Cincom
C12/C16

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Application Manual

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Cincom C1216 Application Manual

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1. Preface

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1.1 Preface

- Every effort has been made to ensure the accuracy of all information in this manual. However, the manual may contain incorrect explanation or typographical errors. If you notice any part unclear, incorrect, or omitted in the manual, please contact Citizen Machinery Co., Ltd.

- The contents of this manual may be revised without prior notice.
  This manual applies to only the machine of the machine number shown on the back cover. Do not use manuals written for dealers and reference when operating the machine. Also, do not use this manual for other machines.

- The characteristics, functions, and operations of the machine explained in this manual do not apply to worldwide use. Some illustrations in the manual may not be identical to the actual machine.

- Citizen Machinery Co., Ltd. has all copyrights regarding this manual. No part of this document may be reproduced in any form or by any means, electronic, mechanical, or photocopying, without the prior written permission of Citizen Machinery Co., Ltd.

- The company names and product names shown in this manual are trademarks or registered trademarks of the companies.

- This machine is a strategic product controlled under the Foreign Exchange and Foreign Trade Control Law of Japan. Therefore, it should not be exported without obtaining export license from the Ministry of International Trade and Industry in accordance with the above Law.

1.2 Readers of This Manual

This manual is intended for the following persons who operate the Cincom series:

- Machine operators
- Programmers
- Persons in charge of scheduled maintenance and repair

Thoroughly read this manual before attempting to operate the machine. In particular, thoroughly read until understanding <Chapter 2 Safety Precautions> and the explanations about safety in other sections of the manual.

1.3 Organization of Instruction Manuals

The instruction manuals consist of a set of three volumes. This manual is one of the three manuals. This section shows the organization of each instruction manual.

Cincom with Guide Bushing Equipped Introduction Manual

Chapter	Title	Description
1	Preface	This chapter gives guidelines for using the instruction manual.
2	Safety Precautions	This chapter explains general notes on safety.
3	Overview of NC Lathe	This chapter explains the overview of the NC lathe. It describes items as prerequisites for operation.
4	Overview of Operation	This chapter explains the overview of Cincom operation.
5	Single-Axis Control Group Programming	This chapter explains single-axis control group programs common to Cincom that are equipped with a guide bushing.
6	Cutting Conditions	This chapter explains standard cutting conditions.
7	Terminology	This chapter explains terms for helping first-time users to understand the contents of the manual.

Cincom Basic Manual

Chapter	Title	Description
1	Preface	This chapter gives guidelines for using the instruction manual.
2	Safety Precautions	This chapter explains the precautions of preparation, operation, and maintenance/checking, the safety devices, and the action to be taken in case of emergency (e.g., fire).
3	Machine Specifications	This chapter shows the parts names of the machine and explains the dimensions and specifications of the machine.
4	Operation Panel	This chapter shows the names of the switches, lamps, and keys on the operation panel and explains their usage.
5	Programming	This chapter explains program functions specific to this product.
6	Screen Functions	This chapter explains the displays and functions of each operation screen.
7	Operation	This chapter explains methods of operating the machine.
8	Tooling	This chapter explains positions for mounting tools.
9	Mounting, Adjustment, and Replacement	This chapter explains methods of mounting/dismounting the standard attachments and methods of replacing consumable parts.
10	Periodical Checking	This chapter explains periodical checking, lubrication, and consumable parts replacement.
11	Troubleshooting	This chapter gives alarm lists and explains response to the alarms.

Cincom Application Manual

Chapter	Title	Description
1	Preface	This chapter gives guidelines for using the instruction manual.
2	Safety Precautions	This chapter explains the precautions of preparation, operation, and maintenance/checking, the safety devices, and the action to be taken in case of emergency (e.g., fire).
3	Machine Structure	This chapter shows the names and configurations of mechanical units.
4	Piping and Wiring Diagrams	This chapter gives piping and wiring diagrams.
5	Ladder Input/Output Lists	This chapter gives ladder input/output lists.
6	Parts Lists	This chapter gives parts lists.
7	Attachment	This chapter explains the setup adjustment, mounting, and dismounting of the accessories and peripheral units.
8	Application Programs	This chapter explains programs whose added value is high.
9	Transfer and Reinstallation of Machine	This chapter explains the method of installing the machine when it is transferred.

1.4 Related Instruction Manuals

The following table lists related instruction manuals:

Title	Description
Alkart Net Instruction Manual	This manual explains methods of operating Alkart net. Alkart net is a system that is connected with our (Citizen Machinery Co., Ltd.) computer through the Internet and provides various types of services.
Dedicated Hydraulic Bar Loader Instruction Manual	This manual explains methods of operating the bar loader dedicated to the Cincom series. (Optional)
Instruction Manual of Automatic Measure Compensation device	This manual explains methods of operating the automatic measure compensation device. This device automatically measures workpiece dimensions and makes compensation for errors. (Optional)
Instruction Manual of Automatic Tool Setting device	This manual explains methods of operating the automatic tool Setting device. The setter is a device that automatically performs tool setting of core and diameter. (Optional)

1.5 Notation

The following table explains the symbols used in this manual:

Symbol	Explanation
Bold character	Bold characters are used to emphasize the text. Example: **Do not open the door** during operation.
<1.1 Preface>	Inequality signs < > indicate the reference section.
	This symbol indicates a sheet key and button on the operation panel.
[PRG SEL]	Brackets [ ] indicate buttons on screens and in dialog boxes.
"Processing..."	Double quotation marks " " indicate a character string on screens and in dialog boxes.
Procedure	This indicates the procedure for operation.
Command format **Argument** **Axis control group**	This indicates the syntax of words (commands) for coding programs and the axis control groups for which commands are to be specified.
Note Note(s):	These indicate information that you should keep in mind.
Program sample **Operation sample** Example(s):	These indicate examples and exercises.

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2. Safety Precautions

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2.1 Safety Signs

Be sure to read and understand this chapter and all other applicable chapters of this Manual and all on-product safety signs before preparation, operating, and maintaining this machine.
Each safety sign has the specific signal word indicating the degree of the danger. The following three signal words are provided. Each signal word indicates a particular degree of danger as described below.

DANGER; alerts you to an imminently hazardous situation which, if not avoided, will result in death or serious personal injury.
WARNING; indicates a potentially hazardous situation which, if not avoided, could result in death or serious personal injury.
CAUTION; indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate personal injury and/or possible damage to the machine and its components.

The location and content of the on-product safety signs are on the following pages. Be sure these signs are read and understood.

 WARNING

Do not remove or hide any safety sign (warning label). If it is peeling, call the Cincom Service Office.
The warning labels are intended to call user's attention to dangers by indicating the contents of the dangers and further prevent the user's safety form being injured or dead and also the machine from being damaged.

<Figure 2.1-1> shows the locations on which the warning labels are put. <Figure 2.1-2> describes the contents of the warning labels.

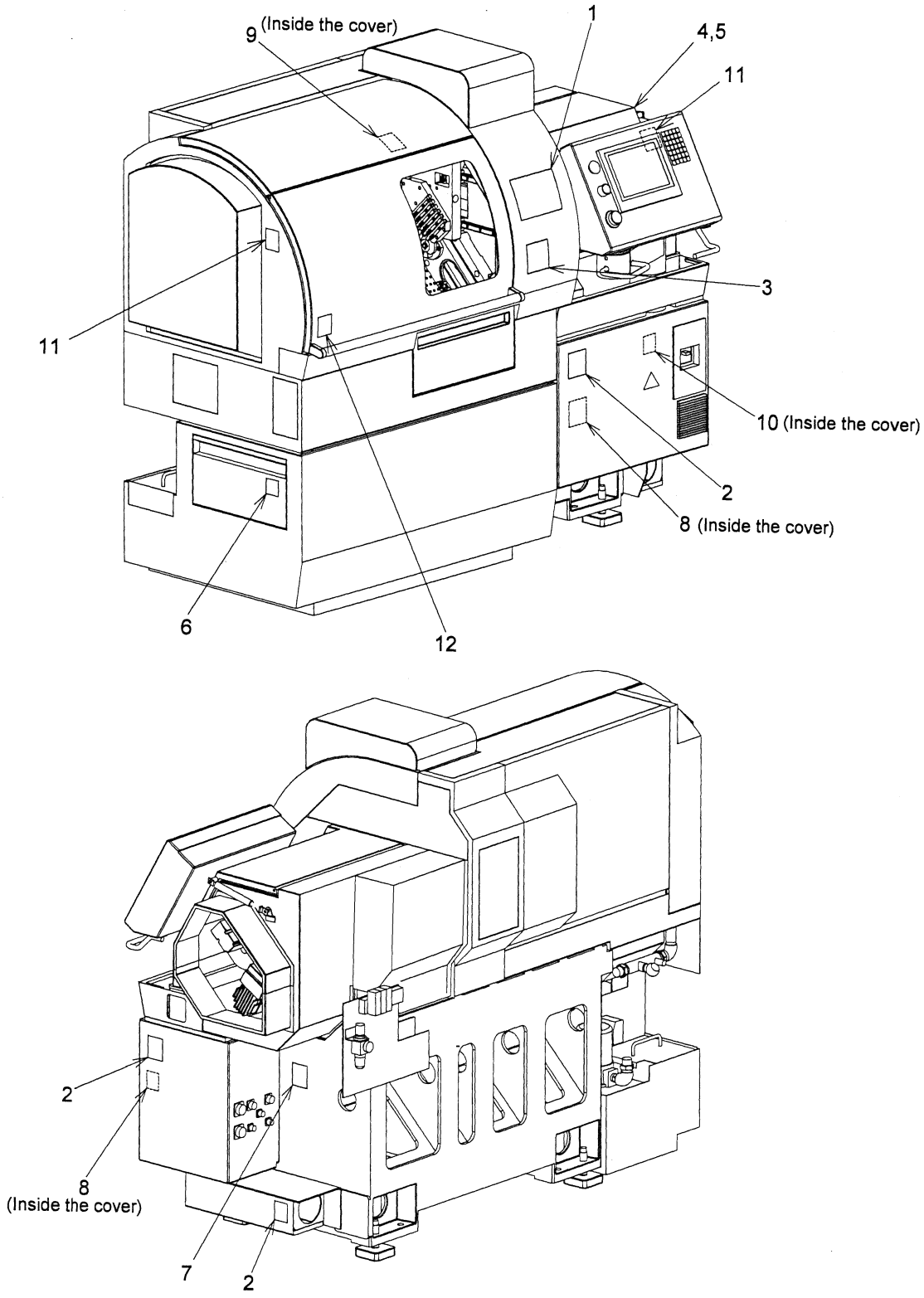


Figure 2.1-1 Location of Warning Labels

1

⚠ WARNING

To prevent serious injury, death or property damage, follow these precautions when operating, inspecting or mintaining the machine:

- Read instruction manual before using machine.
- Do not touch tools or other moving parts when machine is operating.
- Do not operate machine unless all doors and all covers are closed.
- Turn off power at main breaker before opening control unit doors or covers.
- Before operation, be sure all safety devices are working.



⚠ WARNING

To prevent serious injury, death or damage due to fire, do the following:

- Monitor machine when operating.
- Do not use damaged tools.
- Apply sufficient coolant to cutting point during operation.
- Keep flammable items away from machine.
- Be sure all doors, all covers, chip outlet door and product outlet door are closed during operation.
- Regularly remove chip from chip collector and coolant tank.

EW201

2

⚠ WARNING



Hazardous voltage inside. Will shock, burn, or cause death.

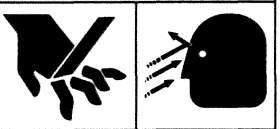
Only qualified personnel totally familiar with electrical circuits and service manual should work inside this enclosure.

Follow Lockout/Tagout.

EW01

3

⚠ WARNING



Moving part, hot chips and hot oil inside.

Keep door closed during operation.

EW02

4

⚠ WARNING



Moving parts inside.

Keep door closed during operation.

EW03

5

⚠ WARNING

Moving parts can cause serious injuries.

Keep hands and body away from moving parts.

EW04

6

⚠ WARNING

Turn off machine before removing chips inside.

Hands or chip remover tool can touch moving parts inside and cause serious injury.

EW05

7

⚠ WARNING



Hazardous voltage. Can shock, burn,or cause death.

Turn off main breaker before connecting or disconnecting coolant pump.

EW07

8

⚠ DANGER

Hazardous voltage inside. Will shock, burn, or cause death.

DO NOT work in this enclosure unless familiar with these electrical circuits and safe servicing procedures.

ED01

9

⚠ WARNING



Hot suface can cause bums.

Do not touch when power is on. Wait until surface cools.

EW11

10

⚠ WARNING



GROUND

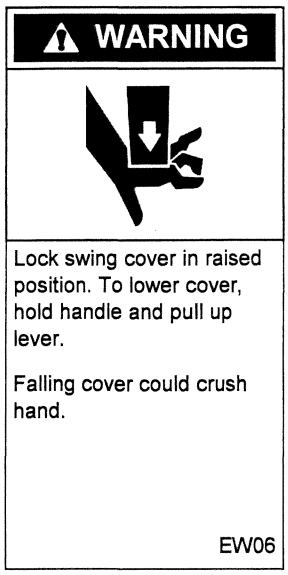
GETTING ELECTRIC SHOCK OR NOISE CAN OCCUR.

THE UNITS MUST BE GROUNDED. (RESISTANCE VALUE MUST BE 100Ω OR LESS)

A-002

Figure 2.1-2 Contents of Warning Labels

11



12

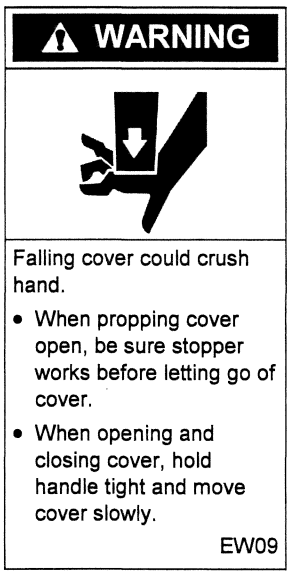


Figure 2.1-2 Contents of Warning Labels

2.2 Emergency Stop Button

The red emergency stop button is located on the operation panel. When there is an emergency situation such as fire, power failure, earthquake, or lightning or if you need to evacuate at once, press this button to stop the operation immediately before you leave the work site. Note, however, that pressing these emergency stop buttons during machine operation might damage a tool as well as the product being processed. To reset the emergency stop state, first verify your safety. Then, turn the locked emergency stop button clockwise to release the lock after confirming the safety of the machine. Also return all the mobile sections of the machine to their return positions and then remove all the workpieces subject to machining from the machine.

<Figure 2.2-1> shows the location of Emergency Stop button.

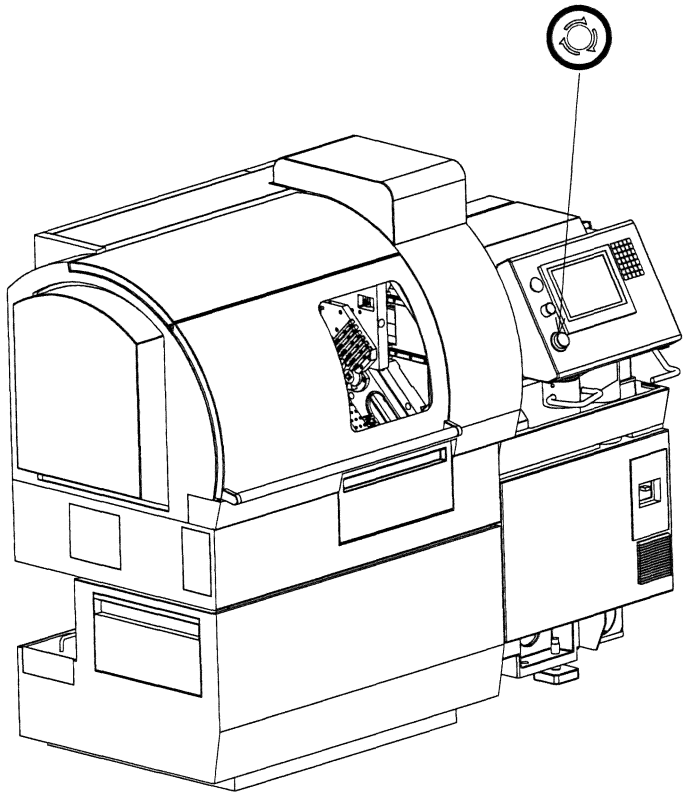


Figure 2.2-1 Location of Emergency Stop Button

2.3 Safety Devices

> ⚠ WARNING
>
> No safety devices provide complete safety against accidents and hazards.
> Be sure to follow the precautions and described in this chapter to operate the machine.
> Failure to do so could result in death or serious personal injury.

Cincom provides the following kinds of safety devices to prevent and detect accidents and hazards when operating the machine.
The standard and optional safety devices shown and described on the following pages are installed depending on particular operating needs of the customer.

- Devices to detect any accident that occurs during machine operation.
- Devices to stop the machine operation under an unsafe condition.
- Devices to prevent production of defective products.
- Devices to prevent damage to the machine or tools.

Safety devices are strongly recommended in the following situations:

- When reducing operator's attention such as operating the machine continuously or in night shift.
- When extending the duties of the operator beyond this machine.
- When further reducing the possibility of accidents.

The remainder of this section shows the locations of safety devices and outlines their functions.

Note

Optional safety device can be used only when you purchase it.

<Figure 2.3-1> and <Figure 2.3-2> show the locations on which safety devices are installed.

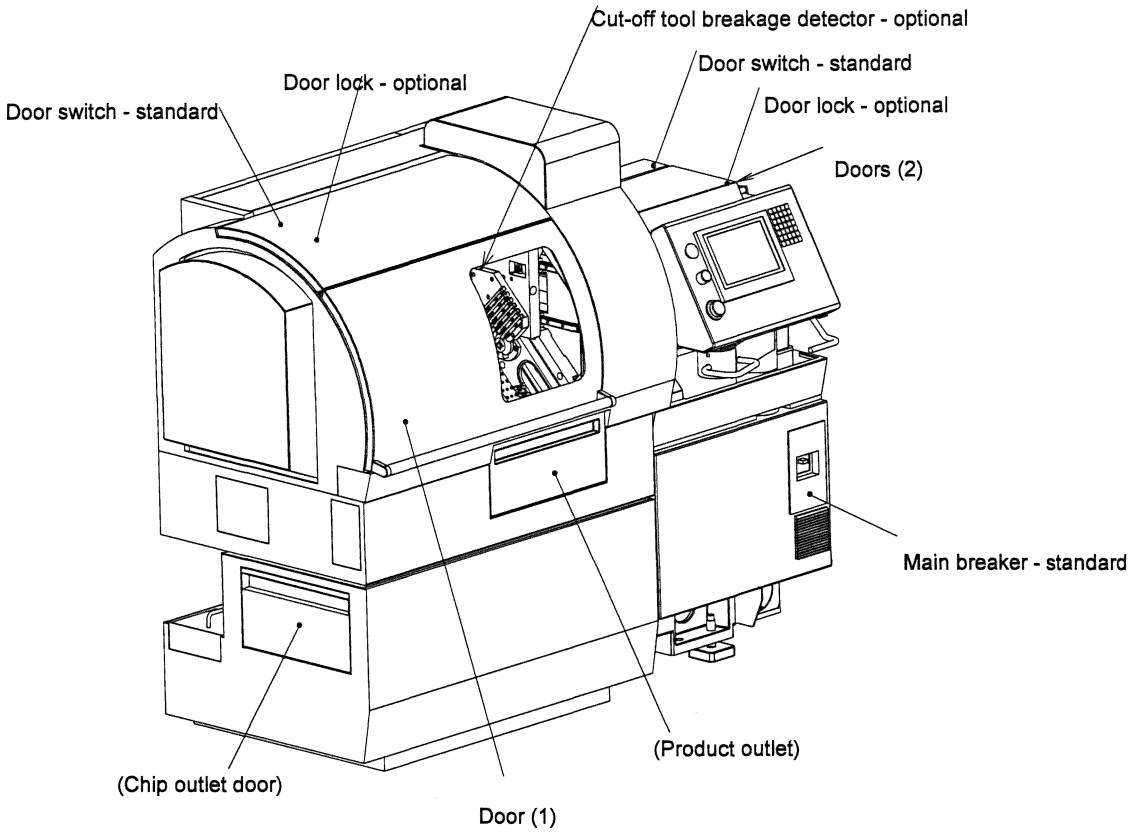


Figure 2.3-1 Locations on which safety devices are installed (viewed from front of machine)

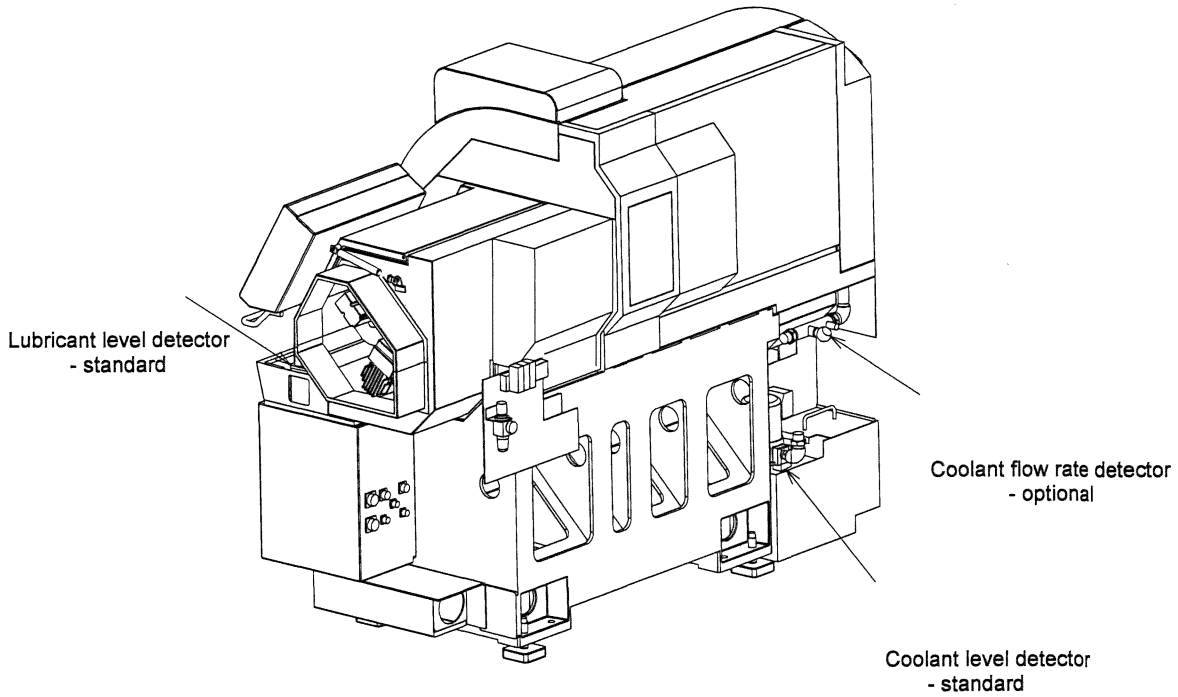


Figure 2.3-2 Locations on which safety devices are installed (viewed from rear of machine)

The following are detailed descriptions of the safety devices:

Door switches - standard

Door switches prevent any person from opening the front left (cutting side) doors (1) and front right (main spindle side) doors (2) during machine operation. See <Figures 2.3-1 and 2.3-2>. The machine can be operated only when all the doors are closed. The machine will be stopped when any of the doors is opened during operation.
In the Handle Feed or Preparation mode, however, operations (excluding the cut-off machining operation) are performed at a speed of up to 2 m per minute even with such doors left open. In addition, manually opening or closing the chuck, manually rotating the spindle, and turning coolant supply on or off are performed whether the doors are open or closed.

Main breaker - standard

The main breaker is automatically turned off to shut down when an overcurrent or a short circuit is detected.

Coolant level detector - standard

This device is installed in the coolant tank and detects the height of the coolant level. When the coolant level gets lower than the limit, the operation of the machine is automatically stopped after completing one cycle to prevent a fire hazard.

Lubricant level detector - standard

This device is installed in the central lubricating oil unit and detects the level of the lubricating oil. When the oil level gets lower than the limit, the operation of the machine is automatically stopped after completing one cycle to prevent machine damage.

Door lock - optional

The door lock disables the door (1) on the front left side (cutting room door) and the door (2) on the front right side (main spindle side door) to be opened during the operation of the machine but enables them to be opened if the machine is stopped (see <Figure 2.3-1>). Door switch is not required when the door lock is mounted.

Cut-off tool breakage detector - optional

A cut-off tool is very easily damaged. If you continue to operate the machine with a damaged cut-off tool, the machine may be damaged or fired. This device detects whether or not material is properly cut. In other words, it indirectly detects whether the cut-off tool is damaged to prevent the above possible dangers. When this device detects a damaged cut-off tool, the operation of the machine is automatically stopped to prevent a fire or machine damage.

Coolant flow rate detector - optional

This device is installed in the coolant supply path to detect the decrease in the flow rate of the coolant. When the coolant flow rate gets lower than the limit, the operation of the machine is automatically stopped to prevent a fire or machine damage.

The following software functions are installed as safety devices in the machine.

Spindle speed change detecting – standard

This function detects excessive changes in spindle speed to prevent machine damage. When the spindle speed fluctuates beyond the predetermined range, the operation of the machine is automatically stopped to prevent the machine from being damaged.
Note, however, that this function must be turned off when the constant surface speed control function is used and during tap and die machining.

Interference check - standard

This function checks for interference between back spindle and opposite tool post. When the function determines the possibility of interference during machine operation, the operation of the machine is stopped to prevent machine damage.

2.4 Specifications of Safety Operations

The start, stop, and speed of the machine are defined as listed in the table below from the viewpoint of safety.

Operation control mode and function	Operating Section	Operation with door being opened	Operation at opening the door
Automatic operation Automatic operation of program Program check Automatic operation of program Handle operation of program MDI operation Preparation for operation Cutting in cut-off machining	Spindle	The operation cannot be started. The operation can be stopped.	The spindle continues to rotate at the specified speed.
	Control axis	The operation cannot be started.	The operation is stopped.
Preparation for operation Start position operation Return position operation Tool selection in cut-off machining Tool selection operation Gang tool return operation Manual tool set operation Positioning point operation Back returning operation	Spindle	–	–
	Control axis	The operation can be started. The operation speed is 2 m/min or less.	The control axis continues the operation at the speed of 2 m/mm or less.
Preparation for operation Chuck open/close operation Automatic adjustment of chuck force Automatic adjustment of guide bushing	Spindle	The operation can be started. The operation speed is 10 min^{-1} or less.	The spindle continues to rotate at the speed of 10 min^{-1} or less.
	Control axis	The operation can be started. The operation speed is 6 m/min or less.	The control axis continues the operation at the speed of 6 m/mm or less.

2.5 General Precautions during Operation

Be sure to follow the notes described below. Failure to do so will result in death or serious personal injury.

- While the main breaker is set to ON, DO NOT make your body contact with or close to the charging section.
- Do not put your fingers or hands into any moving part of the machine during machine operation.

  When the 

key LED on the operation panel lights or flashes, regard the machine status as Operating.

Be sure to follow the notes described below. Failure to do so could result in death or serious personal injury.

- Operate the machine with all the covers closed.
- All the control unit covers and doors must be closed during machine operation. Shutdown the main breaker of the machine before opening the control unit covers and doors.
- Activate all the safety devices during operating the machine.
- DO NOT open all front left and right doors unless the machine is completely stopped.
- Make sure that all front left and right doors are closed and locked (if equipped with locks) and all safety devices are activated before operating the machine.
- To operate the machine, sufficiently understand the operation and visually confirm the operation switch to be used before actually pressing that switch.
- Check the tooling to see that it is securely clamped in place before starting the machine.

Be sure to follow the notes described below. Failure to do so may cause a fire and not only a damage to the property but also a death or serious personal injury.

- Operate the machine where an operator can complete arrangements for fire extinguishing at any time.
- When machining a material combustible (flammable) during machining by cutting, operate the machine where the operator can always monitor the machining procedure.
- Make sure that there is enough coolant in the machine and it is being supplied smoothly to all necessary parts.
- Clean the machine regularly to remove any chips and debris from the cutting area and the chip receiving area. Remove stray chips from the coolant tank as required, depending on cutting condition and type of material being machined.

2.5.1 Before starting the machine

Be sure to follow the notes described below. Failure to do so could result in death, serious personal injury, or damage to the machine.

- Before starting the machine for the first time, you should know the following:
  - The locations of the emergency stop button safety devices, and all front left and right doors.
  - The meaning of all safety signs.
  - How to stop the machine in an emergency situation.
  - What happens to the machine when you operate buttons, switches and keys on the operation panel.
  - Proper shutdown and startup procedures.
  - Procedures for clearing machine troubles.
  - How to shutdown the main breaker of the machine.
- Make sure you are not too tired or sick to operate the machine safely. If you are tired or sick, DO NOT OPERATE THIS MACHINE.
- Wear the proper shop coat (without being slack and/or loose), cap, and safety shoes. Remove gloves, rings, accessories, tie, and those which may possibly be wrapped in the machine from your body.
- Remove the obstacles that may cause slips, falls, and stumbles from the area around the machine.
- Withdraw inflammable chemicals and goods from the area around the machine.
- Clean dirt, oil, and coolant off of the machine, especially on the operation panel.
- Make sure that the machine safety devices are engaged and working properly. DO NOT operate the machine with the safety devices disabled or removed.
- Make sure that the emergency stop button is working properly.
- DO NOT modify the machine and control circuit.

2.5.2 Safety during preparation operation

Be sure to follow the notes described below. Failure to do so causes accidents as in death, serious personal injury, or damage to the machine.

- DO NOT adjust the tools or measure the dimension of the material during machine operation. If adjustment or measurement is necessary, stop the machine first. Then, before adjusting or measuring, make sure that all machine motion has stopped and that the work cycle will not start automatically.
- In the preparation mode, the tool selection or axis move operation can be done if any of the doors on the front left and right sides is opened. Whereas the machine operation speed is suppressed in the situation, take note on the machine fully and do not approach the moving parts of the machine.
- Check whether the chucking force is sufficient for the material.
- Fix the guide bushing by applying proper fixing torque. Failure to do so causes burning or galling.
- Always remove the jig or tool when it is used for the guide bushing or chuck adjustment.
- Confirm that the installed tool does not interfere with the machine in a preparation work such as program installation or tool replacement.
- Confirm the program contents sufficiently. The machine does not have the function of checking of correcting the programs contents automatically.
- DO NOT attempt to perform work that is beyond the specifications of the machine.
- Take coolant flow into consideration when you select the tooling. Select tooling that allows a smooth passage of chips.
- Select the tool fit to the program contents and machining.
- Confirm that proper offset values are set.

2.5.3 Safety at machine start

Be sure to follow the notes described below. Failure to do so causes accidents as in death, serious personal injury, or damage to the machine.

- Confirm that any maintenance work is not done.
- Remove the foreign substance (including tools and work towels) within and out of the machine.
- Make sure there is enough oil in the lubricating oil tank and coolant tank.
- Before starting the machine, confirm that the tooling (including tools, tool holder, chuck, and chuck bushing) is mounted securely at the proper positions.
- Close all the doors on the front left and right sides securely.

2.5.4 Safety during automatic operation

To prevent any secondary accident from being triggered by an unexpected incident, such as jammed chips, be sure to monitor the operation status at appropriate intervals during the automatic operation and troubleshoot a failure, if any. When the machine is not monitored at all times, an operator should be placed within a certain distance from the machine so that he can immediately take an appropriate action at the occurrence of a failure in the machine. Always stop the machine before it is repaired.
During operation, close all the doors of the machine for fire prevention.

Regularly Monitor the Machine

- To produce high-quality products and avoid damage to the machine and possible personal injury, monitor the machine at regular intervals for alarm messages, tool wear, coolant flow, etc.

- Take note on the operation status. If an error occurs, stop the machine immediately and take the appropriate action. The major error include chip entanglement, tool break, and workpiece burning.

- Perform the following items periodically. The interval depends on the cutting condition and material. Define the interval according to the usage state.

Remove chips
Too many chips on the tools and materials can greatly reduce the cooling effect of the coolant. Reduced cooling effect can cause a fire, depending on the type of material being machined. Remove chips from the chip receiving area and the cutting area at suitable intervals. When the machine is regularly used, intervals depend on cutting condition, material, etc.

Inspect the Coolant
Monitor the coolant condition and level regularly. Check regularly to make sure that the coolant is discharged smoothly and that the supply to the machining position is adequate. Failure to do so can result in damage to the tools and a possible fire hazard.

Inspect the Tools
Dull, worn, or damaged tools put excessive load on the machine. This can damage the machine and possibly cause a fire. Follow a regular inspection/maintenance schedule for the tools. During machine operation, listen for abnormal sounds and be aware of possible troubles due to damaged, dull, or worn out tools. Also inspect completed workpieces for evidence of damaged, dull, or worn out tools.

Machine stop during operation

DO NOT adjust the tool or measure the size of the workpiece during operation. If done, a serious personal injury may occur. If it is necessary to mount or adjust the tool or measure the size of the workpiece, first stop the machine. Then after confirming that the machine is stopped completely and the machining cycle is not started automatically, start the adjustment or measurement work.

Door closing

During operation, be sure to close the cutting room door, main spindle side door, chip outlet, and product outlet. If a fire occurs due to some cause without any of the door closed, frames may come out from the doors to spread the fire.

2.5.5 Safety during maintenance

Be sure to follow the notes described below. Failure to do so causes accidents as in death, serious personal injury, or damage to the machine.

- Turn off the main breaker before opening the cover or door of the control unit.
- Only qualified maintenance personnel should perform maintenance operations on the machine.
- When more than one engineer maintain the machine, they should always communicate with each other by voices to confirm the safety.
- The electrical components in this machine are high precision devices that can be damaged by excessive force, shock, or vibration. Use caution when you handle all electrical components of the machine.
- Use care when you disconnect connectors. They are easily damaged.

2.5.6 Safety at end of operation

Be sure to follow the notes described below. Failure to do so causes accidents as in damage to the machine.

- To turn off the power of the machine, press  after stopping the machine, confirm that the LCD display disappears and the lamps on the control unit are off, and turn off the main breaker.

2.6 Action of Emergency Situations

Actions and procedure required in emergency situations are explained in this section.

2.6.1 Emergency situations requiring evacuation

Concern human lives first when an emergency situation such as a fire, lightening, or earthquake occurs.

- If you have time before evacuating

  Stop the machine immediately. Press  and confirm that the LCD display disappears and lamps on the control unit are off. Then, turn off the main circuit breaker. Try to get the machine to stop when the tool is not touching the material. Otherwise, the tip of the tool may be damaged in the process of stopping or restarting operation.

- If you do not have time and must evacuate immediately

  Immediately press the Emergency Stop button and turn off the main circuit breaker to stop the machine.

2.6.2 Power failure

If a power failure occurs, illegal data may enter into the machine due to the machine control scheme. After the power is recovered, turn off the main breaker once and then turn on the power of the machine again.
In addition, if a momentary power failure occurs without machine stop and LCD display disappearing, the main circuit breaker must be turned off once. Press  , confirm that the LCD display disappears and lamps on the control unit are off, and turn off the main breaker. Then, turn on the power of the machine again.

2.6.3 Resuming operation

After emergency stop of the machine or a power failure, follow the procedure below to resume operation of the machine:

Operation procedure

1. Inspect the tool sufficiently to check whether it is damaged or worn. If the tool is damaged or worn considerably, replace it with a normal one. Also confirm that the machine can be operated safely in the normal state.
2. Provide the cut-off machining for the workpiece being subject to machining at the occurrence of the emergency situation.
3. Restart the operation of the machine according to <Chapter 7 Operation> in the Basic Manual.

2.7 Notes for Prevention of Accident

2.7.1 Notes for prevention of electric shock accident

Be sure to follow the notes described below. Failure to do so causes accidents as in death or serious personal injury due to an electric shock.

- DO NOT make your body contact with or close to the charging section of the electric device.
- Always turn off the main breaker of the machine before connecting or disconnecting the power cable of the machine. Then, turn off the power breaker in the shop from which the power is supplied to the machine.
- Ground the machine correctly. Refer to <Chapter 9 Relocating the NC Machine> in the Application Manual for details.
- Before opening the cover or the door of the control unit, always turn off the main breaker.

2.7.2 Notes for prevention of injury or death

Be sure to follow the notes described below. Failure to do so causes accidents as in death or serious personal injury.

- Make sure you are not too tired or sick to operate the machine safely. If you are tired or sick, DO NOT OPERATE THIS MACHINE.
- Make sure you wear the proper work clothes (no loose clothing), safety goggles, cap, and safety footwear. Also make sure you remove any gloves, rings, accessories, neckties that may cause you to be caught by the machine.
- DO NOT put your fingers or hands into any moving part of the machine. DO NOT make your body contact with or close to any rotating section of a tool or the machine.
- During the operation of the machine, have the machine cover and all of the doors on the front left and right doors closed. In addition, DO NOT open any of the doors on the front left and right sides unless the machine completely stopped.
- In the preparation mode, the tool selection or axis move operation can be done if any of the doors on the front left and right sides is opened. Whereas the machine operation speed is suppressed in the status, take note on the machine fully and do not approach the moving parts of the machine.
- Be sure to maintain the machine by qualified personnel familiar with the maintenance work.
- If more than one engineer maintain the machine, they should always communicate with each other by voices to confirm the safety.
- DO NOT modify the machine and control circuit.
- Machine transfer requires work using cranes and forklifts and slinging work. Be sure to assign the personnel certified by the public institute to the work.

2.7.3 Notes for prevention of fire

Major causes of occurrence of fire

- The friction between the workpiece and the tool or the metallic section of the machine caused by break or wear of a cutting tool may overheat the machine to be fired.
- Because the coolant is not discharged to the machining point enough, the workpiece is overheated to fire. The following causes may be assumed:
  - The position of the coolant nozzle is incorrect.
  - Chips get caught in the coolant nozzle to move the position of the coolant nozzle.
  - Because of insufficient coolant in the coolant tank, the coolant flow is rather low.
  - Because chips are accumulated in the coolant tank to decrease the quantity of coolant flown into the pump, the coolant flow is rather low.
  - Because the filter in the coolant tank is clogged, the coolant flow is rather low.
  - Chips are accumulated around the machining point.
- Miscellaneous
  - Inflammable coolant or coolant having only low cooling effect is used to cause a fire to occur.
  - Because the temperature is extremely high in the cutting room, the coolant is vaporized to cause a fire to occur.
  - A combustible workpiece (flammable workpiece) is subject to machining to cause a fire to occur.
  - Because no safety devices are operated, any failure cannot be detected to cause a fire to occur.

Major causes of spread of fire

- The occurrence of a fire was found late because the machine was not monitored.
- Frames were spread out of the cutting room because the cutting room door, chip outlet, and/or product outlet were opened.

Notes for fire prevention

Be sure to follow the notes described below. Failure to do so may cause a fire resulting not only a damage to the property but also a death or serious personal injury.

- Monitor the machine status regularly. Then take appropriate action if a malfunction is found.
- To minimize the spread of a fire if it occurs, monitor the operation status to enable the extinguishing work to be done immediately.
- Always check the machine depending on <Chapter 10 Scheduled Maintenance> in the Basic Manual.
- Check the cutting tools to use proper tools which are neither broken nor worn.
- Operate the machine within the range of the specification. See <Chapter 7 Operation> in the Basic Manual.
- Provide machining under the proper cutting conditions.
- Confirm that the quantity of the coolant is enough to be supplied smoothly to the sections requiring the coolant.
- Confirm that the coolant hose is neither twisted nor broken, the connections are not loosened, and chips are not accumulated at the bending sections.
- It is particular dangerous when an error occurs in the electric device of the machine to generate sparks. Stop the machine immediately, turn off the main breaker of the machine, and contact the Cincom service.
- For the machining of a combustible workpiece (flammable workpiece), operate the machine under the condition that an operator always monitors it. Prepare a metal fire extinguisher near the machine.
- Check the cutting tools for any breaks or wears. If a failure is found on a cutting tool, replace it with a normal one. Also check the machining surfaces of products. If they indicate a failure of the tool, replace it with a normal one.
- DO NOT bring fire such as light of cigarette, light of lighter, and sparks close to the machine.
- Confirm the doors on the front left and right sides, chip outlet, and product outlet to close them securely.
- Monitor the quantity of chips in the chip receiver and the coolant tank regularly to remove them.

2.7.4 Notes for prevention of machine damage

Be sure to follow the notes described below. If not, the assets including the machine and machining products may be lost.

- Confirm that the installed tool does not interfere with the machine in a preparation work such as program installation or tool replacement.
- DO NOT modify the machine and control circuit.
- DO NOT provide any machining exceeding over the machine specification.
- Electric parts are extremely precise to be damaged by excess force, shock, or vibration. Take sufficient notes on handling of electric parts.
- Take sufficient notes when connecting or disconnecting the connector because it can easily be damaged.

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3. Machine Components

3.1 Mechanical Overview 3-3

3.2 Main Components of the Machine 3-4

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3.9 Back Spindle Device 3-13

3.10 Lubricant Piping 3-14

3.11 Pneumatic Piping 3-15

3.12 Electric Device 3-16

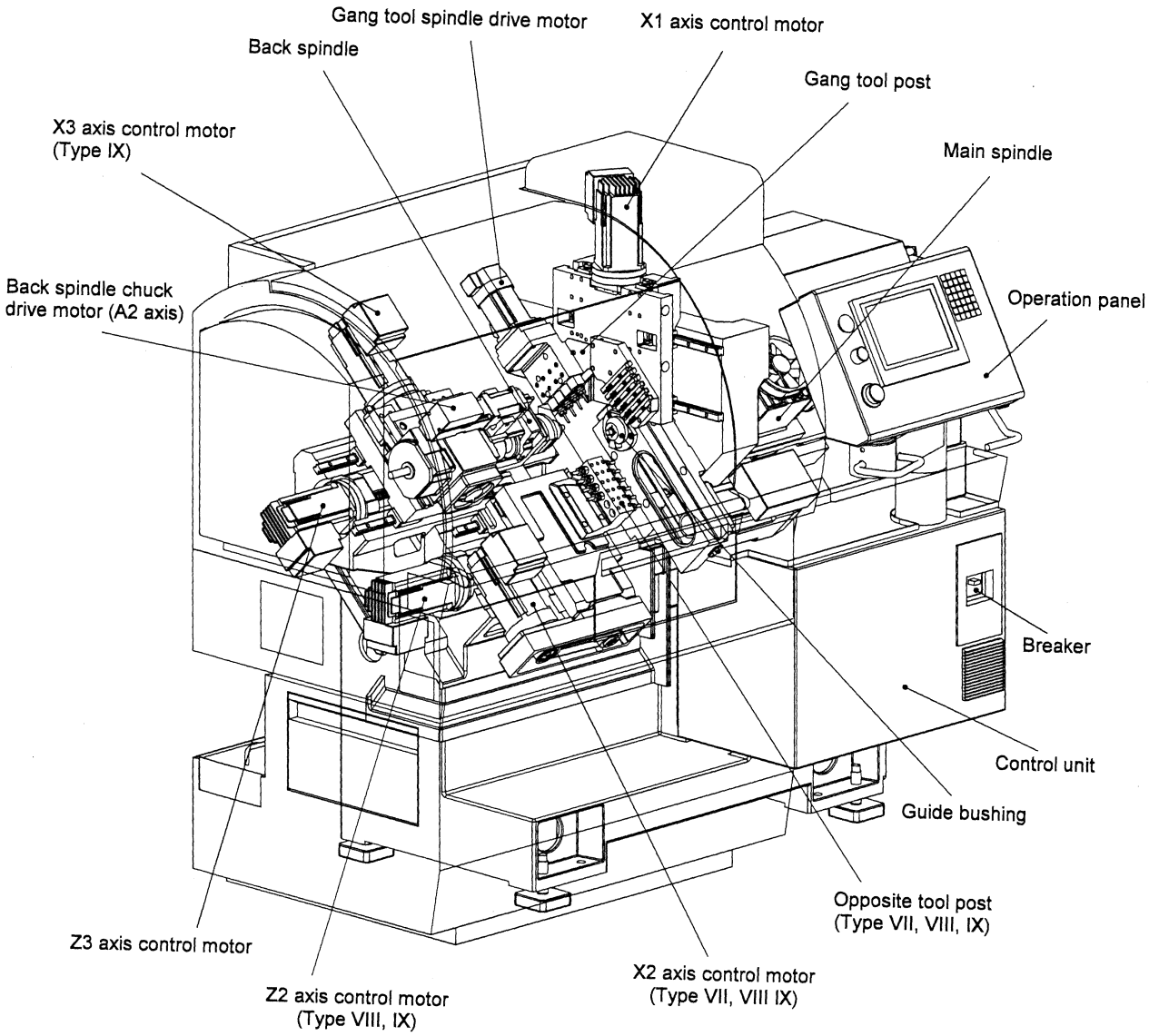
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3.1 Mechanical Overview

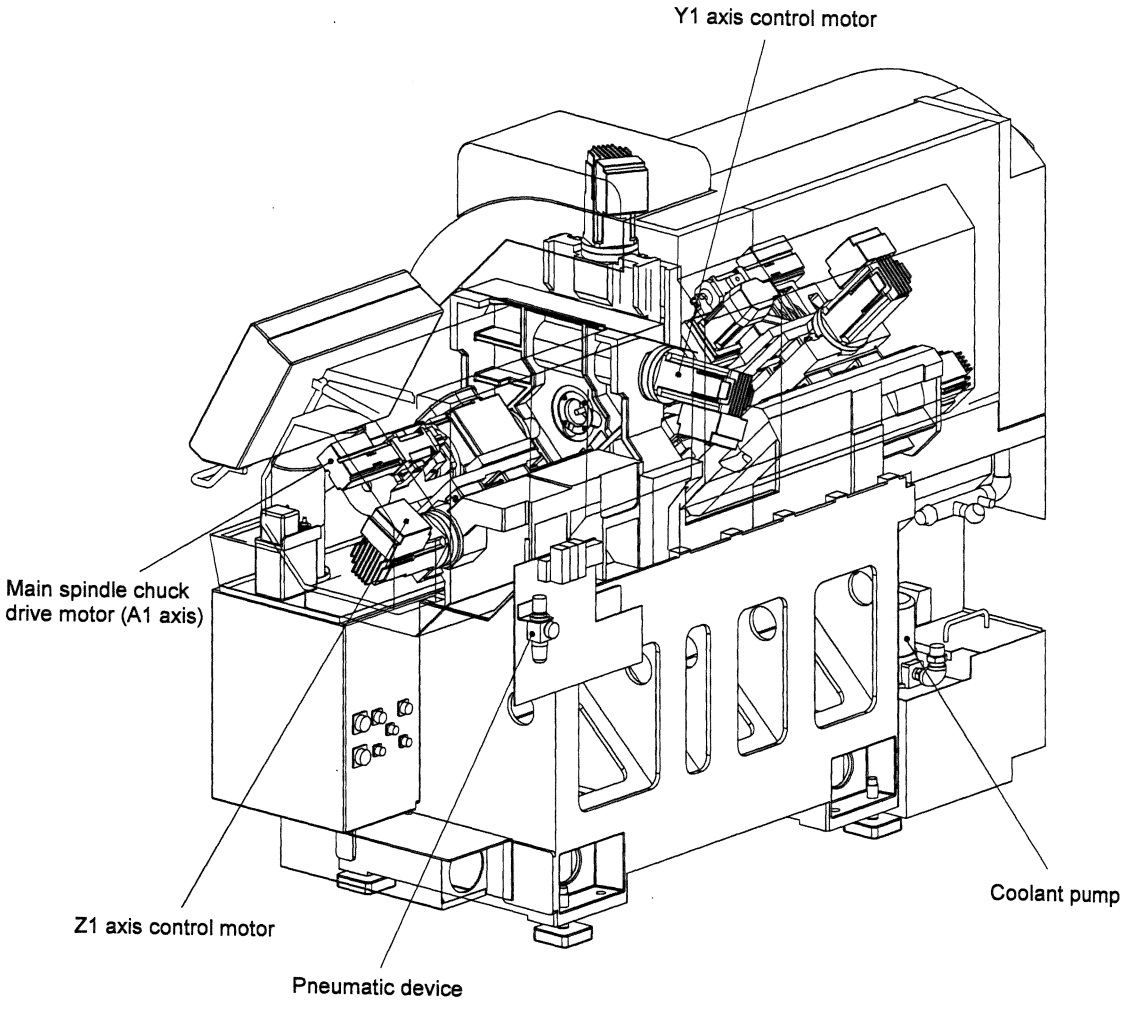
Each user of the machine should understand the outline of its structure for constant maintenance and management of the machine in its optimum conditions and for prompt recovery from machine troubles. To provide an mechanical overview, this chapter illustrates the major mechanisms and components of the machine. See <Chapter 4, Piping and Wiring Diagrams> for electric devices.

3.2 Main Components of the Machine

Shown below are the front and rear views of the machine with the names of its main components.



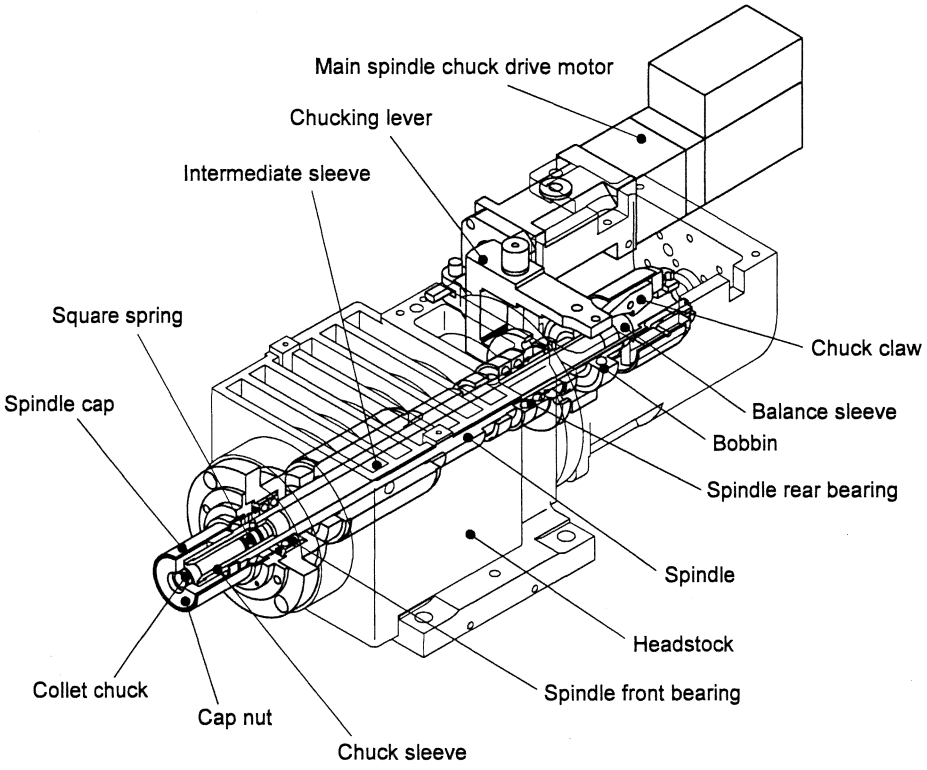
Machine Front View



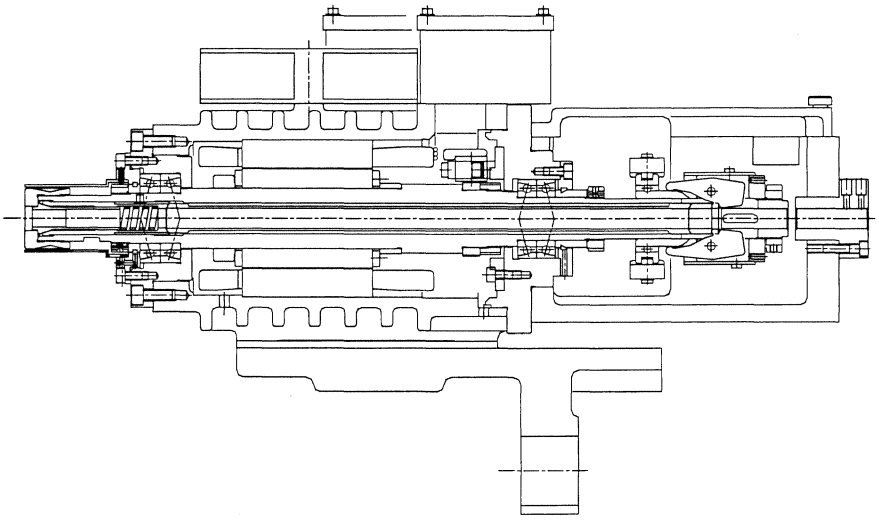
Machine Rear View

3.3 Spindle Device

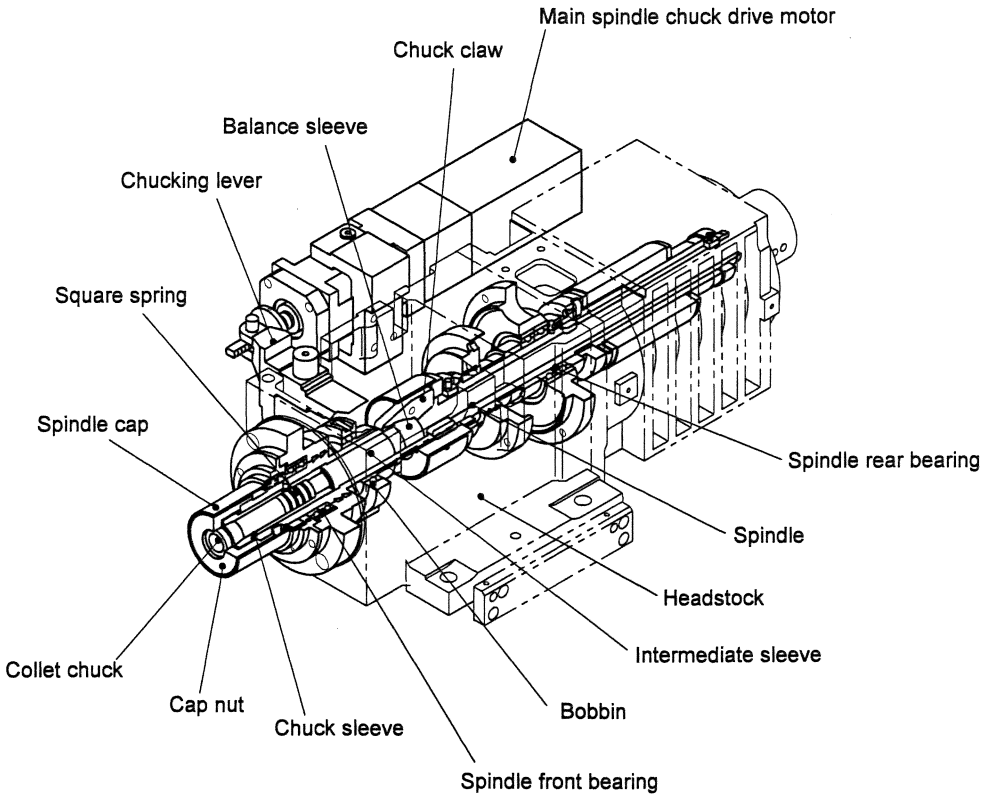
Shown below are the names of the components of the spindle device and its sectional view.



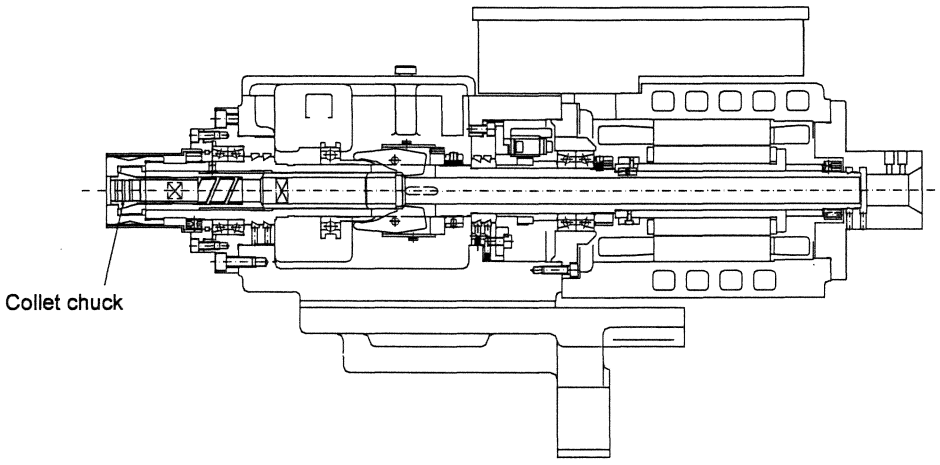
Spindle Device (C12)



Cross-sectional View of Spindle (center of spindle) (C12)



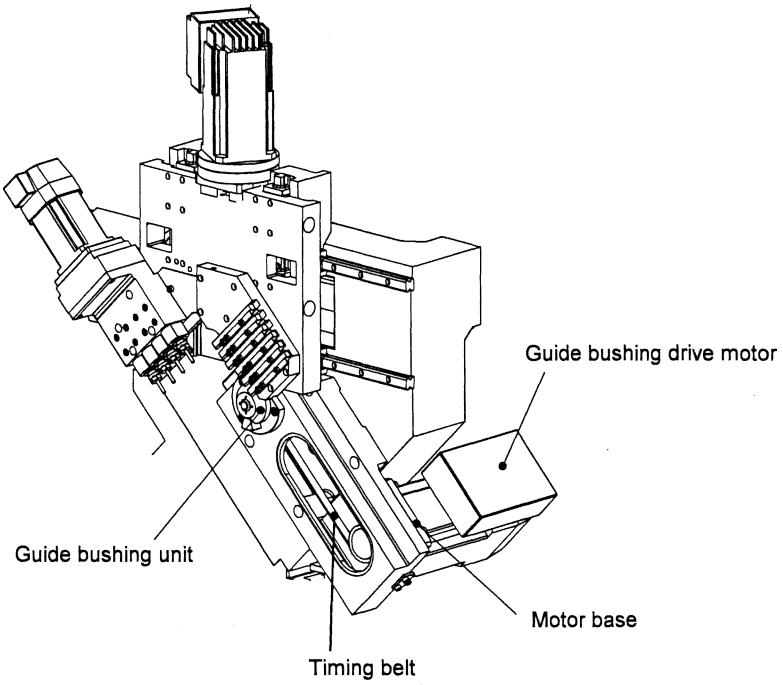
Spindle Device (C16)



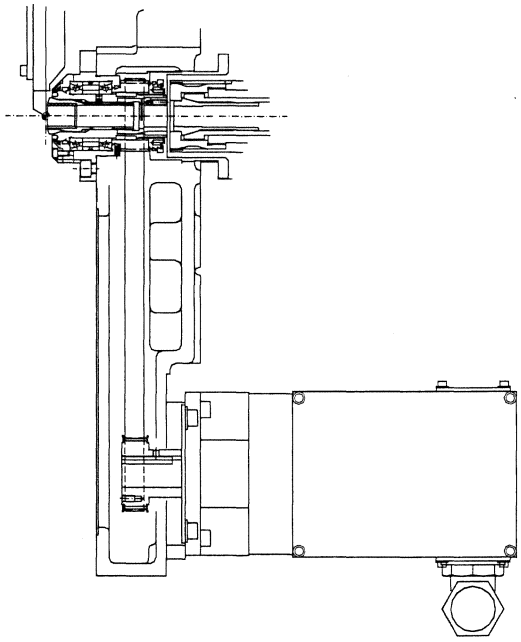
Cross-sectional View of Spindle (center of spindle) (C16)

3.4 Guide Bushing and Guide Bushing Drive Device

Shown below are the names of the components of the guide bushing and the guide bushing drive device and its sectional view.



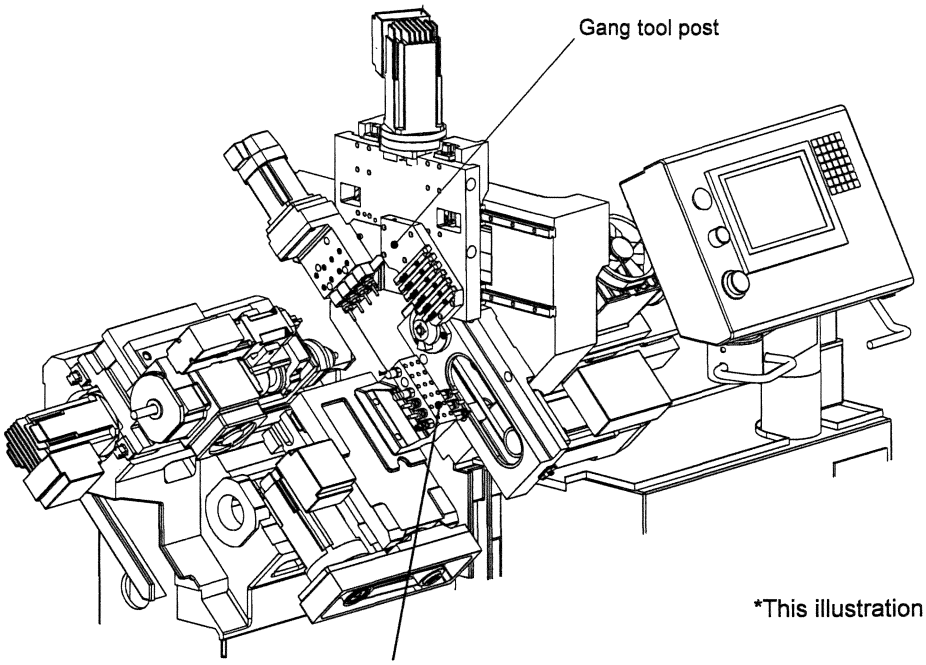
Guide Bushing and Guide Bushing Drive Device



Cross-sectional View of Guide Bushing

3.5 Tool Post

Shown below is the external view of the tool post with the names of its components.

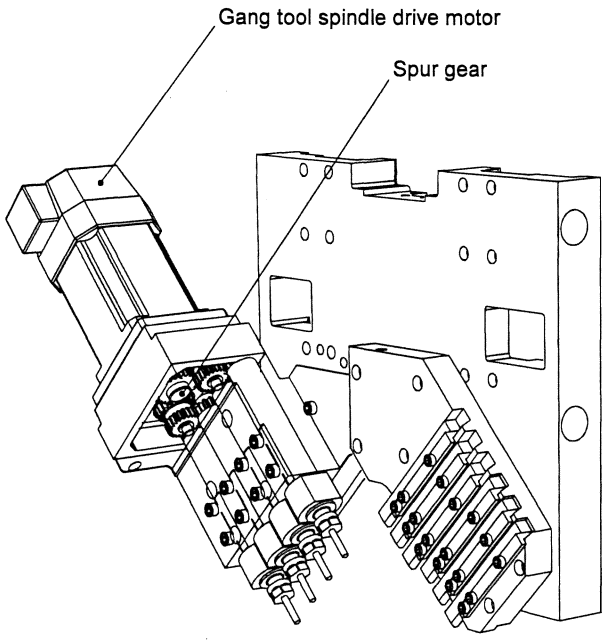


*This illustration is for type VII.

Tool Post

3.6 Tool Spindle Drive Device

Shown below is the external view of the tool spindle drive device with the names of its components.

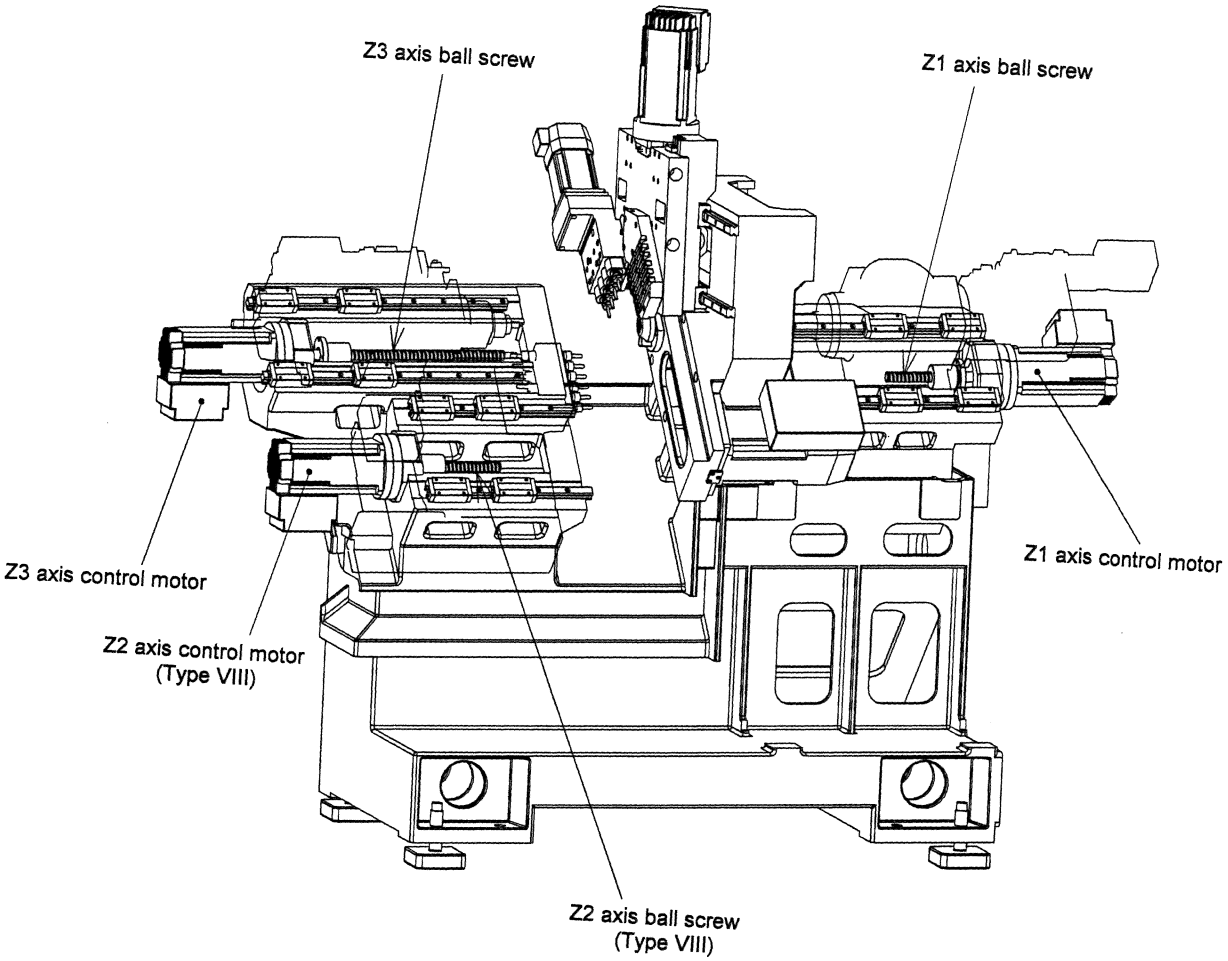


*This illustration is for type VII, VIII, IX.

Tool Spindle Drive Device

3.7 Z-Axis Feed Mechanism

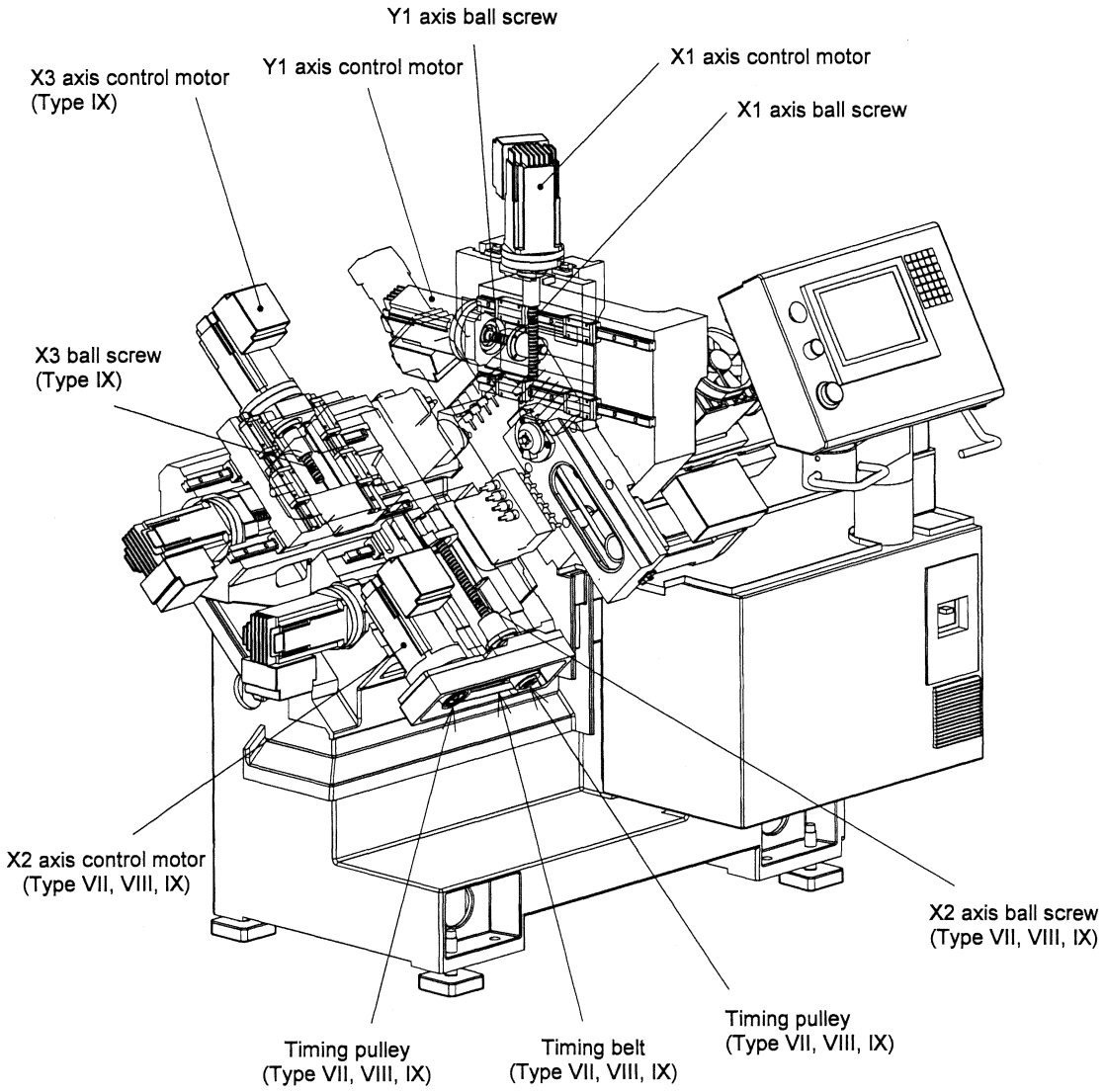
Shown below is the perspective view of the Z-axis feed mechanism with the names of its components.



Z-Axis Feed Mechanism

3.8 X, Y-Axis Feed Mechanism

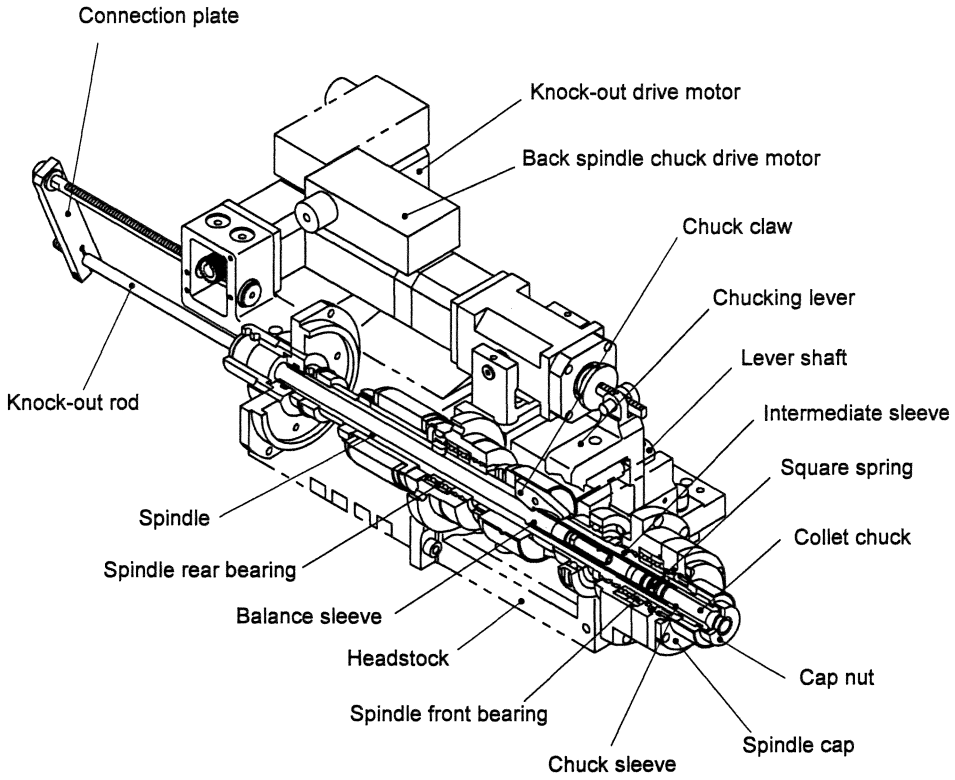
Shown below is the perspective view of the X,Y-axis feed mechanism with the names of its components.



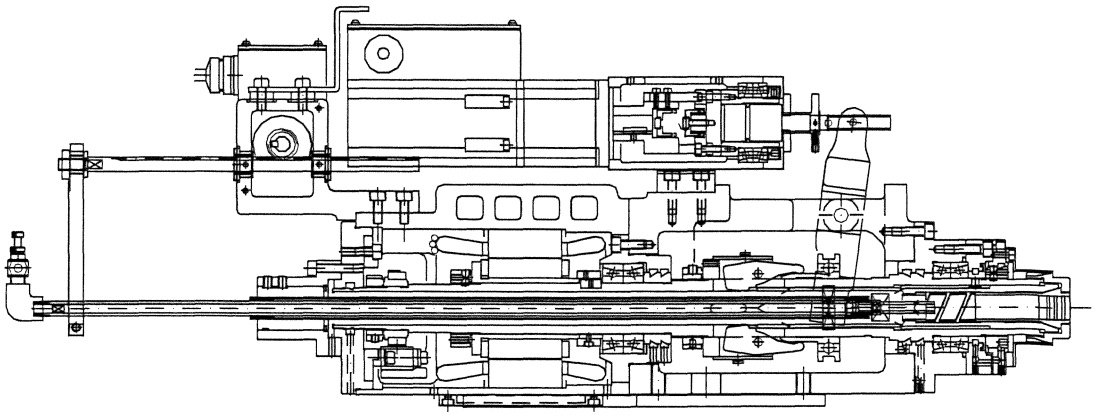
X, Y-Axis Feed Mechanism

3.9 Back Spindle Device

Shown below are the names of the components of the back spindle device and its sectional view.



Back Spindle Device

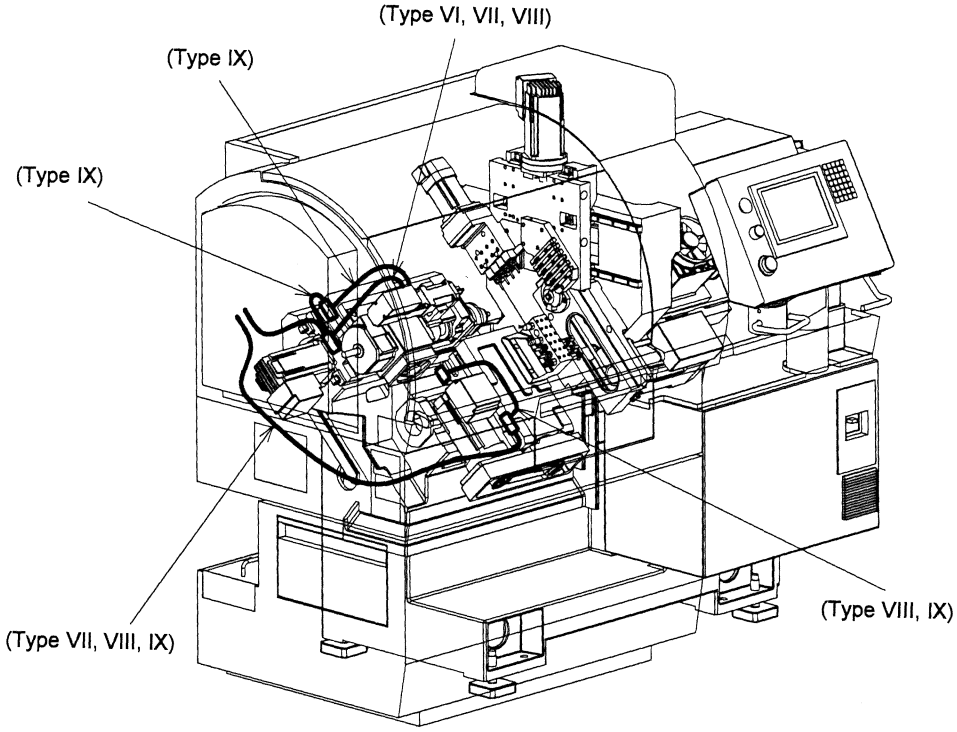


Cross-sectional View of Back Spindle (center of spindle)

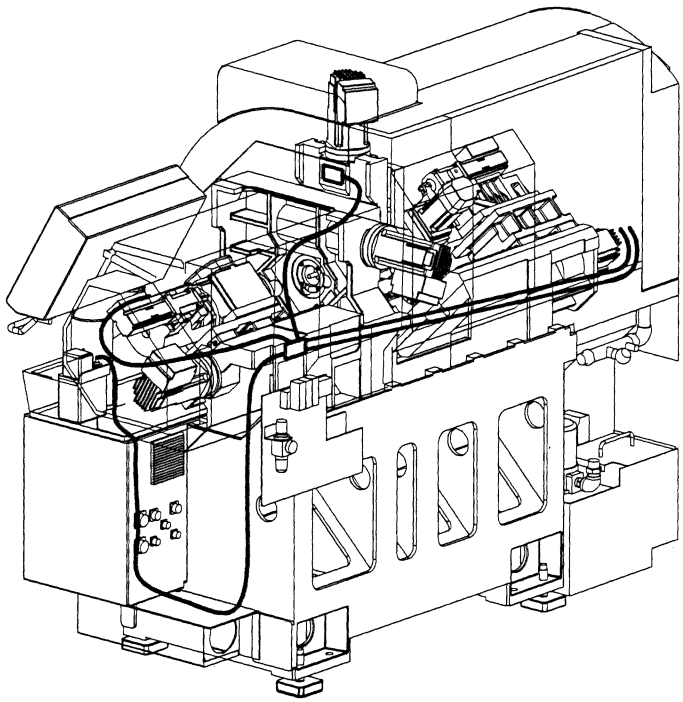
*The illustration is with the motor-driven back knock-out device(optional).

3.10 Lubricant Piping

Shown below are the front and rear views of the lubricant piping.



Lubricant Piping (front view)

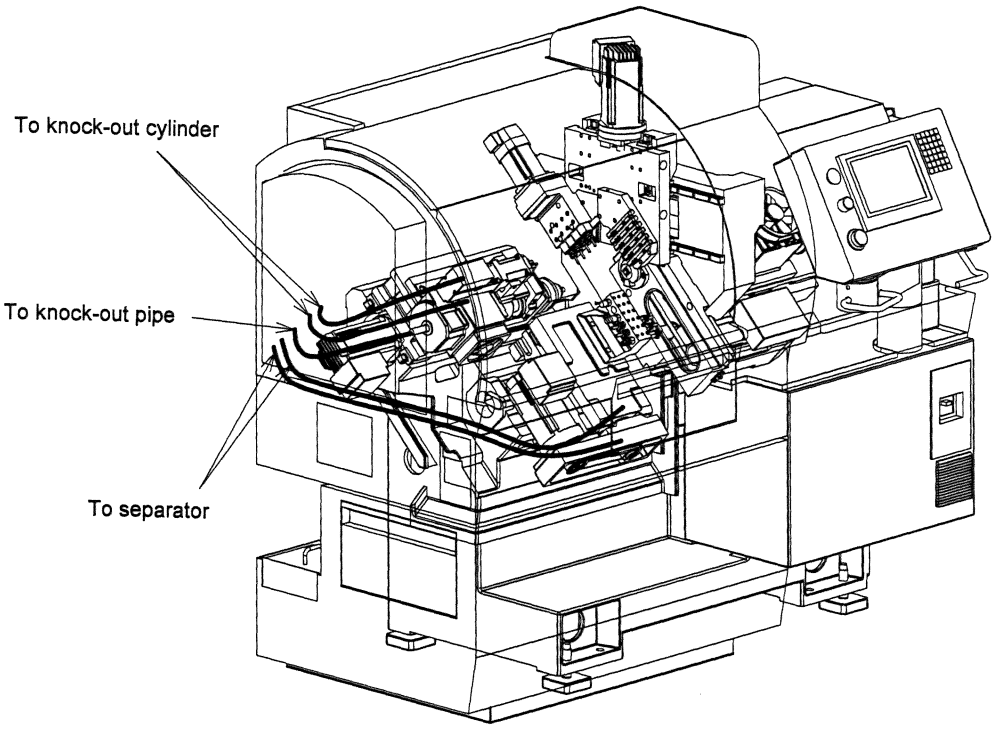


Lubricant Piping (rear view)

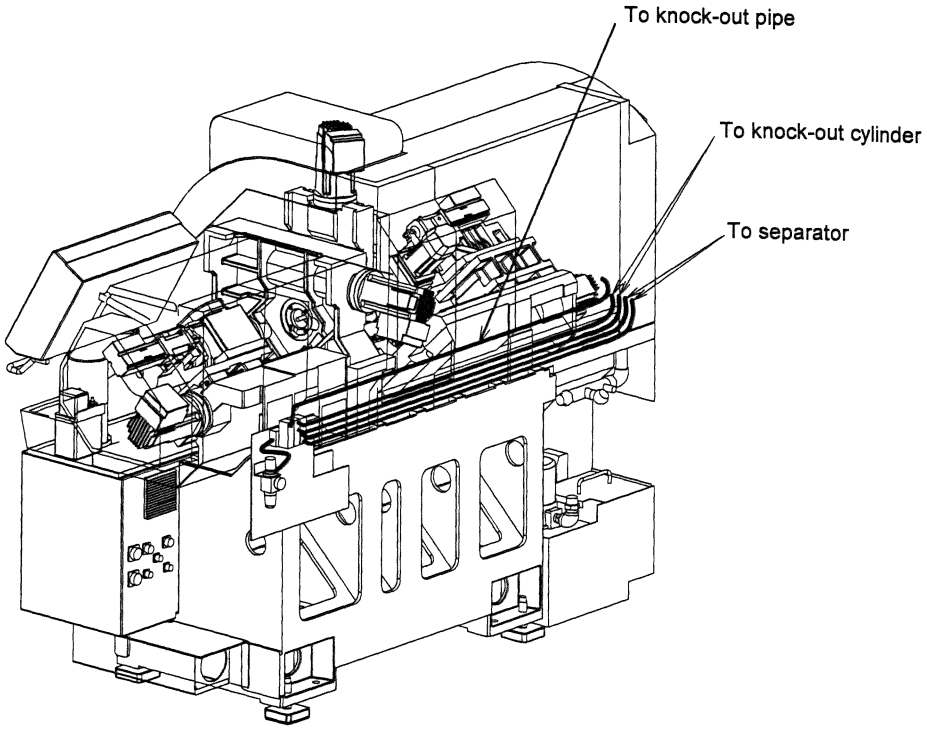
*This illustration is for type VII.

3.11 Pneumatic Piping

Shown below is the pneumatic device (air blow) piping diagram.



Pneumatic Piping (front view)

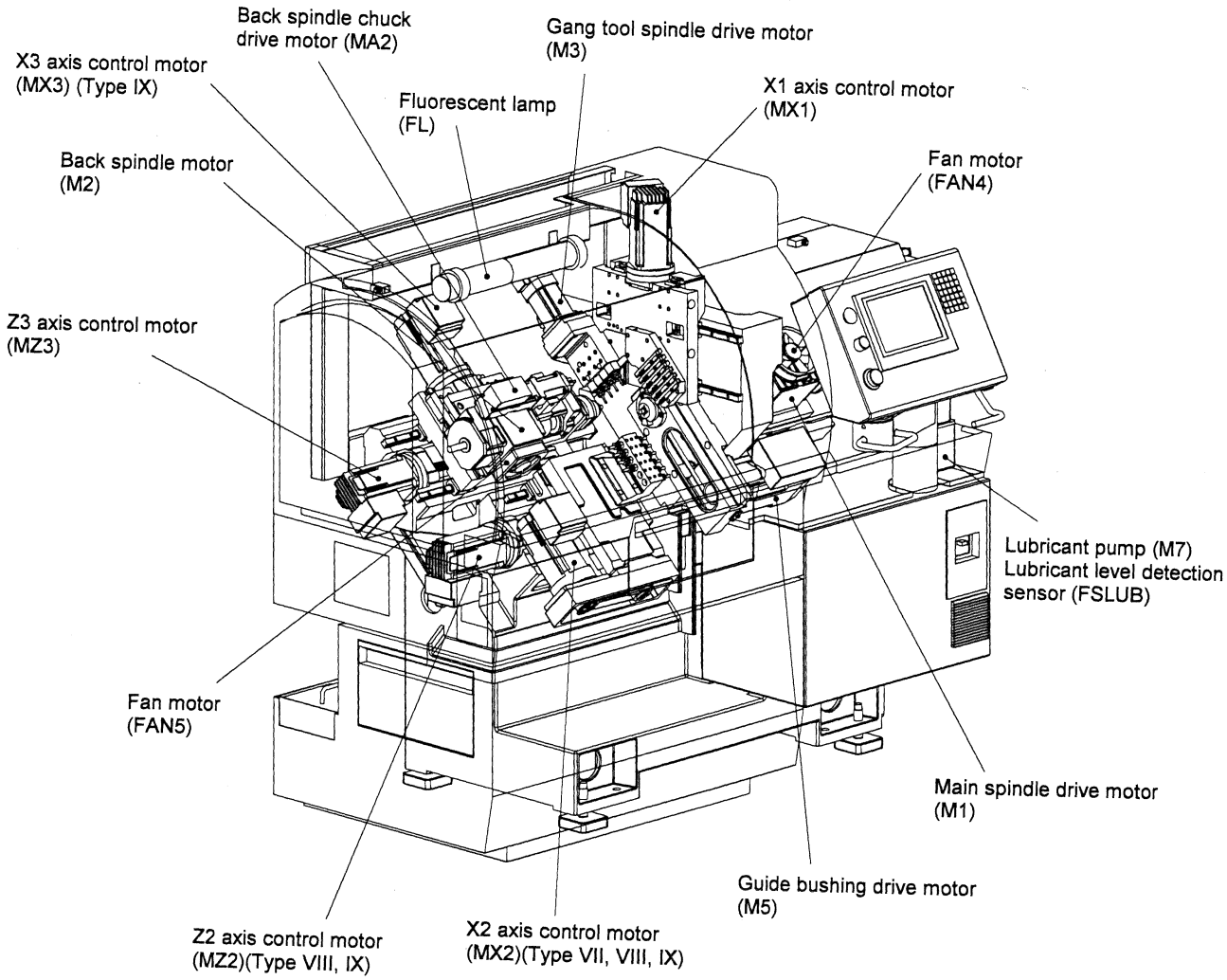


Pneumatic Piping (rear view)

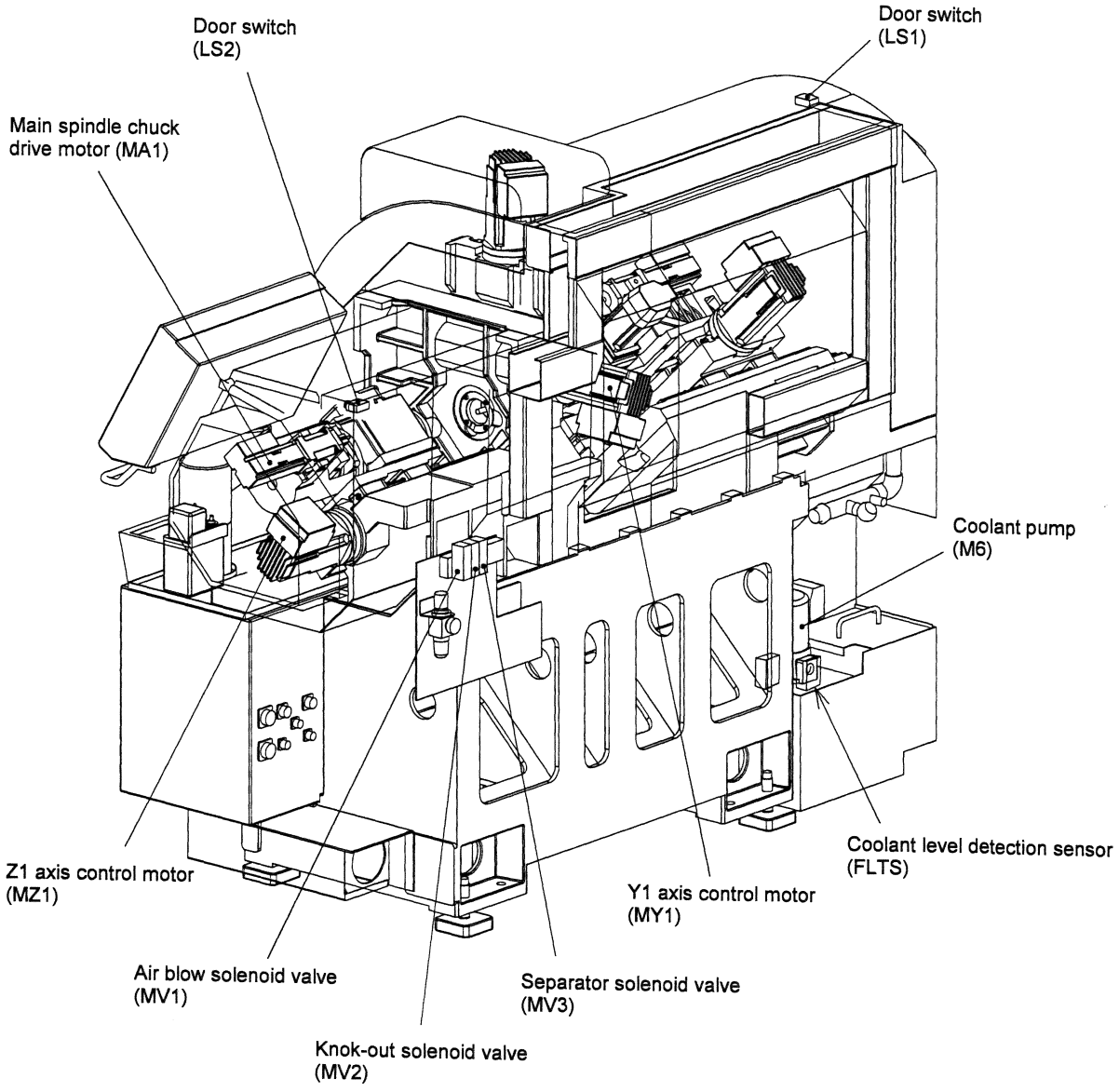
*This illustration is for type VII.

3.12 Electric Device

Shown below are the names and locations of electric components (e.g., motors, switches, and sensors) of the machine.



