

SAFETY MANUAL

Chapter 1 SAFETY & PRECAUTIONS

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Chapter 1

Safety & Precautions

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1.2 NC Class Application & Inquiry

N/C classes for the Machining Center are held regularly once every other month. For registration, call use with the information of your desirable date and the number of participants.



1.2.1 Schedule & Process

· 6 days(The fixed number : 15)

· A.M 9:00 ~ P.M 5:30

:

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- The first Day : Entrance Ceremony, Company Introduction, Basic N/C
- The Second Day : Basic Program, Program Summary
- The Third Day : Program Practice
- The Forth Day : Program Practice, Operating Method Summary
- The Fifth Day : Operating Method Practice
- The Sixth Day : Evaluation & Question and Answer, Completion Ceremony

If you have any special inquiry, call us prior to the training.



1. The Practice of Machine can be different from your machine. Please understand.
2. Some contents can be changed for private reasons.



1.3 Summary of Chapter

This chapter shows how to use the machine and precautions to avoid personal injury or damage to the equipment from accidental events.

The operator must obey following safety rules to avoid personal injury or damage to the equipment when you operate or drive the machine.

- The equipment operating or driving must be restricted to the person who completed the education of using this equipment.
- When you install, use, repair, examine, control, supply of oil or clean, fully educated person must operate according to the rules after shut off an electric source and pneumatic pressure, check up something is wrong or not.
- HYUNDAI-KIA MACHINE are not responsible for damage due to your careless use or optional remodeling.



NOTICE

1. Read and observe this manual and instructions of the nameplate on the machine.
2. Also, do not change the position of the nameplate or damage it.




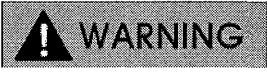


Safety and Caution

HYUNDAI-KIA MACHINE

1.4 Signal Word Introduction

The purpose of safety related items are to prevent unforeseen accidents to operators and machine. "Danger"/"Warning"/"Caution" are three different words meaning different degrees of safety. These words reflect the degree and possibility of danger. Please read the following meanings of each words before using this machine.

Table 1-1 Kind of Signal Word & Contents

Section	Signal Word	Meaning
Danger		When a certain item is not observed, operator's death or similar danger may occur.
Warning		When a certain item is not observed, there is potential of operator's death or severe injury.
Caution		When a certain item is not observed, operator's minor injury or machine's damage may occur.
Notice		It shows reference or advice for operators.




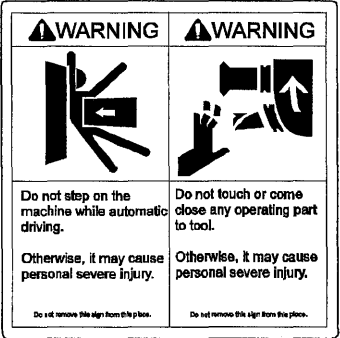
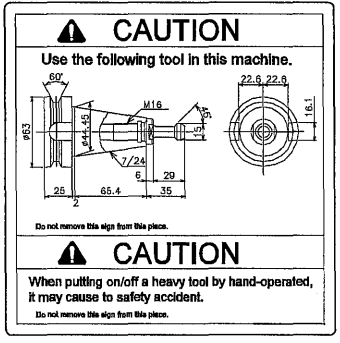
Safety and Caution

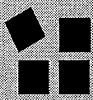
1.5 Safety Labels

A safety label play a role of safety device to let a operator know dangerous factor while he using a equipment. Also, it shows a dangerous part and possible accident or injury.

The operator must use this machine safety after he is familiar with kinds of safety label, danger and accident.







Table 1-2 Kind of Safety Label

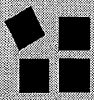
Items	Contents
	<p>DANGER</p> <p>Failure to comply may result in personal fatal wond.</p> <p>High voltage is used in this machine. Only qualified personnel should attempt installation or repair.</p> <p>CAUTION</p> <p>We are not responsible for unauthorized modification.</p>
	<p>WARNING</p> <p>Do not step on the machine while automatic driving. Otherwise, it may cause personal severe injury.</p> <p>WARNING</p> <p>Do not touch or come close any operating part to tool. Otherwise, it may cause personal severe injury.</p>
	<p>CAUTION</p> <p>Use the following tool in this machine.</p> <p>CAUTION</p> <p>When putting on/off a heavy tool by hand-operated, it may cause to safety accident.</p>



Safety and Caution

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Items	Contents												
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">⚠ CAUTION</p> <p>1. Use the following lubrication oil or equal because it has an effect on durability of the machine.</p> <table border="1"> <thead> <tr> <th>ISO CODE</th> <th>SHELL</th> <th>MOBIL</th> </tr> </thead> <tbody> <tr> <td>VG32</td> <td></td> <td>DTE24</td> </tr> </tbody> </table> <p>2. Refer to Install, Repair Manual about detail contents.</p> <p style="font-size: small;">Do not remove this sign from this place.</p> </div>	ISO CODE	SHELL	MOBIL	VG32		DTE24	<p>CAUTION</p> <p>1. Use the following lubrication oil or equal because it has an effect on durability of the machine.</p> <table border="1"> <thead> <tr> <th>ISO CODE</th> <th>SHEEL</th> <th>MOBIL</th> </tr> </thead> <tbody> <tr> <td>VG32</td> <td></td> <td>DTE24</td> </tr> </tbody> </table> <p>2. Refer to Install, Repair Manual about detail contents.</p>	ISO CODE	SHEEL	MOBIL	VG32		DTE24
ISO CODE	SHELL	MOBIL											
VG32		DTE24											
ISO CODE	SHEEL	MOBIL											
VG32		DTE24											
<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>⚠ WARNING</p>  <p>Do not come close while the spindle being rotated. Otherwise, it may cause personal severe injury.</p> <p style="font-size: x-small;">Do not remove this sign from this place.</p> </div> <div style="text-align: center;"> <p>⚠ WARNING</p>  <p>Make sure close the door before and during operating. Otherwise, it may cause personal severe injury.</p> <p style="font-size: x-small;">Do not remove this sign from this place.</p> </div> </div> <p style="text-align: center;">SAFETY INSTRUCTION</p> <ol style="list-style-type: none"> Only personnel who are adequately trained in the safe and proper operation of this machine should attempt to adjust it. Read, understand and follow all instruction manual and warning labels before operating this machine. All safety guards must be in place before operation. Do not operate while wearing rings, watches or loose fitting clothing. Keep your hair away from the moving parts of the machine. Always wear eye protection and approved foot wear. Close sliding door before starting machine. Turn off MAIN CIRCUIT BREAKER before cleaning/repairing. Only qualified personnel should attempt installation or repair. <p style="font-size: x-small;">Do not remove this sign from this place.</p> </div>	<p>WARNING</p> <p>Do not come close while the spindle being rotated. Otherwise, it may cause personal severe injury.</p> <p>WARNING</p> <p>Make sure close the door before and during operating. Otherwise, it may cause personal severe injury.</p>												
<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>⚠ WARNING</p>  <p>Do not open the door while automatic driving. Otherwise, it may cause personal severe injury.</p> <p style="font-size: x-small;">Do not remove this sign from this place.</p> </div> <div style="text-align: center;"> <p>⚠ WARNING</p>  <p>Make sure close the door before and during operating. Otherwise, it may cause personal severe injury.</p> <p style="font-size: x-small;">Do not remove this sign from this place.</p> </div> </div> <p style="text-align: center;">SAFETY INSTRUCTION</p> <ol style="list-style-type: none"> Only personnel who are adequately trained in the safe and proper operation of this machine should attempt to adjust it. Read, understand and follow all instruction manual and warning labels before operating this machine. All safety guards must be in place before operation. Do not operate while wearing rings, watches or loose fitting clothing. Keep your hair away from the moving parts of the machine. Always wear eye protection and approved foot wear. Close sliding door before starting machine. Turn off MAIN CIRCUIT BREAKER before cleaning/repairing. Only qualified personnel should attempt installation or repair. <p style="font-size: x-small;">Do not remove this sign from this place.</p> </div>	<p>WARNING</p> <p>Do not open the door while automatic driving. Otherwise, it may cause personal severe injury.</p> <p>WARNING</p> <p>Make sure close the door before and during operating. Otherwise, it may cause personal severe injury.</p>												
<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center;">⚠ WARNING</p>  <p>Keep away from the operating part while automatic driving.</p> <p>CHIP CONVEYOR may operate.</p> <p style="font-size: x-small;">Do not remove this sign from this place.</p> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center;">⚠ WARNING</p>  <p>Keep away from the operating part while automatic driving.</p> <p>ATC MAGAZINE may operate.</p> <p style="font-size: x-small;">Do not remove this sign from this place.</p> </div> </div>	<p>WARNING</p> <p>Keep away from the operating part while automatic driving.</p> <p>CHIP CONVEYOR may operate.</p> <p>WARNING</p> <p>Keep away from the operating part while automatic driving.</p> <p>ATC MAGAZINE may operate.</p>												



1.6 Danger Area


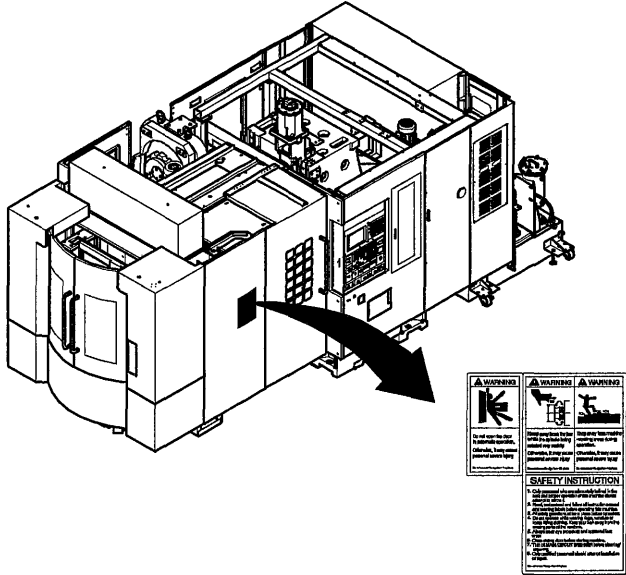
This chapter shows a possible dangerous factor when an operator use this machine by divide into part. Also, the goal of this chapter is to protect the operator as it shows a dangerous area in working zone and explains dangerous cause, dangerous contents, preventable measures.



Safety and Caution

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1. Spindle Head Unit

Safety Label	Contents of Danger
 <p>SAFETY INSTRUCTION</p> <ol style="list-style-type: none"> 1. Only personnel who are adequately trained in the safe and proper operation of this machine should attempt to utilize it. 2. Read, understand and follow all instruction manual and warning labels before operating this machine. 3. All safety guards must be in place before operation. 4. Do not operate while wearing rings, watches or loose fitting clothing. Keep your hair away from the moving parts of the machine. 5. Always wear eye protectors and approved foot wear. 6. Close sliding door before starting machine. 7. Turn off MAIN CIRCUIT BREAKER before cleaning/repairing. 8. Only qualified personnel should attempt installation or repair. 	<p>Keep away from the bar while the spindle being rotated very rapidly. Otherwise, it may cause personal severe injury.</p> <p>Make sure close the door before and during operating and do not step on the machine. It may cause personal severe injury in case of the processing product breaks out of the machine by rapid rotation.</p>
	

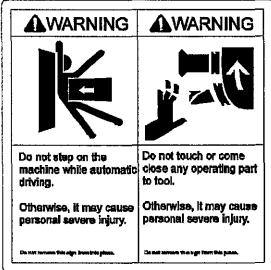

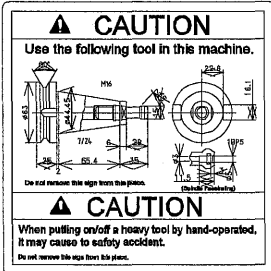

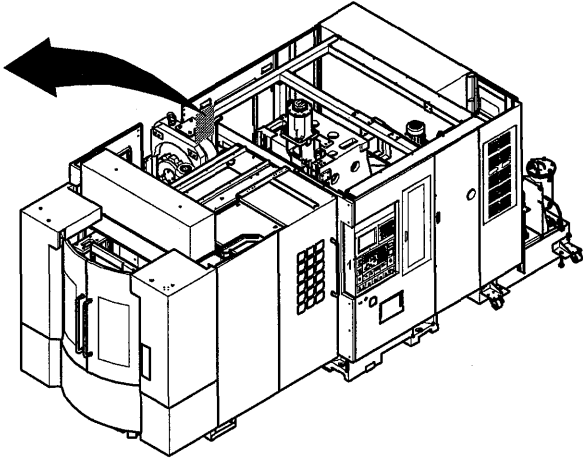
Danger Area	Spindle Head Unit
Danger Cause	When your hand touch the spindle, it may cause being cut because the spindle being rotated while a machine operating.
Prevention Measures	Shut off the power of the machine when you check and A/S it.



Safety and Caution

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2. ATC(Automatic Tool Changer) Part

Safety Label	Contents of Danger
 	<p>Keep away from the operating part because ATC Magazine may operate since when. When you touch the spindle, it may cause personal severe injury.</p> <p>Make sure close the door before and during operating and do not step on the machine. Otherwise, it may cause personal severe injury.</p>
	<p>ATC is composed of Taper Shape and it inserts a tool. Use the side shape tool in this machine. Pay attention to use a standard shank and stud.</p>
	



Safety and Caution

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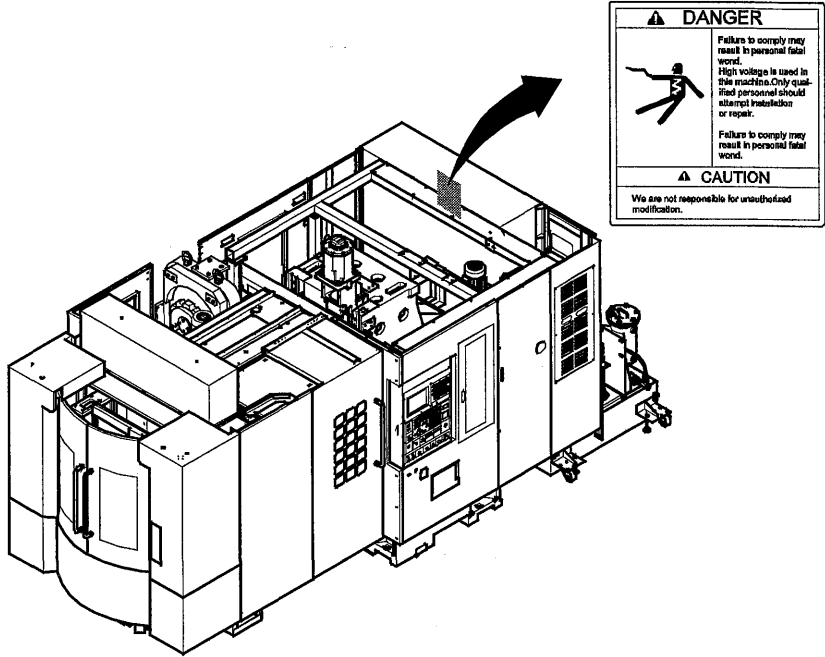
Danger Area	ATC(Automatic Tool Changer) Part
Danger Cause	It is dangerous to step on the machine because ATC Magazine can rotate while operating.
Prevention Measures	Shut off the power of the machine when you examine or clean it.



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3. Main Electric Cabinet

Safety Label	Contents of Danger
<div style="border: 1px solid black; padding: 5px;"> <p>⚠ DANGER</p> <p>Failure to comply may result in personal fatal wound. High voltage is used in this machine. Only qualified personnel should attempt installation or repair.</p> <p>Failure to comply may result in personal fatal wound.</p> <p>⚠ CAUTION</p> <p>We are not responsible for unauthorized modification.</p> </div>	<p>Main Electric Cabinet is in danger of an electric shock by high voltage while operating.</p> <p>Shut off the power of the machine when you examine it because it is dangerous for you by touching.</p>
<div style="text-align: center;">  </div>	

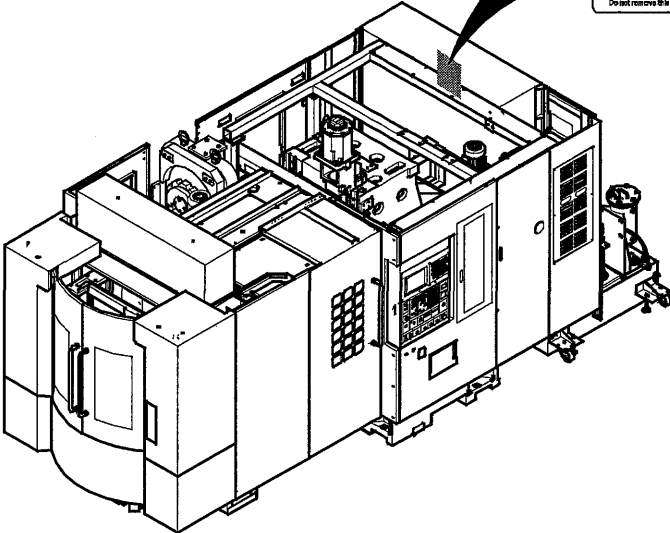
Danger Area	Main Electric Cabinet
Danger Cause	When you touch the Main Electric Cabinet while operating, it may cause safety accident by high voltage.
Prevention Measures	Shut off the power of the machine when you examine it.



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4. Main Operating Panel

Safety Label	Contents of Danger
<div style="border: 1px solid black; padding: 5px;"> <p>⚠ CAUTION Use the accessory connector to a measuring device or input and output devices(AC 100V, MAX2 AMP). To prevent the mis-operation of machine, do not connect the other devices such as railing tool. <small>Do not remove this sign from this place.</small></p> </div>	<p>Use the accessory connector to a measuring device or input and output devices(AC 100V, MAX2 AMP) To prevent the mis-operation of machine, do not connect the other devices such as railing tool.</p>
<div style="display: flex; align-items: center; justify-content: center;">  <div style="border: 1px solid black; padding: 5px; margin-left: 20px;"> <p>⚠ CAUTION Use the accessory connector to a measuring device or input and output devices(AC 100V, MAX2 AMP). To prevent the mis-operation of machine, do not connect the other devices such as railing tool. <small>Do not remove this sign from this place.</small></p> </div> </div>	

Danger Area	Main Operating Panel
Danger Cause	Main Operating Panel is in danger of an electric shock by high voltage, it is dangerous for you by touching.
Prevention Measures	Shut off the power of the machine when you examine and A/S it.



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5. APC(Automatic Pallet Changer) Part

Safety Label	Contents of Danger
<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 30%;"> <p>▲ WARNING</p> <p>Do not place hands or feet into machine-operational area of the pallet changer.</p> <p>Otherwise, it may cause personal severe injur</p> <p><small>Do not remove this sign from this place.</small></p> </div> <div style="border: 1px solid black; padding: 5px; width: 30%;"> <p>▲ WARNING</p> <p>Keep away any personnel, except the operators, from the working areas for sure.</p> <p>Otherwise, it may cause personal severe injur</p> <p><small>Do not remove this sign from this place.</small></p> </div> <div style="border: 1px solid black; padding: 5px; width: 30%;"> <p>▲ WARNING</p> <p>Keep away from machine working areas during operation.</p> <p>Otherwise, it may cause personal severe injury</p> <p><small>Do not remove this sign from this place.</small></p> </div> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>SAFETY INSTRUCTION</p> <ol style="list-style-type: none"> 1. Only personnel who are adequately trained in the safe and proper operation of this machine should attempt to utilize it. 2. Read, understand and follow all instruction manual and warning labels before operating this machine. 3. All safety guards must be in place before operation. 4. Do not operate while wearing rings, watches or loose fitting clothing. Keep your hair away from the moving parts of the machine. 5. Always wear eye protectors and approved foot wear. 6. Close sliding door before starting machine. 7. Turn off MAIN CIRCUIT BREAKER before cleaning/repairing. 8. Only qualified personnel should attempt installation or repair. <p><small>Do not remove this sign from this place.</small></p> </div>	<p>Close the door before and during operating and do not step on the machine.</p> <p>Otherwise, it may cause personal severe injury.</p>
<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> </div> </div>	


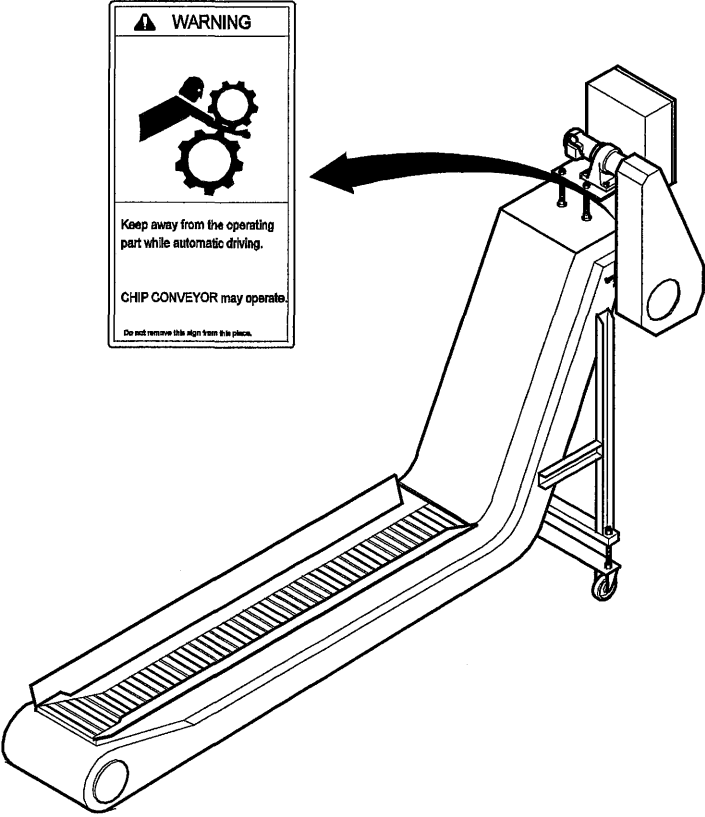
Danger Area	APC(Automatic Pallet Changer) Part
Danger Cause	When your hand touch the spindle, it may cause being cut because the spindle being rotated while a machine operating.
Prevention Measures	Shut off the power of the machine when you examine and A/S it.



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6. Chip Conveyor Part

Safety Label	Contents of Danger
	<p>Keep away from from the operating part while operating because chip conveyor part may operate since when.</p> <p>When you touch the spindle, it may cause personal severe injury.</p>
	

Danger Area	Chip Conveyor Part
Danger Cause	It is very dangerous for you when your hands put in the part because the spindle can be rotated while operating.
Prevention Measures	Shut off the power of the machine when you examine and A/S it.



1.7 Precaution

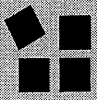
1.7.1 Precaution

DANGER

- 1) There's a good chance of an electric shock or an electrical accident from a high voltage inside the main electric cabinet / the control panel /the transformer/ the motor/ the terminal box/ the operation panel and in the area with the label to say 'electric shock safety'. Accordingly, it's required to handle the machine in safe condition only after making sure there's no possibility of safety accidents likely to occur while operating it.
- 2) It's necessary to check if it has a safety guard after closing all the doors of the machine prior to operation. In case a door is open, shut off the main power promptly.
- 3) Do not touch all the switches of the machine with a wet hand.

WARNING

- 1) Be informed of the location of the emergency stop switch so that you can handle it reflexively.
- 2) Check out the function of switches before operation to prevent the malfunction of the machine.
- 3) Never keep your hands close to the spinning structure or tools when in motion.
- 4) Mop up oil or water on the floor to prevent the operator from slipping.
- 5) Do not go inside the machine when not for repairing.
- 6) Turn off the main power following the switches on the operation panel if the operator needs to leave even for a second.
- 7) Turn off the main power switch on the main electric cabinet, or power service switch at the factory following the power switch on the operation panel when you leave after finishing the day's work.
- 8) As accidents including the loss of lives may happen in case another person operates the machine which you are working or repairing, you make it sure to be careful one another when you cannot but work with more than



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two people.

- 9) Do not place tools, works, or things like that on the moving part or the machine.
- 10) Consult the person in charge of it in event of converting the machine.
- 11) Replace a fuse with power off.
- 12) You need a spacious work place to avoid the danger resulting from falling things.
- 13) Be sure to close the door while operating , for spinning works, transferred tool board, dispersing coolant, and a chip of high temperature make the inside of the machine seriously dangerous.

CAUTION

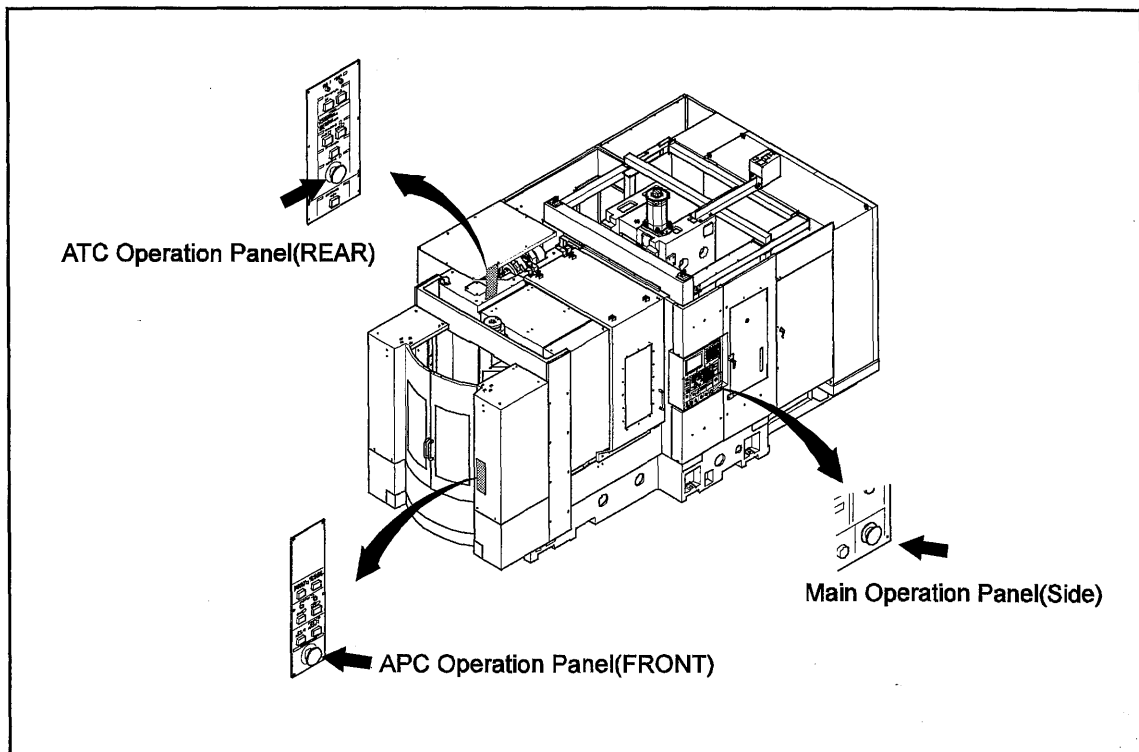
- 1) Carry out regular checkups quarterly to prevent malfunction and breakdown of the machine.
- 2) Be sure to close the door of the machine on automatic operation.
- 3) Keep power off in case of power failure.
- 4) Do not change the location of a name plate attached to the machine at discretion. Inquire of HYUNDAI-KIA MACHINE to purchase one referring to the identification number of an item on the right lower part of the name plate if the name plate is damaged.
- 5) The operator is supposed to put on protective glasses while at work.
- 6) The operator is supposed to put on a safety helmet and safety boots at all times.
- 7) Dress orderly and do not operate the machine with gloves on.
- 8) Prepare a strong worktable located around the machine and do not keep its surface slippery.
- 9) Keep the place around the machine not only bright and dry enough, but also organized and clean not to disturb its operation.
- 10) Remove dust and chips around the main electric cabinet and the surrounding devices, and avoid using compressed air when cleaning.
- 11) Be sure to handle switches after checking.
- 12) Move forward the next step through giving a signal one another at each step in case of working together.
- 13) Shut off the main power in case of power failure.
- 14) Do not shock the operation panel, main electric cabinet and so on.



- 15) Do not alter a set point of electricity. If necessary, alter it after taking a proper action to make it restore to the original condition.
- 16) Never operate the machine while taking medicine or drinking.
- 17) Do not operate the machine and take a rest in case you are sick or sleepy.

1.7.2 Cautions in Event of Emergency Stop

If you notice danger or an unstable state, be prompt to push the emergency stop button on the front switch operation panel to stop all functions of the equipment temporarily. The emergency stop switch keeps the motor from moving temporarily. Therefore, turn the switch to the direction of the arrow to bring it back to the formal state. Be acquainted with the location of the emergency stop switch to push it reflexively.



<Figure 1-1 Emergency Stop Switch Panel>



1.7.3 Caution before Switching on Power

You should be well informed of the following items to prevent a breakdown or an injury.

DANGER

- 1) Check out the condition as electric wire stripped off may cause an electric shock.

WARNING

- 1) Do not touch the operation button on the operation panel until 'Alarm Message' is on the monitor after switching on power. The **POWER ON** switch is connected to other buttons on the operation panel on purpose of repair and checkup. So it may cause a breakdown or an injury from the malfunction of the machine if you touch the operation switch unconsciously.
- 2) Do not operate it until learning the function of each part and its directions.
- 3) Be sure to close the doors to prevent water, dust, and chips from come into the main electric cabinet, the operation panel, and so on.
- 4) When grounding, the connection to other machines may result in a fire owing to over load.
- 5) Use an earth stick more than 0m long and 22mm² wide.
- 6) Switch on power after measuring voltage of the factory to operate NFB on the main electric cabinet following power connecting.

CAUTION

- 1) Select an electric wire with a standard size as specified for a power input wire.
- 2) Do not damage an electric wire with chips or other stuff when placed on the floor.
- 3) Run the pump until oil permeates the wiper on a slide way to prevent scorch and abnormal abrasion if you have not operated it for a good



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while or you operate it for the first time after installing. Additionally, inquire repairing staff at HYUNDAI-KIA MACHINE for details because it differs according to the form of each machine.

- 4) Confirm if the flux of each tank matches the appointed level.
- 5) When it comes to the amount of oil, the kind of oil, and refueling, refer to the direction name panel.
- 6) Check if something is wrong with the movement of switches and levers.
- 7) Follow the order to turn on power.

Power distribution switch in the factory on → The main power of the machine on → Power ON → Emergency Stop Switch Off → Reset

- 8) Check the phase order of a terminal R,S,T, using the phase gauge. In case of a reverse image adjust the phase order by changing 2 phases out of 3 phases of power.
- 9) Use a ground wire thick the same as a power line.
- 10) Lay the earth conductors under the ground more than 1m deep in case it's not laid.
- 11) Select the third one when it comes to the kind of earth.
- 12) Be careful not to earth in the area where a water pipe or other stuff is laid.
- 13) Check bolts if they are fastened tightly. It may cause mechanical trouble to operate the machine with bolts loose.
- 14) Make sure if all connectors are connected without fail. It may cause mechanical trouble to operate the machine with connectors loose.
- 15) Make sure if all kinds of oil/ air pressure hoses or pipes are connected without fail. It may cause leak of oil or air and even a mishap to the machine to switch on power when not connected tight.
- 16) Make sure if the power cable, oil /air pressure hoses, or pipes of external equipment are connected without fail in case external options (such as a palette or a Robot) are equipped.
- 17) Do not keep the main power of the machine on with the main power of the factory off. The main switch may be damaged when it is powered all of a sudden if you keep the main switch on with power off.



1.7.4 Caution after Power Supply

DANGER

- 1) Be prompt to turn off the main switch in case the machine stops working owing to a power failure. If not, it may cause a breakdown or a serious injury resulting from malfunction when power is restored.

WARNING

- 1) The machine can not perform properly without proper power supply. If power is abruptly cut off during operation due to power failure or the falling of thunderbolt, the machine may perform unexpectedly that cause severe damage on the machine. If the voltage of power is not as normal, turn off the power switch.
- 2) Make sure if oil or pressed air is leaking and the scale of each gauge is correct. (It may damage to the machine or cause a serious breakdown if the gauge doesn't work correctly, or the oil / pressed air leaks while operated.)

CAUTION

- 1) Make sure if the fan is working right after switching on power. In case you operate the machine while it isn't working right, it may cause damage to the machine or a defect resulting from generating heat inside the machine. Confirm if a slide way lubricating pump is working normally following switching on in case the lubricating system is equipped with an automatic button. It may cause damage to the machine and a defect because a lubricant isn't supplied normally.
- 2) Provide the surface of the slide with oil by working the lubricating pump manually not moving each shaft soon to protect the slide. If you operate each shaft not providing oil, it may cause a breakdown owing to rapid abrasion and sticking of Ball Screw or the slide.
- 3) Refer to the following directions to switch off.
 - ① Check if there happens a warning or an abnormal case.
 - ② Press the EMERGENCY STOP button.



- ③ Turn off the power switch on the operation panel.
- ④ Turn off the main switch.

In case you cut off power without preparatory steps, the machine may work unexpectedly.

- 4) Check if the program, the parameter, and the offset data are damaged when switching on power again after the machine stops owing to a power failure. If you operate the machine with the above data damaged, it may cause a breakdown.

1.7.5 Caution before Handling the Machine

DANGER

- 1) Do not keep the inflammables close to the all kinds of switches, the main electric cabinet, the main operation panel, or the inside of a power distribution box.

WARNING

- 1) Keep a feed shaft from rotating at its highest rotation rate.
- 2) Be careful to use fuses with proper capacity.

CAUTION

- 1) Do not operate forward, or reverse motion within 5 seconds.
- 2) Be careful to avoid strong sunray and placing a heater near the machine because it may cause poor precision resulting from partial transfiguration by superheat.
- 3) Be sure to organize around the machine, fuel it if necessary, and move the table to the center at all times after finishing work of the day.
- 4) Do not drop chips on the surface of bed sliding, and move the saddle after removing them with an oiled grindstone in case the machine is damaged.
- 5) Do not shock it when fastening a work to the spindle.
- 6) Be careful not to get rusty by anti-rust oil after work when it is damp.



1.7.6 Precautions while Operating

WARNING

- 1) Close the door of the main electric cabinet while working to prevent damage caused by water, chips, or oil.
- 2) In case of removing chips sticking to tools, or chips inside the machine, be sure to stop the machine and remove them using a brush with gloves on because it's very dangerous to use hands.
- 3) Warm-Up of the Machine
Be sure to warm up the machine for normal operation by stabilizing lubrication of the machine, the temperature of oil, and precision if you haven't operate the machine for a good while, or after several troubles occurred. It helps precision and life span of the machine.
- 4) Do not pull out or convert an electric circuit, or the equipment built in for safety such as Dog Limit Switch for Stroke limit and Limit Switch for interruption of Feed axis.
- 5) Check out the tension of a belt. Be careful not to put your hand or finger between the belt and pulley.
- 6) Clamp precisely your works or tools at all times. Besides, in case of cutting the depth of cutting and the amount of transporting should begin from the lowest step.

CAUTION

- 1) Do not touch switches when your hands are wet.
- 2) Be careful not to pile up chips lest hot chips should fire when cutting (Heavy Duty Cutting).
- 3) Make sure bolts of each part are tightly fastened.
- 4) Check out if you notice strange noise from a motor or other parts while at work.
- 5) Warm up the spindle and the Feed Axis before operation.
- 6) Stop the transporting axis and the spindle when installing tools.
- 7) Take proper usage for it in case the machine is equipped extra parts.



1.7.7 Precautions while in Motion

WARNING

- 1) Be careful never to get people (including body parts and clothes) or things to approach the moving part of the machine.
- 2) When something's wrong with the system, you should examine what the trouble is and the situation prior to taking an action with power off, if necessary.
- 3) In case the movements of the equipment look unusual, first, turn on the emergency stop switch. And then shut off power if necessary.
- 4) Do not let anyone except for the operator in the sphere of movements, and never keep your hands close to rotating parts or axes.

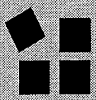
CAUTION

- 1) Only the operator are allowed to get in the sphere of movements
- 2) Be sure to stop the machine when removing chips sticking to tools, or chips lying on the table. It's dangerous to remove them by using hands.

1.7.8 Precautions when Repairing or Checking Up

DANGER

- 1) Make sure the main power is off before repairing the machine.
- 2) Check it again prior to starting repair because the main electric cabinet and other electric devices may be still charged with electricity for a while even with power off.
- 3) Be sure to close all doors, covers and so on when not adjusting them at all times. Pay special attention to the doors of the NC device and the main electric cabinet.
- 4) Open the door of the main electric cabinet only when repaired.



Safety and Caution

HYUNDAI-KIA MACHINE

WARNING

- 1) Only an authorized electrician by HYUNDAI-KIA MACHINE is allowed to mend electric devices.
- 2) An electrician or a person in charge of repairing must follow directions on the 'Caution' sign attached to the machine. In addition, be careful not to soil, damage, or separate the sign.
- 3) A person trained for the devices is allowed to handle them when repairing, check up, adjusting, refueling, or cleaning. Be sure to turn off power while working on it, following directions.
- 4) Be sure to stop operating the machine, turn off the main power, and lock it when cleaning it.
- 5) Do not operate the machine when putting the cover apart for repair.
- 6) Do not set apart an electric circuit, a limit switch for verifying the transported distance of a transporting axis, or other devices installed for safety.
- 7) Press the emergency stop switch on the operation panel, turn off the main power switch on the main electric cabinet, and then the power switch at a factory, and start working after checking carefully. Also, if possible, don't make a cut-off state changed, or indicate 'warning' using a name plate or label, and don't let the operation buttons on the machine pressed by anyone except the authorized.
- 8) Do not use compressed air when repairing or cleaning.
- 9) Use an appropriate support or a ladder when repairing at heights.
- 10) Do not spill water or oil on the floor while repairing or cleaning.

CAUTION

- 1) Place this manual near the machine and start working after reading it carefully.
- 2) Be sure to write a repair report after finishing repairing and place it near the machine.
- 3) Do not convert the limit switch for limiting strokes of working parts or interrupting, all kinds of safety installation devices, or an electric circuit at your discretion.
- 4) Make sure the value of each gauge is normal.



Safety and Caution

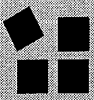
HYUNDAI-KIA MACHINE

- 5) Use only the items of lubricant or grease designated in the manual.
- 6) Check lubricant is supplied for each slide way.
- 7) Fuel each part and change oil regularly following directions in the manual.
- 8) Apply anti-rust oil to each part of the machine after completing repair.
- 9) Use tools such as standard a spanner and a wrench when adjusting or repairing.
- 10) Start working after removing the main power plug on the rear of the device when repairing to prevent the danger likes an electric shock in advance.
- 11) Remove a plug from the power outlet and take a safety measure in case of putting in the plug again by another worker's mistake before repairing.



NOTICE

It is required to read the above carefully and follow all safety regulations to prevent danger and damage to devices when handling or repairing them.



1.7.9 Precautions when Handling Electric Devices

DANGER

- 1) Do not shock the main electric cabinet.
- 2) Be sure to use the standard cable designated in the manual and don't use too long a cable in case of the first wiring. When you cannot but wire on the floor, take a measure for protection not to be damaged by chips or other stuff.

WARNING

- 1) The main electric cabinet is airtight and must not expose to air. Accordingly, do not keep the door of the cabinet open for a long time with power on, for it may cause damage to parts in case the cabinet exposes to direct sunrays or flash light.
- 2) Be sure to use standard products designated by the company when it comes to the devices in the main electric cabinet. Especially, it is necessary to use only standard fuses.
- 3) Do not alter set points of an overload relay in the main electric cabinet or other set points. Also, do not open the door of the main electric cabinet if possible because substances or moist that may cause malfunction can come into it.



1.7.10 Precautions when Supplying Lubricant

As lubricant largely influences on durability or condition of the machine, it's required to give regular check-ups to refueling devices.

WARNING

- 1) Check the bottom of the oil pot for refueling to make sure if it is stained with dirt, moisture, chips, and so on. Also, it is required to avoid sharing the oil pot with different kind of oil, and decide the place to locate it with a special care.
- 2) The operator must check up the machine regularly, clean the inside of the tank promptly, and change the oil if finding it old or polluted. Also, do not use up all of new oil and spare a little for removing moisture or sediment later.

CAUTION

- 1) Supply designated standard oil as much as designated.
- 2) Be careful lest dirt, moisture, chips, or some other things should come into the tank by cleaning its mouth.
- 3) Examine outlet by observing in case the amount of oil decreases rapidly.
- 4) Replace parts like the filter attached to the pump or the filter inside the piping circuit into new ones once a year.



1.7.11 Precautions when Handling Coolant

Water-soluble coolant can go bad by mixture of lubricant, multiplication of microbe or other factors, deteriorate its cutting or anti-rust efficiency, and cause all kinds malfunction. Be careful of the following in case of using water-soluble coolant.

DANGER

- 1) The worker must attend to sanitation because water-soluble coolant is alkaline and may cause skin trouble by removing oil too much.

WARNING

- 1) Water-soluble coolant can go bad by mixture of lubricant, multiplication of microbe or other factors, deteriorate its cutting or anti-rust efficiency, and cause all kinds malfunction.
- 2) Before or after working, be sure to apply lubricant thinly after removing not only chips but also water-soluble coolant on each part of a slide way, a rotating part, a saddle and a column.

CAUTION

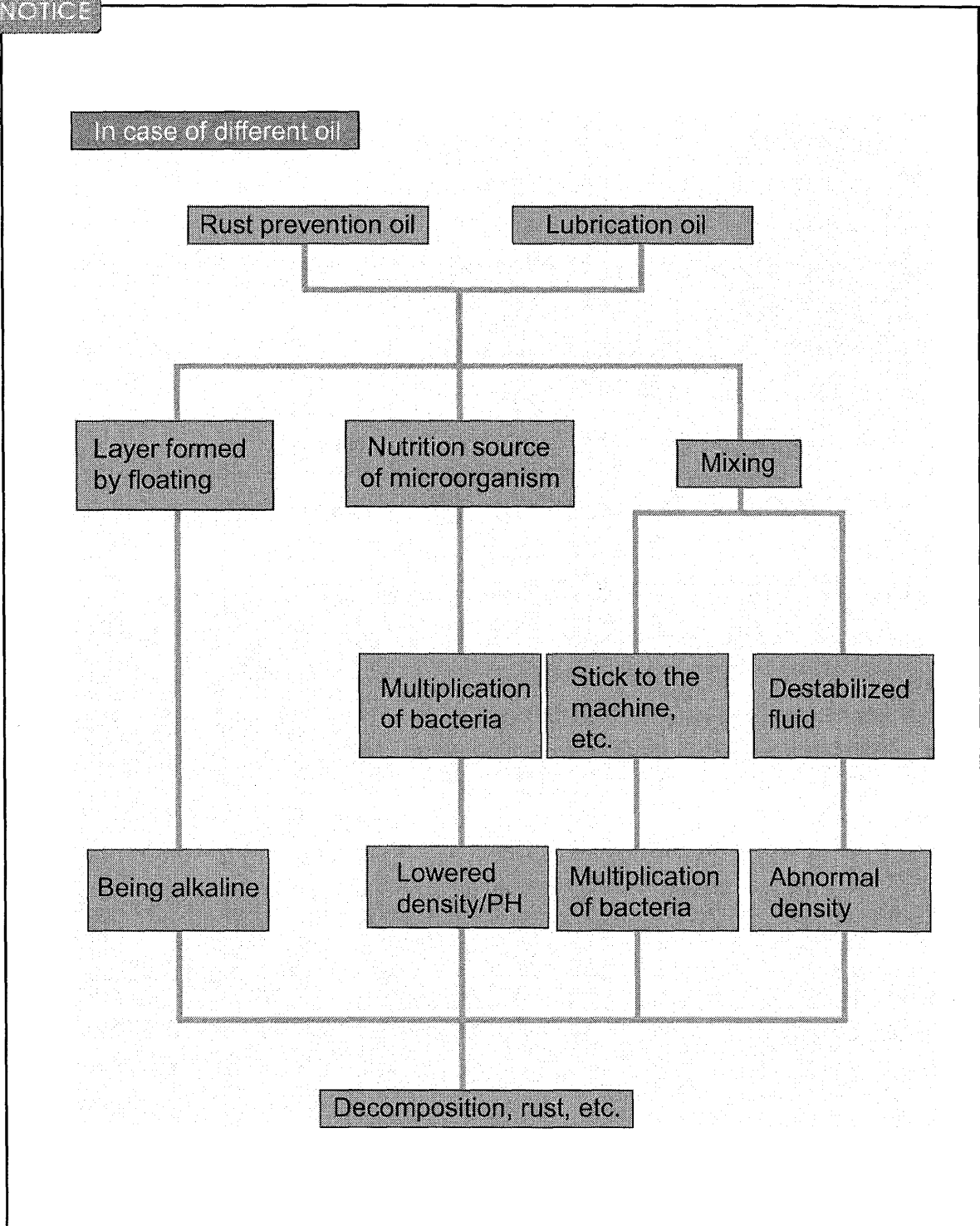
- 1) Be prompt to change water-soluble coolant if decomposed.
- 2) Water-soluble coolant is rustproof. Therefore although the product is okay while wet, it may be rusty when dry. It is required to apply anti-rust oil on the product after working.
- 3) As the way to dilute the coolant and the water for diluting are differ depending on the brand of coolant, use it following the directions of the maker of the cutting oil.
- 4) Use tap water if possible following examining prior to using it, for industrial water may contain a lot of microbes.
- 5) The influence of mixing different kinds of oil is shown in the next page pictures. It is needed to consider managing the cutting oil depending on the decomposed condition.

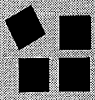


Safety and Caution

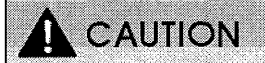


NOTICE





1.7.12 Other Precautions



- 1) Give a careful judgment and handle the system in case it causes troubles.
- 2) Be careful that body parts or clothes don't enter the operation sphere of a dangerous machine.
- 3) Be prompt to stop devices and cut off electric power service in case of an earthquake, damage from a storm or flood, or a fire.
- 4) Take a preventive action on noise of surrounding equipments not for devices to malfunction.
- 5) Be sure to turn off power following directions, clean the machine, and apply anti-rust oil on each part like slide ways and so on after working. Especially, apply carefully in case of using water-soluble coolant.

1.7.13 Precautions when Setting a Machine

The setting of a machine indicates steps before producing actual goods from turning on power. Accordingly, it includes all steps not only to input programs, but also to arrange processed goods, measure offsets of tools, examine programs, and test processing.

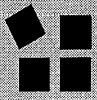
- 1) This machine is designed for one skilled worker to operate. If more than one worker is needed, they must cooperate with each other carefully and communicate each other perfectly. In case one worker press any button on the operation panel, or move the machine while another is fixing processed goods, fixing apparatus of goods, or cutting tools, other workers as well as the operator may be seriously injured.
- 2) Make sure the highest speed of a spindle is set below the limited highest speed of each tool and holder. If it is set at over the highest speed, works or tools may fly out of the machine and cause serious injury or a breakdown of the machine.
- 3) Fix processed works and cutting tools safely, and set the cutting depth and the transporting speed of cutting focused on safety while test processing. If the cutting depth and the transporting speed are set unreasonably, works or tools may fly out of the machine causing a serious injury or a breakdown.



Safety and Caution

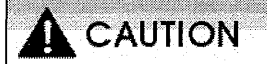
HYUNDAI-KIA MACHINE

- 4) Be sure to choose the most proper tools and holders for the quality and the shape of processed works and check if something's wrong with the processing job. In case processed by inappropriate tools or holders, works or tools may fly out of the machine causing a serious injury or a breakdown. Besides, it may influence on the precision of the machine.
- 5) Make sure that cutting tools, holders, fixing apparatus of the processed works, and the works are all fixed safely. While processed, the works or tools may fly out of the machine causing a serious injury or a breakdown.
- 6) Make sure that tools are installed right and the speed of a spindle is set properly prior to operating the spindle. If not, tools may fly out of the machine causing a serious injury or a breakdown.
- 7) Check the proper equipments like a crane or a hoister when operating heavy stuff, removing apparatus, or transporting things. If you don't use such equipments, it may cause a serious injury or a physical defect.
- 8) Do not touch light lamps inside the machine. In case of a machine with halogen lamps or glow lamps, there may be the danger of burns, for it is highly heated. Therefore, wait for a while prior to touching lamps even after turning off power.
- 9) Turn on lights for safety while setting a machine. If lights are off, it's hard to examine the condition the inside of the machine and conduct a test operation. In addition, it may cause danger of injuries as well as damage or defects of the machine.
- 10) If a machine is not in motion for one or more than one day, it may damage to an oil film in case a manual cutting oil button is on the cutting system of slide ways. If the machine is operated in the condition, it may cause the abrasion or the scorching of slide ways or ball screws.
- 11) Do not press a manual cutting oil button for over a minute to protect the motor of a cutting oil pump in case the button is on the cutting oil system of slide ways. If you do it, it may damage to the motor of a cutting oil pump.



1.7.14 Precaution for fire prevention

1. Before using a machine tool



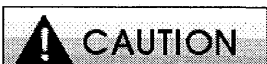
- (1) Do not place the flammable material and equipment around machine tool where firing can occur. (welder, stove, heater, flammable material, etc)
- (2) Verify that cutting oil is full and is not contaminated. (Do not use cutting oil except for specified cutting oil.)
- (3) Against fire, stock fire extinguisher in the work area.

2. During using a machine tool



- (1) Do not smoke around when machine tool operates,
- (2) When flammable material such as wood, plastic, magnesium etc processes, take a caution that fire is not occurred. (Operator should observe it during processing)
- (3) If cutting fluid containing water is used when processing the magnesium, as firing can occur due to H_2 gas discharged with reaction of chip and water, use the anhydrous oil. However, Water-soluble cutting oil including restraint that can reduce H_2 gas, can be used.
- (4) If processing, do not inject other material except for specified cutting oil to processing object. (light oil or other flammable material).
- (5) If processing, verify that cutting oil is injected to processing object.
- (6) If processing, do not perform the welding work or work that firing can occur around machine tool.

3. After using a machine tool



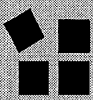
- (1) Verify that machine tool switches off completely.
- (2) Verify that machine tool around is not firing dangerous.

Chapter 2

Safety Management

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2.1 MECHANICAL SAFETY

2.1.1 Safety Generals

1) Working Clothes

(1) Working clothes

- a. The working clothes, which are light and well fitted, shall be selected and its shirttail or trailing end of trousers shall be tied up to prevent from getting jammed if necessary.
- b. Any opened seams shall be darned immediately.

(2) Working cap

- a. When working nearby the machine, cap must be put on.
- b. For women or long-haired person, hair shall be covered with cap or towel completely.

(3) Shoes

- a. Wearing safety shoes is desirable.

(4) Safety Outfits

- a. Proper outfits for work shall be chosen and their usage shall be familiar with
- b. Any necessary outfit must be worn. (ex: Safety goggle, safety helmet)



2.1.2 Safety Requirement for Hand Tools

1) General Requirements

- (1) Any stains on the hands such as oil and water shall be wiped off.
- (2) Working place shall be kept tidy.
- (3) The hand tools shall not be used for other than their original purpose.
- (4) Acceptable quality of tools shall be used.
- (5) The tools shall be used to match their usage.

2) Hand Tools Safety Requirements

(1) Spanner and wrench works

- a. Spanner or wrench shall not be used for substitute use of hammer.
- b. Proper size of spanner and wrench well fitted with the nuts shall be used.
- c. Tooling works shall be conducted slowly.
- d. Tooling works shall be made in a safe manner keeping from hurt or falling down when removed.
- e. Monkey wrench too large for small bolts shall not be used.
- f. Spanner shall not be strained by using pipe or hammered.
- g. Straining shall be made to the forward direction.
- h. Use of steel plate between spanner and nut for improving contact shall not be made.

(2) Screwdriver works

- a. Proper size of screwdriver, which is fitted with the size and shape of groove, shall be used.
- b. Chipped screwdriver shall not be used. (The edge of screwdriver shall be flat and free of chips.)
- c. Screwdriver works shall be made in a safe manner so that the screwdriver not to be removed.
- d. Insulated screwdriver shall be used during electrical works and electroscopic screwdriver shall be used during electroscopic works.



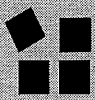
2.1.3 Safety Requirement for Major Machine Works

1) Safety Requirements for Machine Tools

- (1) Tools or materials shall not be placed on the machine
- (2) Machine shall not be stopped while feeding is turned on.
- (3) Machine shall not be stopped by hand or tools while the machine is on running.
- (4) Material and cutting tools shall be installed perfectly.
- (5) Cutting tools shall be installed reduced and replaced soon if the cutting capability is not satisfactory.
- (6) Safety goggle shall be used in order to prevent chips from scattering.
- (7) When removing chips, brush or chip cleaner shall be used and shall not be treated with bare hand.
- (8) Care shall be taken so that the hands are not to be touched to the cutting edge.
- (9) Measurement of material shall not be made during cutting or rotating.

2) Drilling Works

- (1) Hand, head or rag shall be away from the rotating shaft or drill.
- (2) Good quality of drill shall be used. Any drill with crack shall not be used.
- (3) If the cuttability is not satisfactory when drilling, drill shall be grinded before use.
- (4) Fixing or unfixing of drill shall be done after the main shaft is completely stopped.
- (5) Small items shall be fixed with vice or cleat and shall not be hold with hand.
- (6) Drilling of thin items shall be made on the hard plate such as wooden plate for drilling.
- (7) When the drill end is pierced out, feed speed shall be reduced to prevent the rotation of material.
- (8) When the drill is staged in the material, machine shall be stopped and drill pulled by hand.
- (9) When unplug drill socket puller shall be used instead of tampering with hammer.
- (10) When pulling drill or chuck, the gap between main shaft and table shall be reduced and put the wood stuffs on the table to place them.



2.2 ELECTRICAL SAFETY

2.2.1 Safety for Electrical Equipment

1) Use of explosion-proof structure

Spark shall not be occurred when operating the equipment in where there is potential explosion due to gases, flammable materials, dusts, etc. Therefore, switches and others shall be made with explosion-proof structure. Explosion-proof structure can be classified into pressure explosion-proof type, Liquid explosion-proof type and special explosion-proof type.

2) Checkup of electrical facilities

(1) The safety of insulated wires, insulated covers and fences of wiring, cables, switches and electrical machines and equipment shall be checked and repaired as necessary.

(2) Grounding of equipment or breaking of wire shall be checked out.

(3) Fuse box and various safety systems shall be checked whether they are in normal operation or not.

3) Protection from electrostatic hazard

(1) Spark may lead to explosion when there is electric discharge due to electrostatics in where there are dusts, explosive materials and flammable gases

(2) Electrostatics is easily occurred when transporting gasoline, flour, etc. or milling of solid, and printing work.

(3) In order to reduce electrostatics, friction shall be reduced, flow maintained and grounding made as possible.

(4) Damping agent or ionization of air shall be used to neutralize electrostatics as necessary.



2.2.2 Electrical Hazard and its Precautions

1) Resistance and electric shock of human body

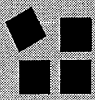
There is higher possibility of electric shock when human body is electrified. The danger of high voltage is even greater. Some may think that he will be safe at about 100 V of voltage but there is a case that someone died at the low voltage of 35 V

Human body is quite resistant against the current to reduce current flow in the body. However, even the lowest voltage may give great impact on human body.

The currents and degrees of electric shock are as follows:

Table 2-1 Current and degree of feeling

Current	Degree of feeling	Current	Degree of feeling
below 1[mA]	Weak feeling of current	above 50[mA]	Danger, potential electrocution
below 5[mA]	Significant pain	above 100[mA]	Fatal death
10~20[mA]	Muscular contraction, loss of command		



2.2.3 Over-voltage Relay

The over-voltage relay is designed to block current to protect circuit in case of voltage above rated voltage. It can be classified into electronic type, thermal type and induction type. Among these, thermal type is most frequently used. Thermal type over-voltage relay is made using bimetal. In case of current over designed current in the circuit, bimetal is heated up and contact opened to cutoff electric current.

Type	Description
Direct heating type	Sensitive to the movement as it is designed to send electric current directly to the bimetal but have loss of current due to resistance.
Semi-indirect type	Bimetal is covered by asbestos for insulation and coiled with heat element (nichrome wire). One end of heat element (nichrome wire) is connected to the bimetal to send electric current.
Heat release type	Electric current is not sent to the bimetal and sent only to the heat element (nichrome wire), resulting slow reactive.



2.2.4 Failure Diagnosis and Control of Various Switches

- 1) Control and switching disabled
 - (1) Deposition due to short circuit
 - (2) Insufficient capacity of switch
 - (3) Longer operation hours of motor
 - (4) Negative phase damping
 - (5) Large remanence
 - (6) Deposition due to vibration of contact resulting from low-voltage
 - (7) Section of iron core is too big or inside of bobbing is too small
 - (8) Sticky oil on the surface of core
- 2) Abnormal reduction of electric current at the contact
 - (1) Developing of arc due to the above (1)~(5) reasons
 - (2) Frequent operation
 - (3) Developing of arc due to bad or dirty contact
- 3) Loose contact and its countermeasures
 - (1) Parallel connection of contacts
 - (2) Removal of foreign substances at the contact
- 4) Failure of thermal type over-voltage relay
 - (1) Burnt out of heater
 - (2) Failure of operating characteristic
- 5) Phase short circuit
 - (1) Phase short circuit due to dust and moisture
 - (2) Phase short circuit due to arc heating
- 6) Cause of coil burn out
 - (1) Short circuit
 - (2) Over-voltage (more than 110 % of rated voltage)
 - (3) Low-voltage (less than 85 % of rated voltage)
 - (4) Deterioration due to passive cutting fluid
 - (5) Failure of Movable contact
 - (6) Excessively frequent switching
- 7) Cause of electromagnetic vibration
 - (1) Low-voltage
 - (2) Foreign substance at contact
 - (3) Rusty electrode
 - (4) Short of shading coil



2.3 INDUSTRIAL ACCIDENT

2.3.1 Causes of Industrial Accident

1) Human factors

- (1) Psychological factor: overwork, mistake, lack of proficiency, violence, excitation, inadvertency, willfulness, etc.
- (2) Physiological factor: adverse effect on physical strength, physical defect, illness, drinking, lack of sleep, fatigue, etc.
- (3) Others: clothes, factory works, etc.

2) Physical factors

- (1) Building (Environment): insufficient ventilation, insufficient lighting, narrow workplace and narrow corridor.
- (2) Facilities: Bad safety system, broken machine, bad tools and inadequate facilities.



2.4 INDUSTRIAL SAFETY AND COUNTERMEASURES

2.4.1 Safety Signs and Colors

1) Working Environment

- (1) Lighting and illumination: Daylight of sunray (4500 lux) shall be used as possible.
- (2) Ventilation: The most desirable temperature, humidity and airflow in Korea are as follows:

Summer	25 °C ~27 °C
Winter	15 °C ~23 °C
Relative humidity	50~60 %
Airflow	1 m/s(current of air)

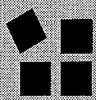
Table 2-2 Intensity of illumination

Factory		Office	
Super precision work	1500~700	Precise desk work	1500~700
Precision work	700~300	Normal desk work	700~300
Coarse work	155~70	Reception room, den	300~150

(3) Noise

Noise means a sound causing unpleasant feeling to the listener in general. The tolerance of noise level is different depending on the researcher but is within the range of 85~95 dB.

※dB: unit of sound pressure



2.4.2 Fire and Explosion

1) Preventive measures against fire and explosion

- (1) The source of fire shall be controlled so that there is no dangerous source of fire nearby.
- (2) Necessary measures against power failure shall be provided including redundant power supply since the power failure during work may cause perplexity and even fire.
- (3) Pipes and equipment shall be checked thoroughly whether there is any flammable gases or steam leaked or not.
- (4) In order to prevent malfunction of machines and mechanical appliances, it is necessary to provide auto control system, rearrange valves so as not cause confusion, and indicate switching status clearly.
- (5) Adequate distance from shall be maintained in order to prevent burning out from fire.
- (6) Necessary firefighting facilities shall be provided in proper locations to take on fire.

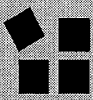
2) Fire in the workplace

(1) extinguishing measures

- a. Fire extinguisher shall be provided in the location easily identified and in the location easily accessible in where there is high possibility of ignition
- b. In case of outdoor fire extinguisher, it shall be kept incased.
- c. Any dangerous or flammable material shall be avoided nearby.
- d. Regular monitoring shall be made for the fire extinguisher so as to use it whenever necessary.

Table 2-3 Type and use of fire extinguishers

Type \ Use	Normal Fire	Oil Fire	Electrical Fire
Foam fire extinguisher	Fair	Fair	Poor
Powder fire extinguisher	Good	Good	Good
CO ₂ fire extinguisher	Good	Good	Fair



2.4.3 First-aid

1) First-aid items need to be provided

1. Gusset	2. Bandage	3. Gauze	4. Plaster	5. Wadding
6. Cotton	7. Scissors	8. Tweezers	9. Styptic rubber strap	
10. Splint	11. Tourniquet	12. Alcohol	13. Iodine tincture	
14. Mercurochrome		15. Boric acid solution		
16. Ammonia solution				

2) First-aid

(1) Cut (stab, wound and scratch)

- a. Wound shall not be touched with dirty paper or gusset
- b. Wound shall be exposed so as not to be irritated
- c. Mercurochrome shall be applied on the wound and a bandage applied to it
- d. Surrounding of wound shall be cleansed
- e. Dirt or soils stuck to the wound shall not be removed forcedly

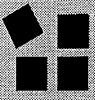
(2) Bruise and sprain

- a. Iodine tincture shall be applied on the bruised or sprained area. (it shall not be used together with the Mercurochrome)
- b. A cold pack shall be applied to the bruised or sprained area
- c. Hear, chest or abdomen shall be treated by doctor

(3) Bleeding

Blood accounts for 7.7 % of weight of human body. It is dangerous if more than 30 % of blood is shed and lead to fatal death if more than 50 % of blood is shed.

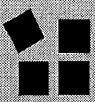
- a. In case of vein hemorrhage (dark red blood), bleeding area shall be pressed by using the sterile surgical compresses or by hand with gauze and held to the higher position.



- b. In case of artery hemorrhage (cardinal blood), treatment by doctor is necessary and blood shall be stanching by using the sterile surgical compresses, acupressure and emergency haemostatic.
- c. In case of hypodermic bleeding, hot pack shall be applied followed by cold pack.

(4) Burn

- a. In case of first-degree burn (red and sore skin), cold pack or boric acid solution pack shall be applied on the target skin.
- b. In case of second-degree burn (red and blistered skin), similar treatment shall be made as in the case of first-degree burn but blister shall not be broken.
- c. In case of third-degree burn (necrosis of subcutaneous tissue), similar treatment shall be made as in the case of second-degree burn as a first aid and treatment by doctor shall be made immediately.
- d. If the burnt area reaches over 30 % of the whole body, even the first-degree burn may endanger and fatal and care shall be taken in treatment.



2.4.4 Regulations for Mechanical Safety

- 1) Regulations for safety management in workplace
 - (1) Compulsive installation of safety devices for the dangerous machines: dangerous machine or device shall not be disposed, leased or installed without safety device provided.
 - (2) Dangerous machines: proper size and capacity of safety devices shall be provided for dangerous machines including grinding machine, press, cutter, saw, plane and roller welder.
 - (3) Type of safety devices: following safety devices are used to secure safety from dangerous work.

a) Two-hand control safety device	b) Magnet safety device
c) Sweep-guard safety device	d) Gate type safety device
e) Cut-off safety device	f) Pull-out safety de-vice
g) Photo electric safety device	h) Voltage reducing de-vice

- (4) Prevention of hazard
 - a. The owner shall provide safety device for the facilities dangerous or hazardous.
 - b. The worker shall perform works conforming to the safety requirements.
- (5) Dangerous works
 - a. Machine or device requiring dangerous work cannot be manufactured, installed and modified without approval of the Ministry of Health and Welfare in advance.
 - b. Any machine or device, which is specified under the presidential decree and without performance test of the Ministry of Health and Welfare shall not be used.
- (6) Limitation in working at the dangerous workplace
 - a. The owner shall not make the unskilled workers to perform dangerous work.
 - b. Dangerous works requiring limitation are specified by the presidential decree.



Safety Management

HYUNDAI-KIA MACHINE

(7) Interruption of power

- a. Proper power interruption device shall be provided for each powered machines.
- b. Emergency stop shall be provided for the device such as roller.

2) Provisions for safety management in workplace

(1) Safety device

- a. Approval of manufacture for the welding machines: approval of Ministry of Labor Affairs
- b. Approval of installation and modification for machines: approval of Ministry of Labor Affairs

(2) Performance test (validity period)

- a. Engine: 1 year
- b. Crane: 2 years
- c. Oxyacetylene welding machine: 3 years
- d. Pressure vessel: 1 year

(3) Companies need to employ safety manager

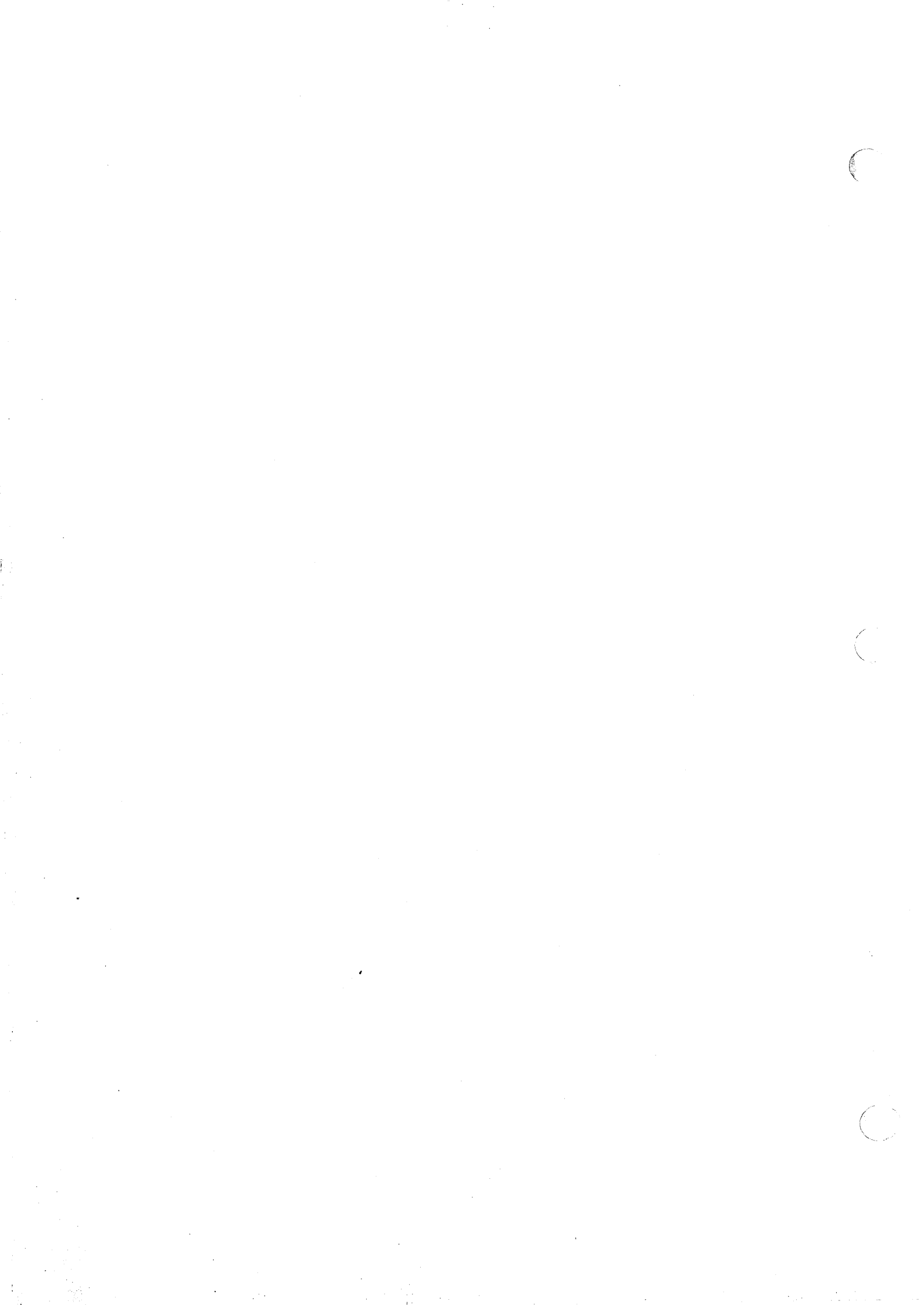
- a. All companies with more than 50 workers and the companies with less than 50 workers and specified by the Ministry of Labor Affairs shall employ the safety manager.
- b. The safety manager means the traffic safety manager as prescribed by the Article 7, Traffic Safety Law.
- c. The responsibility of safety manager is as follows:
 - a) Taking emergency and preventive measures against the hazard due to working in the building, facility, workplace or work method
 - b) Procuring and checking the performance of safety devices and safety outfits
 - c) Conducting regular checkup and maintenance of safety devices, safety outfits, fire fighting facilities and other hazard preventive facility
 - d) Providing training on the safety of work
 - e) Investigating the causes of accident and preparing their countermeasure
 - f) Agreeing to the placement of workers requiring agreement by safety manager
 - g) Supervising safety assistant



- h) Providing comment and recommendation on the workers violated safety regulation
- i) Documenting and recording major safety items
- j) Other safety related
- k) For the work requiring special safety measure, assistant safety manager shall be positioned to assist the safety manager.

(4) Corridor and workplace

- a. The area within 2 m from the corridor wall shall be cleared not to have any obstacle.
- b. The width of corridor between machines shall be at least 80 cm.
- c. Emergency exit: at least 2 emergency exits shall be secured.
 - a) at the indoor workplace in where explosive or flammable materials are used.
 - b) and at the outdoor workplace with more than 50 permanent employees.
- d. Stairs
 - a) The stairwells shall be provided in 5m intervals for the stairs with more than 5 m of height.
 - b) Handrail shall be provided at least on one side of stairs.
- e. Emergency stairs: at least 2 emergency stairs to the outdoor shall be provided for the underground workplace or second floor or higher with more than 20 workers.
- f. Structure of temporary access
 - a) The slope of ramps shall be lower than 35° and proper anti-sleep shall be provided for the ramp with more than 15° of slope except proper footstep or handrail with lower than 2 m of height is installed.
 - b) In the place with potential falling hazard, solid handrail with more than 75 cm of height shall be installed.
 - c) If the length of temporary access in the shaft is longer than 15 m, stepping fences shall be provided for every 10 m.
 - d) For the temporary landing stages with higher than 8 m of height, redundant shall be provided for every 7 m.



INSTALLATION MANUAL

Chapter 1 Delivery

- 1.1 Preparation for the Attendant Inspection 1-3
- 1.2 Delivery of the machine, from bringing in, to operation
guidance 1-5
- 1.3 List of Preparatory Items when Delivering a Machine 1-6

Chapter 2 Conveyance and Installation

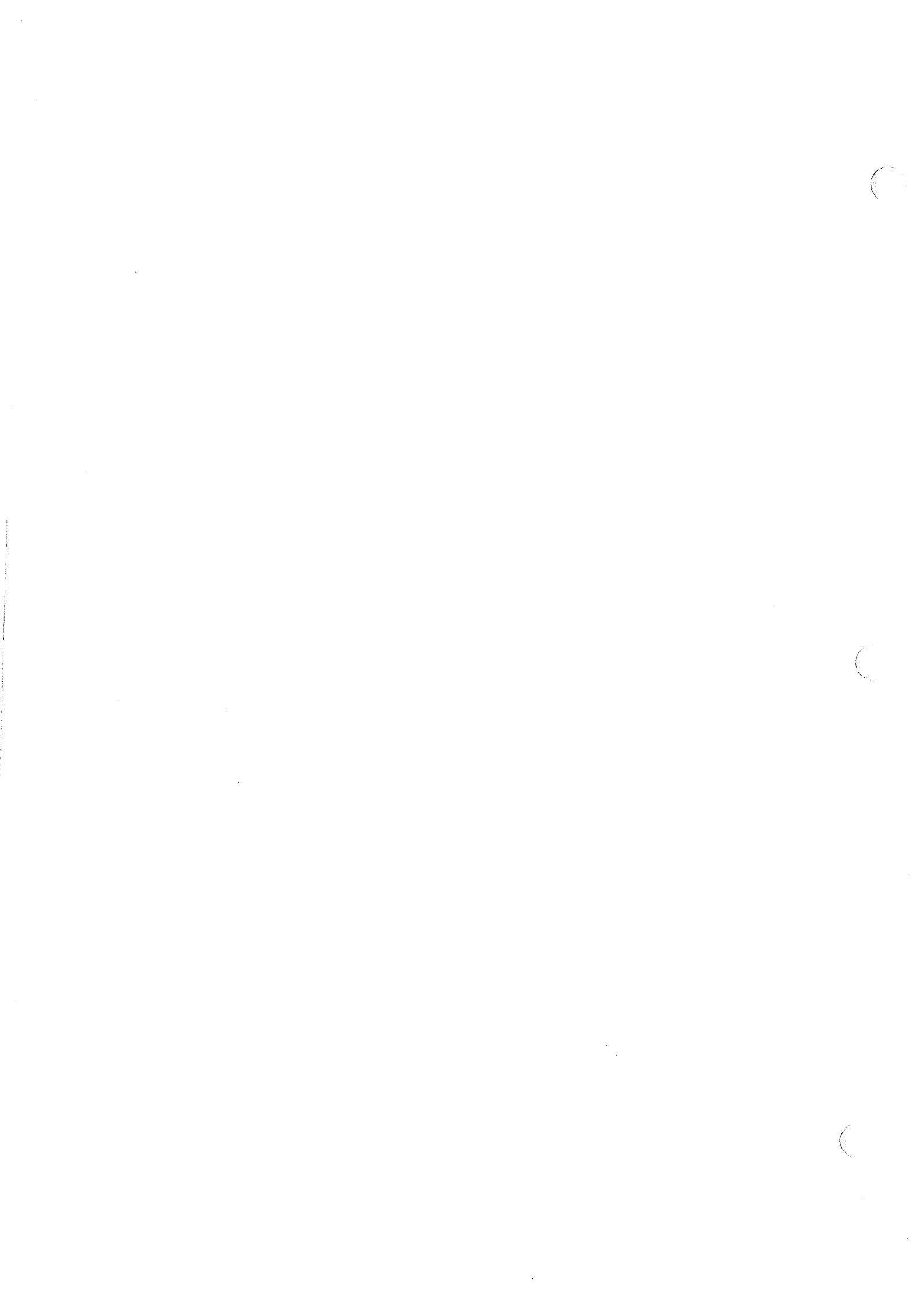
- 2.1 Conveyance of Machine 2-3
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Chapter 1

Delivery

- 1.1 Preparation for the Attendant Inspection 1-3
- 1.2 Delivery of the machine, from bringing in, to operation guidance 1-5
- 1.3 List of Preparatory Items when Delivering a Machine · 1-6





1.1 Preparation for the Attendant Inspection

■ In case of the standard attendant inspection

Preparations shall be made by this company on the basis of standard attendant inspection items with respect to each machine.

■ In case of the attendant on the specified test products

When test products are determined from you, follow the notes as below.

■ Working drawing of the test products

Products for test should be limited to one kind (Do not over 2 kinds).

■ Working drawing

Working drawing should contain the pre-process, reference surface, parts subject to be machined (In red).

■ List of Tools

(The table of position to be machined, tool holder and bite should be attached.)

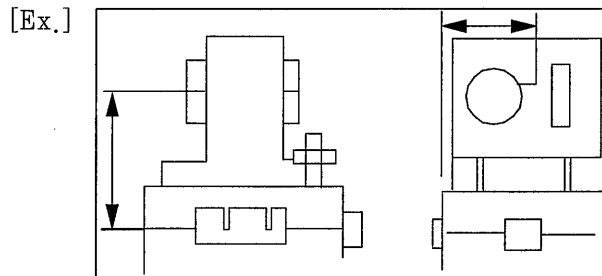
[Example]

NO.	Machining	Type of tool holder	Adapter	EA	Maker	Type of Byte	EA	Maker	Remark
1	Facing	BT40-FMC 22-90	SK-50	1	NIKKEN	Ø63×521	1	SECO	
2	M6 inner diameter	BT40-SK6- 195		1	NIKKEN	ØDRILL	1	K,H	
.									
.									
.									
12	M12랩	BT40-TP3A -1-140	WES 1B-M12	1	NT	M12×1,75 TAP	1	O.S,G	



■ Assembly drawing of jigs

Drawing showing conditions of jigs mounted on the table shall be submitted to this company.



The number of installation shall be recorded on the inspection record of jigs.

■ Specified day of attendance

You are supposed send articles supplied to this company, approximately 2 weeks before the specified day.

- 1) One specified machining
- 2) Tool holder and bite(including a list of tools)
- 3) A set of jigs(including drawings and records)
- 4) Test product inspection standard(If you have instruments for exclusive uses for measuring, please send them to us.)

■ Miscellaneous

If you are going to indicate something like the existence and/or nonexistence of coolants, machining sequence, the standard of preparations for tape and cycle time, etc, inform them of us.



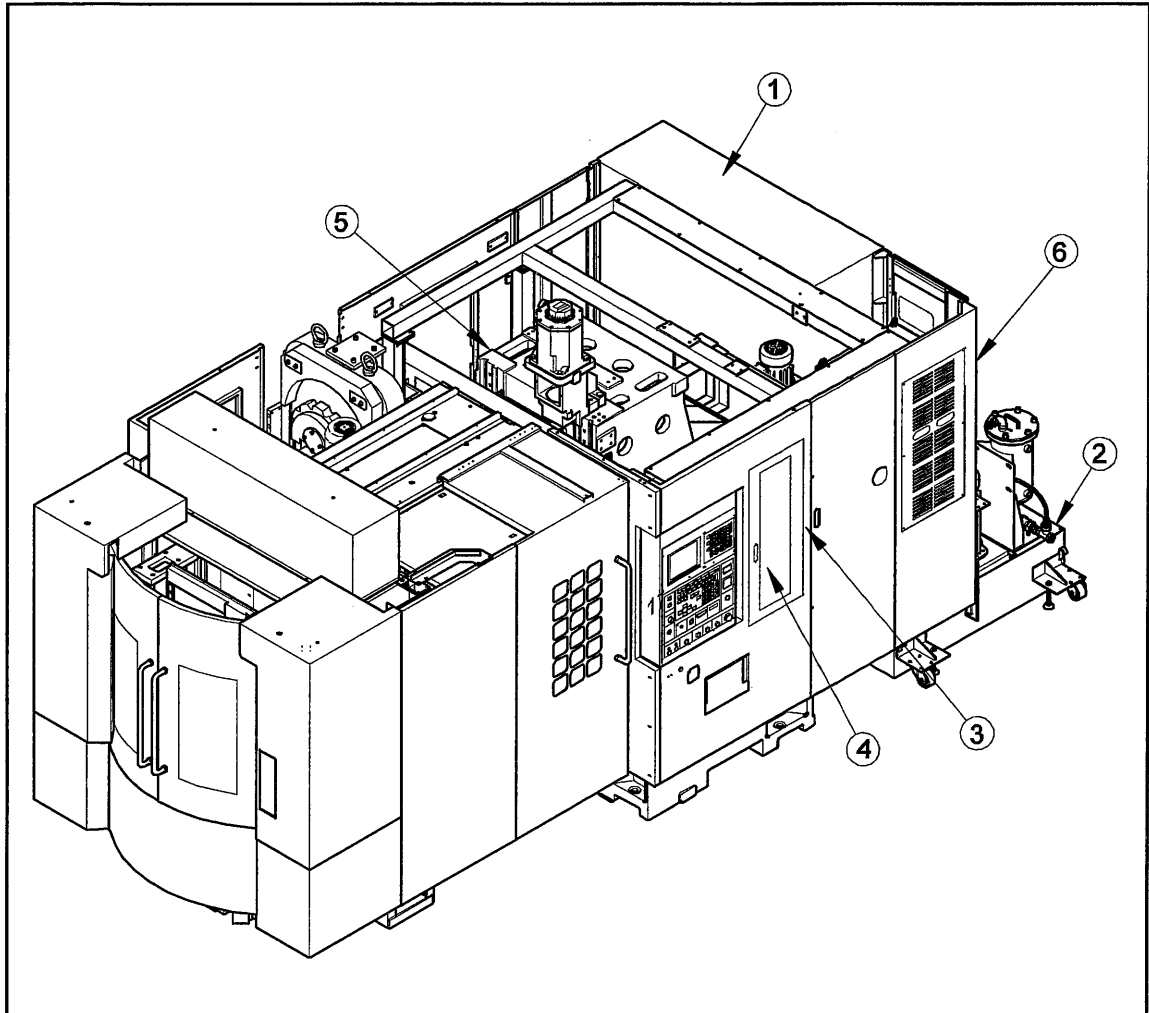
1.2 Delivery of the machine, from bringing in, to operation guidance

Attendance	<p style="text-align: center;">Delivery and carrying in of the machine</p> <p>Delivery and carrying in of the machine shall be determined with consultation as the standard attendance or specified attendance. If the specification of machine has not changed at the attendance, we deliver it after several days.</p>
Preparations for delivery	<p style="text-align: center;">Preparation for carrying in the machine</p> <p>The machine relating preparations shall be made following the "List of preparation items when delivering the machine" annexed to this manual and operating manual. If you have obscure facts, explain them at the attendance. You are supposed to prepare with working draw, tools and jigs, bite and tape, etc, in case that there is specified test cutting products after delivery.</p>
Carrying in and installation	<p style="text-align: center;">Installation</p> <p>You shall indicate the place for installation, and transportation of the machine shall be carried out by a professional transportation company.</p>
Operating guidance	<p style="text-align: center;">Operating Guidance</p> <p>Explanation of operating the machine and programs and cutting guidance) Installation and guidance are taken change of different person. The time for guiding shall be about 3~4 days, and explanation of programs and cutting guidance is carried out for only one programming and cutting in principle. Also, notice the operating guidance do or not in advance.</p>
Operating of the machine	<p style="text-align: center;">Inspection</p> <p>Inspection shall be performed with consultation when installation of the machine is completed, or operating guiding is finished.</p>



1.3 List of Preparatory Items when Delivering a Machine

(Refer to the operation manual for the details.)



<Figure 1-1>

	Item	HS400		Item	HS400	
①	Min, voltage of power Power	AC 220 V±10 %	②	Coolant(ℓ)	600	
		60 Hz±1 %, 3 Phase-3 Wires Type	③	Lubricating oil tank(ℓ) (Air source)		
	Earthing Work	Electric technology more than 3 species, less than 100 Ω	④	Pressure(kgf/cm ²)	5	
		Power breaker(A)	125	⑤	Volume(Nℓ /min)	750
	Min, thickness of wire	More than 50 mm ² (Earth wire more than 22 mm ²)		⑥	Caliber of the hole on the machine	PT 3/8
					⑤	Hydraulic Tank Oil(ℓ)
				⑥	SPINDL Oil(ℓ)	80



NOTICE

1. Inquire about ML0371H, which is convenient for the combined uses as both lubrication oil and coolant, sales department.
2. Use high-frequency operation type of the sensitive current 200 mA when a brake is adopted for preventing from the short-circuit.
3. Air source supplies air to spindle air blowing section, tool unclamp cylinder, cylinder for ATC POT slide & clamp, saddle and spindle reference air blowing section, ATC door, APC pin section, oil mist, etc.



Chapter 2

Conveyance and Installation

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2.11.7	Spindle Function : S Function 4/5 Digit	2-35
2.11.8	Tool Function : T Function 2 digit	2-35





2.1 Conveyance of Machine

This machine has the mechanical and electrical system combined into one construction. You can readily convey the machine to the point of installation merely by disconnecting the power cord from the socket on the machine. Refer to '2.7 How to Lift the Machine' for details regarding how to clamp moving parts of the machine and how to apply lifting cables to the machine.

1. Notes on the conveyance of machine

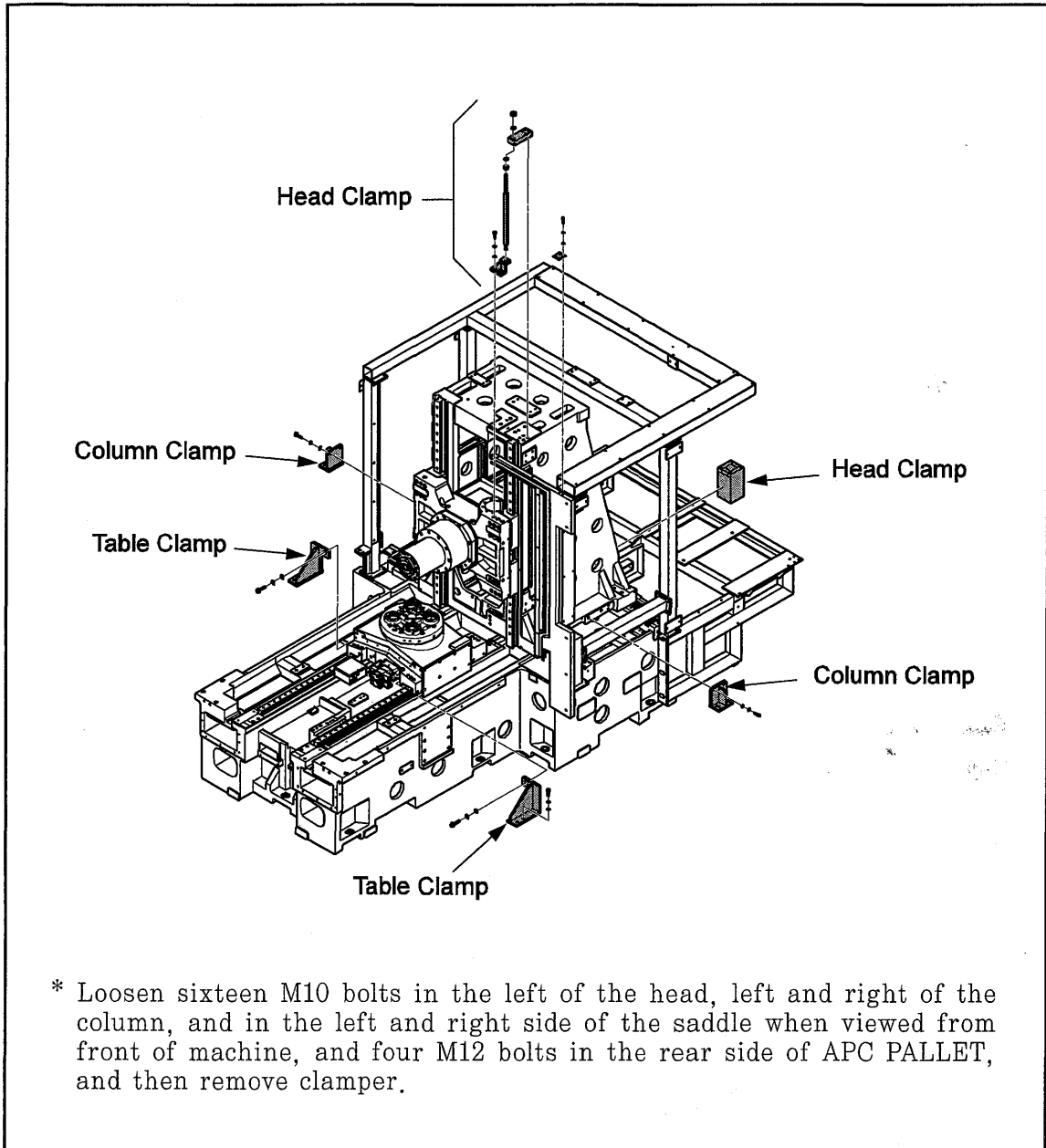
The lifting work is one of the important setups necessary to convey the machine to the point of installation. Therefore, use special care in this connection. The following are the points to be noted in performing the lifting work with a crane or a chain block for machine conveyance.

1. The lifting wire rope suited for this use must have a diameter of more than 15mm.
2. Place padding or wooden blocks between lifting cables and machine to keep cables from rubbing any part of the machine.
3. Lower the spindle head as low as possible to lower the center of gravity. Make it sure to locate the center of load at the center of lifting line.
4. Gradually lift the machine, and stop moving machine when the machine departs from the ground. And check the wire rope and the leveling of machine.
5. Gradually lower the machine, and stop moving machine when the machine contacts the ground. Unload the machine after checking.
6. Make it sure to place machine on the leveling sheet horizontally. If machine is placed on the uneven level, oil leaks or machine suffers from deformation, thus deteriorating the accuracy of machine. After installing machine on the safety place, loosen the clamping bolts as shown in <Figure 2-1 Clamp Fixture>.



Conveyance and Installation

HYUNDAI-KIA MACHINE



〈Figure 2-1 Clamp Fixture〉



2.2 Installation of Machine

2.2.1 Place of Installation

Avoid the place exposed to the direct sun ray. Also avoid the place under the influence of chips, water or oil.

- Range of Temperature : 0~45 °C
- Humidity : 10~75 % RH

2.2.2 Power

The electric equipment should be kept from electric welder or electric spark machine. A rapid voltage falling may cause a malfunction of NC device by an insufficient electric capacity in a factory. Generally, cannot the machine to the power source in separation from main power source.

2.2.3 Earth

Earth should be done separately if possible. The earth should not the earth line with electric welder or discharge machining tool.

Use short and thick(over 22 mm²) earth wire as much as possible.

2.2.4 Precautions in Installation

- 1) Maintenance Space
Secure maintenance space in advance so that control box door and other device doors operate with no interference.
- 2) Secure the space necessary to maintain the chip box and coolant tank.



2.2.5 Check List after the early Operation

- 1) Check the oil level.
- 2) Turn the spindle as follows.
 - ① Operate spindle at 5,000 rpm for 30 minutes.
 - ② Operate spindle at 10,000 rpm for 15 minutes. (Operate spindle in the same manner after machine stops for a long while.)
- 3) Properly use the running program supplied together with machine to check all function.

2.2.6 Levelling

Levelling is the No.1 factor determining the accuracy of machine.

To level the machine is the most basic operation to have influence on the workpiece and the life span of machine.

First, place machine on the levelling sheet, and then align the levelling bolt on machine and lower it in position. (Refer to <Figure 2-4. Foundation Plan>)

The level gauge suited for this use is that has the sensitivity scale of 0.02 mm per in. (The length of level gauge is 200 mm). Do not use the level gauge used in construction field.

Handle level gauge so that each end maintains same direction.

The surface where level gauge is placed should be clean and free from any dust.

Adjust the on the center of table as follows so that the horizontal reading does not differ from the longitudinal reading by more than 0.04 mm/m.

When fix the levelling bolt, be careful not to be loosen it.

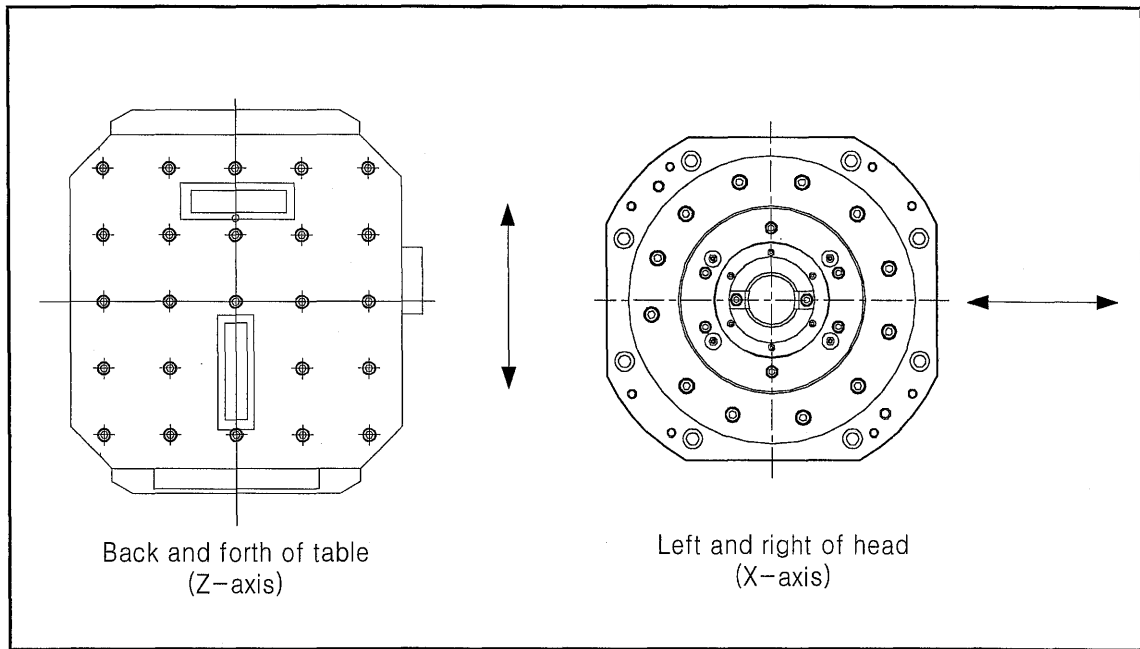
Foundation bolts may be used for fixing if mechanical vibration rises now and then due to ununiform work or intermittent cutting.

Check the level every day for 2~3 days from the installation. Then check it every month for six months from installation, and every three months thereafter.

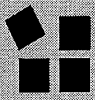


Conveyance and Installation

HYUNDAI-KIA MACHINE



〈Figure 2-2 Leveling〉



Conveyance and Installation

HYUNDAI-KIA MACHINE

2.3 Primary Specification of Machine

Specification		Unit	Metric	Inch
Table	Table Size		400 mm×400 mm	15.75" ×15.75"
	Least Indexing Angle		1° ±3" (0.001")	
	Indexing Command Type		Absolute	
	MAX. Load of Pallet		500 kgf	1102.3 lbs
	Distance from Center of SP. to surface of table		50 mm~610 mm	2.0" ×24"
	Distance from SP.. Nose to center of table		150 mm~800 mm	5.9" ×31.5"
Travel	Table Cross(X-axis)		620 mm	24.4"
	Column Cross (Y-axis)		560 mm	22.0"
	Spindle Head Horizon (Z-axis)		650 mm	25.6"
Spindle	Spindle Taper		NT 40	
	SP. Speed and Driven Type		150~15,000 rpm(Built-in)	
Feed	Least Input Increment		0.001 mm	0.0001"
	Cutting Feedrate		1~50,000 mm/min	0.04~1968.5 in/min
	Cutting Feedrate		0~5,000 mm/min	0~196.9 in/min
	X, Y, Z-axis	X, Z-axis	50,000 mm/min	1968.5 in/min
	Rapid Traverse	Y-axis	50,000 mm/min	1968.5 in/min
Motor	Spindle		18.5/22 kw	24.7/29.3 HP
	Hydraulic Pump		3.7 kw 4P	4.9 HP, 4P
	Lubrication Pump		20 w 4P	0.026 HP, 4P
	X-axis		FANUC AC MODEL, α30/4000is	
	Y-axis		FANUC AC MODEL, α30/4000is	
	Z-axis		FANUC AC MODEL, α30/4000is	
	Indexing Motor of Table		FANUC AC MODEL, α22/4000is	
	SP. Cooling unit		1.1 kw 4P	1.46 HP 4P
ATC	ATC Motor	Twin Arm	0.75 kw 4P	1 HP 4P
	Tool Storage Capacity		40 EA(60 EA)	
	Max. Tool Diameter(Without adjacent Tool)		Ø75(Ø140)	Ø3.5" (Ø5.5")
	Max. Tool Length		300 mm	11.8"
	Max. Tool Weight		10 kg	22 lbs
	Tool selection Type		FIXED ADDRESS	
APC	Changing Type		ROTARY	
	Max. Load on the Pallet		800 kg	1,763 lbs



Conveyance and Installation

HYUNDAI-KIA MACHINE

1. Standard Accessories

No.	Item	No.	Item
1	APC Pallet 2EA	10	Spindle hole taper cleaner 1EA
2	Spindle Cooling unit	11	One set of parts for basic application
3	RIGID TAP	12	220V socket for external equipments
4	Internal Chip Conveyor (One each on left and right)	13	Spindle load meter
5	Splash Guard(Totally enclosed & Auto open/close Inside)	14	Spindle Override
6	Standard Coolant(Fixed Type)	15	Coolant tank
7	Work Lamp (Inside of Splash Guard)	16	Chip Bucket
8	Call Light 1 Step 1 Color(Yellow)	17	Spindle penetrating coolant
9	Operating Tool(Set of spanner & other wrench)	18	Pallet tightness checking device

2. Optional Accessories

No.	Item	No.	Item
1	Oil mist system	9	Automatic recovery function
2	Spindle Rotation Mater	10	Tool presetter
3	Gun coolant	11	Electric leakage breaker
4	Broken tool detection device	12	Weekly timer
5	Magnetic scale(X, Y and Z 3-axis)	13	Call light(3 tone color)
6	Chip Conveyor(Outside the machine)	14	Automatic power breaking device
7	ATC tools 60EA	15	Chip wagon
8	Automatic measuring device or UTS function	16	NC table
		17	Rotary Joint(6Pot)

※ The accessories and attachments may be modified without previous notice since requirements in manufacturing and handling. So far the differences, enquire of the sales department of our company.



Conveyance and Installation

HYUNDAI-KIA MACHINE

2.4 Specification of NC Unit (FANUC 18i-MB)

1. Standard Specification

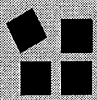
No.	Item	Specifications
1	Controlled axes	4 axes, Simultaneously 3 axes (4 axes, Simultaneously 4 axes) ※1
2	Interpolation	Positioning, Linear interpolation
3	Programming System	Absolute/Incremental Programming
4	Input Increment	0.001mm(0.001deg) ※1
5	Tape Code	EIA/ISO Automatic Recognition
6	Functions	Preparatory G2-digit, Miscellaneous M3-digit, Tool T4-digit
7	Spindle Speed Command	Direct designation of spindle speed by S code
8	Feed Rate Command	Direct designation of feed by F code
9	Feedrate Override	0~200 %
10	Override Cancel	
11	Rapid Override	F0 %, 25 %, 50 %, 100 %
12	Manual Feed Functions	Rapid traverse, Jog feed, Handle Feed
13	Manual Pulse Generator	3-step magnification ×1, ×10, ×100
14	Tool offset	
15	Tool Length Compensation	
16	Cutter Compensation C	
17	Tool Offset Memory A	
18	No. of Tool Offsets	64 Pairs
19	CRT Display	10.4" COLOR LCD
20	Tape storage & editing	
21	Tape Storage Length	320m
22	Canned Cycle	G73, G74, G76, G80~89
23	Reference Point Return	Manual/Auto (G27~G29)
24	2nd Reference Point Return	G30
25	Mirror Image	CRT Setting
26	Optional Block Skip	1 EA
27	Stored Stroke Check 1	



Conveyance and Installation

HYUNDAI-KIA MACHINE

No.	Item	Specifications
28	Stored Pitch Error Compensation	
29	Work Coordinate System Change	
30	Work Coordinate System Presetting	
31	Local Coordinate System Setting	
32	Work Coordinate System	G52
33	Machine Coordinate System	G53
34	I/O Interface	RS232C ※2
35	Registered Programs	63 Pairs
36	Part Program Editing	
37	Radius Designation on Arc	
38	Dwell	G04
39	Program Protection	
40	Buffer Register	
41	Single Block	
42	Cycle Start/Feed Hold	
43	NC Self-Diagnosis Function	
44	Z-axis Command Cancel	
45	Exact Stop	G09, G61
46	Decimal Point Programming	
47	Dry Run	
48	Back-Lash Compensation	
49	Program No. Search	
50	Sequence No. Search	
51	Label Skip	
52	Machine lock, Auxiliary Function lock	
53	Manual Absolute	Fixed at 「ON」
54	Optional Stop	
55	Follow-Up	
56	Change of Tool Offset Amount	G10
57	Watch Function	
58	Expanded Part Program Editing	
59	External Tape Input/Output	



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No.	Item	Specifications
60	Inch/Metric	G20/G21

※1 For NC table indexing specification(Optional)

※2 Interface-only. No connection cable to I/O devices included.



Conveyance and Installation

HYUNDAI-KIA MACHINE

2. Special Specification

No.	Item	Specification
1	Additional 1 Axis	
2	Additional 2 Axis	
3	Helical Interpolation	also applicable to additional axis
4	Skip Function	High Speed
5	Hypothetical axis interpolation	
6	Single Direction Positioning	
7	3 Dimensional Tool Offset	G40, 41
8	Tool Offset Amount Memory B	Geometry/Ware Memory
9	Tool Offset Amount Memory C	Geometry/Ware+Length Offset/diameter, Offset Memory
10	No. of Tool Offsets	99 pairs in total
11	No. of Tool Offsets	200 pairs in total
12	No. of Tool Offsets	400 pairs in total
13	Registerable program	125 Program
14	Registerable program	200 Program
15	Registerable program	400 Program
16	Tape Storage Length	640m in total
17	Tape Storage Length	1,280m in total
18	Linear Acceleration/Deceleration	
19	Manual Arbitrary Angle Feed	Every 5°
20	Stroke Check Before Movement	
21	Straightness Compensation	
22	Inclination Compensation	
23	Sequence No. Comparison and Stop	
24	Optional Block Skip	9 in Total
25	Custom Macro	Common Variables 100
26	Custom Macro	Common Variables 600
27	Automatic Corner Override	
28	Scaling	
29	Coordinate Rotation	
30	Polar Coordinate Interpolation	
31	Optional Angle Chamfering	



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No.	Item	Specification
	Corner R	
32	Manual Handle Interrupt	
33	Tool Life management	256 Tools
34	Tool Life management	512 Tools
35	Graphic Display Function	
36	Run Time and parts Number Display	
37	Remote Buffer	
38	High-Resolution Detection 1/F (0.1 μ Spec)	Specification Required to be Reviewed
39	Cylindrical Interpolation	
40	Exponential Interpolation	
41	Involute interpolation	
42	Acceleration/Deceleration Before Preread	
43	Addition of Work Coordinate System Sets	48 Sets (Conversation Disabled)
44	Program Name	48 Characters (Conversation Disabled)
45	Graphic Copy	
46	Programmable Parameter Input	
47	Tool Length/Work Zero Point Measurement B	Sensor and Touch Probe Required
48	High-Speed Machining	
49	Chopping Function	
50	Block Restart	
51	Tool Retract and Return	
52	Retrace	
53	Manual Numerical command	
54	NC Format Guidance	
55	Machining Time Stamp Function	
56	Playback	

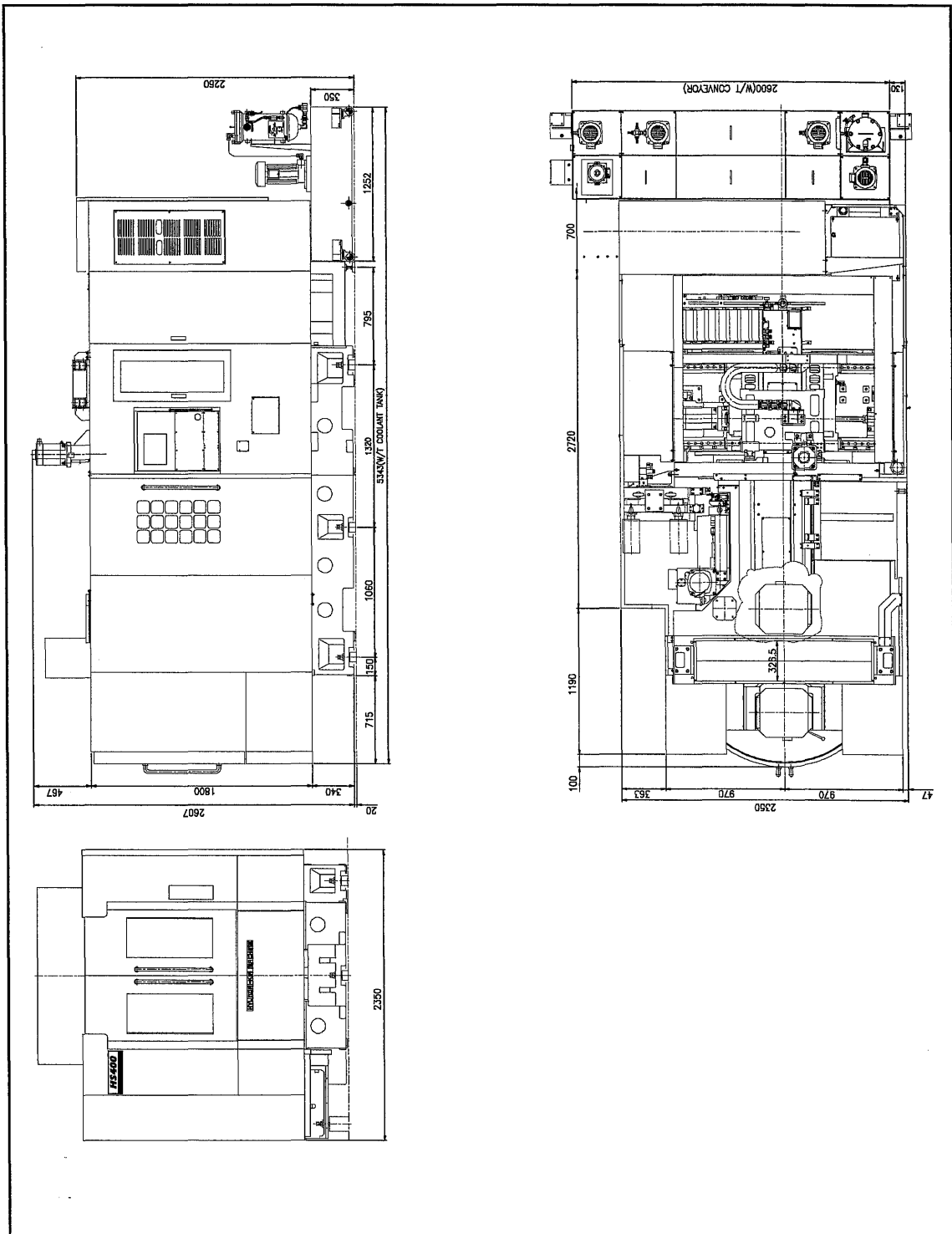


Conveyance and Installation

HYUNDAI-KIA MACHINE

2.5 Principal Dimensional Drawings

(Unit : mm)



〈Figure 2-3 Principal Dimensional Drawings〉



Conveyance and Installation

HYUNDAI-KIA MACHINE

NOTE

1. Use gravel for securing 8 Ton/m² of bearing capacity of soil.
2. Have the compressive strength and tensile strength more than 180 kg/m² and 18 kg/m² respectively.
3. Do not allow a crack on concrete.
4. Apply anti-vibration material such as asphalt on the entire girth.
5. Put steel bars of Ø19 in the reinforced concrete in a grid shape with interval of 150 mm.
6. Get the first concrete closely adhere to the second concrete when installing the equipment as the inner wall, of the hall (320L×250W×360H) for the foundation bolts, has concave-convex.
7. Pour concrete into an empty hole for the foundation bolts and dry the concrete sufficiently for pre-leveling of the machine. Then, install foundation bolts, leveling blocks and other fittings. And pour the second concrete into the hole for foundation bolts to fix.
8. Insert an inflating agent into the second concrete to prevent the dry contraction.
9. Apply waterproof mortar on the surface and grind it smoothly.
10. When pouring the second concrete, fix the leveling blocks and partition plates with set screws to prevent them from falling off. Level the concrete after it is completely dried. Fasten the bolts on the level blocks to fix the foundation of the machine.

No.	Part No.	Part Name	Q'ty	Material	Remark
1	A40JJOOM160	Hex Nut	7		M16
2	41114000080	Nut	10	S45C	M36×2
3	44646100030	Plate	7	SS41	120×80×50t
4	A15B06X0160	SKT SET SCR	14		M6×16L
5	34946110050	Bolt	7	S45C	M16×400L
6	A41JJ00M160	Washer	7		M16
7	41114000070	Jack Bolt	10	S45C	M36×2
8	44946110060	Collar	7	S45C	
9	41644010051	Level Plate	3	FC25	HiT250(For Common Use)



Conveyance and Installation

HYUNDAI-KIA MACHINE

NOTE

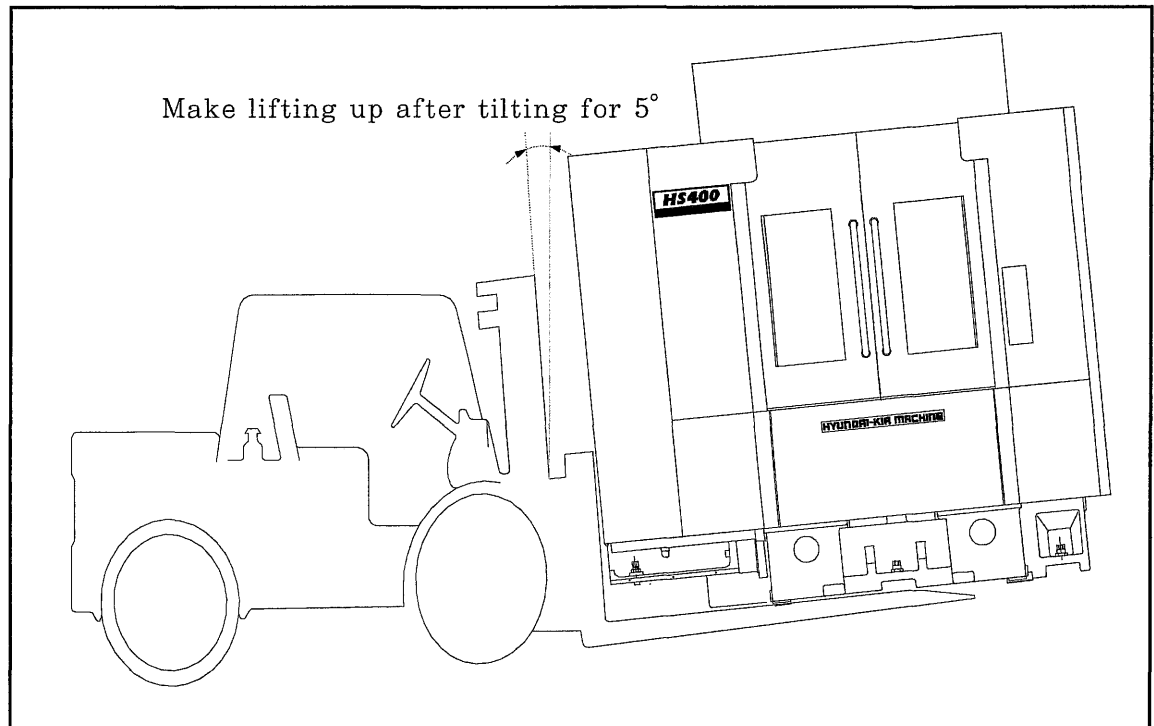
1. Use gravel for securing 8 Ton/m² of bearing capacity of soil.
2. Have the compressive strength and tensile strength more than 180 kg/m² and 18 kg/m² respectively.
3. Do not allow a crack on concrete.
4. Apply anti-vibration material such as asphalt on the entire girth.
5. Put steel bars of Ø19 in the reinforced concrete in a grid shape with interval of 150 mm.

No.	Part No.	Part Name	Q'ty	Material	Remark
1	9001-61-002-0	PLATE	4	SS41	
2	PM1012216030	CHEMICAL ANCHOR BOLT	4		M16
3	SM1001016170	HEX HEAD SCREW	4		M16×170L
4	SM1001020130	HEX HEAD SCREW	4		M20×130L
5	PM1012420157	CHEMICAL ANCHOR	4		



2.7 How to Lift a Machine

2.7.1 How to Lift a Machine by Forklift

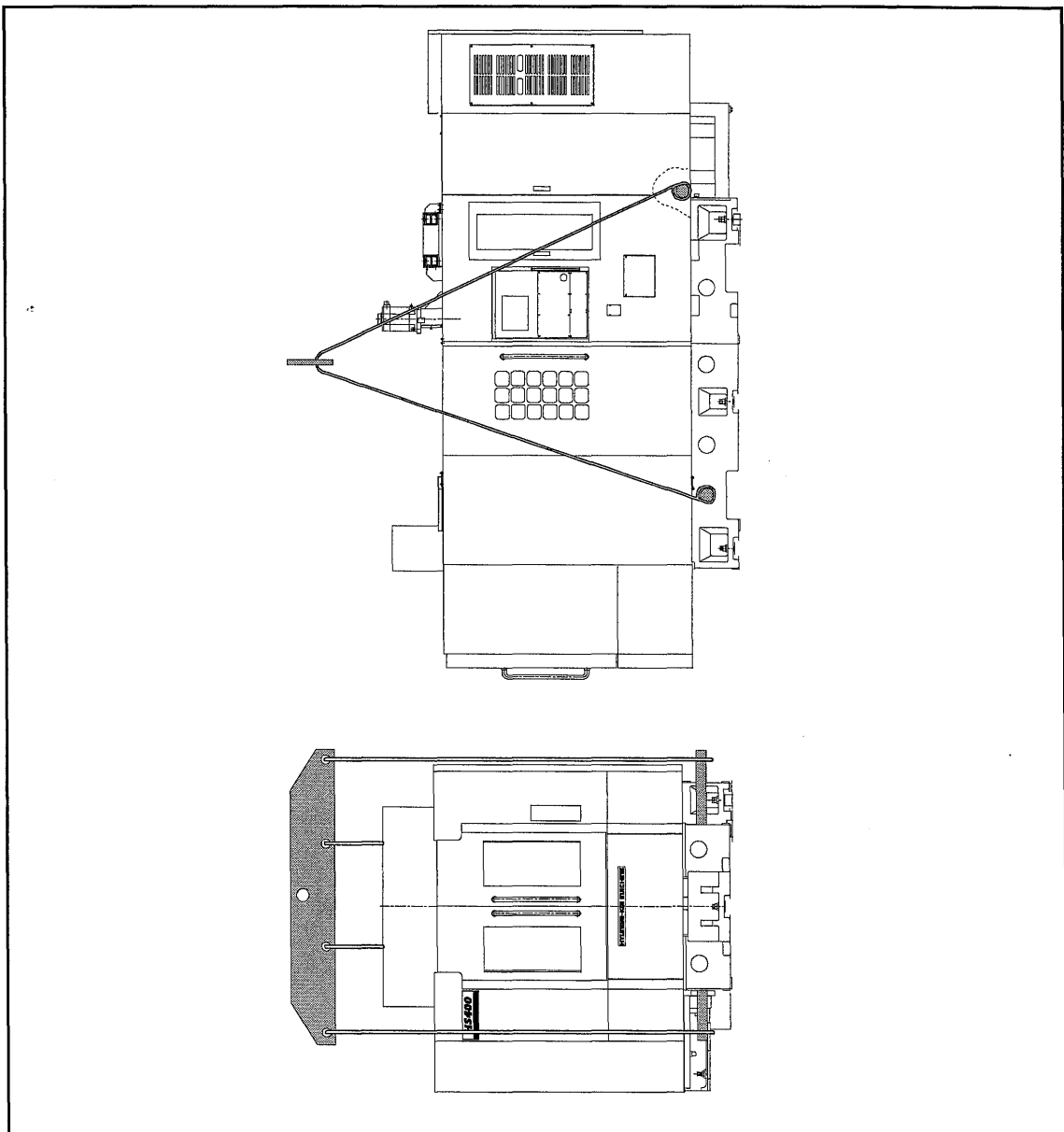


〈Figure 2-7 Lift a Machine by Forklift〉



2.7.2 How to Lift a Machine by Crane

Insert $\text{Ø}100 \times 2,600$ Bar into the hole in front of the machine, attach the lifting jig to the crane, and carry out installation as shown in the figure below. Lift the crane slowly to tighten the rope slightly. Check whether the machine is balanced before lifting. The bar in the front may be bent and rope may be removed if enough stiffness is not ensured. Additional measures are necessary to prevent rope from coming off.



〈Figure 2-8 Lift a Machine by Crane〉



2.8 Environment of Machine

Sufficient attention should be paid to room temp, dust and vibration, etc. so that machine can display fully its function. When room temperature changes extremely, machining with high accuracy can not be expected. If room temperature gradually changes and machine is also affected partially, pay attention to heat transmission from direct ray, ventilation opening and heating units. Under the environment where the air is heavily polluted by dust, etc., the sliding sections and electric devices of the machine are greatly affected in their service lives.

Particularly, since NC unit is sensitive to dust and humidity, install the machine in the environment as clean as possible. Also, the machine must be installed at a place free from vibrations caused by other machines. In case that electric machines and appliances generating high frequency noise are installed or newly elected near by NC machines, keep to the following precautions.

1. Example of the electric machines and appliances generating high frequency noise.

- 1) Arc Welding Machines
- 2) Resistance Welding Machine
- 3) High Frequency Drying Machine
- 4) Electric Discharge Machine
- 5) Others

2. Installation norm of NC machine

1) Power supply line

The power supply line(AC 200 V) of NC unit must be seperated line with that for electric machines and appliances. If impossible, connect the line at the point more than 20 m apart from the point where the power supply for electric machines and appliances is connected.

2) Installation place of NC machine

NC machine must be installed more than 20 m apart from electric machines and appliances.

3) Earth of NC machine

The earth of NC machine must be grounded within 5m from the NC



Conveyance and Installation

HYUNDAI-KIA MACHINE

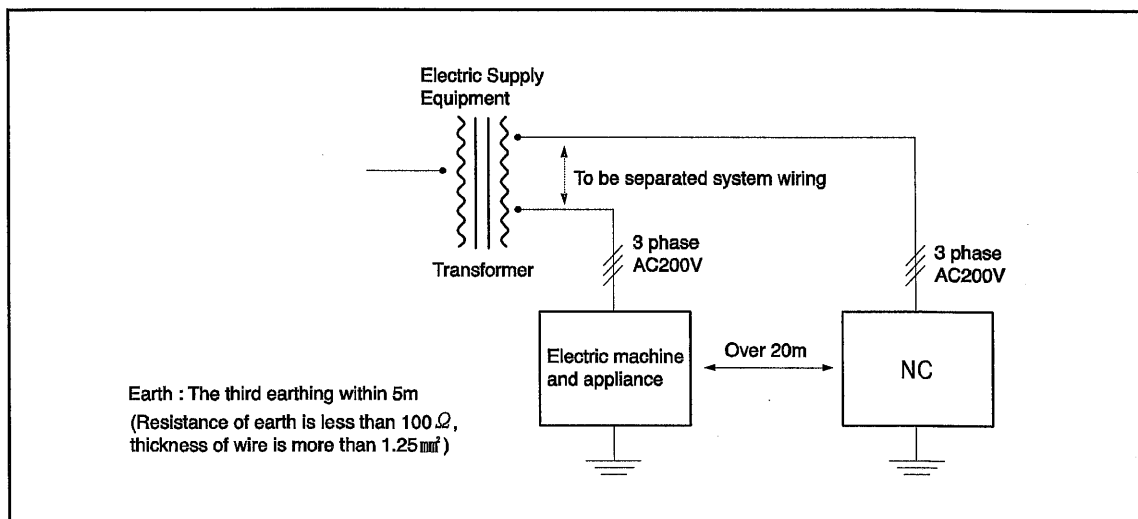
separating from the ground of electric machines and appliances, and make a ground work with not more than 100Ω . (The third Earthing)

Also, the earth wire size must be not less than 1.25 mm^2 .

3. Earth of NC machine

The earth of NC machine must be grounded within 5m from the NC separating from the ground of electric machines and appliances, and make a ground work with not more than 100Ω . (The third Earthing)

Also, the earth wire size must be not less than 1.25 mm^2 .



《Oil Supply》

When adding oil, take care of the following.

1. Add the specified amount of the designated oil. Do not use different oils, and do not add too much of oil.
2. Clean the oil supply part in advance. See that dust, etc. do not enter.
3. When adding oil, set a filter on the oil supply part, so that dust and other foreign substances will not enter. In case a filter is not available, use a wire netting of 150 mesh or more.
4. Always use new oil. Do not use a mixture of new and old oil.
5. Even when using new oil, do not use all the oil from the can. Always leave some oil in the can. This is necessary to avoid sediments in the can being used. For the oil supply positions, frequency, oil amount and quality, refer to "Lubrication and Oil Supply".



《Electric Wiring》

Since this machine only wired from main electric cabinet to accessories, wiring from the power supply source to electric cabinet should be prepared in advance by the customer. For this purpose, use a wire of 22 mm² or more, depending on the distance from the power supply to the electric cabinet.

- Power Supply : 200/200 V(50/60 Hz) 10 %
- Grounding Wire : 22 mm² or more
- Power Supply capacity : 50 KVA

《Pneumatic Source》

This machine uses clean air to clean the spindle taper, the tool, automatic door or for the oil mist unit. So, prepare the pneumatic source.

- Air Pressure : 5 kgf/cm²
- Flow : 750 Nℓ /min

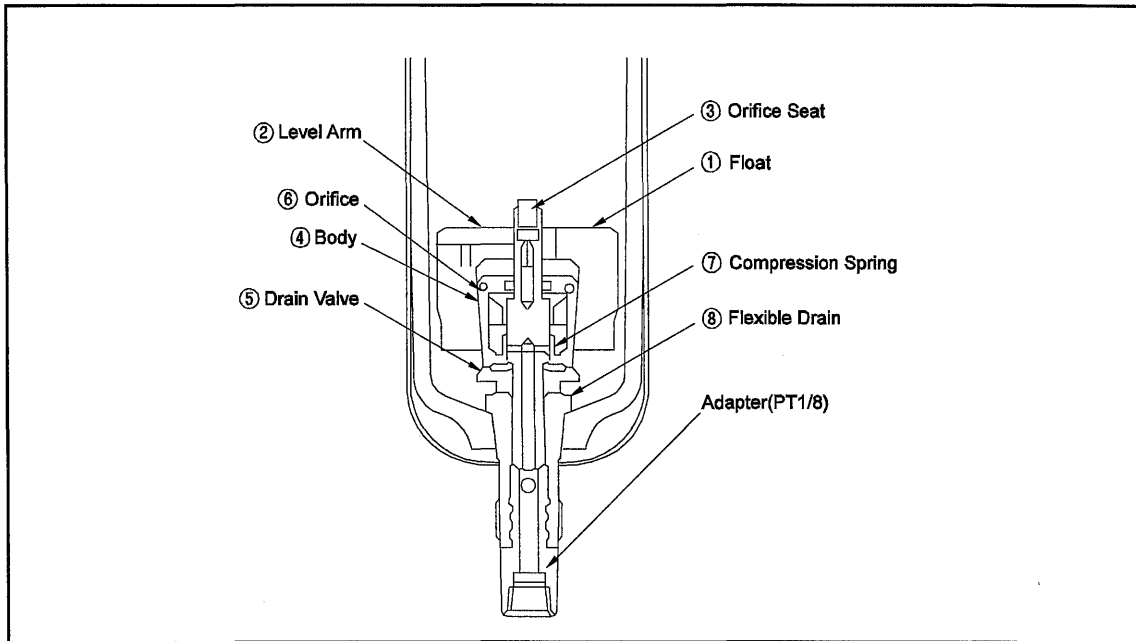
The joint of the machine is PT1/4 female tap.

The machine is provided with an air filter and regulator to remove dust and superaturated moisture from air.

When the temperature of the air from the air supply is higher than that of the machine, air gets cold at the machine and tends to form water drops. If wet air is jetted, the spindle taper and the tool shank will become rusty, thus affecting the machining accuracy and the cutting surface. Therefore, the temperature of the pneumatic source should be below. (Water and dust accumulating in the air filter is automatically drained. To manually drain them, see the descriptions on manual drain operation.) In case there is a large difference in temperature, install an air drier between the air supply and the machine.

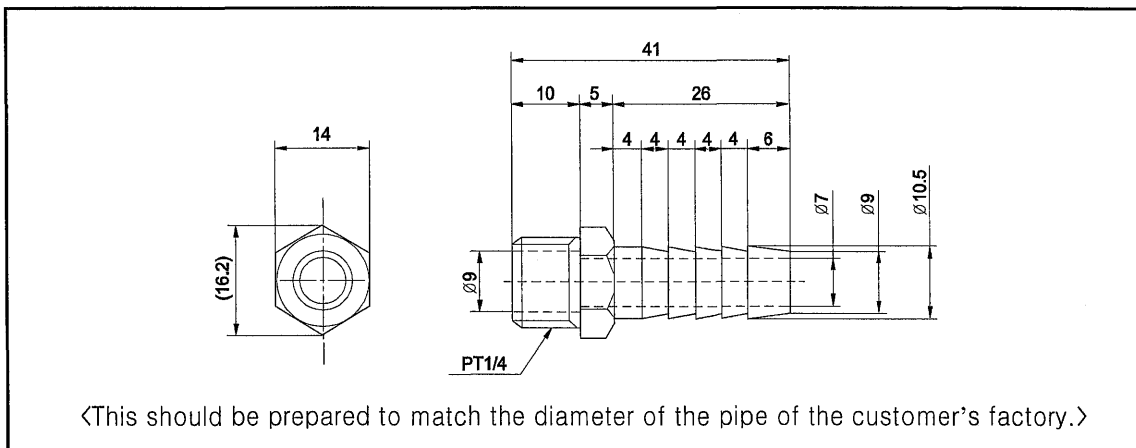
《Manual Drain Operation》

When drain accumulates at the bowl bottom, foamed nitrile float ① rises to open orifice seat ③ by level arm ② and introduce compressed air into the piston chamber. In the piston chamber pressured body ④ moves up to open the seal with respect to drain valve ⑤ and discharge drain to the atmosphere. After the drain is discharged, float ① moves down and orifice seat ③ is closed by level arm ② compressed air in the piston chamber is discharged to the atmosphere, and the drain valve is closed by compression spring ⑦. To manually discharge the drain, push flexible drain ⑧ from the side.



〈Figure 2-9 Manual Drain Operation〉

The diagram below shows example of the air intank port joint.



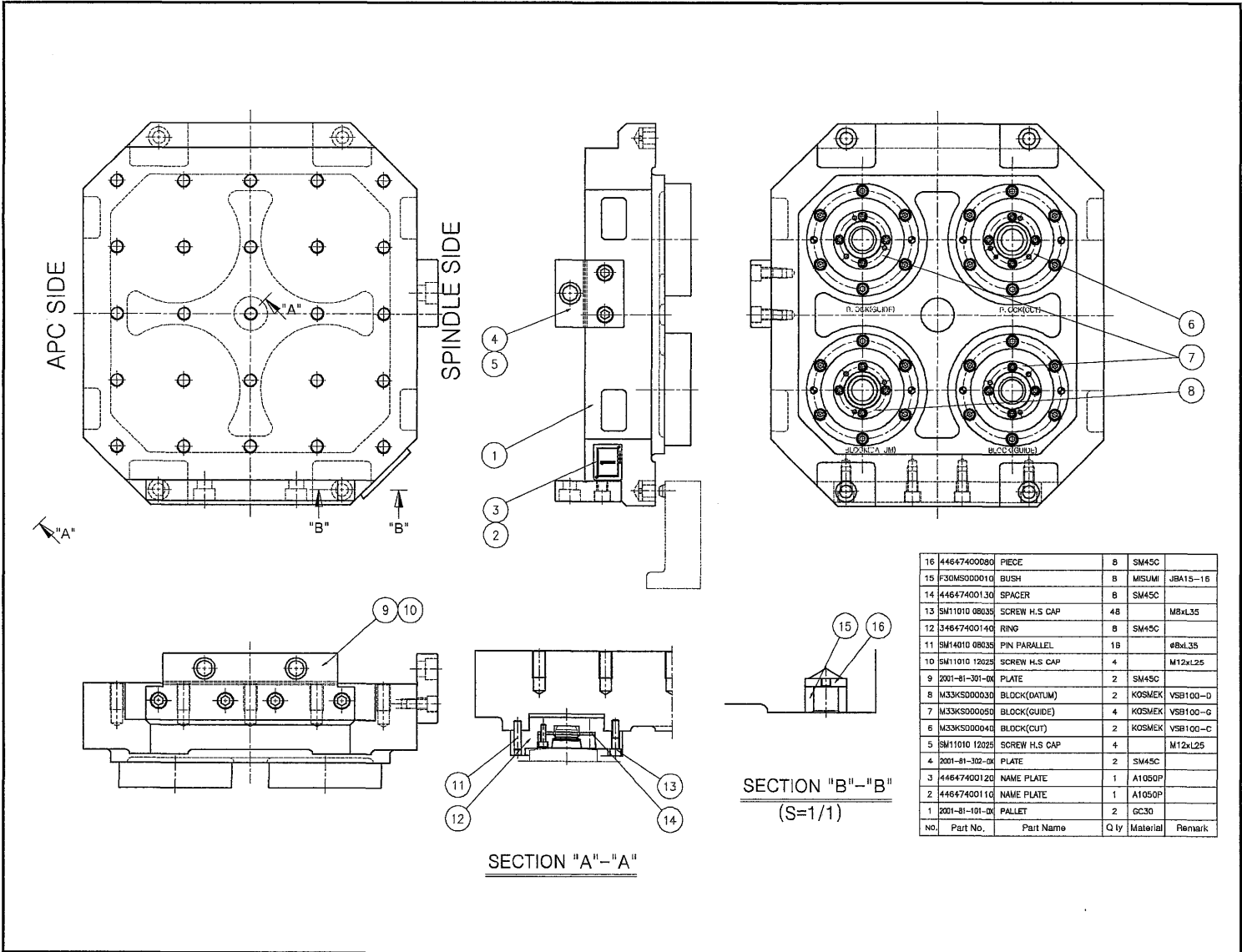
〈Figure 2-10 Joint〉



Conveyance and Installation

HYUNDAI-KIA MACHINE

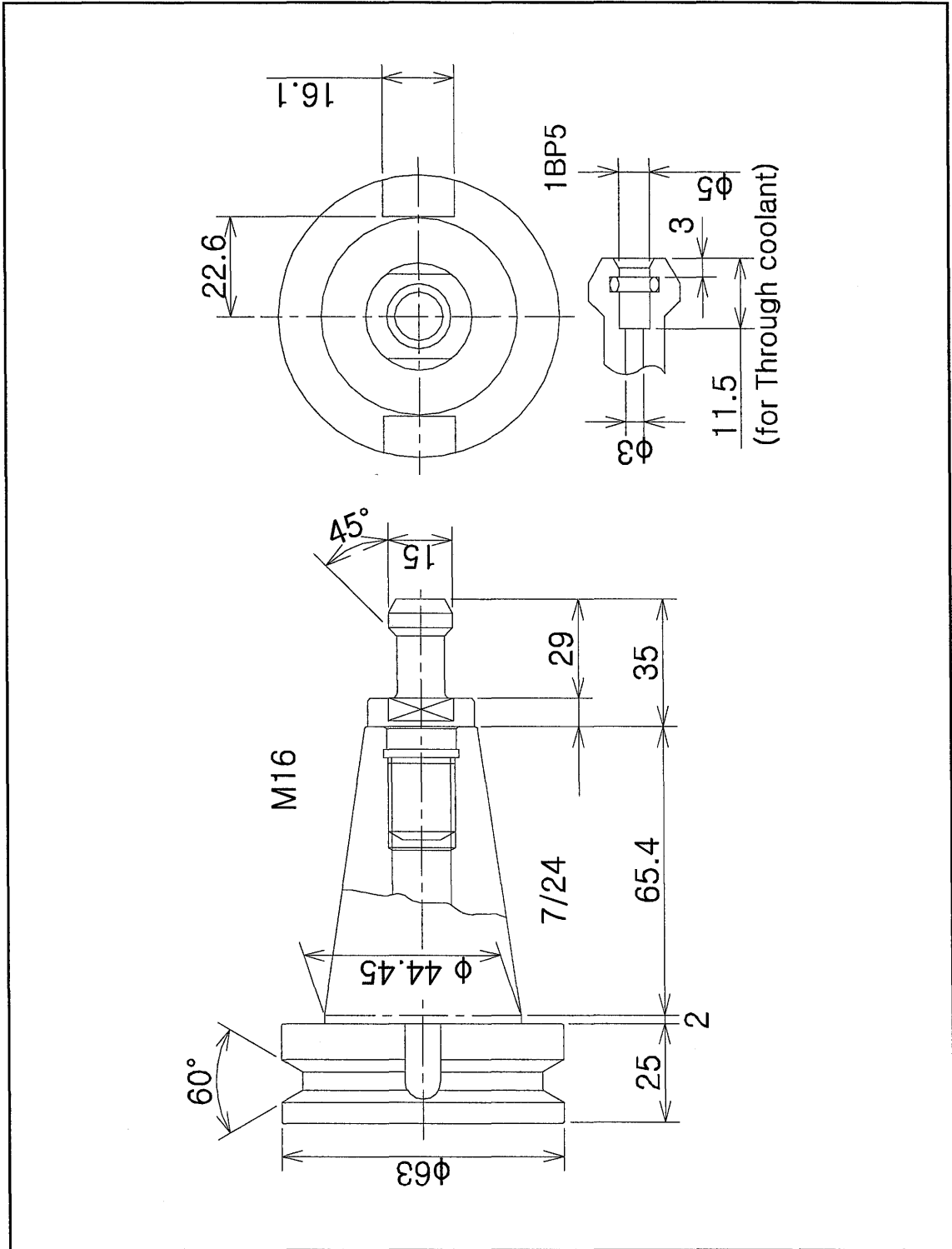
2.9 Pallet



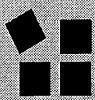
<Figure 2-11 Pallet>



2.10 Tool Shank



<Figure 2-12 Tool Shank>



Conveyance and Installation

HYUNDAI-KIA MACHINE

2.11 Explanation of Command for Each Axis

2.11.1 Preparatory Functions(G2 Digits)(18i-MB)

Code	Group	Function	
G00(★)	01	Positioning	
G01(★)		Linear Interpolation	
G02		Circular interpolation/Helical Interpolation CW	
G03		Circular interpolation/Helical Interpolation CCW	
G02.2, G03.2		Involute Interpolation	
G02.3, G03.3		Exponential Function Interpolation	
G04	00	Dwell	
G05		High Speed Cycle Machining	
G07.1(G107)		Cylindrical Interpolation	
G08		Look-ahead Control	
G09		Exact Stop	
G10		Programmable Data Input	
G10.6		Tool Retract and Recover	
G11		Programmable Data Input Mode Cancel	
G12.1	25	Polar Coordinate Interpolation Mode	
G13.1(★)		Polar Coordinate Interpolation Cancel Mode	
G15(★)	17	Polar Coordinate Command Cancel	
G16		Polar Coordinate Command	
G17(★)	02	Xp Yp Plane	Selection Xp : X axis or its parallel axis Yp : Y axis or its parallel axis Zp : Z axis or its parallel axis
G18(★)		Zp Xp Plane	
G19(★)		Yp Zp Plane	
G20	16	Input in mm	
G21		Input in mm	
G22	04	Stroed Stroke Check Function ON	
G23		Stroed Stroke Check Function OFF	
G25	24	Spindle Speed Fluctuation Detection OFF	
G26		Spindle Speed Fluctuation Detection ON	
G27	00	Reference Position Return Check	



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Code	Group	Function
G28	00	Return to Reference Position
G29		Return from Reference Position
G30		2nd, 3rd and 4th Reference Position Return
G30.1		Floating Reference Point Return
G31		Skip Function
G33	01	Thread Cutting
G65	00	Macro Call
G66	12	Macro Modal Call
G67(★)		Macro Modal Call Cancel
G68	16	Coordinate Rotation/3-Dimension Coordinate Change
G69(★)		Coordinate Rotation/3-Dimension Coordinate Change Cancel
G72.1	00	Rotational Copy
G72.2		Linear Copy
G73	09	Peck Drilling Cycle
G74		Counter Tapping Cycle
G75	01	Plunge Grinding Cycle(for grinding machine)
G76	09	Fine Boring Cycle
G77	01	Direct Constant-Dimension Plunge Grinding Cycle(for Grinding Machine)
G78		Continuous-Feed Surface Grinding Cycle(for Grinding Machine)
G79		Intermittent-Feed Surface Grinding Cycle(for Grinding Machine)
G80(★)	09	Canned Cycle Cancel/External Operation Function Cancel
G81		Drilling Cycle, Spot Boring Cycle
G82		Drilling Cycle, Counter Boring Cycle
G83		Peck Drilling Cycle
G84		Tapping Cycle
G85		Boring Cycle
G86		Boring Cycle
G87		Back Boring Cycle
G88		Boring Cycle
G89		Boring Cycle
G90(★)		03
G91(★)	Increment Command	



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Code	Group	Function
G92	00	Setting for Work Coordinate System or Clamp at Maximum Spindle Speed
G92.1		Workpiece Coordinate System Preset
G94(★)	05	Feed per Minute
G95		Feed per Rotation
G96	13	Constant Surface Speed Control
G97(★)	13	Constant Surface Speed Control Cancel
G98(★)	10	Return to Initial Point in Canned Cycle
G99		Return to R Point in Canned Cycle
G160(★)	20	In-feed Control Function Cancel(for Grinding Machine)
G161		In-feed Control Function(for Grinding Machine)
G37	00	Automatic Tool Length Measurement
G39		Corner Offset Circular Interpolation
G40(★)	07	Cutter Compensation cancel/3-Dimension Cutter Compensation Cancel
G41		Cutter Compensation Left/3-Dimension Cutter Compensation
G42		Cutter Compensation Right
G40.1(G150) (★)	19	Normal Direction Control Cancel Mode
G41.1(G151)		Normal Direction Control Left Side ON
G42.1(G152)		Normal Direction Control Right Side OFF
G43	08	Tool Length Compensation '+' Direction
G44		Tool Length Compensation '-' Direction
G45	00	Tool Offset Increase
G46		Tool Offset Increase
G47		Tool Offset Double Increase
G48		Tool Offset Double Decrease
G49(★)	08	Tool Length Compensation Cancel
G50(★)	11	Scaling Cancel
G51		Scaling
G50.1(★)	22	Programmable Mirror Image Cancel
G51.1		Programmable Mirror Image
G52	00	Local Coordinate System Setting
G53		Machine Coordinate System Setting
G54(★)	14	Workpiece Coordinate System 1 Selection



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Code	Group	Function
G54.1		Additional Workpiece Coordinate System Selection
G55		Workpiece Coordinate System 2 Selection
G56		Workpiece Coordinate System 3 Selection
G57		Workpiece Coordinate System 4 Selection
G58		Workpiece Coordinate System 5 Selection
G59		Workpiece Coordinate System 6 Selection
G60	00	Single Direction Positioning
G61		Exact Stop Mode
G62	15	Automatic Corner Override
G63		Tapping mode
G64	15	Cutting Mode



NOTICE

- 1) The G-codes that marked “(★)” are initial G-code when power on or after resetting. As per G22 and G23, it is G22 when power on and even reset, it will be same as before reset. In case of G00, G01, G17, G18, G43, G44, G49, G94, G95, G90 and G91, initial status can be selected by the parameter setting(G01, G95, G90, G43, G44, G18) of data No. 2401. For G22 & G21, it will be same as before power off or reset on.
- 2) The G-code in ‘00’ group are not modal code and effect only at the block that are commanded.
- 3) It will be occurred an alarm(warning) when G-code that is not showing in G-code list is commanded(PS010).
- 4) More than one G-code can be commanded if they are belong to different group. If more than two G-code that are belong to same group are commanded, the G-code that is commanded in next will be effected.



■ 2.11.2 Sequence Number : N4digits : N1 – N9999

■ 2.11.3 Dimension Word

X, Y, Z, I, K, Q, P

Max. Command Amount : 9999.999 mm

■ 2.11.4 Feed Function

Rapid Traverse(G00 Positioning)

40,000 mm/min(X, Y, Z Axis)

Cutting Feed F Function with 4 digits F1–F10,000

■ 2.11.5 Dwell : G04

G04 P/X

With this command, it is stop for the designated time.

Address 'P' can be designated, as well as 'X'.

In case of address X, more over, a decimal point can be input.

Max. Command Time : 9999.999 sec

Setting Unit : 0.001 sec



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2.11.6 Miscellaneous Function(M Function)

M CODE	Name	Remark	M CODE	Name	Remark
M00	PROGRAM STOP		M34	EXTERNAL CHIP CONV.OFF	OPTION
M01	OPTIONAL STOP		*M35	MAN. ATC MODE ORT.	
M02	PROGRAM END		M36	CHIP CONVEYOR ON	
M03	SPINDLE CW		M37	CHIP CONVEYOR OFF	OPTION
M04	SPINDLE CCW		M47	JET COOLANT ON	
M05	SPINDLE STOP		M48	OVERRIDE CANCEL	
M06	TOOL CHANGE		M49	OVERRIDE 100%	OPTION
M07	OIL MIST COOLANT ON	OPTION	M50	OIL HOLE COOLANT ON	OPTION
M08	COOLANT ON		M51	FLUSHING COOLANT ON	
M09	COOLANT OFF		M52	TOOL BROKEN CHECK	
M10	OIL MIST NOZZLE 1 ON	OPTION	*M53	ROT. ARM TURN CW	MAINT.
M11	OIL MIST NOZZLE 2 ON	OPTION	*M54	ROT. ARM TURN CCW	MAINT.
M12	WORK COUNTER	OPTION	*M55	ROTATING ARM UP	MAINT.
M13	M03 & M08		*M56	ROTATING ARM DOWN	MAINT.
M14	M04 & M08		M56	MIRROR IMAGE X ON	
M15	M05 & M09		M57	MIRROR IMAGE X OFF	
M16	MEASURE. AIR BLOW ON	OPTION	M58	MIRROR IMAGE Y ON	
M17	MEASURE. AIR BLOW OFF	OPTION	M59	MIRROR IMAGE Y OFF	
M19	SPINDLE ORIENTATION		M60	PALLET CHANGE	
*M21	TABLE CLAMP	MAINT.	M61	A PALLET CHANGE	
*M22	TABLE UNCLAMP	MAINT.	M62	B PALLET CHANGE	
*M23	PALLET CLAMP	MAINT.	*M57	TOOL POT CLAMP	MAINT.
*M24	PALLET UNCLAMP	MAINT.	*M58	TOOL POT UNCLAMP	MAINT.
M28	RIGID TAP MODE CANCEL		*M61	TOOL POT SWING MAG. SIDE	MAINT.
M29	RIGID TAP MODE ON		*M62	TOOL POT SWING SP. SIDE	MAINT.
M30	PROGRAM END & REWIND	MAINT.	*M63	MAG. INDEX PIN IN	MAINT.
*M31	MAN. ATC MODE ON	MAINT.	*M64	MAG. INDEX PIN OUT	MAINT.
*M32	MAN. ATC MODE OFF	MAINT.	M66	FIXTURE CLAMP	OPTION
M33	EXTERNAL CHIP CONV.ON	OPTION	M67	FIXTURE UNCLAMP	OPTION



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M CODE	Name	Remark	M CODE	Name	Remark
M70	EXTERNAL M-CODE 1	OPTION	M86	PALLET CLAMP	
M71	EXTERNAL M-CODE 2	OPTION	M87	PALLET UNCLAMP	
M72	EXTERNAL M-CODE 3		M90	AUTO DOOR OPEN	
M73	EXTERNAL M-CODE 4		M91	AUTO DOOR CLOSE	
M74	MEASUREMENT SP. CW1				
M75	MEASUREMENT SP. CW2				
M78	TABLE CLAMP				
M79	TABLE UNCLAMP		M998	MAINTENANCE M MODE ON	
M80	ATC DOOR OPEN		M999	MAINTENANCE M MODE OFF	
M81	ATC DOOR CLOSE				



NOTICE

1. Operation mark 'A' means M function start after feed command.
B' means M function start at the same time of feed command.
2. Mark * is for maintenance.
3. For using a maintenance function, Turn on the maintenance switch inside of main electric cabinet or command 'M998'.



2.11.7 Spindle Function : S Function 4/5 digits

Spindle speed is commanded directly by s4/5 digits.

Example) S4500

2.11.8 Tool Function : T Function 2 digits

Tool No. is designated by T2 digits. (Tool Storage : 40/60 EA)

T01-T40~T60



OPERATION MANUAL

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1.1 General

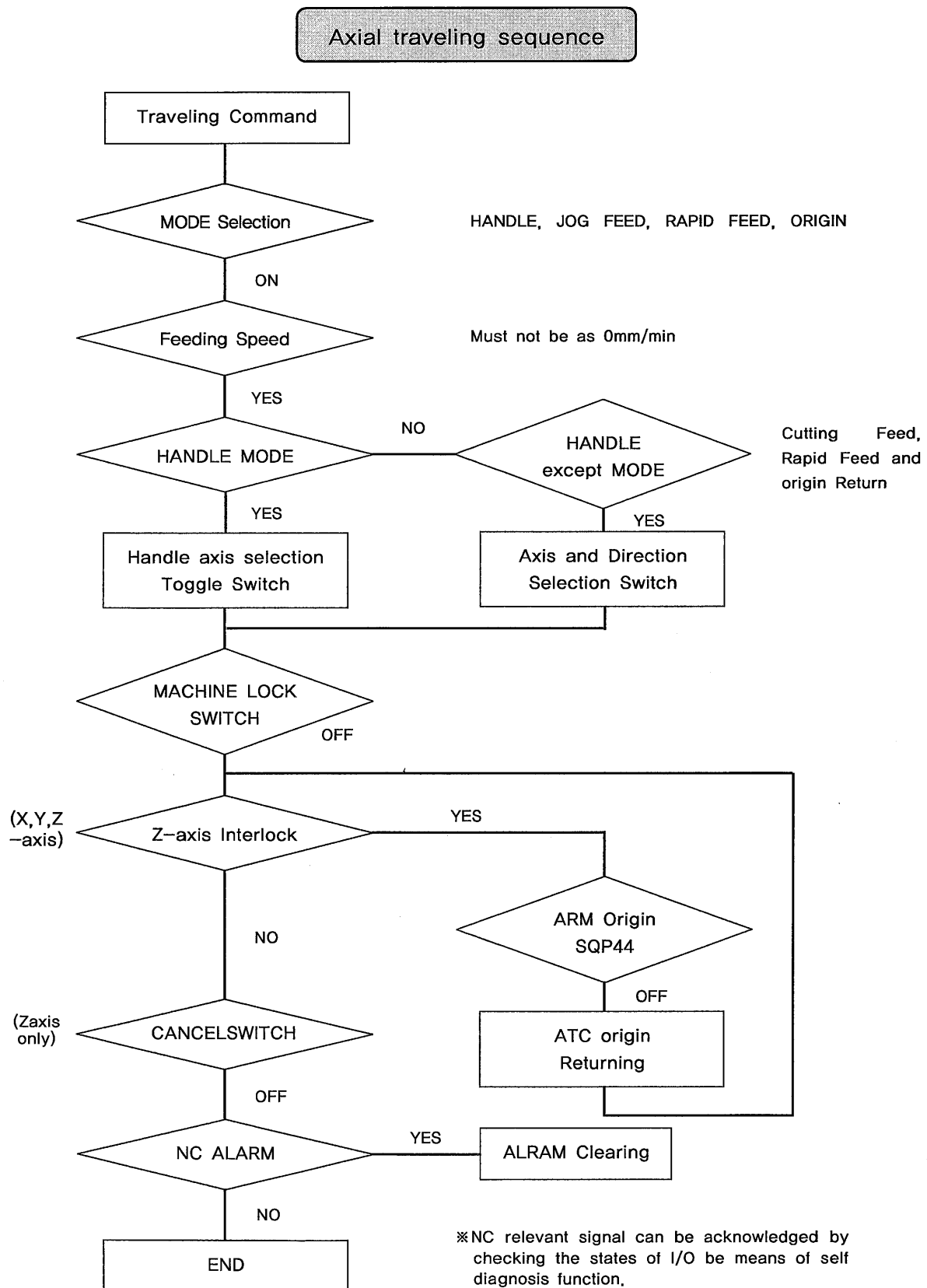
The bed of this machine is stable structure in precision and rigidity. The column on the bed freely travels to the left or right on X-axis, and the spindle head on the column surface with sufficient rigidity moves upwards or downwards on Y-axis, and the table of bed travels forwards or backwards on Z-axis. For sliding surface, a roller guide of an excellent feature as low friction resistance and high rigidity is adapted, so to provide a good potential for motion and that feeding function is also given in design, Super precision ball screw is used as feed screw, and pre-load is applied to nut in advance according to single nut type method to eliminate backlash.



Operation of the Machine

HYUNDAI-KIA MACHINE

1.1.1 Axial Traveling Sequence (Rapid feed, Jog feed, Return to origin and handle)

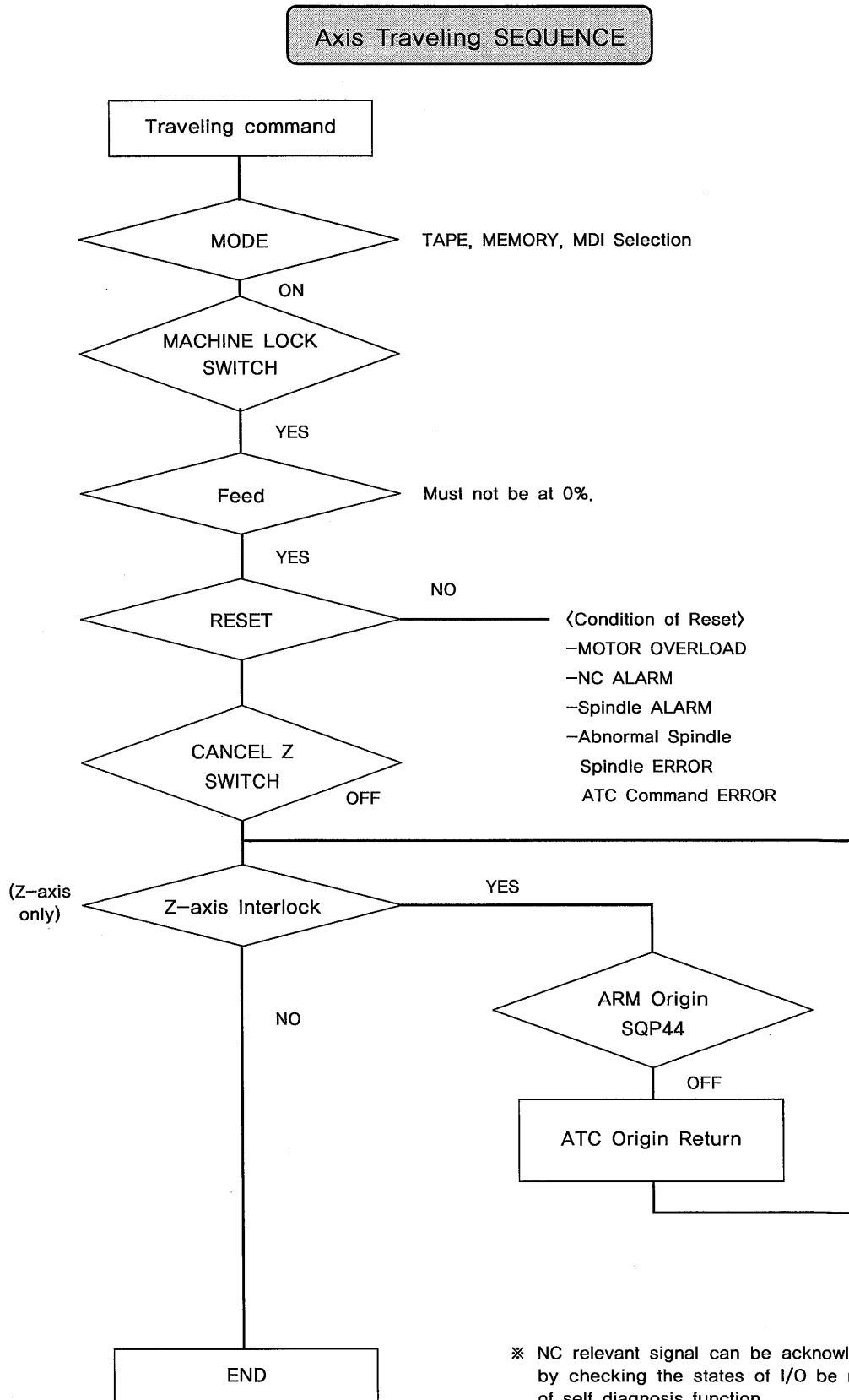




Operation of the Machine

HYUNDAI-KIA MACHINE

1.1.2 Axial Traveling Sequence(TAPE, MEMORY, MDI)

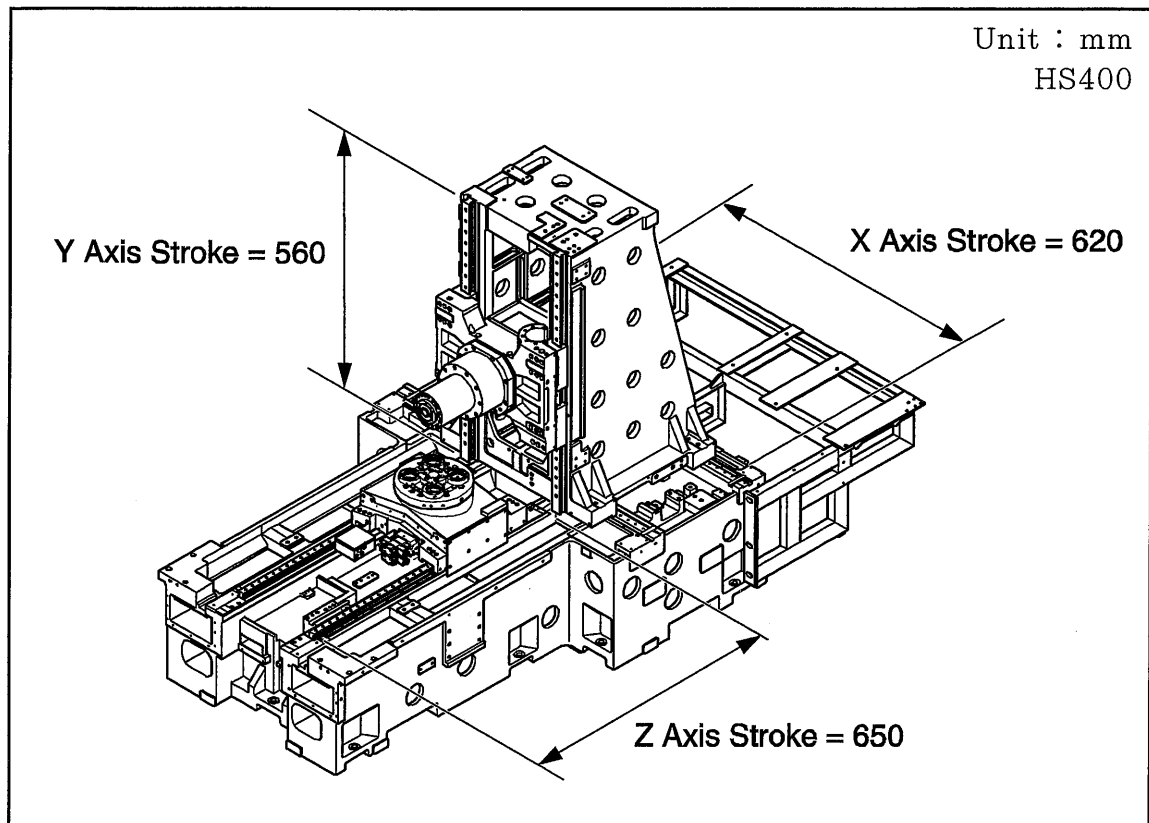


※ NC relevant signal can be acknowledged by checking the states of I/O by means of self diagnosis function.



1.2 Feed for Each Axis

1.2.1 Stroke of Each Spindle



〈Figure 1-1 Stroke of Each Spindle〉

■ Parameter number for stroke adjustment

- Backlash(Setting Value : -9999~+9999, Unit : 1/1000 mm)
NO. 1851(X), 1851(Y), 1851(Z)
- Grid Shift(Origin) (Setting Value : 0~±32767, Unit : 1/1000 mm)
NO. 1850(X), 1850(Y), 1850(Z)
- SOFT O.T(Setting Value : -99999999~+99999999, Unit : 1/1000 mm)
NO. 1320(X, Y, Z, B) + Direction Soft limit
NO. 1321(X, Y, Z, B) - Direction Soft limit

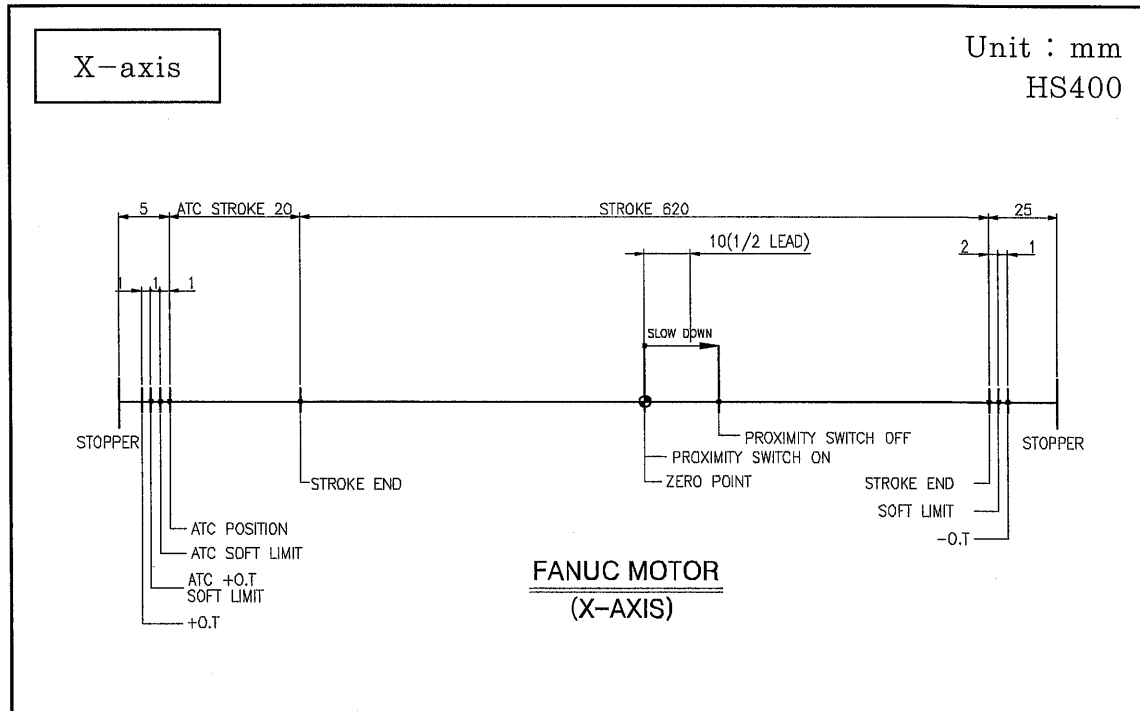
Parameter is to be set for each axis. For example, No. 1851 is the parameter set for backlash of X, Y and Z-axis.



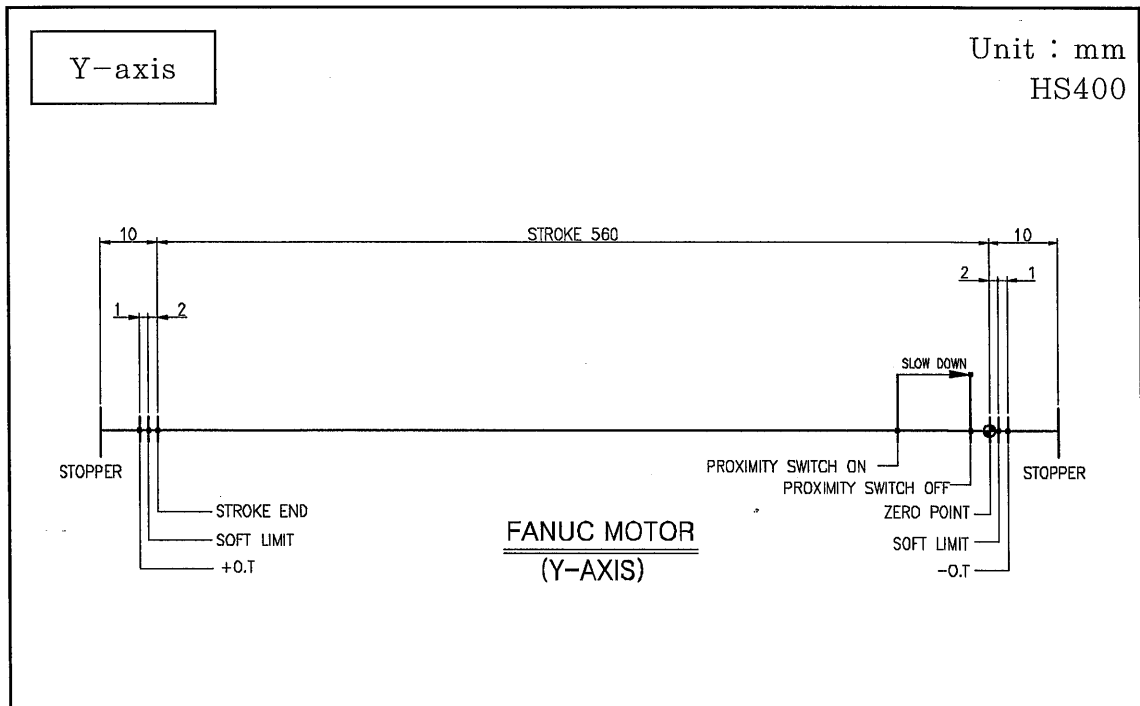
Operation of the Machine

HYUNDAI-KIA MACHINE

1.2.2 Limit Switch of Each Axis



<Figure 1-2 Limit Switch of X-Axis>

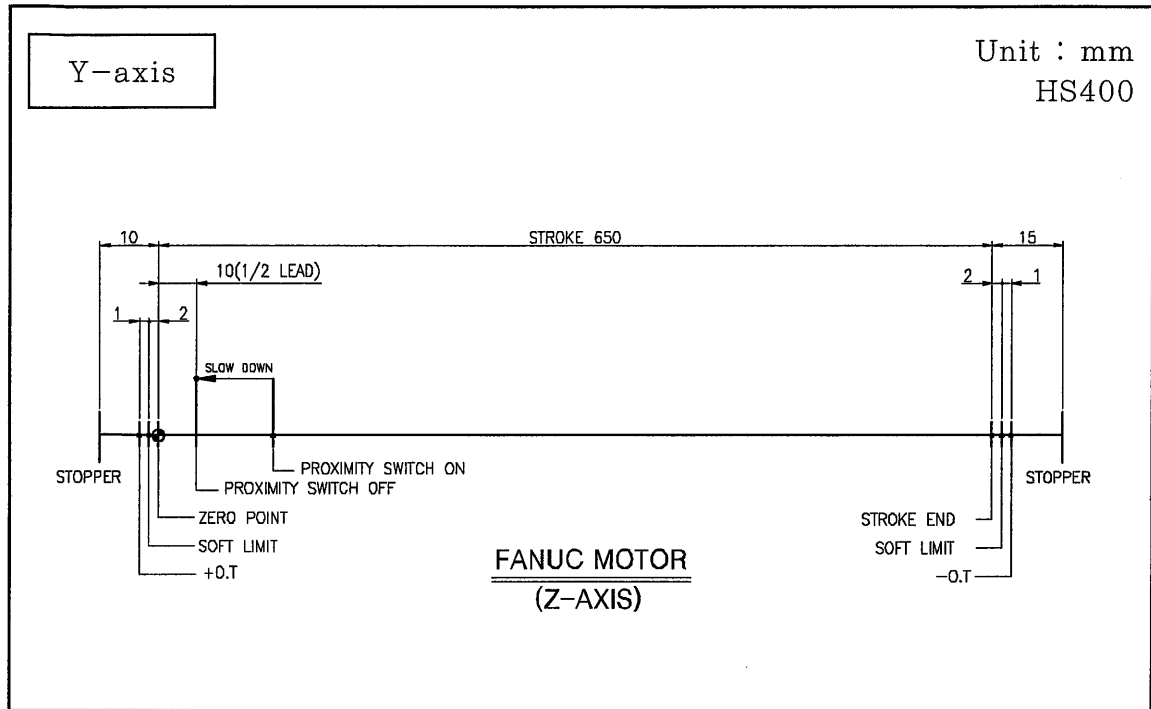


<Figure 1-3 Limit Switch of Y-Axis>



Operation of the Machine

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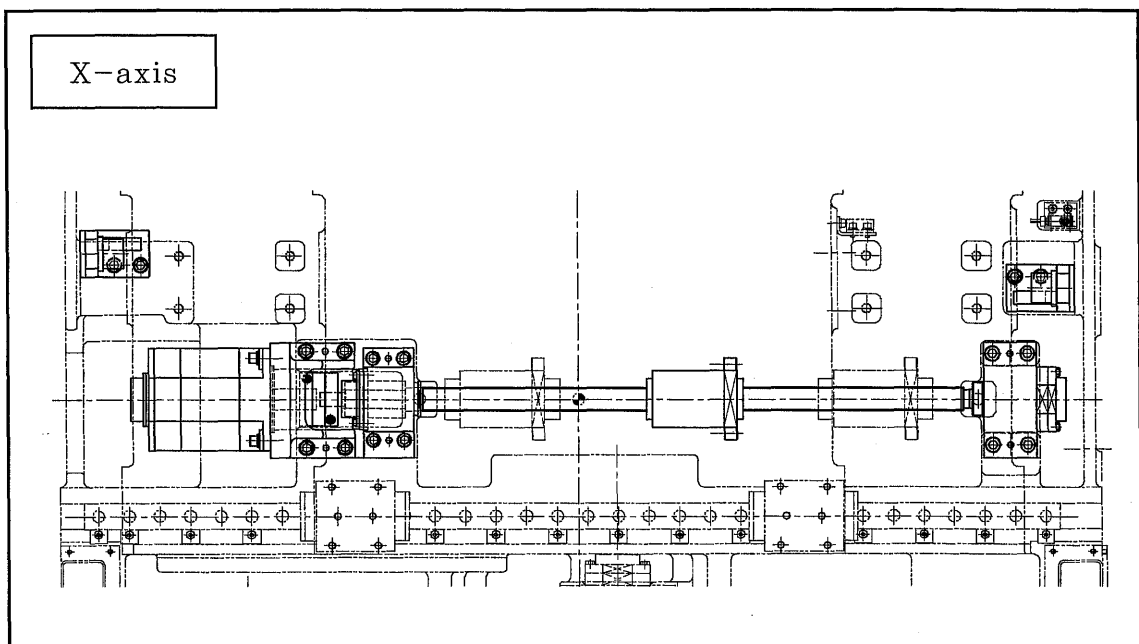


〈Figure 1-4 Limit Switch of Z-Axis〉



1.2.3 Driving Ball Screw for each Axis

Rotation of servo motor is conveyed to ball screw through coupling span so that each unit is driven. Two ends of ball screw of big diameter are secured by angular contact ball bearing that pre-pressure is applied on, a deep groove and thrust ball bearing. Also, the nut of ball screw is lubricated with oil and two ends of bearing ensure a high precision even for high speed operation for hours by means of forcing lubrication. On each axis the slide way with roller guide of low friction and high rigidity is installed.

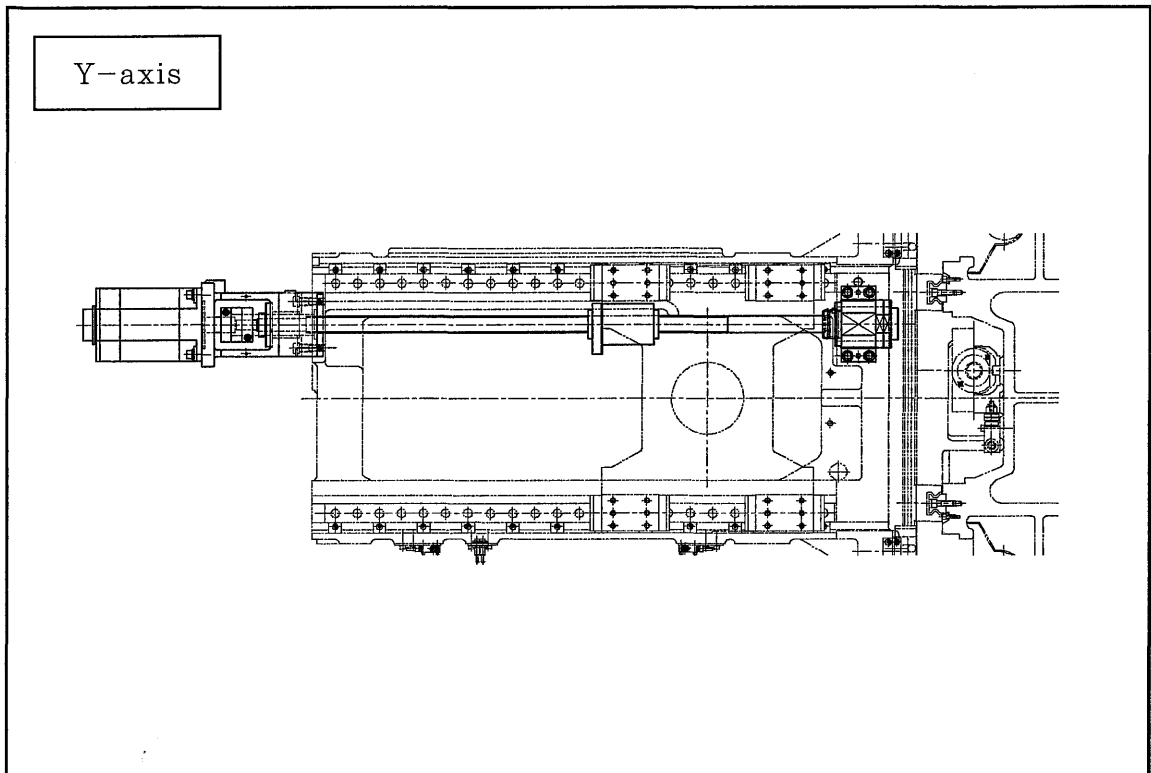


〈Figure 1-5 Driving Ball Screw for X-Axis〉

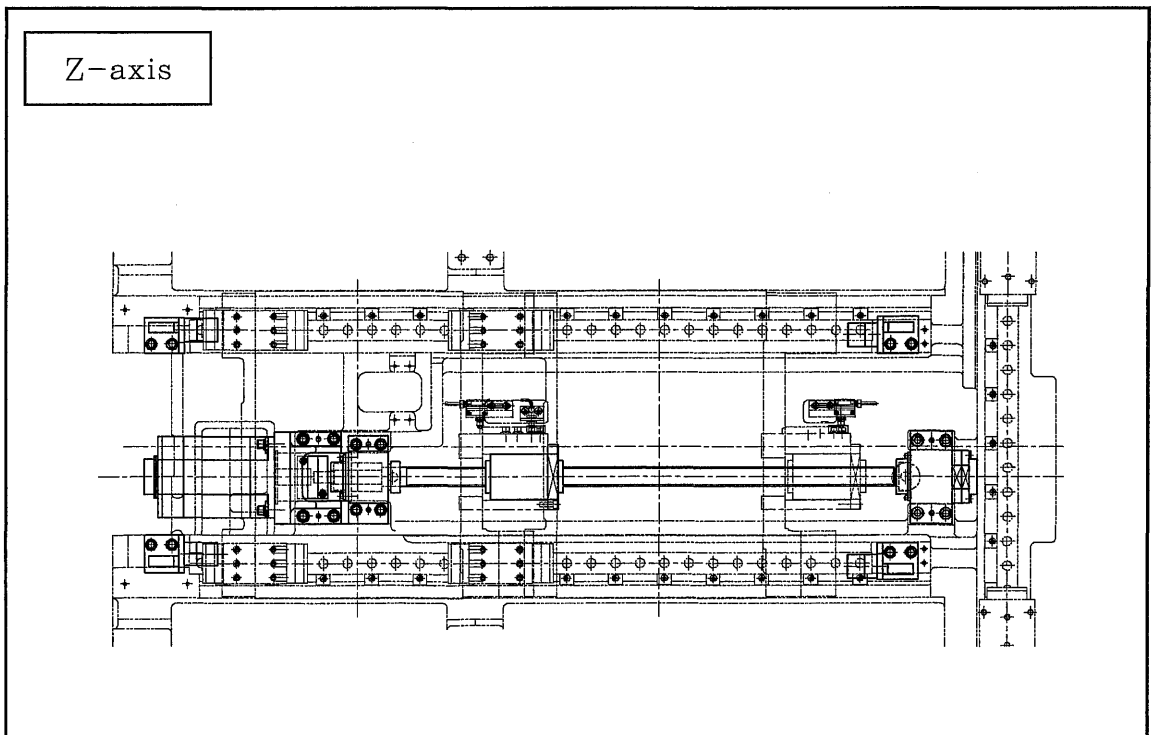


Operation of the Machine

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〈Figure 1-6 Driving Ball Screw for Y-Axis〉



〈Figure 1-7 Driving Ball Screw for Z-Axis〉



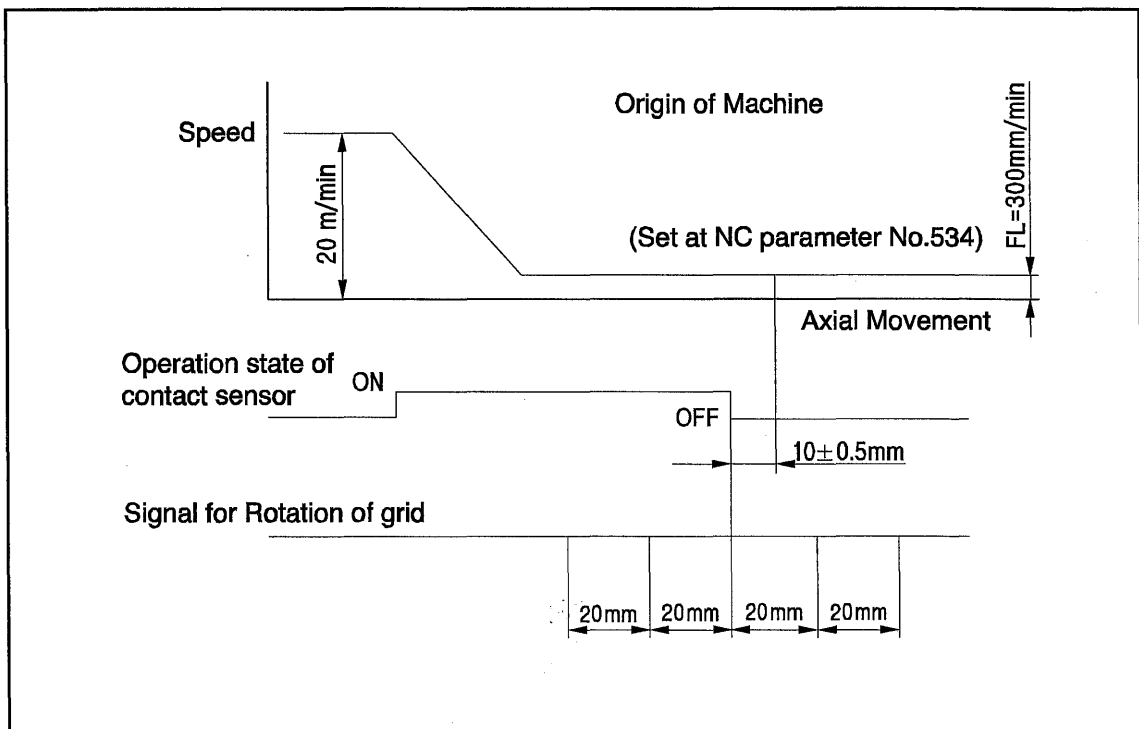
Operation of the Machine

HYUNDAI-KIA MACHINE

1.3 Origin of Machine

1.3.1 Method of Return to Origin

Machine moves rapidly in origin returning direction (X axis “-”side, Y axis “-”side, Z axis “+”side) after receiving the origin return command and when the origin returning dog touches contact sensor, deceleration begins and dog travels at reduced speed as shown in the figure below. When contact sensor off, it travels about $5\pm 0.5\text{mm}$ and stops. The position at which dog stops is the origin.



<Figure 1-8 Method of Return to Origin>



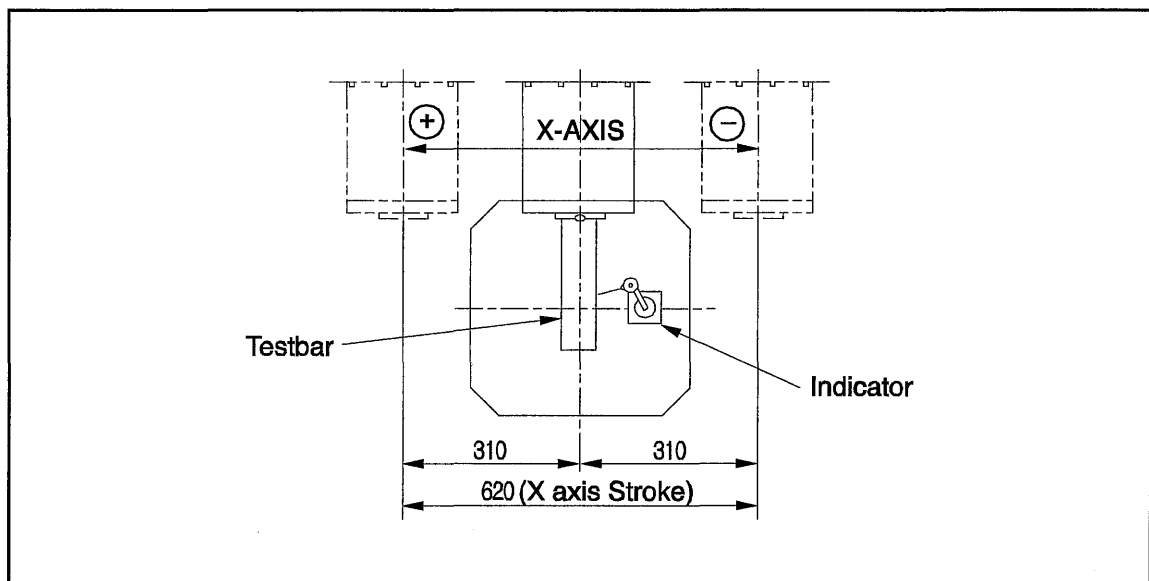
1.3.2 Origin Setting

1. X Axis

After completing proper adjustment for movement, location, lost motion and compensation of pitch error of each axis, set origin. This is a basic condition of origin return in each axis.

■ Origin in X-axis

In this unit the point at which center line of rotation of table meets is origin. Which is a center of stroke in X-axis.



〈Figure 1-9 Origin Setting in X-Axis〉

- 1) Insert test bar into hole of main spindle and place it such a way that center of shaking maintains horizontally.
- 2) Place indicator on pallet and contact it to the side of test var. Then find peak point according to movement in Y direction. And set the point to "0" . At the time, the end of indicator should face center of pallet.
- 3) After moving Y axis in (+) direction (Y) axis should be sufficiently moved not to interfere with indicator when table rotates), rotate table by 180° , then move Y-axis in(-)direction and find peak point of test bar. If this point becomes zero, this pint is the origin of X-axis.



Operation of the Machine

HYUNDAI-KIA MACHINE

- 4) In case origin is not accurately located in both (+) and (-) direction, a half of the gap should be converted to parameter No.1240(1st reference point in X-axis).
- 5) Usual confirmation is now sufficient but, in case of larger error (for example, more than 1.0 mm), the actions as below should be taken.
 - ① Investigate the cause of great error in location origin.
 - ② Adjust position of dog for stroke end at both ends of X-axis.(Between 1.0-1.5)
 - ③ Adjust position of dog for deceleration of origin return (Between 5.0 ± 1 mm)
- 6) After adjusting the position of origin, modification to digit of the 2nd reference position (position of ATC) is required for amount of the changed. For example, if the origin in X-axis is moved for 0.1 mm in direction of (-), digit of parameter 1241c 2nd reference position in X-axis) shall be increased, while if direction of (+), decreased.
- 7) Other notes
 - ① Since indicator is to measure origin with error range of 0.01, normal gauge should naturally be used, and in addition to that, indicator stand with its length short should also be used so that indicator does not be used so that indicator does not move due to impact at the time of rotation by 180° .
 - ② If "0" appears at the time of rotation by 180° , make rotation by 180° to confirm that "0" appears again.
 - ③ In case there is no test bar, boring bar, boring bar may be used as substitute. However, shaking or taper at the point of measurement must be confirmed.
 - ④ After converting 1st reference setting, it is not necessary to disconnect power. However, power may be switched off then on for reason of safety.

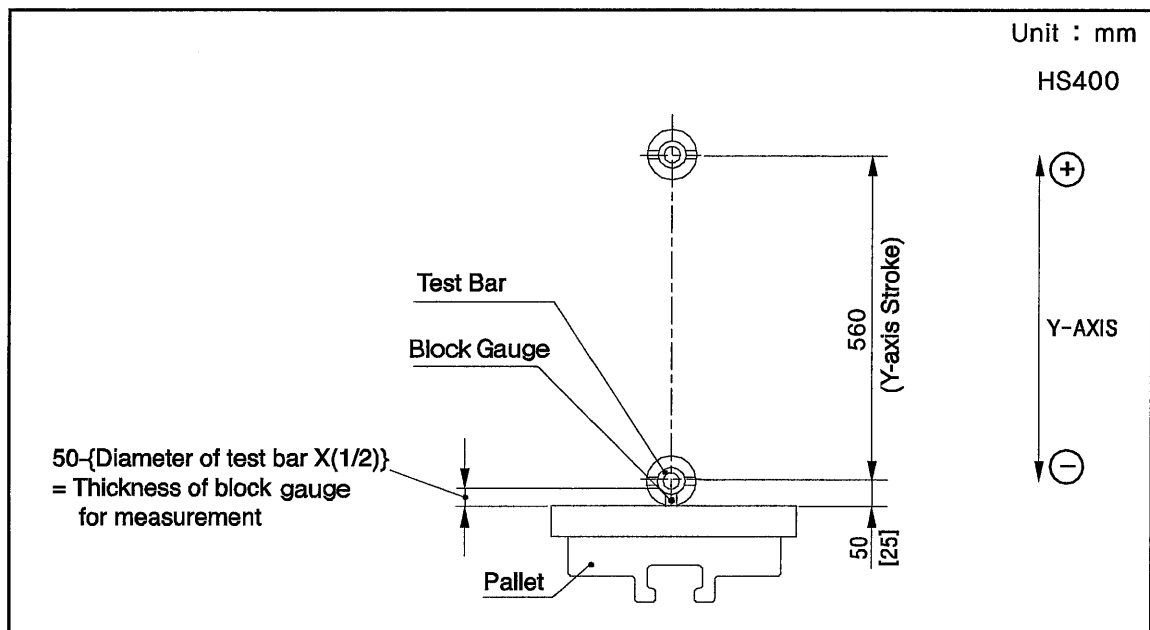
2. Y-Axis

After completing proper adjustment for movement, location and lost motion of each axis and compensation of pitch error, set origin. This is a basic condition of origin return in each axis. Origin is the point +50 mm apart from upper side of pallet along the center line of main spindle.



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〈Figure 1-10 Origin Setting in Y-Axis〉

- 1) Insert test bar into main spindle, and adjust center of shaking in vertical direction.
- 2) Measure behavior of test bar with micro gauge, and use block gauge with its size equal to the value obtained by deducting a half of size of test bar from 50.
- 3) In case of position after returning to origin, it is acceptable if block gauge used in clause 2 is inserted between upper side of pallet and test bar smoothly.
- 4) In case of movement for proper insertion of block gauge, convert the distance to parameter No.1240(1st reference point in Y-axis) which has corresponding value.
- 5) Perform origin return again, and confirm that block gauge is inserted smoothly.
- ※ In case indicator is adjusted just above test bar, hand of indicator moves when block gauge is inserted forcibly.
- 6) The fact that adjustment of origin is completed means that it is necessary to change value in the 2nd reference distance. For example, if origin of Y-axis travels by 0.1 mm in(-)direction, value in parameter No.1241(2nd reference point in Y-axis) is increased to 0.1.
- 7) Usual confirmation of origin is sufficient. However, in case of big error



Operation of the Machine

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(for example, more than 1.0 mm), following action should be taken.

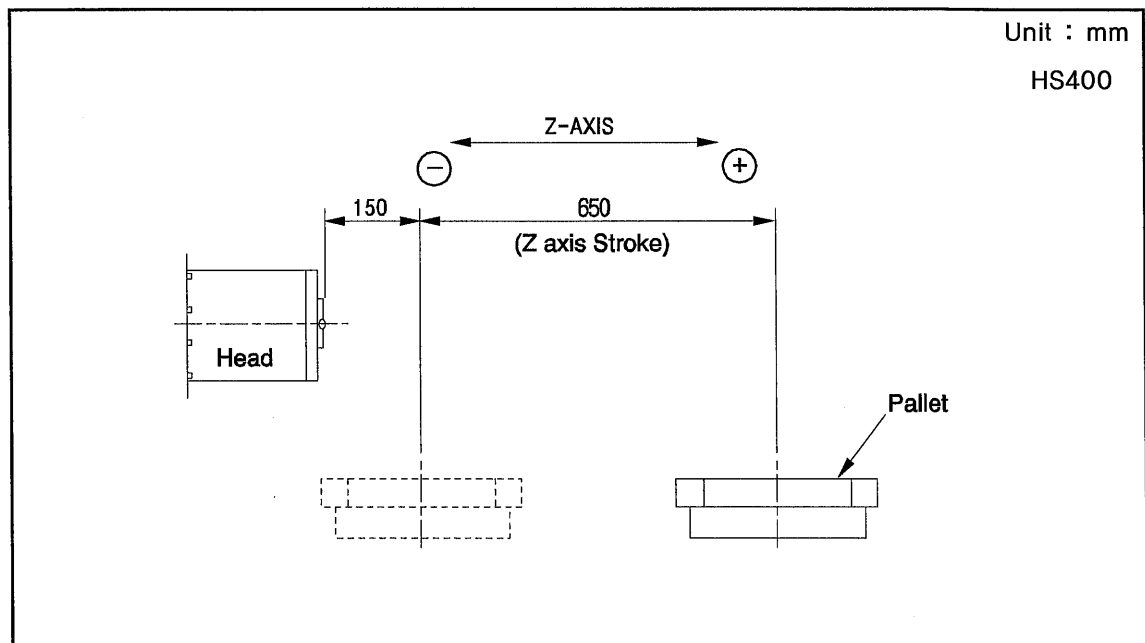
- ① Investigate the cause of great error in location origin.
- ② Adjust position of dog for stroke end at both ends of Y-axis (Between 1.0~1.5).
- ③ Adjust position of dog for deceleration of origin return (Between 5.0 ± 1.0 mm).

8) Other notes

- ① In case there is no test bar, boring bar may be used as a substitute. However, shaking or taper at the point of measurement must be confirmed.
- ② After changing 1st reference point setting, power should be switched off for safety.

3. Z-axis

After completing proper adjustment for movement, location and lost motion of each axis and compensation of pitch error, set origin. This is a basic condition of origin return in each axis.

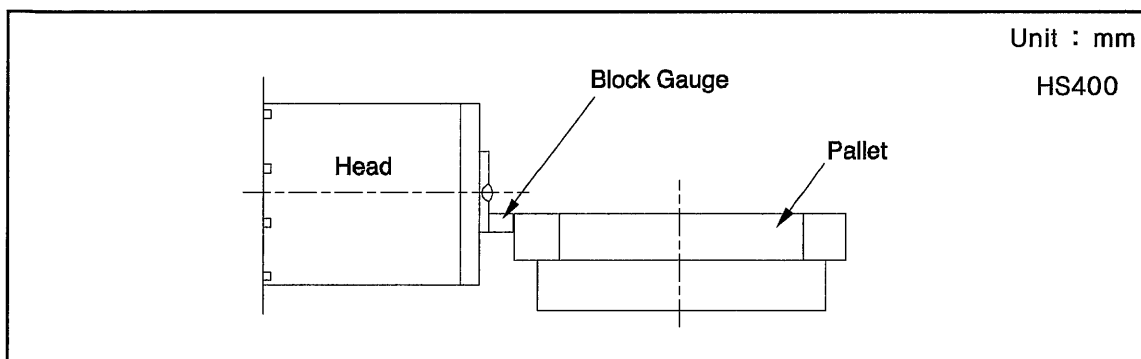


〈Figure 1-11 Origin Setting in Z-Axis〉



Operation of the Machine

HYUNDAI-KIA MACHINE



〈Figure 1-12 Origin Setting in Z-Axis〉

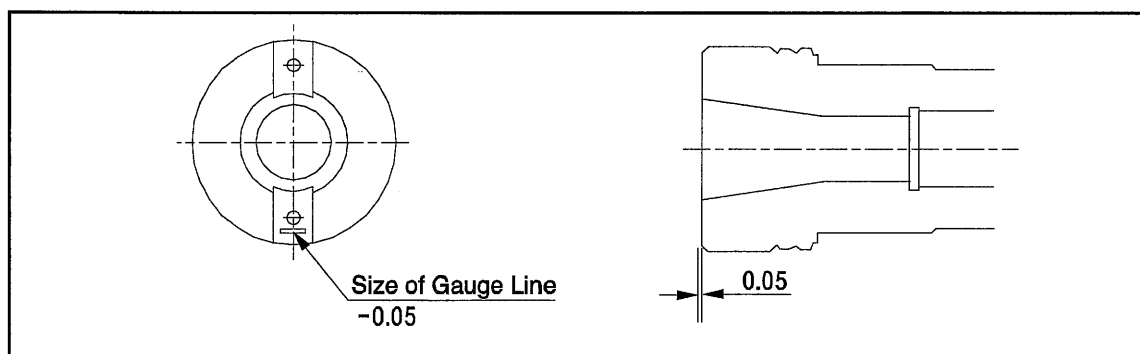
(Example)

- 1) Rotate B axis to 270° , then remove edge locator.
- 2) Use any block gauge (for example 30.00 mm) to set center of stroke in Y-axis.
- 3) Loose nose key and read value of main spindle hole gauge line written on the assembly surface of nose key (for example, if +0.02 is written).
- 4) Move Z-axis below origin in (-) direction by the following distance.
 - Value of stroke : 650.00
 - Amount stroke left toward table : $200 - 170 = 30$
 - Block gauge : 30
 - Personal amount of gauge : 0.02 $\Rightarrow 650.0 - 30 - 30 - 0.02 = 589.98$

(Reference)

[Movement amount of gauge line at spindle taper part]

Movement amount of gauge line of main spindle taper part is written on the assembly surface of nose key in spindle. (this amount should be taken into account when adjusting origin of Z-axis)



〈Figure 1-13 Size of Gauge Line〉



Operation of the Machine

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In case -0.05 is written in the assembly surface as shown in the figure above, gauge line is out by 0.05 mm from section. Therefore, the 2nd reference point can be determined and this value is important.

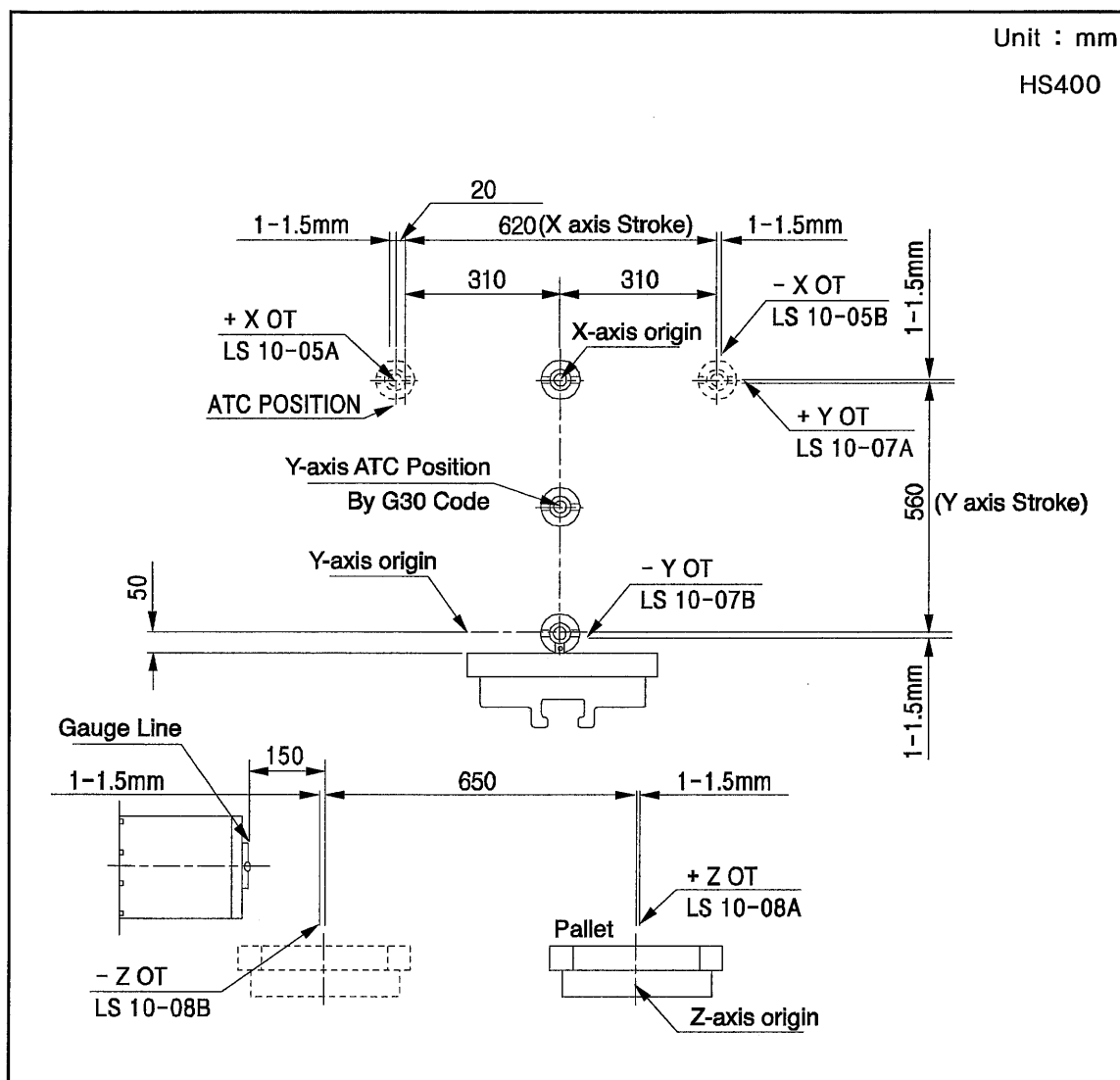
- 5) Move Y-axis in(-) direction by manual. In case Y-axis is at the position as shown in the figure above, insert block gauge (30.00 mm) between pallet and section of spindle. It is acceptable if block gauge is inserted smoothly.
- 6) Value of parameter No.1240(1st reference point of Z-axis) should be changed when moving in order to have smooth insertion of block gauge.
- 7) Then, perform origin return once more and confirm that block gauge is inserted smoothly.
- 8) Usual confirmation of origin is sufficient. However, in case of big error (for example, more than 0.1 mm), following action should be taken.
 - ① Investigate the cause of big error in locating origin.
 - ② Adjust position of dog for stroke end at both ends of Z-axis (Between $1.0\sim 1.5$ mm).
 - ③ Adjust position of dog for origin return (Between 5.0 ± 1 mm). Contact us for these three points.
- 9) Other notes
 - ① After changing 1st reference point setting, power should be switched off for safety.
 - ② If Z-axis travels continuously in(-)direction where Y-axis locates near(-) stroke, there occurs interference between spindle and pallet. Therefore, attention should be paid.
 - ③ Since the 2nd reference point is at the(+)side of stroke, stroke limit of parameter No.1320~No.1321 must be set and limit switch in the(+) direction in Z-axis must be adjusted($1.0\sim 1.5$ mm in addition to stroke).
 - ④ Attention should be paid so that nose key is not damaged.



Operation of the Machine

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1.3.3 Position Setting of Machine Origin



〈Figure 1-14 Position Setting of Machine Origin〉



Operation of the Machine

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1.3.4 Setting List Related to Origin

FANUC 18i-MB Parameter List

Contents	No.	Standard Setting (mm)	Remarks & Inch Setting
1st Reference (G28 Position) (Origin of machine) X axis	1240	-	Setting Unit : Micrometer (μm)
" Y axis	1240	-	"
" Z axis	1240	-	"
Stored Stroke Limit X+	1320	-	"
" Y+	1320	-	"
" Z+	1320	-	"
" X-	1321	-	"
" Y-	1321	-	"
" Z-	1321	-	"
2nd Reference (G30 Position) (ATC Position) X axis	1241	-	"
" Y axis	1241	-	"
" Z axis	1241	-	"

※ Standard setting vary depending on various machine.



Operation of the Machine

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1.4 Main Operation Panel

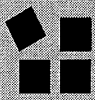
	Name	Usage
AUTOMATIC OPERATION GROUP	Mode Selector Switches	Select one of TAPE(Tape Automatic or DNC Operation), MEMORY(Automatic Operation), MDI(Manual Data Input or MDI operation), JOG(JOG feed operation) and RAPID(Manual Rapid Traverse Operation).
	PROGRAM START	Start a running of Program. When the program is running, program start LED is on until the program is ending.
	FEED HOLD	When this button is pressed, a feed of axis is stop and also Feed Hold LED is on. Feed Hold LED will be off by Program start or reset button.
	FEEDRATE OVERRIDE(%)	It can be applied an override every 10 % from 0 to 200 % for designated speed by F function during automatic operation. But, during G84(Tapping Cycle), override is ignored.
	RAPID OVERRIDE(%)	It can be applied an override by 4 steps, which are F0, 25, 50 and 100 % for rapid traverse of Automatic and Manual operation.
	DRY RUN	If this switch is on, manual federate is applied instead of designated speed on the mode of NC Tape or Memory.
	Z AXIS CANCEL	Only Z axis be locked.



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	Name	Usage
MANUAL OPERATING GROUP	BLOCK SKIP	Program is running with ignoring of the block that includes “/”.
	OPTIONAL STOP	If M01 is commanded in the program, operation of program is stopped.
	SINGLE BLOCK	Program is running one by one block.
	MACHINE LOCK	If this switch is on, feed command pulse in the machine is stopped and is not moved anything, but display is proceeded.
	MEMORY LOCK/WRITE	In case of Lock mode, data of memory is protected. In case of Write mode, data of memory can be modified. To protect a memorized program, please keep Lock mode in normal situation.
	TOGGLE SWITCH OF JOG FEED	By this switch, manual feed(JOG, RAPID FEED) of each axis can be moved to ‘+’ and ‘-’ direction, as well as returning to reference point manually.
	HANDLE	By this switch, manual feed(JOG, RAPID FEED) of each axis can be moved to ‘+’ and ‘-’ direction, as well as returning to reference point manually. By MPG, each axis can be moved. Select an axis that will be moved, select a multiple of feed and feed by MPG. One scale of MPG is one pulse. One pulse will be 0.001 mm, 0.01 mm or 0.1 mm by multiple.
	COOLANT SWITCH	On/off a coolant motor(It is available on the both mode of manual and auto)
	EMERGENCY STOP	Stops the machine completely and reset the control device.
	SPINDLE START/STOP	When Start and Select buttons are pressed together, spindle rotate forward or reverse direction which set by Data Table K1.0.
	CALL LIGHT OFF	Off the call light
MAGAZINE INDEX	Magazine will be rotated forwardly during holding this button.	
WORK LIGHT	On/off the work light.	

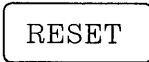

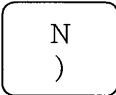
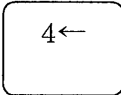






Operation of the Machine

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1.5 Explanation of Key Board

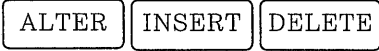

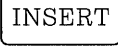
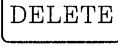

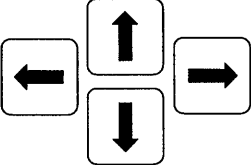








1.5.1 Explanation of Key Board of Operation Panel of CRT/MDI

No.	Name	Usage
1	Reset(RESET) Key 	Used to reset the CNC to release an alarm or other similar state.
2	Help(HELP) Key 	Used to get help with operations such as for the MDI keys, when the operator does not know what to do next. (Help Function)
3	Soft Key	The soft keys are assigned different functions depending on the application. The functions currently assigned to the soft keys are displayed on the lowermost line of the screen.
4	Address/Number Key   ...	Used to enter Alphabet letters and numbers.
5	Shift(SHIFT) Key 	Some of the address keys have two different letters. When the shift key is pressed first before pressing one of these address keys, the lower-right letter is input. When the shift key is pressed, '^' is displayed in the key input buffer indicating that the lower-right letter will be used.
6	INPUT Key 	Data input by pressing an address or numeric key is stored in the key input buffer, and then displayed. When data input to the key input buffer needs to be written to the offset register, press the <INPUT> key. This key is equivalent to soft key [INPUT]. Either key may be used.
7	Cancel(CAN) Key 	Used to delete letters or numbers input to the key input buffer. Example) When N001X100Z is displayed on the key input buffer, pressing the  key deletes the letter Z, and N001X100 is displayed.



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No.	Name	Usage
8	Edit Key 	Used to edit programs.  : Alter  : Insert  : Dlete
9	Function Key 	Used to switch screens for each function. For more details, refer to chapter 2 and 3.
10	Cursor Key 	Four cursor keys are provided.  Moves the cursor to the right or forwards in small units.  Moves the cursor to left or backwards in small units.  Moves the cursor downward or forwards in large units.  Moves the cursor upward or backwards in large units.
11	Page UP/DOWN Key  	Page-up and page-down keys are provided.  Used to display the next page.  Used to display the previous page.



1.5.2 Function Key

The function keys select what is displayed. It is prepared function keys on MDI panel.

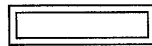
POS	Displays the current position.
PROG	Displays and edits a program stored in memory.
OFFSET SETTING	Displays the Offset/Setting screen.
SYSTEM	Displays the system screen.
MESSAGE	Displays the message screen.
GRAPHIC	Displays the graphic screen.
CUSTOM	Displays the custom screen(conversational Macro screen).



1.5.3 Soft Key

When press a soft key belong to function key, it can be displayed more detailed screen that is changed. And also soft keys are used for actual operations. The transition tree diagram of soft key that is changed by pressing below each function is shown in following.

The symbols in the following figures that is used in tree diagram of soft key mean as shown below.



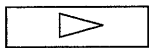
: Indicates Screen.

: Indicates a screen that can be displayed by pressing a function key. *1)

{ } : Indicates a soft key.

() : Indicates input from the MDI panel.

{ } : Indicates a soft key displayed in green.



: Indicates the continuous menu key(right side soft key).

*1) Press function keys to switch between screens that are used frequently.

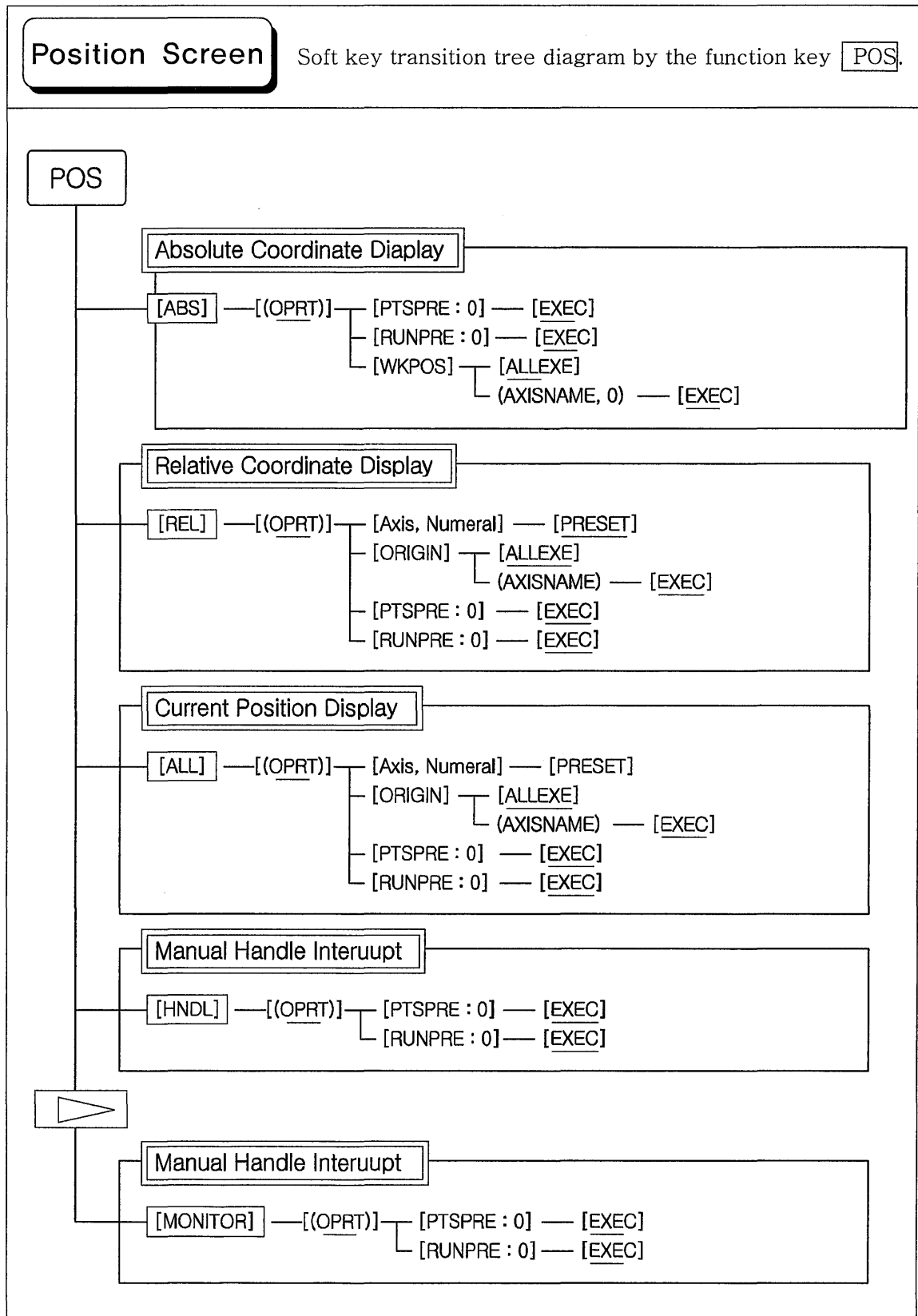
*2) Some of soft keys are not displayed depending on the option configuration.

*3) The continuous menu key might be omitted when the 12 soft keys display unit is used.



Operation of the Machine

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Operation of the Machine

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Program Screen

Soft key transition tree diagram by the function key

(In MEM mode) [PROG]

PROG

Program Display Screen

[PRGRM]

①

[(OPRT)]

[BG EDIT]

(O Number)

[O Search]

(N Number)

[N Search]

[REWIND]

[P TYPE]

[Q TYPE]

[F Search]

[CAN]

(NNumber)

[EXEC]

→ See when the soft key [BG EDIT] is pressed.

Program Check Screen

[CHECK]

[ABS]

[REL]

[(OPRT)]

[BG EDIT]

(O Number)

[O Search]

(N Number)

[N Search]

[REWIND]

[P TYPE]

[Q TYPE]

[F Search]

[CAN]

(N Number)

[EXEC]

→ See when the soft key [BG EDIT] is pressed.

Current Block Screen

(Current Block)

[(OPRT)]

[BG EDIT]

→ See when the soft key [BG EDIT] is pressed.

Next Block Screen

(Next Block)

[(OPRT)]

[BG EDIT]

→ See when the soft key [BG EDIT] is pressed.

Program Restart

(Restart)

[(OPRT)]

[BG EDIT]

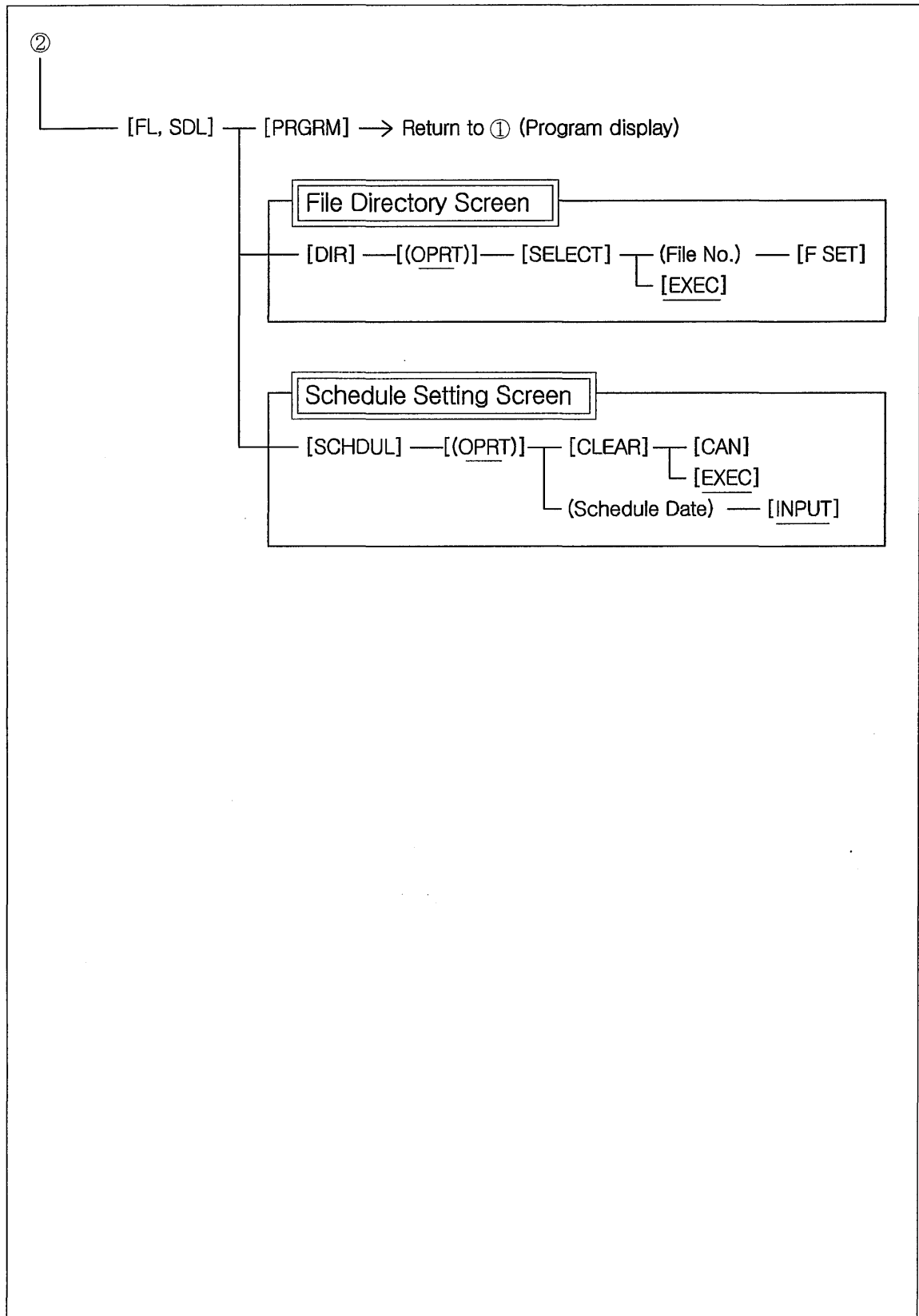
→ See when the soft key [BG EDIT] is pressed.

② (Continued on the next page)



Operation of the Machine

HYUNDAI-KIA MACHINE





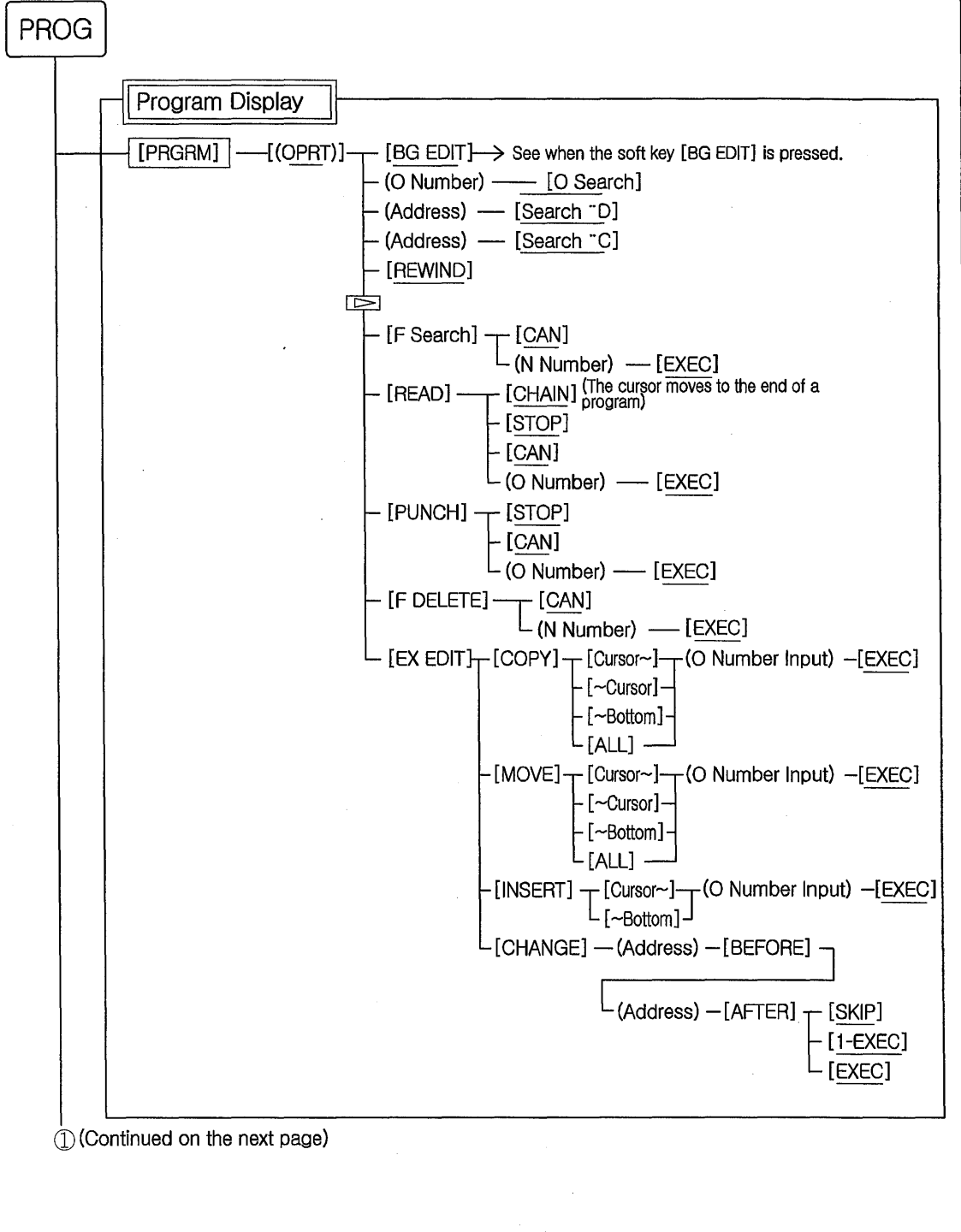
Operation of the Machine

HYUNDAI-KIA MACHINE

Program Screen

Soft key transition tree diagram by the function key

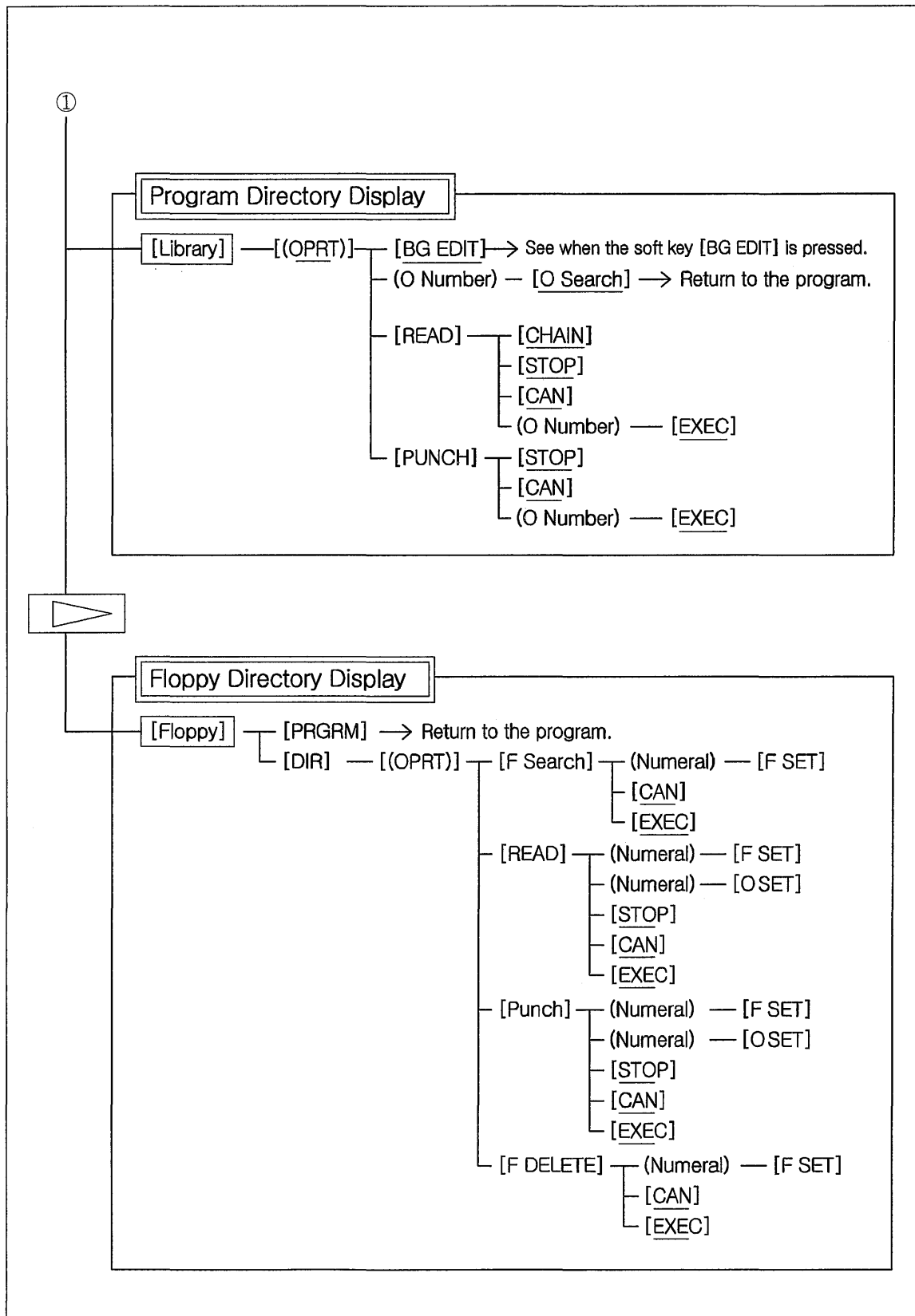
PROG (In EDIT mode)





Operation of the Machine

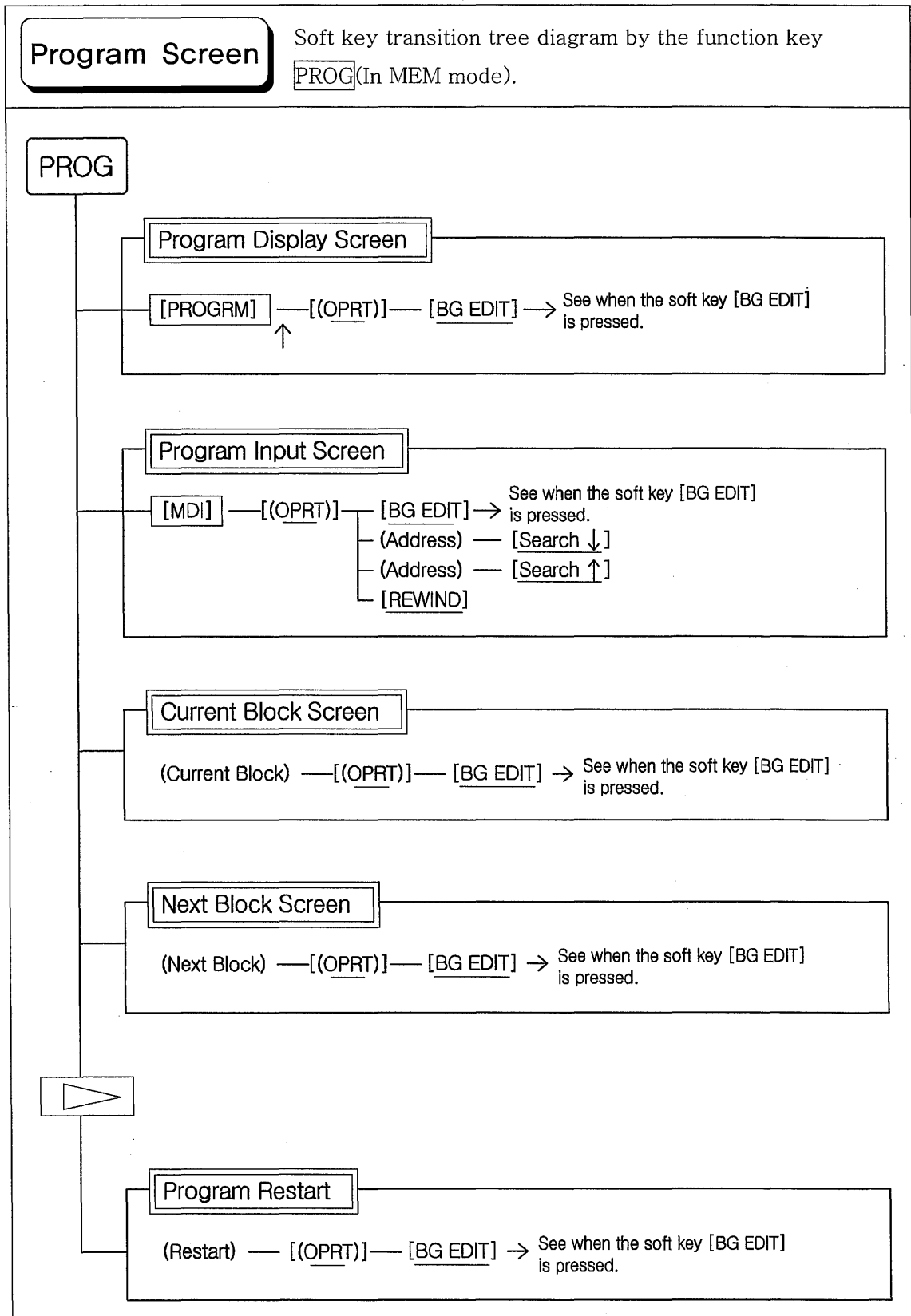
HYUNDAI-KIA MACHINE





Operation of the Machine

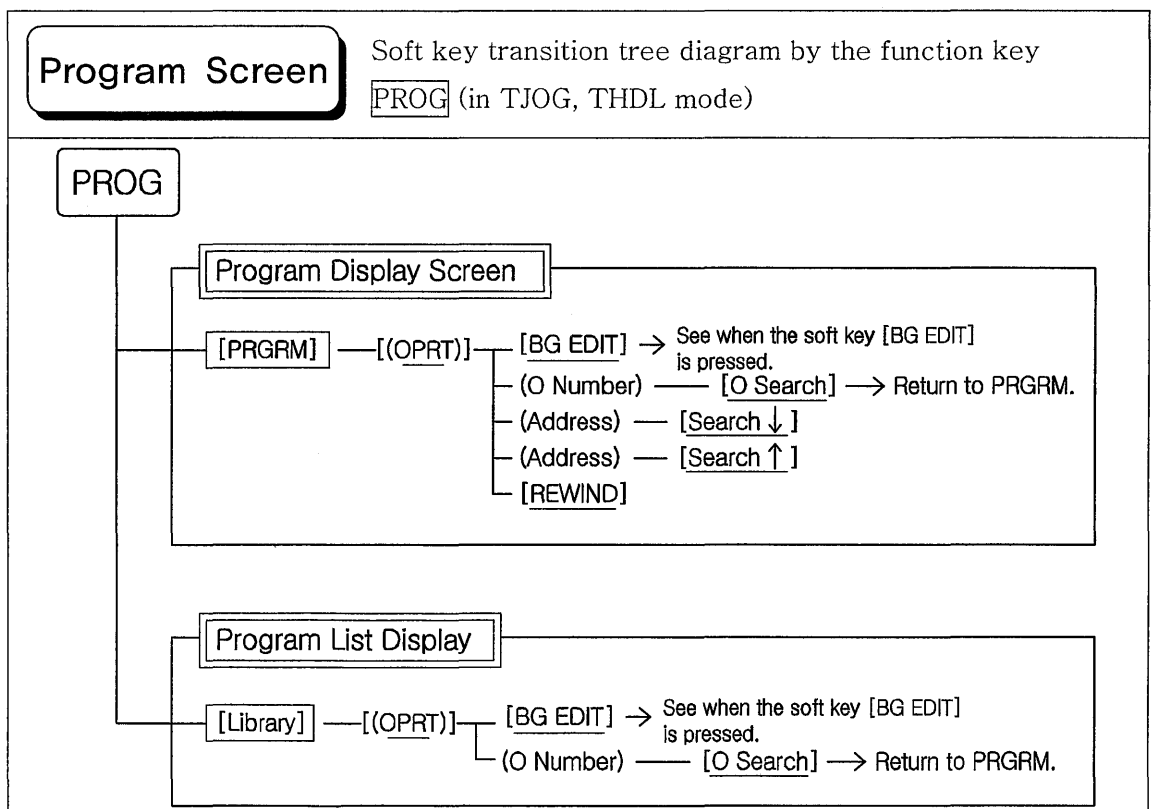
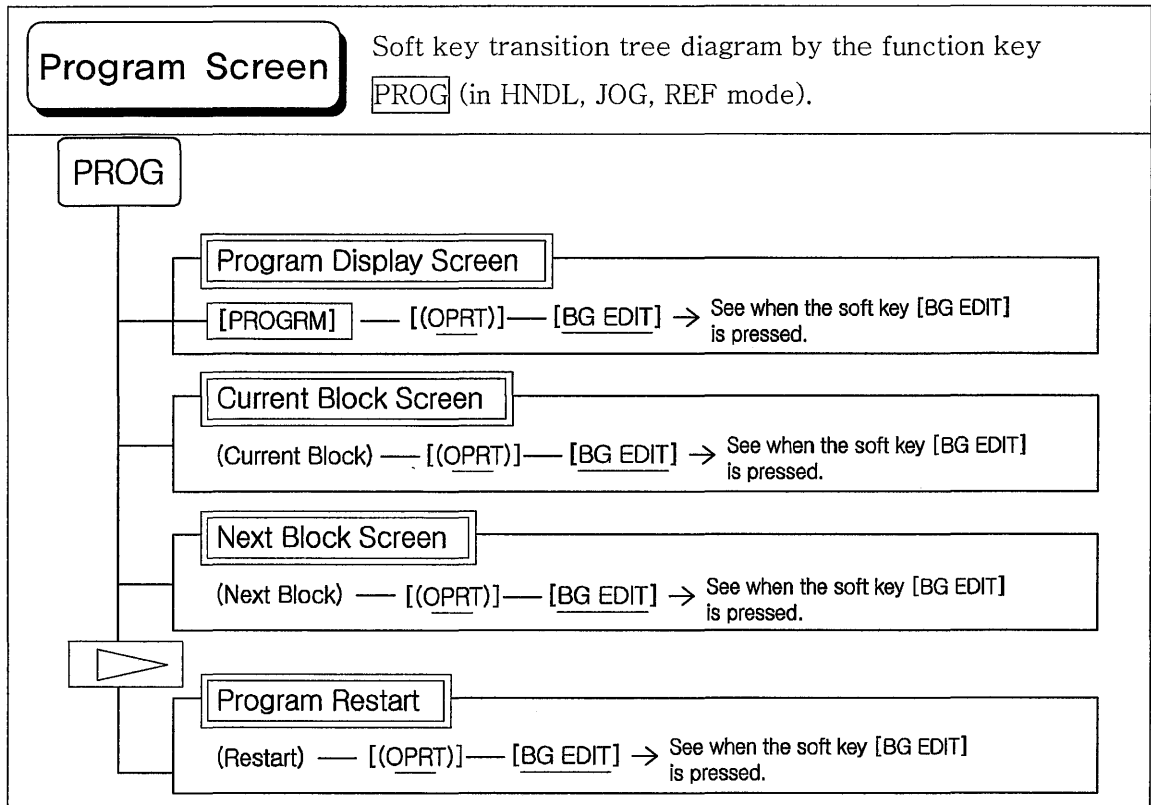
HYUNDAI-KIA MACHINE





Operation of the Machine

HYUNDAI-KIA MACHINE





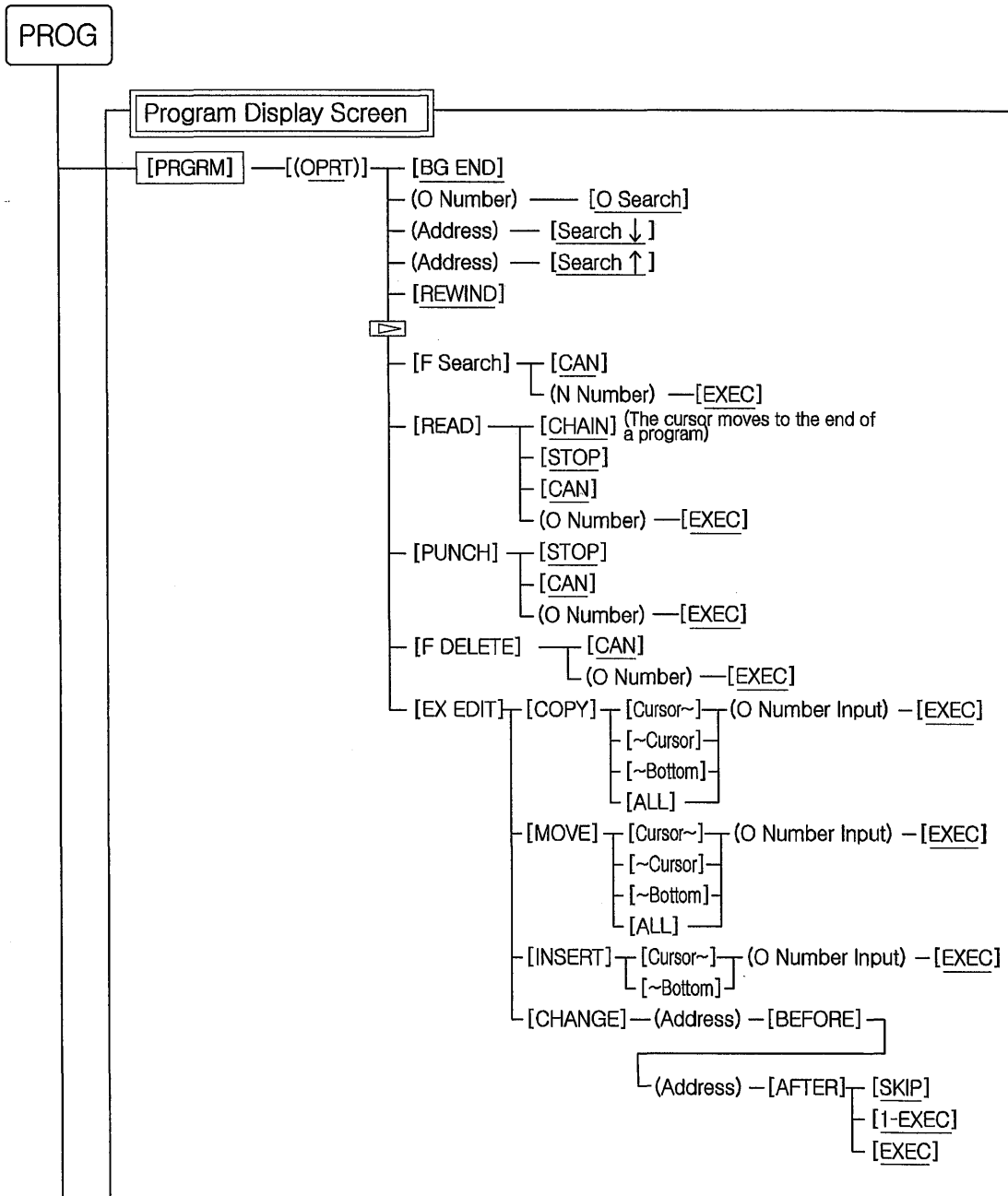
Operation of the Machine

HYUNDAI-KIA MACHINE

Program Screen

Soft key transition tree diagram by the function key

[PROG] (In pressing [BG EDIT] key) <The same of all mode>.

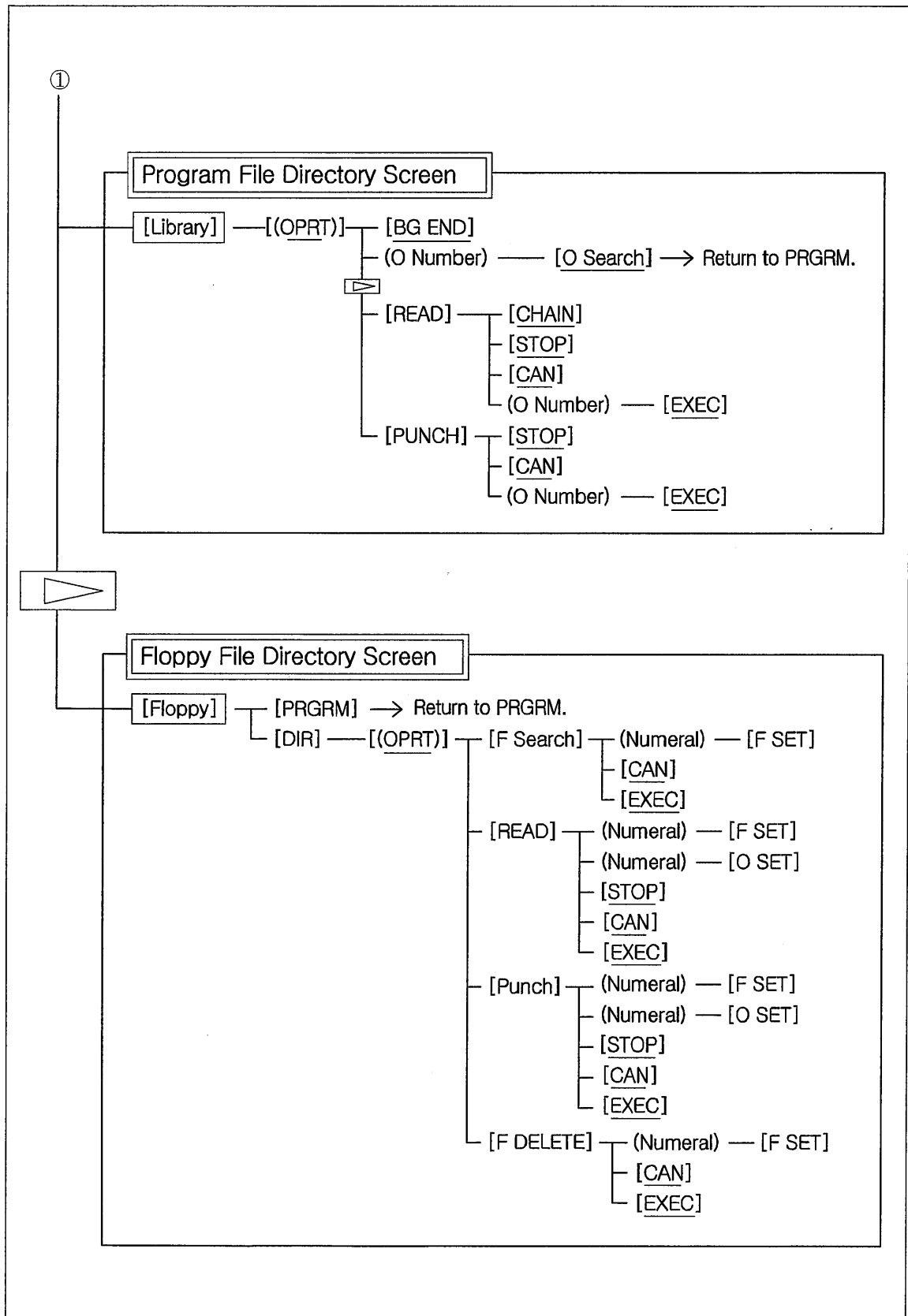


① (Continued on the next page)



Operation of the Machine

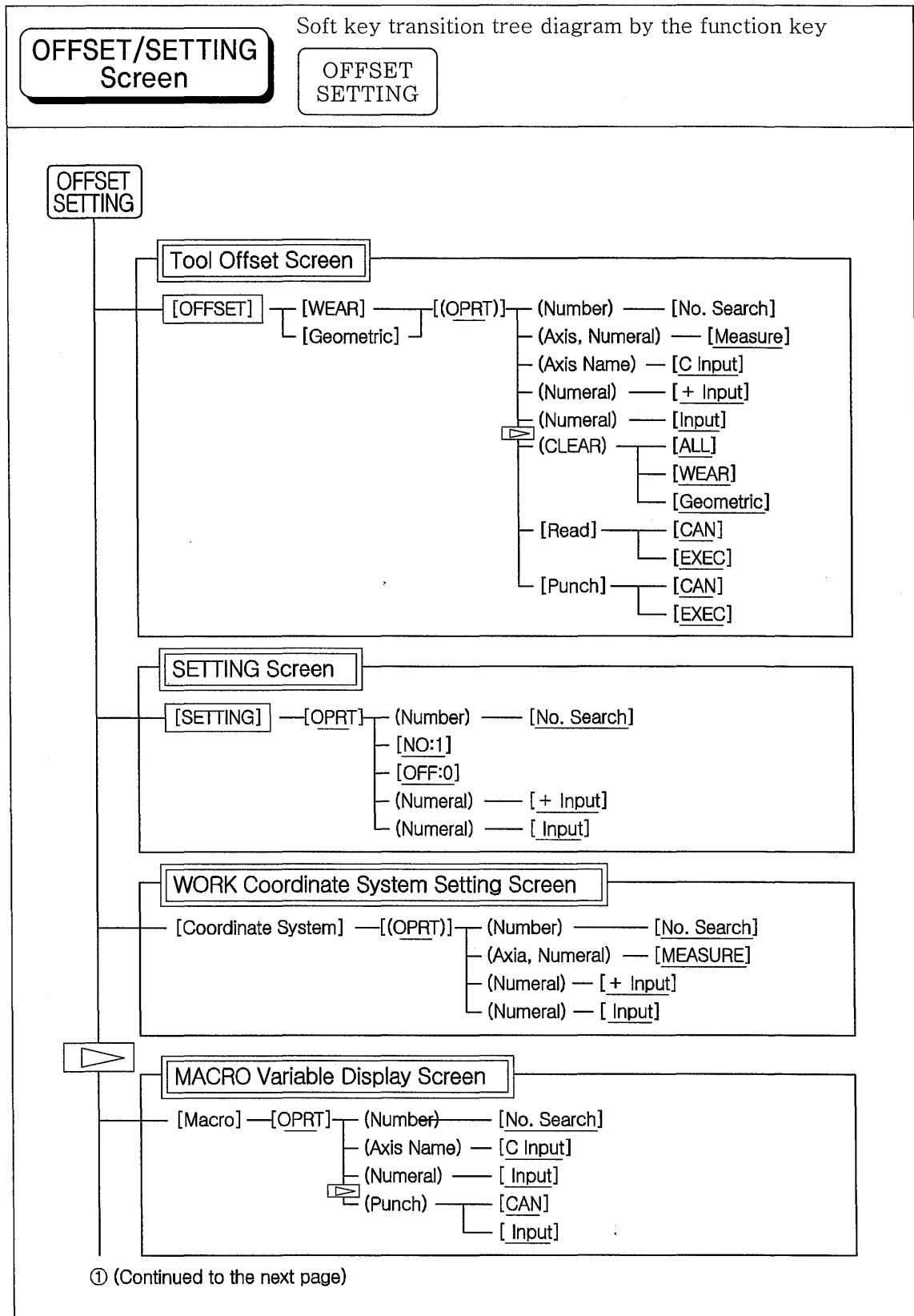
HYUNDAI-KIA MACHINE





Operation of the Machine

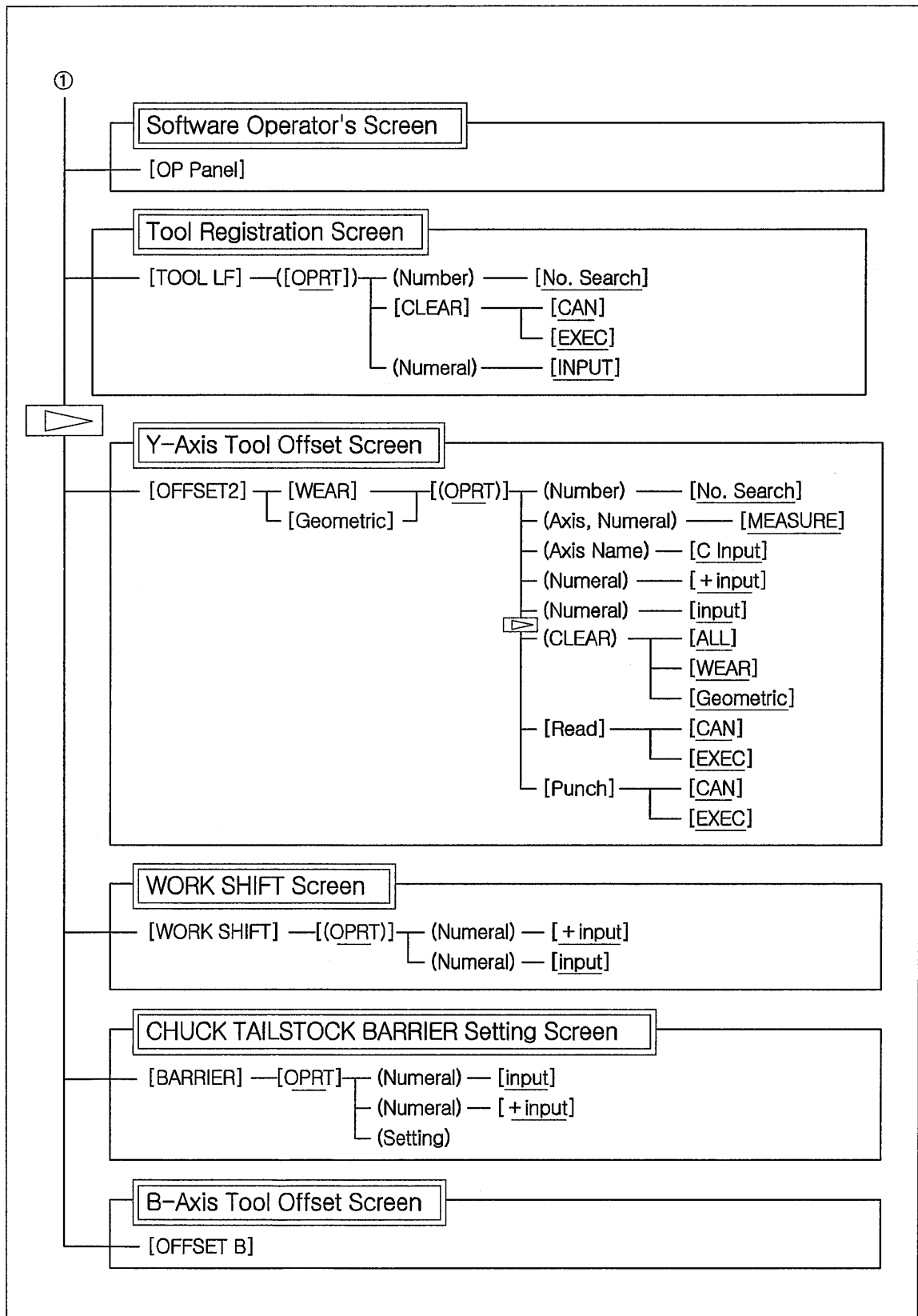
HYUNDAI-KIA MACHINE

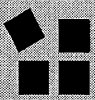




Operation of the Machine

HYUNDAI-KIA MACHINE





Operation of the Machine

System Screen

Soft key transition tree diagram by the function key

SYSTEM.

SYSTEM

PARAM Screen

[PARAM]

— [(OPRT)]

(Number) — [No. Search]

(NO:1)

(OFF:0)

(Numeral) — [+ Input]

(Numeral) — [Input]



(READ) — [CAN]
 [EXEC]

[PUNCH] — [ALL] — [CAN]
 [EXEC]
 [OUT] — [CAN]
 [EXEC]

Diagnosis Screen

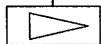
[DGNOS]

— [OPRT]

(Number) — [No. Search]

SYSTEM Configuration Screen

[SYSTEM]

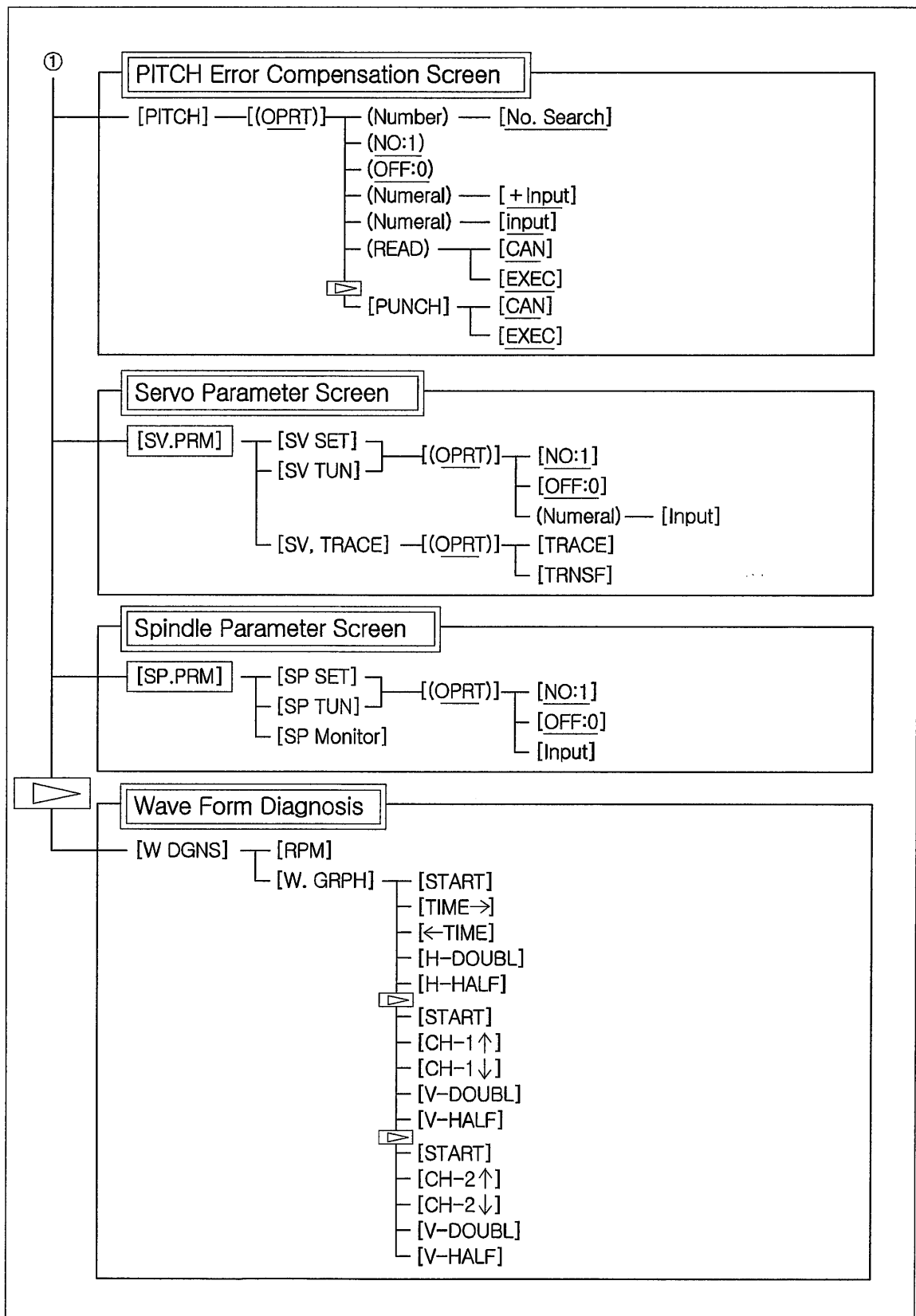


① (Continued on the next page)



Operation of the Machine

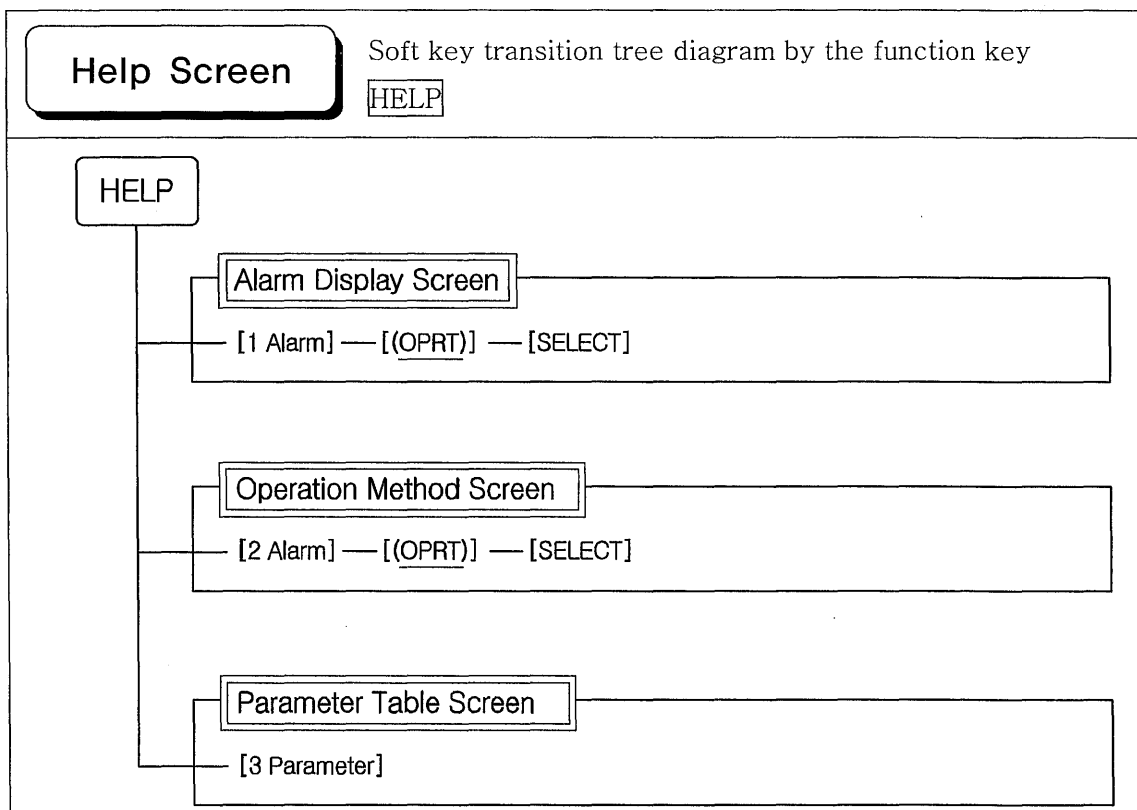
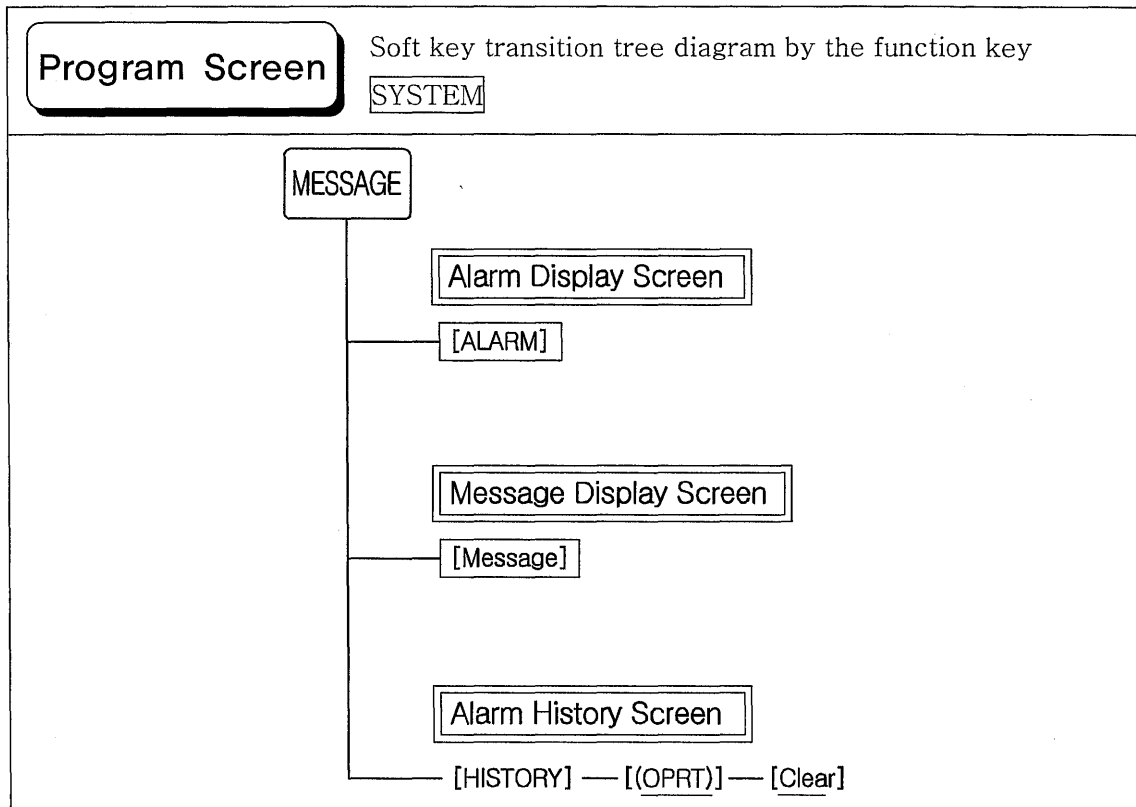
HYUNDAI-KIA MACHINE





Operation of the Machine

HYUNDAI-KIA MACHINE

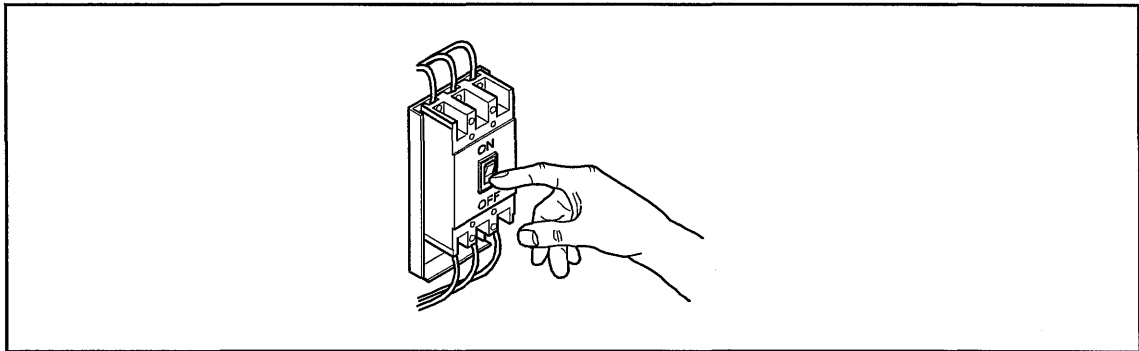




1.6 The Procedure of Machine Operation

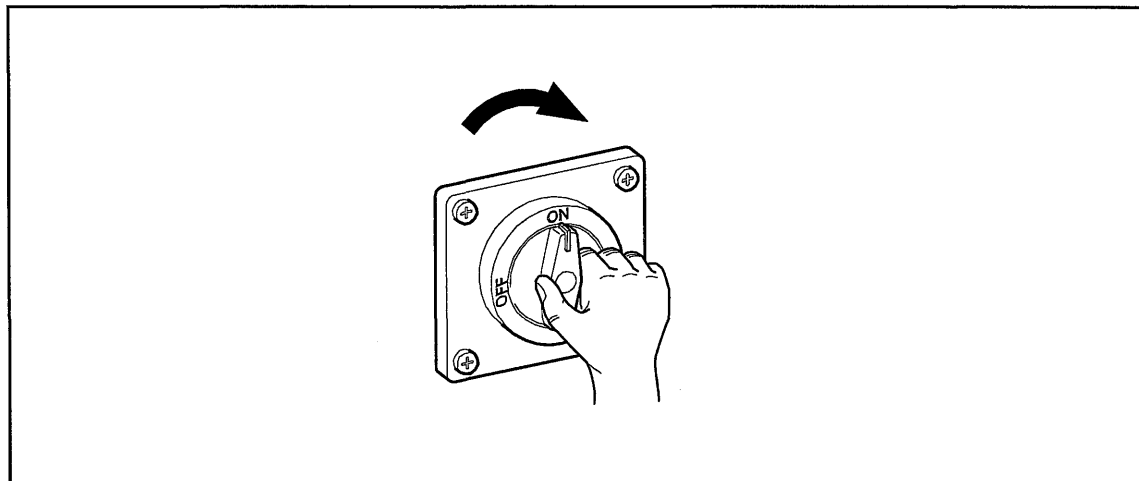
1.6.1 Starting of Machine

- 1) Please maintain a level of machine after checking it.
- 2) Check whether it is wet at the power cable before connecting. If it is wet, please remove it completely.
- 3) Connect a power cable in primary terminal of main switch and plug power into outlet.
- 4) Turn the main switch on.



〈Figure 1-15 Main Power Switch〉

- 5) Turn the power switch of main electric cabinet on.



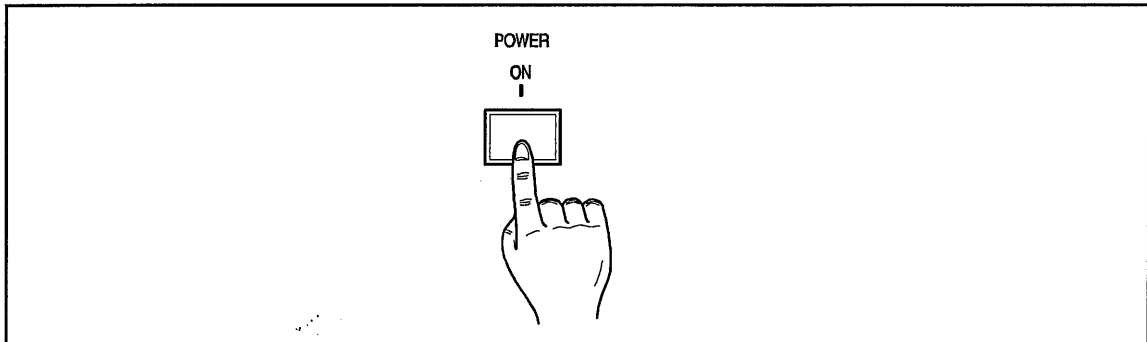
〈Figure 1-16 Power Switch of Main Electric Cabinet〉



Operation of the Machine

HYUNDAI-KIA MACHINE

- 6) Press the power switch of NC unit at the main operation panel.

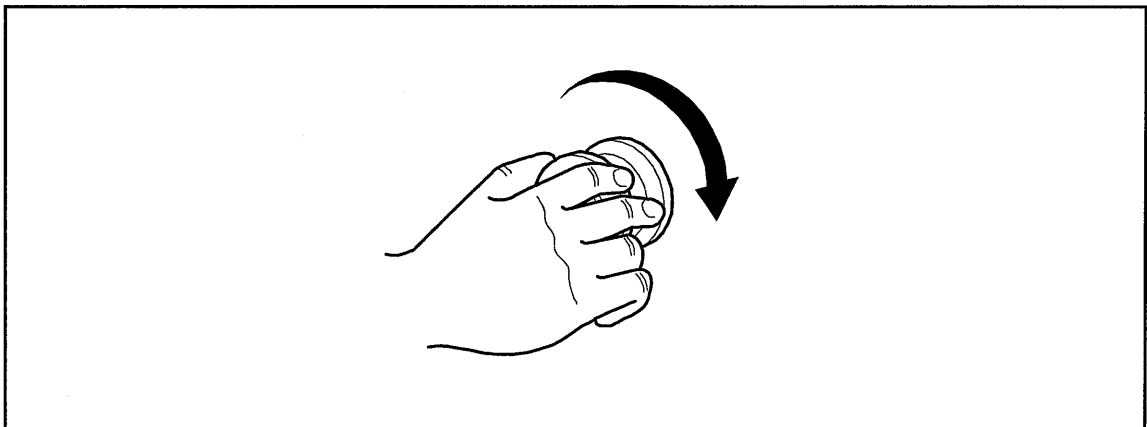


〈Figure 1-17 The Power Switch of NC Unit〉

! CAUTION

The Electric Control Panel is sealed to prevent the ambient air from entering. Do not open the door of Control Panel for long while applying the power. Check the working of fan at the CRT area or inside of Main Electric Cabinet.

- 7) Release the emergency switch with rotating it clock wise direction at the operation panel (Emergency Switch Panel) that is located in front of machine.



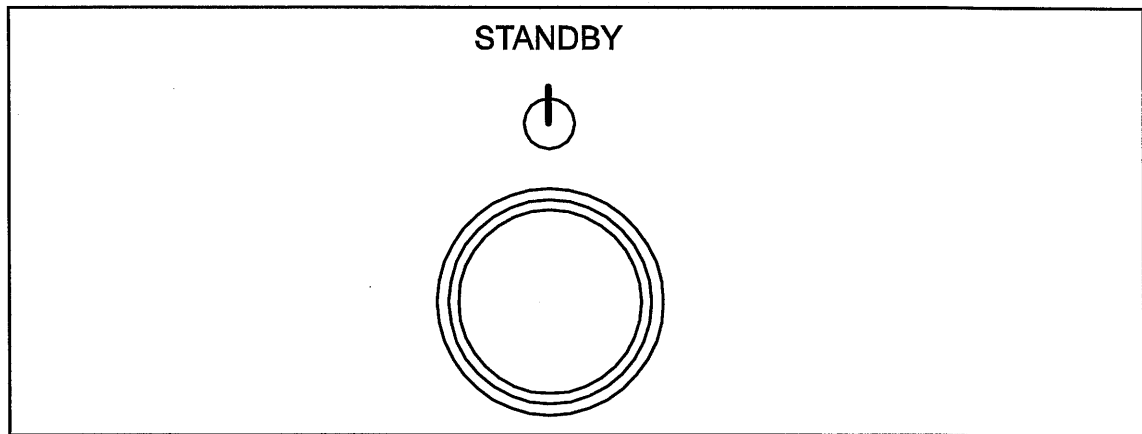
〈Figure 1-18 Releasing of Emergency Switch〉



Operation of the Machine

HYUNDAI-KIA MACHINE

- 8) Machine is ready with flickering 「STANDBY」 Lamp about 3 seconds.



〈Figure 1-19 Standby Switch〉

Check whether normal pressure of setting pressure of Hydraulic unit is around 5.5 Mpa(55 kg · cm²).

- 9) Moving all axes forward and backward several times to lubricate each slide way before going into real operation. (Be cautious not to be O.T at this time)
- 10) Return to reference point.
- 11) Machine coordinate is set up by returning to reference point and stored stroke limit is effected.
- 12) Turn the chip conveyor switch to "ON".

! CAUTION

Do not leave much chip on the trail of chip conveyor before going into main operation.



1.6.2 Procedure of Returning to the Origin Position

It has to be done returning to origin position manually to set the basic machine coordinate up after power up.

- 1) Select the 「ZERO RETURN」 mode.
- 2) Turn the toggle switch that is going to return to origin position to the mark of zero return.
- 3) Returning to origin position with rapid traverse speed(25 % override). Returning is stop at the origin position and the lamp for confirmation of axis's origin is lit up.
- 4) Off your hand from the toggle switch when lamp is lit up. These are all procedure for returning to origin position.



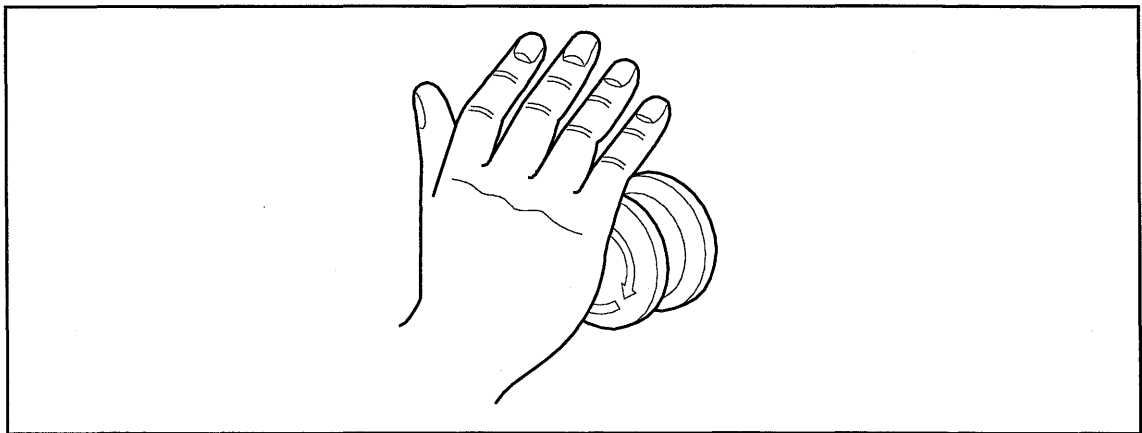
NOTICE

1. If the axis going to do Zero Return is already closed to origin position, move it to the opposite direction around 50mm, and then return to the origin position.
2. Please one by one axis for Zero Return.(Z-axis first)



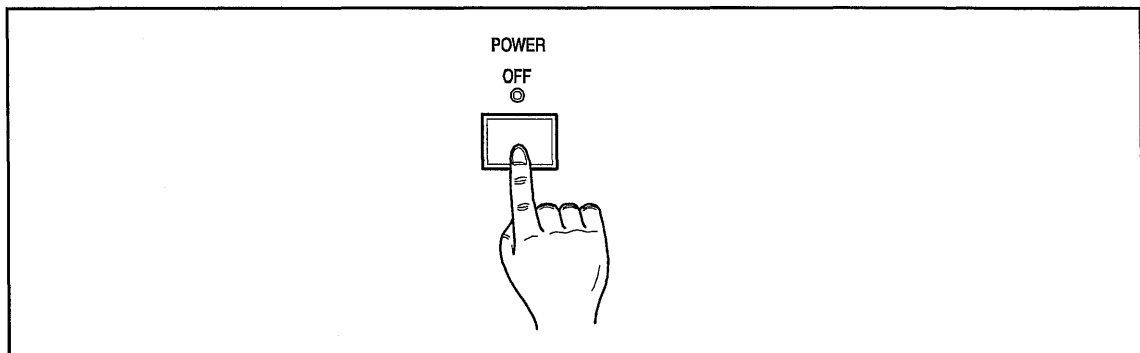
1.6.3 Ending an Operation of Machine

- 1) Please clean a chip and dust inside and outside of machine.
- 2) When all chips are discharged out of conveyor, stop the operation of chip conveyor.
- 3) Return all axes to stop position.
 - X axis – the middle of travel
 - Y axis – the middle of travel
 - X axis – the middle of travel
- 4) Check that the program start lamp of main operation panel is lit off.
- 5) Press 「Emergency Switch」 **EMG.STOP** of main operation panel.



<Figure 1-20 Emergency Stop Switch>

- 6) Turn the control power off by pressing 'power off' button of main operation panel.



<Figure 1-21 Control Power OFF Button of Main Operation Panel>

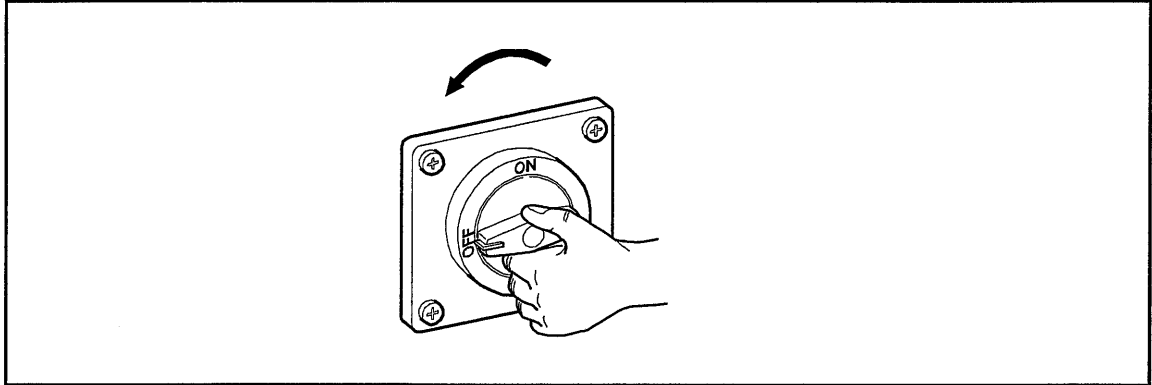


Operation of the Machine

HYUNDAI-KIA MACHINE

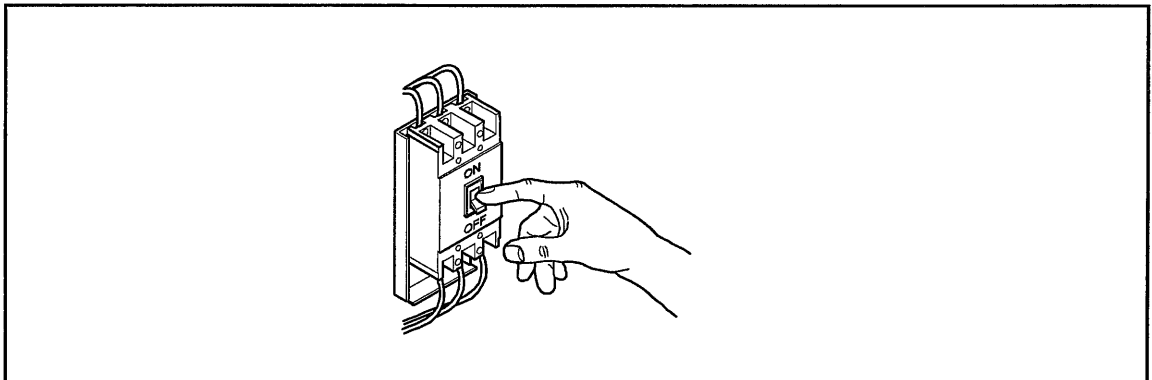
(7) Turn the main control power switch.

① Turn the main power switch off.



〈Figure 1-22 Main Power Switch〉

② Turn the power supply switch of factory off.



〈Figure 1-23 Power Supply Switch〉

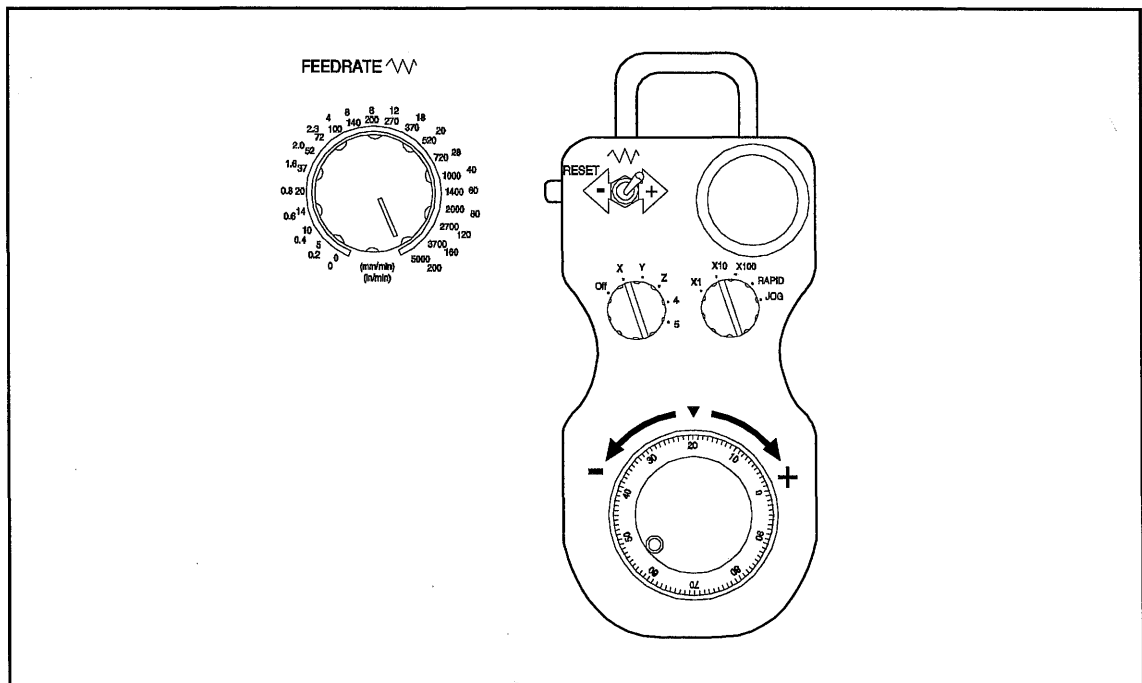


1.7 Manual Operation

1.7.1 Feed of Each Axis

1. Jog Feed

- 1) Select 「JOG」 mode.
- 2) You may select 「HANDLE」 mode.
- 3) Adjust the manual FEEDRATE dial to proper speed.
- 4) Move the axis which is going to travel to any direction that you want to by using the manual feed button.
- 5) Release the switch when arrive at proper position.
- 6) It is moved while holding the switch down.



〈Figure 1-24 Feed of Each Axis〉

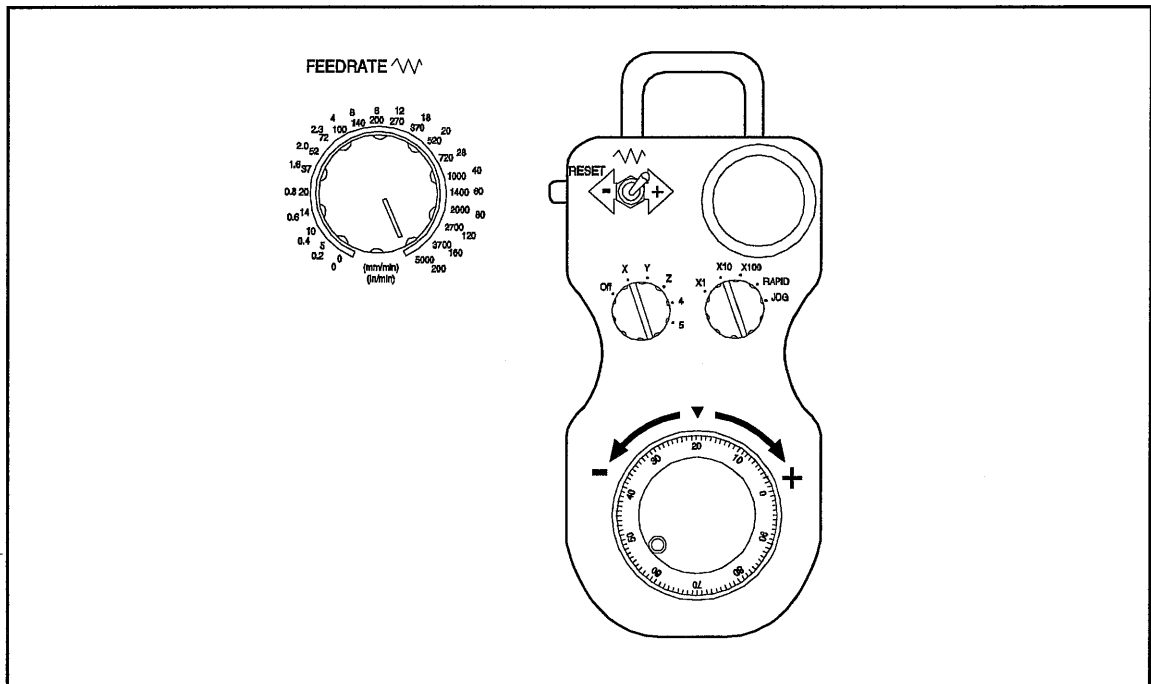
2. Handle Feed

- 1) Select one of 「REF」, 「RAPID」 and 「JOG」 mode.
- 2) Select an axis that you want to move.
 - ① In case of moving an axis to the around origin position.
 - ② In case of machining a work manually.



Operation of the Machine

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〈Figure 1-25 Feed of Each Axis〉

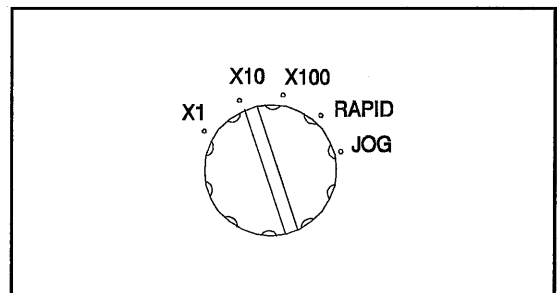
3) It can be moved a little by little by manual handle. Feed speeds are as following.

- X1 : 0.001 mm per 1 pulse
- X10 : 0.01 mm per 1 pulse
- X100 : 0.1 mm per 1 pulse

In case of NC Table(option) and B-axis, the unit is deg.

(Example)

In case of moving a little bit to set up origin position of work and fixture by obtaining reference point.



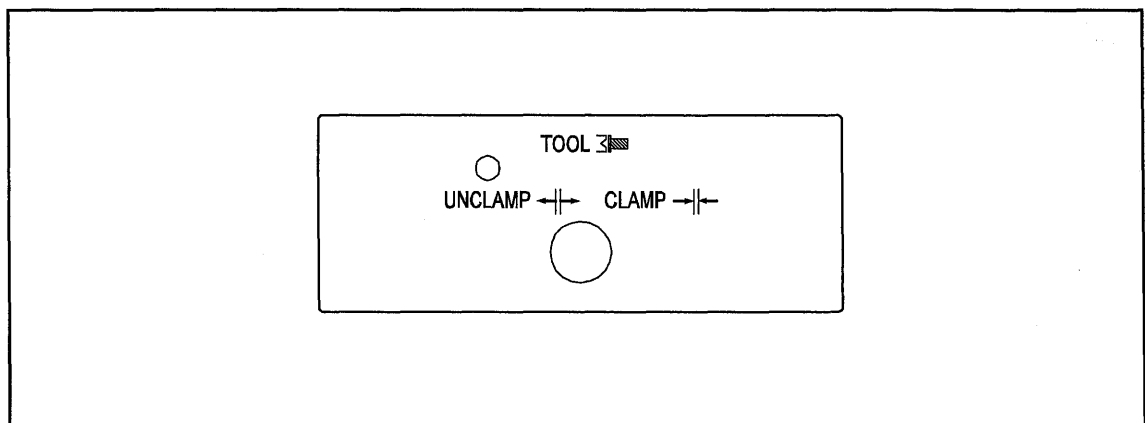


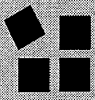
1.7.2 Rapid Traverse

- 1) Select a 「RAPID」 mode.
- 2) Operate switch of the axis that you want to move rapidly. (Rapid traverse is worked only while operating of the switch) At this time, one of the overrides, which are F0, 25, 50 and 100%, is applied to rapid traverse of selected axis.
- 3) As soon as releasing your hand from the switch, rapid traverse is stop.

1.7.3 Tool Clamp/Unclamp

- 1) Move the spindle to some area.
- 2) Select one of the manual modes, which are 「JOG」, 「RAPID」, 「HANDLE」 and 「ZERO RETURN」 mode.
- 3) Hold a tool in the spindle securely, turn the push button switch, which could be switched to “CLAMP” or “UNCLAMP”, to the “UNCLAMP”. In case of existing of clamping tool, if pressing it, the edge of draw bar push the tool shank out of the spindle. (Hold a tool securely not to be drop it) Red LED at the upper-left of push button is lit up during unclamping of tool.
- 4) To clamp a tool, remove a dust completely on the taper surface of tool shank. And also clean inside surface of the spindle by prepared cleaner.
- 5) Insert a tool shank into the spindle hole, turn the switching type push button to the “CLAMP” and press it. Tool is clamped automatically and lamp is lit off.

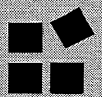




1.8 Operation of Manual Data Input(MDI)

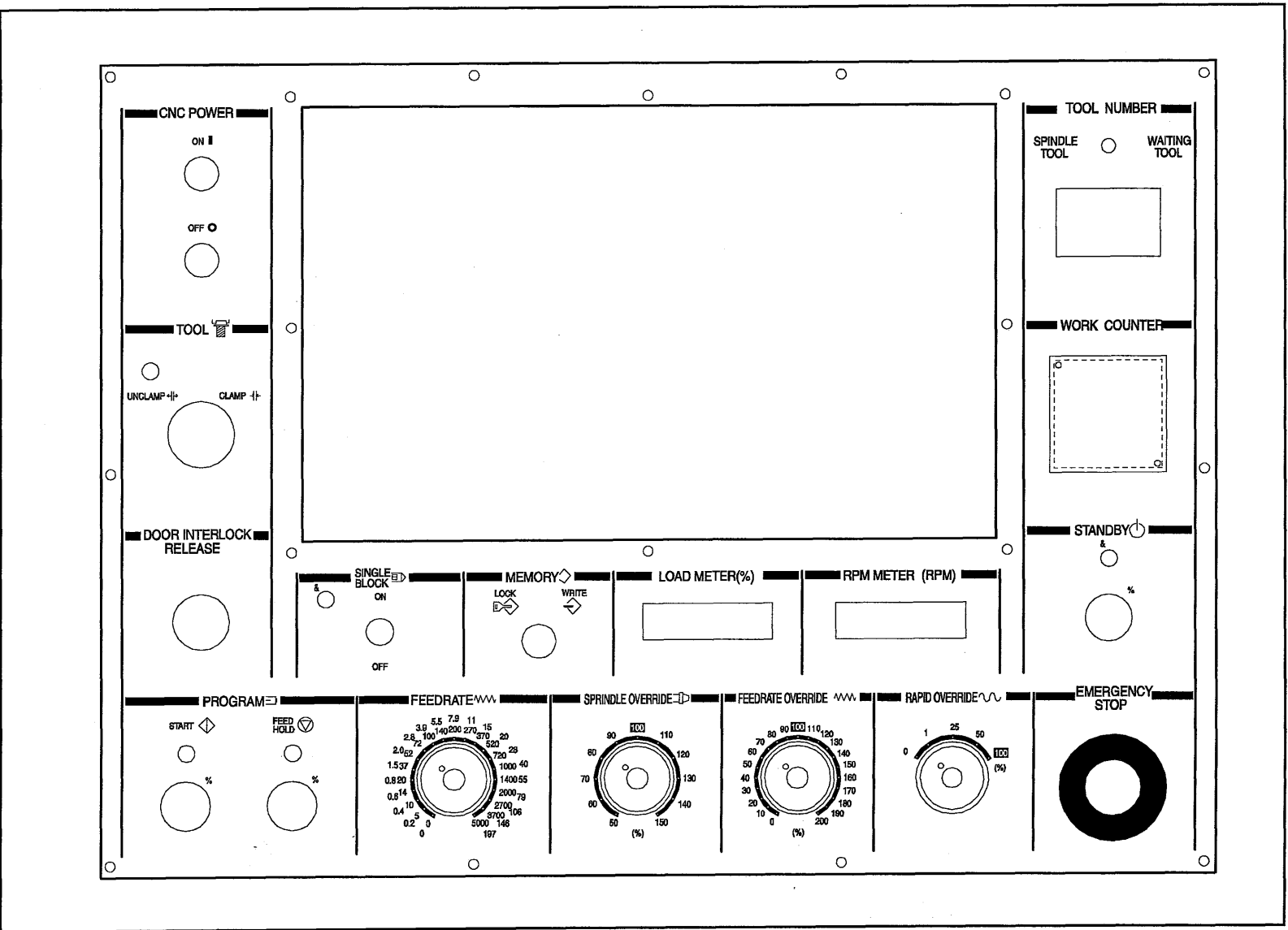
1.8.1 Operation by MDI

- 1) Select a 『MDI』 mode.
- 2) Press function menu key and use the soft key as a function selection key.
- 3) When pressing “PROGRAM” key, the screen is changed to program display screen.
- 4) If program screen is not the text display screen,
 - ① Press the “CHAPTER” key, switch a soft key to the page select key and press “TEXT” , or
 - ② Press the “PROGRAM” key repeatedly until text display screen of the program is displayed.
- 5) Press operation menu key and select a soft key as a selection key of operation.
- 6) To input, type a program by Address and numeric key, and then press [EOB] of Address key. The typed program is transferred into input buffer in advance. If pressing “INSERT” key, the program of input buffer is transferred into the buffer of the MDI operation. The contents of Buffer memory for MDI operation is displayed on the CRT.
- 7) If you want to input a program again, repeat the operation of item (6).
- 8) Press CYCLE START button.



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<Figure 1-26 Operation Panel>



1.8.2 Coolant

- 1) Select MDI mode.
- 2) PROGRAM(MDI) is displayed on the CRT screen.
- 3) Press the address key **M**.
- 4) Press the numerical keys **0** **8** and the **EOB** key.
- 5) Press the **INSERT** button, and then PROGRAM **CYCLE START** button.
Coolant is discharged from the nozzle at the spindle head.
- 6) Coolant stops by specifying M09 in similar operation.

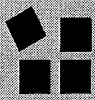
1.8.3 Changing of Spindle Speed

- 1) Select MDI mode.
- 2) Press the function menu key to change the soft keys into the function selector keys.
- 3) Pressing the "PROGRAM" key displays the PROGRAM screen.
- 4) When the PROGRAM screen is not the one to display the program text.
 - ① Press the "CHAPTER" key to change the soft keys into the chapter selector keys. And press "NEXT" . Or,
 - ② Repeat pressing the "PROGRAM" key until the screen appears, which displays the program text.
- 5) Press the operation menu key to change the soft keys into the operation selector keys.
- 6) Press the address key **S** .
- 7) Input a spindle speed with 'DATA' key.
- 8) Press the address key **EOB** .
- 9) Press the **INSERT** key
- 10) Input either M code for spindle forward rotation (M03) or reverse rotation (M04).
- 11) Press the PROGRAM **CYCLE START** button.
- 12) To stop the spindle, specify M05 in similar operation.



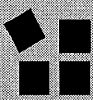
1.8.4 Orientation of Spindle

- 1) Select MDI mode.
- 2) Press the function menu key to change the soft keys into the function selector keys.
- 3) Pressing the PROGRAM key displays the PROGRAM screen.
- 4) When the PROGRAM screen is not the one to display the program text.
 - ① Press the CHAPTER key to change the soft keys into the chapter selector keys. And press NEXT. Or,
 - ② Repeat pressing the PROGRAM key until the screen appears, which displays the program text.
- (5) Press the operation menu key to change the soft keys into the operation selector keys.
- 6) Press the address key **M** .
- 7) Press the 'DATA' keys **1** **9** .
- 8) Press the address key **EOB** .
- 9) Press the **INSERT** key, and then, PROGRAM **CYCLE START** button. The spindle rotates at a low speed and stops at its home position.



1.8.5 Indexing of Table

- 1) Select MDI mode.
- 2) Press the function menu key to change the soft keys into the function selector keys.
- 3) Pressing the PROGRAM key displays the PROGRAM screen.
- 4) When the PROGRAM screen is does not display the program text.
 - ① Press the CHAPTER key to change the soft keys into the chapter selector keys. And press NEXT. Or,
 - ② Repeat pressing the PROGRAM key until the screen appears, which displays the program text.
- 5) Press the operation menu key to change the soft keys into the operation selector keys.
- 6) Press the address key **B**.
- 7) With 'DATA' key, input an indexing angle. (In case of 1 degree index table, no decimal points can be entered.
- 8) In case of NC index table(Option), the index speed (G00, F) is similarly input with data key.
- 9) Press the address key **EOB**.
- 10) Press the **INSERT** key, and then, **CYCLE START** button. The table is indexed by a specified angle and stops.



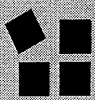
1.9 Automatic Operation

1.9.1 In Case of Machining the First Work with Checking of Newly Written Program

- 1) Go through the steps (1) through (8) in 7.7.2 “Memory Operation of Program”.
- 2) Turn on the SINGLE BLOCK switch. (When this is done, it is recommended to set a rapid traverse override to 25% for safety.)
- 3) Press the PROGRAM **CYCLE START** button.
- 4) Check one block worth of operation. Again, press the PROGRAM **CYCLE START** button and proceed with the program sequentially.

1.9.2 Memory Operation of Program

- 1) Check that the ALARM lamp on the main operation panel is not lit up.
- 2) Check and correct tool length and tool diameter compensation data.
- 3) Select the mode selector switch ‘MEMORY’. At this time, turn of the DRY RUN, OPTIONAL STOP, MACHINE LOCK, BLOCK SKIP and SINGLE BLOCK switches, and set the FEEDRATE OVERRIDE, SPINDLE OVERRIDE and RAPID OVERRIDE switches to 100%, in case of regular operation.
- 4) Press the **RESET** button on the setting operation panel.
- 5) Set X, Y and Z position display values to 0 with the **ORIGIN** button on the display panel. When setting to a numerical value other than 0, set a desired value through the machine lock function. (Return to the AUTO mode again after MDI or manual operation.)
- 6) Press the function menu key to change the soft keys to the function selection keys.
- 7) Press the **PROGRAM CHECK** key to call COMMAND on the display unit, and check an initial state.
- 8) When temporarily stopping machine operation halfway, press the PROGRAM **FEEDHOLDE** button or turn on the SINGLE BOLCK switch. When an unexpected condition occurred, stop the machine immediately by pressing the **EMERGENCY STOP** button on the operation panel.



1.9.3 In Case of Manual Operation during Memory Operation

- 1) Press the PROGRAM **FEEDHOLD** push button switch (while program operation is suspended, a red lamp is lit up) or turn on the SINGLE BLOCK switch to suspend program operation.
- 2) Select the operation mode selector push button switch either 'HANDLE' or 'JOG', and perform manual operation.
- 3) After completing manual operation, return the operation mode to 'MEMORY'.
- 4) Press the PROGRAM **CYCLE START** button to restart the program.

**NOTICE**

Even when the PROGRAM **FEEDHOLD** button is pressed, the M, S and T functions continue until their actions are completed. Manual operation is available only after these actions are completed.

1.9.4 In Case of MDI Operation during Memory Operation

- 1) Turn on the SINGLE BLOCK switch on the operation panel.
- 2) Select the operation mode selector push button switch 'MDI' after stopping the movement in the single block.
- 3) Press the function menu key to change the soft keys to the function selection keys.
- 4) Pressing the PROGRAM key displays the PROGRAM screen.
- 5) When the PROGRAM screen is does not display the program text.
 - ① Press the CHAPTER key to change the soft keys into the chapter selector keys. And press NEXT. Or,
 - ② Repeat pressing the PROGRAM key until the screen appears, which displays the program text.
- 6) Press the operation menu key to change the soft keys to the operation selection keys.
- 7) Enter a required action with the address and numerical keys, and press the **INSERT** button.



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- 8) Check MDI data and press the PROGRAM **CYCLE START** button.
- 9) To restart automatic operation, select the MEMORY mode and turn off the SINGLE BLOCK switch.
- 10) Press the PROGRAM **CYCLE START** button on the main operation panel.



1. When an auto command immediately before is a canned cycle and you specify an action other than canned cycle by MDI operation, be sure to specify a necessary G code.
2. When MDI operation is inserted in the state mentioned in Note 1, you must specify hole machining data preceding MDI insertion, if you want to execute the auto command again.

CAUTION

After you enter actions by MDI operation, if you forget to execute them (due to a certain reason such as leaving a work site) and restart automatic operation, the machine functions in an unexpected way and endangers you, because buffer contents for automatic operation have been replaced with unexecuted MDI buffer contents. Be fully aware of it.



1.10 Rigid Tap Operation

1. Advantages of Tapping Operation

- 1) Since standard collet is used than floating tap holder, cost of tool can be reduced.
- 2) Precision of thread is enhanced since feed speed matches with that of spindle.
- 3) Tapping for small hole diameter which is difficult for machining up to now is possible. (Refer to the part of test data)
- 4) Depth of tap can be machined evenly.

2. Mounting Position

Encoder for rigid tapping is built in spindle motor.

3. Purpose of Using

It is used to synchronize rotation of main spindle and feed in Z-axis, so the machining is capable only with the floating tap holder which is usually used, drill chuck and collet chuck. It is also a kind of option for machine frame that the high speed and high precision tapping at rate of 2,000~3,000 rpm is possible. There are two kinds of tapping as high speed tapping and direct tapping those are identified by maker.

4. Function

In case of rigid tapping, position of rotating spindle is controlled, and rotation of spindle and Z-axis feed is controlled by means of linear compensation for two axes. Therefore, the requirements of deceleration at end, Z-axis feed per turn at acceleration and thread pitch are all satisfied.

5. Programming

In the NC unit Fanuc 18i-MB, G84(right-handed thread) / G74(left-handed thread) are commanded in rigid tapping mode. In case of command in per rotation mode(G95), feed speed(F) can be set just as tapping pitch. If the machine needs spindle speed changing, in case G84 and (S) is commanded in separate block for high and low speed gear shifting, high speed gears always selected regardless of rotation speed amount.



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Rigid tapping cycle is capable with conventional floating tap holder.

6. Rigid TAP Machining Capacity (Test Data)

Classification	Aluminum				Steel (SM45C)				Remark
	Cutting Speed m/min	rpm Rate rpm	Feed mm/min	Depth of Tap mm	Cutting Speed m/min	rpm Rate rpm	Feed mm/min	Depth of Tap mm	
M1×0.25	10	3,000	750	3.5	6	2,000	500	2.5	ROLL TAP
M2×0.4	19	3,000	1,200	6	6	950	380	6	HAND TAP
M3×0.5	20	2,100	1,050	9	8	850	425	9	HAND TAP
M4×0.7	20	1,600	1,120	12	10	800	560	11	HAND TAP
M5×0.8	20	1,270	1,016	15	10	630	504	14	HAND TAP
M6×1.0	20	1,060	1,060	18	10	530	530	15	HAND TAP
M10×1.5	-	-	-	-	10	320	480	20	HAND TAP
M16×2.0	-	-	-	-	10	200	400	24	SPIRAL TAP
M20×2.5	-	-	-	-	10	160	400	45	SPIRAL TAP
PT3/ 8-19山	-	-	-	-	10	190	254	-	-



Operation of the Machine

7. Rigid Tapping Programming G84(Right hand Tap)/G74(Left hand Tap)-Option-

1) Purpose

By the method of synchronizing rotation of spindle and feed of Z-axis, high speed and precision tapping is achieved.

- G94 : Feed per minute,
- G95 : Feed per Rotation
- M29 : Changing to Rigid Tap mode
- M28 : Cancel of the Rigid Tap mode
- X : Coordinate of tap hole precision
- Y : Coordinate of tap hole position
- Z : Position of end of hole
- R : Start Point of machining
- P : Dwell time for returning to hole end and R point
- F : Feed Speed
- S : Spindle Rate
- L : Repeating times

2) Method of Command

● In case of per minute command

G94 *

M29 S _____ * Change to rigid tap mode(M03 command is impossible)

G84 X _____ Y _____ Z _____ R _____ P _____ F _____ L _____ *

X _____ Y _____ *

X _____ Y _____ *

M28

G80

└── Spindle starts(rotation) and stop at R point

└── Feed Speed

● In case of per turn command * *

G95 *

M29 S _____ * Change to rigid tap mode(M03 command is impossible)

G84 X _____ Y _____ Z _____ R _____ P _____ F _____ L _____ *

X _____ Y _____ *

X _____ Y _____ *

M28

G80

└── Spindle starts(rotation) and stop at R point

G94 *



Operation of the Machine

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3) Actual Programming(In case of aluminum M6×P1.0 tap)

● In case of per minute command

```
G54 G90 G00 X50.0 Y100.0 T05 *
G43 Z30.0 H04 *
G94 *
M29 S1000 * Rigid Tap Mode command
(including spindle start)

G98 G84 Z-20.0 R5.0 F1000 *
X75.0 Y150.0 *
X100.0 Y200.0 *
M28 * CANCEL(RIGID MODE)
G80 * CANCEL(RIGID MODE)
```

● In case of command per turn

```
G54 G90 G00 X50.0 Y100.0 T05 *
G43 Z30.0 H04 *
G95 *
M29 S1000 * Rigid Tap Mode command
(including spindle start)

G98 G84 Z-20.0 R5.0 F1.0 *
X75.0 Y150.0 *
X100.0 Y200.0 *
M28 * CANCEL(RIGID MODE)
G80 * CANCEL(RIGID MODE)
G94
```



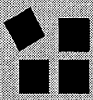
Operation of the Machine

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1.11 NC Command Values

1.11.1 Primary Address and Its Range

Function	Address	Range of Command value
Number of program	O	1~9999
Number of sequence	N	1~99999
Dimension Word	X, Y, Z, U, W, A B, C, I, J, K, R, Q	±99999.999
Feed Sped Rapid Feed(X, Z/Y) Cutting Feed Speed	F	40,000 mm/min 1~30,000 mm/min
Tool Function	T	0~40(Option 60/90/120 EA)
Spindle Function	S	0~12,000
Auxiliary Function	M	0~99
Number of offset	D, H	0~99(Option 200)
Dwell	P, X	0~99999
Repeating function	L	0~9999



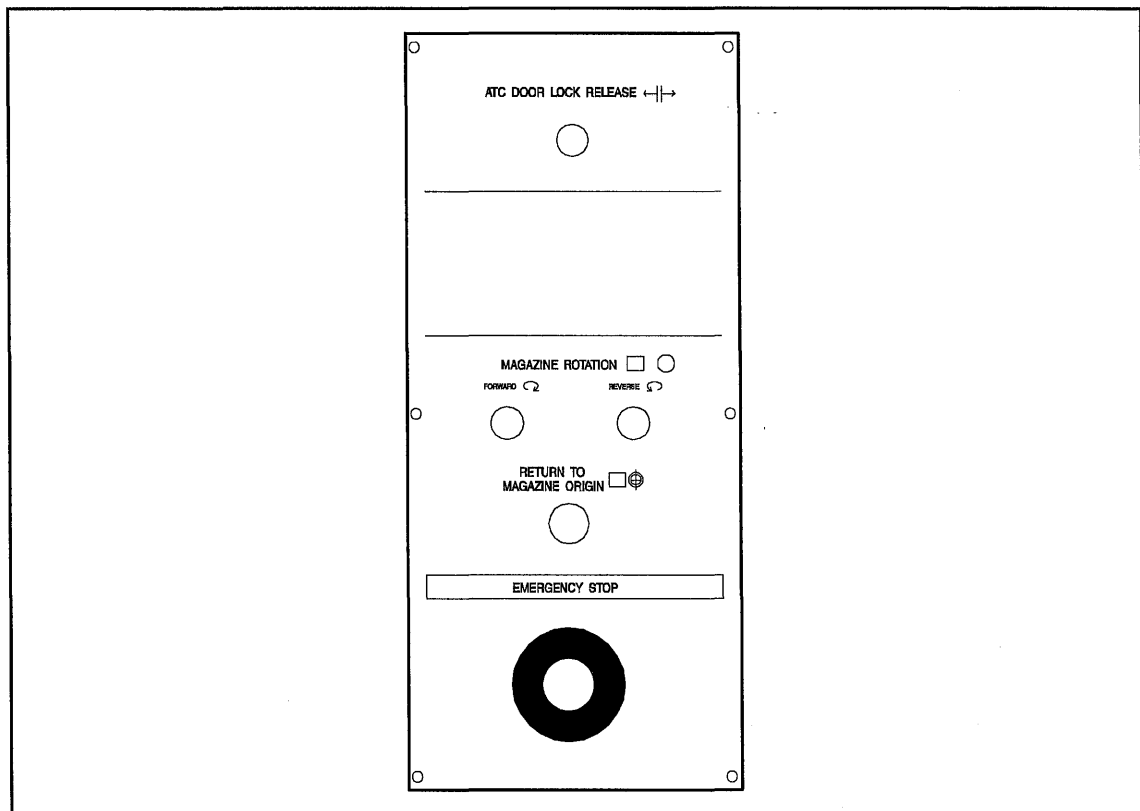
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1.12 ATC Operation

1.12.1 ATC Single Operation(Figure 1-27)

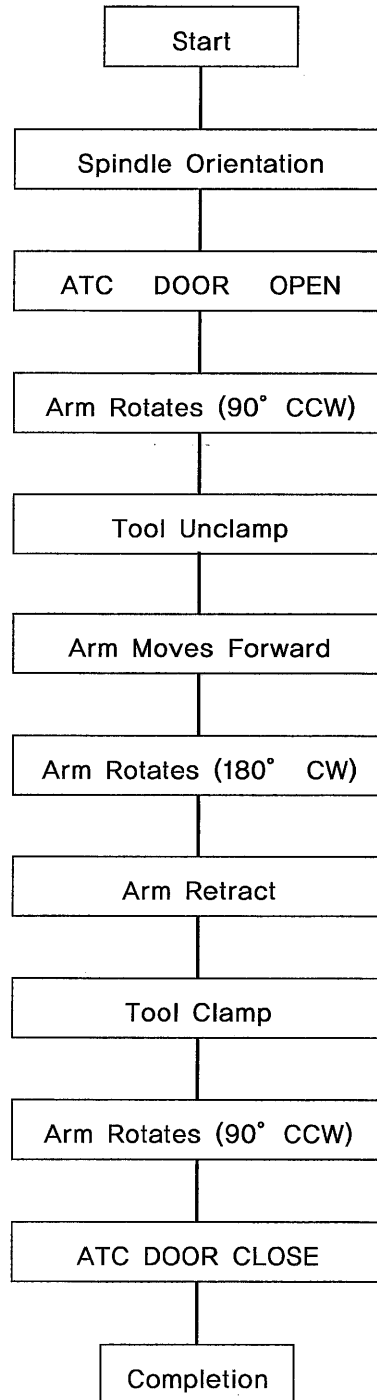
Name	Use
MANUAL MODE	Lamp is lit on when mode selection switch on main operating panel is set to manual operating mode(Handle, Jog, Rapid and Zero return), and operation on this operating panel is possible.
MAGAZINE FORWARD ROTATION	Magazine rotates clockwise while pressing and holding the forward push button switch and select switch.
MAGAZINE REVERSE ROTATION	Magazine rotates counter clockwise while pressing and holding the forward push button switch and select switch.



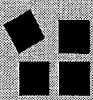
〈Figure 7-27 ATC Operation Panel〉



1.12.2 Flow of ATC Operation



Operation of clamping and unclamping of arm and tool is a movement of interlock driven by high precision compound cam and plain cam, so an operation on upon another made.



1.12.3 Tool Clamp and Unclamp

Tool clamping and unclamping is possible at any position of magazine.
So pay a full attention to safety.

■ Nose key direction

When blade of tool such as boring bar is set in direction of pot ley any the tool is clamped into spindle, the blade of tool will face to the right.
Rotation of magazine is operated by magazine forward/reverse rotation push button on ATC single operation panel.

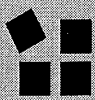
■ Note for Oil Hole Tool

When using oil hole tool, there will be a trouble occur in determination of position if chip attached to oil hole block, is taken into pilot plunger block of the same tool.

Therefore, if oil hole tool is clamped on main spindle manually or automatically, tool change should made after block is cleaned by injecting coolant with coolant switch or M50 command.

1.12.4 Limitation of Tool

- Max. Tool Length : 300 mm 13.8"
- Max. Tool Weight : 10 kgf 22 lbs
(Max MOMENT 1.3 kgf · m, 9.4 lbs-ft)
- Max. Tool Diameter
 - When tool is set successively $\varnothing 75(3.0'')$
 - When adjacent pot is empty $\varnothing 140(5.5'')$



Operation of the Machine

1.12.5 Operation of Auto Tool Changer(ATC)

1. Details and Method of Operation

Single or continuous operation can be achieved by ATC command.

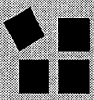
1) Individual operation can be made as the procedure below when an individual single operation test(in case of MDI, MAINT mode), maintenance or adjustment, etc is necessary.

- ① Set each axis and ATC arm to "ATC origin".
- ② Run M19 command for determining spindle position in MDI mode.
- ③ Turn on the MAINT switch, or run M code M998 at MDI mode.
- ④ M code used for separate operation is as below.
- ⑤ Turn off the MAINT switch, or run M code M999 after completion.

	Operation	M CODE	Manual aid	Remark
1	Run MAINT mode	M31/M35		
2	Tool pot move towards spindle side	M62		
3	ATC DOOR OPEN	M80		
4	ATC Arm operation	-		Operation with X-axis jog switch(After running M3, M35 at MDI mode) note 1)
5	Spindle tool unclamp	-	Manual push button	Operation with Z-axis(-) jog switch at MDI mode
6	ATC arm operation	-		Operation with X-axis jog switch(After running M3, M35 at MDI mode) note 1)
7	Spindle tool clamp	-	Manual push button	Operation with Z-axis(+) jog switch at MDI mode
8	ATC ARM HOME position operation	-		Operation with X-axis jog switch
9	ATC DOOR CLOSE	M81		
10	Completion of MAINT mode	M32		

Note) 1. M32 must be run after operation with jog switch for X-axis.

2. The door of high voltage control panel must be closed for safety purpose.



2. Tool magazine(in case of single mode)

Magazine operates during pressing and holding the push button at the back off magazine. When releasing the button at desired pot number being up, magazine will decelerate and position determination is completed.

3. Before operation of ATC Motor

Both ATC twin arm and magazine are driven by an AC gear motor with brake attached.

1) Input of tool data

- ① Press DGNOS key and select the driven for PC parameter.
- ② Move cursor to D130.
- ③ Input data as ATC initial setting list.
- ④ Tool data can not be inputted or changed during operation of ATC or magazine.

2) Notes in automatic tool changing

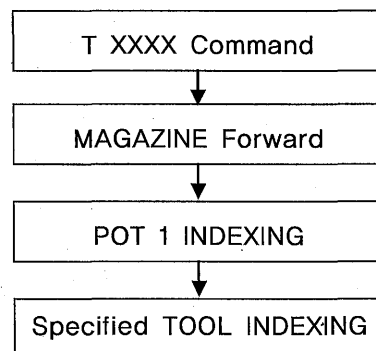
When an tool with such a big diameter that may cause interruption with adjacent pot is to be changed, a great attention should be paid to the programming for preventing any interruption with adjacent pot from accuring while come back to pot.

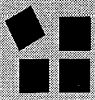
3) MAGAZINE INDEX

Magazine index position is detected by a ring counter with origin(pot 41) being as the reference. The counter will be initialized after initial start or when magazine indexing is interrupted. At this time the magazine should be returned to origin. Or counting does not start and tool changing is also impossible

① Automatic origin return

Magazine is returned automatically to origin by T code and thus desired tool is indexed.





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② Manual Origin Return

When pressign, in manual mode, MAGAZINE INDEX and SELECT buttons on operation panel simultaneously, magazine will rotates forward for the time period the buttons are being pressed, and origin return is achived if pot/would pass tool changing position for more than one time.

4. ATC Single Operation

1) press RESET BUTTON.

2) Return each axis to 2nd reference position. (G91 G3 0X0 Y0 Z0;)

3) In MDI Mode

① Check pot for clamping and spindle side.

② Run M31.

③ Run M35(Confirm spindle orientation)

④ Confirm following points with X-axis jog switch.(It turn only during switch is pressed and held and it will be maintained in stop when the switch is released)

· When pressing +X : TWIN ARM rotates forward

· When pressing -X : TWIN ARM rotates reverse

※ At this time, Tool unclamp start proximity sensor is turn ON.

⑤ Clamp/unclamp the tool with Z-axis jog switch.

· +Z : TOOL CLAMP

· -Z : TOOL UNCLAMP

⑥ Run the arm with X-axis jog switch.

· When pressing +X : TWIN ARM rotates forward

· When pressing -X : TWIN ARM rotates reverse

※ At this time, Tool unclamp start proximity sensor is turn ON.

⑦ Check the origin of arm home sensor.

⑧ Run M32.

5. ATC Returning

If ATC operation stops as in emergency, return it as procedure below.

1) Press RESET Button.

2) In MDI Mode

① Check the pot is on spindle side.

② Command M31 and M35 to run. If M31 and M35 is not run at this



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time, turn on CYCLE START and FEED HOLD SWITCH at the same time and then it is run by force.

③ Confirm the points as below with X-axis jog switch. (It turns only during switch is pressed and held and it will keep in stop when the switch is released.)

- When pressing +X : TWIN ARM rotates forward
- When pressing -X : TWIN ARM rotates reverse

④ Clamp/Unclamp the tool with Z-axis jog switch.

- +Z : TOOL CLAMP
- -Z : TOOL UNCLAMP

⑤ After checking origin of arm press RESET button.

⑥ Run M32.

6. Condition for ATC

- 1) X, Y, Z axis should be in 2nd origin. (G91 G30 X0 Y0 Z0;)
- 2) When pressing MAGAZINE INDEX buttons simultaneously in manual mode, magazine starts rotation.
- 3) Twin arm should be in home position.
- 4) Alarm lamp should be out.
- 5) Magazine should have returned to origin for more than one time.



1.12.6 When Warning Lamp is Lit Up

When alarm led and warning lamp on upper part of main operation panel is lit up during operation or in state of stop, machine will be brought into stop if it's operating and the cause of interruption is needed to located.

1. Trouble in NC unit

When trouble rises in NC unit, "Alarm" will be displayed on CRT. For meaning of alarm, search the alarm list in separate volume "FANUC SYSTEM 18i-MB MANUAL" and remove the trouble as fast as possible

2. Trouble in the machine

Remove the troubles by referring to and in accordance with the appendix "Alarm message" at the rear of this manual.

1) When O.T. occurring in hardware

- ① Set mode selection to handle mode.
- ② Press the spindle stop button on main operation panel and hold, and then select the side O.T. occurred.
- ③ Move it in direction reverse to which O.T. occurred with MPG.
- ④ After confirming O.T. being removed release spindle switch and press RESET button on MDI panel.

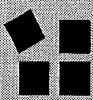
2) In case ATC alarm has occurred

- ① Return ATC to origin by ATC single operation. (Refer to 4. ATC single Operation)
- ② Confirm ATC data table and correct it if necessary.
- ③ Press RESET button on MDI panel.

1.12.7 General Description for APC Operation

Command is as below by MDI or memory operation.

- 1) Move B-axis to origin, and X, Y, Z-axes to 2nd origin (at this time, APC origin position lamp is lit up)
- 2) Rotate pallet M60 command. When lamp is lit up by pressing APC READY button, next operation is carried out. If the lamp is not lit up, next operation is not performed

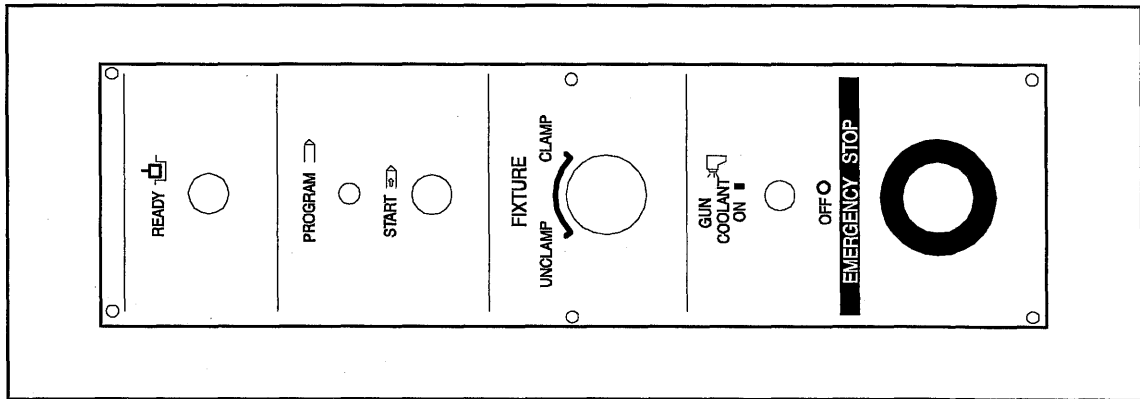


Operation of the Machine

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1.12.8 Single Operation Panel of APC

Name	Use
APC READY BUTTON	This button is pressed when attachment/detachment of workpiece is completed. If this button is not pressed, automatic exchange is not possible.
EMERGENCY STOP	This button stops all the operation of machine as emergency stop button on main operation panel does.



〈Figure 1-28 APC Operation Panel〉

7.12.9 The Procedure for Maintenance Operating of APC

Program as 1.12.10 should be worked out and run to operate by MDI and memory mode. It should not be executed except the case for confirmation of stop during operation

- 1) Turn the 「MAINT」 switch for maintenance in the main electric cabinet on or command M998 on MDI mode.
- 2) Move B-axis to the origin and X, Y, Z to the 2nd origin.
(Input and run G91 G28 B0, and input and run G9 G30 X0 Y0 Z0.)
- 3) PALLET UNCLAMP (M24;)
- 4) ROTATION ARM UP (M55;)
- 5) PALLET ROTATION
(M53; or M54; M53 in case APC side pallet is B while M54 in case of A.)
- 6) ROTATION ARM DOWN (M56;)
- 7) PALLET CLAMP(M23;)
- 8) Turn off the 「MAINT」 switch or run M-code of M999 at MDI.



1.12.10 APC Command

At the initial of machining, APC program should be transferred to each necessary position before running.

G91 G28 B0;.....	Origin return of index table
G30 X0 Y0 Z0;.....	Table moves to the 2nd origin of pallet- turn position(moves to the 2nd origin of X, Y, Z-axes)
M60;.....	PALLET UP → ROTATING ARM UP → PALLET ROTATING(CW and CCW) → ROTATING ARM DOWN → PALLET DOWN completion



If pallet A is at APC side, it is rotated by CW, and if pallet B is at APC side, it is rotated by CCW.

MAINTENANCE MANUAL

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Precaution before Maintenance

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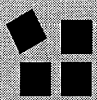


Safety Precaution stipulated for protecting the machine against damage and personal injury is applicable to all the other machines. So observe them thoroughly.

1.1 General Precautions

The general precautions are very important in preparing such working conditions that prevents accidents from happening so that a high enhanced productivity can be ensured.

1. Wear safety glasses.
2. Wear safety shoes.
3. Begin your work wearing safety helmet and suitable tidy working cloths.
4. Do not operate machine wearing gloves.
5. The place where machine is installed should be sufficiently bright and dry, and maintained clean so that operation of machine is not disturbed.
6. When cleaning, remove the dust and chips from machine, high tension control panel, NC unit and peripheral facilities or devices. Using of compressed air shall be avoided as far as possible
7. The working tables around machine shall be fully properly arranged to prevent from any potential slipping.
8. Tools, work and other articles are not allowed to be on moving parts, as well as on the machine.
9. Any modification to the machine is not allowed without clear approval from our company.



1.2 Precaution in Operation

Test operation must be performed after reading the manual in the presence of our service man as far as possible.

- Any door is not allowed to be open during operation.
- When getting into the machine, first verify if the machine is perfectly stopped.

《Maintenance》

1. Workers and maintenance personnel shall read the caution labels attached on machine and must observe or comply with it. Be sure not to have the labels damaged, scratched or fallen off. If caution labels are damaged to such an extent that it can not be read, contact our company.
2. Doors or covers in each part should be closed or fit except in operation. Door of NC unit and high voltage control panel should be closed with special attention.
3. Devices and electric circuits installed for limit switch to check stroke stop on travelling axis and for safety should not be removed or changed.
4. Spanner or wrench with proper size should be used in adjusting or repairing work.
5. When getting into the machine for maintenance or cleaning, be cautious not to step on below covers of each axes.
6. When getting on to the upper part of the machine for maintenance or other works, a ladder or like this can be used being cautions of slippage and other dangerous behavior. Be careful not to step on the upper over, but on the frame during working. Always take care of slipping on the upper part.

《Lubrication》

lubricant relates greatly with durability and precision of the machine. So carry out full management to entire the lubricating system.

1. Lubricating oil is to be used as specified type and class as well as specified amount.
2. Lubricating parts shall be previously cleaned to prevent dust, water and chip, etc. from entering.



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3. Check the bottom of oil kettle for attachment of dust, water or chip, etc. A full management to the oil kettles is necessary as determining the place for keeping custody and identification with color to prevent from being confused, etc.
4. Carry out checking to the oils regularly, if any event as aging or incorporating foreign bodies is detected, immediately clean the inside of tank and change for fresh oil.
5. The lack of oil up of the vessel, but remain a little to prevent from remaining water and sediments from mixed in even in case of fresh oil.
6. The filters attached to pumps and pipings are to be replaced in regular manner annually.
7. The terminating outflow piping is performed with air bleeding fully at delivery. But in case of dismantling the piping for maintenance there after, a perfect air bleeding is necessary as re-laying the piping before operating the machine.

《Coolant》

Mixing of water soluble grease and microbial reproduction, etc. will lead to spoiling of coolant, causing worse features of machining and rust proof. When using water soluble coolant, be cautions to the next precautions..

1. When choosing the soluble coolant to be used, it's responsible to consider fully with the features of lubrication, penetration, rust proof, separation from oil and reliability, etc.
2. Before and after operation, besides cleaning off the chip, the soluble chips sticking to each wet moving part, rotating part, saddle and column shall also be blown away, and a thin coat of grease must be applied thereafter.
3. Water soluble coolant must be changed when it is to be corroded.
4. It's recommended that each cover should be removed to clean wet moving parts, screws of X, Y, Z axes, limit switches and feed motors, etc.
5. The water soluble coolant is rust protective in case of wet rather than dry in which case rust is apt to occur, so apply anti-corrosive to associated parts after operation.
6. When using water soluble coolant, a through health administration for the works in needed since the grease removing feature of alkaline water soluble coolant will lead to injury in skin.



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7. The manner of diluting water soluble coolant and the water used varies in accordance with the type of water soluble coolant used, so observe the instructions provided from the manufacturer of the coolant.
8. When using industrial water, test and analysis to it is needed before using it as dilution or water addition, otherwise, use city water because the former is often examined to have a considerable amount of microorganism.
9. The behavior of various oils to coolant is as below. A sufficient management is required accordance to case of corrosion of coolants.

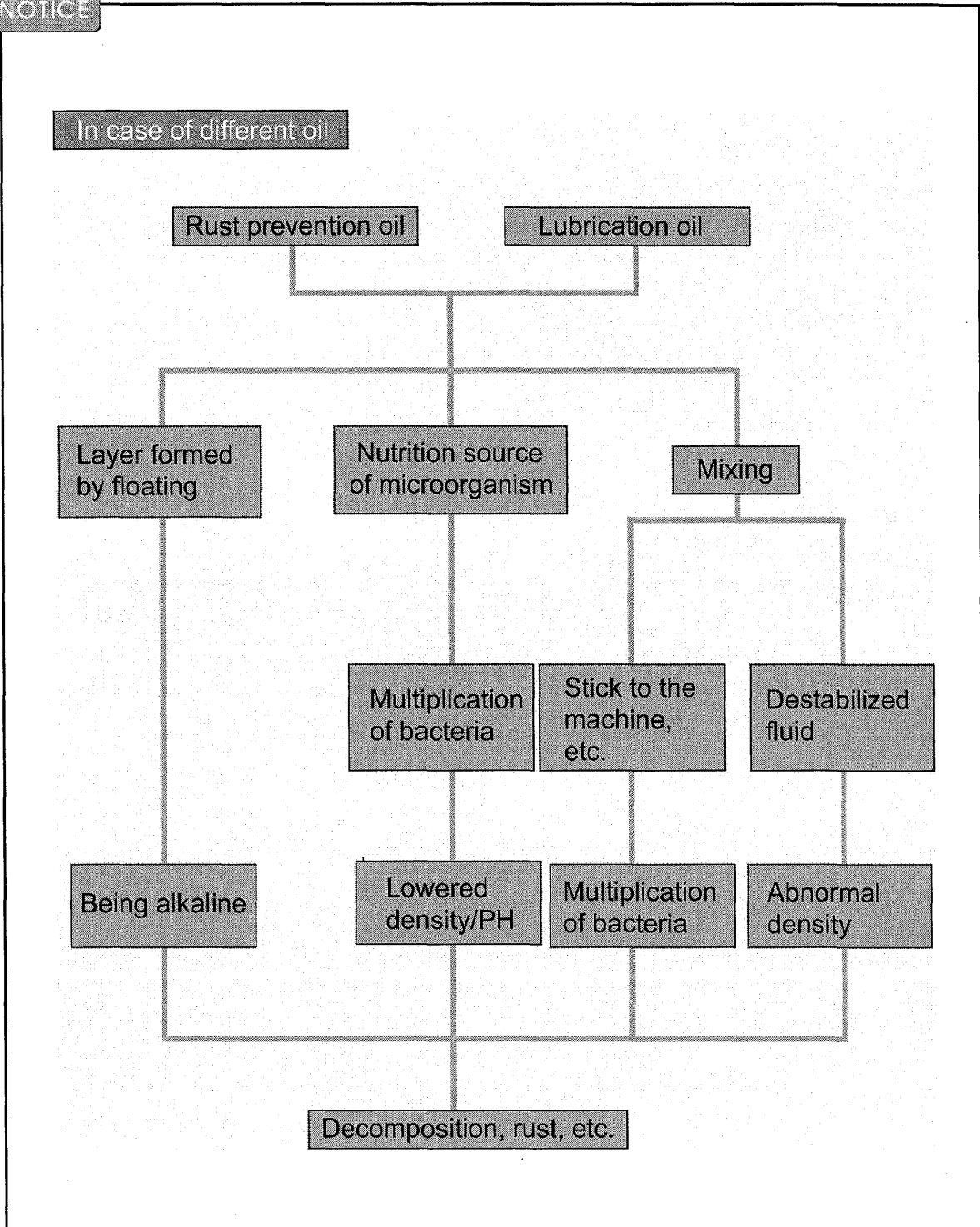


Precaution before Maintenance

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NOTICE





Precaution before Maintenance

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《Operation》

1. It's necessary to be familiar with the position where the emergency stop button is to keenly press it in necessary.
2. The operation is proceeded as the description below.
3. Never get close to rotating or driving parts with your hands during operation.
4. When removing chips clinging to tool or accumulated on device or table, do not pull them out by hands, but stop the machine to avoid danger.
5. Position of coolant nozzle should be adjusted after machine stops operation.
6. Each axis origin returning is designed as by programmed automatic manner not manually, so be cautions for perfoeming rapid feed(100 %) manually.