Electric Device (front view)



Electric Device (rear view)

Product Code C – C 1 2 1 6 VI VII VIII IX – 7 7 0

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4. Piping and Wiring Diagrams

4.1 Lubrication Oil Piping Diagram 4-3

4.2 Coolant Piping Diagram 4-4

4.3 Pneumatic Piping Diagram 4-5

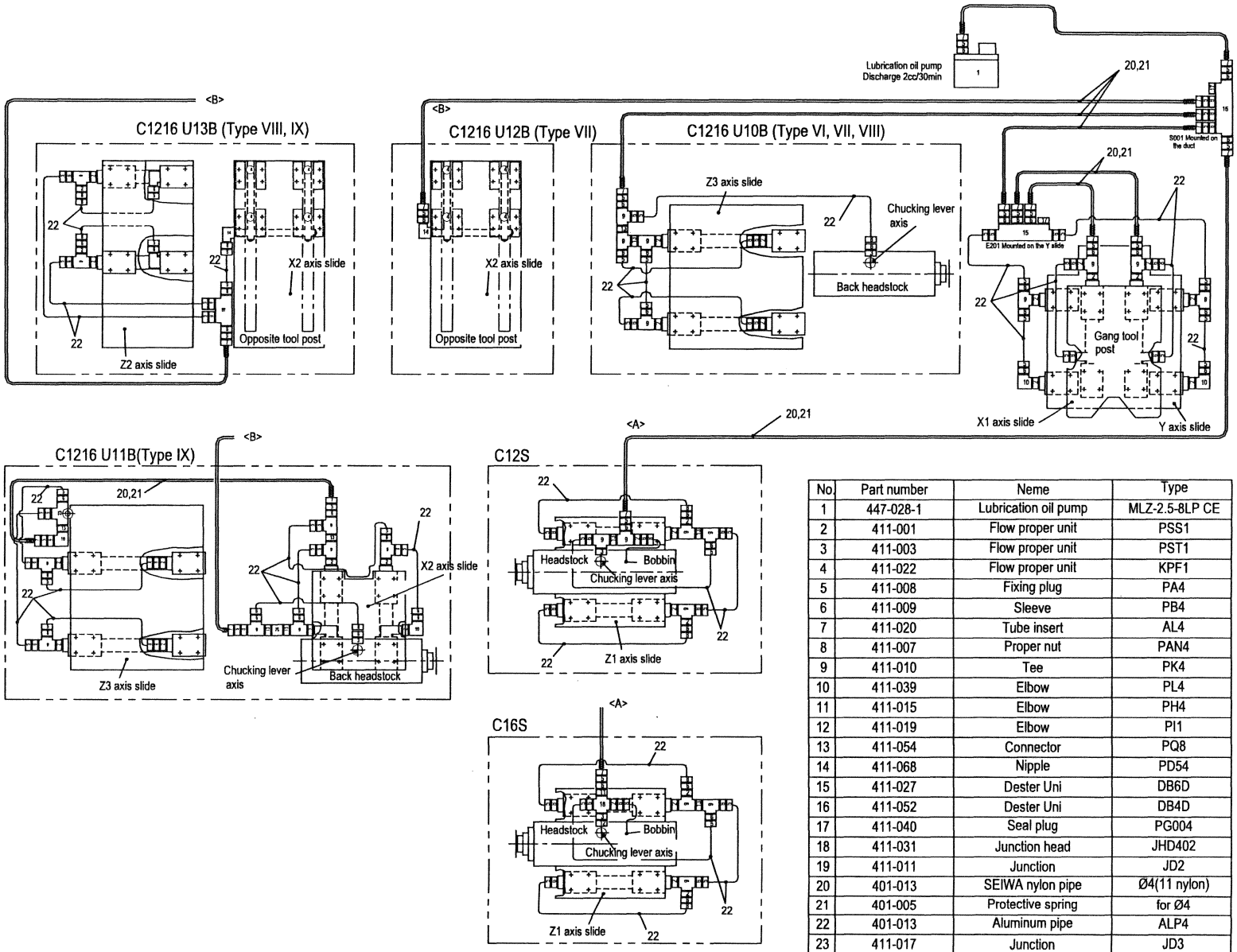
4.4 Wiring Diagrams 4-6

4.5 Integrated Wiring Diagrams 4-131

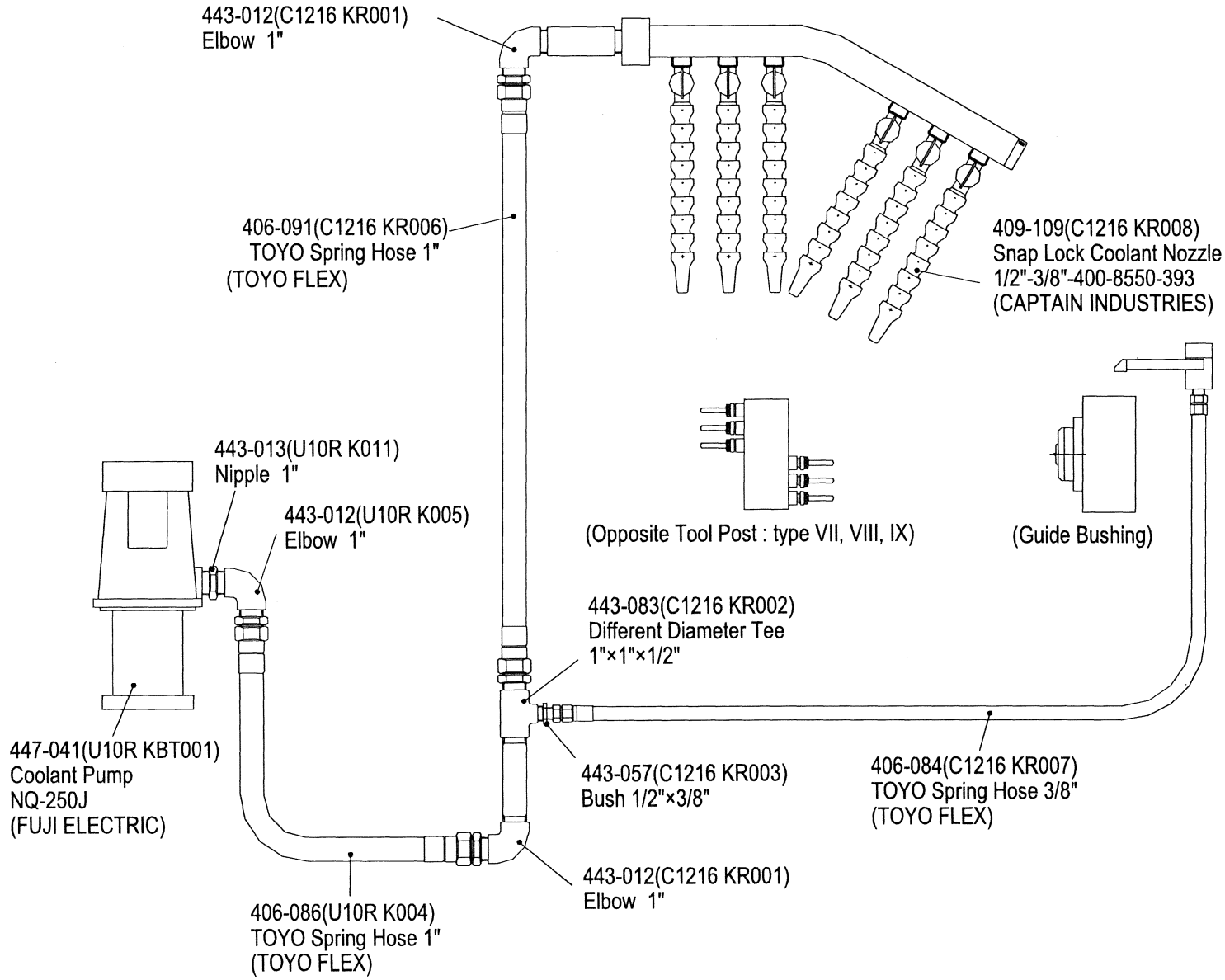
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4.1 Lubrication Oil Piping Diagram

Lubrication Oil Circuit Diagram

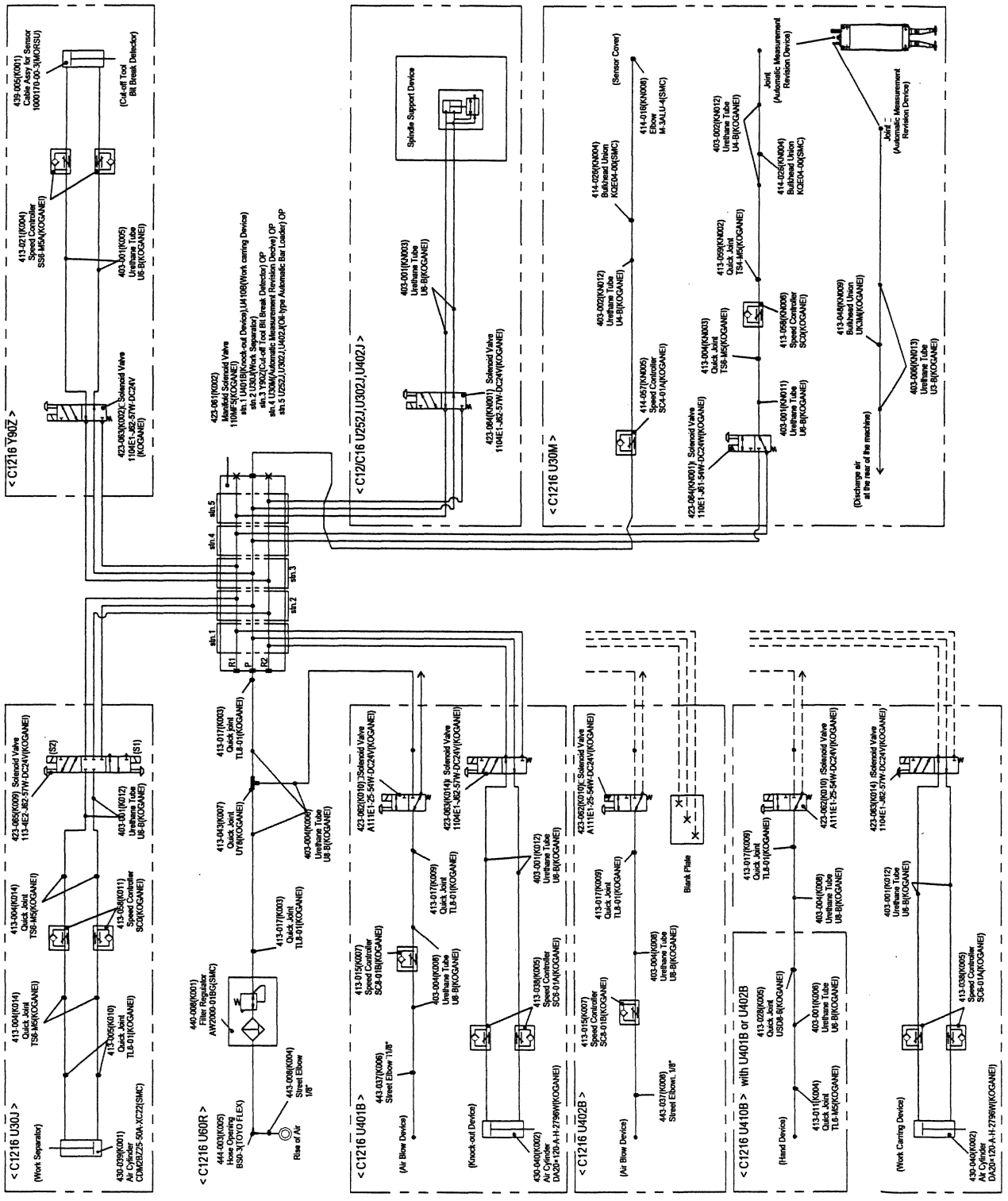


No.	Part number	Neme	Type
1	447-028-1	Lubrication oil pump	MLZ-2.5-8LP CE
2	411-001	Flow proper unit	PSS1
3	411-003	Flow proper unit	PST1
4	411-022	Flow proper unit	KPF1
5	411-008	Fixing plug	PA4
6	411-009	Sleeve	PB4
7	411-020	Tube insert	AL4
8	411-007	Proper nut	PAN4
9	411-010	Tee	PK4
10	411-039	Elbow	PL4
11	411-015	Elbow	PH4
12	411-019	Elbow	PI1
13	411-054	Connector	PQ8
14	411-068	Nipple	PD54
15	411-027	Dester Uni	DB6D
16	411-052	Dester Uni	DB4D
17	411-040	Seal plug	PG004
18	411-031	Junction head	JHD402
19	411-011	Junction	JD2
20	401-013	SEIWA nylon pipe	Ø4(11 nylon)
21	401-005	Protective spring	for Ø4
22	401-013	Aluminum pipe	ALP4
23	411-017	Junction	JD3
24	411-067	Connector	PM4
25			



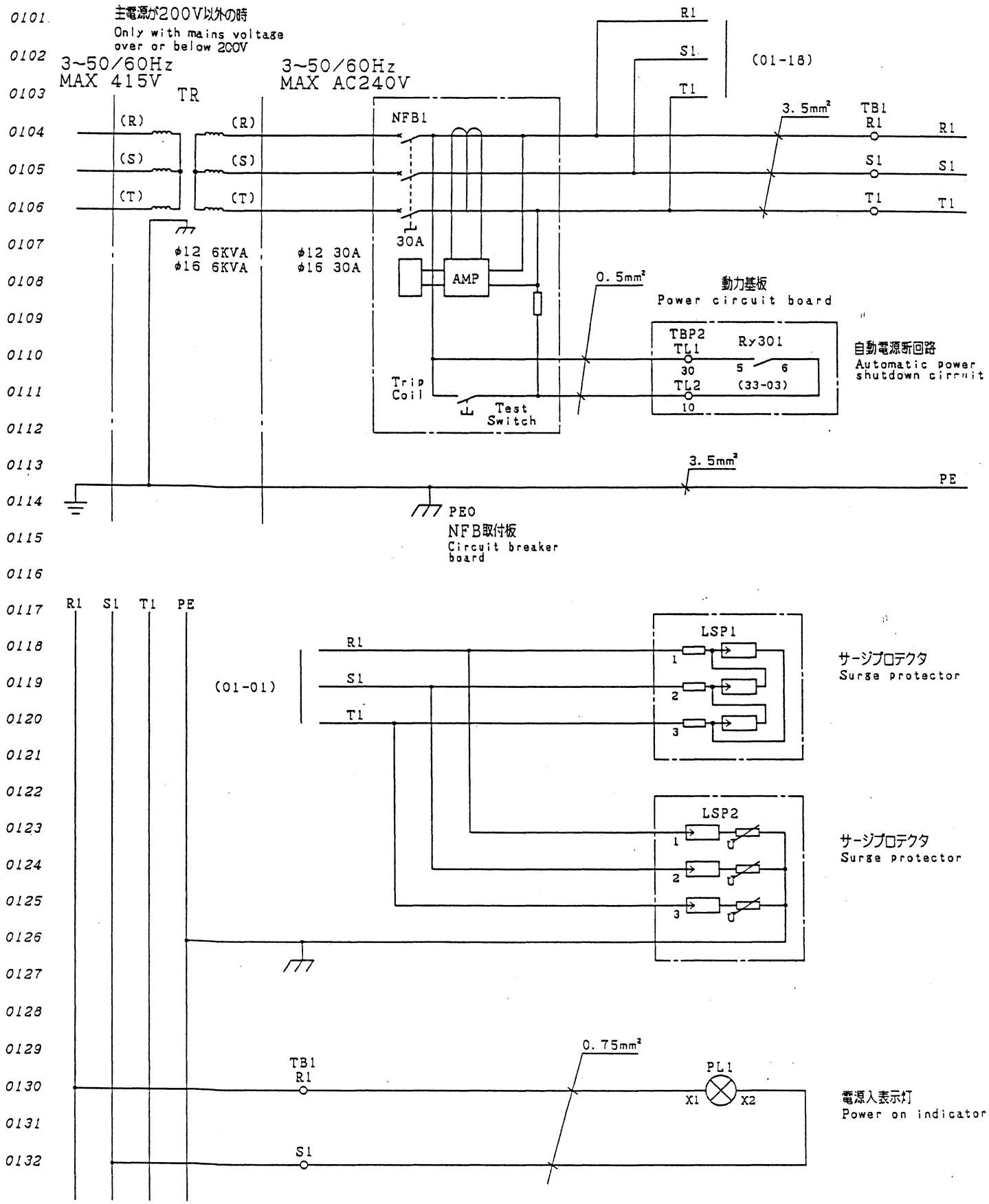
Coolant Circuit Diagram

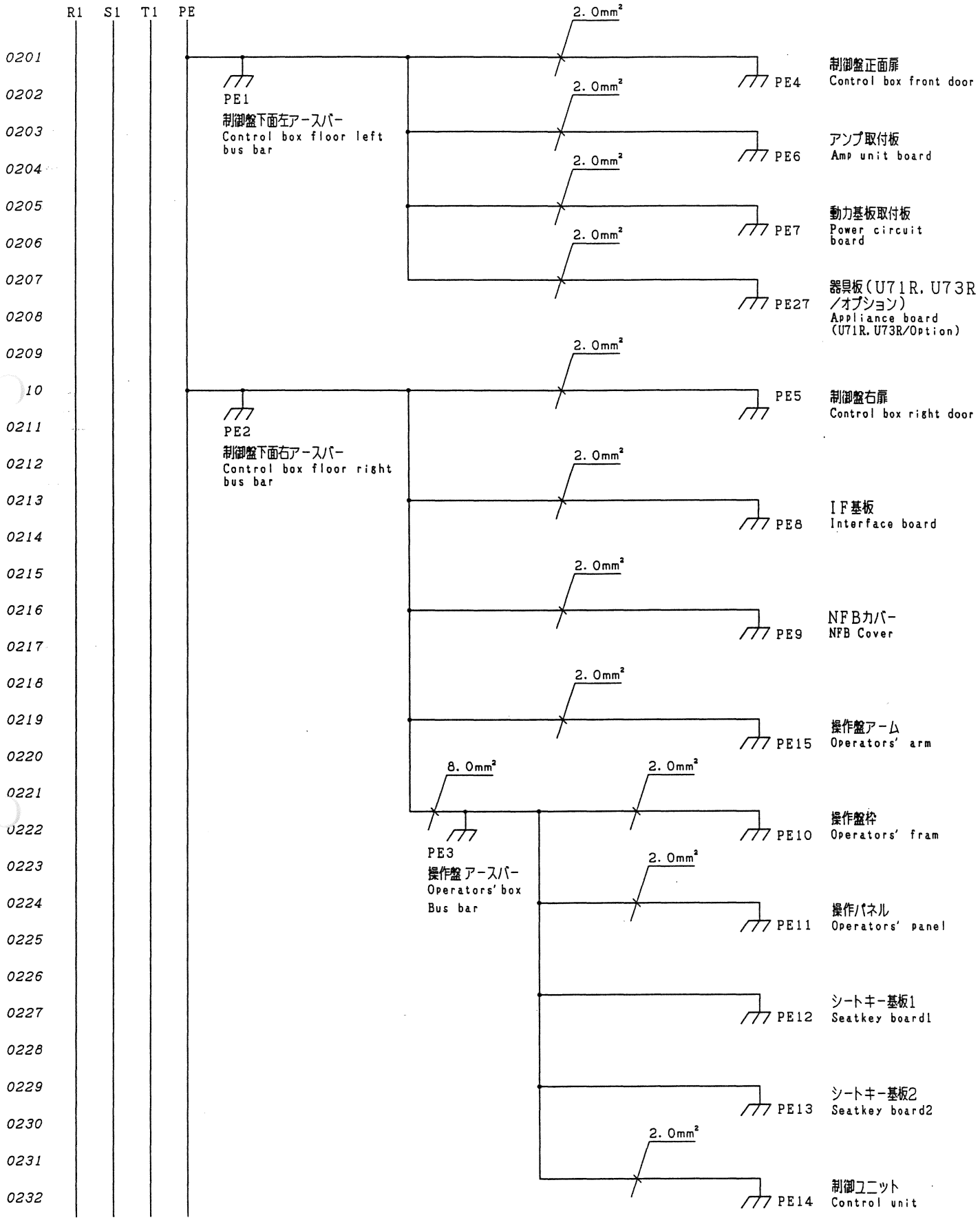
4.3 Pneumatic Piping Diagram

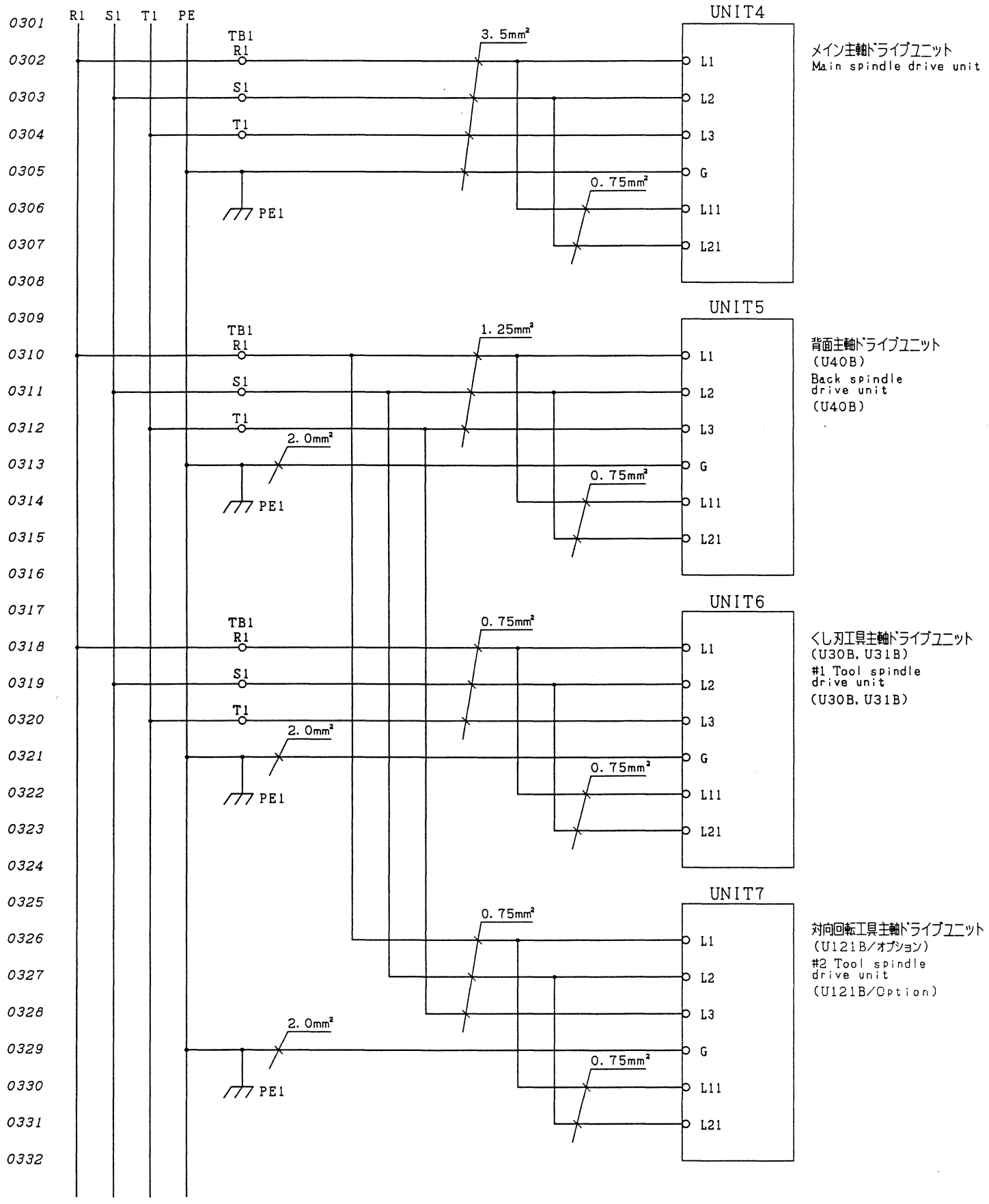


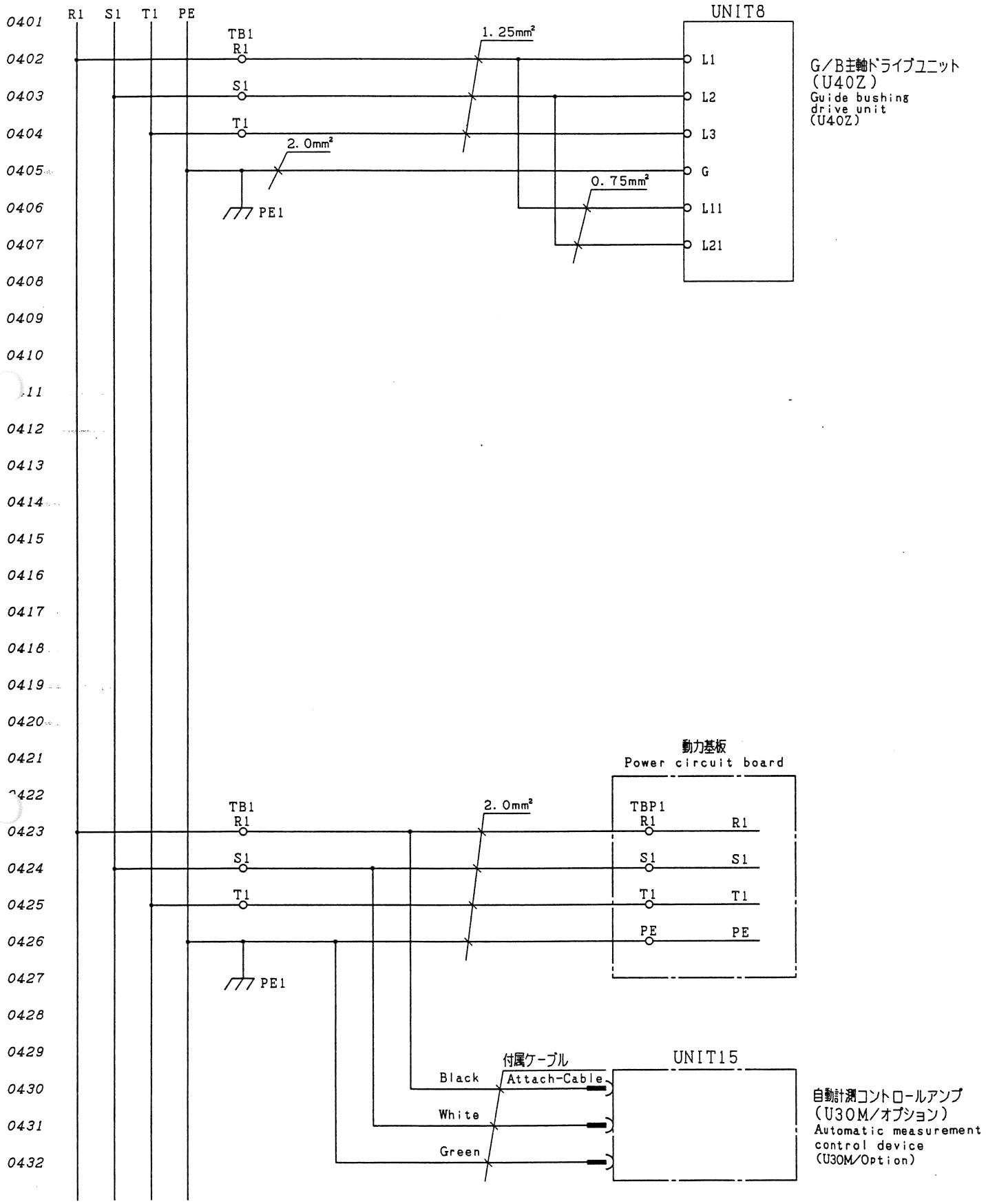
Pneumatic Circuit Diagram

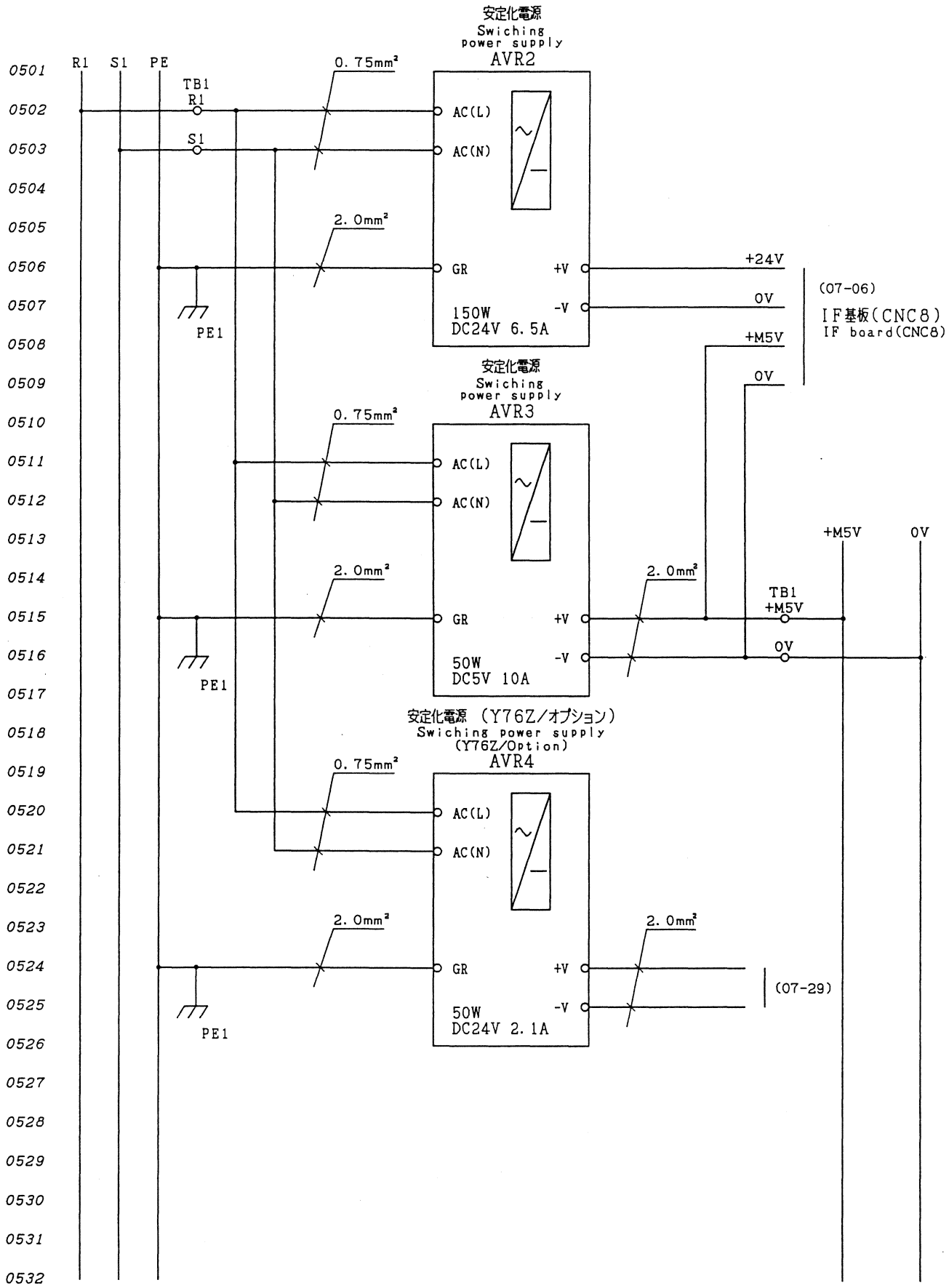
4.4 電気配線図
Wiring Diagrams

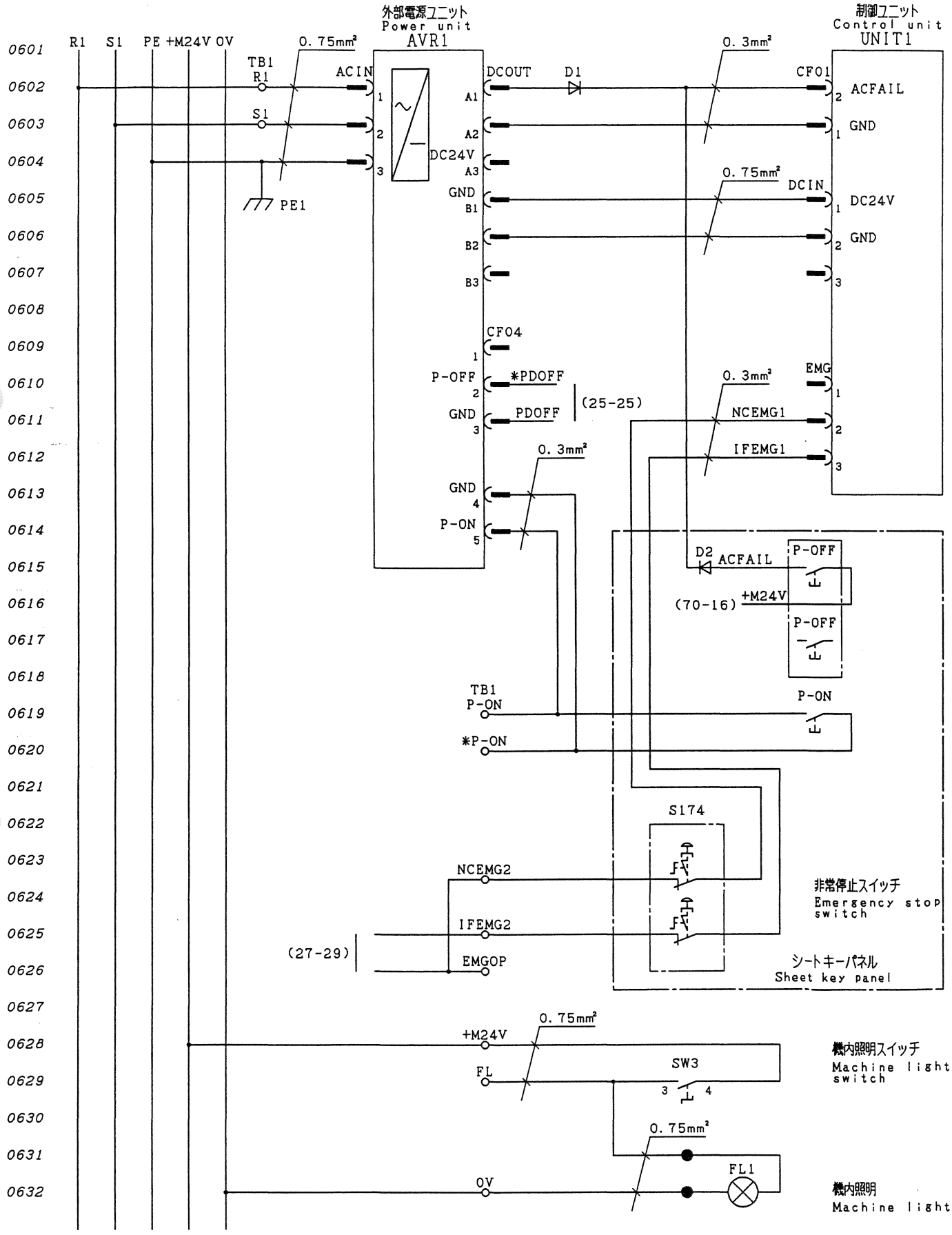


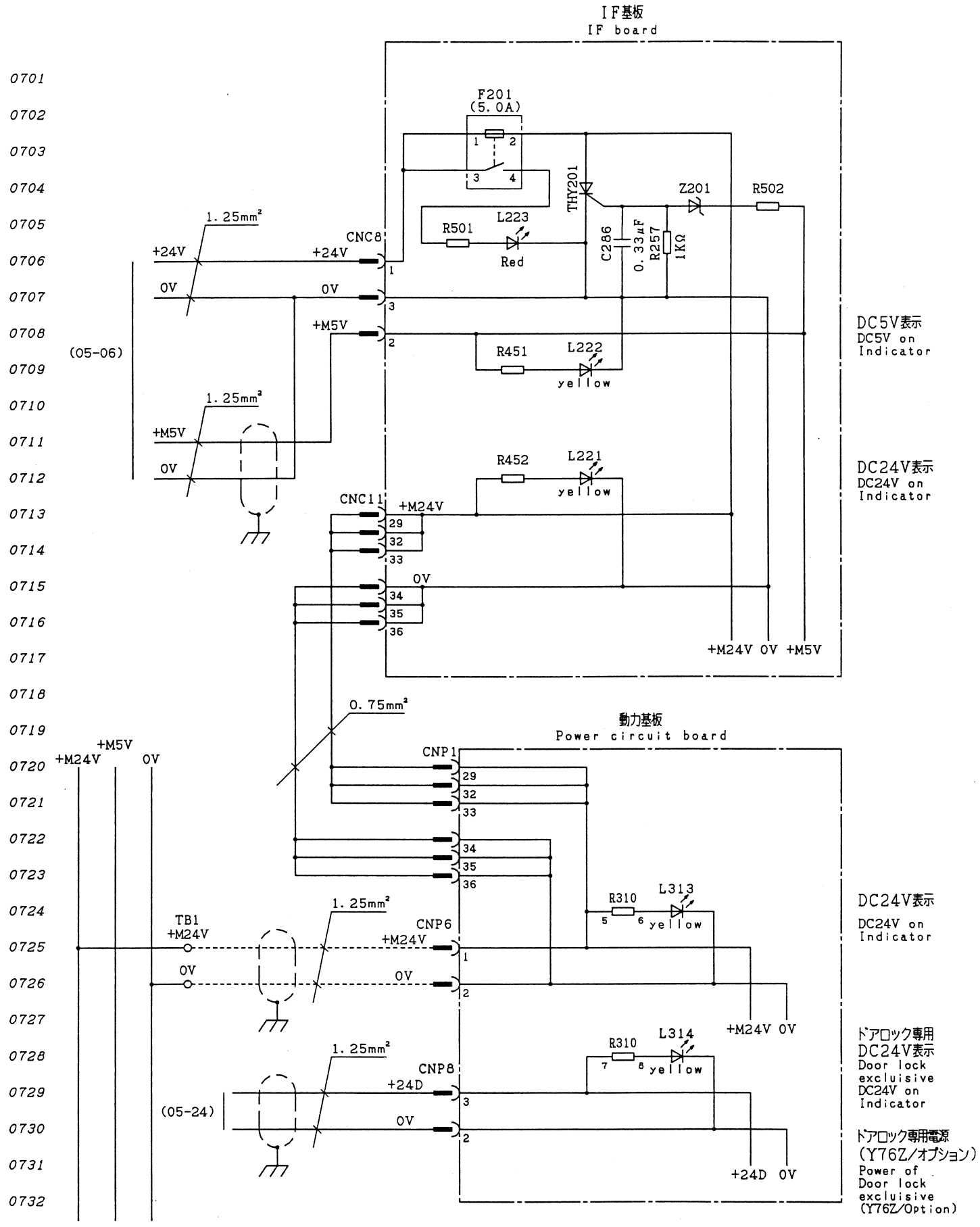

R1
S1
T1
PE
0201
0202
0203
0204
0205
0206
0207
0208
0209
0210
0211
0212
0213
0214
0215
0216
0217
0218
0219
0220
0221
0222
0223
0224
0225
0226
0227
0228
0229
0230
0231
0232
2.0mm²
PE1
制御盤下面左アースバー
Control box floor left bus bar
PE4
制御盤正面扉
Control box front door
PE6
アンプ取付板
Amp unit board
PE7
動力基板取付板
Power circuit board
PE27
器具板(U71R, U73R/オプション)
Appliance board (U71R, U73R/Option)
PE2
制御盤下面右アースバー
Control box floor right bus bar
PE5
制御盤右扉
Control box right door
PE8
IF基板
Interface board
PE9
NFBカバー
NFB Cover
PE15
操作盤アーム
Operators' arm
8.0mm²
PE3
操作盤アースバー
Operators' box Bus bar
PE10
操作盤枠
Operators' fram
PE11
操作パネル
Operators' panel
PE12
シートキー基板1
Seatkey board1
PE13
シートキー基板2
Seatkey board2
PE14
制御ユニット
Control unit

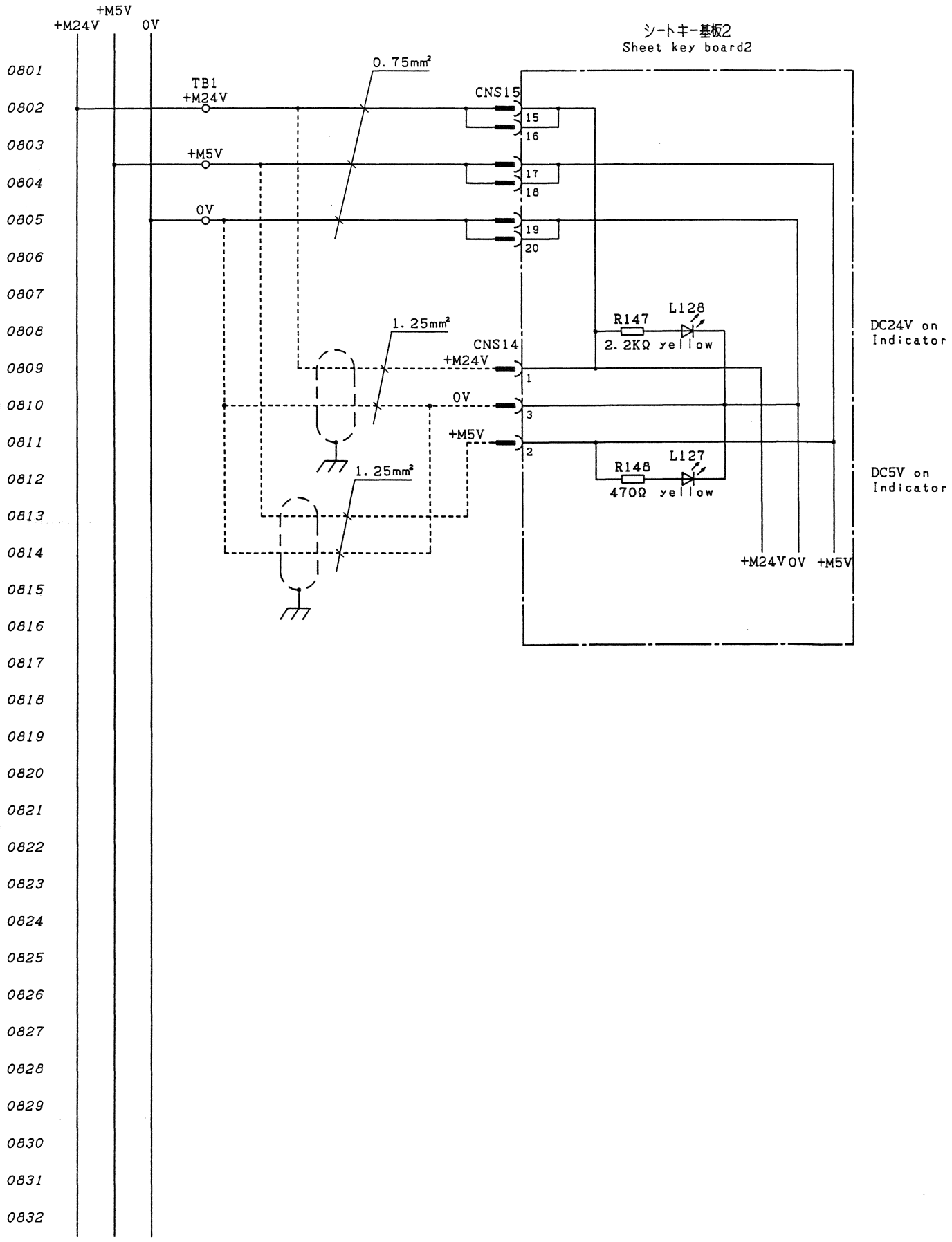

R1
S1
T1
PE
TB1
R1
S1
T1
PE1
3. 5mm²
0. 75mm²
UNIT4
L1
L2
L3
G
L11
L21
メイン主軸ドライブユニット
Main spindle drive unit
UNIT5
1. 25mm²
2. 0mm²
0. 75mm²
背面主軸ドライブユニット
(U40B)
Back spindle
drive unit
(U40B)
UNIT6
くし刃工具主軸ドライブユニット
(U30B, U31B)
#1 Tool spindle
drive unit
(U30B, U31B)
UNIT7
対向回転工具主軸ドライブユニット
(U121B/オプション)
#2 Tool spindle
drive unit
(U121B/Option)

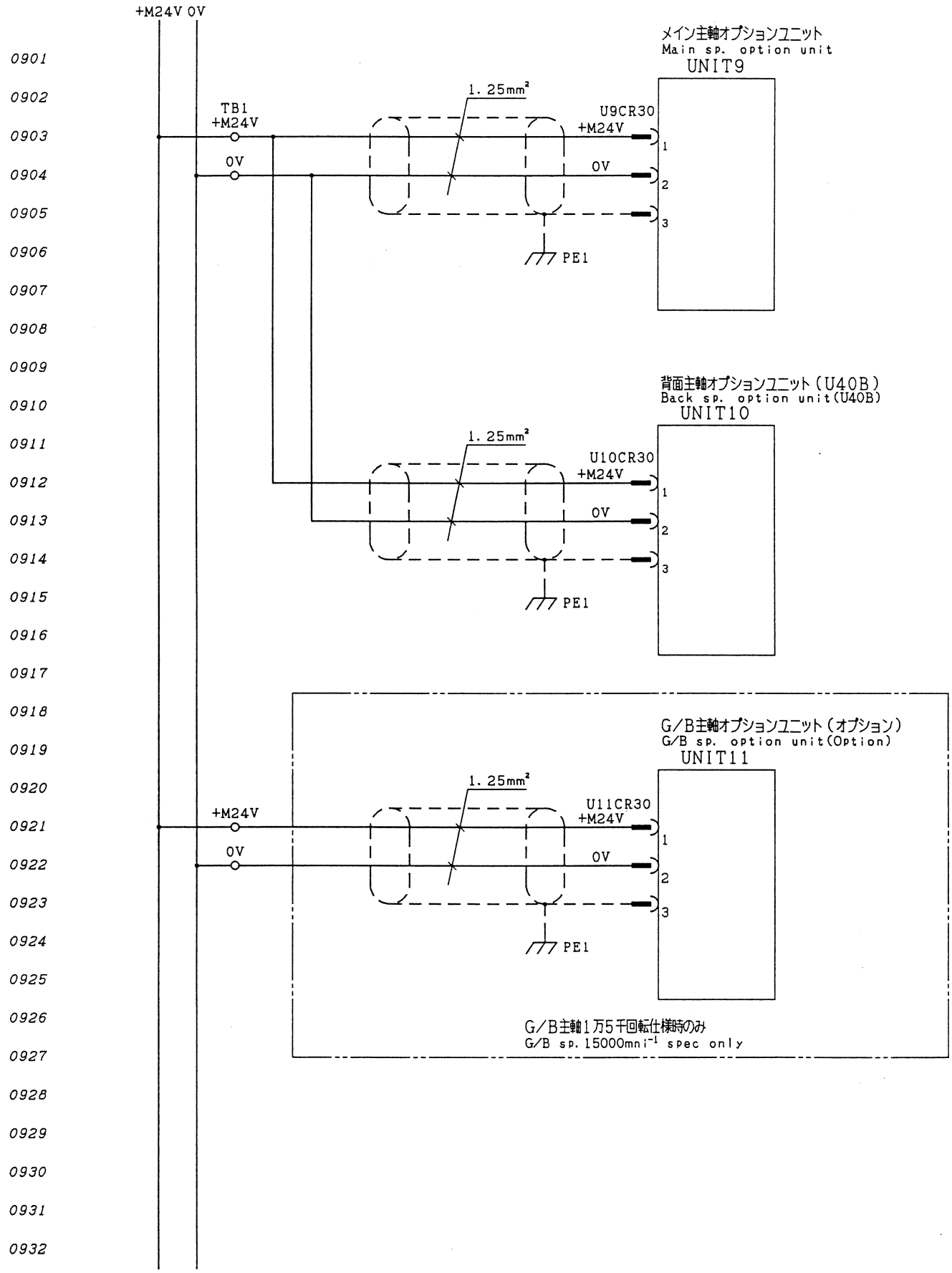

R1
S1
T1
PE
TB1
R1
S1
T1
PE1
1.25mm²
2.0mm²
0.75mm²
UNIT8
L1
L2
L3
G
L11
L21
G/B主軸ドライブユニット
(U40Z)
Guide bushing
drive unit
(U40Z)
動力基板
Power circuit board
TBP1
R1
S1
T1
PE
付属ケーブル
Attach-Cable
Black
White
Green
UNIT15
自動計測コントロールアンプ
(U30M/オプション)
Automatic measurement
control device
(U30M/Option)

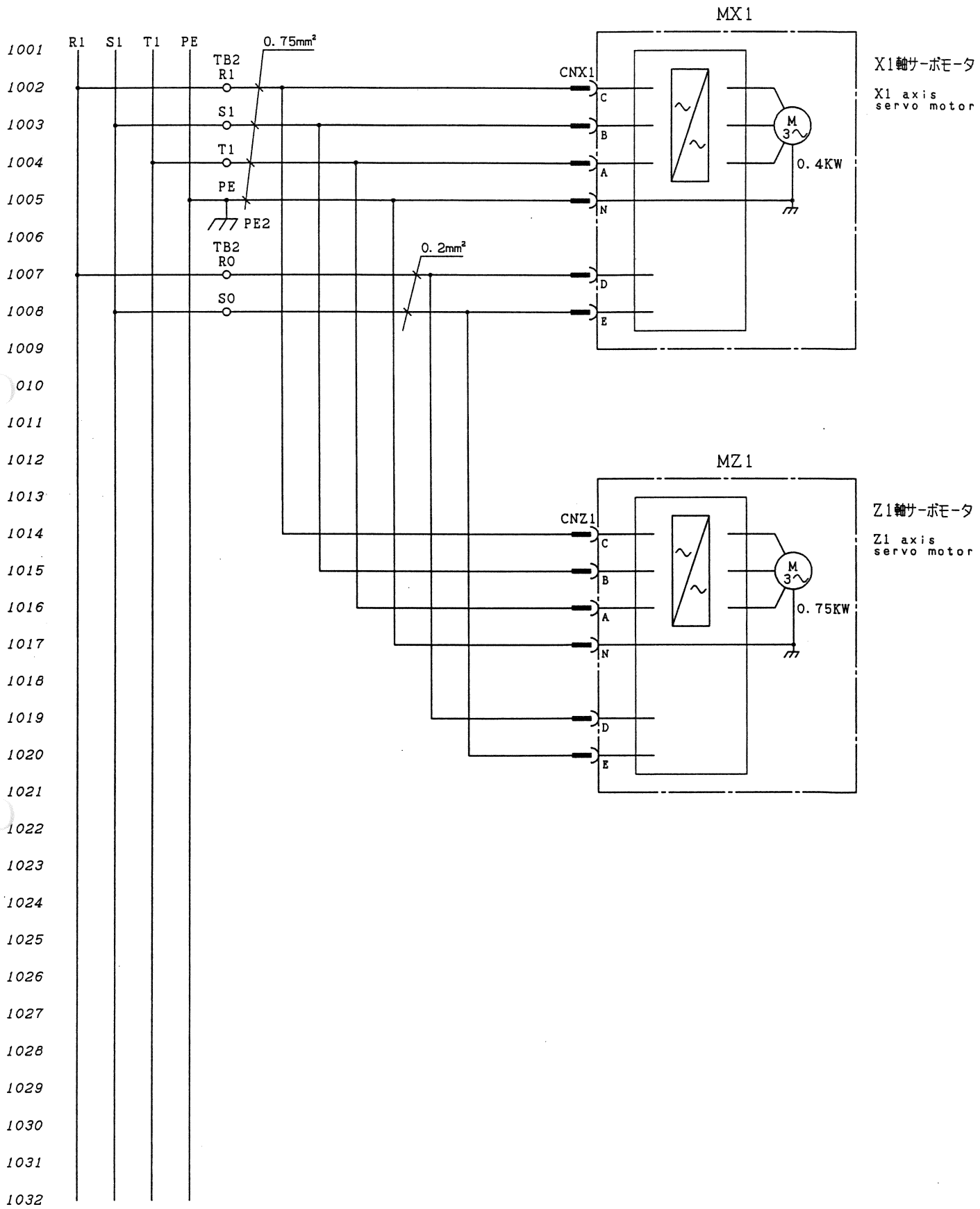

安定化電源
Swiching
power supply
AVR2
R1
S1
PE
0.75mm²
TB1
R1
S1
AC(L)
AC(N)
2.0mm²
GR
+V
-V
150W
DC24V 6.5A
PE1
+24V
0V
(07-06)
IF基板(CNC8)
IF board(CNC8)
+M5V
0V
安定化電源
Swiching
power supply
AVR3
0.75mm²
AC(L)
AC(N)
2.0mm²
GR
+V
-V
50W
DC5V 10A
PE1
+M5V
0V
TB1
+M5V
0V
安定化電源 (Y76Z/オプション)
Swiching power supply
(Y76Z/Option)
AVR4
0.75mm²
AC(L)
AC(N)
2.0mm²
GR
+V
-V
50W
DC24V 2.1A
PE1
(07-29)
0501
0502
0503
0504
0505
0506
0507
0508
0509
0510
0511
0512
0513
0514
0515
0516
0517
0518
0519
0520
0521
0522
0523
0524
0525
0526
0527
0528
0529
0530
0531
0532

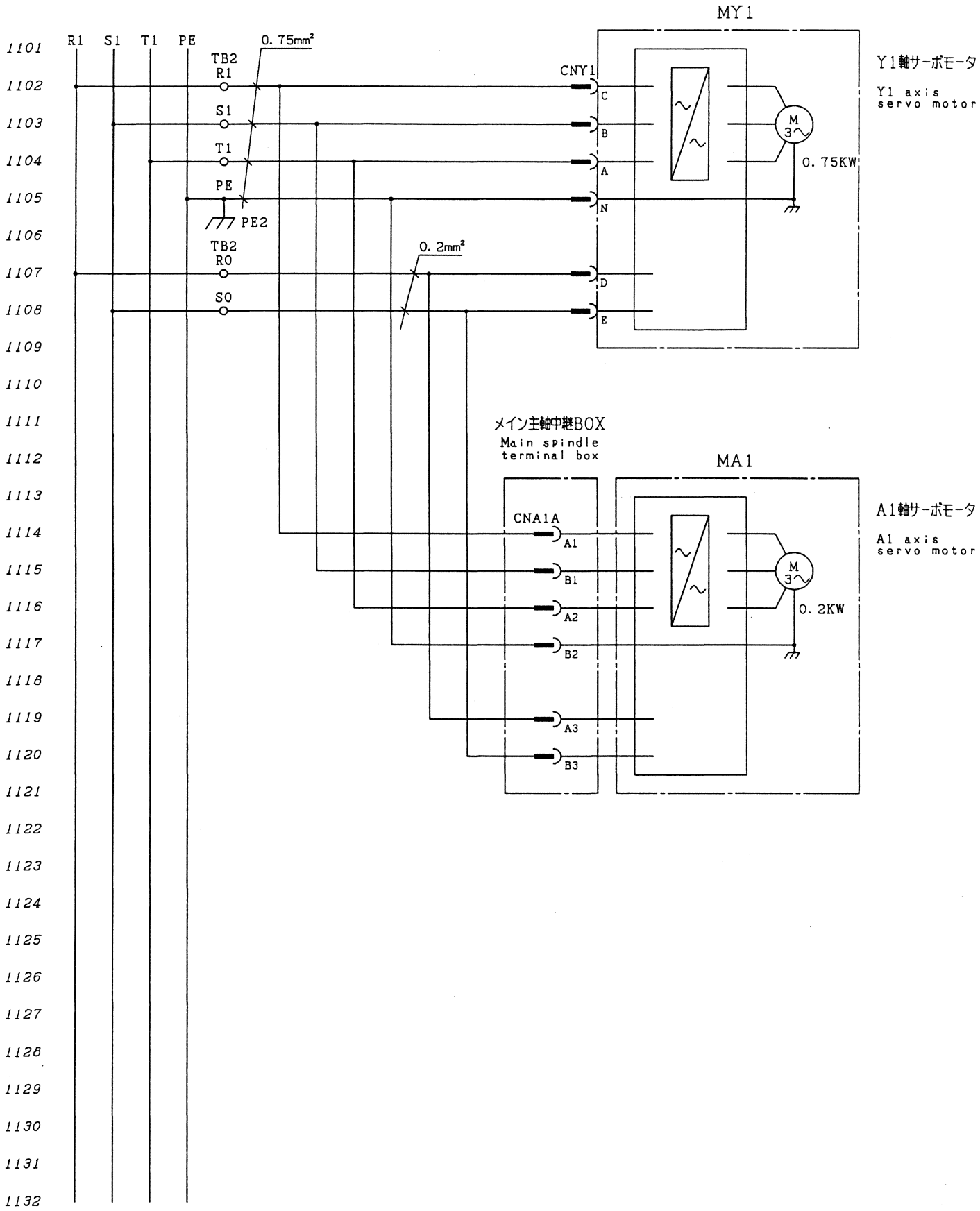

外部電源ユニット
Power unit
AVR1
制御ユニット
Control unit
UNIT1
R1
S1
PE
+M24V
0V
TB1
R1
S1
PE1
0.75mm²
ACIN
DCOUT
D1
0.3mm²
CF01
ACFAIL
GND
DC24V
DCIN
CF04
P-OFF
*PDOFF
PDOFF
(25-25)
EMG
NCEMG1
IFEMG1
D2
(70-16)
TB1
P-ON
*P-ON
S174
NCEMG2
IFEMG2
EMGOP
(27-29)
非常停止スイッチ
Emergency stop switch
シートキーパネル
Sheet key panel
SW3
FL
FL1
機内照明スイッチ
Machine light switch
機内照明
Machine light

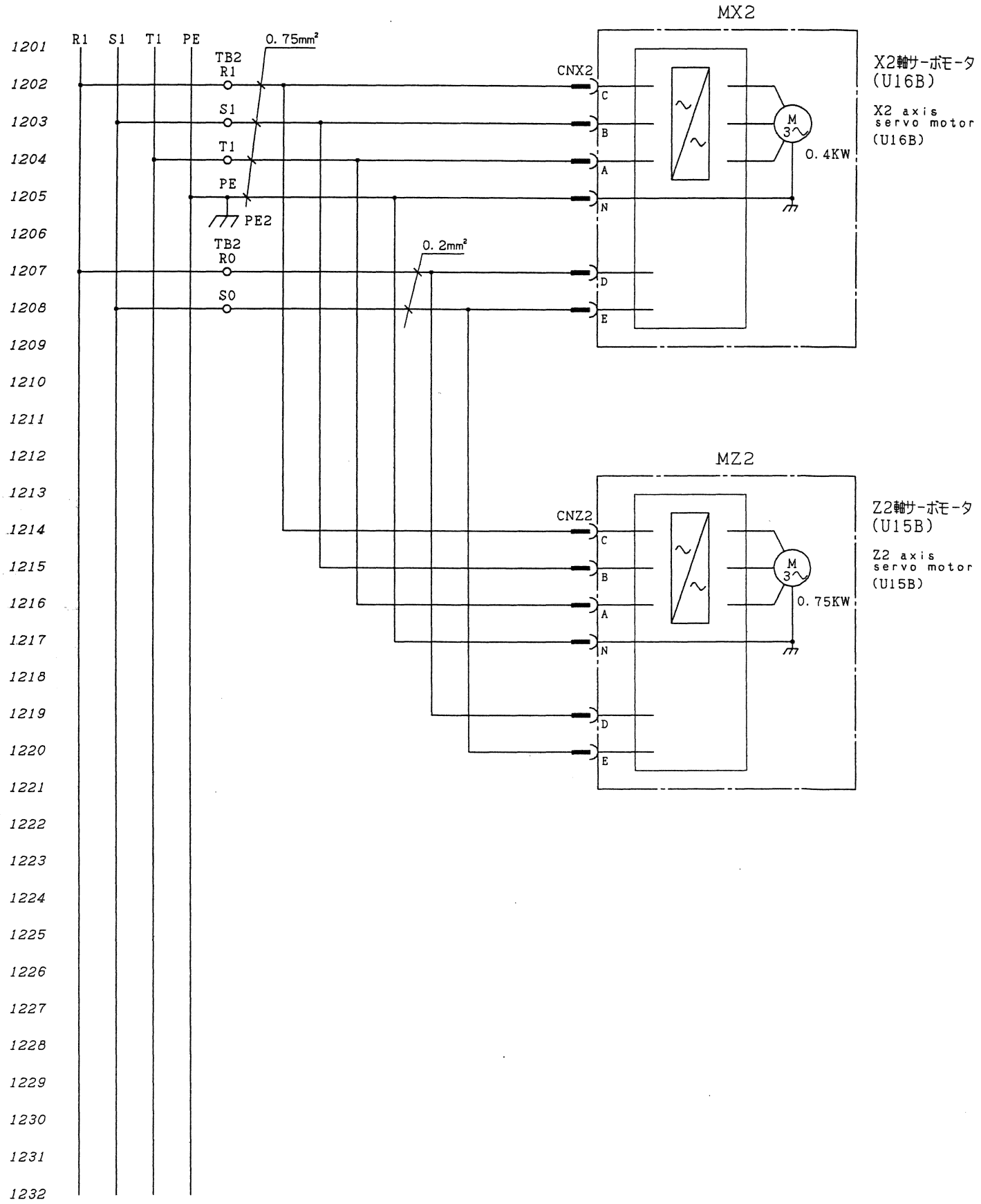

IF基板
IF board
F201
(5.0A)
THY201
Z201
R502
R501
L223
Red
C286
0.33μF
R257
1KΩ
CNC8
1.25mm²
+24V
0V
+M5V
(05-06)
R451
L222
yellow
DC5V表示
DC5V on
Indicator
R452
L221
yellow
DC24V表示
DC24V on
Indicator
CNC11
+M24V
0V
+M24V 0V +M5V
0.75mm²
動力基板
Power circuit board
CNP1
TB1
CNP6
R310
L313
yellow
DC24V表示
DC24V on
Indicator
+M24V 0V
R310
L314
yellow
CNP8
+24D
(05-24)
ドアロック専用
DC24V表示
Door lock
excluisive
DC24V on
Indicator
ドアロック専用電源
(Y76Z/オプション)
Power of
Door lock
excluisive
(Y76Z/Option)
+24D 0V

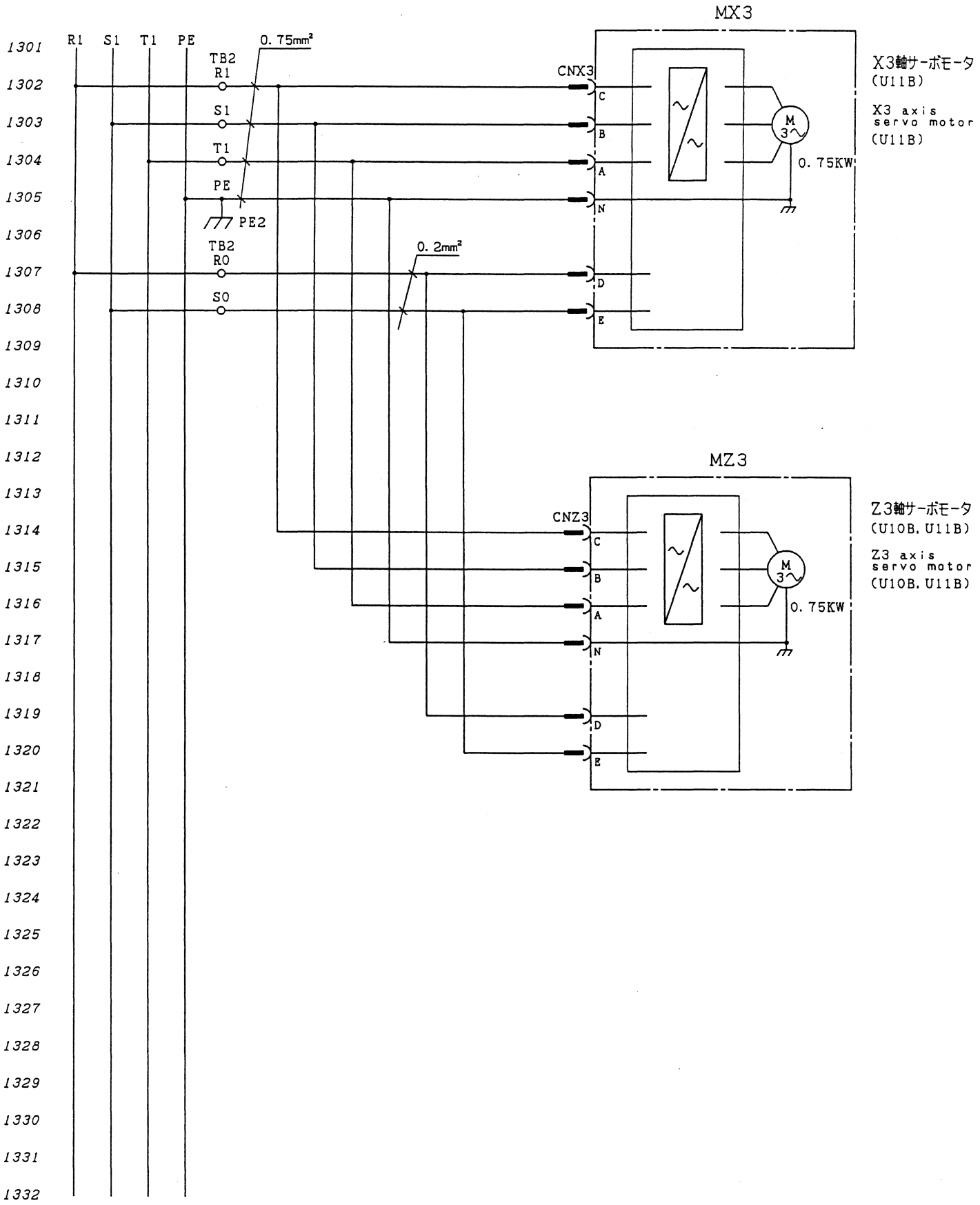

+M5V
+M24V
0V
シートキー基板2
Sheet key board2
0801
0802
0803
0804
0805
0806
0807
0808
0809
0810
0811
0812
0813
0814
0815
0816
0817
0818
0819
0820
0821
0822
0823
0824
0825
0826
0827
0828
0829
0830
0831
0832
0.75mm²
TB1
+M24V
+M5V
0V
CNS15
15
16
17
18
19
20
1.25mm²
CNS14
+M24V
1
0V
3
+M5V
2
1.25mm²
R147
L128
2.2KΩ yellow
DC24V on
Indicator
R148
L127
470Ω yellow
DC5V on
Indicator
+M24V 0V +M5V

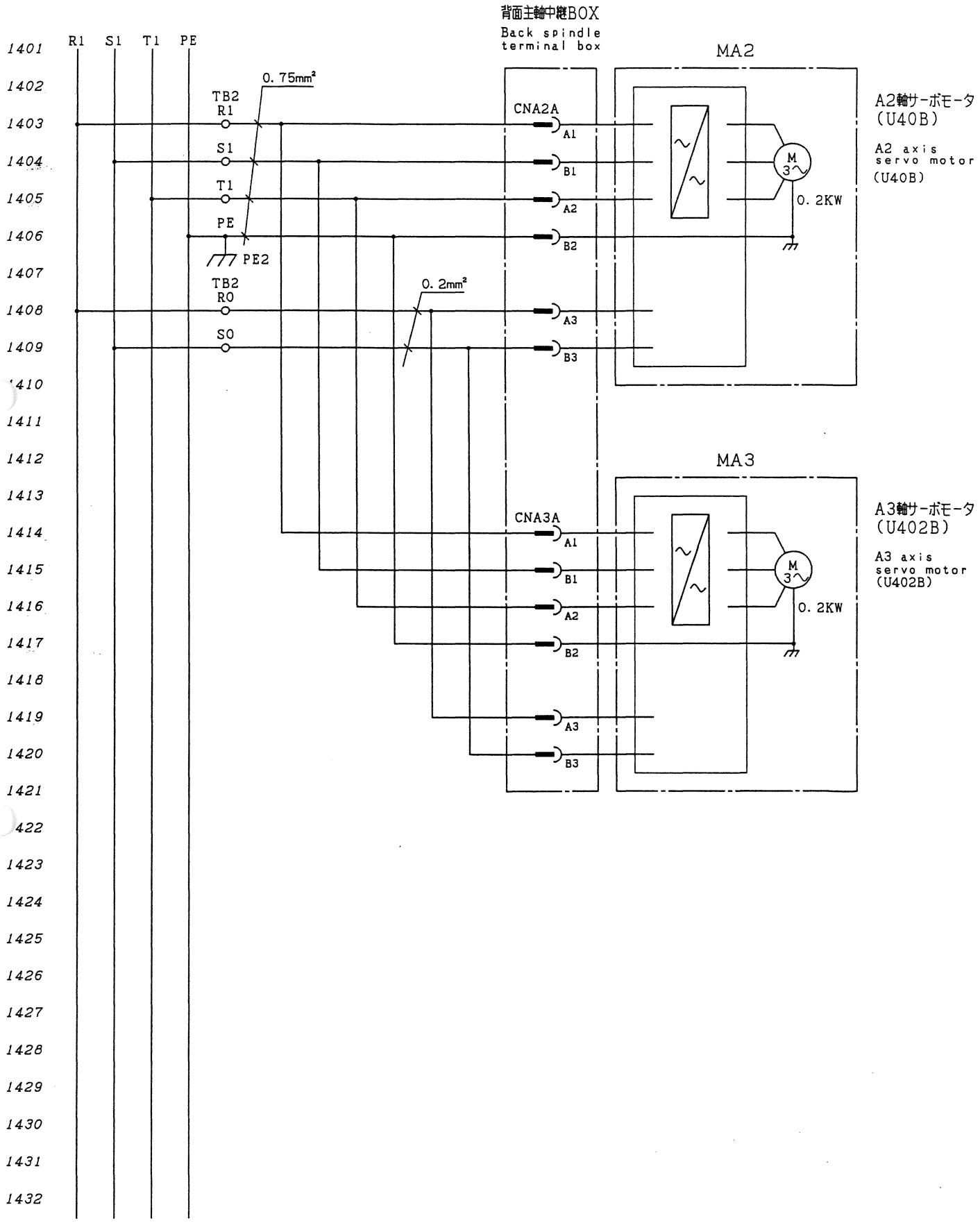

+M24V 0V
メイン主軸オプションユニット
Main sp. option unit
UNIT9
1.25mm²
TB1
+M24V
0V
U9CR30
+M24V
0V
1
2
3
PE1
背面主軸オプションユニット(U40B)
Back sp. option unit(U40B)
UNIT10
1.25mm²
U10CR30
+M24V
0V
1
2
3
PE1
G/B主軸オプションユニット(オプション)
G/B sp. option unit(Option)
UNIT11
1.25mm²
+M24V
0V
U11CR30
+M24V
0V
1
2
3
PE1
G/B主軸1万5千回転仕様時のみ
G/B sp. 15000mni-1 spec only

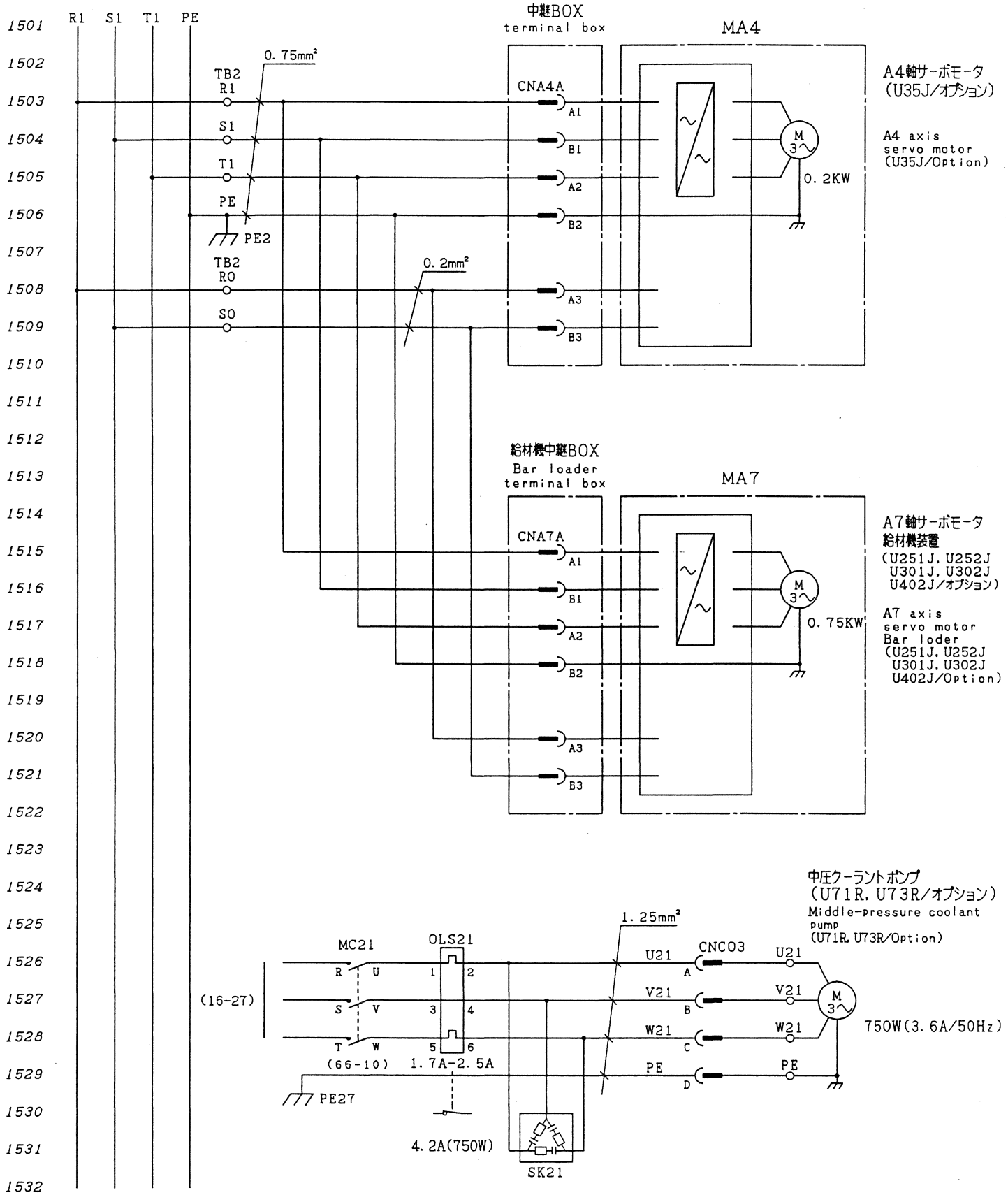

MX1
X1軸サーボモータ
X1 axis servo motor
0.4KW
MZ1
Z1軸サーボモータ
Z1 axis servo motor
0.75KW
R1
S1
T1
PE
0.75mm²
TB2
R1
S1
T1
PE
PE2
TB2
R0
S0
0.2mm²
CNX1
CNZ1
C
B
A
N
D
E
M
3~

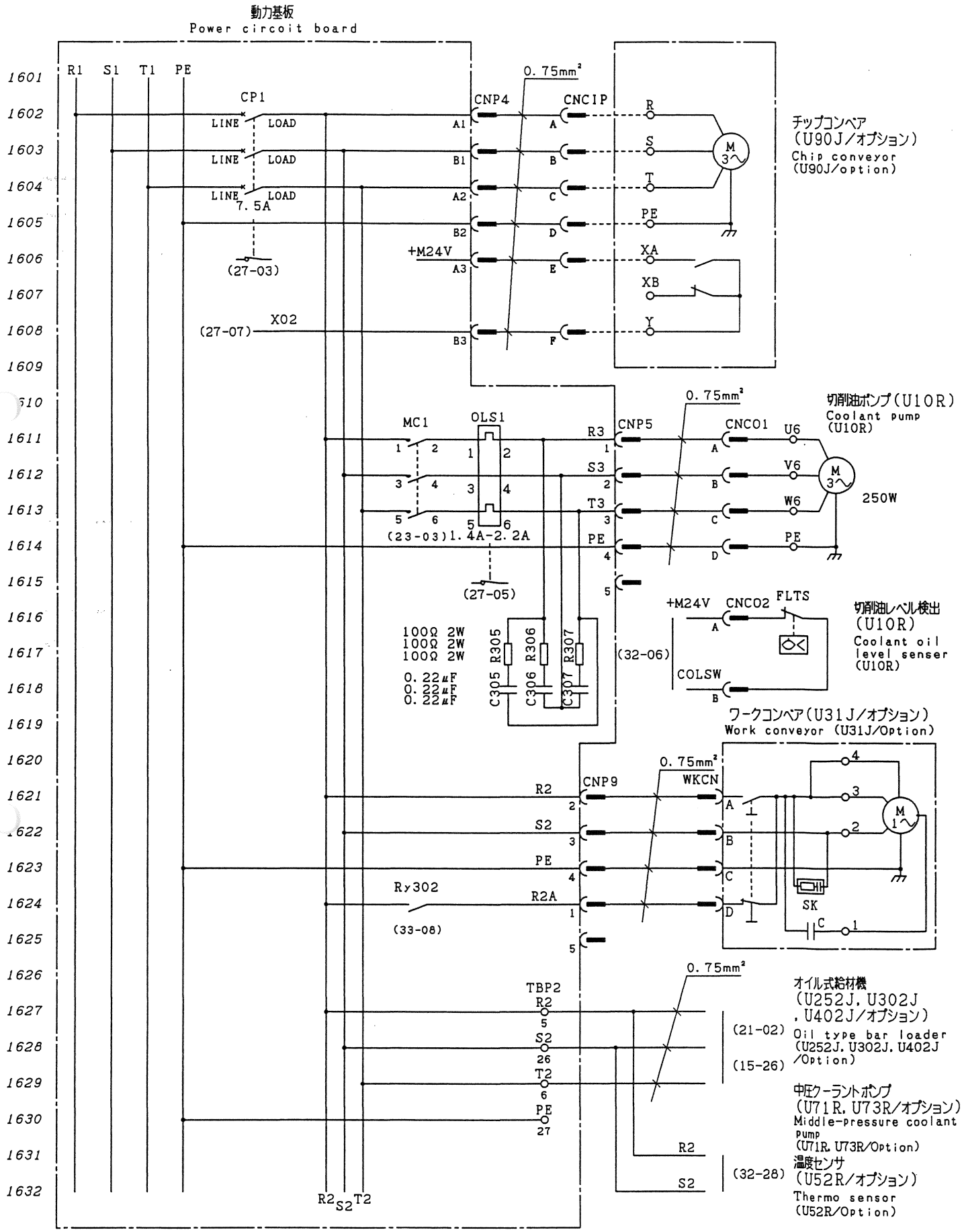

MY1
R1
S1
T1
PE
0.75mm²
TB2
R1
S1
T1
PE
PE2
TB2
R0
S0
0.2mm²
CNY1
C
B
A
N
D
E
M
3
0.75KW
Y1軸サーボモータ
Y1 axis
servo motor
メイン主軸中継BOX
Main spindle
terminal box
MA1
CNA1A
A1
B1
A2
B2
A3
B3
M
3
0.2KW
A1軸サーボモータ
A1 axis
servo motor

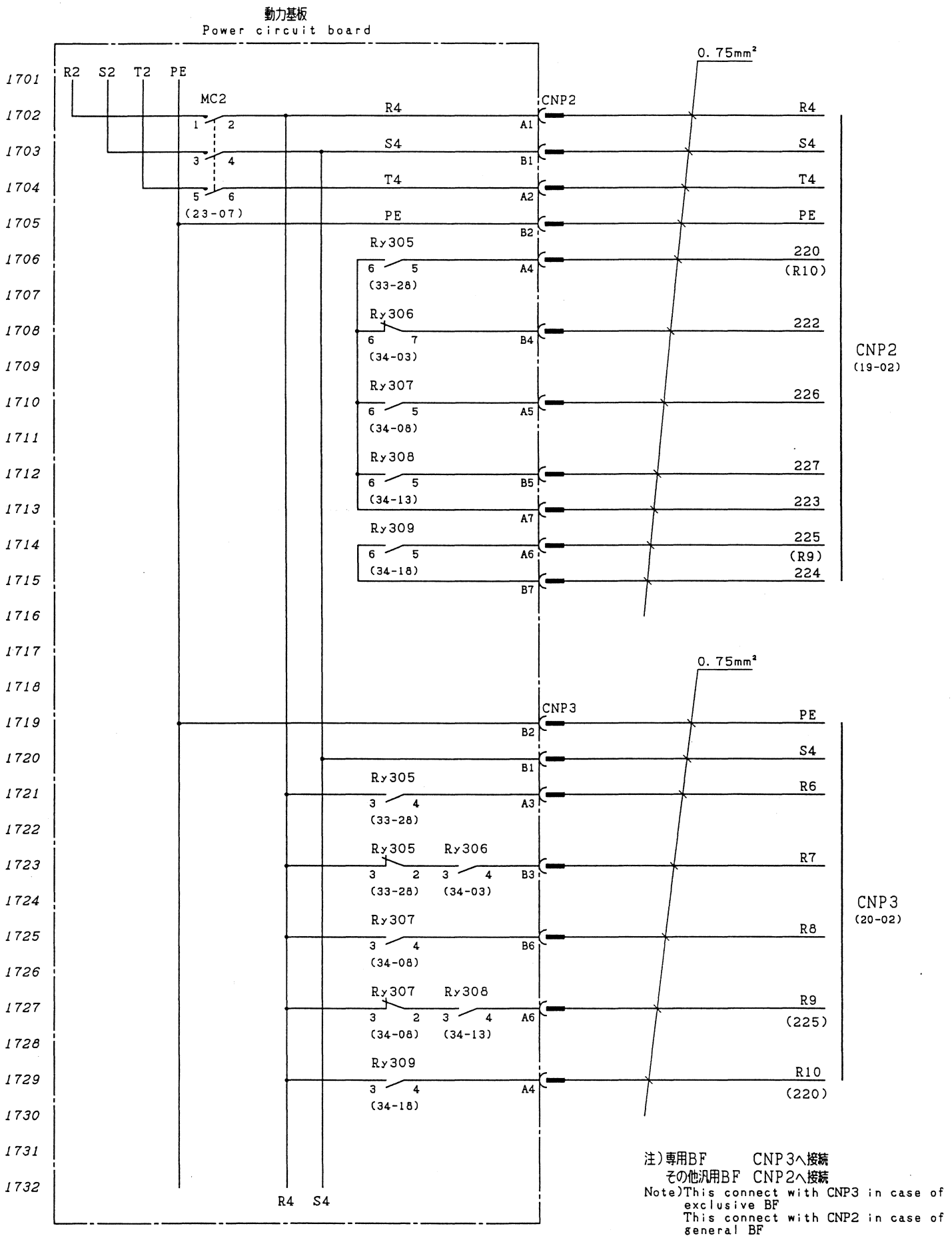

MX2
R1
S1
T1
PE
0.75mm²
TB2
R1
S1
T1
PE
PE2
TB2
R0
S0
0.2mm²
CNX2
C
B
A
N
D
E
M
3
0.4KW
X2軸サーボモータ
(U16B)
X2 axis
servo motor
(U16B)
MZ2
CNZ2
C
B
A
N
D
E
M
3
0.75KW
Z2軸サーボモータ
(U15B)
Z2 axis
servo motor
(U15B)


MX3
R1
S1
T1
PE
0.75mm²
TB2
R1
S1
T1
PE
PE2
TB2
R0
S0
0.2mm²
CNX3
C
B
A
N
D
E
M
3
0.75KW
X3軸サーボモータ
(U11B)
X3 axis
servo motor
(U11B)
MZ3
CNZ3
C
B
A
N
D
E
M
3
0.75KW
Z3軸サーボモータ
(U10B, U11B)
Z3 axis
servo motor
(U10B, U11B)

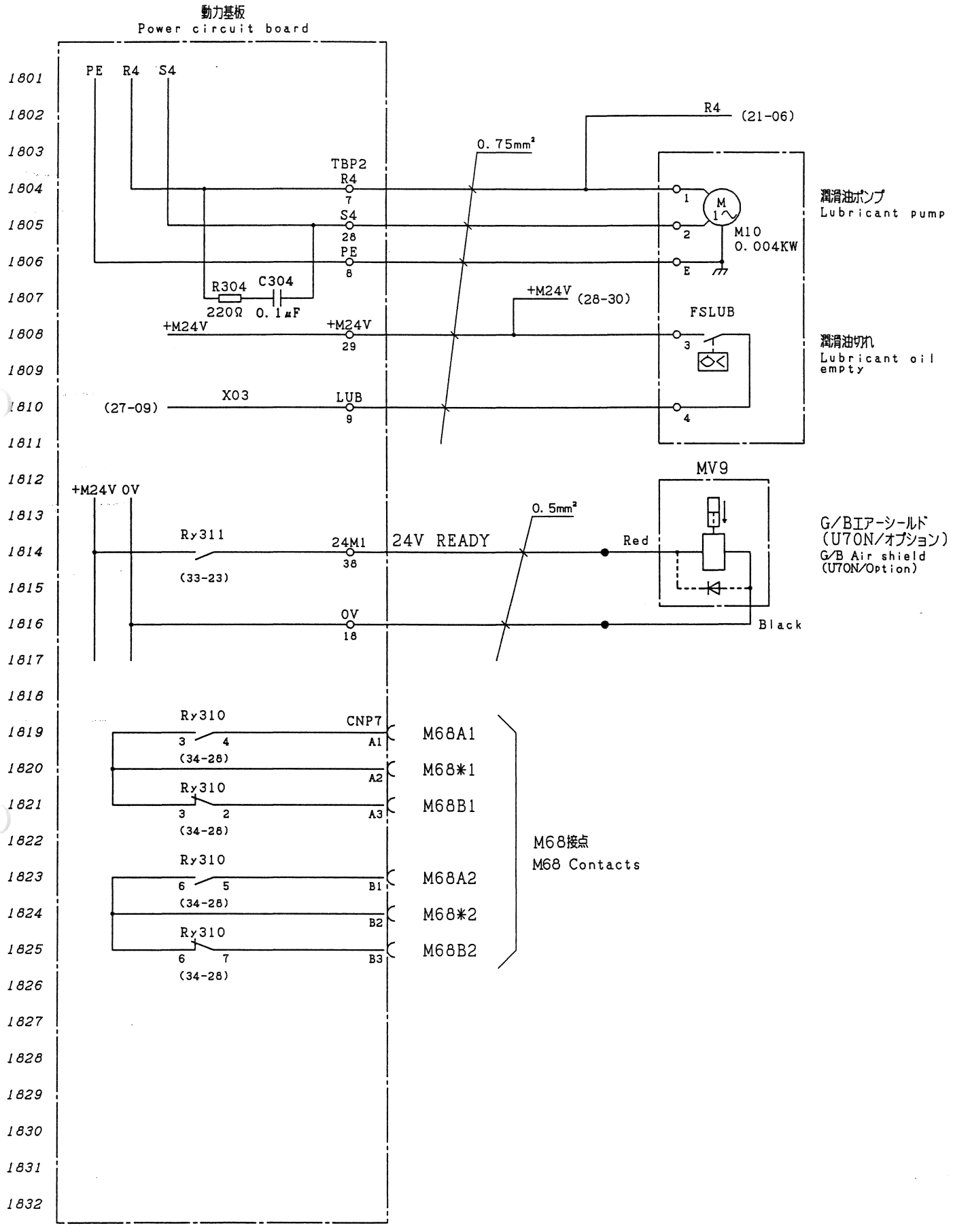

背面主軸中継BOX
Back spindle terminal box
R1
S1
T1
PE
0.75mm²
TB2
R1
S1
T1
PE
PE2
TB2
R0
S0
0.2mm²
CNA2A
A1
B1
A2
B2
A3
B3
MA2
M
3
0.2KW
A2軸サーボモータ
(U40B)
A2 axis servo motor
(U40B)
MA3
CNA3A
A1
B1
A2
B2
A3
B3
M
3
0.2KW
A3軸サーボモータ
(U402B)
A3 axis servo motor
(U402B)

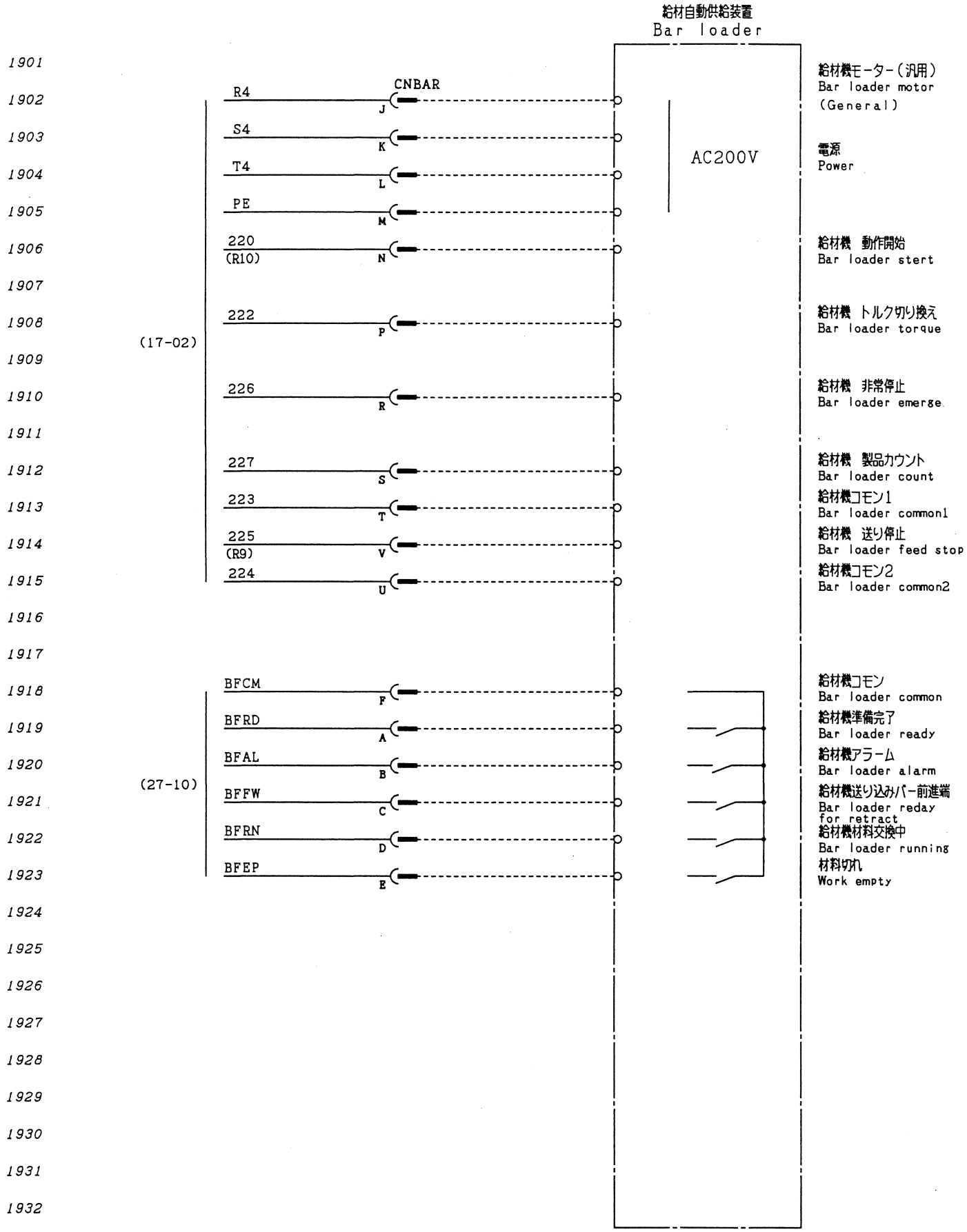

R1
S1
T1
PE
中継BOX
terminal box
MA4
0.75mm²
TB2
R1
S1
T1
PE
PE2
CNA4A
A1
B1
A2
B2
A3
B3
M
3~
0.2KW
A4軸サーボモータ
(U35J/オプション)
A4 axis
servo motor
(U35J/Option)
TB2
RO
SO
0.2mm²
給材機中継BOX
Bar loader
terminal box
MA7
CNA7A
0.75KW
A7軸サーボモータ
給材機装置
(U251J. U252J
U301J. U302J
U402J/オプション)
A7 axis
servo motor
Bar loder
(U251J. U252J
U301J. U302J
U402J/Option)
中圧クーラントポンプ
(U71R. U73R/オプション)
Middle-pressure coolant
pump
(U71R. U73R/Option)
1.25mm²
MC21
OLS21
CNC03
U21
V21
W21
PE
R
S
T
U
V
W
1
2
3
4
5
6
A
B
C
D
(16-27)
(66-10)
1.7A-2.5A
PE27
4.2A(750W)
SK21
750W(3.6A/50Hz)

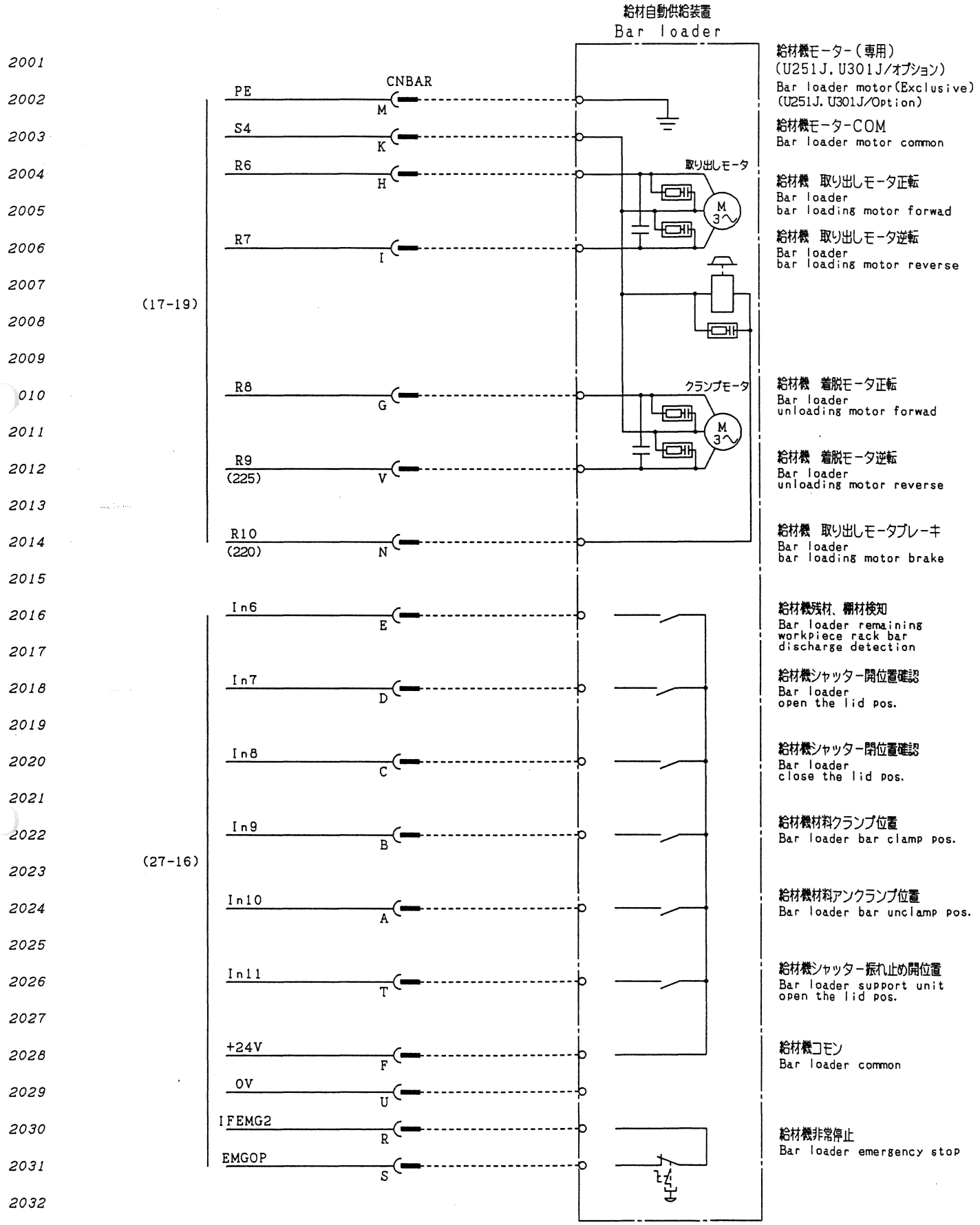

動力基板
Power circoit board
R1 S1 T1 PE
CP1
LINE LOAD
7.5A
(27-03)
X02
(27-07)
0.75mm²
CNP4
CNCIP
A1 B1 A2 B2 A3 B3
A B C D E F
+M24V
R S T PE XA XB Y
M 3~
チップコンベア
(U90J/オプション)
Chip conveyor
(U90J/option)
MC1
OLS1
(23-03)1.4A-2.2A
(27-05)
R3 S3 T3 PE
CNP5
CNCO1
U6 V6 W6 PE
切削油ポンプ(U10R)
Coolant pump
(U10R)
250W
100Ω 2W
100Ω 2W
100Ω 2W
0.22μF
0.22μF
0.22μF
R305 R306 R307
C305 C306 C307
(32-06)
+M24V CNCO2 FLTS
COLSW
切削油レベル検出
(U10R)
Coolant oil
level senser
(U10R)
ワークコンベア(U31J/オプション)
Work conveyor (U31J/Option)
CNP9
WKCN
R2 S2 PE
Ry302
R2A
(33-08)
SK
C
TBP2
R2 S2 T2 PE
(21-02)
(15-26)
(32-28)
オイル式給材機
(U252J, U302J
, U402J/オプション)
Oil type bar loader
(U252J, U302J, U402J
/Option)
中圧クーラントポンプ
(U71R, U73R/オプション)
Middle-pressure coolant
pump
(U71R, U73R/Option)
温度センサ
(U52R/オプション)
Thermo sensor
(U52R/Option)
R2 S2 T2

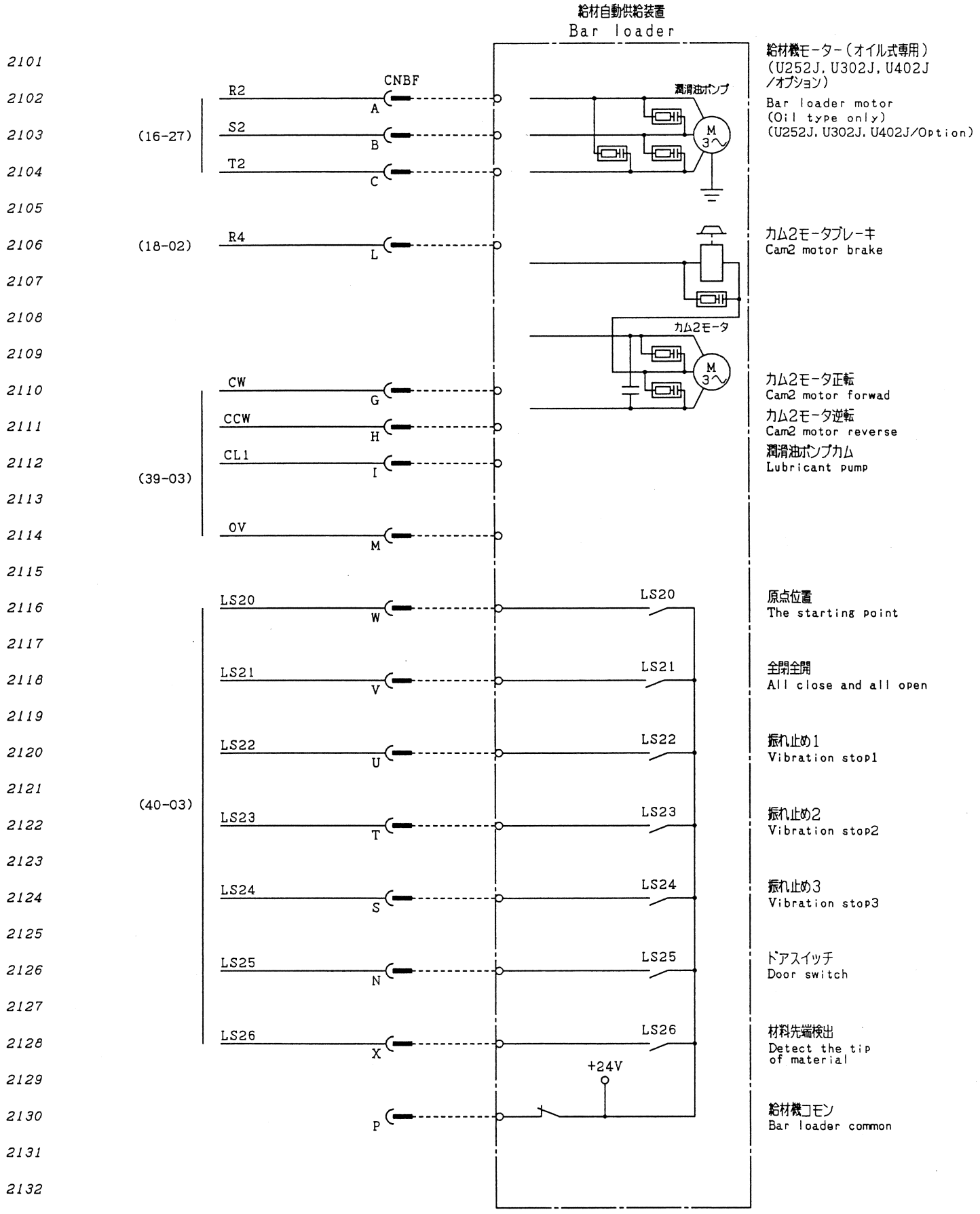


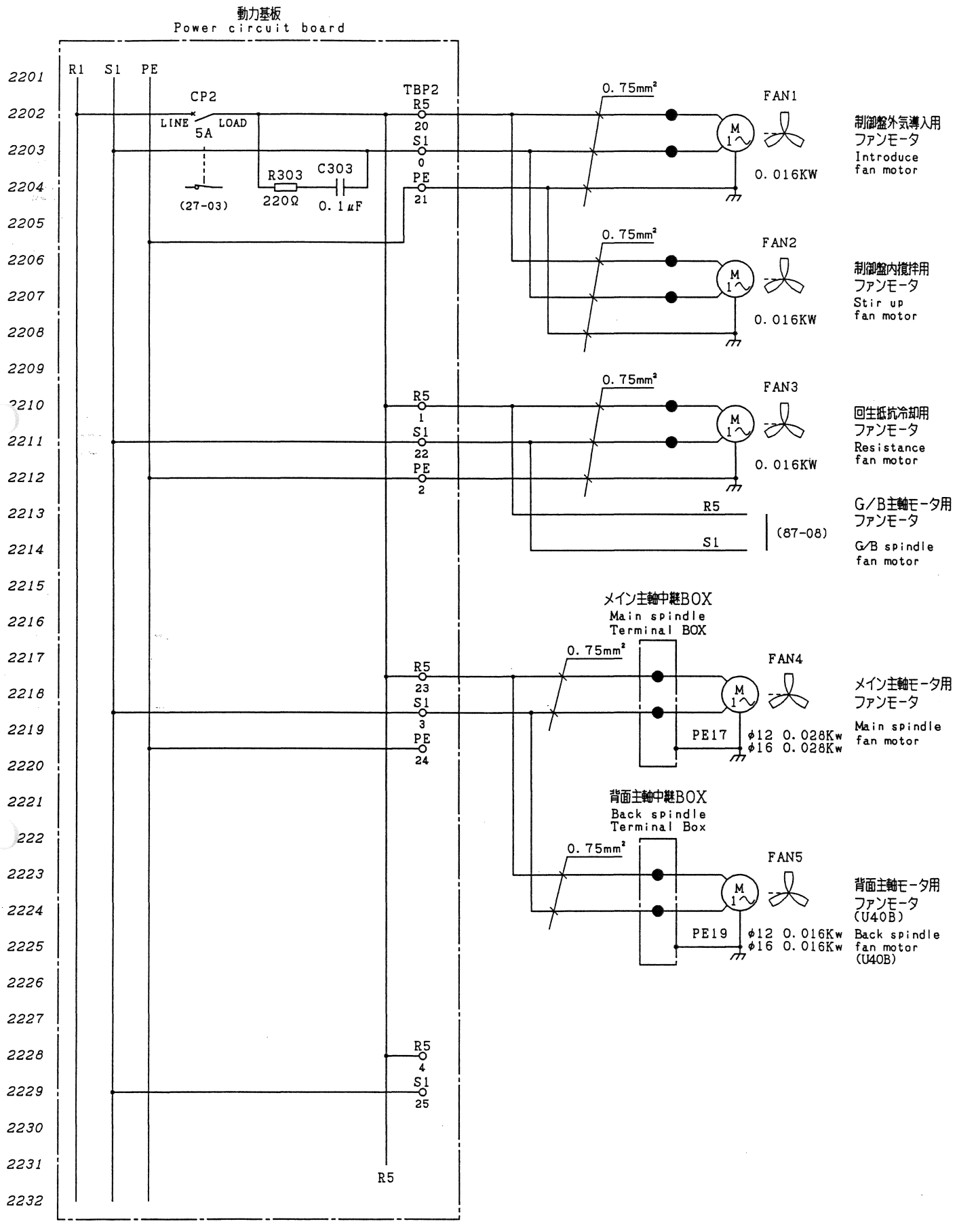
注)専用BF　　CNP3へ接続
　その他汎用BF　CNP2へ接続
Note)This connect with CNP3 in case of exclusive BF
This connect with CNP2 in case of general BF


動力基板
Power circuit board
PE
R4
S4
TBP2
R4
7
S4
28
PE
8
R304
220Ω
C304
0.1μF
+M24V
+M24V
29
(27-09)
X03
LUB
9
0.75mm²
R4
(21-06)
+M24V
(28-30)
M
1
M10
0.004KW
1
2
E
FSLUB
3
4
潤滑油ポンプ
Lubricant pump
潤滑油切れ
Lubricant oil empty
MV9
0.5mm²
Red
Black
G/Bエアーシールド
(U70N/オプション)
G/B Air shield
(U70N/Option)
+M24V 0V
Ry311
(33-23)
24M1
38
24V READY
0V
18
Ry310
3
4
(34-28)
CNP7
A1
M68A1
A2
M68*1
Ry310
3
2
(34-28)
A3
M68B1
Ry310
6
5
(34-28)
B1
M68A2
B2
M68*2
Ry310
6
7
(34-28)
B3
M68B2
M68接点
M68 Contacts

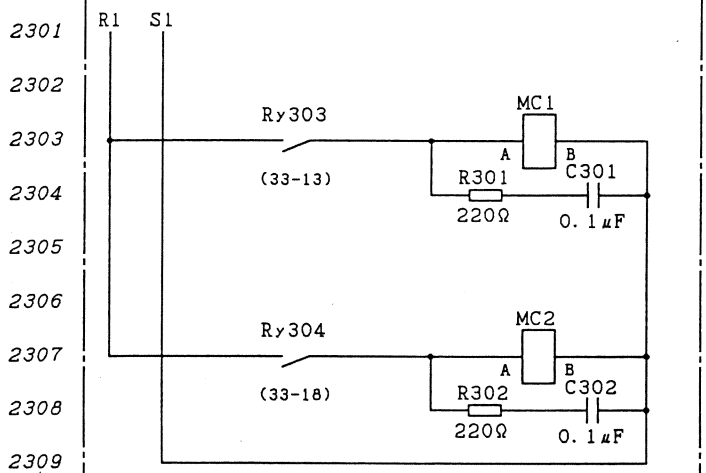

給材自動供給装置
Bar loader
CNBAR
R4
J
S4
K
T4
L
PE
M
220
(R10)
N
222
P
226
R
227
S
223
T
225
(R9)
V
224
U
(17-02)
BFCM
F
BFRD
A
BFAL
B
BFFW
C
BFRN
D
BFEP
E
(27-10)
AC200V
給材機モーター(汎用)
Bar loader motor
(General)
電源
Power
給材機 動作開始
Bar loader stert
給材機 トルク切り換え
Bar loader torque
給材機 非常停止
Bar loader emerge
給材機 製品カウント
Bar loader count
給材機コモン1
Bar loader common1
給材機 送り停止
Bar loader feed stop
給材機コモン2
Bar loader common2
給材機コモン
Bar loader common
給材機準備完了
Bar loader ready
給材機アラーム
Bar loader alarm
給材機送り込みバー前進端
Bar loader reday
for retract
給材機材料交換中
Bar loader running
材料切れ
Work empty


給材自動供給装置
Bar loader
CNBAR
PE
M
S4
K
R6
H
R7
I
(17-19)
R8
G
R9
(225)
V
R10
(220)
N
In6
E
In7
D
In8
C
In9
B
(27-16)
In10
A
In11
T
+24V
F
0V
U
IFEMG2
R
EMGOP
S
取り出しモータ
M
3～
クランプモータ
M
3～
給材機モーター（専用）
(U251J, U301J/オプション)
Bar loader motor(Exclusive)
(U251J, U301J/Option)
給材機モーターCOM
Bar loader motor common
給材機 取り出しモータ正転
Bar loader
bar loading motor forwad
給材機 取り出しモータ逆転
Bar loader
bar loading motor reverse
給材機 着脱モータ正転
Bar loader
unloading motor forwad
給材機 着脱モータ逆転
Bar loader
unloading motor reverse
給材機 取り出しモータブレーキ
Bar loader
bar loading motor brake
給材機残材、棚材検知
Bar loader remaining
workpiece rack bar
discharge detection
給材機シャッター開位置確認
Bar loader
open the lid pos.
給材機シャッター閉位置確認
Bar loader
close the lid pos.
給材機材料クランプ位置
Bar loader bar clamp pos.
給材機材料アンクランプ位置
Bar loader bar unclamp pos.
給材機シャッター振れ止め開位置
Bar loader support unit
open the lid pos.
給材機コモン
Bar loader common
給材機非常停止
Bar loader emergency stop


給材自動供給装置
Bar loader
2101
2102
2103
2104
2105
2106
2107
2108
2109
2110
2111
2112
2113
2114
2115
2116
2117
2118
2119
2120
2121
2122
2123
2124
2125
2126
2127
2128
2129
2130
2131
2132
CNBF
R2
A
S2
B
T2
C
(16-27)
R4
L
(18-02)
CW
G
CCW
H
CL1
I
(39-03)
0V
M
LS20
W
LS21
V
LS22
U
LS23
T
LS24
S
LS25
N
LS26
X
(40-03)
P
+24V
潤滑油ポンプ
M
3～
カム2モータ
M
3～
LS20
LS21
LS22
LS23
LS24
LS25
LS26
給材機モーター（オイル式専用）
(U252J, U302J, U402J
/オプション)
Bar loader motor
(Oil type only)
(U252J, U302J, U402J/Option)
カム2モータブレーキ
Cam2 motor brake
カム2モータ正転
Cam2 motor forwad
カム2モータ逆転
Cam2 motor reverse
潤滑油ポンプカム
Lubricant pump
原点位置
The starting point
全閉全開
All close and all open
振れ止め1
Vibration stop1
振れ止め2
Vibration stop2
振れ止め3
Vibration stop3
ドアスイッチ
Door switch
材料先端検出
Detect the tip
of material
給材機コモン
Bar loader common


動力基板
Power circuit board
R1
S1
PE
CP2
LINE
LOAD
5A
(27-03)
R303
220Ω
C303
0.1μF
TBP2
R5
20
S1
0
PE
21
0.75mm²
FAN1
M
1~
0.016KW
制御盤外気導入用
ファンモータ
Introduce
fan motor
FAN2
制御盤内撹拌用
ファンモータ
Stir up
fan motor
R5
1
S1
22
PE
2
FAN3
回生抵抗冷却用
ファンモータ
Resistance
fan motor
R5
S1
(87-08)
G/B主軸モータ用
ファンモータ
G/B spindle
fan motor
メイン主軸中継BOX
Main spindle
Terminal BOX
R5
23
S1
3
PE
24
FAN4
メイン主軸モータ用
ファンモータ
Main spindle
fan motor
PE17
φ12 0.028Kw
φ16 0.028Kw
背面主軸中継BOX
Back spindle
Terminal Box
FAN5
背面主軸モータ用
ファンモータ
(U40B)
Back spindle
fan motor
(U40B)
PE19
φ12 0.016Kw
φ16 0.016Kw
R5
4
S1
25
R5

動力基板
Power circuit board



切削油ポンプ
Coolant pump

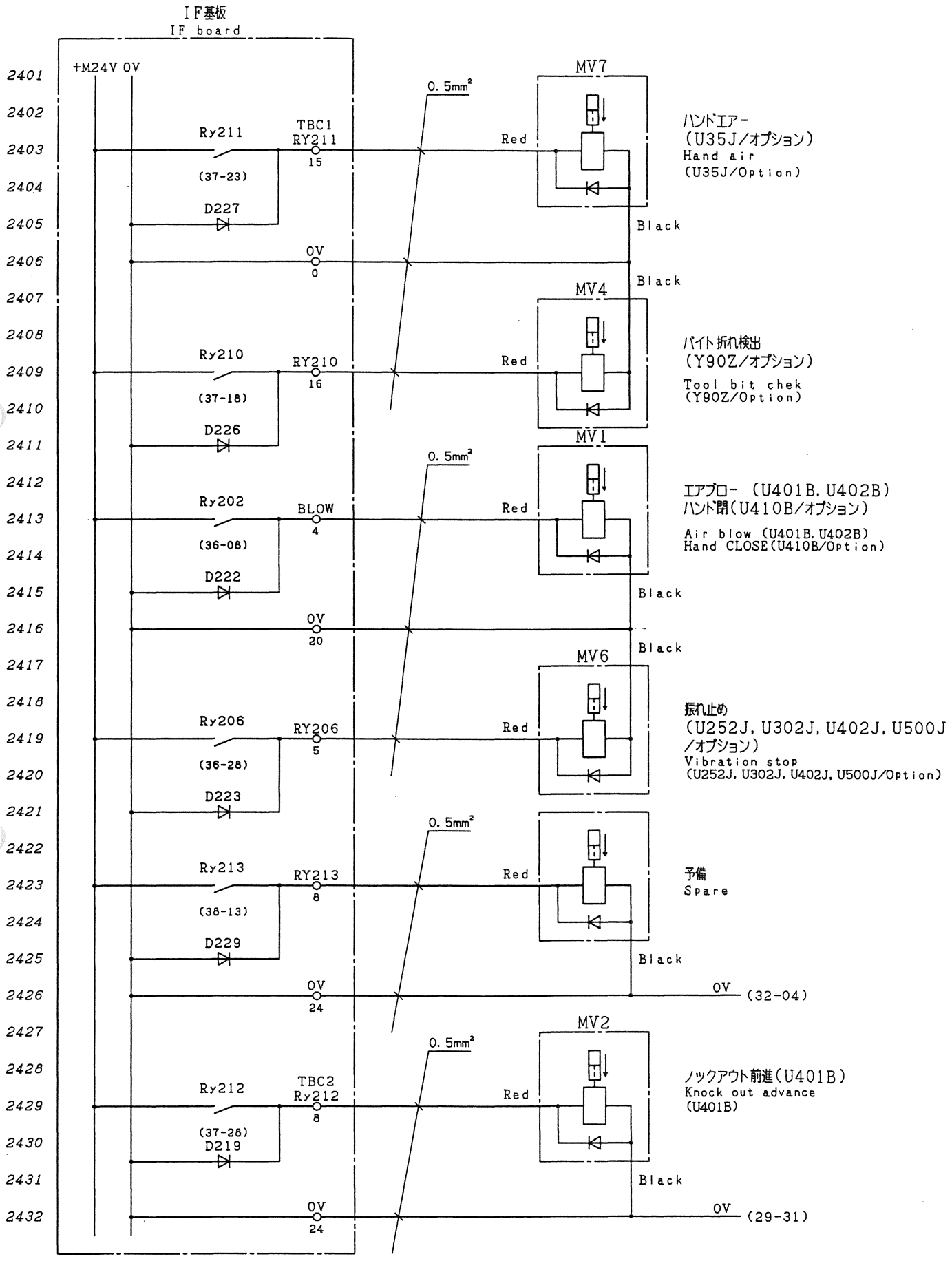
～	1611	1612	1613	
ｱｰｽ				

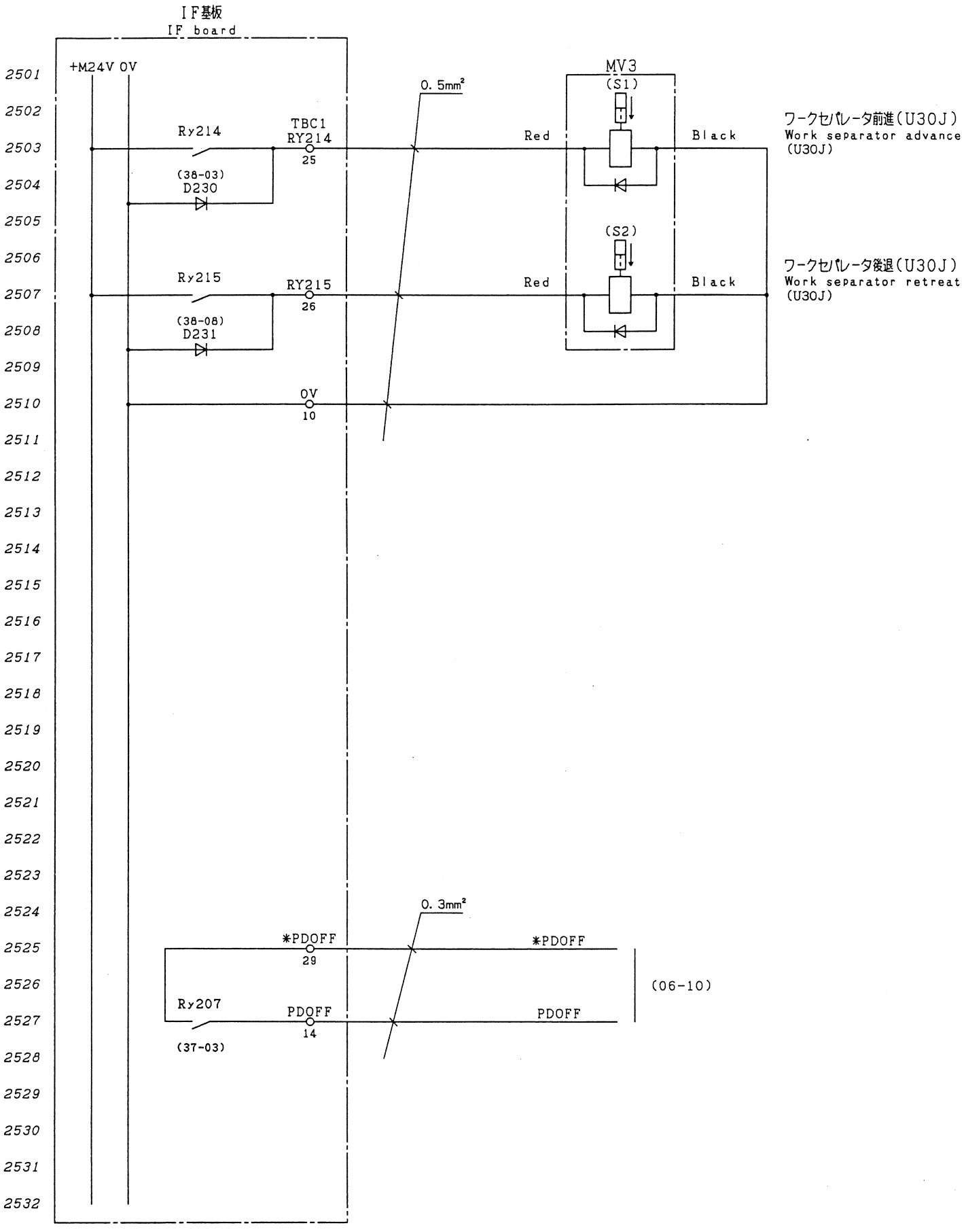
潤滑油ポンプ
Lubricant pump

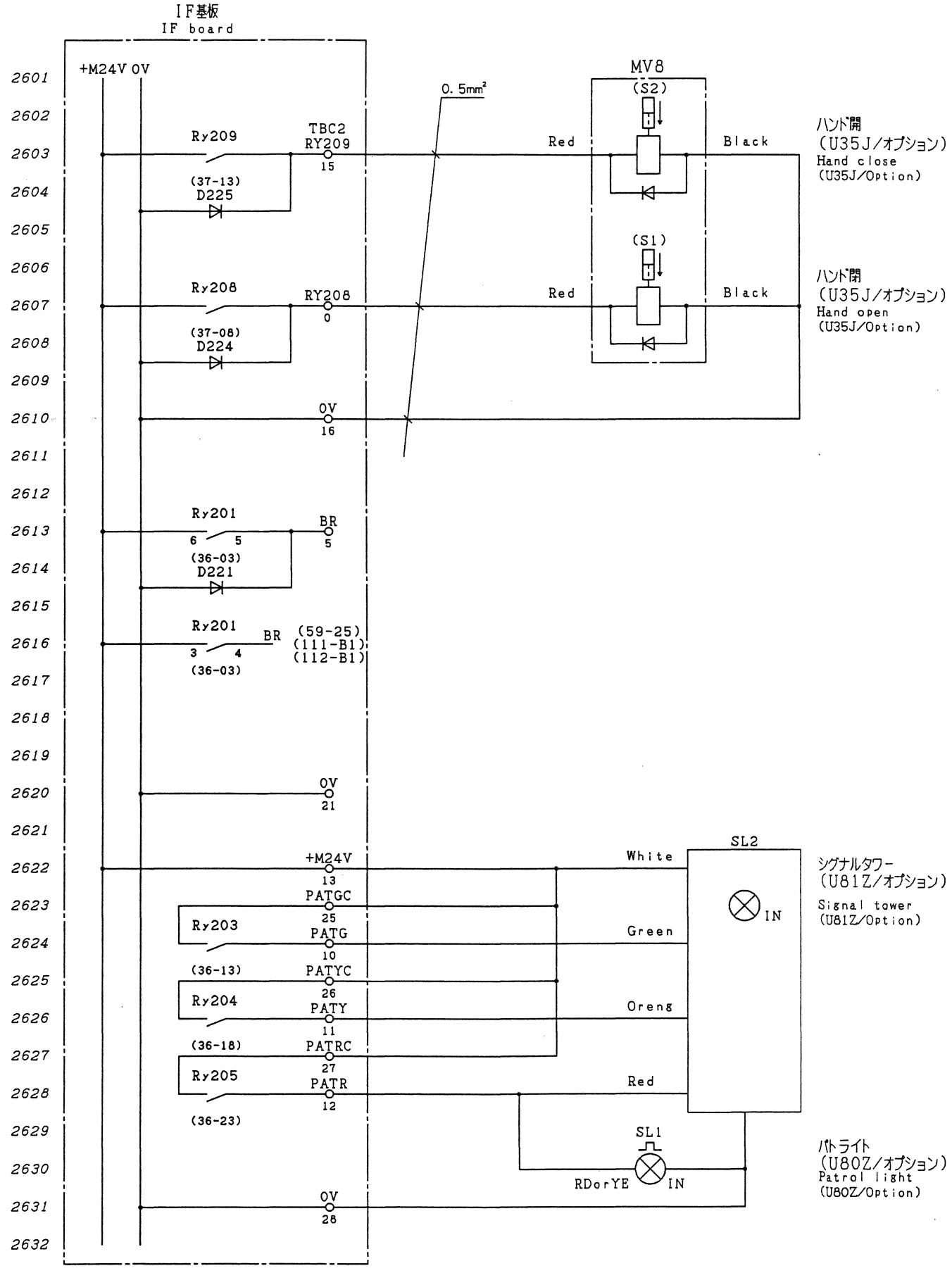
給材機装置
Bar loarder

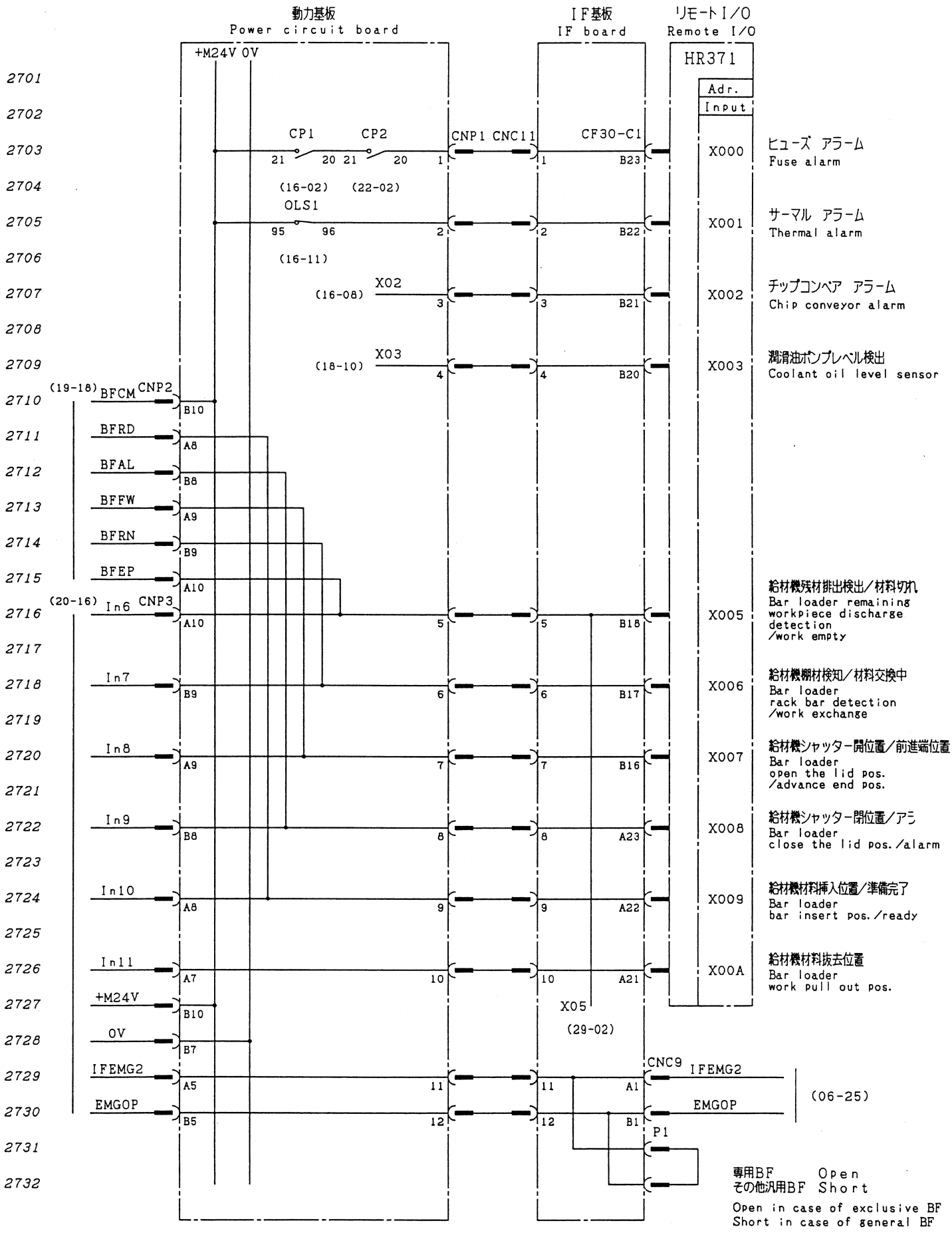
～	1702	1703	1704	
ｱｰｽ				

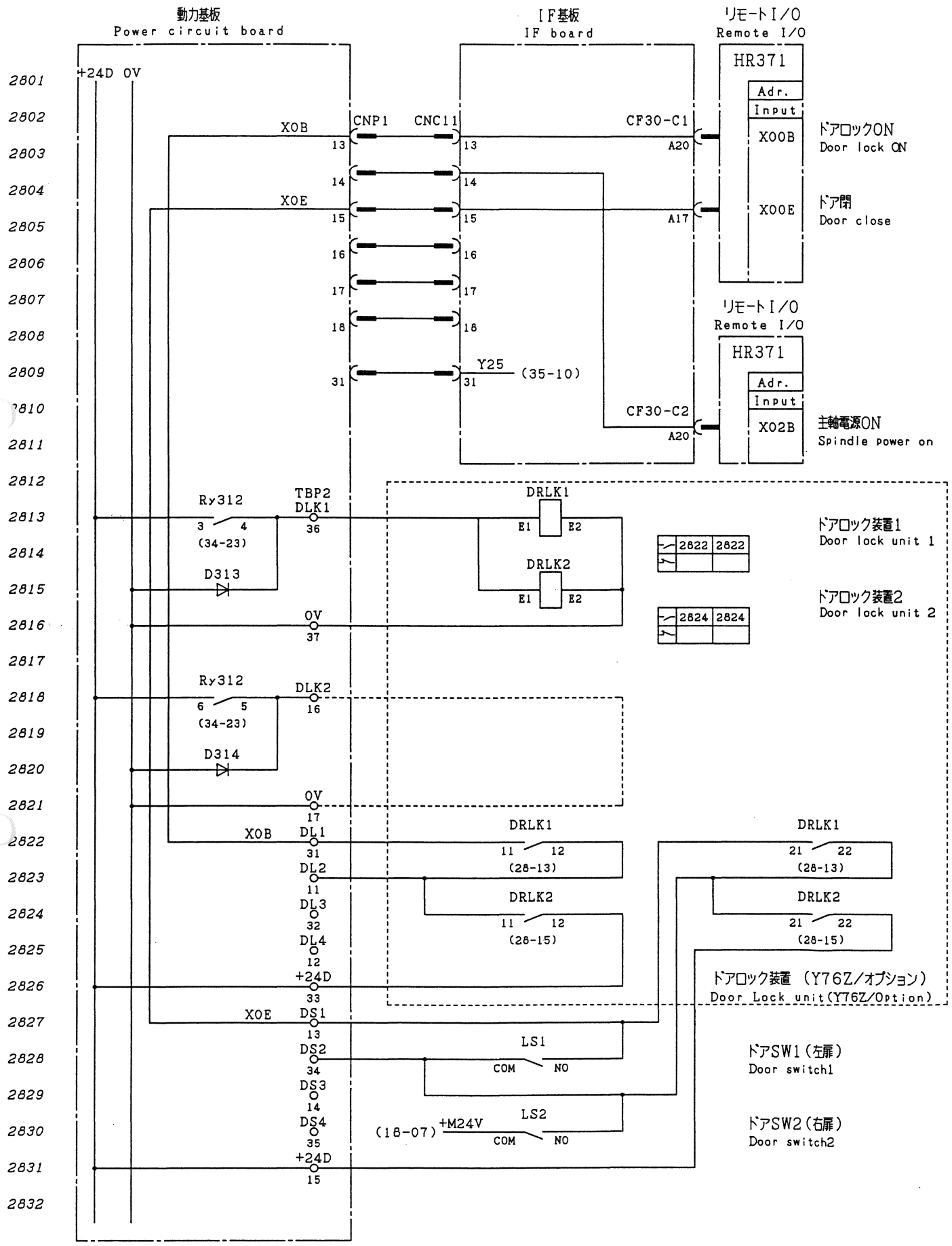
2301
2302
2303
2304
2305
2306
2307
2308
2309
2310
2311
2312
2313
2314
2315
2316
2317
2318
2319
2320
2321
2322
2323
2324
2325
2326
2327
2328
2329
2330
2331
2332

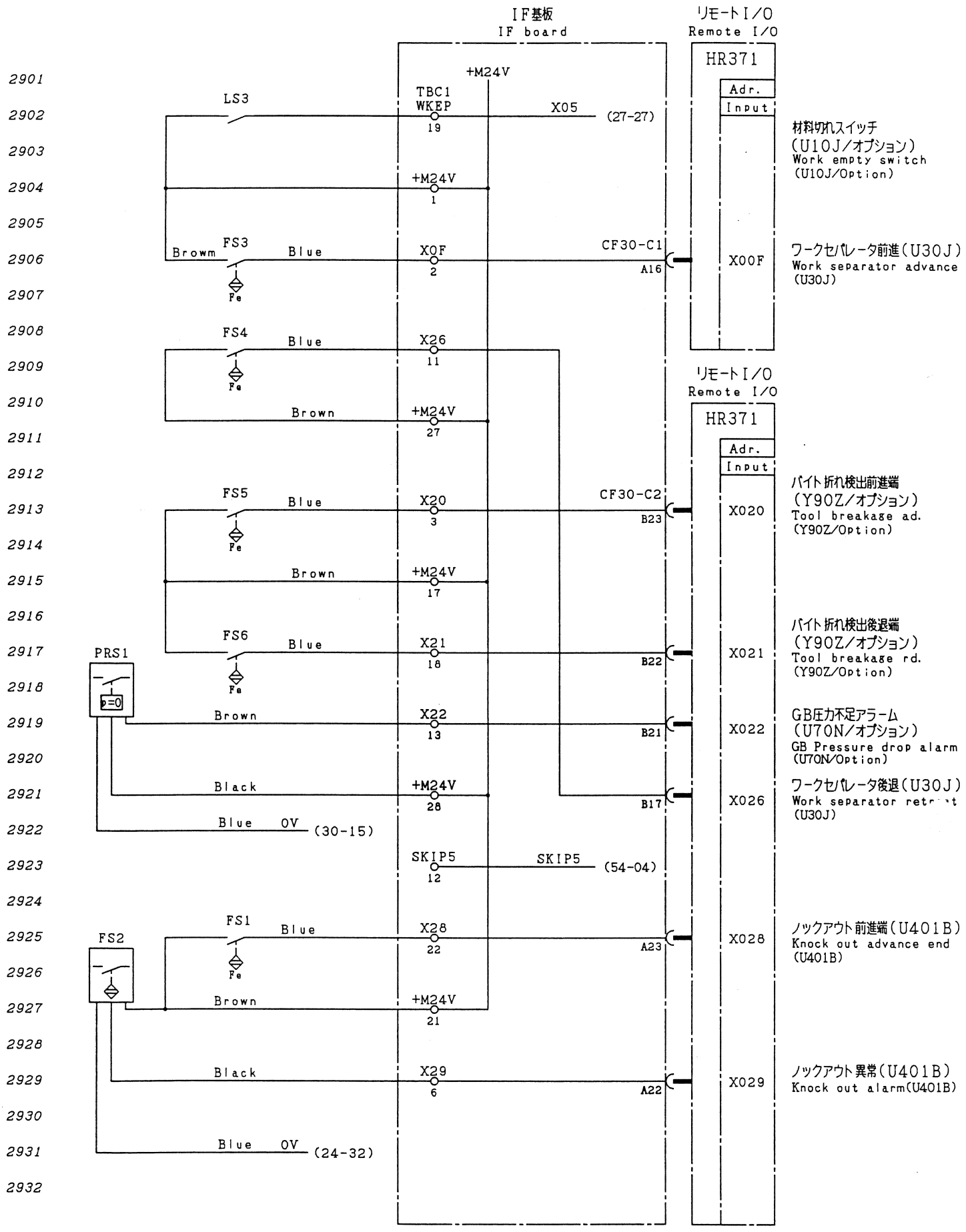

IF基板
IF board
+M24V 0V
2401
2402
2403
2404
2405
2406
2407
2408
2409
2410
2411
2412
2413
2414
2415
2416
2417
2418
2419
2420
2421
2422
2423
2424
2425
2426
2427
2428
2429
2430
2431
2432
Ry211
(37-23)
D227
TBC1
RY211
15
0V
0
0.5mm²
Red
MV7
Black
ハンドエアー
(U35J/オプション)
Hand air
(U35J/Option)
Ry210
(37-18)
D226
RY210
16
MV4
バイト折れ検出
(Y90Z/オプション)
Tool bit chek
(Y90Z/Option)
Ry202
(36-08)
D222
BLOW
4
MV1
エアブロー (U401B, U402B)
ハンド閉(U410B/オプション)
Air blow (U401B, U402B)
Hand CLOSE(U410B/Option)
0V
20
Ry206
(36-28)
D223
RY206
5
MV6
振れ止め
(U252J, U302J, U402J, U500J
/オプション)
Vibration stop
(U252J, U302J, U402J, U500J/Option)
Ry213
(38-13)
D229
RY213
8
予備
Spare
0V
24
0V
(32-04)
MV2
Ry212
(37-28)
D219
TBC2
Ry212
8
ノックアウト前進(U401B)
Knock out advance
(U401B)
0V
24
0V
(29-31)

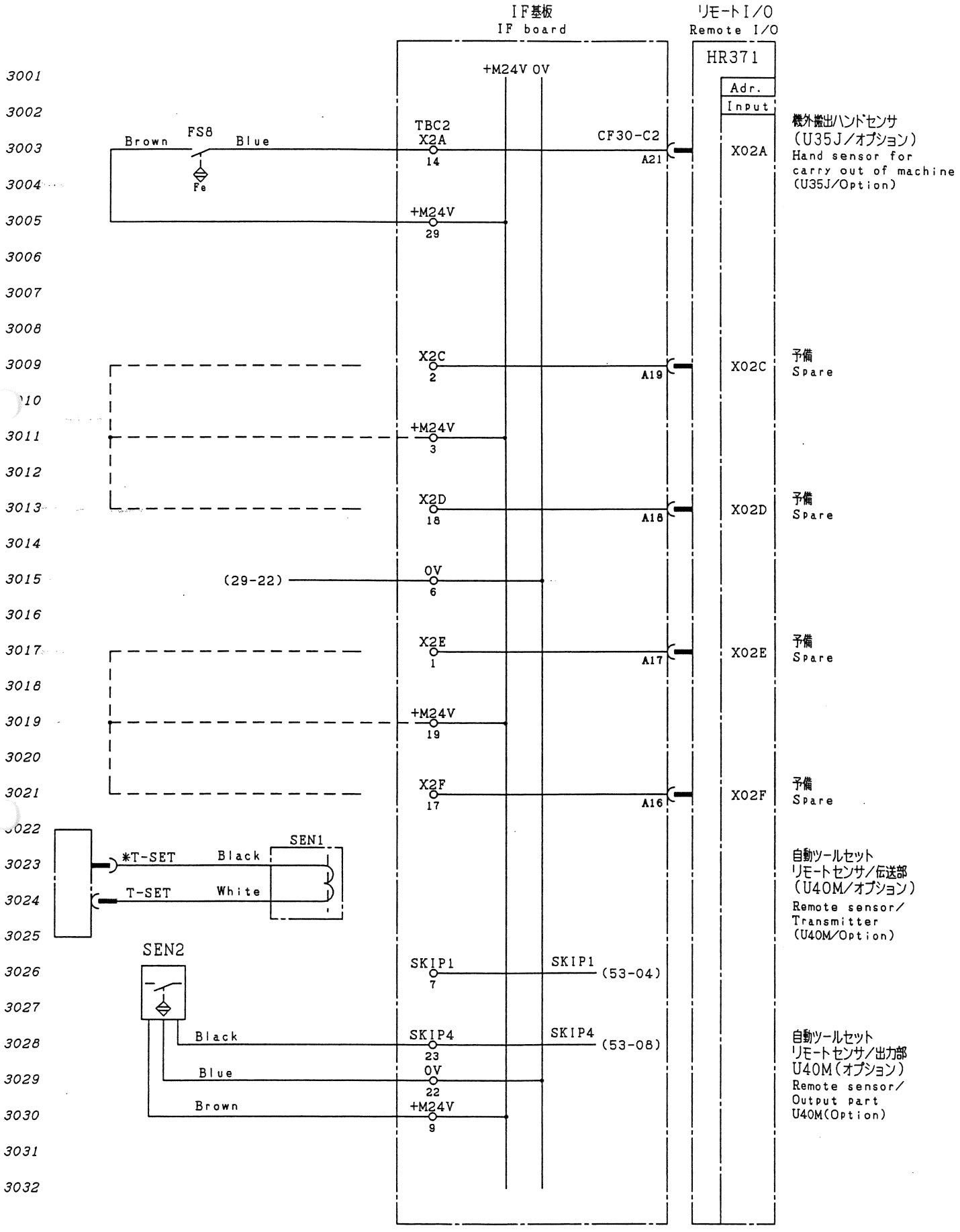

IF基板
IF board
+M24V 0V
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
2516
2517
2518
2519
2520
2521
2522
2523
2524
2525
2526
2527
2528
2529
2530
2531
2532
Ry214
TBC1
RY214
25
(38-03)
D230
Ry215
RY215
26
(38-08)
D231
0V
10
0.5mm²
MV3
(S1)
(S2)
Red
Black
Red
Black
ワークセパレータ前進(U30J)
Work separator advance
(U30J)
ワークセパレータ後退(U30J)
Work separator retreat
(U30J)
0.3mm²
*PDOFF
29
*PDOFF
Ry207
PDOFF
14
PDOFF
(37-03)
(06-10)

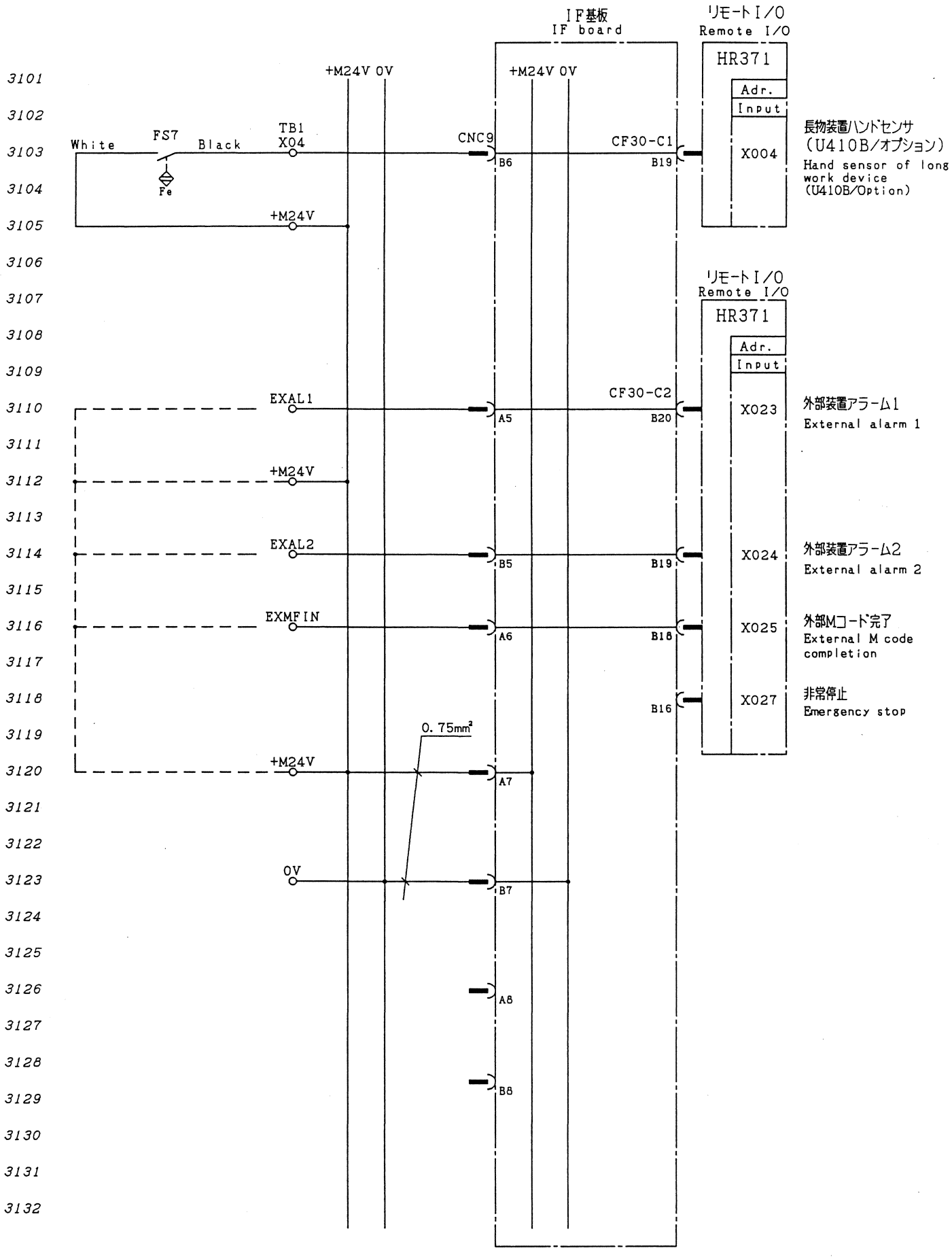

IF基板
IF board
+M24V 0V
2601
2602
2603
2604
2605
2606
2607
2608
2609
2610
2611
2612
2613
2614
2615
2616
2617
2618
2619
2620
2621
2622
2623
2624
2625
2626
2627
2628
2629
2630
2631
2632
Ry209
TBC2
RY209
15
(37-13)
D225
Ry208
RY208
0
(37-08)
D224
0V
16
0.5mm²
MV8
(S2)
(S1)
Red
Black
Red
Black
ハンド開
(U35J/オプション)
Hand close
(U35J/Option)
ハンド閉
(U35J/オプション)
Hand open
(U35J/Option)
Ry201
BR
6
5
5
(36-03)
D221
Ry201
BR
(59-25)
(111-B1)
(112-B1)
3
4
(36-03)
0V
21
SL2
+M24V
13
PATGC
25
Ry203
PATG
10
(36-13)
PATYC
26
Ry204
PATY
11
(36-18)
PATRC
27
Ry205
PATR
12
(36-23)
White
Green
Oreng
Red
IN
SL1
RDorYE
IN
0V
28
シグナルタワー
(U81Z/オプション)
Signal tower
(U81Z/Option)
パトライト
(U80Z/オプション)
Patrol light
(U80Z/Option)

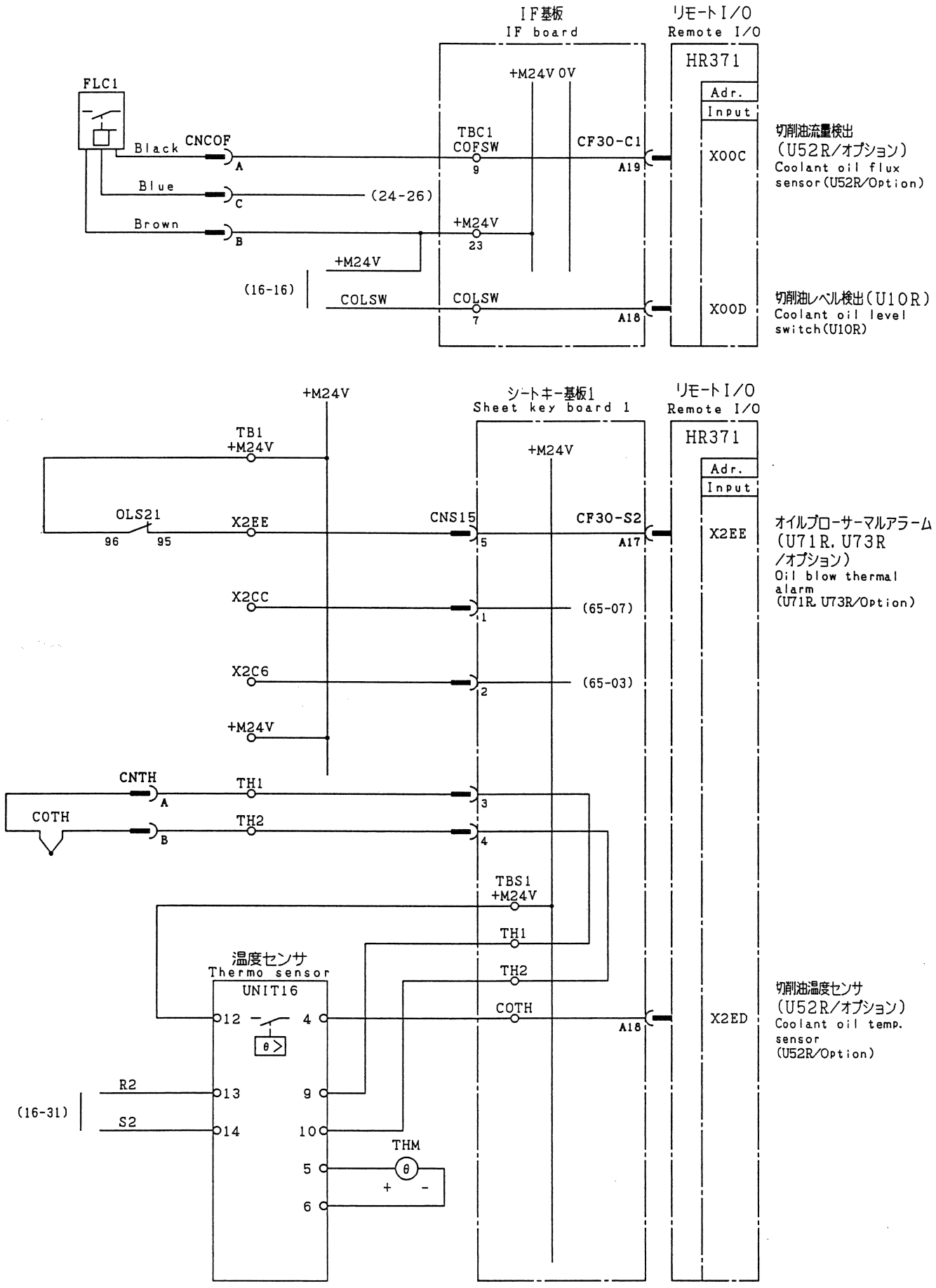

動力基板
Power circuit board
IF基板
IF board
リモートI/O
Remote I/O
+M24V 0V
HR371
Adr.
Input
CP1
CP2
CNP1 CNC11
CF30-C1
X000
ヒューズ アラーム
Fuse alarm
(16-02)
(22-02)
OLS1
X001
サーマル アラーム
Thermal alarm
(16-11)
X02
(16-08)
X002
チップコンベア アラーム
Chip conveyor alarm
X03
(18-10)
X003
潤滑油ポンプレベル検出
Coolant oil level sensor
(19-18)
BFCM
CNP2
BFRD
BFAL
BFFW
BFRN
BFEP
(20-16)
In6
CNP3
X005
給材機残材排出検出/材料切れ
Bar loader remaining workpiece discharge detection /work empty
In7
X006
給材機棚材検知/材料交換中
Bar loader rack bar detection /work exchange
In8
X007
給材機シャッター開位置/前進端位置
Bar loader open the lid pos. /advance end pos.
In9
X008
給材機シャッター閉位置/アラ
Bar loader close the lid pos. /alarm
In10
X009
給材機材料挿入位置/準備完了
Bar loader bar insert pos. /ready
In11
X00A
給材機材料抜去位置
Bar loader work pull out pos.
+M24V
0V
X05
(29-02)
IFEMG2
EMGOP
CNC9
(06-25)
P1
専用BF Open
その他汎用BF Short
Open in case of exclusive BF
Short in case of general BF

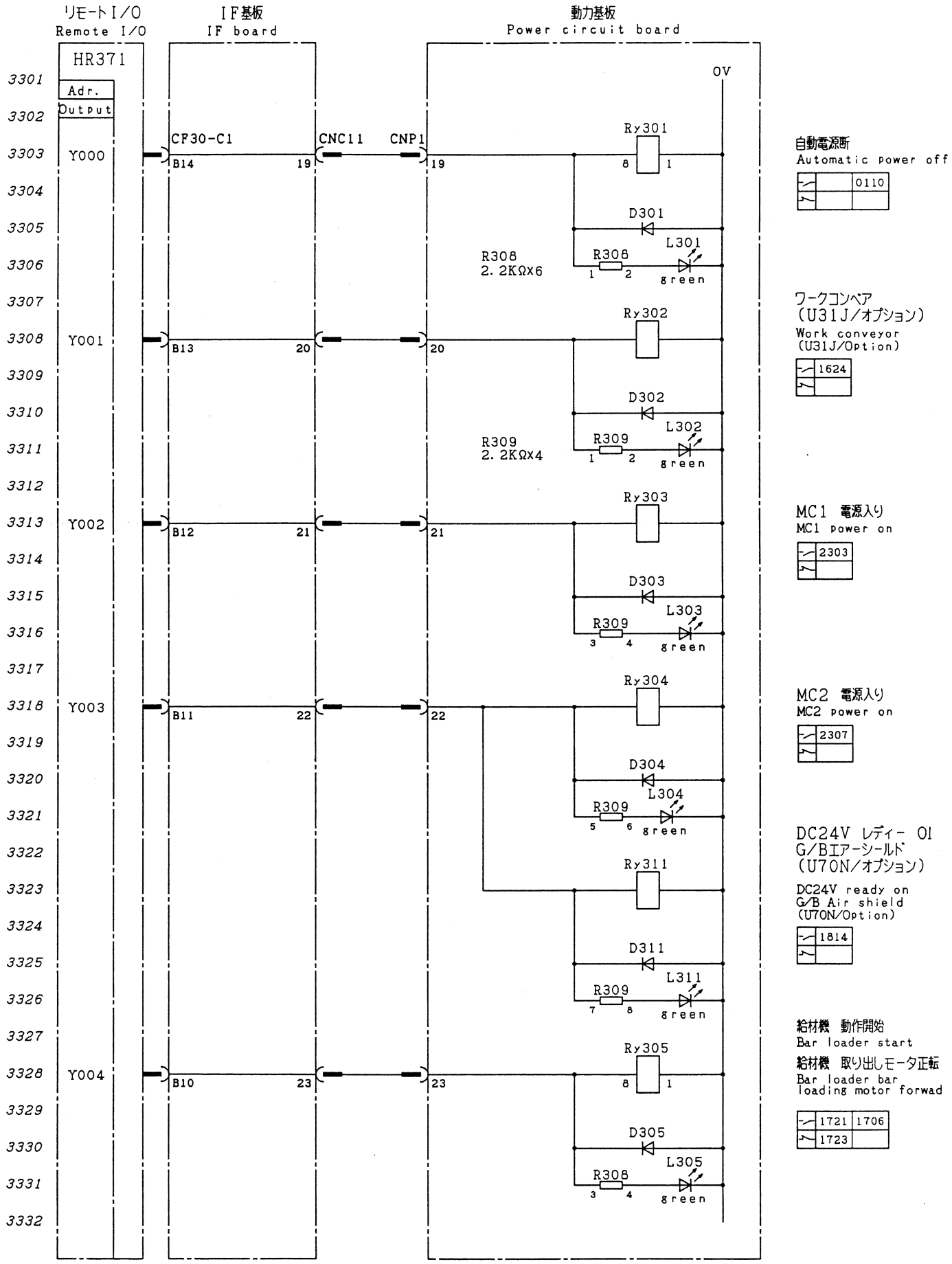

動力基板
Power circuit board
IF基板
IF board
リモートI/O
Remote I/O
HR371
Adr.
Input
X00B
X00E
X02B
ドアロックON
Door lock ON
ドア閉
Door close
主軸電源ON
Spindle power on
+24D 0V
X0B
X0E
CNP1
CNC11
CF30-C1
CF30-C2
A20
A17
Y25
(35-10)
Ry312
TBP2
DLK1
DLK2
D313
D314
0V
DRLK1
DRLK2
E1
E2
2822
2824
ドアロック装置1
Door lock unit 1
ドアロック装置2
Door lock unit 2
DL1
DL2
DL3
DL4
DS1
DS2
DS3
DS4
(34-23)
(28-13)
(28-15)
ドアロック装置 (Y76Z/オプション)
Door Lock unit(Y76Z/Option)
LS1
LS2
COM
NO
+M24V
(18-07)
ドアSW1(左扉)
Door switch1
ドアSW2(右扉)
Door switch2

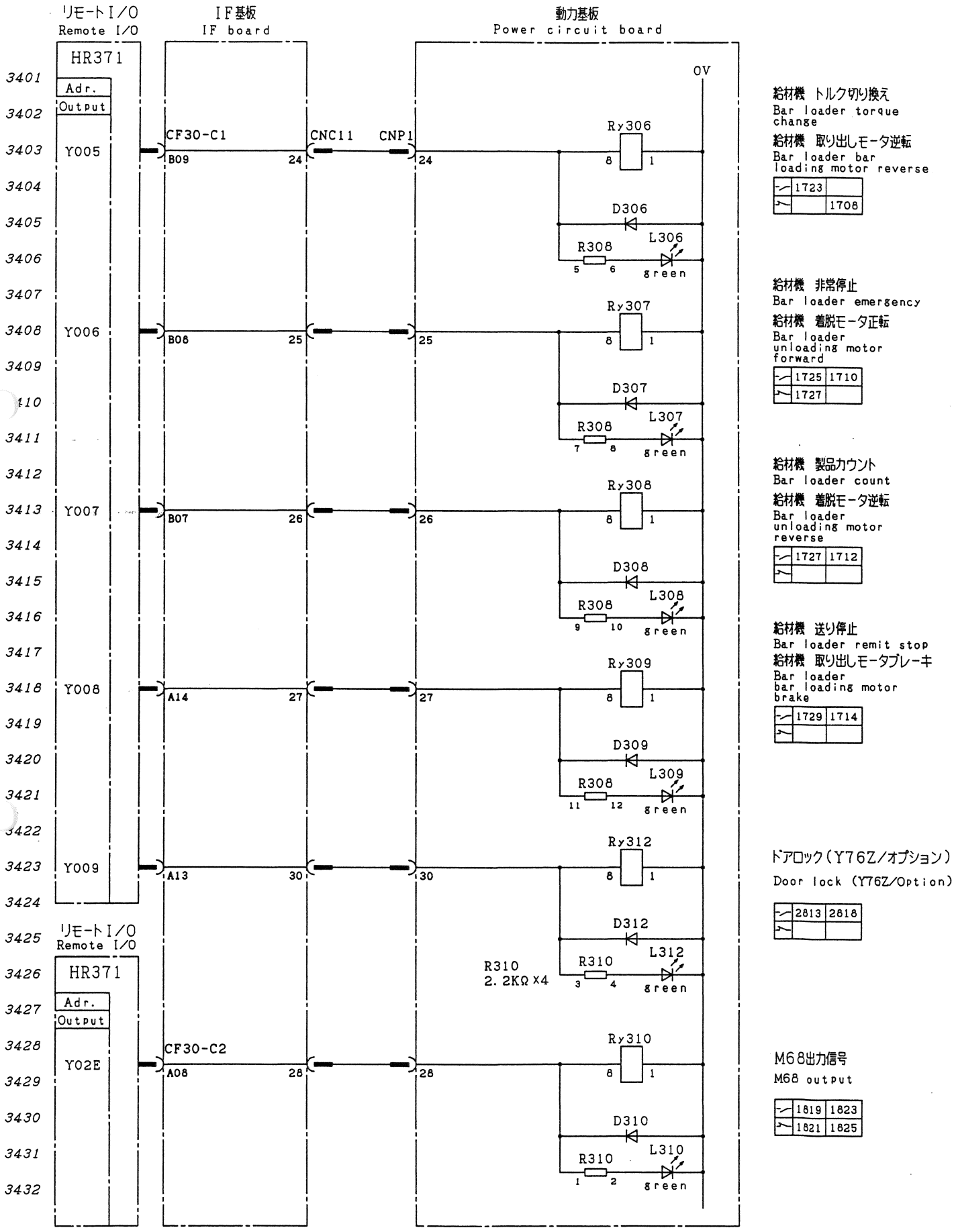

IF基板
IF board
リモートI/O
Remote I/O
HR371
Adr.
Input
+M24V
TBC1
WKEP
19
LS3
X05
(27-27)
+M24V
1
材料切れスイッチ
(U10J/オプション)
Work empty switch
(U10J/Option)
FS3
Browm
Blue
X0F
2
CF30-C1
A16
X00F
ワークセパレータ前進(U30J)
Work separator advance
(U30J)
Fe
FS4
Blue
X26
11
Fe
Brown
+M24V
27
リモートI/O
Remote I/O
HR371
Adr.
Input
FS5
Blue
X20
3
CF30-C2
B23
X020
バイト折れ検出前進端
(Y90Z/オプション)
Tool breakage ad.
(Y90Z/Option)
Fe
Brown
+M24V
17
FS6
Blue
X21
18
B22
X021
バイト折れ検出後退端
(Y90Z/オプション)
Tool breakage rd.
(Y90Z/Option)
PRS1
Fe
p=0
Brown
X22
13
B21
X022
GB圧力不足アラーム
(U70N/オプション)
GB Pressure drop alarm
(U70N/Option)
Black
+M24V
28
B17
X026
ワークセパレータ後退(U30J)
Work separator retract
(U30J)
Blue
0V
(30-15)
SKIP5
12
SKIP5
(54-04)
FS1
Blue
X28
22
A23
X028
ノックアウト前進端(U401B)
Knock out advance end
(U401B)
FS2
Fe
Brown
+M24V
21
Black
X29
6
A22
X029
ノックアウト異常(U401B)
Knock out alarm(U401B)
Blue
0V
(24-32)

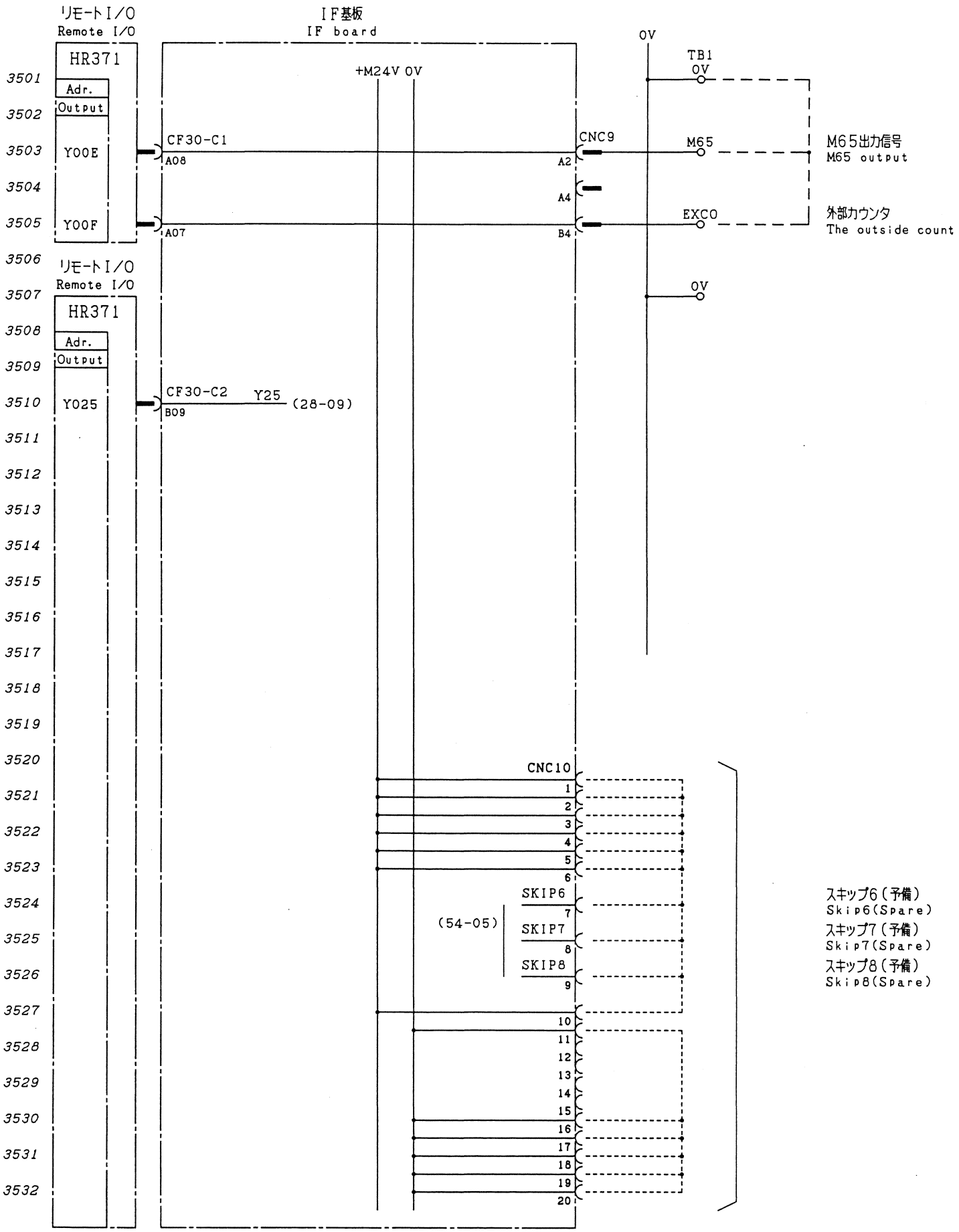

IF基板
IF board
リモートI/O
Remote I/O
HR371
Adr.
Input
+M24V 0V
3001
3002
3003
3004
3005
3006
3007
3008
3009
3010
3011
3012
3013
3014
3015
3016
3017
3018
3019
3020
3021
3022
3023
3024
3025
3026
3027
3028
3029
3030
3031
3032
Brown
FS8
Blue
Fe
TBC2
X2A
14
CF30-C2
A21
X02A
機外搬出ハンドセンサ
(U35J/オプション)
Hand sensor for
carry out of machine
(U35J/Option)
+M24V
29
X2C
2
A19
X02C
予備
Spare
+M24V
3
X2D
18
A18
X02D
予備
Spare
(29-22)
0V
6
X2E
1
A17
X02E
予備
Spare
+M24V
19
X2F
17
A16
X02F
予備
Spare
SEN1
*T-SET
Black
T-SET
White
自動ツールセット
リモートセンサ/伝送部
(U40M/オプション)
Remote sensor/
Transmitter
(U40M/Option)
SEN2
SKIP1
7
SKIP1
(53-04)
Black
SKIP4
23
SKIP4
(53-08)
Blue
0V
22
Brown
+M24V
9
自動ツールセット
リモートセンサ/出力部
U40M(オプション)
Remote sensor/
Output part
U40M(Option)

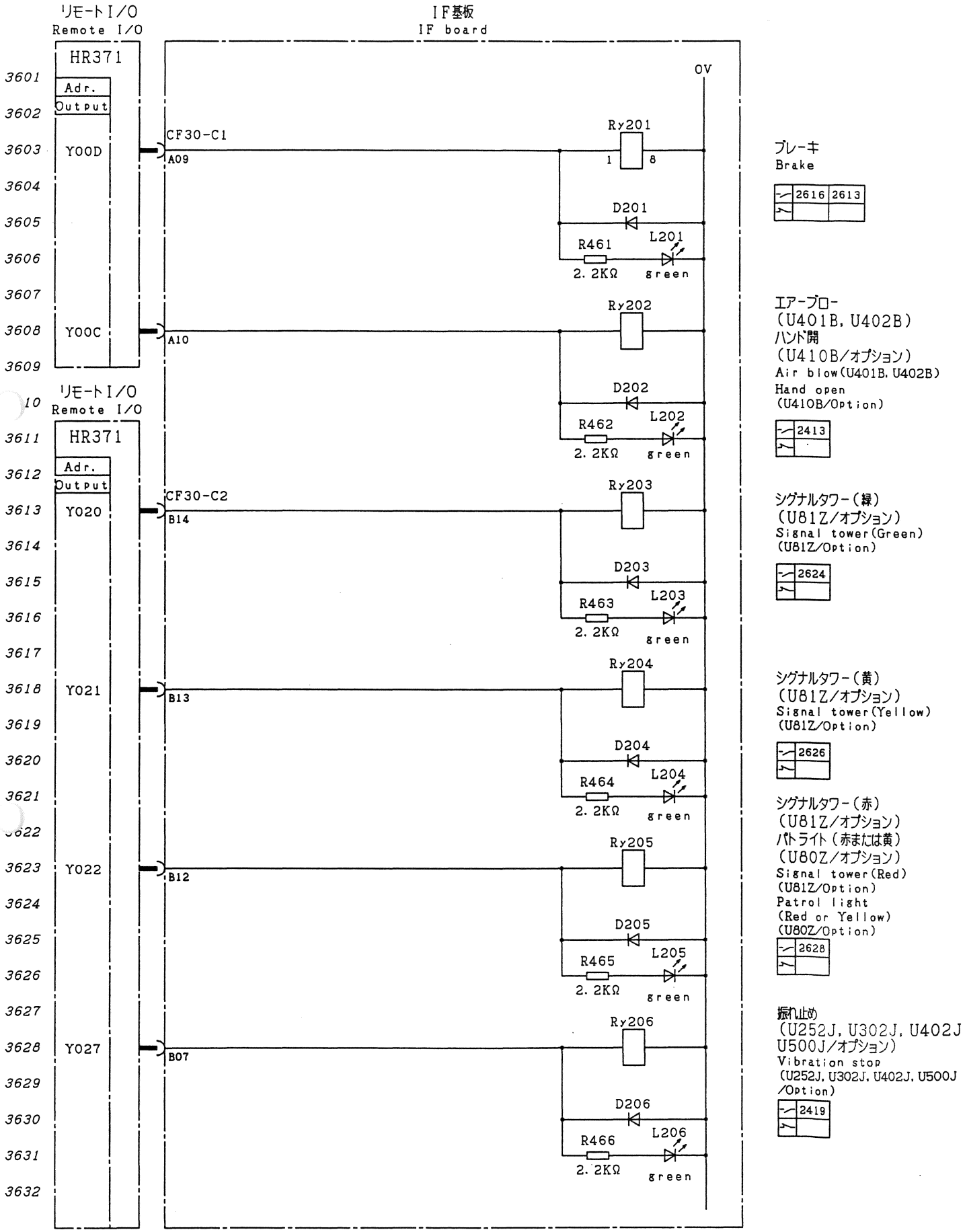

IF基板
IF board
リモートI/O
Remote I/O
HR371
Adr.
Input
+M24V 0V
+M24V 0V
3101
3102
3103
3104
3105
3106
3107
3108
3109
3110
3111
3112
3113
3114
3115
3116
3117
3118
3119
3120
3121
3122
3123
3124
3125
3126
3127
3128
3129
3130
3131
3132
White
FS7
Black
Fe
TB1
X04
+M24V
CNC9
B6
CF30-C1
B19
X004
長物装置ハンドセンサ
(U410B/オプション)
Hand sensor of long work device (U410B/Option)
EXAL1
A5
CF30-C2
B20
X023
外部装置アラーム1
External alarm 1
+M24V
EXAL2
B5
B19
X024
外部装置アラーム2
External alarm 2
EXMFIN
A6
B18
X025
外部Mコード完了
External M code completion
B16
X027
非常停止
Emergency stop
0.75mm²
+M24V
A7
0V
B7
A8
B8

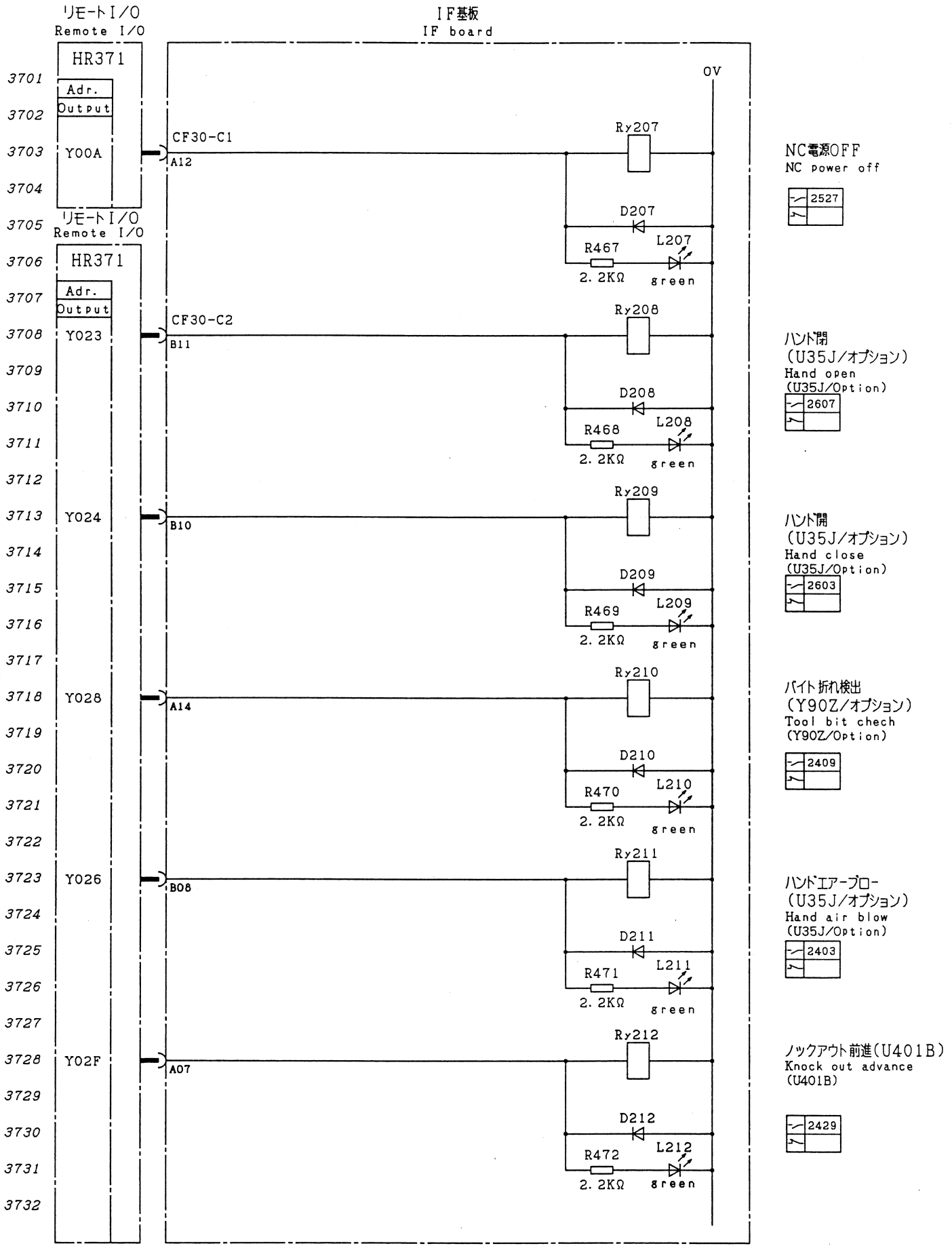

IF基板
IF board
リモートI/O
Remote I/O
HR371
Adr.
Input
FLC1
Black
CNCOF
A
Blue
C
(24-26)
Brown
B
+M24V
0V
TBC1
COFSW
9
CF30-C1
A19
X00C
切削油流量検出
(U52R/オプション)
Coolant oil flux sensor(U52R/Option)
+M24V
23
(16-16)
COLSW
COLSW
7
A18
X00D
切削油レベル検出(U10R)
Coolant oil level switch(U10R)
シートキー基板1
Sheet key board 1
TB1
+M24V
OLS21
96
95
X2EE
CNS15
5
CF30-S2
A17
オイルブローサーマルアラーム
(U71R, U73R/オプション)
Oil blow thermal alarm
(U71R, U73R/Option)
X2CC
1
(65-07)
X2C6
2
(65-03)
CNTH
TH1
A
3
COTH
TH2
B
4
TBS1
+M24V
温度センサ
Thermo sensor
UNIT16
12
4
θ>
COTH
A18
X2ED
切削油温度センサ
(U52R/オプション)
Coolant oil temp. sensor
(U52R/Option)
R2
13
9
(16-31)
S2
14
10
THM
5
6
θ
+
-

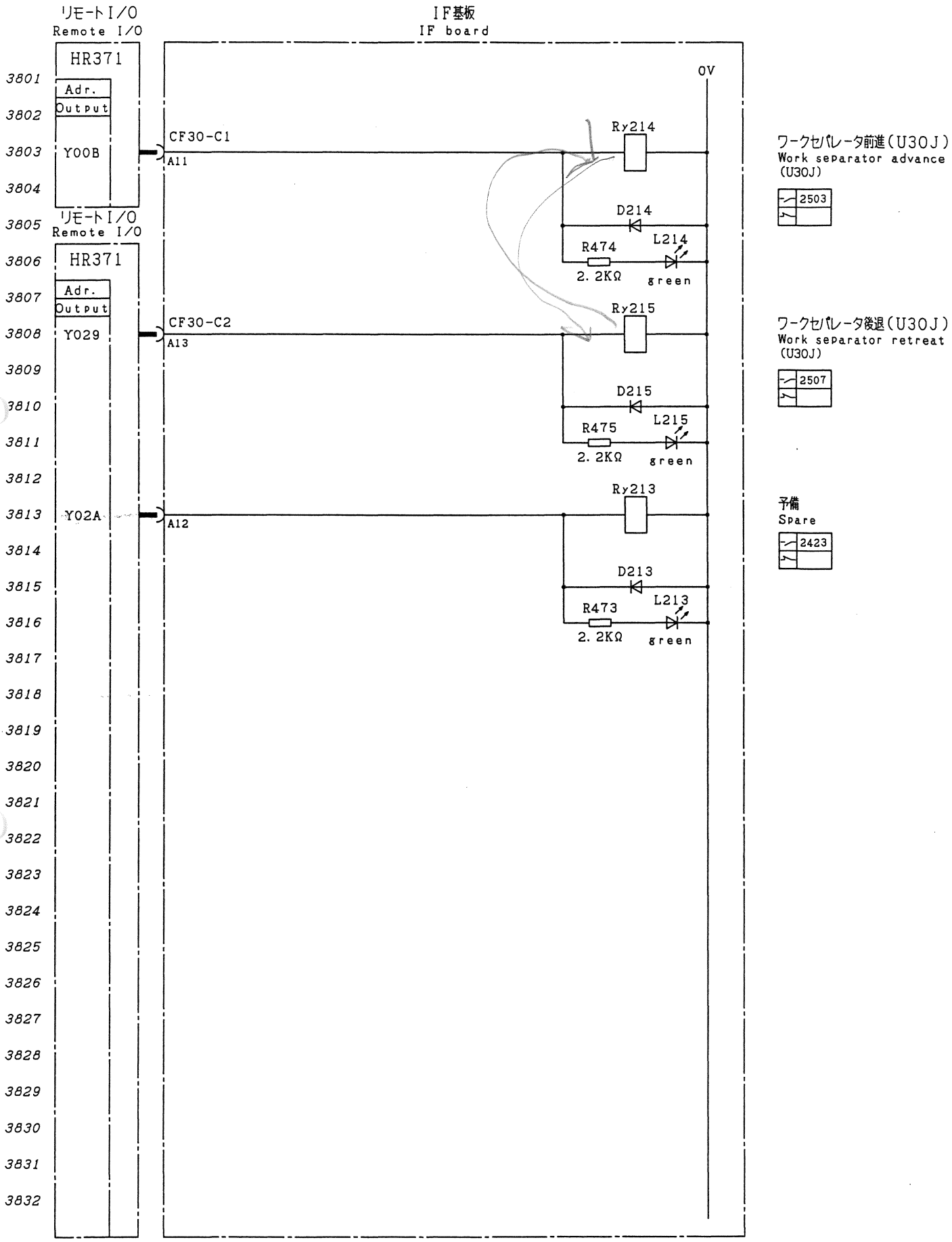

リモートI/O
Remote I/O
IF基板
IF board
動力基板
Power circuit board
HR371
Adr.
Output
3301
3302
3303
3304
3305
3306
3307
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3318
3319
3320
3321
3322
3323
3324
3325
3326
3327
3328
3329
3330
3331
3332
Y000
Y001
Y002
Y003
Y004
CF30-C1
CNC11
CNP1
B14
19
B13
20
B12
21
B11
22
B10
23
0V
Ry301
Ry302
Ry303
Ry304
Ry311
Ry305
D301
D302
D303
D304
D311
D305
L301
L302
L303
L304
L311
L305
R308
2.2KΩx6
R309
2.2KΩx4
green
自動電源断
Automatic power off
0110
ワークコンベア
(U31J/オプション)
Work conveyor
(U31J/Option)
1624
MC1 電源入り
MC1 power on
2303
MC2 電源入り
MC2 power on
2307
DC24V レディー OI
G/Bエアーシールド
(U70N/オプション)
DC24V ready on
G/B Air shield
(U70N/Option)
1814
給材機 動作開始
Bar loader start
給材機 取り出しモータ正転
Bar loader bar
loading motor forwad
1721
1706
1723

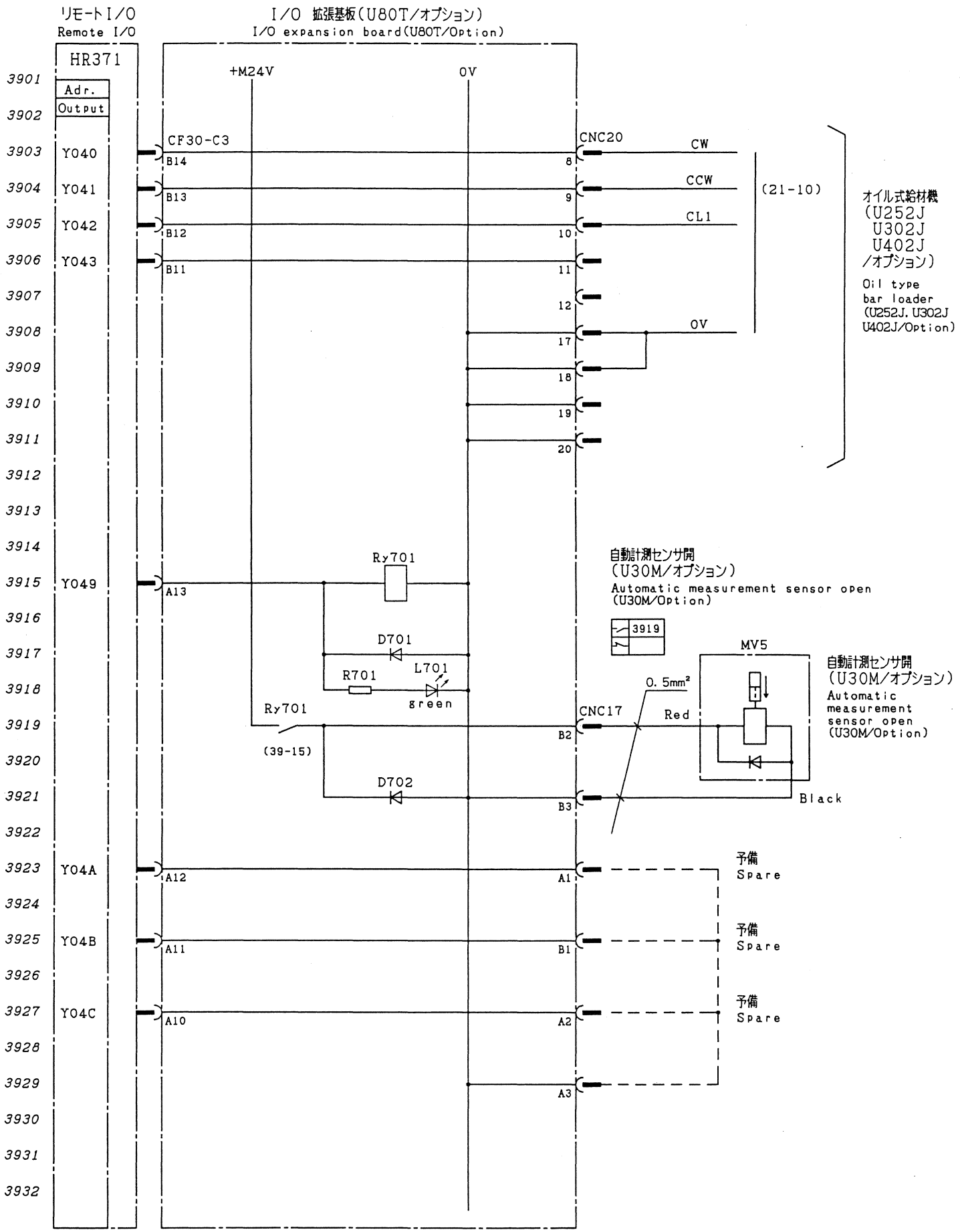

リモートI/O
Remote I/O
IF基板
IF board
動力基板
Power circuit board
HR371
Adr.
Output
Y005
Y006
Y007
Y008
Y009
Y02E
CF30-C1
CF30-C2
CNC11
CNP1
B09
B08
B07
A14
A13
A08
24
25
26
27
30
28
0V
Ry306
Ry307
Ry308
Ry309
Ry312
Ry310
D306
D307
D308
D309
D312
D310
R308
R310
R310
2.2KΩ×4
L306
L307
L308
L309
L312
L310
green
給材機 トルク切り換え
Bar loader torque change
給材機 取り出しモータ逆転
Bar loader bar loading motor reverse
1723
1708
給材機 非常停止
Bar loader emergency
給材機 着脱モータ正転
Bar loader unloading motor forward
1725
1710
1727
給材機 製品カウント
Bar loader count
給材機 着脱モータ逆転
Bar loader unloading motor reverse
1727
1712
給材機 送り停止
Bar loader remit stop
給材機 取り出しモータブレーキ
Bar loader bar loading motor brake
1729
1714
ドアロック(Y76Z/オプション)
Door lock (Y76Z/Option)
2813
2818
M68出力信号
M68 output
1819
1823
1821
1825

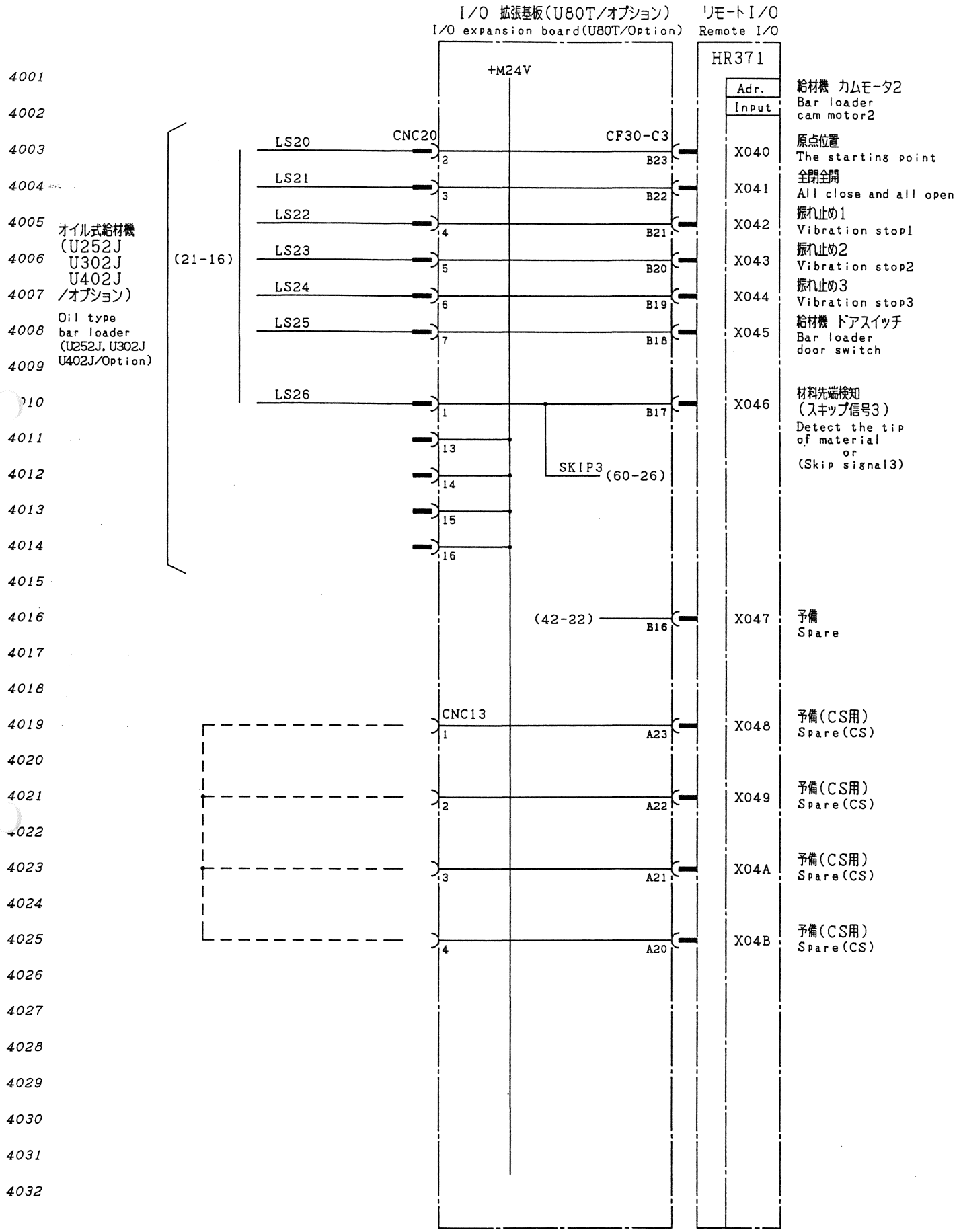

リモートI/O
Remote I/O
HR371
Adr.
Output
Y00E
Y00F
IF基板
IF board
+M24V 0V
0V
TB1
0V
CF30-C1
A08
A07
CNC9
A2
A4
B4
M65
EXCO
M65出力信号
M65 output
外部カウンタ
The outside count
0V
リモートI/O
Remote I/O
HR371
Adr.
Output
Y025
CF30-C2
B09
Y25
(28-09)
CNC10
1
2
3
4
5
6
SKIP6
7
(54-05)
SKIP7
8
SKIP8
9
10
11
12
13
14
15
16
17
18
19
20
スキップ6(予備)
Skip6(Spare)
スキップ7(予備)
Skip7(Spare)
スキップ8(予備)
Skip8(Spare)
3501
3502
3503
3504
3505
3506
3507
3508
3509
3510
3511
3512
3513
3514
3515
3516
3517
3518
3519
3520
3521
3522
3523
3524
3525
3526
3527
3528
3529
3530
3531
3532

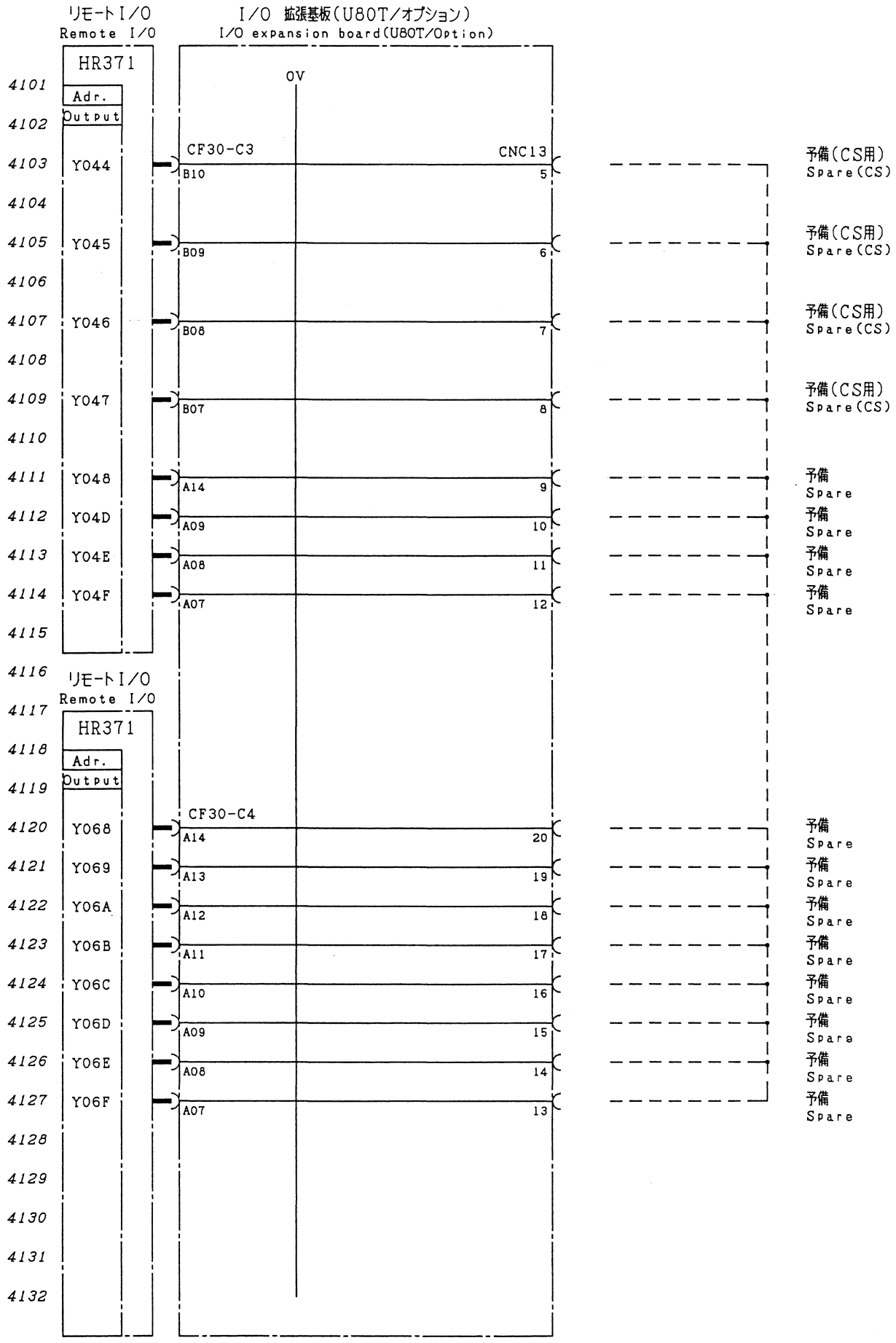

リモートI/O
Remote I/O
IF基板
IF board
HR371
Adr.
Output
Y00D
Y00C
CF30-C1
A09
A10
0V
Ry201
Ry202
D201
D202
R461
R462
L201
L202
2.2KΩ
green
リモートI/O
Remote I/O
HR371
Adr.
Output
Y020
Y021
Y022
Y027
CF30-C2
B14
B13
B12
B07
Ry203
Ry204
Ry205
Ry206
D203
D204
D205
D206
R463
R464
R465
R466
L203
L204
L205
L206
ブレーキ
Brake
2616
2613
エアーブロー
(U401B, U402B)
ハンド開
(U410B/オプション)
Air blow(U401B, U402B)
Hand open
(U410B/Option)
2413
シグナルタワー(緑)
(U81Z/オプション)
Signal tower(Green)
(U81Z/Option)
2624
シグナルタワー(黄)
(U81Z/オプション)
Signal tower(Yellow)
(U81Z/Option)
2626
シグナルタワー(赤)
(U81Z/オプション)
パトライト(赤または黄)
(U80Z/オプション)
Signal tower(Red)
(U81Z/Option)
Patrol light
(Red or Yellow)
(U80Z/Option)
2628
振れ止め
(U252J, U302J, U402J
U500J/オプション)
Vibration stop
(U252J, U302J, U402J, U500J
/Option)
2419

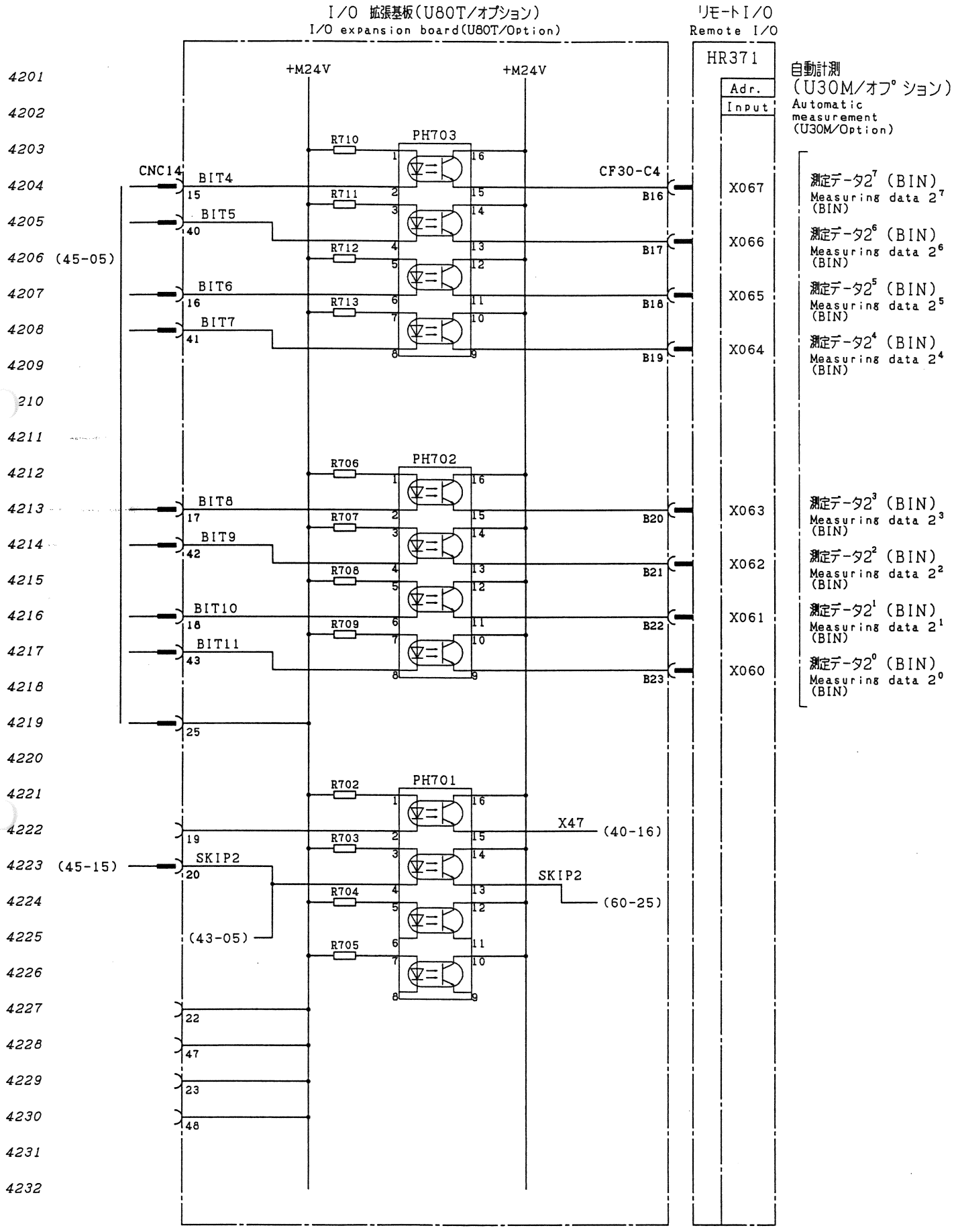

リモートI/O
Remote I/O
HR371
Adr.
Output
Y00A
リモートI/O
Remote I/O
HR371
Adr.
Output
Y023
Y024
Y028
Y026
Y02F
IF基板
IF board
0V
CF30-C1
A12
CF30-C2
B11
B10
A14
B08
A07
Ry207
D207
R467
2.2KΩ
L207
green
Ry208
D208
R468
2.2KΩ
L208
green
Ry209
D209
R469
2.2KΩ
L209
green
Ry210
D210
R470
2.2KΩ
L210
green
Ry211
D211
R471
2.2KΩ
L211
green
Ry212
D212
R472
2.2KΩ
L212
green
3701
3702
3703
3704
3705
3706
3707
3708
3709
3710
3711
3712
3713
3714
3715
3716
3717
3718
3719
3720
3721
3722
3723
3724
3725
3726
3727
3728
3729
3730
3731
3732
NC電源OFF
NC power off
2527
ハンド閉
(U35J/オプション)
Hand open
(U35J/Option)
2607
ハンド開
(U35J/オプション)
Hand close
(U35J/Option)
2603
バイト折れ検出
(Y90Z/オプション)
Tool bit chech
(Y90Z/Option)
2409
ハンドエアーブロー
(U35J/オプション)
Hand air blow
(U35J/Option)
2403
ノックアウト前進(U401B)
Knock out advance
(U401B)
2429

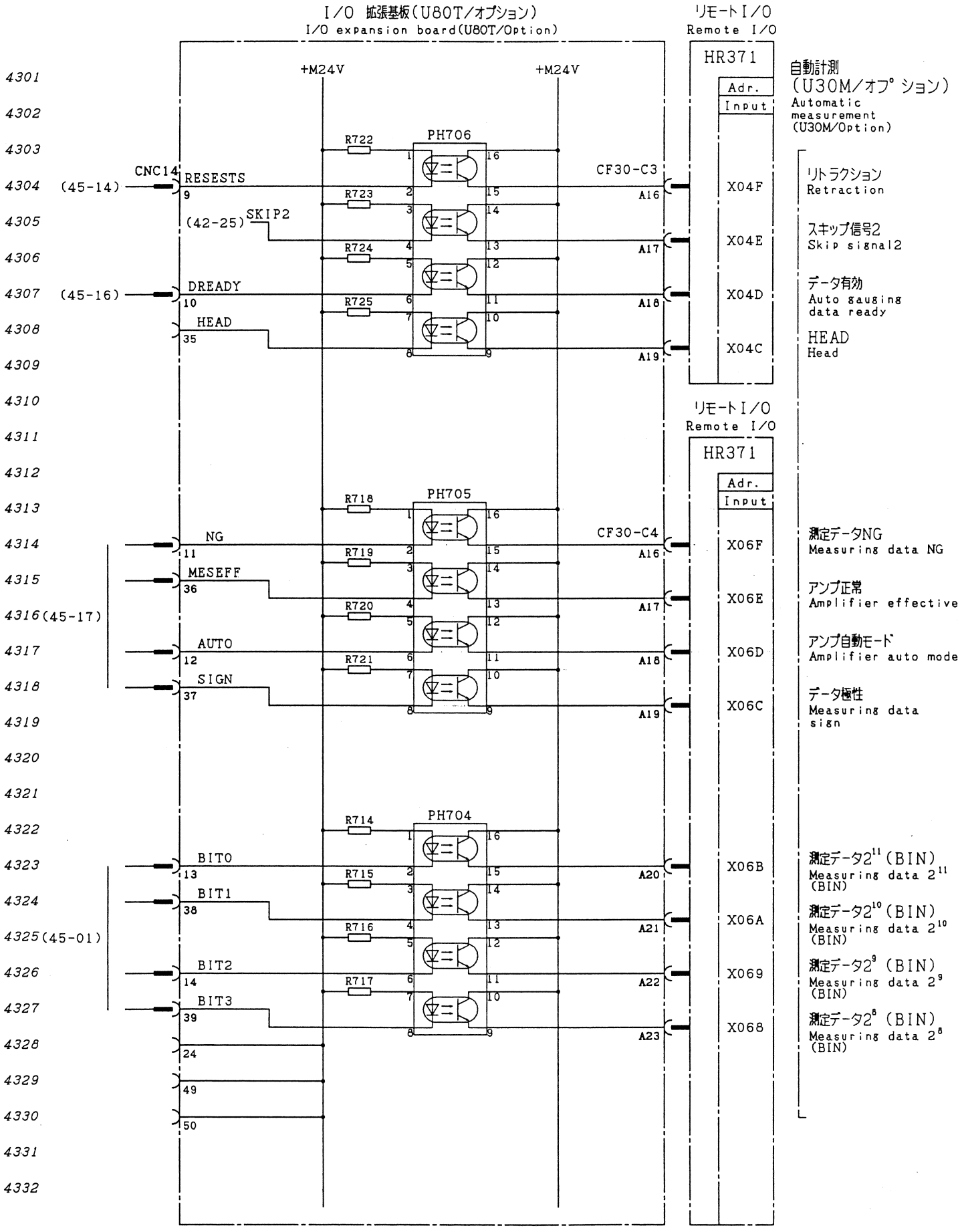

リモートI/O
Remote I/O
HR371
Adr.
Output
Y00B
CF30-C1
A11
IF基板
IF board
0V
Ry214
D214
R474
2.2KΩ
L214
green
ワークセパレータ前進(U30J)
Work separator advance
(U30J)
2503
リモートI/O
Remote I/O
HR371
Adr.
Output
Y029
CF30-C2
A13
Ry215
D215
R475
2.2KΩ
L215
green
ワークセパレータ後退(U30J)
Work separator retreat
(U30J)
2507
Y02A
A12
Ry213
D213
R473
2.2KΩ
L213
green
予備
Spare
2423
3801
3802
3803
3804
3805
3806
3807
3808
3809
3810
3811
3812
3813
3814
3815
3816
3817
3818
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3830
3831
3832

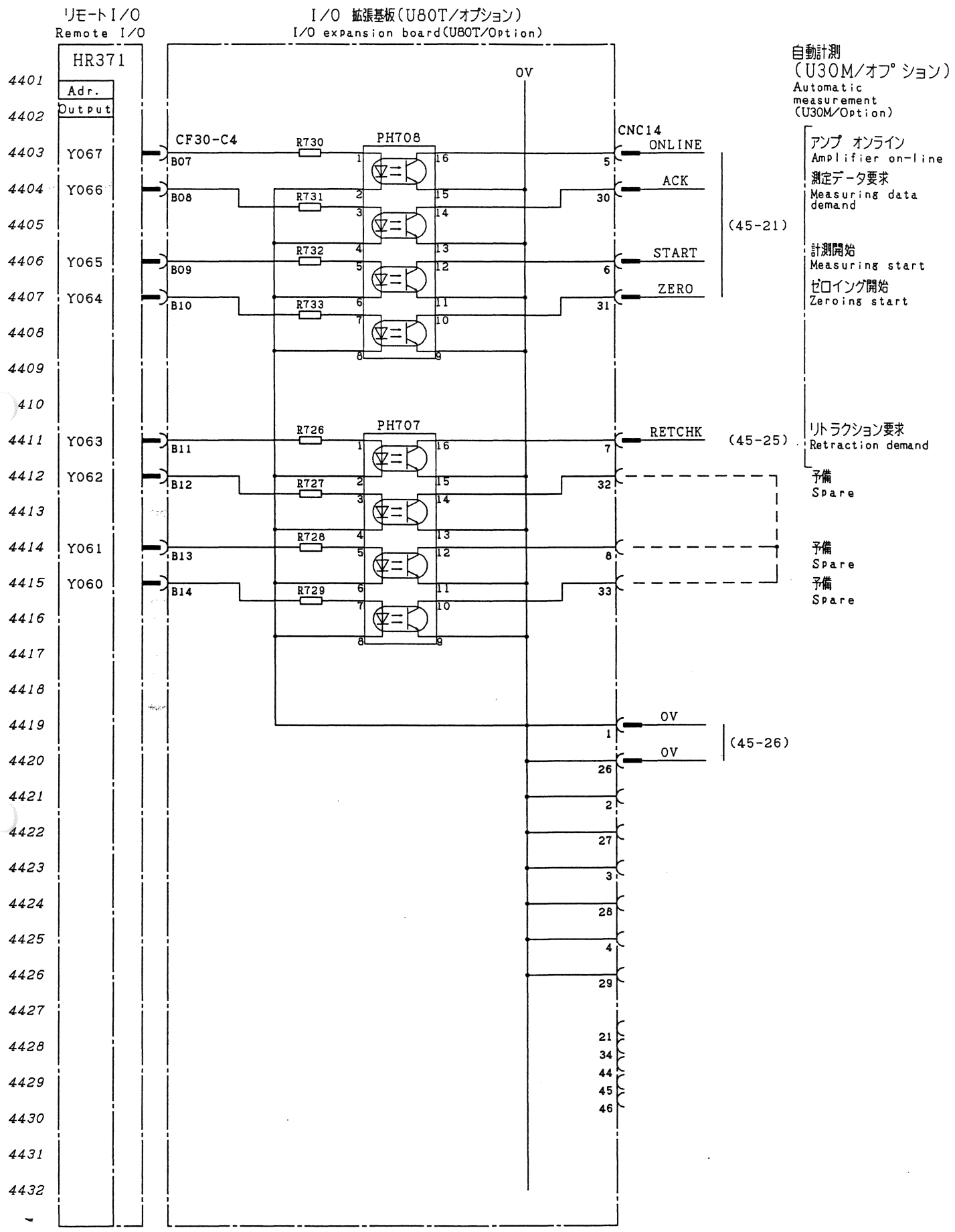

リモートI/O
Remote I/O
I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
HR371
Adr.
Output
+M24V
0V
CF30-C3
CNC20
CW
CCW
CL1
0V
(21-10)
オイル式給材機
(U252J
U302J
U402J
/オプション)
Oil type
bar loader
(U252J. U302J
U402J/Option)
Y040
Y041
Y042
Y043
Y049
Y04A
Y04B
Y04C
B14
B13
B12
B11
A13
A12
A11
A10
8
9
10
11
12
17
18
19
20
A1
B1
A2
A3
Ry701
D701
R701
L701
green
(39-15)
D702
CNC17
B2
B3
自動計測センサ開
(U30M/オプション)
Automatic measurement sensor open
(U30M/Option)
3919
MV5
0.5mm²
Red
Black
予備
Spare
3901
3902
3903
3904
3905
3906
3907
3908
3909
3910
3911
3912
3913
3914
3915
3916
3917
3918
3919
3920
3921
3922
3923
3924
3925
3926
3927
3928
3929
3930
3931
3932

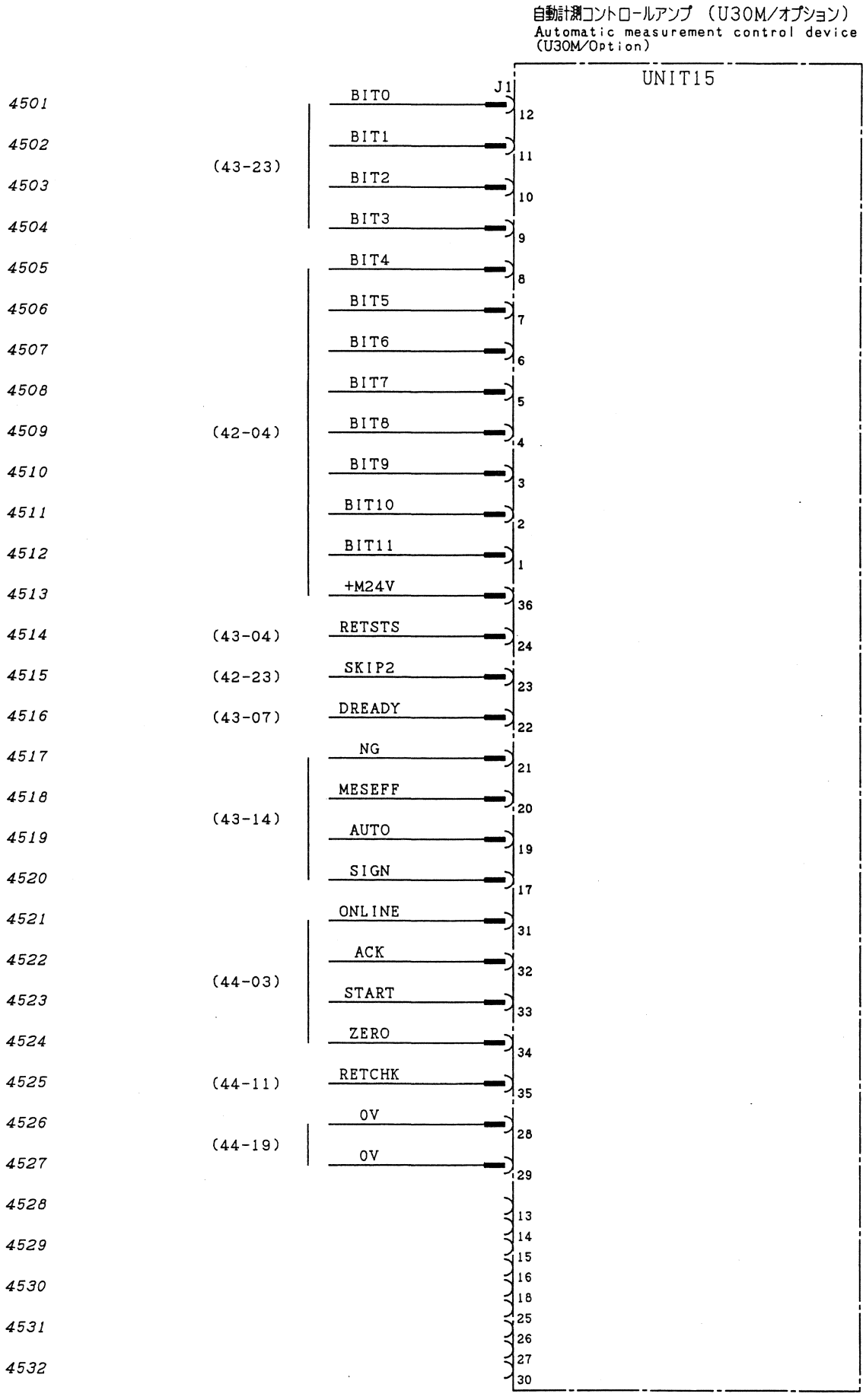

I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
リモートI/O
Remote I/O
HR371
+M24V
Adr.
Input
給材機 カムモータ2
Bar loader cam motor2
原点位置
The starting point
全閉全開
All close and all open
振れ止め1
Vibration stop1
振れ止め2
Vibration stop2
振れ止め3
Vibration stop3
給材機 ドアスイッチ
Bar loader door switch
材料先端検知
(スキップ信号3)
Detect the tip of material or (Skip signal3)
予備
Spare
予備(CS用)
Spare(CS)
オイル式給材機
(U252J U302J U402J /オプション)
Oil type bar loader (U252J, U302J U402J/Option)
(21-16)
LS20
LS21
LS22
LS23
LS24
LS25
LS26
CNC20
CF30-C3
B23
B22
B21
B20
B19
B18
B17
X040
X041
X042
X043
X044
X045
X046
SKIP3
(60-26)
(42-22)
B16
X047
CNC13
A23
A22
A21
A20
X048
X049
X04A
X04B
4001
4002
4003
4004
4005
4006
4007
4008
4009
4010
4011
4012
4013
4014
4015
4016
4017
4018
4019
4020
4021
4022
4023
4024
4025
4026
4027
4028
4029
4030
4031
4032

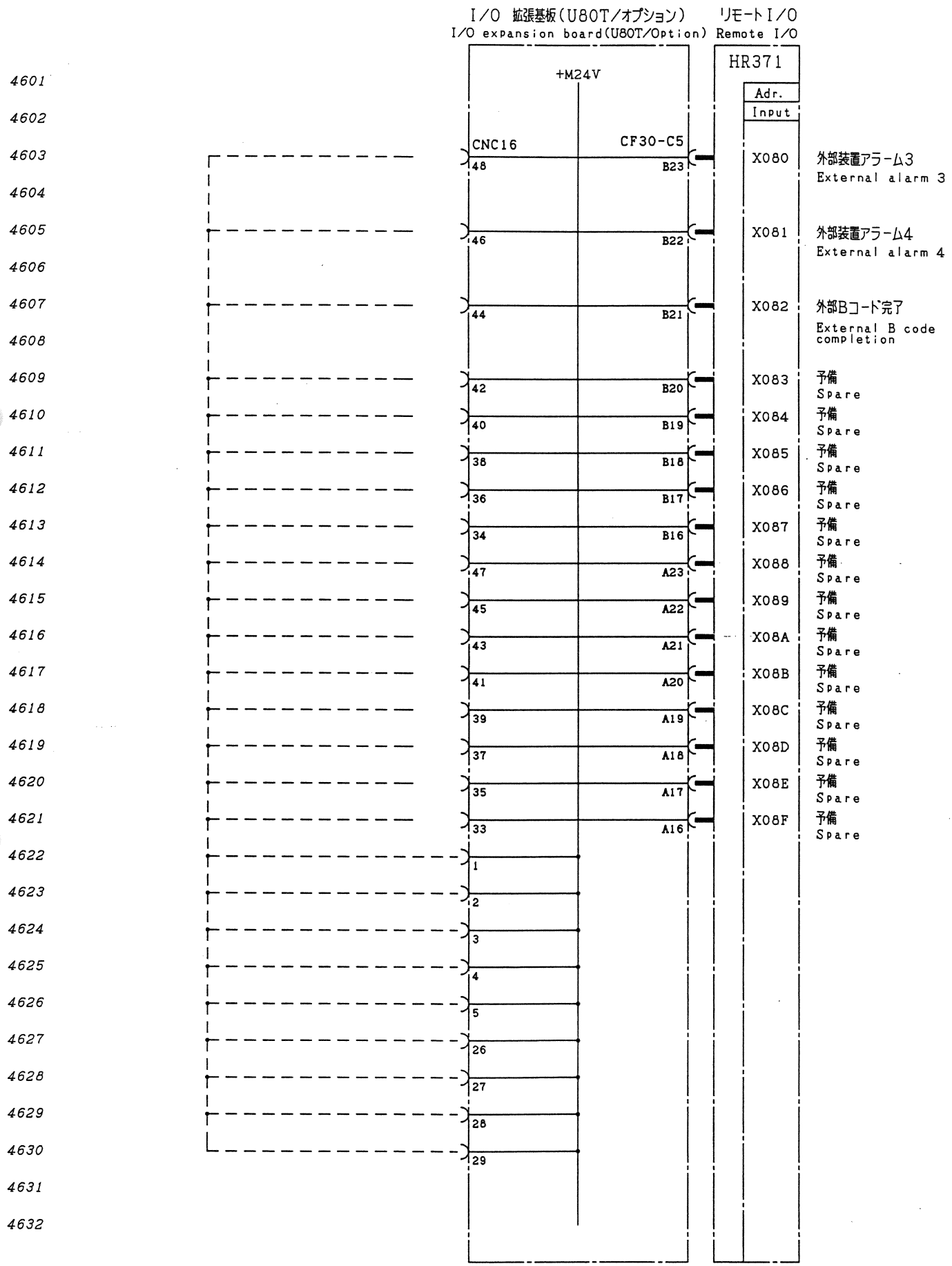

リモートI/O
Remote I/O
HR371
Adr.
Output
I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
0V
CF30-C3
CNC13
4101
4102
4103 Y044 B10 5 予備(CS用) Spare(CS)
4104
4105 Y045 B09 6 予備(CS用) Spare(CS)
4106
4107 Y046 B08 7 予備(CS用) Spare(CS)
4108
4109 Y047 B07 8 予備(CS用) Spare(CS)
4110
4111 Y048 A14 9 予備 Spare
4112 Y04D A09 10 予備 Spare
4113 Y04E A08 11 予備 Spare
4114 Y04F A07 12 予備 Spare
4115
4116
リモートI/O
Remote I/O
4117
HR371
4118
Adr.
4119
Output
CF30-C4
4120 Y068 A14 20 予備 Spare
4121 Y069 A13 19 予備 Spare
4122 Y06A A12 18 予備 Spare
4123 Y06B A11 17 予備 Spare
4124 Y06C A10 16 予備 Spare
4125 Y06D A09 15 予備 Spare
4126 Y06E A08 14 予備 Spare
4127 Y06F A07 13 予備 Spare
4128
4129
4130
4131
4132