《Terminating Operation》

1. After operation, power is switched off, machine is cleaned, and then anti-corrosive oil should be applied to each part as slide surface, etc. In case soluble cutting oil is used, a particular attention shall be paid.



1.3 Precaution of Electric Device and NC Unit

In case of operation or maintenance work for electric device and NC unit, attention should be paid to follows.

1. Impact should not be experted to NC unit or high voltage control panel.
2. Cable with its diameter specified in operating manual should be used as a primary wiring for the machine. Unnecessarily long cable is not used. In case the primary wiring has to be laid over the floor, a proper protective measure should be taken to prevent from damage with chips.
3. At the time of test operation, you should confirm in the presence of our service man, whether parameter excluded backlash should not be changed.
4. Do not change current value setting to thermal relay in high voltage control panel and various volume setting.
5. Do not apply excessive force to cannot plug, connector of flexible tube and cap tire cable.
6. In case of maintenance work on electric devices, press 「Emergency Stop」 switch on the O.P. panel, put off main switch on high voltage control panel, then the power switch installed in factory. After confirming that all the power is disconnected, perform maintenance work. Otherwise, warning label can be attached to each power switch, if possible, so that state of power off is maintained. 「Do not use」 label can also be used to attached to operating buttons to avoid any unauthorized one to operate it.
7. Electric system in main body shall be treated carefully. Also, pay attention to waterproofing.
8. For electric devices in high voltage control panel, must use the specified products of our company. Never use those with excessive capacity or copper wire.
9. If the door of NC unit is left open, direct sunlight, dust or camera strobe flashing may cause damage to the machine. Therefore the door of NC should not be remained open.

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2.1 Daily Check

2.1.1 Oil Hydraulic Unit

- 1) Checking pressure gauge (70 kgf/cm²)
When power is switched on, confirm whether hand of pressure gauge (oil pressure) indicates 70 kgf/cm² or not.
- 2) Checking oil level
Check whether oil level is proper or not, and supply oil if necessary.
- 3) DTE24 oil is filled at shipment. If oil is replaced with other company's of corresponding class it shall be wholly changed.

2.1.2 Air Pneumatic Unit

- 1) Checking pressure gauge (5 kgf/cm²)
When power is switched on, check hand of pressure gauge and make adjustment up to above 5 kgf/cm².

2.1.3 Lubricant Tank

- 1) Checking oil level
Refill oil so that oil level reaches above filter in normal state. (DTE24)
- 2) If oil level drops below filter, machine alarm will be activated.

2.1.4 Cleaning the Machine

- 1) Cleaning section and taper surface of main spindle
Cleaning should be carried out with accessory cleaning tool (Taper hole cleaner) or clean cloth. Main spindle hole, ATC and double arm's griper may also be cleaned.
- 2) Cleaning taper part of each tool
Call our ATC running program (01234), do cleaning by means of single block.



■ 2.2 Monthly check

1. Checking power voltage

On main breaker in control panel to check it being on the range of nominal value $\pm 10\%$

2. Cleaning air filter

3. Checking AC motors for spindle and feed

Cleaning shall be carried out in accordance with instructions provided manufacturer. (Refer to maintenance of AC servo motor)

■ 2.3 Checking on Every 3 Months

1. Check the machine and backlash and give compensation

(Refer to maintenance relate to feed)

2. Machine level check

Machine level check is carried out after about 3 months since acceptance as the first inspection, then after every 6 months there after.

3. Cleaning the coolant tank

■ 2.4 Checking on Every 6 Months

1. NC unit

2. Grease each greasing points

Grease used : SHELL ALVANIA 2 or its equivalent.

3. Changing oil of hydraulic unit and clean the inside of tank (filter will be cleaned).

4. Clean the filters of spindle cooler and the cooler above control panel.

5. Change oil in ATC twin arm box.



2.5 Filling of Lubrication Oil

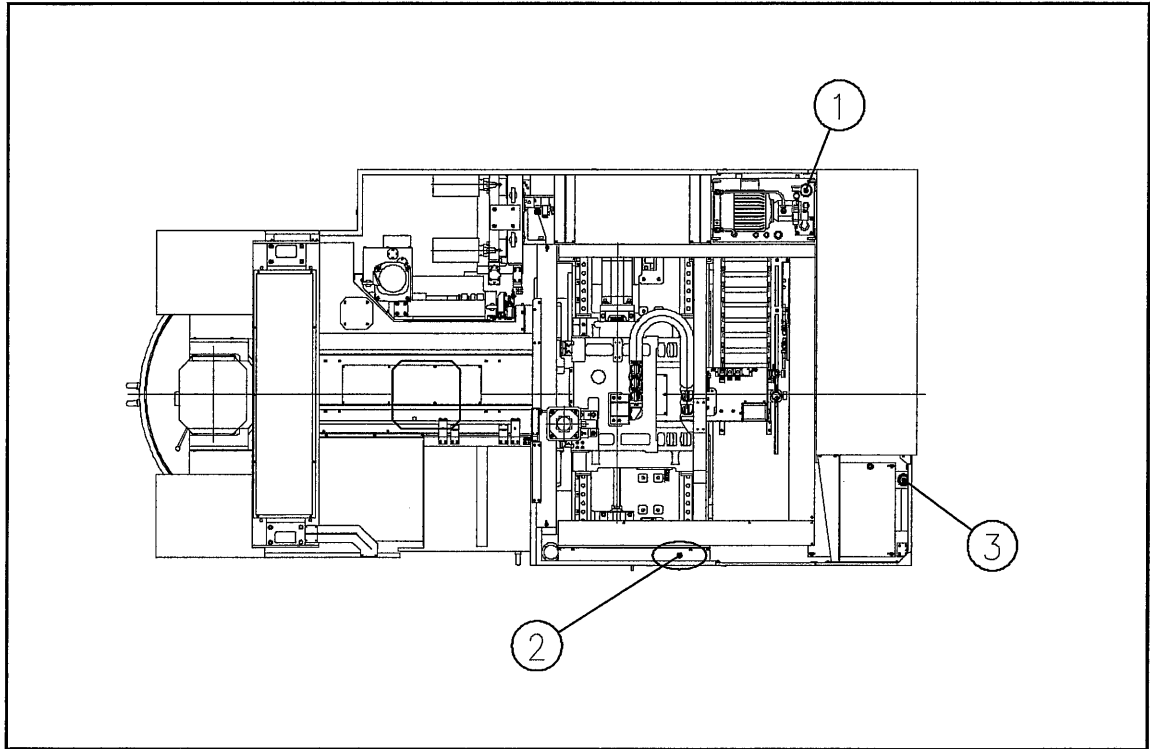
Pay a particular attention to the points as description below.

1. Oil shall be filled to a specified amount with specified type and class.
Never with different type and class or make over filling.
2. First clean carefully away dust to prevent it from entering inside.
3. When adding oil, fill it through filter to prevent foreign bodies as dust being brought into the tank.
4. Use only fresh oil when changing. Using of reproduced oil or long tie preserved oil is not permitted.
5. When filling oil, do not use up the vessel to prevent the sediment and water being filled with. For oiling location, proper oiling period, oiling quantity, type and quality of oil, refer to diagram<Fig. 2-1>.



Regular Check

2.5.1 Lubricating and Oiling Diagram



<Figure 2-1 Location of Lubrication Oil>

<Table 2-1 The Lubrication Table :

The lubrication period is based on the operational time of 8 hours per day.>

No.	Oiling Place	Capacity	Recommended Oil	Remarks
①	Hydraulic Tank	45 l	-DTE 24 (MOBIL) -TELLUS 32(SHELL) -UNI POWER SQ-32 (ESSO)	-Replace oil every six month. -Clean the filters when exchanging oil.
②	Oil-air Lubricating Tank	3 l	-DTE 24 (MOBIL) -TELLUS 32(SHELL) -UNI POWER SQ-32 (ESSO)	-Refill oil immediately, if necessary. -Clean filters every year.
③	Cooling of Spindle Tank	80 l	-Distilled Water : 50 % Purity 99.9 % -Anti-freezing solution : 50 % AF505(SHELL)	-Replace oil every year. -Clean the filters when exchanging oil.



2.6 When Warning Lamp (call light, yellow patrol lamp) Lights Up

The call light lights up as follows.

1. Machine is brought into stop due to the program stop codes (M00, M01, M02 and M30) since program is stopped during program running.
2. Alarm lamp on operation panel lights up because it is turned to an alarm state.

When alarm lamp on, the state of machine is 「Operation stop」 and it shows a cause of interruption.

2.6.1 Kinds of Alarm, Locating Causes and Servicing

- 1) Alarms relate to NC unit (NC alarm)
Number and message of alarm is displayed from CRT. Determine the cause of alarm by checking NC alarm message list and remove it.
- 2) Alarms relate to machine and PC control (Machine alarm)
 - ① CRT is located at the side of control panel.
 - ② Press the key **MESSAGE** to have the function menu displayed. Check alarm number and relevant descriptions displayed on CRT.
 - ③ Find out the cause of trouble corresponding with the alarm being activated by these self- diagnosis function of the PC.



2.6.2 Machine Alarm List

Machine Alarm Message is refer to “Chapter 9. Alarm Message and Solution”



■ 2.7 Parameter

Parameters are very important relating to the features and functions of machine.

Parameters determine a wide extent of settings, such as the determination of standard or optional features and functions, choosing detailed items with regard to specifications or functions and determining motion size and procedure of relevant functions, etc.

■ 2.7.1 Kinds of parameter and relevant descriptions

1) NC Parameter

Refer to NC parameter table.

For detail information, refer to FANUC SERIES 18i-MB maintenance Manual.

2) PC Parameter

■ 2.7.2 Dealing with parameters

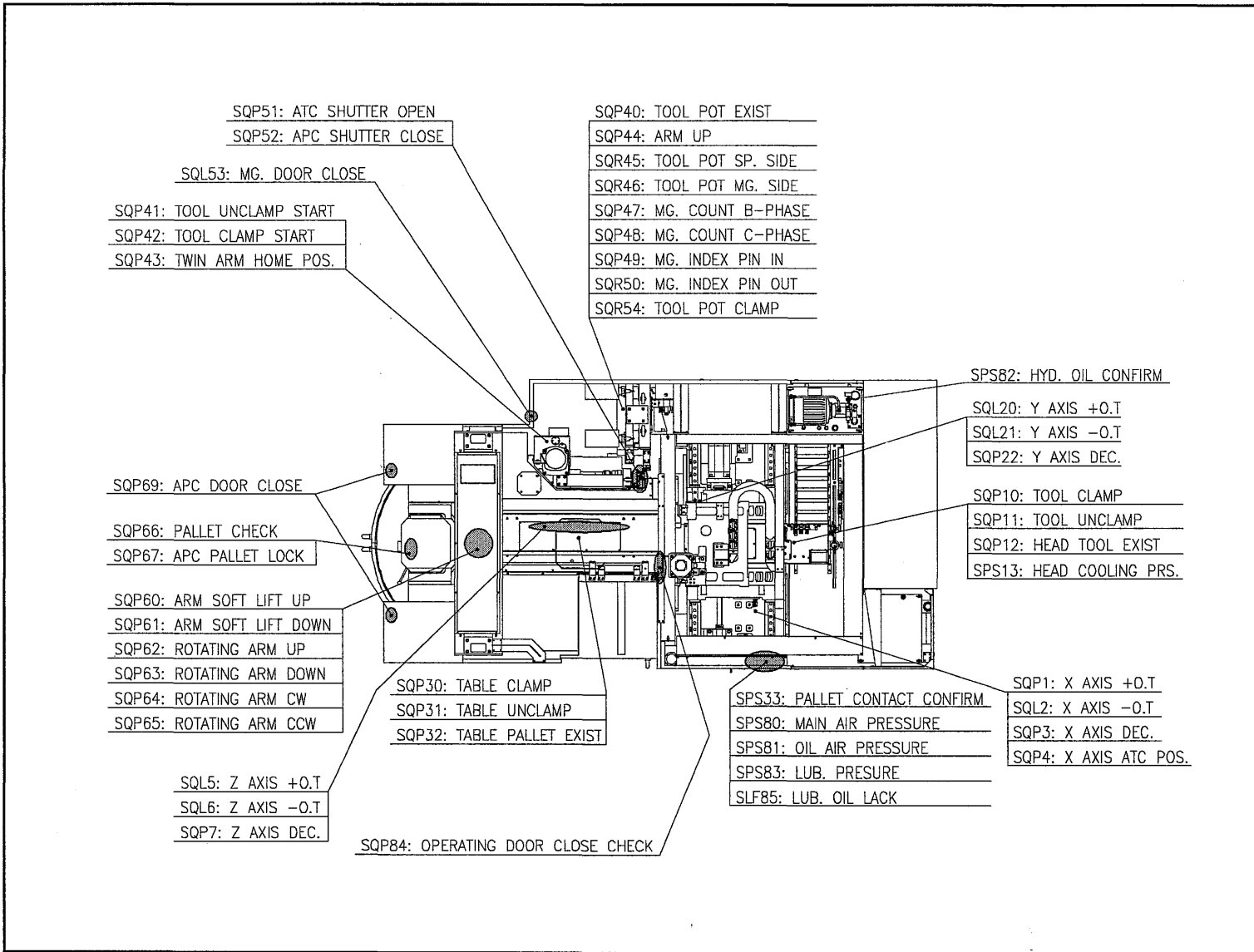
DATA of each parameter is already set by the manufacturer. Therefore, do not modify it anyway except requirement of a very special situation. (But the areas of user macro and backlash/pitch compensation is excepted) Also, the list of NC, PC parameter setting data accompanies with the machine at delivery. It should be kept carefully in custody and is very important in maintenance work.



Regular Check

HYUNDAI-KIA MACHINE

2.8 Limit Switch No.



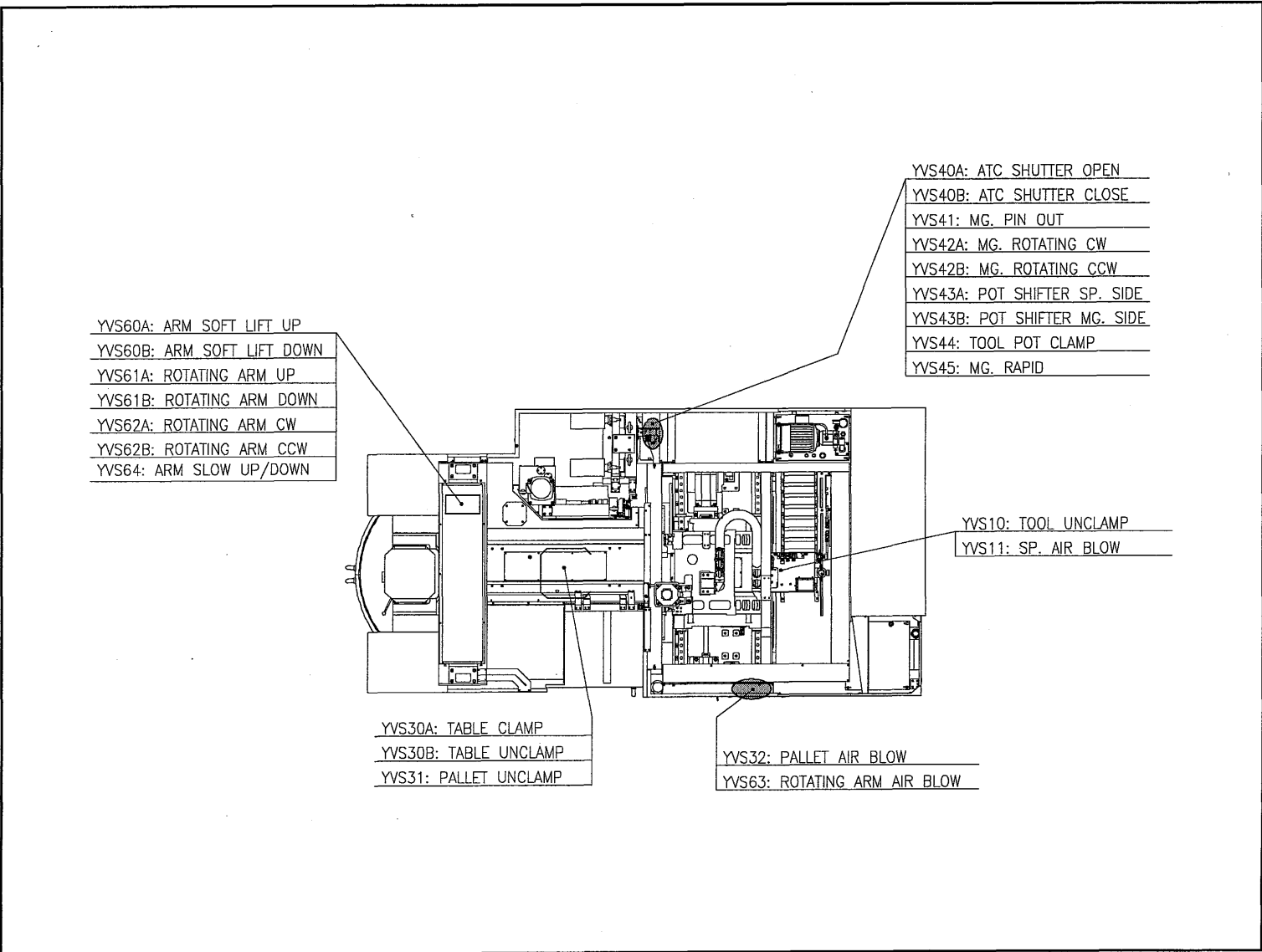
<Figure 2-2 Limit Switch No.>



Regular Check

HYUNDAI-KIA MACHINE

2.9 Solenoid Valve



<Figure 2-3 Solenoid Valve>



Regular Check

HYUNDAI-KIA MACHINE

2.10 Motor

※ : Option

NO.	Use	Type	Output (%ED)		rpm (min-1)	Voltage (V)	Hz	Current (A)	Unit	Remark
1	Feed (X-AXIS)	α 30/4000is	5.5 kw		4000	220	60		X-AXIS	FANUC
2	Feed (Y-AXIS)	α 30/4000is	5.5 kw		4000	220	60		Y-AXIS	FANUC
3	Feed (Z-AXIS)	α 30/4000is	5.5 kw		4000	220	60		Z-AXIS	FANUC
4	Lub. Pump	AMO-II-150S	20 W			220	50/60		LUB.	LUB.
5	Hyd. Unit	3.7Kw \times 4P \times Φ 3	3.7 kw		4P	200/220 \cdot 2 20	50/60		HYD.	LG
6	SPINDLE Cooling	CJWC110- ADPT-S	1.1 kw		4P	200/220 \cdot 2 20	50/60		HEAD COOLING	JESUNG
7	SPINDLE	BiI 112L/15000H	22 kw	25 kw	15,000	220	60	(30min)	HEAD	FANUC
8	TABLE (1° Index)	α 22/4000is	4.0 kw		4,000	220	60		TABLE	FANUC
9	ATC	G3FM-32-40- 075	0.75 kw		4	220	60		ATC CAMBOX	NISSEI



2.11 Action at interruption of electric power (Applicable also to the case of pressing unintendedly the emergency stop switch)

When electric power is interrupted during operation, NC unit and high voltage control panel are switched off. And all the electric commands activated with manual operation button and remaining in NC unit are cleared, and so machine immediately stops. After electric power is supplied, NC unit and machine control circuit can not resume operation if NC unit POWER ON switch and STANDBY push button are not pressed. Oil hydraulic circuit and other devices with stop operation due to interruption of electric power may continue remaining operation when STADBY push button is pressed. So a special attention is needed.

Operation or state before interruption of electric power	Operation or state when power is supplied to control	Action after power is supplied
Main spindle is rotating	Stop	
Main spindle is in stop	Stop	
Main spindle is making orientation with MDI	Stop	Stop Command M19 lines
Tool clamp	Tool clamp	
Tool unclamp	Tool clamp	
Table is rotating	Stops at immediately prior state of interruption of electric power	Table is returned to origin
X, Y, Z axis	Stops at immediately prior state of interruption of electric power	
Coolant is being called	Stop	
Mist is being called	Stop	
Chip conveyor is operating	Stop	



Regular Check

2.11.1 Interruption of electric power or emergency stop during ATC

ATC Bypass Mode

This function facilitates emergency stopping during ATC and restarting when electric power is resupplied.

1) Operation

- ① Select "MDI" mode operation panel.
- ② Check for any interruption as ATC twin-arm is operation before operation.

2) State and method of operation when stopping

No.	State of operation stopping	Method of operation after power is supplied	Remark
1	ATC twin-arm is operating	1) Command M31, M35 2) Move in + direction the toggle switch for X axis jog feed. 3) Move in - direction (Tool unclamp), + direction (Tool clamp) the toggle switch for Z axis jog feed. 4) Command M32 after return to origin.	
2	Tool pot magazine side \rightarrow main spindle is operating \leftarrow	1) Turn "ON" Maintenance switch (or run M998) 2) Run M61 (Tool pot magazine side) \rightarrow \leftarrow M62 (Tool pot spindle side) 3) Turn "OFF" maintenance switch (or run M999)	
3	Magazine is rotating	1) Set the operation mode to manual mode (Feed, rapid feed, origin return, handle mode, etc). 2) Press at the same time the magazine Forward/Reverse and select switches at ATC operation part to operate rotation.	
4	ATC door is open or in operation of closing and opening	1) Set the main operation panel to MDI mode. 2) Run M80 (ATC door open) \rightarrow \leftarrow M81 (ATC door close).	



Regular Check

HYUNDAI-KIA MACHINE

2.11.2 Interruption of electric power during table indexing operation

State of operation just before interruption of electric power (Including emergency stop)	Stop or operation when power is resupplied	Action after power is supplied
Table is rising	Stop just at the state immediately before interruption of electric power	Set the NC mode to MDI and command G28 B0; return the table to origin.
Table is rotating	Stop just at the state immediately before interruption of electric power	Set the NC mode to MDI and command G28 B0; return the table to origin.
Table is lowering	Stop just at the state immediately before interruption of electric power	Set the NC mode to MDI and command G28 B0; return the table to origin.



Regular Check

HYUNDAI-KIA MACHINE

2.11.3 Interruption of electric power or emergency stop during APC operation

State of operation just before interruption of electric power (Including emergency stop)	State or operation when power is resupplied	Action after power is supplied
Pallet is rising or lowering	Stops just at the state immediately before interruption of electric power	Turn "ON" Maintenance switch and command M23 (Pallet clamp) with MDI mode. It's capable only when the rotating arm down limit switch is ON.
Pallet is rotating	Stops just at the state immediately before interruption of electric power	Turn "ON" Maintenance switch and command M53 (Electric interruption on pallet) with MDI mode. It's capable only when the rotating arm up limit switch is ON.
Pallet is rising	Stops just at the state immediately before interruption of electric power	Turn "ON" Maintenance switch and command M56 (Pallet lowering).
Pallet is lowering	Stops just at the state immediately before interruption of electric power	Turn "ON" Maintenance switch and command M56 (Pallet lowering).

※ It is the same to turn "ON" maintenance switch and command M-code M998 with MDI mode.



Regular Check

HYUNDAI-KIA MACHINE

2.11.4 M-Code & Maintenance M-Code

M code	Function	Remarks	M code	Function	Remarks
M00	PROGRAM STOP		M52	TOOL BROKEN CHECK	OPTION
M01	OPTIONAL STOP				
M02	PROGRAM END				
M03	SPINDLE CW				
M04	SPINDLE CCW				
M05	SPINDLE STOP		M56	MIRROR IMAGE X ON	
M06	TOOL CHANGE		M57	MIRROR IMAGE X OFF	
M07	OIL MIST COOLANT ON	OPTION	M58	MIRROR IMAGE Y ON	
M08	COOLANT ON		M59	MIRROR IMAGE Y ON	
M09	COOLANT OFF		M60	PALLET CHANGE	
M10	OIL MIST NOZZLE 1 ON	OPTION	M61	A PALLET CHANGE	
M11	OIL MIST NOZZLE 2 ON	OPTION	M62	B PALLET CHANGE	
M12	WORK COUNTER	OPTION			
M13	M03 & M08				
M14	M04 & M08				
M15	M05 & M09				
M16	MEASURE AIR BLOW ON	OPTION			
M17	MEASURE AIR BLOW OFF	OPTION			
M18	MEASUREMENT SP. ORI.				
M19	SPINDLE ORIENTATION				
			M66	FIXTURE CLAMP	OPTION
			M67	FIXTURE UNCLAMP	OPTION
M25	TOOL DETECTION STOP	OPTION			
M26	TOOL DETECTION STOP	OPTION	M70	EXTERNAL M-CODE 1	OPTION
			M71	EXTERNAL M-CODE 2	OPTION
M28	RIGID TAP MODE CANCEL		M72	EXTERNAL M-CODE 3	OPTION
M29	RIGID TAP MODE ON		M73	EXTERNAL M-CODE 4	OPTION
M30	PROGRAM END & REWIND		M74	MEASUREMENT SP. CW1	OPTION
			M75	MEASUREMENT SP. CW2	OPTION
M33	EXTERNAL CHIP CONV. ON		M78	TABLE CLAMP	
M34	EXTERNAL CHIP CONV. OFF		M79	TABLE UNCLAMP	
			M80	ATC DOOR OPEN	
M36	CHIP CONVEYOR ON		M81	ATC DOOR CLOSE	
M37	CHIP CONVEYOR OFF				
			M86	PALLET CLAMP	
			M87	PALLET UNCLAMP	
M45	B/CYCLE TOOL DET. STOP	OPTION			
M46	B/CYCLE TOOL DET. S/CAN	OPTION	M90	AUTO DOOR OPEN	
M47	JET COOLANT ON	OPTION	M91	AUTO DOOR CLOSE	
M48	OVERRIDE CANCEL				
M49	OVERRIDE 100%				
M50	THROUGH COOLANT ON	OPTION			
M51	FLUSHING COOLANT ON		M200	BET TEMP. SENSOR TRANS	OPTION
			M201	SP. TEMP. SENSOR TRANS	OPTION



Regular Check

HYUNDAI-KIA MACHINE

M code	Function	Remarks
*M21	TABLE CLAMP	
*M22	TABLE UNCLAMP	
*M23	PALLET CLAMP	
M24	PALLET UNCLAMP	
*M53	ROTATING ARM TURN CW	
*M54	ROTATING ARM TURN CCW	
*M55	ROTATING ARM UP	
*M56	ROTATING ARM DOWN	
*M57	TOOL POT CLAMP	
*M58	TOOL POT UNCLAMP	
*M31	MAINTENANCE TWIN ARM MODE ON	TWIN ARM
*M35	MAINTENANCE ATC ORIENTATION MODE ON	TWIN ARM
*M32	MAINTENANCE TWIN ARM/ORIENTATION MODE OFF	TWIN ARM
*M61	ATC SINGLE ARM SWING MAGAZINE SIDE	
*M62	ATC SINGLE ARM SWING SPINDLE SIDE	
M998	MAINTENANCE M MODE ON	
M999	MAINTENANCE M MODE OFF	

* : MAINTENANCE M-CODE

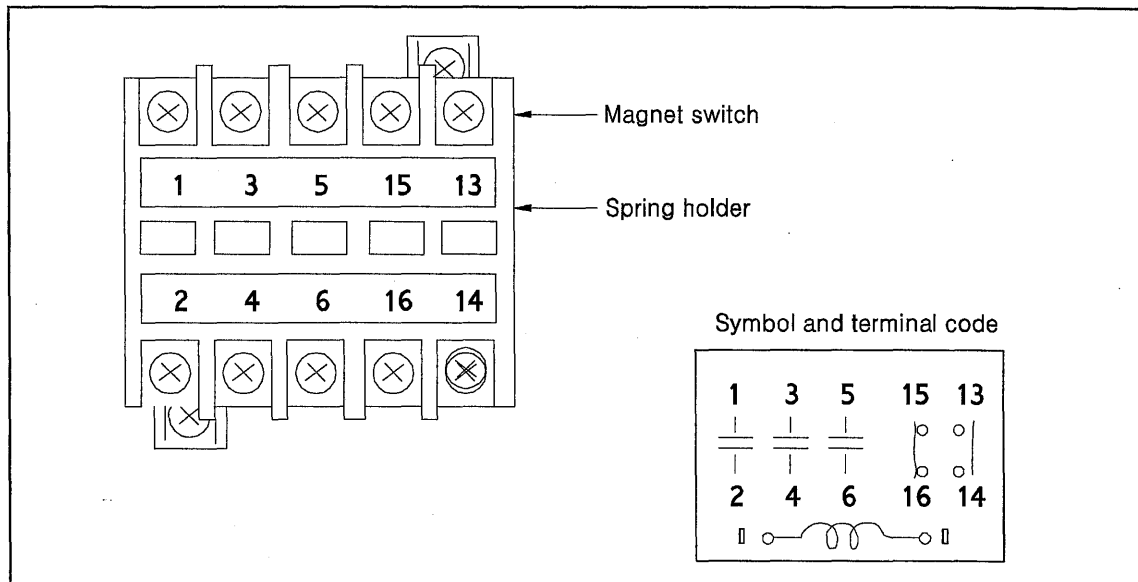


Regular Check

HYUNDAI-KIA MACHINE

2.12 Check of Main Electric Power

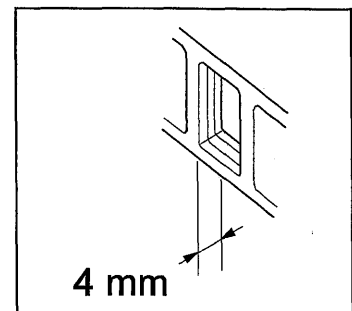
2.12.1 Magnet Switch



〈Figure 2-4 Magnet Switch〉

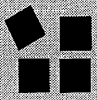
Magnetic switch is used for starting or stopping the induction motor.

- 1) When magnetic switch does not operate, the spring holder and switch body are in a line.
- 2) When magnetic switch does operation, the spring holder is in the position slightly inside the switch body for about 4 mm.



CAUTION

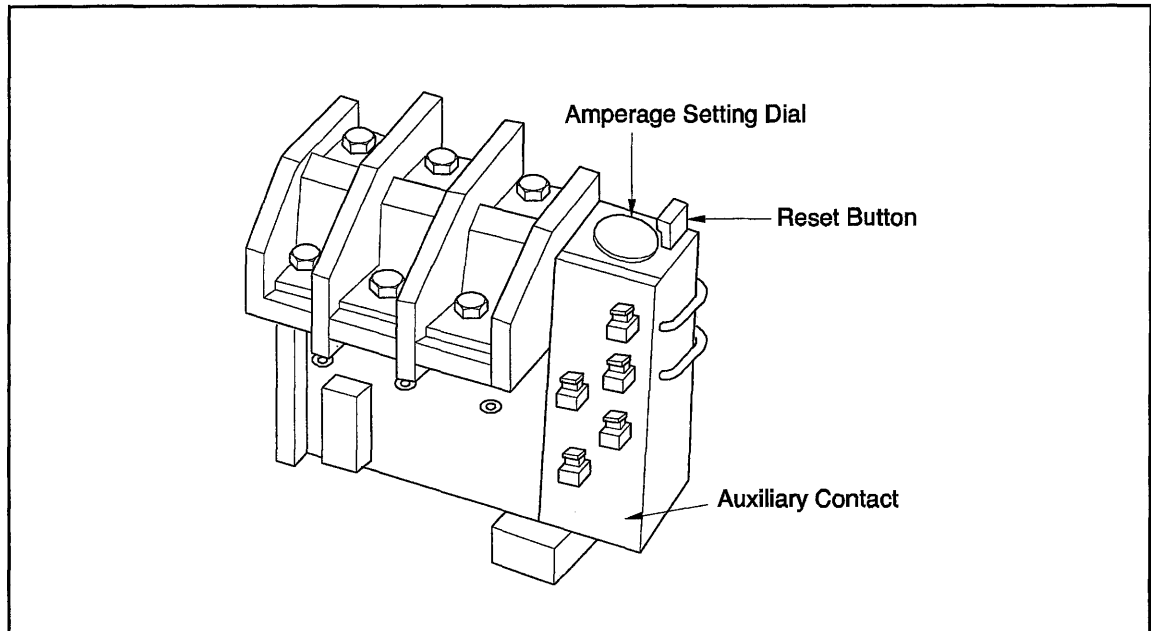
1. When magnetic switch does not operate due to dust or other causes, the spring holder may get inside.
2. For several problems, check the voltage between terminal a and b with multimeter.



Regular Check

HYUNDAI-KIA MACHINE

2.12.2 Thermal Relay



〈Figure 2-5 Thermal Relay〉

The thermal relay is used for preventing motor from over current or burnt out.

1) AMPERAGE SETTING DIAL

Do not touch the dial as it's already been set at delivery.

2) RESET BUTTON

When over current flows on thermal relay causing the RESET button to trip up, reset it after 2~3 minutes by pressing this button.

! CAUTION

Frequently operating thermal relay may weaken the motor resulting in overload on it mechanically.



2.12.3 Circuit Protector

Circuit protector (CP) is just like fuse in function. A fuse has to be changed when blowing off, but the circuit protector can be re-used only by pressing the button "ON".

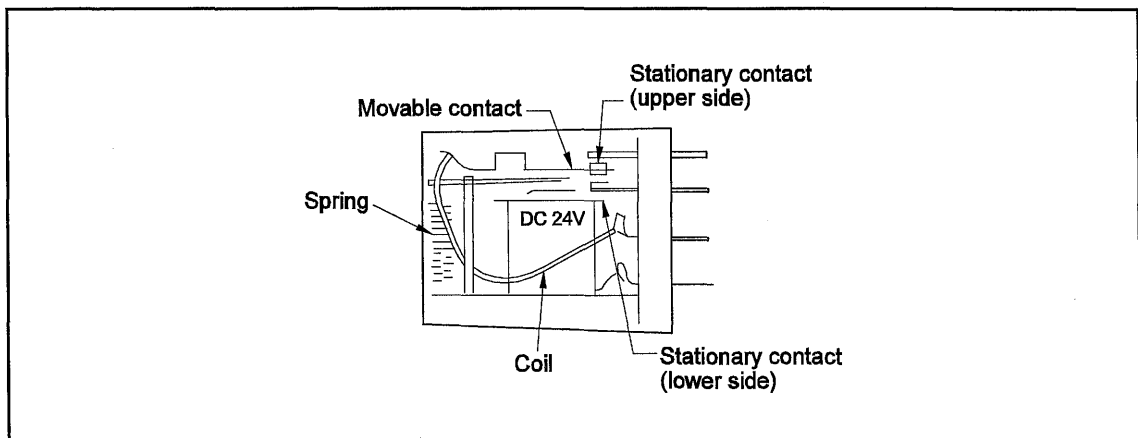
2.12.4 Control Relay

State of operation of control relay, can be confirmed by observing the movement of contacts.

1) When the relay is not operating

When electric current flows on the relay coil, the contact will change. When the relay does not operate, the movable contact will contact with upper contact by pushing up of spring. The contact by which electric current flows as relay not operation is called "B-contact".

Symbol :



<Figure 2-6 Control Relay>

2) When the relay is operating

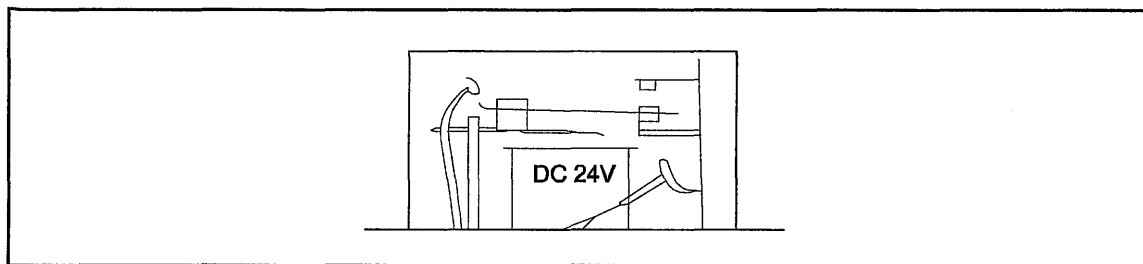
When the movable contact contacts with the lower stationary contact, the relay is switched on. The contact being brought into contact as relay is not operating is called "A-contact". When "A-contact" is configured, "B-contact". Will get opened to cut off the current.

Symbol :



Regular Check

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〈Figure 2-7 Control Relay〉

Chapter 3

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3.1 General

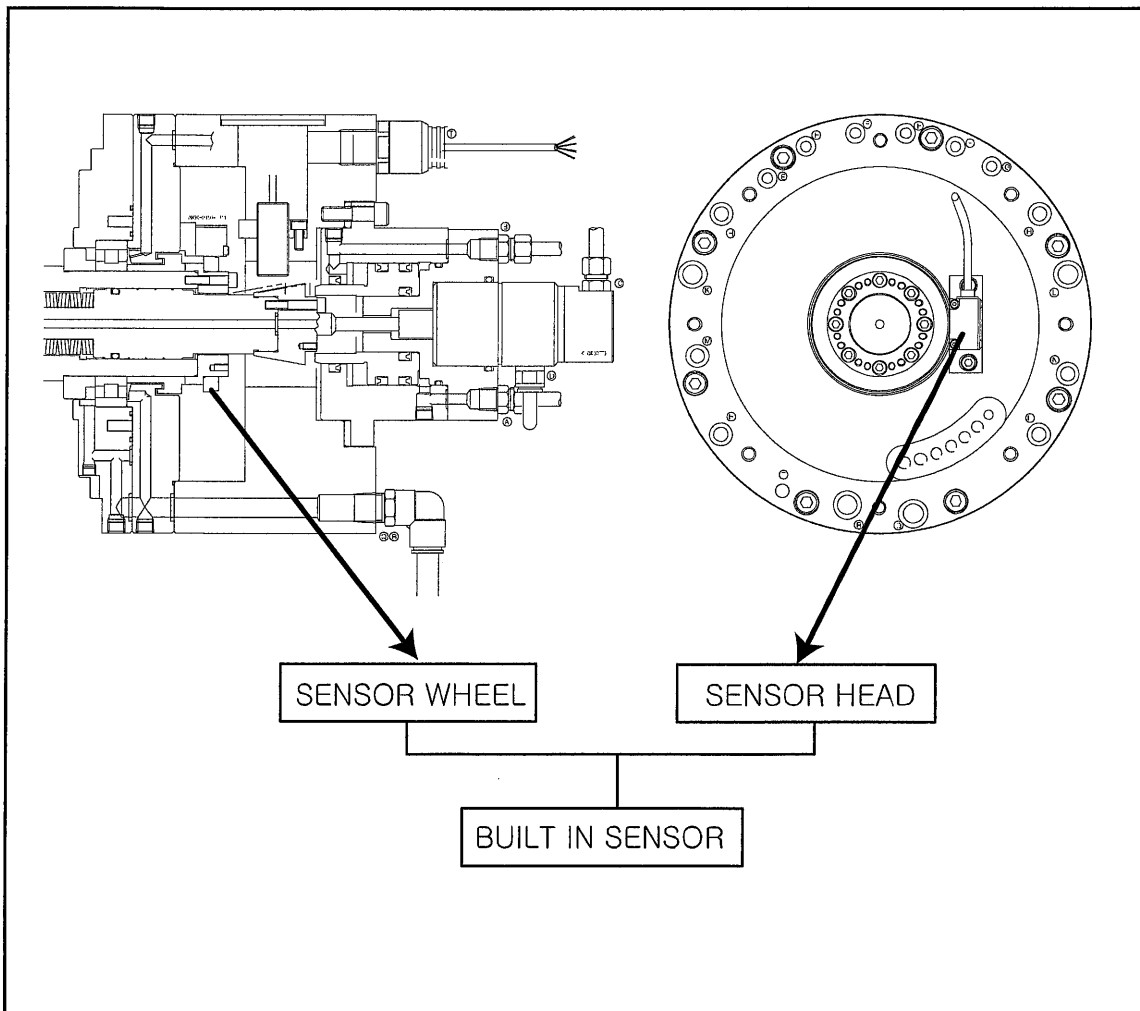
Spindle is supported by angular ball bearing (front side) and high velocity roller bearing (rear part), and equipped with Built-in motor of 22/18.5 kw. Rate of spindle is 150~15,000 rpm with non-stop operation being possible. Spindle is maintenance free since Oil Air Lubricant is filled in each bearing. Spindle orientation is performed without contact using Built-in Sensor and so allows prompt and accurate orientation with high reliability. Tool clamping device is composed of draw bar ass'y and unclamp cylinder, which is composed of con disk spring soild collet, and solenoid valve which connected to oil pressure tank directly.



3.2 Spindle Orientation Device

3.2.1 Spindle Orientation Sensor

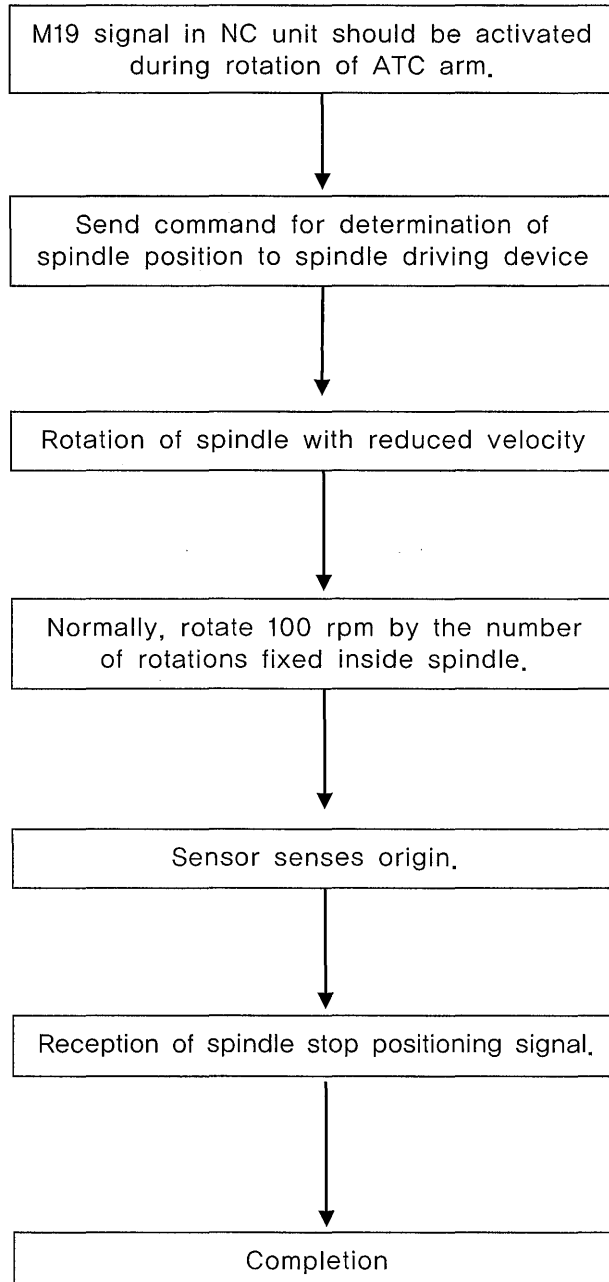
As a sensor, determining the exact location of the surface of the main spindle (NOS Key), it detects the point of origin through the built-in sensor, composed of a wheel and a sensor, inside the major axis, and earths the point to the right position.



〈Figure 3-1 Spindle Orientation Sensor〉



3.2.2 Driving Sequence of Spindle





3.3 Tool clamp / Unclamp Device

3.3.1 Tool Clamp Device

〈Fig. 3-2〉 shows the tool clamp device.

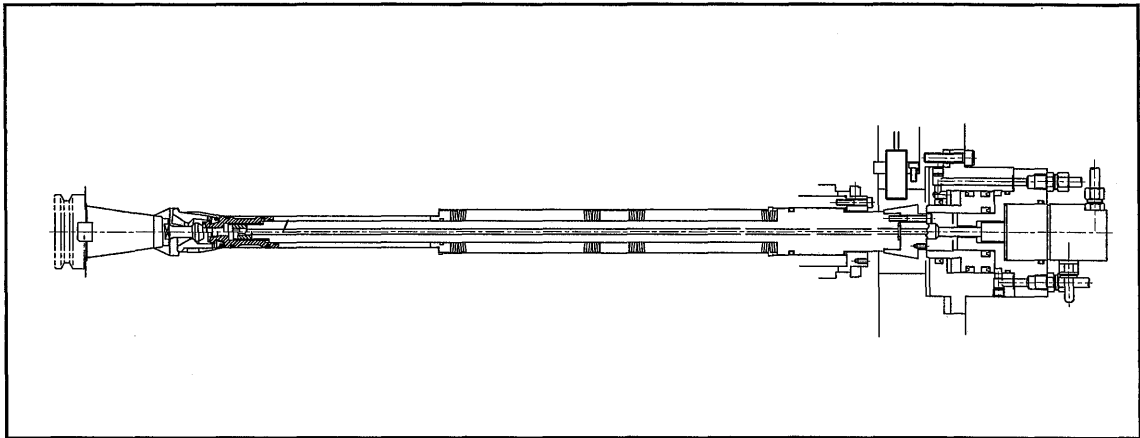
When Tool Holder is inserted into inside pulled against by collects divided into 4 pieces so that the tool holder taper surface is brought closely into contact with the internal taper surface of spindle for the tool to be clamped. The clamping force is given by means of compression con disk spring and the tool unclamping cylinder piston makes the draw bar to move foreword causing the collet open, so the tool is unclamped. For preventing foreign bodies from attaching on the contacting portion of taper surface of tool holder, air (5 kgf/cm²) blowing is provided.



3.3.2 Tool Unclamp Device

<Fig. 3-2> Shows tool unclamp device

When the oil works, the piston of tool unclamp cylinder will extend pushing the draw bar in spindle, so the collet holding the pull stud bolt of tool will be pushed forward to open allowing unclamp of the tool. The draw bar will continuously advance to knock at the end of pull stud bolt to unclamp the tool.



<Figure 3-2 Tool Clamp Device>



3.4 BUILT-IN SPINDLE Manual

3.4.1 Introduction

The Built-In Spindle can be installed, used, checked and repaired only by skilled people that know very well the product.

All users of the Built-In Spindle must read carefully this manual.

It is strictly forbidden to insert the fingers in the tool holder.

DANGER

If this rule is not respected the user can get seriously injured.

The Built-In Spindle are checked by analogic sensors in order to protect them against usages that are not allowed. This sensor can not be moved or excluded.

DANGER

A tampering of this sensor can cause the following problems:

1. The tool can be stopped.
2. The Built-In Spindle can run when the tool is not chucked and this can not happen.
3. The Built-In Spindle can be damaged by an uncorrect use.



3.4.2 General Information about the BUILT-IN SPINDLE

1. The Built-In Spindles are operated by an three asynchronous motor with running rotor in the same direction of the spindle.
2. The speed of the Built-In Spindle is governed by a encoder.
3. The bearings lubrication is by means of oil-air.
4. The bearings are protected against impurities by special labyrinths and by a compressed air system.
5. The Built-In Spindles are equipped with tool taper BBT40.
6. The tools are chucked through a drawbar which is stretched by a set of disc springs. They are ejected through a double effect hydraulic cylinder.
7. In order to dissipate the heat developed by the motor the Built-In Spindle need to cooled through liquid.
8. A heat sensor protects the motor against overloads.



The Built-In Spindle motor is made in such a way that:

1. If the motor drive works properly from the point of view of programming, it can guarantee a high level of reliability and it can be used with a high rate of efficiency. The prerequisite for a good operation is the full conformity with all the technical parameters defined in this document and the tolerance settings.
2. The safety warnings included in this manual and applied to the built-in motor must be observed.
3. The Built-In Spindle drive works with dangerous electric voltages. While making the electrical connection to the electrical power line of the machine tool, it is necessary to comply with the local safety regulations in force.

The casing of the Built-In Spindle motor must be grounded in order to guarantee the necessary protection in case of direct or indirect contact. The manufacturer of the machine tool is responsible for the structural safety of the entire system.

4. Getting in touch with the rotating parts of the Built-In Spindle can cause serious injuries or death of persons, as well as considerable material damages. The manufacturer of the machine tool must provide for proper safety guards and warning signs.
5. The safety equipment must be designed in such a way to guarantee a sufficient protection against the parts that may suddenly come off during the work and thus cause dangerous situations.
6. It is necessary to provide for the assembly of integrating safety equipment, whose purpose is to guarantee that only skilled personnel may reach the start-up controls (e.g. EMERGENCY STOP keylock switch).



3.4.2.1 Safety during the Assembly and Repair Operations

1. Only the skilled personnel is authorised to perform both the first assembly and all the repairs of the Built-In Spindle motor.
2. The Built-In Spindle motor can be started only if it is completely assembled.
3. Before starting any repair action, it is necessary to cut the machine tool off from the mains and make it sure that it cannot be started involuntarily. Once the works are finished, it is necessary to re-apply all the necessary safety equipment, such as, for example, the safety guards.
4. An excellent housekeeping must be guaranteed for any type of work.

3.4.2.2 Safety during Commissioning

1. Comply strictly with all the safety regulations in force.
2. The Built-In Spindle motor can be started only if all the necessary safety guards are installed and properly operating.
3. The guard of the Built-In Spindle must be made in such a way that it can be opened only once the rotation is completed.
4. Never put your hands within the rotation field of the Built-In Spindle.
5. Use only tools having suitable taper end shank and whose tip speed or speed rate are homologated for the maximum speed of the Built-In Spindle.
6. Never leave the tool in the Built-In Spindle in case of longer periods of standstill or at the end of shifts.
7. Never hammer or rap on the Built-In Spindle shaft since this might damage the bearings.
8. The Built-In Spindle is controlled by analogic sensor, which guarantee protection against non-admitted operating conditions. These sensors should not be either displaced or removed.
The tampering of sensors may cause:
 - ① Abnormal stoppage of the tool;
 - ② Turning of the Built-In Spindle without having the tool hooked up.
9. The Built-In Spindle is normally situated inside the machine tool. The working area of the power spindle should be integrated with a portable lamp.



10. The Built-In Spindle is installed on the machine tool by tightening the screws with class of resistance 12.9, with the help of a torque wrench.
11. The vibrations induced by the Built-In Spindle to the machine tool are well counter-balanced if the anchorage requires the assembly of tools, which are adequately balanced for the maximum rotation speeds applied. Non-balanced tools may even come off.
12. The machine must be cleaned while standstill; it is forbidden to use solvents and water and carry out this operation in the presence of fuel.

3.4.2.3 Technical safety controls

The machine tool and all its electrical and mechanical safety equipment, as well as the subordinating power system, must always be perfectly safe and controlled.

It is crucial to keep in mind all the environmental and performance conditions that may have impact on the safety.

3.4.2.4 Risks

Even if the Built-In Spindle is used according to the regulations, it may happen that, while it is working, or during its servicing, some risky situations occur. The life of the operator or of the third persons may be at risk and the Built-In Spindle and/or some things may be damaged. The following safety regulations must be scrupulously observed.

The Built-In Spindles rotate at highest speed. That's why during the operations the particles, cut-off parts and chips may be hurled away at high speeds, especially if the Built-In Spindle breaks.

The following precautionary measures must be complied for the machine where the Built-In Spindle will be mounted:

- The working area must be enclosed by a booth.
- The booth doors must be fitted with safeties, which allow the start-up of the Built-In Spindle only if the doors are closed.
- The booth must be made in such a way that the particles, broken parts or chips may cross neither the walls, nor the windows.



If these provisions are not complied with, the grinding wheel particles or parts may hurt or even kill the workers.

- It is strictly forbidden to put the fingers in the tool-holder attachment. The non-conformity with this rule may cause the squashing of the fingers.
- Due to the effect of the built-in Belleville spring pack, some parts of the Built-In Spindle are under high stress and might fly off at significant speed if the assembly is carried out improperly. That's why only the skilled personnel is authorised to dismantle the Built-In Spindle.



Head

3.4.3 Visual Aspect and Description

3.4.3.1 Technical – Data of the Electrospindle

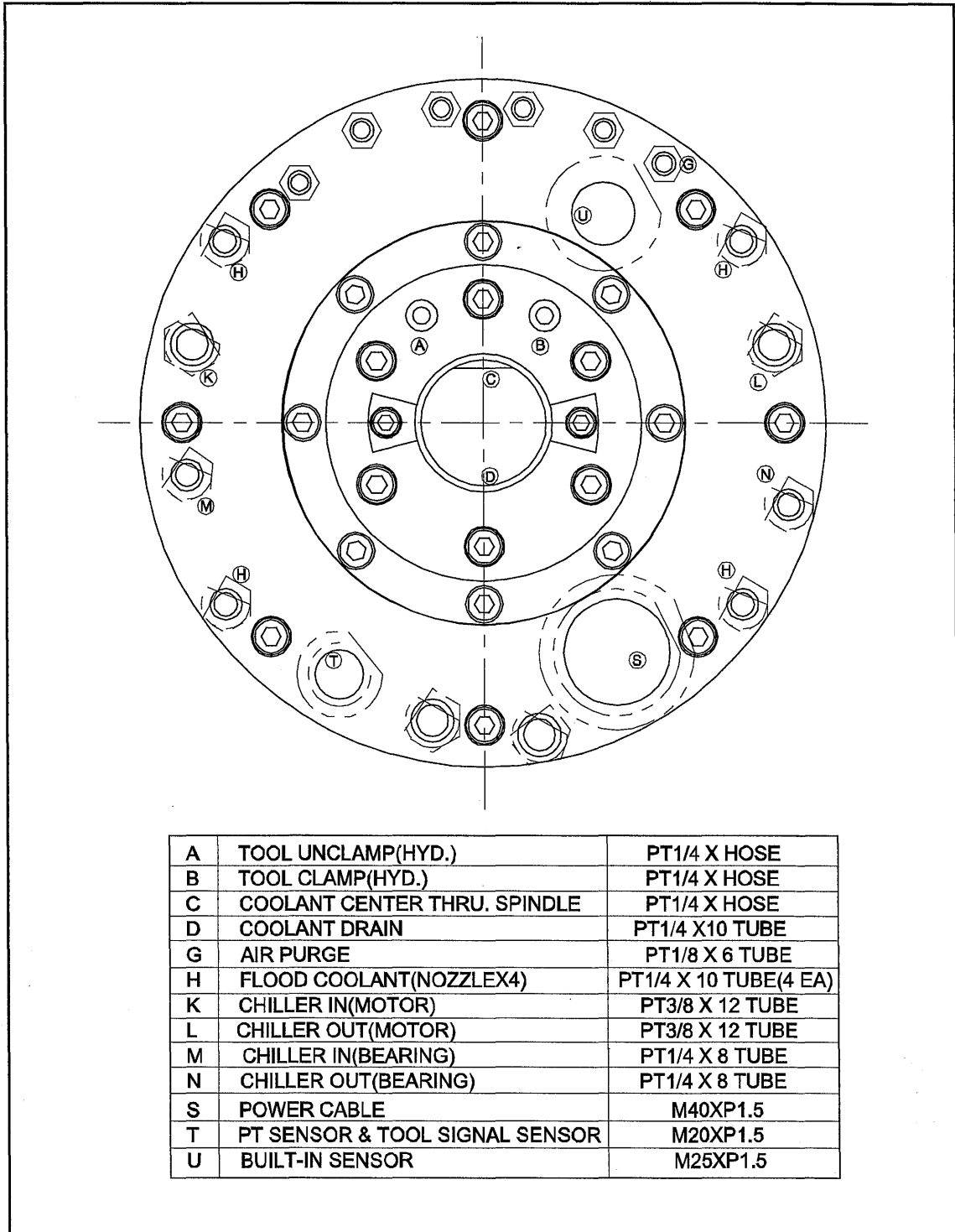
Motor	FANUC BILL 112L/15000				
Rotation	Direct rotation/Reverse rotation				
Max. power	Low Winding	18.5	kW	22	High Winding
Max Speed		3500	min ⁻¹	15000	
Max Torque		95	Nm	42	
Weight moment of inertia	0.04 kgm ²				
Motor Power to be dissipated	4000 Watt				
Tool clamping force	1200 kgf				
Motor cooling	Water				
Bearing lubrication	Air – Oil				
Tool clamping	Automatic mechanical				
Tool release	Double effect hydraulic cylinder				
Position electrospindle	Horizontal				
Tool interface	BBT 40				
Weight	228 kg				



3.4.4 Installation of Original Equipment

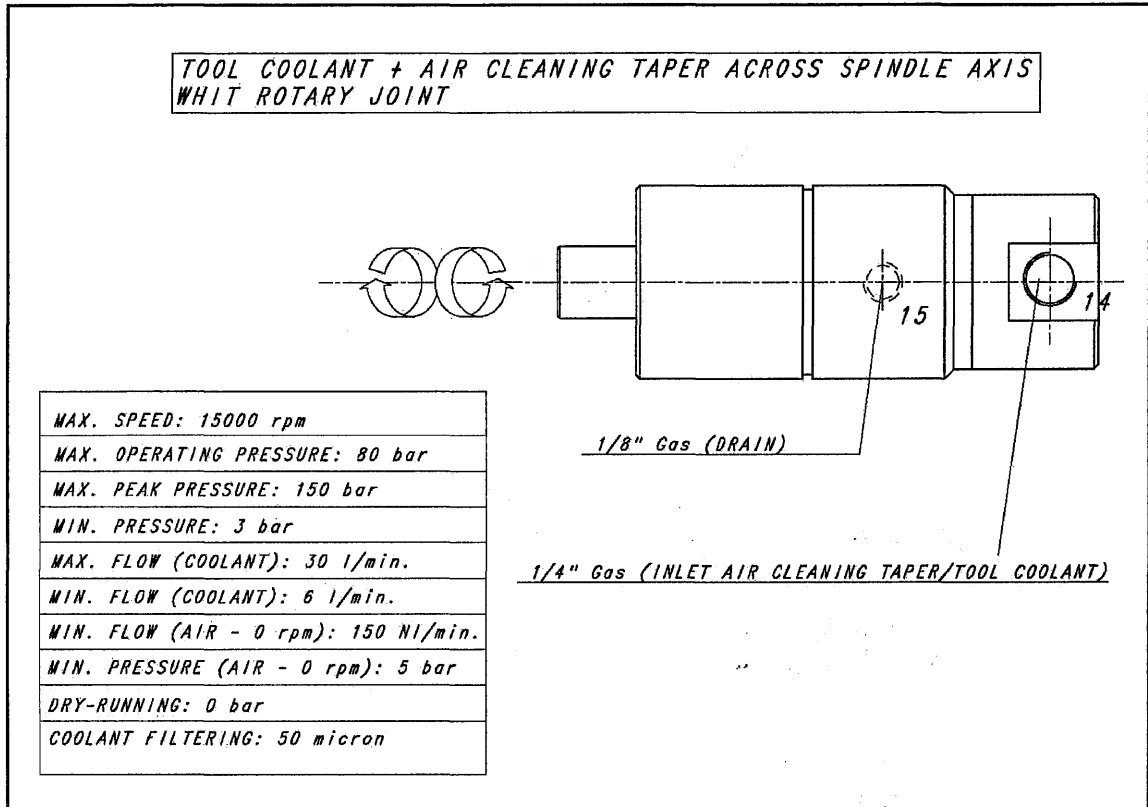
3.4.4.1 Electrical & Utility Connections

The electric and utility connections are on the rear side of the electrospindle:

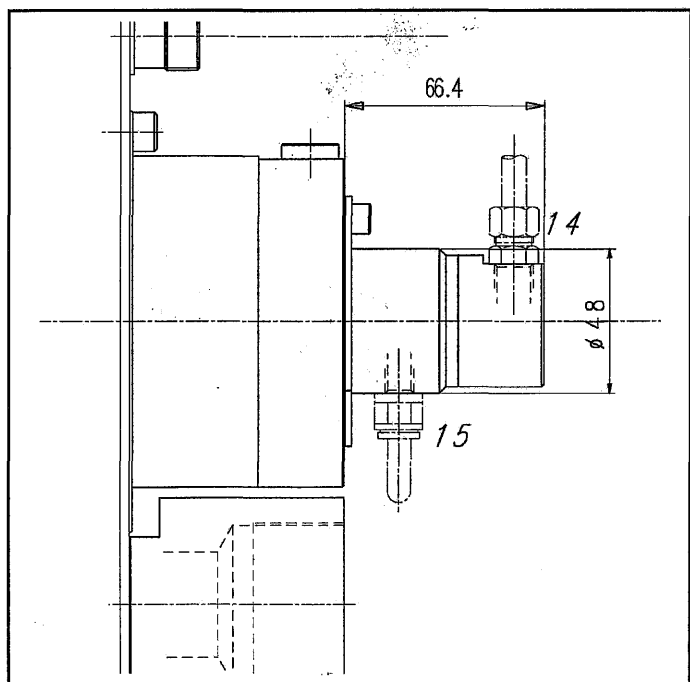




3.4.4.2 Rotary Union Connections



〈Rotary Joint
: FLUITEN G/5560〉



Type and quality of the liquid can be chosen according to the needs of the end-user



Head

HYUNDAI-KIA MACHINE

 **DANGER**

All dimensions of the on holes, of the connections are indicated the enclosed drawing.



■ ■ 3.4.5 Precautions and Measures to be taken for the Built-In Spindle Start-up

■ ■ 3.4.5.1 List of Precautions Concerning the Electric Part

- 1) The U.V.W. power cables must be connected correctly as indicated in the documents provided with the machine.
Incorrect tightening of the cables could cause arcs (sparks) or interruption of the power circuits.
- 2) Make sure that all the parts of the Built-In Spindle are perfectly grounded and connect the earth terminal to the yellow-green conductor of the machine. This action safeguards the operator health and protects him from direct contacts, which could cause harmful voltages between other parts of the machine and the Built-In Spindle.
- 3) Connect the inverter to the terminals of the heat feeler in order to signal the converter with any increase in the winding temperature due to faults in the Built-In Spindle operation or excess of power demand.
- 4) The proper functioning of the sensors need to be confirmed:
- 5) Thermal cutout for motor protection.
- 6) The voltages in the Built-In Spindle can cause serious electric shocks with fatal consequences. In general, the stop function of the converter does not throw harmful voltages off from the terminals; therefore, always before any maintenance operation, switch off the main power supply.
- 7) Between converter and Built-In Spindle should not be installed any remote control switch or relay. Should this not be the case, the transition must take place with current off.
- 8) The Built-In Spindle is equipped with an electric motor, suitable to run within a certain speed range with set electric parameters; therefore, the



motor can work only if it is power supplied by an inverter having suitable features.

If the inverter is of the voltage/frequency type, it is very important to set the rated voltage and frequency values as well as the frequency value corresponding to the maximum speed.

If the inverter is of the vectorial type (with or without speed feedback), the parameters of the equivalent circuit in the rotor-stator unit has to be set up in order to optimize the control of the inverter – Built-In Spindle system under various load conditions.

The following data have been set:

- The maximum absorbed current upon acceleration and/or deceleration has to be lower than twice the rated current,
- the absorbed current under on-load and continuous-duty conditions, has to be lower than or equal to the current set for that specific speed. An intermittent duty is allowed (S3/S6) in accordance with the technical specification included in the documents delivered with the Built-In Spindle,
- The maximum obtainable temperature limit in the stator winding is 130 °C. Note that an erroneous calibration of the inverter causes some anomalous operating conditions as the magnetic circuits of the rotor-stator unit risk to be saturated or demagnetized, with consequent overheating in the first case or power failure in the second one.

- 9) Once the Built-In Spindle has been fit on the machine, during the first start-up the electric measurements should be performed in order to verify the power supply is correct. The steps to be carried out are the following in the order:

Measurement of the real RMS value of supply voltage, under no-load and on-load conditions, by means of a voltage measuring instrument with real RMS value, with fundamental term up to 1000 Hz; this allows to verify the correct functioning of the inverter and be sure that the voltage drop on the dissipative parameter of the cables is not such as to undersupply the Built-In Spindle.



Analysis of the waveform of the supply voltage by means of a proper oscilloscope. Verify that the total harmonic contents are less than 20 % of the value of the first harmonic.

It is important to be sure that the waveform of the voltage across terminals of the Built-In Spindle has always a point value lower than 650V (dimensioning voltage of the winding insulation). Any partial resonances between the machine inductances and the parasitic capacities of the cables can cause overvoltages, which reduce unacceptably the insulation lifetime. Moreover, it is essential that the du/dt voltage gradient is never higher than 1000 V/ μ s not to stress the motor insulation too much. The presence of cables longer than 20 meters between inverter and Built-In Spindle, or the low dispersion reactances of the rotor-stator unit require, in general, the need for using filtering devices, in order to keep the above-mentioned parameters within acceptable limits.

The designer of the machine-aboard system, who knows the inverter parameters and the characteristics of cables and Built-In Spindle, shall determine the right value of eventual inductors or study the sinusoidal filters to be installed between inverter and Built-In Spindle.

A reduced harmonic content limits the power loss in the form of heat from the active parts, and limits also the electromagnetic vibrations and noise.



3.4.5.2 EMC Provisions

The metal structure of the Built-In Spindle has to be connected, with low contact resistance, to the not-painted part of the electric cabinet where the inverter is housed. This connection has to be properly performed, considering that the screens can be run by high-frequency leakage currents.

The painted or galvanised metal parts as well as the supporting bars or the anchoring devices do not meet the requirements for electromagnetic compatibility.

The need for compliance with the above-mentioned provisions obliges to the use of screened cables with plaited braids consisting of tinned or nickel-plated wire, coated at least on 85 % of its surface area.

The power and signal cables have to be laid in separate raceways.

The power and signal cables must absolutely not be laid near any source of disturbances (remote control switches, transformers, ...). If necessary, some screening foils have to be interposed between them.

Also the extension or break of the cables by terminals or other similar fittings has to be avoided; should this be inevitable, as e.g. because of the presence of head changing devices, the continuity of the braid shall be insured through the use of the pin of a connector.

In the area surrounding such connectors, the presence of disturbance sources has to be avoided since, even if the braid continuity is guaranteed, it is not the same for the cables.

To protect the power and signal leads against EMC disturbances, the screen of the cables must cover them until as much as possible close to the terminals, or enter to the connectors in order to guarantee the screening continuity.

As an option, instead of screened cables, it is possible to use single or multiple cables put in a channel or metal sheath, provided that they are connected as the screening braids.



3.4.5.3 Hydraulic Hookup Requirements

The cooling of the motor needs to be guaranteed by the coolant: water + corrosion inhibitor or anti freeze (5 %-8 % flow). The coolant temperature at the inlet needs to be $24\text{ }^{\circ}\text{C} \pm 2^{\circ}\text{C}$. The temperature rise may not exceed $8\text{ }^{\circ}\text{C}$.

3.4.5.4 Pneumatic Hookup Requirements

Bearing damage is primarily due to contamination (for example dirt, coolant). These contaminants cause an interruption of the lubrication and rapid bearing deterioration.

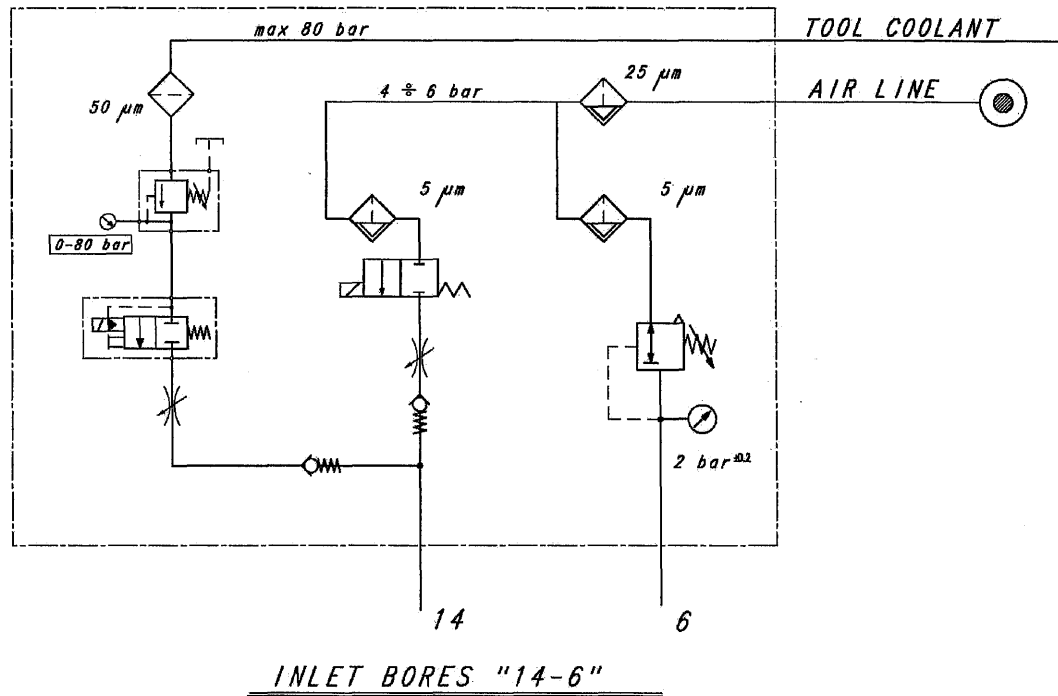
To avoid this damage, the electrospindle is equipped with a pressurization system which prevents contaminants to enter through the labyrinth.

The air supply needs to be absolutely free of contaminants and needs to observe the filtration requirements as shown on the drawing, this applies also to the air blast for taper cleaning. It is recommended to have the air pressurization active at all times, not only when the electrospindle is turning.

Respect the required filtration as shown on the electrospindle drawing and verify the proper pressures.



INLET TOOL COOLANT + AIR CLEANING TAPER TROUGH THE SHAFT WITH ROTARY JOINT FLUITEN TYPE G/5560

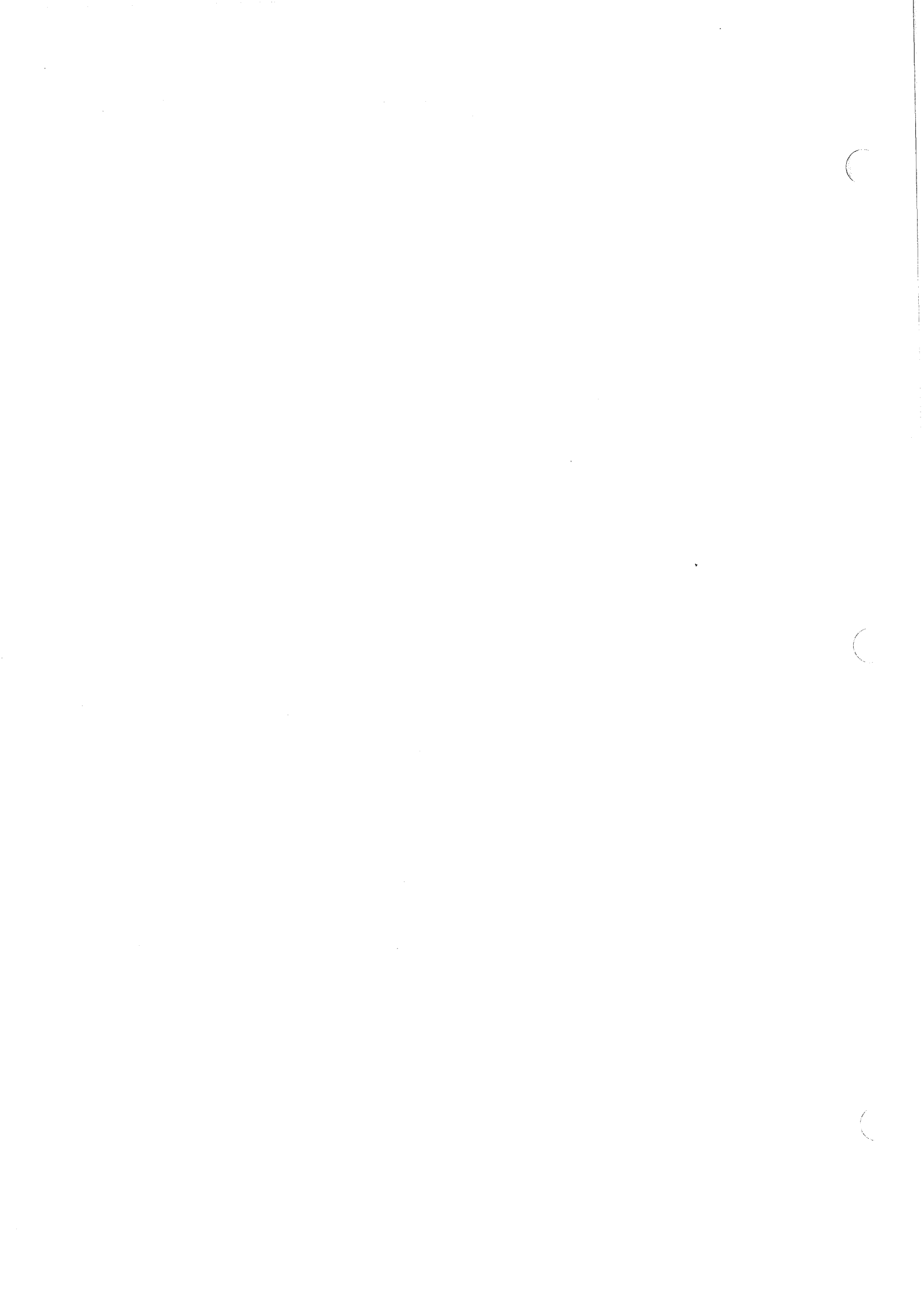




Chapter 4

Table

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4.1 General

Table of this machine may be indexed into 36 (minimum unit angle 10), and indexing of any angle between 0 and 359 is possible. Moreover, two seconds is required to perform 90 indexing, assured by adopting cubic coupling. And location is easily performed by tow edge locators crossing at right angles.

4.1.1 Driving Device for Table Rotation

〈FIGURE 4-1〉 shows table rotation device.

This device is to rotate when table is unclamped, and rotation of AC servo motor (FANUC MODEL $\alpha 22/4000is$) is transmitted to worm axis through interlock with pinion gear in motor axis and pinion gear in worm axis. Both ends of worm axis are supported with ball bearings, and rotate around table though interlock with helical gear assembled on rotation axis of table.

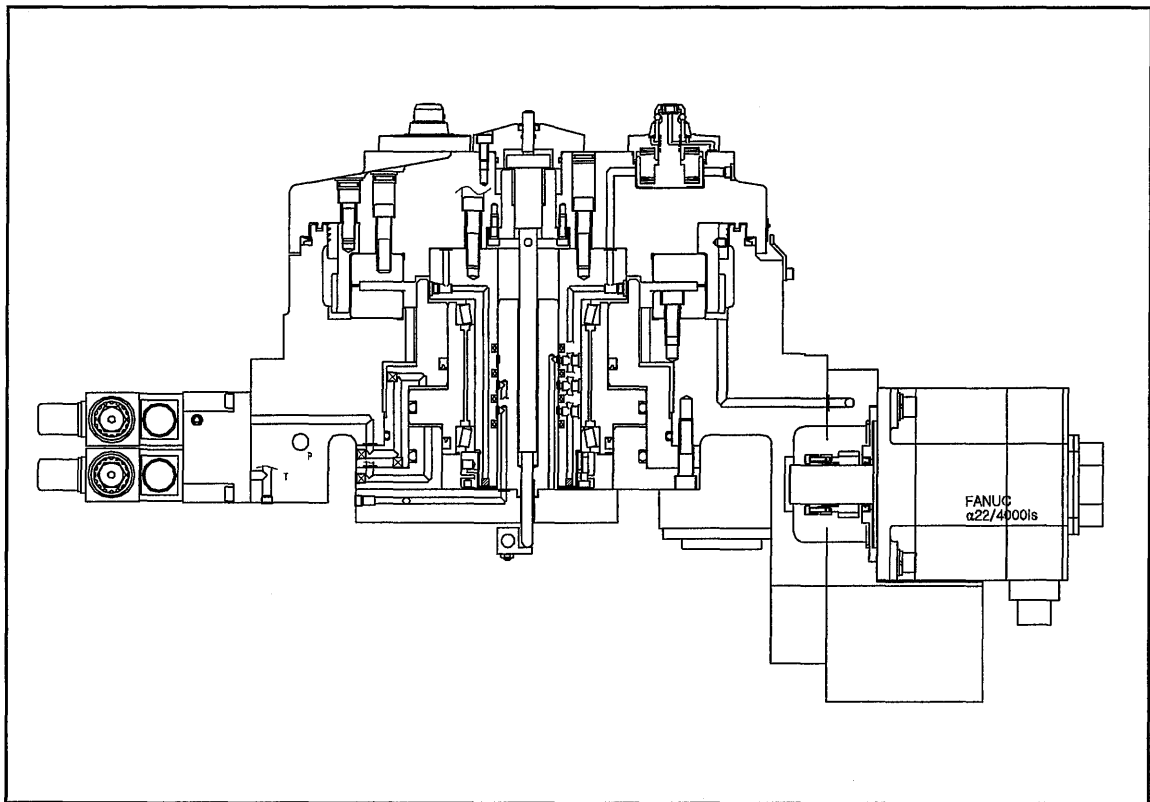
〈Figure 4-2〉 shows table rotation device.

The piston rises by table unclamp operation so that the taper roller bearing which is assembled at upper part of piston supports rotation pressing object and release the cubic coupling.

Table is moved by 3mm upwards at the time of unclamp. Bottom of table is supported by clamp cylinder and top of table by coupling.

At the time of table rotation, center axis of table rotates as guided by inner face of guide bush and piston, and load created by table is supported by taper roller bearing at the top of piston.

Since table rotated at maximum speed of 40 rpm, lubricant is supplied to supporting part.

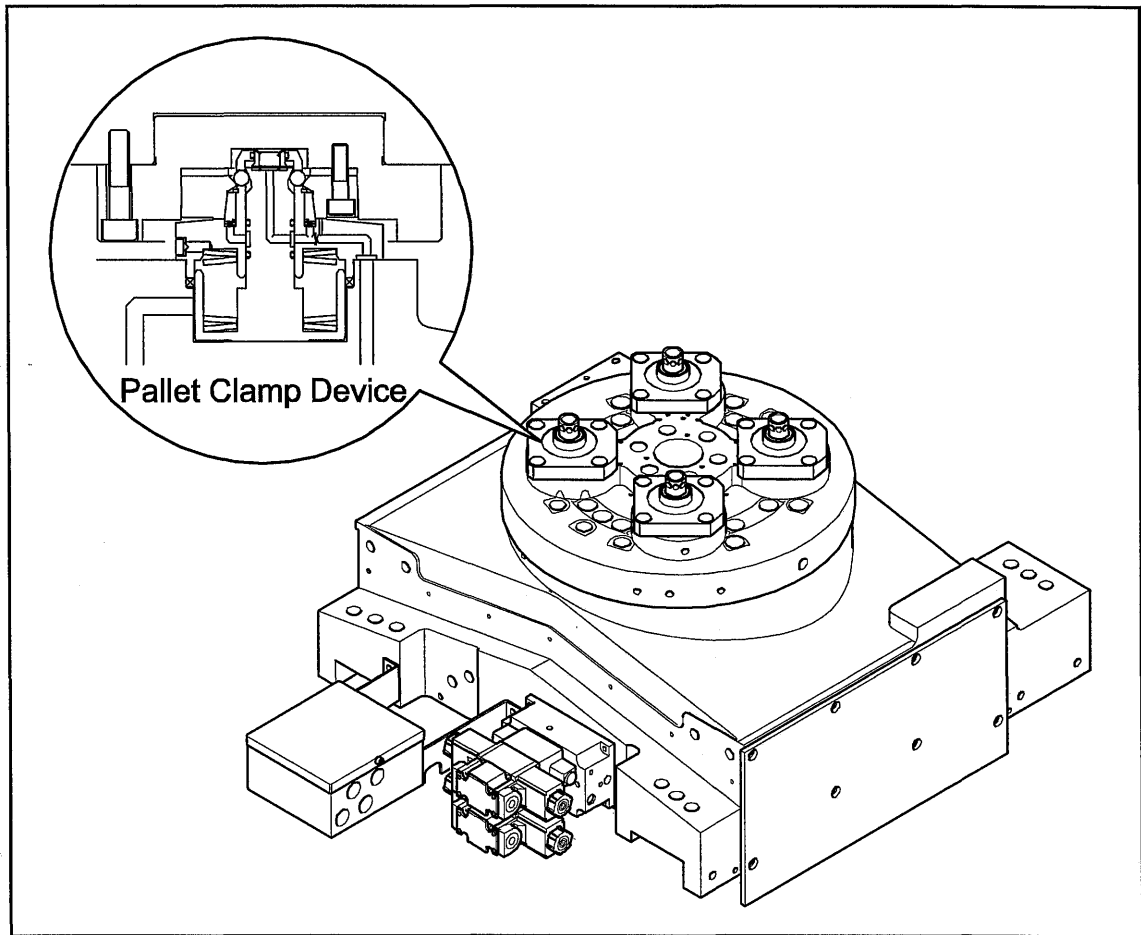


〈Figure 4-1 Device for Table Rotation〉

$$\text{Full deceleration ratio } i = \frac{14}{49} \times \frac{14}{36} \times \frac{14}{140} = \frac{1}{90}$$

Rotation of motor is transmitted to table with deceleration ratio of 1/90.

Table performs indexing of 10 by 1/4 rotation of motor, and lubricant is used to interlock tooth of helical gear and that of worm gear, to reduce interlocking area and to prevent biting at tooth.



〈Figure 4-2 Table Rotation Device〉

4.1.2 Table Clamp and Device for Location

Table indexing is run by NC 3digit command and unclamped by YVS30B. AC servo motor is activated by unclamp conformation operation of LS and decelerated before 17 through out by YVS30A and a high precision positioning is brought by engagement of coupling teeth. The standard of indexing angle is 1.



Refer to <Figure 4-2>

Oil hydraulic actuator related to table is controlled by hydraulic valve main block assembled at the front side of saddle.

■ Table Unclamping

When YVS30B assembled at main block operates, working oil flows into piston chamber in clamp cylinder and raises table by 3 mm with force of about 12 ton, Then interlock of cubic coupling is released and table enters into rotation enabling state.

■ Table Clamping

When YVS30A operates, working oil enters into clamp cylinder piston chamber and lowers piston with force of about 14 tons. End of center axis of piston contacts nut and table is lowered. Then clamping is done while interlock of cubic coupling is maintained. Table position is determined with high precision through interlock of cubic coupling at the time of table clamp operation. Interlocking part of cubic coupling is always filled up with lubricant and prevent from oxidation which may be caused by moisture outside table.

4.1.3 Pallet Clamp Device

Refer to <Figure 4-2>

Pallet clamp is of a structure which fixes pallets with four CONs, which are assembled on the top of the table, and clamps, which are assembled to pallet.

1) Pallet Clamp Operation

When YVS31 in the main block of the saddle is off, pallet is clamped by disk spring inside CON.

2) Pallet Unclamp Operation

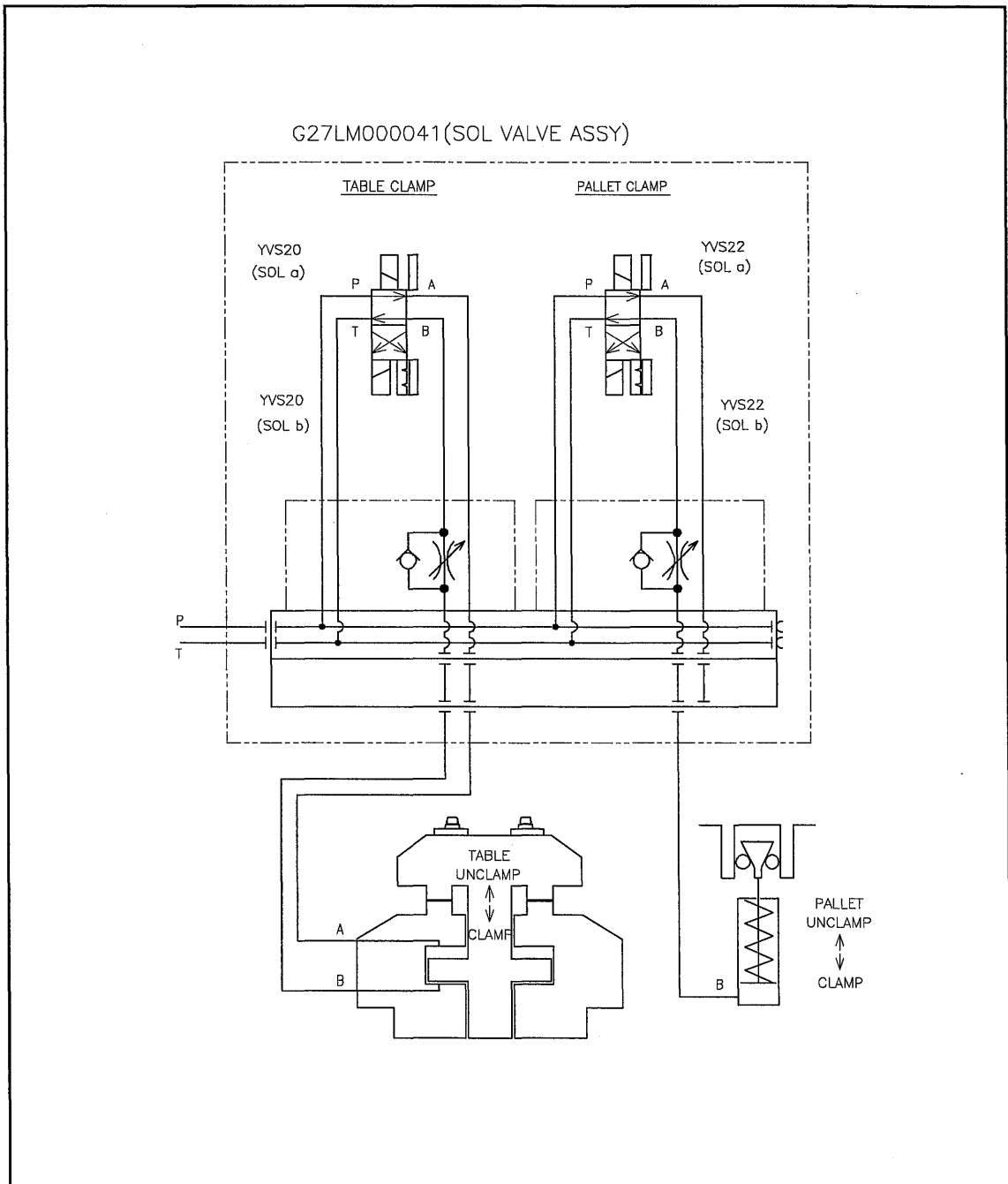
When YVS31 in the main block of the saddle is on, oil flows into the hydraulic cylinder located in bottom of CON, pushing up the piston of CON. When piston is pushed up, 6 balls are pushed in to unclamp the pallet.



4.2 Hydraulic Circuit Diagram of Table

4.2.1 Hydraulic Circuit Diagram of Table

〈Fig. 4-3〉 shows hydraulic circuit diagram of table.



〈Figure 4-3 Hydraulic Circuit Diagram of Table〉



4.2.2 Table Indexing Driving Speed

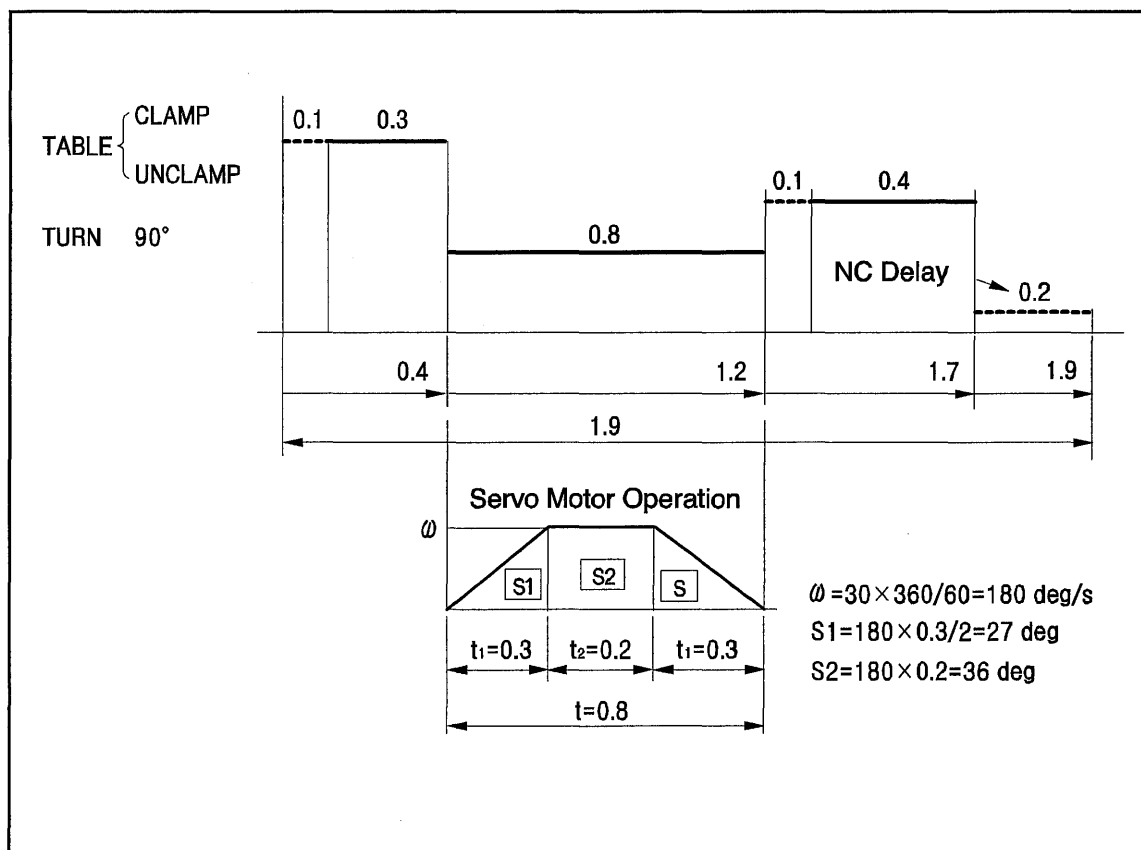
1) Rotational Speed of Table

Rotational movement of table is controlled by AC motor. Relations between No. of rotations of AC driving motor and rotations of table are as follows.

Division Speed	Table	AC Motor Axis
Rotation at high speed	40 rpm	3,600 rpm

Timing Chart

2) Automatic Feed Mode



<Figure 4-4 Automatic Feed Mode>



Table

4.3 Adjusting of Reference point

4.3.1 Position Varies Randomly

Item	Cause of Interruption	Method of Checking	Remedy
1	NOISE	<ul style="list-style-type: none">·Is shield of cable grounded?·Is spark killer installed on solenoid coil?·Is cable of pulse coder connected to high voltage cable?	<ul style="list-style-type: none">·Cable shield should be grounded·Spark killer should be installed.·Cable should be separated
2	Voltage in pulse coder is low.	<ul style="list-style-type: none">·Confirm voltage of pulse coder is higher than 4.75 V when +5 V on NC master print board is adjust to the range of 5.0 ± 0.05 V. (Measure + and - check terminals or between +5 V and 0 V check terminals on pulse coder print when removing servo motor cover.)	<ul style="list-style-type: none">·Total voltage drop of both 5 V and 0 V terminals on cable should be less than 0.2 V. 5 V on master print board should be adjusted in the range of 4.95~5.10 V.
3	Coupling of servo motor and machine is got loosened.	<ul style="list-style-type: none">·Place mark on motor shaft and check for agreement position of machine.	<ul style="list-style-type: none">·Fasten the coupling.
4	Bad Pulse coder	<ul style="list-style-type: none">·Replace PULSE CODER.	<ul style="list-style-type: none">·Replace
5	Defective master print board	<ul style="list-style-type: none">·Replace master print board.	<ul style="list-style-type: none">·Replace



4.3.2 Minor Distance is changed

Item	Cause of Interruption	Method of Checking	Remedy
1	<ul style="list-style-type: none">· Cable orderless· Connection failure	<ul style="list-style-type: none">· Is cable connector firmly clamp and connected?	<ul style="list-style-type: none">· Correct failed connection.
2	<ul style="list-style-type: none">· Fluctuations in offset voltage· Defective master print board or speed control unit	<ul style="list-style-type: none">· Set parameter in such a way that drift does not perform compensation, and check deviation of position by diagnosis function. Fluctuations in offset voltage is different from that in deviation of position.· Exchange master print board, or replace speed control unit plate.	<ul style="list-style-type: none">· Replace master print board with axis control print board, or replace speed control unit plate.



4.4 Limit Switch(LS)

In table driving, limit switch is used for checking cable (pallet) for clamping operation.

4.4.1 Limit Switch for Checking Table (Pallet) for Clamping

SQP30 }
 SQP31 } Clamping and unclamping of table and that of pallet are
 SQP32 } confirmed through assembly three LS and three dogs.

1) Structure and LS setting

The structure is shown in <Fig. 4-5>.

■ Structure

Operation of table actuator can be confirmed from outside by fixing wire rope to table clumper and pulling the other end with spring. Since wire rope bent at rectangular pulls the end of wire rope against spring with appropriate tensile strength, using inside of pipe as guide, movement of actuator is certainly transmitted. Tensile strength of spring should be set to 35mm at the time of table and pallet clamping.

■ Setting

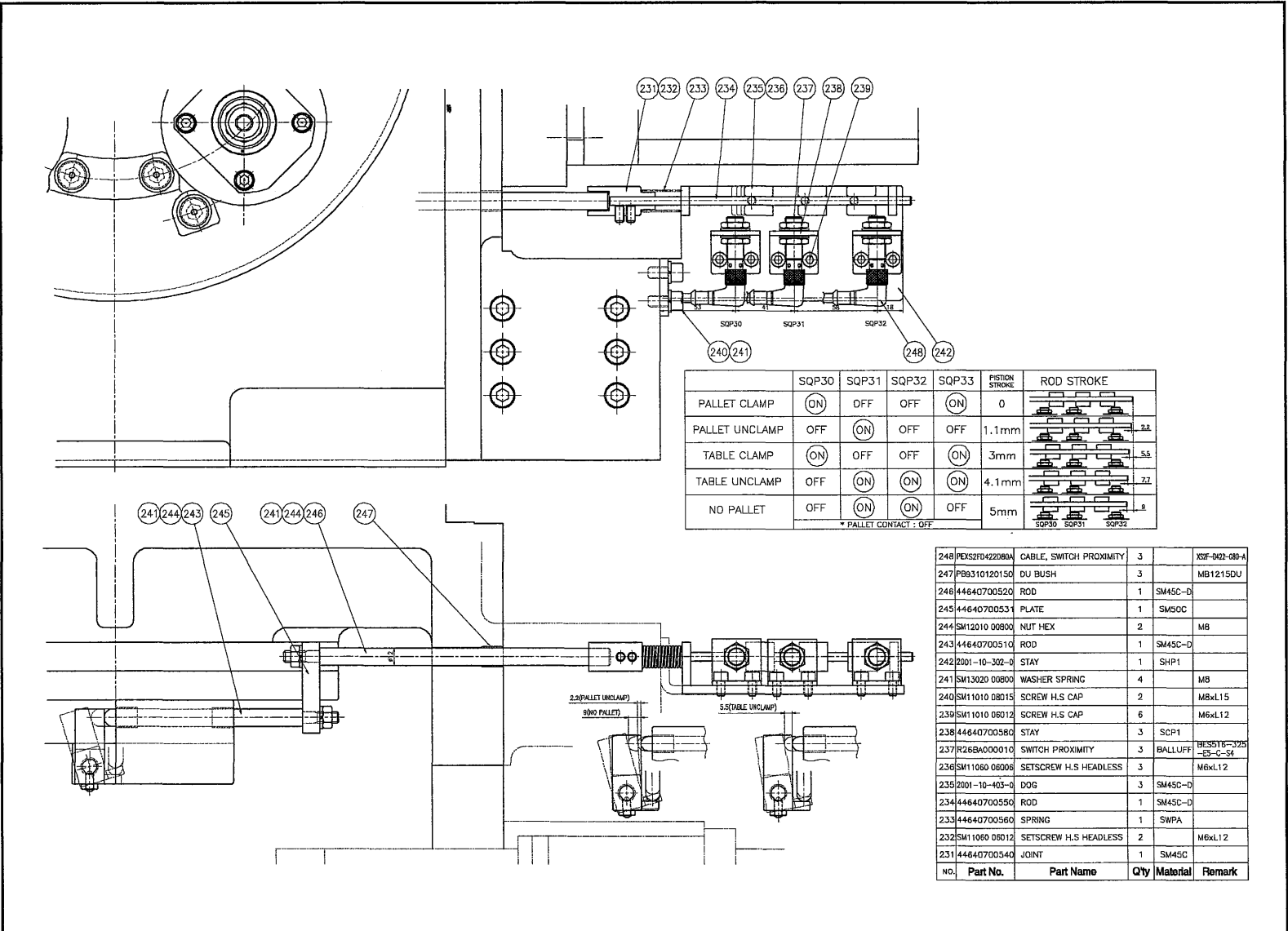
① Setting of dog (A)

		SQP30	SQP31	SQP32	STROKE
PALLET	CLAMP	ON	OFF	OFF	0
	UNCLAMP	OFF	ON	OFF	2mm
TABLE	CLAMP	ON	OFF	OFF	0
	UNCLAMP	OFF	ON	ON	3mm



Table

HYDRA-TRAC MACHINE

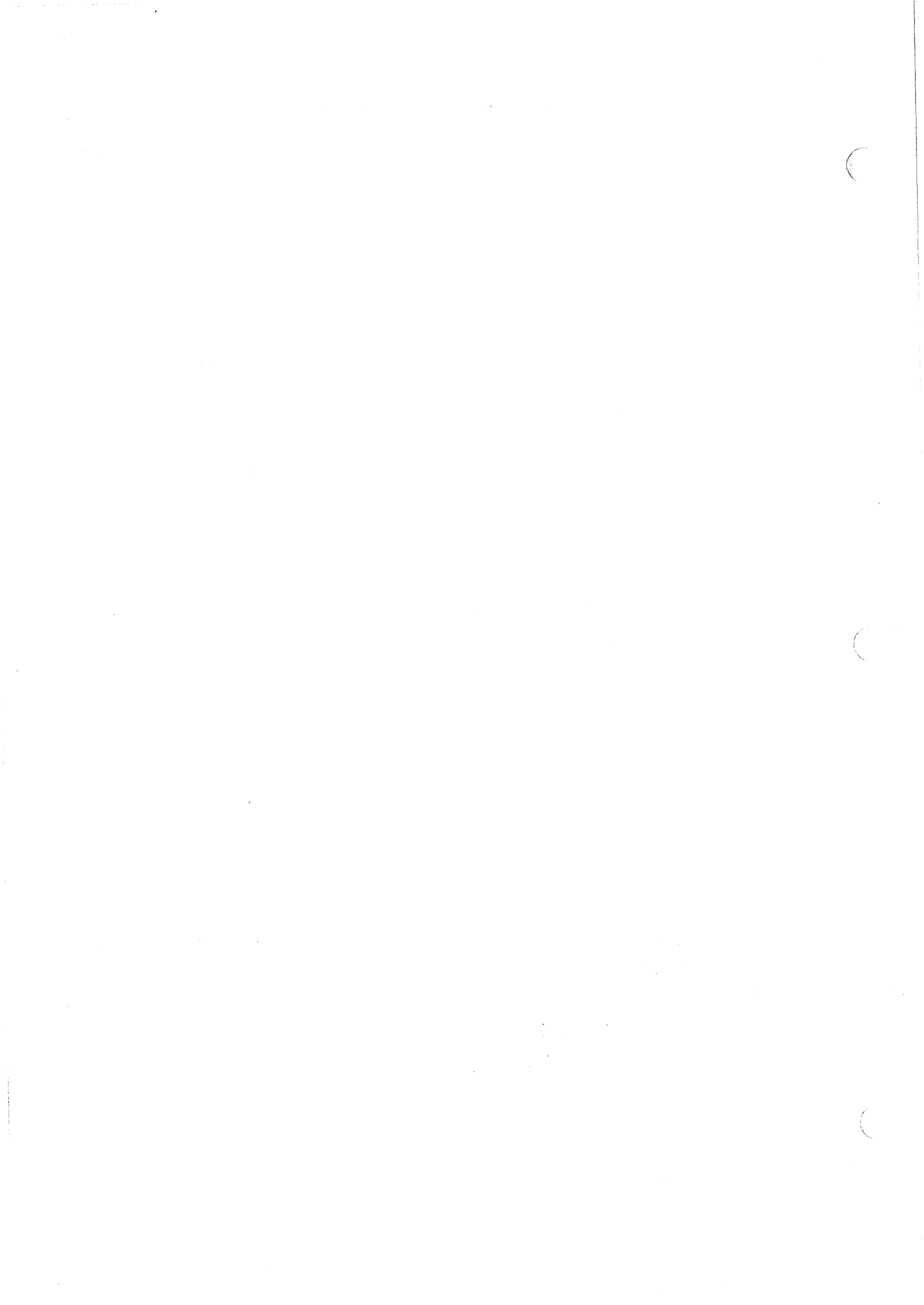


(Figure 4-5 Limit Switch)

Chapter 5

Automatic Tool Changer (ATC)

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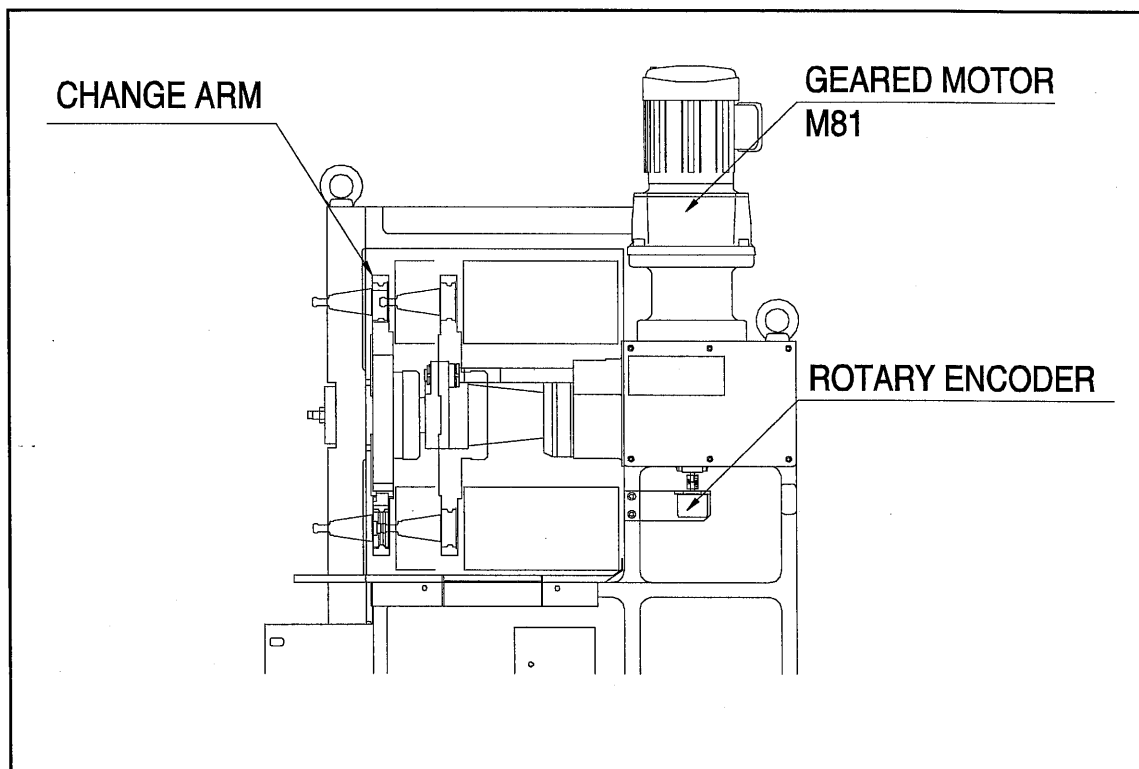
Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE

5.1 General

ATC system is composed of the twin arms moving and carrying tools between spindle ↔ magazine and a magazine containing tool. The main body of the ATC system is installed on the side of column. Twin arms with tool griper respectively at both ends rotates 90° , or 180° , or moves forward or backward. And a tool drop protective device is attached to the tool griper part to prevent tool from falling down during operation of arms. Magazine unit has a tool pot which contains 40 tools (60 tools for option) for national taper No. 40 and is driven by means of servo motor, so the high speed of tool pot and random tool selection is realized by which a random tool calling out is also possible.

5.2 Drive Unit Related to ATC

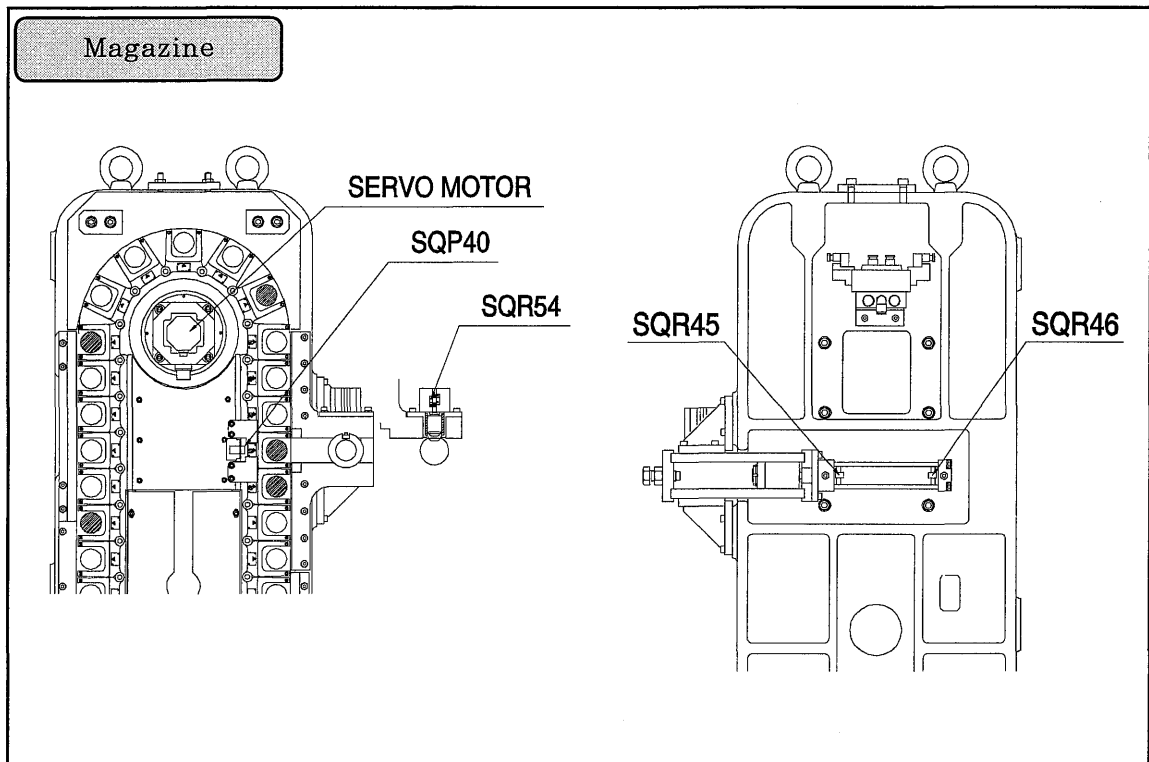


〈Figure 5-1 Drive Unit Related to ATC〉

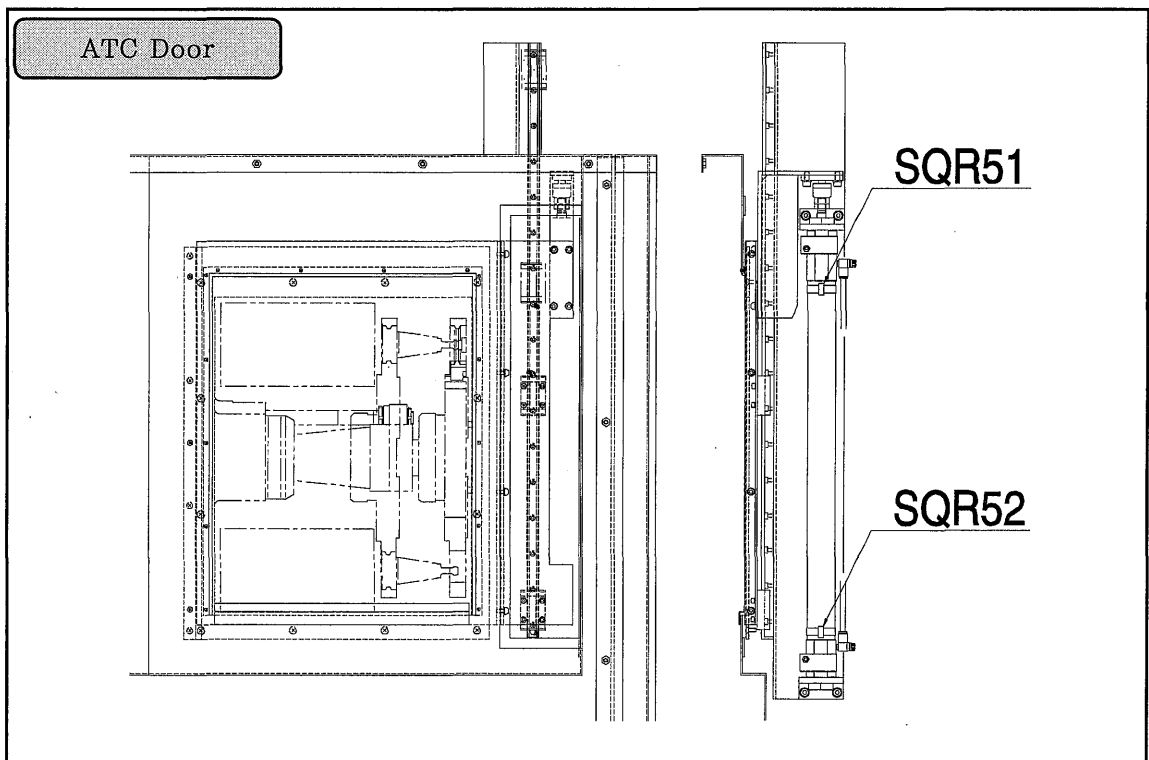


Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE



〈Figure 5-2 Magazine〉

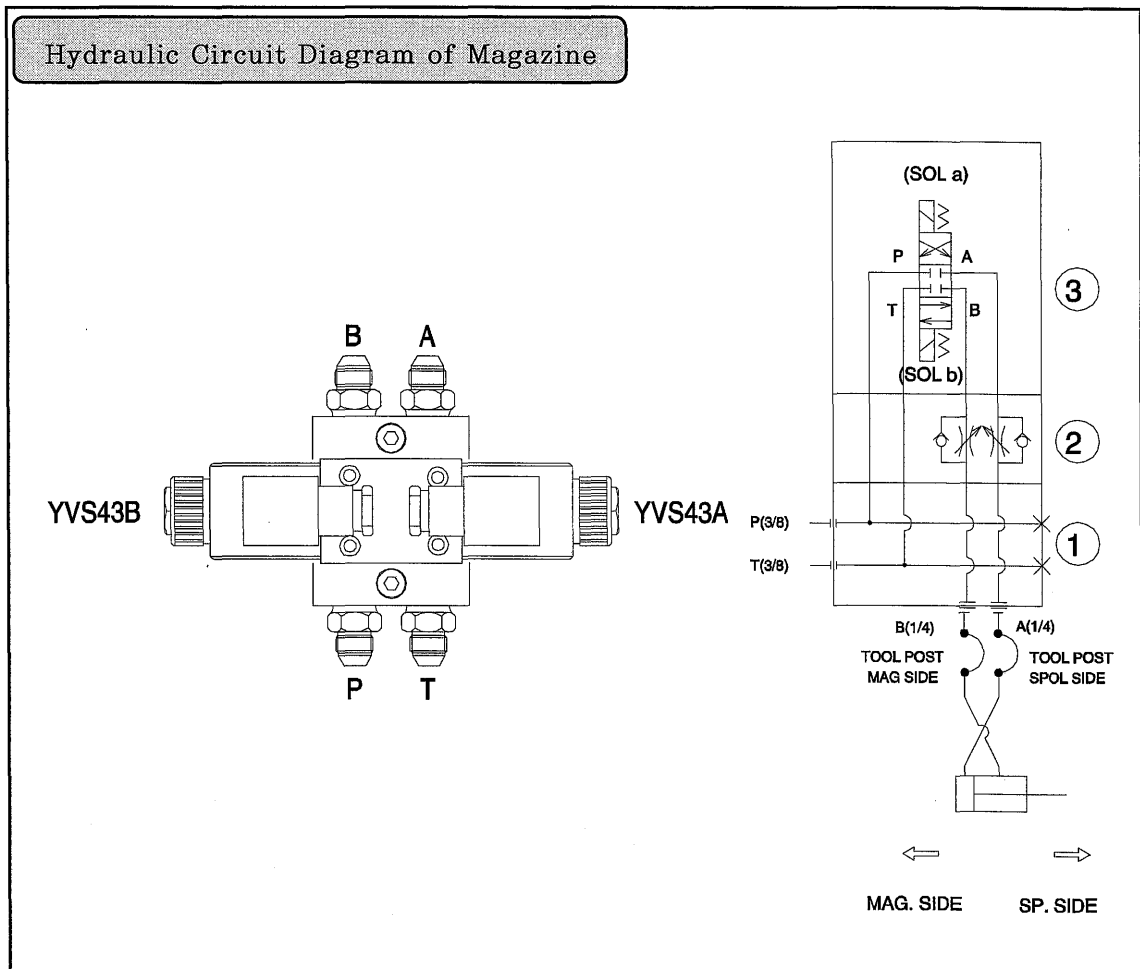


〈Figure 5-3 ATC Door〉

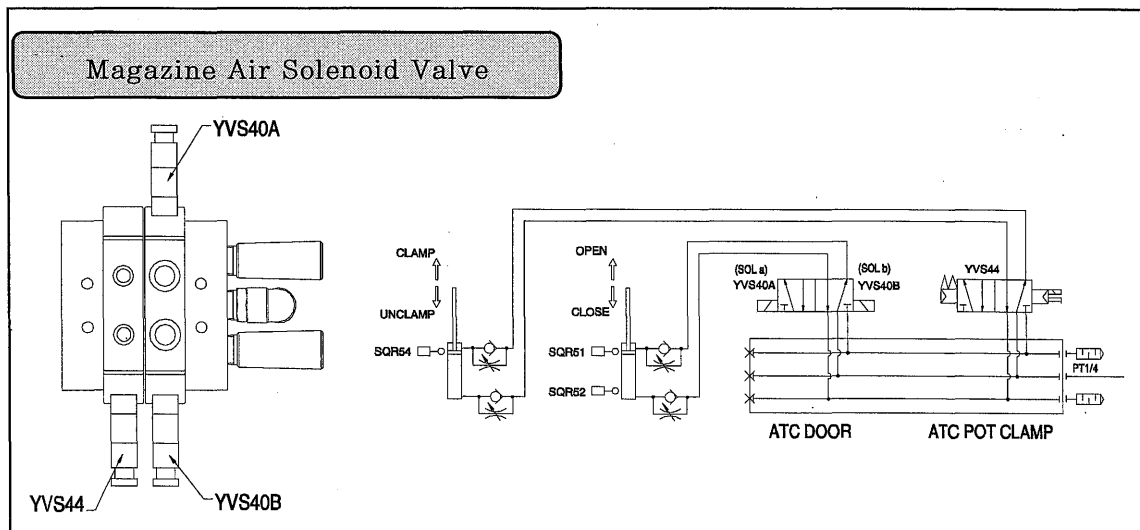


Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE



〈Figure 5-4 Hydraulic Circuit Diagram of Magazine〉



〈Figure 5-5 Magazine Air Solenoid Valve〉



Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE

5.2.1 ATC Functions

Item	Symbol	Name	Function	Present
Motor	M81	TOOL CHANGER MOTOR	Driving tool change device	OFF
Valve	YVS40A	ATC DOOR OPEN	Open Auto door of ATC	OFF
	YVS40B	ATC DOOR CLOSE	Close Auto door of ATC	ON
	YVS43A	WAITING POT SPINDLE SIDE	Moving waiting pot to the spindle side	OFF
	YVS43B	WAITING POT MAGAZINE SIDE	Moving waiting pot to the magazine side	ON
	YVS44	TOOL POT CLAMP	Operating air cylinder for tool pot clamp	OFF
Switch	SQP40	TOOL POT DETECT	Detect tool pot of magazine	OFF
	SQR45	WAITING POT SPINDLE SIDE DETECT	Detect waiting pot at the spindle side	OFF
	SQR46	WAITING POT MAGAZINE SIDE DETECT	Detect waiting pot at the magazine side	ON
	SQR51	ATC DOOR OPEN DETECT	Detect open of ATC auto door	ON
	SQR52	ATC DOOR CLOSE DETECT	Detect close of ATC auto door	OFF
	SQR54	TOOL POT CLAMP CONFIRM	Detect confirmation of tool pot clamp	OFF



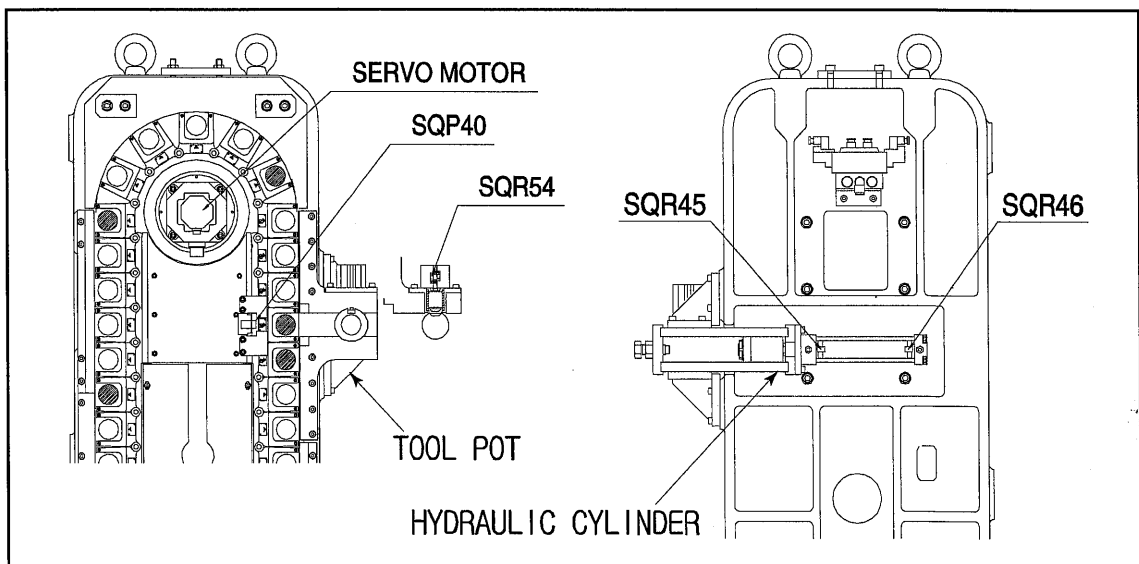
5.2.2 Magazine Part Handling and maintenance

1. Magazine Driving

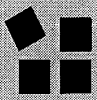
- (1) The Driving for magazine is driven by servo motor.
- (2) Magazine allows tool to be replaced to rotate in the replacement position through a short distance-rotation method.
- (3) Tool count of magazine is performed by encoder embedded in the servo motor, so it has no tolerance.
- (4) Through automatic and manual operation, random tool can be called to replacement position.

2. TOOL SHIFTER DRIVING(Refer to figure 5-6)

- (1) Movement of replacement position for calling magazine tool, performed by hydraulic cylinder.
- (2) Completion verification is performed by leaders position (SQR45), reposition is received in the reader switch (SQR46).
- (3) If movement verification is completed to spindle side, the air cylinder for tool pot clamp is decreased and secured the pot not to move.
- (4) Tool pot clamp status is verified by reader switch (SQR46).
- (5) Access switch (SQP40) verifies whether the tool pot exists or not in the waiting pocket. With access switch ON, hydraulic cylinder can not return to magazine side.



〈Figure 5-6 Tool Shifter Driving〉

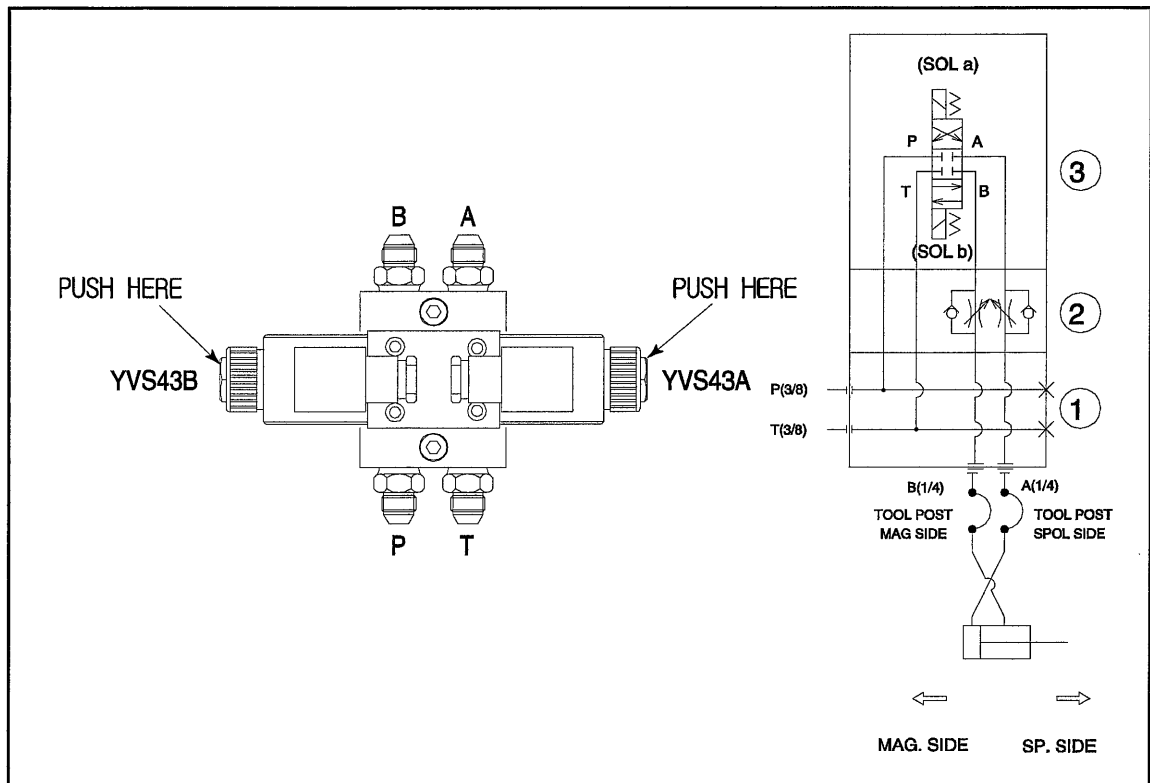


Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE

3. Manual Operation of Tool Shifter (Refer to figure 5-7)

- (1) If solenoid B spool (YVS43B) is pushed to (+) drive, the tool shifter is moved to spindle side.
- (2) If solenoid B spool (YVS43A) is pushed to (+) drive, the tool shifter is moved to magazine side.



〈Figure 5-7 Manual Operation of Tool Shifter〉

4. Fault and Correction Action for Magazine (Refer to figure 5-8)

- (1) When the tool pot is positioned to replacement position, the air cylinder for securing the pot is decreased and secured the pot. Thus, tool pot must not be moved in the replacement position. But, when the air cylinder is decreased, if position is not corrected, the pot shakes and so tool is not replaced smoothly, the tool shifter must be checked.
- (2) If tension of the chain is loosed, when the magazine rotates, the noise can occurs. At this time, disassembly the cover, using the tensioning bolt to adjust the tension.

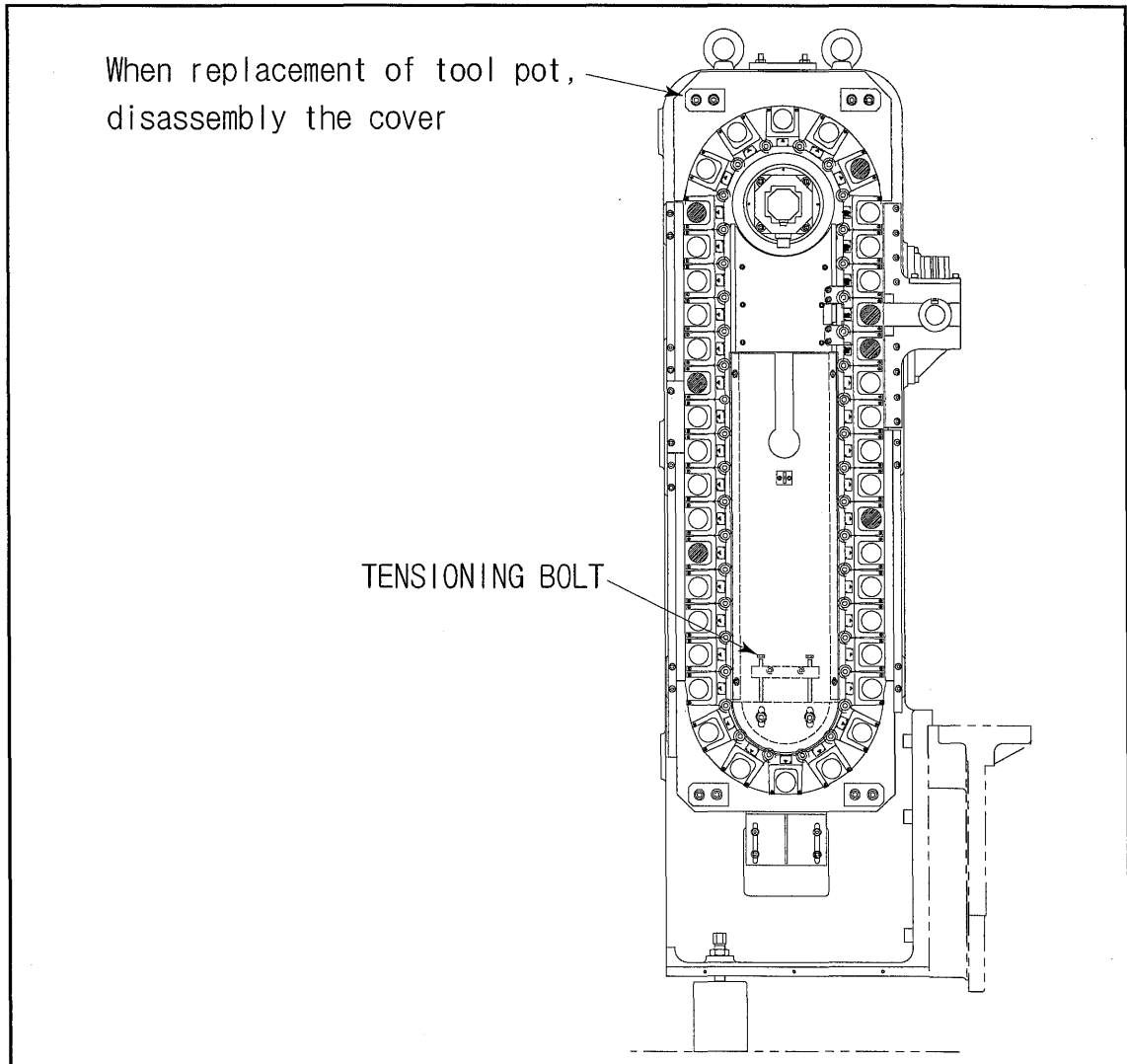


Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE

(3) Replacement of Tool Pot

- If tool pot is broken by shock, disassembly the top guide, move the damaged pot to top, and then replace new pot.



〈Figure 5-7 Replacement of Tool Pot〉



Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE

5.3 Adjustment of ATC System

5.3.1 ATC Data Table

· Data Table Data(Data of ATC)

No.	Address	Data	Function	Remark
000	D0130	-	MAX. MAGAZINE TOOL NO.(AUTO SETTING)	BINARY
001	D0132	-	PRESENT TOOL NO.(AUTO SETTING)	BCD
002	D0134	-	WAITING TOOL NO. → SP. TOOL NO.(AUTO SETTING)	BCD
003	D0136	-	TARGET POSITION TOOL NO.(AUTO SETTING)	BINARY
004	D0138	-	DEC.POSITION TOOL NO.(AUTO SETTING)	BINARY
005	D0140	-	WAITING TOOL NO.(AUTO SETTING)	BCD
006	D0142	-	T-CODE DATA CHANGE(AUTO SETTING)	BCD
007	D0144	-	SPINDLE TOOL NO.(AUTO SETTING)	BCD
008	D0146	-	T-CODE TOOL NO.(AUTO SETTING)	BCD
009	D0148	-	MAX MAGAZINE TOOL NO.+1(AUTO SETTING)	BINARY
010	D015	-	ATCPOS. MAG. TOOL NO.(D310)	BCD
011				
012				
013				
014	D0158		HEAVY TOOL MIN NO.	BCD
015	D0160		HEAVY TOOL MAX NO.	BCD

· Counter

No.	Address	Data	Function	Remark
000	C00	40(60)	ATC.MAGAZINE TOOL POT MAX. CHAIN NO.	AUTO
001	C04	-	ATC POS. MAGAZINE TOOL POT CHAIN NO.	

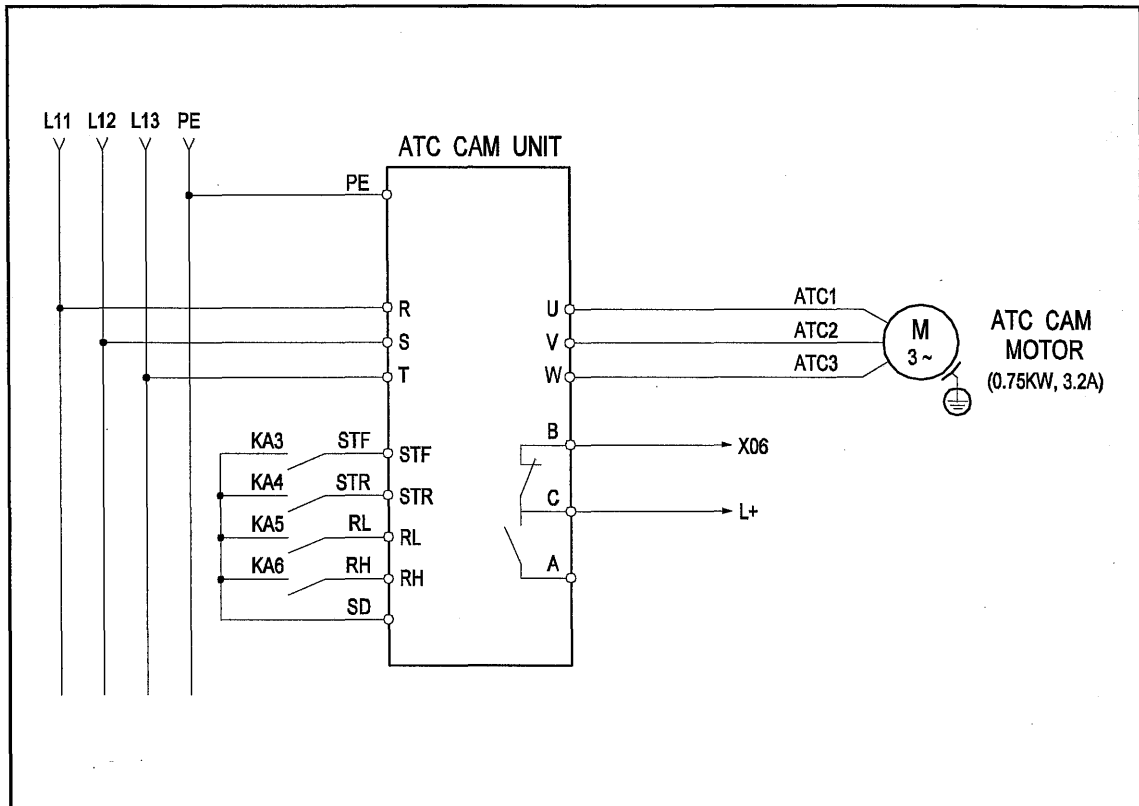


Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE

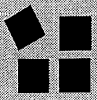
5.3.2 Adjustment of ATC Motor

ATC TWIN ARM is driven by invert operation for ATC.



〈Figure 5-8 Circuit Diagram of ATC Twin Arm Motor〉

No.	Content	PCDGN
KA3	ATC Forward Rotation	Y6.2
KA4	ATC Reverse Rotation	Y6.3
KA5	ATC ARM Low Speed Rotation	Y6.4
KA6	ATC ARM High Speed Rotation	Y6.5



5.4 ATC Operation

5.4.1 Tool Data Recording

1. Setting method of Max. magazine tool pot NO.

- 1) Change NC mode to MDI.
- 2) Change the memory key on operating panel to write.
- 3) Press **SYSTEM** button to change PMC on CRT/MDI panel.
- 4) Press **PCPRM** button to change DATA screen and then move a cursor to "D113", and
 - ① When the Max. Magazine tool pot NO is "40", set 5,6 bit of K7 to "0".
 - ② When the Max. Magazine tool pot NO is "60", set 5bit of k7 to "1".

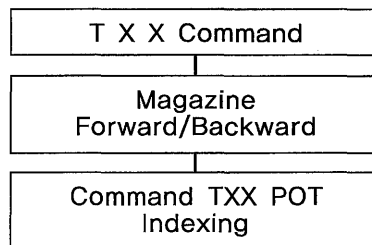
5.4.2 Magazine Indexing

Magazine indexing position is detected by a ring counter with origin (Max. pot chain NO.) being as reference.

1. MAGAZINE INDEXING

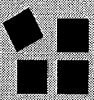
1) Automatic INDEXING(T Command)

Indexing of magazine is automatically performed by command of T code and required tool is indexed.



2) Manual Indexing

In manual mode press the magazine indexing button on ATC operation panel and hold it, the magazine will rotate to a required position at which you can release the button to stop the rotation.



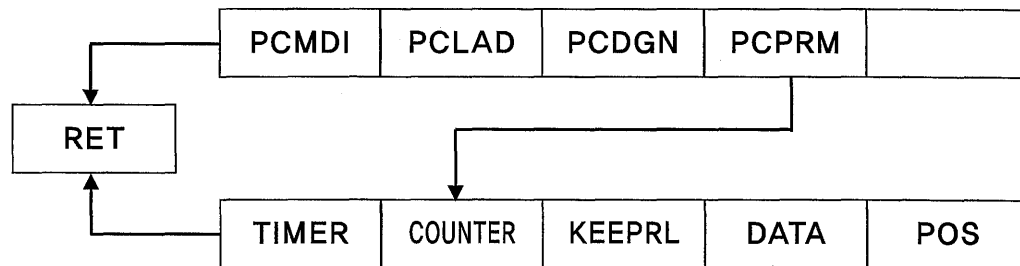
Automatic Tool Changer(ATC)

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5.4.3 Modify of ATC Magazine Tool Pot No.

When the recording data of pot chain NO is incorrect modify as follows.

- 1) Change NC mode to MDI.(status of NC Hyd. Unit on)
- 2) Change the memory key on operation panel
- 3) Press SYSTEM button to change PMC on CRT/MDI panel.
- 4) Press PCPRM button by soft gear of CRT, and press counter button continuously.



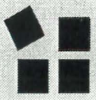
- 5) Place a cursor on "current" of counter No.01, and then input a number the same as waiting tool pot number. (Empty tool pot) Since the magazine pot number and the register data are setted exactly like this, other tool pot No. will be setted properly.

COUNTER			
NO	ADDRESS	PRESET	CURRENT
01	C00	40	
02	C04		
03	C08		
.	.		
.	.		
.	.		
20	C76		

in case
Max. Chain
No. 40

Max.
magazine
pot No.

Waiting
Chain No.




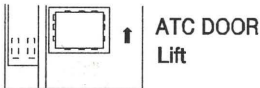
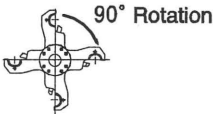



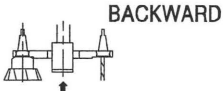
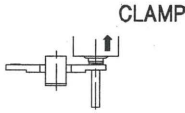


Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE

5.5 Check the Function of ATC

5.5.1 ATC Cycle

ATC cycle run in the procedure as below.

Seq.	Operation	Diagram of state of operation	Remarks
1	SPINDLE ORIENTATION		
2	ATC DOOR OPEN		
3	ARM 90° ROTATION (Clockwise)		
4	TOOL UNCLAMP		When proximity Switch of tool unclamp start on
5	ARM FORWARD		
6	ARM 180° ROTATION (Clockwise)		
7	ARM BACKWARD		
8	TOOL CLAMP		When proximity Switch of tool unclamp start on
9	ARM 90° ROTATION (Counter clockwise)		
10	ATC DOOR CLOSE		



5.5.2 Returning Operation of ATC

If ATC is stopped due to emergency situation, ATC operation is returned as below.

1. Procedure of operation

- 1) In MDI mode, press M31, **INSERT** keys and then **START** key. When the operation can not be operated by pressing the cycle start key, press cycle **START** switch and **FEED HOLD** switch at the same time "ON" and then it will be operated forcibly.
- 2) Confirm origins of X, Y axes. Also, check that arm is not in interruption with machining work. If it does, move the arm to a safety position with manual mode.
- 3) Press M35, **INSERT** key in MDI mode and then **START** key.
- 4) Moving X-axis jog toggle switch in (+) or (-) direction makes arm rotate forward or backward, and tool came into M6 stand by state.
- 5) In case the arm in 90° rotation, move Z-axis toggle switch + (Tool clamp), or -(Tool unclamp) direction.
- 6) Operate M32 in MDI mode and cancel ATC by pass mode.



5.5.3 ATC Single Operation

- 1) Press **RESET** button.
- 2) M31, **INSERT** and **START** in MDI mode.
- 3) Set X,Y,Z axes to origin.
- 4) G91 G30 X0 Y0 Z0 **INSERT** and **START**.
- 5) M35, **INSERT** and **SRART** in MDI mode (confirm spindle orientation)
- 6) press toggle switch for X-axis jog feed and confirm following points.
When press +X : runs arm CW cycle.
When press -X : runs arm CCW cycle.
- 7) Press toggle switch for Z-axis jog feed and confirm following points.
When press +Z : runs tool clamp.
When press -Z : runs tool unclamp.
- 8) M32, **INSERT** and **START**.

M6 COMMAND

For M6(tool changing) interlock is released only when all the conditions as follows are satisfied.

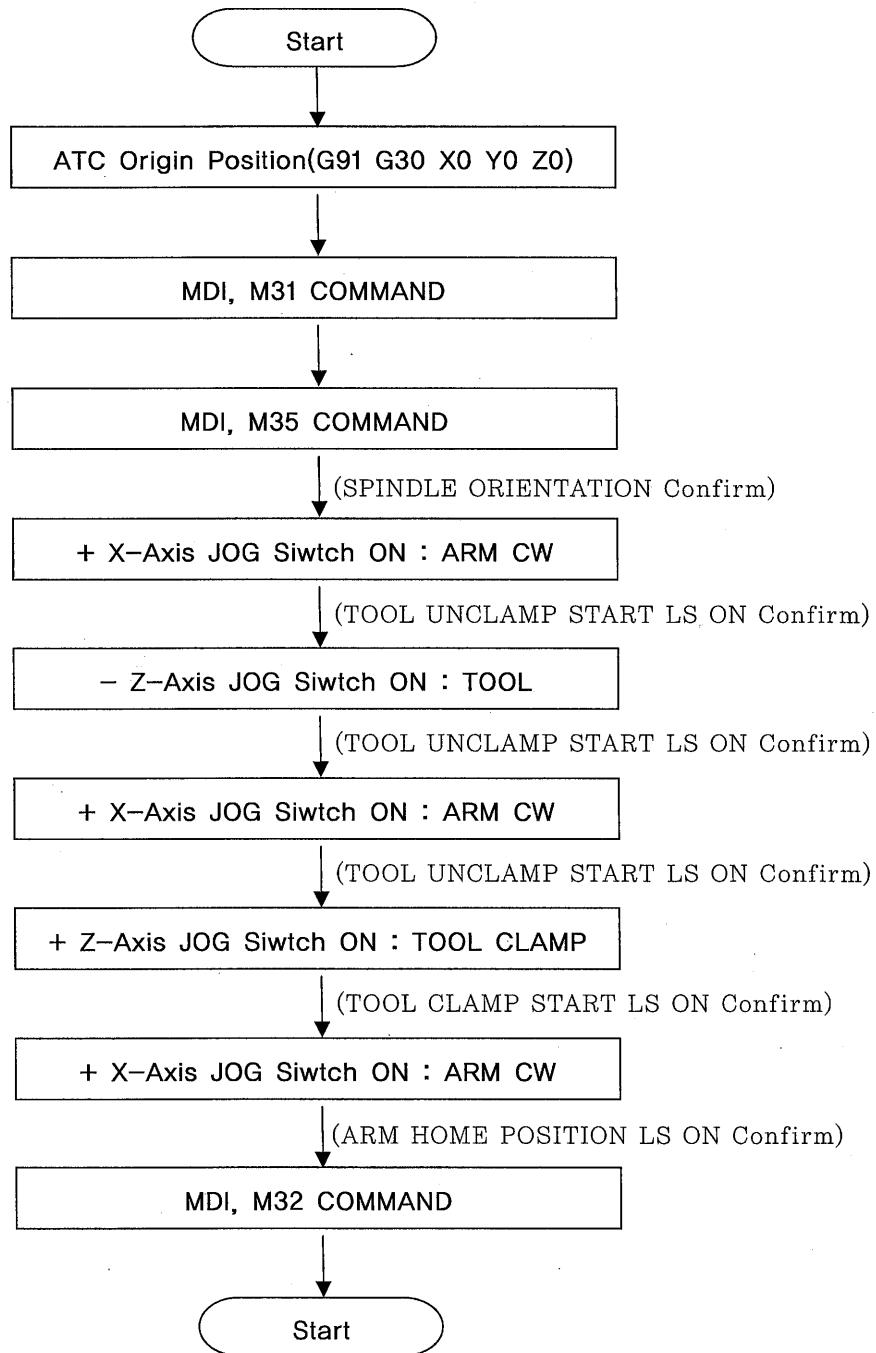
- 1) X,Z and Z axes should be in origin and the ATC POS lamp be lit up.
- 2) Magazine should rotate when pressing magazine indexing button in manual mode.
- 3) Twin arms should be in HOME position (Check that 7 bit of X06 is "1")
- 4) Alarm lamp should be out.

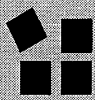


Automatic Tool Changer(ATC)

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5.5.4 Maintenance Operation of ATC





Automatic Tool Changer(ATC)

HYUNDAI-KIA MACHINE

■ Timer (* Timer 1~8 Each 48msec/Timer 9~40 Each 8msec)

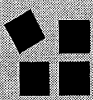
No.	Data	Function	Address	Remark
T1	300,000	LUB. PAUSE	R726.3	
T2	20,000	LUBRICATION ON TIME	R726.2	
T3	5,000	TOOL POT CLAMP/UNCLAMP, SP.SIDE/MAGAZINE SIDE TIME LIMIT	R879.0	
T4	2,000	ARM FORWARD/BACKWARD TIME LIMIT	D123.4	
T5	5,000	ATC ARM NOT BACKWARD TIME LIMIT	D123.5	
T6	300	AFTER B AXIS MOVING, TABLE CLAMP DELAY	R755.3	
T7	600,000	SPINDLE STOP TIME CHECK	R760.0	
T8	1,000	SINGLE ARM RET. DELAY TIME	R846.2	
T9	1,000	SINGLE ARM IN DELAY TIME	R846.3	
T10	500	ORIENTATION FINISH TIME	R757.2	
T11	120,000	LUB.MOTOR OFF TIME CHECK	R760.1	
T12	250,000	GUN COOLANT OFF DELAY TIME	R773.1	
T13	1,000	APC ROTATING ARM UP DELAY TIME	R776.7	
T14	1,000	ROTATION ARM TURN CW, CCW DELAY TIME	R778.5	
T15	2,000	SPINDLE SPEED ARRIVAL DELAY	R626.0	Tool Monitoring System
T16	200	M-CODE SP. STOP COMMAND DELAY	R626.2	↑
T17	0	SPINDLE STOP DELAY	R627.0	↑
T18	500	TOOL DETECTION STOP CANCEL DELAY	R627.4	↑
T19	2,000	AUTO POWER OFF DELAY TIME	R769.6	
T20	3,000	LUB. PRES. SHORTAGE CHECK DELAY TIME	R727.0	
T21				
T22				
T23	20,000	APC ACTION CHECK TIME	R881.7	
T24	1,000	PALLET CLAMP DELAY TIME	R775.2	
T25	1,000	ROTATION ARM DOWN DELAY TIME	R778.6	
T26	1,000	ATC CHANGE FINISH SHUT OFF SOL TIME	R725.5	
T27				
T28				
T29	10,000	TH. COOLANT AIR BLOW SOL OFF DELAY TIME	R773.6	
T30	1,000	TOOL POT SPINDLE SIDE DELAY TIME	R846.4	
T31	3,000	LUB. PRESSURE SHORTAGE CHECK DELAY	R727.1	
T32	96	DRY RUN DELAY TIME	R733.4	
T33				
T34	3,000	ATC MANUAL INTERRUPT OFF DELAY	R305.2	
T35	1,000	TABLE UNCLAMP DELAY	R755.0	
T36	500	TABLE CLAMP DELAY	R755.1	
T37				
T38	1,000	TOOL POT CLAMP DELAY TIME	R702.2	
T39	1,000	TOOL POT UNCLAMP DELAY TIME	R702.3	
T40				

Chapter 6

Automatic Pallet Changer (APC)

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6.2.3	Operation and Motion	6-5
6.2.4	Operation	6-8
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6.1 General

This device is rotation type pallet changing device which move out machined pallet and that to be machined into machine table by turning 180°. Also, in order that the object to be machined could be set on pallet, this device is designed such a that turning for 360° is capable from standby position.

6.2 Specification

6.2.1 A.P.C Specification

Division	Specification
Size of Pallet	400 mm×400 mm
weight of Pallet	100 kg
Size of object to be machined	Ø650×Height 650 mm
Weight of object to be machined	MAX. 500 kg
Radius of object rotation	400 mm (PALLET CENTER)
Power	Hydraulic Pressure

6.2.2 Structure

Refer to (Fig. 6-1) for A.P.C device.

1. APC Device

- 1) Hydraulic cylinders for up and down of the arm and rotation of the arm are installed on Straight motion is transformed to the rotary motion by rack gear and pinion which are monolithic to the piston, rotating arm to replace pallet.
- 2) The forward and reverse rotation is conformed by proximity switch (adjustable).
- 3) The manual rotation origin of external pallet is checked by proximity switch assembled on the frame appear part.

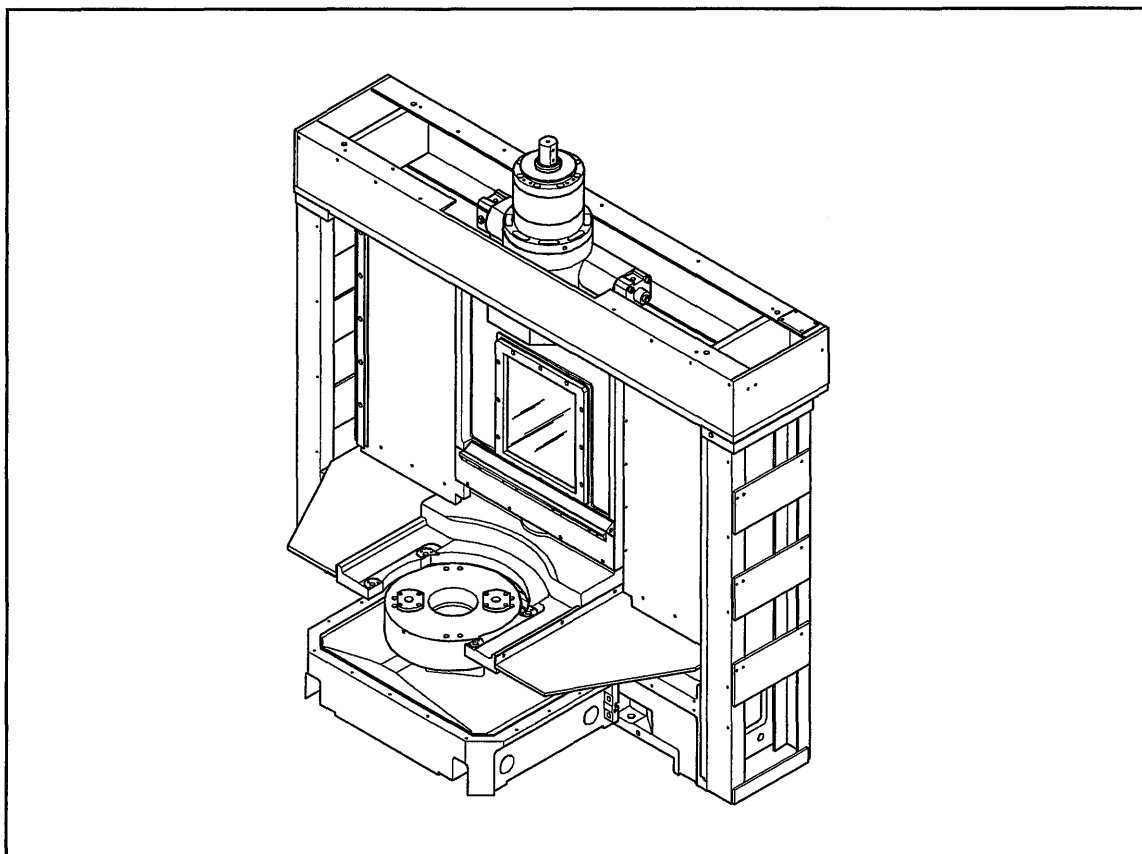


Automatic Pallet Changer(APC)

HYUNDAI-KIA MACHINE

2. Loading Table

- 1) Pallet table can be turned manually by any angle with 360°, and the origin is checked by the proximity switch, (It is impossible to change pallet at other place that origin.)
- 2) Object to be machined can be easily set from outside the device.

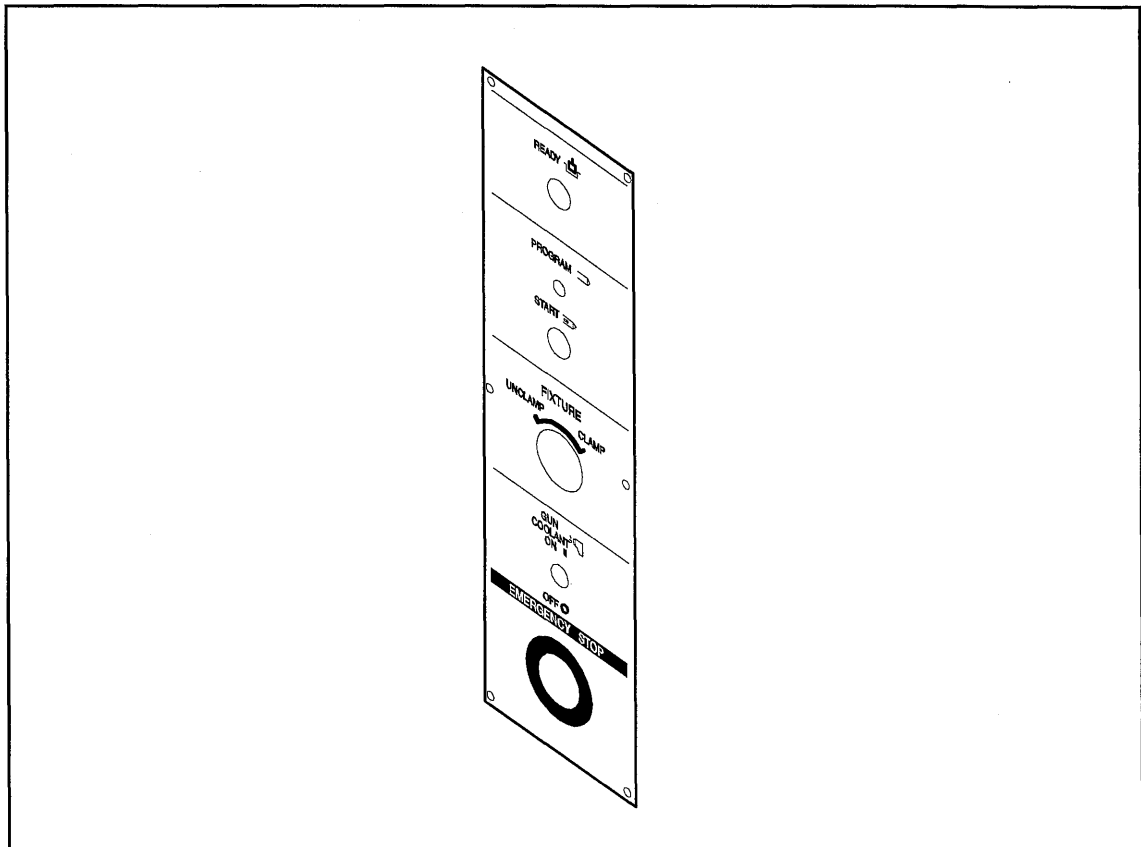


〈Figure 6-1 Automatic Pallet Changer〉



6.2.3 Operation and Motion

1. Single Operation Panel



〈Figure 6-2 APC Operation Panel〉

2. Explanation of operation Switch

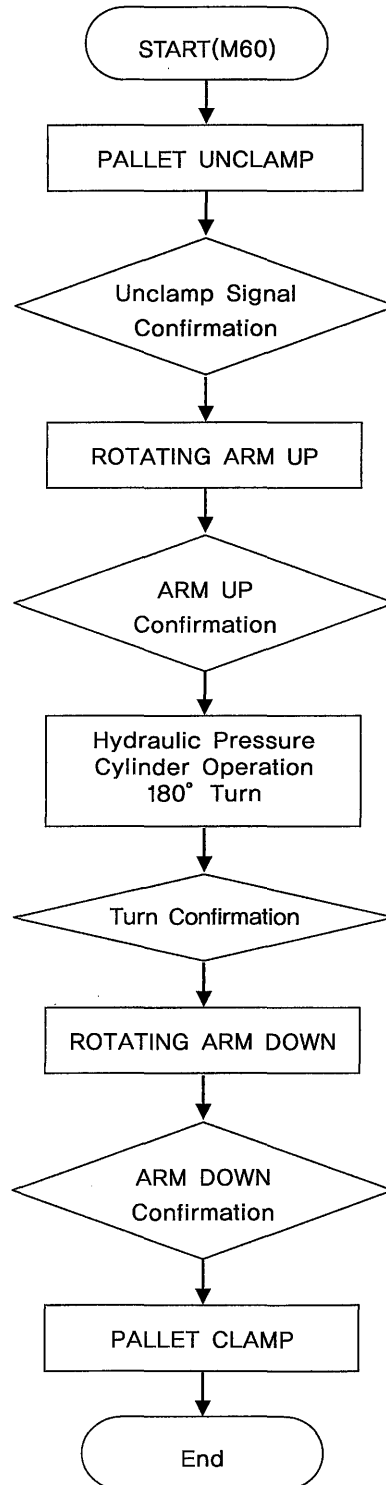
Name		Usage
PROGRAM	START	Press this button to start the program. The button light will be on during the operation. This button works the same way as tee start button on the main operation panel.
APC READY BUTTON		Press this button after the work piece has been mounted. No automatic transfer can occur unless this button is pressed.
EMERGENCY STOP		This button, like the Emergency stop button on the main operation panel, will completely stop the machine.



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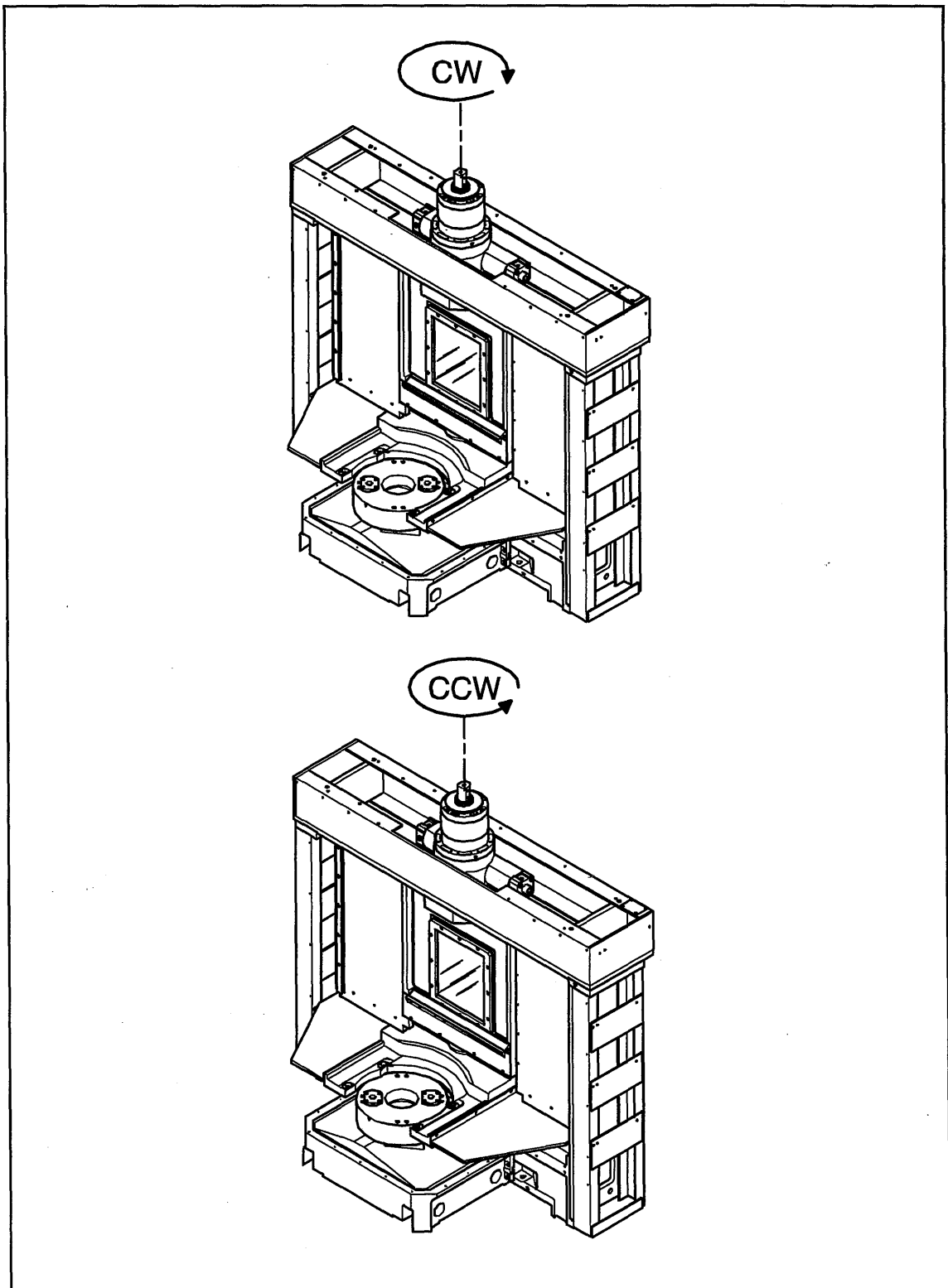
3. Sequence Diagram





Automatic Pallet Changer(APC)

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〈Figure 6-3 APC Turning Direction〉



6.2.4 Operation

- 1) Load object to be machined on pallet.
- 2) When turning reversely the handle attached to the front of carrier, pallet may be turned at 360° any angle in any direction.
- 3) Set object to be machined while turning pallet. After turning pallet in forward direction, turn the handle to original position so that pallet does not turn.

6.2.5 Note in Operation

- 1) Confirm whether pallet is located at 0°(Origin of B-axis).



NOTICE

If above mentioned prerequisite (No.1) is not confirmed, it is impossible to change pallet.



6.3 Method of Adjusting

- 1) Adjustment of second origin(Z-axis)
 - Adjustment of position is possible with parameter on CRT.
- 2) Adjustment of rotation stroke (adjustment of cylinder stroke)
 - Loosen the nuts on both sides of cylinder, and adjust them by turning the set screw.

6.4 Operation in Maintenance Mode

Maintenance mode is used in case of interruption of electric power. Since direct solenoid changing is used in maintenance mode, so it shall be used after grasping thoroughly with the procedures and conditions of operation.

■ Operation of maintenance M-code

- 1) Set operation mode to MDI and turn "on" Maintenance switch, or execute M998 at MDI mode.
- 2) Enter M-code by MDI of NC unit.
- 3) Start program after emergency push button being arranged such a way that it can be promptly pressed.
- 4) After setting of M-code is completed, turn off maintenance switch, or command M999 at MDI mode.

CAUTION

Since operation of maintenance M-code unconditionally force the machine to operate, so first confirm is there any interruption with other operation before maintenance operation, and always arrange the emergency stopping operation in a very easy way.



Automatic Pallet Changer(APC)

HYUNDAI-KIA MACHINE

Table 6-1 Maintenance Code List

M-Code	Name	Solenoid Valve No.	M-Code	Name	Solenoid valve No.
M24	Pallet Unclamp	YVS31	M56	Rotating Arm Down	YVS61B
M23	Pallet Clamp		M53	Rotating Arm CW	YVS62A
M55	Rotating Arm Lift	YVS61A	M54	Rotating Arm CCW	YVS62B

Table 6-2 LS List

LS No.	Usage
SQP32	Table Pallet Existence Confirmation
SQP60	Rotating Arm Soft Lift Up Confirmation
SQP61	Rotating Arm Soft Lift Down Confirmation
SQP62	Rotating Arm(Pallet) Lift
SQP63	Rotating Arm(Pallet) Down
SQP64	Rotating Arm(Pallet) CW Confirmation
SQP65	Rotating Arm(Pallet) CCW Confirmation
SQP66	APC Pallet Existence Confirmation
SQP67	APC Pallet Confirmation

Chapter 7

Utility Circuit Diagram

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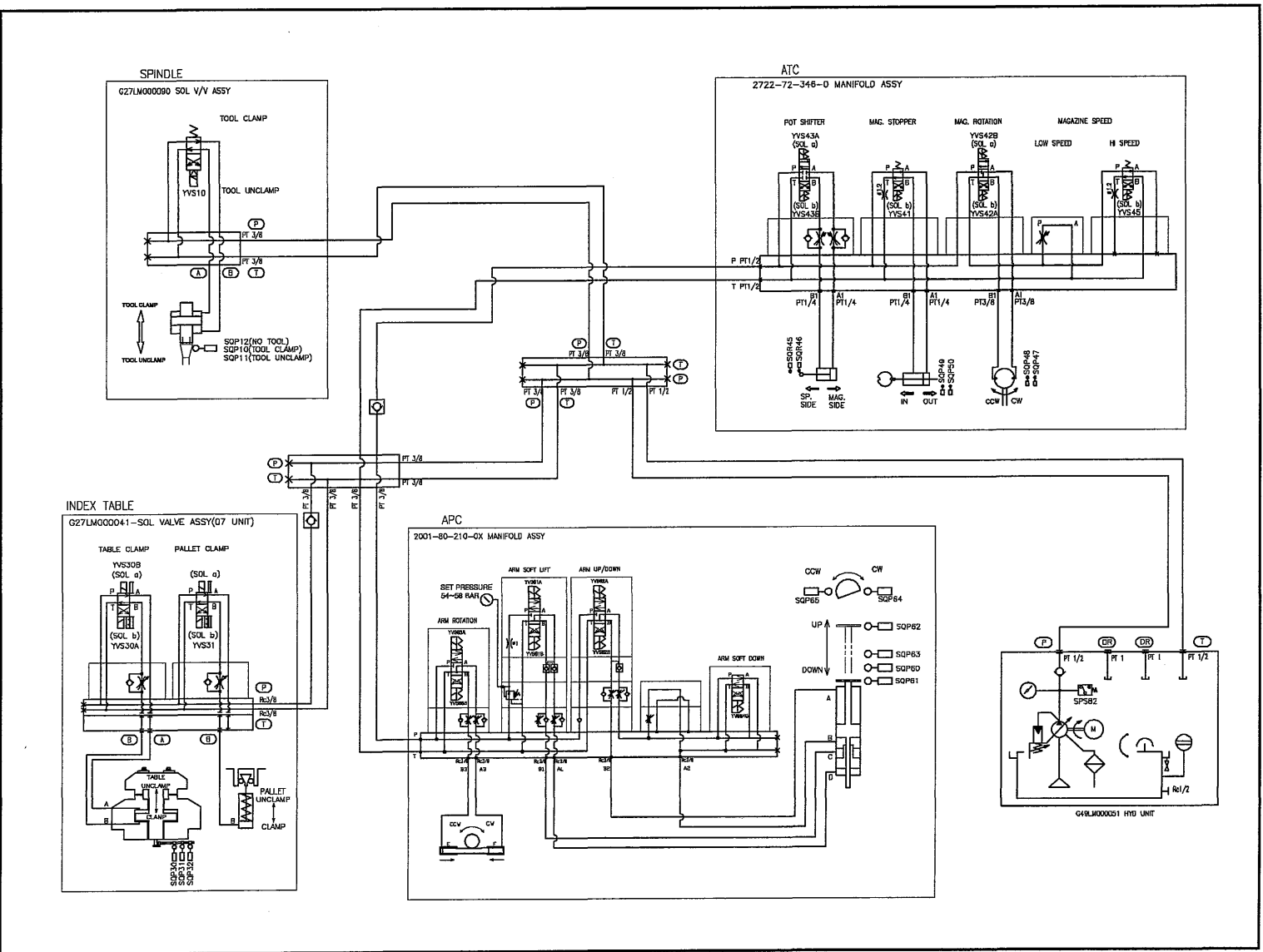




Utility Circuit Diagram

HYUNDAI-KIA MACHINE

7.1 Hydraulic Circuit Diagram



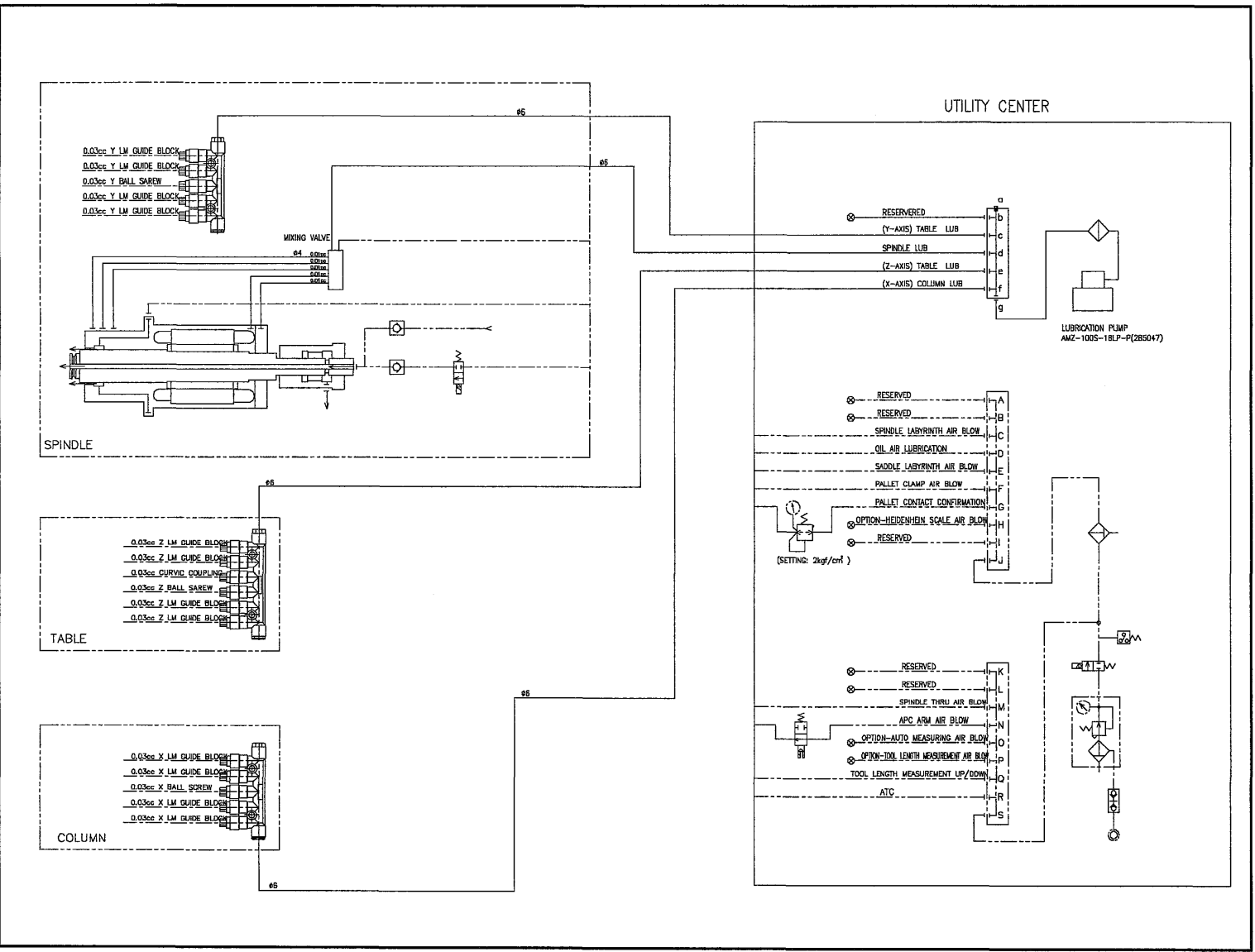
<Figure 7-1 Hydraulic Circuit Diagram>



Utility Circuit Diagram

HYUNDAI-KIA MACHINE

7.2 Lubricating Circuit Diagram



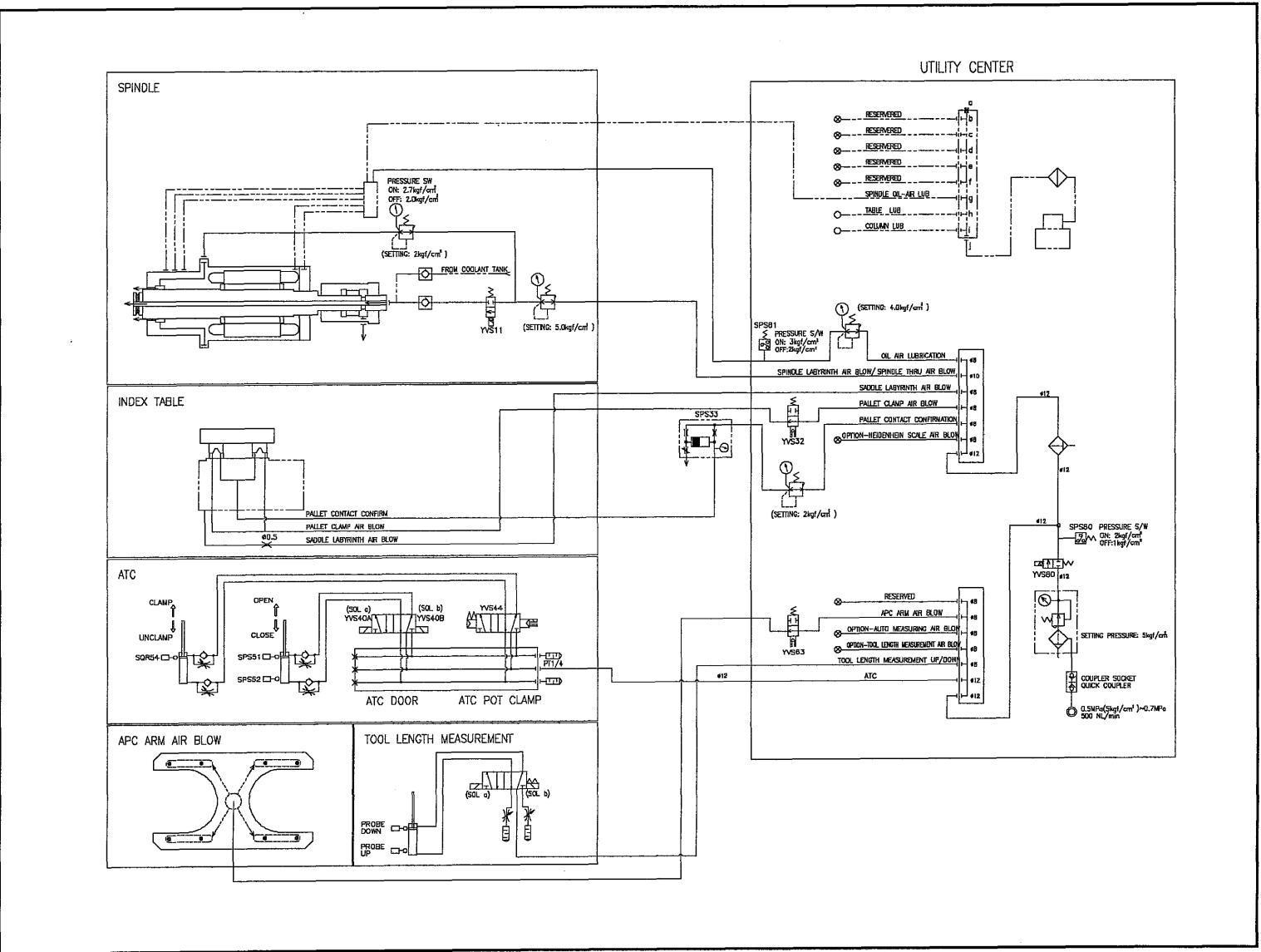
<Figure 7-2 Lubricating Circuit Diagram>



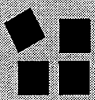
Utility Circuit Diagram

HYUNDAI-KIA MACHINE

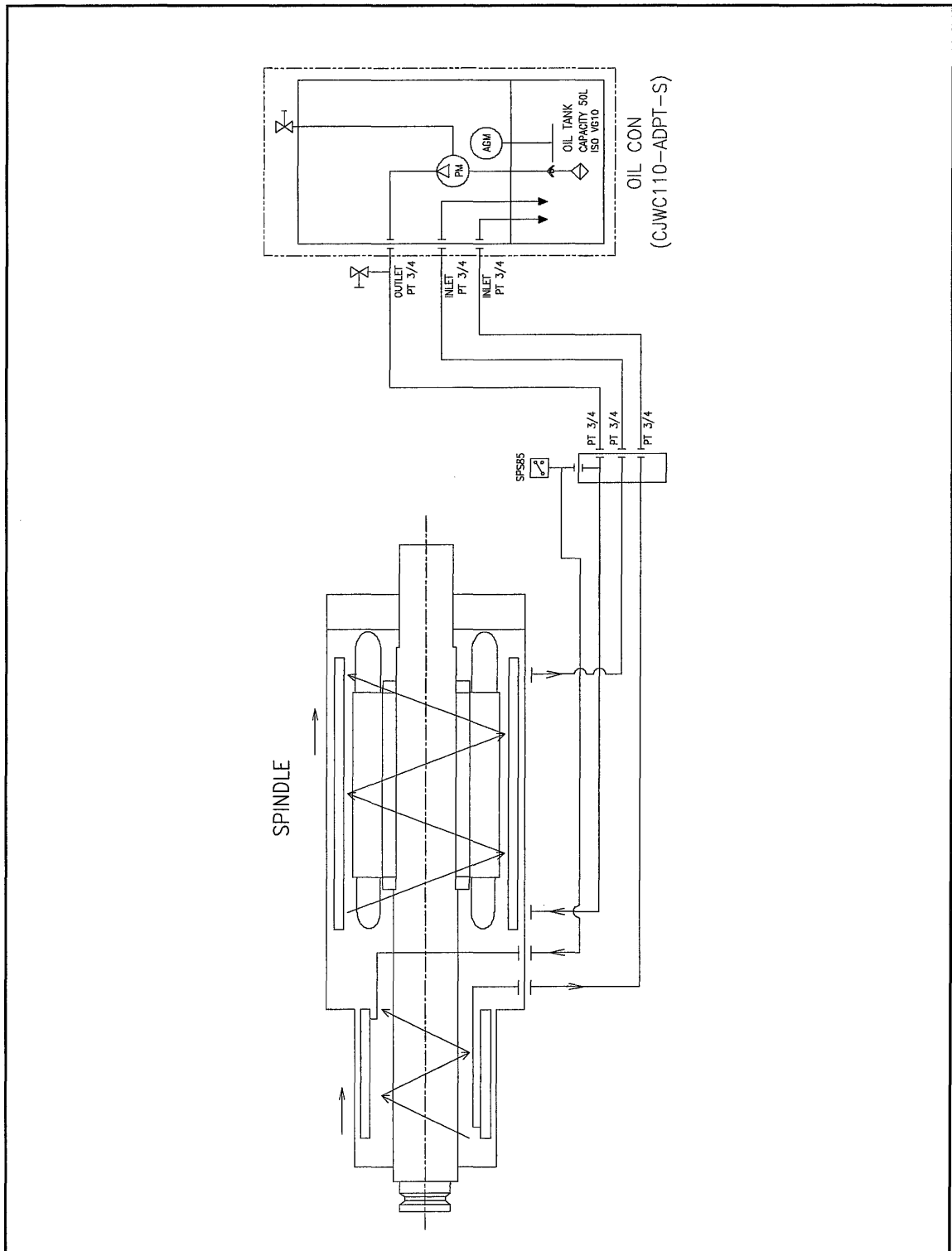
7.3 Pneumatic Circuit Diagram



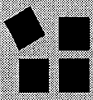
〈Figure 7-3 Pneumatic Circuit Diagram〉



7.4 Cooling of Spindle Circuit Diagram



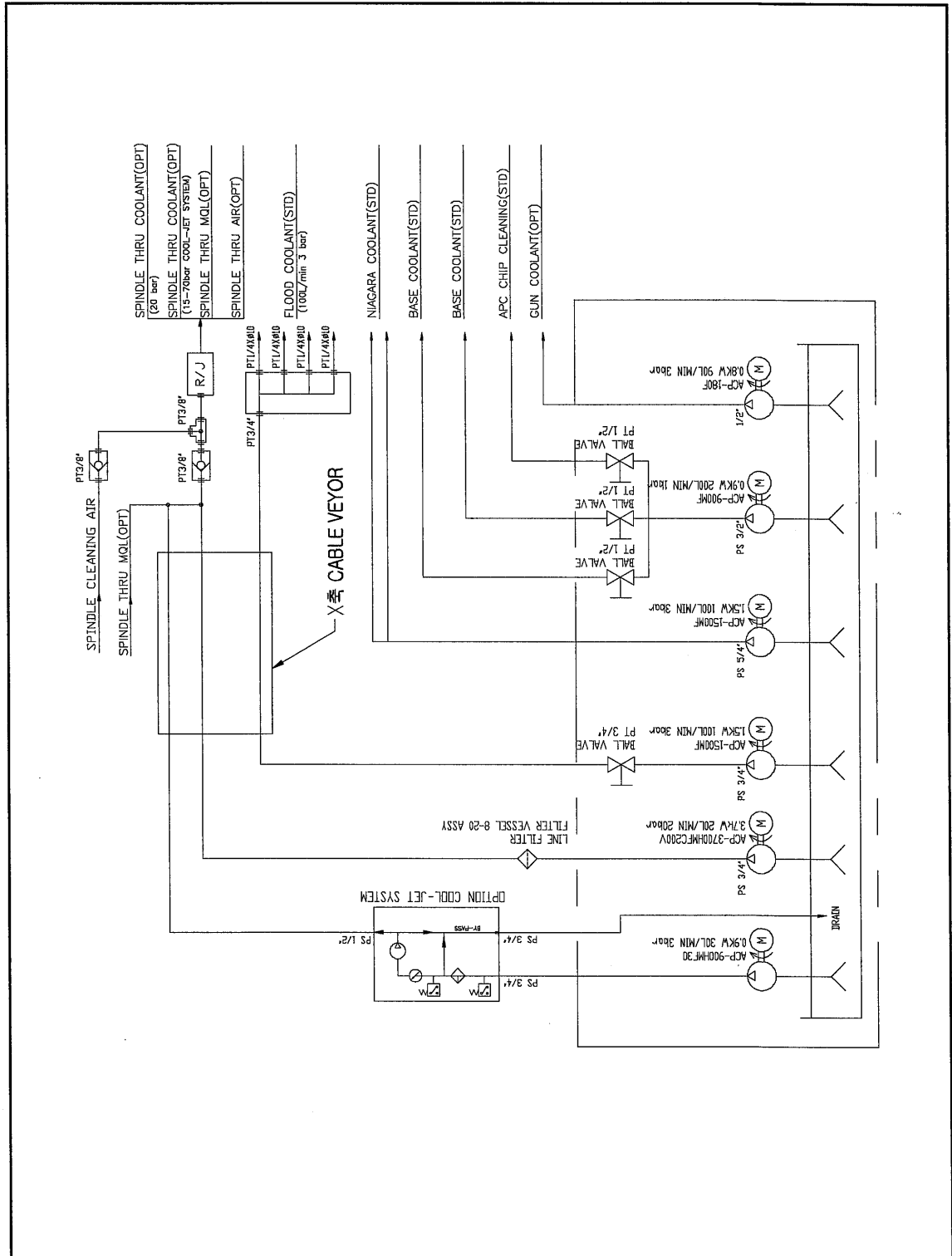
<Figure 7-4 Cooling of Spindle Circuit Diagram>



Utility Circuit Diagram

HYUNDAI-KIA MACHINE

7.5 Coolant Circuit Diagram



<Figure 7-5 Coolant Circuit Diagram>



Chapter 8

Error Code and Trouble Shooting

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8.1 Error Code and Electric Particulars

This chapter is sorted and diagrammatized kinds of error code, which can be occurred while using a machine, and trouble shooting. When the error is occurred, refer to follows.

8.1.1 NC Alarm and Trouble Shooting

The abnormal situation which can be occurred during the machine operation is arranged in this chapter, and shows trouble shooting in it. However we explained NC alarm briefly because it is too complicate. For more detail, refer to maintenance manual of NC unit or request A/S to our company. There are some trouble in the machine which seems to be caused by NC unit. In this case, Please find a cause and repair it by referring to maintenance manual of NC unit and other contents that is written in this chapter.

1. If warning lamp (Call light, yellow rotating lamp) lights up

In the following cases, the call light is lit up :

- 1) When the machine is stopped by a program stop load (MOD, M01, M02, M03, etc) while executing the program.
- 2) When the alarm lamp on the operation panel is let up. The machine comes "standstill" indication that a trouble occurred.

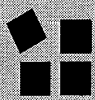
2. Type of alarm, caused of trouble and troubleshooting

1) Alarm related to the NC unit (NC alarm)

Number and message of alarm is displayed from CRT. Determine the causes of alarm by checking NC alarm message list and remove it.

2) Alarm related to the machine's devices or PC controls (machine alarm)

- ① CRT is located at the side of control panel.
- ② Press the key **ALARM** to have the function menu displayed on the CRT.
- ③ Now, an alarm message and an alarm relay number are display on the CRT.
- ④ Using the self diagnostic function (DGN) of PC, lock for a trouble cause which outputs the ALARM relay No. and take a troubleshooting measure.



Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

Table 8-1. Alarm Message Data List

No.	Address	Function
001	A0.0(D117.0)	2000 AIR PRESSURE ALARM
002	A0.1(D117.1)	2001 HYD. MOTOR OVERLOAD
003	A0.2(D117.2)	2002 LUB. PRESSURE CHECK ERROR AT LUB. PUMP ON
004	A0.3(D117.3)	2003 LUB. OIL LACK ALARM
005	A0.4(D117.4)	2004 TOOL POT EXIST AT POT MAGAZINE SIDE COM. ERROR
006	A0.5(D117.5)	2005 STANDARD COOLANT OVERLOAD
007	A0.6(D117.6)	2006 TF ARM ERROR
008	A0.7(D117.7)	2007 AC100V / DC24V TRIP
009	A1.0(D118.0)	2008 SPINDLE COOLING ALARM
010	A1.1(D118.1)	2009 WORK COUNTER FINISH
011	A1.2(D118.2)	2010 SCREW CHIP CONVEWOR MOTOR OVER LOAD
012	A1.3(D118.3)	2011 GEAR CHANGE TIME OVER
013	A1.4(D118.4)	2012 TOOL CLAMP ERROR
014	A1.5(D118.5)	2013 ATC ARM ORIGIN ERROR
015	A1.6(D118.6)	2014 SPINDLE SPEED ERROR
016	A1.7(D118.7)	2015 SPINDLE DATA ERROR
017	A2.0(D119.0)	2016 THROUGH COOLANT FILTER ERROR
018	A2.1(D119.1)	2017 NO. S-CODE SP. START ERROR
019	A2.2(D119.2)	2018 ATC ARM ORIGIN SPINDLE START ERROR
020	A2.3(D119.3)	2019 TOOL CLAMP SPINDLE START ERROR
021	A2.4(D119.4)	2020 ATC ARM ORIGIN SPINDLE ROTATION ERROR
022	A2.5(D119.5)	2021 TOOL CLAMP SPINDLE ROTATION ERROR
023	A2.6(D119.6)	2022 AIR BLOW SPINDLE START ERROR
024	A2.7(D119.7)	2023 AIR BLOW SPINDLE ROTATION ERROR
025	A3.0(D120.0)	2024 MEASUREMENT AIR BLOW COMMAND ERROR
026	A3.1(D120.1)	2025 SPINDLE UNIT ALARM
027	A3.2(D120.2)	2026 COOLANT MOTOR OVERLOAD
028	A3.3(D120.3)	2027 TF MAGAZINE ERROR
029	A3.4(D120.4)	2028 TOOL POT SWING SPINDLE SIDE L/S CHECK ERROR
030	A3.5(D120.5)	2029 APC MAINTENANCE MODE M60,M61,M62 COMMAND ERROR
031	A3.6(D120.6)	2030 TOOL BROKEN ALARM
032	A3.7(D120.7)	2031 M60, M61, M62 APC STANDBY ERROR
033	A4.0(D121.0)	2032 ATC ARM MODE POSITION ERROR
034	A4.1(D121.1)	2033 TOOL CLAMP ERROR
035	A4.2(D121.2)	2034 SPINDLE ROTATION AT M31 MODE
036	A4.3(D121.3)	2035 M06 COMMAND AT TOOL POT NOT SPINDLE SIDE
037	A4.4(D121.4)	2036 MAGAZINE NOT ZERO RETURN
038	A4.5(D121.5)	2037 M31 NOT CANCEL
039	A4.6(D121.6)	2038 M06 AT NOT TOOL CLAMP
040	A4.7(D121.7)	2039 ATC CYCLE NOT END



Error Code and Trouble Shooting

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No.	Address	Function
041	A5.0(D122.0)	2040 M60 POSITION ERROR
042	A5.1(D122.1)	2041 M31, M35 AT NOT MDI MODE
043	A5.2(D122.2)	2042 M31, M35 COMMAND DURING SPINDLE ROTATION
044	A5.3(D122.3)	2043 M31 NOT COMMAND
045	A5.4(D122.4)	2044 M06 AT NOT ATC POSITION
046	A5.5(D122.5)	2045 ATC ALARM NOT CANCEL
047	A5.6(D122.6)	2046 TOOL POT UNCLAMP L/S NOT ON
048	A5.7(D122.7)	2047 TOOL POT CLAMP L/S NOT OFF
049	A6.0(D123.0)	2048 OLD TOOL RETURN ERROR
050	A6.1(D123.1)	2049 TOOL POT UNCLAMP L/S NOT OFF
051	A6.2(D123.2)	2050 TOOL POT NOT UNCLAMP
052	A6.3(D123.3)	2051 TOOL POT NOT CLAMP
053	A6.4(D123.4)	2052 ATC ARM FORWARD/BACKWARD TIME OVER
054	A6.5(D123.5)	2053 ATC ARM NOT BACKWARD
055	A6.6(D123.6)	2054 ATC ARM NOT HOME POSITION
056	A6.7(D123.7)	2055 NEW POT CYCLE ERROR
057	A6.0(D124.0)	2056 ATC ARM RETURN L/S ERROR
058	A7.1(D124.1)	2057 HYD. OIL CONFIRM CHECK ERROR
059	A7.2(D124.2)	2058 MAINTENANCE MODE ON
060	A7.3(D124.3)	2059 TOOL POT EXIST AT M/Z SIDE COMMAND
061	A7.4(D124.4)	2060 T COMMAND OVER
062	A7.5(D124.5)	2061 APC L/S CHECK ERROR
063	A7.6(D124.6)	2062 TOOL POT SWING MAGAZINE SIDE L/S CHECK ERROR
064	A7.7(D124.7)	2063 T CYCLE OVER
065	A8.0(D125.0)	2064 NC ALARM
066	A8.1(D125.1)	2065 EXTERNAL CHIP CONVEYOR OVERLOAD
067	A8.2(D125.2)	2066 RIGID TAPPING COMMAND ERROR
068	A8.3(D125.3)	2067 LUB. PRESSURE CHECK ERROR AT LUB. PUMP OFF
069	A8.4(D125.4)	2068 B-AXIS INDEX POSITION ERROR
070	A8.5(D125.5)	2069 CE(OPERATOR) DOOR OPEN ERROR
071	A8.6(D125.6)	2070 CE(ATC) DOOR OPEN ERROR
072	A8.7(D125.7)	2071 CE(APC) DOOR OPEN ERROR
073	A9.0(D126.0)	2072 MANUAL OPERATOR DOOR OPEN ERROR(NOT CE)
074	A9.1(D126.1)	2073 MANUAL MAGAZINE INDEX ERROR
075	A9.2(D126.2)	2074 MAINTENANCE M-CODE COMMAND ERROR
076	A9.3(D126.3)	2075 TOOL LIFE END ERROR
077	A9.4(D126.4)	2076 TABLE/PALLET MAINTENANCE M-CODE ERROR
078	A9.5(D126.5)	2077 MAGAZINE ALARM NO.
079	A9.6(D126.6)	2078 MAGAZINE POWER OFF REQUIRE
080	A9.7(D126.7)	2079 BEA-AMP ADJUST MODE



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No.	Address	Function
081	A10.0(D127.0)	2080 MAGAZINE ENCODER BATTERY ALARM
082	A10.1(D127.1)	2081 ATC CAM UNIT INVERTER ALARM
083	A10.2(D127.2)	2082 APC CHANGER INVERTER ALARM
084	A10.3(D127.3)	2083 SPINDLE COOLING UNIT ALARM
085	A10.4(D127.4)	2084 CUTTING TOOL OVERLOAD ALARM
086	A10.5(D127.5)	2085 CUTTING MONITOR NOT READY ALARM
087	A10.6(D127.6)	2086 CUTTING TOOL LIFE END ALARM
088	A10.7(D127.7)	2087 NO OPTION ERROR
089	A11.0(D128.0)	2088 SPINDLE HEAD TEMPERATURE SENSOR OPENED
090	A11.1(D128.1)	2089 BED TEMPERATURE SENSOR OPENED
091	A11.2(D128.2)	2090 TEMPERATURE COMPENSATION SENSOR ALARM
092	A11.3(D128.3)	2091 SPINDLE HEAD OVERHEAT



8.1.2 Setting of Parameter

The parameter is an important factor to determine the characterize and functions of the machine. There are various types of parameters which characterize standard specifications and optional specifications, select the contents of specifications and the functions in details, and determine the capabilities of relevant functions and processing procedures.

1. Types of Parameter and Their Contents

- 1) NC Parameter : Refer to NC parameters list.
- 2) PC Parameter

2. Handling of Parameters

Since respective parameters have been set to proper values (data) by a machine manufacturer, the user normally does not have to change and set it except requirement of a very special situation, (However, a user macro area and backlash/pitch error compensation area are excluded.) Upon shipment of the machine, an actual NCPC parameter values(setting data) list is packed together with machine. Keep carefully and make use of it when required for maintenance.

3. Action at interruption of electric power(Applicable also to the case of pressing unintendedly the emergency stop switch)

When electric power is interrupted during operation, NC unit and high voltage control panel are switched off. And all the electric commands activated with manual operation button and remaining is NC unit are cleared, and so machine immediately stops. After electric power is supplied, NC unit and machine control circuit can not resume operation if NC unit **POWER ON** switch and **STANDBY** push button are not pressed. Oil hydraulic circuit and other devices which stop operation due to interruption of electric power may continue remaining operation when **STANDBY** push button so pressed. So a special attention is needed.



Error Code and Trouble Shooting

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Table 8-2. Action at interruption of electric power

Operation or state before interruption of electric power	Operation or state when power is supplied to control	Action after power is supplied
Spindle is rotating	Stop	
Spindle is in stop	Stop	
Spindle is changing speed	Stop	Command S5 lines with MDI
Spindle is making orientation	Stop	Command M19 lines with MDI
Tool clamp	Tool Unclamp	
Table is rotating	stop operation due to interruption of electric power	Table is returned to origin
X, Y, Z-Axis	stop operation due to interruption of electric power	
Coolant is being called	Stop	
Mist is being called	Stop	
Chip conveyor is operating	Stop	

4. Interruption of electric power or emergency stop during ATC

ATC Bypass Mode

This function facilitates emergency stopping during ATC and restarting when electric power is resupplied.

1) Operation

- ① Select "MDI" mode operation panel.
- ② Check for any interruption as ATC twin-arm is operation before operation.

2) State and method of operation when stopping

No.	State of operation stopping	Method of operation after power is supplied	Remark
1	ATC twin-arm is operating	<ol style="list-style-type: none"> 1) Command M31, M35 2) Move in + direction the toggle switch for X axis jog feed. 3) Move in - direction (Tool unclamp), + direction (Tool clamp) the toggle switch for Z axis jog feed. 4) Command M32 after return to origin. 	
2	S-Arm operating (magazine side → waiting pot)	<ol style="list-style-type: none"> 1) Turn "ON" Maintenance switch 2) Run M61 (Tool pot magazine side) ← M62 (Tool pot spindle side) 3) Turn "OFF" maintenance switch. 	



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No.	State of operation stopping	Method of operation after power is supplied	Remark
3	Magazine is rotating	1) Set the operation mode to manual mode (Feed, rapid feed, origin return, handle mode, etc). 2) Press at the same time the magazine Forward /Reverse and select switches at ATC operation part to operate rotation.	
4	ATC door is open or in operation of closing and opening	1) Set the main operation panel to MDI mode. 2) Run M80(ATC door open)↔ M81(ATC door close).	

5. Interruption of Electric Power or Emergency Stop During Table Indexing Operation

State of operation just before interruption of electric power (Including emergency stop)	Stop or operation hen power is resupplied	Action after power is supplied
Table is rising	Stop just at the state immediately before interruption of electric power	Set the NC mode to MDI and command G28 B0; return the table to origin.
Table is rotating		
Table is lowering		

6. Interruption of Electric Power or Emergency Stop during ATC Operation

State of operation just before interruption of electric power (Including emergency stop)	State or operation when power is resupplied	Action after power is supplied
Pallet is rising or lowering	Stop just at the state immediately before interruption of electric power	Turn "ON" Maintenance switch and command M23 (Pallet clamp) with MDI mode.
Pallet is rotating		Turn "ON" Maintenance switch and command M53 (Electric interruption on pallet) with MDI mode.
Pallet is rising, Pallet is lowering		Turn "ON" Maintenance switch and command M56 (Pallet lowering).



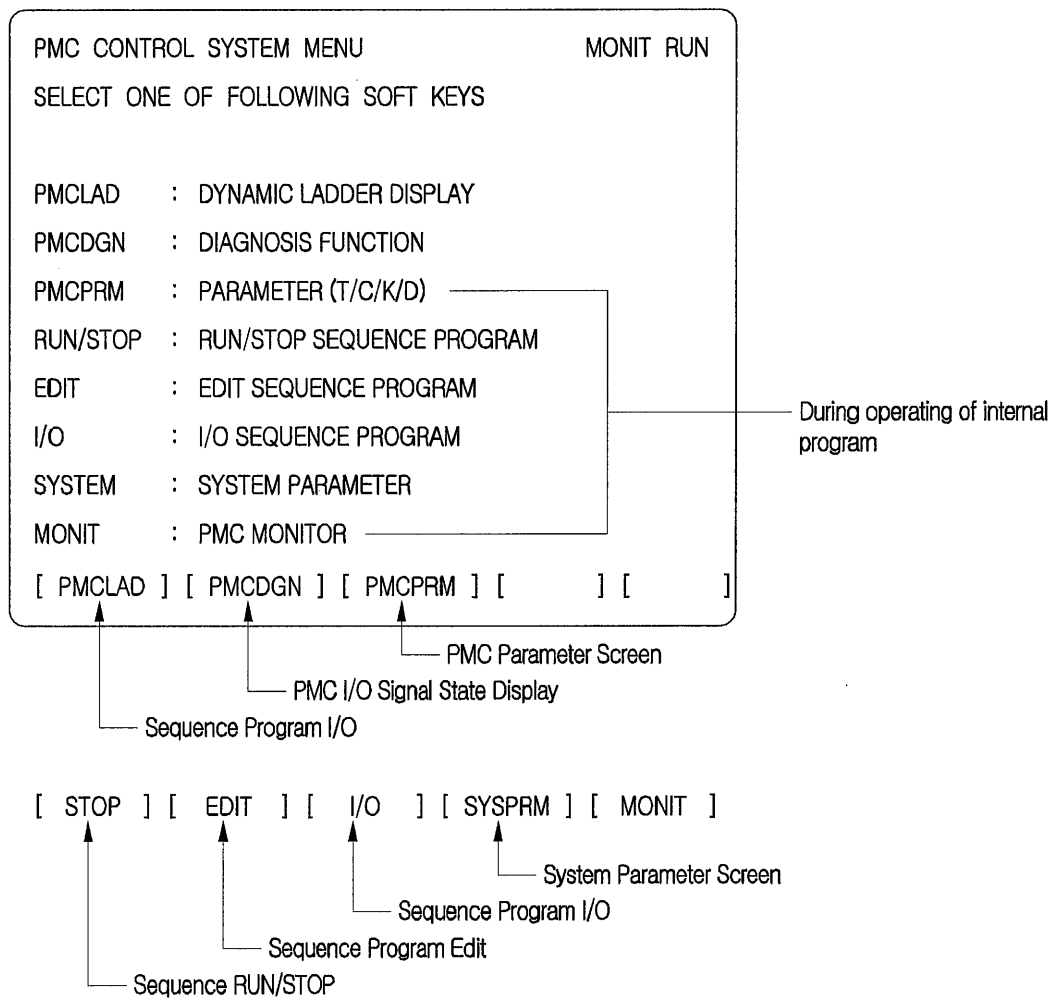
Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

8.2 PMC Screen

8.2.1 How to Display

- 1) Press the **SYSTEM** key.
- 2) Press the soft key [PMC], PMC screen will be displayed, and the following soft key will be displayed.



X : Not use

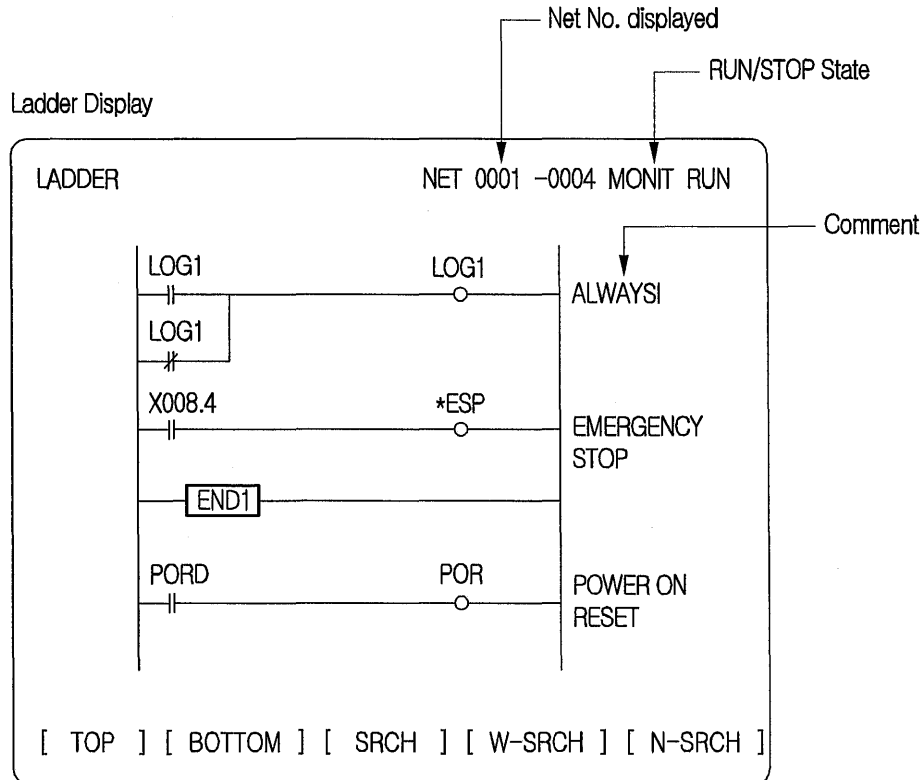
	Without Edit Card	With Edit card	With C Language Board
RUN/STOP	O	O	O
EDIT	X	O	O
EDIT	O	O	O
SYSTEM	X	O	O



Error Code and Trouble Shooting

8.2.2 PMCLAD Screen

Press the soft key [PMCLAD], the sequence program will be displayed dynamically. And you can see the motion monitoring.



• Other Soft key

[F-SRCH] [] [] [ADDRESS]

↓ ↑ Changing Every Press.





[SYMBOL]

1. Contents of Display

- 1) Green(Slight brightness) contact : open
Relay : OFF
- 2) White(High brightness) contact : Close
Relay : ON



2. How to search

- 1) Change ladder screen by     .
- 2) [TOP] : Search the top of ladder diagram.
- 3) [BOTTOM] : Search the end of ladder diagram.
- 4) ADDRESS, BIT [SRCH] or SYMBOL [SRCH]
- 5) ADDRESS, BIT [W-SRCH] or SYMBOL [W-SRCH]
- 6) NET SIGNAL [N-SRCH] : Display ladder diagram from selected net signal.
- 7) FUNCTION SIGNAL [F-SRCH] or FUNCTION COMMAND [F-SRCH]
- 8) [ADDRESS]: Display the signal as address and bit number.

3. On-line Edit

When keep relay K17(SB6 is K900) bit 1=1, a soft key {ONLEDT} is displayed and a original function is effected. You can change some part of the program without stopping rum of ladder diagram.

Changeable as follows.

- Change the kinds of contact (A contact, B contact)
- Change a contact or address of coil
- Change the address parameter of function command
 - Changing is limited without changing size
 - In case a size is different, to add, delete and exchange is impossible.

Also, when keep relay K18(SB6 is K901) bit 3=1, the edited contents by on-line is reflected to the ladder program for editing. When keep relay K18(SB6 is K901) bit 3=1.

Reflect to the ladder program for editing by using the FROM/WRITE function on I/O screen. If you shut off the power without this operation, the edited content is not saved.



8.2.3 PMCDGN Screen

Press a soft key [PMCDGN], display PMC diagnosis screen.

1. Contents of display

When making ladder program, display registered title data.

Page No.

PMC TITLE DATA #1		MONIT RUN
PMC PROGRAM NO.	:	
EDITION NO.	:	
SERIES : 406A EDITION : 08		
(SERIES : 406C EDITION : 08)		
PMC TYPE CONTROL : SB6 PROGRAM : SB6		
MEMORY USED	:	KB
LADDER	:	KB
SYMBOL	:	KB
MESSAGE	:	KB
SCAN TIME	:	MSEC
SCAN MAX : 016 MS MIN : 008 MS		
[TITLE] [STATUS] [ALARM] [TRACE] []		

• Other Soft Keys

[M. SRCH] [ANALYS] [] [] []



Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

1) Page 1

PMC PROGRAM NO. :] Be set when making PMC.
EDITION NO. :

PMC CONTROL PROGRAM

SERIES : EDITION : — PMC control software series and edition.

MEMORY USED : KB
LADDER : KB
SYMBOL : KB
MESSAGE : KB
SCAN TIME : MSEC] Be displayed the status of memory using, run time.

2) Page 2

MACHINE TOOL BUILDER NAME :
MACHINE TOOL NAME :
CNC & PMC TYPE NAME :
PROGRAM DRAWING NO. :] Be set when making PMC.

3) Page 3

DATA OF DRAWING :
PROGRAM DESIGNED BY :
ROM WRITTEN BY :



Error Code and Trouble Shooting

2. Status Screen

Be displayed a I/O signal, ON/OFF status of inner relay.





PMC SIGNAL STATUS								MONIT RUN
ADDRESS	7	6	5	4	3	2	1	0
	ED7	ED6	ED5	ED4	ED3	ED2	ED1	ED0
G0000	0	0	0	0	0	0	0	0
	ED15	ED14	ED13	ED12	ED11	ED10	ED9	ED8
G0001	0	0	0	0	0	0	0	0
	ESTB	EA6	EA5	EA4	EA3	EA2	EA1	EA0
G0002	0	0	0	0	0	0	0	0
G0003	0	0	0	0	0	0	0	0
	FIN							
G0004	0	0	0	0	0	0	0	0
[SEARCH] [] [] [] []								

← Symbol

← Status of signal
0 : OFF
1 : ON

Or
● : OFF
| : Be displayed ON.

1) How to search

- ①   key : Up/Down of the screen
- ②   key : Front/Back of the diagnostic signal
- ③ Search the selected address or symbol.
Enter ADDRESS NO. or SYMBOL, Press a soft key [SEARCH].

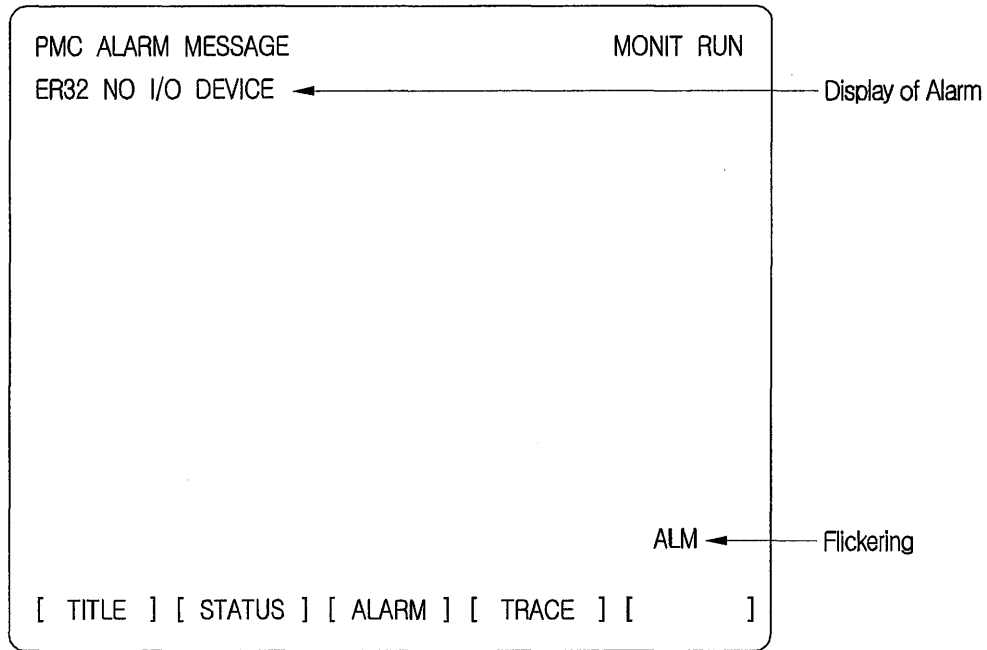


Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

3. Alarm Screen

Be displayed an alarm at PMC.





4. Trace Screen



The status of signal is memorized at trace memory whenever the selected signal is changed, and use the trace screen for intermittent trouble check.

1) Trace Parameter Screen

PMC SIGNAL TRACE	MONIT RUN
TRACE MODE	
(0 : 1 BYTE / 1 : 2 BYTE / 2 : WORD)	
1ST TRACE	ADDRESS CONDITION
ADDRESS	TYPE :
ADDRESS	MASK DATA
2ND TRACE	ADDRESS CONDITION
ADDRESS	TYPE :
ADDRESS	MASK DATA
[T. DISP]	[EXEC] [] [] []

— The changed soft key on the contents display screen of trace memory(The screen of next page)

Parameter item is

selected by  



8.2.4 PM CPRM Screen

1. How to enter a PMC parameter at MDI

- 1) Select MDI mode or press emergency stop.
- 2) Set '1' at [PWE] of the setting screen or '1' at [KEY 4] of the protect signal for program.

	PWE	KEY4
TIME	○	—
counter	○	○
keep relay	○	—
data table	○	○

Either of the two

Either of the two

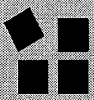
3) Press a soft key and select one of the following.

- [TIMER] : Timer Screen
- [COUNTR] : Counter Screen
- [KEEPRL] : Keep Relay Screen
- [DATA] : Data Tabel Screen

4) Press a cursor key and move it to the number that you want.

5) Type a DATA and press INPUT key to insert it.

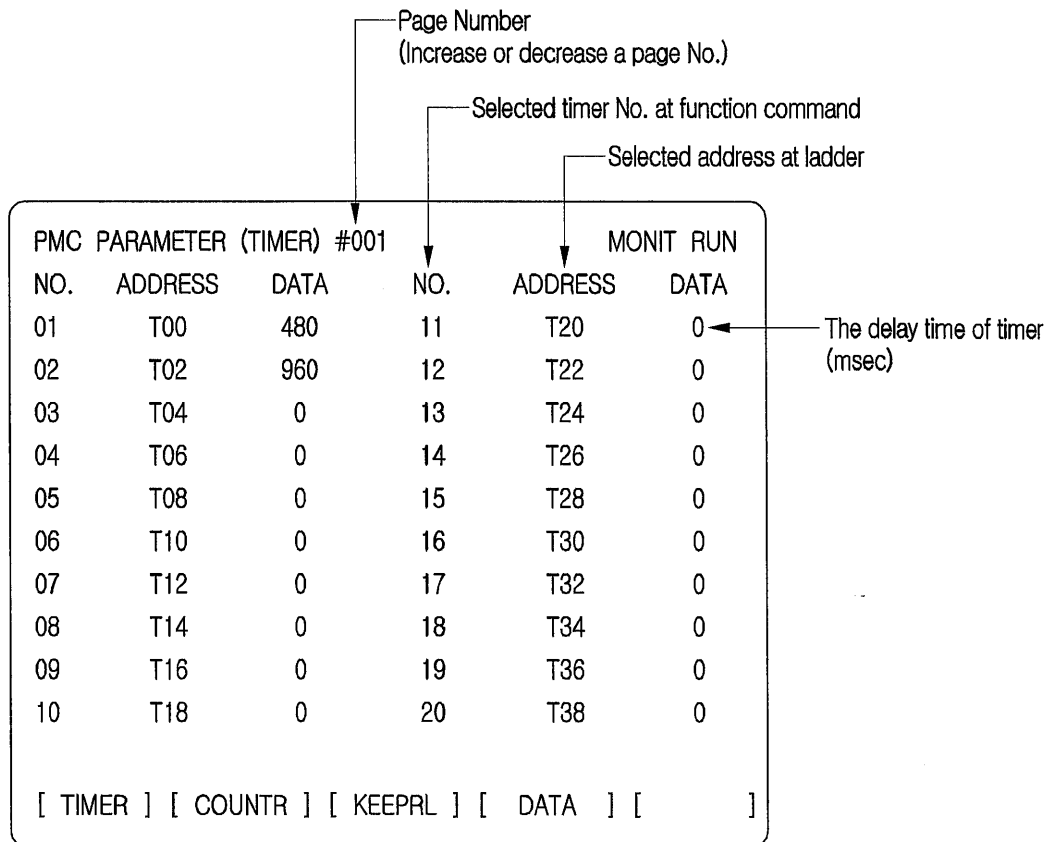
6) Return the 「PWE」 of setting screen or 「KEY4」 to '0' after the data is entered.



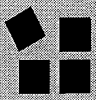
Error Code and Trouble Shooting

2. Timer Screen

This is used to set a time value at the function command timer(SUB3).



The setting time of timer : In the timer No. 1~8, Max. data is 1572.8 seconds and the multiple value of them is 48 msec. In the timer No. 9~10, Max. data is 262.1 seconds and the multiple value of them is 8 msec.

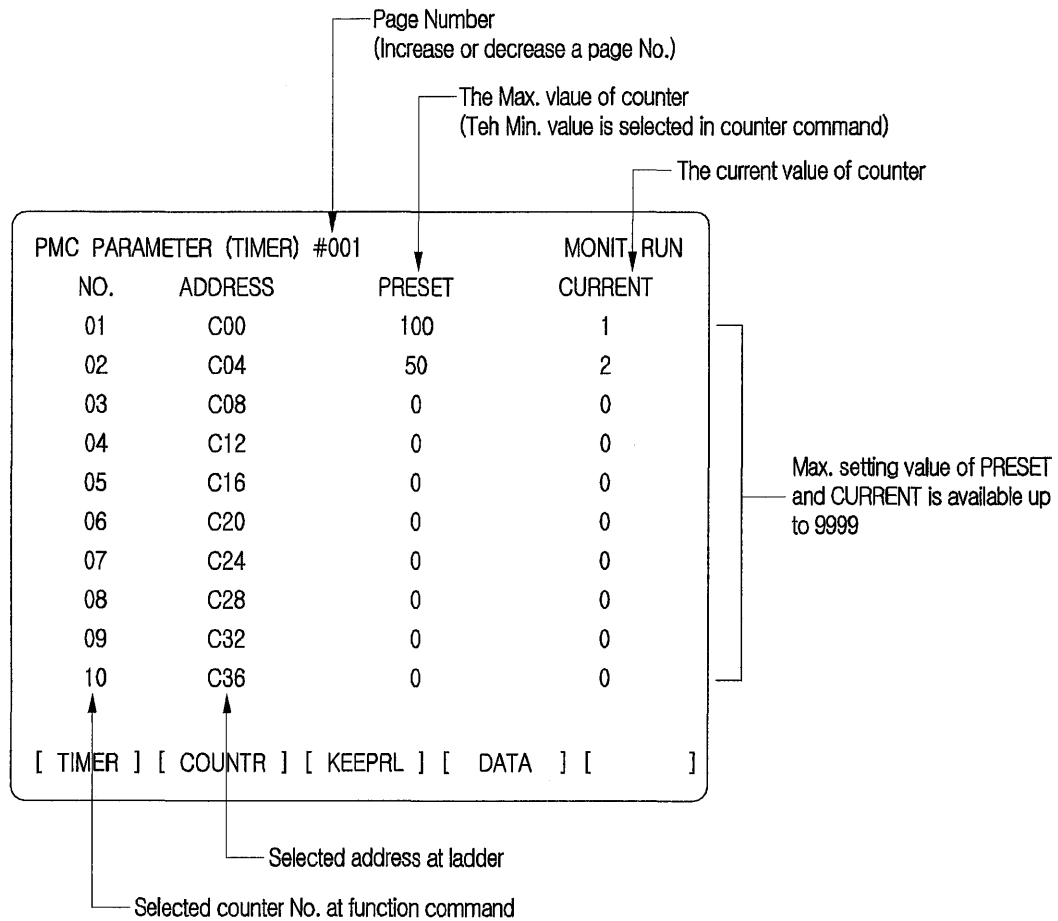


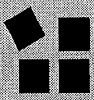
Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

3. Counter Screen

The counter command(SUB4) set Max. value and current value, and display them.





Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

4. Keeprl Screen

Selected address at Ladder

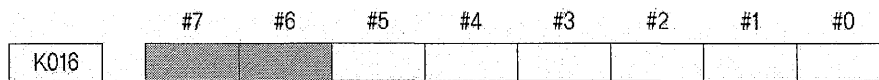
PMC PARAMETER (KEEP REALAY) #001			MONIT RUN		
NO.	ADDRESS	DATA	NO.	ADDRESS	DATA
01	K00	00000000	11	K10	00000000
02	K01	00000000	12	K11	00000000
03	K02	00000000	13	K12	00000000
04	K03	00000000	14	K13	00000000
05	K04	00000000	15	K14	00000000
06	K05	00000000	16	K15	00000000
07	K06	00000000	17	K16	00000000
08	K07	00000000	18	K17	00000000
09	K08	00000000	19	K18	00000000
10	K09	00000000	20	K19	00000000

[TIMER] [COUNTR] [KEEPRL] [DATA] []

Selected address at Ladder

Using at PMC system
 (Refer to next page)

1) Control the keep memory



- #7 MWRTF 2 : Confirming the status of entering into keep memory
- #6 MWRTF 1 : The status of entering into keep memory

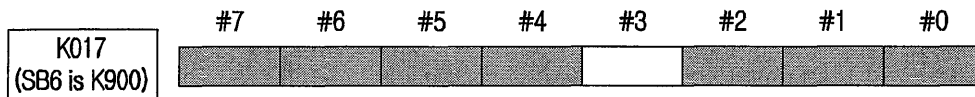


Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

2) PMC system parameter

The keep relay in below can not be used at sequence program because it is used at system.

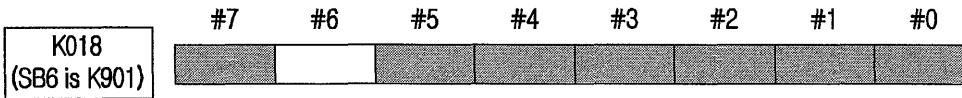


#7 DTBLDSP	0	The PMC parameter data table control screen is displayed.
	1	The PMC parameter data table control screen is not displayed.
#6 ANASTAT	0	The display function of wave from signal starts sampling by 「EXEC」 soft key.
	1	The display function of waveform signal starts sampling automatically after power on.
#5 TRCSTAT	0	The function of signal trace starts trace by 「EXEC」 soft key.
	1	The function of signal trace starts trace automatically after power on.
#4 MEMINP	0	To enter the data at memory content display function is possible.
	1	To enter the data at memory content display function is impossible.
#2 AUTORUN	0	The sequence program runs automatically after power on.
	1	The sequence program runs by 「EXEC」 soft key.
#1 PROGRAM	0	An internal program is not used.
	1	An internal program is used.
#0 LADMASK	0	The dynamic of ladder is displayed.
	1	The dynamic of ladder is not displayed.

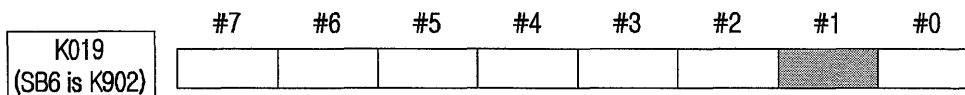


Error Code and Trouble Shooting

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#7 IGDINT 0	When changing to PMCMDI, the screen is initialized.
1	When changing to PMCMDI, the screen is not initialized.
※ When using C language of PMC, it is effected.	
#5 CHKPRTY 0	Check system ROM, PROGRAM ROM/RAM PARITY.
1	Not check SYSTEM ROM, PROGRAM ROM/RAM PARITY.
#4 CALCPRTY 0	RAM PARITY is calculated at internal program function.
1	RAM PARITY is not calculated at internal program function.
#3 TRNSRAM 0	The ladder program is not transferred to Back-up RAM automatically after finishing the On-line edit
1	The ladder program is transferred to Back-up RAM automatically after finishing the On-line edit
#2 TRGSTAT 0	The trigger stop function is not run automatically when power on.
1	The trigger stop function is run automatically when power on.
#1 DBGSTAT 0	The automatic breaking is not started at debug function of c language when power on.
1	The automatic breaking is started at debug function of c language when power on.
※ This flag is effective in case of choosing C language function.	
#0 IGNKEY 0	To use the function key during displaying the user screen of user program is possible.
1	To use the function key during displaying the user screen of user program is impossible.
※ When using C language of DMC, it is effected. When this bit is "1" the user screen can not be exchanged to NC serene by function key. Therefore, this bit is set "0" correctly, or it is necessary to make the program that can be exchanged to NC screen.	

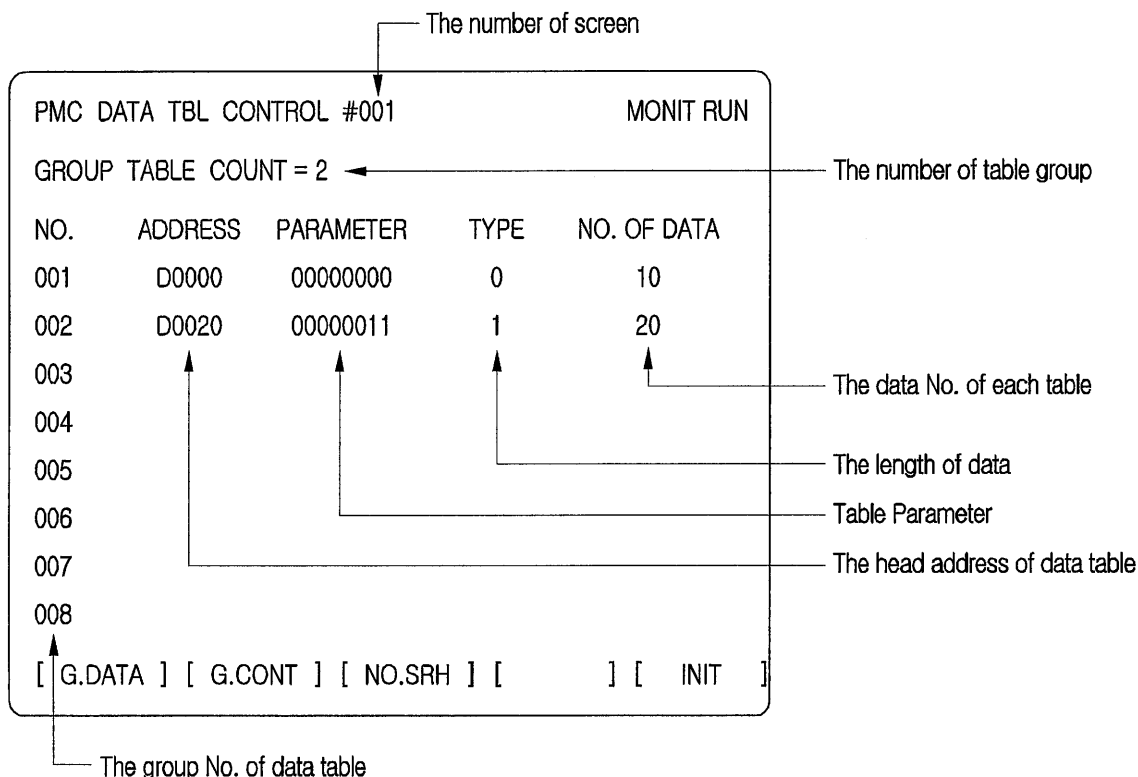


#1 C-REJECT 0	C program is run.
#1 C-REJECT 1	C program is not run by force.
※ It is effective in case of using C language program of PMC.	
※ Do not change the setting value because the unused range of the data for the management soft of PMC is used at system. Usually, all bit is set "0".	



5. Data Screen

1) Setting screen of data table



- ① Soft key [G.DATA] : The data display screen of the data table is selected. (The screen of next page)
- ② [G.CONT] : The group No. of data table is set.
- ③ [No.SRH] : The cursor is moved to the selected group.
- ④ Soft key [INIT] : The setting of data table is initialized.
Group No. is 1, address is d0000, parameter is 00000000, Type is 0, No. of data is 1860.

※ Usually, this is operated when making the sequence program only. When PMC parameter is set, the internal parameter is not influenced.



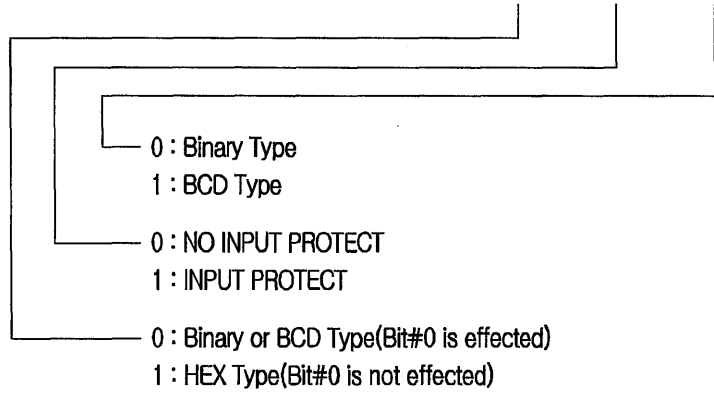
Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

CAUTION

Table Parameter

#7	#6	#5	#4	#3	#2	#1	#0





Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

2) Data display screen

Group No. Page No.

PMC PRM (DATA) 001/001		MONIT RUN
NO.	ADDRESS	DATA
000	D0000	0
001	D0001	0
002	D0002	0
003	D0003	0
004	D0004	0
005	D0005	0
006	D0006	0
007	D0007	0
008	D0008	0
009	D0009	0

[C.DATA] [G.SRCH] [SEARCH] [] []

- ① Soft key [C.DATA] : Be returned to the data setting screen of data table.
(Former Screen)
- ② GROUP NO. [G-SRCH] : The head of selected group is selected.
- ③ GROUP NO. [SEARCH] : The address is seached among the selected group.



Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

6. Setting Screen

PMC PRM		PMC RUN
TRACE START	= 0 (0 : MANUAL 1 : AUTO)	
EDIT ENABLE	= 0 (0 : NO 1 : YES)	
WRITE TO F-ROM(EDIT)	= 0 (0 : NO 1 : YES)	
RAM WRITE ENABLE	= 0 (0 : NO 1 : YES)	
DATA TBL CNTL SCREEN	= 0 (0 : YES 1 : NO)	
HIDE PMC PROGRAM	= 0 (0 : NO 1 : YES)	
IO GROUP SELECTION	= 0 (0 : HIDE 1 : SHOW)	
LADDER START	= 0 (0 : AUTO 1 : MANUAL)	
ALLOW PMC STOP	= 0 (0 : NO 1 : YES)	
PROGRAMMER ENABLE	= 0 (0 : NO 1 : YES)	
[MANUAL] [AUTO] [] [PREV] [NEXT]		

- 1) TRACE START(PMC-SB7 : K906.5)
 - MANUAL(0): When you press the [EXEC] soft key, the trace function starts the trace operation.
 - AUTO(1) : The trace function starts sampling automatically when power on.
- 2) EDIT ENABLE(PMC-SB7 : K901.6, PMC-SA1 : K18.6)
 - NO(0) : Disable the sequence program editing
 - YES(1) : Enable the sequence program editing
- 3) WRITE TO F-ROM(EDIT)(PMC-SB7 : K902.0, PMC-SA1 : K19.0)
 - NO(0) : Not be recorded to F-ROM automatically after editing the ladder
 - YES(1) : Be recorded to F-ROM automatically after editing the ladder
- 4) RAM WRITE ENABLE(PMC-SB7 : K900.4, PMC-SA1 : K17.4)
 - NO(0) : Disable the forcing function and override function.
 - YES(1) : Enable the forcing function and override function.
- 5) DATA TBL CNTL SCREEN(PMC-SB7 : K900.7, PMC-SA1 : K17.7)
 - NO(0) : The PMC parameter data table control screen is not displayed.
 - YES(1) : The PMC parameter data table control screen is displayed.
- 6) Disable or enable the read of PMC program (PMC-SB7: K900.0, PMC-SA1:K17.0)
 - NO(0) : Disable the read of sequence program



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- YES(1) : Enable the read of sequence program
- 7) I/O group selection(pmc-sb7 : k906.1)
- HIDE(0) : The setting screen of I/O data selection function is not displayed.
 - SHOW(1) : The setting screen of I/O data selection function is displayed.
- 8) LADDER START(PMC-SB7 : K900.2, PMC-SA1 : K17.2)
- AUTOMATIC(0): The sequence program is run automatically when power on.
 - MANUAL(1): The sequence program is not run when pressing[EXEC] soft key of sequence.
- 9) ALLOW PMC STOP(PMC-SB7 : K902.2, PMC-SA1 : K19.2)
- NO(0) : Disable the Run/Stop operation of sequence program.
 - YES(1) : Enable the Run/Stop operation of sequence program.
- 10) PROGRAMMER ENABLE(PMC-SB7 : K900.1, PMC-SA1 : K17.1)
- NO(0) : The internal programmer function is not run.
 - YES(1) : The internal programmer function is run.



8.2.5 Ladder Diagram Monitor Screen

The ladder diagram monitor screen is displayed a contact, ON/OFF state of coil and the inventory of address which shows function command parameter. In order to call a ladder diagram screen, press [PMCLAD] soft key at main menu of PMC. You can use flowing functions include “Forcing I/O function(Forcing mode)” in the screen. Also, you can exchange the relay or function command address parameter to new status or value by using these functions.

- Changing the serve program that you want to display [LIST]
- Searching an address and other contents [SEARCH]
- Displaying the function command data table [TABLE]
- Turning to the ladder diagram edit mode [EDIT]
- Calling the multiple monitor screen [SWITCH]
- Forcing I/O function (Forcing mode) “No” +Input key

1. Ladder Window Display

The ladder window is displayed. Also, the next display is possible by using the ladder window display screen.

- Displaying by the search of the ladder window any relay coil box
- Displaying the ladder window dynamic

When the ON/OFF state is monochrom CRT, a brightness is changed. When it is color CRT, a color is changed.

1) Ladder window display

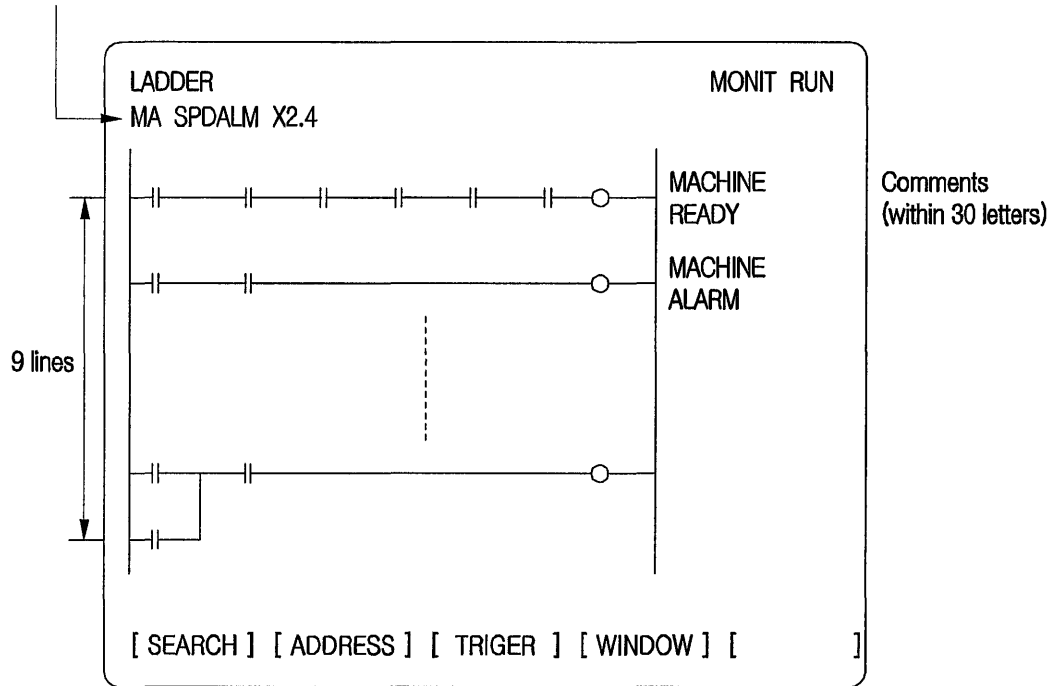
If you don't press the [PMCLAD] soft key of PMC basic menu, the ladder window is not displayed. The crosswise of screen is displayed up to 8 each including relay contacts and relay coils. If there are relay contacts more than 8 each, it is displayed more than 2 divided lines with changing line.



Error Code and Trouble Shooting

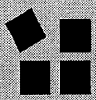
HYUNDAI-KIA MACHINE

The name of signal(within 6 letters)
The address or name of symbol



CAUTION

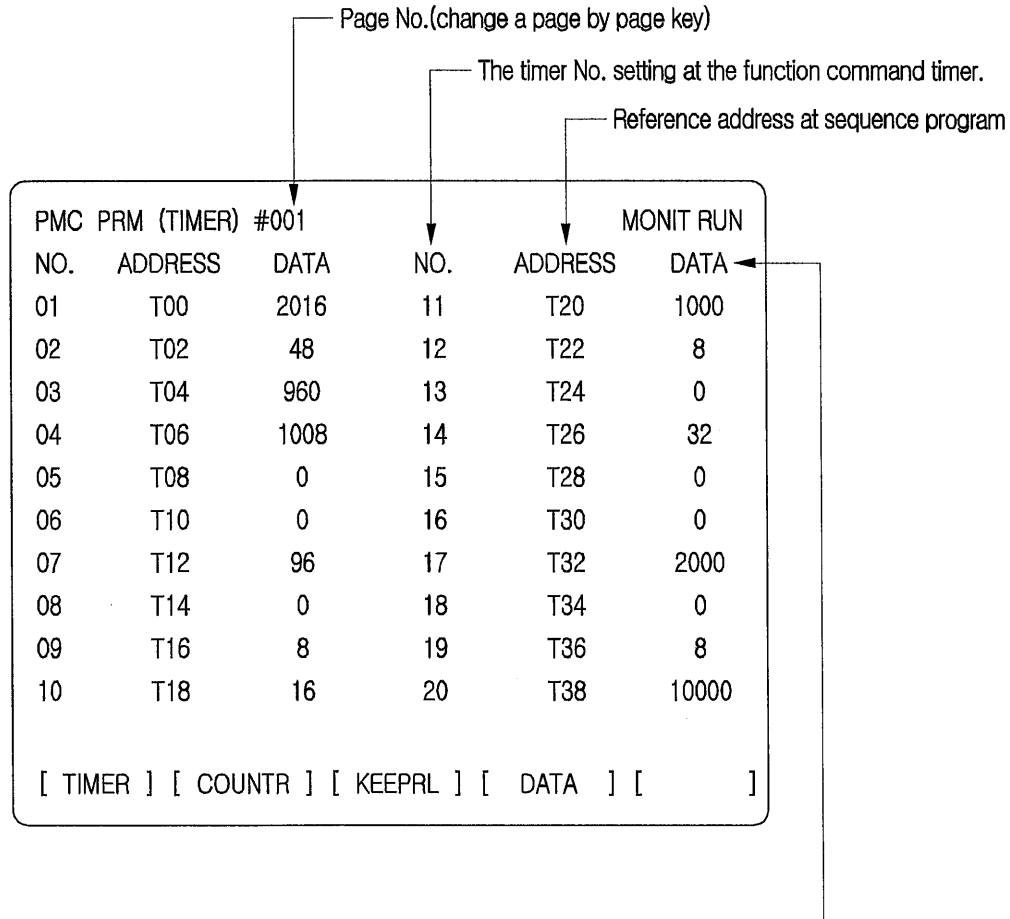
Select "USE" at on-line setting screen and press [PMCLAD] soft key when communicating on-line, "PEJECT(ONLINE MONITOR ACTIVE)" is displayed and entered to the screen. In that case, select "NOT USE" at on-line setting screen and stop the on-line communication of PC side.



8.2.6 Setting, Display Screen

1. Timer Screen

This is used to set, display a time value at the function command timer.



Timer Setting Time(Refer to Table)

Timer No.	Min. Setting Time	Max. Setting Time
1~8	48(ms)	1572.8(s)
9~40 or 9~150(Note1)	8(ms)	262.136(s)

(Note1) The usable number is different according to the kinds of machine. Refer to the page of "2. Timer Screen in the 15.2.4 PMCPRM screen".



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2. Counter Screen

This is used to set display the Max. counter value and current value of the function command counter(SUB5).

Selected counter No. at function command

Reference address at sequence program

Page No.(Change a page by page key)

Max. value of counter
(Min. value is selected in counter command)

PMC PARAMETER (TIMER) #001	MONIT RUN		
NO.	ADDRESS	PRESET	CURRENT
01	C00	4	1
02	C04	4	2
03	C08	4	3
04	C12	5	4
05	C16	4	5
06	C20	545	6
07	C24	5	3
08	C28	6	2
09	C32	6	1
10	C36	6	4

The current value counter

Max. Setting value of RESET, and CURRENT is available up to 32767

[TIMER] [COUNTR] [KEEPRL] [DATA] []



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3. Keep Relay Screen

- 1) This is used to set, display the keep relay and the control data of keep memory.

Address to use at the sequence program

PMC PRM (TIME) #001			MONIT RUN		
NO.	ADDRESS	DATA	NO.	ADDRESS	DATA
01	K00	00000000	11	K10	00000000
02	K01	00000000	12	K11	00000000
03	K02	00000000	13	K12	00000000
04	K03	00000000	14	K13	00000000
05	K04	00000000	15	K14	00000000
06	K05	00000000	16	K15	00000000
07	K06	00000000	17	K16	00000000
08	K07	00000000	18	K17	00000000
09	K08	00000000	19	K18	00000000
10	K09	00000000	20	K19	10000

[TIMER] [COUNTR] [KEEPRL] [DATA] []

Attention is needed to use it special use.(Notes)

CAUTION

The keep relay under the data for PMC management soft (K17~19 or K900~909) is not used at sequence program because it is used at the management soft.



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2) The data for PMC management soft

Kind of Machine	PA1	PA3
The data 1 for PMC management soft	K17	K17
The data 2 for PMC management soft	K18	K18
Reserved	K19	K19

Kind of Machine	SA1	SA3
The data 1 for PMC management soft	K17	K17
The data 2 for PMC management soft	K18	K18
Reserved	K19	K19

Kind of Machine	SB	SB2
The data 1 for PMC management soft	K17	K17
The data 2 for PMC management soft	K18	K18
Reserved	K19	K19



Error Code and Trouble Shooting

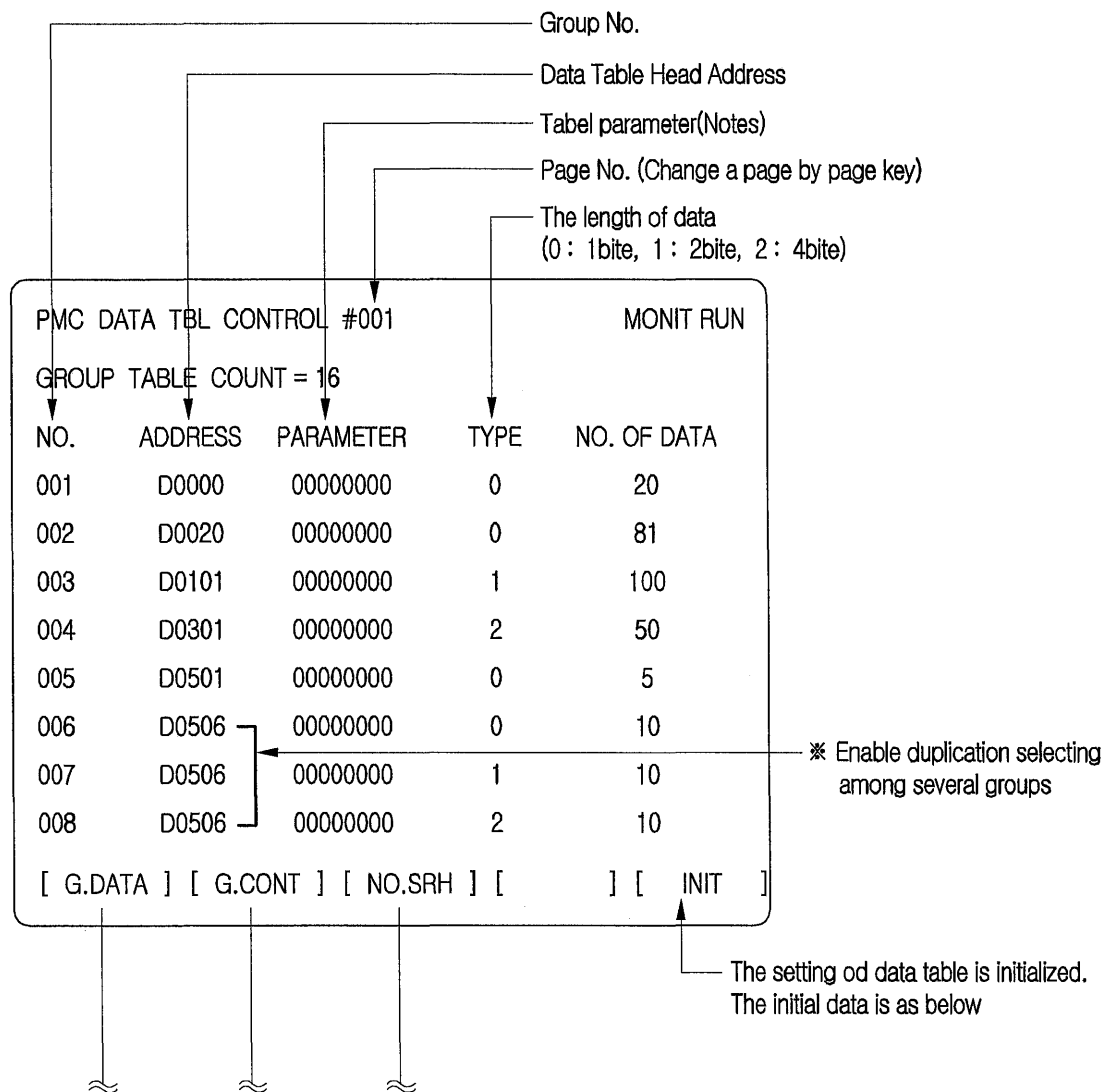
HYUNDAI-KIA MACHINE

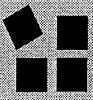
4. Data Table

There are two screen, data table control data and data table, in the data table.

1) Data table control data screen

When pressing the [DATA] soft key, the data table control data setting, displaying screen for management the data table is displayed.





Error Code and Trouble Shooting

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PMC DATA TBL CONTROL #001				MONIT RUN
GROUP TABLE COUNT = 1				
NO.	ADDRESS	PARAMETER	TYPE	NO. OF DATA
001	D0000	00000000	0	1860
002				

※ It is 3000 in SB3/SB5/SC/SC3/NB

※ It is 8000 in SB4/SB6/NB2

After typing a group number, it is enable to move a cursor key to the designated group by pressing this key.

After typing a number of group, it is enable to set of group by pressing this key.

It is enable to change the data setting and display screen of data table.

CAUTION

Table Parameter

#7	#6	#5	#4	#3	#2	#1	#0

- 0 : Binary Type
- 1 : BCD Type
- 0 : NO INPUT PROTECT
- 1 : INPUT PROTECT
- 0 : Binary or BCD Type(Bit#0 is effected)
- 1 : HEX Type(Bit#0 is not effected)



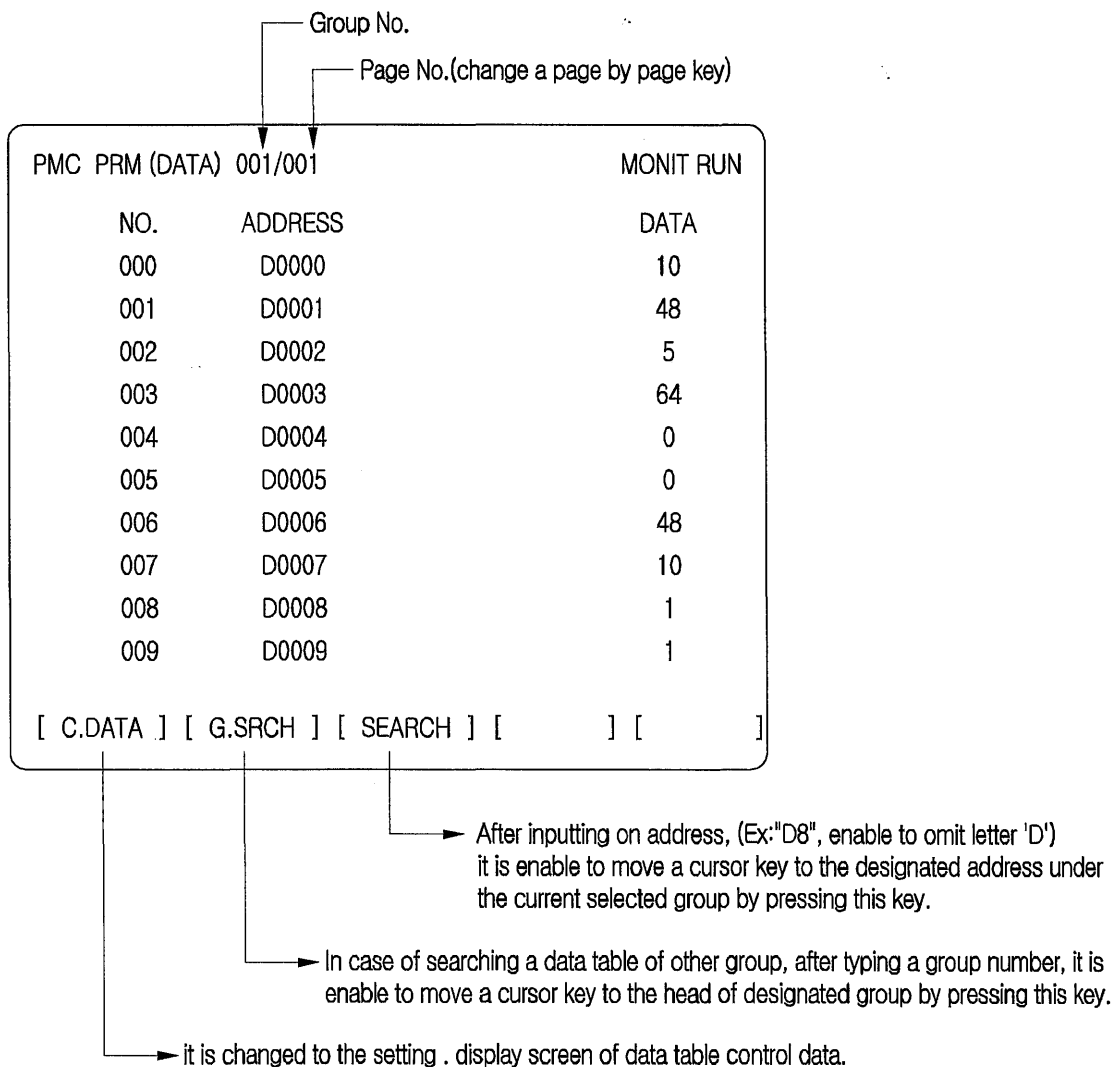
Error Code and Trouble Shooting

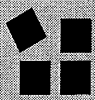
HYUNDAI-KIA MACHINE

2) Data Table Screen

If the data table control data is set, press the soft key [G.DATA] at the data table control data setting · displaying screen, and then the data table setting · displaying screen is displayed.

※ Disable bit data to input at the data table setting.





Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

8.3 HS400 Parameter Sheet

8.3.1 Parameter Sheet (FANUC 18i-MB)

1. Timer

No.	Data	Function	Address	Remark
T1	300,000	LUB. PAUSE	R726.3	
T2	20,000	LUBRICATION ON TIME	R726.2	
T3	5,000	TOOL POT CLAMP/UNCLAMP, SP. SIDE/MAGAZINE SIDE TIME LIMIT	R879.0	
T4	2,000	ARM FORWARD/BACKWARD TIME LIMIT	D123.4	
T5	5,000	ATC ARM NOT BACKWARD TIME LIMIT	D123.5	
T6	300	AFTER B ASIX MOVING, TABLE CLAMP DELAY	R755.3	
T7	600,000	SPINDLE STOP TIME CHECK	R760.0	
T8	1,000	SINGLE ARM RET. DELAY TIME	R846.2	
T9	1,000	SINGLE ARM IN DELAY TIME	R846.3	
T10	500	ORIENTATION FINISH TIME	R757.2	
T11	120,000	LUB. MOTOR OFF TIME CHECK	R760.1	
T12	250,000	GUN COOLANT OFF DELAY TIME	R773.1	
T13	1,000	APC ROTATING ARM UP DELAY TIME	R776.7	
T14	1,000	ROTATION ARM TURN CW,CCW DELAY TIME	R778.5	
T15	2,000	SPINDLE SPEED ARRIVAL DELAY	R626.0	Tool monitoring device
T16	200	M-CODE SP.STOP COMMAND DELAY	R626.2	↑
T17	0	SPINDLE STOP DELAY	R627.0	↑
T18	500	TOOL DETECTION STOP CANCEL DELAY	R627.4	↑
T19	2,000	AUTO POWER OFF DELAY TIME	R769.6	
T20	3,000	LUB. PRES. SHORTAGE CHECK DELAY TIME	R727.0	
T21				
T22				
T23	20,000	APC ACTION CHECK TIME	R881.7	
T24	1,000	PALLET CLAMP DELAY TIME	R755.2	
T25	1,000	ROTATION ARM DOWN DELAY TIME	R778.6	
T26	1,000	ATC CHANGE FINISH SHUT OFF SOL TIME	R725.5	
T27				
T28				
T29	10,000	TH. COOLANT AIR BLOW SOL OFF DELAY TIME	R773.6	
T30	1,000	TOOL POT SPINDLE SIDE DELAY TIME	R846.4	
T31	3,000	LUB. PRESSURE SHORTAGE CHECK DELAY	R727.1	
T32	96	DRY RUN DELAY TIME	R733.4	
T33				



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No.	Data	Function	Address	Remark
T34	3,000	ATC MANUAL INTERRUPT OFF DELAY	R305.2	
T35	1,000	TABLE UNCLAMP DELAY	R755.0	
T36	500	TABLE CLAMP DELAY	R755.1	
T37				
T38	1,000	TOOL POT CLAMP DELAY TIME	R702.2	
T39	1,000	TOOL POT UNCLAMP DELAY TIME	R702.3	
T40				
*NOTE : TIMER 1-8 EACH 48msec TIMER 9-40 EACH 8msec				

2. Fixed Timer(*Note : TIMER 1-8 EACH 48msec TIMER 9-40 EACH 8msec)

No.	Data	Function	Address	Remark
1	500	FLICKER ON TIME	R723.0	
2	500	FLICKER OFF TIME	R723.1	
3	3,000	LUB. LACK CHECK TIME	R726.7	
4	20,000	MANUAL MAGAZINE INDEX TIME	R385.3	
5	50	CYCLE START TIME	R765.4	
6	1,000	SPINDLE ORIENTATION OFF TIME	R854.6	
7	500	RIGID TAPPING ON TIME	R786.7	
8	3,000	THROUGH COOLANT FILTER P/S DELAY TIME	R718.6	
9	2,000	ROTATING ARM TURN CHECK TIME	R777.7	
10	1,000	PALLET UNCLAMP DELAY TIME	R778.3	
11				
12	96	DISTRIBUTOR END DELAY TIME	R383.0	
13	3,000	INITIAL SET TIME	R725.3	
14	100	TF DELAY TIME	R385.6	
15	300	M06 DELAY TIME	R385.7	
16	120,000	ATC START OVER TIME	R385.2	
17	5,000	MAG.END DELAY TIME	R869.2	
18	5,000	HYD.OIL CONFIRM CHECK TIME	R719.4	
19				
20	1,000	SPINDLE MOTOR POWER LINE OFF CHECK	R752.5	
21				
22	150	MAGAZINE AUTO INDEX DELAY TIME	R55.3	
23	50	MAGAZINE INDEX STOP COMMAND(MANUAL)	R57.3	
24	3000	MAGAZINE INDEX CONDITION NG TIME	R779.7	
25	3,000	CYCLE DELAY TIME	R765.7	
26	100	M FUNCTION DELAY TIME	R766.5	
27	500	AFTER 0.5SEC, INTERVAL ON	R1051.7	TEMP. COMP
28	10,000	AFTER 10SEC, INTERVAL ON	R1052.1	↑
29	300	Y AXIS, Z AXIS TEMP. DATA INPUT COM. TIME	R1052.3	↑



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No.	Data	Function	Address	Remark
30	2,000	M200 SENSOR TEMPERATURE TRANSFER TIME	R1056.1	↑
31	2,000	M201 SENSOR TEMPERATURE TRANSFER TIME	R1056.3	↑
32				
33				
34				
35				
36				
37				
38				
39				
40				

3. Data Table of Control Data

· Group Table Counter = 5

No.	Address	Parameter	Type	No. of data	Remark
001	D0042	0000 0000	1	9	SPINDLE
002	D0060	0000 0010	1	24	FEEDRATE
003	D0117	0000 0000	0	13	ALARM
004	D0130	0000 0000	1	16	ATC DATA
005	D0250	0000 0000	1	21	TEMPERATURE COMP. DATA

· Data Table Data #001

No.	Address	Data	Function
000	D0042	-	S-CODE BCD DATA CHANGE
001	D0044	24	FEEDRATE STEP NO.
002	D0046	50	AT CE OPERATOR DOOR OPEN SPINDLE RPM(LOW GEAR)
003	D0048	8	AT CE OPERATOR DOOR OPEN SPINDLE RPM(LOW GEAR)
004	D0050	-	HEAVY TOOL MIN NO.
005	D0052	-	HEAVY TOOL MAX NO.
006	D0054	-	
007	D0056	-	
008	D0058	-	



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· Data Table Data #002 (Manual Feed Data)

No.	Address	Data	No.	Address	Data
000	D0060	0	012	D0084	370
001	D0062	5	013	D0086	520
002	D0064	10	014	D0088	720
003	D0066	14	015	D0090	1000
004	D0068	20	016	D0092	1400
005	D0070	37	017	D0094	2000
006	D0072	52	018	D0096	2700
007	D0074	72	019	D0098	3700
008	D0076	100	020	D0100	5000
009	D0078	140	021	D0102	0
010	D0080	200	022	D0104	0
011	D0082	270	023	D0106	0

· Data Table Data #004 (Data Of ATC)

No.	Address	Data	Function	Remark
000	D0130	-	MAX. MAGAZINE TOOL NO.(AUTO SETTING)	BINARY
001	D0132	-	PRESENT TOOL NO.(AUTO SETTING)	BCD
002	D0134	-	WAITING TOOL NO. → SP. TOOL NO.(AUTO SETTING)	BCD
003	D0136	-	TARGET POSITION TOOL NO.(AUTO SETTING)	BINARY
004	D0138	-	DEC. POSITION TOOL NO.(AUTO SETTING)	BINARY
005	D0140	-	WAITING TOOL NO.(AUTO SETTING)	BCD
006	D0142	-	T-CODE BCD DATA CHANGE(AUTO SETTING)	BCD
007	D0144	-	SPINDLE TOOL NO.(AUTO SETTING)	BCD
008	D0146	-	T-CODE TOOL NO.(AUTO SETTING)	BCD
009	D0148	-	MAX. MAGAZINE TOOL NO. + 1(AUTO SETTING)	BINARY
010	D0150	-	ATC POS. MAG. TOOL NO. (D310)	BCD
011	D0152			
012	D0154			
013	D0156			
014	D0158		HEAVY TOOL MIN NO.	BCD
015	D0160		HEAVY TOOL MAX NO.	BCD



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· Data Table Data #005 (Data Of Temperature Compensation)

No.	Address	Data	Function	Remark
000	D0250	(-33)	Manipulating variable for thermal deformation compensation curve for Y axis (To be determined based on measurement data)	Integer
001	D0252	(20)	Manipulating variable for thermal deformation compensation curve for Z axis (To be determined based on measurement data)	Integer
002	D0254	-	BED Part Temperature of the temperature sensor	0.01 °C
003	D0256			
004	D0258	-	SPINDLE HEAD Part Temperature of the temperature sensor	0.01 °C
005	D0260			
006	D0262			
007	D0264	-	Temperature of the Bed of previous compensation	0.01 °C
008	D0266			
009	D0268	-	Temperature of the Spindle Head of previous compensation	0.01 °C
010	D0270			
011	D0272			
012	D0274	-	Temperature +2 °C of the bed of previous compensation	0.01 °C
013	D0276			
014	D0278	-	Temperature +2 °C of the spindle head of previous compensation	0.01 °C
015	D0280	-	Reference temperature difference for spindle overheat alarm, 20 °C(4000)	
016	D0282	-	Temperature difference between spindle head and bed	AL. Trouble shooting
017	D0284			
018	D0286	-	Thermal deformation compensation for Y axis (Actual compensation depending on temperature change of head sensor)	μm
019	D0288			
020	D0290	-	Thermal deformation compensation for Z axis (Actual compensation depending on temperature change of head sensor)	μm

Note)

1. Sampling Time :

Measure at 1 scan time intervals, level 2, after reference return of the Z-axis

2. D254 (= Reading Value (0.01 °C), D258 (= Reading Value (0.01 °C)

3. $D286 = (((D258 - D254) ==> R1008) / D250) ==> R1012 ==> D286 \rightarrow Y \text{ axis}$

4. $D290 = (((D258 - D254) ==> R1008) / D252) ==> R1014 ==> D290 \rightarrow Z \text{ axis}$



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4. Counter

No.	Address	Data	Function	Remark
000	C00	40(*60)	ATC MAGAZINE TOOL POT MAX. CHAIN NO.(*:OPTION)	AUTO
001	C04	-	ATC POS.MAGAZINE TOOL POT CHAIN NO.	

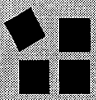


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5. M-CODE LIST

M Code	Function	Remarks	M Code	Function	Remarks
M00	PROGRAM STOP		M52	TOOL BROKEN CHECK	OPTION
M01	OPTIONAL STOP				
M02	PROGRAM END				
M03	SPINDLE CW.				
M04	SPINDLE CCW.				
M05	SPINDLE STOP		M56	MIRROR IMAGE X ON	
M06	TOOL CHANGE		M57	MIRROR IMAGE X OFF	
M07	OIL MIST COOLANT ON	OPTION	M58	MIRROR IMAGE Y ON	
M08	COOLANT ON		M59	MIRROR IMAGE Y OFF	
M09	COOLANT OFF		M60	PALLET CHANGE	
M10	OIL MIST NOZZLE 1 ON	OPTION	M61	A PALLET CHANGE	
M11	OIL MIST NOZZLE 2 ON	OPTION	M62	B PALLET CHANGE	
M12	WORK COUNTER	OPTION			
M13	M03 & M08				
M14	M04 & M08				
M15	M05 & M09				
M16	MEASURE, AIR BLOW ON	OPTION			
M17	MEASURE, AIR BLOW OFF	OPTION			
M18	MEASUREMENT SP. ORI.	OPTION			
M19	SPINDLE ORIENTATION				
			M66	FIXTURE CLAMP	OPTION
			M67	FIXTURE UNCLAMP	OPTION
M25	TOOL DETECTION STOP	OPTION			
M26	TOOL DETECTION STOP CANCEL	OPTION	M70	EXTERNAL M-CODE 1	OPTION
			M71	EXTERNAL M-CODE 2	OPTION
M28	RIGID TAP MODE CANCEL		M72	EXTERNAL M-CODE 3	OPTION
M29	RIGID TAP MODE ON		M73	EXTERNAL M-CODE 4	OPTION
M30	PROGRAM END & REWIND		M74	MEASUREMENT SP.CW1	OPTION
			M75	MEASUREMENT SP.CW2	OPTION
M33	EXTERNAL CHIP CONV. ON	OPTION	M78	TABLE CLAMP	
M34	EXTERNAL CHIP CONV. OFF	OPTION	M79	TABLE UNCLAMP	
			M80	ATC DOOR OPEN	
M36	CHIP CONVEYOR ON		M81	ATC DOOR CLOSE	
M37	CHIP CONVEYOR OFF				
			M86	PALLET CLAMP	
			M87	PALLET UNCLAMP	
M45	B/CYCLE TOOL DET. STOP	OPTION			
M46	B/CYCLE TOOL DET. S/CAN.	OPTION	M90	AUTO DOOR OPEN	
M47	JET COOLANT ON	OPTION	M91	AUTO DOOR CLOS	
M48	OVERRIDE CANCEL				
M49	OVERRIDE 100%				
M50	THROUGH COOLANT ON	OPTION			
M51	FLUSHING COOLANT ON		M200	BED TEMP. SENSOR TRANS	OPTION
			M201	SP. TEMP. SENSOR TRANS	OPTION



Error Code and Trouble Shooting

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6. Maintenance M-Code List

M code	Function	Remarks
M21	TABLE CLAMP	
M22	TABLE UNCLAMP	
M23	PALLET CLAMP	
M24	PALLET UNCLAMP	
M53	ROTATING ARM TURN CW	
M54	ROTATING ARM TURN CCW	
M55	ROTATING ARM UP	
M56	ROTATING ARM DOWN	
M57	TOOL POT CLAMP	
M58	TOOL POT UNCLAMP	
M31	MAINTENANCE TWIN ARM MODE ON	TWIN ARM
M35	MAINTENANCE ATC ORIENTATION MODE ON	TWIN ARM
M32	MAINTENANCE TWIN ARM/ORIENTATION MODE OFF	TWIN ARM
M61	ATC SINGLE ARM SWING MAGAZINE SIDE	
M62	ATC SINGLE ARM SWING SPINDLE SIDE	
M998	MAINTENANCE M MODE ON	
M999	MAINTENANCE M MODE OFF	



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8.3.2 FR-S500 Inverter Parameter Explanation

1. HS400 ATC Unit Basic Function

Parameter	Group	Name	Range	Unit	Setting Value
0	Basic Function	Torque Booster	0~150 %	0.1 %	6 %/5 %/4 %(Note 4)
1		Max. Frequency	0~120 Hz	0.1 Hz	60Hz
2		Min. Frequency	0~120 Hz	0.1 Hz	0Hz
3		Basic Frequency	0~120 Hz	0.1 Hz	60Hz
4		3 Step Speed Setting(High)	0~120 Hz	0.1 Hz	60Hz
5		3 Step Speed Setting(Medium)	0~120 Hz	0.1 Hz	30Hz
6		3 Step Speed Setting(Low)	0~120 Hz	0.1 Hz	10Hz
7		Acceleration Time	0~999 s	0.1 s	5 s
8		Deceleration Time	0~999 s	0.1 s	5 s
9		Electro Thermal	0~50 A	0.1 A	Constant output current(Note3)
30		Selection of the extended function display	0, 1	1	0
79		Selection of Run mode	0~4, 7, 8	1	0

(Notes)

1. The parameter of part can be changed during operation.
2. It is also available by the parameter that have a RS-485 communication function.
3. In case of less than 0.75 KW, it is 85 % of constant output current.
4. It is 5 % for FR-S540-1.5K, 2.2, 4 % for FR-S540-3.7K and 6 % for others.



Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

2. HS400 ATC Unit Extended Function

It is enabling to set an extended parameter as below by setting '1' at parameter #30.

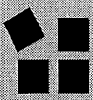
Parameter	Group	Name	
10	Standard Run Function	Operation Frequency of Direct current Control	
11		Operation Time of Direct current Control	
12		Voltage of Direct current Control	
13		Starting Frequency	
14		Selection of common Frequency	
15		JOG Frequency	
16		JOG Acc./Dcc. Time	
17		Selection of Run Key Rotating Direction	
19		Basic Frequency Voltage	
20		Acc/Dcc Reference Frequency	
21		Selection a Function of STALL Protecting	
22		Level of STALL Protecting Function	
23		Compensation constant for STALL Protecting Motion level during speed up.	
24		Multi-Speed setting(4 steps)	
25		Multi-Speed setting(5 steps)	
26		Multi-Speed setting(6 steps)	
27		Multi-Speed setting(7 steps)	
28		Frequency for starting Low-level of STALL Protecting Motion	
29		Acc/Dcc Pattern	
31		Frequency Jump 1A	
32		Frequency Jump 1B	
33		Frequency Jump 2A	
34		Frequency Jump 2B	
35		Frequency Jump 3A	
36		Frequency Jump 3B	
37		Display a Screen	
38		Frequency for setting voltage gain	
39		Frequency for setting current gain	
40		Selection of detecting a thunderstruck when starting	
41		Output Terminal Function	Motion Width of Frequency Arrival
42			Detection an Output Frequency
43			Detection an Output Frequency during reverse rotation



Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

Parameter	Group	Name	
44	The 2nd Function	The 2nd Acc./Dcc. Time	
45		The 2nd Dcc. Time	
46		The 2nd Torque Booster	
47		The 2nd V/F(Basic Frequency)	
48	Detection Current	Detection Level of Output Current	
49		Delay Time for Detection Signal of Output Current	
50		Detection Level of Zero Current	
51		Detection Time of Zero Current	
52	Display Function	Selection of Data for Operation Panel Display	
53		Selection of Setting and Operating for Frequency	
54		Selection a Function of FM Terminals	
55		Reference of Frequency Monitor	
56	Restarting	Reference of Current Monitor	
57		Restarting Free Run Time	
58		Restarting On Time	
59	Terminal Function	Selection of Remote Setting	
60		Selection a function of RL Terminal	Selected one of RL, RM, RH, AU, STOP, MRS, CH, REX, JOG, RES, X14, X16, STR signals. (STR signal available to distribute only when Pr.63)
61		Selection a function of RM Terminal	
62		Selection a function of RH Terminal	
63		Selection a function of STR Terminal	Selected one of RUN, SU, OL, FU, RY, Y12, Y13, FDN, FUP, RL and LF
64		Selection a function of RUN Terminal	
65	Selection a function of A,B,C Terminal		
66	Operation Selection Function	Selection of RE-TRY	
67		Collection of RE-TRY when alarm is occurred	
68		Waiting Time when RE-TRY is run	
69		Erase Display times of RE-TRY Run	
70		Setting of SOFT-RWM	
71		Application Motor	
72		Selection of PWM Frequency	
73		Selection of 0~5 V or 0~10 V	
74		Time constant of Input Filter	
75		Selection of Reset and PU stop	
76		Selection of run of Cooling Fan	
77	Selection of Parameter enabling to write		
78		Selection of Prevention of Reverse current	



Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

Parameter	Group	Name
80	Multiple Speed Operation Function	Multiple Speed Setting (8 steps)
81		Multiple Speed Setting (9 steps)
82		Multiple Speed Setting (10 steps)
83		Multiple Speed Setting (11 steps)
84		Multiple Speed Setting (12 steps)
85		Multiple Speed Setting (13 steps)
86		Multiple Speed Setting (14 steps)
87		Multiple Speed Setting (15 steps)
88	PID Control	Selection of PID Operation
89		PID proportion
90		PID Integral Time
91		PID Upper Limit
92		PID Lower Limit
93	PDI Control	PID Target Value when PU Operation
94		PID Differential Time
95	Slip Compensation	Motor Regular slip
96		Compensation Time Constant for Slip
97		Selection Slip Compensation in the regular Output
98		Selection of Auto Torque Booster(Motor Capacity)
99		The first resistance of Motor
n1		Communication Exchange number
n2	Communication /PU Function (Note2)	Communication Speed
n3		The length of Stop Bit
n4		Parity Check or not
n5		A number of communication Re-Try
n6		Interval of communication check time
n7		Setting a waiting time
n8		Motion Order
n9		Speed Order
n10		Selection of Link On
n11		Selection of CR·LF
n12	Communication /PU Function (Note2)	Selection of E2PROM write or not
n13		Control of PU Display Language
n14		Control of PU Buzzer Sound
n15		Adjustment of PU Contrast
n16		Selection of PU Main Screen Data
n17		PU Releasing Detection/PU Setting Lock
c1	Rectification Function	Rectification of FM Terminal
c2		Bias Frequency of setting voltage for Frequency



Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

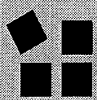
Parameter	Group	Name
c3	Rectification Function	Bias of setting voltage for Frequency
c4		Gain of setting voltage for Frequency
c5		Bias Frequency of setting current for Frequency
c6		Bias of setting current for Frequency
c7		Gain of setting current for Frequency
C8		Parameter for User's setting
CLr	Auxiliary Function	Clear Parameter
ECL		Clear history of alarm

Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

8.4 HS400 Data Table

BIT ADD	7	6	5	4	3	2	1	0	
K00	COMPLETION CALL 1: 有 0: 無	TOOL AIR BLOW 1: 有 0: 無	HANDLE INTERRUPT 1: 有 0: 無	ATC/APC POS.MOVE 1: X/Y/Z MOVING: 0: AFTER Z, XY MV.	WORK SETTER SAFETY GUARD 1: 有 0: 無	MANUAL ABSOLUTE 1: 無 0: 有	SP. HEAD MAKER 1: OMLAT 0: SHOWA / WIA		
K01	RESET AT SP. ROTATION 1: 有 0: 無	Y-AXIS MIRROR IMAGE 1: 有 0: 無	X-AXIS MIRROR IMAGE 1: 有 0: 無	B-AXIS AND Z-AXIS INTERLOCK 1: 有 0: 無	AXIS 5TH 1: 有 0: 無	主軸 回轉 方向 11: CCW 00: CW		MAN. SP. START 1: SP. CCW 0: SP. CW	
K02		PLAY BACK 1: 有 0: 無		FEEDHOLD AT MACHINE ERROR 1: 有 0: 無	WORK NO. SEARCH 1: 有 0: 無		CE 1: 有 0: 無	COOLANT STOP & M05 1: 有 0: 無	
K03	M00 / M01 FEED HOLD 1: 有 0: 無	F1-DIGIT FEED 1: 有 0: 無	THROUGH COOLANT 1: 有 0: 無	OIL HOLE COOLANT 1: 有 0: 無	GUN COOLANT 1: 有 0: 無	OIL MIST 1: 有 0: 無	JET COOLANT 1: 有 0: 無	RIGID TAP 1: 有 0: 無	
K04		CHIP CONV. START 0: M CODE/SW 1: MAINT (보수)	CHIP CONV. START 0: K4.6 SETTING 1: M-CODE	APC SIDE PALLET CHECK 1: 無 0: 有	ATC DOOR 1: 有 0: 無	AUTO DOOR 1: 有 0: 無	ATC POSITION Z-AXIS INTERLOCK 1: 無 0: 有	APC 1: 有 0: 無	
K05	PROGRAM RESTART 1: 有 0: 無	BLOCK RESTART 1: 有 0: 無	WEEKLY TIMER PROGRAM START 1: 有 0: 無	WEEKLY TIMER SP. STOP TIME 1: 有 0: 無		TOOL BROKEN 1: 有 0: 無	AUTO POWER CUT OFF 1: 有 0: 無	HEAVY TOOL 1: 有 0: 無	
K06	APC STABBY FIXTURE RELA. 1: 有 0: 無	HYD. MOTOR FOR FIXTURE 1: 有 0: 無	TOOL LIFE MANAGEMENT 1: 有 0: 無	ALARM BUZZER 1: 有 0: 無	1 deg. TABLE COM. 1: B COM. AFTER M- CODE COM. 0: B COMMAND	LUB. OIL LACK H/W CONTACT 1: A CONTACT 0: B CONTACT	ATC NOT ORIGIN HANDLE MODE INT. RELEASE 1: 有 0: 無	ATC NOT ORIGIN CYCLE START 1: 有 0: 無	
K07	APC PART FIXTURE UNCLAMP	MAX. MAGAZINE TOOL NO. SET		LUB. PRESSURE SHORTAGE H/W CONTACT 1: A CONTACT 0: B CONTACT	TOOL INDEX FIN. SP. TOOL NO. POT INDEX 1: 無 0: 有	MAG. MANUAL INDEX OPERATOR AT MAIN OPERATE BOX 1: 有 0: 無	M30 COM. AT MAG. INDEX 1: FINISH 0: AFTER INDEX	OPERATOR MANUAL DOOR 1: 有 0: 無	
		K07.6	K07.5						M/Z MAX TOOL
		0	0						40 本
		0	1						60 本
		1	0						90 本
1	1	120 本							



Error Code and Trouble Shooting

HYUNDAI-KIA MACHINE

BIT ADD	7	6	5	4	3	2	1	0
K08	APC POSITION 1: X/Y AXIS 無視 0: X/Y AXIS 2nd POS.		NC TABLE 1: 有 0: 無	CALL LIGHT(Y) 1: LAMP ON 0: LAMP FLIKER	APC STANDBY 강제 ON 1: 有 0: 無	CALL LIGHT 1: 3 STEP(Y,G,R) 0: 1 STEP(Y)	ALARM MESSAGE 1: 有 0: 無	LAMP CHECK 1: 有 0: 無
K09	TOOL DETECTION ENABLE 1: 有 0: 無	SP. STOP AT OVERLOAD 1: 有 0: 無	SP. STOP COM. DELAY 1: 有 0: 無	TOOL LIFE END ALERT SIGNAL 1: 有 0: 無	TOOL LIFE END SIGNAL ENABLE 1: 有 0: 無	CUTTING MONI. START AT NORMAL SIGNAL ON 1: 無 0: 有	CUT. MONITOR MODE 1: 자동 0: 관계 無	CUTTING MONITOR SYSTEM UNIT 1: 有 0: 無
KD10				Z AXIS TEMP. COMPENSA TION 1: 有 0: 無	Y AXIS TEMP. COMPENSA TION 1: 有 0: 無	SENSOR TEMP. TRANSFER (2sec) 1: 有 0: 無	TEMPERAT URE COMPENSA TION 1: 有 0: 無	TOOL SETTER 1: 有 0: 無

HYUNDAI-KIA MACHINE

Chapter 9

Alarm Message and Solution





2000 AIR PRESSURE ALARM

Cause:

- ALARM occurs in case that the air pressure goes down under the standard value.
- Malfunction of the pressure switch
- Fault in the wiring

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on
- Spindle stops

Actions:/Procedures:

- Supply the air pressure according to regular value properly.
- Adjust the pressure by turning adjustment bolt placed on the upper side of pressure switch.
- If contact point of X2.3(AIR PRESSURE CHECK) doesn't turn on when the pressure is set according to regular value, check the wiring

Solution:

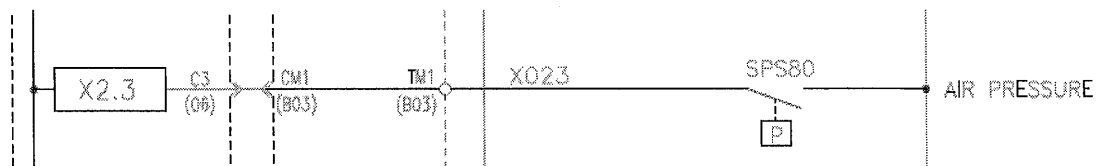
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X2 => Search

X02	7	6	5	4	3	2	1	0
	1							

If input signal, X2.3 becomes 1, this means normal state.

- Confirming the electric Diagram



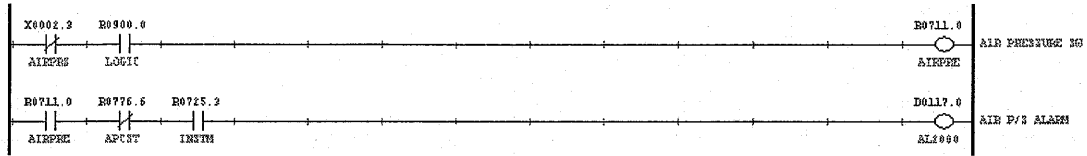
Check the signal X2.3 and switch SPS80.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



ALARM occurs in case that the air pressure is not a regular level. If ALARM occurs, the machine stops and if air pressure becomes normal state, ALARM disappears automatically.



2001 HYD. MOTOR OVERLOAD

Cause:

- OCR(QM1) has been tripped due to over-current flowed into the motor result from overload of the HYD. motor
- Malfunction of the THERMAL RELAY
- Phase missing of 3 phase power source and Faults in the wiring.

Condition:

- NOT READY
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

Warning
<ol style="list-style-type: none"> 1. Check the wiring after shut off power source 2. There is possibility of motor damage in case of continuous THERMAL RELAY trip. After inspecting the below-mentioned facts certainly, remove the reason of overload before operation.

- Turn QM1 on in electrical box, and then inspect the resistance of QM10 between each terminal with TESTER. In case that electrical current has been blocked, exchange the THERMAL RELAY or auxiliary contact point unit.
- Examine the R,S,T phase of oil pressure motor.
- May you have trouble after following above referred inspection, check the contact point of input signal X1.3

Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

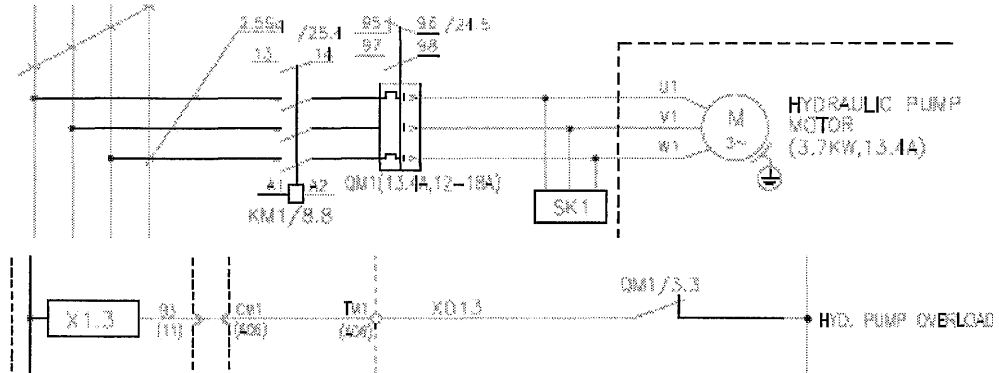
X01	7	6	5	4	3	2	1	0
	1							

If input signal, X1.3 is displayed as 1, this means normal state.



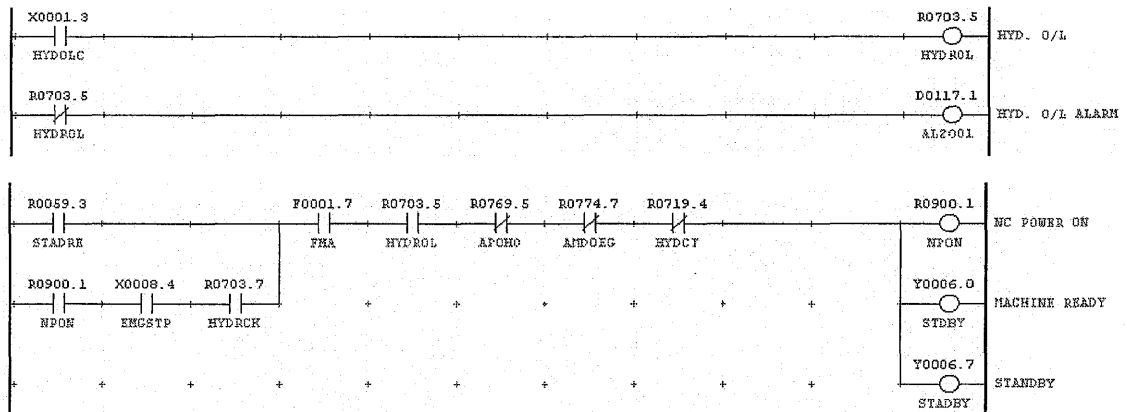
Alarm Message and Solution

- Confirming the electric Diagram



Check the capacity of magnet switch and status of the motor.

- Confirming the PMC



NC is not on stand-by unless X1.3 becomes "ON" state,



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2002 LUB. PRESSURE CHECK ERROR AT LUB. MOTOR ON

Cause:

- Pressure of lubrication pump is set below regular value.
- Fault in the wiring.
- DATA TABLE setting is not input or an error in the table.

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- When a lubrication pump operates, set the air pressure as regular value by turning the adjustment bolt.
- Check the wiring unless contact point of X1.2 switches properly when the pressure is set according to the regular value.

Solution:

-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

X01	7	6	5	4	3	2	1	0
	1(0)							

Check the input signal X1.2 whether it is displayed as 1(or 0).

- Confirming the electric Diagram

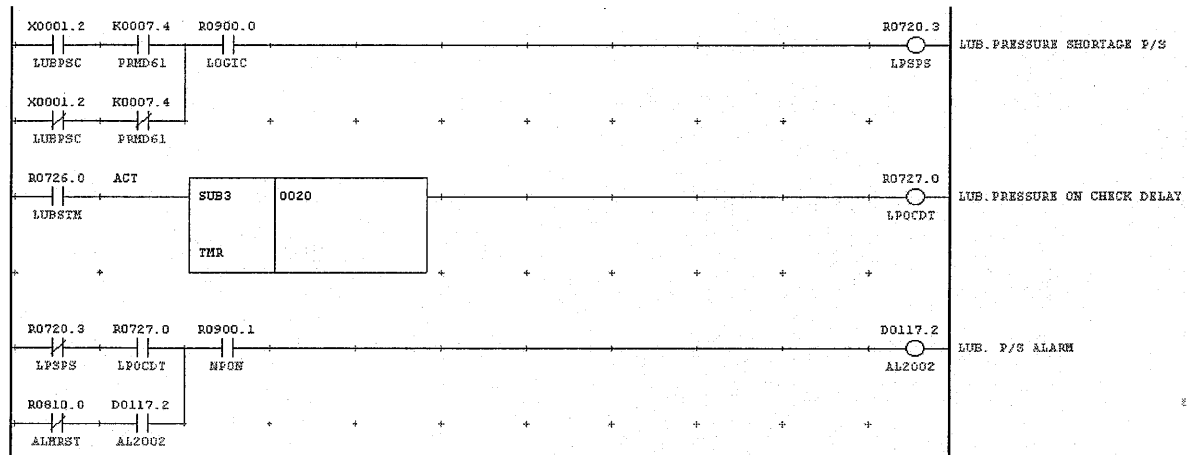




Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



Alarm occurs in case that the lubrication pressure signal (X1.2) isn't checked during 6 sec set at TIMER No.20 after lubrication pump operates.



2003 LUB. OIL LACK ALARM

Cause:

- Lack of lubrication oil in LUB unit.
- Trouble of FLOAT SWITCH in LUB unit.
- Fault in the wiring
- DATA TABLE setting value error

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Fill up the oil in the lubrication pump and then clear the ALARM sign with pressing the reset button.
- If contact point of X1.1 isn't shown as 1(or 0) after filling up oil shortage, check the wiring or exchange the unit.

Solution:

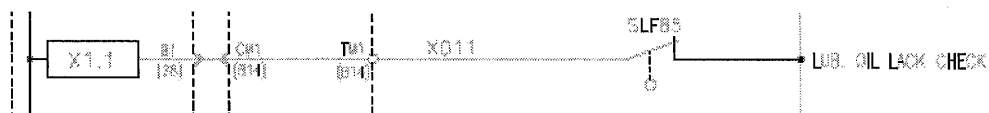
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

X01	7	6	5	4	3	2	1	0
	1(0)							

Input signal X1.1 should be displayed 1 in normal state.

- Confirming the electric Diagram

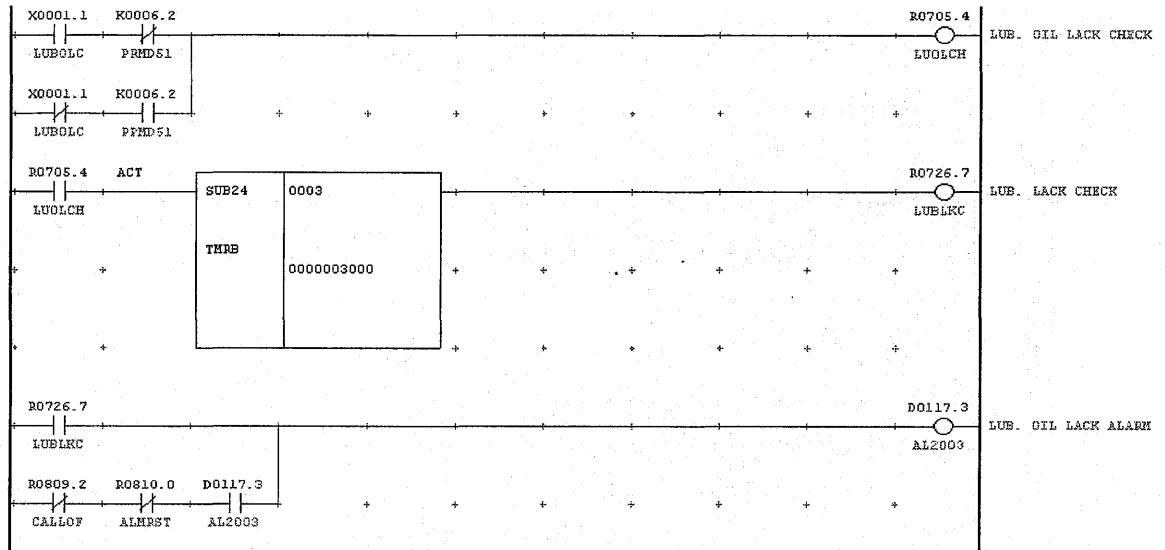




Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



Alarm occurs in case that the LUB OIL LACK signal X1.1 has been kept ON state over 3 seconds after start of the lubrication motor.



2004 TOOL POT EXIST AT POT MAGAZINE SIDE COMMAND ERROR

Causes:

- In case of issuing the MAGAZINE SIDE command, a TOOL POT is already occupied in the CHAIN
- Malfunction of the sensor for checking the MAGAZINE POT
- MAGAZINE COUNT ERROR
- Wrong operation of stand-by TOOL POT number setting

Conditions:

- Alarm Lamp in operation panel is on
- ATC operation halts
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Examine the sensor for checking MAGAZINE TOOL POT and check the wiring (X8.0)
- Compare the MAGAZINE COUNTER and standby TOOL number with present values, And in case that a trouble happens, set the values rightly.

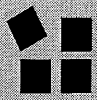
Solutions:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

X08	7	6	5	4	3	2	1	0
	0							

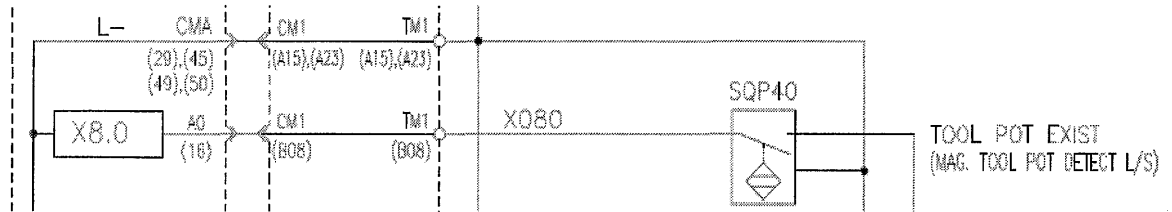
Check if input signal X8.0 becomes '0'.



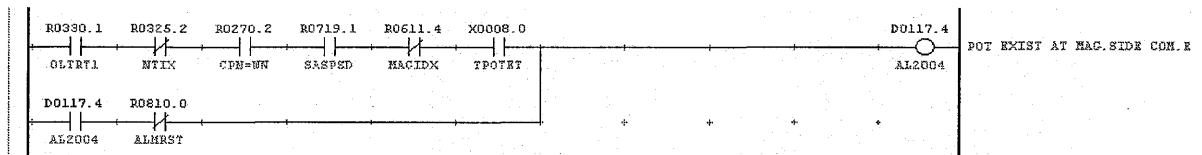
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2005 STANDARD COOLANT OVERLOAD ALARM

Causes:

- OCR(QM3) have been tripped due to over-current resulted from overload of STANDARD COOLANT
- Malfunction of THERMAL RELAY
- Phase missing of 3 phase power source and Faults in the wiring
- Error of current setting value

Conditions:

- Alarm Lamp in operation panel is on
- Unable to operate CYCLE START
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

Warning	
3.	Check the wiring after shut off power source.
4.	There is possibility of motor damage in case of continuous THERMAL RELAY trip. After inspecting the below-mentioned facts certainly, remove the reason of overload before operation.

- Turn on QM3,7,9 in electrical box, and then inspect the resistance of QM3,7,9 between each terminal with TESTER. In case that electrical current has been blocked, exchange the THERMAL RELAY or auxiliary contact point unit.
- Examine the R,S,T phase of ATC motor.
- May you have trouble after following above referred inspection, check the contact point of input signal X1.4

Solutions:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

X01	7	6	5	4	3	2	1	0
	1							

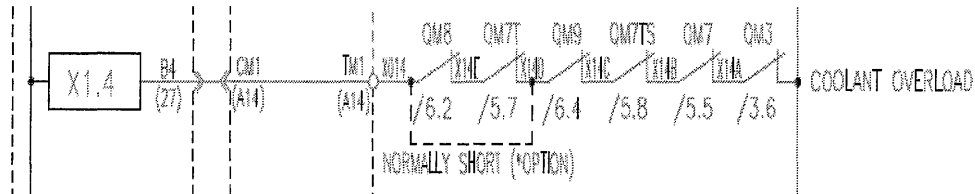
Check the input signal X1,4 to see if it's displayed as "1"



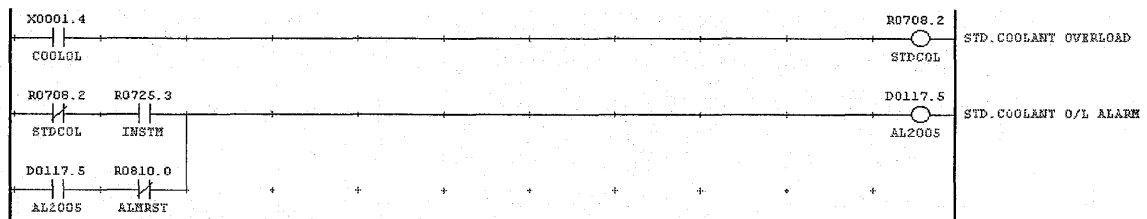
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC



In case that OCR(QM3) is tripped when a magnet for the STANDARD COOLANT MOTOR turns 'ON', check the setting value, then reset and restart the machine.



2006 TF ARM ERROR

Causes:

- T-CODE has been issued when ATC TWIN ARM is not in position.
- Malfunction of the sensor for checking the position of ATC TWIN ARM (Malfunction of the encoder)
- Fault in the Data(D158, D160) setting for home position region of ATC TWIN ARM

Conditions:

- Alarm Lamp in operator panel is on
- ATC operation halts
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- Place the ATC TWIN ARM in the reference position and issue the T-CODE.
- Examine the sensor for checking ATC TWIN ARM(Encoder) in position and check the wirings. (X10..0~X10.7and X11.7)
- D158,D160 and D182 are the data for placing ATC TWIN ARM in position. Compare the initially set data value(D158,D160) with the present data value(D182). And then modify the present data(D182) if the present values are out of the initially set value. (Present value should not exceed the range of initially set one.)

Solution

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X10 => Search

	7	6	5	4	3	2	1	0
X10								
X11								

Check the variation of contact point of the input signal X10.0~X10.7,X11.7.

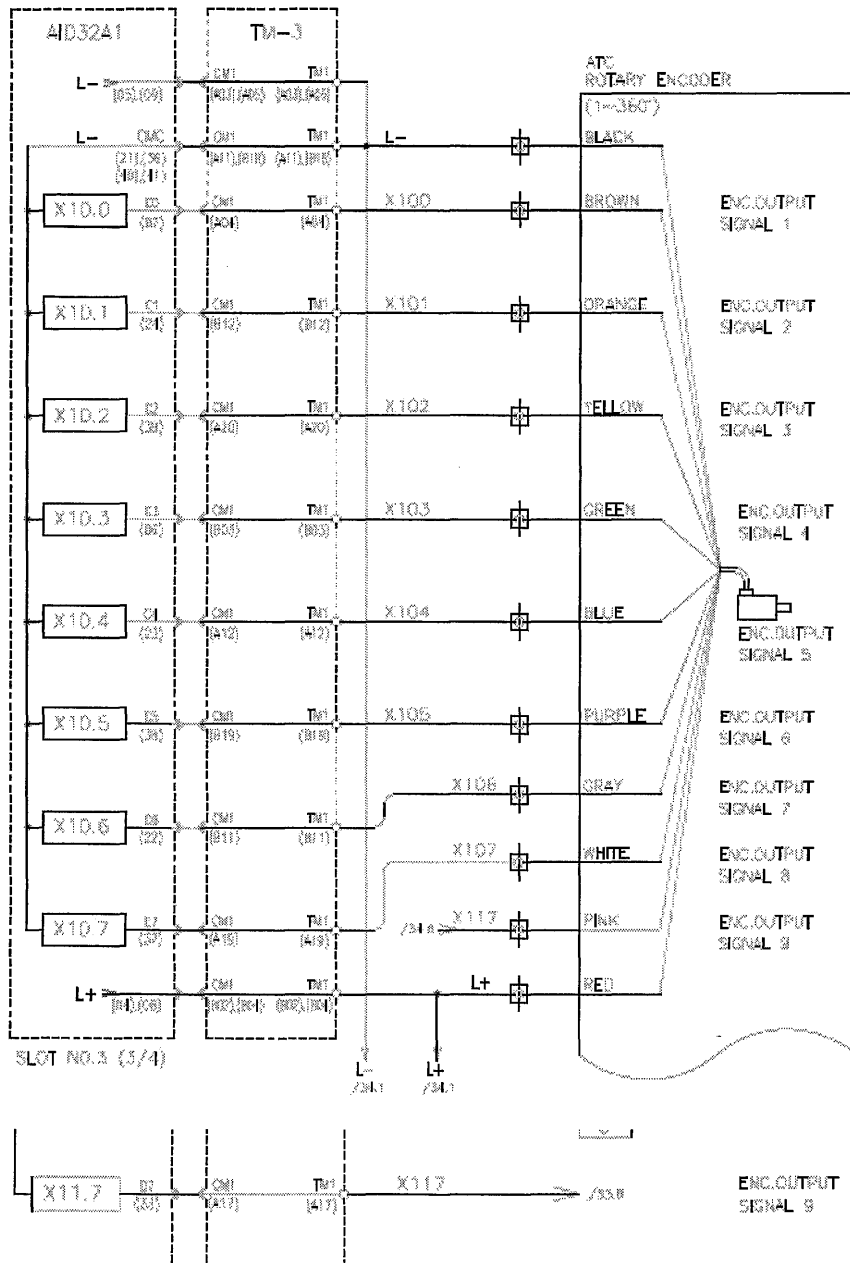
Unless the variation of contact point occurs regularly, exchange the encoder for ATC TWIN ARM with new one.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram





2007 AC100V/DC24V TRIP

Causes:

- CP(QF3, QF4) have been tripped due to the fault current flowed into AC 100V line and 28V line.
- Malfunction of the CP(circuit protector).
- Fault in the wiring

Conditions:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

Warning	
Check the wiring, after make it sure to shut the power source off in any case	

- After shut off the power source, check if there is short circuit with tester.
- After shut off the power source, check the malfunction of CP.
- May you have trouble after following above referred inspection, check the contact point of input signal X1.6.

Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X9=> Search

X01	7	6	5	4	3	2	1	0
	1							

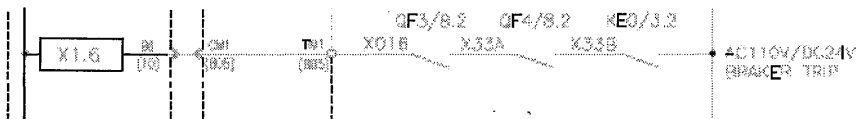
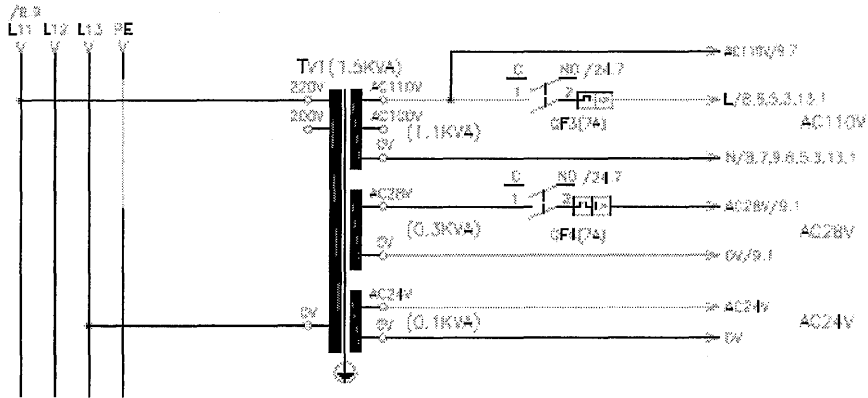
If input signal, X1.6 becomes 1(ON), this means normal state.



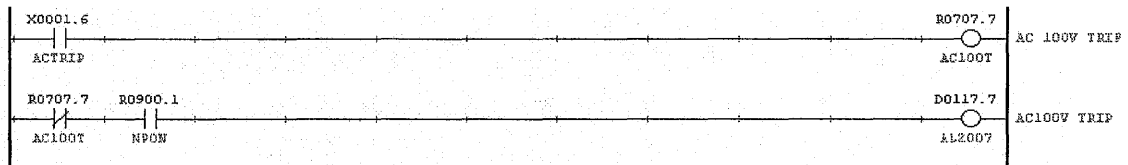
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC



If CP has been tripped, X9.6 signal becomes off and alarm occurs.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2008 SPINDLE COOLING ALARM

Cause:

- Operational power source of SPINDLE COOLING Unit is not applied normally.
- Alarm occurs because SPINDLE COOLING UNIT is out of order itself.
- Fault in the wiring

Condition:

- Alarm Lamp in operation panel is on
- All axes INTERLOCK and unable to rotate the spindle
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

Warning
Check the wiring after shut off the power source.

- Check if the each 3 phase voltage between cooling units is 220 volt in case of main power is applied.
- May you have trouble after following above referred inspection, check the contact point of input signal X1.0.

Solution:

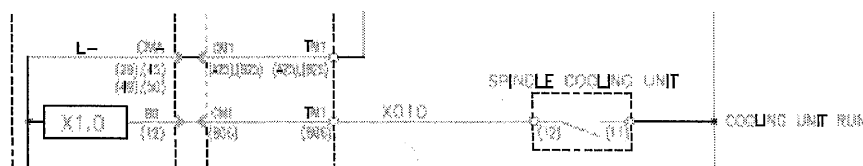
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1=> Search

X01	7	6	5	4	3	2	1	0
								1

In case of turning on the power, X1.0 Signal should be "1" normally.

- Confirming the electric Diagram

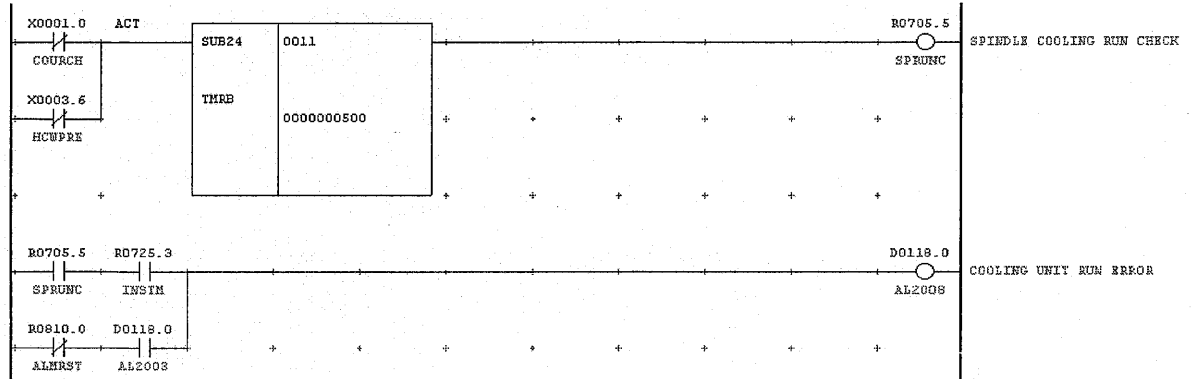




Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



ALARM occurs if error signal of cooling unit continues over 0.5 second



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2009 WORK COUNT FINISH

Causes:

- Count reaches it's limitation value.

Conditions:

- Lighting on a Alarm Lamp in operator panel
- Lighting on a FEED HOLD in operator panel
- Lighting on a CALL LIGHT and BUZZER

Actions:/Procedures:

- Release the Alarm with pressing the RESET button in WORK COUNT UNIT and then reset the setting value of COUNT.
- Reset the internal NC process count.

Solution:

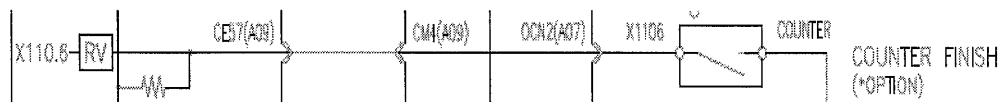
-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X110 => Search

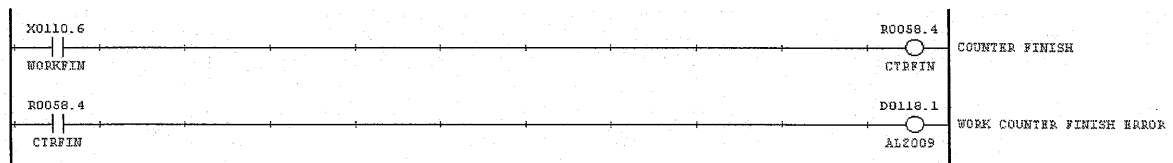
X110	7	6	5	4	3	2	1	0
	0							

If the X110.6 becomes 0, that means normal state.

- Confirming the electric Diagram



- Confirming the PMC



Alarm occurs in case that the counter reaches its setting value.



2010 SCREW CHIP CONVEYOR MOTOR OVERLOAD

Causes:

- OCRs(QM5,6) have been tripped due to over-current resulted from overload of SCREW CHIP COVEYOR motor.
- Wrong input of THERMAL RELAY SETTING value(1.2A)
- Phase missing of 3 phase power source and Faults in the wiring of the contact point.

Conditions:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

Warning	
5.	Check the wiring after shut off power source.
6.	There is possibility of motor damage in case of continuous THERMAL RELAY trip. After inspecting the below-mentioned facts certainly, remove the reason of overload before operation.

- Turn QM5,6 on in electrical box, and then inspect the resistance of QM5,6 between each terminal with TESTER. In case that electrical current has been blocked, exchange the THERMAL RELAY or auxiliary contact point unit.
- Examine the R,S,T phase of ATC motor.
- May you have trouble after following above referred inspection, check the contact point of input signal X1.5(Normal ON)
- Check the DATA TABLE SETTING value

Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

X01	7	6	5	4	3	2	1	0
	1							



2012 TOOL CLAMP ERROR

Causes:

- ORT(M19) or ATC operation(M06) command is executed when a TOOL is not clamped.
- Malfunction of the proximity switch for TOOL UNCLAMP.
- Fault in the wiring

Conditions:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Clear Alarm with the reset button and CLAMP the TOOL CLAMP switch at MAINTENANCE MODE and then execute the ORT command or ATC operation.
- Check the malfunction of the proximity switch for TOOL CLAMP and UNCLAMP.
Check the ON/OFF state of the TOOL CLAMP(X3.4 or No TOOL X3.4 and X3.3) and UNCLAMP(X3.5) signal.

Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X3=> Search

X03	7	6	5	4	3	2	1	0
			0	1	0(1)			

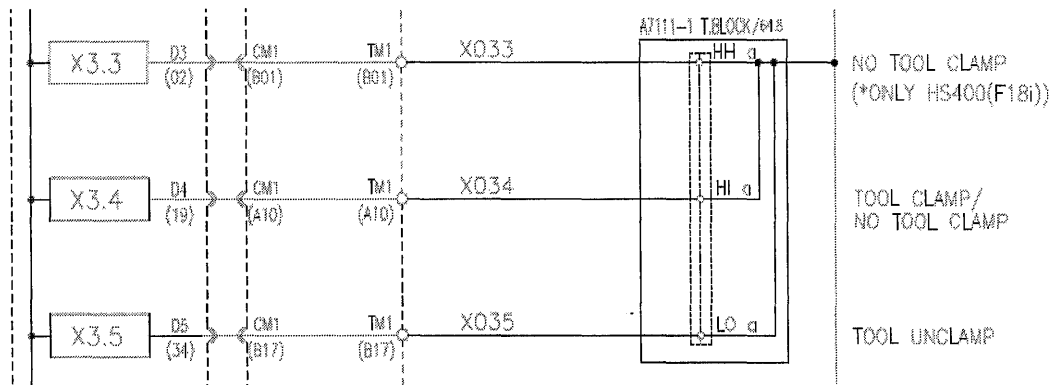
In case of normal operation, input signal X3.5 is OFF(0) and X3.4 or X3.5 is ON(1) state.



Alarm Message and Solution

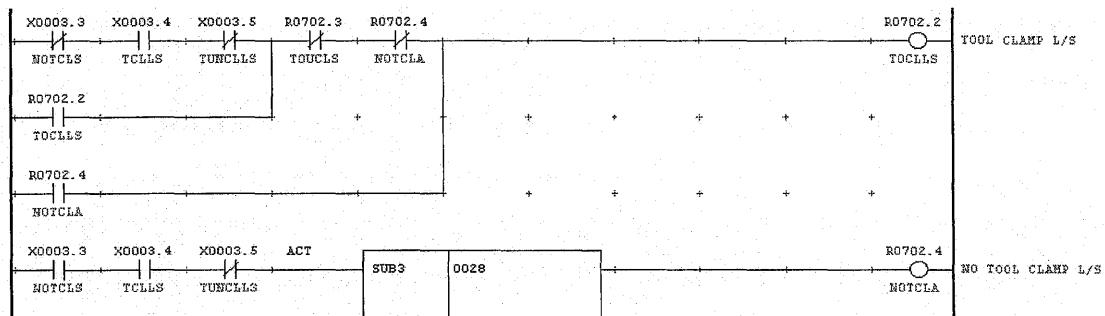
HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



Test and confirm the manipulation of SWITCH at manual mode and operation in auto mode

- Confirming the PMC



In case that TOOL CLAMP signal (X3.4) becomes OFF; namely, in TOOL UNCLAMP state, ALARM occurs when ORT command such as M19(ORT)&M06(ATC CHANGE) has been used. Therefore, it needs to check TOOL CLAMP(X3.4) status



2013 ATC ARM ORIGIN ERROR

Causes:

- ORT order (M19) or ATC operation (M06) has been executed when the ATC TWIN ARM is not in position.
- Malfunction of the sensor for checking the position of ATC TWIN ARM (Malfunction of the encoder)
- Faulty Data(D158, D160) setting for position of ATC TWIN ARM

Conditions:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- Place the ATC TWIN ARM in position and then execute the ORT command(M19) or ATC operation(M06)
- Examine the sensor for checking ATC TWIN ARM in position and check the wirings. (X10..0~X10.7and X11.7)
- D158,D160 and D182 are the data for placing ATC TWIN ARM in position. Compare the initially set data value(D158,D160) with the present data value(D182). And then modify the present data(D182) if the present values are out of the initially set value. (Present value should not exceed the range of initially set one.)

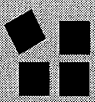
Solution

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X10 => Search

X10	7	6	5	4	3	2	1	0
X11								

Check the variation of contact point of the input signal X10.0~X10.7,X11.7.

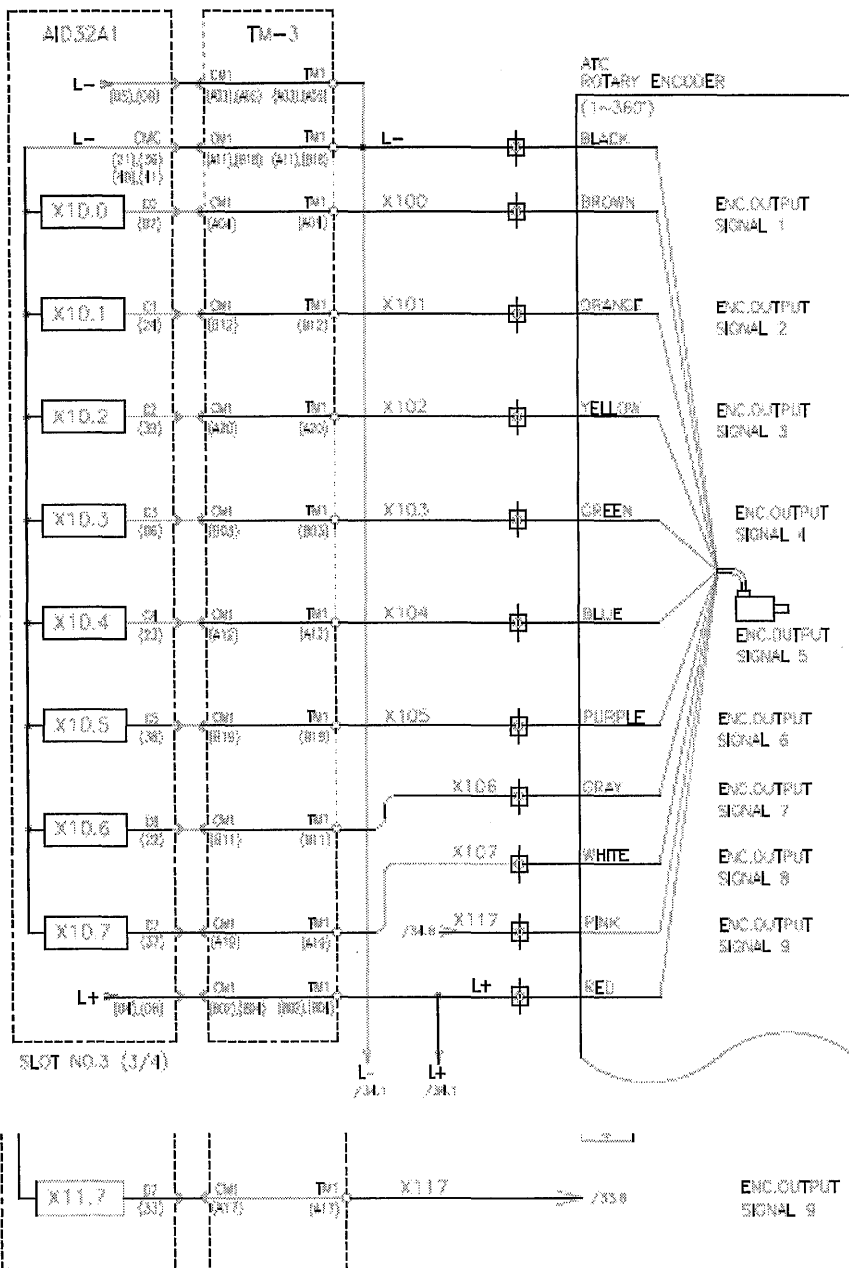


Alarm Message and Solution

HYUNDAI-KIA MACHINE

Unless the variation of contact point occurs regularly, exchange the encoder for ATC TWIN ARM with new one.

- Confirming the electric Diagram





2016 SP. THROUGH COOLANT FILTER ERROR

Cause:

- A filter or pressure switch in the unit isn't activated when the spindle through coolant motor operates.

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Check the COOL JET UNIT

Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

	7	6	5	4	3	2	1	0
X1	0							
X2				0				

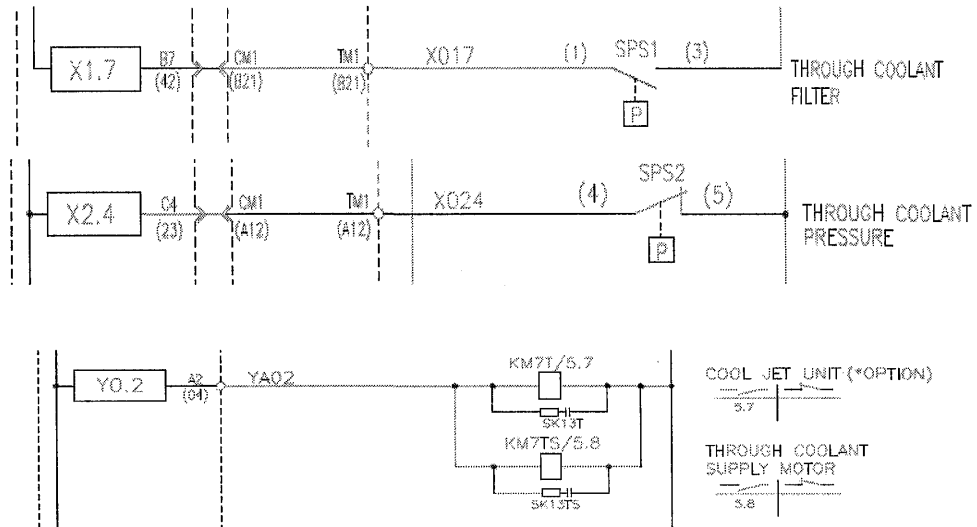
X1.7 and X2.4 should be displayed as "0" in normal condition



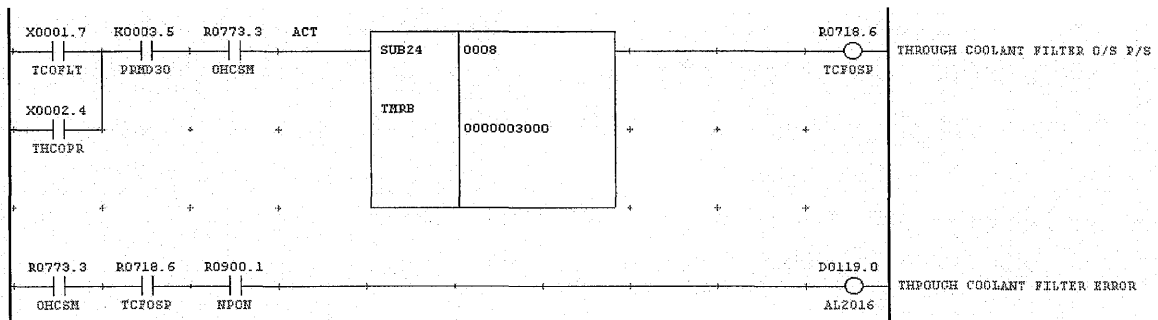
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC



A filter for cool jet unit isn't activated in 3 seconds when coolant motor operates. In this case, alarm occurs



2017 NO S-CODE SP. START ERROR

Cause:

- When spindle rotation command is used at auto-mode, spindle doesn't rotate. Because the strobe signal SF in S code is not output.

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Inspect the breakdown of spindle motor and wiring between the AMPs
- Check whether the PMC G4.3(FIN) signal is output.
- Check strobe signal SF(F7.2) and distribution completion signal (F1.3). In case of signals are not output, check ST(G7.2) and *SP signals too.

Solution:

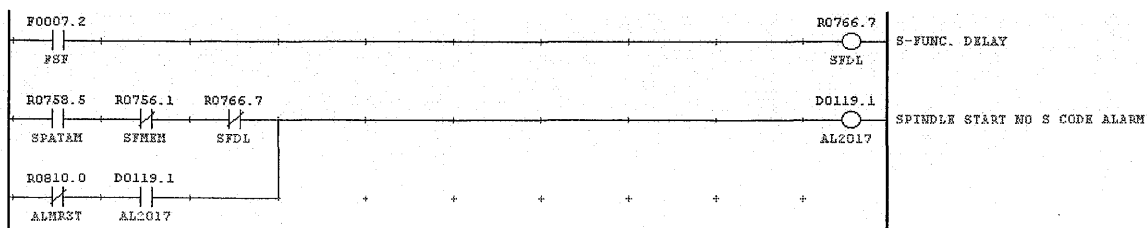
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>F7=> Search

F07	7	6	5	4	3	2	1	0
	1							

When rotation command is used, F7.2 becomes 1 in normal condition.

- Confirming the PMC



Alarm occurs if F7.2 signal is OFF state while S code command has been used in auto mode.



2018 ATC ARM ORIGIN SPINDLE START ERROR

Cause:

- Spindle rotation command is issued(M03, M04) in case that the ATC TWIN ARM is not in position.
- Malfunction of the sensor for checking the reference position of ATC TWIN ARM (Malfunction of the encoder)
- Fault in the Data (D158, D160) setting for reference position region of ATC TWIN ARM

Conditions:

- Alarm Lamp in operation panel is on
- ATC operation halts
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Place the ATC TWIN ARM in position and then issue the spindle rotation command.
- Examine the sensor for checking ATC TWIN ARM in position and check the wirings. (X10..0~X10.7and X11.7)
- D158,D160 and D182 are the data for placing ATC TWIN ARM in position. Compare the initially set data value(D158,D160) with the present data value(D182). And then modify the present data(D182) if the present values are out of the initially set value. (Present value should not exceed the range of initially set one.)

Solution

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X10 => Search

	7	6	5	4	3	2	1	0
X10								
X11								

Check the contact point change of the input signal X10.0~X10.7,X11.7.

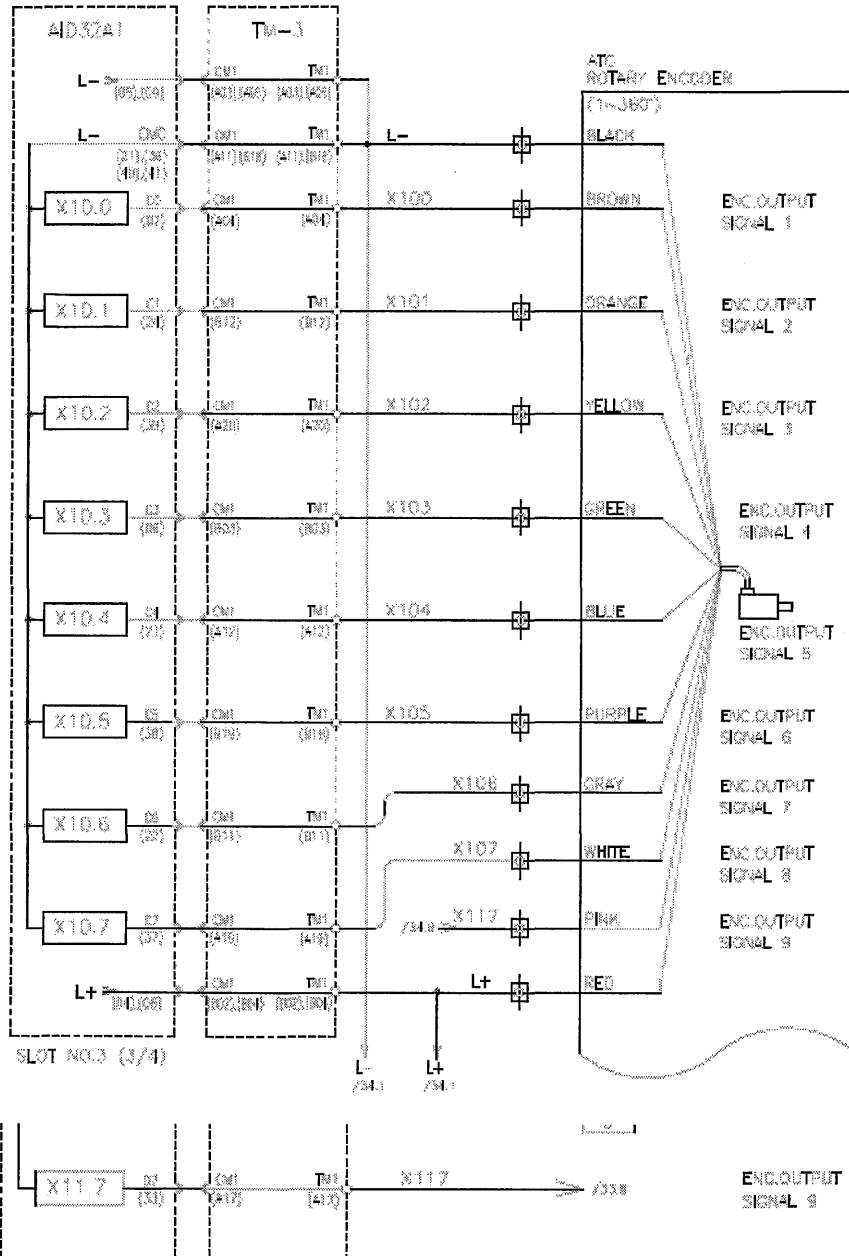
Unless the contact point changes regularly, exchange the encoder for ATC TWIN ARM.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram





2019 TOOL CLAMP/NO TOOL CLAMP SPINDLE START ERROR

Cause:

- Not under TOOL CLAMP state, Spindle rotation command has been issued.
- Malfunction of the proximity switch for TOOL CLAMP and UNCLAMP.
- Fault in the wiring

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Clear Alarm with the reset button and CLAMP the TOOL CLAMP switch at MAINTENANCE MODE and then execute the ORT command or ATC operation.
- Check the malfunction of the proximity switch for TOOL CLAMP and UNCLAMP.
Check the ON/OFF state of the TOOL CLAMP(X3.4 or No TOOL X3.4 and X3.3) and UNCLAMP(X3.5) signal.

Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X3=> Search

X03	7	6	5	4	3	2	1	0
	0 1 0(1)							

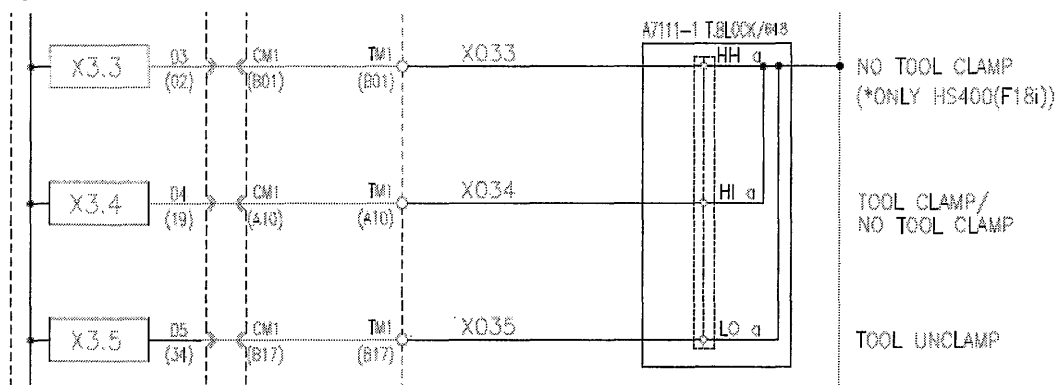
In case of normal operation, input signal X3.5 is OFF(0) and X3.4 or X3.5 is ON(1) state.