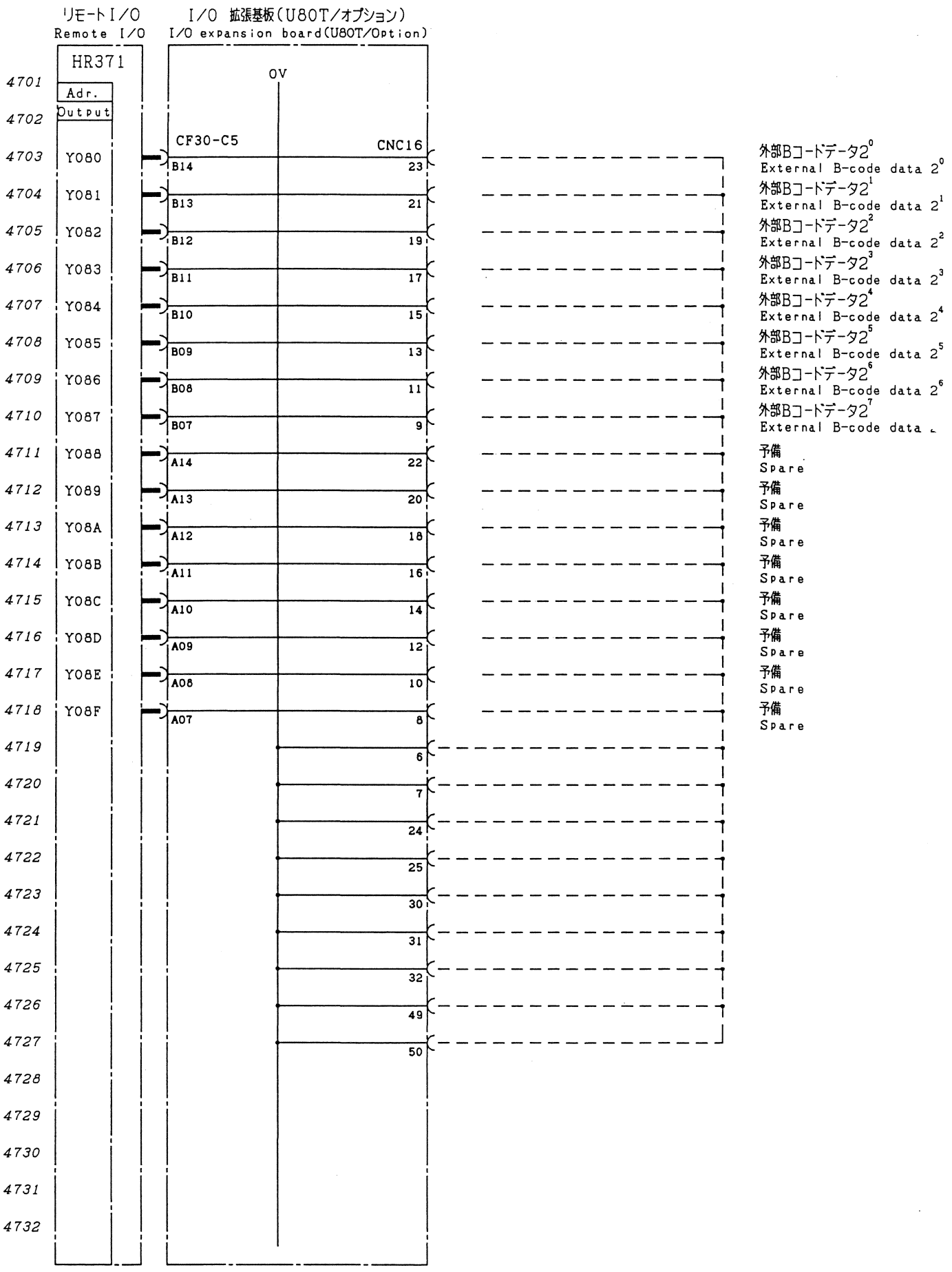

I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
リモートI/O
Remote I/O
HR371
Adr.
Input
+M24V
+M24V
PH703
PH702
PH701
R710
R711
R712
R713
R706
R707
R708
R709
R702
R703
R704
R705
CNC14
BIT4
BIT5
BIT6
BIT7
BIT8
BIT9
BIT10
BIT11
SKIP2
(45-05)
(45-15)
(43-05)
CF30-C4
X47
(40-16)
SKIP2
(60-25)
X067
X066
X065
X064
X063
X062
X061
X060
自動計測
(U30M/オプション)
Automatic measurement (U30M/Option)
測定データ2^7 (BIN) Measuring data 2^7 (BIN)
測定データ2^6 (BIN) Measuring data 2^6 (BIN)
測定データ2^5 (BIN) Measuring data 2^5 (BIN)
測定データ2^4 (BIN) Measuring data 2^4 (BIN)
測定データ2^3 (BIN) Measuring data 2^3 (BIN)
測定データ2^2 (BIN) Measuring data 2^2 (BIN)
測定データ2^1 (BIN) Measuring data 2^1 (BIN)
測定データ2^0 (BIN) Measuring data 2^0 (BIN)

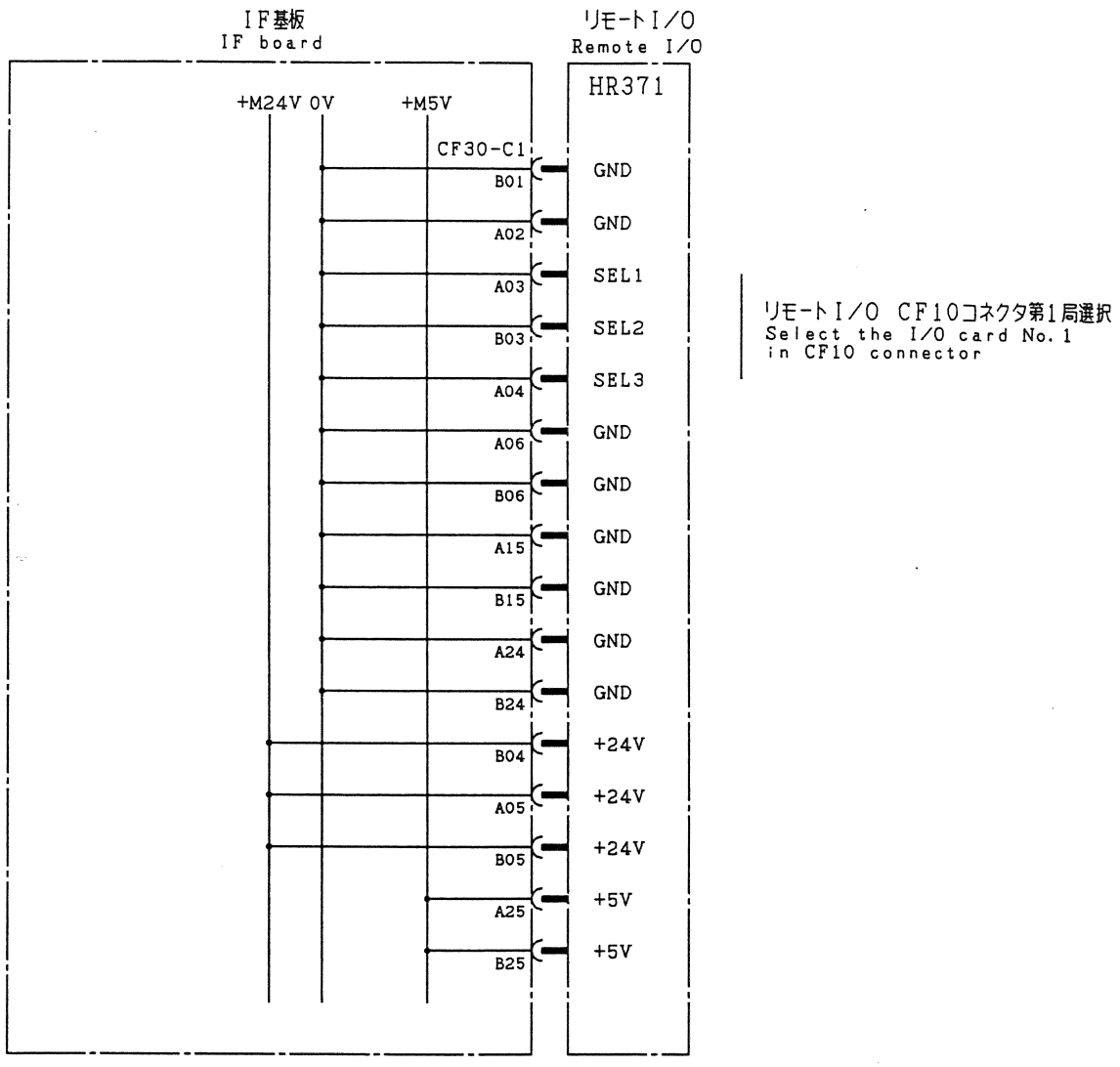

I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
リモートI/O
Remote I/O
HR371
Adr.
Input
自動計測
(U30M/オプション)
Automatic measurement (U30M/Option)
+M24V
+M24V
CNC14
(45-14)
RESESTS
9
(42-25)
SKIP2
DREADY
10
(45-16)
HEAD
35
R722
R723
R724
R725
PH706
CF30-C3
A16
A17
A18
A19
X04F
X04E
X04D
X04C
リトラクション
Retraction
スキップ信号2
Skip signal2
データ有効
Auto gauging data ready
HEAD
Head
R718
R719
R720
R721
PH705
CF30-C4
NG
11
MESEFF
36
AUTO
12
SIGN
37
(45-17)
X06F
X06E
X06D
X06C
測定データNG
Measuring data NG
アンプ正常
Amplifier effective
アンプ自動モード
Amplifier auto mode
データ極性
Measuring data sign
R714
R715
R716
R717
PH704
BIT0
13
BIT1
38
BIT2
14
BIT3
39
(45-01)
24
49
50
A20
A21
A22
A23
X06B
X06A
X069
X068
測定データ2^11 (BIN)
Measuring data 2^11 (BIN)
測定データ2^10 (BIN)
Measuring data 2^10 (BIN)
測定データ2^9 (BIN)
Measuring data 2^9 (BIN)
測定データ2^8 (BIN)
Measuring data 2^8 (BIN)

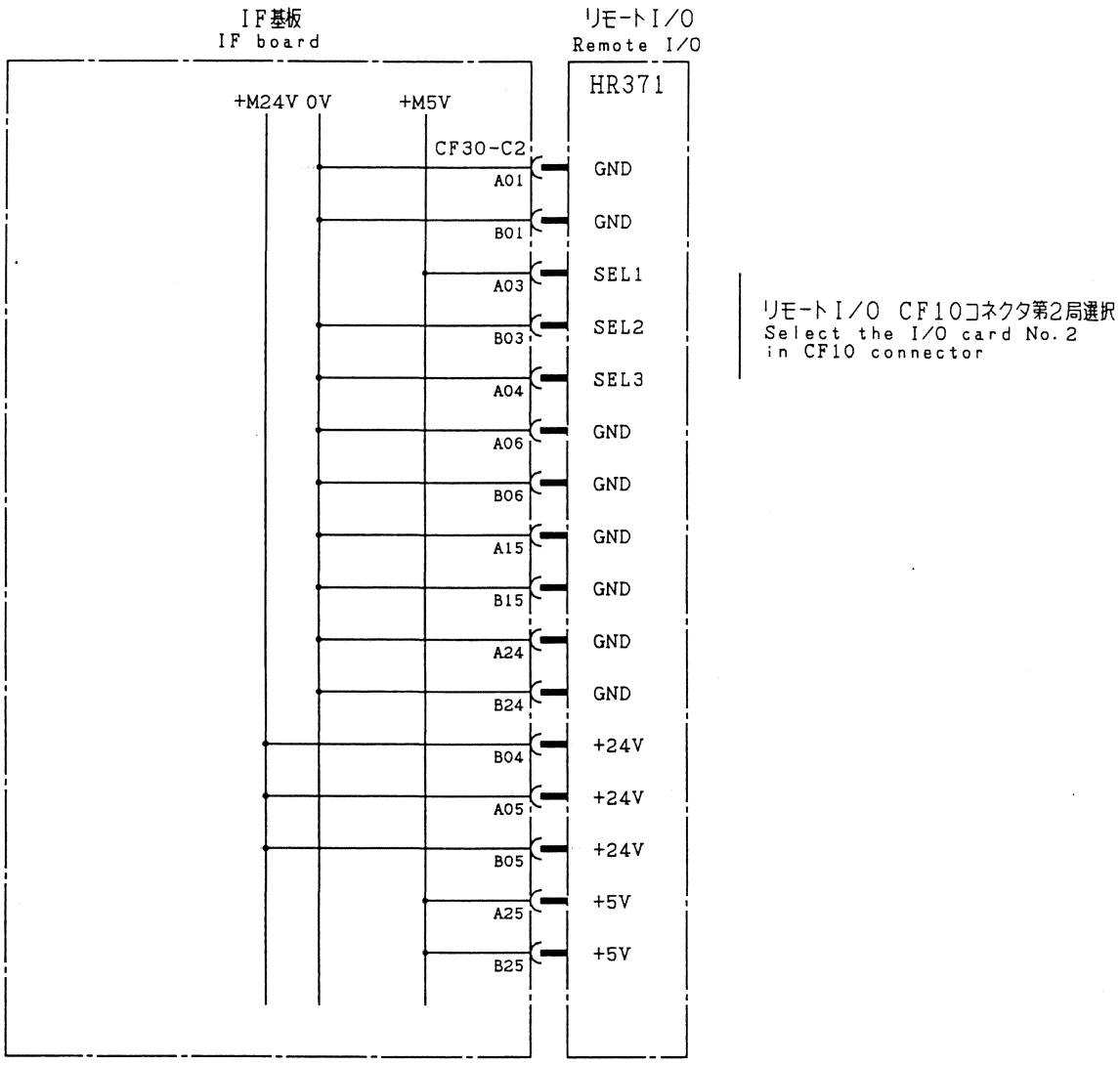

リモートI/O
Remote I/O
I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
HR371
Adr.
Output
4401
4402
4403
4404
4405
4406
4407
4408
4409
410
4411
4412
4413
4414
4415
4416
4417
4418
4419
4420
4421
4422
4423
4424
4425
4426
4427
4428
4429
4430
4431
4432
Y067
Y066
Y065
Y064
Y063
Y062
Y061
Y060
CF30-C4
B07
B08
B09
B10
B11
B12
B13
B14
R730
R731
R732
R733
R726
R727
R728
R729
PH708
PH707
0V
CNC14
ONLINE
ACK
START
ZERO
RETCHK
0V
0V
5
30
6
31
7
32
8
33
1
26
2
27
3
28
4
29
21
34
44
45
46
(45-21)
(45-25)
(45-26)
自動計測
(U30M/オプション)
Automatic measurement
(U30M/Option)
アンプ オンライン
Amplifier on-line
測定データ要求
Measuring data demand
計測開始
Measuring start
ゼロイング開始
Zeroing start
リトラクション要求
Retraction demand
予備
Spare
予備
Spare
予備
Spare

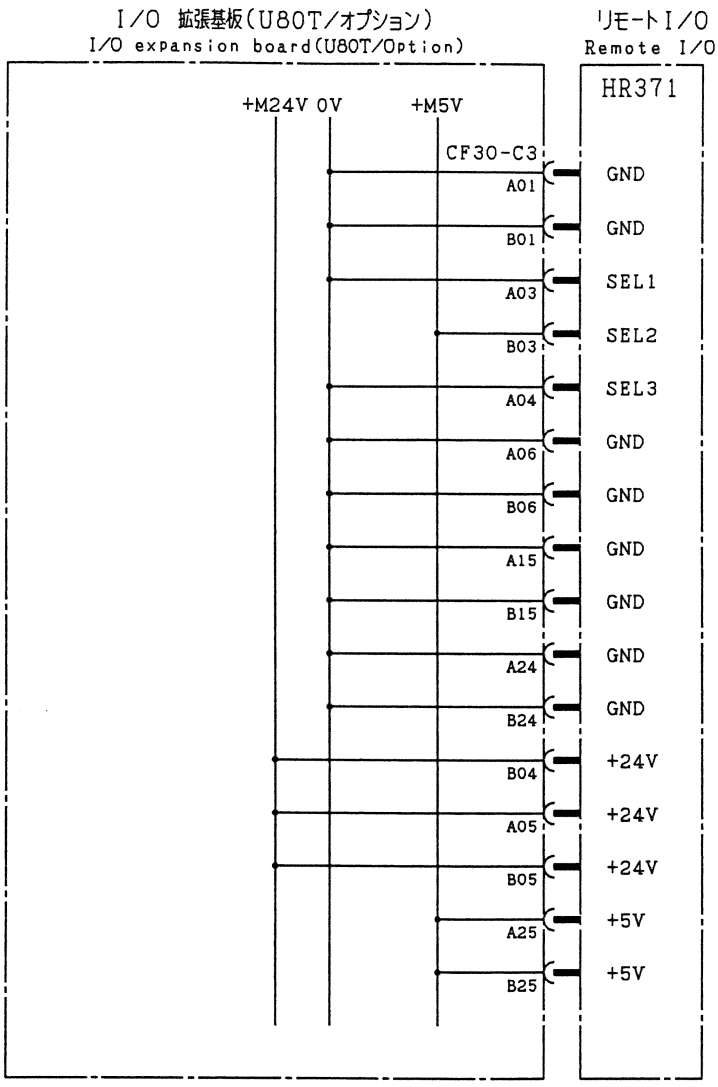

自動計測コントロールアンプ (U30M/オプション)
Automatic measurement control device
(U30M/Option)
UNIT15
J1
4501
4502
4503
4504
4505
4506
4507
4508
4509
4510
4511
4512
4513
4514
4515
4516
4517
4518
4519
4520
4521
4522
4523
4524
4525
4526
4527
4528
4529
4530
4531
4532
(43-23)
(42-04)
(43-04)
(42-23)
(43-07)
(43-14)
(44-03)
(44-11)
(44-19)
BIT0
BIT1
BIT2
BIT3
BIT4
BIT5
BIT6
BIT7
BIT8
BIT9
BIT10
BIT11
+M24V
RETSTS
SKIP2
DREADY
NG
MESEFF
AUTO
SIGN
ONLINE
ACK
START
ZERO
RETCHK
0V
0V
12
11
10
9
8
7
6
5
4
3
2
1
36
24
23
22
21
20
19
17
31
32
33
34
35
28
29
13
14
15
16
18
25
26
27
30


I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
リモートI/O
Remote I/O
HR371
Adr.
Input
+M24V
CNC16
CF30-C5
48
B23
X080
外部装置アラーム3
External alarm 3
46
B22
X081
外部装置アラーム4
External alarm 4
44
B21
X082
外部Bコード完了
External B code completion
42
B20
X083
予備
Spare
40
B19
X084
予備
Spare
38
B18
X085
予備
Spare
36
B17
X086
予備
Spare
34
B16
X087
予備
Spare
47
A23
X088
予備
Spare
45
A22
X089
予備
Spare
43
A21
X08A
予備
Spare
41
A20
X08B
予備
Spare
39
A19
X08C
予備
Spare
37
A18
X08D
予備
Spare
35
A17
X08E
予備
Spare
33
A16
X08F
予備
Spare
1
2
3
4
5
26
27
28
29
4601
4602
4603
4604
4605
4606
4607
4608
4609
4610
4611
4612
4613
4614
4615
4616
4617
4618
4619
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4621
4622
4623
4624
4625
4626
4627
4628
4629
4630
4631
4632

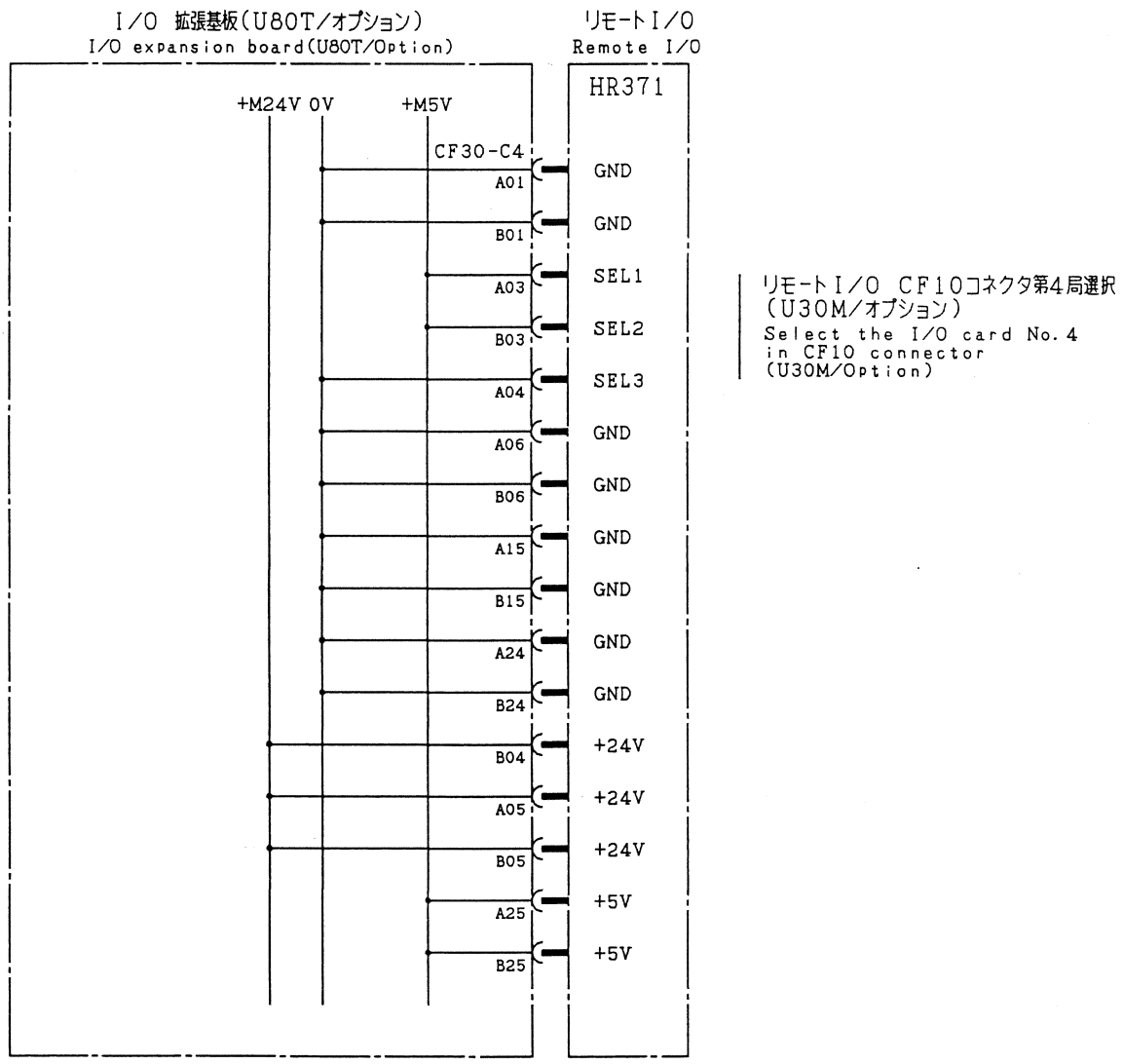

リモートI/O
Remote I/O
I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
HR371
Adr.
Output
0V
CF30-C5
CNC16
4701
4702
4703 Y080 B14 23
4704 Y081 B13 21
4705 Y082 B12 19
4706 Y083 B11 17
4707 Y084 B10 15
4708 Y085 B09 13
4709 Y086 B08 11
4710 Y087 B07 9
4711 Y088 A14 22
4712 Y089 A13 20
4713 Y08A A12 18
4714 Y08B A11 16
4715 Y08C A10 14
4716 Y08D A09 12
4717 Y08E A08 10
4718 Y08F A07 8
4719 6
4720 7
4721 24
4722 25
4723 30
4724 31
4725 32
4726 49
4727 50
4728
4729
4730
4731
4732
外部Bコードデータ2^0
External B-code data 2^0
外部Bコードデータ2^1
External B-code data 2^1
外部Bコードデータ2^2
External B-code data 2^2
外部Bコードデータ2^3
External B-code data 2^3
外部Bコードデータ2^4
External B-code data 2^4
外部Bコードデータ2^5
External B-code data 2^5
外部Bコードデータ2^6
External B-code data 2^6
外部Bコードデータ2^7
External B-code data
予備
Spare
予備
Spare
予備
Spare
予備
Spare
予備
Spare
予備
Spare
予備
Spare
予備
Spare

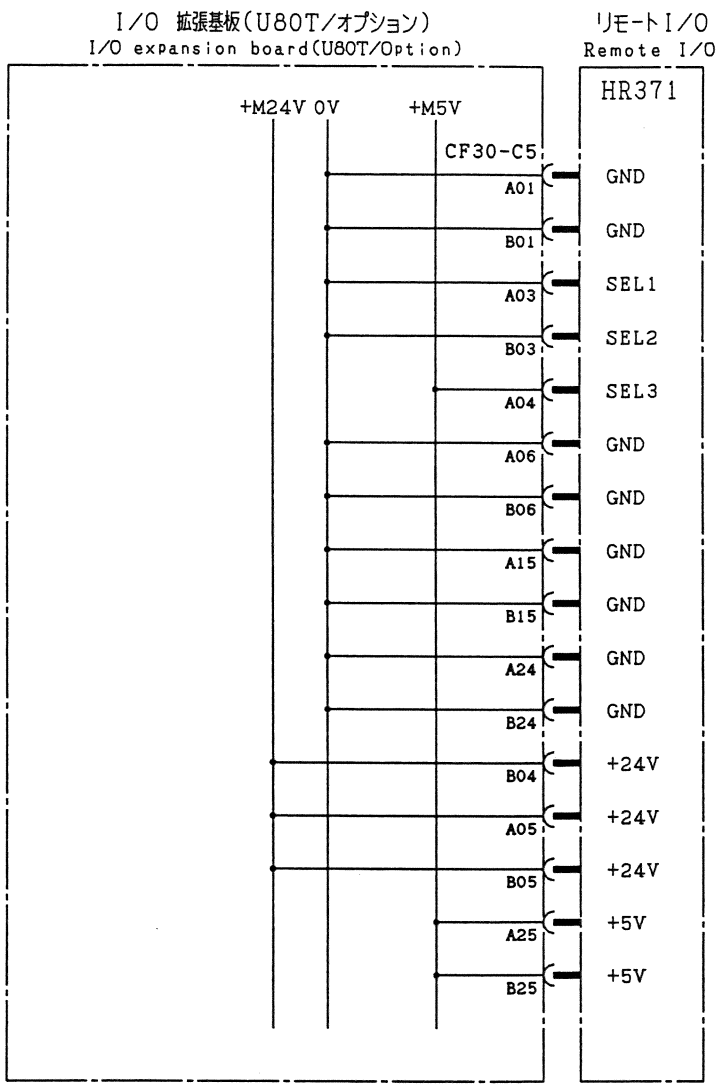

IF基板
IF board
リモートI/O
Remote I/O
HR371
+M24V
0V
+M5V
CF30-C1
B01
GND
A02
GND
A03
SEL1
B03
SEL2
A04
SEL3
A06
GND
B06
GND
A15
GND
B15
GND
A24
GND
B24
GND
B04
+24V
A05
+24V
B05
+24V
A25
+5V
B25
+5V
リモートI/O CF10コネクタ第1局選択
Select the I/O card No.1
in CF10 connector


IF基板
IF board
リモートI/O
Remote I/O
HR371
+M24V
0V
+M5V
CF30-C2
A01
GND
B01
GND
A03
SEL1
B03
SEL2
A04
SEL3
A06
GND
B06
GND
A15
GND
B15
GND
A24
GND
B24
GND
B04
+24V
A05
+24V
B05
+24V
A25
+5V
B25
+5V
リモートI/O CF10コネクタ第2局選択
Select the I/O card No.2
in CF10 connector



リモートI/O CF10コネクタ第3局選択
(U80T/オプション)
Select the I/O card No.3
in CF10 connector
(U80T/Option)

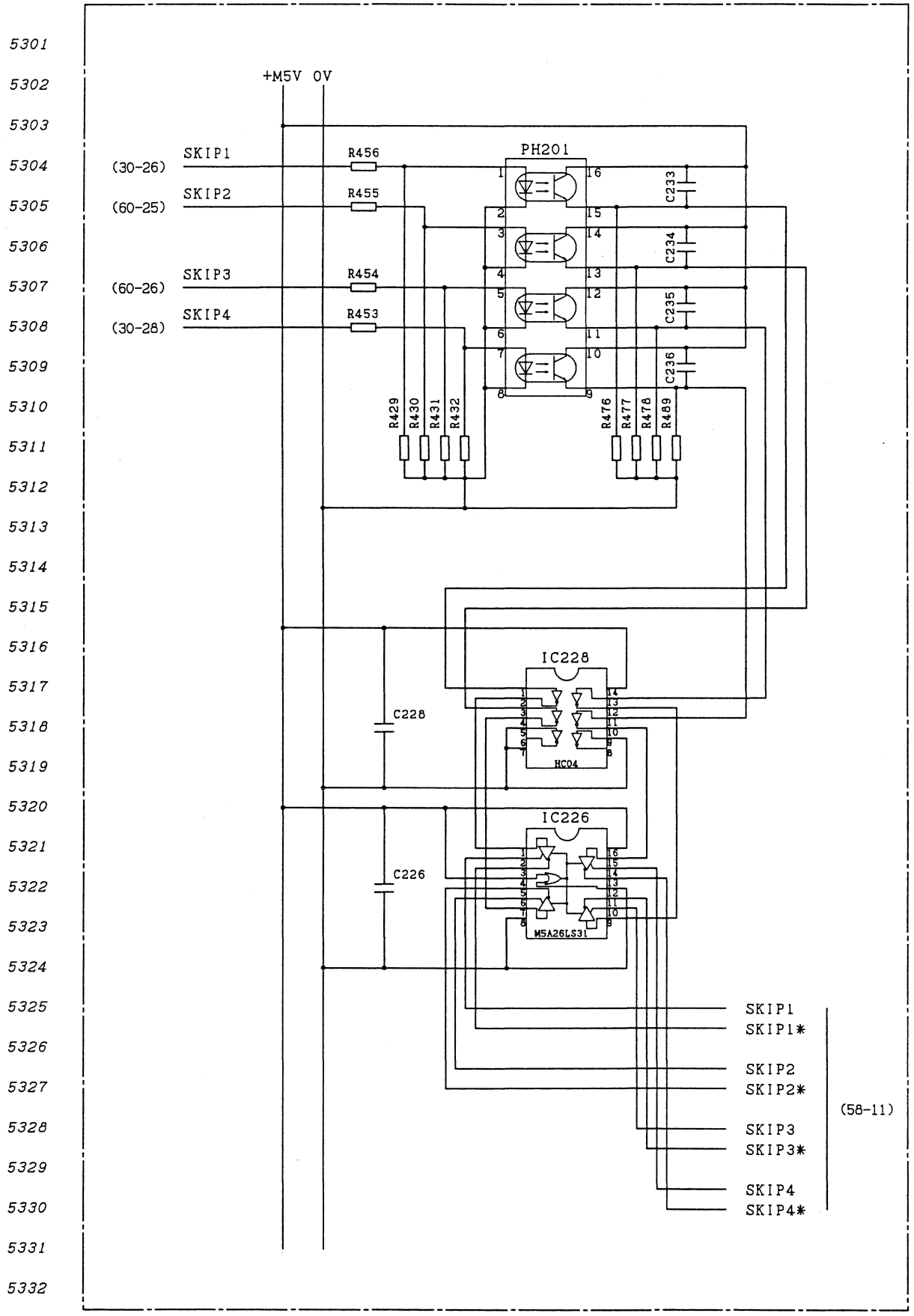

I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
リモートI/O
Remote I/O
HR371
+M24V
0V
+M5V
CF30-C4
A01
GND
B01
GND
A03
SEL1
B03
SEL2
A04
SEL3
A06
GND
B06
GND
A15
GND
B15
GND
A24
GND
B24
GND
B04
+24V
A05
+24V
B05
+24V
A25
+5V
B25
+5V
リモートI/O CF10コネクタ第4局選択
(U30M/オプション)
Select the I/O card No.4
in CF10 connector
(U30M/Option)



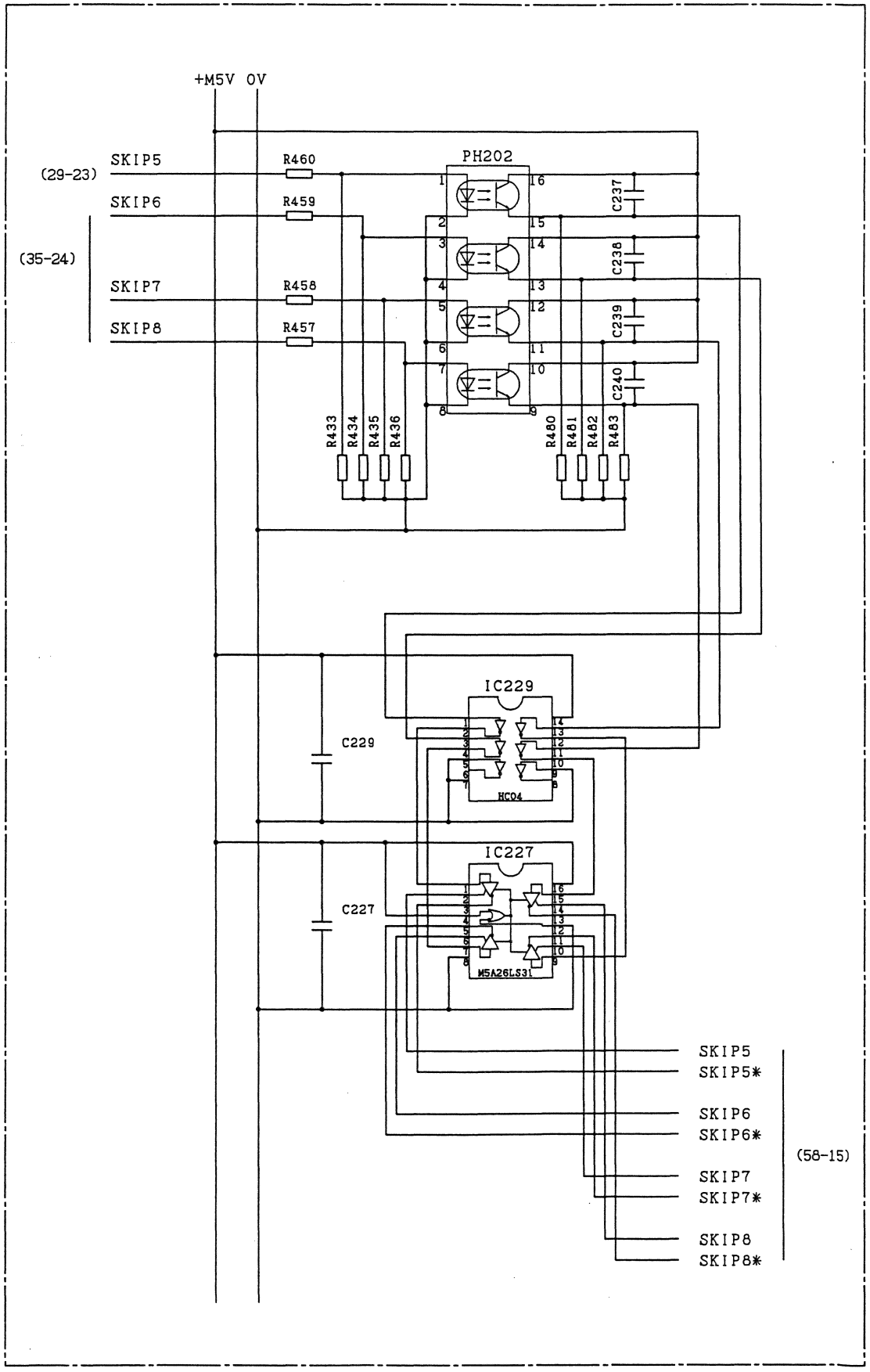
リモートI/O CF10コネクタ第5局選択
(予備)

Select the I/O card No.5
in CF10 connector
(Spare)

IF基板
IF board

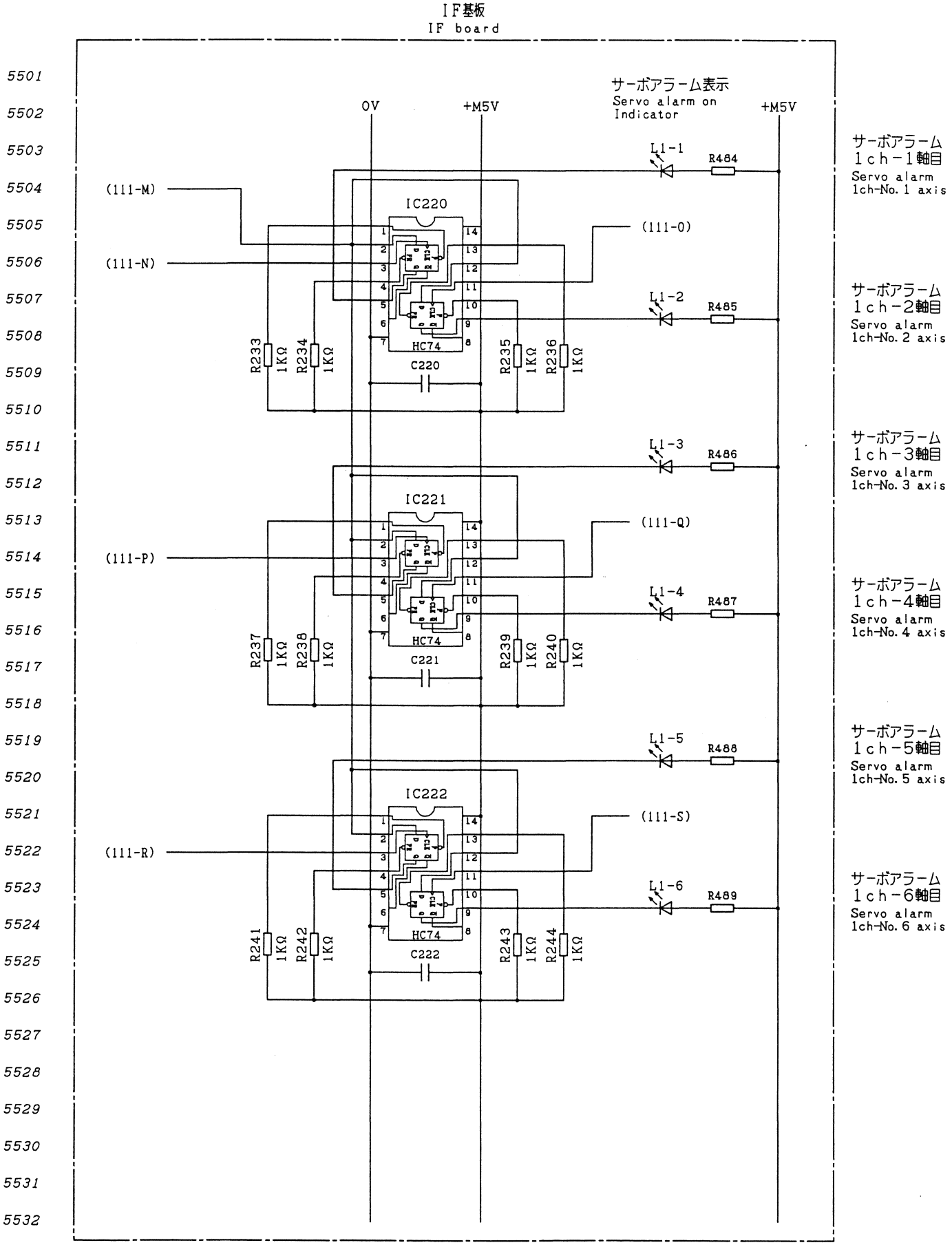


IF基板
IF board

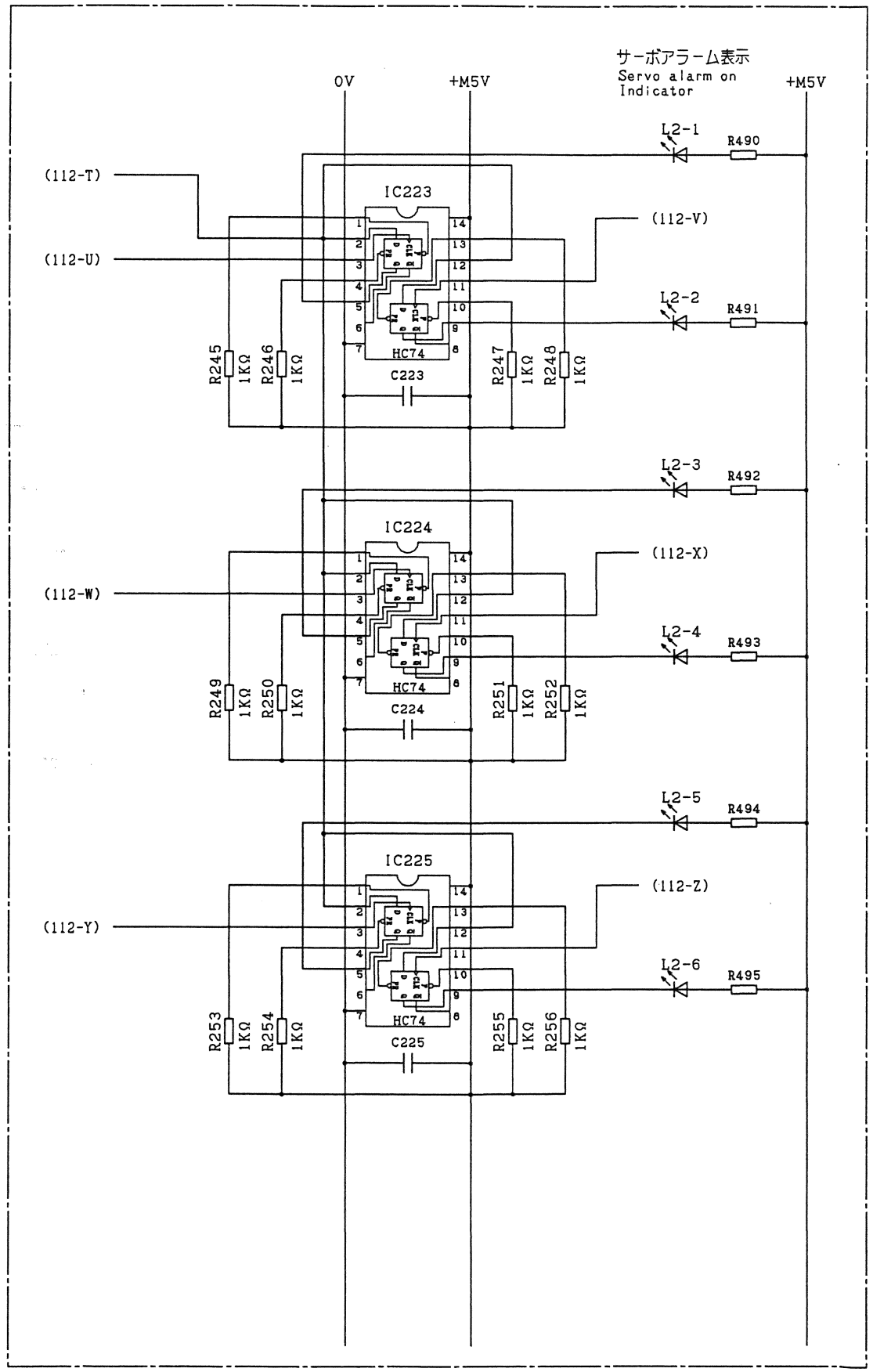


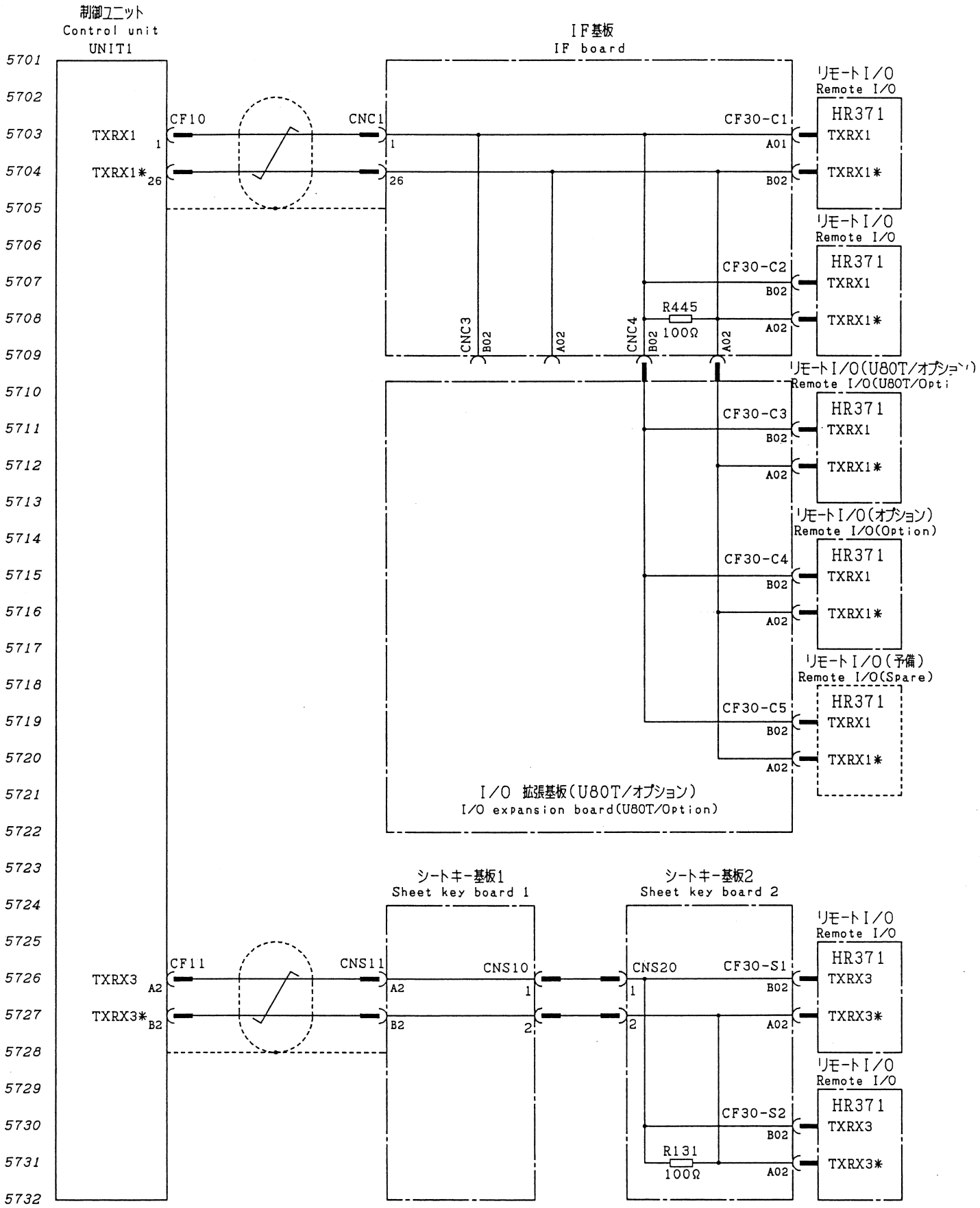
スキップ信号5
Skip signal 5
スキップ信号6
Skip signal 6

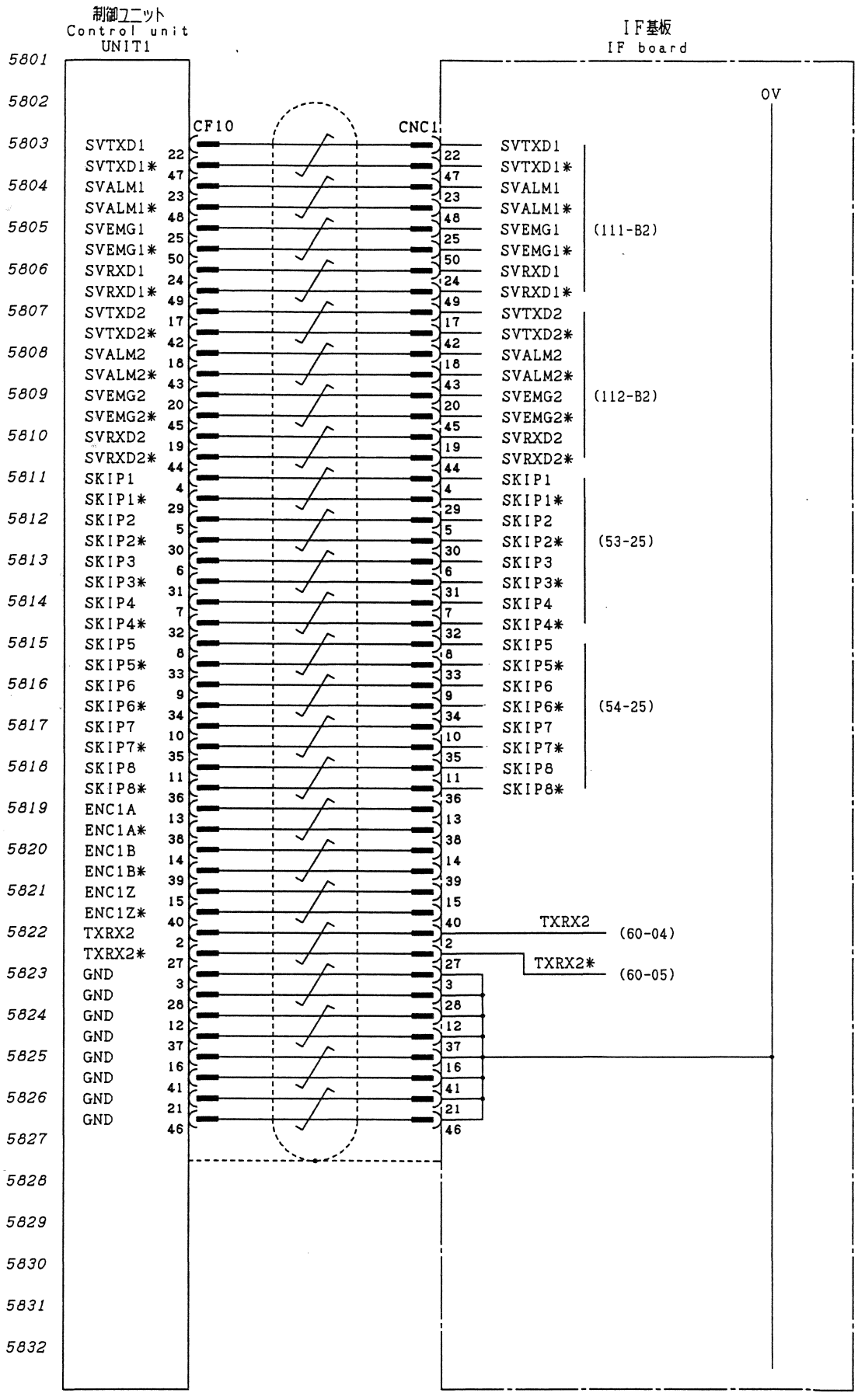
スキップ信号7
Skip signal 7
スキップ信号8
Skip signal 8

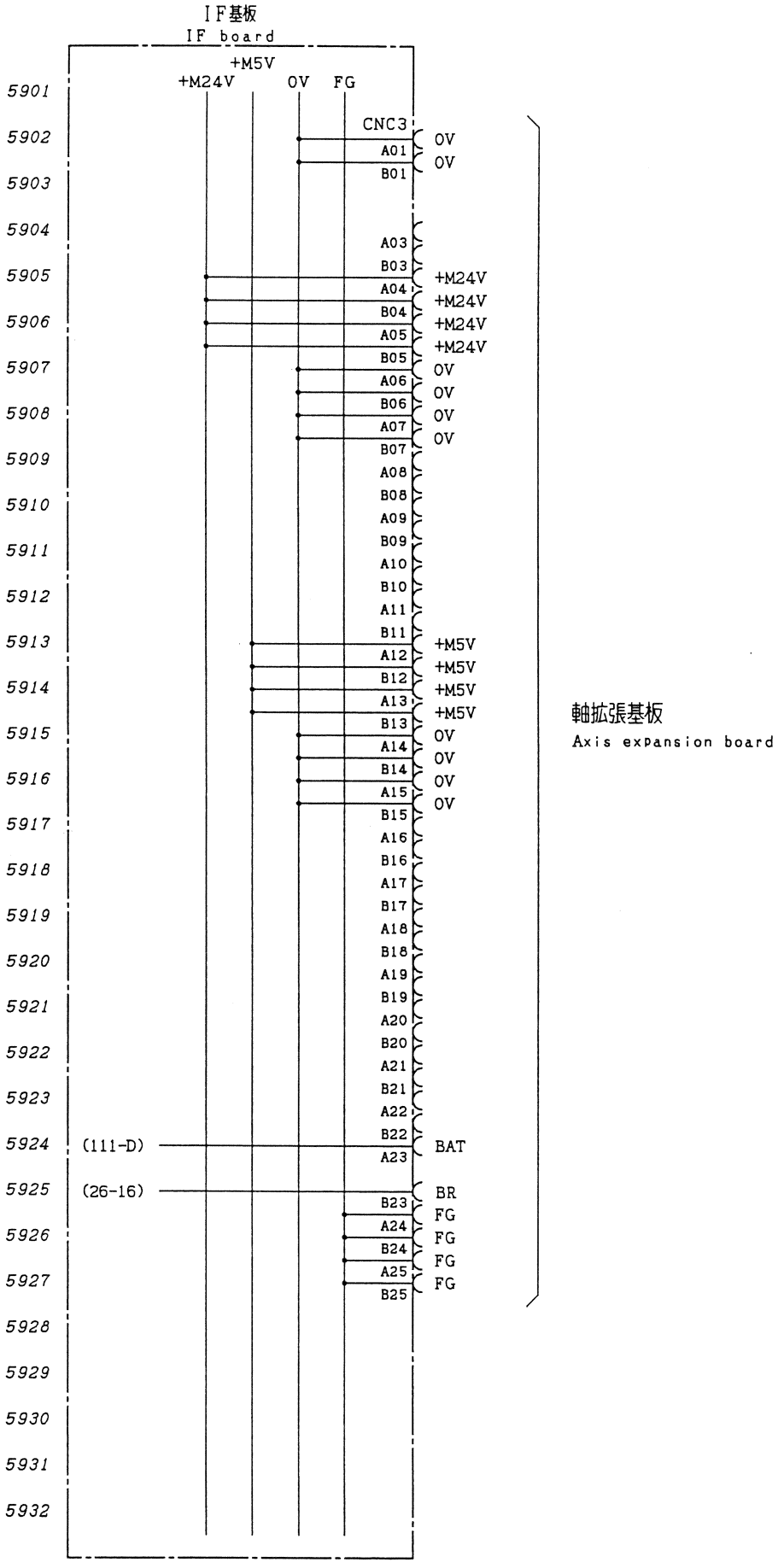

IF基板
IF board
サーボアラーム表示
Servo alarm on
Indicator
0V
+M5V
+M5V
(111-M)
(111-N)
(111-O)
(111-P)
(111-Q)
(111-R)
(111-S)
IC220
IC221
IC222
HC74
C220
C221
C222
L1-1
L1-2
L1-3
L1-4
L1-5
L1-6
R484
R485
R486
R487
R488
R489
R233
R234
R235
R236
R237
R238
R239
R240
R241
R242
R243
R244
1KΩ
サーボアラーム
1ch-1軸目
Servo alarm
1ch-No. 1 axis
サーボアラーム
1ch-2軸目
Servo alarm
1ch-No. 2 axis
サーボアラーム
1ch-3軸目
Servo alarm
1ch-No. 3 axis
サーボアラーム
1ch-4軸目
Servo alarm
1ch-No. 4 axis
サーボアラーム
1ch-5軸目
Servo alarm
1ch-No. 5 axis
サーボアラーム
1ch-6軸目
Servo alarm
1ch-No. 6 axis

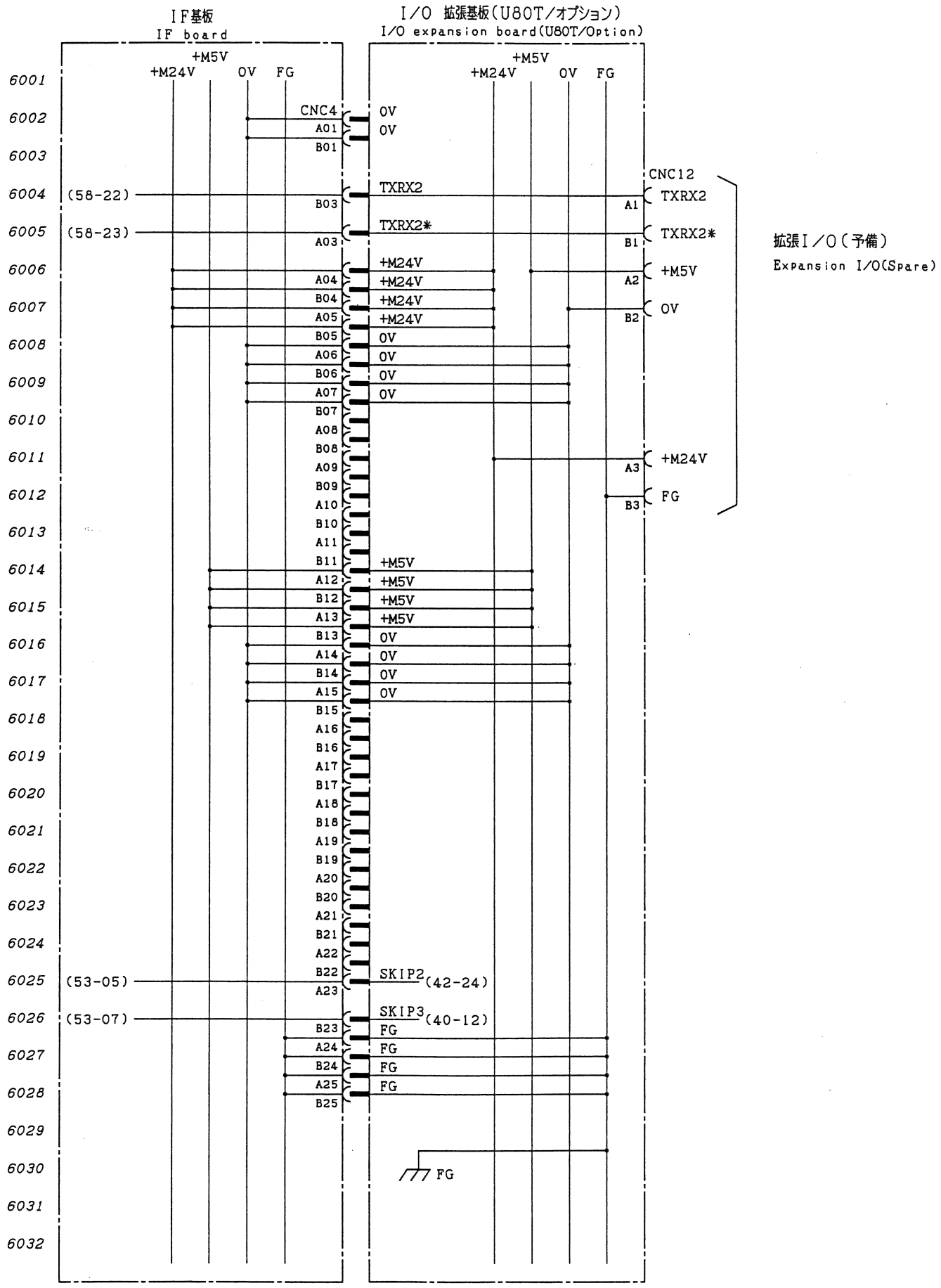
IF基板
IF board

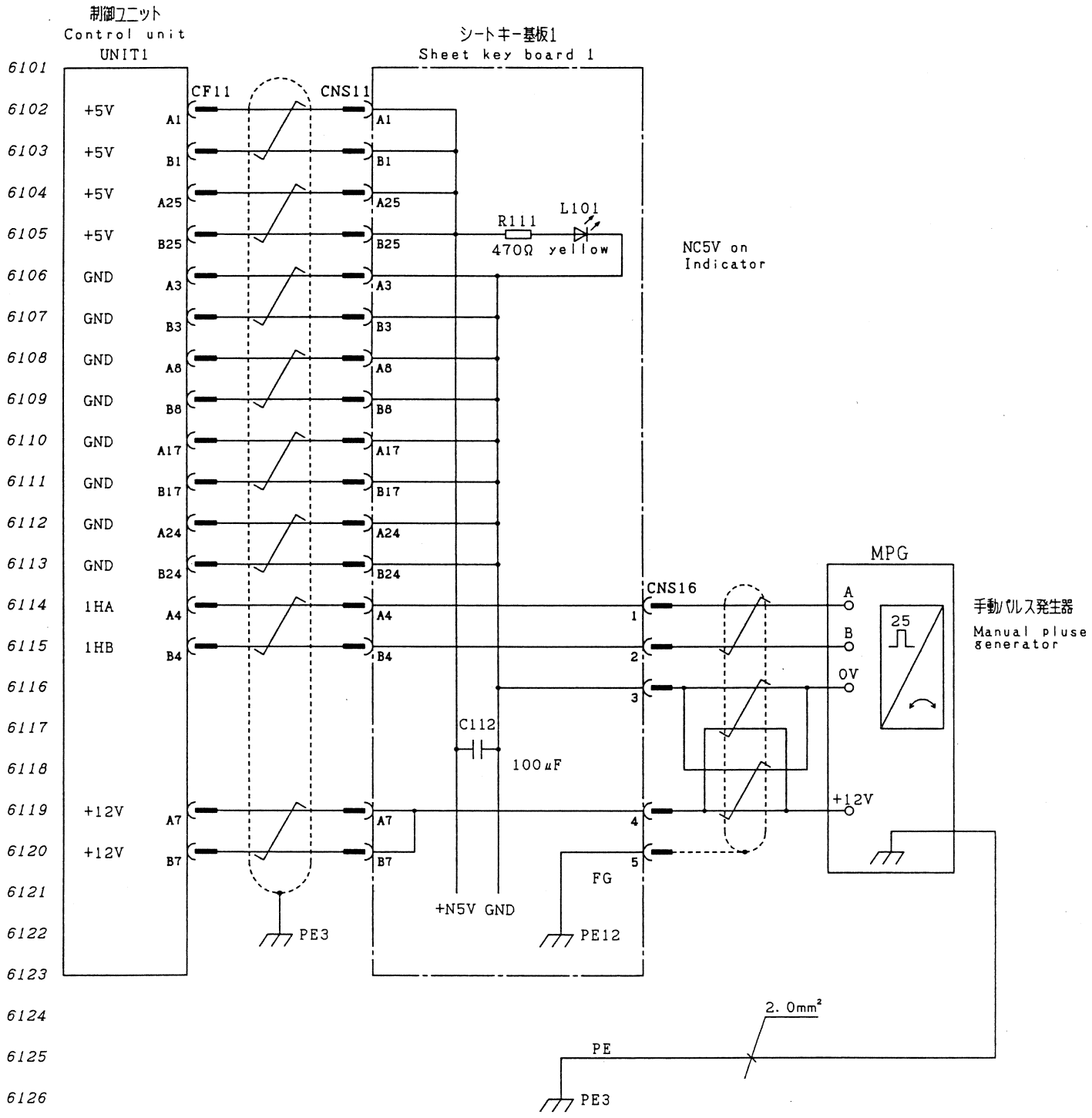


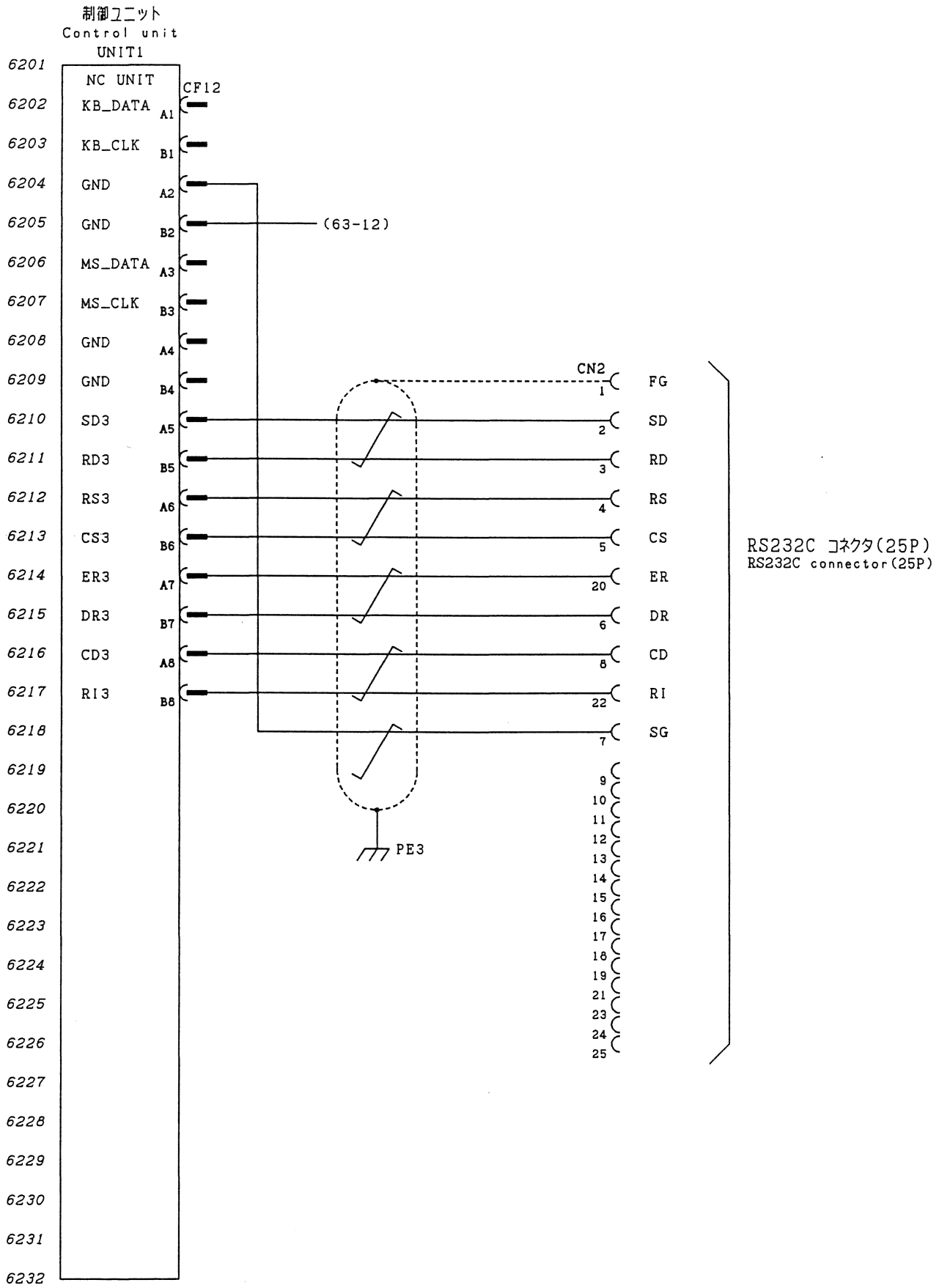

制御ユニット
Control unit
UNIT1
IF基板
IF board
TXRX1
TXRX1*
CF10
CNC1
CF30-C1
CF30-C2
CF30-C3
CF30-C4
CF30-C5
R445
100Ω
CNC3
CNC4
リモートI/O
Remote I/O
HR371
TXRX1
TXRX1*
リモートI/O(U80T/オプション)
Remote I/O(U80T/Opti
リモートI/O(オプション)
Remote I/O(Option)
リモートI/O(予備)
Remote I/O(Spare)
I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
シートキー基板1
Sheet key board 1
シートキー基板2
Sheet key board 2
TXRX3
TXRX3*
CF11
CNS11
CNS10
CNS20
CF30-S1
CF30-S2
R131
100Ω
TXRX3
TXRX3*

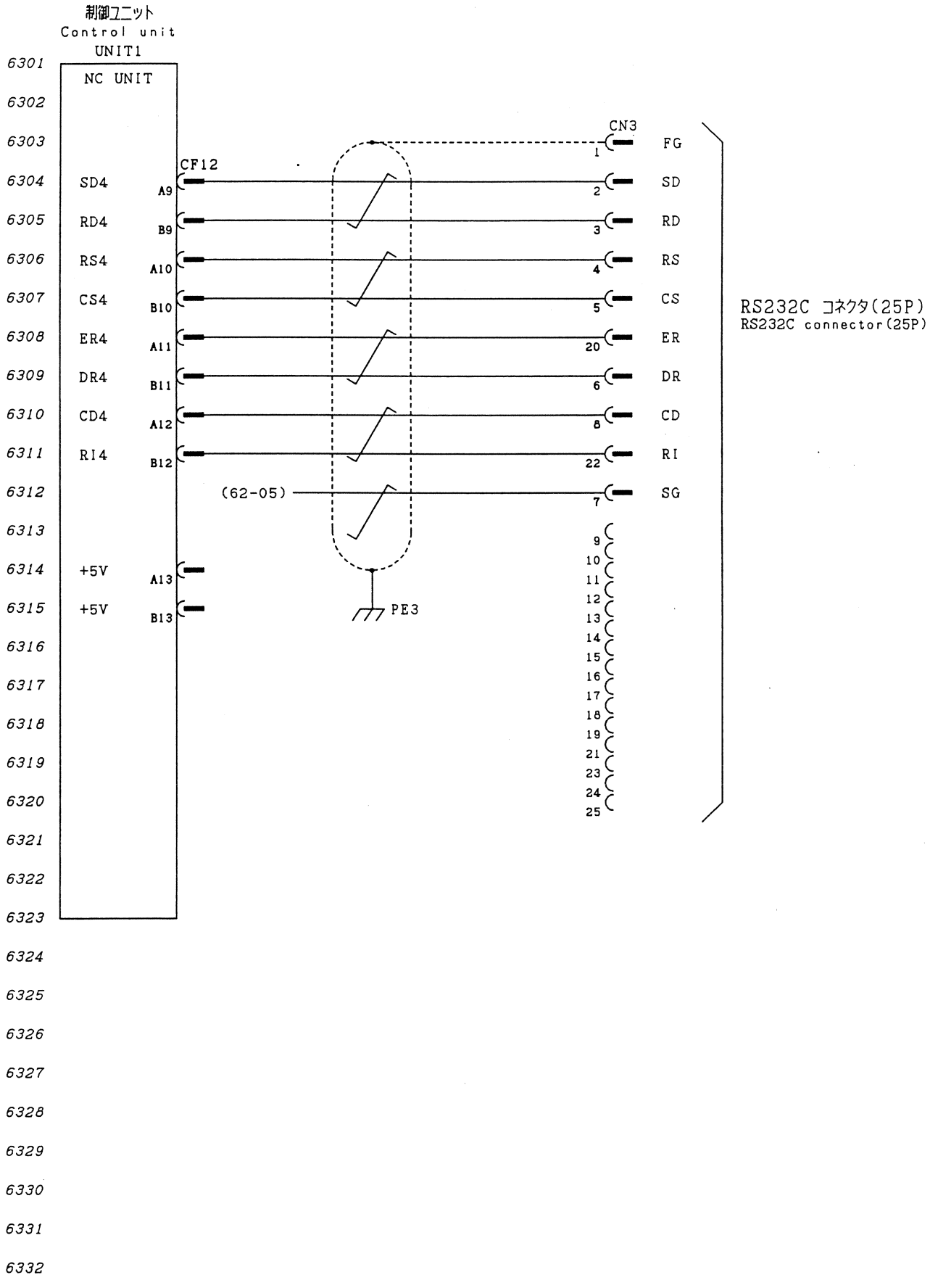

制御ユニット
Control unit
UNIT1
IF基板
IF board
CF10
CNC1
0V
SVTXD1
SVTXD1*
SVALM1
SVALM1*
SVEMG1
SVEMG1*
SVRXD1
SVRXD1*
SVTXD2
SVTXD2*
SVALM2
SVALM2*
SVEMG2
SVEMG2*
SVRXD2
SVRXD2*
SKIP1
SKIP1*
SKIP2
SKIP2*
SKIP3
SKIP3*
SKIP4
SKIP4*
SKIP5
SKIP5*
SKIP6
SKIP6*
SKIP7
SKIP7*
SKIP8
SKIP8*
ENC1A
ENC1A*
ENC1B
ENC1B*
ENC1Z
ENC1Z*
TXRX2
TXRX2*
GND
(111-B2)
(112-B2)
(53-25)
(54-25)
(60-04)
(60-05)

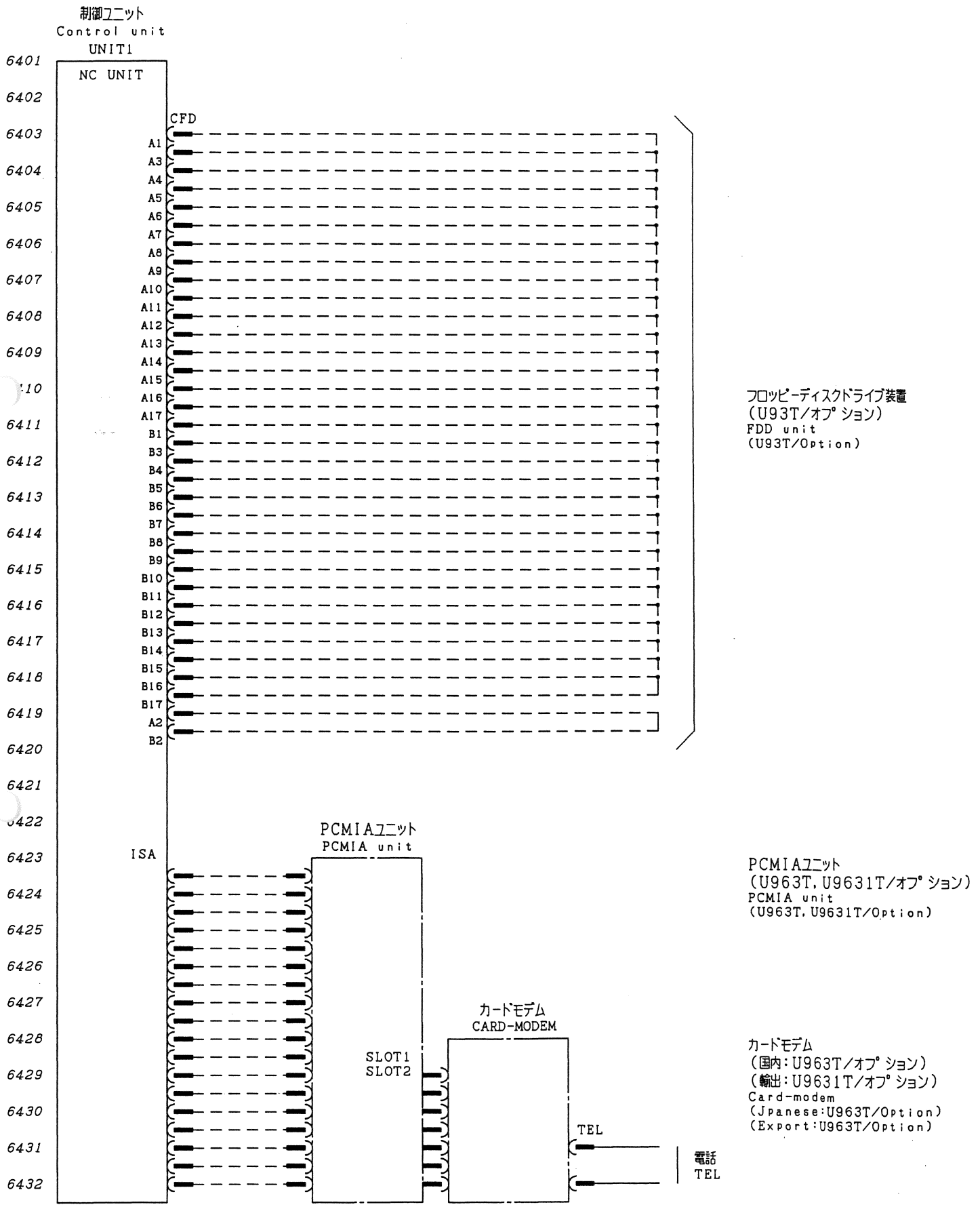

IF基板
IF board
+M5V
+M24V
0V
FG
CNC3
5901
5902
5903
5904
5905
5906
5907
5908
5909
5910
5911
5912
5913
5914
5915
5916
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
5927
5928
5929
5930
5931
5932
A01
B01
A03
B03
A04
B04
A05
B05
A06
B06
A07
B07
A08
B08
A09
B09
A10
B10
A11
B11
A12
B12
A13
B13
A14
B14
A15
B15
A16
B16
A17
B17
A18
B18
A19
B19
A20
B20
A21
B21
A22
B22
A23
B23
A24
B24
A25
B25
0V
0V
+M24V
+M24V
+M24V
+M24V
0V
0V
0V
0V
+M5V
+M5V
+M5V
+M5V
0V
0V
0V
0V
(111-D)
BAT
(26-16)
BR
FG
FG
FG
FG
軸拡張基板
Axis expansion board

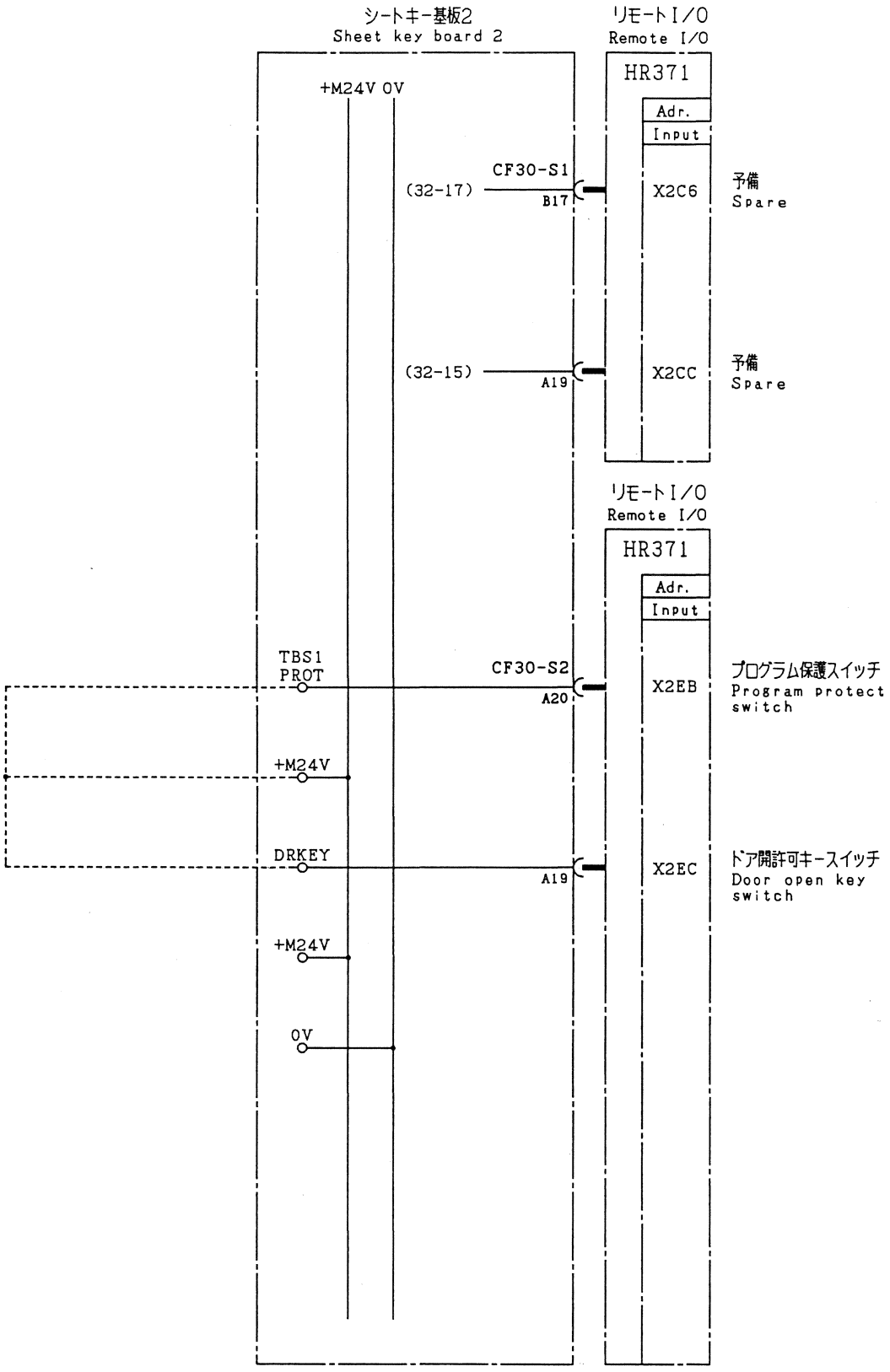

IF基板
IF board
I/O 拡張基板(U80T/オプション)
I/O expansion board(U80T/Option)
+M5V
+M24V
0V
FG
CNC4
CNC12
(58-22)
(58-23)
(53-05)
(53-07)
SKIP2(42-24)
SKIP3(40-12)
TXRX2
TXRX2*
拡張I/O(予備)
Expansion I/O(Spare)

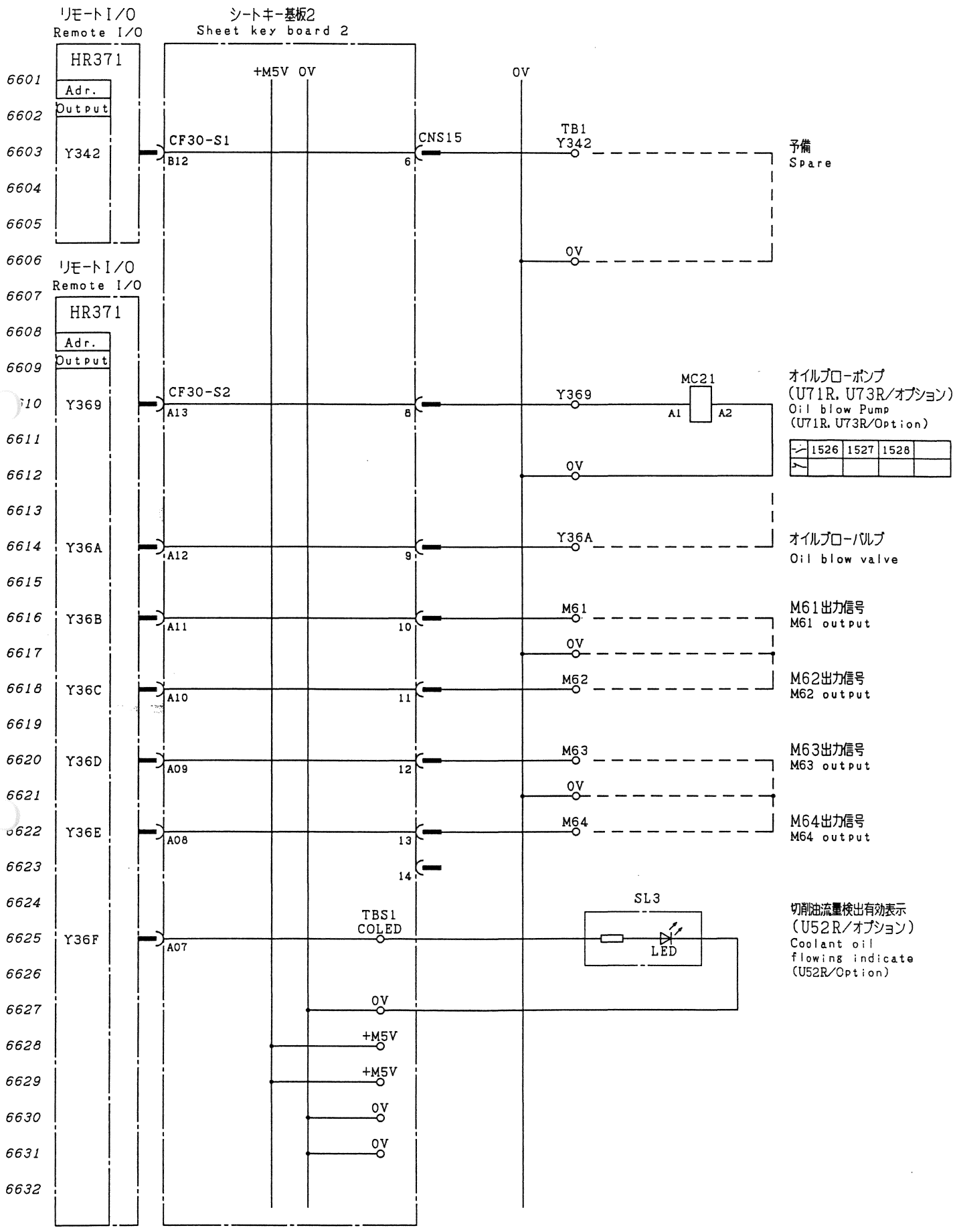

制御ユニット
Control unit
UNIT1
シートキー基板1
Sheet key board 1
CF11
CNS11
+5V
+5V
+5V
+5V
GND
GND
GND
GND
GND
GND
GND
1HA
1HB
+12V
+12V
A1
B1
A25
B25
A3
B3
A8
B8
A17
B17
A24
B24
A4
B4
A7
B7
R111
470Ω
L101
yellow
NC5V on
Indicator
C112
100μF
+N5V GND
PE3
FG
PE12
CNS16
MPG
A
B
0V
+12V
25
手動パルス発生器
Manual pluse
generator
2.0mm²
PE
PE3

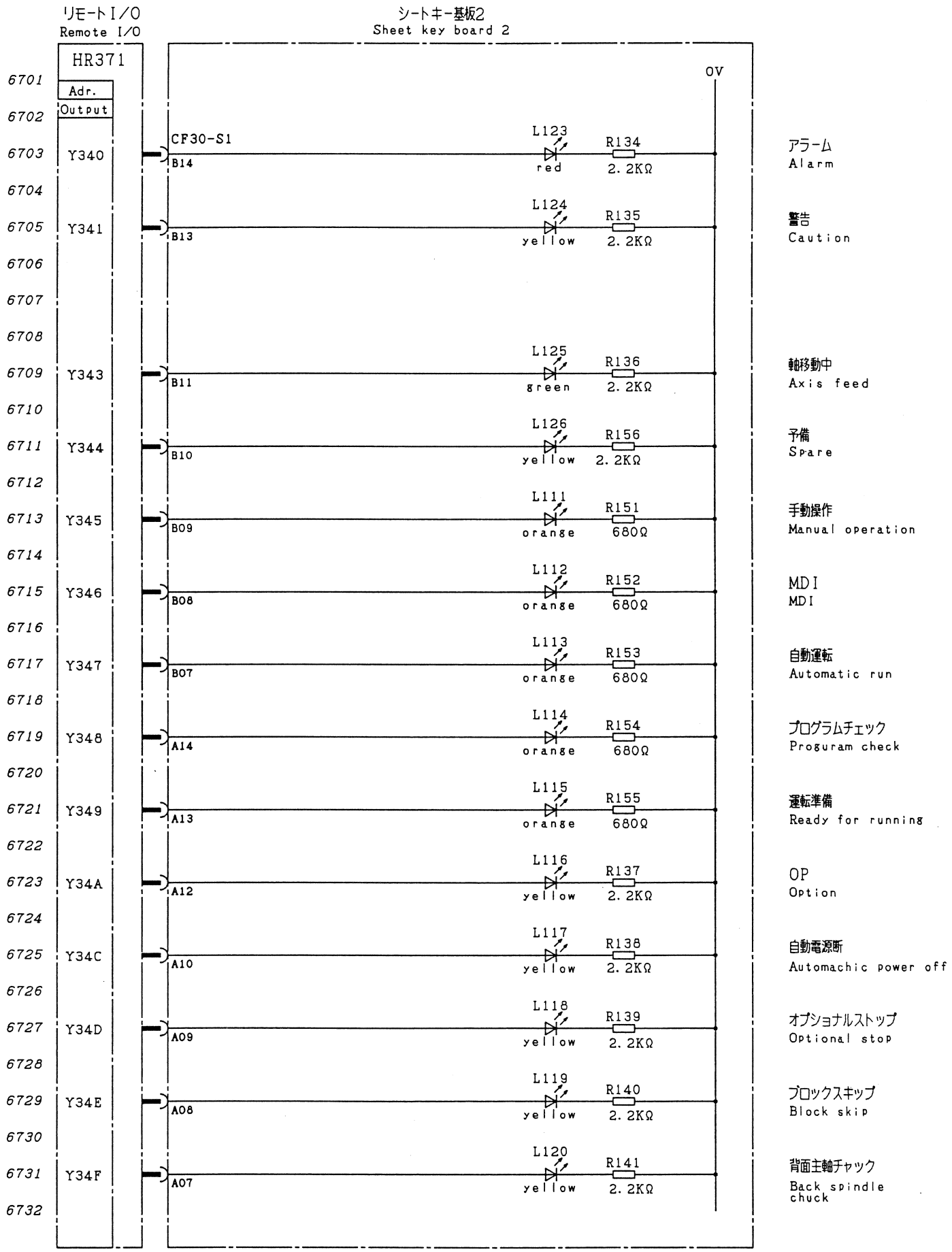

制御ユニット
Control unit
UNIT1
NC UNIT
CF12
6201
6202 KB_DATA A1
6203 KB_CLK B1
6204 GND A2
6205 GND B2
6206 MS_DATA A3
6207 MS_CLK B3
6208 GND A4
6209 GND B4
6210 SD3 A5
6211 RD3 B5
6212 RS3 A6
6213 CS3 B6
6214 ER3 A7
6215 DR3 B7
6216 CD3 A8
6217 RI3 B8
6218
6219
6220
6221
6222
6223
6224
6225
6226
6227
6228
6229
6230
6231
6232
(63-12)
CN2
1 FG
2 SD
3 RD
4 RS
5 CS
20 ER
6 DR
8 CD
22 RI
7 SG
9
10
11
12
13
14
15
16
17
18
19
21
23
24
25
PE3
RS232C コネクタ(25P)
RS232C connector(25P)

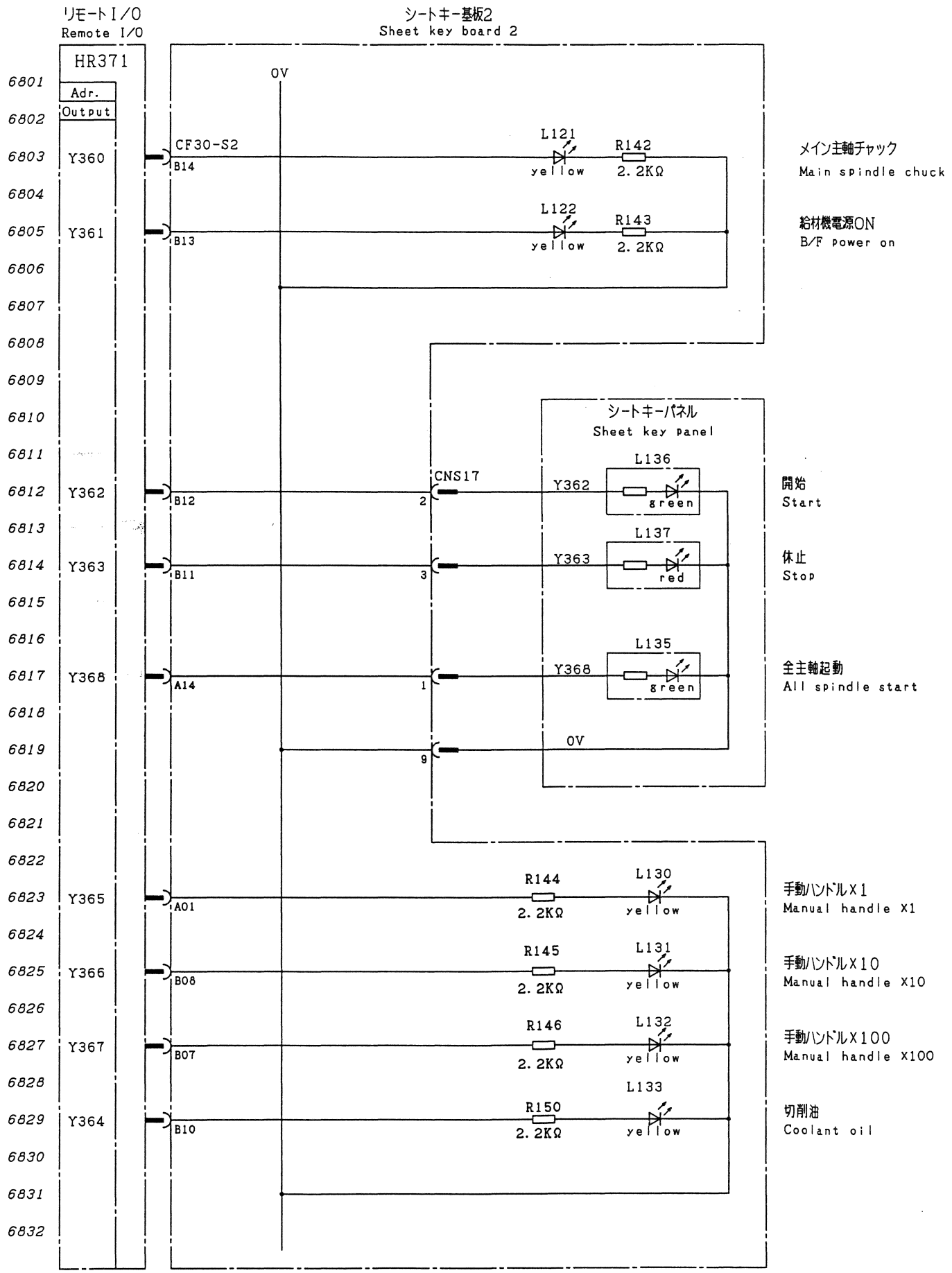

制御ユニット
Control unit
UNIT1
NC UNIT
CF12
SD4
RD4
RS4
CS4
ER4
DR4
CD4
RI4
+5V
+5V
A9
B9
A10
B10
A11
B11
A12
B12
A13
B13
(62-05)
PE3
CN3
FG
SD
RD
RS
CS
ER
DR
CD
RI
SG
RS232C コネクタ(25P)
RS232C connector(25P)

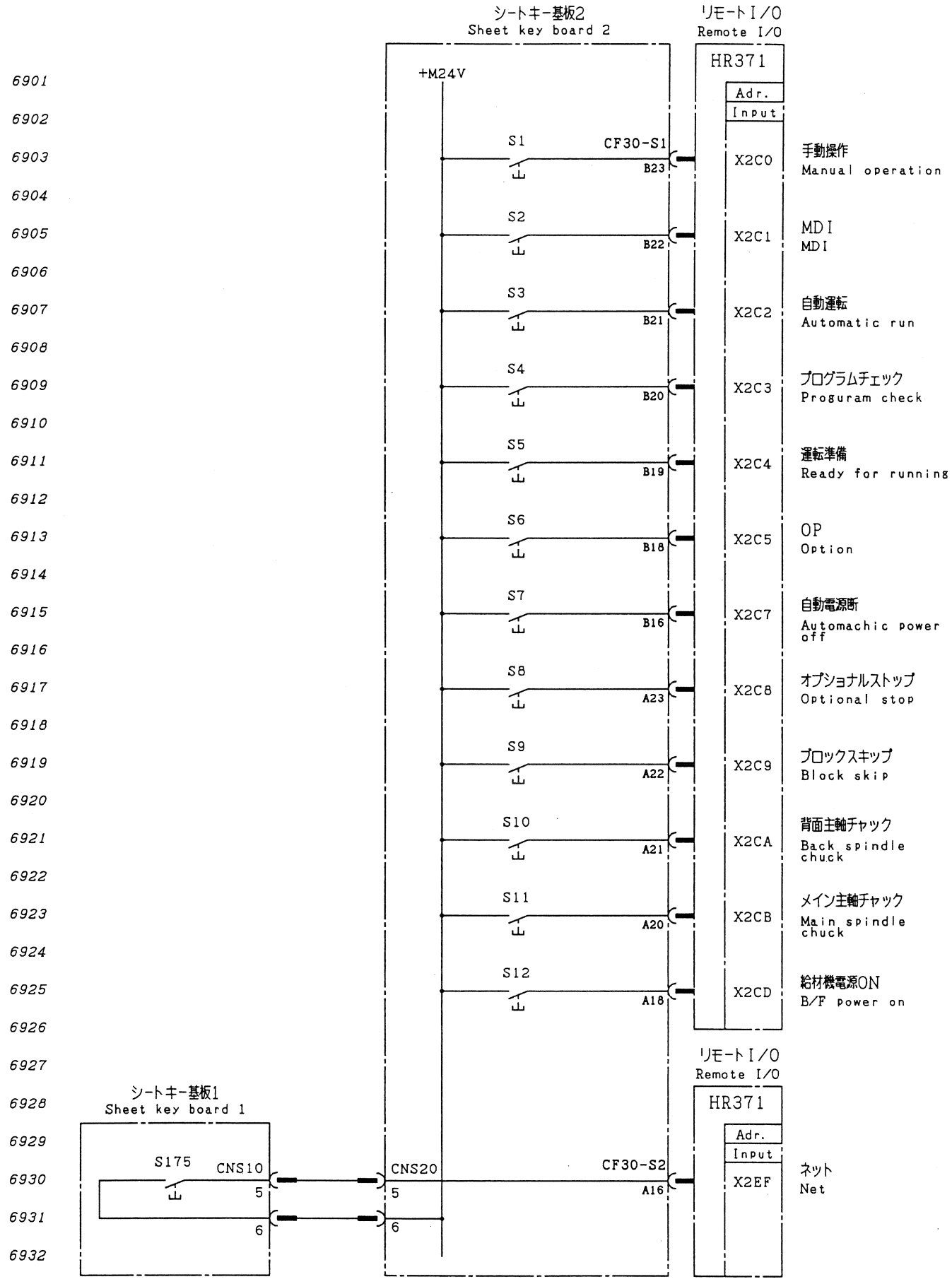

制御ユニット
Control unit
UNIT1
NC UNIT
CFD
A1
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
B1
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
B13
B14
B15
B16
B17
A2
B2
6401
6402
6403
6404
6405
6406
6407
6408
6409
6410
6411
6412
6413
6414
6415
6416
6417
6418
6419
6420
6421
6422
6423
6424
6425
6426
6427
6428
6429
6430
6431
6432
ISA
PCMIAユニット
PCMIA unit
SLOT1
SLOT2
カードモデム
CARD-MODEM
TEL
電話
TEL
フロッピーディスクドライブ装置
(U93T/オプション)
FDD unit
(U93T/Option)
PCMIAユニット
(U963T, U9631T/オプション)
PCMIA unit
(U963T, U9631T/Option)
カードモデム
(国内:U963T/オプション)
(輸出:U9631T/オプション)
Card-modem
(Jpanese:U963T/Option)
(Export:U963T/Option)

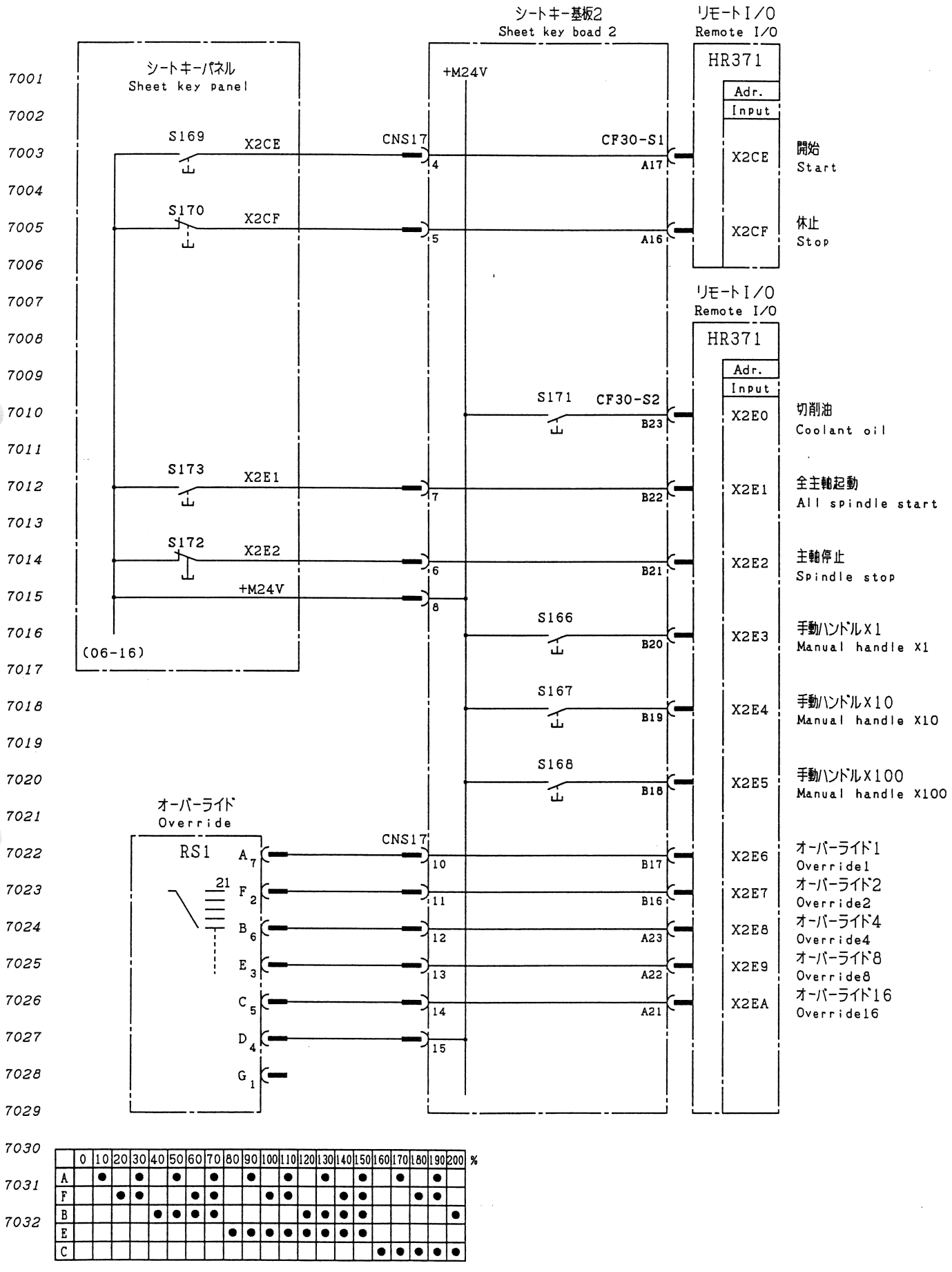

シートキー基板2
Sheet key board 2
リモートI/O
Remote I/O
HR371
Adr.
Input
+M24V 0V
CF30-S1
(32-17)
B17
X2C6
予備
Spare
(32-15)
A19
X2CC
予備
Spare
リモートI/O
Remote I/O
HR371
Adr.
Input
TBS1
PROT
CF30-S2
A20
X2EB
プログラム保護スイッチ
Program protect switch
+M24V
DRKEY
A19
X2EC
ドア開許可キースイッチ
Door open key switch
+M24V
0V

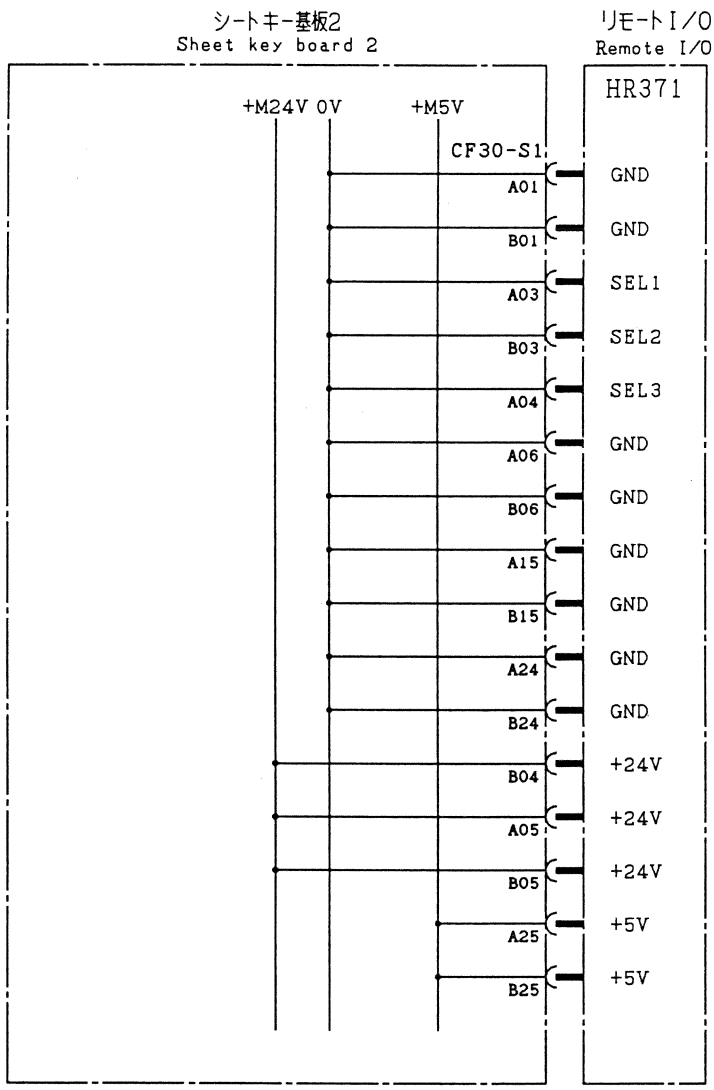

リモートI/O
Remote I/O
HR371
Adr.
Output
Y342
シートキー基板2
Sheet key board 2
+M5V 0V
0V
CF30-S1
B12
CNS15
6
TB1
Y342
予備
Spare
0V
リモートI/O
Remote I/O
HR371
Adr.
Output
Y369
CF30-S2
A13
8
Y369
MC21
A1
A2
オイルブローポンプ
(U71R, U73R/オプション)
Oil blow Pump
(U71R, U73R/Option)
1526 1527 1528
0V
Y36A
A12
9
Y36A
オイルブローバルブ
Oil blow valve
Y36B
A11
10
M61
M61出力信号
M61 output
0V
Y36C
A10
11
M62
M62出力信号
M62 output
Y36D
A09
12
M63
M63出力信号
M63 output
0V
Y36E
A08
13
M64
M64出力信号
M64 output
14
SL3
TBS1
COLED
Y36F
A07
LED
切削油流量検出有効表示
(U52R/オプション)
Coolant oil
flowing indicate
(U52R/Option)
0V
+M5V
+M5V
0V
0V
6601
6602
6603
6604
6605
6606
6607
6608
6609
6610
6611
6612
6613
6614
6615
6616
6617
6618
6619
6620
6621
6622
6623
6624
6625
6626
6627
6628
6629
6630
6631
6632


リモートI/O
Remote I/O
シートキー基板2
Sheet key board 2
HR371
Adr.
Output
0V
CF30-S1
6701
6702
6703 Y340 B14 L123 red R134 2.2KΩ アラーム Alarm
6704
6705 Y341 B13 L124 yellow R135 2.2KΩ 警告 Caution
6706
6707
6708
6709 Y343 B11 L125 green R136 2.2KΩ 軸移動中 Axis feed
6710
6711 Y344 B10 L126 yellow R156 2.2KΩ 予備 Spare
6712
6713 Y345 B09 L111 orange R151 680Ω 手動操作 Manual operation
6714
6715 Y346 B08 L112 orange R152 680Ω MDI MDI
6716
6717 Y347 B07 L113 orange R153 680Ω 自動運転 Automatic run
6718
6719 Y348 A14 L114 orange R154 680Ω プログラムチェック Proguram check
6720
6721 Y349 A13 L115 orange R155 680Ω 運転準備 Ready for running
6722
6723 Y34A A12 L116 yellow R137 2.2KΩ OP Option
6724
6725 Y34C A10 L117 yellow R138 2.2KΩ 自動電源断 Automachic power off
6726
6727 Y34D A09 L118 yellow R139 2.2KΩ オプショナルストップ Optional stop
6728
6729 Y34E A08 L119 yellow R140 2.2KΩ ブロックスキップ Block skip
6730
6731 Y34F A07 L120 yellow R141 2.2KΩ 背面主軸チャック Back spindle chuck
6732

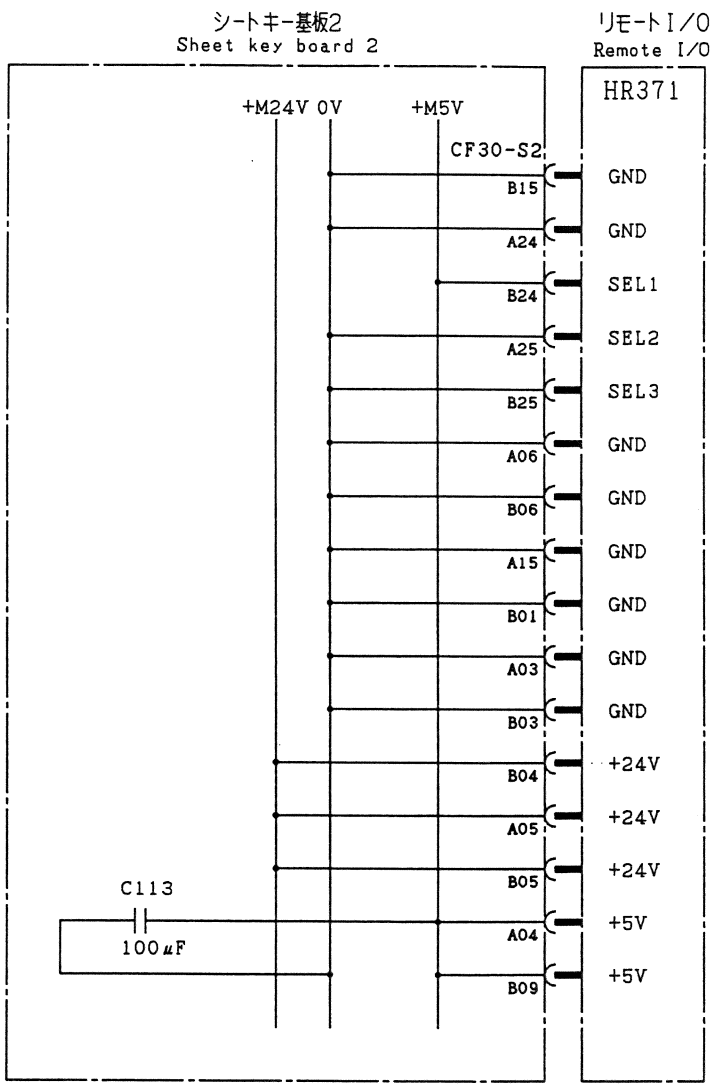

リモートI/O
Remote I/O
シートキー基板2
Sheet key board 2
HR371
Adr.
Output
6801
6802
6803
6804
6805
6806
6807
6808
6809
6810
6811
6812
6813
6814
6815
6816
6817
6818
6819
6820
6821
6822
6823
6824
6825
6826
6827
6828
6829
6830
6831
6832
Y360
Y361
Y362
Y363
Y368
Y365
Y366
Y367
Y364
0V
CF30-S2
B14
B13
B12
B11
A14
A01
B08
B07
B10
L121
yellow
R142
2.2KΩ
L122
yellow
R143
2.2KΩ
メイン主軸チャック
Main spindle chuck
給材機電源ON
B/F power on
シートキーパネル
Sheet key panel
CNS17
2
3
1
9
L136
Y362
green
開始
Start
L137
Y363
red
休止
Stop
L135
Y368
green
全主軸起動
All spindle start
0V
R144
2.2KΩ
L130
yellow
手動ハンドルX1
Manual handle X1
R145
2.2KΩ
L131
yellow
手動ハンドルX10
Manual handle X10
R146
2.2KΩ
L132
yellow
手動ハンドルX100
Manual handle X100
R150
2.2KΩ
L133
yellow
切削油
Coolant oil


シートキー基板2
Sheet key board 2
リモートI/O
Remote I/O
HR371
Adr.
Input
+M24V
S1
CF30-S1
B23
X2C0
手動操作
Manual operation
S2
B22
X2C1
MDI
MDI
S3
B21
X2C2
自動運転
Automatic run
S4
B20
X2C3
プログラムチェック
Proguram check
S5
B19
X2C4
運転準備
Ready for running
S6
B18
X2C5
OP
Option
S7
B16
X2C7
自動電源断
Automachic power off
S8
A23
X2C8
オプショナルストップ
Optional stop
S9
A22
X2C9
ブロックスキップ
Block skip
S10
A21
X2CA
背面主軸チャック
Back spindle chuck
S11
A20
X2CB
メイン主軸チャック
Main spindle chuck
S12
A18
X2CD
給材機電源ON
B/F power on
リモートI/O
Remote I/O
HR371
Adr.
Input
X2EF
ネット
Net
CF30-S2
A16
CNS20
5
6
シートキー基板1
Sheet key board 1
S175
CNS10
5
6

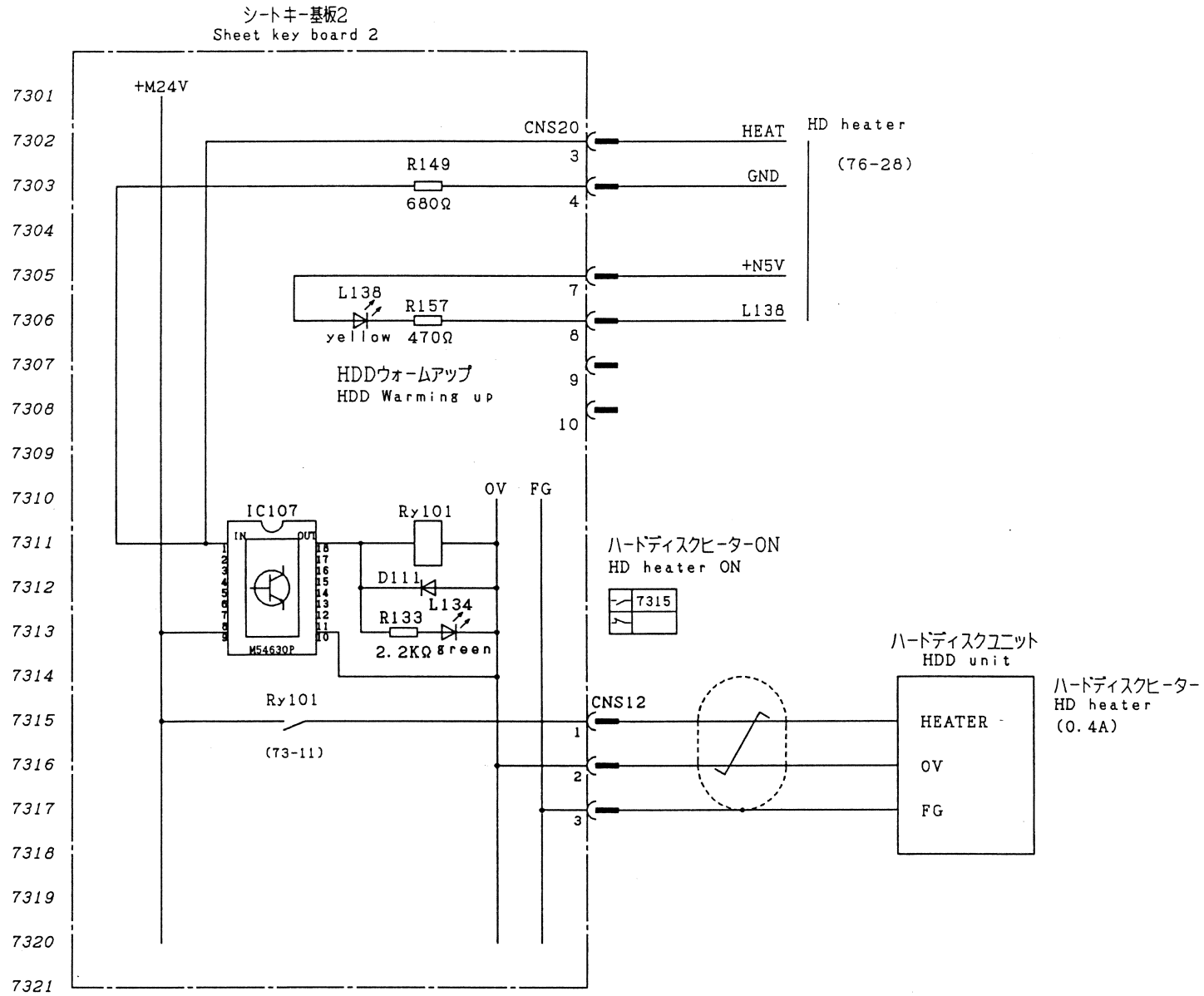

シートキー基板2
Sheet key boad 2
リモートI/O
Remote I/O
HR371
Adr.
Input
シートキーパネル
Sheet key panel
+M24V
S169
X2CE
CNS17
CF30-S1
A17
開始
Start
S170
X2CF
A16
休止
Stop
S171
CF30-S2
B23
切削油
Coolant oil
S173
X2E1
B22
全主軸起動
All spindle start
S172
X2E2
B21
主軸停止
Spindle stop
S166
B20
手動ハンドルX1
Manual handle X1
S167
B19
手動ハンドルX10
Manual handle X10
S168
B18
手動ハンドルX100
Manual handle X100
(06-16)
オーバーライド
Override
RS1
21
A7
F2
B6
E3
C5
D4
G1
B17
オーバーライド1
Override1
B16
オーバーライド2
Override2
A23
オーバーライド4
Override4
A22
オーバーライド8
Override8
A21
オーバーライド16
Override16
X2E0
X2E1
X2E2
X2E3
X2E4
X2E5
X2E6
X2E7
X2E8
X2E9
X2EA
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 %
A
F
B
E
C

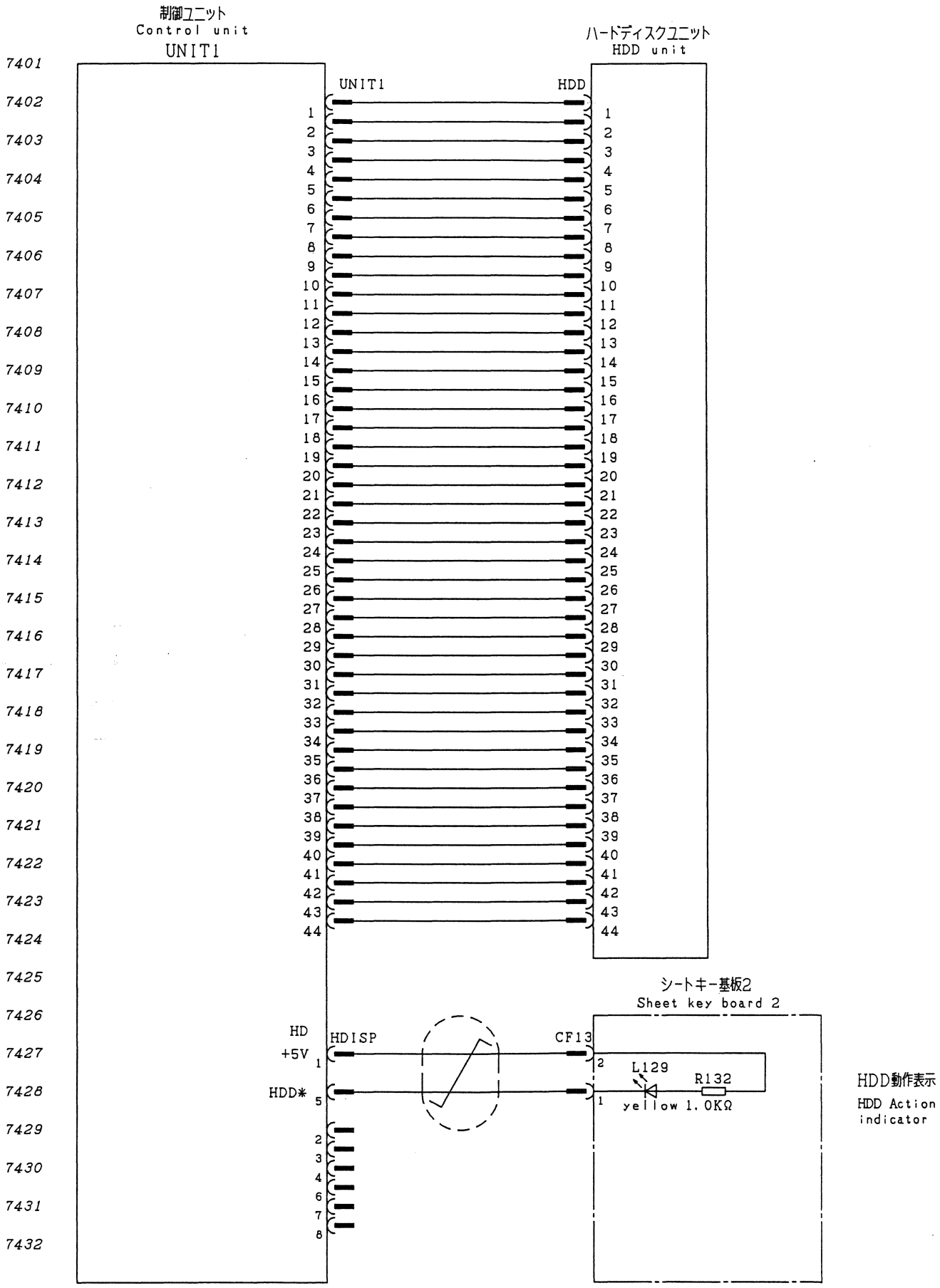


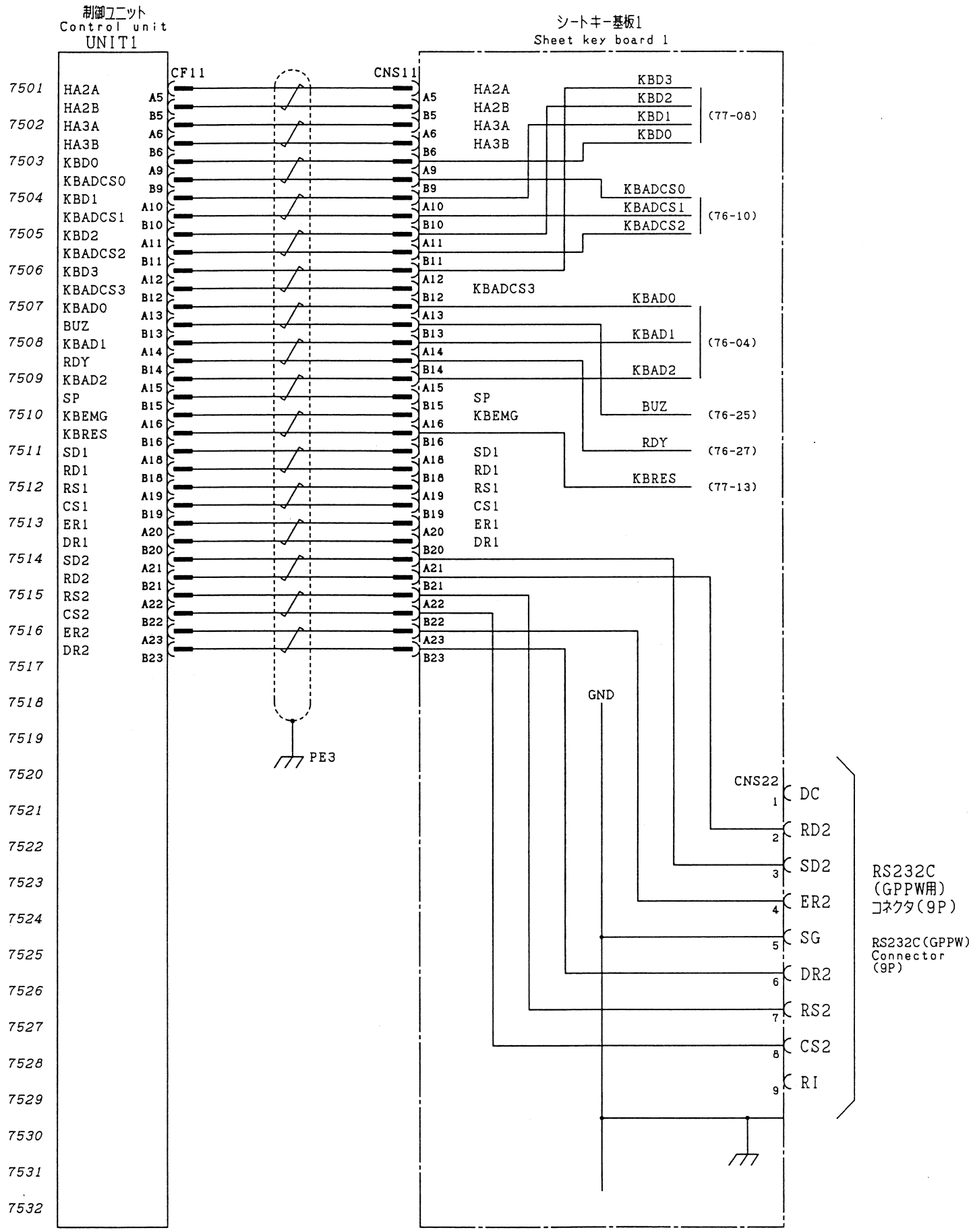
リモートI/O CF11コネクタ第1局選択
Select the I/O card No. 1 in CF11 connector



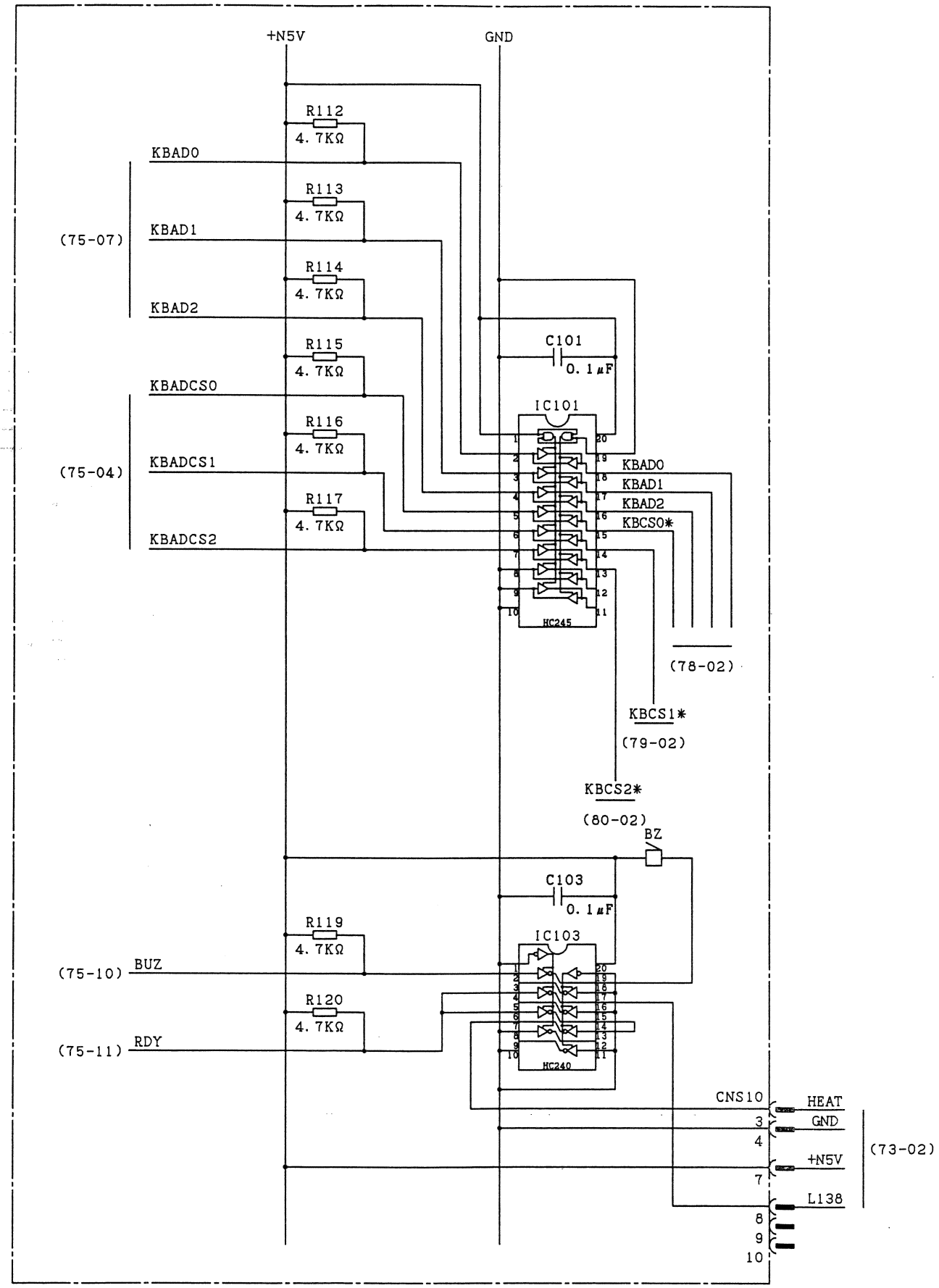
リモートI/O CF11コネクタ第2局選択
Select the I/O card No.2 in CF11 connector

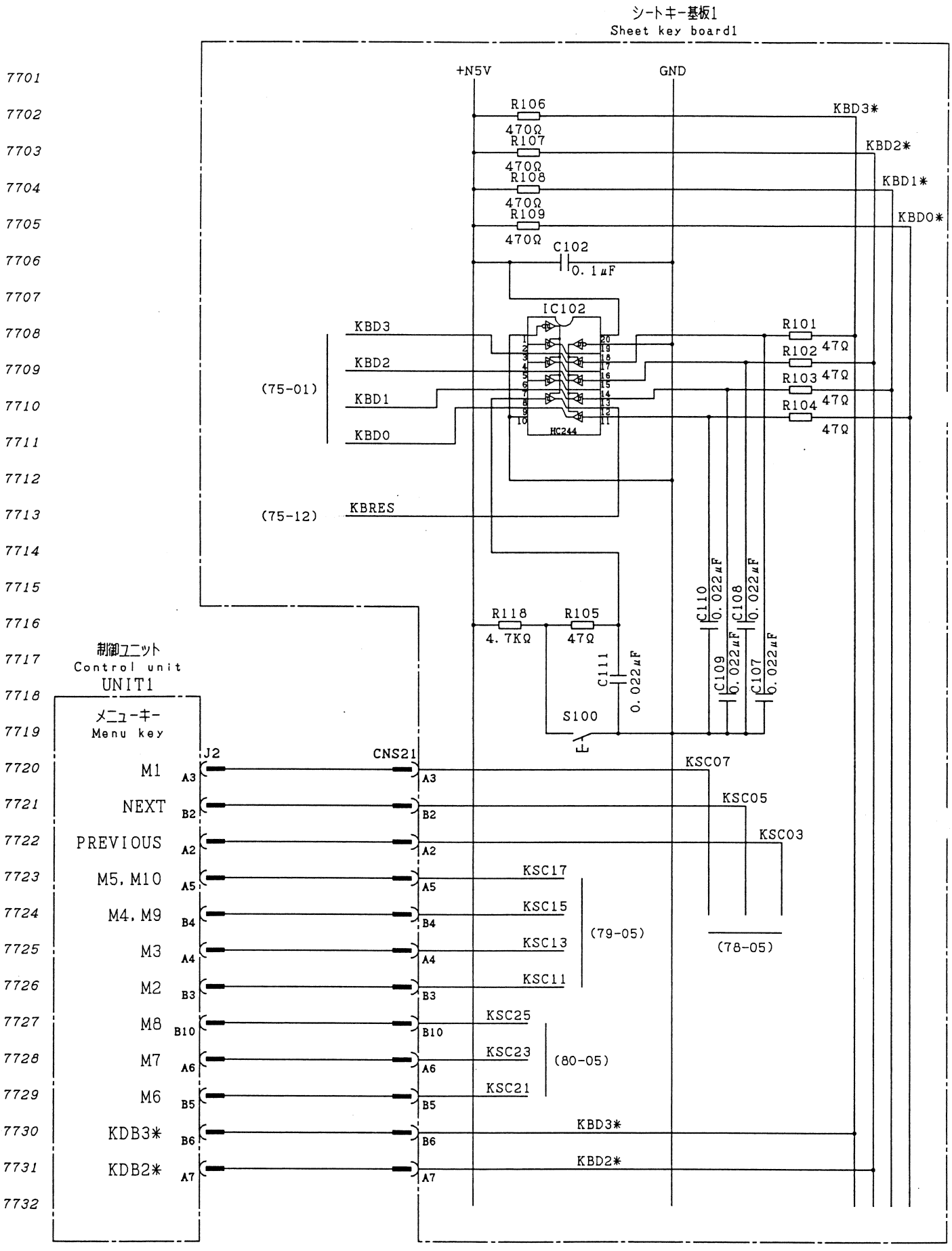

シートキー基板2
Sheet key board 2
+M24V
CNS20
3
4
HEAT
GND
HD heater
(76-28)
R149
680Ω
+N5V
7
L138
R157
yellow 470Ω
8
L138
HDDウォームアップ
HDD Warming up
9
10
0V
FG
IC107
IN
OUT
M54630P
Ry101
D111
L134
R133
2.2KΩ
Green
ハードディスクヒーターON
HD heater ON
7315
Ry101
(73-11)
CNS12
1
2
3
ハードディスクユニット
HDD unit
HEATER
0V
FG
ハードディスクヒーター
HD heater
(0.4A)


制御ユニット
Control unit
UNIT1
ハードディスクユニット
HDD unit
UNIT1
HDD
シートキー基板2
Sheet key board 2
HD
+5V
HDD*
HDISP
CF13
L129
R132
yellow 1.0KΩ
HDD動作表示
HDD Action indicator

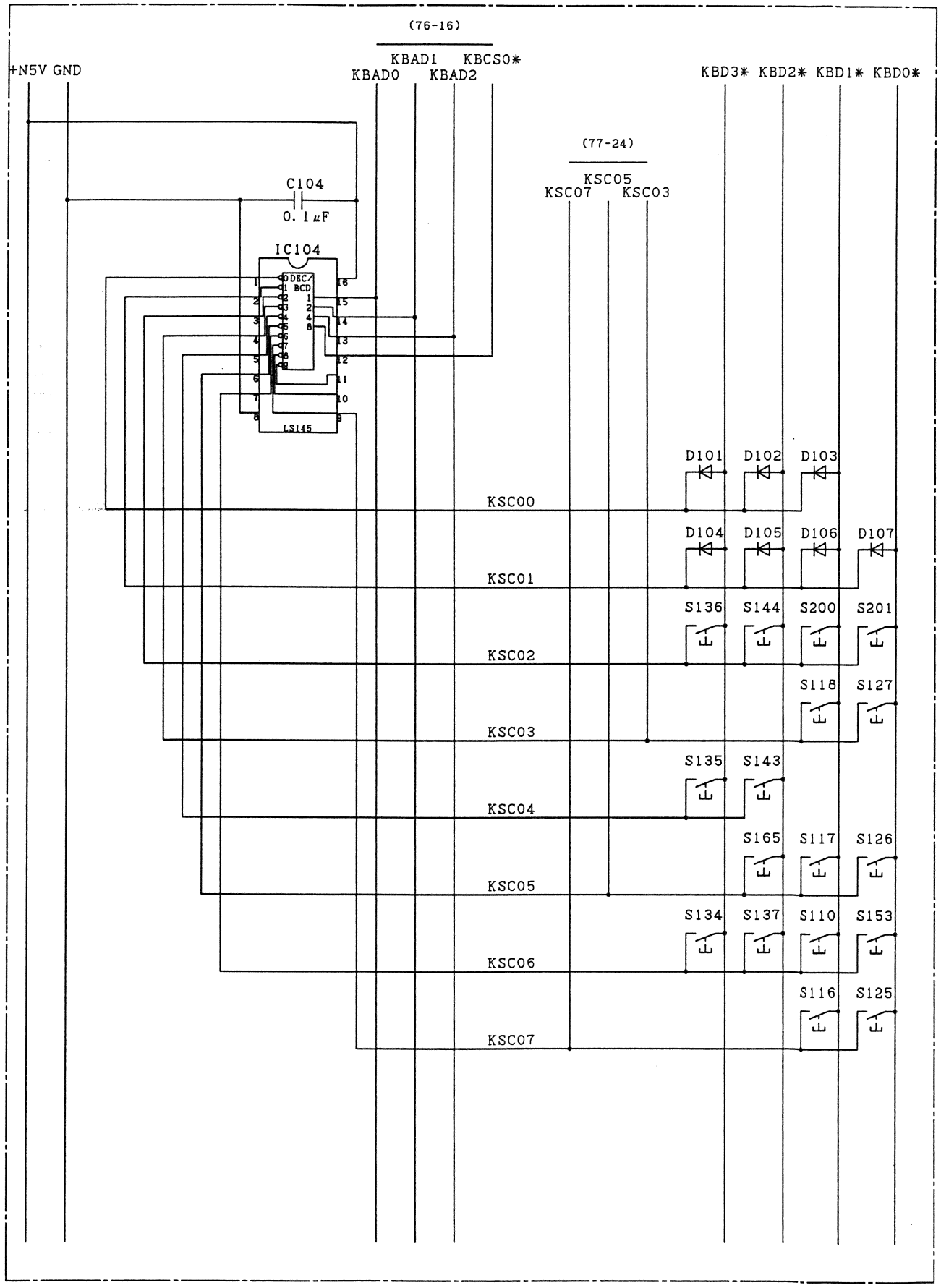

制御ユニット
Control unit
UNIT1
シートキー基板1
Sheet key board 1
CF11
CNS11
7501
7502
7503
7504
7505
7506
7507
7508
7509
7510
7511
7512
7513
7514
7515
7516
7517
7518
7519
7520
7521
7522
7523
7524
7525
7526
7527
7528
7529
7530
7531
7532
HA2A
HA2B
HA3A
HA3B
KBD0
KBADCS0
KBD1
KBADCS1
KBD2
KBADCS2
KBD3
KBADCS3
KBAD0
BUZ
KBAD1
RDY
KBAD2
SP
KBEMG
KBRES
SD1
RD1
RS1
CS1
ER1
DR1
SD2
RD2
RS2
CS2
ER2
DR2
A5
B5
A6
B6
A9
B9
A10
B10
A11
B11
A12
B12
A13
B13
A14
B14
A15
B15
A16
B16
A18
B18
A19
B19
A20
B20
A21
B21
A22
B22
A23
B23
KBD3
KBD2
KBD1
KBD0
(77-08)
KBADCS0
KBADCS1
KBADCS2
(76-10)
KBAD0
KBAD1
KBAD2
(76-04)
BUZ
(76-25)
RDY
(76-27)
KBRES
(77-13)
GND
PE3
CNS22
1 DC
2 RD2
3 SD2
4 ER2
5 SG
6 DR2
7 RS2
8 CS2
9 RI
RS232C
(GPPW用)
コネクタ(9P)
RS232C(GPPW)
Connector
(9P)

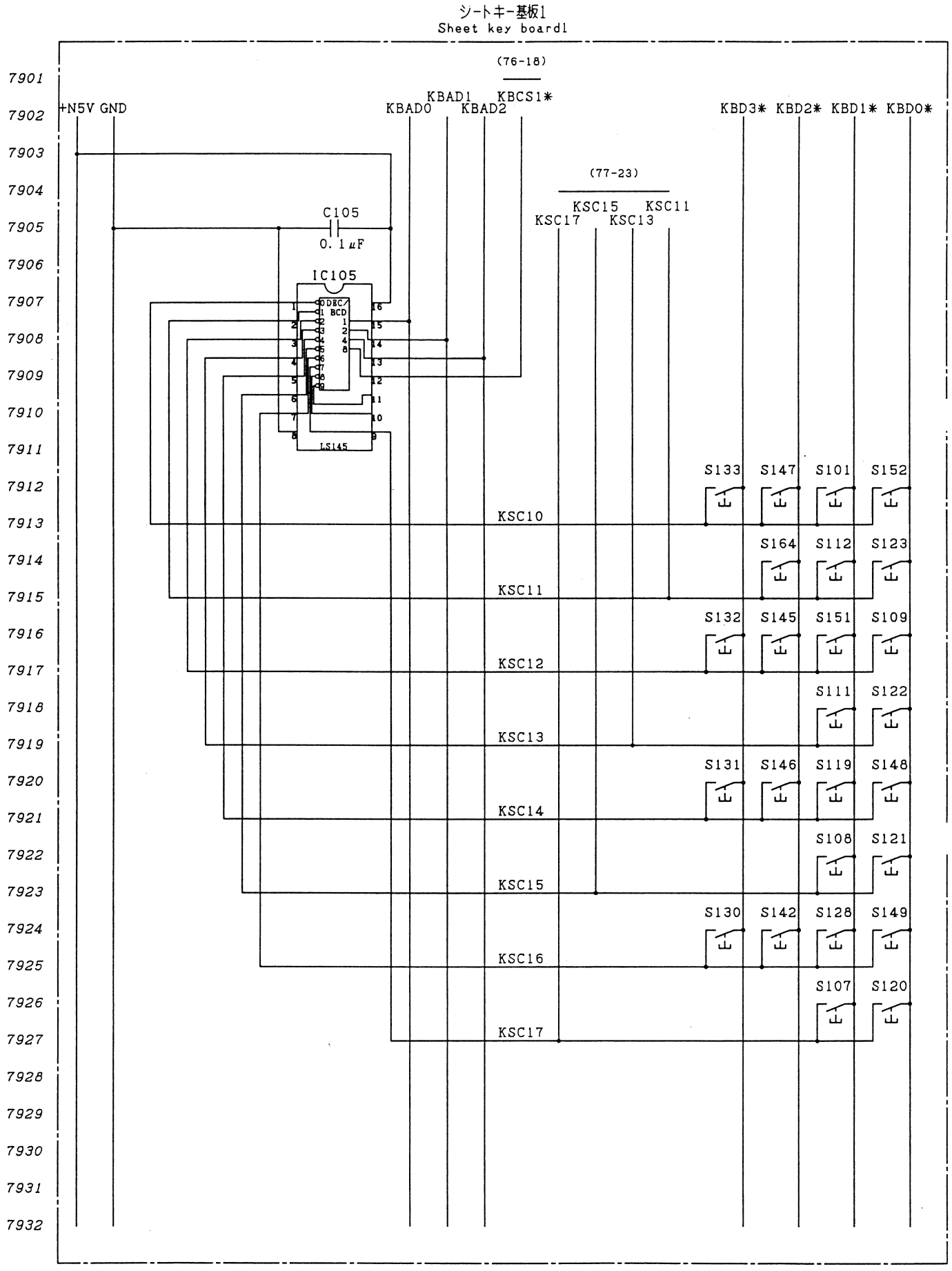
シートキー基板1
Sheet key board1



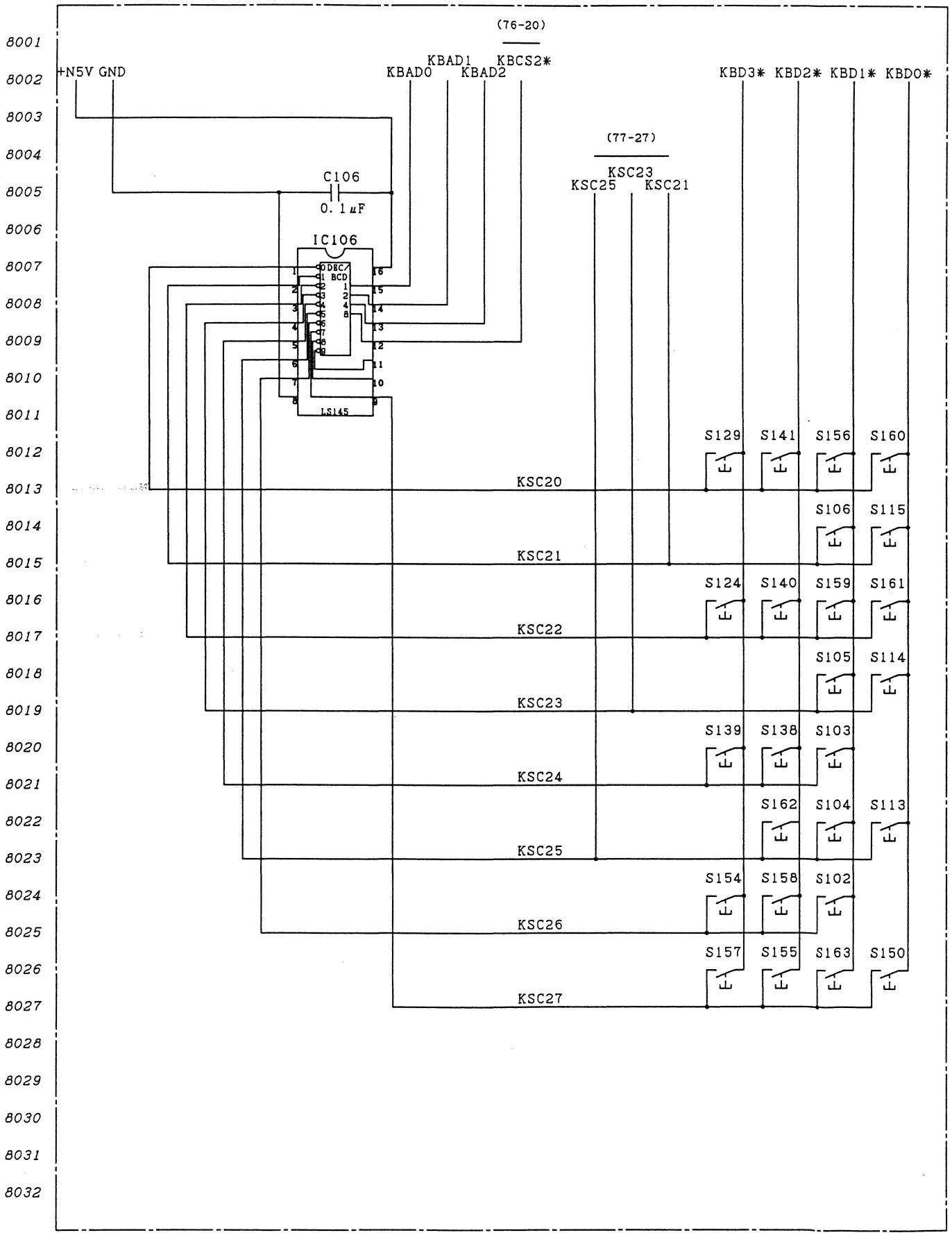

シートキー基板1
Sheet key board1
+N5V
GND
R106
470Ω
KBD3*
R107
470Ω
KBD2*
R108
470Ω
KBD1*
R109
470Ω
KBD0*
C102
0.1μF
IC102
HC244
KBD3
KBD2
KBD1
KBD0
(75-01)
KBRES
(75-12)
R101
R102
R103
R104
47Ω
R118
4.7KΩ
R105
47Ω
C111
0.022μF
S100
C110
C108
C109
C107
0.022μF
制御ユニット
Control unit
UNIT1
メニューキー
Menu key
J2
CNS21
M1
NEXT
PREVIOUS
M5, M10
M4, M9
M3
M2
M8
M7
M6
KDB3*
KDB2*
KSC07
KSC05
KSC03
KSC17
KSC15
KSC13
KSC11
(79-05)
(78-05)
KSC25
KSC23
KSC21
(80-05)

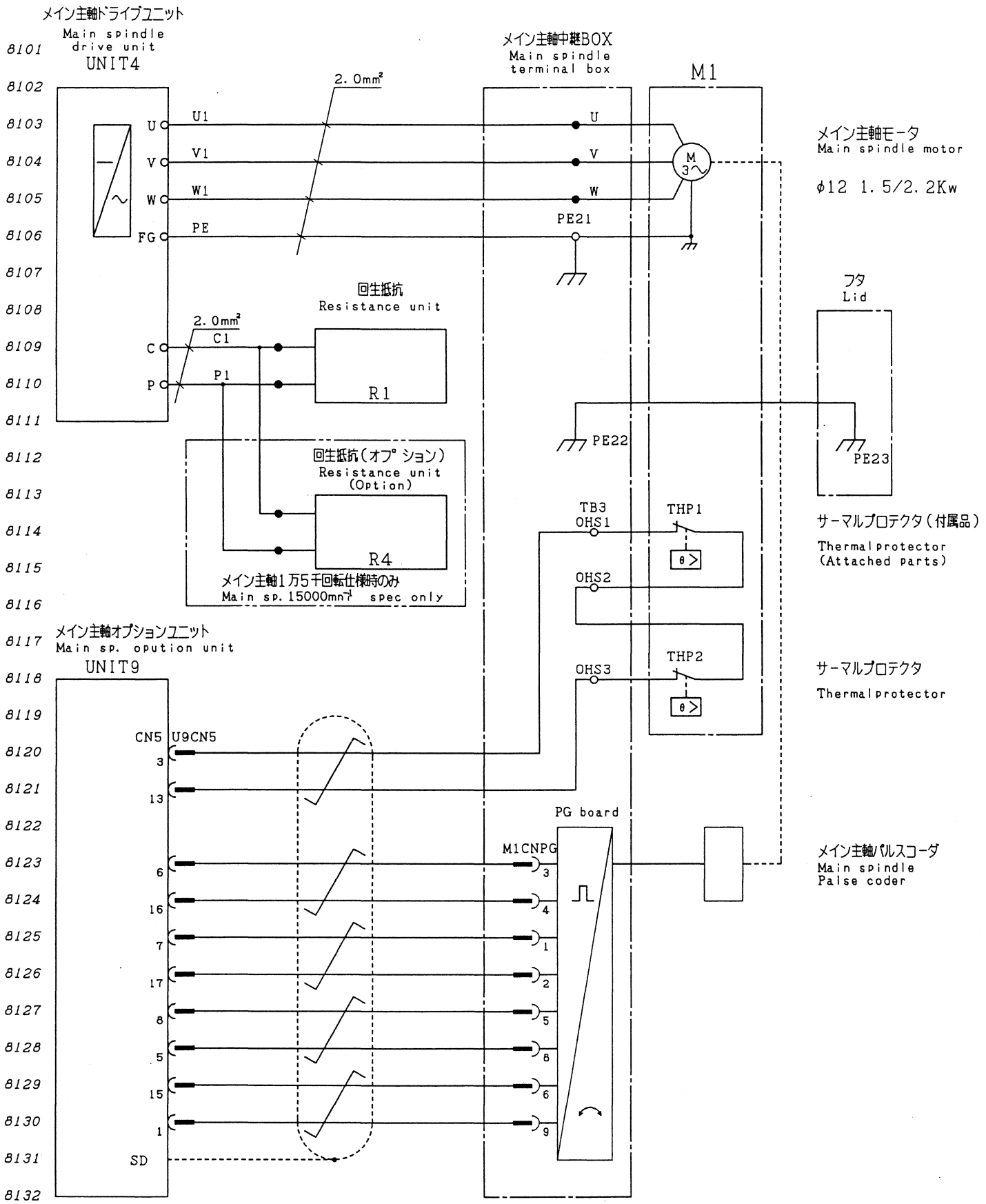
シートキー基板1
Sheet key board1

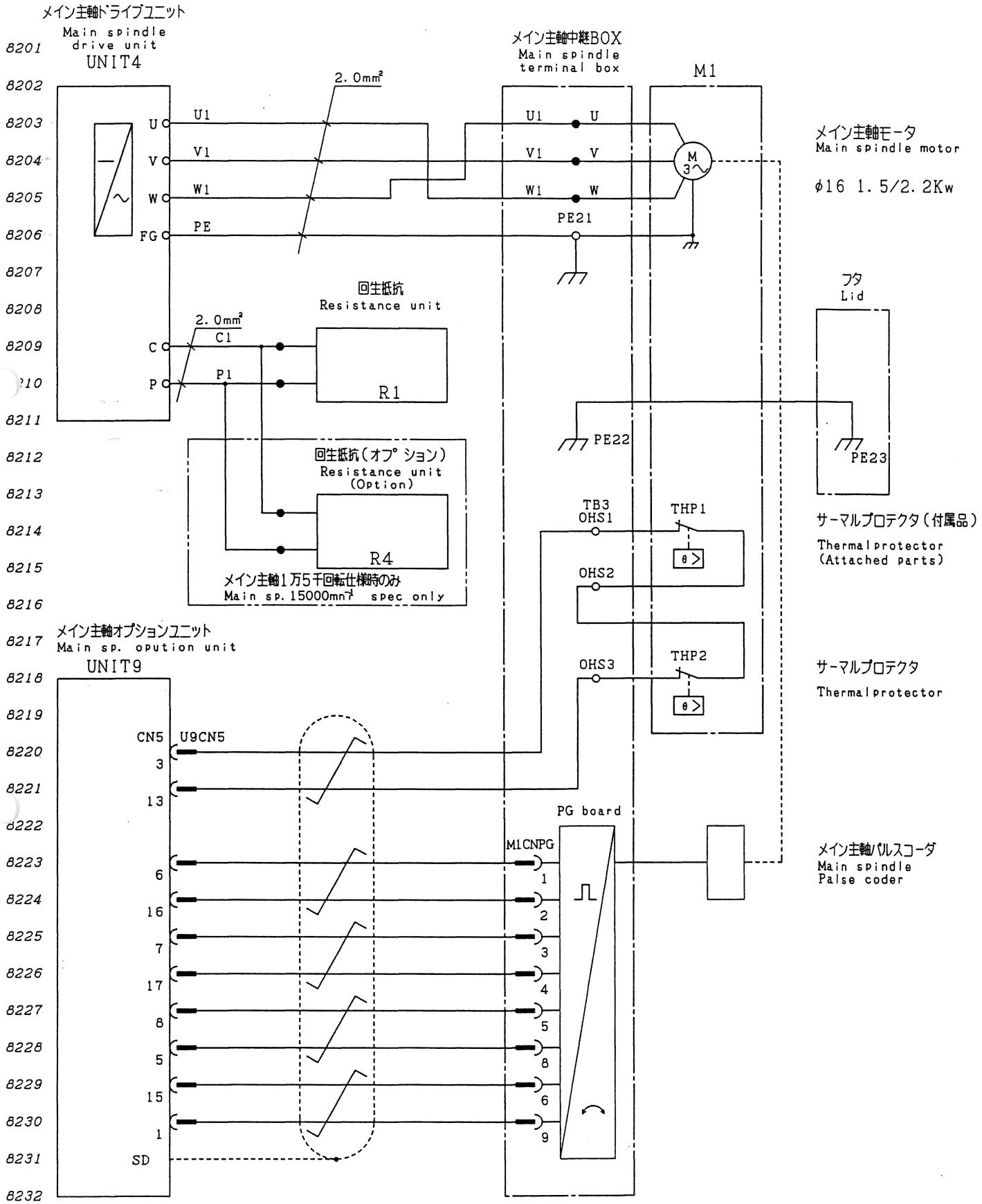


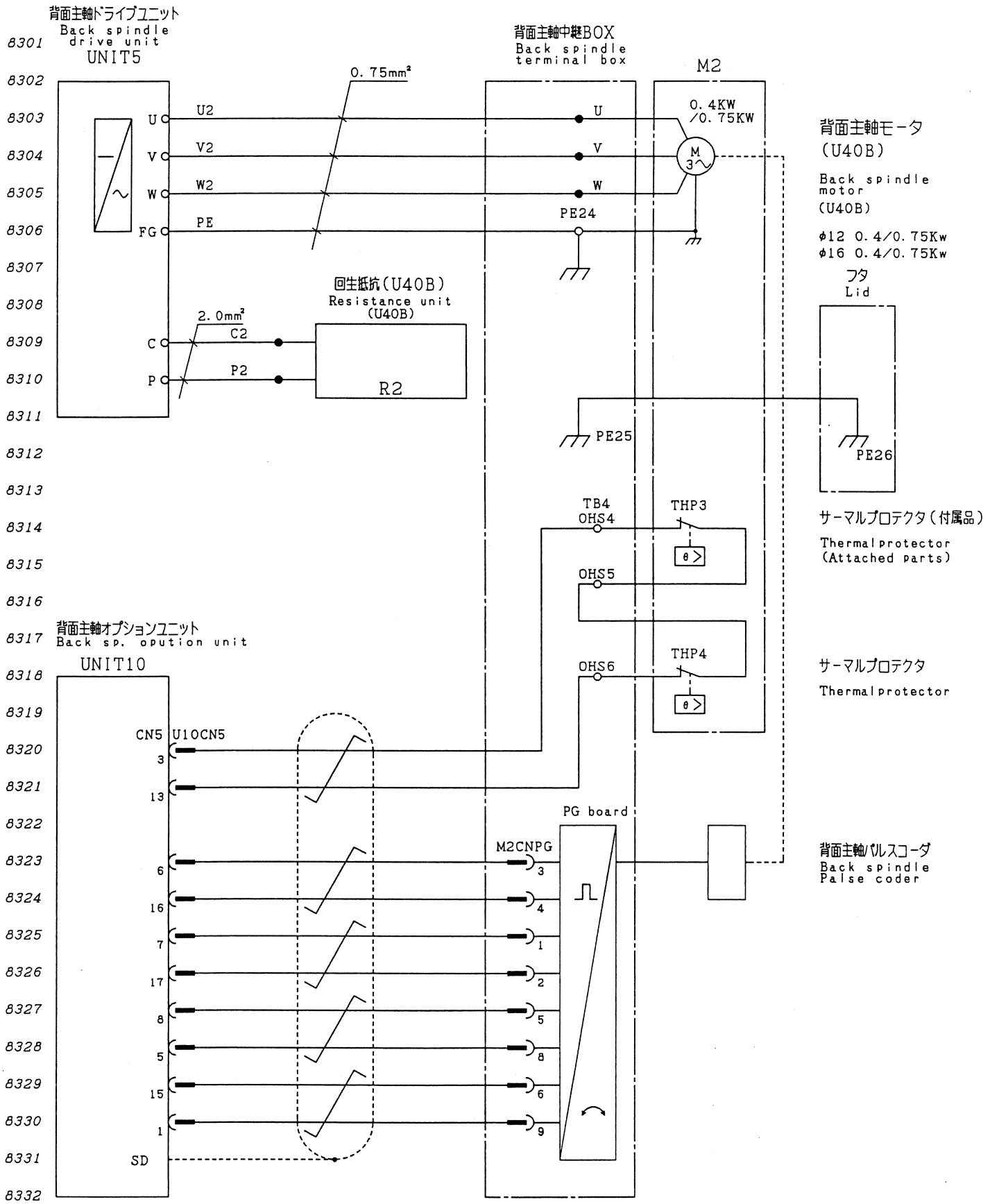

シートキー基板1
Sheet key board1
(76-18)
KBAD1
KBCS1*
+N5V GND
KBAD0
KBAD2
KBD3* KBD2* KBD1* KBD0*
(77-23)
KSC15
KSC11
KSC17
KSC13
C105
0.1μF
IC105
DEC/BCD
LS145
S133 S147 S101 S152
KSC10
S164 S112 S123
KSC11
S132 S145 S151 S109
KSC12
S111 S122
KSC13
S131 S146 S119 S148
KSC14
S108 S121
KSC15
S130 S142 S128 S149
KSC16
S107 S120
KSC17

シートキー基板1
Sheet key board1

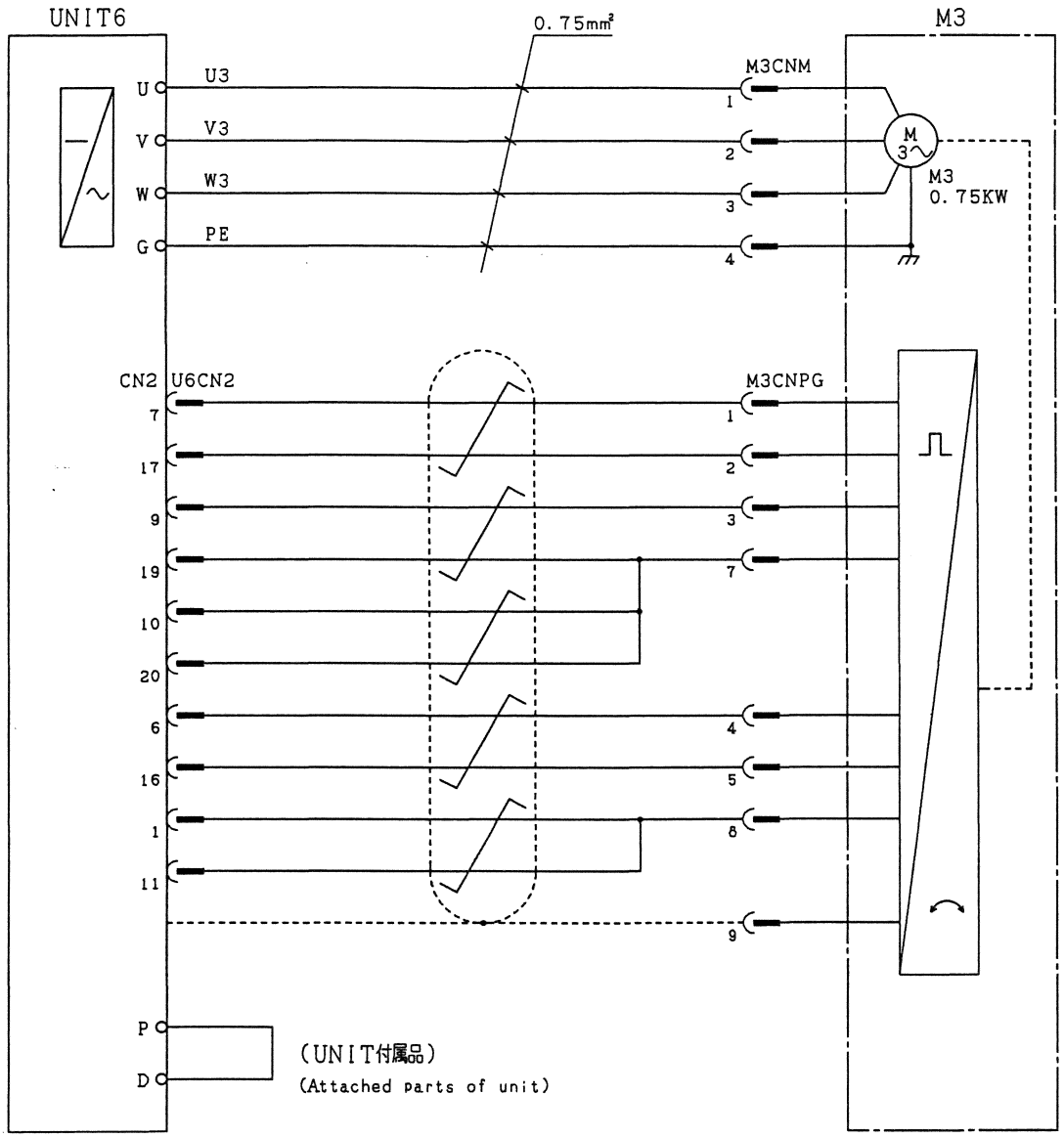



メイン主軸ドライブユニット
Main spindle drive unit
UNIT4
メイン主軸中継BOX
Main spindle terminal box
M1
2.0mm²
U
V
W
FG
U1
V1
W1
PE
U
V
W
PE21
メイン主軸モータ
Main spindle motor
φ12 1.5/2.2Kw
回生抵抗
Resistance unit
2.0mm²
C1
C
P
P1
R1
フタ
Lid
PE22
PE23
回生抵抗(オプション)
Resistance unit
(Option)
R4
メイン主軸1万5千回転仕様時のみ
Main sp. 15000mn⁻¹ spec only
TB3
OHS1
OHS2
OHS3
THP1
THP2
θ>
サーマルプロテクタ(付属品)
Thermal protector
(Attached parts)
サーマルプロテクタ
Thermal protector
メイン主軸オプションユニット
Main sp. oputionunit
UNIT9
CN5
U9CN5
3
13
6
16
7
17
8
5
15
1
SD
PG board
M1CNPG
3
4
1
2
5
8
6
9
メイン主軸パルスコーダ
Main spindle Palse coder

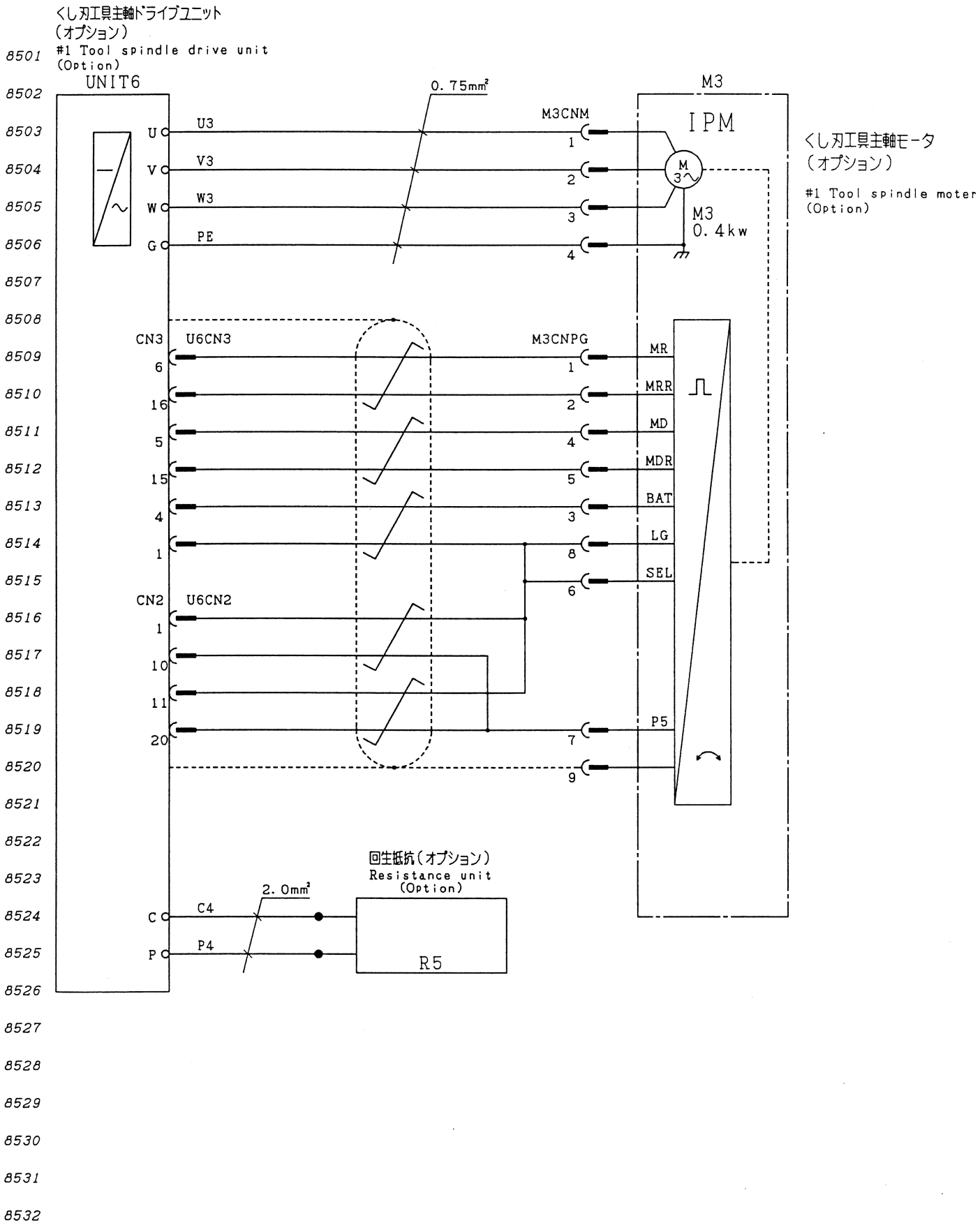

メイン主軸ドライブユニット
Main spindle drive unit
UNIT4
メイン主軸中継BOX
Main spindle terminal box
M1
2.0mm²
U1
V1
W1
PE
U
V
W
FG
U1
V1
W1
PE21
M
3
メイン主軸モータ
Main spindle motor
φ16 1.5/2.2Kw
回生抵抗
Resistance unit
2.0mm²
C1
P1
C
P
R1
フタ
Lid
PE22
PE23
回生抵抗(オプション)
Resistance unit
(Option)
R4
メイン主軸1万5千回転仕様時のみ
Main sp. 15000mn⁻¹ spec only
TB3
OHS1
THP1
θ
サーマルプロテクタ(付属品)
Thermal protector
(Attached parts)
OHS2
OHS3
THP2
サーマルプロテクタ
Thermal protector
メイン主軸オプションユニット
Main sp. oputionunit
UNIT9
CN5
U9CN5
3
13
6
16
7
17
8
5
15
1
SD
PG board
M1CNPG
1
2
3
4
5
8
6
9
メイン主軸パルスコーダ
Main spindle Paise coder


背面主軸ドライブユニット
Back spindle drive unit
UNIT5
背面主軸中継BOX
Back spindle terminal box
M2
0.75mm²
U2
V2
W2
PE
U
V
W
PE24
0.4KW /0.75KW
M 3~
背面主軸モータ (U40B)
Back spindle motor (U40B)
φ12 0.4/0.75Kw
φ16 0.4/0.75Kw
フタ
Lid
回生抵抗(U40B)
Resistance unit (U40B)
2.0mm²
C2
P2
R2
PE25
PE26
TB4
OHS4
THP3
OHS5
サーマルプロテクタ(付属品)
Thermal protector (Attached parts)
背面主軸オプションユニット
Back sp. oputionunit
UNIT10
OHS6
THP4
サーマルプロテクタ
Thermal protector
CN5
U10CN5
PG board
M2CNPG
背面主軸パルスコーダ
Back spindle Palse coder
SD

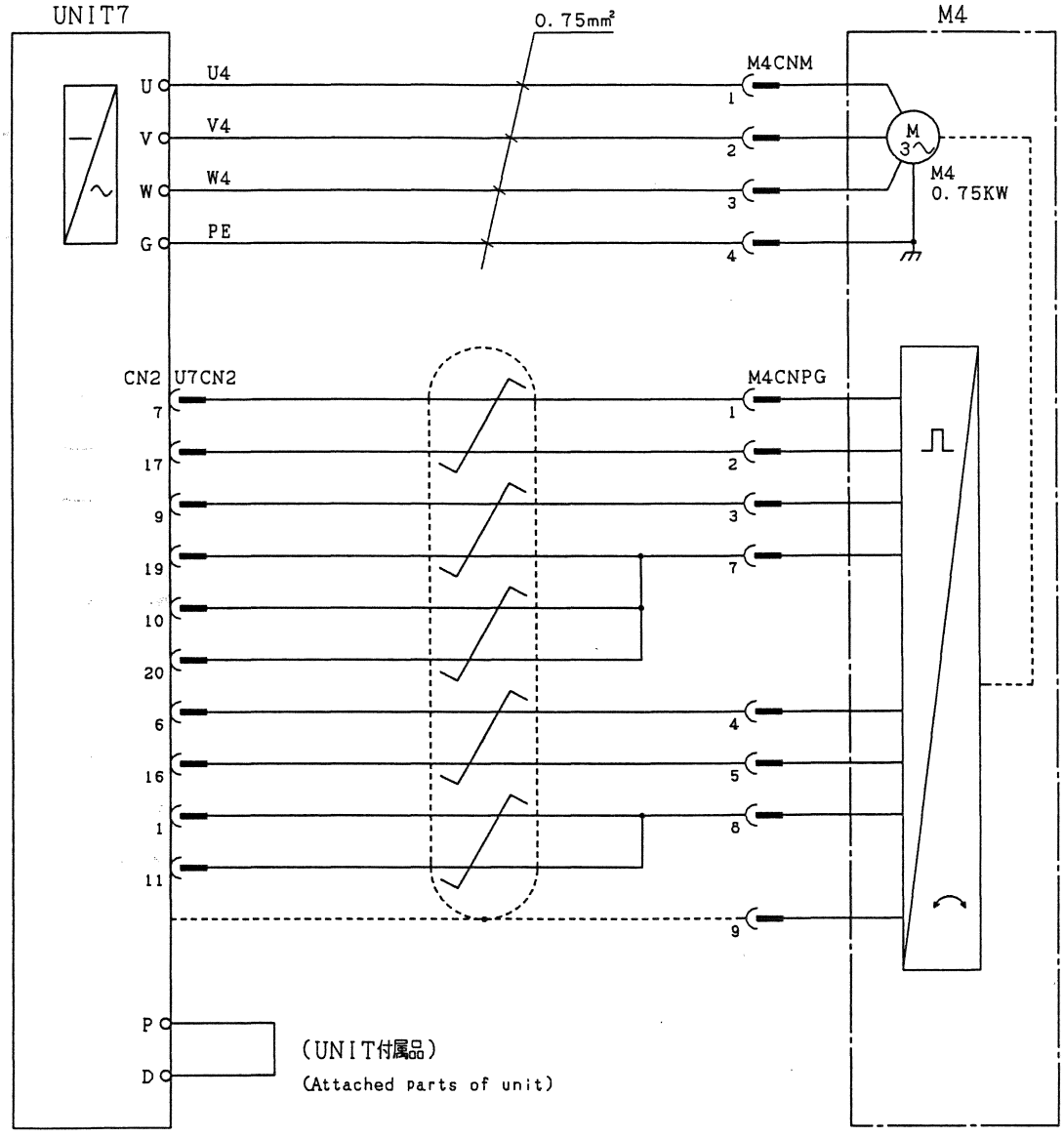
くし刃工具主軸ドライブユニット
(U30B, U31B)
#1 Tool spindle drive unit
(U30B, U31B)



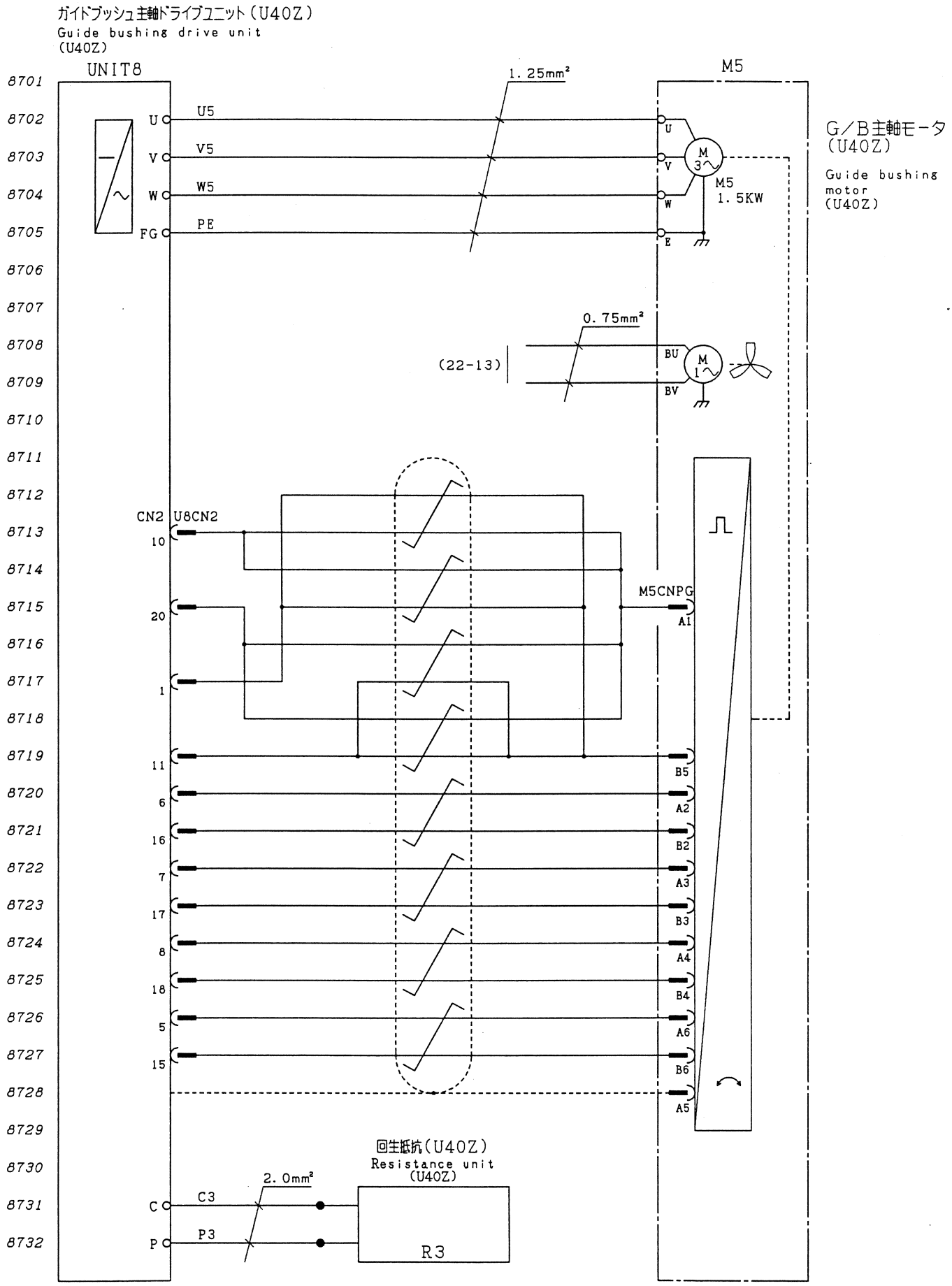
くし刃工具主軸モータ
(U30B, U31B)
#1 Tool spindle moter
(U30B, U31B)


くし刃工具主軸ドライブユニット
(オプション)
#1 Tool spindle drive unit
(Option)
UNIT6
0.75mm²
M3
IPM
M3CNM
U3
V3
W3
PE
U
V
W
G
1
2
3
4
M
3~
M3
0.4kw
くし刃工具主軸モータ
(オプション)
#1 Tool spindle moter
(Option)
CN3
U6CN3
M3CNPG
6
16
5
15
4
1
MR
MRR
MD
MDR
BAT
LG
SEL
8
CN2
U6CN2
10
11
20
P5
7
9
回生抵抗(オプション)
Resistance unit
(Option)
2.0mm²
C4
P4
C
P
R5

対向回転工具主軸ドライブユニット
(U121B/オプション)
#2 tool spindle drive unit
(U121B/Option)

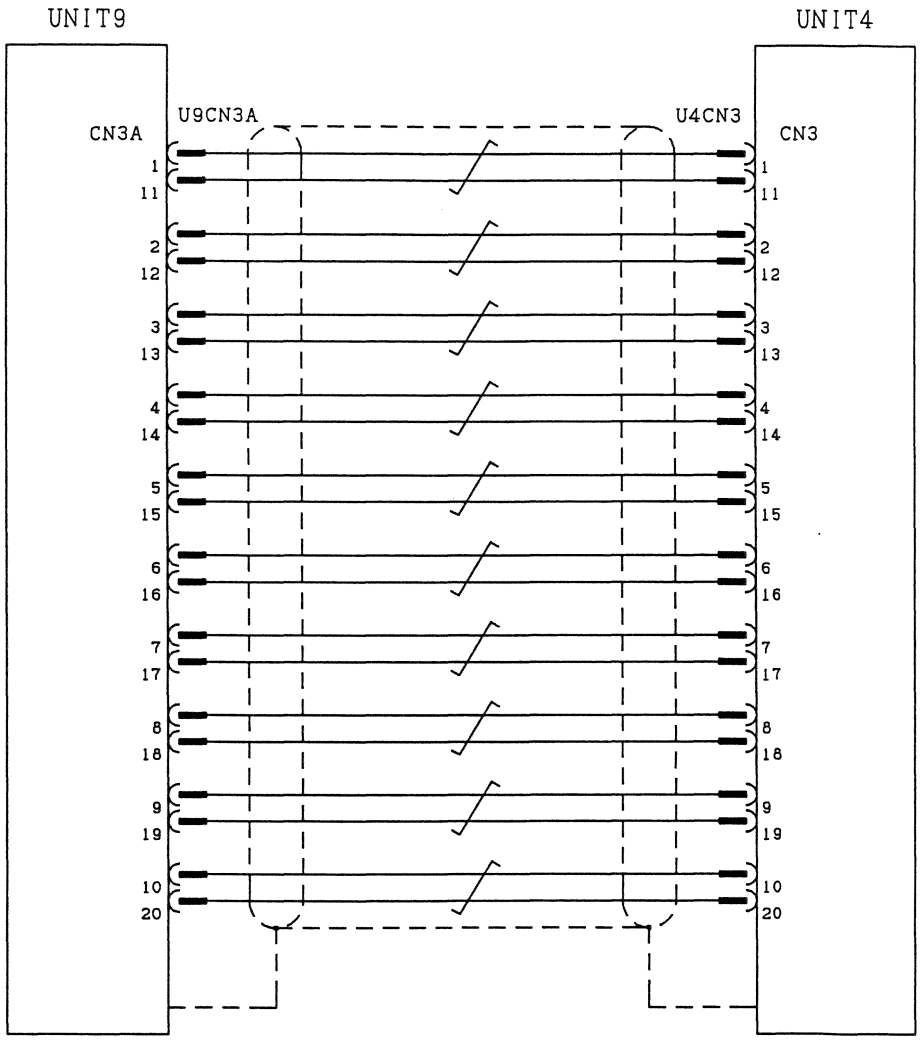


対向回転工具主軸モータ
(U121B/オプション)
#2 Tool spindle moter(U121B/Option)


ガイドブッシュ主軸ドライブユニット（U40Z）
Guide bushing drive unit
(U40Z)
UNIT8
M5
1.25mm²
U5
V5
W5
PE
U
V
W
FG
M
3~
M5
1.5KW
G／B主軸モータ
(U40Z)
Guide bushing
motor
(U40Z)
0.75mm²
(22-13)
BU
BV
M
1~
CN2
U8CN2
10
20
1
11
6
16
7
17
8
18
5
15
M5CNPG
A1
B5
A2
B2
A3
B3
A4
B4
A6
B6
A5
回生抵抗（U40Z）
Resistance unit
(U40Z)
2.0mm²
C3
P3
C
P
R3

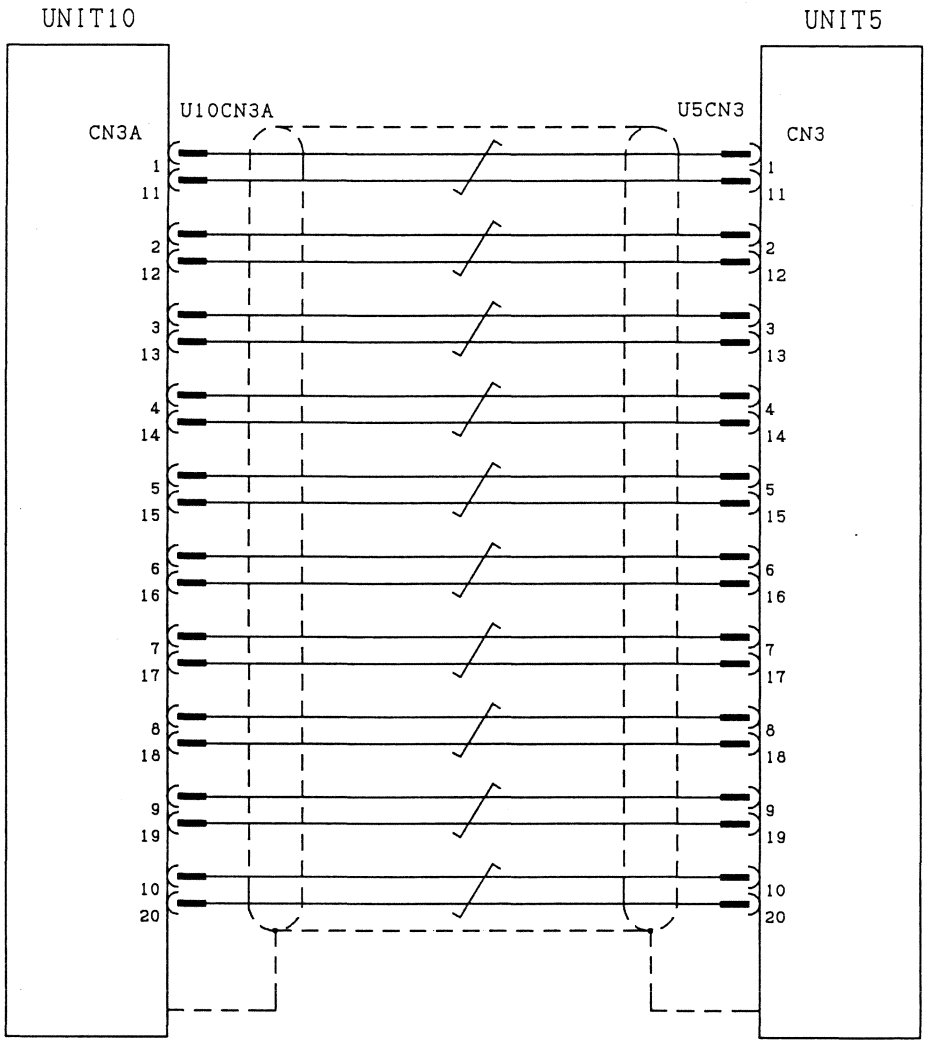
メイン主軸オプションユニット
Main sp. option unit

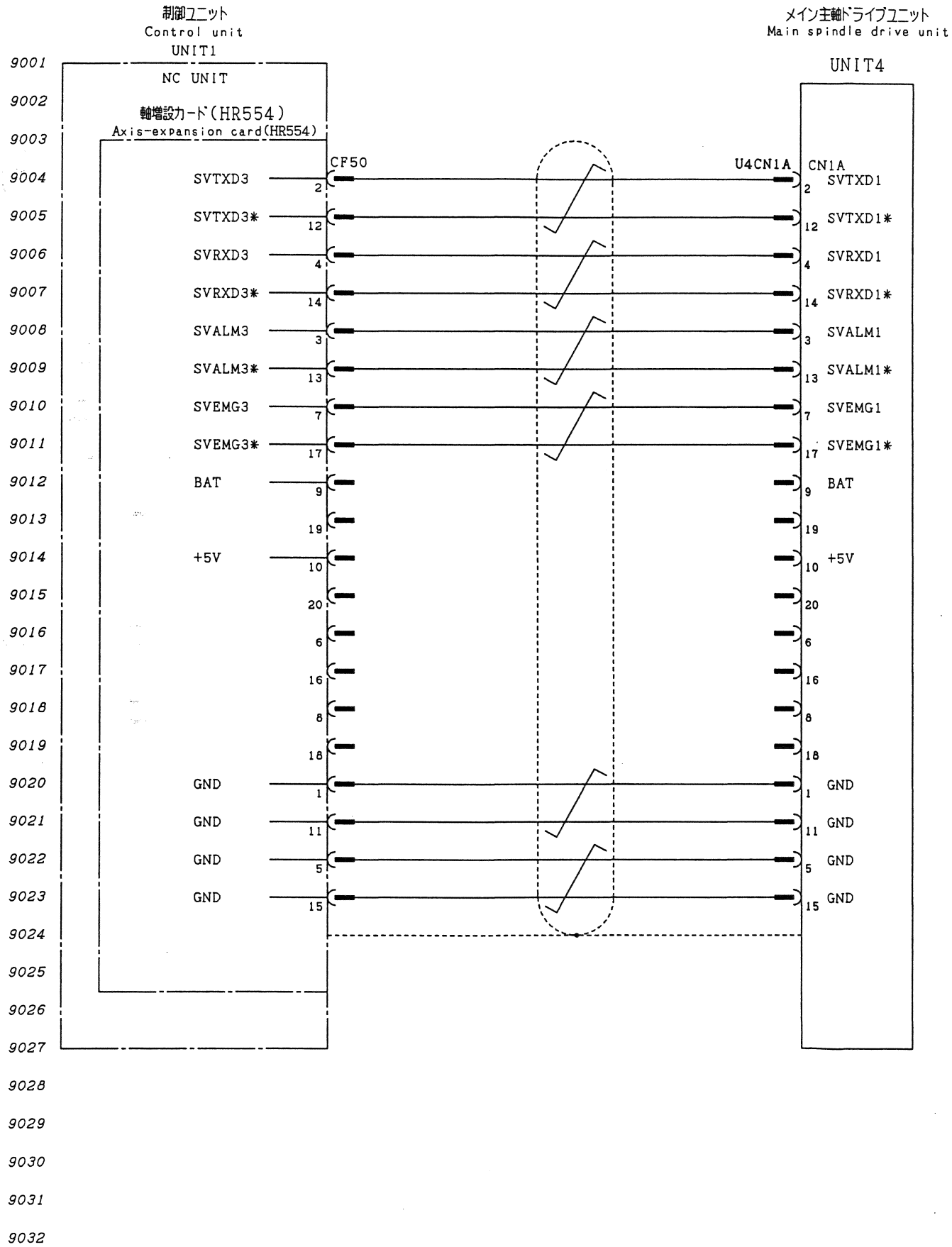
メイン主軸ドライブユニット
Main spindle drive unit

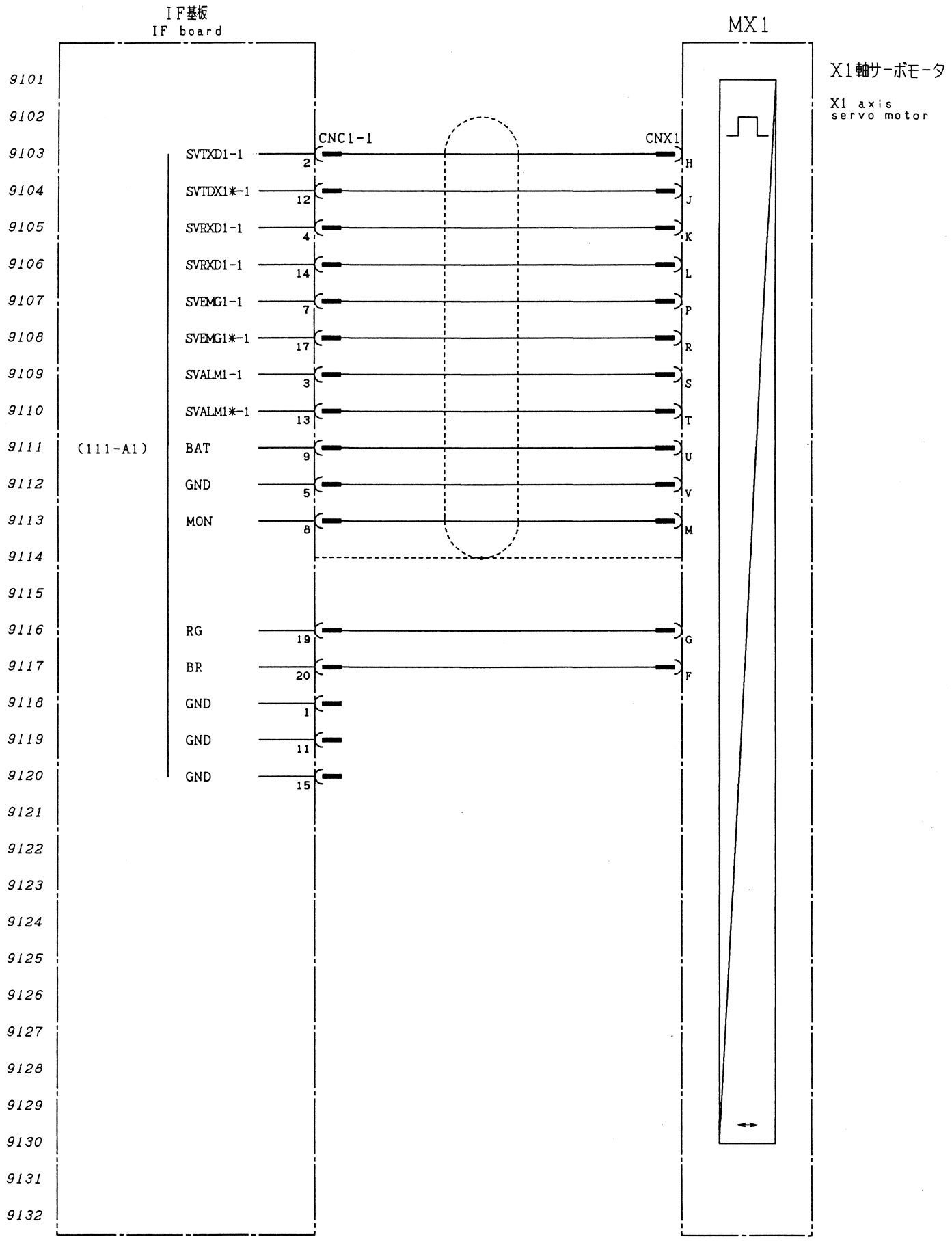


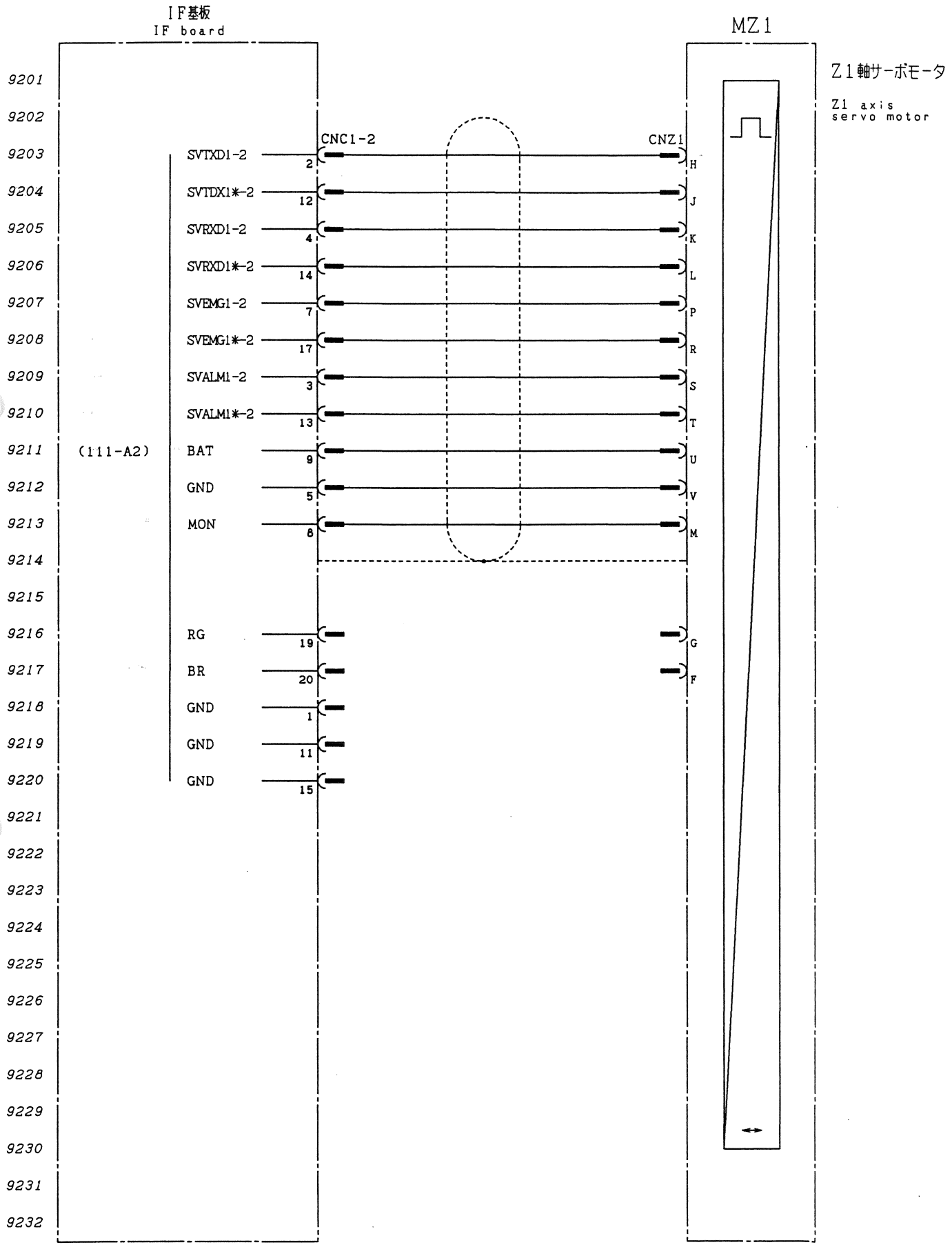
背面主軸オプションユニット（U40B）
Back sp. option unit(U40B)

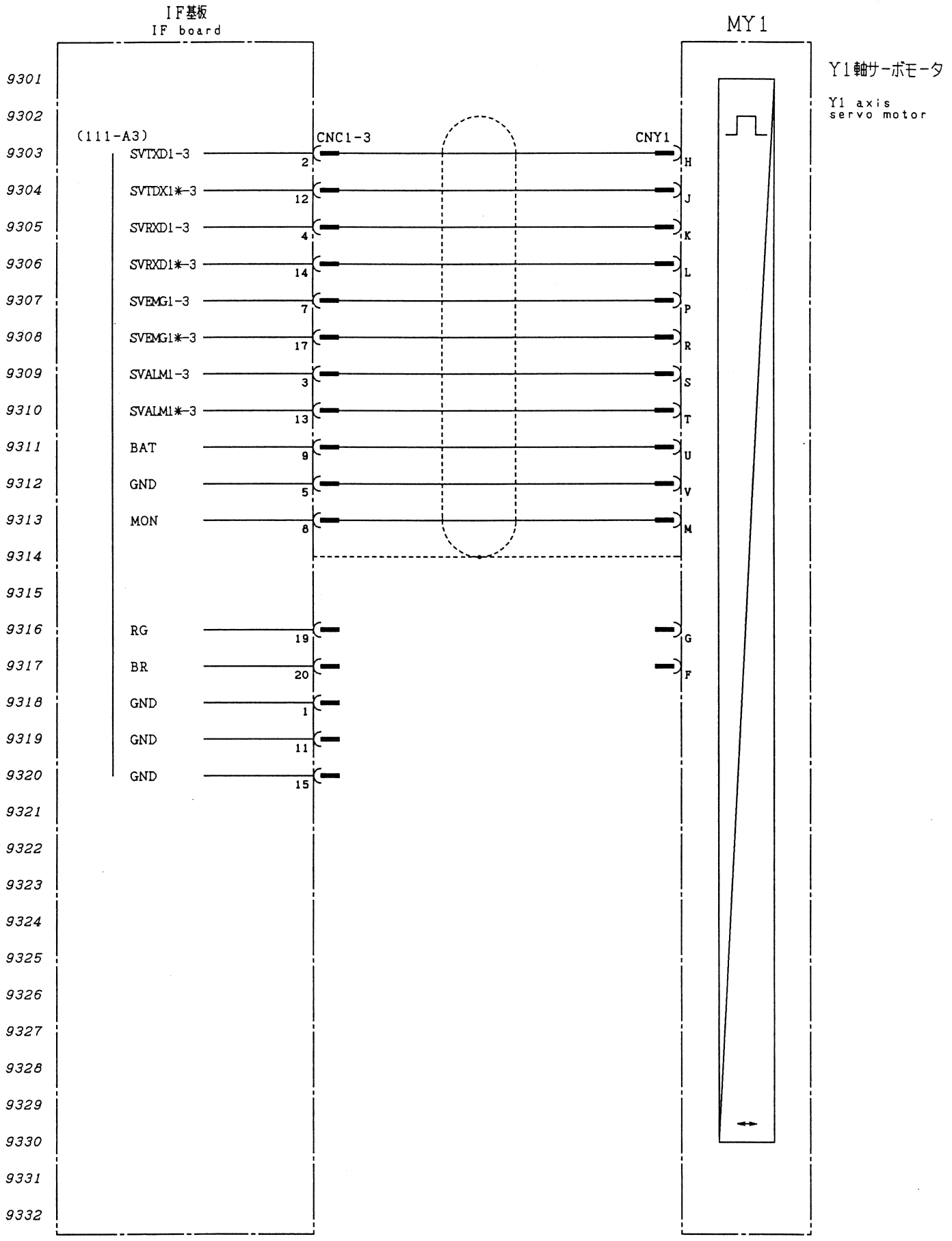
背面主軸ドライブユニット（U40B）
Back spindle drive unit(U40B)

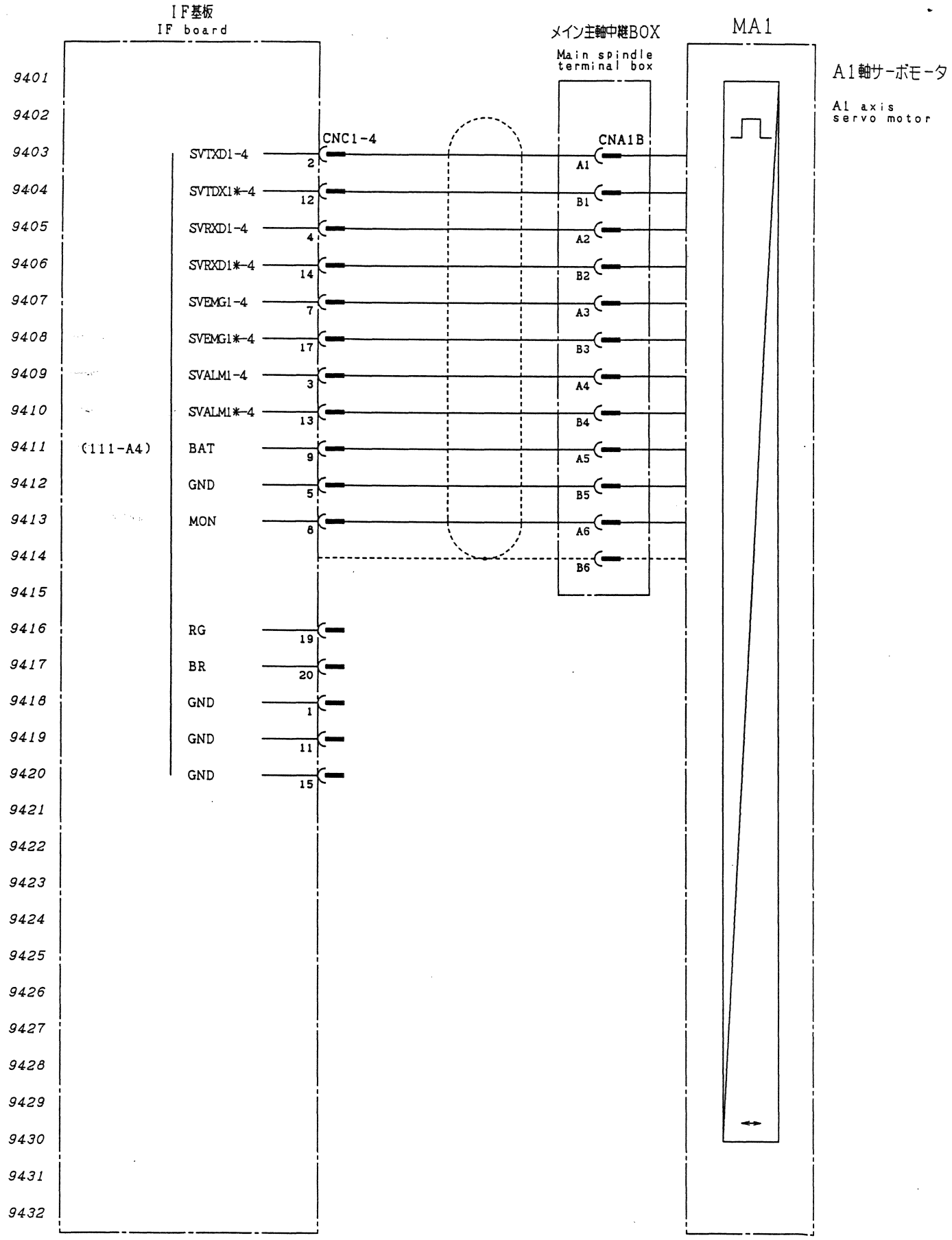


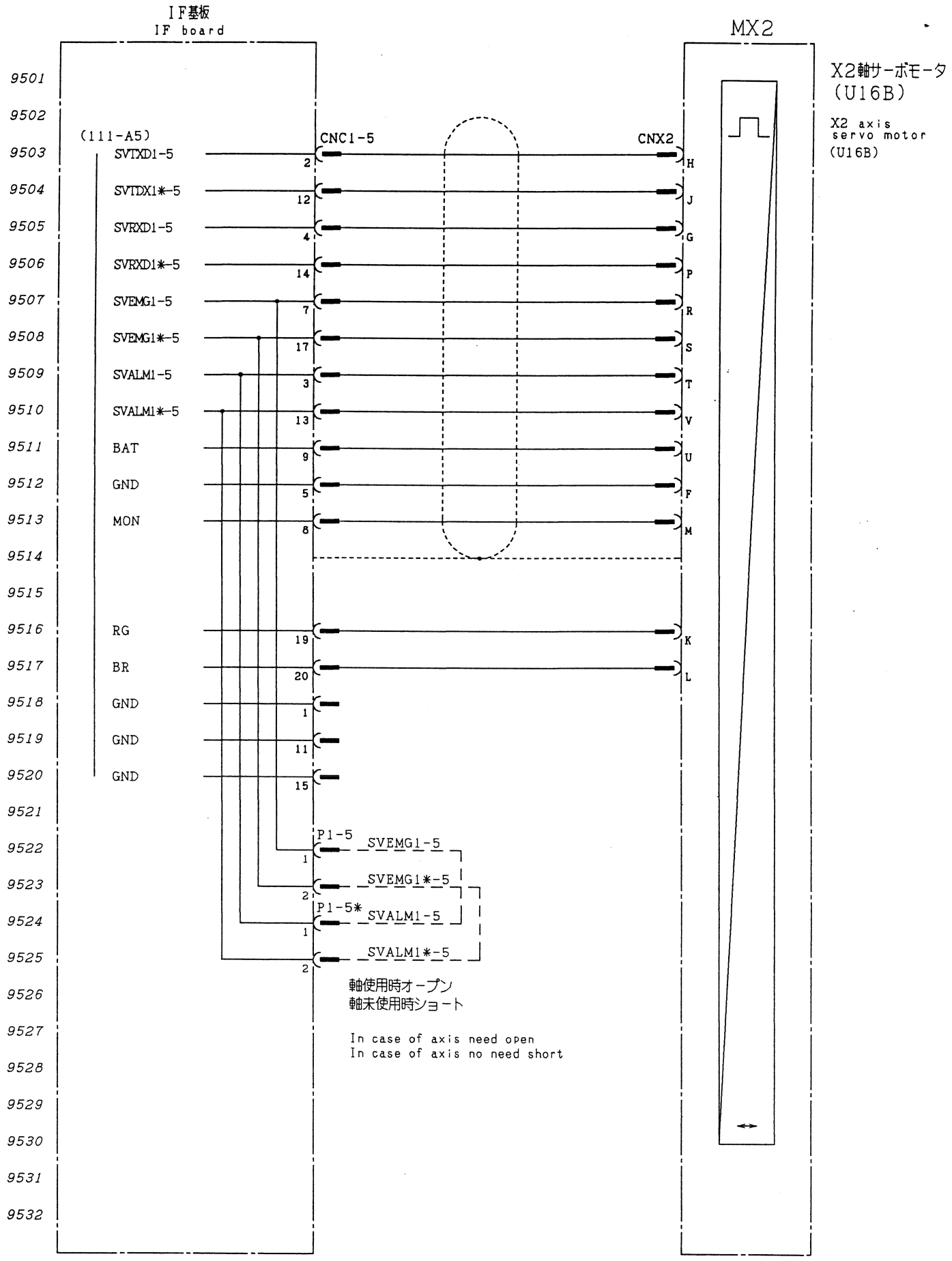

制御ユニット
Control unit
UNIT1
NC UNIT
軸増設カード(HR554)
Axis-expansion card(HR554)
CF50
SVTXD3
SVTXD3*
SVRXD3
SVRXD3*
SVALM3
SVALM3*
SVEMG3
SVEMG3*
BAT
+5V
GND
GND
GND
GND
メイン主軸ドライブユニット
Main spindle drive unit
UNIT4
U4CN1A
CN1A
SVTXD1
SVTXD1*
SVRXD1
SVRXD1*
SVALM1
SVALM1*
SVEMG1
SVEMG1*
BAT
+5V
GND
GND
GND
GND