Alarm Message and Solution

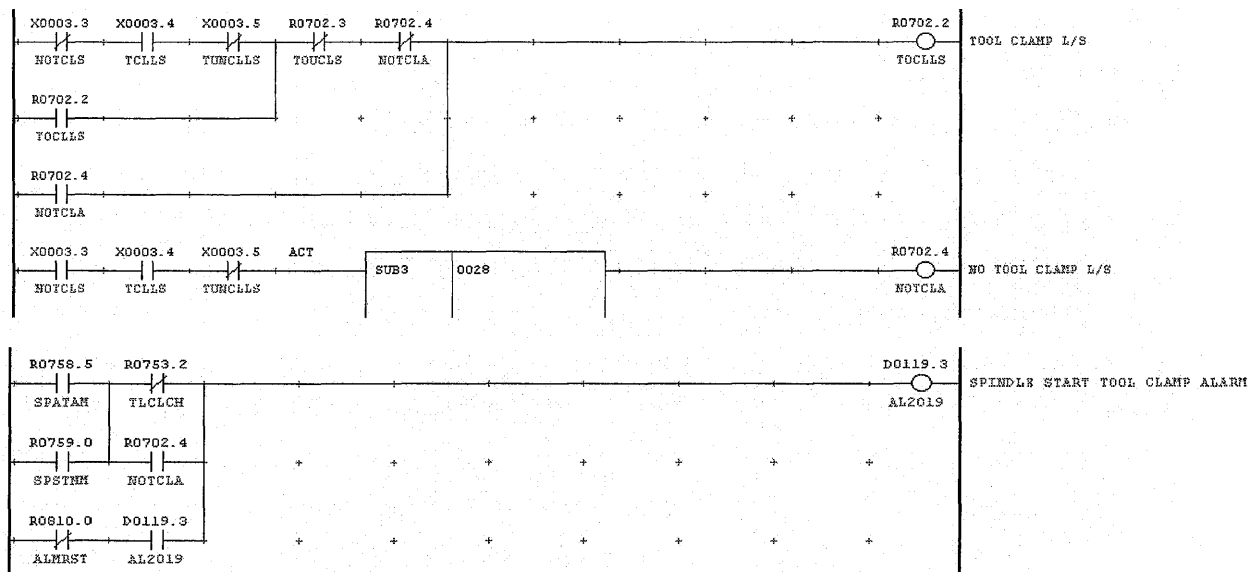
HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



Test and confirm the manipulation of SWITCH at manual mode and operation in auto mode

- Confirming the PMC



In case of TOOL CLAMP signal (X3.4) becomes OFF; namely, in TOOL UNCLAMP state, ALARM occurs when ORT command such as M19(ORT)&M06(ATC CHANGE) has been used. Therefore, it needs to check TOOL CLAMP(X3.4) status



2020 ATC ARM ORIGIN SPINDLE ROTATION ERROR

Cause:

- A spindle rotation command is issued in case ATC TWIN ARM is not in position.
- Malfunction of the sensor for checking the position of ATC TWIN ARM (Malfunction of the encoder)
- Fault in the Data(D158, D160) setting for position region of ATC TWIN ARM

Conditions:

- Alarm Lamp in operation panel is on
- ATC operation halts
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Place the ATC TWIN ARM in position and then execute the ORT command(M19) or ATC operation(M06)
- Examine the sensor for checking ATC TWIN ARM in position and check the wirings. (X10..0~X10.7and X11.7)
- D158,D160 and D182 are the data for placing ATC TWIN ARM in position. Compare the initially set data value(D158,D160) with the present data value(D182). And then modify the present data(D182) if the present values are out of the initially set value. (Present value should not exceed the range of initially set one.)

Solution

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X10 => Search

X10	7	6	5	4	3	2	1	0
X11								

Check the contact point change of the input signal X10.0~X10.7,X11.7.

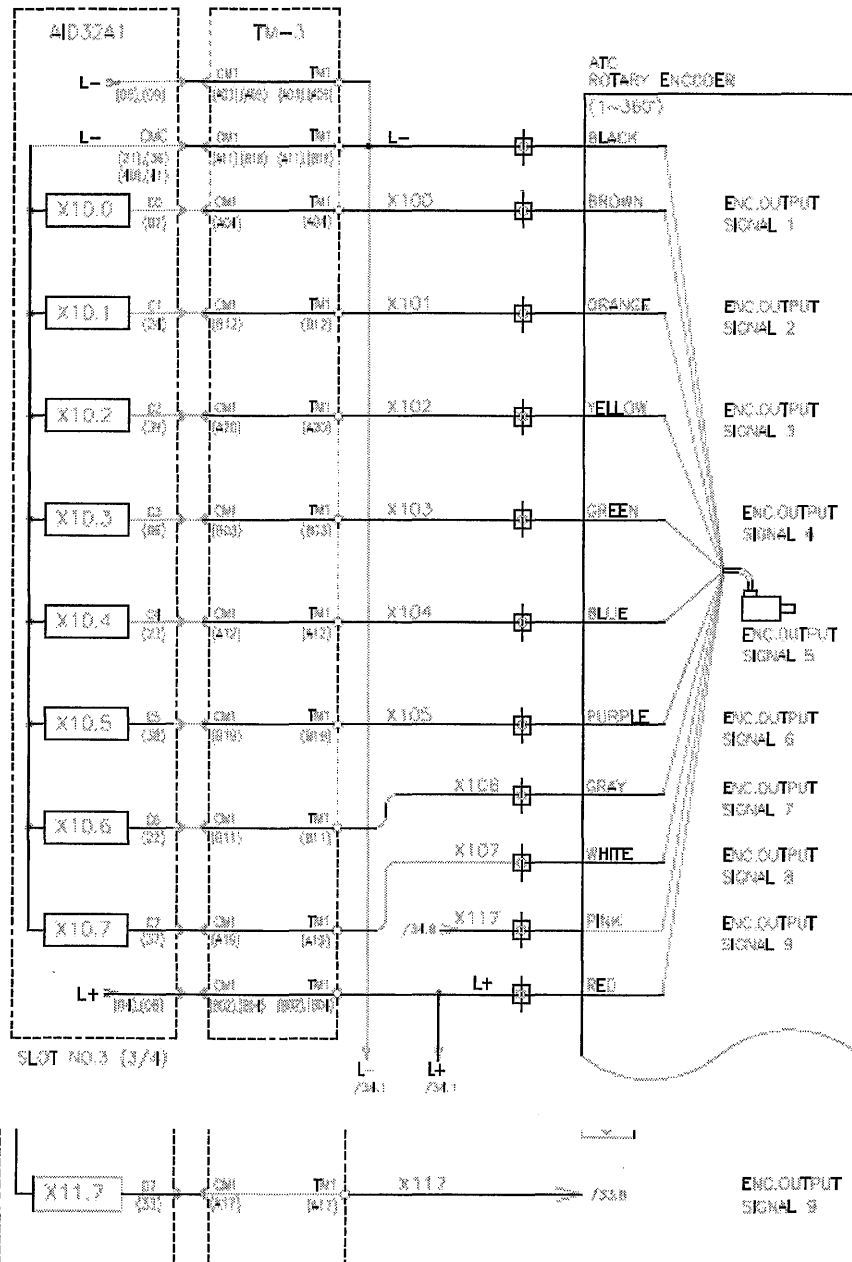
Unless the contact point changes regularly, exchange the encoder for ATC TWIN ARM.

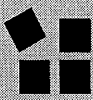


Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram





2021 TOOL CLAMP/NO TOOL CLAMP SPINDLE ROTATION ERROR

Causes:

- ORT(M19) or ATC operation(M06) command is executed when it's not the TOOL CLAMP condition.
- Malfunction of the proximity switch for TOOL UNCLAMP.
- Fault in the wiring

Conditions:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Clear Alarm with the reset button and CLAMP the TOOL CLAMP switch at MAINTENANCE MODE and then execute the ORT command or ATC operation.
- Check the malfunction of the proximity switch for TOOL CLAMP and UNCLAMP. Check the ON/OFF state of the TOOL CLAMP(X3.4 or No TOOL X3.4 and X3.3) and UNCLAMP(X3.5) signal.

Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X3=> Search

X03	7	6	5	4	3	2	1	0
	0 1 0(1)							

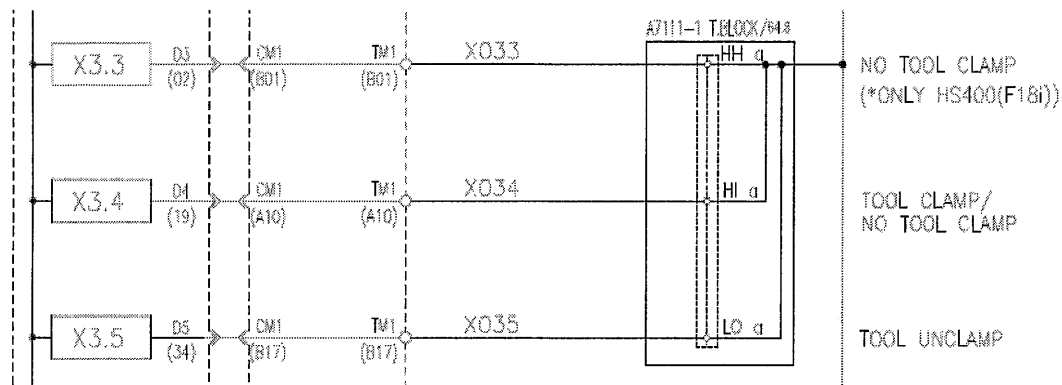
In case of normal operation, input signal X3.5 is OFF(0) and X3.4 or X3.5 is ON(1) state.



Alarm Message and Solution

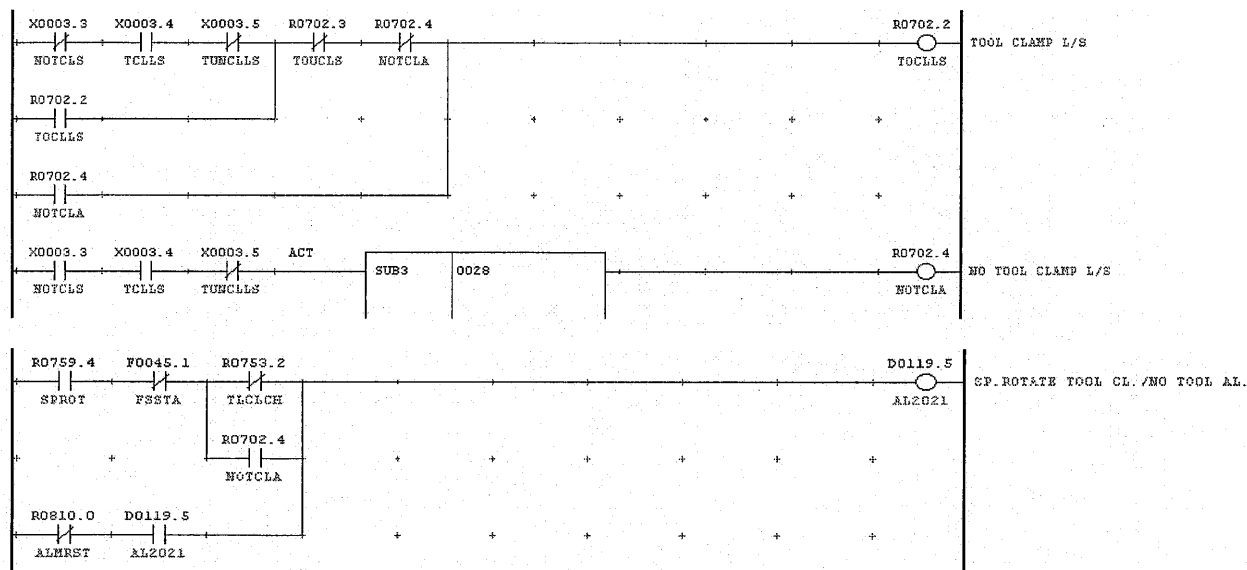
HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



Test and confirm the manipulation of SWITCH at manual mode and operation in auto mode.

- Confirming the PMC



In case of TOOL CLAMP signal (X3.4) becomes OFF; namely, in TOOL UNCLAMP state, ALARM occurs when ORT command such as M19(ORT)&M06(ATC CHANGE) has been used. Therefore, it needs to check TOOL CLAMP(X3.4) status



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2022 SPINDLE OIL AIR PRESSURE ERROR

Cause:

- Spindle rotation command is issued in case that the pressure switch doesn't operate after several seconds has been passed from the start of solenoid operation for OIL AIR
- Fault in the wiring.

Conditions:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Check the wiring if the AIR PRESSURE switch and X3.7 contact point don't operate after the operation of the OIL AIR SOL.

Solution

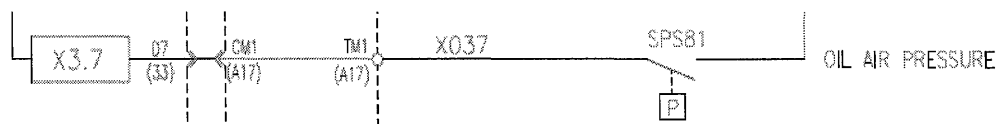
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X3 => Search

X03	7	6	5	4	3	2	1	0
	1							

Check if input signal X3.7 becomes '1'.

- Confirming the electric Diagram

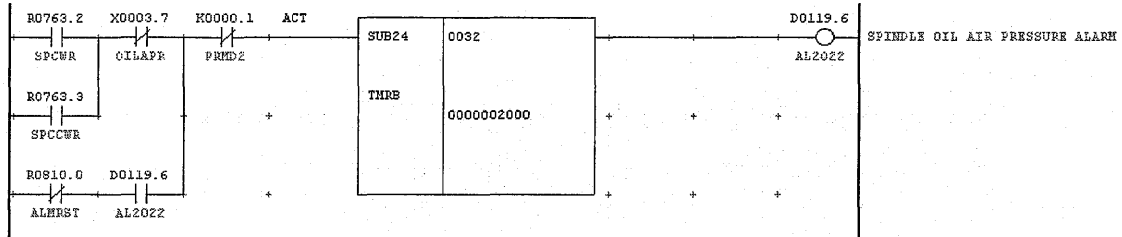


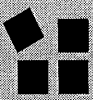


Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC





2023 AIR BLOW SPINDLE ROTATION ERROR

Cause:

- Spindle rotation command is issued during the AIR BLOW SOL for measuring is in the middle of operation.
- Fault in the wiring.
- MISS of the processing program

Conditions:

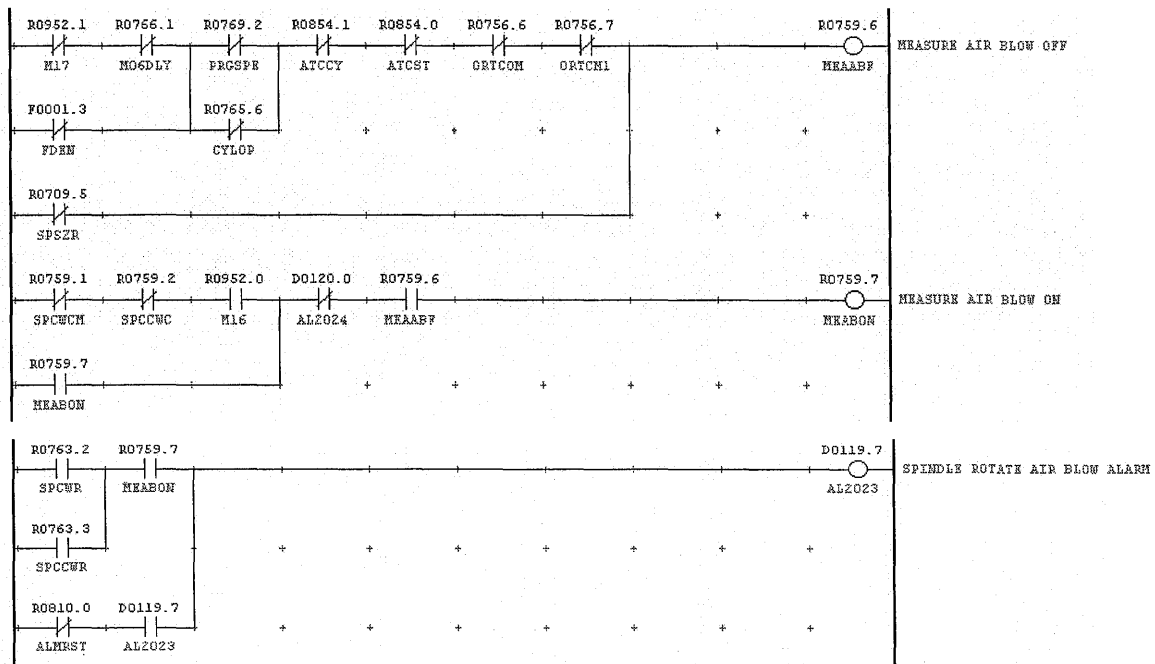
- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Cancel the ALARM with the RESET button and then execute spindle rotation command after stop the AIR BLOW SOL for measuring(M17)

Solution:

- Confirming the PMC





2024 MEASUREMENT AIR BLOW COMMAND ERROR

Cause:

- Spindle rotation command is issued during the AIR BLOW SOL for measuring is in the middle of operation.
- MISS of the processing program

Conditions:

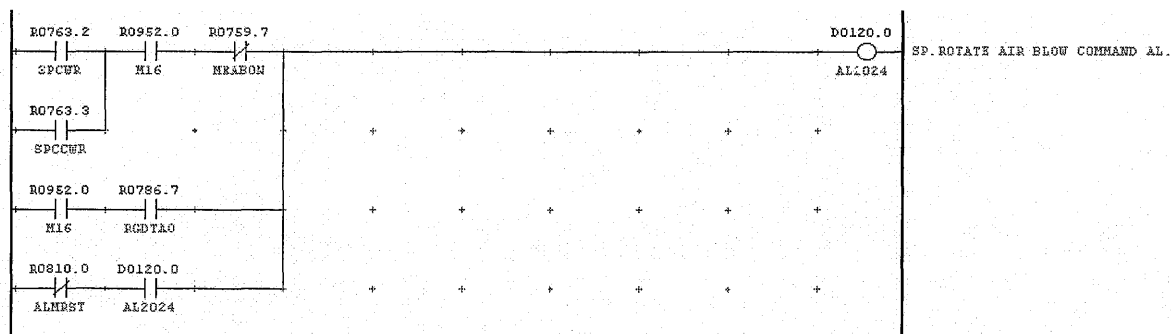
- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

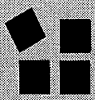
Actions:/Procedures:

- Cancel the ALARM with the RESET button and then execute the AIR BLOW SOL for measuring(M17) after stop the spindle rotation after stop

Solution:

- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2025 SPINDLE UNIT ALARM

Cause:

- Spindle has been stopped due to Alarm occurring at SPINDLE AMP and SPINDLE

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Check the information displayed in SPINDLE AMP LED and follow direction of FANUC instruction and maintenance manual.
- Terminate the cause of ALARM and clear ALARM with RESET button.

Solution:

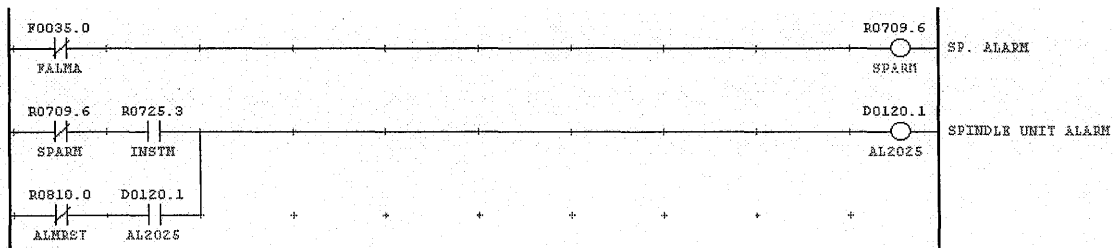
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>F45=> Search

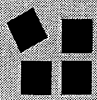
F45	7	6	5	4	3	2	1	0

F45.0 is '0' in normal condition.

- Confirming the PMC



If SPINDLE ALARM signal F45.0 becomes OFF, ALARM occurs.



2026 OPTION COOLANT OVERLOAD ALARM

Cause:

- OCR(QM7T or QM8) has been tripped due to over-current flowing resulted from overload of the option COOLANT pump motor.
- Malfunction of THERMAL RELAY
- Phase missing of 3 phase power source and Faults in the wiring
- Current setting value error

Conditions:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

Warning	
7.	Check the wiring after shutting off power source.
8.	There is possibility of motor damage in case of continuous THERMAL RELAY trip. After inspecting the below-mentioned facts certainly, remove the reason of overload before operation.

Turn QM7T,QM8 on in electrical box, and then inspect the resistance of QM7T,8 between each terminal with TESTER. In case of electrical current has been blocked, exchange the THERMAL RELAY or auxiliary contact point unit.

- Examine the R,S,T phase of oil pressure motor.
- May you have trouble after following above referred inspection, check the contact point of input signal X1.4

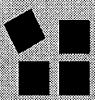
Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

X01	7	6	5	4	3	2	1	0
	1							

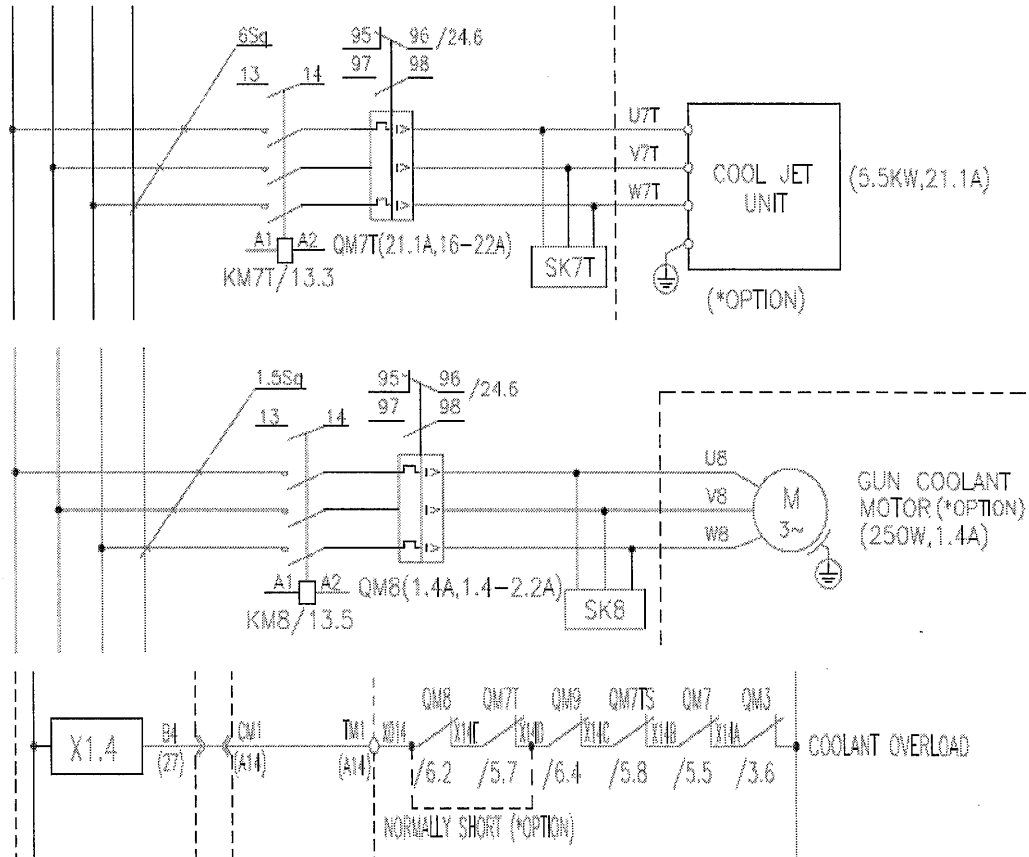
Check if input signal X1.4 becomes '1'.



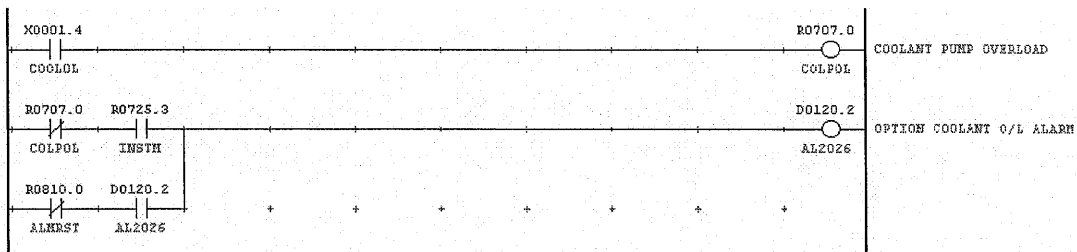
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC



When OCR(QM7T, QM8) has been tripped by operation of the MAGNET for COOLANT MOTOR,

Check the setting value of it and clear alarm with the reset key. Restart the program.



2027 TF MAGAZINE ERROR

Causes:

- T-CODE has been issued when the SERVO MOTOR for MAGAZINE operation is not in position.

Conditions:

- Alarm Lamp in operation panel is on
- ATC operation halts
- CALL LIGHT and BUZZER are on

Actions:/Procedures

- Reset the alarm and then issue the T-CODE

Solution

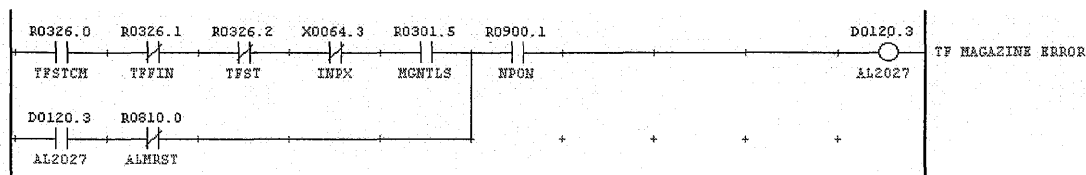
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X64 => Search

X64	7	6	5	4	3	2	1	0
					1			

Check if the X64.3 contact point is '1'

- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2028 TOOL POT SPINDLE SIDE L/S CHECK ERROR

Cause:

- Although a solenoid for TOOL POT SP. SIDE is operating, the limit switches for POT SP. SIDE and MAG. SIDE have been OFF state over 5 seconds after the activation of the switches.
- Malfunction of the limit switches for POT SP. SIDE and MAG. SIDE and fault in the wiring.

Condition:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT and BUZZ is on

Actions:/Procedures:

- M998; At MAINTANANCE MODE, execute M62;(POT SP. SIDE),M61;(POT MAG.SIDE) command repeatedly to check the interruption and operation of the limit switch.
- Adjust position of the switch or check the wiring unless X9.6 and X9.7 operated correctly.

Solution:

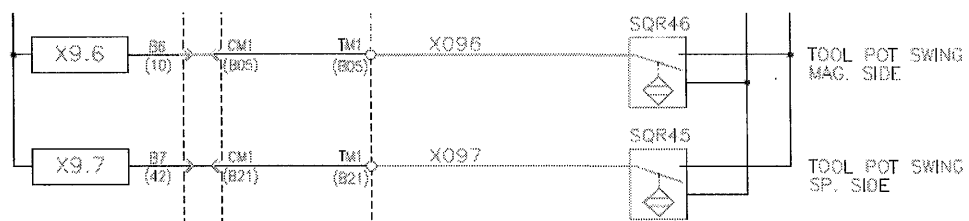
-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X9 => Search

X9	7	6	5	4	3	2	1	0
	1	0						

In case of POT SP. SIDE, signal X9.6 and X9.7 become 0 and 1 in normal state

- Confirming the electric Diagram

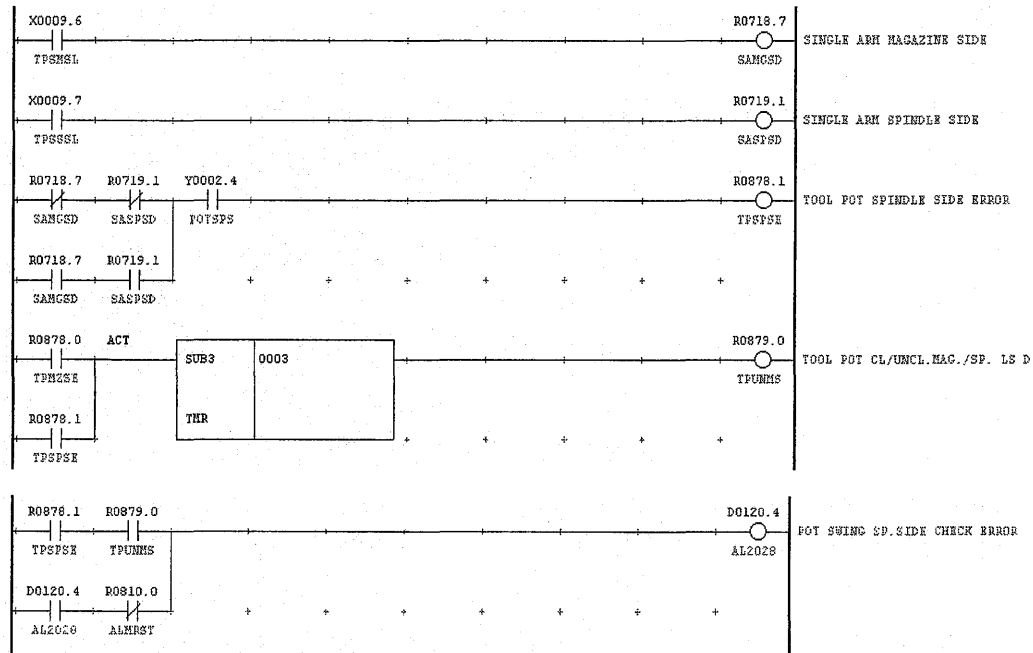




Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



Alarm occurs in case that both POT UNCLAMP L/S and POT CLAMP L/S don't become ON state within 5 seconds which is set at TIMER NO.3 while POT SP. SIDE SOL is operating. In this case check the operation of the solenoid and AIR pipe.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2029 APC MAINTENANCE MODE M60,M61,M62 COMMAND ERROR

Causes:

- ATC(M60) command has been issued while MAINTENANCE MODE(M998) is being executed.

Conditions:

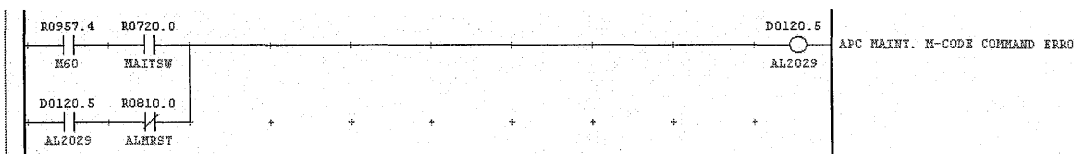
- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Release the Alarm with pressing the RESET key.
- Execute the APC(M60) operation after releasing the MAINTENANCE MODE.(M999)

Solution:

- Confirming the PMC





2030 TOOL BROKEN ERROR

Cause:

- Tool broken is recognized because the signal becomes off state when M52 command is executed for checking the existence of a tool.
- Malfunction of the limit switch for TOOL BROKEN CHECK and fault in the wiring

Condition:

- Lighting on a Alarm Lamp in operator panel
- Lighting on a FEED HOLD in operator panel
- Lighting on a CALL LIGHT and BUZZER

Actions:/Procedures:

- Check if current using tool is out of order.
- Exchange the tool in case of tool has been broken
- Check if there is an error in the program.

Solution:

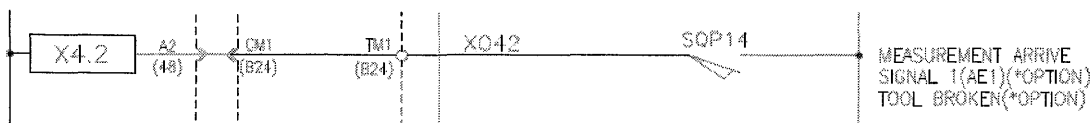
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X4 => Search

X4	7	6	5	4	3	2	1	0
	1							

If the Tool reaches TOUCH PROBE at command M43, input signal X4.2 becomes 1 in normal state.

- Confirming the electric Diagram

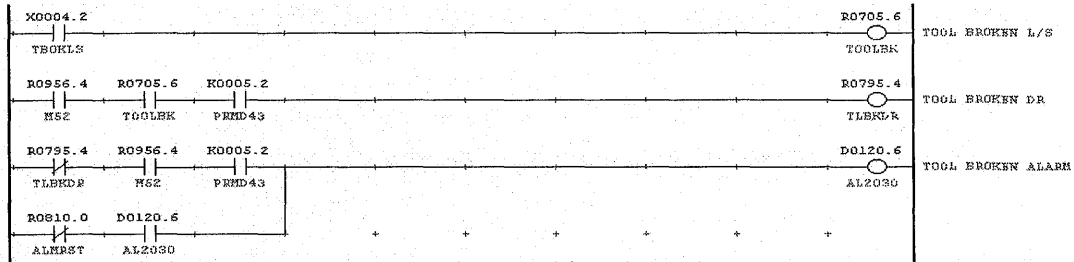




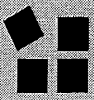
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



Alarm occurs when M43 for Tool Broken check is used and the tool is off from the surface of touch probe. Check the Tool length or setting Error.



2031 M60,M61,M62 COMMAND APC STANDBY ERROR

Cause:

- APC(M60,M61,M62) command has been issued when APC is not on standby.

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Cancel the Alarm with the RESET key.
- Finish the APC STANDBY operation by pressing the APC STANDBY switch and then execute APC(M60,M61,M62) operation. (A LAMP turns on after completion of APC STANDBY operation)

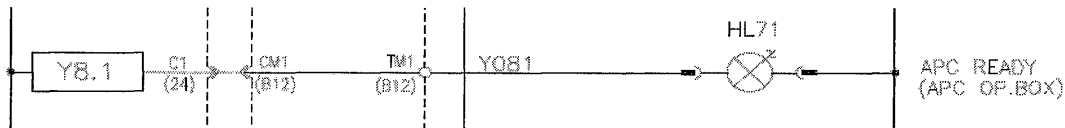
Solution:

- Information of DGN

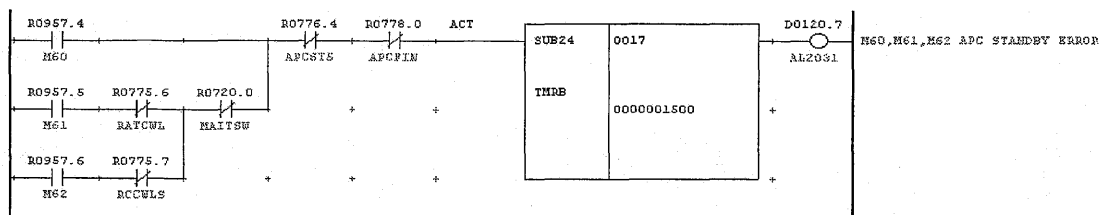
SYSTEM =>PMC =>PMCDGN=> STATUS =>X4 => Search

Y8	7	6	5	4	3	2	1	0
							1	

- Confirming the electric diagram



- Confirming the PMC





2032 ATC ARM MODE POSITION ERROR

Cause:

- A spindle rotation command is issued in case of ATC TWIN ARM is not in position.
- Malfunction of the sensor for checking the reference position of ATC TWIN ARM (Malfunction of the encoder)
- Fault in the Data(D158, D160) setting for reference position region of ATC TWIN ARM

Conditions:

- Alarm Lamp in operation panel is on
- ATC operation halts
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Place the ATC TWIN ARM in position and then execute the ORT command(M19) or ATC operation(M06)
- Examine the sensor for checking ATC TWIN ARM in position and check the wirings. (X10.0~X10.7 and X11.7)
- D158, D160 and D182 are the data for placing ATC TWIN ARM in position. Compare the initially set data value(D158, D160) with the present data value(D182). And then modify the present data(D182) if the present values are out of the initially set value. (Present value should not exceed the range of initially set one.)

Solution

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X10 => Search

	7	6	5	4	3	2	1	0
X10								
X11								

Check the contact point change of the input signal X10.0~X10.7, X11.7.

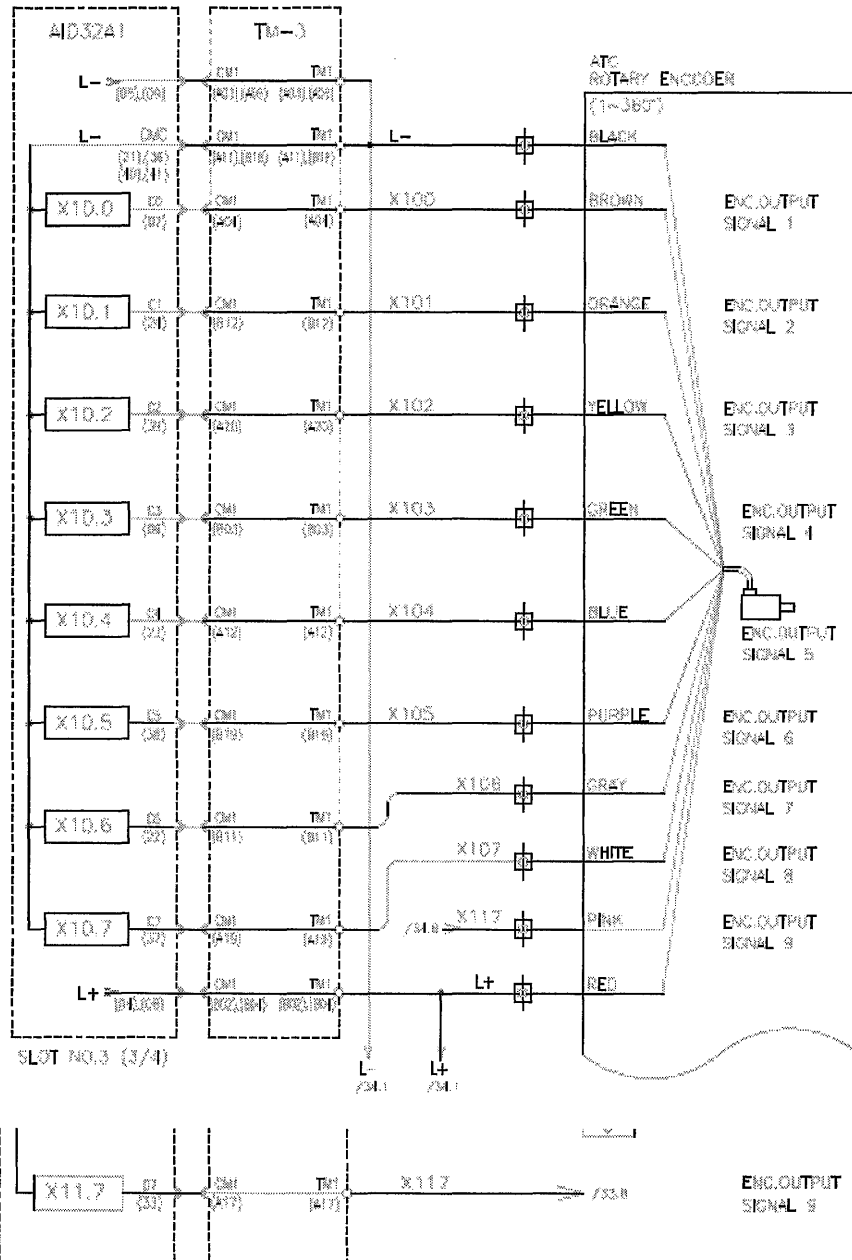
Unless the contact point changes regularly, exchange the encoder for ATC TWIN ARM.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram





2033 MEASUREMENT LOW BATTERY ERROR

Causes:

- Alarm occurs because LOW BATTERY signal has been activated from the tool for measurement when M74 command for measuring a tool condition is issued.
- Discharge of the TOOL UNIT for measurement or malfunction of the signal for battery check
- Fault in the wiring.

Conditions:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Check the battery of TOOL UNIL for measurement and in case of low voltage, exchange the battery
- In case of tool broken, change the tool
- Check if there is an error in the program

Solution

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X4 => Search

X4	7	6	5	4	3	2	1	0
	0							

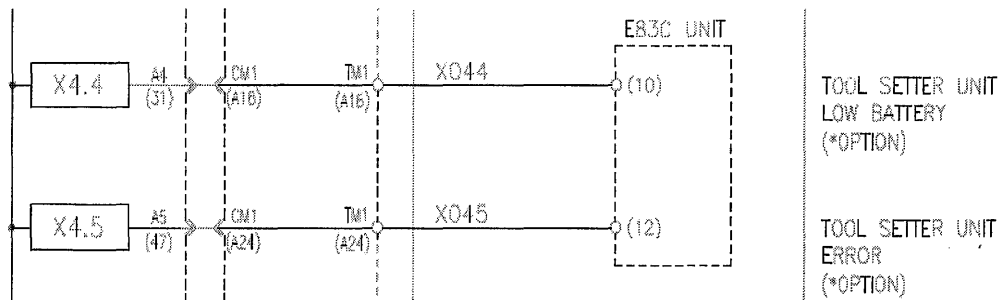
In case M52 command is used and the tool reaches TOUCH PROBE, input signal X4.2 is displayed as "1" at normal state.



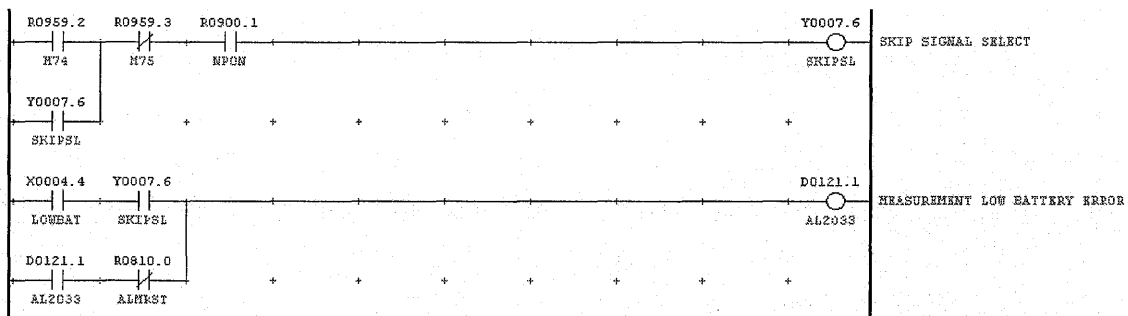
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC



Alarm occurs in case M52 command for TOOL BROKEN CHECK is issued and the tool is off from TOUCH PROBE. Check the tool length and setting error.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2034 SPINDLE ROTATION AT M31 MODE

Causes:

- Spindle rotation command(M03,M04)is issued during MAINTENANCE MODE(M31) is being executed.

Conditions:

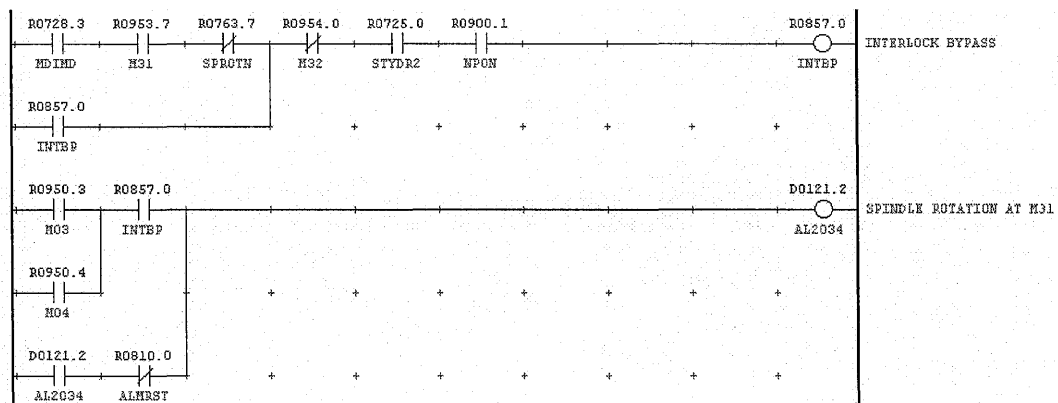
- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions: /Procedure:

- Release the Alarm with RESET key.
- Issue the SPINDLE rotation command after completion of ATC operation and execution of M32 (MAINTENANCE MODE completion).

Solution:

- Confirming the PMC



Alarm occurs in case of issuing Spindle rotation command(M03,M04) during execution of MAINTENANCE MODE(M31). Check the malfunction of proximity switch.



2035 M06 COMMAND AT TOOL POT NOT SPINDLE SIDE

Cause:

- ATC(M06) command is issued even though the limit switches for POT SP. SIDE doesn't operate properly.
- Malfunction of the limit switches for POT SP. SIDE and fault in the wiring.

Conditions

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- M998; At MAINTANANCE MODE, execute M62;(POT SP. SIDE),M61;(POT MAG.SIDE) command repeatedly to check the interruption and operation of the limit switch.
- Adjust position of the switch or check the wiring unless X9.6 and X9.7 operated correctly.

Solution:

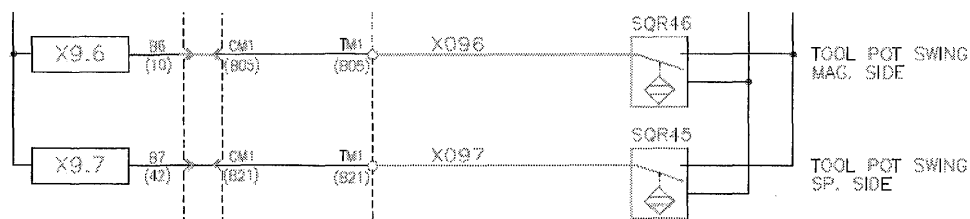
-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X9 => Search

X9	7	6	5	4	3	2	1	0
	1	0						

In case of POT SP. SIDE, signal X9.6 and X9.7 become 0 and 1 in normal state

- Confirming the electric Diagram

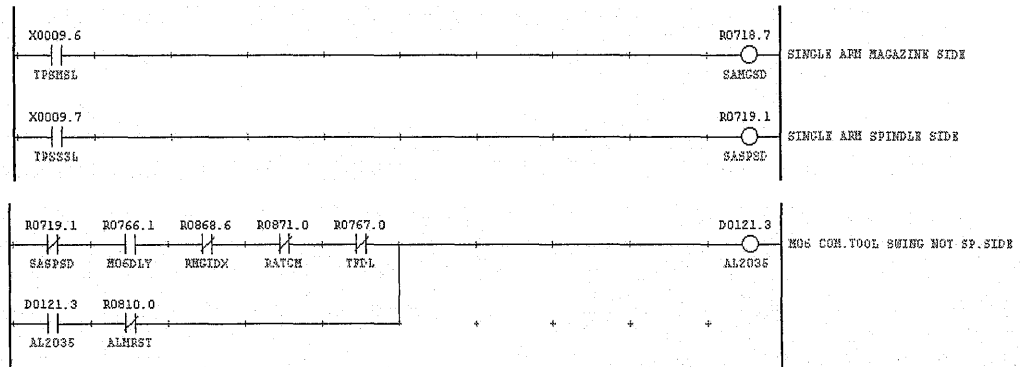




Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC





2037 M31 NOT CANCEL

Cause:

- ATC CHANGE(M06) command is issued while ATC MAINTENANCE MODE(M31) is being executed at MDI mode.

Condition:

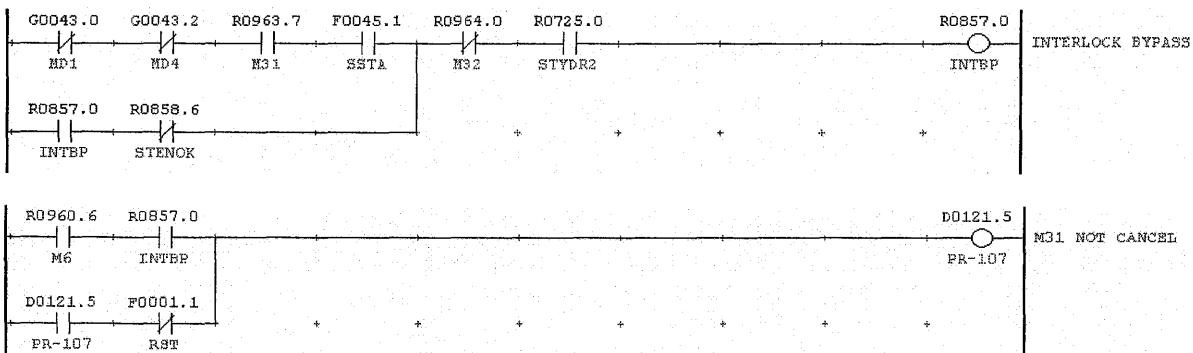
- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Cancel the alarm with the RESET key.
- Release MAINTENANCE mode by issuing M32 command at MDI mode and then execute M06 command(ATC CHANGE).

Solution:

- Confirming the PMC



Alarm occurs in case that M06 CYCLE is issued during ATC MAINTENACE MODE is being executed. In this case, release the MAINTENACE MODE by issuing M32 command.



2038 M06 AT NOT TOOL CLAMP ERROR

Cause:

- In case of NOT TOOL CLAMP state, ATC command (M06) is executed.
- Malfunction of the L/S for TOOL CLAMP and TOOL UNCLAMP
- Fault in the wiring

Condition:

- Lighting on a Alarm Lamp in control panel
- Lighting on a FEED HOLD in control panel
- Lighting on a CALL LIGHT and BUZZER

Actions:/Procedures:

- Release ALARM with pressing RESET button and clamp the tool using TOOL CLAMP switch at manual mode. Then execute ORT command or ATC operation.
- Check the malfunction and signal of L/S for TOOL CLAMP and UNCLAMP and then Check the ON/OFF signal of TOOL CLAMP (X3.4 or No tool; X3.4 and X3.3) & TOOL UNCLAMP (X3.5)

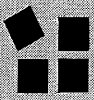
Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X3=> Search

X03	7	6	5	4	3	2	1	0
			0	1	0(1)			

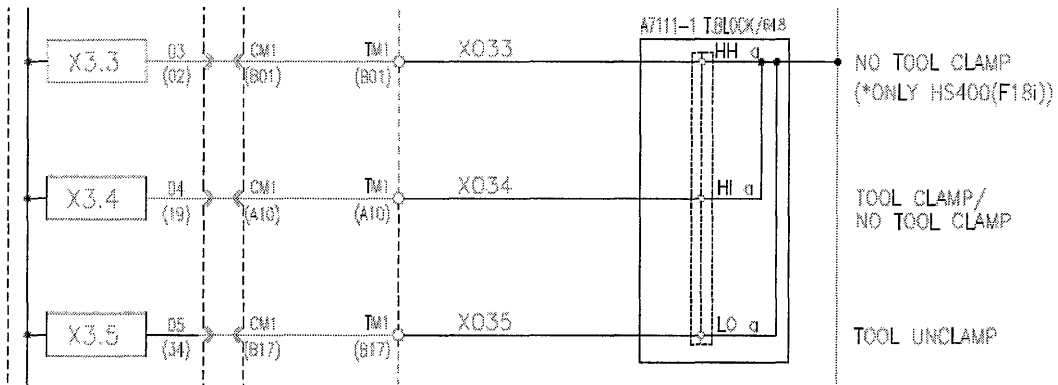
In normal state, input signal X3.5 and X3.4 become OFF(0) and ON(1) state respectively



Alarm Message and Solution

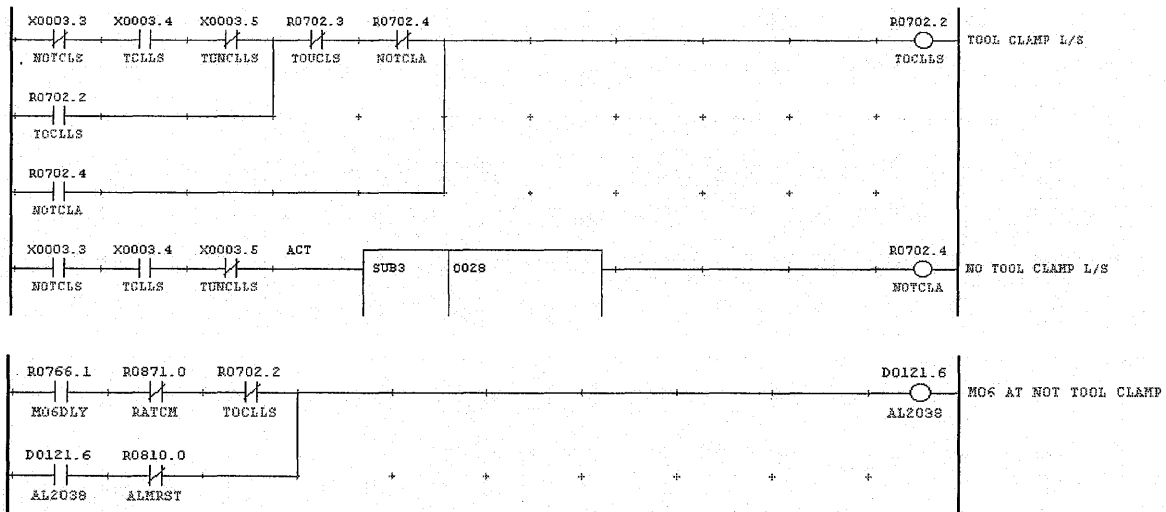
HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



Test and confirm the manipulation of SWITCH at manual mode and the operation in auto mode.

- Confirming the PMC



In case of TOOL CLAMP signal (X3.4) becomes OFF; namely, in TOOL UNCLAMP state, ALARM occurs when ORT command such as M06(ATC CHANGE) is used. Therefore, it needs to check TOOL CLAMP(X3.4) status.



2039 ATC CYCLE NOT END

Cause:

- M06 ATC CHANGE CYCLE is not finished yet.
- Malfunction or incorrect position of a proximity switch.

Condition:

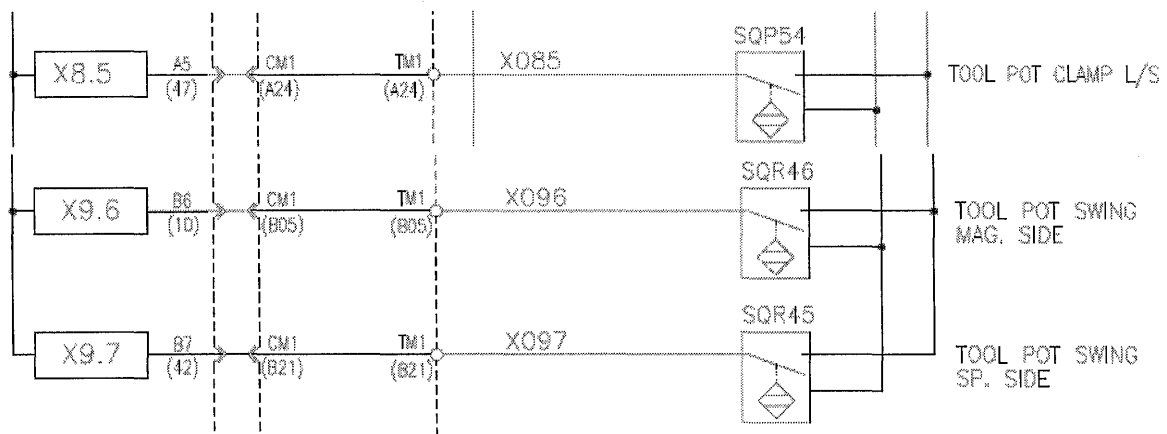
- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on

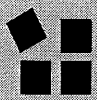
Actions:/Procedures:

- If ATC is not stationary condition during it is standstill, return ATC to its home position by operating MAINTENANCE MODE and then Execute M06.
 - If a proximity switch is not on status when ATC arm and pot is located in its correct position, adjust position of the proximity switch or check the wiring.
 - ARM UP, ARM HOME POSITION, POT UP and ATC POSITION SENSOR
- If ATC is standstill, the normal state indicates that ARM UP SENSOR, ARM HOME POSITION, POT UP and ATC POSITION become ON state.

Solution:

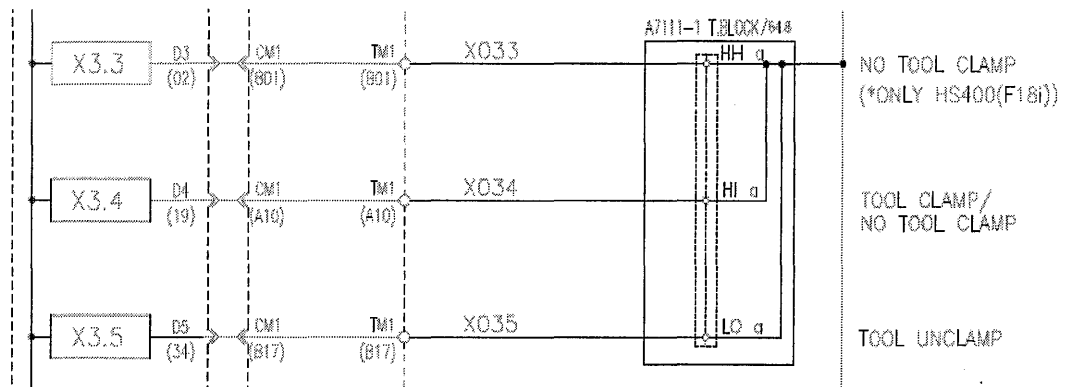
- Confirming the electric Diagram



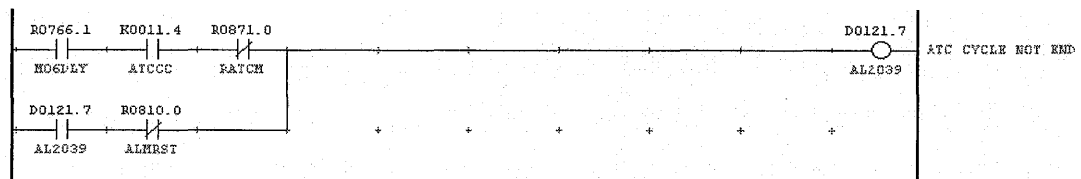


Alarm Message and Solution

HYUNDAI-KIA MACHINE



- Confirming the PMC



Alarm occurs when M06 cycle is not completed. It needs to be checked whether the ATC operation is correct.



2040 M60 POSITION ERROR

Cause:

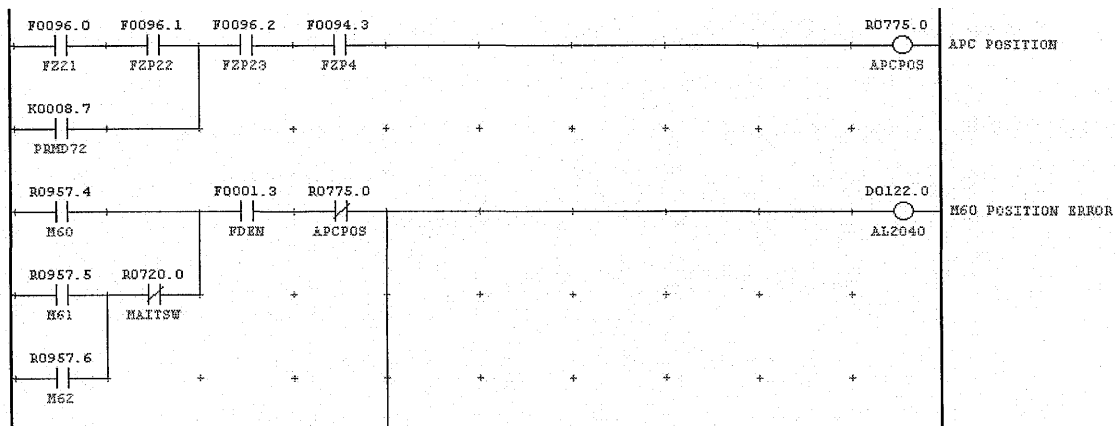
- M60 command is issued when it is not APC CHANGE position.

Actions:/Procedures:

- Release the ALARM with RESET button.
 - Return the X,Y,Z axis to the second reference position and B axis to reference position.
- After that, issue the M60 command.

Solution:

- Confirming the PMC



Alarm occurs in case that M60 command is issued under NOT APC CHANGE POSITION.
Auto APC CHANGE is possible at any position in case that ATC is operated by AUTO
MACRO PROGRAM



2041 M31, M35 AT NOT MDI MODE

Cause:

- M31 or M35 command is issued except the MDI mode.

Conditions:

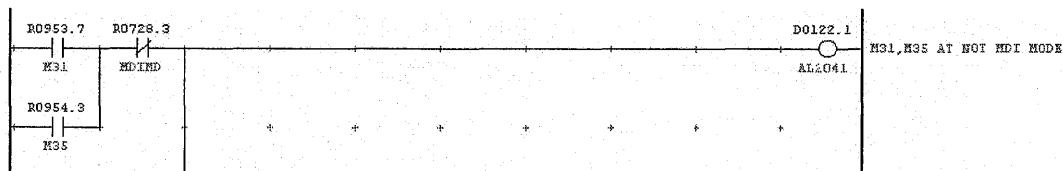
- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Cancel the Alarm with pressing the RESET button.
- Issue the M31 or M35 command at MDI mode only.
- MAINTENANCE MODE can be operated only at MDI mode only.

Solution:

- Confirming the PMC



ATC MAINTENANCE MODE(M31,M35) can be executed at only MDI mode only.



2042 M31, M35 DURING SPINDLE ROTATION

Cause:

- M31 or M35 command is issued while spindle rotates or MAINTENANCE MODE(M31) is executed.

Condition:

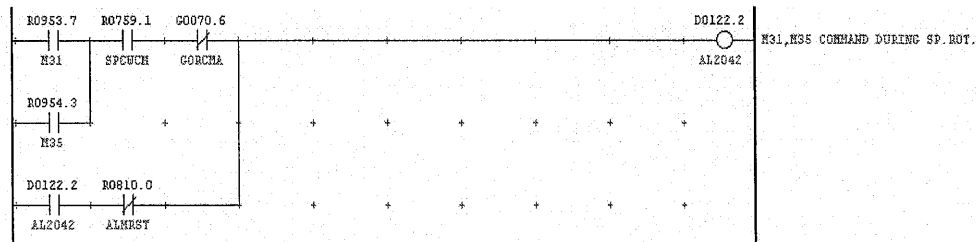
- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Execute M31 and M35 command after spindle stops completely.

Solution:

- Confirming the PMC



Alarm occurs in the event of spindle rotation, orientation operation and execution of M31, M35 at ATC maintenance mode, therefore execute M31, M35 when spindle stops.



2043 M31 NOT COMMAND

Cause:

- M35 command is issued when M31 (maintenance mode on) is not executed.

Condition:

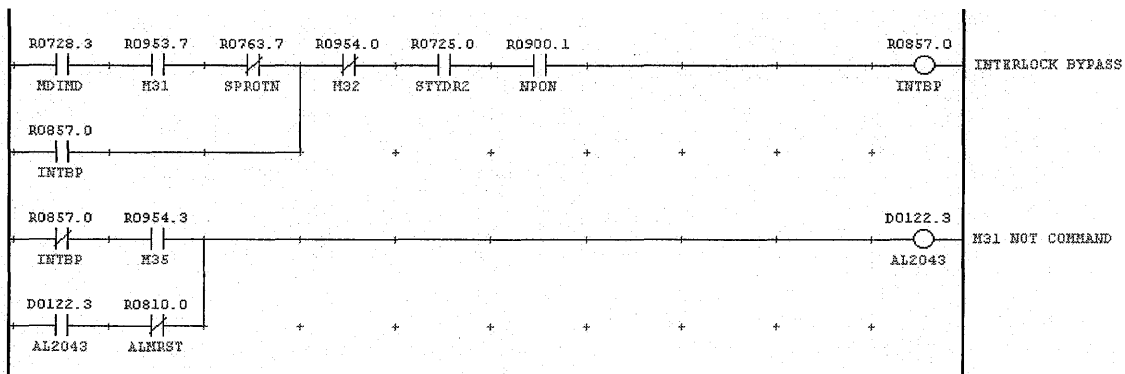
- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

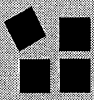
- Cancel the alarm with reset button.
- Execute M35 after M31 command is finished.

Solution:

- Confirming the PMC



M35 command can not be executed in case that MAINTENANCE MODE is not on state.
Execute M35 after M31 command being finished.



2046 M06 AT NOT ATC POSITION

Causes:

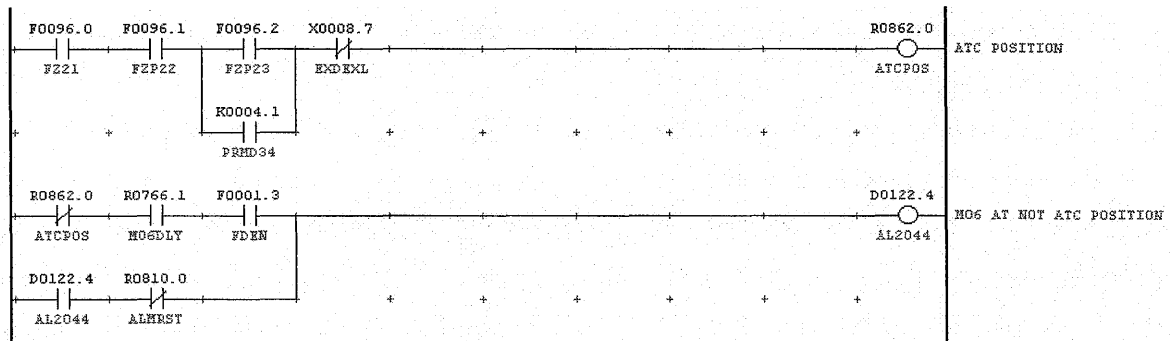
- M06 command is issued at not being ATC home position.

Actions: /procedures:

- Cancel the alarm with pressing Reset button
- Issue the M06 command after return X,Y,Z Axis to the second reference position after

Measures:

- confirming the PMC



Alarm occurs in case that M06 has been executed at not ATC change position.

Auto ATC CHANGE is possible at any position it locates while auto macro program is executing.



2045 ATC ALARM NOT CANCEL

Cause:

- T-code command is executed before ATC cycle is finished.
- Malfunction and incorrect position of proximity switch

Condition:

- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Issue the T-CODE after ATC ARM returns its home position completely according to the ATC returning process at MDI mode.
- If proximity switch is not on state when ATC ARM is in position, adjust the position of proximity switch or check the wiring

Solutions:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X10 => Search

	7	6	5	4	3	2	1	0
X10								
X11								

Check the variation of contact point of the input signal X10.0~X10.7,X11.7.

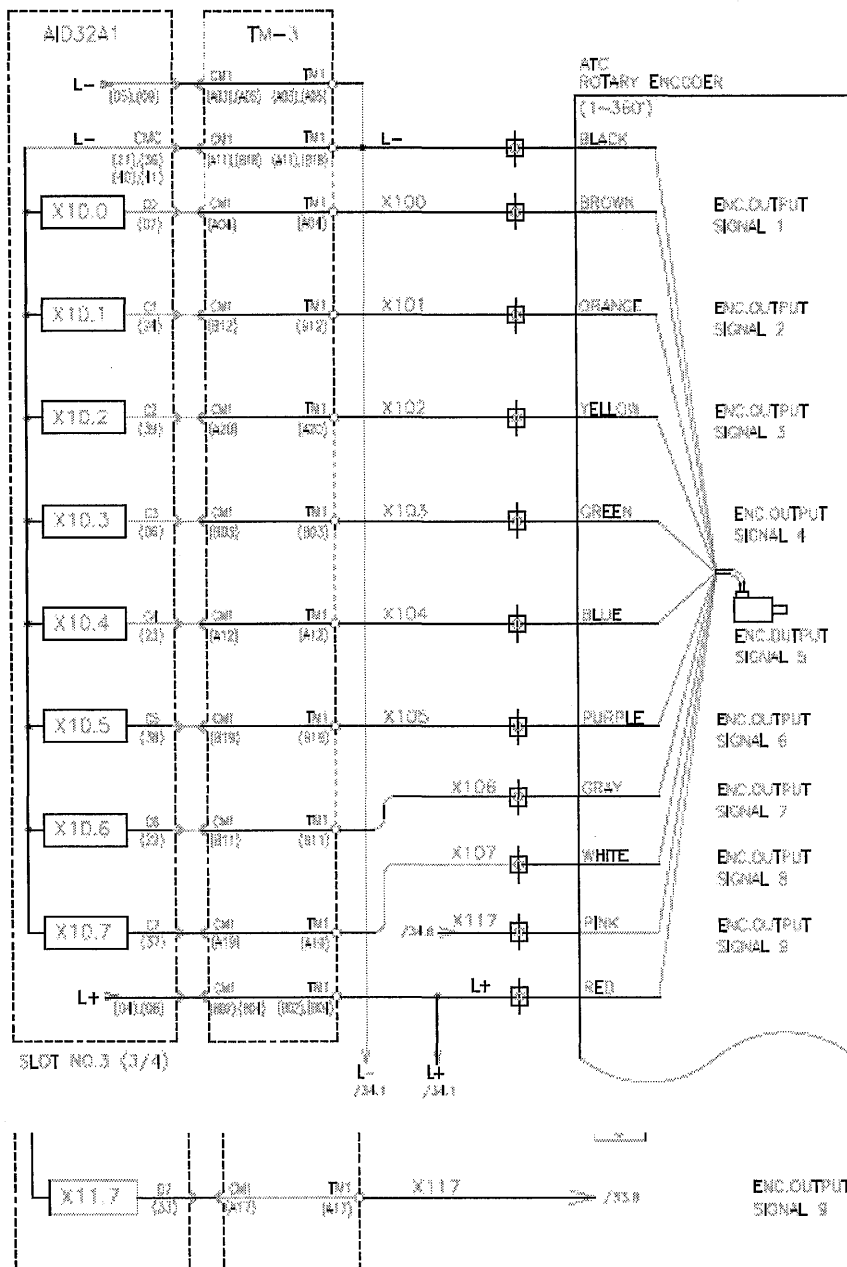
Unless the variation of contact point occurs regularly, exchange the encoder for ATC TWIN ARM with new one.



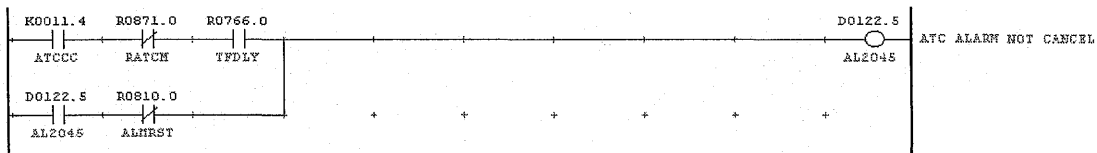
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC





2046 TOOL POT UNCLAMP L/S NOT ON

Cause:

- Although a solenoid for TOOL UNCLAMP is operating, the limit switches for POT UNCLAMP and POT CLAMP have been OFF state over 5 seconds after the activation of the switches.
- Malfunction of the limit switches for POT UNCLAMP and POT CLAMP and fault in the wiring.

Condition:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- At MAINTANANCE MODE, execute M58(TOOL POT CLAMP), M57(TOOL POT CLAMP) command repeatedly to check the interruption and operation of the limit switch.
- Adjust position of the switch or check the wiring unless X2.5and X2.6 operated correctly

Solution:

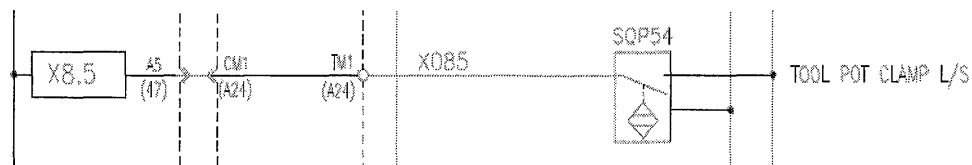
-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X8 => Search

X8	7	6	5	4	3	2	1	0
	0							

In case of POT UNCLAMP, X8.5 signal is '0' in normal state.

- Confirming the electric Diagram

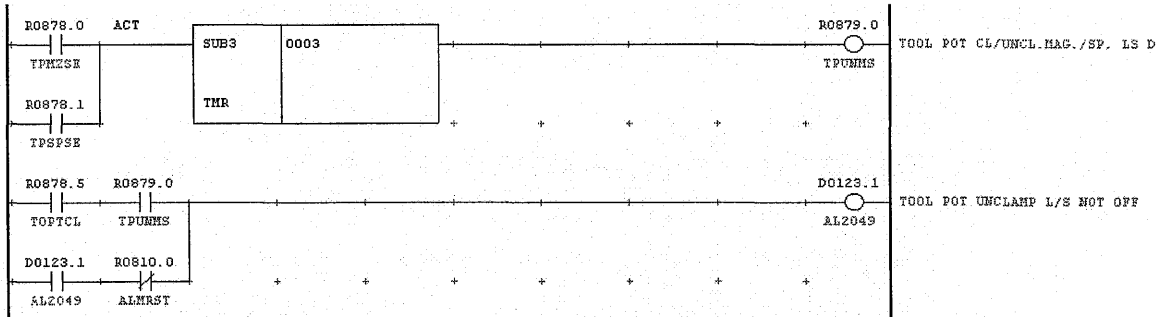




Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



Alarm occurs in case that both POT UNCLAMP L/S and POT CLAMP L/S don't become ON state within 5 seconds which is set at TIMER NO.3 while POT SP. SIDE SOL is operating. In this case check the operation of the solenoid and AIR pipe.



2052 ATC ARM FORWARD/BACKWARD TIME OVER

Causes:

- T-CODE has been issued when ATC TWIN ARM is not in position.
- Malfunction of the sensor for checking the position of ATC TWIN ARM (Malfunction of the encoder)
- Fault in the Data (D158, D160) setting for home position region of ATC TWIN ARM

Conditions:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures

- Examine the sensor for checking ATC TWIN ARM(Encoder) in position and check the wirings. (X10..0~X10.7and X11.7)
- D158,D160 and D182 are the data for placing ATC TWIN ARM in position. Compare the initially set data value(D158,D160) with the present data value(D182). And then modify the present data(D182) if the present values are out of the initially set value. (Present value should not exceed the range of initially set one.)

Solution

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X10 => Search

X10	7	6	5	4	3	2	1	0
X11								

Check the variation of contact point of the input signal X10.0~X10.7,X11.7.

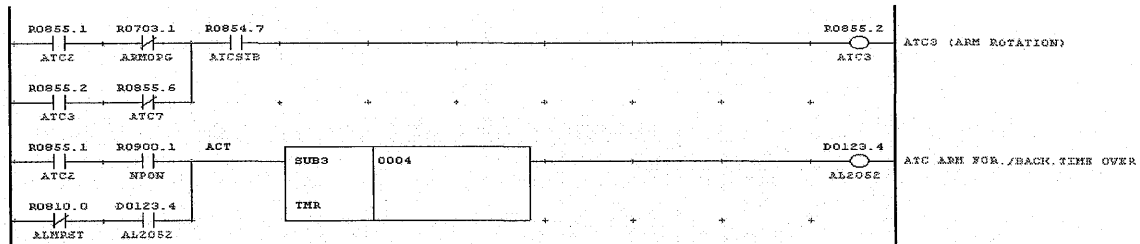
Unless the variation of contact point occurs regularly, exchange the encoder for ATC TWIN ARM with new one.



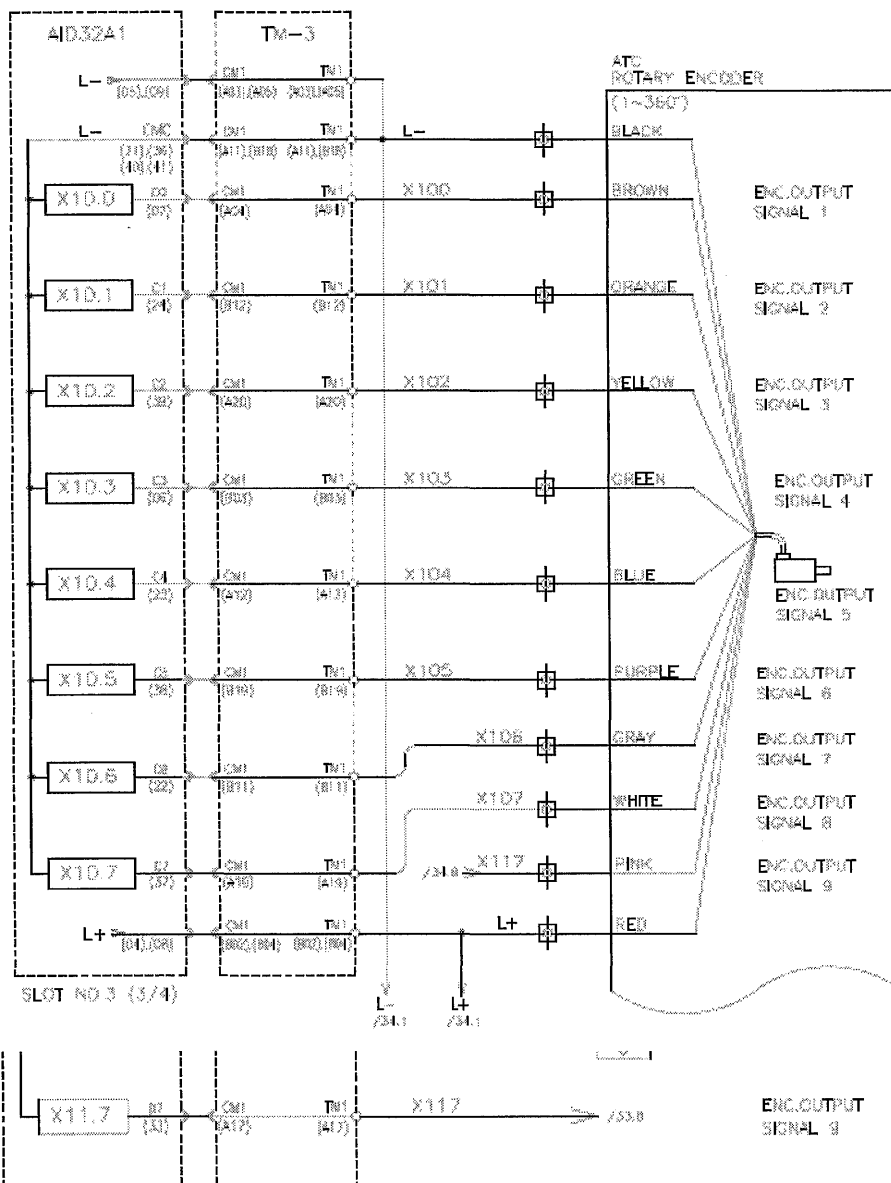
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



- Confirming the electric Diagram





2053 ATC ARM NOT BACKWARD

Causes:

- TWIN ARM ORIGIN has not been confirmed although 5 seconds has been passed from the start of ATC ARM operation.
- Malfunction of the sensor for checking the position of ATC TWIN ARM (Malfunction of the encoder)
- Faulty Data(D158, D160) setting for position of ATC TWIN ARM

Conditions:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound
- Examine the sensor for checking ATC TWIN ARM in position and check the wirings. (X10.0~X10.7 and X11.7)
- D158, D160 and D182 are the data for placing ATC TWIN ARM in position. Compare the initially set data value(D158, D160) with the present data value(D182). And then modify the present data(D182) if the present values are out of the initially set value. (Present value should not exceed the range of initially set one.)

Solution

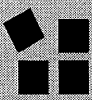
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X10 => Search

X10	7	6	5	4	3	2	1	0
X11								

Check the variation of contact point of the input signal X10.0~X10.7, X11.7.

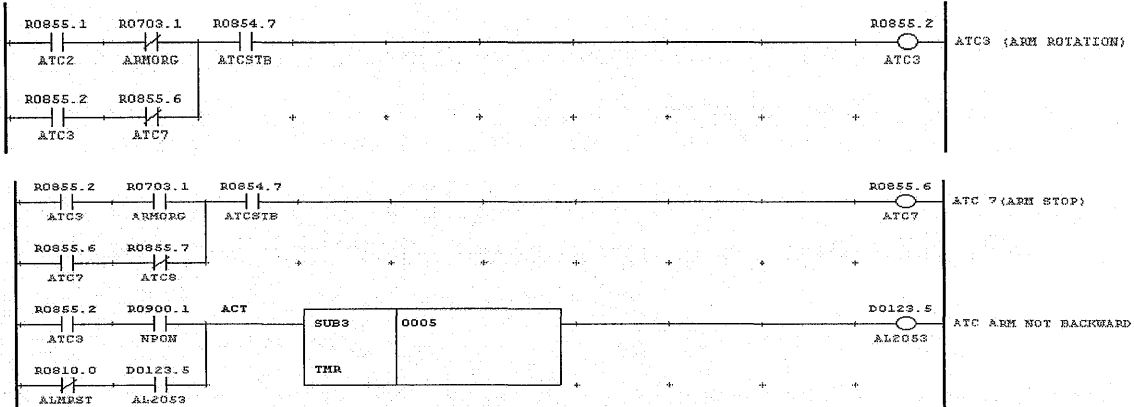
Unless the variation of contact point occurs regularly, exchange the encoder for ATC TWIN ARM with new one.



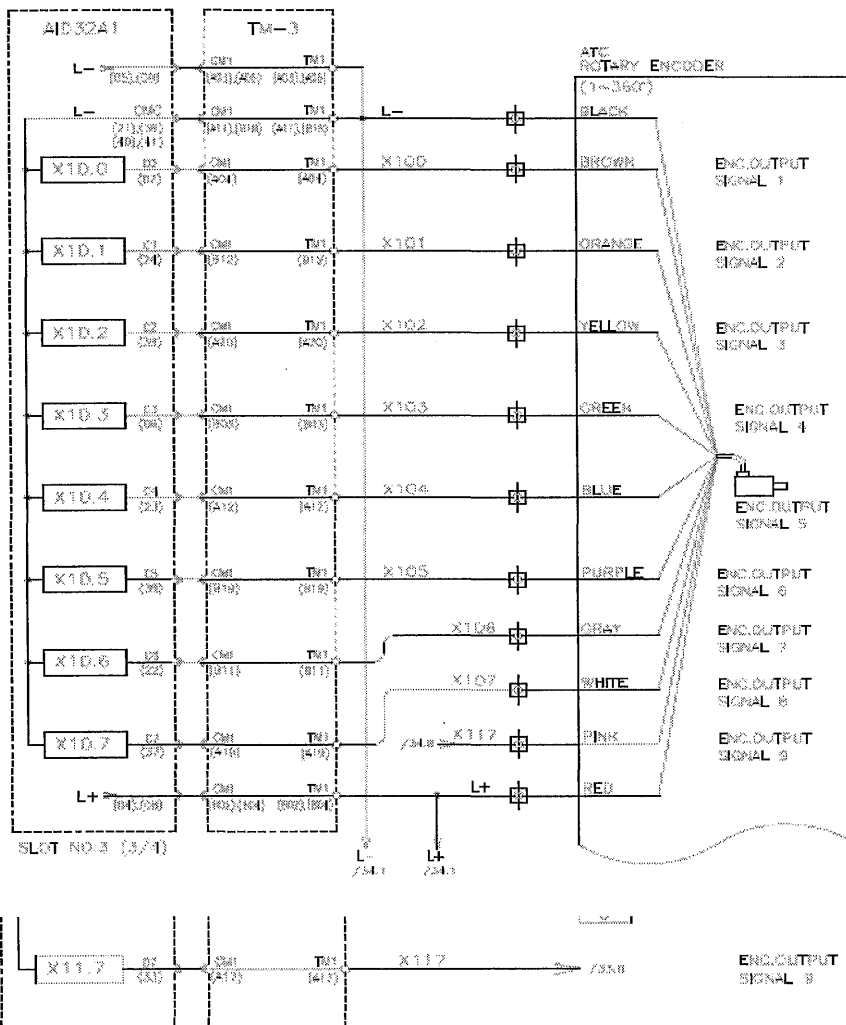
Alarm Message and Solution

HYUNDAI-KIA MACHINE

Confirming the PMC



- Confirming the electric Diagram





2054 ATC ARM NOT HOME POSITION

Causes:

- TWIN ARM ORINGIN has not been confirmed although 5 seconds has been passed from the start of ATC ARM operation.
- Malfunction of the sensor for checking the position of ATC TWIN ARM (Malfunction of the encoder)
- Faulty Data(D158, D160) setting for position of ATC TWIN ARM

Conditions:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound
- Examine the sensor for checking ATC TWIN ARM in position and check the wirings. (X10..0~X10.7and X11.7)
- D158,D160 and D182 are the data for placing ATC TWIN ARM in position. Compare the initially set data value(D158,D160) with the present data value(D182). And then modify the present data(D182) if the present values are out of the initially set value. (Present value should not exceed the range of initially set one.)

Solution

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X10 => Search

X10	7	6	5	4	3	2	1	0
X11								

Check the variation of contact point of the input signal X10.0~X10.7,X11.7.

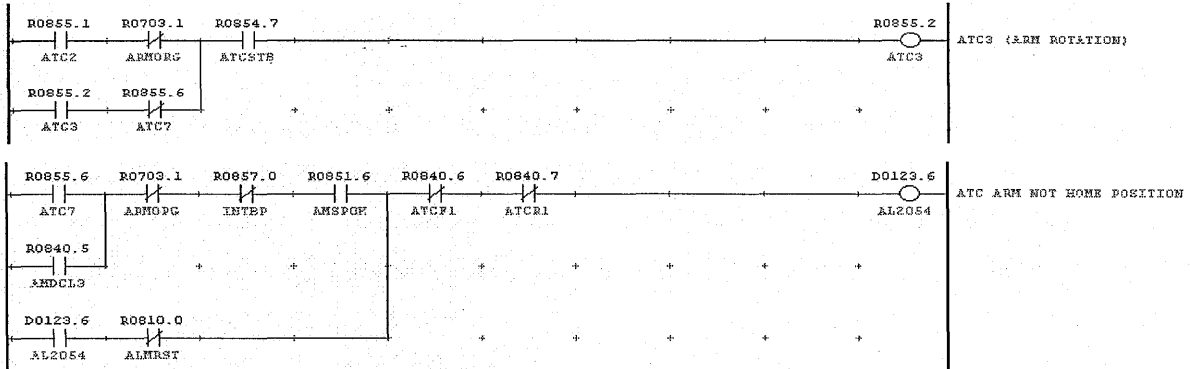
Unless the variation of contact point occurs regularly, exchange the encoder for ATC TWIN ARM with new one.



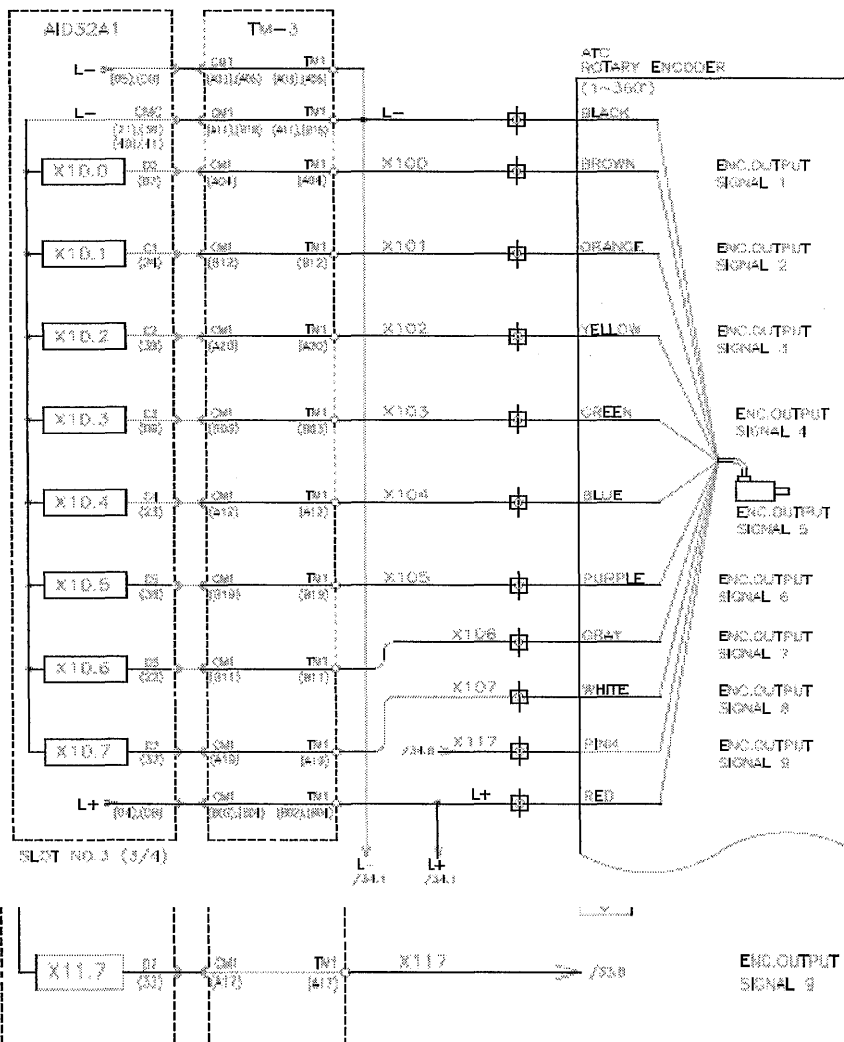
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



- Confirming electric diagram





2056 NEW POT CYCLE ERROR

Cause:

- Although a solenoid for TOOL POT M/Z SIDE or SP. SIDE SOL. is operating, the limit switches for POT SP. SIDE and POT MAG. SIDE have been OFF state over 5 seconds after the activation of the switches.
- Malfunction of the limit switches for POT SP. SIDE and MAG. SIDE and fault in the Wiring

Condition:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- M998; At MAINTANANCE MODE, execute M62;(POT SP. SIDE),M61;(POT MAG.SIDE) command repeatedly to check the interruption and operation of the limit switch.
- Adjust position of the switch or check the wiring unless X9.6 and X9.7 operated correctly.

Solution:

-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X9 => Search

X9	7	6	5	4	3	2	1	0
	1(0)	0(1)						

In case of POT SP. SIDE, signal X9.6 and X9.7 become 0 and 1 in normal state

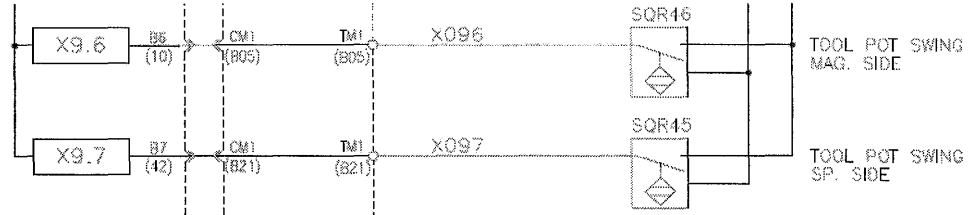
And in case of POT M/Z.SIDE, signal X9.6 and X9.7 become 1 and 0 in normal state



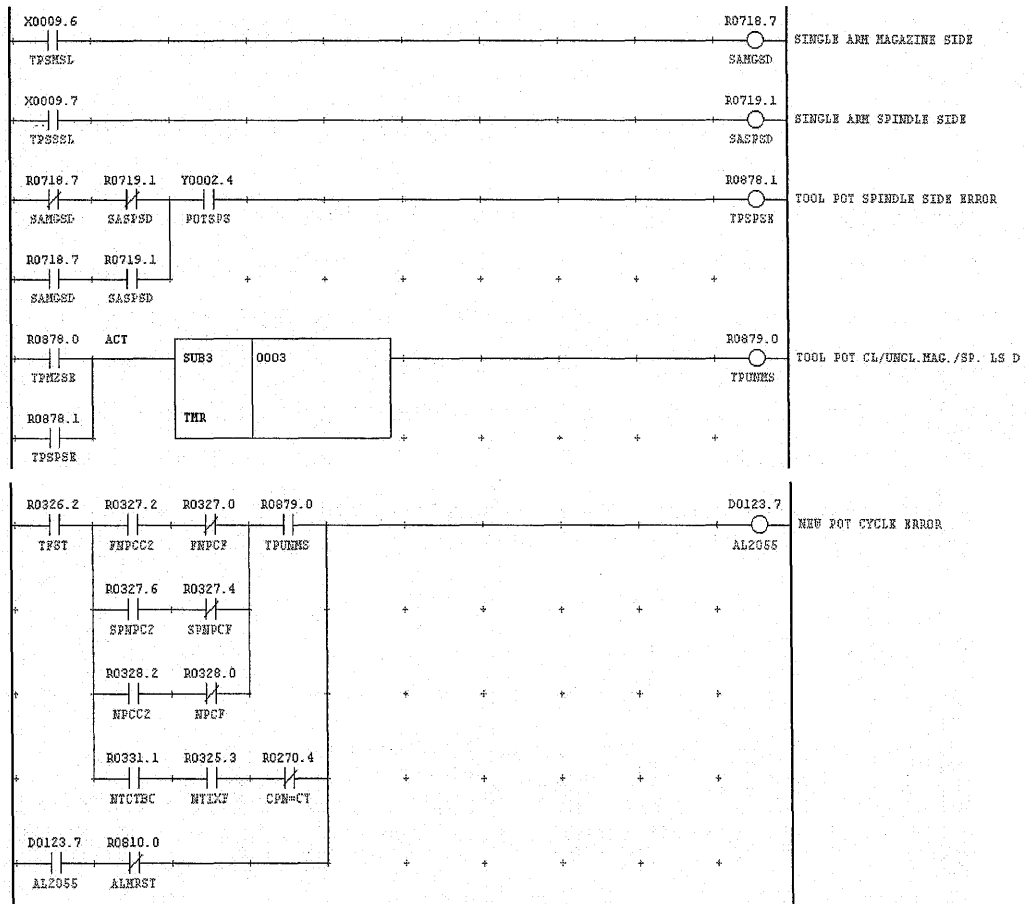
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC



Alarm occurs in case that both POT UNCLAMP L/S and POT CLAMP L/S don't become ON state within 5 seconds which is set at TIMER NO.3 while POT SP. SIDE SOL is operating. In this case check the operation of the solenoid and AIR pipe.



2057 HYD. OIL CONFIRM CHECK ALARM

Cause:

- Pressure switch(for checking) doesn't become activated although several seconds passed after first start of the machine's main oil pressure.
- Fault in the wiring

Conditions:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- Check the wiring unless the **pressure switch(for checking) and contact point of X3.7** are activated after operation of the oil pressure motor

Measures:

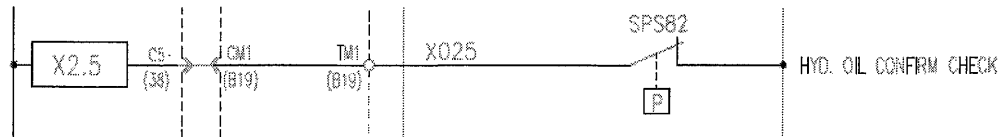
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X2 => Search

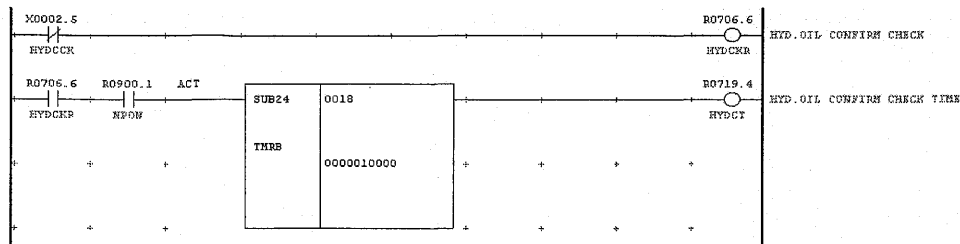
X02	7	6	5	4	3	2	1	0
			1					

Check if the input signal X2.5 is '1'

- Confirming the electric Diagram



- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2058 MAINTENANCE MODE ON

Cause:

- At MAINTENANCE MODE, M CODE(M998) is issued or MAINTENANCE switch is turned 'ON' in the electrical box.

Condition:

- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

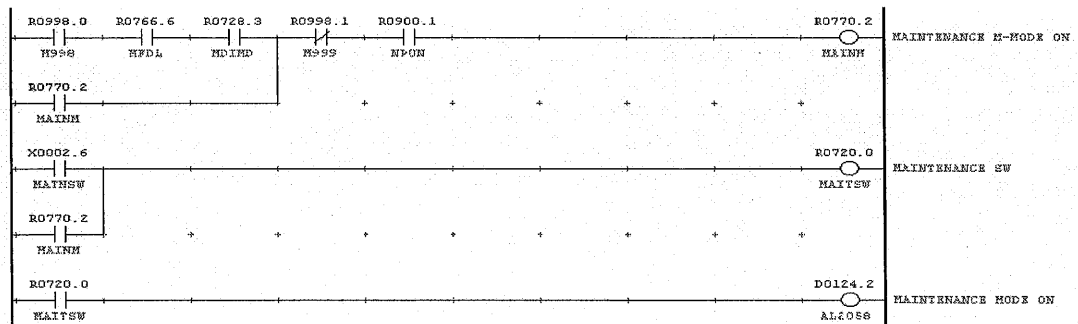
- In case that M998 related to activation of MAINTENANCE MODE is issued after finishing the execution of MAINTENANCE concerning M-CODE, be sure to issue M999(MAINTENANCE MODE ineffective). Or if you activate the MAINTENANCE MODE with turning on the MAINTENANCE switch in electrical box, turn off the MAINTENANCE switch

Solution:

-Information of DGN



- Confirming the PMC





2059 TOOL POT EXIS AT M/Z SIDE COMMAND ERROR

Cause:

- TOOL POT is already occupied in MAGAZINE in case of M/Z SIDE shifting of TOOL POT with issuing T CODE or the other command
- Malfunction of the limit switches for TOOL POT checking and fault in the wiring

Condition:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- Reset the Alarm condition and then, compare the number of present stand-by tool with the number of MAGAZINE CHAIN to check if those are same value. If the numbers are different, set the number of present stand-by tool or that of M/Z TOOL correctly.
- If the two tool numbers are same from the above listed sentence, check the detect sensor for TOOL POT and if the operation condition of X8.0 is not good, adjust position of the sensor or check the wiring.

Solution:

-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X9 => Search

X8	7	6	5	4	3	2	1	0
	0							

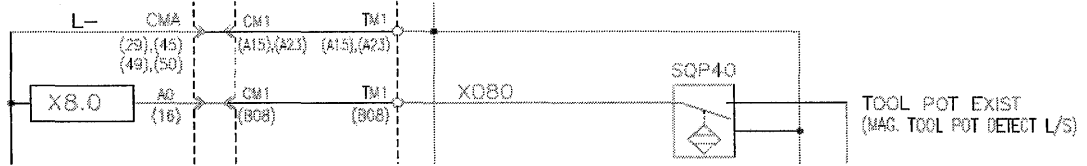
It's a normal condition if the signal X8.0 of detect sensor for TOOL POT is '0'



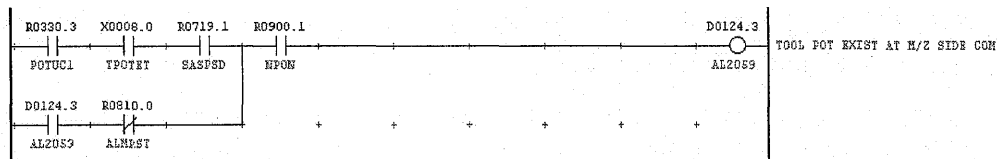
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC





2060 T COMMAND OVER

Cause:

- In case of issuing T cycle, target tool or SP. TOOL number exceeds the maximum allowable range.
- Faulty setting of Max TOOL Number.

Condition:

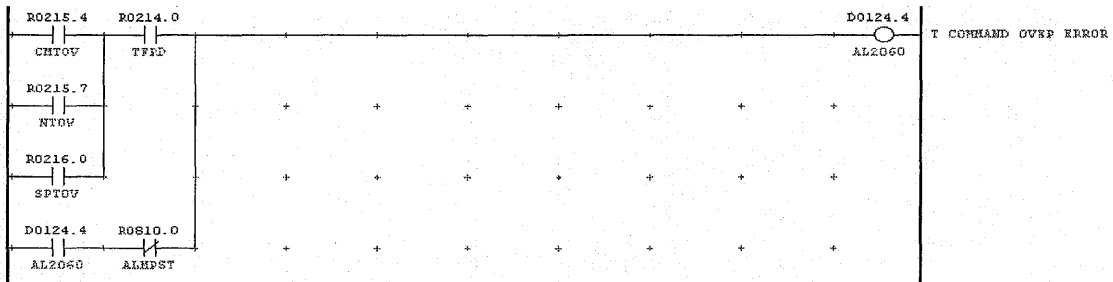
- Alarm Lamp in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- Check the DATA concerning to ATC, Max TOOL number(D148), target tool number(D142), standby tool number(D140), number of the tool occupied in main spindle(D148).

Solution:

- Confirming the PMC





2061 APC L/S CHECK ERROR

Cause:

- A proximity switch or limit switch concerning APC has not been checked or confirmed even though certain period of time passed after issuing check command.

Conditions:

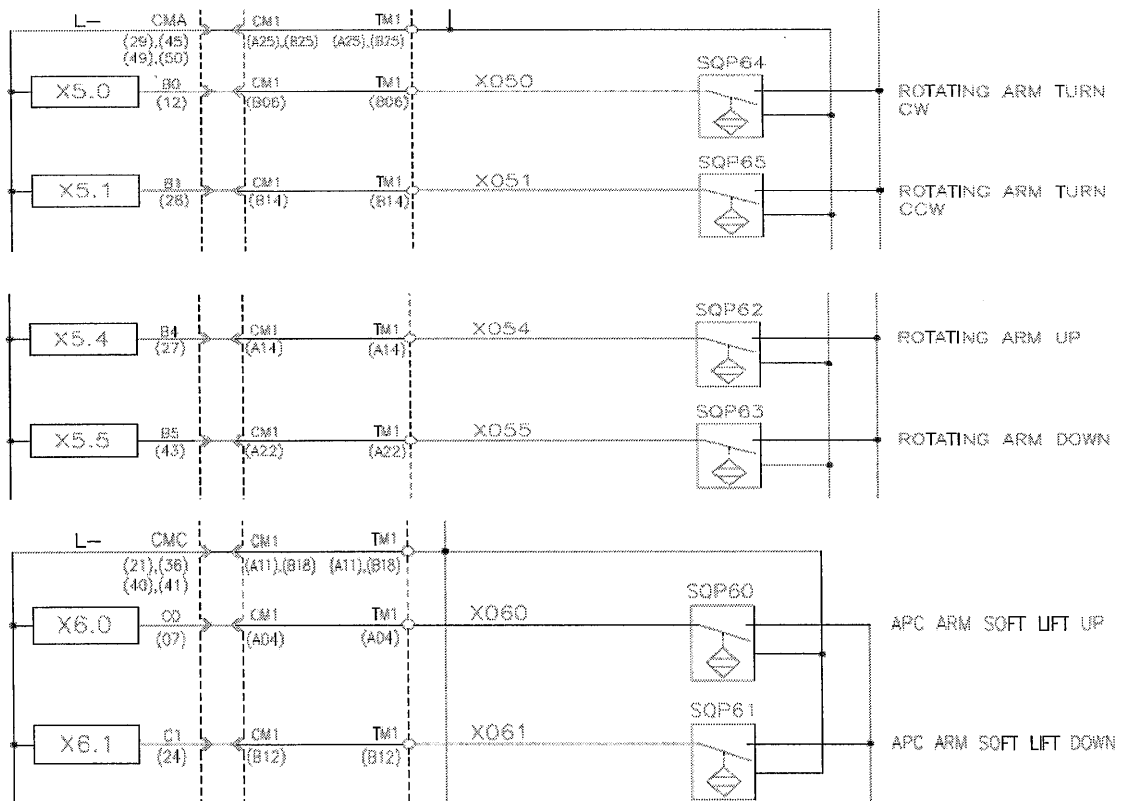
- Alarm Lamp in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

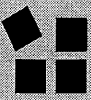
Actions:/Procedures:

- Check the setting position of APC relating proximity switch and wiring.

Solution:

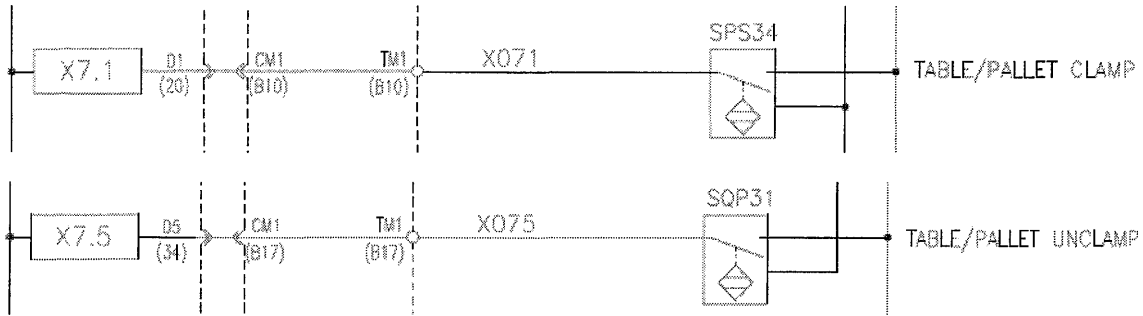
- Confirming the electric Diagram



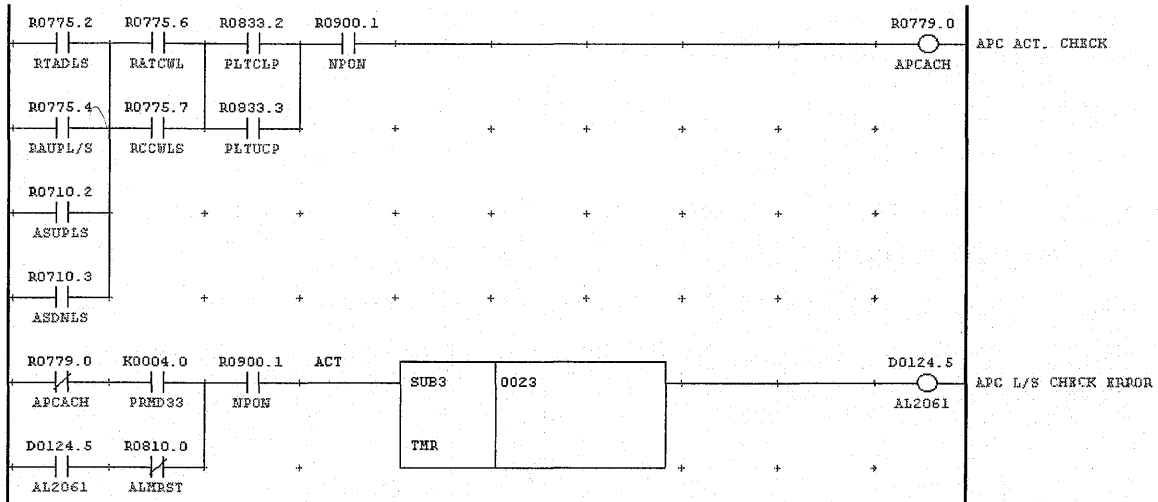


Alarm Message and Solution

HYUNDAI-KIA MACHINE



- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2062 TOOL POT MAGAZINE SIDE L/S CHECK ERROR

Cause:

- Although a solenoid for TOOL POT M/Z. SIDE is operating, the limit switches for POT SP. SIDE and POT MAG. SIDE have been OFF state over 5 seconds after the activation of the switches.
- Malfunction of the limit switches for POT SP. SIDE and MAG. SIDE and fault in the wiring.

Condition:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- M998; At MAINTANANCE MODE, execute M62;(POT SP. SIDE),M61;(POT MAG.SIDE) command repeatedly to check the interruption and operation of the limit switch.
- Adjust position of the switch or check the wiring unless X9.6 and X9.7 operated correctly.

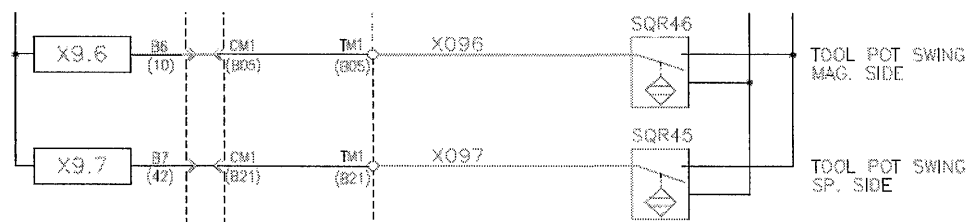
Solution:

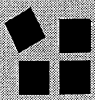
SYSTEM =>PMC =>PMCDGN=> STATUS =>X9 => Search

X9	7	6	5	4	3	2	1	0
	0	1						

In case of POT M/Z SIDE, signal X9.7 and X9.6 become 0 and 1 in normal state

- Confirming the electric Diagram

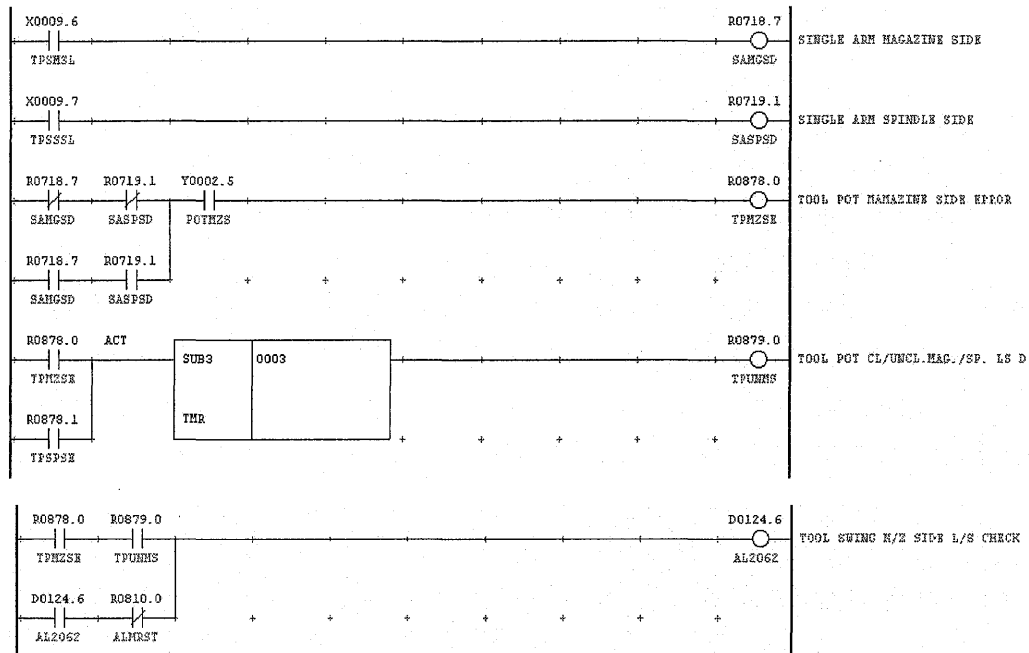




Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



Alarm occurs If both the limit switches for POT SP. SIDE and POT M/Z.SIDE have not been 'ON' state over 5 seconds which is set in TIMER NO.3 while a solenoid for TOOL POT M/Z. SIDE is operating. In this case, check the operation of solenoid and air pipe.



2063 T CYCLE OVER

Cause:

- T CYCLE is not finished yet although 2 minutes passed after issuing the T CYCLE command.

Condition:

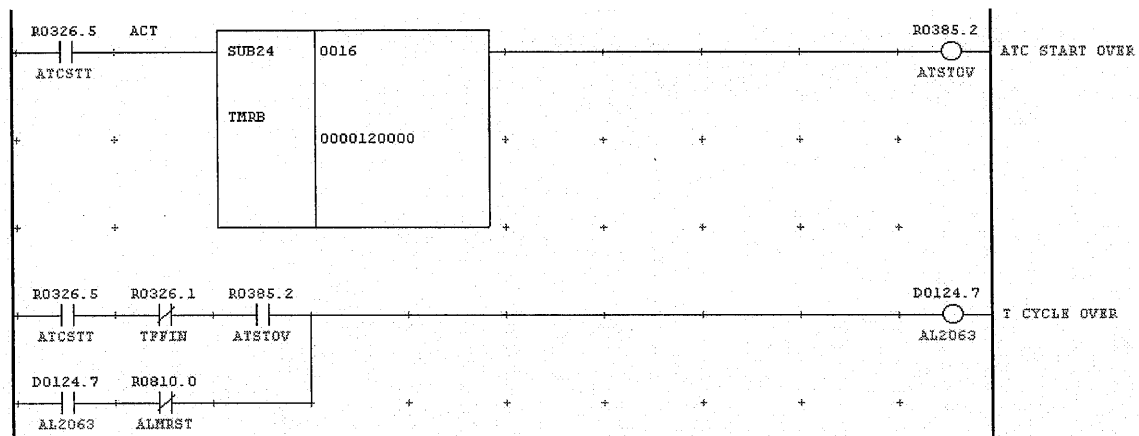
- Alarm Lamp in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- Check the proximity switch and limit switch which is related to TOOL POT and MAGAZINE after reset the alarm condition.

Solution:

- Confirming the PMC





2064 PALLET CONTACT ERROR

Cause:

- Confirmation sensor of pallet clamp is off although PALLET CLAMP is commanded.
- The setting of pallet clamp sensor is faulty
- Fault in the wiring.

Condition:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT is on and makes a buzzing sound

Actions:/Procedures:

- Cancel alarm by pressing reset button.
- Change operation mode to maintenance mode
- Do clamp(M23) or unclamp(M24) the pallet for several times.
- Readjust the confirmation sensor of pallet clamp or check the wiring.

Solution:

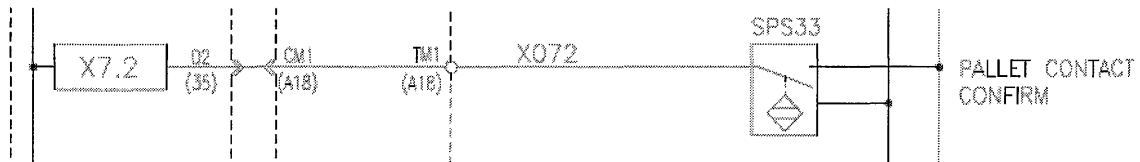
-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X9 => Search

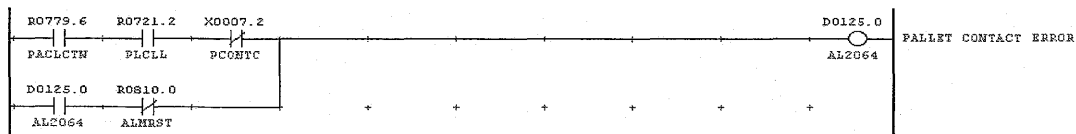
X7	7	6	5	4	3	2	1	0
						1		

The signal X7.2 of confirmation sensor of pallet clamp is 1 in normal state.

- Confirming the electric Diagram



- Confirming the PMC





Alarm Message and Solution

2065 EXTERNAL CHIP CONVEYOR O/L ALARM

Cause:

- THERMAL RELAY has been tripped due to over-current flowed into the motor result from overload of the EXTERNAL CHIP COVEYOR motor.
- Wrong input of THERMAL RELAY SETTING
- Phase missing of 3 phase power source and Faults in the wiring.

Condition:

- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

Warning	
	<ol style="list-style-type: none"> 1. Check the wiring after shut off power source 2. There is possibility of motor damage in case of continuous THERMAL RELAY trip. After inspecting the below-mentioned facts certainly, remove the reason of overload before operation.

-Turn THERMAL RELAY on in electrical box of the EXTERNAL CHIP COVEYOR, and then inspect the resistance of THERMAL RELAY between each terminal with TESTER. In case that electrical current has been blocked, exchange the THERMAL RELAY or auxiliary contact point unit.

- Examine the R,S,T phase of oil pressure motor.
- May you have trouble after following above referred inspection, check the contact point of input signal X3.2(NORMAL ON).

Solution:

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

X03	7	6	5	4	3	2	1	0
						0		

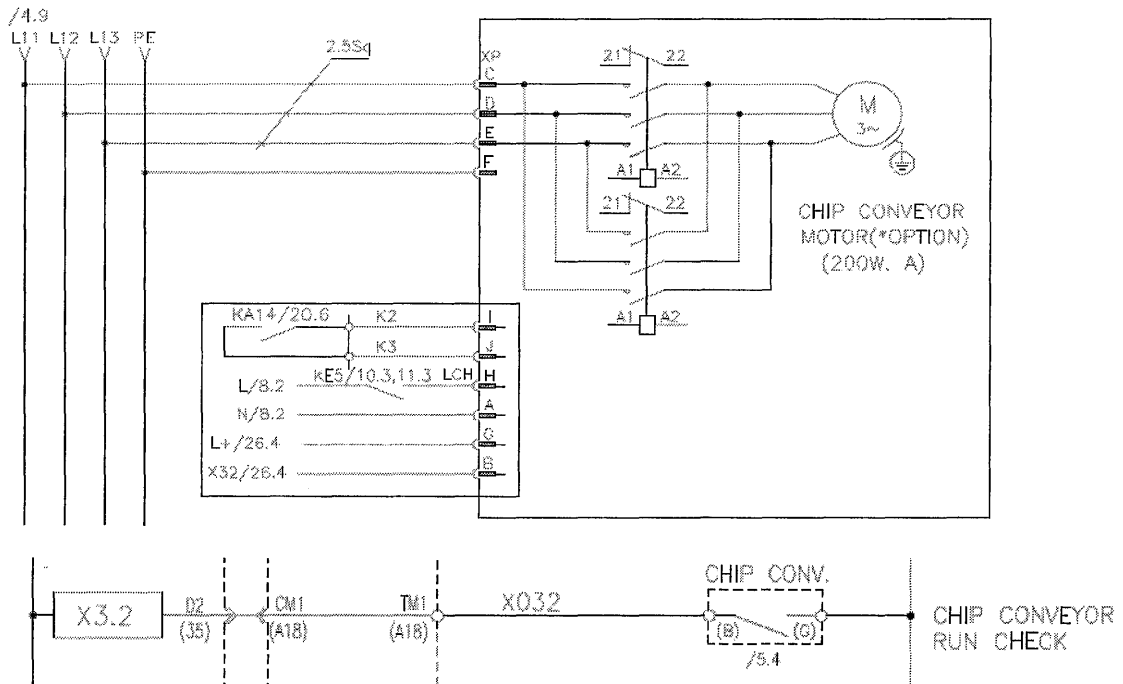
If input signal, X3.2 is displayed as 0, this means normal state.



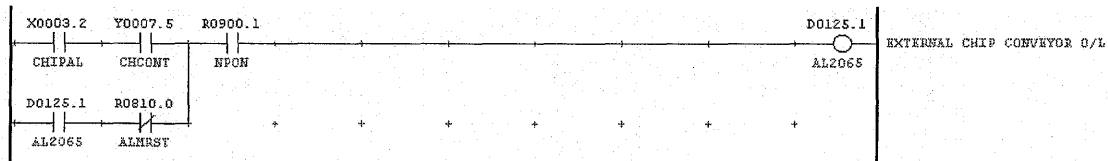
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC



Alarm occurs when OCR is tripped due to the overload of the EXTERNAL CHIP CONVEYOR motor. (X3.2 becomes '1') after M/C READY.

=>Check the OCR setting value.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2067 LUB. PRESSURE CHECK ERROR AT LUB. MOTOR OFF

Cause:

- Pressure switch doesn't become 'OFF' although certain period of time(over 3 seconds) has passed after the lubrication pump motor is stopped(MOTOR OFF).
- Fault in the wiring.
- DATA TABLE setting value error

Conditions:

- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on
- Unable to operate CYCLE START

Actions:/Procedures:

- Check the operation of the pressure switch for lubrication in case that lubrication pump stops.
- Check the wiring if the pressure switch for lubrication doesn't work properly.

Solution

- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X1 => Search

X01	7	6	5	4	3	2	1	0
	0(1)							

Check if input signal X1.2 becomes '0'(or '1')

- Confirming the electric Diagram





2068 B AXIS INDEX POSITION ERROR

Cause:

- INDEX command of B axis is issued in the area where the rotation command is prohibited.

Conditions:

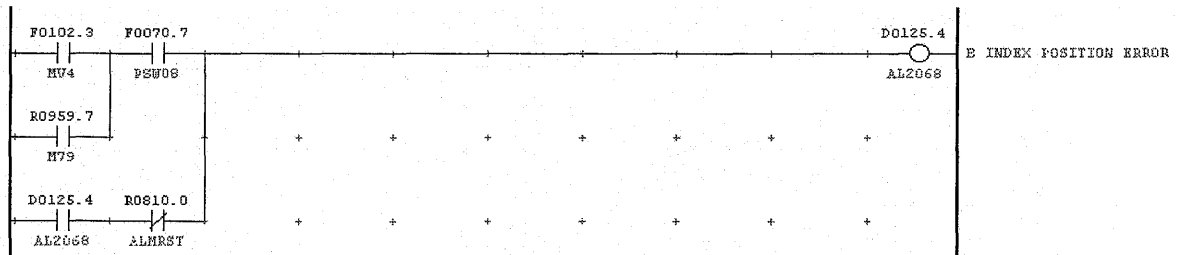
- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions: /procedures:

- Reset the alarm and execute the INDEX operation of B axis.

Solution:

- Modify the processing program
- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2069 CE(OPERATOR) DOOR OPEN ERROR

Cause:

- OPERATOR DOOR is being opened when the processing program is executed.
- Malfunction of the DOOR LOCK UNIT
- Fault in the wiring

Actions:/Procedures:

- Release the ALARM with pressing RESET button, close the door and then restart it.
- Check if the confirmation signal for DOOR CLOSE, X3.1, is ON(1) state in case that OP. DOOR is CLOSEed.

Solutions:

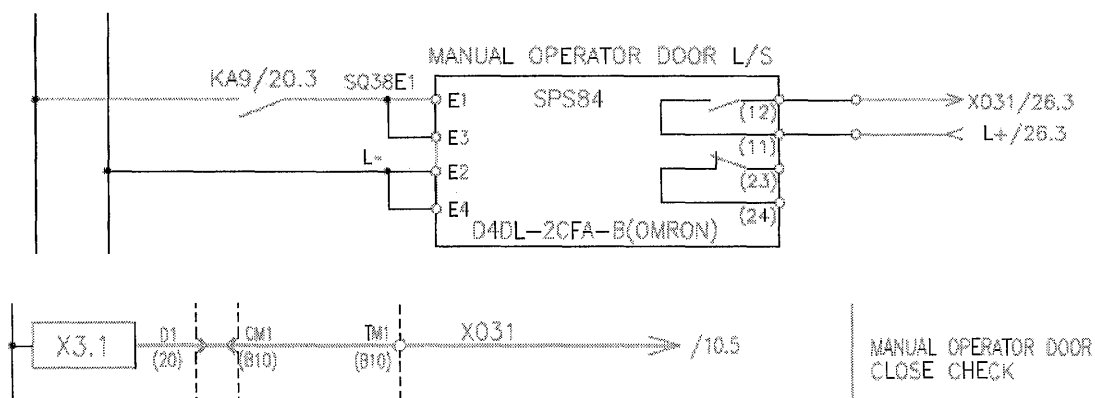
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X3=> Search

X03	7	6	5	4	3	2	1	0
							1	

It is a normal condition that X3.1 is 1 when the door is closed.

- Confirming the electric Diagram



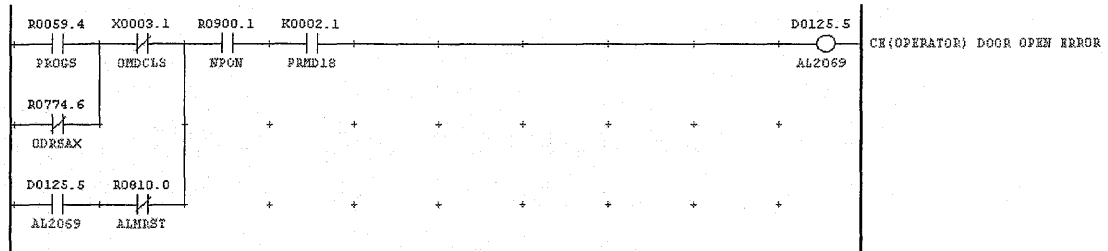
Check the confirmation signal of DOOR CLOSE X3.1 in the DOOR LOCKING UNIT.



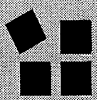
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



The program is not executed when door is being opened according to domestic PL(product liability) related safety specification. Close the door because ALARM occurs when door is being opened. Door is not opened while program is being executed automatically.



Alarm Message and Solution

2070 CE(ATC) DOOR OPEN ERROR

Cause:

- ATC OPERATOR DOOR is being opened in case of ATC operation
- Fault in the wiring

Actions:/Procedures:

- Cancel the ALARM with pressing RESET button, close the door and then restart it.
- Check if the confirmation signal for DOOR CLOSE, X3.1, is ON(1) state in case that OP. DOOR is CLOSEed.

Solutions:

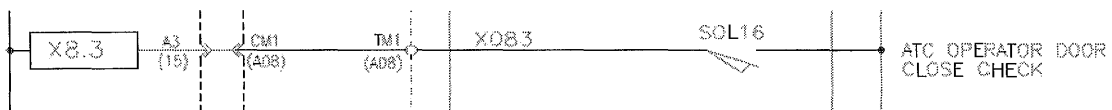
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X8=> Search

X08	7	6	5	4	3	2	1	0
	1							

It is a normal condition that X8.3 is 1 when the door is closed.

- Confirming the electric Diagram



Check the confirmation signal of DOOR CLOSE X2.0 in the DOOR LOCKING UNIT.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC

RO770.3	X0008.3	X0011.3	R0900.1	R0002.1	D0125.6	
MOGATE	A000CH	ATCDBL	HPON	PRMD18	AL2070	CR(ATT) DOOR OPEN ERROR
FO007.3						
FTF						
R0960.0						
HS0						
R0960.1						
HS1						
R0711.1	R0765.1					
MNAGTF	MANMD					
R0711.2						
MNAGTF						
D0125.6	R0810.0					
AL2070	ALMEST					

The program is not executed when door is being opened according to domestic PL(product liability) related safety specification. Close the door because ALARM occurs when door is being opened. Door is not opened while program is being executed automatically.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2071 CE(APC) DOOR OPEN ERROR

Cause:

- OPERATOR DOOR is being opened when the ATC program is executed.
- Malfunction of the DOOR LOCK UNIT
- Fault in the wiring

Actions:/Procedures:

- Release the ALARM with pressing RESET button, close the APC OP. DOOR
- Check if the confirmation signal for APC OP. DOOR CLOSE X2.0 is ON(1) state in case that OP. DOOR is CLOSEed.

Solutions:

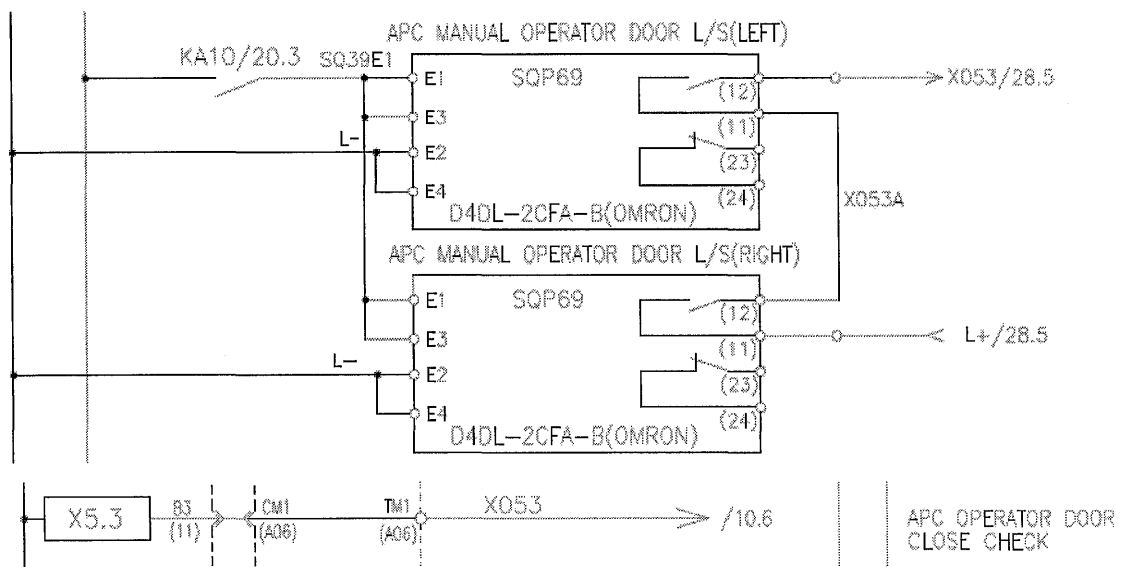
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X5=> Search

X05	7	6	5	4	3	2	1	0
	1							

It is a normal condition that X5.3 is 1 when the door is closed

- Confirming the electric Diagram



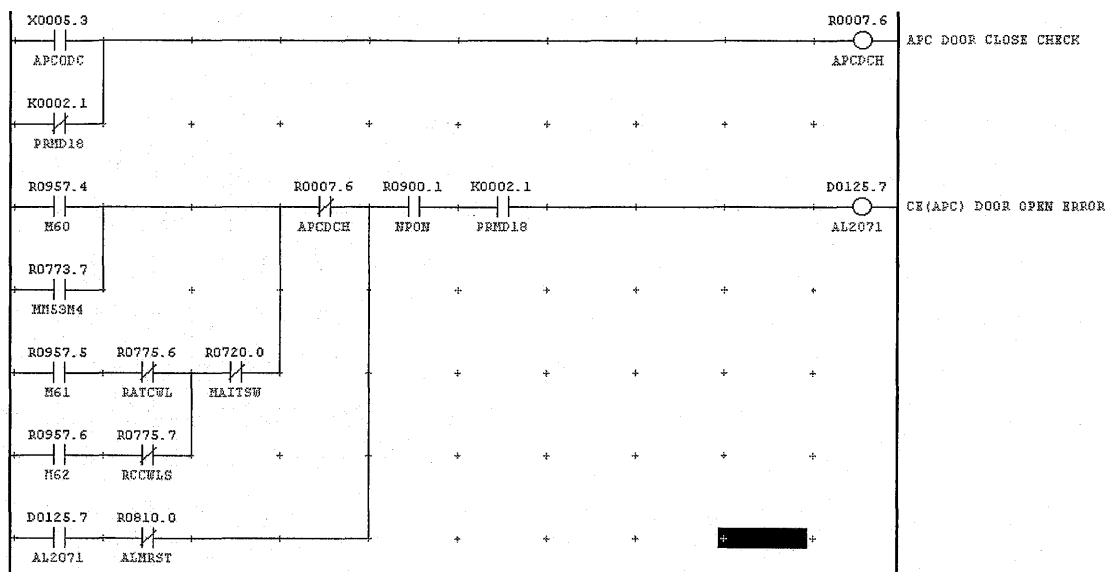
Check the confirmation signal of DOOR CLOSE X5.3 in the DOOR LOCKING UNIT.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



The program is not executed when door is being opened according to domestic PL(product liability) related safety specification. Close the door because ALARM occurs when door is being opened. Door is not opened while program is being executed automatically.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2072 MANUAL OPERATOR DOOR OPEN ERROR

Cause:

- MANUAL OPERATOR DOOR is being opened when the APC program is executed.
- Malfunction of the DOOR LOCK UNIT
- Fault in the wiring

Actions:/Procedures:

- Release the ALARM with pressing RESET button, close the door and then restart it.
- Check if the confirmation signal for DOOR CLOSE, X2.0, is ON(1) state in case that OP. DOOR is CLOSEed.

Solutions:

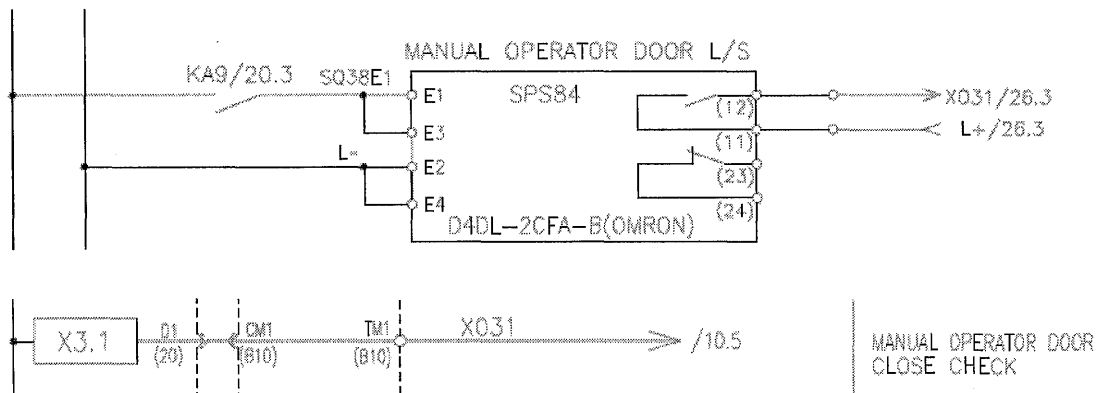
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X3=> Search

X03	7	6	5	4	3	2	1	0
							1	

It is a normal condition that X3.1 is 1 when the door is closed.

- Confirming the electric Diagram



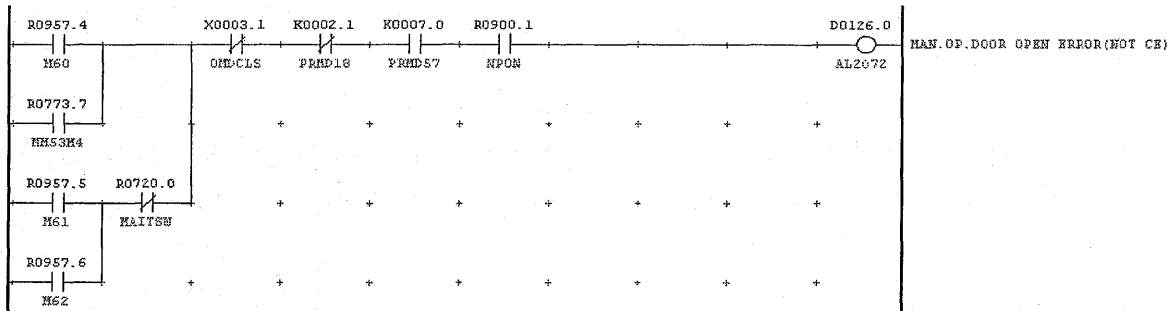
Check the confirmation signal of DOOR CLOSE X3.1 in the DOOR LOCKING UNIT.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the PMC



The program is not executed when door is being opened according to domestic PL(product liability) related safety specification. Close the door because ALARM occurs when door is being opened. Door is not opened while program is being executed automatically.



2073 MANUAL MAGAZINE INDEX ERROR

Cause:

- Although the limit switch for TOOL POT SP. SIDE or TOOL POT MAG. SIDE doesn't operate, MAGAZINE INDEX operation is executed manually
- Malfunction of the limit switches for POT SP. SIDE and MAG. SIDE and fault in the wiring

Condition:

- Alarm Lamp in operator panel is on
- FEED HOLD in operator panel is on
- CALL LIGHT and BUZZ is on

Actions:/Procedures:

- M998; At MAINTANANCE MODE, execute M62;(POT SP. SIDE),M61;(POT MAG.SIDE) command repeatedly to check the interruption and operation of the limit switch.
- Adjust position of the switch or check the wiring unless X9.6 and X9.7 operated correctly.

Solution:

-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X9 => Search

X9	7	6	5	4	3	2	1	0
	1(0)	0(1)						

In case of POT SP. SIDE, signal X9.6 and X9.7 become 0 and 1 in normal state

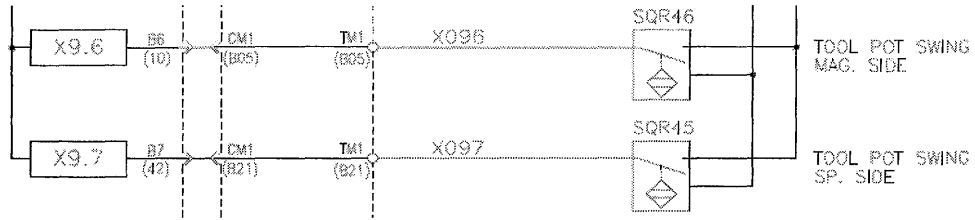
Or in case of POT MAG. SIDE, signal X9.6 and X9.7 become 1 and 0 in normal state



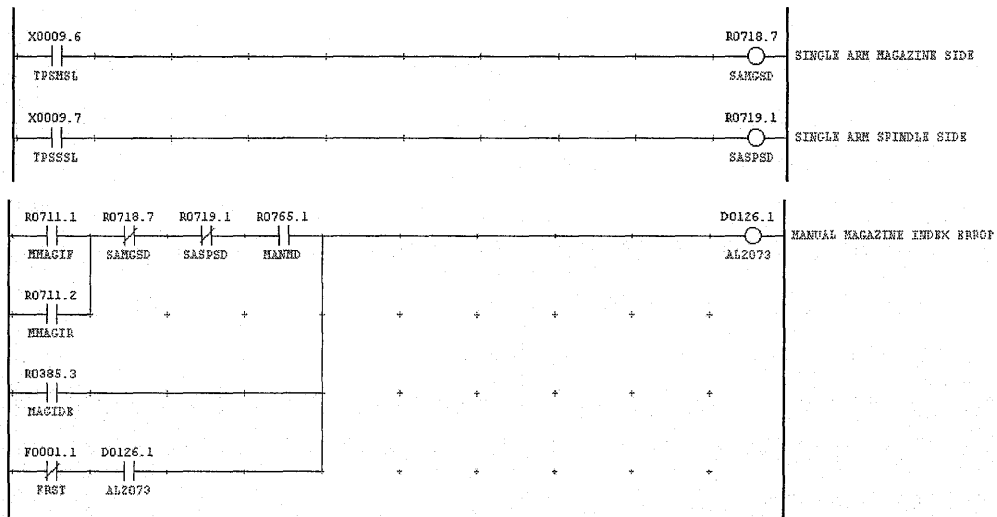
Alarm Message and Solution

HYUNDAI-KIA MACHINE

- Confirming the electric Diagram



- Confirming the PMC





2074 MAINTENANCE M-CODE COMMAND ERROR

Cause:

- M61(TOOL POT MAG. SIDE) is issued at the MAINTENANCE MODE in case that the Standby TOOL number is not accordance with the MAGAZINE CHAIN number.

Condition:

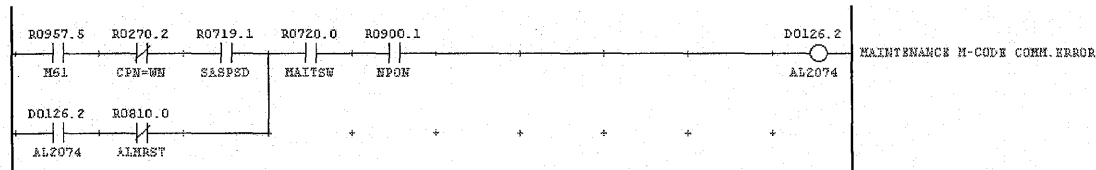
- Alarm Lamp in operator panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Reset the alarm condition and change the operation mode to manual mode. Match the TOOL NO.(D140) with MAG.CHAIN NO.(C02) by giving the MAGAZINE index order. And then execute M61(TOOL POT MAG.SIDE) at the MAINTENANCE MODE

Solution:

- Check the concerning DATA, TOOL NO.(D140) and MAG.CHAIN NO.(C02)
- Confirming the PMC





2075 TOOL LIFE END ERROR

Cause:

- Exchange the tool due to the Tool Life span has expired.
- DATA TABLE K6.5 setting error

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Reset the total usage number and time of Tool in the counter and then exchange an old tool with new one.

Solution:

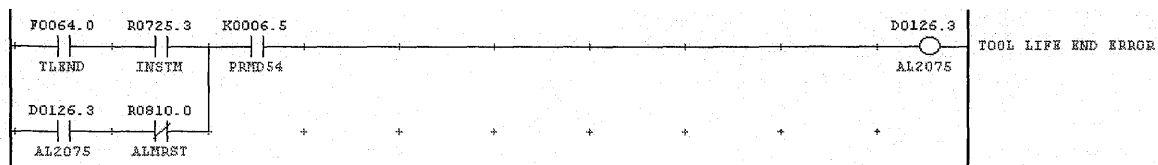
-Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>F64 => Search

F64	7	6	5	4	3	2	1	0
								0

In case that the Tool Life span has expired. a signal F64.0 is displayed as ' 1'.

- Confirming the PMC



If the COUNT reaches initial setting value and then F64.0(Signal for TOOL change) is output. In this case ALARM occurs. Release the Alarm with resetting the COUNT.



Alarm Message and Solution

HYUNDAI-KIA MACHINE

2076 TABLE/PALLET MAINTENANCE M-CODE ERROR

Cause:

- M24(PALLET UNCLAMP) or M22(TABLE UNCLAMP) is issued during TABLE UNCLAMP SOL or PALLET UNCLAMP SOL is operating at the MAINTENANCE MODE

Condition:

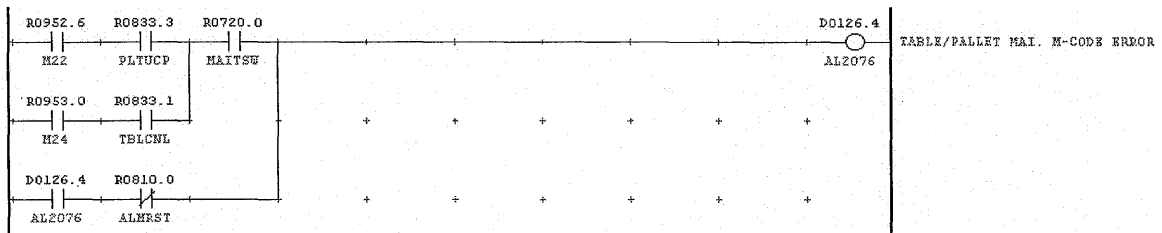
- Alarm Lamp in operator panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Issue the M21(TABLE CLAMP) and execute M24(PALLET UNCLAMP). Or Issue the M23(PALLET CLAMP) and execute M22(TABLE UNCLAMP)

Solution:

- Confirming the PMC





2077 MAGAZINE ALARM NO.

Cause:

- Alarm condition is detected in the MAGAZINE SERVO SYSTEM

Condition:

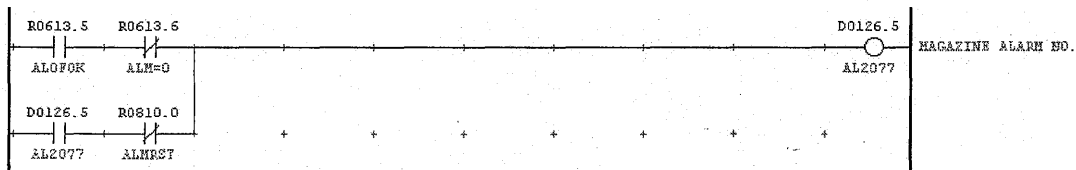
- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Check the alarm number which is displayed in PMM of MAGAZINE SERVO SYSTEM. Or Check the alarm number which is shown at MAGAZINE AMP in the electrical box. And then refer to the NC maintenance manual.

Solution:

- Confirming the PMC





2078 MAGAZINE POWER OFF REQUIRE

Cause:

- This message is displayed in case that the origin setting of MAGAZINE SERVO MOTOR (PM11 #0="1") is finished

Condition:

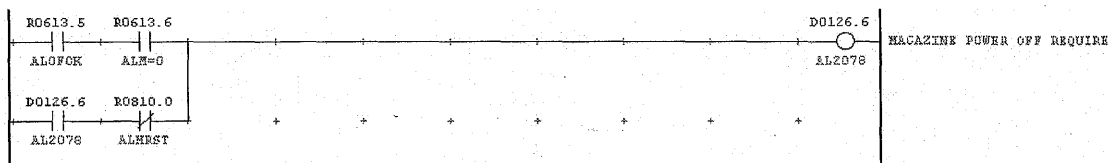
- Alarm Lamp in operator panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

Turn the NC power off and on again.

Solution:

- Confirming the PMC





2079 BETA-AMP. ADJUST MODE

Cause:

- Input "1" at K2.7 to reset the origin of MAGAZINE SERVO MOTOR

Condition:

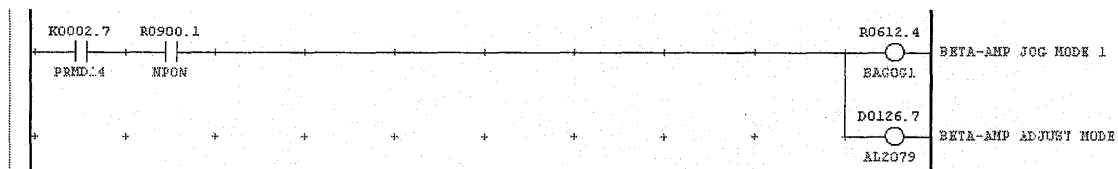
- Alarm Lamp in operator panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Change K2.7 value to "0" after resetting the origin of MAGAZINE SERVO MOTOR

Solution:

- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2081 ATC CAM UNIT INVERTER ALARM

Cause:

- Alarm is detected at the inverter which is for operating ATC TWIN ARM.

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Reset and check the ALARM NO. displayed at the inverter which is for operating ATC TWIN ARM. And then refer to the inverter manual.

Solution:

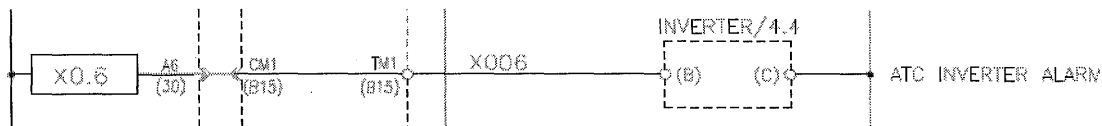
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X0=> Search

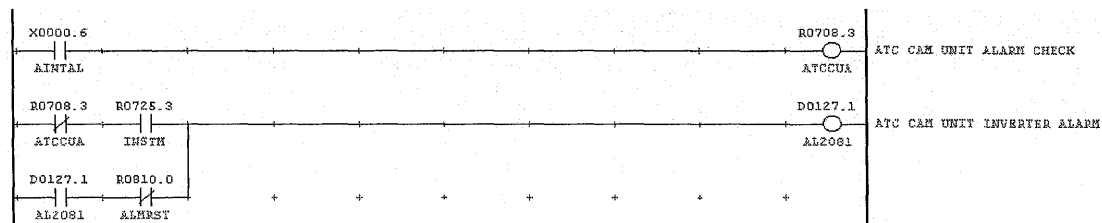
X00	7	6	5	4	3	2	1	0
		1						

X0.6 is "1" when ALARM occurs.

- Confirming the electric Diagram



- Confirming the PMC





2084 CUTTING TOOL OVERLOAD ALARM

Cause:

- TOOL overload alarm is detected in the cutting observance device.

Condition:

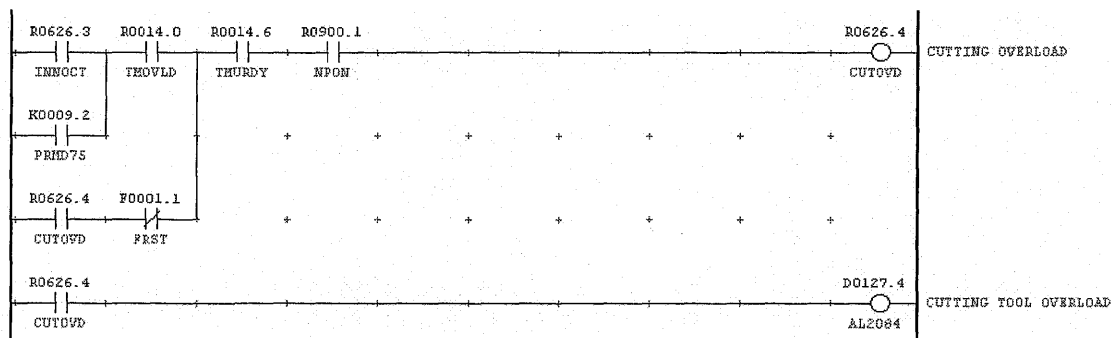
- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Reset and check the condition of present working tool. And change the tool if it is worn or broken. Or if there is no problem in the tool condition, check the cutting observance device unit or the other wiring.

Solution:

- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2085 CUTTING MONITOR NOT READY ALARM

Cause:

- NOT READY signal is detected in the cutting observance device.

Condition:

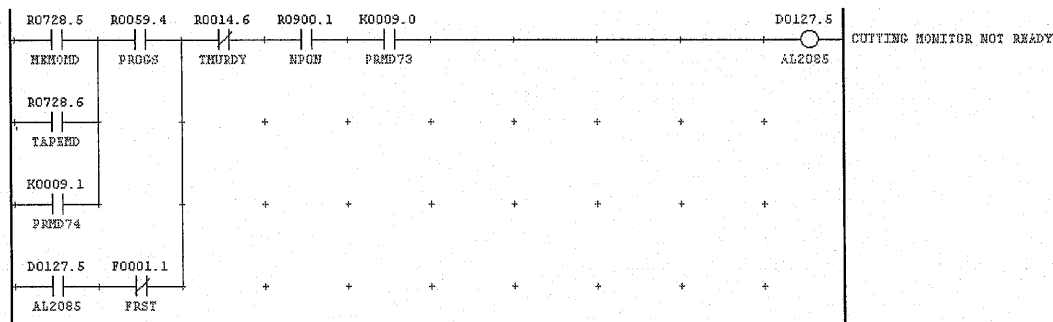
- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Reset and check the cutting observance device unit or the other wiring.

Solution:

- Confirming the PMC





2086 TOOL LIFE END ALARM

Cause:

- Tool Life span has expired

Condition:

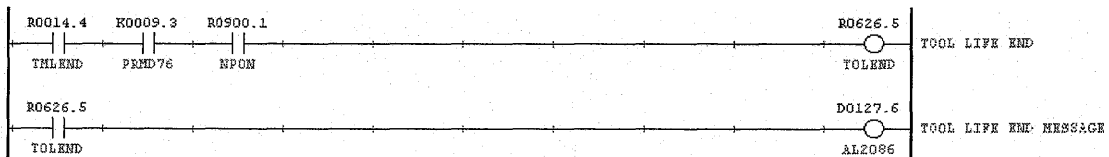
- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Reset and check the condition of present working tool. And change the tool with new one in case that the tool life span has expired. If there is no problem in the tool condition, check the cutting observance device unit or the other wiring.

Solution:

- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2089 NO OPTION ERROR

Cause:

- No option key operated at operation SHEET KEY.

Condition:

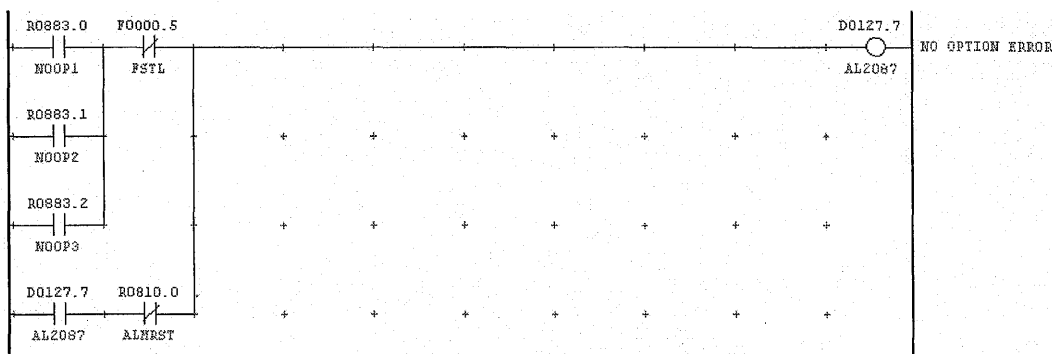
- Alarm Lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

- Reset and check the DATA TABLE which is related to the option appliance. If there is no problem in the DATA, check the wiring of SHEET KEY.

Solution:

- Confirming the PMC





2088 SPINDLE HEAD TEMPERATURE SENSOR OPEND

Cause:

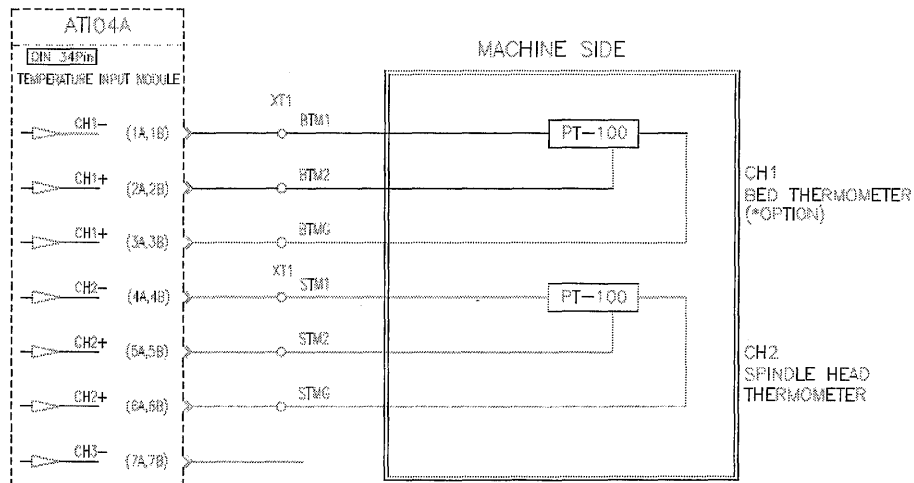
- Abnormal signal from the temperature sensor for the compensation device of spindle temperature displacement or fault in the wiring is detected.

Actions:/Procedures:

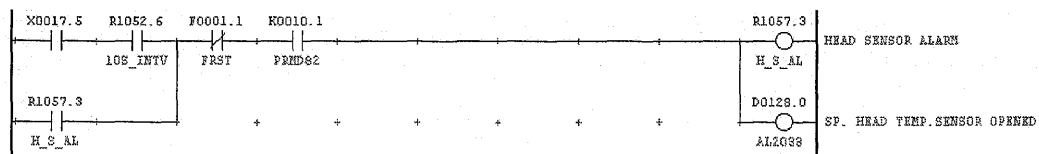
- Check the malfunction of the spindle temperature sensor or fault in the wiring.
- If there is no problem in the wiring, change the temperature sensor.

Solution:

- Confirming the electrical diagram



- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2089 BED TEMPERATURE SENSOR OPEN

Cause:

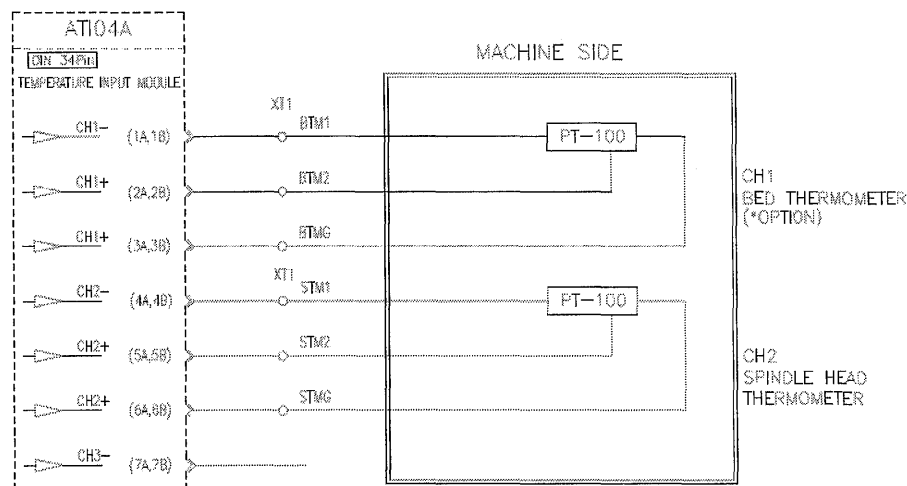
- Abnormal signal from the BED temperature sensor for the compensation device of spindle temperature displacement or fault in the wiring is detected.

Actions:/Procedures:

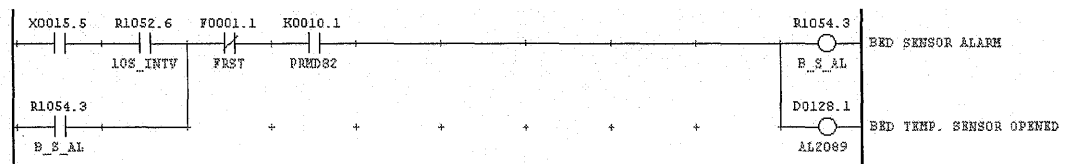
- Check the malfunction of the BED temperature sensor and wiring.
- If there is no problem in the wiring, change the temperature sensor.

Solution:

- Confirming the electrical diagram



- Confirming the PMC





2090 TEMPERATURE COMP. SENSOR ALARM

Cause:

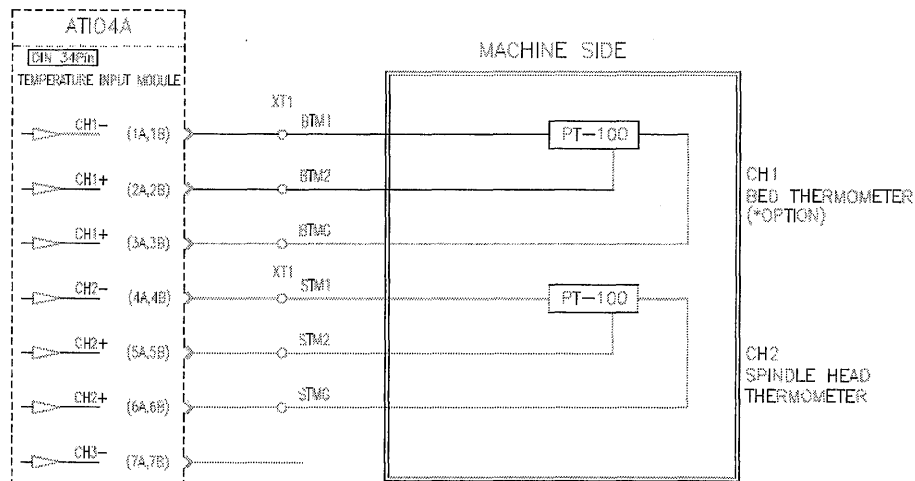
- Temperature of present using spindle and BED is higher than +2°C which temperature of past using spindle and BED is .

Actions:/Procedures:

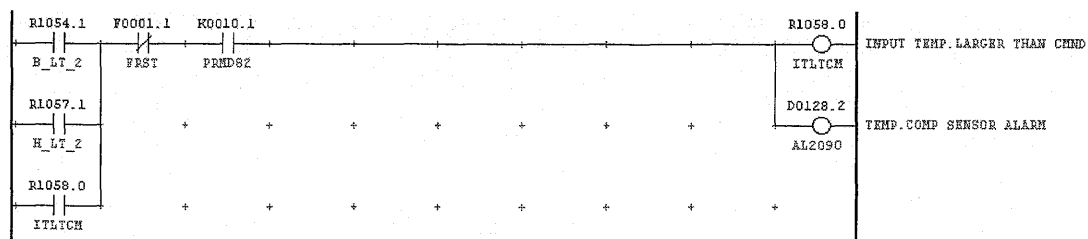
- Check the malfunction of the BED temperature sensor or fault in the wiring.
- If there is no problem in the wiring, change the temperature sensor.

Solution:

- Confirming the electrical diagram



- Confirming the PMC





Alarm Message and Solution

HYUNDAI-KIA MACHINE

2091 SPINDLE HEAD OVERHEAT

Cause:

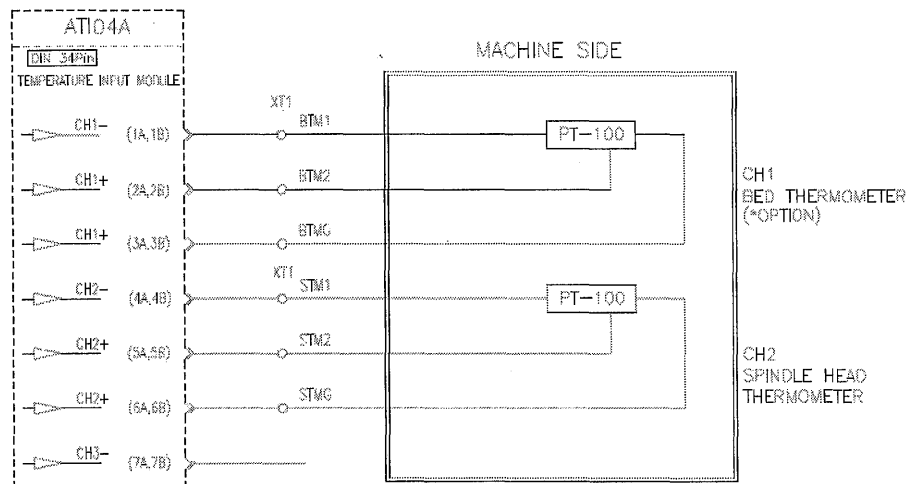
- Temperature difference between the SPINDLE HEAD and BED is over 20°C

Actions:/Procedures:

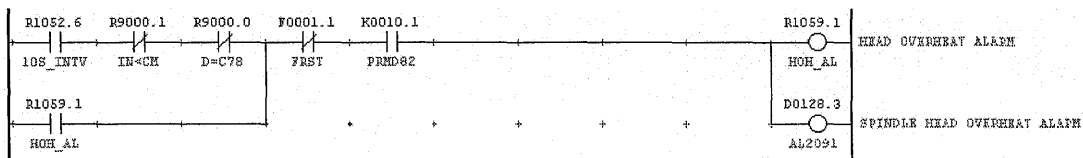
- Check the malfunction of the BED temperature sensor or fault in the wiring.
- If there is no problem in the wiring, change the temperature sensor

Solution:

- Confirming the electrical diagram



- Confirming the PMC





2096 MIST COLLECTOR OVERLOAD ALARM

Cause:

- OCR has been tripped due to over-current flowed into the motor result from overload of the MIST COOLECTOR motor
- Fault in the THERMAL RELAY setting
- Phase missing of 3 phase power source and Faults in the wiring.

Condition:

- Alarm Lamp in operation panel is on
- Feed hold lamp in operation panel is on
- CALL LIGHT and BUZZER are on

Actions:/Procedures:

Warning
<ol style="list-style-type: none">1. Check the wiring after shut off power source2. There is possibility of motor damage in case of continuous THERMAL RELAY trip. After inspecting the below-mentioned facts certainly, remove the reason of overload before operation.

- Turn THERMAL RELAY on in electrical box, and then inspect the resistance between each terminal with TESTER. In case that electrical current has been blocked, exchange the THERMAL RELAY or auxiliary contact point unit.
- Examine the R,S,T phase of oil pressure motor.
- May you have trouble after following above referred inspection, check the contact point of input signal X0.7(NORMAL ON).
- Check the DATA TABLE SETTING value.



Alarm Message and Solution

Solution:

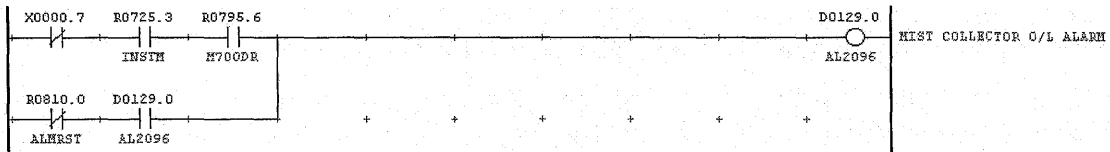
- Information of DGN

SYSTEM =>PMC =>PMCDGN=> STATUS =>X0 => Search

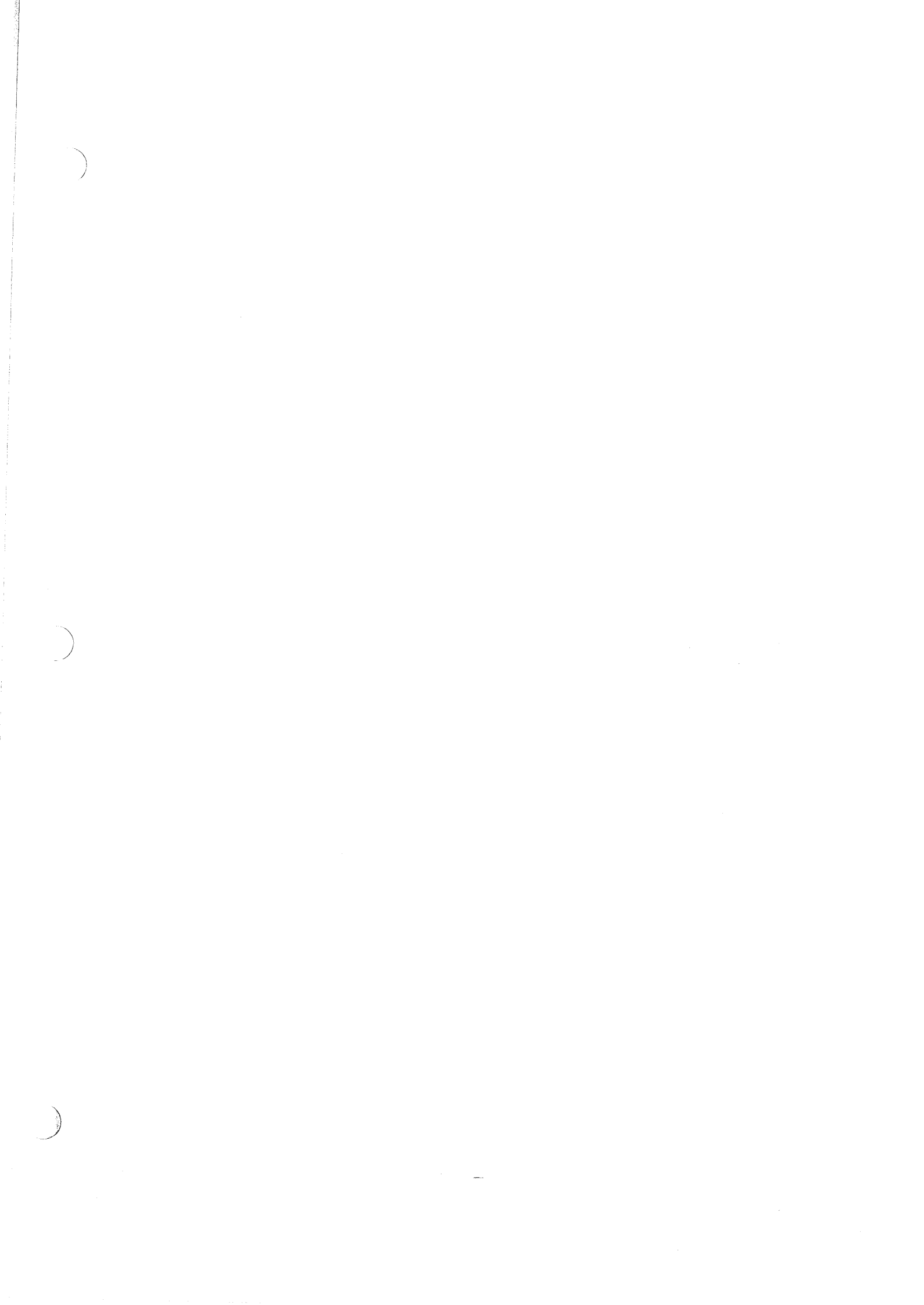
X00	7	6	5	4	3	2	1	0
	1							

It is normal condition when the input signal X0.7 is "1"

- Confirming the PMC



Alarm occurs when OCR is tripped due to the overload of the lubrication motor.(X0.7 turns 'off') after M/C READY. =>Check the OCR setting value.



Chapter 10

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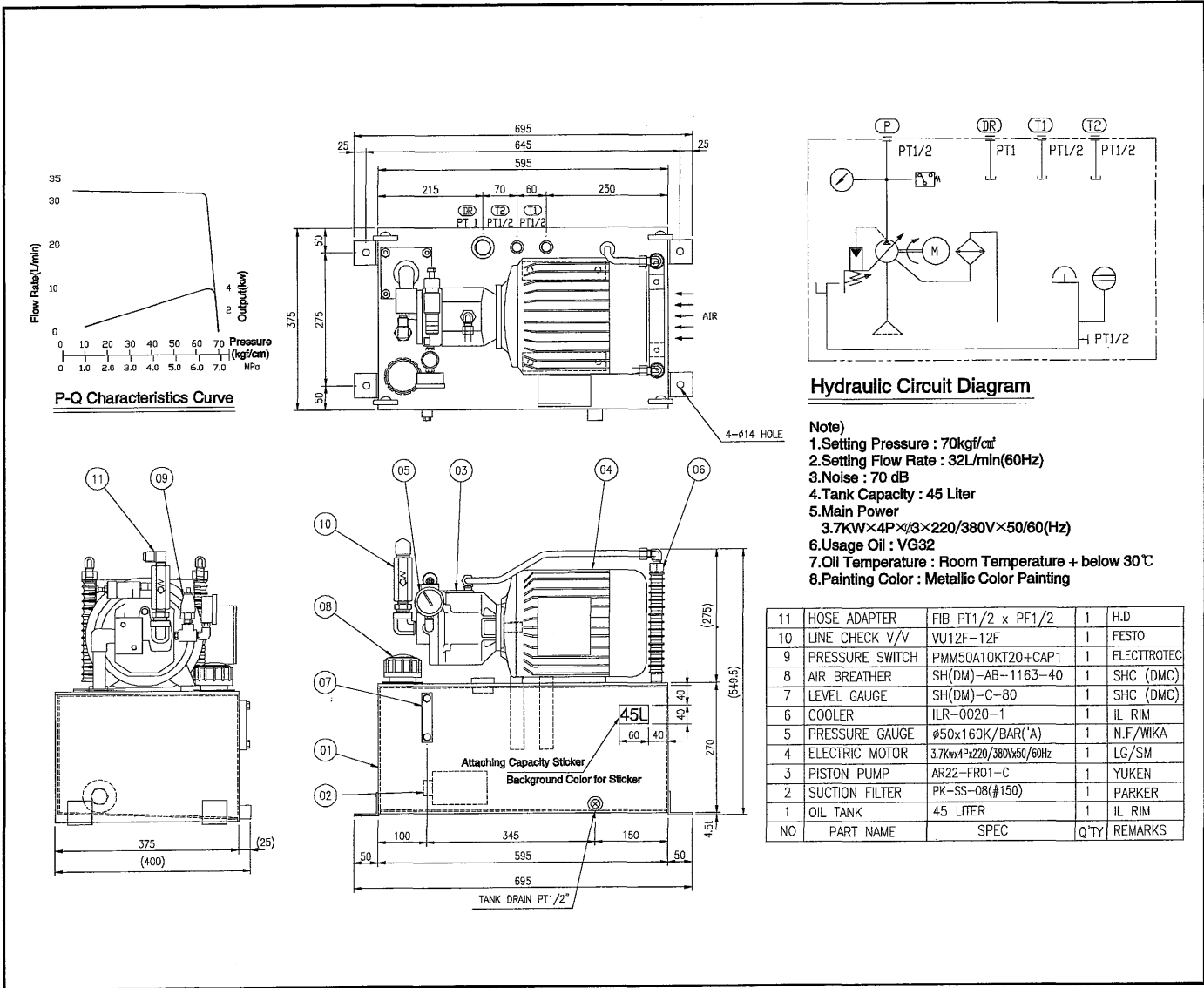


Reference

HYUNDAI-KIA MACHINE

10.1 Hydraulic Driving Unit

10.1.1 Adjusting of Hydraulic Unit



〈Figure 10-1 Hydraulic Unit〉



Reference

HYUNDAI-KIA MACHINE

10.2 Water Chiller

10.2.1 Specification

Specifications		Unit	50/60 Hz	
Cooling Function	Cooling capacity	[Kcal/hr]	3,800/4,000	
	Control range	fix	[°C] (Inlet temp.)	10 ~ 50
		sync.		- 15 ~ + 15(for ambient temp.)
	Operating Range	fix	[°C] (Inlet temp.)	10 ~ 50
		sync.		10 ~ 45
	Accuracy	fix	[°C]	± 1
sync.			± 0.5	
Cooling type		fixed temp. control & machine body auto tracking		
Refrigerant	Kind	R-22		
	Volume	[grams] max.	1440	
	Oil	[ml]	550	
Compressor	Model & Maker	C-2R153H3S, Sanyo(Made in Japan)		
	Type	Hermatic Rotary Compressor		
	Power	[W]	1,100	
	Voltage	[V] 3-Phase	200 / 220	
	Amperage	[A] max.	6.23 / 7.14	
Pump	Model & Maker	CH2-30, GRUNDFOS(Made in Germany)		
	Volume	[Liter/min.]	60[l /min] @ 0.2[kg/cm ²]~20[l /min] @ 4.0[kg/cm ²]	
	Pressure (Test Condition)	[kgf/cm ²]	4.0 (at 20[Liter/min.])	
Pump Motor	Power	[W]	780	
	Voltage	[V] 3-Phase	200~220 //346~ 380 60[Hz]	
	Amperage	[A]	2.7	
Agiator Motor	Power	[W]	90	
	Voltage	[V] 3-Phase	220	
	Amperage	[A]	0.7	
Agiator Wing	Diameter	[mm]	140	
Fan Wing	Diameter	[mm]	350	



Specifications		Unit	50/60Hz
Fan Wing	Diameter	[mm]	350
Fan Motor	Power	[W]	200
	Voltage	[V] 3-Phase	220 // 380
	Amperage	[A]	0.55/0.62 // 0.32/0.36
Fittings	Inlet	2-PT 3/4" Socket	
	Outlet	PT 3/4" Socket	
Water Tank	Liter	85	
Main Power	Voltage	3-Phase 200 ~ 220[Vac] 60[Hz]	
Dimensions	Water Chiller	[mm]	W550 x H1235 x D510
Ship Weight		[kg]	195(include Water)
Paint		Powder Coat	Light Gray(Standard)
Note : Anti-freeze(Anti-freeze + distilled water 25% :75% Rate)			

10.2.2 Before Installing

- (1) Shocks or strong vibrations may cause changes or damages to Water Chiller. Please be careful when transporting or installing.
- (2) Coolant (R-22) is sealed inside. Please do not damage the interior pipes during installation or wiring.
- (3) Amount coolant sealed inside the Water Chiller has been adjusted appropriately. Please do not change the amount of coolant.
- (4) Please understand the user manual before installing.
- (5) If the interior must be opened (top, front, rear, left or right cover opened) after installation, for reasons such as electrical wiring, please make sure the power is cut off beforehand. Should you work at powered state, please take safety cautions. When the interior is opened, the pipes inside are very hot. Also, be careful of the rotating Fan Motor.
- (6) Cooling and heating is done automatically depending on the temperature conditions.
- (7) Replenish oil or lubricants up to the level indicated on the caution label on the left and right of the gauge at the front of the unit. When replenishing, open the cover at the front of the unit. This unit has a port for the overflow pipe. When replenishing oil, fill it until it starts flowing out of the overflow



port. Too much oil may cause overflow.

- (8) This unit has a Self-Suction Type Centrifugal Pump. Allow filtered clean water to be supplied to the oil pipe. Dirty water may cause damages to the pump and a drop in cooling efficiency.

10.2.3 How to Install

1. Location

- (1) Please install in a well-ventilated location with good air circulation. Secure enough space to allow smooth air flow into the air inlet (air filter part) and exhaust from the top and front pipes. Make sure that the exhaust air does not come in direct contact with the machine. It may be a direct cause in changing thermal displacement and the operating machine.
- (2) Please install at a temperature between 10 °C and 45 °C. Especially avoid installing where the temperature is over 45 °C.
- (3) Please make sure to level the unit when installing.

2. Pipes

On the Water Chiller tank, there is one outlet (overflow) pipe and one inlet socket.

Size of the inlet/outlet is PT/NPT 3/4" (25A) female. Please use the supplied hose for piping. Please install so that there is no sharp curves or bends on the pipe structure. It may cause the unit's tank to overflow.

To prevent air inflow or oil leaks during piping, please use sealants or Teflon tapes. However, make sure that these materials do not enter the pipes' interior.

Select a hose for oil with interior pressure of 12 kgf/cm² or less.

Short, straight pipes are preferred. Long pipes or curves are main causes for decrease in oil supply. Use straight piping wherever possible.

(1) Inlet/Outlet Pipe

- 1) For smooth circulation of oil and appropriate cooling efficiency, there is one 25 A (PT 3/4") Inlet pipe Socket. Should you need to adjust the amount of oil, use the valve. When assembling the fitting, use Teflon or other sealants to prevent oil leaks. However, make sure that these materials do not enter the pipes' interior.



- 2) Allow clean, filtered water to flow into the tank to prevent chips and other contaminants from blocking the oil pipe way in the Water Chiller.

3. Electrical Wiring

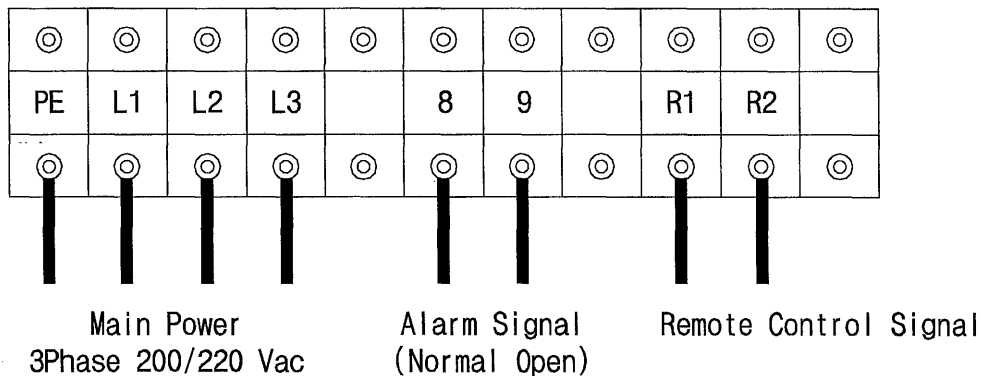
Water Chiller main power is 3-phase 220V. Operating at a different power supply may result in damage or malfunction. Refer to 'Figure 3' for wiring.

- (1) Open the 2 bolts on the control panel door to open the Control Panel.

- * At the completion of electrical wiring, before starting the Water Chiller, the door must be closed and fastened with bolts. Operating with the door open may allow contaminants to enter. This is a cause for wire disconnections, other malfunctions and electrocution. Please be careful.

- * For 3-phase power supply, if the R/S/T (or L1/L2/L3) phases are changed, the negative phase PCB inside the Water Chiller will light the Negative Phase LED (Red) and stop the unit. In this case, change the 2 of the 3 main power phases.

- (2) Wire the alarm and remote control signal cable (RE1, RE2) accurately. Unconnected alarm signal cable may cause spindle and processing problems. Before wiring the remote control signal cable, remove the short bars on the terminal stand RE1 and RE2. (RE1, RE2 Common is factory default)



4. Mounting Temperature Sensors

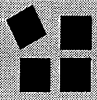
- (1) This unit has four temperature sensors.

- 1) Oil Temperature Sensor (ambient temperature sync type)

This sensor detects the temperature of the circulating oil supplied from the circulation pump attached on the tank inlet's side. Do not change the sensor's position or type. It may cause problems in operation or cooling effects.

- 2) Ambient Sensor (ambient temperature sync type)

It is attached on the side of the unit to measure the target temperature (or standard temperature). It measures the surrounding ambient

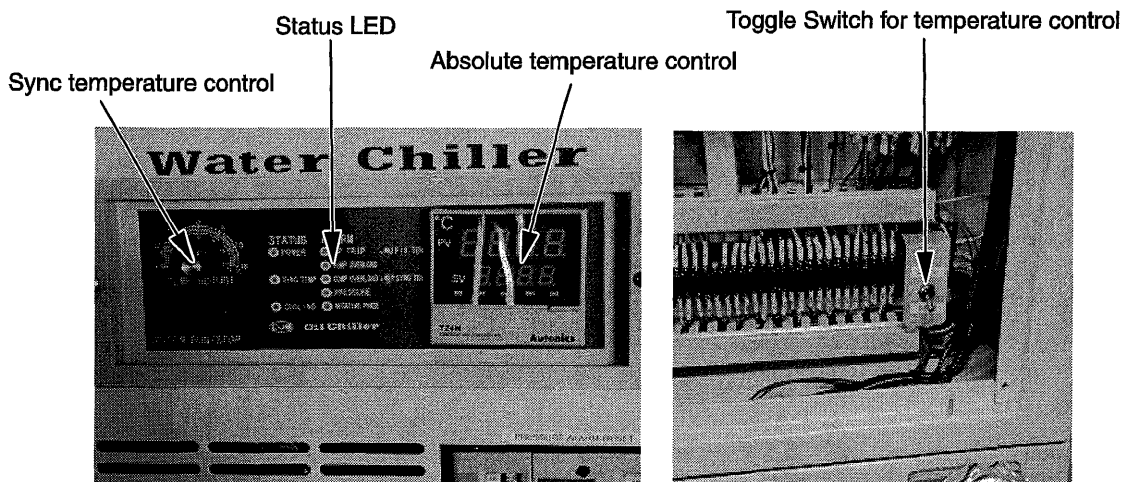


temperature or the machine's temperature. It is connected with 4,5 m lead wire to allow installations at desired locations. PT1/8" – 40mm can be attached as necessary.

- Measuring ambient Temperature: It can be used attached on the left side. We recommend installing on the machine's BED or column surface with a PT Tap. If above installation is not possible, you can install it at the measurement location. However, avoid locations with bad air circulation or difficult heat discharge, such as parts near where the machine generates heat (motor, oil pressure tank, cooling fan).
- Measuring machine temperature : Attach on the machine body with a tap (tap specs: 1/8"-40 mm)

(2) Setting the Temperature

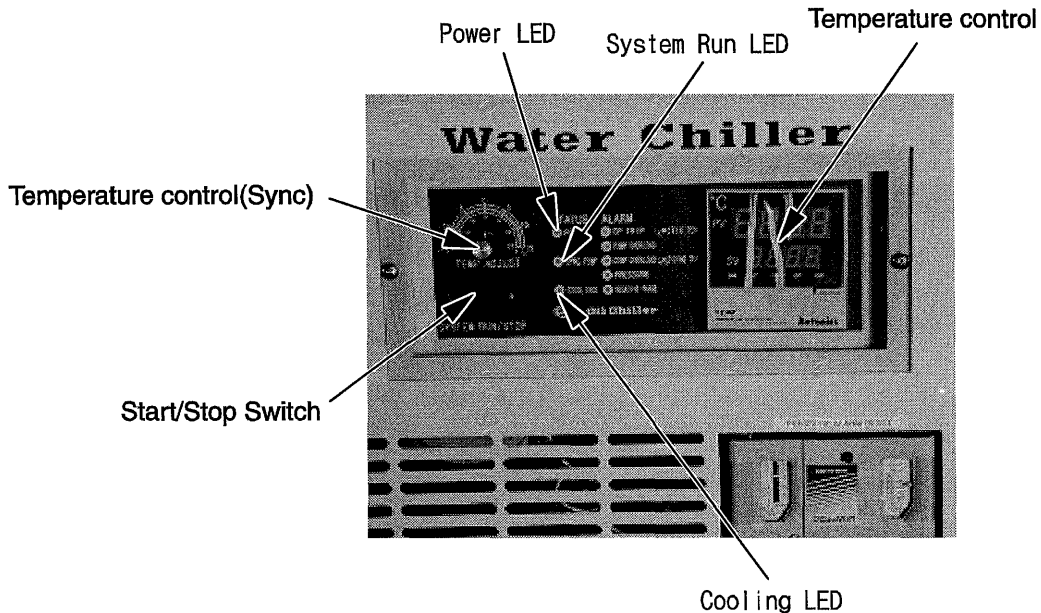
There are two ways to set the temperature. Open the unit's Operator Panel Door to access the Toggle Switch inside. Toggle this switch to select between fixed temperature control and absolute temperature control. The selected temperature control type LED lamp is lit. (Figure) Details are explained in "10.2.6 Setting the Temperature"





10.2.4 About the Operator Panel

1. Name and Function of Each Part



(1) Start/Stop Switch (Sync & fixed temperature control types)

See-saw type switch. Press the switch ("1") for automatic operation. If the oil temperature is low, the cooling unit may not operate. This is not a malfunction, and the unit will automatically start when the oil temperature rises.

(2) Temperature control knob (for sync temperature control type)

Marked from -15 to +15 in intervals of 5. Turn the knob to set the temperature.

(3) Status LED

There are a total of 13 LED lamps in the LED status indication and alarm indication parts. Each lamp is explained below.

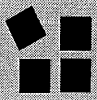
1) Power LED (Green)

LED is lit when normal power (AC 220[V] 60[Hz]) is supplied from the main machine to the cooling unit. Pressing the Start/Stop switch when this LED is lit will automatically operate the cooling unit depending on the changes in the oil temperature.

2) System Run LED (Green)

Indicates that the cooling unit's control system is in operation. This lamp is lit when the start/stop switch is pressed and there is no alarm conditions. Cooling unit will operate automatically depending on the temperature conditions.

3) Cooling LED (Green)



Indicates that the cooling unit and fan is in operation. Only when the start/stop switch is ON (1), it is lit automatically depending on the temperature conditions.

4) CP Trip LED (Red)

Indicates the cooling unit's temperature control type selection. Lights when the temperature control selection switch inside the control box is set to FIXED.

5) Compressor Overload LED (Red)

Indicates the cooling unit's temperature control type selection. Lights when the temperature control selection switch inside the control box is set to SYNC.

6) Pump Motor Overload LED (Red)

Indicates operation status of the oil heater inside the cooling unit. When the temperature of the overflow oil falls below the value set in the heater control, the heater will automatically start and the LED will be lit.

7) Pressure LED (Red)

Detects the oil level of the cooling unit tank. When it rises above the corresponding level, the cooling unit's circulation pump turns off and the LED will be lit. This LED automatically lights on and off depending on the oil level.

8) Negative Phase LED (Red)

Used to prevent reverse operation of the cooling unit when the 3-phase main power is connected in reverse or when one of the phases is open. It is used during initial installation. In this case reverse the connection of the two of 3-phase wires (refer to figure)

9) Compressor Overload LED (Red)

Lights when the overload current, caused by over-current from the compressor motor or the fan motor is detected. In this case, verify the compressor motor current and the overload current values and press the green RESET button near the OVERLOAD. Refer to "10.2.8.Troubleshooting" for details.

10) Pump Motor Overload LED (Red)

Lights when the overload current, caused by over-current from the pump motor is detected. In this case, verify the pump motor current and the overload current values and press the green RESET button near the OVERLOAD. Refer to "10.2.8.Troubleshooting" for details.

(11) HEATER Overload LED (Red); OPTIONAL PARTS

Lights when the overload current, caused by over-current from the heater is detected. In this case, verify the heater current and the overload current values and press the green RESET button near the OVERLOAD. Refer to "10.2.8.Troubleshooting" for details.



12) High Temp LED (Red)

Lights when the cooling unit's overflow oil temperature is above the set value. Lights when cooling does not work due to cooling unit problems, insufficient coolant, or other problems. Alarm LED lights up. In this case, resolve the cause of problem and restart. Refer to "10.2.8.Troubleshooting" for details.

13) Pressure LED (Red)

If a pressure above 25 [Kgs/cm²] or below 1.5 [Kgs/cm²] is detected in the piping system, the LET is lit. This may be caused by contaminants on the air filter and cooling radiator prevent air inflow, reverse fan motor rotation, or coolant leakages. Check the air filter, cooling radiator, fan and coolant. Refer to "10.2.8.Troubleshooting" for details.

10.2.5 Starting the Water Chiller

1. Sync Temperature Control

Temperature control selection switch is found in the lower right corner in the Control Box. Toggle the switch to SYNC.

- (1) Check that the start/stop switch is off. Toggle the switch left for ON and right for OFF.
- (2) Set the temperature control knob to +15 °C.
- (3) Supply power to the machine. If power is supplied to the machine normally, the Power LED (Green) on the Operator Panel is lit.
- (4) Adjust the temperature set to +15 °C in (1) to a desired value.

※ Refer to '10.2.6. Setting the temperature.'

- (5) Toggle the start/stop switch ON. The pump & compressor motor and the fan motor will start simultaneously. (However, the compressor and fan motor will start when the temperature condition is valid) The compressor and fan motor may not start depending on the temperature setting. This is not a malfunction. They will automatically start as the oil temperature rises.

※ Frequent On/Off switchings with the Cooling Lamp lit may cause serious problems in the cooling unit. After switching Off, wait 3 minutes before switching On again.

2. Fixed Temperature Control

Temperature control selection switch is found in the lower right corner in the



Control Box. Toggle the switch to FIXED.

- (1) Follow identical steps as (1) on page 9-13.
 - (2) Open the cover below the fixed temperature control.
 - (3) Use the temperature adjustment button to input the desired temperature data.
- ※ Methods to adjust temperature is explained in (2) fixed temperature control type on page 9-15.
- (4) With the desired temperature setting, the cooling unit will operate automatically when the oil temperature rises above the set value.

10.2.6 Setting the Temperature

1. Temperature Control Types

You can select temperature sync or fixed control types for the cooling unit. Make your selection depending on the oil type and application.

(1) Ambient temperature sync type

Refer to (2) on page 9-10 to switch the temperature control type to ambient temperature sync type. This method maintains the difference (value set by the user using the temperature adjustment knob) between the temperature detected by the ambient sensor and the oil temperature sensor. For example, if the temperature adjustment knob is set to +5 °C, the oil temperature can be 5 °C above the ambient temperature. If the air temperature is 30 °C, the oil temperature can be 35 °C. Therefore, it is different from maintaining a fixed temperature (ex : 35 °C).

1) Setting

Refer to 4. Mounting Temperature Sensors' on page 10-9 to verify that the ambient sensor is mounted in the desired location. Refer to (2) on page 10-10 to switch the temperature control type to SYNC.

- 2) Use the temperature adjustment knob on the Operator Panel to set the desired value on the circular scale. (ex : with the sensor fixed on the machine body, to make the machine temperature and the oil temperature identical, set the scale to '0')
- 3) If the oil temperature is lower than the ambient temperature, the cooling unit will not operate. It will start automatically when the oil temperature rises above the set value and will stop automatically if it falls below again. Toggling the start/stop switch to ON will cause automatic ON/OFF.

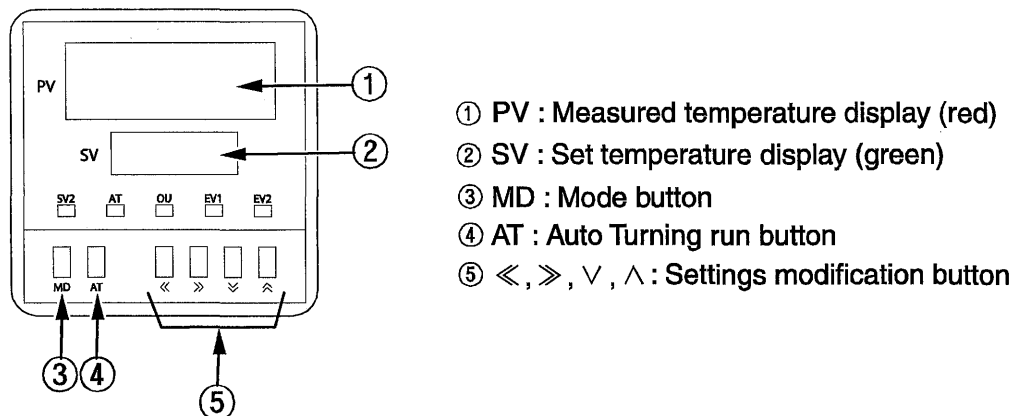


(2) Fixed temperature control type

Refer to (2) on page 10-10 to switch the temperature control type to fixed temperature control type. This method maintains the overflow oil temperature to a set value using the sensor on the circulation pump overflow. It controls the cooling unit by the set temperature, not depending on the ambient temperature. For example, setting the desired temperature to 25 °C on the temperature controller will cause automatic cooling operation when the overflow temperature rises above 25 °C. Conversely, it will automatically stop when the overflow oil temperature falls below 25 °C. Here, to prevent frequent operations of the cooling unit, a parameter value is used to delay the cooling unit operation (factory default for On/Off Delay Parameter is 1 °C). For example, if oil temperature management is required at 25 °C, the cooling unit will actually start operating at 26 °C and stop at 24 °C.

2. How to Input Temperature Controller Data

(1) Cooling Temp. & Heating Controller Buttons



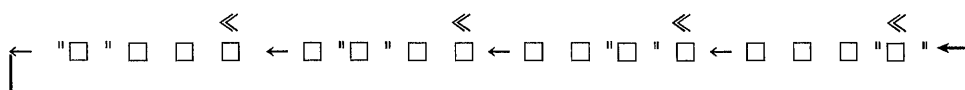
(2) How to input data

Methods to input data on the Cooling Temp. Controller and the Heating Controller are identical.

1) During operation, press the << to modify the temperature setting. The "ones" digit in the SV display will light up.

□ □ □ "□"

2) Press the digit key to light the next digits.





- 3) When the digit you want to change is lit, press the \wedge , \vee to change the number.
- 4) Press the MD button when complete. Lights will go off and setting will be complete, returning to operation.

3. Temperature Control Input Data

(1) Cooling Temp. Input value

This input data may change depending on the user's environment. Refer to 2. on page 10-16 to input your data.

(2) Heating Temp. Input Value ; OPTIONAL PARTS

This input data may change depending on the user's environment. Refer to 2. on page 10-16 to input your data. However, data in 10.2.2 must be 1[°C] less than the data in 10.2.1. Identical data can be used but simultaneous operations of the cooling unit and the heater may be a cause for lower durability and efficiency.

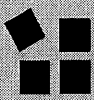
ex) Desired temperature for oil : 25[°C]

- Cooling Temp. Controller Data : input 25[°C]

- Heating Controller Data : input 25[°C] - 1[°C] = 24[°C]

10.2.7 Check List and Procedures

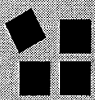
Target	Location	Period	Procedure	Misc
Air Filter	Black net in the machine's front	At least once a week	Remove air filter and wash with warm water. Completely dry or blow with air gun to remove filter blocks.	May cause decrease in cooling efficiency and damages to cooling unit
Cooling Radiator	Inside the air filter in machine's front	At least once a month	Dust with soft brush and blow with strong air gun to remove contaminants between the fins.	
Tank	Lower part of machine	Once a quarter	Completely remove oil and remove the side cover. Remove grinding dust and other contaminants from tank's interior.	Contaminants may cause decrease in cooling efficiency and damages to parts



Reference

10.2.8 Troubleshooting

Trouble	Cause	Problem	Resolution
<ul style="list-style-type: none"> Negative Phase LED (green) lit 	<ul style="list-style-type: none"> Reverse-phase prevention relay in the controller is in operation. 	<ul style="list-style-type: none"> Phase is reversed in the 3-phase power Main power open phase 	<ul style="list-style-type: none"> Switch the 2 of 3 phases Verify the main power voltage and reconnect the open phase.
<ul style="list-style-type: none"> Pressure LED (red) lit 	<ul style="list-style-type: none"> Low pressure switched 	<ul style="list-style-type: none"> Coolant leakage 	<ul style="list-style-type: none"> Replenish coolant (contact A/S)
	<ul style="list-style-type: none"> High pressure switched 	<ul style="list-style-type: none"> Air inflow is not smooth Air exhaust is not smooth 	<ul style="list-style-type: none"> Clean air filter Clean cooling radiator Press the high pressure reset S/W Check fan motor operation. Press the high pressure reset S/W
Alarm LED (Red) Lit <ul style="list-style-type: none"> Compressor Overload LED (red) lit 	<ul style="list-style-type: none"> Compressor Motor Overload operation 	<ul style="list-style-type: none"> Overload operation cause by Compressor Motor 	<ul style="list-style-type: none"> Verify that overload current value is set correctly Verify that current value is detected correctly during compressor operation (contact A/S if over-current is detected) Verify defective compressor overload parts. Replace if defective. Verify that current value is detected correctly during fan motor operation (replace if over-current is detected)
<ul style="list-style-type: none"> High Temp LED (red) lit 	<ul style="list-style-type: none"> Protection mechanism when abnormal oil temperature is detected 	<ul style="list-style-type: none"> Cooling unit problem Temperature controller problem Temperature controller data input problem 	<ul style="list-style-type: none"> Verify operation of temperature controller Verify operation of cooling unit Verify oil level
<ul style="list-style-type: none"> Heater Overload LED (red) lit 	<ul style="list-style-type: none"> Compressor Motor Overload operation 	<ul style="list-style-type: none"> Overload from heater Overload parts damaged 	<ul style="list-style-type: none"> Replace heater Replace overload parts



Reference

Trouble		Cause	Problem	Resolution
Alarm LED (Red) Lit	• Oil circulation is not smooth	• Suction does not work	• Inlet Pump does not work	• Verify inlet pump operation • Replenish oil
		• Pipe is blocked	• Pipe is blocked or bent	• Remove blocks or bends in pipe
		• Air inflow	• Pipe is loose • Pump Housing Crack	• Tighten loose parts of pipe • Replace pipe
		• Pump does not rotate	• Contaminants in pipe • Pump damage	• Remove contaminants from inside the pipe • Replace damaged pipe
		• Oil circulation not possible	• Insufficient water in pump	• Replenish water inside pump
• Noise	• Noise from compressor	• Compressor damage	• Replace compressor (contact A/S)	
	• Noise from exhaust fan	• Fan hits surrounding objects during rotation	• Remove contaminant or cause for collision	



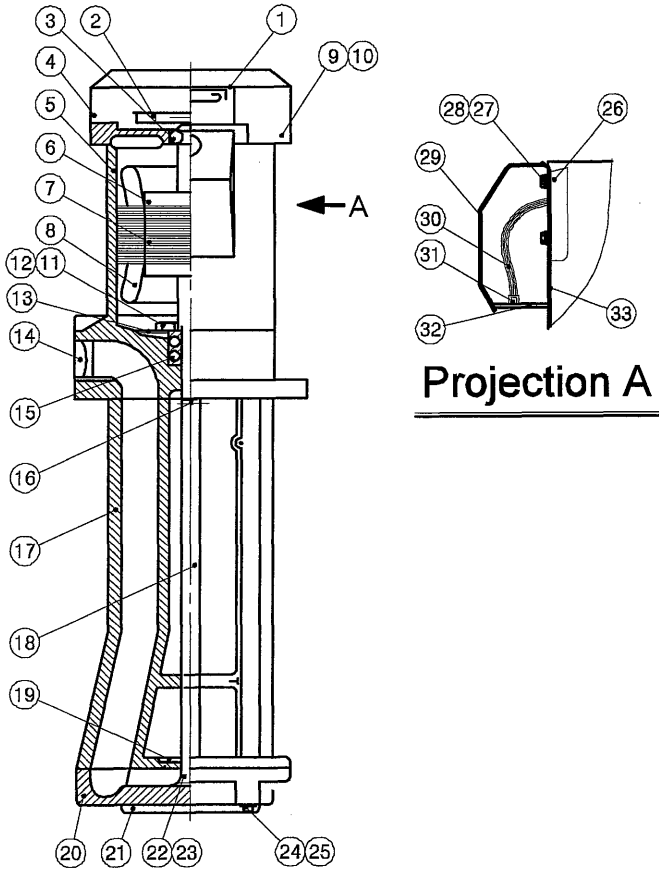
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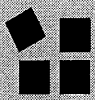
10.3 Coolant Pump

10.3.1 Flute Coolant Pump (Standard)

ACP-180F

NO	Part Name	Material	Qty	Spec.	Remark
1	FAN COVER	SB34	1		
2	FAN	SB41	1		
3	BEARING	6203zz	1	K.B.C	
4	MOTOR COVER	GC20	1		
5	MOTOR FRAME	ALDC	1		
6	STATOR	Si	1		
7	ROTOR	Si & Al	1		
8	COIL	Cu	1		
9	R-SCRAW(+)	S20C	3	M4x5	
10	FLAT WASHER	S20C	3	Ø4	
11	R-SCRAW(+)	S20C	2	M5x12	
12	WASHER	S20C	2	Ø5	
13	END COVER	SS41	1		
14	OIL CAP	PE	1	1"	
15	BEARING	6204zz	2	K.B.C	
16	OIL STOPPER	SS41	1		
17	PUMP BODY	GC25	1		
18	SHAFT	S45C	1		
19	ADJUST'G WASHER	Cu	1		
20	SPIRAL CASING	G05	1		
21	IMPELLER	BsBD	1		
22	R-SCREW(+)	S20C	1	M5x15	
23	TOOTH WASHER	S20C	1	Ø5	
24	R-SCREW(+)	S20C	3	M5x25	
25	SPRING WASHER	S20C	3	Ø5	
26	TERMINAL BOX PACKING	NBR	1		
27	R-SCRAW(+)	S20C	4	Mx12	
28	SPRING WASHER	S20C	4	Ø4	
29	TERMINAL BOX COVER	PE	1		
30	WIRE	Cu	3		
31	TERMINAL	Cu	3		
32	LEAD WIRE TUBE	NBR	1		
33	TERMINAL BOX	PE	1		

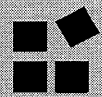




Reference

Table 10-1. ACP-180F Specification

Type Specification		ACP-180F	
Pump	Diameter (mm)	12.5	
	Outlet amount (ℓ /min)	75	90
	Total Dynamic Head (m)	3	
	Allowable viscosity (cSt)	75	
	Degree of filtration	Medium (max. length of chip filterable in the pump : 2,5 mm)	
	Material	Impeller, casing, outlet casing : GC	
Motor	Phase	3	
	Poles	2	
	Power (kW)	0.18	
	Voltage (V)	200	220/380
	Max. allowable current(A)	2.4	2.5/1.44
	Frequency (Hz)	50	60
	Revolution of motor (rpm)	2870	3450
	Class of insulation	E	
	Exterior temperature (°C)	-50 ~ +40	
	Temperature raising (deg)	Below 75	
	Rating	Continuous	
	Motor type	Totally enclosed type for indoor use	
	Bearing	Loading	6204ZZ
Anti-loading		6203ZZ	
Weight (kgf)		10.5	



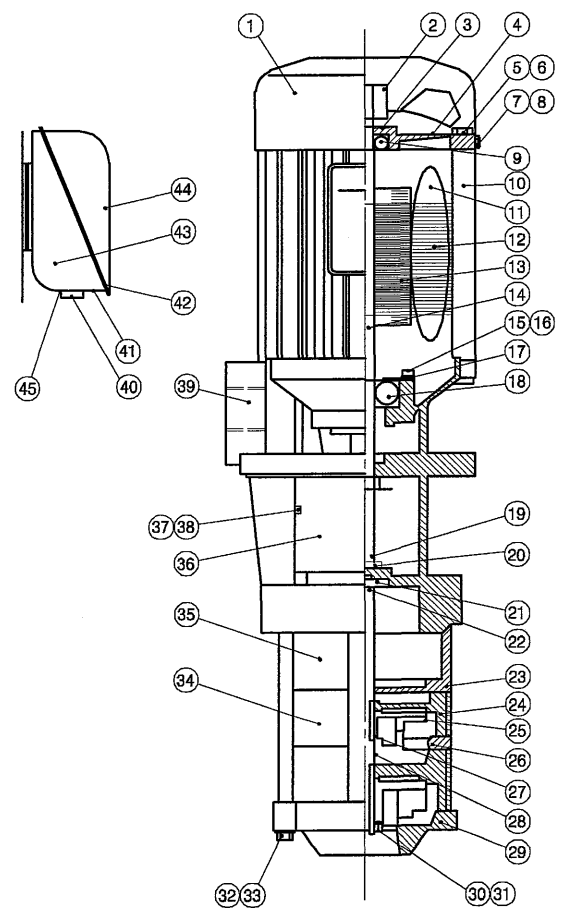
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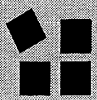
HYUNDAI-KIA MACHINE

ACP-900MF

10.3.2 Bed Flushing Coolant Pump (Standard)

NO	Part Name	Material	Qty	Spec.	Remark
1	FAN COVER	SS41	1		
2	FAN	P.P	1		
3	WAVE WASHER	SUP	1	#35	
4	MOTOR COVER	GC25	1		
5	HEX-BOLT	S20C	6	M6x25	
6	SPRING WASHER	S20C	6		
7	+ R-SCREW	S20C	3		
8	SPRING WASHER	S20C	3		
9	BEARING	KBC	1	6204zz	
10	MOTOR FRAME	GC25	1		
11	STATOR COIL	Cu	1		
12	STATOR CORE	SI	1		
13	ROTOR	SI & AL	1		
14	SHAFT	S45C	1		
15	+ R-SCREW	S20C	3	M4x2	
16	SPRING WASHER	NBR	1		
17	END COVER	SS41	1		
18	BEARING	KBC	1		
19	SET SCREW	S20C	1		
20	OIL STOPPER	SB41	2		
21	BUSH	BsBD3	1		
22	KEY	S45C	1		
23	COLLAR	SB41	1		
24	GUIDE VANE	GC25	2		
25	IMPELLER	GC25	2		
26	LINER RING	BsBD3	2		
27	KEY	S45C	2		
28	COLLAR	SB41	1		
29	CASING (BELLOW)	GC25	1		
30	NUT	S20C	1	M12	
31	SPRING WASHER	S20C	1	Ø12	
32	HEX-STUDBOLT	S20C	6	M10x165	
33	SPRING WASHER	S20C	6	Ø10	
34	CASING (MIDDLE)		1		
35	CASING (OVER)	GC25	1		
36	COVER PLATE	SS41	1		
37	+ R-SCREW	S20C	4	Mx10	
38	SPRING WASHER	S20C	4	Ø5	
39	PUMP BODY	GC25	1		
40	TERMINAL BOX	SS41	1		
41	RUBBER TUBE	NBR	1		
42	+ R-SCREW	S20C	1	M4x5	
43	TERMINAL BASE	P.P	1		
44	TERMINAL BOX COVER	SS41	1		
45	SEAL PLATE	NBR	1		





Reference

Table 10-2. ACP-900MF Specification

Type of Pump		ACP-900MF	
Pump	Outlet amount (ℓ /min)	160	100
	Total Dynamic Head (m)	20	
	Fluid	Water soluble coolant, cleaning agent (weak alkali solution)	
	Material	Rotor (glass wool tempered polyamide resin)	
Intermediate casing, impeller guide (mineral tempered polyamide resin)			
Motor	Phase	3	
	Poles	2	
	Power (kW)	0.9	
	Voltage (V)	200	220
	Max. allowable current (A)	4.5	5.2
	Frequency (Hz)	50	60
	Class of insulation	E	
	Exterior temperature (°C)	-50 ~ +40	
	Temperature raising (deg)	Below 75	
	Rating	Continuous	
	Motor type	Totally enclosed type for indoor use	
Bearing	Loading	6204ZZ	
	Anti-loading	6203ZZ	
Weight (kgf)		32.0	

Note :Please contact us if you want to use highly adhesive fluid
(with more than 75cSt of viscosity).



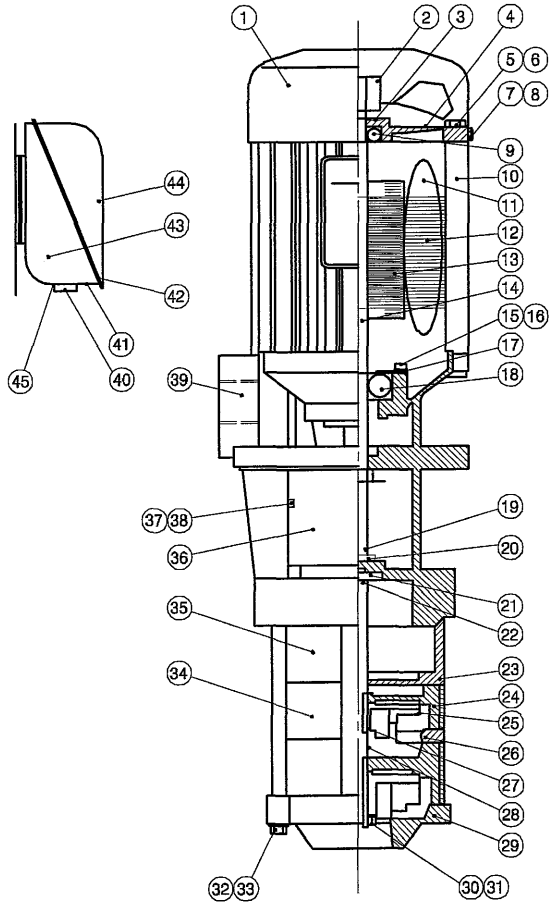
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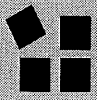
HYUNDAI-KIH MACHINE

ACP-1500MF

10.3.3 Oil Hole Coolant Pump (Option)

NO	Part Name	Material	Qty	Spec.	Remark
1	FAN COVER	SS41	1		
2	FAN	P.P	1		
3	WAVE WASHER	SUP	1	#35	
4	MOTOR COVER	GC25	1		
5	HEX-BOLT	S20C	6	M6x25	
6	SPRING WASHER	S20C	6		
7	+ R-SCREW	S20C	3		
8	SPRING WASHER	S20C	3		
9	BEARING	KBC	1	6204zz	
10	MOTOR FRAME	GC25	1		
11	STATOR COIL	Cu	1		
12	STATOR CORE	Si	1		
13	ROTOR	SI &AL	1		
14	SHAFT	S45C	1		
15	+ R-SCREW	S20C	3	M4x2	
16	SPRING WASHER	NBR	1		
17	END COVER	SS41	1		
18	BEARING	KBC	1		
19	SET SCREW	S20C	1		
20	OIL STOPPER	SB41	2		
21	BUSH	BsBD3	1		
22	KEY	S45C	1		
23	COLLAR	SB41	1		
24	GUIDE VANE	GC25	2		
25	IMPELLER	GC25	2		
26	LINER RING	BsBD3	2		
27	KEY	S45C	2		
28	COLLAR	SB41	1		
29	CASING (BELLOW)	GC25	1		
30	NUT	S20C	1	M12	
31	SPRING WASHER	S20C	1	Ø12	
32	HEX-STUDBOLT	S20C	6	M10x165	
33	SPRING WASHER	S20C	6	Ø10	
34	CASING (MIDDLE)		1		
35	CASING (OVER)	GC25	1		
36	COVER PLATE	SS41			
37	+ R-SCREW	S20C	4	Mx10	
38	SPRING WASHER	S20C	4	Ø5	
39	PUMP BODY	GC25	1		
40	TERMINAL BOX	SS41	1		
41	RUBBER TUBE	NBR	1		
42	+ R-SCREW	S20C	1	M4x5	
43	TERMINAL BASE	P.P	1		
44	TERMINAL BOX COVER	SS41	1		
45	SEAL PLATE	NBR	1		





Reference

Table 10-3. ACP-1500MF Specification

Type of Pump		ACP-1500MF	
Pump	Diameter (mm)	38	
	Outlet amount (ℓ /min)	85	100
	Total Dynamic Head (m)	30	
	Fluid	Water soluble coolant, cleaning agent (weak alkali solution)	
	Material	Rotor (glass wool tempered polyamide resin) Intermediate casing, impeller guide (mineral tempered polyamide resin)	
Motor	Phase	3	
	Poles	2	
	Power (kW)	1.5	
	Voltage (V)	200	220/380
	Max. allowable current (A)	6.4	7.0/4.0
	Frequency (Hz)	50	60
	Revolution of motor (rpm)	2870	3450
	Class of insulation	E	
	Exterior temperature (°C)	-50 ~ +40	
	Temperature raising (deg)	Below 75	
	Rating	Continuous	
	Motor type	Totally enclosed type for indoor use	
	Bearing	Loading	6204ZZ
Anti-loading		6203ZZ	
Weight (kgf)			

Note :Please contact us if you want to use highly adhesive fluid (with more than 75cSt of viscosity).



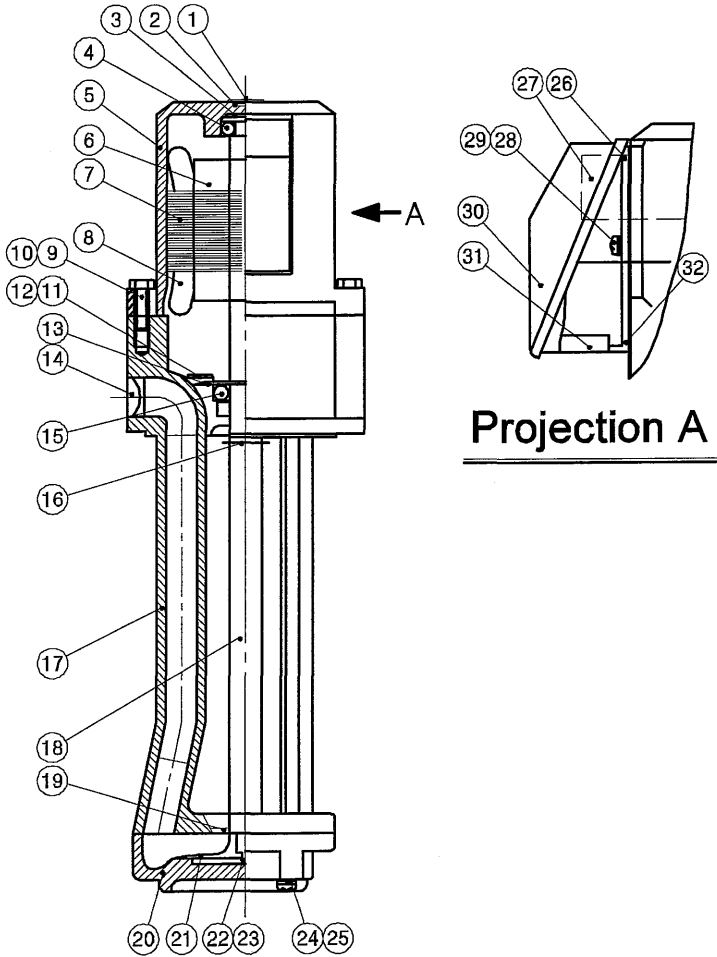
Reference

HYUNDAI-KIA MACHINE

ACP-180F

10.3.4 Gun Coolant Pump (Option)

NO	Part Name	Material	Qty	Spec.	Remark
1	WINDOW	PE	1		
2	WINDOW PACKING	NBR	1		
3	WAVE WASHER	SUP	1	#35	
4	BEARING	6202zz	1		
5	MOTOR FRAME	AL D/C	1		
6	STATOR	Si	1		
7	ROTOR	Si & Al	1		
8	COIL	Cu	1		
9	H.H BOLT	S20C	2	M6x30	
10	SPRING WASHER	S20C	2	Ø5	
11	R-SCREW(+)	S20C	2	M4x12	
12	WASHER	S20C	2	Ø4	
13	END COVER	SS41	1	1	
14	OIL CAP	PE	1	3/4"	
15	BEARING	6203zz	2	K.B.C	
16	OIL STOPPER	SS41	1		
17	PUMP BODY	GC25	1		
18	SHAFT	S45C	1		
19	ADJUST'G WASHER	Cu	1		
20	SPIRAL CASING	GC25	1		
21	IMPELLER	BsBD	1		
22	R-SCREW(+)	S20C	1	M5x15	
23	TOOTH WASHER	S20C	1	Ø5	
24	R-SCREW(+)	S20C	3	M5x25	
25	SPRING WASHER	S20C	3	Ø5	
26	TERMINAL BOX PACKING	NBR	1		
27	TERMINAL BLOCK	PP	1	Mx12	
28	R-SCREW(+)	S20C	4	M4x12	
29	SPRING WASHER	S20C	4		
30	TERMINAL BOX COVER	PE	1		
31	LEAD WIRE TUBE	NBR	1		
32	TERMINAL BOX	PE	1		
33					





Reference

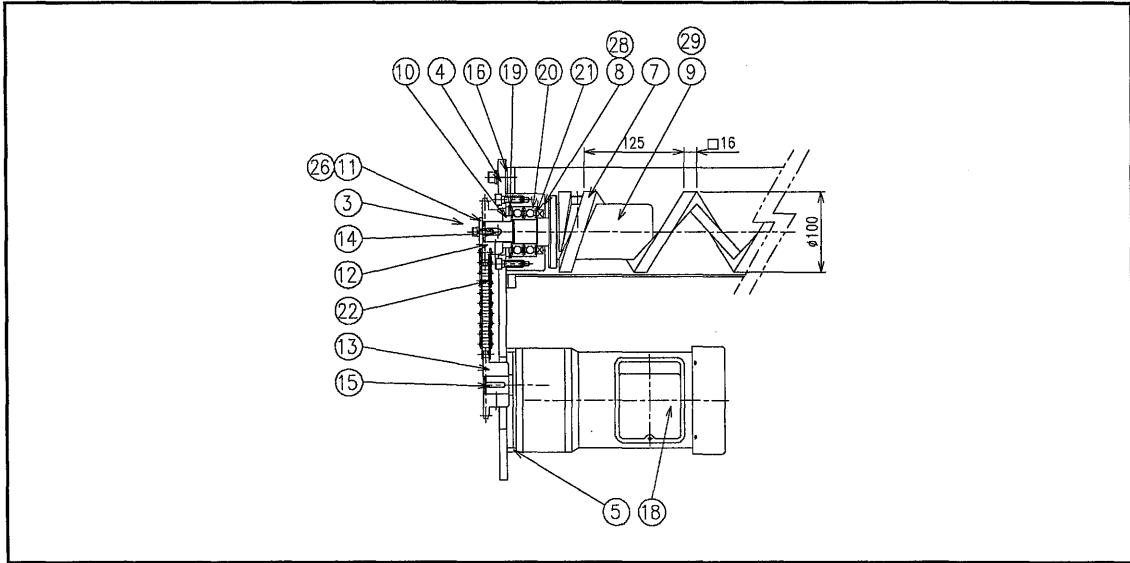
Table 10-4. ACP-180F Specification

Type of Pump		ACP-180F	
Pump	Diameter (mm)	19	
	Outlet amount (ℓ /min)	75	90
	Total Dynamic Head (m)	3	
	Allowable viscosity (cSt)	75	
	Degree of filtration	Medium (max. length of chip filterable in the pump : 2.5 mm)	
	Material	Impeller, casing, outlet casing : GC	
Motor	Phase	3	
	Poles	2	
	Power (kW)	0.18	
	Voltage (V)	200	220/380
	Max. allowable (A)	1.4	1.5/0.87
	Frequency (Hz)	50	60
	Revolution of motor (rpm)	2870	3450
	Class of insulation	E	
	Exterior temperature (°C)	-50 ~ +40	
	Temperature raising (deg)	Below 75	
	Rating	Continuous	
	Motor type	Totally enclosed type for indoor use	
	Bearing	Loading	6204ZZ
Anti-loading		6203ZZ	
Weight (kgf)		10.5	

Note :Please contact us if you want to use highly adhesive fluid (with more than 75cSt of viscosity).



10.4 Spiral Conveyor



〈Figure 10-8 Spiral Conveyor〉

Spiral Conveyor Specifications	
Geared Motor	Gear Ratio 1:40, 0.2 Kw, 4P, 50/60 Hz(SAM-YANG)
R.P.M	EX.43.8 rpm(60 Hz), 36.3 rpm(50Hz)
Power Source	AC 200/220 V, 50/60 Hz, 3 PHASE
Painting	-
Chip Type	Cast Iron, Steel and Aluminium(With Cutting Oil)
Spiral Size	□ 16 × Ø100 × P125(Seamless)
Spiral Material	S45C, HRc24 ± 5

No.	Part No.	Description	Material	Q' ty	Remark
1		Tray	SPCC	2	
2		Chute	SPCC	2	
3		Chain Cover	SPCC	2	
4		Base	SS400	2	
5		Motor Base	SS400	2	
6		Coil Stopper	SPCC	4	
7		Coil	S45C	2	
8		Bearing Housing	S45C	2	



Reference

HYUNDAI-KIA MACHINE

No.	Part No.	Description	Material	Q' ty	Remark
9		Shaft	S45C	2	
10		Spacer	S45C	2	
11		End Plate	SPCC	2	
12		Chain Sprocket(S)	S45C	2	#RS40×19NT
13		Chain Sprocket(M)	SPCC	2	#RS40×19NT
14		Key(S)		2	8×7×1R
15		Key(M)		2	6×6×1R
16		Packing-1	NBR	2	3t
17		Packing-2	NBR	2	3t
18		Geared Motor	SAM-YANG	2	SY-MAX-V002-60-V88
19		Snap Ring		2	R62
20		Ball Bearing	KBC	4	#6206DDU
21		Oil Seal		2	35×55×81
22		Chain	DONG-BO		#RS40
23		Hex Bolt		4	M8×35L
24		Wrench Bolt S/W P/W		12	M8×15L
25		Wrench Bolt S/W P/W		16	M6×30L
26		Wrench Bolt S/W P/W		2	M6×20L
27		Wrench Bolt S/W P/W		18	M8×25L
28		Wrench Bolt S/W P/W		8	M8×25L
29		Wrench Bolt S/W P/W		2	M10×20L
30		Wrench Bolt S/W P/W		8	M8×40L
31		Nut		8	M8

2001EN18iBPL0

HS400 머시닝 센터 **(Horizontal Machining Center)**

PARTS LIST

VERSION NO. : 1.0

HYUNDAI-KIA MACHINE



목 차

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1. 파트리스트 보는 방법	5
(HOW TO USE THE PARTS LIST)	
2. 보수부품의 주문 방법	7
(HOW TO ORDER REPAIR PARTS PROMPT SERVICE)	
3. PARTS ORDER(부품 주문서)	8
4. PARTS LIST	9



1.HOW TO USE THE PARTS LIST

In this Parts List each figure shows the components of the unit which comprises the machine.

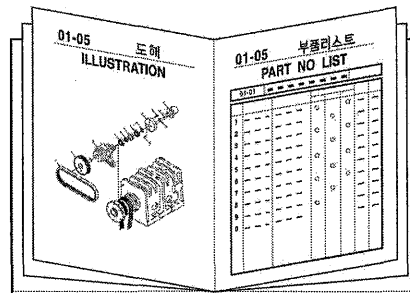
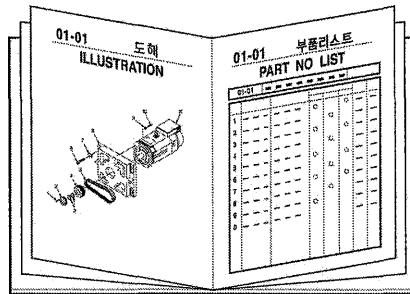
1. 파트리스트 보는 방법

본 파트리스트의 FIG(Group) 설정은 보기를 구성하는 유니트 단위로 분할하여 설정하고 있습니다.

CONTENTS	
목 차	
NO.	Page 페이지
01	
05	
10	
11	

NUMERICAL INDEX	
색 인	
Made Parts and Purchases	
제작부품 및 구입부품	
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.	
.	
.	

01-01 →
The first page of the
Figures in each group
1장째 표시
FIG(GROUP)NO.을 표시



⋮

E×planation for the parts book 도해 및 리스트 표시설명

◆ 위아(주)제작 부품 World Industries Ace made Parts		◆ 구입 부품 Purchases	
5	예 2 2611-20-406-0 (No. 2) World industries Ace made Parts 제작부품표시	13	예 16 SM1302001200 (No. 16) Part No Starts with "S" (Refer to the Si×th Column of the Parts No. and Makers)
37	예 172611-01-405-0 (No.17) World Industries Ace made Parts 제작부품표시	15	◆ 표준부품 Standard Parts 예 17....SM1101012055 (No. 17)S로 시작하는 부품비교 란에 사양 및 제작 업체표시

FIG01

FIG05

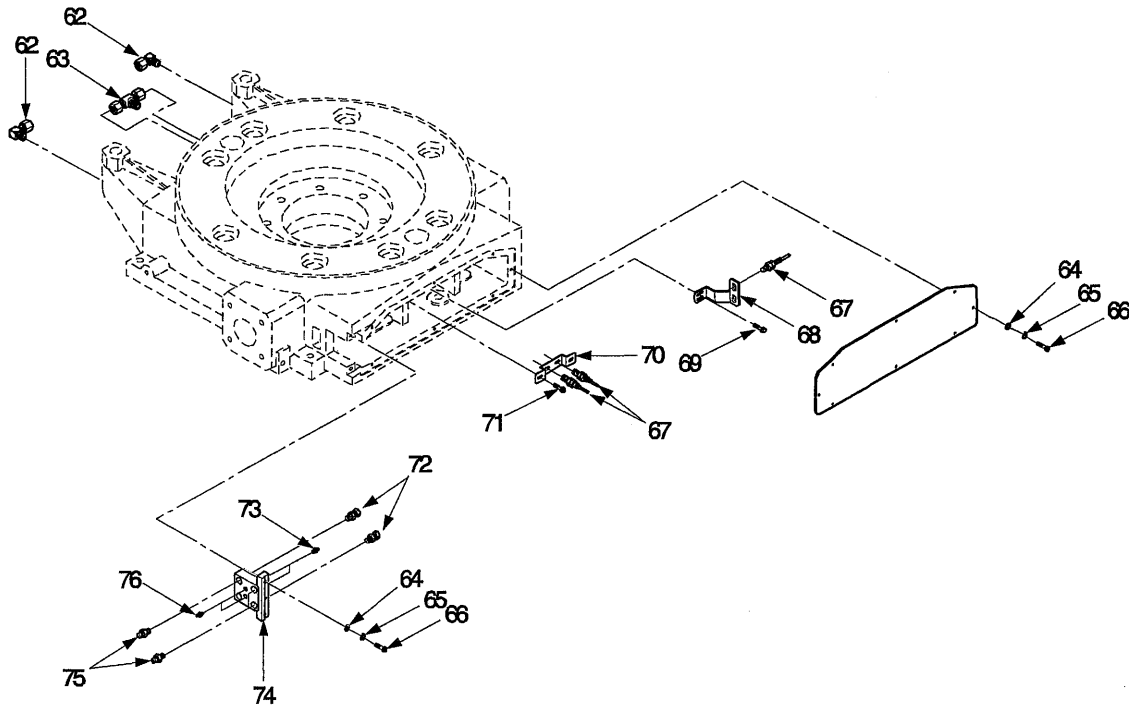
FIG10

1. Part No. list, in one to four pages, follows after figure

도해 1장에 리스트 4페이지(최대)로 구성되어 있습니다.

2. Item No. is marked to every purchase and World Industries Ace made part. As for the part spec and nominal size refer to note.

위아(주) 제작부품 및 구입부품에 독립된 아이템 NO를 기재하고, 비고란에는 부품의 사양과 크기를 기재하고 있습니다.



Parts List 부품리스트

NO. 번호	Part NO. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
67	PE820235070R	PROXIMITY SENSOR 근접 센서	3	E2E-X2F1-5M
74	2682-10-307-0	BLOCK 블록	1	

→ Spec. of maker
→ maker

→ 위아(주) 제작품 및 구입품 번호

NO. made to World Industries Ace made part and purchase.

2. HOW TO ORDER REPAIR PARTS PROMPT SERVICE

On repair parts orders depends upon your furnishing us the following information.

2. 보수부품의 주문방법

신속한 서비스를 위하여 아래와 같이 기입 후 연락 바랍니다.

1. Quantity Wanted 필요수량

2. Page No. Key No. Part No. and Part Name

페이지 번호

키 번호

부품번호

부품명

(1)

(2)

(3)

(4)

NO. 번호	Part NO. 부 품 번 호	Part Name 부 품 명	Q'ty 수 량	Note 비 고
1	2611-01-101-0	COLUMN 컬럼	1	
2	2611-20-310-0	STOPER 스톱퍼	1	

- 9 -

3. The Model and Serial Number of Machine

기계형식 및 제조번호

HYUNDAI KIA MACHINE

MODEL

SERIAL NO

WEIGHT

DATE

391-8, KAUMJUNG DONG
CHANGWON, KYUNGNAM, KOREA
TEL : (055) 280-9114

WIA CORPORATION

WHEN ORDERING PARTS

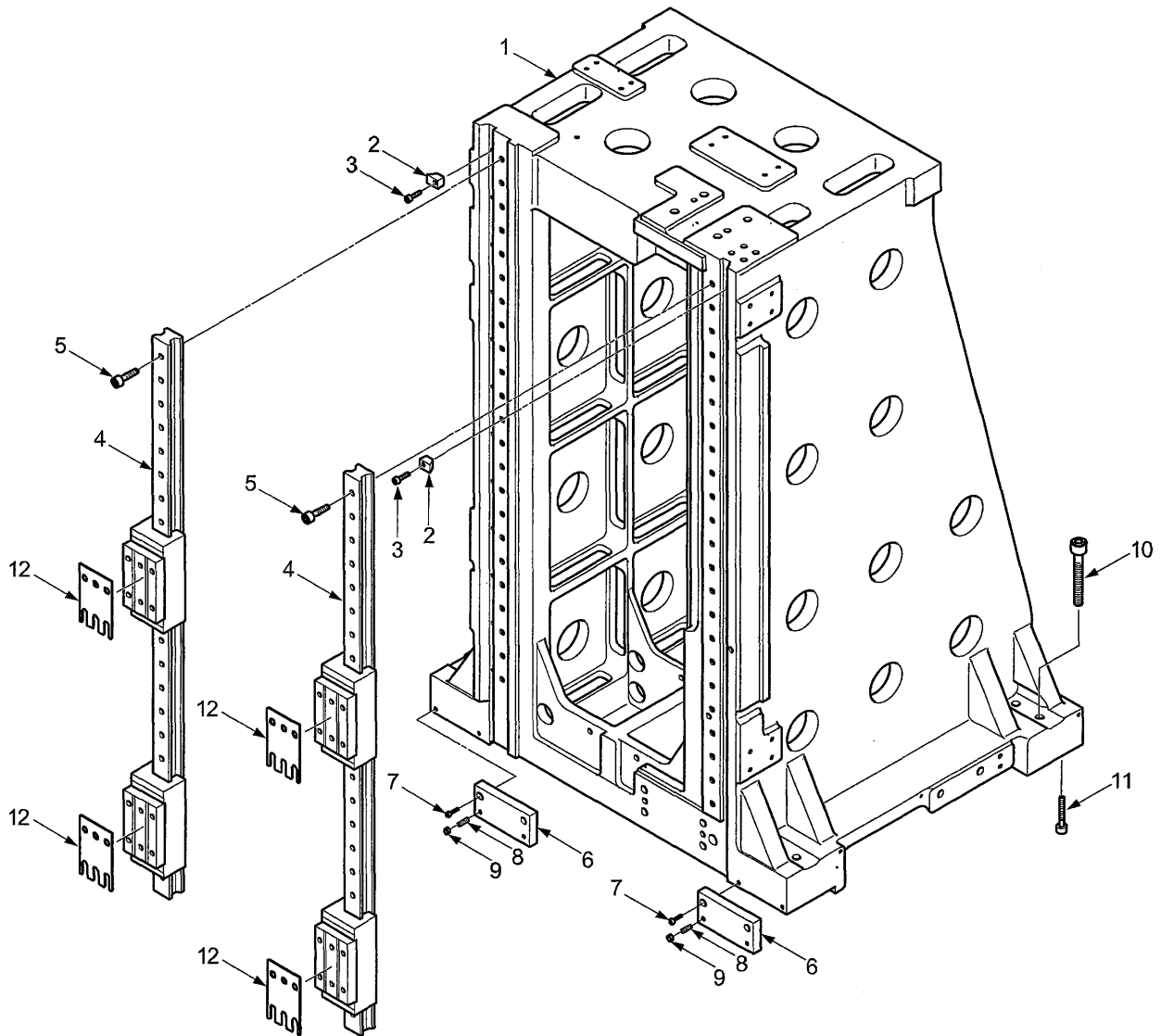
Be sure to give the Model and Serial number that Are stamped on the name plate.

부품을 주문할 경우

명판에 인쇄되어 있는 기계형식 및 제조번호를 꼭 연락바랍니다.

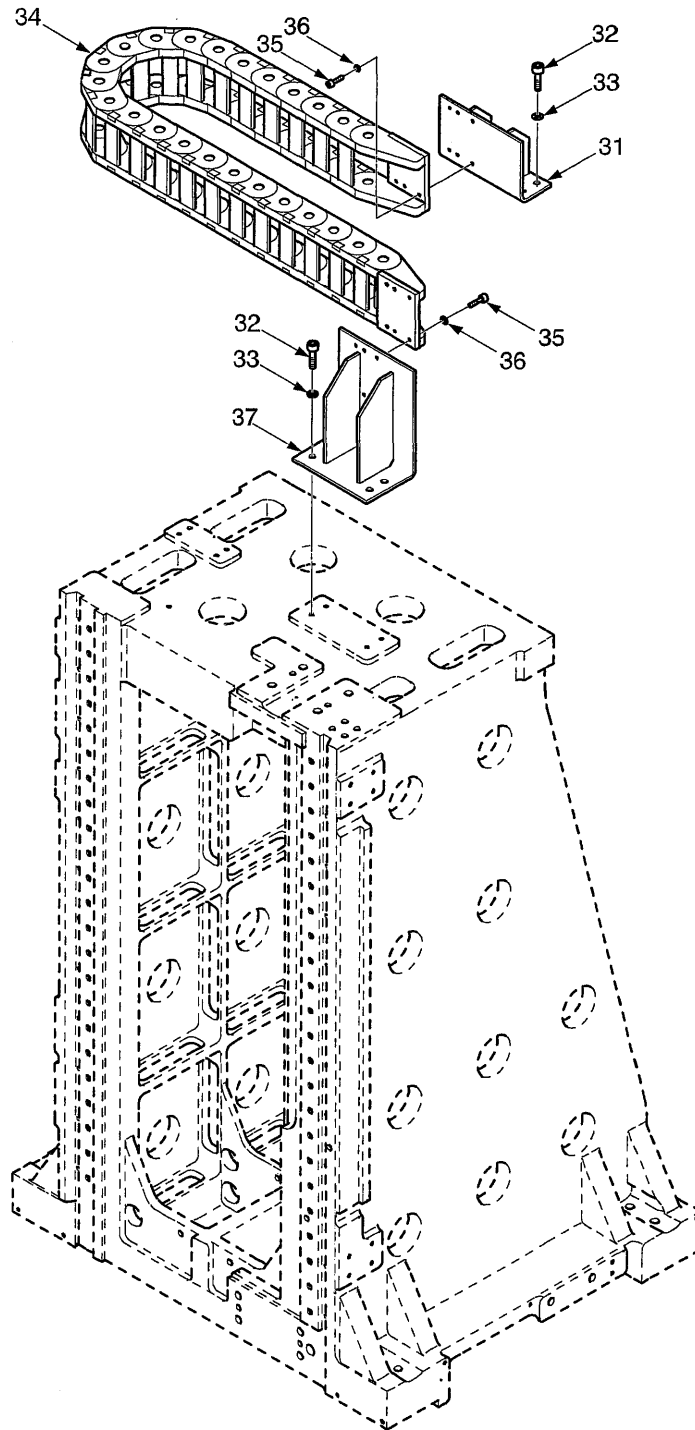
4. PARTS LIST

CONTENTS				
목 차				
NO. 번호	GROUP No. 그룹번호	GROUP NAME 그룹 명칭	PAGE 페이지	REMARK 비고
1	01	COLUMN 칼럼	10	
2	05	SPINDLE HEAD 스핀들 헤드	16	
3	10	TABLE 테이블	26	
4	11	FX DRIVE X축 이송	48	
5	12	FY DRIVE Y축 이송	52	
6	13	FZ DRIVE Z축 이송	56	
7	20	BED 베드	60	
8	43	HEAD COOLING 주축 냉각	76	
9	44	HYDRAULIC 유압	78	
10	45	PNEUMATIC 공압	82	
11	46	LUBRICATION 윤활	88	
12	47	COOLANT 쿨런트	92	
13	68	FOUNDATION 설치 기초도	102	
14	69	FIXTURE 출하 고정구	104	
15	70	ATC 자동 공구교환 장치	108	
16	71	MAGAZINE 메거진	124	
17	75	SPLASH GUARD 스프레쉬 가드	156	
18	80	APC 자동 팔레트교환 장치	204	
19	81	PALLET 팔레트	230	
20	99	NAME PLATE 명판	238	

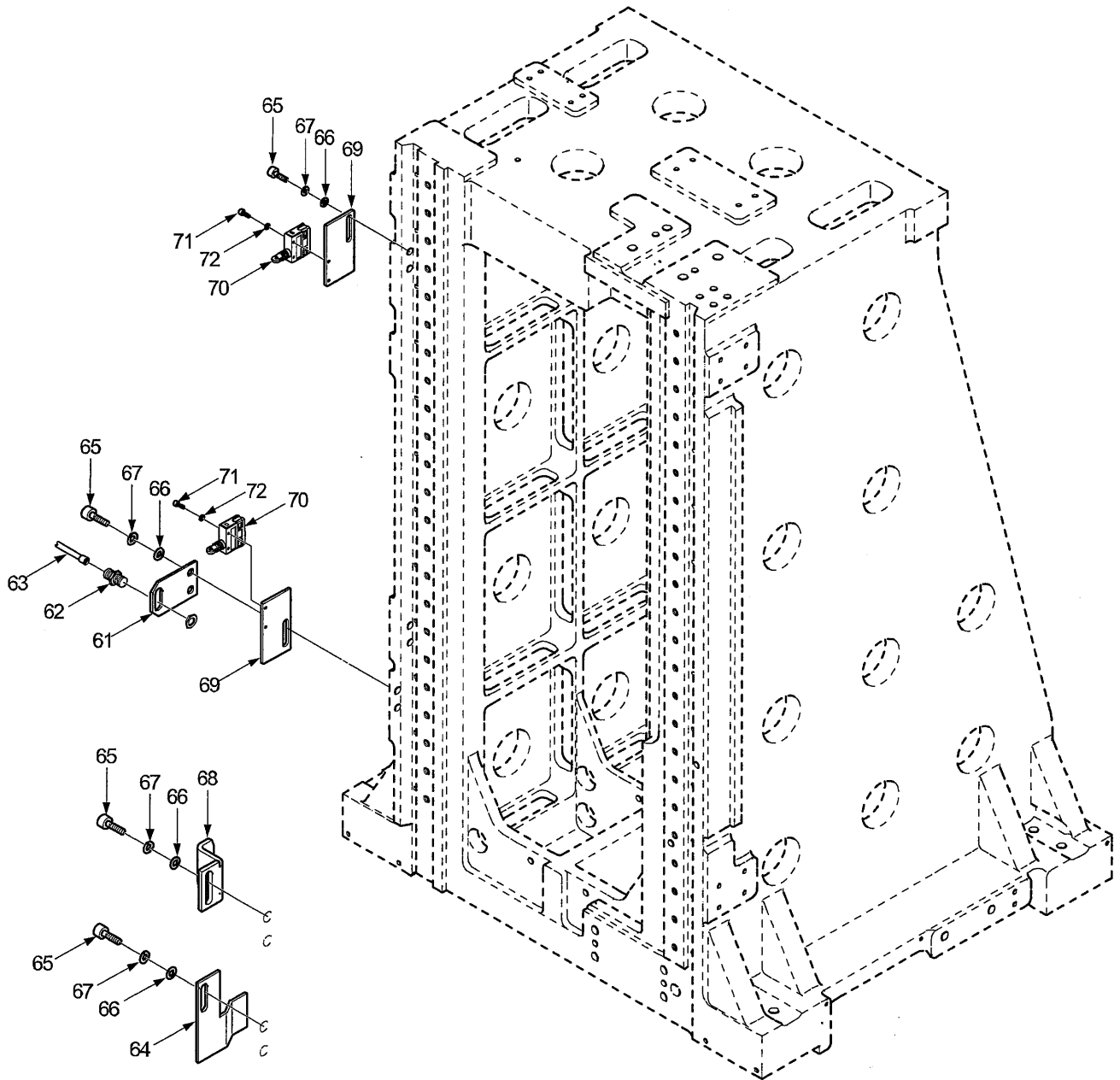


01-01	COLUMN 칼럼	2001-01
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-01-101-0	COLUMN FRAME 칼럼 프레임	1	
2	A80T30S0800	RETAINER 리테이너	24	T-3
3	SM11010 08020	SCREW H.S CAP 육각 구멍볼이 나사	24	M8×L20
4	2001-01-301-0	ROLLER GUIDE(Y) ROLLER 가이드(Y)	2	SCHNEEBERGER
5	SM11010 12040	SCREW H.S CAP 육각 구멍볼이 나사	46	M12×L40
6	44640300310	BLOCK 블록	2	HS500공용
7	SM11010 08020	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L20
8	SM11060 08020	SETSCREW H.S HEADLESS 세트 스크류	4	M8×L20
9	SM12010 00800	NUT HEX 육각 너트	8	M8
10	SM11010 12095	SCREW H.S CAP 육각 구멍볼이 나사	8	M12×L95
11	SM11010 10035	SCREW H.S CAP 육각 구멍볼이 나사	16	M10×L35
12	44640100301	SPACER(4EA/SET) 스페이서	1	HS500공용

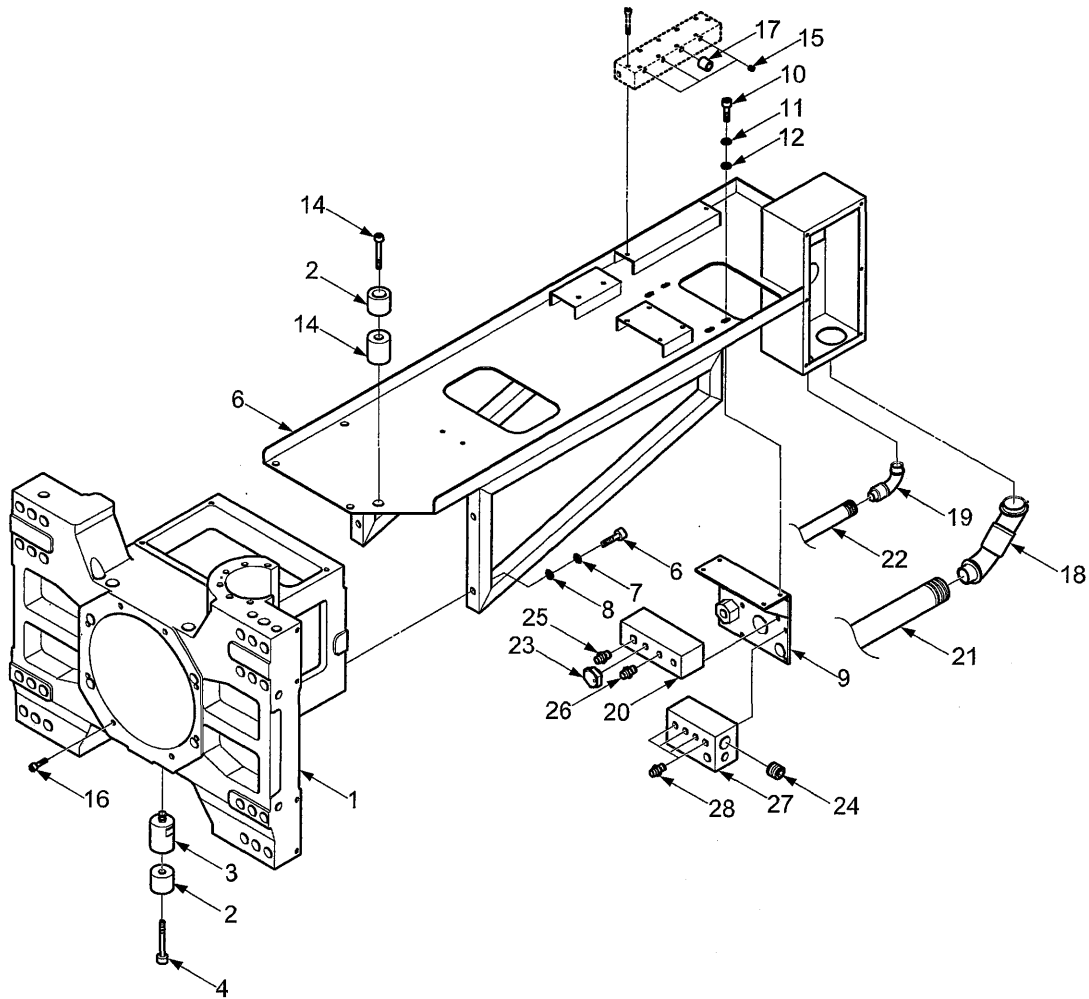


01-02		COLUMN 칼럼		2001-01
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	2001-01-305-0	STAY 스테인	1	
32	SM11010 08020	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L20
33	SM13020 00800	WASHER SPRING 스프링 와셔	8	M8
34	2001-01-304-0	CABLE CHAIN 케이블 체인	1	CP095N.075. R150-1140L
35	SM11010 06020	SCREW H.S CAP 육각 구멍볼이 나사	12	M6×L15
36	SM13020 00600	WASHER SPRING 스프링 와셔	8	M6
37	2001-01-306-0	STAY 스테인	1	



01-03	COLUMN 칼럼	2001-01
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
61	2001-01-401-0	PLATE 플레이트	1	
62	R26BA000020	SWITCH PROXIMITY 근접 스위치	1	BES-516-370 -E5-C-S4
63	PEXS2FD422D80A	CABLE PROXIMITY SWITCH 근접 스위치 케이블	1	XS2F-D422-G80-A
64	2001-01-303-0	DOG 도그	1	
65	SM11010 08015	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L15
66	SM13010 00800	WASHER PLAIN 평와셔	8	M8
67	SM13020 00800	WASHER SPRING 스프링 와셔	8	M8
68	2001-01-402-0	DOG 도그	1	
69	44644600081	PLATE 플레이트	2	
70	PE820135010R	SWITCH LIMIT 리미트 스위치	2	D4E-1A20N,100V
71	SM11010 04025	SCREW H.S CAP 육각 구멍볼이 나사	4	M4×L25
72	SM13010 00400	WASHER PLAIN 평와셔	4	M4

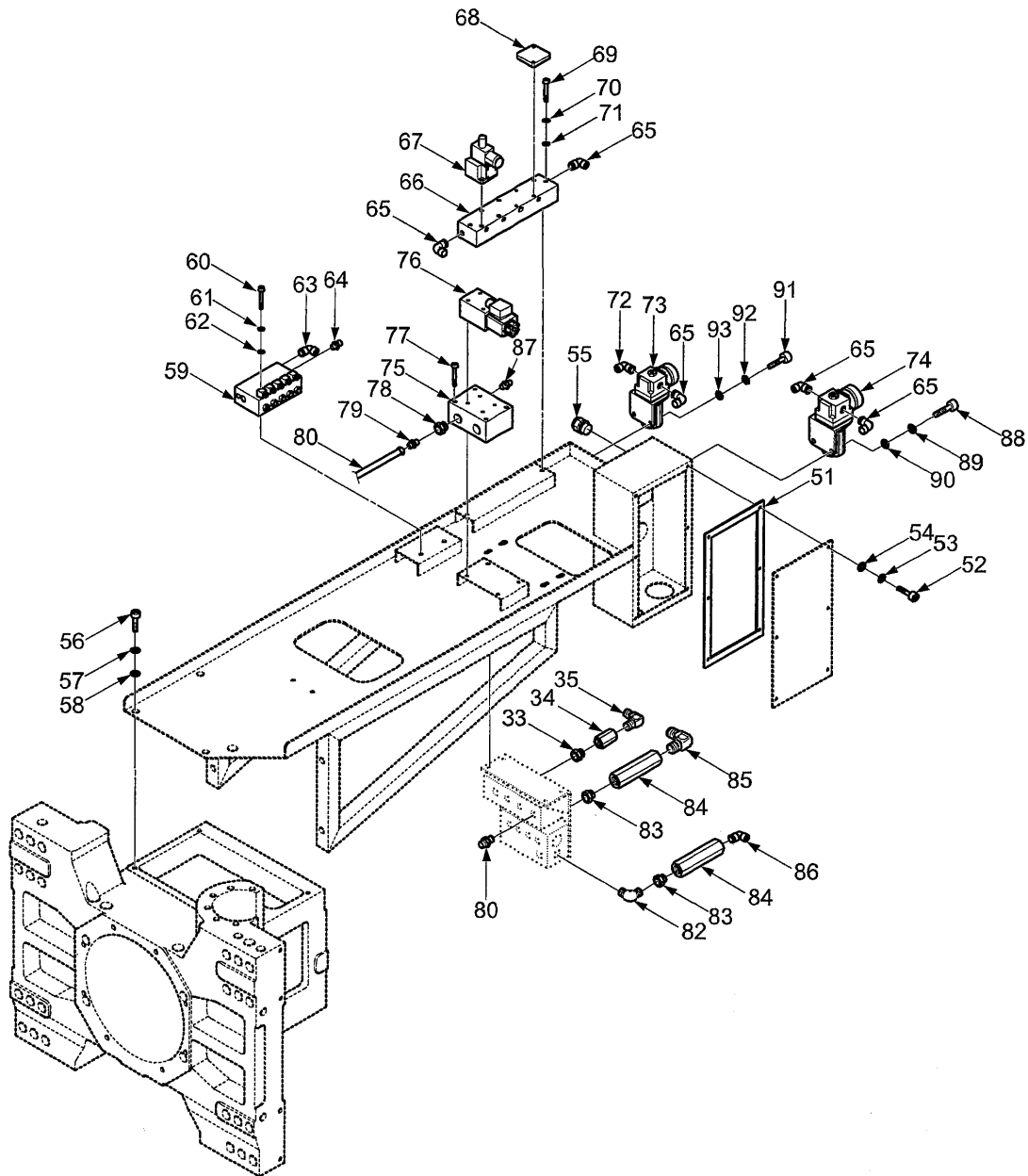


05-01	SPINDLE HEAD 스펀들 헤드	(1/2)	2001-05
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	1 463 01 0001 0	HEAD BODY 헤드 바디	1	
2	4 464 01 0051 0	STOPPER 스토퍼	2	IRON RUBBER
3	4 464 01 0038 0	BOLT 볼트	1	
4	SM11010 12030	SCREW, HEX SOCKET CAP 육각 구멍붙이 나사	1	M12×30
6	2001-05-101-0	BRACKET 브라켓트	1	
7	SM11010 08025	SCREW, HEX SOCKET CAP 육각 구멍붙이 나사	4	M8×25
8	SM13020 00800	SPRING WASHER 스프링 와셔	4	M8
9	SM13010 00800	PLAIN WASHER 평와셔	4	M8
10	2001-05-302-0	BRACKET 브라켓트	1	
11	SM11010 06020	SCREW, HEX SOCKET CAP 육각 구멍붙이 나사	4	M6×20
12	SM13020 00600	SPRING WASHER 스프링 와셔	4	M6
13	SM13010 00600	WASHER 와셔	4	M6
14	4 464 01 0039 1	RING 링	1	
15	SM11010 12075	SCREW, HEX SOCKET CAP 육각 구멍붙이 나사	1	M12×75
17	PM43256 0002	PLUG, HEX 육각 플러그	3	PT1/4

05-01	SPINDLE HEAD 스펀들 헤드		(2/2)	2001-05
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
18	SM11010 12040	SCREW, HEX SOCKET CAP 육각 구멍볼이 나사	8	M12×40
19	PH02990 6532S	HALF UNION 하프 유니온	1	KQH08-02
20	PE11110 91090	CABLE CONNECTOR(45°) 케이블 콘넥터(45°)	1	Pg36
21	PE11110 11050	CABLE CONNECTOR(ELBOW) 케이블 콘넥터(엘보우)	1	Pg21
22	2001-05-303-0	BLOCK 블록	1	
23	PE11040 10360	CORRUGATED TUBE(0.7m) 튜브(0.7m)	1	CPS-36B:0.7
24	PE11040 10220	CORRUGATED TUBE(0.7m) 튜브(0.7m)	1	CPS-22B:0.7
25	PH032209001Z	PRESSURE S/W 압력 스위치	1	176-110-300 (VOGEL)
26	PM43256 0006	PLUG, HEX 육각 플러그	2	PT3/4
27	PM41403B1200903	CONNECTOR,MALE 콘넥터	2	D12×D9-PT3/8
28	PM41403B0800602	CONNECTOR,MALE 콘넥터	2	D8×D6-PT1/4
29	2001-05-304-0	BLOCK 블록	1	
30	PM41403B1000752	CONNECTOR,MALE 콘넥터	4	D10×D7.5-PT1/4

MEMO



05-02	SPINDLE HEAD 스펀들 헤드	(1/3)	2001-05
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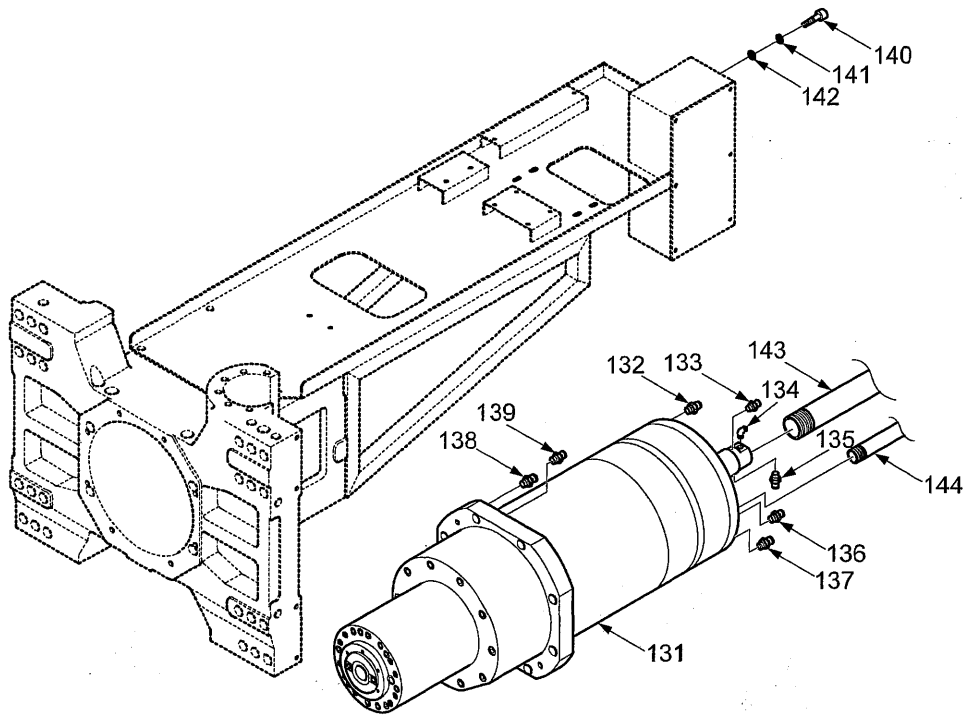
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
51	2001-05-401-0	PACKING 패킹	1	NBR
52	SM11010 06012	SCREW, HEX SOCKET CAP 육각 구멍볼이 나사	6	M6×12
53	SM13020 00600	SPRING WASHER 스프링 와셔	6	M6
54	SM13010 00600	PLAIN WASHER 평와셔	6	M6
55	PE10510 31416	CABLE GRAND 케이블 그랜드	3	FCG-M16B
56	SM11010 08025	SCREW, HEX SOCKET CAP 육각 구멍볼이 나사	4	M8×25
57	SM13020 00800	SPRING WASHER 스프링 와셔	4	M8
58	SM13010 00800	PLAIN WASHER 평와셔	4	M8
59	G 77 HP 00003 0	MIXING VALVE 믹싱 밸브	1	MIX-5A
60	SM11010 06045	SCREW, HEX SOCKET CAP 육각 구멍볼이 나사	2	M6×45
61	SM13020 00600	SPRING WASHER 스프링 와셔	2	M6
62	SM13010 00600	PLAIN WASHER 평와셔	2	M6
63	PM41435B0600401	ELBOW 엘보우	1	L4N6×4-PT1/8
64	PH02990 6532S	HALF UNION 하프 유니온	1	KQH08-02 SMC
65	PH02990 6514S	ELBOW UNION 엘보우 유니온	5	KQL10-03S SMC

05-02	SPINDLE HEAD 스피들 헤드	(2/3)	2001-05
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
66	G 27 HP 00035 0	MANIFOLD 매니폴드	1	VV317-02-041-02 (SMC)
67	G 50 HP 00068 0	SOL VALVE 솔레노이드 밸브	1	V0317-3D SMC
68	G 28 HP 00005 0	PLATE KET 플레이트	3	PVT317-53-1A SMC
69	SM11010 06040	SCREW, HEX SOCKET CAP 육각 구멍볼이 나사	2	M6×40
70	SM13020 00600	SPRING WASHER 스프링 와셔	2	M6
71	SM13010 00600	PLAIN WASHER 평와셔	2	M6
72	PH02990 7529B	ELBOW UNION 엘보우 유니온	1	KQL08-03 SMC
73	PH020806545S	REGULATOR 레귤레이터	1	AR3000-03B-G SMC
74	PH020806565S	REGULATOR 레귤레이터	1	AR4000-03B-G SMC
75	G 16 HP 00075 0	SOLENOID VALVE 솔레노이드 밸브	1	DSG-01-2B2-A100 YUKEN
76	G 27 FH 00067 0	SUB PLATE 서브 플레이트	1	MSA-01Y-T-10 NACHI
77	SM11010 05050	SCREW, HEX SOCKET CAP 육각 구멍볼이 나사	4	M5×50
78	PM43204 10302	HEX BUSHING 육각 부싱	2	PT3/8×1/4 HYUPDONG
79	PM42350 10802	CONNECTOR MALE 콘넥터	2	BMC08-03R
80	PM41403B1000752	CONNECTOR MALE 콘넥터	1	BMC10-02R HYUPDONG

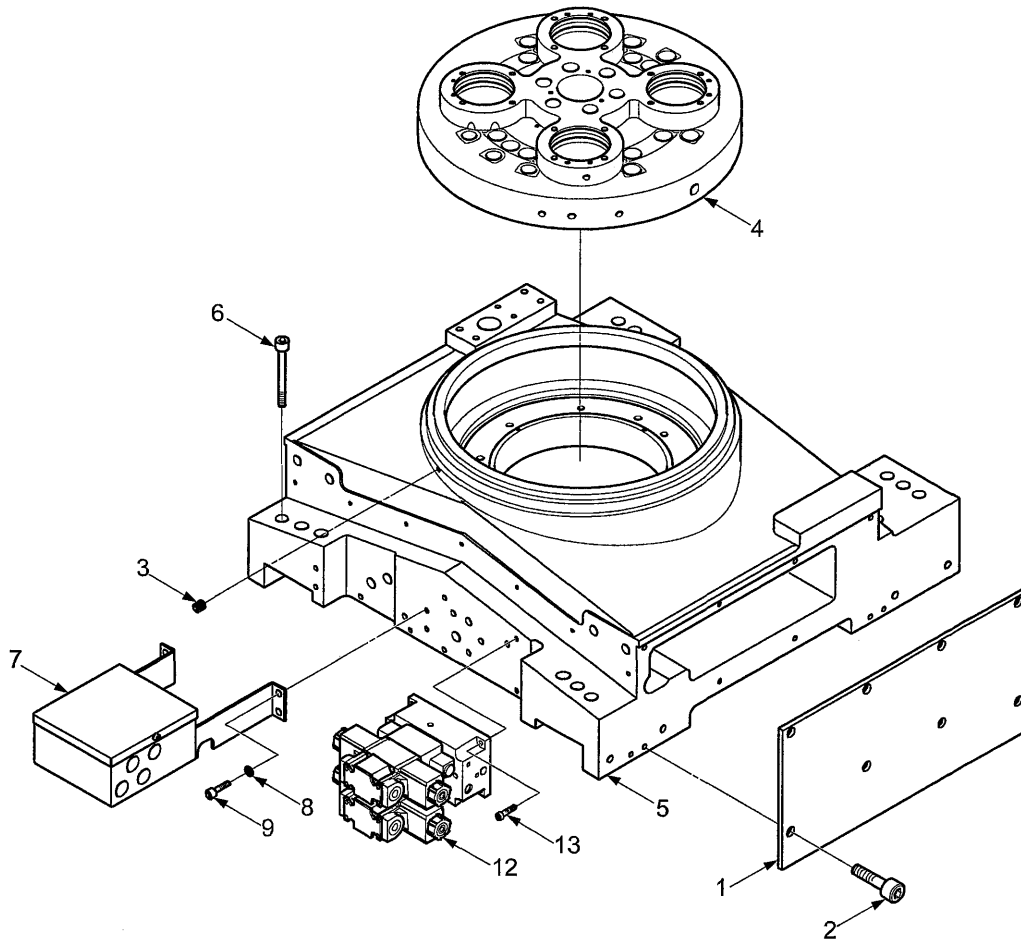
05-02	SPINDLE HEAD	스핀들 헤드	(3/3)	2001-05
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
82	PM43127 10003	STREEL ELBOW 스틸 엘보우	1	SLC-03R HYUPDONG
83	PM43151 10003	HEX NIPPLE 육각 니플	2	SNA-03R HYUPDONG
84	PH012309005Y	CHECK VALVE 체크 밸브	2	CIT-03-5-20 YUKEN
85	PM40132 10303	MALE HOSE ELBOW 호스 엘보우	1	HMAM-0303R HYUPDONG
86	PH02990 7529B	ELBOW UNION 엘보우 유니온	1	KQL08-03 SMC
87	PM40111 10303	MALE HOSE CONNECTOE 호스 콘넥터	2	HMCM0303R HYUPDONG
88	SM11010 08020	SCREW, HEX SOCKET CAP 육각 구멍붙이 나사	2	M8*20
89	SM13020 00800	SPRING WASHER 스프링 와셔	2	M8
90	SM13010 00800	PLAIN WASHER 평와셔	2	M8
91	SM11010 06016	SCREW, HEX SOCKET CAP 육각 구멍붙이 나사	2	M6*16
92	SM13020 00600	SPRING WASHER 스프링 와셔	2	M6
93	SM13010 00600	PLAIN WASHER 평와셔	2	M6
95	PM43151 10006	HEX NIPPLE 육각 니플	2	SSA-06R HYUPDONG
96	PM43151 30006R	HEX SOCKET 육각 소켓	2	SNA-06R HYUPDONG
97	PM40132 10606	MALE HOSE ELBOW 호스 엘보우	4	HMAM-0606R HYUPDONG



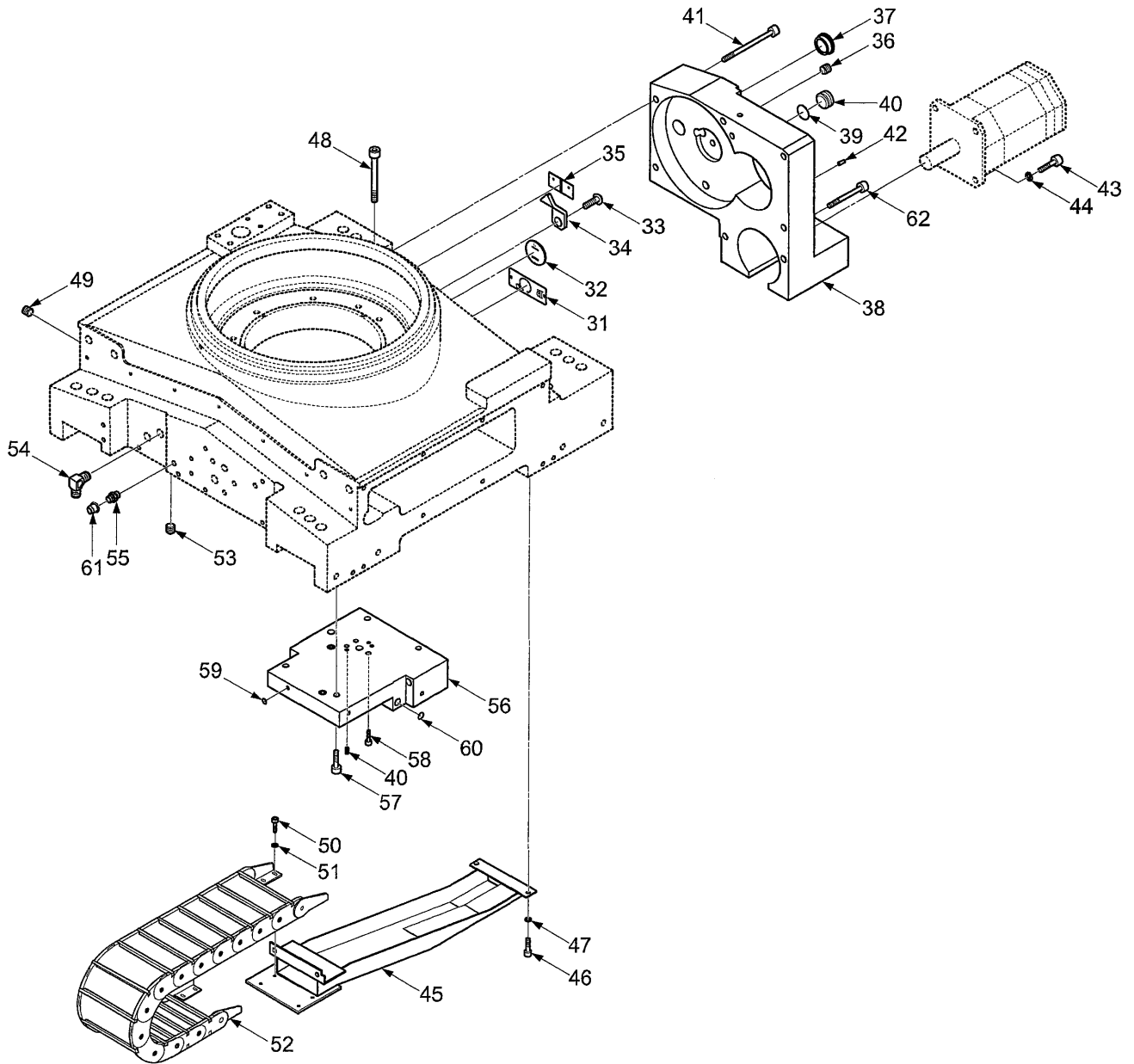
05-03	SPINDLE HEAD 스펀들 헤드	2001-05
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
131	2001-05-201-0	SPINDLE CARTRIDGE ASSY 스핀들 카트리지 조립체	1	HF230.7AI20 CFHKVW OMLAT
132	PM41303B0401000	CONNECTOR 콘넥터	5	PT1/8×Ø4
133	PM42421 10802	ELBOW MALE 엘보우	2	BLM08-02R
134	PM42421 11002	ELBOW MALE 엘보우	1	BLM10-02R
135	PM41303B0601000	CONNECTOR 콘넥터	1	PT1/8×Ø6
136	PM41403B0800602	CONNECTOR MALE 콘넥터	2	PT1/4×Ø8
137	PM41403B1000802	CONNECTOR MALE 콘넥터	4	PT1/4×Ø10
138	PM41303B0602000	CONNECTOR MALE 콘넥터	1	PT1/4×Ø6
139	PM41303B1203000	CONNECTOR MALE 콘넥터	2	PT3/8×Ø12
140	SM11010 06015	SCREW, HEX SOCKET CAP 육각 구멍볼이 나사	8	M6×15
141	SM13020 00600	SPRING WASHER 스프링 와셔	8	M6
142	SM13010 00600	PLAIN WASHER 평와셔	8	M6
143	PE11110 01090	CABLE CONNECTOR 케이블 콘넥터	1	Pg36
144	PE11110 01050	CABLE CONNECTOR 케이블 콘넥터	1	Pg21



10-01	TABLE 테이블	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-10-303-1	COVER 커버	2	
2	SM11010 08015	SCREW H.S CAP 육각 구멍붙이 나사	16	M8×L15
3	PM4325610001	PLUG HOLLOW HEX 육각 플러그	5	PT1/8
4	14640700722	TABLE 테이블	1	
5	2001-10-101-0	SADDLE 새들	1	
6	SM11010 10070	SCREW H.S CAP 육각 구멍붙이 나사	18	M10×L70
7	2001-10-202-0	TB BOX TB 박스	1	
8	SM11010 08015	SCREW H.S CAP 육각 구멍붙이 나사	4	M8×L15
9	SM13020 00800	WASHER SPRING 스프링 와셔	4	M8
12	G27LM000041	SOL VALVE ASS'Y 솔레노이드 밸브 조립체	1	
13	SM11010 08025	SCREW H.S CAP 육각 구멍붙이 나사	4	M8×L25



10-02	TABLE 테이블	(1/3)	2001-10
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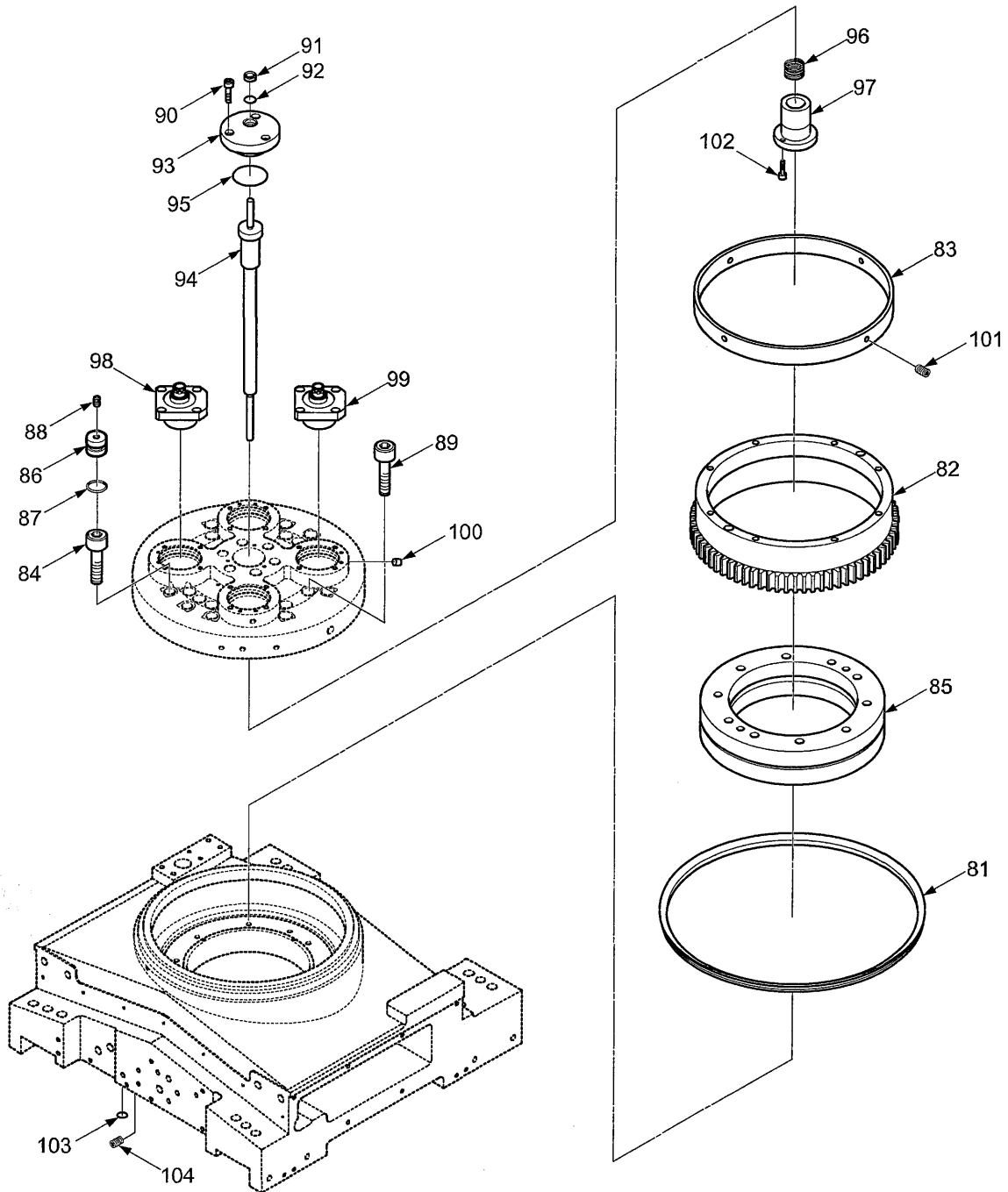
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	44640700610	NAME PLATE 명판	1	
32	PM4903111040	OIL LEVEL GAUGE 오일 수준게이지	1	
33	SM11010 06012	SCREW H.S CAP 육각 구멍붙이 나사	1	M6×L12
34	44640700601	PIECE 피스	1	
35	44640700620	NAME PLATE 명판	1	
36	PM4325610002	PLUG HOLLOW HEX 육각 플러그	1	PT1/4
37	G29SJ000020	OIL LEVEL GAUGE 오일 수준 게이지	1	SH-LG-28
38	2001-10-201-0	GEAR BOX 기어박스	1	
39	PM4801120090N	O-RING O-링	1	1BP9
40	PM4325610001	PLUG HOLLOW HEX 육각 플러그	5	PT1/8
41	SM11010 10080	SCREW H.S CAP 육각 구멍붙이 나사	4	M10×L80
42	SM14010 08025	PIN PARALLEL 평행 핀	2	Ø8×25L
43	SM11010 12040	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×L40
44	SM13020 01200	WASHER SPRING 스프링 와셔	4	M12
45	2001-10-203-0	DUCT 덕트	1	

10-02	TABLE 테이블	(2/3)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
46	SM11010 08015	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L15
47	SM13020 00800	WASHER SPRING 스프링 와셔	4	M8
48	SM11010 10060	SCREW H.S CAP 육각 구멍볼이 나사	6	M10×L60
49	PM4325610003	PLUG HOLLOW HEX 육각 플러그	2	PT3/8
50	SM11010 06010	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L10
51	SM13020 00600	WASHER SPRING 스프링 와셔	4	M6
52	Z91CP000021	CABLE CHAIN 케이블 체인	1	
53	PM4325610001	PLUG HOLLOW HEX 육각 플러그	3	PT1/8
54	PM4013810303	ADAPTER-A HOSE 45° 어댑터-A호스45°	2	PT3/8
55	PM41301A081000	CONNECTOR 콘넥터	1	PT1/8
56	14640700731	BLOCK 블록	1	
57	SM11010 08030	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L30
58	SM11010 06030	SCREW H.S CAP 육각 구멍볼이 나사	3	M6×L30
59	PM4801120060N	O-RING O-링	5	1BP6
60	PM4801120090N	O-RING O-링	3	1BP9

10-02	TABLE 테이블	(3/3)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
61	44640100460	PLUG 플러그	1	
62	SM11010 10050	SCREW H.S CAP 육각 구멍볼이 나사	3	M10×L50



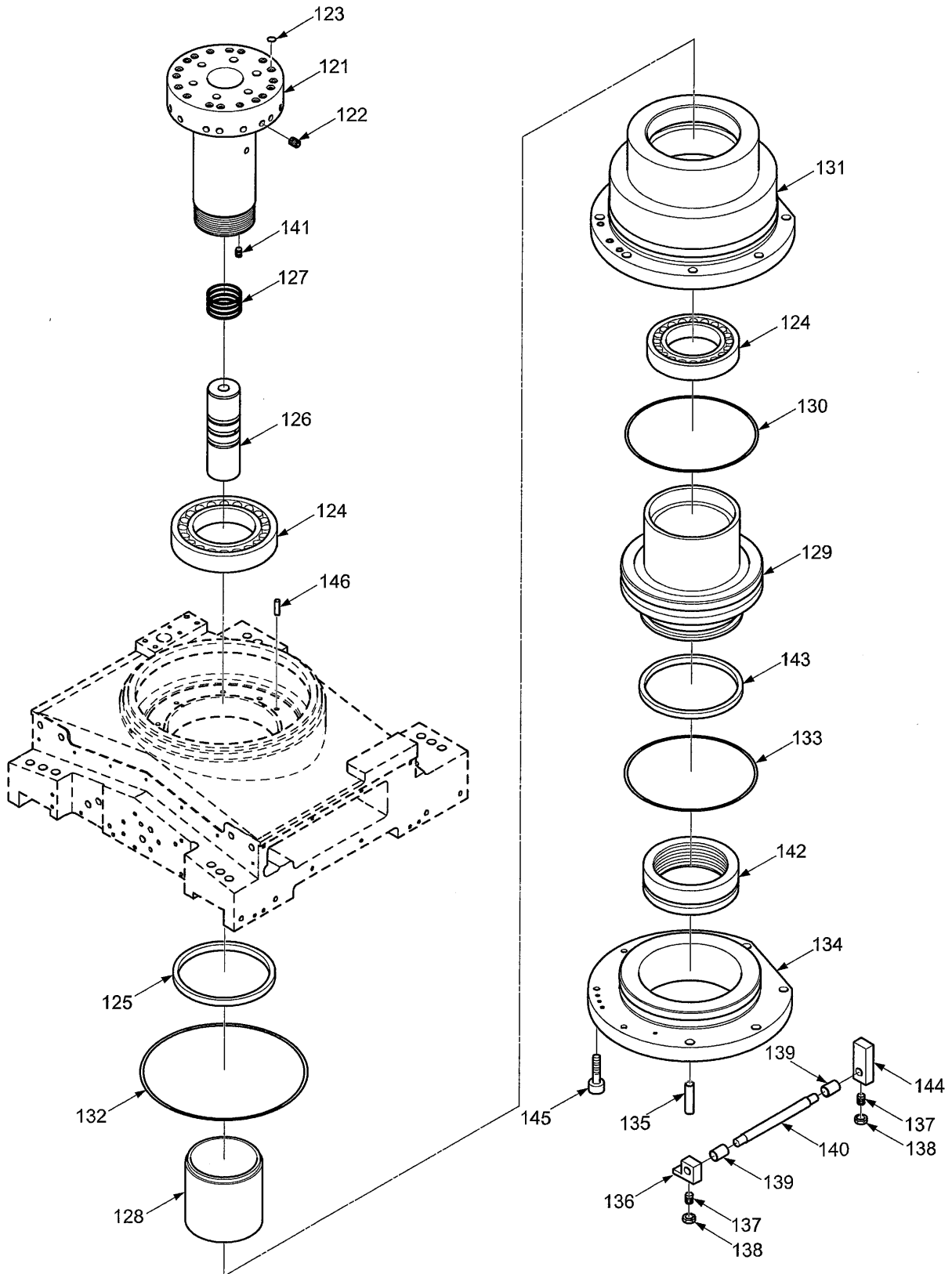
10-03	TABLE 테이블	(1/2)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
81	J21FG000790	V-SEAL V-시일	1	V-400L
82	24640700122	SPUR GEAR 스퍼 기어	1	
83	24640700830	RING 링	1	
84	SM11010 12035	SCREW H.S CAP 육각 구멍볼이 나사	8	M12×L35
85	2722-15-250-0	CURVIC COUPLING 큐빅 커플링	1	360320-225XV
86	44640700290	PLUG 플러그	26	
87	PM4801120160N	O-RING O-링	26	1BP16
88	SM11060 04005	SET SCREW H.S HEADLESS 세트 스크류	26	M4×L5
89	SM11010 12050	SCREW H.S CAP 육각 구멍볼이 나사	14	M12×50L
90	SM11010 08020	SCREW H.S CAP 육각 구멍볼이 나사	3	M8×20L
91	J24NV000010	DUST SEAL 더스트 시일	1	DKH102057
92	PM4801120100N	O-RING O-링	1	1BP10
93	34640700190	COVER 커버	1	
94	44640700280	ROD 로드	1	
95	PM4801210550	O-RING O-링	1	1AG55

10-03	TABLE 테이블	(2/2)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
96	44640700340	SPRING 스프링	1	
97	44640700330	FLANGE 플랜지	1	
98	M33KS000010	CLAMP (DATUM) 클램프	2	VS0100-MD
99	M33KS000020	CLAMP (GUIDE) 클램프	2	VS0100-MG
100	PM4325610001	PLUG HOLLOW HEX 육각 플러그	12	PT1/8
101	SM11080 08010	SETSCREW H.S HEADLESS 세트 스크류	4	M8×10L
102	SM11010 06020	SCREW H.S CAP 육각 구멍볼이 나사	2	M6×20L
103	PM4801120090N	O-RING O-링	7	1BP9
104	PM4325610001	PLUG HOLLOW HEX 플러그	4	PT1/8

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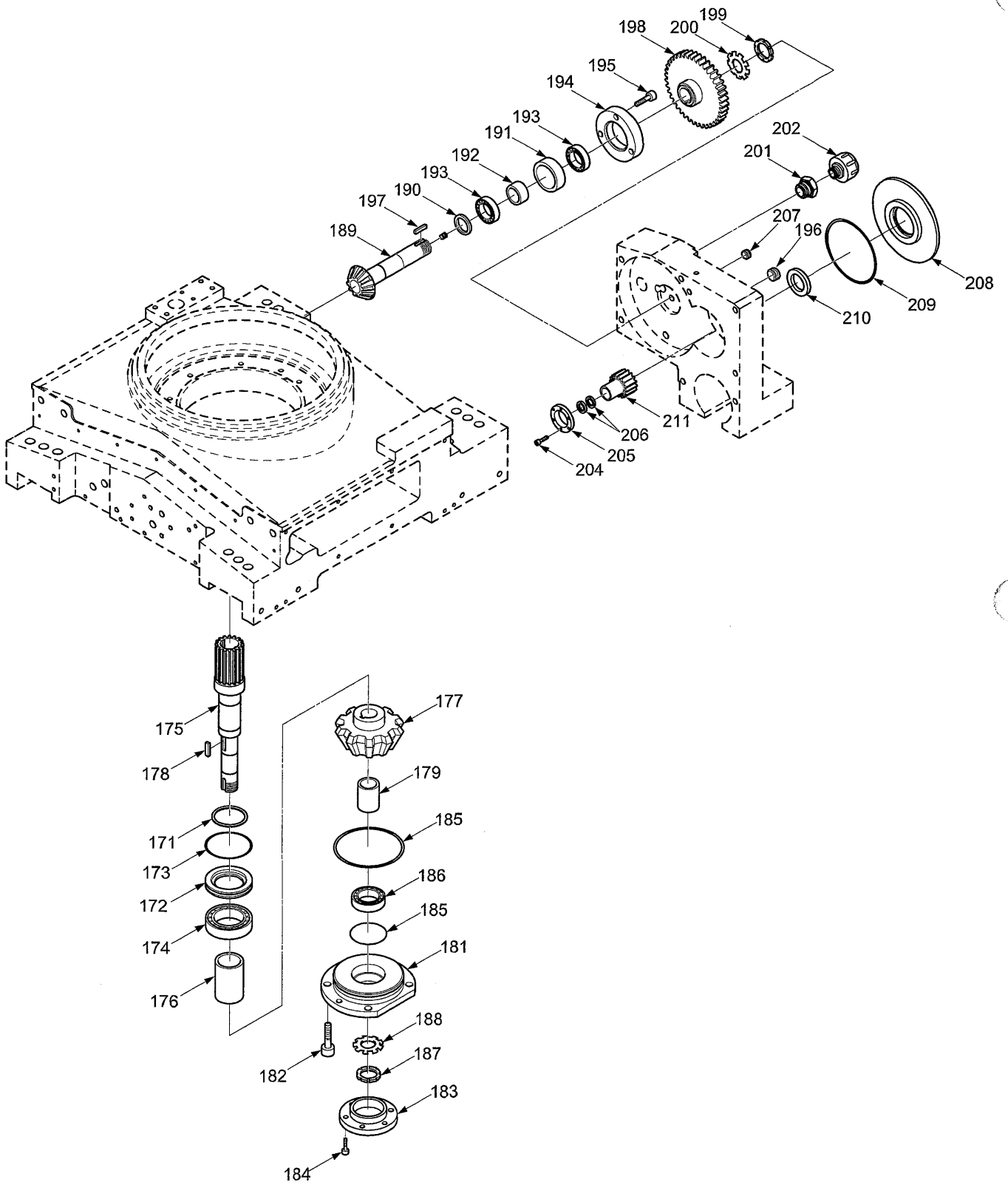
10-04	TABLE 테이블	(1/2)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
121	14640700741	SHAFT 샤프트	1	
122	PM4325610001	PLUG HOLLOW HEX 육각 플러그	27	PT1/8
123	PM4801120080N	O-RING O-링	18	1BP8
124	PB3322095130	TAPER ROLLER BEARING 테이퍼 롤러 베어링	2	HR32919J P5
125	PM48041XA364S	SKY PACKING 스카이 패킹	1	SKY-145
126	24640700760	VALVE BODY 밸브 바디	1	
127	J99HS000010	QUAD RING 링	4	QBAR04331
128	44640700270	COLLAR 칼라	1	
129	24640700110	PISTON 피스톤	1	
130	PM4801122000N	O-RING O-링	1	1BP200
131	14640700751	CYLINDER 실린더	1	
132	PM4801212500	O-RING O-링	1	1AG250
133	PM4801122000N	O-RING O-링	1	1BP200
134	24640700771	COVER 커버	1	
135	PB9310100150	DU BUSH DU 부시	1	MB1015DU

10-04	TABLE 테이블	(2/2)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
136	44640700491	LEVER 레버	1	
137	SM11080 06015	SETSCREW H.S HEADLESS 세트 스크류	2	M6×15L
138	SM12010 00600	NUT HEX 육각 너트	2	M6
139	PB9310120150	DU BUSH DU 부시	2	MB1215DU
140	44640700480	ROD 로드	1	
141	PMS432560116	PLUG HOLLOW HEX 육각 플러그	5	PT1/16
142	PM1210509000	LOCK NUT 잠금 너트	1	MSR90×2.0
143	PM48041XA361S	SKY PACKING 스카이 패킹	1	SKY-140
144	44640700501	LEVER 레버	1	
145	SM11010 12040	SCREW H.S CAP 육각 구멍붙이 나사	10	M12×40L
146	SM14010 13040	PIN PARALLEL 평행핀	6	Ø13×40L

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10-05	TABLE	테이블	(1/3)	2001-10
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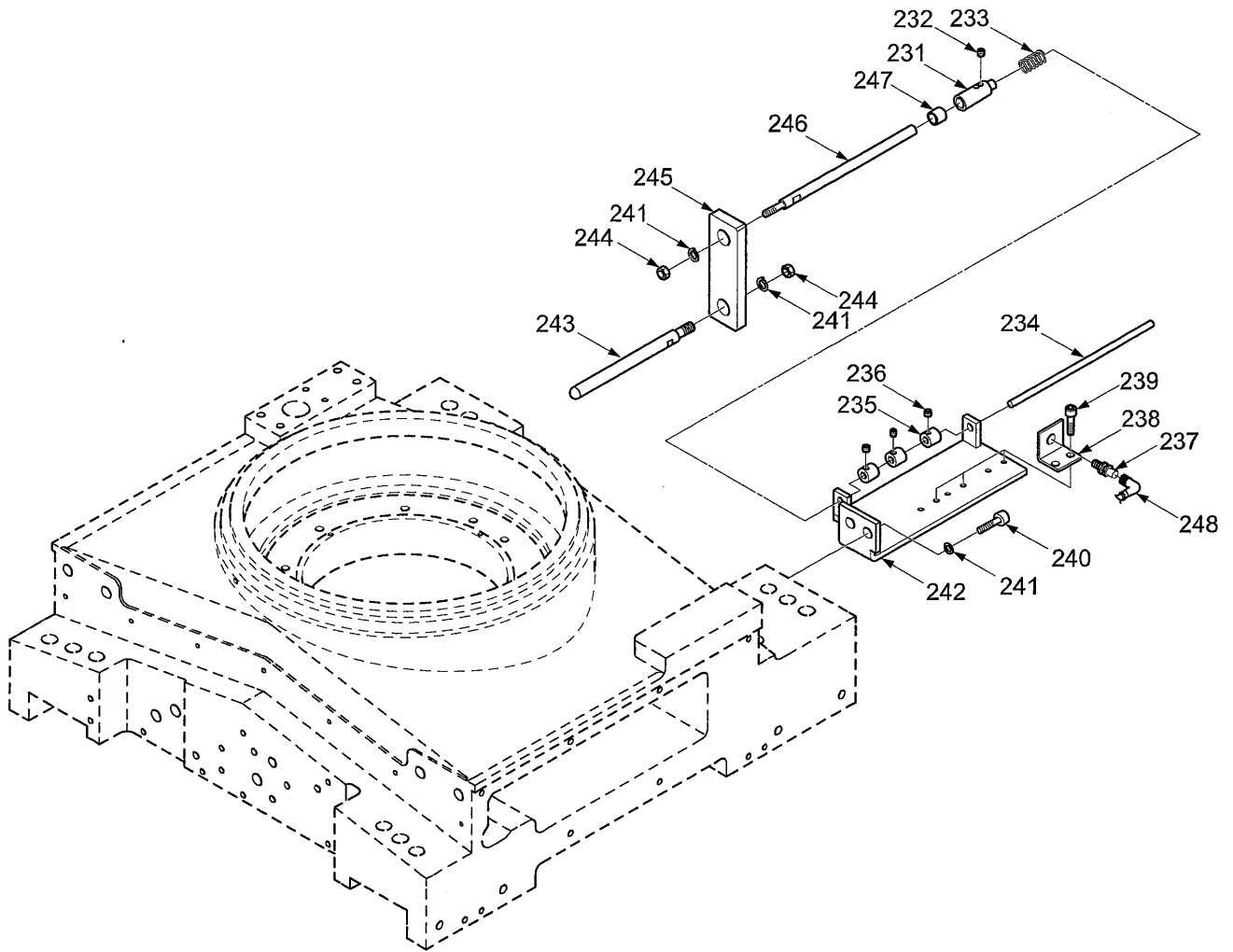
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
171	PM4803001400	OIL SEAL 오일 시일	1	G45×55×4
172	44640700420	COLLAR 칼라	1	
173	PM4801210650	O-RING O-링	1	1AG65
174	E007207C000	BEARING ANGULAR BALL 앵글러 볼 베어링	1	7207C P5
175	24640700140	SPUR GEAR 스피어 기어	1	
176	44640700431	COLLAR 칼라	1	
177	34640700210	BEVEL GEAR 베벨 기어	1	
178	SM20010 05020	KEY SUNK 키 선크	2	5×5×20L
179	44640700360	COLLAR 칼라	1	
180	PM4801210850	O-RING O-링	1	1AG85
181	34640700241	RETAINER 리테이너	1	
182	SM11010 08025	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L25
183	34640700780	RETAINER 리테이너	1	
184	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L12
185	PM4801210500	O-RING O-링	1	1AG50

10-05	TABLE 테이블	(2/3)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
186	PB772053115B	BEARING ANGULAR BALL 앵귤러 볼 베어링	1	7205C
187	SM12100 02500	NUT LOCK 로크 너트	1	M25×1.5p
188	SM13030 02500	WASHER LOCK 로크 와셔	1	M25
189	34640700200	BEVEL GEAR 베벨 기어	1	
190	44640700370	COLLAR 칼라	1	
191	44640700380	COLLAR 칼라	1	
192	44640700390	COLLAR 칼라	1	
193	PB772053115B	BEARING ANGULAR BALL 앵귤러 볼 베어링	2	7205C
194	44640700400	RETAINER 리테이너	1	
195	SM11010 08020	SCREW H.S CAP 육각 구멍붙이 나사	3	M8×L20
196	PM4325610003	PLUG HOLLOW HEX 육각 플러그	1	PT3/8
197	SM20010 05020	KEY SUNK 키이	2	5×5×20L
198	34640700221	SPUR GEAR 스퍼 기어	1	
199	SM12100 02500	NUT LOCK 로크 너트	1	M25×1.5p
200	SM13030 02500	WASHER LOCK 로크 와셔	1	M25

10-05	TABLE 테이블	(3/3)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
201	PM4320410403	BUSHING SCREW TYPE 나사형 부싱	1	
202	G47SJ000010	AIR BREATHER 에어 브리더	1	SNAB-03 SEJIN
204	SM11010 04015	SCREW H.S CAP 육각 구멍붙이 나사	6	M4×L15
205	2001-10-401-0	FLANGE 플랜지	1	
206	A30HP000050	POWER LOCK 파워 락	2	SWLE300(35×40) YHB
207	PM4325610002	PLUG HOLLOW HEX 육각 플러그	1	PT1/4
208	2001-10-402-0	RING 링	1	
209	PM4801211100	O-RING O-링	1	1AG110
210	J01AC2056E0	OIL SEAL 오일 시일	1	AC2056E0 NOK
211	2001-10-301-0	SPUR GEAR 스퍼 기어	1	



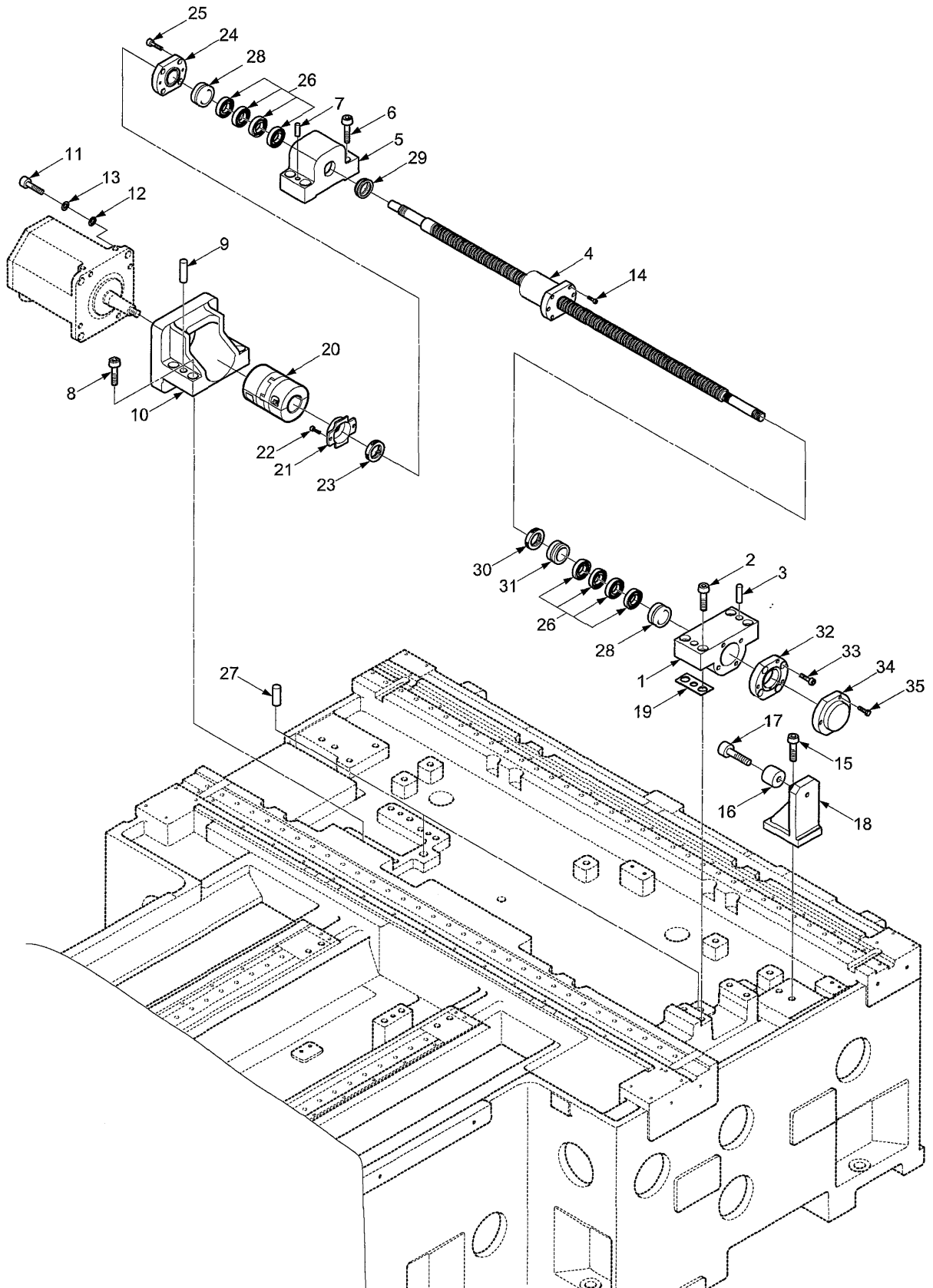
10-06	TABLE 테이블	(1/2)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
231	44640700540	JOINT 조인트	1	
232	SM11060 06012	SETSCREW H.S HEADLESS 세트 스크류	2	M6×L12
233	44640700560	SPRING 스프링	1	
234	44640700550	ROD 로드	1	
235	2001-10-403-0	DOG 도그	3	
236	SM11060 06006	SETSCREW H.S HEADLESS 세트 스크류	3	M6×L12
237	R26BA000010	SWITCH PROXIMITY 근접 스위치	3	BES516-325
238	44640700580	STAY 스테인	3	
239	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L12
240	SM11010 08015	SCREW H.S CAP 육각 구멍볼이 나사	2	M8×L15
241	SM13020 00800	WASHER SPRING 스프링 와셔	4	M8
242	2001-10-302-0	STAY 스테인	1	
243	44640700510	ROD 로드	1	
244	SM12010 00800	NUT HEX 육각 너트	2	M8
245	44640700531	PLATE 플레이트	1	

10-06	TABLE 테이블	(2/2)	2001-10
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
246	44640700520	ROD 로드	1	
247	PB9310120150	DU BUSH DU 부시	3	MB1215DU
248	PEXS2FD422D80A	CABLE, SWITCH PROXIMITY 케이블, 근접스위치	3	XS2F-D422-G80-A

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11-01	FX DRIVE X축 이송	(1/3)	2001-11
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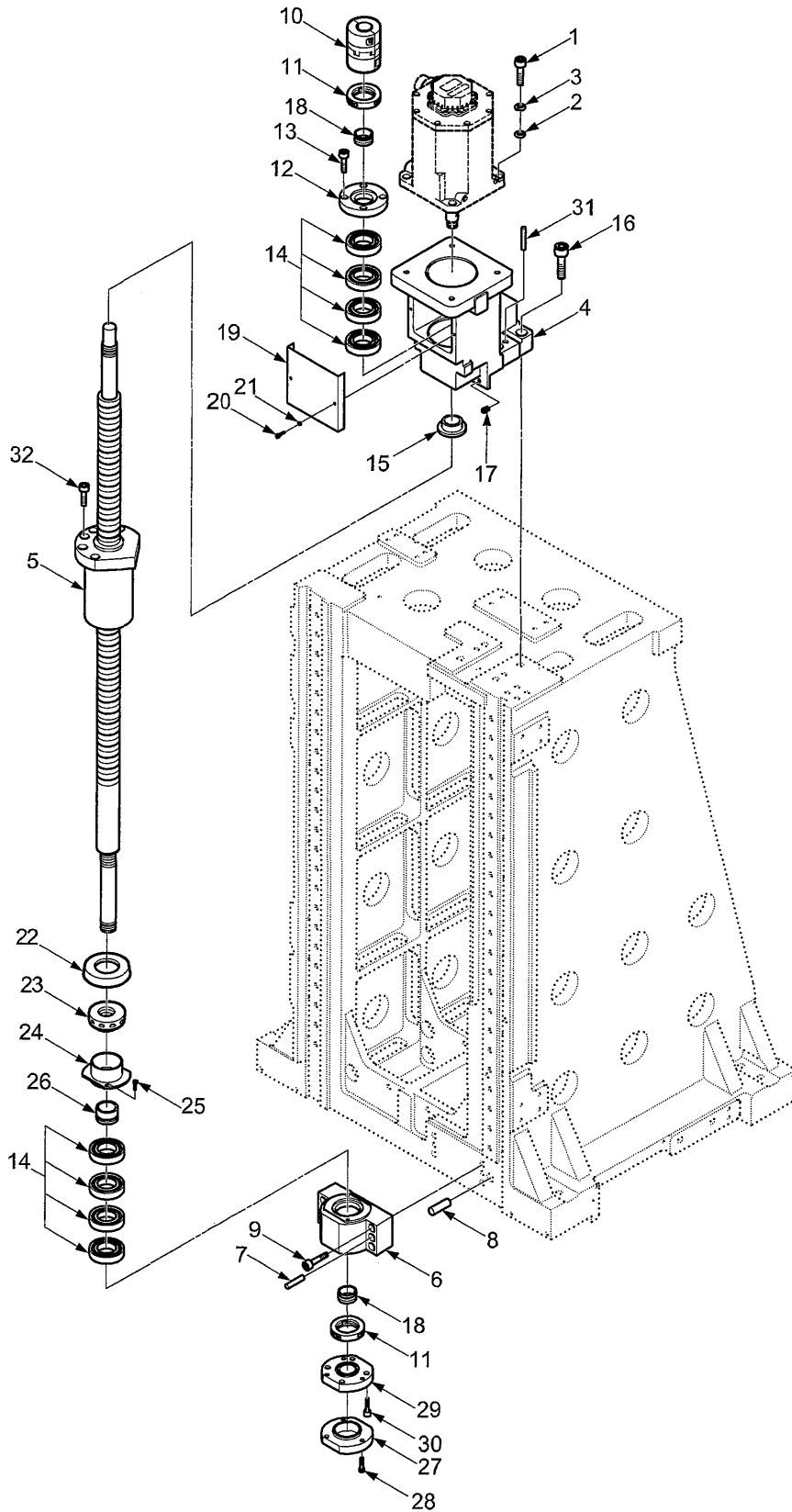
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	34641100011	BRACKET 브라켓트	1	
2	SM11010 16050	SCREW H.S CAP 육각 구멍붙이 나사	4	M16×50L
3	SM14010 10070	PIN PARALLEL 평행핀	2	Ø10×70L
4	2001-20-303-0	BALL SCREW 볼 스크류	1	NSK
5	34631300011	BRACKET 브라켓트	1	
6	SM11010 16060	SCREW H.S CAP 육각 구멍붙이 나사	4	M16×60L
7	SM14010 10070	PIN PARALLEL 평행 핀	2	Ø10×70L
8	SM11010 16070	SCREW H.S CAP 육각 구멍붙이 나사	4	M16×70L
9	SM14010 10070	PIN PARALLEL 평행핀	2	Ø10×70L
10	2001-11-201-0	BRACKET 브라켓트	1	
11	SM11010 12040	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×40L
12	SM13010 01200	WASHER PLAIN 평와셔	4	M12
13	SM13020 01200	WASHER SPRING 스프링 와셔	4	M12
14	SM11010 10025	SCREW H.S CAP 육각 구멍붙이 나사	6	M10×25L
15	SM11010 16045	SCREW H.S CAP 육각 구멍붙이 나사	4	M16×45L

11-01	FX DRIVE	X축 이송	(2/3)	2001-11
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q' ty 수량	Note 비고
16	44640100510	STOPPER 스토퍼	2	IRON RUBBER
17	SM11010 12030	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×30L
18	2001-11-302-0	STAY 스테인	2	
19	44631300040	SPACER 스페이서	2	35H7/25H7
20	2001-11-401-0	COUPLING 커플링	1	ROTE×GS38 KTR
21	34641300080	COVER 커버	1	
22	SM11010 06015	SCREW H.S CAP 육각 구멍볼이 나사	2	M6×15L
23	A31FG000020	LOCK NUT 로크 너트	2	HKZM30 FUKUDA
24	34641100050	RETAINER 리테이너	1	
25	SM11010 12035	SCREW H.S CAP 육각 구멍볼이 나사	4	M12×35L
26	PB793012014A	BEARING 베어링	8	30TAC 62B SU C10 PN7B
27	SM14010 20040	PIN PARALLEL 평행핀	2	Ø20×40L
28	44641100090	COLLAR 칼라	2	
29	44641100100	SLEEVE 슬리브	1	
30	A31FG000030	LOCK NUT 로크 너트	1	HKZM32 FUKUDA

11-01	FX DRIVE X축 이송	(3/3)	2001-11
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	44641100080	COLLAR 칼라	1	
32	34641100040	RETAINER 리테이너	1	
33	SM11010 12025	SCREW H.S CAP 육각 구멍볼이 나사	4	M12×25L
34	2001-11-303-0	COVER 커버	1	
35	SM10010 08025	BOLT HEX HEAD 육각 볼트	3	M8×25L



12-01	FY DRIVE	Y축 이송	(1/3)	2001-12
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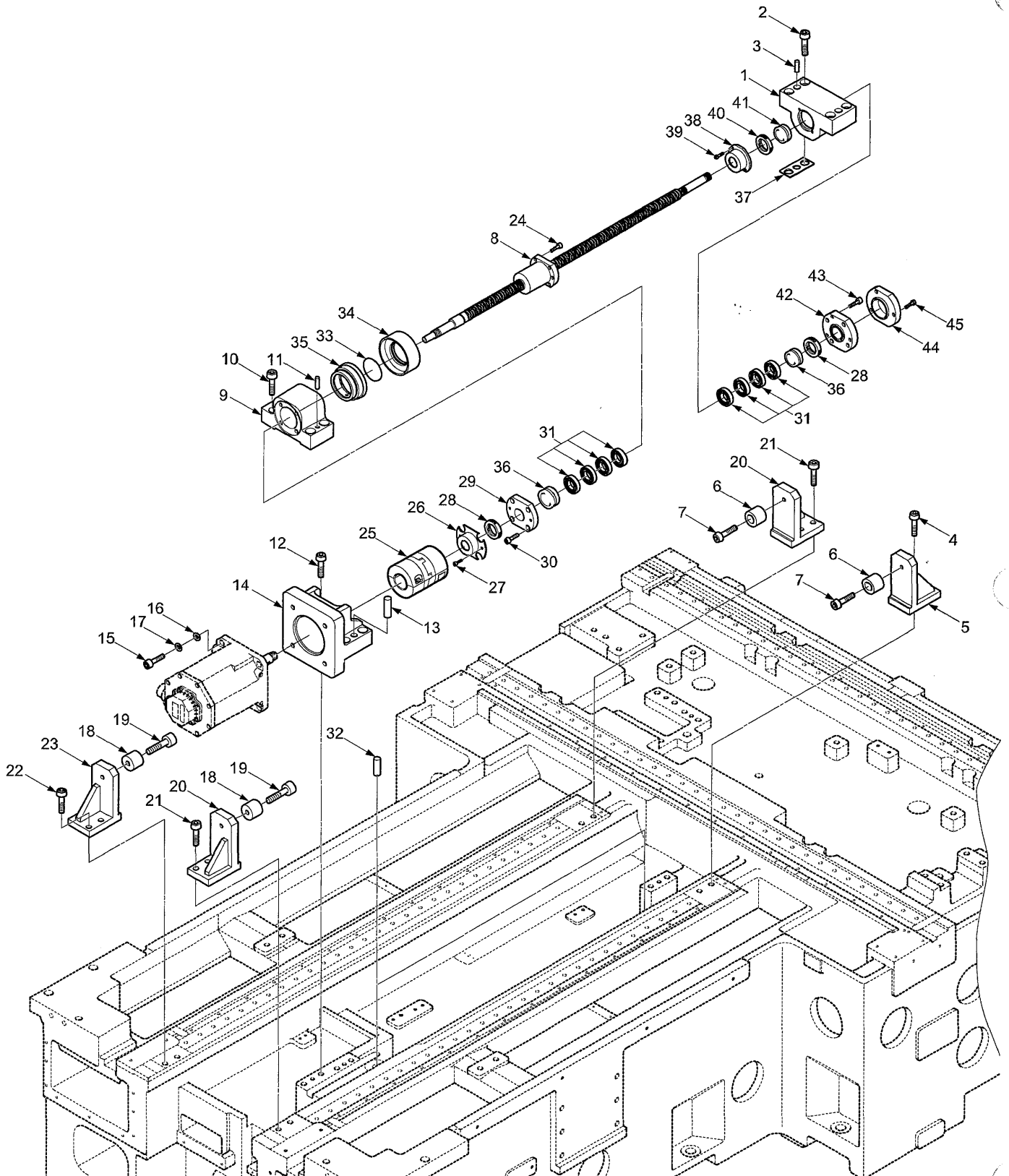
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	SM11010 12040	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×40L
2	SM13010 01200	WASHER PLAIN 평와셔	4	M12
3	SM13020 01200	WASHER SPRING 스프링 와셔	4	M12
4	2001-12-201-0	BRACKET 브라켓트	1	
5	2001-01-302-0	BALL SCREW 볼 스크류	1	
6	34641200011	BRACKET 브라켓트	1	
7	SM14010 10063	PIN PARALLEL 평행 핀	2	Ø10×63L
8	SM14010 20040	PIN PARALLEL 평행핀	1	Ø20×40L
9	SM11010 16080	SCREW H.S CAP 육각 구멍붙이 나사	4	M16×80L
10	2001-11-401-0	COUPLING 커플링	1	ROTEX38GS 35H7/25H7 (KTR)
11	A31FG000020	LOCK NUT 로크 너트	2	HKZM30 FUKUDA
12	34641200040	RETAINER 리테이너	1	
13	SM11010 12035	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×35L
14	PB793012014A	BEARING 베어링	8	30TAC 62B SU C10 PN7B (NSK)
15	44641200060	COLLAR 칼라	1	

12-01	FY DRIVE	Y축 이송	(2/3)	2001-12
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	SM11010 16060	SCREW H.S CAP 육각 구멍볼이 나사	4	M16×60L
17	SM11060 10015	SETSCREW H.S HEADLESS 세트스크류	2	M10×15L
18	44641100090	COLLAR 칼라	2	
19	44641200070	COVER 커버	1	
20	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	2	M6×12L
21	SM13020 00600	WASHER SPRING 스프링 와셔	2	M6
22	PM48041VH150	PACKING 패킹	1	CP1 FC0102C1 MOK
23	A31FG000030	LOCK NUT 로크 너트	1	HKZM32 FUKUDA
24	34641200050	FLANGE 플랜지	1	
25	SM11010 06015	SCREW H.S CAP 육각 구멍볼이 나사	2	M6×15L
26	44641100080	COLLAR 칼라	1	
27	2001-11-303-0	COVER 커버	1	Ø20×40L
28	SM10010 08025	BOLT HEX HEAD 육각 볼트	3	M8×25L
29	34641200030	RETAINER 리테이너	1	
30	SM11010 12025	SCREW H.S CAP 육각 구멍볼이 나사	4	M12×25L

12-01	FY DRIVE	Y축 이송	(3/3)	2001-12
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	SM14010 10060	PIN PARALLEL 평행핀	2	Ø10×60L
32	SM11010 10025	SCREW H.S CAP 육각 구멍볼이 나사	4	M10×25L



13-01	FZ DRIVE Z축 이송	(1/3)	2001-13
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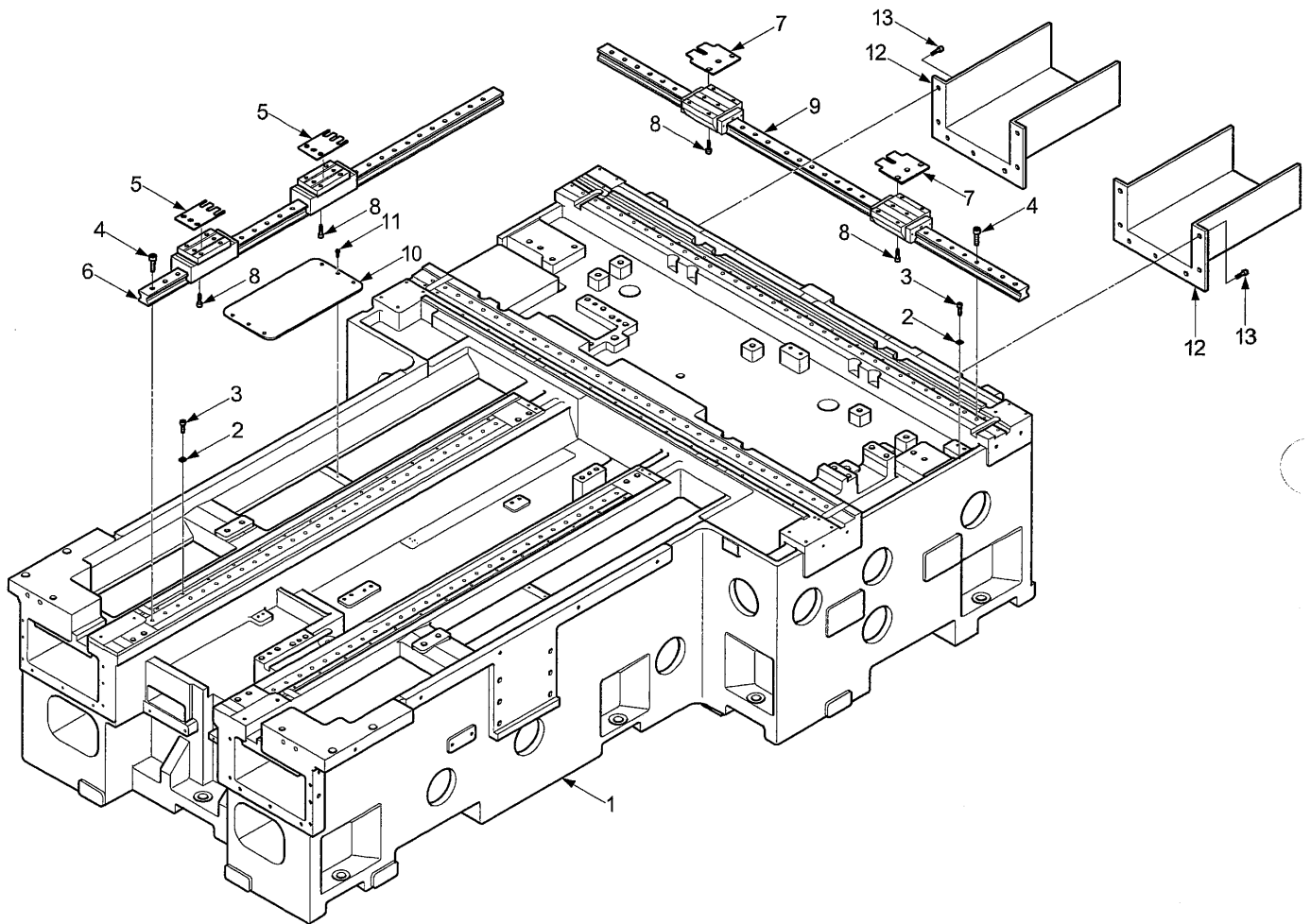
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	34641100011	BRACKET 브라켓트	1	
2	SM11010 16050	SCREW H.S CAP 육각 구멍볼이 나사	4	M16×50L
3	SM14010 10070	PIN PARALLEL 평행핀	2	Ø10×70L
4	SM11010 16045	SCREW H.S CAP 육각 구멍볼이 나사	2	M16×45L
5	34641300060	STAY 스테인	1	
6	44641300090	STOPPER 스토퍼	2	IRON RUBBER
7	SM11010 12030	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×30L
8	2001-20-304-0	BALL SCREW 볼 스크류	1	NSK
9	34631300011	BRACKET 브라켓트	1	
10	SM11010 16060	SCREW H.S CAP 육각 구멍볼이 나사	4	M16×60L
11	SM14010 10070	PIN PARALLEL 평행핀	2	Ø10×70L
12	SM11010 16070	SCREW H.S CAP 육각 구멍볼이 나사	4	M16×70L
13	SM14010 10070	PIN PARALLEL 평행핀	2	Ø10×70L
14	2001-11-201-0	BRACKET 브라켓트	1	
15	SM11010 12040	SCREW H.S CAP 육각 구멍볼이 나사	4	M12×40L

13-01	FZ DRIVE	Z축 이송	(2/3)	2001-13
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	SM13010 01200	WASHER PLAIN 평와셔	4	M12
17	SM13020 01200	WASHER SPRING 스프링 와셔	4	M12
18	44640100510	STOPPER 스토퍼	2	IRON RUBBER
19	SM11010 12030	SCREW H.S CAP 육각 구멍붙이 나사	2	M12×30L
20	34641300040	STAY 스테인	2	
21	SM11010 16045	SCREW H.S CAP 육각 구멍붙이 나사	4	M16×45L
22	SM11010 16045	SCREW H.S CAP 육각 구멍붙이 나사	2	M16×45L
23	34641300050	STAY 스테인	1	
24	SM11010 10025	SCREW H.S CAP 육각 구멍붙이 나사	6	M10×25L
25	2001-11-401-0	COUPLING 커플링	1	ROTEXGS38 35H7/25H7(KTR)
26	34641300080	COVER 커버	1	
27	SM11010 06015	SCREW H.S CAP 육각 구멍붙이 나사	2	Ø20×40L
28	A31FG000020	LOCK NUT 로크 너트	2	HKZM30 FUKUDA
29	34641100050	RETAINER 리테이너	1	
30	SM11010 12035	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×35L

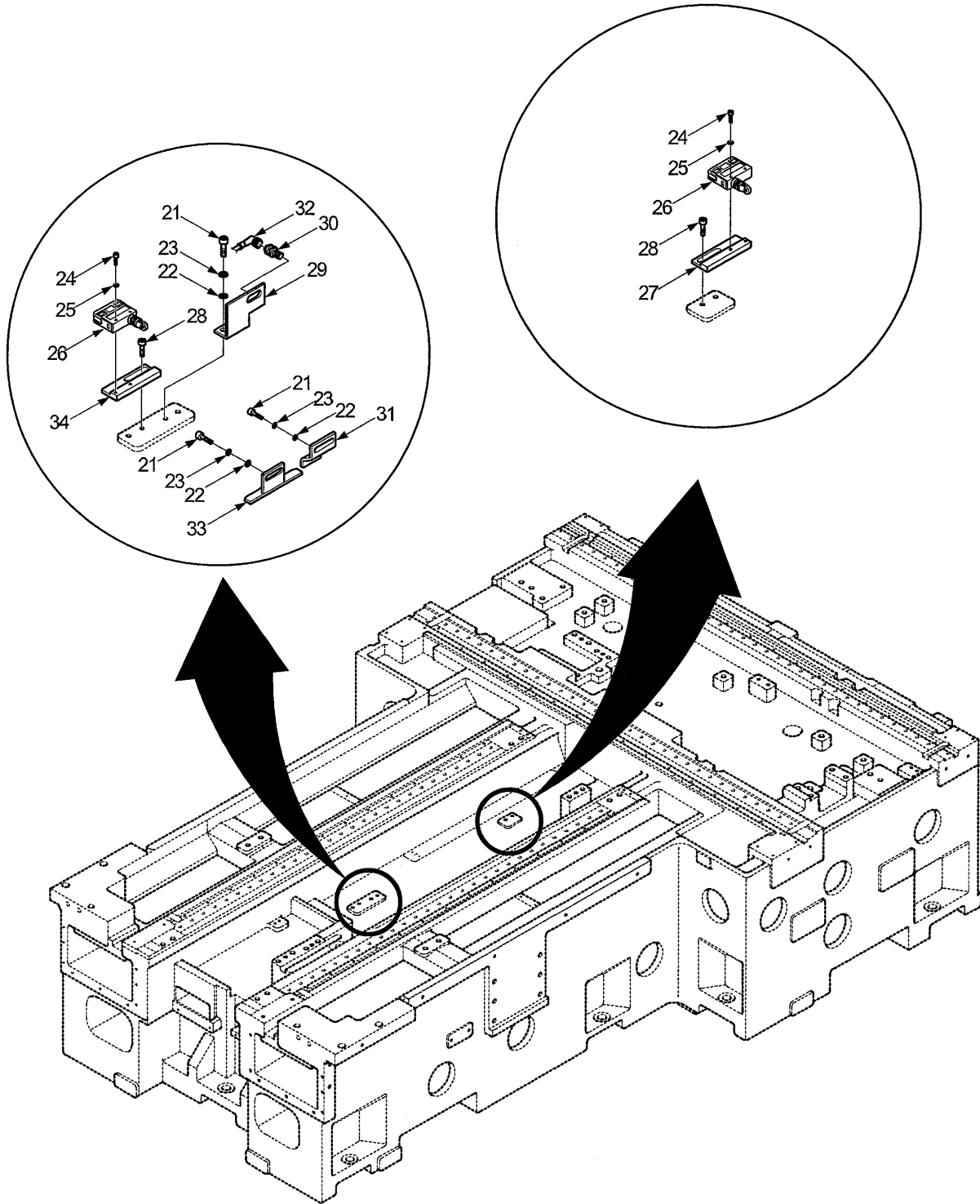
13-01	FZ DRIVE	Z축 이송	(3/3)	2001-13
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	E30TAC62DFF	BEARING 베어링	2	30TAC 62B DFF C10
32	SM14010 20040	PIN PARALLEL 평행핀	2	Ø20×40L
33	PM4801120360N	O-RING O-링	1	1BP36
34	44641100110	SLEEVE 슬리브	1	
35	44641100100	SLEEVE 슬리브	1	
36	44641100090	COLLAR 칼라	2	
37	44631300040	SPACER (2EA/SET) 스페이스	1	
38	34641300070	COVER 커버	1	
39	SM11010 06015	SCREW H.S CAP 육각 구멍붙이 나사	2	M6×15L
40	A31FG000030	LOCK NUT 로크 너트	1	HKZM32 FUKUDA
41	44641100080	COLLAR 칼라	1	
42	34641100040	RETAINER 리테이너	1	
43	SM11010 12025	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×25L
44	2001-11-303-0	COVER 커버	1	
45	SM10010 08025	BOLT HEX HEAD 육각 볼트	3	M8×25L



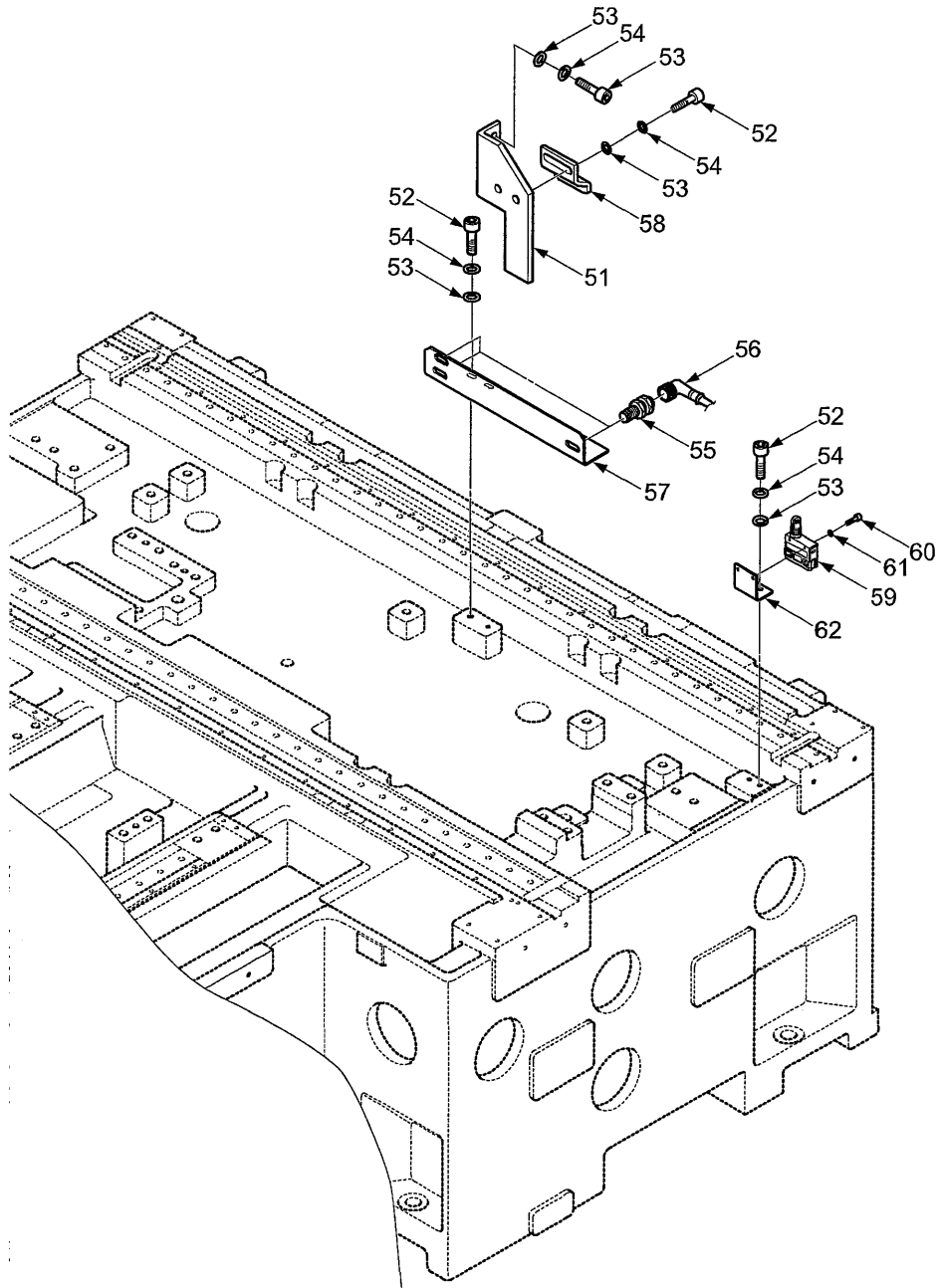
20-01	BED 베드	2001-20
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-01-101-0	BED 베드	1	
2	A80T30S0800	RETAINER 리테이너	62	
3	SM11010 08020	SCREW H,S CAP 육각구멍붙이나사	62	M8×L20
4	SM11010 12040	SCREW H,S CAP 육각구멍붙이나사	120	M12×L40
5	44640100300	SPACER 스페이서	4	
6	2001-20-302-0	ROLLER GUIDE (Z) 롤러 가이드 (Z)	2	
7	44640300020	SPACER 스페이스	4	
8	SM11010 08035	SCREW H,S CAP 육각구멍붙이나사	16	M10×L35
9	2001-20-301-0	ROLLER GUIDE (X) 롤러 가이드 (X)	2	
10	2001-20-320-0	COVER 커버	2	
11	SM11030 05010	SCREW CORSS FLAT HEAD 나사	12	M5×L10
12	2001-20-321-0	COVER 커버	2	
13	SM11010 08020	SCREW H,S CAP 육각구멍붙이나사	14	M8×L20