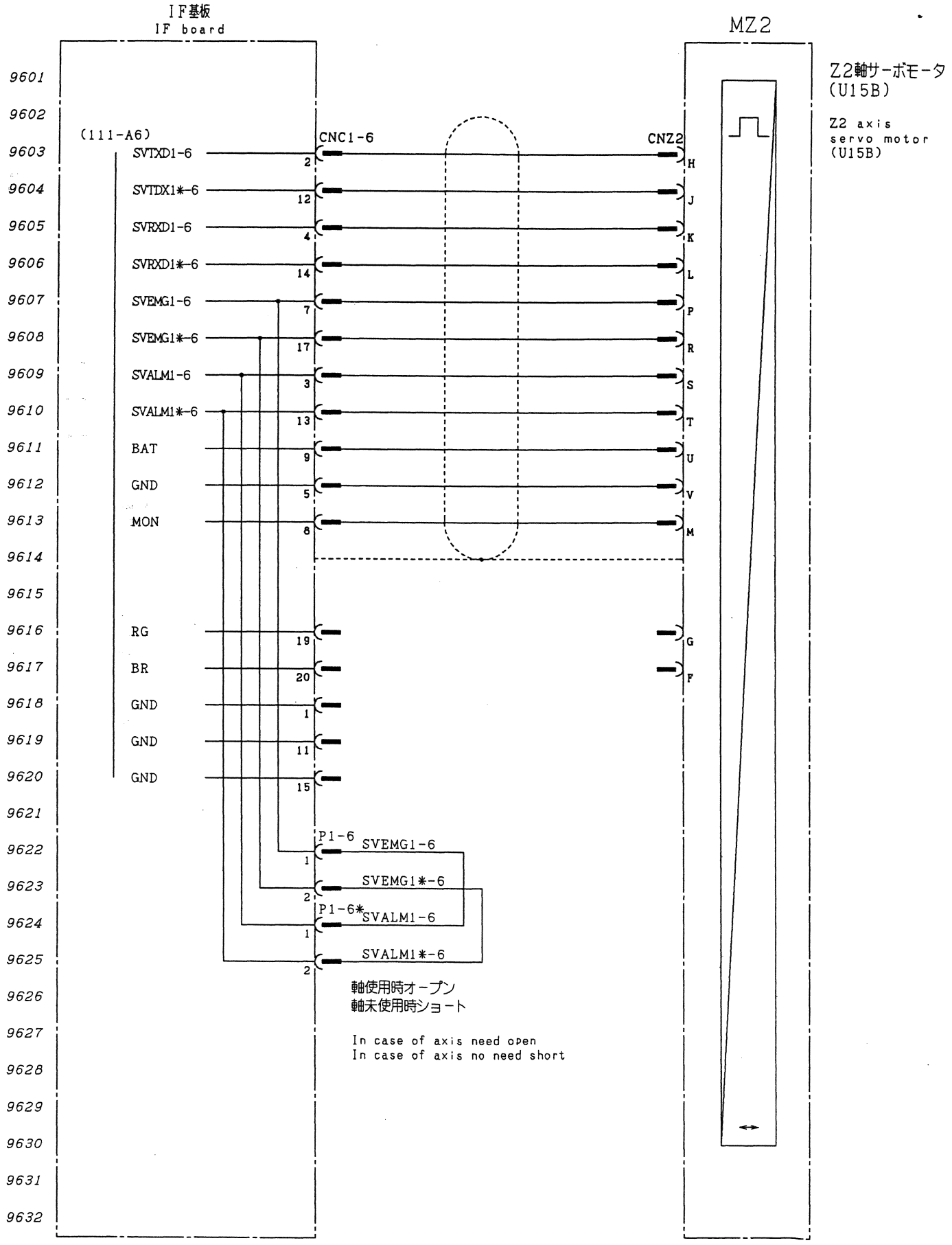

IF基板
IF board
MX1
X1軸サーボモータ
X1 axis
servo motor
CNC1-1
CNX1
9101
9102
9103
9104
9105
9106
9107
9108
9109
9110
9111
9112
9113
9114
9115
9116
9117
9118
9119
9120
9121
9122
9123
9124
9125
9126
9127
9128
9129
9130
9131
9132
(111-A1)
SVTXD1-1
SVTDX1*-1
SVRXD1-1
SVRXD1-1
SVEMG1-1
SVEMG1*-1
SVALM1-1
SVALM1*-1
BAT
GND
MON
RG
BR
GND
GND
GND
2
12
4
14
7
17
3
13
9
5
8
19
20
1
11
15
H
J
K
L
P
R
S
T
U
V
M
G
F

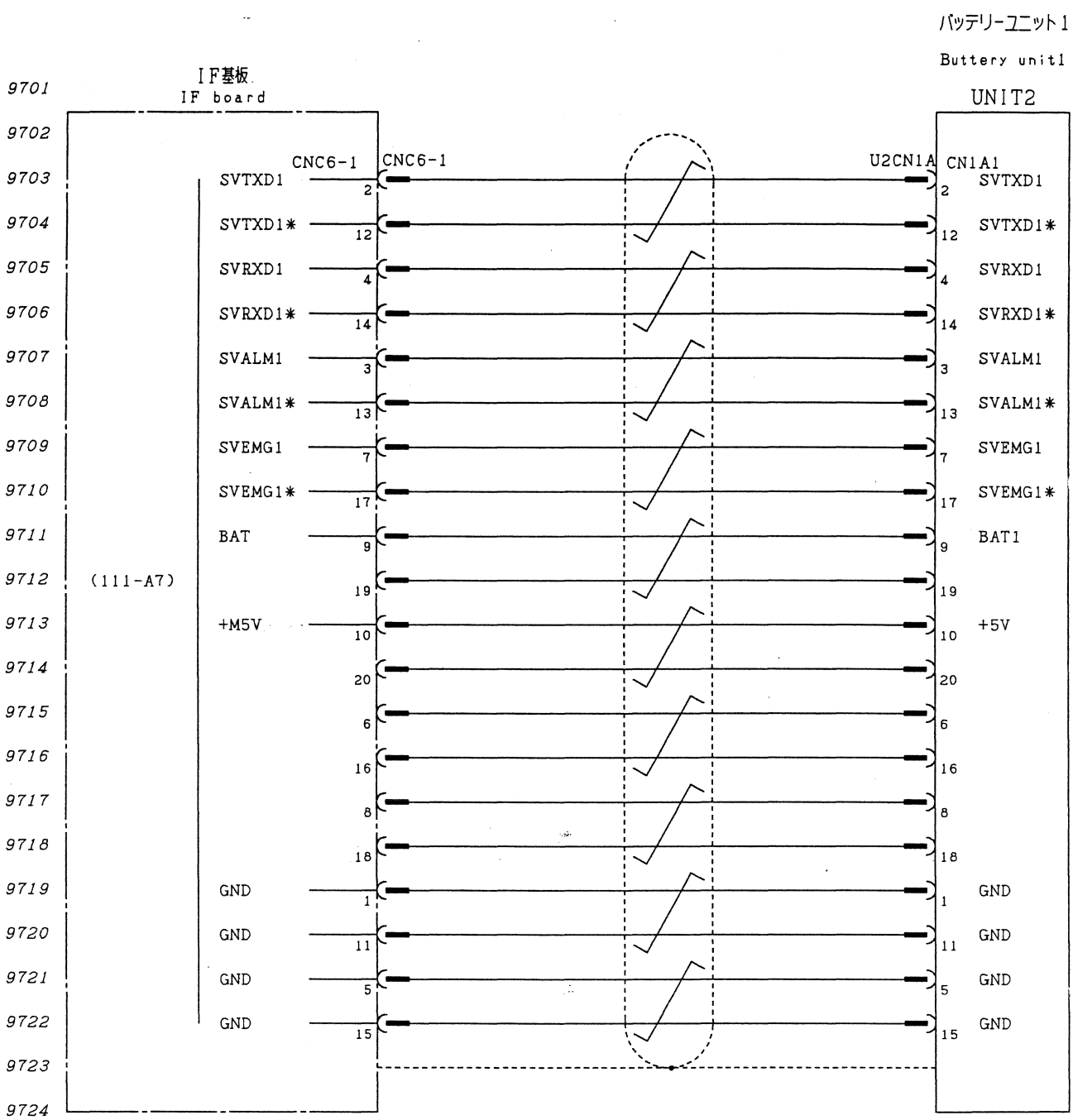

IF基板
IF board
MZ1
Z1軸サーボモータ
Z1 axis
servo motor
CNC1-2
CNZ1
9201
9202
9203
9204
9205
9206
9207
9208
9209
9210
9211
9212
9213
9214
9215
9216
9217
9218
9219
9220
9221
9222
9223
9224
9225
9226
9227
9228
9229
9230
9231
9232
(111-A2)
SVTXD1-2
SVTDX1*-2
SVRXD1-2
SVRXD1*-2
SVEMG1-2
SVEMG1*-2
SVALM1-2
SVALM1*-2
BAT
GND
MON
RG
BR
GND
GND
GND
2
12
4
14
7
17
3
13
9
5
6
19
20
1
11
15
H
J
K
L
P
R
S
T
U
V
M
G
F

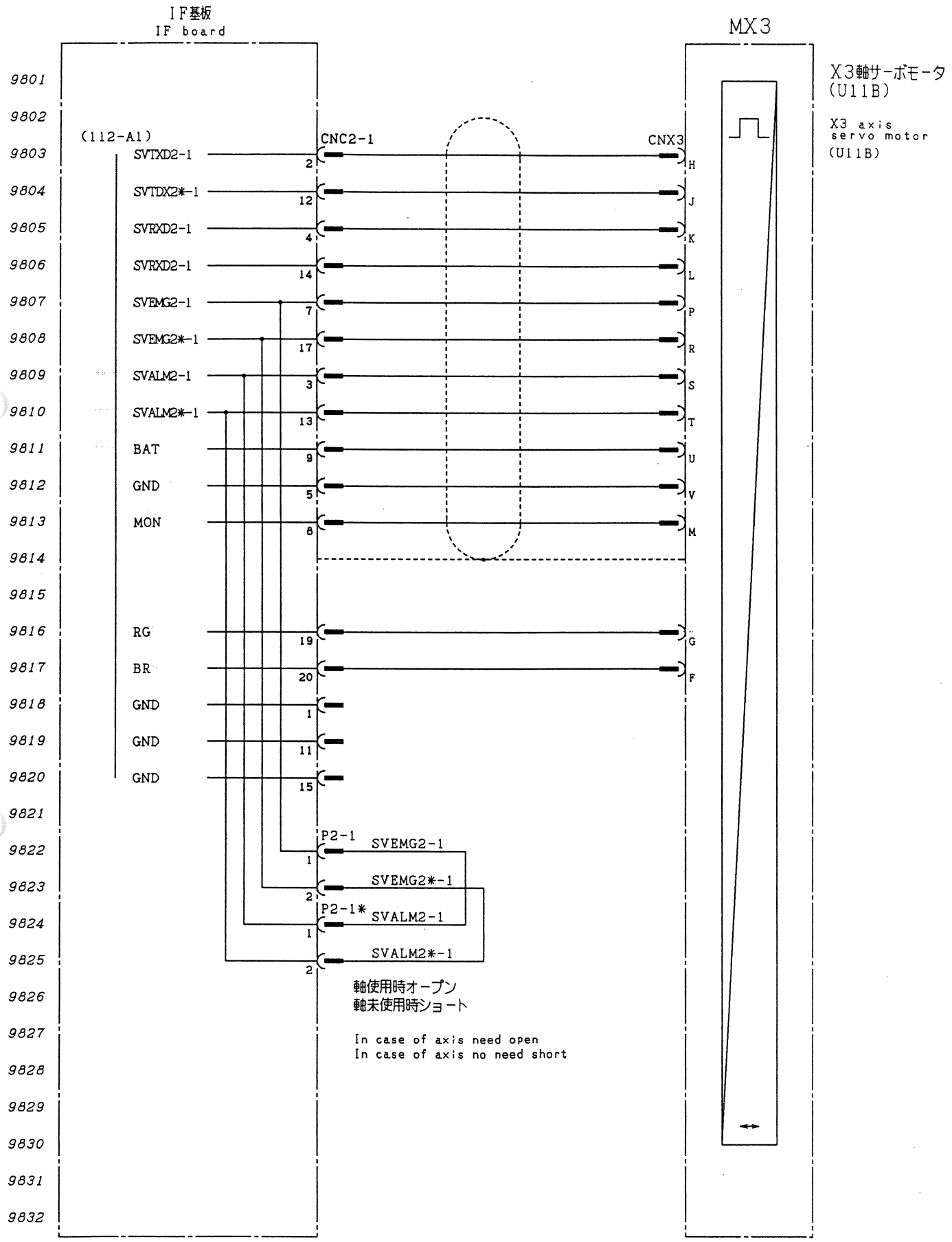

IF基板
IF board
MY1
Y1軸サーボモータ
Y1 axis
servo motor
(111-A3)
CNC1-3
CNY1
SVTXD1-3
SVTDX1*-3
SVRXD1-3
SVRXD1*-3
SVEMG1-3
SVEMG1*-3
SVALM1-3
SVALM1*-3
BAT
GND
MON
RG
BR
GND
GND
GND
2
12
4
14
7
17
3
13
9
5
8
19
20
1
11
15
H
J
K
L
P
R
S
T
U
V
M
G
F
9301
9302
9303
9304
9305
9306
9307
9308
9309
9310
9311
9312
9313
9314
9315
9316
9317
9318
9319
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9329
9330
9331
9332

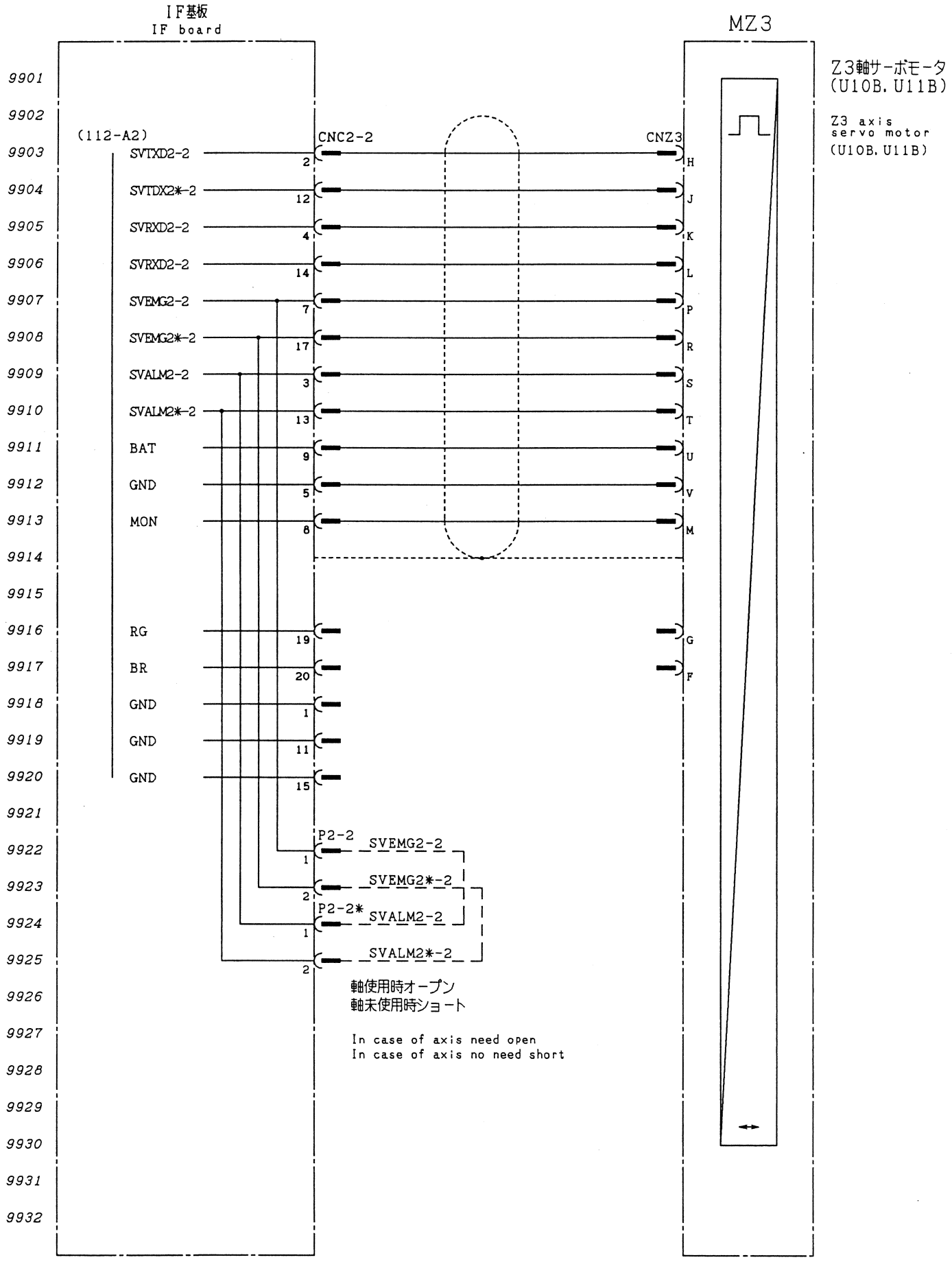

IF基板
IF board
メイン主軸中継BOX
Main spindle terminal box
MA1
A1軸サーボモータ
A1 axis servo motor
CNC1-4
CNA1B
(111-A4)
SVTXD1-4
SVTDX1*-4
SVRXD1-4
SVRXD1*-4
SVEMG1-4
SVEMG1*-4
SVALM1-4
SVALM1*-4
BAT
GND
MON
RG
BR
GND
GND
GND
2
12
4
14
7
17
3
13
9
5
8
19
20
1
11
15
A1
B1
A2
B2
A3
B3
A4
B4
A5
B5
A6
B6
9401
9402
9403
9404
9405
9406
9407
9408
9409
9410
9411
9412
9413
9414
9415
9416
9417
9418
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9431
9432

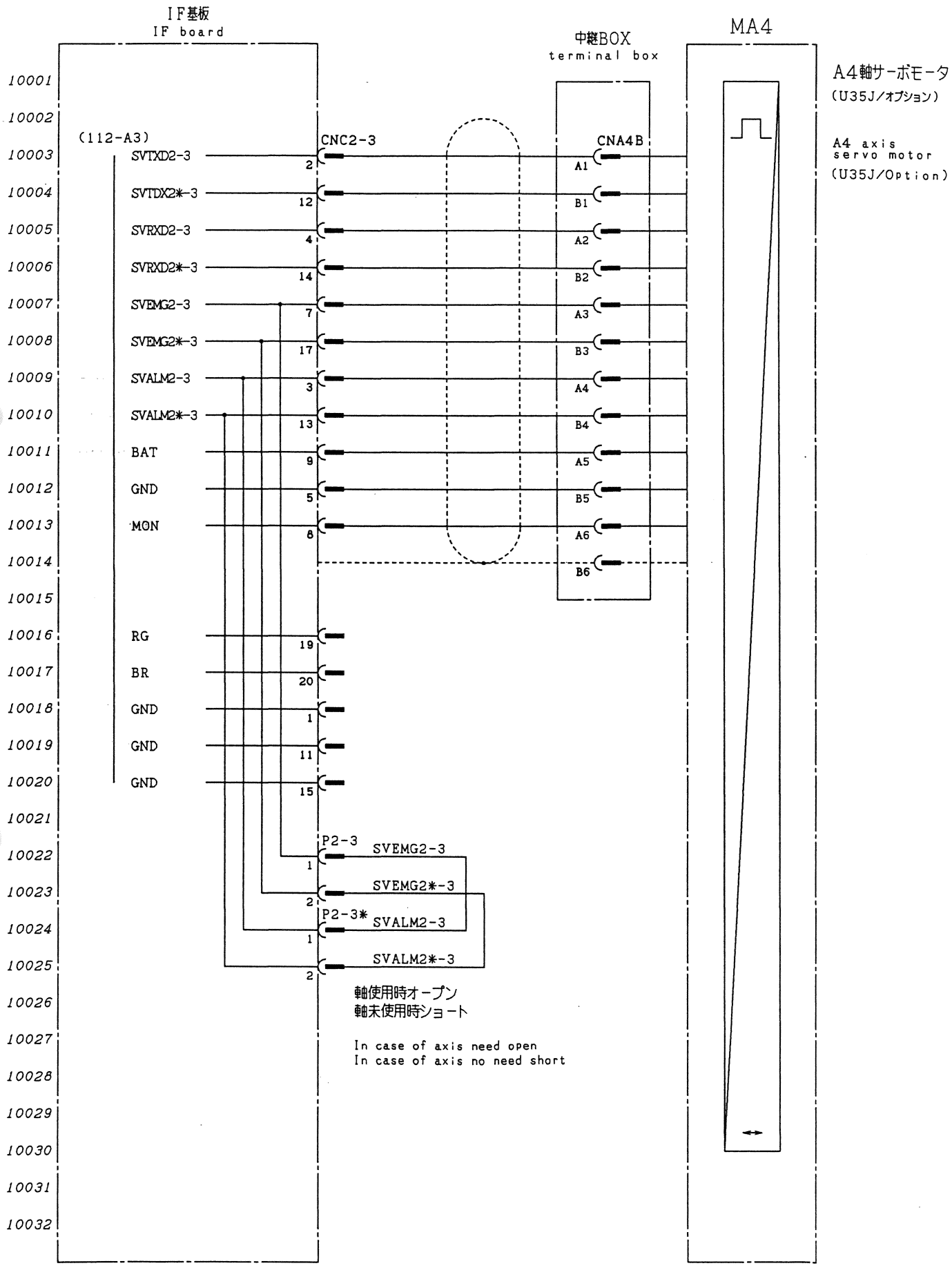

IF基板
IF board
MX2
X2軸サーボモータ
(U16B)
X2 axis
servo motor
(U16B)
(111-A5)
CNC1-5
CNX2
9501
9502
9503 SVTXD1-5 2 H
9504 SVTDX1*-5 12 J
9505 SVRXD1-5 4 G
9506 SVRXD1*-5 14 P
9507 SVEMG1-5 7 R
9508 SVEMG1*-5 17 S
9509 SVALM1-5 3 T
9510 SVALM1*-5 13 V
9511 BAT 9 U
9512 GND 5 F
9513 MON 8 M
9514
9515
9516 RG 19 K
9517 BR 20 L
9518 GND 1
9519 GND 11
9520 GND 15
9521
9522 P1-5 1 SVEMG1-5
9523 2 SVEMG1*-5
9524 P1-5* 1 SVALM1-5
9525 2 SVALM1*-5
9526
9527
9528
9529
9530
9531
9532
軸使用時オープン
軸未使用時ショート
In case of axis need open
In case of axis no need short

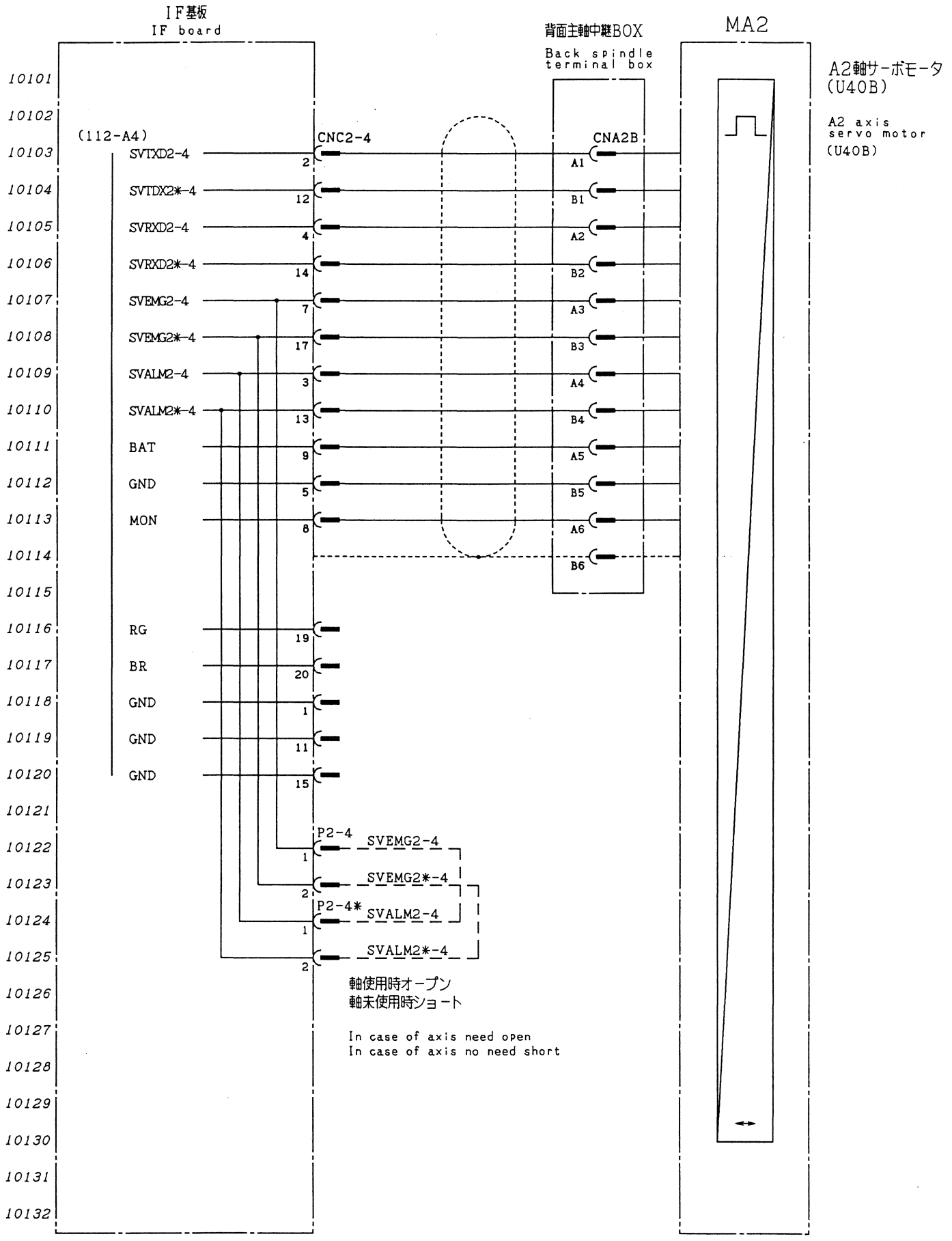

IF基板
IF board
MZ2
Z2軸サーボモータ
(U15B)
Z2 axis
servo motor
(U15B)
9601
9602
9603
9604
9605
9606
9607
9608
9609
9610
9611
9612
9613
9614
9615
9616
9617
9618
9619
9620
9621
9622
9623
9624
9625
9626
9627
9628
9629
9630
9631
9632
(111-A6)
CNC1-6
CNZ2
SVTXD1-6
SVTDX1*-6
SVRXD1-6
SVRXD1*-6
SVEMG1-6
SVEMG1*-6
SVALM1-6
SVALM1*-6
BAT
GND
MON
RG
BR
GND
GND
GND
2
12
4
14
7
17
3
13
9
5
8
19
20
1
11
15
H
J
K
L
P
R
S
T
U
V
M
G
F
P1-6
SVEMG1-6
SVEMG1*-6
P1-6*
SVALM1-6
SVALM1*-6
1
2
1
2
軸使用時オープン
軸未使用時ショート
In case of axis need open
In case of axis no need short

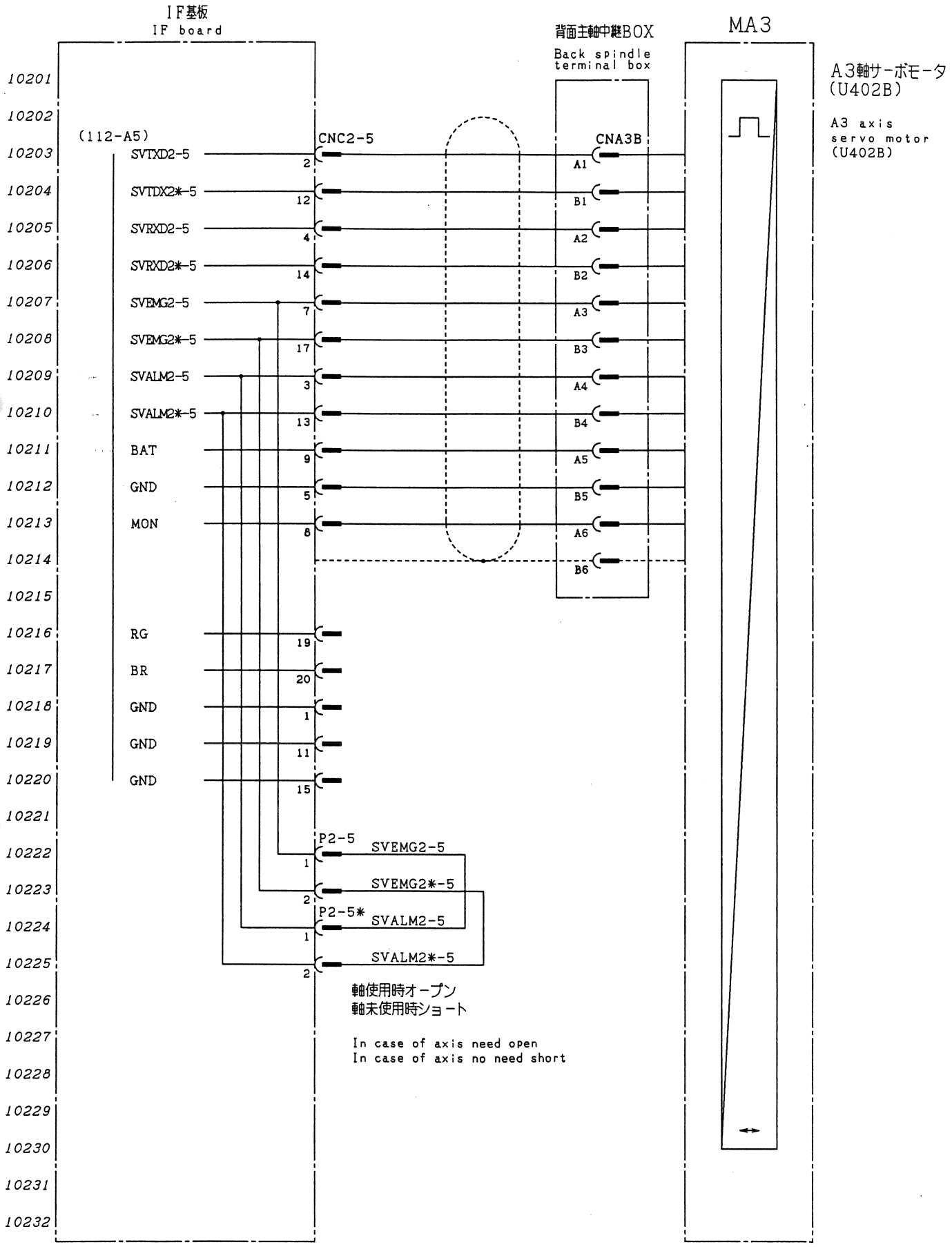

バッテリーユニット1
Buttery unit1
UNIT2
IF基板
IF board
(111-A7)
CNC6-1
CNC6-1
U2CN1A
CN1A1
SVTXD1
SVTXD1*
SVRXD1
SVRXD1*
SVALM1
SVALM1*
SVEMG1
SVEMG1*
BAT
+M5V
GND
GND
GND
GND
SVTXD1
SVTXD1*
SVRXD1
SVRXD1*
SVALM1
SVALM1*
SVEMG1
SVEMG1*
BAT1
+5V
GND
GND
GND
GND

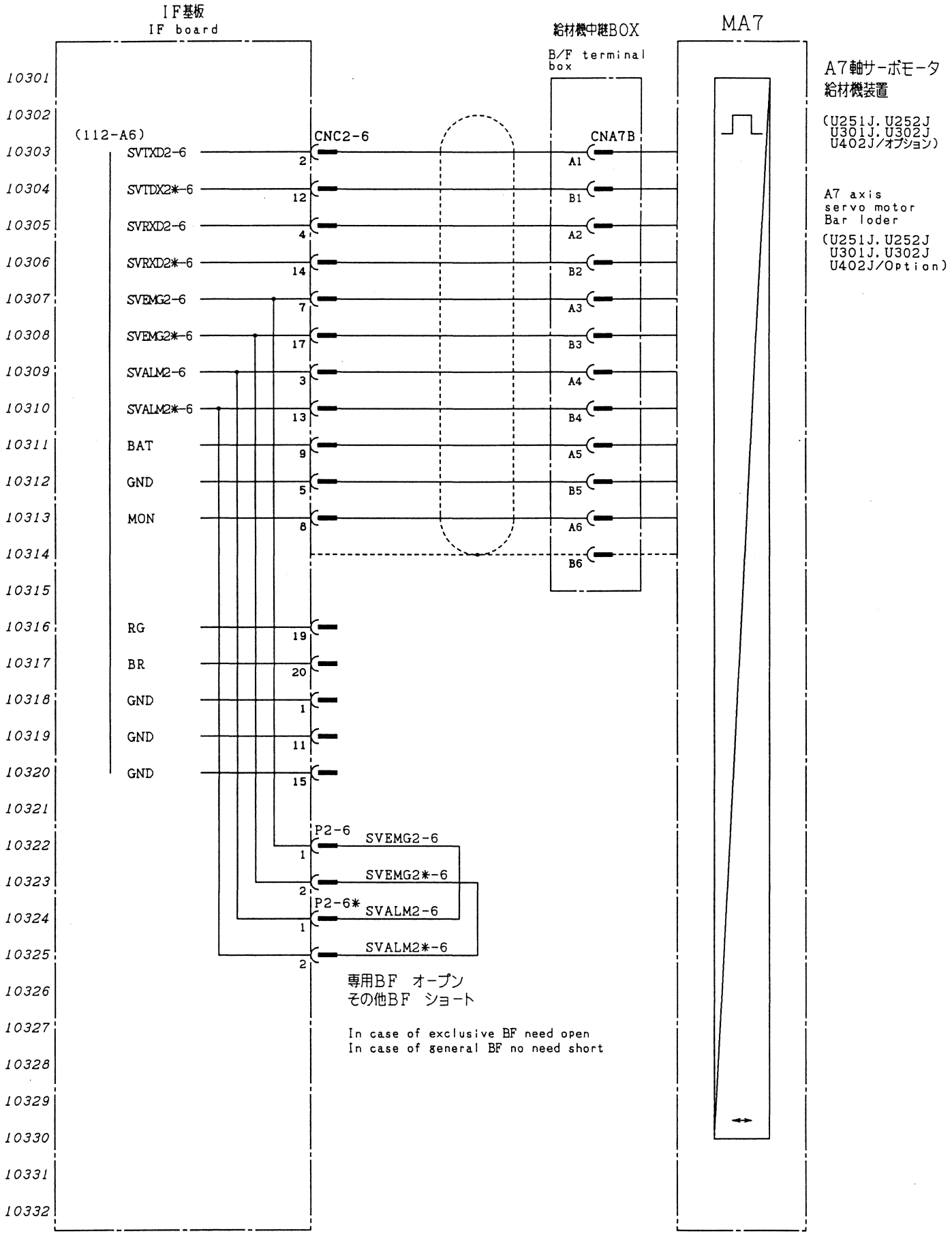

IF基板
IF board
MX3
X3軸サーボモータ
(U11B)
X3 axis
servo motor
(U11B)
(112-A1)
CNC2-1
CNX3
SVTXD2-1
SVTDX2*-1
SVRXD2-1
SVRXD2-1
SVEMG2-1
SVEMG2*-1
SVALM2-1
SVALM2*-1
BAT
GND
MON
RG
BR
GND
GND
GND
P2-1
P2-1*
軸使用時オープン
軸未使用時ショート
In case of axis need open
In case of axis no need short

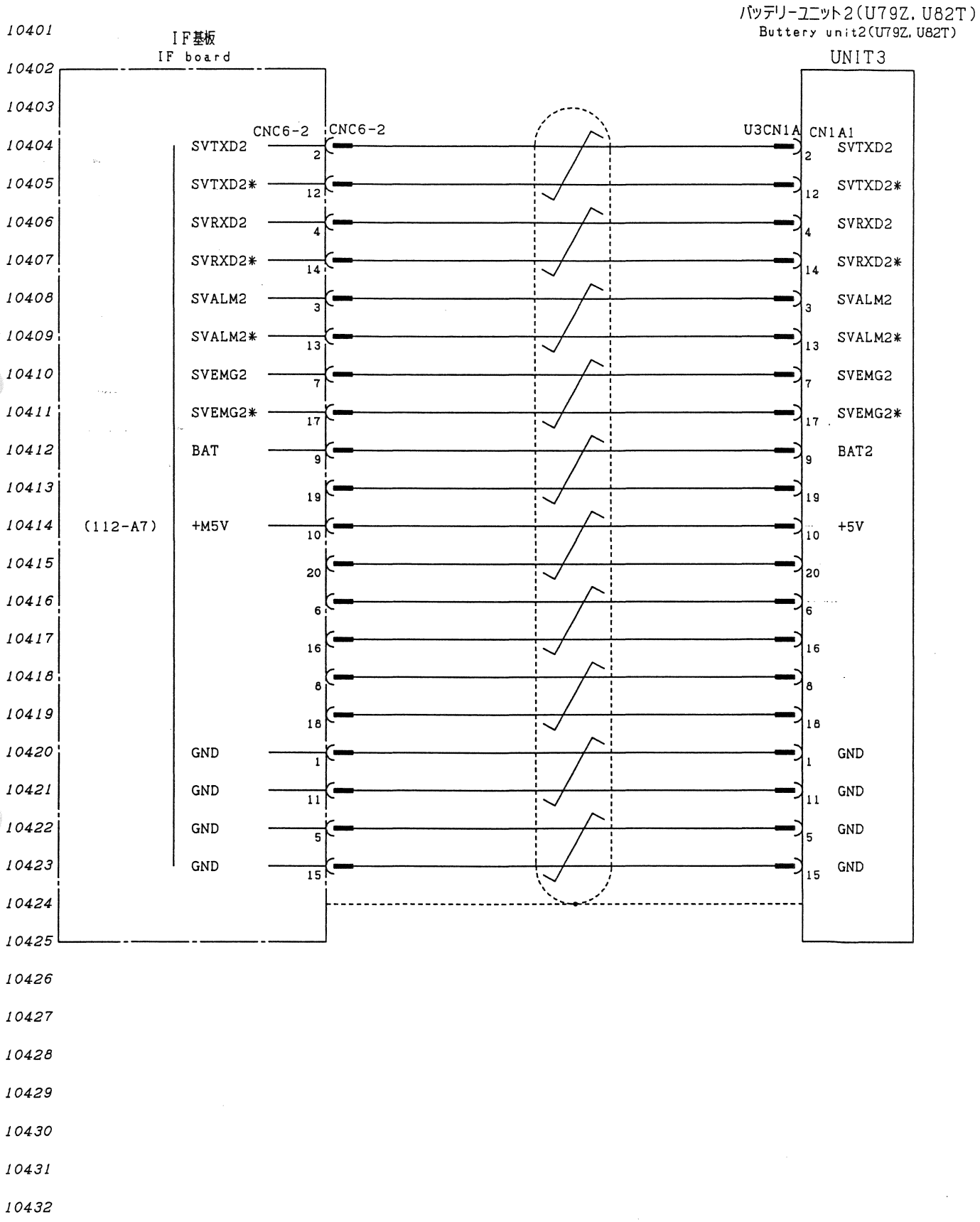

IF基板
IF board
MZ3
Z3軸サーボモータ
(U10B, U11B)
Z3 axis
servo motor
(U10B, U11B)
(112-A2)
CNC2-2
CNZ3
9901
9902
9903
9904
9905
9906
9907
9908
9909
9910
9911
9912
9913
9914
9915
9916
9917
9918
9919
9920
9921
9922
9923
9924
9925
9926
9927
9928
9929
9930
9931
9932
SVTXD2-2
SVTDX2*-2
SVRXD2-2
SVRXD2-2
SVEMG2-2
SVEMG2*-2
SVALM2-2
SVALM2*-2
BAT
GND
MON
RG
BR
GND
GND
GND
2
12
4
14
7
17
3
13
9
5
8
19
20
1
11
15
H
J
K
L
P
R
S
T
U
V
M
G
F
P2-2
SVEMG2-2
SVEMG2*-2
P2-2*
SVALM2-2
SVALM2*-2
1
2
1
2
軸使用時オープン
軸未使用時ショート
In case of axis need open
In case of axis no need short

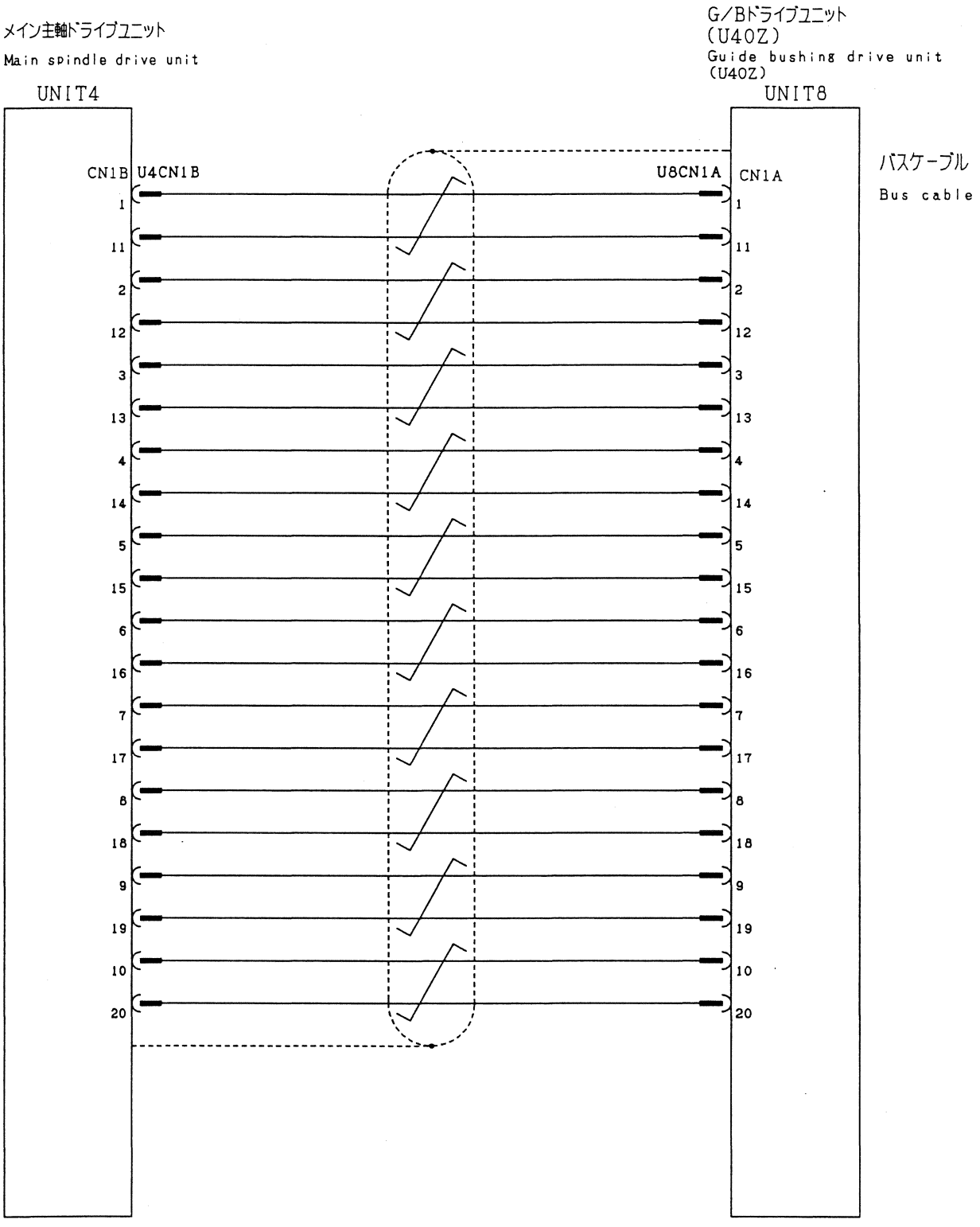

IF基板
IF board
中継BOX
terminal box
MA4
A4軸サーボモータ
(U35J/オプション)
A4 axis
servo motor
(U35J/Option)
(112-A3)
CNC2-3
CNA4B
SVTXD2-3
SVTDX2*-3
SVRXD2-3
SVRXD2*-3
SVEMG2-3
SVEMG2*-3
SVALM2-3
SVALM2*-3
BAT
GND
MON
RG
BR
GND
GND
GND
P2-3
P2-3*
軸使用時オープン
軸未使用時ショート
In case of axis need open
In case of axis no need short

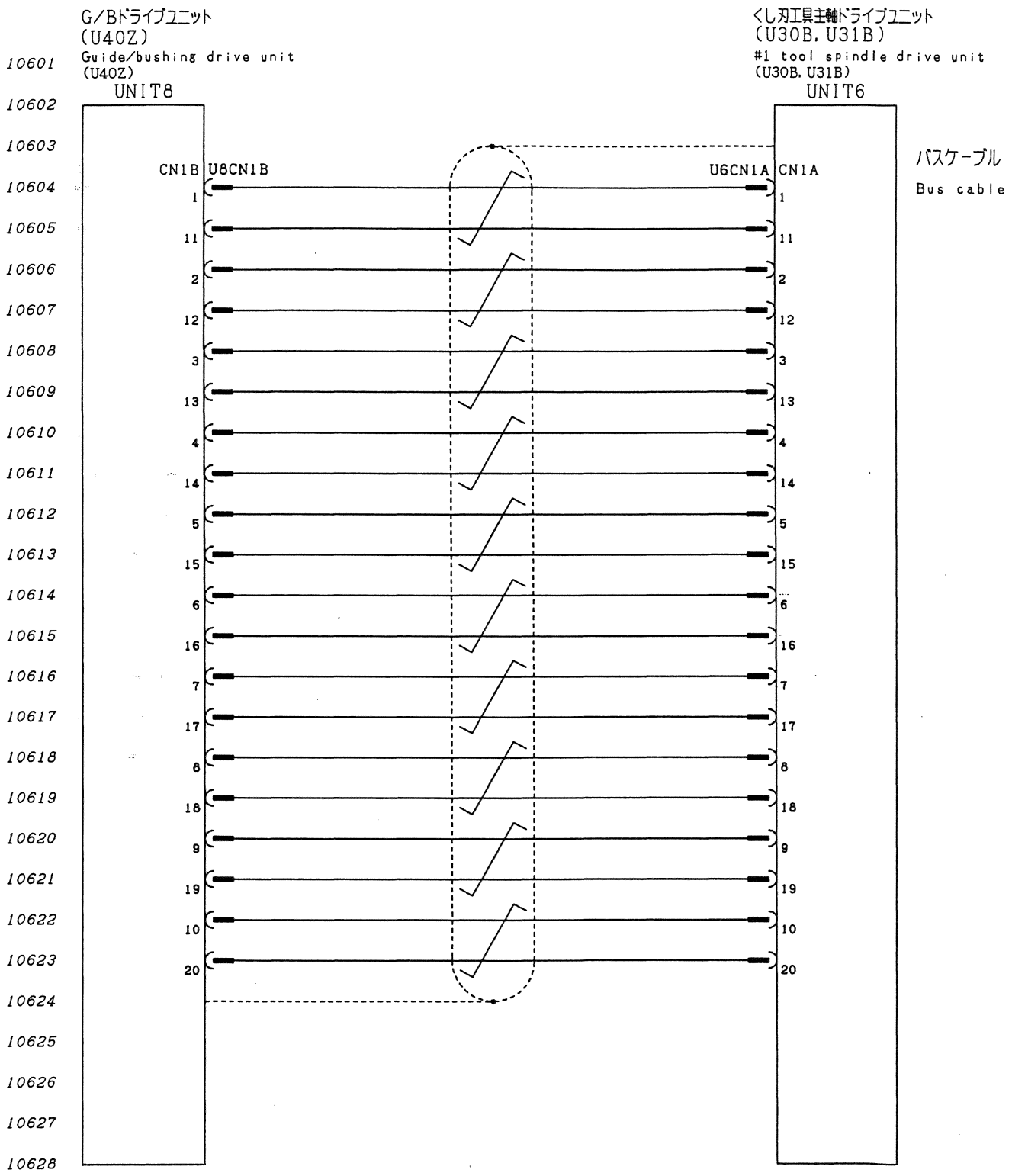

IF基板
IF board
背面主軸中継BOX
Back spindle terminal box
MA2
A2軸サーボモータ (U40B)
A2 axis servo motor (U40B)
(112-A4)
CNC2-4
CNA2B
10101
10102
10103
10104
10105
10106
10107
10108
10109
10110
10111
10112
10113
10114
10115
10116
10117
10118
10119
10120
10121
10122
10123
10124
10125
10126
10127
10128
10129
10130
10131
10132
SVTXD2-4
SVTDX2*-4
SVRXD2-4
SVRXD2*-4
SVEMG2-4
SVEMG2*-4
SVALM2-4
SVALM2*-4
BAT
GND
MON
RG
BR
GND
GND
GND
2
12
4
14
7
17
3
13
9
5
8
19
20
1
11
15
A1
B1
A2
B2
A3
B3
A4
B4
A5
B5
A6
B6
P2-4
SVEMG2-4
SVEMG2*-4
P2-4*
SVALM2-4
SVALM2*-4
1
2
1
2
軸使用時オープン
軸未使用時ショート
In case of axis need open
In case of axis no need short

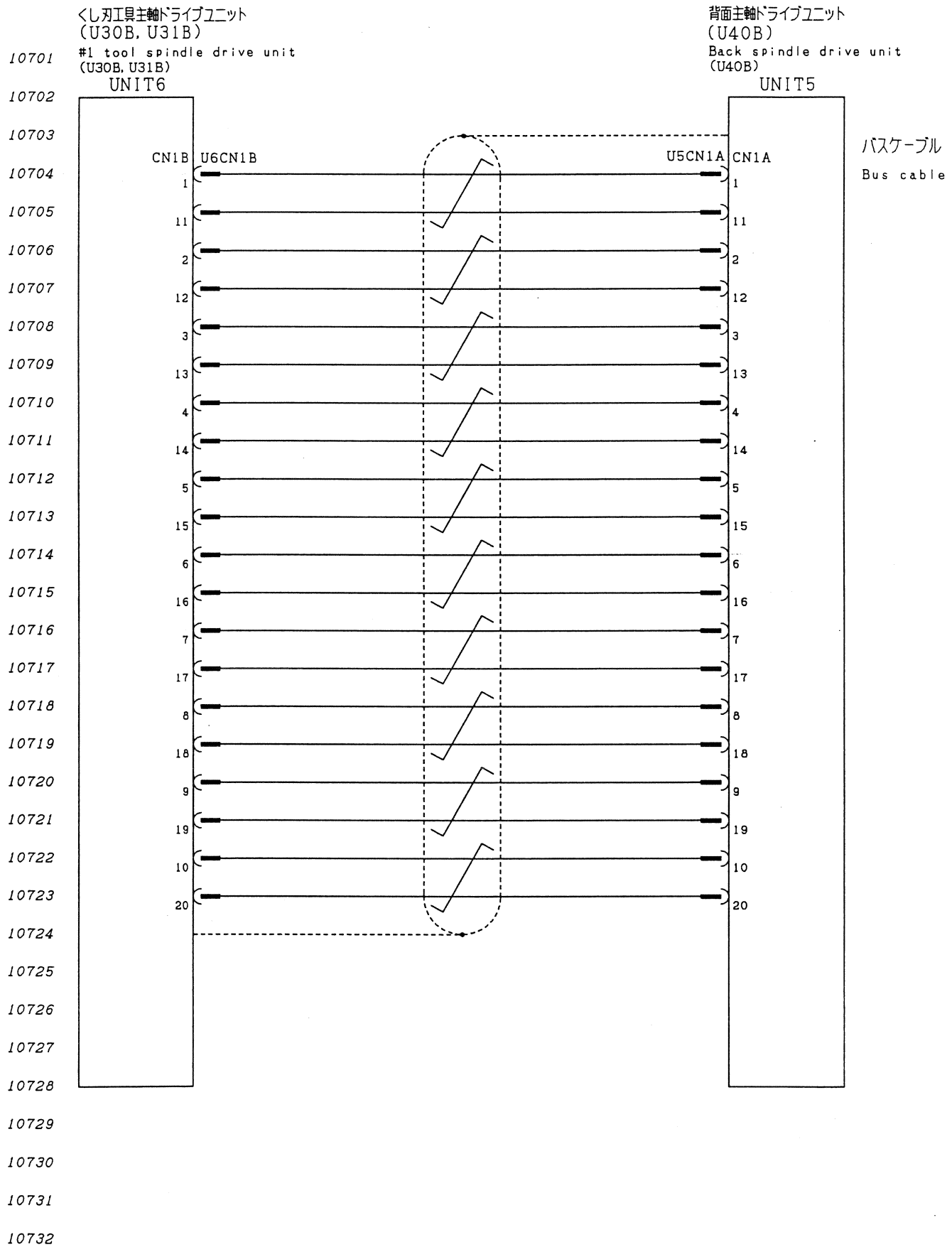

IF基板
IF board
背面主軸中継BOX
Back spindle terminal box
MA3
A3軸サーボモータ
(U402B)
A3 axis servo motor
(U402B)
(112-A5)
CNC2-5
CNA3B
SVTXD2-5
SVTDX2*-5
SVRXD2-5
SVRXD2*-5
SVEMG2-5
SVEMG2*-5
SVALM2-5
SVALM2*-5
BAT
GND
MON
RG
BR
GND
GND
GND
P2-5
P2-5*
軸使用時オープン
軸未使用時ショート
In case of axis need open
In case of axis no need short

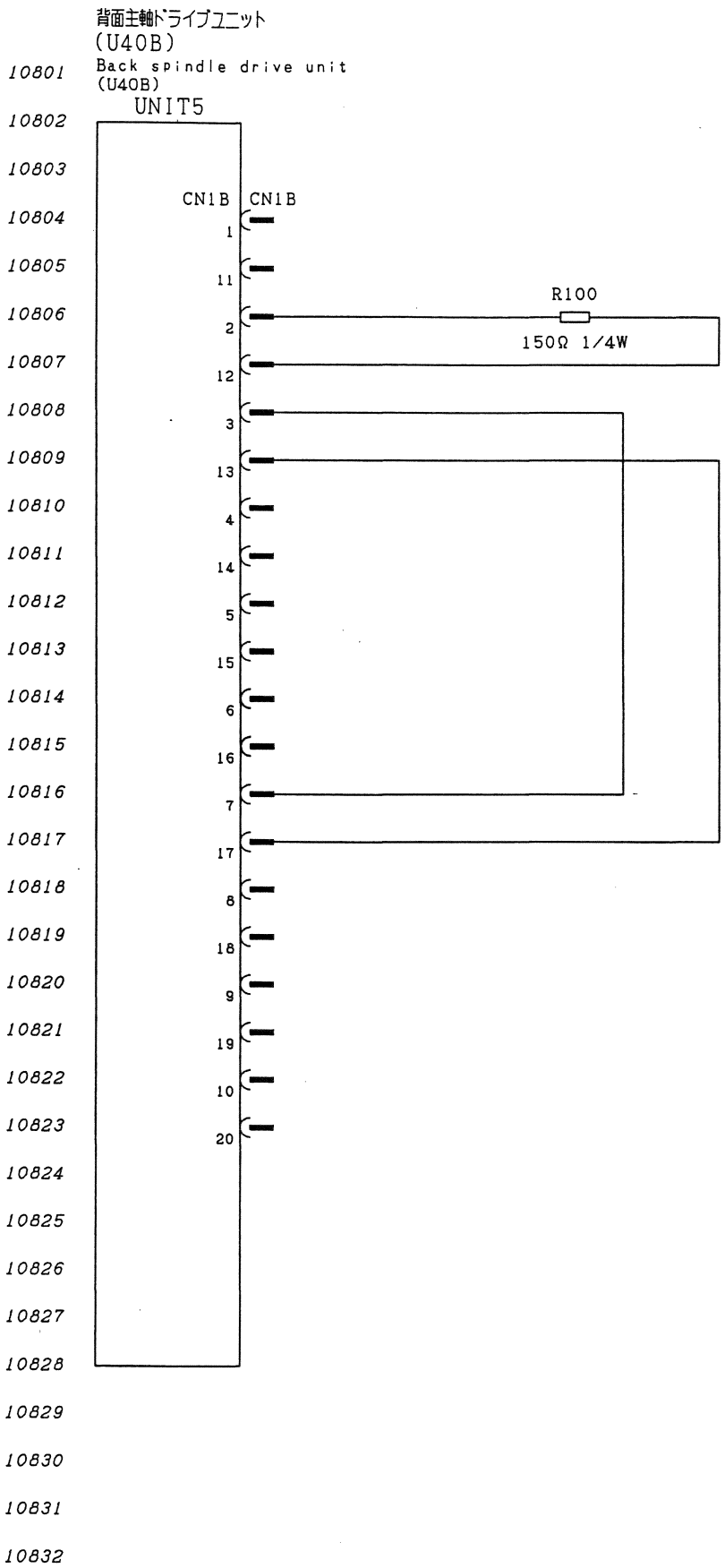

IF基板
IF board
給材機中継BOX
B/F terminal box
MA7
A7軸サーボモータ
給材機装置
(U251J.U252J U301J.U302J U402J/オプション)
A7 axis servo motor Bar loder
(U251J.U252J U301J.U302J U402J/Option)
(112-A6)
CNC2-6
CNA7B
10301
10302
10303
10304
10305
10306
10307
10308
10309
10310
10311
10312
10313
10314
10315
10316
10317
10318
10319
10320
10321
10322
10323
10324
10325
10326
10327
10328
10329
10330
10331
10332
SVTXD2-6
SVTDX2*-6
SVRXD2-6
SVRXD2*-6
SVEMG2-6
SVEMG2*-6
SVALM2-6
SVALM2*-6
BAT
GND
MON
RG
BR
GND
GND
GND
2
12
4
14
7
17
3
13
9
5
8
A1
B1
A2
B2
A3
B3
A4
B4
A5
B5
A6
B6
19
20
1
11
15
P2-6
1
SVEMG2-6
2
SVEMG2*-6
P2-6*
1
SVALM2-6
2
SVALM2*-6
専用BF オープン
その他BF ショート
In case of exclusive BF need open
In case of general BF no need short

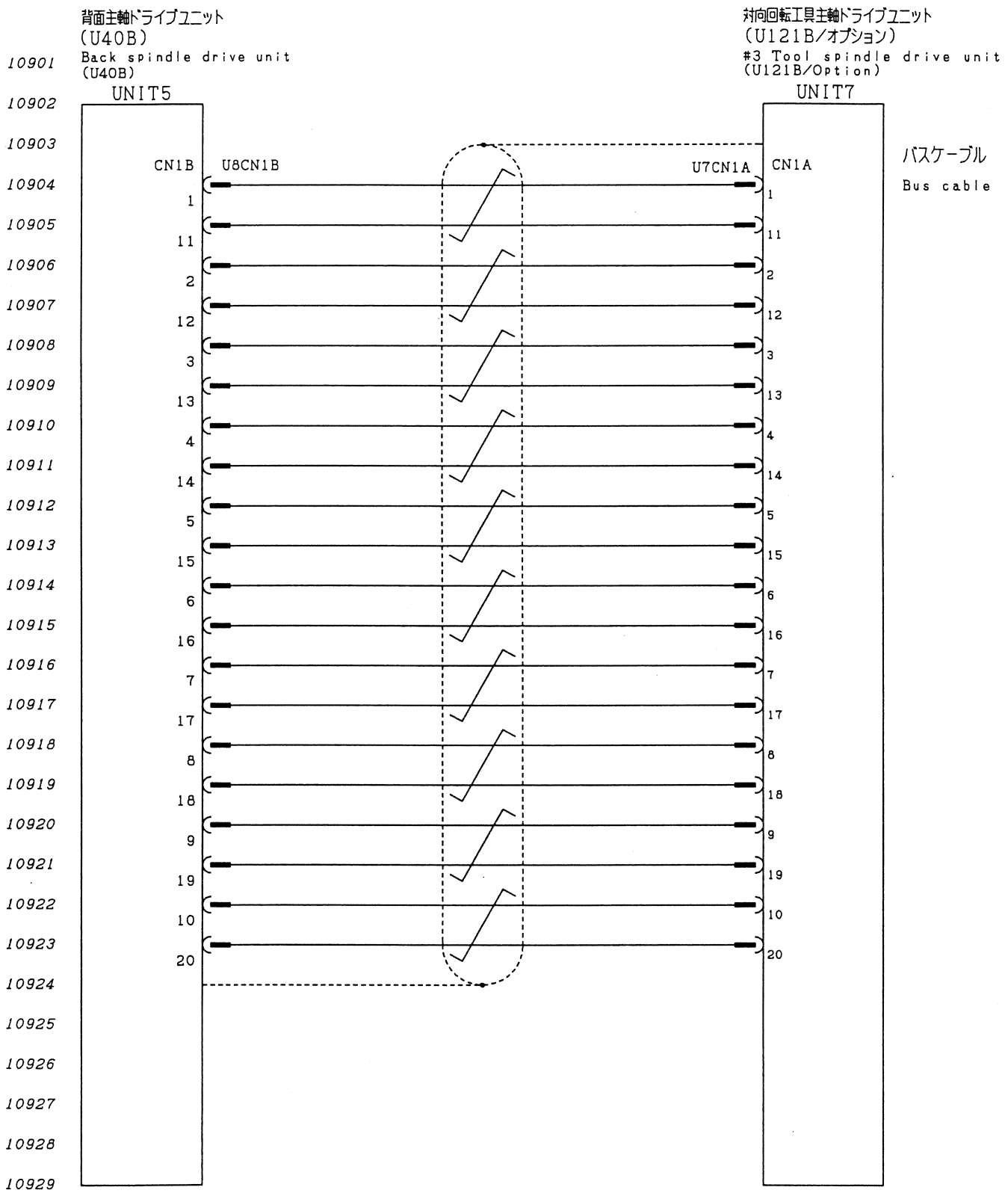

バッテリーユニット2(U79Z, U82T)
Buttery unit2(U79Z, U82T)
UNIT3
IF基板
IF board
CNC6-2
CNC6-2
U3CN1A
CN1A1
SVTXD2
SVTXD2*
SVRXD2
SVRXD2*
SVALM2
SVALM2*
SVEMG2
SVEMG2*
BAT
+M5V
GND
GND
GND
GND
(112-A7)
BAT2
+5V


メイン主軸ドライブユニット
Main spindle drive unit
UNIT4
G/Bドライブユニット
(U40Z)
Guide bushing drive unit
(U40Z)
UNIT8
CN1B
U4CN1B
U8CN1A
CN1A
バスケーブル
Bus cable
1
11
2
12
3
13
4
14
5
15
6
16
7
17
8
18
9
19
10
20


G/Bドライブユニット
(U40Z)
Guide/bushing drive unit
(U40Z)
UNIT8
くし刃工具主軸ドライブユニット
(U30B, U31B)
#1 tool spindle drive unit
(U30B, U31B)
UNIT6
CN1B
U8CN1B
U6CN1A
CN1A
バスケーブル
Bus cable
1
11
2
12
3
13
4
14
5
15
6
16
7
17
8
18
9
19
10
20


くし刃工具主軸ドライブユニット
(U30B, U31B)
#1 tool spindle drive unit
(U30B, U31B)
UNIT6
背面主軸ドライブユニット
(U40B)
Back spindle drive unit
(U40B)
UNIT5
CN1B
U6CN1B
U5CN1A
CN1A
バスケーブル
Bus cable
1
11
2
12
3
13
4
14
5
15
6
16
7
17
8
18
9
19
10
20
10701
10702
10703
10704
10705
10706
10707
10708
10709
10710
10711
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10731
10732

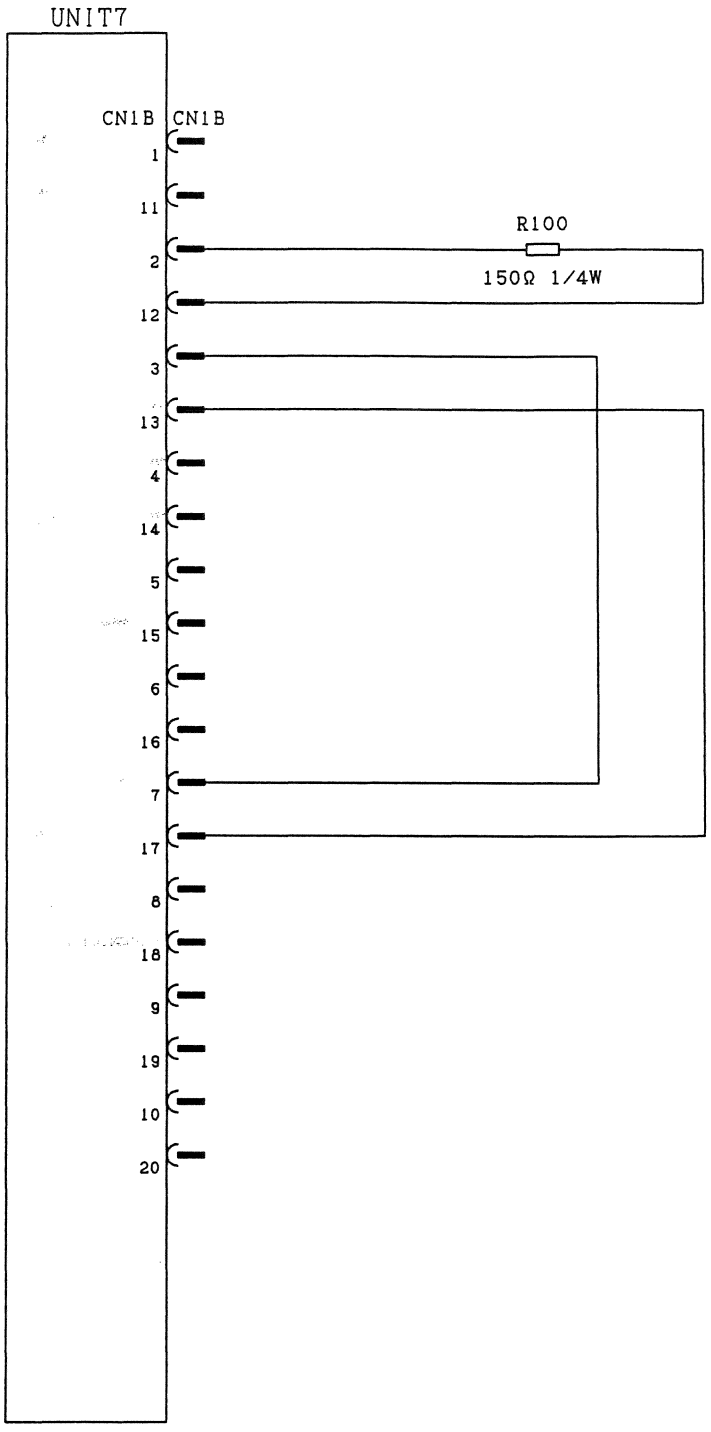

背面主軸ドライブユニット
(U40B)
Back spindle drive unit
(U40B)
UNIT5
CN1B
CN1B
1
11
2
12
3
13
4
14
5
15
6
16
7
17
8
18
9
19
10
20
R100
150Ω 1/4W
10801
10802
10803
10804
10805
10806
10807
10808
10809
10810
10811
10812
10813
10814
10815
10816
10817
10818
10819
10820
10821
10822
10823
10824
10825
10826
10827
10828
10829
10830
10831
10832



注）オプションのドライブユニット増設時には、UNIT5（CN1B）の終端コネクタを外しこのBUSケーブルを接続。

Note)In case of this "UNIT7" drive unit pull apart end connector.
And this bus-cable connect with UNIT5(CN1B).

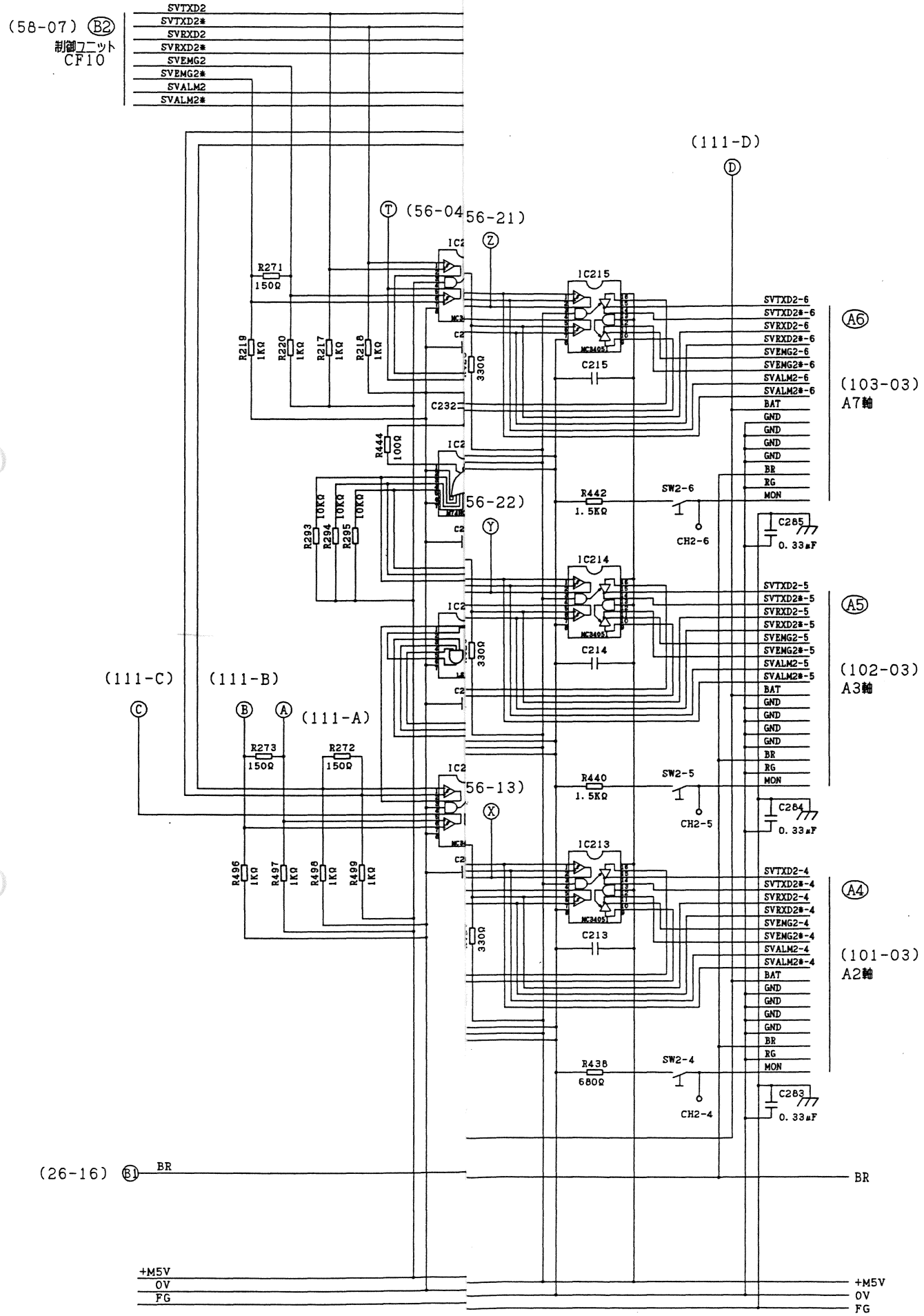
対向回転工具主軸ドライブユニット
(U121B/オプション)
#3 Tool spindle drive unit
(U121B/Option)

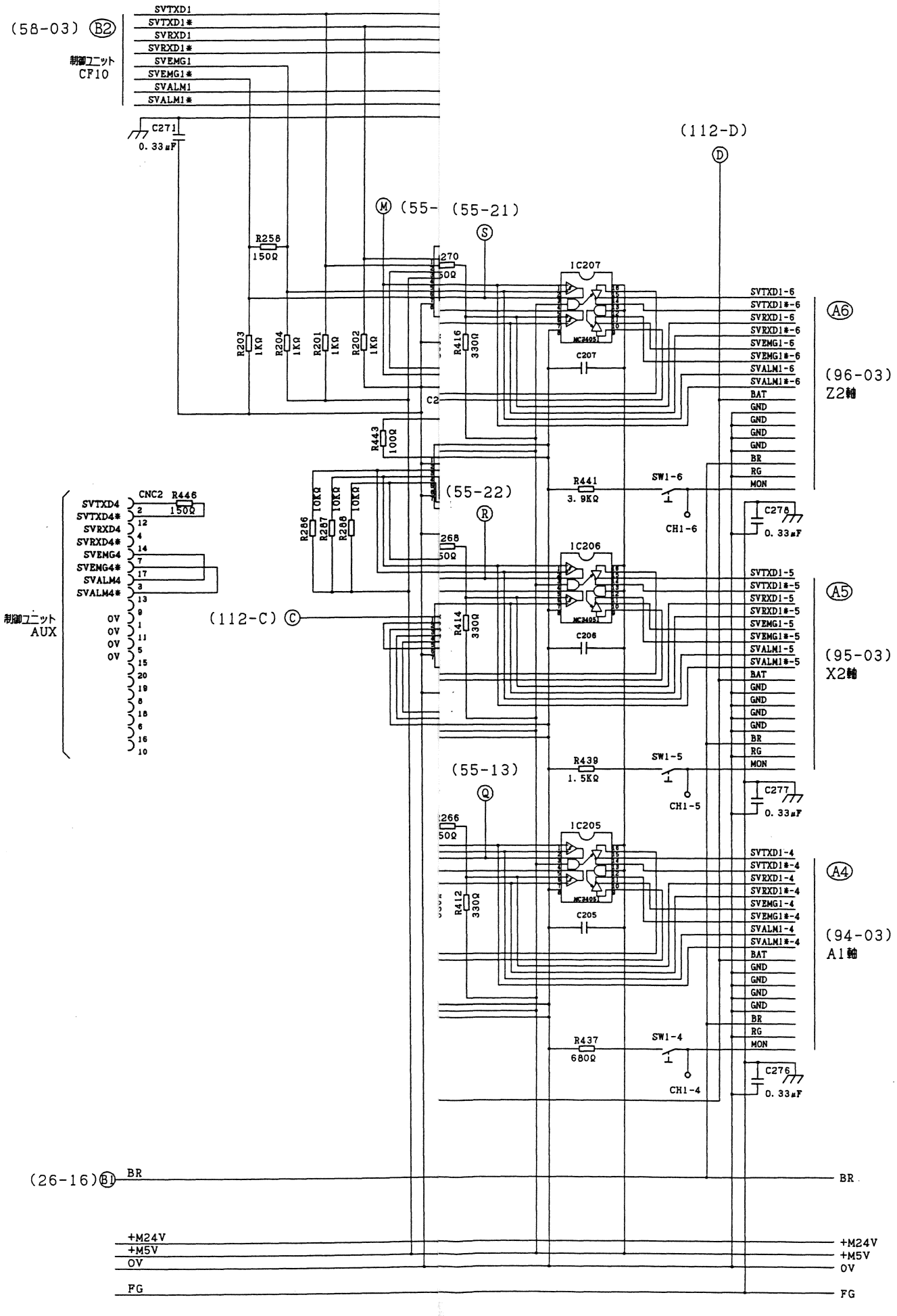


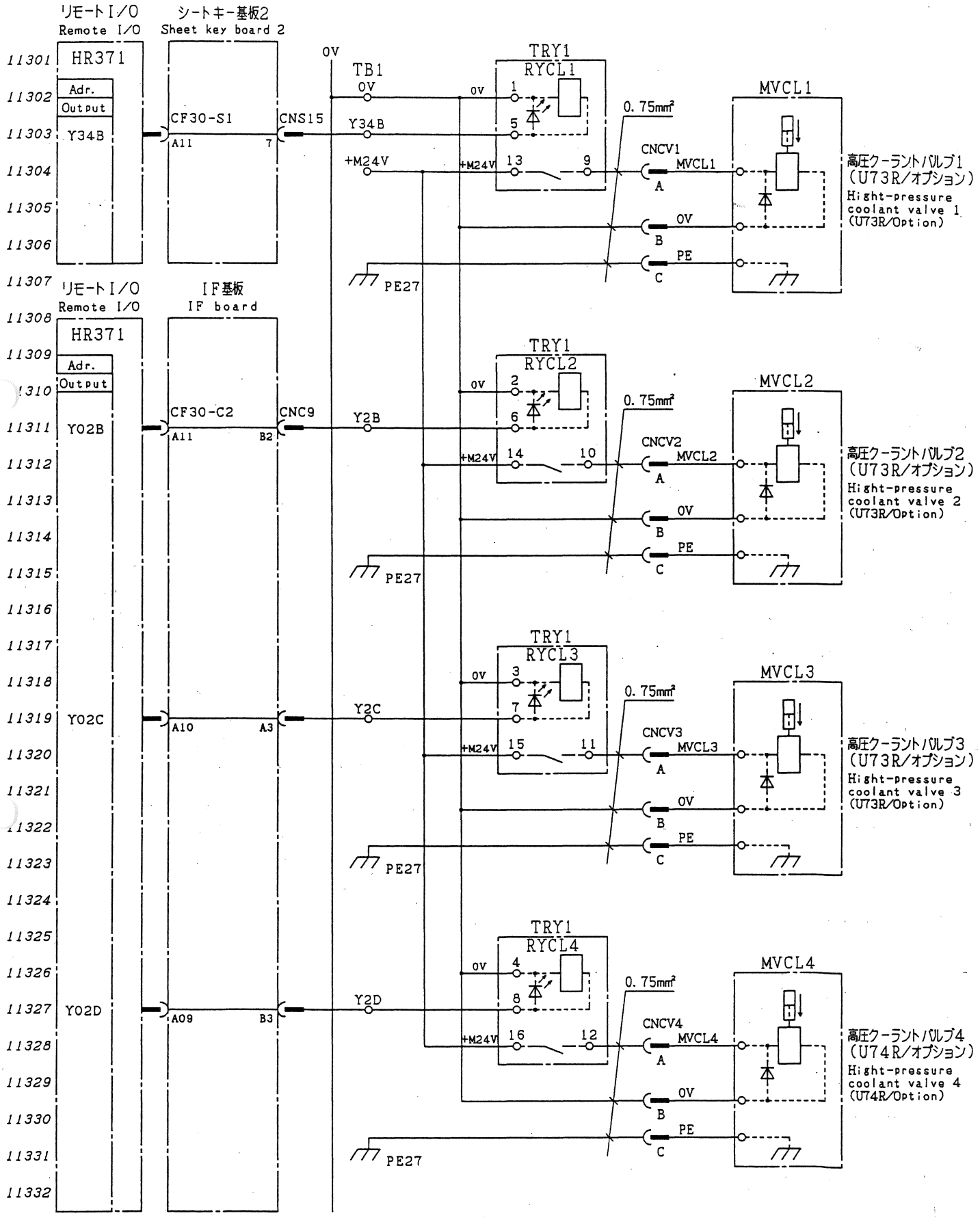
注)オプションのドライブユニット増設時には、UNIT5(CN1B)の終端コネクタを外し
UNIT7(CN1B)に接続。

Note)In case of this "UNIT7" drive unit pull apart end connector.
And this end connector connect with UNIT7(CN1B).

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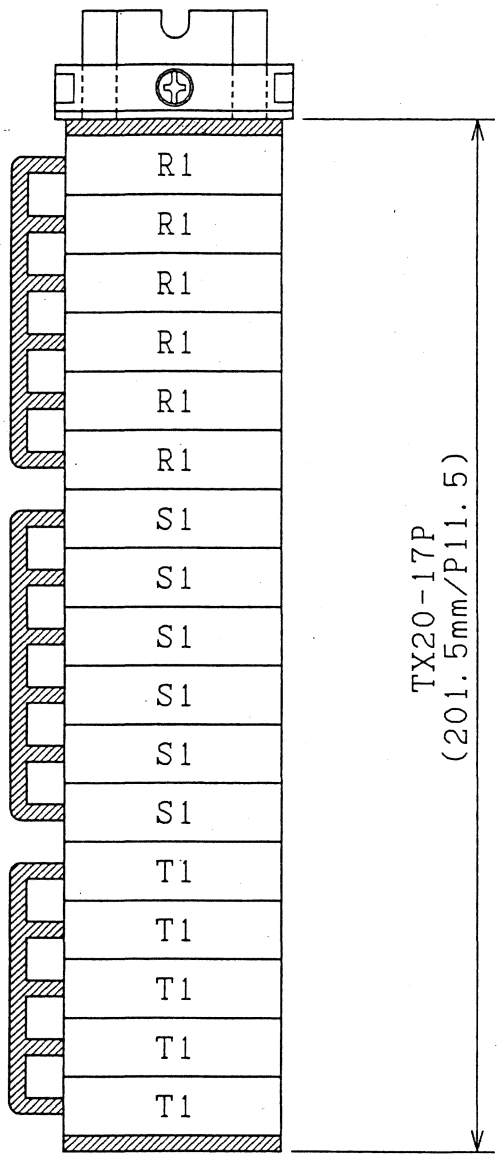

(58-07) B2
制御ユニット
CF10
SVTXD2
SVTXD2*
SVRXD2
SVRXD2*
SVEMG2
SVEMG2*
SVALM2
SVALM2*
(111-D)
D
T (56-04
56-21)
Z
IC2
R271
150Ω
R219 1KΩ
R220 1KΩ
R217 1KΩ
R218 1KΩ
330Ω
C232
R444
100Ω
IC215
C215
SVTXD2-6
SVTXD2*-6
SVRXD2-6
SVRXD2*-6
SVEMG2-6
SVEMG2*-6
SVALM2-6
SVALM2*-6
BAT
GND
GND
GND
GND
BR
RG
MON
A6
(103-03)
A7軸
R442
1.5KΩ
SW2-6
CH2-6
C285
0.33μF
56-22)
Y
R293 10KΩ
R294 10KΩ
R295 10KΩ
IC214
C214
SVTXD2-5
SVTXD2*-5
SVRXD2-5
SVRXD2*-5
SVEMG2-5
SVEMG2*-5
SVALM2-5
SVALM2*-5
BAT
GND
GND
GND
GND
BR
RG
MON
A5
(102-03)
A3軸
(111-C)
(111-B)
(111-A)
C
B
A
R273
150Ω
R272
150Ω
R440
1.5KΩ
SW2-5
CH2-5
C284
0.33μF
56-13)
X
R496 1KΩ
R497 1KΩ
R498 1KΩ
R499 1KΩ
IC213
C213
SVTXD2-4
SVTXD2*-4
SVRXD2-4
SVRXD2*-4
SVEMG2-4
SVEMG2*-4
SVALM2-4
SVALM2*-4
BAT
GND
GND
GND
GND
BR
RG
MON
A4
(101-03)
A2軸
R438
680Ω
SW2-4
CH2-4
C283
0.33μF
(26-16) B1
BR
BR
+M5V
0V
FG
+M5V
0V
FG

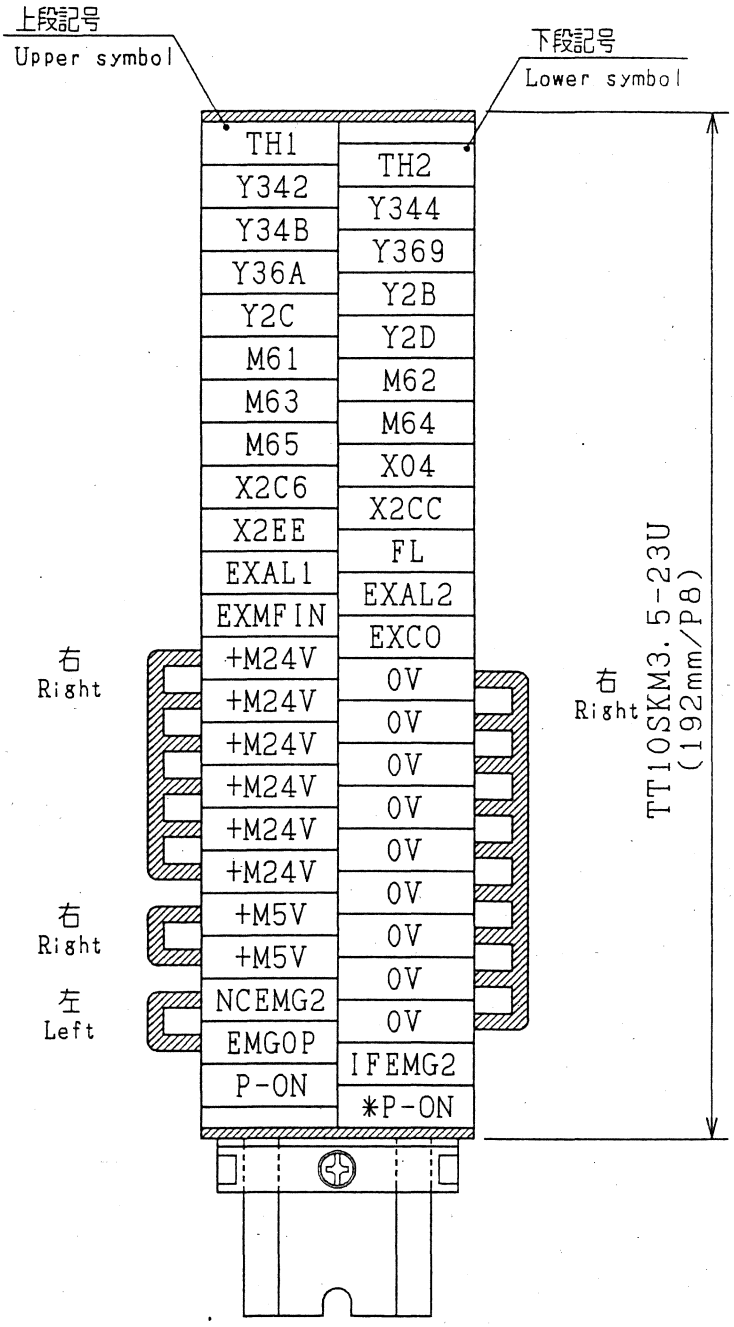

(58-03) B2
制御ユニット
CF10
SVTXD1
SVTXD1*
SVRXD1
SVRXD1*
SVEMG1
SVEMG1*
SVALM1
SVALM1*
C271
0.33μF
(112-D)
D
M (55-
(55-21)
S
R258
150Ω
270
50Ω
IC207
R203 1KΩ
R204 1KΩ
R201 1KΩ
R202 1KΩ
R416 330Ω
C207
C2
R443 100Ω
SVTXD1-6
SVTXD1*-6
SVRXD1-6
SVRXD1*-6
SVEMG1-6
SVEMG1*-6
SVALM1-6
SVALM1*-6
BAT
GND
GND
GND
GND
BR
RG
MON
A6
(96-03)
Z2軸
(55-22)
R
R441
3.9KΩ
SW1-6
CH1-6
C278
0.33μF
CNC2 R446
150Ω
SVTXD4
SVTXD4*
SVRXD4
SVRXD4*
SVEMG4
SVEMG4*
SVALM4
SVALM4*
0V
0V
0V
0V
制御ユニット
AUX
R286 10KΩ
R287 10KΩ
R288 10KΩ
268
50Ω
IC206
(112-C) C
R414 330Ω
C206
SVTXD1-5
SVTXD1*-5
SVRXD1-5
SVRXD1*-5
SVEMG1-5
SVEMG1*-5
SVALM1-5
SVALM1*-5
BAT
GND
GND
GND
GND
BR
RG
MON
A5
(95-03)
X2軸
(55-13)
Q
R439
1.5KΩ
SW1-5
CH1-5
C277
0.33μF
266
50Ω
IC205
R412 330Ω
C205
SVTXD1-4
SVTXD1*-4
SVRXD1-4
SVRXD1*-4
SVEMG1-4
SVEMG1*-4
SVALM1-4
SVALM1*-4
BAT
GND
GND
GND
GND
BR
RG
MON
A4
(94-03)
A1軸
R437
680Ω
SW1-4
CH1-4
C276
0.33μF
(26-16) B1
BR
BR
+M24V
+M5V
0V
FG
+M24V
+M5V
0V
FG


リモートI/O
Remote I/O
シートキー基板2
Sheet key board 2
HR371
Adr.
Output
Y34B
CF30-S1
A11
7
CNS15
0V
TB1
Y34B
+M24V
PE27
TRY1
RYCL1
1
5
13
9
0.75mm²
CNCV1
MVCL1
A
B
C
MVCL1
高圧クーラントバルブ1
(U73R/オプション)
Hight-pressure
coolant valve 1
(U73R/Option)
リモートI/O
Remote I/O
IF基板
IF board
HR371
Adr.
Output
Y02B
CF30-C2
A11
B2
CNC9
Y2B
TRY1
RYCL2
2
6
14
10
CNCV2
MVCL2
MVCL2
高圧クーラントバルブ2
(U73R/オプション)
Hight-pressure
coolant valve 2
(U73R/Option)
Y02C
A10
A3
Y2C
TRY1
RYCL3
3
7
15
11
CNCV3
MVCL3
MVCL3
高圧クーラントバルブ3
(U73R/オプション)
Hight-pressure
coolant valve 3
(U73R/Option)
Y02D
A09
B3
Y2D
TRY1
RYCL4
4
8
16
12
CNCV4
MVCL4
MVCL4
高圧クーラントバルブ4
(U74R/オプション)
Hight-pressure
coolant valve 4
(U74R/Option)

制御盤端子台
Terminal block of control box

TB1

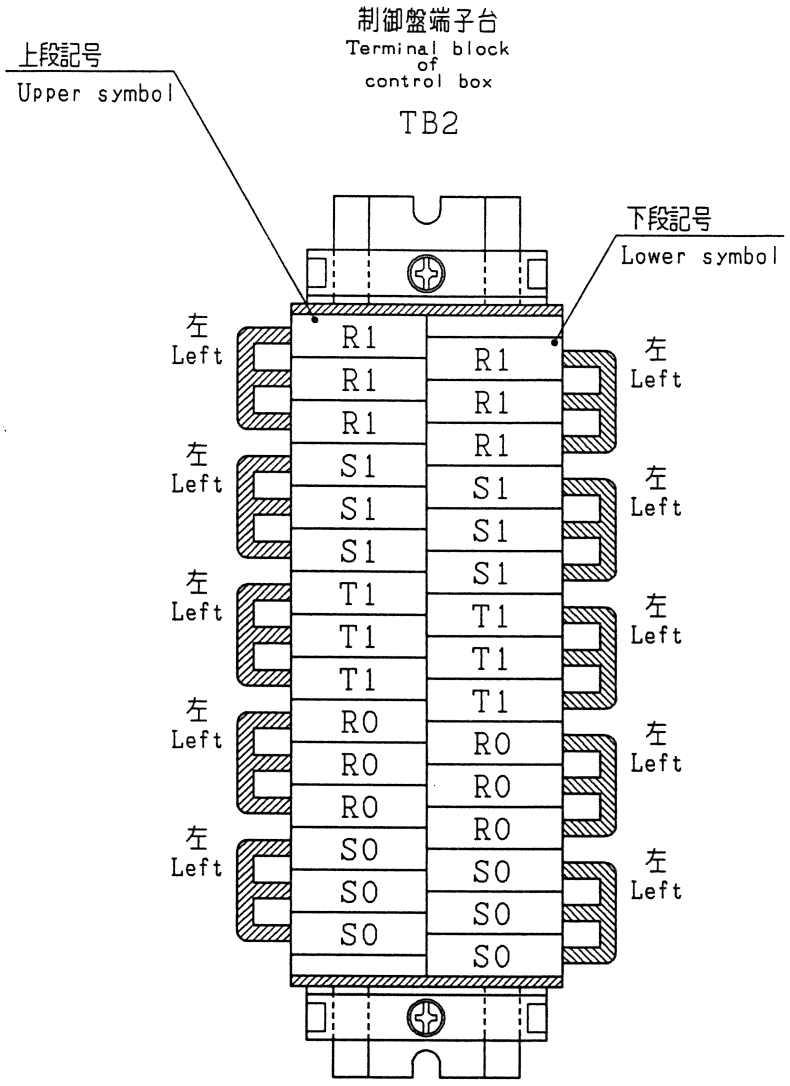




：ショートバー
Short bar
（絶縁被覆付き）
(With insulate)

制御盤端子台
Terminal block of control box

TB2

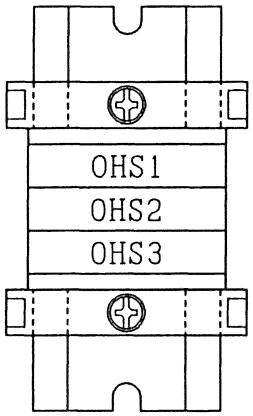


TT10SKM3.5-15U
(128mm/P8)

：ショートバー
Short bar
（絶縁被覆付き）
(With insulate)

メイン主軸中継BOX端子台
Terminal block
of
mein spindle
terminal box

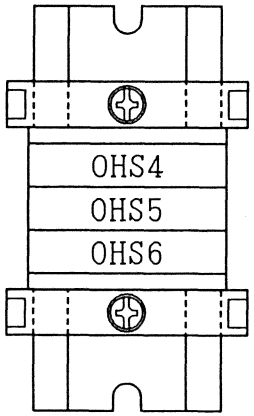
TB3



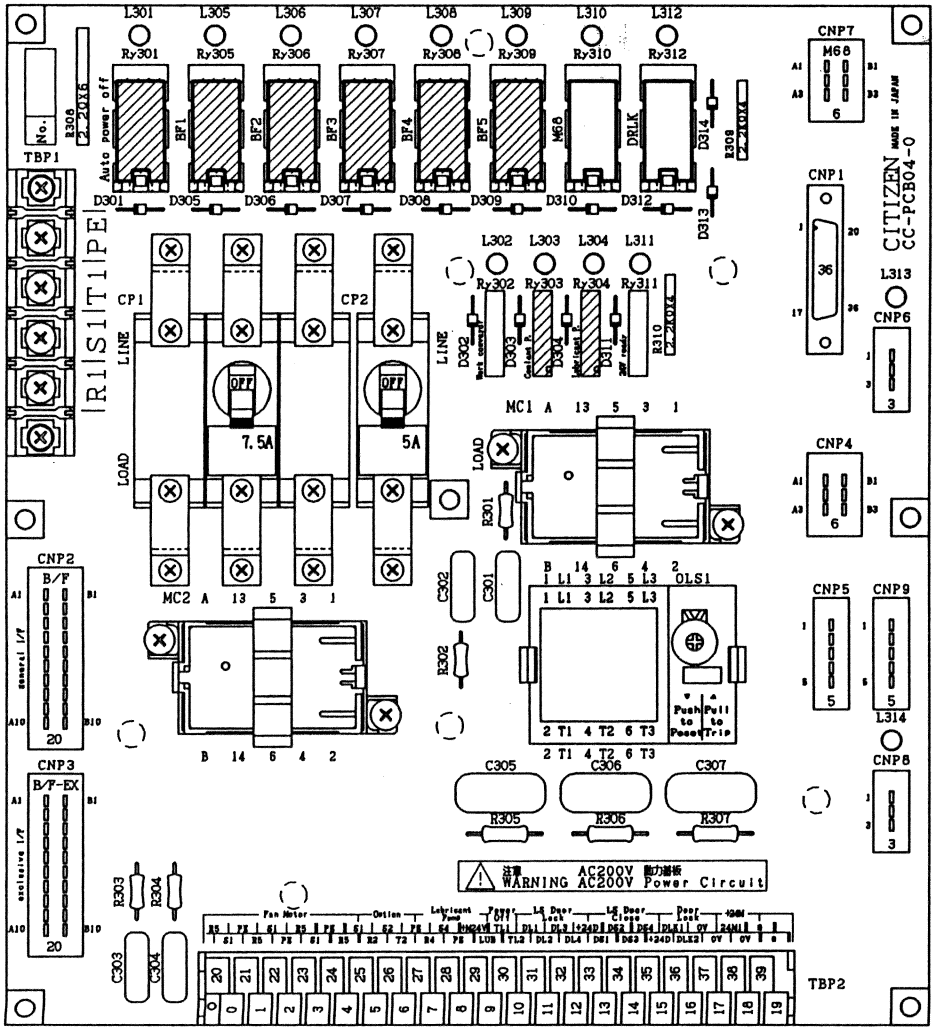
TXU10S-3P
(30mm)

背面主軸中継BOX端子台
Terminal block
of
back spindle
terminal box

TB4



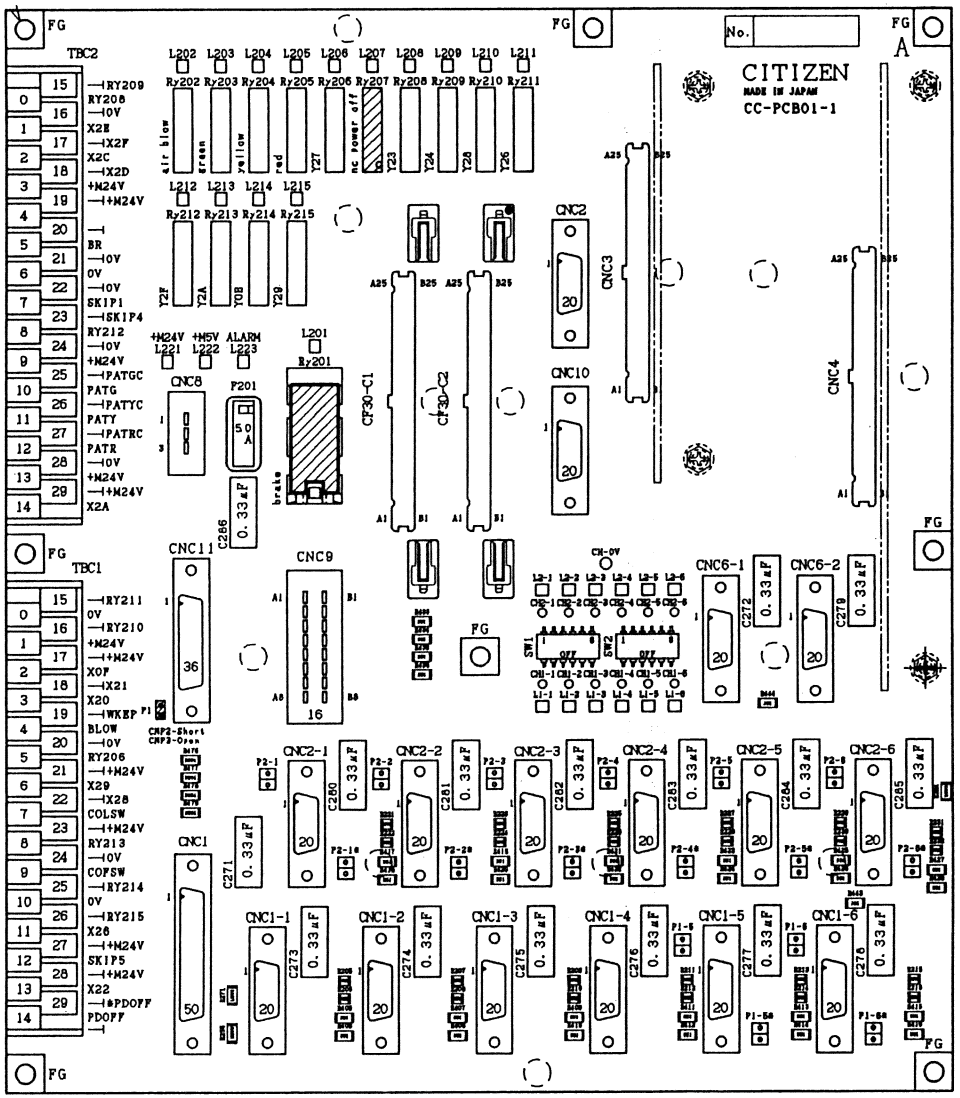
TXU10S-3P
(30mm)



半田面側よりサポートを行なう箇所
(7-φ7)

Support space at solder side
(7-φ7)

Used for supporting from the rear
of the board.
Do not mount any circuit component.



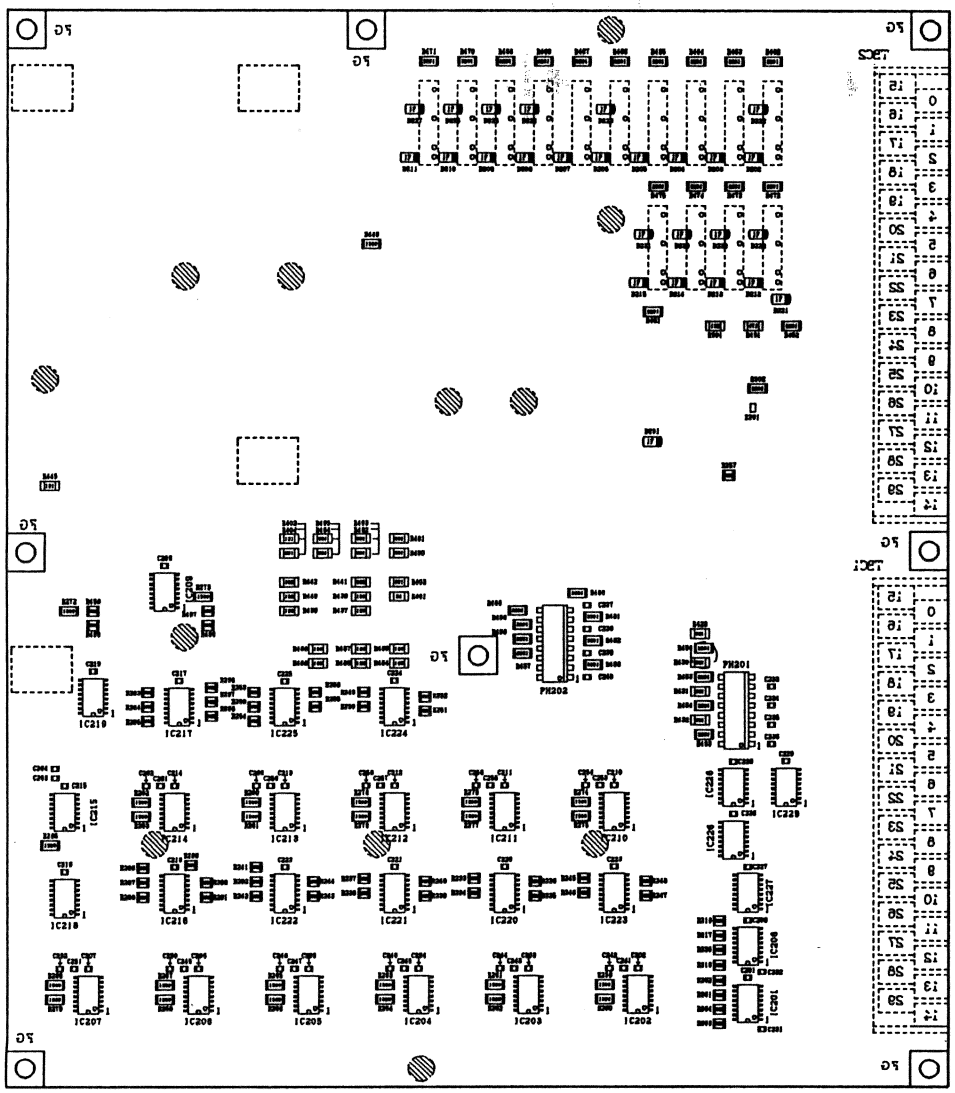
半田面側よりサポートを行なう箇所
(13-φ7)

Support space at solder side
(13-φ7)

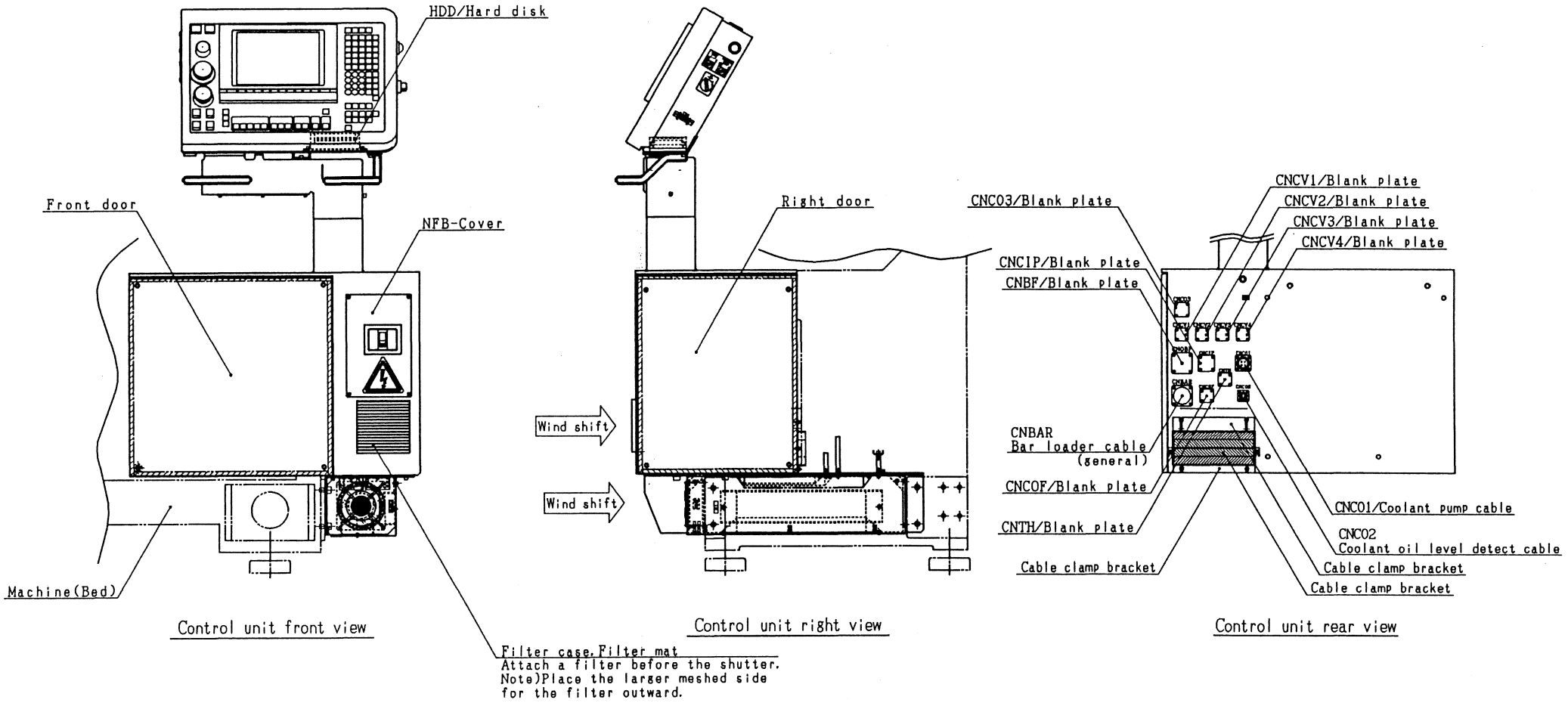
Used for supporting from the rear
of the board.
Do not mount any circuit component.