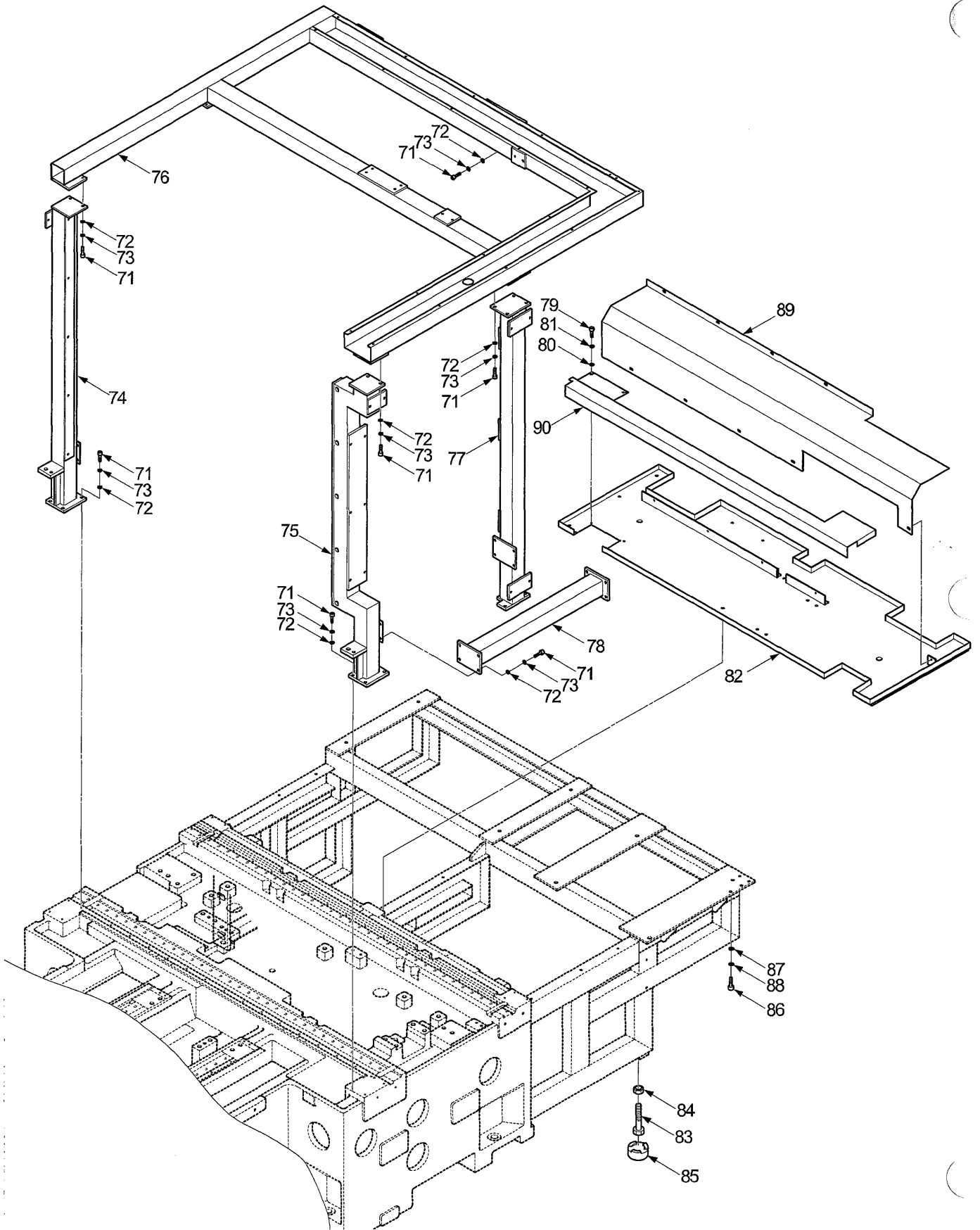
20-02	BED 베드	2001-20
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
21	SM11010 08015	SCREW H,S CAP 육각구멍붙이나사	6	M8×L15
22	SM13010 00800	WASHER PLAIN 평와셔	6	M8
23	SM13020 00800	WASHER SPRING 스프링와셔	6	M8
24	SM11010 04025	SCREW H,S CAP 육각구멍붙이나사	4	M4×L25
25	SM13010 00400	WASHER PLAIN 평와셔	4	M4
26	PE820135010R	SWITCH LIMIT 리미트 스위치	2	
27	2001-20-402-0	PLATE 플레이트	2	
28	SM11010 08025	SCREW H,S CAP 육각구멍붙이나사	4	M8×L25
29	2001-20-305-0	BRACKET 브라켓	1	
30	R26BA000020	SWITCH PROXIMITY 근접스위치	1	BES-516-370- E5-C-S4
31	44544500030	DOG 도그	1	
32	PEXS2FD422D80A	CABLE PROXIMITY SWITCH 근접스위치 케이블	1	XF2F-D422-G80-A
33	2001-20-401-0	DOG 도그	1	
34	2001-20-403-0	PLATE 플레이트	1	



20-03	BED 베드	2001-20
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
51	2001-20-306-0	DOG 도그	1	
52	SM11010 08015	SCREW H.S CAP 육각 구멍붙이 나사	8	M8×L15
53	SM13010 00800	WASHER PLAIN 평와셔	8	M8
54	SM13020 00800	WASHER SPRING 스프링와셔	8	M8
55	R26BA000020	SWITCH PROXIMITY 근접 스위치	3	BES-516-370 -E5-C-S4
56	PEXS2FD422D80A	CABLE PROXIMITY SWITCH 근접스위치 케이블	3	XS2F-D422 -G80-A
57	2001-20-307-0	STAY 스테이	1	
58	44644600070	DOG 도그	1	
59	PE820135010R	SWITCH LIMIT 리미트 스위치	1	D4E-1A20N,100V
60	SM11010 04025	SCREW H.S CAP 육각 구멍붙이 나사	2	M4×L25
61	SM13010 00400	WASHER PLAIN 평와셔	2	M4
62	34644600121	STAY 스테이	1	



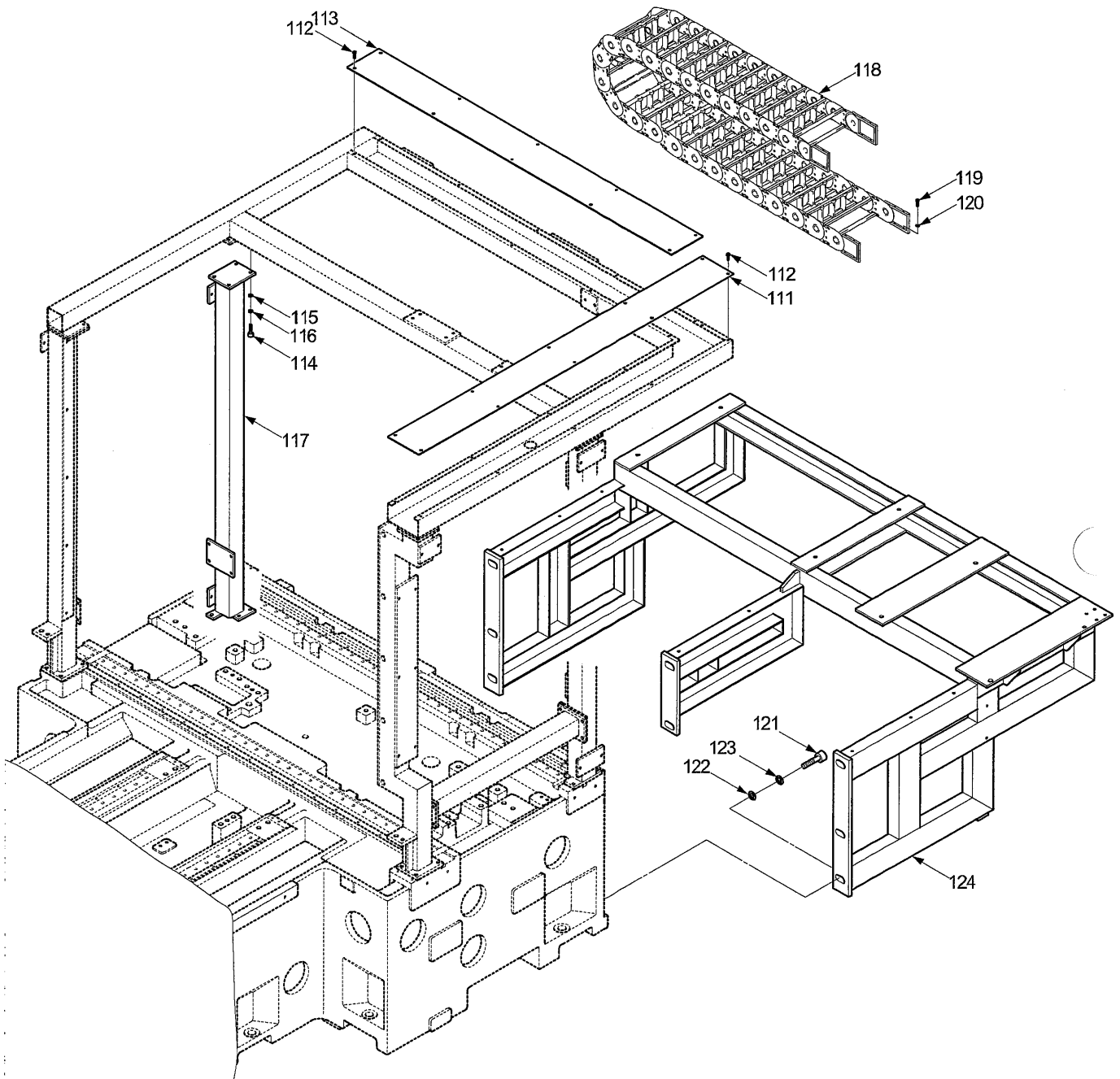
20-04	BED 베드	(1/2)	2001-20
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
71	SM11010 08025	SCREW H.S CAP 육각 구멍붙이 나사	48	M8×L25
72	SM13010 00800	WASHER PLAIN 평와셔	48	M8
73	SM13020 00800	WASHER SPRING 스프링 와셔	48	M8
74	2001-20-201-0	FRAME 프레임	1	
75	2001-20-202-0	FRAME 프레임	1	
76	2001-20-102-0	FRAME 프레임	1	
77	2001-20-203-0	FRAME 프레임	1	
78	2001-20-308-0	FRAME 프레임	2	
79	SM11010 08015	SCREW H.S CAP 육각 구멍붙이 나사	8	M8×L15
80	SM13010 00800	WASHER PLAIN 평와셔	8	M8
81	SM13020 00800	WASHER SPRING 스프링 와셔	8	M8
82	2001-20-204-0	STAY 스태이	1	
83	SM10010 16070	BOLT HEX HEAD 육각 볼트	2	M16×L70
84	SM12010 01600	NUT HEX 육각 너트	2	M16
85	44056100010	LEVEL PLATE 레벨 플레이트	3	

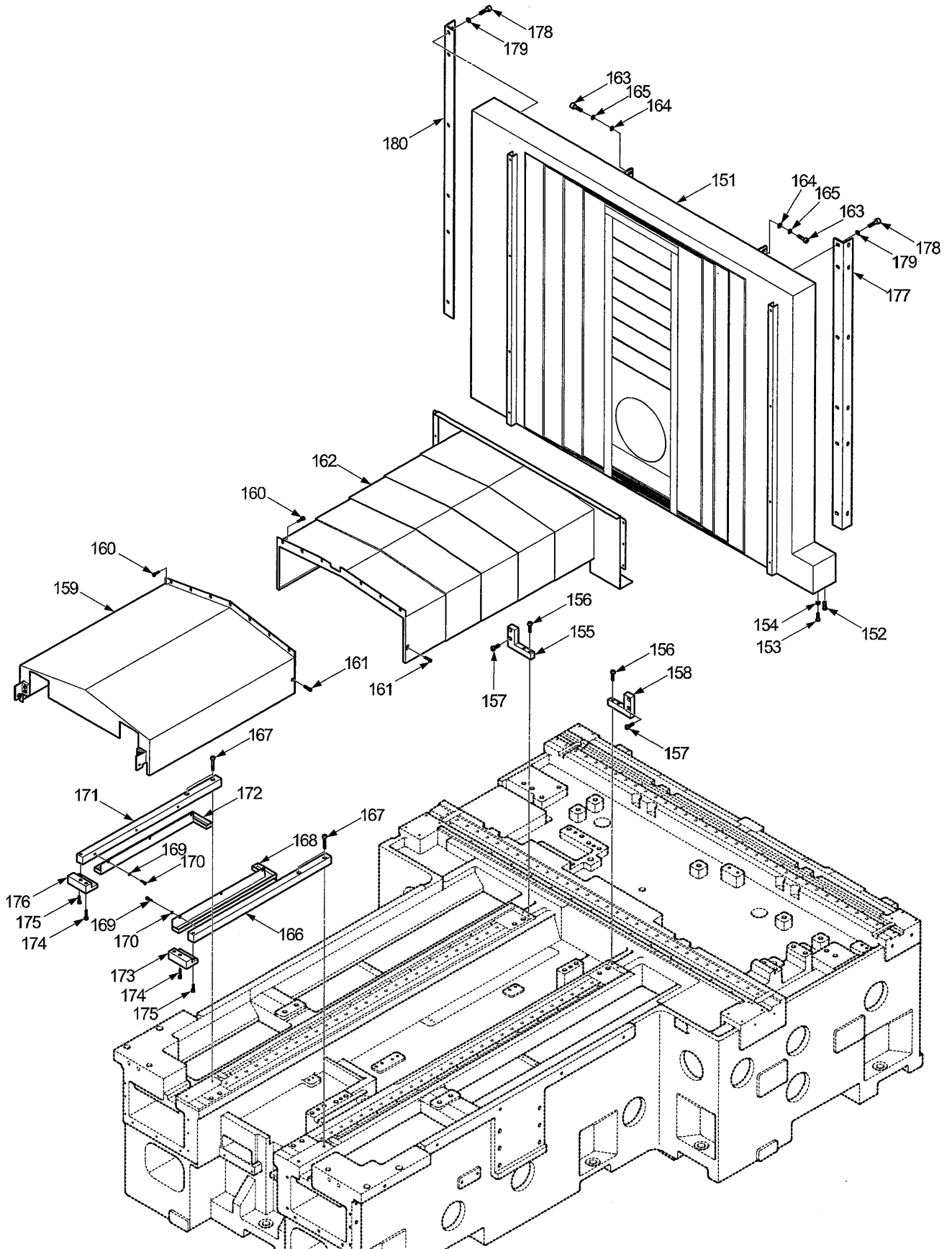
20-04	BED 베드	(2/2)	2001-20
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
86	SM11010 12030	SCREW H.S CAP 육각 구멍볼이 나사	6	M12×L30
87	SM13010 01200	WASHER PLAIN 평와셔	6	M12
88	SM13020 01200	WASHER SPRING 스프링 와셔	6	M12
89	2001-20-208-0	COVER 커버	1	
90	2001-20-209-0	COVER 커버	1	

MEMO



20-05		BED 베드		2001-20
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
111	2001-20-309-0	COVER 커버	1	
112	SM11013 06010	SCREW BUTTON HEAD 나사	20	M6×10
113	2001-20-310-0	COVER 커버	1	
114	SM11010 08025	SCREW H.S CAP 육각 구멍볼이 나사	16	M8×L25
115	SM13010 00800	WASHER PLAIN 평와셔	16	M8
116	SM13020 00800	WASHER SPRING 스프링 와셔	16	M8
117	2001-20-205-0	FRAME 프레임	1	
118	Z91CP000041	CABLE CHAIN 케이블 체인	1	CP090N.250.R250 -198ØL
119	SM11010 08025	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L25
120	SM13020 00800	WASHER SPRING 스프링 와셔	8	M8
121	SM11010 20050	SCREW H.S CAP 육각 구멍볼이 나사	8	M20×L50
122	SM13010 02000	WASHER PLAIN 평와셔	8	M20
123	SM13020 02000	WASHER SPRING 스프링 와셔	8	M20
124	2001-20-103-0	FRAME 프레임	1	

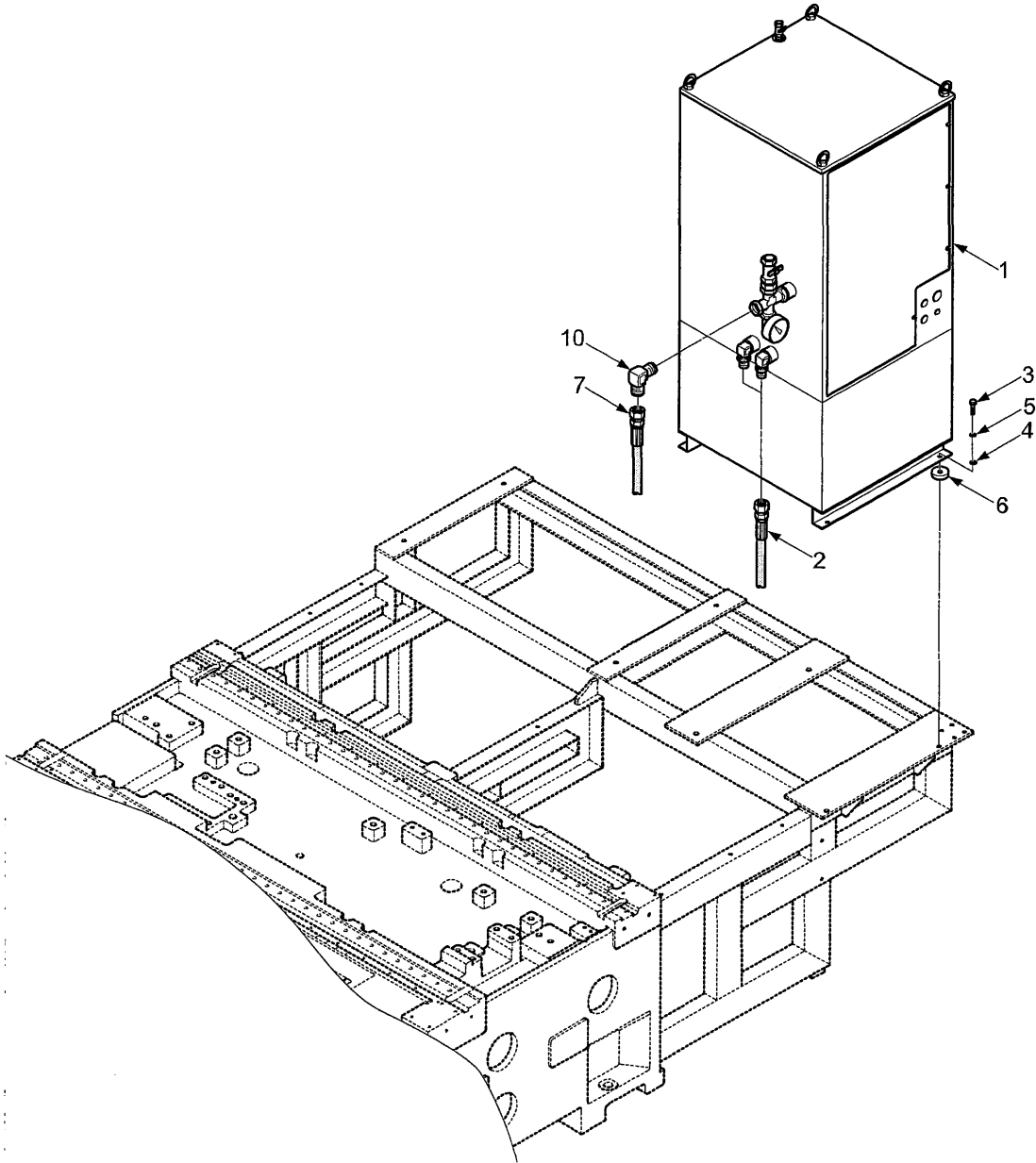


20-06	BED 베드	(1/2)	2001-20
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
151	2001-20-317-0	SLIDE COVER(X,Y) 슬라이드 커버(X,Y)	1	
152	SM10010 12035	BOLT HEX HEAD 육각 볼트	2	M12×L35
153	SM10010 12040	BOLT HEX HEAD 육각 볼트	2	M12×L40
154	SM12010 01200	NUT HEX 육각 너트	2	M12
155	44645101010	BRACKET 브라켓트	1	
156	SM11010 08035	SCREW H.S CAP 육각 구멍붙이 나사	4	M8×L35
157	SM11010 08025	SCREW H.S CAP 육각 구멍붙이 나사	4	M8×L25
158	44645101000	BRACKET 브라켓트	1	
159	2001-20-318-0	SLIDE COVER(Z-FR) 슬라이트 커버(Z-FR)	1	
160	SM11010 06015	SCREW H.S CAP 육각 구멍붙이 나사	7	M6×L15
161	SM11010 08015	SCREW H.S CAP 육각 구멍붙이 나사	2	M8×L15
162	2001-20-319-0	SLIDE COVER(Z-RR) 슬라이드 커버(ZORR)	1	
163	SM11010 08035	SCREW H.S CAP 육각 구멍붙이 나사	16	M8×L35
164	SM13010 00800	WASHER PLAIN 평와셔	16	M8
165	SM13020 00800	WASHER SPRING 스프링 와셔	16	M8

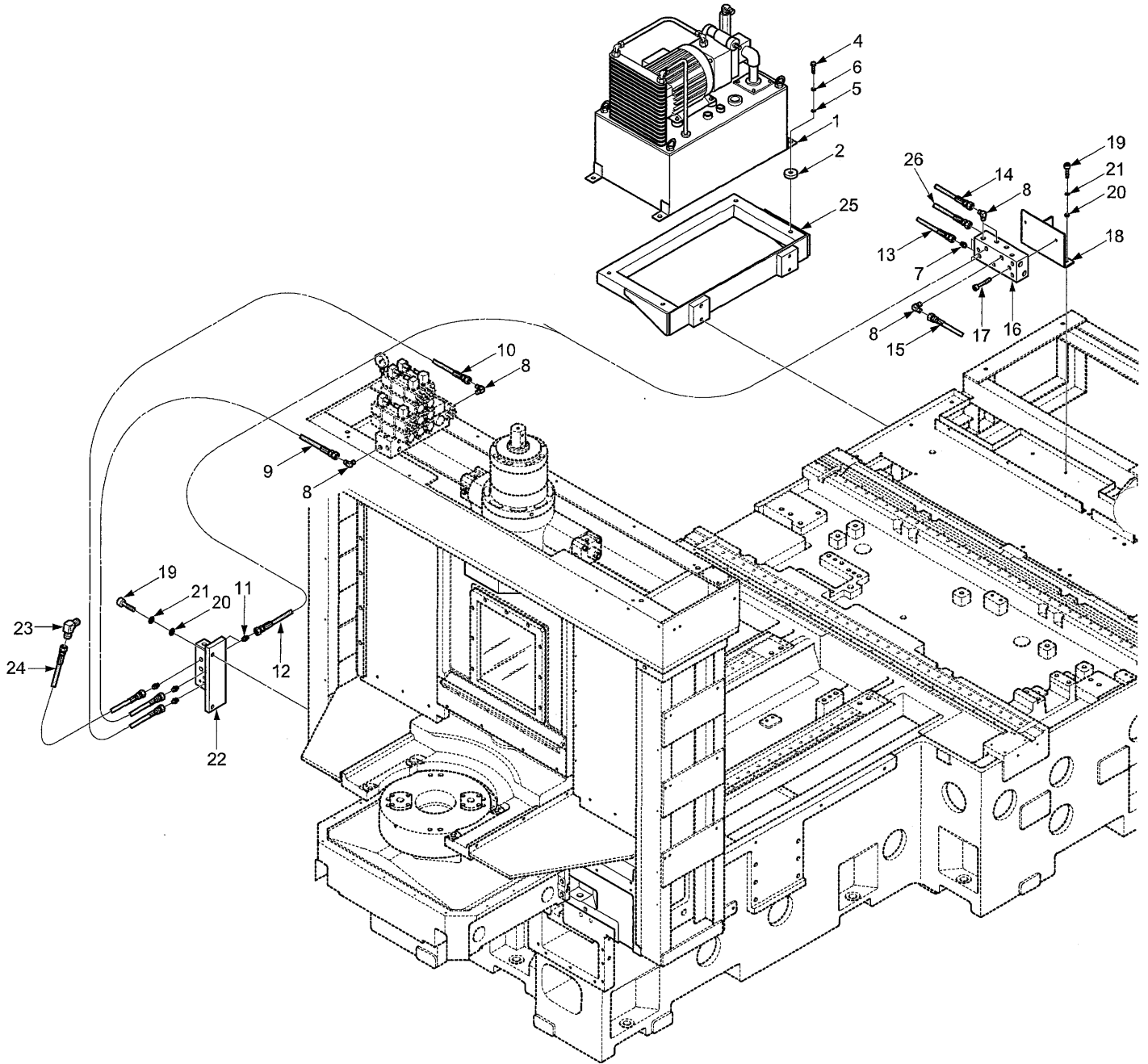
20-06	BED 베드		(2/2)	2001-20
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
166	2001-20-311-0	BLOCK 블록	1	
167	SM11010 08035	SCREW H.S CAP 육각 구멍붙이 나사	4	M8×L35
168	2001-20-312-0	PAN 팬	1	
169	SM11010 06012	SCREW H.S CAP 육각 구멍붙이 나사	6	M6×L12
170	SM13010 00600	WASHER PLAIN 평와셔	6	M6
171	2001-20-313-0	BLOCK 블록	1	
172	2001-20-314-0	PAN 팬	1	
173	44645101021	BRACKET 브라켓트	1	
174	SM11010 08040	SCREW H.S CAP 육각 구멍붙이 나사	4	M8×L40
175	SM11010 08030	SCREW H.S CAP 육각 구멍붙이 나사	2	M8×L30
176	44645101051	BRACKET 브라켓트	1	
177	2001-20-316-0	BRACKET 브라켓트	1	
178	SM11010 08025	SCREW H.S CAP 육각 구멍붙이 나사	10	M8×L25
179	SM13010 00800	WASHER PLAIN 평와셔	10	M8
180	2001-20-315-0	BRACKET 브라켓트	1	

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43-01	HEAD COOLING 주축 냉각	2001-43
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	G34HP000310	WATER CHILLER 워터 칠러	1	CJWC110-ADPT-S
2	PM40CH185185350	HOSE ASS'Y 호스	2	
3	SM1001010028	BOLT HEX HEAD 육각 볼트	4	M10×L28
4	SM1301001000	WASHER PLAIN 평와셔	4	M10
5	SM1302001000	WASHER SPRING 스프링 와셔	4	M10
6	4 147 52 4144 0	CUSHION 쿠션	4	
7	PM40CH185185390	HOSE ASS'Y 호스	1	
10	PM4013210606	ADAPTER-90,ELBOW 엘보우 어댑터	3	PT3/4



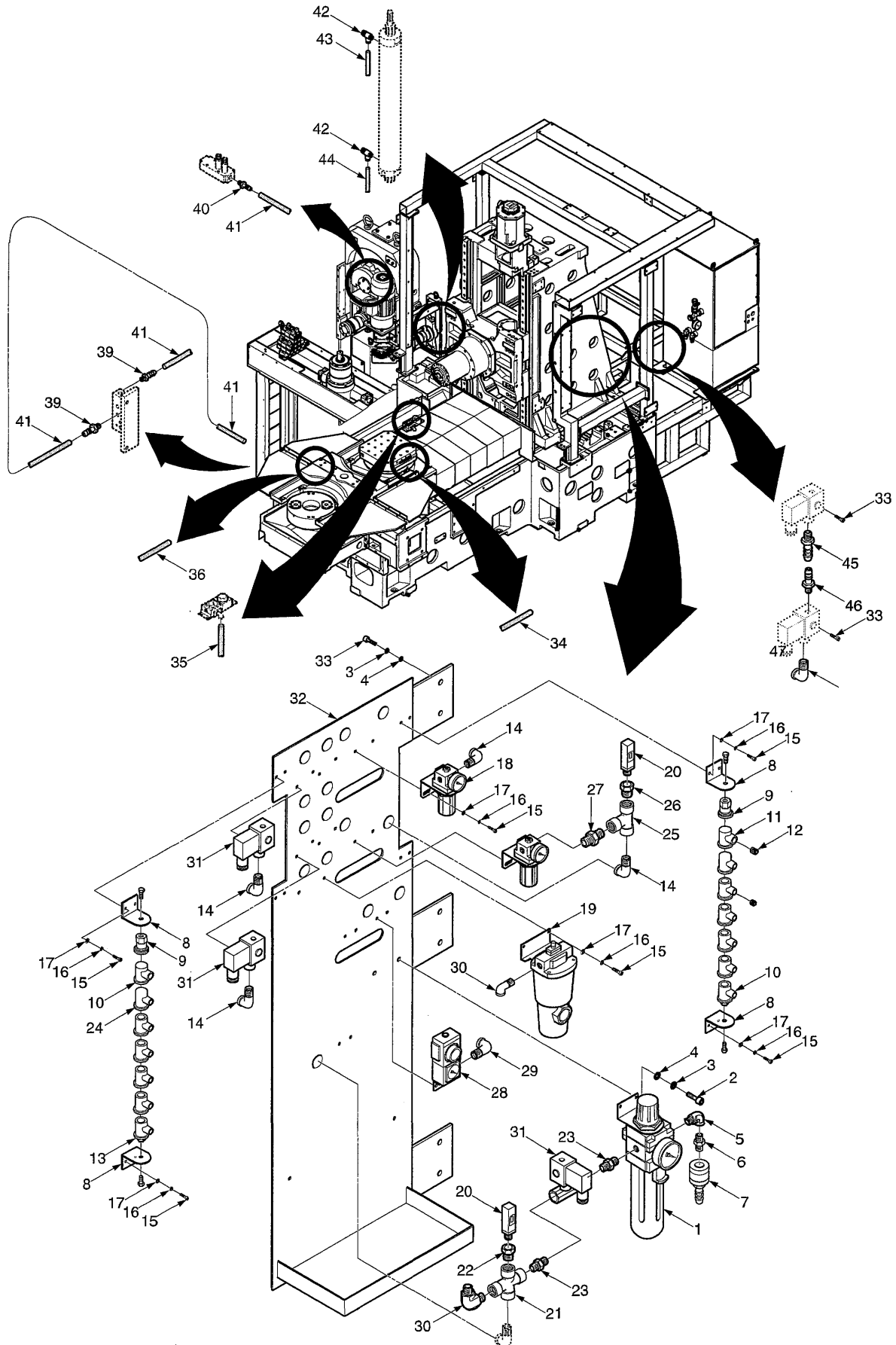
44-01	HYDRAULIC 유압	(1/2)	2001-44
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q ' ty 수량	Note 비고
1	2001-44-302-0	HYD' UNIT 유압 유니트	1	
2	4 147 52 4144 0	CUSHION 쿠션	4	RUBBER
4	SM1101012035	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×L35
5	SM1301001200	WASHER PLAIN 평와셔	4	M12
6	SM1302001200	WASHER SPRING 스프링 와셔	4	M12
7	PM4011110404	ADAPTER-A,HOSE 호스 어댑터	2	1/2
8	PM4013210303	ADAPTER-A,HOSE ELBOW 호스 엘보우 어댑터	8	3/8
9	PM40CF183183250	HOSE ASS'Y 호스	1	
10	PM40CF183183240	HOSE ASS'Y 호스	1	
11	PM4011110303	ADAPTER-A,HOSE 호스 어댑터	8	3/8
12	PM40CF183183360	HOSE ASS'Y 호스	2	
13	PM40CF183183340	HOSE ASS'Y 호스	2	
14	PM40CG184184150	HOSE ASS'Y 호스	1	
15	PM40CF183183360	HOSE ASS'Y 호스	2	
16	2001-44-301-0	BLOCK 블록	1	

44-01	HYDRAULIC 유압	(2/2)	2001-44
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q' ty 수량	Note 비고
17	SM1101008060	SCREW H.S CAP 육각 구멍볼이 나사	2	M8×L60
18	34644100261	STAY 스테인	1	
19	SM1101008025	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L25
20	SM1301000800	WASHER PLAIN 평와셔	4	
21	SM1302000800	WASHER SPRING 스프링 와셔	4	
22	24644100590	MANIFOLD 매니폴트	1	
23	PM4013810303	ADAPTER-A, HOSE 45° ELBOW 어댑터-A, 호스 45° 엘보우	2	3/8
24	PM40CF183183280	HOSE ASS'Y 호스	2	
25	2001-44-201-0	BRACKET 브라켓트	1	
26	PM40CG184184070	HOSE ASS'Y 호스	1	

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45-01	PNEUMATIC 공압	(1/4)	2001-45
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	PH020906581S	FILTER REGULATOR 레귤레이터 필터	1	AW4002-03-DBG
2	SM1101008016	SCREW H.S CAP 육각 구멍볼이 나사	2	M8×L16
3	SM1302000800	WASHER SPRING 스프링 와셔	2	M8
4	SM1301000800	WASHER PLAIN 평와셔	2	M8
5	PM4312730003	ELBOW STREET SCREWED TYPE 엘보우	1	PT3/8 (HYUP DONG)
6	PM405011103	COUPLER SOCKET 커플러 소켓	1	30SH
7	PM405012203	PLUG COUPLER 커플러 플러그	1	30PM
8	PMS999900KBX6	BRACKET 브라켓트	4	KBX6
9	PMS999900KBC3	CAP 캡	2	KBC3
10	PMS9999KBV312	ELBOW MODULE 엘보우	3	KBV3-12
11	PMS9999KBV308	ELBOW MODULE 엘보우	10	KBV3-08
12	PMS99990KQP08	PLUG 플러그	4	KQP-08
13	PMS999900KBP3	PLUG 플러그	2	KBP3
14	PM41335A0802000	ELBOW SWIVEL MALE 엘보우	8	1/4-Ø8
15	SM1101005010	SCREW H.S CAP 육각 구멍볼이 나사	20	M5×L10

45-01	PNEUMATIC 공압	(2/4)	2001-45
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q ' ty 수량	Note 비고
16	SM1302000500	WASHER SPRING 스프링 와셔	20	M5
17	SM1301000500	WASHER PLAIN 평와셔	20	M5
18	PH020806533S	REGULATOR 레귤레이터	2	AR2001-02BG
19	PH023207137S	MIST FILTER 미스트 필터	1	AMH150-02BD-T
20	PH022206516S	PRESSURE S/W 압력 스위치	2	IS1000-01
21	PM4314830003	CROSS,SCREW TYPE 나사형 크로스	1	1/4
22	PM4320430302	BUSHING,SCREWD TYPE 나사형 부싱	1	3/8×1/8 (HYUP DONG)
23	PM4315130003	NIPPLE,SCREWD TYPE 나사형 니플	2	1/4
24	PMS9999KBV310	ELBOW MODULE 엘보우 모듈	1	KBV3-10
25	PM4314230002	TEE,SCREW TYPE 나사형 티	1	1/4
26	PM4320430201	BUSHING,SCREWD TYPE 나사형 부싱	1	SHB02-01R (HYUP DONG)
27	PM4315130002	NIPPLE,SCREWD TYPE 나사형 니플	1	1/4
28	G23SV000020	SWITCH PRESSURE 압력 스위치	1	ISA2-HE5L
29	PM41335A0801000	ELBOW SWIVEL MALE 스위블 엘보우	2	1/8-Ø08
30	PM41335A1203000	ELBOW SWIVEL MALE 스위블 엘보우	3	3/8-Ø12

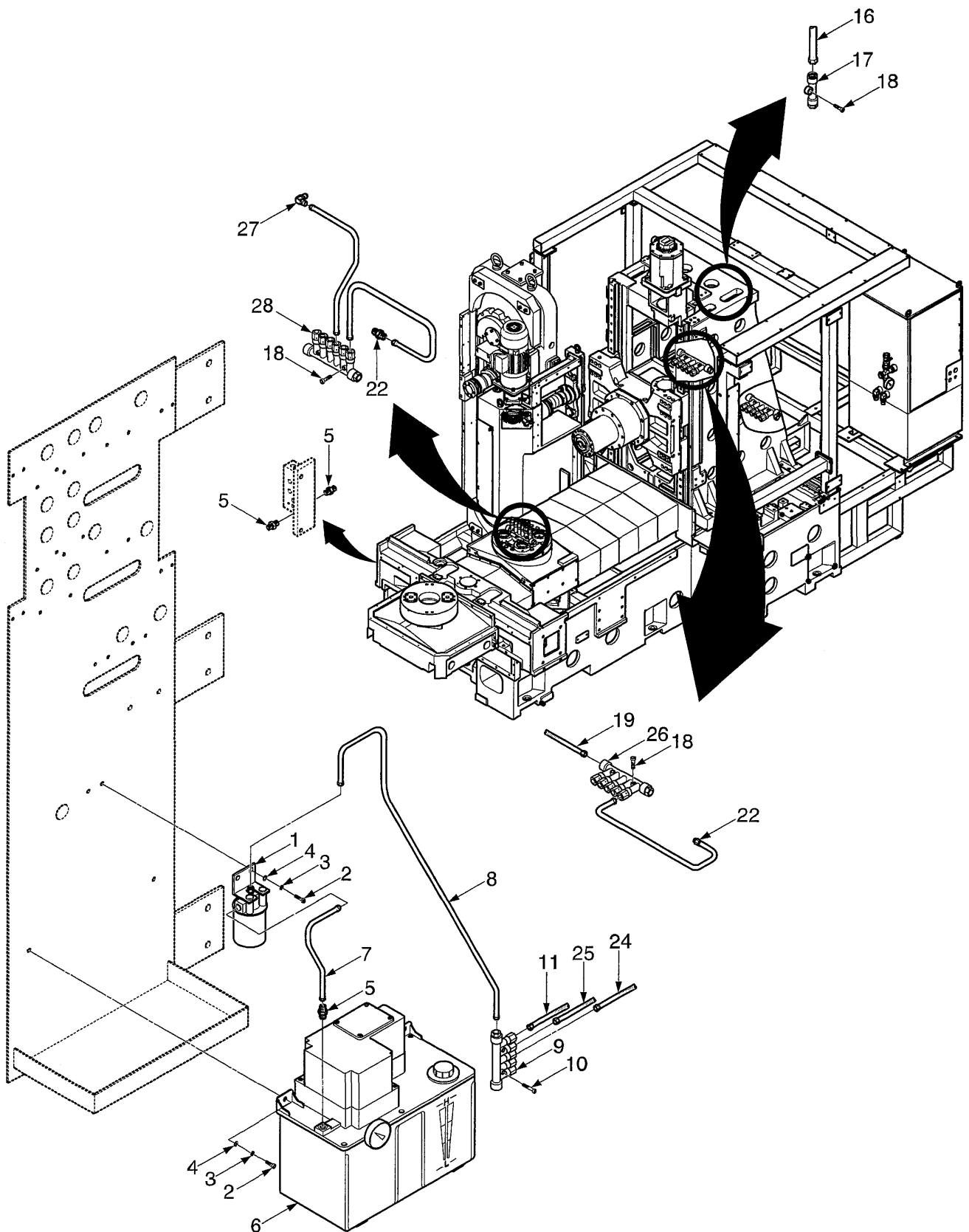
45-01	PNEUMATIC 공압	(3/4)	2001-45
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	G50SV005950	SOLENOID V/V 솔레노이드 밸브	2	VX2130-02-1DB-Q
32	2001-45-201-0	PLATE 플레이트	1	
33	SM1101006012	SCREW H.S CAP 육각 구멍붙이 나사	8	M6×L12
34	PM4111080006001	HOSE,SYNFLEX 호스	2.4MT	Ø8×2400L
35	PM4111080006001	HOSE,SYNFLEX 호스	2.6MT	Ø8×2600L
36	PM4111080006001	HOSE,SYNFLEX 호스	1.8MT	Ø8×1800L
37	PM4111080006001	HOSE,SYNFLEX 호스	1.2MT	Ø8×1200L
38	PM4111080006001	HOSE,SYNFLEX 호스	26.4MT	Ø8×6600L
39	PM41303A0802000	CONNECTOR,MALE 콘넥터	8	1/4-Ø8
40	PM41303A1202000	CONNECTOR,MALE 콘넥터	1	1/4-Ø12
41	PM4111120008002	HOSE,SYNFLEX 호스	3.6MT	Ø12×3600L
42	PM41335A1003000	ELBOW SWIVEL MALE 엘보우	2	3/8-Ø10
43	PM4111100008001	HOSE,SYNFLEX 호스	3.8MT	Ø10×3800L
44	PM4111100008001	HOSE,SYNFLEX 호스	2.8MT	Ø10×3800L
45	PM41303A0802000	CONNECTOR, MALE 콘넥터	2	1/4-Ø8

45-01	PNEUMATIC 공압	(4/4)	2001-45
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
46	PM41503B0602000	CONNECTOR, MALE 콘넥터	1	1/4-Ø6
47	PM41535B0602000	ELBOW, MAIN 엘보우	1	1/4-Ø6

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46-01	LUBRICATION	윤활	(1/2)	2001-46
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	G30LA000020	LINE FILTER 라인 필터	1	FX1(209311)
2	SM1101006012	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L12
3	SM1302000600	WASHER SPRING 스프링 와셔	6	M6
4	SM1301000600	WASHER PLAIN 평와셔	6	M6
5	PM4091030060A	NIPPLE 니플	9	PD6
6	2001-46-301-0	LUBE PUMP 윤활 펌프	1	AMO-II-150S
7	PM4110600040003	HOSE,SYNFLEX 호스	0.3M	D6×4×L300
8	PM4110600040003	HOSE,SYNFLEX 호스	0.6M	D6×4×L600
9	PH030203827K	DISTRIBUTOR 디스트리뷰터	1	DB-7PT (ARYUNG)
10	SM1101006030	SCREW H.S CAP 육각 구멍볼이 나사	2	M6×L30
11	PM4110600040003	HOSE,SYNFLEX 호스	0.8M	D6×4×L800
16	PM4110600040003	HOSE,SYNFLEX 호스	2.5M	D6×4×L2500
17	PM4091240060	TEE 티이	1	PKD-6 (SHOWA)
18	SM1101006025	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L25
19	SR3402G00610	PIPE 파이프	3M	STP2,D6×1.0

46-01	LUBRICATION	윤활	(2/2)	2001-46
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
22	PM4091030040A	NIPPLE 니플	15	PD4
24	PM4110600040003	HOSE,SYNFLEX 호스	3M	D6×4×L1500×2
25	PM4110600040003	HOSE,SYNFLEX 호스	2.7M	D6×4×L2700
26	2001-46-403-0	X,Y-AXIS LUB SET X,Y-축 윤활 세트	2	
27	PM4091110040A	ELBOW 엘보우	1	PH4
28	2001-46-404-0	Z-AXIS LUB SET Z-축 윤활 세트	1	

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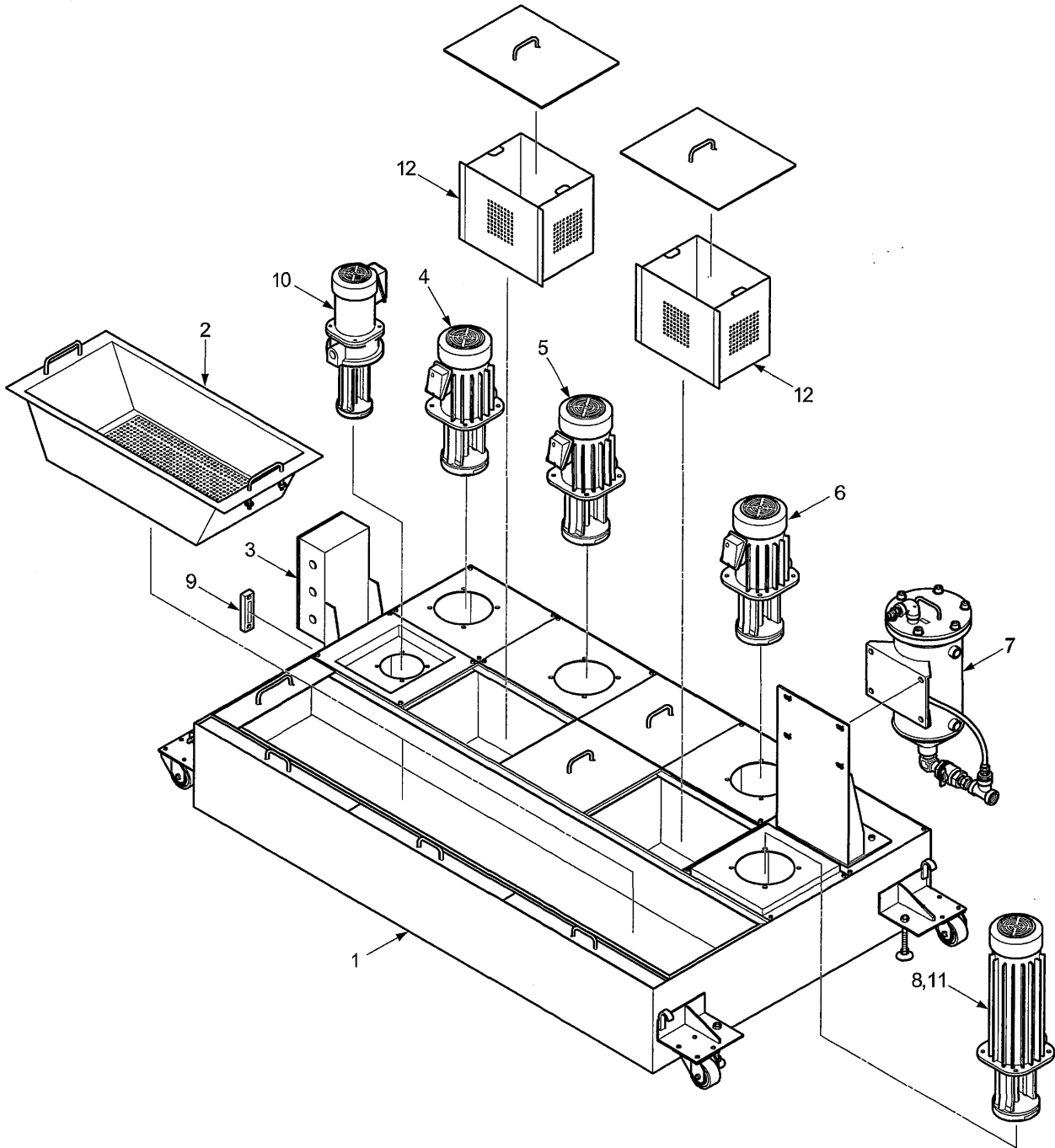
47-01	COOLANT	쿨러트	(1/3)	2001-47
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1		TRAY 트레이	2	
2		CHUTE 슈트	2	
3		CHAIN COVER 체인 커버	2	
4		BASE 베이스	2	
5		MOTOR BASE 모터 베이스	2	
6		COIL STOPPER 코일 스톱퍼	4	
7		COIL 코일	2	
8		BEARING HOUSING 베어링 하우징	2	
9		SHAFT 샤프트	2	
10		SPACER 스페이서	2	
11		END PLATE 엔드 플레이트	2	
12		CHAIN SPROCKET(S) 체인 스프로켓(S)	2	#RS40×19NT
13		CHAIN SPROCKET(M) 체인 스프로켓(M)	2	#RS40×19NT
14		KEY(S) 키(S)	2	8×7×1R
15		KEY(M) 키(M)	2	6×6×1R

47-01	COOLANT 쿨런트		(2/3)	2001-47
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16		PACKING-1 패킹-1	2	3t
17		PACKING-2 패킹-2	2	3t
18		GEARED MOTOR 기어드 모터	2	SY-MAX-V002- 60-V88
19		SNAP RING 스냅 링	2	R62
20		BALL BEARING 볼 베어링	4	#6206DDU
21		OIL SEAL 오일 시일	2	35×55×8t
22		CHAIN 체인		#RS40
23		HEX BOLT 육각 볼트	4	M8×35L
24		WRENCH BOLT S/W P/W 렌치 볼트	12	M8×15L
25		WRENCH BOLT S/W P/W 렌치 볼트	16	M6×30L
26		WRENCH BOLT S/W P/W 렌치 볼트	2	M6×20L
27		WRENCH BOLT S/W P/W 렌치 볼트	18	M8×25L
28		WRENCH BOLT S/W P/W 렌치 볼트	8	M8×25L
29		WRENCH BOLT S/W P/W 렌치 볼트	2	M10×20L
30		WRENCH BOLT S/W P/W 렌치 볼트	8	M8×40L

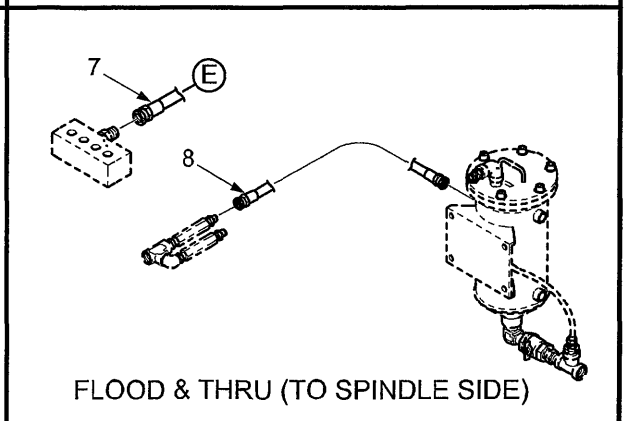
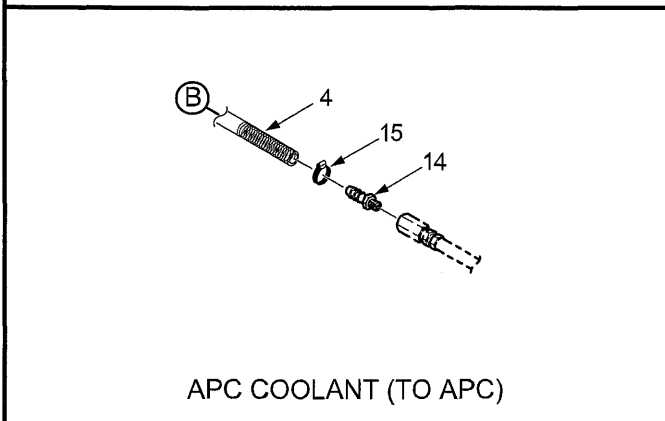
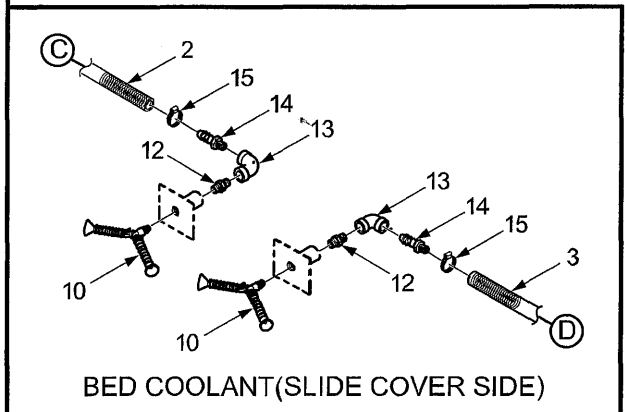
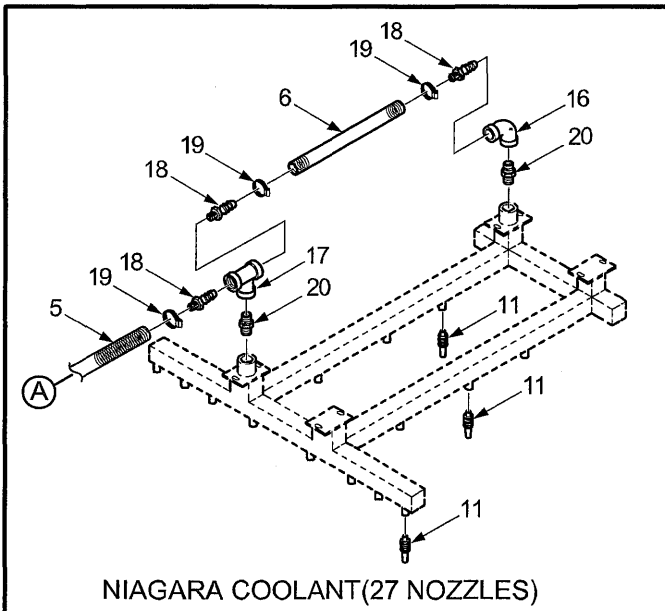
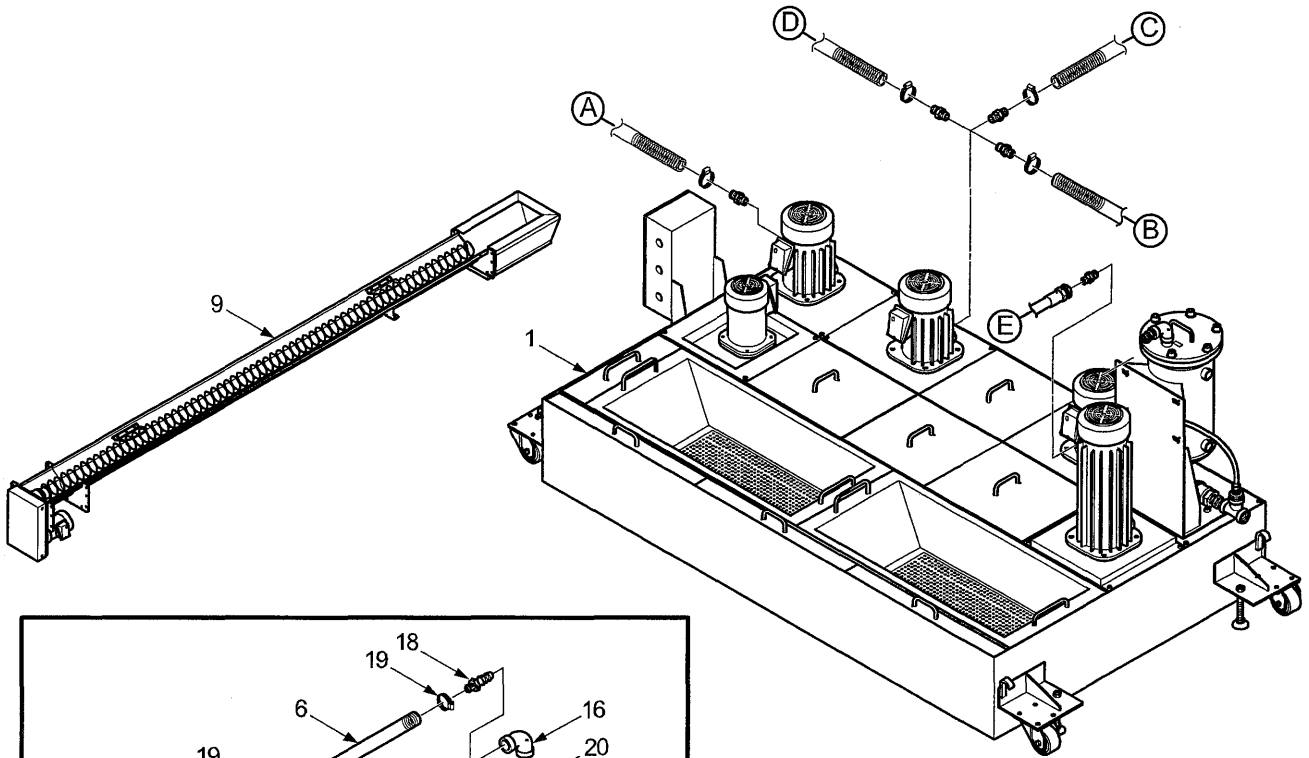
47-01	COOLANT	쿨런트	(3/3)	2001-47
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31		NUT 너트	8	M8



47-02	COOLANT 쿨런트	2001-47
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1		TANK 탱크	1	3T (600L)
2		CHIP BASKET-1 칩 바스켓-1	2	2.3T
3		JUNCTION BOX 정션 박스	1	200×360×120
4		COOLANT PUMP 쿨런트 펌프	1	STD (도번:06C01791)적용
5		COOLANT PUMP 쿨런트 펌프	1	ACP-1500MF A-RYUNG
6		COOLANT PUMP 쿨런트 펌프	1	ACP-900MF A-RYUNG
7		LINE FILTER 라인 필터	1	MCF 8-20 JESUNG
8		COOLANT PUMP 쿨런트 펌프	1	ACP-3700HMFC200V A-RYUNG
9		OIL GAUGE 오일 게이지	1	SH-C-120 (M12)
10		COOLANT PUMP (GUN) 쿨런트 펌프(건)	1	ACP-180F A-RYUNG(OPT.)
11		COOLANT PUMP 쿨런트 펌프	1	ACP-900HMF30 A-RYUNG(OPT.)
12		CHIP BASKET-2 칩 바스켓-2	2	PUNCHING PLATE 2.0T



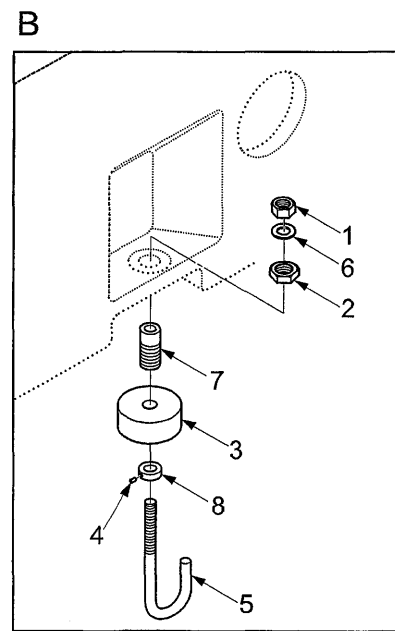
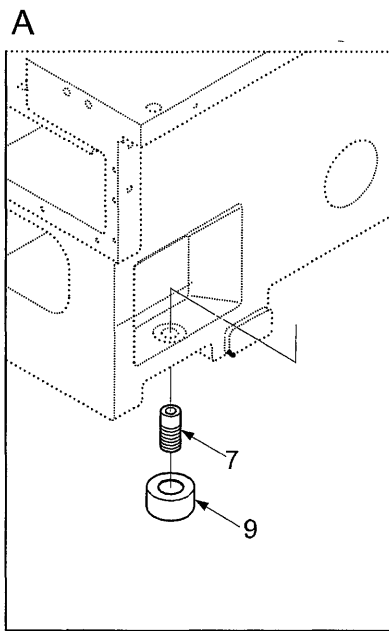
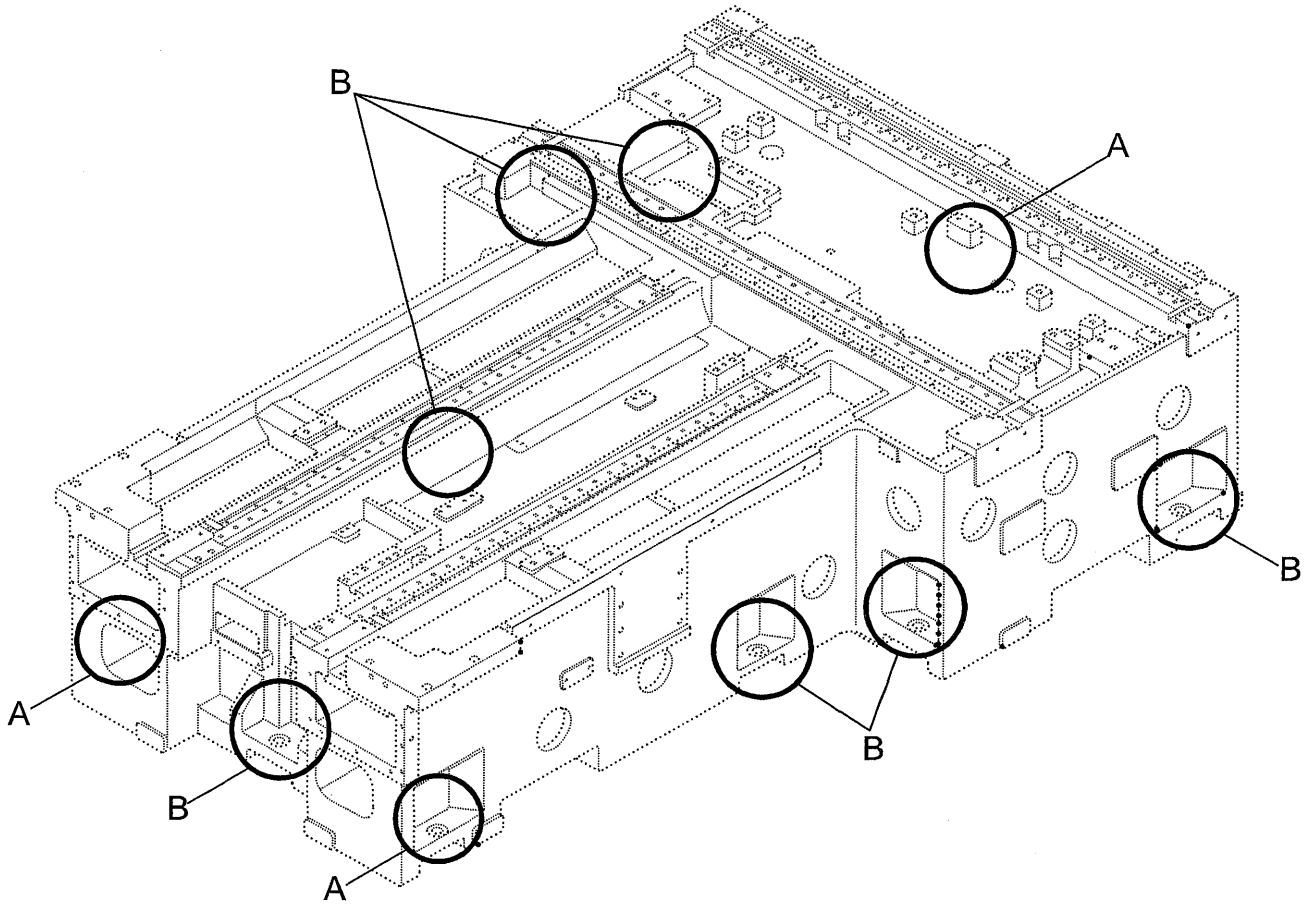
47-03	COOLANT	쿨런트	(1/2)	2001-47
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-47-202-0	COOLANT TANK ASSY 쿨런트 탱크 조립체	1	W/T CON, 600L
2	SM4004001900	HOSE,WIRE SPRING VINYL 호스, 와이어 스프링 비닐	1	Ø19
3	SM4004001900	HOSE,WIRE SPRING VINYL 호스, 와이어 스프링 비닐	1	Ø19
4	SM4004001900	HOSE,WIRE SPRING VINYL 호스, 와이어 스프링 비닐	1	Ø19
5	SM4004003200	HOSE,WIRE SPRING VINYL 호스, 와이어 스프링 비닐	1	Ø32
6	SM4004003200	HOSE,WIRE SPRING VINYL 호스, 와이어 스프링 비닐	1	Ø32×900L
7	PM40CH18518550	HOSE ASS'Y 호스	1	
8	PM40CF18318550	HOSE ASS'Y 호스	1	
9	2001-47-201-0	SPIRAL CONVEYOR (R,L) 스파이럴 컨베이어 (좌,우)	1	SHINJIN
10	0464ASY36B0	NOZZLE ASS'Y 노즐	2	SHINSUNG
11	0464ASY36A0	NOZZLE ASS'Y 노즐	27	SHINSUNG
12	PM4315150004	NIPPLE,SCREW TYPE 나사형 니플	2	SNA-04R
13	PM4312150004	ELBOW,SCREW TYPE 나사형 엘보우	2	SLA-04R
14	PM4022519004	NIPPLE,MAIL 니플	3	D19×1/2"
15	PM4901110010	HOSE BAND 호스 밴드	6	1/2~1"

47-03	COOLANT	쿨런트	(2/2)	2001-47
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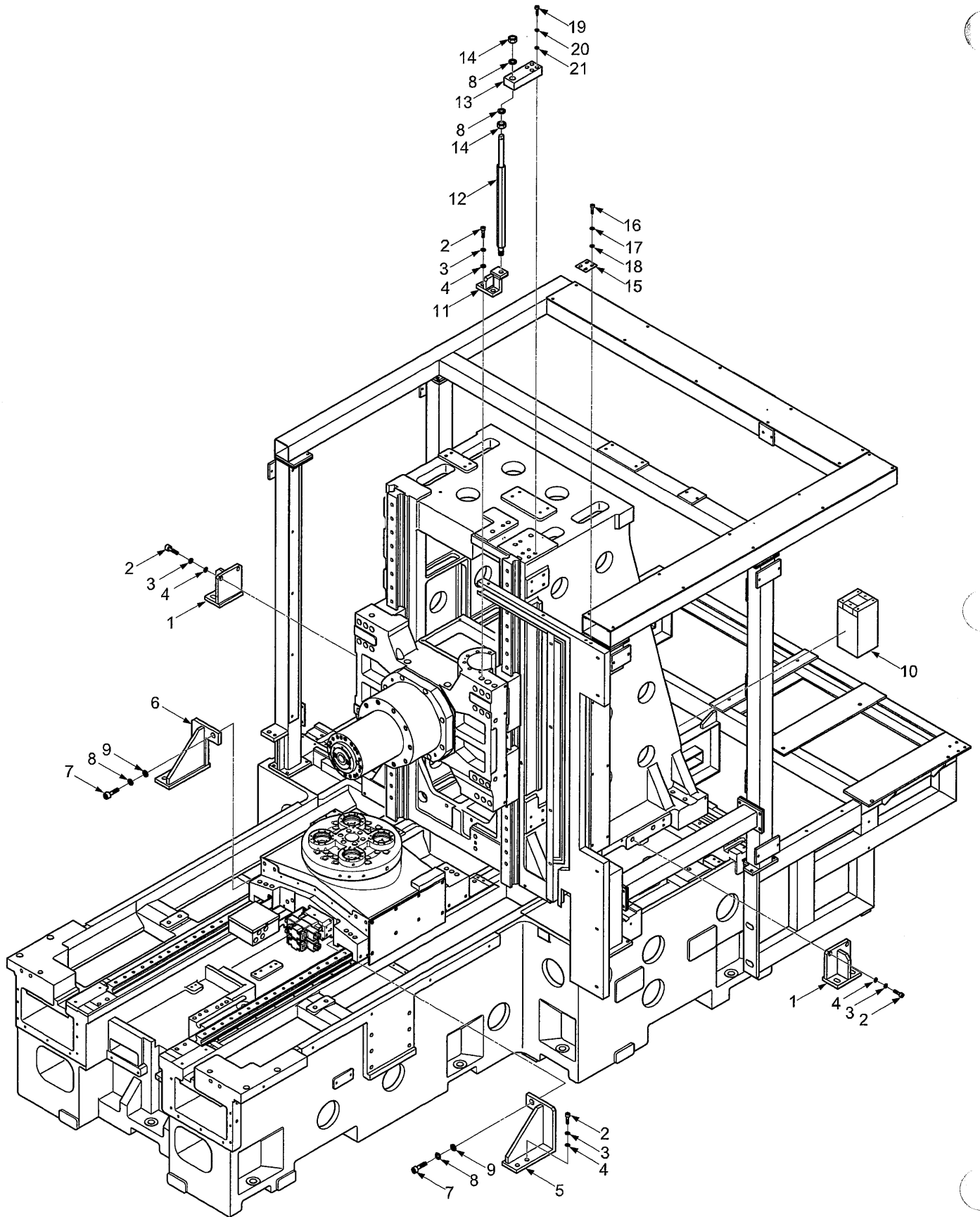
NO. 번호	Part No. 부품번호	Part Name 부품명	Q' ty 수량	Note 비고
16	PM4312150008	ELBOW,SCREW TYPE 나사형 엘보우	1	STA-08R
17	PM4314250008	TEE 티이	1	STA-08R
18	PM4022532008	NIPPLE,MAIL 니플	3	D32×1"
19	PM4901110020	HOSE BAND 호스 밴드	4	1/2~1"
20	PM4315150008	NIPPLE,SCREW TYPE 나사형 니플	2	SNA-08R

MEMO



68-01	FOUNDATION	설치 기초도	2001-68
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	A40JJ00M160	HEX NUT 육각 너트	7	M16
2	41114000080	NUT 너트	10	M36×2
3	44646100030	PLATE 플레이트	7	120×80×50t
4	A15B06X0160	SKT SET SCR 세트 스크류	14	M6 × 16L
5	34946110050	BOLT 볼트	7	M16×400L
6	A41JJ00M160	WASHER 와셔	7	M16
7	41114000070	JACK BOLT 잭 볼트	10	M36×2
8	44946110060	COLLAR 칼라	7	
9	41644010051	LEVEL PLATE 레벨 플레이트	3	HiT250공용



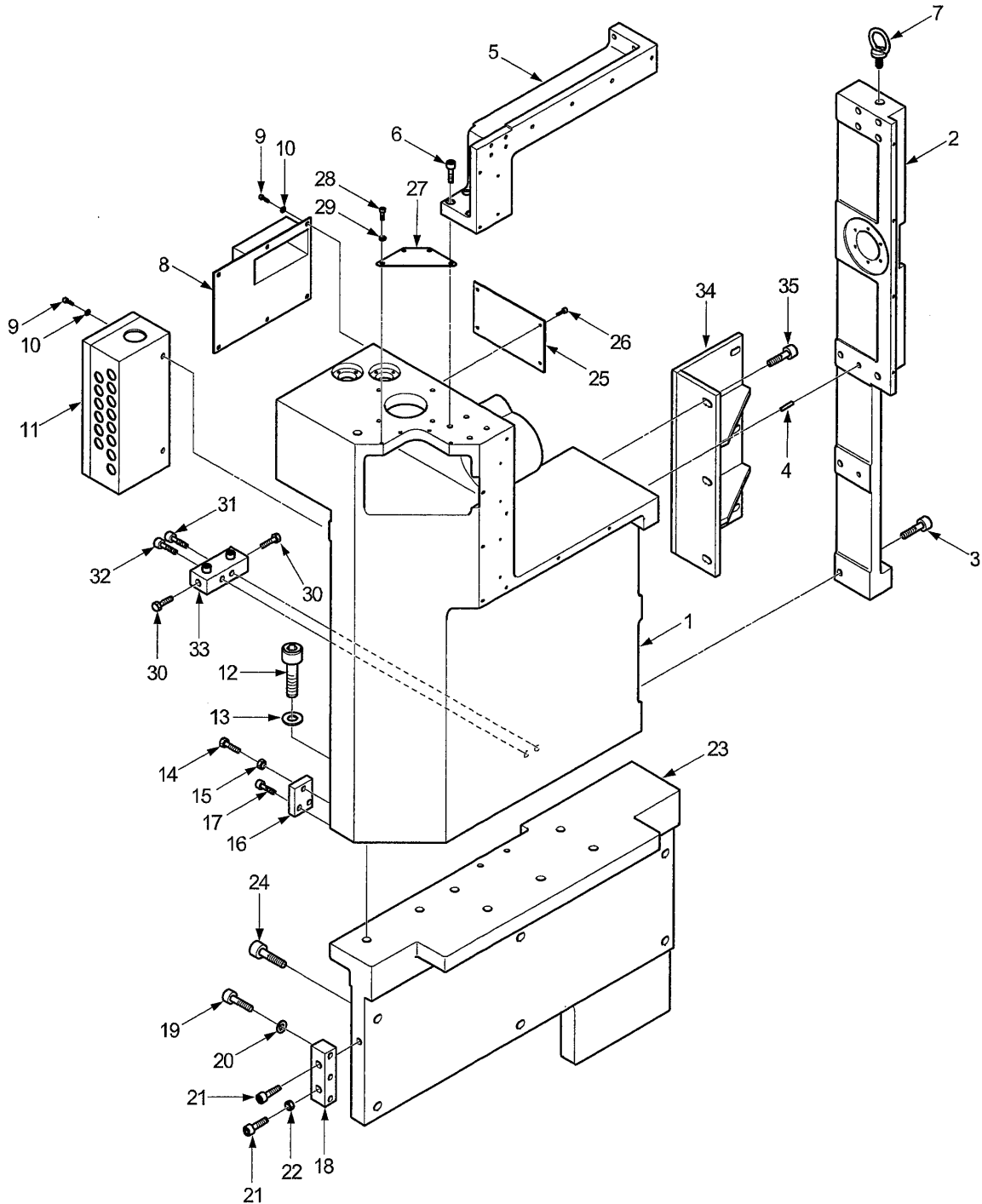
69-01	FIXTURE	출하 고정구	(1/2)	2001-69
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-69-303-0	STAY(FOR COLUMN) 스테인(칼럼용)	2	
2	SM11010 16045	SCREW H.S CAP 육각 구멍볼이 나사	14	M16×L45
3	SM13010 01600	WASHER SPRING 스프링 와셔	14	M16
4	SM13020 01600	WASHER PLAIN 평와셔	14	M16
5	2001-69-302-0	STAY(FOR TABLE R) 스테인(테이블 우측용)	1	
6	2001-69-301-0	STAY(FOR TABLE L) 스테인(테이블 좌측용)	1	
7	SM11010 20055	SCREW H.S CAP 육각 구멍볼이 나사	2	M20×L55
8	SM13020 02000	WASHER SPRING 스프링 와셔	5	M20
9	SM13010 02000	WASHER PLAIN 평와셔	3	M20
10	44647000130	FIXTURE(FOR HEAD) 치구(헤드용)	1	WOOD
11	2001-69-304-0	STAY(FOR HEAD) 스테인(헤드용)	1	
12	2001-69-305-0	BOLT(FOR HEAD) 볼트(헤드용)	1	
13	44647000080	BLOCK(FOR HEAD) 블록(헤드용)	1	
14	SM12010 02000	NUT HEX 육각 너트	3	M20
15	2001-69-401-0	STAY(FOR OP DOOR) 스테인(OP 도어용)	1	

69-01	FIXTURE	출하 고정구	(2/2)	2001-69
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	SM11010 06016	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L16
17	SM13010 00600	WASHER SPRING 스프링 와셔	4	M6
18	SM13010 00600	WASHER PLAIN 평와셔	4	M6
19	SM11010 12045	SCREW H.S CAP 육각 구멍볼이 나사	4	
20	SM13020 01200	WASHER SPRING 스프링 와셔	4	
21	SM13010 01200	WASHER PLAIN 평와셔	4	

MEMO



70-01	ATC	자동 공구교환 장치	(1/3)	2001-70
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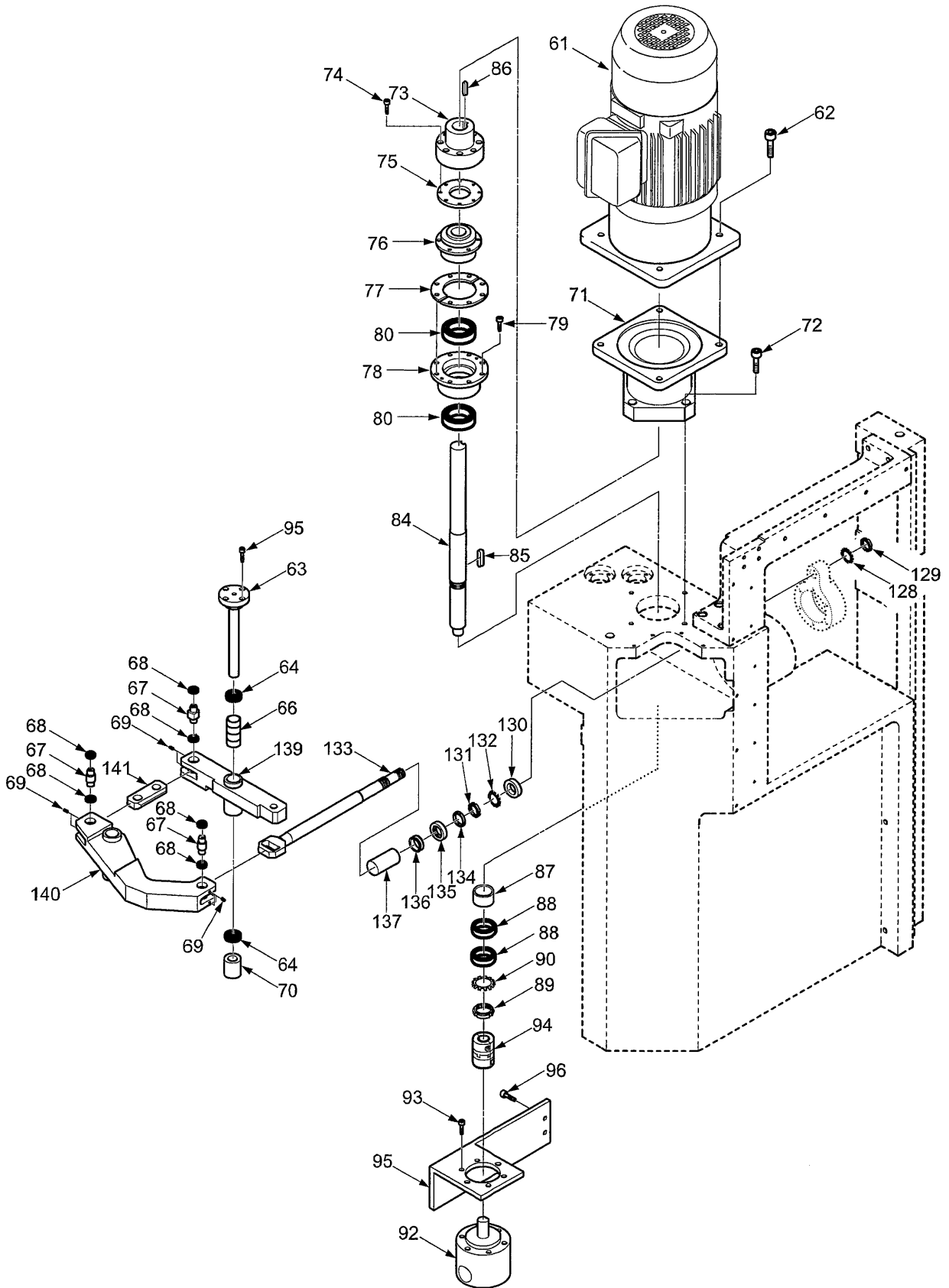
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-70-102-0	FRAME 프레임	1	
2	2001-70-201-0	BRACKET 브라켓트	1	
3	SM11010 12070	SCREW H.S CAP 육각 구멍붙이 나사	10	M12×L70
4	SM14010 13050	PIN PARALLEL 평행 핀	2	Ø13×L50
5	2722-70-313-1	BRACKET 브라켓트	1	
6	SM11010 12045	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×L45
7	SM10090 20000	EYE BOLT 아이 볼트	2	M20
8	2722-70-216-0	COVER 커버	1	
9	SM11010 06010	SCREW H.S CAP 육각 구멍붙이 나사	9	M6×L10
10	SM13010 00600	WASHER PLAIN 평화셔	9	M6
11	2722-72-221-0	BOX TERMINAL 터미널 박스	1	
12	SM11010 20070	SCREW H.S CAP 육각 구멍붙이 나사	7	M20×L70
13	SM13010 02000	WASHER PLAIN 평화셔	7	M20
14	SM10010 12050	BOLT HEX HEAD 육각 볼트	1	M12×L50
15	SM12010 01200	NUT HEX 육각 너트	1	M12

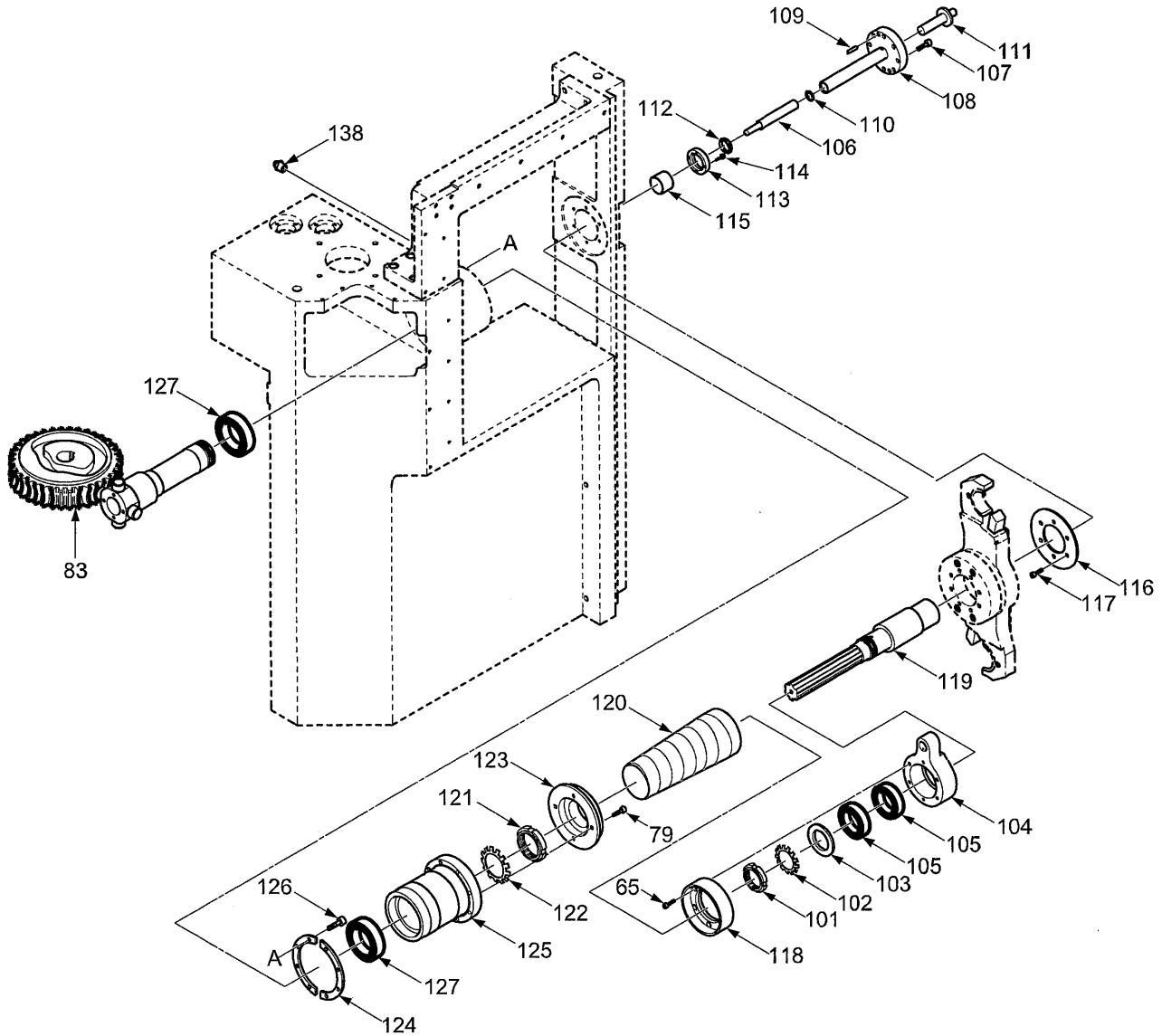
70-01	ATC	자동 공구교환 장치	(2/3)	2001-70
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	2722-72-450-0	BRACKET 브라켓트	1	
17	SM11010 06015	SCREW H.S CAP 육각 구멍붙이 나사	2	M6×L15
18	2722-72-357-0	BLOCK 블록	1	M6
19	SM11010 12050	SCREW H.S CAP 육각 구멍붙이 나사	3	M12×L50
20	SM13020 01200	WASHER SPRING 스프링 와셔	3	M12
21	SM11010 16060	SCREW H.S CAP 육각 구멍붙이 나사	2	M16×L60
22	SM12010 01600	NUT HEX 육각 너트	1	M16
23	2001-70-101-0	BRACKET 브라켓트	1	
24	SM11010 16045	SCREW H.S CAP 육각 구멍붙이 나사	6	M16×L45
25	2722-70-329-0	COVER 커버	1	
26	SM11050 05008	SCREW SLOT FLAT HEAD 슬롯 평머리 나사	4	M5×L8
27	2722-70-328-0	COVER 커버	1	
28	SM11010 06010	SCREW H.S CAP 육각 구멍붙이 나사	4	M6×L10
29	SM13010 00600	WASHER PLAIN 평와셔	4	M6
30	SM10010 10035	BOLT HEX HEAD 육각 볼트	2	M10×L35

70-01	ATC	자동 공구교환 장치	(3/3)	2001-70
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	SM11010 12075	SCREW H.S CAP 육각 구멍붙이 나사	1	M12×L75
32	SM11010 12075	SCREW H.S CAP 육각 구멍붙이 나사	1	M12×L75
33	2722-70-354-0	BLOCK 블록	1	
34	2001-70-202-0	BRACKET 브라켓트	1	
35	SM11010 12075	SCREW H.S CAP 육각 구멍붙이 나사	3	M12×L30





70-02	ATC 자동 공구교환 장치	(1/5)	2001-70
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
61	PES86G3FM324075	MOTOR GEARD 기어드 모터	1	G3FM-32-40-075 NISSEI
62	SM11010 12030	SCREW H.S CAP 육각 구멍볼이 나사	4	M12×L30
63	2722-70-325-0	SHAFT LINK 샤프트 링크	1	
64	PB5511040000	THRUST BEARING 스러스트 베어링	4	51104
65	SM11010 06015	SCREW H.S CAP 육각 구멍볼이 나사	10	M6×L15
66	PB933020040H	BEARING,OILESS 오일레스 베어링	4	HB202840 HANDO
67	2722-70-414-0	SHAFT 샤프트	2	
68	PB8020141300	BEARING,NEEDLE ROLLER 니들 롤러 베어링	6	RNA4900
69	SM11090 05012	SETSCREW H.S HEADLESS 세트 스크류	6	M5×L12
70	2722-70-416-0	COLLAR 칼라	2	
71	2722-70-310-0	BRACKET MOTOR 모터 브라켓트	1	
72	SM11010 10040	SCREW H.S CAP 육각 구멍볼이 나사	4	M10×L40
73	2722-70-330-0	CONNECTOR TORQUE 토크 콘넥터	1	
74	SM11010 06035	SCREW H.S CAP 육각 구멍볼이 나사	8	M6×L35
75	2722-70-331-0	PLATE 플레이트	1	

70-02	ATC	자동 공구교환 장치	(2/5)	2001-70
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
76	2722-70-356-0	CLUTCH 클러치	1	ETL13K 대성 파택
77	2722-70-327-0	LINER 라이너	1	
78	2722-70-326-0	HOUSING BEARING 베어링 하우스	1	
79	SM11010 06025	SCREW H.S CAP 육각 구멍붙이 나사	12	M6×L25
80	PB3302070000	TAPER BEARING 테이퍼 베어링	2	30207
81	2722-70-418-0	PIN CONNECTOR 핀 콘넥터	1	
82	SM11090 05012	SETSCREW H.S HEADLESS 세트 스크류	6	M5×L12
83	2722-70-116-1	CAM ROLLER GEAR 캠 롤러 기어	1	
84	2722-70-215-0	SHAFT CAM 샤프트 캠	1	
85	2722-70-420-0	KEY 키	1	
86	SM20010 10070	KEY SUNK 키 선크	1	10×8×70
87	2722-70-417-0	LINER 라이너	1	
88	PB6060072000	BALL BEARING 볼 베어링	2	6007ZZ
89	SM12100 03500	NUT LOCK 로크 너트	2	M35
90	SM13030 03500	WASHER LOCK 로크 와셔	2	M35

70-02	ATC	자동 공구교환 장치	(3/5)	2001-70
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q' ty 수량	Note 비고
92	PE052099 0096	ROTARY ENCODER 로터리 엔코더	1	E6C3-AG5B-360
93	SM11010 04010	SCREW H.S CAP 육각 구멍볼이 나사	6	M4×L10
94	PMS3508E69C08B	COUPLING 커플링	1	E69-C08B
95	2001-70-302-0	BRACKET 브라켓트	1	
96	SM11010 08010	SCREW H.S CAP 육각 구멍볼이 나사	1	M8×L10
101	SM12100 04500	NUT LOCK 로크 너트	1	M45
102	SM13030 04500	WASHER LOCK 로크 와셔	1	M45
103	2722-70-410-0	COLLAR 칼라	2	
104	2722-70-315-0	LEVER 레버	1	
105	PB7700932100	BEARING 베어링	2	7009CDB
106	2722-70-318-0	ROD 로드	1	
107	SM11010 06025	SCREW H.S CAP 육각 구멍볼이 나사	8	M6×L25
108	2722-70-332-0	BAR, GUIDE 가이드 바아	1	
109	SM14010 08032	PIN PARALLEL 평행 핀	2	Ø8×L32
110	SM21020 02000	RETAINING RING 리테이닝 링	1	

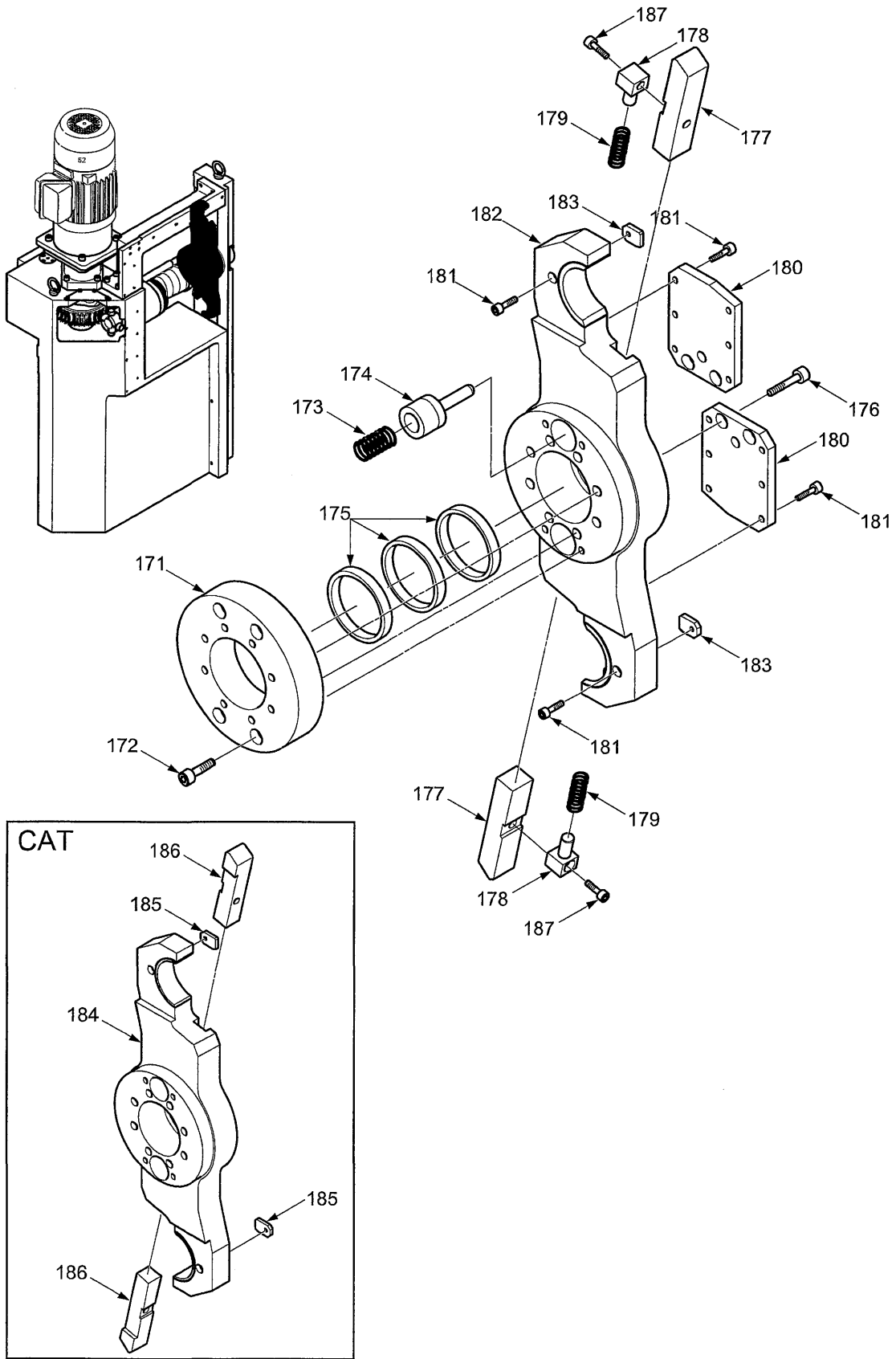
70-02	ATC	자동 공구교환 장치	(4/5)	2001-70
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
111	PH011809511Z	ABSORBER SHOCK 쇼크 압소버	1	PR025MC-3B
112	PM48040XF030	DUST SEAL 더스트 시일	1	SDR30
113	2722-70-319-0	RETAINER 리테이너	1	
114	SM11010 04015	SCREW H.S CAP 육각 구멍붙이 나사	4	M4×L15
115	PB933030035H	BEARING,OILESS 오일레스 베어링	1	HB303835 HANDO
116	2722-70-317-0	SPACER 스페이서	1	
117	SM11010 05010	SCREW H.S CAP 육각 구멍붙이 나사	6	M5×L10
118	2722-70-316-0	RETAINER 리테이너	1	
119	2722-70-115-0	SHAFT,CHANGE ARM 체인지 아암 샤프트	1	
120	2722-70-353-0	BALL SCREW COVER 볼 스크류 커버	1	
121	SM12100 05500	NUT LOCK 로크 너트	1	M55
122	SM13030 05500	WASHER LOCK 로크 와셔	1	M55
123	2722-70-314-0	RETAINER 리테이너	1	
124	2722-70-312-0	SPACER 스페이서	1	
125	2722-70-311-0	BRACKET 브라켓트	1	

70-02	ATC	자동 공구교환 장치	(5/5)	2001-70
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
126	SM11010 05030	SCREW H.S CAP 육각 구멍볼이 나사	8	M5×L30
127	PB3320110000	TAPER BEARING 테이퍼 베어링	2	32011
128	SM12100 02000	NUT LOCK 로크 너트	1	M20
129	SM13030 02000	WASHER LOCK 로크 와셔	1	M20
130	2722-70-413-0	COLLAR 칼라	1	
131	SM12100 02500	NUT LOCK 로크 너트	1	M25
132	SM13030 02500	WASHER LOCK 로크 와셔	1	M25
133	2722-70-320-0	ROD 로드	1	
134	2722-70-412-0	COLLAR 칼라	1	
135	PM48040XF025	DUST SEAL 더스트 시일	1	SDR25
136	2722-70-411-0	COLLAR 칼라	1	
137	PB933025030H	BEARING,OILESS 오일레스 베어링	2	HB253330 HANDO
138	SM8203000600	GREASE NIPPLE 그리스 니플	1	M6
139	2722-70-212-0	LEVER 레버	1	
140	2722-70-213-0	LEVER 레버	1	
141	2722-70-415-0	LINK3 ARM IN-OUT 링크3 아암 IN-OUT	1	

MEMO



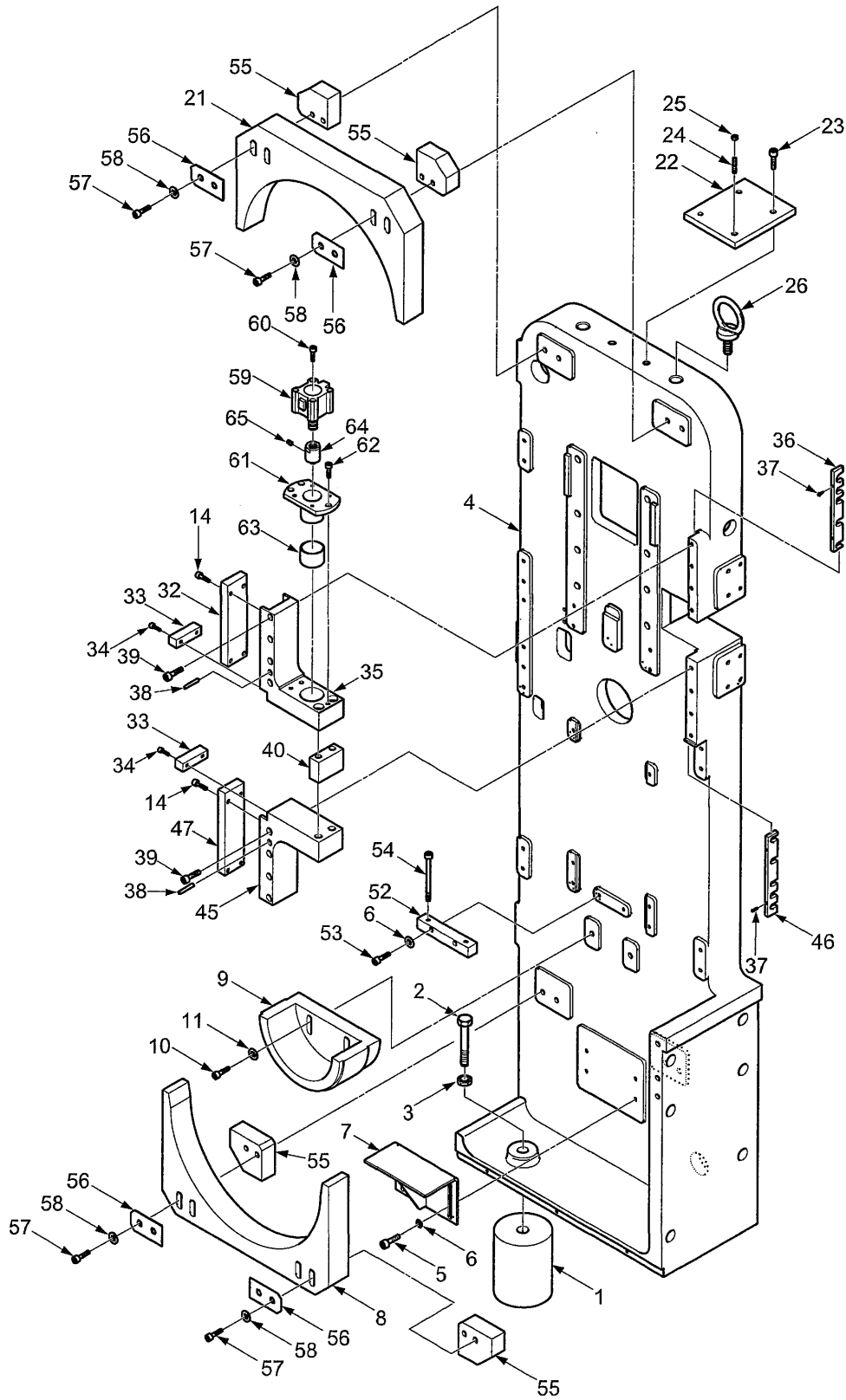
70-03	ATC	자동 공구교환 장치	(1/2)	2001-70
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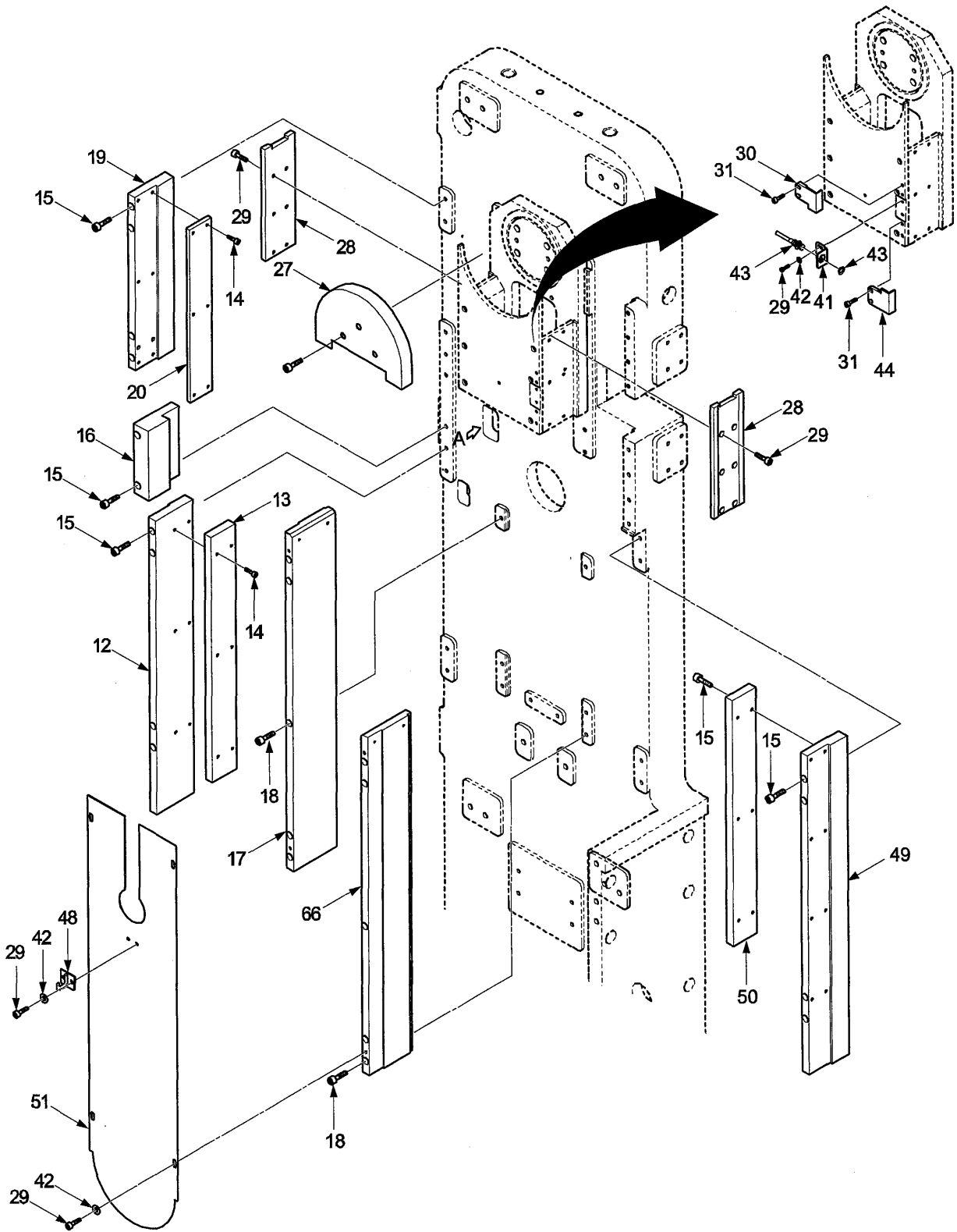
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
171	2722-70-352-0	CAP, SPAN RING 스팬 링 캡	1	
172	SM11010 08030	SCREW H.S CAP 육각 구멍붙이 나사	4	M8×L30
173	2722-70-454-0	SPRING, COIL 코일 스프링	2	
174	2722-70-450-0	ROD, PUSH 푸쉬 로드	2	
175	PM3505060060068	SPAN RING 스팬 링	3	TLK300-60×68
176	SM11010 08065	SCREW H.S CAP 육각 구멍붙이 나사	8	M8×L65
177	2722-70-350-0	LOCKER(BT) 로커	2	BT
178	2722-70-451-0	BLOCK, SPRING 스프링 블록	2	
179	2722-70-453-0	SPRING, COIL 코일 스프링	2	
180	2001-70-301-0	PLATE 플레이트	2	
181	SM11010 05012	SCREW H.S CAP 육각 구멍붙이 나사	14	M5×L12
182	2722-70-150-0	BODY ARM(BT) 바디 아암(BT)	1	BT
183	2722-70-452-0	KEY TOOL FIX.(BT) 키 툴 고정	2	BT
184	2722-73-101-0	BODY ARM(CAT) 바디 아암(CAT)	1	CAT
185	2722-73-401-0	KEY TOOL FIX.(CAT) 키 툴 고정	2	CAT

70-03	ATC	자동 공구교환 장치	(2/2)	2001-70
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
186	2722-73-301-0	LOCKER (CAT) 로커	2	CAT
187	SM11010 06010	SCREW H.S CAP 육각 구멍볼이 나사	2	M6×L10

MEMO





71-01	MAGAZINE	메가진	(1/5)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2722-72-414-0	SEAT 시트	1	
2	9001-70-002-0	BOLT HEX HEADED 육각 볼트	1	
3	SM12170 02400	NUT,LEVELING 레벨링 너트	1	M24×p2.0
4	2001-70-101-0	FRAME 프레임	1	
5	SM11010 08025	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L25
6	SM13020 00800	WASHER SPRING 스프링 와셔	6	M8
7	2722-72-316-0	STAY 스테이	1	
8	2722-72-313-0	GUIDE 가이드	1	
9	2722-72-341-0	ROLLER 롤러	6	
10	SM11010 12050	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×L50
11	SM13020 01200	WASHER SPRING 스프링 와셔	2	M12
12	2722-72-314-0	GUIDE 가이드	1	
13	2722-72-318-0	GUIDE, RAIL 레일 가이드	1	
14	SM11010 06020	SCREW H.S CAP 육각 구멍볼이 나사	28	M6×L20
15	SM11010 08100	SCREW H.S CAP 육각 구멍볼이 나사	14	M8×L100

71-01	MAGAZINE	메가진	(2/5)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	2722-72-345-0	RAIL PULL OUT 풀 아웃 레일	1	
17	2722-72-329-0	GUIDE RAIL(L) 가이드 레일(좌측)	1	
18	SM11010 08015	SCREW H.S CAP 육각 구멍볼이 나사	10	M8×L15
19	2722-72-331-0	GUIDE RAIL 가이드 레일	1	
20	2722-72-332-0	GUIDE RAIL 가이드 레일	1	
21	2722-72-312-0	GUIDE 가이드	1	
22	2722-72-413-0	BLOCK 블록	1	
23	SM11010 12040	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×L40
24	SM11060 12040	SETSCREW H.S HEADLESS 세트 스크류	2	M12×L40
25	SM12010 01200	NUT HEX 육각 너트	2	M12
26	SM10090 24000	EYE BOLT 아이 볼트	2	M24
27	2722-72-343-0	SPROCKET COVER 스프로킷 커버	1	
28	2722-72-344-0	RAIL 레일	2	
29	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	14	M6×L12
30	2722-72-442-0	BRACKET 브라켓트	1	

71-01	MAGAZINE	메가진	(3/5)	2001-71
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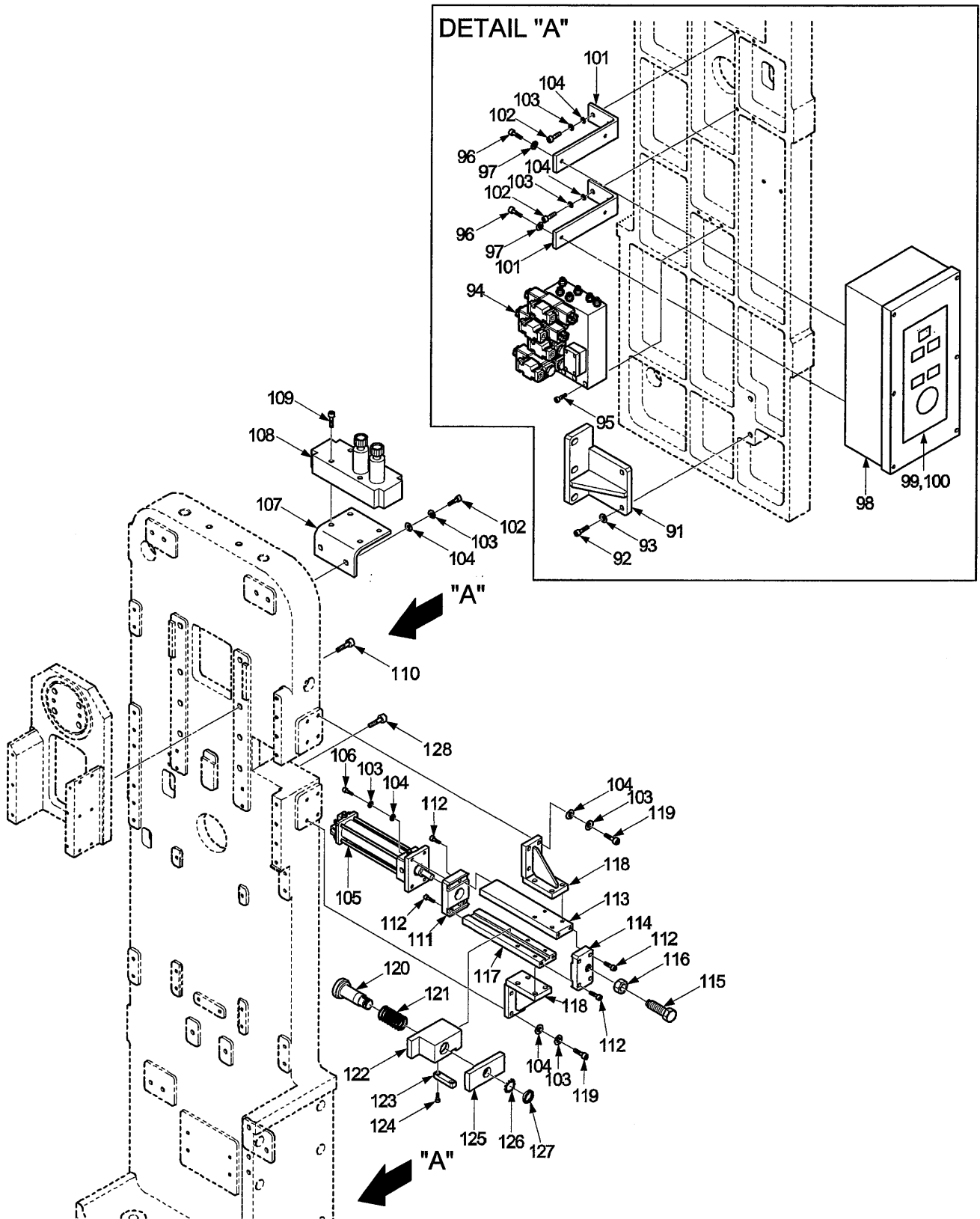
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	SM11010 06015	SCREW H.S CAP 육각 구멍불이 나사	4	M6×L15
32	2722-72-335-0	RAIL 레일	1	
33	2722-72-438-0	BRACKET 브라켓트	2	
34	SM11010 05020	SCREW H.S CAP 육각 구멍불이 나사	4	M5×L20
35	2722-72-210-0	BRACKER 브랙커	1	
36	2722-72-336-0	LINER (UP) 라이너(상부)	1	
37	SM11010 08080	SCREW H.S CAP 육각 구멍불이 나사	4	M8×L80
38	SM14010 13060	PIN PARALLEL 평행 핀	2	Ø13×L60
39	SM11010 12055	SCREW H.S CAP 육각 구멍불이 나사	4	M12×L55
40	2722-72-445-1	BLOCK 블록	1	
41	2722-72-441-0	BRACKET SENSOR 센서 브라켓트	1	
42	SM13010 00600	WASHER PLAIN 평와셔	6	M6
43	PE820262172B	SWITCH PROXIMITY 근접 스위치	1	BESM18MI-PSC 5ØB-SØ4G
44	2722-72-443-0	BRACKET 브라켓트	1	
45	2722-72-211-0	BRACKET 브라켓트	1	

71-01	MAGAZINE	메가진	(4/5)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
46	2722-72-337-0	LINER(DOWN) 라이너(하부)	1	
47	2722-72-353-0	RAIL 레일	1	
48	2722-72-444-0	HOOK 후크	1	
49	2722-72-315-0	GUIDE 가이드	1	
50	2722-72-319-0	RAIL 레일	1	
51	2722-72-311-0	COVER 커버	1	
52	2722-72-328-0	BRACKET 브라켓트	1	
53	SM11010 08035	SCREW H.S CAP 육각 구멍불이 나사	2	M8×L35
54	SM11010 08100	SCREW H.S CAP 육각 구멍불이 나사	2	M8×L100
55	2722-72-411-0	BLOCK 블록	4	
56	2722-72-410-0	COVER 커버	4	
57	SM11010 12120	SCREW H.S CAP 육각 구멍불이 나사	8	M12×L120
58	SM13010 01200	WASHER PLAIN 평와셔	8	M12
59	2722-72-351-0	CYLINDER AIR 에어 실린더	1	
60	SM11010 06050	SCREW H.S CAP 육각 구멍불이 나사	4	M6×L50

71-01	MAGAZINE 메가진		(5/5)	2001-71
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
61	2722-72-338-0	BRACKET CYL 실린더 브라켓트	1	
62	SM11010 10025	SCREW H.S CAP 육각 구멍볼이 나사	4	M10×L25
63	PB933030045H	OILLESS BUSHING 오일레스 부싱	1	HB303845 HANDO
64	2722-72-440-0	BAR PUSHER 바아 푸셔	1	
65	SM11060 05005	SETSCREW H.S HEADLESS 세트 스크류	1	M5×L5
66	2722-72-330-0	GUIDE RAIL (R) 가이드 레일(우측)	1	

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71-02	MAGAZINE	메가진	(1/3)	2001-71
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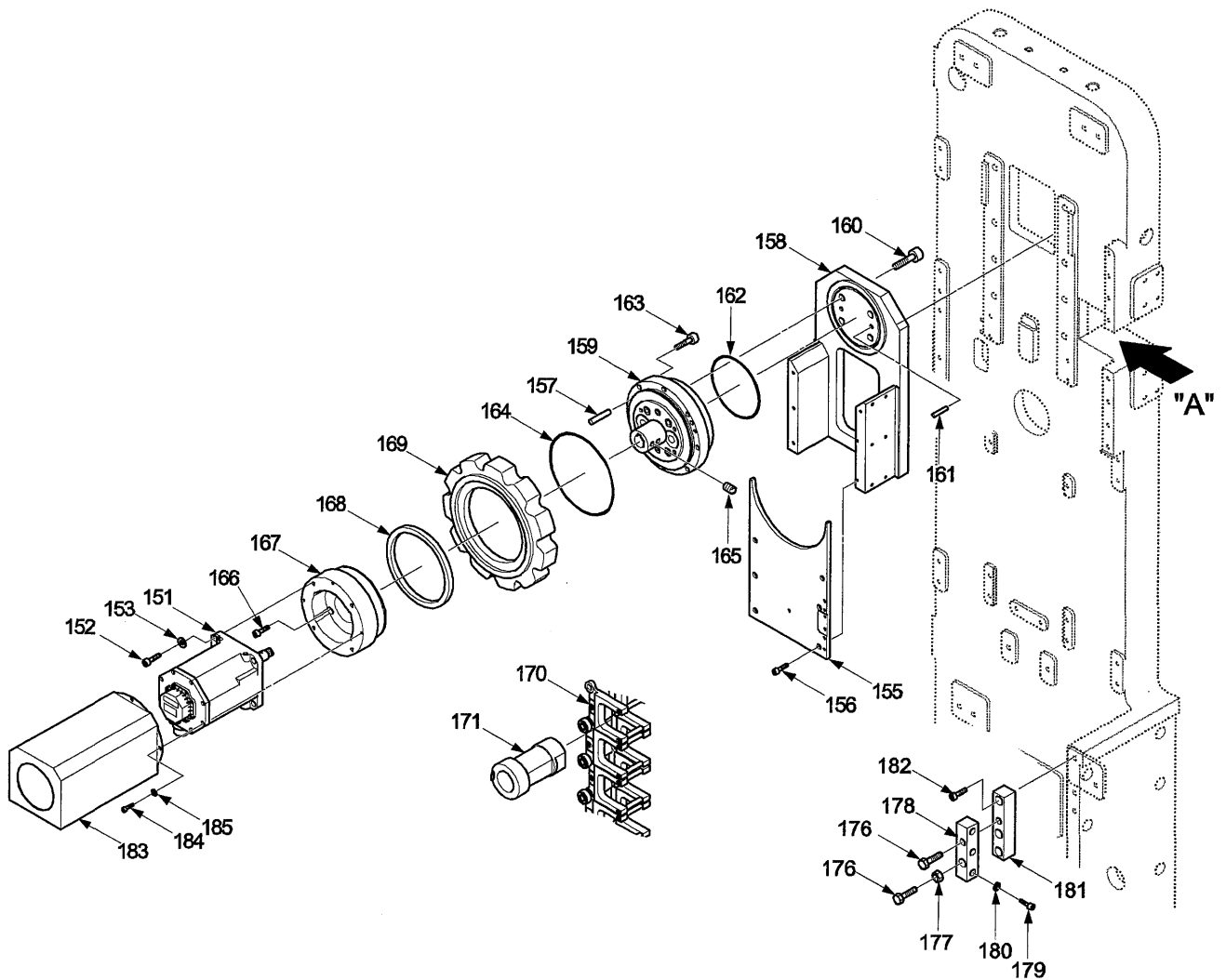
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
91	2001-71-301-0	BRACKET 브라켓트	1	
92	SM11010 16055	SCREW H.S CAP 육각 구멍볼이 나사	2	M16×L55
93	SM13020 01600	WASHER SPRING 스프링 와셔	2	M16
94	2722-72-346-0	MANIFOLD ASS'Y(HYD) 매니폴드 조립체(유압)	1	
95	SM11010 08070	SCREW H.S CAP 육각 구멍볼이 나사	2	M8×L70
96	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L12
97	SM13020 00600	WASHER SPRING 스프링 와셔	4	M6
98	2722-72-213-0	BOX 박스	1	
99	2722-48-200-0	ATC NAME PLATE ATC 명판	1	
100	2741-48-316-0	NAME PLATE 명판	1	
101	2001-71-302-0	STAY 스테인	2	
102	SM11010 08012	SCREW H.S CAP 육각 구멍볼이 나사	9	M8×L12
103	SM13020 00800	WASHER SPRING 스프링 와셔	29	M8
104	SM13010 00800	WASHER PLAIN 평와셔	29	M8
105	2722-72-347-0	CYLINDER HYD 유압 실린더	1	

71-02	MAGAZINE	메가진	(2/3)	2001-71
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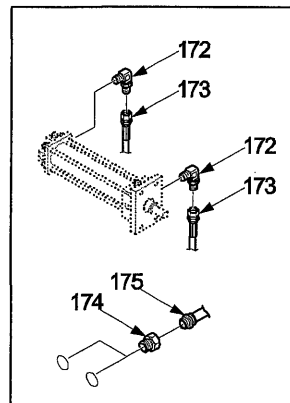
NO. 번호	Part No. 부품번호	Part Name 부품명	Q' ty 수량	Note 비고
106	SM11010 08030	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L30
107	2722-72-352-0	BRACKET 브라켓트	1	
108	2722-72-362-1	AIR SOL VALVE SET 에어 솔레노이드 밸브 세트	1	
109	SM11010 04040	SCREW H.S CAP 육각 구멍볼이 나사	4	M4×L40
110	SM11010 12050	SCREW H.S CAP 육각 구멍볼이 나사	8	M12×L50
111	2722-72-324-0	PLATE CYLINDER 실린더 플레이트	1	
112	SM11010 08015	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L15
113	2722-72-322-0	GUIDE 가이드	1	
114	2722-72-325-0	PLATE 플레이트	1	
115	2722-72-430-0	BOLT 볼트	1	
116	1682-01-406-0	NUT,LEVELING 레벨링 너트	1	M20×p1.5
117	2722-72-323-0	GUIDE 가이드	1	
118	2722-72-326-0	BRACKET 브라켓트	2	
119	SM11010 08035	SCREW H.S CAP 육각 구멍볼이 나사	16	M8×L35
120	2722-72-439-0	SHAFT CLAMP 샤프트 클램프	1	

71-02	MAGAZINE	메가진	(3/3)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
121	2722-72-431-0	SPRING 스프링	1	
122	2722-72-354-0	BLOCK CLAMP 블록 클램프	1	
123	2722-72-432-0	KEY 키	1	
124	SM11010 06012	SCREW H.S CAP 육각 구멍붙이 나사	2	M6×L12
125	2722-72-327-0	PLATE 플레이트	1	
126	SM12100 02500	NUT LOCK 로크 너트	1	M25
127	SM13030 02500	WASHER LOCK 로크 와셔	1	M25



Detail "A"



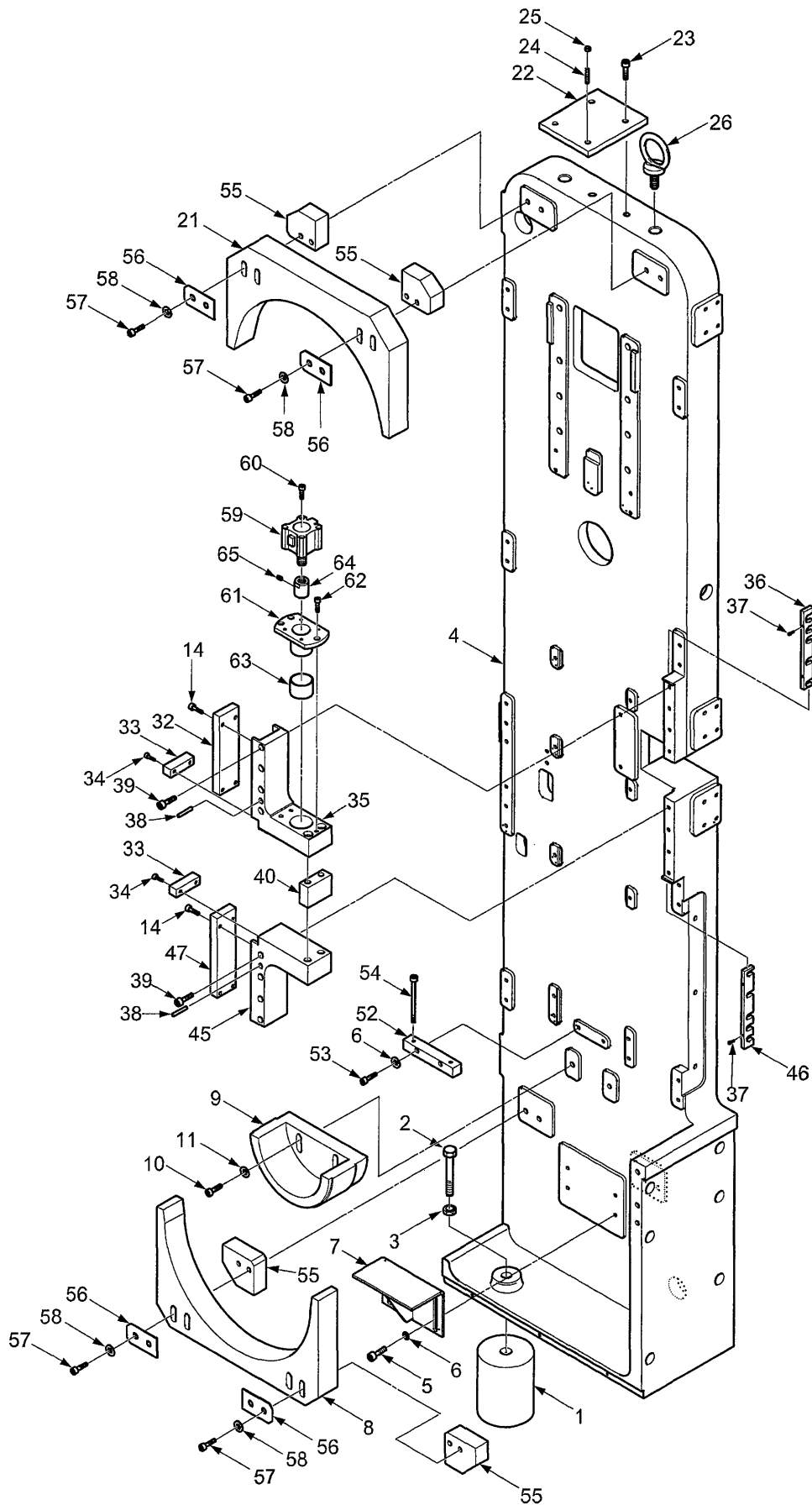
71-03	MAGAZINE	메가진	(1/3)	2001-71
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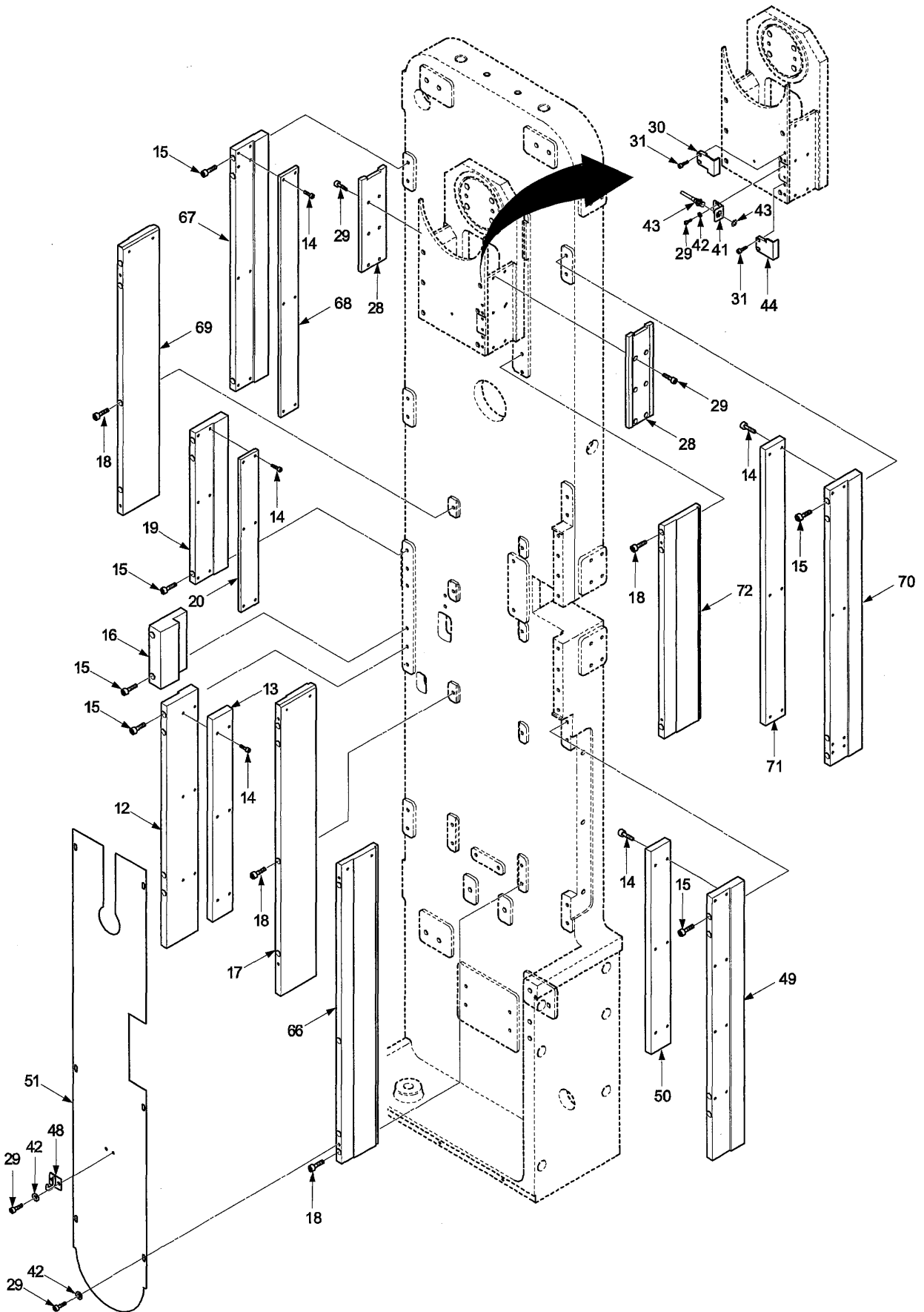
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
151		AC SERVO MOTOR AC 서보 모터	1	B12/3000is FANUC
152	SM11010 08025	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L25
153	SM13020 00800	WASHER SPRING 스프링 와셔	4	M8
155	2001-71-307-0	COVER(SERVO) 커버(서보)	1	
156	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L12
157	SM14010 06025	PARALLEL PIN 평행핀	2	Ø6×25
158	2001-71-204-0	BRACKET(SERVO) 브라켓트(서보)	1	
159	2001-71-308-0	RV REDUCER RV 리듀서	1	RV-40E-81 TEJIN
160	SM11010 12030	SCREW H.S CAP 육각 구멍볼이 나사	4	M12×L30
161	SM14010 08035	PARALLEL PIN 평행핀	2	Ø8×35
162	PM4801211300	O-RING O-링	1	G130 NOK
163	SM11010 08040	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L40
164	J26NV000030	O-RING O-링	1	AS568-258-4D NOK
165	SM11070 06006	SET SCREW DOG POINT 도그 포인트 세트 스크류	2	M6×L6
166	SM11010 08030	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L30

71-03		MAGAZINE 메가진		(2/3)	2001-71
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고	
167	2001-71-309-0	ADAPTER(SERVO) 어댑터(서보)	1		
168	J26NV000020	OIL SEAL 오일 시일	1	TC15018014 NOK	
169	2001-71-310-0	SPROCKET(SERVO) 스프로킷(서보)	1		
170	2722-72-120-0	CHAIN BLOCK ASS'Y 체인 블록	1		
171	2722-72-350-1	POT TOOL 툴 포트	40		
172	PM4013210202	ADAPTER-A HOSE ELBOW 어댑터-A 호스 엘보우	2	PT1/4	
173	PM40CC182182080	HOSE 호스	2	PT1/4×L800	
174	PM41303A1002000	CONNECTOR MALE 콘넥터	2	Ø10×PT1/4	
175	PM4112100007501	HOSE SYNFFLEX SYNFFLEX 호스	4m	Ø10×7.5	
176	SM10010 16060	BOLT HEX HEAD 육각 볼트	2	M16×L60	
177	SM12010 01600	NUT HEX 육각 너트	1	M16	
178	2722-72-357-0	BLOCK 블록	1		
179	SM11010 12050	SCREW H.S CAP 육각 구멍붙이 나사	3	M12×L50	
180	SM13020 01200	WASHER SPRING 스프링 와셔	3	M12	
181	2722-72-358-0	BLOCK 블록	1		

71-03	MAGAZINE 메가진	(3/3)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
182	SM11010 12035	SCREW H.S CAP 육각 구멍볼이 나사	3	M12×L35
183	2001-71-311-0	COVER(SERVO) 커버(서보)	1	
184	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	3	M5×L10
185	SM13020 00500	WASHER SPRING 스프링 와셔	3	M5





71-01	MAGAZINE(60 Tool) 메가진 60	(1/5)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2722-72-414-0	SEAT 시트	1	
2	9001-70-002-0	BOLT HEX HEADED 육각 볼트	1	
3	SM12170 02400	NUT,LEVELING 레벨링 너트	1	M24×p2.0
4	2001-70-121-0	FRAME 프레임	1	
5	SM11010 08025	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L25
6	SM13020 00800	WASHER SPRING 스프링 와셔	6	M8
7	2722-72-316-0	STAY 스테인	1	
8	2722-72-313-1	GUIDE 가이드	1	
9	2722-72-341-0	ROLLER 롤러	6	
10	SM11010 12050	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×L50
11	SM13020 01200	WASHER SPRING 스프링 와셔	2	M12
12	2722-72-314-0	GUIDE 가이드	1	
13	2722-72-318-0	GUIDE, RAIL 레일 가이드	1	
14	SM11010 06020	SCREW H.S CAP 육각 구멍볼이 나사	28	M6×L20
15	SM11010 08100	SCREW H.S CAP 육각 구멍볼이 나사	14	M8×L100

71-01	MAGAZINE(60 Tool) 메가진 60	(2/5)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	2722-72-345-0	RAIL PULL OUT 풀 아웃 레일	1	
17	2722-72-366-1	GUIDE RAIL(L) 가이드 레일(좌측)	1	
18	SM11010 08015	SCREW H.S CAP 육각 구멍붙이 나사	10	M8×L15
19	2722-72-373-0	GUIDE RAIL 가이드 레일	1	
20	2722-72-374-0	GUIDE RAIL 가이드 레일	1	
21	2722-72-312-0	GUIDE 가이드	1	
22	2722-72-413-0	BLOCK 블록	1	
23	SM11010 12040	SCREW H.S CAP 육각 구멍붙이 나사	2	M12×L40
24	SM11060 12040	SETSCREW H.S HEADLESS 세트 스크류	2	M12×L40
25	SM12010 01200	NUT HEX 육각 너트	2	M12
26	SM10090 24000	EYE BOLT 아이 볼트	2	M24
27	2722-72-343-0	SPROCKET COVER 스프로킷 커버	1	
28	2722-72-344-0	RAIL 레일	2	
29	SM11010 06012	SCREW H.S CAP 육각 구멍붙이 나사	14	M6×L12
30	2722-72-442-0	BRACKET 브라켓트	1	

71-01	MAGAZINE(60 Tool) 메가진 60	(3/5)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	SM11010 06015	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L15
32	2722-72-335-0	RAIL 레일	1	
33	2722-72-438-0	BRACKET 브라켓트	2	
34	SM11010 05020	SCREW H.S CAP 육각 구멍볼이 나사	4	M5×L20
35	2722-72-210-0	BRACKER 브랙커	1	
36	2722-72-336-0	LINER(UP) 라이너(상부)	1	
37	SM11010 08080	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L80
38	SM14010 13060	PIN PARALLEL 평행 핀	2	Ø13×L60
39	SM11010 12055	SCREW H.S CAP 육각 구멍볼이 나사	4	M12×L55
40	2722-72-445-1	BLOCK 블록	1	
41	2722-72-441-0	BRACKET SENSOR 센서 브라켓트	1	
42	SM13010 00600	WASHER PLAIN 평와셔	6	M6
43	PE820262172B	SWITCH PROXIMITY 근접 스위치	1	BESM18MI-PSC 5ØB-SØ4G
44	2722-72-443-0	BRACKET 브라켓트	1	
45	2722-72-211-0	BRACKET 브라켓트	1	

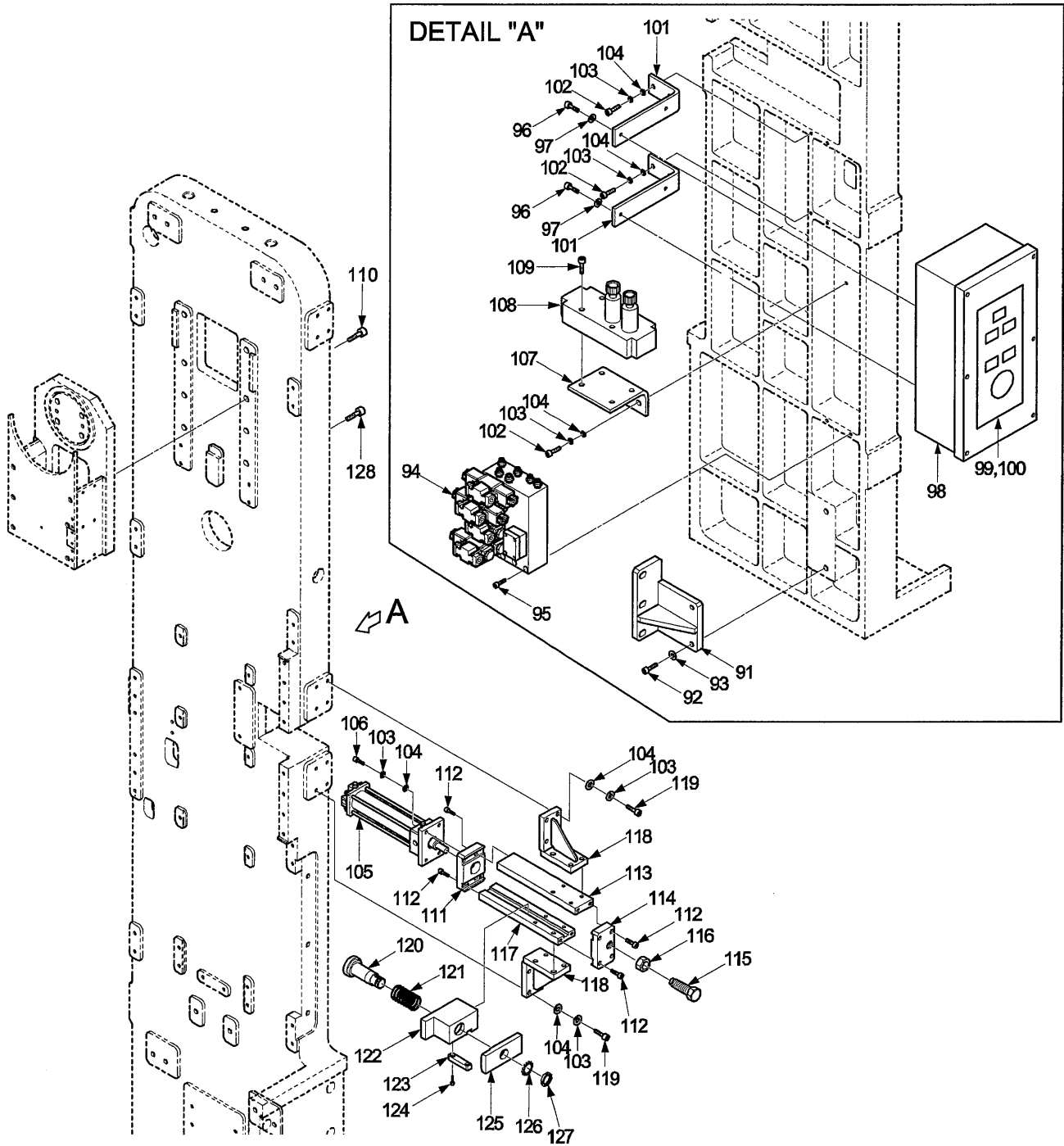
71-01	MAGAZINE(60 Tool) 메가진 60	(4/5)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
46	2722-72-337-0	LINER(DOWN) 라이너(하부)	1	
47	2722-72-353-0	RAIL 레일	1	
48	2722-72-444-0	HOOK 후크	1	
49	2722-72-315-1	GUIDE 가이드	1	
50	2722-72-319-0	RAIL 레일	1	
51	2722-72-311-0	COVER 커버	1	
52	2722-72-328-0	BRACKET 브라켓트	1	
53	SM11010 08035	SCREW H.S CAP 육각 구멍볼이 나사	2	M8×L35
54	SM11010 08100	SCREW H.S CAP 육각 구멍볼이 나사	2	M8×L100
55	2722-72-411-0	BLOCK 블록	4	
56	2722-72-410-0	COVER 커버	4	
57	SM11010 12120	SCREW H.S CAP 육각 구멍볼이 나사	8	M12×L120
58	SM13010 01200	WASHER PLAIN 평와셔	8	M12
59	2722-72-351-0	CYLINDER AIR 에어 실린더	1	
60	SM11010 06050	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L50

71-01	MAGAZINE(60 Tool) 메가진 60	(5/5)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
61	2722-72-338-0	BRACKET CYL 실린더 브라켓트	1	
62	SM11010 10025	SCREW H.S CAP 육각 구멍볼이 나사	4	M10×L25
63	PB933030045H	OILLESS BUSHING 오일레스 부싱	1	HB303845 HANDO
64	2722-72-440-0	BAR PUSHER 바아 푸셔	1	
65	SM11060 05005	SETSCREW H.S HEADLESS 세트 스크류	1	M5×L5
66	2722-72-367-0	GUIDE RAIL (R) 가이드 레일 (우측)	1	
67	2722-72-368-0	GUIDE RAIL (L) 가이드 레일 (좌측)	1	
68	2722-72-369-0	GUIDE RAIL 가이드 레일	1	
69	2722-72-365-0	GUIDE RAIL (L) 가이드 레일 (좌측)	1	
70	2722-72-371-0	GUIDE RAIL (L) 가이드 레일 (좌측)	1	
71	2722-72-372-0	GUIDE RAIL 가이드 레일	1	
72	2722-72-364-0	GUIDE RAIL (R) 가이드 레일 (우측)	1	

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71-02	MAGAZINE(60 Tool) 메가진 60	(1/3)	2001-71
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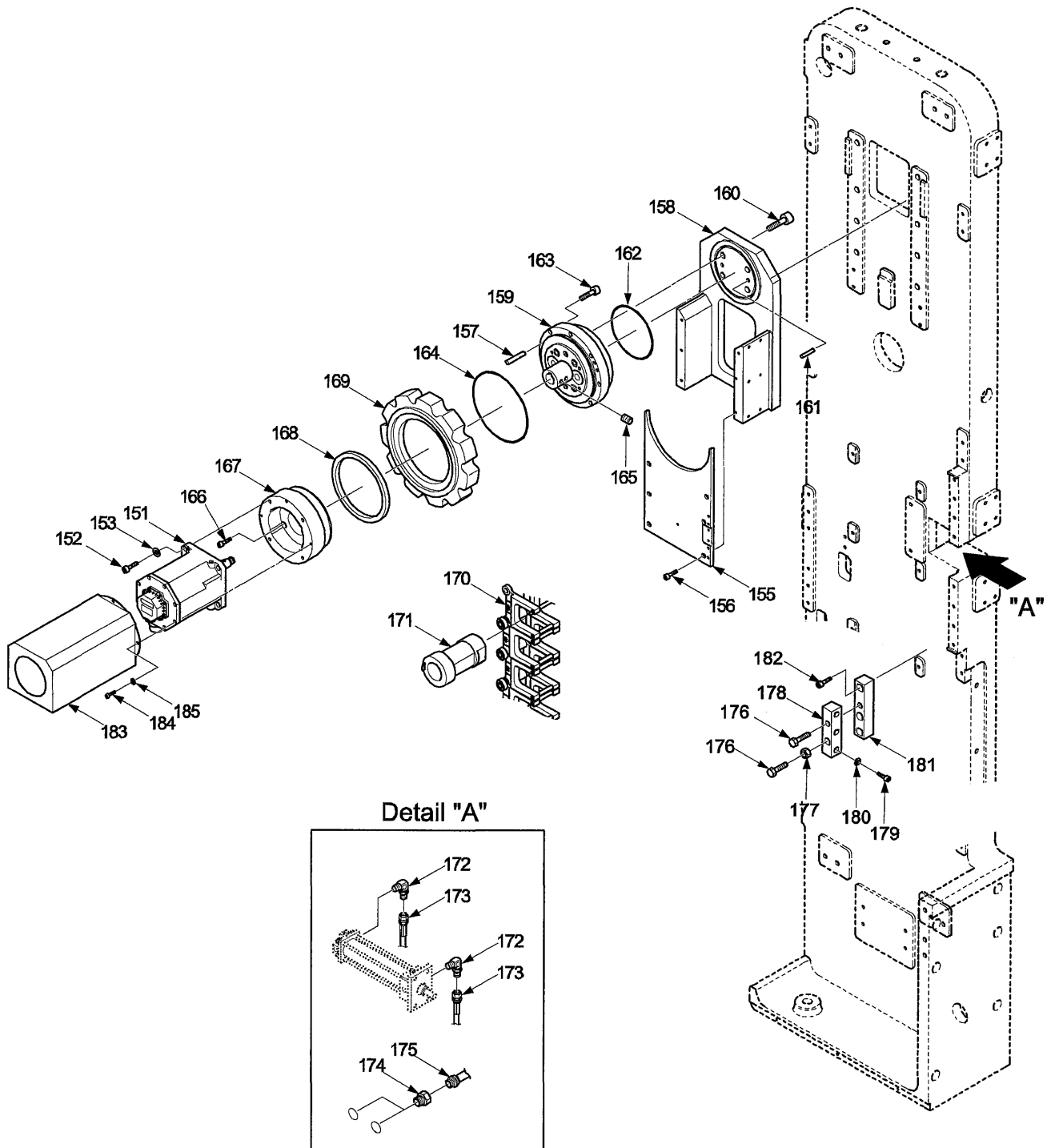
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
91	2001-71-301-0	BRACKET 브라켓트	1	
92	SM11010 16055	SCREW H.S CAP 육각 구멍볼이 나사	2	M16×L55
93	SM13020 01600	WASHER SPRING 스프링 와셔	2	M16
94	2722-72-346-0	MANIFOLD ASS'Y(HYD) 매니폴드 조립체(유압)	1	
95	SM11010 08070	SCREW H.S CAP 육각 구멍볼이 나사	2	M8×L70
96	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L12
97	SM13020 00600	WASHER SPRING 스프링 와셔	4	M6
98	2722-72-213-0	BOX 박스	1	
99	2722-48-200-0	ATC NAME PLATE ATC 명판	1	
100	2741-48-316-0	NAME PLATE 명판	1	
101	2001-71-302-0	STAY 스테인	2	
102	SM11010 08012	SCREW H.S CAP 육각 구멍볼이 나사	9	M8×L12
103	SM13020 00800	WASHER SPRING 스프링 와셔	29	M8
104	SM13010 00800	WASHER PLAIN 평와셔	29	M8
105	2722-72-347-0	CYLINDER HYD 유압 실린더	1	

71-02	MAGAZINE(60 Tool) 메가진 60	(2/3)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
106	SM11010 08030	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L30
107	2722-72-352-0	BRACKET 브라켓트	1	
108	2722-72-362-1	AIR SOL VALVE SET 에어 솔레노이드 밸브 세트	1	
109	SM11010 04040	SCREW H.S CAP 육각 구멍볼이 나사	4	M4×L40
110	SM11010 12050	SCREW H.S CAP 육각 구멍볼이 나사	8	M12×L50
111	2722-72-324-0	PLATE CYLINDER 실린더 플레이트	1	
112	SM11010 08015	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L15
113	2722-72-322-0	GUIDE 가이드	1	
114	2722-72-325-0	PLATE 플레이트	1	
115	2722-72-430-0	BOLT 볼트	1	
116	1682-01-406-0	NUT,LEVELING 레벨링 너트	1	M20×p1.5
117	2722-72-323-0	GUIDE 가이드	1	
118	2722-72-326-0	BRACKET 브라켓트	2	
119	SM11010 08035	SCREW H.S CAP 육각 구멍볼이 나사	16	M8×L35
120	2722-72-439-0	SHAFT CLAMP 샤프트 클램프	1	

71-02	MAGAZINE(60 Tool) 메가진 60	(3/3)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
121	2722-72-431-0	SPRING 스프링	1	
122	2722-72-354-0	BLOCK CLAMP 블록 클램프	1	
123	2722-72-432-0	KEY 키	1	
124	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	2	M6×L12
125	2722-72-327-0	PLATE 플레이트	1	
126	SM12100 02500	NUT LOCK 로크 너트	1	M25
127	SM13030 02500	WASHER LOCK 로크 와셔	1	M25



71-03	MAGAZINE(60 Tool) 메가진 60	(1/3)	2001-71
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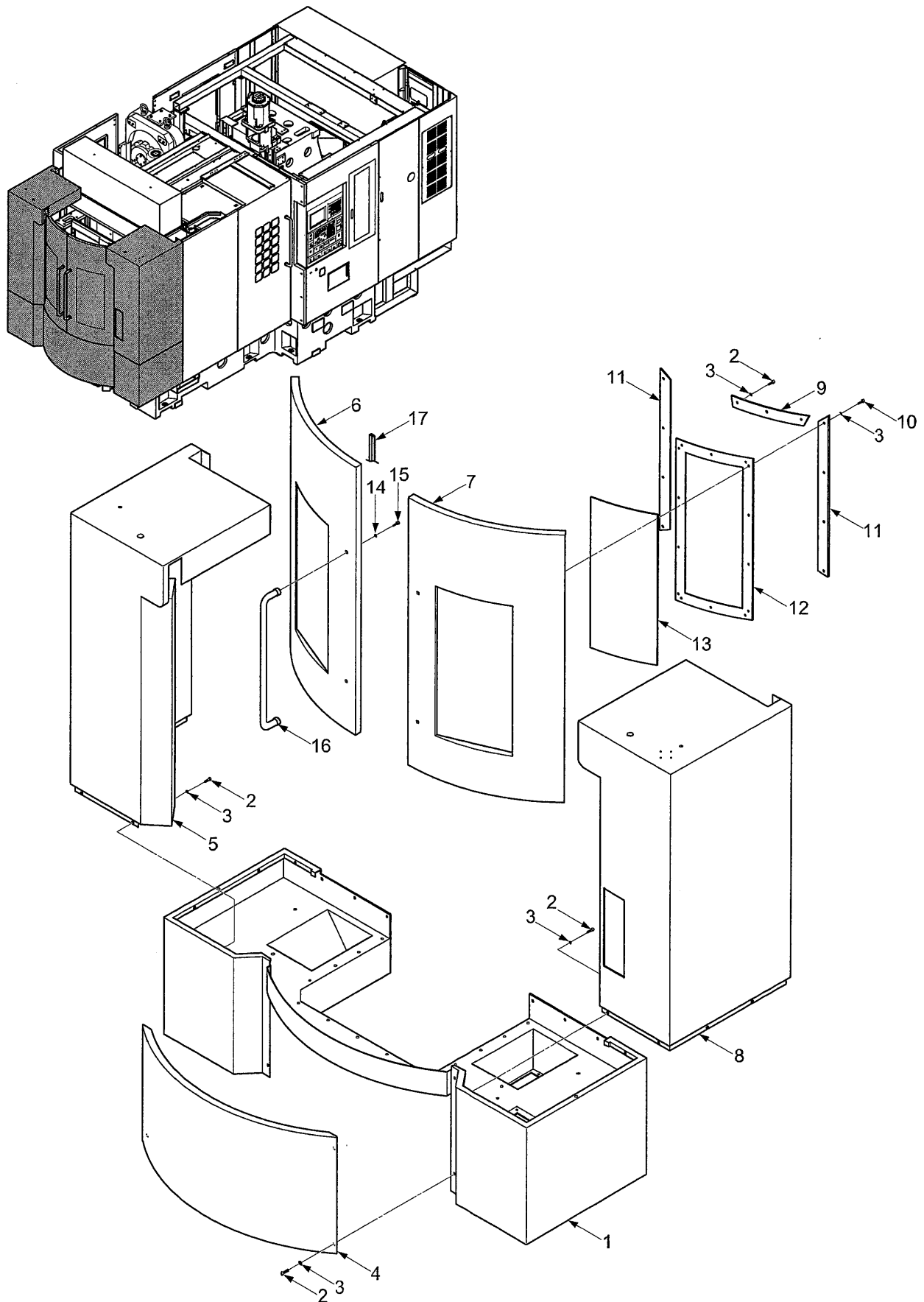
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
151		AC SERVO MOTOR AC 서보 모터	1	B12/3000is FANUC
152	SM11010 08025	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L25
153	SM13020 00800	WASHER SPRING 스프링 와셔	4	M8
155	2001-71-307-0	COVER(SERVO) 커버(서보)	1	
156	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L12
158	2001-71-204-0	BRACKET(SERVO) 브라켓트(서보)	1	
159	2001-71-308-0	RV REDUCER RV 리듀서	1	RV-40E-81 TEIJIN
160	SM11010 12030	SCREW H.S CAP 육각 구멍볼이 나사	4	M12×L30
161	SM14010 08035	PARALLEL PIN 평행핀	2	Ø8×35
162	PM4801211300	O-RING	1	G130 NOK
163	SM11010 08040	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L40
164	J26NV000030	O-RING O-링	1	AS568-258-4D NOK
165	SM11070 06006	SET SCREW DOG POINT 도그 포인트 세트 스크류	2	M6×L6
166	SM11010 08030	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L30
167	2001-71-309-0	ADAPTER(SERVO) 어댑터(서보)	1	

71-03	MAGAZINE(60 Tool) 메가진 60	(2/3)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
168	J26NV000020	OIL SEAL 오일 시일	1	TC15018014 NOK
169	2001-71-310-0	SPROCKET(SERVO) 스프로켓(서보)	1	
170	2722-72-120-0	CHAIN BLOCK ASS'Y 체인 블록	1	
171	2722-72-350-1	POT TOOL 틀 포트	40	
172	PM4013210202	ADAPTER-A HOSE ELBOW 어댑터-A 호스 엘보우	2	PT1/4
173	PM40CC182182080	HOSE 호스	2	PT1/4×L800
174	PM41303A1002000	CONNECTOR MALE 콘넥터	2	Ø10×PT1/4
175	PM4112100007501	HOSE SYNFLEX SYNFLEX 호스	4m	Ø10×7.5
176	SM10010 16060	BOLT HEX HEAD 육각 볼트	2	M16×L60
177	SM12010 01600	NUT HEX 육각 너트	1	M16
178	2722-72-357-0	BLOCK 블록	1	
179	SM11010 12050	SCREW H.S CAP 육각 구멍볼이 나사	3	M12×L50
180	SM13020 01200	WASHER SPRING 스프링 와셔	3	M12
181	2722-72-358-0	BLOCK 블록	1	
182	SM11010 12035	SCREW H.S CAP 육각 구멍볼이 나사	3	M12×L35

71-03	MAGAZINE(60 Tool) 메가진 60	(3/3)	2001-71
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q' ty 수량	Note 비고
183	2001-71-311-0	COVER(SERVO) 커버(서보)	1	
184	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	3	M5×L10
185	SM13020 00500	WASHER SPRING 스프링 와셔	3	M5



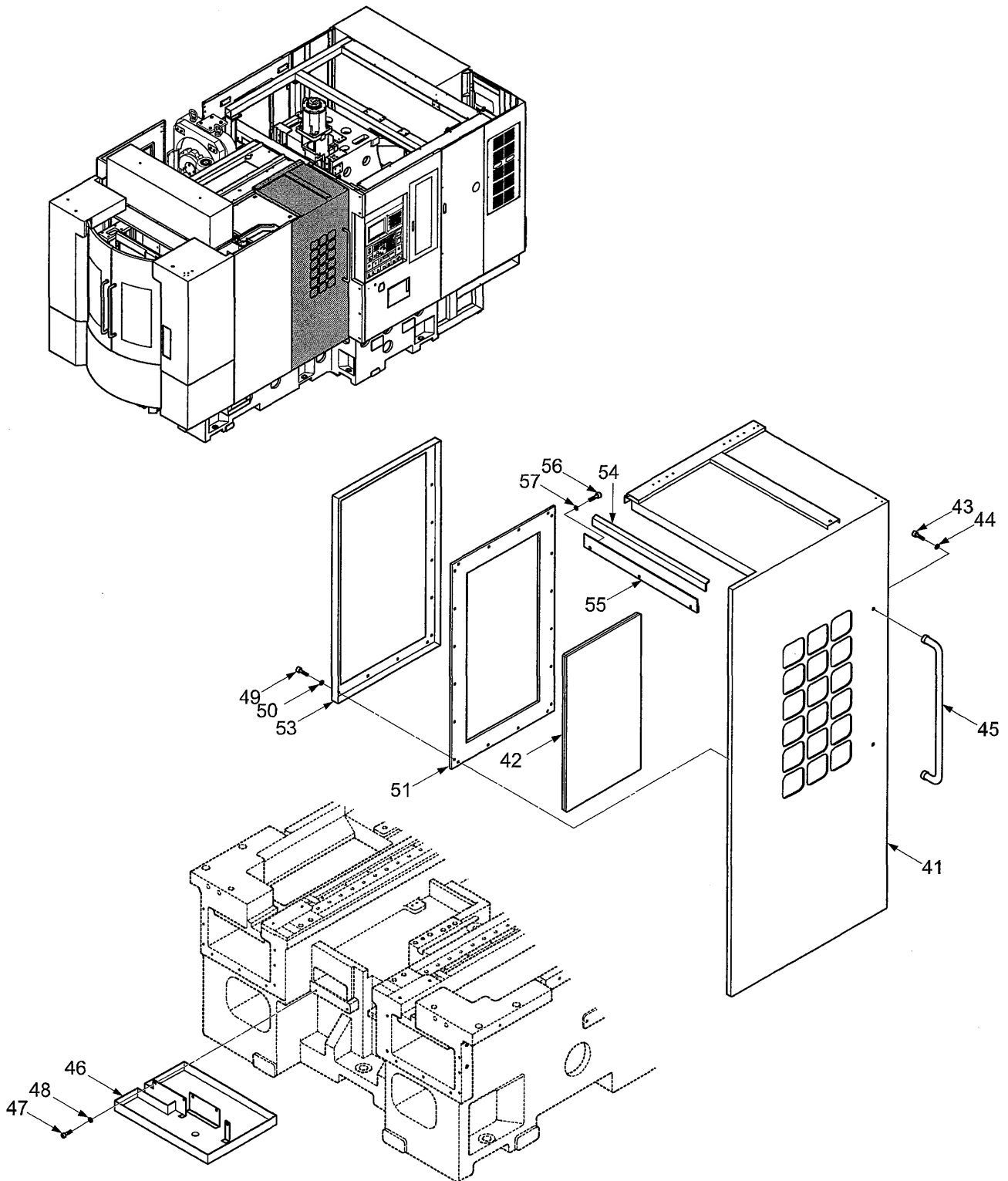
75-01	SPLASH GUARD	스프레쉬가드	(1/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-75-101-0	OIL PAN(APC) 오일 팬	1	
2	SM11014 06010	SCREW BUTTON HD CAP 버튼 스크류	33	M6×L10
3	SM13010 00600	WASHER PLAIN 평와셔	65	M6
4	2001-75-102-0	COVER 커버	1	
5	2001-75-103-0	APC COVER APC 커버	1	
6	2001-75-104-0	DOOR 도어	1	
7	2001-75-105-0	DOOR 도어	1	
8	2001-75-106-0	APC COVER APC 커버	1	
9	2001-75-301-0	PLATE 플레이트	4	
10	SM11010 06012	SCREW H.S CAP 육각 구멍불이 나사	32	M6×L12
11	2001-75-302-0	PLATE 플레이트	4	
12	2001-75-303-0	PACKING 패킹	2	
13	2001-75-304-0	GLASS 글래스	2	ACRYLIC
14	SM11010 10025	SCREW H.S CAP 육각 구멍불이 나사	4	M10×L25
15	SM13010 01000	WASHER PLAIN 평와셔	4	M10

75-01	SPLASH GUARD	스프레쉬가드	(2/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	Z14KN000150	HANDLE 핸들	2	KA-P200 KONG JIN
17	2001-75-401-0	CUSHION 쿠션	1	NBR

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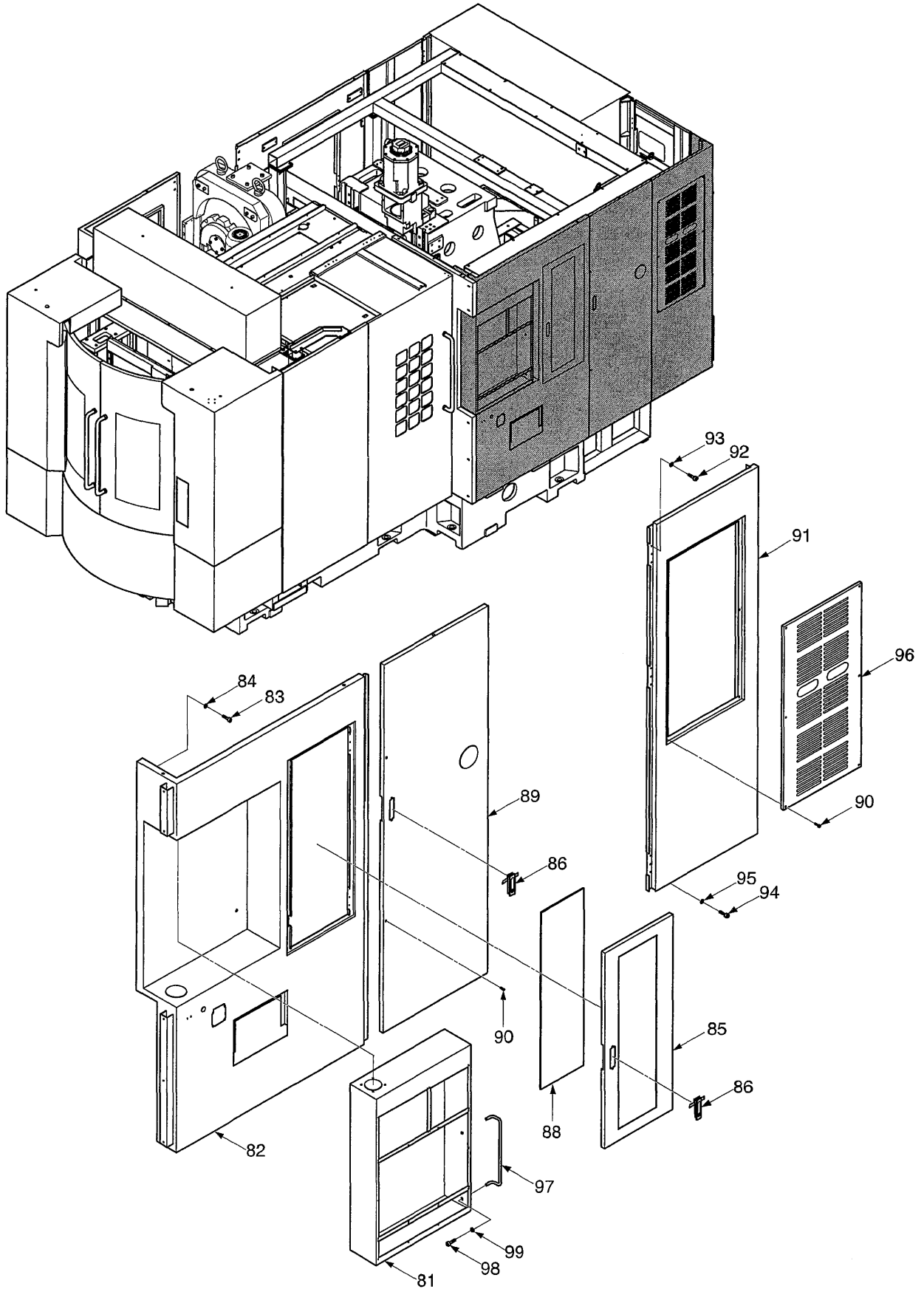
75-02	SPLASH GUARD	스프레쉬가드	(1/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
41	2001-75-107-0	SIDE DOOR 사이드 도어	1	
42	2001-75-305-0	GLASS 글래스	1	POLY-CARBONATE
43	Z14KN000150	HANDLE 핸들	1	KA-P200 KONG JIN
44	SM11010 10025	SCREW H.S CAP 육각 구멍붙이 나사	2	M10×L25
45	SM13010 01000	WASHER PLAIN 평와셔	2	M10
46	2001-75-201-0	OIL PAN 오일 팬	1	
47	SM11010 08015	SCREW H.S CAP 육각 구멍붙이 나사	3	M8×L15
48	SM13010 00800	WASHER PLAIN 평와셔	3	M8
49	SM11010 06012	SCREW H.S CAP 육각 구멍붙이 나사	20	M6×L15
50	SM13010 00600	WASHER PLAIN 평와셔	20	M6
51	2001-75-306-0	PACKING 패킹	1	NBR
53	2001-75-308-0	PLATE 플레이트	1	
54	2001-75-309-0	SCRAPER 스크래이퍼	1	
55	2001-75-310-0	PLATE 플레이트	1	
56	SM11014 06014	SCREW BUTTON HD CAP 버튼 나사	3	M6×L14

75-02	SPLASH GUARD	스프레쉬가드	(2/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
57	SM13010 00600	WASHER PLAIN 평와셔	3	M6

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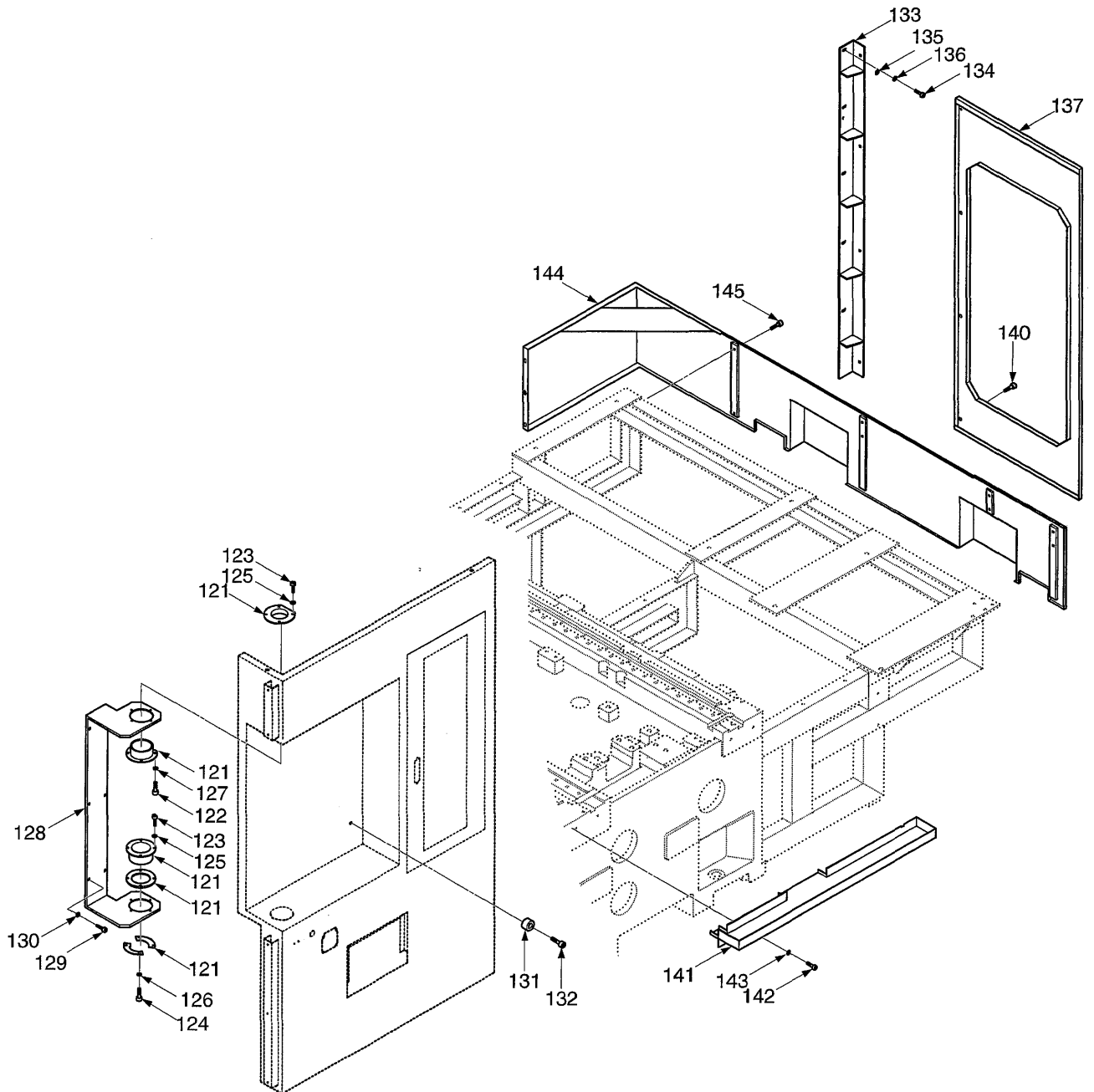
75-03	SPLASH GUARD	스프레쉬가드	(1/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
81	2001-75-108-0	OP BOX OP 박스	1	
82	2001-75-109-0	GUARD 가드	1	
83	SM11010 08016	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L16
84	SM13010 00800	WASHER PLAIN 평와셔	8	M8
85	2001-75-110-0	DOOR 도어	1	
86	Z14HP000450	HANDLE 핸들	2	A-2240-2K
88	2001-75-311-0	GLASS 글래스	1	ACRYLIC
89	2001-75-111-0	DOOR 도어	1	
90	SM11010 06020	SCREW H.S CAP 육각 구멍볼이 나사	8	M6×L20
91	2001-75-112-1	GUARD 가드	1	
92	SM11010 06016	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L16
93	SM13010 00600	WASHER PLAIN 평와셔	4	M6
94	SM11010 08020	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L20
95	SM13010 00800	WASHER PLAIN 평와셔	4	M8
96	2001-75-202-0	DOOR 도어	1	

75-03	SPLASH GUARD	스프레쉬가드	(2/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
97	Z14KN000140	HANDLE 핸들	1	KA-12 KONG JIN
98	SM11010 08020	SCREW H.S CAP 육각 구멍볼이 나사	2	M8×L20
99	SM13010 00800	WASHER PLAIN 평와셔	2	M8

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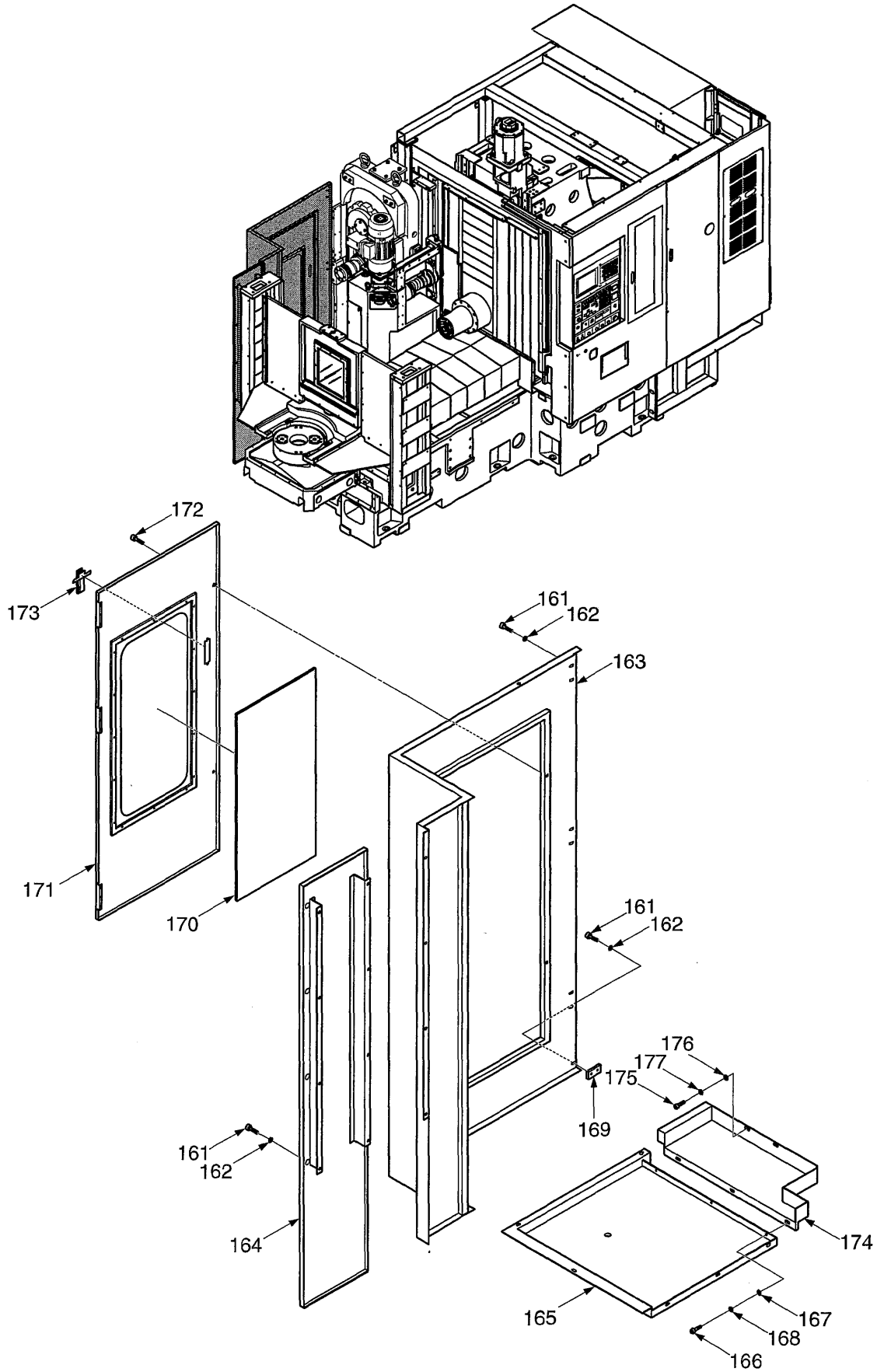
75-04	SPLASH GUARD	스프레쉬가드	(1/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
121	24645600650	FLANGE SET 플랜지 세트	1	
122	SM11010 06010	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L10
123	SM11010 06016	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L16
124	SM11010 06020	SCREW H.S CAP 육각 구멍볼이 나사	8	M6×L20
125	SM13020 00600	WASHER SPRING 스프링 와셔	18	M6
126	SM11010 06016	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L16
127	SM13020 00600	WASHER SPRING 스프링 와셔	4	M6
128	2001-75-203-0	STAY 스테인	1	
129	SM11010 08025	SCREW H.S CAP 육각 구멍볼이 나사	6	M8×L25
130	SM13020 00800	WASHER SPRING 스프링 와셔	6	M8
131	44640100510	STOPPER 스토퍼	2	IRON RUBBER
132	SM11010 12025	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×L25
133	2001-75-204-0	STAY 스테인	1	
134	SM11010 06016	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L16
135	SM13010 00600	WASHER PLAIN 평와셔	6	M6

75-04	SPLASH GUARD	스프레쉬가드	(2/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
136	SM13020 00600	WASHER SPRING 스프링 와셔	6	M6
137	2001-75-113-1	DOOR 도어	1	
140	SM11010 06025	SCREW H.S CAP 육각 구멍볼이 나사	1	M6×L25
141	2001-75-332-0	OIL PAN 오일 팬	2	
142	SM11010 08016	SCREW H.S CAP 육각 구멍볼이 나사	1	M8×L16
143	SM13020 00800	WASHER SPRING 스프링 와셔	4	M8
144	2001-75-138-0	COVER 커버	4	
145	SM11010 06020	SCREW H.S CAP 육각 구멍볼이 나사	1	M6×L20
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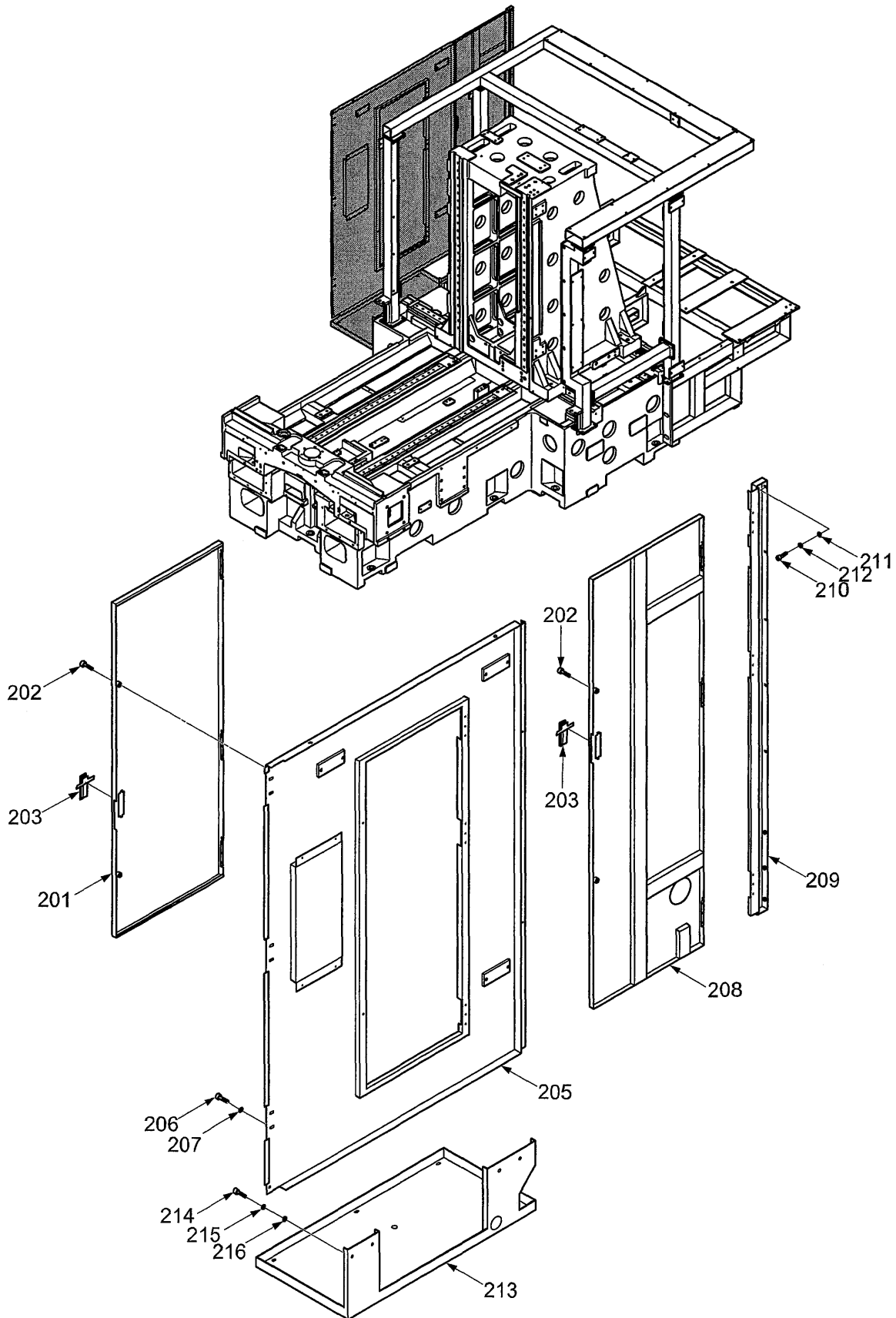
75-05	SPLASH GUARD	스프레쉬가드	(1/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
161	SM11014 06010	SCREW BUTTON HD CAP 버튼 스크류	18	M6×L10
162	SM13010 00600	WASHER PLAIN 평와셔	18	M6
163	2001-75-114-0	GUARD 가드	1	
164	2001-75-115-0	COVER 커버	1	
165	2001-75-116-0	OIL PAN 오일 팬	1	
166	SM11010 06012	SCREW H.S CAP 육각 구멍불이 나사	9	M6×L12
167	SM13010 00600	WASHER PLAIN 평와셔	9	M6
168	SM13020 00600	WASHER SPRING 스프링 와셔	9	M6
169	2001-75-402-0	PLATE 플레이트	1	
170	2001-75-343-0	WINDOW 윈도우	1	
171	2001-75-117-0	DOOR 도어	1	
172	SM11010 06025	SCREW H.S CAP 육각 구멍불이 나사	2	M6×L25
173	Z14HP000450	HANDLE 핸들	1	A-2240-2K KONG JIN
174	2001-75-208-0	COVER 커버	1	
175	SM11010 08016	SCREW H.S CAP 육각 구멍불이 나사	2	M8×L16

75-05	SPLASH GUARD	스프레쉬가드	(2/2)	2001-75
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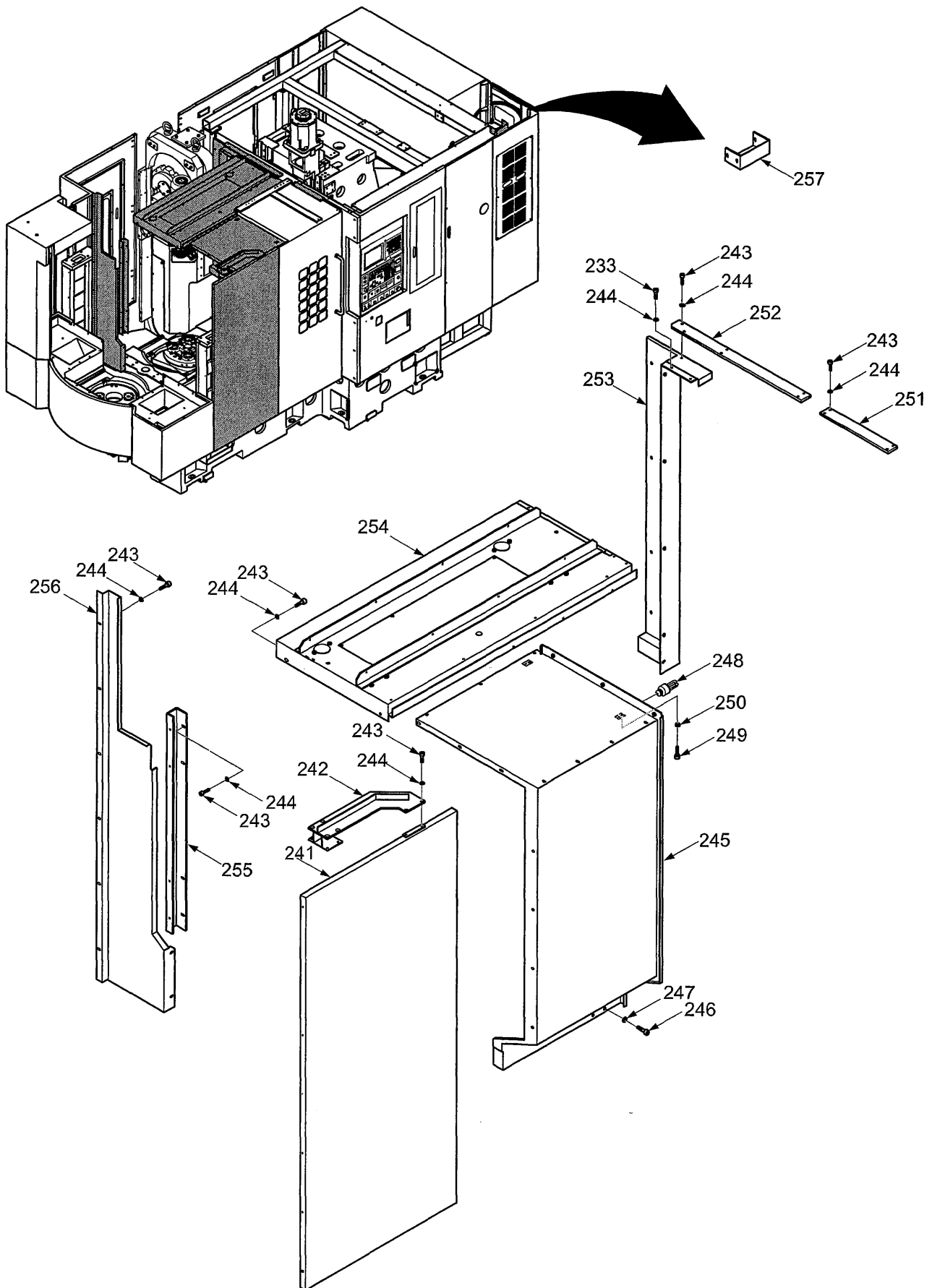
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
176	SM13010 00800	WASHER PLAIN 평와셔	2	M6
177	SM13020 00800	WASHER SPRING 스프링 와셔	2	M6

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75-06	SPLASH GUARD	스프레쉬가드	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
201	2001-75-118-0	DOOR 도어	1	
202	SM11010 06025	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L25
203	Z14HP000450	HANDLE 핸들	2	A-2240-2K KONG JIN
205	2001-75-119-0	GUARD 가드	1	
206	SM11010 08016	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L16
207	SM13010 00800	WASHER PLAIN 평와셔	8	M8
208	2001-75-120-0	DOOR 도어	1	
209	2001-75-205-0	STAY 스테인	1	
210	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L12
211	SM13010 00600	WASHER PLAIN 평와셔	6	M6
212	SM13020 00600	WASHER SPRING 스프링 와셔	6	M6
213	2001-75-139-0	OIL PAN 오일 팬	1	
214	SM11010 08016	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L16
215	SM13020 00800	WASHER SPRING 스프링 와셔	4	M8
216	SM13010 00800	WASHER PLAIN 평와셔	4	M8



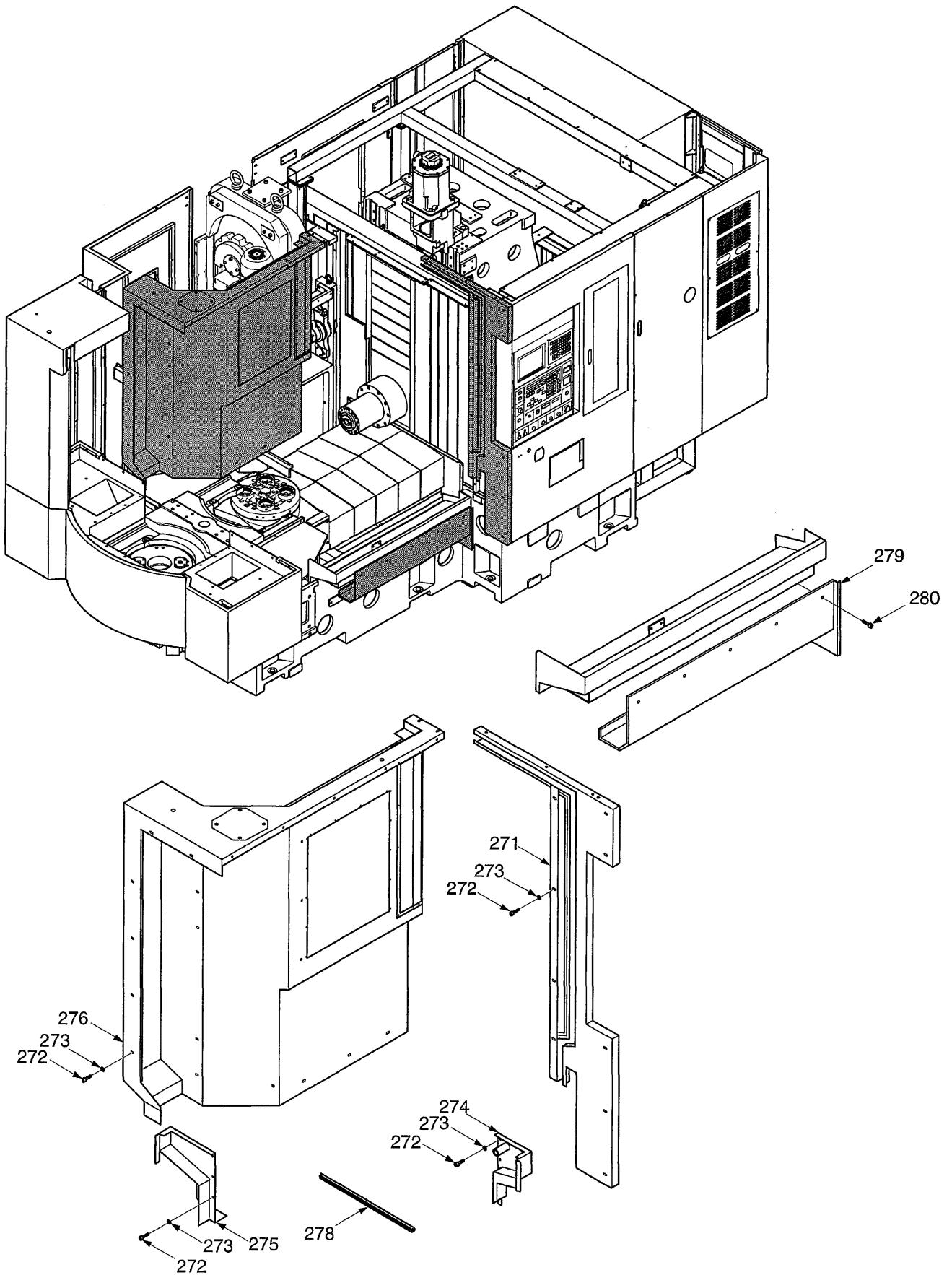
75-07	SPLASH GUARD	스프레쉬가드	(1/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
241	2001-75-121-0	COVER 커버	1	
242	2001-75-312-0	BRACKET 브라켓트	1	
243	SM11014 06010	SCREW BUTTON HD CAP 버튼 스크류	44	M6×L10
244	SM13010 00600	WASHER PLAIN 평와셔	44	M6
245	2001-75-122-0	COVER 커버	1	
246	SM11014 08010	SCREW BUTTON HD CAP 버튼 스크류	2	M8×L10
247	SM13010 00800	WASHER PLAIN 평와셔	2	M8
248	D20TV000210	FLUORESCENT LAMP 형광등	2	TYPB-206 TAE YANG
249	SM11060 06020	SET SCREW HEX. SOCKET 세트 스크류	8	M6×L20
250	SM12010 00600	NUT HEX. 육각 너트	8	M6
251	2001-75-313-0	COVER 커버	1	
252	2001-75-314-0	PLATE 플레이트	1	
253	2001-75-135-0	COVER 커버	1	
254	2001-75-136-0	COVER 커버	1	
255	2001-75-334-0	BRACKET 브라켓트	1	

75-07	SPLASH GUARD	스프레쉬가드	(2/2)	2001-75
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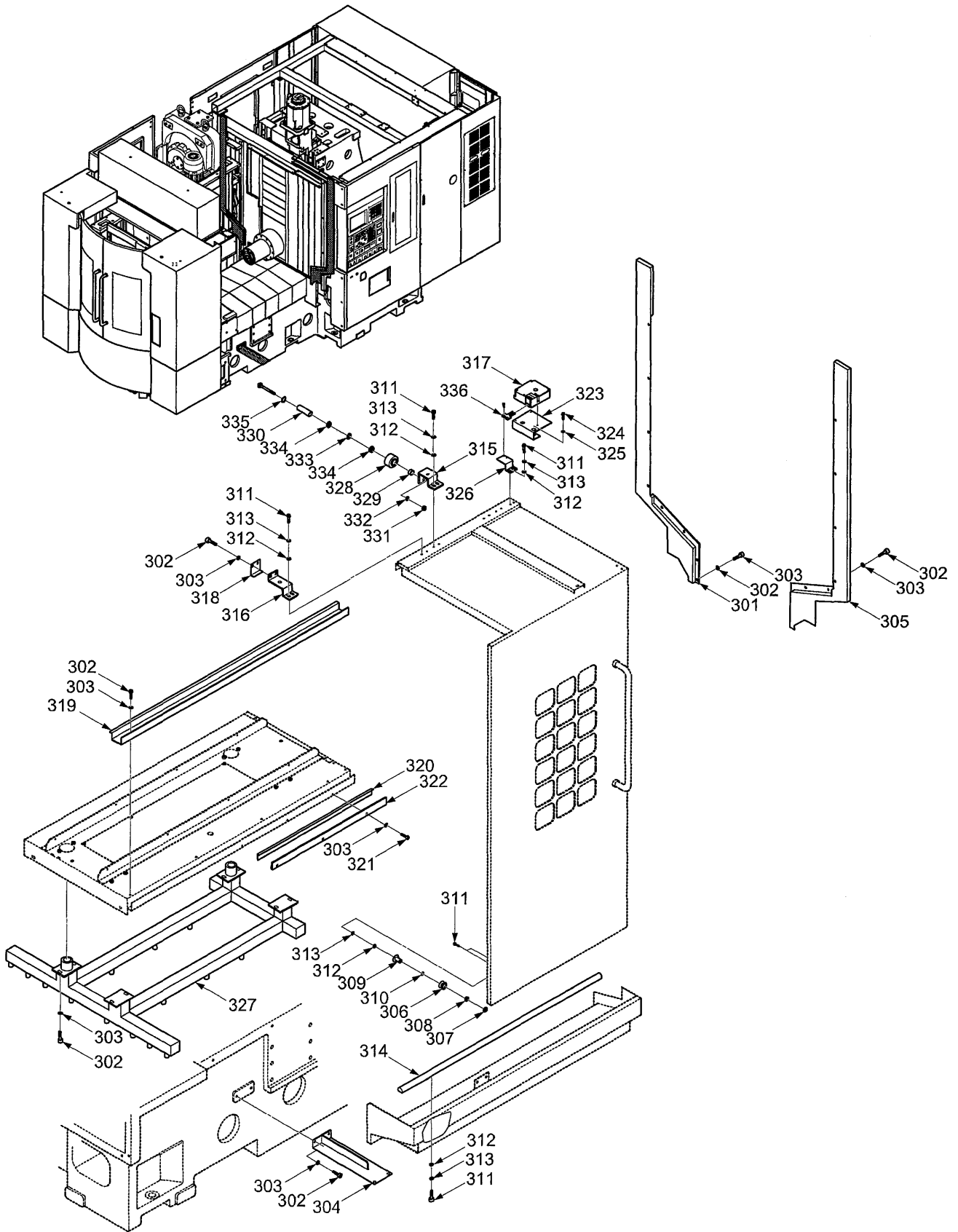
NO. 번호	Part No. 부품번호	Part Name 부품명	Q ' ty 수량	Note 비고
256	2001-75-137-0	COVER 커버	1	
257	2001-75-342-0	BRACKET 브라켓트	1	

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75-08	SPLASH GUARD	스프레쉬가드	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
271	2001-75-123-0	COVER 커버	1	
272	SM11014 06010	SCREW BUTTON HD CAP 버튼 스크류	17	M6×L10
273	SM13010 00600	WASHER PLAIN 평와셔	17	M6
274	2001-75-206-0	COVER 커버	1	
275	2001-75-207-0	COVER 커버	1	
276	2001-75-124-0	COVER 커버	1	
278	2001-75-404-0	CUSHION 쿠션	1	NBR
279	2001-75-346-0	DUCT 덕트	1	
280	SM11014 06015	SCREW H.S CAP 육각 구멍볼이 나사	5	M6×L15



75-09	SPLASH GUARD	스프레쉬가드	(1/3)	2001-75
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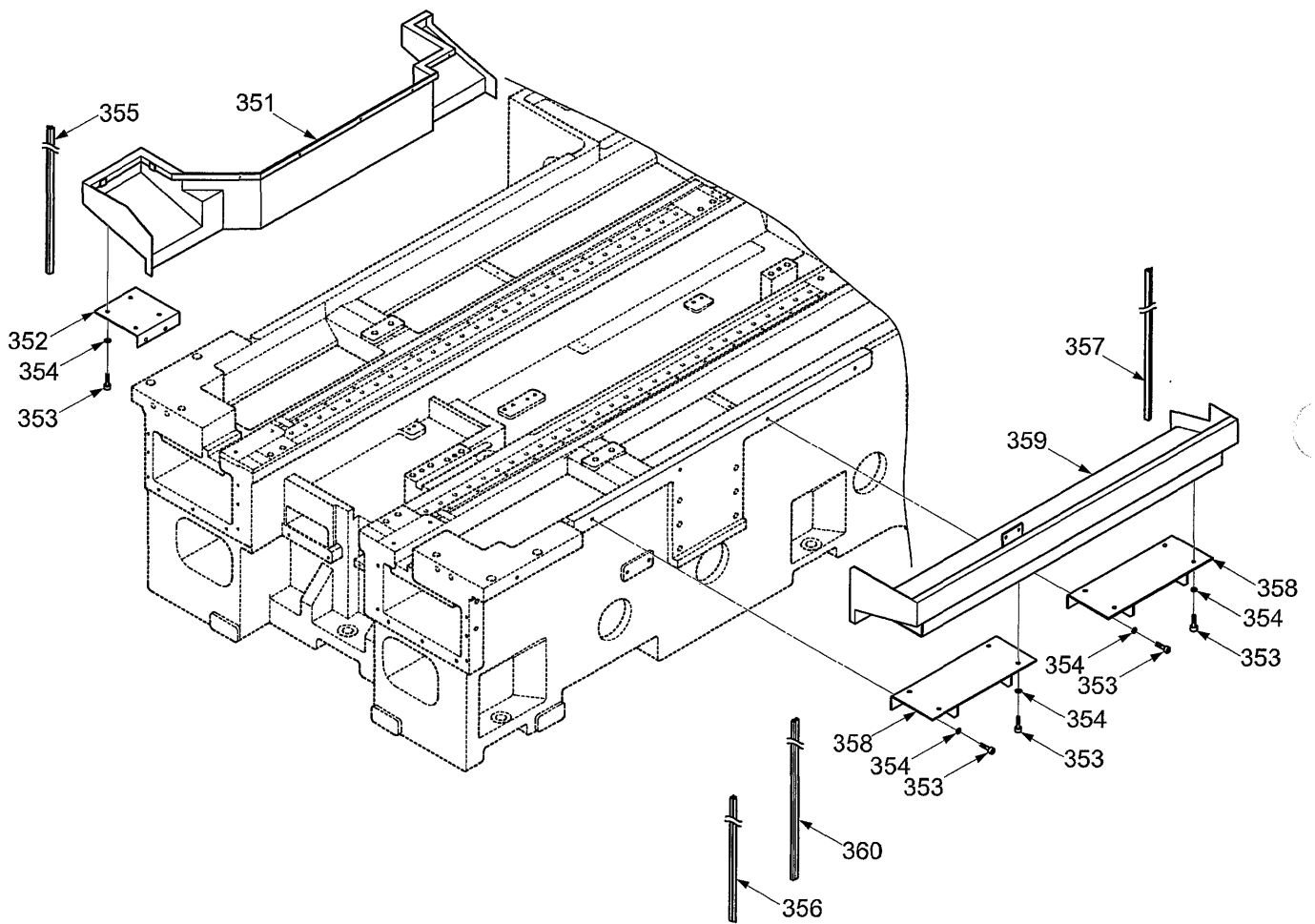
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
301	2001-75-125-0	COVER 커버	1	
302	SM11014 06010	SCREW BUTTON HD CAP 버튼 스크류	28	M6×L10
303	SM13010 00600	WASHER PLAIN 평와셔	31	M6
304	2001-75-315-0	BRACKET 브라켓트	1	
305	2001-75-126-0	COVER 커버	1	
306	43414972540	ROLLER 롤러	2	
307	SM21020 02800	RETAIN RING 링	2	
308	PB60600 12000	BEARING BALL 볼 베어링	2	6001ZZ KBC
309	41414843500	SHAFT 축	2	
310	SM21010 01200	RETAIN RING 링	2	
311	SM11010 06012	SCREW H.S CAP 육각 구멍붙이 나사	20	M6×L12
312	SM13010 00600	WASHER PLAIN 평와셔	20	M6
313	SM13020 00600	WASHER SPRING 스프링 와셔	20	M6
314	2001-75-316-0	RAIL 레일	1	
315	34645900361	BRACKET 브라켓트	2	

75-09	SPLASH GUARD	스프레쉬가드	(2/3)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
316	34645900371	BRACKET 브라켓트	2	
317	PE820132009R	SWITCH, SAFETY(DC24V) 안전 스위치	1	D4DL-2CFA-B OMRON
318	44645900431	PLATE 플레이트	2	
319	2001-75-317-0	GUIDE 가이드	1	
320	2001-75-318-0	PLATE 플레이트	1	
321	SM11014 06014	SCREW BUTTON HD CAP 버튼 스크류	3	M6×L14
322	2001-75-319-0	SCRAPER 스크레이퍼	1	NBR
323	2001-75-341-0	BRACKET 브라켓트	1	
324	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	3	M6×L12
325	SM13010 00600	WASHER PLAIN 평와셔	3	M6
326	2001-75-412-0	BRACKET 브라켓트	1	
327	2001-75-127-0	PIPE 파이프	1	
328	44645900980	ROLLER 롤러	4	MC NYLON
329	44645900830	COLLAR 칼라	4	
330	44645900840	COLLAR 칼라	4	

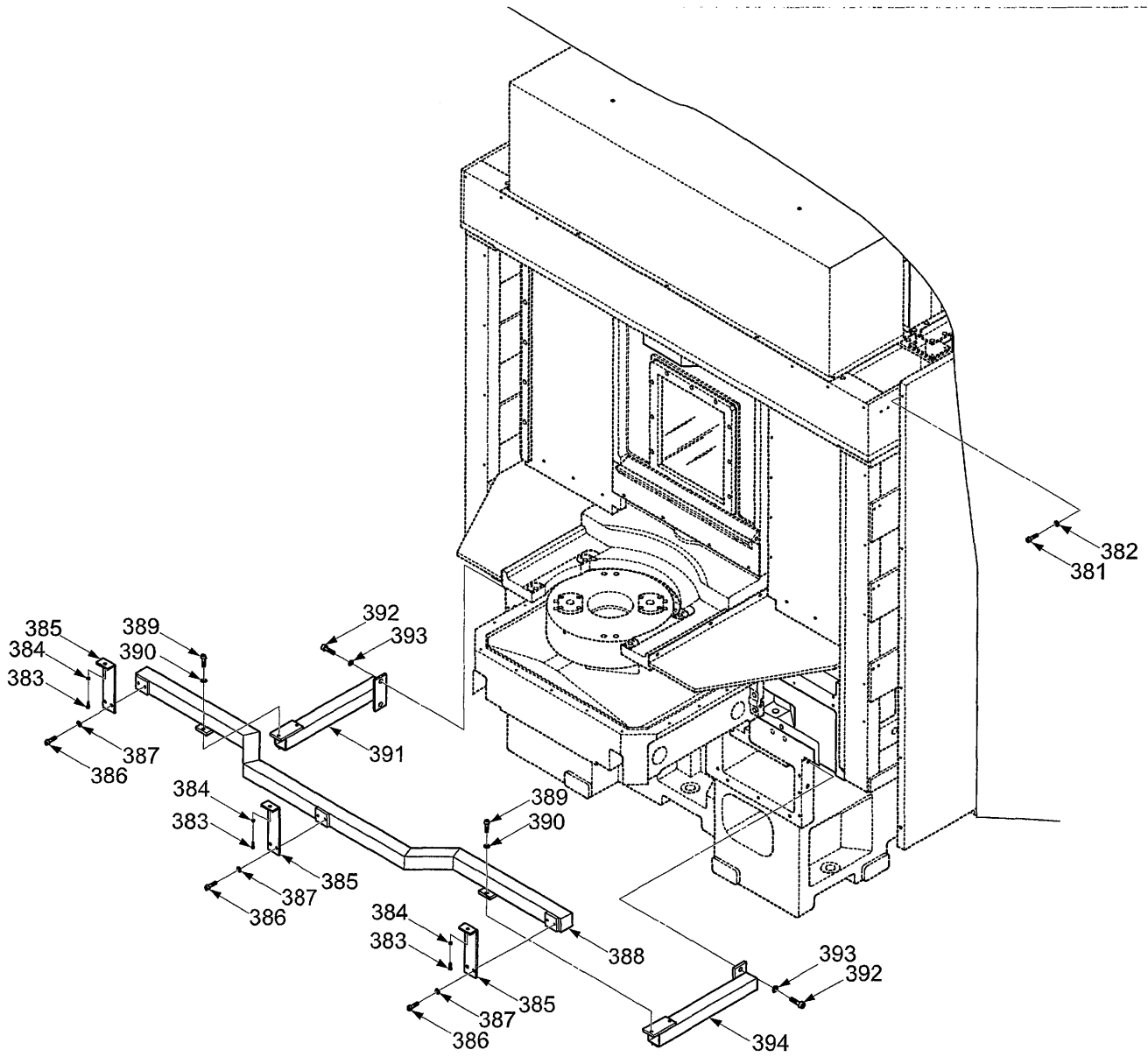
75-09	SPLASH GUARD	스프레쉬가드	(3/3)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
331	SM1201000800	NUT 너트	4	M8
332	SM1302000800	SPRING WASHER 스프링 와셔	4	M8
333	44645900991	COLLAR 칼라	4	
334	E0000006080	BALL BEARING 볼 베어링	8	608
335	SM2102002200	RETAIN RING 리테인 링	8	H22
336	PE820132011R	SWITCH, KEY 키아, 스위치	1	D4DS-K1 OMRON



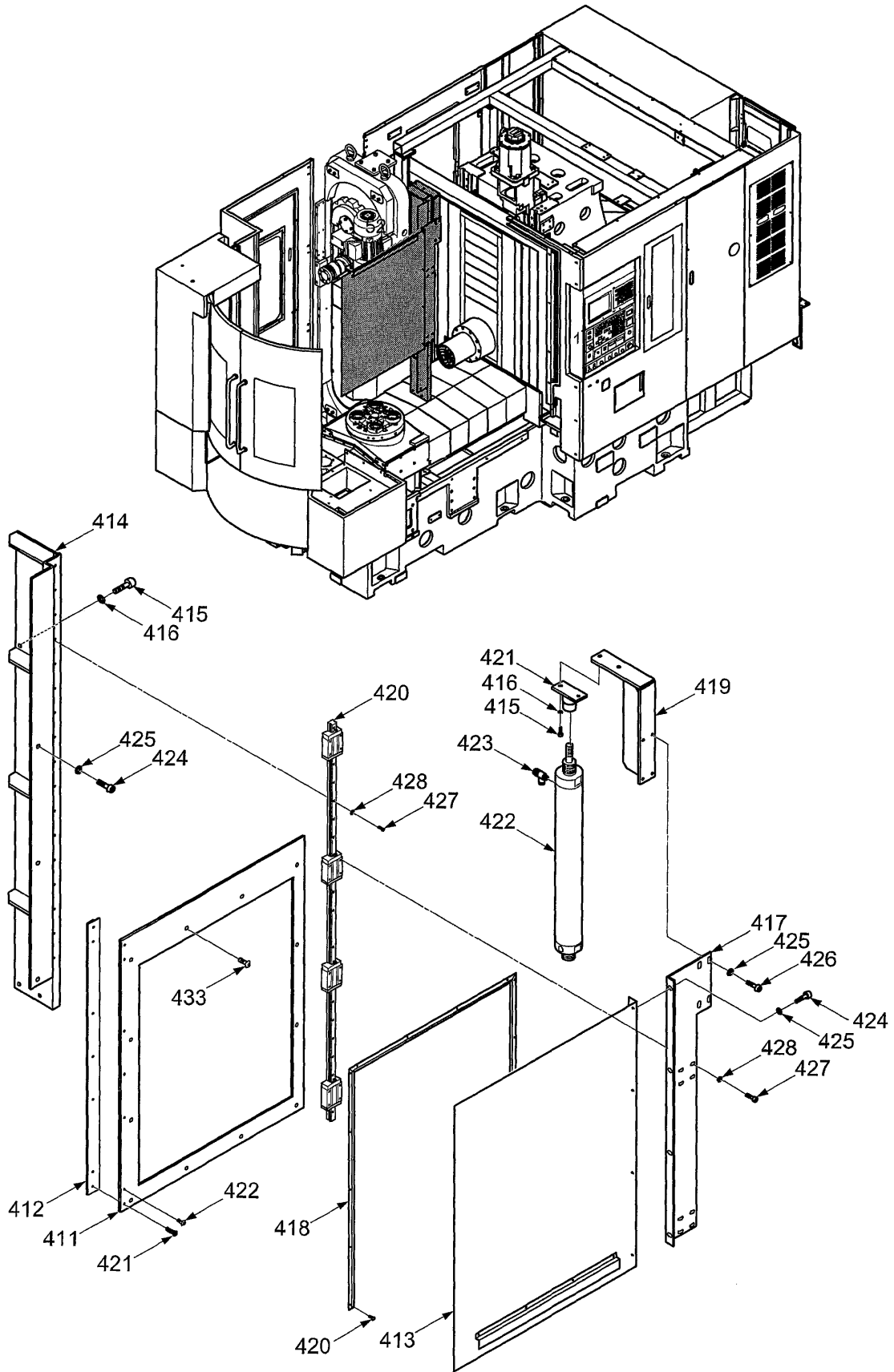
75-10	SPLASH GUARD	스프레쉬가드	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
351	2001-75-128-0	OIL PAN 오일 팬	1	
352	2001-75-320-0	BRACKET 브라켓트	1	
353	SM11010 08020	SCREW H.S CAP 육각 구멍볼이 나사	18	M8×L20
354	SM13010 00800	WASHER PLAIN 평와셔	18	M8
355	2001-75-404-0	CUSHION 쿠션	1	NBR
356	2001-75-405-0	CUSHION 쿠션	1	NBR
357	2001-75-406-0	CUSHION 쿠션	2	NBR
358	2001-75-321-0	BRACKET 브라켓트	2	
359	2001-75-129-1	OIL PAN 오일 팬	1	
360	2001-75-401-0	CUSHION 쿠션	1	NBR



75-11	SPLASH GUARD 스프레쉬가드	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
381	SM11014 06010	SCREW BUTTON HD CAP 버튼 스크류	33	M6×L10
382	SM13010 00600	WASHER PLAIN 평와셔	33	M6
383	SM10010 10040	BOLT HEX 육각 볼트	3	M10×L40
384	SM12010 01000	NUT HEX 육각 너트	3	M10
385	34645900511	STAY 스테인	3	
386	SM11010 08020	SCREW H.S CAP 육각 구멍붙이 나사	6	M8×L20
387	SM13020 00800	WASHER SPRING 스프링 와셔	6	M8
388	2001-75-130-0	STAY 스테인	1	
389	SM11010 08020	SCREW H.S CAP 육각 구멍붙이 나사	4	M8×L20
390	SM13020 00800	WASHER SPRING 스프링 와셔	4	M8
391	2001-75-322-0	STAY 스테인	1	
392	SM11010 12025	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×L25
393	SM13020 01200	WASHER SPRING 스프링 와셔	4	M12
394	2001-75-323-0	STAY 스테인	1	



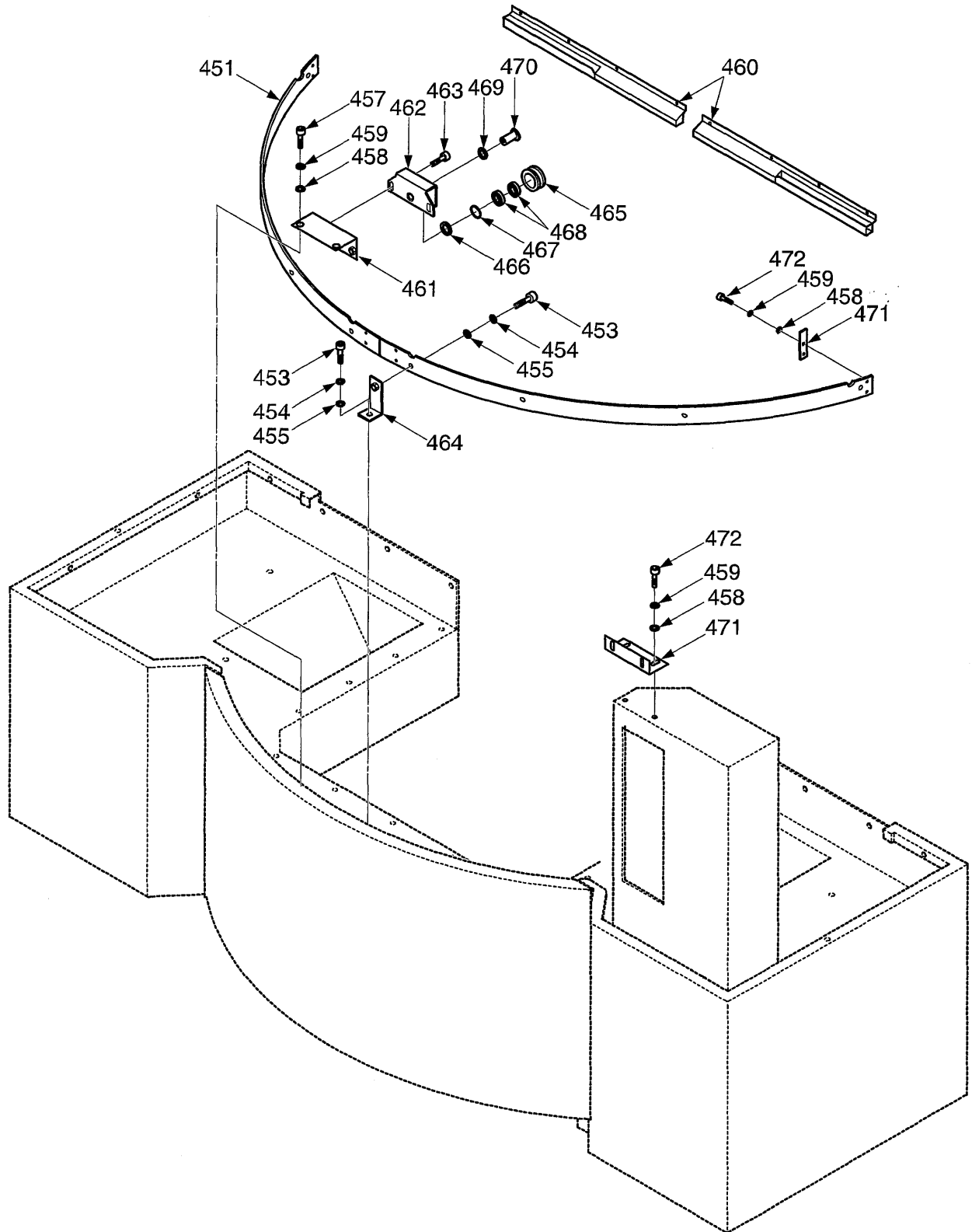
75-12	SPLASH GUARD	스프레쉬가드	(1/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
411	2001-75-335-0	COVER 커버	1	
412	2722-75-323-0	GUIDE 가이드	1	
413	2001-75-338-0	SHUTTER 셔터	1	
414	2001-75-337-0	BRACKET 브라켓트	1	
415	SM1101008020	SCREW HEX SOCKET CAP 육각 구멍볼이 나사	6	M8×L20
416	SM1302000800	WASHER SPRING 스프링 와셔	6	M8
417	2001-75-336-0	BRACKET 브라켓트	1	
418	2001-75-340-0	WIPER 와이퍼	1	
419	2001-75-339-0	BRACKET 브라켓트	1	
420	PBSSR20XW1000	LM GUIDE LM 가이드	1	SSR20×W2UU +1000L(THK)
421	G20HP000160	FLOATING JOINT 플로팅 조인트	1	
422	PH020607230S	AIR CYLINDER 에어 클리너	1	RHCL40-550- C73L
423	G54SV000870	SPEED CON 스피드 콘	2	SC3W-8-8(CKD)
424	SM1101006016	SCREW HEX SOCKET CAP 육각 구멍볼이 나사	7	M6×L16
425	SM1302000600	WASHER SPRING 스프링 와셔	11	M6

75-12	SPLASH GUARD	스프레쉬가드	(2/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
426	SM1101006012	SCREW HEX SOCKET CAP 육각 구멍볼이 나사	4	M6×L12
427	SM1101005010	SCREW HEX SOCKET CAP 육각 구멍볼이 나사	8	M5×L10
428	SM1302000500	WASHER SPRING 스프링 와셔	8	M5
429	SM1101005012	SCREW HEX SOCKET CAP 육각 구멍볼이 나사	17	M5×L12
430	SM1102003006	CROSS RECESSED SCREW 십자 나사	14	M3×L6
431	SM11014 05015	SCREW BUTTON HD CAP 버튼 스크류	3	M5×L15
432	SM1103005010	CROSS RECESSED SCREW 십자 나사	4	M5×L10
433	SM1103006012	CROSS RECESSED SCREW 십자 나사	14	M6×L12

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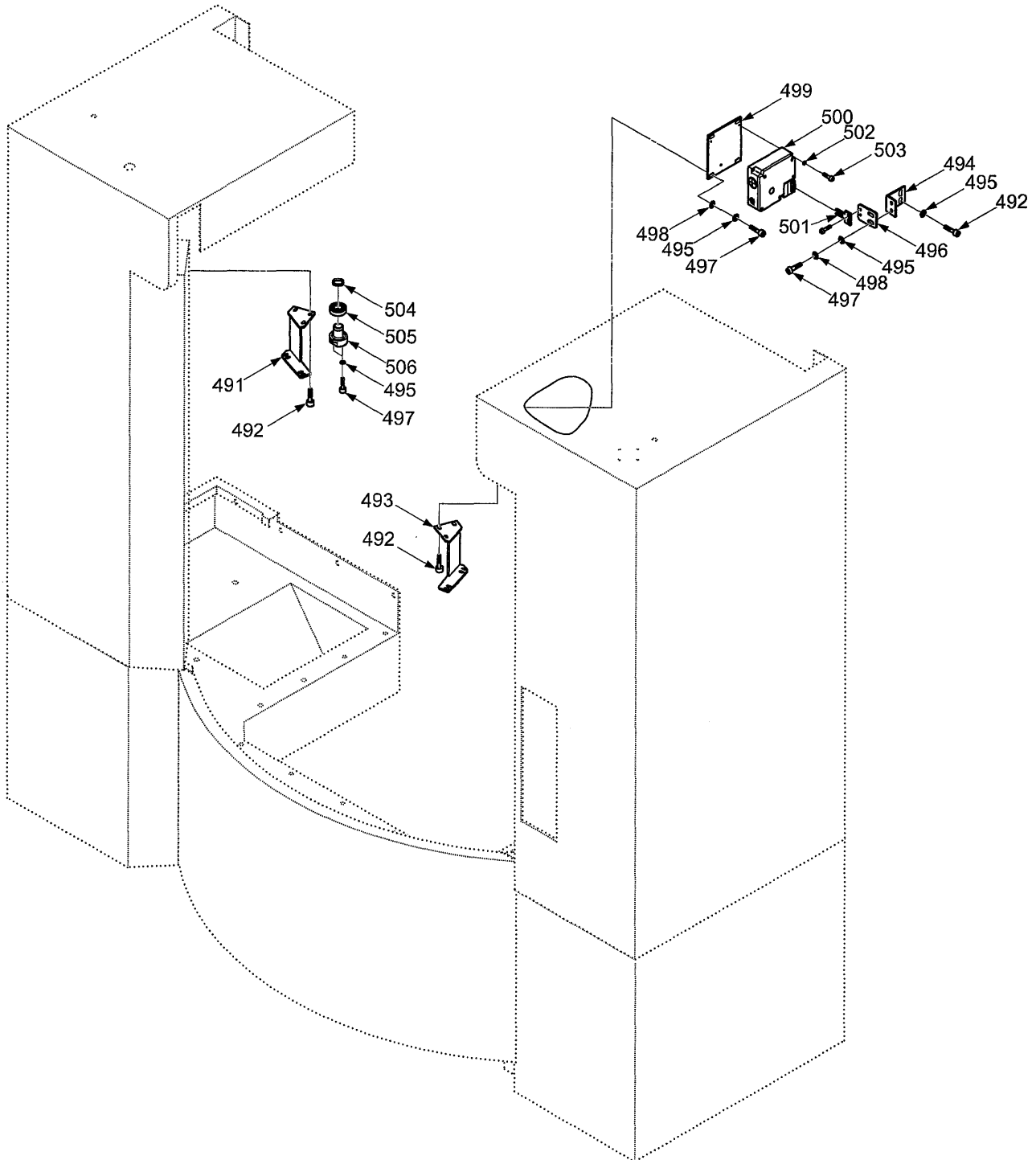
75-13	SPLASH GUARD	스프레쉬가드	(1/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
451	2001-75-132-0	RAIL 레일	1	
453	SM11010 08020	SCREW H.S CAP 육각 구멍볼이 나사	16	M8×L20
454	SM13020 00800	WASHER SPRING 스프링 와셔	16	M8
455	SM13010 00800	WASHER PLAIN 평와셔	16	M8
456	44645901010	BRACKET 브라켓트	1	
457	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	12	M6×L12
458	SM13020 00600	WASHER SPRING 스프링 와셔	20	M6
459	SM13010 00600	WASHER PLAIN 평와셔	20	M6
460	2001-75-134-0	COVER 커버	1	
461	34645900611	STAY 스태이	4	
462	34645900621	COVER 커버	4	
463	SM11010 08016	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L16
464	34645900630	STAY 스태이	8	
465	34645900641	ROLLER 롤러	4	
466	44645900651	COLLAR 칼라	4	

75-13	SPLASH GUARD	스프레쉬가드	(2/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
467	SM21020 02800	RETAIN RING 리테인 링	4	H28
468	PB6060012000	BEARING 베어링	4	6001ZZ
469	44645900671	COLLAR 칼라	4	
470	44645900661	SHAFT 샤프트	4	
471	34645900600	STOPPER 스토퍼	4	
472	SM11010 06016	SCREW H.S CAP 육각 구멍붙이 나사	8	M6×L16

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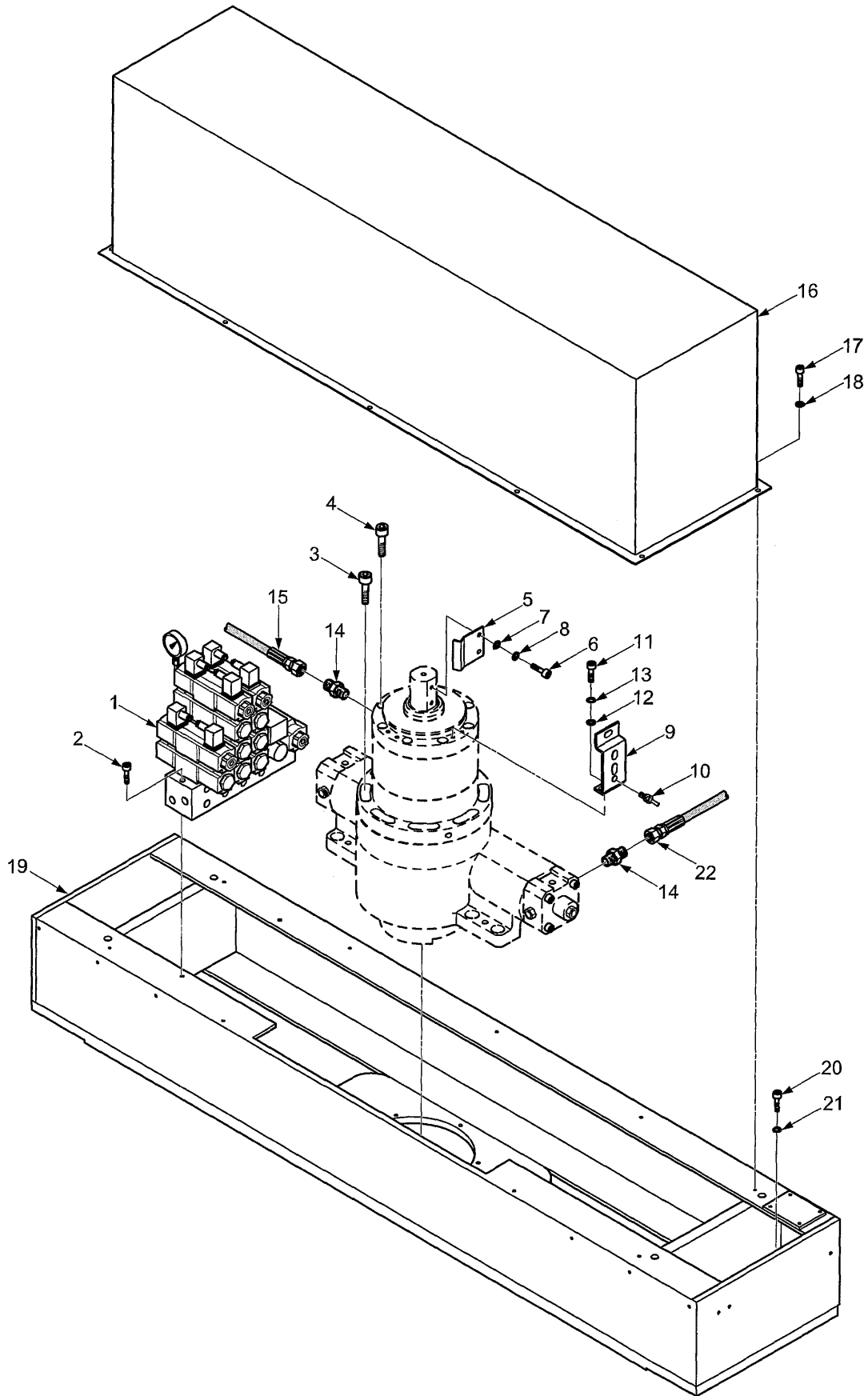
75-14	SPLASH GUARD	스프레쉬가드	(1/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
491	34645900772	STAY 스테인	1	
492	SM11014 06010	SCREW BUTTON HD CAP 버튼 스크류	8	M6×L10
493	34645900712	STAY 스테인	1	
494	2001-75-409-0	STAY 스테인	2	
495	SM13010 00600	WASHER PLAIN 평와셔	22	M6
496	2001-75-411-0	PLATE 플레이트	2	
497	SM11010 06012	SCREW H.S CAP 육각 구멍볼이 나사	20	M6×L12
498	SM13020 00600	WASHER SPRING 스프링 와셔	18	M6
499	2001-75-410-0	PLATE 플레이트	2	
500	PE820132009R	SWITCH, SAFETY(DC24V) 안전 스위치	2	D4DL-2CFA-B OMRON
501	PE820132011R	SWITCH, KEY 키, 스위치	2	D4DS-K1 OMRON
502	SM11010 04035	SCREW H.S CAP 육각 구멍볼이 나사	6	M4×L35
503	SM13020 00600	WASHER SPRING 스프링 와셔	6	M4
504	SM21010 01200	RETAIN RING 리테인 링	4	S12
505	PB6060012000	BEARING 베어링	4	6001ZZ

75-14	SPLASH GUARD	스프레쉬가드	(2/2)	2001-75
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
506	4341497292A	SHAFT 샤프트	4	

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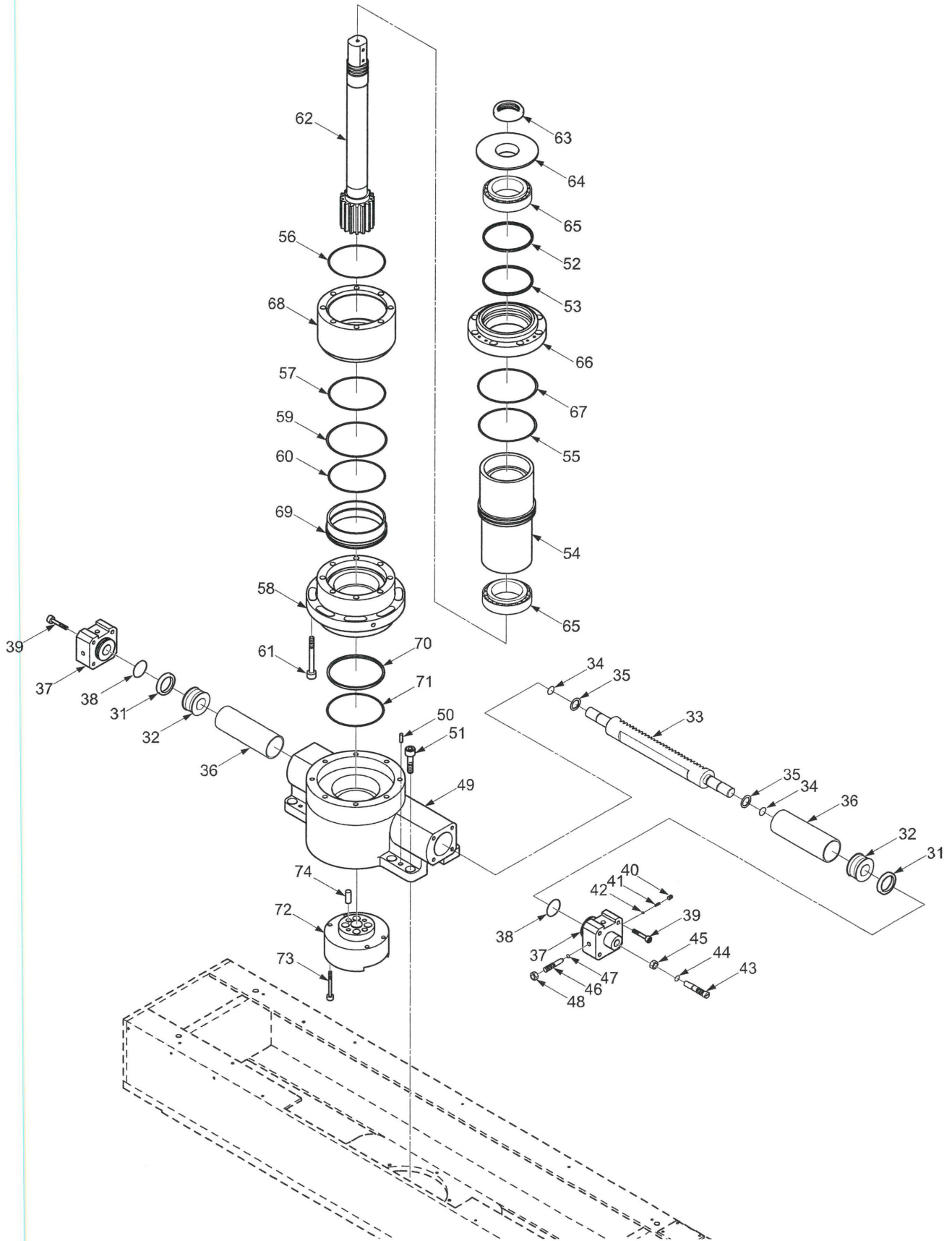
80-01	APC 자동 팔레트교환 장치	(1/2)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-80-210-0	MANIFOLD ASS'Y 매니폴드 조립체	1	
2	SM11010 08075	SCREW H.S CAP 육각 구멍붙이 나사	2	M8×L75
3	SM11010 12035	SCREW H.S CAP 육각 구멍붙이 나사	7	M12×L35
4	SM11010 12040	SCREW H.S CAP 육각 구멍붙이 나사	8	M12×L40
5	2001-80-313-0	DOG 도그	1	
6	SM11010 06015	SCREW H.S CAP 육각 구멍붙이 나사	2	M6×L15
7	SM13010 00600	WASHER PLAIN 평washer	2	M6
8	SM13020 00600	WASHER SPRING 스프링 washer	2	M6
9	2001-80-314-0	STAY 스테인	2	
10	R26BA000010	SWITCH PROXIMITY 근접 스위치	6	BES516-325 -E5-C-S4
11	SM11010 06015	SCREW H.S CAP 육각 구멍붙이 나사	4	M6×L15
12	SM13010 00600	WASHER PLAIN 평washer	4	M6
13	SM13020 00600	WASHER SPRING 스프링 washer	4	M6
14	PM4235011203	HOSE MALECONNECTOR 호스	12	HMCM-0303R HYPDONG
15	H85L0905000	HOSE ASSY 호스 조립체	5	3/8×L500

80-01	APC 자동 팔레트교환 장치	(2/2)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q' ty 수량	Note 비고
16	2001-80-203-0	COVER 커버	1	
17	SM11010 06015	SCREW H.S CAP 육각 구멍볼이 나사	10	M6×L15
18	SM13020 00600	WASHER SPRING 스프링 와셔	10	M6
19	2001-80-105-0	BEAM 빔	1	
20	SM11010 16055	SCREW H.S CAP 육각 구멍볼이 나사	8	M16×L50
21	SM13020 01600	WASHER SPRING 스프링 와셔	8	M16
22	H85L0910000	HOSE 호스	1	3/8×L1000

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80-02	APC 자동 팔레트교환 장치	(1/3)	2001-80
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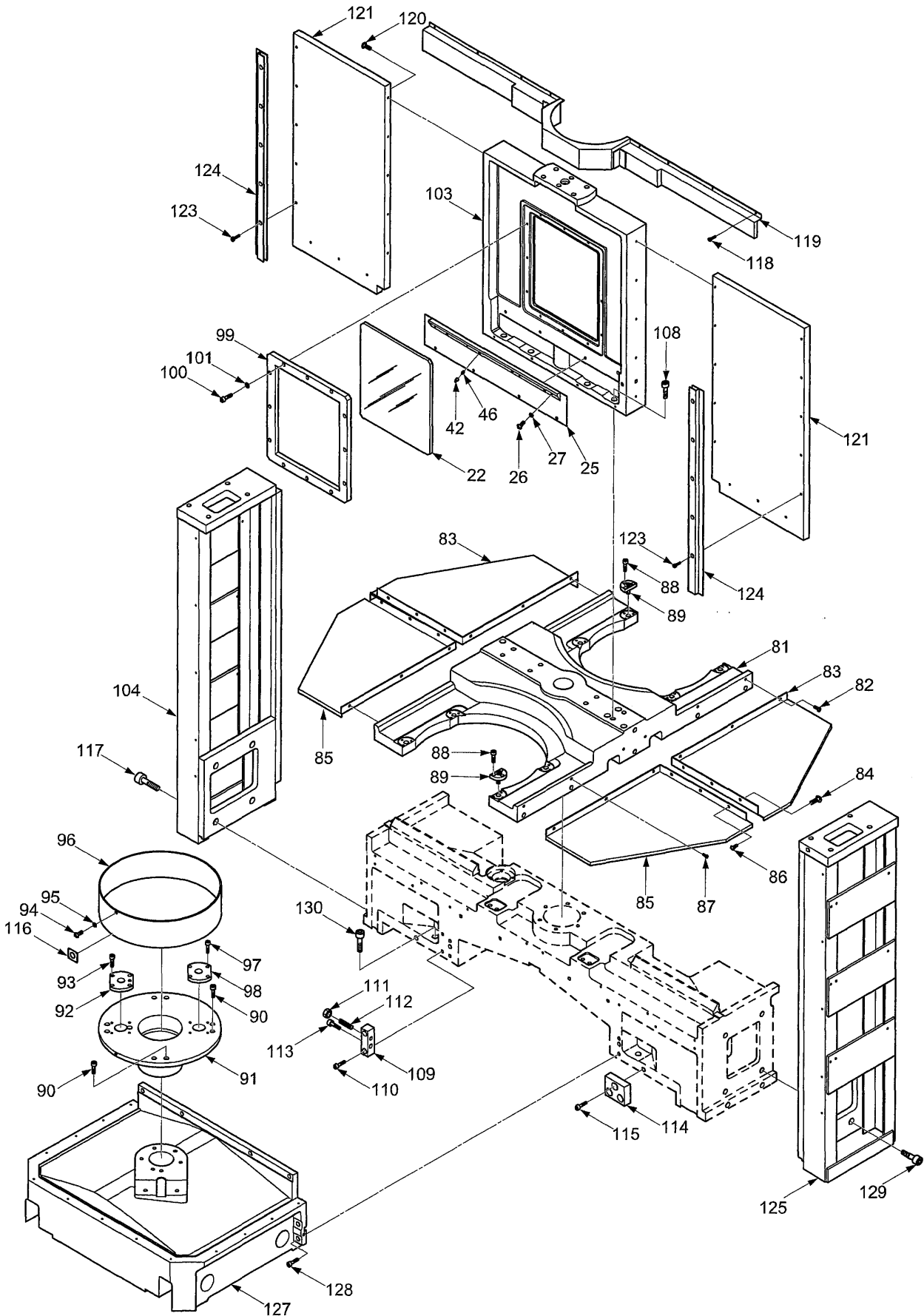
NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
31	PMS99900KASS	COPACT SEAL 시일	2	KDAS063-04 HANSUNG
32	2716-80-406-1	PISTON 피스톤	2	
33	2702-80-203-0	RACK GEAR 랙 기어	1	
34	PM4801120210N	O-RING O-링	2	1BP21
35	SM21010 02500	RETAINING RING 리테이닝 링	2	R25
36	2702-80-409-0	CYLINDER 실린더	2	STKM13A
37	2722-80-330-1	BRACKET 브라켓	2	
38	PM4801120530N	O-RING O-링	2	1BP53
39	SM11010 10050	SCREW H.S CAP 육각 구멍붙이 나사	8	M10×L50
40	PM4325610001	PLUG HOLLOW HEX SCR TYPE 육각 플러그	2	PT1/8
41	3614-70-460-0	SPRING 스프링	2	SPR D0.6×D5.0 ×25L×N15
42	G996111500	STEEL BALL 스틸 볼	2	3/16"
43	2714-80-429-0	STOPPER 스토퍼	2	
44	PM4801120090N	O-RING O-링	2	1BP9
45	SM12010 01600	NUT HEX 육각 너트	2	M16

80-02	APC 자동 팔레트교환 장치	(2/3)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q' ty 수량	Note 비고
46	2722-80-438-0	NOZZLE 노즐	2	
47	PM4801120030N	O-RING O-링	2	1BP3
48	SM12010 01000	NUT HEX 육각 너트	2	M10
49	2001-80-104-0	HOUSING 하우징	1	
50	SM14010 10050	PIN PARALLEL 평행 핀	2	Ø10×L50
51	SM11010 16050	SCREW H.S CAP 육각 구멍볼이 나사	8	M16×L50
52	PM48040GH130	DUST SEAL 더스트 시일	1	FQ0093D0 DSI130×143×7 (NOK)
53	PM48041XA347	SKY PACKING 스카이 패킹	1	0130001N906 SKY-130×145×9 (SAKAGAMI)
54	2001-80-311-0	PISTON 피스톤	1	
55	PM4801121400N	O-RING O-링	1	1BP140
56	PM4801121400N	O-RING O-링	1	1BP140
57	PM4801211500	O-RING O-링	1	1AG150
58	2001-80-301-0	RETAINER 리테이너	1	
59	PM4801121400N	O-RING O-링	1	1BP140
60	PM4801121200N	O-RING O-링	1	1BP120

80-02	APC 자동 팔레트교환 장치	(3/3)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
61	SM11010 12090	SCREW H.S CAP 육각 구멍볼이 나사	8	M12×L90
62	2001-80-202-0	SHAFT 샤프트	1	(M60×p2)
63	A31SH000030	LOCK NUT 로크 너트	1	SLN12 (M60×p2) (YHB)
64	2001-80-315-0	DOG 도그	1	
65	EOHR33112J0	TAPER ROLLER BEARING 테이퍼 롤 베어링	2	HR33112J
66	34647300130	RETAINER 리테이너	1	
67	PM4801211500	O-RING O-링	1	1AG150
68	34647300141	CYLINDER 실린더	1	
69	2001-80-312-0	PISTON 피스톤	1	
70	PM48041XA341	SKY PACKING 스카이 패킹	1	0120001N906 SKY-120×135×9 (SAKAGAMI)
71	PM48040GH120	DUST SEAL 더스트 시일	1	FQ0087D0 DSI120×130×6 (NOK)
72	2001-80-302-0	FLANGE 플랜지	1	
73	SM11010 12090	SCREW H.S CAP 육각 구멍볼이 나사	4	M12×L90
74	SM14010 12050	PIN PARALLEL 평행핀	2	Ø12×L50



80-03	APC 자동 팔레트교환 장치	(1/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
81	2001-80-103-0	FORK 포크	1	
82	SM11013 08012	SCREW BUTTON H. CAP 버튼 스크류	6	M8×L12
83	2001-80-204-0	COVER 커버	2	
84	SM11013 06012	SCREW BUTTON H. CAP 육각 구멍붙이 나사	6	M6×L12
85	2001-80-205-0	COVER 커버	2	
86	SM11013 06012	SCREW BUTTON H. CAP 버튼 스크류	6	M6×L12
87	SM11013 08012	SCREW BUTTON H. CAP 버튼 스크류	6	M8×L12
88	SM11010 06012	SCREW H.S CAP 육각 구멍붙이 나사	12	M6×L12
89	44647301331	PIN 핀	8	
90	SM11010 08020	SCREW H.S CAP 육각 구멍붙이 나사	8	M8×L20
91	2001-80-211-0	DISK 디스크	1	
92	34647301721	FLANGE 플랜지	1	
93	SM11010 06015	SCREW H.S CAP 육각 구멍붙이 나사	4	M6×L15
94	SM11020 06012	SCREW CROSS-RECE. H.M 나사	3	M6×L12
95	SM13020 00600	WASHER SPRING 스프링 와셔	3	M6

80-03	APC 자동 팔레트교환 장치	(2/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
96	44647301350	COVER 커버	1	
97	SM11010 06015	SCREW H.S CAP 육각 구멍볼이 나사	4	M6×L15
98	34647301761	FLANGE 플랜지	1	
99	2001-80-303-0	COVER 커버	1	
100	SM10010 06012	SCREW H.S CAP 육각 구멍볼이 나사	12	M6×L12
101	SM13010 00600	WASHER PLAIN 평와셔	12	M6
102	2001-80-304-0	WINDOW 윈도우	1	P.C
103	2001-80-201-0	STAY 스테인	1	
104	2001-80-206-0	STAND 스탠드	1	
105	2001-80-305-0	COVER 커버	2	
106	SM11013 06012	SCREW BUTTON H. CAP 버튼 스크류	16	M6×L12
107	SM13010 00600	WASHER PLAIN 평와셔	16	M6
108	SM11010 16050	SCREW H.S CAP 육각 구멍볼이 나사	8	M16×L50
109	44647301370	BLOCK 블록	1	
110	SM11010 12035	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×L35

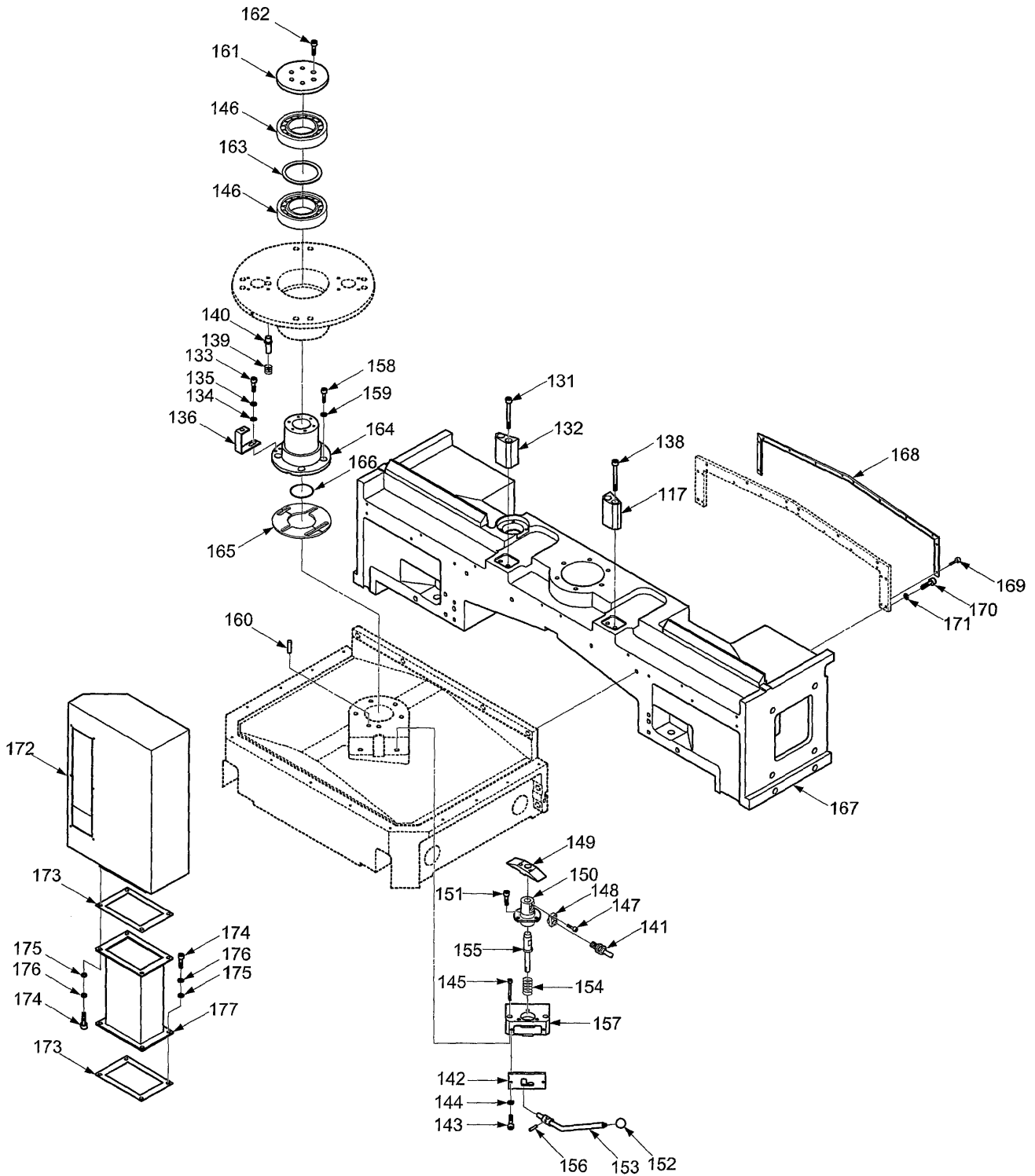
80-03	APC 자동 팔레트교환 장치	(3/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
111	SM12010 01200	NUT HEX 육각 너트	1	M12
112	SM11060 12050	SETSCREW H.S HEADLESS 세트 스크류	1	M12×L50
113	SM11010 12050	SCREW H.S CAP 육각 구멍붙이 나사	1	M12×L50
114	44647301360	PAD 패드	2	
115	SM11010 16030	SCREW H.S CAP 육각 구멍붙이 나사	6	M16×L30
116	44647301770	PANEL 패널	1	
117	SM11010 20050	SCREW H.S CAP 육각 구멍붙이 나사	4	M20×L50
118	SM10010 06012	SCREW H.S CAP 육각 구멍붙이 나사	6	M6×L12
119	2001-80-207-0	COVER 커버	1	
120	SM11013 06012	SCREW BUTTON H. CAP 버튼 나사	12	M6×L12
121	2001-80-208-0	COVER 커버	2	
122	PM8211041403	NOZZLE, 1/8 CIRCLE 노즐	8	41403 LOC-LINE
123	SM11013 06012	SCREW BUTTON H. CAP 버튼 나사	10	M6×L12
124	2001-80-306-0	WIPER 와이퍼	2	
125	2001-80-209-0	STAND 스탠드	1	

80-03	APC 자동 팔레트교환 장치	(4/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
126	PM82110 41417	CONNECTOR,1/8 BSPT 콘넥터	8	41417 LOC-LINE
127	2001-80-102-0	BRACKET 브라켓트	1	
128	SM10010 12040	SCREW H.S CAP 육각 구멍불이 나사	6	M12×L40
129	SM11010 20050	SCREW H.S CAP 육각 구멍불이 나사	4	M20×L50
130	SM11010 20060	SCREW H.S CAP 육각 구멍불이 나사	2	M20×L60

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80-04	APC 자동 팔레트교환 장치	(1/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
131	SM11010 12060	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×L60
132	44647301321	BLOCK 블록	1	
133	SM11010 06015	SCREW H.S CAP 육각 구멍볼이 나사	2	M6×L15
134	SM13010 00600	WASHER PLAIN 평와셔	2	M6
135	SM13020 00600	WASHER SPRING 스프링 와셔	2	M6
136	44647301740	STAY 스태이	1	
137	44647301311	BLOCK 블록	1	
138	SM11010 12060	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×L60
139	44647301570	SPRING 스프링	1	
140	44647301730	PIN 핀	1	
141	R26BA000020	SWITCH PROXIMITY 근접 스위치	2	BES516-370 -E5-C-S4
142	44647301521	GUIDE 가이드	1	
143	SM11010 06015	SCREW H.S CAP 육각 구멍볼이 나사	2	M6×L15
144	SM13020 00600	WASHER SPRING 스프링 와셔	2	M6
145	SM11010 12090	SCREW H.S CAP 육각 구멍볼이 나사	2	M12×L90

80-04	APC 자동 팔레트교환 장치	(2/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
146	E0006019ZZ0	BALL BEARING 볼 베어링	2	6019ZZ
147	SM11010 05012	SCREW H.S CAP 육각 구멍볼이 나사	1	M5×L12
148	44647301540	HOLDER 홀더	1	
149	34647301250	DOG 도그	4	
150	34647301510	HOLDER 홀더	1	
151	SM11010 08020	SCREW H.S CAP 육각 구멍볼이 나사	3	M8×L20
152	Z14MS000020	BALL KNOB 볼 손잡이	1	PCA8-25 MISUMI
153	34647301241	LEVER 레버	1	
154	A50TH000010	SPRING 스프링	1	TF25×30 TOKYO HATSUJU
155	44647301530	ROD 로드	1	
156	SM14060 40020	PIN SPRING 스프링 핀	1	Ø4×L20
157	24647301131	BRACKET 브라켓트	1	
158	SM11010 12045	SCREW H.S CAP 육각 구멍볼이 나사	5	M12×L45
159	SM13020 01200	WASHER SPRING 스프링 와셔	5	M12
160	SM14010 10025	PIN PARALLEL 평행핀	1	Ø10×L25

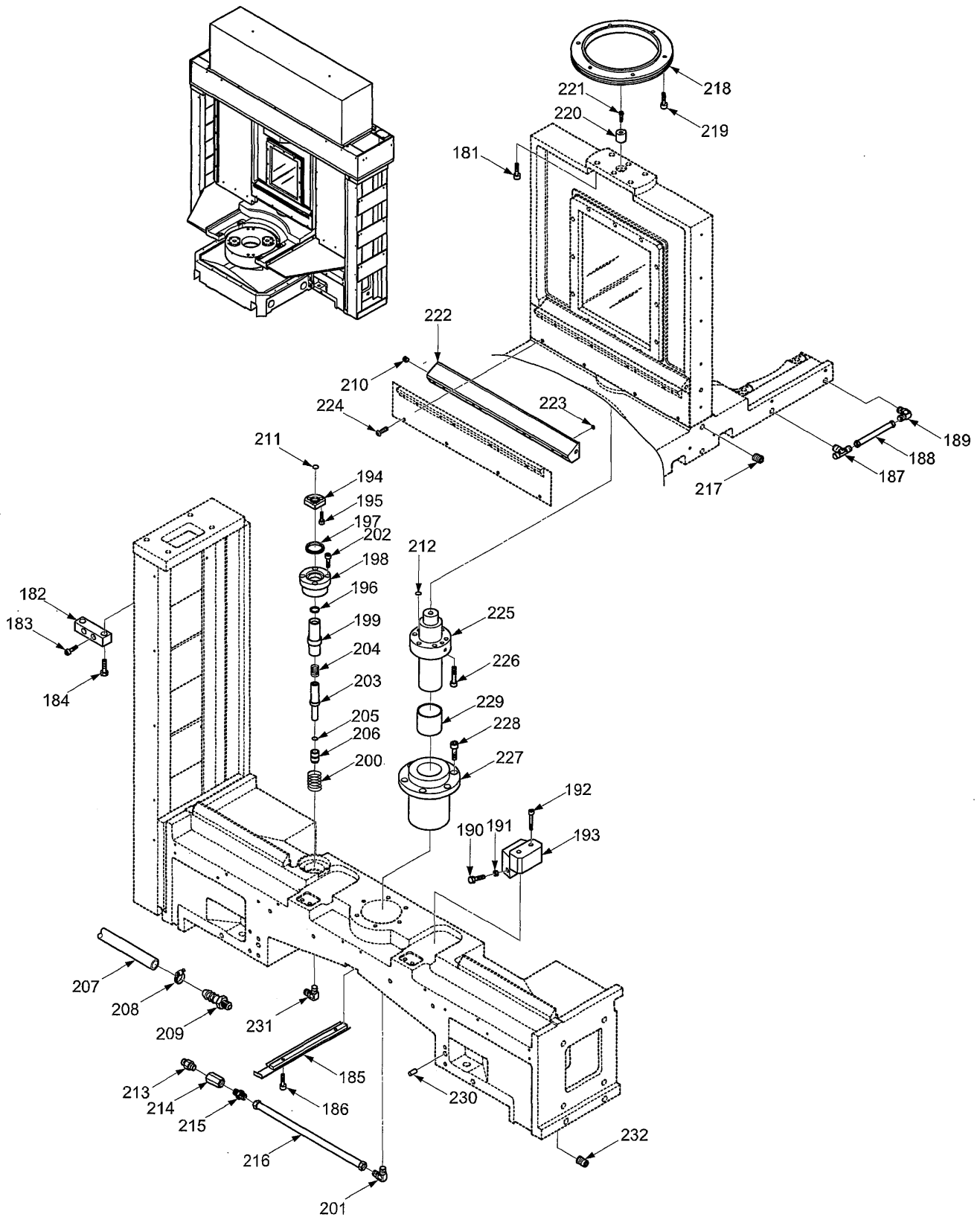
80-04	APC 자동 팔레트교환 장치	(3/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
161	2001-80-310-0	RETAINER 리테이너	1	
162	SM10010 06012	SCREW H.S CAP 육각 구멍볼이 나사	6	M6×L12
163	44647305050	SPACER 스페이스	1	
164	2001-80-212-0	SHAFT 샤프트	1	
165	44647301610	SPACER 스페이스	1	
166	PM4801210750	O-RING O-링	1	1AG75
167	2001-80-101-0	BRACKET 브라켓트	1	
168	2001-80-316-0	WIPER 와이퍼	1	
169	SM11020 05012	SCREW CROSS-RECE. H.M 나사	12	M5×L12
170	SM11010 06015	SCREW H.S CAP 육각 구멍볼이 나사	10	M6×L15
171	SM13020 00600	WASHER SPRING 스프링 와셔	10	M6
172	24647301621	BOX 박스	1	
173	44647301641	PACKING 패킹	2	NBR
174	SM10010 08015	SCREW H.S CAP 육각 구멍볼이 나사	8	M8×L15
175	SM13010 00800	WASHER PLAIN 평와셔	8	M8

80-04	APC 자동 팔레트교환 장치	(4/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
176	SM13020 00800	WASHER SPRING 스프링 와셔	8	M8
177	34647301631	STAND 스탠드	1	

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80-05	APC 자동 팔레트교환 장치	(1/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
181	SM11010 12040	SCREW H.S CAP 육각 구멍붙이 나사	6	M12×L40
182	44647300351	BLOCK 블록	2	
183	SM11010 16055	SCREW H.S CAP 육각 구멍붙이 나사	4	M16×L55
184	SM10010 16065	BOLT HEX HEAD 육각 볼트	4	M16×L65
185	2001-80-307-0	COVER 커버	1	
186	SM11010 06012	SCREW H.S CAP 육각 구멍붙이 나사	2	M6×L12
187	PM4246310601	TEE MALE BRANCH 티이	6	BBTM06-01R
188	SR6307G00610	PIPE 파이프	2	Ø6×L2000
189	PM4242110601	ELBOW MALE 엘보우	4	BLM06-01R
190	SM10010 12040	BOLT HEX HEAD 육각 볼트	2	M12×L40
191	SM12010 01200	NUT HEX 육각 너트	2	M12
192	SM11010 12070	SCREW H.S CAP 육각 구멍붙이 나사	2	M12×L70
193	34647301281	BLOCK 블록	1	
194	34647301432	PLUG 플러그	2	
195	SM11010 06015	SCREW H.S CAP 육각 구멍붙이 나사	6	M6×L15

80-05	APC 자동 팔레트교환 장치	(2/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
196	J99HS000030	QUAD RING 쿼드 링	1	QRAR04214 HANSUNG
197	PM48040AH040	DUST SEAL 더스트 시일	1	FD2342A0
198	34647301502	HOLDER 홀더	1	
199	34647301442	PISTON 피스톤	1	
200	2001-80-316-0	SPRING 스프링	1	
201	PM4312710003	ELBOW STREET SCREW 엘보우	1	SSTL 3/8
202	SM11010 08015	SCREW H.S CAP 육각 구멍볼이 나사	4	M8×L15
203	34647305320	PIN 핀	1	
204	2001-80-317-0	SPRING 스프링	1	
205	PM4801120150N	O-RING O-링	1	1BP15
206	346473015310	HOLDER 홀더	1	
207	SM40030 01200	SPRING HOSE 스프링 호스	1	Ø12×L6000
208	PM4901110010	HOSE BAND 호스 밴드	1	
209	PM4022113003	NIPPLE MALE HOSE 호스 니플	1	
210	PM4325610002	PLUG HOLLOW HEX SCREW 육각 나사 플러그	8	

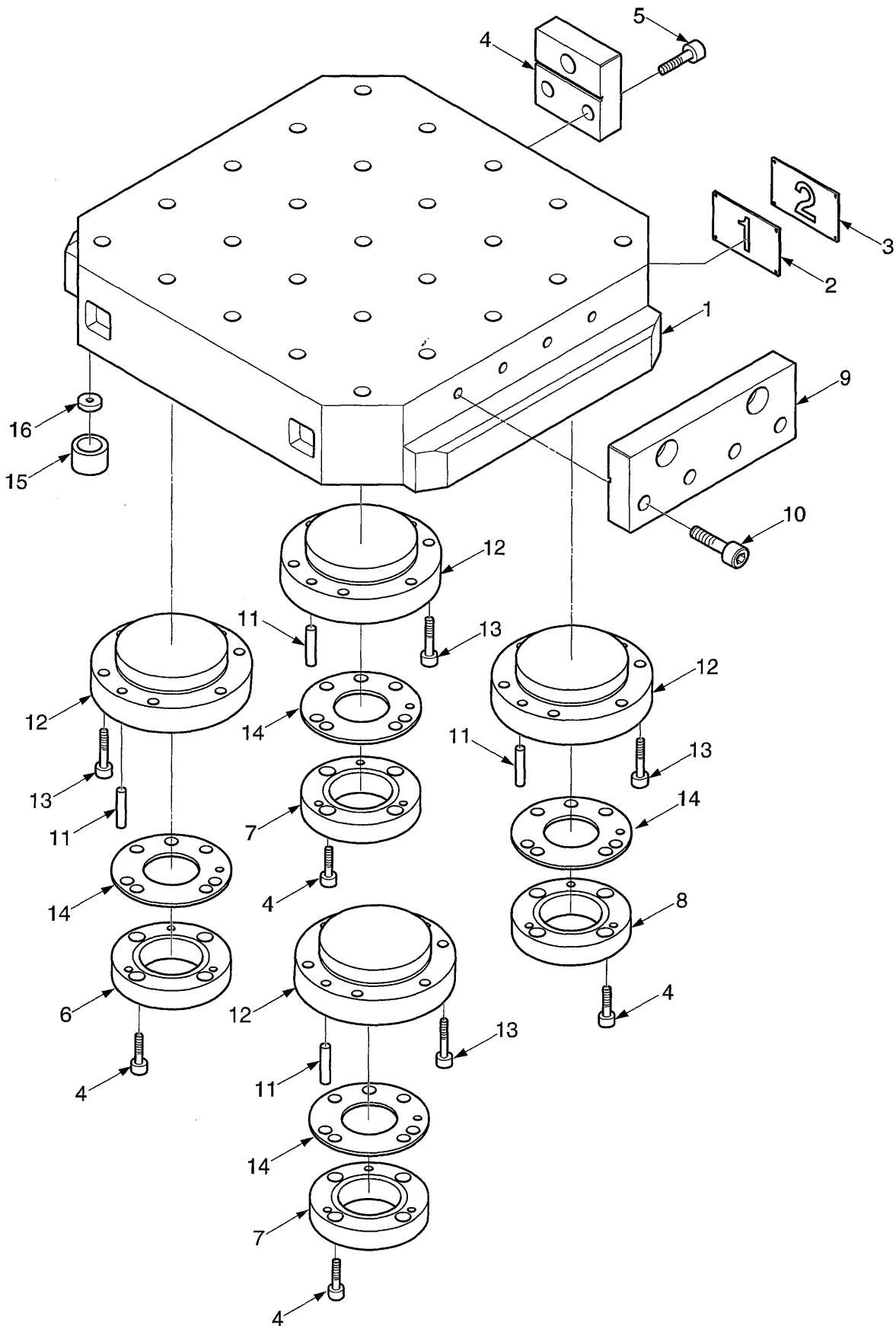
80-05	APC 자동 팔레트교환 장치	(3/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
211	PM4801120090N	O-RING O-링	2	1BP9
212	PM4801120180N	O-RING O-링	2	1BP18
213	PM41303A0802000	CONNECTOR MALE 콘넥터	1	
214	PM4317210002	SOCKET HEX SCREW 육각 나사	1	
215	PM4235010802	CONNECTOR MALE 콘넥터	1	BMC08-02R
216	SR6307G00610	PIPE 파이프	1	Ø8×L600
217	PM4325610001	PLUG HOLLOW HEX SCREW 육각 나사 플러그	6	
218	2001-80-308-0	RING 링	1	
219	SM11010 08020	SCREW H.S CAP 육각 구멍붙이 나사	6	M8×L20
220	44647301460	PIN 핀	1	
221	SM11010 06035	SCREW H.S CAP 육각 구멍붙이 나사	1	M6×L35
222	2001-80-309-0	BLOCK 블록	2	
223	PM4801120120N	O-RING O-링	2	1BP12
224	SM11013 06012	SCREW BUTTON H. CAP 버튼 나사	8	M6×L12
225	34647301201	SHAFT 샤프트	1	

80-05	APC 자동 팔레트교환 장치	(4/4)	2001-80
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
226	SM11010 12040	SCREW H.S CAP 육각 구멍불이 나사	6	M12×L40
227	34647301211	HOLDER 홀더	1	
228	SM11010 12025	SCREW H.S CAP 육각 구멍불이 나사	6	M12×L25
229	PB9330600601	OILLESS BUSH 부시	1	HB60*74*60 LUBO
230	SM14010 13030	PIN PARALLEL 평행핀	1	Ø13×L30
231	PM4242110802	ELBOW MALE 엘보우	1	BLM08-02R
232	SM11060 16035	SET SCREW H.S. HEADLESS 세트 스크류	2	M16×L35

MEMO



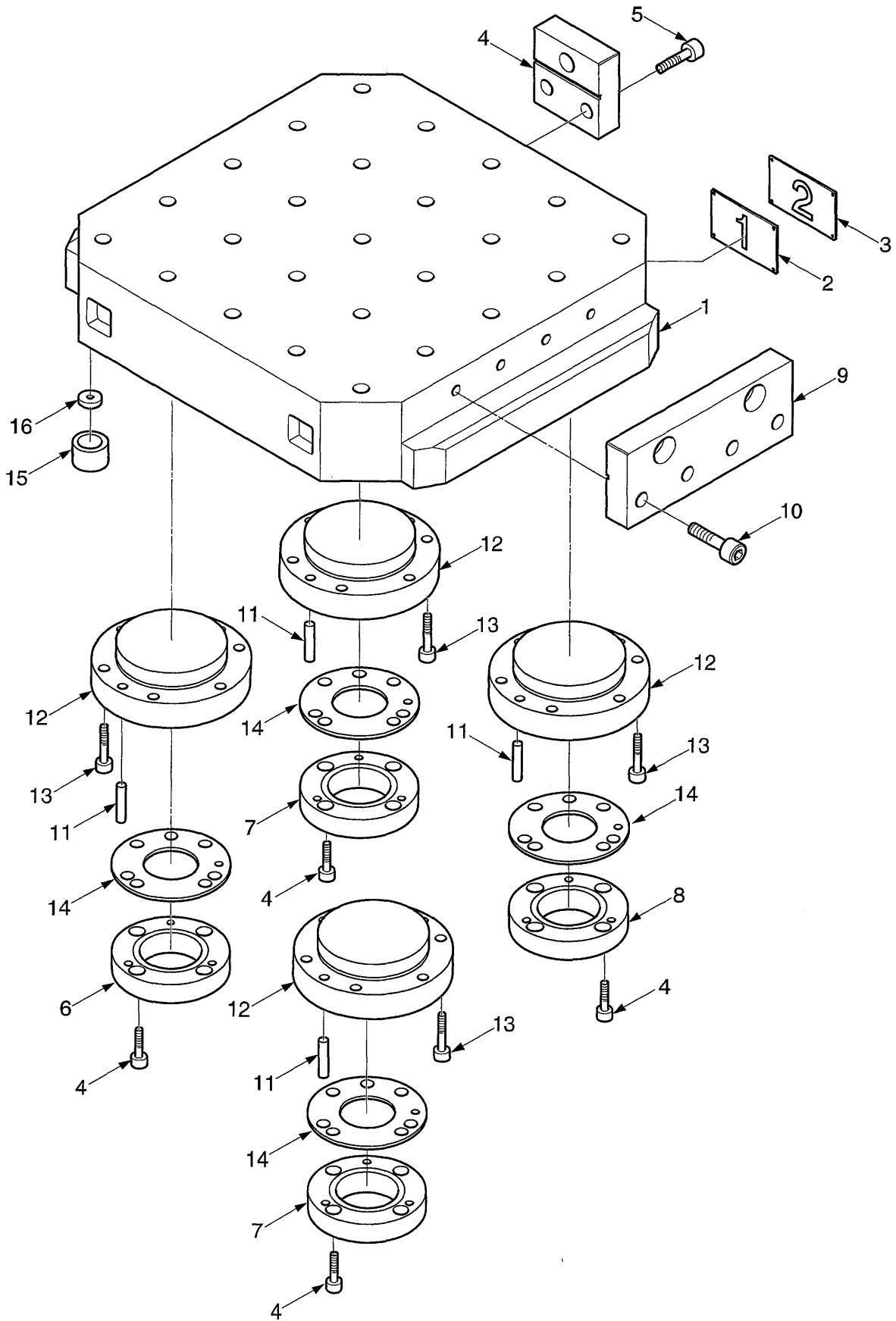
81-01	PALLET 팔레트	(1/2)	2001-81
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-81-101-0	PALLET 팔레트	2	
2	2722-11-402-0	NAME PLATE 명판	1	
3	2722-11-403-0	NAME PLATE 명판	1	
4	2001-81-302-0	PLATE 팔레트	2	
5	SM11010 12025	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×L25
6	M33KS000040	BLOCK (CUT) 블록	2	VSB100-C
7	M33KS000050	BLOCK (GUIDE) 블록	4	VSB100-G
8	M33KS000030	BLOCK (DATUM) 블록	2	VSB100-D
9	2001-81-301-0	PLATE 플레이트	2	
10	SM11010 12025	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×L25
11	SM14010 08035	PIN PARALLEL 평행 핀	16	Ø8×L35
12	34647400140	RING 링	8	
13	SM11010 08035	SCREW H.S CAP 육각 구멍붙이 나사	48	M8×L35
14	44647400130	SPACER 스페이서	8	
15	F30MS000010	BUSH 부시	8	JBA15-16

81-01	PALLET 팔레트	(2/2)	2001-81
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	44647400080	PIECE 피스	8	

MEMO



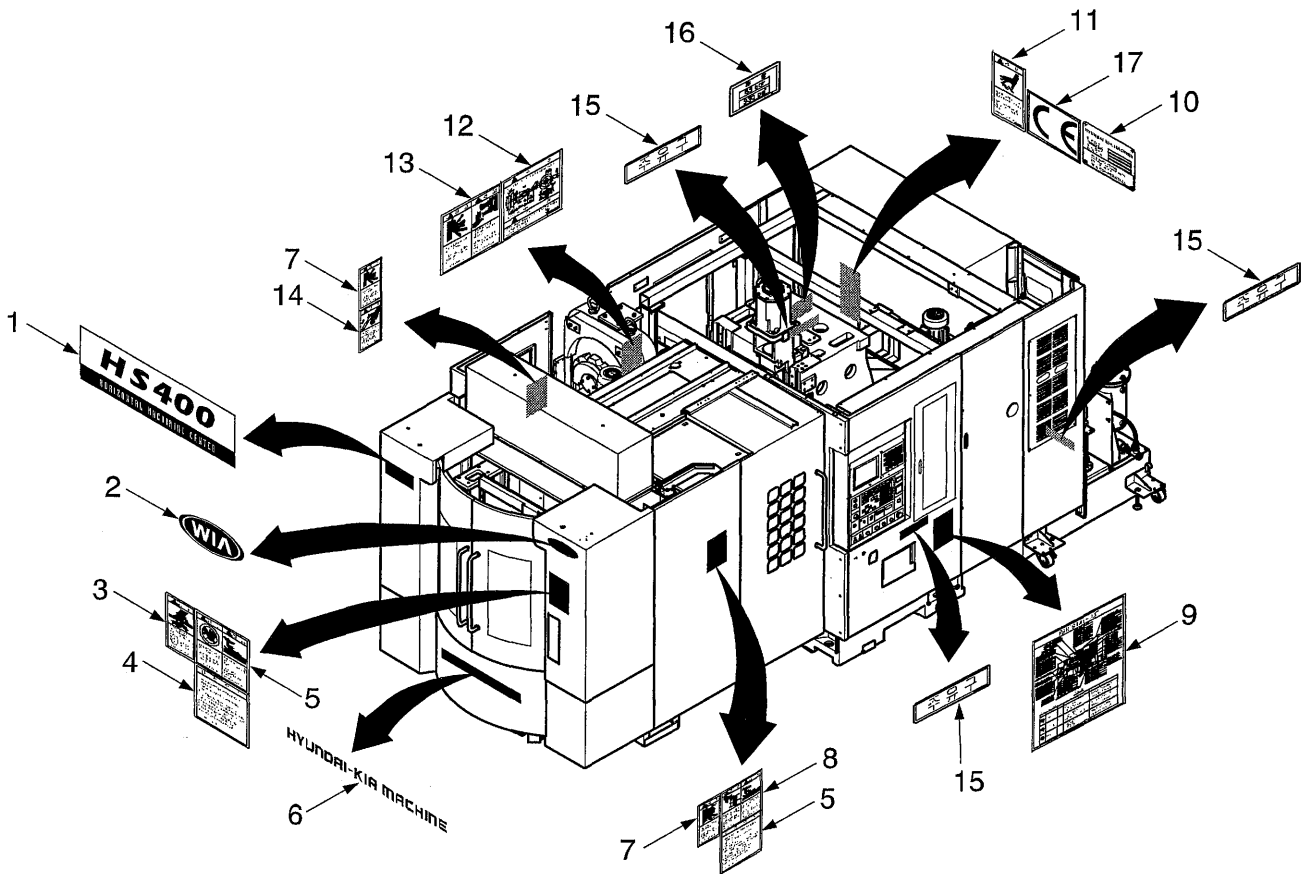
81-03	PALLET 팔레트	(1/2)	2001-81
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001-81-103-0	PALLET(INCH) 팔레트	2	
2	2722-11-402-0	NAME PLATE 명판	1	
3	2722-11-403-0	NAME PLATE 명판	1	
4	2001-81-302-0	PLATE 팔레트	2	
5	SM11010 12025	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×L25
6	M33KS000040	BLOCK(CUT) 블록	2	VSB100-C
7	M33KS000050	BLOCK(GUIDE) 블록	4	VSB100-G
8	M33KS000030	BLOCK(DATUM) 블록	2	VSB100-D
9	2001-81-301-0	PLATE 플레이트	2	
10	SM11010 12025	SCREW H.S CAP 육각 구멍붙이 나사	4	M12×L25
11	SM14010 08035	PIN PARALLEL 평행 핀	16	Ø8×L35
12	34647400140	RING 링	8	
13	SM11010 08035	SCREW H.S CAP 육각 구멍붙이 나사	48	M8×L35
14	44647400130	SPACER 스페이서	8	
15	F30MS000010	BUSH 부시	8	JBA15-16

81-03	PALLET 팔레트	(2/2)	2001-81
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	44647400080	PIECE 피스	8	

MEMO



99-01	NAME PLATE 명판	(1/2)	2001-99
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
1	2001992010	NAME PLATE 기종 명판	1	
2	9001993240	WIA LOGO, MIDDLE 위아 로고	1	
3	9001993580KORL 9001993580USAL	NAME PLATE OF WARNING 경고 명판	1	FOR DOMESTIC FOR EXPORT
4	9001993550KORL 9001993550USAL	NAME PLATE OF WARNING 경고 명판	1	FOR DOMESTIC FOR EXPORT
5	9001993012KORL 9001993012USAL	NAME PLATE OF SAFETY 안전 명판	1	FOR DOMESTIC FOR EXPORT
6	9001996010	HYUNDAI-KIA MACHINE 현대-기아 머신	1	
7	9001993142KORL 9001993142USAL	NAME PLATE OF DOOR WARNING 도어 경고 명판	2	FOR DOMESTIC FOR EXPORT
8	900199209KORL 900199209USAL	NAME PLATE OF ASS'Y 조립체 명판	1	FOR DOMESTIC FOR EXPORT
9	2001992020	PARTS LAY OUT 파트 레이아웃	1	
10	9001993430	NAME PLATE, SERIAL 시리얼 명판	1	
11	9001993192KORL 9001993192USAL	NAME PLATE OF CAUTION 주의 명판	1	FOR DOMESTIC FOR EXPORT
12		NAME PLATE OF CAUTION 주의 명판	1	
13		NAME PLATE OF WARNING 경고 명판	1	
14		NAME PLATE OF WARNING 경고 명판	1	
15	32326201050	NAME PLATE 주유구 명판	3	

99-01	NAME PLATE 명판 (2/2)	2001-99
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NO. 번호	Part No. 부품번호	Part Name 부품명	Q'ty 수량	Note 비고
16	3440620102C	NAME PLATE OF HYDRAULIC PRESSURE 유압 명판	1	
17	1664-05-301-0	NAME PLATE CE LOGO CE 로고 명판	1	FOR EXPORT

A B C D E F

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HS400/HS500

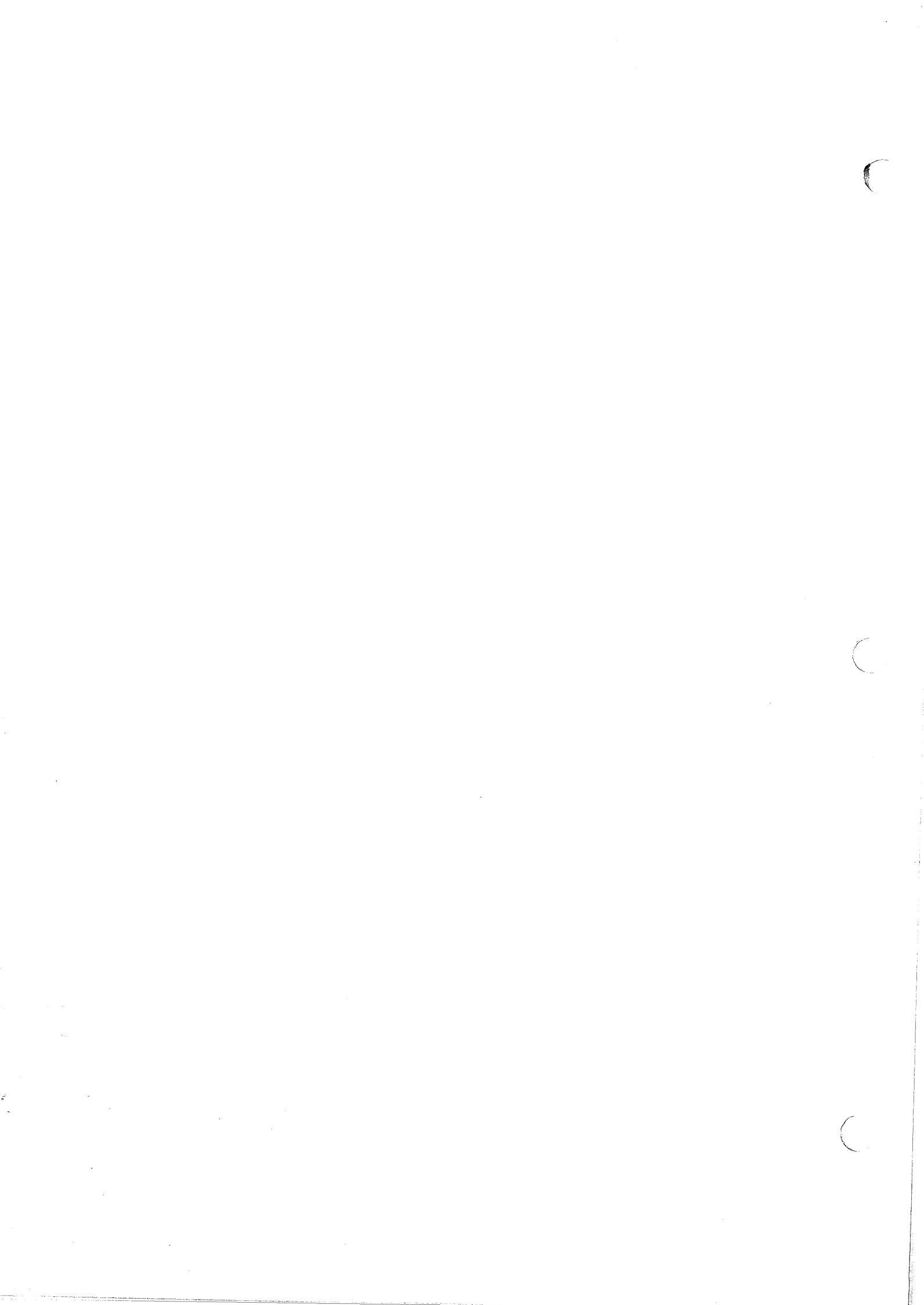
HS400i/HS500i

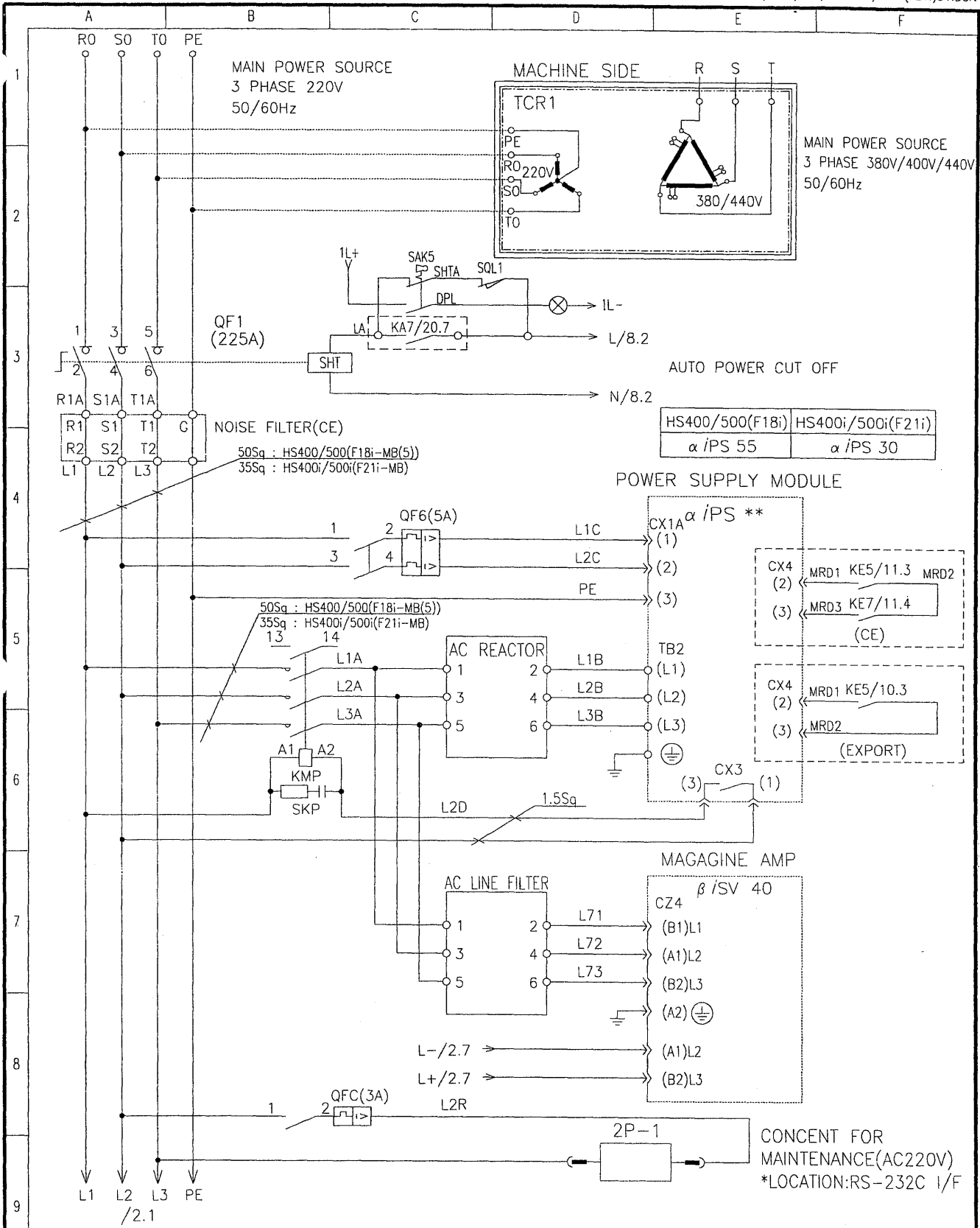
WIRING DIAGRAM

CNC	FANUC 18i-MB(5)/21i-MB
PMC	FANUC PMC-SB7
SERVO	FANUC DIGITAL SERVO ALPHA i
SPINDLE	HS400/HS500(F18i) : FANUC BUILT-IN SPINDLE HS400i/HS500i(F21i) : FANUC ALPHA i SPINDLE
REMARK	

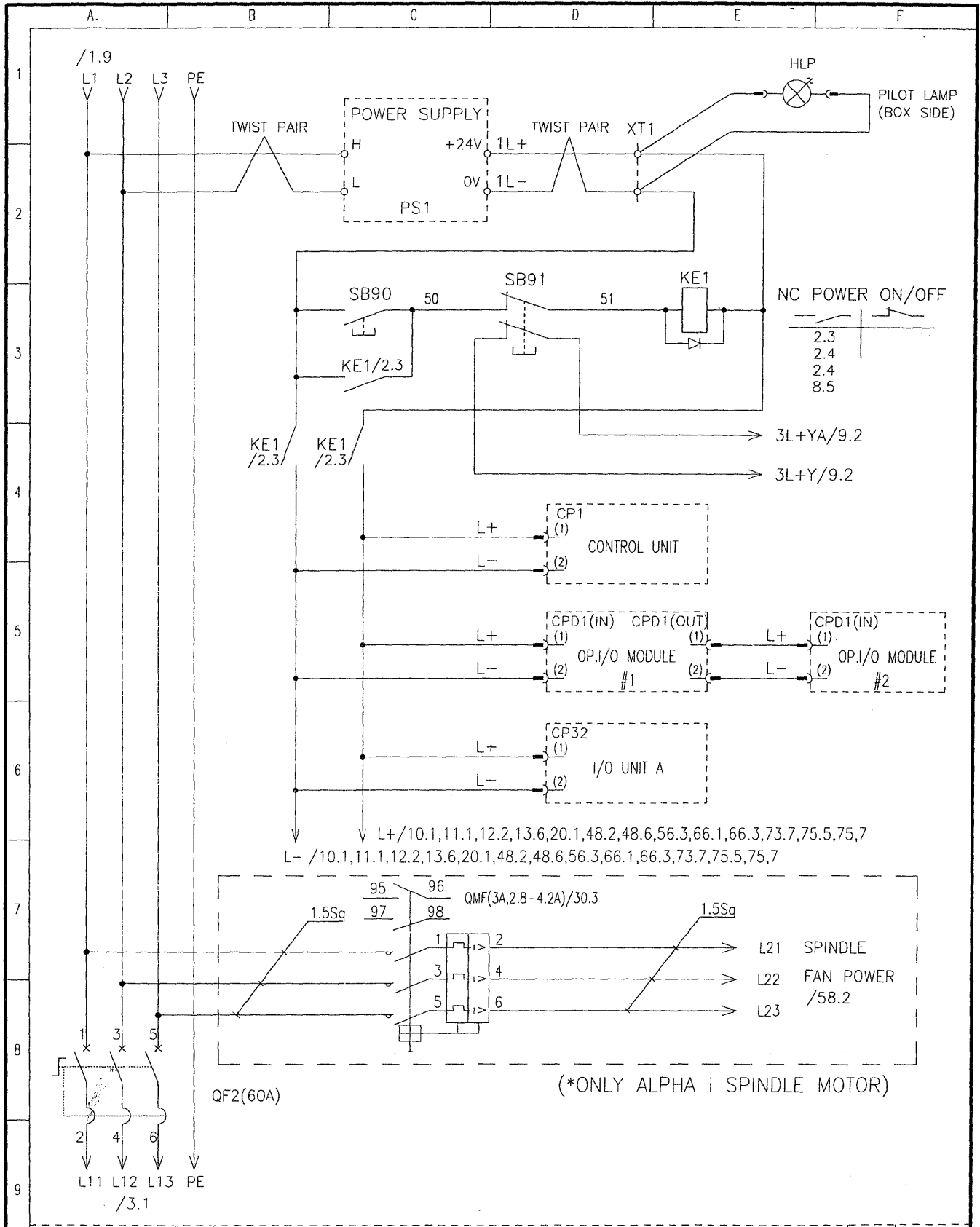
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MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	 WIA CORPORATION	DESIGN	CHECKED	APPROVED
DWG No.	TITLE	WIRING DIAGRAM	DATE		
			2007.07		

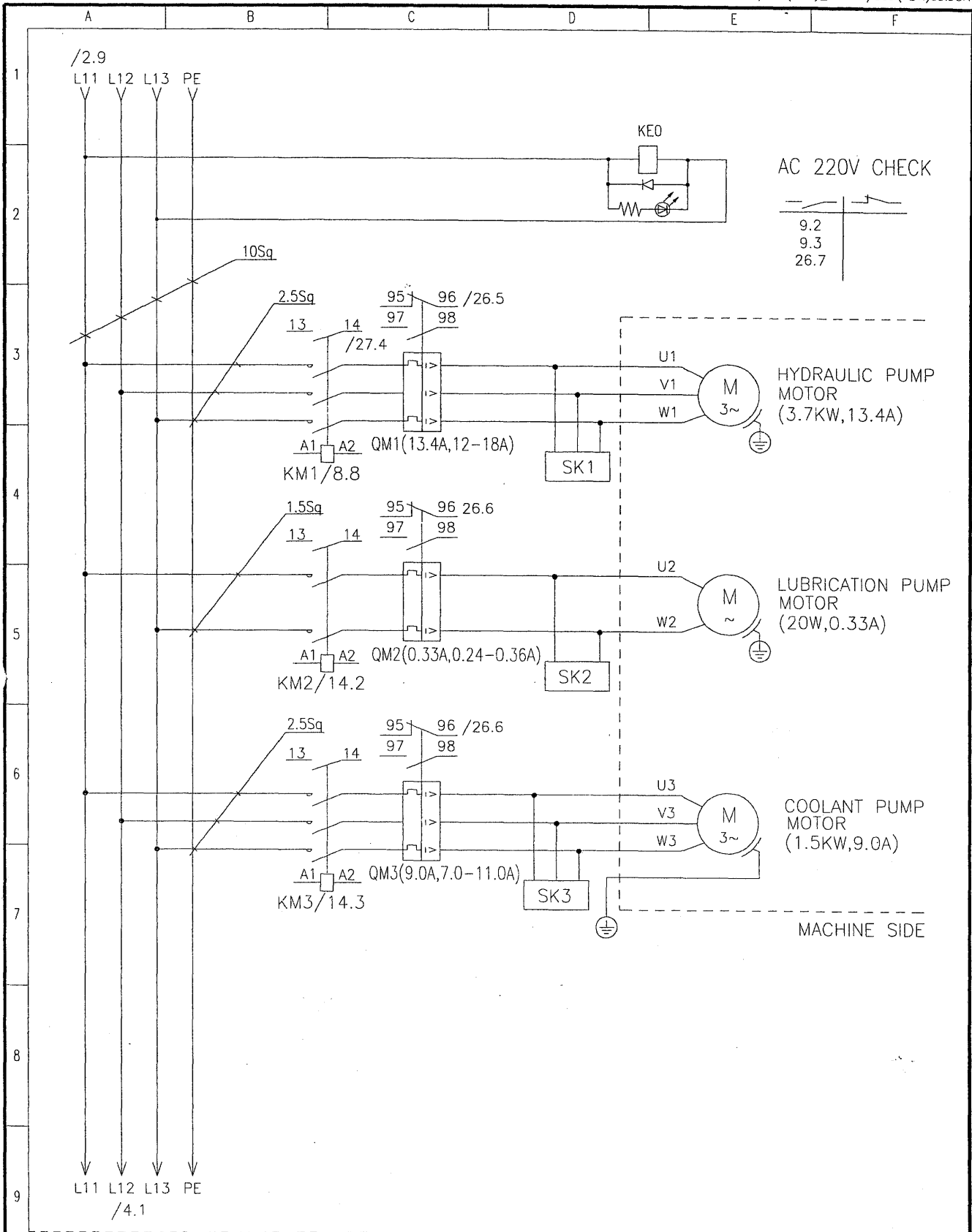




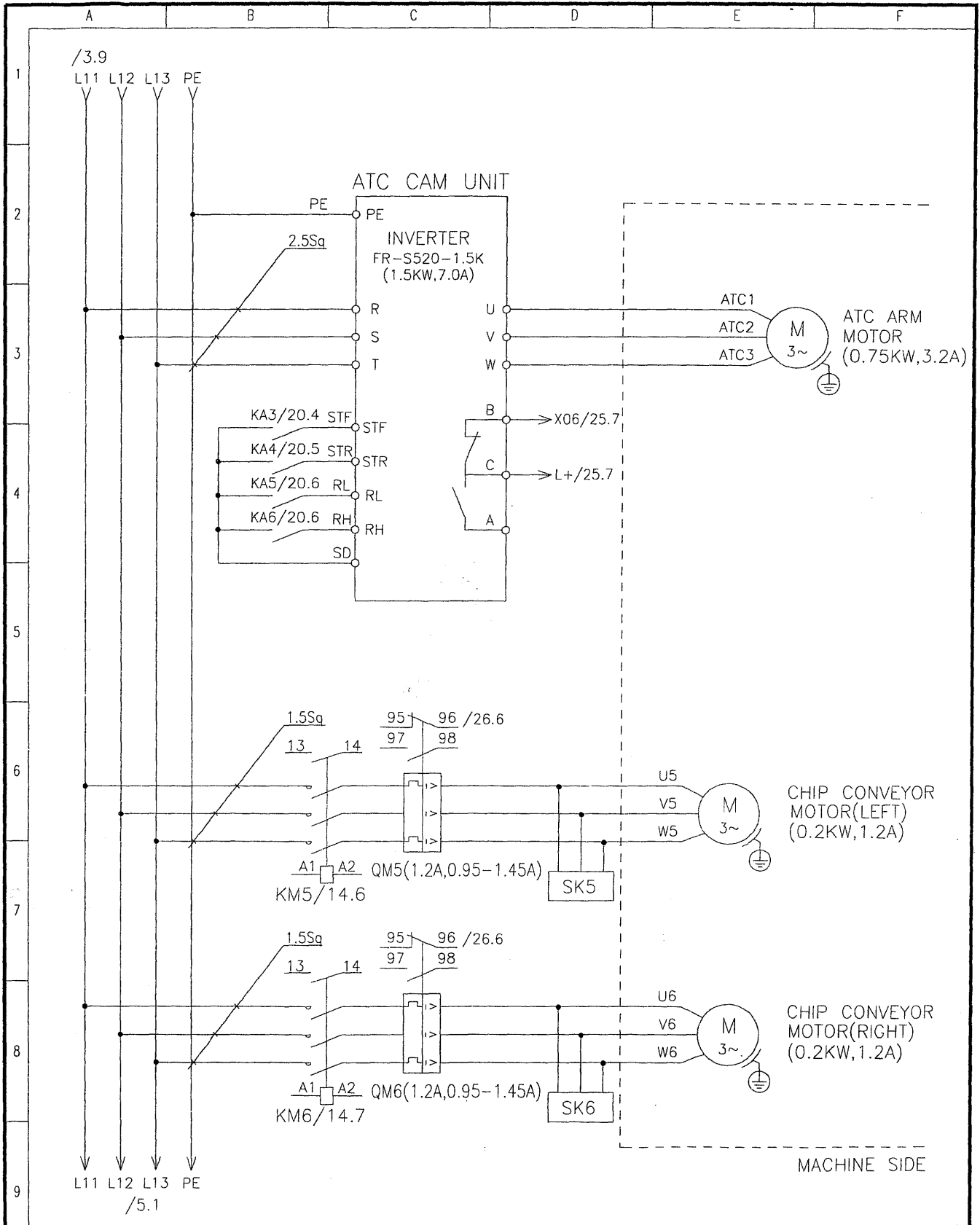
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DWG No.			TITLE	POWER CONNECTION	DATE



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DWG No.	TITLE		POWER CONNECTION	DATE	2007.07

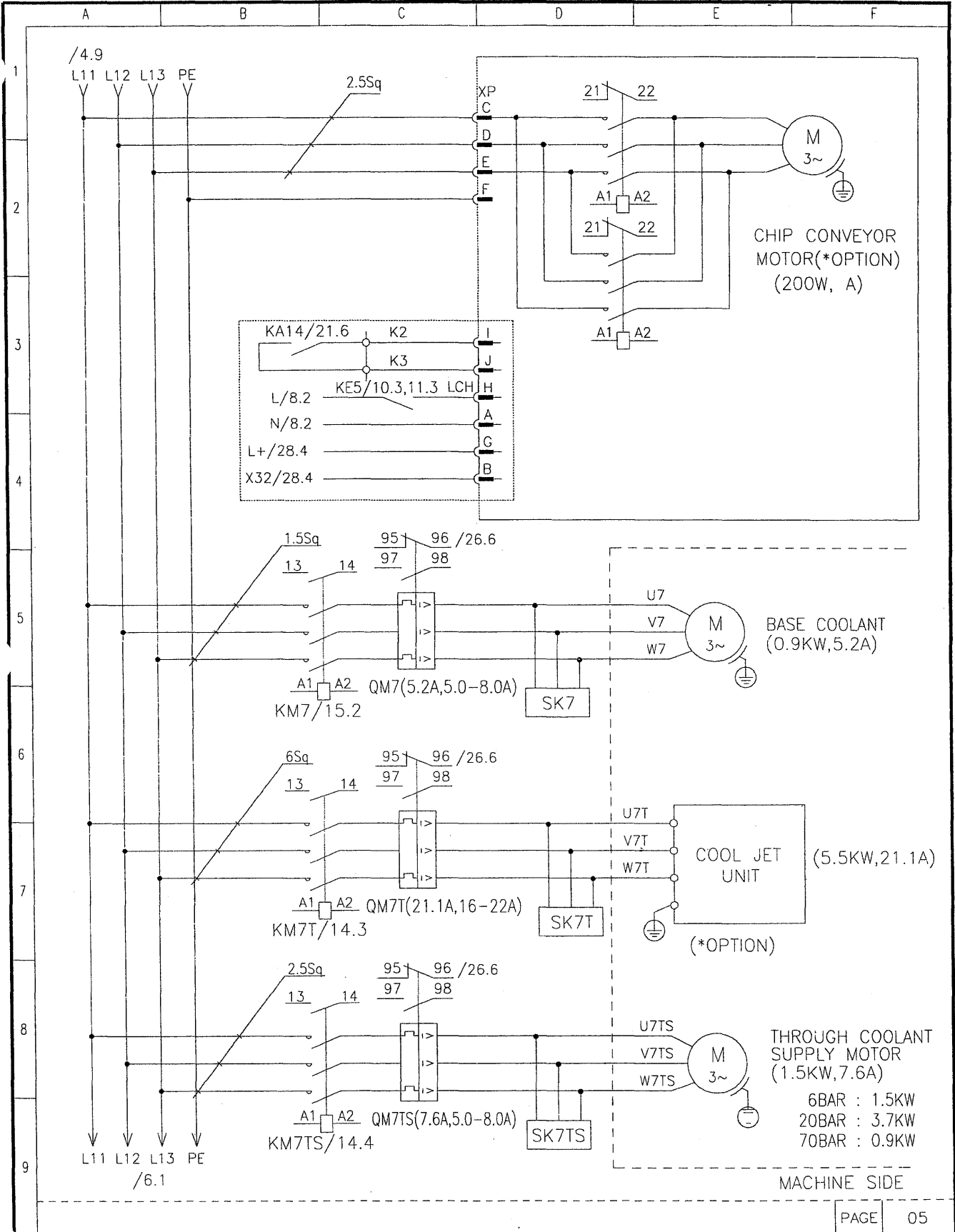


MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
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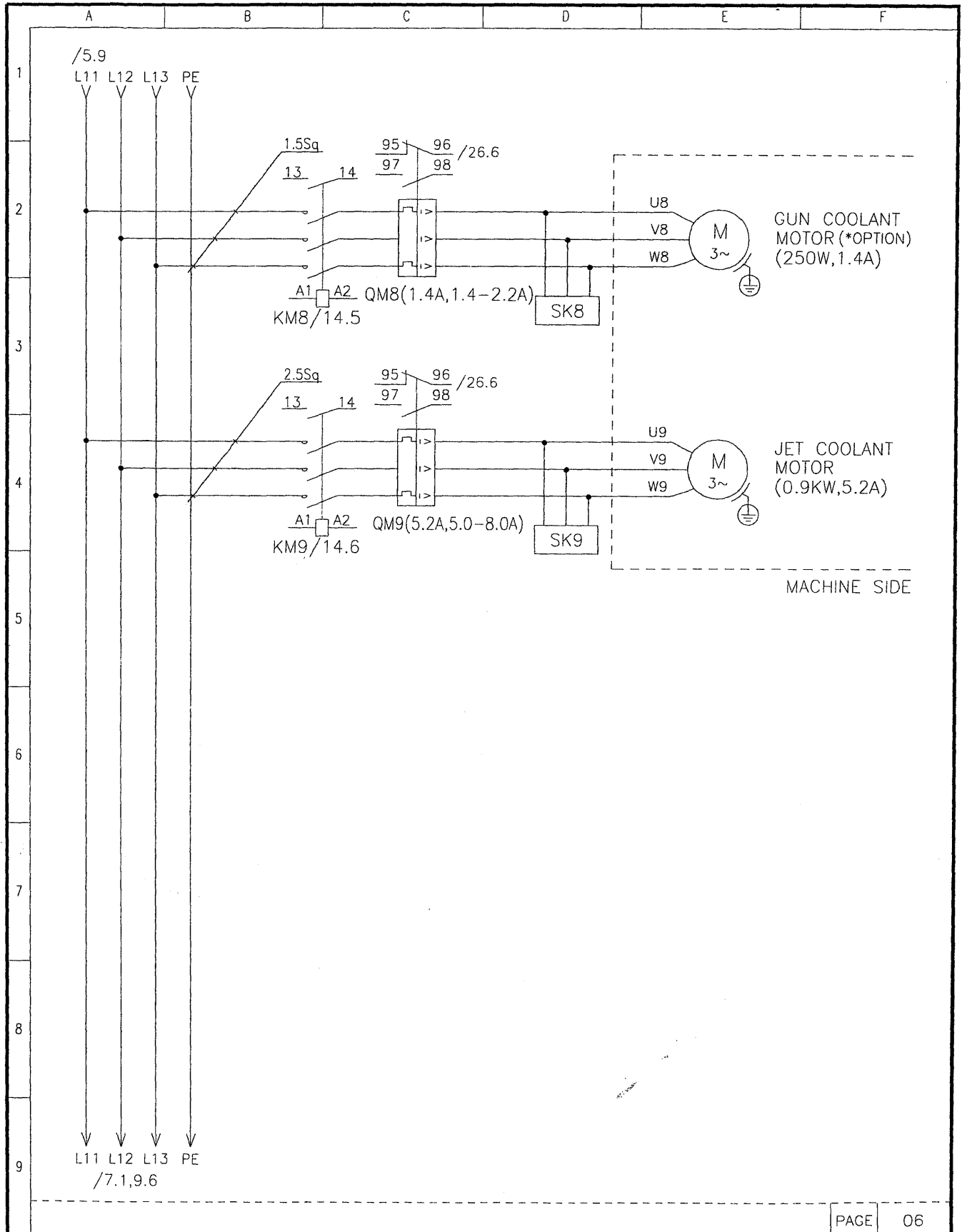


MACHINE SIDE

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.				TITLE	MOTOR CONNECTION	DATE
				2007.07		

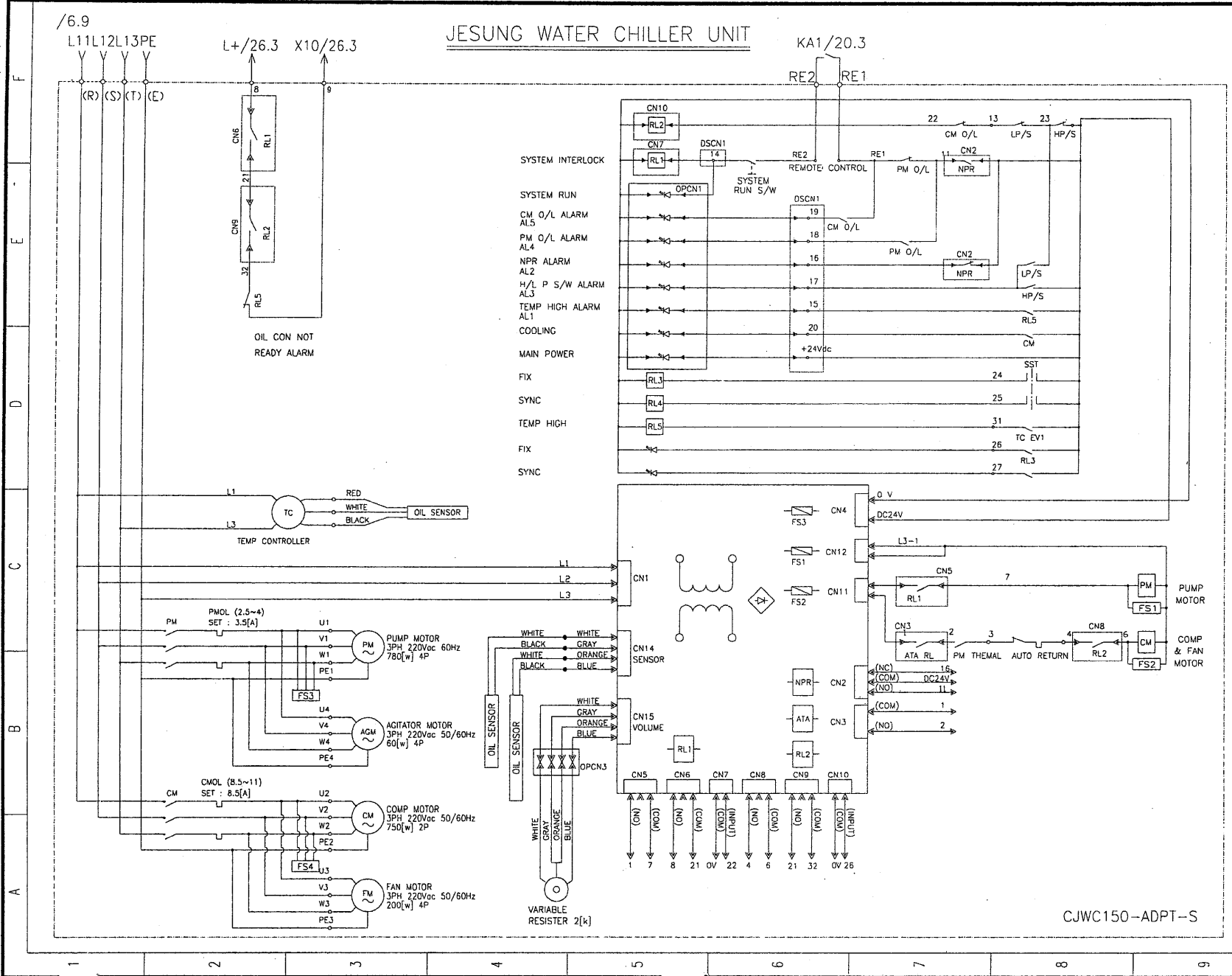


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DWG No.	TITLE		MOTOR CONNECTION	DATE	
			2007.07		



MACHINE SIDE

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.				TITLE	MOTOR CONNECTION	DATE



(*ONLY GENERAL EXPORT) PAGE 07

DESIGN	CHECKED	APPROVED
DATE 2007.07		
TITLE SP. COOLING UNIT		
WIA CORPORATION		
HS400/500(F1B)_HS400/500(F21)		
DWG No.		



CJWC150-ADPT-S

A B C D E F

CURRENT SETTING VALUE FOR MOTORS

<STANDARD MOTOR>

HYDRAULIC PUMP MOTOR

CODE LETTER	KM1+QM1	
MOTOR TYPE	*	*
MOTOR POWER	3.7KW	*
CURRENT(A) 220V(60Hz)	13.4A	*

LUB. PUMP MOTOR

CODE LETTER	KM2+QM2	
MOTOR TYPE	*	*
MOTOR POWER	20W	*
CURRENT(A) 220V(60Hz)	0.33A	*

COOLANT PUMP MOTOR

CODE LETTER	KM3+QM3	
MOTOR TYPE	*	*
MOTOR POWER	1.5KW	*
CURRENT(A) 220V(60Hz)	9.0A	*

ATC ARM MOTOR

CODE LETTER		
MOTOR TYPE	*	*
MOTOR POWER	0.75KW	*
CURRENT(A) 220V(60Hz)	3.2A	*

CHIP CONVEYOR MOTOR(LEFT)

CODE LETTER	KM5+QM5	
MOTOR TYPE	*	*
MOTOR POWER	0.2KW	*
CURRENT(A) 220V(60Hz)	1.2A	*

CHIP CONVEYOR MOTOR(RIGHT)

CODE LETTER	KM6+QM6	
MOTOR TYPE	*	*
MOTOR POWER	0.2KW	*
CURRENT(A) 220V(60Hz)	1.2A	*

BASE COOLANT PUMP MOTOR

CODE LETTER	KM7+QM7	
MOTOR TYPE	*	*
MOTOR POWER	0.9KW	*
CURRENT(A) 220V(60Hz)	5.2A	*

THROUGH COOLANT PUMP MOTOR

CODE LETTER	KM7TS+QM7TS	
MOTOR TYPE	*	*
MOTOR POWER	1.5KW	*
CURRENT(A) 220V(60Hz)	7.6A	*

JET COOLANT MOTOR

CODE LETTER	KM9+QM9	
MOTOR TYPE	*	*
MOTOR POWER	0.9KW	*
CURRENT(A) 220V(60Hz)	5.2A	*

<OPTION MOTOR>

COOL JET UNIT

CODE LETTER	KM7T+QM7T	
MOTOR TYPE	*	*
MOTOR POWER	5.5KW	*
CURRENT(A) 220V(60Hz)	21.1A	*

GUN COOLANT MOTOR

CODE LETTER	KM8+QM8	
MOTOR TYPE	*	*
MOTOR POWER	250W	*
CURRENT(A) 220V(60Hz)	1.4A	*

CHIP CONVEYOR MOTOR

CODE LETTER		
MOTOR TYPE	*	*
MOTOR POWER	200W	*
CURRENT(A) 220V(60Hz)	*	*

PAGE *

MACHINE HS400/500(F18i)_HS400i/500i(F21i)

 WIA CORPORATION

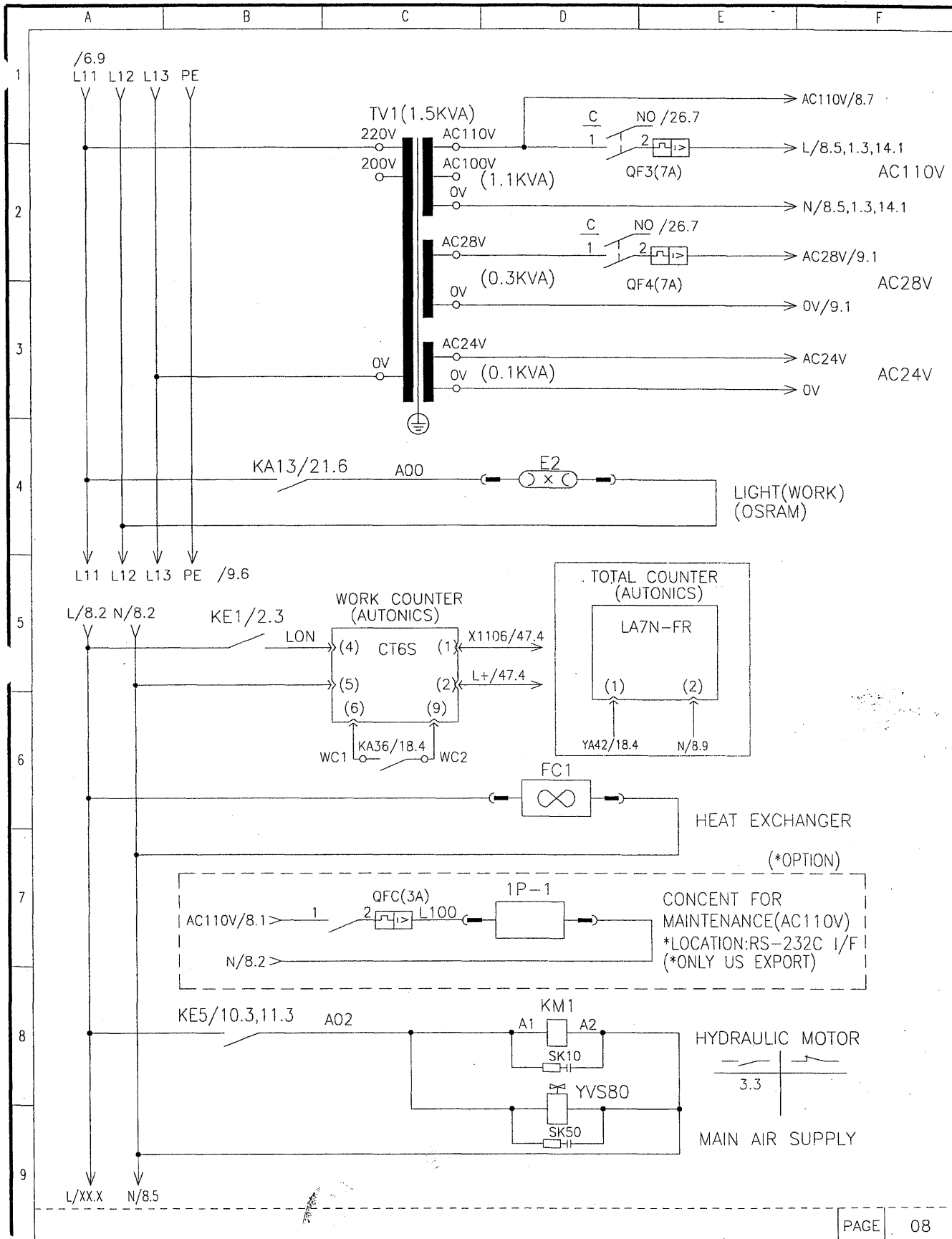
DESIGN CHECKED APPROVED

DWG No.