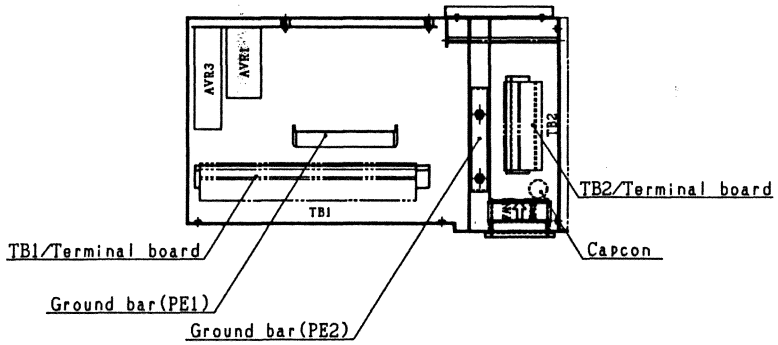
・各設定
[SW1][SW2] 1~6 全て「ON」

・Set up
[SW1][SW2] 1 to 6 All「ON」

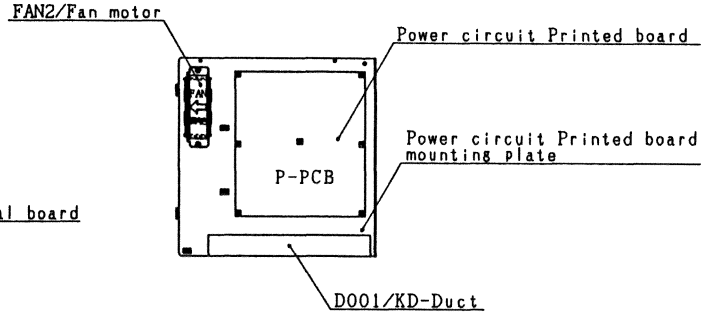


サポートを行なう箇所
Support space

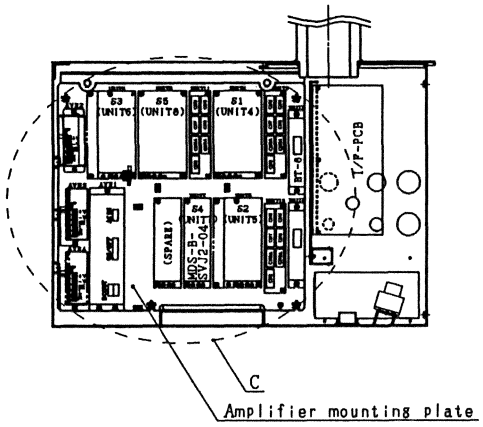

HDD/Hard disk
Front door
NFB-Cover
Machine(Bed)
Control unit front view
Filter case, Filter mat
Attach a filter before the shutter.
Note)Place the larger meshed side
for the filter outward.
Right door
Wind shift
Wind shift
Control unit right view
CNCV1/Blank plate
CNCV2/Blank plate
CNCV3/Blank plate
CNCV4/Blank plate
CNC03/Blank plate
CNCIP/Blank plate
CNBF/Blank plate
CNBAR
Bar loader cable
(general)
CNCOF/Blank plate
CNTH/Blank plate
Cable clamp bracket
CNC01/Coolant pump cable
CNC02
Coolant oil level detect cable
Cable clamp bracket
Cable clamp bracket
Control unit rear view



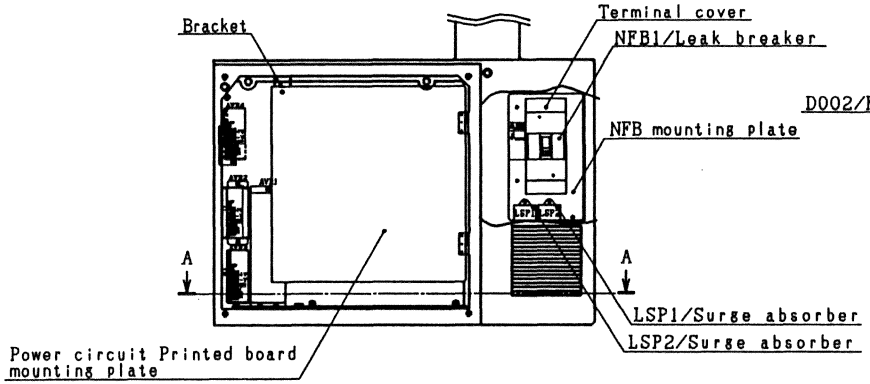
A-A cross-sectional view



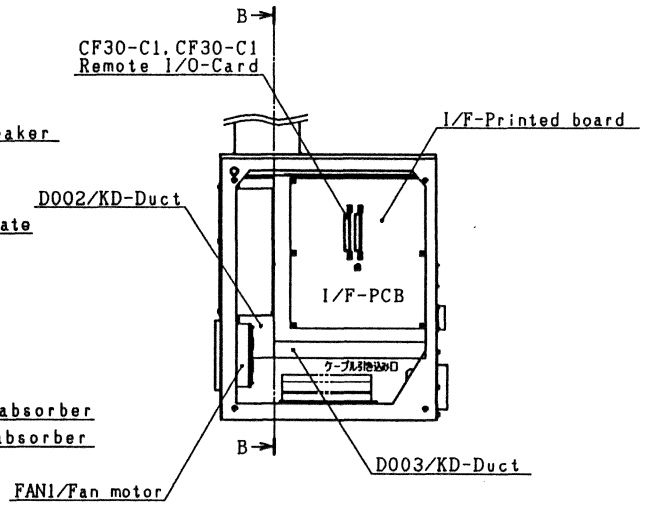
Power circuit
Printed board mounting plate
(Rer view)



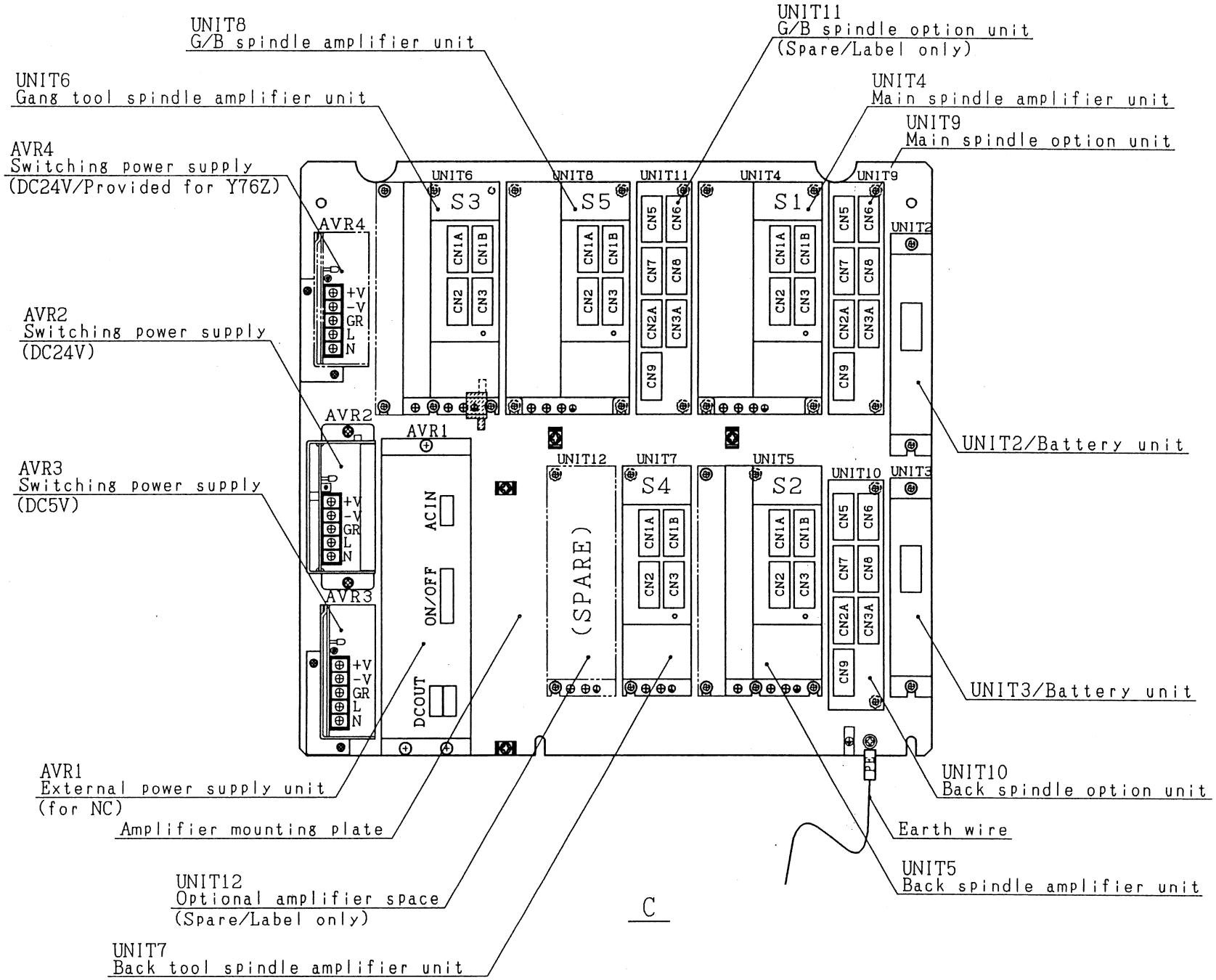
B-B cross-sectional view



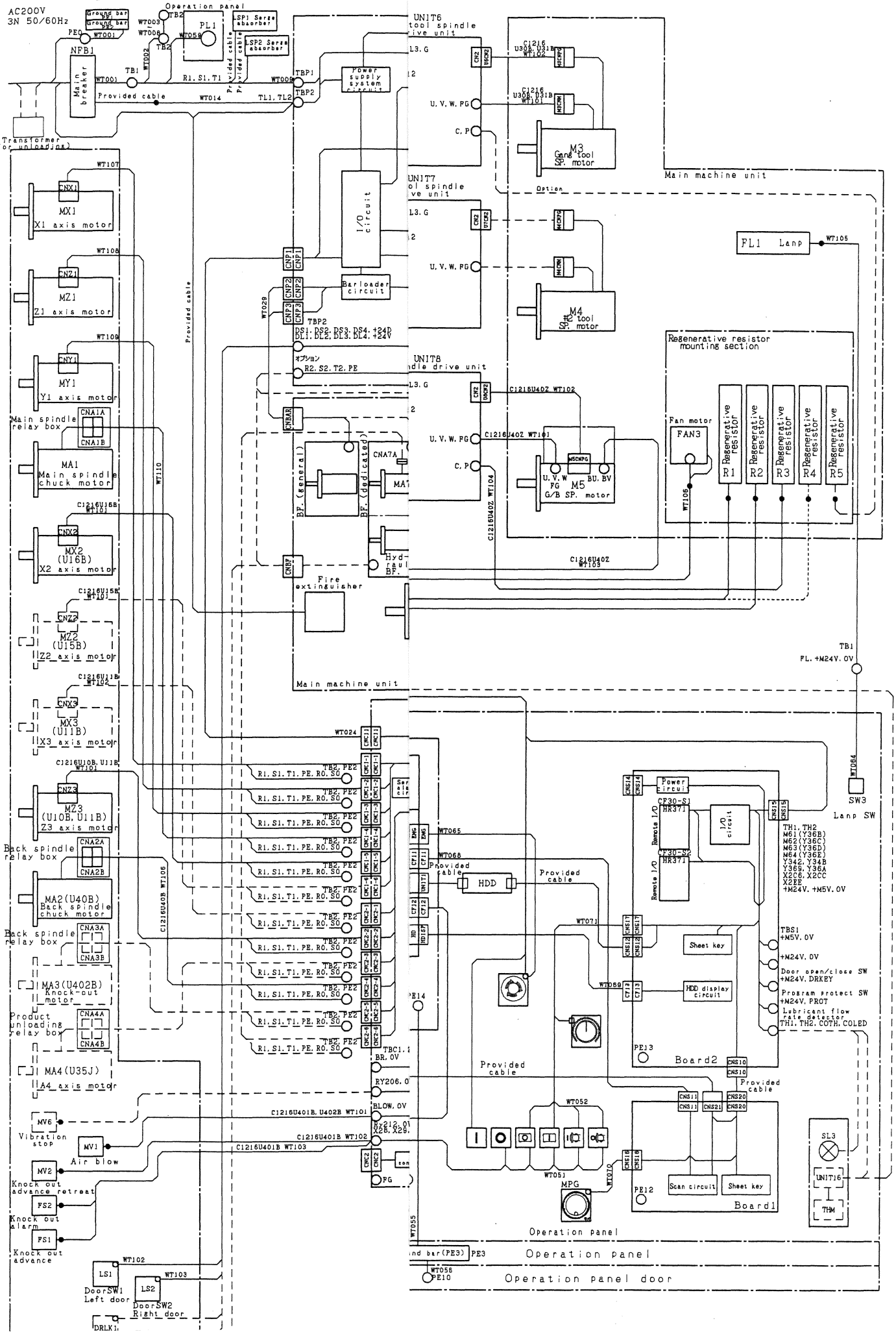
Control unit front view
(With the front door opened)



Control unit right view
(With the right door opened)


UNIT8
G/B spindle amplifier unit
UNIT11
G/B spindle option unit
(Spare/Label only)
UNIT6
Gang tool spindle amplifier unit
UNIT4
Main spindle amplifier unit
UNIT9
Main spindle option unit
AVR4
Switching power supply
(DC24V/Provided for Y76Z)
AVR2
Switching power supply
(DC24V)
AVR3
Switching power supply
(DC5V)
AVR1
External power supply unit
(for NC)
Amplifier mounting plate
UNIT12
Optional amplifier space
(Spare/Label only)
UNIT7
Back tool spindle amplifier unit
UNIT2/Battery unit
UNIT3/Battery unit
UNIT10
Back spindle option unit
Earth wire
UNIT5
Back spindle amplifier unit
C
UNIT6
UNIT8
UNIT11
UNIT4
UNIT9
UNIT2
S3
S5
S1
CN1A
CN1B
CN2
CN3
CN5
CN6
CN7
CN8
CN2A
CN3A
CN9
AVR4
AVR2
AVR1
AVR3
+V
-V
GR
L
N
ACIN
ON/OFF
DCOUT
UNIT12
UNIT7
UNIT5
UNIT10
UNIT3
(SPARE)
S4
S2
PE

4.3 Integrated Wiring Diagrams



(58-03) B2

制御ユニット
CF10

SVTXD1
SVTXD1*
SVRXD1
SVRXD1*
SVEMG1
SVEMG1*
SVALM1
SVALM1*

C271
0.33μF

(112-A) A
(112-B) B

(55-04) M

IC201
MC3405
C201

R258 150Ω
R203 1KΩ
R204 1KΩ
R201 1KΩ
R202 1KΩ

C231

R443 100Ω
R292 10KΩ
R289 10KΩ
R290 10KΩ
R291 10KΩ

IC216
C216

R286 10KΩ
R287 10KΩ
R288 10KΩ

IC218
C218

(112-C) C

CNC2 R446 150Ω

SVTXD4
SVTXD4*
SVRXD4
SVRXD4*
SVEMG4
SVEMG4*
SVALM4
SVALM4*

制御ユニット
AUX

0V
0V
0V
0V

(55-06) N

R259 150Ω
R260 150Ω
IC202
C202
R205 1KΩ
R206 1KΩ
R405 330Ω
R406 330Ω
C241
C242

(55-05) O

R261 150Ω
R262 150Ω
IC203
C203
R207 1KΩ
R208 1KΩ
R407 330Ω
R408 330Ω
C243
C244

(55-14) P

R263 150Ω
R264 150Ω
IC204
C204
R209 1KΩ
R210 1KΩ
R409 330Ω
R410 330Ω
C245
C246

SW1-1
CH1-1
SW1-2
CH1-2
SW1-3
CH1-3
CH-0V

R401 120Ω
R403 330Ω

C272 0.33μF
C273 0.33μF
C274 0.33μF
C275 0.33μF

SVTXD1
SVTXD1*
SVRXD1
SVRXD1*
SVEMG1
SVEMG1*
SVALM1
SVALM1*
BAT1
GND
GND
GND
GND
+M5V

SVTXD1-1
SVTXD1*-1
SVRXD1-1
SVRXD1*-1
SVEMG1-1
SVEMG1*-1
SVALM1-1
SVALM1*-1
BAT
GND
GND
GND
GND
BR
RG
MON

SVTXD1-2
SVTXD1*-2
SVRXD1-2
SVRXD1*-2
SVEMG1-2
SVEMG1*-2
SVALM1-2
SVALM1*-2
BAT
GND
GND
GND
GND
BR
RG
MON

SVTXD1-3
SVTXD1*-3
SVRXD1-3
SVRXD1*-3
SVEMG1-3
SVEMG1*-3
SVALM1-3
SVALM1*-3
BAT
GND
GND
GND
GND
BR
RG
MON

A7
(97-03)
バッテリー1

A1
(91-03)
X1軸

A2
(92-03)
Z1軸

A3
(93-03)
Y1軸

(112-D) D

(55-21) S

IC207
MC3405
C207
R269 150Ω
R270 150Ω
R215 1KΩ
R216 1KΩ
R415 330Ω
R416 330Ω
C251
C252

(55-22) R

IC206
MC3405
C206
R267 150Ω
R268 150Ω
R213 1KΩ
R214 1KΩ
R413 330Ω
R414 330Ω
C249
C250

(55-13) Q

IC205
MC3405
C205
R265 150Ω
R266 150Ω
R211 1KΩ
R212 1KΩ
R411 330Ω
R412 330Ω
C247
C248

SW1-6
CH1-6
SW1-5
CH1-5
SW1-4
CH1-4

R441 3.9KΩ
R439 1.5KΩ
R437 680Ω

C276 0.33μF
C277 0.33μF
C276 0.33μF

SVTXD1-6
SVTXD1*-6
SVRXD1-6
SVRXD1*-6
SVEMG1-6
SVEMG1*-6
SVALM1-6
SVALM1*-6
BAT
GND
GND
GND
GND
BR
RG
MON

SVTXD1-5
SVTXD1*-5
SVRXD1-5
SVRXD1*-5
SVEMG1-5
SVEMG1*-5
SVALM1-5
SVALM1*-5
BAT
GND
GND
GND
GND
BR
RG
MON

SVTXD1-4
SVTXD1*-4
SVRXD1-4
SVRXD1*-4
SVEMG1-4
SVEMG1*-4
SVALM1-4
SVALM1*-4
BAT
GND
GND
GND
GND
BR
RG
MON

A6
(96-03)
Z2軸

A5
(95-03)
X2軸

A4
(94-03)
A1軸

(26-16) B1

BR
+M24V
+M5V
0V
FG

BR
+M24V
+M5V
0V
FG

(58-07) B2
制御ユニット
CF10

SVTXD2
SVTXD2*
SVEXD2
SVRXD2*
SVEMG2
SVEMG2*
SVALM2
SVALM2*

A7
(104-03)
バッテリー2

BAT2
GND
GND
GND
GND
+M5V

C279
0.33μF

(56-04) T

IC208
MC3403
R271 150Ω
R219 1KΩ
R220 1KΩ
R217 1KΩ
R218 1KΩ
C208
C232
R444 100Ω
IC217
MC3403
R299 10KΩ
R296 10KΩ
R297 10KΩ
R298 10KΩ
R293 10KΩ
R294 10KΩ
R295 10KΩ
C217
IC219
MC3403
C219

(56-06) U

R274 150Ω
R275 150Ω
IC210
MC3403
C210
R221 1KΩ
R222 1KΩ
R417 330Ω
R418 330Ω
C253
C254

A1
(98-03)
X3軸

SVTXD2-1
SVTXD2*-1
SVRXD2-1
SVRXD2*-1
SVEMG2-1
SVEMG2*-1
SVALM2-1
SVALM2*-1
BAT
GND
GND
GND
GND
GND
MON

SW2-1
CH2-1
C280
0.33μF

(56-05) V

R276 150Ω
R277 150Ω
IC211
MC3403
C211
R223 1KΩ
R224 1KΩ
R419 330Ω
R420 330Ω
C255
C256

A2
(99-03)
Z3軸

SVTXD2-2
SVTXD2*-2
SVRXD2-2
SVRXD2*-2
SVEMG2-2
SVEMG2*-2
SVALM2-2
SVALM2*-2
BAT
GND
GND
GND
GND
BR
RG
MON

(56-14) W

R402 120Ω
SW2-2
CH2-2
C281
0.33μF

R278 150Ω
R279 150Ω
IC212
MC3403
C212
R225 1KΩ
R226 1KΩ
R421 330Ω
R422 330Ω
C257
C258

A3
(100-03)
A4軸

SVTXD2-3
SVTXD2*-3
SVRXD2-3
SVRXD2*-3
SVEMG2-3
SVEMG2*-3
SVALM2-3
SVALM2*-3
BAT
GND
GND
GND
GND
BR
RG
MON

R404 330Ω
SW2-3
CH2-3
C282
0.33μF

(111-D) D

(56-21) Z

R284 150Ω
R285 150Ω
IC215
MC3403
C215
R231 1KΩ
R232 1KΩ
R427 330Ω
R428 330Ω
C263
C264

A6
(103-03)
A7軸

SVTXD2-6
SVTXD2*-6
SVRXD2-6
SVRXD2*-6
SVEMG2-6
SVEMG2*-6
SVALM2-6
SVALM2*-6
BAT
GND
GND
GND
GND
BR
RG
MON

(56-22) Y

R442 1.5KΩ
SW2-6
CH2-6
C285
0.33μF

R282 150Ω
R283 150Ω
IC214
MC3403
C214
R229 1KΩ
R230 1KΩ
R425 330Ω
R426 330Ω
C261
C262

A5
(102-03)
A3軸

SVTXD2-5
SVTXD2*-5
SVRXD2-5
SVRXD2*-5
SVEMG2-5
SVEMG2*-5
SVALM2-5
SVALM2*-5
BAT
GND
GND
GND
GND
BR
RG
MON

(56-13) X

R440 1.5KΩ
SW2-5
CH2-5
C284
0.33μF

R280 150Ω
R281 150Ω
IC213
MC3403
C213
R227 1KΩ
R228 1KΩ
R423 330Ω
R424 330Ω
C259
C260

A4
(101-03)
A2軸

SVTXD2-4
SVTXD2*-4
SVRXD2-4
SVRXD2*-4
SVEMG2-4
SVEMG2*-4
SVALM2-4
SVALM2*-4
BAT
GND
GND
GND
GND
BR
RG
MON

R438 680Ω
SW2-4
CH2-4
C283
0.33μF

(111-C) C
(111-B) B
(111-A) A

R273 150Ω
R272 150Ω
IC209
MC3403
C209
R496 1KΩ
R497 1KΩ
R498 1KΩ
R499 1KΩ

(26-16) B1 BR

BR

+M5V
0V
FG

+M5V
0V
FG

+M5V
0V
FG

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Product Code C – C 1 2 1 6 VI VII VIII IX – 7 7 0

Document Code 6 E 1 – 0 4 0 4

5章 ラダーI/Oリスト

5. Ladder I/O List

Code No.	C-C1216 VI VII VIII IX-770 6J1-0503 6E1-0503 6E2-0503	MFG No.	C1216/0359 ~	Issue Date	2005.12

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＊＊＊コメントリスト＊＊＊ （MELDAS M600）

ADDRESS	COMMENT	
X000	AC200V 過電流	AC200V OVERLOAD
X001	サーマルアラーム	SERMAL ALARM
X002	チップコンベア過負荷アラーム	CHIP C/V OVERLOAD
X003	潤削油ポンプレベル検出	LUBRICATING OIL LEVEL DETECT
X004	長物装置ハンド開	LONG WORK DEVICE'S HAND POEN
X005	残材排出検知／材料切れ	BAR LODER SHORTAGE
X006	棚材検知／材料交換中	BAR LOADER BAR CHANGING
X007	シャッター開位置／前進端位置	BAR LOADER FEED IN BAR ADVANCE
X008	シャッター閉位置／アラーム	BAR LOADER ALARM
X009	材料挿入位置／準備完了	BAR LOADER READY
X00A	シャッター振れ止め開位置	BAR LODDER OPEN THE LID POS.
X00B	ドアロック信号	DOOR LOCK SIG.
X00C	切削油流量検出／ 安全監視ユニット 2 アラーム信号 4	COOLANT OIL FLOWING DETECT / SAFETY CHECK UNIT 2 ALARM SIGNAL 4
X00D	切削油レベル検出	COOLANT OIL LEVEL DETECT
X00E	ドア閉	DOOR CLOSE
X00F	セパレータ前進	WORK SEPARATER ADV.
X020	バイト折れ検出前進端	BIT BREAKAGE DETECT ADV.
X021	バイト折れ検出後退端	BIT BREAKAGE DETECT RET.
X022	GB 圧力不足アラーム	GB PRESSURE ALARM
X023	外部装置アラーム 1（即停止）	EXTERNAL ALARM 1
X024	外部アラーム 2（サイクル停止）／ 安全監視ユニット 1 アラーム信号 1	EXTERNAL ALARM 2 / SAFETY CHECK UNIT 1 ALARM SIGNAL 1
X025	外部Mコード完了	EXTERNAL M FINISH
X026	セパレータ後退	WORK SEPARATER RET.
X027	非常停止	EMERGENCY STOP
X028	ノックアウト前進端	KNOCK OUT ADV.END
X029	ノックアウト異常	KNOCK OUT ERROR
X02A	製品ハンド開（U33J）	WORK HAND OPEN (U33J)
X02B	主軸電源 ON	SPINDLE POWER ON
X02C	機械移動検出／ 安全監視ユニット 2 アラーム信号 1	MACHINE MOVE DETECT/ SAFETY CHECK UNIT 2 ALARM SIGNAL 1
X02D	安全監視ユニット 2 アラーム信号 2	SAFETY CHECK UNIT 2 ALARM SIGNAL 2
X02E	安全監視ユニット 2 アラーム信号 3	SAFETY CHECK UNIT 2 ALARM SIGNAL 3
X02F	安全監視ユニット 1 アラーム信号 2	SAFETY CHECK UNIT 1 ALARM SIGNAL 2
X040	原点（OIL BF）	ORIGIN(OIL BF)
X041	全閉全開（OIL BF）	CLISE&OPEN(OIL BF)
X042	振れ止め 1（OIL BF）	VIBRATION STOP 1
X043	振れ止め 2（OIL BF）	VIBRATION STOP 2
X044	振れ止め 3（OIL BF）	VIBRATION STOP 3
X045	ドアスイッチ（OIL BF）	DOOR SW. (OIL BF)
X046	先端検出 SK.3 OIL BF	DETECT OF THE TIP SK.3(OIL BF)
X047	予備	SPARE
X048	予備	SPARE
X049	予備	SPARE
X04A	予備	SPARE
X04B	予備	SPARE
X04C	ヘッド上昇端	HEAD UP POSITION
X04D	データ有効	EFFECTIVE DETA
X04E	計測信号入力	MEASURE SIG. INPUT
X04F	リトラクション	RETRY

＊＊＊コメントリスト＊＊＊ （MELDAS　M600）

ADDRESS	COMMENT	
X060	データ 0	DATA 0
X061	データ 1	DATA 1
X062	データ 2	DATA 2
X063	データ 3	DATA 3
X064	データ 4	DATA 4
X065	データ 5	DATA 5
X066	データ 6	DATA 6
X067	データ 7	DATA 7
X068	データ 8	DATA 8
X069	データ 9	DATA 9
X06A	データ 10	DATA 10
X06B	データ 11	DATA 11
X06C	極性＋－	MARK +-
X06D	アンプ正常	AMP. NOMAL STATE
X06E	アンプオンライン	AMP. ON LINE
X06F	NG データ	NG DATA
X080	外部アラーム 3	EXTERNAL ALARM 3
X081	外部アラーム 4	EXTERNAL ALARM 4
X082	外部コード完了	EXTERNAL CODE FINISH
X083	予備	SPARE
X084	予備	SPARE
X085	予備	SPARE
X086	予備	SPARE
X087	予備	SPARE
X088	予備	SPARE
X089	予備	SPARE
X08A	予備	SPARE
X08B	予備	SPARE
X08C	予備	SPARE
X08D	予備	SPARE
X08E	予備	SPARE
X08F	予備	SPARE
X2C0	手動操作	MANUAL OPERATION MODE
X2C1	MDI	MDI MODE
X2C2	自動運転	AUTOMATIC OPERATION MODE
X2C3	プログラムチェック	PROGRAM CHECK MODE
X2C4	運転準備	PREPARATION FOR OPERATION MODE
X2C5	OP	OPTION
X2C6	安全監視ユニット 1 アラーム信号 3	SAFETY CHECK UNIT 1 ALARM SIGNAL 3
X2C7	自動電源断	AUTOMATIC POWER OFF
X2C8	オプショナルストップ	OPTIONAL STOP
X2C9	ブロックスキップ	BLOCK SKIP
X2CA	背面主軸チャック	BACK SPINDLE CHUCK
X2CB	主軸チャック	SPINDLE CHUCK
X2CC	予備	SPARE
X2CD	給材機電源 ON	BF POWER ON
X2CE	開始	START
X2CF	休止	PAUSE

＊＊＊コメントリスト＊＊＊ （MELDAS M600）

ADDRESS	COMMENT	
X2E0	切削油	COOLANT OIL
X2E1	主軸起動	SPINDLE START
X2E2	主軸停止	SPINDLE STOP
X2E3	X1	X1
X2E4	X10	X10
X2E5	X100	X100
X2E6	オーバーライド 1	OVERRIDE 1
X2E7	オーバーライド 2	OVERRIDE 2
X2E8	オーバーライド 4	OVERRIDE 4
X2E9	オーバーライド 8	OVERRIDE 8
X2EA	オーバーライド 16	OVERRIDE 16
X2EB	プログラム保護（キースイッチ）	PROGRAM PROTECT KEY
X2EC	安全監視ユニット 1 アラーム信号 4	SAFETY CHECK UNIT 1 ALARM SIGNAL 4
X2ED	切削油流量検出温度検知	COOLANT OIL TEMP.SENSOR
X2EE	オイルブロー過負荷	OIL BLOW SA.
X2EF	ネット	NET KEY
X108	リセット信号	RESET SIGNAL
X178	自動計測	AUTO MEASURIN
X179	先端検出	BAR TOP DETECT
X17A	自動ﾂｰﾙｾｯﾄ	AUTO T SET
X17B	センサ入力 4	SENSOR INPUT 4
X17C	センサ入力 5	SENSOR INPUT 5
X17D	センサ入力 6	SENSOR INPUT 6
X17E	センサ入力 7	SENSOR INPUT 7
X17F	センサ入力 8	SENSOR INPUT 8

＊＊＊コメントリスト＊＊＊ （MELDAS　M600）

ADDRESS	COMMENT	
Y000	自動電源断	AUTO POWER OFF
Y001	ワークコンベア起動	WORK CONVEYOR
Y002	切削油ポンプ起動	COOLANT OIL PUMP
Y003	潤滑油ポンプ／給材機電源	LUBRICAT.PUMP/BAR LOADER OFF
Y004	取出しモータ正転／材料交換開始	PICK UP MTR ON/BAR LOAD.RUN.ST
Y005	取出しモータ逆転／トルク切替え	PICK UP MTR ON/B-LOAD.TORQ.CHG
Y006	着脱モータ正転／機械側アラーム	MOTOR ON / BAR LOADER EMG.STOP
Y007	着脱モーター逆転／カウント	MOTOR ON / COUNT RESET
Y008	ブレーキ解除／送り停止	BRAKE RELEASE/BAR LOAD.FD.SP
Y009	ドアロック ON	DOOR LOCK ON
Y00A	ＮＣ電源 OFF	NC POWER OFF
Y00B	セパレータ前進	WORK SEPARATER ADV.
Y00C	エアブロー	AIR BLOW
Y00D	ブレーキ	BRAKE
Y00E	外部M65	EXTERNAL M65
Y00F	外部カウンタ	EXTERNAL COUNTER
Y020	シグナルタワー緑	SIGNAL TOWER GREEN
Y021	シグナルタワー黄	SIGNAL TOWER YELLOW
Y022	シグナルタワー赤	SIGNAL TOWER RED
Y023	ハンド閉（U33J）	HAND CLOSE (U33J)
Y024	ハンド開（U33J）	HAND OPEN (U33J)
Y025	サーボ OFF	SERVO OFF
Y026	ハンドエアーブロー（U33J）	HAND AIR BLOW (U33J)
Y027	振れ止め閉	VIBRATION STOP CLOSE
Y028	バイト折れ検出	TOOL BIT CHECH ON
Y029	セパレータ後退	WORK SEPARATER REV.
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Y02C	CS	CS
Y02D	CS	CS
Y02E	外部M68	EXTERNAL M68
Y02F	ノックアウト前進	KNOCK OUT ADV.
Y040	カム軸正転	CAM AXIS FORWARD
Y041	カム軸逆転	CAM AXIS REVERS
Y042	カムポンプ１起動	CAM PUMP 1 STARTING
Y043	カムポンプ２起動	CAM PUMP 2 STARTING
Y044	予備	SPARE
Y045	予備	SPARE
Y046	予備	SPARE
Y047	予備	SPARE
Y048	予備	SPARE
Y049	計測ヘッド開	MEASURE HEAD OPEN
Y04A	予備	SPARE
Y04B	予備	SPARE
Y04C	予備	SPARE
Y04D	予備	SPARE
Y04E	予備	SPARE
Y04F	予備	SPARE

＊＊＊コメントリスト＊＊＊ （MELDAS M600）

ADDRESS	COMMENT	
Y060	予備	SPARE
Y061	予備	SPARE
Y062	予備	SPARE
Y063	リトライ	RETRY
Y064	ゼロイング	ZEROING
Y065	計測開始	MEASURE START
Y066	データ要求	DATA DEMANDS
Y067	アンプ自動モード	AUTO MEASURE MODE
Y068	予備	SPARE
Y069	予備	SPARE
Y06A	予備	SPARE
Y06B	予備	SPARE
Y06C	予備	SPARE
Y06D	予備	SPARE
Y06E	予備	SPARE
Y06F	予備	SPARE
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Y081	外部コード出力 2-1	EXTERNAL CODE 2-1
Y082	外部コード出力 2-2	EXTERNAL CODE 2-2
Y083	外部コード出力 2-3	EXTERNAL CODE 2-3
Y084	外部コード出力 2-4	EXTERNAL CODE 2-4
Y085	外部コード出力 2-5	EXTERNAL CODE 2-5
Y086	外部コード出力 2-6	EXTERNAL CODE 2-6
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Y089	予備	SPARE
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Y08B	予備	SPARE
Y08C	予備	SPARE
Y08D	予備	SPARE
Y08E	予備	SPARE
Y08F	予備	SPARE
Y340	アラーム	ALARM
Y341	警告	ERROR
Y342	予備	SPARE
Y343	軸移動中	AXIS MOVING
Y344	予備	SPARE
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Y346	MDI	MDI MODE
Y347	自動運転	AUTOMATIC OPERATION MODE
Y348	プログラムチェック	PROGRAM CHECK MODE
Y349	運転準備	PREPARATION FOR OPERATION MODE
Y34A	OP	OPTION
Y34B	CS	CS
Y34C	自動電源断	AUTO POWER OFF
Y34D	オプショナルストップ	OPTIONAL STOP
Y34E	ブロックスキップ	BLOCK SKIP
Y34F	背面主軸チャック	BACK SPINDLE CHUK

＊＊＊コメントリスト＊＊＊ （MELDAS　M600）

ADDRESS	COMMENT	
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Y361	給材機電源	BF POWER
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Y363	休止	PAUSE
Y364	切削油	COOLANT OIL
Y365	X1	X1
Y366	X10	X10
Y367	X100	X100
Y368	主軸起動	SP. START
Y369	オイルブローポンプ ON	OIL BLOW PUMP ON
Y36A	オイルブローバルブ ON	OIL BLOW VALVE ON
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Y36C	外部M62	EXTERNAL M62
Y36D	外部M63	EXTERNAL M63
Y36E	外部M64	EXTERNAL M64
Y36F	切削油流量検出温度表示	COOL.OIL FLOW.DETECT [ON] IND.

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6章　パーツリスト
6. PARTS LIST
C1216A

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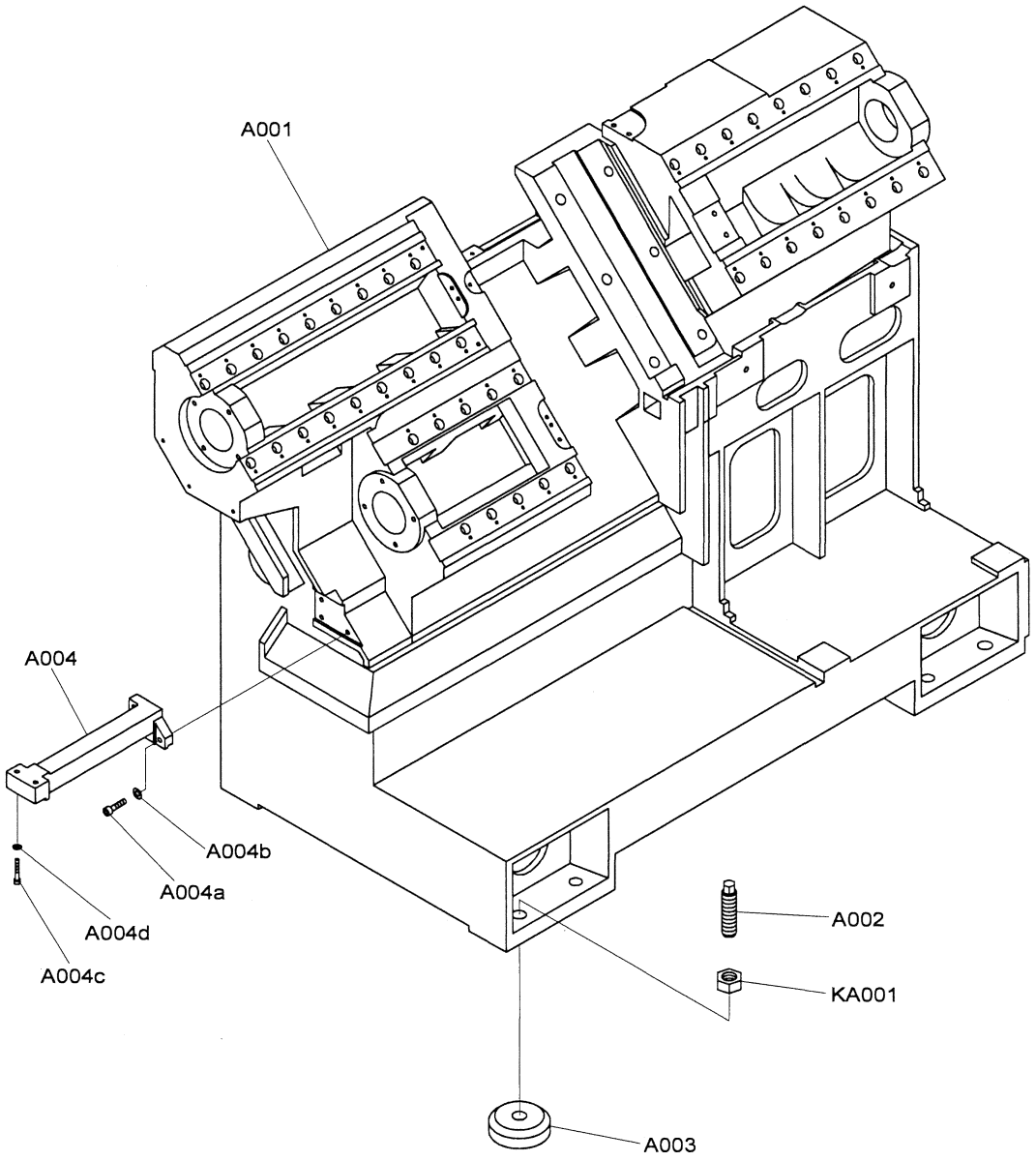
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C1216 U40Z	ロータリーガイドブッシュ駆動装置	ROTARY GUIDE BUSHING DEVICE	WT000	6-281
C1216 U40Z	ロータリーガイドブッシュ駆動装置	ROTARY GUIDE BUSHING DEVICE	WT100	6-282
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C1216 U76Z	型式別専用ブロック	EXCLUSIVE BLOCK	CT000	6-286
C1216 U76Z	型式別専用ブロック	EXCLUSIVE BLOCK	DT300	6-287
C1216 U76Z	型式別専用ブロック	EXCLUSIVE BLOCK	WT000	6-288
C1216 U77Z	型式別専用ブロック（C1216 U10A 含む）	EXCLUSIVE BLOCK (Include C1216 U10A)	000	6-289
C1216 U77Z	型式別専用ブロック	EXCLUSIVE BLOCK	CT000	6-290
C1216 U77Z	型式別専用ブロック	EXCLUSIVE BLOCK	DT300	6-291
C1216 U77Z	型式別専用ブロック	EXCLUSIVE BLOCK	WT000	6-292
C1216 U78Z	型式別専用ブロック（C1216 U10A 含む）	EXCLUSIVE BLOCK (Include C1216 U10A)	000	6-293
C1216 U78Z	型式別専用ブロック	EXCLUSIVE BLOCK	CT000	6-294
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C12 U110Z	固定型ガイドブッシュ装置	FIXED GUIDE BUSHING DEVICE	000	6-306
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C12 U2110Z	同期型ロータリーガイドブッシュ装置(輸出用)	ROTARY GUIDE BUSHING DEVICE(FOR EXPORT)	000	6-330
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C1216 Y90Z	突切りバイト折れ検出	CUT-OFF TOOL BIT BREAK DETECTOR	WT100	
C1216 Y90Z	突切りバイト折れ検出	CUT-OFF TOOL BIT BREAK DETECTOR	WT9100	

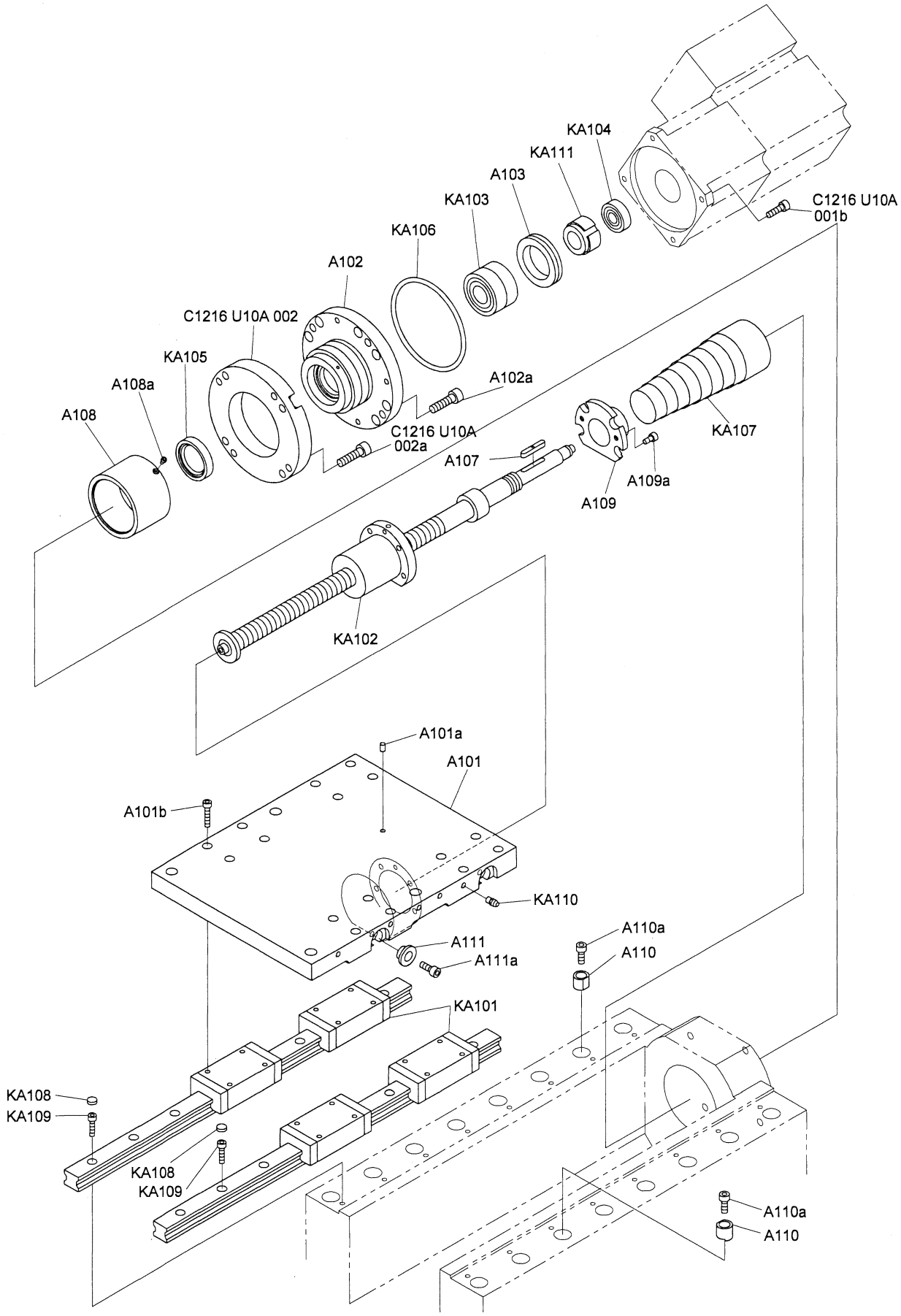
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C1216	ベッド部 BED	A000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
A001	ベッド	BED		1	
A002	水平調整ボルト	ADJUST BOLT		4	
A003	据付座	SEAT		4	
A004	エプロンサポート	APRON SUPPORT		1	
A004a	六角穴付ボルト	BOLT	M8x35	3	
A004b	平座金	WASHER	M8	3	
A004c	六角穴付ボルト	BOLT	M6x40	2	
A004d	平座金	WASHER	M6	2	
KA001	六角ナット	NUT	M24	4	

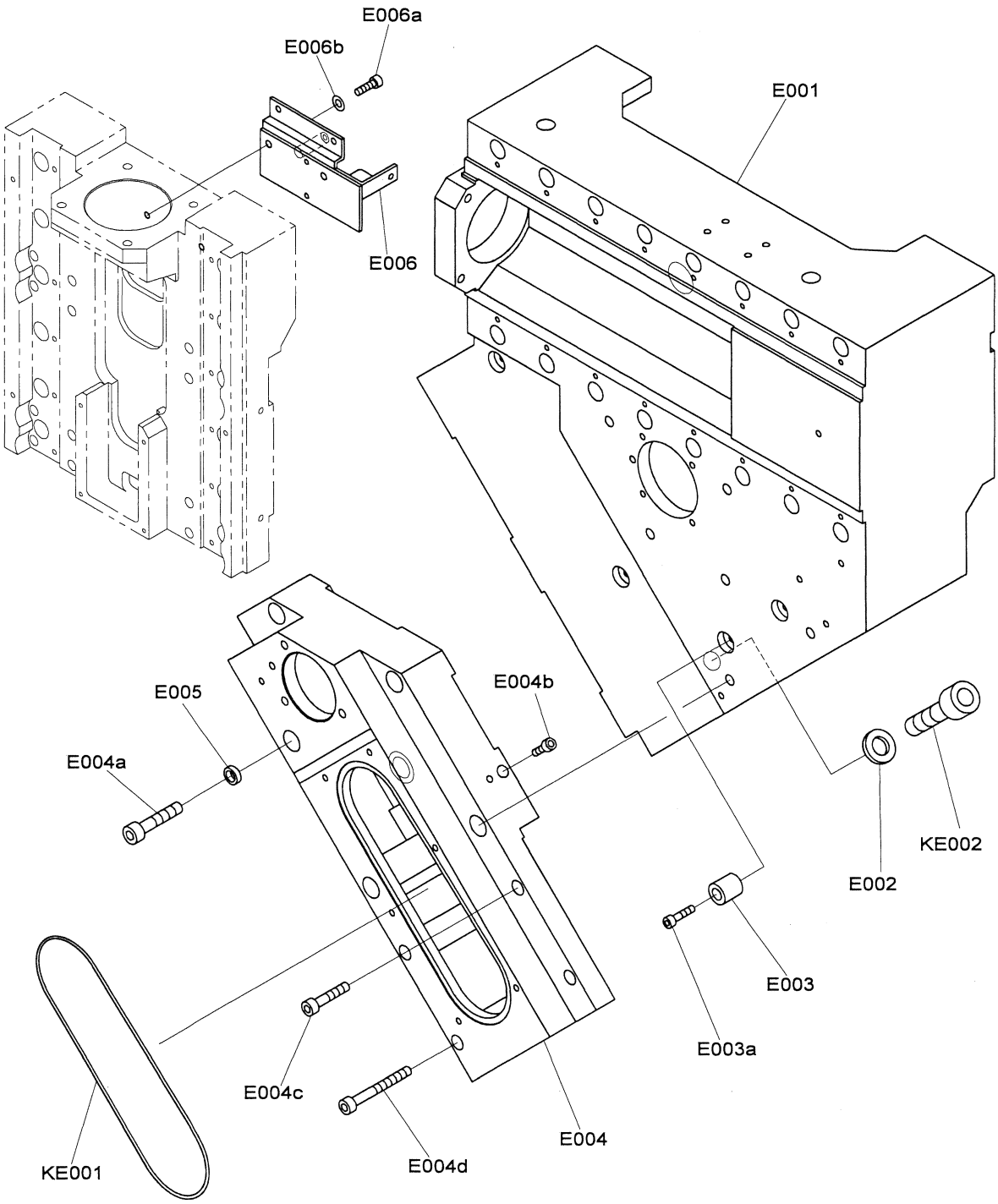
C1216	ベッド部 BED	A000



C1216	Z1 軸送り機構部 Z1-AXIS FEED MECHANISM	A100 (C1216 U10A)

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
A101	Z1スライド	Z1-SLIDE		1	
A101a	フサギ栓	PLUG	ø5x8	1	
A101b	六角穴付ボルト	BOLT	M5x25	16	
A102	ボールネジサポート	BALL SCREW SUPPORT		1	
A102a	六角穴付ボルト	BOLT	M8x30	4	
A102b	六角穴付ボルト	BOLT	M6x20	4	
A103	ベアリング押え	NUT		1	
C1216U10A 002	スペーサー	SPACER		1	
C1216U10A 002a	六角穴付ボルト	BOLT	M8x20	4	
A107	キー	KEY		1	
A108	スクリューカバー受け (外)	SCREW COVER RECEIVE (OUT)		1	
A108a	六角穴付ボルト	BOLT	M3x5	4	
A109	スクリューカバー受け (内)	SCREW COVER RECEIVE (IN)		1	
A109a	六角穴付ボルト	BOLT	M5x10	2	
A110	コマ	BLOCK		16	
A110a	六角穴付ボルト	BOLT	M6x16	16	
A111	コマ	BLOCK		2	
A111a	六角穴付ボルト	BOLT	M6x16	2	
KA101	LM ガイド	LM GUIDE	HSR20LR2UUCOE +480LP-II(A)	1set	THK
KA102	ボールネジ	BALL SCREW	BS3620	1	CMJ
KA103	ボールネジサポート軸受	BALL SCREW SUPPORT BEARING	20TAB04DB	1set	NACHI
KA104	深溝玉軸受	BALL BEARING	6201ZZ	1	NACHI
KA105	オイルシール SB 型	OIL SEAL (SB TYPE)	AB1679A3	1	NOK
KA106	O リング	O-RING	S95	1	NOK
KA107	フレックスカバー	FREX COVER	FC-16	1	TAIYO
KA108	LM 用キャップ	LM CAP	C5	16	THK
KA109	六角穴付ボルト	BOLT	M5x20	16	UNBRAKO
KA110	グリースニップル	GREASE NIPPLES	TYPE A M6x1	1	
KA111	ロックナット	LOCK NUT	KTKA20x1	1	FUKUDA

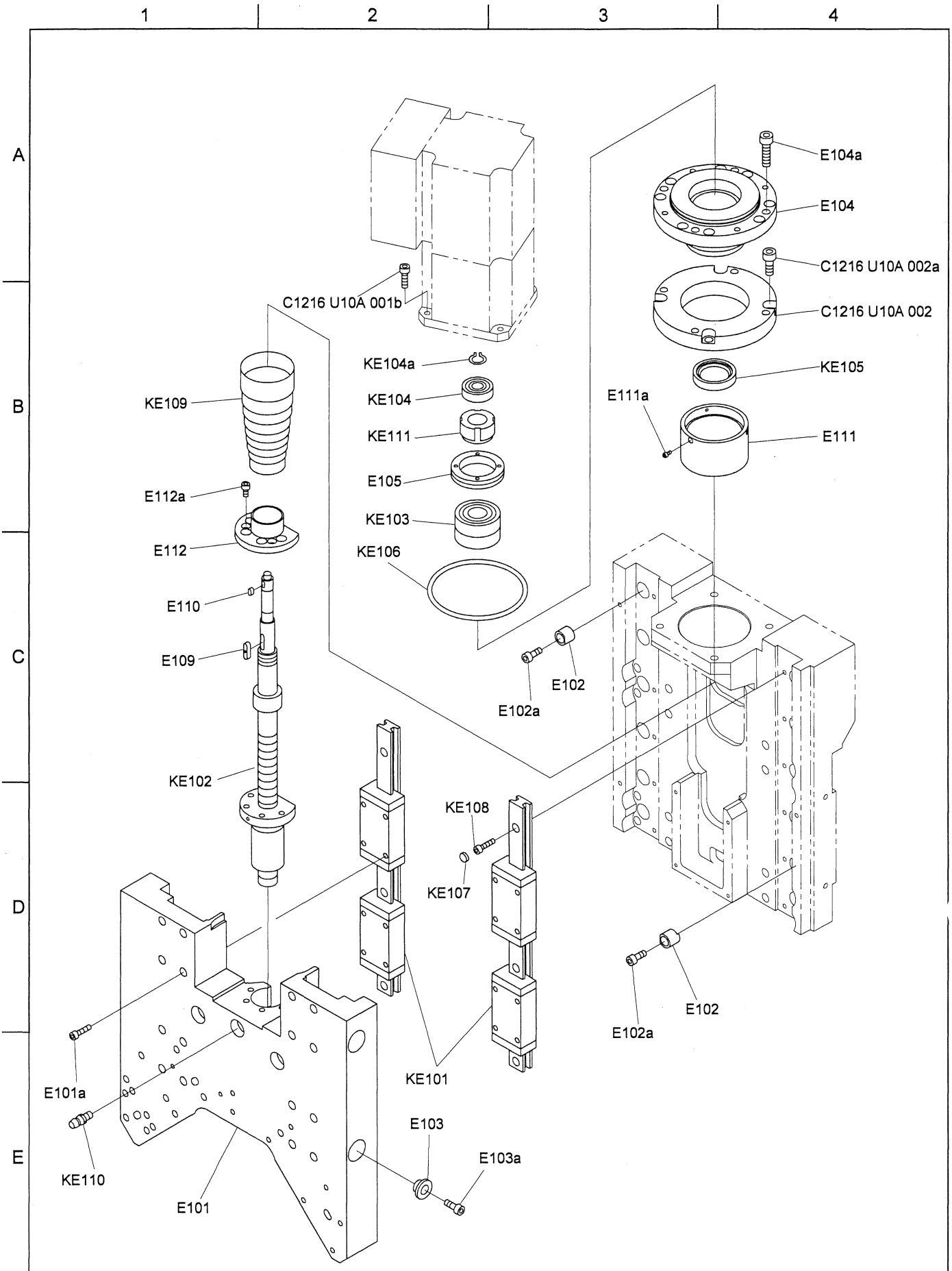
C1216	Z1 軸送り機構部 Z1-AXIS FEED MECHANISM	A100 (C1216 U10A)



C1216	くし刃刃物台 GANG TOOL POST	E000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
E001	刃物台本体	MAIN BODY		1	
E002	座金	WASHER		6	
E003	位置決メピン	POSITIONING PIN		2	
E003a	六角穴付ボルト	BOLT	M6x25	2	
E004	ガイドブッシュ本体	GUIDE BUSHING BODY		1	
E004a	六角穴付ボルト	BOLT	M10x50	6	
E004b	六角穴付ボルト	BOLT	M6x20	2	
E004c	六角穴付ボルト	BOLT	M8x40	2	
E004d	六角穴付ボルト	BOLT	M8x70	2	
E005	座金	WASHER		6	
E006	ガイド	GUIDE		1	
E006a	六角穴付ボルト	BOLT	M6x20	2	
E006b	平座金	WASHER	M6	2	
KE001	スターロープ	STAR ROPE	NUMBER 2 L=650mm	1	MITSUBOSHI
KE002	六角穴付ボルト	BOLT	M16x70	6	UNBRAKO

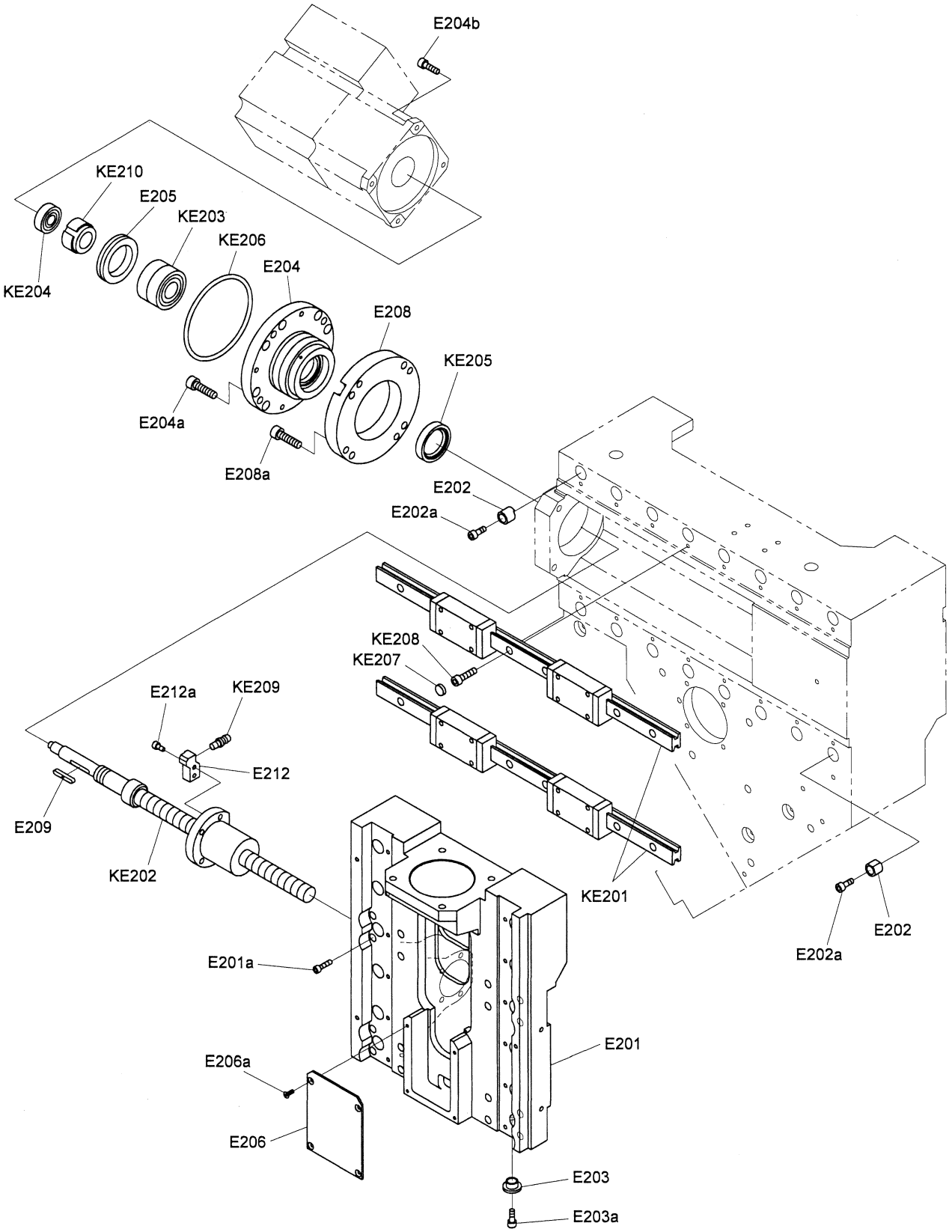
C1216	くし刃刃物台 GANG TOOL POST	E000



C1216	X1 軸送り機構部 X1-AXIS FEED MECHANISM	E100 (C1216 U10A)

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
E101	X1スライド	X1 SLIDE		1	
E101a	六角穴付ボルト	BOLT	M5x20	16	
E102	コマ	BLOCK		12	
E102a	六角穴付ボルト	BOLT	M6x16	12	
E103	コマ	BLOCK		2	
E103a	六角穴付ボルト	BOLT	M6x16	2	
E104	ボールネジサポート	BALL SCREW SUPPORT		1	
E104a	六角穴付ボルト	BOLT	M8x30	4	
E104b	六角穴付ボルト	BOLT	M6x20	4	
E105	ベアリング押さえ	NUT		1	
C1216U10A 002	スペーサー	SPACER		1	
C1216U10A 002a	六角穴付ボルト	BOLT	M8x20	4	
E109	キー	KEY		1	
E110	キー	KEY		1	
E111	スクリューカバー受け (外)	SCREW COVER RECEIVE (OUT)		1	
E111a	六角穴付ボルト	BOLT	M3x5	3	
E112	スクリューカバー受け (内)	SCREW COVER RECEIVE (IN)		1	
E112a	六角穴付ボルト	BOLT	M5x10	2	
KE101	LM ガイド	LM GUIDE	HSR20LR2UUCOE +339LP-II	1set	THK
KE102	ボールネジ	BALL SCREW	BS3720	1	CMJ
KE102a	軸用 C トメワ	RETAINING RING (C TYPE)	12	1	
KE103	ボールネジサポート軸受	BALL SCREW SUPPORT BEARING	20TAB04DB	1set	NACHI
KE104	深溝玉軸受	BALL BEARING	6201ZZ	1	NACHI
KE105	オイルシール SB 型	OIL SEAL (SB TYPE)	AB1679A3	1	NOK
KE106	O リング	O-RING	S95	1	NOK
KE107	LM 用キャップ	LM CAP	C5	12	THK
KE108	六角穴付ボルト	BOLT	M5x20	12	UNBRAKO
KE109	フレックスカバー	FREX COVER	FC-14	1	TAIYO HATSUJO
KE110	グリースニップル	GREASE NIPPLES	TYPE A M6x1	1	
KE111	ロックナット	LOCK NUT	KTKA20x1	1	FUKUDA

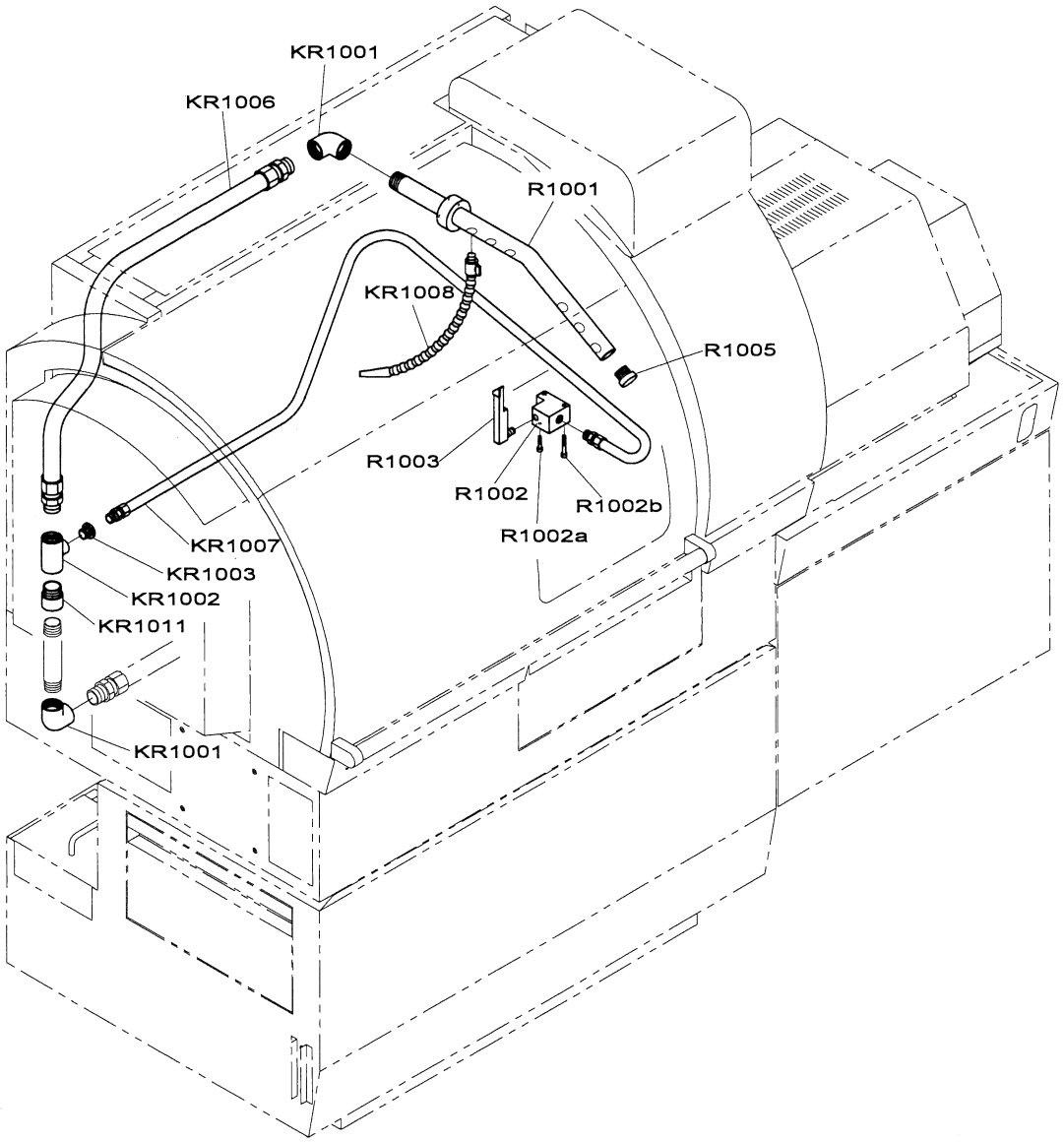
C1216	X1 軸送り機構部 X1-AXIS FEED MECHANISM	E100 (C1216 U10A)



C1216	Y1 軸送り機構部 Y1-AXIS FEED MECHANISM	E200

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
E201	Y_1スライド	Y_1 SLIDE		1	
E201a	六角穴付ボルト	BOLT	M5x20	16	
E202	コマ	BLOCK		16	
E202a	六角穴付ボルト	BOLT	M6x16	16	
E203	コマ	BLOCK		2	
E203a	六角穴付ボルト	BOLT	M6x16	2	
E204	ボールネジサポート	BALL SCREW SUPPORT		1	
E204a	六角穴付ボルト	BOLT	M8x30	4	
E204b	六角穴付ボルト	BOLT	M6x20	4	
E205	ベアリング押さえ	NUT		1	
E206	フタ	COVER		1	
E206a	皿小ネジ	COUNTER-SUNK SCREW	M4x8	4	
E208	スペーサー	SPACER		1	
E208a	六角穴付ボルト	BOLT	M8x20	4	
E209	キー	KEY		1	
E212	ブロック	BLOCK		1	
E212a	六角穴付ボルト	BOLT	M5x10	2	
KE201	LM ガイド	LM GUIDE	HSR20LR2UUCOE +493LP-II	1set	THK
KE202	ボールネジ	BALL SCREW	BS2420	1	CPM
KE203	ボールネジサポート軸受	BALL SCREW SUPPORT BEARING	20TAB04DB	1set	NACHI
KE204	深溝玉軸受	BALL BEARING	6201ZZ	1	NACHI
KE205	オイルシール SB 型	OIL SEAL (SB TYPE)	AB1679A3	1	NOK
KE206	O リング	O-RING	S95	1	NOK
KE207	LM 用キャップ	LM CAP	C5	16	THK
KE208	六角穴付ボルト	BOLT	M5x20	16	UNBRAKO
KE209	グリースニップル	GREASE NIPPLES	TYPE A M6x1	1	
KE210	KMT ナット	KMT NUT	M20 P1	1	SKF

C1216	Y_1 軸送り機構部 Y_1-AXIS FEED MECHANISM	E200



C1216	切削油供給装置 COOLANT SUPPLY DEVICE	R1000

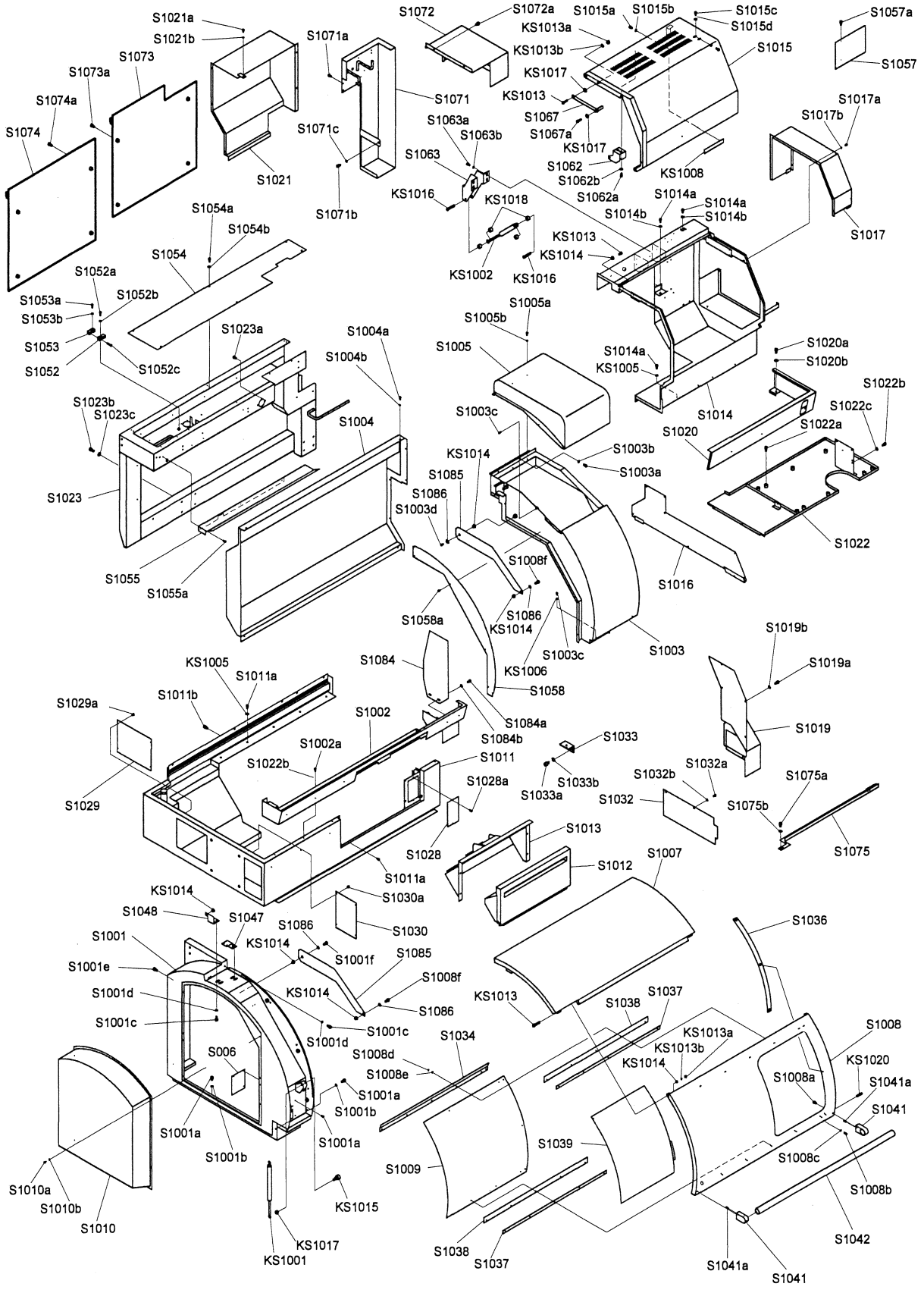
PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
R1001	切削油ディストリビュータ	COOLANT DISTRIBUTOR		1	
R1002	切削油ブロック	COOLANT BLOCK		1	
R1002a	六角穴付ボルト	BOLT	M6x25	1	
R1002b	六角穴付ボルト	BOLT	M6x40	2	
R1003	切削油ノズル	COOLANT NOZZLE		1	
KR1001	エルボ	ELBOW	1"	2	
KR1002	径違いティー	TEE	1"x1"x1/2"	1	
KR1003	ブッシュ	BUSH	1/2"x3/8"	1	
KR1006	トヨスプリングホース	HOSE	1"	1	TOYO FLEX
KR1007	トヨスプリングホース	HOSE	3/8"	1	TOYO FLEX
KR1008	スナップロッククーラントノズル	NOZZLE	1/2"-3/8"-400 -8550-393	6	CAPTAIN INDUSTRIES
KR1010	スクリュープラグ	SCREW PLUG	MSWZ27	1	MISUMI
KR1011	めすおすソケット	FEMALE-MALE SOCKET	1"	1	

C1216	切削油供給装置 COOLANT SUPPLY DEVICE	R1000

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PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KR201	潤滑油ポンプ	LUBRICATING OIL PUMP	MLZ-2.5-8LP CE	1	LUBE
KR202	フロープロパーユニット	FLOW PROPER UNIT	PSS1	8	SHOWA YUKI
KR203	締付プラグ	FIXING PLUG	PA4	22	SHOWA YUKI
KR204	スリーブ	SLEEVE	PB4	24	SHOWA YUKI
KR205	チューブインサート	TUBE INSERT	AL4	12	SHOWA YUKI
KR206	プロパーナット	PROPER NUT	PAN4	2	SHOWA YUKI
KR207	ティー	TEE	PK4	4	SHOWA YUKI
KR208	エルボ	ELBOW	PL4	2	SHOWA YUKI
KR211	デスターユニ	JUNCTION	DB6D	2	SHOWA YUKI
KR212	シールプラグ	SEAL PLUG	PG004	2	SHOWA YUKI
KR213	正和ナイロンパイプ	NYLON PIPE	⌀4(11NYLON) 15m	1	SHOWA YUKI
KR214	保護スプリング	SPRING	For ⌀4 15m	1	SHOWA YUKI
KR215	アルミパイプ	PIPE	ALP4 8m	1	SHOWA YUKI

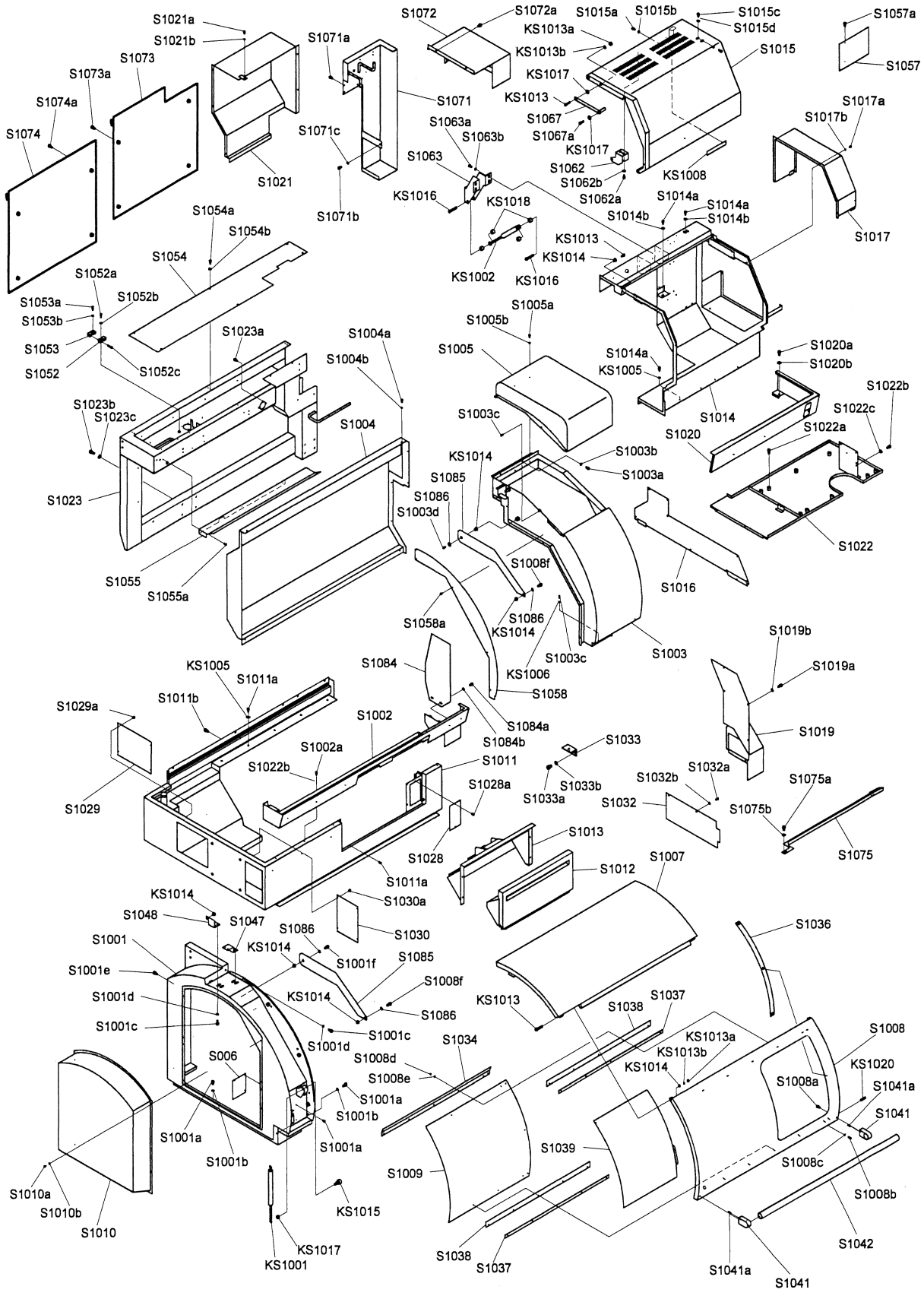
C1216	集中潤滑油装置 LUBRICANT DEVICE	R200



C1216	スプラッシュガード部 SPLASH GUARD	S1000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
S1001	正面カバー (左)	FRONT COVER (L)		1	
S1001a	六角穴付ボルト	BOLT	M4x12	6	
S1001b	平座金	WASHER	M4	3	
S1001c	六角穴付ボルト	BOLT	M6x12	5	
S1001d	平座金	WASHER	M6	5	
S1001e	六角穴付ボルト	BOLT	M4x6	3	
S1001f	六角穴付ボルト	BOLT	M5x10	1	
S1002	正面カバー (下)	FRONT COVER (LOWER)		1	
S1002a	六角穴付ボルト	BOLT	M4x8	4	
S1002b	平座金	WASHER	M4	4	
S1003	正面カバー (前)	FRONT COVER (FRONT)		1	
S1003a	六角穴付ボルト	BOLT	M6x12	2	
S1003b	平座金	WASHER	M6	2	
S1003c	六角穴付ボルト	BOLT	M4x10	3	
S1003d	六角穴付ボルト	BOLT	M5x10	1	
S1004	背面カバー (外)	BACK COVER (OUT)		1	
S1004a	六角穴付ボルト	BOLT	M4x8	6	
S1004b	平座金	WASHER	M4	6	
S1005	トップカバー	TOP COVER		1	
S1005a	六角穴付ボルト	BOLT	M4x8	2	
S1005b	平座金	WASHER	M4	2	
S1006	フタ	COVER		1	
S1007	左トビラ (上)	LEFT DOOR (UPPER)		1	
S1008	左トビラ (下)	LEFT DOOR (LOWER)		1	
S1008a	六角穴付ボルト	BOLT	M6x12	2	
S1008b	六角穴付止ネジ (平先)	SET SCREW	M3x5	1	
S1008c	真チュウ座	SEAT	M3	1	
S1008d	六角ナット	NUT	M4	13	
S1008e	平座金	WASHER	M4	13	
S1008f	六角穴付ボルト	BOLT	M5x10	2	
S1009	マド	WINDOW		1	
S1010	左側面カバー	LEFT SIDE COVER		1	
S1010a	六角穴付ボルト	BOLT	M4x8	4	
S1010b	平座金	WASHER	M4	4	
S1011	エプロン	APRON		1	
S1011a	六角穴付ボルト	BOLT	M6x12	10	
S1011b	六角穴付ボルト	BOLT	M4x5	3	
S1012	製品受箱	RECEIVE BOX		1	
S1013	製品シュート	WORK CHUTE		1	
S1014	右正面カバー	RIGHT FRONT COVER		1	
S1014a	六角穴付ボルト	BOLT	M6x12	4	
S1014b	平座金	WASHER	M6	4	
S1015	右トビラ	RIGHT DOOR		1	
S1015a	六角穴付ボルト	BOLT	M4x8	2	
S1015b	平座金	WASHER	M4	2	
S1015c	六角穴付ボルト	BOLT	M6x10	2	
S1015d	平座金	WASHER	M6	2	
S1016	正面カバー (右)	FRONT COVER (R)		1	
S1016a	六角穴付ボルト	BOLT	M4x6	7	
S1016b	平座金	WASHER	M4	7	

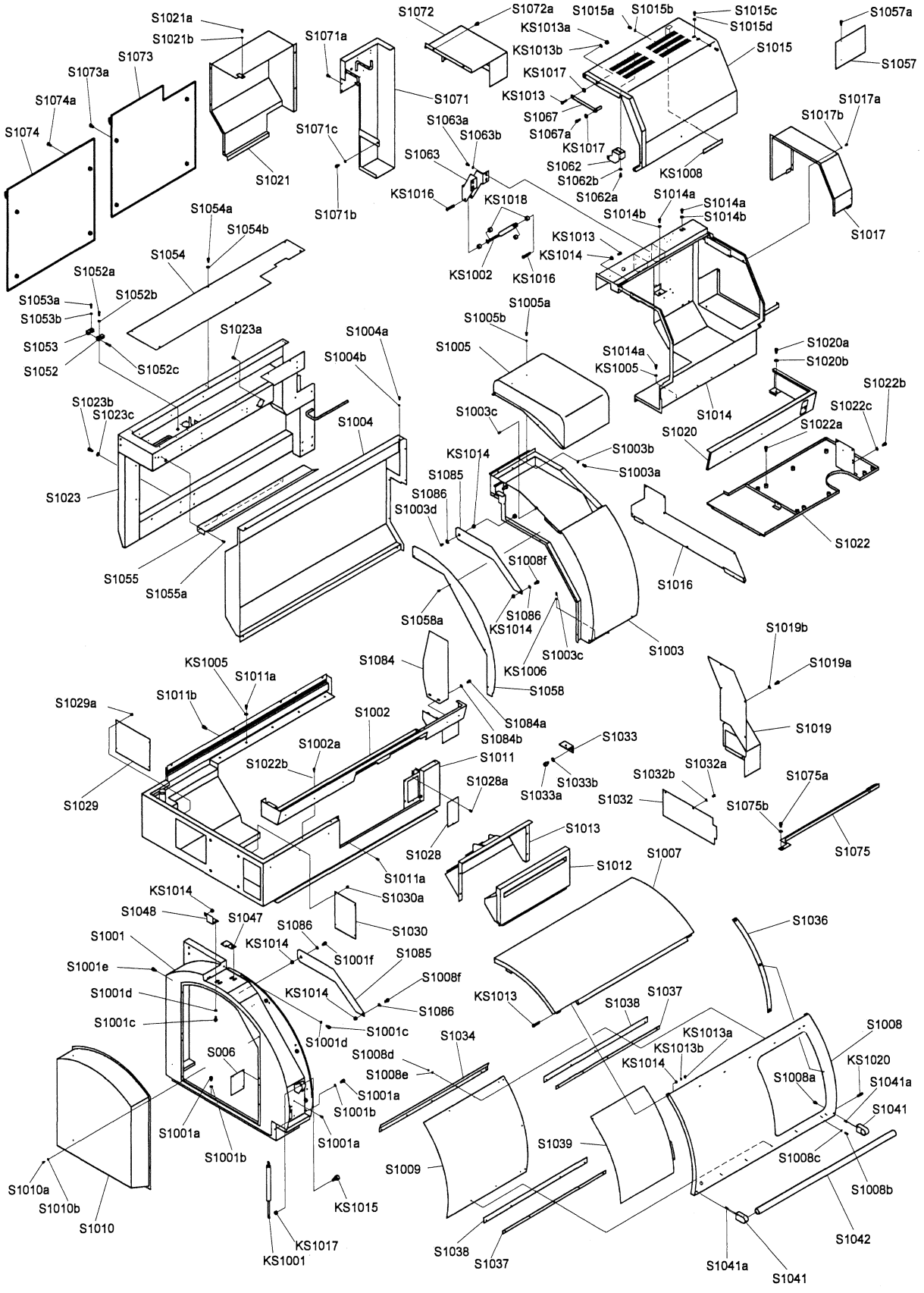
C1216	スプラッシュガード部 SPLASH GUARD	S1000



C1216	スプラッシュガード部 SPLASH GUARD	S1000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
S1017	右側面カバー (上)	RIGHT SIDE COVER (UPPER)		1	
S1017a	六角穴付ボルト	BOLT	M4x6	3	
S1017b	平座金	WASHER	M4	3	
S1019	モーターカバー	MOTOR COVER		1	
S1019a	六角穴付ボルト	BOLT	M4x6	5	
S1019b	平座金	WASHER	M4	5	
S1020	操作盤下部カバー	OPERATION LOWER COVER		1	
S1020a	六角穴付ボルト	BOLT	M6x12	4	
S1020b	平座金	WASHER	M6	4	
S1021	右背面カバー	RIGHT BACK COVER		1	
S1021a	六角穴付ボルト	BOLT	M4x6	5	
S1021b	平座金	WASHER	M4	5	
S1022	潤滑油プレート	LUBRICANT PLATE		1	
S1022a	六角穴付ボルト	BOLT	M6x16	4	
S1022b	六角穴付ボルト	BOLT	M4x8	2	
S1022c	平座金	WASHER	M4	2	
S1023	ダクト	DUCT		1	
S1023a	六角穴付ボルト	BOLT	M6x12	3	
S1023b	六角穴付ボルト	BOLT	M8x20	9	
S1023c	平座金	WASHER	M8	9	
S1028	フタ	COVER		1	
S1028a	六角穴付ボルト	BOLT	M4x8	2	
S1029	左側面フタ (1)	LEFT SIDE COVER (1)		1	
S1029a	六角穴付ボルト	BOLT	M4x6	4	
S1030	左側面フタ (2)	LEFT SIDE COVER (2)		1	
S1030a	六角穴付ボルト	BOLT	M4x6	4	
S1032	仕切板	PARTITION		1	
S1032a	六角穴付ボルト	BOLT	M4x8	2	
S1032b	平座金	WASHER	M4	2	
S1033	ブラケット	BRACKET		1	
S1033a	六角穴付ボルト	BOLT	M8x16	2	
S1033b	平座金	WASHER	M8	2	
S1034	スペーサー (1)	SPACER (1)		1	
S1036	スペーサー (3)	SPACER (3)		1	
S1037	スペーサー (4)	SPACER (4)		2	
S1038	レール	RAIL		2	
S1039	シャッター	SHUTTER		1	
S1041	取手受け	KNOB RECEIVE		2	
S1041a	六角穴付止ネジ (平先)	SET SCREW	M4x16	2	
S1042	取手	KNOB		1	
S1047	LS 取付板	LS MOUNTING PLATE		2	
S1048	ブラケット	BRACKET		1	
S1052	ガイド (1)	GUIDE (1)		1	
S1052a	六角穴付ボルト	BOLT	M4x16	1	
S1052b	平座金	WASHER	M4	1	
S1052c	六角穴付ボルト	BOLT	M4x25	2	
S1053	ガイド (2)	GUIDE (2)		1	
S1053a	六角穴付ボルト	BOLT	M4x16	1	
S1053b	平座金	WASHER	M4	1	
S1054	ダクトフタ	DUCT COVER		1	

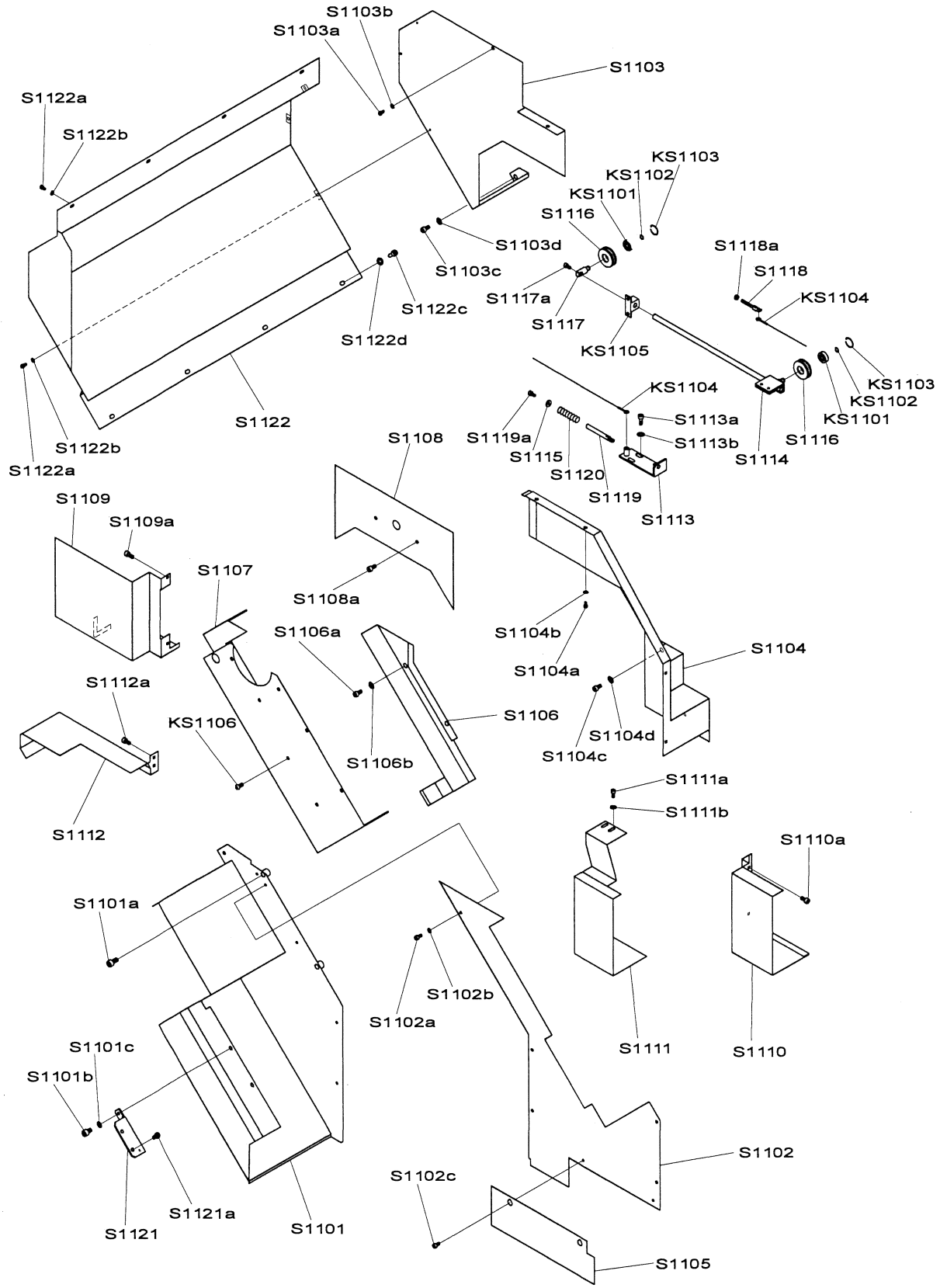
C1216	スプラッシュガード部 SPLASH GUARD	S1000



C1216	スプラッシュガード部 SPLASH GUARD	S1000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
S1054a	六角穴付ボルト	BOLT	M4x8	6	
S1054b	平座金	WASHER	M4	6	
S1055	油よけカバー	COVER		1	
S1055a	六角穴付ボルト	BOLT	M4x8	3	
S1057	Z1軸モーターカバー	Z1-AXIS MOTOR COVER		1	
S1057a	六角穴付ボルト	BOLT	M5x10	1	
S1058	といカバー	COVER		1	
S1058a	六角穴付ボルト	BOLT	M4x8	4	
S1062	ブラケット (1)	BRCKET (1)		1	
S1062a	六角穴付ボルト	BOLT	M6x10	2	
S1062b	平座金	WASHER	M6	2	
S1063	ブラケット (2)	BRCKET (2)		1	
S1063a	六角穴付ボルト	BOLT	M6x12	4	
S1063b	平座金	WASHER	M6	4	
S1067	リンク	LINK		1	
S1067a	六角穴付ボルト	BOLT	M6x12	1	
S1071	ケーブルカバー (1)	CABLE COVER (1)		1	
S1071a	六角穴付ボルト	BOLT	M6x10	4	
S1071b	六角穴付ボルト	BOLT	M6x12	1	
S1071c	平座金	WASHER	M6	1	
S1072	ケーブルカバー (2)	CABLE COVER (2)		1	
S1072a	六角穴付ボルト	BOLT	M6x10	2	
S1073	背面カバー (1)	BACK COVER (1)		1	
S1073a	六角穴付ボルト	BOLT	M6x12	4	
S1074	背面カバー (2)	BACK COVER (2)		1	
S1074a	六角穴付ボルト	BOLT	M6x12	4	
S1075	とい	GUTTER		1	
S1084	プレート	PLATE		1	
S1084a	六角穴付ボルト	BOLT	M6x12	2	
S1084b	平座金	WASHER	M6	2	
S1085	リンク	LINK		2	
S1086	座金	WASHER		5	
KS1001	ガススプリング	GAS SPRING		1	TOKIKO
KS1002	ガススプリング	GAS SPRING		1	TOKIKO
KS1005	シールワッシャー	SEAL WASHER	W6	8	KEEPER
KS1006	シールワッシャー	SEAL WASHER	W4	2	KEEPER
KS1008	プルハンドル	PULL HANDLE	PH1-105N	1	IMAO
KS1013	外ネジ式ストリッパボルト	BOLT	MSB 8-10	4	MISUMI
KS1013a	六角ナット	HEX.NUT	M6	2	
KS1013b	平座金	WASHER	M6	2	
KS1014	含油軸受	BEARING	B-F8-23	10	NTN
KS1015	ヒンジピン	HINGE PIN	CDG 8-25	2	MISUMI
KS1016	ヒンジピン	HINGE PIN	CDG 8-45	2	MISUMI
KS1017	金属ワッシャ	WASHER	WSSB 16-8-5	4	MISUMI
KS1018	金属カラー	COLLAR	NCLB 8-16-12.5	4	MISUMI
KS1019	膜付グロメット	GROMMETS	C-30-SG-9A	1	TAKIGEN
KS1020	ボールスクリュー	BALL SCREW	BSR6x10	1	IMAO

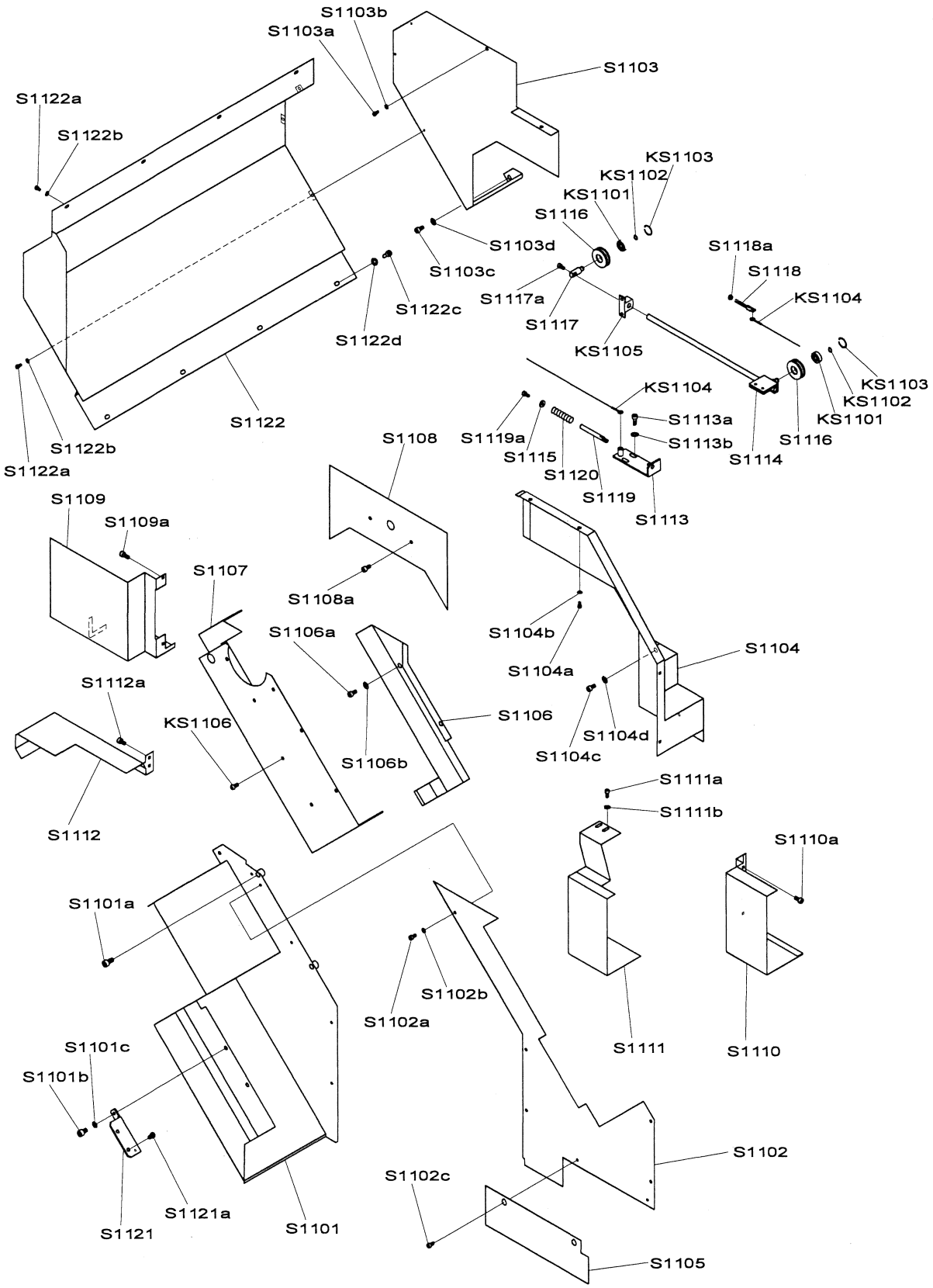
C1216	スプラッシュガード部 SPLASH GUARD	S1000



C1216	スライドカバー部 SLIDE COVER	S1100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
S1101	切粉シュート	CHIP CHUTE		1	
S1101a	六角穴付ボルト	BOLT	M6x16	2	
S1101b	六角穴付ボルト	BOLT	M6x10	2	
S1101c	平座金	WASHER	M6	2	
S1102	仕切板 (1)	PARTITION (1)		1	
S1102a	六角穴付ボルト	BOLT	M4x8	5	
S1102b	平座金	WASHER	M4	5	
S1102c	六角穴付ボルト	BOLT	M4x10	2	
S1103	仕切板 (2)	PARTITION (2)		1	
S1103a	六角穴付ボルト	BOLT	M4x8	2	
S1103b	平座金	WASHER	M4	2	
S1103c	六角穴付ボルト	BOLT	M6x10	1	
S1103d	平座金	WASHER	M6	1	
S1104	仕切板 (3)	PARTITION (3)		1	
S1104a	六角穴付ボルト	BOLT	M4x8	4	
S1104b	平座金	WASHER	M4	4	
S1104c	六角穴付ボルト	BOLT	M6x10	1	
S1104d	平座金	WASHER	M6	1	
S1105	仕切板 (4)	PARTITION (4)		1	
S1106	仕切板 (5)	PARTITION (5)		1	
S1106a	六角穴付ボルト	BOLT	M6x12	2	
S1106b	平座金	WASHER	M6	2	
S1107	ガイドブッシュカバー	GUIDE BUSHING COVER		1	
S1108	X_1スライドカバー	X_1SLIDE COVER		1	
S1108a	六角穴付ボルト	BOLT	M6x12	2	
S1109	Y_1スライドカバー (1)	Y_1SLIDE COVER (1)		1	
S1109a	六角穴付ボルト	BOLT	M6x10	2	
S1110	Y_1スライドカバー (2)	Y_1SLIDE COVER (2)		1	
S1110a	六角穴付ボルト	BOLT	M6x10	2	
S1111	Y_1スライドカバー (3)	Y_1SLIDE COVER (3)		1	
S1111a	六角穴付ボルト	BOLT	M5x12	2	
S1111b	平座金	WASHER	M5	2	
S1112	油よけ板	PLATE		1	
S1112a	六角穴付ボルト	BOLT	M6x10	2	
S1113	ブラケット	BRACKET		1	
S1113a	六角穴付ボルト	BOLT	M6x16	3	
S1113b	平座金	WASHER	M6	3	
S1114	ガイドカバー	GUIDE COVER		1	
S1115	座金	WASHER		1	
S1116	プーリー	PULLEY		2	
S1117	プーリー軸	PULLEY SHAFT		1	
S1117a	六角穴付ボルト	BOLT	M5x16	1	
S1118	連結ボルト	CONNECTING BOLT		1	
S1118a	六角ナット (3 種)	HEX. NUT	M5	2	
S1119	バネ受け	SPRING GUIDE		1	
S1119a	六角穴付ボルト	BOLT	M5x10	1	
S1120	圧縮コイルバネ	SPRING		1	
S1121	シュートブラケット	SHOOT BRACKET		1	
S1121a	六角穴付ボルト	BOLT	M6x12	2	
S1122	背面カバー (内)	BACK COVER (IN)		1	