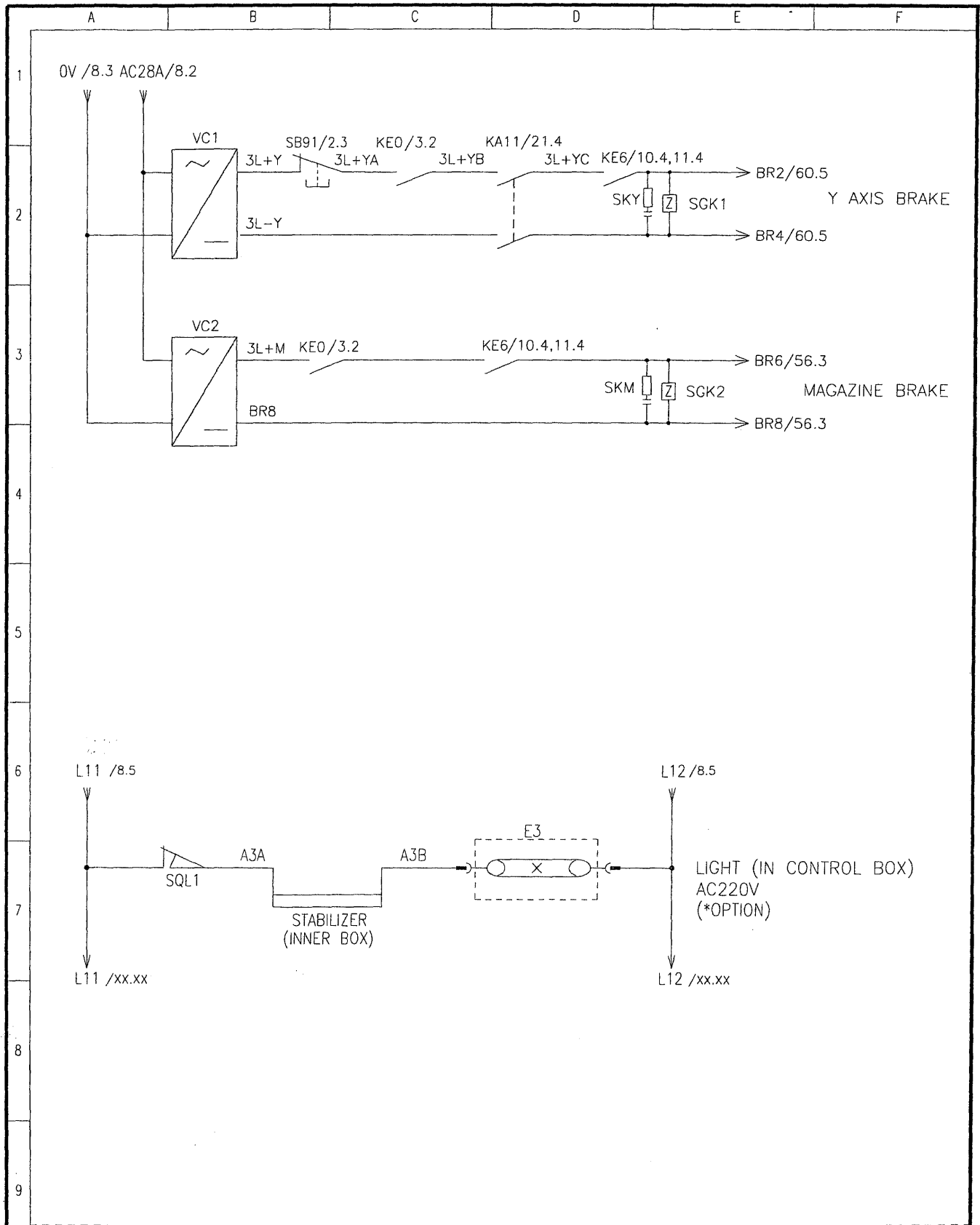
TITLE

MOTOR CAPACITY

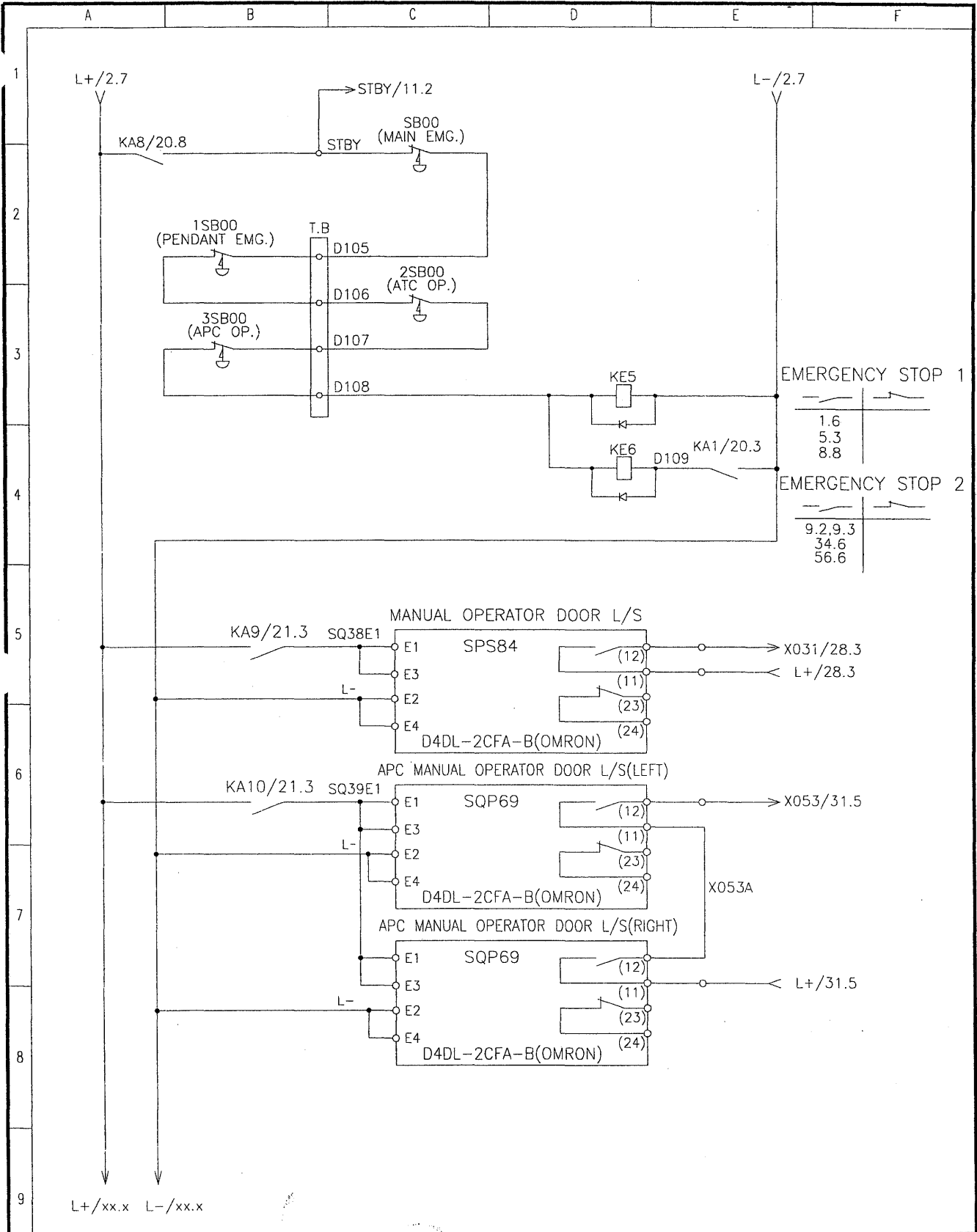
DATE
2007.07



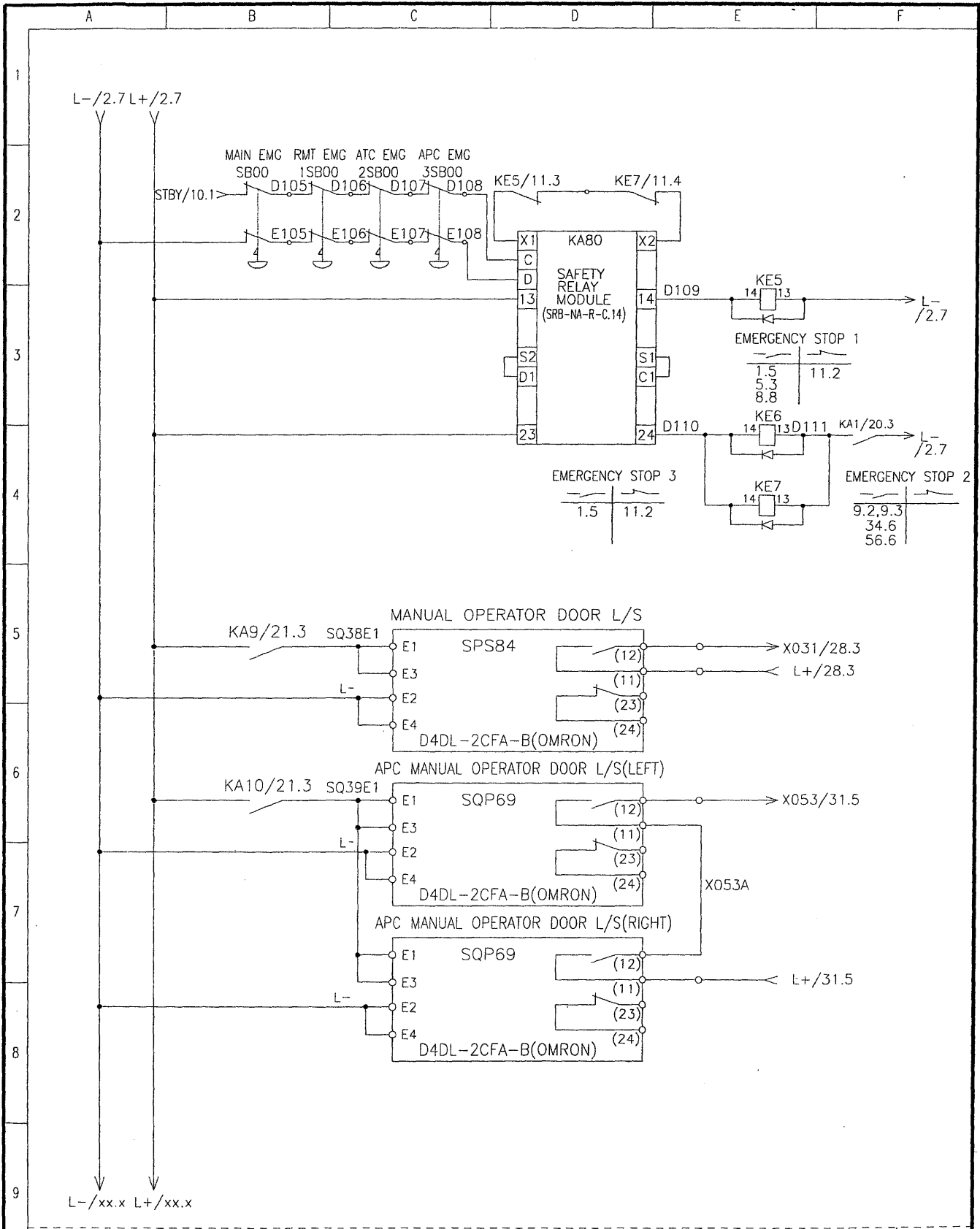
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			DWG No.	TITLE	DATE
		AC 100V CONNECTION	2007.07		



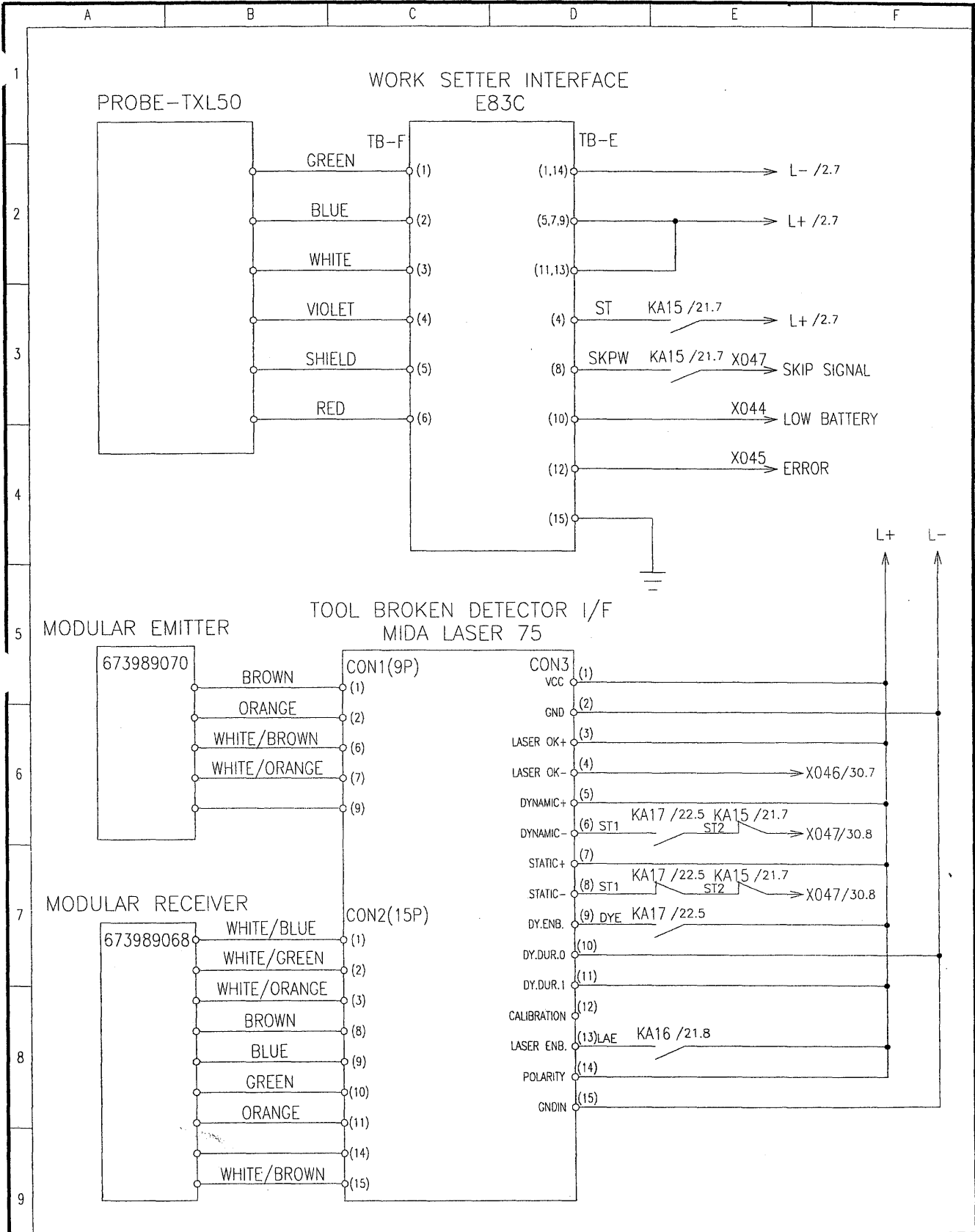
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MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION			DESIGN	CHECKED	APPROVED
DWG No.		TITLE	DC24V BRAKE POWER	DATE			
				2007.07			



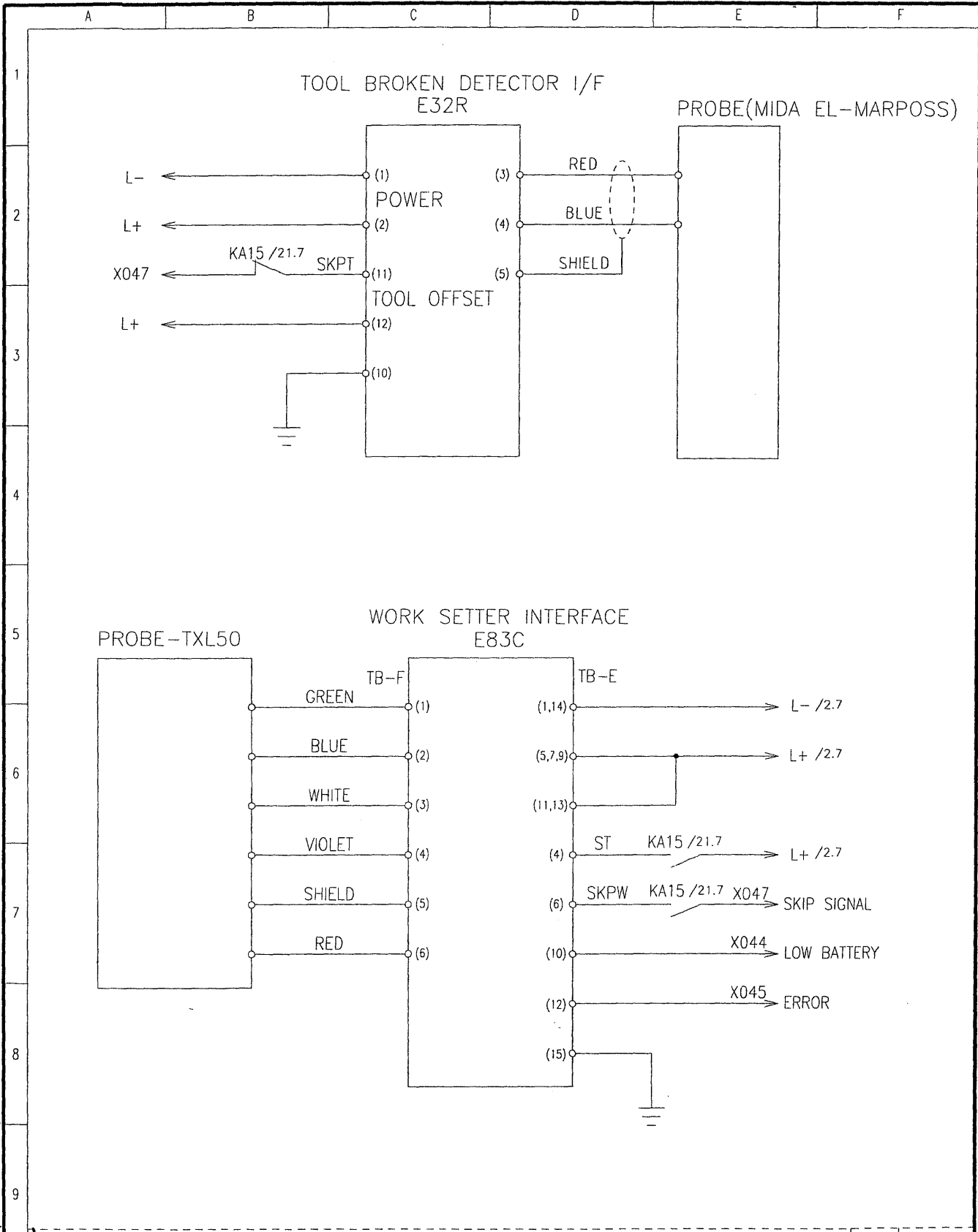
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DWG No.			TITLE	SAFETY RELAY MODULE	DATE



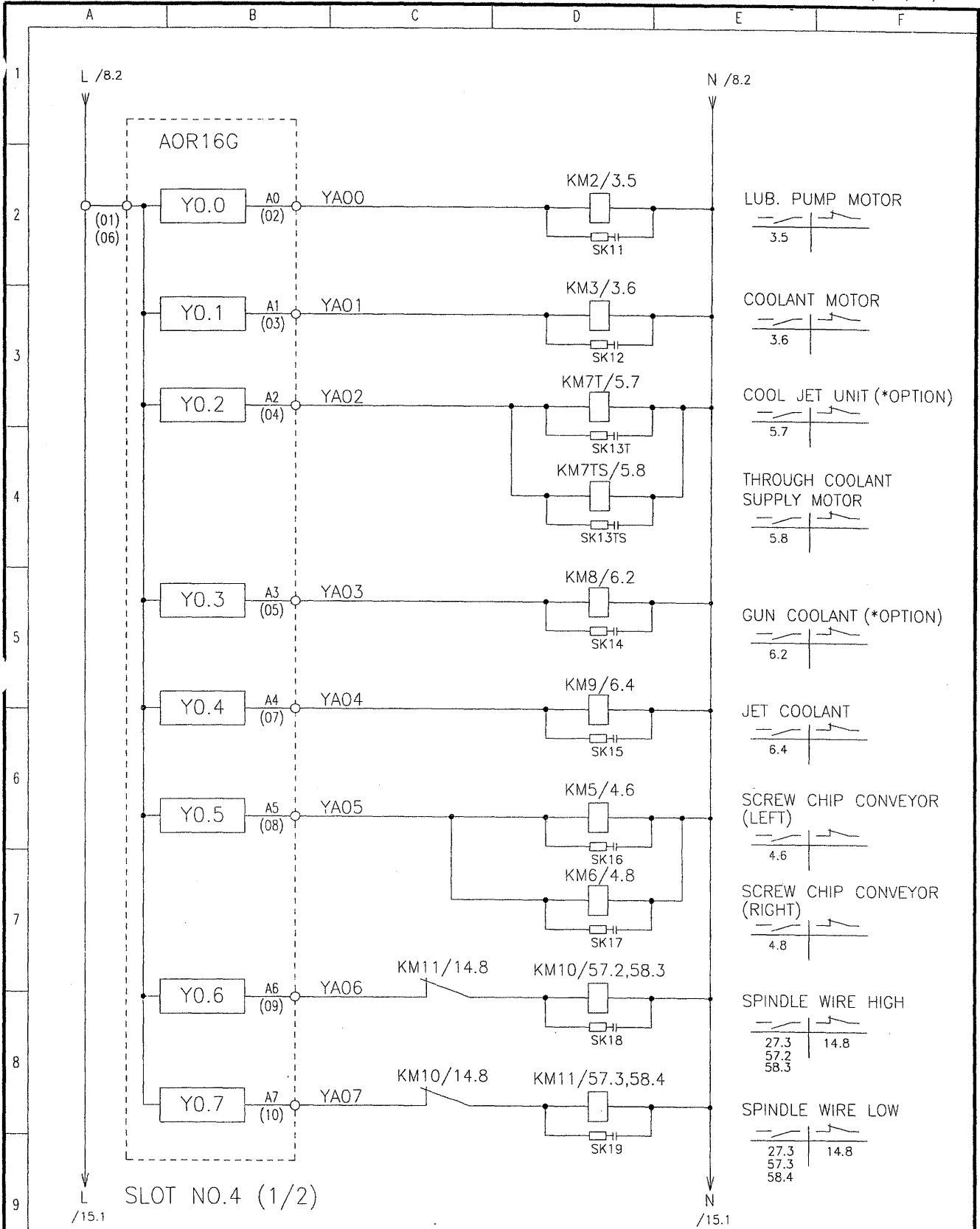
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DWG No.		TITLE	SAFETY RELAY MODULE	DATE	2007.07	



MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.	TITLE		TOOL/WORK SETTER	DATE	2007.07

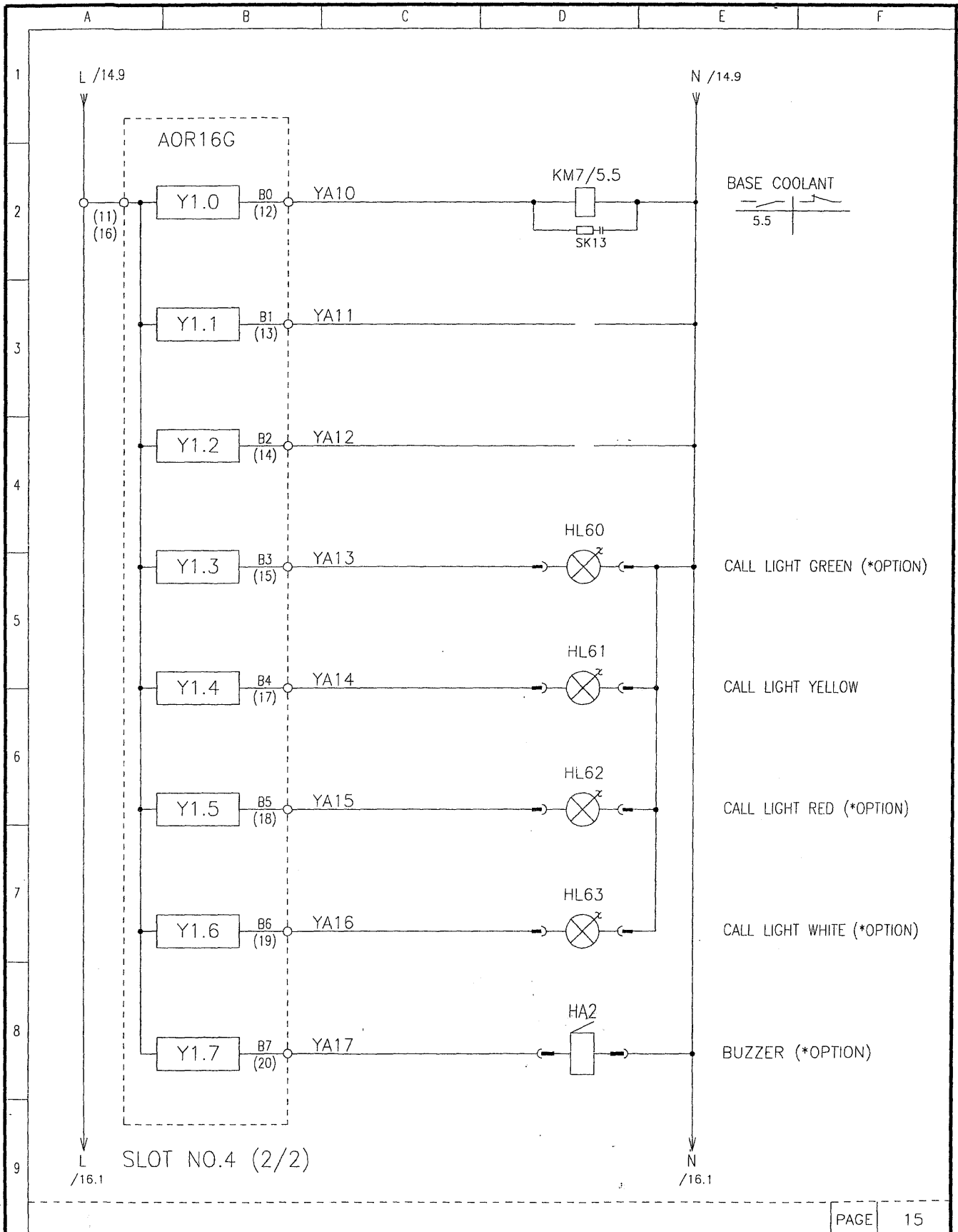


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DWG No.				TITLE	TOOL/WORK SETTER	DATE



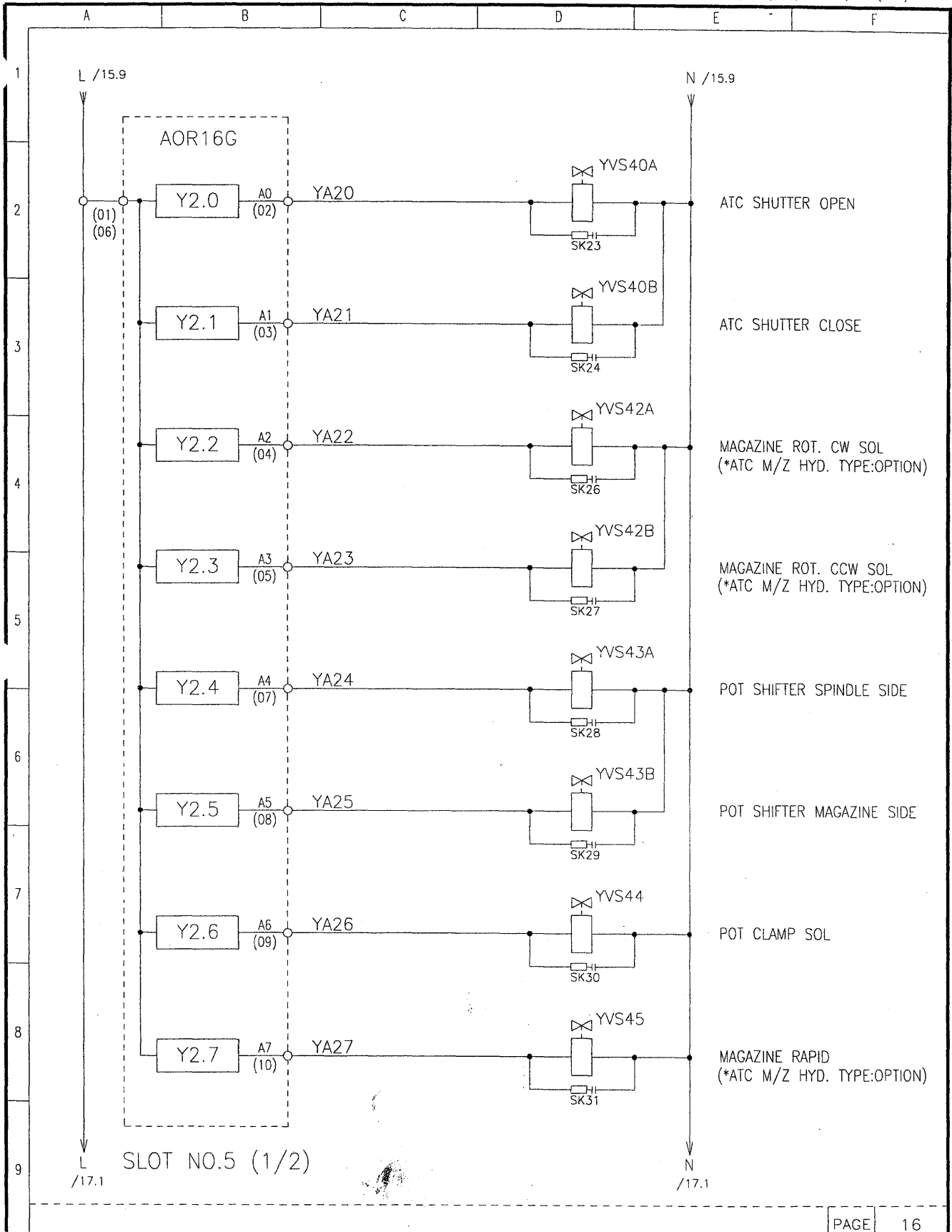
SLOT NO.4 (1/2)

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
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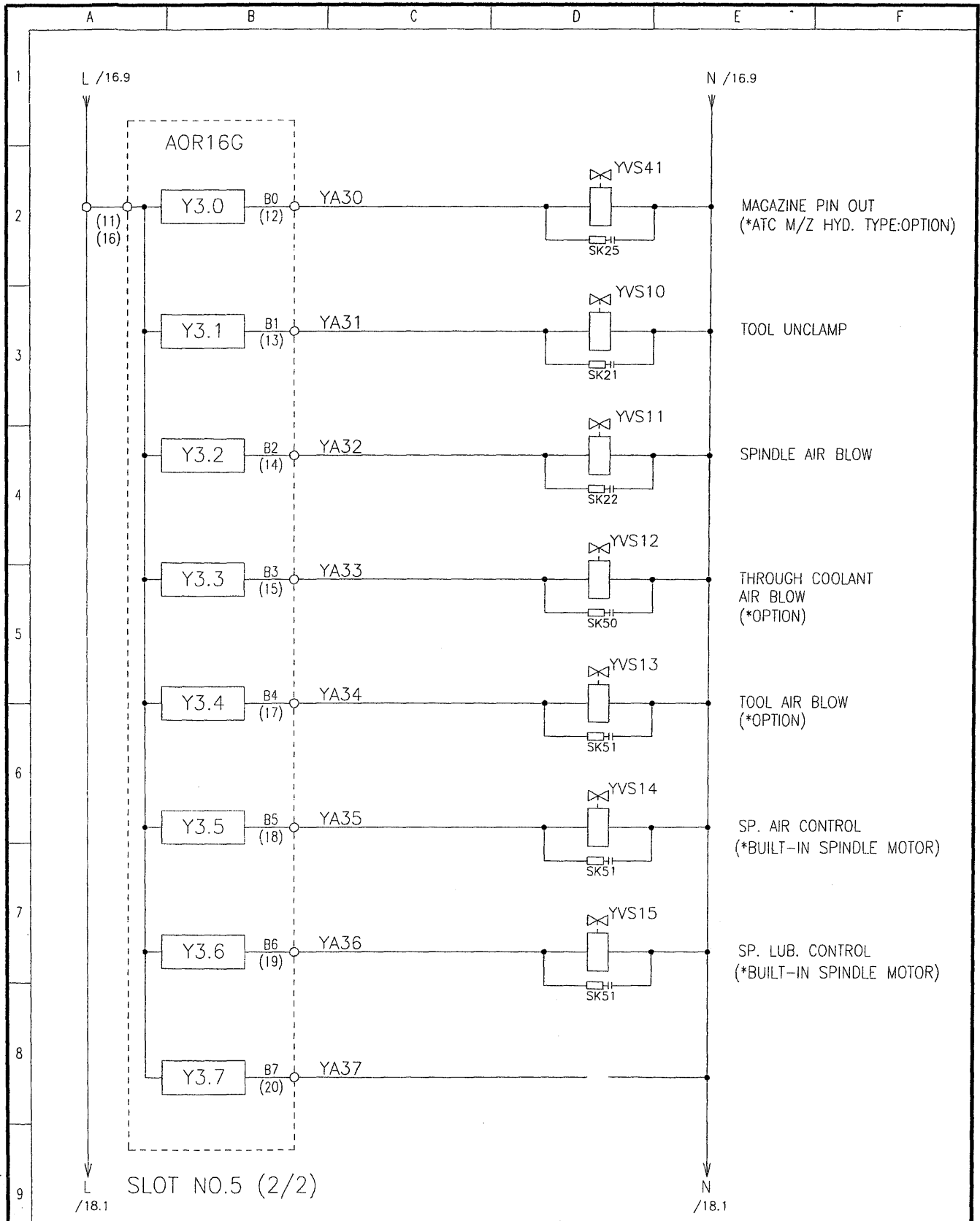
SLOT NO.4 (2/2)

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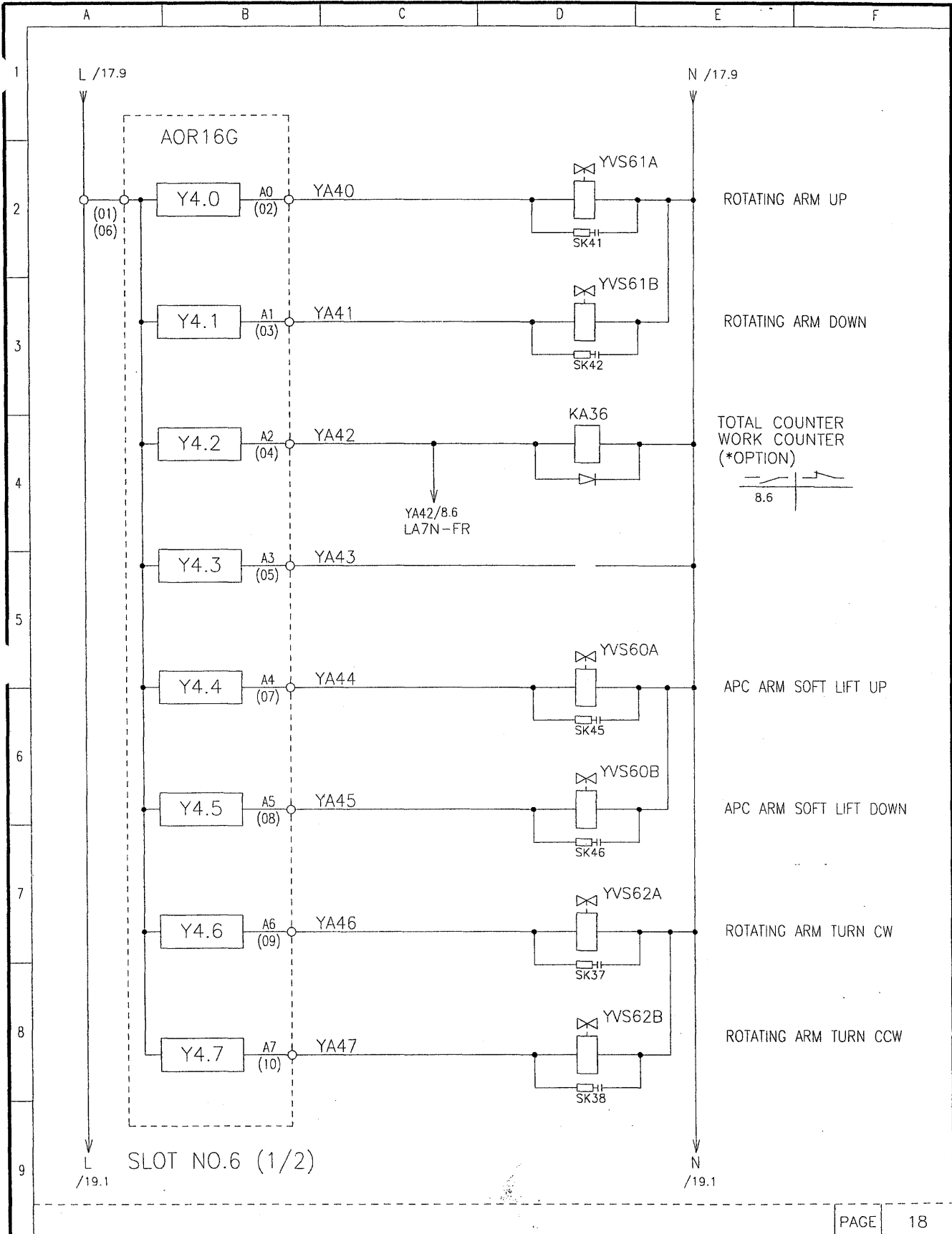
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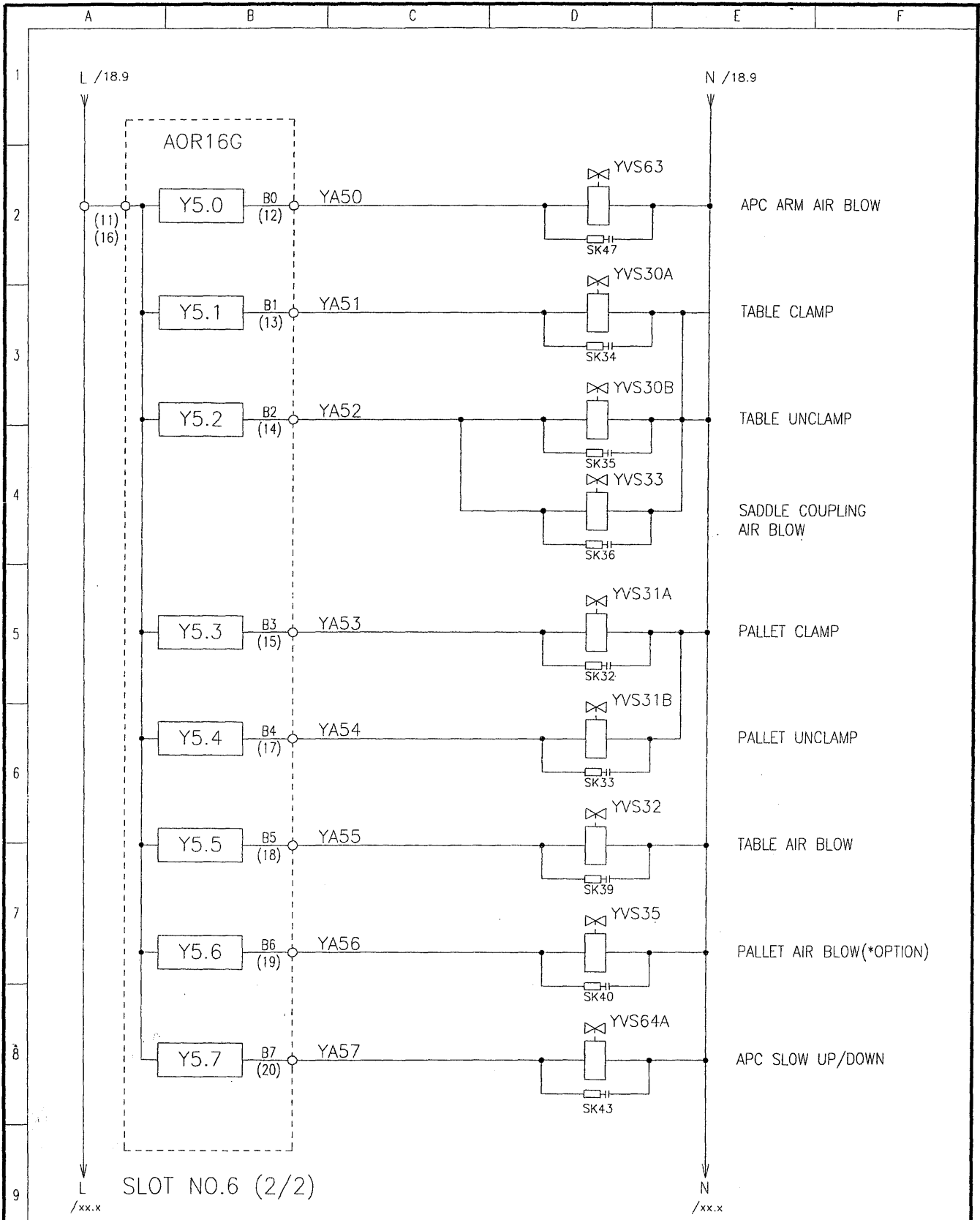


SLOT NO.5 (2/2)

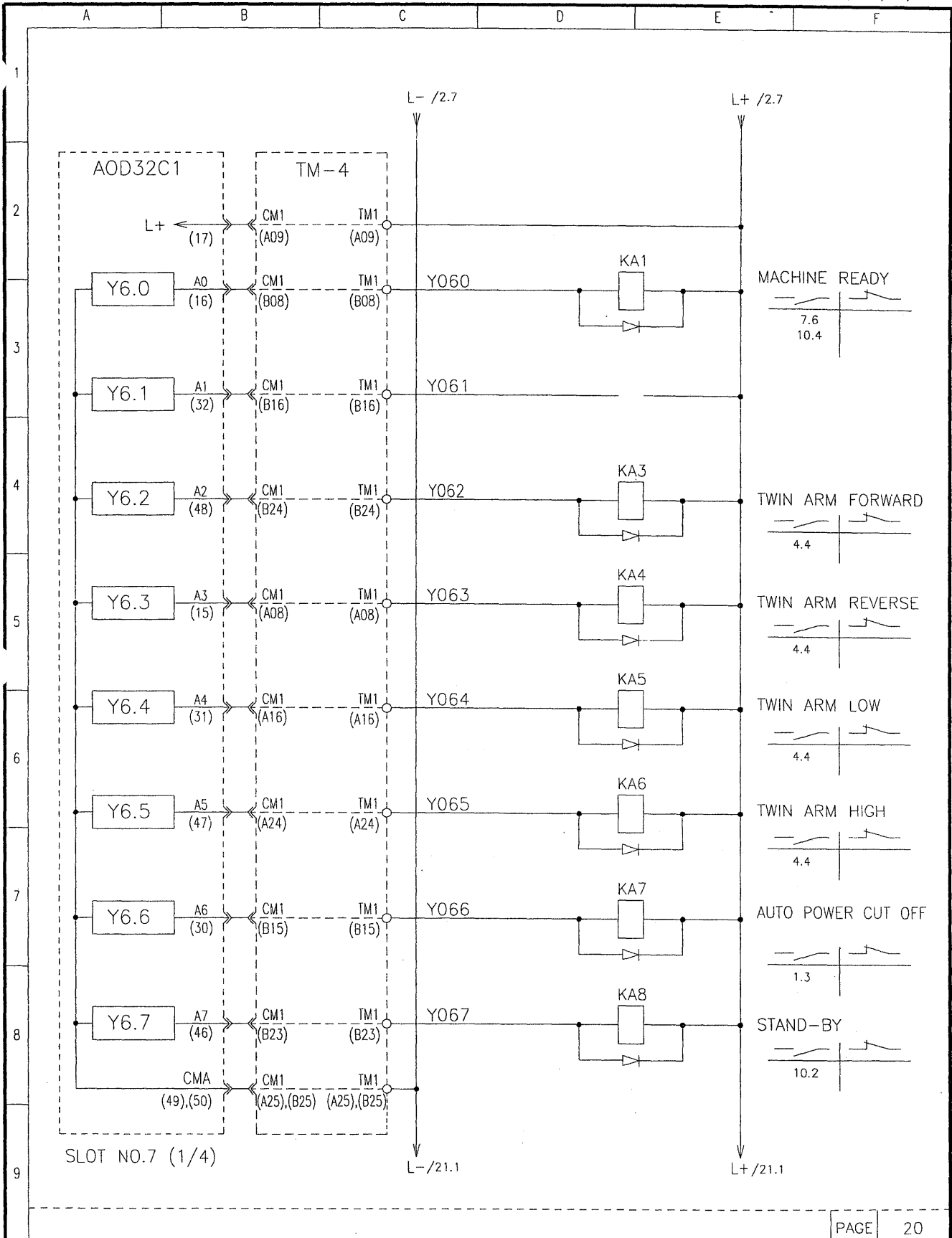
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				2007.07		



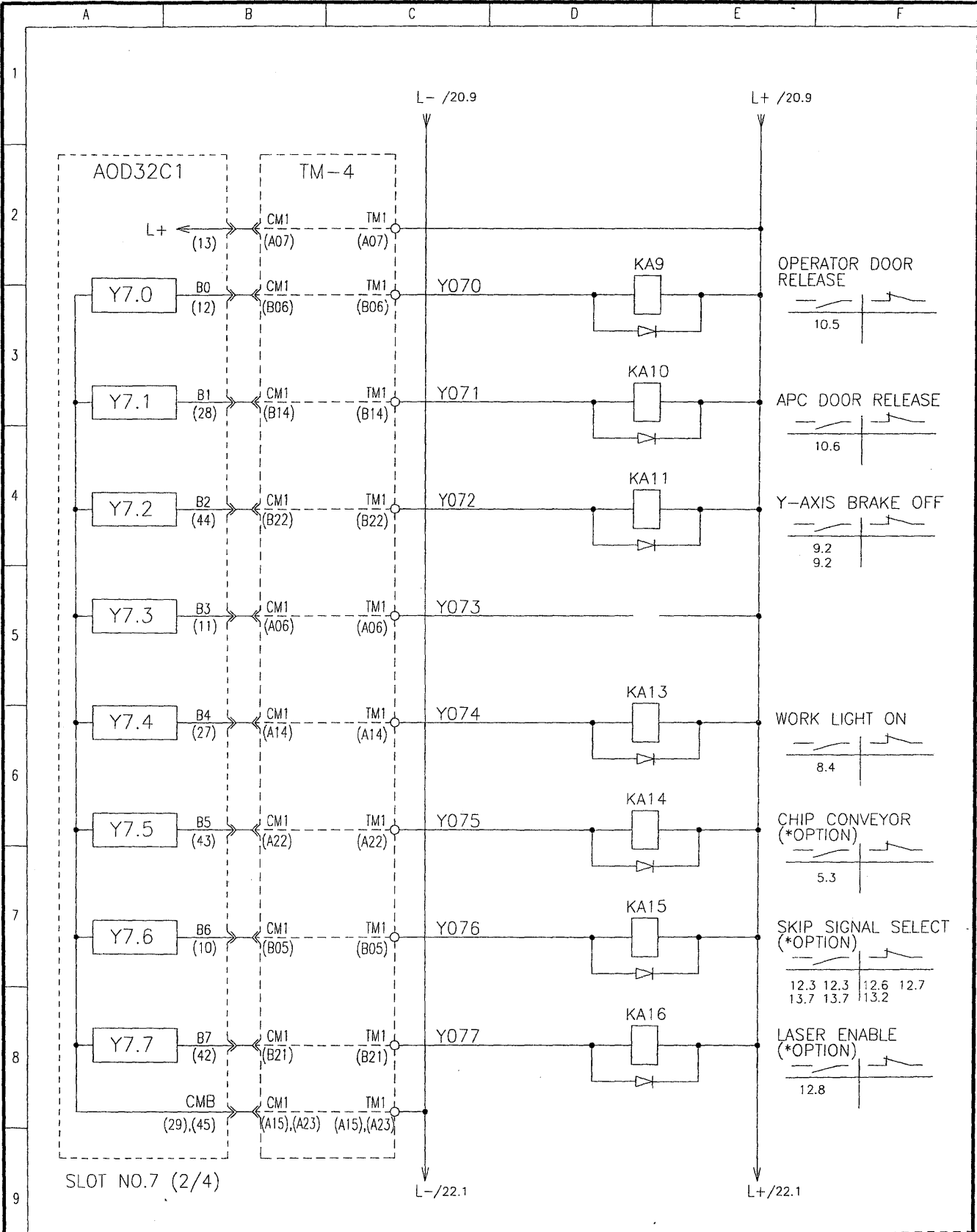
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	AC110V OUTPUT		2007.07		



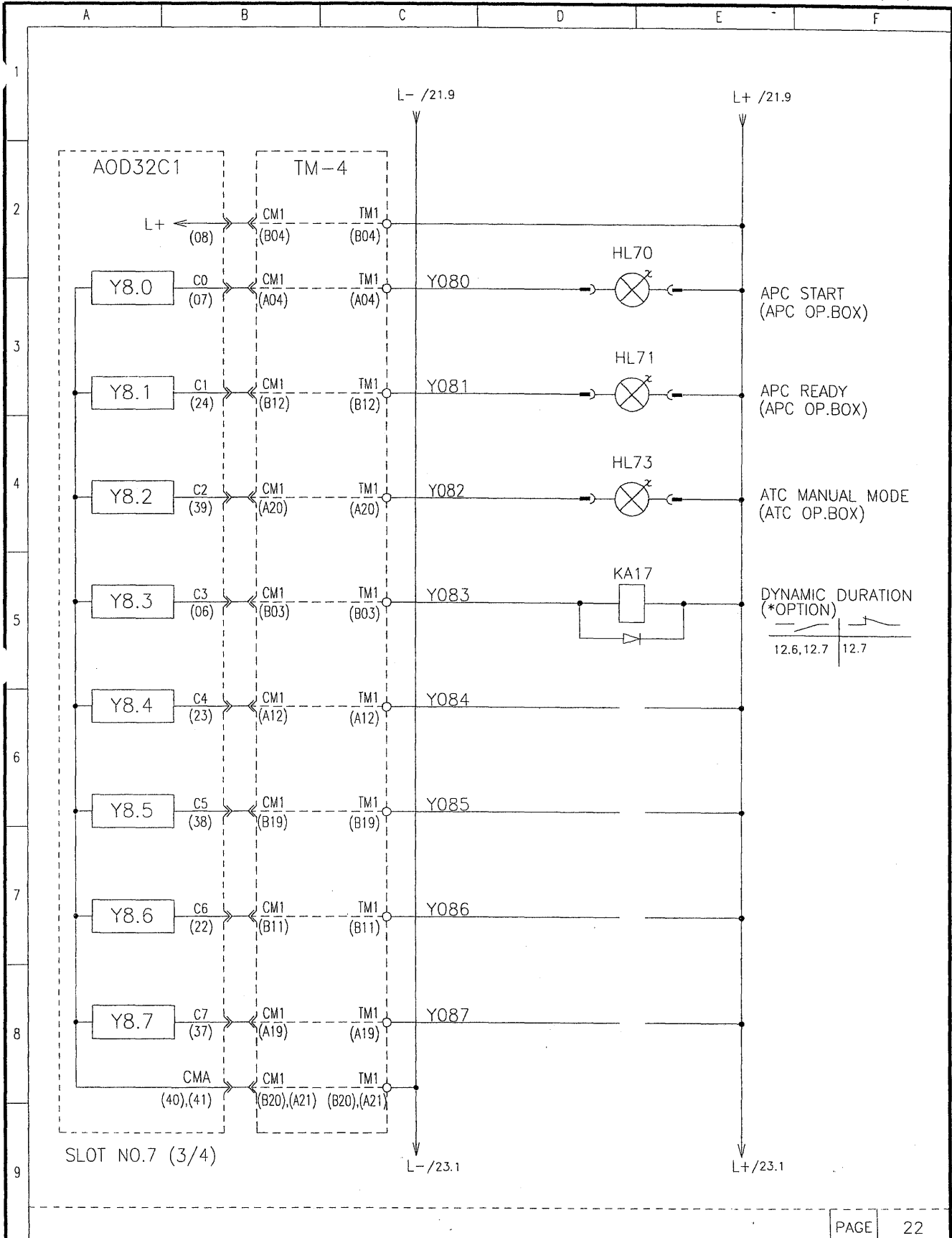
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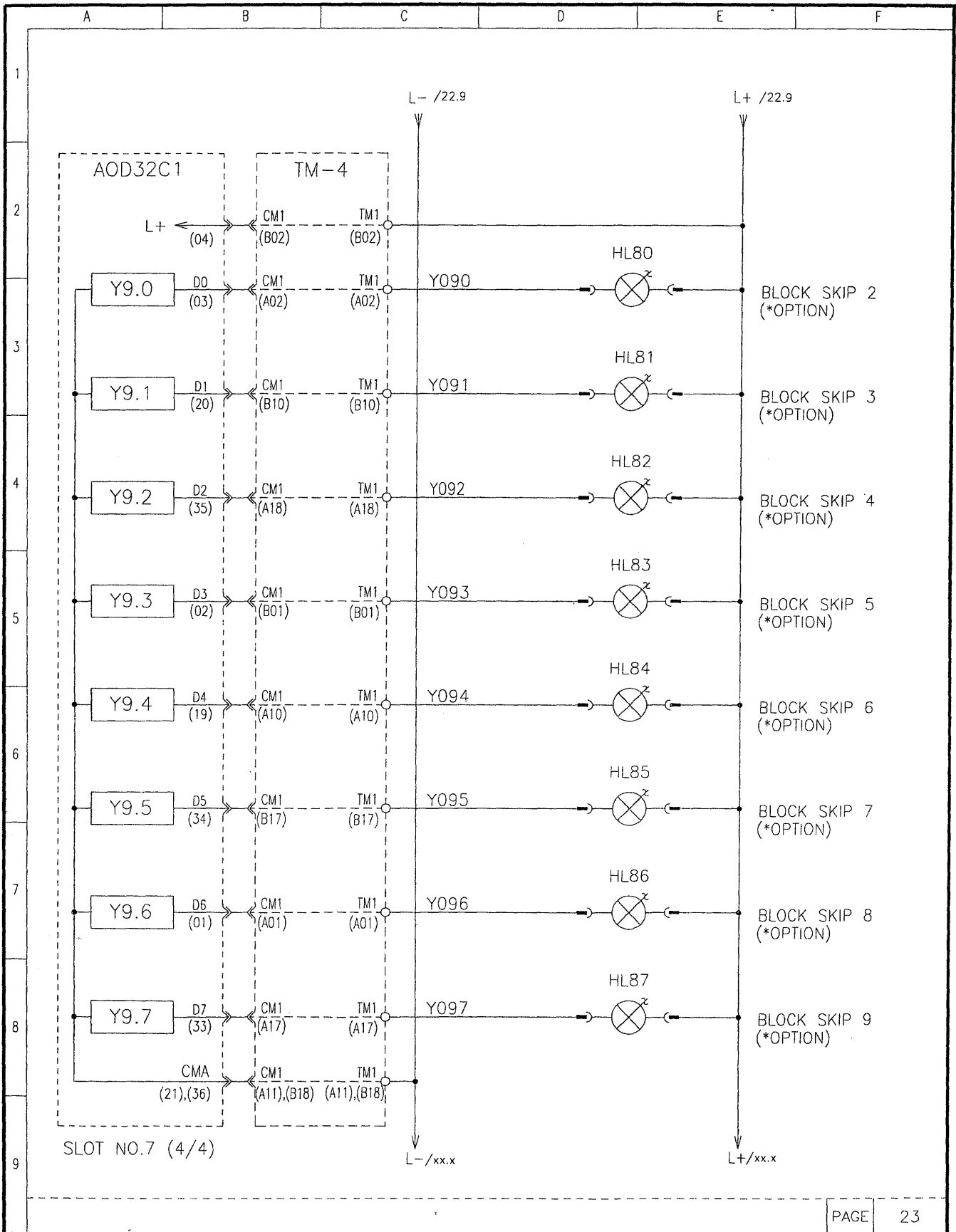
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				2007.07		



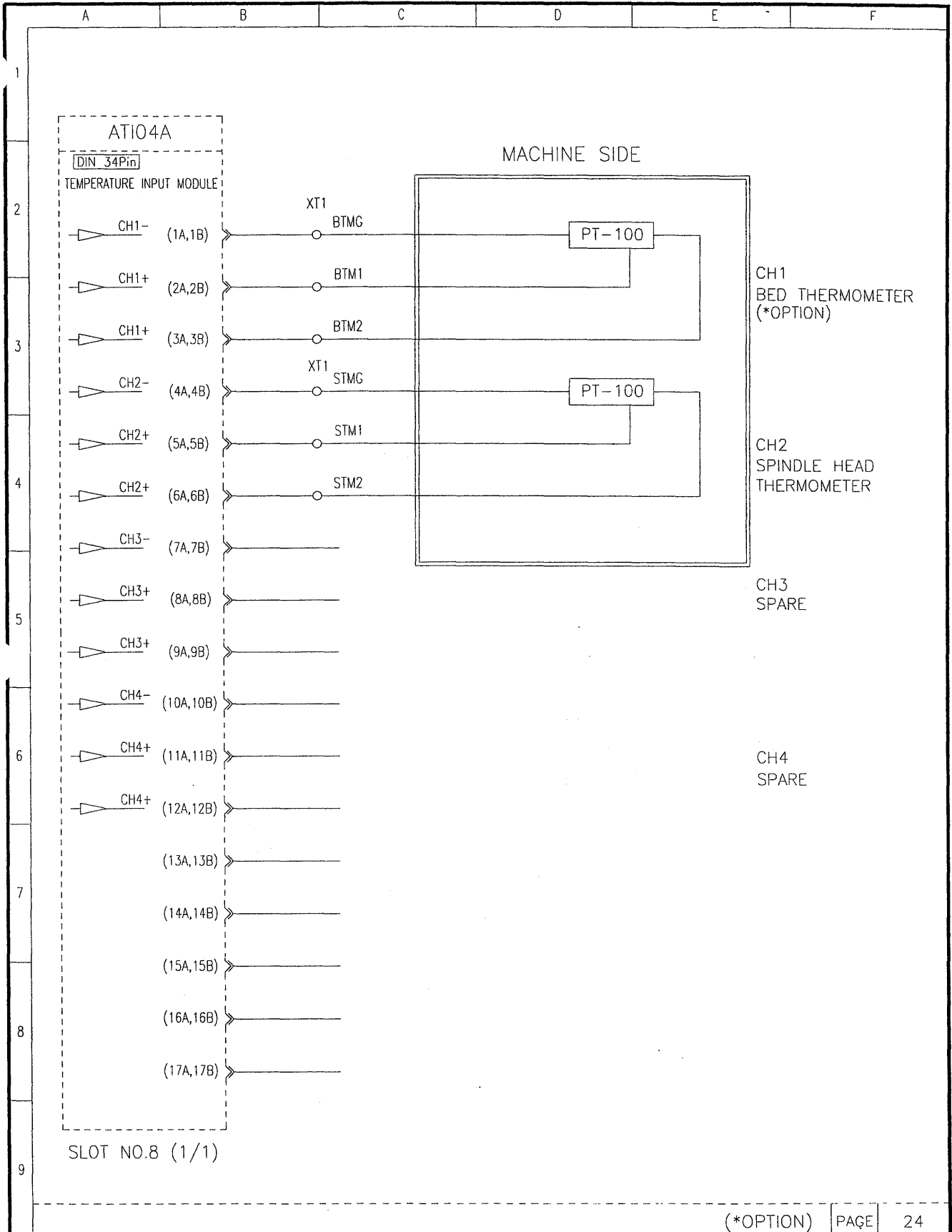
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DWG No.		TITLE	AC110V OUTPUT	DATE	2007.07	



MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION	DESIGN	CHECKED	APPROVED
DWG No.	TITLE		DATE		
	AC110V OUTPUT		2007.07		

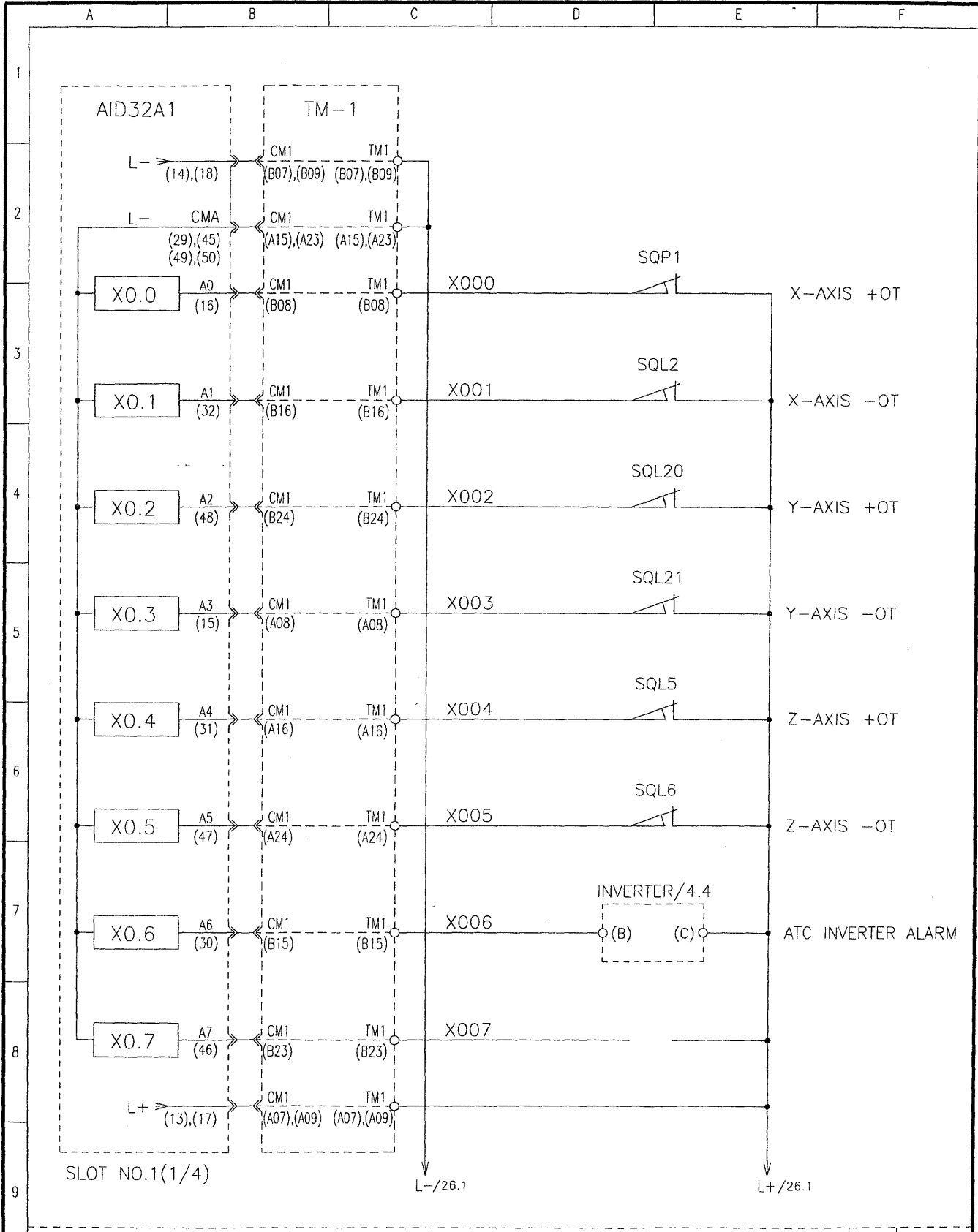


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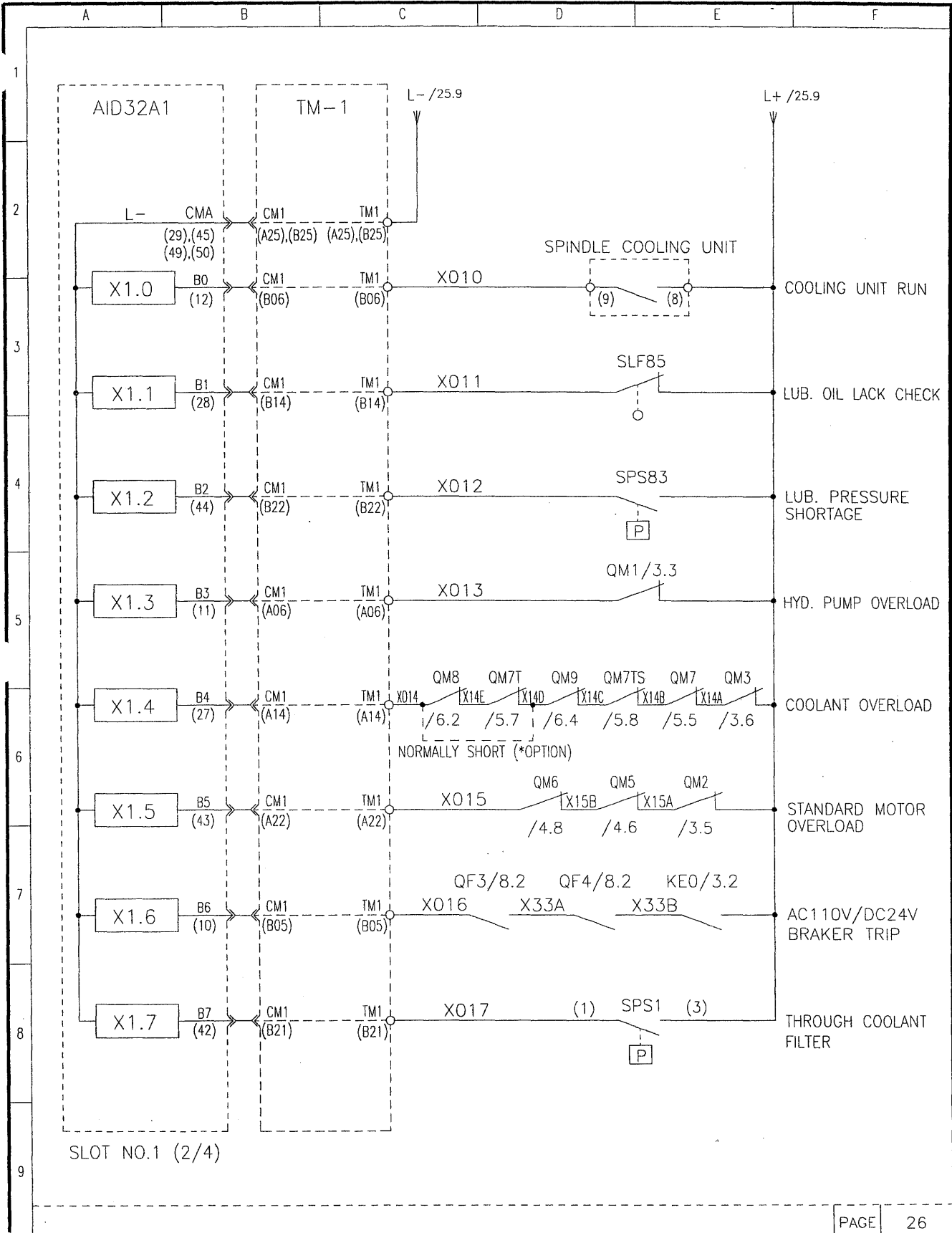


(*OPTION) PAGE 24

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
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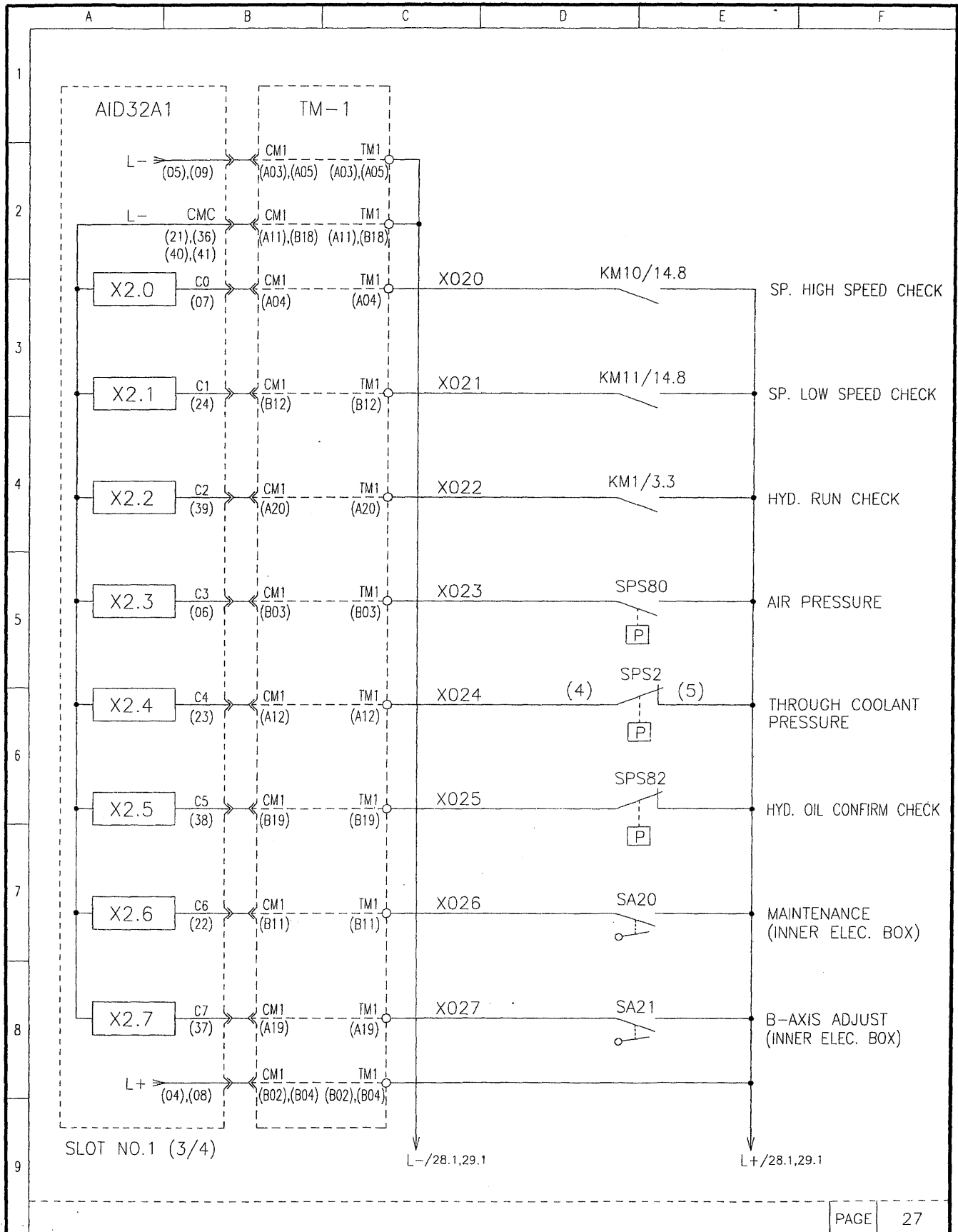


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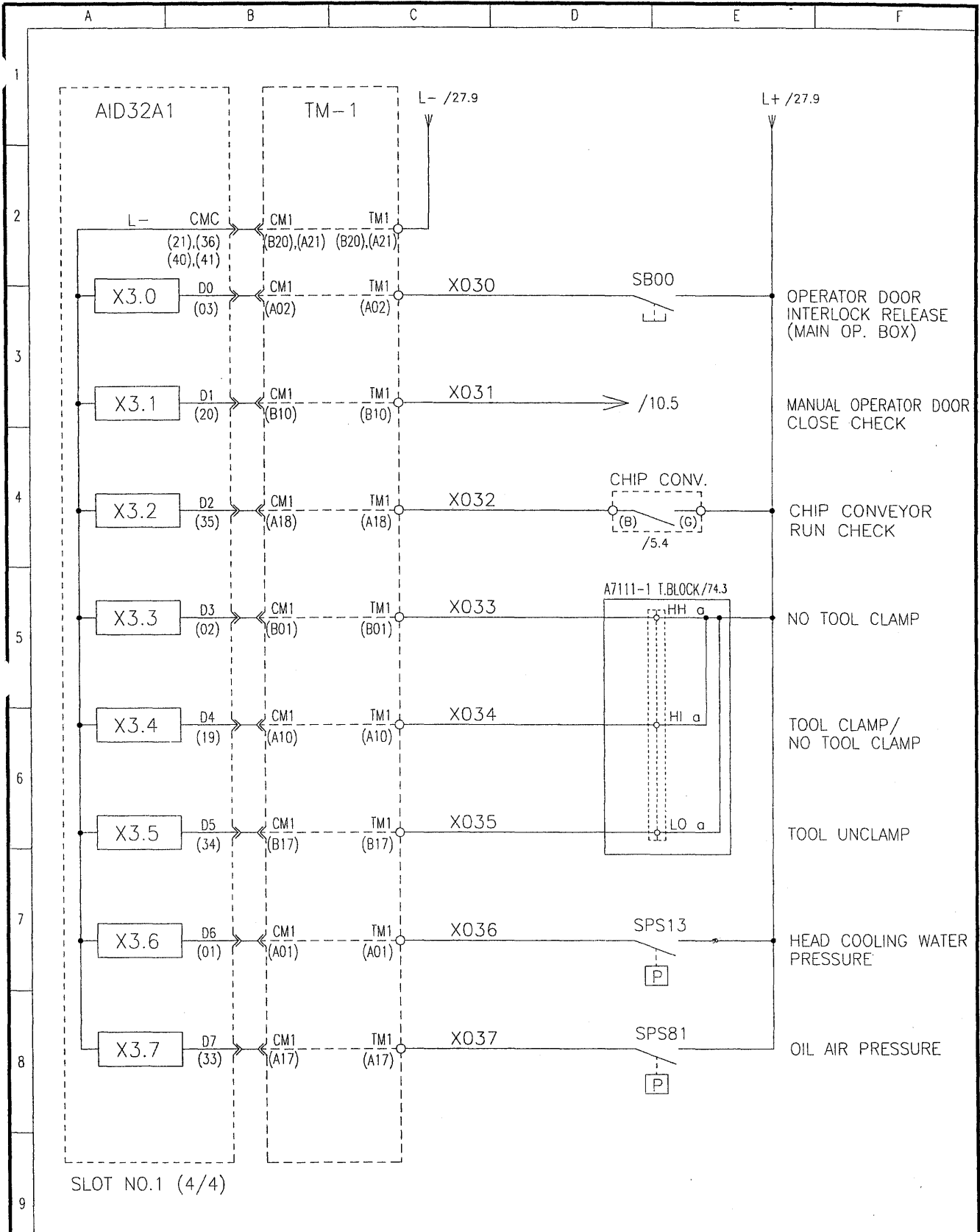


SLOT NO.1 (2/4)

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
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				2007.07		



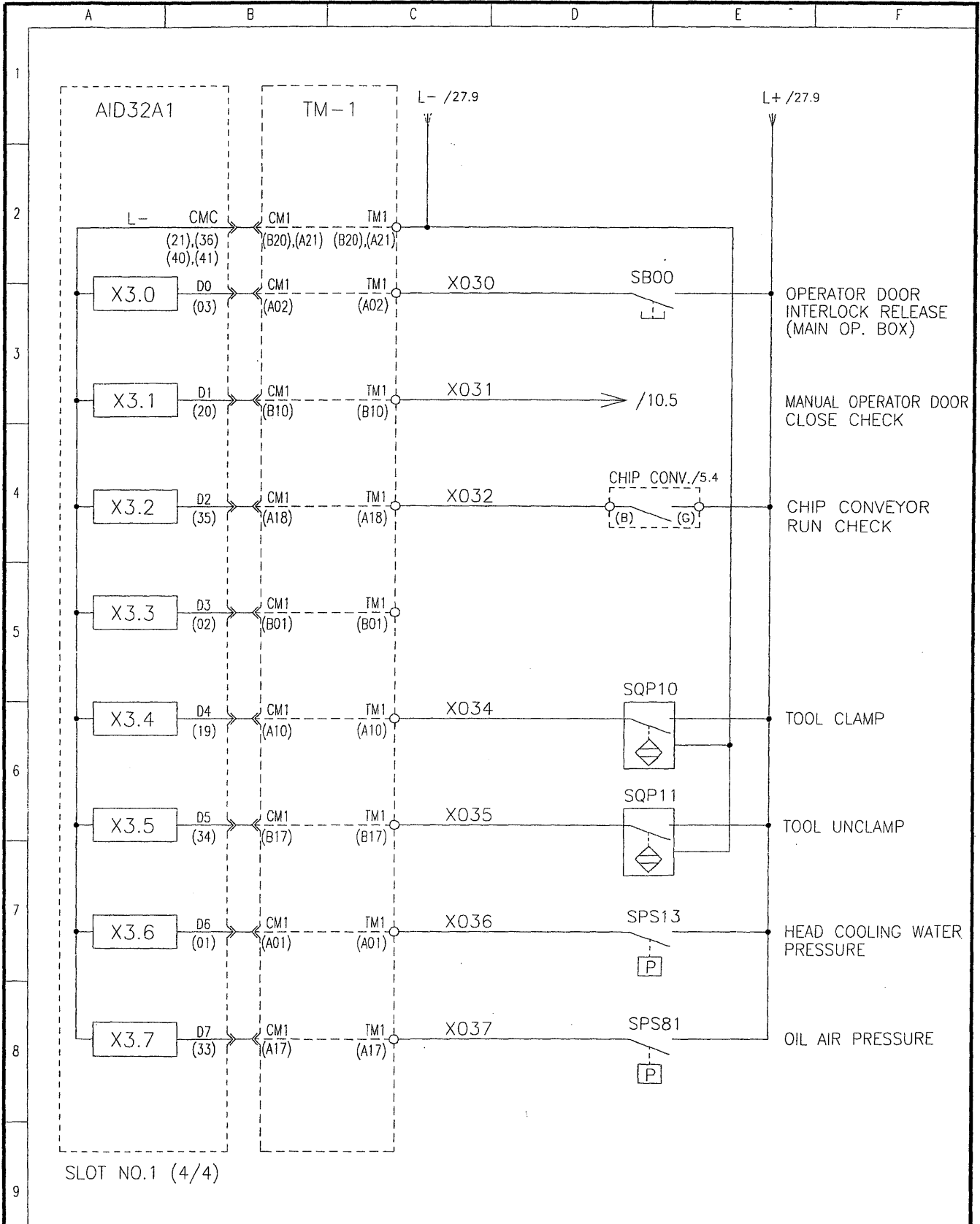
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DWG No.				TITLE	DC24V INPUT	DATE



SLOT NO.1 (4/4)

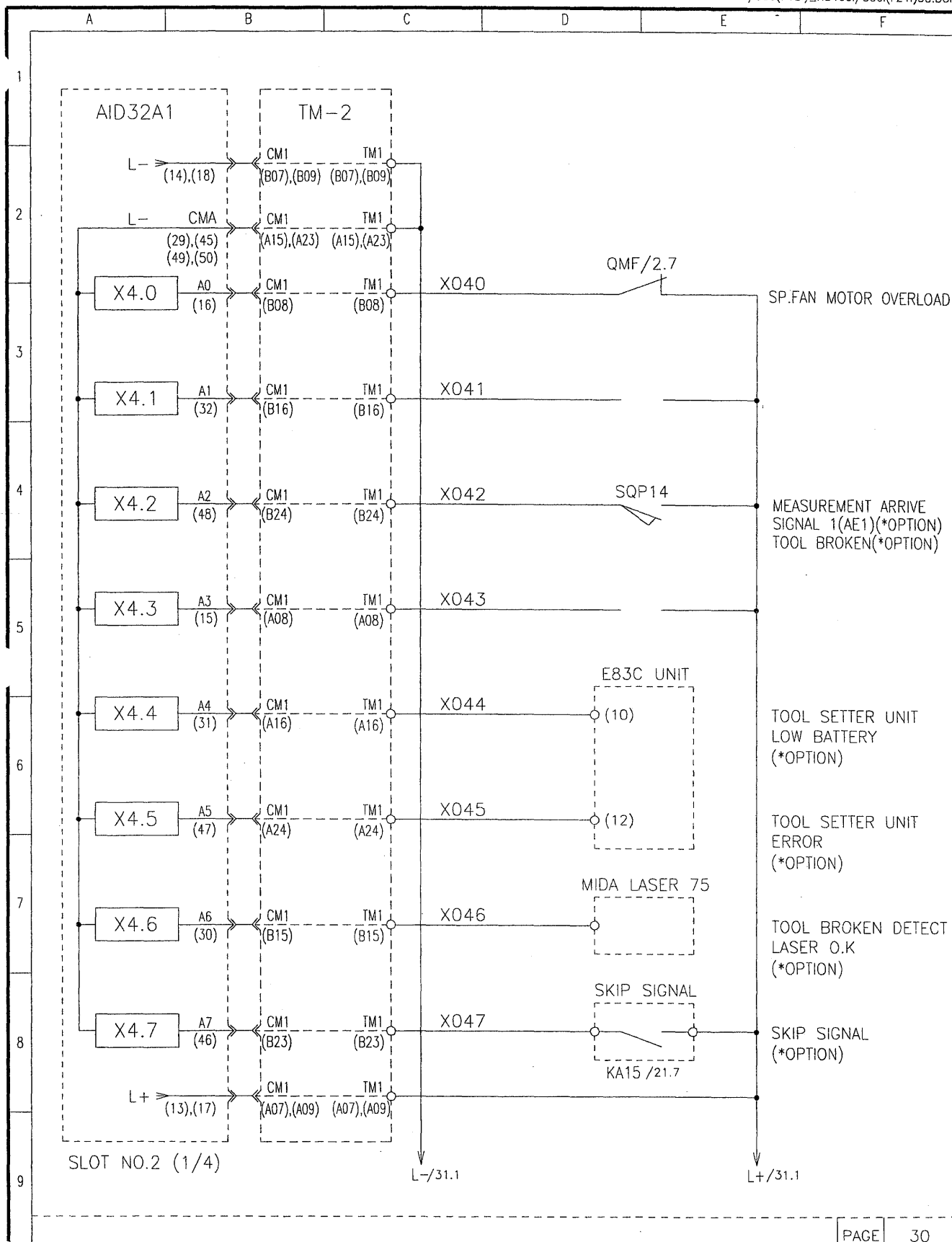
(*ONLY BUILT-IN SPINDLE MOTOR) PAGE 28

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.				TITLE	DC24V INPUT	DATE

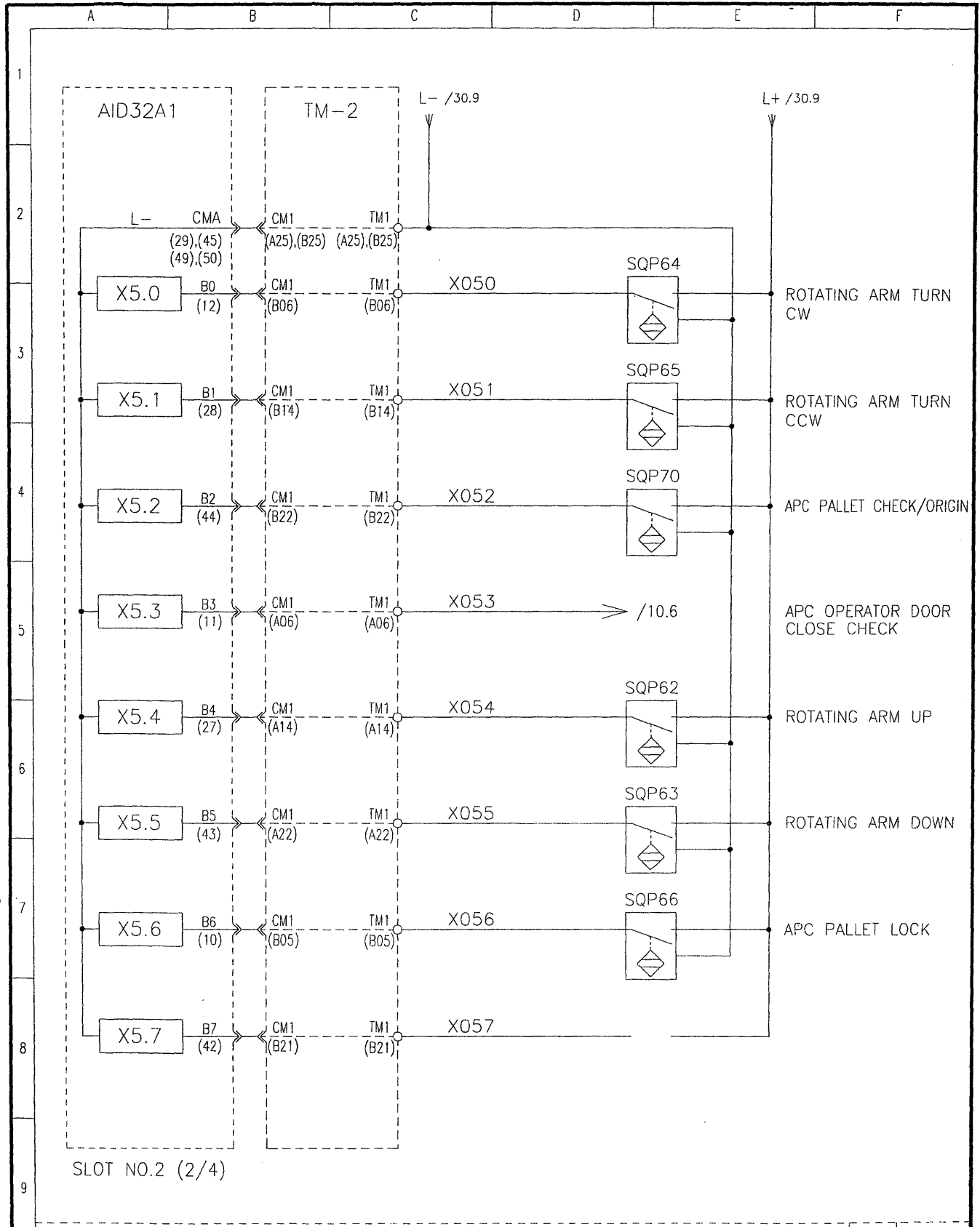


(*ONLY ALPHA i SPINDLE MOTOR) PAGE 29

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.		TITLE	DC24V INPUT	DATE		
				2007.07		

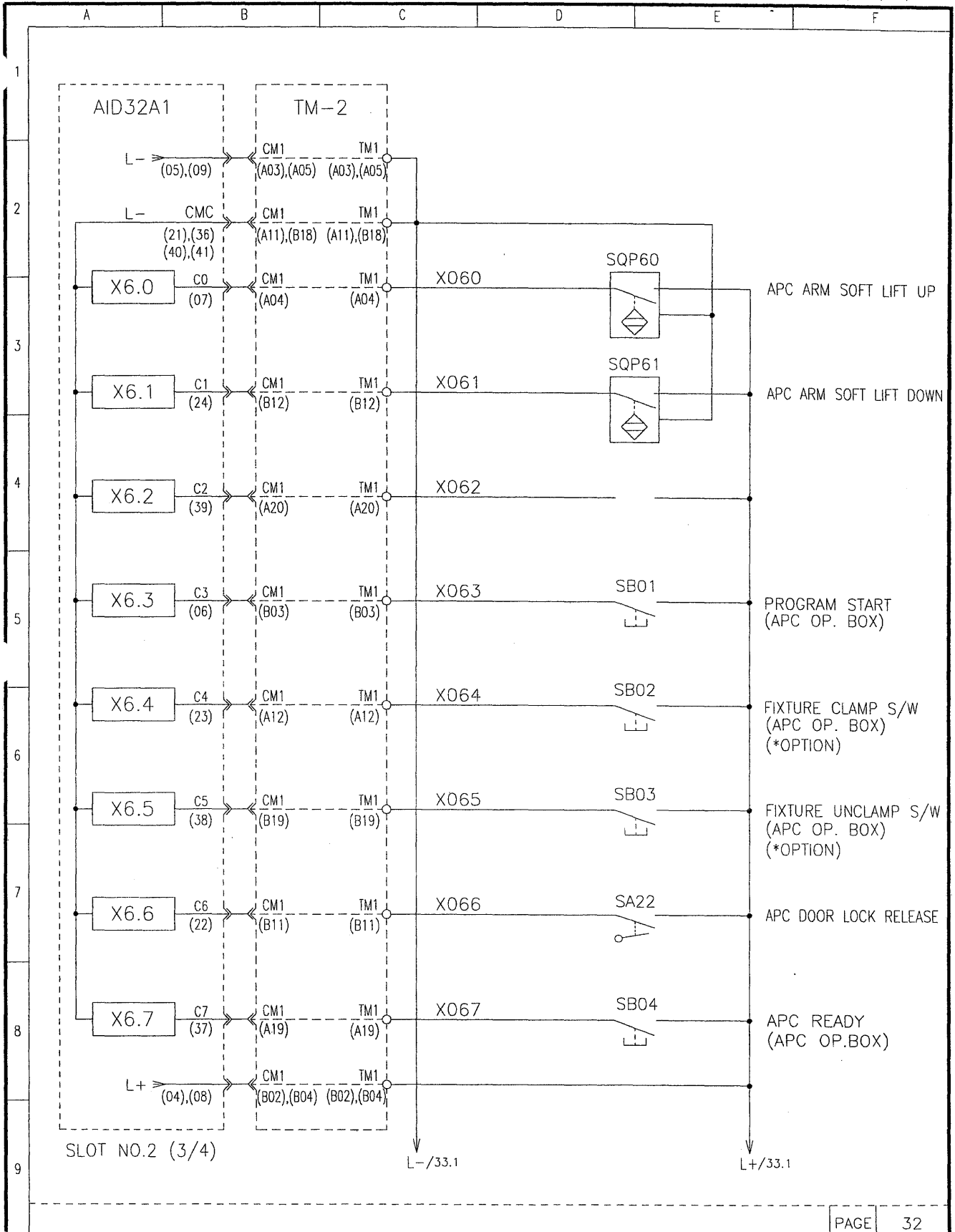


MACHINE	HS400/500(F18i)_HS400i/500(F21i)			DESIGN	CHECKED	APPROVED
DWG No.	TITLE			DC24V INPUT	DATE	
				2007.07		

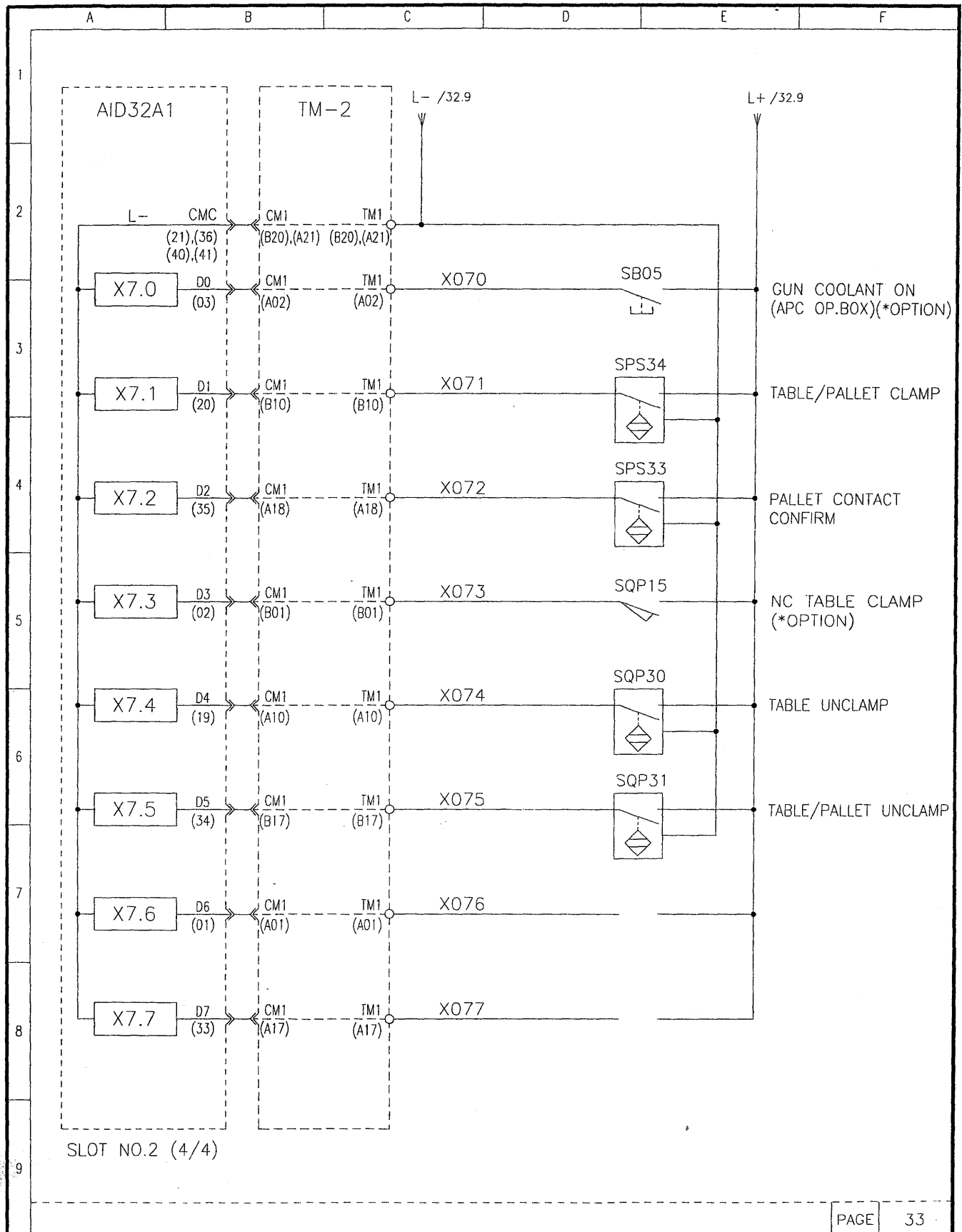


SLOT NO.2 (2/4)

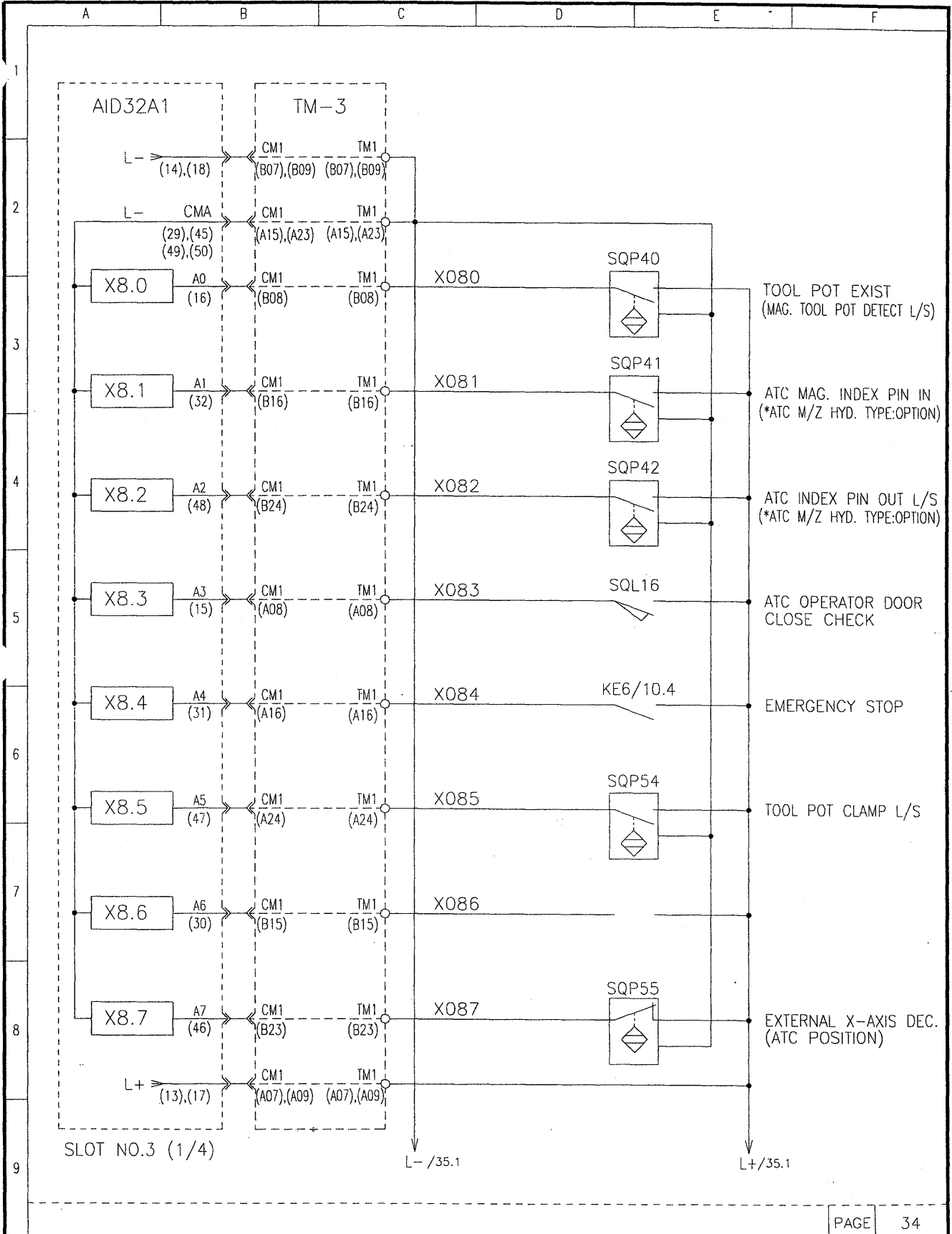
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.	TITLE	DC24V INPUT	DATE			
			2007.07			



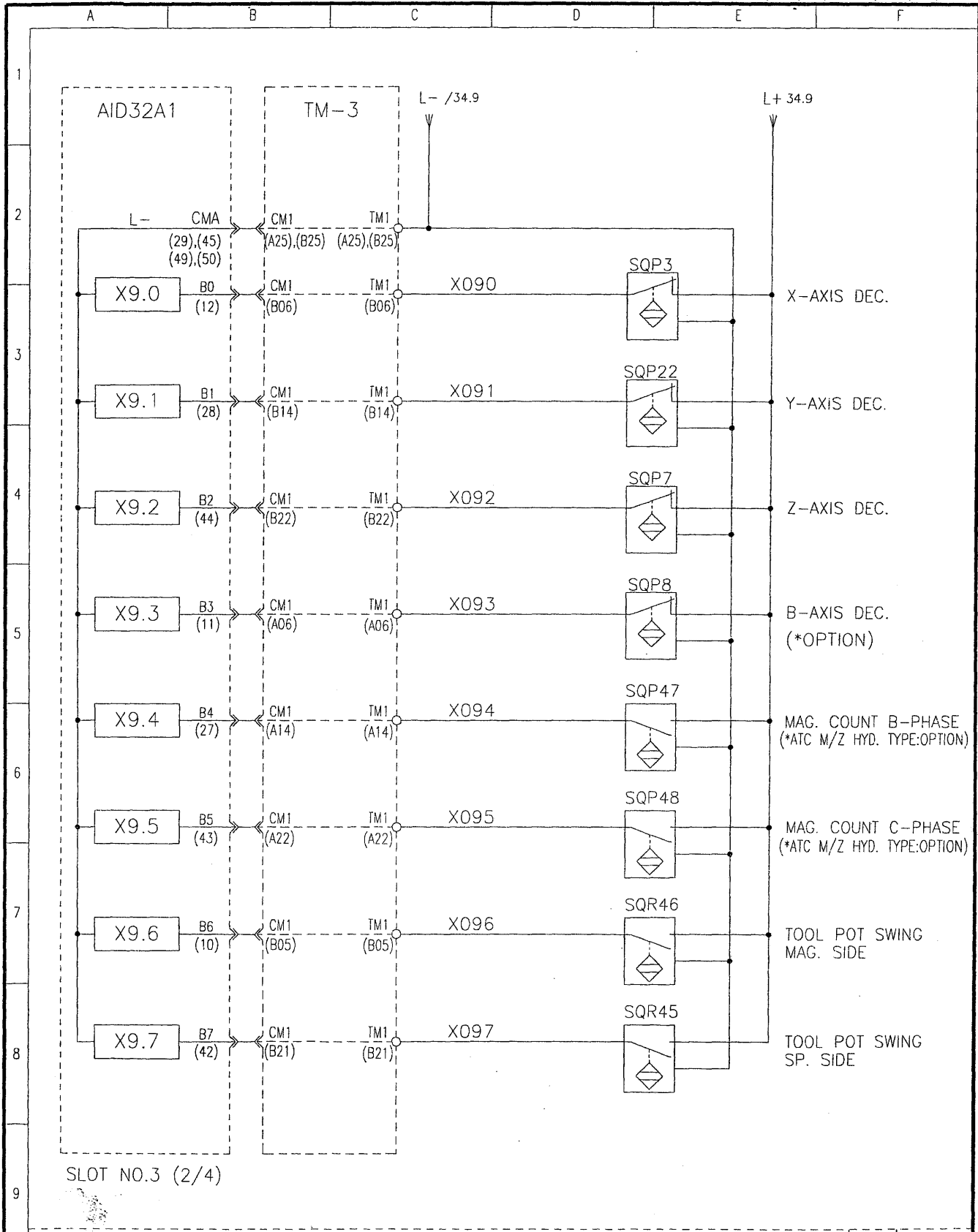
ACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.		TITLE	DC24V INPUT	DATE	2007.07	



MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.	TITLE			DC24V INPUT	DATE	
				2007.07		

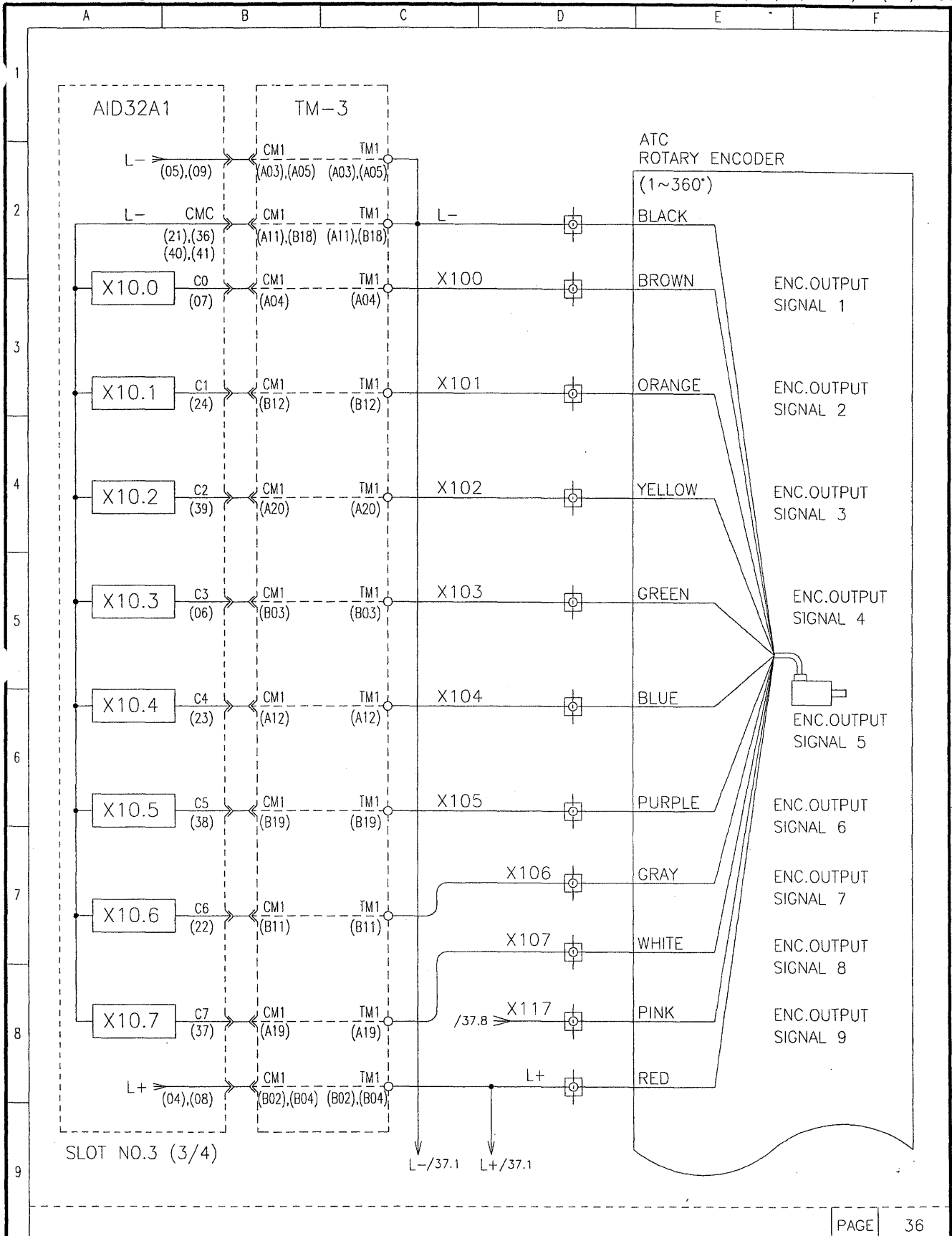


MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.				TITLE	DC24V INPUT	DATE

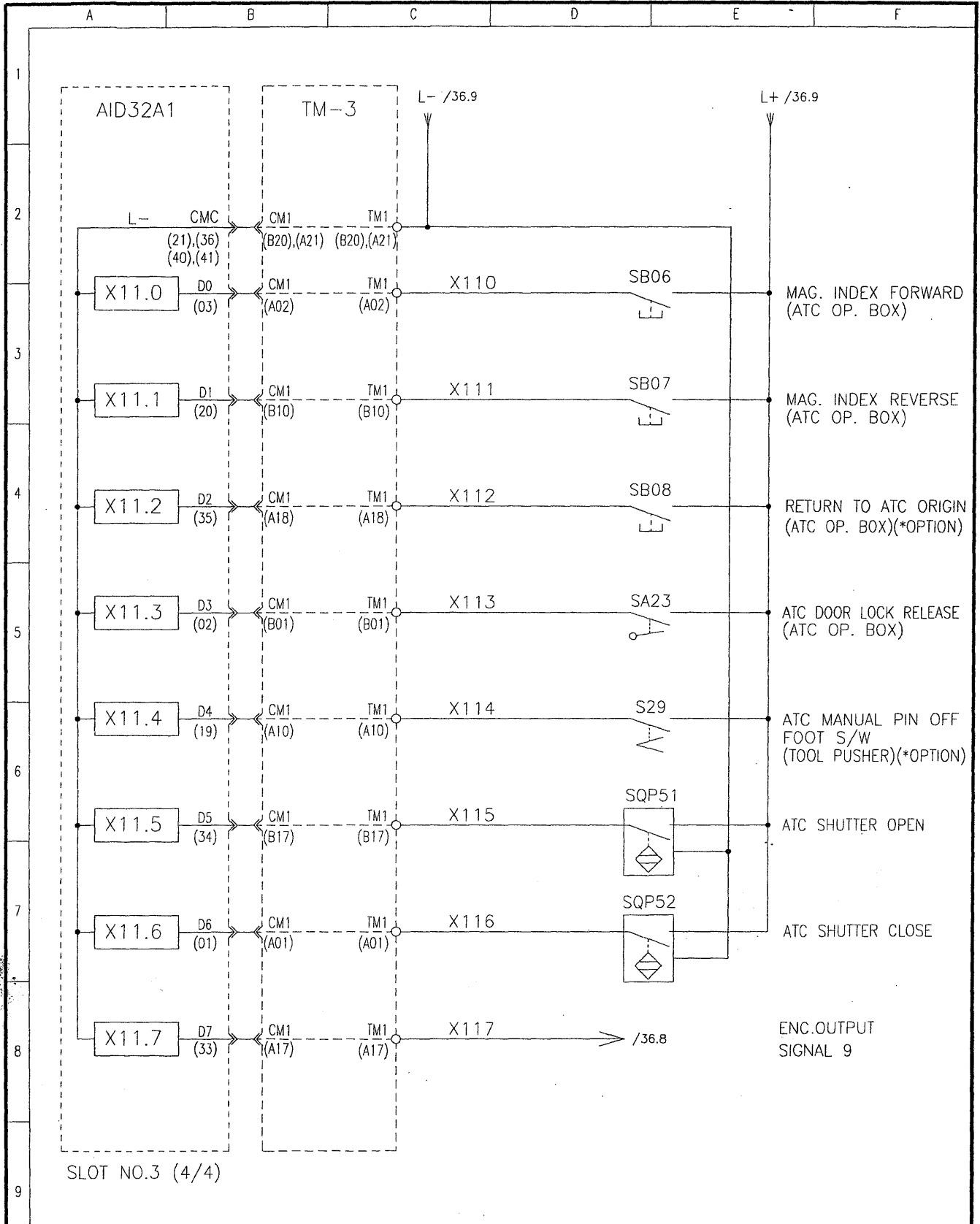


SLOT NO.3 (2/4)

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.	TITLE			DC24V INPUT	DATE	
				2007.07		

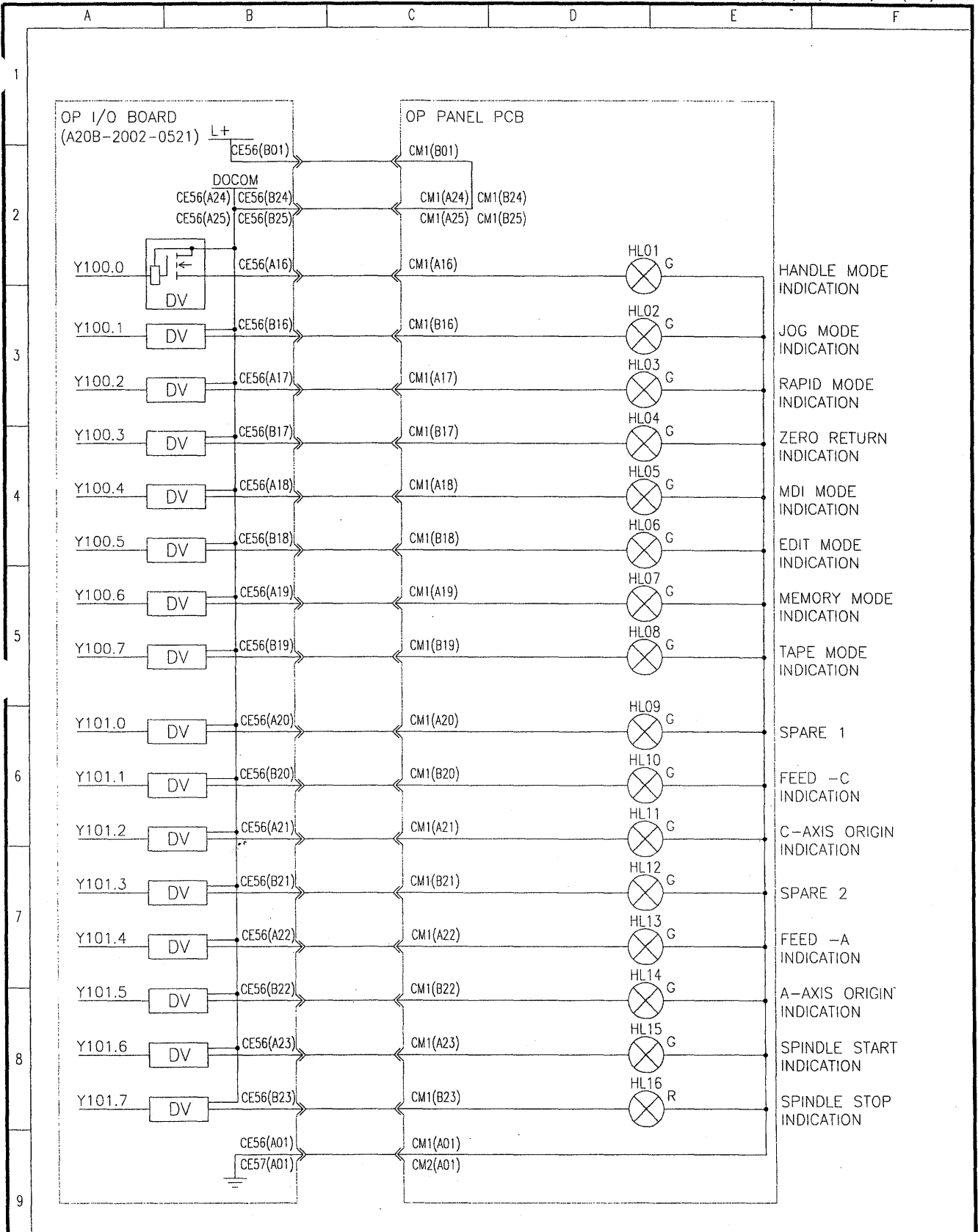


MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.		TITLE	DC24V INPUT	DATE	2007.07	

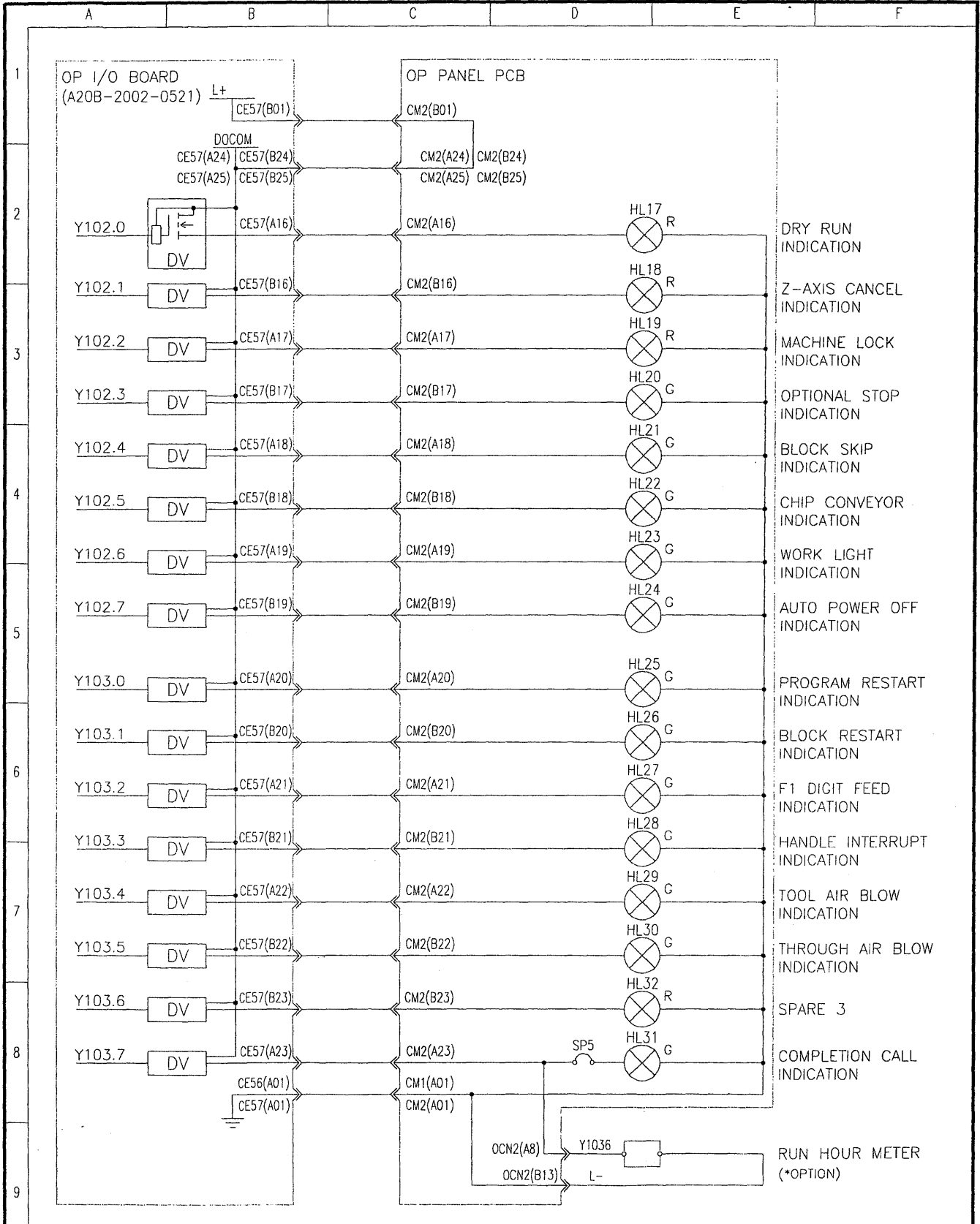


SLOT NO.3 (4/4)

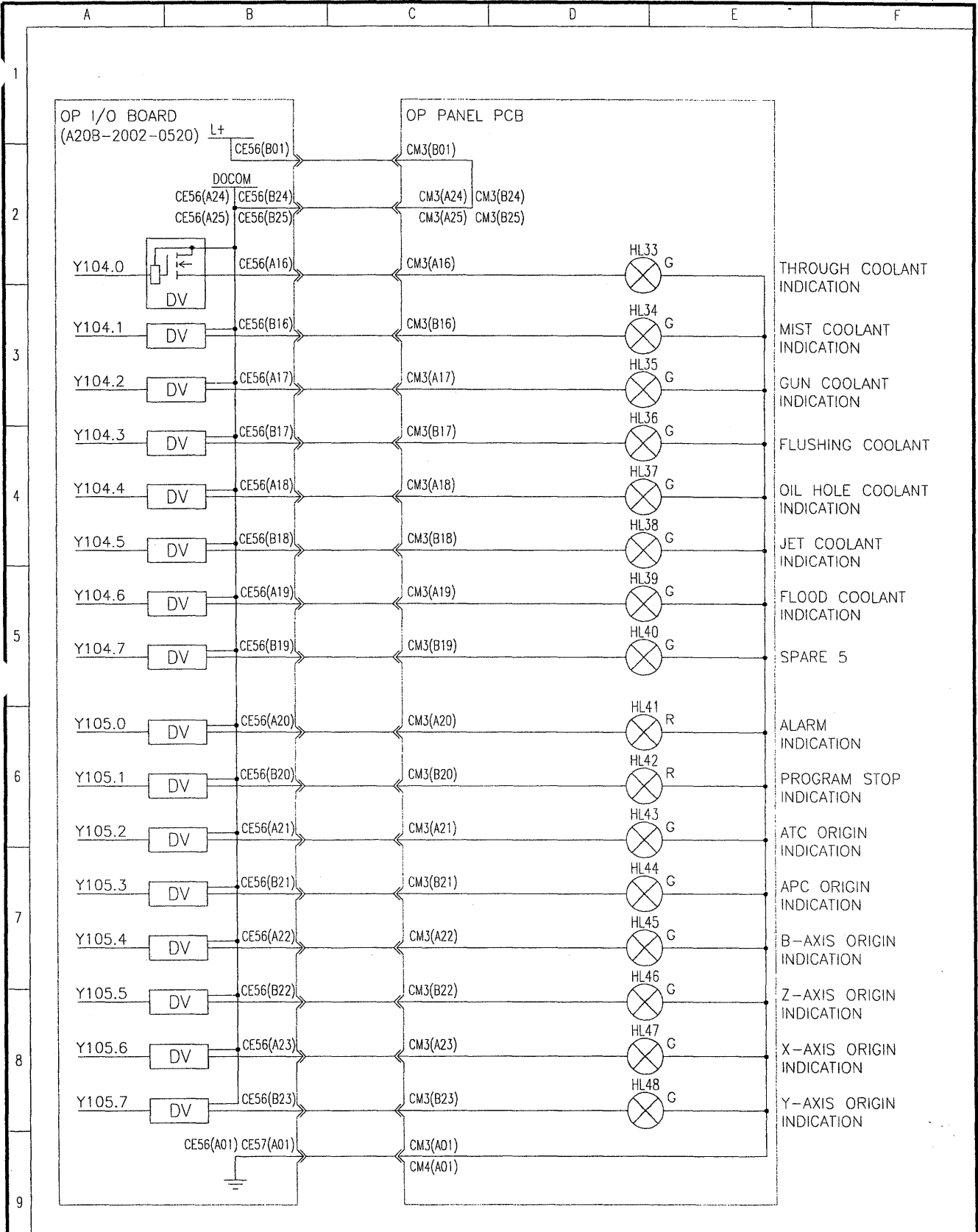
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.		TITLE	DC24V INPUT	DATE	2007.07	



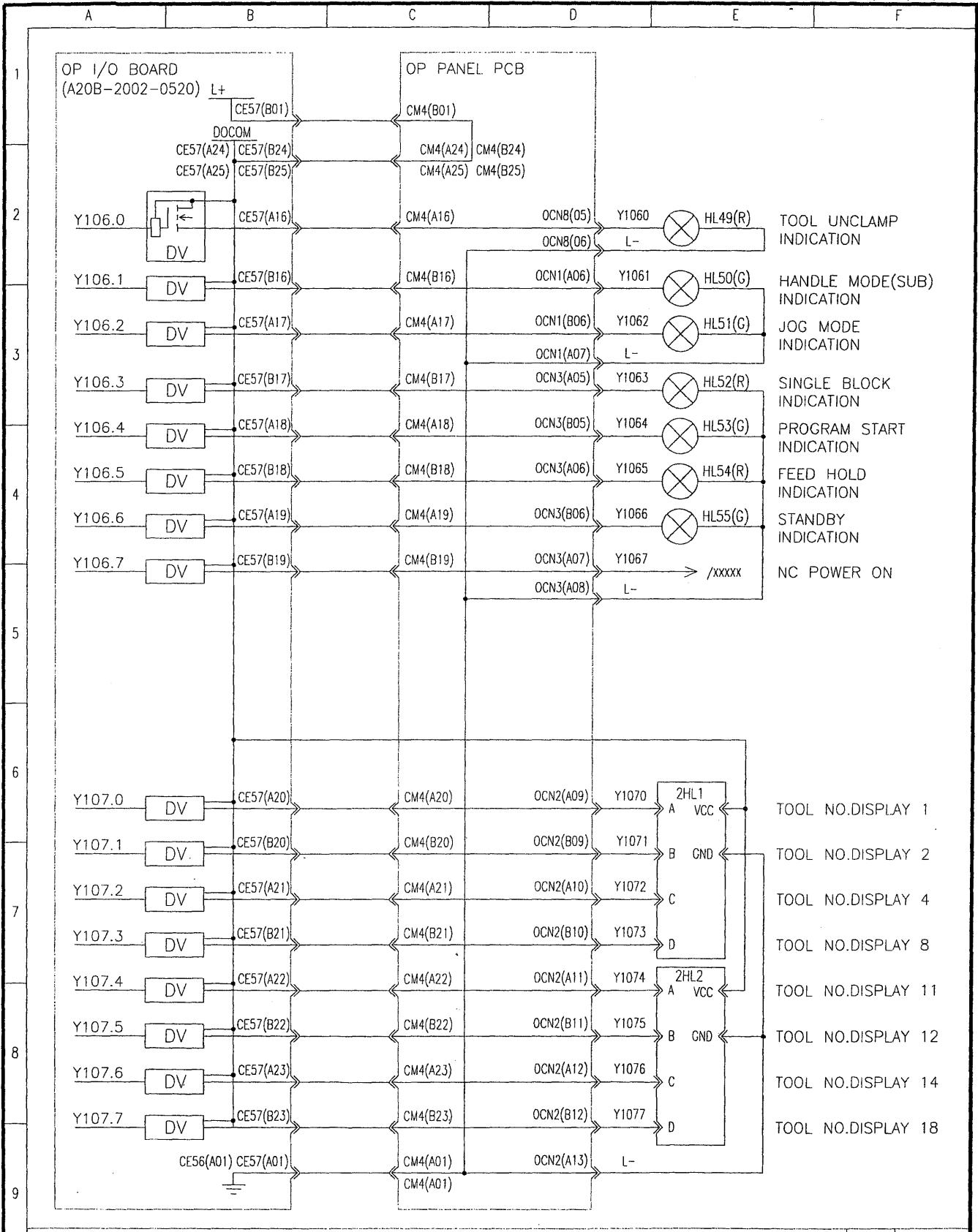
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)				DESIGN	CHECKED	APPROVED
					DWG No.	TITLE	OP.PCB OUTPUT1



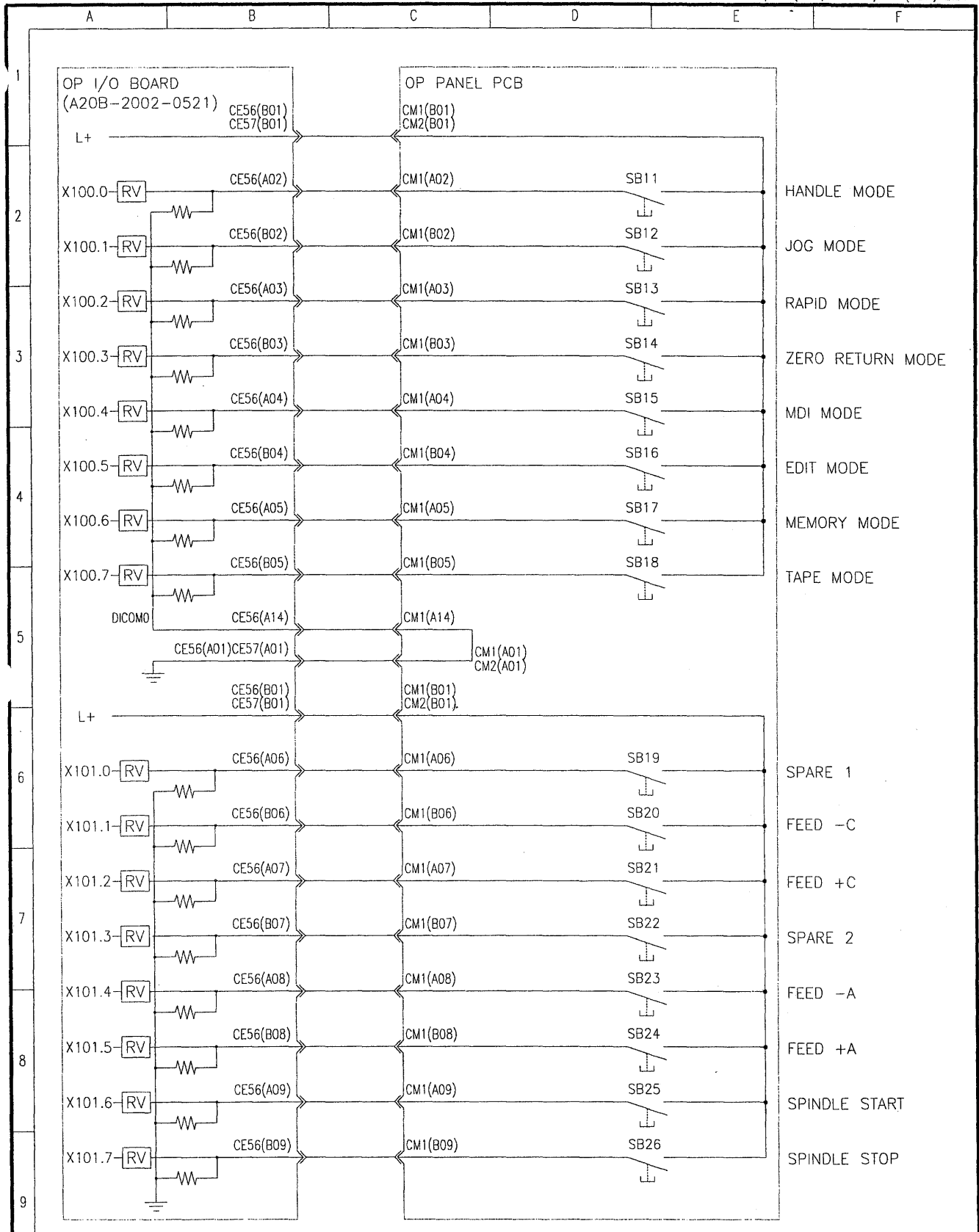
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.	TITLE		DATE		
	OP.PCB OUTPUT2		2007.07		



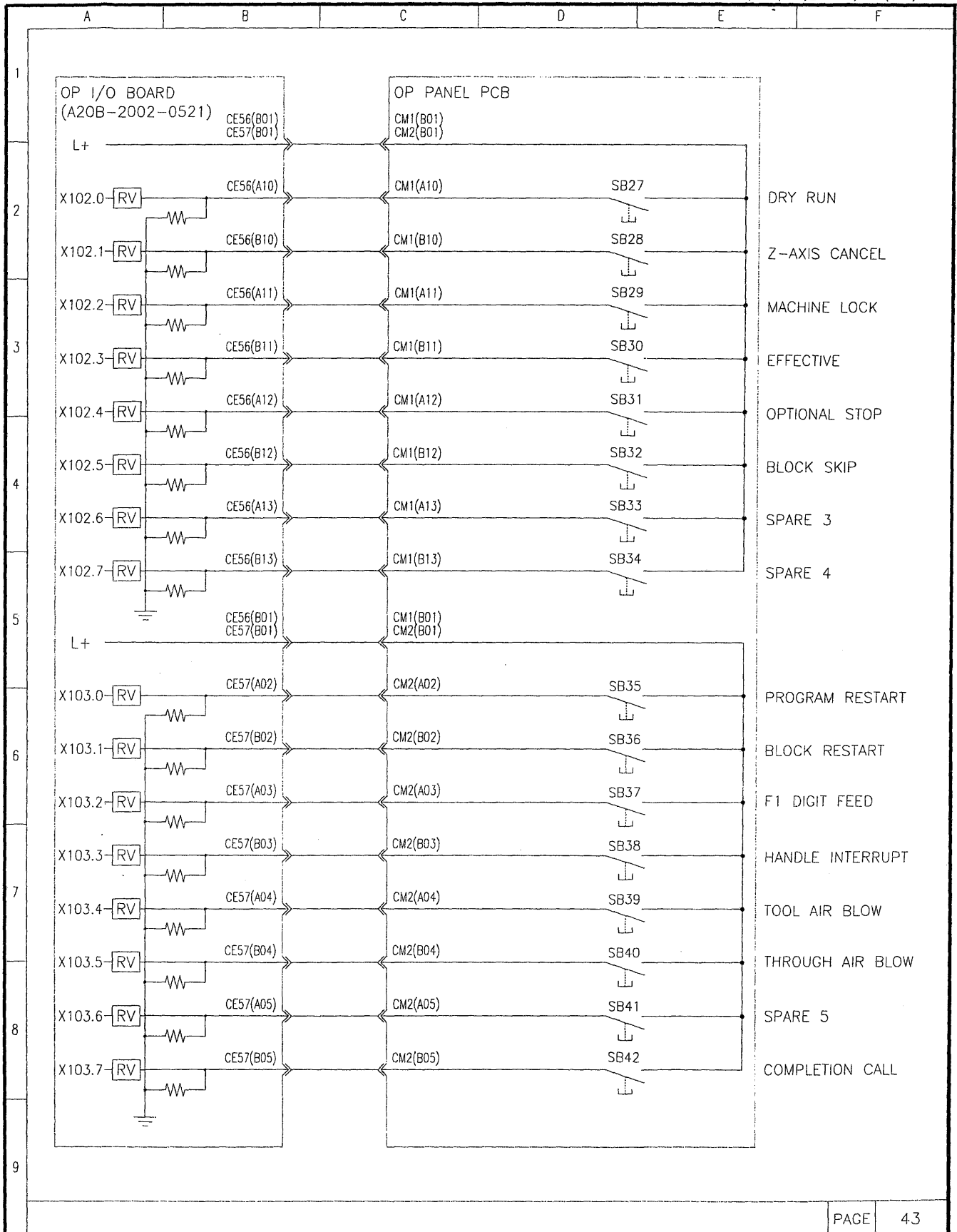
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.		TITLE	OP.PCB OUTPUT3	DATE	2007.07	



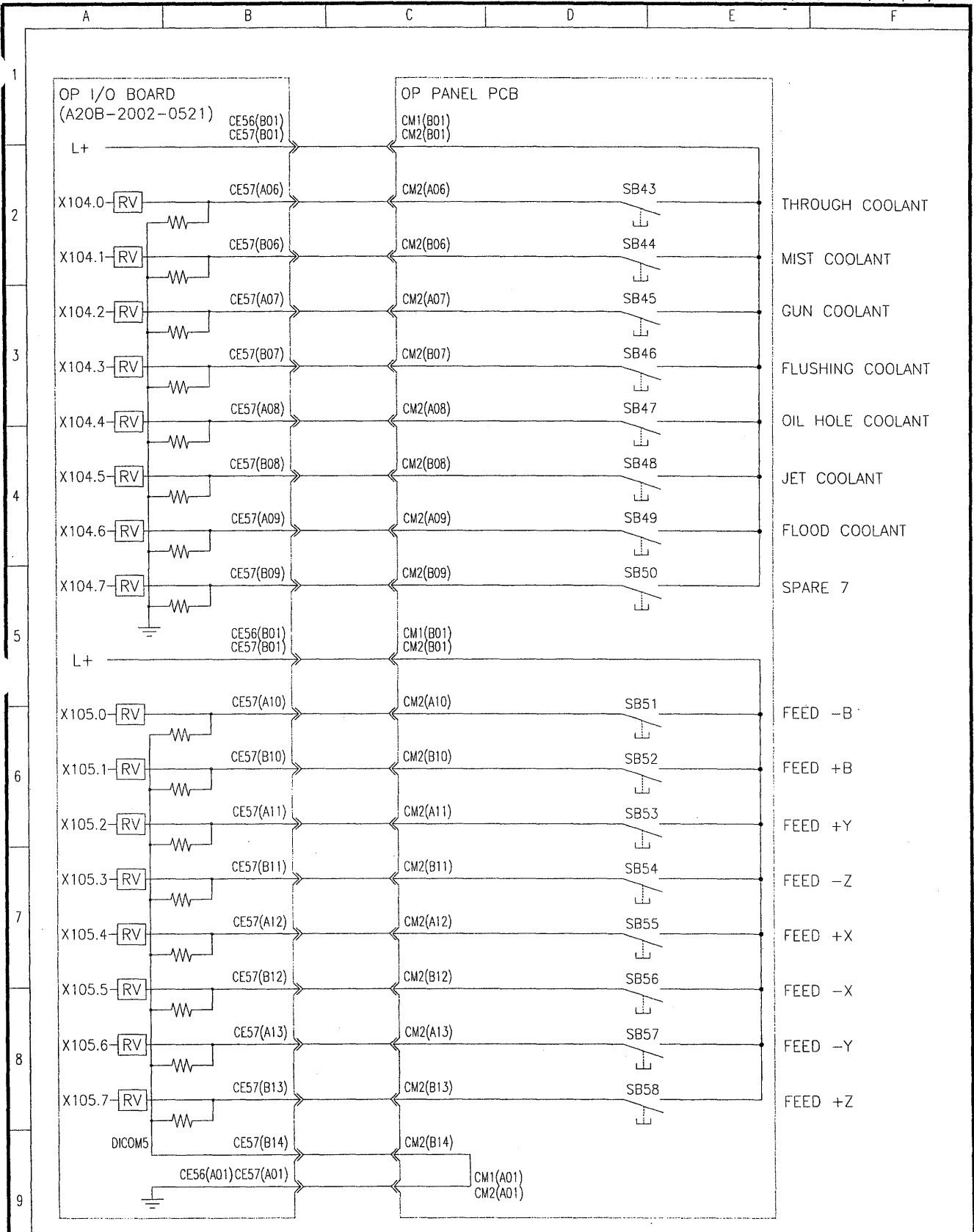
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.				TITLE	OP.PCB OUTPUT4	DATE



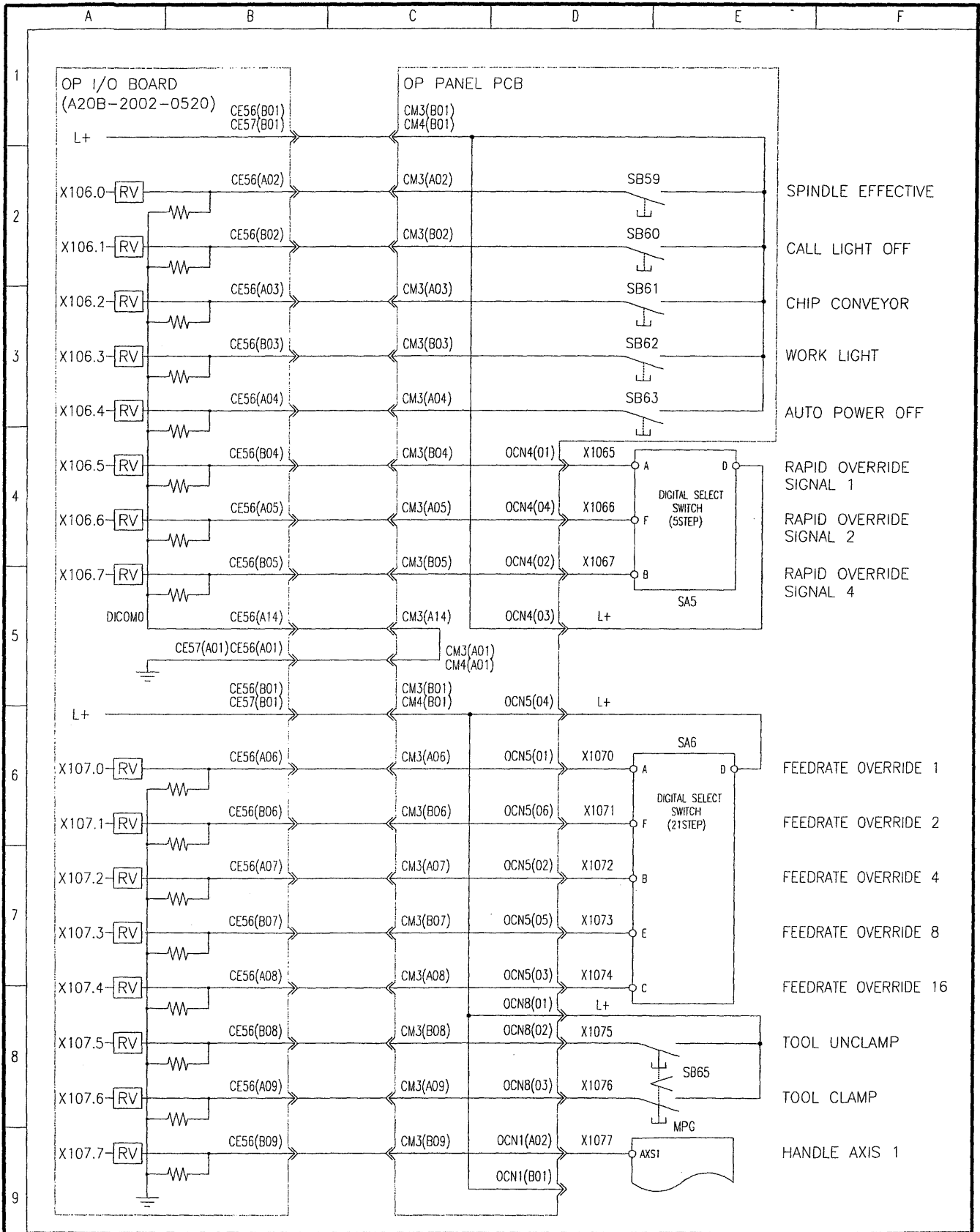
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.				TITLE	OP.PCB INPUT 1	DATE



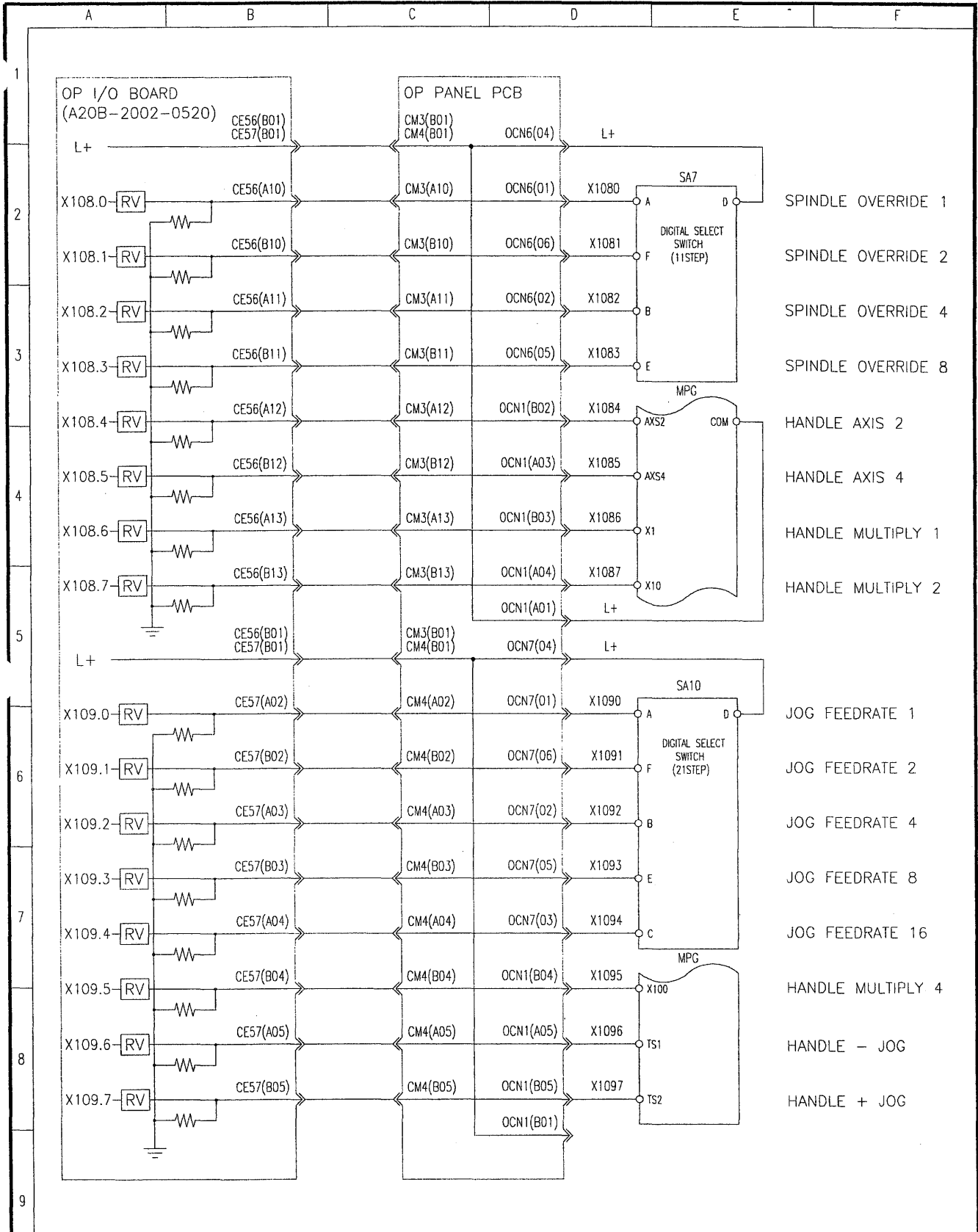
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.			TITLE	DATE	
			OP.PCB INPUT2	2007.07	



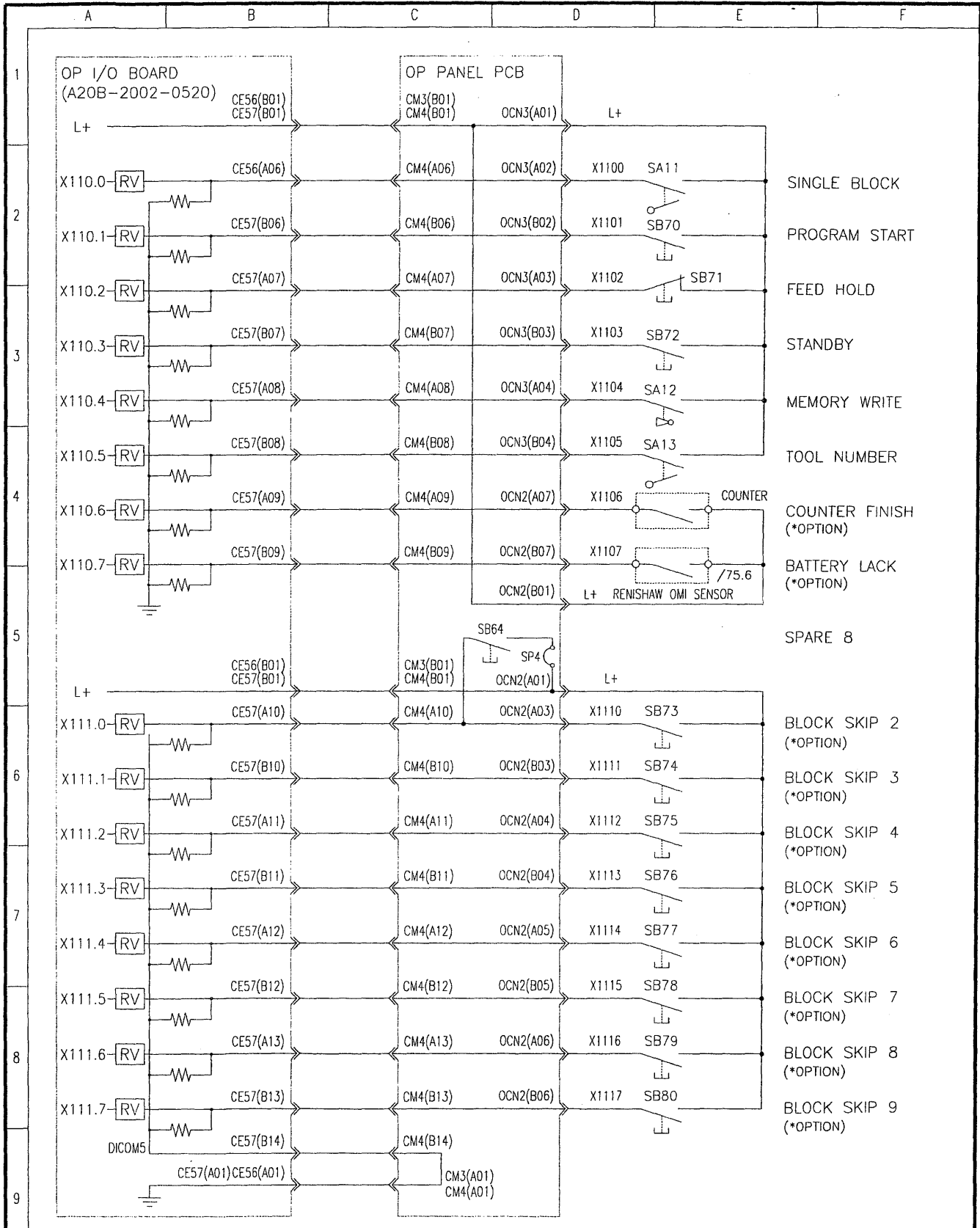
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.	TITLE			OP.PCB INPUT3	DATE	
				2007.07		



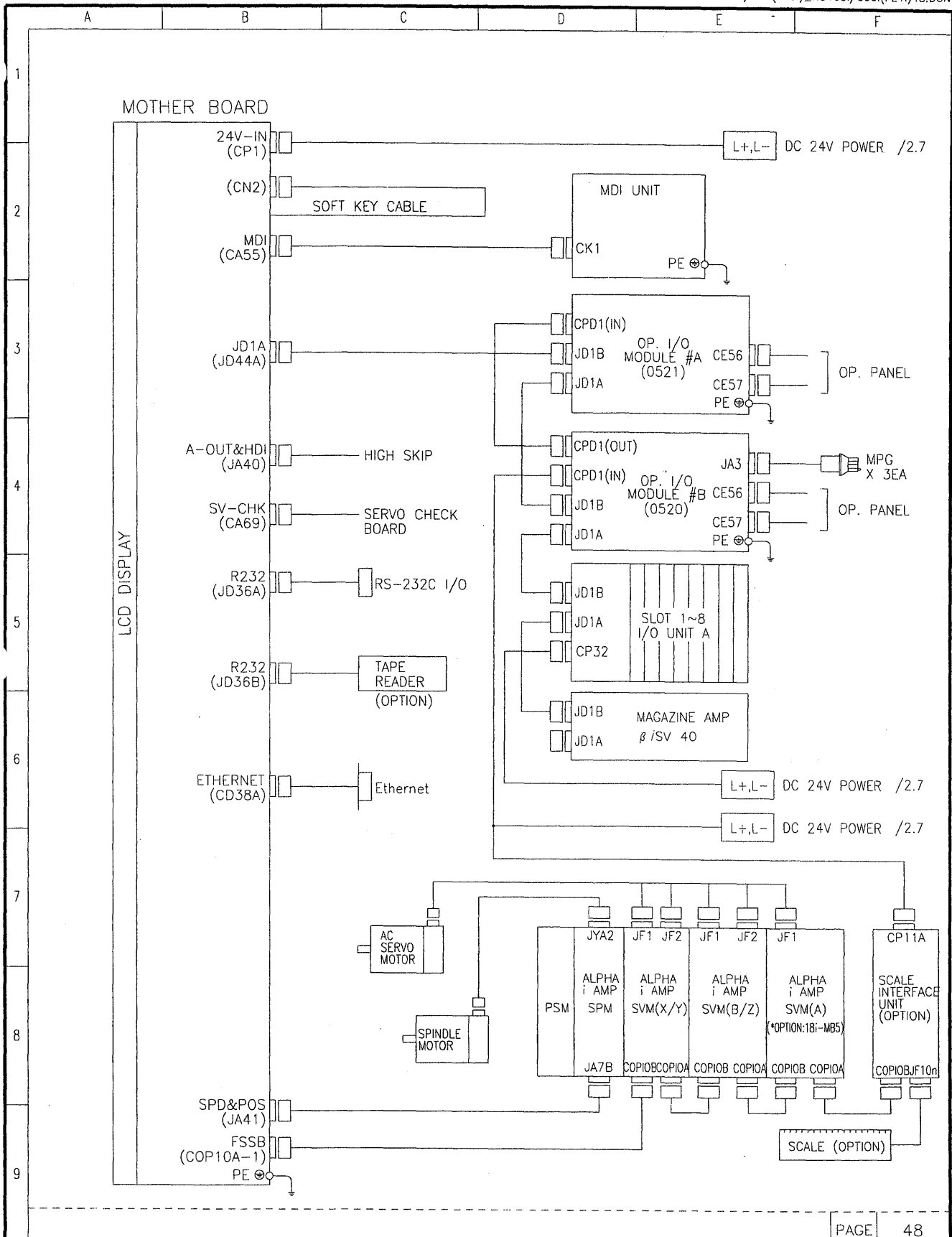
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.		TITLE	OP.PCB INPUT4	DATE		
				2007.07		



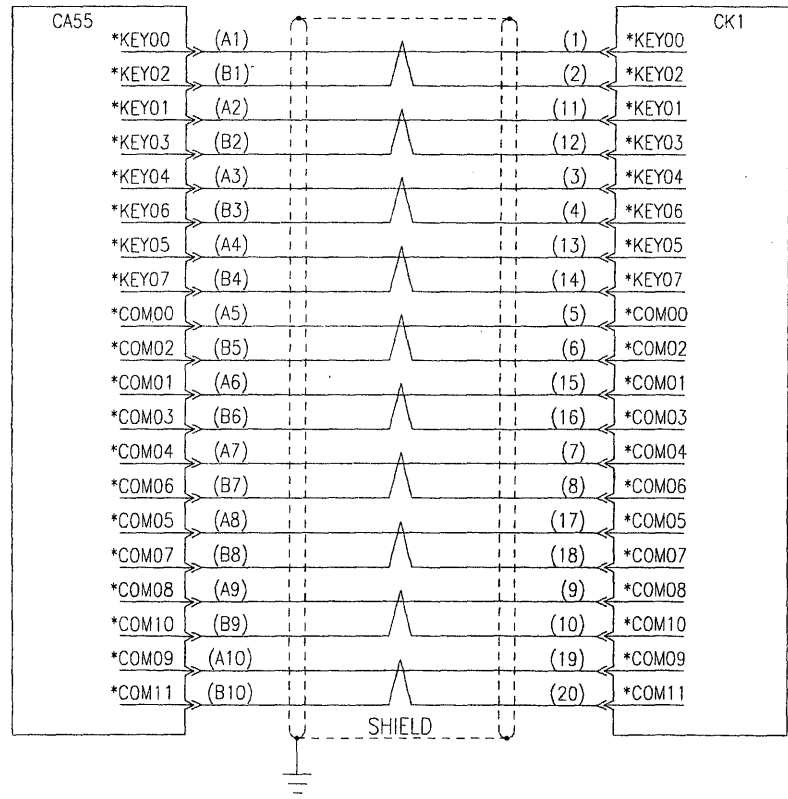
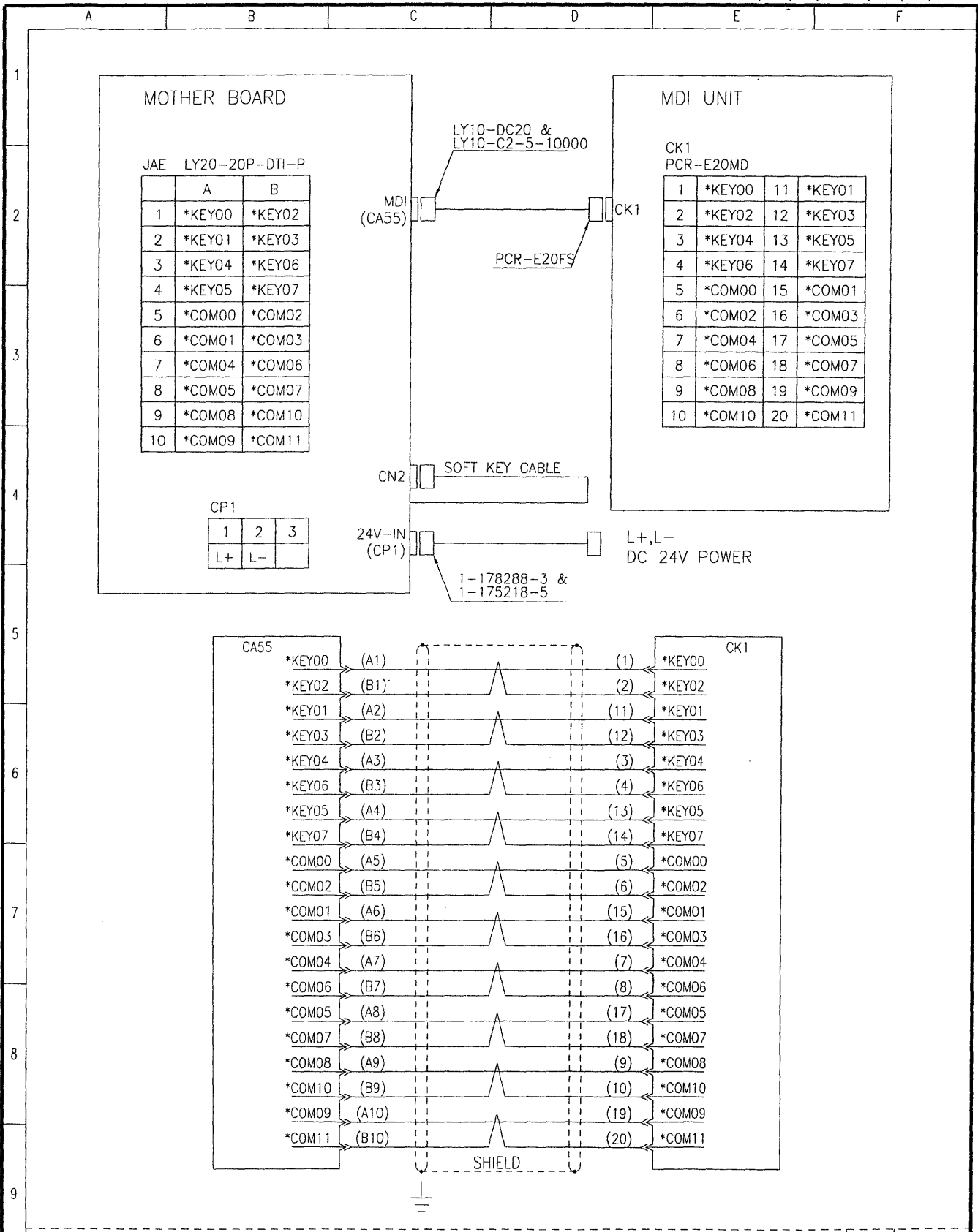
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION			DESIGN	CHECKED	APPROVED
DWG No.		TITLE	OP.PCB INPUT5	DATE			
				2007.07			



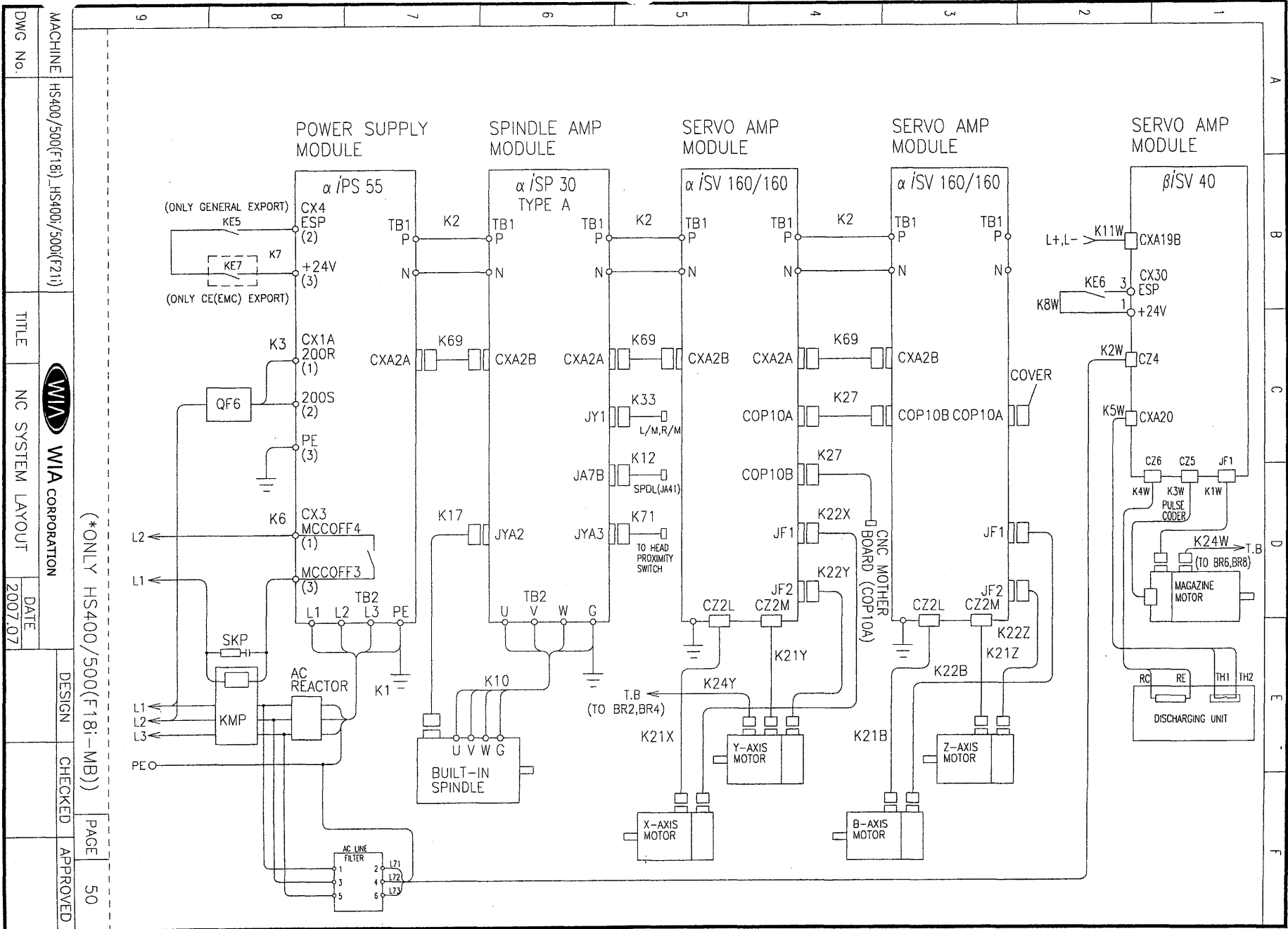
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.	TITLE			OP.PCB INPUT6	DATE	
				2007.07		



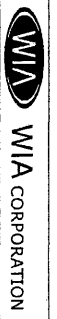
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.		TITLE	NC SYSTEM LAYOUT	DATE		
				2007.07		



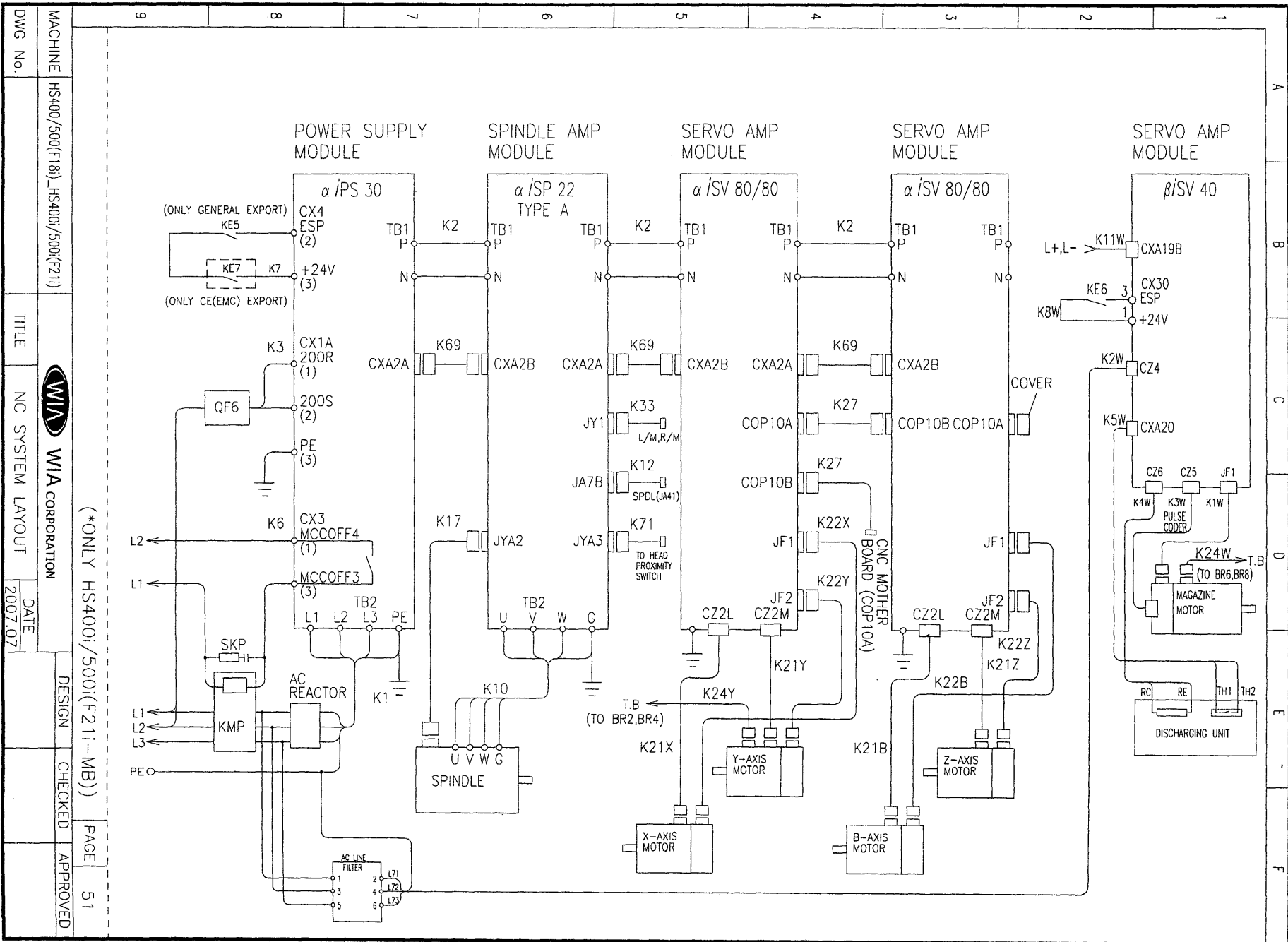
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.	TITLE		CNC & MDI/LCD	DATE	2007.07



DWG No.	MACHINE	TITLE	DATE	DESIGN	CHECKED	APPROVED
	HS400/500(F18)_HS400/500(F21)	NC SYSTEM LAYOUT	2007.07			
			(ONLY HS400/500(F18-MB))			
			PAGE 50			



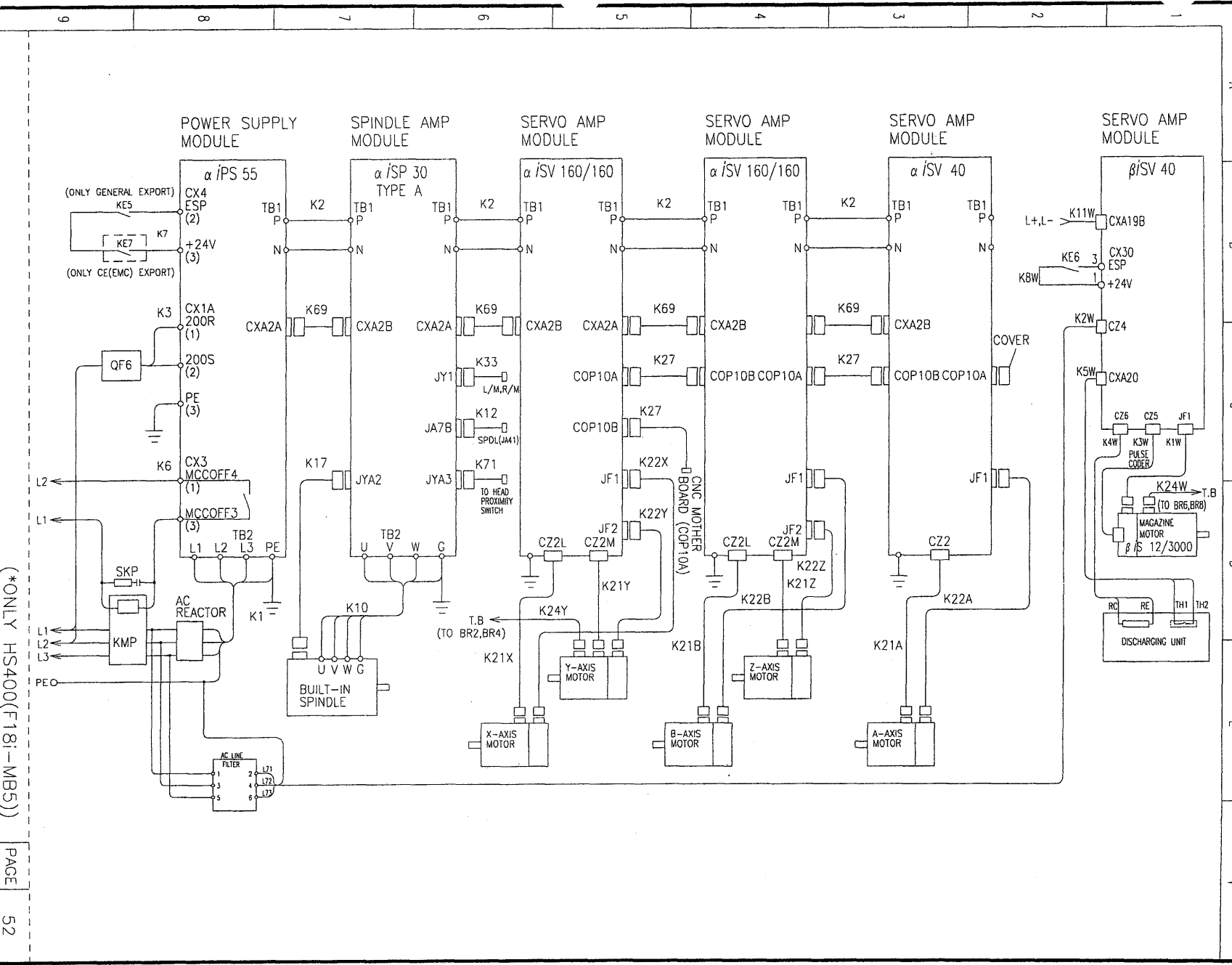
HS400/500(F18)_HS400/500(F21)50.DGN



DWG No.	MACHINE	TITLE	DATE	DESIGN	CHECKED	APPROVED
	HS400/500(F18)_HS400/500(F21)	NC SYSTEM LAYOUT	2007.07			

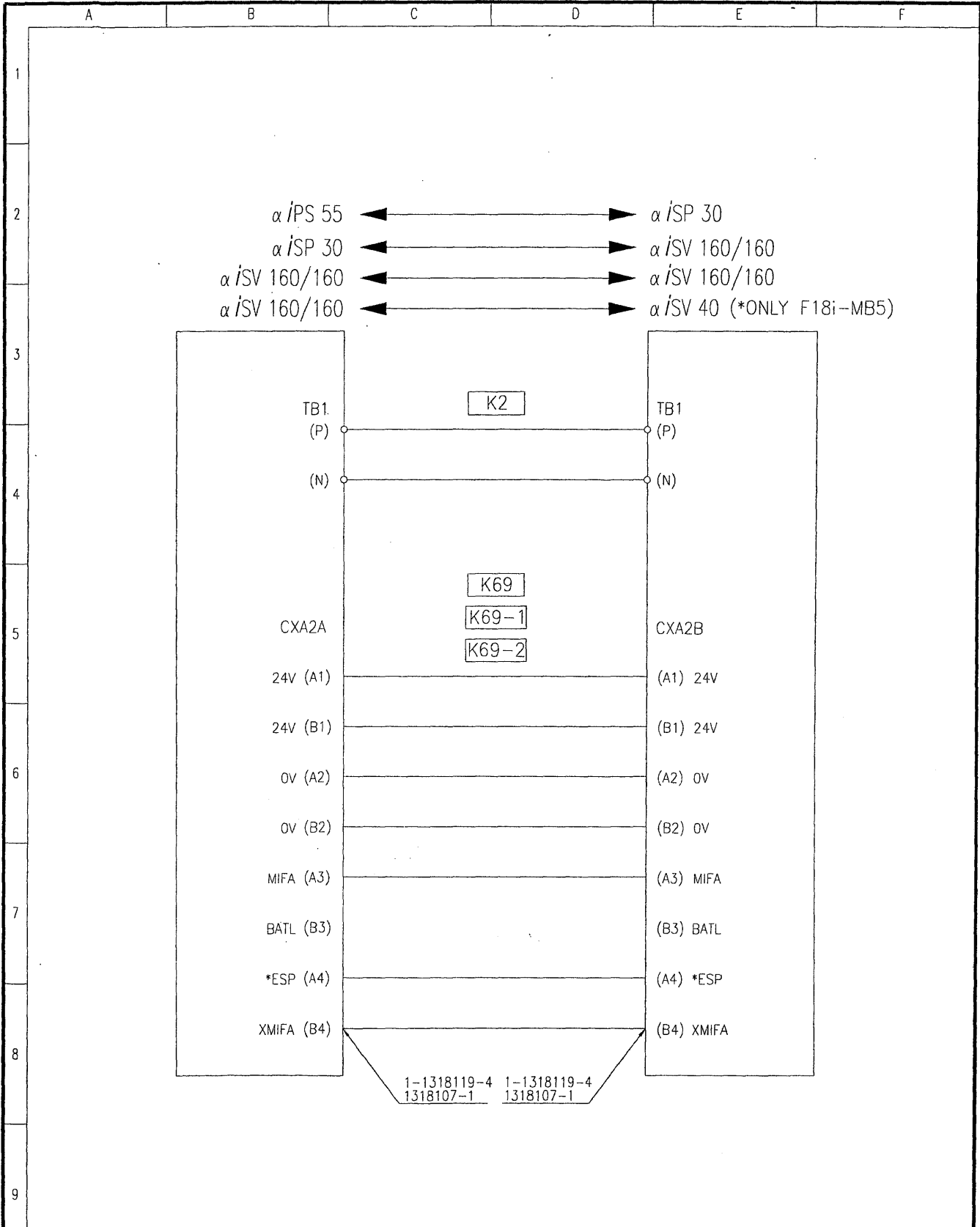
(ONLY HS400/500(F21-MB))

HS400/500(F18)_HS400/500(F21)51.DGN



(*ONLY HS400(F18)-MB5)

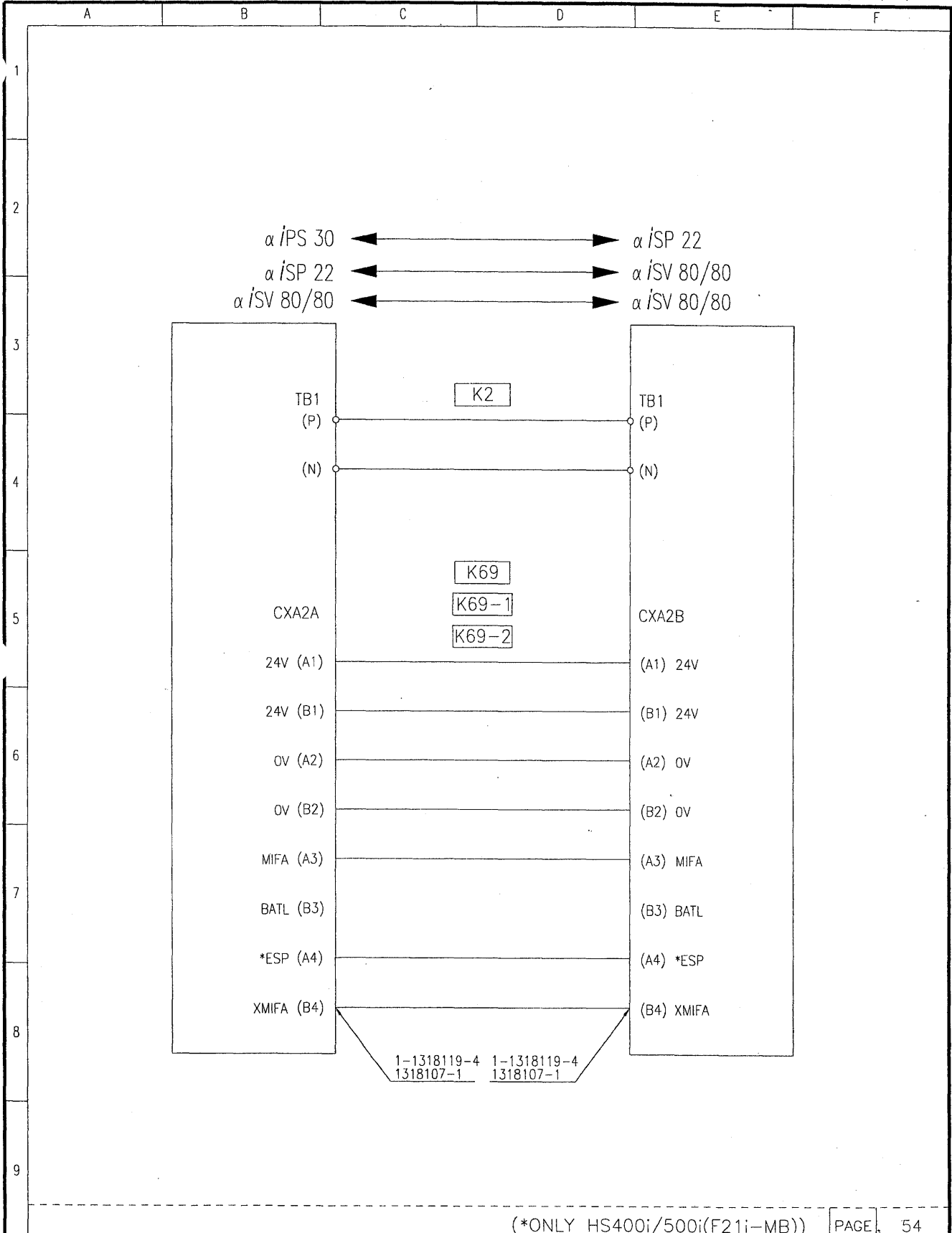
DWG No.	AACHINE HS400/500(F18)_HS400/500(F21)
TITLE	NC SYSTEM LAYOUT
DATE	2007.07
DESIGN	WIA CORPORATION
CHECKED	
APPROVED	
PAGE	52



1-1318119-4 1-1318119-4
1318107-1 1318107-1

(*ONLY HS400/500(F18i-MB)) PAGE 53

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.				TITLE	PSM/SPINDLE INTERFACE	DATE

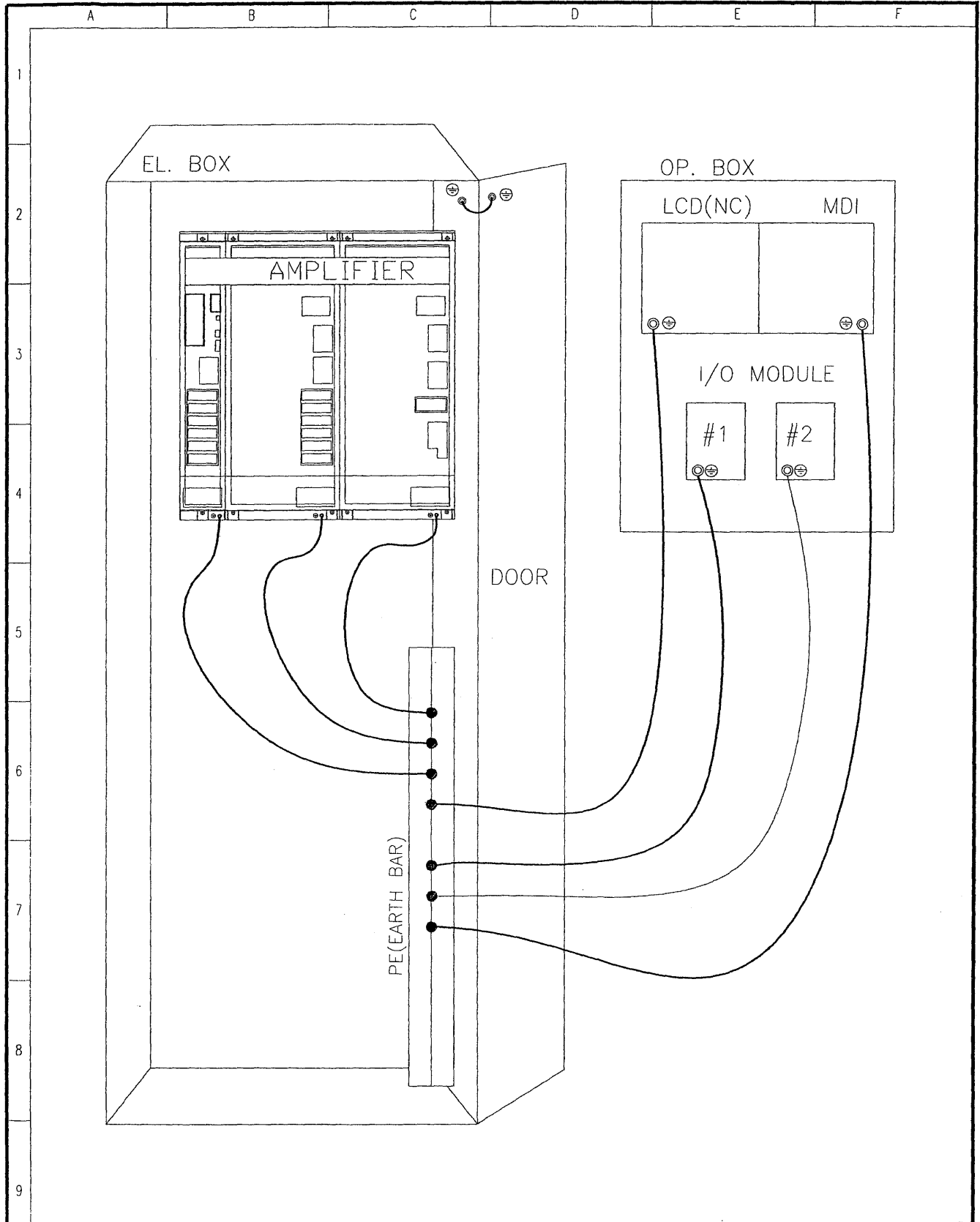


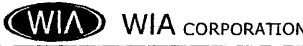
1-1318119-4 1-1318119-4
1318107-1 1318107-1

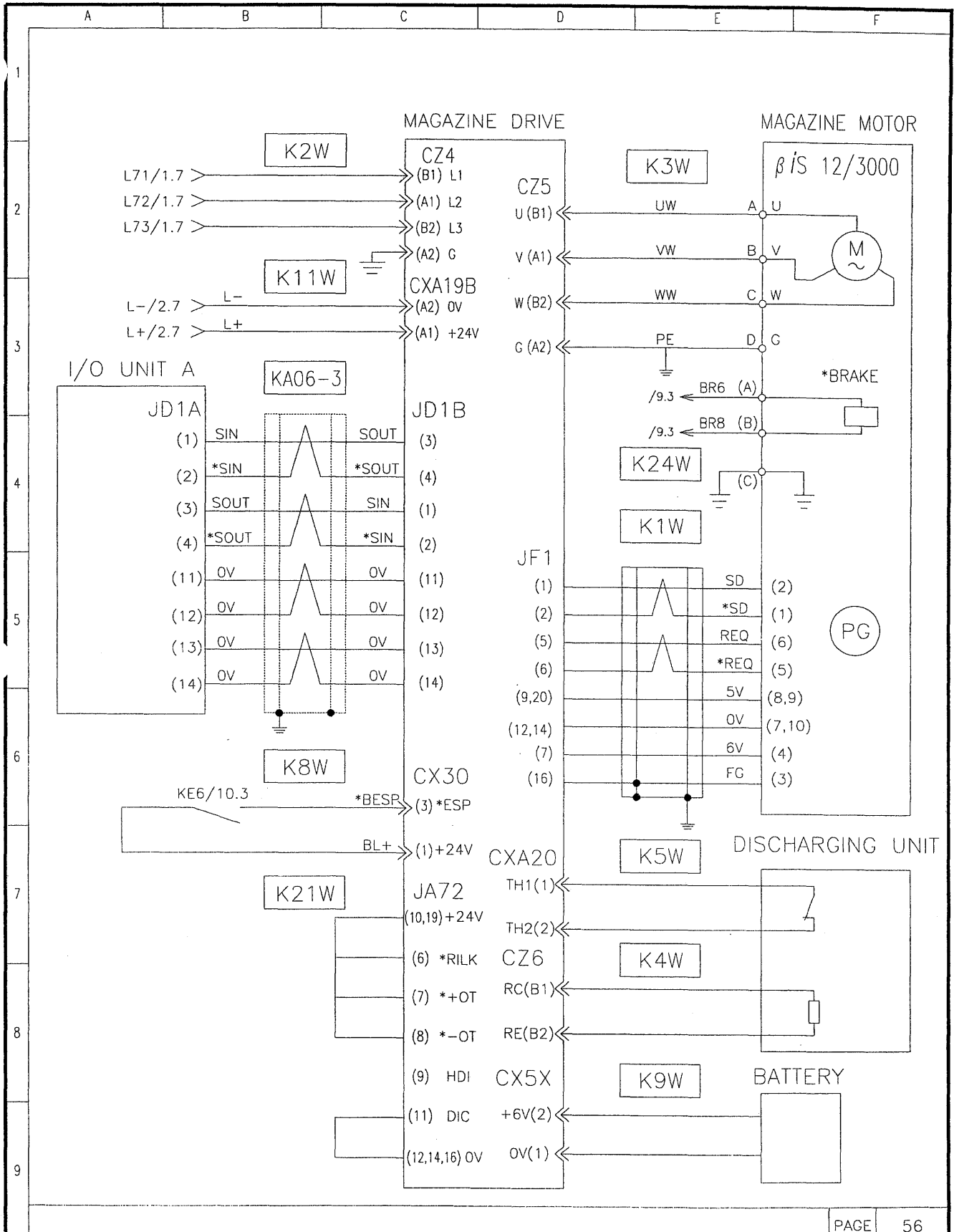
(*ONLY HS400i/500i(F21i-MB))

PAGE 54

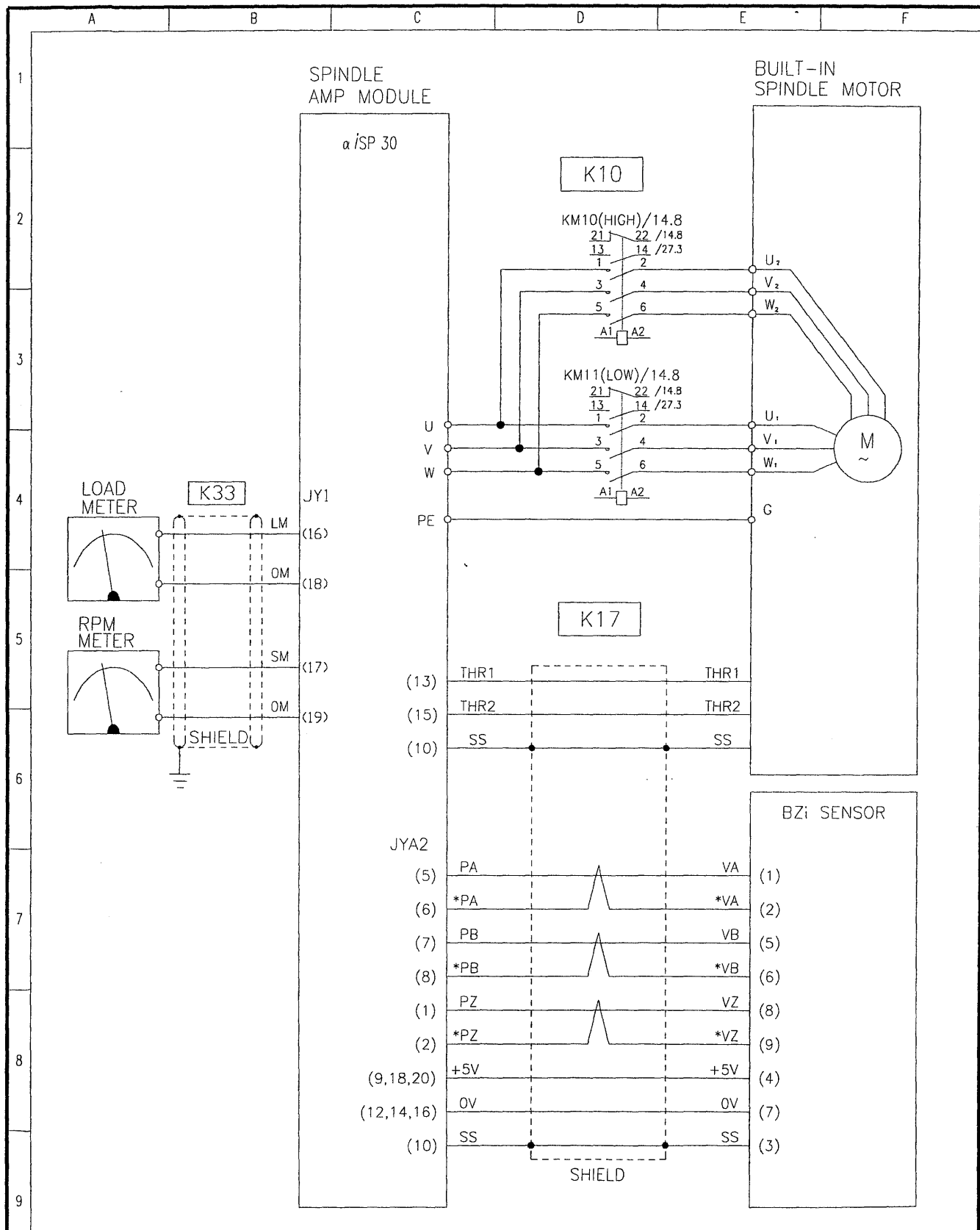
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.				TITLE	PSM/SPINDLE INTERFACE	DATE



					PAGE	55	
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)				DESIGN	CHECKED	APPROVED
DWG No.		TITLE	EARTH LAYOUT	DATE			
				2007.07			

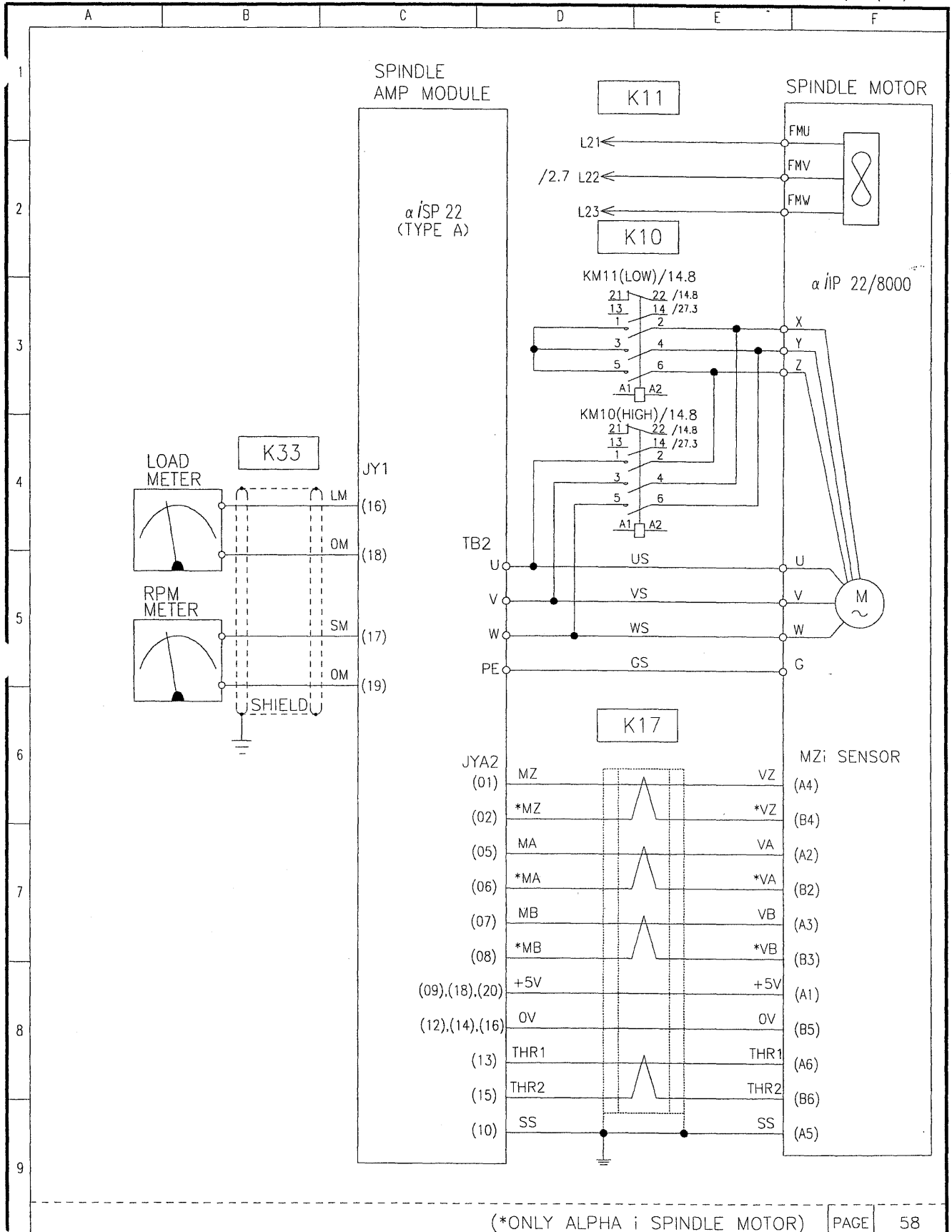


MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA CORPORATION	DESIGN	CHECKED	APPROVED
DWG No.	TITLE		MAGAZINE WIRING	DATE	
			2007.07		



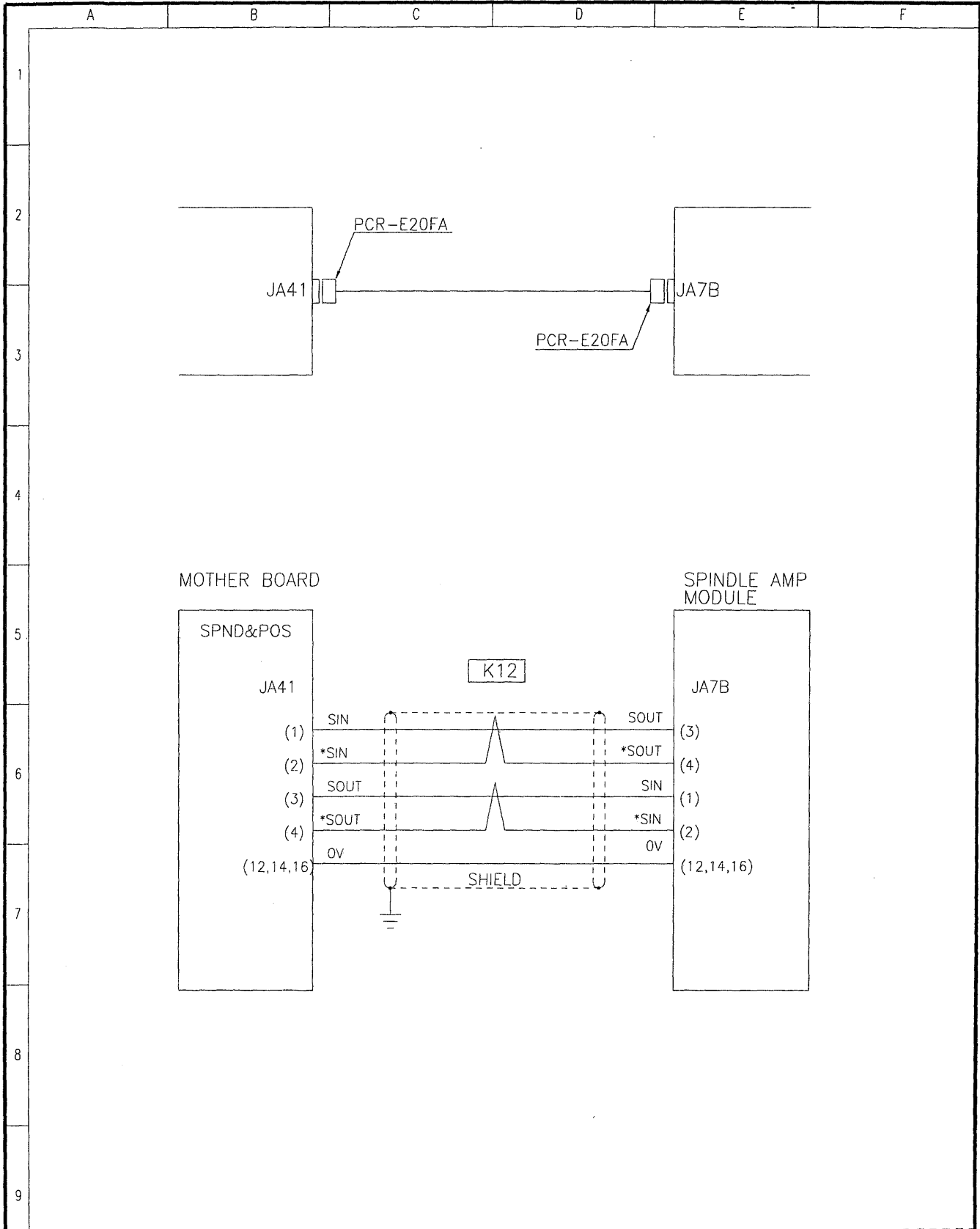
(*ONLY BUILT-IN SPINDLE MOTOR) PAGE 57

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.			TITLE	DATE	
		SPINDLE AMP & MOTOR	2007.07		

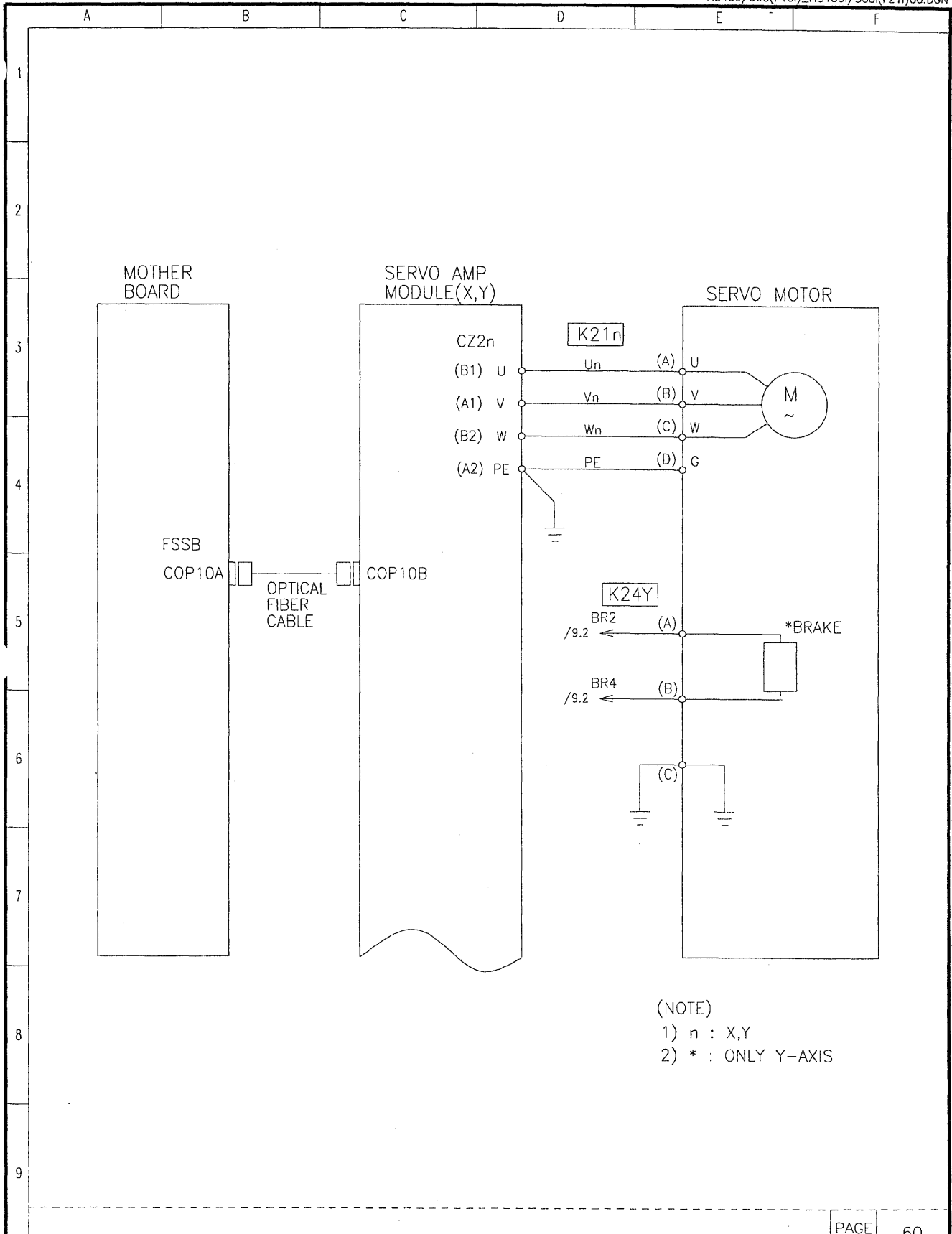


(*ONLY ALPHA i SPINDLE MOTOR) PAGE 58

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION	DESIGN	CHECKED	APPROVED
DWG No.			TITLE	DATE	
			SPINDLE AMP & MOTOR	2007.07	

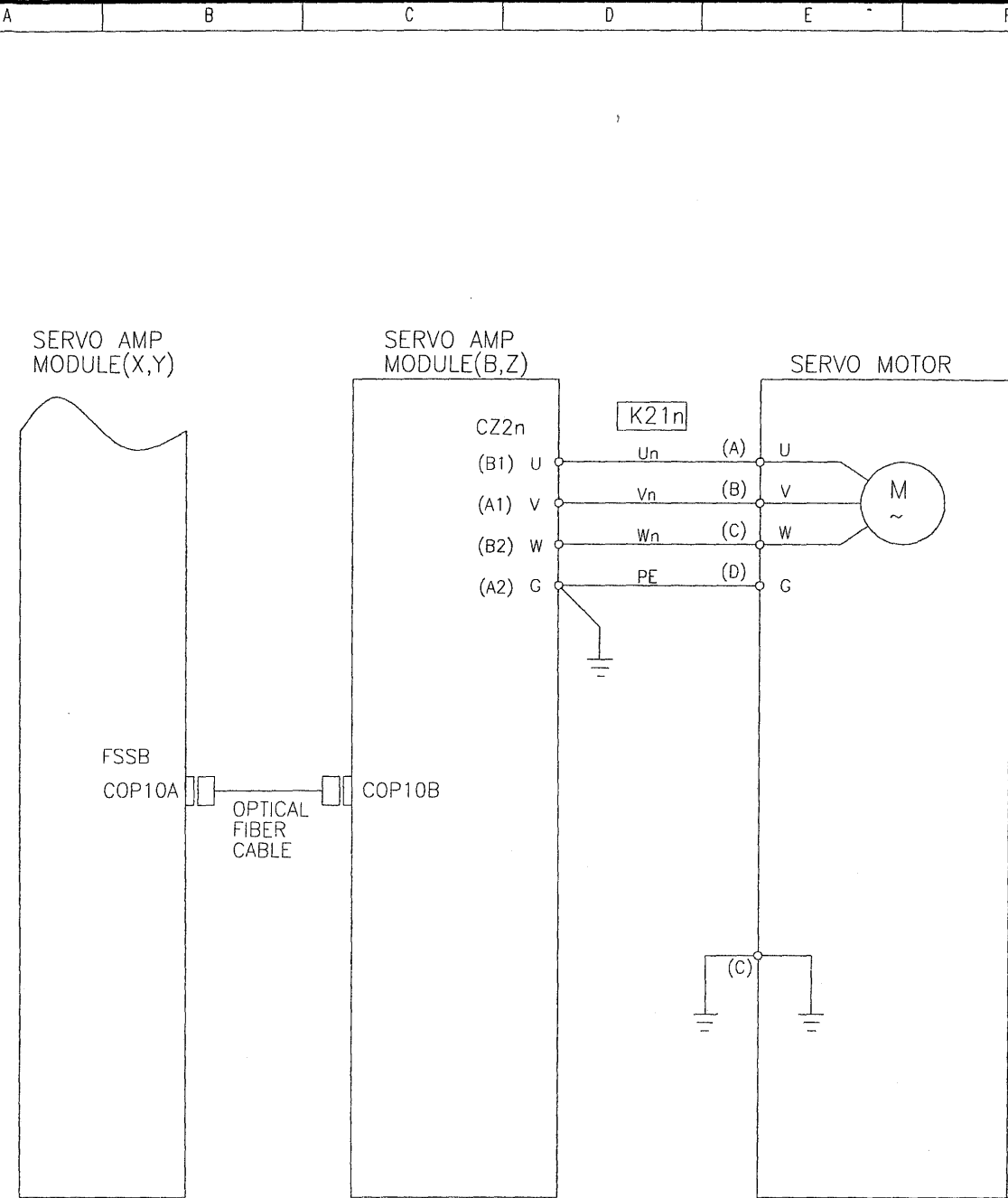


MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.				TITLE	CNC & SP. INTERFACE	DATE



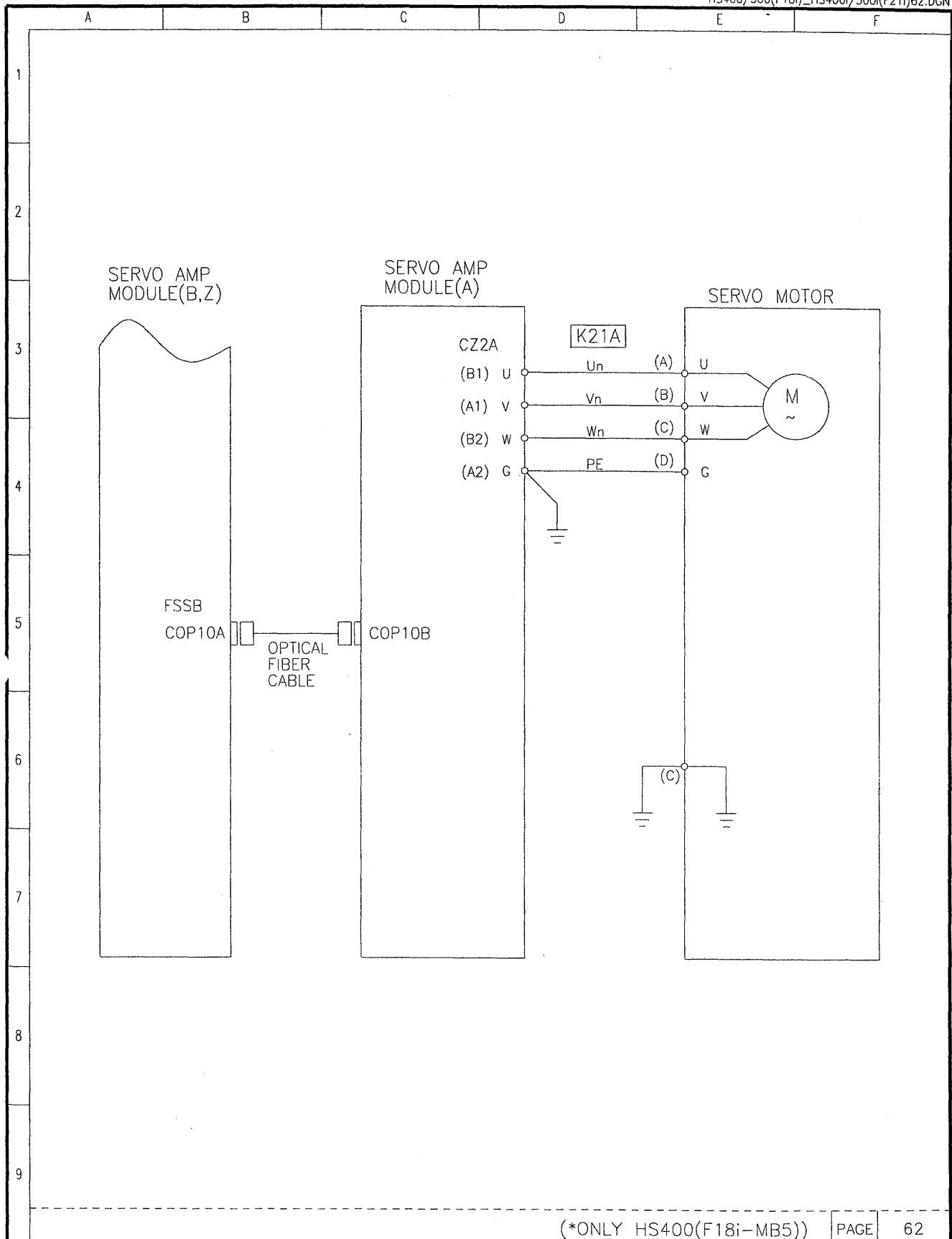
(NOTE)
 1) n : X,Y
 2) * : ONLY Y-AXIS

MACHINE		HS400/500(F18i)_HS400i/500i(F21i)				DESIGN	CHECKED	APPROVED
DWG No.	TITLE			SERVO & CNC INTERFACE		DATE		
						2007.07		



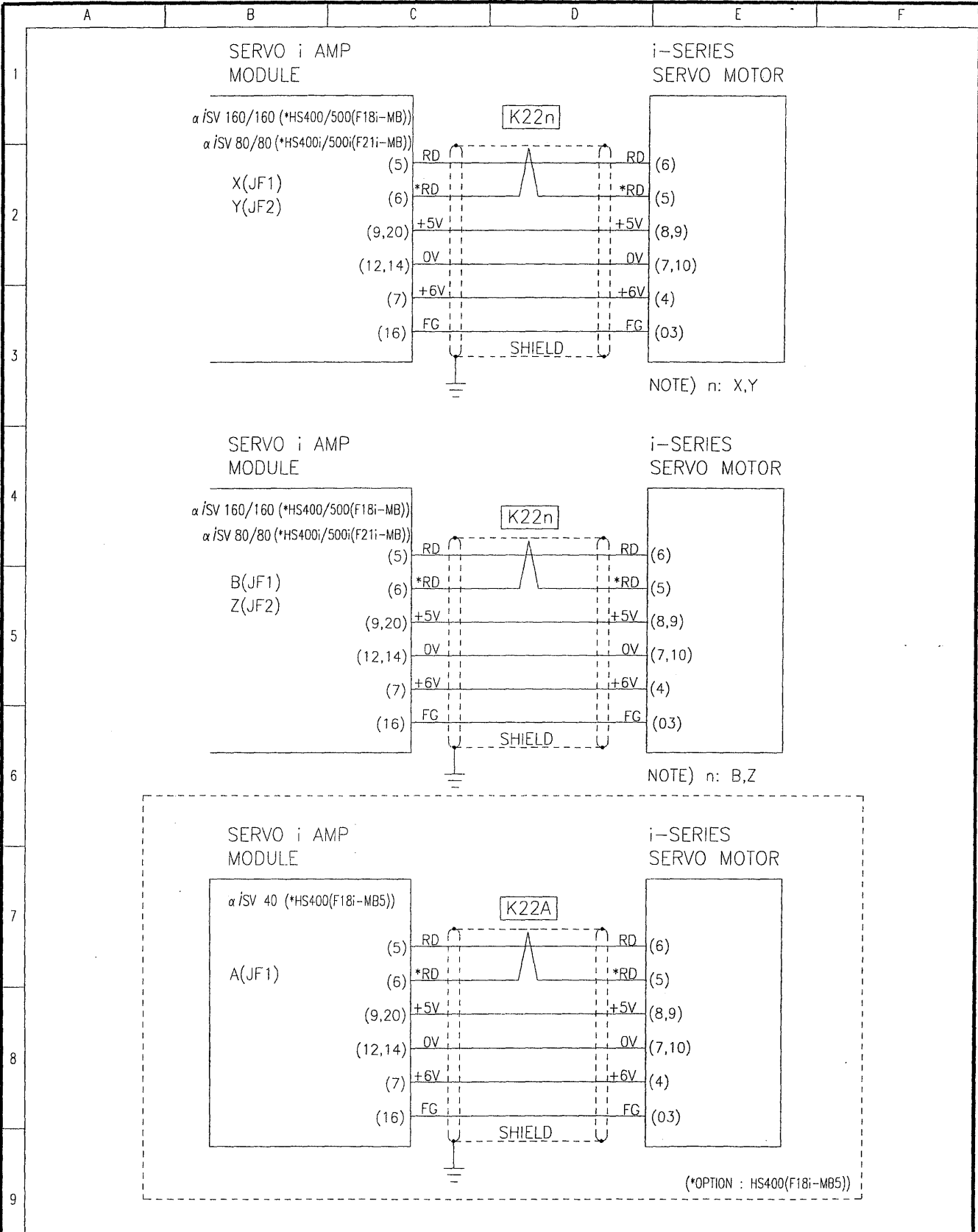
(NOTE)
1) n : B,Z

MACHINE		HS400/500(F18i)_HS400i/500i(F21i)				DESIGN		CHECKED		APPROVED	
DWG No.		TITLE				SERVO & CNC INTERFACE		DATE		2007.07	
										61	

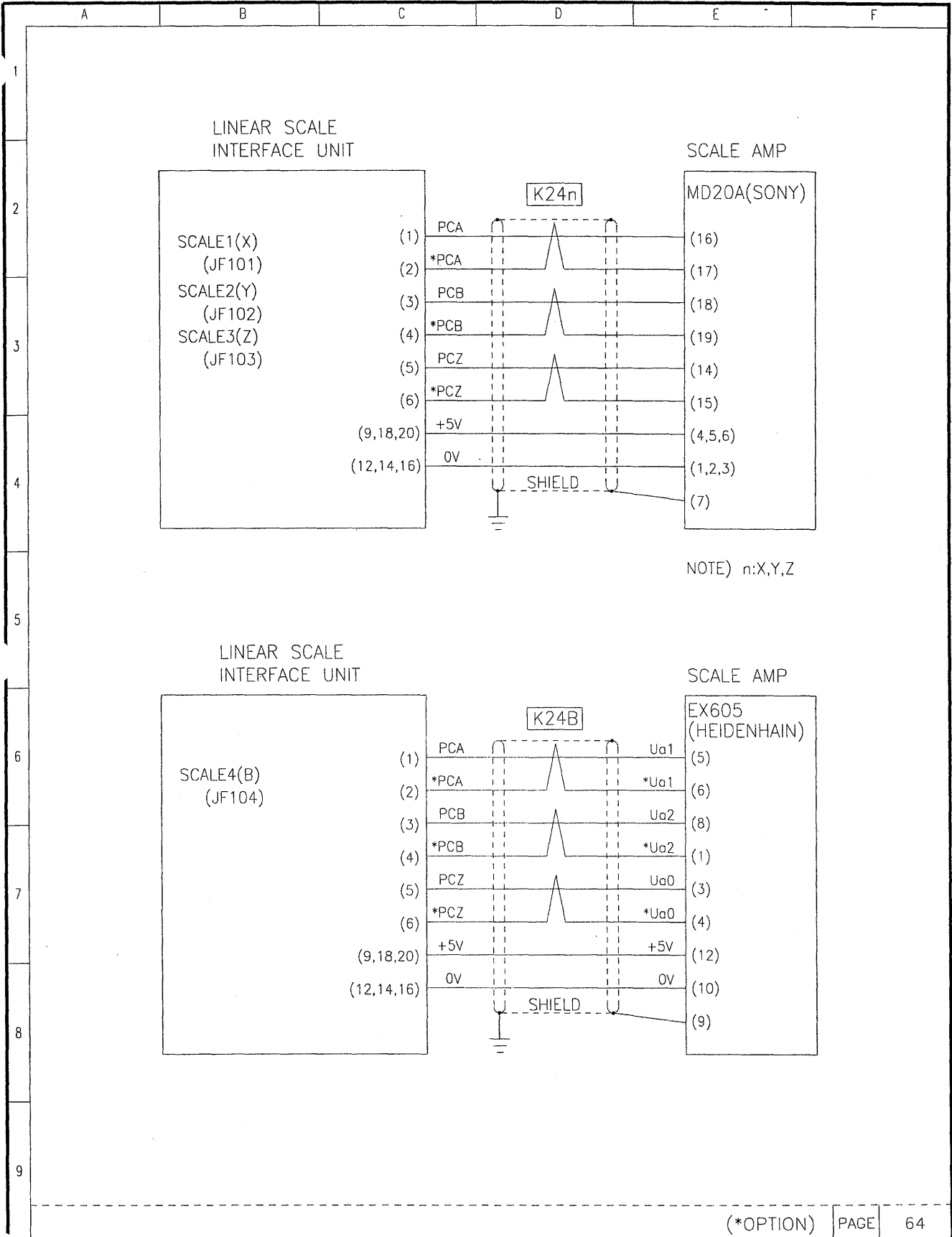


(*ONLY HS400(F18i-MB5)) PAGE 62

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.			TITLE	DATE	
		SERVO & CNC INTERFACE	2007.07		



MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.			TITLE	MOTOR & AMP INTERFACE	DATE



(*OPTION) PAGE 64

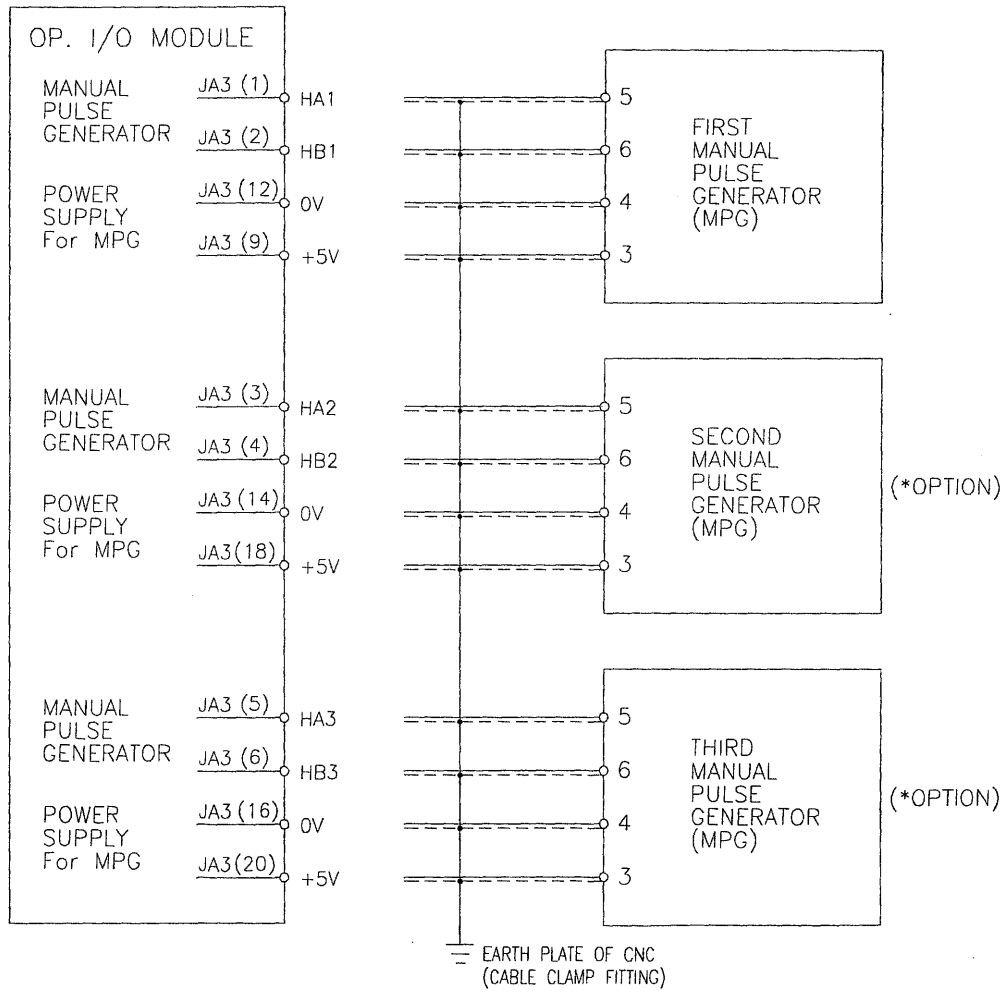
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.			TITLE	LINEAR SCALE INTERFACE	DATE

A B C D E F

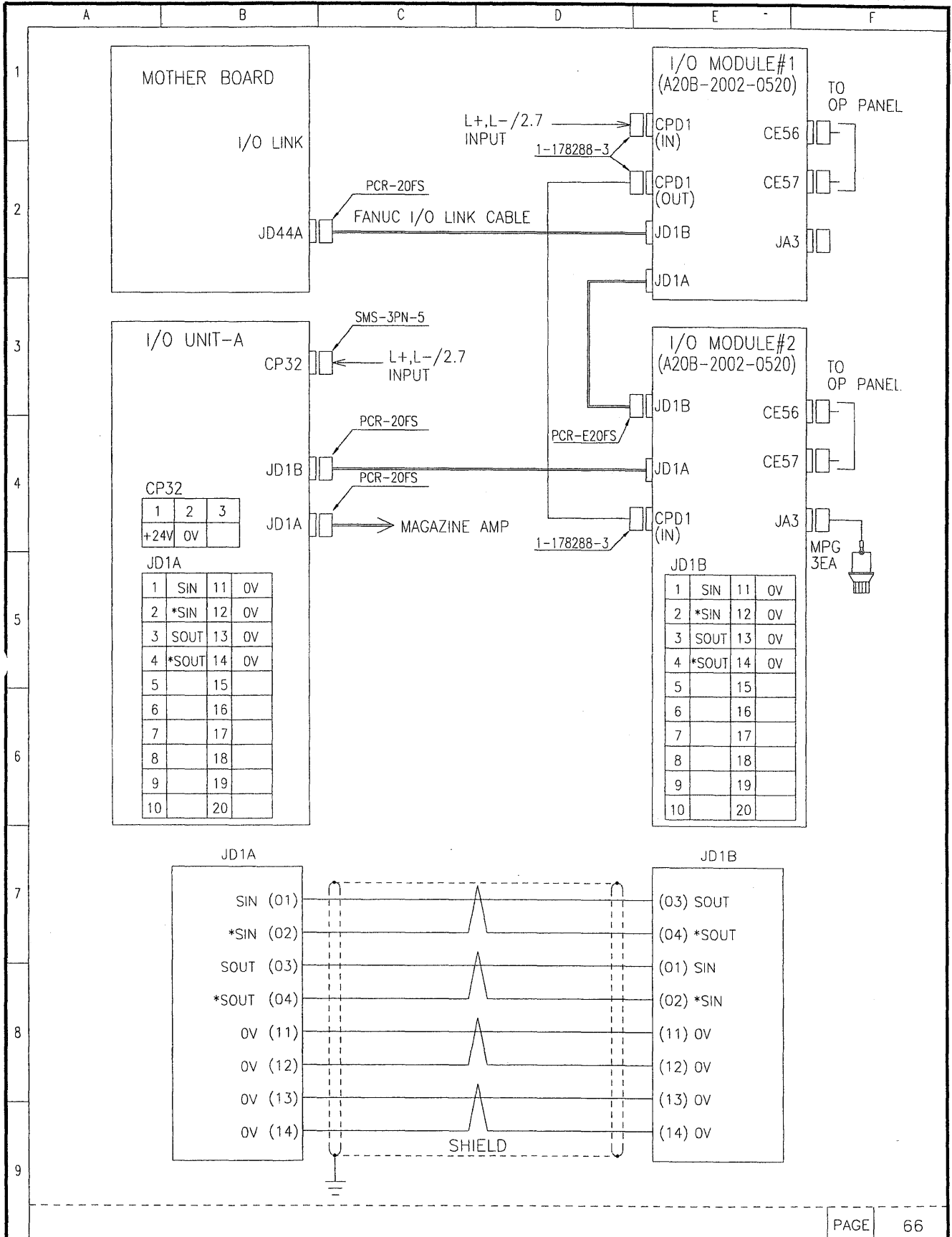
OP. I/O MODULE
JA3 PCR-EV20LMDT

1	HA1	11	
2	HB1	12	0V
3	HA2	13	
4	HB2	14	0V
5	HA3	15	
6	HB3	16	0V
7		17	
8		18	+5V
9	+5V	19	
10		20	+5V

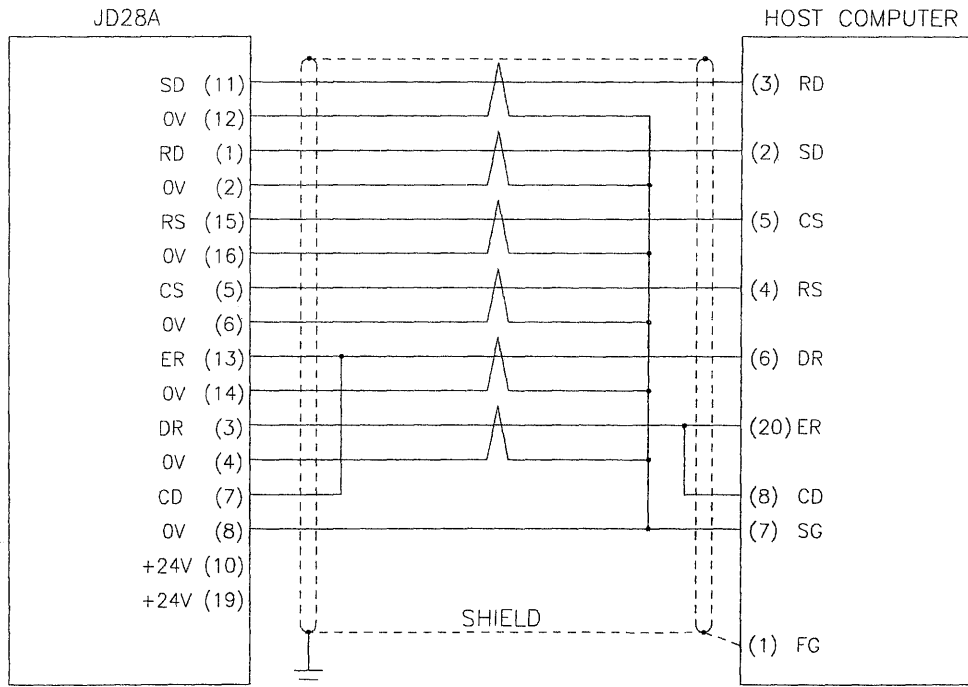
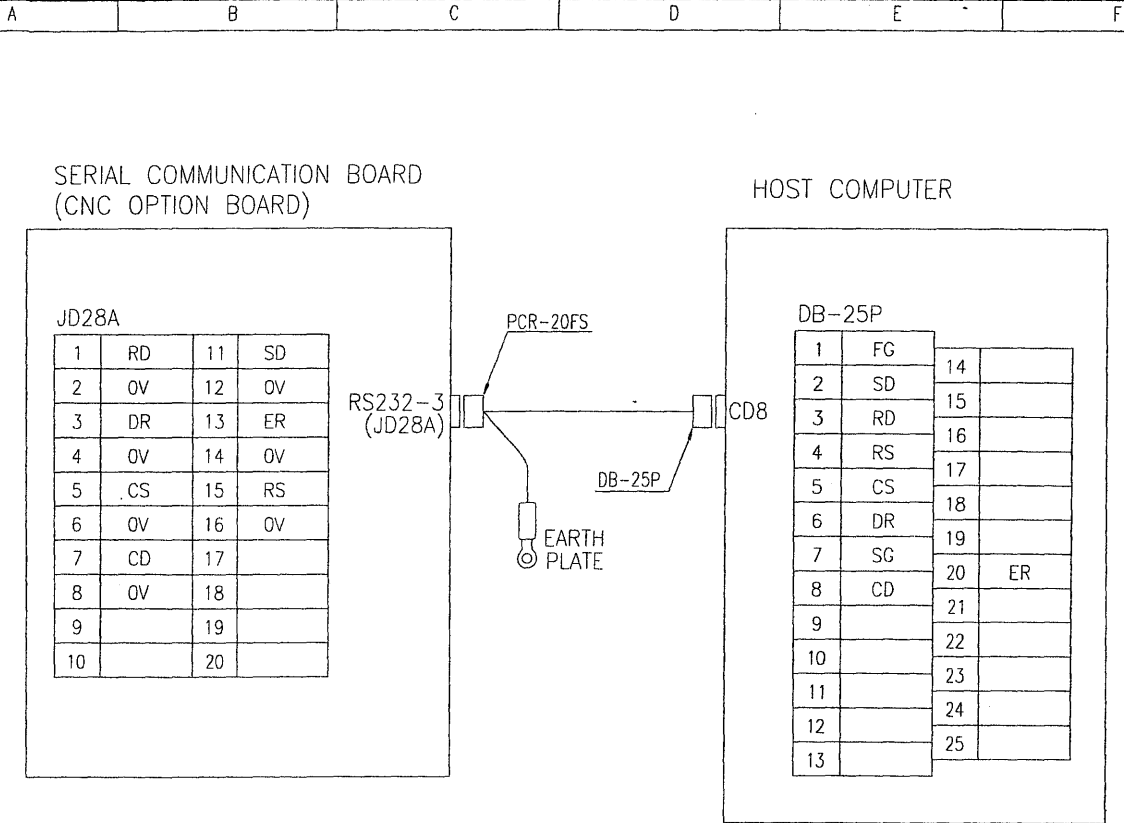
NAME	DESCRIPTION
HA1~HA3	MANUAL PULSE A-PHASE SIGNAL
HB1~HB3	MANUAL PULSE B-PHASE SIGNAL



MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.	TITLE		MPG INTERFACE	DATE	2007.07



MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.	TITLE	I/O MODULE CONNECTION	DATE			
			2007.07			



(*OPTION) PAGE 67

MACHINE HS400/500(F18i)_HS400i/500i(F21i)

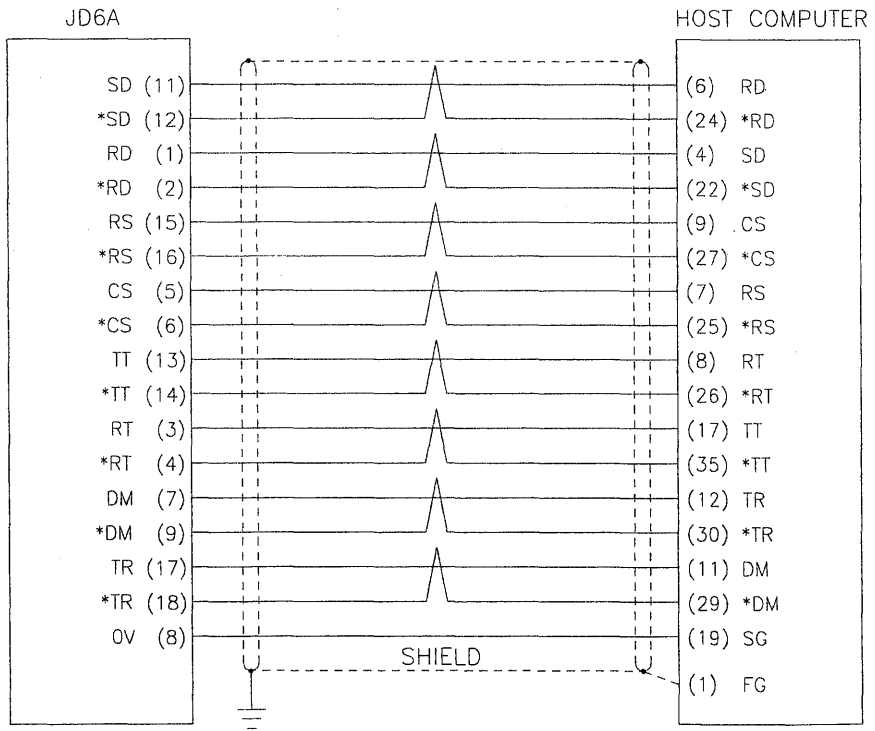
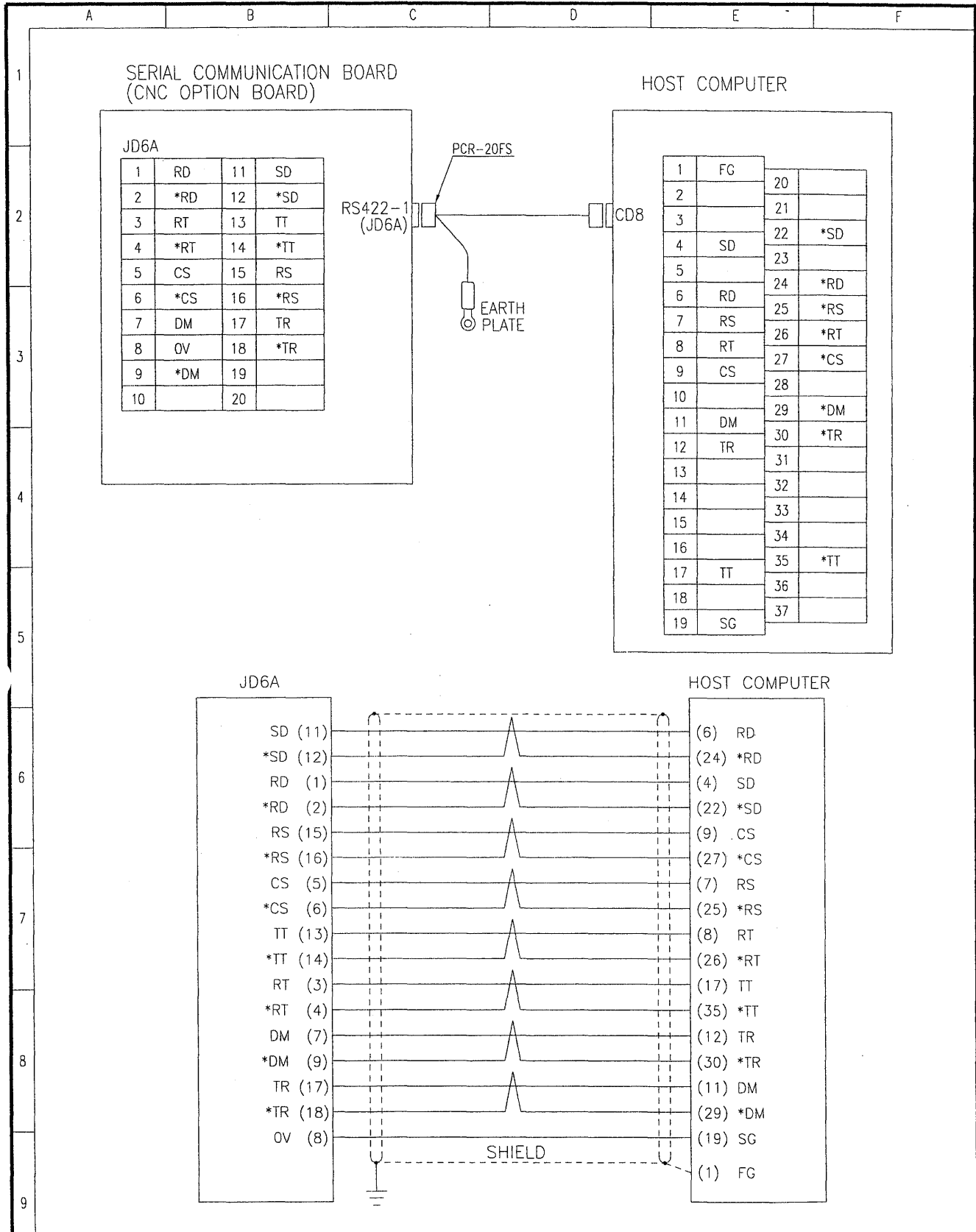
WIA WIA CORPORATION

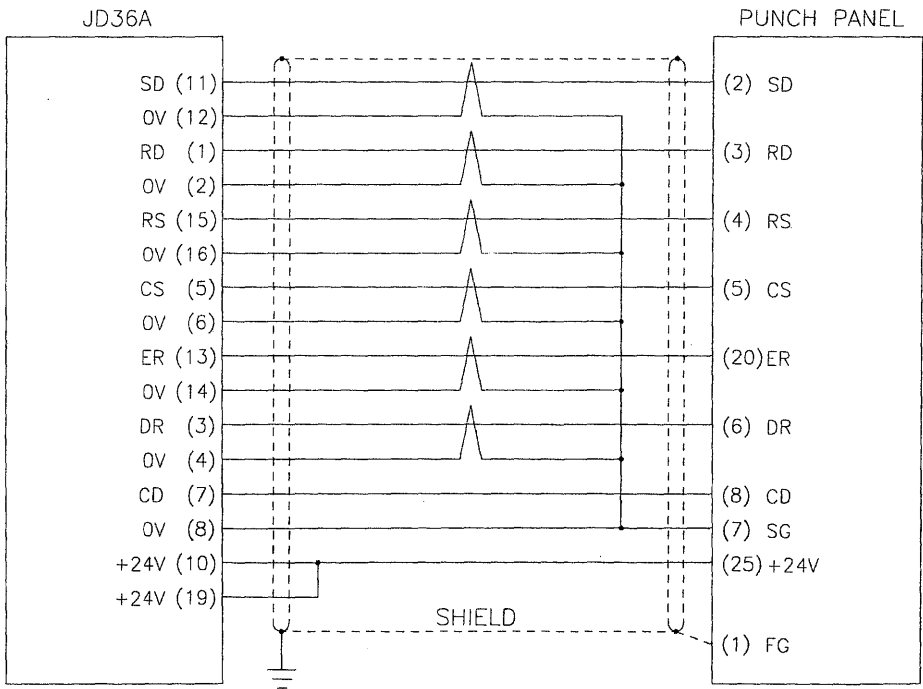
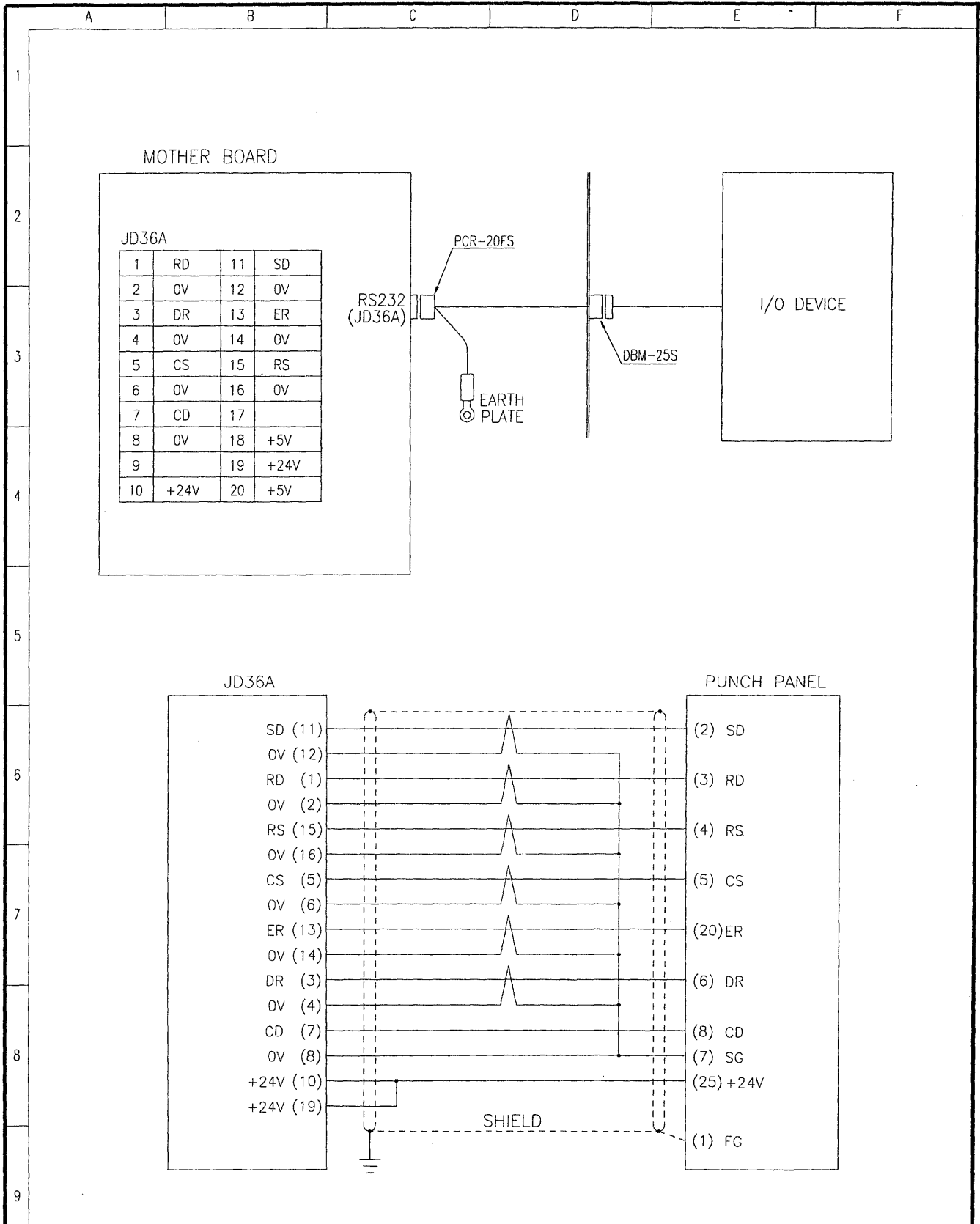
DESIGN CHECKED APPROVED

DWG No.

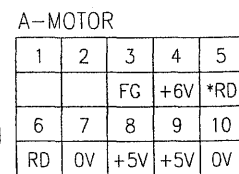
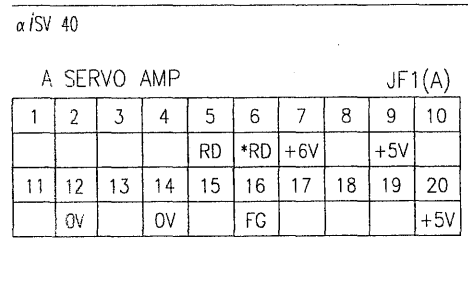
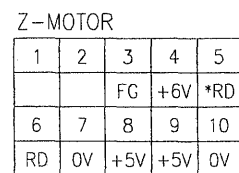
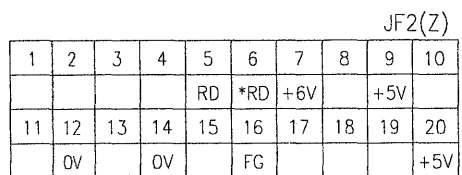
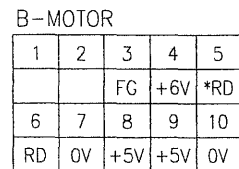
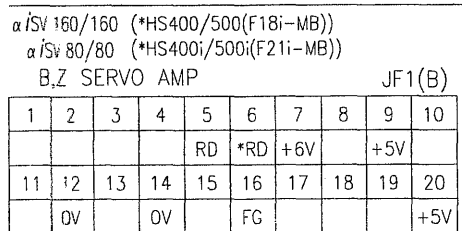
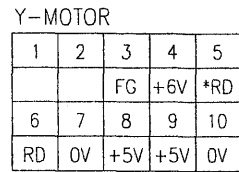
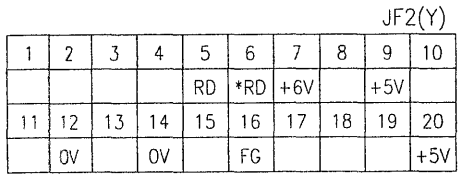
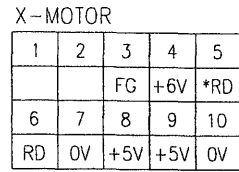
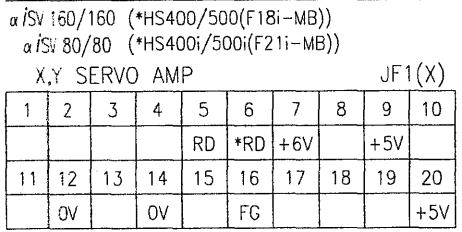
TITLE REMOTE BUFFER(RS-232C)

DATE 2007.07





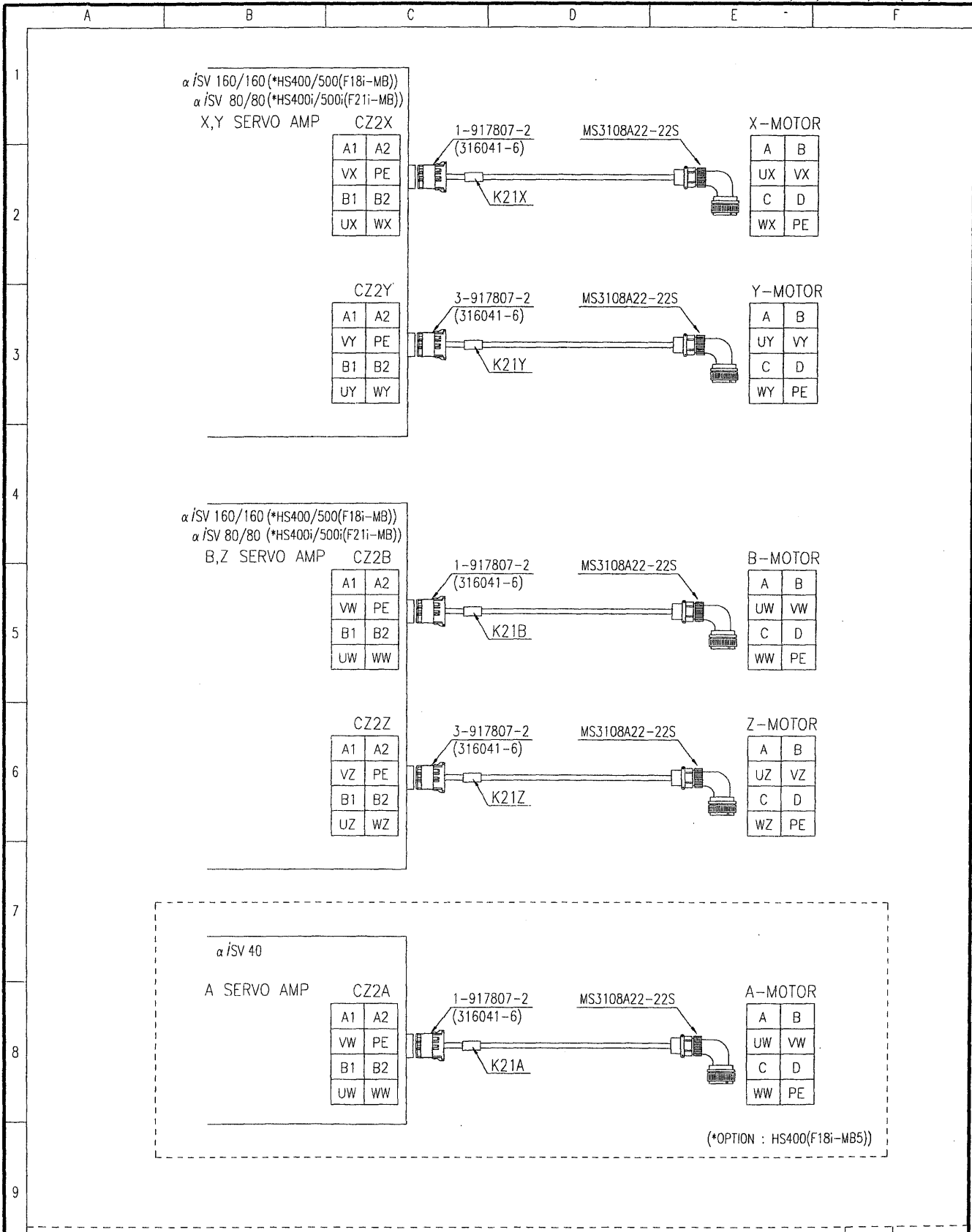
MACHINE	HS400/500(F18i)_HS400i/500i(F21i)	WIA WIA CORPORATION		DESIGN	CHECKED	APPROVED
DWG No.		TITLE	PUNCH PANEL I/F	DATE		
				2007.07		



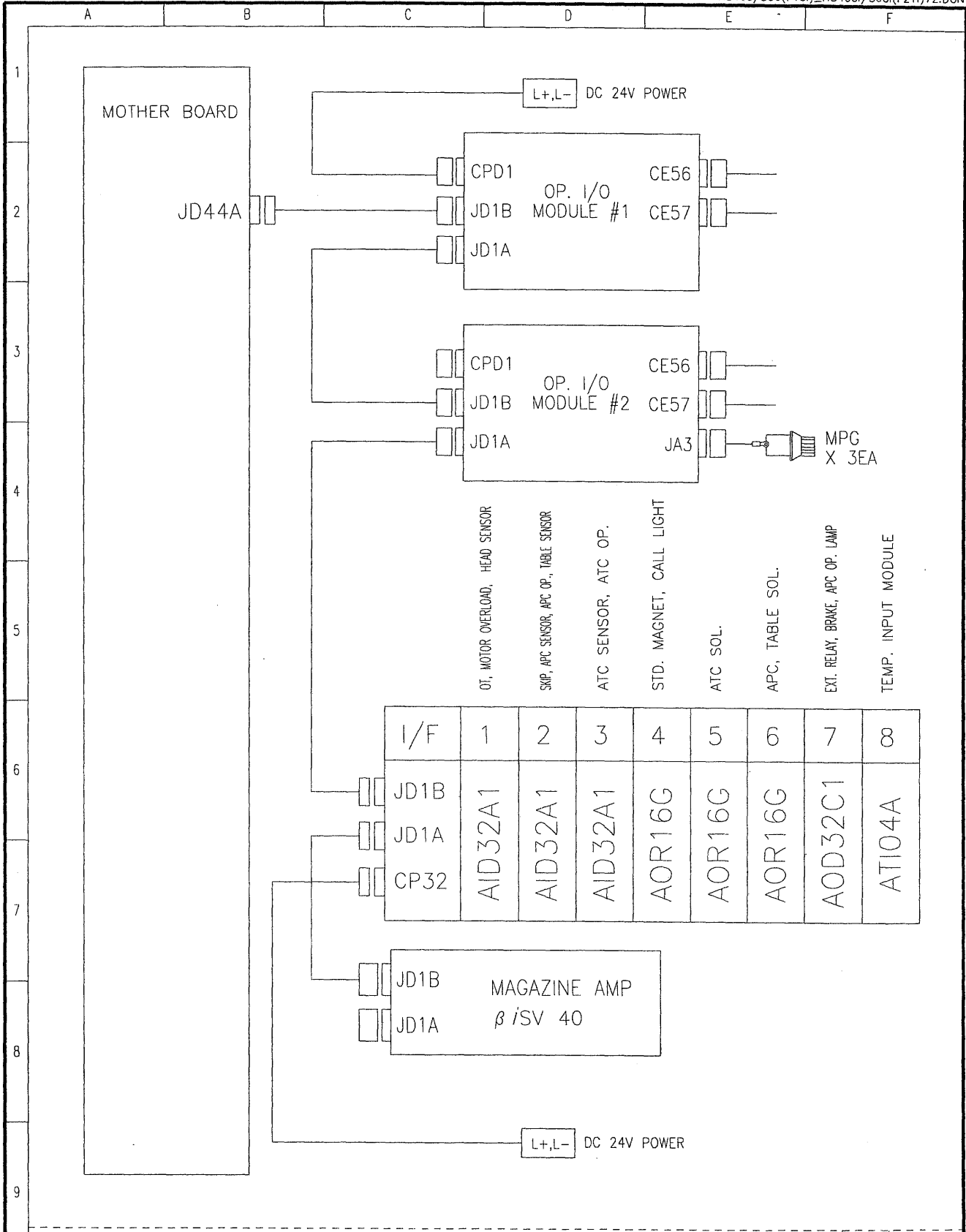
(*OPTION : HS400(F18i-MB5))

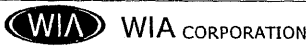
*NOTE : +6V IS ONLY IN CASE OF ABSOLUTE PURSECODER

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.	TITLE		DATE		
	SERVO MOTOR FEEDBACK		2007.07		

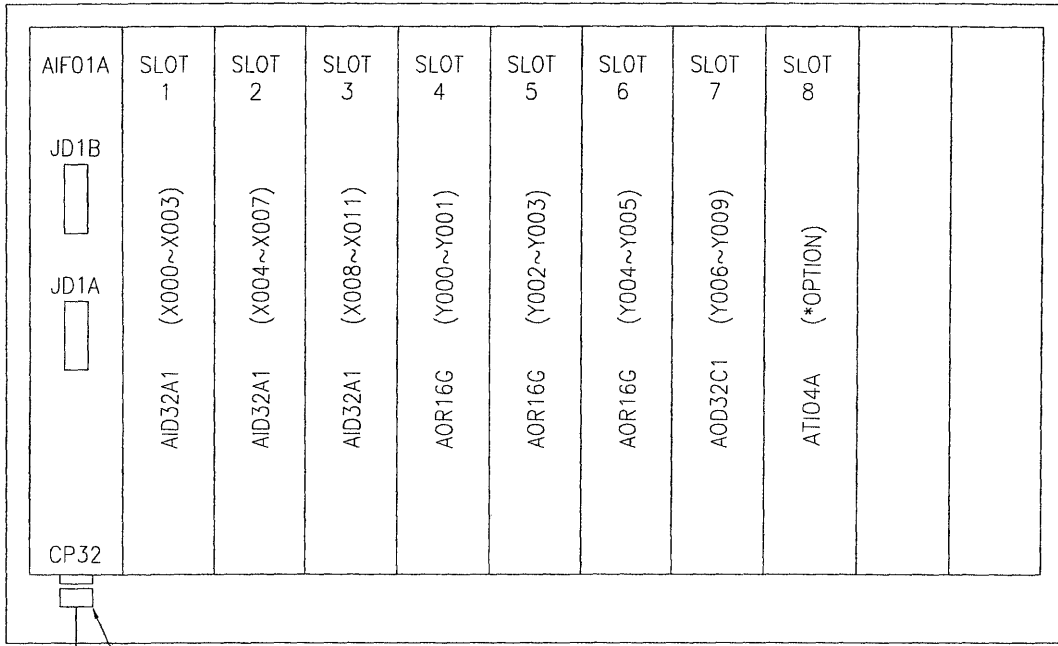


MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.	TITLE		SERVO MOTOR POWER	DATE	
			2007.07		



MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.	TITLE		I/O INTERFACE	DATE	2007.07

I/O UNIT A

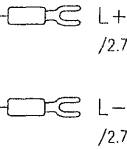


CP32

1	2	3
L+	L-	

SMS-3PNS-5(BURNDY)

TERMINAL BLOCK



MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.	TITLE		I/O UNIT A	DATE	2007.07

직류 전압 측정기

(사양: A7111-1)

UPPER TERMINAL

P.SEL1	P.SEL2	P.SEL3	S/H	PH	DZ	COM	HH a	c	HI a	c	GO a	LO a	c	LL a
							X033	L+	X034	L+		X035	L+	

LOWER TERMINAL

15-HI	14-HI	13-HI	12-HI	11-HI	LO
		OUT			L-

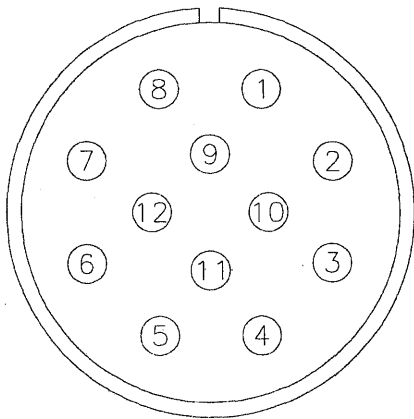
/2.7

(-)	(+)
L	N

Λ/8.2

Λ/8.2

ANALOGIC SENSOR DRAWBAR CONTROL



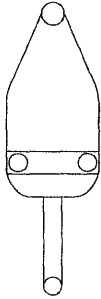
PIN	COLOR	SIGNAL
7	BLUE	ANALOGIC SENSOR 0V
8	BLACK	SIGNAL ANALOGIC SENSOR
9	BROWN	ANALOGIC SENSOR +24V
6	RED	PT 100 (BEARINGS)
11	RED	PT 100 (BEARINGS)
5	WHITE	PT 100 (BEARINGS)

CONNECTOR: BEARINGS THERMIC SENSOR(PT100)

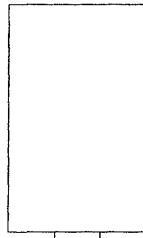
(*ONLY HS400/500(F18i-MB(5))) PAGE 74

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.			TITLE	MEASURING INSTRUMENT	DATE

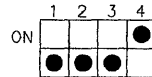
MP10
TOUCH PROBE
(BATTERY 9V)



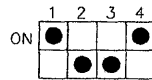
RENISHAW
OMI
SENSOR



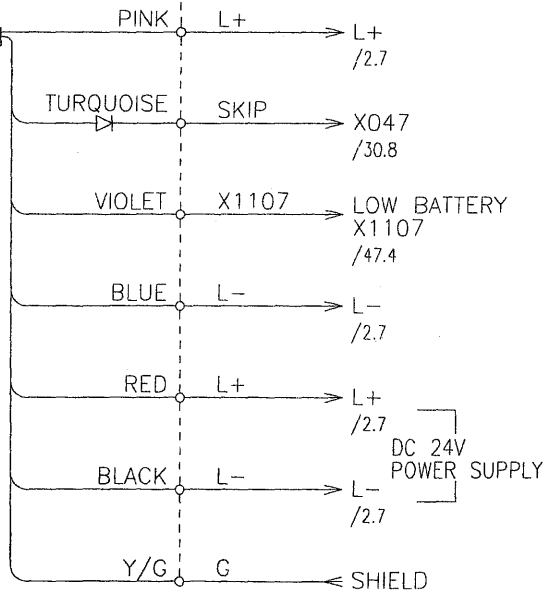
SW1 SETTING
(INNER OMI SENSOR)



SW2 SETTING
(INNER OMI SENSOR)



PANEL
TERMINAL



	A	B	C	D	E	F
1						
2						
3	TM-1		TM-2		TM-3	
4						
5						
6						
7						
8	TERMINAL MODULE : TG-1H50S (SAMWON ACT.) NOTE) CONNECTOR : HIROSE/HIF3BA-50PA-2.54DSA					
9						

TM-1

	A	B
01	X3.6	X3.3
02	X3.0	L+
03	L-	X2.3
04	X2.0	L+
05	L-	X1.6
06	X1.3	X1.0
07	L+	L-
08	X0.3	X0.0
09	L+	L-
10	X3.4	X3.1
11	L-	X2.6
12	X2.4	X2.1
13		
14	X1.4	X1.1
15	L-	X0.6
16	X0.4	X0.1
17	X3.7	X3.5
18	X3.2	L-
19	X2.7	X2.5
20	X2.2	L-
21	L-	X1.7
22	X1.5	X1.2
23	L-	X0.7
24	X0.5	X0.2
25	L-	L-

TM-2

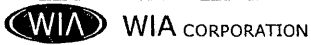
	A	B
01	X7.6	X7.3
02	X7.0	L+
03	L-	X6.3
04	X6.0	L+
05	L-	X5.6
06	X5.3	X5.0
07	L+	L-
08	X4.3	X4.0
09	L+	L-
10	X7.4	X7.1
11	L-	X6.6
12	X6.4	X6.1
13		
14	X5.4	X5.1
15	L-	X4.6
16	X4.4	X4.1
17	X7.7	X7.5
18	X7.2	L-
19	X6.7	X6.5
20	X6.2	L-
21	L-	X5.7
22	X5.5	X5.2
23	L-	X4.7
24	X4.5	X4.2
25	L-	L-

TM-3

	A	B
01	X11.6	X11.3
02	X11.0	L+
03	L-	X10.3
04	X10.0	L+
05	L-	X9.6
06	X9.3	X9.0
07	L+	L-
08	X8.3	X8.0
09	L+	L-
10	X11.4	X11.1
11	L-	X10.6
12	X10.4	X10.1
13		
14	X9.4	X9.1
15	L-	X8.6
16	X8.4	X8.1
17	X11.7	X11.5
18	X11.2	L-
19	X10.7	X10.5
20	X10.2	L-
21	L-	X9.7
22	X9.5	X9.2
23	L-	X8.7
24	X8.5	X8.2
25	L-	L-

TM-4

	A	B
01	Y9.6	Y9.3
02	Y9.0	L+
03	L-	Y8.3
04	Y8.0	L+
05	L-	Y7.6
06	Y7.3	Y7.0
07	L+	L-
08	Y6.3	Y6.0
09	L+	L-
10	Y9.4	Y9.1
11	L-	Y8.6
12	Y8.4	Y8.1
13		
14	Y7.4	Y7.1
15	L-	Y6.6
16	Y6.4	Y6.1
17	Y9.7	Y9.5
18	Y9.2	L-
19	Y8.7	Y8.5
20	Y8.2	L-
21	L-	Y7.7
22	Y7.5	Y7.2
23	L-	Y6.7
24	Y6.5	Y6.2
25	L-	L-

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)			DESIGN	CHECKED	APPROVED
DWG No.	TITLE			DATE		
	TERMINAL MODULE	2007.07				

CE56

	A	B
01	L-	L+
02	X100.0	X100.1
03	X100.2	X100.3
04	X100.4	X100.5
05	X100.6	X100.7
06	X101.0	X101.1
07	X101.2	X101.3
08	X101.4	X101.5
09	X101.6	X101.7
10	X102.0	X102.1
11	X102.2	X102.3
12	X102.4	X102.5
13	X102.6	X102.7
14	L-	
15		
16	Y100.0	Y100.1
17	Y100.2	Y100.3
18	Y100.4	Y100.5
19	Y100.6	Y100.7
20	Y101.0	Y101.1
21	Y101.2	Y101.3
22	Y101.4	Y101.5
23	Y101.6	Y101.7
24	L+	L+
25	L+	L+

CE57

	A	B
01	L-	L+
02	X103.0	X103.1
03	X103.2	X103.3
04	X103.4	X103.5
05	X103.6	X103.7
06	X104.0	X104.1
07	X104.2	X104.3
08	X104.4	X104.5
09	X104.6	X104.7
10	X105.0	X105.1
11	X105.2	X105.3
12	X105.4	X105.5
13	X105.6	X105.7
14		L-
15		
16	Y102.0	Y102.1
17	Y102.2	Y102.3
18	Y102.4	Y102.5
19	Y102.6	Y102.7
20	Y103.0	Y103.1
21	Y103.2	Y103.3
22	Y103.4	Y103.5
23	Y103.6	Y103.7
24	L+	L+
25	L+	L+

CE56

	A	B
01	L-	L+
02	X106.0	X106.1
03	X106.2	X106.3
04	X106.4	X106.5
05	X106.6	X106.7
06	X107.0	X107.1
07	X107.2	X107.3
08	X107.4	X107.5
09	X107.6	X107.7
10	X108.0	X108.1
11	X108.2	X108.3
12	X108.4	X108.5
13	X108.6	X108.7
14	L-	
15		
16	Y104.0	Y104.1
17	Y104.2	Y104.3
18	Y104.4	Y104.5
19	Y104.6	Y104.7
20	Y105.0	Y105.1
21	Y105.2	Y105.3
22	Y105.4	Y105.5
23	Y105.6	Y105.7
24	L+	L+
25	L+	L+

CE57

	A	B
01	L-	L+
02	X109.0	X109.1
03	X109.2	X109.3
04	X109.4	X109.5
05	X109.6	X109.7
06	X110.0	X110.1
07	X110.2	X110.3
08	X110.4	X110.5
09	X110.6	X110.7
10	X111.0	X111.1
11	X111.2	X111.3
12	X111.4	X111.5
13	X111.6	X111.7
14		L-
15		
16	Y106.0	Y106.1
17	Y106.2	Y106.3
18	Y106.4	Y106.5
19	Y106.6	Y106.7
20	Y107.0	Y107.1
21	Y107.2	Y107.3
22	Y107.4	Y107.5
23	Y107.6	Y107.7
24	L+	L+
25	L+	L+

A20B-2002-0521
NOTE)CONNECTOR : HIROSE/HIF3BB-50D-2.54R

A20B-2002-0520
NOTE)CONNECTOR : HIROSE/HIF3BB-50D-2.54R

CM1

	A	B
01	L-	L+
02	X100.0	X100.1
03	X100.2	X100.3
04	X100.4	X100.5
05	X100.6	X100.7
06	X101.0	X101.1
07	X101.2	X101.3
08	X101.4	X101.5
09	X101.6	X101.7
10	X102.0	X102.1
11	X102.2	X102.3
12	X102.4	X102.5
13	X102.6	X102.7
14	DICOM0	
15		
16	Y100.0	Y100.1
17	Y100.2	Y100.3
18	Y100.4	Y100.5
19	Y100.6	Y100.7
20	Y101.0	Y101.1
21	Y101.2	Y101.3
22	Y101.4	Y101.5
23	Y101.6	Y101.7
24	DOCOM	DOCOM
25	DOCOM	DOCOM

CM2

	A	B
01	L-	L+
02	X103.0	X103.1
03	X103.2	X103.3
04	X103.4	X103.5
05	X103.6	X103.7
06	X104.0	X104.1
07	X104.2	X104.3
08	X104.4	X104.5
09	X104.6	X104.7
10	X105.0	X105.1
11	X105.2	X105.3
12	X105.4	X105.5
13	X105.6	X105.7
14		DICOM5
15		
16	Y102.0	Y102.1
17	Y102.2	Y102.3
18	Y102.4	Y102.5
19	Y102.6	Y102.7
20	Y103.0	Y103.1
21	Y103.2	Y103.3
22	Y103.4	Y103.5
23	Y103.6	Y103.7
24	DOCOM	DOCOM
25	DOCOM	DOCOM

CM3

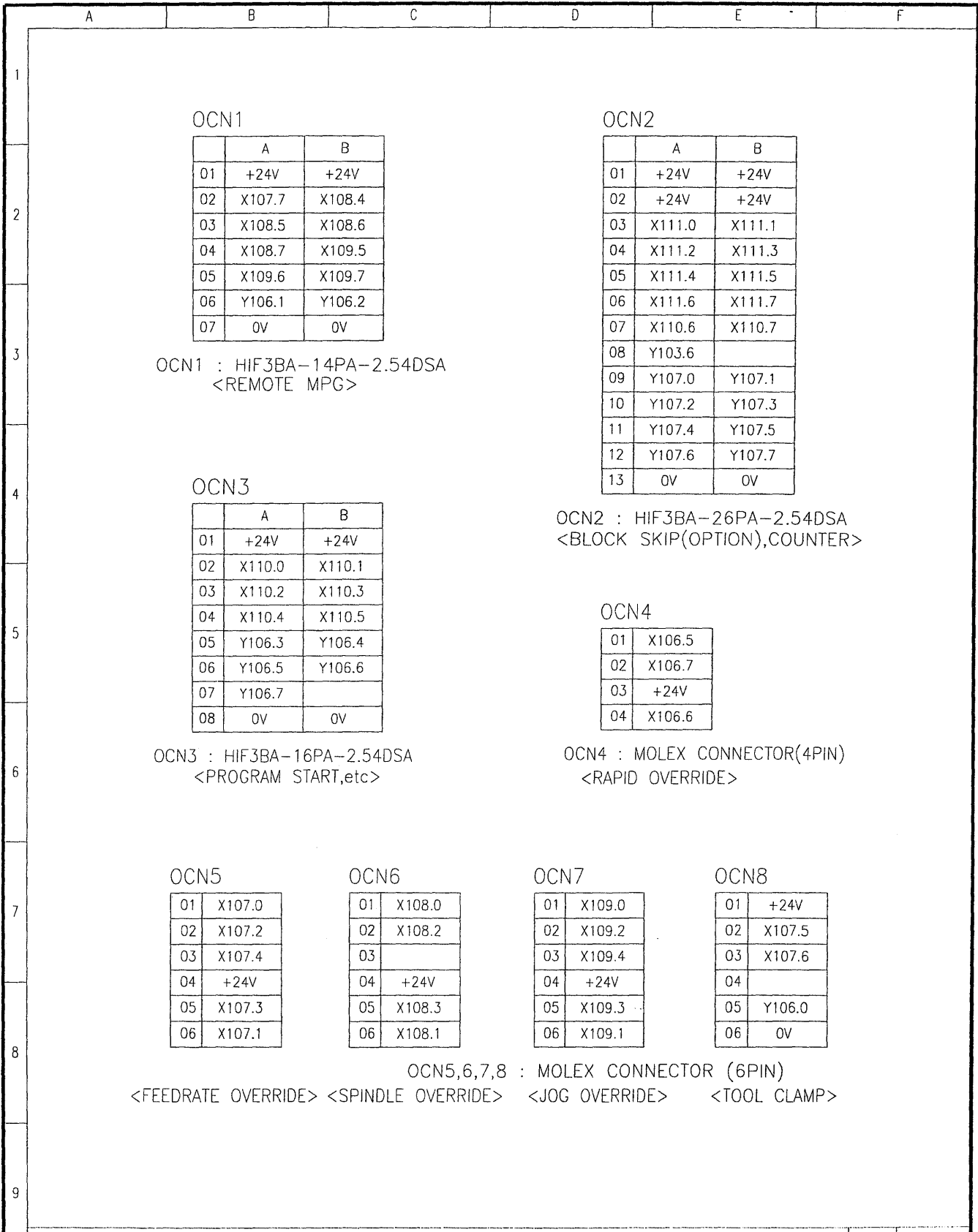
	A	B
01	L-	L+
02	X106.0	X106.1
03	X106.2	X106.3
04	X106.4	X106.5
05	X106.6	X106.7
06	X107.0	X107.1
07	X107.2	X107.3
08	X107.4	X107.5
09	X107.6	X107.7
10	X108.0	X108.1
11	X108.2	X108.3
12	X108.4	X108.5
13	X108.6	X108.7
14	DICOM0	
15		
16	Y104.0	Y104.1
17	Y104.2	Y104.3
18	Y104.4	Y104.5
19	Y104.6	Y104.7
20	Y105.0	Y105.1
21	Y105.2	Y105.3
22	Y105.4	Y105.5
23	Y105.6	Y105.7
24	DOCOM	DOCOM
25	DOCOM	DOCOM

CM4

	A	B
01	L-	L+
02	X109.0	X109.1
03	X109.2	X109.3
04	X109.4	X109.5
05	X109.6	X109.7
06	X110.0	X110.1
07	X110.2	X110.3
08	X110.4	X110.5
09	X110.6	X110.7
10	X111.0	X111.1
11	X111.2	X111.3
12	X111.4	X111.5
13	X111.6	X111.7
14		DICOM5
15		
16	Y106.0	Y106.1
17	Y106.2	Y106.3
18	Y106.4	Y106.5
19	Y106.6	Y106.7
20	Y107.0	Y107.1
21	Y107.2	Y107.3
22	Y107.4	Y107.5
23	Y107.6	Y107.7
24	DOCOM	DOCOM
25	DOCOM	DOCOM

OP.PCB

*)CONNECTOR : HIROSE/HIF3BB-50D-2.54R



OCN1

	A	B
01	+24V	+24V
02	X107.7	X108.4
03	X108.5	X108.6
04	X108.7	X109.5
05	X109.6	X109.7
06	Y106.1	Y106.2
07	0V	0V

OCN1 : HIF3BA-14PA-2.54DSA
<REMOTE MPG>

OCN2

	A	B
01	+24V	+24V
02	+24V	+24V
03	X111.0	X111.1
04	X111.2	X111.3
05	X111.4	X111.5
06	X111.6	X111.7
07	X110.6	X110.7
08	Y103.6	
09	Y107.0	Y107.1
10	Y107.2	Y107.3
11	Y107.4	Y107.5
12	Y107.6	Y107.7
13	0V	0V

OCN2 : HIF3BA-26PA-2.54DSA
<BLOCK SKIP(OPTION),COUNTER>

OCN3

	A	B
01	+24V	+24V
02	X110.0	X110.1
03	X110.2	X110.3
04	X110.4	X110.5
05	Y106.3	Y106.4
06	Y106.5	Y106.6
07	Y106.7	
08	0V	0V

OCN3 : HIF3BA-16PA-2.54DSA
<PROGRAM START,etc>

OCN4

01	X106.5
02	X106.7
03	+24V
04	X106.6

OCN4 : MOLEX CONNECTOR(4PIN)
<RAPID OVERRIDE>

OCN5

01	X107.0
02	X107.2
03	X107.4
04	+24V
05	X107.3
06	X107.1

OCN6

01	X108.0
02	X108.2
03	
04	+24V
05	X108.3
06	X108.1

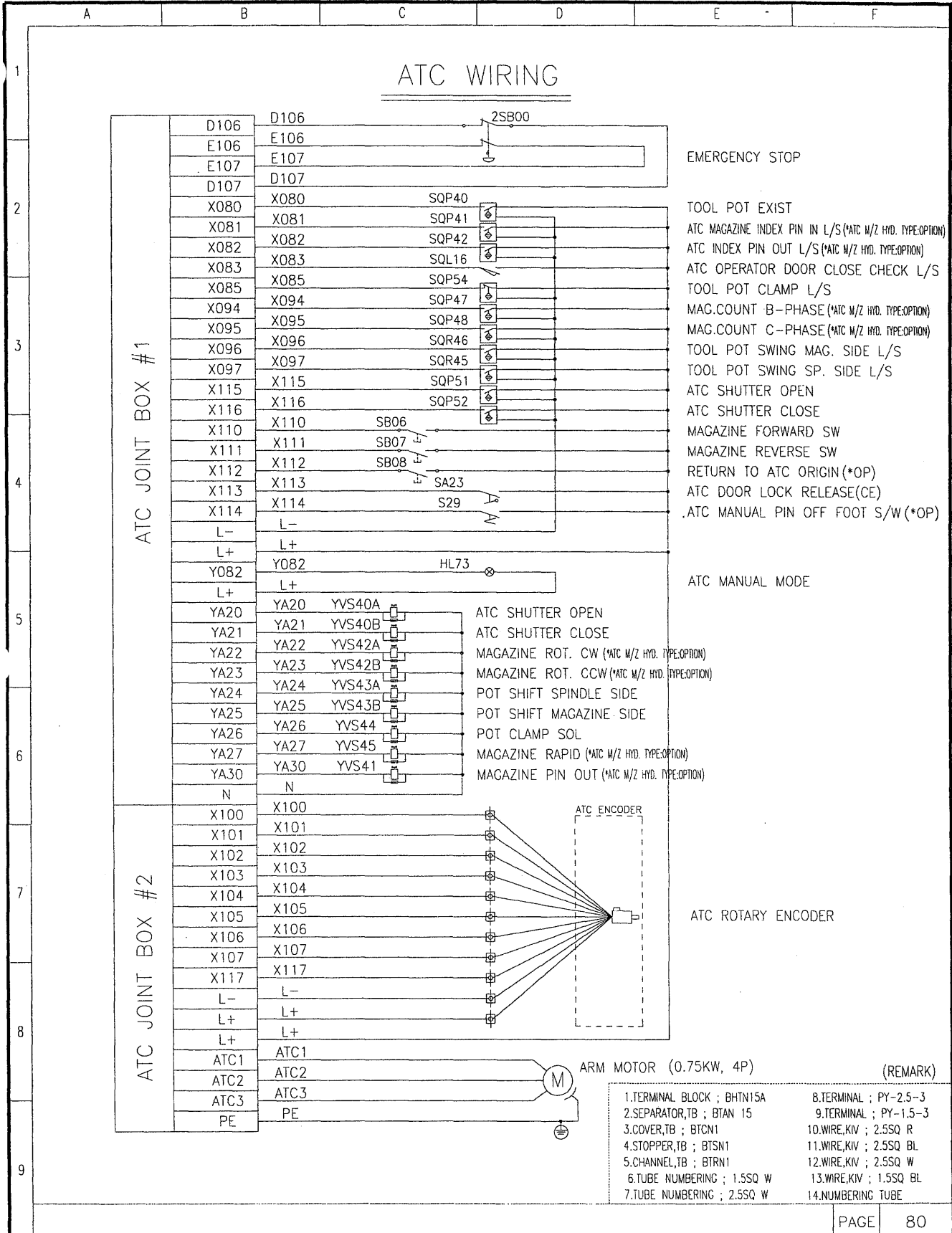
OCN7

01	X109.0
02	X109.2
03	X109.4
04	+24V
05	X109.3
06	X109.1

OCN8

01	+24V
02	X107.5
03	X107.6
04	
05	Y106.0
06	0V

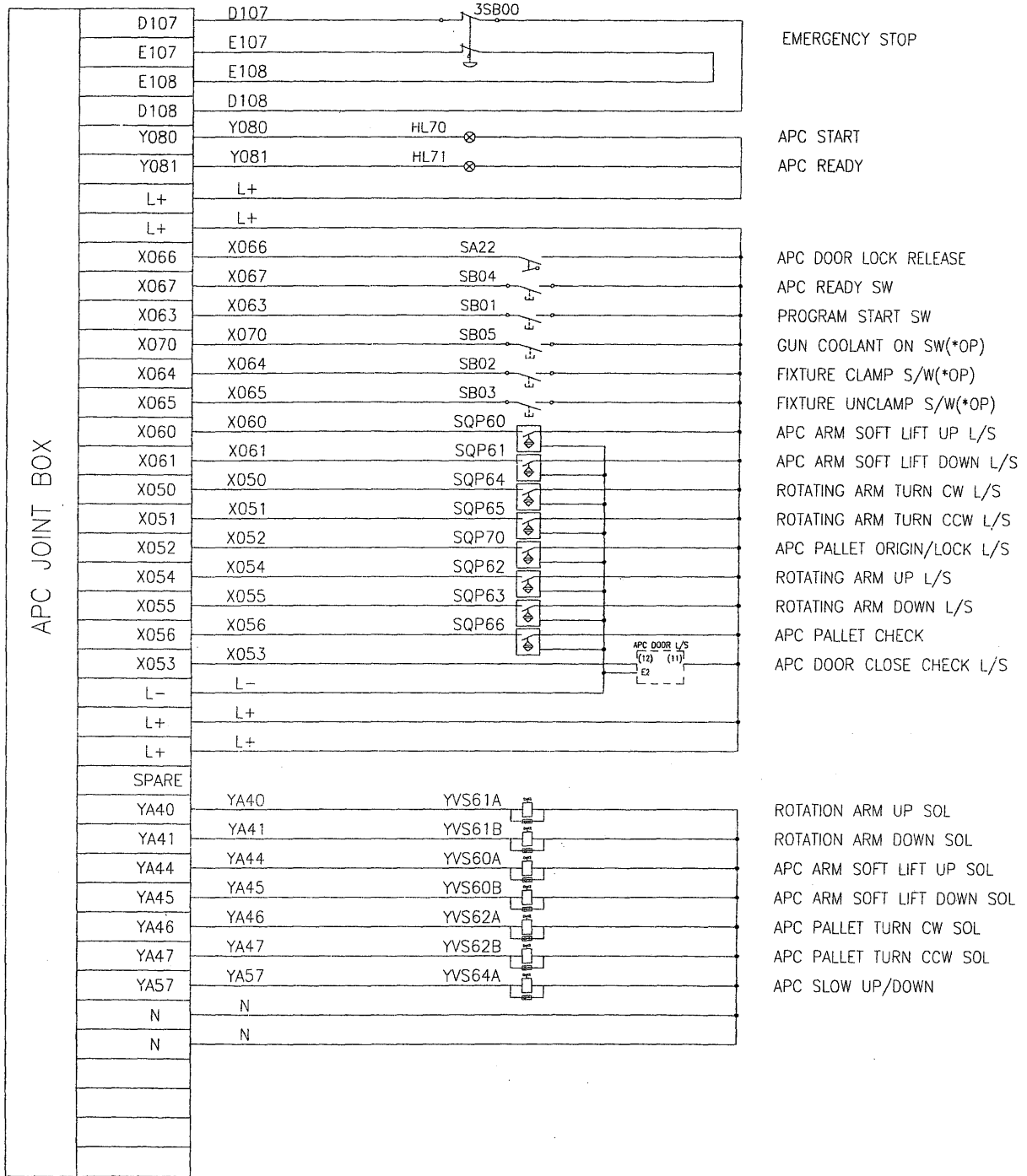
OCN5,6,7,8 : MOLEX CONNECTOR (6PIN)
<FEEDRATE OVERRIDE> <SPINDLE OVERRIDE> <JOG OVERRIDE> <TOOL CLAMP>



- (REMARK)
- | | |
|----------------------------|------------------------|
| 1.TERMINAL BLOCK ; BHTN15A | 8.TERMINAL ; PY-2.5-3 |
| 2.SEPARATOR,TB ; BTAN 15 | 9.TERMINAL ; PY-1.5-3 |
| 3.COVER,TB ; BTCN1 | 10.WIRE,KIV ; 2.5SQ R |
| 4.STOPPER,TB ; BTSN1 | 11.WIRE,KIV ; 2.5SQ BL |
| 5.CHANNEL,TB ; BTRN1 | 12.WIRE,KIV ; 2.5SQ W |
| 6.TUBE NUMBERING ; 1.5SQ W | 13.WIRE,KIV ; 1.5SQ BL |
| 7.TUBE NUMBERING ; 2.5SQ W | 14.NUMBERING TUBE |

MACHINE	HS400/500(F18i)_HS400i/500i(F21i)		DESIGN	CHECKED	APPROVED
DWG No.	TITLE	ATC CONNECTION	DATE		
			2007.07		

APC WIRING



1.PARTS LIST(강전반)

HS400/500(F18)_HS400/500(F21)

PARTS	NO	NAME	SPECIFICATION	HS400 (18i-MB)	HS500 (18i-MB)	HS400i (21i-MB)	HS400i (21i-MB)	MAKER	REMARK
B	1	MAIN NFB(QF1)	SA203C/T(225A)	1	1	1	1	FUJI	Trip Coil, Cover포함
	2	NFB HANDLE	BZ6V408-C	1	1	1	1	FUJI	Packing포함
	3	NFB(QF2)	SA53C/T(60A)	1	1	1	1	FUJI	유도 Motor용
	4								
MCC/ THERMAL	1	MCC(KMP)	SC-7N/T(200A,220V,50/60Hz) SC-5N/T(150A,220V,50/60Hz)	1	1	-	-	FUJI	Servo Ready용
	2	MCC+THERMAL(KM1)	SW-4-0/T(110V,50/60Hz,12~18A, 13.4A)	1	1	1	1	FUJI	Hydraulic Pump Motor용
	3	MCC+THERMAL(KM2)	SW-03/T(110V,50/60Hz,0.24~0.36A, 0.33A)	1	1	1	1	FUJI	Lubrication Motor용
	4	MCC+THERMAL(KM3)	SW-03/T(110V,50/60Hz,7.0~11.0A, 9.0A)	1	1	1	1	FUJI	Coolant Motor용
	5	MCC+THERMAL(KM5)	SW-03/T(110V,50/60Hz,0.95~1.45A, 1.2A)	1	1	1	1	FUJI	Chip Conveyor Motor(LEFT)용
	6	MCC+THERMAL(KM6)	SW-03/T(110V,50/60Hz,0.95~1.45A, 1.2A)	1	1	1	1	FUJI	Chip Conveyor Motor(RIGHT)용
	7	MCC(KM10,KM11)	SC-5N/T(110V,50/60Hz) SC-3N/T(110V,50/60Hz)	2	2	-	-	FUJI	권선절환용
	8	MCC+THERMAL(KM7)	SW-03/T(110V,50/60Hz,5.0~8.0A, 5.2A)	1	1	1	1	FUJI	Base Coolant Motor용
	9	MCC+THERMAL(KM7TS)	SW-03/T(110V,50/60Hz,5.0~8.0A, 7.6A)	1	1	1	1	FUJI	Through Coolant Motor용
	10	MCC+THERMAL(KM9)	SW-03/T(110V,50/60Hz,5.0~8.0A, 5.2A)	1	1	1	1	FUJI	Jet Coolant Motor용
	11	THERMAL(QMF)	TR-0NH/3T(2.8~4.2A, 3.0A)	-	-	1	1	FUJI	Spindle Fan Motor용
	12								
POWER SUPPLY	1	SMPS	SWS150-24	1	1	1	1	LAMBDA	
	2	TRANS	1.5KVA(IN:220V OUT:110V/28V/24V/)	1	1	1	1	ACE TRANS	CE인증(COVER부착)
	3	RECTIFIER(VC1)	KBPC1506	2	2	2	2	KEM	DC 24V BRAKE 전원공급용
	4	INVERTER	FR-S520-1.5K(1.5KW,7.0A)	1	1	1	1	MITSUBISHI	ATC Arm Motor용
	5								
CIRCUIT PROTECT	1	CIRCUIT PROTECT(QF3)	DCP-51DR-070AMW(7A)	1	1	1	1	DAERYUK	Trans 2차측,110V 전원용
	2	CIRCUIT PROTECT(QF4)	DCP-51DR-070AMW(7A)	1	1	1	1	DAERYUK	Trans 2차측 28V 전원용
	3	CIRCUIT PROTECT(QF6)	DCP-52DR-050AMW(5A)	1	1	1	1	DAERYUK	PSM 전원용
	4	CIRCUIT PROTECT(QFC)	DCP-51DR-030AMS(3A)	1	1	1	1	DAERYUK	RS-232C 220V CONCENT
	5								
SPARK & SURGE KILLER	1	SPARK KILLER	KCR-20200	2	2	2	2	KEM	220V 단상용
	2	SPARK KILLER	K3CR-50500	7	7	7	7	KEM	220V 3상용
	3	SPARK KILLER	KCR-10200	38	38	38	38	KEM	110V 단상용
	4	SURGE ABSORBER	TNR23G471K	2	2	2	2		axis brake용
	5	SPARK KILLER	KCR-10200	2	2	2	2	KEM	axis brake용
	6								
FAN/ AIR CON	1	FAN COOLER	DCF-20S(110V)	1	1	1	1	DAEYANG	
2									
Y	1	EXTERNAL RELAY	MY4ZN(DC24V)	1	1	1	1	OMRON	NC POWER ON/OFF
	2	EXTERNAL RELAY	MY4ZN(COIL:AC 220V)	1	1	1	1	OMRON	AC220V CHECK용
	3	EXTERNAL RELAY	SZR-LY2-X1(COIL: DC 24V)	13	13	13	13	LG하니엘	MC Ready,STBY,Brake,ATC ARM,Work Light,Chip C/V ETC.
	4	EXTERNAL RELAY	SZR-LY4-X1(COIL: DC 24V)	2	2	2	2	LG하니엘	EMG 1,2
	5	EXTERNAL RELAY SOCKET	SZX-SLF-14	4	4	4	4	LG하니엘	External Relay
	6	EXTERNAL RELAY SOCKET	SZX-SLF-08	13	13	13	13	LG하니엘	External Relay
	7								
TERMINAL MODULE	1	TERMINAL MODULE	TG-1H50S	4	4	4	4	삼원 FA	I/O UNIT INTERFACE
2									
BOX	1	E-BOX(LOCKER)	ASS'Y, 1690*600*1560(L*W*H) ASS'Y, 1690*600*1600(L*W*H)	1	-	1	-		Locker포함
	2	JOINT BOX	130*130*80(L*W*H)	2	2	2	2		
	3								
ASSY'	1	EARTH BAR		1SET	1SET	1SET	1SET		
	2	CABLE CLAMP		1SET	1SET	1SET	1SET		
	3	DUCT	80*100	2m	2m	2m	2m		
	4	DUCT	60*100	7m	7m	7m	7m		
	5	DUCT	40*100	1m	1m	1m	1m		
	6	TERMINAL BLOCK	SHTN-15A	70	70	70	70		
	7	TERMINAL BLOCK	SHTN-35A	12	12	12	12		
	8	TERMINAL BLOCK	SHT -100A	7	7	-	-		
	9	TERMINAL BLOCK	SHT-15A	3	3	-	-		
	10	STOPPER		6SET	6SET	6SET	6SET		
	11	CHANNEL		4m	4m	4m	4m		
	12	STICKER		1SET	1SET	1SET	1SET		
	13	SHORT BAR		1SET	1SET	1SET	1SET		
	14	기종 NAME PLATE	스티커(100x80)	1	1	1	1		2007년 부터 전기종 추가
	15								
ETC.	1	DOOR LIMIT S/W	KH-9015-PB(L)	1	1	1	1	건흥전기	CONTROL BOX 전면부 부착용
	2	PILOT LAMP	KH-501DL	1	1	1	1	신흥전기	CONTROL BOX 부착용(DC24V,20mA,Ø25)
	3	PUNCH PANEL	KICD-200-25L	1	1	1	1	KEM	220V구 포함,LAN 포함
	4	PORTABLE M.P.G ASSY'	PHS-P0-DC11-0	1	1	1	1	영창기업	Pendant MPG(EMG PB 2b)
	5	TOGGLE S/W	WJT-2210	2	2	2	2	WOOJIN	MAINTENANCE, B-ADJUST 용(INNER BOX)
	6	방청제	VCI CAPSULE	1	1	1	1	마이크로마크	NOKSTOP
	7	HOLE PLUG	PG48	1	1	1	1		
8									
9									

2.PARTS LIST(조작반)

HS400/500(F18i)_HS400i/500i(F21i)

NO	NAME	SPECIFICATION	Q'TY	MAKER	REMARK
1	OP PANEL(1SET)	ASS'Y	1		KH50/63G용(전장업체 구입분)
2	OP SHEET	K350-0500-0238#02S/01	1		KH40G용(전장업체 구입분)
3	PANEL	K350-0500-0238#02P/01	1		KH50/63G용(전장업체 구입분)
4	P.C.B	K350-0500-0238#02K/01	1		KH50/63G용(전장업체 구입분)
5	MAIN PANEL	600 x 380	1SET		2.3t,도면참조
6	B/SWITCH	AB12-SF1260	47	FUJI	LED TYPE
7	B/SWITCH	AB12-SF260	7	FUJI	NON LED TYPE
8	PUSH B/SW	AR22FOR-10G	1	FUJI	CYCLE START
9	PUSH B/SW	AR22EOR-01R	1	FUJI	FEEDHOLD
10	PUSH B/SW	AR22FOR-10G	1	FUJI	STANDBY
11	PUSH B/SW	AH165-TGLG11E3	1	FUJI	POWER ON
12	PUSH B/SW	AH165-TGFR02	1	FUJI	POWER OFF (2b)
13	EMG S/W	AR22V2R-02R	1	FUJI	EMERGENCY
14	SELECT S/W	AH30-S2G22	1	FUJI	TOOL CLAMP/UNCLAMP
17	KEY S/W	AH165-J2A11A	1	FUJI	MEMORY LOCK
18	ROTARY S/W	AC09-CY	2	FUJI	JOG, FEED OVERRIDE
19	ROTARY S/W	AC09-CX	2	FUJI	SPINDLE, RAPID OVERRIDE
20	KNOB	K-2195 TYPE A(SMALL)	4	SATO	ROTARY S/W용
21	LED	KL-08D24Y	1	KEM	TOOL CLAMP/UNCLAMP
22	LED	KL-08D24R	2	KEM	SINGLE BLOCK,FEED HOLD
23	LED	KL-08D24G	2	KEM	CYCLE START,STANDBY
24	LED	24V, 3φ	51		B/SWITCH용
25	DIODE		58		B/SWITCH용
26	ARRAY RESISTOR	2.2/3.3KΩ-1/2W	13		PCB LED용
27	TOGGLE S/W	MT205N	2	WOJIN	2단
28	PUSH B/SW	AR22FOR-10Y	1	FUJI	DOOR INTERLOCK RELEASE
29	SEGMENT SEVENT	D1SA-R	2	AUTONICS	
30	CONNECTOR	HIF3BB-50PA-2.54DSA	4	HIROSE	OP PCB용
31	CONNECTOR	HIF3BA-14PA-2.54DSA	1	HIROSE	OP PCB용
32	CONNECTOR	HIF3BA-16PA-2.54DSA	1	HIROSE	OP PCB용
33	CONNECTOR	HIF3BA-26PA-2.54DSA	1	HIROSE	OP PCB용
34	MOLEX CONNECTOR	4PIN	1	MOLEX	OP PCB용
35	MOLEX CONNECTOR	6PIN	4	MOLEX	OP PCB용
36	CABLE SET		1SET		
37	LOAD METER		1	현전사	180%용
38	IF. PCB1	A20B-2002-0520	1		사급
39	IF. PCB2	A20B-2002-0521	1		사급
40	SPEED METER		1	현전사	12000rpm
41	SEVENT SEGMENT	D1SA-R	2	AUTONICS	TOOL NO.DISPLAY
42	TOOL COUNTER		1		(*Option)
43	WORK COUNTER		1		(*Option)
44	BLANK PANEL	520X100	1SET		SUB PLATE

3.PARTS LIST(CABLE)

HS400/500(F18i)_HS400i/500i(F21i)

NO	NAME	HS400 (18i-MB)	HS500 (18i-MB)	HS400i (21i-MB)	HS500i (21i-MB)	CONNECTION	Q'TY	FLEXIBLE	REMARK
1	NC POWER	6100mm	6100mm	6100mm	6100mm	CP1-T.BLOCK	1		AMP,VCTF 0.75SqX2C
2	POWER ON/OFF	6500mm	6500mm	6500mm	6500mm	T.B.- 조작용	1		VCTF 0.75SqX5C
	RS-232C	1200mm	1200mm	1200mm	1200mm	JD36A-DBM-25S	1		PCR-PUNCH PANEL, COVW-SB 0.2SqX10PS
	RS-232C CONCENT	6100mm	6100mm	6100mm	6100mm	TERMIAL-RS232C	1		PUNCH PANEL VCTF 1.25SqX3C
5	EMERGENCY CABLE	6500mm	6500mm	6500mm	6500mm	TERMIAL-조작용	1		VCTF 0.75SqX8C
6	OP./O MODULE POWER 1	6100mm	6100mm	6100mm	6100mm	T.BLOCK-MODULE #A	1		AMP,VCTF 0.75SqX2C
7	OP./O MODULE POWER 2	300mm	300mm	300mm	300mm	MODULE#A-MODULE#B	1		AMP,VCTF 0.75SqX2C
8	I/O LINK CABLE#1	350mm	350mm	350mm	350mm	JD44A-JD1B	1		PCR-PCR, 0.08SqX5PS
9	I/O LINK CABLE#2	250mm	250mm	250mm	250mm	JD1A-JD1B	1		PCR-PCR, 0.08SqX5PS
10	I/O LINK CABLE#3	5100mm	5100mm	5100mm	5100mm	JD1A-JD1B	1		PCR-PCR, 0.08SqX5PS
11	I/O LINK CABLE#4	2500mm	2500mm	2500mm	2500mm	JD1A-JD1B	1		PCR-PCR, 0.08SqX6PS
12	SPINDLE COMMAND	6500mm	6500mm	6500mm	6500mm	JA41-JA7B	1		PCR-PCR, 0.08SqX5PS
13	CALL LIGHT	1700mm	1700mm	1700mm	1700mm	APC JOINT BOX#2-CALL LIGHT	1		VCTF 0.75SqX7C
14	LOAD,SPEED METER	6500mm	6500mm	6500mm	6500mm	JY1-LOAD/RPM METER	1		PCR, COVW-SB 0.2SqX2PS
15	I/O UNIT A POWER	2000mm	2000mm	2000mm	2000mm	XT1-CP32	1		VCTF 0.75SqX2C
16	MPG SIGNAL	1100mm	1100mm	1100mm	1100mm	JA3-MPG	1		PCR, 0.2Sq,5PS
17	PSM ESP	2000mm	2000mm	2000mm	2000mm	CX4-EXTERNAL RELAY	1		AMP,VCTF 1.5SqX2C
18	PSM CONTROL POWER	2100mm	2100mm	2100mm	2100mm	CX1A-OF6	1		AMP,VCTF 1.5SqX3C
19	PSM READY	2500mm	2500mm	2500mm	2500mm	CX3-TERMINAL	1		AMP,VCTF 1.5SqX2C
20	SIGNAL TRANSMISSION1,2,3	250mm	250mm	250mm	250mm	CXA2A-CXA2B	3		AMP-AMP, VCTF 0.5SqX8C
21	SP. FEEDBACK SENSOR(Bzi)	5250mm	5250mm	-	-	JYA2-Bzi SENSOR	1	FX1	PCR-AMP, 0.2SQX6C+0.3SQX1PS
22	SP.HEAD CABLE #1	5250mm	5250mm	-	-	T.M-SP.HEAD JOINT BOX	1		AMP-BUNDY,COVW-SB 0.2SQX20P,KIV0.75SQX5C
23	SP. FEEDBACK SENSOR(Mzi)	-	-	7100mm	6000mm	JYA2-Mzi SENSOR	1	FX1	PCR-AMP, COVW-SB 0.2SQX10P
23	SP.HEAD CABLE #1	-	-	5250mm	5250mm	T.M-SP.HEAD JOINT BOX	1	FX2	AMP-BUNDY,COVW-SB 0.2SQX20P,KIV0.75SQX5C
24	SP.HEAD CABLE #2	1000mm	1000mm	1000mm	1000mm	SP.HEAD JOINT BOX-SOL,L/S	6		BUNDY, VCTF 0.75SqX2P
25	BUILT-IN SP. POWER	4000mm	4000mm	-	-	MCC-SP.HEAD JOINT BOX	1	FX2	KIV 25.0SqX7C
26	SP. POWER	-	-	7100mm	6000mm	MCC-MOTOR	1		KIV 16.0SqX8C
27	SP. FAN POWER	-	-	7100mm	6000mm	T.BLOCK	1	FX1	KIV 1.5SqX3C
29	X-AXIS MOTOR FEEDBACK	3800mm	4300mm	3800mm	4300mm	JF1- MOTOR	1	FX3	PCR-JN2DS10SL2, COVW-SB 0.2SqX5P
30	Y-AXIS MOTOR FEEDBACK	6900mm	6900mm	6900mm	6900mm	JF2- MOTOR	1	FX4	PCR-JN2DS10SL2, COVW-SB 0.2SqX5P
31	Y +OT,-OT,DEC #1	5500mm	5500mm	5500mm	5500mm	T.MODULE-Y-AXIS JOINT BOX	1		PG21,VCTF 0.75SqX10C
32	Y +OT,-OT,DEC #2	1500mm	1500mm	1500mm	1500mm	Y-AXIS JOINT BOX-SENSOR	3		PG13.5,VCTF 0.75SqX2C
33	Z-AXIS MOTOR FEEDBACK	6400mm	6600mm	6400mm	6600mm	JF2- MOTOR	1	FX5	PCR-JN2DS10SL2, COVW-SB 0.2SqX5P
34	X-AXIS POWER	3600mm	4300mm	3600mm	4300mm	CZ2X-MOTOR	1	FX6	AMP-MS3108A22-22S, VCTF 6SqX4C
	Y-AXIS POWER	6500mm	6500mm	6500mm	6500mm	CZ2Y-MOTOR	1	FX7	AMP-MS3108B22-22S, VCTF 6SqX4C
	Y-AXIS BRAKE	6500mm	6500mm	6500mm	6500mm	TERMINAL-MOTOR	1		JN1DS04FK2, VCTF 1.5SqX3C
38	Z-AXIS POWER	5800mm	6500mm	5800mm	6500mm	CZ2Z-MOTOR	1	FX8	AMP-MS3108A22-22S, VCTF 6SqX4C
40	X,Z +OT,-OT,DEC #1	4000mm	4700mm	4000mm	4700mm	T.MODULE - X,ZJOINT BOX	1	FX9	BUNDY,VCTF 0.75SqX24C
41	X,Z +OT,-OT,DEC #2	3300mm	4300mm	3300mm	4300mm	X,Z-JOINT BOX-SENSOR	3		BUNDY, VCTF 0.75SqX2C,3EA
42	TABLE JOINT BOX #1	6800mm	6800mm	6800mm	6800mm	T.M-TABLE JOINT BOX	1	FX10	S-200 18x0.75Sq
43	TABLE JOINT BOX #2	500mm	500mm	500mm	500mm	TABLE JOINT BOX-SOL.	4		VCTF 0.75SqX2C
44	B-AXIS MOTOR FEEDBACK	7400mm	7400mm	7400mm	7400mm	JF1-MOTOR	1	FX11	SD-200 C TP 5x2x0.25Sq
45	B-AXIS POWER	7300mm	7300mm	7300mm	7300mm	CZ2L-MOTOR	1	FX12	S-200 4x6Sq
46	MAGAZINE FEEDBACK	7300mm	6100mm	7300mm	6100mm	JF1-MOTOR	1	FX20	PCR-JN2DS10SL2, COVW-SB 0.2SqX2P+0.5SqX5C
47	MAGAZINE MOTOR POWER	7200mm	6100mm	7200mm	6100mm	CZ5-MOTOR	1	FX21	VCTF 1.5SqX4C
48	MAGAZINE MOTOR BRAKE	7100mm	6000mm	7100mm	6000mm	TERMINAL-MOTOR	1		JN1DS04FK2, VCTF 1.5SqX3C
49	MAGAZINE POWER	1500mm	1500mm	1500mm	1500mm	CZ4-LINE FILTER	1		AMP, VCTF 1.5SqX4C
50	B-AMP CONTROLLER POWER	2500mm	2500mm	2500mm	2500mm	CXA19B-T.BLOCK	1		AMP, VCTF 0.75SqX2C
51	B-AMP EMG.	2000mm	2000mm	2500mm	2500mm	CX30-KE6	1		AMP, VCTF 0.5SqX2C
52	DISCHARGING UNIT CABLE #1	600mm	600mm	600mm	600mm	CZ6-UNIT	1		AMP, VCTF 4.0SqX2C
53	DISCHARGING UNIT CABLE #2	600mm	600mm	600mm	600mm	CXA20-UNIT	1		AMP, VCTF 0.75SqX2C
54	APC CABLE #1	6000mm	7200mm	6000mm	7200mm	MODULE-APC JOINT BOX#1	3	FX13	KIV 0.75SqX24C,0.5sqX19C,0.5sqX24C
55	APC CABLE #2	2700mm	3200mm	2700mm	3200mm	APC JOINT BOX#1-APC JOINT BOX#2	2	FX14.	KIV 0.75SqX24C,0.5sqX24C
56	APC CABLE #3	5000mm	3000mm	5000mm	3000mm	APC JOINT BOX#1-APC OP.	1	FX15	KIV 0.5SqX19C
57	APC DOOR L/S(LEFT/RIGHT)	3700mm	3900mm	3700mm	3900mm	APC JOINT BOX#2-APC DOOR L/S	2		VCTF 0.5SqX6C,2EA
58	ATC JOINT BOX CABLE #1	5700mm	5900mm	5700mm	5900mm	MODULE-ATC JOINT BOX#1	2	FX16	KIV 0.75SqX15C, 0.5sqX24C
59	ATC JOINT BOX CABLE #2	5600mm	5800mm	5600mm	5800mm	MODULE-ATC JOINT BOX#2	1	FX17	KIV 0.75SqX24C
60	HYD. MOTOR POWER	2800mm	2800mm	2800mm	2800mm	MCC-MOTOR	1	FX18	VCTF 4.0SqX4C
61	HYD. MOTOR OIL CHECK	3800mm	3800mm	3800mm	3800mm	MODULE-MOTOR	1		VCTF 0.75SqX2C
62	SP.COOLING UNIT	4200mm	4200mm	4200mm	4200mm	TERMINAL-COOLING UNIT	1	FX19	VCTF 2.5SqX4C + VCTF 0.75SqX2C,2EA

NO	NAME	HS400 (18i-MB)	HS500 (18i-MB)	HS400i (21i-MB)	HS500i (21i-MB)	CONNECTION	Q'TY	FLEXIBLE	REMARK
63	COOLANT UNIT#1	2300mm	2300mm	2300mm	2300mm	MCC-MOTOR	1		KIV 2.5SqX10C,KIV 0.75SqX4C
64	COOLANT UNIT#2	2300mm	2300mm	2300mm	2300mm	MCC-MOTOR	1		KIV 2.5SqX10C,KIV 0.75SqX4C
65	CHIP CONVEYOR UNIT	3500mm	3500mm	3500mm	3500mm	MCC-MS CONNECTOR	1		KIV 2.5Sq*10C,MS312A-18-1S
66	CONVEYOR MOTOR(L) POWER	5800mm	2800mm	5800mm	2800mm	MCC-MOTOR	1		VCTF 1.5SqX4C
67	CONVEYOR MOTOR(R) POWER	6400mm	3400mm	6400mm	3400mm	MCC-MOTOR	1		VCTF 1.5SqX4C
68	UTILITY CABLE#1	5200mm	5200mm	5200mm	5200mm	T.MODULE-MOTOR, L/S	5		VCTF 0.75SqX6P + VCTF 0.5SqX2C,4EA
69	UTILITY CABLE#2	5200mm	5200mm	5200mm	5200mm	T.MODULE-SOL	4		VCTF 0.75SqX2P,3EA + VCTF 0.75SqX3P
70	I/O MODULE CONNECTION	1000mm	1000mm	1000mm	1000mm	I/O UNIT A - T.M1,2,3,4	4		HONDA 50P - HRS 50P
71	DOOR L/S	6000mm	6000mm	6000mm	6000mm	T.BLOCK-L/S	1		VCTF 0.5SqX6C
72	ATC DOOR L/S	2800mm	2800mm	2800mm	2800mm	ATC JOINT BOX-L/S	1		VCTF 0.75SqX2C
73	WORK LIGHT	4500mm	4500mm	4500mm	4500mm	T.BLOCK-WORK LIGJT	1		VCTF 0.75SqX4C
74	OP FLAT CABLE1	800mm	800mm	800mm	800mm	CE56,57-CM1,CM2	2		H.50P-H.50P
75	OP FLAT CABLE2	800mm	800mm	800mm	800mm	CE56,57-CM3,CM4	2		H.50P-H.50P
76	OP EARTH CABLE	6000mm	6000mm	6000mm	6000mm		4		KIV 2.0Sq
78	WORK COUNTER	6500mm	6500mm	6500mm	6500mm	T.BLOCK-OP. BOX	1		COVV-SB 0.25SqX4P

4.FLEXIBLE LIST

HS400/500(F18i)_HS400i/500i(F21i)

NO	선재 및 직경	HS400 (18i-MB)	HS500 (18i-MB)	HS400i (21i-MB)	HS500i (21i-MB)	신호 내용	양쪽 종단처리	비 고
FX2	PAH,Φ36	3100mm	3100mm	-	-	SP.MOTOR FEEDBACK/SIGNAL	TNC-M36B - TNC-M36B	
		-	-	4100mm	3000mm	SP.MOTOR POWER/FEEDBACK/FAN	TNC-M36B - TWC-M36B	
	PAH,Φ36	3000mm	3000mm	-	-	SP.POWER	TNC-G36B - TNC-G36B	
		-	-	3100mm	3100mm	SP. HEAD JOINT BOX CABLE #1	TNC-G36B - TNC-G36B	
FX3	PAH,Φ10	1800mm	2300mm	1800mm	2300mm	X축 FEEDBACK	TNC-G10B - FIC-U1010B	
FX4	PAH,Φ22	2400mm	2400mm	2400mm	2400mm	Y축 FEEDBACK	TNC-G22B - INSERT	
FX5	PAH,Φ10	4000mm	4200mm	4000mm	4200mm	Z축 FEEDBACK	TNC-G10B - FIC-U1010B	
FX6	PAH,Φ28	1300mm	2000mm	1300mm	2000mm	X축 MOTOR POWER	TNC-G28B - INSERT	
FX7	PAH,Φ28	2400mm	2400mm	2400mm	2400mm	Y축 MOTOR POWER/BRAKE	TNC-G28B - INSERT	
FX8	PAH,Φ28	3300mm	4000mm	3300mm	4000mm	Z축 MOTOR POWER	TNC-G28B - INSERT	
FX9	PAH,Φ16	1800mm	2500mm	1800mm	2500mm	X,Z축 LIMIT S/W	TNC-G16B - TNC-G16B	
FX10	PAH,Φ22	4600mm	4600mm	4600mm	4600mm	TABLE JOINT BOX#1	TNC-P21B - TNC-P21B	
FX11	PAH,Φ10	5300mm	5300mm	5300mm	5300mm	B-AXIS FEEDBACK	TNC-G10B - INSERT	
FX12	PAH,Φ16	5300mm	5300mm	5300mm	5300mm	B-AXIS POWER	TNC-G16B - FIC-U2016B	
FX13	PAH,Φ36	3800mm	5000mm	3800mm	5000mm	APC CABLE #1	TNC-G36B - TNC-G36B	
FX14	PAH,Φ36	2300mm	2800mm	2300mm	2800mm	APC CABLE #2	TNC-G36B - TNC-G36B	
FX15	PAH,Φ16	4500mm	2500mm	4500mm	2500mm	APC CABLE #3	TNC-G16B - TNC-G16B	
FX16	PAH,Φ28	3200mm	3400mm	3200mm	3400mm	ATC CABLE#1	TNC-G28B - TNC-G28B	
FX17	PAH,Φ22	3200mm	3400mm	3200mm	3400mm	ATC CABLE#2	TNC-P21B - TNC-P21B	
FX18	PAH,Φ12	1500mm	1500mm	1500mm	1500mm	HYD. MOTOR	TNC-G12B - TNC-G12B	
FX19	PAH,Φ12	1500mm	1500mm	1500mm	1500mm	SP. COOLING UNIT	TNC-G12B - TWC-G12B	
FX20	PAH,Φ10	4700mm	3500mm	4700mm	3500mm	MAGAZINE FEEDBACK	TNC-G10B - INSERT	
FX21	PAH,Φ16	4700mm	3600mm	4700mm	3600mm	MAGAZINE POWER	TNC-G16B - INSERT	

표면

수 정 내 용

부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜

HS400/500(F18i)

HS400i/500i(F21i)

CABLE DIAGRAM

보통 허용차 (절삭가공)		열처리	재질				
호칭치수 구 분	허용치 ±mm	표면처리	소재 치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1		폭	수량	중량	도명	
4 초과 16이하	0.2					도면크기	
16 초과 63이하	0.3		제	실	검	승	도
63 초과 250 "	0.5						
250 # 1000 "	0.8	2007.07					
1000 초과	1.2						
플트구멍 및 탭 의 중심 거리	0.3						

부호	설비CODE	내 용	수정자	승인자	날짜

DWG. No.	CABLE NO.	TITLE	비고
1	KA01	NC +24V POWER CABLE	
2	KA02	OP BOX CABLE (a/b/c)	
3		EMERGENCY/DOOR INTERLOCK PUSH BUTTON CABLE	DETAIL B
4	KA03/KA03-1	RS 232C CABLE	
5	KA05/KA05-1	OP.I/O MODULE POWER CABLE	
6	KA06/KA06-1	I/O LINK CABLE #1	
7	KA06-2/KA06-3	I/O LINK CABLE #2	
8	K12	SPINDLE CONTROL CABLE	
9	K33	LOAD/RPM METER CABLE	
10	KA29	I/O UNIT A POWER	
11	K124	MPG CABLE	
12	K69/K69-1/K69-2	TRANSMISSION CABLE	*HS400/500(F18i)
13	K69/K69-1/K69-2	TRANSMISSION CABLE	*HS400/500i(F21i)
14	K3/K6/K7	PSM CABLE	
15	K17/KA7/KA8	BZi SENSOR & SP. HEAD JOINT BOX CABLE #1(FX1)	*BUILT-IN SP. MOTOR
16		BZi & HEAD SENSOR CONNECTION	*BUILT-IN SP. MOTOR
17	KA7/KA8	SP. HEAD JOINT BOX CABLE #1(FX2)	*ALPHA i SP. MOTOR
18	KA7-1~4/KA8-1,2	SP. HEAD JOINT BOX CABLE #2	*BUILT-IN SP. MOTOR
19	KA7-1,2/KA8-1~4	SP. HEAD JOINT BOX CABLE #2	*ALPHA i SP. MOTOR
20	K10	SP. POWER CABLE(FX2)	*BUILT-IN SP. MOTOR
21	K17/KA31/K10	SP. POWER CABLE(FX1)	*ALPHA i SP. MOTOR
22	KA9	TEMP. INPUT MODULE CONNECTION	*OPTION
23	K22X	X-AXIS FEEDBACK CABLE(FX3)	
24	K22Y/KA10	Y-AXIS FEEDBACK CABLE & Y-AXIS L/S #1(FX4)	
25	KA10-1,2	Y-AXIS L/S #2	
26	K22Z	Z-AXIS FEEDBACK CABLE(FX5)	
27	K21X	X-AXIS MOTOR POWER(FX6)	
28	K21Y/K24Y	Y-AXIS MOTOR POWER & BRAKE CABLE(FX7)	
29	K21Z	Z-AXIS MOTOR POWER(FX8)	
30	KA11	X,Z-AXIS LIMIT SWITCH CABLE #1(FX9)	
31	KA11-1~3	X,Z-AXIS LIMIT SWITCH CABLE #2	
32	K22B	B-AXIS FEEDBACK CABLE(FX11)	
33	K21B	B-AXIS MOTOR POWER CABLE(FX12)	
34	KA12	TABLE JOINT BOX CABLE #1(FX10)	
35	KA12-1~4	TABLE JOINT BOX CABLE #2	
36	KA13/KA14/KA15	APC CABLE #1(FX13)	
37		APC CONNECTION	

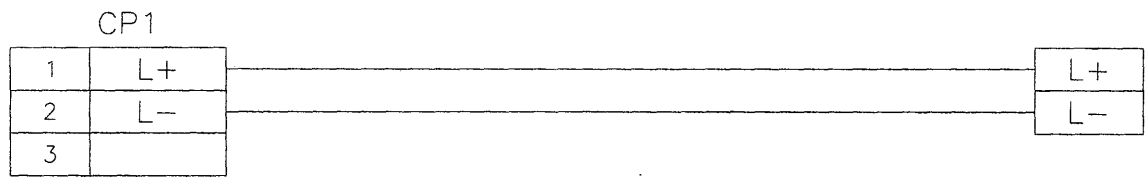
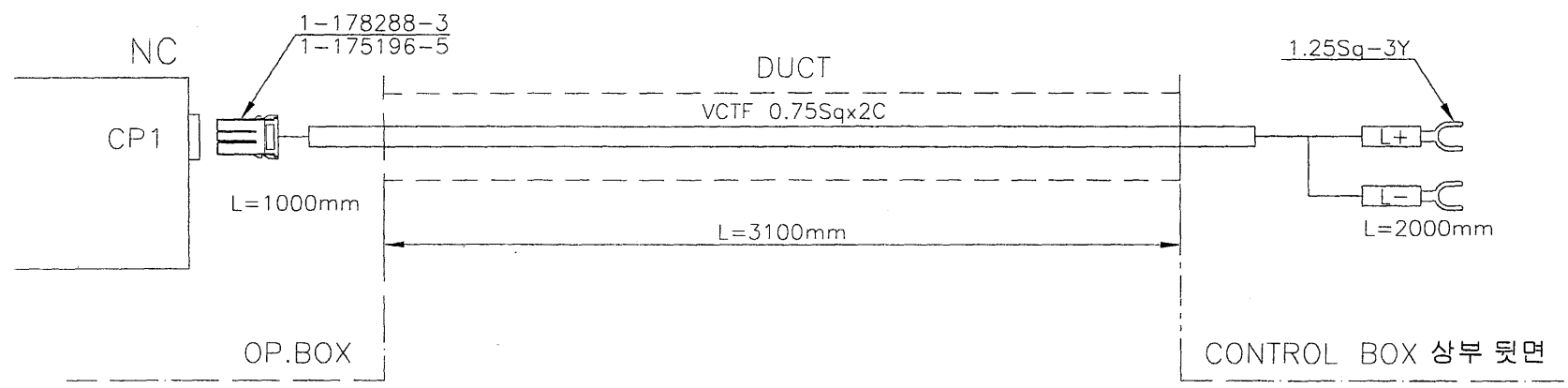
DWG. No.	CABLE NO.	TITLE	비고
38	KA13-1/KA14-1	APC CABLE #2(FX14)	
39	KA15-1	APC CABLE #3(FX15)	
40	KA16	CALL LIGHT CABLE	
41	KA17/KA17-1	APC DOOR L/S CABLE(LEFT/RIGHT)	
42	K1W	MAGAZINE FEEDBACK CABLE(FX20)	
43	K3W/K24W	MAGAZINE MOTOR POWER CABLE(FX21)	
44	K2W	MAGAZINE POWER CABLE	
45	K11W	B-AMP CONTROLLER CABLE	
46	K8W/K21W	B-AMP EMC & DI SIGNAL CABLE	
47	K4W/K5W	DISCHARGING CABLE	
48	KA18/KA18-1	ATC JOINT BOX #1(FX16)	
49	KA18-2	ATC JOINT BOX #2(FX17)	
50	KA19,KA19-1	HYD. MOTOR POWER & HYD. OIL CHECK CABLE(FX18)	
51	KA20	SP.COOLING UNIT CABLE(FX19)	
52	KA21	COOLANT MOTOR CABLE #1	
53	KA22	COOLANT MOTOR CABLE #2	
54	KA23/KA23-1	CHIP CONVEYOR MOTOR CABLE(LEFT/RIGHT)	
55	KA24/KA24-1	UTILITY BOX CABLE #1	
56	KA24-2~6	UTILITY BOX CABLE #2	
57	KA25	EX. CHIP CONVEYOR MOTOR	
58	TM1,2,3,4	INTERNAL I/O CONNECTION	
59	CE56A,B/CE57A,B	OP. FLAT CABLE	
60		REMOTE MPG CABLE	
61	KA26/KA27	DOOR L/S	
62	KA28	WORK LIGHT	*HS400/400i
62a	KA28	WORK LIGHT	*HS500/500i
63	KA30	EARTH CABLE	

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량	도명
4 초과 16 이하	0.2						
16 초과 63 이하	0.3			제도	설계	검토	승인
63 초과 250 #	0.5						
250 # 1000 #	0.8			2007.07		도번	
1000 초과	1.2					0	
플트구멍 및 탭 의 중심 거리	0.3					도면크기	

CABLE LIST

표 5

KA01



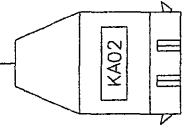
수 정 내 용					
부 호	설 비 CODE	내 용	수 정 자	승 인 자	날 짜

보통허용차 (절삭가공)		열처리		재질			WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재 치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량	KA01	
4 초과 16 이하	0.2						도명	
16 초과 63 이하	0.3						NC +24V POWER	
63 초과 250 "	0.5						도번	
250 " 1000 "	0.8	제도	설계	검토	승인		1	
1000 초과	1.2						2007.07	
플트구멍 및 탭 의 중심 거리	0.3							

수정내용				
부호	설변CODE	내용	수정자	승인자

KA02

DUCT



SNS24R

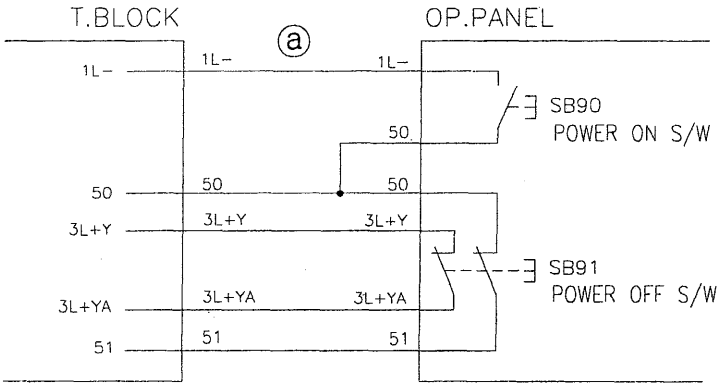
L=1000mm

L=3500mm

<KA02> SNS24R

4	3	2	1
3L+Y	1L-	51	50
8	7	6	5
E105	D105	STBY	3L+YA
12	11	10	9
LON	X030	L-	L+
16	15	14	13
WC1	N	YA42	N
20	19	18	17
50	E106	D106	WC2
24	23	22	21
SPO4	SPO3	SPO2	SPO1

MARKING					
WC1	WC2	L	YA42	N	N
COLOR					
BL			R		
WIRE					
COV SB 0.25Sqx6P					



OP.BOX

T.BLOCK

(a)
POWER ON/OFF
VCTF 0.5Sqx5C

(b)
EMERGENCY/
DOOR INT. LOCK
VCTF 0.75Sqx8C

TM1

TM1(A02)
TM1(B02)

T.BLOCK

(c)
WORK
COUNTER
COV-SB 0.25Sqx6P

AOR16G

A2(04)

CONTROL BOX 상부 뒷면

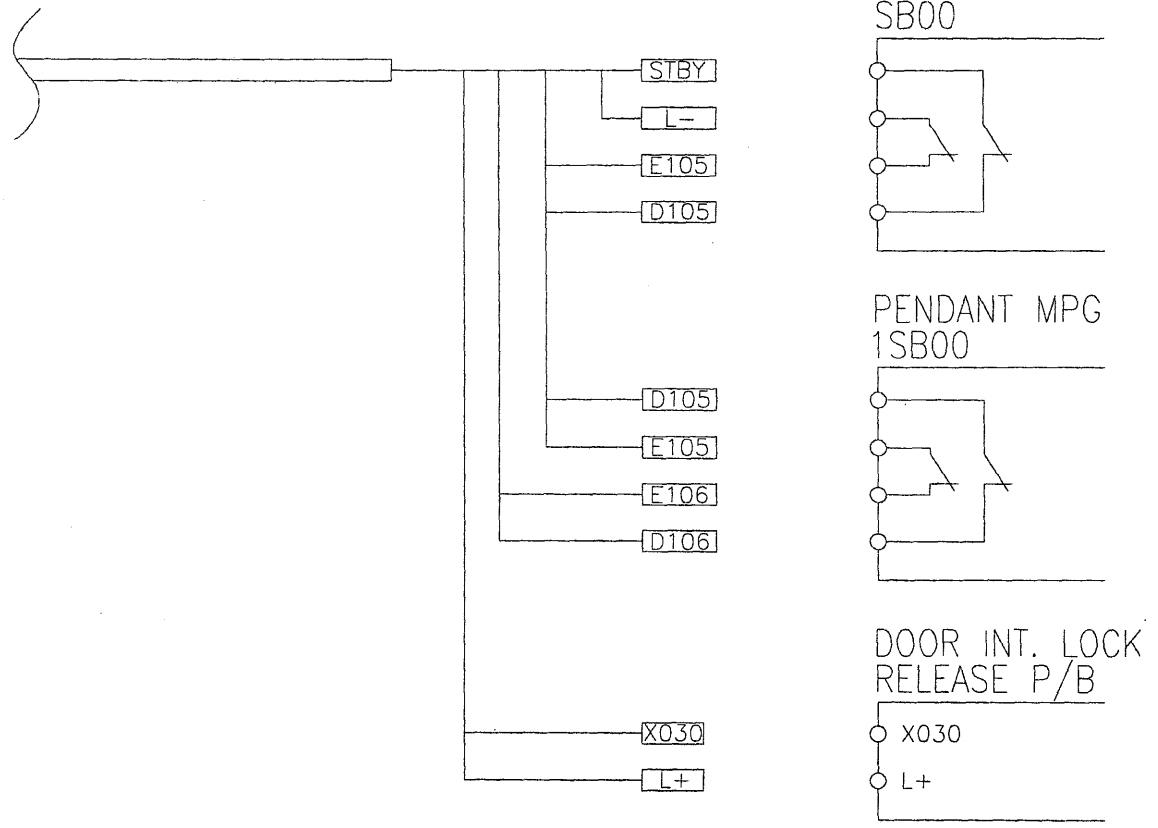
보통허용차 (절삭가공)		열처리	재질		WIA CORPORATION HS400/500(F18i)_HS400i/500i(F21i)
호칭치수 구분	허용치 ±mm		소재치수		
1 이상 4 이하	0.1	표면처리	최도	수량	중량
4 초과 16 이하	0.2				
16 초과 63 이하	0.3				
63 초과 250 "	0.5				
250 " 1000 "	0.8	제도	설계	검토	승인
1000 초과	1.2				
볼트구멍 및 탭 의 중심 거리	0.3	2007.07			

WIA CORPORATION	
HS400/500(F18i)_HS400i/500i(F21i)	
KA02	
도명	도면크기
OP. BOX CABLE	2
도번	

표 5

수 정 내 용				
부 호	설 변 CODE	내 용	수 정 자	승 인 자

DETAIL ②

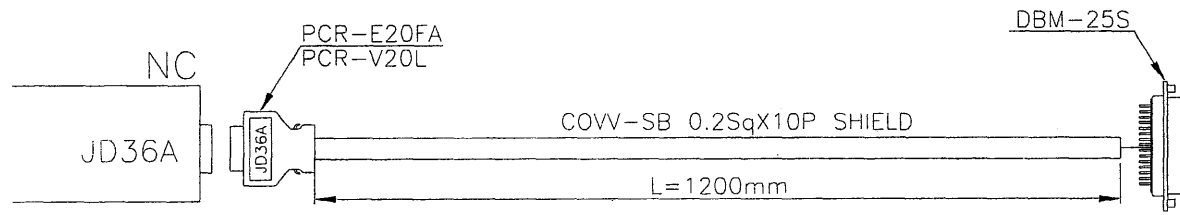


보통허용차 (절삭가공)		열처리		재질			WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량		
4 초과 16이하	0.2							
16 초과 63이하	0.3							
63 초과 250"	0.5							
250" 1000"	0.8	제도	설계	검토		승인		
1000 초과	1.2							
플러그형 및 탭 의 중심 거리	0.3							
		2007.07					도명	
							EMERGENCY / DOOR INT LOCK	
							도번	3

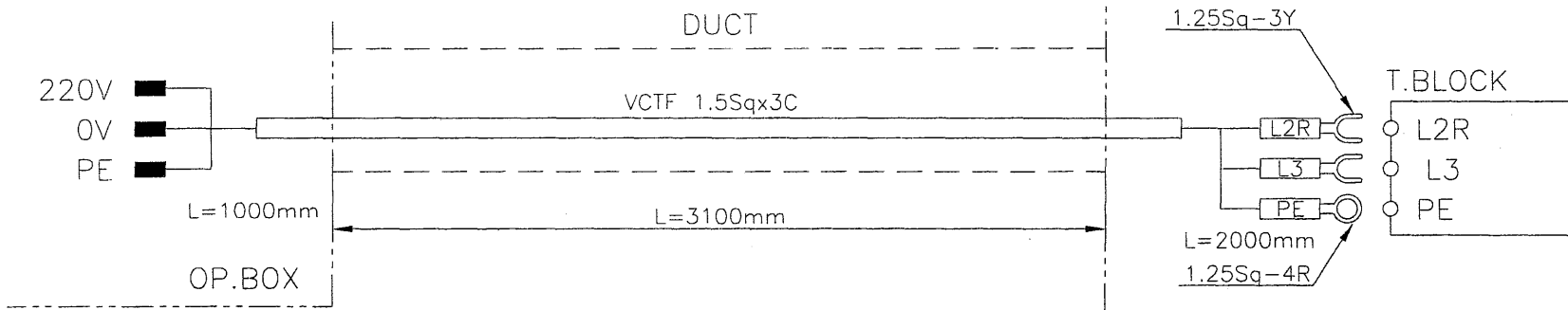
판공

수정내용					
부호	설번CODE	내용	수정자	승인자	날짜

KA03



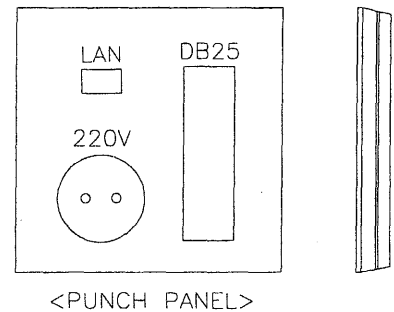
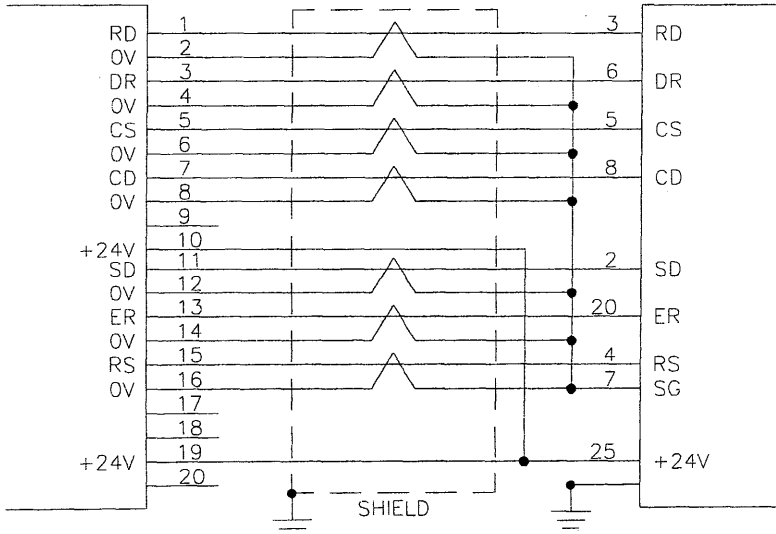
KA03-1



CONTROL BOX 상부 뒷면

JD36A

RS232C



보통허용차 (절삭가공)		열처리		재질			WIA CORPORATION	
호칭치수	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)	
구분				척도	수량	중량	KA03/KA03-1	
1 이상 4 이하	0.1						도명	도면크기
4 초과 16 이하	0.2						RS232C CABLE	
16 초과 63 이하	0.3						도번	4
63 초과 250 "	0.5							
250 " 1000 "	0.8							
1000 초과	1.2							
플러그구멍 및 탭의 중심 거리	0.3	제도	설계	검토	승인			
		2007.07						

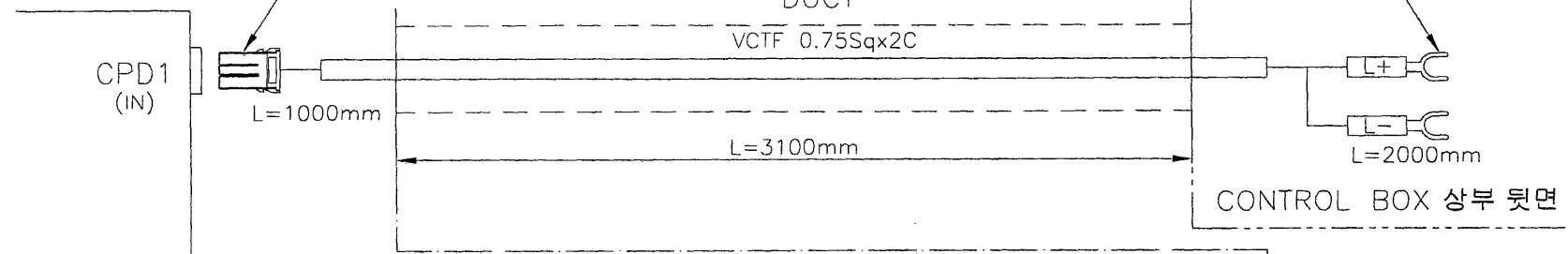
品名

수 정 내 용

부호	실변CODE	내 용	수정자	승인자	날짜

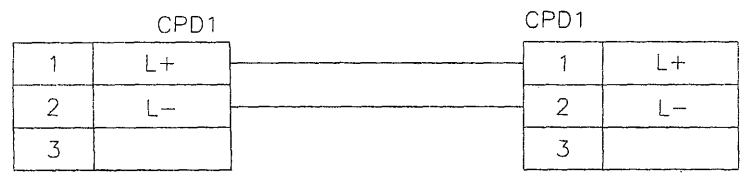
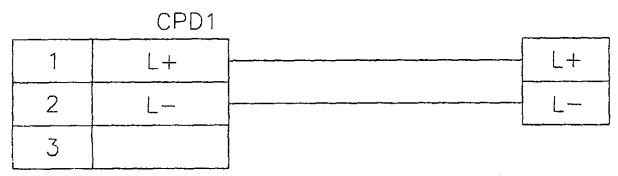
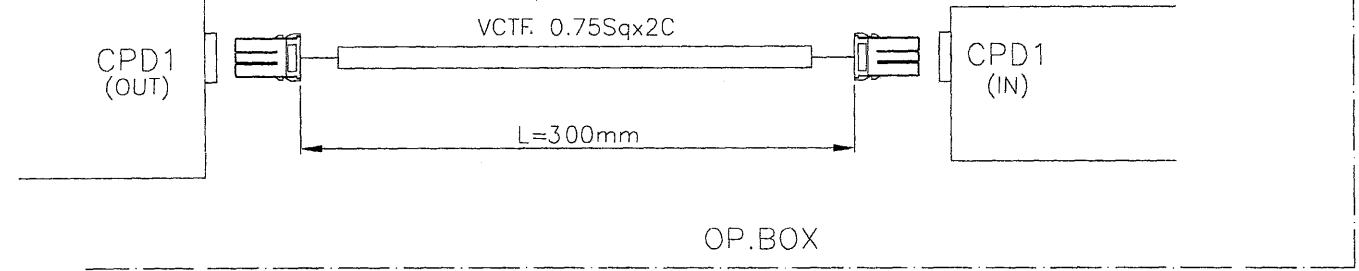
KA05

OP.I/O MODULE #A



KA05-1

OP.I/O MODULE #B



보통허용차 (절삭가공)	열처리	재질	WIA CORPORATION			
허용치 구 분 ±mm	표면처리	소재치수	HS400/500(F18i)_HS400i/500i(F21i)			
1 이상 4 이하 0.1	제 도	설 계	검 토	승 인	도면크기	
4 초과 16 이하 0.2						도면
16 초과 63 이하 0.3						
63 초과 250 " 0.5						
250 " 1000 " 0.8	2007.07	5				
1000 초과 1.2						
볼트구멍 및 탭 의 중심 거리 0.3						

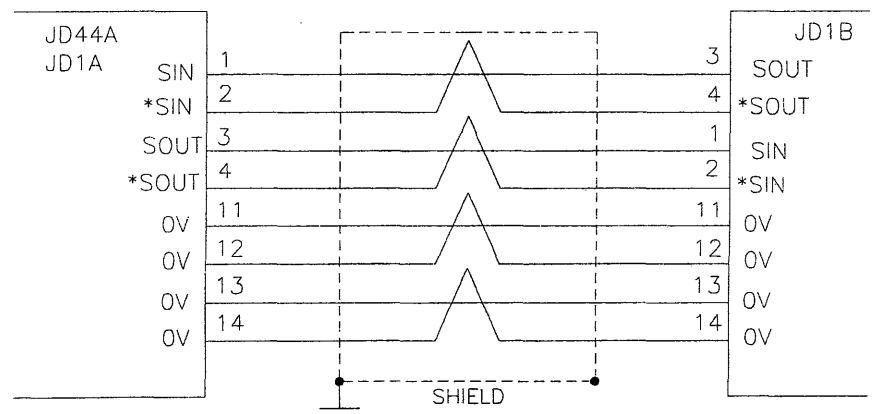
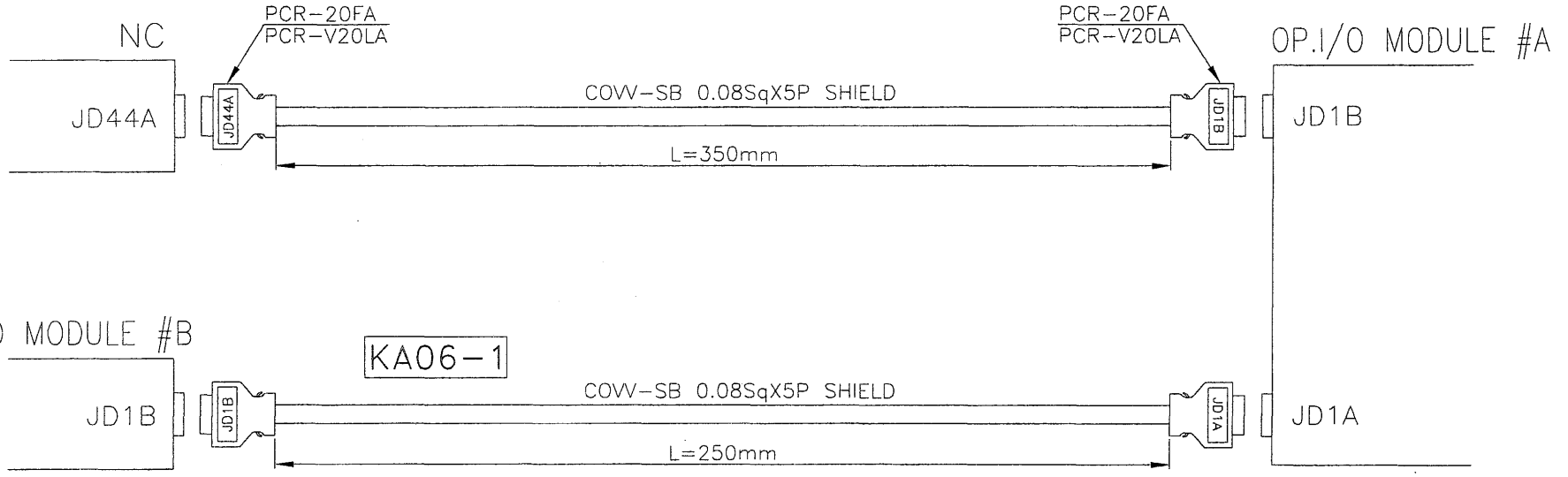
WIA CORPORATION	
HS400/500(F18i)_HS400i/500i(F21i)	
KA05/KA05-1	
도명	OP.I/O MODULE POWER CABLE
도번	5

品名

KA06

수정내용

부호	설번CODE	내용	수정자	승인자	날짜



보통허용차 (절삭가공)		열처리	재질				
호칭치수 구분	허용치 ±mm		소재치수				
1 이상 4 이하	0.1	표면처리	최대	수량	수량	HS400/500(F18i)_HS400i/500i(F21i)	
4 초과 16이하	0.2					KA06/KA06-1	
16 초과 63이하	0.3		제도	실계	검토	승인	도명 I/O LINK CABLE 1#
63 초과 250"	0.5						도번
250 ~ 1000"	0.8	2007.07			도면크기 6		
1000 초과	1.2						
플트구멍 및 탭의 중심 거리	0.3						

판공

수정내용

부호	실변CODE	내용	수정자	승인자	날짜

KA06-2

OP.I/O MODULE #B



PCR-20FA
PCR-V20LA

COW-SB 0.08SqX5P SHIELD

L=3100mm

PCR-20FA
PCR-V20LA

I/O UNIT #A



OP.BOX

CONTROL BOX 상부 뒷면

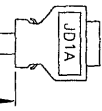
βISV 40

KA06-3

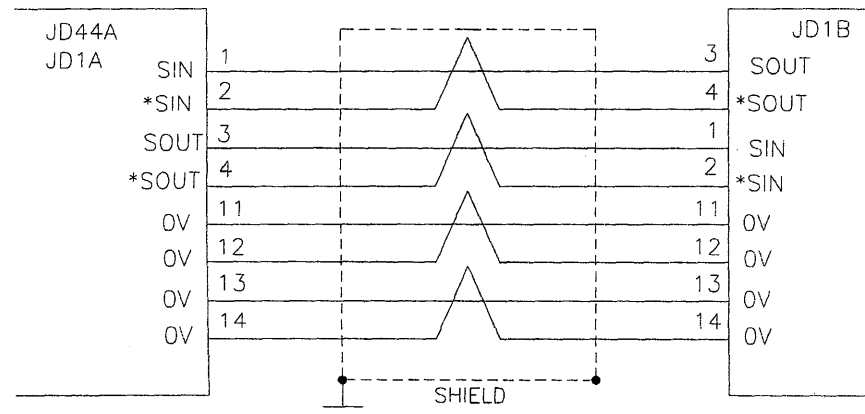


COW-SB 0.08SqX5P SHIELD

L=2500mm



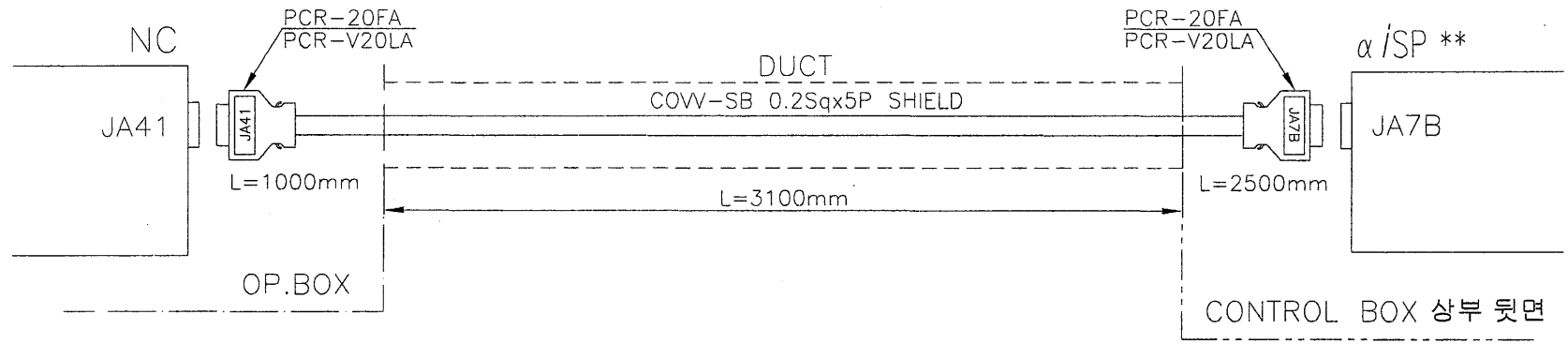
JD1A



보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
허용치수 구 분	허용치 ±mm	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			최도	수량	중량	KA06-2/KA06-3
4 초과 16 이하	0.2						
16 초과 63 이하	0.3						
63 초과 250 "	0.5						
250 " 1000 "	0.8	제도	설계	검토	승인	도명 I/O LINK CABLE #2	
1000 초과	1.2					도번 7	
플러그구멍 및 탭의 중심 거리	0.3	2007.07					

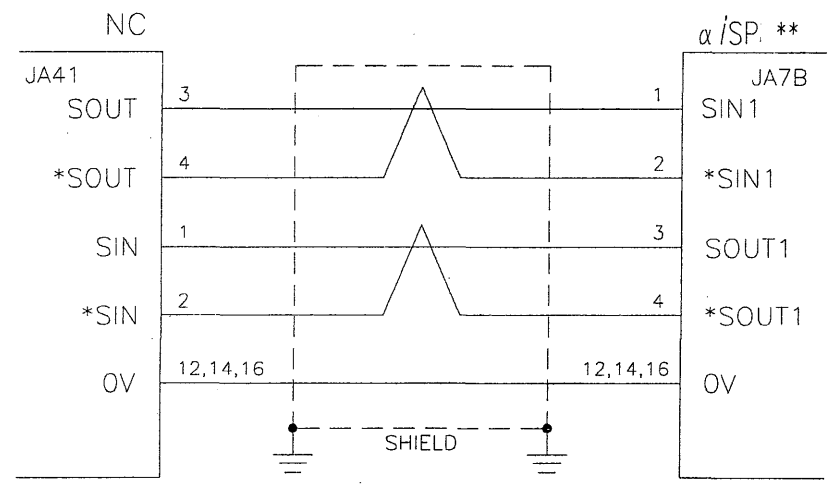
수 정 내 용				
부 호	설 변 CODE	내 용	수 정 자	승 인 자

K12



CONNECTOR JA7A, JA7B

9		10		19		20	
7		8		17		18	
5		6		15		16	OV
3	SOUT	4	*SOUT	13		14	OV
1	SIN	2	*SIN	11		12	OV



HS400/500	HS400i/500i
αiSP 30	αiSP 22

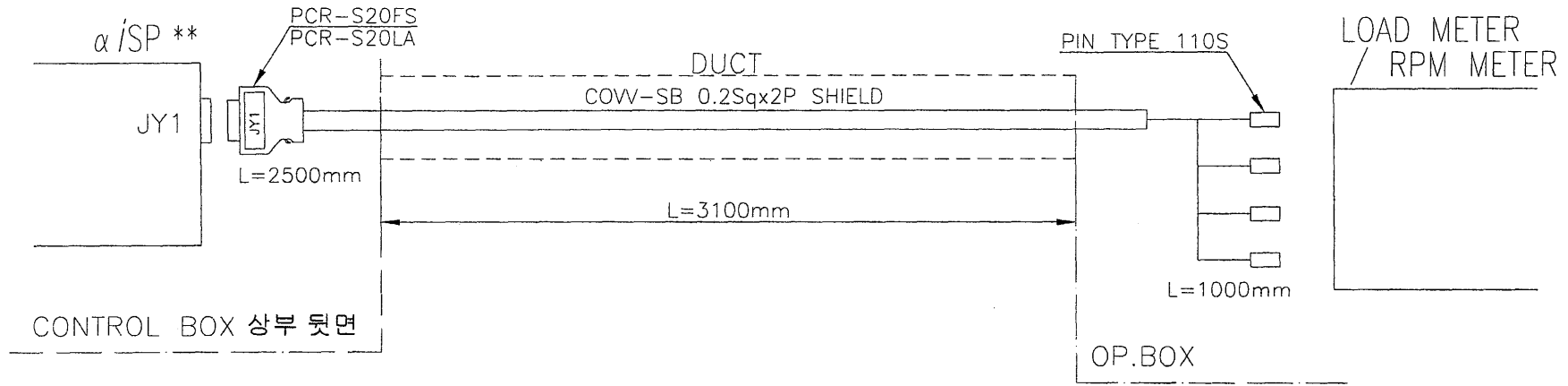
보통허용차 (절삭가공)		열처리		재질		WIA CORPORATION	
호칭치수	허용치	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
구분	±mm			척도	수량	수량	K12
1 이상 4 이하	0.1			도명			도면크기
4 초과 16 이하	0.2	제도	설계	검토	승인	SPINDLE CONTROL	
16 초과 63 이하	0.3					도번	8
63 초과 250 #	0.5						
250 # 1000 #	0.8						
1000 초과	1.2						
물트구멍 및 탭의 중심 거리	0.3	2007.07					

판공

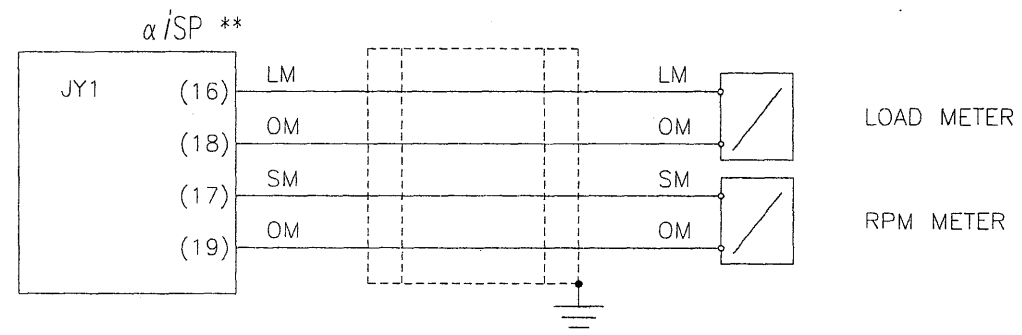
수정내용

부호	실변CODE	내용	수정자	승인자	날짜

K33



HS400/500	HS400i/500i
α /SP 30	α /SP 22



보통허용차 (절삭가공)		열처리		재질			WIA CORPORATION		
호칭치수 구분	허용치 \pm mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)		
1 이상 4 이하	0.1			최도	수량	중량	K33		
4 초과 16이하	0.2						도명 LOAD / RPM METER CABLE		도면크기
16 초과 63이하	0.3						도번		
63 초과 250 "	0.5						제도		승인
250 " 1000 "	0.8	설계	검토						
1000 초과	1.2	2007.07							
플러그머 및 탭 의 중심 거리	0.3								

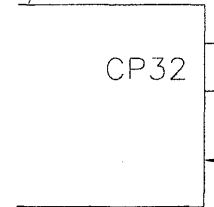
用吉

수 정 내 용

부 호	실번CODE	내 용	수정자	승인자	날짜

KA29

I/O UNIT A

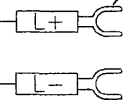


SMS-3PNS-5
RC16M-SCT3

VCTF 0.75SqX2C

L=2000mm

1.25Sq-3Y



CP32

1	L+
2	L-
3	

L+
L-

보통허용차 (절삭가공)		열처리		재질		WIA CORPORATION			
호칭치수 구 분	허용치 ±mm	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)			
1 이상 4 이하	0.1			척도	수량	종량	KA29		
4 초과 16 이하	0.2								
16 초과 63 이하	0.3			제 도	설 계	검 토	승 인	도명	도면크기
63 초과 250 #	0.5							I/O UNIT A POWER	10
250 # 1000 #	0.8	2007.07							
1000 초과	1.2								
볼트구멍 및 탭 의 중심 거리	0.3								

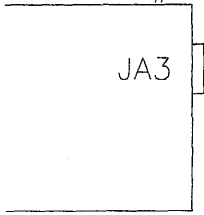
표기

수 정 내 용

부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜

K124

OP.I/O MODULE #B



PCR-S20FS
PCR-S20LA

COVV-SB 0.2SqX3P+6C

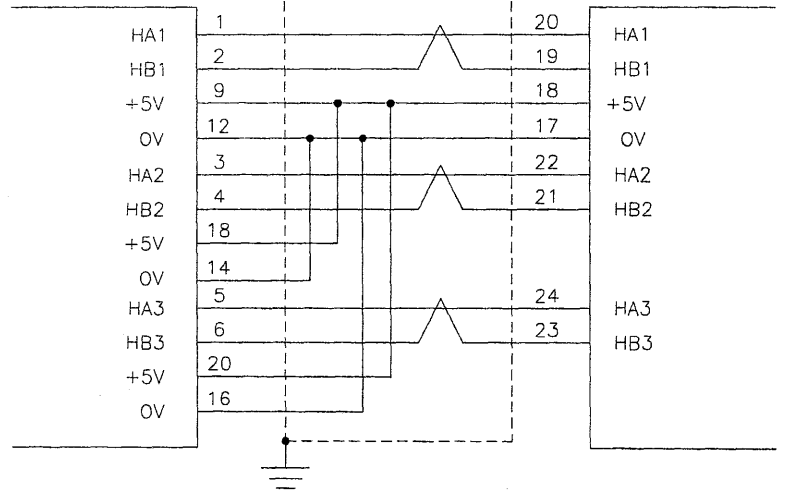
L=100mm

L=1000mm

※ AMP CONNECTOR로 처리
(Cable 도면 48page 참고)

OP.I/O MODULE

MPG CONNECTOR

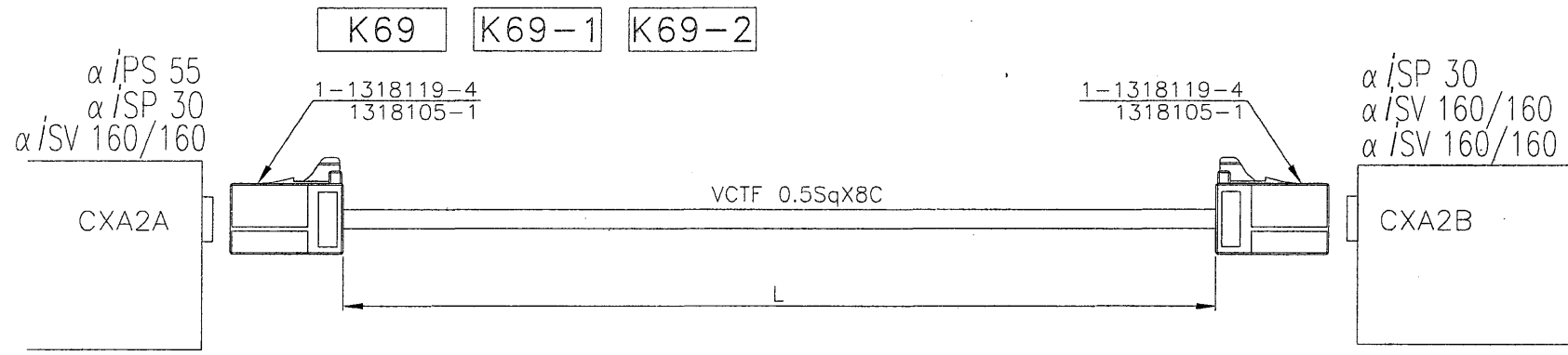


보통허용차 (절삭가공)		열처리		재질		WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량	K124
4 초과 16 이하	0.2						도명
16 초과 63 이하	0.3						도면크기
63 초과 250 "	0.5						MPG CABLE
250 " 1000 "	0.8	제도	설계	검토	승인		도번
1000 초과	1.2	2007.07					11
플러그구멍 및 탭 의 중심 거리	0.3						

用五

수 정 내 용

부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜



α/PS 55		α/SP 30
α/SP 30		α/SV 160/160
α/SV 160/160		α/SV 160/160
CXA2A		CXA2B
(A1)	+24V	+24V
(B1)	+24V	+24V
(A2)	OV	OV
(B2)	OV	OV
(A3)	MIFA	MIFA
(B3)	BATL	BATL
(A4)	*ESP	*ESP
(B4)	XMIFA	XMIFA

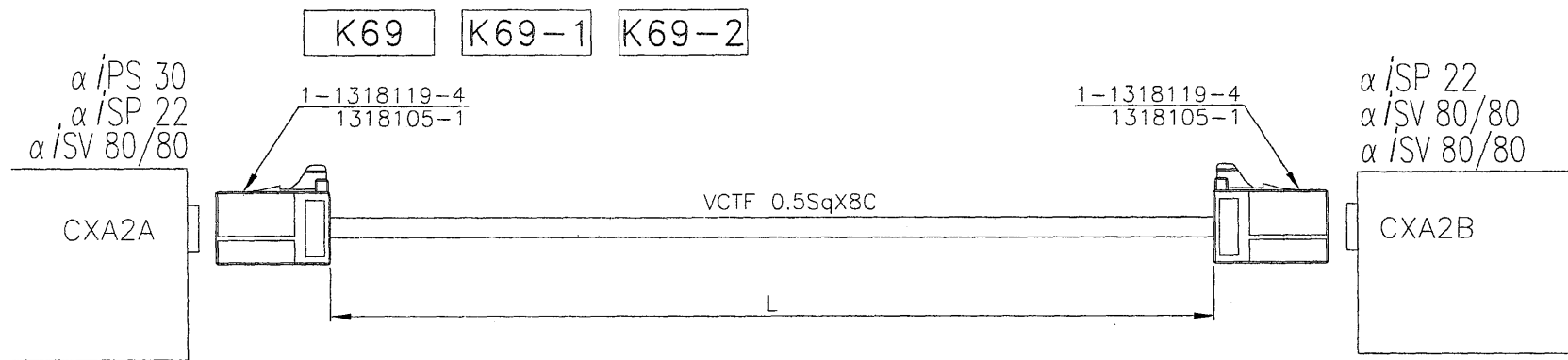
LENGTH (L)		
K69	PSM-SPM	250mm
K69-1	SPM-SVM2	200mm
K69-2	SVM2-SVM2	200mm

(*ONLY HS400/500(F18i-MB))

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량	K69/K69-1/K69-2
4 초과 16이하	0.2						도명 TRANSMISSION CABLE
16 초과 63이하	0.3			제도	실계	검토	도면크기
63 초과 250 "	0.5						도번
250 " 1000 "	0.8						12
1000 초과	1.2						
플러그명 및 탭 의 중심 거리	0.3						
		2007.07					

插五

수 정 내 용					
부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜



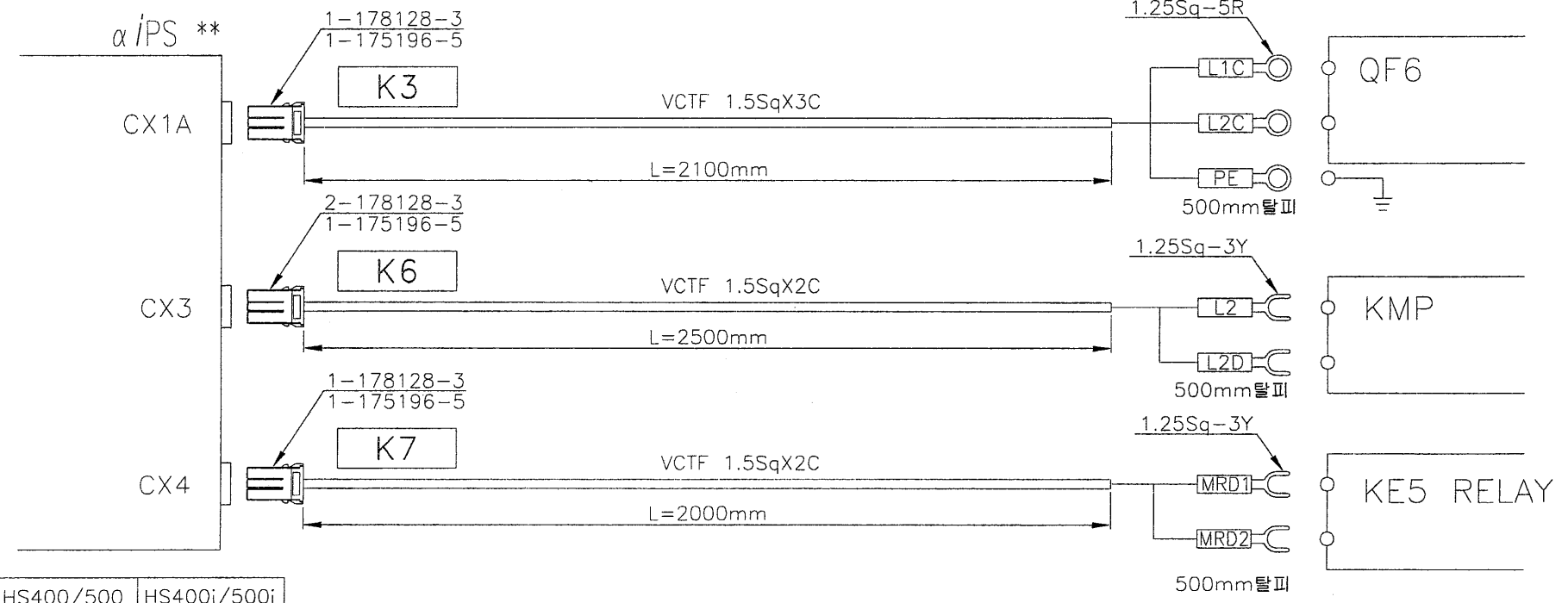
CXA2A		CXA2B	
(A1)	+24V	(A1)	+24V
(B1)	+24V	(B1)	+24V
(A2)	0V	(A2)	0V
(B2)	0V	(B2)	0V
(A3)	MIFA	(A3)	MIFA
(B3)	BATL	(B3)	BATL
(A4)	*ESP	(A4)	*ESP
(B4)	XMIFA	(B4)	XMIFA

LENGTH (L)		
K69	PSM-SPM	250mm
K69-1	SPM-SVM2	200mm
K69-2	SVM2-SVM2	200mm

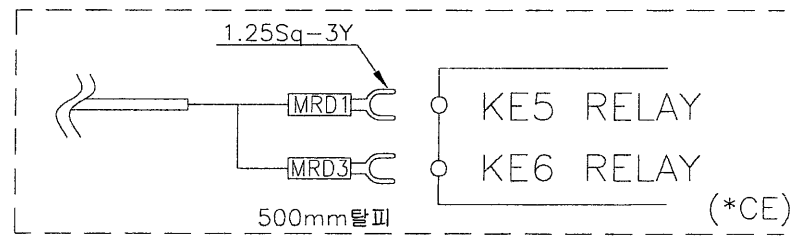
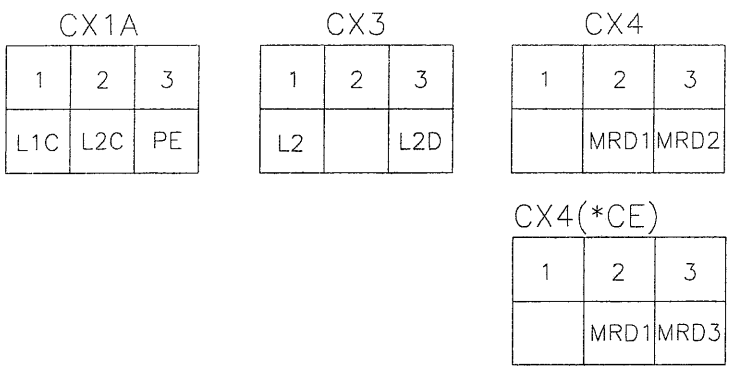
(*ONLY HS400i/500i(F21i-MB))

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	종량	K69/K69-1/K69-2
4 초과 16이하	0.2						
16 초과 63이하	0.3						
63 초과 250"	0.5						
250" 1000"	0.8						
1000 초과	1.2	제	설	검	승	인	도명 TRANSMISSION CABLE
플트구멍 및 탭 의 중심 거리	0.3	도	계	본	인		도번
		2007.07					
						도면크기 13	

수 정 내 용					
부호	설번CODE	내 용	수정자	승인자	날짜



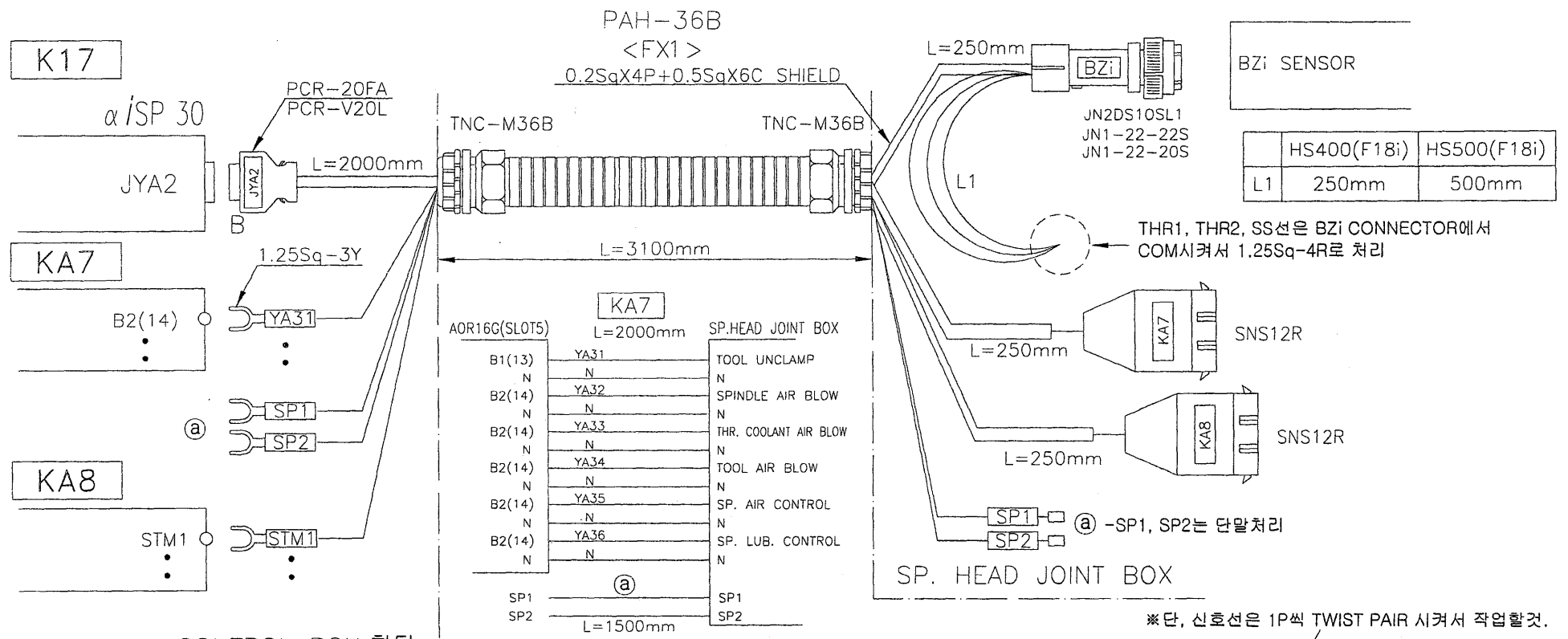
HS400/500	HS400i/500i
α iPS 55	α iPS 30



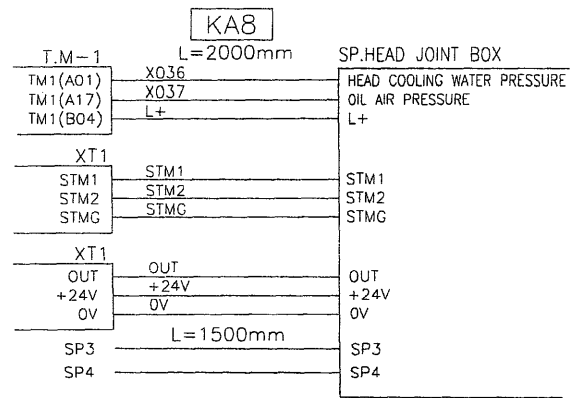
보통허용차 (절삭가공)		열처리		재질		WIA CORPORATION	
호칭치수	허용치	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
구분	±mm					K3/K6/K7	
1 이상 4 이하	0.1					도명	
4 초과 16이하	0.2					PSM CABLE	
16 초과 63이하	0.3					도번	
63 초과 250 "	0.5					14	
250 " 1000 "	0.8	제도	설계	검투	승인		
1000 초과	1.2	2007.07					
플러그형 및 탭의 중심 거리	0.3						

補正

수정내용					
부호	설변CODE	내용	수정자	승인자	날짜



CONTROL BOX 하단



	<KA7>										①		<KA8>												
MARKING	YA31	YA32	YA33	YA34	YA35	YA36	N	N	N	N	N	N	SP1	SP2	STM1	STM2	STMG+24V	OV	OUT	X036	X037	L+	L+	SP3	SP4
WIRE	KIV 0.75SqX14C												*COW-SB 0.2SqX6P(SHIELD)				KIV 0.5SqX6C								

(*ONLY BUILT-IN SPINDLE MOTOR)

보통허용차 (절삭가공)		열처리	재질		
호칭치수	허용치	표면처리	소재치수		
구분	±mm				
1 이상 4 이하	0.1				
4 초과 16이하	0.2				
16 초과 63이하	0.3				
63 초과 250"	0.5	제도	설계	검토	수량
250" 1000"	0.8	승인	도면		
1000 초과	1.2	2007.07			
플트구멍 및 탭의 중심 거리	0.3				



HS400/500(F18i)_HS400i/500i(F21i)

K17/KA7/KA8

도명 Bzi SENSOR & SP.HEAD CABLE#1

도면크기

도번

15

부 5

수 정 내 용

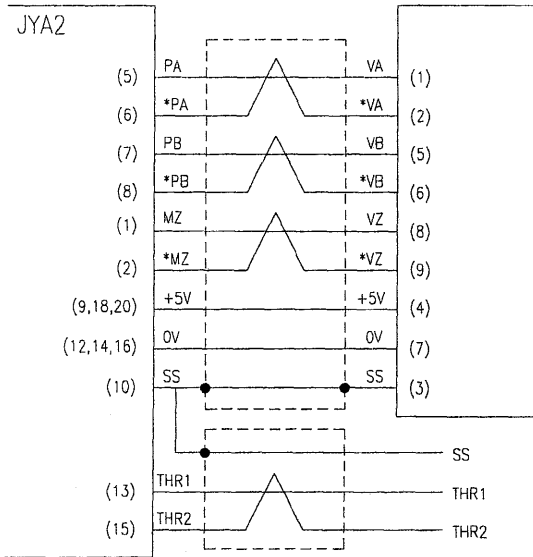
부 호	실 변 CODE	내 용	수 정 자	승 인 자	날 짜

B(SP.MOTOR SIDE)

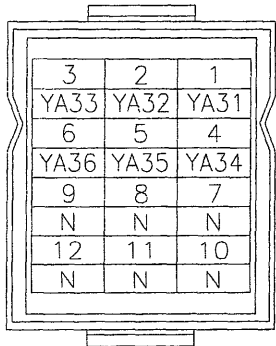
(1)	(2)	(3)	(4)	(5)	(6)
VA	*VA	SS	+5V	VB	*VB
(7)	(8)	(9)			
OV	VZ	*VZ			

α /SP 30

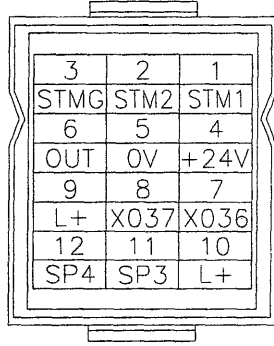
Bzi SENSOR



<KA7> SNS12R



<KA8> SNS12R



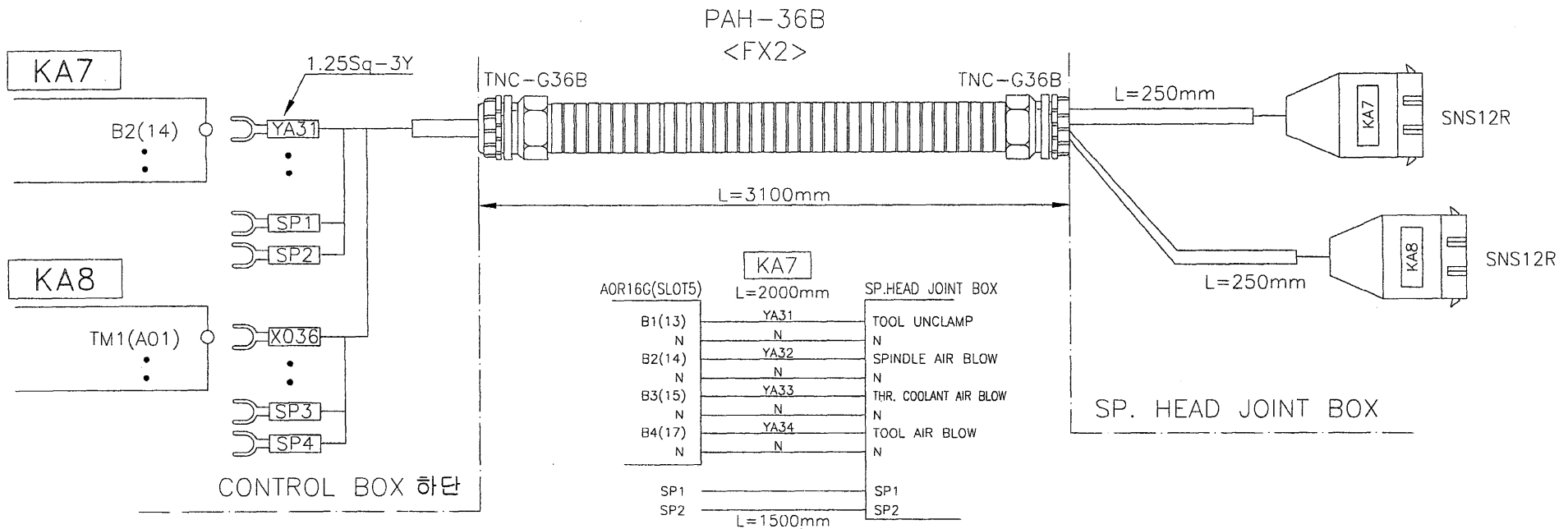
B(JYA2: α /SP 30)

9	5V	10	SS	19	#	20	5V
7	PB	8	*PB	17	#	18	5V
5	PA	6	*PA	15	THR2	16	OV
3	#	4	#	13	THR1	14	OV
1	MZ	2	*MZ	11	#	12	OV

(*ONLY BUILT-IN SPINDLE MOTOR)

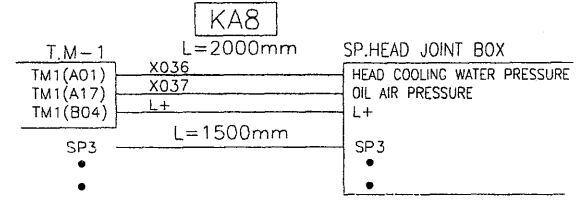
보통허용차 (절삭가공)		열처리		재질		WIA CORPORATION	
호칭치수	허용치	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
구분	±mm						
1 이상 4 이하	0.1						
4 초과 16이하	0.2						
16 초과 63이하	0.3						
63 초과 250"	0.5						
250" 1000"	0.8						
1000 초과	1.2						
플트구멍 및 탭의 중심 거리	0.3	제도	설계	검토	승인	도명	도면크기
		2007.07				BZi & HEAD SENSOR CONNECTION	
						도번	16

수정내용					
부호	실변CODE	내용	수정자	승인자	날짜

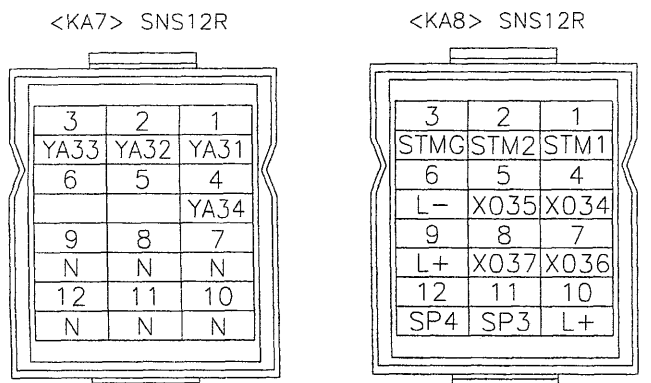


AOR16G(SLOT5)		KA7		SP.HEAD JOINT BOX	
B1(13)	YA31	TOOL UNCLAMP		SP1	SP1
N	N	N		SP2	SP2
B2(14)	YA32	SPINDLE AIR BLOW			
N	N	N			
B3(15)	YA33	THR. COOLANT AIR BLOW			
N	N	N			
B4(17)	YA34	TOOL AIR BLOW			
N	N	N			
SP1					
SP2					

L=1500mm



	<KA7>											<KA8>											
MARKING	YA31	YA32	YA33	YA34	SP1	SP2	N	N	N	N	N	STM1	STM2	STM3	X034	X035	X036	X037	L+	L+	L-	SP3	SP4
WIRE	KIV 0.75SqX12C											KIV 0.5SqX12C											



(*ONLY ALPHA i SPINDLE MOTOR)

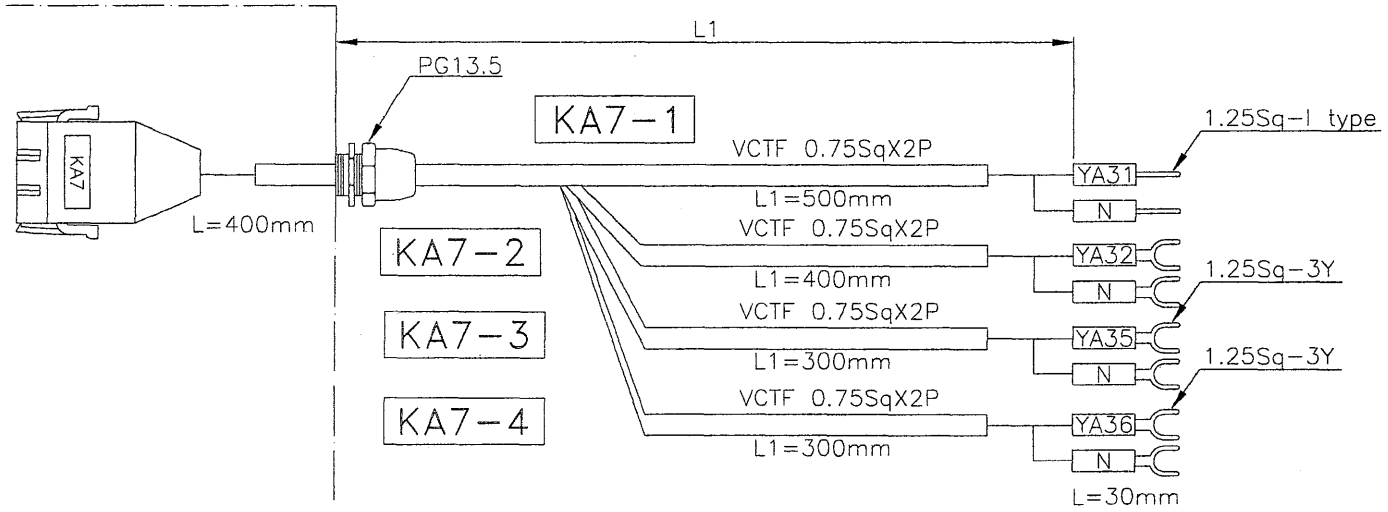
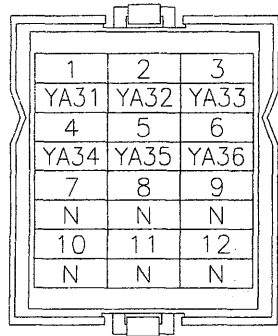
보통허용차 (절삭가공)	열처리	재질	WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	소재 치수	HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1	최도 수량 중량	KA7/KA8	
4 초과 16 이하	0.2			
16 초과 63 이하	0.3	도명 도면크기	SP.HEAD CABLE #1	
63 초과 250 "	0.5			
250 " 1000 "	0.8	승인	17	
1000 초과	1.2			
볼트구멍 면적의 종상	0.3	제도 설계 검토	도번	
		2007.07		

부호

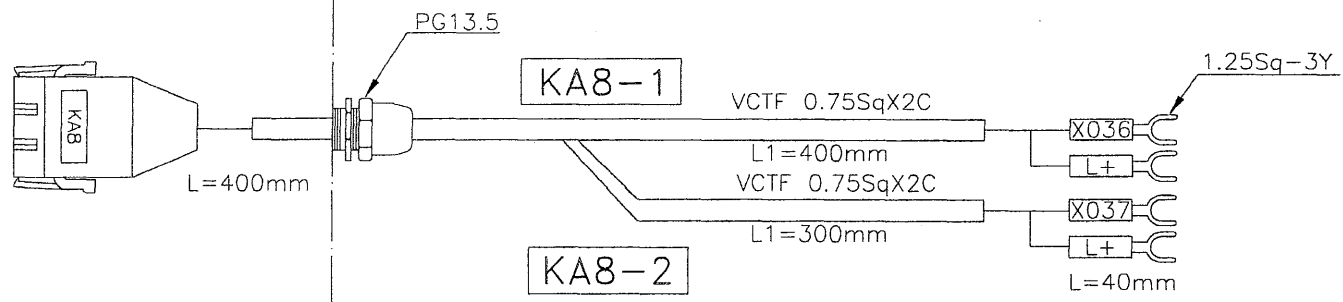
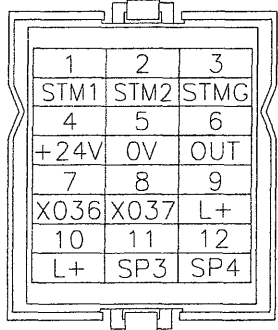
수정내용

부호	설번CODE	내용	수정자	승인자	날짜

<KA7> SNS8P



<KA8> SNS8P



SP. HEAD JOINT BOX

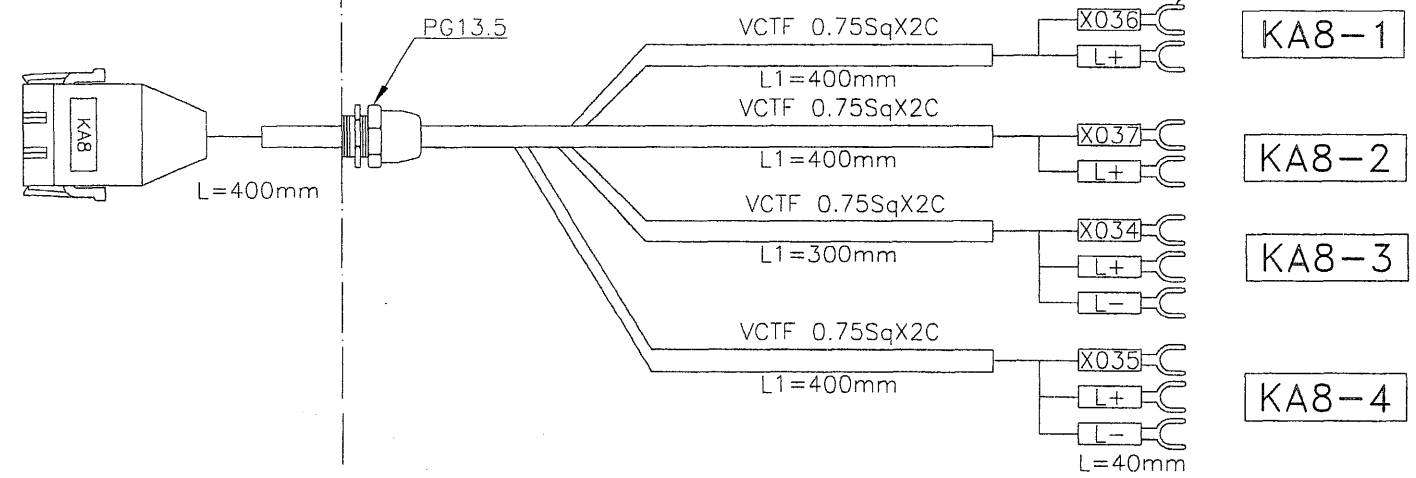
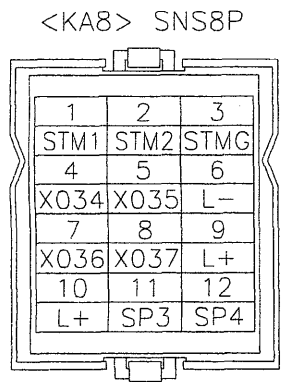
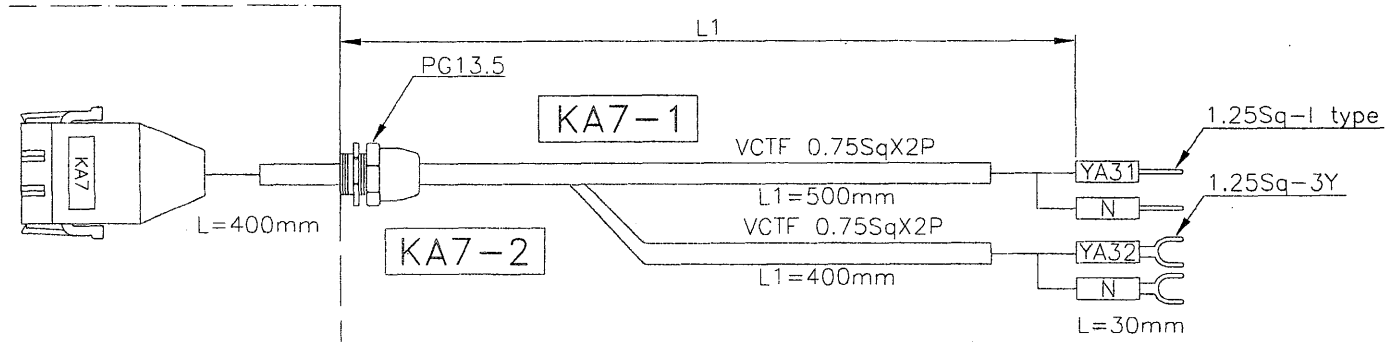
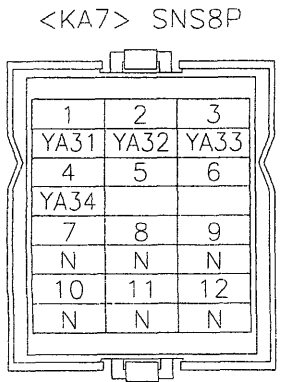
(*ONLY BUILT-IN SPINDLE MOTOR)

보통허용차 (절삭가공)		열처리		재질			WIA CORPORATION		
호칭치수	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)		
1 이상 4 이하	0.1			척도	수량	중량	KA7-1~4/KA8-1,2		
4 초과 16 이하	0.2						도명		도면크기
16 초과 63 이하	0.3			제도		실계	감투	SP. HEAD JOINT BOX #2	
63 초과 250 "	0.5			승인				도번	
250 " 1000 "	0.8			2007.07				18	
1000 초과	1.2								
볼트구멍 및 탭의 중심 거리		0.3							

표기

수 정 내 용

부호	실변CODE	내 용	수정자	승인자	날짜



(*ONLY ALPHA i SPINDLE MOTOR)

SP. HEAD JOINT BOX

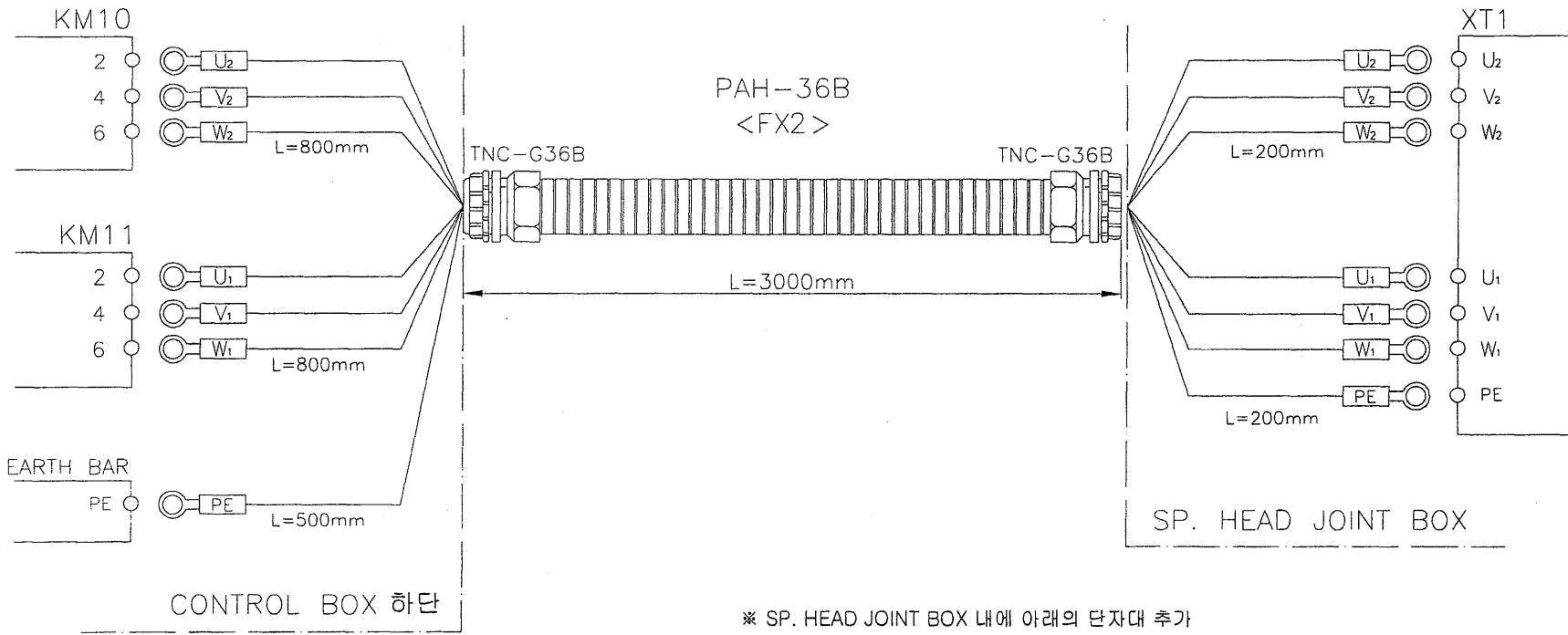
보통허용차 (절삭가공)	열처리	재질	WIA WIA CORPORATION	
	표면처리	소재치수	HS400/500(F18i)_HS400i/500i(F21i)	
호칭치수 구 분	허용치 ±mm	최도	수량	수량
1 이상 4 이하	0.1	제도	실계	검투
4 초과 16이하	0.2	2007.07	승인	
16 초과 63이하	0.3			
63 초과 250"	0.5			
250" 1000"	0.8			
1000 초과	1.2			
플트구멍, 리택 의 중심	0.3			
도명			도면크기	
SP. HEAD JOINT BOX #2			도면	
			19	

표준

수 정 내 용

부호	실변CODE	내 용	수정자	승인자	날짜

K10



※ SP. HEAD JOINT BOX 내에 아래의 단자대 추가

U ₁	V ₁	W ₁	U ₂	V ₂	W ₂	PE	THR1	THR2	SS
100A							15A		

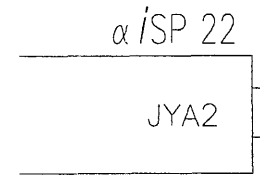
MARKING	U ₁	V ₁	W ₁	PE	U ₂	V ₂	W ₂
WIRE	KIV 25Sq X 4C				KIV 25Sq X 3C		
COLOR	R	W	B	Y/G	R	W	B
TERMINAL	22Sq-8R				22Sq-8R		

(*ONLY BUILT-IN SPINDLE MOTOR)

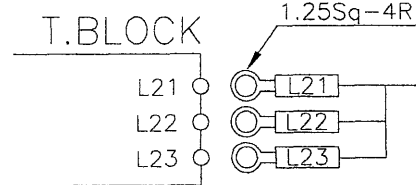
보통허용차 (절삭가공) 호칭치수 구분 허용치 ±mm 1 이상 4 이하 0.1 4 초과 16이하 0.2 16 초과 63이하 0.3 63 초과 250 " 0.5 250 " 1000 " 0.8 1000 초과 1.2 볼트구멍 및 탭 의 중심 거리 0.3	열처리	재질					
	표면처리	소재치수			HS400/500(F18i)_HS400i/500i(F21i)		
제	설	검	도	수	중	K10 도명 SP. MOTOR POWER 도번	
2007.07	계	본	면	량	량		
					20		

수 정 내 용					
부 호	실변CODE	내 용	수정자	승인자	날짜

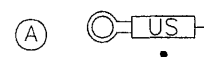
K17



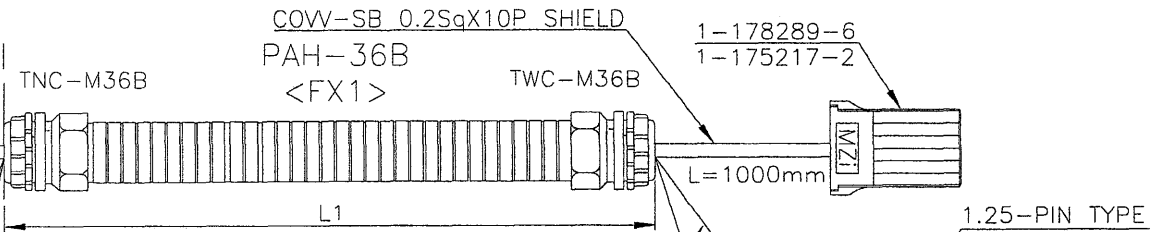
KA31



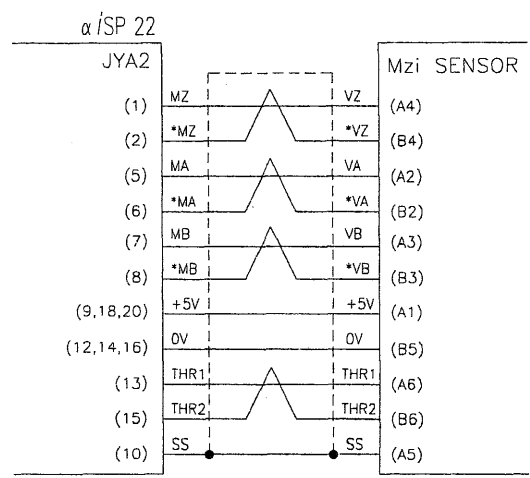
K10



CONTROL BOX 하단



	HS400i	HS500i
L1	4100mm	3000mm



	A						
MARKING	US	VS	WS	PE	X	Y	Z
COLOR	R	W	BK	Y/G	R	W	BK
WIRE	KIV16.0SqX3C+10.0SqX1C			KIV16.0SqX3C			
TERMINAL	14.0Sq-6R			14.0Sq-6R			

(*ONLY ALPHA i SPINDLE MOTOR)

보통허용차 (절삭가공)		열처리	재질			WIA CORPORATION	
호칭치수	허용치	표면처리	소재치수			HS400/500(F18i)_HS400i/500i(F21i)	
구 분	±mm					K17/KA31/K10	
1 이상 4 이하	0.1		도명 SP. MOTOR POWER		도면크기		
4 초과 16 이하	0.2		/SIGNAL/FAN POWER				
16 초과 63 이하	0.3		제도	설계	검배	승인	도번
63 초과 250 #	0.5	2007.07					
250 # 1000 #	0.8						
1000 초과	1.2						
볼트구멍 및 탭의 중심치	0.3						

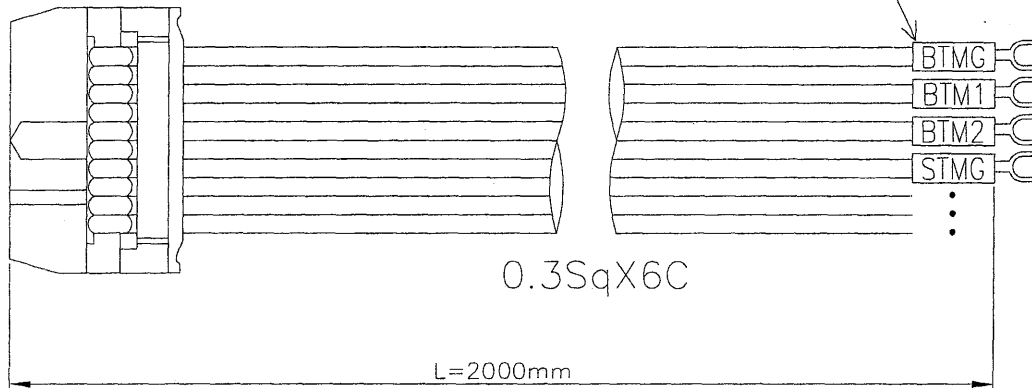
판 5

KA9

수 정 내 용

부 호	설번CODE	내 용	수정자	승인자	날짜

ATI04A(SLOT8)
HIF3BA-34D-2.54R



ATI04A(SLOT8)

	A	B
1	BTMG	BTMG
2	BTM1	BTM1
3	BTM2	BTM2
4	STMG	STMG
5	STM1	STM1
6	STM2	STM2
7		
8		
9		
10		
11		
12		

1차 3Y

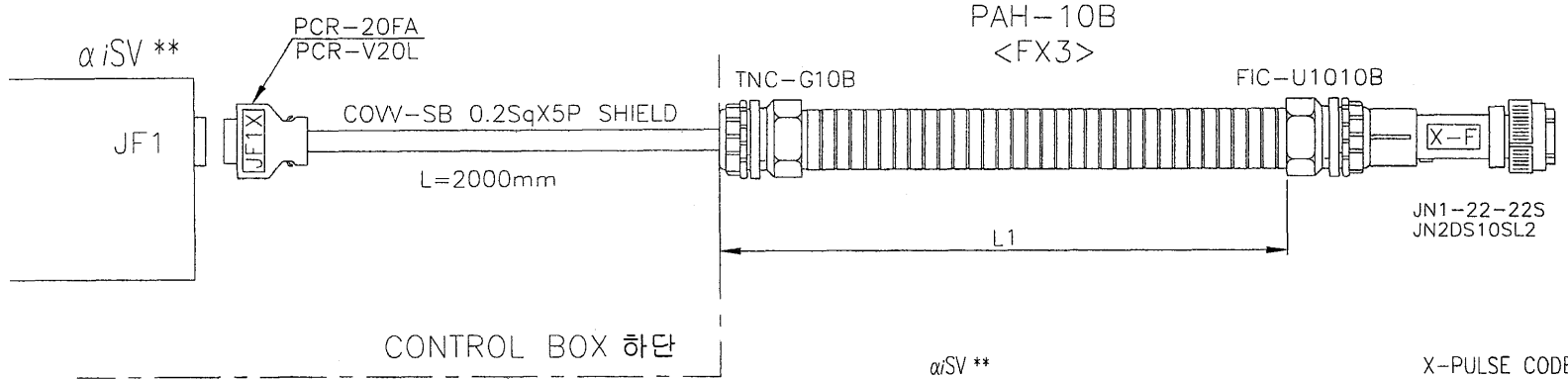
(*OPTION)

보통허용차 (절삭가공)		열처리		재질			WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량	KA9	
4 초과 16 이하	0.2			제도	설계	검토	도명 TEMP. INPUT MODULE CONNECTION	
16 초과 63 이하	0.3			2007.07			도면크기	
63 초과 250 "	0.5						도번	
250 " 1000 "	0.8						22	
1000 초과	1.2							
플트구멍 및 탭 의 중심 거리	0.3							

표기

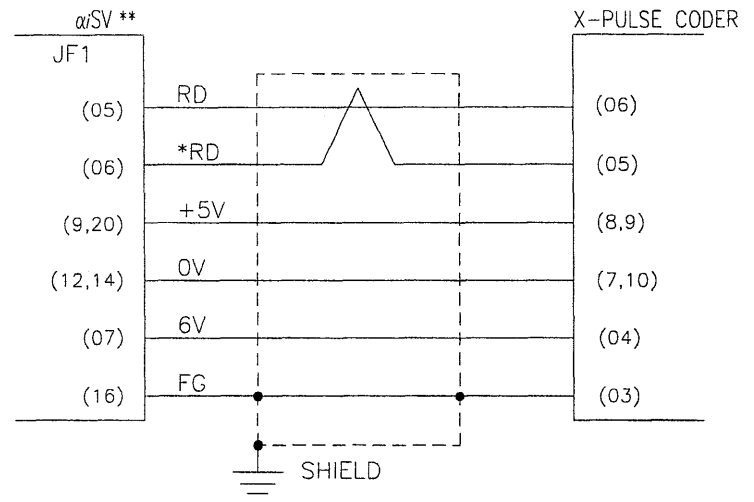
수 정 내 용					
부호	설변CODE	내 용	수정자	승인자	날짜

K22X



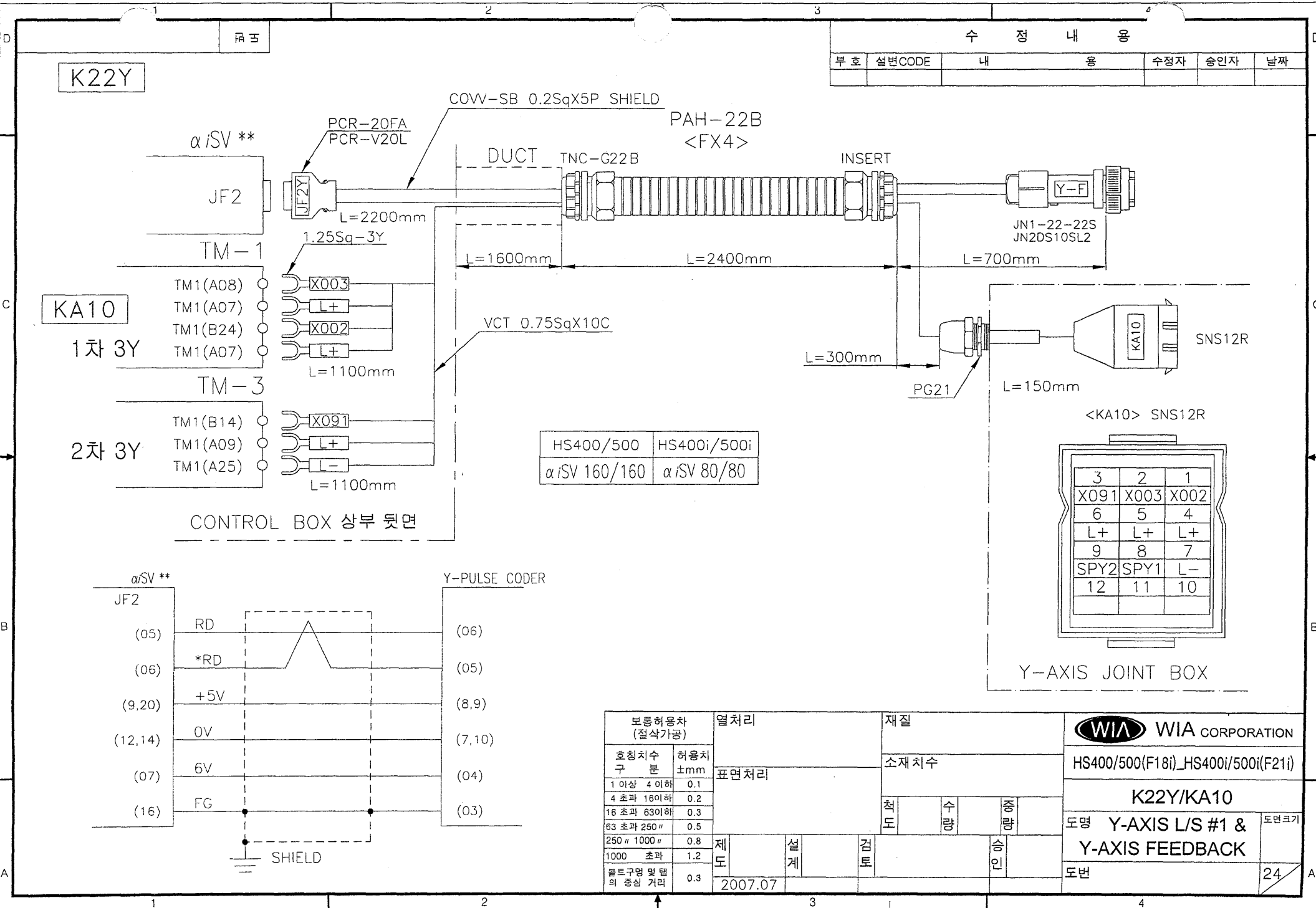
HS400/500	HS400i/500i
α iSV 160/160	α iSV 80/80

	HS400/400i	HS500/500i
L1	1800mm	2300mm



보통 허용차 (절삭가공)		열처리		재질			WIA WIA CORPORATION		
호칭치수	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)		
1 이상 4 이하	0.1			최도	수량	수량	K22X		
4 초과 16 이하	0.2						도명		도면크기
16 초과 63 이하	0.3			제도		X-AXIS FEEDBACK			
63 초과 250 "	0.5			설계		도번		23	
250 " 1000 "	0.8			검토					
1000 초과	1.2	2007.07							
볼트구멍 탭의 중의 중	0.3								

수 정 내 용					
부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜



K22Y

KA10

α iSV **

TM-1

TM-3

1차 3Y

2차 3Y

CONTROL BOX 상부 뒷면

α iSV **

JF2

(05) RD

(06) *RD

(9,20) +5V

(12,14) 0V

(07) 6V

(16) FG

SHIELD

Y-PULSE CODER

(06)

(05)

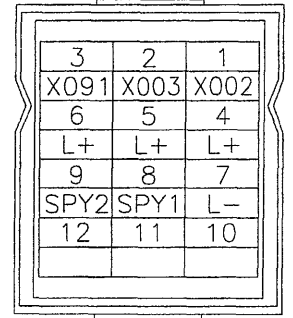
(8,9)

(7,10)

(04)

(03)

HS400/500	HS400i/500i
α iSV 160/160	α iSV 80/80

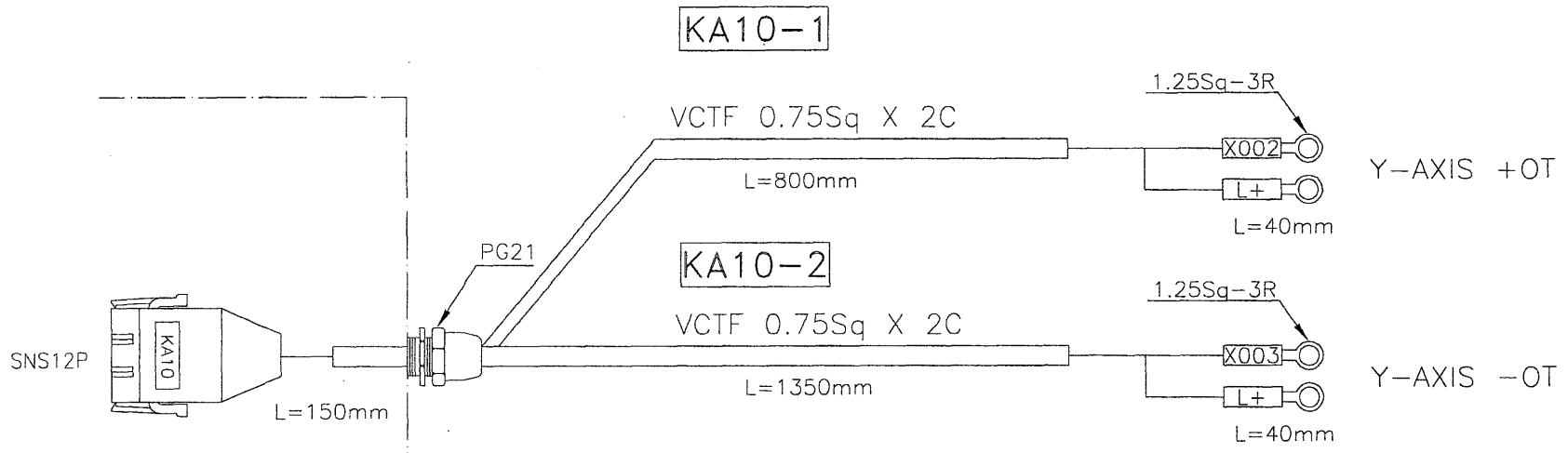


Y-AXIS JOINT BOX

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수	허용치	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
구분	±mm			척도	수량	종량	K22Y/KA10
1 이상 4 이하	0.1			제도	설계	검토	도명 Y-AXIS L/S #1 & Y-AXIS FEEDBACK
4 초과 16이하	0.2			2007.07			도번
16 초과 63이하	0.3						24
63 초과 250"	0.5						
250" 1000"	0.8						
1000 초과	1.2						
볼트구멍 및 탭의 중심 거리	0.3						

표기

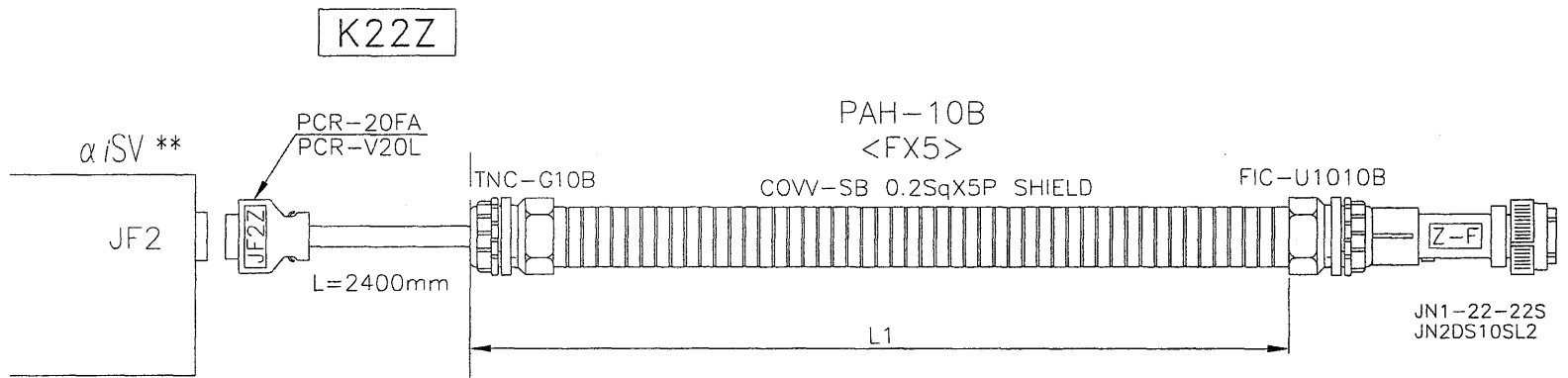
수 정 내 용					
부 호	실 면 CODE	내 용	수 정 자	승 인 자	날 짜



Y-Axis JOINT BOX

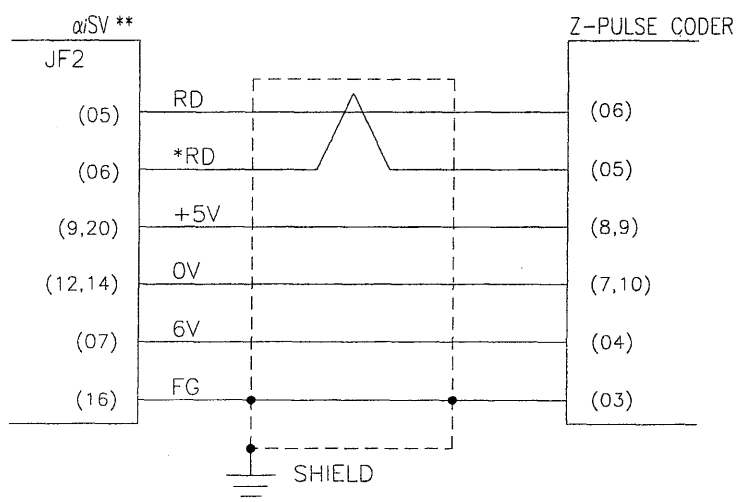
보통허용차 (절삭가공)		열처리		재질			WIA WIA CORPORATION		
호칭치수 구 분	허용치 ±mm	표면처리		소재 치수			HS400/500(F18i)_HS400i/500i(F21i)		
1 이상 4 이하	0.1			최 고	수 량	생 량	KA10-1,2		
4 초과 16 이하	0.2						도 명		도면크기
16 초과 63 이하	0.3						Y-AXIS L/S #2		
63 초과 250 "	0.5						도 번		25
250 " 1000 "	0.8	제 도	설 계	검 토편	승 인				
1000 초과	1.2	2007.07							
블록구멍 및 탭 의 중	0.3								

수정내용					
부호	설변CODE	내용	수정자	승인자	날짜



HS400/500	HS400i/500i
alpha iSV 160/160	alpha iSV 80/80

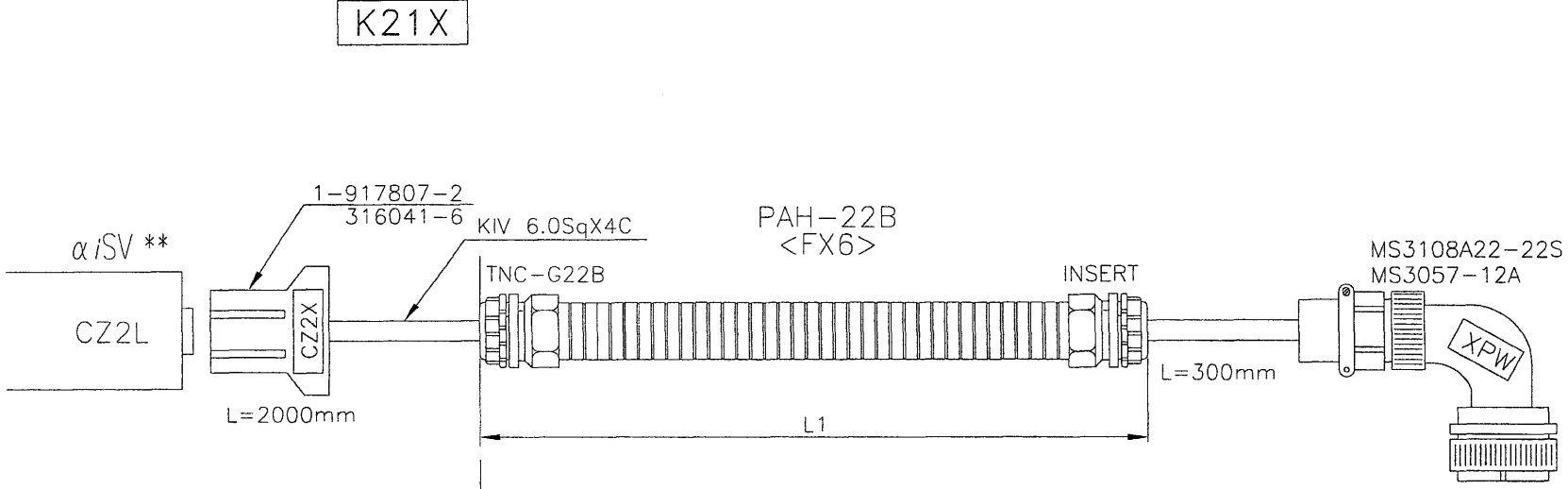
	HS400/400i	HS500/500i
L1	4000mm	4200mm



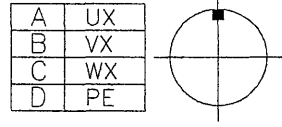
보통허용차 (절삭가공)	열처리	재질	WIA CORPORATION	
	표면처리	소재치수	HS400/500(F18i)_HS400i/500i(F21i)	
호칭치수 구분	허용치 ±mm	첨도	수량	종량
1 이상 4 이하	0.1	제 도	설 계	검 본
4 초과 16 이하	0.2			
16 초과 63 이하	0.3	2007.07		
63 초과 250 "	0.5			
250 " 1000 "	0.8			
1000 초과	1.2			
봉트구멍 및 탭 의 중심 거리	0.3			
WIA CORPORATION				도 면 크 기
K22Z				26
Z-AXIS FEEDBACK				
도 번				

표기

수 정 내 용					
부호	실변CODE	내 용	수정자	승인자	날짜



CONTROL BOX 하단



HS400/500	HS400i/500i
α iSV 160/160	α iSV 80/80

α iSV **	
CZ2L	UX R UX
CZ2X(B1)	VX W VX
CZ2X(A1)	WX BK WX
CZ2X(B2)	PE Y/G PE
CZ2X(A2)	

X-AXIS MOTOR	
A	
B	
C	
D	

	HS400/400i	HS500/500i
L1	1300mm	2000mm

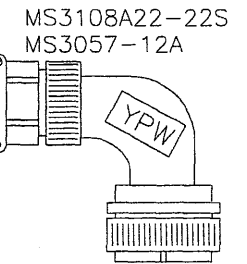
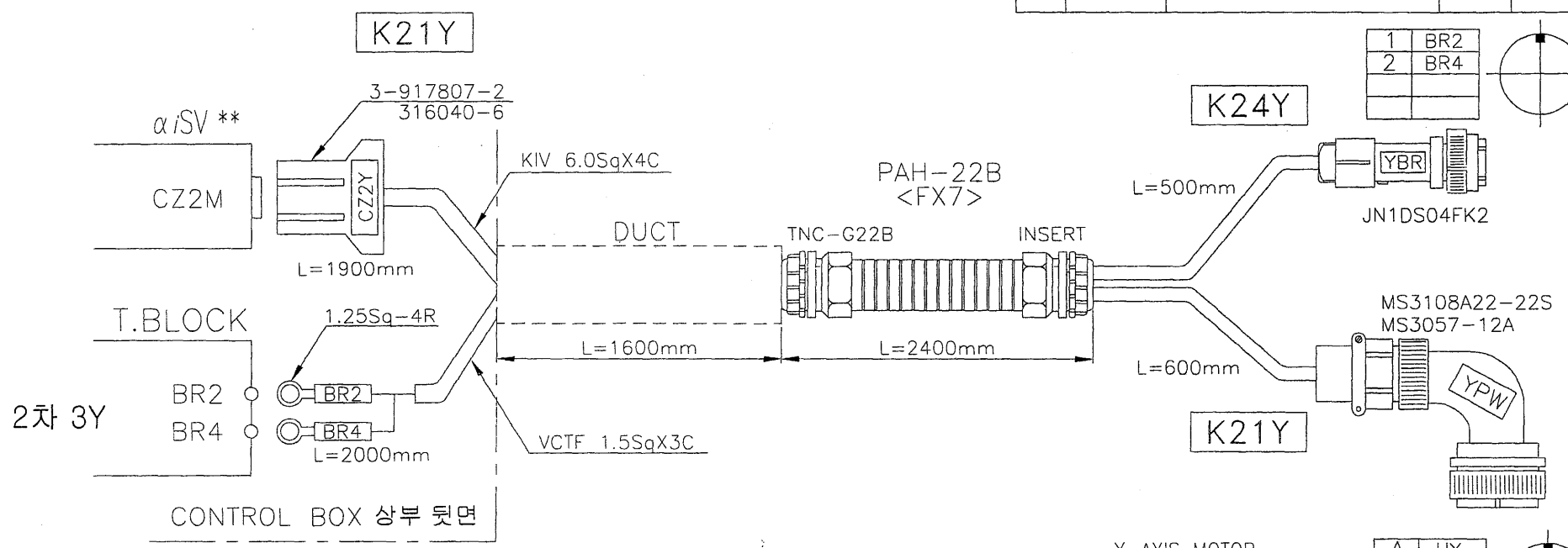
보통허용차 (절삭가공)		열처리	재질	WIA CORPORATION	
호칭치수	허용치	표면처리	소재 치수	HS400/500(F18i)_HS400i/500i(F21i)	
구 분	\pm mm			K21X	
1 이상 4 이하	0.1			도명	도면크기
4 초과 16이하	0.2			도명	27
16 초과 63이하	0.3			X-AXIS POWER	
63 초과 250"	0.5	제	설	검	승
250" 1000"	0.8	도	계	투	인
1000" 초과	1.2	2007.07			
플트구멍 및 탭의 중심	0.3				

閉止

수정내용

부호	설변CODE	내용	수정자	승인자	날짜

1	BR2	
2	BR4	



A	UY	
B	VY	
C	WY	
D	PE	

2차 3Y

CONTROL BOX 상부 뒷면

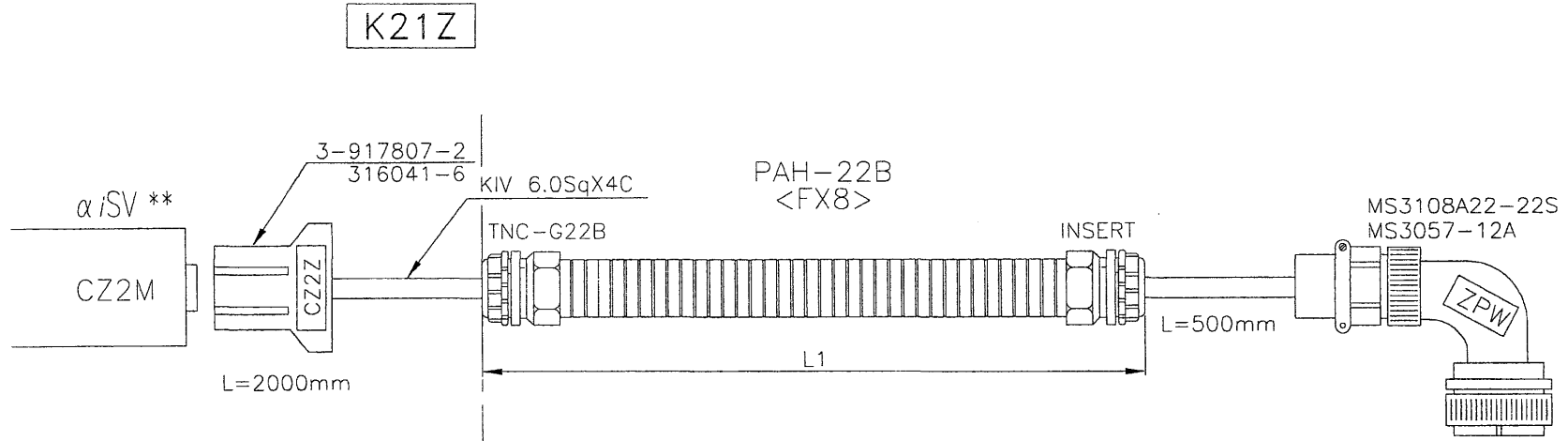
HS400/500	HS400i/500i
αiSV 160/160	αiSV 80/80

αiSV **		Y-AXIS MOTOR		
CZ2M				
CZ2Y(B1)	UY	R	UY	A
CZ2Y(A1)	VY	W	VY	B
CZ2Y(B2)	WY	BK	WY	C
CZ2Y(A2)	PE	Y/G	PE	D

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION							
호칭치수	허용치 ±mm	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)							
1 이상 4 이하	0.1	<table border="1"> <tr> <td>최도</td> <td>수량</td> <td>중량</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>		최도	수량	중량				K21Y/K24Y		도명	Y-AXIS POWER & BRAKE CABLE
최도	수량			중량									
4 초과 16 이하	0.2			도번		28							
16 초과 63 이하	0.3			제			2007.07						
63 초과 250 "	0.5	도		2007.07									
250 " 1000 "	0.8	실			2007.07								
1000 초과	1.2	계		2007.07									
볼트구멍 및 탭의 중심 거리	0.3	검			2007.07								
		토		2007.07									
		승			2007.07								
		인		2007.07									

표기

수 정 내 용					
부 호	설 번 CODE	내 용	수 정 자	승 인 자	날 짜



CONTROL BOX 하단

HS400/500	HS400i/500i
alpha iSV 160/160	alpha iSV 80/80

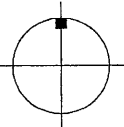
	HS400/400i	HS500/500i
L1	3300mm	4000mm

alpha iSV **		
CZ2M		
CZ2Z(B1)	UZ R UZ	
CZ2Z(A1)	VZ W VZ	
CZ2Z(B2)	WZ BK WZ	
CZ2Z(A2)	PE Y/G PE	

Z-AXIS MOTOR

A	B	C	D
---	---	---	---

A	UZ
B	VZ
C	WZ
D	PE



보통허용차 (절삭가공)		열처리		재질		WIA CORPORATION	
호칭치수	허용치 ±mm	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
구 분				척도	수량	중량	K21Z
1 이상 4 이하	0.1			제도	실계	검토	도명
4 초과 16 이하	0.2			승인			도면크기
16 초과 63 이하	0.3			2007.07			Z-AXIS POWER
63 초과 250 "	0.5						도번
250 # 1000 "	0.8						29
1000 초과	1.2						
볼트구멍 및 탭의 용	0.3						

WIA CORPORATION

HS400/500(F18i)_HS400i/500i(F21i)

K21Z

Z-AXIS POWER

29

附五

수 정 내 용					
부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜

KA11

PAH-16B
<FX9>

VCTF 0.75SqX24C

TNC-G16B

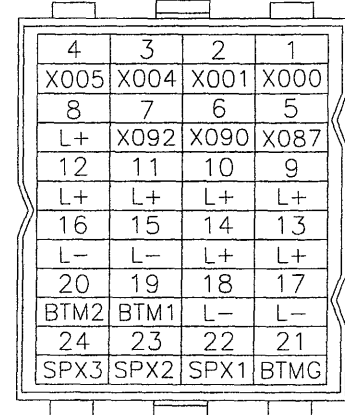
TNC-G16B

SNS24R

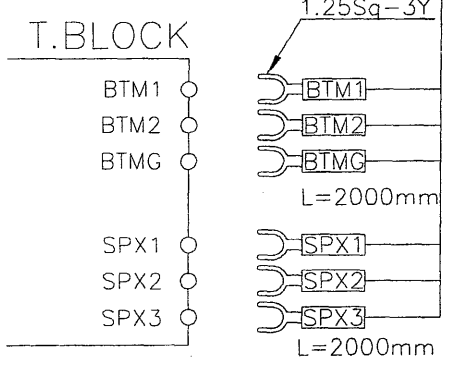
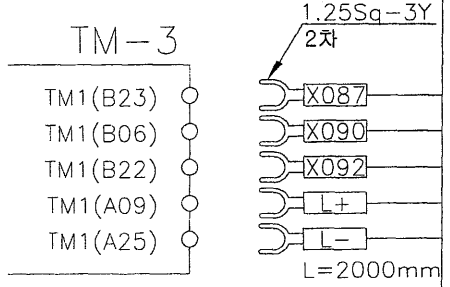
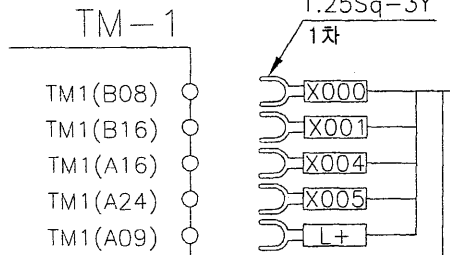
L=250mm

	HS400/400i	HS500/500i
L1	1800mm	2500mm

<KA11> SNS24R



X,Z-AXIS JOINT BOX



CONTROL BOX 하단

보통허용차 (절삭가공)		열처리		재질	
호칭치수 구분	허용치 ±mm	표면처리		소재 치수	
1 이상 4 이하	0.1	제 도	설 계	검 토	수 량
4 초과 16 이하	0.2				
16 초과 63 이하	0.3				
63 초과 250 #	0.5				
250 # 1000 #	0.8	제 도	설 계	검 토	수 량
1000 초과	1.2				
볼트구멍 및 탭의 중심 거리	0.3	2007.07			

WIA WIA CORPORATION

HS400/500(F18i)_HS400i/500i(F21i)

KA11

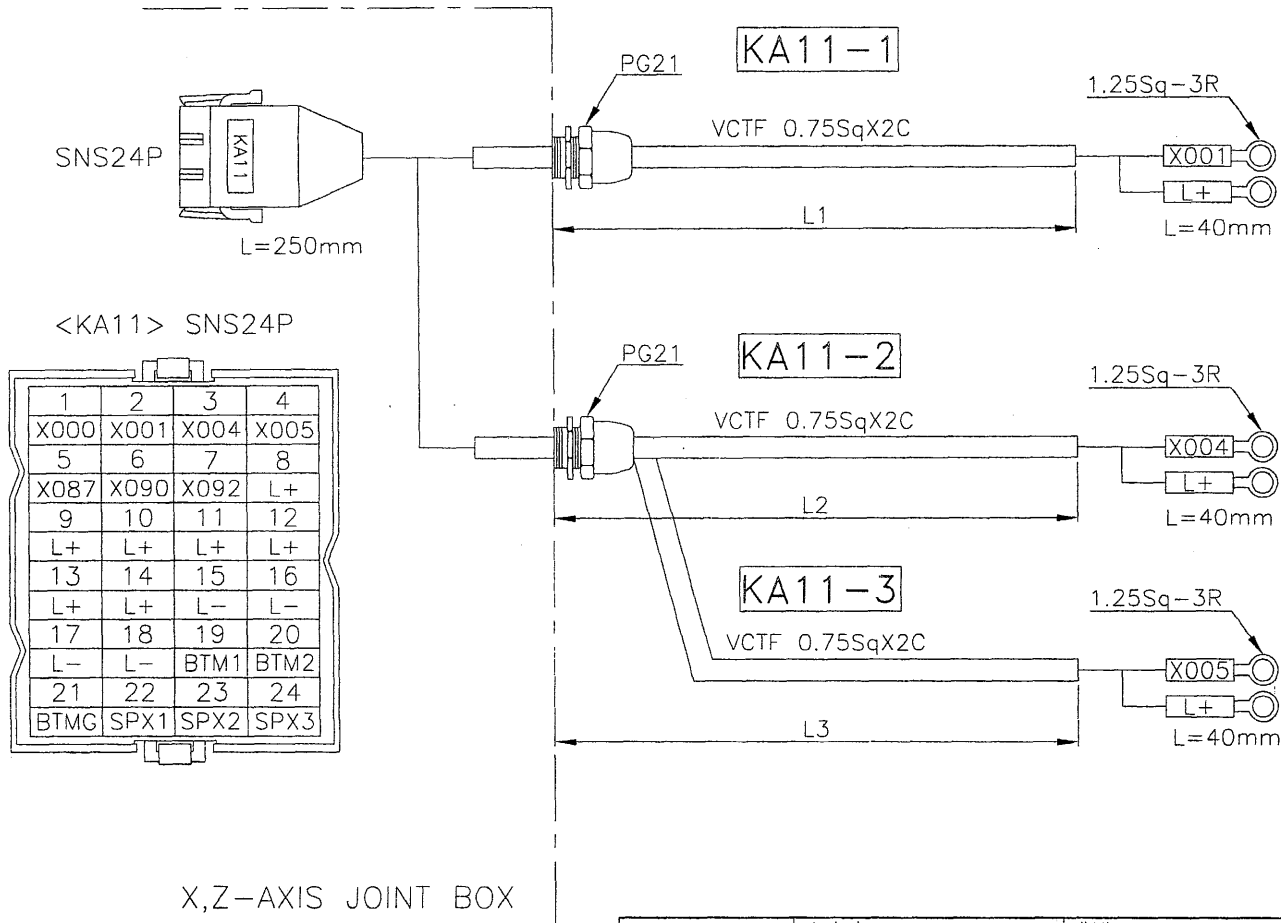
도명 X,Z-AXIS LIMIT S/W CABLE #1

도번

도면크기 30

부호

수 정 내 용					
부호	설변CODE	내 용	수정자	승인자	날짜



	HS400/400i	HS500/500i
L1	2800mm	3500mm
L2	3050mm	4000mm
L3	2250mm	3000mm

<KA11> SNS24P

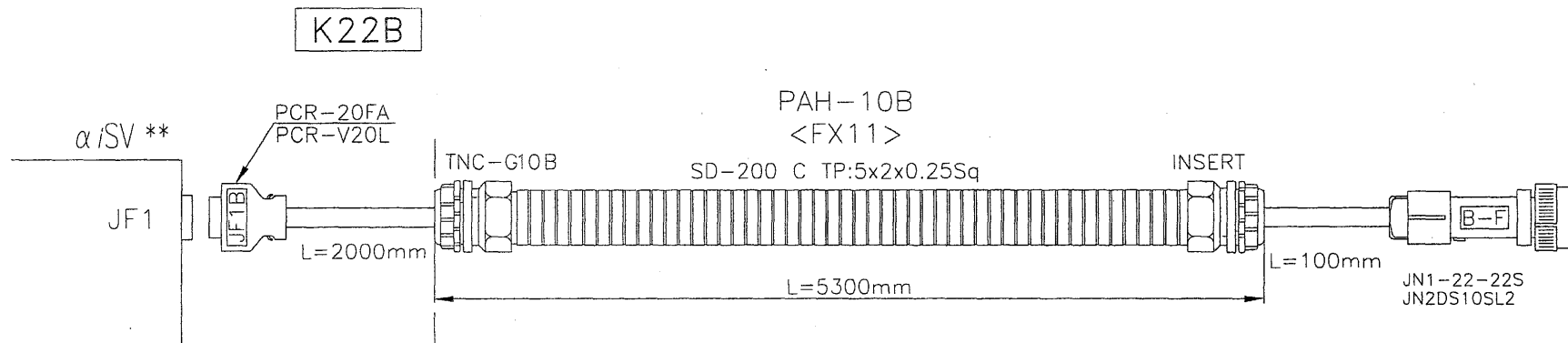
1	2	3	4
X000	X001	X004	X005
5	6	7	8
X087	X090	X092	L+
9	10	11	12
L+	L+	L+	L+
13	14	15	16
L+	L+	L-	L-
17	18	19	20
L-	L-	BTM1	BTM2
21	22	23	24
BTMG	SPX1	SPX2	SPX3

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량	KA11-1~3
4 초과 16이하	0.2			검도	검정	승인	도명 X,Z-AXIS LIMIT S/W CABLE #2
16 초과 63이하	0.3			2007.07			도번 31
63 초과 250"	0.5						
250" 1000"	0.8						
1000" 초과	1.2						
플트구멍 의 중	0.3						

표기

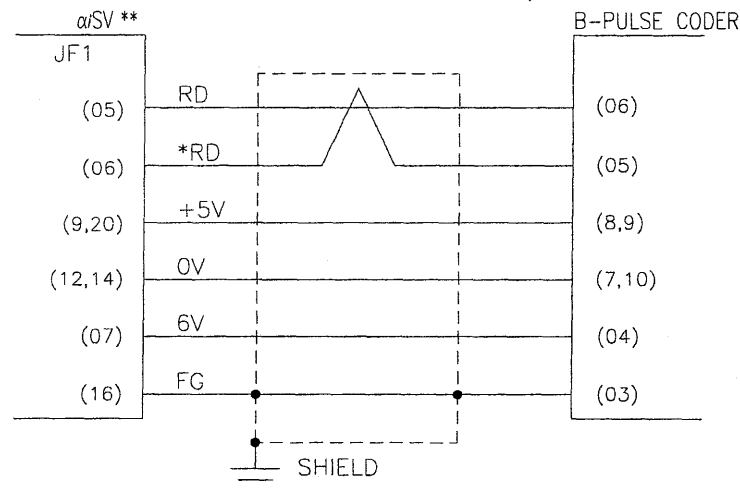
수 정 내 용

부호	설변CODE	내 용	수정자	승인자	날짜



CONTROL BOX 하단

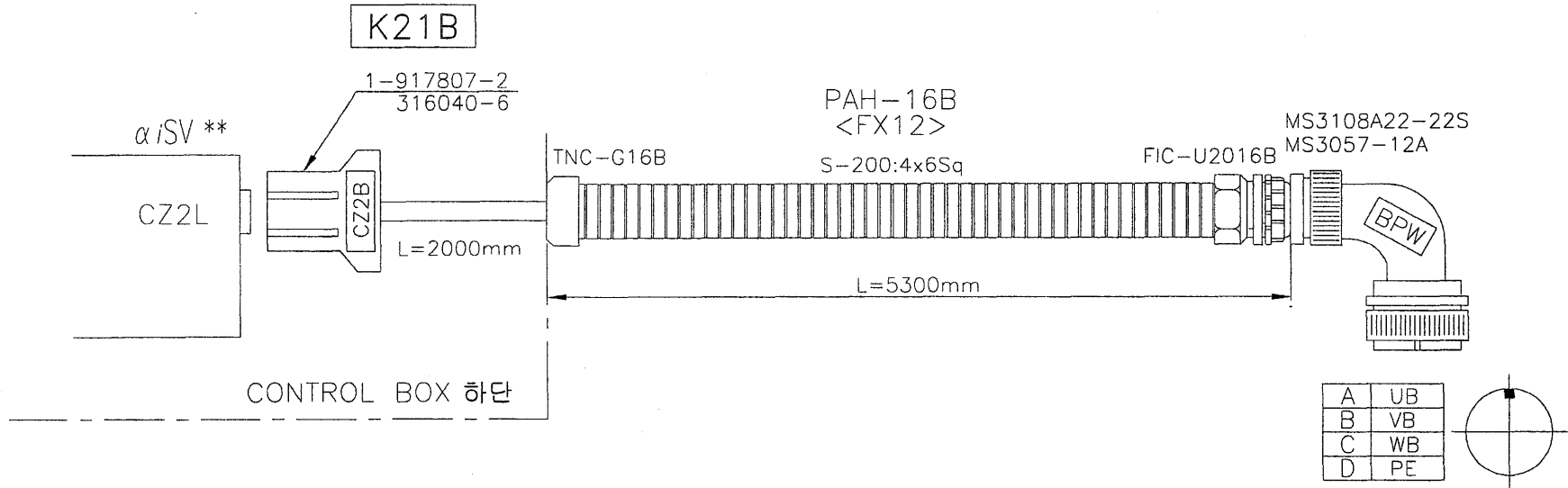
HS400/500	HS400i/500i
αiSV 160/160	αiSV 80/80



보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량	K22B
4 초과 16 이하	0.2						
16 초과 63 이하	0.3						도명
63 초과 250 "	0.5						도면크기
250 " 1000 "	0.8	제도	설계	검토	승인	B-Axis FEEDBACK	
1000 초과	1.2					도번	
몰트구멍 및 탭 의 중심 거리	0.3	2007.07				32	

표기

수 정 내 용					
부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜



HS400/500	HS400i/500i
alpha iSV 160/160	alpha iSV 80/80

alpha iSV **		B-AXIS MOTOR	
CZ2L			
CZ2B(B1)	UB	R	UB
CZ2B(A1)	VB	W	VB
CZ2B(B2)	WB	BK	WB
CZ2B(A2)	PE	Y/G	PE

A	UB
B	VB
C	WB
D	PE

보통허용차 (절삭가공)		열처리		재질			WIA WIA CORPORATION	
호칭치수	허용치 ±mm	표면처리		소재 치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	종량	K21B	
4 초과 16 이하	0.2						도명 B-AXIS MOTOR	
16 초과 63 이하	0.3			제도 설계 검토 승인		POWER CABLE		
63 초과 250 "	0.5			2007.07		도번		33
250 " 1000 "	0.8							
1000 초과	1.2							
플트구멍 및 탭 외 용	0.3							

표기

수정내용

부호	설번CODE	내용	수정자	승인자	날짜

KA12

PAH-22B
<FX10>
S-200:18x0.75Sq

AOR16G(SLOT6)

- B1(13)
- B2(14)
- B3(15)
- B4(17)
- N

- YA51
- YA52
- YA53
- YA54
- N

L=2000mm

TM-2

- TM1(B10)
- TM1(B01)
- TM1(A10)
- TM1(B17)
- TM1(B04)
- TM1(A21)

- X071
- X073
- X074
- X075
- L+
- L-

L=2000mm

TM-3

- TM1(A06)
- TM1(A09)

- X093
- L+

L=2000mm

T.BLOCK

- RED
- BLUE
- SHIELD

- RED
- BLUE
- SHIELD

L=2000mm

CONTROL BOX 하단

TNC-P21B

TNC-P21B

L=4700mm

L=150mm

<KA12> SNS24R

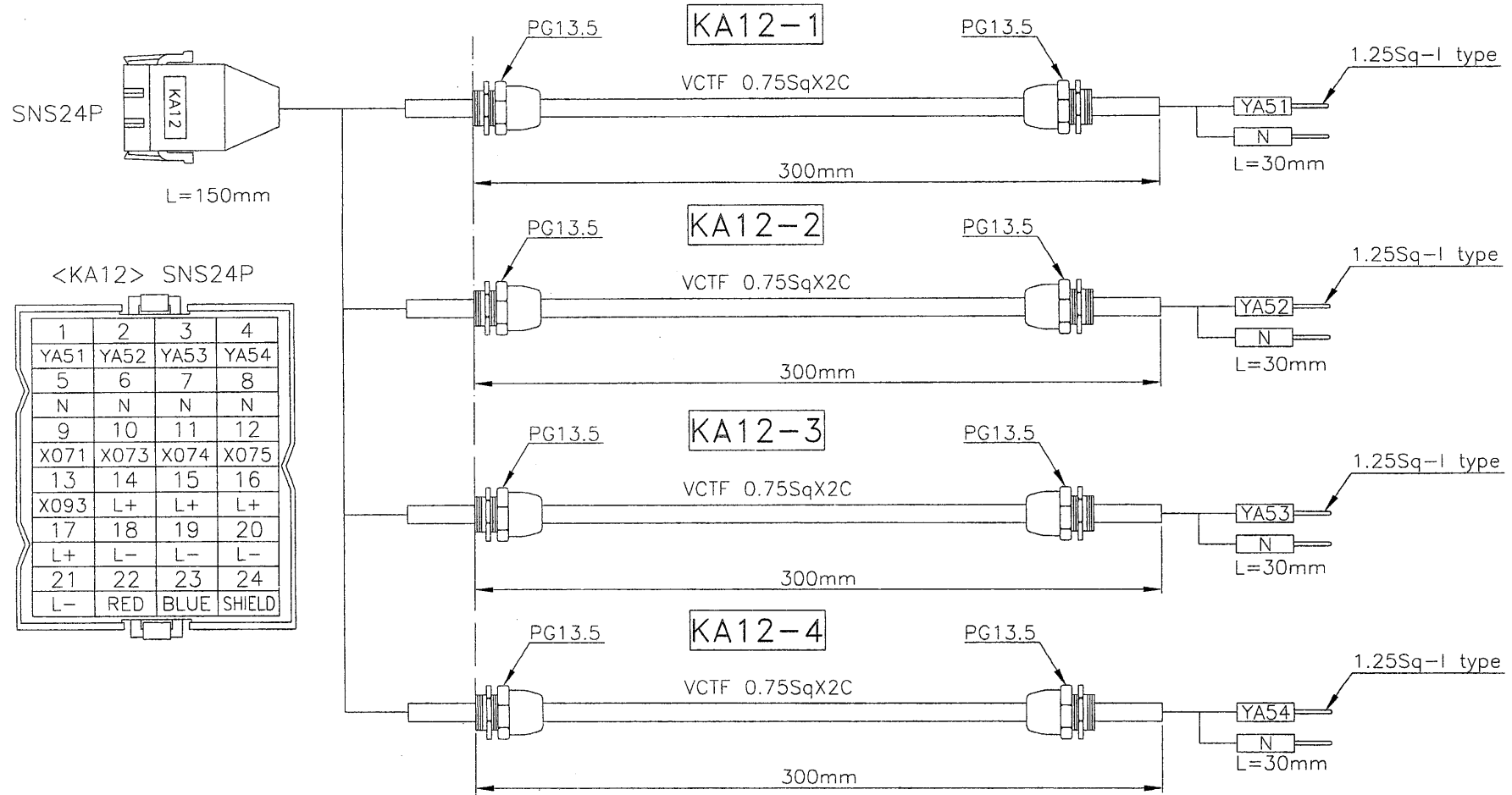
4	3	2	1
YA54	YA53	YA52	YA51
8	7	6	5
N	N	N	N
12	11	10	9
X075	X074	X073	X071
16	15	14	13
L+	L+	L+	X093
20	19	18	17
L-	L-	L-	L+
24	23	22	21
SHIELD	BLUE	RED	L-

TABLE JOINT BOX

보통허용차 (절삭가공)		열처리		재질		WIA CORPORATION	
호칭치수 구분	허용치 ±mm	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	종량	KA12
4 초과 16 이하	0.2			제도	설계	검토	
16 초과 63 이하	0.3					승인	도명
63 초과 250 "	0.5						TABLE JOINT BOX CABLE #1
250 " 1000 "	0.8						도번
1000 초과	1.2						34
물트구멍 및 탭 의 중심 거리	0.3	2007.07					

표기

수 정 내 용					
부 호	실번CODE	내 용	수정자	승인자	날짜



<KA12> SNS24P

1	2	3	4
YA51	YA52	YA53	YA54
5	6	7	8
N	N	N	N
9	10	11	12
X071	X073	X074	X075
13	14	15	16
X093	L+	L+	L+
17	18	19	20
L+	L-	L-	L-
21	22	23	24
L-	RED	BLUE	SHIELD

TABLE JOINT BOX

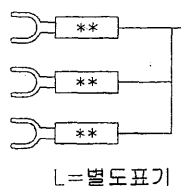
보통허용차 (절삭가공)		열처리		재질			WIA WIA CORPORATION		
호칭치수 구 분	허용치 ±mm	표면처리		소재 치수			HS400/500(F18i)_HS400i/500i(F21i)		
1 이상 4 이하	0.1			척도	수량	중량	KA12-1~4		
4 초과 16 이하	0.2						도명		TABLE JOINT BOX CABLE #2
16 초과 63 이하	0.3			제 도	설 계	검 토	승 인	도번	
63 초과 250 "	0.5							35	
250 " 1000 "	0.8			2007.07					
1000 초과	1.2								
볼트구멍 및 탭 의 치수	0.3								

표 5

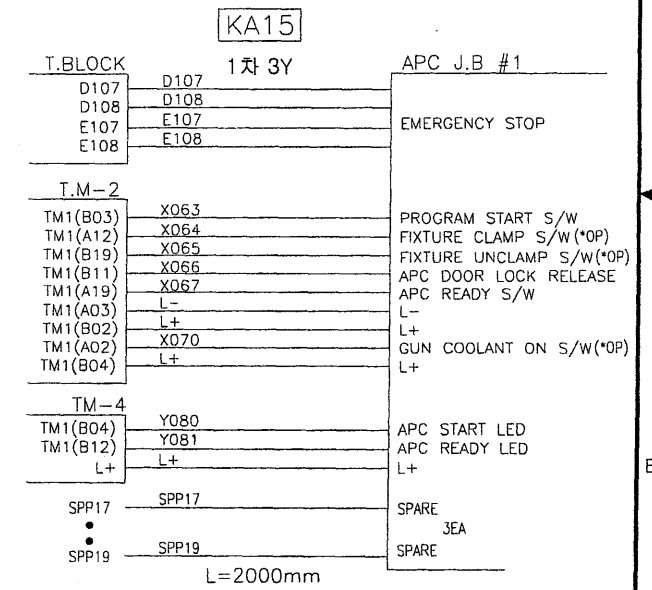
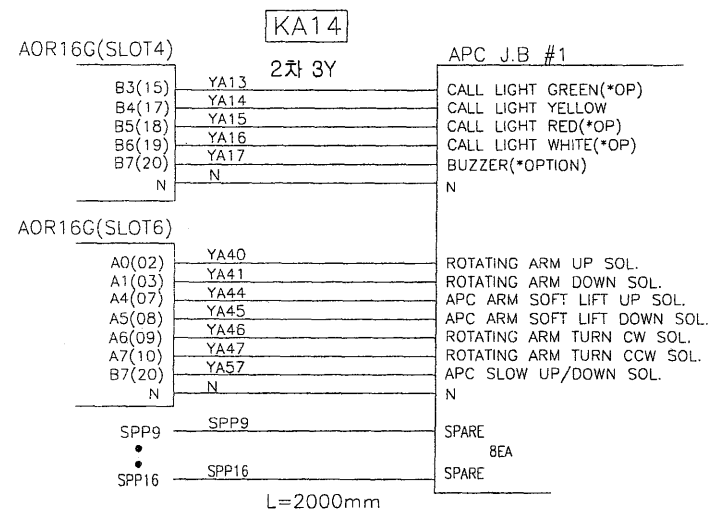
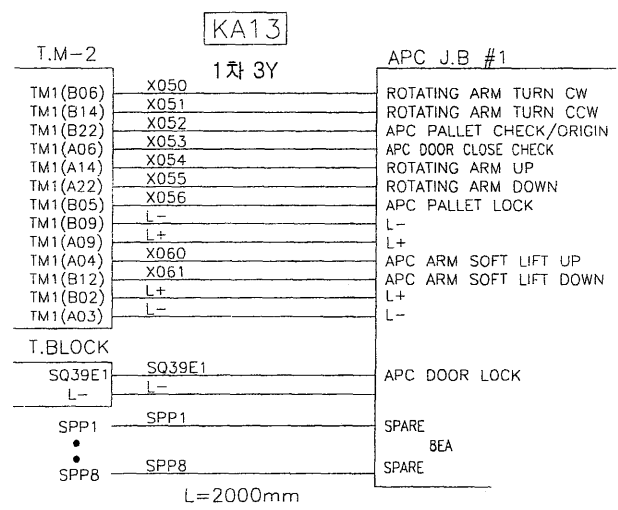
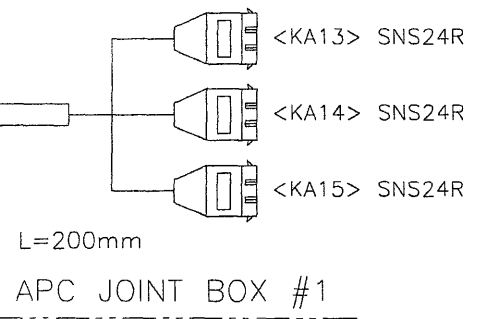
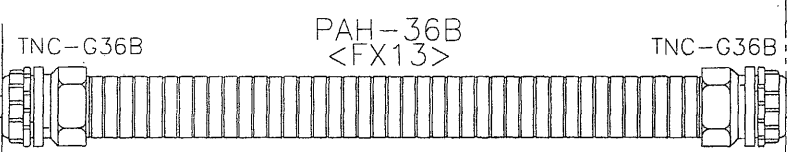
KA13

수 정 내 용					
부 호	설 번 CODE	내 용	수 정 자	승 인 자	날 짜

KA13
KA14
KA15



CONTROL BOX 하단



	HS400/400i	HS500/500i
L1	3800mm	5000mm

보통허용차 (절삭가공)		열처리	재질		WIA CORPORATION
호칭치수 구분	허용치 ±mm	표면처리	소재치수		
1 이상 4 이하	0.1		도명	수량	도면크기
4 초과 16 이하	0.2				
16 초과 63 이하	0.3				
63 초과 250 "	0.5				
250 " 1000 "	0.8	제	설	검	승
1000 초과	1.2				
볼트구멍 및 탭의 중심 거리	0.3				
		2007.07			36

WIA WIA CORPORATION

HS400/500(F18i)_HS400i/500i(F21i)

KA13/KA14/KA15

APC CABLE #1

36

品名

수 정 내 용				
부 호	설 번 CODE	내 용	수 정 자	승 인 자

<KA13>															
MARKING	X050	X051	X052	X053	X054	X055	X056	X060	X061	SQ39E1	L+	L+	L-	L-	SPP1 ~ SPP8
COLOR	BLUE														
WIRE	KIV 0.5SqX24C														
TERMINAL	1.25Sq-3.2Y											CABLE TIE			

<KA13> SNS24R

4	3	2	1
X053	X052	X051	X050
8	7	6	5
X060	X056	X055	X054
12	11	10	9
L+	L+	SQ39E1	X061
16	15	14	13
L-	L-	L-	L+
20	19	18	17
SPP4	SPP3	SPP2	SPP1
24	23	22	21
SPP8	SPP7	SPP6	SPP5

<KA14> SNS24R

4	3	2	1
YA16	YA15	YA14	YA13
8	7	6	5
YA44	YA41	YA40	YA17
12	11	10	9
YA57	YA47	YA46	YA45
16	15	14	13
N	N	N	N
20	19	18	17
SPP12	SPP11	SPP10	SPP9
24	23	22	21
SPP16	SPP15	SPP14	SPP13

<KA14>															
MARKING	YA13	YA14	YA15	YA16	YA17	YA40	YA41	YA44	YA45	YA46	YA47	YA57	N	N	SPP9~SPP16
COLOR	RED														
WIRE	KIV 0.75SqX24C														
TERMINAL	1.25Sq-3.2Y											CABLE TIE			

<KA15> SNS24R

4	3	2	1
E108	E107	D108	D107
8	7	6	5
X066	X065	X064	X063
12	11	10	9
L+	L+	X070	X067
16	15	14	13
Y081	Y080	L-	L+
20	19	18	17
	SPP19	SPP18	SPP17
24	23	22	21

<KA15>															
MARKING	D107	D108	E107	E108	X063	X064	X065	X066	X067	Y080	Y081	L+	L+	L-	SPP17~SPP19
COLOR	BLUE														
WIRE	KIV 0.5SqX19C														
TERMINAL	1.25Sq-3.2Y											CABLE TIE			

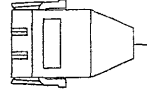
보통허용차 (절삭가공)		열처리		재질		WIA CORPORATION HS400/500(F18i)_HS400i/500i(F21i)									
호칭치수	허용치	표면처리		소재치수											
구분	±mm					<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>최도</td><td>수량</td><td>중량</td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>		최도	수량	중량					
최도	수량	중량													
1 이상 4 이하	0.1	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>제</td><td>실</td><td>감</td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>		제	실	감				<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>승</td></tr> <tr><td> </td></tr> </table>		승		도명 APC CONNECTION	
제	실			감											
승															
4 초과 16 이하	0.2	도번 2007.07		도면크기 37											
16 초과 63 이하	0.3					도번 2007.07		도면크기 37							
63 초과 250 "	0.5	도번 2007.07		도면크기 37											
250 " 1000 "	0.8					도번 2007.07		도면크기 37							
1000 초과	1.2	도번 2007.07		도면크기 37											
플트구멍의 직경	0.3					도번 2007.07		도면크기 37							

第五

KA13-1

수 정 내 용					
부 호	설 번 CODE	내 용	수 정 자	승 인 자	날 짜

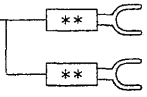
SNS24P <KA13>



TNC-G28B

PAH-28B
<FX14>

TNC-G28B



<KA13-1>

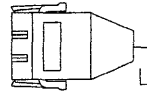
<KA14-1>

L=200mm
100mm 탈피

APC JOINT BOX #2

KA14-1

SNS24P <KA14>



L=200mm

L1

<KA13> SNS24P

<KA14> SNS24P

1	2	3	4
X050	X051	X052	X053
5	6	7	8
X054	X055	X056	X060
9	10	11	12
X061	SQ39E1	L+	L+
13	14	15	16
L+	L-	L-	L-
17	18	19	20
SPP1	SPP2	SPP3	SPP4
21	22	23	24
SPP5	SPP6	SPP7	SPP8

1	2	3	4
YA13	YA14	YA15	YA16
5	6	7	8
YA17	YA40	YA41	YA44
9	10	11	12
YA45	YA46	YA47	YA57
13	14	15	16
N	N	N	N
17	18	19	20
SPP9	SPP10	SPP11	SPP12
21	22	23	24
SPP13	SPP14	SPP15	SPP16

APC JOINT BOX #1

	HS400/400i	HS500/500i
L1	2300mm	2800mm

<KA13-1>															
MARKING	X050	X051	X052	X053	X054	X055	X056	X060	X061	SQ39E1	L+	L+	L-	L-	SPP1 ~ SPP8
COLOR	BLUE														
WIRE	KIV 0.5SqX24C														
TERMINAL	1.25Sq-3.2Y										CABLE TIE				

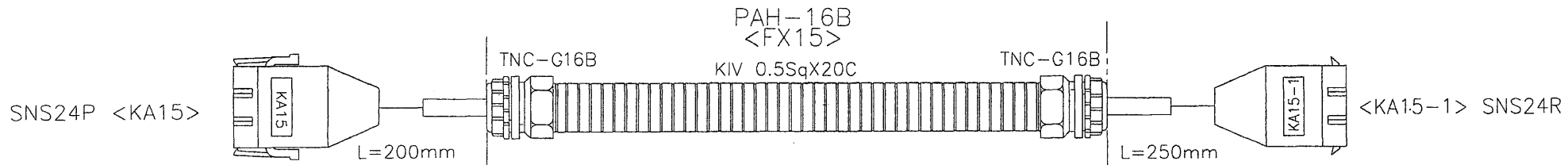
<KA14-1>															
MARKING	YA13	YA14	YA15	YA16	YA17	YA40	YA41	YA44	YA45	YA46	YA47	YA57	N	N	SPP9~SPP16
COLOR	RED														
WIRE	KIV 0.75SqX24C														
TERMINAL	1.25Sq-3.2Y										CABLE TIE				

보통허용차 (절삭가공)	열처리		재질			WIA WIA CORPORATION
	호칭치수 구분	허용치 ±mm	소재치수			
1 이상 4 이하	0.1	표면처리			KA13-1/KA14-1	도명
4 초과 16 이하	0.2	척도	수량	종량		
16 초과 63 이하	0.3				제도	설계
63 초과 250 "	0.5	2007.07				
250 " 1000 "	0.8				도번	
1000 초과	1.2				38	
플러그 및 탭 의 중심 거리	0.3					

표기

수 정 내 용					
부 호	설 번 CODE	내 용	수 정 자	승 인 자	날 짜

KA15-1



<KA15> SNS24P

1	2	3	4
D107	D108	E107	E108
5	6	7	8
X063	X064	X065	X066
9	10	11	12
X067	X070	L+	L+
13	14	15	16
L+	L-	Y080	Y081
17	18	19	20
SPP17	SPP18	SPP19	
21	22	23	24

APC JOINT BOX #1

	HS400/400i	HS500/500i
L1	4500mm	2500mm

<KA15-1> SNS24R

4	3	2	1
E108	E107	D108	D107
8	7	6	5
X066	X065	X064	X063
12	11	10	9
L+	L+	X070	X067
16	15	14	13
Y081	Y080	L-	L+
20	19	18	17
	SPP19	SPP18	SPP17
24	23	22	21

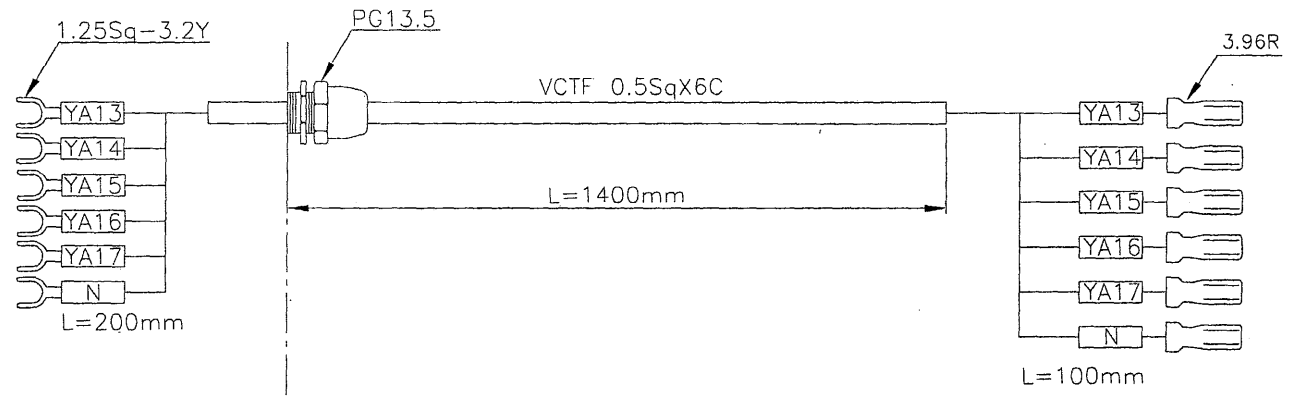
APC OP.

보통허용차 (절삭가공)		열처리		재질			WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량	KA15-1	
4 초과 16 이하	0.2						도명	
16 초과 63 이하	0.3	제도	설계	검토	승인	APC CABLE #3		39
63 초과 250 "	0.5					도번		
250 " 1000 "	0.8	2007.07						
1000 초과	1.2							
볼트구멍 및 탭 의 중	0.3							

표기

수 정 내 용					
부 호	설 번 CODE	내 용	수 정 자	승 인 자	날 짜

KA16



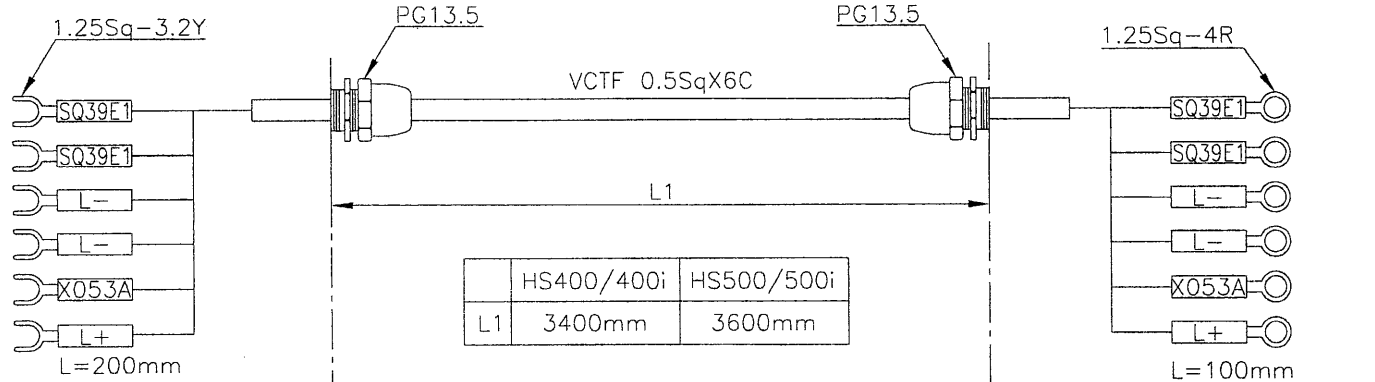
APC JOINT BOX #2

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	종량	KA16
4 초과 16이하	0.2						
16 초과 63이하	0.3						
63 초과 250 #	0.5						
250 # 1000 #	0.8	제 도	설 계	검 토	승 인	도명 CALL LIGHT CABLE	
1000 초과	1.2					도번 40	
플트구멍 및 탭 의 중심 거리	0.3	2007.07					

부호

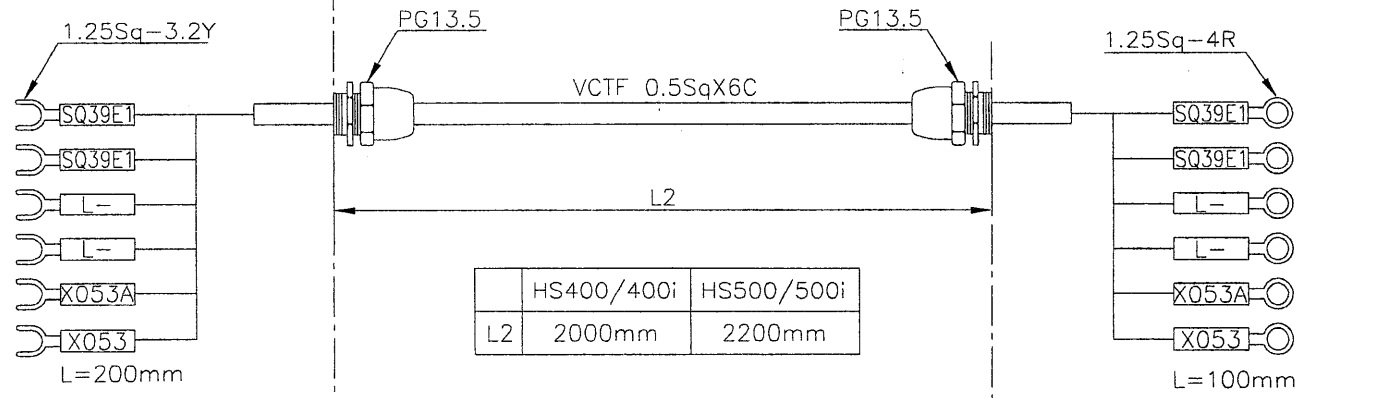
수 정 내 용					
부호	설번CODE	내 용	수정자	승인자	날짜

KA17



	HS400/400i	HS500/500i
L1	3400mm	3600mm

KA17-1



	HS400/400i	HS500/500i
L2	2000mm	2200mm

APC JOINT BOX #2

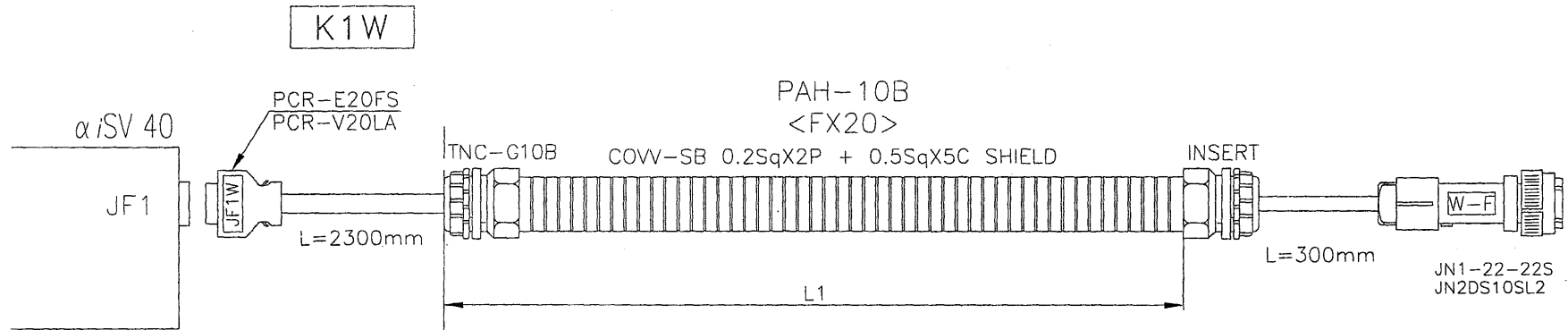
APC DOOR L/S(RIGHT)

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION									
호칭치수	허용치	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)									
구 분	±mm					<table border="1"> <tr> <th>최도</th> <th>수량</th> <th>중량</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>		최도	수량	중량				KA17/KA17-1	
최도	수량							중량							
1 이상 4 이하	0.1							도명 APC DOOR L/S (LEFT/RIGHT)		도면크기					
4 초과 16이하	0.2	도번		41											
16 초과 63이하	0.3	<table border="1"> <tr> <th>제</th> <th>설</th> <th>검</th> <th>승</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		제	설	검	승								
제	설	검	승												
63 초과 250 "	0.5	2007.07													
250 " 1000 "	0.8														
1000 초과	1.2														
플트구멍 및 탭의 종횡방향	0.3														

내용

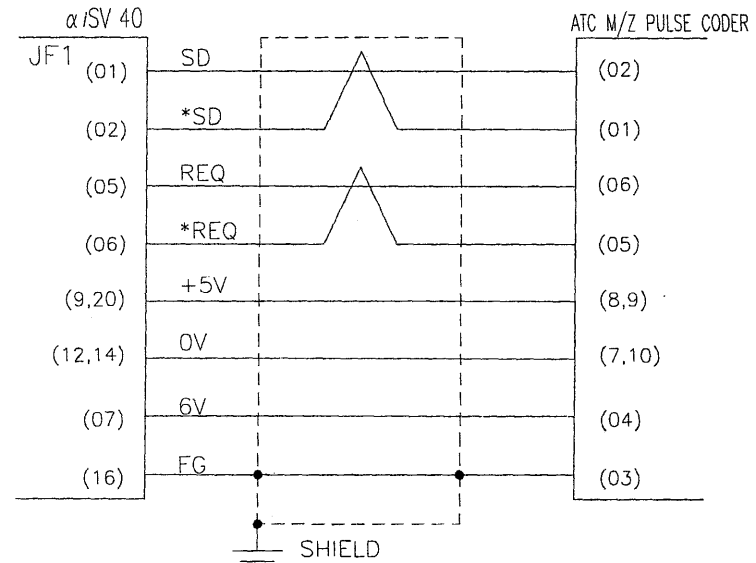
수정내용

부호	설번CODE	내용	수정자	승인자	날짜



CONTROL BOX 하부

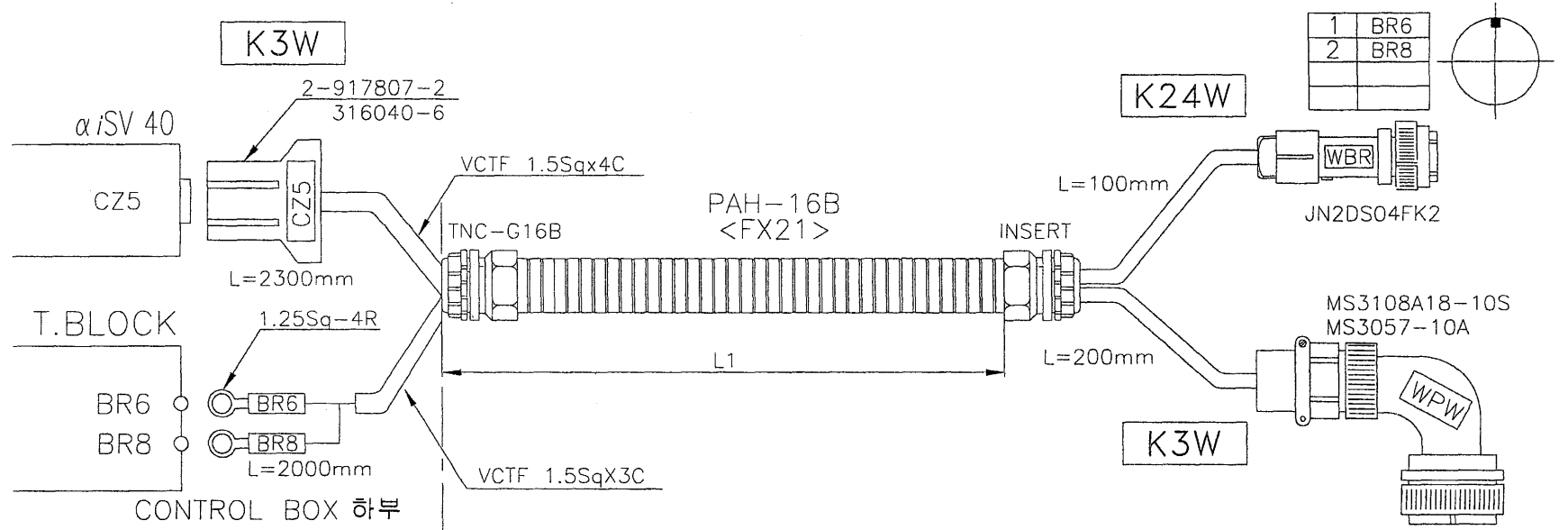
	HS400/400i	HS500/500i
L1	4700mm	3500mm



보통허용차 (절삭가공)		열처리		재질			WIA WIA CORPORATION	
호칭치수 구분	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	종량	K1W	
4 초과 16 이하	0.2			제도	설계	검토	도명 MAGAZINE	
16 초과 63 이하	0.3						도번	
63 초과 250 "	0.5			승인				
250 " 1000 "	0.8			2007.07				
1000 초과	1.2							
볼트구멍 및 탭 의 중심 거리	0.3							
							42	

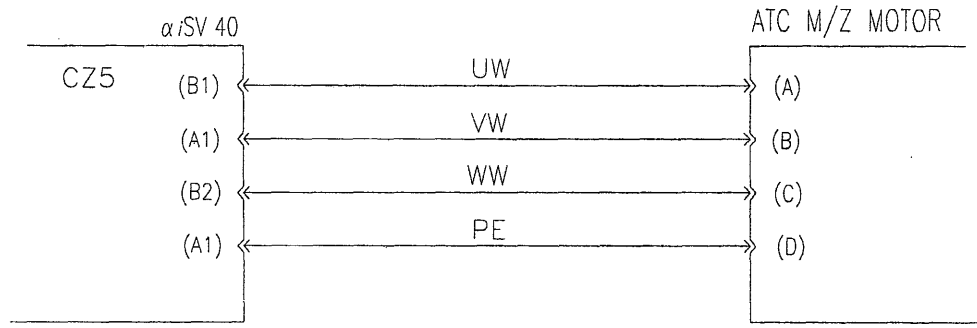
부호

수 정 내 용					
부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜



1	BR6
2	BR8

A	UW
B	VW
C	WW
D	PE



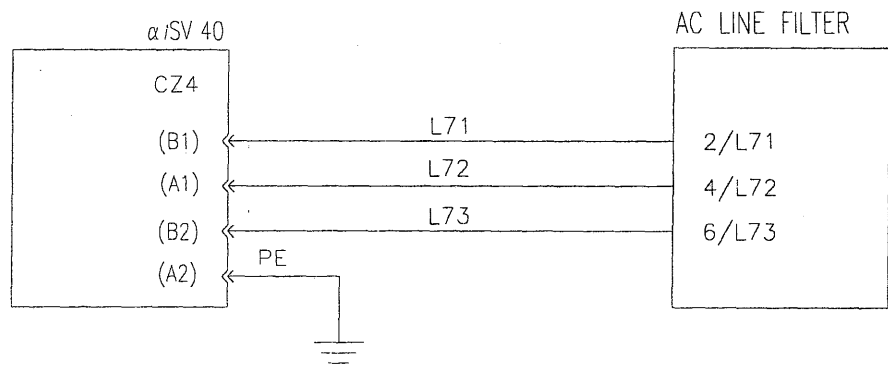
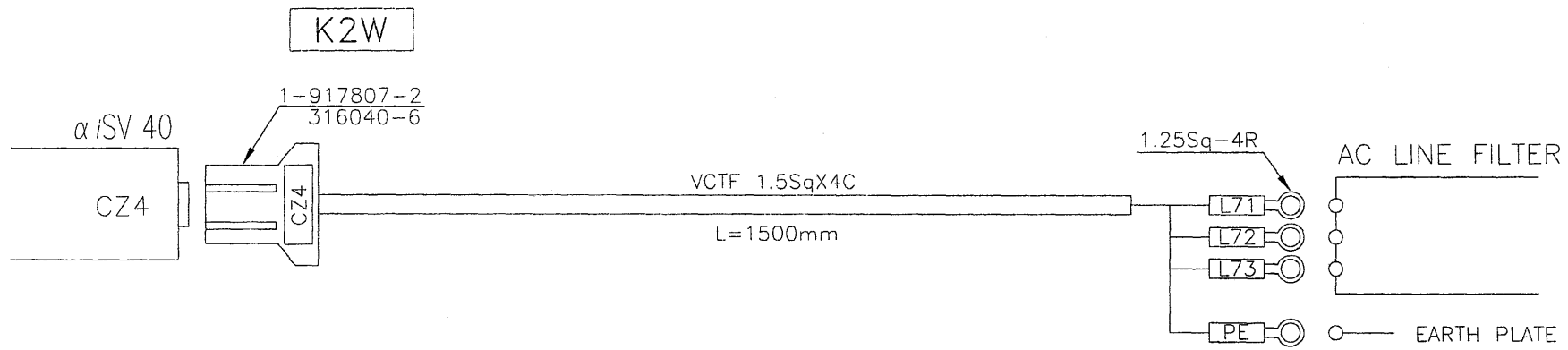
	HS400/400i	HS500/500i
L1	4700mm	3600mm

보통허용차 (절삭가공)		열처리		재질		WIA CORPORATION	
호칭치수	허용치 ±mm	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			재질	수량	종량	K3W/K24W
4 초과 16 이하	0.2						
16 초과 63 이하	0.3						
63 초과 250 "	0.5						
250 # 1000 "	0.8	제도	실계	검배	승인	MAGAZINE MOTOR POWER CABLE	
1000 초과	1.2					도명	
플트구멍 및 템의 중	0.3					도번	
		2007.07				43	

第五

수 정 내 용

부호	설변CODE	내 용	수정자	승인자	날짜

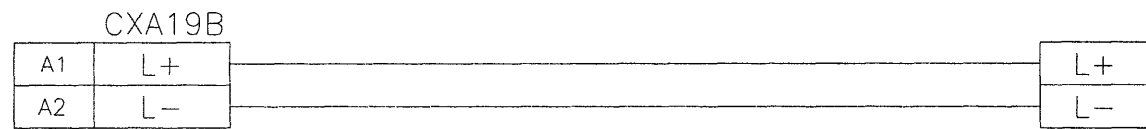
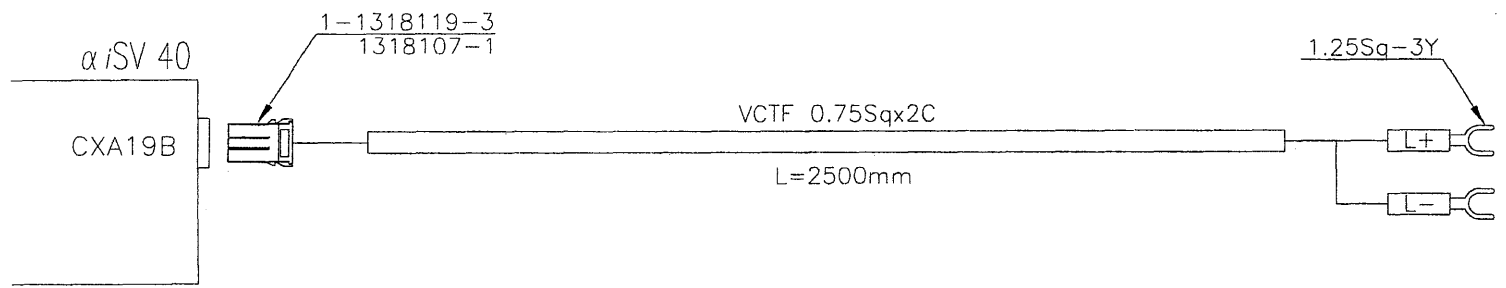


보통허용차 (절삭가공)		열처리		재질			WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	종량	K2W	
4 초과 16이하	0.2			도명		MAGAZINE POWER CABLE		도면크기
16 초과 63이하	0.3			도번				44
63 초과 250 "	0.5							
250 " 1000 "	0.8	제도	설계	검토	승인			
1000 초과	1.2	2007.07						
플트구멍 및 탭 의 중심 거리	0.3							

공공

수 정 내 용					
부 호	실 변 CODE	내 용	수 정 자	승 인 자	날 짜

K11W

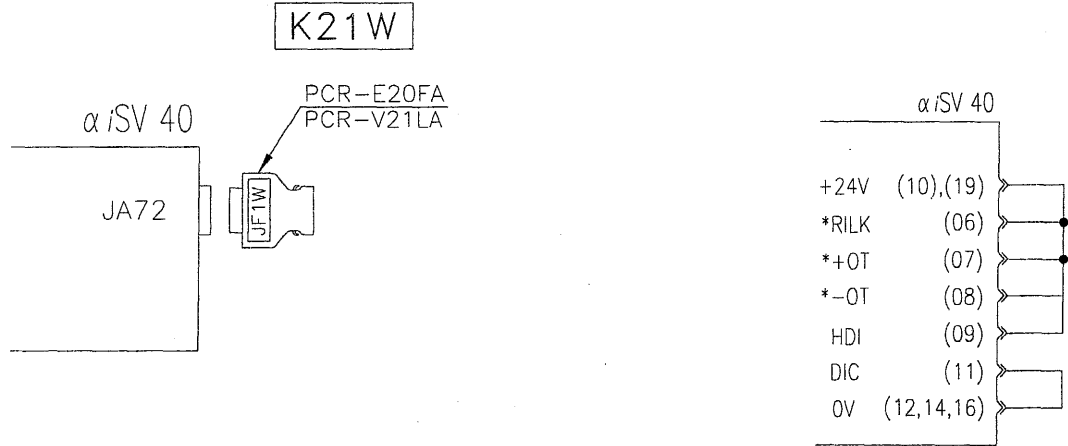
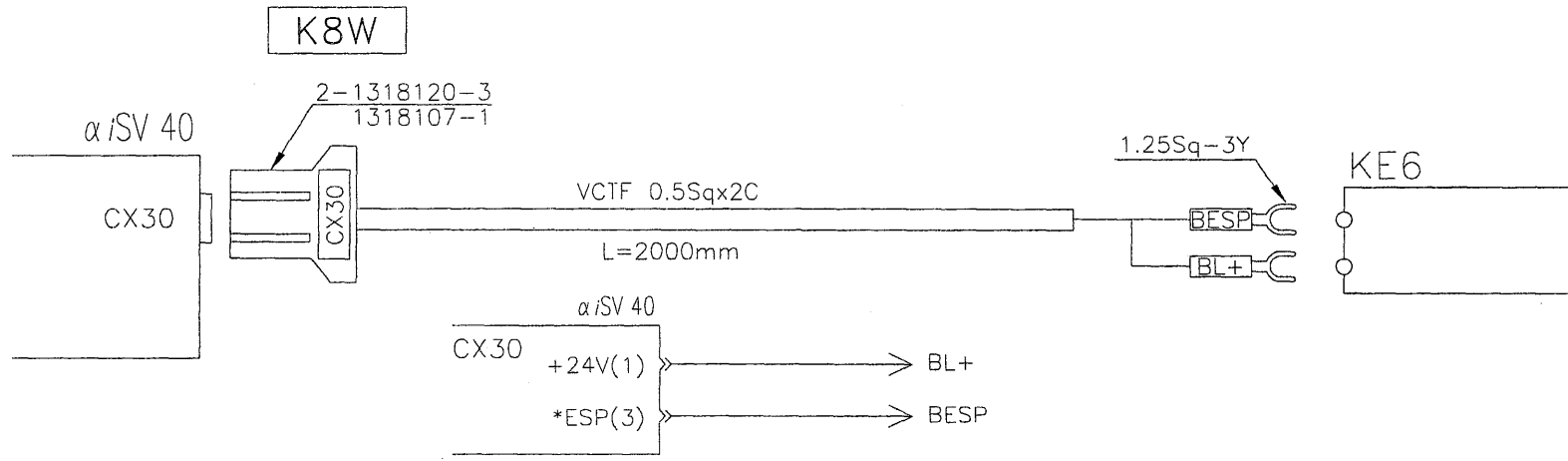


보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수 구 분	허용치 \pm mm	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			천도	수량	종량	K11W
4 초과 16이하	0.2						
16 초과 63이하	0.3						
63 초과 250"	0.5						
250" 1000"	0.8						
1000 초과	1.2	제도	설계	검토	승인	도명 B-AMP CONTROLLER POWER	
플트구멍 의 중	0.3	2007.07					도면크기 45

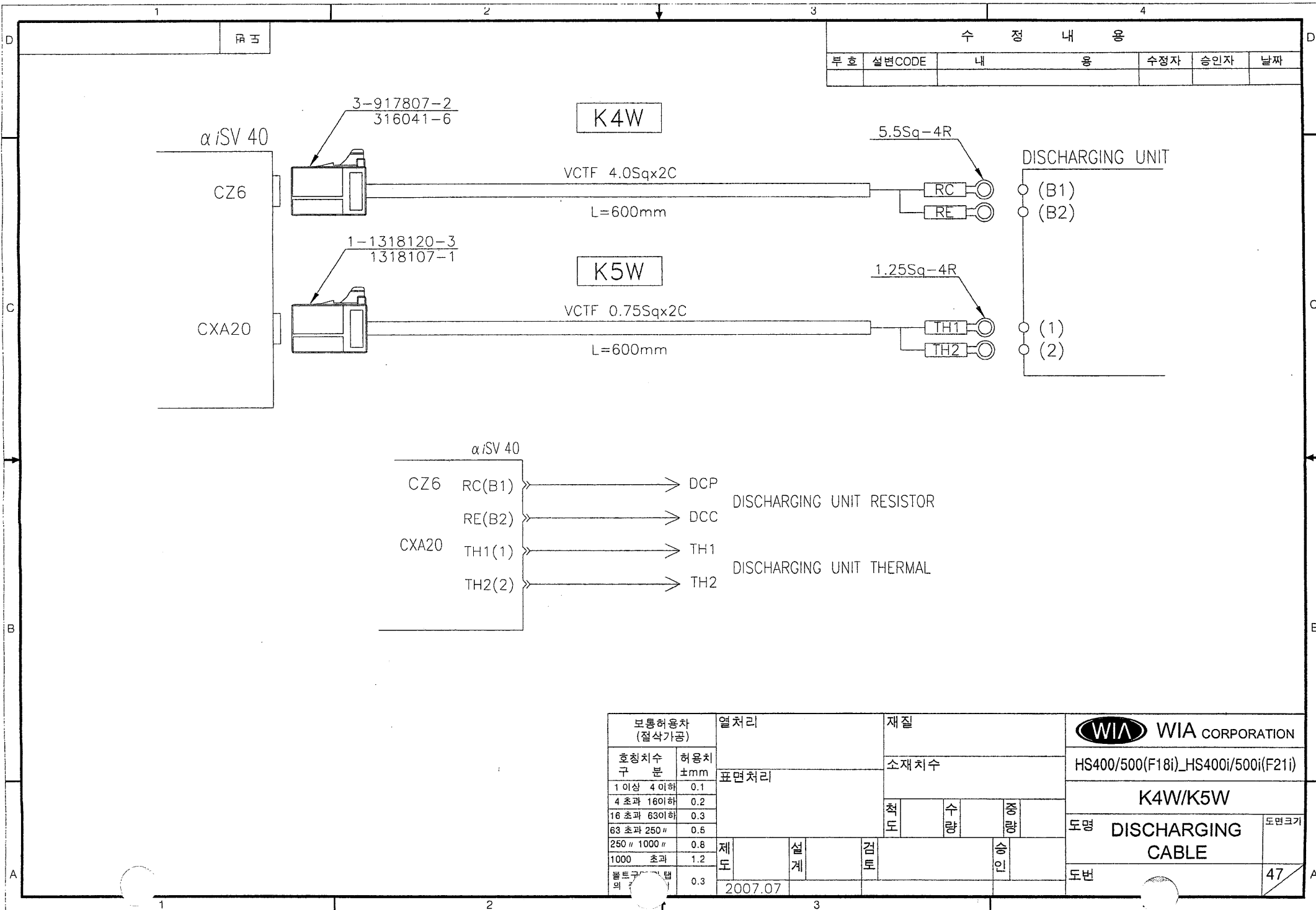
丙 五

수 정 내 용

부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜

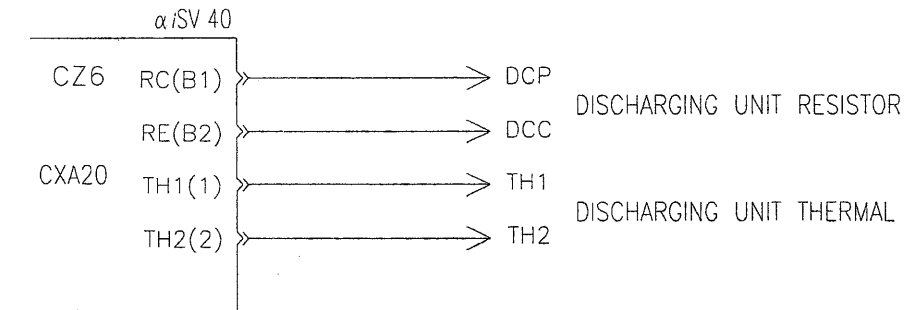


보통허용차 (절삭가공)		열처리		재질			WIA WIA CORPORATION		
호칭치수 구 분	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)		
1 이상 4 이하	0.1			척도	수량	종량	K8W/K21W		
4 초과 16 이하	0.2						도명 B-AMP EMG & DI SIGNAL CABLE		도면크기
16 초과 63 이하	0.3						도번		
63 초과 250 "	0.5								
250 " 1000 "	0.8	제	설	검	승				
1000 초과	1.2	도	계	투	인				
볼트구멍 및 탭 의 중심 거리	0.3	2007.07							



내용

수 정 내 용					
부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜



보통허용차 (절삭가공)		열처리		재질			WIA CORPORATION		
호칭치수	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)		
1 이상 4 이하	0.1			적도	수량	중량	K4W/K5W		
4 초과 16이하	0.2						도명	DISCHARGING CABLE	도면크기
16 초과 63이하	0.3								
63 초과 250 "	0.5								
250 " 1000 "	0.8	제도	설계	검토	승인				
1000 초과	1.2	2007.07							
볼트구멍의 직경	0.3								

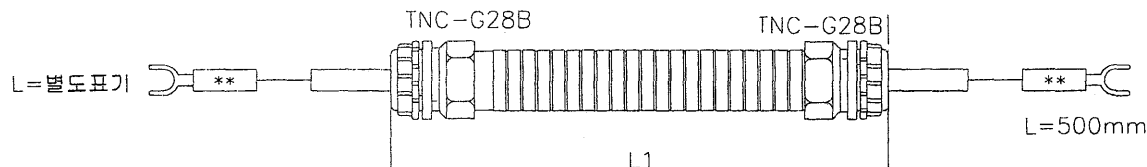
부호

수 정 내 용

부호	설번CODE	내 용	수정자	승인자	날짜

KA18

PAH-28B
<FX16>



CONTROL BOX 하단

ATC JOINT BOX #1

<KA18> (TERMINAL MODULE)

MARKING	D106	D107	E106	E107	YA20	YA21	YA22	YA23	YA24	YA25	YA26	YA27	YA30	Y082	L+	N	N	SPT1~7
COLOR	KIV 0.75SqX24C																	
WIRE	RED																	
TERMINAL	1.25Sq-3.2Y																	CABLE TIE

KA18

2차 3Y

L=1600mm

KA18

2차 3Y

L=2000mm

T.BLOCK	D106	D107	E106	E107	TM-4	Y082	L+	AOR16(SLOT5)	YA30	YA20	YA21	YA22	YA23	YA24	YA25	YA26	YA27	N	N	N	N	SPT1	SPT1	SPT7	SPT7	

T.M-3	X080	X081	X082	X083	X085	X094	X095	X096	X097	X110	X111	X112	X113	X114	X115	X116	L-	L+
TM1(B08)	TM1(B16)	TM1(B24)	TM1(A08)	TM1(A24)	TM1(A14)	TM1(A22)	TM1(B05)	TM1(B21)	TM1(A02)	TM1(B10)	TM1(A18)	TM1(B01)	TM1(A10)	TM1(B17)	TM1(A01)	TM1(B07)	TM1(B02)	

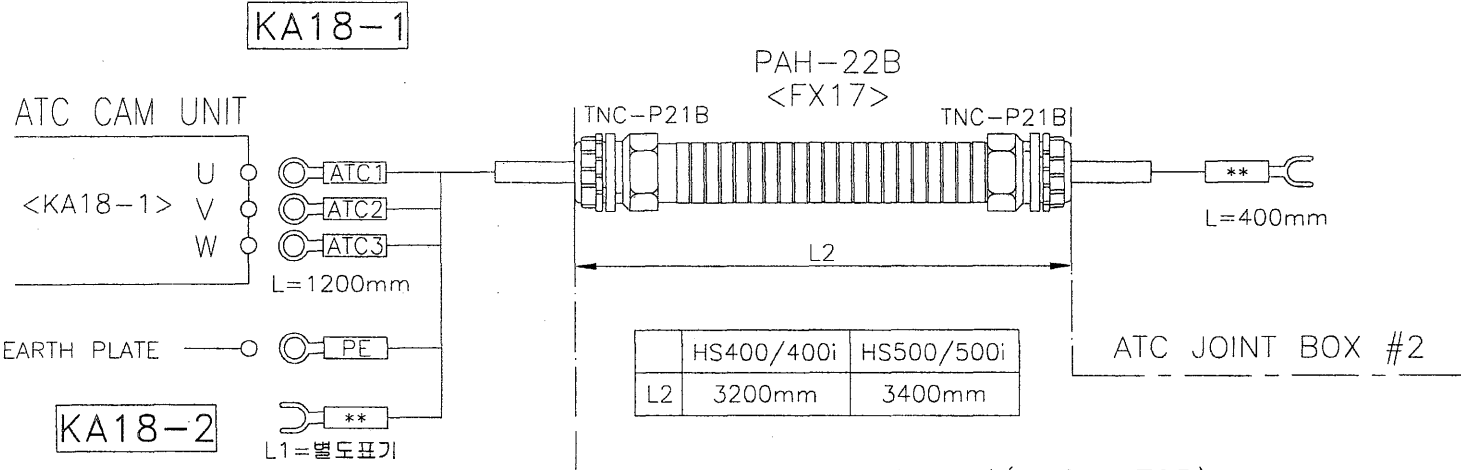
MARKING	X080	X081	X082	X083	X085	X094	X095	X096	X097	X110	X111	X112	X113	X114	X115	X116	L+	L-
COLOR	BLUE																	
WIRE	KIV 0.5SqX24C																	
TERMINAL	1.25Sq-3.2Y																	

	HS400/400i	HS500/500i
L1	3200mm	3400mm

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수	허용치 ±mm	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1					KA18	
4 초과 16 이하	0.2					도명	
16 초과 63 이하	0.3					ATC JOINT BOX #1	
63 초과 250 "	0.5					도번	
250 " 1000 "	0.8					48	
1000 초과	1.2						
볼트구멍 및 탭의 중심 거리	0.3	2007.07					

第五

수 정 내 용					
부 호	설 번 CODE	내 용	수 정 자	승 인 자	날 짜



	HS400/400i	HS500/500i
L2	3200mm	3400mm

<KA18-1> (MAG.MOTOR)

MARKING	ATC1	ATC2	ATC3	PE
WIRE	KIV 2.5SqX4C			
COLOR	R	W	B	Y/G
TERMINAL	2.0Sq-4R			

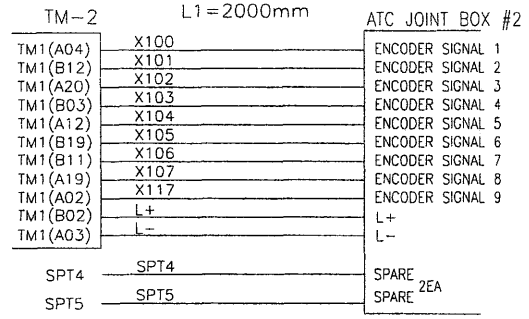
<KA18-2> (TERMINAL MODULE)

MARKING	X100	X101	X102	X103	X104	X105	X106	X107	X117	L+	L-	L+	L-	SPT4,5
COLOR	BLUE													
WIRE	KIV 0.75SqX15C													
TERMINAL	1.25Sq-3.2Y												CABLE TIE	

KA18-2

2차 3Y

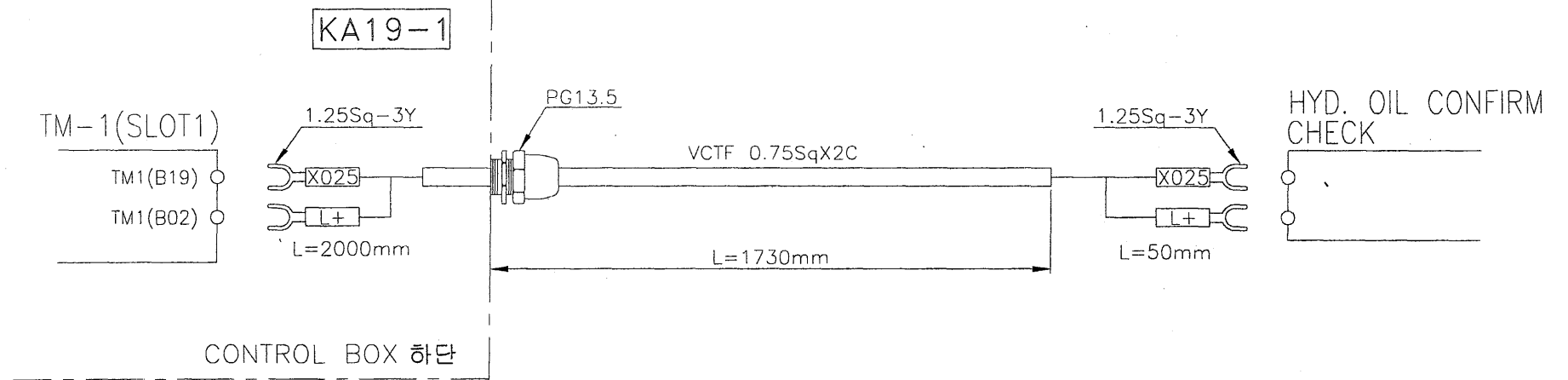
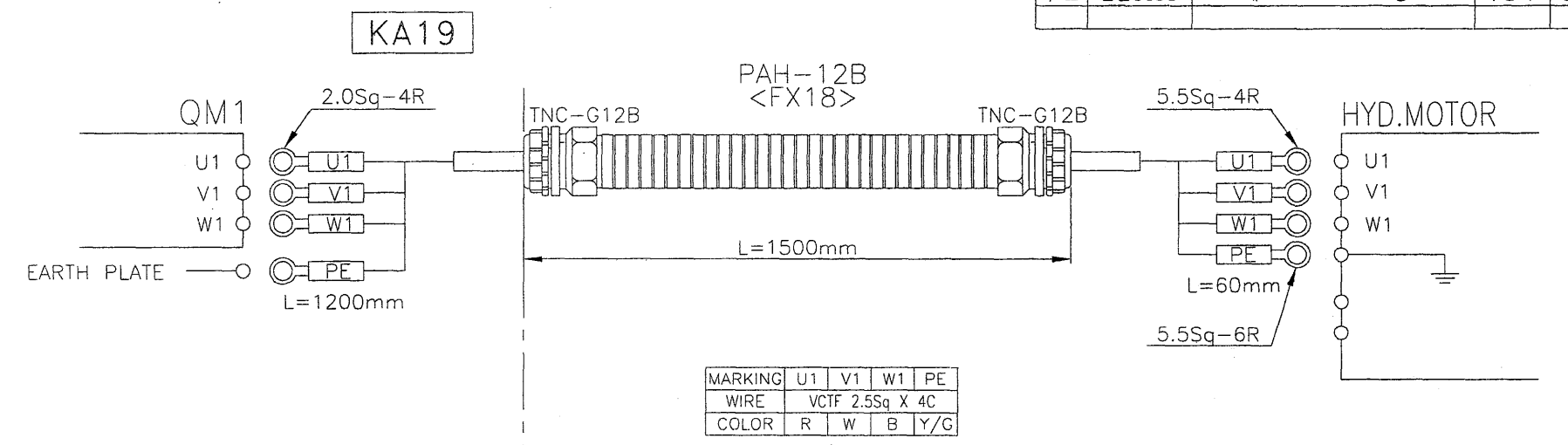
L1=2000mm



보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수	허용치	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)	
구 분	±mm					KA18-1,2	
1 이상 4 이하	0.1			척도	수량	중량	도명
4 초과 16 이하	0.2					도면크기	
16 초과 63 이하	0.3					ATC JOIN BOX #2	
63 초과 250 "	0.5					도번	
250 # 1000 "	0.8					49	
1000 초과	1.2	제도	실계	검토	승인		
플트구멍 및 템의 홈	0.3	2007.07					

표 5

수 정 내 용					
부 호	실변CODE	내 용	수정자	승인자	날짜



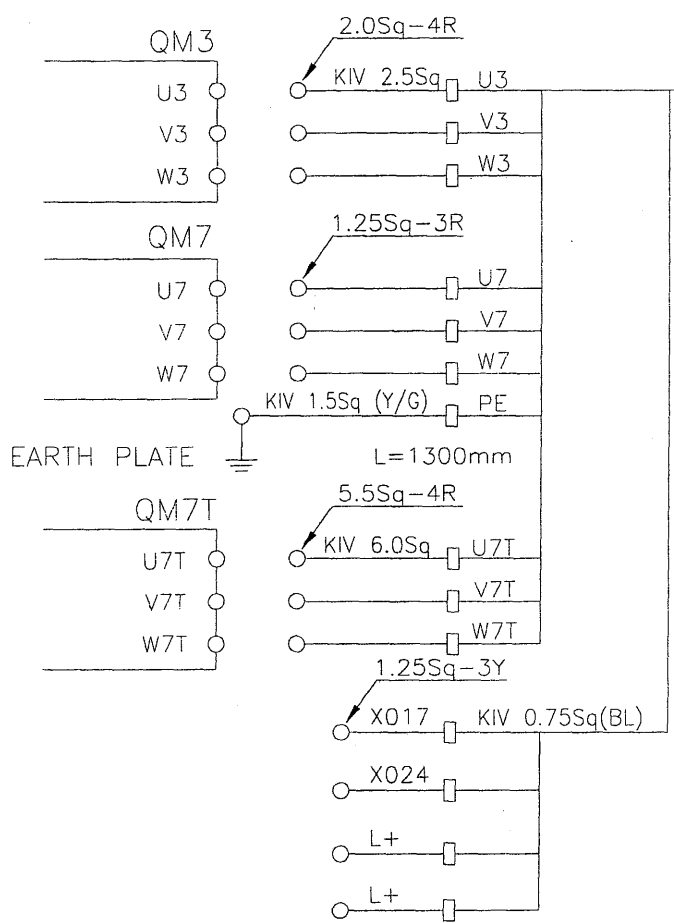
보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION		
호칭치수 구 분	허용치 ±mm	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)		
1 이상 4 이하	0.1			척도	수량	종량	KA19/KA19-1	
4 초과 16 이하	0.2						도명 HYDRAULIC MOTOR & HYD.OIL CHECK CABLE	도면크기
16 초과 63 이하	0.3						도번	50
63 초과 250 "	0.5							
250 " 1000 "	0.8	제도	설계	검토	승인			
1000 초과	1.2	2007.07						
볼트구멍 및 탭 의 중심 거리	0.3							

내용

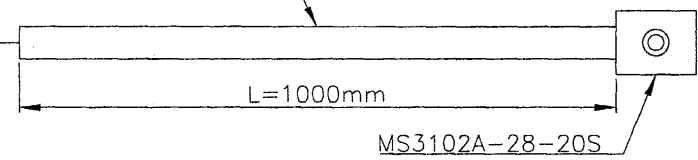
수 정 내 용

부호	설변CODE	내 용	수정자	승인자	날짜

KA21



절연TUBE



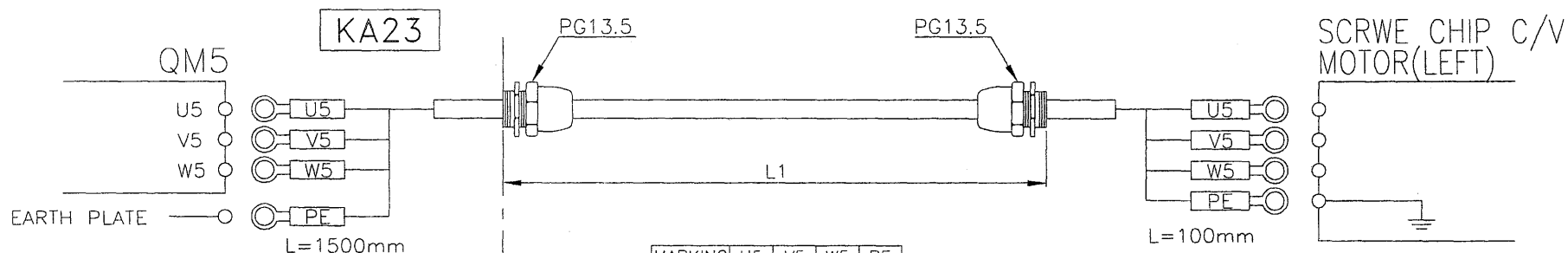
A	B	C	D	E	F	G	H	J	K
U3	V3	W3	U7	V7	W7	U7T	V7T	W7T	X017
L	M	N	P						
X024	L+	L+	PE						

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재 치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	수량	KA21
4 초과 16 이하	0.2			제도	설계	검토	도명
16 초과 63 이하	0.3			제도	설계	검토	COOLANT CABLE #1
63 초과 250 #	0.5			제도	설계	검토	도면크기
250 # 1000 #	0.8			제도	설계	검토	52
1000 초과	1.2			제도	설계	검토	도번
플트구멍 및 탭 의 중심 거리	0.3	2007.07		제도	설계	검토	

附 5

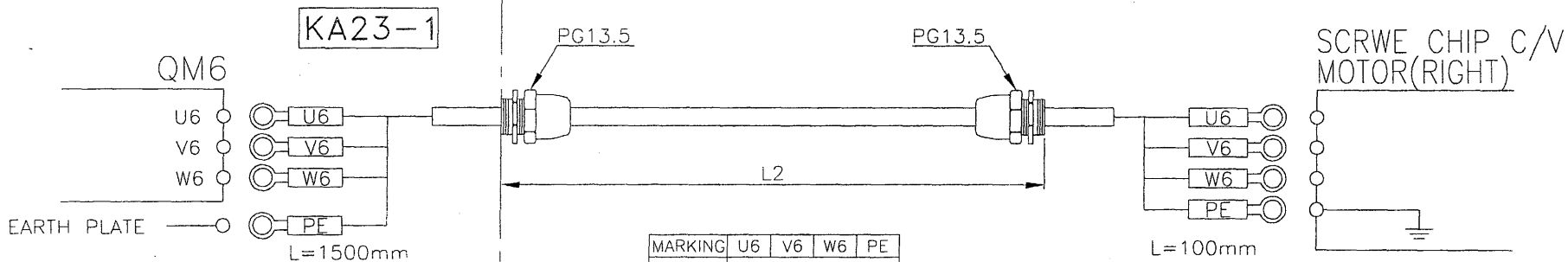
수 정 내 용

부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜



MARKING	U5	V5	W5	PE
WIRE	VCTF 1.5Sq X 4C			
COLOR	R	W	B	Y/G
TERMINAL	1.25Sq-4R			

	HS400/400i	HS500/500i
L1	4200mm	1200mm



MARKING	U6	V6	W6	PE
WIRE	VCTF 1.5Sq X 4C			
COLOR	R	W	B	Y/G
TERMINAL	1.25Sq-4R			

	HS400/400i	HS500/500i
L2	4800mm	1800mm

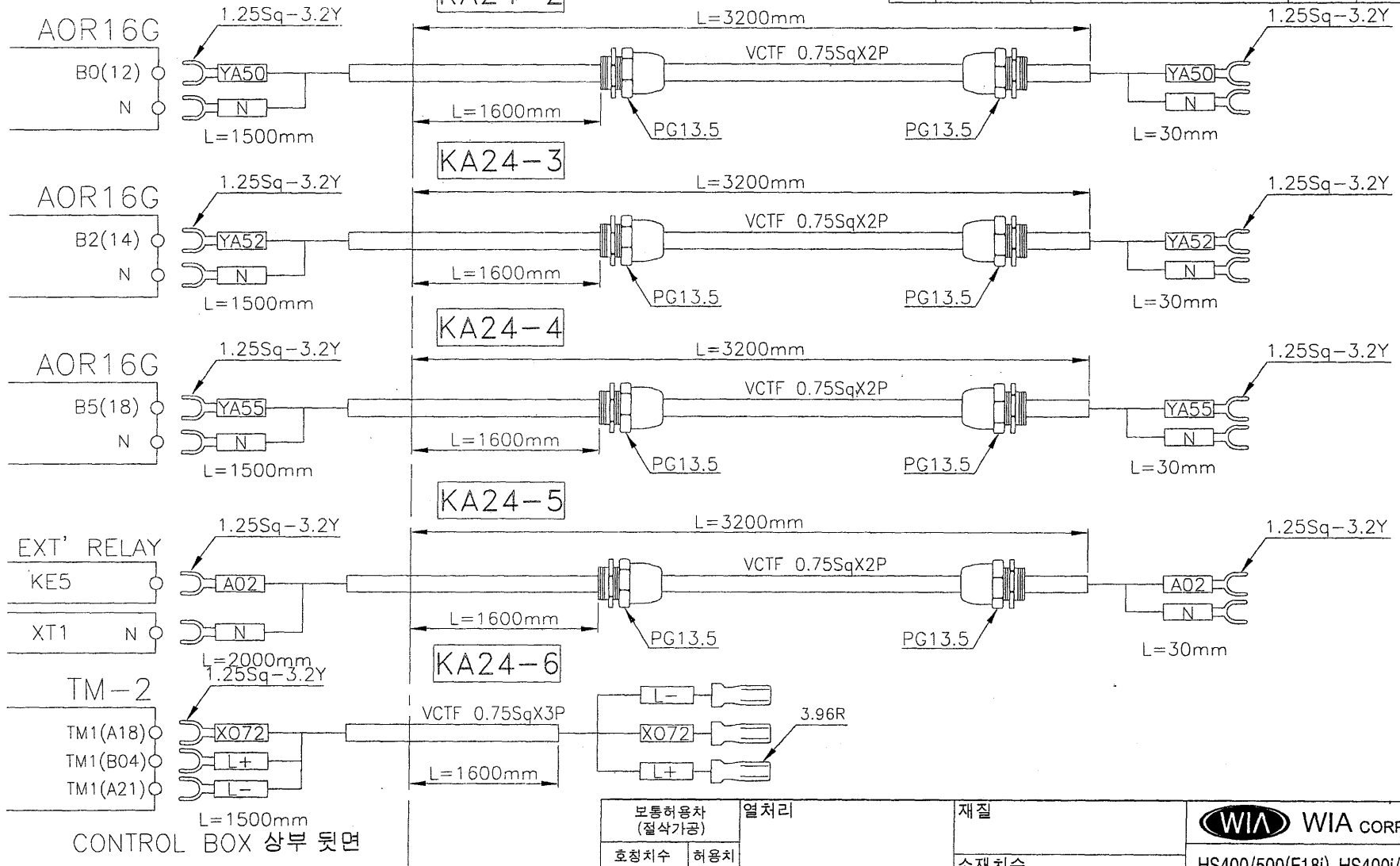
CONTROL BOX 하단

보통허용차 (절삭가공)		열처리	재질			
호칭치수 구 분	허용치 ±mm	표면처리	소재치수			HS400/500(F18i)_HS400i/500i(F21i)
1 이상 4 이하	0.1		최도	수량	중량	
4 초과 16이하	0.2					
16 초과 63이하	0.3					
63 초과 250 "	0.5					
250 " 1000 "	0.8	제 도	설 계	검 투	승 인	
1000 초과	1.2	2007.07				
볼트구멍 및 탭 의 중심 거리	0.3					
					도명	도면크기
					SCRWE CHIP CONVEYOR CABLE	54
					도번	

箱号

수 정 내 용

부 호	설 변 CODE	내 용	수 정 자	승 인 자	날 짜



CONTROL BOX 상부 뒷면

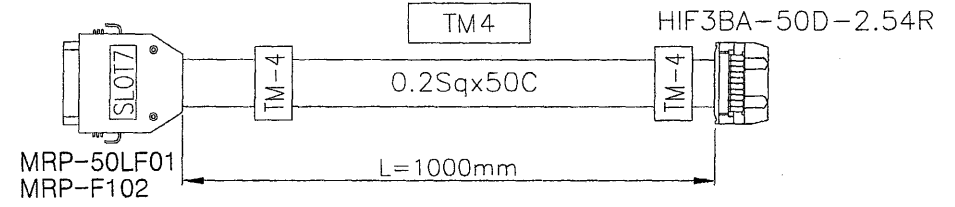
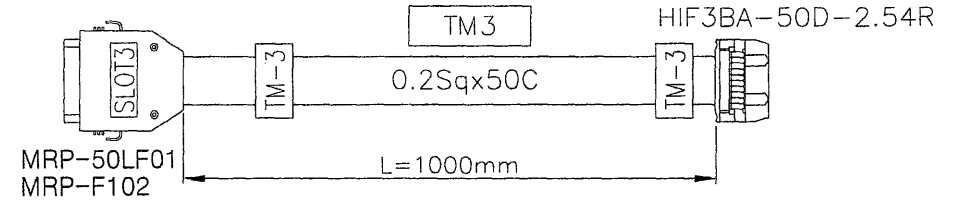
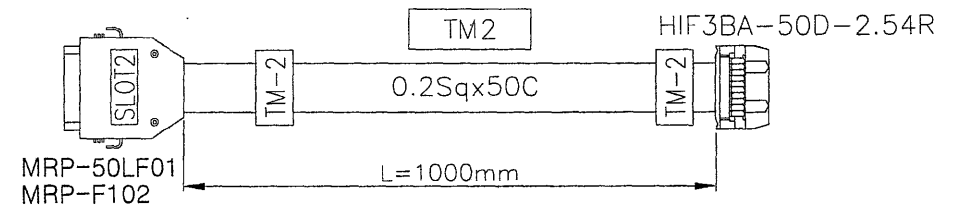
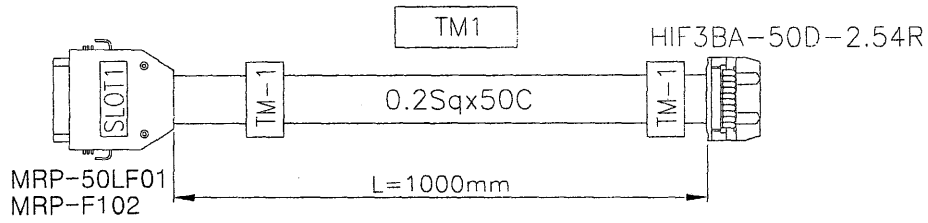
보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	중량	도명
4 초과 16이하	0.2						
16 초과 63이하	0.3			제 도	승 인	도번	도면크기
63 초과 250 "	0.5						
250 " 1000 "	0.8	실 계	검 토				
1000 초과	1.2						
볼트구멍 및 탭 의 중심 거리	0.3	2007.07					
KA24-2~6						UTILITY CABLE #2	
						56	

0-109-08 222

표 5

수 정 내 용

부호	설번CODE	내 용	수정자	승인자	날짜



MRP-50LF01 ↔ HIF3BA-50D-2.54R

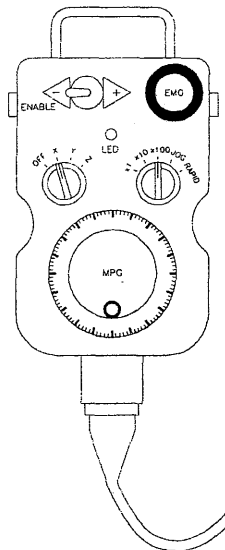
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34	B17	02	B01
35	A18	03	A02
36	B18	04	B02
37	A19	05	A03
38	B19	06	B03
39	A20	07	A04
40	B20	08	B04
41	A21	09	A05
42	B21	10	B05
43	A22	11	A06
44	B22	12	B06
45	A23	13	A07
46	B23	14	B07
47	A24	15	A08
48	B24	16	B08
49	A25	17	A09
50	B25	18	B09

	A	B
01	A01	B01
02	A02	B02
03	A03	B03
04	A04	B04
05	A05	B05
06	A06	B06
07	A07	B07
08	A08	B08
09	A09	B09
10	A10	B10
11	A11	B11
12	A12	B12
13	A13	B13
14	A14	B14
15	A15	B15
16	A16	B16
17	A17	B17
18	A18	B18
19	A19	B19
20	A20	B20
21	A21	B21
22	A22	B22
23	A23	B23
24	A24	B24
25	A25	B25

보통허용차 (절삭가공)		열처리		재질		WIA WIA CORPORATION	
호칭치수	허용치	표면처리		소재치수		HS400/500(F18i)_HS400i/500i(F21i)	
구 분	±mm					TM1/TM2/TM3/TM4	
1 이상 4 이하	0.1			도명 TM-1.~ TM-4		도면크기	
4 초과 16이하	0.2						
16 초과 63이하	0.3						
63 초과 250"	0.5	제	실	검	승	도면	
250 ~ 1000"	0.8	도	계	토	인		
1000 초과	1.2	2007.07					
플러그형 및 탭의 중심 거리		0.3				58	

수 정 내 용					
부 호	설 번 CODE	내 용	수 정 자	승 인 자	날 짜

※ EMG 관련 CABLE (E105,E106,D105,D106)은 3.96R로 끝단처리 해야 함. 그외 CABLE은 아래의 PIN번호에 맞게 AMP CONNECTOR로 끝단처리 할것



* OP BOX 취부시 PG13.5 처리

AMP 1-640515-0
350968-1

AMP 1-640525-0
641294-1

MPG-1(1-640515-0)

1	2	3	4
L+	L-	Y1061	X1096
5	6	7	8
X1097	D106	D105	X1095
9	10	11	12
X1087	X1086	X1085	X1084
13	14	15	16
X1077	E105	E106	SPM1
17	18	19	20
OV	+5V	HB1	HA1
21	22	23	24
HB2	HA2	HB3	HA3

MPG (1-640525-0)

4	3	2	1
X1096	Y1061	L-	L+
8	7	6	5
X1095	D105	D106	X1097
12	11	10	9
X1084	X1085	X1086	X1087
16	15	14	13
SPM1	E106	E105	X1077
20	19	18	17
HA1	HB1	+5V	OV
24	23	22	21
HA3	HB3	HA2	HB2

24	HA3	HA3	MPG CABLE
23	HB3	HB3	
22	HA2	HA2	
21	HB2	HB2	
20	HA1	HA1	
19	HB1	HB1	
18	+5V	+5V	
17	OV	OV	
16	SPARE	SPM1	
15	E106	E106	
14	E105	E105	
13	AXIS1	X1077	
12	AXIS2	X1084	
11	AXIS3	X1085	
10	X1	X1086	
9	X10	X1087	
8	X100	X1095	
7	ES2	D105	EMG. CABLE
6	ES3	D106	
5	TS2	X1097	
4	TS1	X1096	
3	LED	Y1061	
2	G24	L-	
1	+24V	L+	

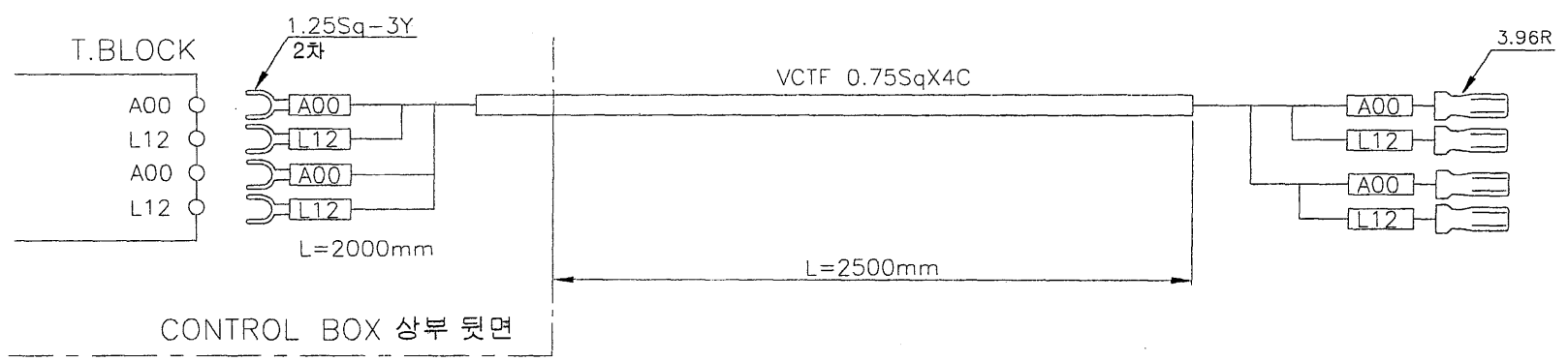
보통허용차 (절삭가공)		열처리	재질			WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리	소재치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1		최도	수량	종량	도명	REMOTE MPG CABLE
4 초과 16이하	0.2						
16 초과 63이하	0.3						
63 초과 250 "	0.5						
250 # 1000 "	0.8						
1000 초과	1.2	제	설	검	승	도번	60
볼트구멍 및 탭의 중심 거리	0.3	도	계	토	인		
		2007.07					

第五

수 정 내 용

부호	설번CODE	내 용	수정자	승인자	날짜

KA28



(*ONLY HS400/400i)

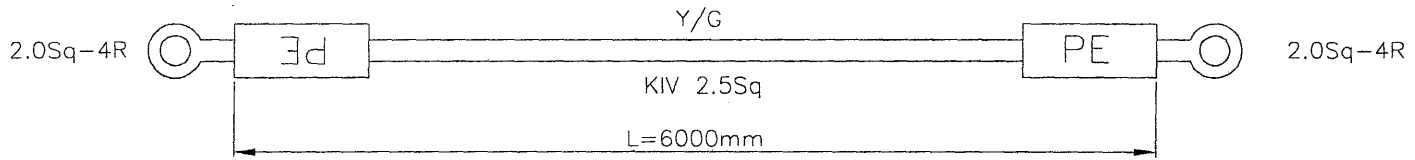
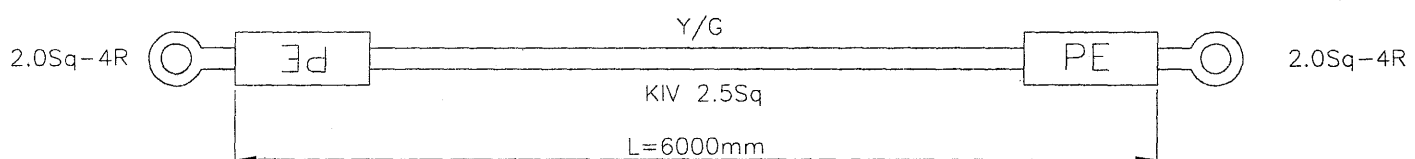
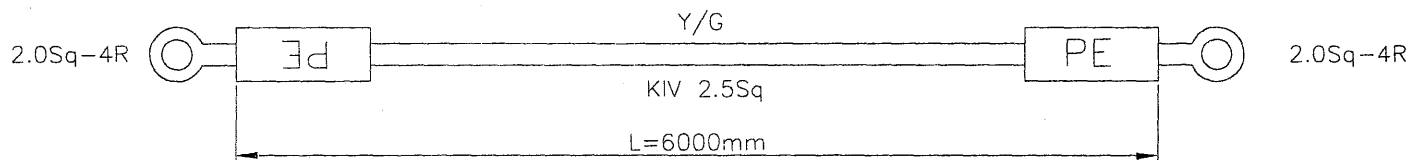
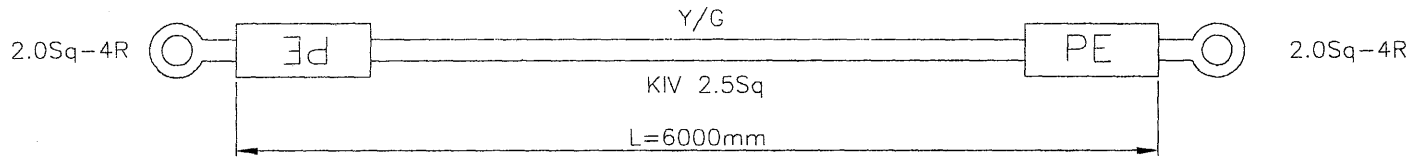
보통허용차 (절삭가공)		열처리		재질			WIA WIA CORPORATION		
호칭치수 구분	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)		
1 이상 4 이하	0.1			척도	수량	중량	KA28		
4 초과 16 이하	0.2						도명		도면크기
16 초과 63 이하	0.3						WORK LIGHT		
63 초과 250 "	0.5						도번		62
250 " 1000 "	0.8	제도	설계	검토	승인				
1000 초과	1.2	2007.07							
볼트구멍 및 탭의 중심 거리	0.3								

표 3

수 정 내 용

부 호	설번CODE	내 용	수정자	승인자	날짜

KA30



보통허용차 (절삭가공)		열처리		재질			WIA WIA CORPORATION	
호칭치수 구 분	허용치 ±mm	표면처리		소재치수			HS400/500(F18i)_HS400i/500i(F21i)	
1 이상 4 이하	0.1			척도	수량	종량	KA30	
4 초과 16이하	0.2						도명	도면크기
16 초과 63이하	0.3						EARTH CABLE	
63 초과 250 "	0.5						도번	63
250 " 1000 "	0.8	제도	설계	검토	승인			
1000 초과	1.2	2007.07						
볼트구멍 및 탭 의 중심 거리	0.3							

2) TIMER

NO.	DATA	FUNCTION	ADDRESS	REMARK
T1	300,000	LUB. PAUSE	R726.3	
T2	20,000	LUBRICATION ON TIME	R726.2	
T3	5,000	TOOL POT CLAMP/UNCLAMP, SP.SIDE/MAGAZINE SIDE TIME LIMIT	R879.0	
T4	2,000	ARM FORWARD/BACKWARD TIME LIMIT	D123.4	
T5	5,000	ATC ARM NOT BACKWARD TIME LIMIT	D123.5	
T6	300	AFTER B ASIX MOVING, TABLE CLAMP DELAY	R755.3	
T7	600,000	SPINDLE STOP TIME CHECK	R760.0	
T8	500	TOOL POT CLAMP CHECK TIME	R846.2	
T9	1,000	TOOL POT MAGAZINE SIDE DELAY TIME	R846.3	
T10	500	ORIENTATION FINISH TIME	R757.2	
T11	120,000	LUB. MOTOR OFF TIME CHECK	R760.1	
T12	250,000	GUN COOLANT OFF DELAY TIME	R773.1	
T13	1,000	APC ROTATING ARM UP DELAY TIME	R776.7	
T14	1,000	ROTATION ARM TURN CW,CCW DELAY TIME	R778.5	
T15	2,000	SPINDLE SPEED ARRIVAL DELAY	R626.0	절삭감시 장치
T16	200	M-CODE SP.STOP COMMAND DELAY	R626.2	↑
T17	0	SPINDLE STOP DELAY	R627.0	↑
T18	500	TOOL DETECTION STOP CANCEL DELAY	R627.4	↑
T19	2,000	AUTO POWER OFF DELAY TIME	R769.6	
T20	6,000	LUB. PRES. SHORTAGE CHECK DELAY TIME	R727.0	
T21	2,000	PALLET UNCL. AT PALLET CONTACT NG DELAY	R779.2	
T22	2,000	PALLET CL. AT PALLET CONTACT NG DELAY	R779.6	
T23	20,000	APC ACTION CHECK TIME	R881.7	
T24	1,000	PALLET CLAMP DELAY TIME	R755.2	
T25	1,000	ROTATION ARM DOWN DELAY TIME	R778.6	
T26	100	ATC CHANGE TOOL CLAMP/ARM FOR. DELAY TIME	R841.5	
T27	0	ATC CHANGE ARM STOP/TOOL CLAMP DELAY TIME	R705.3	
T28	2,000	NO TOOL CLAMP CHECK DELAY TIME	R702.4	
T29	10,000	TH. COOLANT AIR BLOW SOL OFF DELAY TIME	R773.6	
T30	1,000	TOOL POT SPINDLE SIDE DELAY TIME	R846.4	
T31	3,000	LUB. PRESSURE SHORTAGE CHECK DELAY	R727.1	
T32	96	DRY RUN DELAY TIME	R733.4	
T33				
T34	3,000	ATC MANUAL INTERRUPT OFF DELAY	R305.2	
T35	1,000	TABLE UNCLAMP DELAY	R755.0	
T36	500	TABLE CLAMP DELAY	R755.1	
T37				
T38				
T39				
T40				
※NOTE : TIMER 1-8 EACH 48msec TIMER 9-40 EACH 8msec				

**DATA TABLE DATA #005
(DATA OF ATC TWIN ARM ENCODER)**

NO.	ADDRESS	DATA	FUNCTION	REMARK
000	D0158		ATC TWIN ARM ORIGIN POSITION MIN.	BINARY
001	D0160		ATC TWIN ARM ORIGIN POSITION MAX.	BINARY
002	D0162		ATC TWIN ARM TOOL UNCLAMP START POSITION MIN.	BINARY
003	D0164		ATC TWIN ARM TOOL UNCLAMP START POSITION MAX.	BINARY
004	D0166		ATC TWIN ARM TOOL CLAMP START POSITION MIN.	BINARY
005	D0168		ATC TWIN ARM TOOL CLAMP START POSITION MAX.	BINARY
006	D0170		ATC TWIN ARM ORIGIN POSITION MAX.(HEAVY TOOL)	BINARY
007	D0172		ATC TWIN ARM ORIGIN POSITION MIN.(HEAVY TOOL)	BINARY
008	D0174		ATC TWIN ARM TOOL UNCLAMP START POSITION MIN.(H)	BINARY
009	D0176		ATC TWIN ARM TOOL UNCLAMP START POSITION MAX.(H)	BINARY
010	D0178		ATC TWIN ARM TOOL CLAMP START POSITION MIN.(H)	BINARY
011	D0180		ATC TWIN ARM TOOL CLAMP START POSITION MIN.(H)	BINARY
012	D0182	-	ATC TWIN ARM POSITION (AUTO SETTING)	BINARY
013	D0184		(SPARE)	

**DATA TABLE DATA #006
(DATA OF TEMPERATURE COMPENSATION)**

NO.	ADDRESS	DATA	FUNCTION	REMARK
000	D0250	0	Y축 열변위보정 곡선 조정변수 (측정DATA에 의거 값을 설정)	정수
001	D0252	(20)	Z축 열변위보정 곡선 조정변수 (측정DATA에 의거 값을 설정)	정수
002	D0254	-	BED部 온도센서의 온도	0.01℃
003	D0256			
004	D0258	-	SPINDLE HEAD部 온도센서의 온도	0.01℃
005	D0260			
006	D0262			
007	D0264	-	前回 보상時の BED部 온도센서의 온도	0.01℃
008	D0266			
009	D0268	-	前回 보상時の SPINDLE HEAD部 온도센서의 온도	0.01℃
010	D0270			
011	D0272			
012	D0274	-	前回 보상時の BED部 온도센서의 온도 + 2℃	0.01℃
013	D0276			
014	D0278	-	前回 보상時の SPINDLE HEAD部 온도센서의 온도 + 2℃	0.01℃
015	D0280	-	SPINDLE OVERHEAT ALARM처리 기준온도차, 20℃(4000)	
016	D0282	-	SPINDLE HEAD 온도와 BED 온도차	AL.처리
017	D0284			
018	D0286	-	Y축 열변위보정량 (Head Sensor의 온도변화에 따른 실제보정량)	μm
019	D0288			
020	D0290	-	Z축 열변위보정량 (Head Sensor의 온도변화에 따른 실제보정량)	μm
021	D0292			
022	D0294	-	Y축 열변위보정량 (Bed Sensor의 온도변화에 따른 실제보정량)	μm
023	D0296			
024	D0298	-	Z축 열변위보정량 (Bed Sensor의 온도변화에 따른 실제보정량)	μm
025	D0300			
026	D0302		Y축 조정값 AREA B	
027	D0304		Z축 조정값 AREA B	
028	D0306		Y축 조정값 AREA C	
029	D0308		Z축 조정값 AREA C	

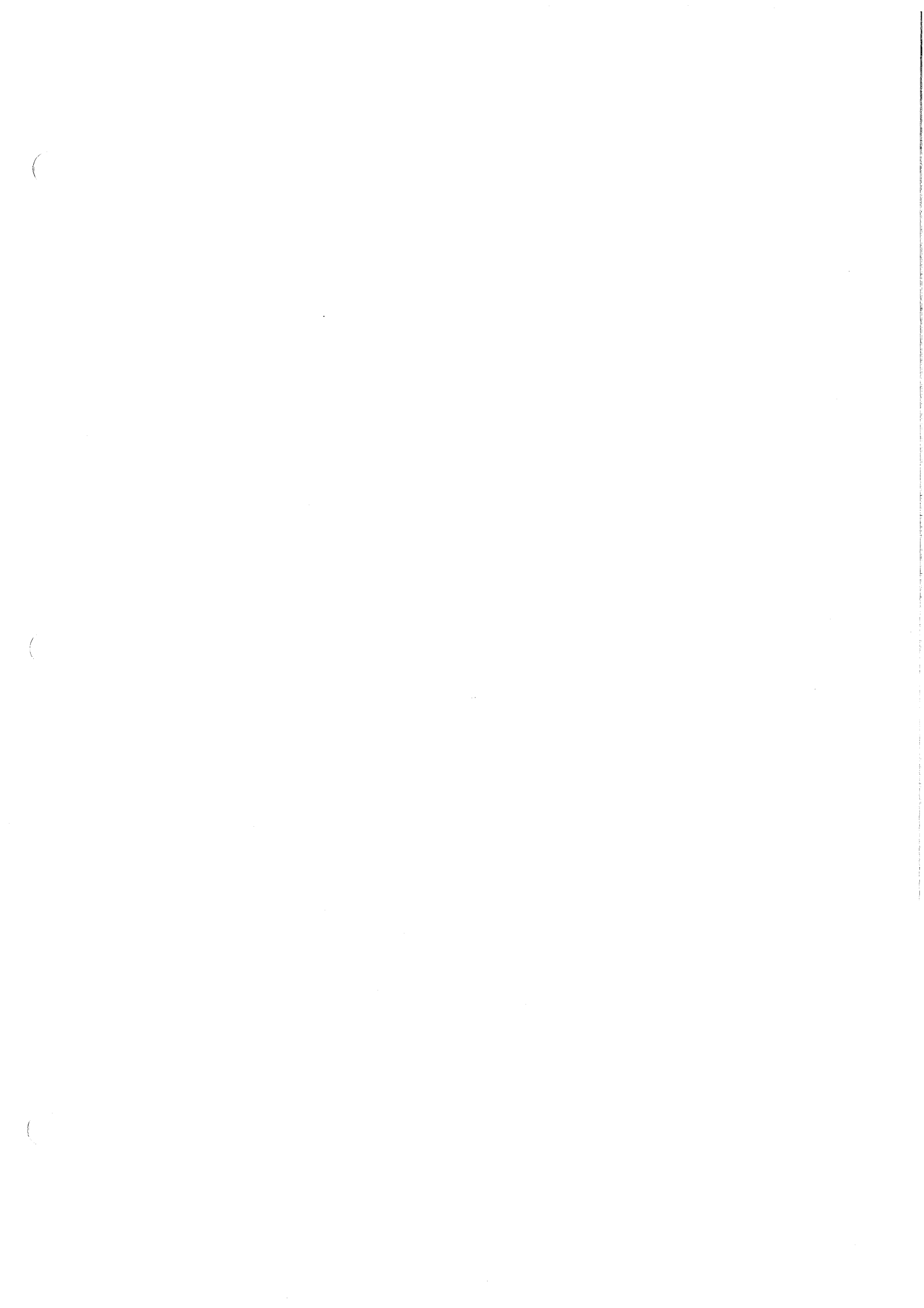
- NOTE) 1. Sampling시간 : Z축 원점복귀후 2 Level의 1scan Time간격으로 측정
 2. D254(= Reading 값 (0.01℃), D258 (= Reading 값 (0.01℃)
 3. D286 (=((D258-D254)==>R1008) / D250) ==> R1012 ==>D286 → Y축
 4. D290 (=((D258-D254)==>R1008) / D252) ==> R1014 ==>D290 → Z축

6) MAINTENANCE M-CODE LIST

M CODE	FUNCTION	REMARKS
M21	TABLE CLAMP	MAINTENANCE M-CODE ON
M22	TABLE UNCLAMP	MAINTENANCE M-CODE ON
M23	PALLET CLAMP	MAINTENANCE M-CODE ON
M24	PALLET UNCLAMP	MAINTENANCE M-CODE ON
M31	MAINTENANCE TWIN ARM MODE ON	TWIN ARM
M32	MAINTENANCE TWIN ARM/ORIENTATION MODE OFF	TWIN ARM
M35	MAINTENANCE ATC ORIENTATION MODE ON	TWIN ARM
M53	ROTATING ARM TURN CW	MAINTENANCE M-CODE ON
M54	ROTATING ARM TURN CCW	MAINTENANCE M-CODE ON
M55	ROTATING ARM UP	MAINTENANCE M-CODE ON
M56	ROTATING ARM DOWN	MAINTENANCE M-CODE ON
M57	TOOL POT CLAMP	MAINTENANCE M-CODE ON
M58	TOOL POT UNCLAMP	MAINTENANCE M-CODE ON
M61	ATC SINGLE ARM SWING MAGAZINE SIDE	MAINTENANCE M-CODE ON
M62	ATC SINGLE ARM SWING SPINDLE SIDE	MAINTENANCE M-CODE ON
M998	MAINTENANCE M MODE ON	
M999	MAINTENANCE M MODE OFF	

NO.	ADDRESS	FUNCTION
041	A5.0(D122.0)	2040 M60 POSITION ERROR
042	A5.1(D122.1)	2041 M31, M35 AT NOT MDI MODE
043	A5.2(D122.2)	2042 M31, M35 COMMAND DURING SPINDLE ROTATION
044	A5.3(D122.3)	2043 M31 NOT COMMAND
045	A5.4(D122.4)	2044 M06 AT NOT ATC POSITION
046	A5.5(D122.5)	2045 ATC ALARM NOT CANCEL
047	A5.6(D122.6)	2046 TOOL POT UNCLAMP L/S NOT ON
048	A5.7(D122.7)	2047 TOOL POT CLAMP L/S NOT OFF
049	A6.0(D123.0)	2048 OLD TOOL RETURN ERROR
050	A6.1(D123.1)	2049 TOOL POT UNCLAMP L/S NOT OFF
051	A6.2(D123.2)	2050 TOOL POT NOT UNCLAMP
052	A6.3(D123.3)	2051 TOOL POT NOT CLAMP
053	A6.4(D123.4)	2052 ATC ARM FORWARD/BACKWARD TIME OVER
054	A6.5(D123.5)	2053 ATC ARM NOT BACKWARD
055	A6.6(D123.6)	2054 ATC ARM NOT HOME POSITION
056	A6.7(D123.7)	2055 NEW POT CYCLE ERROR
057	A6.0(D124.0)	2056
058	A7.1(D124.1)	2057 HYD. OIL CONFIRM CHECK ERROR
059	A7.2(D124.2)	2058 MAINTENANCE MODE ON
060	A7.3(D124.3)	2059 TOOL POT EXIST AT M/Z SIDE COMMAND
061	A7.4(D124.4)	2060 T COMMAND OVER
062	A7.5(D124.5)	2061 APC L/S CHECK ERROR
063	A7.6(D124.6)	2062 TOOL POT SWING MAGAZINE SIDE L/S CHECK ERROR
064	A7.7(D124.7)	2063 T CYCLE OVER
065	A8.0(D125.0)	2064 PALLET CONTACT ERROR
066	A8.1(D125.1)	2065 EXTERNAL CHIP CONVEYOR OVERLOAD
067	A8.2(D125.2)	2066 RIGID TAPPING COMMAND ERROR
068	A8.3(D125.3)	2067 LUB. PRESSURE CHECK ERROR AT LUB. PUMP OFF
069	A8.4(D125.4)	2068 B-AXIS INDEX POSITION ERROR
070	A8.5(D125.5)	2069 CE(OPERATOR) DOOR OPEN ERROR
071	A8.6(D125.6)	2070 CE(ATC) DOOR OPEN ERROR
072	A8.7(D125.7)	2071 CE(APC) DOOR OPEN ERROR
073	A9.0(D126.0)	2072 MANUAL OPERATOR DOOR OPEN ERROR(NOT CE)
074	A9.1(D126.1)	2073 MANUAL MAGAZINE INDEX ERROR
075	A9.2(D126.2)	2074 MAINTENANCE M-CODE COMMAND ERROR
076	A9.3(D126.3)	2075 TOOL LIFE END ERROR
077	A9.4(D126.4)	2076 TABLE/PALLET MAINTENANCE M-CODE ERROR
078	A9.5(D126.5)	2077 MAGAZINE ALARM NO.
079	A9.6(D126.6)	2078 MAGAZINE POWER OFF REQUIRE
080	A9.7(D126.7)	2079 BETA-AMP ADJUST MODE
081	A10.0(D127.0)	2080 MAGAZINE ENCODER BATTERY ALARM
082	A10.1(D127.1)	2081 ATC CAM UNIT INVERTER ALARM
083	A10.2(D127.2)	2082
084	A10.3(D127.3)	2083 SPINDLE COOLING UNIT ALARM
085	A10.4(D127.4)	2084 CUTTING TOOL OVERLOAD ALARM
086	A10.5(D127.5)	2085 CUTTING MONITOR NOT READY ALARM
087	A10.6(D127.6)	2086 CUTTING TOOL LIFE END ALARM
088	A10.7(D127.7)	2087 NO OPTION ERROR
089	A11.0(D128.0)	2088 SPINDLE HEAD TEMPERATURE SENSOR OPENED
090	A11.1(D128.1)	2089 BED TEMPERATURE SENSOR OPENED
091	A11.2(D128.2)	2090 TEMPERATURE COMPENSATION SENSOR ALARM
092	A11.3(D128.3)	2091 SP.HEAD OVERHEAT ALARM
093	A12.0(D129.0)	2096 MIST COLLECTOR OVERLOAD ALARM

R255,3

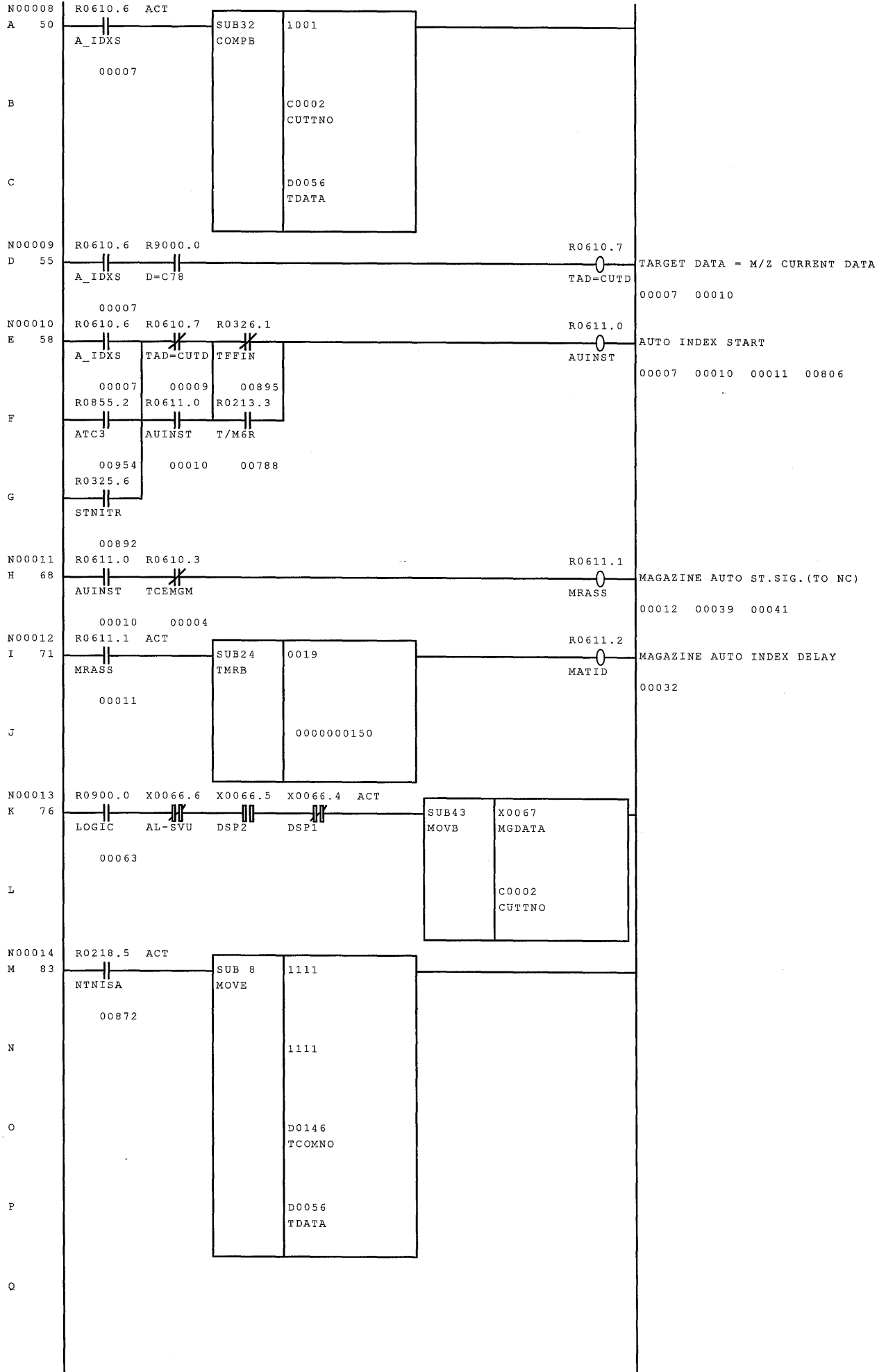


ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT	CHANNEL 1
X0073	3	0	02	OC02I		
X0074	3	0	02	OC02I		
X0075	3	0	02	OC02I		
X0076	3	0	02	OC02I		
X0077	3	0	02	OC02I		
X0078	3	0	02	OC02I		
X0079	3	0	02	OC02I		
X0080						
X0081						
X0082						
X0083						
X0084						
X0085						
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X0089						
X0090						
X0091						
X0092						
X0093						
X0094						
X0095						
X0096						
X0097						
X0098						
X0099						
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X0101	0	0	01	/6		
X0102	0	0	01	/6		
X0103	0	0	01	/6		
X0104	0	0	01	/6		
X0105	0	0	01	/6		
X0106	1	0	01	OC02I		
X0107	1	0	01	OC02I		
X0108	1	0	01	OC02I		
X0109	1	0	01	OC02I		
X0110	1	0	01	OC02I		
X0111	1	0	01	OC02I		
X0112	1	0	01	OC02I		
X0113	1	0	01	OC02I		
X0114	1	0	01	OC02I		
X0115	1	0	01	OC02I		
X0116	1	0	01	OC02I		
X0117	1	0	01	OC02I		
X0118	1	0	01	OC02I		
X0119	1	0	01	OC02I		
X0120	1	0	01	OC02I		
X0121	1	0	01	OC02I		
X0122						
X0123						
X0124						
X0125						
X0126						
X0127						

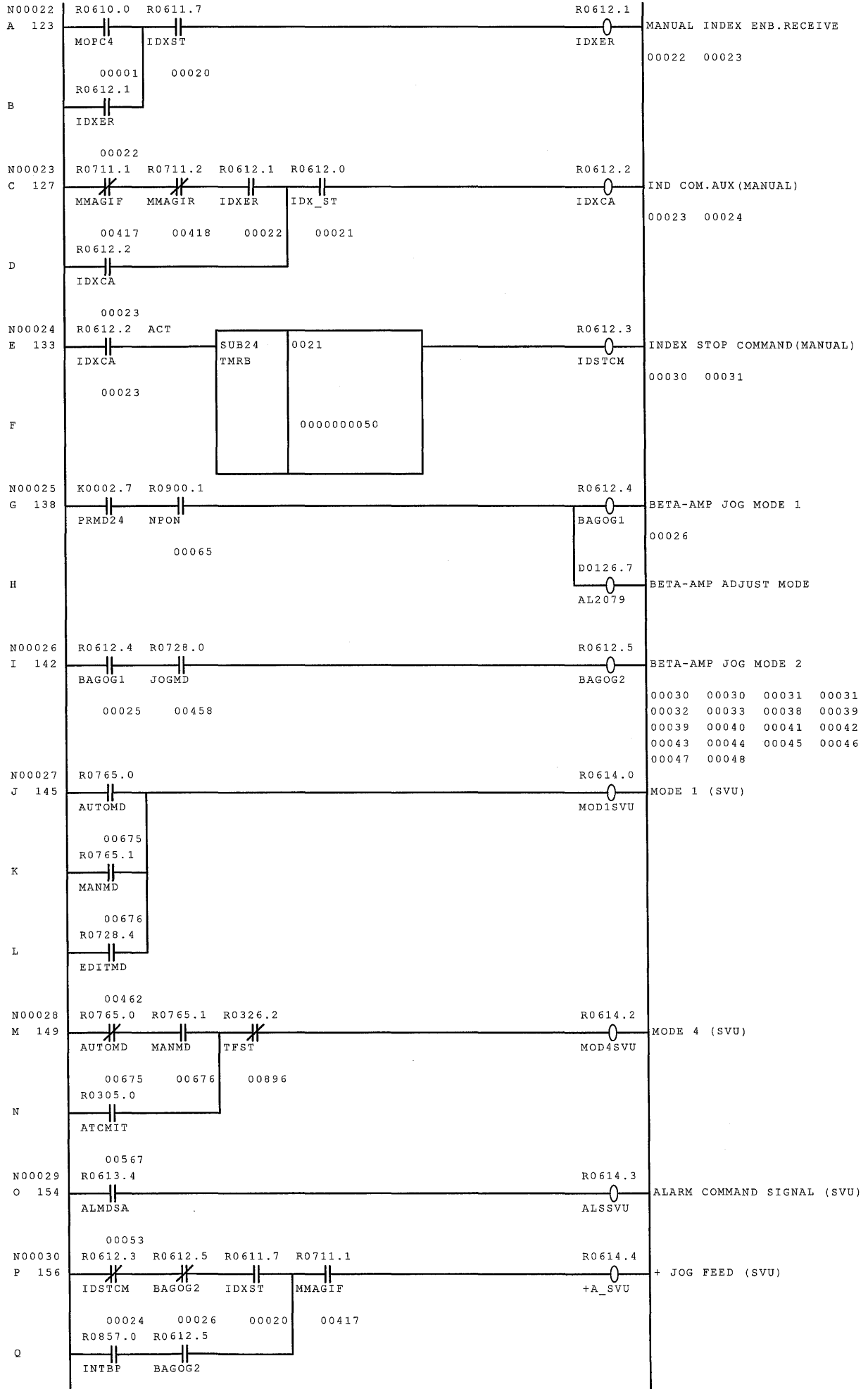
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Y0073	3	0	02	OC020		
Y0074	3	0	02	OC020		
Y0075	3	0	02	OC020		
Y0076	3	0	02	OC020		
Y0077	3	0	02	OC020		
Y0078	3	0	02	OC020		
Y0079	3	0	02	OC020		
Y0080						
Y0081						
Y0082						
Y0083						
Y0084						
Y0085						
Y0086						
Y0087						
Y0088						
Y0089						
Y0090						
Y0091						
Y0092						
Y0093						
Y0094						
Y0095						
Y0096						
Y0097						
Y0098						
Y0099						
Y0100	0	0	01	/4		
Y0101	0	0	01	/4		
Y0102	0	0	01	/4		
Y0103	0	0	01	/4		
Y0104	1	0	01	/4		
Y0105	1	0	01	/4		
Y0106	1	0	01	/4		
Y0107	1	0	01	/4		
Y0108						
Y0109						
Y0110						
Y0111						
Y0112						
Y0113						
Y0114						
Y0115						
Y0116						
Y0117						
Y0118						
Y0119						
Y0120						
Y0121						
Y0122						
Y0123						
Y0124						
Y0125						
Y0126						
Y0127						

NO.	ADDRESS	MESSAGE
0075	A009.2	2074 MAINTENANCE M-CODE COMMAND ERROR
0076	A009.3	2075 TOOL LIFE END ERROR
0077	A009.4	2076 TABLE/PALLET MAINTENANCE M-CODE ERROR
0078	A009.5	2077 MAGAZINE ALARM NO.
0079	A009.6	2078 MAGAZINE POWER OFF REQUIRE
0080	A009.7	2079 BETA-AMP ADJUST MODE
0081	A010.0	2080 MAGAZINE ENCODER BATTERY ALARM
0082	A010.1	2081 ATC CAM UNIT INVERTER ALARM
0083	A010.2	2082
0084	A010.3	2083 SPINDLE COOLING UNIT ALARM
0085	A010.4	2084 CUTTING TOOL OVERLOAD ALARM
0086	A010.5	2085 CUTTING MONITOR NOT READY ALARM
0087	A010.6	2086 TOOL LIFE END ALARM
0088	A010.7	2087 NO OPTION ERROR
0089	A011.0	2088 SPINDLE HEAD TEMPERATURE SENSOR OPENED
0090	A011.1	2089 BED TEMPERATURE SENSOR OPENED
0091	A011.2	2090 TEMPERATURE COMPENSATION SENSOR ALARM
0092	A011.3	2091 SP.HEAD OVERHEAT ALARM
0093	A011.4	2092
0094	A011.5	2093
0095	A011.6	2094
0096	A011.7	2095

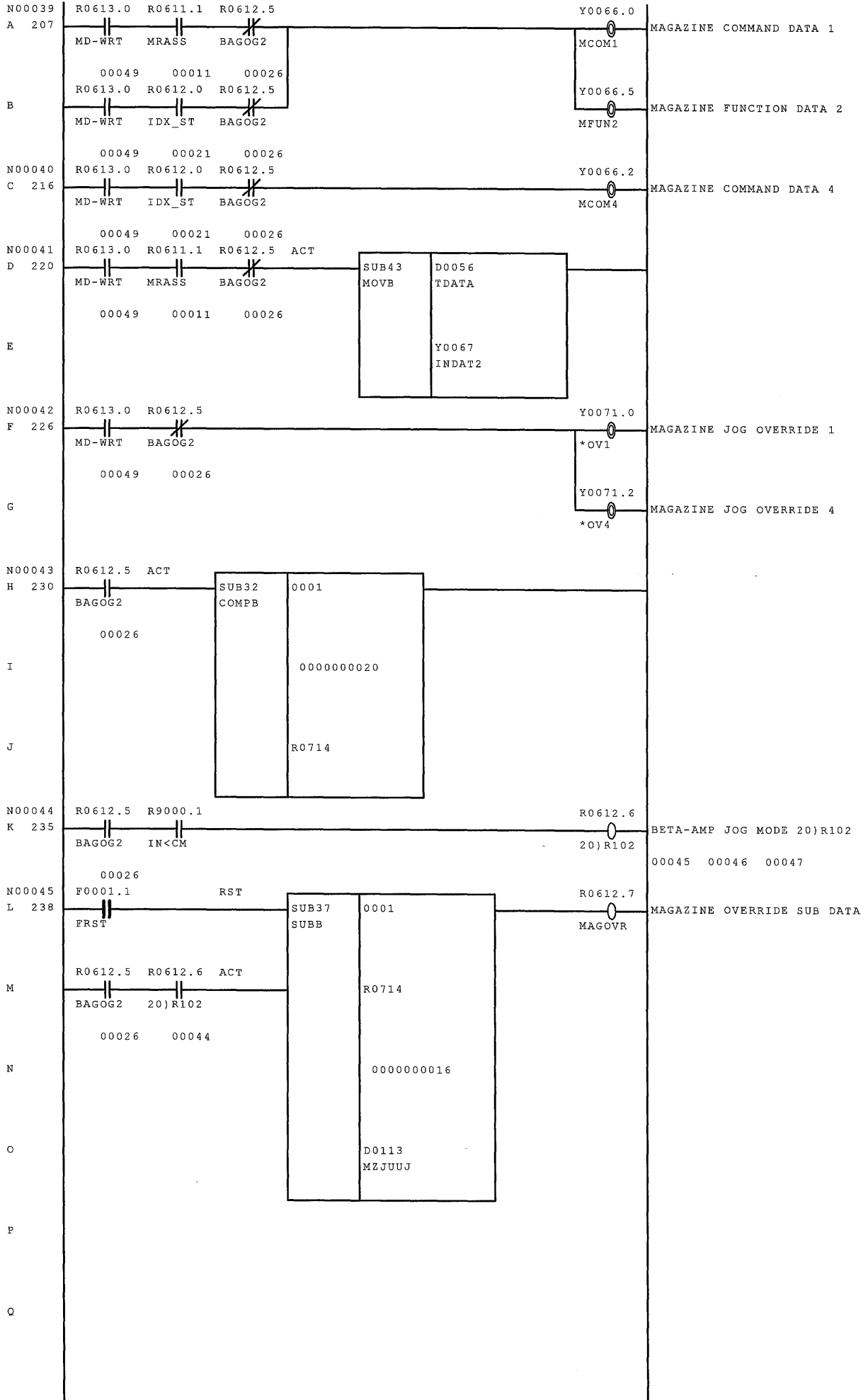
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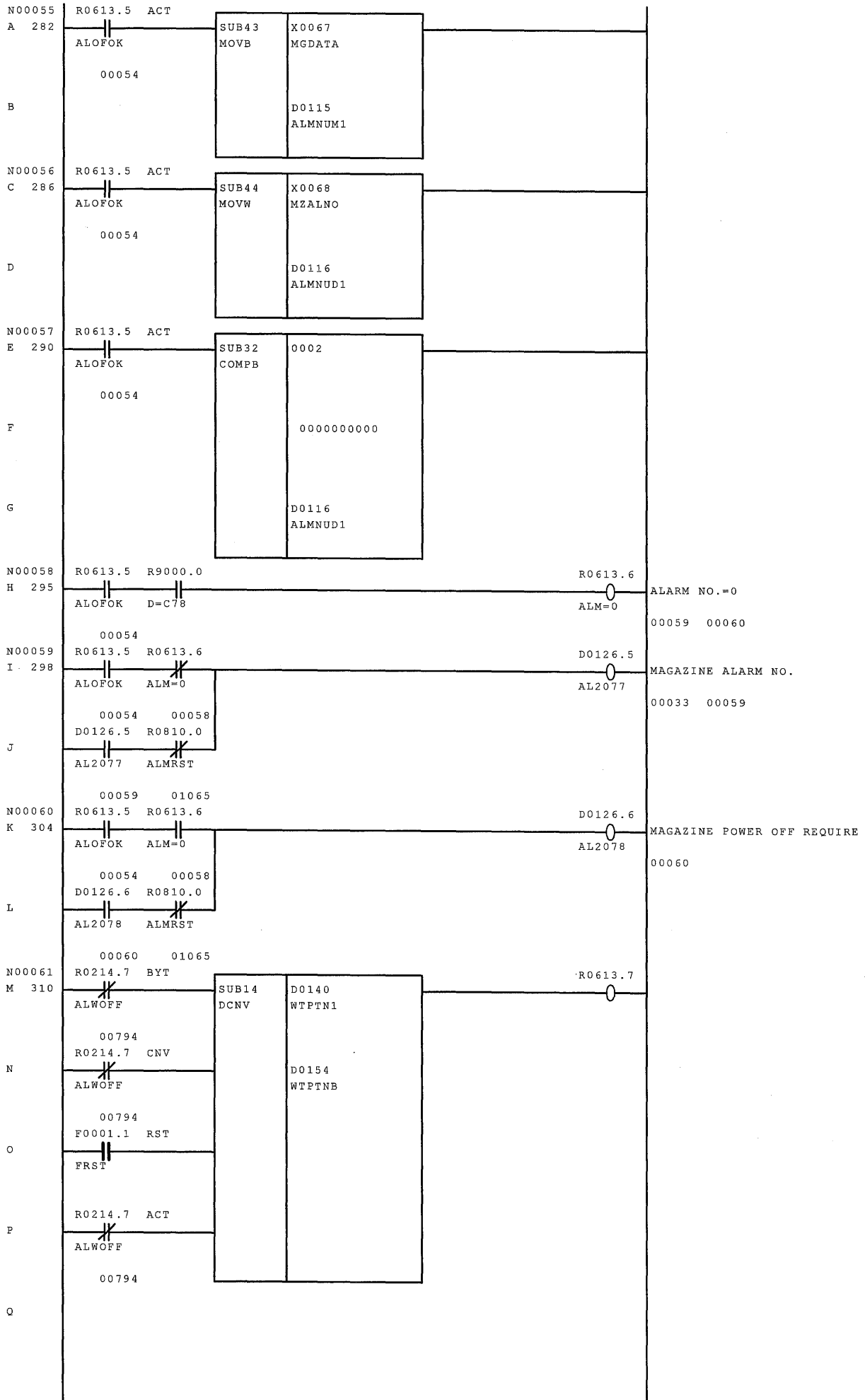
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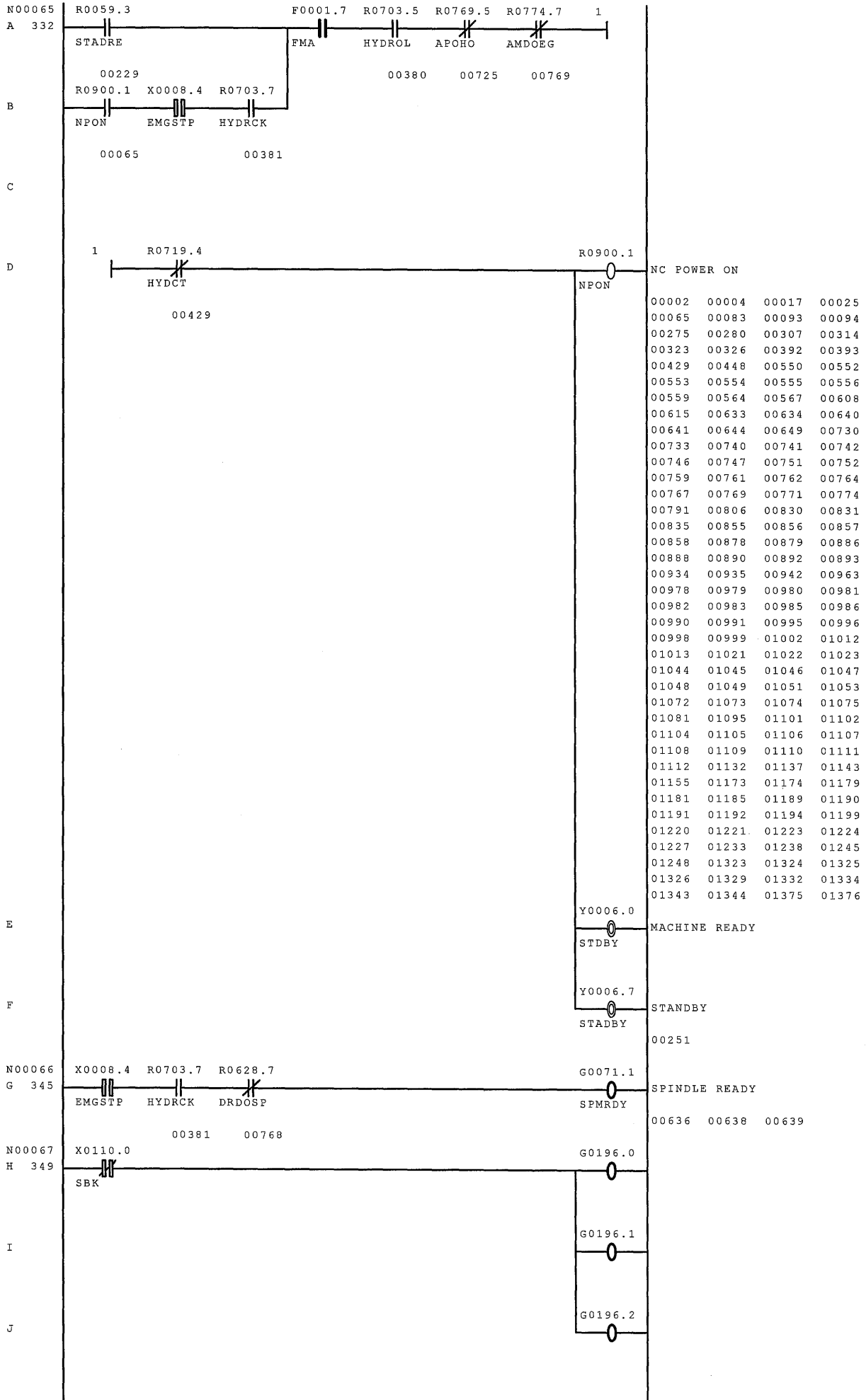
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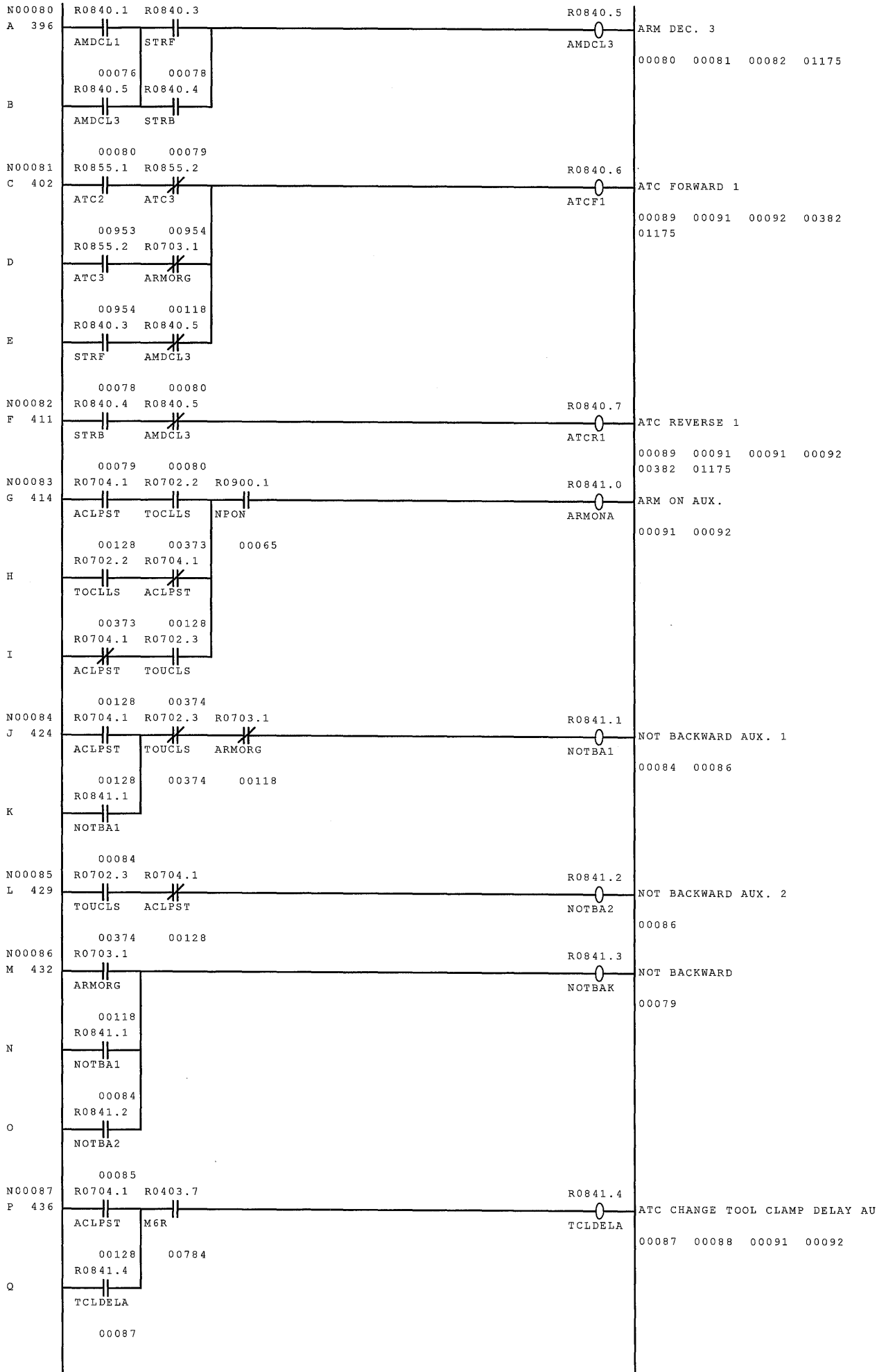
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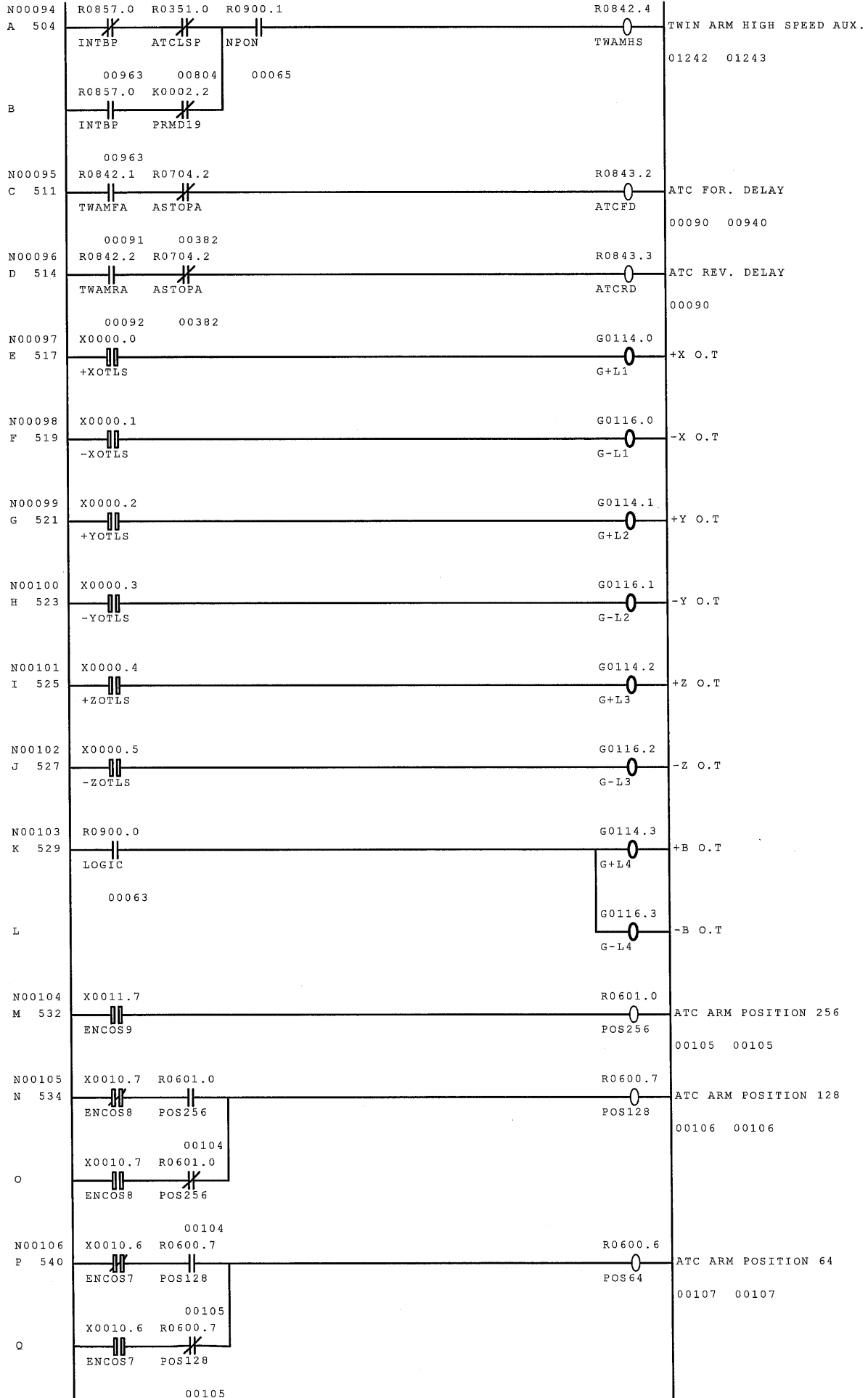
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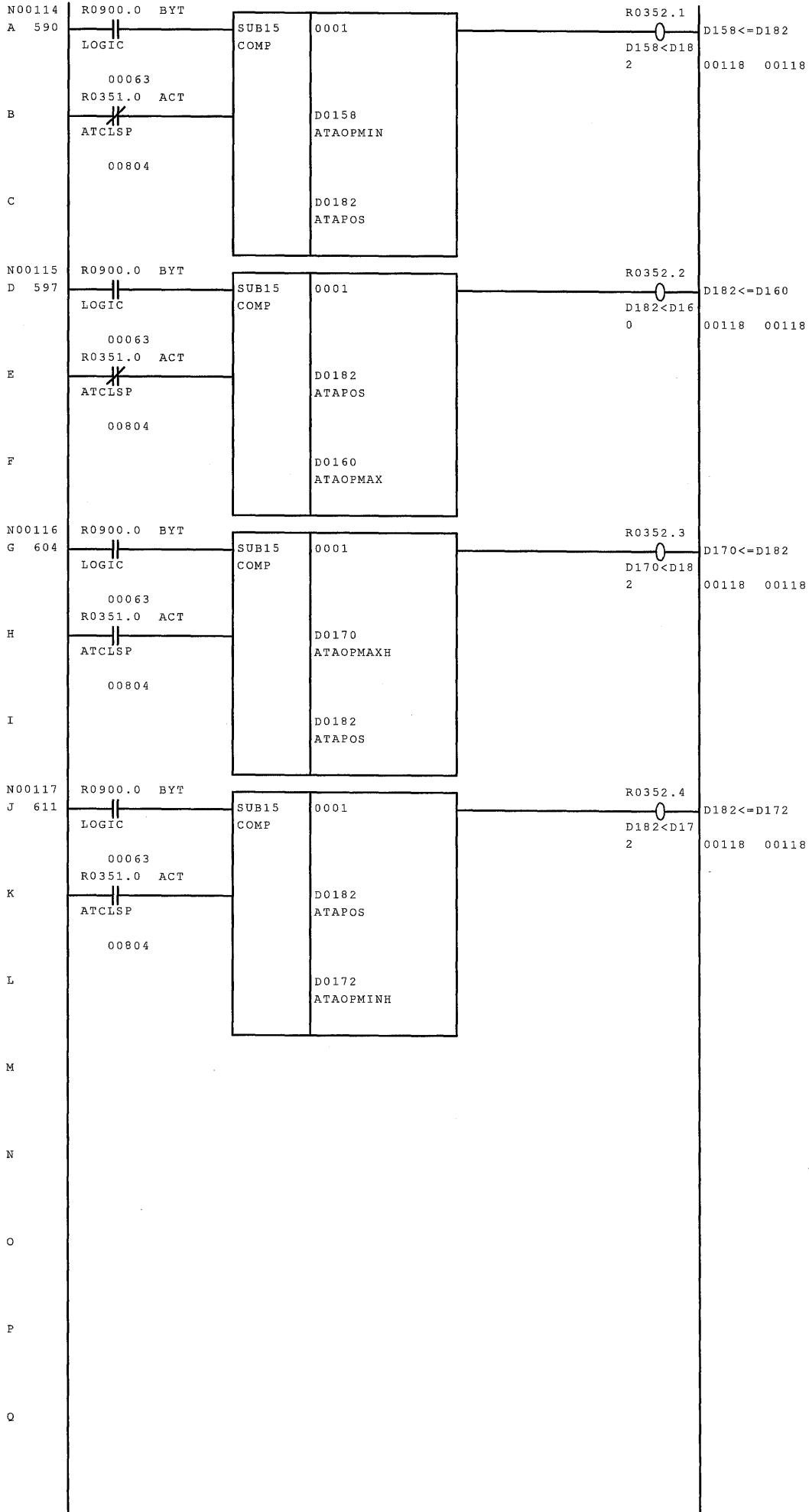
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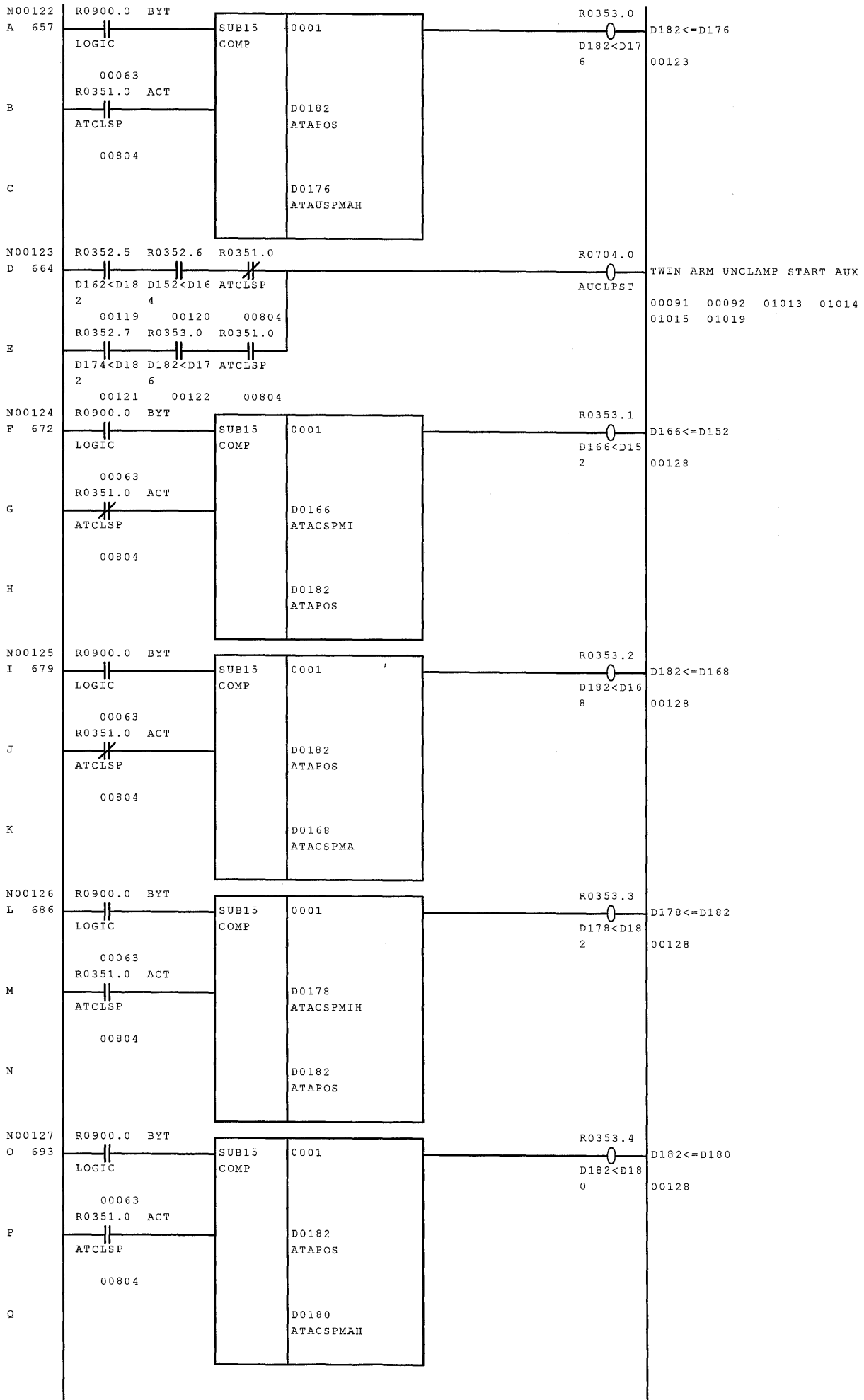
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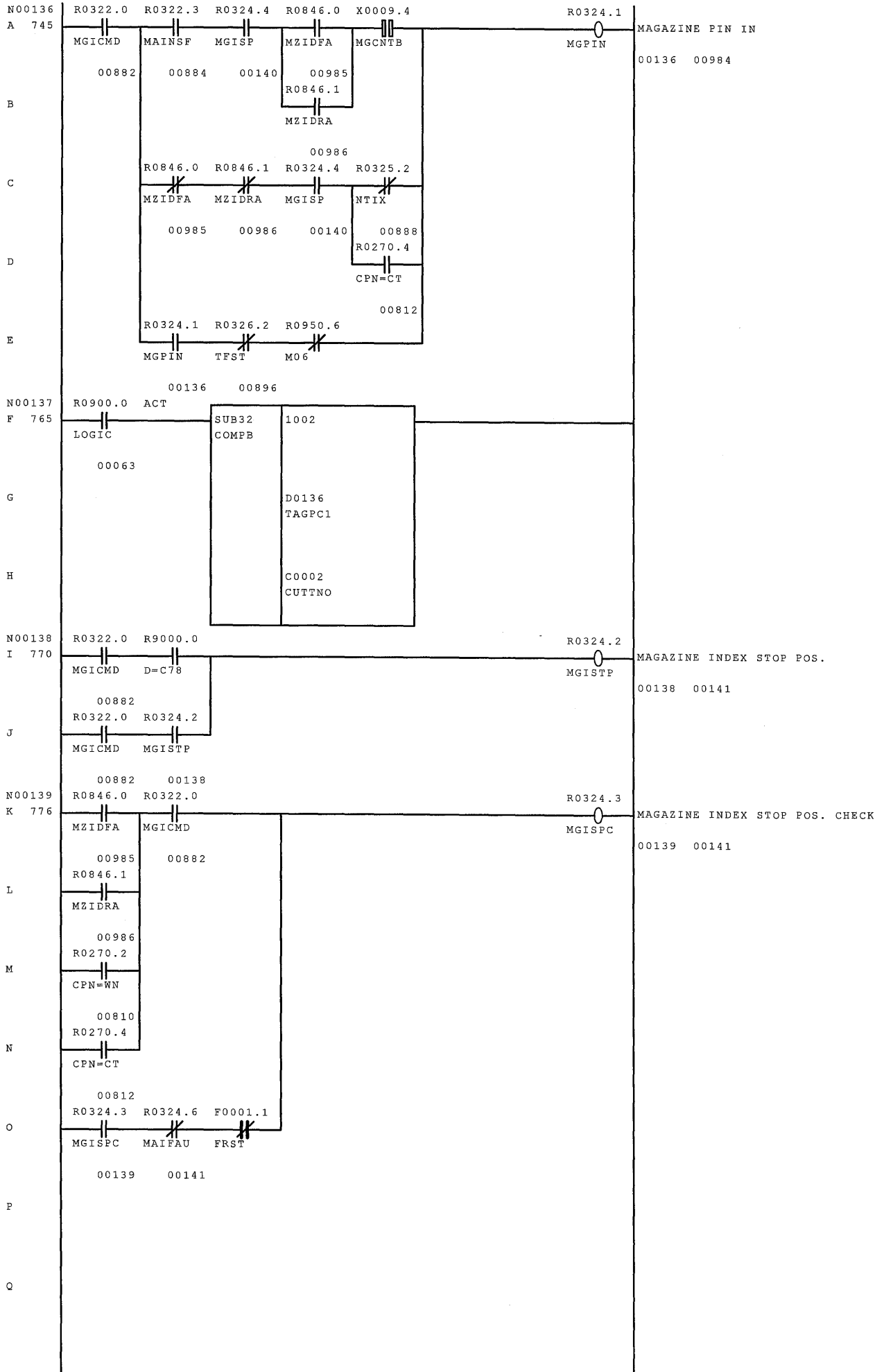
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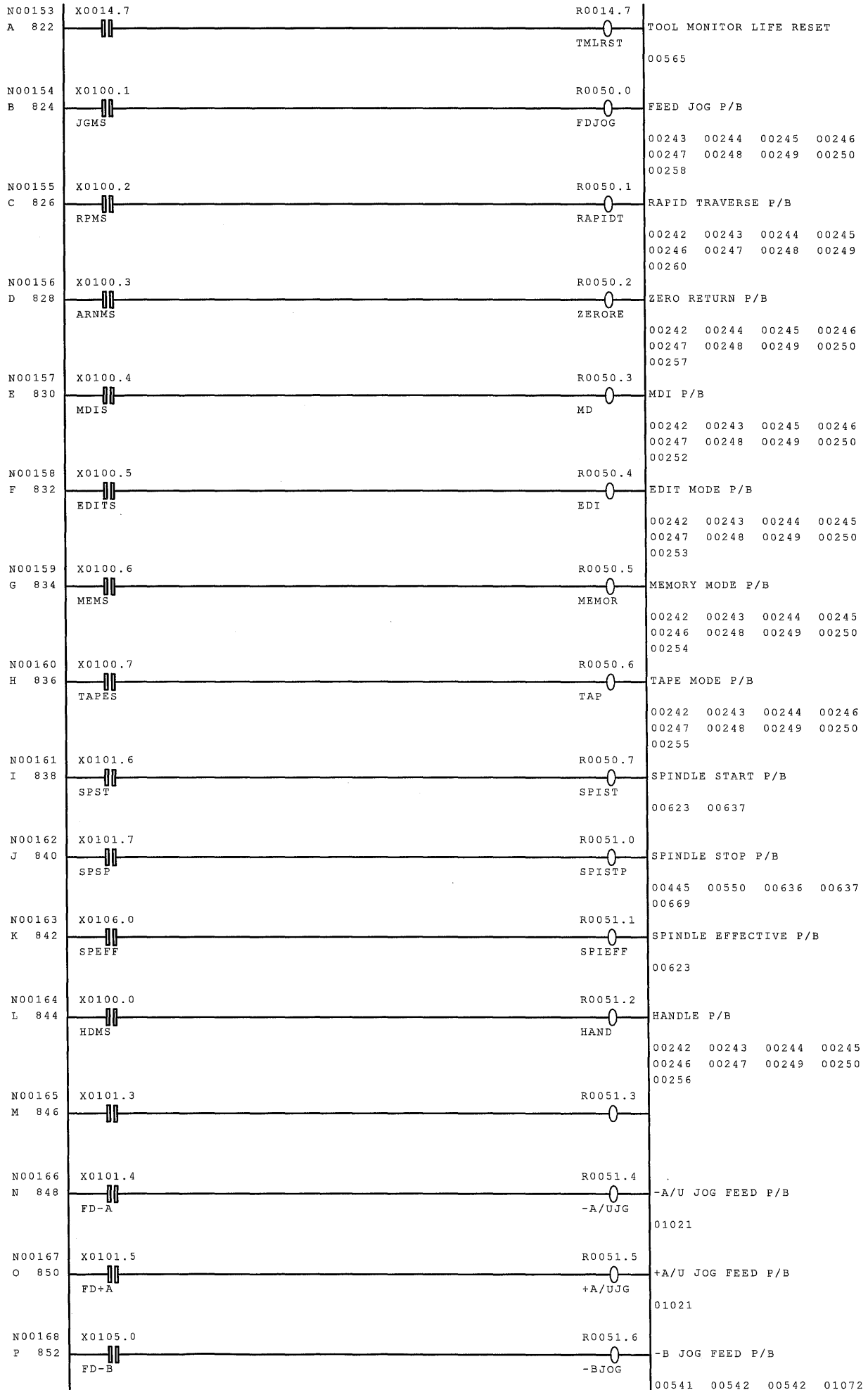
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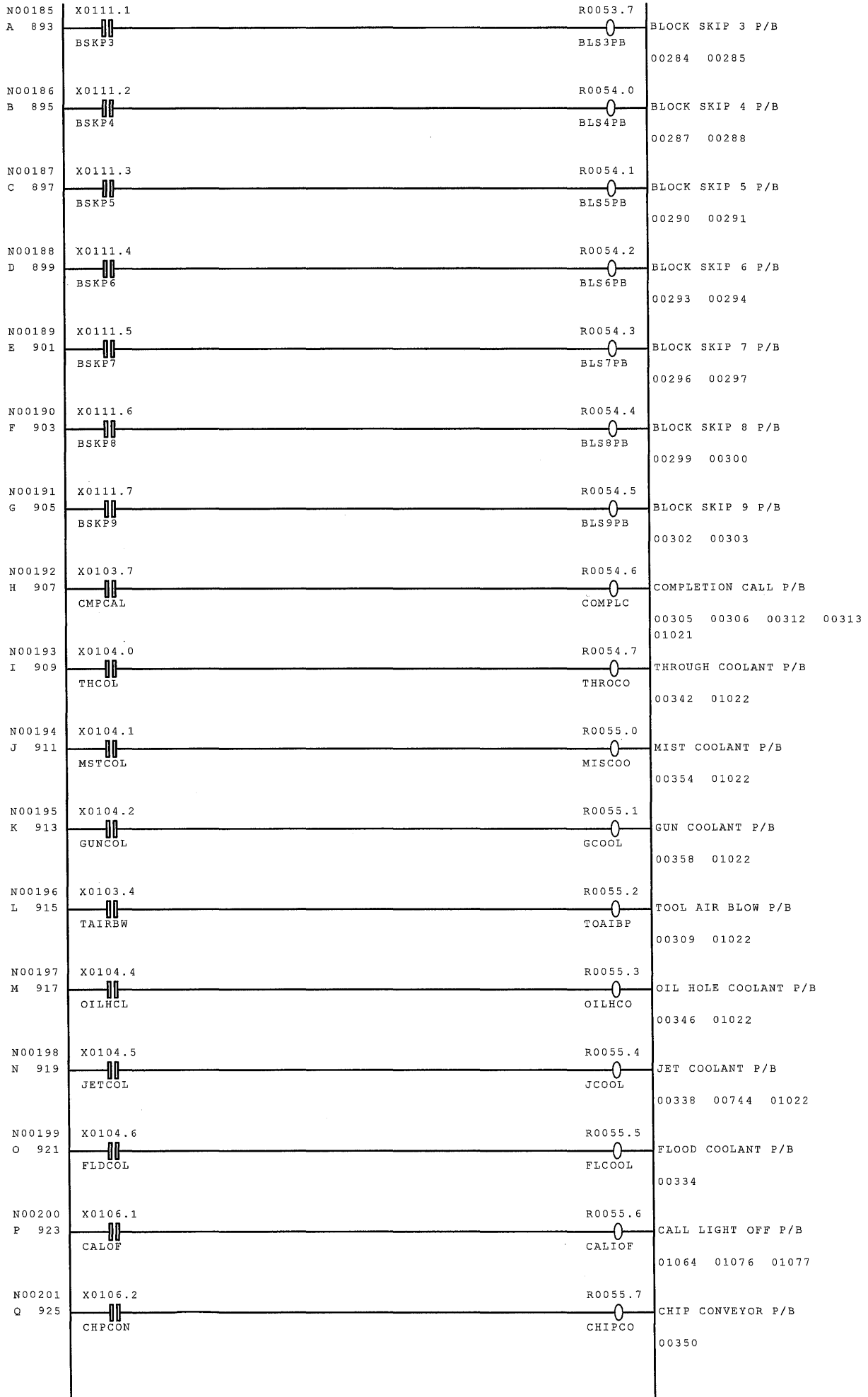
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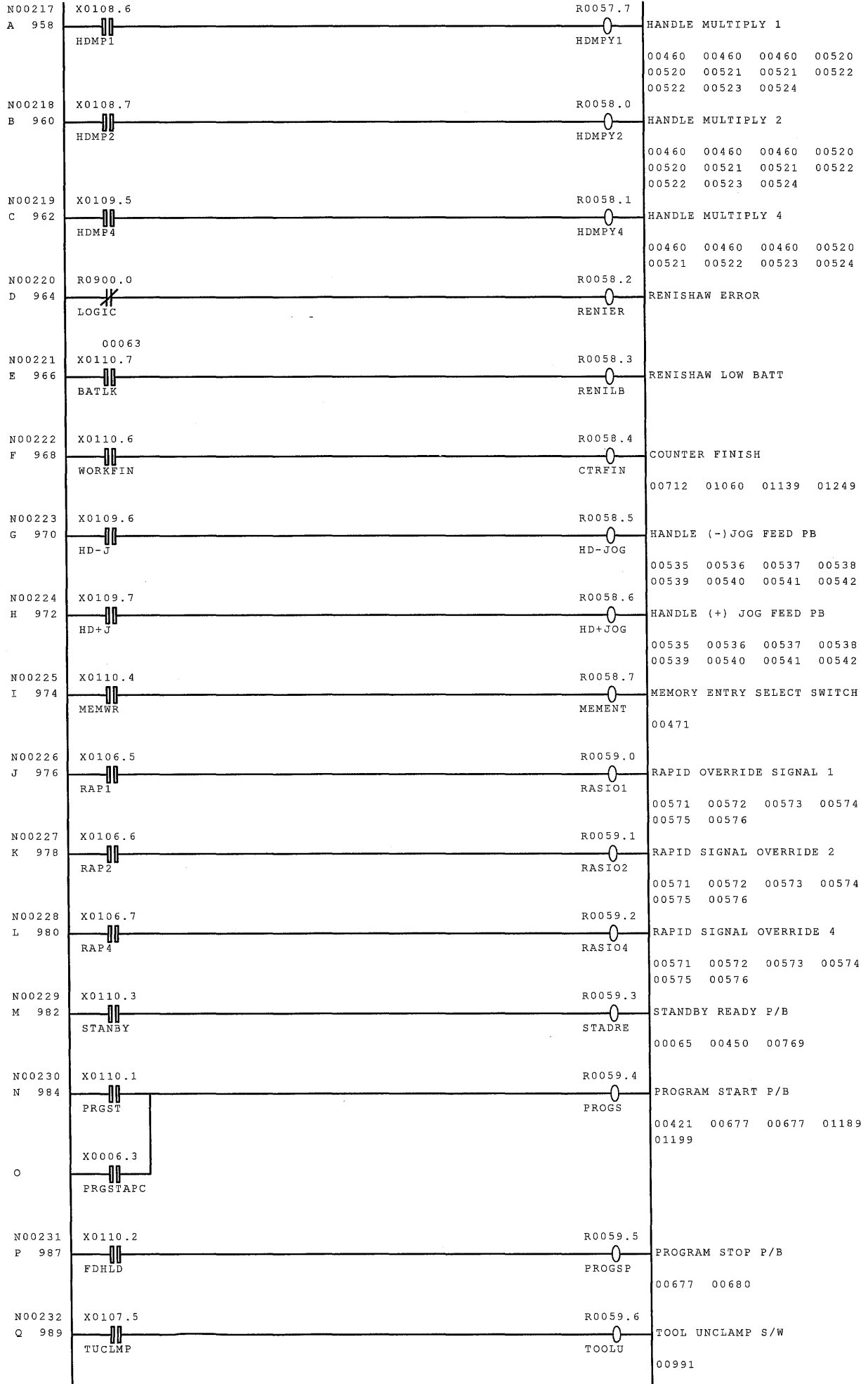
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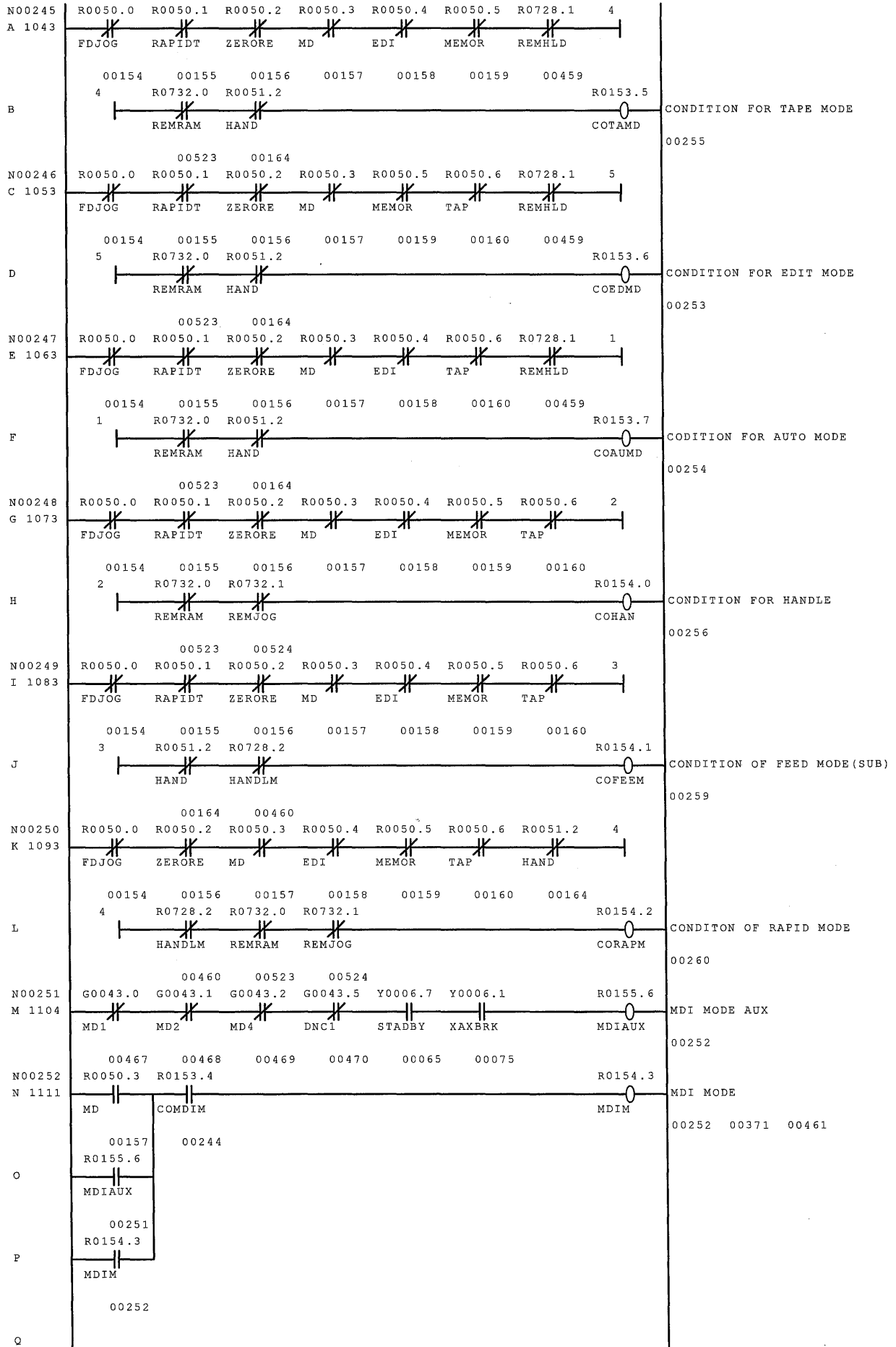
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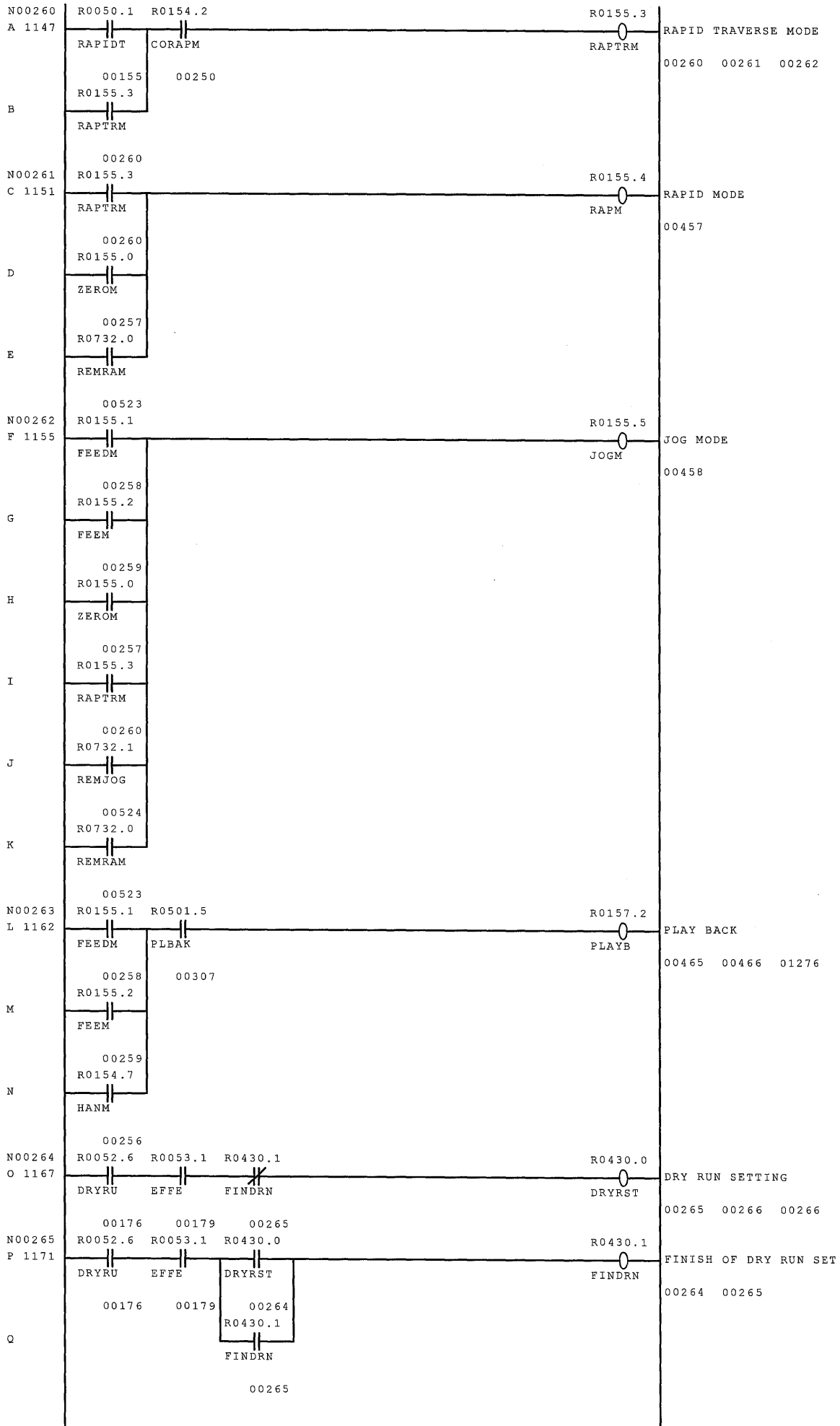
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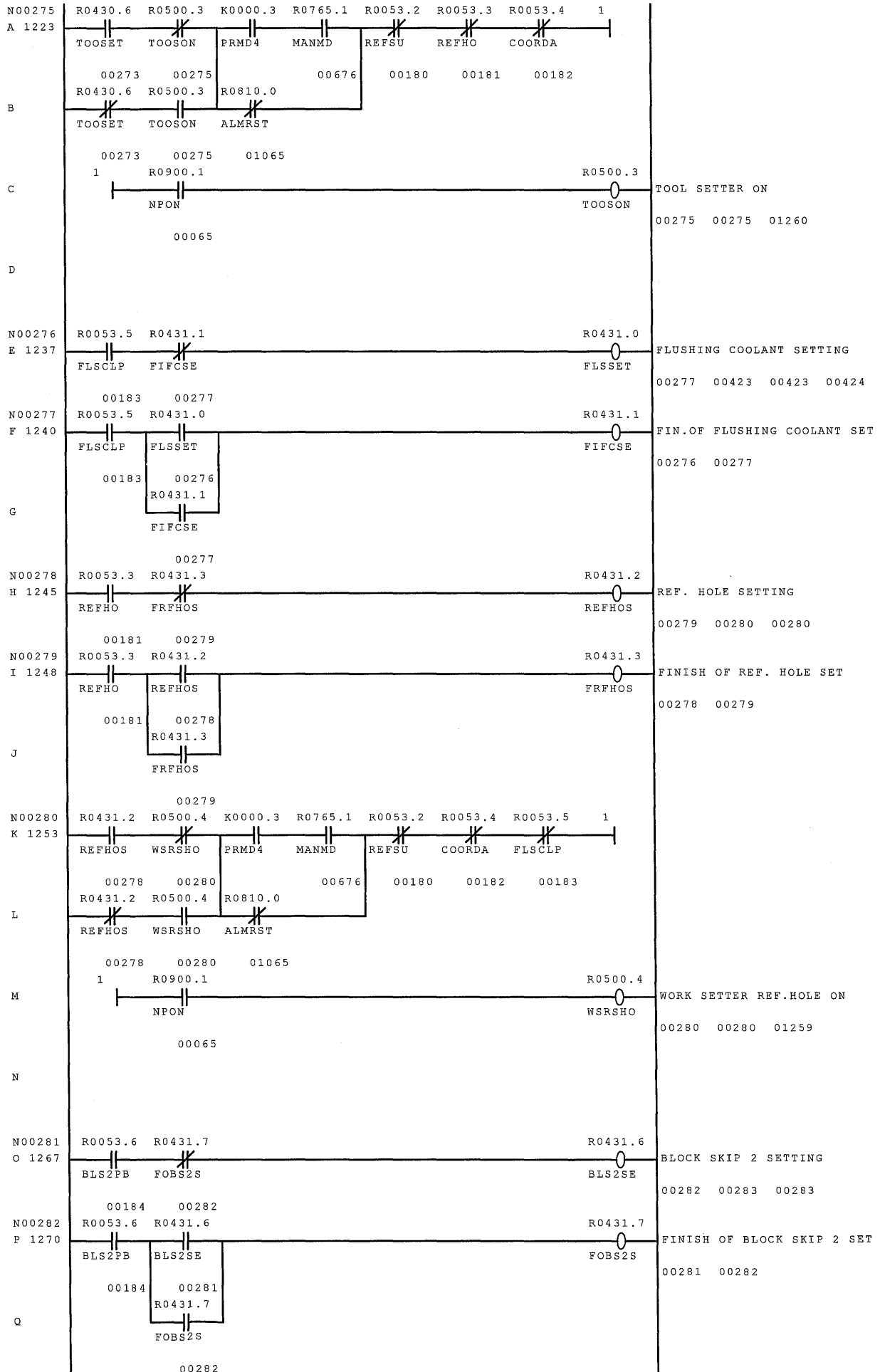
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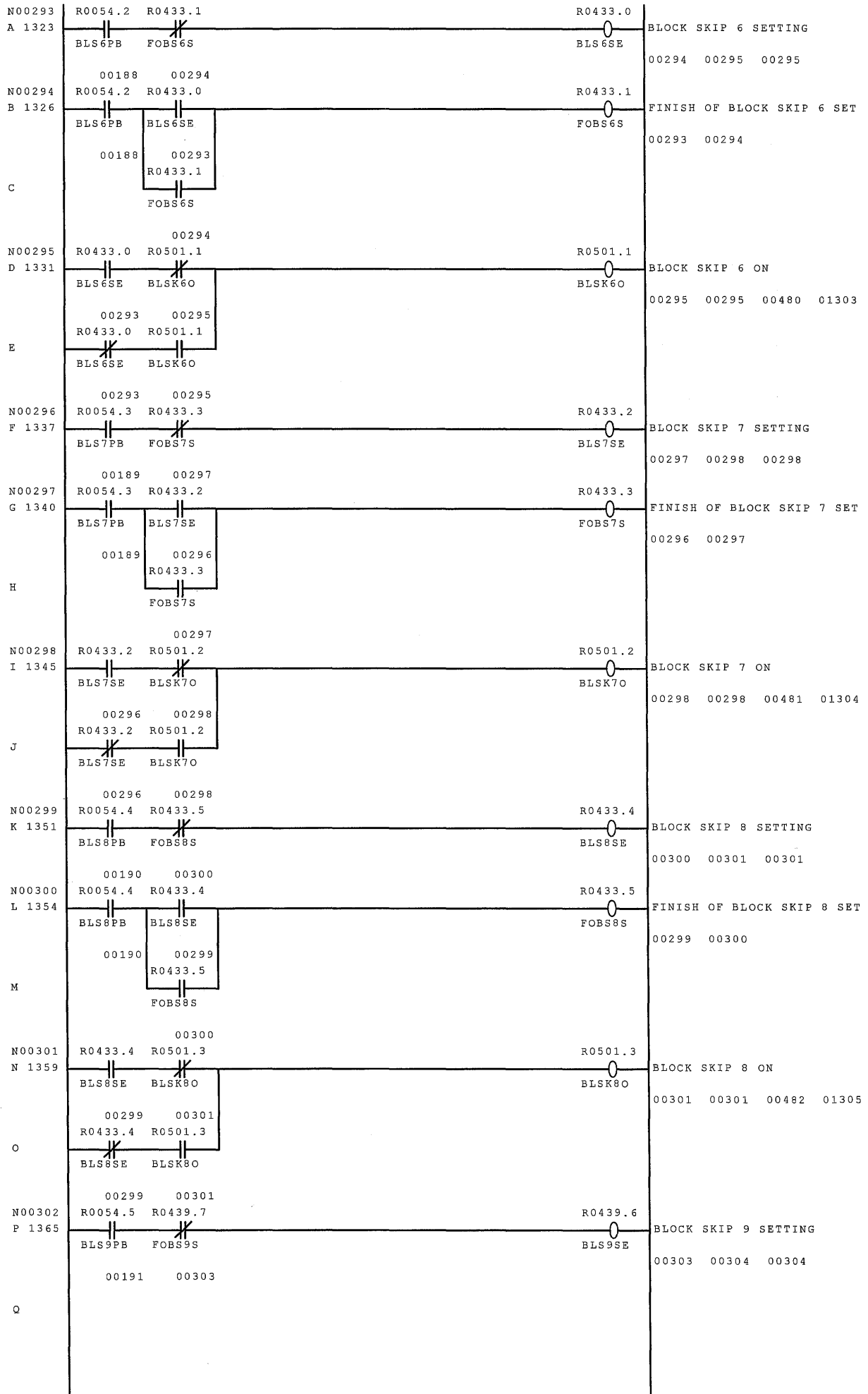
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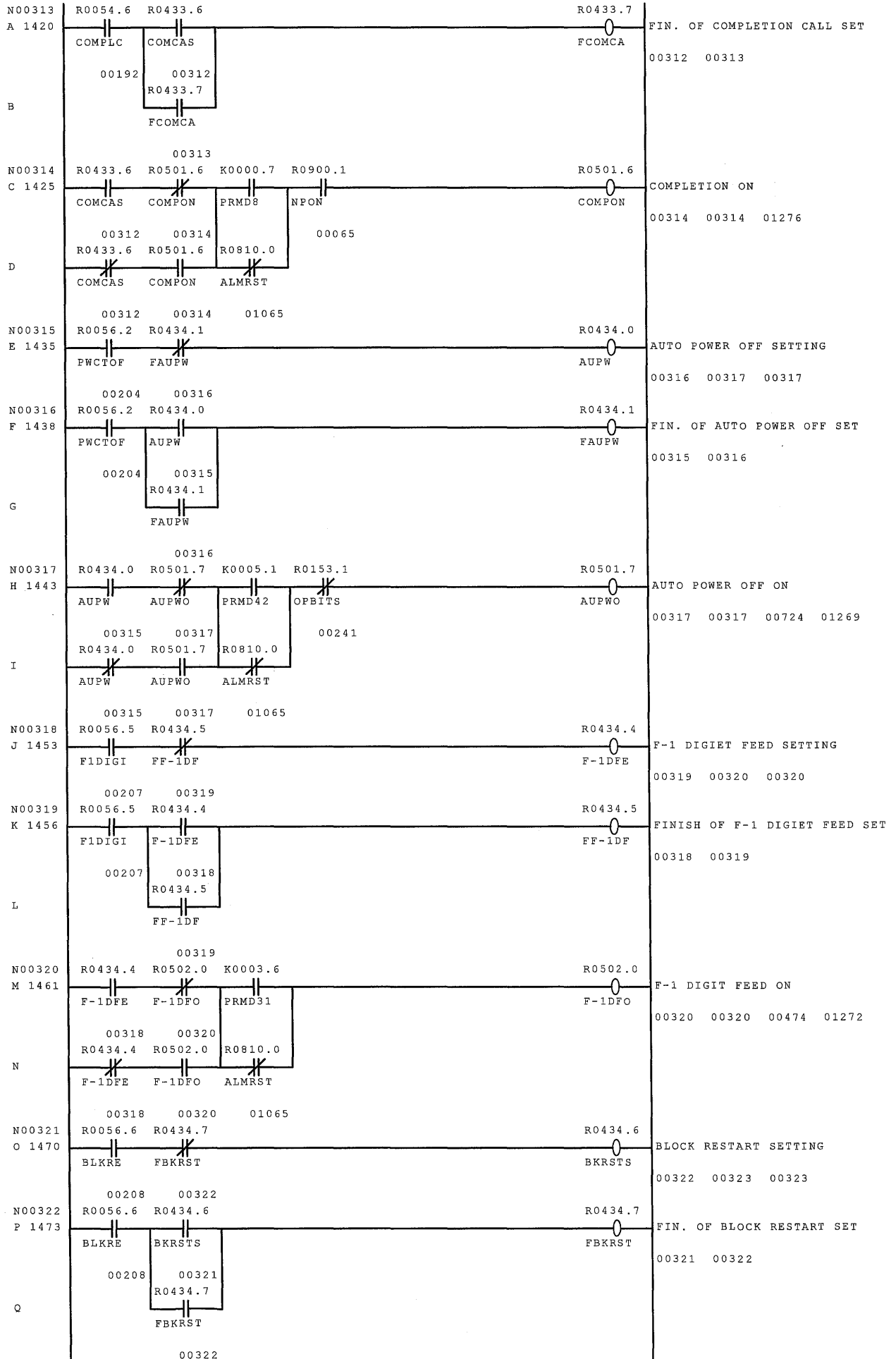
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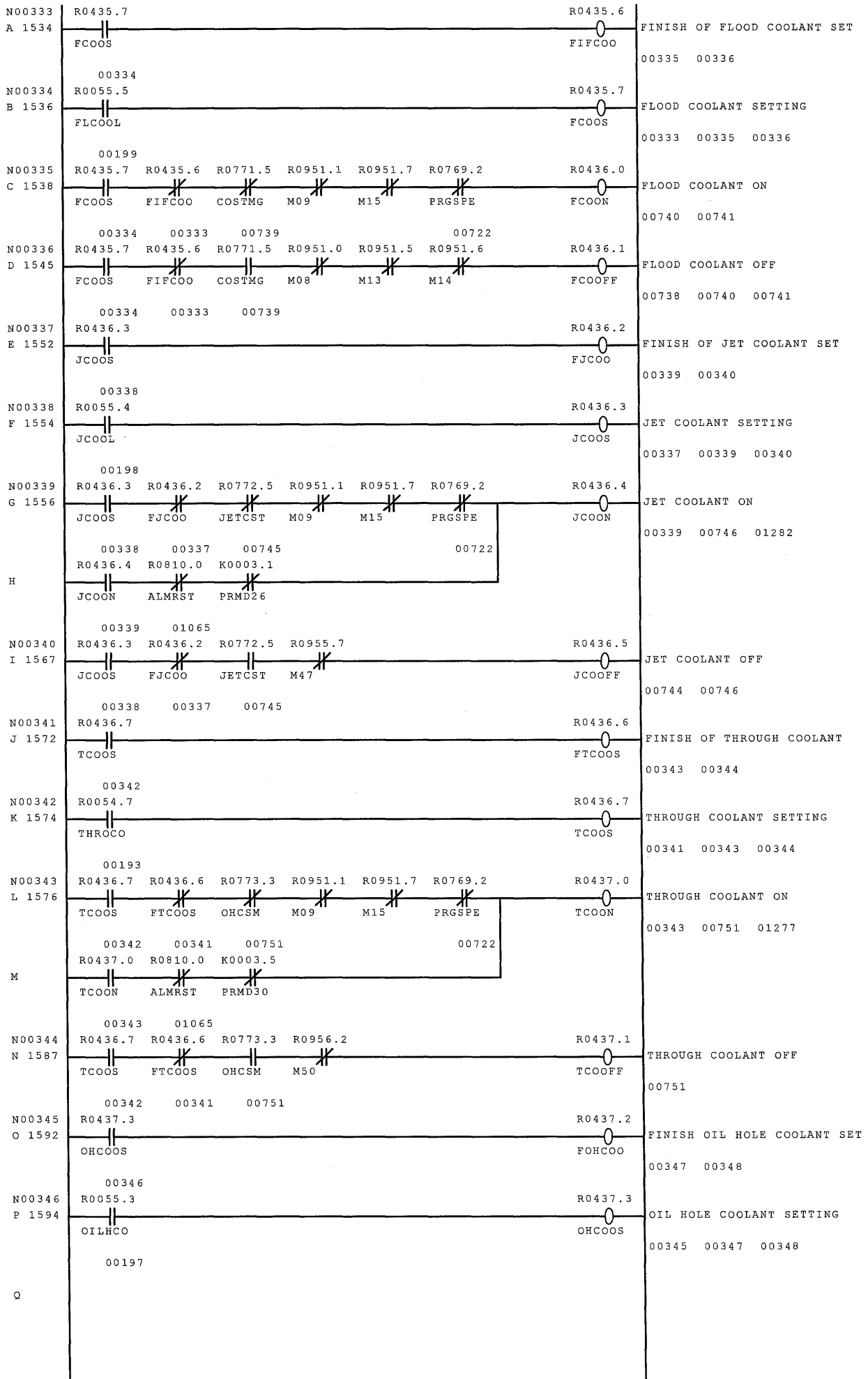
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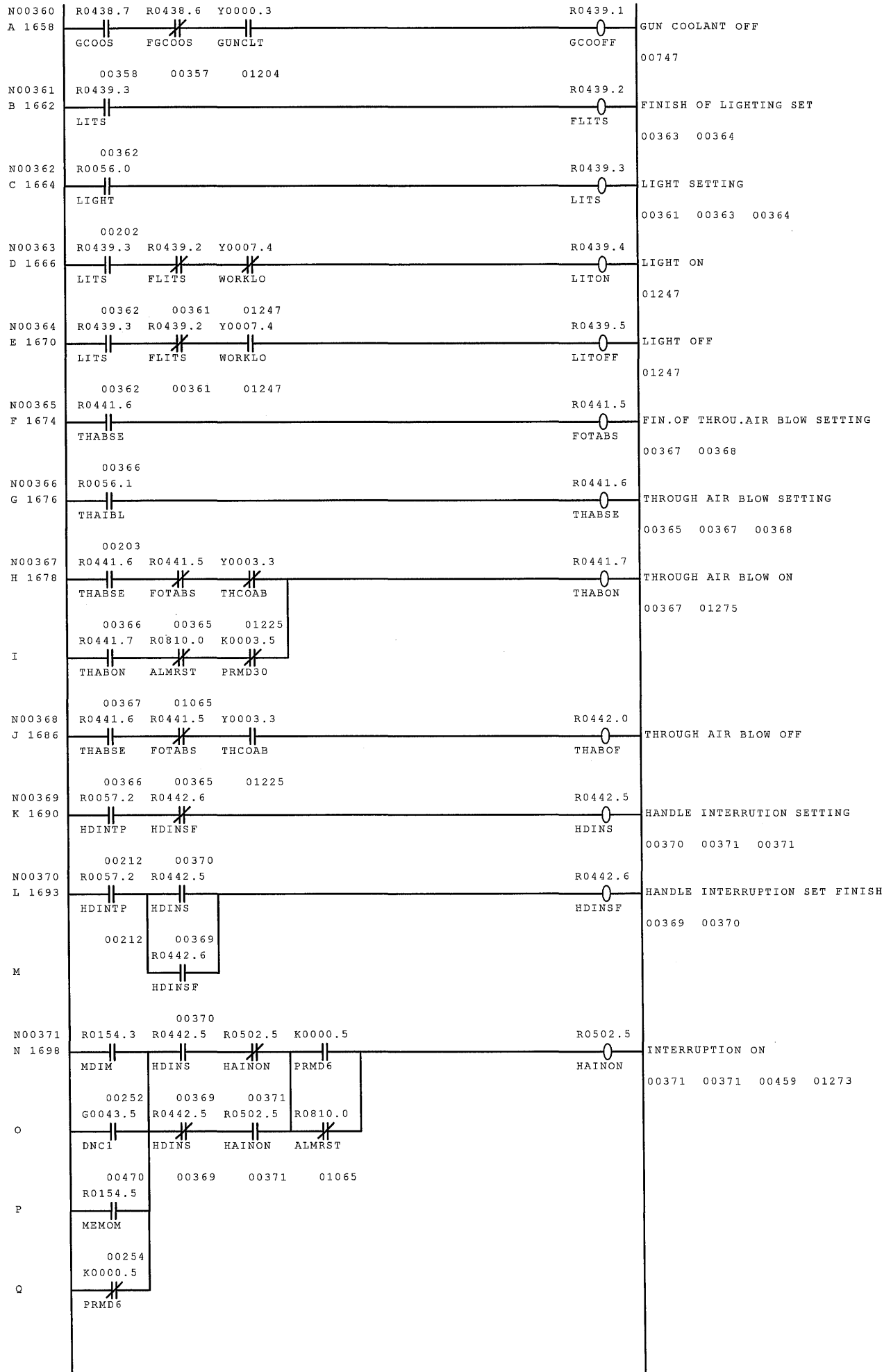
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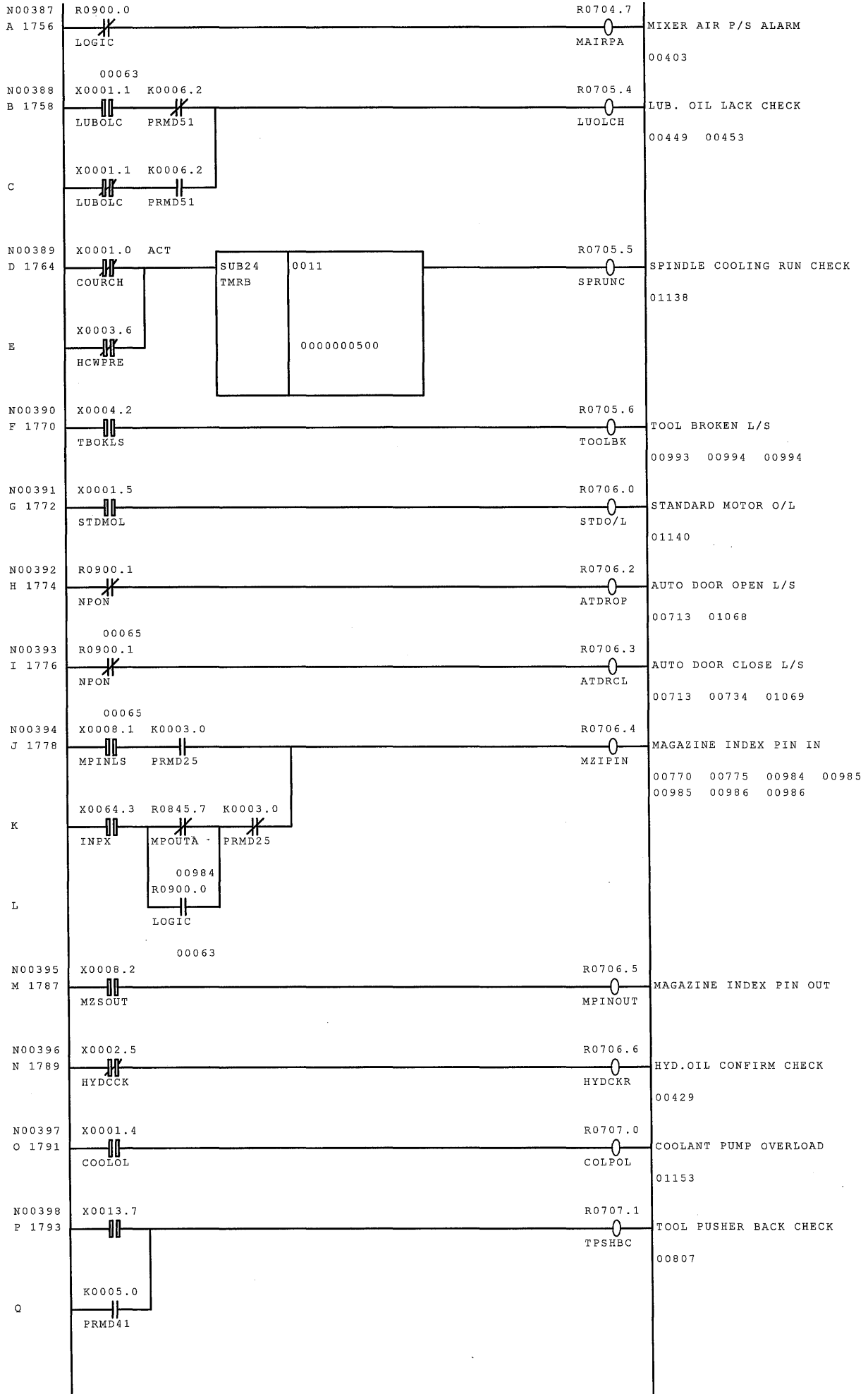
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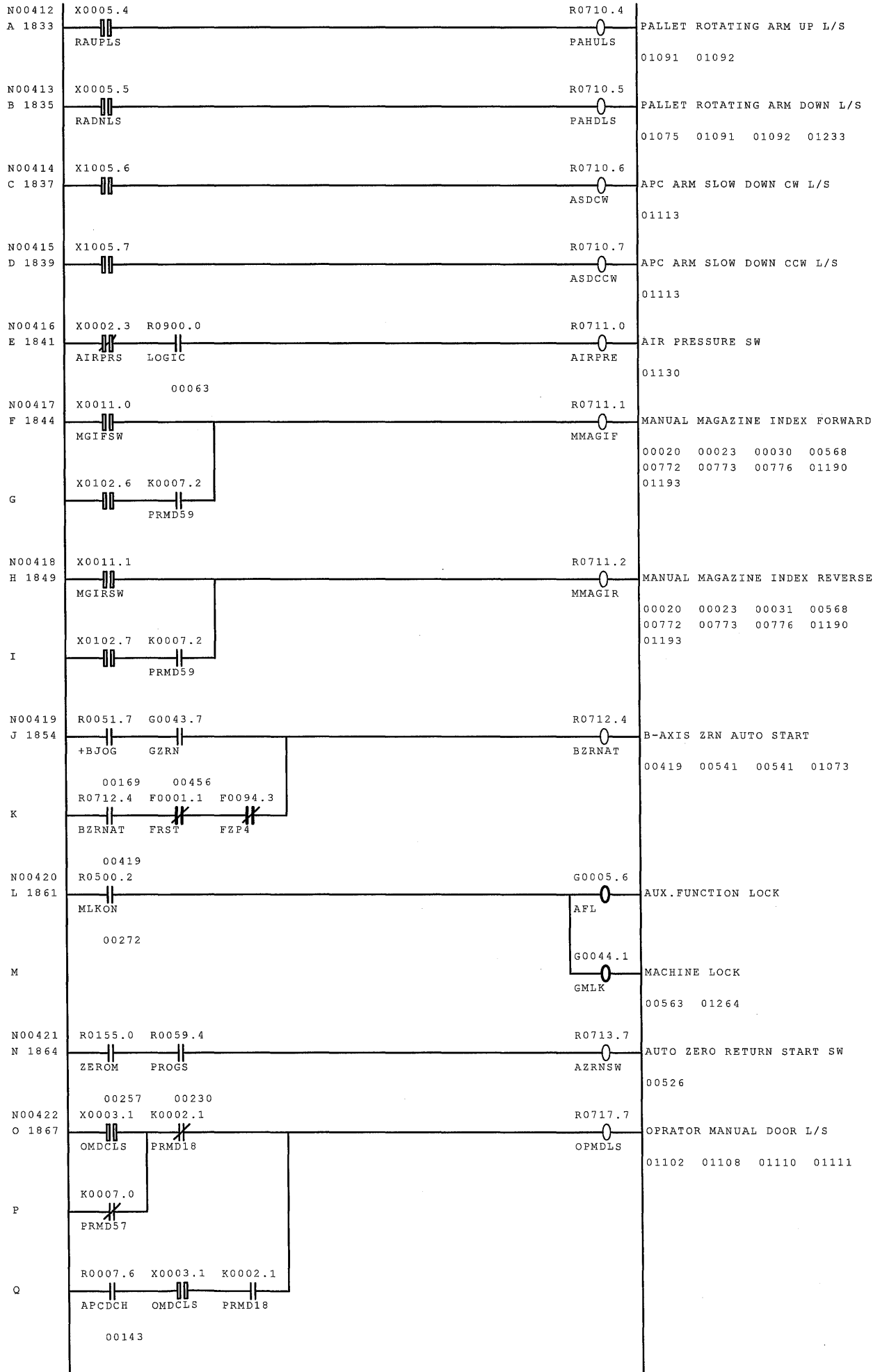
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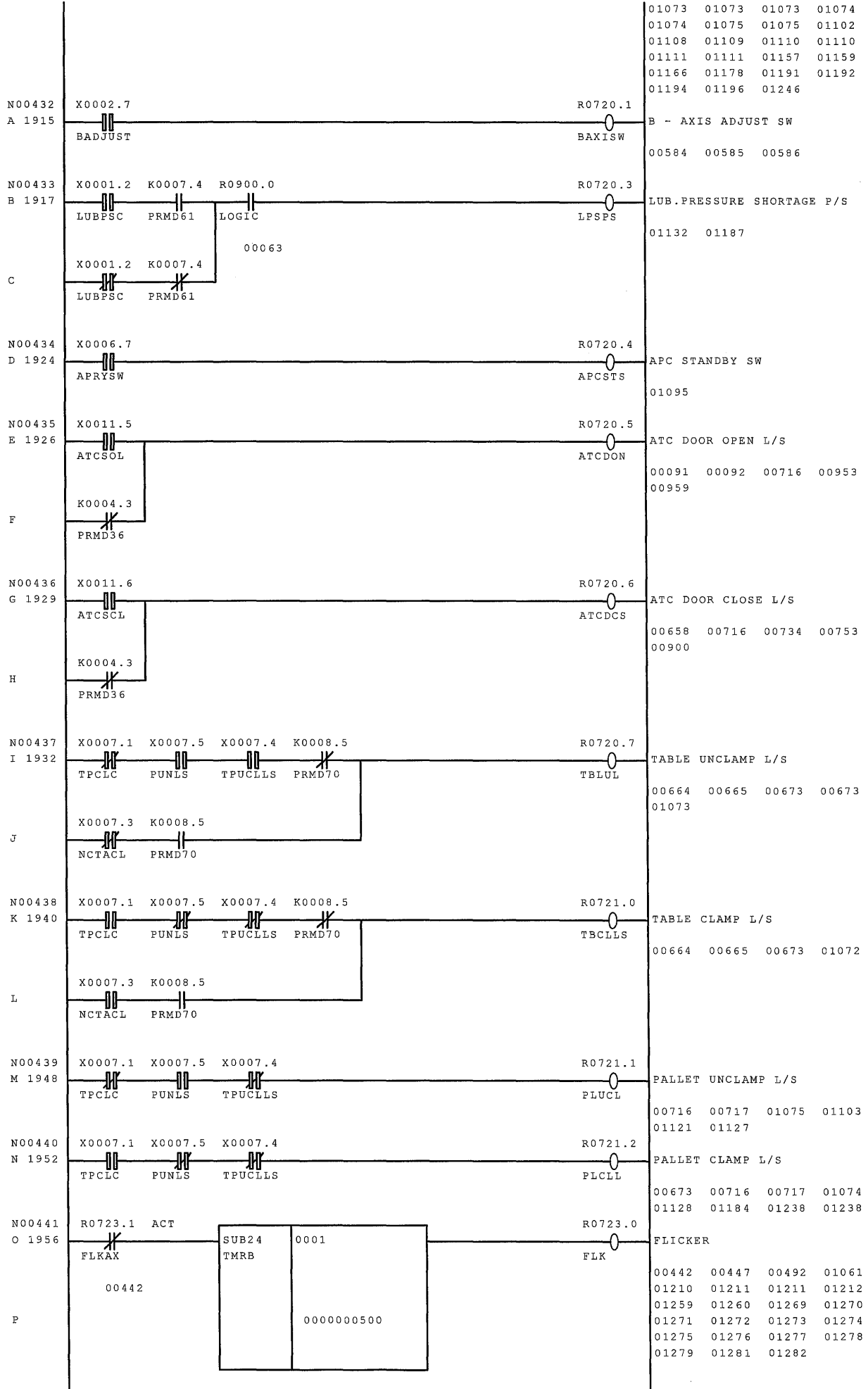
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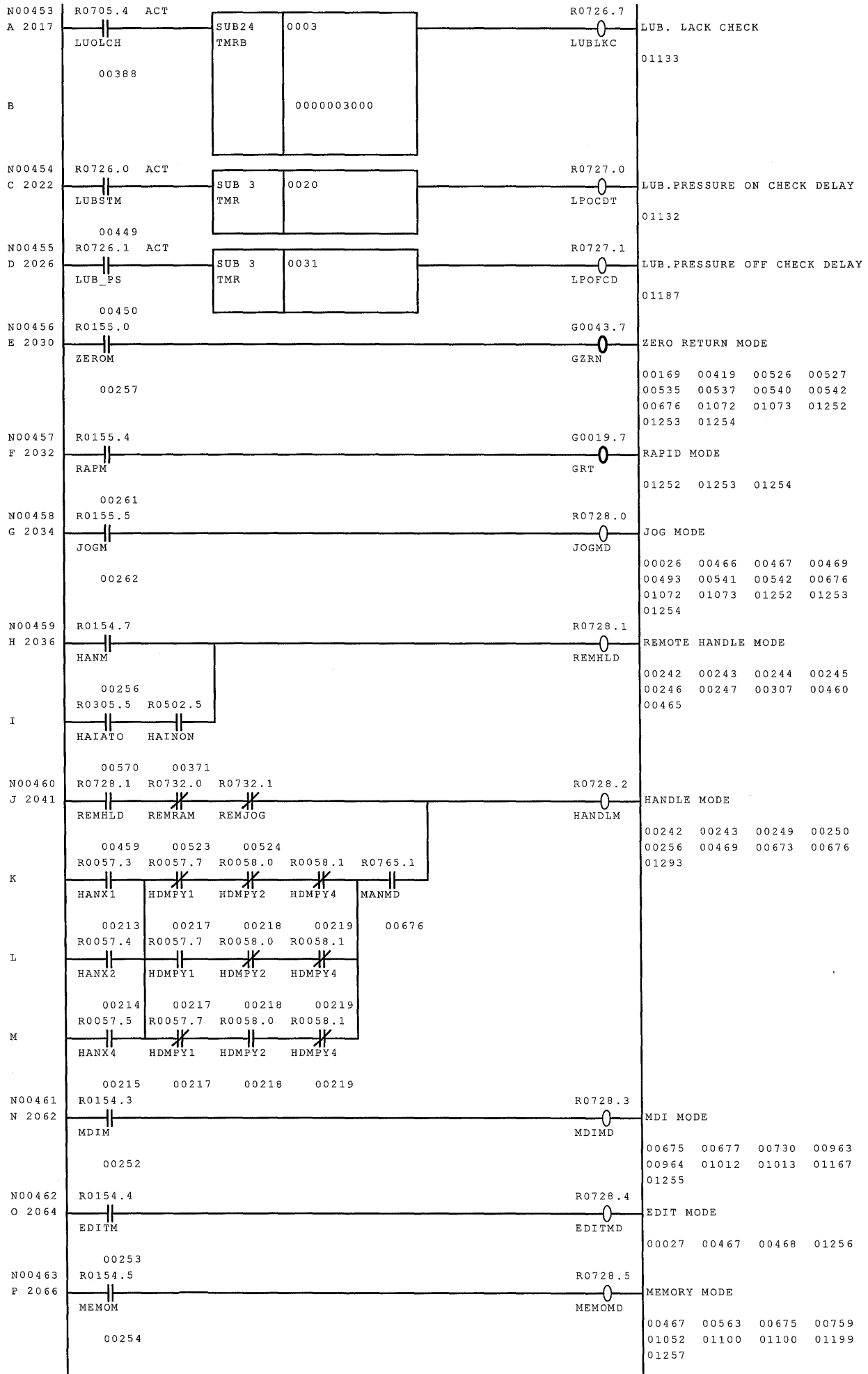
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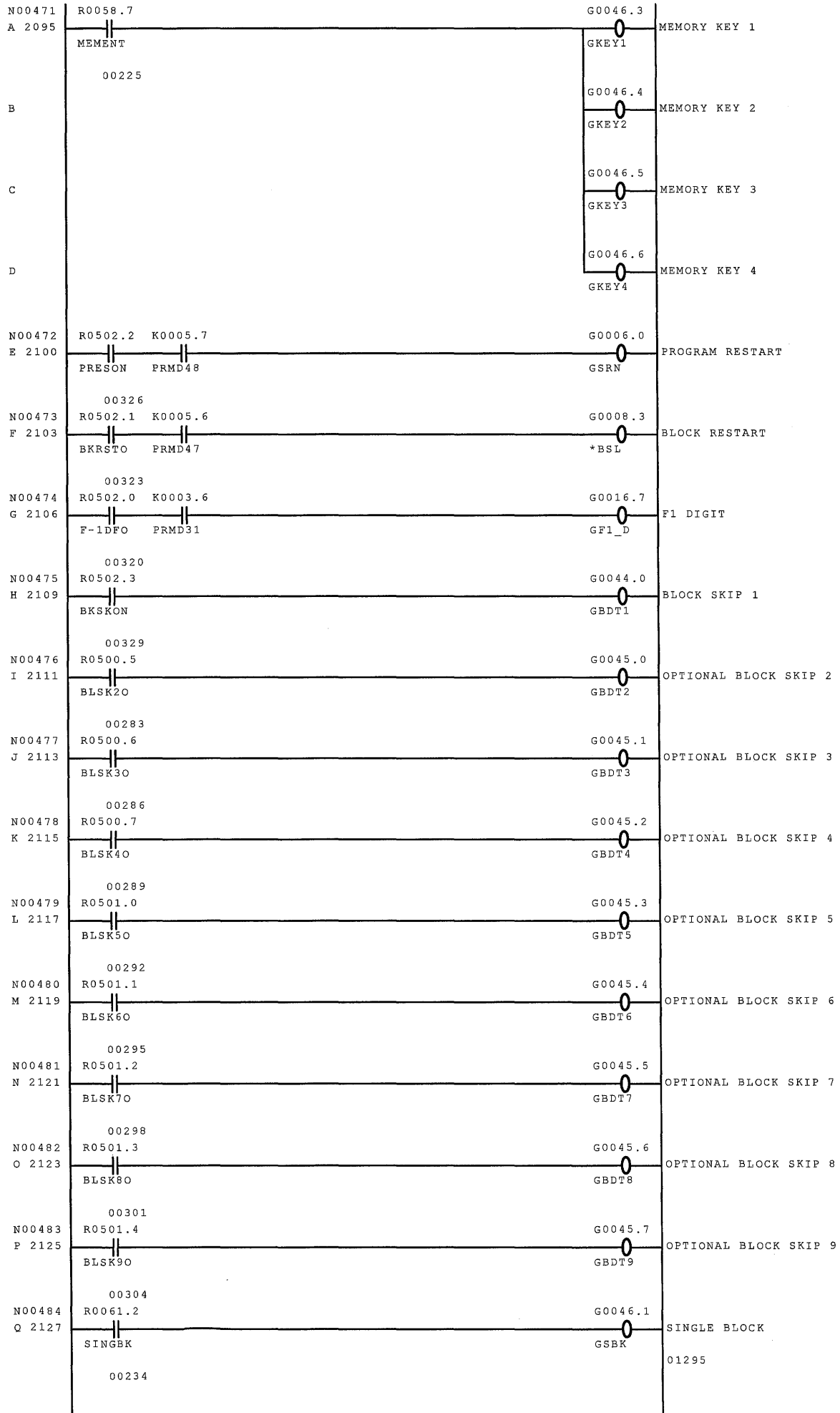
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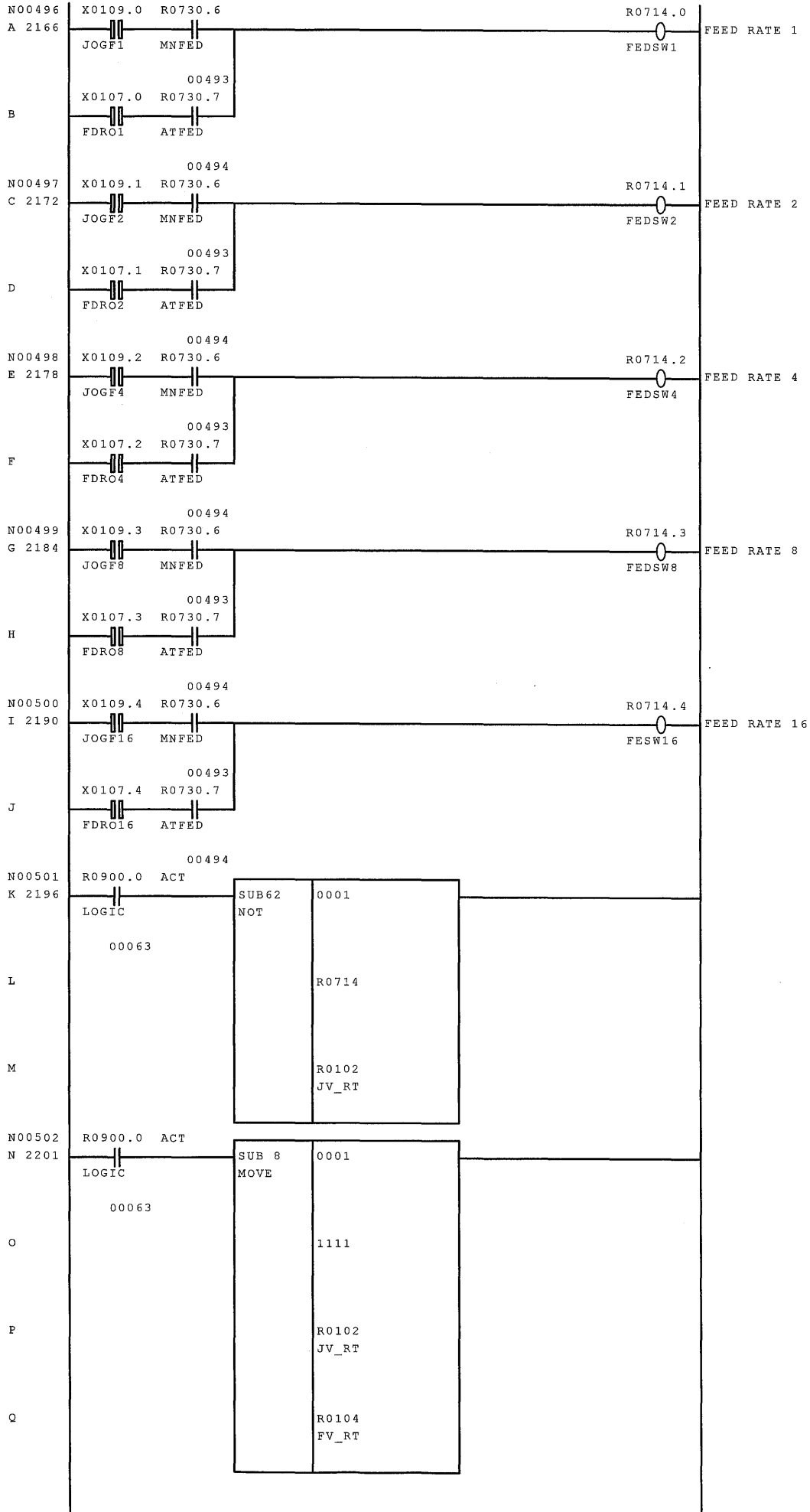
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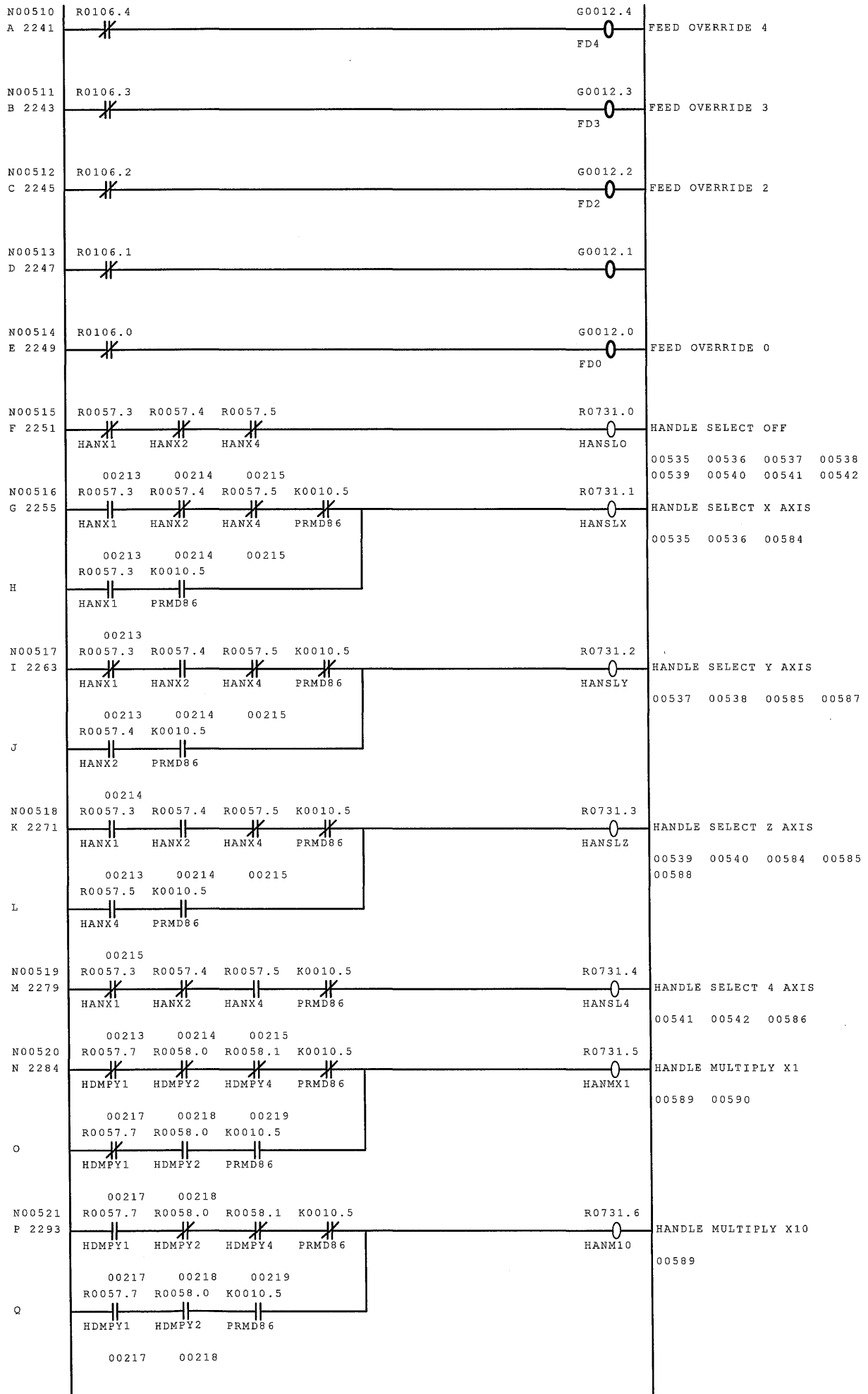
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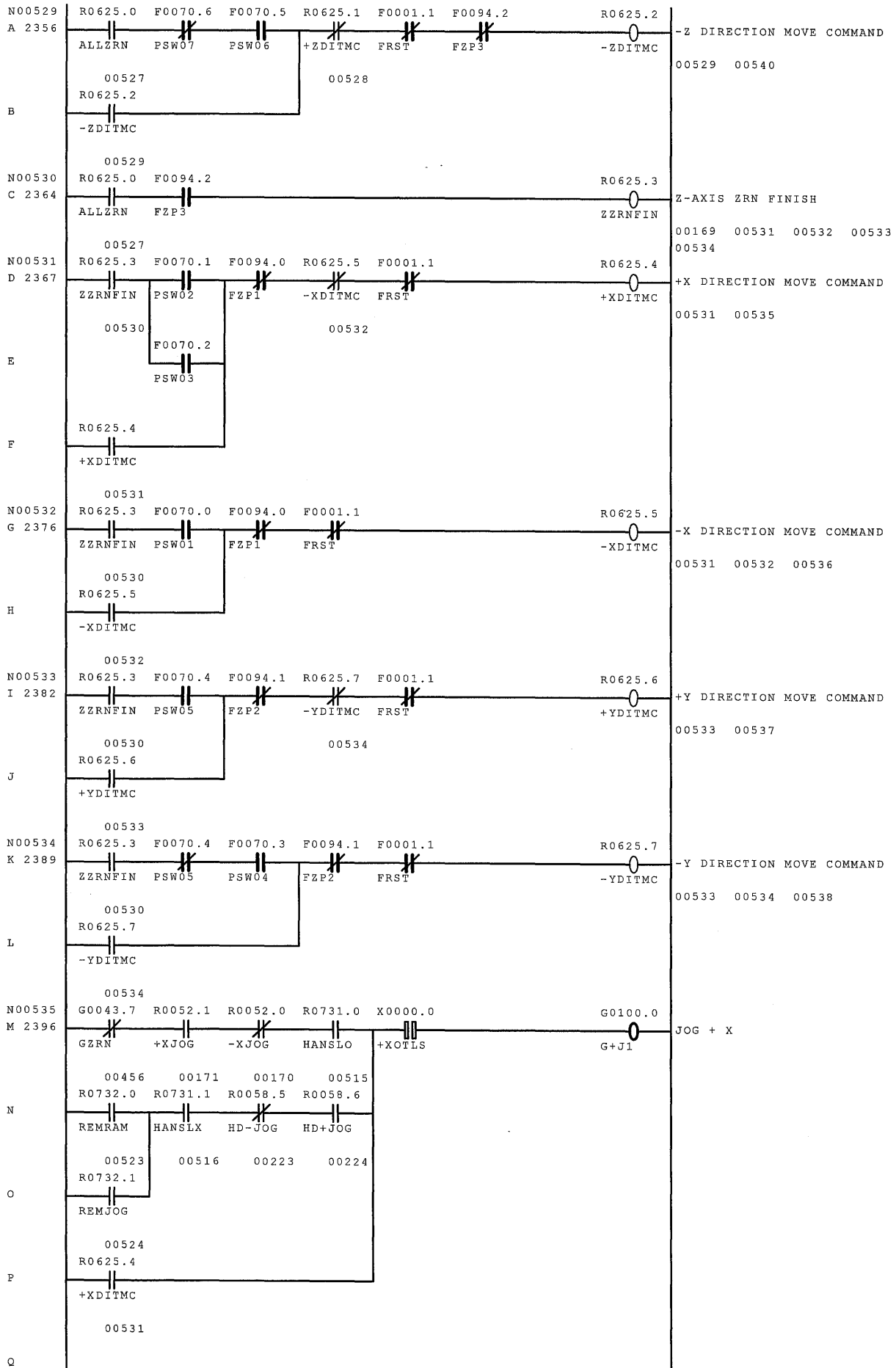
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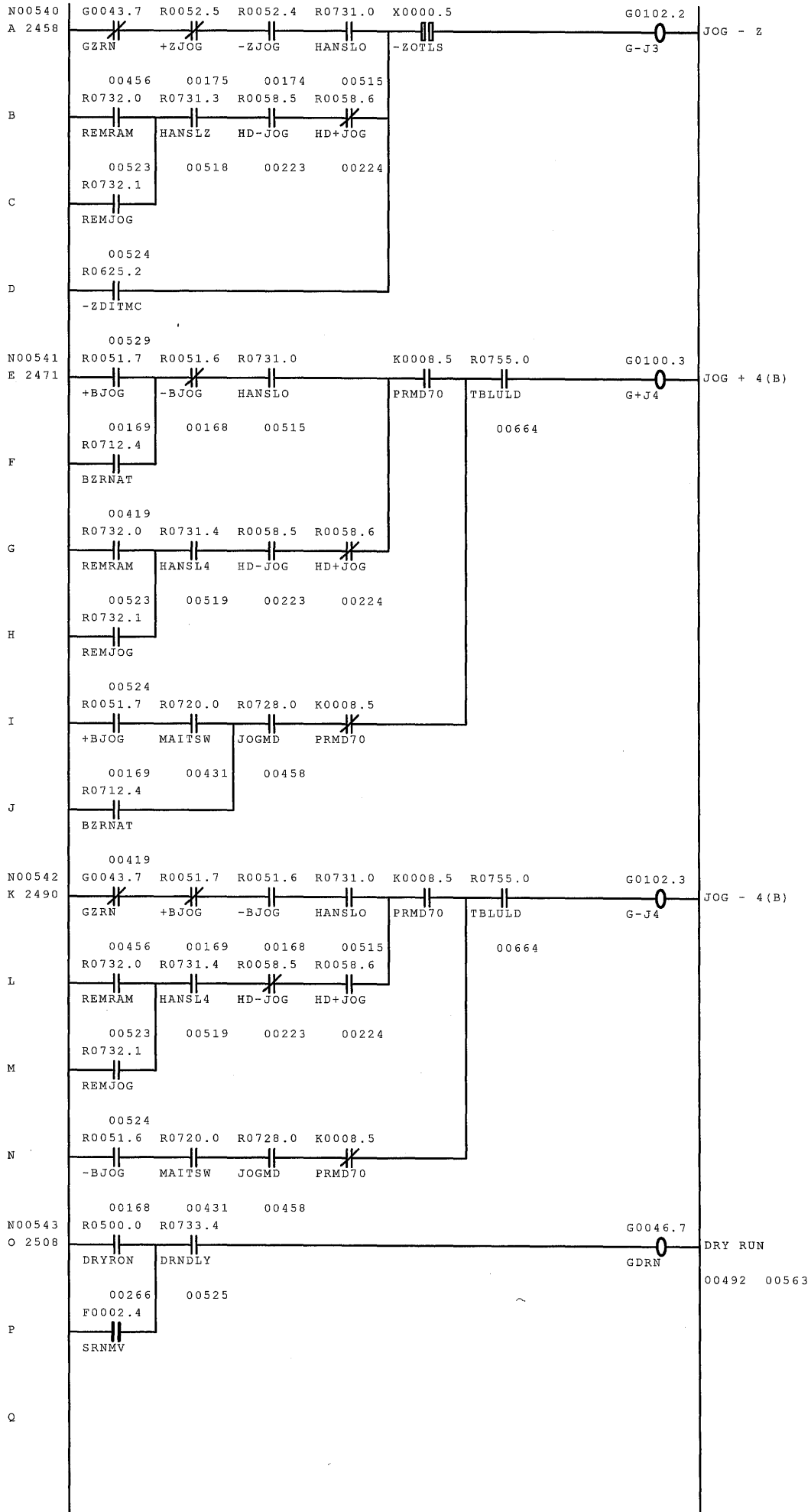
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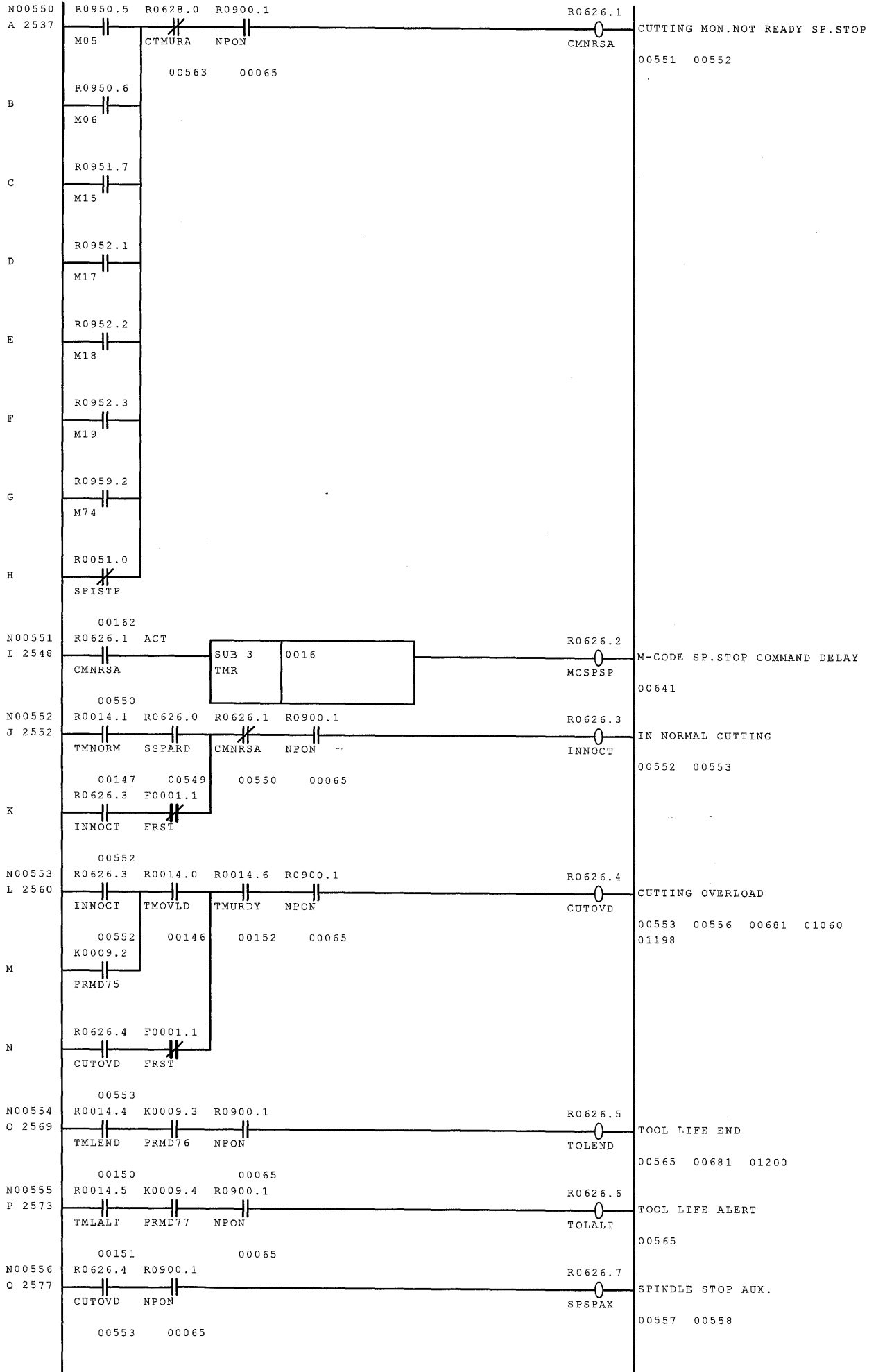
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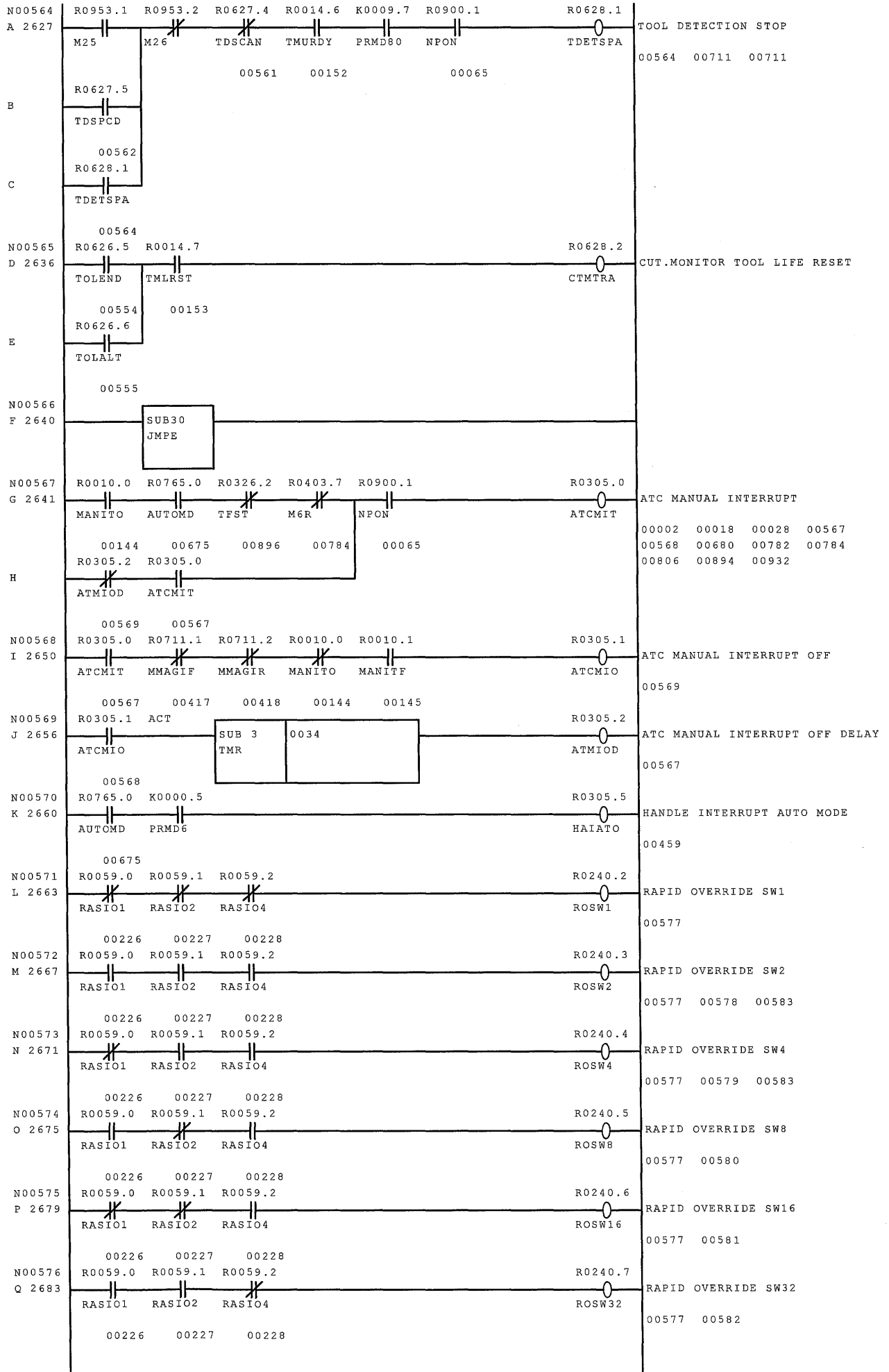
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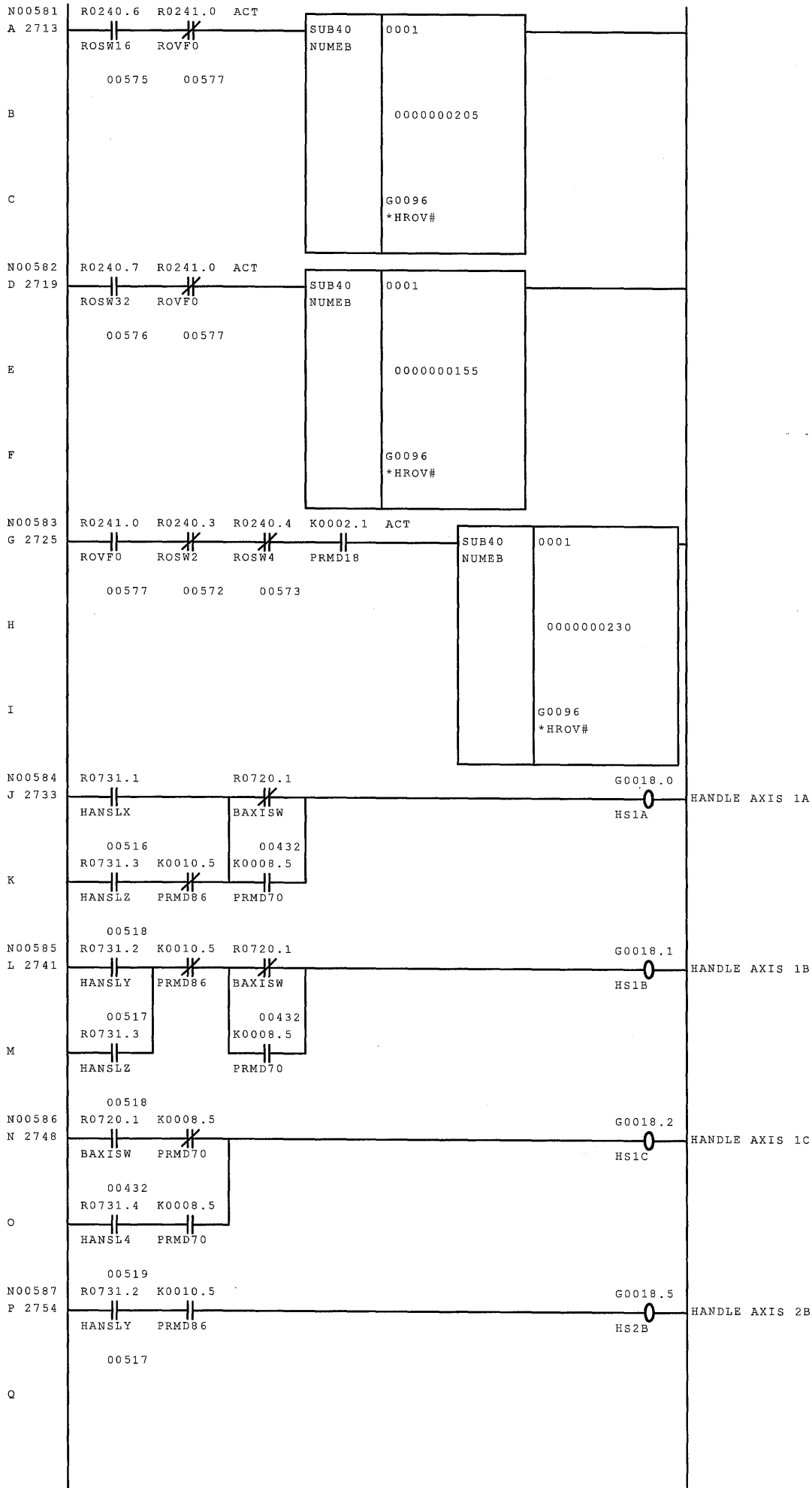
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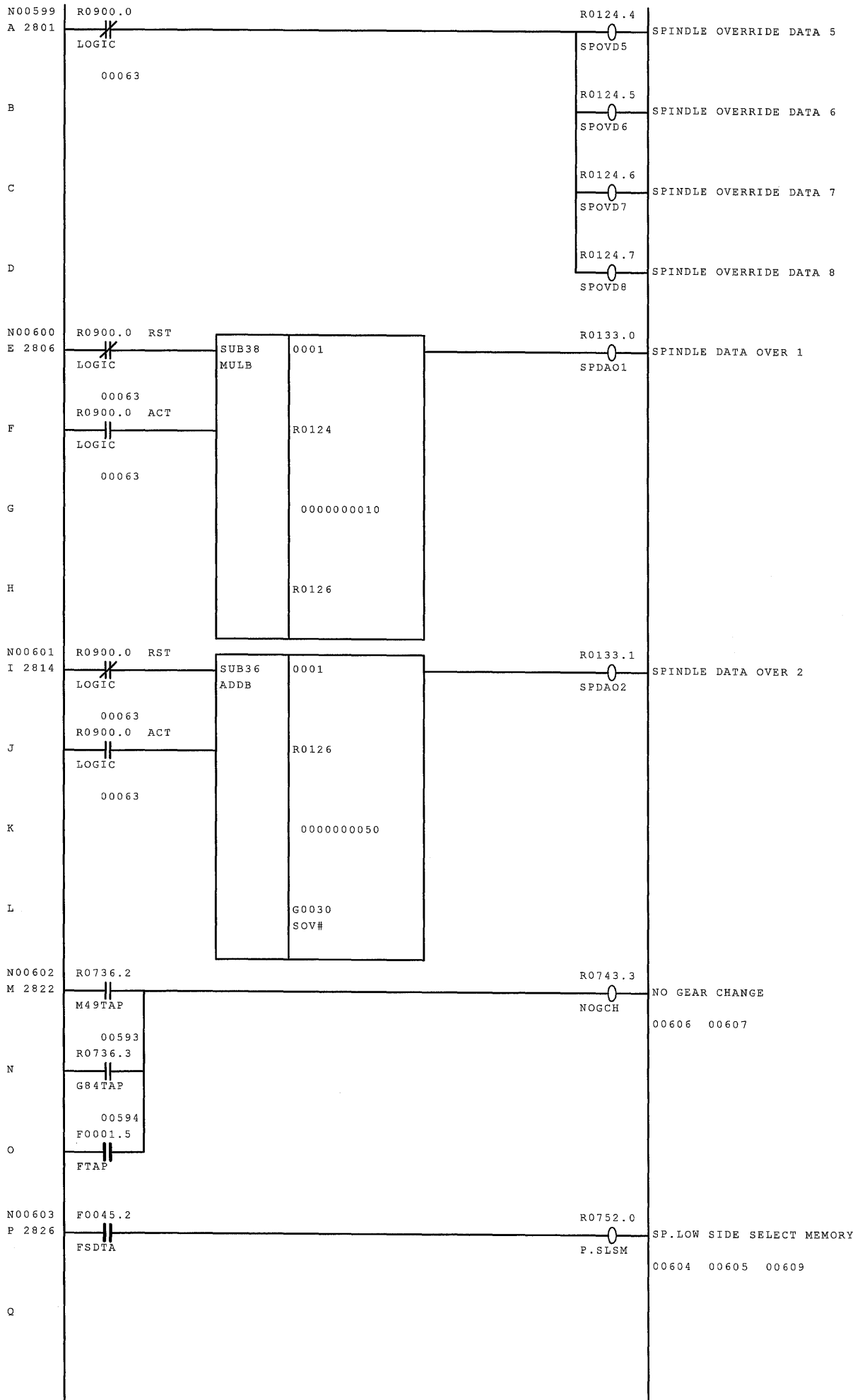
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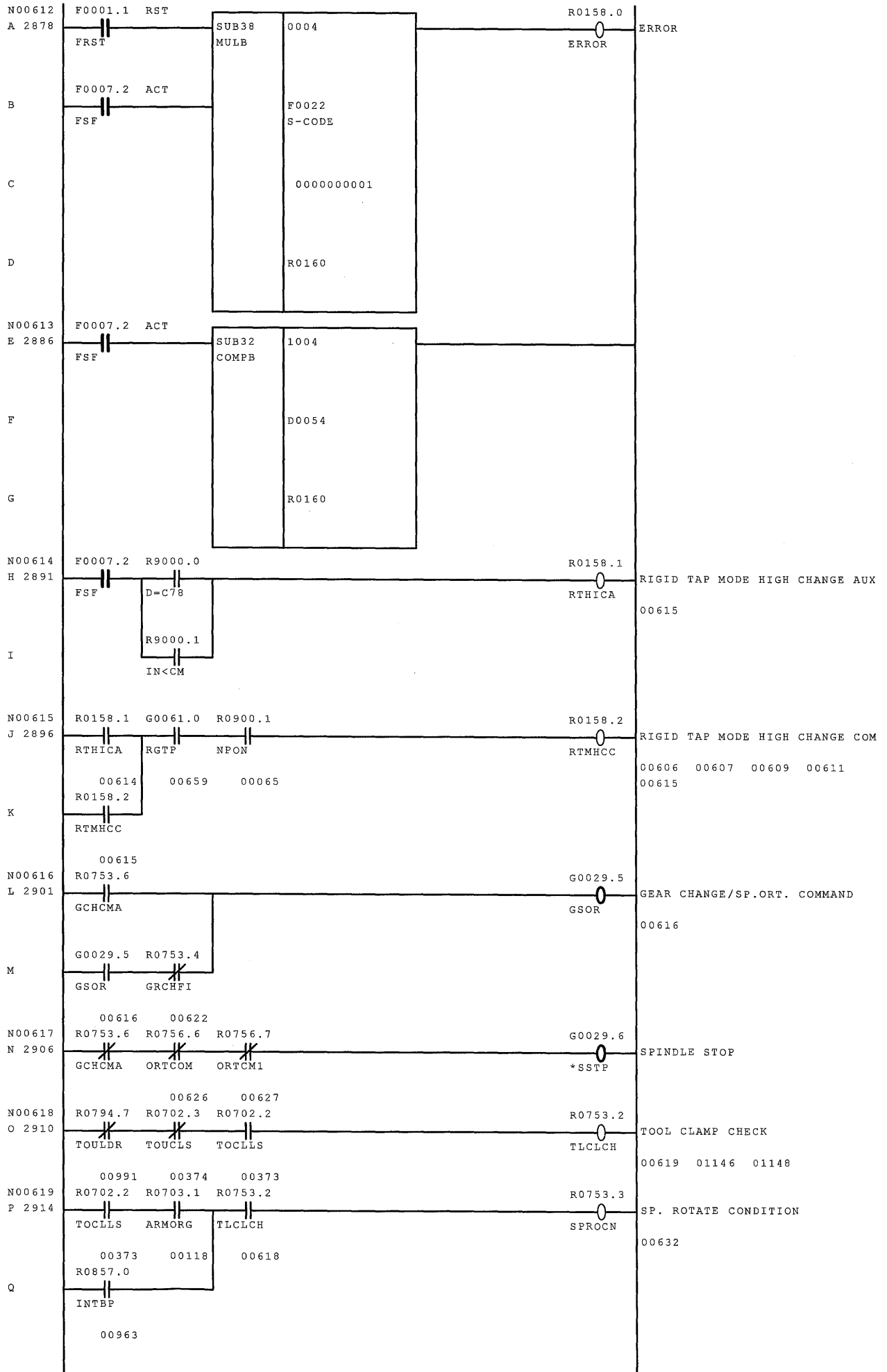
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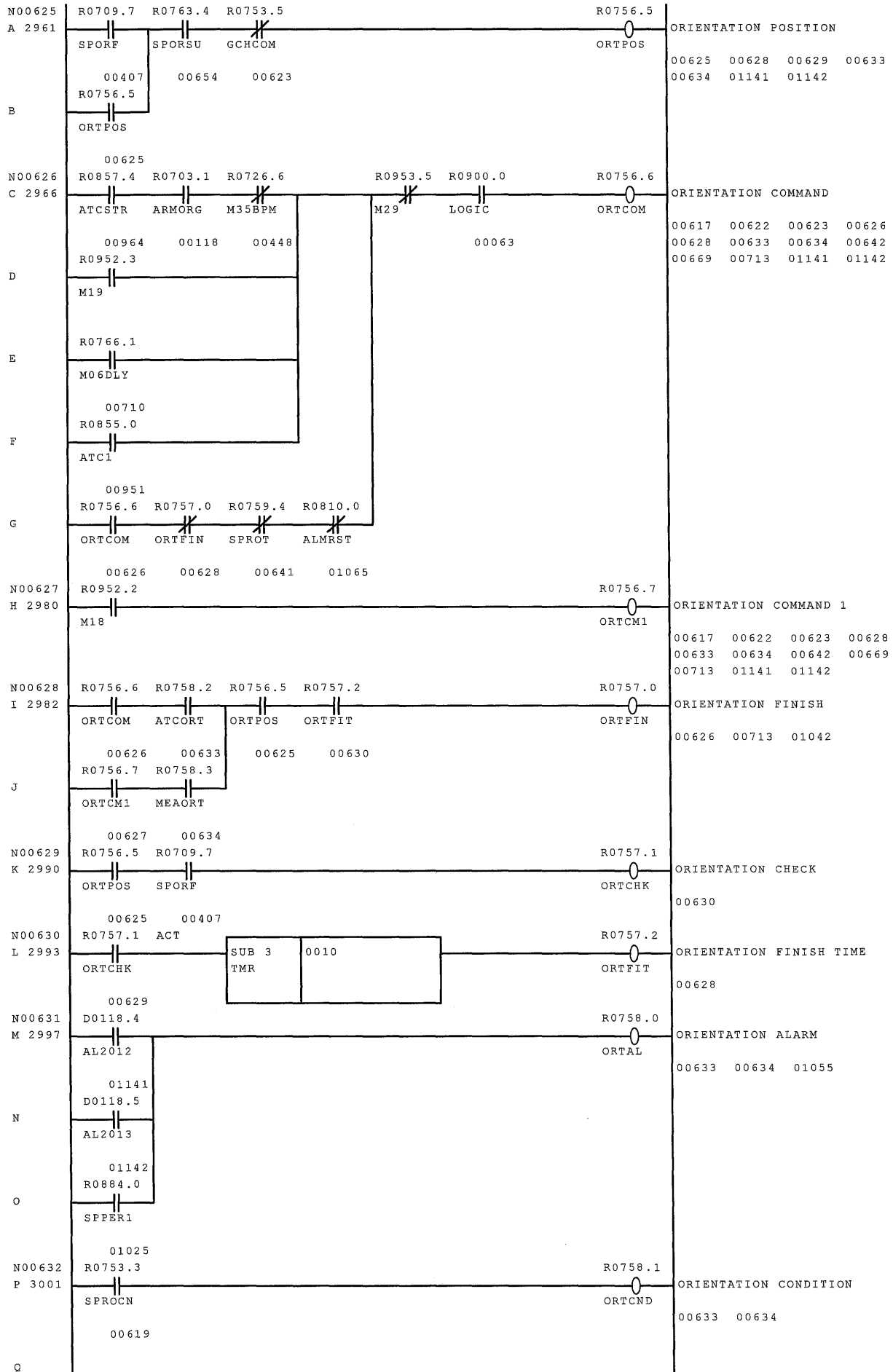
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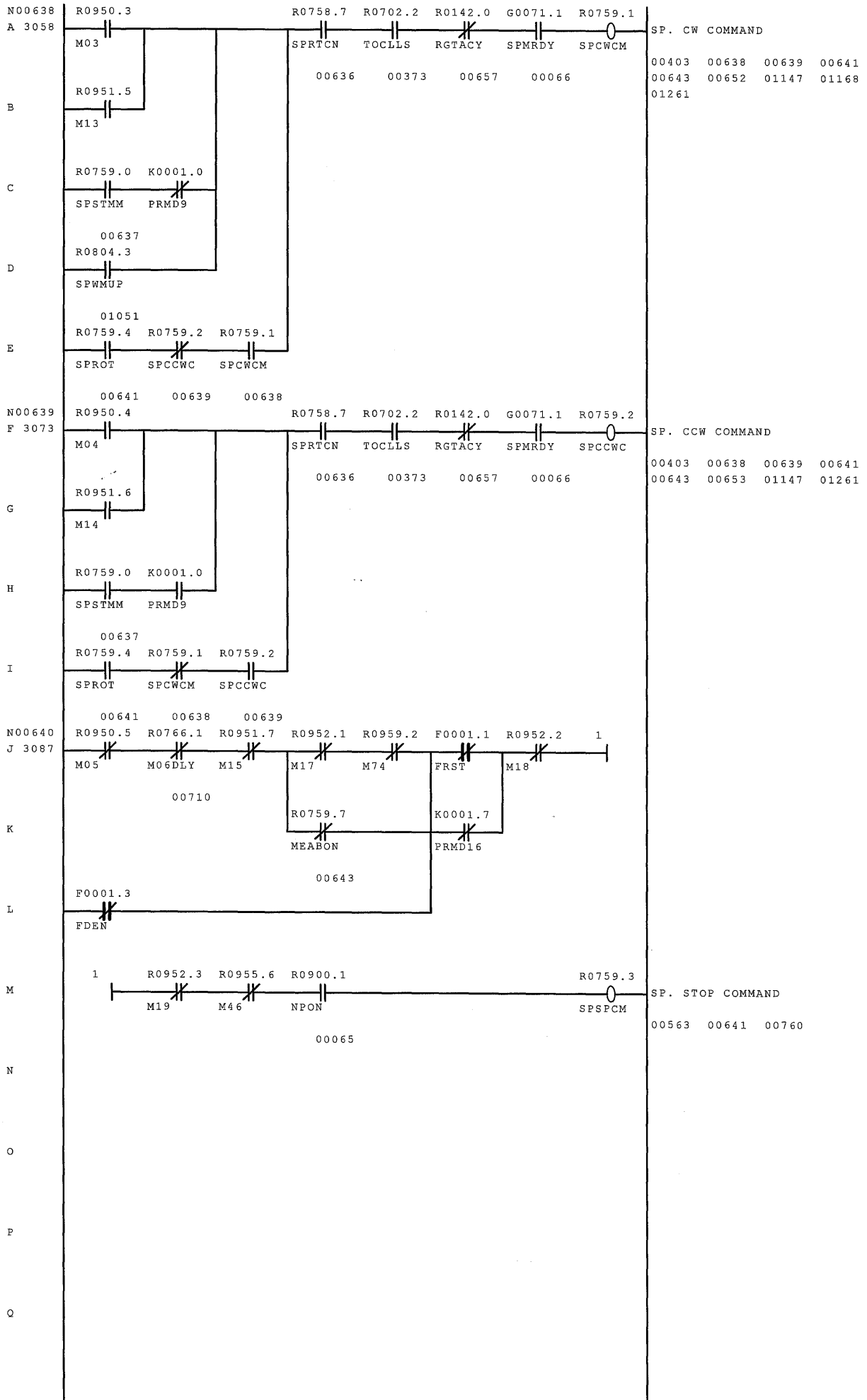
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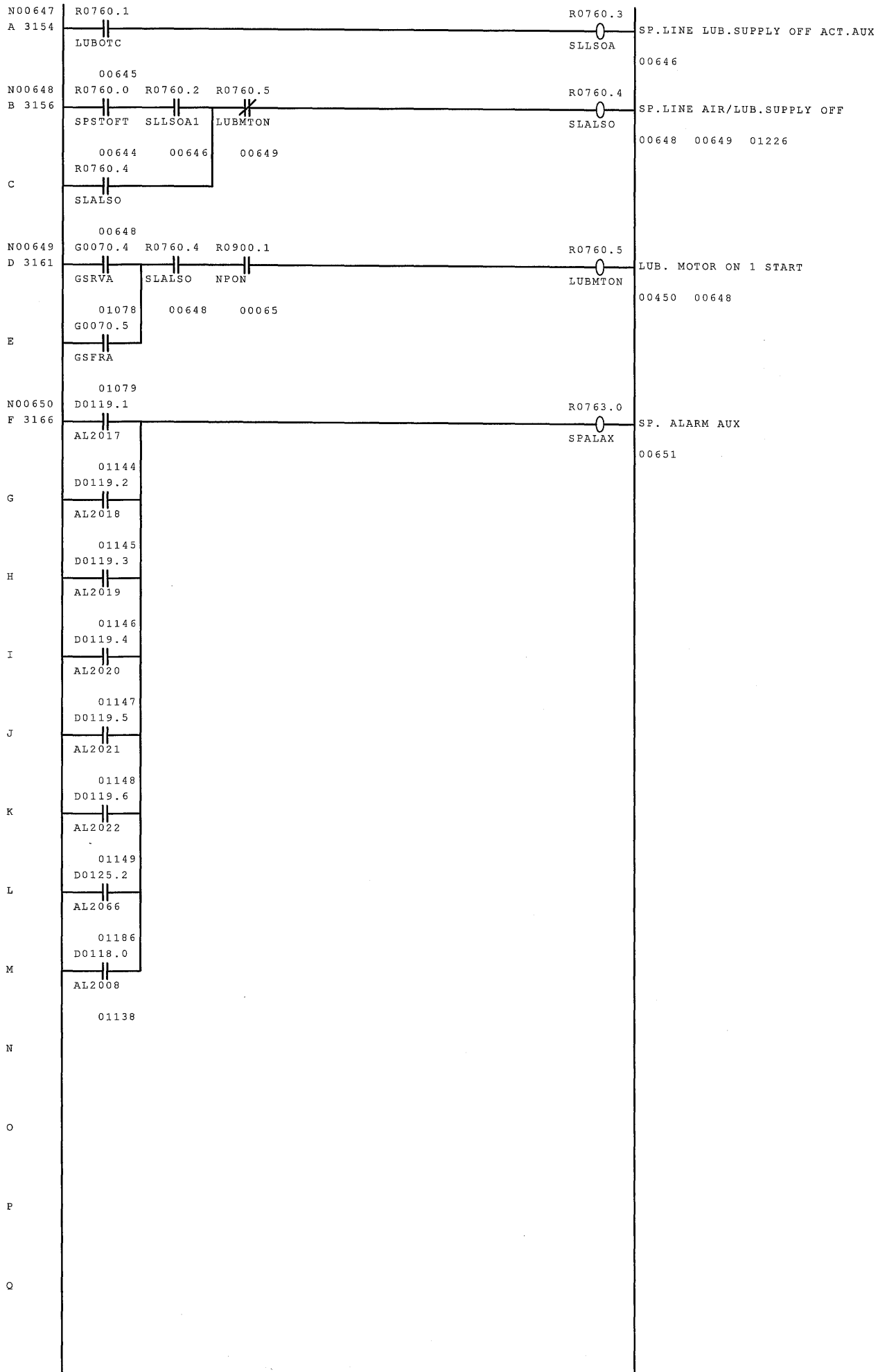
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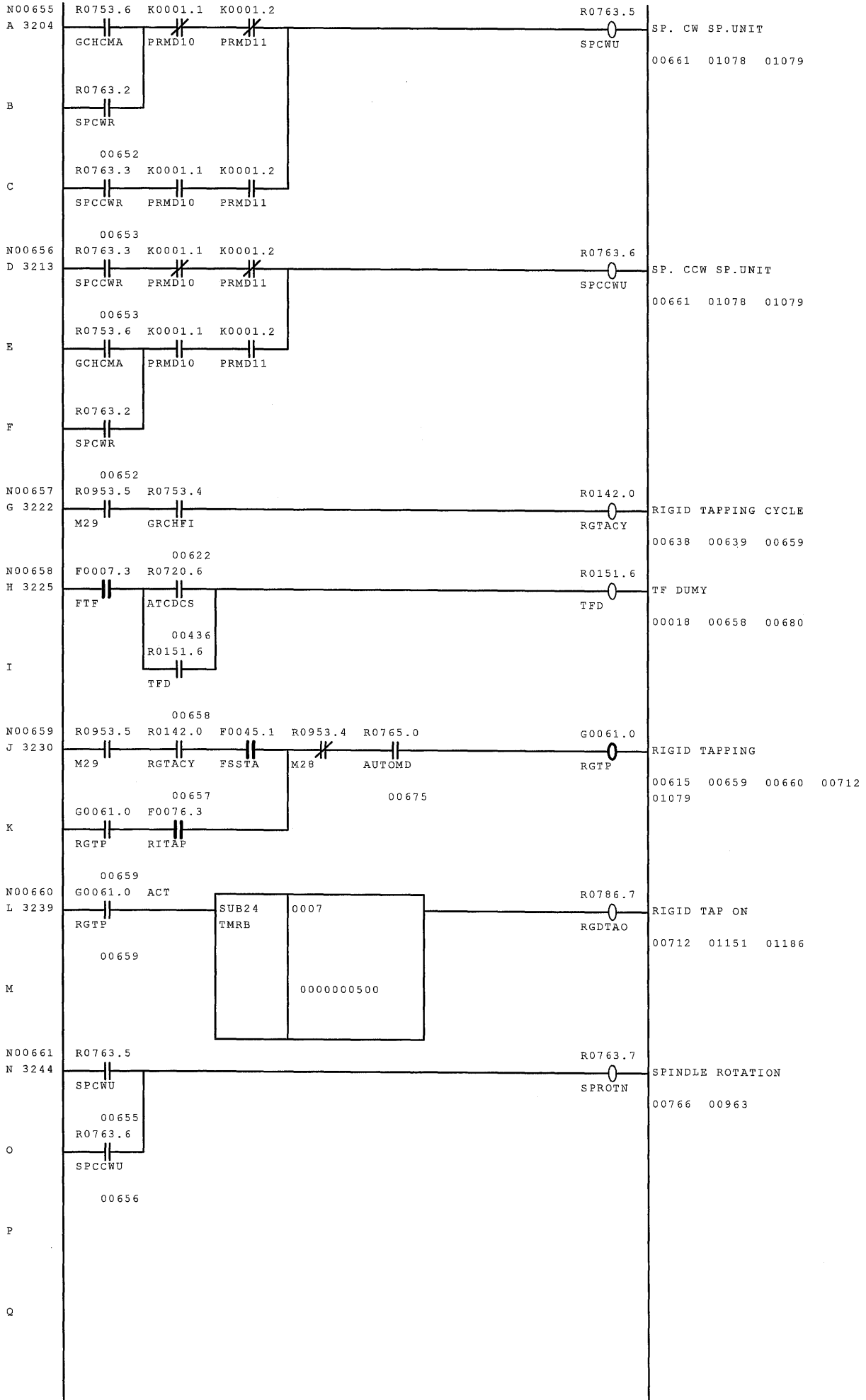
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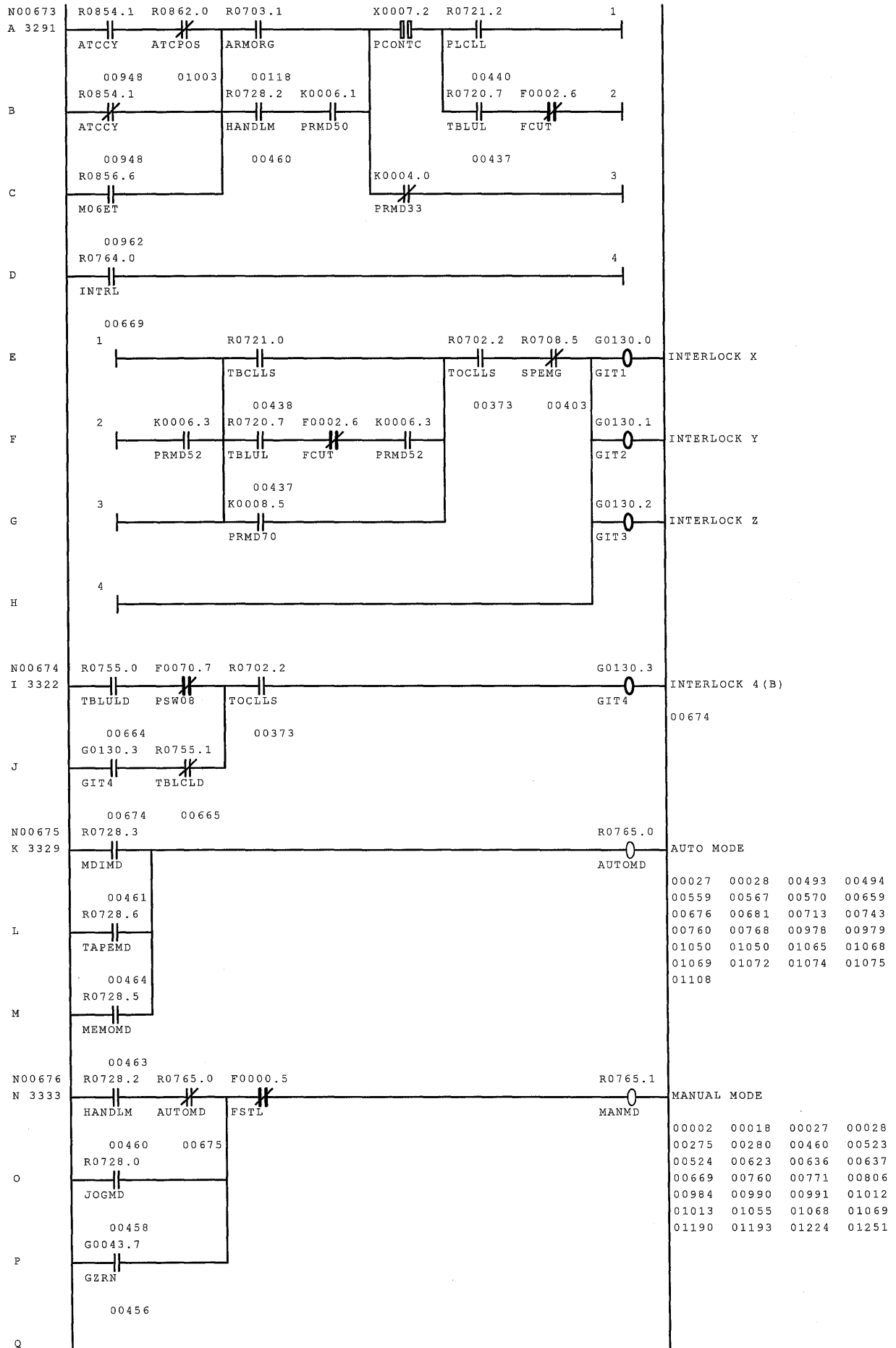
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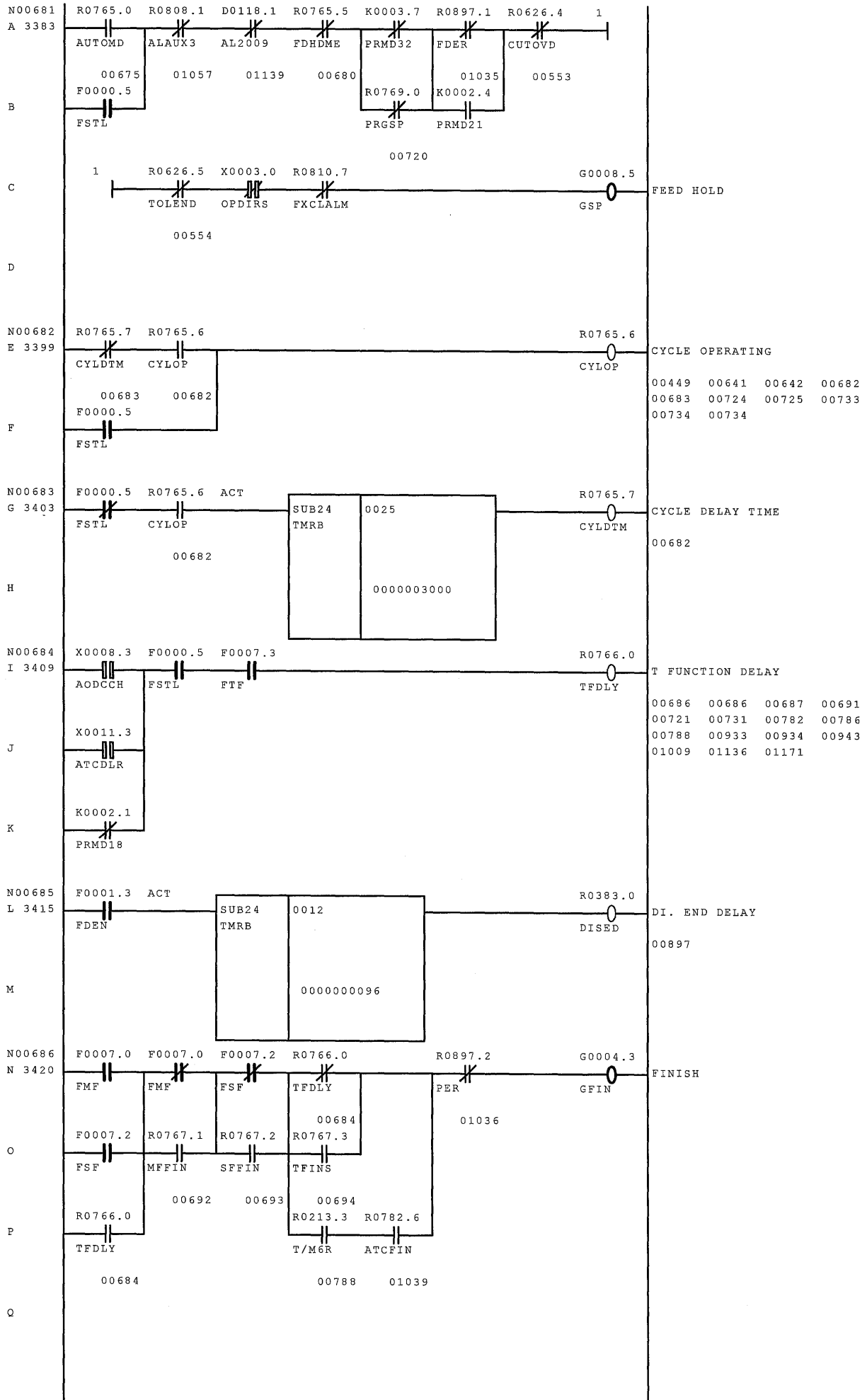
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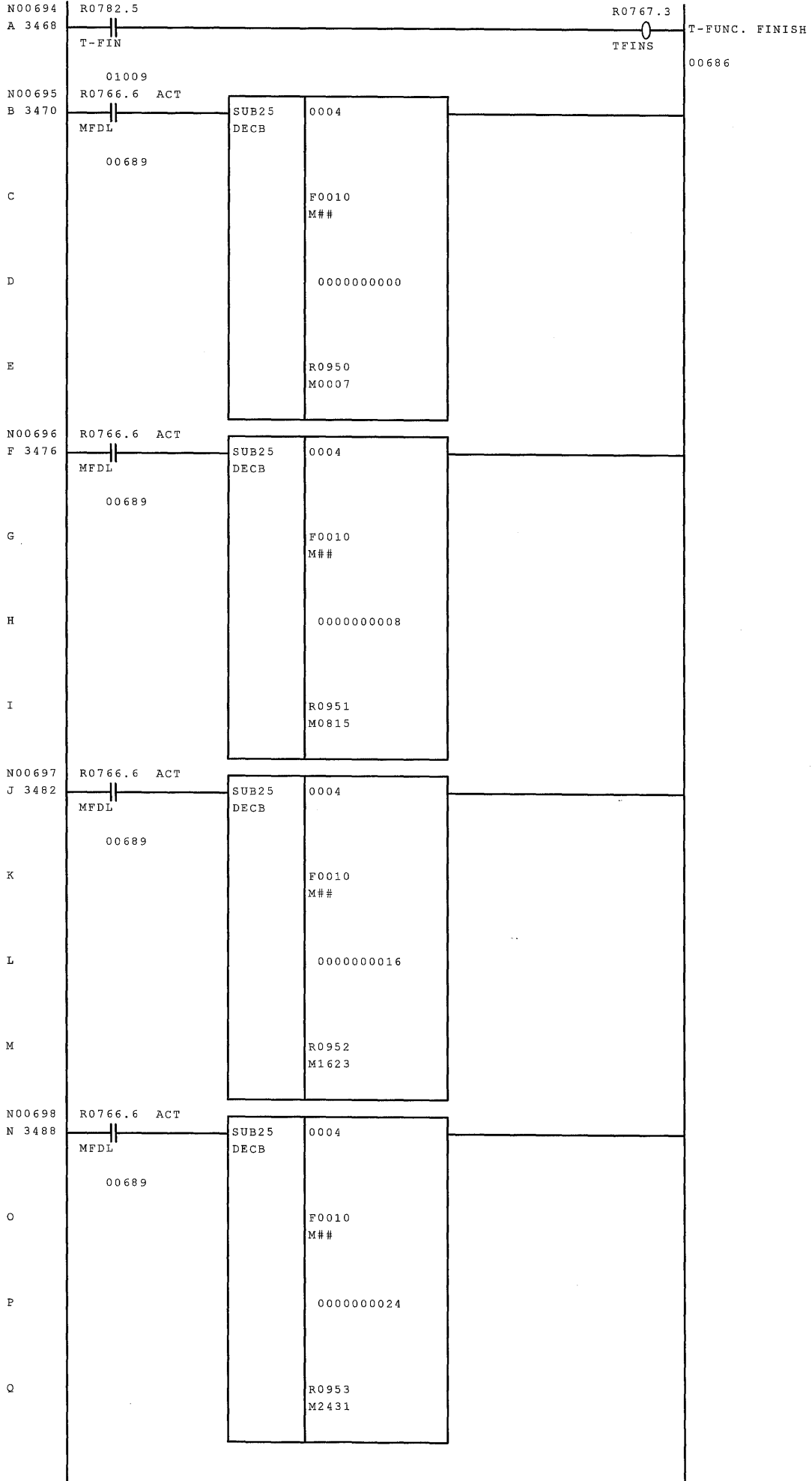
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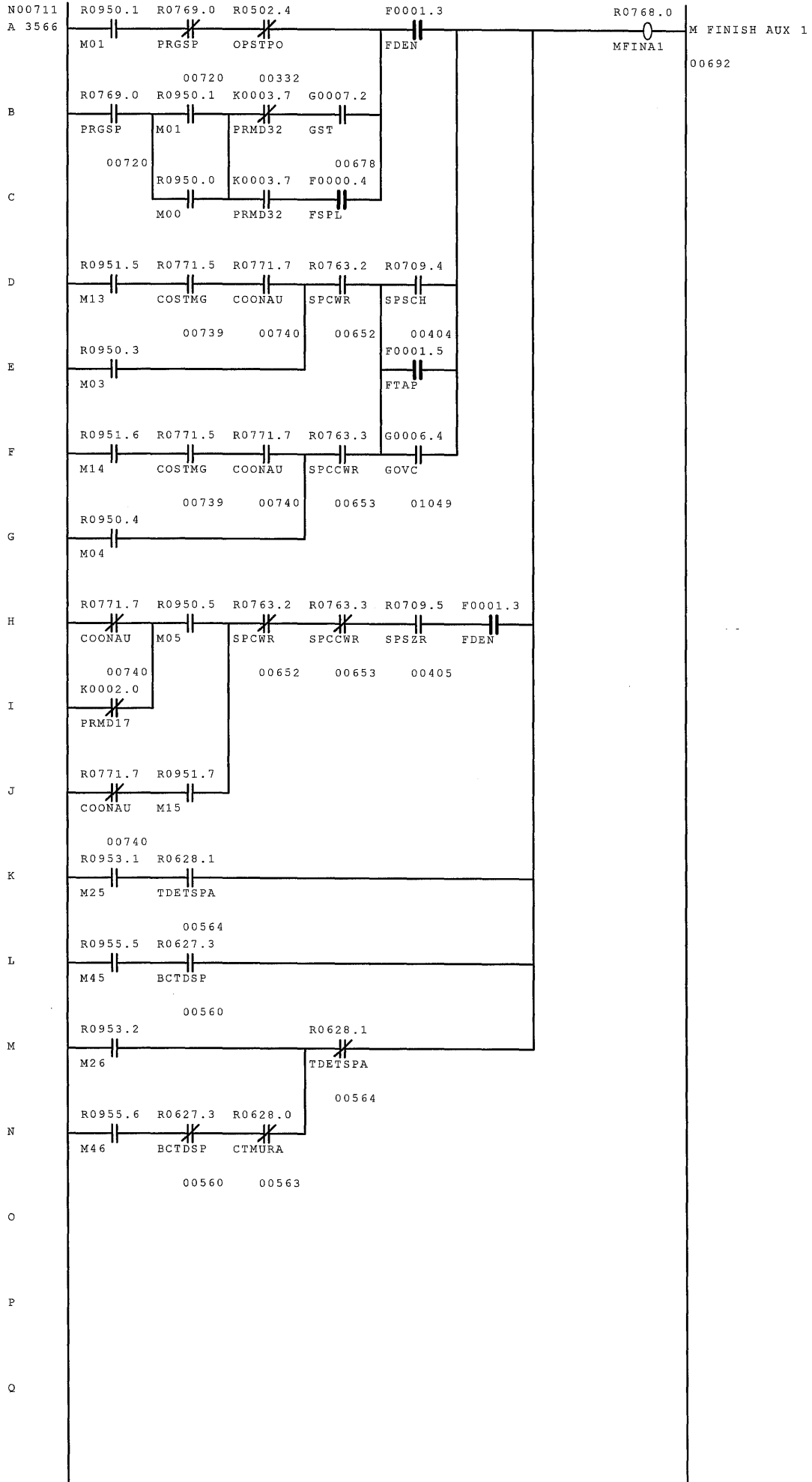


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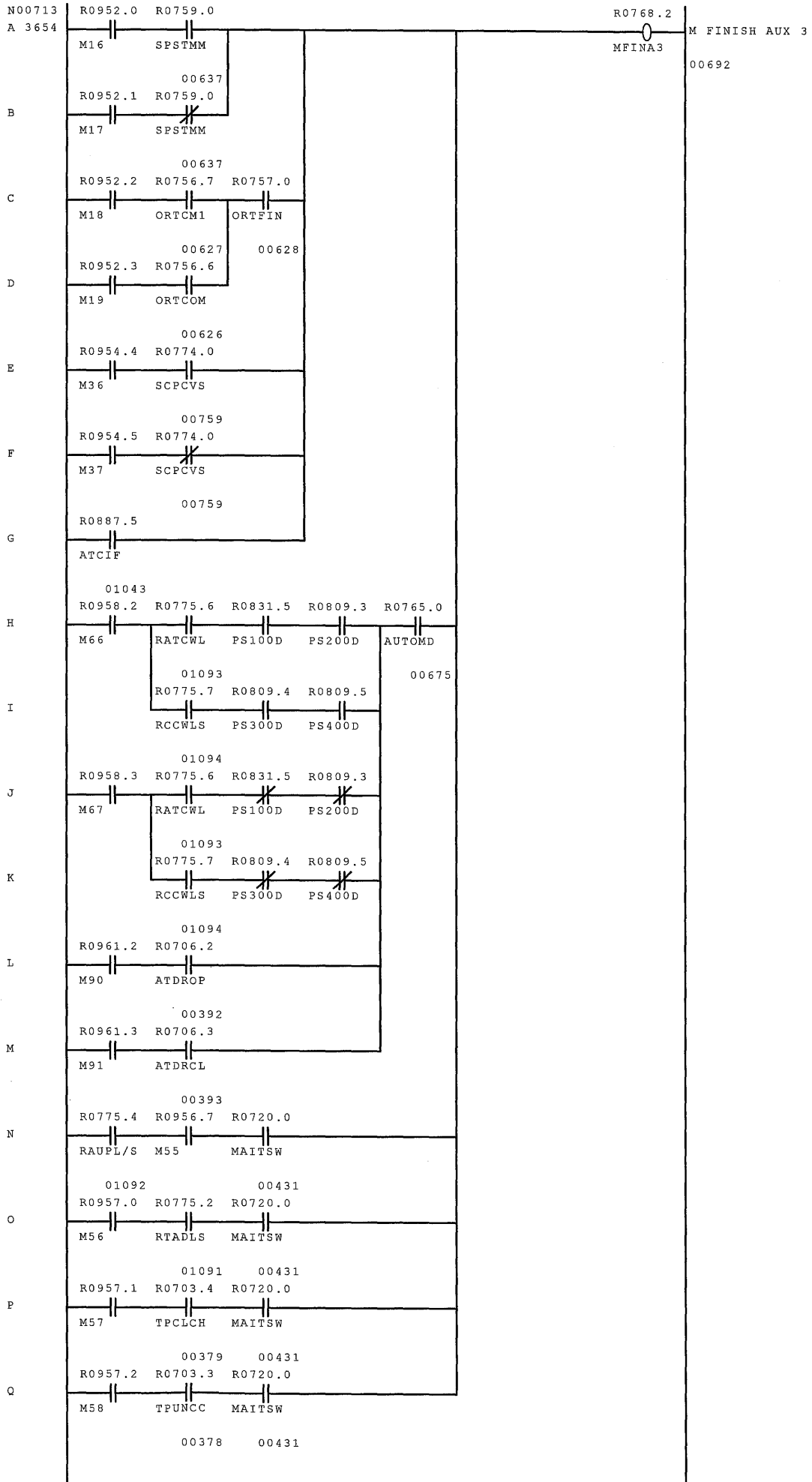




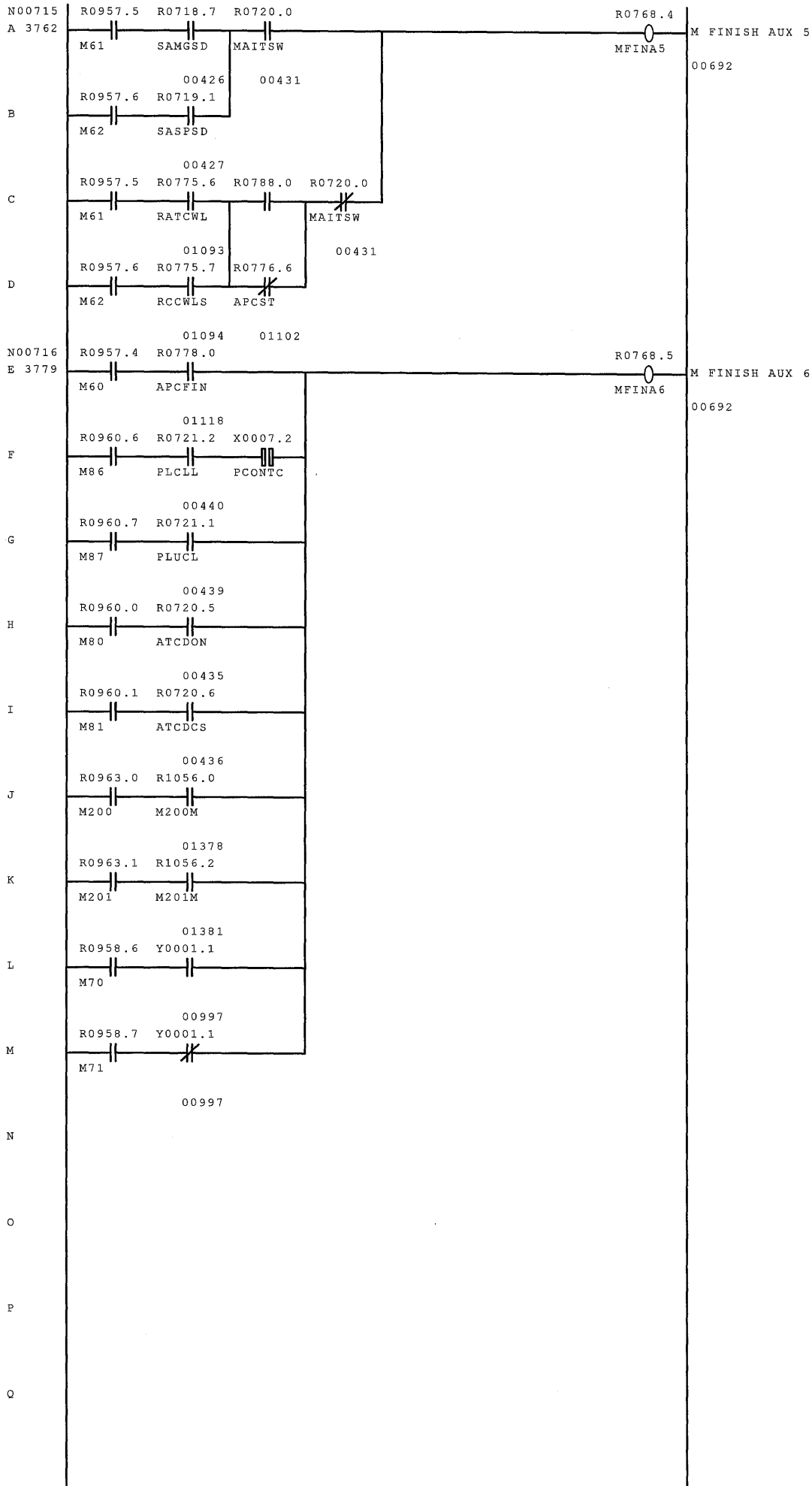
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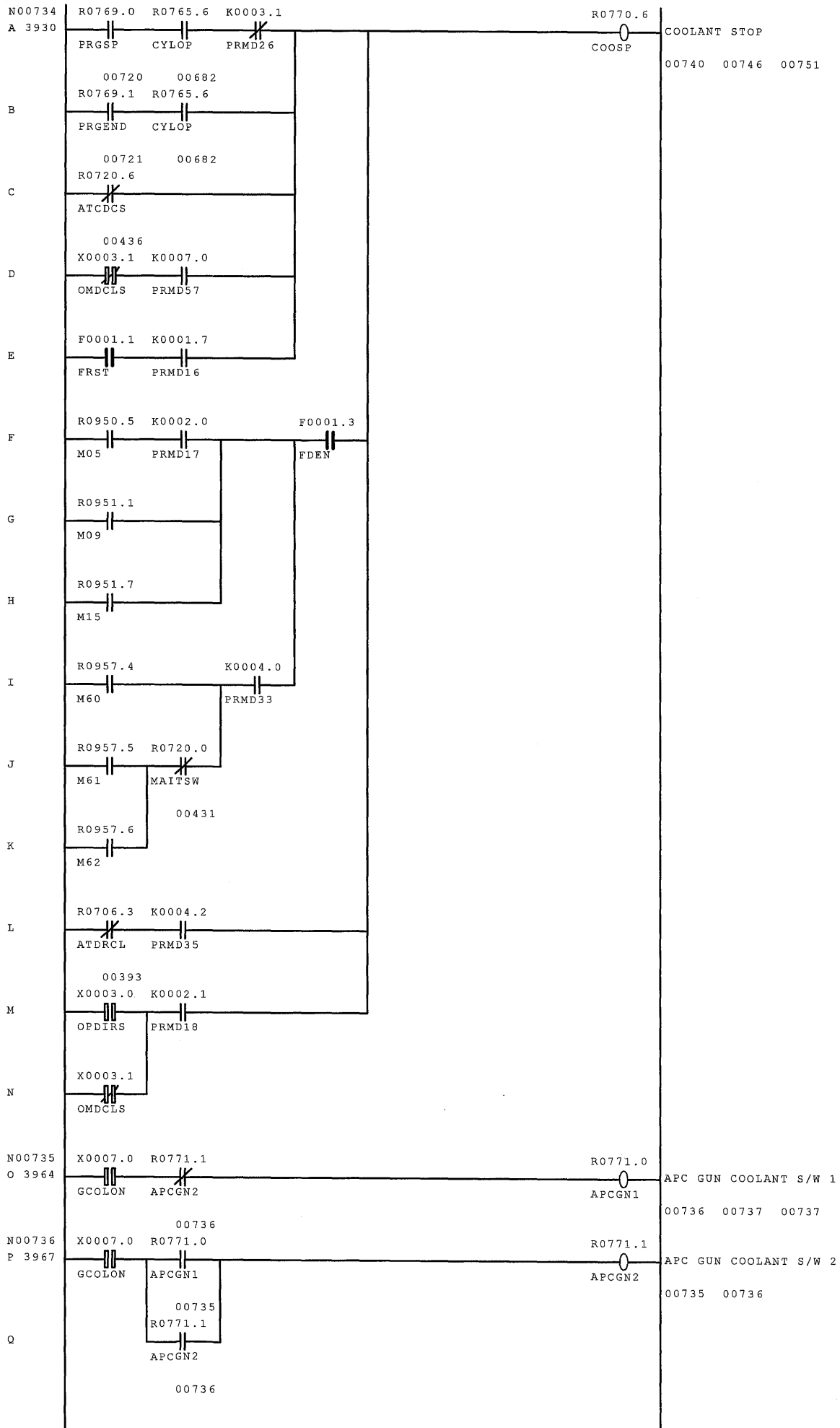
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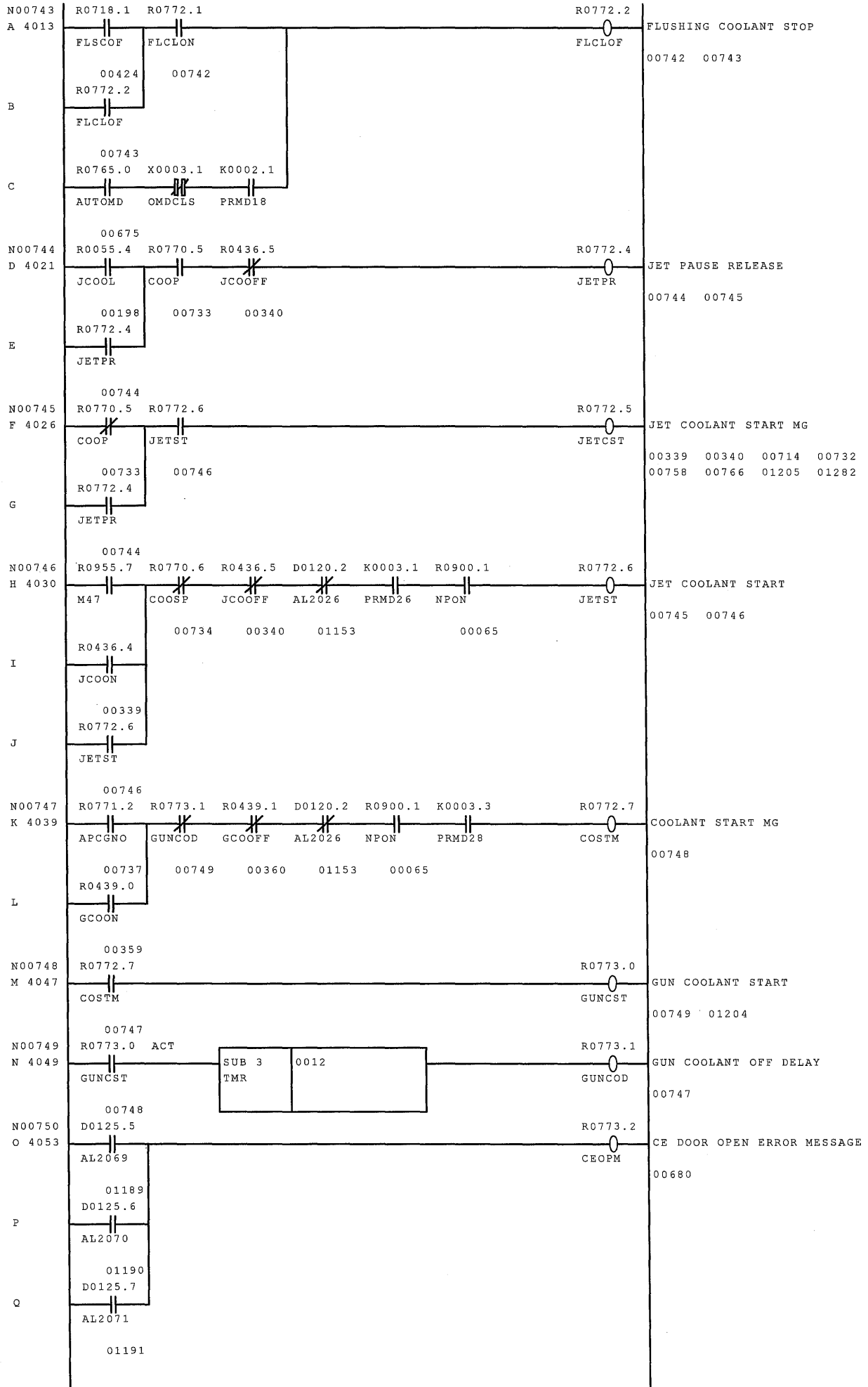
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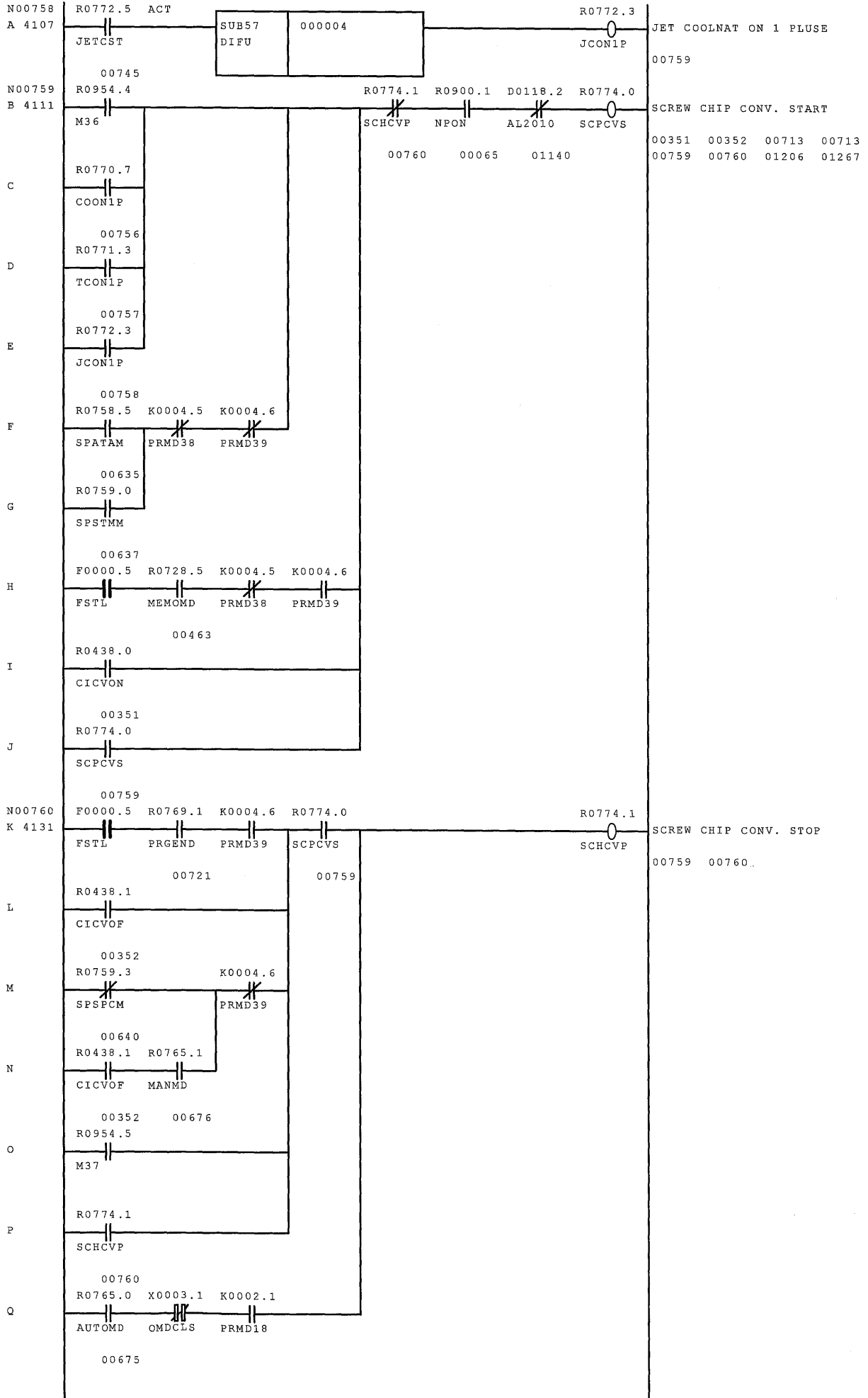
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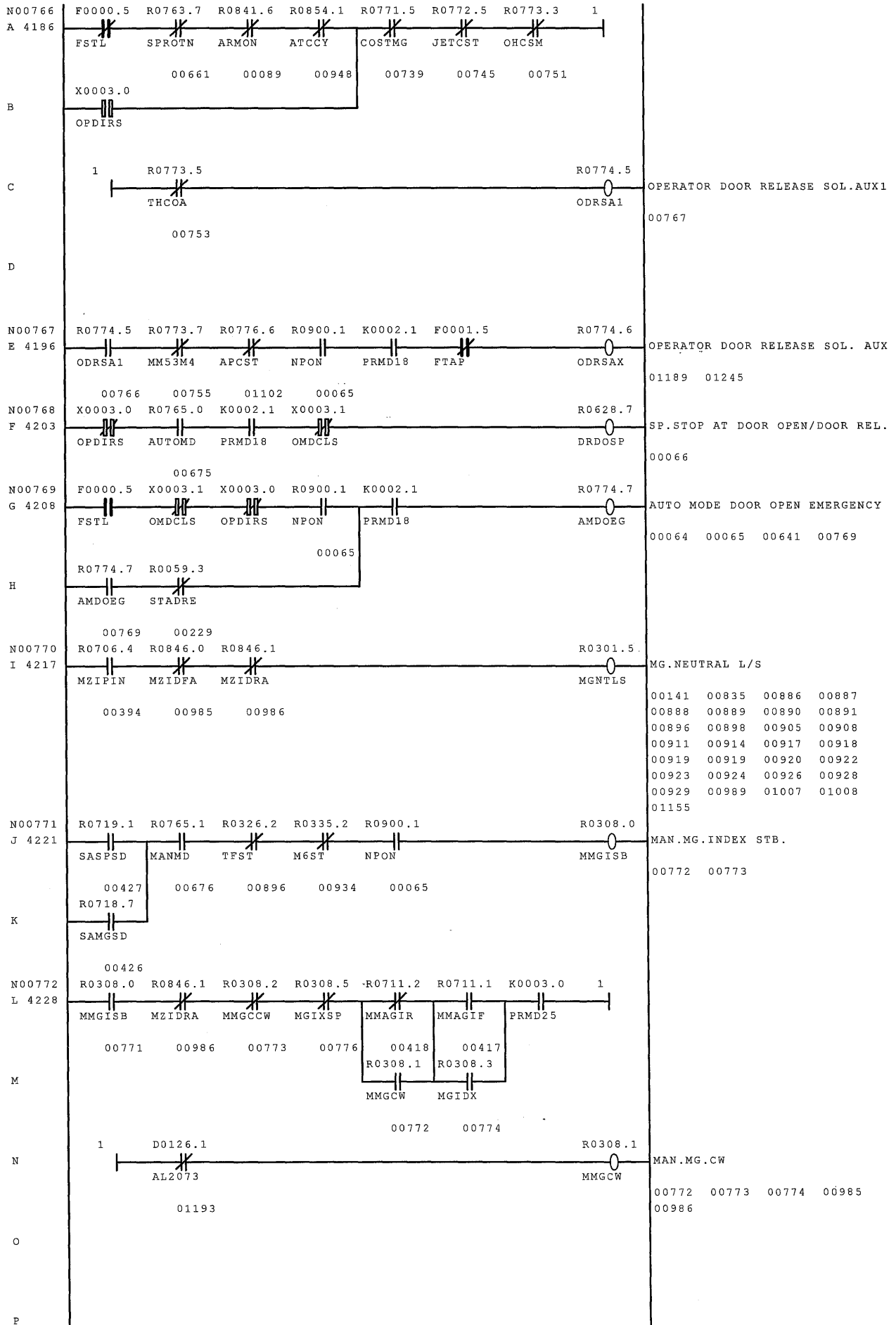
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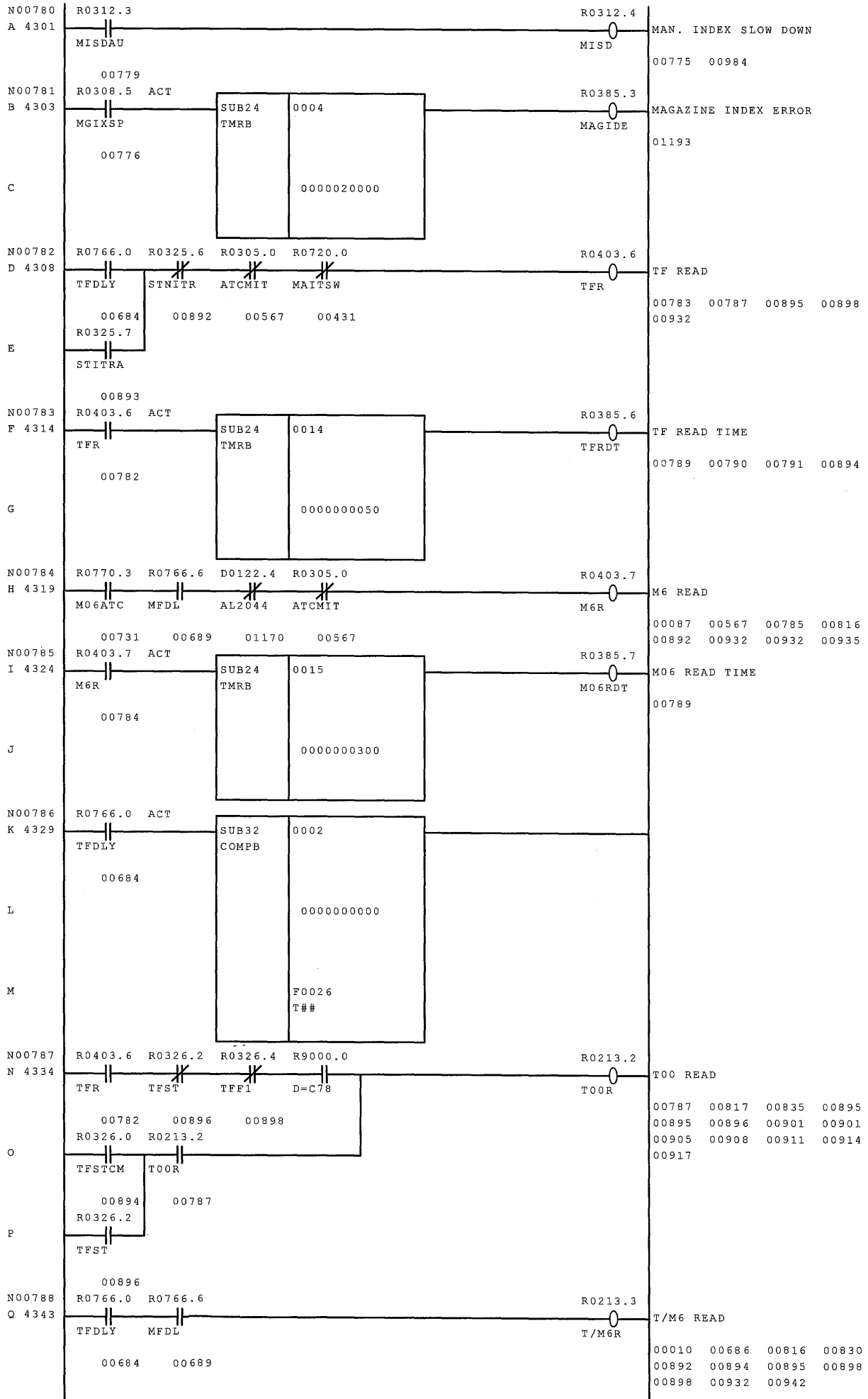
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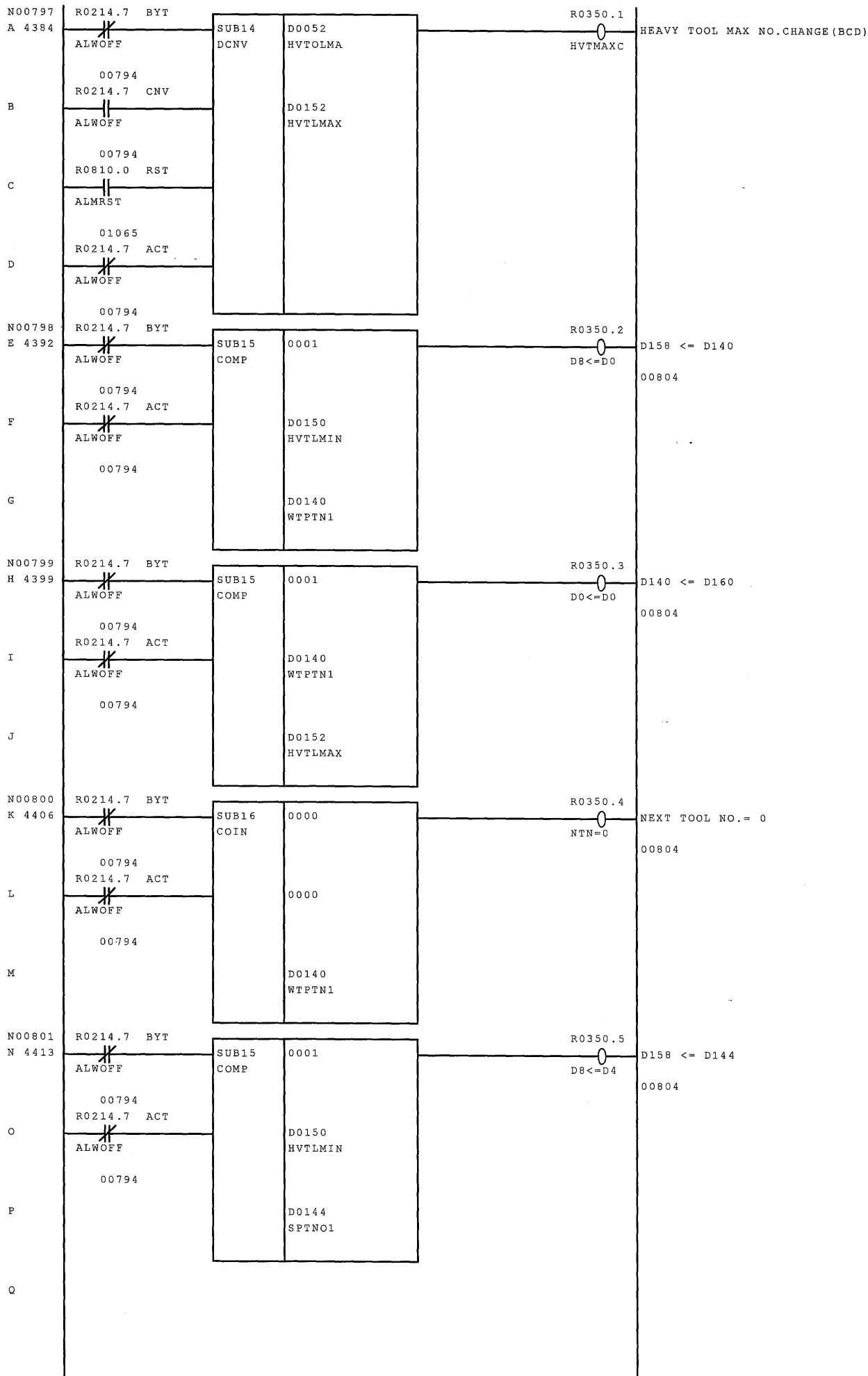
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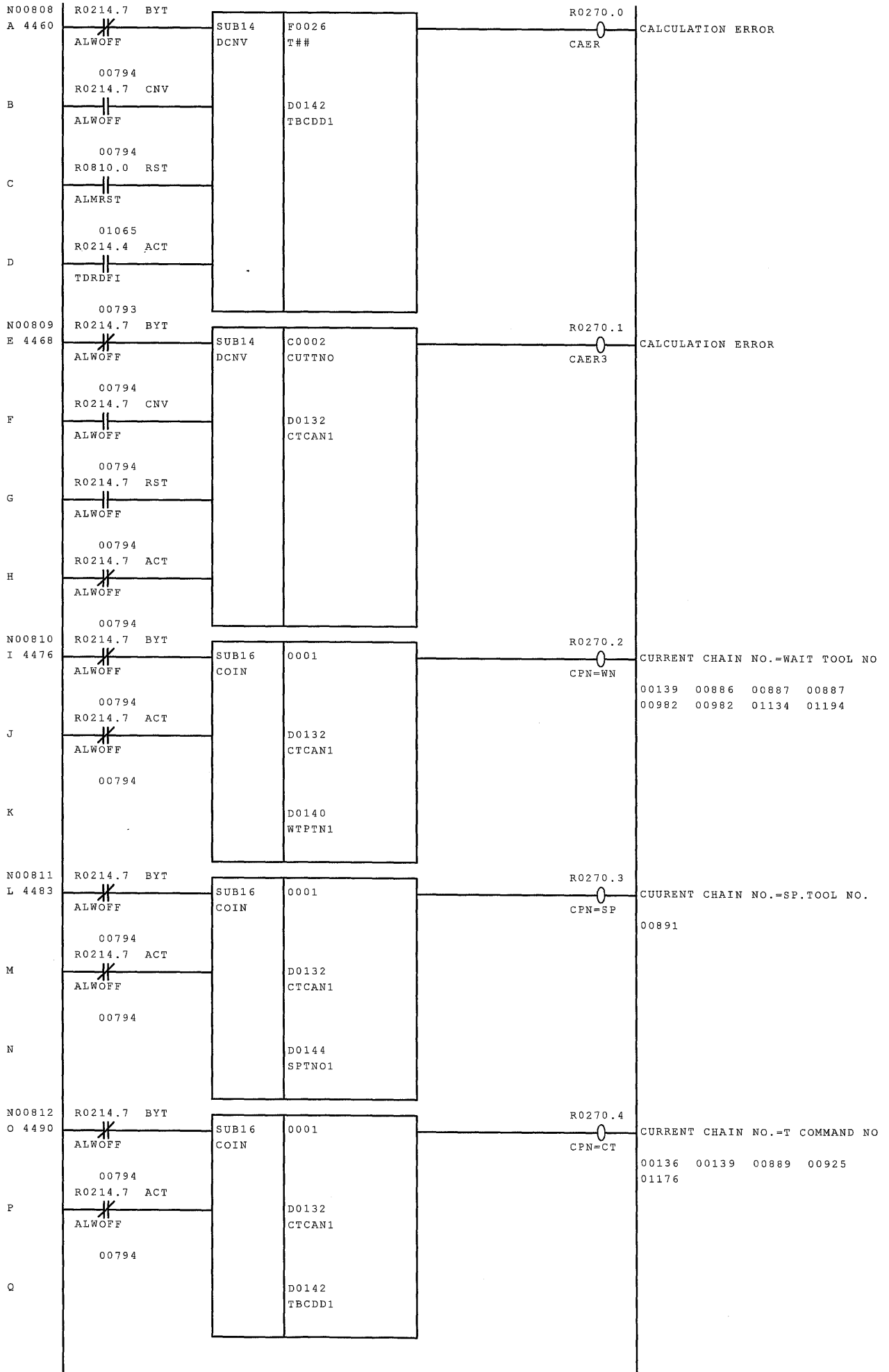
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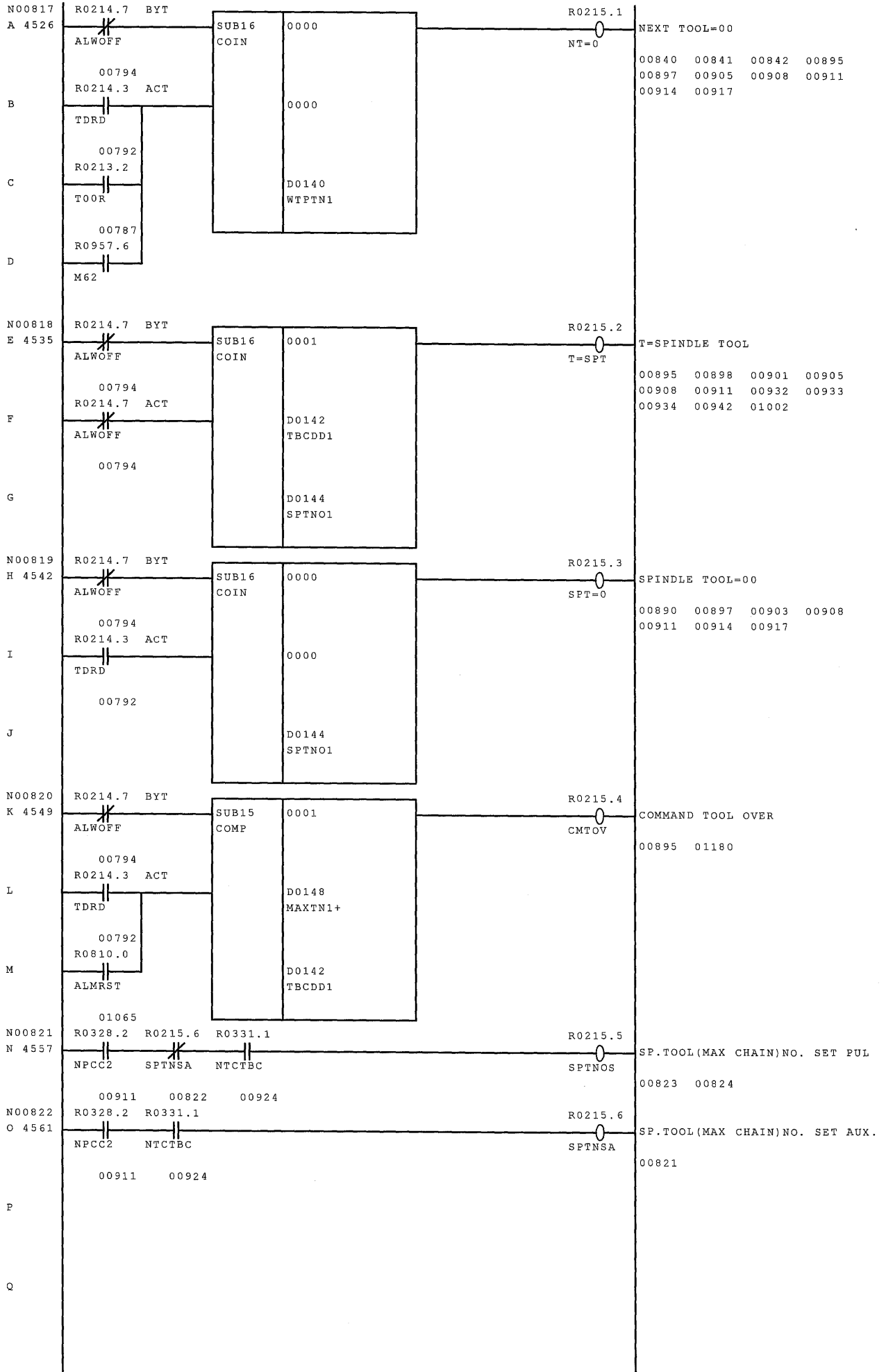
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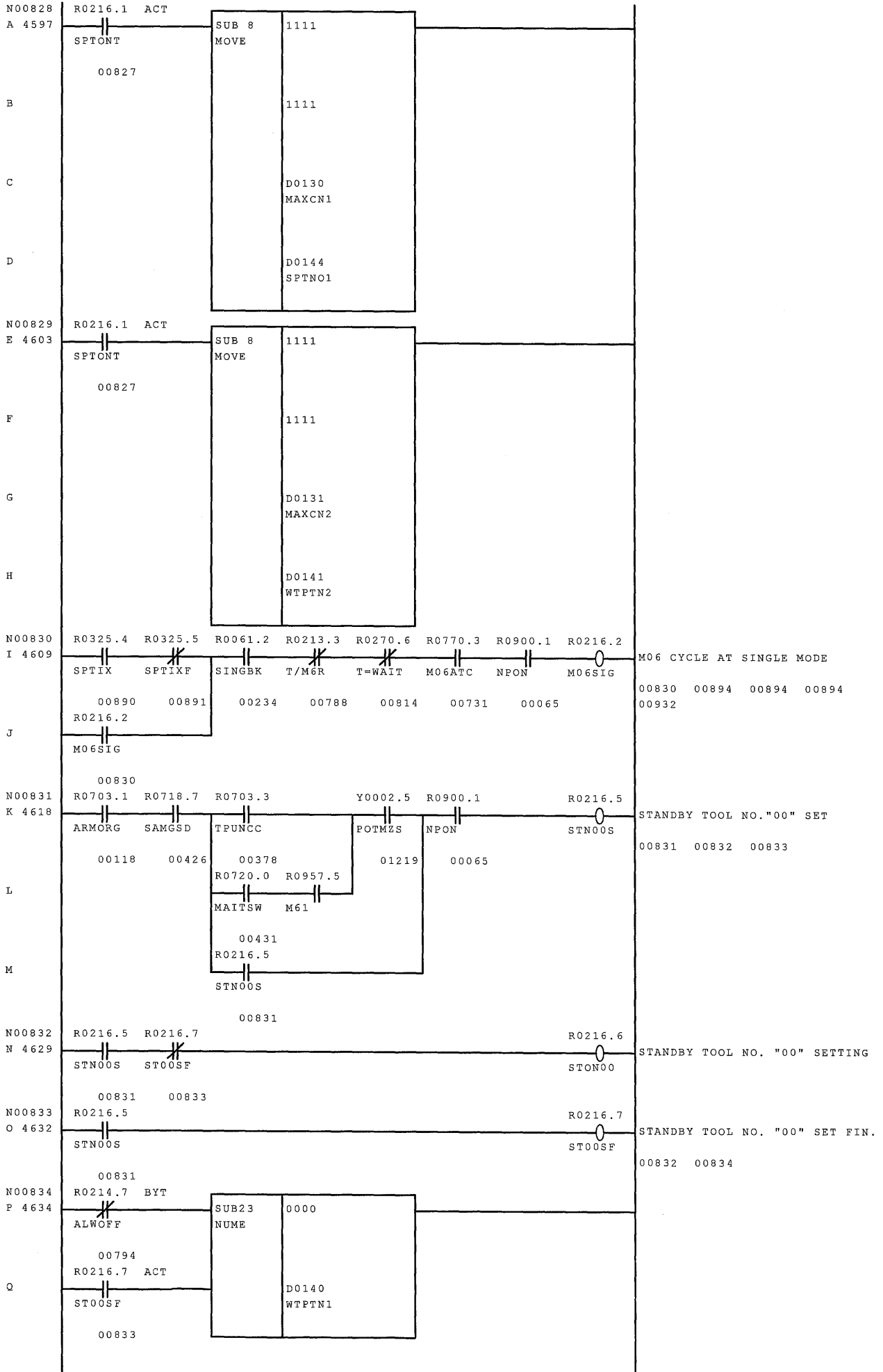
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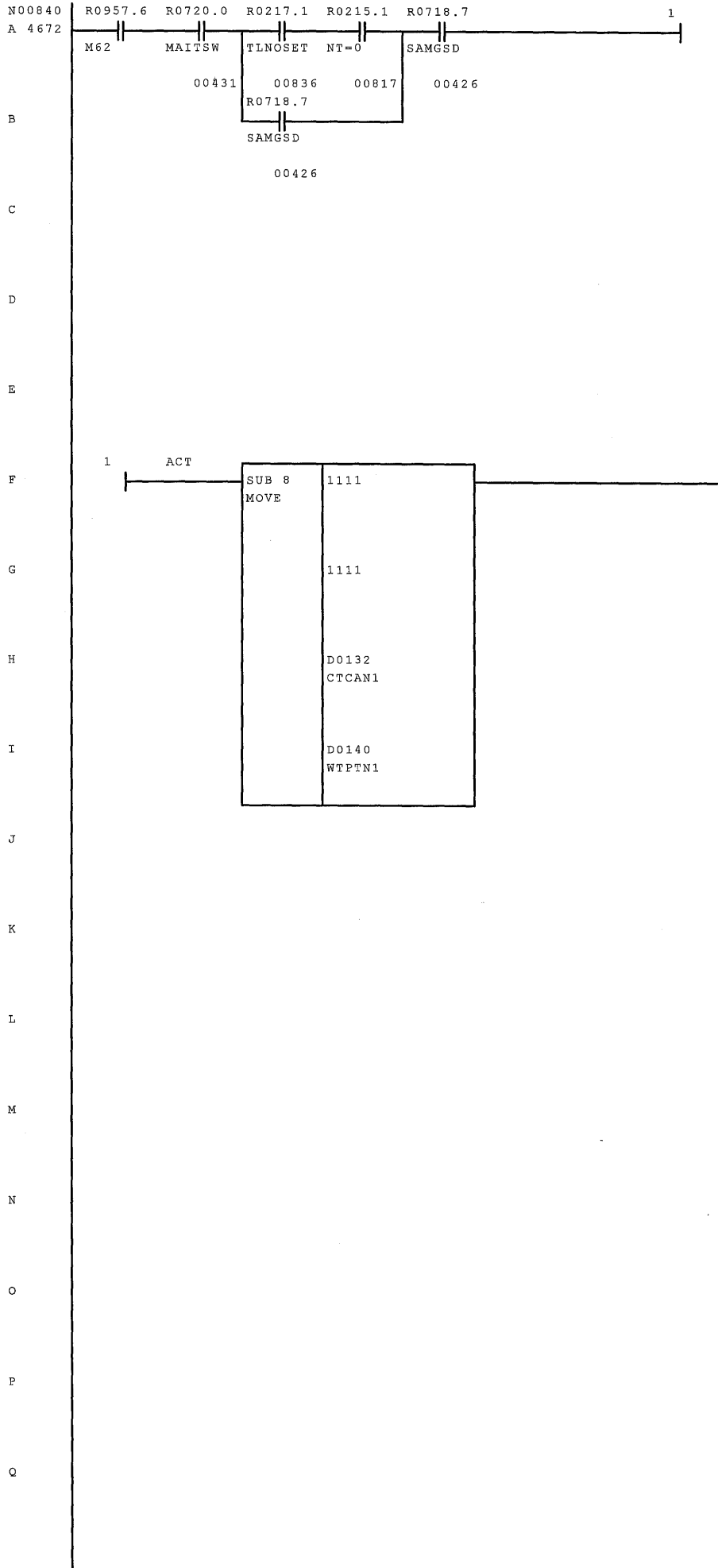
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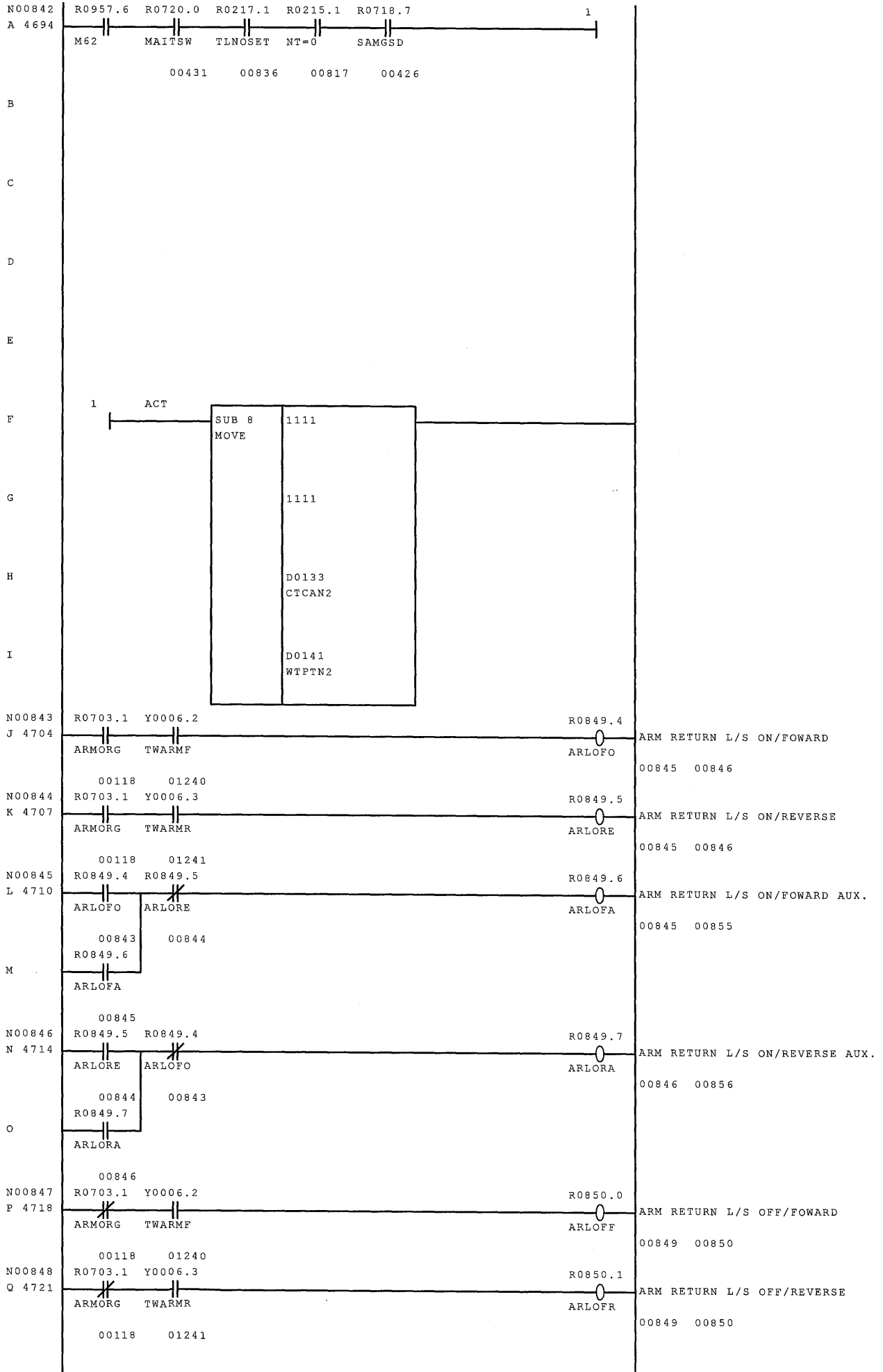
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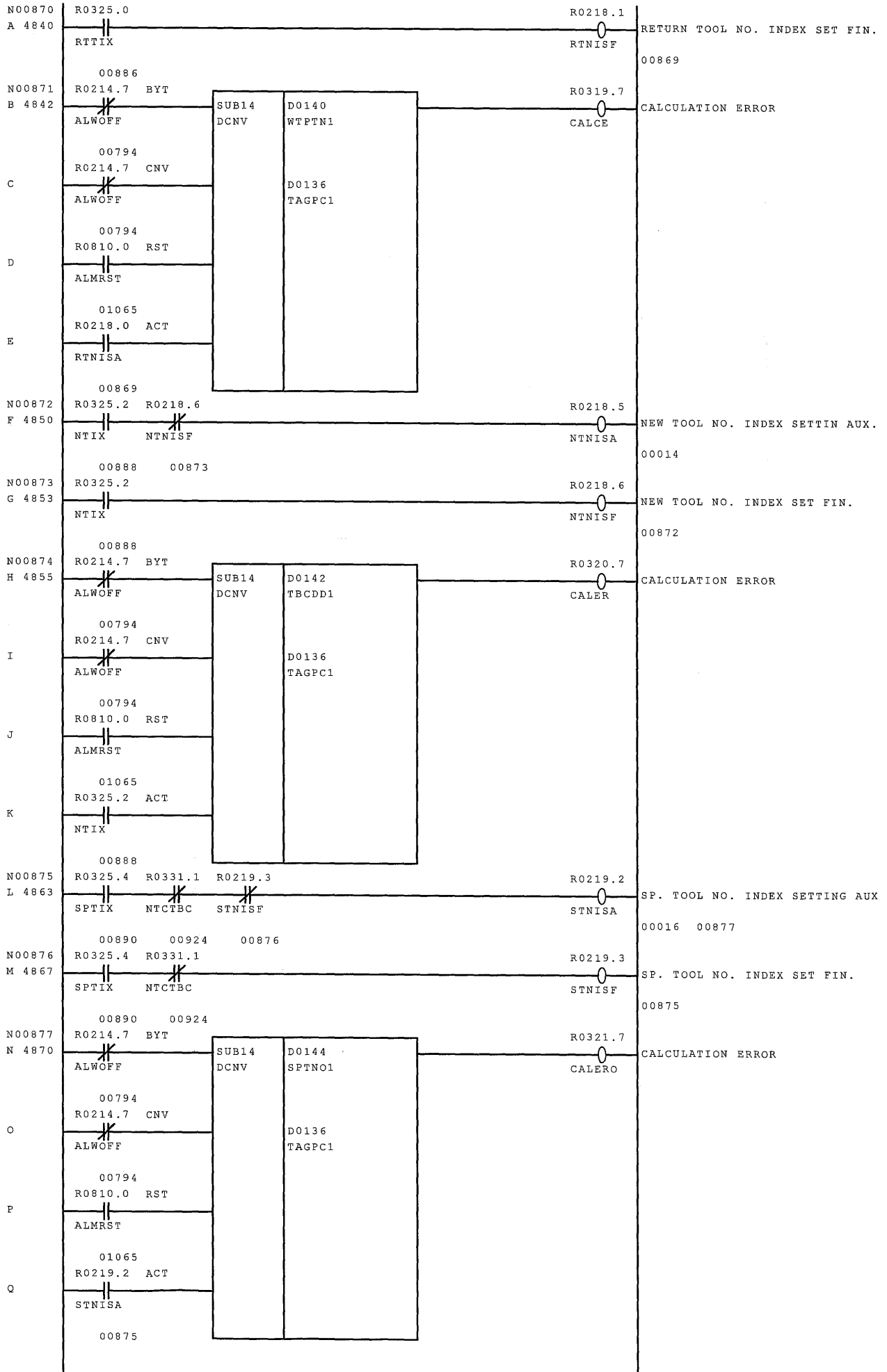
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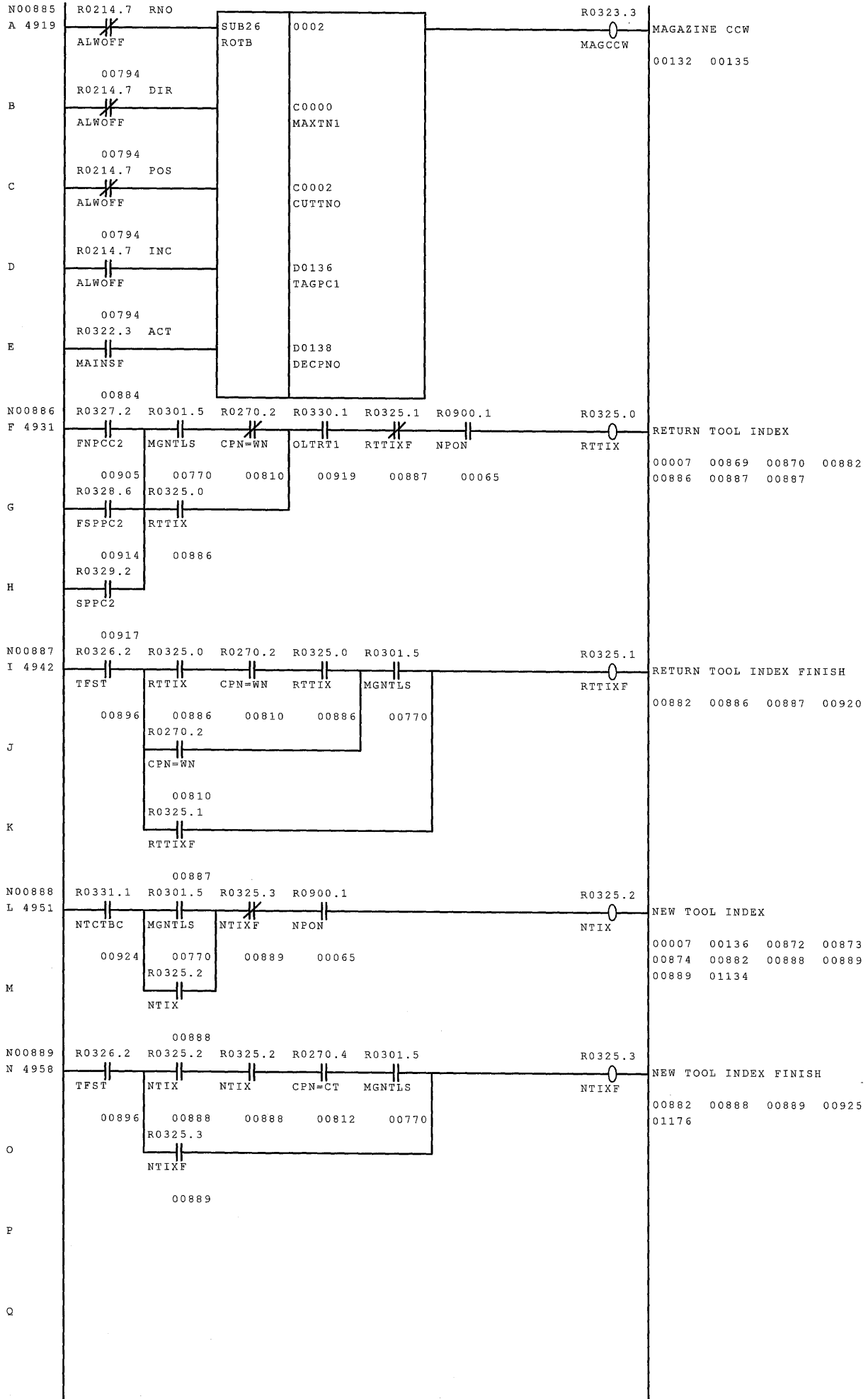
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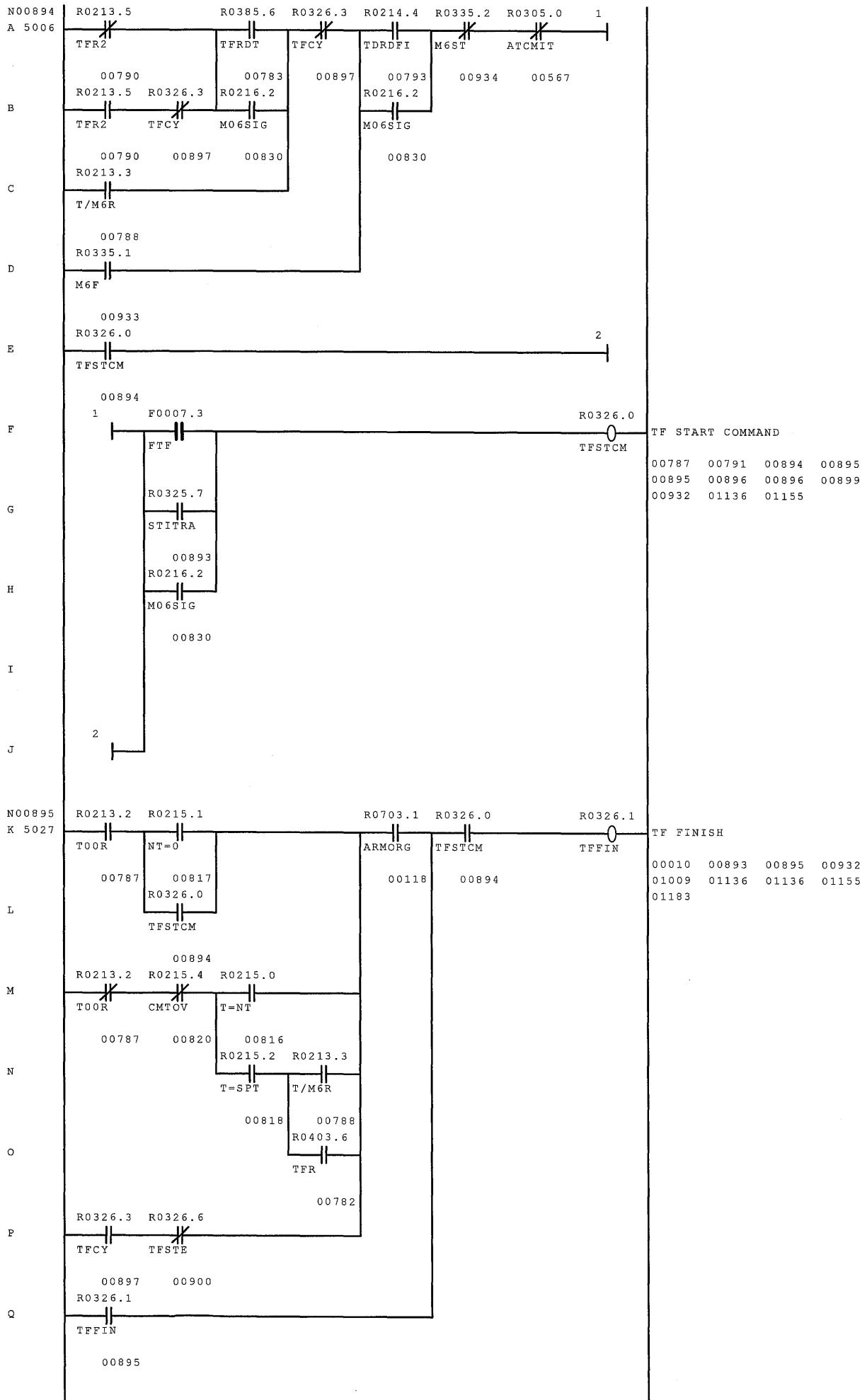
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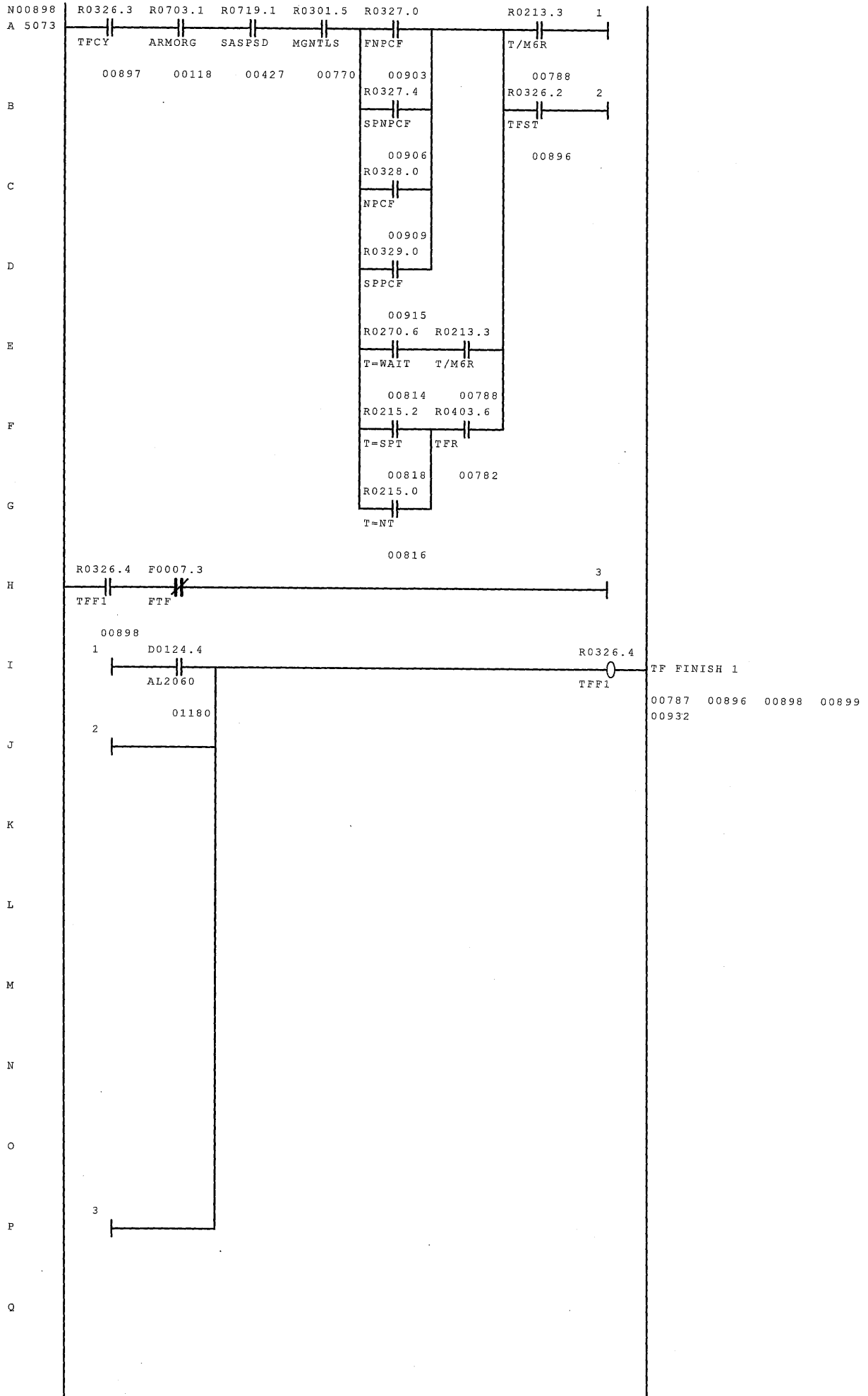
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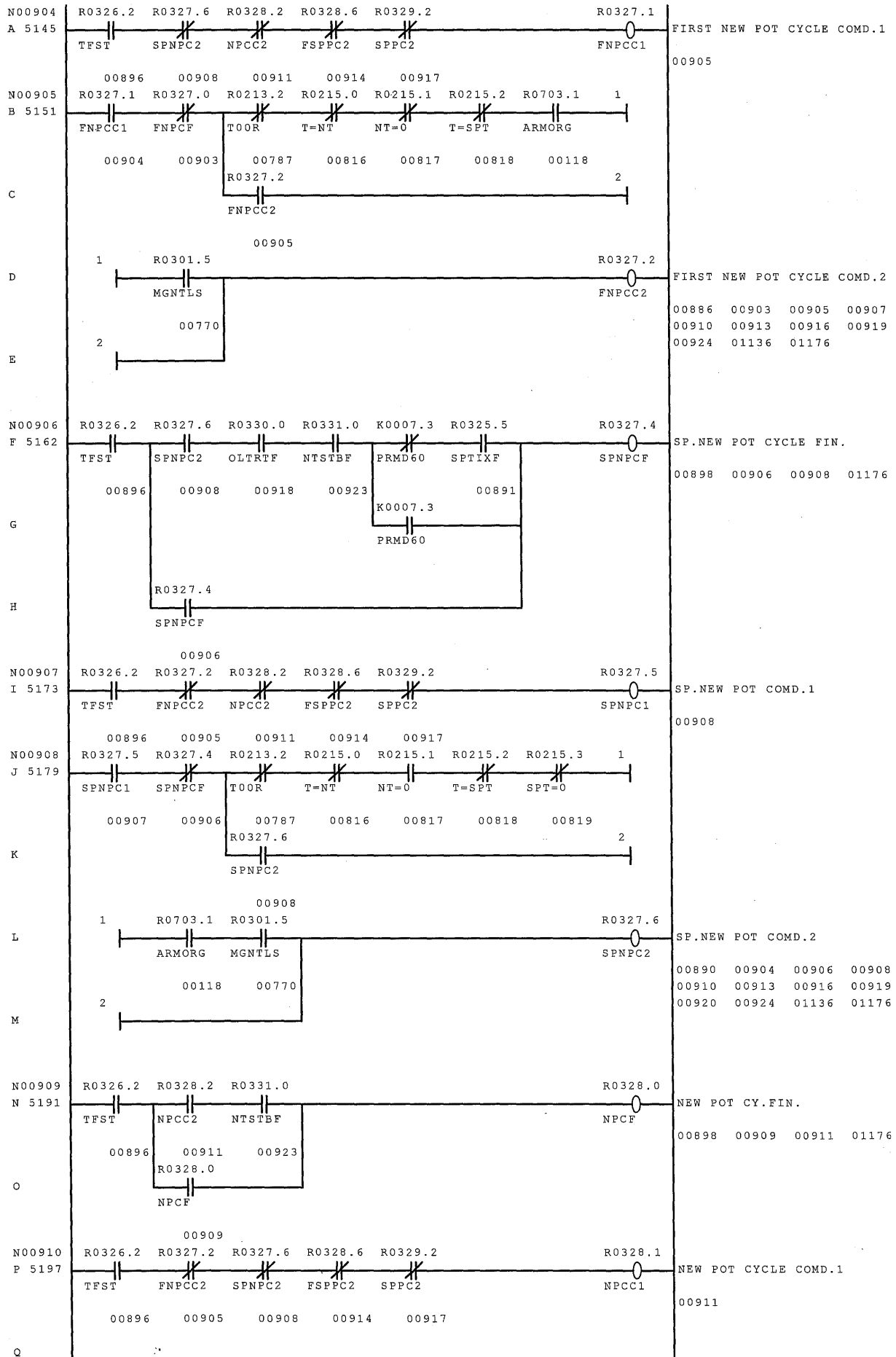
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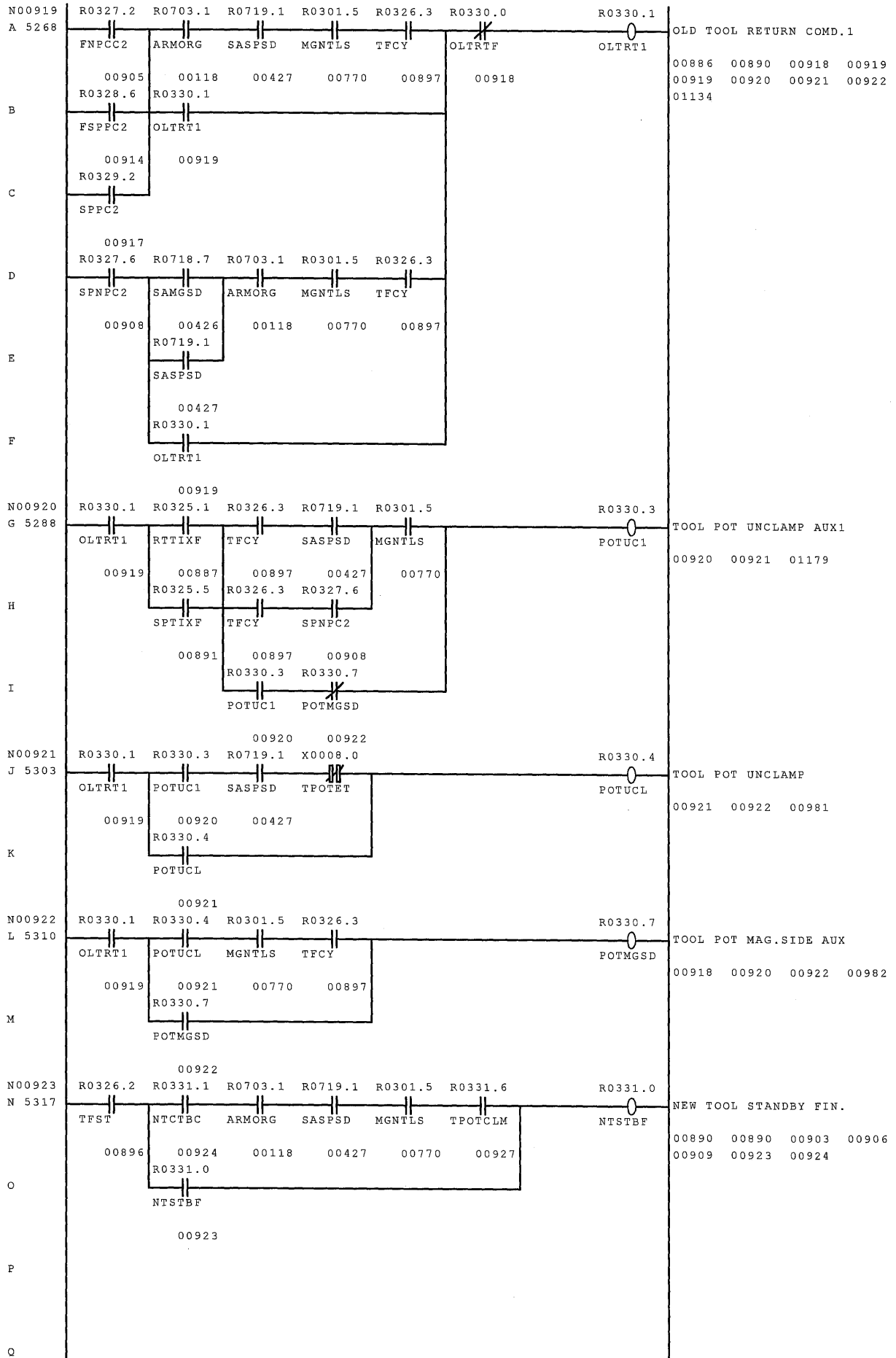
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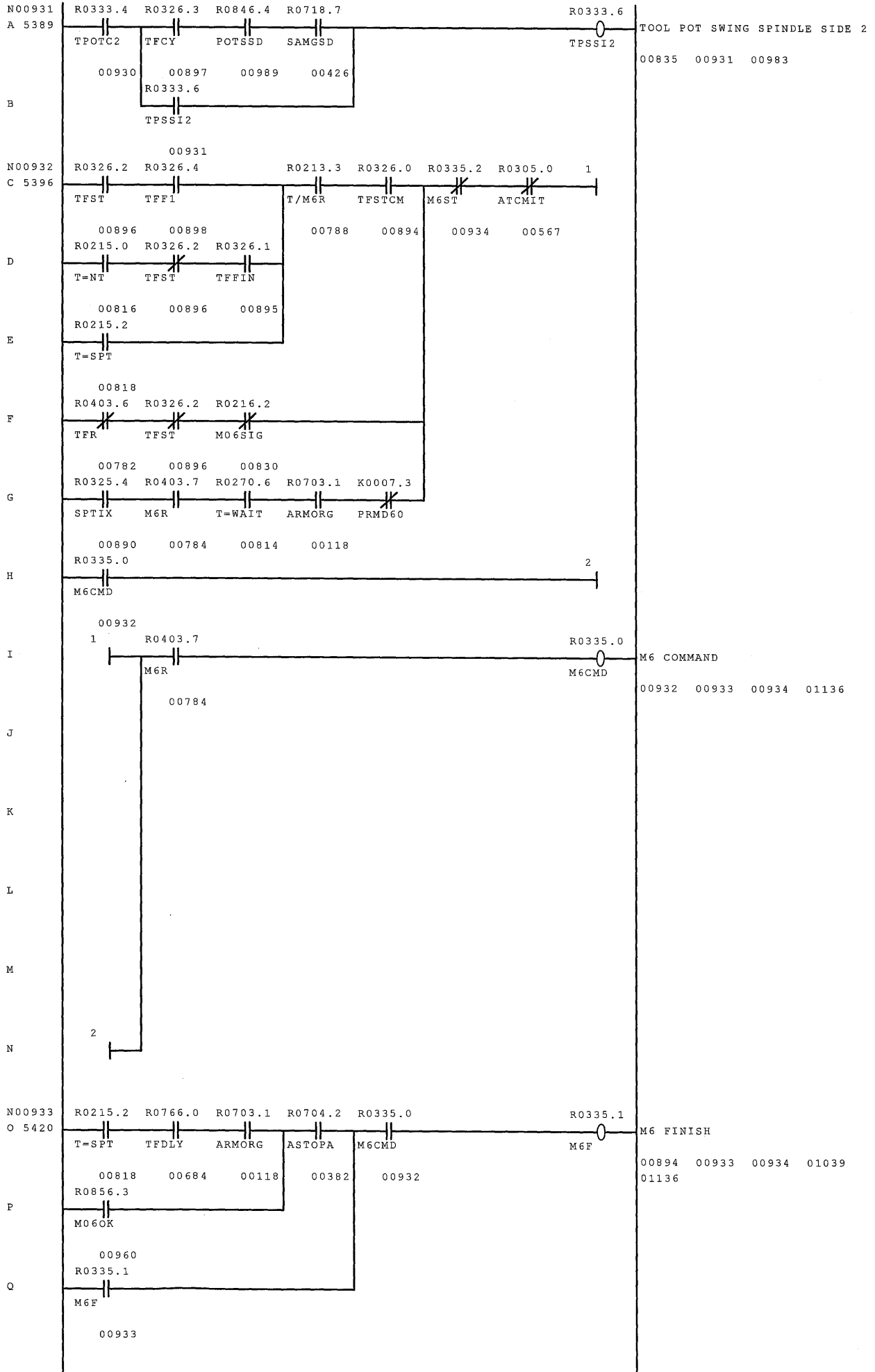
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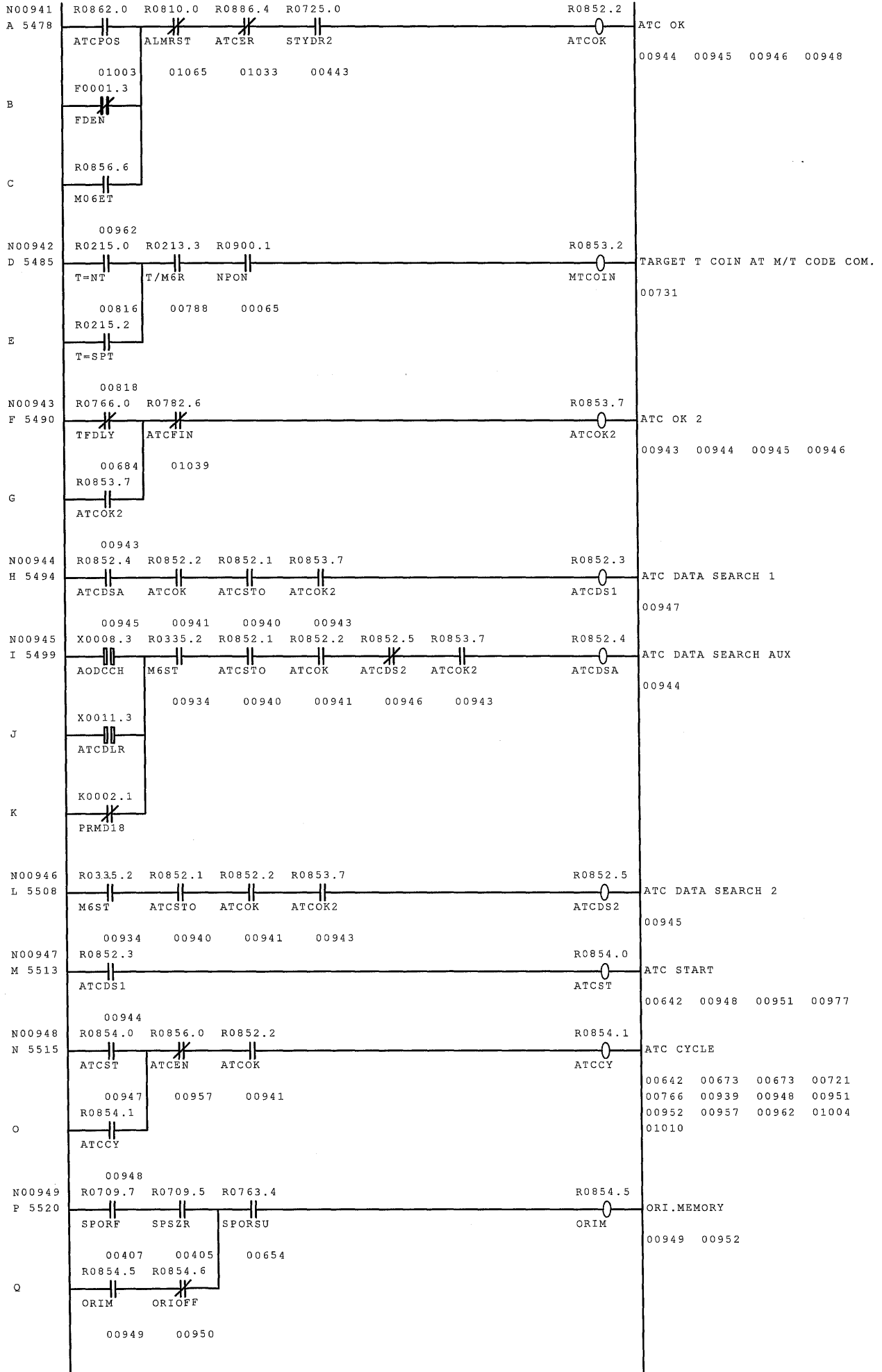
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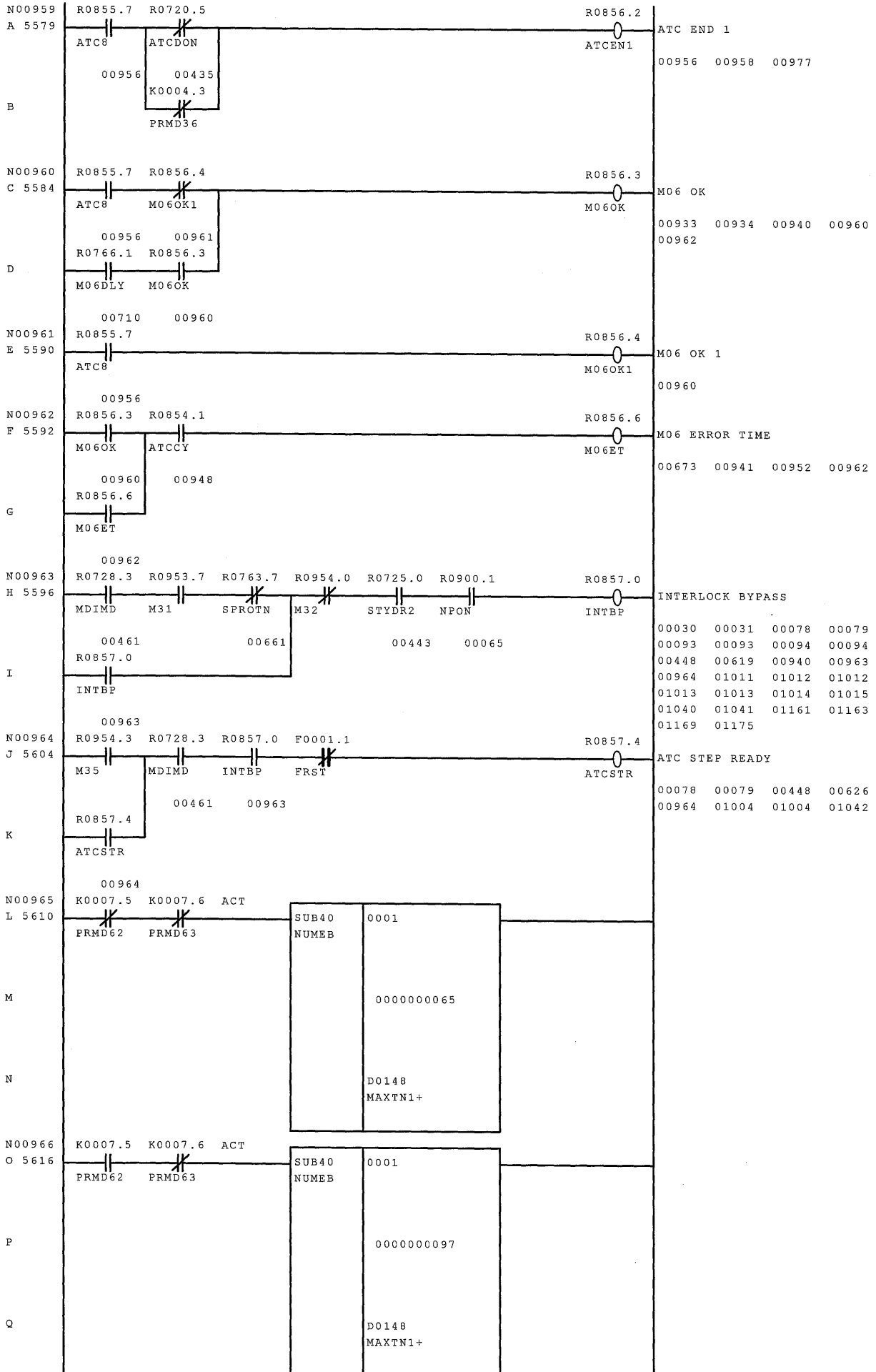
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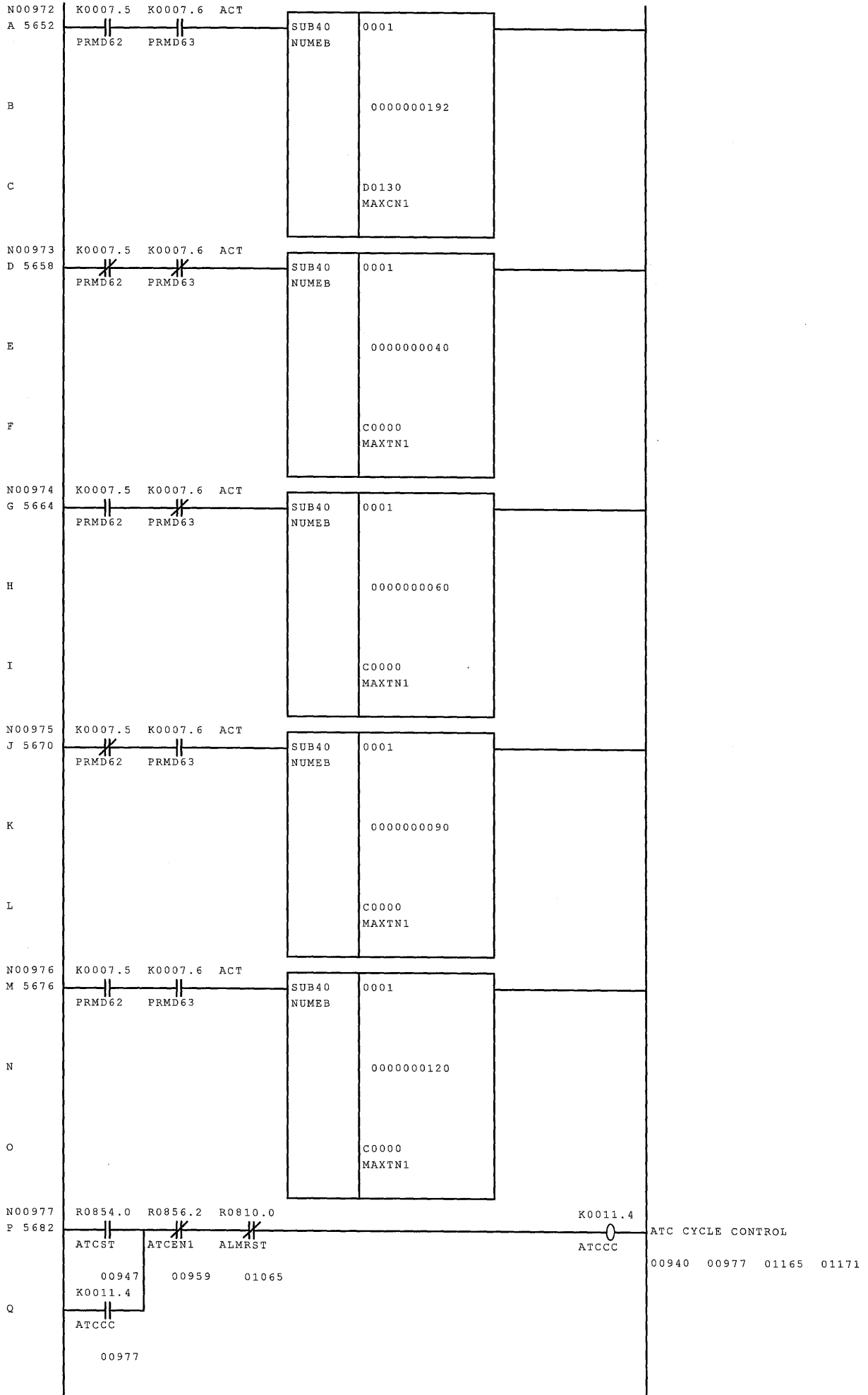
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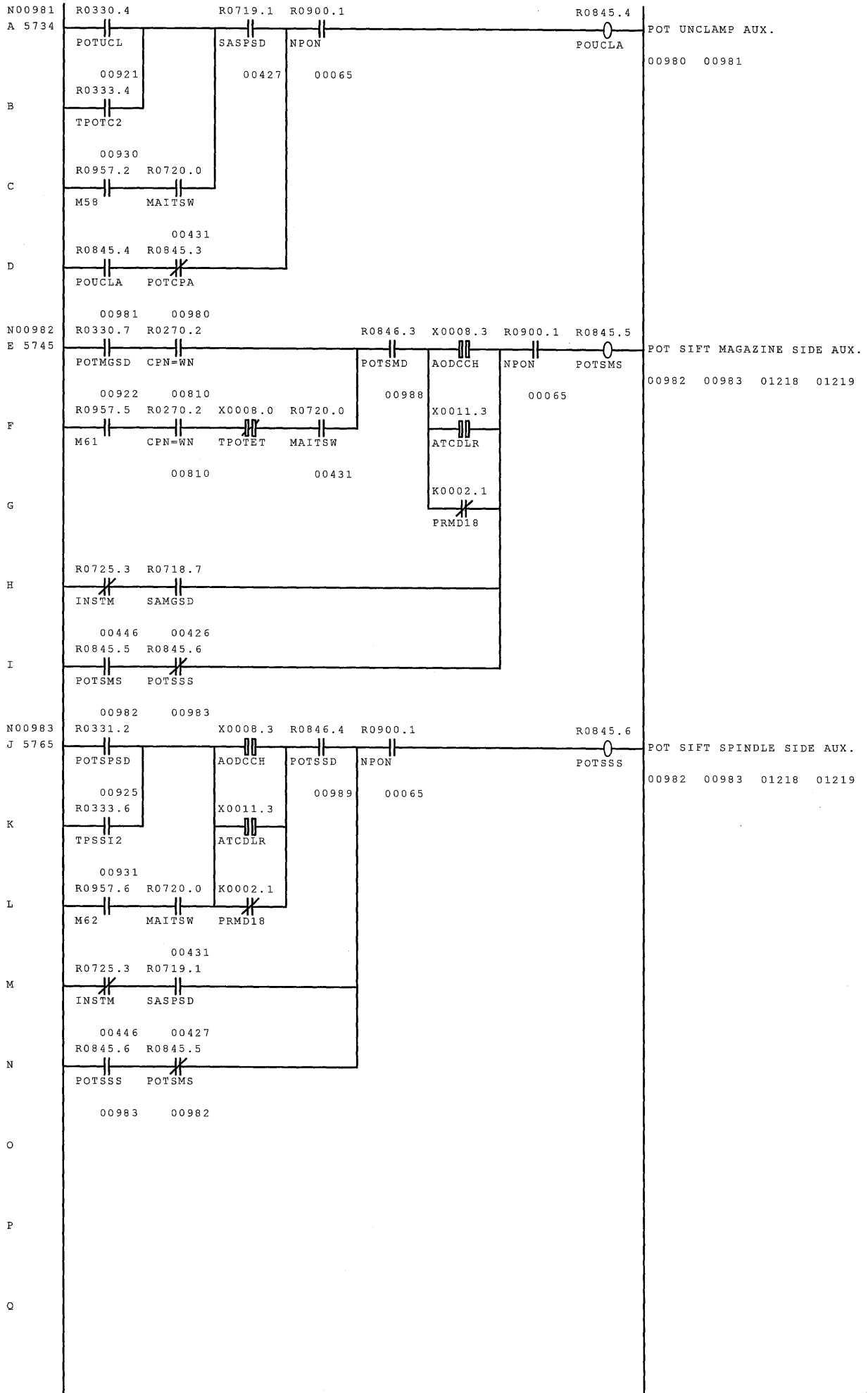
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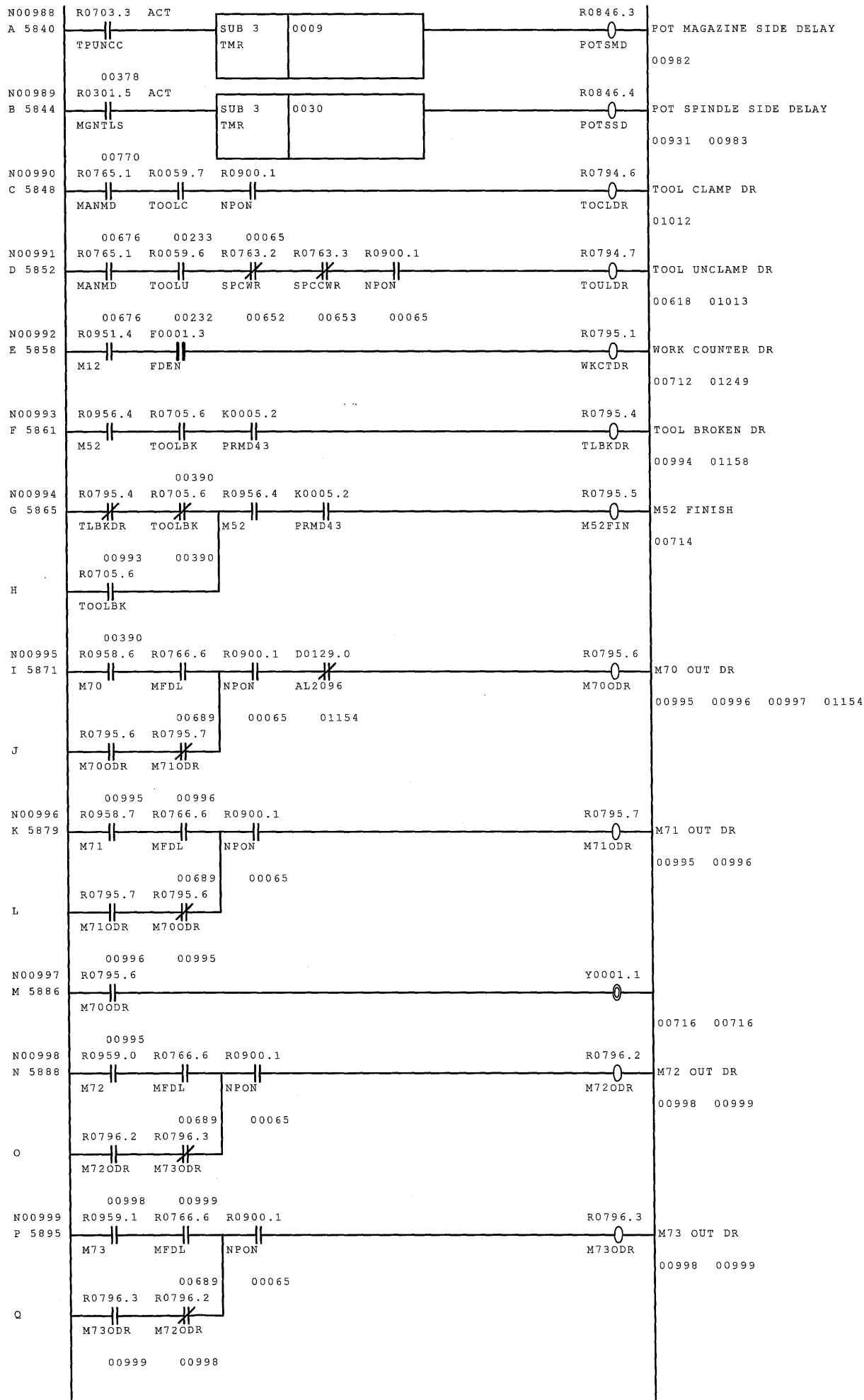
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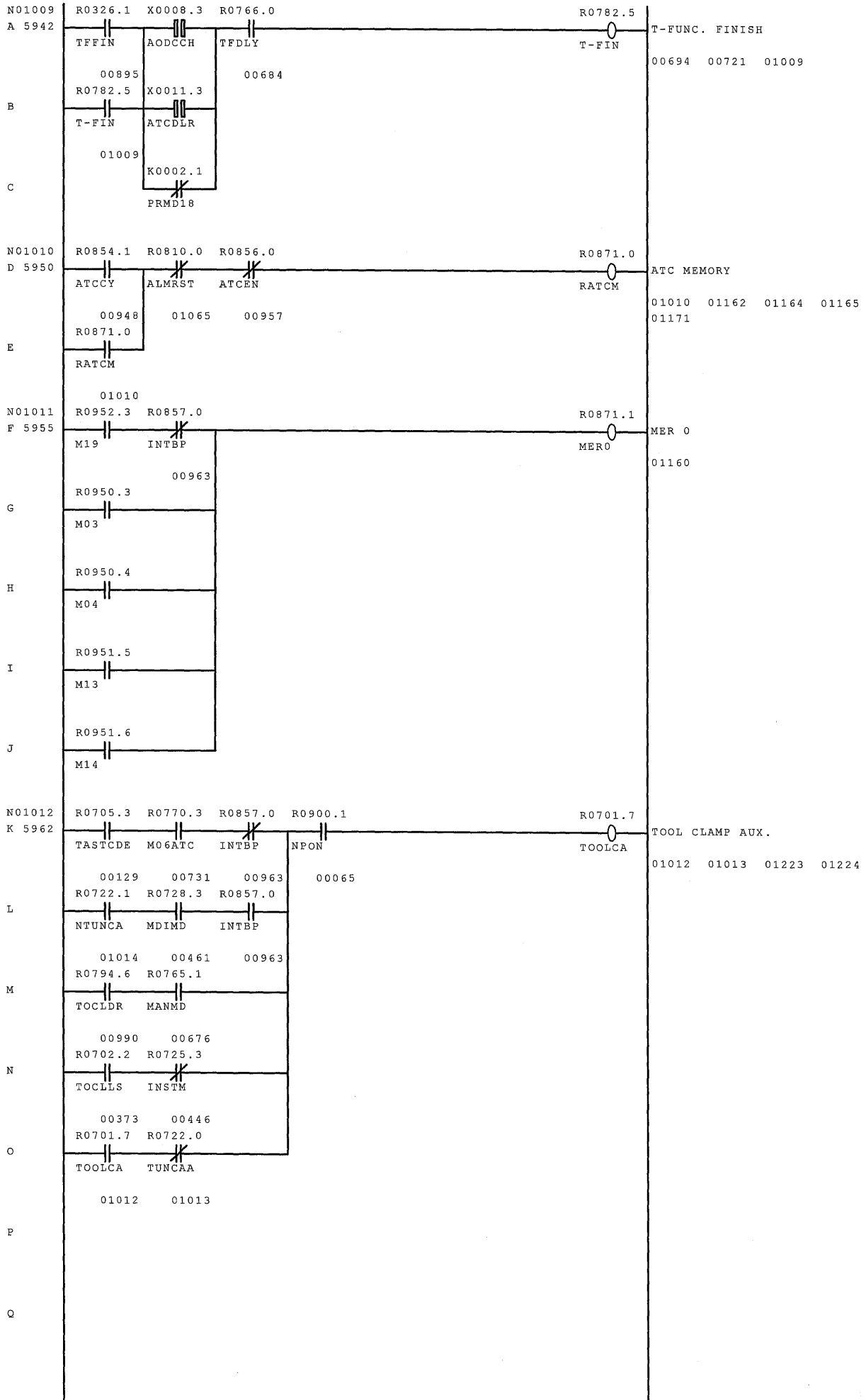
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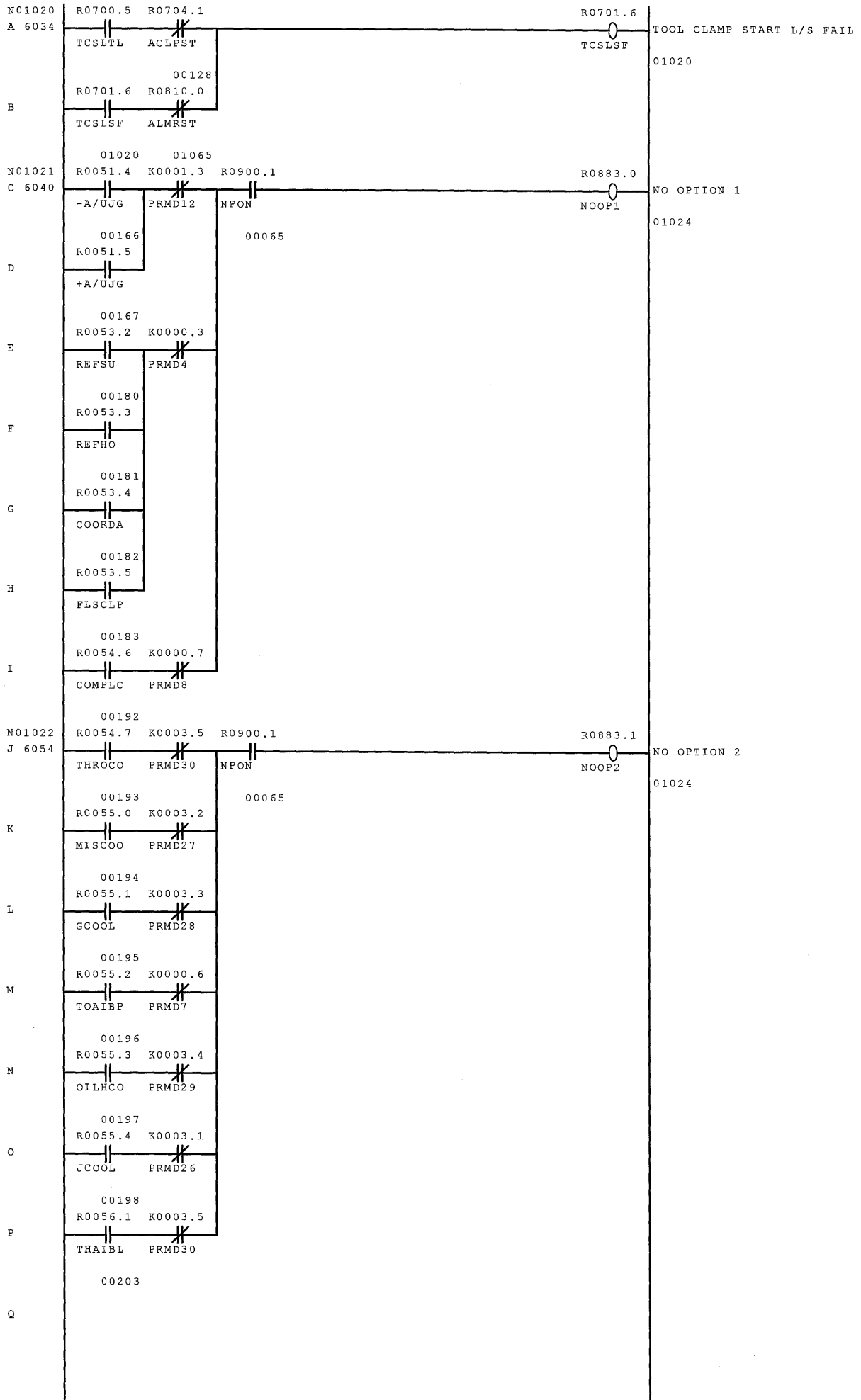
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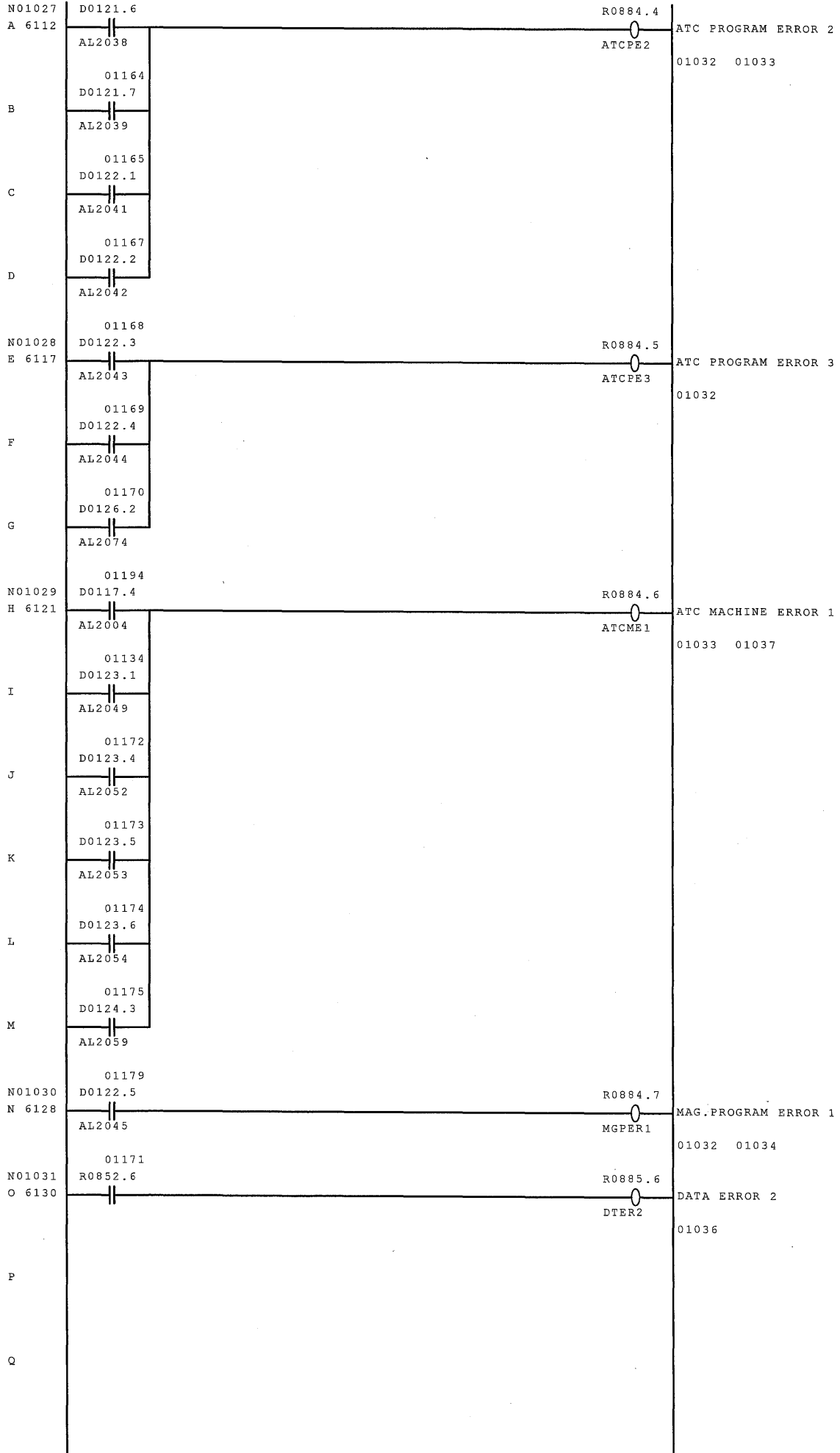
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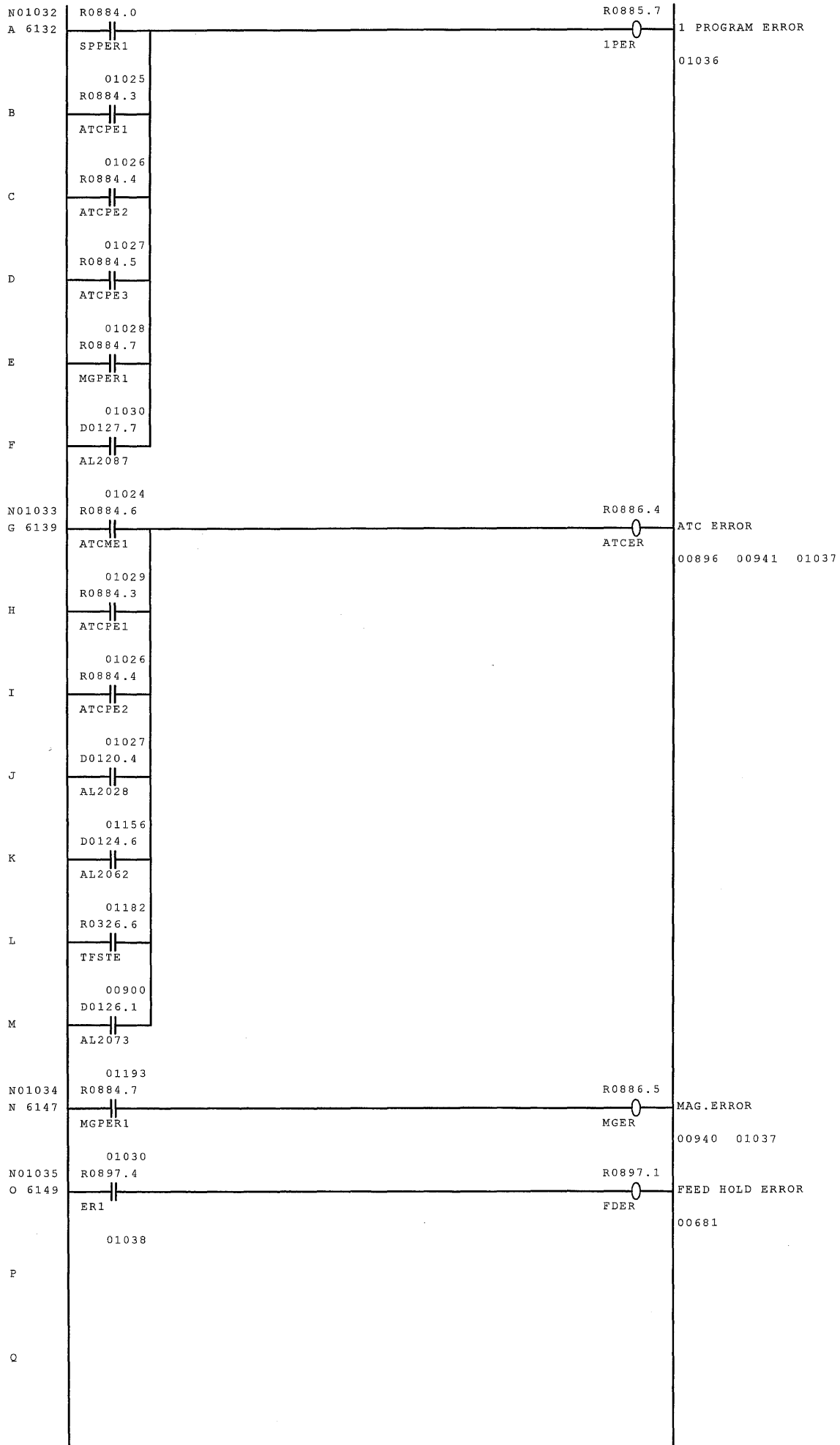
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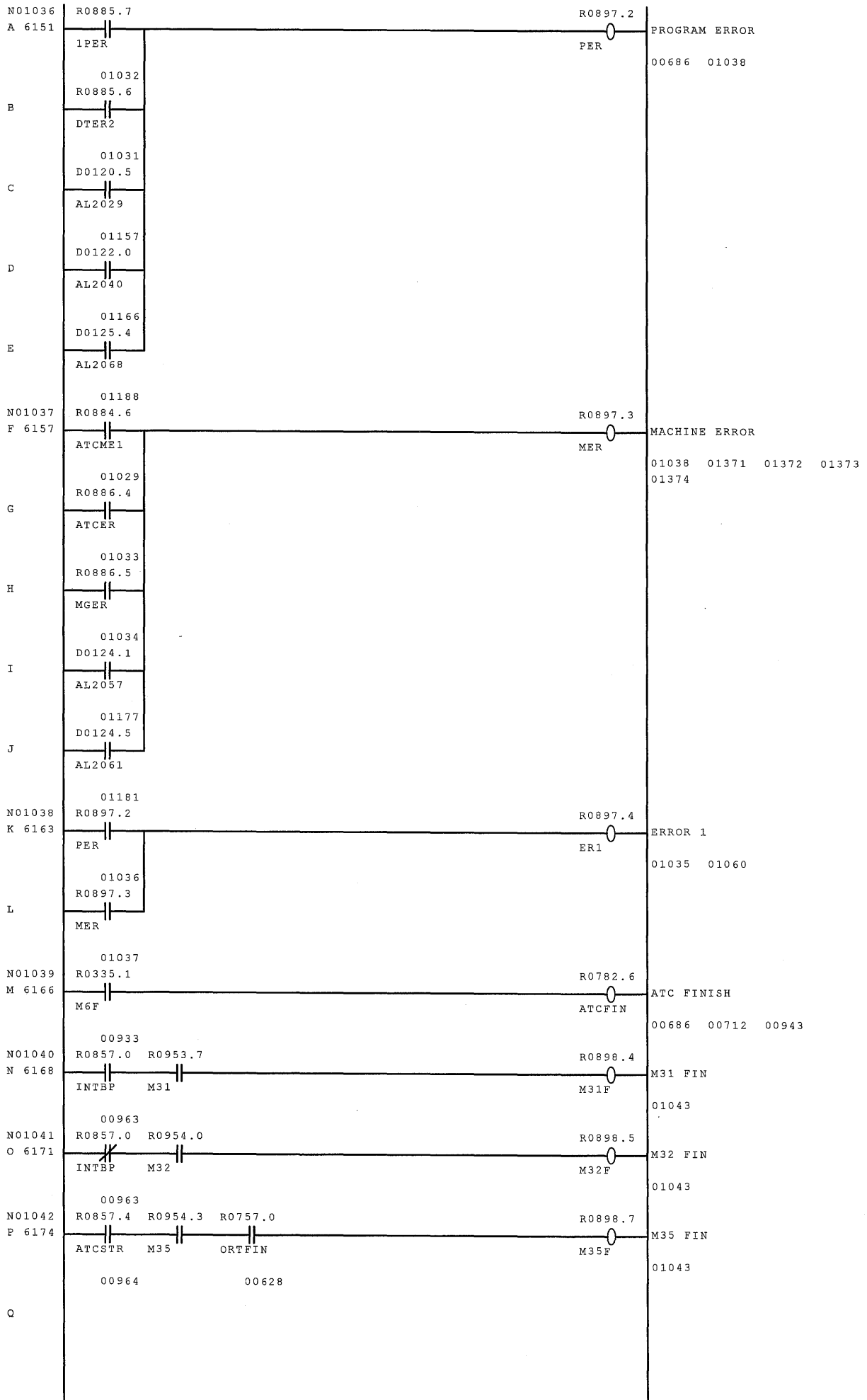
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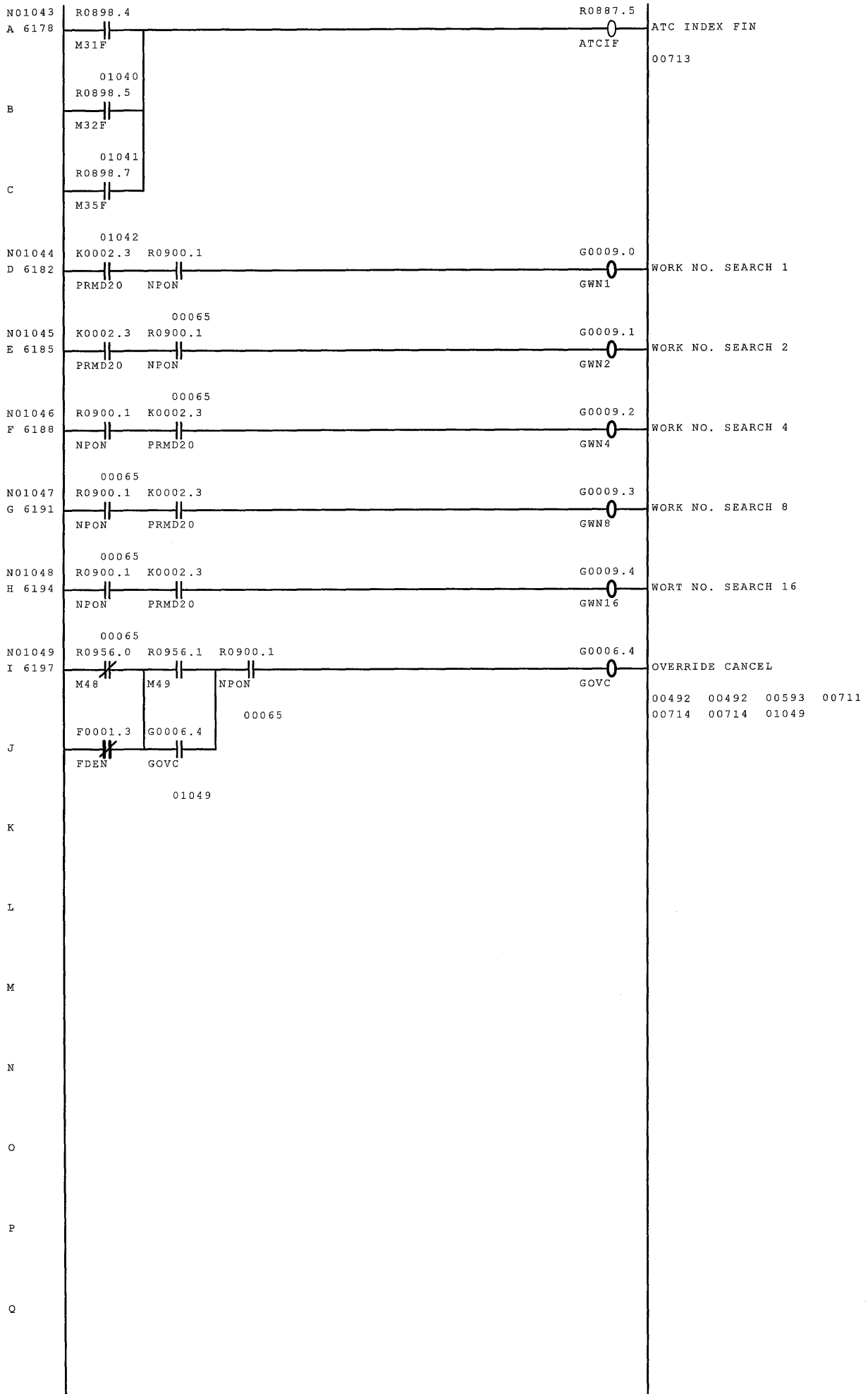
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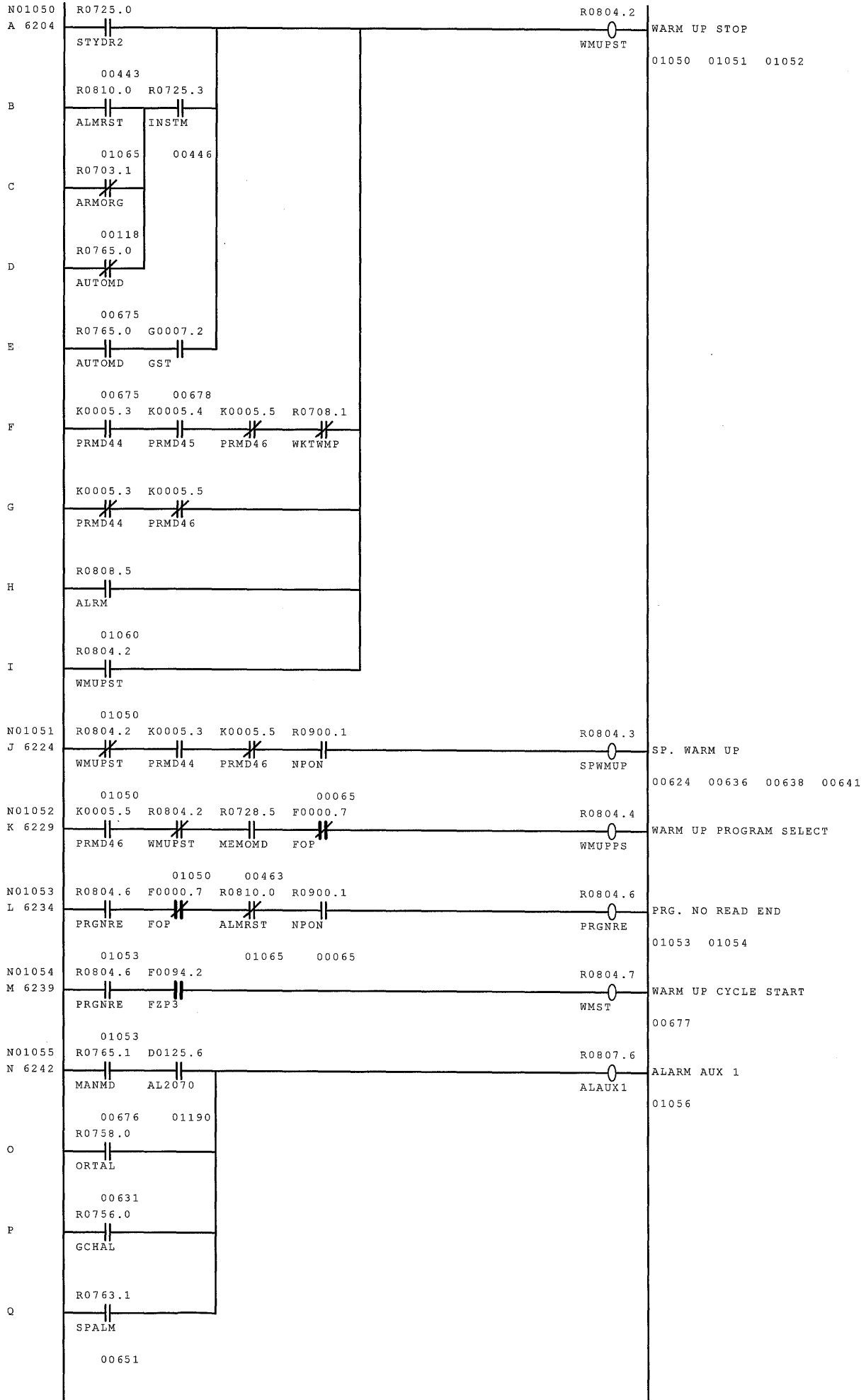
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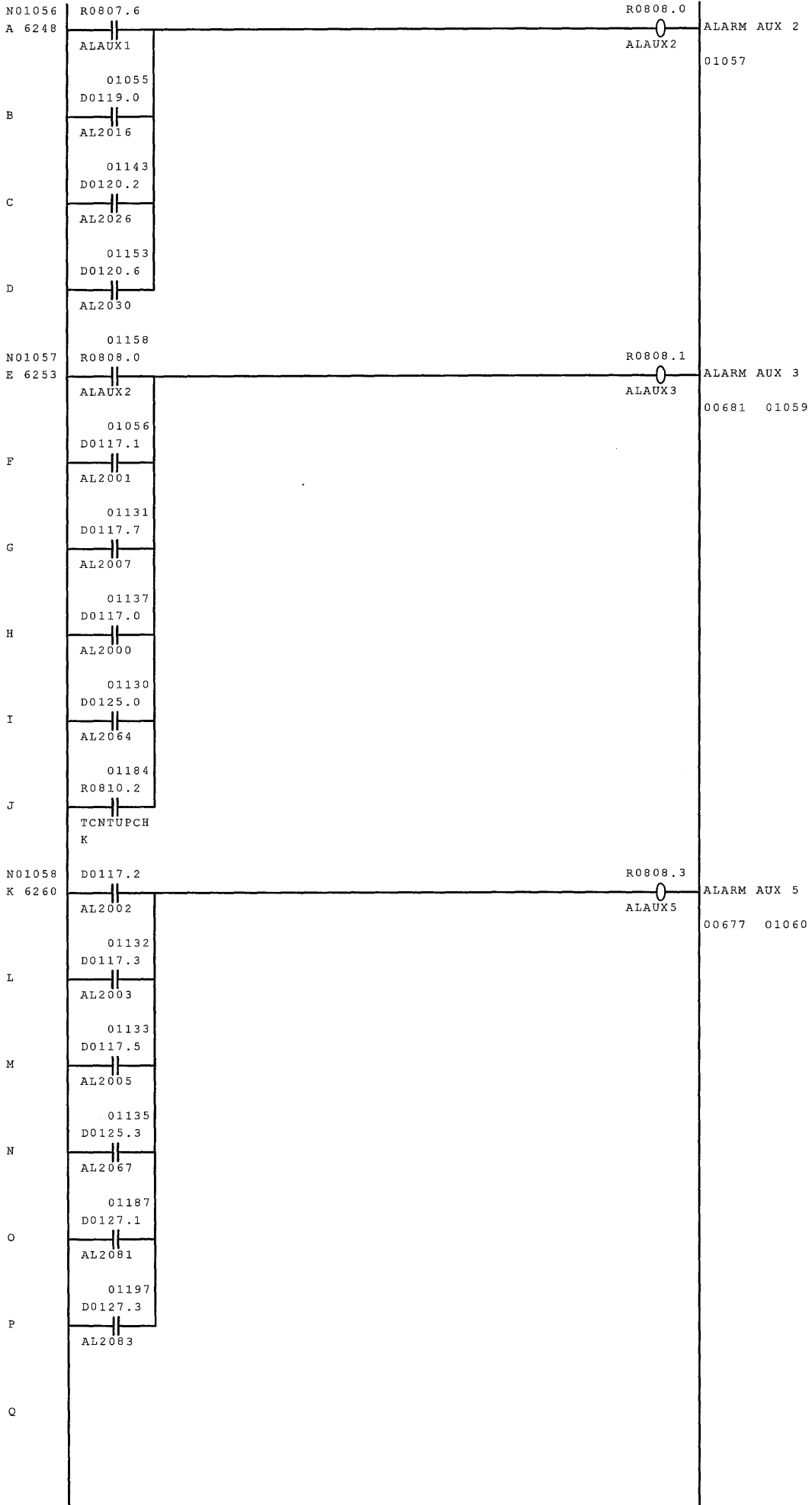
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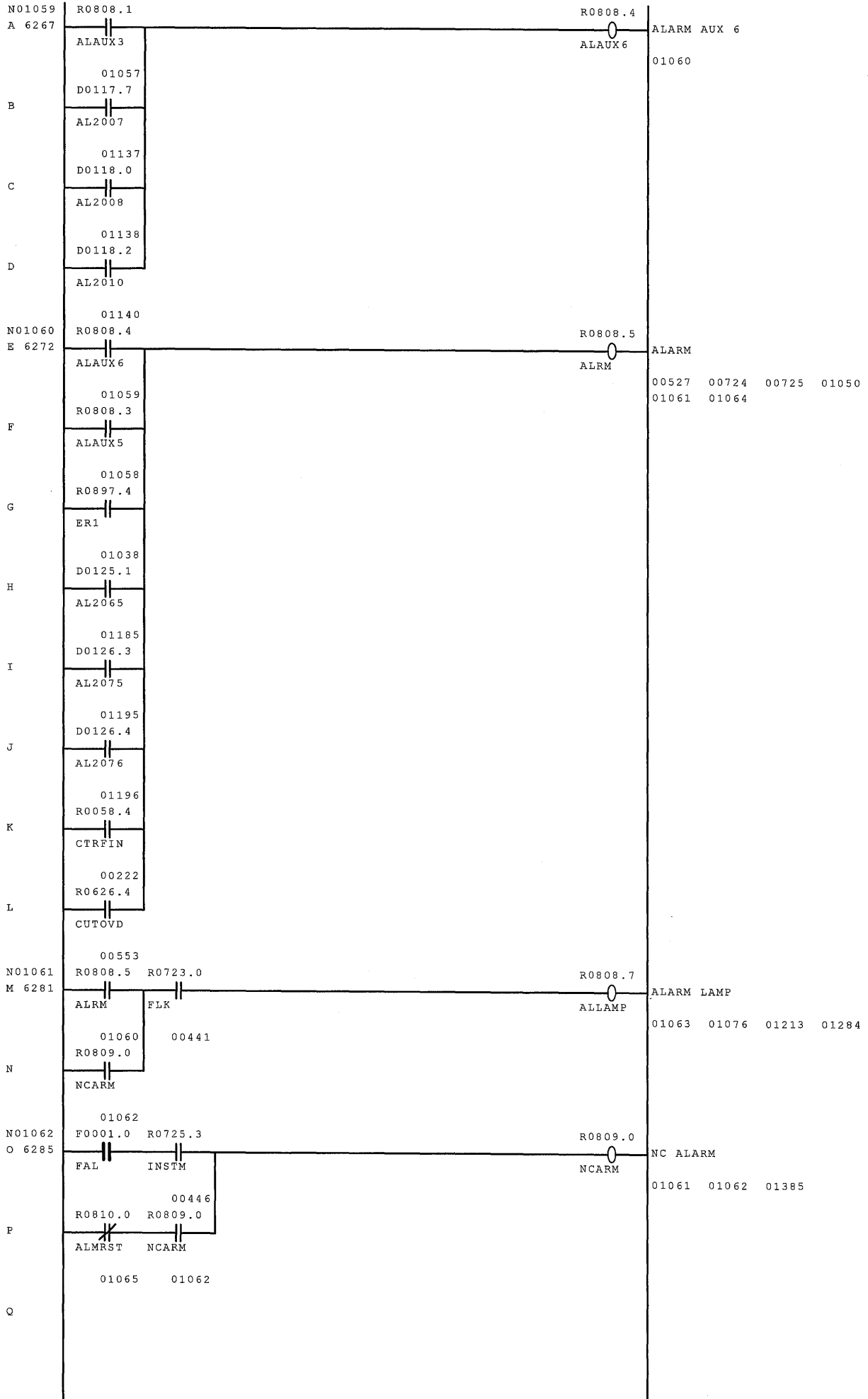
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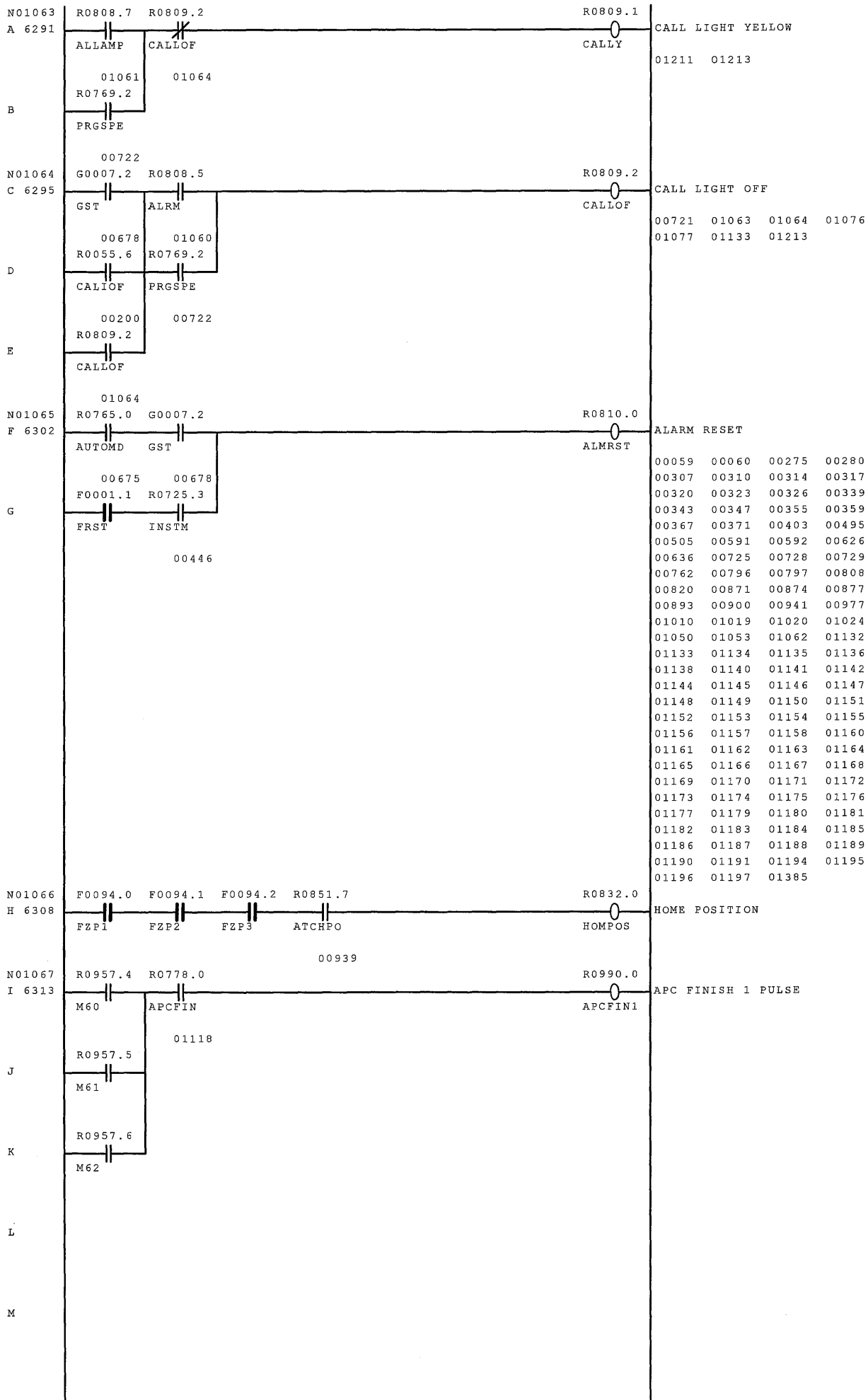
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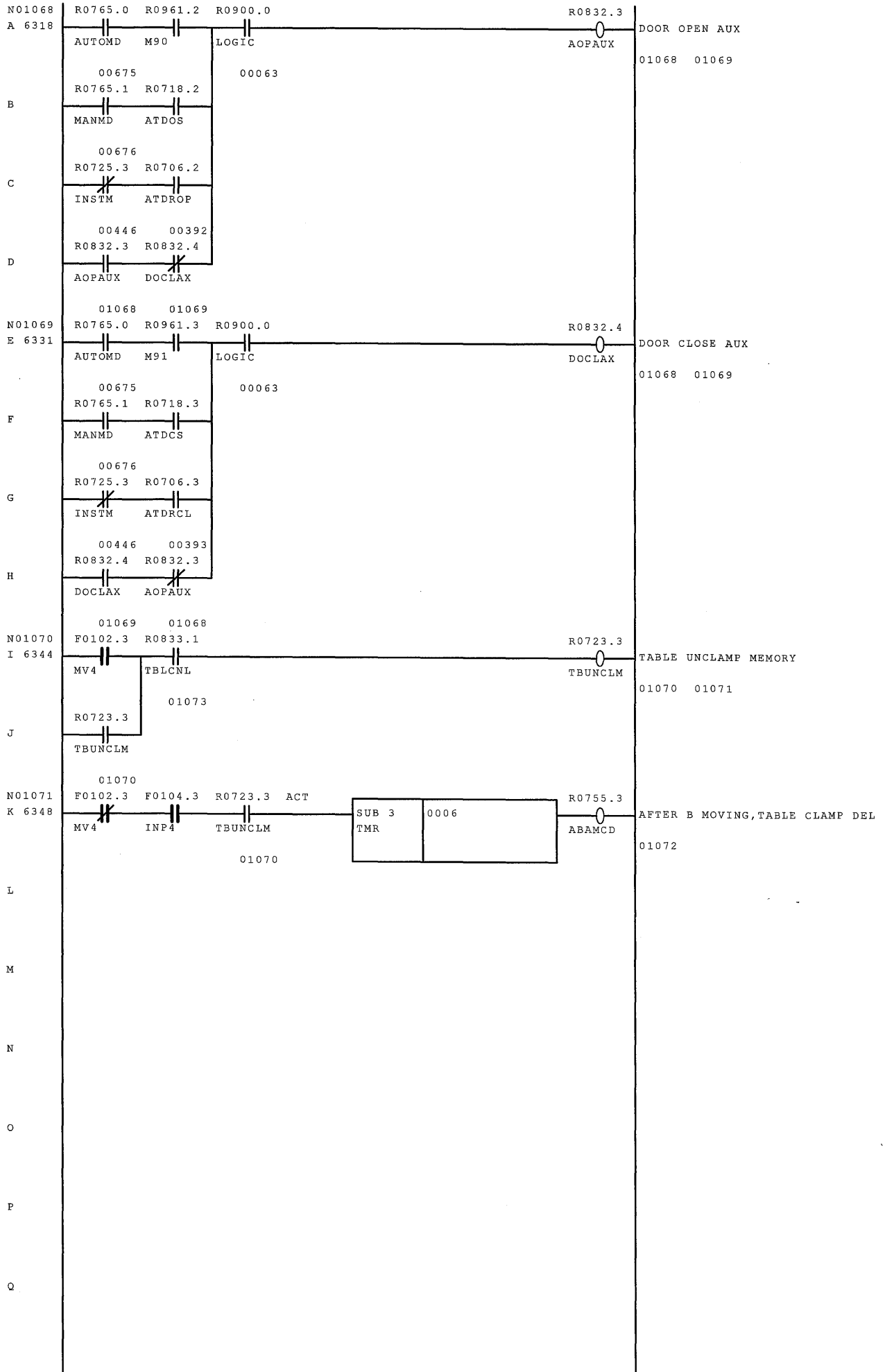
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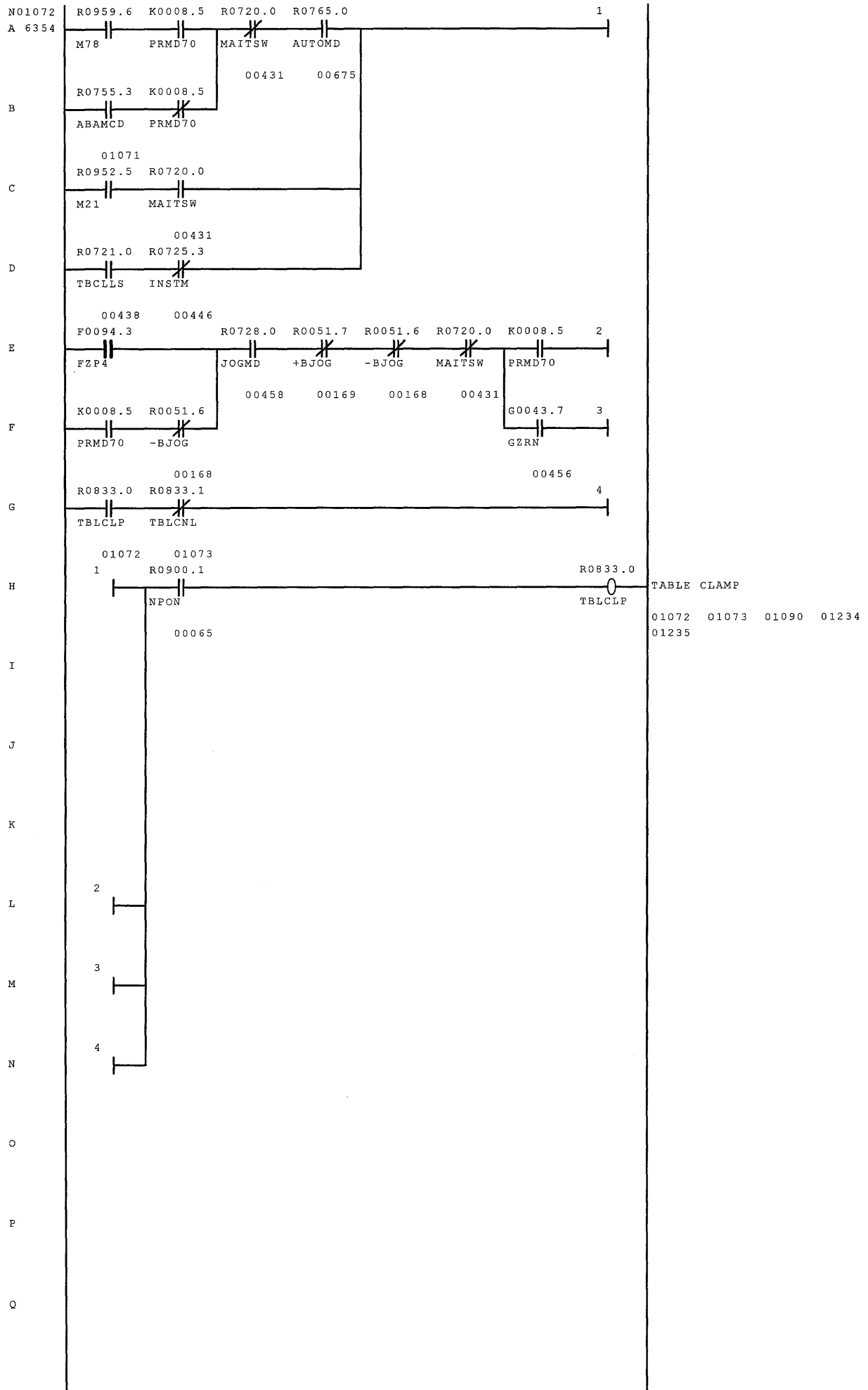
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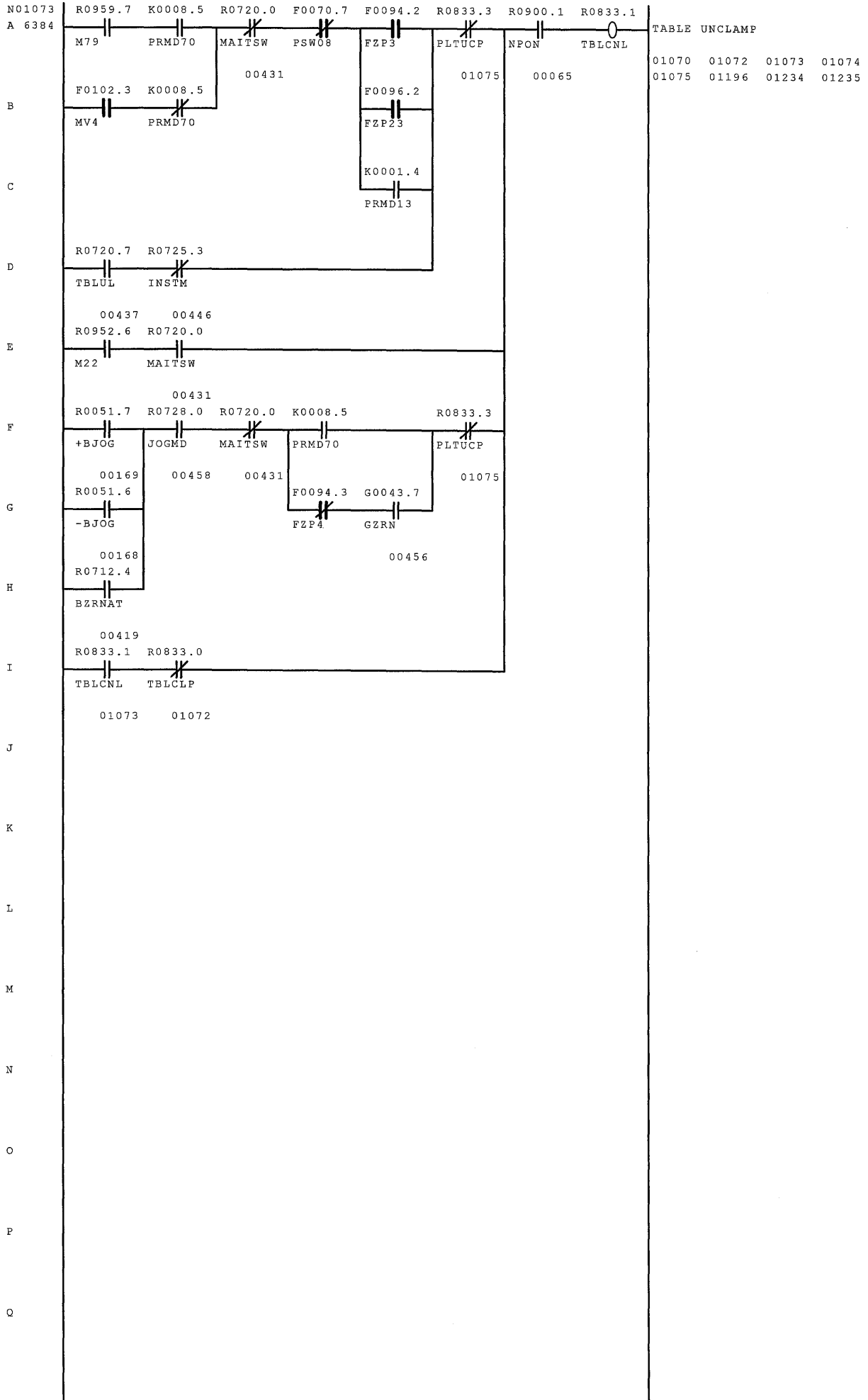
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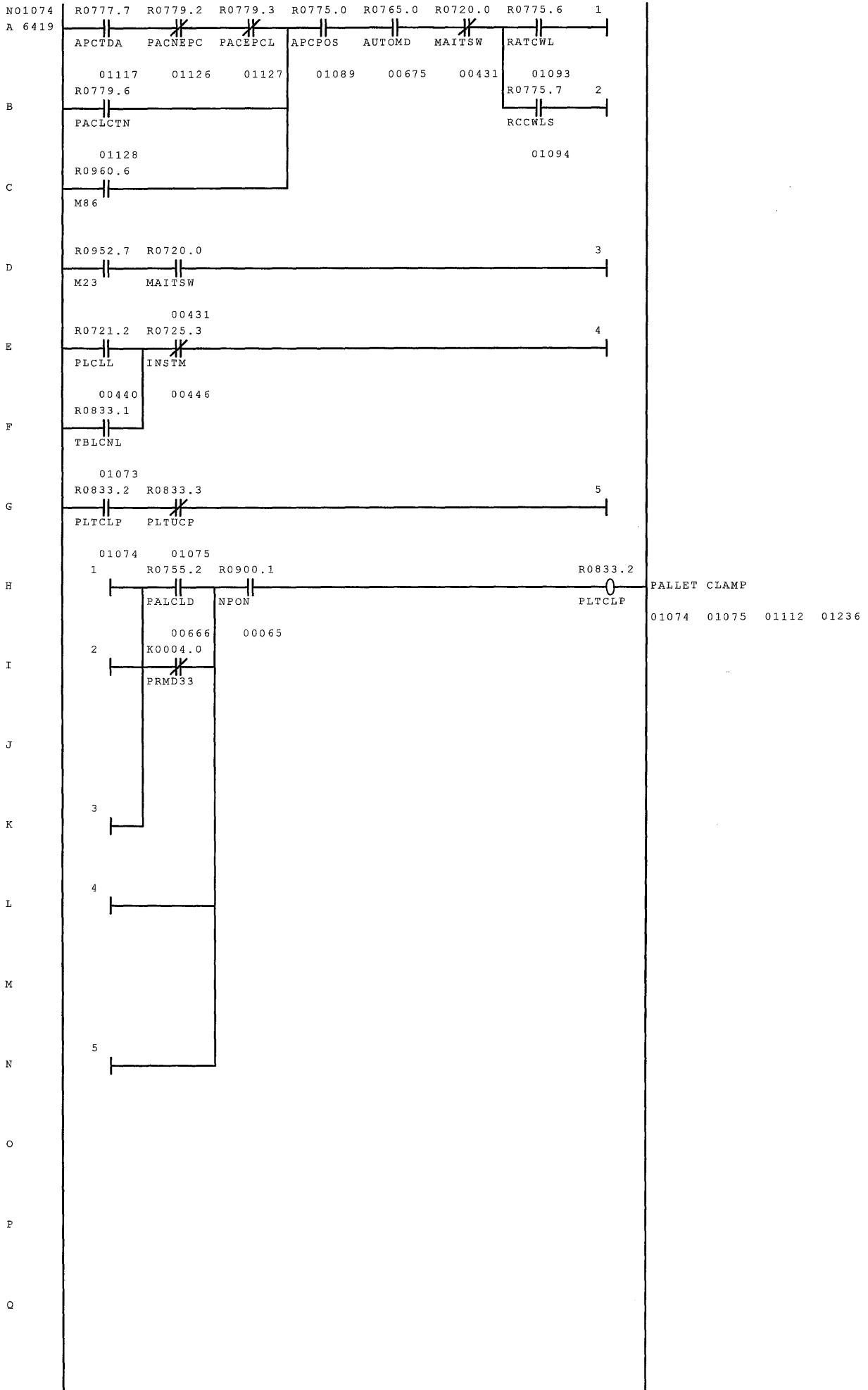
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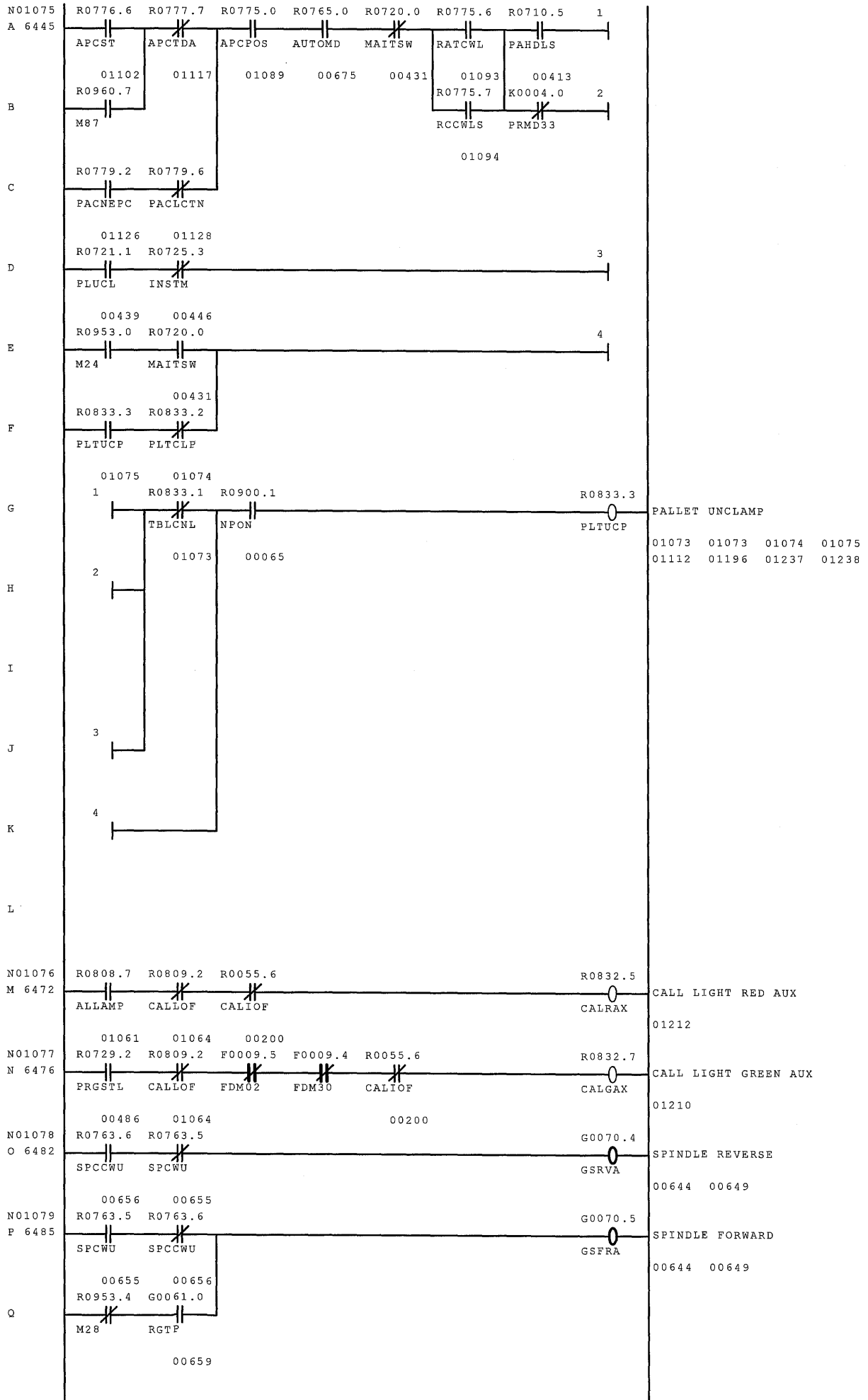
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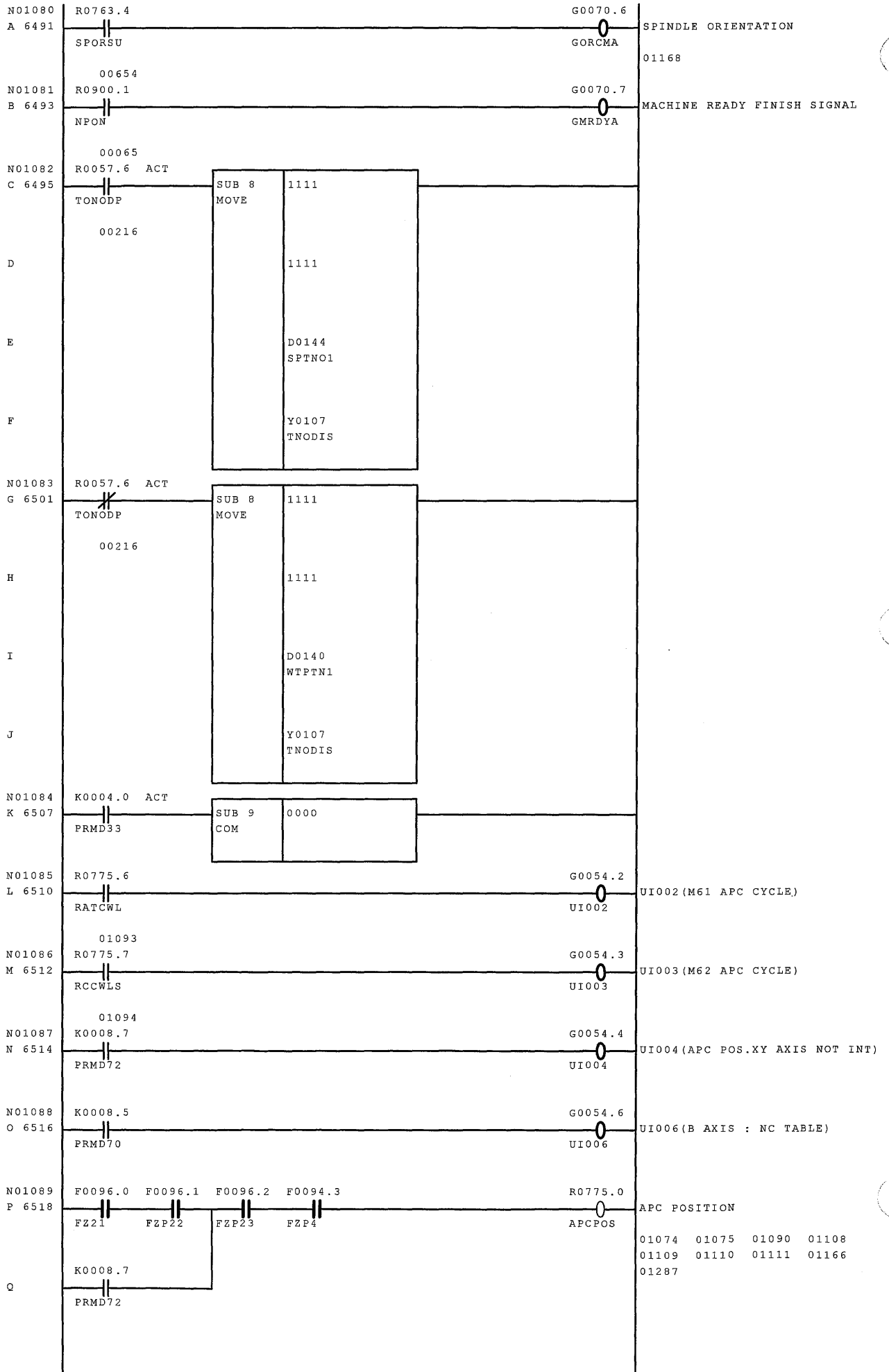
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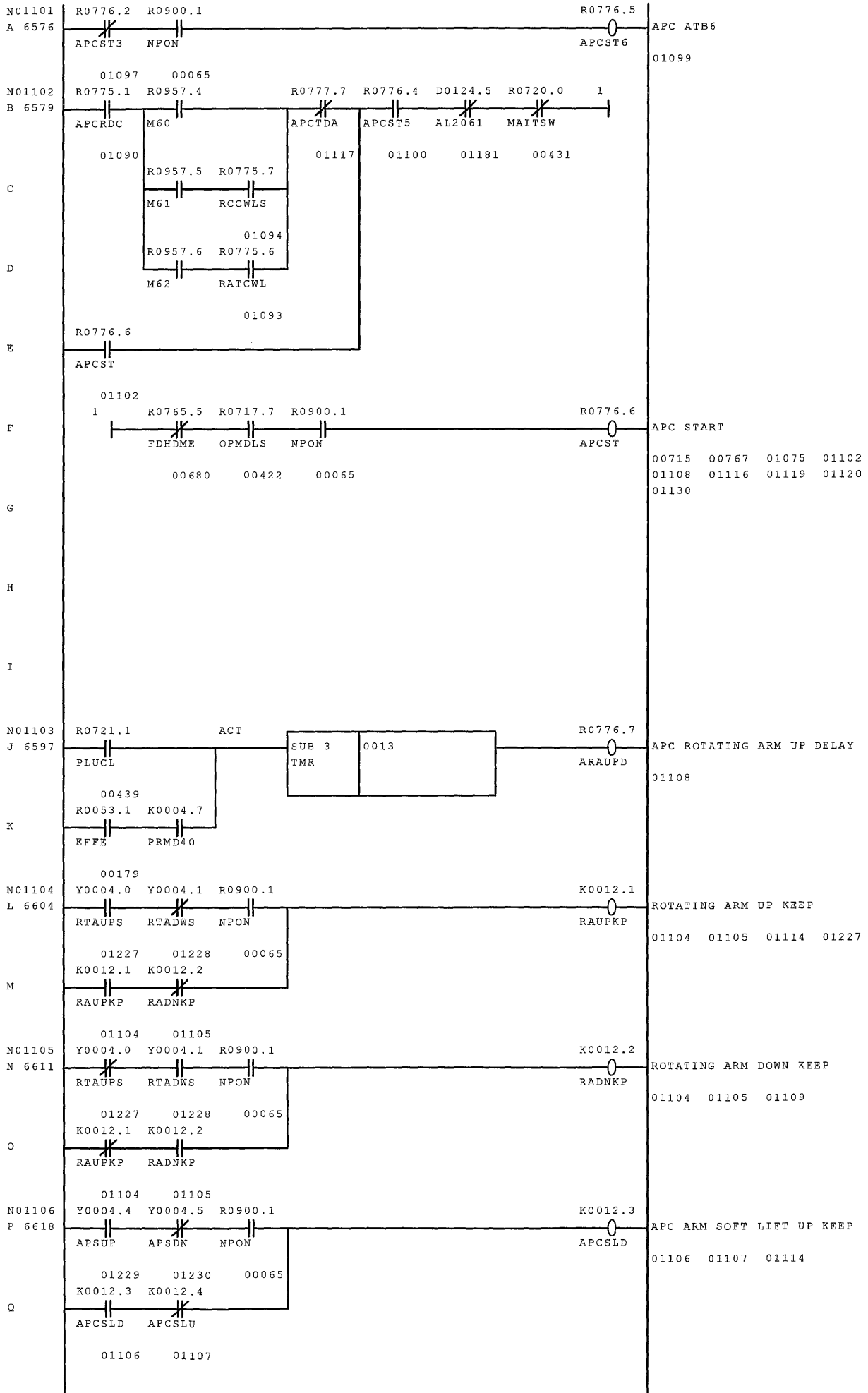
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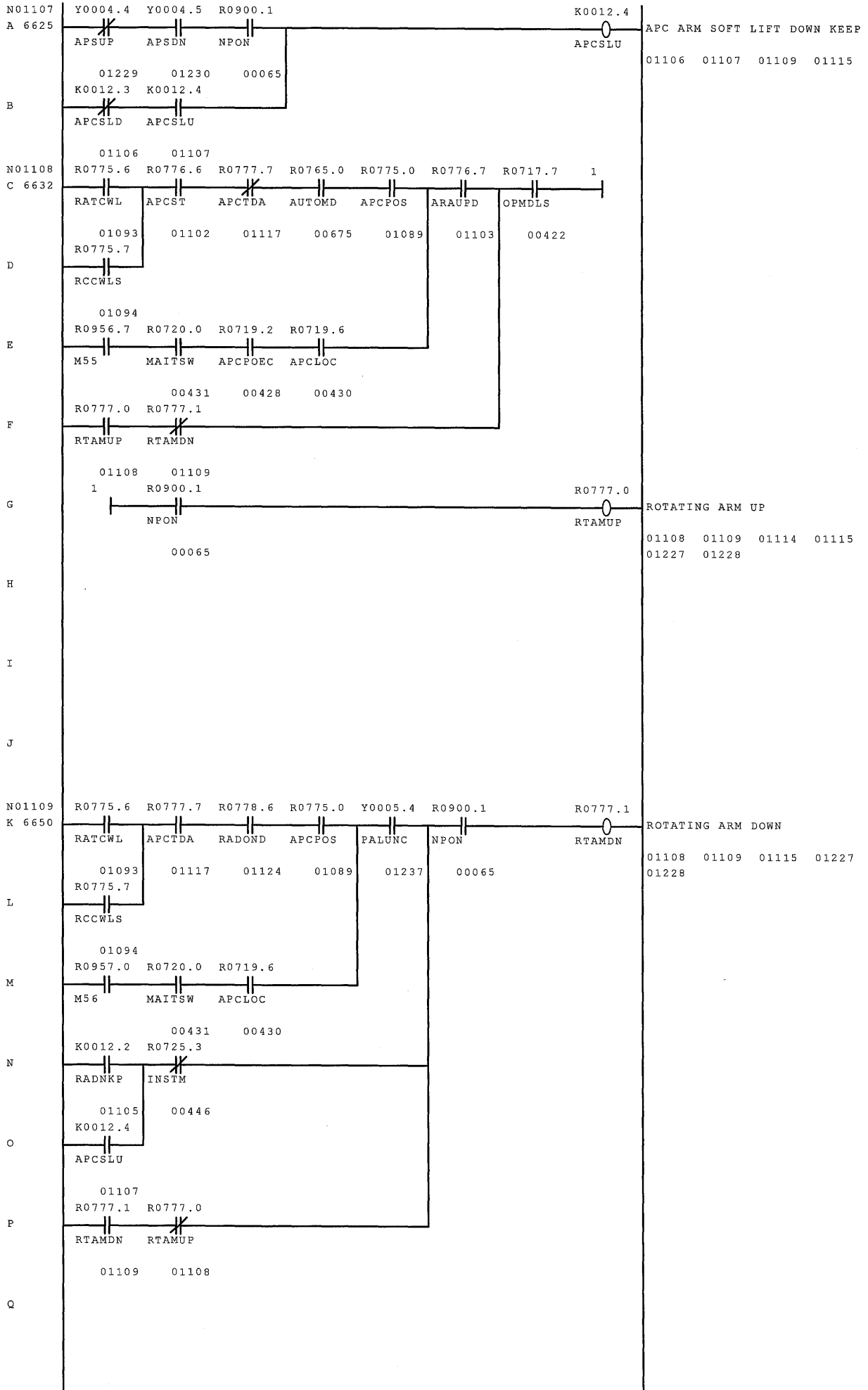
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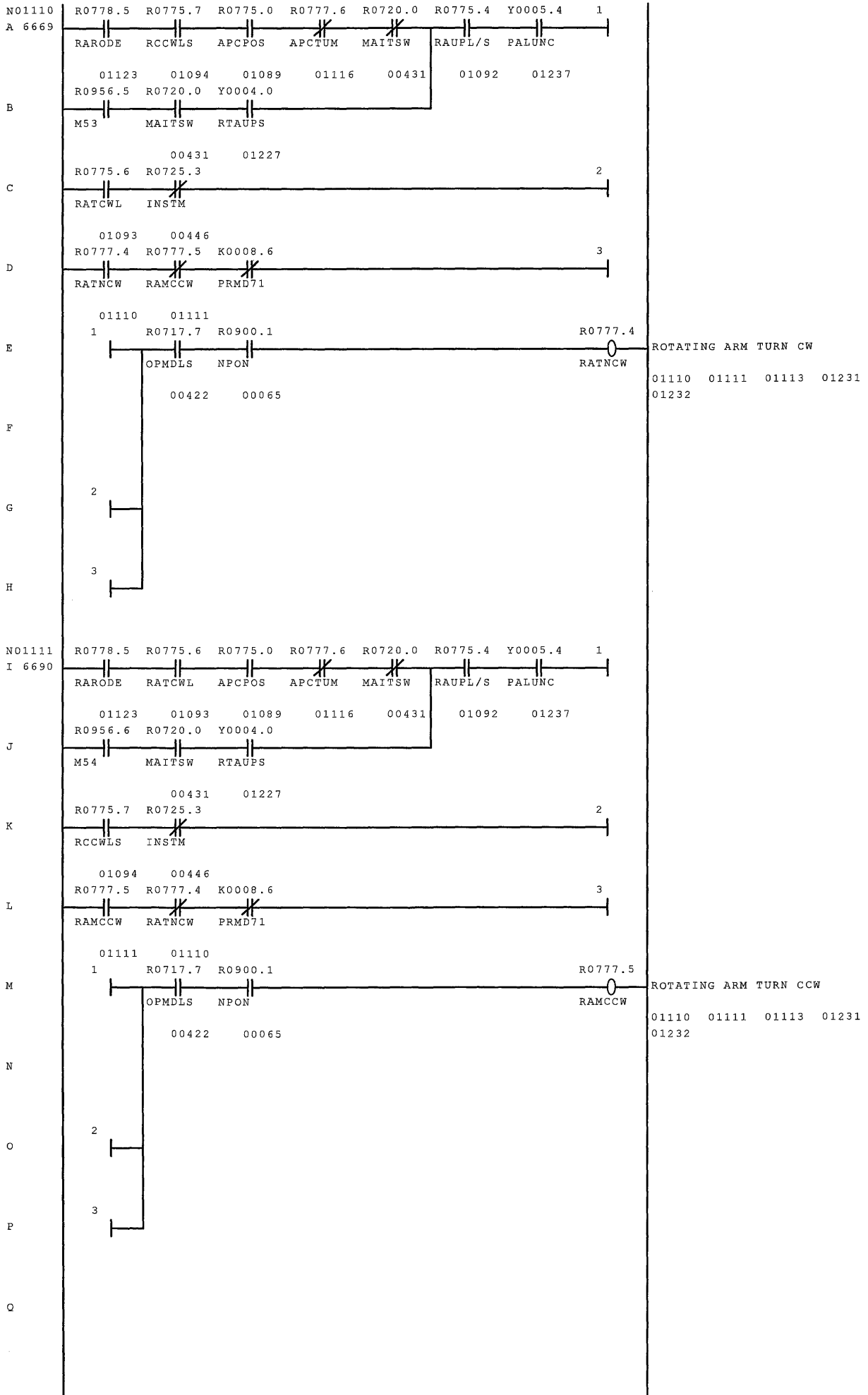
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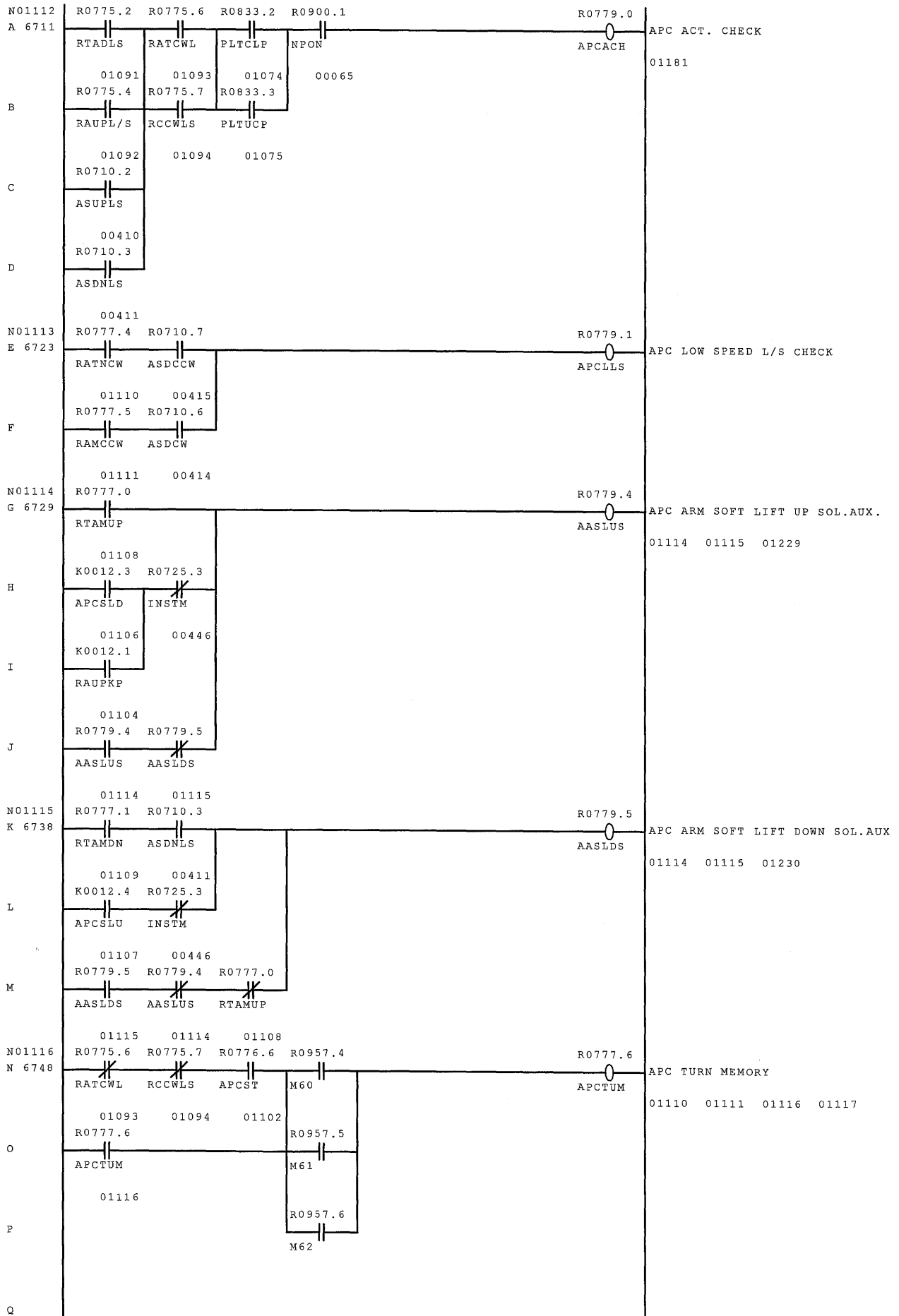
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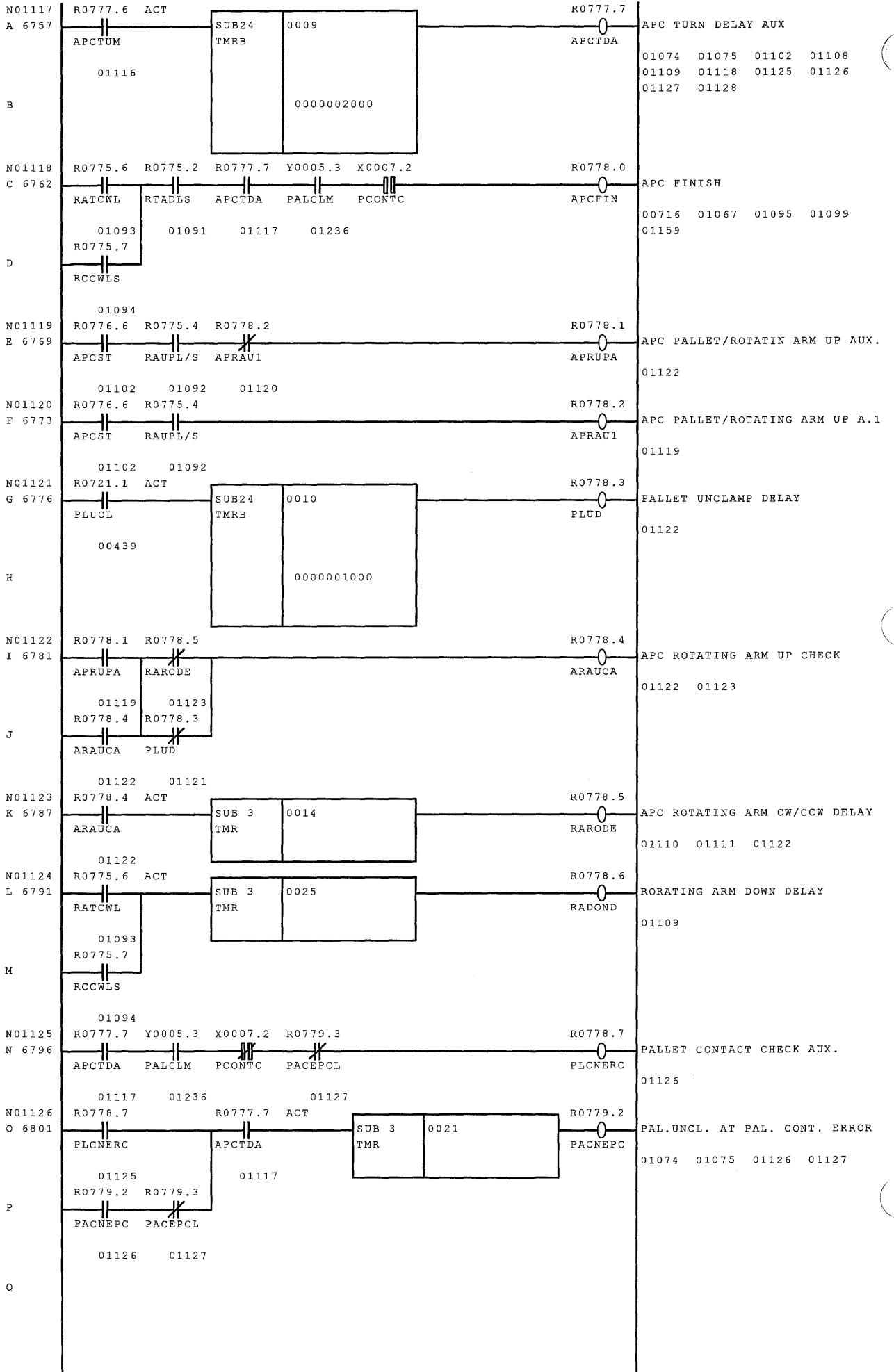
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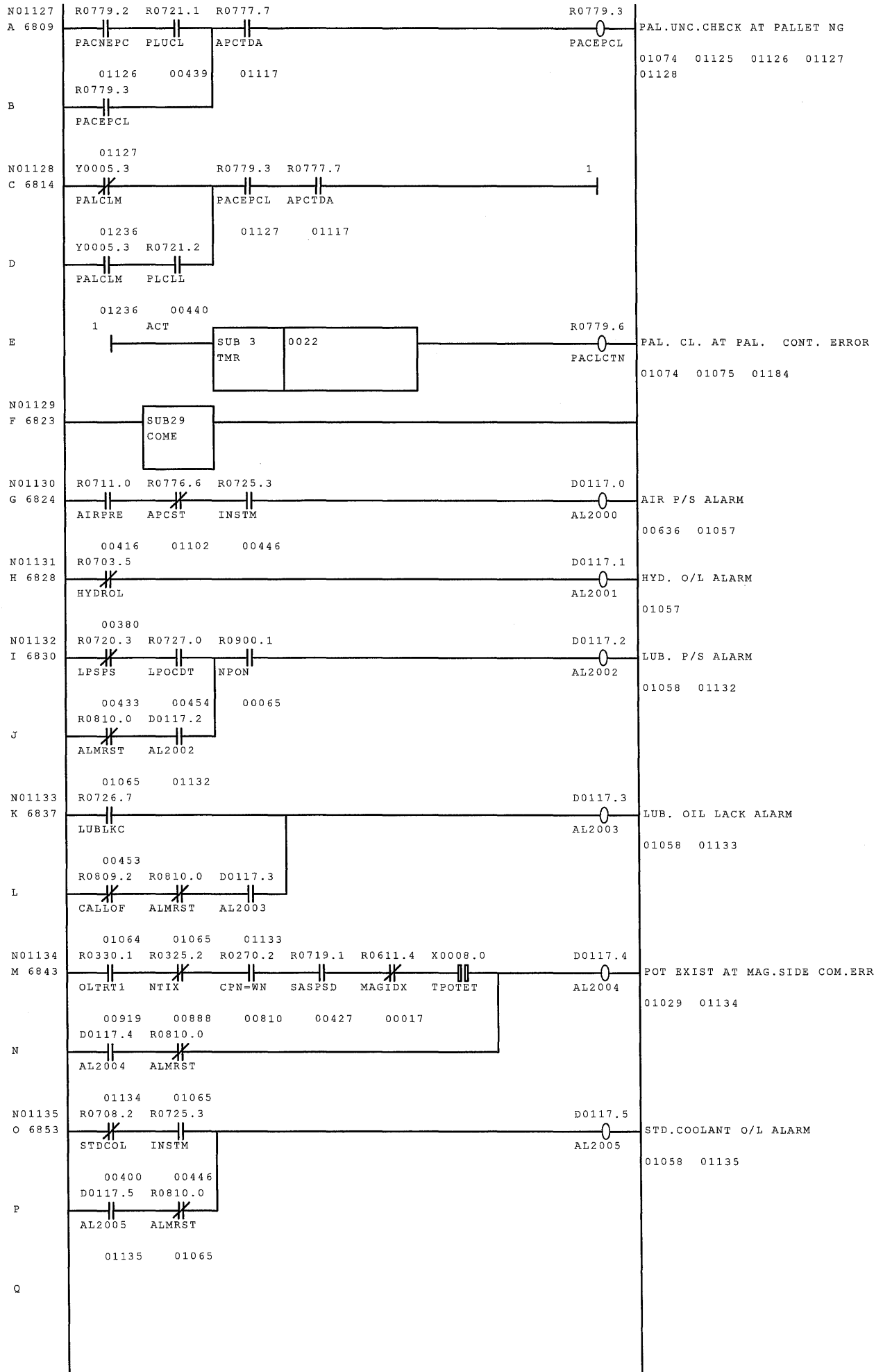
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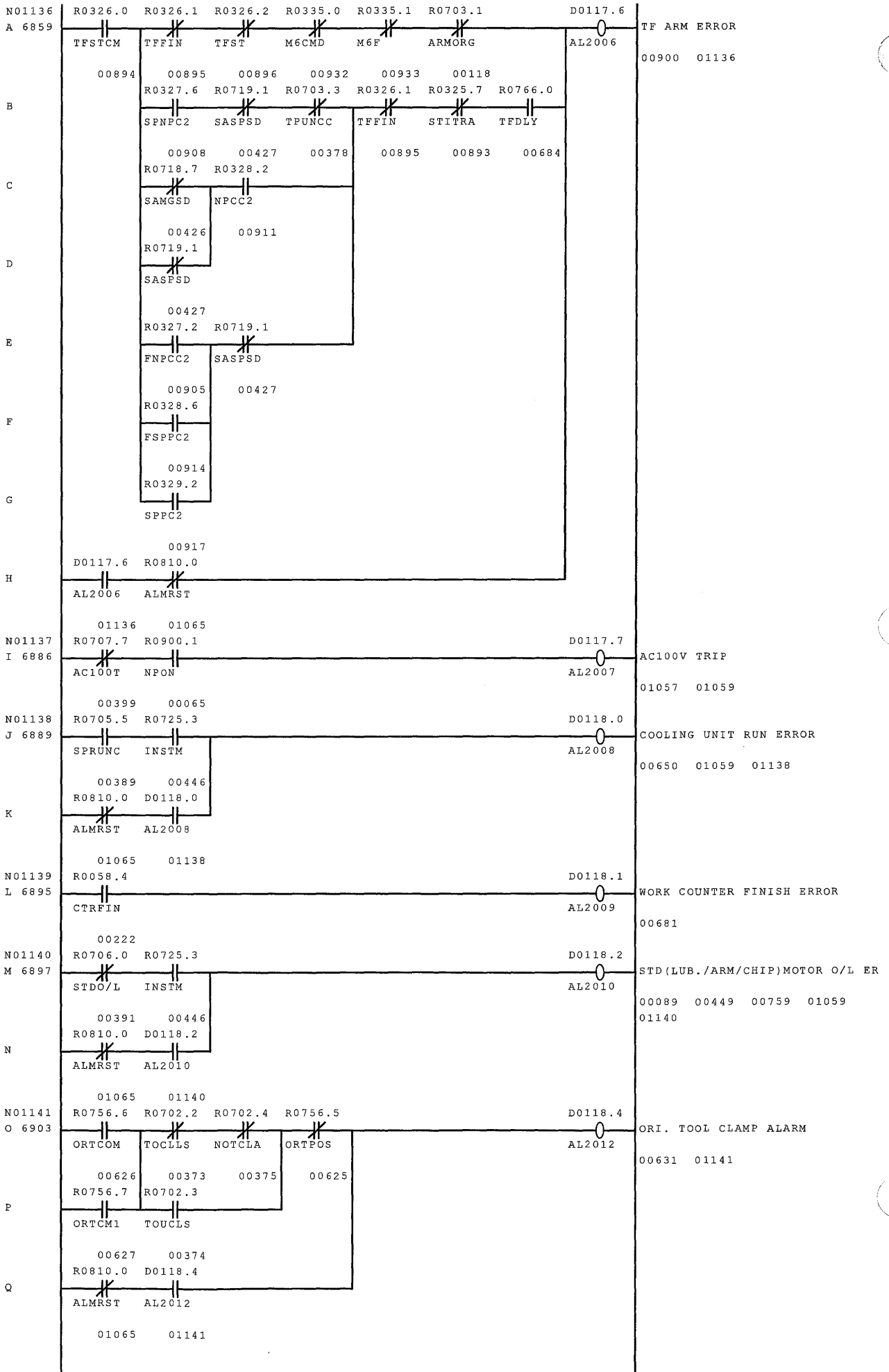
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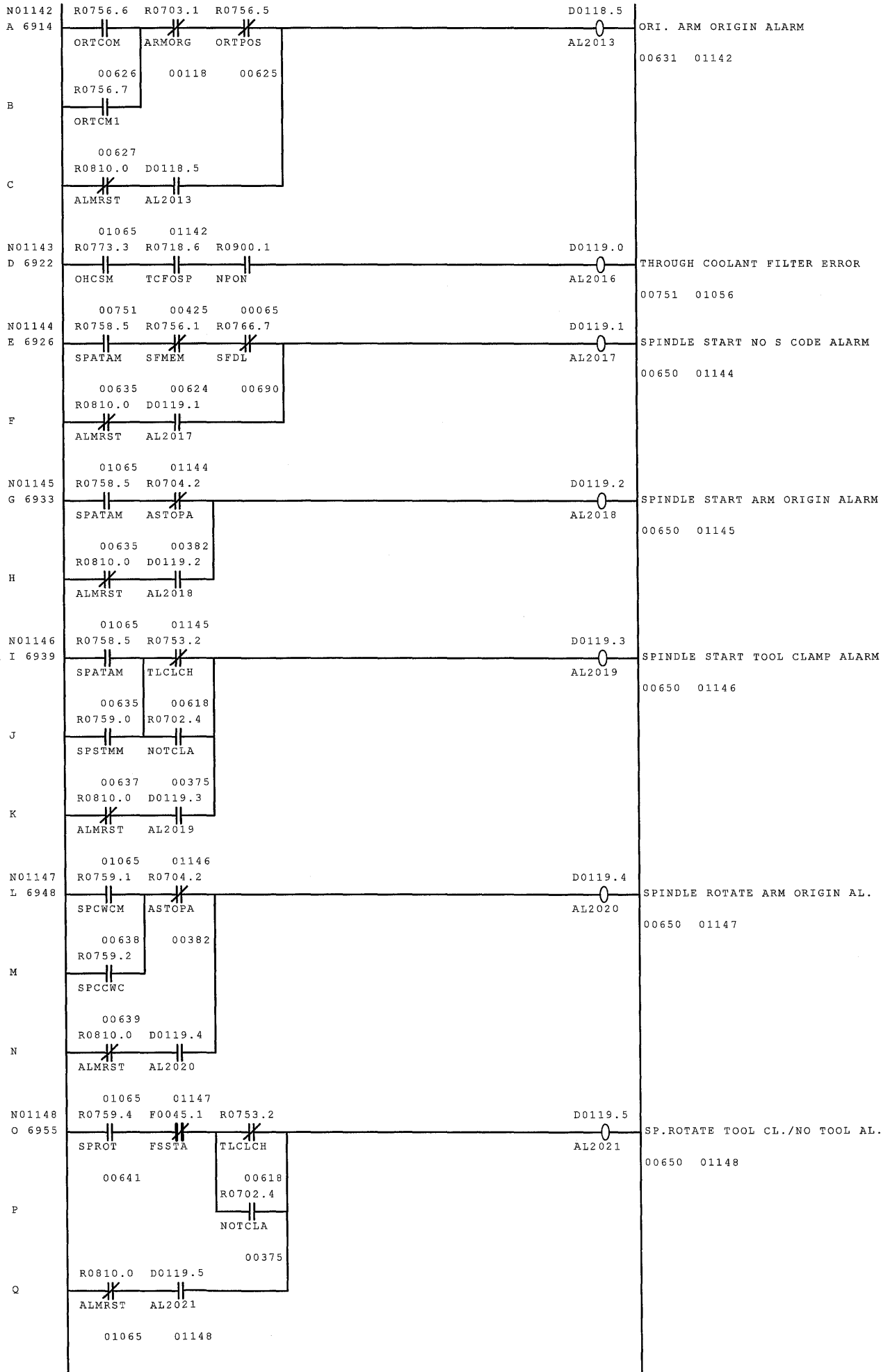
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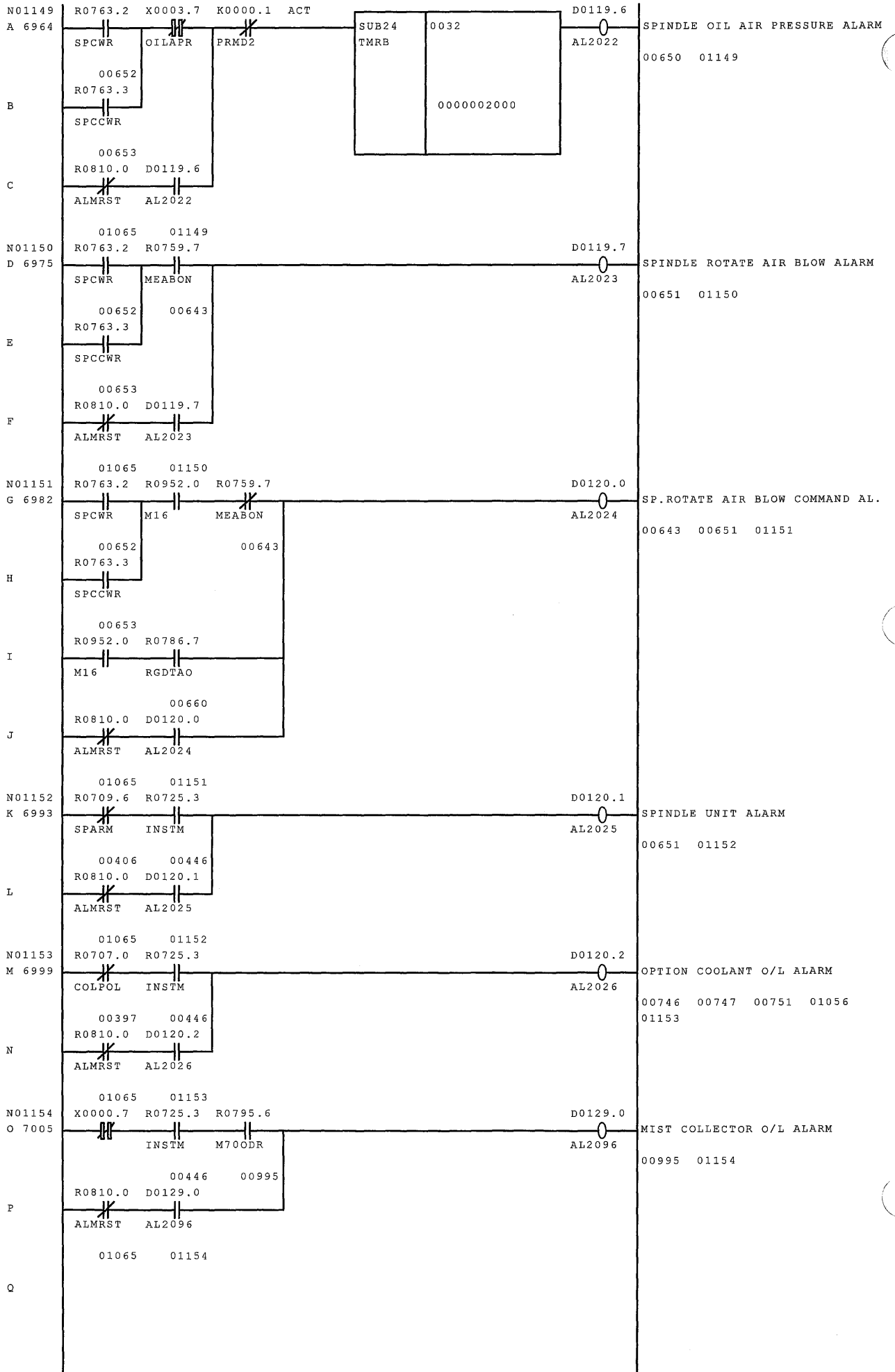
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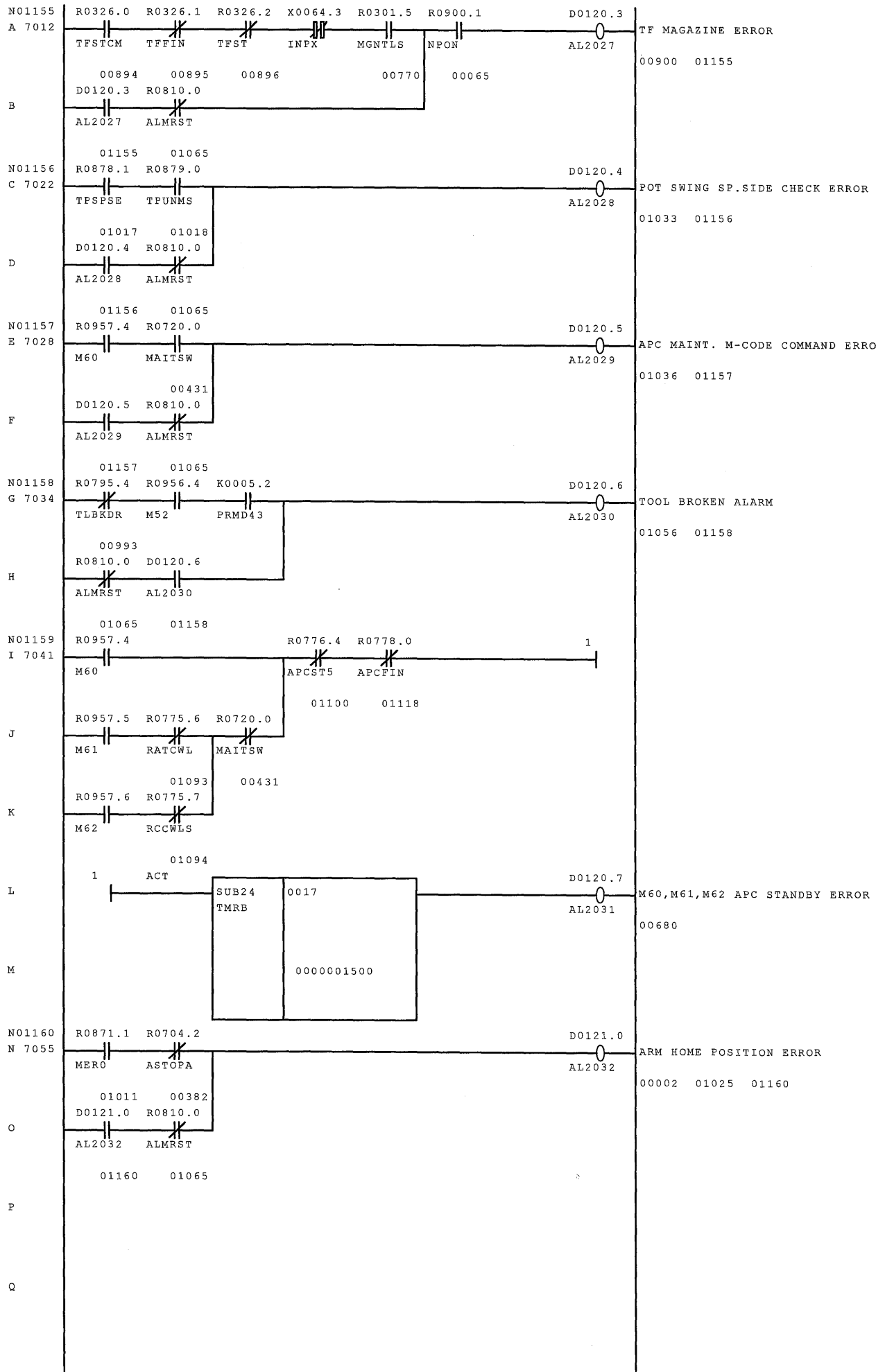
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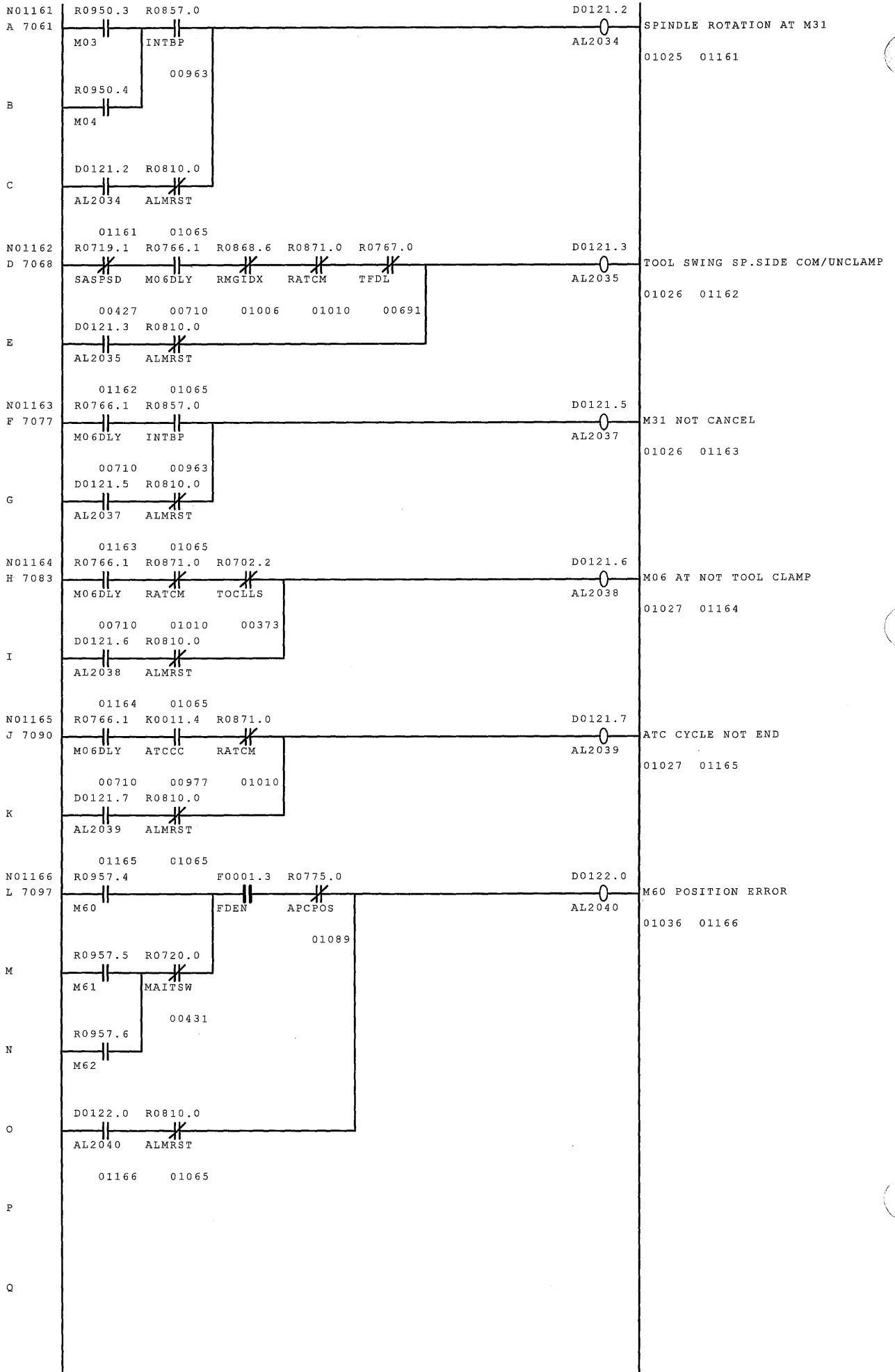
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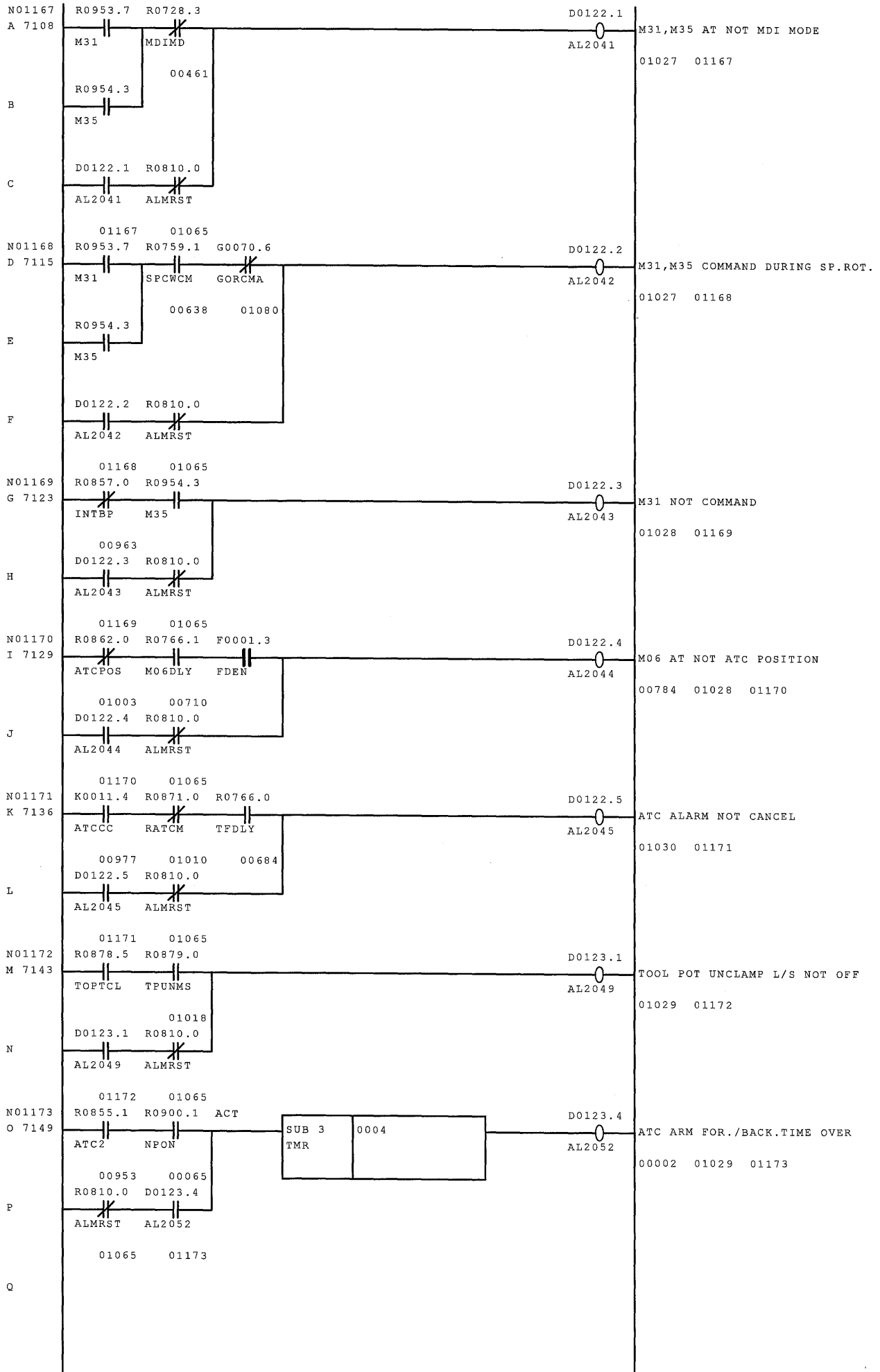
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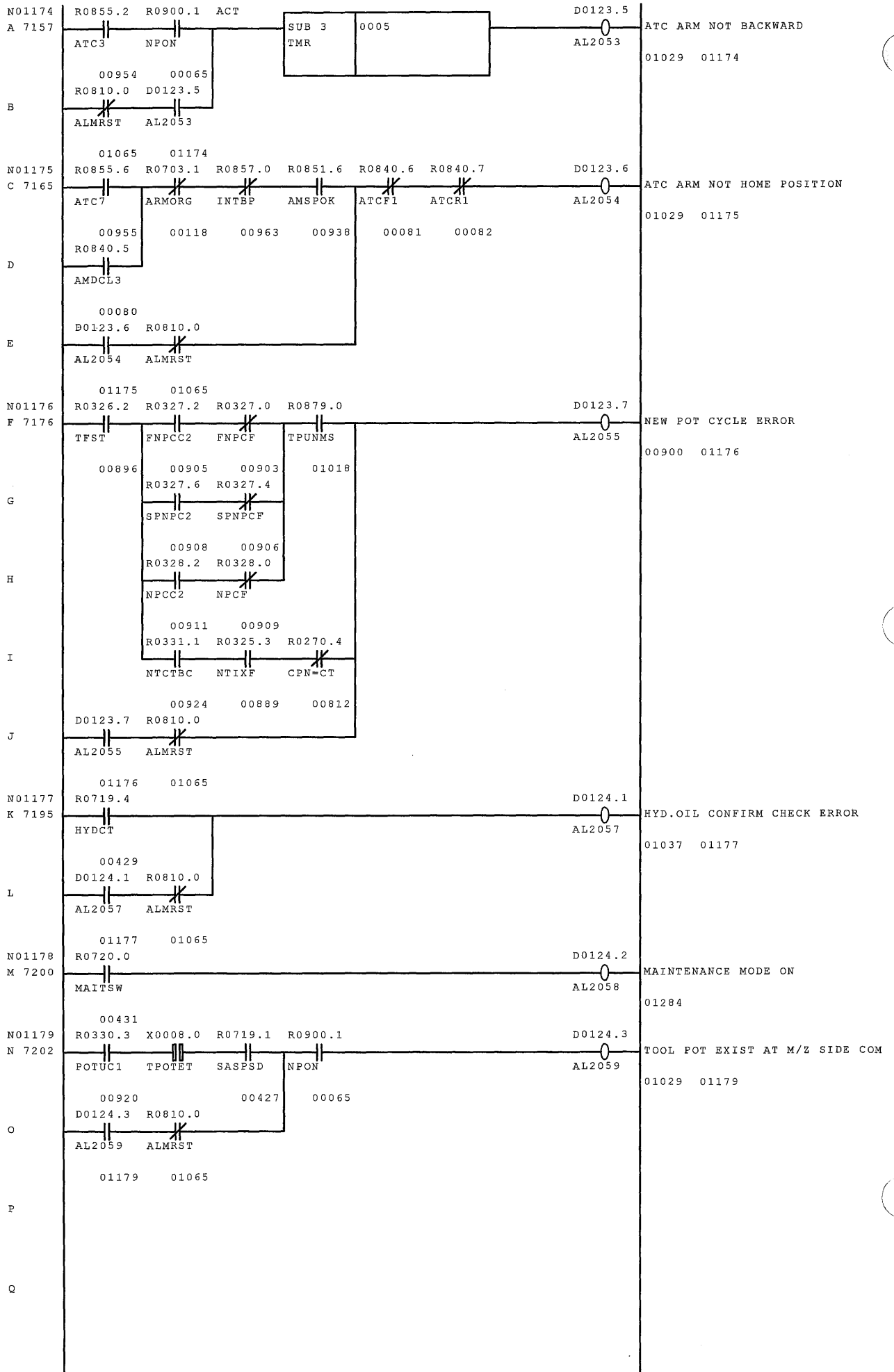
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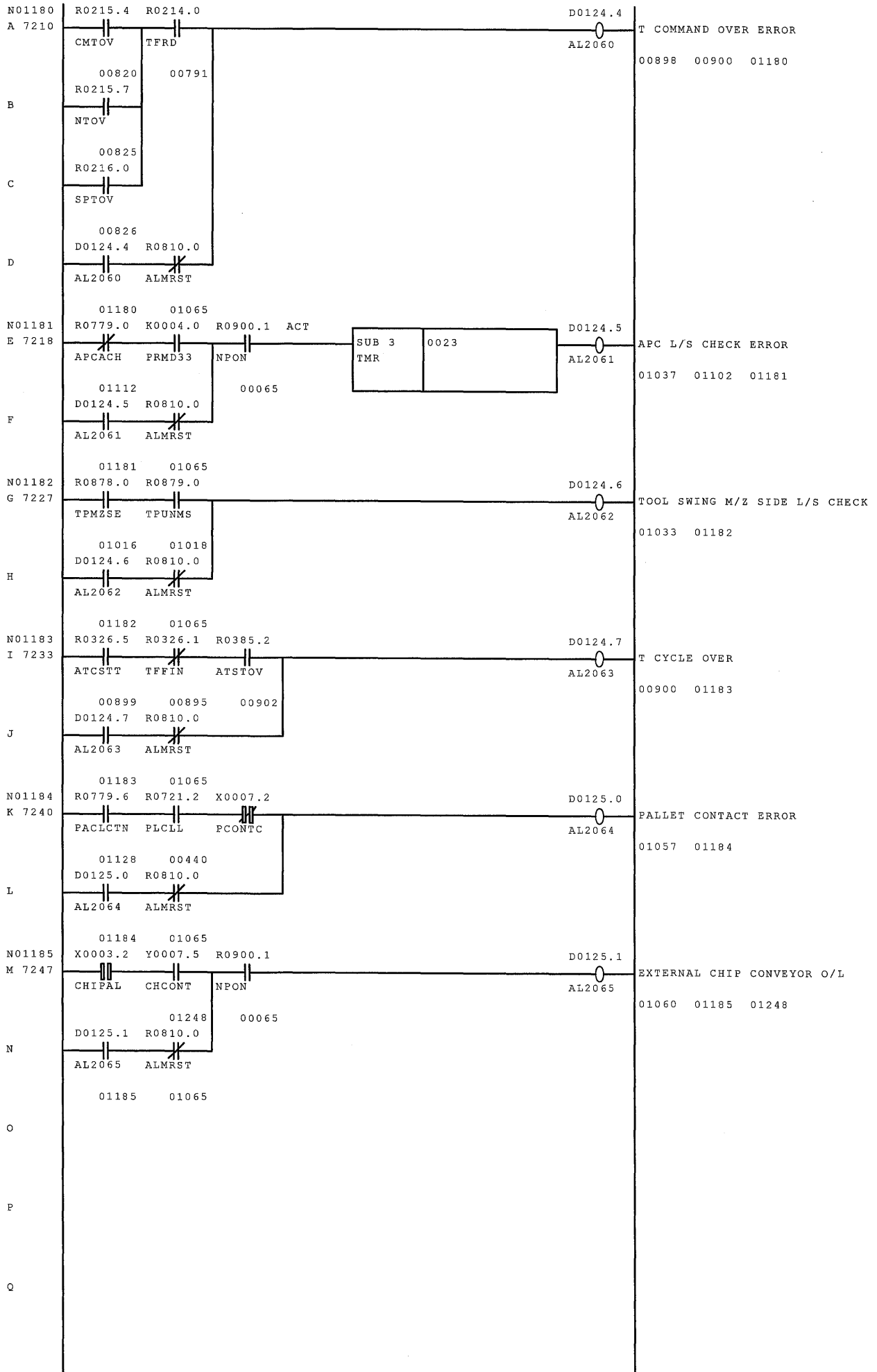
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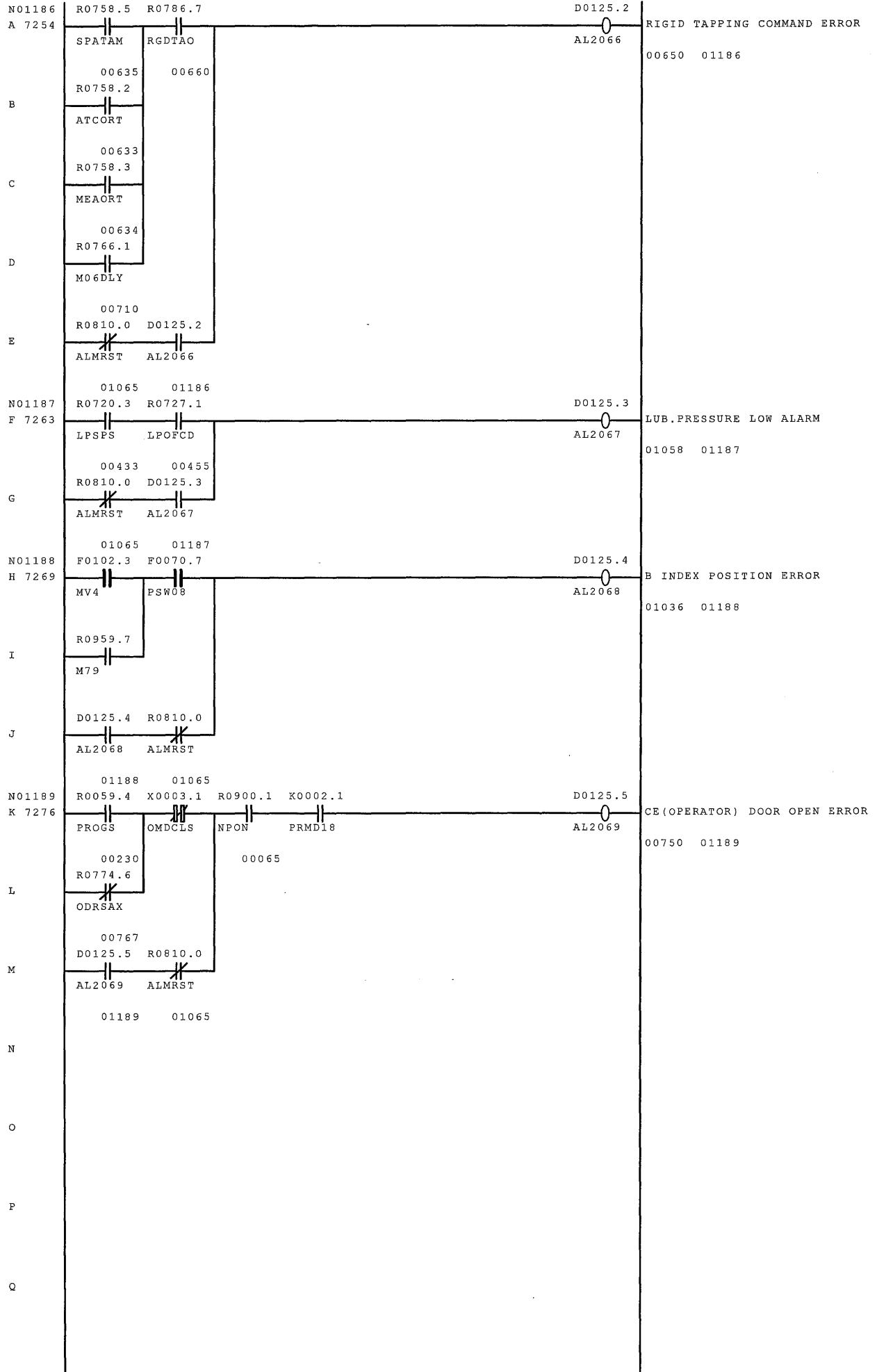
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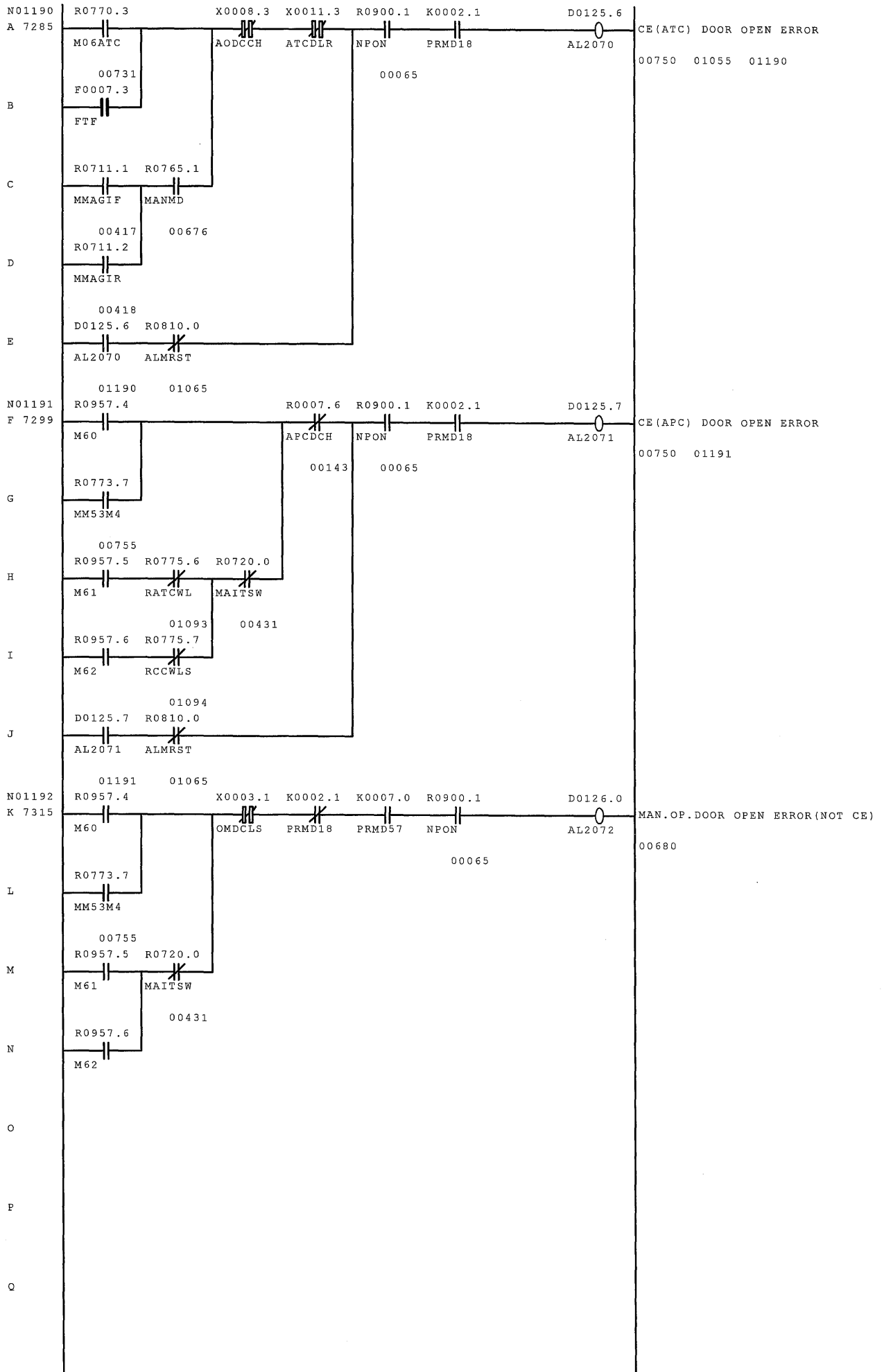
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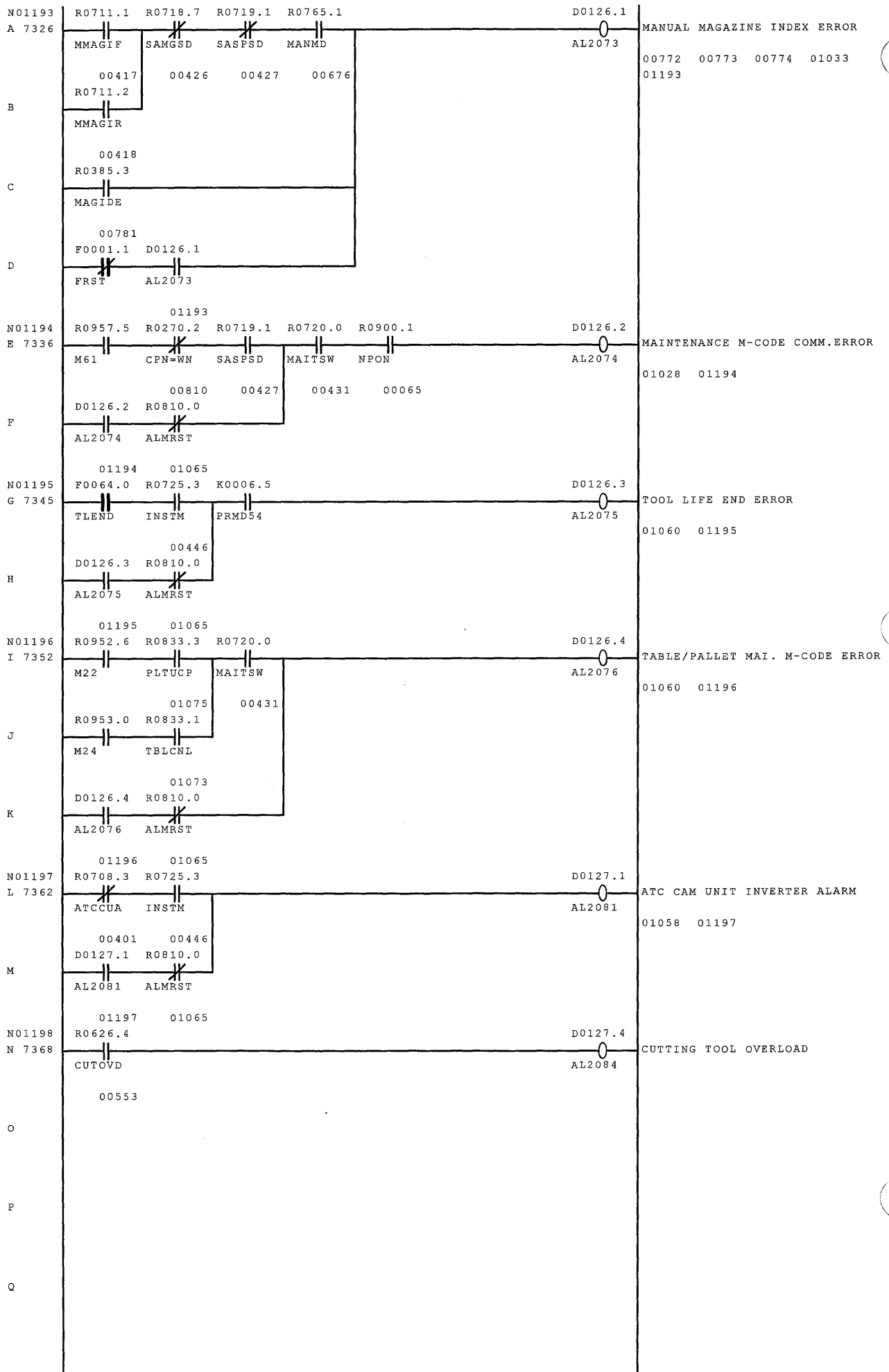
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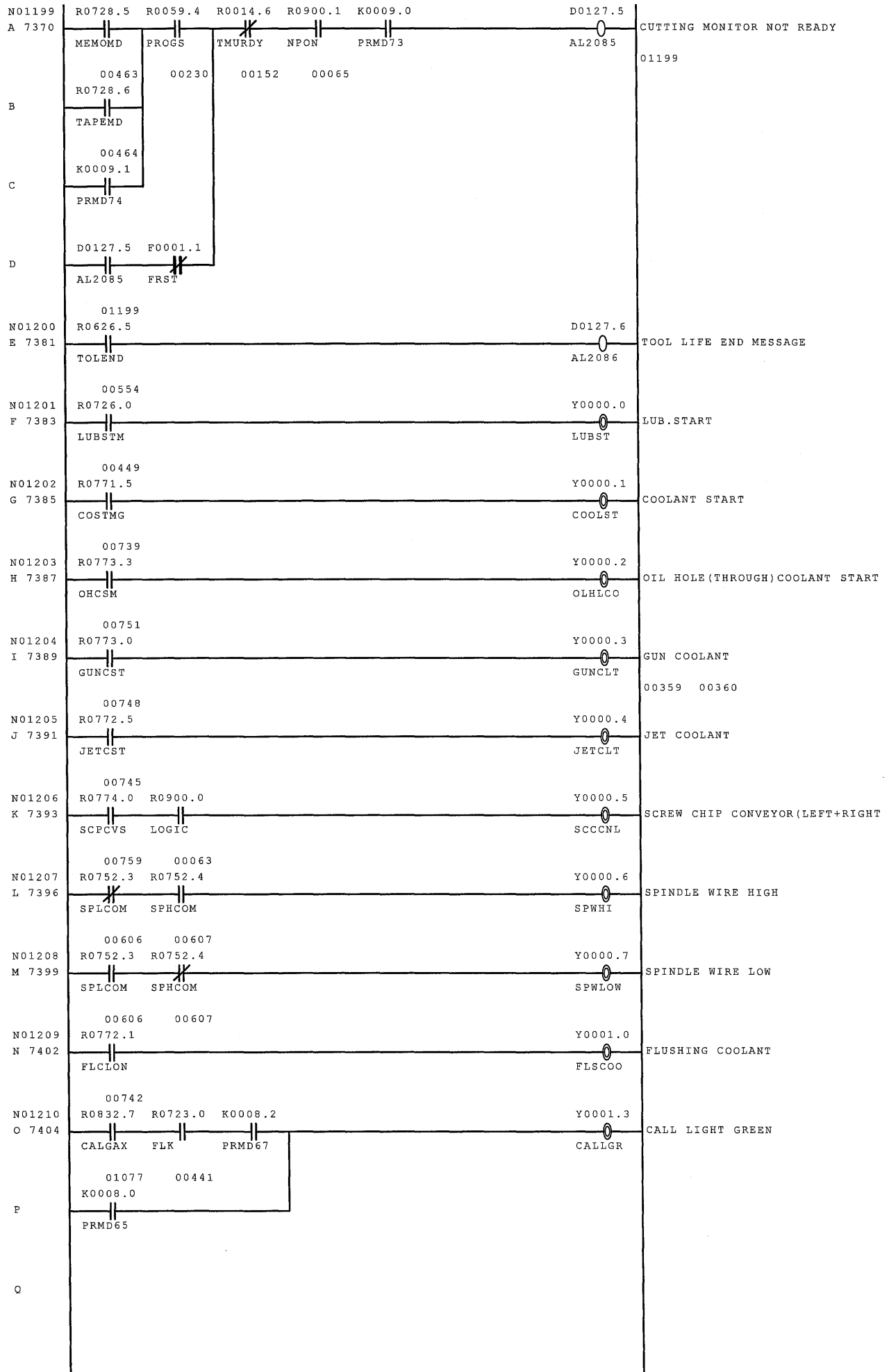
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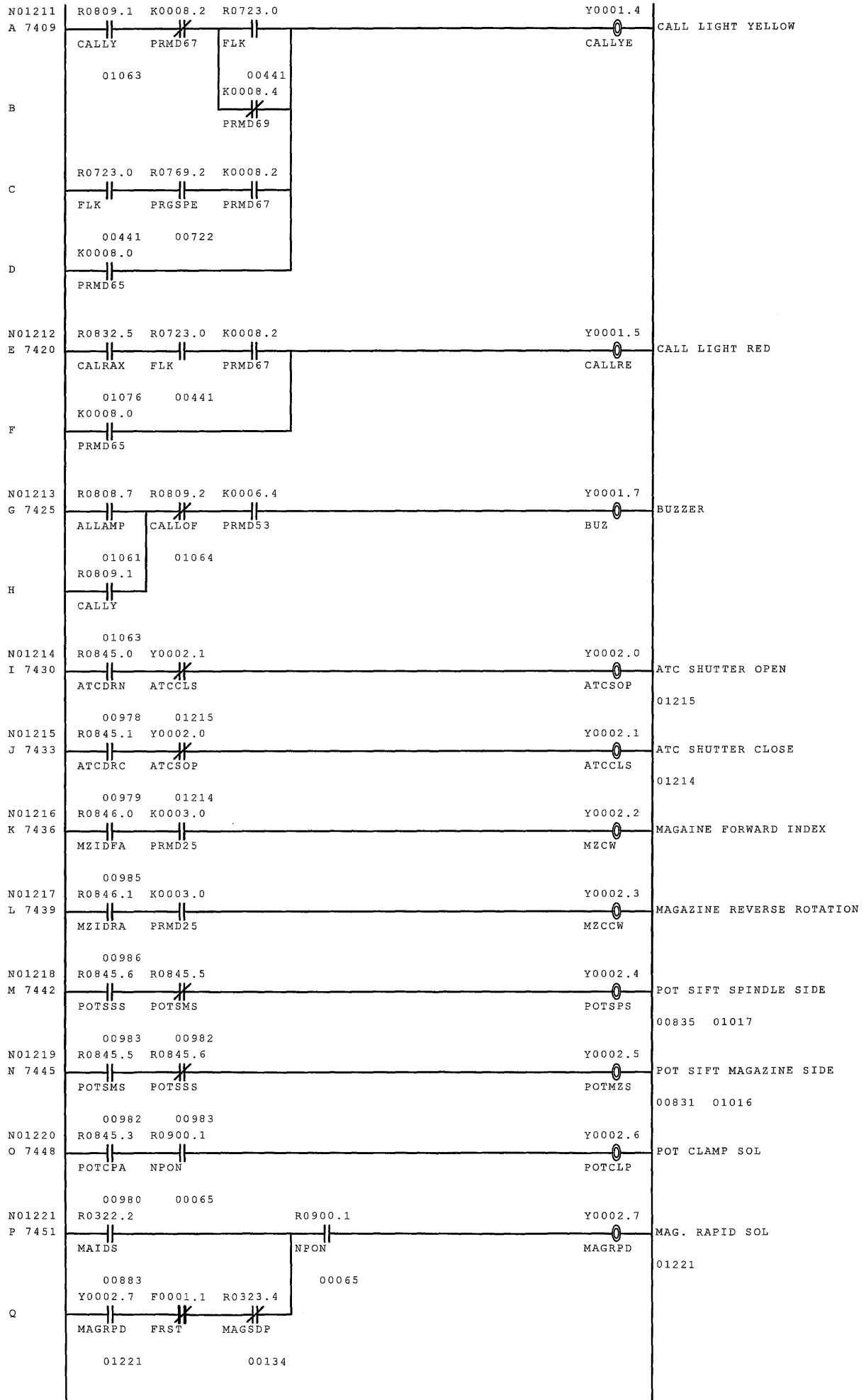
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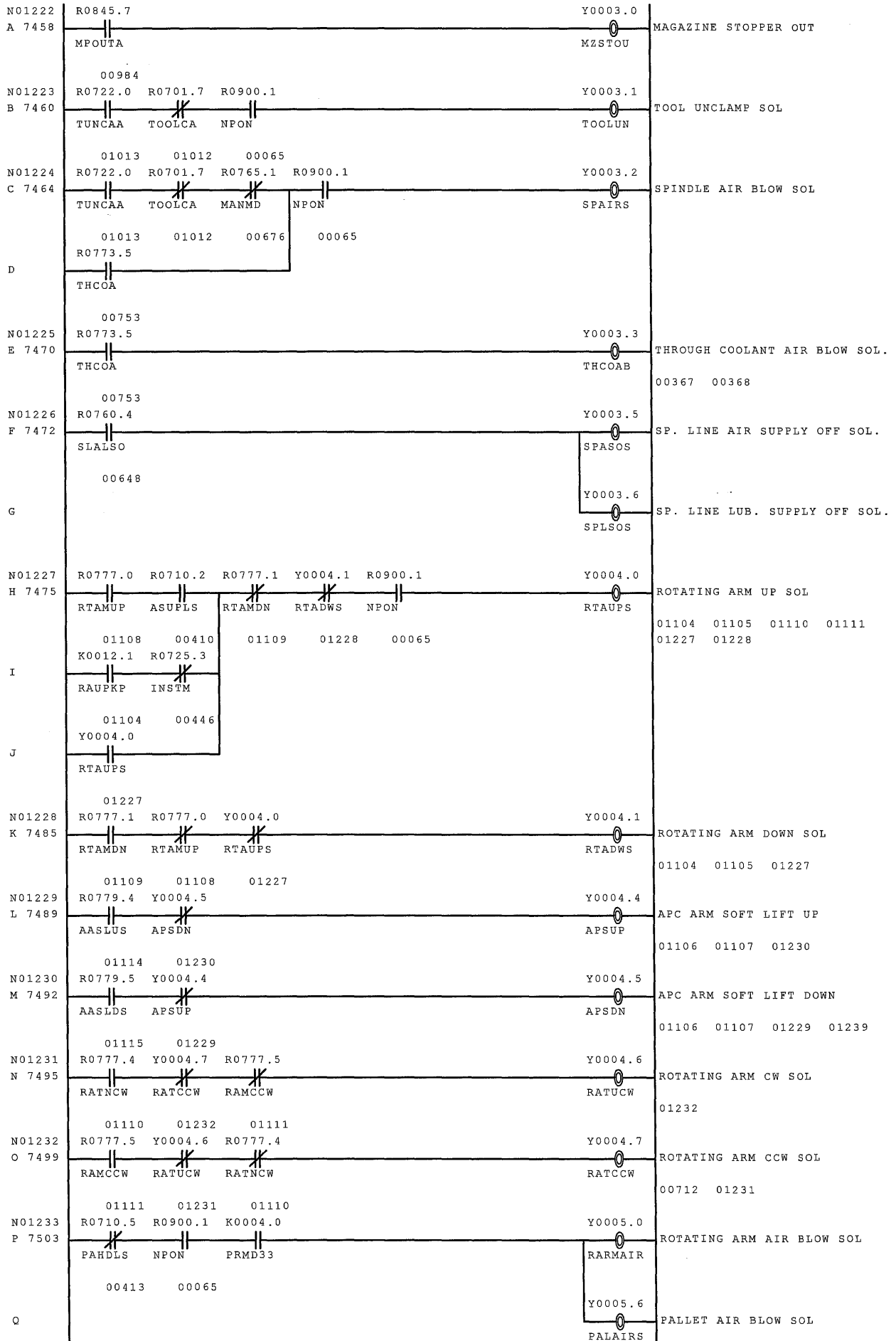
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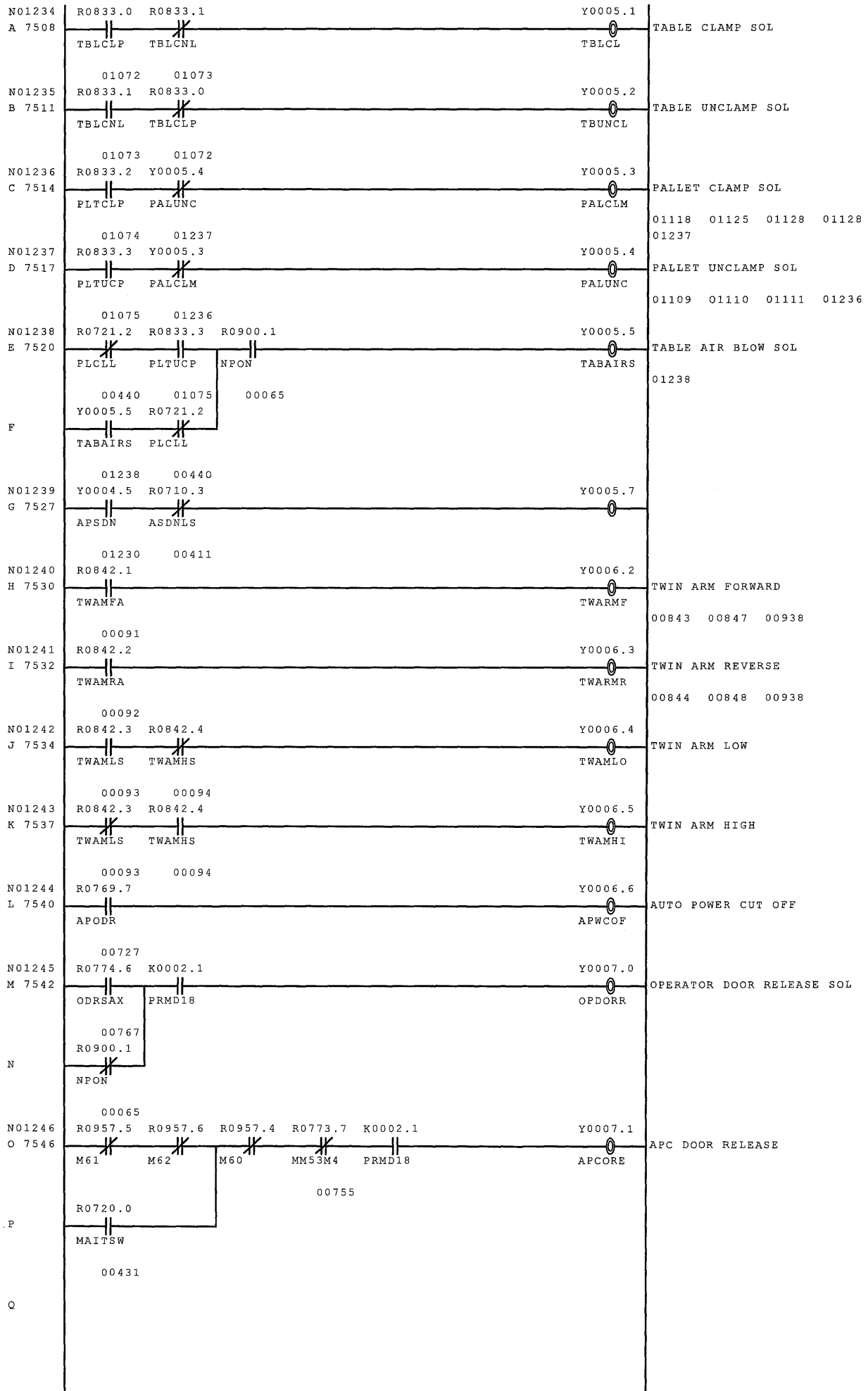
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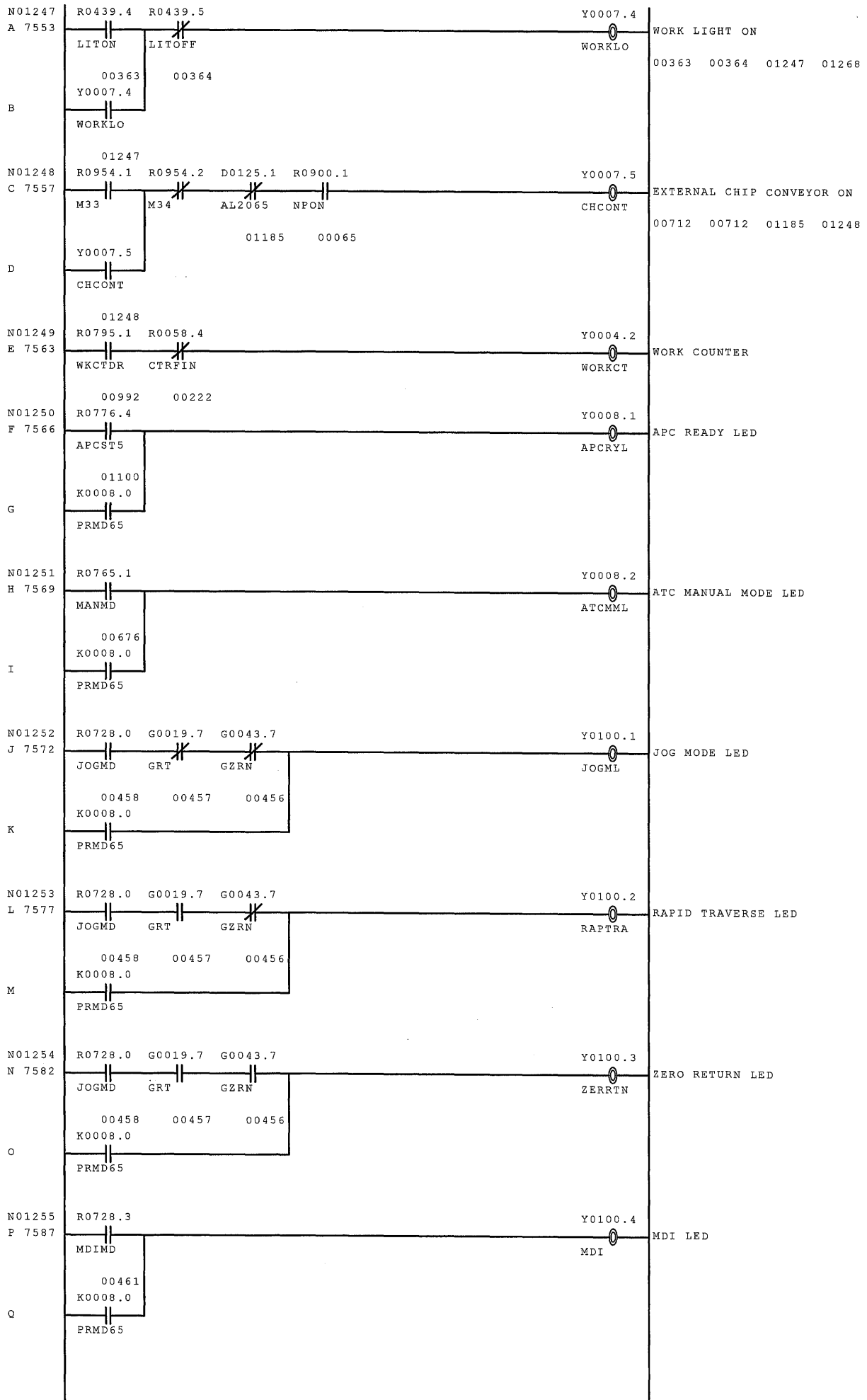
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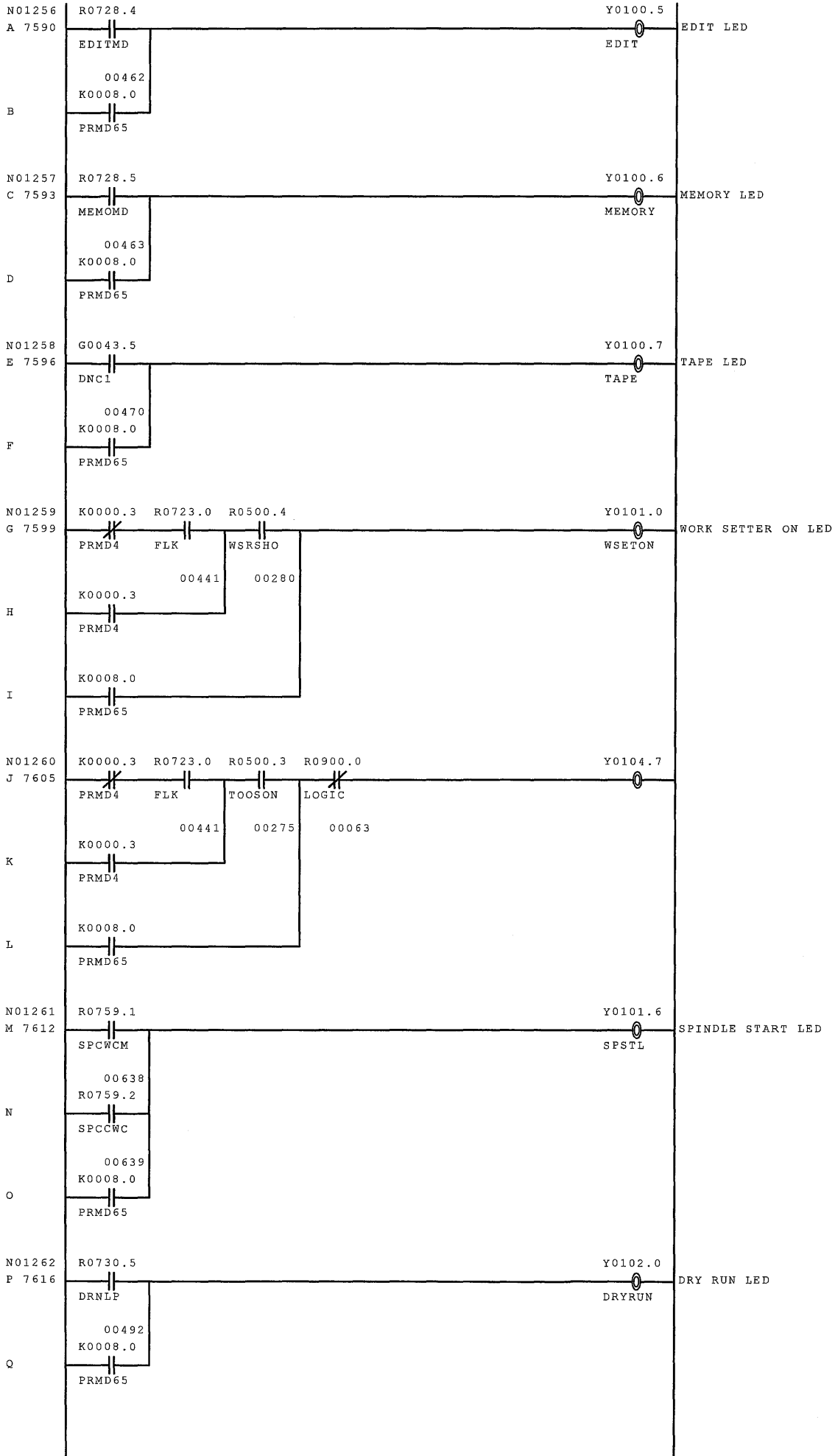
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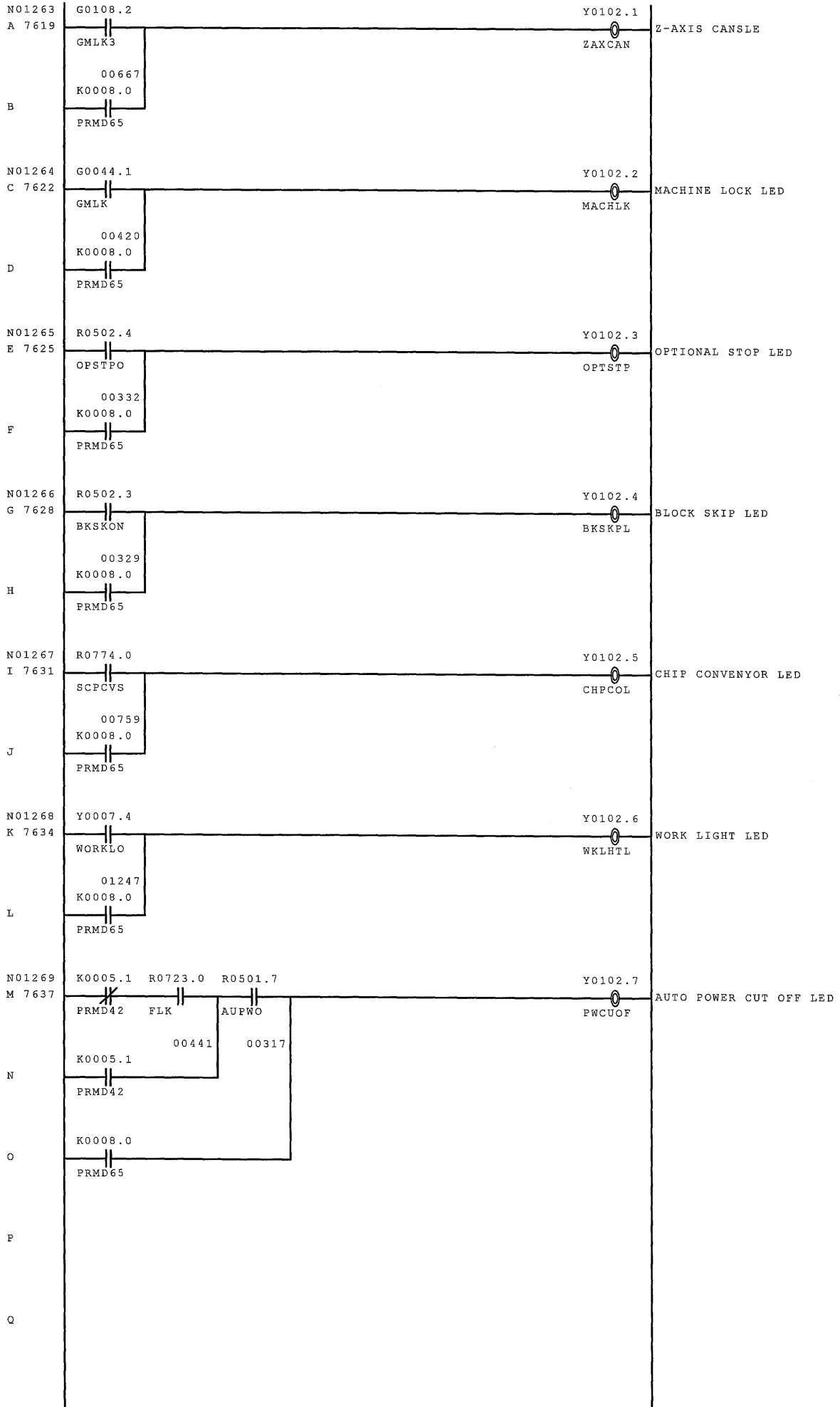
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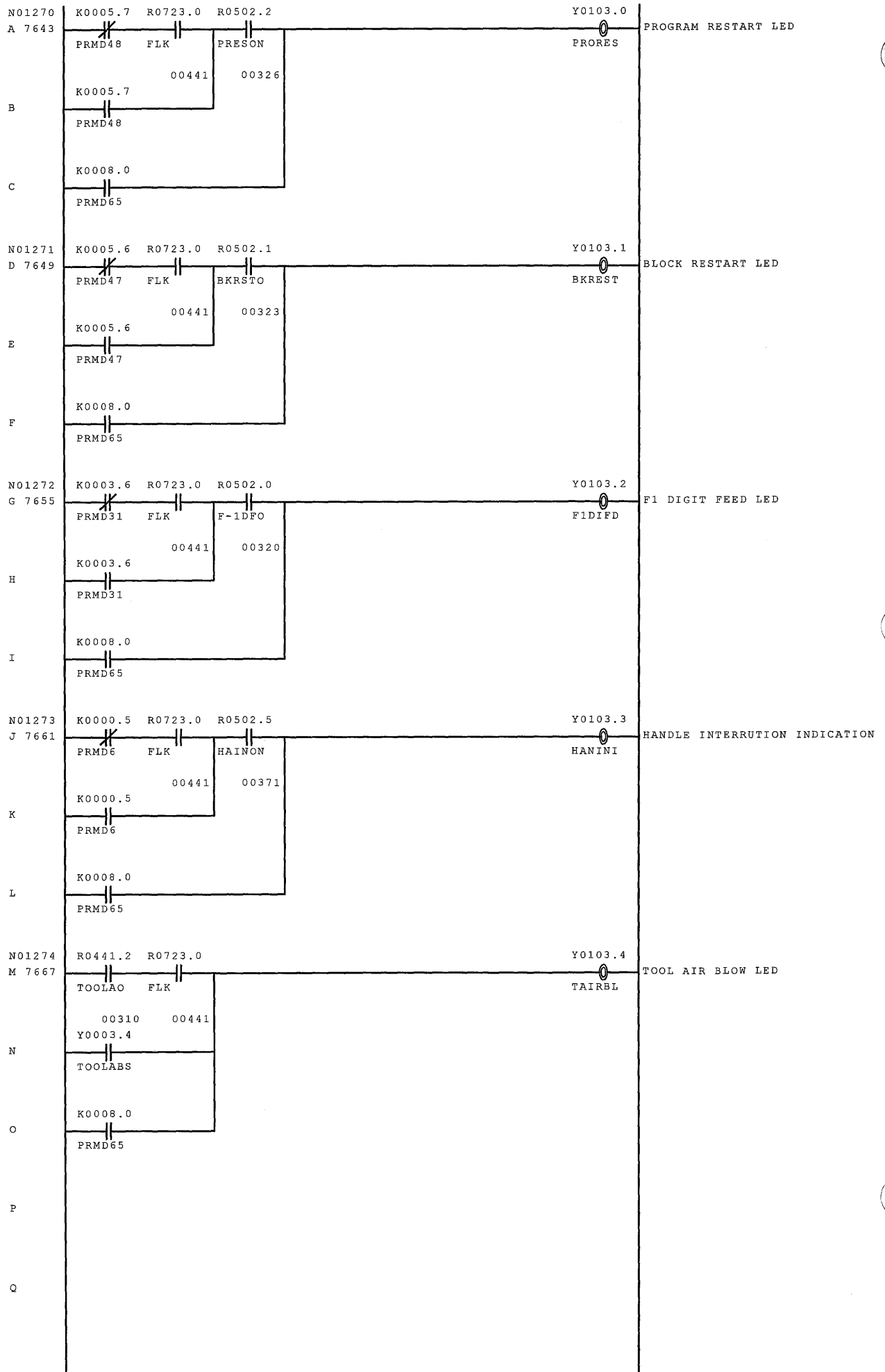
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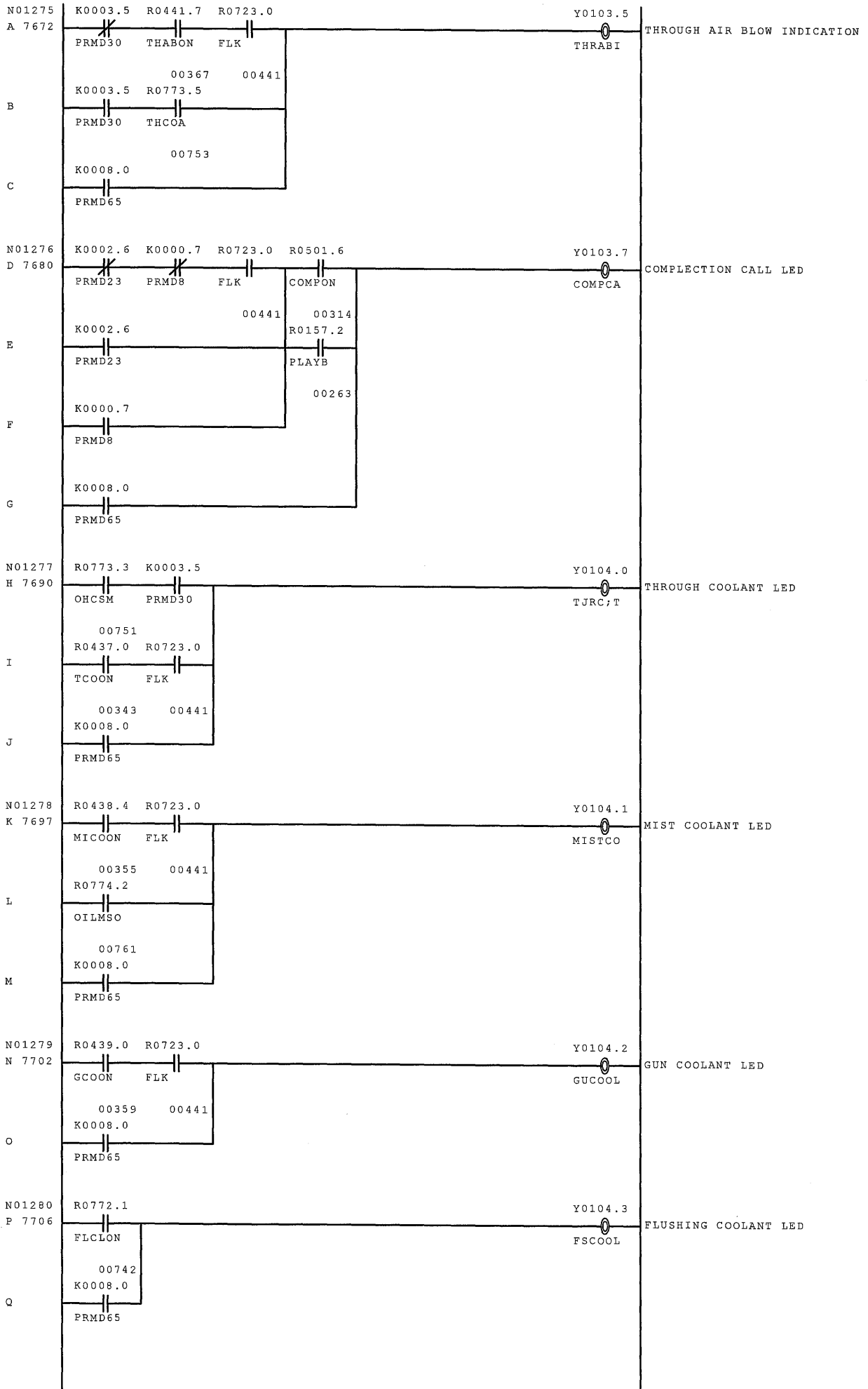
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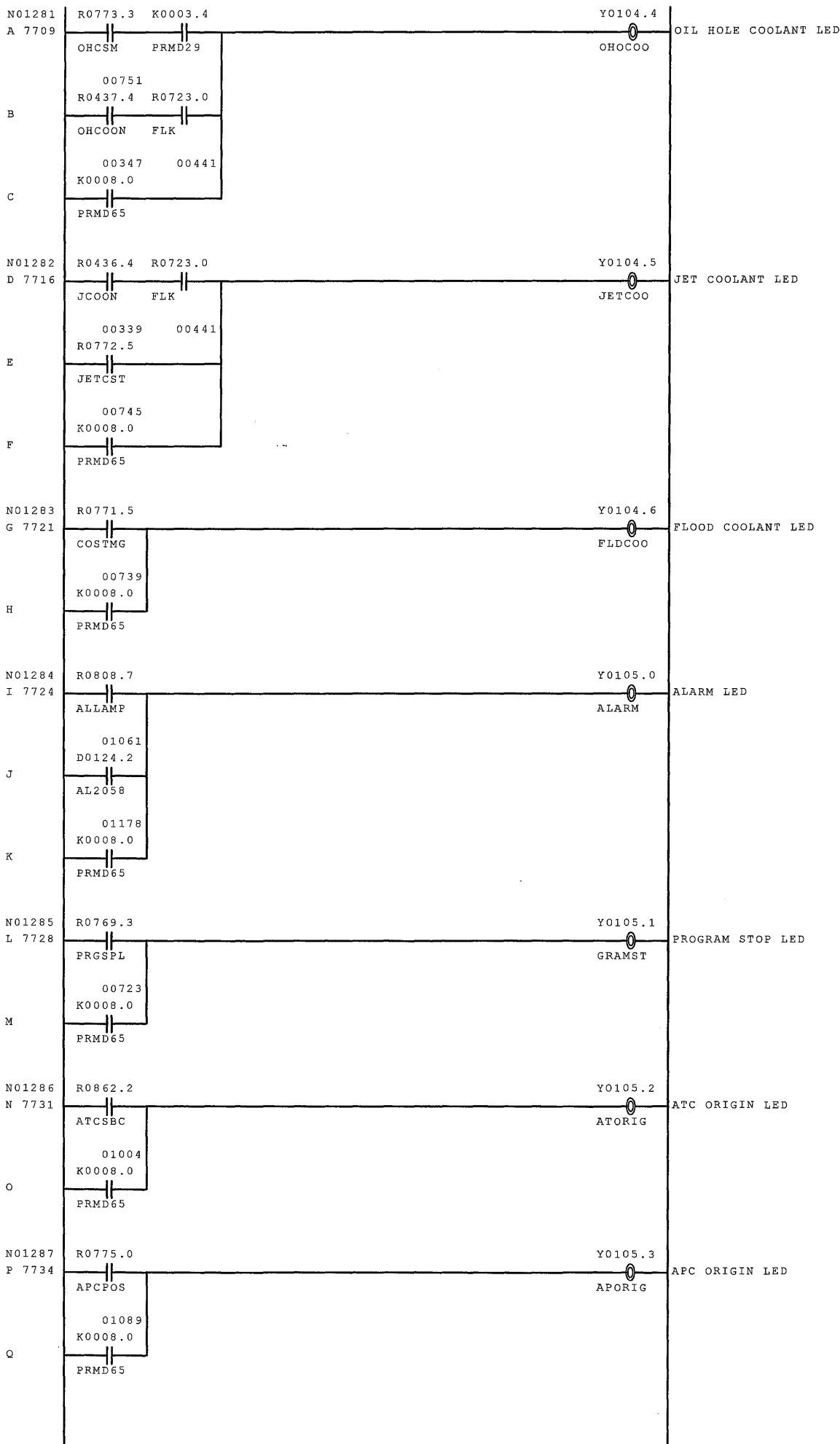
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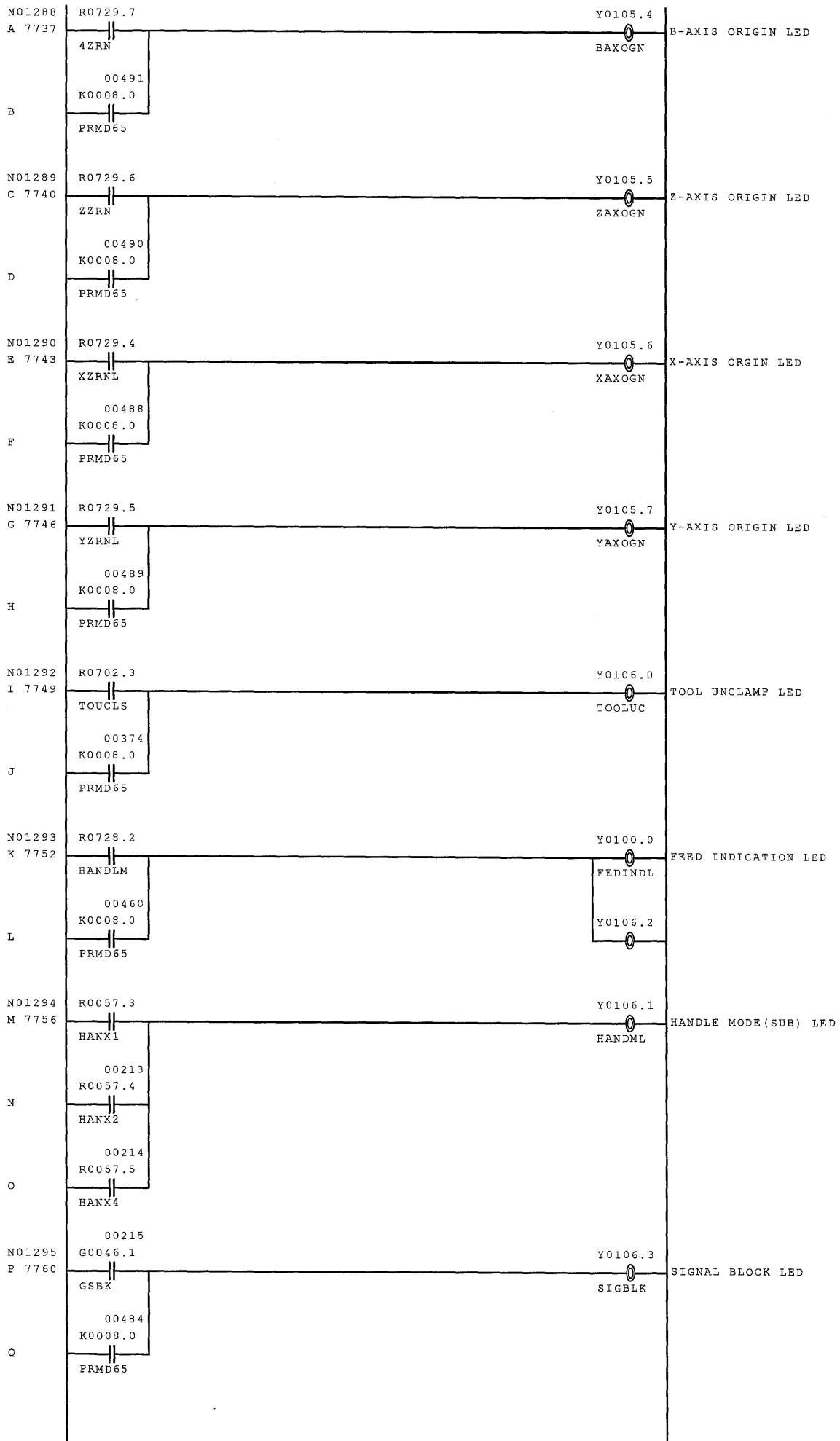
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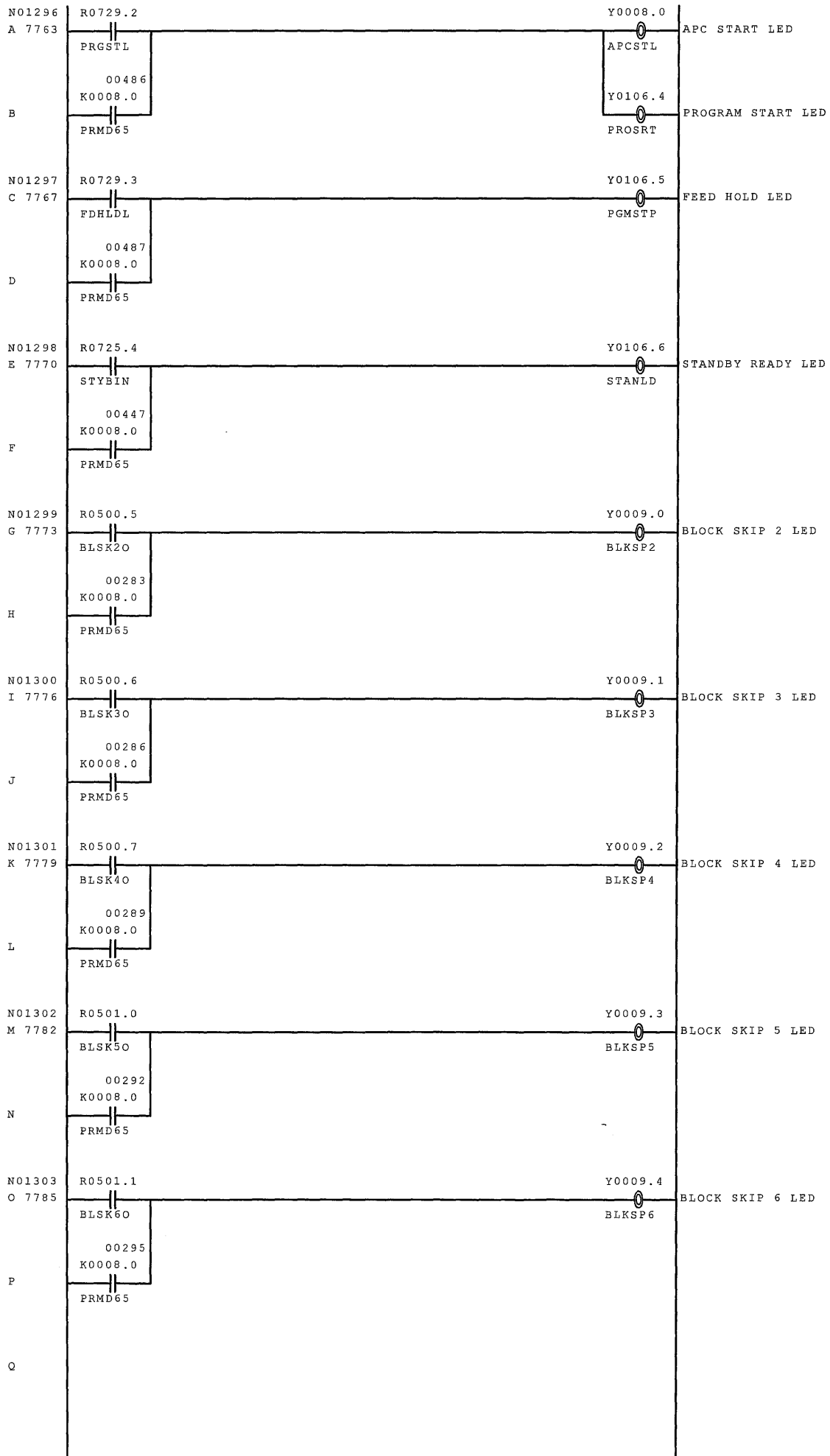
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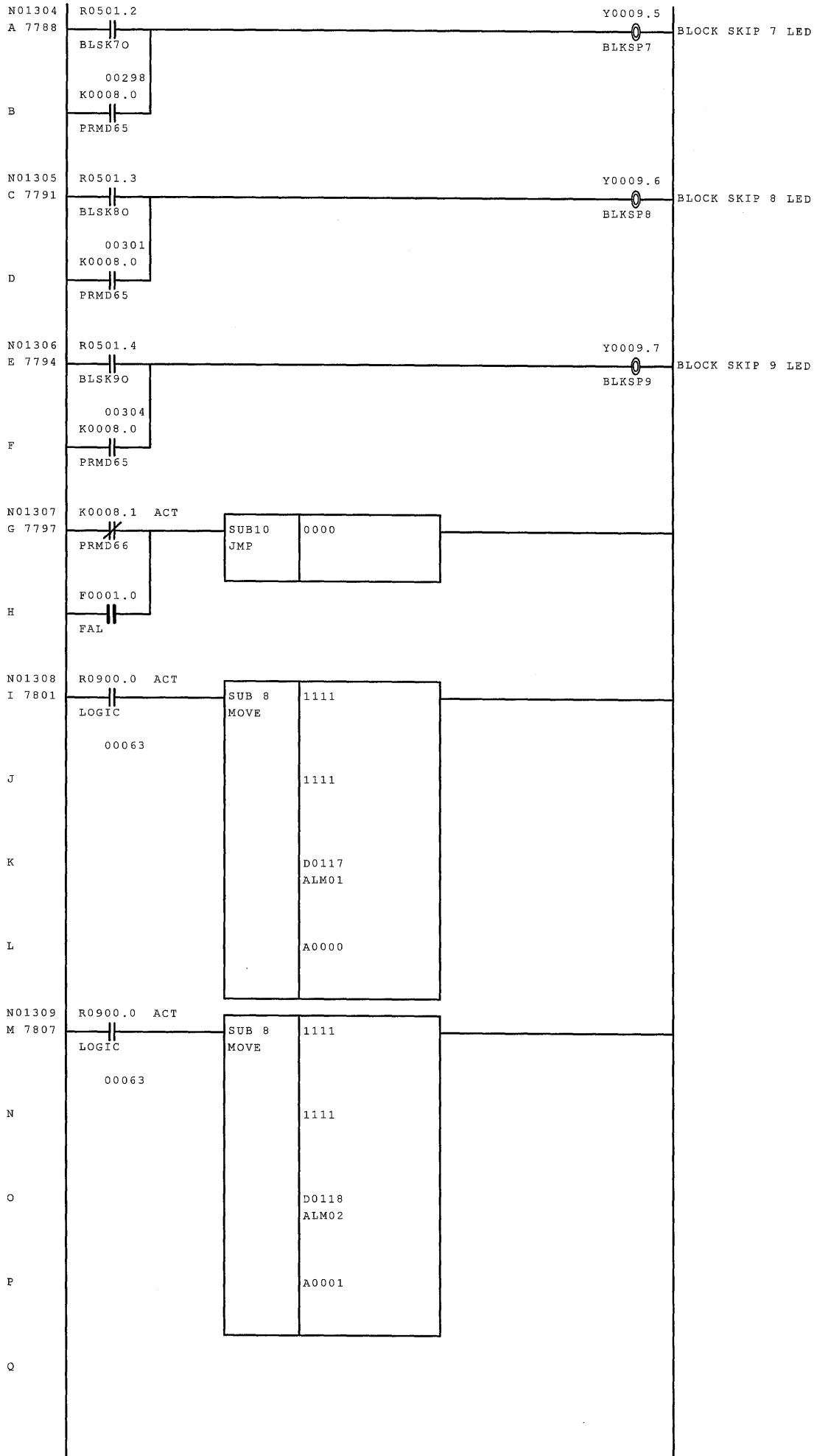
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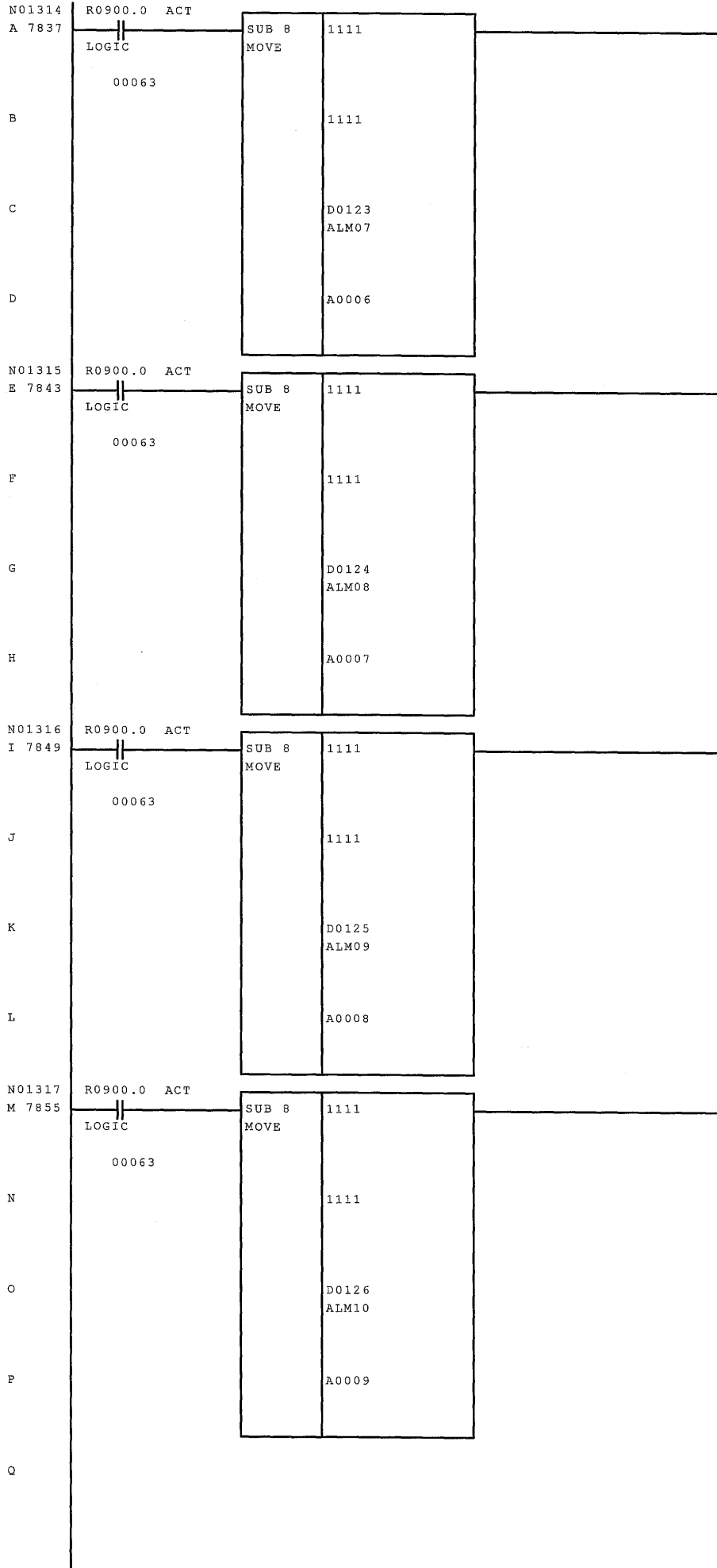


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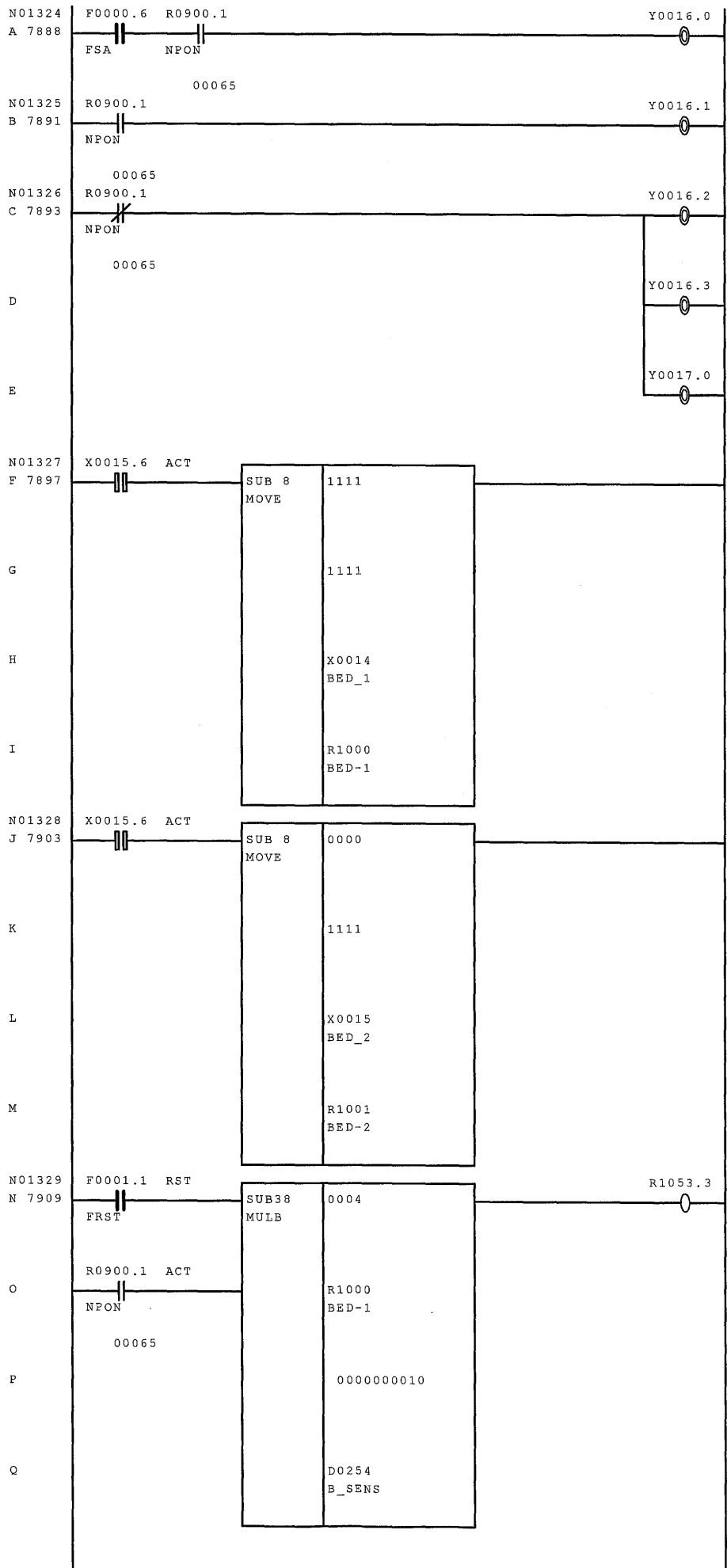




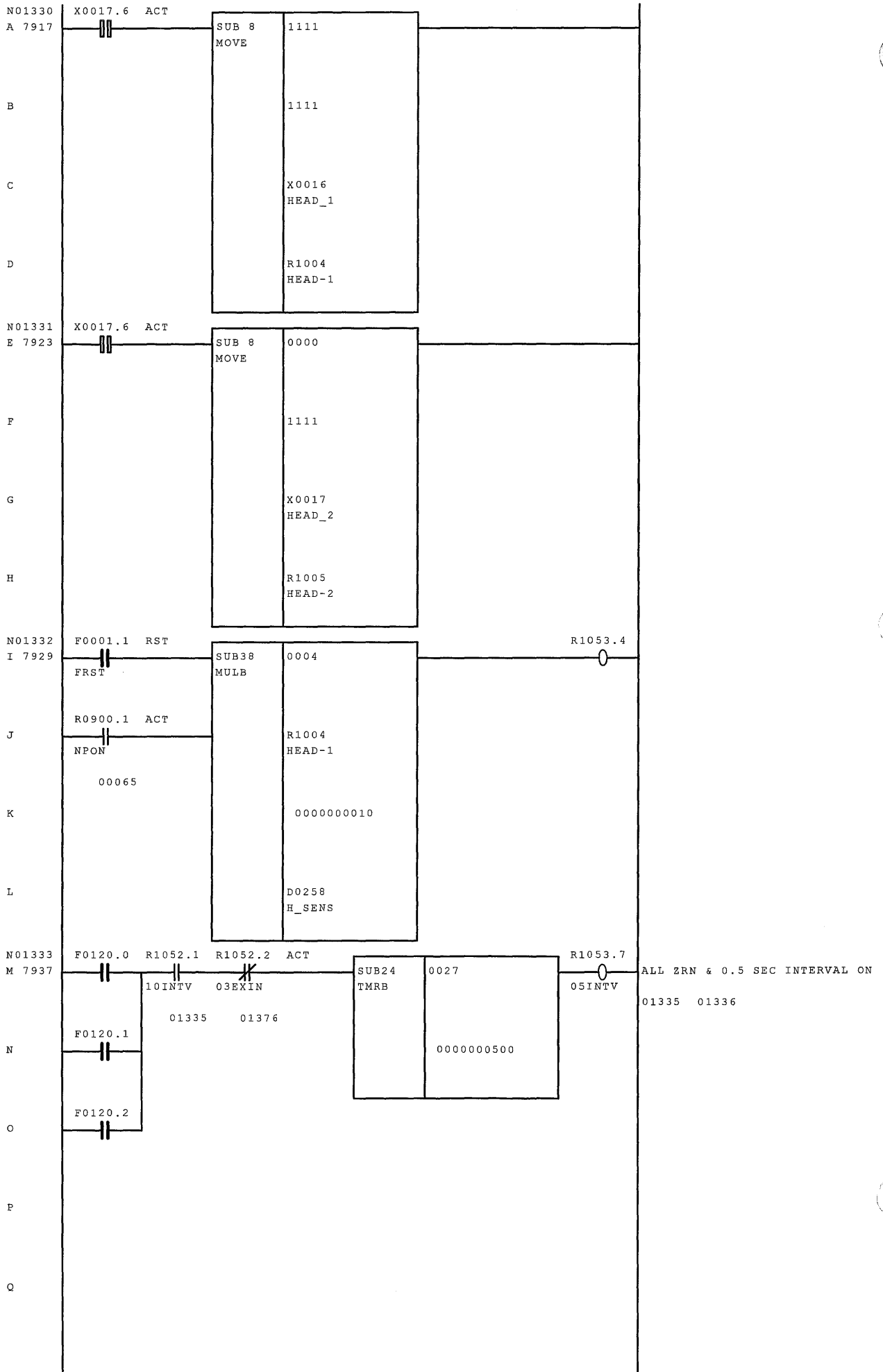
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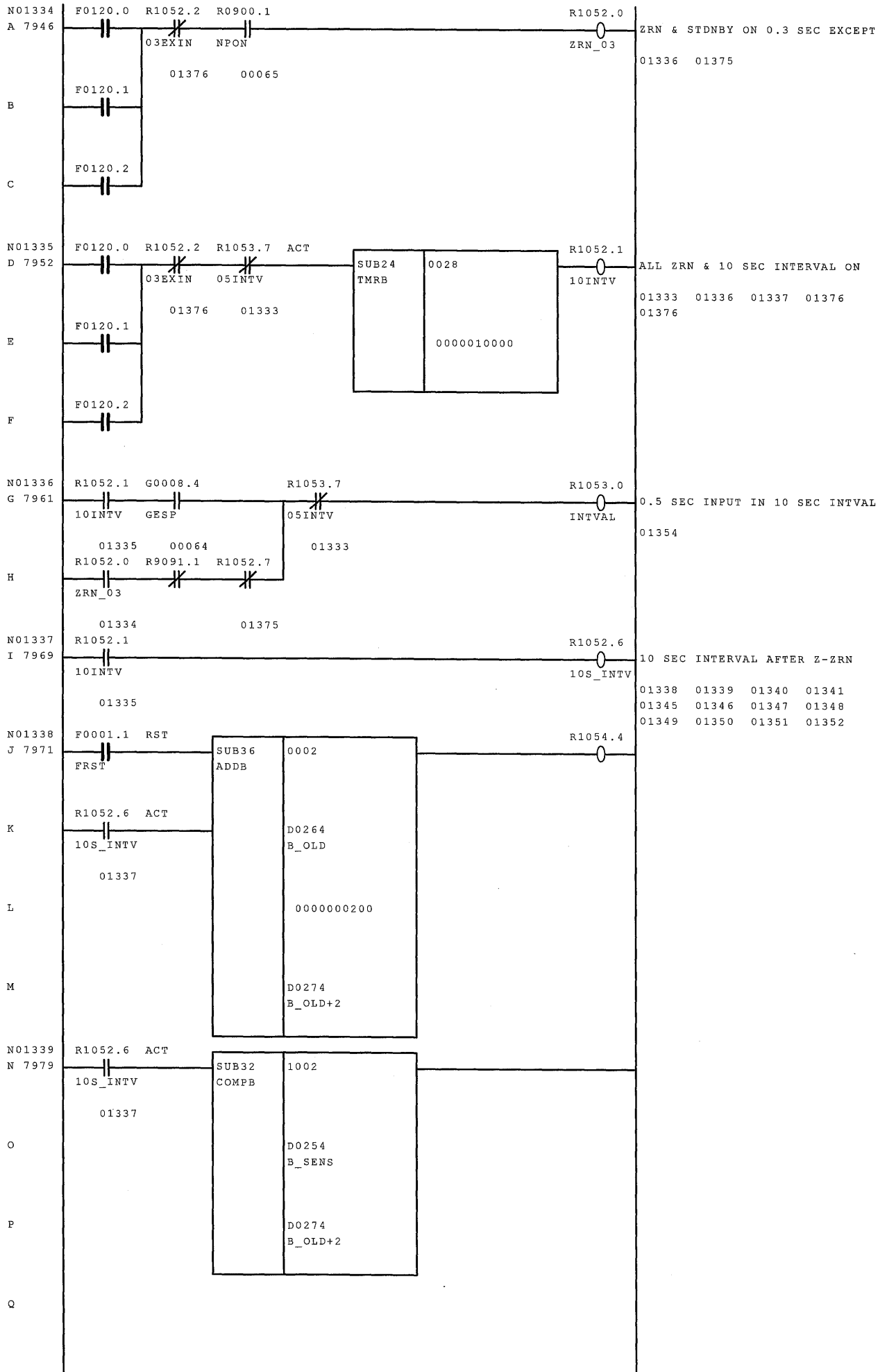
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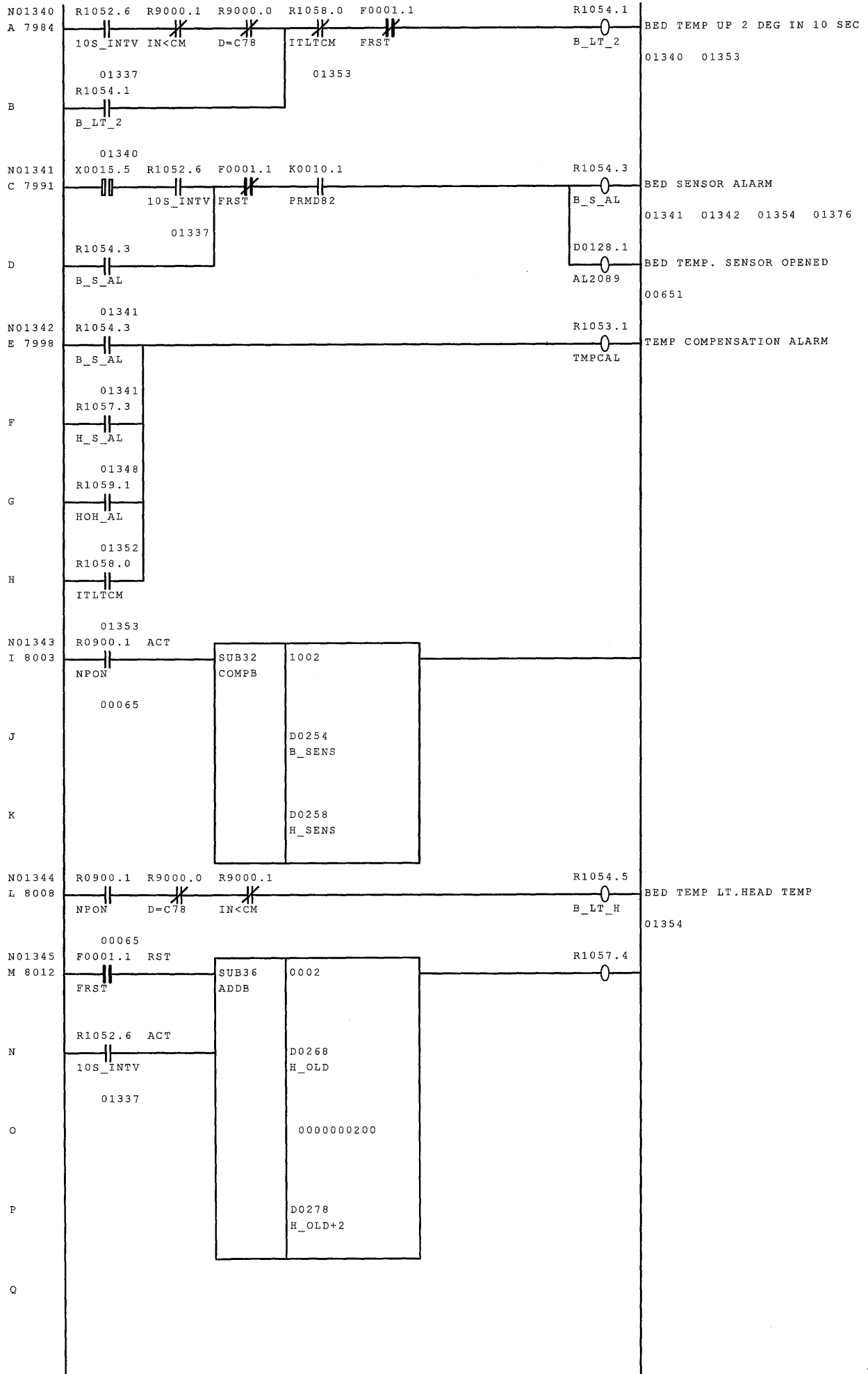
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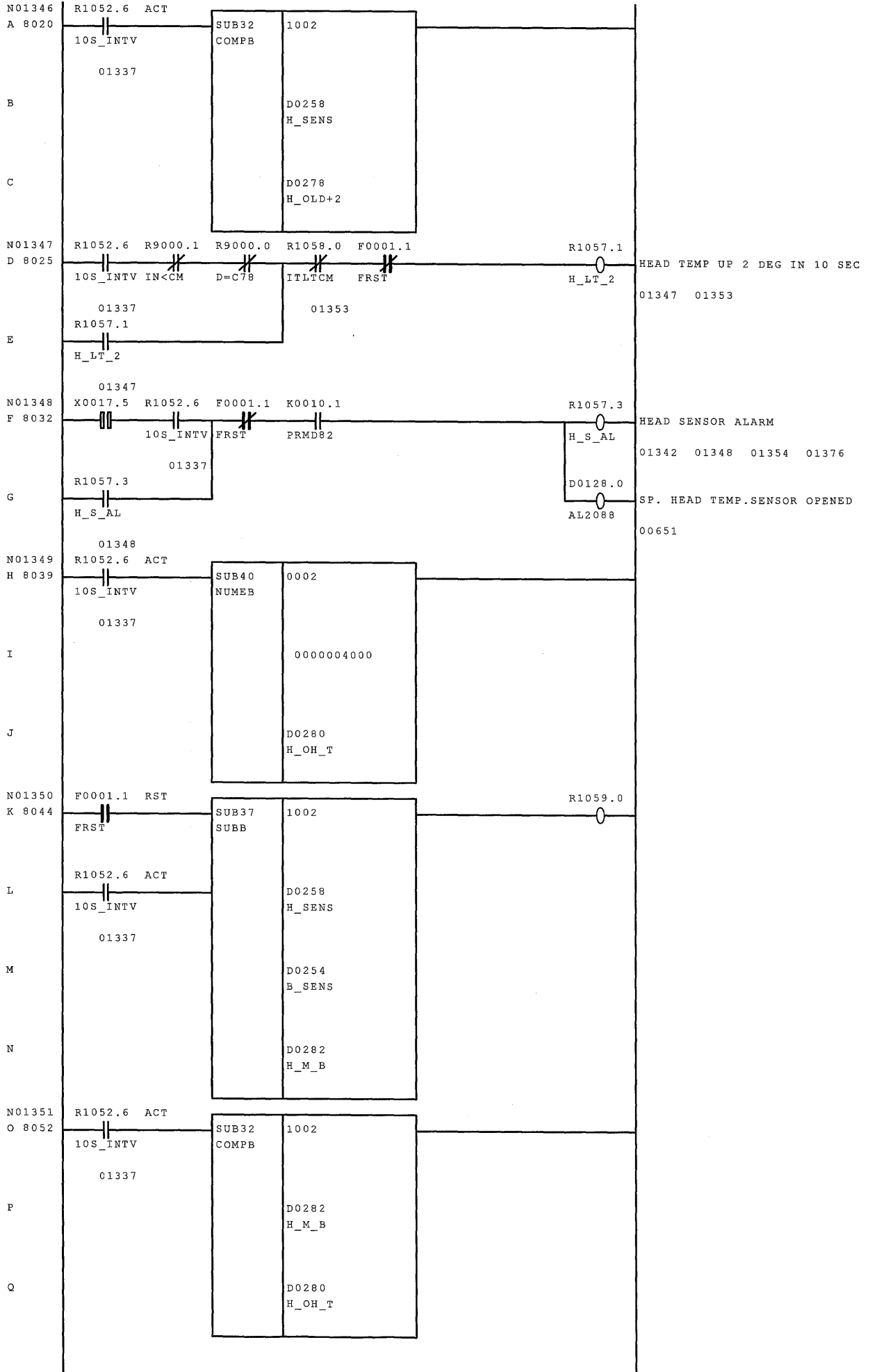
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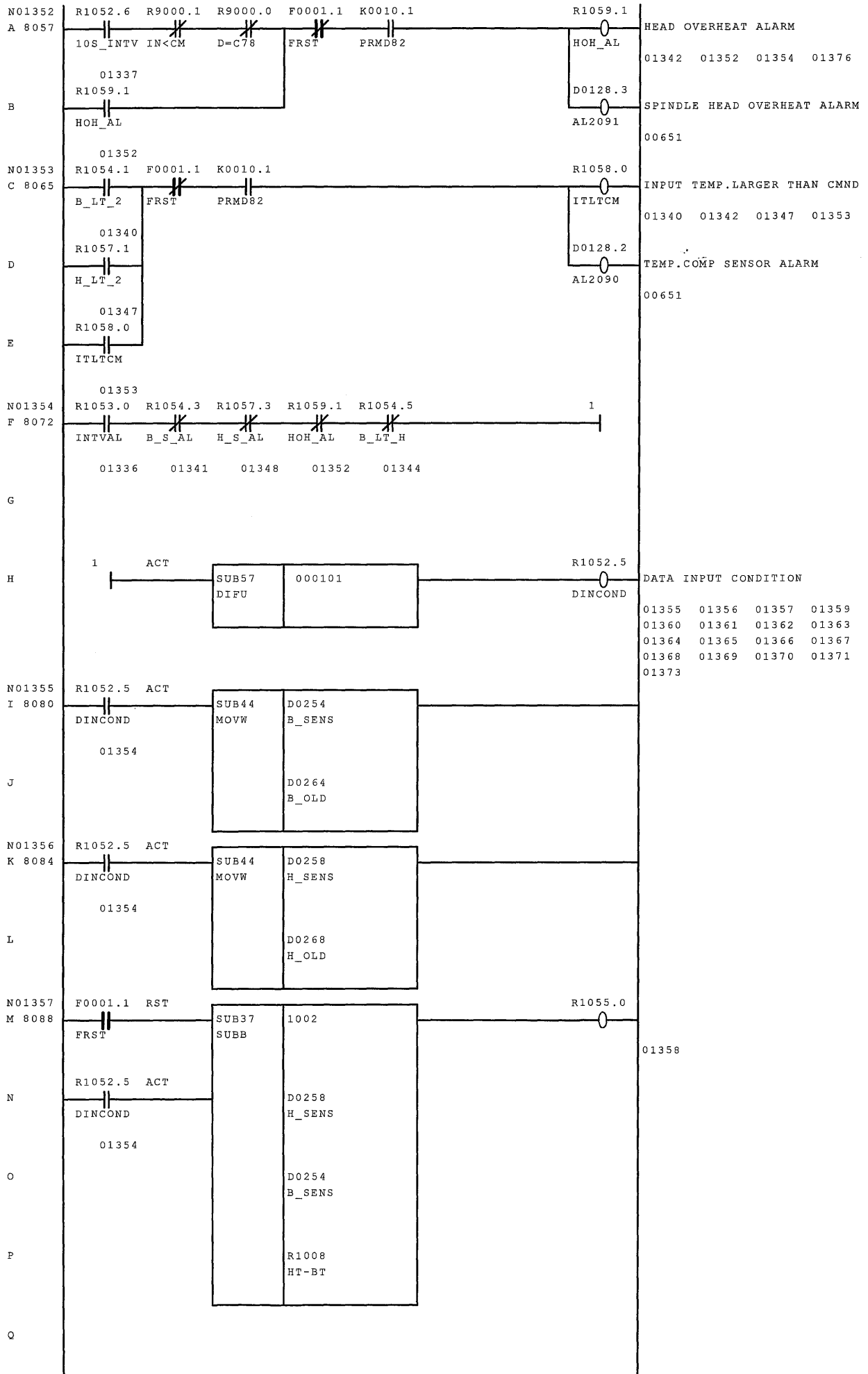
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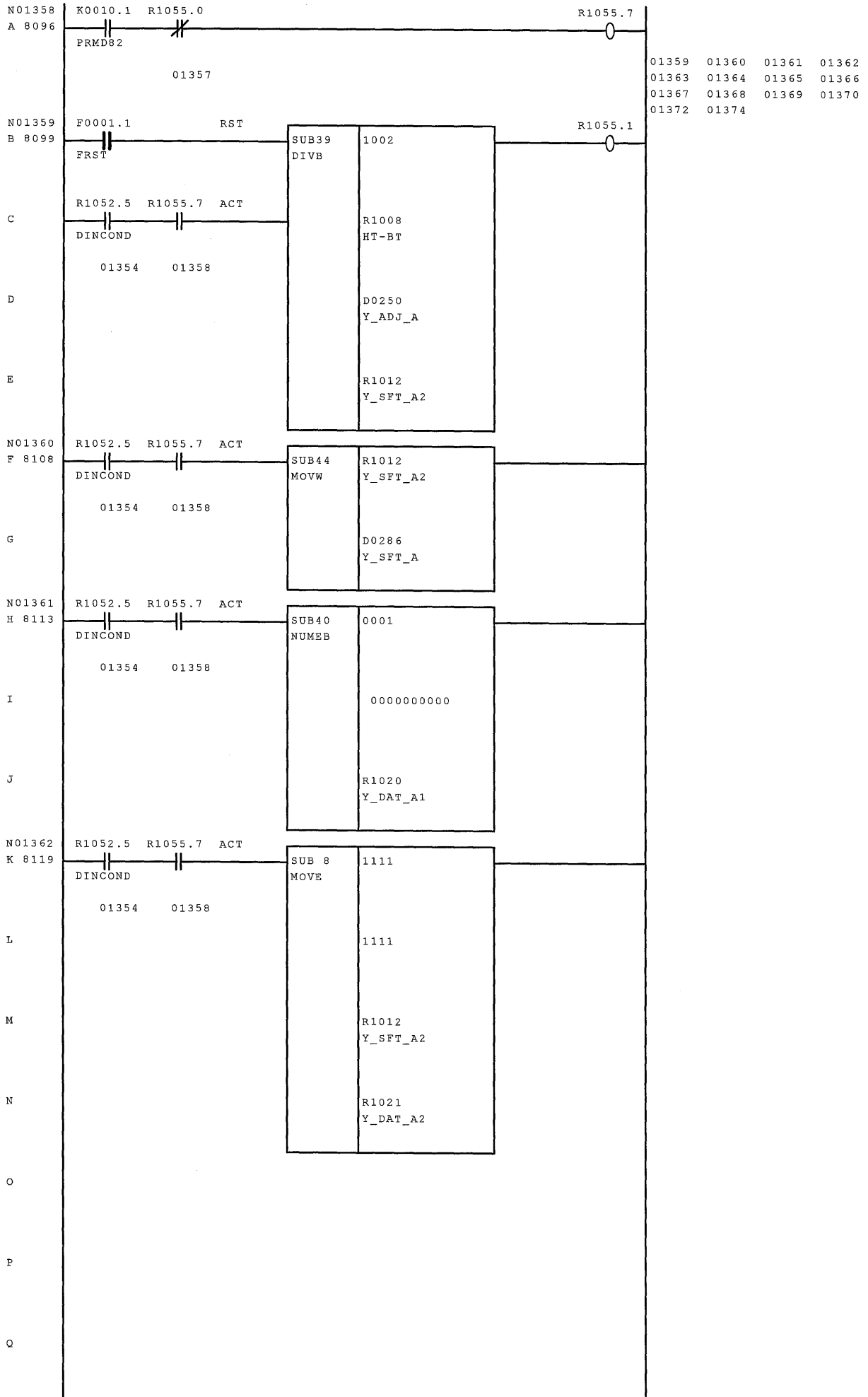
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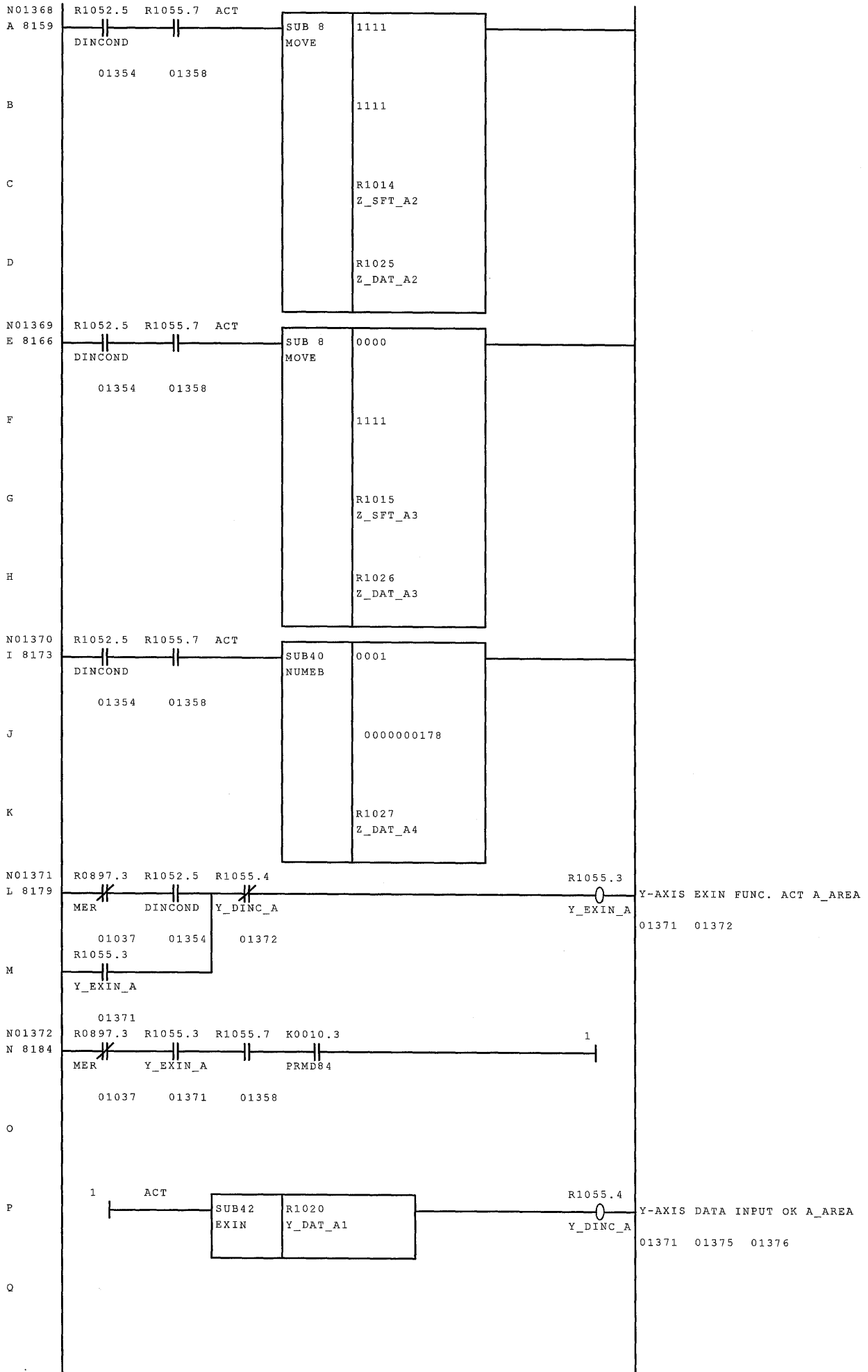
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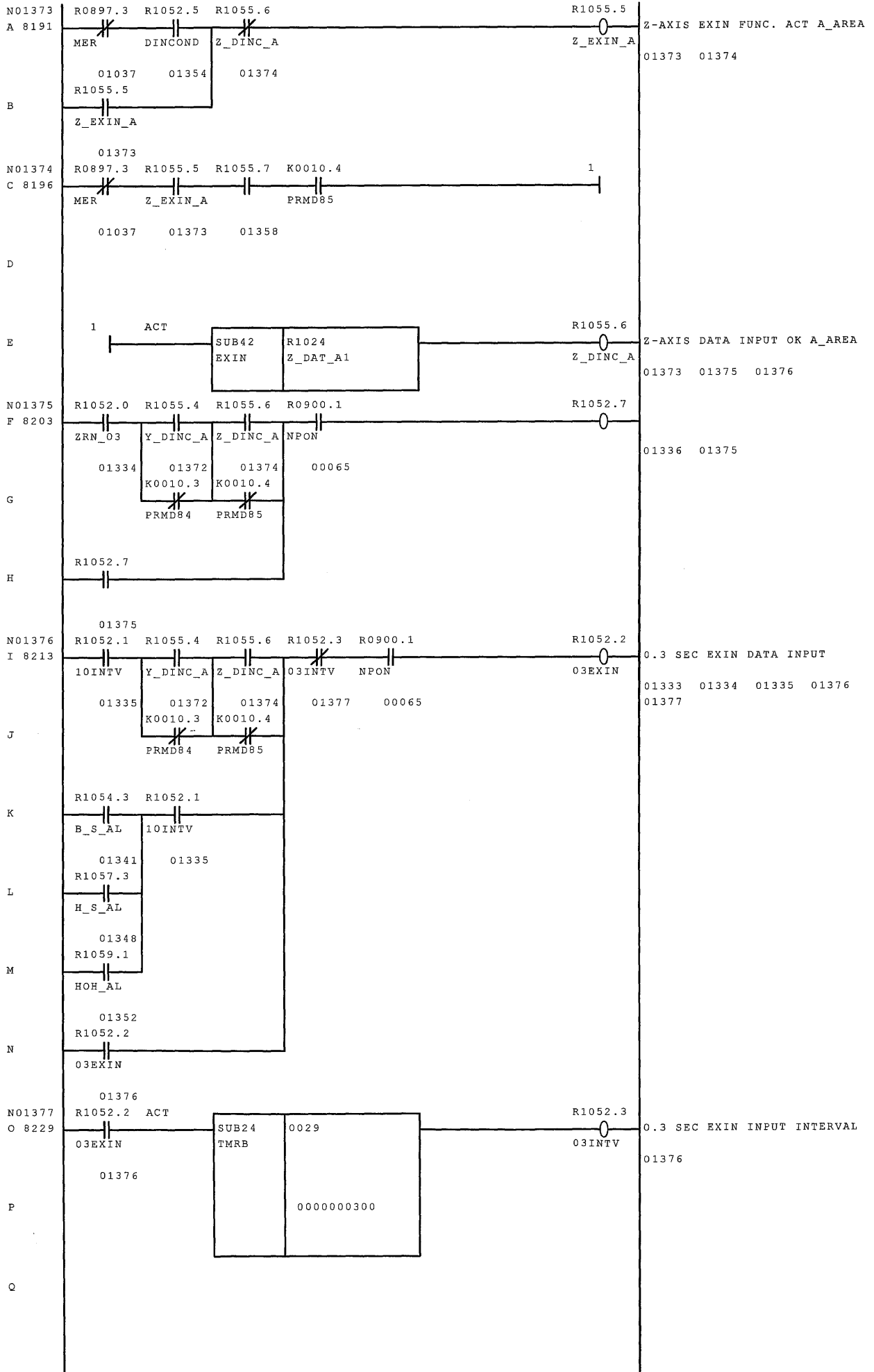
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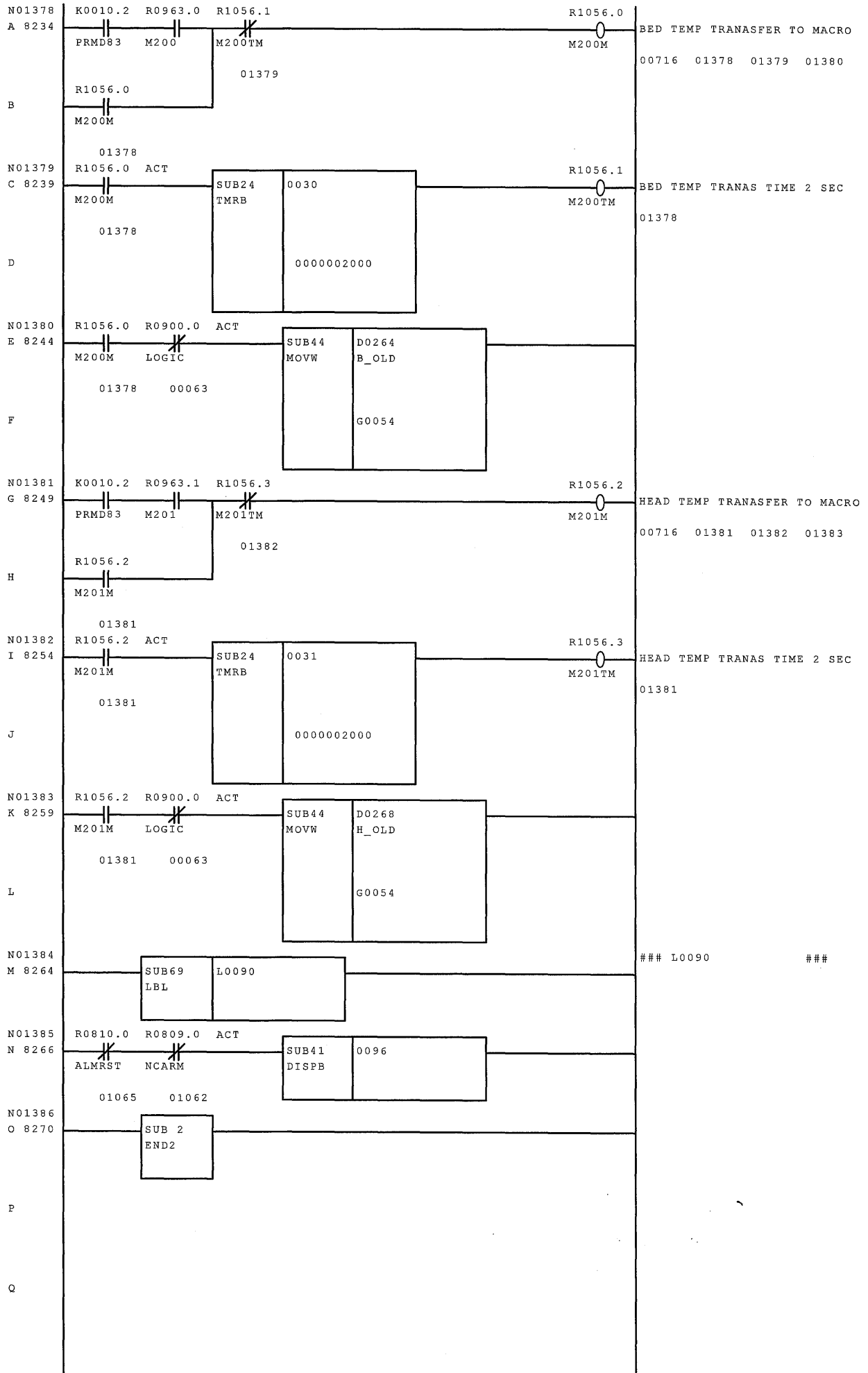
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NET NO.



NET NO.



ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0000.0 	+XOTLS S000517/N00097	X AXIS +O.T. S002407/N00535	
X0000.1 	-XOTLS S000519/N00098	X AXIS -O.T. S002419/N00536	
X0000.2 	+YOTLS S000521/N00099	Y AXIS +O.T. S002432/N00537	
X0000.3 	-YOTLS S000523/N00100	Y AXIS -O.T. S002444/N00538	
X0000.4 	+ZOTLS S000525/N00101	Z AXIS +O.T. S002456/N00539	
X0000.5 	-ZOTLS S000527/N00102	Z AXIS -O.T. S002469/N00540	
X0000.6 	AINTAL S001800/N00401	ATC INVERTER ALARM	
X0000.7 	S007005/N01154		
X0001.0 	COURCH S001764/N00389	COOLING UNIT RUN	
X0001.1 	LUBOLC S001758/N00388	LUB.OIL LACK S001760/N00388	
X0001.2 	LUBPSC S001917/N00433	LUB.PRESSURE SHORTAGE S001919/N00433	
X0001.3 	HYDOLC S001740/N00380	HYD.MOTOR O/L	
X0001.4 	COOLOL S001791/N00397	COOLANT MOTOR O/L S001798/N00400	
X0001.5 	STDMOL S001772/N00391	STD MOTOR O/L	
X0001.6 	ACTRIP S001796/N00399	AC110V/DC24V TRIP	
X0001.7 	TCOFLT S001887/N00425	THROUGH COOLANT FILTER	
X0002.0 	SPWHCK S002866/N00610	SP.WIRE HIGH CHECK S002871/N00611	
X0002.1 	SPWLCK S002867/N00610	SP.WIRE LOW CHECK S002870/N00611	
X0002.2 	HYDRNC S001742/N00381	HYD.RUN CHECK	
X0002.3 	AIRPRS S001841/N00416	AIR PRESSURE	
X0002.4 	THCOPR S001888/N00425	THROUGH COOLANT PRESSURE CHK	
X0002.5 	HYDCCK S001789/N00396	HYD.OIL CONFIRM CHECK	
X0002.6 	MATNSW S001912/N00431	MAINTENANCE SW	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0002.7 — — — —	BADJUST S001915/N00432	B AXIS ADJUST SW	
X0003.0 — — — —	OPDIRS S003396/N00681 S004210/N00769	OP DOOR INTERLOCK RELEASE S003959/N00734 S004083/N00753 S004190/N00766 S004203/N00769	
X0003.1 — — — —	OMDCLS S001867/N00422 S003960/N00734 S004206/N00768	OP.DOOR CLOSE CHECK S001871/N00422 S002693/N00577 S003349/N00677 S003937/N00734 S004017/N00743 S004082/N00753 S004145/N00760 S004172/N00768 S004209/N00769 S007278/N01189 S007321/N01192	
X0003.2 — — — —	CHIPAL S007247/N01185	EXTERNAL CHIP CONVEYOR ALARM	
X0003.3 — — — —	NOTCLS S001714/N00373	NO TOOL CLAMP CHECK S001722/N00374 S001726/N00375	
X0003.4 — — — —	TCLLS S001715/N00373	TOOL CLAMP CHECK S001723/N00374 S001727/N00375	
X0003.5 — — — —	TUNCLLS S001716/N00373	TOOL UNCLAMP CHECK S001724/N00374 S001728/N00375	
X0003.6 — — — —	HCWPRE S001765/N00389	HEAD COOLING WATER PRESSURE	
X0003.7 — — — —	OILAPR S006966/N01149	OIL AIR PRESSURE	
X0004.2 — — — —	TBOKLS S001770/N00390	TOOL BROCKEN CHECK	
X0005.0 — — — —	RACWLS S001825/N00408	ROTATING ARM CW	
X0005.1 — — — —	RACCLS S001827/N00409	ROTATING ARM CCW	
X0005.2 — — — —	APOREC S001899/N00428	APC PALLET ORGIN/EXIST CHECK	
X0005.3 — — — —	APCODC S000801/N00143	APC DOOR CLOSE CHECK	
X0005.4 — — — —	RAUPLS S001833/N00412	ROTATING ARM UP	
X0005.5 — — — —	RADNLS S001835/N00413	ROTATING ARM DOWN	
X0005.6 — — — —	APCHLC S001910/N00430	APC PALLET LOCK CHECK	
X0006.0 — — — —	ASLFUP S001829/N00410	APC ARM SOFT LIFT UP	
X0006.1 — — — —	ASLFDN S001831/N00411	APC ARM SOFT LIFT DOWN	
X0006.3 — — — —	PRGSTAPC S000985/N00230	PRG.START (APC)	
X0006.7 — — — —	APRYSW S001924/N00434	APC READY SW	
X0007.0 — — — —	GCOLON S003964/N00735	GUN COOLANT ON (APC) S003967/N00736	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0007.1	TPCLC	TABLE PALLET CLAMP CHECK L/S	
— — 	— — 	S001932/N00437 S001940/N00438 S001948/N00439 S001952/N00440	
X0007.2	PCONTC	PALLET CONTACT CONFIRM	
— — 	— — 	S003300/N00673 S003783/N00716 S006767/N01118 S006798/N01125 S007242/N01125	
X0007.3	NCTACL	NC TABLE CLAMP	
— — 	— — 	S001936/N00437 S001944/N00438	
X0007.4	TPUCLLS	TABLE/PALLET UNCLAMP CHECK L/S	
— — 	— — 	S001934/N00437 S001942/N00438 S001950/N00439 S001954/N00440	
X0007.5	PUNLS	PALLET UNCLAMP CHECK L/S	
— — 	— — 	S001933/N00437 S001941/N00438 S001949/N00439 S001953/N00440	
X0008.0	TPOTET	TOOL POT EXIST	
— — 	— — 	S005306/N00921 S005749/N00982 S006848/N01134 S007203/N01179	
X0008.1	MPINLS	MAG.INDEX PIN IN	
— — 	— — 	S001778/N00394	
X0008.2	MZSOUT	MAG.STOPPER OUT L/S	
— — 	— — 	S001787/N00395	
X0008.3	AODCCH	ATC OPERATOR DOOR CLOSE CHECK	
— — 	— — 	S000190/N00036 S003409/N00684 S003560/N00710 S004261/N00774 S004907/N00893 S004997/N00893 S005058/N00896 S005109/N00900 S005499/N00945 S005692/N00945 S005709/N00979 S005753/N00982 S005770/N00983 S005944/N01009 S007291/N01009	
X0008.4	EMGSTP	EMERGENCY STOP	
— — 	— — 	S000329/N00064 S000334/N00065 S000345/N00066	
X0008.5	TPOTCL	TOOL POT CLAMP L/S	
— — 	— — 	S001736/N00378 S001738/N00379	
X0008.7	EXDEXL	EXT.X AXIS DEC	
— — 	— — 	S005915/N01003	
X0009.4	MGCNTB	MAG.COUNT B-PHASE	
— — 	— — 	S000712/N00130 S000716/N00131 S000727/N00132 S000751/N00136 S001712/N00136 S004246/N00773	
X0009.5	MGCNTC	MAG.COUNT C-PHASE	
— — 	— — 	S005925/N01005	
X0009.6	TPSM SL	TOOL POT SWING MAG.SIDE	
— — 	— — 	S001895/N00426	
X0009.7	TPSSSL	TOOL POT SWING SP.SIDE	
— — 	— — 	S001897/N00427 S005727/N00980	
X0010.0	ENCOS1	ENC. OUTPUT SIGNAL 1	
— — 	— — 	S000576/N00112 S000578/N00112	
X0010.1	ENCOS2	ENC. OUTPUT SIGNAL 2	
— — 	— — 	S000570/N00111 S000572/N00111	
X0010.2	ENCOS3	ENC. OUTPUT SIGNAL 3	
— — 	— — 	S000564/N00110 S000566/N00110	
X0010.3	ENCOS4	ENC. OUTPUT SIGNAL 4	
— — 	— — 	S000558/N00109 S000560/N00109	
X0010.4	ENCOS5	ENC. OUTPUT SIGNAL 5	
— — 	— — 	S000552/N00108 S000554/N00108	
X0010.5	ENCOS6	ENC. OUTPUT SIGNAL 6	
— — 	— — 	S000546/N00107 S000548/N00107	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0010.6	ENCOS7	ENC. OUTPUT SIGNAL 7	
— — — —	S000540/N00106	S000542/N00106	
X0010.7	ENCOS8	ENC. OUTPUT SIGNAL 8	
— — — —	S000534/N00105	S000536/N00105	
X0011.0	MGIFSW	MAG.INDEX FORWARD	
— — — —	S001844/N00417		
X0011.1	MGIRSW	MAG.INDEX REVERSE	
— — — —	S001849/N00418		
X0011.3	ATCDLR	ATC DOOR LOCK RELEASE	
— — — —	S000191/N00036	S003277/N00670 S003280/N00671 S003410/N00684 S003561/N00685	
	S004262/N00774	S004908/N00882 S004998/N00893 S005059/N00896 S005110/N00897	
	S005500/N00945	S005693/N00978 S005710/N00979 S005754/N00982 S005771/N00983	
	S005945/N01009	S007292/N01190	
X0011.4	AMPOFS	ATC MAN.PIN OFF FOOT S/W	
— — — —	S001734/N00377		
X0011.5	ATCSOL	ATC SHUTTER OPEN	
— — — —	S001926/N00435	S005697/N00978	
X0011.6	ATCSCL	ATC SHUTTER CLOSE	
— — — —	S001929/N00436	S005714/N00979	
X0011.7	ENCOS9	ENC. OUTPUT SIGNAL 9	
— — — —	S000532/N00104		
X0013.5			
— — — —	S001732/N00376		
X0013.7			
— — — —	S001793/N00398		
X0014.0			
— — — —	S000808/N00146		
X0014.1			
— — — —	S000810/N00147		
X0014.2			
— — — —	S000812/N00148		
X0014.3			
— — — —	S000814/N00149		
X0014.4			
— — — —	S000816/N00150		
X0014.5			
— — — —	S000818/N00151		
X0014.6			
— — — —	S000820/N00152		
X0014.7			
— — — —	S000822/N00153		
X0015.5			
— — — —	S007991/N01341		
X0015.6			
— — — —	S007897/N01327 S007903/N01328		
X0017.5			
— — — —	S008032/N01348		

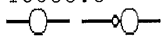
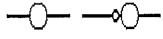
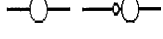
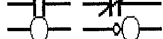
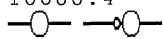
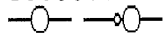
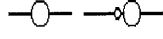
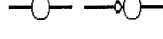

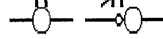
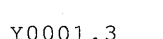
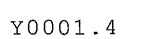
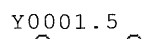
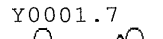
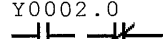
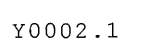


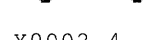
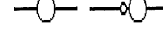
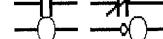
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0017.6 — — — —	S007917/N01330	S007923/N01331	
X0064.3 — — — —	INPX S001780/N00394	ATC MAGAZINE INPOSITION SIG. S007015/N01155	
X0064.6 — — — —	OPC3 S000182/N00033	SVU ACTION FINISH 3	
X0064.7 — — — —	OPC4 S000001/N00001	SVU ACTION FINISH 4	
X0065.1 — — — —	DRC0 S000030/N00005	SVU INTERFACE SIGNAL	
X0065.6 — — — —	SA-SVU S000031/N00005	SVU SERVO READY	
X0066.3 — — — —	DSALO S000280/N00054	SVU ON ALARM CONDITION	
X0066.4 — — — —	DSP1 S000079/N00013	SVU DATA CHECK 1	
X0066.5 — — — —	DSP2 S000078/N00013	SVU DATA CHECK 2	
X0066.6 — — — —	AL-SVU S000012/N00002	SVU ALARM SIGNAL S000029/N00005 S000077/N00013 S000267/N00050	
X0100.0 — — — —	HDMS S000844/N00164	HANDLE MODE	
X0100.1 — — — —	JGMS S000824/N00154	JOG MODE	
X0100.2 — — — —	RPMS S000826/N00155	RAPID MODE	
X0100.3 — — — —	ARNMS S000828/N00156	ZERO RETURN MODE	
X0100.4 — — — —	MDIS S000830/N00157	MDI MODE	
X0100.5 — — — —	EDITS S000832/N00158	EDIT MODE	
X0100.6 — — — —	MEMS S000834/N00159	MEMORY MODE	
X0100.7 — — — —	TAPES S000836/N00160	TAPE MODE	
X0101.3 — — — —	S000846/N00165		
X0101.4 — — — —	FD-A S000848/N00166	FEED -A	
X0101.5 — — — —	FD+A S000850/N00167	FEED +A	
X0101.6 — — — —	SPST S000838/N00161	SPINDLE START	
X0101.7 — — — —	SPSP S000840/N00162	SPINDLE STOP	


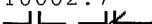
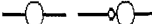
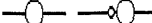
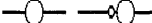
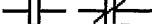
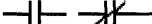

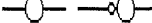
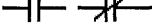
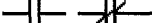

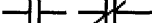
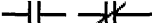




ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0102.0 — — — —	DYRN S000873/N00176	DRY RUN	
X0102.1 — — — —	ZCANL S000875/N00177	Z-AXIS CANCEL	
X0102.2 — — — —	MCLK S000877/N00178	MACHINE LOCK	
X0102.3 — — — —	SPSEL S000879/N00179	SPINDLE SELECT	
X0102.4 — — — —	OPSTP S000946/N00211	OPTIONAL STOP	
X0102.5 — — — —	BKSKP S000944/N00210	BLOCK SKIP	
X0102.6 — — — —	S000881/N00180	S001845/N00417	
X0102.7 — — — —	S000884/N00181	S001850/N00418	
X0103.0 — — — —	PGRST S000941/N00209	PROGRAM RESTART	
X0103.1 — — — —	BKRST S000939/N00208	BLOCK RESTART	
X0103.2 — — — —	F1DGT S000937/N00207	F1 DIGIT FEED	
X0103.3 — — — —	HDINT S000948/N00212	HANDLE INTERRUPT	
X0103.4 — — — —	TAIRBW S000915/N00196	TOOL AIR BLOW	
X0103.5 — — — —	THAIRB S000929/N00203	THROUGH AIR BLOW	
X0103.6 — — — —	S000887/N00182		
X0103.7 — — — —	CMPCAL S000907/N00192	COMPLETION CALL	
X0104.0 — — — —	THCOL S000909/N00193	THROUGH COOLANT	
X0104.1 — — — —	MSTCOL S000911/N00194	MIST COOLANT	
X0104.2 — — — —	GUNCOL S000913/N00195	GUN COOLANT	
X0104.3 — — — —	FLUSHC S000889/N00183	FLUSHING COOLANT	
X0104.4 — — — —	OILHCL S000917/N00197	OIL HOLE COOLANT	
X0104.5 — — — —	JETCOL S000919/N00198	JET COOLANT	
X0104.6 — — — —	FLDCOL S000921/N00199	FLOOD COOLANT	

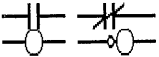
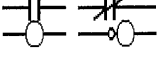
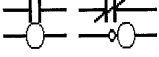
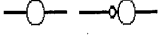
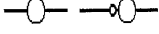
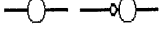
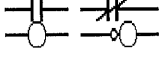
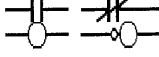
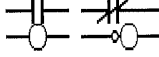
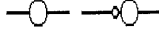
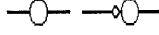
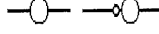
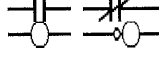
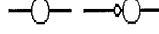
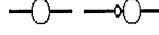
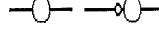
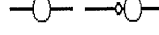
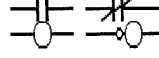
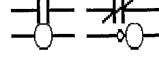

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0104.7 — — — —	TLSET S000933/N00205	TOOL SETTER	
X0105.0 — — — —	FD-B S000852/N00168	FEED -B	
X0105.1 — — — —	FD+B S000854/N00169	FEED +B	
X0105.2 — — — —	FD+Y S000867/N00173	FEED +Y	
X0105.3 — — — —	FD-Z S000869/N00174	FEED -Z	
X0105.4 — — — —	FD+X S000863/N00171	FEED +X	
X0105.5 — — — —	FD-X S000861/N00170	FEED -X	
X0105.6 — — — —	FD-Y S000865/N00172	FEED -Y	
X0105.7 — — — —	FD+Z S000871/N00175	FEED +Z	
X0106.0 — — — —	SPEFF S000842/N00163	SPINDLE EFFECTIVE	
X0106.1 — — — —	CALOF S000923/N00200	CALL LIGHT OFF	
X0106.2 — — — —	CHPCON S000925/N00201	CHIP CONVEYOR	
X0106.3 — — — —	WORKL S000927/N00202	WORK LIGHT	
X0106.4 — — — —	ATPOF S000931/N00204	AUTO POWER OFF	
X0106.5 — — — —	RAP1 S000976/N00226	RAPID OVERRIDE 1	
X0106.6 — — — —	RAP2 S000978/N00227	RAPID OVERRIDE 2	
X0106.7 — — — —	RAP4 S000980/N00228	RAPID OVERRIDE 3	
X0107.0 — — — —	FDRO1 S002168/N00496	FEEDRATE OVERRIDE 1	
X0107.1 — — — —	FDRO2 S002174/N00497	FEEDRATE OVERRIDE 2	
X0107.2 — — — —	FDRO4 S002180/N00498	FEEDRATE OVERRIDE 4	
X0107.3 — — — —	FDRO8 S002186/N00499	FEEDRATE OVERRIDE 8	
X0107.4 — — — —	FDRO16 S002192/N00500	FEEDRATE OVERRIDE 16	
X0107.5 — — — —	TUCLMP S000989/N00232	TOOL UNCLAMP	


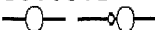
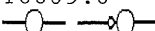


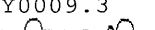
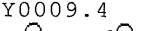
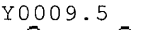
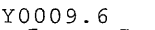
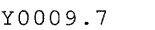
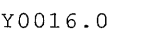
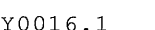
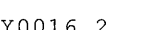
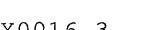
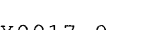







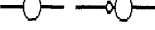
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0107.6 — — — —	TCLMP S000991/N00233	TOOL CLAMP	
X0107.7 — — — —	HD1 S000950/N00213	HANDLE AXIS 1	
X0108.0 — — — —	SPOV1 S000995/N00235	SPINDLE OVERRIDE 1	
X0108.1 — — — —	SPOV2 S000997/N00236	SPINDLE OVERRIDE 2	
X0108.2 — — — —	SPOV4 S000999/N00237	SPINDLE OVERRIDE 4	
X0108.3 — — — —	SPOV8 S001001/N00238	SPINDLE OVERRIDE 8	
X0108.4 — — — —	HD2 S000952/N00214	HANDLE AXIS 2	
X0108.5 — — — —	HD4 S000954/N00215	HANDLE AXIS 4	
X0108.6 — — — —	HDMP1 S000958/N00217	HANDLE MULTIPLY 1	
X0108.7 — — — —	HDMP2 S000960/N00218	HANDLE MULTIPLY 2	
X0109.0 — — — —	JOGF1 S002166/N00496	JOG FEEDRATE 1	
X0109.1 — — — —	JOGF2 S002172/N00497	JOG FEEDRATE 2	
X0109.2 — — — —	JOGF4 S002178/N00498	JOG FEEDRATE 4	
X0109.3 — — — —	JOGF8 S002184/N00499	JOG FEEDRATE 8	
X0109.4 — — — —	JOGF16 S002190/N00500	JOG FEEDRATE 16	
X0109.5 — — — —	HDMP4 S000962/N00219	HANDLE MULTIPLY 4	
X0109.6 — — — —	HD-J S000970/N00223	HANDLE -JOG	
X0109.7 — — — —	HD+J S000972/N00224	HANDLE +JOG	
X0110.0 — — — —	SBK S000349/N00067	SINGLE BLOCK S000993/N00234	
X0110.1 — — — —	PRGST S000984/N00230	PROGRAM START	
X0110.2 — — — —	FDHLD S000987/N00231	FEED HOLD	
X0110.3 — — — —	STANBY S000982/N00229	STANDBY S002006/N00450	
X0110.4 — — — —	MEMWR S000974/N00225	MEMORY WRITE	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0110.5 — — — —	TOOLN S000956/N00216	TOOL NUMBER	
X0110.6 — — — —	WORKFIN S000968/N00222	WORK COUNTER FINISH	
X0110.7 — — — —	BATLK S000966/N00221	BATTERY LACK	
X0111.0 — — — —	BSKP2 S000891/N00184	BLOCK SKIP 2	
X0111.1 — — — —	BSKP3 S000893/N00185	BLOCK SKIP 3	
X0111.2 — — — —	BSKP4 S000895/N00186	BLOCK SKIP 4	
X0111.3 — — — —	BSKP5 S000897/N00187	BLOCK SKIP 5	
X0111.4 — — — —	BSKP6 S000899/N00188	BLOCK SKIP 6	
X0111.5 — — — —	BSKP7 S000901/N00189	BLOCK SKIP 7	
X0111.6 — — — —	BSKP8 S000903/N00190	BLOCK SKIP 8	
X0111.7 — — — —	BSKP9 S000905/N00191	BLOCK SKIP 9	
X1003.7 — — — —	S001802/N00402		
X1005.6 — — — —	S001837/N00414		
X1005.7 — — — —	S001839/N00415		

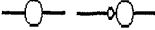
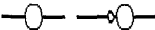
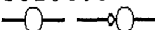
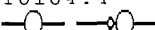
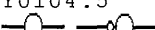
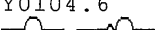
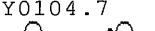
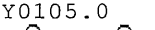
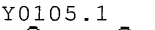
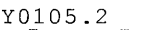
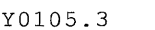
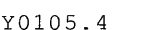
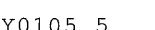
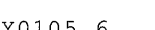
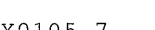
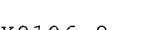






ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
Y0000.0	LUBST 	LUB.START	
Y0000.1	COOLST 	COOLANT START	
Y0000.2	OLHLCO 	OIL HOLE (THROUGH) COOLANT START	
Y0000.3	GUNCLT 	GUN COOLANT	
	S007384/N01201	S001652/N00359 S001660/N00360	
	S007390/N01204		
Y0000.4	JETCLT 	JET COOLANT	
	S007392/N01205		
Y0000.5	SCCCNL 	SCREW CHIP CONVEYOR (LEFT+RIGHT)	
	S007395/N01206		
Y0000.6	SPWHI 	SPINDLE WIRE HIGH	
	S007398/N01207		
Y0000.7	SPWLOW 	SPINDLE WIRE LOW	
	S007401/N01208		
Y0001.0	FLSCOO 	FLUSHING COOLANT	
	S007403/N01209		
Y0001.1	 		
	S003801/N00716 S003804/N00716		
	S005887/N00997		
Y0001.3	CALLGR 	CALL LIGHT GREEN	
	S007408/N01210		
Y0001.4	CALLYE 	CALL LIGHT YELLOW	
	S007419/N01211		
Y0001.5	CALLRE 	CALL LIGHT RED	
	S007424/N01212		
Y0001.7	BUZ 	BUZZER	
	S007429/N01213		
Y0002.0	ATCSOP 	ATC SHUTTER OPEN	
	S007434/N01215 S007432/N01214		
Y0002.1	ATCCLS 	ATC SHUTTER CLOSE	
	S007431/N01214 S007435/N01215		
Y0002.2	MZCW 	MAGAZINE FORWARD INDEX	
	S007438/N01216		
Y0002.3	MZCCW 	MAGAZINE REVERSE ROTATION	
	S007441/N01217		
Y0002.4	POTSPS 	POT SIFT SPINDLE SIDE	
	S004642/N00835 S006021/N01017		
	S007444/N01218		
Y0002.5	POTMZS 	POT SIFT MAGAZINE SIDE	
	S004624/N00831 S006014/N01016		
	S007447/N01219		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
Y0002.6	 POTCLP S007450/N01220	POT CLAMP SOL	
Y0002.7	 MAGRPD S007452/N01221 S007457/N01221	MAG. RAPID SOL	
Y0003.0	 MZSTOU S007459/N01222	MAGAZINE STOPPER OUT	
Y0003.1	 TOOLUN S007463/N01223	TOOL UNCLAMP SOL	
Y0003.2	 SPAIRS S007469/N01224	SPINDLE AIR BLOW SOL	
Y0003.3	 THCOAB S001680/N00367 S001688/N00368 S007471/N01225	THROUGH COOLANT AIR BLOW SOL.	
Y0003.4	 TOOLABS S001407/N00310 S001415/N00311 S007669/N01274	TOOL AIR BLOW SOL.	
Y0003.5	 SPASOS S007473/N01226	SP. LINE AIR SUPPLY OFF SOL.	
Y0003.6	 SPLSOS S007474/N01226	SP. LINE LUB. SUPPLY OFF SOL.	
Y0004.0	 RTAUPS S006604/N01104 S006611/N01105 S006676/N01110 S006697/N01111 S007480/N01112 S007487/N01228 S007484/N01227	ROTATING ARM UP SOL	
Y0004.1	 RTADWS S006605/N01104 S006612/N01105 S007482/N01227 S007488/N01228	ROTATING ARM DOWN SOL	
Y0004.2	 WORKCT S007565/N01249	WORK COUNTER	
Y0004.4	 APSUP S006618/N01106 S006625/N01107 S007493/N01230 S007491/N01229	APC ARM SOFT LIFT UP	
Y0004.5	 APSDN S006619/N01106 S006626/N01107 S007490/N01229 S007527/N01239 S007494/N01230	APC ARM SOFT LIFT DOWN	
Y0004.6	 RATUCW S007500/N01232 S007498/N01231	ROTATING ARM CW SOL	
Y0004.7	 RATCCW S003625/N00712 S007496/N01231 S007502/N01232	ROTATING ARM CCW SOL	
Y0005.0	 RARMAIR S007506/N01233	ROTATING ARM AIR BLOW SOL	
Y0005.1	 TBLCL S007510/N01234	TABLE CLAMP SOL	
Y0005.2	 TBUNCL S007513/N01235	TABLE UNCLAMP SOL	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
Y0005.3	PALCLM 	PALLET CLAMP SOL	S006766/N01118 S006797/N01125 S006814/N01128 S006815/N01128 S007518/N01236
Y0005.4	PALUNC 	PALLET UNCLAMP SOL	S006659/N01109 S006679/N01110 S006700/N01111 S007515/N01236
Y0005.5	TABAIRS 	TABLE AIR BLOW SOL	S007522/N01238 S007526/N01238
Y0005.6	PALAIRS 	PALLET AIR BLOW SOL	S007507/N01233
Y0005.7			S007529/N01239
Y0006.0	STDBY 	MACHINE READY	S000343/N00065
Y0006.1	XAXBRK 	X-AXIS BRAKE OFF	S001109/N00251 S000369/N00075
Y0006.2	TWARMF 	TWIN ARM FORWARD	S004705/N00843 S004719/N00847 S005459/N00938 S007531/N01240
Y0006.3	TWARMR 	TWIN ARM REVERSE	S004708/N00844 S004722/N00848 S005460/N00938 S007533/N01241
Y0006.4	TWAMLO 	TWIN ARM LOW	S007536/N01242
Y0006.5	TWAMHI 	TWIN ARM HIGH	S007539/N01243
Y0006.6	APWCOF 	AUTO POWER CUT OFF	S007541/N01244
Y0006.7	STADBY 	STANDBY	S001108/N00251 S000344/N00065
Y0007.0	OPDORR 	OPERATOR DOOR RELEASE SOL	S007545/N01245
Y0007.1	APCORE 	APC DOOR RELEASE	S007552/N01246
Y0007.2	YAXBRK 	Y-AXIS BRAKE OFF	S000370/N00075
Y0007.3	ZAXBRK 	Z-AXIS BRAKE OFF	S000371/N00075
Y0007.4	WORKLO 	WORK LIGHT ON	S001668/N00363 S001672/N00364 S007554/N01247 S007634/N01268 S007556/N01247
Y0007.5	CHCONT 	EXTERNAL CHIP CONVEYOR ON	S003648/N00712 S003651/N00712 S007248/N01185 S007558/N01248 S007562/N01248
Y0008.0	APCSTL 	APC START LED	S007765/N01296

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
Y0008.1 	APCRYL S007568/N01250	APC READY LED	
Y0008.2 	ATCMML S007571/N01251	ATC MANUAL MODE LED	
Y0009.0 	BLKSP2 S007775/N01299	BLOCK SKIP 2 LED	
Y0009.1 	BLKSP3 S007778/N01300	BLOCK SKIP 3 LED	
Y0009.2 	BLKSP4 S007781/N01301	BLOCK SKIP 4 LED	
Y0009.3 	BLKSP5 S007784/N01302	BLOCK SKIP 5 LED	
Y0009.4 	BLKSP6 S007787/N01303	BLOCK SKIP 6 LED	
Y0009.5 	BLKSP7 S007790/N01304	BLOCK SKIP 7 LED	
Y0009.6 	BLKSP8 S007793/N01305	BLOCK SKIP 8 LED	
Y0009.7 	BLKSP9 S007796/N01306	BLOCK SKIP 9 LED	
Y0016.0 	S007890/N01324		
Y0016.1 	S007892/N01325		
Y0016.2 	S007894/N01326		
Y0016.3 	S007895/N01326		
Y0017.0 	S007896/N01326		
Y0066.0 	MCOM1 S000214/N00039	MAGAZINE COMMAND DATA 1	
Y0066.2 	MCOM4 S000219/N00040	MAGAZINE COMMAND DATA 4	
Y0066.5 	MFUN2 S000215/N00039	MAGAZINE FUNCTION DATA 2	
Y0071.0 	*OV1 S000228/N00042	MAGAZINE JOG OVERRIDE 1	
Y0071.2 	*OV4 S000229/N00042	MAGAZINE JOG OVERRIDE 4	
Y0100.0 	FEDINDL S007754/N01293	FEED INDICATION LED	
Y0100.1 	JOGML S007576/N01252	JOG MODE LED	
Y0100.2 	RAPTRA S007581/N01253	RAPID TRAVERSE LED	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
Y0100.3 —○— →○—	ZERRTN S007586/N01254	ZERO RETURN LED	
Y0100.4 —○— →○—	MDI S007589/N01255	MDI LED	
Y0100.5 —○— →○—	EDIT S007592/N01256	EDIT LED	
Y0100.6 —○— →○—	MEMORY S007595/N01257	MEMORY LED	
Y0100.7 —○— →○—	TAPE S007598/N01258	TAPE LED	
Y0101.0 —○— →○—	WSETON S007604/N01259	WORK SETTER ON LED	
Y0101.6 —○— →○—	SPSTL S007615/N01261	SPINDLE START LED	
Y0102.0 —○— →○—	DRYRUN S007618/N01262	DRY RUN LED	
Y0102.1 —○— →○—	ZAXCAN S007621/N01263	Z-AXIS CANSLE	
Y0102.2 —○— →○—	MACHLK S007624/N01264	MACHINE LOCK LED	
Y0102.3 —○— →○—	OPTSTP S007627/N01265	OPTIONAL STOP LED	
Y0102.4 —○— →○—	BKSKPL S007630/N01266	BLOCK SKIP LED	
Y0102.5 —○— →○—	CHPCOL S007633/N01267	CHIP CONVENYOR LED	
Y0102.6 —○— →○—	WKLHTL S007636/N01268	WORK LIGHT LED	
Y0102.7 —○— →○—	PWCUOF S007642/N01269	AUTO POWER CUT OFF LED	
Y0103.0 —○— →○—	PRORES S007648/N01270	PROGRAM RESTART LED	
Y0103.1 —○— →○—	BKREST S007654/N01271	BLOCK RESTART LED	
Y0103.2 —○— →○—	F1DIFD S007660/N01272	F1 DIGIT FEED LED	
Y0103.3 —○— →○—	HANINI S007666/N01273	HANDLE INTERRUPTION INDICATION	
Y0103.4 —○— →○—	TAIRBL S007671/N01274	TOOL AIR BLOW LED	
Y0103.5 —○— →○—	THRABI S007679/N01275	THROUGH AIR BLOW INDICATION	
Y0103.7 —○— →○—	COMPCA S007689/N01276	COMPLECTION CALL LED	
Y0104.0 —○— →○—	TJRC;T S007696/N01277	THROUGH COOLANT LED	

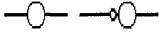
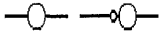
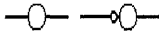
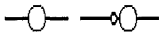
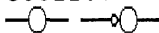
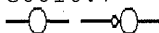
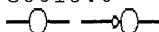
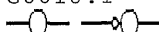
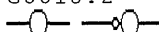
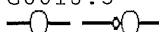
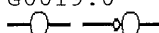
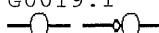
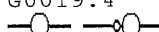
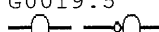
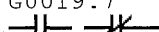


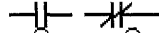
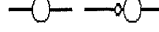
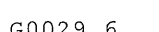

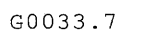

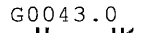
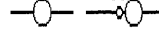
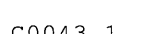
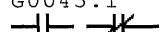

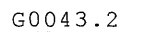
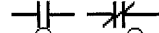



ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
Y0104.1 	MISTCO S007701/N01278	MIST COOLANT LED	
Y0104.2 	GUCOOL S007705/N01279	GUN COOLANT LED	
Y0104.3 	FSCOOL S007708/N01280	FLUSHING COOLANT LED	
Y0104.4 	OHOCOO S007715/N01281	OIL HOLE COOLANT LED	
Y0104.5 	JETCOO S007720/N01282	JET COOLANT LED	
Y0104.6 	FLDCOO S007723/N01283	FLOOD COOLANT LED	
Y0104.7 	S007611/N01260		
Y0105.0 	ALARM S007727/N01284	ALARM LED	
Y0105.1 	GRAMST S007730/N01285	PROGRAM STOP LED	
Y0105.2 	ATORIG S007733/N01286	ATC ORIGIN LED	
Y0105.3 	APORIG S007736/N01287	APC ORIGIN LED	
Y0105.4 	BAXOGN S007739/N01288	B-AXIS ORIGIN LED	
Y0105.5 	ZAXOGN S007742/N01289	Z-AXIS ORIGIN LED	
Y0105.6 	XAXOGN S007745/N01290	X-AXIS ORIGIN LED	
Y0105.7 	YAXOGN S007748/N01291	Y-AXIS ORIGIN LED	
Y0106.0 	TOOLUC S007751/N01292	TOOL UNCLAMP LED	
Y0106.1 	HANDML S007759/N01294	HANDLE MODE (SUB) LED	
Y0106.2 	S007755/N01293		
Y0106.3 	SIGBLK S007762/N01295	SIGNAL BLOCK LED	
Y0106.4 	PROSRT S007766/N01296	PROGRAM START LED	
Y0106.5 	PGMSTP S007769/N01297	FEED HOLD LED	
Y0106.6 	STANLD S007772/N01298	STANDBY READY LED	

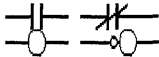
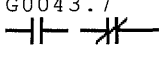
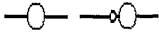
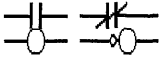
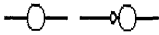
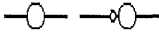
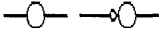
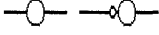
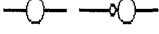
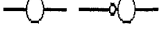
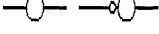
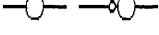
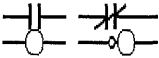

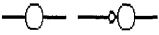
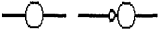
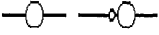
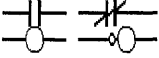
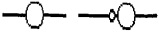
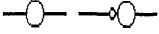
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
F0000.4	FSPL	FEED HOLD	
	S002133/N00487	S003274/N00669	S003576/N00711
F0000.5	FSTL	CYCLE START	
	S002131/N00486	S003337/N00676	S003360/N00678 S003384/N00681 S003401/N00682
	S003403/N00683	S003412/N00684	S003563/N00710 S004120/N00759 S004131/N00760
	S004186/N00766	S004208/N00769	S006101/N01024
F0000.6	FSA	SERVO READY	
	S001971/N00444	S002514/N00544	S002518/N00545 S002522/N00546 S007888/N00760
F0000.7	FOP	OPERATING	
	S006232/N01052	S006235/N01053	
F0001.0	FAL	NC ALARM	
	S006285/N01062	S007798/N01307	
F0001.1	FRST	RESET	
	S000175/N00033	S000238/N00045	S000268/N00050 S000312/N00061 S000320/N00062
	S000582/N00113	S000783/N00139	S001857/N00419 S002348/N00527 S002354/N00528
	S002361/N00529	S002374/N00531	S002380/N00532 S002387/N00533 S002394/N00534
	S002555/N00552	S002564/N00553	S002878/N00612 S003095/N00640 S003107/N00641
	S003380/N00680	S003940/N00734	S004258/N00774 S004349/N00789 S004783/N00790
	S005063/N00896	S005100/N00899	S005445/N00935 S005608/N00964 S005796/N00965
	S006304/N01065	S006563/N01099	S007332/N01193 S007375/N01199 S007453/N01200
	S007909/N01329	S007929/N01332	S007971/N01338 S007989/N01340 S007994/N01341
	S008012/N01345	S008030/N01347	S008035/N01348 S008044/N01350 S008061/N01351
	S008068/N01353	S008088/N01357	S008099/N01359 S008139/N01365
F0001.3	FDEN	DISTRIBUTION END	
	S002600/N00560	S003094/N00640	S003124/N00642 S003415/N00685 S003580/N00686
	S003606/N00711	S003634/N00712	S003837/N00720 S003862/N00724 S003954/N00725
	S005479/N00941	S005539/N00952	S005859/N00992 S006198/N01049 S007102/N01050
	S007131/N01170		
F0001.5	FTAP	TAPPING	
	S002143/N00492	S002146/N00492	S002155/N00493 S002787/N00594 S002789/N00595
	S002824/N00602	S003593/N00711	S004201/N00767
F0001.7	FMA	NC READY	
	S000337/N00065	S001966/N00443	S001970/N00444
F0002.4	SRNMV	PROGRAM RESTARTING SIGNAL	
	S000942/N00209	S002160/N00494	S002330/N00525 S002509/N00543
F0002.6	FCUT	CUTTING CYCLE	
	S003303/N00673	S003311/N00673	
F0002.7			
	S002145/N00492		
F0007.0	FMF	M FUNCTION	
	S003420/N00686	S003423/N00686	S003437/N00687 S003451/N00689
F0007.2	FSF	S FUNCTION	
	S002879/N00612	S002886/N00613	S002891/N00614 S003015/N00633 S003421/N00634
	S003426/N00686	S003438/N00687	S003453/N00690
F0007.3	FTF	T FUNCTION	
	S000027/N00004	S003225/N00658	S003413/N00684 S005022/N00894 S005094/N00895
	S005111/N00900	S007286/N01190	
F0009.4	FDM30	M30 DECODE	
	S003826/N00718	S003841/N00721	S003861/N00724 S003876/N00725 S003891/N00726
	S006479/N01077		

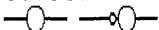
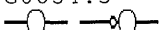
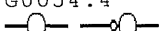
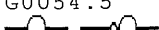
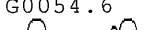
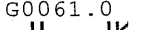

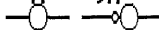
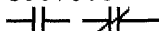
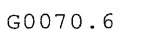


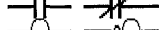
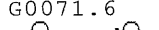
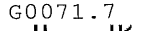

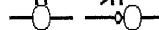
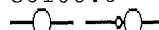
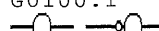
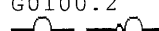
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
F0009.5 — — — —	FDM02 S003829/N00719 S006478/N01077	M02 DECODE S003840/N00721 S003860/N00724 S003875/N00725 S003892/N	
F0035.0 — — — —	FALMA S001821/N00406	SPINDLE ALARM	
F0045.1 — — — —	FSSTA S001819/N00405	SPINDLE ZERO SPEED S003232/N00659 S005993/N01013 S006956/N01148	
F0045.2 — — — —	FSDTA S002826/N00603	SPINDLE SPEED CHECK S002875/N00611	
F0045.3 — — — —	FSARA S001817/N00404	SPINDLE SPEED DETECT	
F0045.7 — — — —	FORARA S001823/N00407	SPINDLE ORIENTATION FINISH	
F0046.2 — — — —	RCHPA S002829/N00604	POWER WINDING CHANGE COMMAND S002836/N00605 S002844/N00606 S002868/N00610	
F0064.0 — — — —	TLEND S007345/N01195	TOOL LIFE END	
F0070.0 — — — —	PSW01 S002377/N00532	POSITION SWITCH 1	
F0070.1 — — — —	PSW02 S002368/N00531	POSITION SWITCH 2	
F0070.2 — — — —	PSW03 S002369/N00531	POSITION SWITCH 3	
F0070.3 — — — —	PSW04 S002391/N00534	POSITION SWITCH 4	
F0070.4 — — — —	PSW05 S002383/N00533	POSITION SWITCH 5 S002390/N00534	
F0070.5 — — — —	PSW06 S002358/N00529	POSITION SWITCH 6	
F0070.6 — — — —	PSW07 S002351/N00528	POSITION SWITCH 7 S002357/N00529	
F0070.7 — — — —	PSW08 S003323/N00674	POSITION SWITCH 8 S006390/N01073 S007271/N01188	
F0076.3 — — — —	RITAP S002589/N00559	RIGID TAPPING MODE S003234/N00659	
F0094.0 — — — —	FZP1 S000856/N00169 S002512/N00544	X REF. POINT END S002135/N00488 S002341/N00527 S002372/N00531 S002379/N S006308/N01066	
F0094.1 — — — —	FZP2 S000857/N00169 S002516/N00545	Y REF. POINT END S002137/N00489 S002342/N00527 S002385/N00533 S002393/N S006309/N01066	
F0094.2 — — — —	FZP3 S002139/N00490 S002520/N00546	Z REF. POINT END S002343/N00527 S002353/N00528 S002362/N00529 S002365/N S006240/N01054 S006310/N01066 S006391/N01073	
F0094.3 — — — —	FZP4 S001858/N00419 S006522/N01089	4TH(B) REF. POINT END S002141/N00491 S002344/N00527 S006367/N01072 S006408/N	

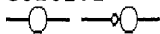
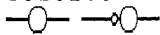
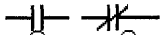
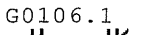

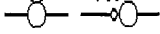
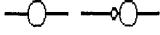
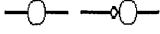
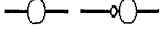
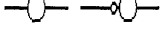
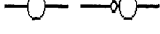
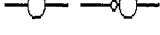










ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
F0096.0 — — — —	FZ21	X 2ND REF. POINT END	
	S005910/N01003	S006518/N01089	
F0096.1 — — — —	FZP22	Y 2ND REF. POINT END	
	S005911/N01003	S006519/N01089	
F0096.2 — — — —	FZP23	Z 2ND REF. POINT END	
	S005912/N01003	S006392/N01073 S006521/N01089	
F0102.2 — — — —	MV3	Z-AXIS MOVING SIGNAL	
	S002608/N00562		
F0102.3 — — — —	MV4	B AXIS MOVE COMMAND	
	S006344/N01070	S006348/N01071 S006386/N01073 S007269/N01188	
F0104.3 — — — —	INP4	B AXIS INPOSITION	
	S006349/N01071		
F0120.0 — — — —			
	S007937/N01333	S007946/N01334 S007952/N01335	
F0120.1 — — — —			
	S007938/N01333	S007947/N01334 S007953/N01335	
F0120.2 — — — —			
	S007939/N01333	S007948/N01334 S007954/N01335	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
G0004.3 	GFIN S003436/N00686	FINISH	
G0005.6 	AFL S001862/N00420	AUX.FUNCTION LOCK	
G0006.0 	GSRN S002102/N00472	PROGRAM RESTART	
G0006.2 	GABS S002130/N00485	ABSOLUTE	
G0006.4 	GOVC S002144/N00492 S003723/N00714 S006203/N01049	OVERRIDE CANCEL S002147/N00492 S002781/N00593 S003594/N00711 S003720/N00714 S006200/N01049	
G0007.2 	GST S003353/N00678 S003924/N00733 S003365/N00678	CYCLE START S003379/N00680 S003574/N00711 S003851/N00721 S003921/N00733 S005101/N00899 S006211/N01050 S006295/N01064 S006303/N01049	
G0008.0 	*IT S003270/N00668	INTERLOCK	
G0008.3 	*BSL S002105/N00473	BLOCK RESTART	
G0008.4 	GESP S000185/N00034 S000331/N00064	EMERGENCY STOP S000265/N00049 S007962/N01336	
G0008.5 	GSP S003398/N00681	FEED HOLD	
G0008.6 	GRRW S003828/N00718	RESET AND REWIND	
G0008.7 	GERS S003895/N00728 S003831/N00719	EXTERNAL RESET	
G0009.0 	GWN1 S006184/N01044	WORK NO. SEARCH 1	
G0009.1 	GWN2 S006187/N01045	WORK NO. SEARCH 2	
G0009.2 	GWN4 S006190/N01046	WORK NO. SEARCH 4	
G0009.3 	GWN8 S006193/N01047	WORK NO. SEARCH 8	
G0009.4 	GWN16 S006196/N01048	WORT NO. SEARCH 16	
G0012.0 	FD0 S002250/N00514	FEED OVERRIDE 0	
G0012.1 	S002248/N00513		
G0012.2 	FD2 S002246/N00512	FEED OVERRIDE 2	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
G0012.3	FD3 	FEED OVERRIDE 3	
G0012.4	FD4 	FEED OVERRIDE 4	
G0012.5	FD5 	FEED OVERRIDE 5	
G0012.6	FD6 	FEED OVERRIDE 6	
G0012.7	FD7 	FEED OVERRIDE 7	
G0016.7	GF1_D 	F1 DIGIT	
G0018.0	HS1A 	HANDLE AXIS 1A	
G0018.1	HS1B 	HANDLE AXIS 1B	
G0018.2	HS1C 	HANDLE AXIS 1C	
G0018.5	HS2B 	HANDLE AXIS 2B	
G0019.0	HS3A 	HANDLE AXIS 3A	
G0019.1	HS3B 	HANDLE AXIS 3B	
G0019.4	GMP1 	HANDLE MULTIPLY 1	
G0019.5	GMP2 	HANDLE MULTIPLY 2	
G0019.7	GRT 	RAPID MODE	
		S007573/N01252 S007578/N01253 S007583/N01254	
		S002033/N00457	
G0029.5	GSOR 	GEAR CHANGE/SP.ORT. COMMAND	
		S002902/N00616	
		S002905/N00616	
G0029.6	*SSTP 	SPINDLE STOP	
		S002909/N00617	
G0033.7	SIND 	SPINDLE CONTROL SIGNAL	
		S004179/N00764	
G0043.0	MD1 	MODE SELECT 1	
		S001104/N00251	
		S002083/N00467	
G0043.1	MD2 	MODE SELECT 2	
		S001105/N00251	
		S002087/N00468	
G0043.2	MD4 	MODE SELECT 4	
		S001106/N00251	
		S002092/N00469	

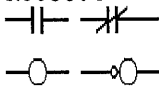
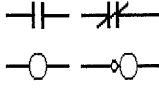
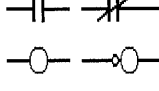
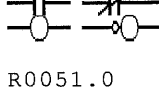
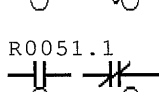
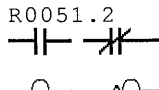
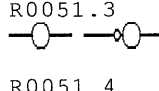
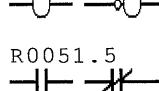
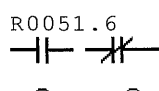
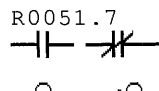
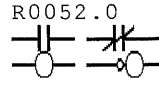
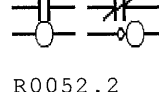
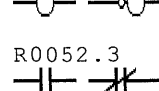


ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
G0043.5	DNC1 	TAPE MODE	
	S001107/N00251	S001699/N00371	S007596/N01258
	S002094/N00470		
G0043.7	GZRN 	ZERO RETURN MODE	
	S000858/N00169	S001855/N00419	S002337/N00526 S002346/N00527 S002396/N00528
	S002423/N00537	S002458/N00540	S002490/N00542 S003336/N00676 S006376/N00677
	S006409/N01073	S007574/N01252	S007579/N01253 S007584/N01254
	S002031/N00456		
G0044.0	GBDT1 	BLOCK SKIP 1	
	S002110/N00475		
G0044.1	GMLK 	MACHINE LOCK	
	S002619/N00563	S007622/N01264	
	S001863/N00420		
G0045.0	GBDT2 	OPTIONAL BLOCK SKIP 2	
	S002112/N00476		
G0045.1	GBDT3 	OPTIONAL BLOCK SKIP 3	
	S002114/N00477		
G0045.2	GBDT4 	OPTIONAL BLOCK SKIP 4	
	S002116/N00478		
G0045.3	GBDT5 	OPTIONAL BLOCK SKIP 5	
	S002118/N00479		
G0045.4	GBDT6 	OPTIONAL BLOCK SKIP 6	
	S002120/N00480		
G0045.5	GBDT7 	OPTIONAL BLOCK SKIP 7	
	S002122/N00481		
G0045.6	GBDT8 	OPTIONAL BLOCK SKIP 8	
	S002124/N00482		
G0045.7	GBDT9 	OPTIONAL BLOCK SKIP 9	
	S002126/N00483		
G0046.1	GSBK 	SINGLE BLOCK	
	S007760/N01295		
	S002128/N00484		
G0046.3	GKEY1 	MEMORY KEY 1	
	S002096/N00471		
G0046.4	GKEY2 	MEMORY KEY 2	
	S002097/N00471		
G0046.5	GKEY3 	MEMORY KEY 3	
	S002098/N00471		
G0046.6	GKEY4 	MEMORY KEY 4	
	S002099/N00471		
G0046.7	GDRN 	DRY RUN	
	S002148/N00492	S002620/N00563	
	S002511/N00543		
G0054.0	UI000 	UI000(ATC/APC POS.MOVE SELECT)	
	S005903/N01000		
G0054.1	UI001 	UI001(ATC POS. Z AXIS INT.)	
	S005905/N01001		

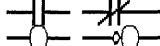
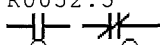
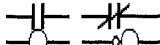
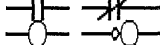
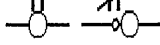

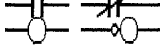
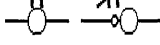
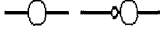

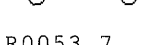
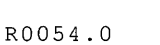
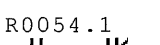
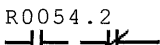
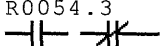
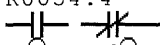

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
G0054.2	UI002 	UI002(M61 APC CYCLE)	
G0054.3	UI003 	UI003(M62 APC CYCLE)	
G0054.4	UI004 	UI004(APC POS.XY AXIS NOT INT)	
G0054.5	UI005 	UI005(T CODE=SP.TOOL NO.)	
G0054.6	UI006 	UI006(B AXIS : NC TABLE)	
G0061.0	RGTP 	RIGID TAPPING	
	S002898/N00615	S003233/N00659	S003239/N00660
	S003238/N00659	S003642/N00712	S006488/N00712
G0070.4	GSRVA 	SPINDLE REVERSE	
	S003141/N00644	S003161/N00649	
	S006484/N01078		
G0070.5	GSFRA 	SPINDLE FORWARD	
	S003142/N00644	S003162/N00649	
	S006490/N01079		
G0070.6	GORCMA 	SPINDLE ORIENTATION	
	S007118/N01168		
	S006492/N01080		
G0070.7	GMRDYA 	MACHINE READY FINISH SIGNAL	
	S006494/N01081		
G0071.1	SPMRDY 	SPINDLE READY	
	S003051/N00636	S003071/N00638	S003085/N00639
	S000348/N00066		
G0071.6	RSLA 	SP.WINDING CHANGE COMMAND	
	S002865/N00609		
G0071.7	RCHA 	SP.POWER LINE MONITOR SIGNAL	
	S002837/N00605		
	S002869/N00610		
G0072.7	RCHHGA 	SPINDLE COIL HIGH SIGNAL	
	S002830/N00604		
	S002877/N00611		
G0100.0	G+J1 	JOG + X	
	S002408/N00535		
G0100.1	G+J2 	JOG + Y	
	S002433/N00537		
G0100.2	G+J3 	JOG + Z	
	S002457/N00539		
G0100.3	G+J4 	JOG + 4(B)	
	S002489/N00541		
G0102.0	G-J1 	JOG - X	
	S002420/N00536		
G0102.1	G-J2 	JOG - Y	
	S002445/N00538		

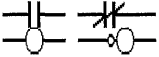
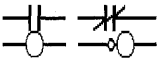
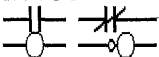
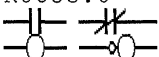
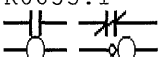
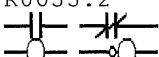
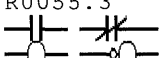
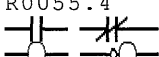
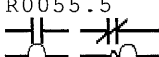
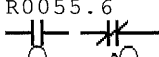
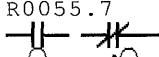
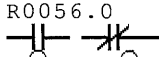
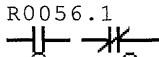
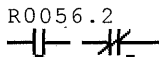
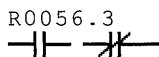
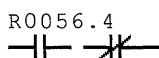
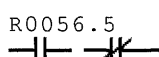
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
G0102.2 	G-J3 S002470/N00540	JOG - Z	
G0102.3 	G-J4 S002507/N00542	JOG - 4(B)	
G0106.0 	GMI1 S002768/N00591 S002772/N00591	MIRROR IMAGE X AXIS S003742/N00714 S003744/N00714	
G0106.1 	GMI2 S002774/N00592 S002778/N00592	MIRROR IMAGE Y AXIS S003749/N00714 S003751/N00714	
G0108.2 	GMLK3 S007619/N01263 S003268/N00667	MACHINE LOCK Z AXIS	
G0114.0 	G+L1 S000518/N00097	+X O.T	
G0114.1 	G+L2 S000522/N00099	+Y O.T	
G0114.2 	G+L3 S000526/N00101	+Z O.T	
G0114.3 	G+L4 S000530/N00103	+B O.T	
G0116.0 	G-L1 S000520/N00098	-X O.T	
G0116.1 	G-L2 S000524/N00100	-Y O.T	
G0116.2 	G-L3 S000528/N00102	-Z O.T	
G0116.3 	G-L4 S000531/N00103	-B O.T	
G0118.0 	*X+ED S000354/N00068	+ X AXIS EXTERNAL DEC.	
G0118.1 	*Y+ED S000358/N00070	+ Y AXIS EXTERNAL DEC.	
G0118.2 	*Z+ED S000362/N00072	+ Z AXIS EXTERNAL DEC.	
G0118.3 	*B+ED S000366/N00074	+ B AXIS EXTERNAL DEC.	
G0120.0 	*X-ED S000356/N00069	- X AXIS EXTERNAL DEC.	
G0120.1 	*Y-ED S000360/N00071	- Y AXIS EXTERNAL DEC.	
G0120.2 	*Z-ED S000364/N00073	- Z AXIS EXTERNAL DEC.	
G0120.3 	*B-ED S000367/N00074	- B AXIS EXTERNAL DEC.	
G0126.0 	GSVF1 S003248/N00662	SERVO OFF X	

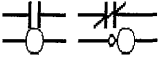
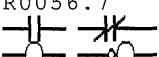
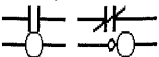
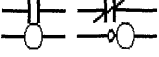

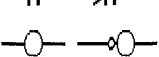
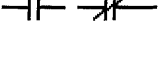
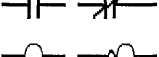
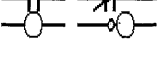
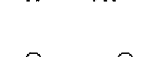
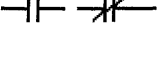
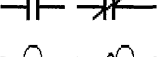
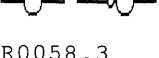
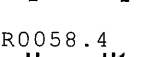

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
G0126.1	GSVF2 S003249/N00662	SERVO OFF Y	
G0126.2	GSV3 S003250/N00662	SERVO OFF Z	
G0126.3	GSVF4 S003252/N00663	4(B) SERVO OFF	
G0130.0	GIT1 S003319/N00673	INTERLOCK X	
G0130.1	GIT2 S003320/N00673	INTERLOCK Y	
G0130.2	GIT3 S003321/N00673	INTERLOCK Z	
G0130.3	GIT4 S003324/N00674 S003328/N00674	INTERLOCK 4(B)	
G0196.0	S000350/N00067		
G0196.1	S000351/N00067		
G0196.2	S000352/N00067		

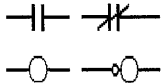
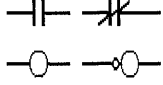
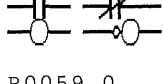
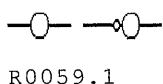
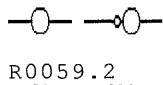
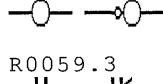
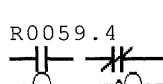
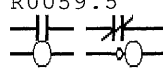
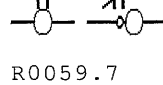
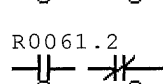
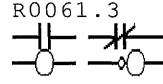
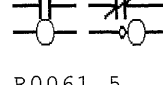
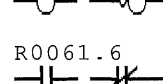


ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0007.6	APCDCH	APC DOOR CLOSE CHECK	
	S001870/N00422	S006574/N01100 S007308/N01191	
	S000803/N00143		
R0010.0	MANITO	MANUAL INTERRUPT ON PB	
	S002641/N00567	S002653/N00568	
	S000805/N00144		
R0010.1	MANITF	MANUAL INTERRUPT OFF PB	
	S002654/N00568		
	S000807/N00145		
R0014.0	TMOVLD	TOOL MONITOR OVERLOAD	
	S002562/N00553		
	S000809/N00146		
R0014.1	TMNORM	TOOL MONITOR NORMAL	
	S002552/N00552		
	S000811/N00147		
R0014.2	TMAGING	TOOL MONITOR AGING	
	S000813/N00148		
R0014.3	TMUNLD	TOOL MONITOR UNLOAD	
	S000815/N00149		
R0014.4	TMLEND	TOOL MONITOR LIFE END	
	S002569/N00554		
	S000817/N00150		
R0014.5	TMLALT	TOOL MONITOR LIFE ALERT	
	S002573/N00555		
	S000819/N00151		
R0014.6	TMURDY	TOOL MONITOR UNIT READY	
	S002566/N00553	S002622/N00563 S002632/N00564 S003356/N00678 S007377/N00679	
	S000821/N00152		
R0014.7	TMLRST	TOOL MONITOR LIFE RESET	
	S002638/N00565		
	S000823/N00153		
R0015.3			
	S001648/N00358		
R0050.0	FDJOG	FEED JOG P/B	
	S001021/N00243	S001033/N00244 S001043/N00245 S001053/N00246 S001063/N00247	
	S001073/N00248	S001083/N00249 S001093/N00250 S001137/N00258	
	S000825/N00154		
R0050.1	RAPIDT	RAPID TRAVERSE P/B	
	S001010/N00242	S001022/N00243 S001034/N00244 S001044/N00245 S001054/N00246	
	S001064/N00247	S001074/N00248 S001084/N00249 S001147/N00260	
	S000827/N00155		
R0050.2	ZERORE	ZERO RETURN P/B	
	S001011/N00242	S001035/N00244 S001045/N00245 S001055/N00246 S001065/N00247	
	S001075/N00248	S001085/N00249 S001094/N00250 S001133/N00257	
	S000829/N00156		
R0050.3	MD	MDI P/B	
	S001012/N00242	S001023/N00243 S001046/N00245 S001056/N00246 S001066/N00247	
	S001076/N00248	S001086/N00249 S001095/N00250 S001111/N00252	
	S000831/N00157		

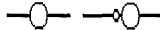
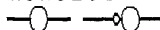
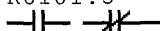
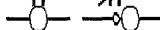
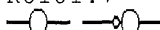
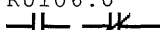
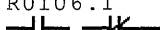
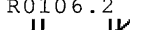
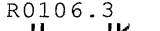
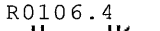
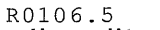
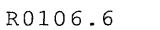
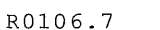
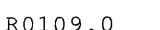
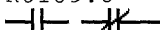
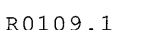
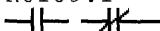
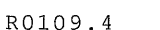
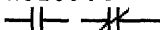
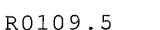
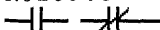
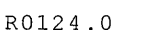

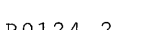


ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0050.4	EDI 	EDIT MODE P/B	
		S001013/N00242 S001024/N00243 S001036/N00244 S001047/N00245 S001067/N00246	
		S001077/N00248 S001087/N00249 S001096/N00250 S001116/N00253	
		S000833/N00158	
R0050.5	MEMOR 	MEMORY MODE P/B	
		S001014/N00242 S001025/N00243 S001037/N00244 S001048/N00245 S001057/N00246	
		S001078/N00248 S001088/N00249 S001097/N00250 S001120/N00254	
		S000835/N00159	
R0050.6	TAP 	TAPE MODE P/B	
		S001015/N00242 S001026/N00243 S001038/N00244 S001058/N00246 S001068/N00247	
		S001079/N00248 S001089/N00249 S001098/N00250 S001124/N00255	
		S000837/N00160	
R0050.7	SPIST 	SPINDLE START P/B	
		S002948/N00623 S003054/N00637	
		S000839/N00161	
R0051.0	SPISTP 	SPINDLE STOP P/B	
		S001976/N00445 S002544/N00550 S003041/N00636 S003055/N00637 S003271/N00638	
		S000841/N00162	
R0051.1	SPIEFF 	SPINDLE EFFECTIVE P/B	
		S002949/N00623	
		S000843/N00163	
R0051.2	HAND 	HANDLE P/B	
		S001019/N00242 S001027/N00243 S001041/N00244 S001051/N00245 S001061/N00246	
		S001071/N00247 S001090/N00249 S001099/N00250 S001128/N00256	
		S000845/N00164	
R0051.3			
		S000847/N00165	
R0051.4	-A/UJG 	-A/U JOG FEED P/B	
		S006040/N01021	
		S000849/N00166	
R0051.5	+A/UJG 	+A/U JOG FEED P/B	
		S006041/N01021	
		S000851/N00167	
R0051.6	-BJOG 	-B JOG FEED P/B	
		S002473/N00541 S002492/N00542 S002501/N00542 S006369/N01072 S006373/N01073	
		S006403/N01073	
		S000853/N00168	
R0051.7	+BJOG 	+B JOG FEED P/B	
		S001854/N00419 S002471/N00541 S002482/N00541 S002491/N00542 S006372/N01073	
		S006402/N01073	
		S000860/N00169	
R0052.0	-XJOG 	-X JOG FEED P/B	
		S000015/N00003 S000378/N00078 S000387/N00079 S002398/N00535 S002410/N00536	
		S000862/N00170	
R0052.1	+XJOG 	+X JOG FEED P/B	
		S000016/N00003 S000377/N00078 S000386/N00079 S002397/N00535 S002409/N00536	
		S000864/N00171	
R0052.2	-YJOG 	-Y JOG FEED P/B	
		S000017/N00003 S002422/N00537 S002435/N00538	
		S000866/N00172	
R0052.3	+YJOG 	+Y JOG FEED P/B	
		S000018/N00003 S002421/N00537 S002434/N00538	
		S000868/N00173	


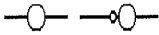
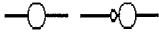
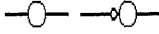
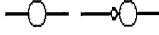
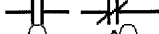
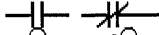
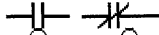
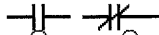
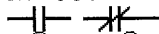
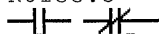
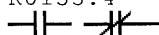
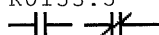
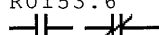
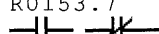
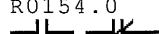
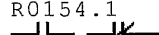
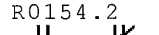
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0052.4	-ZJOG 	-Z JOG FEED P/B	
	S000019/N00003	S002447/N00539 S002460/N00540	S006007/N01015
	S000870/N00174		
R0052.5	+ZJOG 	+Z JOG FEED P/B	
	S000020/N00003	S002446/N00539 S002459/N00540	S006002/N01014
	S000872/N00175		
R0052.6	DRYRU 	DRY RUN P/B	
	S001167/N00264	S001171/N00265	
	S000874/N00176		
R0052.7	ZCAN 	Z-AXIS CANSEL P/B	
	S001183/N00267	S001187/N00268	
	S000876/N00177		
R0053.0	MACLOC 	MACHINE LOCK P/B	
	S001199/N00270	S001203/N00271	
	S000878/N00178		
R0053.1	EFFE 	EFFECTIVE P/B	
	S001168/N00264	S001172/N00265 S001184/N00267	S001188/N00268 S001200/N00269
	S001204/N00271	S001900/N00428	S006598/N01103
	S000880/N00179		
R0053.2	REFSU 	REF. SURFACE P/B	
	S001232/N00275	S001262/N00280	S006043/N01021
	S000883/N00180		
R0053.3	REFHO 	REF. HOLE P/B	
	S001233/N00275	S001245/N00278 S001248/N00279	S006044/N01021
	S000886/N00181		
R0053.4	COORDA 	COORD. ALARM P/B	
	S001234/N00275	S001263/N00280	S006045/N01021
	S000888/N00182		
R0053.5	FLSCLP 	FLUSHING COOLANT P/B	
	S001237/N00276	S001240/N00277 S001264/N00280	S006046/N01021
	S000890/N00183		
R0053.6	BLS2PB 	BLOCK SKIP 2 P/B	
	S001267/N00281	S001270/N00282	
	S000892/N00184		
R0053.7	BLS3PB 	BLOCK SKIP 3 P/B	
	S001281/N00284	S001284/N00285	
	S000894/N00185		
R0054.0	BLS4PB 	BLOCK SKIP 4 P/B	
	S001295/N00287	S001298/N00288	
	S000896/N00186		
R0054.1	BLS5PB 	BLOCK SKIP 5 P/B	
	S001309/N00290	S001312/N00291	
	S000898/N00187		
R0054.2	BLS6PB 	BLOCK SKIP 6 P/B	
	S001323/N00293	S001326/N00294	
	S000900/N00188		
R0054.3	BLS7PB 	BLOCK SKIP 7 P/B	
	S001337/N00296	S001340/N00297	
	S000902/N00189		
R0054.4	BLS8PB 	BLOCK SKIP 8 P/B	
	S001351/N00299	S001354/N00300	
	S000904/N00190		

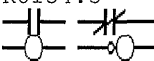
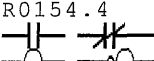
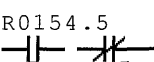
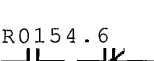
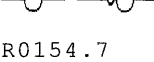
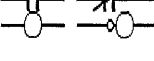
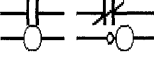
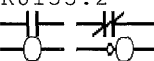
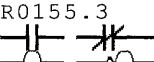
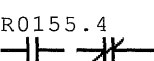
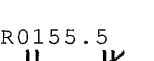
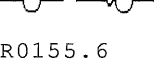
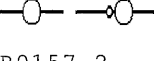
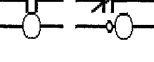
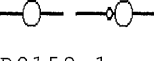
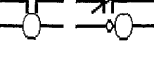
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0054.5	BLS9PB 	BLOCK SKIP 9 P/B S001365/N00302 S001368/N00303 S000906/N00191	
R0054.6	COMPLC 	COMPLETION CALL P/B S001379/N00305 S001382/N00306 S001417/N00312 S001420/N00313 S006049/N00314 S000908/N00192	
R0054.7	THROCO 	THROUGH COOLANT P/B S001574/N00342 S006054/N01022 S000910/N00193	
R0055.0	MISCOO 	MIST COOLANT P/B S001627/N00354 S006056/N01022 S000912/N00194	
R0055.1	GCOOL 	GUN COOLANT P/B S001647/N00358 S006059/N01022 S000914/N00195	
R0055.2	TOAIBP 	TOOL AIR BLOW P/B S001403/N00309 S006062/N01022 S000916/N00196	
R0055.3	OILHCO 	OIL HOLE COOLANT P/B S001594/N00346 S006065/N01022 S000918/N00197	
R0055.4	JCOOL 	JET COOLANT P/B S001554/N00338 S004021/N00744 S006068/N01022 S000920/N00198	
R0055.5	FLCOOL 	FLOOD COOLANT P/B S001536/N00334 S000922/N00199	
R0055.6	CALIOF 	CALL LIGHT OFF P/B S006296/N01064 S006474/N01076 S006480/N01077 S000924/N00200	
R0055.7	CHIPCO 	CHIP CONVEYOR P/B S001614/N00350 S000926/N00201	
R0056.0	LIGHT 	LIGHTING P/B S001664/N00362 S000928/N00202	
R0056.1	THAIBL 	THROUGH AIR BLOW P/B S001676/N00366 S006071/N01022 S000930/N00203	
R0056.2	PWCTOF 	POWER CUT OFF P/B S001435/N00315 S001438/N00316 S006076/N01023 S000932/N00204	
R0056.3	TLSETP 	TOOL SETTER P/B S001215/N00273 S001218/N00274 S006078/N01023 S000934/N00205	
R0056.4	CUTMNI 	CUTTING MONITOR P/B S006081/N01023 S000936/N00206	
R0056.5	F1DIGI 	F1 DIGIT FEED P/B S001453/N00318 S001456/N00319 S006084/N01023 S000938/N00207	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0056.6		BLKRE BLOCK RESTART P/B	S001470/N00321 S001473/N00322 S006087/N01023 S000940/N00208
R0056.7		PROGRE PROGRAM RESTART P/B	S001488/N00324 S001491/N00325 S006090/N01023 S000943/N00209
R0057.0		BLKSK BLOCK SKIP P/B	S001506/N00327 S001509/N00328 S000945/N00210
R0057.1		OPTINS OPTIONAL STOP P/B	S001520/N00330 S001523/N00331 S000947/N00211
R0057.2		HDINTP HANDLE INTERRUPTION P/B	S001690/N00369 S001693/N00370 S006093/N01023 S000949/N00212
R0057.3		HANX1 HANDLE AXIS 1	S002044/N00460 S002251/N00515 S002255/N00516 S002259/N00516 S002263/N00517 S002271/N00518 S002279/N00519 S002311/N00523 S002320/N00524 S007756/N01294 S000951/N00213
R0057.4		HANX2 HANDLE AXIS 2	S002045/N00460 S002252/N00515 S002256/N00516 S002264/N00517 S002267/N00518 S002272/N00518 S002280/N00519 S002312/N00523 S002313/N00523 S002321/N00524 S007757/N01294 S000953/N00214
R0057.5		HANX4 HANDLE AXIS 4	S002046/N00460 S002253/N00515 S002257/N00516 S002265/N00517 S002273/N00518 S002275/N00518 S002281/N00519 S002322/N00524 S007758/N01294 S000955/N00215
R0057.6		TONODP TOOL NO. DISPLAY	S006495/N01082 S006501/N01083 S000957/N00216
R0057.7		HDMPY1 HANDLE MULTIPLY 1	S002047/N00460 S002050/N00460 S002054/N00460 S002284/N00520 S002288/N00521 S002293/N00521 S002297/N00521 S002302/N00522 S002306/N00522 S002314/N00523 S002323/N00524 S000959/N00217
R0058.0		HDMPY2 HANDLE MULTIPLY 2	S002048/N00460 S002051/N00460 S002055/N00460 S002285/N00520 S002289/N00521 S002294/N00521 S002298/N00521 S002303/N00522 S002307/N00522 S002315/N00523 S002324/N00524 S000961/N00218
R0058.1		HDMPY4 HANDLE MULTIPLY 4	S002049/N00460 S002052/N00460 S002056/N00460 S002286/N00520 S002295/N00521 S002304/N00522 S002316/N00523 S002325/N00524 S000963/N00219
R0058.2		RENIER RENISHAW ERROR	S000965/N00220
R0058.3		RENILB RENISHAW LOW BATT	S000967/N00221
R0058.4		CTRFIN COUNTER FINISH	S003638/N00712 S006278/N01060 S006895/N01139 S007564/N01249 S000969/N00222

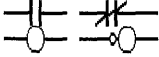
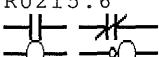
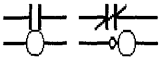
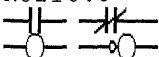
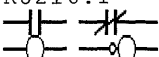
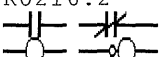
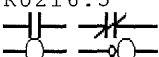
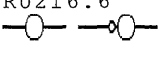
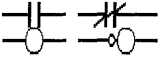
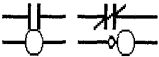
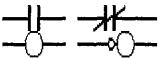
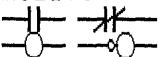
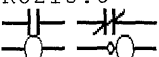
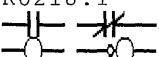
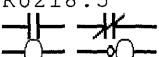
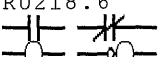
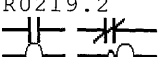
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0058.5	HD-JOG 	HANDLE (-) JOG FEED PB	
	S002403/N00535	S002415/N00536 S002428/N00537	S002440/N00538 S002452/N00539
	S002465/N00540	S002478/N00541 S002497/N00542	
	S000971/N00223		
R0058.6	HD+JOG 	HANDLE (+) JOG FEED PB	
	S002404/N00535	S002416/N00536 S002429/N00537	S002441/N00538 S002453/N00539
	S002466/N00540	S002479/N00541 S002498/N00542	
	S000973/N00224		
R0058.7	MEMENT 	MEMORY ENTRY SELECT SWITCH	
	S002095/N00471		
	S000975/N00225		
R0059.0	RASIO1 	RAPID OVERRIDE SIGNAL 1	
	S002663/N00571	S002667/N00572 S002671/N00573	S002675/N00574 S002679/N00580
	S002683/N00576		
	S000977/N00226		
R0059.1	RASIO2 	RAPID SIGNAL OVERRIDE 2	
	S002664/N00571	S002668/N00572 S002672/N00573	S002676/N00574 S002680/N00580
	S002684/N00576		
	S000979/N00227		
R0059.2	RASIO4 	RAPID SIGNAL OVERRIDE 4	
	S002665/N00571	S002669/N00572 S002673/N00573	S002677/N00574 S002681/N00580
	S002685/N00576		
	S000981/N00228		
R0059.3	STADRE 	STANDBY READY P/B	
	S000332/N00065	S002003/N00450 S004213/N00769	
	S000983/N00229		
R0059.4	PROGS 	PROGRAM START P/B	
	S001865/N00421	S003339/N00677 S003343/N00677	S007276/N01189 S007373/N01190
	S000986/N00230		
R0059.5	PROGSP 	PROGRAM STOP P/B	
	S003344/N00677	S003371/N00680	
	S000988/N00231		
R0059.6	TOOLU 	TOOL UNCLAMP S/W	
	S005853/N00991		
	S000990/N00232		
R0059.7	TOOLC 	TOOL CLAMP S/W	
	S005849/N00990		
	S000992/N00233		
R0061.2	SINGBK 	SINGLE BLOCK S/W	
	S002127/N00484	S004612/N00830	
	S000994/N00234		
R0061.3	SPINO1 	SPINDLE OVERRIDE 1	
	S002793/N00595		
	S000996/N00235		
R0061.4	SPINO2 	SPINDLE OVERRIDE 2	
	S002795/N00596		
	S000998/N00236		
R0061.5	SPINO4 	SPINDLE OVERRIDE 4	
	S002797/N00597		
	S001000/N00237		
R0061.6	SPINO8 	SPINDLE OVERRIDE 8	
	S002799/N00598		
	S001002/N00238		

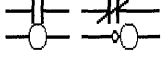
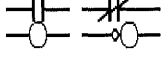
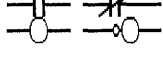
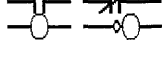
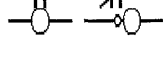
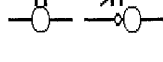
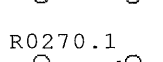
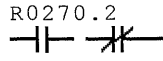
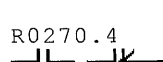
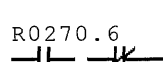
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0061.7	SKIP3 	SKIP3	
	S001004/N00239		
R0101.4	CTS 	COUNT SIGNAL	
	S000715/N00130		
R0101.5	 	S000718/N00131 S000726/N00132 S000720/N00131	
R0101.7	RC 	RING COUNTER	
	S000730/N00132		
R0106.0			
	S002249/N00514		
R0106.1			
	S002247/N00513		
R0106.2			
	S002245/N00512		
R0106.3			
	S002243/N00511		
R0106.4			
	S002241/N00510		
R0106.5			
	S002239/N00509		
R0106.6			
	S002237/N00508		
R0106.7			
	S002235/N00507		
R0109.0	JOVRS  	JOG OVERRIDE SUB	
	S002208/N00503 S002165/N00495		
R0109.1	JOVRC  	JOG OVERRIDE COM.	
	S002209/N00503 S002217/N00503		
R0109.4	 		
	S002226/N00506 S002225/N00505		
R0109.5	 		
	S002227/N00506 S002234/N00506		
R0124.0	SPOVD1 	SPINDLE OVERRIDE DATA 1	
	S002794/N00595		
R0124.1	SPOVD2 	SPINDLE OVERRIDE DATA 2	
	S002796/N00596		
R0124.2	SPOVD3 	SPINDLE OVERRIDE DATA 3	
	S002798/N00597		
R0124.3	SPOVD4 	SPINDLE OVERRIDE DATA 4	
	S002800/N00598		
R0124.4	SPOVD5 	SPINDLE OVERRIDE DATA 5	
	S002802/N00599		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0124.5	SPOVD6 	SPINDLE OVERRIDE DATA 6	
R0124.6	SPOVD7 	SPINDLE OVERRIDE DATA 7	
R0124.7	SPOVD8 	SPINDLE OVERRIDE DATA 8	
R0133.0	SPDAO1 	SPINDLE DATA OVER 1	
R0133.1	SPDAO2 	SPINDLE DATA OVER 2	
R0142.0	RGTACY 	RIGID TAPPING CYCLE	
	S003070/N00638	S003084/N00639	S003231/N00659
	S003224/N00657		
R0151.6	TFD 	TF DUMMY	
	S000109/N00018	S003227/N00658	S003376/N00680
	S003229/N00658		
R0153.0	OPBISF 	OPERATING BOARD INT. SET FIN.	
	S001006/N00240	S001008/N00241	
	S001007/N00240		
R0153.1	OPBITS 	OPERATING BOARD INITIAL SET	
	S001005/N00240	S001138/N00258	S001451/N00317
	S001009/N00241		
R0153.2	COFEMD 	CONDITION OF FEED MODE(MAIN)	
	S001140/N00258		
	S001020/N00242		
R0153.3	COZERT 	CONDITION FOR ZERO RETURN	
	S001135/N00257		
	S001032/N00243		
R0153.4	COMDIM 	CONDITION FOR MDI MODE	
	S001114/N00252		
	S001042/N00244		
R0153.5	COTAMD 	CONDITION FOR TAPE MODE	
	S001126/N00255		
	S001052/N00245		
R0153.6	COEDMD 	CONDITION FOR EDIT MODE	
	S001118/N00253		
	S001062/N00246		
R0153.7	COAUMD 	CONDITION FOR AUTO MODE	
	S001122/N00254		
	S001072/N00247		
R0154.0	COHAN 	CONDITION FOR HANDLE	
	S001131/N00256		
	S001082/N00248		
R0154.1	COFEEM 	CONDITION OF FEED MODE(SUB)	
	S001145/N00259		
	S001092/N00249		
R0154.2	CORAPM 	CONDITON OF RAPID MODE	
	S001149/N00260		
	S001103/N00250		

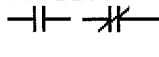
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0154.3	MDIM 	MDI MODE	
		S001113/N00252 S001698/N00371 S002062/N00461	
		S001115/N00252	
R0154.4	EDITM 	EDIT MODE	
		S001117/N00253 S002064/N00462	
		S001119/N00253	
R0154.5	MEMOM 	MEMORY MODE	
		S001121/N00254 S001700/N00371 S002066/N00463	
		S001123/N00254	
R0154.6	TAPEM 	TAPE MODE	
		S001125/N00255 S002068/N00464	
		S001127/N00255	
R0154.7	HANM 	HANDLE MODE	
		S001130/N00256 S001164/N00263 S002036/N00459	
		S001132/N00256	
R0155.0	ZEROM 	ZERO RETURN MODE	
		S001134/N00257 S001152/N00261 S001157/N00262 S001864/N00421 S002030/N00421	
		S001136/N00257	
R0155.1	FEEDM 	FEED MODE (MAIN OPE. BOARD)	
		S001139/N00258 S001155/N00262 S001162/N00263 S001387/N00307	
		S001141/N00258	
R0155.2	FEEM 	FEED MODE (M. PALUSE OPE. BOX)	
		S001144/N00259 S001156/N00262 S001163/N00263 S001388/N00307	
		S001146/N00259	
R0155.3	RAPTRM 	RAPID TRAVERSE MODE	
		S001148/N00260 S001151/N00261 S001158/N00262	
		S001150/N00260	
R0155.4	RAPM 	RAPID MODE	
		S002032/N00457	
		S001154/N00261	
R0155.5	JOGM 	JOG MODE	
		S002034/N00458	
		S001161/N00262	
R0155.6	MDIAUX 	MDI MODE AUX	
		S001112/N00252	
		S001110/N00251	
R0157.2	PLAYB 	PLAY BACK	
		S002071/N00465 S002075/N00466 S007686/N01276	
		S001166/N00263	
R0158.0	ERROR 	ERROR	
		S002885/N00612	
R0158.1	RTHICA 	RIGID TAP MODE HIGH CHANGE AUX	
		S002896/N00615	
		S002895/N00614	
R0158.2	RTMHCC 	RIGID TAP MODE HIGH CHANGE COM	
		S002849/N00606 S002854/N00607 S002864/N00609 S002876/N00611 S002897/N00612	
		S002900/N00615	
R0213.2	T00R 	T00 READ	
		S004340/N00787 S004528/N00817 S004639/N00835 S005027/N00895 S005031/N00896	
		S005048/N00896 S005120/N00901 S005123/N00901 S005153/N00905 S005181/N00906	
		S005205/N00911 S005229/N00914 S005251/N00917	
		S004342/N00787	

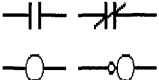
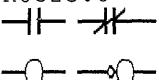
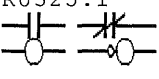
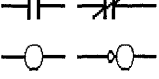
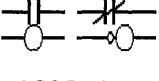
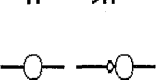
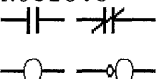
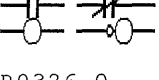
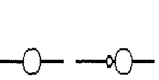
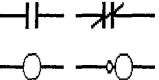

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.			
R0213.3	T/M6R	T/M6 READ				
		S000065/N00010	S003431/N00686	S004519/N00816	S004613/N00830	S004991/N00830
		S005013/N00894	S005035/N00895	S005082/N00898	S005089/N00898	S005403/N00898
		S005487/N00942				
		S004345/N00788				
R0213.4	TFR1	TF READ 1				
		S004347/N00789	S004353/N00790			
		S004350/N00789				
R0213.5	TFR2	TF READ 2				
		S004352/N00790	S005006/N00894	S005007/N00894		
		S004354/N00790				
R0214.0	TFRD	TF READ				
		S004360/N00791	S004365/N00792	S004368/N00793	S007213/N01180	
		S004364/N00791				
R0214.3	TDRD	T DATA READING				
		S004518/N00816	S004527/N00817	S004543/N00819	S004550/N00820	S004577/N00820
		S004584/N00826				
		S004367/N00792				
R0214.4	TDRDFI	T DATA READ FINISH				
		S004358/N00791	S004366/N00792	S004463/N00808	S004497/N00813	S005016/N00813
		S004369/N00793				
R0214.7	ALWOFF	ALWAYS OFF				
		S000310/N00061	S000311/N00061	S000313/N00061	S000318/N00062	S000319/N00062
		S000321/N00062	S004376/N00796	S004377/N00796	S004379/N00796	S004384/N00796
		S004385/N00797	S004387/N00797	S004392/N00798	S004393/N00798	S004399/N00798
		S004400/N00799	S004406/N00800	S004407/N00800	S004413/N00801	S004414/N00801
		S004420/N00802	S004421/N00802	S004427/N00803	S004428/N00803	S004460/N00803
		S004461/N00808	S004468/N00809	S004469/N00809	S004470/N00809	S004471/N00809
		S004476/N00810	S004477/N00810	S004483/N00811	S004484/N00811	S004490/N00811
		S004491/N00812	S004503/N00814	S004504/N00814	S004510/N00815	S004511/N00815
		S004517/N00816	S004526/N00817	S004535/N00818	S004536/N00818	S004542/N00818
		S004549/N00820	S004576/N00825	S004583/N00826	S004590/N00827	S004634/N00827
		S004842/N00871	S004843/N00871	S004855/N00874	S004856/N00874	S004870/N00874
		S004871/N00877	S004919/N00885	S004920/N00885	S004921/N00885	S004922/N00885
		S004372/N00794				
R0215.0	T=NT	T=NEXT TOOL				
		S005033/N00895	S005085/N00898	S005121/N00901	S005124/N00901	S005154/N00901
		S005182/N00908	S005206/N00911	S005398/N00932	S005485/N00942	
		S004525/N00816				
R0215.1	NT=0	NEXT TOOL=00				
		S004675/N00840	S004687/N00841	S004697/N00842	S005028/N00895	S005069/N00895
		S005155/N00905	S005183/N00908	S005207/N00911	S005230/N00914	S005252/N00914
		S004534/N00817				
R0215.2	T=SPT	T=SPINDLE TOOL				
		S005034/N00895	S005084/N00898	S005122/N00901	S005156/N00905	S005184/N00905
		S005208/N00911	S005402/N00932	S005420/N00933	S005430/N00934	S005486/N00934
		S005906/N01002				
		S004541/N00818				
R0215.3	SPT=0	SPINDLE TOOL=00				
		S004977/N00890	S005068/N00897	S005140/N00903	S005185/N00908	S005209/N00908
		S005231/N00914	S005253/N00917			
		S004548/N00819				
R0215.4	CMTOV	COMMAND TOOL OVER				
		S005032/N00895	S007210/N01180			
		S004556/N00820				

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0215.5	SPTNOS 	SP.TOOL(MAX CHAIN)NO. SET PUL	
		S004564/N00823 S004570/N00824	
		S004560/N00821	
R0215.6	SPTNSA 	SP.TOOL(MAX CHAIN)NO. SET AUX.	
		S004558/N00821	
		S004563/N00822	
R0215.7	NTOV 	NEXT TOOL OVER	
		S007211/N01180	
		S004582/N00825	
R0216.0	SPTOV 	SPINDLE TOOL OVER	
		S007212/N01180	
		S004589/N00826	
R0216.1	SPTONT 	SPINDLE TOOL NOTHING	
		S004597/N00828 S004603/N00829	
		S004596/N00827	
R0216.2	M06SIG 	M06 CYCLE AT SINGLE MODE	
		S004611/N00830 S005011/N00894 S005017/N00894 S005024/N00894 S005407/N00894	
		S004617/N00830	
R0216.5	STN00S 	STANDBY TOOL NO."00" SET	
		S004625/N00831 S004629/N00832 S004632/N00833	
		S004628/N00831	
R0216.6	STON00 	STANDBY TOOL NO. "00" SETTING	
		S004631/N00832	
R0216.7	ST00SF 	STANDBY TOOL NO. "00" SET FIN.	
		S004630/N00832 S004635/N00834	
		S004633/N00833	
R0217.0	SBTONS 	STANDBY TOOL NO. SET	
		S004643/N00835 S004653/N00836 S004656/N00837	
		S004652/N00835	
R0217.1	TLNOSET 	STANDBY TOOL NO.SETTING	
		S004658/N00838 S004665/N00839 S004674/N00840 S004686/N00841 S004696/N00842	
		S004655/N00836	
R0217.2	TLNOSTFIN 	STANDBY TOOL NO.SET FINISH	
		S004654/N00836	
		S004657/N00837	
R0218.0	RTNISA 	RETURN TOOL NO. INDEX SETI. AU	
		S000089/N00015 S004845/N00871	
		S004839/N00869	
R0218.1	RTNISF 	RETURN TOOL NO. INDEX SET FIN.	
		S004838/N00869	
		S004841/N00870	
R0218.5	NTNISA 	NEW TOOL NO. INDEX SETTING AUX.	
		S000083/N00014	
		S004852/N00872	
R0218.6	NTNISF 	NEW TOOL NO. INDEX SET FIN.	
		S004851/N00872	
		S004854/N00873	
R0219.2	STNISA 	SP. TOOL NO. INDEX SETTING AUX	
		S000095/N00016 S004873/N00877	
		S004866/N00875	

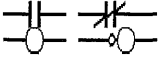
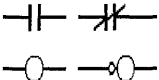
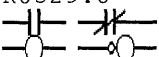
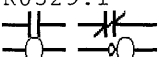
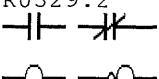
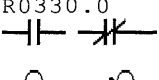
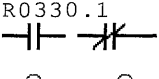
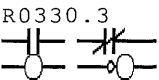
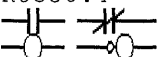
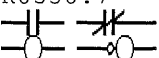
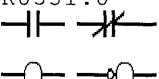
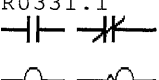
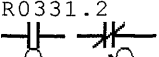
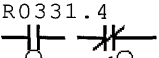
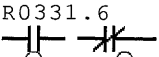
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0219.3	STNISF 	SP. TOOL NO. INDEX SET FIN.	
	S004865/N00875 S004869/N00876		
R0219.4	MAXCNO 	MAX. ATC MAGAZINE CHAIN NO. MV	
	S004887/N00880 S004882/N00878	S004893/N00881	
R0219.5	MAXCNA 	MAX. MAGAZINE CHAIN NO. MOVE AU	
	S004880/N00878 S004886/N00879		
R0240.2	ROSW1 	RAPID OVERRIDE SW1	
	S002687/N00577 S002666/N00571		
R0240.3	ROSW2 	RAPID OVERRIDE SW2	
	S002688/N00577 S002670/N00572	S002697/N00578 S002726/N00583	
R0240.4	ROSW4 	RAPID OVERRIDE SW4	
	S002689/N00577 S002674/N00573	S002702/N00579 S002727/N00583	
R0240.5	ROSW8 	RAPID OVERRIDE SW8	
	S002690/N00577 S002678/N00574	S002707/N00580	
R0240.6	ROSW16 	RAPID OVERRIDE SW16	
	S002691/N00577 S002682/N00575	S002713/N00581	
R0240.7	ROSW32 	RAPID OVERRIDE SW32	
	S002692/N00577 S002686/N00576	S002719/N00582	
R0241.0	ROVFO 	RAPID OVERRIDE F0 SELECT	
	S002708/N00580 S002696/N00577	S002714/N00581 S002720/N00582 S002725/N00583	
R0270.0	CAER 	CALCULATION ERROR	
	S004467/N00808		
R0270.1	CAER3 	CALCULATION ERROR	
	S004475/N00809		
R0270.2	CPN=WN 	CURRENT CHAIN NO.=WAIT TOOL NO	
	S000778/N00139 S005748/N00982 S004482/N00810	S004935/N00886 S004944/N00887 S004946/N00887 S005746/N00887 S006845/N01134 S007337/N01194	
R0270.3	CPN=SP 	CUURRENT CHAIN NO.=SP.TOOL NO.	
	S004983/N00891 S004489/N00811		
R0270.4	CPN=CT 	CURRENT CHAIN NO.=T COMMAND NO	
	S000756/N00136 S004496/N00812	S000779/N00139 S004961/N00889 S005343/N00925 S007188/N00925	
R0270.6	T=WAIT 	T COMMAND=WAITING TOOL NO.	
	S004614/N00830 S004509/N00814	S005081/N00898 S005112/N00900 S005411/N00932	
R0270.7	T=0 	T CODE = 0	
	S005907/N01002 S004516/N00815		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.		
R0280.1	XAZRNP 	X AXIS ZERO RETURN POSITION			
	S002513/N00544 S002515/N00544				
R0280.2	YAZRNP 	Y AXIS ZERO RETURN POSITION			
	S002517/N00545 S002519/N00545				
R0280.3	ZAZRNP 	Z AXIS ZERO RETURN POSITION			
	S002521/N00546 S002523/N00546				
R0301.5	MGNTLS 	MG.NEUTRAL L/S			
	S000796/N00141 S004962/N00889 S005158/N00905 S005263/N00918 S005321/N00923 S005844/N00989 S004220/N00770	S004641/N00835 S004973/N00890 S005187/N00908 S005273/N00919 S005335/N00924 S005935/N01007	S004934/N00886 S004985/N00891 S005211/N00911 S005281/N00919 S005354/N00926 S005940/N01008	S004947/N00887 S005051/N00896 S005233/N00914 S005297/N00920 S005369/N00928 S007016/N01155	S004952/N00887 S005076/N00889 S005255/N00911 S005312/N00919 S005377/N00928
R0305.0	ATCMIT 	ATC MANUAL INTERRUPT			
	S000006/N00002 S003375/N00680 S005416/N00932 S002649/N00567	S000108/N00018 S004311/N00782	S000151/N00028 S004322/N00784	S002646/N00567 S004446/N00806	S002650/N00567 S005020/N00567
R0305.1	ATCMIO 	ATC MANUAL INTERRUPT OFF			
	S002656/N00569 S002655/N00568				
R0305.2	ATMIOD 	ATC MANUAL INTERRUPT OFF DELAY			
	S002645/N00567 S002659/N00569				
R0305.5	HAIATO 	HANDLE INTERRUPT AUTO MODE			
	S002037/N00459 S002662/N00570				
R0308.0	MMGISB 	MAN.MG.INDEX STB.			
	S004228/N00772 S004227/N00771	S004241/N00773			
R0308.1	MMGCW 	MAN.MG.CW			
	S004233/N00772 S004240/N00772	S004243/N00773	S004255/N00774	S005798/N00985	S005817/N00985
R0308.2	MMGCCW 	MAN.MG.CCW			
	S000724/N00132 S005818/N00986 S004254/N00773	S004230/N00772	S004247/N00773	S004256/N00774	S005800/N00985
R0308.3	MGIDX 	MG.INDEXING			
	S000723/N00132 S004273/N00776 S005932/N01006 S004267/N00774	S004236/N00772 S004299/N00779	S004250/N00773 S005783/N00984	S004257/N00774 S005801/N00985	S004271/N00985 S005820/N00985
R0308.4	MGIXF 	MG.INDEX FINISH			
	S004259/N00774 S004272/N00775	S004270/N00775	S005784/N00984	S005802/N00985	S005821/N00985
R0308.5	MGIXSP 	MG.INDEX STOP			
	S004231/N00772 S004303/N00781 S004282/N00776	S004244/N00773	S004280/N00776	S004283/N00777	S004288/N00777

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0312.1	MCWSPS 	MAN. CW STOP POS. SETTING S004289/N00778 S004293/N00779 S004287/N00777	
R0312.2	MCCWSP 	MAN. CCW STOP POS. SETTING S004284/N00777 S004295/N00779 S004292/N00778	
R0312.3	MISDAU 	MAN. INDEX SLOW DOWN AUX. S004286/N00777 S004291/N00778 S004298/N00779 S004301/N00780 S004300/N00779	
R0312.4	MISD 	MAN. INDEX SLOW DOWN S004268/N00775 S005794/N00984 S004302/N00780	
R0319.7	CALCE 	CALCULATION ERROR S004849/N00871	
R0320.7	CALER 	CALCULATION ERROR S004862/N00874	
R0321.7	CALERO 	CALCULATION ERROR S004877/N00877	
R0322.0	MGICMD 	MG.INDEX COMMAND S000739/N00135 S000745/N00136 S000770/N00138 S000772/N00138 S000780/N00140 S000787/N00140 S004914/N00883 S004917/N00884 S005785/N00984 S005804/N00986 S005823/N00986 S005931/N01006 S004913/N00882	
R0322.2	MAIDS 	MAGAZINE INDEX SETTING S000740/N00135 S005805/N00985 S005824/N00986 S007451/N01221 S004916/N00883	
R0322.3	MAINSF 	MAGAZINE INDEX SET FINISH S000731/N00133 S000736/N00134 S000746/N00136 S004915/N00883 S004923/N00884 S005806/N00985 S005825/N00986 S004918/N00884	
R0323.3	MAGCCW 	MAGAZINE CCW S000722/N00132 S000741/N00135 S004930/N00885	
R0323.4	MAGSDP 	MAGAZINE SLOW DOWN POS. S007454/N01221 S000738/N00134	
R0324.0	MGICCW 	MAGAZINE INDEX CCW S000742/N00135 S005807/N00985 S005826/N00986 S000744/N00135	
R0324.1	MGPIN 	MAGAZINE PIN IN S000759/N00136 S005795/N00984 S000764/N00136	
R0324.2	MGISTP 	MAGAZINE INDEX STOP POS. S000773/N00138 S000794/N00141 S000775/N00138	
R0324.3	MGISPC 	MAGAZINE INDEX STOP POS. CHECK S000781/N00139 S000793/N00141 S000785/N00139	
R0324.4	MGISP 	MAGAZINE INDEX STOP POS. S000747/N00136 S000754/N00136 S000795/N00141 S000792/N00140	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0324.6		MAIFAU MAGAZINE INDEX FIN. AUX.	S000782/N00139 S000797/N00141 S004450/N00806 S004911/N00882 S004982/N00984 S005786/N00984 S005808/N00985 S005827/N00986 S000799/N00141
R0325.0		RTTIX RETURN TOOL INDEX	S000039/N00007 S004837/N00869 S004840/N00870 S004899/N00882 S004936/N00887 S004943/N00887 S004945/N00887 S004941/N00886
R0325.1		RTTIXF RETURN TOOL INDEX FINISH	S004900/N00882 S004939/N00886 S004948/N00887 S005289/N00920 S004950/N00887
R0325.2		NTIX NEW TOOL INDEX	S000040/N00007 S000755/N00136 S004850/N00872 S004853/N00873 S004858/N00882 S004901/N00882 S004953/N00888 S004959/N00889 S004960/N00889 S006844/N00888 S004957/N00888
R0325.3		NTIXF NEW TOOL INDEX FINISH	S004902/N00882 S004955/N00888 S004963/N00889 S005344/N00925 S007187/N00889 S004965/N00889
R0325.4		SPTIX SP.TOOL INDEX	S000041/N00007 S004609/N00830 S004863/N00875 S004867/N00876 S004878/N00882 S004883/N00879 S004904/N00882 S004974/N00890 S004981/N00891 S004990/N00882 S005409/N00932 S005441/N00935 S004979/N00890
R0325.5		SPTIXF SP.TOOL INDEX FINISH	S004610/N00830 S004905/N00882 S004976/N00890 S004986/N00891 S005139/N00882 S005167/N00906 S005290/N00920 S005383/N00930 S004988/N00891
R0325.6		STNITR SP. TOOL NO. INDEX T CODE READ	S000060/N00010 S004310/N00782 S004995/N00893 S005444/N00935 S004994/N00892
R0325.7		STITRA SP. TOOL NO. INDEX TF READ AUX	S004309/N00782 S004996/N00893 S005023/N00894 S006878/N01136 S005005/N00893
R0326.0		TFSTCM TF START COMMAND	S004338/N00787 S004356/N00791 S005021/N00894 S005029/N00895 S005046/N00882 S005049/N00896 S005056/N00896 S005097/N00899 S005404/N00932 S006859/N00882 S007012/N01155 S005026/N00894
R0326.1		TFFIN TF FINISH	S000064/N00010 S005001/N00893 S005045/N00895 S005400/N00932 S005942/N00882 S006860/N01136 S006877/N01136 S007013/N01155 S007234/N01183 S005047/N00895
R0326.2		TFST TF START	S000152/N00028 S000760/N00136 S002643/N00567 S004224/N00771 S004335/N00882 S004339/N00787 S004359/N00791 S004362/N00791 S004942/N00887 S004958/N00882 S004980/N00891 S004989/N00892 S005054/N00896 S005065/N00897 S005091/N00882 S005098/N00899 S005132/N00903 S005145/N00904 S005162/N00906 S005173/N00882 S005191/N00909 S005197/N00910 S005215/N00912 S005222/N00913 S005237/N00882 S005243/N00916 S005259/N00918 S005317/N00923 S005365/N00928 S005396/N00882 S005399/N00932 S005406/N00932 S005439/N00935 S006861/N01136 S007014/N00882 S007176/N01176 S005064/N00896

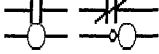
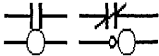
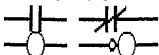
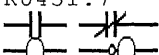
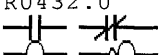
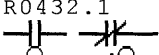
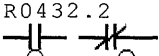
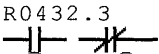
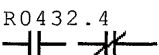
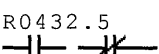
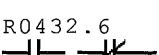
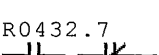
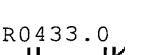
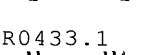
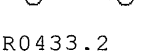
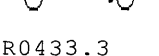
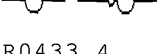
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
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		S005070/N00897 S005073/N00898 S005274/N00919 S005282/N00919 S005292/N00920	
		S005294/N00920 S005313/N00922 S005336/N00924 S005346/N00925 S005355/N00926	
		S005360/N00927 S005375/N00929 S005384/N00930 S005390/N00931	
		S005072/N00897	
R0326.4	TFF1 	TF FINISH 1	
		S004336/N00787 S005055/N00896 S005093/N00898 S005099/N00899 S005397/N00899	
		S005096/N00898	
R0326.5	ATCSTT 	ATC START TIME	
		S005127/N00902 S007233/N01183	
		S005102/N00899	
R0326.6	TFSTE 	TF START ERROR	
		S005042/N00895 S005066/N00897 S005116/N00900 S006144/N01033	
		S005119/N00900	
R0326.7	TFSTA 	TF START ASSIST	
		S005053/N00896	
		S005126/N00901	
R0327.0	FNPFC 	FIRST NEW POT CYCLE FIN.	
		S005077/N00898 S005134/N00903 S005152/N00905 S007178/N01176	
		S005144/N00903	
R0327.1	FNPCC1 	FIRST NEW POT CYCLE COMD.1	
		S005151/N00905	
		S005150/N00904	
R0327.2	FNPCC2 	FIRST NEW POT CYCLE COMD.2	
		S004931/N00886 S005133/N00903 S005159/N00905 S005174/N00907 S005198/N00908	
		S005223/N00913 S005244/N00916 S005268/N00919 S005326/N00924 S006872/N00925	
		S007177/N01176	
		S005161/N00905	
R0327.4	SPNPCF 	SP.NEW POT CYCLE FIN.	
		S005078/N00898 S005170/N00906 S005180/N00908 S007180/N01176	
		S005172/N00906	
R0327.5	SPNPC1 	SP.NEW POT COMD.1	
		S005179/N00908	
		S005178/N00907	
R0327.6	SPNPC2 	SP.NEW POT COMD.2	
		S004966/N00890 S005146/N00904 S005163/N00906 S005188/N00908 S005199/N00909	
		S005224/N00913 S005245/N00916 S005277/N00919 S005295/N00920 S005327/N00921	
		S006865/N01136 S007179/N01176	
		S005190/N00908	
R0328.0	NPCF 	NEW POT CY.FIN.	
		S005079/N00898 S005194/N00909 S005204/N00911 S007183/N01176	
		S005196/N00909	
R0328.1	NPCC1 	NEW POT CYCLE COMD.1	
		S005203/N00911	
		S005202/N00910	
R0328.2	NPCC2 	NEW POT CYCLE CODM.2	
		S004557/N00821 S004561/N00822 S005147/N00904 S005175/N00907 S005192/N00908	
		S005212/N00911 S005225/N00913 S005246/N00916 S005333/N00924 S005347/N00925	
		S006870/N01136 S007182/N01176	
		S005214/N00911	
R0328.4	FSPPCF 	FIRST SP.POT CYCLE FIN.	
		S005219/N00912	
		S005221/N00912	

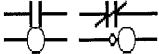
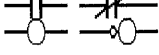
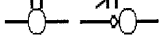
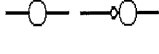
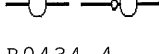
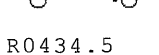
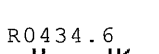
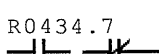
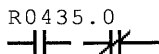
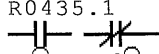
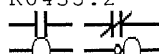
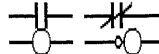
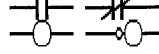
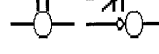
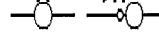
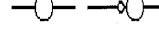

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
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R0328.6		FSPPC2 S004932/N00886 S005234/N00914 S005236/N00914	FIRST SP.POT COMD.2 S005148/N00904 S005176/N00907 S005200/N00910 S005216/N00911 S005247/N00916 S005269/N00919 S005373/N00929 S006873/N00929
R0329.0		SPPCF S005080/N00898 S005242/N00915	SP.POT CYCLE FIN. S005240/N00915 S005250/N00917
R0329.1		SPPC1 S005249/N00917 S005248/N00916	SP.POT COMD.1
R0329.2		SPPC2 S004933/N00886 S005238/N00915 S005258/N00917	SP.POT COMD.2 S005149/N00904 S005177/N00907 S005201/N00910 S005226/N00911 S005256/N00917 S005270/N00919 S006874/N01136
R0330.0		OLTRTF S005136/N00903 S005286/N00919 S005267/N00918	OLD TOOL RETURN FIN. S005164/N00906 S005217/N00912 S005239/N00915 S005265/N00916 S005328/N00924 S005374/N00929
R0330.1		OLTRT1 S004938/N00886 S005288/N00920 S005287/N00919	OLD TOOL RETURN COMD.1 S004967/N00890 S005260/N00918 S005275/N00919 S005283/N00920 S005303/N00921 S005310/N00922 S006843/N01134
R0330.3		POTUC1 S005298/N00920 S005302/N00920	TOOL POT UNCLAMP AUX1 S005304/N00921 S007202/N01179
R0330.4		POTUCL S005307/N00921 S005309/N00921	TOOL POT UNCLAMP S005311/N00922 S005734/N00981
R0330.7		POTMGSD S005264/N00918 S005316/N00922	TOOL POT MAG.SIDE AUX S005299/N00920 S005314/N00922 S005745/N00982
R0331.0		NTSTBF S004968/N00890 S005323/N00923 S005325/N00923	NEW TOOL STANDBY FIN. S004970/N00890 S005137/N00903 S005165/N00906 S005193/N00907 S005340/N00924
R0331.1		NTCTBC S004559/N00821 S005318/N00923 S005341/N00924	NEW TOOL STANDBY COMD.1 S004562/N00822 S004864/N00875 S004868/N00876 S004951/N00877 S005331/N00924 S005337/N00924 S005342/N00925 S007186/N00926
R0331.2		POTSPSD S005349/N00925 S005351/N00925	TOOL POT SPINDLE SIDE S005352/N00926 S005765/N00983
R0331.4		PTSPSDC S005356/N00926 S005358/N00926	TOOL POT SPINDLE SIDE CHECK S005359/N00927
R0331.6		TPOTCLM S004646/N00835 S005364/N00927	TOOL POT CLAMP S005322/N00923 S005362/N00927 S005721/N00980

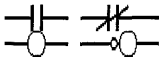
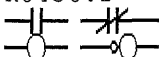
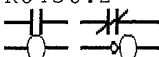
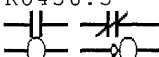
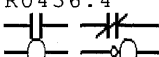
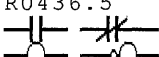
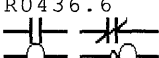
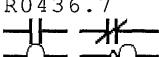
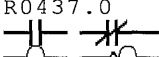
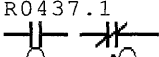
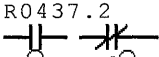
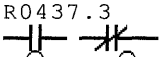
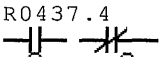
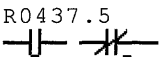
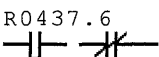
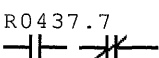
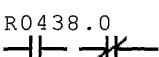
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0333.0	OSTBF 	0 STANDBY FINISH	
	S005218/N00912	S005370/N00928	S005378/N00929 S005380/N00929
	S005372/N00928		
R0333.1	OSTBC 	0 STB.COMD.1	
	S004879/N00878	S004884/N00879	S005366/N00928 S005382/N00930
	S005381/N00929		
R0333.4	TPOTC2 	TOOL POT CLAMP 2	
	S005386/N00930	S005389/N00931	S005735/N00981
	S005388/N00930		
R0333.6	TPSSI2 	TOOL POT SWING SPINDLE SIDE 2	
	S004647/N00835	S005393/N00931	S005766/N00983
	S005395/N00931		
R0335.0	M6CMD 	M6 COMMAND	
	S005417/N00932	S005426/N00933	S005436/N00934 S006862/N01136
	S005419/N00932		
R0335.1	M6F 	M6 FINISH	
	S005015/N00894	S005425/N00933	S005435/N00934 S006166/N01039 S006863/N01039
	S005427/N00933		
R0335.2	M6ST 	M6 START	
	S004225/N00771	S004357/N00791	S005019/N00894 S005415/N00932 S005434/N00934
	S005502/N00945	S005508/N00946	
	S005438/N00934		
R0337.7	STNM6M 	SP. TOOL NO.INDEX M06 MEMORY	
	S005443/N00935		
	S005448/N00935		
R0350.0	HVTMINC 	HEAVY TOOL MIN NO.CHANGE(BCD)	
	S004383/N00796		
R0350.1	HVTMAXC 	HEAVY TOOL MAX NO.CHANGE(BCD)	
	S004391/N00797		
R0350.2	D8<=D0 	D158 <= D140	
	S004434/N00804		
	S004398/N00798		
R0350.3	D0<=D0 	D140 <= D160	
	S004435/N00804		
	S004405/N00799		
R0350.4	NTN=0 	NEXT TOOL NO.= 0	
	S004436/N00804		
	S004412/N00800		
R0350.5	D8<=D4 	D158 <= D144	
	S004437/N00804		
	S004419/N00801		
R0350.6	D4<=D0 	D144 <= D160	
	S004438/N00804		
	S004426/N00802		
R0350.7	SPN=0 	SPINDLE TOOL NO.= 0	
	S004439/N00804		
	S004433/N00803		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0351.0	ATCLSP 	ATC LOW SPEED AUX.	
		S000497/N00093 S000505/N00094 S000591/N00114 S000598/N00115 S000605/N00116	
		S000612/N00117 S000620/N00118 S000623/N00118 S000628/N00118 S000631/N00119	
		S000637/N00119 S000644/N00120 S000651/N00121 S000658/N00122 S000666/N00123	
		S000669/N00123 S000673/N00124 S000680/N00125 S000687/N00126 S000694/N00127	
		S000702/N00128 S000705/N00128	
		S004444/N00804	
R0351.1	TPSAUX 	TOOL PUSHER AUX.	
		S004451/N00806 S004456/N00807	
		S004455/N00806	
R0351.2	TPBCCK 	TOOL PUSHER BACK CHECK	
		S000013/N00002 S000032/N00005	
		S004459/N00807	
R0352.0	ERR 	ERROR	
		S000589/N00113	
R0352.1	D158<D182 	D158<=D182	
		S000618/N00118 S000626/N00118	
		S000596/N00114	
R0352.2	D182<D160 	D182<=D160	
		S000619/N00118 S000627/N00118	
		S000603/N00115	
R0352.3	D170<D182 	D170<=D182	
		S000621/N00118 S000629/N00118	
		S000610/N00116	
R0352.4	D182<D172 	D182<=D172	
		S000622/N00118 S000630/N00118	
		S000617/N00117	
R0352.5	D162<D182 	D162<=D182	
		S000664/N00123 S000642/N00119	
R0352.6	D152<D164 	D152<=D164	
		S000665/N00123 S000649/N00120	
R0352.7	D174<D182 	D174<=D182	
		S000667/N00123 S000656/N00121	
R0353.0	D182<D176 	D182<=D176	
		S000668/N00123 S000663/N00122	
R0353.1	D166<D152 	D166<=D152	
		S000700/N00128 S000678/N00124	
R0353.2	D182<D168 	D182<=D168	
		S000701/N00128 S000685/N00125	
R0353.3	D178<D182 	D178<=D182	
		S000703/N00128 S000692/N00126	
R0353.4	D182<D180 	D182<=D180	
		S000704/N00128 S000699/N00127	

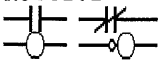
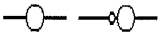
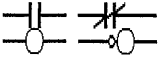
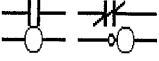
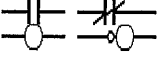
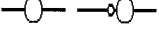
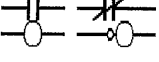
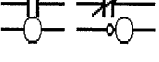

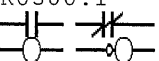
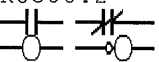
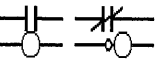
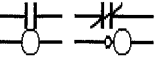
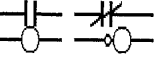
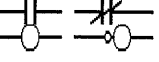
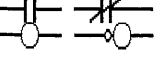
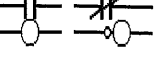
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0383.0	DISED 	DI. END DELAY	
	S005067/N00897 S003419/N00685		
R0385.2	ATSTOV 	ATC START OVER	
	S007235/N01183 S005131/N00902		
R0385.3	MAGIDE 	MAGAZINE INDEX ERROR	
	S007331/N01193 S004307/N00781		
R0385.6	TFRDT 	TF READ TIME	
	S004346/N00789 S004318/N00783	S004351/N00790 S004355/N00791 S005010/N00894	
R0385.7	M06RDT 	M06 READ TIME	
	S004348/N00789 S004328/N00785		
R0403.6	TFR 	TF READ	
	S004314/N00783 S004313/N00782	S004334/N00787 S005036/N00895 S005086/N00898 S005405/N00899	
R0403.7	M6R 	M6 READ	
	S000438/N00087 S005410/N00932 S004323/N00784	S002644/N00567 S004324/N00785 S004520/N00816 S004993/N00817 S005418/N00932 S005440/N00935	
R0430.0	DRYRST 	DRY RUN SETTING	
	S001173/N00265 S001170/N00264	S001177/N00266 S001179/N00266	
R0430.1	FINDRN 	FINISH OF DRY RUN SET	
	S001169/N00264 S001176/N00265	S001174/N00265	
R0430.2	CANZST 	CANCEL Z SETTING	
	S001189/N00268 S001186/N00267	S001193/N00269 S001195/N00269	
R0430.3	FICAZS 	FINISH CANCEL Z SET	
	S001185/N00267 S001192/N00268	S001190/N00268	
R0430.4	MLKSET 	MACHINE LOCK SETTING	
	S001205/N00271 S001202/N00270	S001209/N00272 S001211/N00272	
R0430.5	FIMLKS 	FIN. OF MACHINE LOCK SET	
	S001201/N00270 S001208/N00271	S001206/N00271	
R0430.6	TOOSET 	TOOL SETTER SETTING	
	S001219/N00274 S001217/N00273	S001223/N00275 S001225/N00275	
R0430.7	FITOSE 	FINISH OF TOOL SETTER SET	
	S001216/N00273 S001222/N00274	S001220/N00274	
R0431.0	FLSSET 	FLUSHING COOLANT SETTING	
	S001241/N00277 S001239/N00276	S001875/N00423 S001878/N00423 S001884/N00424	
R0431.1	FIFCSE 	FIN. OF FLUSHING COOLANT SET	
	S001238/N00276 S001244/N00277	S001242/N00277	

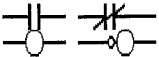
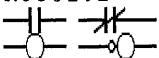
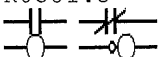
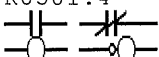
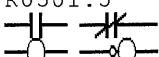
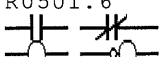
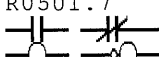
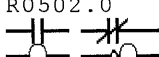
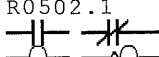
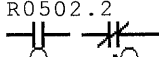
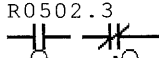
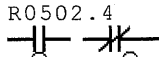
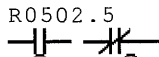
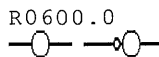
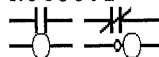
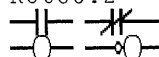
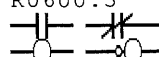
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0431.2	REFHOS 	REF. HOLE SETTING	S001249/N00279 S001253/N00280 S001255/N00280 S001247/N00278
R0431.3	FRFHOS 	FINISH OF REF. HOLE SET	S001246/N00278 S001250/N00279 S001252/N00279
R0431.6	BLS2SE 	BLOCK SKIP 2 SETTING	S001271/N00282 S001275/N00283 S001277/N00283 S001269/N00281
R0431.7	FOBS2S 	FINISH OF BLOCK SKIP 2 SET	S001268/N00281 S001272/N00282 S001274/N00282
R0432.0	BLS3SE 	BLOCK SKIP 3 SETTING	S001285/N00285 S001289/N00286 S001291/N00286 S001283/N00284
R0432.1	FOBS3S 	FINISH OF BLOCK SKIP 3 SET	S001282/N00284 S001286/N00285 S001288/N00285
R0432.2	BLS4SE 	BLOCK SKIP 4 SETTING	S001299/N00288 S001303/N00289 S001305/N00289 S001297/N00287
R0432.3	FOBS4S 	FINISH OF BLOCK SKIP 4 SET	S001296/N00287 S001300/N00288 S001302/N00288
R0432.4	BLS5SE 	BLOCK SKIP 5 SETTING	S001313/N00291 S001317/N00292 S001319/N00292 S001311/N00290
R0432.5	FOBS5S 	FINISH OF BLOCK SKIP 5 SET	S001310/N00290 S001314/N00291 S001316/N00291
R0432.6	PLABAS 	PLAY BACK SETTING	S001383/N00306 S001390/N00307 S001392/N00307 S001381/N00305
R0432.7	PLABAF 	PLAY BACK SET FINISH	S001380/N00305 S001384/N00306 S001386/N00306
R0433.0	BLS6SE 	BLOCK SKIP 6 SETTING	S001327/N00294 S001331/N00295 S001333/N00295 S001325/N00293
R0433.1	FOBS6S 	FINISH OF BLOCK SKIP 6 SET	S001324/N00293 S001328/N00294 S001330/N00294
R0433.2	BLS7SE 	BLOCK SKIP 7 SETTING	S001341/N00297 S001345/N00298 S001347/N00298 S001339/N00296
R0433.3	FOBS7S 	FINISH OF BLOCK SKIP 7 SET	S001338/N00296 S001342/N00297 S001344/N00297
R0433.4	BLS8SE 	BLOCK SKIP 8 SETTING	S001355/N00300 S001359/N00301 S001361/N00301 S001353/N00299

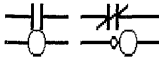
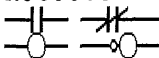
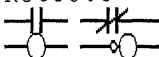
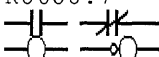
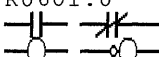
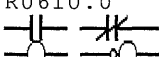
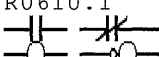
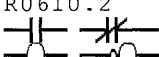
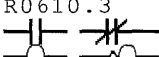
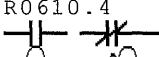
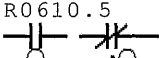
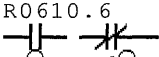
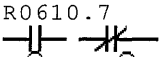
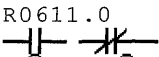
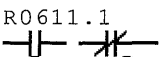
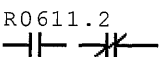
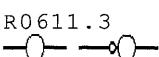
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0433.5	F0BS8S 	FINISH OF BLOCK SKIP 8 SET	
		S001352/N00299 S001356/N00300	
		S001358/N00300	
R0433.6	COMCAS 	COMPLETION CALL SETTING	
		S001421/N00313 S001425/N00314 S001427/N00314	
		S001419/N00312	
R0433.7	F0MCA 	FIN. OF COMPLETION CALL SET	
		S001418/N00312 S001422/N00313	
		S001424/N00313	
R0434.0	AUPW 	AUTO POWER OFF SETTING	
		S001439/N00316 S001443/N00317 S001445/N00317	
		S001437/N00315	
R0434.1	FAUPW 	FIN. OF AUTO POWER OFF SET	
		S001436/N00315 S001440/N00316	
		S001442/N00316	
R0434.4	F-1DFE 	F-1 DIGIET FEED SETTING	
		S001457/N00319 S001461/N00320 S001463/N00320	
		S001455/N00318	
R0434.5	FF-1DF 	FINISH OF F-1 DIGIET FEED SET	
		S001454/N00318 S001458/N00319	
		S001460/N00319	
R0434.6	BKRSTS 	BLOCK RESTART SETTING	
		S001474/N00322 S001478/N00323 S001480/N00323	
		S001472/N00321	
R0434.7	FBKRST 	FIN. OF BLOCK RESTART SET	
		S001471/N00321 S001475/N00322	
		S001477/N00322	
R0435.0	PRRES 	PROGRAM RESTART SETTING	
		S001492/N00325 S001496/N00326 S001498/N00326	
		S001490/N00324	
R0435.1	FPRRES 	FIN. OF PROGRAM RESTART SET	
		S001489/N00324 S001493/N00325	
		S001495/N00325	
R0435.2	BLKSKP 	BLOCK SKIP SETTING	
		S001510/N00328 S001514/N00329 S001516/N00329	
		S001508/N00327	
R0435.3	FBKSKP 	FIN. OF BLOCK SKIP SET	
		S001507/N00327 S001511/N00328	
		S001513/N00328	
R0435.4	OPLSTP 	OPTIONAL STOP SETTING	
		S001524/N00331 S001528/N00332 S001530/N00332	
		S001522/N00330	
R0435.5	FOPSTP 	FINISH OF OPTIONAL STOP SET	
		S001521/N00330 S001525/N00331	
		S001527/N00331	
R0435.6	FIFCOO 	FINISH OF FLOOD COOLANT SET	
		S001539/N00335 S001546/N00336	
		S001535/N00333	
R0435.7	F0COO 	FLOOD COOLANT SETTING	
		S001534/N00333 S001538/N00335 S001545/N00336	
		S001537/N00334	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0436.0		FLOOD COOLANT ON	
		S003994/N00740 S004002/N00741	
		S001544/N00335	
R0436.1		FLOOD COOLANT OFF	
		S003984/N00738 S003997/N00740 S004000/N00741	
		S001551/N00336	
R0436.2		FINISH OF JET COOLANT SET	
		S001557/N00339 S001568/N00340	
		S001553/N00337	
R0436.3		JET COOLANT SETTING	
		S001552/N00337 S001556/N00339 S001567/N00340	
		S001555/N00338	
R0436.4		JET COOLANT ON	
		S001562/N00339 S004031/N00746 S007716/N01282	
		S001566/N00339	
R0436.5		JET COOLANT OFF	
		S004024/N00744 S004034/N00746	
		S001571/N00340	
R0436.6		FINISH OF THROUGH COOLANT	
		S001577/N00343 S001588/N00344	
		S001573/N00341	
R0436.7		THROUGH COOLANT SETTING	
		S001572/N00341 S001576/N00343 S001587/N00344	
		S001575/N00342	
R0437.0		THROUGH COOLANT ON	
		S001582/N00343 S004061/N00751 S007692/N01277	
		S001586/N00343	
R0437.1		THROUGH COOLANT OFF	
		S004065/N00751	
		S001591/N00344	
R0437.2		FINISH OIL HOLE COOLANT SET	
		S001597/N00347 S001608/N00348	
		S001593/N00345	
R0437.3		OIL HOLE COOLANT SETTING	
		S001592/N00345 S001596/N00347 S001607/N00348	
		S001595/N00346	
R0437.4		OIL HOLE COOLANT ON	
		S001602/N00347 S004057/N00751 S007711/N01281	
		S001606/N00347	
R0437.5		OIL HOLE COOLANT OFF	
		S004064/N00751	
		S001611/N00348	
R0437.6		FINISH OF CIP C/V SET	
		S001617/N00351 S001621/N00352	
		S001613/N00349	
R0437.7		CIP C/V SETTING	
		S001612/N00349 S001616/N00351 S001620/N00352	
		S001615/N00350	
R0438.0		CIP C/V ON	
		S004125/N00759	
		S001619/N00351	

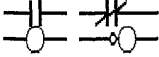
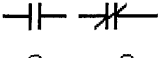
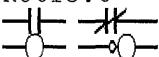
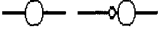
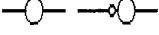
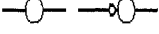
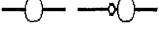
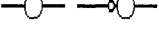
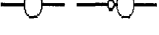
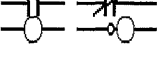
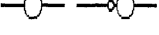


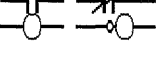
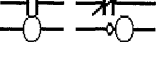
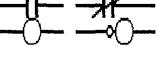
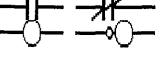
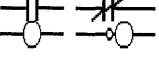
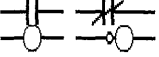
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0438.1	CICVOF 	CIP C/V OFF S004134/N00760 S004136/N00760 S001624/N00352	
R0438.2	FMICOO 	FINISH OF MIST COOLANT SET S001630/N00355 S001641/N00356 S001626/N00353	
R0438.3	MICOOS 	MIST COOLANT SETTING S001625/N00353 S001629/N00355 S001640/N00356 S001628/N00354	
R0438.4	MICOON 	MIST COOLANT ON S001635/N00355 S004150/N00761 S007697/N01278 S001639/N00355	
R0438.5	MICOOF 	MIST COOLANT OFF S004153/N00761 S001644/N00356	
R0438.6	FGCOOS 	FINISH OF GUN COOLANT SET S001651/N00359 S001659/N00360 S001646/N00357	
R0438.7	GCOOS 	GUN COOLANT SETTING S001645/N00357 S001650/N00359 S001658/N00360 S001649/N00358	
R0439.0	GCOON 	GUN COOLANT ON S001653/N00359 S004040/N00747 S007702/N01279 S001657/N00359	
R0439.1	GCOOFF 	GUN COOLANT OFF S004042/N00747 S001661/N00360	
R0439.2	FLITS 	FINISH OF LIGHTING SET S001667/N00363 S001671/N00364 S001663/N00361	
R0439.3	LITS 	LIGHT SETTING S001662/N00361 S001666/N00363 S001670/N00364 S001665/N00362	
R0439.4	LITON 	LIGHT ON S007553/N01247 S001669/N00363	
R0439.5	LITOFF 	LIGHT OFF S007555/N01247 S001673/N00364	
R0439.6	BLS9SE 	BLOCK SKIP 9 SETTING S001369/N00303 S001373/N00304 S001375/N00304 S001367/N00302	
R0439.7	FOBS9S 	FINISH OF BLOCK SKIP 9 SET S001366/N00302 S001370/N00303 S001372/N00303	
R0440.0	FINTAB 	FINISH OF TOOL AIR BLOW SET S001406/N00310 S001414/N00311 S001402/N00308	
R0441.1	TARSET 	TOOL AIR BLOW SETTING S001401/N00308 S001405/N00310 S001413/N00311 S001404/N00309	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0441.2		TOOLAO S001408/N00310 S007667/N01274 S001412/N00310	TOOL AIR BLOW ON
R0441.3		TOOAOF S001416/N00311	TOOL AIR BLOW OFF
R0441.5		FOTABS S001679/N00367 S001687/N00368 S001675/N00365	FIN.OF THROU.AIR BLOW SETTING
R0441.6		THABSE S001674/N00365 S001678/N00367 S001686/N00368 S001677/N00366	THROUGH AIR BLOW SETTING
R0441.7		THABON S001681/N00367 S007673/N01275 S001685/N00367	THROUGH AIR BLOW ON
R0442.0		THABOF S001689/N00368	THROUGH AIR BLOW OFF
R0442.5		HDINS S001694/N00370 S001702/N00371 S001704/N00371 S001692/N00369	HANDLE INTERRUPTION SETTING
R0442.6		HDINSF S001691/N00369 S001695/N00370 S001697/N00370	HANDLE INTERRUPTION SET FINISH
R0500.0		DRYON S001178/N00266 S001180/N00266 S002154/N00493 S002159/N00494 S002329/N S002508/N00543 S001182/N00266	DRY RUN ON
R0500.1		CANZON S001194/N00269 S001196/N00269 S003267/N00667 S001198/N00269	CANCEL Z ON
R0500.2		MLKON S001210/N00272 S001212/N00272 S001861/N00420 S001214/N00272	MACHINE LOCK ON
R0500.3		TOOSON S001224/N00275 S001226/N00275 S007608/N01260 S001236/N00275	TOOL SETTER ON
R0500.4		WSRSHO S001254/N00280 S001256/N00280 S007602/N01259 S001266/N00280	WORK SETTER REF.HOLE ON
R0500.5		BLSK2O S001276/N00283 S001278/N00283 S002111/N00476 S007773/N01299 S001280/N00283	BLOCK SKIP 2 ON
R0500.6		BLSK3O S001290/N00286 S001292/N00286 S002113/N00477 S007776/N01300 S001294/N00286	BLOCK SKIP 3 ON
R0500.7		BLSK4O S001304/N00289 S001306/N00289 S002115/N00478 S007779/N01301 S001308/N00289	BLOCK SKIP 4 ON
R0501.0		BLSK5O S001318/N00292 S001320/N00292 S002117/N00479 S007782/N01302 S001322/N00292	BLOCK SKIP 5 ON

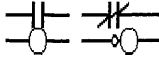
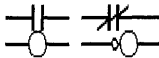
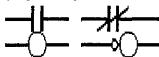
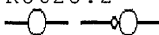
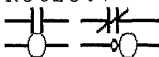
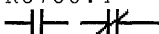
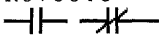
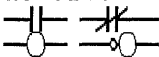
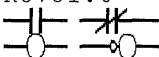
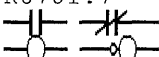
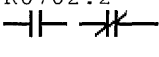
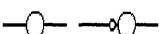
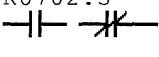
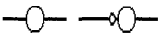
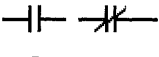
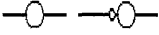
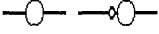
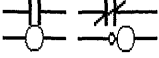
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R0501.1	BLSK60	BLOCK SKIP 6 ON	
	S001332/N00295	S001334/N00295	S002119/N00480 S007785/N01303
	S001336/N00295		
R0501.2	BLSK70	BLOCK SKIP 7 ON	
	S001346/N00298	S001348/N00298	S002121/N00481 S007788/N01304
	S001350/N00298		
R0501.3	BLSK80	BLOCK SKIP 8 ON	
	S001360/N00301	S001362/N00301	S002123/N00482 S007791/N01305
	S001364/N00301		
R0501.4	BLSK90	BLOCK SKIP 9 ON	
	S001374/N00304	S001376/N00304	S002125/N00483 S007794/N01306
	S001378/N00304		
R0501.5	PLBAK	PLAY BACK ON	
	S001165/N00263	S001391/N00307	S001393/N00307
	S001400/N00307		
R0501.6	COMPON	COMPLETION ON	
	S001426/N00314	S001428/N00314	S007685/N01276
	S001434/N00314		
R0501.7	AUPWO	AUTO POWER OFF ON	
	S001444/N00317	S001446/N00317	S003867/N00724 S007640/N01269
	S001452/N00317		
R0502.0	F-1DFO	F-1 DIGIT FEED ON	
	S001462/N00320	S001464/N00320	S002106/N00474 S007658/N01272
	S001469/N00320		
R0502.1	BKRSTO	BLOCK RESTART ON	
	S001479/N00323	S001481/N00323	S002103/N00473 S007652/N01271
	S001487/N00323		
R0502.2	PRESON	PROGRAM RESTART ON	
	S001497/N00326	S001499/N00326	S002100/N00472 S007646/N01270
	S001505/N00326		
R0502.3	BKSKON	BLOCK SKIP ON	
	S001515/N00329	S001517/N00329	S002109/N00475 S007628/N01266
	S001519/N00329		
R0502.4	OPSTPO	OPTIONAL STOP ON	
	S001529/N00332	S001531/N00332	S003568/N00711 S003835/N00720 S007625/N01270
	S001533/N00332		
R0502.5	HAINON	INTERRUPTION ON	
	S001703/N00371	S001705/N00371	S002038/N00459 S007664/N01273
	S001711/N00371		
R0600.0	POS1	ATC ARM POSITION 1	
	S000581/N00112		
R0600.1	POS2	ATC ARM POSITION 2	
	S000577/N00112	S000579/N00112	
	S000575/N00111		
R0600.2	POS4	ATC ARM POSITION 4	
	S000571/N00111	S000573/N00111	
	S000569/N00110		
R0600.3	POS8	ATC ARM POSITION 8	
	S000565/N00110	S000567/N00110	
	S000563/N00109		

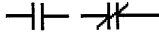
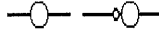
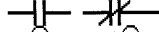
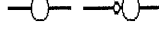
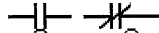
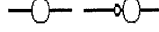
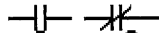

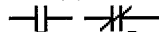

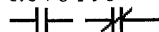

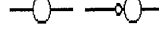
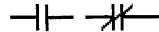
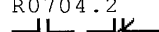

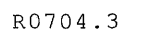
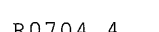
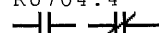
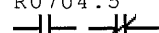
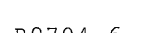
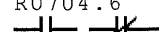
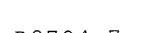
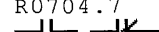
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0600.4	POS16 	ATC ARM POSITION 16 S000559/N00109 S000561/N00109 S000557/N00108	
R0600.5	POS32 	ATC ARM POSITION 32 S000553/N00108 S000555/N00108 S000551/N00107	
R0600.6	POS64 	ATC ARM POSITION 64 S000547/N00107 S000549/N00107 S000545/N00106	
R0600.7	POS128 	ATC ARM POSITION 128 S000541/N00106 S000543/N00106 S000539/N00105	
R0601.0	POS256 	ATC ARM POSITION 256 S000535/N00105 S000537/N00105 S000533/N00104	
R0610.0	MOPC4 	MAGAZINE OPC 4 (FINISH SIGNAL) S000047/N00007 S000103/N00017 S000123/N00022 S000002/N00001	
R0610.1	IDX_J 	MAGAZINE INDEX CONDITION S000022/N00003 S000014/N00002	
R0610.2	INXCON 	MAGAZINE INDEX CONDITION S000035/N00006 S000111/N00019 S000024/N00003	
R0610.3	TCEMGM 	T-COMMAND WITH EMG. MEM. S000026/N00004 S000069/N00011 S000028/N00004	
R0610.4	SVUOC 	SVU OPERATION CONDITION S000034/N00006 S000114/N00019 S000033/N00005	
R0610.5	A_IDXC 	AUTO MODE INDEX CONDITION S000048/N00007 S000036/N00006	
R0610.6	A_IDXS 	AUTO MODE INDEX START S000042/N00007 S000050/N00008 S000055/N00009 S000058/N00010 S000049/N00007	
R0610.7	TAD=CUTD 	TARGET DATA = M/Z CURRENT DATA S000045/N00007 S000061/N00010 S000057/N00009	
R0611.0	AUINST 	AUTO INDEX START S000044/N00007 S000062/N00010 S000068/N00011 S004448/N00806 S000067/N00010	
R0611.1	MRASS 	MAGAZINE AUTO ST.SIG. (TO NC) S000071/N00012 S000208/N00039 S000221/N00041 S000070/N00011	
R0611.2	MATID 	MAGAZINE AUTO INDEX DELAY S000172/N00032 S000075/N00012	
R0611.3		S000325/N00062	

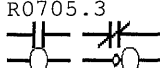
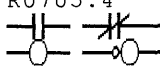
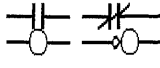
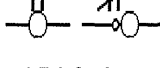
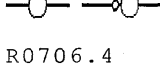
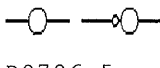
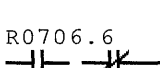
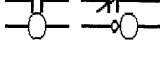
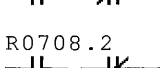
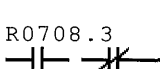
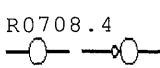
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0611.4	MAGIDX 	MAGAZINE AUTO INDEXING	
	S000102/N00017	S006847/N01134	
	S000106/N00017		
R0611.5	MAN 	MANUAL MODE	
	S000021/N00003	S000112/N00019	
	S000110/N00018		
R0611.6	IDX_C 	MANUAL INDEX CONITION	
	S000119/N00020		
	S000115/N00019		
R0611.7	IDXST 	MANUAL MODE INDEX START	
	S000121/N00021	S000125/N00022 S000158/N00030 S000166/N00031 S004449/N00031	
	S000120/N00020		
R0612.0	IDX_ST 	MANUAL MODE INDEX START	
	S000131/N00023	S000177/N00033 S000211/N00039 S000217/N00040	
	S000122/N00021		
R0612.1	IDXER 	MANUAL INDEX ENB.RECEIVE	
	S000124/N00022	S000129/N00023	
	S000126/N00022		
R0612.2	IDXCA 	IND COM.AUX(MANUAL)	
	S000130/N00023	S000133/N00024	
	S000132/N00023		
R0612.3	IDSTCM 	INDEX STOP COMMAND(MANUAL)	
	S000156/N00030	S000164/N00031	
	S000137/N00024		
R0612.4	BAGOG1 	BETA-AMP JOG MODE 1	
	S000142/N00026		
	S000140/N00025		
R0612.5	BAGOG2 	BETA-AMP JOG MODE 2	
	S000157/N00030	S000160/N00030 S000165/N00031 S000168/N00031 S000173/N00031	
	S000181/N00033	S000202/N00038 S000209/N00039 S000212/N00039 S000218/N00039	
	S000222/N00041	S000227/N00042 S000230/N00043 S000235/N00044 S000239/N00044	
	S000247/N00046	S000254/N00047 S000261/N00048	
	S000144/N00026		
R0612.6	20)R102 	BETA-AMP JOG MODE 20)R102	
	S000240/N00045	S000248/N00046 S000255/N00047	
	S000237/N00044		
R0612.7	MAGOVR 	MAGAZINE OVERRIDE SUB DATA	
	S000246/N00045		
R0613.0	MD-WRT 	BETA-AMP DATA WRITE	
	S000197/N00037	S000201/N00038 S000207/N00039 S000210/N00039 S000216/N00039	
	S000220/N00041	S000226/N00042 S000260/N00048	
	S000266/N00049		
R0613.1	ALOCC 	ALARM OUTPUT COMMAND COND.	
	S000270/N00051	S000273/N00052	
	S000269/N00050		
R0613.2	ALOCM1 	ALARM OUTPUT COMMAND 1	
	S000275/N00053		
	S000272/N00051		
R0613.3	ALOCM2 	ALARM OUTPUT COMMAND 2	
	S000271/N00051		
	S000274/N00052		

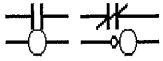
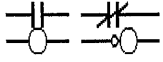
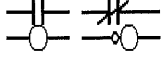
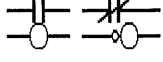
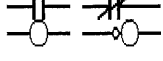
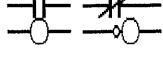
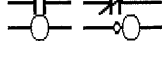
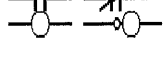
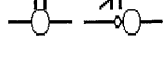
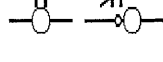
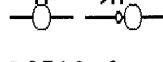
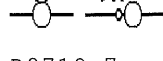
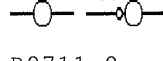
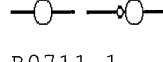
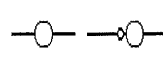

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
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	S000154/N00029	S000276/N00053	S000279/N00054
	S000278/N00053		
R0613.5	ALOFOK 	ALARM OUTPUT FINISH O.K	
	S000277/N00053	S000282/N00055	S000286/N00056
	S000298/N00059	S000304/N00060	S000290/N00057
	S000281/N00054		S000295/N00057
R0613.6	ALM=0 	ALARM NO.=0	
	S000299/N00059	S000305/N00060	
	S000297/N00058		
R0613.7			
	S000317/N00061		
R0614.0	MOD1SVU 	MODE 1 (SVU)	
	S000148/N00027		
R0614.2	MOD4SVU 	MODE 4 (SVU)	
	S000153/N00028		
R0614.3	ALSSVU 	ALARM COMMAND SIGNAL (SVU)	
	S000155/N00029		
R0614.4	+A_SVU 	+ JOG FEED (SVU)	
	S000163/N00030		
R0614.5	-A_SVU 	- JOG FEED (SVU)	
	S000171/N00031		
R0614.7	STR_SVU 	START (SVU)	
	S000176/N00033		
	S000174/N00032		
R0615.0	REST_SVU 	RESTART (SVU)	
	S000184/N00033		
R0615.1	EMG_SVU 	EMERGENCY STOP (SVU)	
	S000186/N00034		
R0615.2	SOC_S 	SERVO OFF COMMAND SIGNAL (SVU)	
	S000188/N00035		
R0615.3	INT_SVU 	INTERLOCK SIGNAL (SVU)	
	S000118/N00020		
	S000196/N00036		
R0624.0	ZRNSTR 	AUTO ZERO RETURN START	
	S002339/N00527		
	S002338/N00526		
R0625.0	ALLZRN 	ALL AXIS ZRN START	
	S002340/N00527	S002350/N00528	S002356/N00529
	S002349/N00527		S002364/N00530
R0625.1	+ZDITMC 	+Z DIRECTION MOVE COMMAND	
	S002352/N00528	S002360/N00529	S002455/N00539
	S002355/N00528		
R0625.2	-ZDITMC 	-Z DIRECTION MOVE COMMAND	
	S002359/N00529	S002468/N00540	
	S002363/N00529		
R0625.3	ZZRNFN 	Z-AXIS ZRN FINISH	
	S000855/N00169	S002367/N00531	S002376/N00532
	S002366/N00530		S002382/N00533
			S002389/N00534

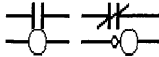
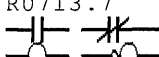
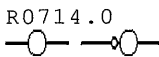
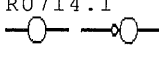
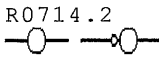
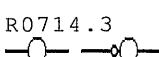
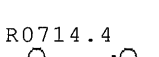
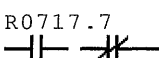
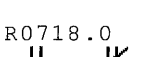
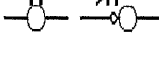
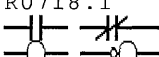
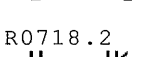
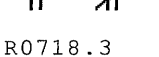
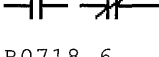
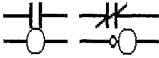
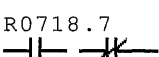
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0625.4	+XDITMC 	+X DIRECTION MOVE COMMAND	
	S002371/N00531	S002406/N00535	
	S002375/N00531		
R0625.5	-XDITMC 	-X DIRECTION MOVE COMMAND	
	S002373/N00531	S002378/N00532 S002418/N00536	
	S002381/N00532		
R0625.6	+YDITMC 	+Y DIRECTION MOVE COMMAND	
	S002384/N00533	S002431/N00537	
	S002388/N00533		
R0625.7	-YDITMC 	-Y DIRECTION MOVE COMMAND	
	S002386/N00533	S002392/N00534 S002443/N00538	
	S002395/N00534		
R0626.0	SSPARD 	SPINDLE SPEED ARRIVAL DELAY	
	S002553/N00552	S002615/N00563	
	S002536/N00549		
R0626.1	CMNRSA 	CUTTING MON.NOT READY SP.STOP	
	S002548/N00551	S002557/N00552	
	S002547/N00550		
R0626.2	MCSPSP 	M-CODE SP.STOP COMMAND DELAY	
	S003116/N00641		
	S002551/N00551		
R0626.3	INNOCT 	IN NORMAL CUTTING	
	S002554/N00552	S002560/N00553	
	S002559/N00552		
R0626.4	CUTOVD 	CUTTING OVERLOAD	
	S002563/N00553	S002577/N00556 S003394/N00681 S006279/N01060 S007368/N0	
	S002568/N00553		
R0626.5	TOLEND 	TOOL LIFE END	
	S002636/N00565	S003395/N00681 S007381/N01200	
	S002572/N00554		
R0626.6	TOLALT 	TOOL LIFE ALERT	
	S002637/N00565		
	S002576/N00555		
R0626.7	SPSPAX 	SPINDLE STOP AUX.	
	S002580/N00557	S002586/N00558	
	S002579/N00556		
R0627.0	SPSPDL 	SPINDLE STOP DELAY	
	S002584/N00558		
	S002583/N00557		
R0627.1	SPSTP 	SPINDLE STOP	
	S002621/N00563	S003117/N00641	
	S002588/N00558		
R0627.2	SPRTMD 	SPINDLE RIGID TAP MODE	
	S002590/N00559	S002624/N00563	
	S002598/N00559		
R0627.3	BCTDSP 	BORING CYCLE TOOL DETECTION ST	
	S002601/N00560	S002607/N00562 S003612/N00711 S003616/N00711	
	S002603/N00560		
R0627.4	TDSCAN 	TOOL DETECTION STOP CANCEL	
	S002631/N00564		
	S002606/N00561		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0627.5		TDSPCD S002628/N00564 S002611/N00562	TOOL DETECTION STOP CANCEL DEL
R0628.0		CTMURA S002545/N00550 S002626/N00563	CUTTING MONITOR UNIT RUN S002605/N00561 S002616/N00563 S003617/N00711
R0628.1		TDETSPA S002629/N00564 S002635/N00564	TOOL DETECTION STOP S003609/N00711 S003619/N00711
R0628.2		CTMTRA S002639/N00565	CUT.MONITOR TOOL LIFE RESET
R0628.7		DRDOSP S000347/N00066 S004207/N00768	SP.STOP AT DOOR OPEN/DOOR REL.
R0700.4		TUSLTL S006028/N01019	TOOL UNCL.START L/S TOUCH LIM
R0700.5		TCSLTL S006034/N01020	TOOL CL.START L/S TOUCH LIMIT
R0701.5		TUSLSF S006030/N01019 S006033/N01019	TOOL UNCLAMP START L/S FAIL
R0701.6		TCLSLF S006036/N01020 S006039/N01020	TOOL CLAMP START L/S FAIL
R0701.7		TOOLCA S005975/N01012 S005979/N01012	TOOL CLAMP AUX. S005994/N01013 S007461/N01223 S007465/N01224
R0702.2	 	TOCLLS S000415/N00083 S002914/N00619 S004786/N00860 S005972/N01012 S001721/N00373	TOOL CLAMP L/S S000416/N00083 S000441/N00088 S001717/N00373 S002912/N00083 S003069/N00638 S003083/N00639 S003316/N00673 S003327/N00639 S004791/N00861 S005428/N00934 S005449/N00936 S005465/N00936 S006905/N01141 S007085/N01164
R0702.3	 	TOUCLS S000420/N00083 S005450/N00936 S001725/N00374	TOOL UNCLAMP L/S S000426/N00084 S000429/N00085 S001718/N00373 S002911/N00083 S005455/N00937 S005990/N01013 S006907/N01141 S007749/N00936
R0702.4	 	NOTCLA S001719/N00373 S005466/N00939 S001731/N00375	NO TOOL CLAMP L/S S001720/N00373 S003049/N00636 S005451/N00936 S005454/N00936 S006906/N01141 S006942/N01146 S006958/N01148
R0702.7		TCLWTL S001733/N00376	TOOL CLAMP WITHOUT TOOL
R0703.0		TPSHFS S004452/N00806 S001735/N00377	TOOL PUSHER FOOT S/W

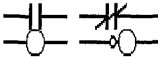
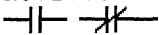
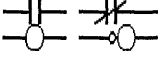
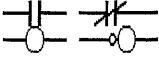
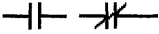
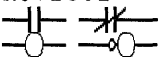
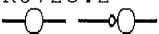
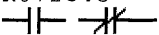
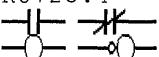
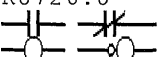
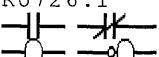
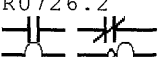
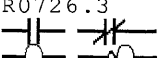
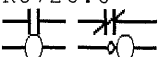
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0703.1	ARMORG	TWIN ARM ORIGIN L/S	
	S000372/N00076	S000375/N00077	S000405/N00081
	S001744/N00382	S001988/N00448	S002915/N00619
	S003342/N00677	S004591/N00827	S004618/N00831
	S004718/N00847	S004721/N00848	S004732/N00851
	S004740/N00854	S004745/N00855	S004753/N00856
	S005044/N00895	S005052/N00896	S005074/N00898
	S005210/N00911	S005232/N00914	S005254/N00917
	S005280/N00919	S005319/N00923	S005329/N00924
	S005412/N00932	S005422/N00933	S005553/N00954
	S005688/N00978	S005705/N00979	S006206/N01050
	S007167/N01175	S006864/N01136	S006916/N01136
	S000635/N00118		
R0703.3	TPUNCC	TOOL POT UNCLAMP CHECK	
	S000007/N00002	S003713/N00713	S004620/N00831
	S001737/N00378	S005840/N00988	S006867/N01136
R0703.4	TPCLCH	TOOL POT CLAMP CHECK	
	S003709/N00713	S005836/N00987	
	S001739/N00379		
R0703.5	HYDROL	HYD. O/L	
	S000338/N00065	S006828/N01131	
	S001741/N00380		
R0703.7	HYDRCK	HYD. RUN CHECK	
	S000335/N00065	S000346/N00066	S001967/N00443
	S001743/N00381		
R0704.0	AUCLPST	TWIN ARM UNCLAMP START AUX	
	S000464/N00091	S000484/N00092	S005980/N01013
	S006029/N01019	S005999/N01014	S006004/N01014
	S000671/N00123		
R0704.1	ACLPST	TWIN ARM CLAMP START AUX	
	S000414/N00083	S000417/N00083	S000419/N00083
	S000436/N00087	S000708/N00129	S004768/N00858
	S005453/N00937	S006000/N01014	S006005/N01015
	S000707/N00128	S006035/N01020	
R0704.2	ASTOPA	TWIN ARM STOP AUX	
	S000471/N00091	S000491/N00092	S000512/N00095
	S003199/N00653	S005424/N00933	S005429/N00934
	S006950/N01147	S005468/N00939	S006934/N01136
	S001747/N00382	S007056/N01160	
R0704.3	MXALLC	MIXAIR LUB.LACK CHECK	
	S001749/N00383		
R0704.4	MXAALM	MIXAIR LUB.ALARM CHECK	
	S001804/N00403		
	S001751/N00384		
R0704.5	SPHOV	SP.HEAD OVERHEAT	
	S001805/N00403		
	S001753/N00385		
R0704.6	AIRPAL	AIR P/S ALARM(6BAR)	
	S001806/N00403		
	S001755/N00386		
R0704.7	MAIRPA	MIXER AIR P/S ALARM	
	S001807/N00403		
	S001757/N00387		

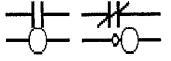
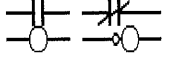
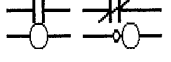
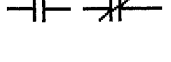
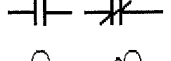
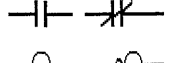
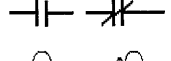
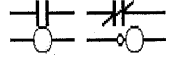
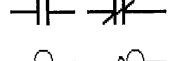
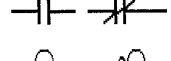
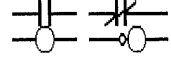
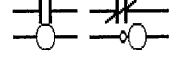
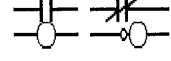
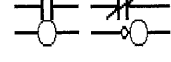
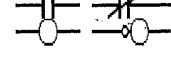
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0705.3		TWIN ARM STOP/TOOL CLAMP DELAY	
		S000468/N00091 S000487/N00092 S005962/N01012	
		S000711/N00129	
R0705.4		LUB. OIL LACK CHECK	
		S001995/N00449 S002017/N00453	
		S001763/N00388	
R0705.5		SPINDLE COOLING RUN CHECK	
		S006889/N01138	
		S001769/N00389	
R0705.6		TOOL BROKEN L/S	
		S005862/N00993 S005866/N00994 S005867/N00994	
		S001771/N00390	
R0706.0		STANDARD MOTOR O/L	
		S006897/N01140	
		S001773/N00391	
R0706.2		AUTO DOOR OPEN L/S	
		S003692/N00713 S006324/N01068	
		S001775/N00392	
R0706.3		AUTO DOOR CLOSE L/S	
		S003695/N00713 S003956/N00734 S006337/N01069	
		S001777/N00393	
R0706.4		MAGAZINE INDEX PIN IN	
		S004217/N00770 S004269/N00775 S005789/N00984 S005803/N00985 S005809/N00986	
		S005822/N00986 S005828/N00986	
		S001786/N00394	
R0706.5		MAGAZINE INDEX PIN OUT	
		S001788/N00395	
R0706.6		HYD.OIL CONFIRM CHECK	
		S001904/N00429	
		S001790/N00396	
R0707.0		COOLANT PUMP OVERLOAD	
		S006999/N01153	
		S001792/N00397	
R0707.1		TOOL PUSHER BACK CHECK	
		S004457/N00807	
		S001795/N00398	
R0707.3		HYD.OIL LOW DELAY	
		S006568/N01100	
R0707.7		AC 100V TRIP	
		S006886/N01137	
		S001797/N00399	
R0708.1		WEEKLY TIMER WARM UP	
		S006216/N01050	
R0708.2		STD.COOLANT OVERLOAD	
		S003989/N00739 S004011/N00742 S006853/N01135	
		S001799/N00400	
R0708.3		ATC CAM UNIT ALARM CHECK	
		S007362/N01197	
		S001801/N00401	
R0708.4		APC CHANGER INVERTER ALARM	
		S001803/N00402	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0708.5	SPEMG 	SPINDLE EMG.STOP S001813/N00403 S003317/N00673 S001816/N00403	
R0709.4	SPSCH 	SP. SPEED CHECK S002533/N00549 S003592/N00711 S001818/N00404	
R0709.5	SPSZR 	SP. SPEED ZERO S003132/N00642 S003187/N00652 S003195/N00653 S003605/N00711 S005521/N00711 S001820/N00405	
R0709.6	SPARM 	SP. ALARM S006993/N01152 S001822/N00406	
R0709.7	SPORF 	SP. ORI. FINISH S002941/N00623 S002961/N00625 S002991/N00629 S005520/N00949 S005527/N00949 S001824/N00407	
R0710.0	PLTCWL 	APC PALLET TURN CW L/S S006537/N01093 S006540/N01094 S001826/N00408	
R0710.1	PTCCWL 	APC PALLET TURN CCW L/S S006538/N01093 S006541/N01094 S001828/N00409	
R0710.2	ASUPLS 	APC ARM SLOW UP L/S S006713/N01112 S007476/N01227 S001830/N00410	
R0710.3	ASDNL3 	APC ARM SLOW DOWN L/S S006714/N01112 S006739/N01115 S007528/N01239 S001832/N00411	
R0710.4	PAHULS 	PALLET ROTATING ARM UP L/S S006531/N01091 S006534/N01092 S001834/N00412	
R0710.5	PAHDLS 	PALLET ROTATING ARM DOWN L/S S006457/N01075 S006532/N01091 S006535/N01092 S007503/N01233 S001836/N00413	
R0710.6	ASDCW 	APC ARM SLOW DOWN CW L/S S006726/N01113 S001838/N00414	
R0710.7	ASDCCW 	APC ARM SLOW DOWN CCW L/S S006724/N01113 S001840/N00415	
R0711.0	AIRPRE 	AIR PRESSURE SW S006824/N01130 S001843/N00416	
R0711.1	MMAGIF 	MANUAL MAGAZINE INDEX FORWARD S000116/N00020 S000127/N00023 S000162/N00030 S002651/N00568 S004235/N00568 S004245/N00773 S004274/N00776 S007287/N01190 S007326/N01193 S001848/N00417	
R0711.2	MMAGIR 	MANUAL MAGAZINE INDEX REVERSE S000117/N00020 S000128/N00023 S000170/N00031 S002652/N00568 S004232/N00568 S004249/N00773 S004275/N00776 S007288/N01190 S007327/N01193 S001853/N00418	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0712.4		B-ZRNAT S001856/N00419 S001860/N00419	B-AXIS ZRN AUTO START S002472/N00541 S002484/N00541 S006404/N01073
R0713.7		AZRNSW S002336/N00526 S001866/N00421	AUTO ZERO RETURN START SW
R0714.0		FEDSW1 S002171/N00496	FEED RATE 1
R0714.1		FEDSW2 S002177/N00497	FEED RATE 2
R0714.2		FEDSW4 S002183/N00498	FEED RATE 4
R0714.3		FEDSW8 S002189/N00499	FEED RATE 8
R0714.4		FESW16 S002195/N00500	FEED RATE 16
R0717.7		OPMDLS S006594/N01102 S001874/N00422	OPRATOR MANUAL DOOR L/S S006647/N01108 S006687/N01110 S006708/N01111
R0718.0		FLSCON S001877/N00423 S001883/N00423	FLUSHING COOLANT ON S001879/N00423 S001885/N00424 S004008/N00742
R0718.1		FLSCOF S004013/N00743 S001886/N00424	FLUSHING COOLANT OFF
R0718.2		ATDOS S006321/N01068	AUTO DOOR OPEN SW
R0718.3		ATDCS S006334/N01069	AUTO DOOR CLOSE SW
R0718.6		TCFOSP S006923/N01143 S001894/N00425	THROUGH COOLANT FILTER O/S P/S
R0718.7		SAMGSD S000037/N00007 S000193/N00036 S0003763/N00715 S0004222/N00771 S0004619/N00840 S0004678/N00840 S0004688/N00841 S0004698/N00842 S0005278/N00919 S0005278/N00919 S0005330/N00924 S0005334/N00924 S0005345/N00925 S0005385/N00931 S0005392/N00931 S0005758/N00982 S0005811/N00985 S0005830/N00986 S0006009/N01016 S0006011/N01016 S0006016/N01017 S0006018/N01017 S0006868/N01136 S0007328/N00426 S001896/N00426	SINGLE ARM MAGAZINE SIDE
R0719.1		SASPSD S000038/N00007 S000194/N00036 S000384/N00078 S000393/N00079 S000449/N000771 S0003765/N00715 S0004221/N00771 S0004440/N00804 S0004640/N00835 S0005075/N00919 S0005272/N00919 S0005279/N00919 S0005293/N00920 S0005305/N00921 S0005320/N00926 S0005353/N00926 S0005361/N00927 S0005368/N00928 S0005464/N00939 S0005538/N00953 S0005546/N00953 S0005725/N00980 S0005739/N00981 S0005776/N00983 S0005812/N00986 S0005831/N00986 S0005919/N01004 S0006010/N01016 S0006012/N01016 S0006017/N01017 S0006019/N01017 S0006846/N01134 S0006866/N01136 S0006869/N01136 S0006875/N01162 S0007068/N01162 S0007204/N01179 S0007329/N01193 S0007338/N01194 S001898/N00427	SINGLE ARM SPINDLE SIDE
R0719.2		APCPOEC S006528/N01090 S001903/N00428	APC PALLET ORIGIN/EXIST CHECK S006560/N01099 S006640/N01108

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0719.4	HYDCT	HYD.OIL CONFIRM CHECK TIME	
	S000341/N00065	S007195/N01177	
	S001909/N00429		
R0719.6	APCLOC	APC PALLET LOCK CHECK L/S	
	S006529/N01090	S006562/N01099 S006641/N01108 S006657/N01109	
	S001911/N00430		
R0720.0	MAITSW	MAINTENANCE SW	
	S002483/N00541	S002502/N00542 S003702/N00713 S003706/N00713 S003710/N00713	
	S003714/N00713	S003739/N00714 S003767/N00715 S003776/N00715 S003812/N00715	
	S003815/N00717	S003821/N00717 S003915/N00731 S003950/N00734 S004097/N00734	
	S004312/N00782	S004621/N00831 S004649/N00835 S004673/N00840 S004685/N00840	
	S004695/N00842	S005723/N00980 S005737/N00981 S005750/N00982 S005768/N00982	
	S006359/N01072	S006362/N01072 S006374/N01072 S006389/N01073 S006400/N01073	
	S006406/N01073	S006426/N01074 S006431/N01074 S006453/N01075 S006465/N01075	
	S006592/N01102	S006639/N01108 S006656/N01109 S006673/N01110 S006675/N01110	
	S006694/N01111	S006696/N01111 S007029/N01157 S007047/N01159 S007100/N01159	
	S007200/N01178	S007306/N01191 S007319/N01192 S007342/N01194 S007357/N01194	
	S007548/N01246		
	S001914/N00431		
R0720.1	BAXISW	B - AXIS ADJUST SW	
	S002737/N00584	S002744/N00585 S002748/N00586	
	S001916/N00432		
R0720.3	LPSPS	LUB.PRESSURE SHORTAGE P/S	
	S006830/N01132	S007263/N01187	
	S001923/N00433		
R0720.4	APCSTS	APC STANDBY SW	
	S006543/N01095		
	S001925/N00434		
R0720.5	ATCDON	ATC DOOR OPEN L/S	
	S000477/N00091	S000494/N00092 S003789/N00716 S005545/N00953 S005580/N00953	
	S001928/N00435		
R0720.6	ATCDCS	ATC DOOR CLOSE L/S	
	S003226/N00658	S003792/N00716 S003936/N00734 S004088/N00753 S005113/N00753	
	S001931/N00436		
R0720.7	TBLUL	TABLE UNCLAMP L/S	
	S003253/N00664	S003259/N00665 S003302/N00673 S003310/N00673 S006395/N00673	
	S001939/N00437		
R0721.0	TBCLLS	TABLE CLAMP L/S	
	S003254/N00664	S003258/N00665 S003309/N00673 S006364/N01072	
	S001947/N00438		
R0721.1	PLUCL	PALLET UNCLAMP L/S	
	S003786/N00716	S003810/N00717 S006460/N01075 S006597/N01103 S006776/N01103	
	S006810/N01127		
	S001951/N00439		
R0721.2	PLCLL	PALLET CLAMP L/S	
	S003301/N00673	S003782/N00716 S003808/N00717 S006436/N01074 S006816/N01074	
	S007241/N01184	S007520/N01238 S007523/N01238	
	S001955/N00440		
R0722.0	TUNCAA	TOOL UNCLAMP AUX.	
	S005976/N01012	S005995/N01013 S007460/N01223 S007464/N01224	
	S005998/N01013		
R0722.1	NTUNCA	NOT TOOL UNCLAMP AUX.	
	S005965/N01012		
	S006003/N01014		

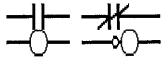
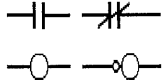
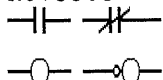
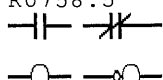
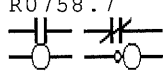
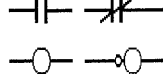
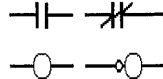
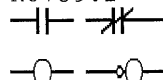
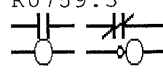
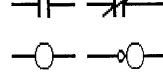
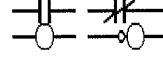
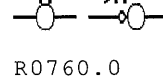
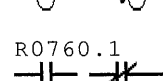
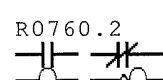

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0722.2	NTCLAA 	NOT TOOL CLAMP AUX.	
	S005983/N01013		
	S006008/N01015		
R0723.0	FLK 	FLICKER	
	S001961/N00442	S001985/N00447	S002149/N00492 S006283/N01061 S007405/N01210
	S007411/N01211	S007414/N01211	S007421/N01212 S007600/N01259 S007606/N01260
	S007638/N01269	S007644/N01270	S007650/N01271 S007656/N01272 S007662/N01273
	S007668/N01274	S007674/N01275	S007682/N01276 S007693/N01277 S007698/N01278
	S007703/N01279	S007712/N01281	S007717/N01282
	S001960/N00441		
R0723.1	FLKAX 	FLICKER AUX	
	S001956/N00441		
	S001965/N00442		
R0723.3	TBUNCLM 	TABLE UNCLAMP MEMORY	
	S006345/N01070	S006350/N01071	
	S006347/N01070		
R0725.0	STYDR2 	STANDBY DR2	
	S001972/N00444	S001974/N00445	S001984/N00447 S002164/N00495 S005483/N01061
	S005601/N00963	S006204/N01050	
	S001969/N00443		
R0725.1	YBRKDR 	Y-AXIS BRAKE OFF	
	S000010/N00002	S000113/N00019	S000368/N00075 S001978/N00446 S001998/N01061
	S001973/N00444		
R0725.2	INITL 	INTIALING	
	S001977/N00445		
R0725.3	INSTM 	INITIAL SET TIMING	
	S000178/N00033	S001975/N00445	S001983/N00447 S003868/N00724 S004761/N01061
	S005696/N00978	S005713/N00979	S005726/N00980 S005757/N00982 S005775/N01061
	S005788/N00984	S005973/N01012	S005991/N01013 S006208/N01050 S006286/N01061
	S006305/N01065	S006323/N01068	S006336/N01069 S006365/N01072 S006396/N01073
	S006438/N01074	S006461/N01075	S006662/N01109 S006681/N01110 S006702/N01111
	S006732/N01114	S006741/N01115	S006826/N01130 S006854/N01135 S006890/N01136
	S006898/N01140	S006994/N01152	S007000/N01153 S007006/N01154 S007346/N01061
	S007363/N01197	S007478/N01227	
	S001982/N00446		
R0725.4	STYBIN 	STANDBY INDICATION	
	S007770/N01298		
	S001987/N00447		
R0726.0	LUBSTM 	LUB. START MG.	
	S002009/N00451	S002022/N00454	S007383/N01201
	S002000/N00449		
R0726.1	LUB_PS 	LUB. PAUSE	
	S001994/N00449	S002004/N00450	S002013/N00452 S002026/N00455 S003147/N01061
	S002008/N00450		
R0726.2	LUBONT 	LUB. ON TIME	
	S002001/N00450		
	S002012/N00451		
R0726.3	LUBPST 	LUB. PAUSE TIME	
	S002002/N00450		
	S002016/N00452		
R0726.6	M35BPM 	M35 BYPASS MODE ON	
	S001990/N00448	S002968/N00626	
	S001993/N00448		

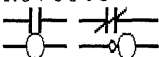
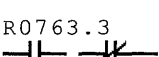
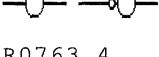
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0726.7	LUBLKC 	LUB. LACK CHECK	
	S006837/N01133 S002021/N00453		
R0727.0	LPOCDT 	LUB.PRESSURE ON CHECK DELAY	
	S006831/N01132 S002025/N00454		
R0727.1	LPOFCD 	LUB.PRESSURE OFF CHECK DELAY	
	S007264/N01187 S002029/N00455		
R0728.0	JOGMD 	JOG MODE	
	S000143/N00026 S002485/N00541 S007572/N01252 S002035/N00458	S002074/N00466 S002503/N00542 S007577/N01253	S002078/N00467 S003335/N00676 S007582/N01254 S002088/N00469 S006371/N01072 S002152/N00465 S006405/N00466
R0728.1	REMHL D 	REMOTE HANDLE MODE	
	S001016/N00242 S001069/N00247 S002040/N00459	S001028/N00243 S001389/N00307	S001039/N00244 S002041/N00460 S001049/N00245 S002070/N00465 S001059/N00466
R0728.2	HANDLM 	HANDLE MODE	
	S001017/N00242 S002089/N00469 S002061/N00460	S001029/N00243 S003296/N00673	S001091/N00249 S003333/N00676 S001100/N00250 S007752/N01293 S001129/N00466
R0728.3	MDIM D 	MDI MODE	
	S003329/N00675 S005966/N01012 S002063/N00461	S003345/N00677 S005984/N01013	S003904/N00730 S007110/N01167 S005596/N00963 S007587/N01255 S005606/N00466
R0728.4	EDITMD 	EDIT MODE	
	S000147/N00027 S002065/N00462	S002079/N00467	S002084/N00468 S007590/N01256
R0728.5	MEMOMD 	MEMORY MODE	
	S002080/N00467 S006569/N01100 S002067/N00463	S002612/N00563 S006571/N01100	S003331/N00675 S007370/N01199 S004121/N00759 S007593/N01257 S006231/N00466
R0728.6	TAPEMD 	TAPE MODE	
	S002081/N00467 S007371/N01199 S002069/N00464	S002093/N00470	S002613/N00563 S003330/N00675 S003882/N00466
R0729.0	TCHINH 	TEACH IN HANDLE MODE	
	S002082/N00467 S002073/N00465	S002085/N00468	S002090/N00469
R0729.1	TCHINJ 	TEACH IN JOG MODE	
	S002086/N00468 S002077/N00466	S002091/N00469	
R0729.2	PRGSTL 	PROGRAM START LAMP	
	S006476/N01077 S002132/N00486	S007763/N01296	
R0729.3	FDHLDL 	FEED HOLD LAMP	
	S007767/N01297 S002134/N00487		
R0729.4	XZRNL 	X ZERO RETURN LAMP	
	S007743/N01290 S002136/N00488		

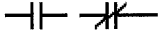



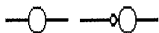

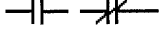




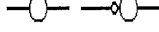
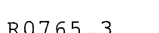


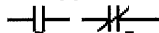
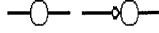
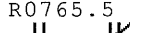

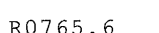
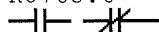


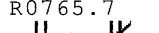
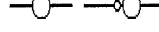
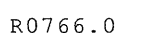
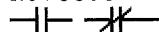

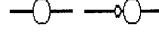
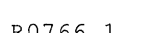
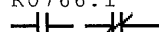

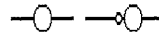

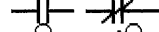
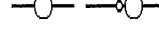
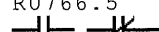
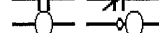

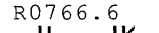
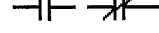

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0729.5	YZRNL 	Y ZERO RETURN LAMP	
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	S002138/N00489		
R0729.6	ZZRNL 	Z ZERO RETURN LAMP	
	S007740/N01289		
	S002140/N00490		
R0729.7	4ZRNL 	4TH ZERO RETURN LAMP	
	S007737/N01288		
	S002142/N00491		
R0730.5	DRNLP 	DRY RUN LAMP	
	S007616/N01262		
	S002151/N00492		
R0730.6	MNFED 	MANUAL FEED	
	S002167/N00496	S002173/N00497	S002179/N00498 S002185/N00499 S002191/N00495
	S002210/N00503	S002218/N00504	S002224/N00505
	S002157/N00493		
R0730.7	ATFED 	AUTO FEED	
	S002163/N00495	S002169/N00496	S002175/N00497 S002181/N00498 S002187/N00495
	S002193/N00500	S002228/N00506	
	S002161/N00494		
R0731.0	HANSLO 	HANDLE SELECT OFF	
	S002399/N00535	S002411/N00536	S002424/N00537 S002436/N00538 S002448/N00539
	S002461/N00540	S002474/N00541	S002493/N00542
	S002254/N00515		
R0731.1	HANS LX 	HANDLE SELECT X AXIS	
	S002402/N00535	S002414/N00536	S002733/N00584
	S002262/N00516		
R0731.2	HANS LY 	HANDLE SELECT Y AXIS	
	S002427/N00537	S002439/N00538	S002741/N00585 S002754/N00587
	S002270/N00517		
R0731.3	HANS LZ 	HANDLE SELECT Z AXIS	
	S002451/N00539	S002464/N00540	S002734/N00584 S002742/N00585 S002757/N00587
	S002278/N00518		
R0731.4	HANS L4 	HANDLE SELECT 4 AXIS	
	S002477/N00541	S002496/N00542	S002750/N00586
	S002283/N00519		
R0731.5	HANMX1 	HANDLE MULTIPLY X1	
	S002761/N00589	S002764/N00590	
	S002292/N00520		
R0731.6	HANM10 	HANDLE MULTIPLY X10	
	S002762/N00589		
	S002301/N00521		
R0731.7	HAN100 	HANDLE MULTIPLY X100	
	S002765/N00590		
	S002310/N00522		
R0732.0	REMRAM 	REMOTE RAPID MODE	
	S001018/N00242	S001030/N00243	S001040/N00244 S001050/N00245 S001060/N00246
	S001070/N00247	S001080/N00248	S001101/N00250 S001142/N00259 S001153/N00260
	S001160/N00262	S002042/N00460	S002400/N00535 S002412/N00536 S002425/N00537
	S002437/N00538	S002449/N00539	S002462/N00540 S002475/N00541 S002494/N00542
	S002319/N00523		

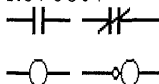
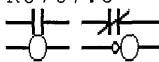
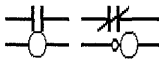
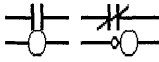
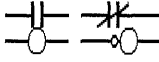
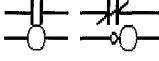
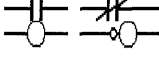
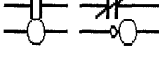
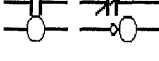
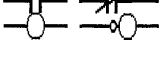
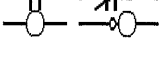
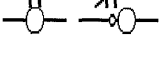
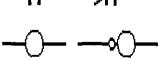
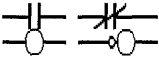
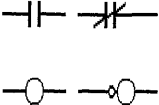
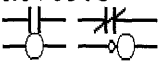
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0732.1	REMJOB	REMOTE JOG MODE	
	S001031/N00243	S001081/N00248	S001102/N00250 S001143/N00259 S001159/N00260
	S002043/N00460	S002401/N00535	S002413/N00536 S002426/N00537 S002438/N00539
	S002450/N00539	S002463/N00540	S002476/N00541 S002495/N00542
	S002328/N00524		
R0733.4	DRNDLY	DRN RUN SW DELAY	
	S002510/N00543		
	S002335/N00525		
R0736.2	M49TAP	M49 TAP	
	S002783/N00593	S002822/N00602	
	S002785/N00593		
R0736.3	G84TAP	G84 TAP	
	S002788/N00594	S002823/N00602	
	S002792/N00594		
R0743.3	NOGCH	NO GEAR CHANGE	
	S002848/N00606	S002853/N00607	
	S002825/N00602		
R0752.0	P.SLSM	SP.LOW SIDE SELECT MEMORY	
	S002828/N00604	S002835/N00605	S002862/N00609
	S002827/N00603		
R0752.1	SPCHLO	SPINDLE COIL CHANGE LOW	
	S002831/N00604	S002839/N00605	S002842/N00606 S002851/N00607
	S002834/N00604		
R0752.2	SPCHHI	SPINDLE COIL CHANGE HIGH	
	S002832/N00604	S002838/N00605	S002843/N00606 S002852/N00607
	S002841/N00605		
R0752.3	SPLCOM	SP.COIL CHANGE LOW COM.	
	S002845/N00606	S007396/N01207	S007399/N01208
	S002850/N00606		
R0752.4	SPHCOM	SP.COIL CHANGE HIGH COM.	
	S002872/N00611	S007397/N01207	S007400/N01208
	S002855/N00607		
R0752.5	MSPOFC	MSPL OFF CHECK	
	S002847/N00606	S002857/N00608	S002863/N00609 S002873/N00611
	S002861/N00608		
R0753.2	TLCLCH	TOOL CLAMP CHECK	
	S002917/N00619	S006941/N01146	S006957/N01148
	S002913/N00618		
R0753.3	SPROCN	SP. ROTATE CONDITION	
	S003001/N00632		
	S002918/N00619		
R0753.4	GRCHFI	GEAR CHANGE FINISH	
	S002903/N00616	S002934/N00622	S002954/N00623 S003223/N00657 S003441/N00658
	S002936/N00622		
R0753.5	GCHCOM	GEAR CHANGE COMMAND	
	S002933/N00622	S002964/N00625	S003047/N00636 S003440/N00687
	S002955/N00623		
R0753.6	GCHCMA	GEAR CHANGE COMMAND AUX.	
	S002901/N00616	S002906/N00617	S003204/N00655 S003216/N00656
R0754.6	LOGRCH	SP. LOW GEAR	
	S002925/N00621		
	S002922/N00620		

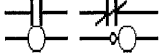
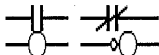
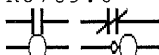
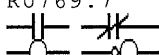
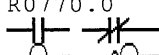
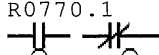
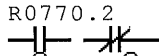
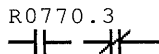
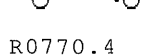
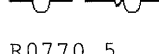
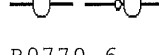
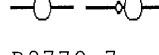
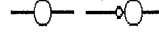
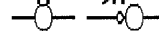
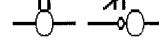
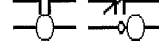
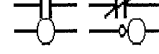
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0754.7	HIGRCH 	SP. HIGH GEAR	
		S002921/N00620	
		S002926/N00621	
R0755.0	TBLULD 	TABLE UNCLAMP DELAY	
		S002488/N00541	S002506/N00542 S003322/N00674 S003823/N00717
		S003257/N00664	
R0755.1	TBLCLD 	TABLE CLAMP DELAY	
		S003251/N00663	S003325/N00674 S003817/N00717
		S003262/N00665	
R0755.2	PALCLD 	PALLET CLAMP DELAY	
		S006433/N01074	
		S003266/N00666	
R0755.3	ABAMCD 	AFTER B MOVING, TABLE CLAMP DEL	
		S006356/N01072	
		S006353/N01071	
R0755.5	GRCH 	GEAR CHANGE START	
		S003442/N00687	
R0756.0	GCHAL 	GEAR CHANGE ALARM	
		S006245/N01055	
R0756.1	SFMEM 	S-FUNCTION MEMORY	
		S002952/N00623	S002958/N00624 S003043/N00636 S006927/N01144
		S002960/N00624	
R0756.3	LOGR 	LOW GEAR	
		S002919/N00620	S002924/N00621
R0756.4	HIGR 	HIGH GEAR	
		S002920/N00620	S002923/N00621
R0756.5	ORTPOS 	ORIENTATION POSITION	
		S002962/N00625	S002987/N00628 S002990/N00629 S003006/N00633 S003023/N00634
		S006909/N01141	S006917/N01142
		S002965/N00625	
R0756.6	ORTCOM 	ORIENTATION COMMAND	
		S002907/N00617	S002931/N00622 S002939/N00623 S002972/N00626 S002982/N00627
		S003003/N00633	S003029/N00634 S003130/N00642 S003272/N00669 S003662/N00670
		S006903/N01141	S006914/N01142
		S002979/N00626	
R0756.7	ORTCM1 	ORIENTATION COMMAND 1	
		S002908/N00617	S002932/N00622 S002940/N00623 S002984/N00628 S003012/N00629
		S003020/N00634	S003131/N00642 S003273/N00669 S003660/N00713 S006904/N01141
		S006915/N01142	
		S002981/N00627	
R0757.0	ORTFIN 	ORIENTATION FINISH	
		S002973/N00626	S003664/N00713 S006176/N01042
		S002989/N00628	
R0757.1	ORTCHK 	ORIENTATION CHECK	
		S002993/N00630	
		S002992/N00629	
R0757.2	ORTFIT 	ORIENTATION FINISH TIME	
		S002988/N00628	
		S002996/N00630	
R0758.0	ORTAL 	ORIENTATION ALARM	
		S003011/N00633	S003028/N00634 S006244/N01055
		S003000/N00631	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0758.1	ORTCND 	ORIENTATION CONDITION S003008/N00633 S003025/N00634 S003002/N00632	
R0758.2	ATCORT 	ATC ORIENTATION S002927/N00622 S002944/N00623 S002983/N00628 S003004/N00633 S003009/N00634 S003022/N00634 S003201/N00654 S007255/N01186 S003019/N00633	
R0758.3	MEAORT 	MEASUREMENT ORT. S002928/N00622 S002945/N00623 S002985/N00628 S003005/N00633 S003021/N00634 S003026/N00634 S003202/N00654 S007256/N01186 S003035/N00634	
R0758.5	SPATAM 	SP. START AUTO MODE S001808/N00403 S002947/N00623 S003013/N00633 S003030/N00634 S004115/N00635 S006926/N01144 S006933/N01145 S006939/N01146 S007254/N01186 S003040/N00635	
R0758.7	SPRTCND 	SPINDLE ROTATION CONDITION S003068/N00638 S003082/N00639 S003053/N00636	
R0759.0	SPSTMM 	SP. START MAN. MODE S001809/N00403 S003014/N00633 S003031/N00634 S003060/N00638 S003075/N00639 S003655/N00713 S003657/N00713 S004116/N00759 S006940/N01146 S003057/N00637	
R0759.1	SPCWCM 	SP. CW COMMAND S001810/N00403 S003066/N00638 S003079/N00639 S003103/N00641 S003134/N00642 S003189/N00652 S006948/N01147 S007117/N01168 S007612/N01261 S003072/N00638	
R0759.2	SPCCWC 	SP. CCW COMMAND S001811/N00403 S003065/N00638 S003080/N00639 S003104/N00641 S003135/N00642 S003197/N00653 S006949/N01147 S007613/N01261 S003086/N00639	
R0759.3	SPSPCM 	SP. STOP COMMAND S002623/N00563 S003113/N00641 S004135/N00760 S003102/N00640	
R0759.4	SPROT 	SP. ROTATING S002782/N00593 S002790/N00594 S002938/N00623 S002974/N00626 S003064/N00639 S003078/N00639 S003106/N00641 S006955/N01148 S003120/N00641	
R0759.6	MEAAABF 	MEASURE AIR BLOW OFF S003139/N00643 S003133/N00642	
R0759.7	MEABON 	MEASURE AIR BLOW ON S003092/N00640 S003137/N00643 S006977/N01150 S006985/N01151 S003140/N00643	
R0760.0	SPSTOFT 	SP. STOP TIME CHECK S003156/N00648 S003146/N00644	
R0760.1	LUBOTC 	LUB. OFF TIME CHECK S003151/N00646 S003154/N00647 S003150/N00645	
R0760.2	SLLSOA1 	SP.LINE LUB.SUPPLY OFF ACT. 1 S003157/N00648 S003153/N00646	

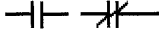
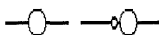
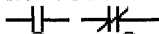

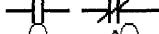

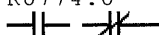

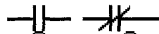


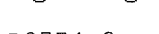
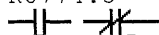
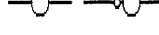

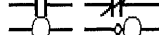
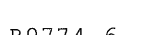
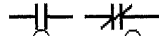

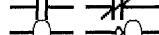
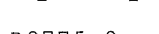
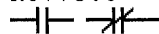



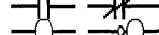
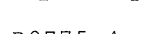
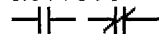
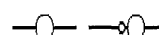
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0760.3		SP.LINE LUB.SUPPLY OFF ACT.AUX	
	S003152/N00646		
	S003155/N00647		
R0760.4		SP.LINE AIR/LUB.SUPPLY OFF	
	S003158/N00648	S003163/N00649	S007472/N01226
	S003160/N00648		
R0760.5		LUB. MOTOR ON 1 START	
	S002007/N00450	S003159/N00648	
	S003165/N00649		
R0763.0		SP. ALARM AUX	
	S003175/N00651		
	S003174/N00650		
R0763.1		SP. ALARM	
	S002618/N00563	S003050/N00636	S003190/N00652 S003198/N00653 S006246/N00651
	S003184/N00651		
R0763.2		SP. CW ROTATION	
	S003188/N00652	S003205/N00655	S003217/N00656 S003585/N00711 S003603/N00652
	S005854/N00991	S006964/N01149	S006975/N01150 S006982/N01151
	S003192/N00652		
R0763.3		SP. CCW ROTATION	
	S003196/N00653	S003208/N00655	S003213/N00656 S003590/N00711 S003604/N00653
	S005855/N00991	S006965/N01149	S006976/N01150 S006983/N01151
	S003200/N00653		
R0763.4		ORIENTATION SP. UNIT	
	S002963/N00625	S005525/N00949	S006491/N01080
	S003203/N00654		
R0763.5		SP. CW SP.UNIT	
	S003244/N00661	S006483/N01078	S006485/N01079
	S003212/N00655		
R0763.6		SP. CCW SP.UNIT	
	S003245/N00661	S006482/N01078	S006486/N01079
	S003221/N00656		
R0763.7		SPINDLE ROTATION	
	S004187/N00766	S005598/N00963	
	S003246/N00661		
R0764.0		INTERLOCK RELEASE	
	S003318/N00673		
	S003276/N00669		
R0764.1		ATC DOOR LOCK RELEASE S/W 1	
	S003278/N00670	S003281/N00671	S003285/N00672 S003287/N00672
	S003279/N00670		
R0764.2		ATC DOOR LOCK RELEASE S/W 2	
	S003282/N00671		
	S003284/N00671		
R0764.3		ATC DOOR LOCK RELEASE ON	
	S003286/N00672	S003288/N00672	
	S003290/N00672		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0765.0	AUTOMD	AUTO MODE	
	S000145/N00027	S000149/N00028	S002153/N00493 S002158/N00494 S002596/N00675
	S002642/N00567	S002660/N00570	S003237/N00659 S003334/N00676 S003383/N00677
	S003698/N00713	S004016/N00743	S004144/N00760 S004204/N00768 S005690/N00769
	S005707/N00979	S006207/N01050	S006210/N01050 S006302/N01065 S006318/N01066
	S006331/N01069	S006360/N01072	S006425/N01074 S006452/N01075 S006636/N01076
	S003332/N00675		
R0765.1	MANMD	MANUAL MODE	
	S000005/N00002	S000107/N00018	S000146/N00027 S000150/N00028 S001229/N00029
	S001259/N00280	S002059/N00460	S002317/N00523 S002326/N00524 S002950/N00525
	S003042/N00636	S003056/N00637	S003275/N00669 S004137/N00760 S004223/N00761
	S004447/N00806	S005792/N00984	S005848/N00990 S005852/N00991 S005970/N00992
	S005988/N01013	S006242/N01055	S006320/N01068 S006333/N01069 S007289/N01070
	S007330/N01193	S007466/N01224	S007569/N01251
	S003338/N00676		
R0765.3	CYLSTA	CYCLE START AUX	
	S003355/N00678	S003366/N00679	S003832/N00720
	S003352/N00677		
R0765.4	CYLSTM	CYCLE START TIME	
	S003354/N00678		
	S003370/N00679		
R0765.5	FDHME	FEED HOLD MEMORY	
	S003378/N00680	S003387/N00681	S006593/N01102
	S003382/N00680		
R0765.6	CYLOP	CYCLE OPERATING	
	S001996/N00449	S003110/N00641	S003126/N00642 S003400/N00682 S003404/N00683
	S003864/N00724	S003881/N00725	S003922/N00733 S003931/N00734 S003934/N00735
	S003402/N00682		
R0765.7	CYLDTM	CYCLE DELAY TIME	
	S003399/N00682		
	S003408/N00683		
R0766.0	TFDLY	T FUNCTION DELAY	
	S003422/N00686	S003429/N00686	S003439/N00687 S003455/N00691 S003842/N00692
	S003909/N00731	S004308/N00782	S004329/N00786 S004343/N00788 S005421/N00789
	S005431/N00934	S005490/N00943	S005948/N01009 S006879/N01136 S007138/N01137
	S003414/N00684		
R0766.1	M06DLY	M06 FUNCTION DELAY	
	S002970/N00626	S003088/N00640	S003123/N00642 S003622/N00712 S004087/N00713
	S005586/N00960	S007069/N01162	S007077/N01163 S007083/N01164 S007090/N01165
	S007130/N01170	S007257/N01186	
	S003565/N00710		
R0766.4	MFDLTM	F-FUNC. DELAY TIME	
	S003446/N00688		
	S003445/N00687		
R0766.5	MFDTM	M-FUNC. DELAY TIME	
	S003186/N00652	S003194/N00653	S003466/N00693
	S003450/N00688		
R0766.6	MFDDL	M-FUNC. DELAY	
	S003470/N00695	S003476/N00696	S003482/N00697 S003488/N00698 S003494/N00699
	S003500/N00700	S003506/N00701	S003512/N00702 S003518/N00703 S003524/N00704
	S003530/N00705	S003536/N00706	S003542/N00707 S003548/N00708 S003554/N00709
	S003903/N00730	S003913/N00731	S004320/N00784 S004344/N00788 S005872/N00789
	S005880/N00996	S005889/N00998	S005896/N00999
	S003452/N00689		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0766.7	SFDL 	S-FUNC. DELAY	S002780/N00593 S002786/N00594 S002937/N00623 S002956/N00624 S003185/N00625 S003193/N00653 S003465/N00693 S006928/N01144 S003454/N00690
R0767.0	TFDL 	T-FUNC. DELAY	S007072/N01162 S003456/N00691
R0767.1	MFFIN 	M-FUNC. FINISH	S003424/N00686 S003464/N00692
R0767.2	SFFIN 	S-FUNC. FINISH	S003427/N00686 S003467/N00693
R0767.3	TFINS 	T-FUNC. FINISH	S003430/N00686 S003469/N00694
R0768.0	MFINA1 	M FINISH AUX 1	S003457/N00692 S003621/N00711
R0768.1	MFINA2 	M FINISH AUX 2	S003458/N00692 S003653/N00712
R0768.2	MFINA3 	M FINISH AUX 3	S003459/N00692 S003716/N00713
R0768.3	MFINA4 	M FINISH AUX 4	S003460/N00692 S003761/N00714
R0768.4	MFINA5 	M FINISH AUX 5	S003461/N00692 S003778/N00715
R0768.5	MFINA6 	M FINISH AUX 6	S003462/N00692 S003806/N00716
R0768.6	MFINA7 	M FINISH AUX 7	S003463/N00692 S003825/N00717
R0769.0	PRGSP 	PROGRAM STOP	S003362/N00678 S003389/N00681 S003567/N00711 S003569/N00711 S003833/N00712 S003855/N00722 S003920/N00733 S003930/N00734 S003839/N00720
R0769.1	PRGEND 	PROGRAM END	S003849/N00721 S003856/N00722 S003933/N00734 S004132/N00760 S003854/N00721
R0769.2	PRGSPE 	PROGRAM STOP END	S001543/N00335 S001561/N00339 S001581/N00343 S001601/N00347 S001634/N00351 S003109/N00641 S003125/N00642 S003858/N00723 S006292/N01063 S006299/N01064 S007415/N01211 S003857/N00722
R0769.3	PRGSPL 	PROGRAM STOP LAMP	S003827/N00718 S003830/N00719 S003893/N00728 S007728/N01285 S003859/N00723

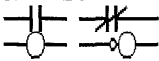
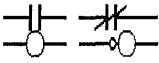
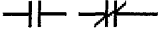
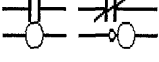
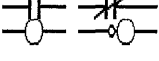
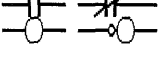
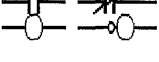
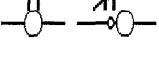
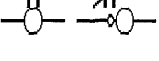
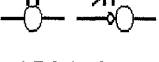
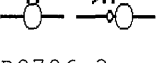
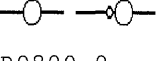
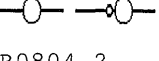
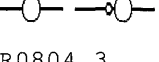
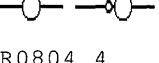
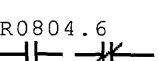

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0769.4		APOFCM AUTO POWER OFF COMMAND	S003863/N00724 S003869/N00724 S003880/N00725 S003872/N00724
R0769.5		APOHO AUTO POWER HYD. OFF	S000339/N00065 S003878/N00725 S003885/N00726 S003884/N00725
R0769.6		APOTM AUTO POWER OFF TIME	S003889/N00727 S003888/N00726
R0769.7		APODR AUTO POWER OFF DR	S007540/N01244 S003890/N00727
R0770.0		MREST RESET M CODE	S003896/N00728 S003900/N00729 S003898/N00728
R0770.1		RST1 RESET BUTTON	S003850/N00721 S003901/N00729
R0770.2		MAINM MAINTENANCE M-MODE ON	S001913/N00431 S003756/N00714 S003759/N00714 S003905/N00730 S003908/N00730
R0770.3		M06ATC ATC M06	S003564/N00710 S003912/N00731 S004319/N00784 S004615/N00830 S005963/N00731 S005981/N01013 S007285/N01190 S003916/N00731
R0770.4		COOFCN COOLANT OFF CONDITION	S003923/N00733 S003919/N00732
R0770.5		COOP COOLANT OPERATING	S003925/N00733 S003983/N00738 S003986/N00739 S004023/N00744 S004026/N00733 S003929/N00733
R0770.6		COOSP COOLANT STOP	S003996/N00740 S004033/N00746 S004066/N00751 S003963/N00734
R0770.7		COON1P FLOOD COOLNAT ON 1 PLUSE	S004112/N00759 S004102/N00756
R0771.0		APCGN1 APC GUN COOLANT S/W 1	S003968/N00736 S003972/N00737 S003974/N00737 S003966/N00735
R0771.1		APCGN2 APC GUN COOLANT S/W 2	S003965/N00735 S003969/N00736 S003971/N00736
R0771.2		APCGNO APC GUN COOLANT ON	S003973/N00737 S003975/N00737 S004039/N00747 S003977/N00737
R0771.3		TCON1P THROUGH COOLNAT ON 1 PLUSE	S004113/N00759 S004106/N00757
R0771.4		COOPR COOLANT PAUSE RELEASE	S003982/N00738 S003987/N00739 S003985/N00738

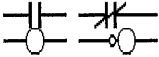
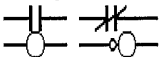
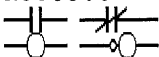
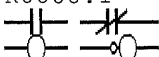
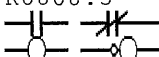
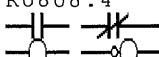
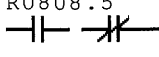
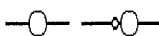
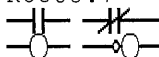
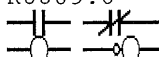
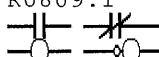
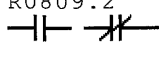
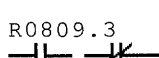
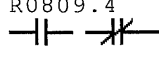
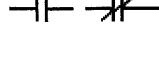
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0771.5		COSTMG COOLANT START MG	S001540/N00335 S001547/N00336 S003582/N00711 S003587/N00711 S003629/N00711 S003917/N00732 S004099/N00756 S004191/N00766 S007385/N01202 S007721/N00739 S003990/N00739
R0771.6		ERROR2 ERROR 2	S004174/N00764 S004164/N00762
R0771.7		COONAU COOLANT ON AUX.	S003583/N00711 S003588/N00711 S003597/N00711 S003600/N00711 S003632/N00711 S003988/N00739 S003995/N00740 S003999/N00740
R0772.0		COOFAU COOLANT OFF AUX.	S004001/N00741 S004007/N00741
R0772.1		FLCLON FLUSHING COOLANT START ON	S003729/N00714 S004015/N00743 S007402/N01209 S007706/N01280 S004012/N00742
R0772.2		FLCLOF FLUSHING COOLANT STOP	S004009/N00742 S004014/N00743 S004020/N00743
R0772.3		JCON1P JET COOLNAT ON 1 PLUSE	S004114/N00759 S004110/N00758
R0772.4		JETPR JET PAUSE RELEASE	S004022/N00744 S004027/N00745 S004025/N00744
R0772.5		JETCST JET COOLANT START MG	S001558/N00339 S001569/N00340 S003718/N00714 S003918/N00732 S004107/N00732 S004192/N00766 S007391/N01205 S007718/N01282 S004029/N00745
R0772.6		JETST JET COOLANT START	S004028/N00745 S004032/N00746 S004038/N00746
R0772.7		COSTM COOLANT START MG	S004047/N00748 S004046/N00747
R0773.0		GUNCST GUN COOLANT START	S004049/N00749 S007389/N01204 S004048/N00748
R0773.1		GUNCOD GUN COOLANT OFF DELAY	S004041/N00747 S004052/N00749
R0773.2		CEOPM CE DOOR OPEN ERROR MESSAGE	S003374/N00680 S004056/N00750
R0773.3		OHCSM OIL HOLE COOLANT START	S001578/N00343 S001589/N00344 S001598/N00347 S001609/N00348 S001890/N00349 S003726/N00714 S004060/N00751 S004072/N00752 S004089/N00753 S004103/N00754 S004193/N00766 S006922/N01143 S007387/N01203 S007690/N01277 S007709/N01282 S004071/N00751
R0773.4		THCOM THROUGH COOLANT ON MEMORY	S004074/N00752 S004080/N00753 S004079/N00752

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0773.5	THCOA  	THROUGH COOLANT AIR BLOW ON S004073/N00752 S004081/N00753 S004091/N00754 S004194/N00766 S007467/N00767 S007470/N01225 S007676/N01275 S004090/N00753	
R0773.6	THCOAF  	THROUGH COOLANT AIR BLOW OFF S004076/N00752 S004086/N00753 S004094/N00754	
R0773.7	MM53M4  	MAINTENANCE M53/M54 S004197/N00767 S007300/N01191 S007316/N01192 S007550/N01246 S004098/N00755	
R0774.0	SCPCVS  	SCREW CHIP CONV. START S001618/N00351 S001622/N00352 S003667/N00713 S003670/N00713 S004126/N00714 S004143/N00760 S007393/N01206 S007631/N01267 S004130/N00759	
R0774.1	SCHCVP  	SCREW CHIP CONV. STOP S004127/N00759 S004142/N00760 S004148/N00760	
R0774.2	OILMSO  	OIL MIST SOL. ON S001631/N00355 S001642/N00356 S003633/N00712 S004151/N00761 S007699/N00770 S004156/N00761	
R0774.3	S50RPM  	SP. RPM >= 50RPM S004173/N00764 S004171/N00763	
R0774.4	ASR50P  	AT SP. RPM >= 50RPM OP. DOOR OPEN S004180/N00765 S004178/N00764	
R0774.5	ODRSA1  	OPERATOR DOOR RELEASE SOL. AUX1 S004196/N00767 S004195/N00766	
R0774.6	ODRSAX  	OPERATOR DOOR RELEASE SOL. AUX S007277/N01189 S007542/N01245 S004202/N00767	
R0774.7	AMDOEG  	AUTO MODE DOOR OPEN EMERGENCY S000330/N00064 S000340/N00065 S003112/N00641 S004212/N00769 S004216/N00769	
R0775.0	APCPOS  	APC POSITION S006424/N01074 S006451/N01075 S006526/N01090 S006637/N01108 S006654/N01109 S006671/N01110 S006692/N01111 S007103/N01166 S007734/N01287 S006523/N01089	
R0775.1	APCRDC  	APC READY CHECK S006579/N01102 S006530/N01090	
R0775.2	RTADLS  	ROTATING ARM DOWN L/S S003263/N00666 S003705/N00713 S006559/N01099 S006711/N01112 S006764/N01113 S006533/N01091	
R0775.4	RAUPL/S  	ROTATING ARM UP L/S S003700/N00713 S006678/N01110 S006699/N01111 S006712/N01112 S006770/N01113 S006774/N01120 S006536/N01092	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0775.6		RATCWL ROTATING ARM TURN CW L/S	
		S003674/N00713 S003683/N00713 S003735/N00714 S003769/N00715 S006427/N	
		S006454/N01075 S006510/N01085 S006524/N01090 S006585/N01102 S006632/N	
		S006650/N01109 S006680/N01110 S006691/N01111 S006715/N01112 S006748/N	
		S006762/N01118 S006791/N01124 S007043/N01159 S007302/N01191	
		S006539/N01093	
R0775.7		RCCWLS ROTATING ARM TURN CCW L/S	
		S003677/N00713 S003686/N00713 S003737/N00714 S003771/N00715 S006428/N	
		S006455/N01075 S006512/N01086 S006525/N01090 S006582/N01102 S006633/N	
		S006651/N01109 S006670/N01110 S006701/N01111 S006716/N01112 S006749/N	
		S006763/N01118 S006792/N01124 S007045/N01159 S007304/N01191	
		S006542/N01094	
R0776.0		APCST1 APC STB1	
		S006547/N01096 S006551/N01097 S006555/N01098	
		S006546/N01095	
R0776.1		APCST2 APC STB2	
		S006557/N01099	
		S006550/N01096	
R0776.2		APCST3 APC STB3	
		S006576/N01101	
		S006554/N01097	
R0776.3		APCST4 APC STB4	
		S006548/N01096 S006553/N01097	
		S006556/N01098	
R0776.4		APCST5 APC STB5	
		S006549/N01096 S006552/N01097 S006561/N01099 S006590/N01102 S007049/N	
		S007566/N01250	
		S006575/N01100	
R0776.5		APCST6 APC ATB6	
		S006564/N01099	
		S006578/N01101	
R0776.6		APCST APC START	
		S003774/N00715 S004198/N00767 S006445/N01075 S006589/N01102 S006634/N	
		S006750/N01116 S006769/N01119 S006773/N01120 S006825/N01130	
		S006596/N01102	
R0776.7		ARAUPD APC ROTATING ARM UP DELAY	
		S006643/N01108	
		S006603/N01103	
R0777.0		RTAMUP ROTATING ARM UP	
		S006644/N01108 S006665/N01109 S006729/N01114 S006745/N01115 S007475/N	
		S007486/N01228	
		S006649/N01108	
R0777.1		RTAMDN ROTATING ARM DOWN	
		S006645/N01108 S006664/N01109 S006738/N01115 S007481/N01227 S007485/N	
		S006668/N01109	
R0777.4		RATNCW ROTATING ARM TURN CW	
		S006683/N01110 S006705/N01111 S006723/N01113 S007495/N01231 S007501/N	
		S006689/N01110	
R0777.5		RAMCCW ROTATING ARM TURN CCW	
		S006684/N01110 S006704/N01111 S006725/N01113 S007497/N01231 S007499/N	
		S006710/N01111	
R0777.6		APCTUM APC TURN MEMORY	
		S006672/N01110 S006693/N01111 S006751/N01116 S006757/N01117	
		S006756/N01116	

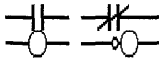
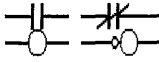
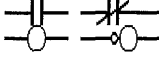
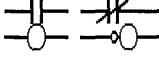
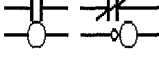
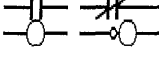
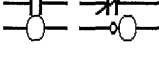
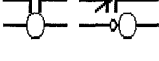
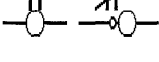
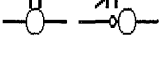
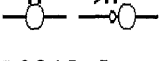
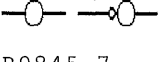
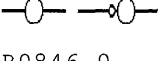
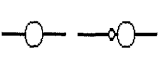
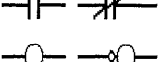
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0777.7	APCTDA 	APC TURN DELAY AUX	
	S006419/N01074	S006447/N01075 S006588/N01102	S006635/N01108 S006652/N01109
	S006765/N01118	S006796/N01125 S006805/N01126	S006812/N01127 S006819/N01128
	S006761/N01117		
R0778.0	APCFIN 	APC FINISH	
	S003780/N00716	S006316/N01067 S006545/N01095	S006565/N01099 S007050/N01100
	S006768/N01118		
R0778.1	APRUPA 	APC PALLET/ROTATING ARM UP AUX.	
	S006781/N01122		
	S006772/N01119		
R0778.2	APRAU1 	APC PALLET/ROTATING ARM UP A.1	
	S006771/N01119		
	S006775/N01120		
R0778.3	PLUD 	PALLET UNCLAMP DELAY	
	S006784/N01122		
	S006780/N01121		
R0778.4	ARAUCA 	APC ROTATING ARM UP CHECK	
	S006782/N01122	S006787/N01123	
	S006786/N01122		
R0778.5	RARODE 	APC ROTATING ARM CW/CCW DELAY	
	S006669/N01110	S006690/N01111 S006783/N01122	
	S006790/N01123		
R0778.6	RADOND 	ROTATING ARM DOWN DELAY	
	S006653/N01109		
	S006795/N01124		
R0778.7	PLCNERC 	PALLET CONTACT CHECK AUX.	
	S006801/N01126		
	S006800/N01125		
R0779.0	APCACH 	APC ACT. CHECK	
	S007218/N01181		
	S006722/N01112		
R0779.1	APCLLS 	APC LOW SPEED L/S CHECK	
	S006728/N01113		
R0779.2	PACNEPC 	PAL.UNCL. AT PAL. CONT. ERROR	
	S006420/N01074	S006448/N01075 S006802/N01126	S006809/N01127
	S006808/N01126		
R0779.3	PACEPLC 	PAL.UNC.CHECK AT PALLET NG	
	S006421/N01074	S006799/N01125 S006803/N01126	S006811/N01127 S006818/N01128
	S006813/N01127		
R0779.4	AASLUS 	APC ARM SOFT LIFT UP SOL.AUX.	
	S006734/N01114	S006744/N01115 S007489/N01229	
	S006737/N01114		
R0779.5	AASLDS 	APC ARM SOFT LIFT DOWN SOL.AUX	
	S006735/N01114	S006743/N01115 S007492/N01230	
	S006747/N01115		
R0779.6	PACLCTN 	PAL. CL. AT PAL. CONT. ERROR	
	S006422/N01074	S006449/N01075 S007240/N01184	
	S006822/N01128		
R0782.5	T-FIN 	T-FUNC. FINISH	
	S003468/N00694	S003843/N00721 S005943/N01009	
	S005949/N01009		

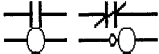
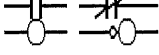
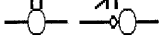
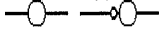
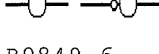
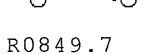
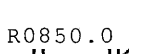
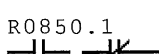
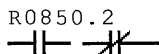
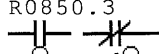
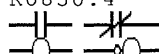
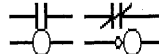
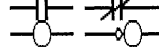
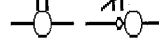
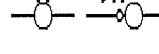

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
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R0786.7		RGDTAO S003645/N00712 S003243/N00660	RIGID TAP ON S006987/N01151 S007258/N01186
R0788.0		S003773/N00715	
R0794.6		TOCLDR S005969/N01012 S005851/N00990	TOOL CLAMP DR
R0794.7		TOULDR S002910/N00618 S005857/N00991	TOOL UNCLAMP DR S005987/N01013
R0795.1		WKCTDR S003637/N00712 S005860/N00992	WORK COUNTER DR S007563/N01249
R0795.4		TLBKDR S005865/N00994 S005864/N00993	TOOL BROKEN DR S007034/N01158
R0795.5		M52FIN S003732/N00714 S005870/N00994	M52 FINISH
R0795.6		M70ODR S005873/N00995 S005878/N00995	M70 OUT DR S005882/N00996 S005886/N00997 S007007/N01154
R0795.7		M71ODR S005874/N00995 S005885/N00996	M71 OUT DR S005881/N00996
R0796.2		M72ODR S005890/N00998 S005894/N00998	M72 OUT DR S005898/N00999
R0796.3		M73ODR S005891/N00998 S005901/N00999	M73 OUT DR S005897/N00999
R0800.0		APCSTB5A S006567/N01100 S006566/N01099	APC STB5 AUX
R0804.2		WMUPST S006222/N01050 S006223/N01050	WARM UP STOP S006224/N01051 S006230/N01052
R0804.3		SPWMUP S002957/N00624 S006228/N01051	SP. WARM UP S003044/N00636 S003063/N00638 S003105/N00641
R0804.4		WMUPPS S006233/N01052	WARM UP PROGRAM SELECT
R0804.6		PRGNRE S006234/N01053 S006238/N01053	PRG. NO READ END S006239/N01054

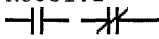
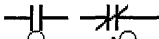
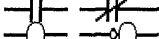
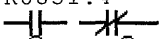
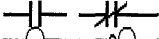
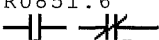
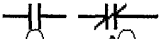
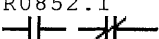
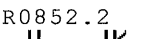
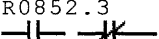
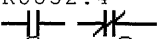
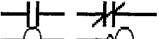
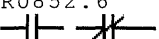
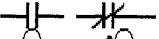
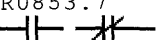
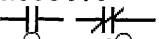
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0804.7	 WMST S003340/N00677 S006241/N01054	WARM UP CYCLE START	
R0807.6	 ALAUX1 S006248/N01056 S006247/N01055	ALARM AUX 1	
R0808.0	 ALAUX2 S006253/N01057 S006252/N01056	ALARM AUX 2	
R0808.1	 ALAUX3 S003385/N00681 S006259/N01057	ALARM AUX 3	S006267/N01059
R0808.3	 ALAUX5 S003341/N00677 S006266/N01058	ALARM AUX 5	S006273/N01060
R0808.4	 ALAUX6 S006272/N01060 S006271/N01059	ALARM AUX 6	
R0808.5	 ALRM S002347/N00527 S006298/N01064  S006280/N01060	ALARM	S003865/N00724 S003874/N00725 S006221/N01050 S006281/N01060
R0808.7	 ALLAMP S006291/N01063 S006284/N01061	ALARM LAMP	S006472/N01076 S007425/N01213 S007724/N01284
R0809.0	 NCARM S006282/N01061 S006290/N01062	NC ALARM	S006288/N01062 S008267/N01385
R0809.1	 CALLY S007409/N01211 S006294/N01063	CALL LIGHT YELLOW	S007426/N01213
R0809.2	 CALLOF S003852/N00721 S006838/N01133 S006301/N01064	CALL LIGHT OFF	S006293/N01063 S006297/N01064 S006473/N01076 S006477/N01064
R0809.3	 PS200D S003676/N00713	A FIXTURE 2 CLAMP CHECK DELAY	S003685/N00713
R0809.4	 PS300D S003678/N00713	B FIXTURE 1 CLAMP CHECK DELAY	S003687/N00713
R0809.5	 PS400D S003679/N00713	B FIXTURE 2 CLAMP CHECK DELAY	S003688/N00713

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0810.0		ALMRST ALARM RESET	
		S000301/N00059 S000307/N00060 S001230/N00275 S001260/N00280 S001397/N00280	
		S001409/N00310 S001431/N00314 S001449/N00317 S001467/N00320 S001484/N00320	
		S001502/N00326 S001563/N00339 S001583/N00343 S001603/N00347 S001636/N00347	
		S001654/N00359 S001682/N00367 S001709/N00371 S001814/N00403 S002162/N00403	
		S002223/N00505 S002770/N00591 S002776/N00592 S002975/N00626 S003046/N00626	
		S003877/N00725 S003894/N00728 S003899/N00729 S004159/N00762 S004378/N00762	
		S004386/N00797 S004462/N00808 S004551/N00820 S004844/N00871 S004857/N00871	
		S004872/N00877 S005002/N00893 S005117/N00900 S005481/N00941 S005685/N00941	
		S005952/N01010 S006031/N01019 S006037/N01020 S006103/N01024 S006205/N01024	
		S006236/N01053 S006287/N01062 S006832/N01132 S006839/N01133 S006850/N01133	
		S006856/N01135 S006883/N01136 S006891/N01138 S006899/N01140 S006910/N01140	
		S006918/N01142 S006929/N01144 S006935/N01145 S006944/N01146 S006951/N01146	
		S006960/N01148 S006967/N01149 S006978/N01150 S006989/N01151 S006995/N01151	
		S007001/N01153 S007008/N01154 S007018/N01155 S007025/N01156 S007031/N01156	
		S007037/N01158 S007058/N01160 S007065/N01161 S007074/N01162 S007080/N01162	
		S007087/N01164 S007094/N01165 S007105/N01166 S007112/N01167 S007120/N01167	
		S007126/N01169 S007133/N01170 S007140/N01171 S007146/N01172 S007151/N01172	
		S007159/N01174 S007171/N01175 S007192/N01176 S007197/N01177 S007206/N01177	
		S007215/N01180 S007221/N01181 S007230/N01182 S007237/N01183 S007244/N01183	
		S007250/N01185 S007259/N01186 S007265/N01187 S007273/N01188 S007280/N01188	
		S007294/N01190 S007310/N01191 S007340/N01194 S007348/N01195 S007359/N01195	
		S007365/N01197 S008266/N01385	
		S006307/N01065	
R0810.1		FXALCLP FIXTURE ALL CLAMPED	
		S006570/N01100	
R0810.2		TCNTUPCHK TOOL COUNT UP CHECK	
		S006258/N01057	
R0810.7		FXCLALM FIX.CLAMP PS ERROR	
		S003397/N00681	
R0831.5		PS100D A FIXTURE 1 CLAMP CHECK DELAY	
		S003675/N00713 S003684/N00713	
R0832.0		HOMPOS HOME POSITION	
		S006312/N01066	
R0832.3		AOPAUX DOOR OPEN AUX	
		S006326/N01068 S006340/N01069	
		S006330/N01068	
R0832.4		DOCLAX DOOR CLOSE AUX	
		S006327/N01068 S006339/N01069	
		S006343/N01069	
R0832.5		CALRAX CALL LIGHT RED AUX	
		S007420/N01212	
		S006475/N01076	
R0832.7		CALGAX CALL LIGHT GREEN AUX	
		S007404/N01210	
		S006481/N01077	
R0833.0		TBLCLP TABLE CLAMP	
		S006378/N01072 S006415/N01073 S006527/N01090 S007508/N01234 S007512/N01234	
		S006383/N01072	
R0833.1		TBLCNL TABLE UNCLAMP	
		S006346/N01070 S006379/N01072 S006414/N01073 S006437/N01074 S006463/N01074	
		S007355/N01196 S007509/N01234 S007511/N01235	
		S006418/N01073	
R0833.2		PLTCLP PALLET CLAMP	
		S006440/N01074 S006467/N01075 S006718/N01112 S007514/N01236	
		S006444/N01074	

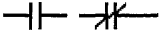
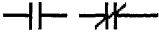
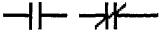
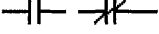
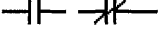
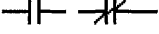
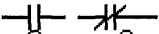
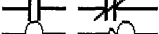
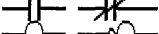
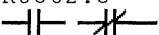

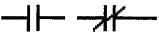
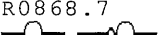
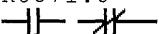
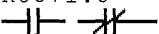
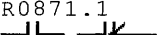
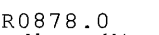
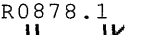
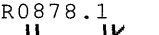
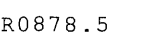
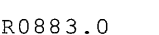
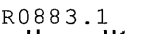
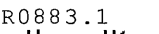
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
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		S006398/N01073 S006412/N01073 S006441/N01074 S006466/N01075 S006719/N01076	
		S007353/N01196 S007517/N01237 S007521/N01238	
		S006471/N01075	
R0840.1	AMDCL1 	ARM DEC. 1	
		S000396/N00080 S000374/N00076	
R0840.2	AMDCL2 	ARM DEC. 2	
		S000373/N00076 S000376/N00077	
R0840.3	STRF 	SPECIAL RETURN FORWARD	
		S000398/N00080 S000407/N00081	
		S000385/N00078	
R0840.4	STRB 	SPECIAL RETURN BACKWARD	
		S000399/N00080 S000411/N00082	
		S000395/N00079	
R0840.5	AMDCL3 	ARM DEC. 3	
		S000397/N00080 S000408/N00081 S000412/N00082 S007166/N01175	
		S000401/N00080	
R0840.6	ATCF1 	ATC FORWARD 1	
		S000447/N00089 S000460/N00091 S000492/N00092 S001745/N00382 S007173/N00081	
		S000410/N00081	
R0840.7	ATCR1 	ATC REVERSE 1	
		S000448/N00089 S000466/N00091 S000472/N00091 S000480/N00092 S001746/N00082	
		S0007174/N01175	
		S000413/N00082	
R0841.0	ARMONA 	ARM ON AUX.	
		S000463/N00091 S000483/N00092	
		S000423/N00083	
R0841.1	NOTBA1 	NOT BACKWARD AUX. 1	
		S000425/N00084 S000433/N00086	
		S000428/N00084	
R0841.2	NOTBA2 	NOT BACKWARD AUX. 2	
		S000434/N00086 S000431/N00085	
		S000431/N00085	
R0841.3	NOTBAK 	NOT BACKWARD	
		S000394/N00079 S000435/N00086	
		S000435/N00086	
R0841.4	TCLDELA 	ATC CHANGE TOOL CLAMP DELAY AU	
		S000437/N00087 S000440/N00088 S000474/N00091 S000489/N00092	
		S000439/N00087	
R0841.5	TCLDELY 	ATC CHANGE TOOL CLAMP DELAY	
		S000475/N00091 S000444/N00088	
		S000444/N00088	
R0841.6	ARMON 	ARM ON	
		S000445/N00089 S000461/N00091 S000481/N00092 S004188/N00766 S005461/N00089	
		S000451/N00089	
R0842.0	ATCSP1 	ATC STOP 1	
		S005457/N00938 S005936/N01007	
		S000459/N00090	

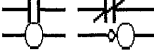
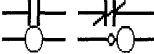
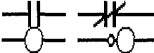
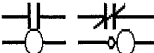
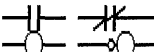
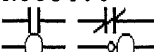
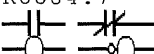
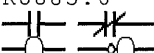
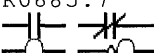
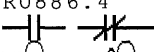
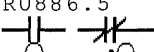
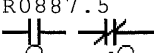
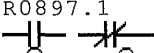
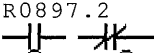
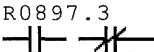
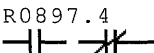
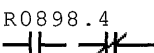
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R0842.1		TWAMFA S000452/N00090 S000479/N00091	TWIN ARM FORWARD AUX. S000457/N00090 S000482/N00092 S000511/N00095 S007530/N00091
R0842.2		TWAMRA S000454/N00090 S000496/N00092	TWIN ARM REVERSE AUX. S000458/N00090 S000462/N00091 S000514/N00096 S007532/N00091
R0842.3		TWAMLS S007534/N01242 S000503/N00093	TWIN ARM LOW SPEED AUX. S007537/N01243
R0842.4		TWAMHS S007535/N01242 S000510/N00094	TWIN ARM HIGH SPEED AUX. S007538/N01243
R0843.2		ATCFD S000453/N00090 S000513/N00095	ATC FOR. DELAY S005471/N00940
R0843.3		ATCRD S000455/N00090 S000516/N00096	ATC REV. DELAY
R0844.1		MGLB2 S004279/N00776 S001713/N00372	MAG. LS B 2 S004294/N00779 S004296/N00779 S005924/N01005
R0845.0		ATCDRN S005699/N00978 S005703/N00978	ATC DOOR OPEN S005717/N00979 S007430/N01214
R0845.1		ATCDRC S005700/N00978 S005720/N00979	ATC DOOR CLOSE S005716/N00979 S007433/N01215
R0845.3		POTCPA S005729/N00980 S005733/N00980	POT CLAMP AUX. S005741/N00981 S007448/N01220
R0845.4		POUCLA S005730/N00980 S005744/N00981	POT UNCLAMP AUX. S005740/N00981
R0845.5		POTSMS S005760/N00982 S005764/N00982	POT SIFT MAGAZINE SIDE AUX. S005779/N00983 S007443/N01218 S007445/N01219
R0845.6		POTSSS S005761/N00982 S005782/N00983	POT SIFT SPINDLE SIDE AUX. S005778/N00983 S007442/N01218 S007446/N01219
R0845.7		MPOUTA S001781/N00394 S005797/N00984	ATC MAGAZINE PIN OUT AUX. S005791/N00984 S007458/N01222
R0846.0		MZIDFA S000748/N00136 S004276/N00776 S005816/N00985	MAGAZINE INDEX FOR. AUX. S000752/N00136 S000776/N00139 S004218/N00770 S004242/N00770 S004285/N00777 S005799/N00985 S005833/N00986 S007436/N00985
R0846.1		MZIDRA S000749/N00136 S004277/N00776 S005835/N00986	MAGAZINE INDEX REV. AUX. S000753/N00136 S000777/N00139 S004219/N00770 S004229/N00770 S004290/N00778 S005814/N00985 S005819/N00986 S007439/N00985

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0846.2	POTCCDT	TOOL POT CLAMP CHECK DELAY	
	S000478/N00091	S000495/N00092	
	S005839/N00987		
R0846.3	POTSMD	POT MAGAZINE SIDE DELAY	
	S005752/N00982		
	S005843/N00988		
R0846.4	POTSSD	POT SPINDLE SIDE DELAY	
	S005391/N00931	S005774/N00983	
	S005847/N00989		
R0849.4	ARLOFO	ARM RETURN L/S ON/FOWARD	
	S004710/N00845	S004716/N00846	
	S004706/N00843		
R0849.5	ARLORE	ARM RETURN L/S ON/REVERSE	
	S004712/N00845	S004714/N00846	
	S004709/N00844		
R0849.6	ARLOFA	ARM RETURN L/S ON/FOWARD AUX.	
	S004711/N00845	S004743/N00855	
	S004713/N00845		
R0849.7	ARLORA	ARM RETURN L/S ON/REVERSE AUX.	
	S004715/N00846	S004751/N00856	
	S004717/N00846		
R0850.0	ARLOFF	ARM RETURN L/S OFF/FOWARD	
	S004724/N00849	S004730/N00850	
	S004720/N00847		
R0850.1	ARLOFR	ARM RETURN L/S OFF/REVERSE	
	S004726/N00849	S004728/N00850	
	S004723/N00848		
R0850.2	ARLFAU	ARM RETURN L/S OFF/FOWARD AUX.	
	S004725/N00849	S004759/N00857	
	S004727/N00849		
R0850.3	ARLFRA	ARM RETURN L/S OFF/REVERSE AUX	
	S004729/N00850	S004770/N00858	
	S004731/N00850		
R0850.4	ARLO1F	ARM RETURN L/S OFF 1 PULSE	
	S004742/N00855	S004750/N00856	
	S004734/N00851		
R0850.5	ARLSOF	ARM RETURN L/S OFF	
	S004733/N00851		
	S004736/N00852		
R0850.6	ARLO1S	ARM RETURN L/S ON 1 PULSE	
	S004758/N00857	S004769/N00858	
	S004739/N00853		
R0850.7	ARL/SO	ARM RETURN L/S ON	
	S004738/N00853		
	S004741/N00854		
R0851.0	ARFROF	ARM FOR./REV. RETURN L/S ON/OF	
	S004781/N00859	S004785/N00860	S004790/N00861
	S004784/N00859		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0851.1		ARM RETURN L/S OFF 1 PULSE	
		S004747/N00855 S004755/N00856 S004765/N00857 S004772/N00858 S004782/N00859	
		S004801/N00863 S004807/N00864 S004813/N00865 S004819/N00866 S004825/N00867	
		S004831/N00868 S004789/N00860	
R0851.2		ARM RETURN L/S OFF	
		S004788/N00860 S004793/N00861	
R0851.3		ARM FOR./REV. RETURN L/S OFF	
		S004746/N00855 S004754/N00856 S004764/N00857 S004773/N00858	
		S004800/N00862	
R0851.4		TOOL UNCLAMP START LS OK	
		S000465/N00091 S000485/N00092	
		S005452/N00936	
R0851.5		TOOL CLAMP START LS OK	
		S000469/N00091 S000488/N00092	
		S005456/N00937	
R0851.6		ARM STOP OK	
		S000446/N00089 S005458/N00938 S007169/N01175	
		S005463/N00938	
R0851.7		ATC HOME POSITION	
		S003911/N00731 S005475/N00940 S005918/N01004 S006311/N01066	
		S005470/N00939	
R0852.1		ATC START OK	
		S005496/N00944 S005503/N00945 S005509/N00946	
		S005477/N00940	
R0852.2		ATC OK	
		S005495/N00944 S005504/N00945 S005510/N00946 S005518/N00948	
		S005484/N00941	
R0852.3		ATC DATA SEARCH 1	
		S005513/N00947 S005498/N00944	
R0852.4		ATC DATA SEARCH AUX	
		S005494/N00944 S005507/N00945	
R0852.5		ATC DATA SEARCH 2	
		S005505/N00945 S005512/N00946	
R0852.6			
		S006130/N01031	
R0853.2		TARGET T COIN AT M/T CODE COM.	
		S003910/N00731 S005489/N00942	
R0853.7		ATC OK 2	
		S005491/N00943 S005497/N00944 S005506/N00945 S005511/N00946	
		S005493/N00943	
R0854.0		ATC START	
		S003129/N00642 S005515/N00948 S005534/N00951 S005682/N00977	
		S005514/N00947	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0854.1	ATCCY	ATC CYCLE	
	S003128/N00642	S003291/N00673	S003293/N00673 S003848/N00721 S004189/N00721
	S005469/N00939	S005516/N00948	S005535/N00951 S005542/N00952 S005573/N00952
	S005594/N00962	S005921/N01004	S005950/N01010
	S005519/N00948		
R0854.5	ORIM	ORI.MEMORY	
	S005522/N00949	S005540/N00952	
	S005526/N00949		
R0854.6	ORIOFF	ORI OFF	
	S005523/N00949		
	S005531/N00950		
R0854.7	ATCSTB	ATC STANDBY CHECK	
	S005550/N00953	S005557/N00954	S005564/N00955 S005571/N00956
	S005543/N00952		
R0855.0	ATC1	ATC1 (POT DOWN, SP ORT)	
	S002971/N00626	S005532/N00951	S005544/N00953 S005687/N00978
	S005536/N00951		
R0855.1	ATC2	ATC2 (ARM FOR.)	
	S000402/N00081	S005533/N00951	S005547/N00953 S005552/N00954 S007149/N00954
	S005551/N00953		
R0855.2	ATC3	ATC3 (ARM ROTATION)	
	S000059/N00010	S000403/N00081	S000404/N00081 S005442/N00935 S005548/N00935
	S005554/N00954	S005559/N00955	S007157/N01174
	S005558/N00954		
R0855.6	ATC7	ATC 7 (ARM STOP)	
	S005555/N00954	S005561/N00955	S005566/N00956 S007165/N01175
	S005565/N00955		
R0855.7	ATC8	ATC 8 (DOOR CLOSE)	
	S005562/N00955	S005568/N00956	S005579/N00959 S005584/N00960 S005590/N00960
	S005704/N00979		
	S005572/N00956		
R0856.0	ATCEN	ATC END	
	S005517/N00948	S005574/N00957	S005953/N01010
	S005576/N00957		
R0856.1	ATCEN2	ATC END 2	
	S005575/N00957		
	S005578/N00958		
R0856.2	ATCEN1	ATC END 1	
	S005569/N00956	S005577/N00958	S005684/N00977
	S005583/N00959		
R0856.3	M06OK	M06 OK	
	S005423/N00933	S005433/N00934	S005473/N00940 S005587/N00960 S005592/N00960
	S005589/N00960		
R0856.4	M06OK1	M06 OK 1	
	S005585/N00960		
	S005591/N00961		
R0856.6	M06ET	M06 ERROR TIME	
	S003294/N00673	S005480/N00941	S005541/N00952 S005593/N00962
	S005595/N00962		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0857.0	INTBP 	INTERLOCK BYPASS	
		S000159/N00030 S000167/N00031 S000380/N00078 S000389/N00079 S000498/N00078	
		S000499/N00093 S000504/N00094 S000506/N00094 S001991/N00448 S002916/N00448	
		S005476/N00940 S005599/N00963 S005607/N00964 S005956/N01011 S005964/N01011	
		S005967/N01012 S005982/N01013 S005985/N01013 S006001/N01014 S006006/N01014	
		S006168/N01040 S006171/N01041 S007063/N01161 S007078/N01163 S007123/N01163	
		S007168/N01175 S005603/N00963	
R0857.4	ATCSTR 	ATC STEP READY	
		S000379/N00078 S000388/N00079 S001989/N00448 S002966/N00626 S005605/N00626	
		S005917/N01004 S005920/N01004 S006174/N01042	
		S005609/N00964	
R0862.0	ATCPOS 	ATC POSITION	
		S003292/N00673 S005478/N00941 S005537/N00952 S005922/N01004 S007129/N01004	
		S005916/N01003	
R0862.2	ATCSBC 	ATC STANDBY CHECK	
		S007731/N01286 S005923/N01004	
R0862.5	MGSPOK 	MAG. STOP OK	
		S005937/N01007	
R0867.3	IDXE 	MAG. INDEX END	
		S005941/N01008	
R0868.6	RMGIDX 	MAG. INDEX	
		S000101/N00017 S003845/N00721 S003873/N00725 S005934/N01007 S005939/N01007	
		S007070/N01162 S005933/N01006	
R0868.7	MGEND 	MAG. END	
		S005938/N01007	
R0871.0	RATCM 	ATC MEMORY	
		S005951/N01010 S007071/N01162 S007084/N01164 S007092/N01165 S007137/N01165	
		S005954/N01010	
R0871.1	MERO 	MER 0	
		S007055/N01160 S005961/N01011	
R0878.0	TPMZSE 	TOOL POT MAMAZINE SIDE ERROR	
		S006023/N01018 S007227/N01182 S006015/N01016	
R0878.1	TPSPSE 	TOOL POT SPINDLE SIDE ERROR	
		S006024/N01018 S007022/N01156 S006022/N01017	
R0878.5	TOPTCL 	TOOL POT CLAMP	
		S007143/N01172	
R0879.0	TPUNMS 	TOOL POT CL/UNCL.MAG./SP. LS D	
		S007023/N01156 S007144/N01172 S007185/N01176 S007228/N01182 S006027/N01018	
R0883.0	NOOP1 	NO OPTION 1	
		S006098/N01024 S006053/N01021	
R0883.1	NOOP2 	NO OPTION 2	
		S006099/N01024 S006075/N01022	

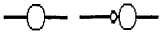
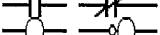
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0883.2	NOOP3 	NO OPTION 3	
	S006100/N01024		
	S006097/N01023		
R0884.0	SPPER1 	SP.PROGRAM ERROR 1	
	S002999/N00631	S006132/N01032	
	S006108/N01025		
R0884.3	ATCPE1 	ATC PROGRAM ERROR 1	
	S006133/N01032	S006140/N01033	
	S006111/N01026		
R0884.4	ATCPE2 	ATC PROGRAM ERROR 2	
	S006134/N01032	S006141/N01033	
	S006116/N01027		
R0884.5	ATCPE3 	ATC PROGRAM ERROR 3	
	S006135/N01032		
	S006120/N01028		
R0884.6	ATCME1 	ATC MACHINE ERROR 1	
	S006139/N01033	S006157/N01037	
	S006127/N01029		
R0884.7	MGPER1 	MAG.PROGRAM ERROR 1	
	S006136/N01032	S006147/N01034	
	S006129/N01030		
R0885.6	DTER2 	DATA ERROR 2	
	S006152/N01036		
	S006131/N01031		
R0885.7	1PER 	1 PROGRAM ERROR	
	S006151/N01036		
	S006138/N01032		
R0886.4	ATCER 	ATC ERROR	
	S005062/N00896	S005482/N00941	S006158/N01037
	S006146/N01033		
R0886.5	MGER 	MAG.ERROR	
	S005474/N00940	S006159/N01037	
	S006148/N01034		
R0887.5	ATCIF 	ATC INDEX FIN	
	S003672/N00713		
	S006181/N01043		
R0897.1	FDER 	FEED HOLD ERROR	
	S003391/N00681		
	S006150/N01035		
R0897.2	PER 	PROGRAM ERROR	
	S003435/N00686	S006163/N01038	
	S006156/N01036		
R0897.3	MER 	MACHINE ERROR	
	S006164/N01038	S008179/N01371	S008184/N01372
	S006162/N01037	S008191/N01373	S008196/N01374
R0897.4	ER1 	ERROR 1	
	S006149/N01035	S006274/N01060	
	S006165/N01038		
R0898.4	M31F 	M31. FIN	
	S006178/N01043		
	S006170/N01040		

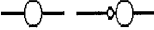
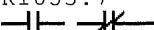


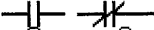
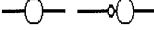
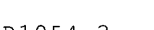


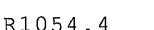

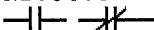


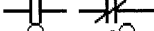
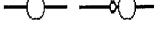
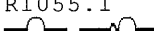
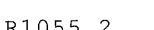

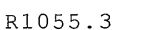
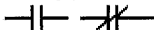

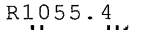
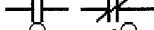
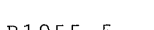
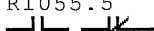
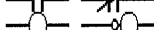
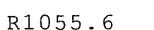
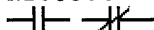
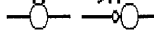
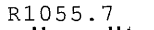
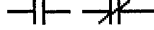


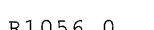
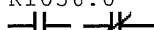
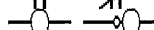
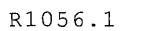

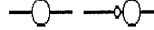
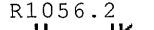
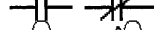

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R0898.5	M32F	M32 FIN	
	S006179/N01043		
	S006173/N01041		
R0898.7	M35F	M35 FIN	
	S006180/N01043		
	S006177/N01042		
R0900.0	LOGIC	LOGIC ON	
	S000076/N00013	S000187/N00035	S000326/N00063
	S000355/N00069	S000357/N00070	S000359/N00071
	S000365/N00074	S000529/N00103	S000583/N00113
	S000604/N00116	S000611/N00117	S000636/N00119
	S000657/N00122	S000672/N00124	S000679/N00125
	S000717/N00131	S000721/N00132	S000725/N00132
	S000935/N00206	S000964/N00220	S001003/N00239
	S001752/N00385	S001754/N00386	S001756/N00387
	S001922/N00433	S001968/N00443	S002196/N00501
	S002527/N00548	S002801/N00599	S002806/N00600
	S002815/N00601	S002959/N00624	S002978/N00626
	S004157/N00762	S004158/N00762	S004165/N00763
	S004371/N00794	S006329/N01068	S006342/N01069
	S007801/N01308	S007807/N01309	S007813/N01310
	S007831/N01313	S007837/N01314	S007843/N01315
	S007861/N01318	S007867/N01319	S007873/N01320
	S000328/N00063		S000327/N00063
			S000353/N00063
			S000363/N00072
			S000597/N00114
			S000650/N00120
			S000693/N00126
			S000786/N00137
			S001750/N00383
			S001842/N00394
			S002207/N00502
			S002814/N00600
			S003269/N00662
			S004370/N00763
			S007610/N01069
			S007825/N01311
			S007855/N01316
			S008260/N01380
R0900.1	NPON	NC POWER ON	
	S000011/N00002	S000025/N00004	S000105/N00017
	S000422/N00083	S000502/N00093	S000509/N00094
	S001399/N00307	S001433/N00314	S001486/N00323
	S001776/N00393	S001905/N00429	S001992/N00448
	S002567/N00553	S002571/N00554	S002575/N00555
	S002634/N00564	S002648/N00567	S002856/N00608
	S003034/N00634	S003101/N00640	S003119/N00641
	S003907/N00730	S003928/N00733	S003998/N00740
	S004037/N00746	S004044/N00747	S004069/N00751
	S004154/N00761	S004160/N00762	S004176/N00764
	S004226/N00771	S004266/N00774	S004363/N00791
	S004627/N00831	S004645/N00835	S004748/N00855
	S004774/N00858	S004881/N00878	S004885/N00879
	S004978/N00890	S004992/N00892	S005004/N00893
	S005488/N00942	S005602/N00963	S005702/N00978
	S005743/N00981	S005763/N00982	S005781/N00983
	S005850/N00990	S005856/N00991	S005876/N00995
	S005900/N00999	S005908/N01002	S005978/N01012
	S006074/N01022	S006096/N01023	S006183/N01044
	S006191/N01047	S006194/N01048	S006202/N01049
	S006382/N01072	S006417/N01073	S006443/N01074
	S006544/N01095	S006577/N01101	S006595/N01102
	S006620/N01106	S006627/N01107	S006648/N01108
	S006709/N01111	S006721/N01112	S006835/N01132
	S007020/N01155	S007150/N01173	S007158/N01174
	S007252/N01185	S007282/N01189	S007296/N01190
	S007343/N01194	S007378/N01199	S007449/N01220
	S007468/N01224	S007483/N01227	S007504/N01233
	S007561/N01248	S007883/N01323	S007889/N01324
	S007910/N01329	S007930/N01332	S007950/N01334
	S008211/N01375	S008227/N01376	S008003/N01343
	S000342/N00065		S000333/N00025
			S001235/N00275
			S001774/N00326
			S002558/N00550
			S002597/N00556
			S003018/N00615
			S003164/N00644
			S004010/N00741
			S004128/N00752
			S004211/N00767
			S004454/N00806
			S004766/N00856
			S004956/N00886
			S005447/N00934
			S005732/N00979
			S005834/N00985
			S005893/N00996
			S006052/N01013
			S006188/N01045
			S006237/N01051
			S006493/N01075
			S006613/N01104
			S006688/N01109
			S006924/N01137
			S007223/N01179
			S007324/N01191
			S007462/N01221
			S007543/N01238
			S007893/N01325
			S008008/N01343
R0950.0	M00	M00	
	S003571/N00711	S003836/N00720	
R0950.1	M01	M01	
	S003566/N00711	S003570/N00711	S003834/N00720

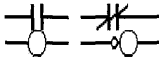
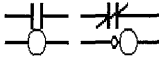
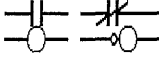
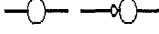
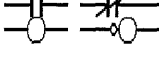

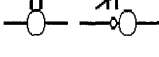
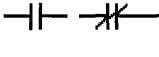
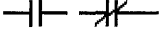
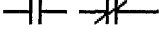
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0950.3 — — — —	M03	M03 SP.CW	S003036/N00635 S003058/N00638 S003584/N00711 S005957/N01011 S007061/N0
R0950.4 — — — —	M04	M04 SP.CCW	S003037/N00635 S003073/N00639 S003589/N00711 S005958/N01011 S007062/N0
R0950.5 — — — —	M05	M05 SP.STOP	S002537/N00550 S002591/N00559 S003017/N00633 S003033/N00634 S003087/N0 S003599/N00711 S003943/N00734
R0950.6 — — — —	M06	M06	S000761/N00136 S002538/N00550 S002592/N00559 S003914/N00731
R0950.7 — — — —	M07	M07 OIL MIST ON	S001643/N00356 S003624/N00712 S004149/N00761
R0951.0 — — — —	M08	M08 COOLANT ON	S001548/N00336 S003628/N00712 S003978/N00738 S003979/N00738 S003991/N0 S004003/N00741
R0951.1 — — — —	M09	M09 COOLANT OFF	S001541/N00335 S001559/N00339 S001579/N00343 S001599/N00347 S001632/N0 S001881/N00423 S003631/N00712 S003945/N00734 S004070/N00751 S004152/N0
R0951.4 — — — —	M12	WORK COUNTER	S003636/N00712 S005858/N00992
R0951.5 — — — —	M13	M03 & M08	S001549/N00336 S003038/N00635 S003059/N00638 S003581/N00711 S003980/N0 S003992/N00740 S004004/N00741 S005959/N01011
R0951.6 — — — —	M14	M04 & M08	S001550/N00336 S003039/N00635 S003074/N00639 S003586/N00711 S003981/N0 S003993/N00740 S004005/N00741 S005960/N01011
R0951.7 — — — —	M15	M05 & M09	S001542/N00335 S001560/N00339 S001580/N00343 S001600/N00347 S001633/N0 S001882/N00423 S002539/N00550 S002593/N00559 S003089/N00640 S003601/N0 S003946/N00734
R0952.0 — — — —	M16	MEASUREMENT AIR BLOW ON	S003136/N00643 S003654/N00713 S006984/N01151 S006986/N01151
R0952.1 — — — —	M17	MEASUREMENT AIR BLOW OFF	S002540/N00550 S003090/N00640 S003121/N00642 S003656/N00713
R0952.2 — — — —	M18	MEASUREMENT SP. ORI.	S002541/N00550 S002594/N00559 S002929/N00622 S002980/N00627 S003098/N0 S003659/N00713
R0952.3 — — — —	M19	M19 SP.ORI	S002542/N00550 S002595/N00559 S002930/N00622 S002969/N00626 S003099/N0 S003661/N00713 S005955/N01011
R0952.5 — — — —	M21	M21/TABLE CLAMP (M)	S003814/N00717 S006361/N01072
R0952.6 — — — —	M22	TABLE UNCLAMP (M)	S003820/N00717 S006399/N01073 S007352/N01196
R0952.7 — — — —	M23	PALLET CLAMP (M)	S003807/N00717 S006430/N01074
R0953.0 — — — —	M24	PALLET UNCLAMP (M)	S003809/N00717 S006464/N01075 S007354/N01196
R0953.1 — — — —	M25	TOOL DETECTION STOP	S002627/N00564 S003608/N00711

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0953.2 — — — —	M26	TOOL DETECTION STOP CANCEL	
	S002630/N00564	S003614/N00711	
R0953.4 — — — —	M28	RIGID TAP COMMAND CANCEL	
	S003236/N00659	S003641/N00712 S006487/N01079	
R0953.5 — — — —	M29	RIGID TAP COMMAND	
	S002943/N00623	S002977/N00626 S003016/N00633 S003032/N00634 S003222/N00635	
	S003230/N00659	S003644/N00712	
R0953.7 — — — —	M31	MAN. ATC MODE	
	S001623/N00352	S005597/N00963 S006169/N01040 S007108/N01167 S007115/N01168	
R0954.0 — — — —	M32	MAN. ATC MODE CANCEL	
	S005600/N00963	S006172/N01041	
R0954.1 — — — —	M33	EXTERNAL CHIP CONVEYOR ON	
	S003647/N00712	S007557/N01248	
R0954.2 — — — —	M34	EXTERNAL CHIP CONVEYOR OFF	
	S003650/N00712	S007559/N01248	
R0954.3 — — — —	M35	MAN. ATC ORT.	
	S005604/N00964	S006175/N01042 S007109/N01167 S007116/N01168 S007124/N01169	
R0954.4 — — — —	M36	CHIP CONVEYOR ON	
	S003666/N00713	S004111/N00759	
R0954.5 — — — —	M37	CHIP CONVEYOR OFF	
	S003669/N00713	S004141/N00760	
R0955.5 — — — —	M45	BORING CYCLE TOOL DET. STOP	
	S002599/N00560	S003611/N00711	
R0955.6 — — — —	M46	BORING CYCLE TOOL DET. STOP CAN	
	S002602/N00560	S002604/N00561 S003100/N00640 S003118/N00641 S003615/N00642	
R0955.7 — — — —	M47	JET COOLANT	
	S001570/N00340	S003717/N00714 S004030/N00746	
R0956.0 — — — —	M48	OVERRIDE CANCEL OK	
	S003719/N00714	S006197/N01049	
R0956.1 — — — —	M49	OVERRIDE CANCEL NO	
	S002779/N00593	S003722/N00714 S006199/N01049	
R0956.2 — — — —	M50	OIL HOLE COOLANT ON	
	S001590/N00344	S001610/N00348 S003725/N00714 S004059/N00751	
R0956.3 — — — —	M51	FLUSHING COOLANT ON	
	S001876/N00423	S003728/N00714	
R0956.4 — — — —	M52	TOOL BROCKEN CHECK	
	S003731/N00714	S005861/N00993 S005868/N00994 S007035/N01158	
R0956.5 — — — —	M53	ROTATING ARM TURN CW (M)	
	S003734/N00714	S004095/N00755 S006674/N01110	
R0956.6 — — — —	M54	ROTATING ARM TURN CCW (M)	
	S003736/N00714	S004096/N00755 S006695/N01111	
R0956.7 — — — —	M55	ROTATING ARM UP (M)	
	S003701/N00713	S006638/N01108	
R0957.0 — — — —	M56	ROTATING ARM DOWN (M)	
	S002767/N00591	S003704/N00713 S003741/N00714 S006655/N01109	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0957.1	M57	ATC SINGLE ARM FORWARD (M)	
— — — —	S002769/N00591	S003708/N00713 S003743/N00714	S005722/N00980
R0957.2	M58	ATC SINGLE ARM RETRACT (M)	
— — — —	S002773/N00592	S003712/N00713 S003748/N00714	S005736/N00981
R0957.3	M59	M59	
— — — —	S002775/N00592	S003750/N00714	
R0957.4	M60	AUTO PALLET CHANGE	
— — — —	S003779/N00716	S003947/N00734 S006313/N01067	S006580/N01102 S006752/N01102
	S007028/N01157	S007041/N01159 S007097/N01166	S007299/N01191 S007315/N01191
	S007549/N01246		
R0957.5	M61	ATC SINGLE ARM MAG. SIDE (M)	
— — — —	S003762/N00715	S003768/N00715 S003948/N00734	S004622/N00831 S005747/N00831
	S006314/N01067	S006581/N01102 S006753/N01116	S007042/N01159 S007098/N01159
	S007301/N01191	S007317/N01192 S007336/N01194	S007546/N01246
R0957.6	M62	ATC SINGLE ARM SP. SIDE (M)	
— — — —	S003764/N00715	S003770/N00715 S003949/N00734	S004529/N00817 S004648/N00817
	S004659/N00838	S004666/N00839 S004672/N00840	S004684/N00841 S004694/N00841
	S005767/N00983	S006315/N01067 S006584/N01102	S006754/N01116 S007044/N01116
	S007099/N01166	S007303/N01191 S007318/N01192	S007547/N01246
R0958.2	M66	FIXTURE CLAMP	
— — — —	S003673/N00713		
R0958.3	M67	FIXTURE UNCLAMP	
— — — —	S003682/N00713		
R0958.6	M70	M70	
— — — —	S003800/N00716	S005871/N00995	
R0958.7	M71	M71	
— — — —	S003803/N00716	S005879/N00996	
R0959.0	M72	M72	
— — — —	S005888/N00998		
R0959.1	M73	M73	
— — — —	S005895/N00999		
R0959.2	M74	M74	
— — — —	S002543/N00550	S003091/N00640 S003122/N00642	
R0959.6	M78	TABLE CLAMP	
— — — —	S003813/N00717	S006354/N01072	
R0959.7	M79	TABLE UNCLAMP	
— — — —	S003819/N00717	S006384/N01073 S007270/N01188	
R0960.0	M80	ATC DOOR OPEN	
— — — —	S003788/N00716	S005689/N00978	
R0960.1	M81	ATC DOOR CLOSE	
— — — —	S003791/N00716	S005706/N00979	
R0960.6	M86	M86	
— — — —	S003781/N00716	S006423/N01074	
R0960.7	M87	M87	
— — — —	S003785/N00716	S006446/N01075	
R0961.2	M90	AUTO DOOR OPEN	
— — — —	S003691/N00713	S006319/N01068	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0961.3	M91 	AUTO DOOR CLOSE	
	S003694/N00713	S006332/N01069	
R0963.0	M200 	M200 BED TEMP.MEASURE	
	S003794/N00716	S008235/N01378	
R0963.1	M201 	M201 HEAD TEMP.MEASURE	
	S003797/N00716	S008250/N01381	
R0990.0	APCFIN1 	APC FINISH 1 PULSE	
	S006317/N01067		
R0998.0	M998 	M998 (MAINTENANCE ON)	
	S003755/N00714	S003902/N00730	
R0998.1	M999 	M999 (MAINTENANCE OFF)	
	S003758/N00714	S003906/N00730	
R1012.2			
	S000804/N00144		
R1012.3			
	S000806/N00145		
R1052.0	ZRN 03 	ZRN & STDNBY ON 0.3 SEC EXCEPT	
	S007963/N01336	S008203/N01375	
	S007951/N01334		
R1052.1	10INTV 	ALL ZRN & 10 SEC INTERVAL ON	
	S007940/N01333	S007961/N01336 S007969/N01337 S008213/N01376 S008223/N01377	
	S007960/N01335		
R1052.2	03EXIN 	0.3 SEC EXIN DATA INPUT	
	S007941/N01333	S007949/N01334 S007955/N01335 S008225/N01376 S008229/N01377	
	S008228/N01376		
R1052.3	03INTV 	0.3 SEC EXIN INPUT INTERVAL	
	S008226/N01376		
	S008233/N01377		
R1052.5	DINCOND 	DATA INPUT CONDITION	
	S008080/N01355	S008084/N01356 S008089/N01357 S008100/N01359 S008108/N01360	
	S008113/N01361	S008119/N01362 S008126/N01363 S008133/N01364 S008140/N01365	
	S008148/N01366	S008153/N01367 S008159/N01368 S008166/N01369 S008173/N01370	
	S008180/N01371	S008192/N01373	
	S008079/N01354		
R1052.6	10S_INTV 	10 SEC INTERVAL AFTER Z-ZRN	
	S007972/N01338	S007979/N01339 S007984/N01340 S007992/N01341 S008013/N01342	
	S008020/N01346	S008025/N01347 S008033/N01348 S008039/N01349 S008045/N01350	
	S008052/N01351	S008057/N01352	
	S007970/N01337		
R1052.7			
	S007965/N01336	S008210/N01375	
	S008212/N01375		
R1053.0	INTVAL 	0.5 SEC INPUT IN 10 SEC INTVAL	
	S008072/N01354		
	S007968/N01336		
R1053.1	TMPCAL 	TEMP COMPENSATION ALARM	
	S008002/N01342		
R1053.3			
	S007916/N01329		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R1053.4		S007936/N01332	
R1053.7		05INTV ALL ZRN & 0.5 SEC INTERVAL ON	
		S007956/N01335 S007967/N01336	
		S007945/N01333	
R1054.1		B_LT_2 BED TEMP UP 2 DEG IN 10 SEC	
		S007987/N01340 S008065/N01353	
		S007990/N01340	
R1054.3		B_S_AL BED SENSOR ALARM	
		S007993/N01341 S007998/N01342 S008073/N01354 S008220/N01376	
		S007996/N01341	
R1054.4		S007978/N01338	
R1054.5		B_LT_H BED TEMP LT.HEAD TEMP	
		S008076/N01354	
		S008011/N01344	
R1055.0		S008097/N01358	
		S008095/N01357	
R1055.1		S008107/N01359	
R1055.2		S008147/N01365	
R1055.3		Y_EXIN_A Y-AXIS EXIN FUNC. ACT A_AREA	
		S008181/N01371 S008185/N01372	
		S008183/N01371	
R1055.4		Y_DINC_A Y-AXIS DATA INPUT OK A_AREA	
		S008182/N01371 S008204/N01375 S008214/N01376	
		S008190/N01372	
R1055.5		Z_EXIN_A Z-AXIS EXIN FUNC. ACT A_AREA	
		S008193/N01373 S008197/N01374	
		S008195/N01373	
R1055.6		Z_DINC_A Z-AXIS DATA INPUT OK A_AREA	
		S008194/N01373 S008207/N01375 S008217/N01376	
		S008202/N01374	
R1055.7		S008101/N01359 S008109/N01360 S008114/N01361 S008120/N01362 S008127/N01363	
		S008134/N01364 S008141/N01365 S008149/N01366 S008154/N01367 S008160/N01368	
		S008167/N01369 S008174/N01370 S008186/N01372 S008198/N01374	
		S008098/N01358	
R1056.0		M200M BED TEMP TRANSFER TO MACRO	
		S003795/N00716 S008236/N01378 S008239/N01379 S008244/N01380	
		S008238/N01378	
R1056.1		M200TM BED TEMP TRANS TIME 2 SEC	
		S008237/N01378	
		S008243/N01379	
R1056.2		M201M HEAD TEMP TRANSFER TO MACRO	
		S003798/N00716 S008251/N01381 S008254/N01382 S008259/N01383	
		S008253/N01381	

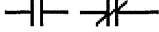

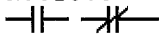
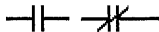
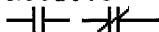
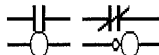
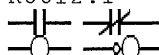
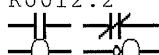
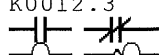
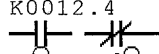
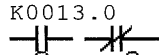
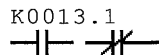
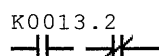
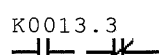
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R1056.3	M201TM 	HEAD TEMP TRANAS TIME 2 SEC	
		S008252/N01381	
		S008258/N01382	
R1057.1	H_LT_2 	HEAD TEMP UP 2 DEG IN 10 SEC	
		S008028/N01347	S008066/N01353
		S008031/N01347	
R1057.3	H_S_AL 	HEAD SENSOR ALARM	
		S007999/N01342	S008034/N01348 S008074/N01354 S008221/N01376
		S008037/N01348	
R1057.4			
		S008019/N01345	
R1058.0	ITLTCM 	INPUT TEMP.LARGER THAN CMND	
		S007988/N01340	S008001/N01342 S008029/N01347 S008067/N01353
		S008070/N01353	
R1059.0			
		S008051/N01350	
R1059.1	HOH_AL 	HEAD OVERHEAT ALARM	
		S008000/N01342	S008060/N01352 S008075/N01354 S008222/N01376
		S008063/N01352	
R9000.0	D=C78 	DATA=C78(ATC MAG.CHAIN NO.)	
		S000056/N00009	S000296/N00058 S000737/N00134 S000771/N00138 S002892/N00138
		S004337/N00787	S007986/N01340 S008009/N01344 S008027/N01347 S008059/N01347
R9000.1	IN<CM 	INPUT ST COMMAND	
		S000236/N00044	S002893/N00614 S007985/N01340 S008010/N01344 S008026/N01344
		S008058/N01352	
R9091.1			
		S007964/N01336	

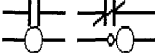
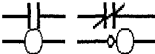
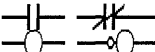
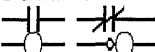
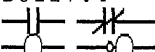
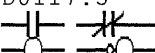
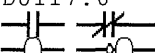
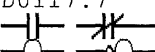
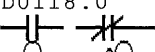
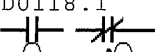
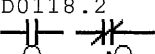
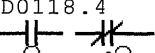
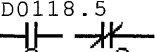
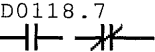
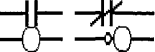
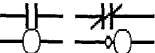
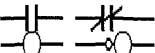
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
K0000.0 — — — —	PRMD1	ATC TWIN ARM BYPASS M35 CAN.	
	S000381/N00078	S000390/N00079	
K0000.1 — — — —	PRMD2	SP.MOTOR(0=BUILT-IN,1=FLAGE)	
	S006970/N01149		
K0000.2 — — — —	PRMD3	MANUAL ABSOLUTE USE	
	S002129/N00485		
K0000.3 — — — —	PRMD4	WORK SETTER S/GUARD USE	
	S001228/N00275	S001258/N00280 S006047/N01021 S007599/N01259 S007601/N01260	
	S007605/N01260	S007607/N01260	
K0000.4 — — — —	PRMD5	ATC POSITION MOVE SELECT	
	S005902/N01000		
K0000.5 — — — —	PRMD6	HANDLE INTERRUPT ON	
	S001701/N00371	S001708/N00371 S002661/N00570 S006094/N01023 S007661/N01273	
	S007663/N01273		
K0000.6 — — — —	PRMD7	TOOL AIR BLOW	
	S001410/N00310	S006063/N01022	
K0000.7 — — — —	PRMD8	COMPLETION CALL USE	
	S001430/N00314	S006050/N01021 S007681/N01276 S007684/N01276	
K0001.0 — — — —	PRMD9	JOG SP.START(CW/CCW)	
	S003061/N00638	S003076/N00639	
K0001.1 — — — —	PRMD10	SP.ROT DIRECTION(CW/CCW)	
	S003206/N00655	S003209/N00655 S003214/N00656 S003218/N00656	
K0001.2 — — — —	PRMD11	SP.ROT DIRECTION(CW/CCW)	
	S003207/N00655	S003210/N00655 S003215/N00656 S003219/N00656	
K0001.3 — — — —	PRMD12	SPINDLE OVERRIDE USE	
	S006042/N01021		
K0001.4 — — — —	PRMD13	B/Z-AXIS INTERLOCK	
	S006393/N01073		
K0001.5 — — — —	PRMD14	X-AXIS MIRROR IMAGE	
	S002771/N00591	S003746/N00714	
K0001.6 — — — —	PRMD15	Y-AXIS MIRROR IMAGE	
	S002777/N00592	S003753/N00714	
K0001.7 — — — —	PRMD16	RESET AT SP.ROTATION	
	S003096/N00640	S003941/N00734	
K0002.0 — — — —	PRMD17	COOLANT STOP/M05	
	S003598/N00711	S003944/N00734 S004909/N00882	
K0002.1 — — — —	PRMD18	CE	
	S000189/N00036	S000802/N00143 S001869/N00422 S001872/N00422 S002694/N00583	
	S002728/N00583	S003350/N00677 S003411/N00684 S003562/N00710 S003961/N00743	
	S004018/N00743	S004084/N00753 S004146/N00760 S004177/N00764 S004200/N00768	
	S004205/N00768	S004215/N00769 S004263/N00774 S004999/N00893 S005060/N00900	
	S005114/N00900	S005501/N00945 S005694/N00978 S005711/N00979 S005755/N00983	
	S005772/N00983	S005946/N01009 S007283/N01189 S007297/N01190 S007313/N01192	
	S007322/N01192	S007544/N01245 S007551/N01246	
K0002.2 — — — —	PRMD19	TWIN ARM BYPASS SPEED LOW	
	S000500/N00093	S000507/N00094 S004442/N00804 S004443/N00804	
K0002.3 — — — —	PRMD20	WORK NO. SEARTCH	
	S006182/N01044	S006185/N01045 S006189/N01046 S006192/N01047 S006195/N01048	

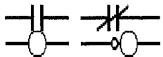
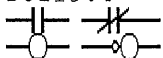
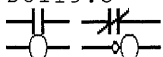
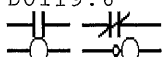
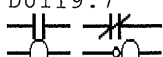
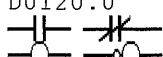
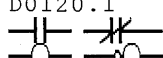
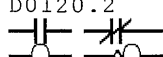
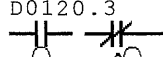
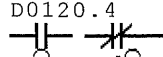
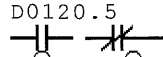
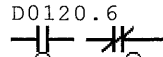
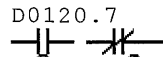
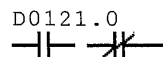
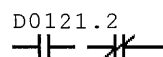
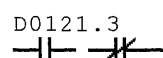
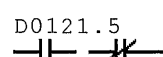
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
K0002.4 — — — —	PRMD21 S003392/N00681	FEEDHOLD AT MACHINE ERROR	
K0002.5 — — — —	PRMD22 S000625/N00118	ATC TWIN ARM ENCODER ORI.SIG.	S000633/N00118
K0002.6 — — — —	PRMD23 S001396/N00307	PLAY BACK USE	S002072/N00465 S002076/N00466 S007680/N01276 S007683/N0
K0002.7 — — — —	PRMD24 S000023/N00003	MAGAZINE ADJUST MODE	S000138/N00025 S000192/N00036
K0003.0 — — — —	PRMD25 S000719/N00131	ATC SERVO SYSTEM	S001779/N00394 S001784/N00394 S004238/N00772 S004252/N0 S007437/N01216 S007440/N01217
K0003.1 — — — —	PRMD26 S001564/N00339	JET COOLANT	S003927/N00733 S003932/N00734 S004036/N00746 S006069/N0
K0003.2 — — — —	PRMD27 S001637/N00355	OIL MIST	S003626/N00712 S004155/N00761 S006057/N01022
K0003.3 — — — —	PRMD28 S001655/N00359	GUN COOLANT	S004045/N00747 S006060/N01022
K0003.4 — — — —	PRMD29 S001604/N00347	OIL HOLE COOLANT	S004058/N00751 S006066/N01022 S007710/N01281
K0003.5 — — — —	PRMD30 S001584/N00343	THROUGH COOLANT	S001683/N00367 S001889/N00425 S004062/N00751 S004078/N0 S006055/N01022 S006072/N01022 S007672/N01275 S007675/N01275 S007691/N0
K0003.6 — — — —	PRMD31 S001466/N00320	F1-DIGIT FEED USE	S002107/N00474 S006085/N01023 S007655/N01272 S007657/N0
K0003.7 — — — —	PRMD32 S003361/N00678	M00/M01 FEEDHOLD	S003388/N00681 S003573/N00711 S003575/N00711
K0004.0 — — — —	PRMD33 S003307/N00673	APC USE	S003952/N00734 S006434/N01074 S006458/N01075 S006507/N0 S007219/N01181 S007505/N01233
K0004.1 — — — —	PRMD34 S005904/N01001	APC POS./Z-AXIS INTERLOCK	S005913/N01003
K0004.2 — — — —	PRMD35 S003957/N00734	AUTO DOOR	
K0004.3 — — — —	PRMD36 S001927/N00435	ATC DOOR	S001930/N00436 S005581/N00959
K0004.4 — — — —	PRMD37 S001901/N00428	APC PALLET NO EXIST	
K0004.5 — — — —	PRMD38 S004117/N00759		S004122/N00759
K0004.6 — — — —	PRMD39 S004118/N00759	CHIP CON.AT SP.START/STOP	S004123/N00759 S004133/N00760 S004139/N00760
K0004.7 — — — —	PRMD40 S006599/N01103		
K0005.0 — — — —	PRMD41 S001794/N00398	HEAVY TOOL USE	S004373/N00795 S004453/N00806 S004458/N00807
K0005.1 — — — —	PRMD42 S001448/N00317	AUTO POWER CUT OFF	S003871/N00724 S006077/N01023 S007637/N01269 S007639/N0

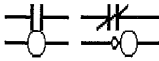
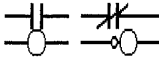
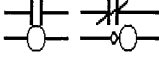
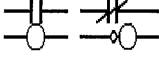
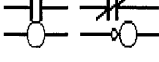
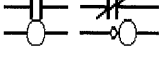
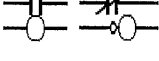
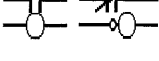
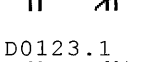
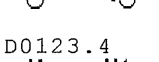
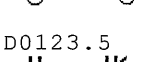
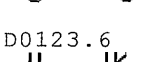
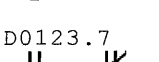
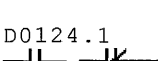
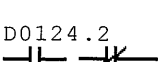
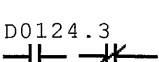

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
— — — — — —	K0005.2 PRMD43	TOOL BROKEN	
	S005863/N00993	S005869/N00994	S007036/N01158
— — — — — —	K0005.3 PRMD44	WEEKER TIMER (SP. RUN)	
	S006213/N01050	S006218/N01050	S006225/N01051
— — — — — —	K0005.4 PRMD45	WEEKER TIMER (SP. STOP)	
	S006214/N01050		
— — — — — —	K0005.5 PRMD46	WEEKER TIMER (PROGRAM START)	
	S006215/N01050	S006219/N01050	S006226/N01051 S006229/N01052
— — — — — —	K0005.6 PRMD47	BLOCK RESTART USE	
	S001483/N00323	S002104/N00473	S006088/N01023 S007649/N01271 S007651/N01270
— — — — — —	K0005.7 PRMD48	PROGRAM RESTART USE	
	S001501/N00326	S002101/N00472	S002331/N00525 S006091/N01023 S007643/N01270
— — — — — —	K0006.0 PRMD49	ATC NOT ORIGIN/CYCLE START	
	S003347/N00677		
— — — — — —	K0006.1 PRMD50	ATC NOT ORIGIN/HD.INT.RELEASE	
	S003297/N00673		
— — — — — —	K0006.2 PRMD51	LUB.OIL LACK (A CONT./B CONT.)	
	S001759/N00388	S001761/N00388	
— — — — — —	K0006.3 PRMD52	1 DEG TABLE COM SELECT	
	S003304/N00673	S003312/N00673	
— — — — — —	K0006.4 PRMD53	ALARM BUZZER	
	S007428/N01213		
— — — — — —	K0006.5 PRMD54	TOOL LIFE MANAGEMENT	
	S007350/N01195		
— — — — — —	K0006.7 PRMD56	APC ILK	
	S006572/N01100		
— — — — — —	K0007.0 PRMD57	OPERATOR MAN. DOOR	
	S001868/N00422	S003938/N00734	S007323/N01192
— — — — — —	K0007.1 PRMD58	M30 AT M/Z INDEX (FIN/AFT.FIN)	
	S003846/N00721		
— — — — — —	K0007.2 PRMD59	RESET AT M/Z (INDEX/STOP)	
	S000882/N00180	S000885/N00181	S001846/N00417 S001851/N00418
— — — — — —	K0007.3 PRMD60	TOOL INDEX FIN/SP.TOOL NO IDX.	
	S004971/N00890	S005003/N00893	S005138/N00903 S005142/N00903 S005166/N00903
	S005168/N00906	S005413/N00932	S005446/N00935
— — — — — —	K0007.4 PRMD61	LUB.PRESSURE (A CONT./B CONT.)	
	S001918/N00433	S001920/N00433	
— — — — — —	K0007.5 PRMD62	MAX.M/Z TOOL NO.SET 1	
	S005610/N00965	S005616/N00966	S005622/N00967 S005628/N00968 S005634/N00969
	S005640/N00970	S005646/N00971	S005652/N00972 S005658/N00973 S005664/N00974
	S005670/N00975	S005676/N00976	
— — — — — —	K0007.6 PRMD63	MAX.M/Z TOOL NO.SET 2	
	S005611/N00965	S005617/N00966	S005623/N00967 S005629/N00968 S005635/N00969
	S005641/N00970	S005647/N00971	S005653/N00972 S005659/N00973 S005665/N00974
	S005671/N00975	S005677/N00976	

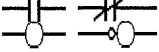
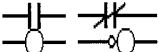
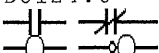
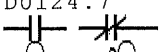
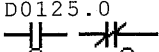
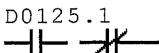
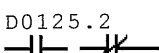
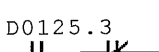
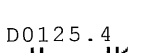
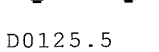
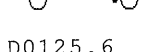
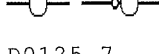
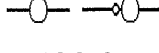
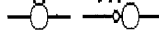
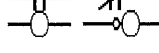
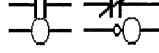
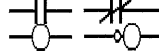
ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
K0008.0	PRMD65	LAMP CHECK	
— — — —	S007407/N01210	S007418/N01211	S007423/N01212 S007567/N01250 S007570/N01251
	S007575/N01252	S007580/N01253	S007585/N01254 S007588/N01255 S007591/N01256
	S007594/N01257	S007597/N01258	S007603/N01259 S007609/N01260 S007614/N01261
	S007617/N01262	S007620/N01263	S007623/N01264 S007626/N01265 S007629/N01266
	S007632/N01267	S007635/N01268	S007641/N01269 S007647/N01270 S007653/N01271
	S007659/N01272	S007665/N01273	S007670/N01274 S007678/N01275 S007688/N01276
	S007695/N01277	S007700/N01278	S007704/N01279 S007707/N01280 S007714/N01281
	S007719/N01282	S007722/N01283	S007726/N01284 S007729/N01285 S007732/N01286
	S007735/N01287	S007738/N01288	S007741/N01289 S007744/N01290 S007747/N01291
	S007750/N01292	S007753/N01293	S007761/N01295 S007764/N01296 S007768/N01297
	S007771/N01298	S007774/N01299	S007777/N01300 S007780/N01301 S007783/N01302
	S007786/N01303	S007789/N01304	S007792/N01305 S007795/N01306
K0008.1	PRMD66	ALARM MESSAGE DISPLAY	
— — — —	S007797/N01307		
K0008.2	PRMD67	CALL LIGHT SELECT(1/3)	
— — — —	S007406/N01210	S007410/N01211	S007416/N01211 S007422/N01212
K0008.3	PRMD68	APC STANDBY LAMP ON	
— — — —	S006558/N01099		
K0008.4	PRMD69	CALL LIGHT(ON/FLIKER)	
— — — —	S007412/N01211		
K0008.5	PRMD70	NC TABLE USE	
— — — —	S001935/N00437	S001937/N00437	S001943/N00438 S001945/N00438 S002481/N00439
	S002486/N00541	S002500/N00542	S002504/N00542 S002738/N00584 S002745/N00585
	S002749/N00586	S002751/N00586	S003314/N00673 S006355/N01072 S006357/N01073
	S006368/N01072	S006375/N01072	S006385/N01073 S006387/N01073 S006407/N01074
	S006516/N01088		
K0008.6	PRMD71	APC ROTATING ARM SOL. KEEP	
— — — —	S006685/N01110	S006706/N01111	
K0008.7	PRMD72	APC POSITION X/Y AXIS 2ND INT.	
— — — —	S006514/N01087	S006520/N01089	
K0009.0	PRMD73	TOOL MONITORING USE	
— — — —	S002524/N00547	S003114/N00641	S003357/N00678 S006082/N01023 S007379/N01024
K0009.1	PRMD74	TOOL MONITORING MODE	
— — — —	S002614/N00563	S007372/N01199	
K0009.2	PRMD75	TOOL MONITORING START	
— — — —	S002561/N00553		
K0009.3	PRMD76	TOOL LIFE END USE	
— — — —	S002570/N00554		
K0009.4	PRMD77	TOOL LIFE ALERT USE	
— — — —	S002574/N00555		
K0009.5	PRMD78	SP.STOP COM. DELAY ENABLE	
— — — —	S002585/N00558		
K0009.6	PRMD79	OVERLOAD SP.STOP ENABLE	
— — — —	S002587/N00558		
K0009.7	PRMD80	TOOL DETECTION ENABLE	
— — — —	S002633/N00564		
K0010.0	PRMD81	TOOL SETTER ENABLE	
— — — —	S006079/N01023		

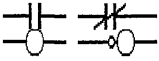
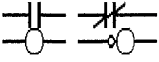
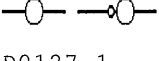
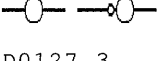
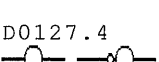
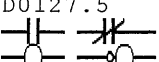
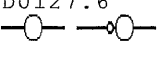
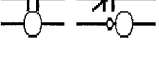
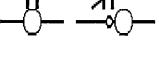
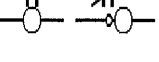
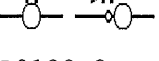
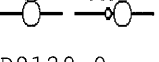
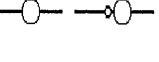

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
K0010.1	PRMD82 	TEMPERATURE COMPENSATION ENAB. S007880/N01322 S007995/N01341 S008036/N01348 S008062/N01352 S008069/N01358	
K0010.2	PRMD83 	SENSOR TEMPERATURE TRANS ENAB. S008234/N01378 S008249/N01381	
K0010.3	PRMD84 	Y AXIS TEMPERATURE COMP. ENAB. S008187/N01372 S008205/N01375 S008215/N01376	
K0010.4	PRMD85 	Z AXIS TEMPERATURE COMP. ENAB. S008199/N01374 S008208/N01375 S008218/N01376	
K0010.5	PRMD86 	3 MPG ENABLE S002258/N00516 S002260/N00516 S002266/N00517 S002268/N00517 S002274/N00518 S002276/N00518 S002282/N00519 S002287/N00520 S002290/N00520 S002296/N00521 S002299/N00521 S002305/N00522 S002308/N00522 S002318/N00523 S002327/N00524 S002735/N00584 S002743/N00585 S002755/N00587 S002758/N00588	
K0011.4	ATCCC 	ATC CYCLE CONTROL S005472/N00940 S005683/N00977 S007091/N01165 S007136/N01171 S005686/N00977	
K0012.1	RAUPKP 	ROTATING ARM UP KEEP S006607/N01104 S006614/N01105 S006731/N01114 S007477/N01227 S006610/N01104	
K0012.2	RADNKP 	ROTATING ARM DOWN KEEP S006608/N01104 S006615/N01105 S006660/N01109 S006617/N01105	
K0012.3	APCSLD 	APC ARM SOFT LIFT UP KEEP S006621/N01106 S006628/N01107 S006730/N01114 S006624/N01106	
K0012.4	APCSLU 	APC ARM SOFT LIFT DOWN KEEP S006622/N01106 S006629/N01107 S006661/N01109 S006740/N01115 S006631/N01107	
K0013.0	TCFRSTM 	TWIN ARM FOR. ROT. START MEM. S004744/N00855 S004776/N00859 S004794/N00862 S004749/N00855	
K0013.1	TCRRSTM 	TWIN ARM REV. ROT. START MEM. S004752/N00856 S004778/N00859 S004796/N00862 S004757/N00856	
K0013.2	TCFRFNM 	TWIN ARM FOR. ROT. FIN. MEM. S004763/N00857 S004777/N00859 S004797/N00862 S004767/N00857	
K0013.3	TCRRFNM 	TWIN ARM REV. ROT. FIN. MEM. S004771/N00858 S004779/N00859 S004795/N00862 S004775/N00858	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
D0117.0	AL2000 	AIR P/S ALARM S003052/N00636 S006256/N01057 S006827/N01130	
D0117.1	AL2001 	HYD. O/L ALARM S006254/N01057 S006829/N01131	
D0117.2	AL2002 	LUB. P/S ALARM S006260/N01058 S006833/N01132 S006836/N01132	
D0117.3	AL2003 	LUB. OIL LACK ALARM S006261/N01058 S006840/N01133 S006842/N01133	
D0117.4	AL2004 	POT EXIST AT MAG.SIDE COM.ERR S006121/N01029 S006849/N01134 S006852/N01134	
D0117.5	AL2005 	STD.COOLANT O/L ALARM S006262/N01058 S006855/N01135 S006858/N01135	
D0117.6	AL2006 	TF ARM ERROR S005103/N00900 S006882/N01136 S006885/N01136	
D0117.7	AL2007 	AC100V TRIP S006255/N01057 S006268/N01059 S006888/N01137	
D0118.0	AL2008 	COOLING UNIT RUN ERROR S003173/N00650 S006269/N01059 S006892/N01138 S006894/N01138	
D0118.1	AL2009 	WORK COUNTER FINISH ERROR S003386/N00681 S006896/N01139	
D0118.2	AL2010 	STD(LUB./ARM/CHIP)MOTOR O/L ER S000450/N00089 S001999/N00449 S004129/N00759 S006270/N01059 S006900/N01140 S006902/N01140	
D0118.4	AL2012 	ORI. TOOL CLAMP ALARM S002997/N00631 S006911/N01141 S006913/N01141	
D0118.5	AL2013 	ORI. ARM ORIGIN ALARM S002998/N00631 S006919/N01142 S006921/N01142	
D0118.7	AL2015 	SPINDLE DATA OVER ERROR S003176/N00651	
D0119.0	AL2016 	THROUGH COOLANT FILTER ERROR S004067/N00751 S006249/N01056 S006925/N01143	
D0119.1	AL2017 	SPINDLE START NO S CODE ALARM S003166/N00650 S006930/N01144 S006932/N01144	
D0119.2	AL2018 	SPINDLE START ARM ORIGIN ALARM S003167/N00650 S006936/N01145 S006938/N01145	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
D0119.3	AL2019 	SPINDLE START TOOL CLAMP ALARM S003168/N00650 S006945/N01146 S006947/N01146	
D0119.4	AL2020 	SPINDLE ROTATE ARM ORIGIN AL. S003169/N00650 S006952/N01147 S006954/N01147	
D0119.5	AL2021 	SP.ROTATE TOOL CL./NO TOOL AL. S003170/N00650 S006961/N01148 S006963/N01148	
D0119.6	AL2022 	SPINDLE OIL AIR PRESSURE ALARM S003171/N00650 S006968/N01149 S006974/N01149	
D0119.7	AL2023 	SPINDLE ROTATE AIR BLOW ALARM S003177/N00651 S006979/N01150 S006981/N01150	
D0120.0	AL2024 	SP.ROTATE AIR BLOW COMMAND AL. S003138/N00643 S003178/N00651 S006990/N01151 S006992/N01151	
D0120.1	AL2025 	SPINDLE UNIT ALARM S003179/N00651 S006996/N01152 S006998/N01152	
D0120.2	AL2026 	OPTION COOLANT O/L ALARM S004035/N00746 S004043/N00747 S004068/N00751 S006250/N01056 S007002/N01153 S007004/N01153	
D0120.3	AL2027 	TF MAGAZINE ERROR S005104/N00900 S007017/N01155 S007021/N01155	
D0120.4	AL2028 	POT SWING SP.SIDE CHECK ERROR S006142/N01033 S007024/N01156 S007027/N01156	
D0120.5	AL2029 	APC MAINT. M-CODE COMMAND ERRO S006153/N01036 S007030/N01157 S007033/N01157	
D0120.6	AL2030 	TOOL BROKEN ALARM S006251/N01056 S007038/N01158 S007040/N01158	
D0120.7	AL2031 	M60,M61,M62 APC STANDBY ERROR S003372/N00680 S007054/N01159	
D0121.0	AL2032 	ARM HOME POSITION ERROR S000003/N00002 S006106/N01025 S007057/N01160 S007060/N01160	
D0121.2	AL2034 	SPINDLE ROTATION AT M31 S006107/N01025 S007064/N01161 S007067/N01161	
D0121.3	AL2035 	TOOL SWING SP.SIDE COM/UNCLAMP S006109/N01026 S007073/N01162 S007076/N01162	
D0121.5	AL2037 	M31 NOT CANCEL S006110/N01026 S007079/N01163 S007082/N01163	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
D0121.6	AL2038	M06 AT NOT TOOL CLAMP	
	S006112/N01027	S007086/N01164	
	S007089/N01164		
D0121.7	AL2039	ATC CYCLE NOT END	
	S006113/N01027	S007093/N01165	
	S007096/N01165		
D0122.0	AL2040	M60 POSITION ERROR	
	S006154/N01036	S007104/N01166	
	S007107/N01166		
D0122.1	AL2041	M31,M35 AT NOT MDI MODE	
	S006114/N01027	S007111/N01167	
	S007114/N01167		
D0122.2	AL2042	M31,M35 COMMAND DURING SP.ROT.	
	S006115/N01027	S007119/N01168	
	S007122/N01168		
D0122.3	AL2043	M31 NOT COMMAND	
	S006117/N01028	S007125/N01169	
	S007128/N01169		
D0122.4	AL2044	M06 AT NOT ATC POSITION	
	S004321/N00784	S006118/N01028 S007132/N01170	
	S007135/N01170		
D0122.5	AL2045	ATC ALARM NOT CANCEL	
	S006128/N01030	S007139/N01171	
	S007142/N01171		
D0123.0	AL2048	OLD TOOL RETURN ERROR	
	S005105/N00900		
D0123.1	AL2049	TOOL POT UNCLAMP L/S NOT OFF	
	S006122/N01029	S007145/N01172	
	S007148/N01172		
D0123.4	AL2052	ATC ARM FOR./BACK.TIME OVER	
	S000004/N00002	S006123/N01029 S007152/N01173	
	S007156/N01173		
D0123.5	AL2053	ATC ARM NOT BACKWARD	
	S006124/N01029	S007160/N01174	
	S007164/N01174		
D0123.6	AL2054	ATC ARM NOT HOME POSITION	
	S006125/N01029	S007170/N01175	
	S007175/N01175		
D0123.7	AL2055	NEW POT CYCLE ERROR	
	S005106/N00900	S007191/N01176	
	S007194/N01176		
D0124.1	AL2057	HYD.OIL CONFIRM CHECK ERROR	
	S006160/N01037	S007196/N01177	
	S007199/N01177		
D0124.2	AL2058	MAINTENANCE MODE ON	
	S007725/N01284		
	S007201/N01178		
D0124.3	AL2059	TOOL POT EXIST AT M/Z SIDE COM	
	S006126/N01029	S007205/N01179	
	S007209/N01179		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
D0124.4	AL2060 	T COMMAND OVER ERROR	S005090/N00898 S005107/N00900 S007214/N01180 S007217/N01180
D0124.5	AL2061 	APC L/S CHECK ERROR	S006161/N01037 S006591/N01102 S007220/N01181 S007226/N01181
D0124.6	AL2062 	TOOL SWING M/Z SIDE L/S CHECK	S006143/N01033 S007229/N01182 S007232/N01182
D0124.7	AL2063 	T CYCLE OVER	S005108/N00900 S007236/N01183 S007239/N01183
D0125.0	AL2064 	PALLET CONTACT ERROR	S006257/N01057 S007243/N01184 S007246/N01184
D0125.1	AL2065 	EXTERNAL CHIP CONVEYOR O/L	S006275/N01060 S007249/N01185 S007560/N01248 S007253/N01185
D0125.2	AL2066 	RIGID TAPPING COMMAND ERROR	S003172/N00650 S007260/N01186 S007262/N01186
D0125.3	AL2067 	LUB.PRESSURE LOW ALARM	S006263/N01058 S007266/N01187 S007268/N01187
D0125.4	AL2068 	B INDEX POSITION ERROR	S006155/N01036 S007272/N01188 S007275/N01188
D0125.5	AL2069 	CE(OPERATOR) DOOR OPEN ERROR	S004053/N00750 S007279/N01189 S007284/N01189
D0125.6	AL2070 	CE(ATC) DOOR OPEN ERROR	S004054/N00750 S006243/N01055 S007293/N01190 S007298/N01190
D0125.7	AL2071 	CE(APC) DOOR OPEN ERROR	S004055/N00750 S007309/N01191 S007314/N01191
D0126.0	AL2072 	MAN.OP.DOOR OPEN ERROR(NOT CE)	S003373/N00680 S007325/N01192 S007325/N01192
D0126.1	AL2073 	MANUAL MAGAZINE INDEX ERROR	S004239/N00772 S004253/N00773 S004265/N00774 S006145/N01033 S007333/N01193 S007335/N01193
D0126.2	AL2074 	MAINTENANCE M-CODE COMM.ERROR	S006119/N01028 S007339/N01194 S007344/N01194
D0126.3	AL2075 	TOOL LIFE END ERROR	S006276/N01060 S007347/N01195 S007351/N01195
D0126.4	AL2076 	TABLE/PALLET MAI. M-CODE ERROR	S006277/N01060 S007358/N01196 S007361/N01196

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
D0126.5	AL2077 	MAGAZINE ALARM NO.	
	S000179/N00033	S000300/N00059	
	S000303/N00059		
D0126.6	AL2078 	MAGAZINE POWER OFF REQUIRE	
	S000306/N00060		
	S000309/N00060		
D0126.7	AL2079 	BETA-AMP ADJUST MODE	
	S000141/N00025		
D0127.1	AL2081 	ATC CAM UNIT INVERTER ALARM	
	S006264/N01058	S007364/N01197	
	S007367/N01197		
D0127.3	AL2083 	SPINDLE COOLING UNIT ALARM	
	S006265/N01058		
D0127.4	AL2084 	CUTTING TOOL OVERLOAD	
	S007369/N01198		
D0127.5	AL2085 	CUTTING MONITOR NOT READY	
	S007374/N01199		
	S007380/N01199		
D0127.6	AL2086 	TOOL LIFE END MESSAGE	
	S007382/N01200		
D0127.7	AL2087 	NO OPTION ERROR	
	S006102/N01024	S006137/N01032	
	S006105/N01024		
D0128.0	AL2088 	SP. HEAD TEMP.SENSOR OPENED	
	S003180/N00651		
	S008038/N01348		
D0128.1	AL2089 	BED TEMP. SENSOR OPENED	
	S003181/N00651		
	S007997/N01341		
D0128.2	AL2090 	TEMP.COMP SENSOR ALARM	
	S003182/N00651		
	S008071/N01353		
D0128.3	AL2091 	SPINDLE HEAD OVERHEAT ALARM	
	S003183/N00651		
	S008064/N01352		
D0129.0	AL2096 	MIST COLLECTOR O/L ALARM	
	S005877/N00995	S007009/N01154	
	S007011/N01154		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
X0014	BED_1 S007901/N01327		
X0015	BED_2 S007907/N01328		
X0016	HEAD_1 S007921/N01330		
X0017	HEAD_2 S007927/N01331		
X0067	MGDATA S000081/N00013	MAGAZINE POSITION DATA(SVU) S000284/N00055	
X0068	MZALNO S000288/N00056	MAGAZINE ALARM NO. (SVU)	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
Y0009	TMTOLD S002532/N00548	TOOL MONITORING TOOL DATA	
Y0014	S007887/N01323		
Y0064	COM:M1 S000200/N00037	MAGAZINE COM. SIGNAL 1(SVU)	
Y0066	INDAT1 S000206/N00038	MAGAZINE INPUT DATA 1(SVU)	
Y0067	INDAT2 S000225/N00041	MAGAZINE INPUT DATA 2(SVU)	
Y0071	SVUDAT S000264/N00048	MAGAZINE INPUT DATA(SVU)	
Y0107	TNODIS S006500/N01082 S006506/N01083	TOOL NO. DISPLAY	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
F0010	M##		
	S003473/N00695	S003479/N00696	S003485/N00697 S003491/N00698 S003497/N00699
	S003503/N00700	S003509/N00701	S003515/N00702 S003521/N00703 S003527/N00704
	S003533/N00705	S003539/N00706	S003545/N00707 S003551/N00708 S003557/N00709
F0022	S-CODE		
	S002882/N00612	S004162/N00762	
F0026	T##		
	S004333/N00786	S004465/N00808	S004501/N00813 S004515/N00815

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
G0010	*JV S002222/N00504		
G0030	SOV# S002820/N00601		
G0032	R0#I S004185/N00765		
G0054	S008248/N01380 S008263/N01383		
G0096	*HROV# S002701/N00578 S002706/N00579 S002712/N00580 S002718/N00581 S002724/N00582 S002732/N00583		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0102	JV_RT S002200/N00501	S002205/N00502	
R0104	FV_RT S002206/N00502	S002216/N00503 S002231/N00506	
R0106	S002233/N00506		
R0110	S002215/N00503	S002221/N00504	
R0124	S002810/N00600		
R0126	S002812/N00600	S002818/N00601	
R0160	S002884/N00612	S002890/N00613	
R0600	POSDATA S000586/N00113	ATC ARM POSITION DATA	
R0614	AMFD S000199/N00037	ATC MAGAZINE FUNCTION DATA	
R0714	S000234/N00043	S000243/N00045 S002199/N00501	
R0950	M0007 S003475/N00695	M00-M07 M CODE	
R0951	M0815 S003481/N00696	M08-M15 M CODE	
R0952	M1623 S003487/N00697	M16-M23 M CODE	
R0953	M2431 S003493/N00698	M24-M31 M CODE	
R0954	M3239 S003499/N00699	M32-M39 M CODE	
R0955	M4047 S003505/N00700	M40-M47 M CODE	
R0956	M4855 S003511/N00701	M48-M55 M CODE	
R0957	M5663 S003517/N00702	M56-M63 M CODE	
R0958	M6471 S003523/N00703	M64-M71 M CODE	
R0959	M7279 S003529/N00704	M72-M79 M CODE	
R0960	M8087 S003535/N00705	M80-M87 M CODE	
R0961	M8895 S003541/N00706	M88-M95 M CODE	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
R0962	M96103 S003547/N00707	M96-M103 M CODE	
R0963	M200207 S003553/N00708	M200-M207 M CODE	
R0998	M998999 S003559/N00709	M998-M999 M CODE	
R1000	BED-1 S007902/N01327	BED TEMP INPUT_1 S007913/N01329	
R1001	BED-2 S007908/N01328	BED TEMP INPUT_2	
R1004	HEAD-1 S007922/N01330	HEAD TEMP INPUT_1 S007933/N01332	
R1005	HEAD-2 S007928/N01331	HEAD TEMP INPUT_2	
R1008	HT-BT S008094/N01357	HEAD TEMP MINUS BED TEMP S008104/N01359 S008144/N01365	
R1012	Y_SFT_A2 S008106/N01359	Y-AXIS SHIFT_A-AREA_VALUE 2 S008111/N01360 S008124/N01362	
R1013	Y_SFT_A3 S008131/N01363	Y-AXIS SHIFT_A-AREA_VALUE 3	
R1014	Z_SFT_A2 S008146/N01365	Z-AXIS SHIFT_A-AREA_VALUE 2 S008151/N01366 S008164/N01368	
R1015	Z_SFT_A3 S008171/N01369	Z-AXIS SHIFT_A-AREA_VALUE 3	
R1020	Y_DAT_A1 S008118/N01361	Y-AXIS EXIN DATA_A1 S008189/N01372	
R1021	Y_DAT_A2 S008125/N01362	Y-AXIS EXIN DATA_A2	
R1022	Y_DAT_A3 S008132/N01363	Y-AXIS EXIN DATA_A3	
R1023	Y_DAT_A4 S008138/N01364	Y-AXIS EXIN DATA_A4	
R1024	Z_DAT_A1 S008158/N01367	Z-AXIS EXIN DATA_A1 S008201/N01374	
R1025	Z_DAT_A2 S008165/N01368	Z-AXIS EXIN DATA_A2	
R1026	Z_DAT_A3 S008172/N01369	Z-AXIS EXIN DATA_A3	
R1027	Z_DAT_A4 S008178/N01370	Z-AXIS EXIN DATA_A4	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
A0000	S007806/N01308		
A0001	S007812/N01309		
A0002	S007818/N01310		
A0003	S007824/N01311		
A0004	S007830/N01312		
A0005	S007836/N01313		
A0006	S007842/N01314		
A0007	S007848/N01315		
A0008	S007854/N01316		
A0009	S007860/N01317		
A0010	S007866/N01318		
A0011	S007872/N01319		
A0012	S007878/N01320		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
C0000	MAXTN1	MAX TOOL NO. 1	
	S004891/N00880	S004926/N00885	S005663/N00973 S005669/N00974 S005675/N00975
	S005681/N00976	S005929/N01005	
C0001	MAXTN2	MAX TOOL NO. 2	
	S004897/N00881		
C0002	CUTTNO	CURRENT TOOL NO.	
	S000053/N00008	S000082/N00013	S000735/N00133 S000769/N00137 S000791/N00140
	S004473/N00809	S004927/N00885	S005930/N01005

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
D0042	S##BCD S004163/N00762	S004170/N00763	
D0044	S002213/N00503		
D0046	SPRPLM S004184/N00765		
D0050	HVTOLMN S004381/N00796	HEAVY TOOL MIN NO. SET	
D0052	HVTOLMA S004389/N00797	HEAVY TOOL MAX NO. SET	
D0054	S002889/N00613		
D0056	TDATA S000054/N00008	T-CODE DATA S000088/N00014 S000094/N00015	S000100/N00016 S000224/N00041
D0060	S002214/N00503		
D0113	MZJUJ S000245/N00045	MAGAZINE JOD DATA S000252/N00046	
D0114	MZJDUO S000253/N00046	MAGAZINE JOD DATA S000259/N00047 S000263/N00048	
D0115	ALMNUM1 S000285/N00055	MAGAZINE ALARM DATA	
D0116	ALMNUD1 S000289/N00056	MAGAZINE ALARM DATA S000294/N00057	
D0117	ALM01 S007805/N01308	ALARM DISPLAY ADDRESS 1	
D0118	ALM02 S007811/N01309	ALARM DISPLAY ADDRESS 2	
D0119	ALM03 S007817/N01310	ALARM DISPLAY ADDRESS 3	
D0120	ALM04 S007823/N01311	ALARM DISPLAY ADDRESS 4	
D0121	ALM05 S007829/N01312	ALARM DISPLAY ADDRESS 5	
D0122	ALM06 S007835/N01313	ALARM DISPLAY ADDRESS 6	
D0123	ALM07 S007841/N01314	ALARM DISPLAY ADDRESS 7	
D0124	ALM08 S007847/N01315	ALARM DISPLAY ADDRESS 8	
D0125	ALM09 S007853/N01316	ALARM DISPLAY ADDRESS 9	
D0126	ALM10 S007859/N01317	ALARM DISPLAY ADDRESS 10	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
D0127	ALM11 S007865/N01318	ALARM DISPLAY ADDRESS 11	
D0128	ALM12 S007871/N01319	ALARM DISPLAY ADDRESS 12	
D0129	S007877/N01320		
D0130	MAXCN1 S004568/N00823 S005657/N00972	MAX MAGAZINE TOOL NO. 1 S004601/N00828 S005639/N00969 S005645/N00970 S005651/N00971	
D0131	MAXCN2 S004574/N00824	MAX MAGAZINE TOOL NO. 2 S004607/N00829	
D0132	CTCAN1 S004474/N00809	PRESENT TOOL NO. 1 S004480/N00810 S004487/N00811 S004494/N00812 S004682/N00840	
D0133	CTCAN2 S004692/N00841	PRESENT TOOL NO. 2 S004702/N00842	
D0134	W/STM1 S004806/N00863	WAIT TOOL -> SP. TOOL NO. 1 S004829/N00867	
D0135	W/STM2 S004812/N00864	WAIT TOOL -> SP. TOOL NO. 2 S004835/N00868	
D0136	TAGPC1 S000768/N00137 S004892/N00880	TARGET POSITION TOOL NO. 1 S000790/N00140 S004848/N00871 S004861/N00874 S004876/N00877 S004928/N00885	
D0137	TAGPC2 S004898/N00881	TARGET POSITION TOOL NO. 2	
D0138	DECPNO S000734/N00133	DEC. POSITION TOOL NO. S004929/N00885	
D0140	WTPTN1 S000315/N00061 S004508/N00814 S004664/N00838 S006505/N01083	WAITING TOOL NO. 1 S004397/N00798 S004403/N00799 S004411/N00800 S004481/N00810 S004524/N00816 S004533/N00817 S004581/N00825 S004638/N00834 S004683/N00840 S004805/N00863 S004818/N00865 S004847/N00871	
D0141	WTPTN2 S004608/N00829 S004824/N00866	WAITING TOOL NO. 2 S004671/N00839 S004693/N00841 S004703/N00842 S004811/N00864	
D0142	TBCDD1 S004466/N00808 S004555/N00820	T-CODE BCD DATA CHANGE 1 S004495/N00812 S004507/N00814 S004523/N00816 S004539/N00818 S004663/N00838 S004860/N00874	
D0143	TBCDD2 S004670/N00839	T-CODE BCD DATA CHANGE 2	
D0144	SPTNO1 S000323/N00062 S004488/N00811 S004595/N00827 S006499/N01082	SPINDLE TOOL NO. 1 S002531/N00548 S004418/N00801 S004424/N00802 S004432/N00803 S004540/N00818 S004547/N00819 S004569/N00823 S004588/N00826 S004602/N00828 S004817/N00865 S004830/N00867 S004875/N00877	
D0145	SPTNO2 S004575/N00824	SPINDLE TOOL NO. 2 S004823/N00866 S004836/N00868	
D0146	TCOMNO S000087/N00014	T CODE COMMAND TOOL NO. S004502/N00813	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
D0148	MAXTN1+ S004554/N00820 S005627/N00967	MAX MAGAZINE TOOL NO.+1 S004580/N00825 S004587/N00826 S005615/N00965 S005621/N00966 S005633/N00968	
D0150	HVTLMIN S004382/N00796	HEAVY TOOL MIN NO.BCD DATA S004396/N00798 S004417/N00801	
D0152	HVTLMAX S004390/N00797	HEAVY TOOL MAX NO.BCD DATA S004404/N00799 S004425/N00802	
D0154	WTPTNB S000093/N00015	WAITING TOOL NO. (BINARY) S000316/N00061	
D0156	SPTNOB S000099/N00016	SPINDLE TOOL NO. (BINARY) S000324/N00062	
D0158	ATAOPMIN S000594/N00114	ATC TWIN ARM ORIGIN POS. MIN.	
D0160	ATAOPMAX S000602/N00115	ATC TWIN ARM ORIGIN POS. MAX	
D0162	ATAUSPMI S000640/N00119	ATC TWIN ARM UNCL.ST POS. MIN.	
D0164	ATAUSPMA S000648/N00120	ATC TWIN ARM UNCL.ST POS. MAX.	
D0166	ATACSPMI S000676/N00124	ATC TWIN ARM CL.START POS. MIN	
D0168	ATACSPMA S000684/N00125	ATC TWIN ARM CL.START POS. MAX	
D0170	ATAOPMAXH S000608/N00116	ATC TWIN ARM ORIGIN POS. MAX(H)	
D0172	ATAOPMINH S000616/N00117	ATC TWIN ARM ORIGIN POS. MIN(H)	
D0174	ATAUSPMIH S000654/N00121	ATC TWIN ARM UNCL.ST POS.MIN(H)	
D0176	ATAUSPMAH S000662/N00122	ATC TWIN ARM UNCL.ST POS.MAX(H)	
D0178	ATACSPMIH S000690/N00126	ATC TWIN ARM CL.ST POS. MIN.(H)	
D0180	ATACSPMAH S000698/N00127	ATC TWIN ARM CL.ST POS. MAX(H)	
D0182	ATAPOS S000588/N00113 S000641/N00119 S000683/N00125	ATC TWIN ARM POSITION S000595/N00114 S000601/N00115 S000609/N00116 S000615/N00117 S000647/N00120 S000655/N00121 S000661/N00122 S000677/N00124 S000691/N00126 S000697/N00127	
D0250	Y_ADJ_A S008105/N01359	Y-AXIS ADJUST VALUE _ AREA_A	
D0252	Z_ADJ_A S008145/N01365	Z-AXIS ADJUST VALUE _ AREA_A	
D0254	B_SENS S007915/N01329 S008093/N01357	BED SENSE TEMP. S007982/N01339 S008006/N01343 S008049/N01350 S008082/N01355	

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
D0258	H_SENS	HEAD SENSE TEMP.	
	S007935/N01332	S008007/N01343 S008023/N01346 S008048/N01350 S008086/N01356	
	S008092/N01357		
D0264	B_OLD	BED OLD TEMP	
	S007975/N01338	S008083/N01355 S008247/N01380	
D0268	H_OLD	HEAD OLD TEMP	
	S008016/N01345	S008087/N01356 S008262/N01383	
D0274	B_OLD+2	BED OLD TEMP PLUS 2.	
	S007977/N01338	S007983/N01339	
D0278	H_OLD+2	HEAD OLD TEMP PLUS 2.	
	S008018/N01345	S008024/N01346	
D0280	H_OH_T	HEAD OVERHEAT TEMP.	
	S008043/N01349	S008056/N01351	
D0282	H_M_B	HEAD MINUS BED TEMP.	
	S008050/N01350	S008055/N01351	
D0286	Y_SFT_A	Y-AXIS SHIFT DATA _AREA_A	
	S008112/N01360		
D0290	Z_SFT_A	Z-AXIS SHIFT DATA _AREA_A	
	S008152/N01366		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
L0090	S007882/N01322 S008265/N01384		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
CTR No.1	S000728/N00132		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
TMR No.1	S002014/N00452		
TMR No.2	S002010/N00451		
TMR No.3	S006025/N01018		
TMR No.4	S007154/N01173		
TMR No.5	S007162/N01174		
TMR No.6	S006351/N01071		
TMR No.7	S003144/N00644		
TMR No.8	S005837/N00987		
TMR No.9	S005841/N00988		
TMR No.10	S002994/N00630		
TMR No.11	S003148/N00645		
TMR No.12	S004050/N00749		
TMR No.13	S006601/N01103		
TMR No.14	S006788/N01123		
TMR No.15	S002534/N00549		
TMR No.16	S002549/N00551		
TMR No.17	S002581/N00557		
TMR No.18	S002609/N00562		
TMR No.19	S003886/N00726		
TMR No.20	S002023/N00454		
TMR No.21	S006806/N01126		
TMR No.22	S006820/N01128		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
TMR No.23	S007224/N01181		
TMR No.24	S003264/N00666		
TMR No.25	S006793/N01124		
TMR No.26	S000442/N00088		
TMR No.27	S000709/N00129		
TMR No.28	S001729/N00375		
TMR No.29	S004092/N00754		
TMR No.30	S005845/N00989		
TMR No.31	S002027/N00455		
TMR No.32	S002333/N00525		
TMR No.34	S002657/N00569		
TMR No.35	S003255/N00664		
TMR No.36	S003260/N00665		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
TMRB No.1	S001957/N00441		
TMRB No.2	S001962/N00442		
TMRB No.3	S002018/N00453		
TMRB No.4	S004304/N00781		
TMRB No.5	S003367/N00679		
TMRB No.6	S005528/N00950		
TMRB No.7	S003240/N00660		
TMRB No.8	S001891/N00425		
TMRB No.9	S006758/N01117		
TMRB No.10	S006777/N01121		
TMRB No.11	S001766/N00389		
TMRB No.12	S003416/N00685		
TMRB No.13	S001979/N00446		
TMRB No.14	S004315/N00783		
TMRB No.15	S004325/N00785		
TMRB No.16	S005128/N00902		
TMRB No.17	S007051/N01159		
TMRB No.18	S001906/N00429		
TMRB No.19	S000072/N00012		
TMRB No.20	S002858/N00608		
TMRB No.21	S000134/N00024		
TMRB No.25	S003405/N00683		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
TMRB No.26	S003447/N00688		
TMRB No.27	S007942/N01333		
TMRB No.28	S007957/N01335		
TMRB No.29	S008230/N01377		
TMRB No.30	S008240/N01379		
TMRB No.31	S008255/N01382		
TMRB No.32	S006971/N01149		

ADDRESS	SYMBOL	COIL COMMENT	STEP NO./NET NO.
DIFU No.1	S000713/N00130		
DIFU No.2	S004100/N00756		
DIFU No.3	S004104/N00757		
DIFU No.4	S004108/N00758		
DIFU No.101	S008077/N01354		