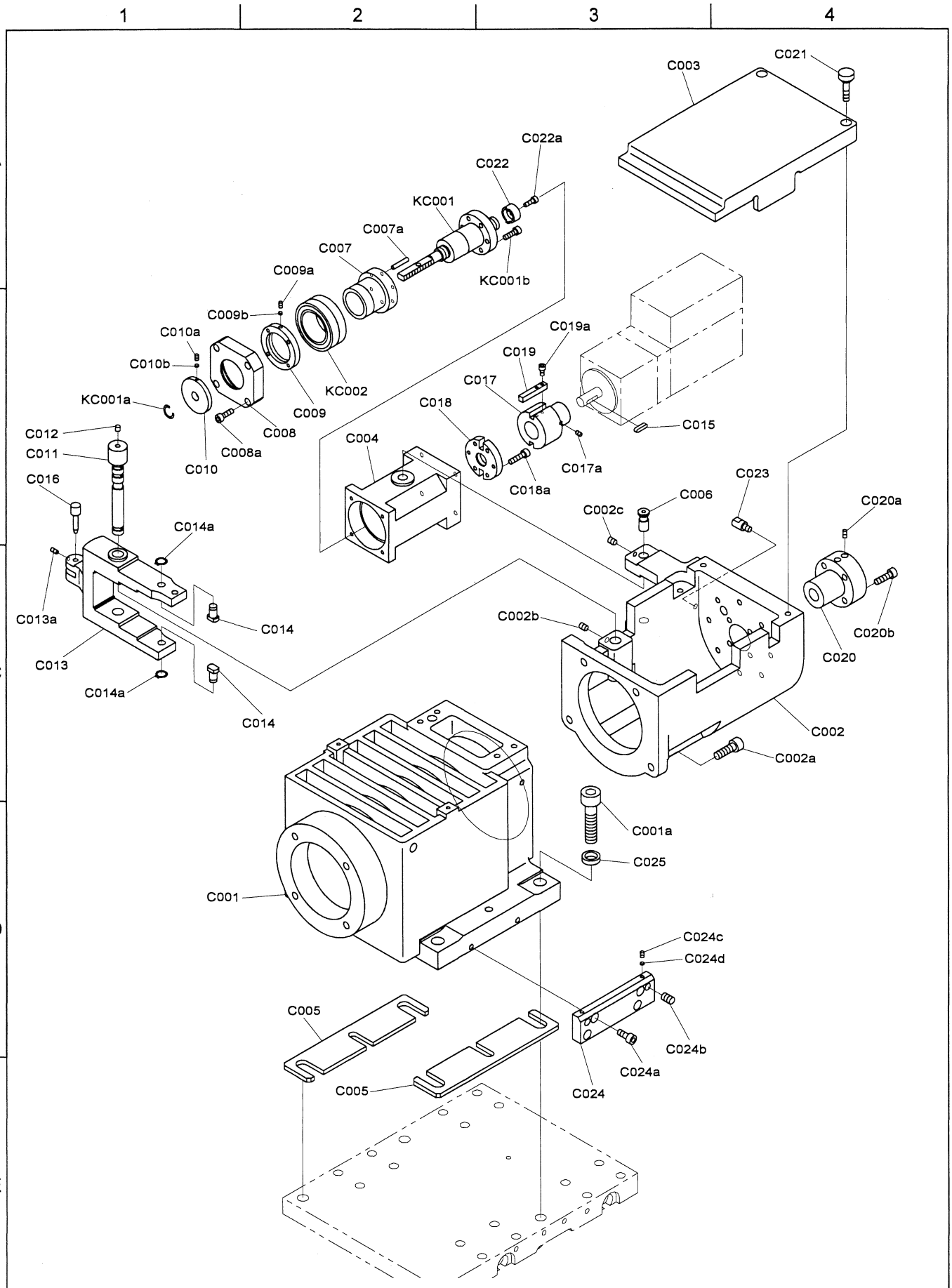
C1216	スライドカバー部 SLIDE COVER	S1100



C1216	スライドカバー部 SLIDE COVER	S1100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
S1122a	六角穴付ボルト	BOLT	M4x8	7	
S1122b	平座金	WASHER	M4	7	
S1122c	六角穴付ボルト	BOLT	M6x16	3	
S1122d	平座金	WASHER	M6	3	
KS1101	ミニアチュア玉軸受	BALL BEARING	608ZZ	2	NTN
KS1102	インバーテッドリング	INVERTED RING	ISTW8	2	OCHIAI
KS1103	インバーテッドリング	INVERTED RING	IRTW22	2	OCHIAI
KS1104	ステンレスワイヤ-ロープ	STAINLESS WIRE ROPE	L=285	2	TOYO MINIROPE
KS1105	ミニピローユニット	MINI PILLOW UNIT	B-BAP1012	1	NTN
KS1106	六角穴付ボタンボルト	BUTTON BOLT	M6x12	7	GOSHO WORKS

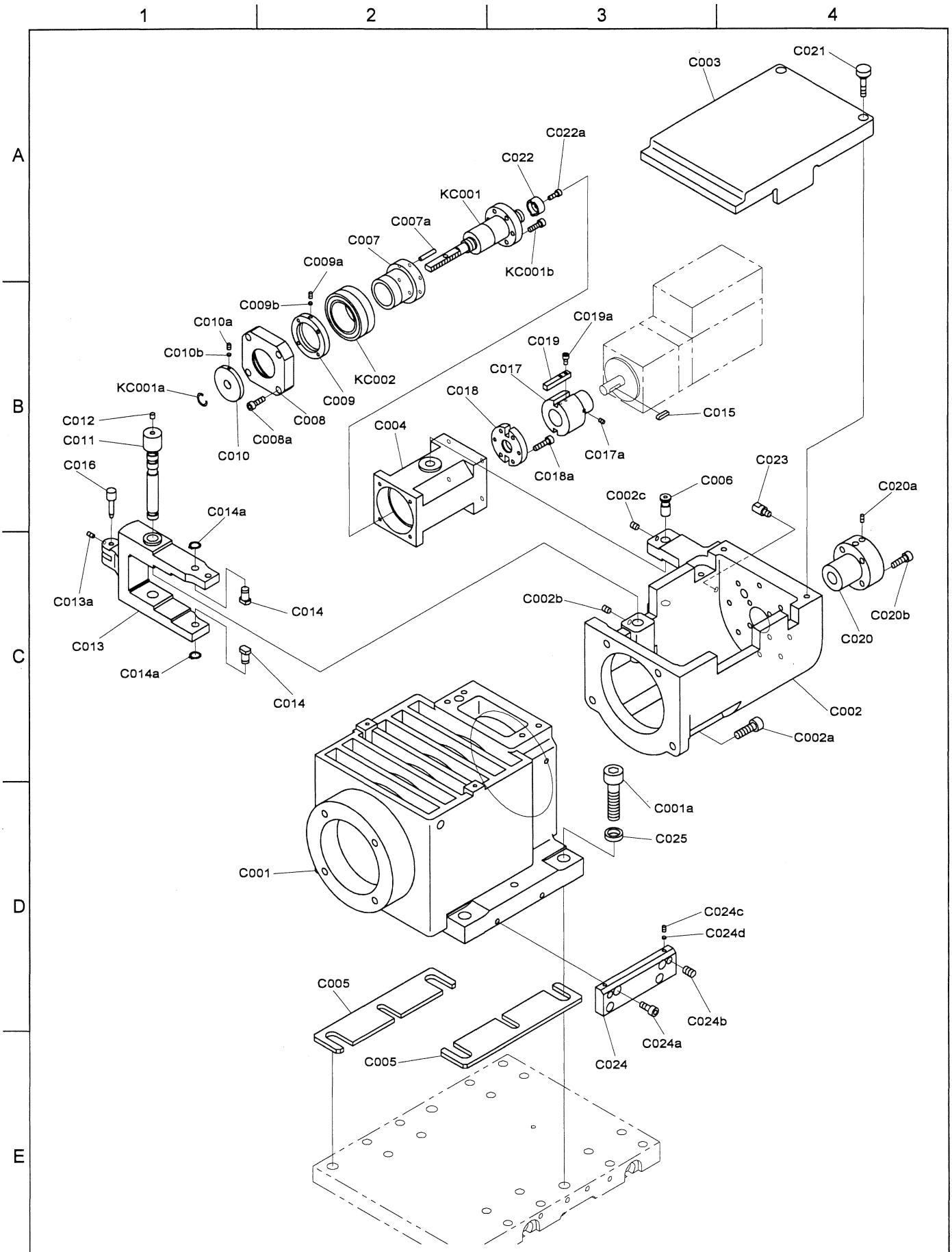
C1216	スライドカバー部 SLIDE COVER	S1100



C12S	主軸台 HEAD STOCK	C000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
C001	主軸台	HEAD STOCK		1	
C001a	六角穴付ボルト	BOLT	M12x50	4	
C002	主軸台ブラケット	HEAD STOCK BRACKET		1	
C002a	六角穴付ボルト	BOLT	M8x25	4	
C002b	六角穴付止ネジ (平先)	SET SCREW	M6x8	1	
C002c	六角穴付止ネジ (平先)	SET SCREW	M5x8	2	
C003	主軸台カバー	HEAD STOCK COVER		1	
C004	ハウジング	HOUSING		1	
C005	スペーサー	SPACER		2	
C006	ピボット	PIVOT		2	
C007	ホルダー	HOLDER		1	
C007a	平行ピン	PARALLEL PIN	ø4x22	2	
C008	ベアリング押さえ	FLANGE		1	
C008a	六角穴付ボルト	BOLT	M4x16	4	
C009	ナット (JIS1 級ネジ)	NUT		1	
C009a	六角穴付止ネジ (平先)	SET SCREW	M4x5	1	
C009b	真鍮座	SEAT	M4	1	
C010	ストッパー	STOPPER		1	
C010a	六角穴付止ネジ (平先)	SET SCREW	M3x10	2	
C010b	真鍮座	SEAT	M3	2	
C011	レバー軸	LEVER SHAFT		1	
C012	塞ぎ栓	PLUG		2	
C013	チャッキングレバー	CHUCKING LEVER		1	
C013a	六角穴付止ネジ (平先)	SET SCREW	M4x8	1	
C014	チャック作動ピン	PIN		2	
C014a	軸用 C トメワ	RETAINING RING (C TYPE)	8	2	
C015	キー	KEY		1	
C016	連結軸	CONNECTING SHAFT		1	
C017	カップリング	COUPLING		1	
C017a	六角穴付止ネジ (平先)	SET SCREW	M4x5	1	
C018	フランジ	FLANGE		1	
C018a	六角穴付ボルト	BOLT	M4x20	4	
C019	キー	KEY		2	
C019a	六角穴付ボルト	BOLT	M3x10	8	
C020	パイプサポート	PIPE SUPPORT		1	
C020a	六角穴付止ネジ (平先)	SET SCREW	M4x8	2	
C020b	六角穴付ボルト	BOLT	M6x20	4	
C021	カバー取付ネジ	MOUNTING SCREW		2	
C022	カラー	COLLAR		1	
C022a	六角穴付ボルト	BOLT	M4x12	1	
C023	ストッパー駒	STOPPER BLOCK		1	
C024	調整ブロック	ADJUSTING BLOCK		1	
C024a	六角穴付ボルト	BOLT	M6x15	4	
C024b	六角穴付止ネジ (平先)	SET SCREW	M8x12	2	
C024c	六角穴付止ネジ (平先)	SET SCREW	M4x5	2	
C024d	真鍮座	SEAT	M4	2	
C025	座金	WASHER		4	
KC001	転造ボールネジ (予圧タイプ)	BALL SCREW	JPF1404-4RRGO +137LC7T	1	THK
KC001a	E トメワ	STOP RING	8	1	

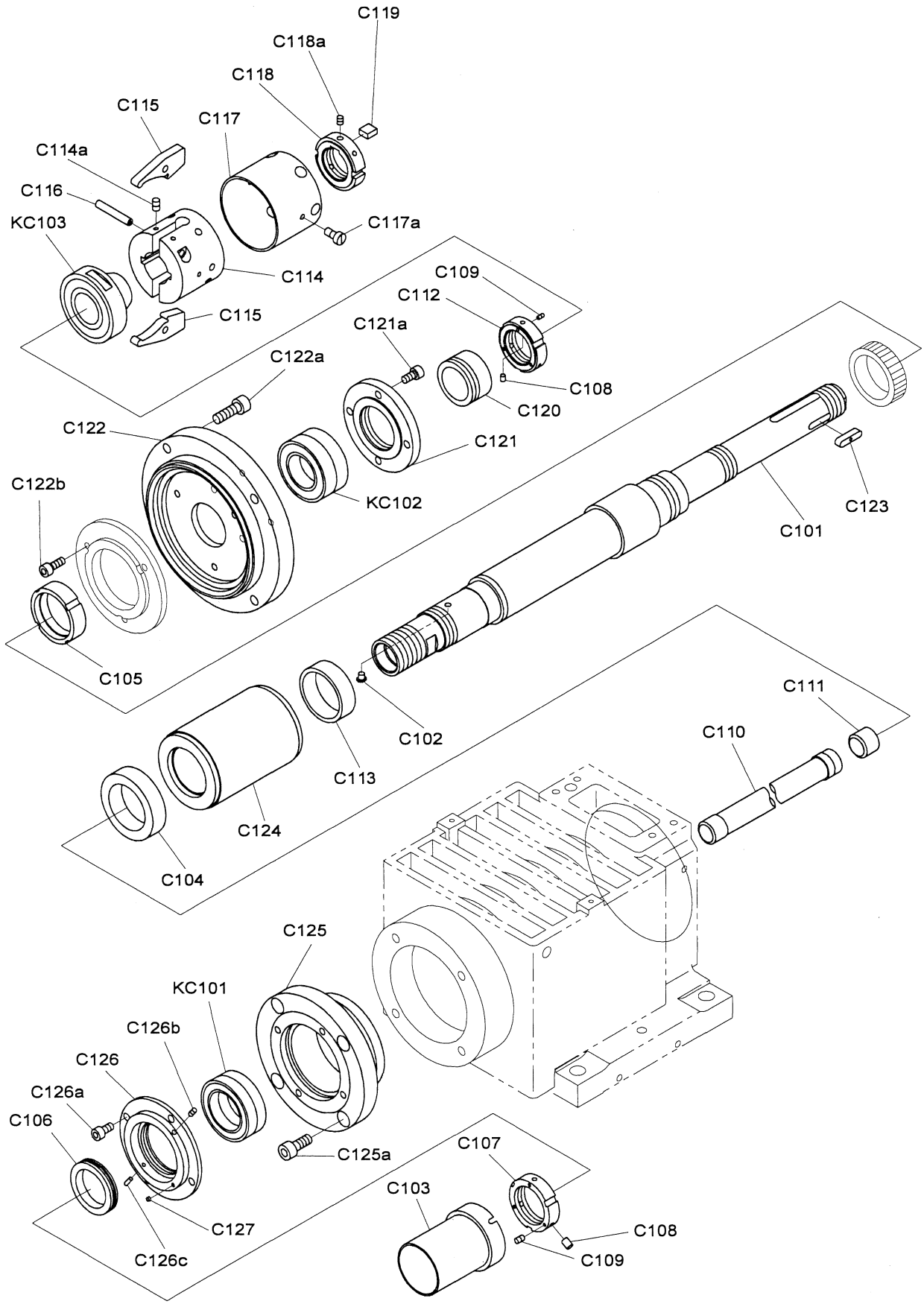
C12S	主軸台 HEAD STOCK	C000



C12S	主軸台 HEAD STOCK	C000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KC001b	六角穴付ボルト	BOLT	M5x20	4	
KC002	アンギュラ玉軸受	ANGULAR BALL BEARING	7907T2DB/GMP5	1set	NTN

C12S	主軸台 HEAD STOCK	C000



C12S	主軸 MAIN SPINDLE	C100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
C101	主軸	SPINDLE		1	
C102	キーピン	KEY PIN		1	
C103	主軸キャップ	SPINDLE CAP		1	
C104	バランスリング	BALANCE RING		1	
C105	ナット	NUT		1	
C106	スペーサー	SPACER		1	
C107	ロックナット (特級)	LOCK NUT		1	
C108	ネジ座	LOCK KEY		6	
C109	押ネジ	SCREW		6	
C110	中間スリーブ	MIDDLE SLEEVE		1	
C111	バランススリーブ	BALANCE SLEEVE		1	
C112	ナット (特級ネジ)	NUT		1	
C113	カラー	COLLAR		1	
C114	チャック爪ホルダー	FINGER HOLDER		1	
C114a	六角穴付止ネジ (平先)	SET SCREW	M4x5	4	
C115	チャック作動爪	FINGER		2	
C116	レバー軸	LEVER SHAFT		2	
C117	リングカバー	RING COVER		1	
C117a	平小ネジ	SCREW	M4x8	2	
C118	ナット (JIS1 級ネジ)	NUT		1	
C118a	六角穴付止ネジ (平先)	SET SCREW	M5x5	1	
C119	ネジ座 (JIS1 級ネジ)	LOCK KEY		1	
C120	スペーサー	SPACER		1	
C121	ベアリング押え	FLANGE		1	
C121a	六角穴付ボルト	BOLT	M6x10	4	
C122	ハウジング	HOUSING		1	
C122a	六角穴付ボルト	BOLT	M8x25	4	
C122b	六角穴付ボルト	BOLT	M6x16	3	
C123	キー	KEY		2	
C124	ローター	ROTOR		1	
C125	フランジ	FLANGE		1	
C125a	六角穴付ボルト	BOLT	M8x20	4	
C126	ベアリング押え	FLANGE		1	
C126a	六角穴付ボルト	BOLT	M6x12	4	
C126b	六角穴付止ネジ (平先)	SET SCREW	M4x8	1	
C126c	平行ピン	PARALLEL PIN	ø3x10	1	
C127	塞ぎ栓	PLUG		2	
KC101	高速組合せアンギュラ玉軸受	ANGULAR BALL BEARING	B7007C.TPAP4UL	1set	FUKUDA
KC102	高速組合せアンギュラ玉軸受	ANGULAR BALL BEARING	7006CD/P4ADBB	1set	SKF
KC103	ボビン	BOBBIN	28BCV06S2G-2NK	1	NACHI

C12S	主軸 MAIN SPINDLE	C100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KR201	フロープロパーユニット	FLOW PROPER UNIT	PSS1	5	SHOWA YUKI
KR202	フロープロパーユニット	FLOW PROPER UNIT	PST1	1	SHOWA YUKI
KR203	締付プラグ	PLUG	PA4	7	SHOWA YUKI
KR204	スリーブ	SLEEVE	PB4	10	SHOWA YUKI
KR205	チューブインサート	TUBE INSERT	AL4	1	SHOWA YUKI
KR206	プロパーナット	PROPER NUT	PAN4	3	SHOWA YUKI
KR207	ティー	TEE	PK4	5	SHOWA YUKI
KR208	コネクタ	CONNECTOR	PQ8	2	SHOWA YUKI

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
Z101	両口スパナ	DOUBLE SPANNER		1	
Z102	トミー棒	TOMMY BAR		1	
Z103	チャック治具本体	CHUCK JIG BODY		1	
Z103a	六角穴付ボルト	BOLT	M3x5	1	
Z104	ナット固定ピン	NUT FIXED PIN		1	
Z105	位置決めピン	POSITIONING PIN		2	
Z106	チャック開閉用工具	CAM		1	
Z107	背面チャック治具	BACK CHUCK JIG		1	
Z107a	六角穴付ボルト	BOLT	M6x30	1	
Z107b	六角穴付止ネジ (平先)	SET SCREW	M4x6	1	
Z108	ナット固定ピン	NUT FIXED PIN		1	
Z109	トミー棒	TOMMY BAR		1	
Z110	スパナ	SPANNER		1	
Z110a	平行ピン	PARALLEL PIN	ø4x10	2	
Z110b	平行ピン	PARALLEL PIN	ø3x10	1	
Z110c	六角穴付ボルト	BOLT	M4x10	3	
Z111	スパナ回し	SPANNER TURN		1	
Z112	片口スパナ	SINGLE SPANNER		1	
Z113	トミー棒	TOMMY BAR		1	
Z114	切粉かき出し棒	CHIP REMOVER ROD		1	
Z115	スパナ	SPANNER		1	
Z116	スパナ	SPANNER		1	
KZ101	六角棒スパナ	HEXAGON BAR WRENCH	2	1	
KZ102	六角棒スパナ	HEXAGON BAR WRENCH	2.5	1	
KZ103	六角棒スパナ	HEXAGON BAR WRENCH	3	1	
KZ104	六角棒スパナ	HEXAGON BAR WRENCH	4	1	
KZ105	六角棒スパナ	HEXAGON BAR WRENCH	5	1	
KZ106	六角棒スパナ	HEXAGON BAR WRENCH	5(LONG)	1	
KZ107	六角棒スパナ	HEXAGON BAR WRENCH	6	1	
KZ108	六角棒スパナ	HEXAGON BAR WRENCH	8	1	
KZ109	六角棒スパナ	HEXAGON BAR WRENCH	10	1	
KZ110	カギスパナ	HOOK SPANNER WRENCH	40/42	1	
KZ111	両口スパナ	DOUBLE SPANNER	6x8	1	
KZ112	両口スパナ	DOUBLE SPANNER	9x10	1	
KZ113	両口スパナ	DOUBLE SPANNER	17x19	1	
KZ115	両口スパナ	DOUBLE SPANNER	12x14	1	
KZ118	棒スパナ	BAR WRENCH	FOR DRAWBAR	1	REGO fix
KZ119	六角棒スパナ	HEXAGON BAR WRENCH	1.5	1	

C12S	取扱工具 HANDLING TOOL	Z100

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	MA1	インテリジェントサーボモータ	SERVO MOTOR	HS-MF23EX-S2	1	MITSUBISHI ELECTRIC
KCT002	M1	ロータ	ROTOR	SJ-2B4003 RT	1	MITSUBISHI ELECTRIC
KCT003	M1	ステーター式	STATOR SET	SJ-2B4003 ST/PLG	1	MITSUBISHI ELECTRIC
SP1		ステータ	STATOR	SJ-2B4003-ST	(1)	MITSUBISHI ELECTRIC
SP2		ギア	GEAR	MU1450N137	(1)	MITSUBISHI ELECTRIC
SP3		センサ	SENSOR	TS1860N1280	(1)	MITSUBISHI ELECTRIC

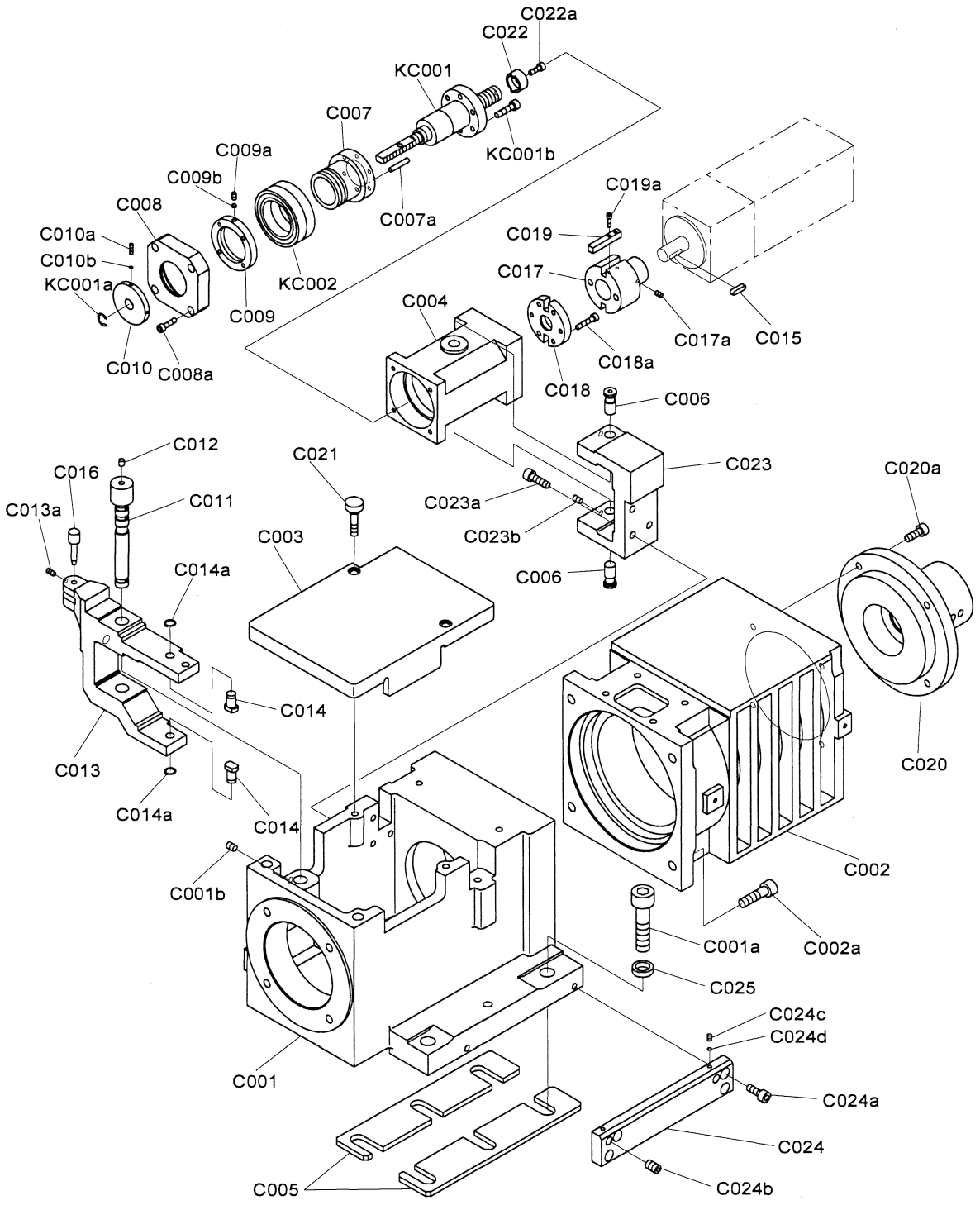
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
FT002		中継ボックス	INTERMEDIATE BOX		1	
FT002a		六角穴付ボルト	BOLT	M6x12	3	
FT002b		平座金	WASHER	M6	3	
FT002c		ナベ小セムス B (大)	SCREW	M6x16	1	
FT002d		六角穴付ボルト	BOLT	M4x10	2	
FT002e		平座金	WASHER	M4	2	
FT002f		ナベ小セムス B (小)	SCREW	M4x8	2	
FT002g		ナベ小セムス B (大)	SCREW	M4x8	4	
FT003		フタ	COVER		1	
FT004		クランプ金具	CLAMP METAL		1	
KFT001	TB3	端子台	TERMINAL	C-TB3-0	1	KASUGA ELECTRIC
KFT001a		ナベ小セムス (大)	SCREW	M4x8	2	
KFT002		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
KFT003		シールワッシャー	SEAL WASHER	W4	5	KEEPER
KFT004		マルチシール引出板	SEAL PLATE	EMSF10S1-190	1	SANKEI
KFT004a		ナベ小セムス (大)	SCREW	M5x16	6	
KFT005		電源マーク	POWER MARK	20MM	1	NIKKOUKAI
KFT006		バインド小ネジ	SCREW	M4x8	5	
KFT007		NBR スポンジ	NBR SPONGE	15x15	90mm	

C12S	C12 専用電装部品 C12 EXCLUSIVE USE PART	FT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	U9CN5	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT102		シェル	SHELL	10620-5600-008	1	SUMITOMO 3M
KWT103		ラッチ	LATCH	10600-L0F0-8	2	SUMITOMO 3M
KWT104	M1CNPG	プラグ	PLUG	350720-1	1	AMP
KWT105		ソケット	SOCKET	350689-1	8	AMP

C12S	C12 専用電装部品 C12 EXCLUSIVE USE PART	WT100

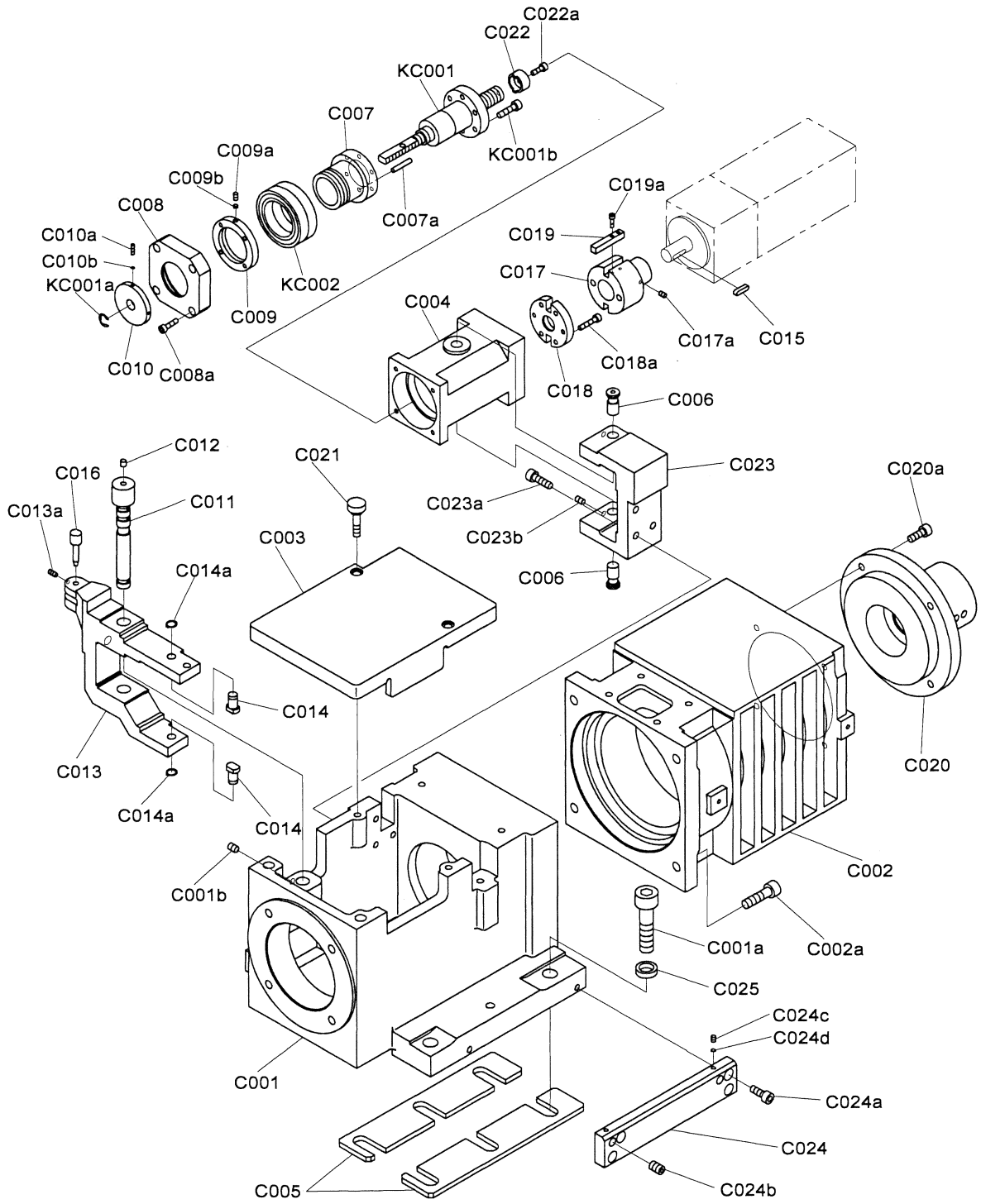
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C16S	主軸台 HEAD STOCK	C000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
C001	主軸台	HEAD STOCK		1	
C001a	六角穴付ボルト	BOLT	M12x50	4	
C001b	六角穴付止ネジ (平先)	SET SCREW	M6x8	1	
C002	モーターハウジング	MOTOR HOUSING		1	
C002a	六角穴付ボルト	BOLT	M8x30	4	
C003	主軸台カバー	HEAD STOCK COVER		1	
C004	ハウジング	HOUSING		1	
C005	スペーサー	SPACER		2	
C006	ピボット	PIVOT		2	
C007	ホルダー	HOLDER		1	
C007a	平行ピン	PARALLEL PIN	ø4x22	2	
C008	ベアリング押さえ	FLANGE		1	
C008a	六角穴付ボルト	BOLT	M4x16	4	
C009	ナット (JIS1 級ネジ)	NUT		1	
C009a	六角穴付止ネジ (平先)	SET SCREW	M4x5	1	
C009b	真鍮座	SEAT	M4	1	
C010	ストッパー	STOPPER		1	
C010a	六角穴付止ネジ (平先)	SET SCREW	M3x10	2	
C010b	真鍮座	SEAT	M3	2	
C011	レバー軸	LEVER SHAFT		1	
C012	塞ぎ栓	PLUG		2	
C013	チャッキングレバー	CHUCKING LEVER		1	
C013a	六角穴付止ネジ (平先)	SET SCREW	M4x8	1	
C014	チャック作動ピン	PIN		2	
C014a	軸用 C トメワ	RETAINING RING (C TYPE)	8	2	
C015	キー	KEY		1	
C016	連結軸	CONNECTING SHAFT		1	
C017	カップリング	COUPLING		1	
C017a	六角穴付止ネジ (平先)	SET SCREW	M4x5	1	
C018	フランジ	FLANGE		1	
C018a	六角穴付ボルト	BOLT	M4x20	4	
C019	キー	KEY		2	
C019a	六角穴付ボルト	BOLT	M3x10	8	
C020	パイプサポート	PIPE SUPPORT		1	
C020a	六角穴付ボルト	BOLT	M6x16	4	
C021	カバー取付ネジ	MOUNTING SCREW		2	
C022	カラー	COLLAR		1	
C022a	六角穴付ボルト	BOLT	M4x12	1	
C023	ブラケット	BRACKET		1	
C023a	六角穴付ボルト	BOLT	M6x20	3	
C023b	六角穴付止ネジ (平先)	SET SCREW	M5x8	2	
C024	調整ブロック	ADJUSTING BLOCK		1	
C024a	六角穴付ボルト	BOLT	M6x16	4	
C024b	六角穴付止ネジ (平先)	SET SCREW	M8x12	2	
C024c	六角穴付止ネジ (平先)	SET SCREW	M4x5	2	
C024d	真鍮座	SEAT	M4	2	
C025	座金	WASHER		4	
KC001	転造ボールネジ (予圧タイプ)	BALL SCREW	JPF1404-4RRGO +137LC7T	1	THK
KC001a	E トメワ	STOP RING	8	1	

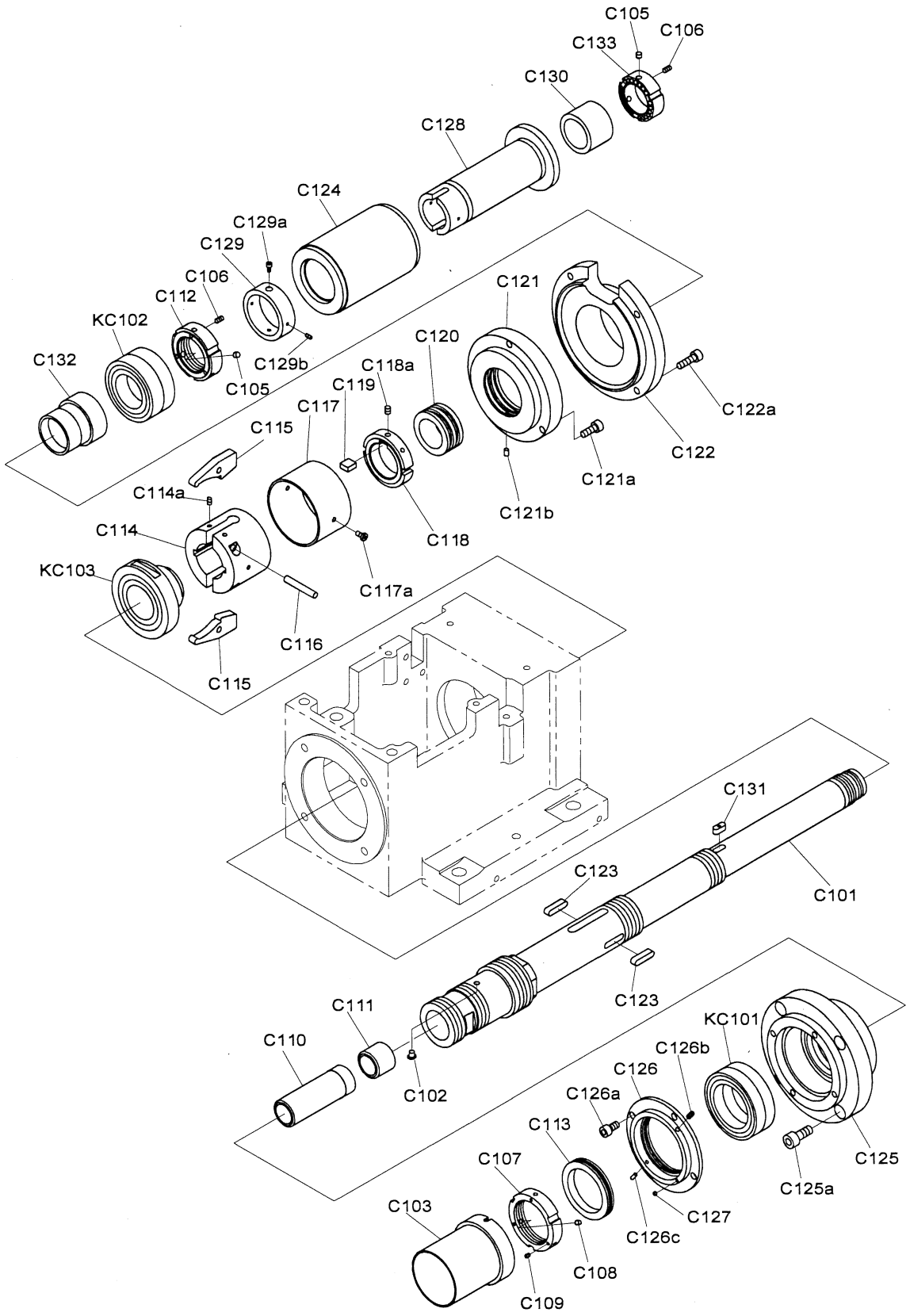
C16S	主軸台 HEAD STOCK	C000



C16S	主軸台 HEAD STOCK	C000

PARTS NO.	PARTS NAME	TYPE	Q'TY	REMARKS
KC001b	六角穴付ボルト BOLT	M5x20	4	
KC002	アンギュラ玉軸受 ANGULAR BALL BEARING	7907T2DB/GMP5	1set	NTN

C16S	主軸台 HEAD STOCK	C000



C16S	主軸 MAIN SPINDLE	C100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
C101	主軸	SPINDLE		1	
C102	キーピン	KEY PIN		1	
C103	主軸キャップ	SPINDLE CAP		1	
C105	ネジ座	LOCK KEY		9	
C106	押ネジ	SCREW		6	
C107	ロックナット (特級)	LOCK NUT		1	
C109	押ネジ	SCREW		3	
C110	中間スリーブ	MIDDLE SLEEVE		1	
C111	バランススリーブ	BALANCE SLEEVE		1	
C112	ナット (特級ネジ)	NUT		1	
C113	スペーサー	SPACER		1	
C114	チャック爪ホルダー	FINGER HOLDER		1	
C114a	六角穴付止ネジ (平先)	SET SCREW	M4x4	4	
C115	チャック作動爪	FINGER		2	
C116	レバー軸	LEVER SHAFT		2	
C117	リングカバー	RING COVER		1	
C117a	平小ネジ	SCREW	M4x8	2	
C118	ナット (JIS1 級ネジ)	NUT		1	
C118a	六角穴付止ネジ (平先)	SET SCREW	M6x6	1	
C119	ネジ座 (JIS1 級ネジ)	LOCK KEY		1	
C120	スペーサー	SPACER		1	
C121	シールリング	SEAL RING		1	
C121a	六角穴付ボルト	BOLT	M6x12	3	
C121b	塞ぎ栓	PLUG	ø4.2x6	2	
C122	ハウジング (後)	HOUSING (B)		1	
C122a	六角穴付ボルト	BOLT	M6x20	4	
C123	キー	KEY		2	
C124	ローター	ROTOR		1	
C125	フランジ	FLANGE		1	
C125a	六角穴付ボルト	BOLT	M8x20	4	
C126	ベアリング押さえ	FLANGE		1	
C126a	六角穴付ボルト	BOLT	M6x12	4	
C126b	六角穴付止ネジ (平先)	SET SCREW	M4x8	1	
C126c	平行ピン	PARALLEL PIN	ø3x8	1	
C127	塞ぎ栓	PLUG		2	
C128	ロータースリーブ	ROTOR SLEEVE		1	
C129	リング	RING		1	
C129a	六角穴付ボルト	BOLT	M3x5	2	
C129b	六角穴付止ネジ (平先)	SET SCREW	M3x6	2	
C130	スペーサー	SPACER		1	
C131	キー	KEY		2	
C132	エンコーダーリング	ENCOCER RING		1	
C133	ナット (JIS1 級ネジ)	NUT		1	
KC101	高速組合せアンギュラ玉軸受	ANGULAR BALL BEARING	B71909C.TPAP4UL	1set	FUKUDA
KC102	高速組合せアンギュラ玉軸受	ANGULAR BALL BEARING	B7007C.TPAP4UL	1set	FUKUDA
KC103	ボビン	BOBBIN	SX08C04LLBPX1/5K	1	NTN

C16S	主軸 MAIN SPINDLE	C100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KR201	フロープロパーユニット	FLOW PROPER UNIT	PSS1	5	SHOWA YUKI
KR202	フロープロパーユニット	FLOW PROPER UNIT	PST1	1	SHOWA YUKI
KR203	締付プラグ	PLUG	PA4	7	SHOWA YUKI
KR204	スリーブ	SLEEVE	PB4	10	SHOWA YUKI
KR205	チューブインサート	TUBE INSERT	AL4	1	SHOWA YUKI
KR206	プロパーナット	PROPER NUT	PAN4	3	SHOWA YUKI
KR207	ティー	TEE	PK4	3	SHOWA YUKI
KR208	コネクタ	CONNECTOR	PQ8	1	SHOWA YUKI
KR209	エルボ	ELBOW	PI1	1	SHOWA YUKI
KR210	エルボ	ELBOW	PH4	1	SHOWA YUKI
KR211	ジャンクションヘッド	JUNCTION HEAD	JHD402	1	SHOWA YUKI

C16S	集中潤滑油装置 LUBRICANT DEVICE	R200

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
Z101	片口スパナ	SINGLE SPANNER		1	
Z102	トミー棒	TOMMY BAR		1	
Z103	チャック治具本体	CHUCK JIG BODY		1	
Z103a	六角穴付ボルト	BOLT	M3x5	1	
Z104	ナット固定ピン	NUT FIXED PIN		1	
Z105	位置決めピン	POSITIONING PIN		2	
Z106	チャック開閉用工具	CAM		1	
Z107	背面チャック治具	BACK CHUCK JIG		1	
Z107a	六角穴付ボルト	BOLT	M6x30	1	
Z107b	六角穴付止ネジ (平先)	SET SCREW	M4x6	1	
Z108	ナット固定ピン	NUT FIXED PIN		1	
Z109	トミー棒	TOMMY BAR		1	
Z110	スパナ	SPANNER		1	
Z110a	平行ピン	PARALLEL PIN	ø4x10	2	
Z110b	平行ピン	PARALLEL PIN	ø3x10	1	
Z110c	六角穴付ボルト	BOLT	M4x8	3	
Z111	スパナ回し	SPANNER TURN		1	
Z112	片口スパナ	SINGLE SPANNER		1	
Z114	切粉かき出し棒	CHIP REMOVER ROD		1	
Z115	スパナ	SPANNER		1	
Z116	スパナ	SPANNER		1	
KZ101	六角棒スパナ	HEXAGON BAR WRENCH	2	1	
KZ102	六角棒スパナ	HEXAGON BAR WRENCH	2.5	1	
KZ103	六角棒スパナ	HEXAGON BAR WRENCH	3	1	
KZ104	六角棒スパナ	HEXAGON BAR WRENCH	4	1	
KZ105	六角棒スパナ	HEXAGON BAR WRENCH	5	1	
KZ106	六角棒スパナ	HEXAGON BAR WRENCH	5(LONG)	1	
KZ107	六角棒スパナ	HEXAGON BAR WRENCH	6	1	
KZ108	六角棒スパナ	HEXAGON BAR WRENCH	8	1	
KZ109	六角棒スパナ	HEXAGON BAR WRENCH	10	1	
KZ110	カギスパナ	HOOK SPANNER WRENCH	45/50	1	
KZ111	両口スパナ	DOUBLE SPANNER	6x8	1	
KZ112	両口スパナ	DOUBLE SPANNER	9x10	1	
KZ113	両口スパナ	DOUBLE SPANNER	17x19	1	
KZ115	両口スパナ	DOUBLE SPANNER	12x14	1	
KZ118	棒スパナ	BAR WRENCH	FOR DRAWBAR	1	
KZ119	六角棒スパナ	HEXAGON BAR WRENCH	1.5	1	

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	MA1	インテリジェントサーボモータ	SERVO MOTOR	HS-MF23EX-S2	1	MITSUBISHI ELECTRIC
KCT002	M1	ロータ	ROTOR	SJ-2B4003 RT	1	MITSUBISHI ELECTRIC
KCT003	M1	ステーター式	STATOR SET	SJ-2B4003 ST/PLG	1	MITSUBISHI ELECTRIC
SP1		ステータ	STATOR	SJ-2B4003-ST	1	MITSUBISHI ELECTRIC
SP2		ギア	GEAR	MU1450N137	1	MITSUBISHI ELECTRIC
SP3		センサ	SENSOR	TS1860N1280	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
FT001		中継ボックス	INTERMEDIATE BOX		1	
FT001a		六角穴付ボルト	BOLT	M6x12	3	
FT001b		平座金	WASHER	M6	3	
FT001c		六角穴付ボルト	BOLT	M4x10	2	
FT001d		平座金	WASHER	M4	2	
FT001e		ナベ小セムス B (小)	SCREW	M6x18	1	
FT001f		ナベ小セムス B (大)	SCREW	M4x8	1	
FT001g		ナベ小セムス B (大)	SCREW	M4x8	4	
FT002		フタ	COVER		1	
FT002a		ナベ小セムス B (小)	SCREW	M4x8	1	
KFT001	TB3	端子台	TERMINAL	C-TB3-0	1	KASUGA ELECTRIC
KFT001a		ナベ小セムス (大)	SCREW	M4x8	2	
KFT002		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
KFT003		シールワッシャー	SEAL WASHER	W4	4	KEEPER
KFT004		ケーブルシール引出板	CABLE SEAL PLATE	EMSF10S1-190	1	SANKEI
KFT004a		ナベ小セムス (大)	SCREW	M5x16	6	
KFT005		電源マーク	POWER MARK	20MM	1	NIKKOUKAI
KFT006		バインド小ネジ	SCREW	M4x8	4	

C16S	C16 専用電装部品 C16 EXCLUSIVE USE PART	FT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	U9CN5	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT102		シェル	SHELL	10620-5600-008	1	SUMITOMO 3M
KWT103		ラッチ	LATCH	10600-L0F0-8	2	SUMITOMO 3M
KWT104	M1CNPG	プラグ	PLUG	350720-1	1	AMP
KWT105		ソケット	SOCKET	350689-1	8	AMP

C16S	C16 専用電装部品 C16 EXCLUSIVE USE PART	WT100

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	FL1	照明装置	ILLUMINATOR	KE/418G (591-054-006)DC24V	1	FKB
KBT001SP1		蛍光灯	LAMP	213-920-008	(1)	FKB
KBT002		保持金具	RELAY RETAINING METAL	599-001-002	2	FKB
KBT002a		六角穴付ボルト	BOLT	M6x12	4	
KBT003	LS1 LS2	リミットスイッチ	LIMIT SWITCH	SHL-Q2155	2	OMRON
KBT003a		六角穴付ボルト	BOLT	M4x25	4	
KBT004		スーパーシール	SUPER SEAL	NW-12R	1	NIX.INC.
KBT005	FAN4	ファンモータ	FAN MOTOR	5915PC-20W -B20-S05	1	NMB
KBT006		ファンガード	FAN GUARD	PG-59-02(8126)	1	NMB
KBT007		六角穴付ボルト	BOLT	M4x50	2	
KBT008		絶縁キャップ	CAP	OA-QM4	2	OHM ELECTRIC
KBT009		絶縁キャップ	CAP	OA-QM5	3	OHM ELECTRIC
KBT010	THP2	サーマルプロテクタ	THERMAL PROTECTOR	T70AR1U1	1	SAKAGUTI DENNETSU

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	UNIT1	制御ユニット	CONTROL UNIT	FCU6-MU516-44	1	MITSUBISHI ELECTRIC
KCT001a		ナベ小セムス B (小)	SCREW	M5x10	4	
KCT002	LCD	表示器	DISPLAY	FCU6-DUN36 (10.4 COLLAR TFT (N))	1	MITSUBISHI ELECTRIC
KCT002a		ナベ小セムス B (大)	SCREW	M3x6	4	
KCT003		軸増設用カード	CARD	HR554	1	MITSUBISHI ELECTRIC
KCT004		拡張メモリカセット	MEMORY CASSETTE	FCU6-HR412	1	MITSUBISHI ELECTRIC
KCT005		ATA カード I/F	ATA CARD I/F	FCU6-EP101-1	1	MITSUBISHI ELECTRIC
KCT006		HDD	HDD	FCU6-HD221 -1C(4.3GB)	1	MITSUBISHI ELECTRIC
KCT006a		ナベ小セムス B (大)	SCREW	M4x8	4	
KCT007	CF30-S1 CF30-S2 CF30-C1 CF30-C2	リモート I/O カード	I/O CARD	HR371	4	MITSUBISHI ELECTRIC
KCT008	AVR1	外部電源ユニット	POWER UNIT	PD25B	1	MITSUBISHI ELECTRIC
KCT008a		ナベ小セムス B (大)	SCREW	M5x8	3	
KCT009	UNIT4	AC スピンドルドライブユニット	DRIVE UNITE	MDS-B-SPJ2X -22	1	MITSUBISHI ELECTRIC
KCT009a		ナベ小セムス B (小)	SCREW	M5x12	3	
KCT010	UNIT9	オプションユニット	OPTION UNIT	MDS-B-PJEX	1	MITSUBISHI ELECTRIC
KCT010a		ナベ小セムス B (小)	SCREW	M5x12	3	
KCT011	R1	回生抵抗	RESISTANCE UNIT	FCUA-RB75/2	1	MITSUBISHI ELECTRIC
KCT011a		ナベ小セムス B (大)	SCREW	M4x8	2	
KCT018	MX1	モータ	MOTOR	HS-RF43B-S1	1	MITSUBISHI ELECTRIC
KCT019	(MX1)	アンプ	AMPLIFIER	MDS-B-ISV04NX	1	MITSUBISHI ELECTRIC
KCT020	MY1 MZ1	モータ	MOTOR	HS-RF73-S1	2	MITSUBISHI ELECTRIC
KCT021	(MY1) (MZ1)	アンプ	AMPLIFIER	MDS-B-ISV07NX	2	MITSUBISHI ELECTRIC
KCT022	UNIT2	バッテリユニット	BATTERY UNIT	A-BT-8	1	MITSUBISHI ELECTRIC
KCT022a		ナベ小セムス B (大)	SCREW	M5x8	2	

C1216-770T	NC 関係 NC,etc.	CT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
DT002		制御盤本体	CONTROL BOX		1	
DT002a		六角穴付ボルト	BOLT	M10x20	2	
DT002b		平座金	WASHER	M10	2	
DT003		アンプ取付板	AMP PLATE		1	
DT003a		セムス B (大)	SCREW	M5x12	4	
DT004		動力基板取付板	POWER BOARD PLATE		1	
DT004a		セムス B (大)	SCREW	M4x10	1	
DT005		ブラケット	BRACKET		1	
DT005a		セムス B (大)	SCREW	M4x10	2	
DT006		FAN 取付板	FAN PLATE		1	
DT006a		セムス B (大)	SCREW	M4x8	2	
DT007		NFB 取付板	NFB PLATE		1	
DT007a		セムス B (大)	SCREW	M5x8	2	
DT008		NFB カバー	NFB COVER		1	
DT008a		セムス B (大)	SCREW	M4x8	2	
DT009		クランプ金具	CLAMP METAL		1	
DT009a		六角穴付ボルト	BOLT	M4x12	2	
DT009b		平座金	WASHER	M4	2	
DT010		クランプ金具	CLAMP METAL		1	
DT010a		六角穴付ボルト	BOLT	M4x12	2	
DT010b		平座金	WASHER	M4	2	
DT011		クランプ金具	CLAMP METAL		1	
DT011a		六角穴付ボルト	BOLT	M4x12	2	
DT011b		平座金	WASHER	M4	2	
DT012		メクラ板	PLATE		2	
DT012a		セムス B (小)	SCREW	M3x8	4	
DT013		メクラ板	PLATE		1	
DT013a		セムス B (小)	SCREW	M3x8	4	
DT014		メクラ板	PLATE		1	
DT014a		セムス B (小)	SCREW	M3x8	4	
DT015		正面扉	FRONT DOOR		1	
DT015a		六角穴付ボルト	BOLT	M6x20	4	
DT016		右扉	RIGHT DOOR		1	
DT016a		六角穴付ボルト	BOLT	M6x20	4	
KDT001	NFB1	漏電遮断器	LEAK BREAKER	NV50CP-3P-30mA -WITH TBL 30A	1	MITSUBISHI ELECTRIC
KDT002		端子カバー	TERMINAL COVER	TCS-05SP3 (WITH SEAL PLATE)	1	MITSUBISHI ELECTRIC
KDT003		電源マーク	POWER MARK	80MM	1	NIKKOUKAI
KDT004	LSP1	サージプロテクタ	SURGE PROTECTOR	R.A.V781BYZ-2	1	OKAYA ELECTRIC
KDT004a		ナベ小セムス B (大)	SCREW	M4x10	1	
KDT005	LSP2	サージプロテクタ	SURGE PROTECTOR	R.A.V781BXZ-2A	1	OKAYA ELECTRIC
KDT005a		ナベ小セムス B (大)	SCREW	M4x10	1	
KDT006	AVR2	スイッチング電源	POWER SUPPLY	S82J-15024D (6.5A)	1	OMRON
KDT006a		ナベ小セムス B (大)	SCREW	M4x8	2	
KDT007	AVR3	スイッチング電源	POWER SUPPLY	S82J-6505 (10A)	1	OMRON

C1216-770T	制御盤 CONTROL BOX	DT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KDT007a		ナベ小セムス B (大)	SCREW	M3x8	2	
KDT008	FAN1	ファン	FAN	S12D20-TW2G	2	STYLE
	FAN2			120□x38t		ELECTRON
KDT009		ファンガード	FAN GUARD	PG-47	2	NMB
KDT009a		ナベ小セムス B (大)	SCREW	M3x45	4	
KDT010		ファンガード	FAN GUARD	PG-47-01	1	NMB
KDT010a		平座金	WASHER	M3	4	
KDT010b		バネ座金	SPRING WASHER	M3	4	
KDT010c		ナット	NUT	M3	4	
KDT011		フィルターケース前	FILTER CASE FRONT	T770A002	1	RIKEN PLUSTIC
KDT012		フィルターケース後	FILTER CASE BACK	T770A003	1	RIKEN PLUSTIC
KDT012a		ナベ小セムス B (大)	SCREW	M3x12	4	
KDT013		フィルターマット	FILTER MAT	SK3170100	1	RITTAL
KDT014		スペーサー	SPACER	SP-16	4	MACEIGHT
KDT015		PCB サポート	PCB SUPPORT	PCB-6S	20	NIX.INC.
KDT016	TB1	端子台	TERMINAL	C-TB1-1	1	KASUGA ELECTRIC
KDT016a		ナベ小セムス B (大)	SCREW	M4x8	2	
KDT017	TB2	端子台	TERMINAL	C-TB2-1	1	KASUGA ELECTRIC
KDT017a		ナベ小セムス B (大)	SCREW	M4x8	2	
KDT018	D001	ダクト	DUCT	KD-46-16-T	1	KOWAKASEI
KDT018a		ナベ小セムス B (大)	SCREW	M4x8	13	
KDT019	D002	ダクト	DUCT	KD-74-16-T	1	KOWAKASEI
KDT019a		ナベ小セムス B (大)	SCREW	M4x8	6	
KDT020	D003	ダクト	DUCT	KD-24-16-T	1	KOWAKASEI
KDT020a		ナベ小セムス B (大)	SCREW	M4x8	3	
KDT021		キャプコン	CAPCON	OA-2	1	OHM ELECTRIC
KDT022		タイマウント	TIE MOUNT	TM2S8-M	9	PANDUIT
KDT022a		ナベ小セムス A	SCREW	M4x6	9	
KDT023		NBR スポンジ	NBR SPONGE	20x20	1	BRIDGESTONE
KDT024		NBR スポンジ	NBR SPONGE	5x10	1	BRIDGESTONE
KDT025		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
KDT026		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
KDT027		セムス B (大)	SCREW	M3x50	1	
KDT028		バインド小ネジ	SCREW	M4x8(BLACK)	7	

C1216-770T	制御盤 CONTROL BOX	DT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
DT101		ステー	STAY		1	
DT101a		六角穴付ボルト	BOLT	M10x20	6	
DT101b		平座金	WASHER	M10	6	
DT101c		六角穴付ボルト	BOLT	M5x16	6	
DT101d		平座金	WASHER	M5	6	
DT102		カバー	COVER		1	
DT102a		六角穴付ボルト	BOLT	M4x10	4	
DT102b		平座金	WASHER	M4	4	
DT103		支柱	SUPPORTING COLUMN		1	
DT104		支柱	SUPPORTING COLUMN		1	
DT105		支柱	SUPPORTING COLUMN		2	
DT106		押さえ板	FIXED PLATE		1	
DT106a		六角穴付ボルト	BOLT	M5x12	2	
DT106b		平座金	WASHER	M5	2	
KDT101	FAN3	ファン	FAN	S12D20-TW2G	1	STYLE
				120□x38t		ELECTRON
KDT102		ファンガード	FAN GUARD	PG-47-01	2	NMB
KDT102a		平座金	WASHER	M3	4	
KDT102b		バネ座金	SPRING WASHER	M3	4	
KDT102c		ナット	NUT	M3	4	
KDT102d		ナベ小セムス B (大)	SCREW	M3x8	4	
KDT103		ファンガード	FAN GUARD	PG-47	1	NMB
KDT104		タイマウント	TIE MOUNT	TM2S8-M	4	PANDUIT
KDT104a		ナベ小セムス A	SCREW	M4x6	4	
KDT105		セムス B (大)	SCREW	M3x55	4	

C1216-770T	回生抵抗部 RESISTANCE UNIT	DT100

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
DT202		ブラケット	BRACKET		8	
KDT201		プリント基板	PRINTED BOARD	CC-PCB04-0	1	ELEX
KDT201a		ナベ小セムスB(大)	SCREW	M4x8	7	
KDT202	CNP1	リセプタクル	RECEPTACLE	10236-6202JL	1	SUMITOMO 3M
KDT202a		ナベ小セムスB(小)	SCREW	M2.6x5	2	
KDT203	CNP2 CNP3	タブヘッダー	TAB HEADER	178328-5	2	AMP
KDT204	CNP4 CNP7	タブヘッダー	TAB HEADER	178323-5	2	AMP
KDT205	CNP5 CNP9	タブヘッダー	TAB HEADER	1-178315-5	2	AMP
KDT206	(CNP6) CNP8	タブヘッダー	TAB HEADER	1-178313-5	1	AMP
KDT207	TBP1	端子台	TERMINAL	UF2350A-3.5L -4P-CT	1	FUJIKON
KDT207a		ナベ小セムスB(小)	SCREW	M4x20	2	
KDT207b		平座金 (小)	WASHER	M4	2	
KDT207c		ナット	NUT	M4	2	
KDT208	TBP2	端子台	TERMINAL	PS7-40A	1	YOSHIDA ELECTRIC
KDT209	Ry301 Ry308 Ry305 Ry309 Ry306 Ry310 Ry307 Ry312	ソケット	SOCKET	P2R-08P	8	OMRON
KDT210	Ry301 Ry307 Ry305 Ry308 Ry306 Ry309	リレー	RELAY	G2R-2-S(DC24V)	6	OMRON
KDT211	Ry302 Ry304 Ry303 Ry311	ソケット	SOCKET	TP04	4	FUJI ELECTRIC
KDT212	Ry303 Ry304	リレー	RELAY	RB104-DE(DC24V)	2	FUJI ELECTRIC
KDT213		ソケット	SOCKET	SZ6SF12A	2	FUJI ELECTRIC
KDT214	MC1 MC2	電磁接触器	ELECTROMAGNETIC CONTACTOR	FMC-0T(AC200V)	2	FUJI ELECTRIC
KDT214a		ナベ小セムスB(小)	SCREW	M4x12	4	
KDT214b		平座金 (小)	WASHER	M4	4	
KDT214c		ナット	NUT	M4	4	
KDT215	OLS1	サーマルリレー	THERMAL RELAY	TP13NB-M (1.4~2.2)	1	FUJI ELECTRIC
KDT216		耐振金具	EARTHQUAKE-PROOF FITTING	TZ6TP13B	2	FUJI ELECTRIC
KDT217	CP1	サーキットプロテクタ	CIRCUIT PROTECTOR	CP33EM/7.5WP	1	FUJI ELECTRIC
KDT217a		ナベ小セムスB(小)	SCREW	M3x6	4	
KDT218	CP2	サーキットプロテクタ	CIRCUIT PROTECTOR	CP31EM/5WP	1	FUJI ELECTRIC
KDT218a		ナベ小セムスB(小)	SCREW	M3x6	4	
KDT219	L301-L312	LED	LED	GL5EG71	12	SHARP
KDT220	L313	LED	LED	GL5HY71	2	SHARP

C1216-770T	動力基板 POWER BOARD	DT200

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
	L314					
KDT221	D301-D314	ダイオード	DIODE	DIN20	14	SHINDENGEN
KDT222	R301~R304	抵抗	RESISTANCE	RD50S220ΩJ	4	KOA
KDT223	R305~R307	抵抗	RESISTANCE	SPR2 100ΩJ	3	KOA
KDT224	R308	抵抗ネットワーク	RESISTANCE NETWORK	RKH1/2B6S2.2KΩJ	1	KOA
KDT225	R309	抵抗ネットワーク	RESISTANCE NETWORK	RKH1/2B4S2.2KΩJ	2	KOA
	R310					
KDT226	C301~C304	フィルムコンデンサ	FILM CONDENSER	ECQE6104KF	4	PANASONIC.
KDT227	C305~C307	フィルムコンデンサ	FILM CONDENSER	ECQE2A224MW	3	PANASONIC.

C1216-770T	動力基板 POWER BOARD	DT200

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KDT301		プリント基板	PRINTED BOARD	CC-PCB01-1	1	ELEX
KDT301a		ナベ小セムスB(大)	SCREW	M4x8	8	
KDT302	TBC1	端子台	TERMINAL	PS7-30A	2	YOSHIDA
	TBC2					ELECTRIC
KDT303	CNC1	リセプタクル	RECEPTACLE	10250-6202JL	1	SUMITOMO 3M
KDT303a		ナベ小セムスB(小)	SCREW	M2.6x5	2	
KDT304	CNC11	リセプタクル	RECEPTACLE	10236-6202JL	1	SUMITOMO 3M
KDT304a		ナベ小セムスB(小)	SCREW	M2.6x5	2	
KDT305	CNC1-1~	リセプタクル	RECEPTACLE	10220-6202JL	16	SUMITOMO 3M
	CNC1-6					
	CNC2-1~					
	CNC2-6					
	CNC6-1/					
	CNC6-2					
	CNC2					
	CNC10					
KDT305a		ナベ小セムスB(小)	SCREW	M2.6x5	32	
KDT306	CF30-C1	ソケット	SOCKET	9150-4500SC	4	SUMITOMO 3M
	CF30-C2					
	CNC3					
	CNC4					
KDT307	CNC8	基板取付タブヘッダー	CONNECTOR	1-178313-5	1	AMP
KDT308	CNC9	基板取付タブヘッダー	CONNECTOR	178327-5	1	AMP
KDT309	Ry201	ソケット	SOCKET	P2R-08P	1	OMRON
KDT310	Ry201	リレー	RELAY	G2R-2-S(DC24V)	1	OMRON
KDT311	Ry202~	ソケット	SOCKET	TP04	14	FUJI
	Ry215					ELECTRIC
KDT312	Ry207	リレー	RELAY	RB104-DE	1	FUJI
				(DC24V)		ELECTRIC
KDT313	L201~	LED	LED	LT1K51A	15	SHARP
	L215			(GREEN)		
KDT314	L221	LED	LED	LT1H51A	2	SHARP
	L222			(YELLOW)		
KDT315	L223	LED	LED	LT1T51A	13	SHARP
	L1-1~L1-6			(RED)		
	L2-1~L2-6					
KDT316	D201~D215	ダイオード	DIODE	D1F20	26	SHINDENGEN
	D221~D231					
KDT317	IC201~	IC	IC	M5M34051FP	15	MITSUBISHI
	IC215					ELECTRIC
KDT318	IC216	IC	IC	TC74HC4078AF	2	TOSHIBA
	IC217					
KDT319	IC218	IC	IC	TC74HC11AF	2	TOSHIBA
	IC219					
KDT320	IC226	IC	IC	M5A26LS31FP	2	MITSUBISHI
	IC227					ELECTRIC
KDT321	IC228	IC	IC	TC74HC04AF	2	TOSHIBA
	IC229					
KDT322	IC220~	IC	IC	TC74HC74AF	6	TOSHIBA
	IC225					

C1216-770T	I/F 基板 I/F BOARD	DT300

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KDT323	PH201 PH202	フォトカプラ	PHOTO COUPLER	PS2501L-4	2	NEC
KDT324	THY201	サイリスタ	THYRISTOR	8P4M	1	NEC
KDT325	Z201	ツェナーダイオード	DIODE	RD6.2MB	1	NEC
KDT326	R201~R257 R496~R499	抵抗	RESISTANCE	RK73H2E1KΩF	61	KOA
KDT327	R258~R285 R446	抵抗	RESISTANCE	RK73H2H150ΩF	29	KOA
KDT328	R286~ R299	抵抗	RESISTANCE	RK73H2E10KΩF	14	KOA
KDT329	R401 R402	抵抗	RESISTANCE	RK73K2E120ΩG	2	KOA
KDT330	R403~ R436	抵抗	RESISTANCE	RK73K2E330ΩG	34	KOA
KDT331	R437 R438	抵抗	RESISTANCE	RK73K2E680ΩG	2	KOA
KDT332	R439 R440 R501	抵抗	RESISTANCE	RK73K2E1.5KΩG	3	KOA
KDT333	R441 R442	抵抗	RESISTANCE	RK73K2E3.9KΩG	2	KOA
KDT334	R443~ R445	抵抗	RESISTANCE	RK73K2E100ΩJ	3	KOA
KDT335	R451	抵抗	RESISTANCE	RK73K2E470ΩJ	1	KOA
KDT336	R452~ R475	抵抗	RESISTANCE	RK73H2H2.2KΩF	24	KOA
KDT337	R476~ R483	抵抗	RESISTANCE	RK73H2E3.3KΩF	8	KOA
KDT338	R484~ R495	抵抗	RESISTANCE	RK73K2E680ΩJ	12	KOA
KDT339	R502	抵抗	RESISTANCE	RK73K2E22ΩJ	1	KOA
KDT340	C201~ C229	セラミックコンデンサ	CERAMIC CONDENSER	GRM40F104Z50PT	29	MURATA
KDT341	C231~ C240	セラミックコンデンサ	CERAMIC CONDENSER	GRM40F103M50PT	10	MURATA
KDT342	C241~ C264	セラミックコンデンサ	CERAMIC CONDENSER	GRM40B102K50PT	24	MURATA
KDT343	C271~ C286	フィルムコンデンサ	FILM CONDENSER	ECQE4334KFB	16	PANASONIC.
KDT344	SW1 SW2	ディップスライドスイッチ	SLIDE SWITCH	SMS706	2	FUJISOKU
KDT345		カードコーナーホルダー	CARD CORNER HOLDER	KGCH-20-0	4	KITAGAWA
KDT346	P1	端子板	TERMINAL PLATE	DIC-152-2P	1	HONDA TSUUSHIN KOGYO
KDT347		短絡プラグ	SHORT CIRCUIT PLUG	DIC128	1	HONDA TSUUSHIN KOGYO
KDT348	P1-5,P1-6 P1-5*,P1-6* P2-1~P2-6 P2-1*~P2-6*	端子板	TERMINAL PLATE	FFC-2AMEP1	16	HONDA TSUUSHIN KOGYO

C1216-770T	I/F 基板 I/F BOARD	DT300

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KDT349	F201	ヒューズホルダー	FUSE HOLDER	MPH-4V	1	DAITOU TSUUSHIN
KDT350	F201	ヒューズ	FUSE	MP50	1	DAITOU TSUUSHIN
KDT351	CH-OV	チェック端子	CHECK TERMINAL	LC-2-G-BLACK	2	MACEIGHT
KDT352	CH1-1~ CH1-6 CH2-1~ CH2-6	チェック端子	CHECK TERMINAL	LC-3-G-RED	12	MACEIGHT

C1216-770T	I/F 基板 I/F BOARD	DT300

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
ET001		操作盤	OPERATION BOX		1	
ET001a		E形止め輪	RETAINING RING (E TYPE)	4	2	
ET001b		セムスB (大)	SCREW	M4x8	10	
ET002		操作盤枠	OPERATION BOX FRAME		1	
ET003		取手	KNOB		1	
ET004		蛍光灯 SW 銘板	LAMP SW PLATE		1	
ET005		ドアロック金具	DOOR LOCK METAL		2	
ET006		メクラ板	PLATE		1	
ET007		ブラケット	BRACKET		1	
ET007a		セムスB (小)	SCREW	M4x8	2	
KET001	PL1	表示灯	INDICATOR LAMP	DR22D0L-M4W	1	FUJI ELECTRIC
KET002	SW3	セレクトスイッチ	SELECT SWITCH	AR22PR-210B	1	FUJI ELECTRIC
KET003	MPG	手動パルス発生器	MANUAL PULSE GENERATOR	UFO-M0025-2H-12	1	NEMICON
KET003a		平座金	WASHER	M3	3	
KET003b		バネ座金	SPRING WASHER	M3	3	
KET003c		ナット	NUT	M3	3	
KET004		ステンレスワイヤーロープ	STAINLESS WIRE ROPE	TM-173 (NYLONCOATING)	1	TOCHIGIYA
KET004a		六角穴付ボルト	BOLT	M5x10	2	
KET005		スプリング付きロックハンドル	SPRING LOCK HANDLE	A-61	2	TAKIGEN
KET006		スプリング付きロックハンドル	SPRING LOCK HANDLE	A-61-H	1	TAKIGEN
KET007		ホールプラグ	HOLE PLUG	CP-30-HP-7	2	TAKIGEN
KET008		7m ケーブル (両端モジュラー付)	CABLE	ICT CABLE 0.51P	1	SANKOU TSUUSHIN
KET009		嵌合固定台	FIXING STAND	D20418-J2	2	JAE
KET009a		ナベ小セムス A	SCREW	M2.6x6	8	
KET010		キャップ	CAP	DB-59-J2	1	JAE
KET011		タイマウント	TIE MOUNT	TM2S8-M	4	PANDUIT
KET011a		ナベ小ネジ	SCREW	M4x6	4	
KET012		NBR スポンジ	NBR SPONGE	5x10	1712mm	BRIDGESTONE
KET013		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
KET014		バインド小ネジ	BINDING HEAD SCREW	M4x8	4	

C1216-770T	操作盤 OPERATION BOX	ET000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
ET101		操作盤アーム	OPERATION BOX ARM		1	
ET101a		六角穴付ボルト	BOLT	M6x16	2	
ET101b		六角穴付ボルト	BOLT	M6x20	2	
ET101c		平行ピン	PARALLEL PIN	ø8x18	1	
ET102		フタ	COVER		1	
ET102a		六角穴付ボルト	BOLT	M5x8	6	
ET102b		平座金	WASHER	M5	6	
ET103		取手	KNOB		1	
ET104		ブラケット	BRACKET		1	
ET104a		六角穴付ボルト	BOLT	M6x10	2	
ET105		抜け止めボルト	STOP BOLT		1	

C1216-770T	アーム部 ARM	ET100

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	CNC8	ハウジング	HOUSING	1-178288-3	1	AMP
KWT002	CF04	ハウジング	HOUSING	1-178288-5	3	AMP
	CNS16					
	CNP5					
KWT003	DCOUT	ハウジング	HOUSING	3-178127-6	1	AMP
KWT004	DCIN/	ハウジング	HOUSING	2-178288-3	3	AMP
	CNS14					
	U9CR30					
KWT005	CNC9	ハウジング	HOUSING	178289-7	1	AMP
KWT006	CNP2	ハウジング	HOUSING	178289-8	1	AMP
	(CNP3)					
KWT007	ACIN	ハウジング	HOUSING	2-178128-3	1	AMP
KWT008		コンタクト	CONTACT	1-175217-5	11	AMP
KWT009		コンタクト	CONTACT	1-175218-5	53	AMP
KWT010	CF01	ハウジング	HOUSING	51030-0230	1	MOLEX
KWT011	EMG	ハウジング	HOUSING	51030-0330	1	MOLEX
KWT012		メスターミナル	TERMINAL	50084-8160	4	MOLEX
KWT013	HDISP	ハウジング	HOUSING	5251-08	1	MOLEX
KWT014	CF13	ハウジング	HOUSING	5251-02	1	MOLEX
KWT015		メスターミナル	TERMINAL	5659PBT2L	10	MOLEX
KWT016	CNC01	コネクター	CONNECTOR	MS3102A 20-4S	1	JAE
KWT017	CNC02	コネクター	CONNECTOR	MS3102A 12S-3S	1	JAE
KWT018	CNS17	ハウジング	HOUSING	IL-7S-S3L-(N)	1	JAE
KWT019		コンタクト	CONTACT	IL-C2	6	JAE
KWT020	CNBAR	コネクター	CONNECTOR	JL04V 2A28-11SE	1	JAE
KWT021	CF11	レセプタクル	RECEPTACLE	DHD-RB50-20AN	2	DDK
	CNS11					
KWT022	CF12	レセプタクル	RECEPTACLE	DHD-RB26-20AN	1	DDK
KWT023	CN2	レセプタクル	RECEPTACLE	17JE-13250-02(D1)	1	DDK
	CN3					
KWT024	R100	抵抗	RESISTANCE	SN14K2C150ΩF	1	KOA
KWT025	CNC17	ハウジング	HOUSING	608263315815000	1	ERUKO
KWT026		コンタクト	CONTACT	608263252300808	6	ERUKO
KWT027	U2CN1A	プラグ	PLUG	10120-6000EL	4	SUMITOMO 3M
	U9CN3A					
	U4CN3					
	CNC6-1					
KWT028		シェル	SHELL	10320-3210-000	3	SUMITOMO 3M
KWT029	CF10	プラグ	PLUG	10150-6000EL	2	SUMITOMO 3M
	CNC1					
KWT030		シェル	SHELL	10350-52A0-008	2	SUMITOMO 3M
KWT031	UN1B	プラグ	PLUG	10120-3000VE	5	SUMITOMO 3M
	CNS15					
	U4CN1A					
	CNC2					
	CF50					
KWT032		シェル	SHELL	10320-42F0-008	1	SUMITOMO 3M
KWT033		シェル	SHELL	10320-42A0-008	1	SUMITOMO 3M
KWT034		シェル	SHELL	10320-52A0-008	3	SUMITOMO 3M

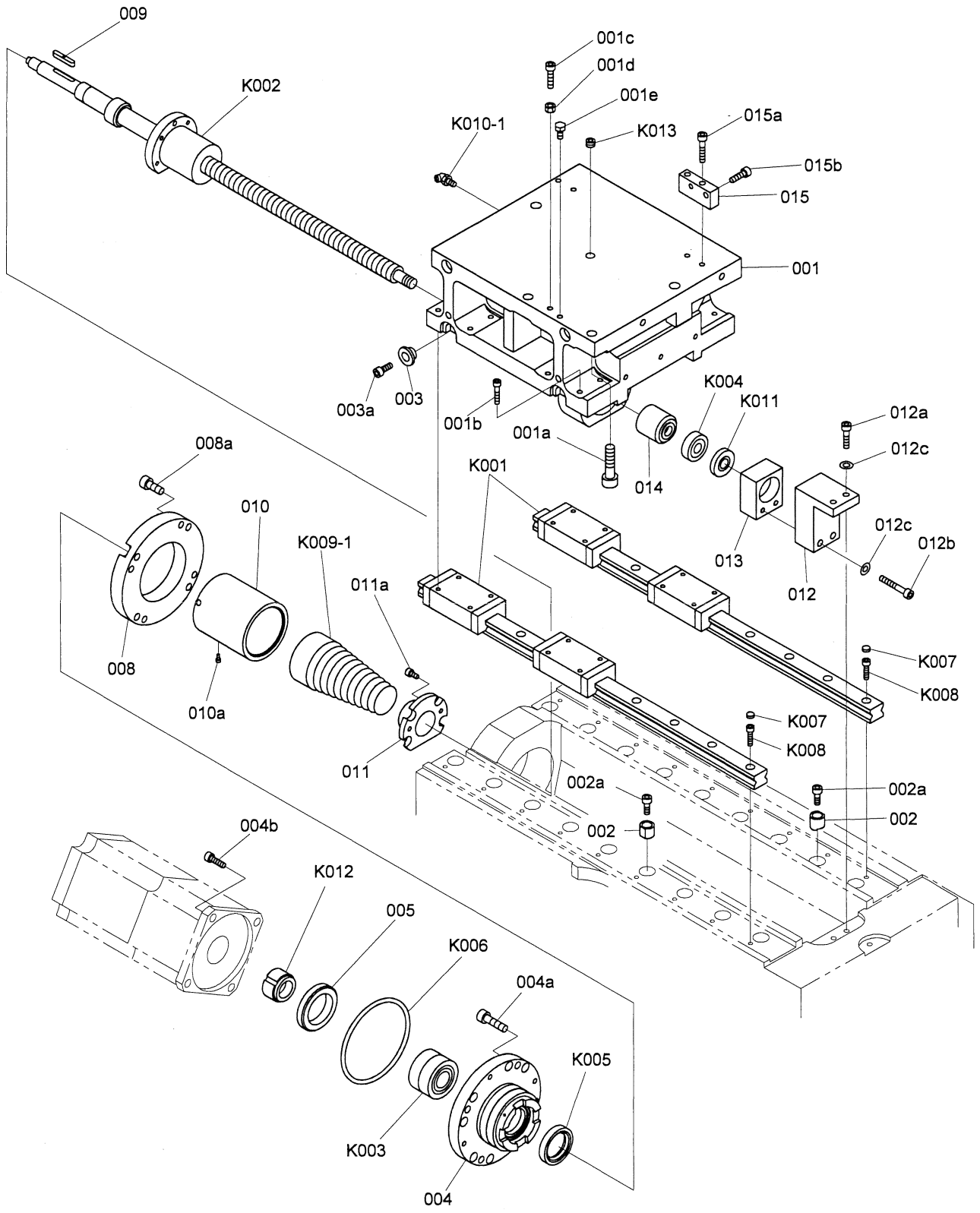
C1216-770T	盤内ケーブル CABLE	WT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT035		シェル	SHELL	10620-5600-008	1	SUMITOMO 3M
KWT036		ラッチ	LATCH	10600-L0F0-8	2	SUMITOMO 3M
KWT037	CNC11 CNP1	プラグ	PLUG	10136-3000VE	2	SUMITOMO 3M
KWT038		シェル	SHELL	10336-42A0-008	2	SUMITOMO 3M
KWT039	D1 D2	ダイオード	DIODE	DIN20	2	SHINDENGEN
WT020		AVR1 入力ケーブル	AVR1 INPUT CABLE		1	
WT021		I/F 基板電源ケーブル	I/F BOARD POWER SUPPLY CABLE		1	
WT022		ファンモータケーブル	FAN MOTOR CABLE		1	
WT023		I/F 基板信号ケーブル	I/F BOARD SIGNAL CABLE		1	
WT024		機械信号ケーブル	MACHINE SIGNAL CABLE		1	
WT025		電源 ON-OFF ケーブル	POWER SUPPLY ON-OFF CABLE		1	
WT026		バスケーブル	BUS CABLE		1	
WT027		DC 電源ケーブル	DC POWER SUPPLY CABLE		1	
WT028		終端コネクタ	END CONNECTOR		1	
WT029		給材機ケーブル	BAR LOADER CABLE		1	
WT030		切削油ポンプケーブル	COOLANT PUMP CABLE		1	
WT031		切削油レベル検出ケーブル	COOLANT LEVEL DETECTOR CABLE		1	
WT034		ファンモータケーブル	FAN MOTOR CABLE		1	
WT059		電源入表示灯ケーブル	POWER ON INDICATIVE LIGHT CABLE		1	
WT060		AVR1 出力ケーブル	AVR1 OUTPUT CABLE		1	
WT061		機械信号ケーブル	MACHINE SIGNAL CABLE		1	
WT062		10 インターフェイスケーブ	10 I/F CABLE		1	
WT063		機械信号ケーブル	MACHINE SIGNAL CABLE		1	
WT064		機内照明 SW ケーブル	MACHINE INSIDE LIGHT CABLE		1	
WT065		EMG ケーブル	EMG CABLE		1	
WT067		RS-232C ケーブル	RS-232C CABLE		1	
WT068		キーボードケーブル	KEYBOAD CABLE		1	
WT069		HDD 表示ケーブル	HDD INDICATIVE CABLE		1	
WT070		手動パルス発生器ケーブル	MANYUAL PULSE GENERATOR		1	
WT071		シートキーボードケーブル	SHEET KEYBOAD CABLE		1	

C1216-770T	盤内ケーブル CABLE	WT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	CNC1-1 CNC1-2 CNC1-3 CNC1-4	プラグ	PLUG	10120-3000VE	4	SUMITOMO 3M
KWT102		シェル	SHELL	10320-52A0-008	4	SUMITOMO 3M
KWT103	CNX1 CNZ1 CNY1	コネクター	CONNECTOR	MS3108B 22-14S	3	JAE
KWT104		ケーブルクランプ	CABLE CLAMP	MS3057-12A	2	JAE
KWT105	CNA1A	ハウジング	HOUSING	178289-3	1	AMP
KWT106	CNA1B	ハウジング	HOUSING	178289-6	1	AMP
KWT107		コンタクト	CONTACT	1-175216-5	13	AMP
KWT108		コンタクト	CONTACT	1-175218-5	5	AMP
KWT109		サンフレキ	FLEXIBLE TUBE	NS#20	0.8m	SANKEI
KWT110		カップリング	COUPLING	NKM-20-20·22	1	SANKEI
WT102		ドアスイッチケーブル	DOOR SWITCH CABLE		1	
WT103		ドアスイッチケーブル	DOOR SWITCH CABLE		1	
WT104		潤滑油ポンプケーブル	LUBRICATION PUMP CABLE		1	
WT105		蛍光燈ケーブル	LIGHT CABLE		1	
WT106		回生抵抗ファンケーブル	REGENERATIVE RESISTOR FAN CABLE		1	
WT107		X1 軸モータケーブル	X1 AXIS MOTOR CABLE		1	
WT108		Z1 軸モータケーブル	Z1 AXIS MOTOR CABLE		1	
WT109		Y1 軸モータケーブル	Y1 AXIS MOTOR CABLE		1	
WT110		チャックモータケーブル	CHUCK MOTOR CABLE		1	
WT111		メイン主軸ファンケーブル	MAIN SPINDLE FAN CABLE		1	
WT112		メイン主軸回生抵抗ケーブル	MAIN SPINDLE REGENERATIVE RESISTOR CABLE		1	

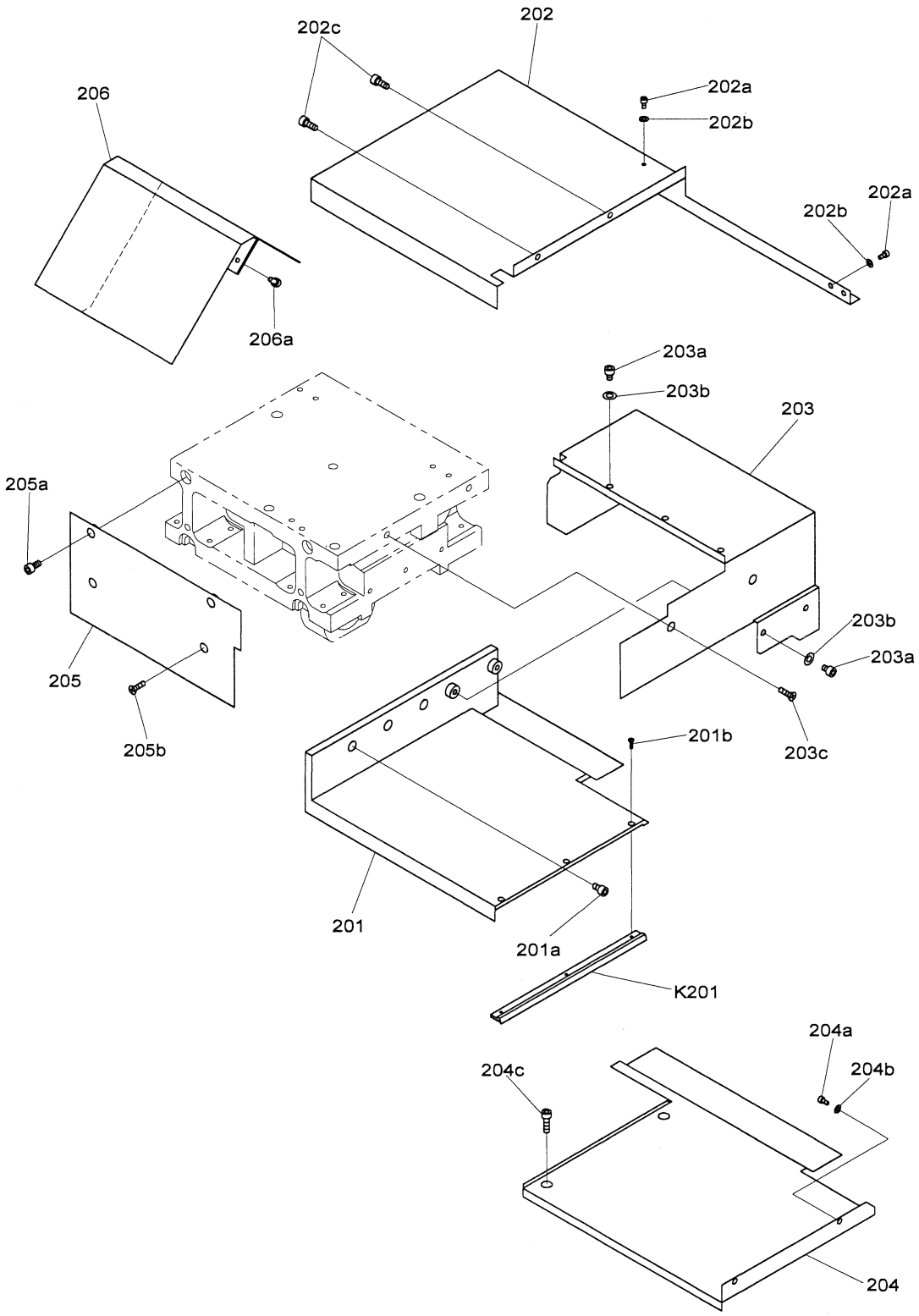
C1216-770T	本体ケーブル CABLE	WT100



C1216 U10B	Z3 軸送り機構部 Z3-AXIS FEED MECHANISM	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	Z_3 スライド	Z_3 -SLIDE		1	
001a	六角穴付ボルト	BOLT	M10x40	2	
001b	六角穴付ボルト	BOLT	M5x25	16	
001c	六角穴付ボルト	BOLT	M6x25	1	
001d	六角ナット	NUT	M6	1	
001e	六角ボルト	BOLT	M6x12	1	
002	コマ	BLOCK		18	
002a	六角穴付ボルト	BOLT	M6x16	18	
003	コマ	BLOCK		2	
003a	六角穴付ボルト	BOLT	M6x16	2	
004	ボールネジサポート	BALL SCREW SUPPORT		1	
004a	六角穴付ボルト	BOLT	M8x30	4	
004b	六角穴付ボルト	BOLT	M6x20	4	
005	ベアリング押え	NUT		1	
008	スペーサー	SPACER		1	
008a	六角穴付ボルト	BOLT	M8x20	4	
009	キー	KEY		1	
010	スクリューカバー受け (外)	SCREW COVER RECEIVE (OUT)		1	
010a	六角穴付ボルト	BOLT	M3x5	4	
011	スクリューカバー受け (内)	SCREW COVER RECEIVE (IN)		1	
011a	六角穴付ボルト	BOLT	M5x10	2	
012	振れ止めベース	SUPPORT BASE		1	
012a	六角穴付ボルト	BOLT	M6x25	2	
012b	六角穴付ボルト	BOLT	M6x40	2	
012c	平座金	WASHER	M6	4	
013	振れ止めプレート	SUPPORT PLATE		1	
014	ストッパー	STOPPER		1	
015	調整駒	BLOCK		2	
015a	六角穴付ボルト	BOLT	M6x30	4	
015b	六角穴付ボルト	BOLT	M6x20	4	
K001	LM ガイド	LM GUIDE	HSR20LR2UUC0E +528LP-II	1set	THK
K002	ボールネジ	BALL SCREW	BS1920	1	CPM
K003	ボールネジサポート軸受	BALL SCREW SUPPORT BEARING	20TAB04DB	1set	NACHI
K004	深溝玉軸受	BALL BEARING	6201ZZ	2	NACHI
K005	オイルシール SB 型	OIL SEAL (SB TYPE)	AB1679A3	1	NOK
K006	O リング	O-RING	S95	1	NOK
K007	LM 用キャップ	LM CAP	C5	18	THK
K008	六角穴付ボルト	BOLT	M5x20	18	UNBRAKO
K009-1	フレックスカバー	FLEXIBLE COVER	FC-17	1	TAIYO HATSUJO
K010-1	グリースニップル	GREASE NIPPLES	A TYPE PT1/8	1	
K011	ファイン U ナット	FAIN U-NUT	FU01SS	1	FUJI SEIMITSU
K012	KMT ナット	KMT NUT	M20 P1	1	SKF
K013	六角穴付止ネジ (平先)	SET SCREW	M10x6	1	GOSHO

C1216 U10B	Z_3 軸送り機構部 Z_3-AXIS FEED MECHANISM	000



C1216 U10B	Z3 軸送り機構部 Z3-AXIS FEED MECHANISM	200

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
201	Z3スライドカバー (前)	Z3 SLIDE COVER (FRONT)		1	
201a	六角穴付ボルト	BOLT	M6x10	3	
201b	皿小ネジ	COUNTER SUNK SCREW	M3x8	3	
202	Z3スライドカバー (後)	Z3 SLIDE COVER (BACK)		1	
202a	六角穴付ボルト	BOLT	M4x6	3	
202b	平座金	WASHER	M4	3	
202c	六角穴付ボルト	BOLT	M6x12	2	
203	Z3スライドカバー (中央)	Z3 SLIDE COVER (CENTER)		1	
203a	六角穴付ボルト	BOLT	M6x8	5	
203b	平座金	WASHER	M6	5	
203c	皿小ネジ	COUNTER SUNK SCREW	M5x12	2	
204	Z3固定カバー	Z3 FIXED COVER		1	
204a	六角穴付ボルト	BOLT	M4x6	2	
204b	平座金	WASHER	M4	2	
204c	六角穴付ボルト	BOLT	M6x20	2	
205	フタ	COVER		1	
205a	六角穴付ボルト	BOLT	M6x12	2	
205b	皿小ネジ	COUNTER SUNK SCREW	M5x12	2	
206	モーターカバー	MOTOR COVER		1	
206a	六角穴付ボルト	BOLT	M5x10	1	
K201	テレスコカバー用シール	SEAL	SH-8(L=223)	1	NITTA

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KR201	フロープロパーユニット	FLOW PROPER UNIT	PSS1	4	SHOWA YUKI
KR202	締付プラグ	PLUG	PA4	5	SHOWA YUKI
KR203	スリーブ	SLEEVE	PB4	7	SHOWA YUKI
KR204	チューブインサート	TUBE INSERT	AL4	2	SHOWA YUKI
KR205	プロパーナット	PROPER NUT	PAN4	2	SHOWA YUKI
KR206	ティー	TEE	PK4	3	SHOWA YUKI
KR208	コネクタ	CONNECTOR	PQ8	1	SHOWA YUKI
KR212	アルミパイプ	ALUMINUM PIPE	ALP4 1.5m	1	SHOWA YUKI

C1216 U10B	Z3 軸送り機構部 Z3-AXIS FEED MECHANISM	R200

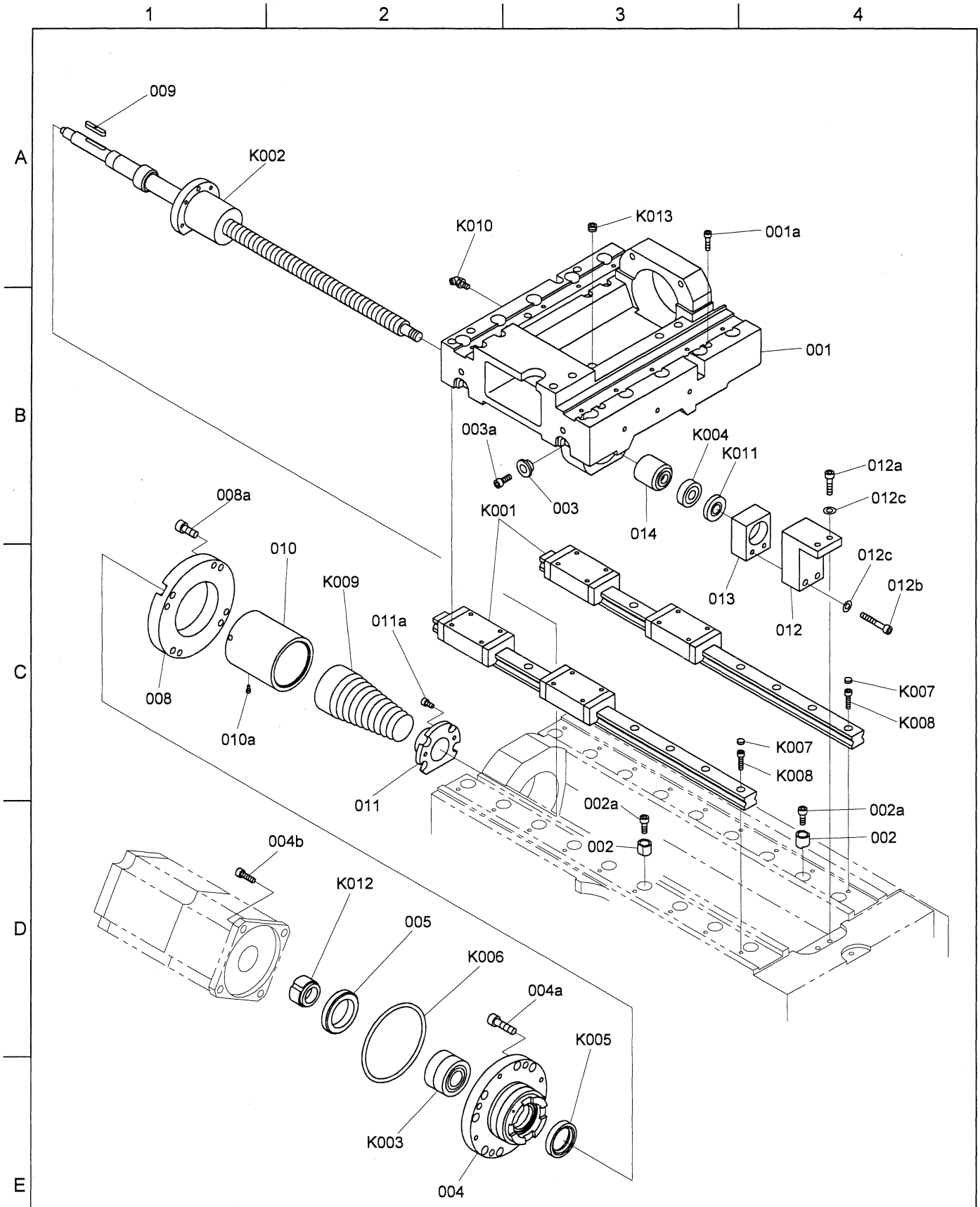
PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT002	MZ3	インテリジェントサーボモータ　SERVO MOTOR	HS-RF73NX-S1	1	MITSUBISHI ELECTRIC

C1216 U10B	Z3 軸送り機構部 Z3-AXIS FEED MECHANISM	CT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	CNC2-2	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT102		シェル	SHELL	10320-52A0-008	1	SUMITOMO 3M
KWT103	CNZ3	コネクタ	CONNECTOR	MS3106A 22-14S (D190)	1	DDK
KWT104		アングルバックシェル	ANGLE BACK SHELL	CE-22BA-S	1	DDK
KWT105		防水ケーブルクランプ	WATER PROOF CABLE CLAMP	CE3057-12A-2	1	DDK
WT101		Z3 軸モーターケーブル	Z3 MOTOR CABLE		1	

C1216 U10B	Z3 軸送り機構部 Z3-AXIS FEED MECHANISM	WT100

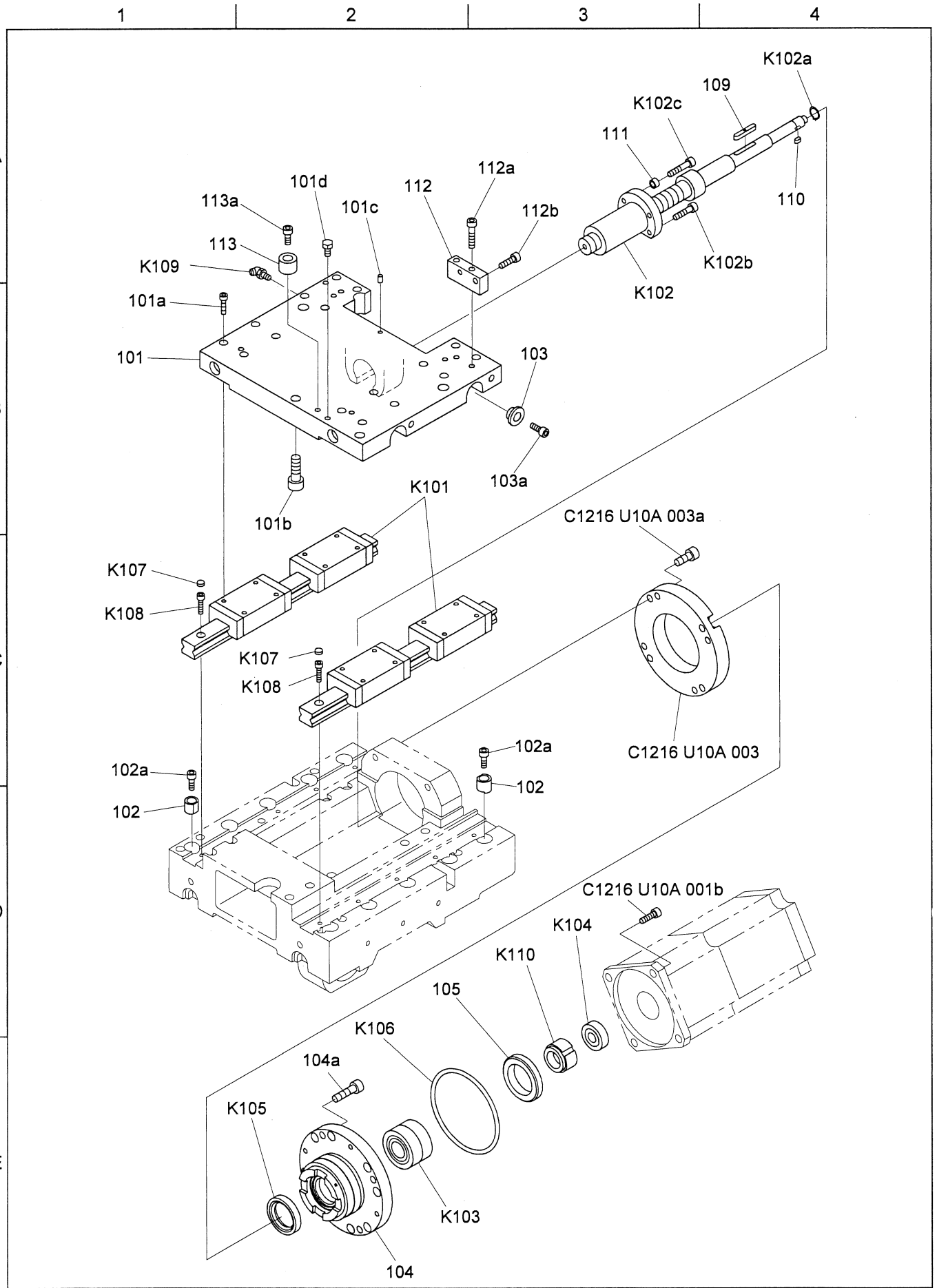
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C1216 U11B	X_3,Z_3 軸送り機構部 X_3,Z_3-AXIS FEED MECHANISM	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	クロススライド	CROSS SLIDE		1	
001a	六角穴付ボルト	BOLT	M5x20	14	
002	コマ	BLOCK		18	
002a	六角穴付ボルト	BOLT	M6x16	18	
003	コマ	BLOCK		2	
003a	六角穴付ボルト	BOLT	M6x16	2	
004	ボールネジサポート	BALL SCREW SUPPORT		1	
004a	六角穴付ボルト	BOLT	M8x30	4	
004b	六角穴付ボルト	BOLT	M6x20	4	
005	ベアリング押え	NUT		1	
008	スペーサー	SPACER		1	
008a	六角穴付ボルト	BOLT	M8x20	4	
009	キー	KEY		1	
010	スクリューカバー受け (外)	SCREW COVER RECEIVE (OUT)		1	
010a	六角穴付ボルト	BOLT	M3x5	4	
011	スクリューカバー受け (内)	SCREW COVER RECEIVE (IN)		1	
011a	六角穴付ボルト	BOLT	M5x10	2	
012	振れ止めベース	SUPPORT BASE		1	
012a	六角穴付ボルト	BOLT	M6x25	2	
012b	六角穴付ボルト	BOLT	M6x40	2	
012c	平座金	WASHER	M6	4	
013	振れ止めプレート	SUPPORT PLATE		1	
014	ストッパー	STOPPER		1	
K001	LM ガイド	LM GUIDE	HSR20LR2UUC0E +528LP-II	1set	THK
K002	ボールネジ	BALL SCREW	BS1920	1	CPM
K003	ボールネジサポート軸受	BALL SCREW SUPPORT BEARING	20TAB04DB	1set	NACHI
K004	深溝玉軸受	BALL BEARING	6201ZZ	2	NACHI
K005	オイルシール SB 型	OIL SEAL (SB TYPE)	AB1679A3	1	NOK
K006	O リング	O-RING	S95	1	NOK
K007	LM ガイド取付用キャップ	LM CAP	C5	18	
K008	六角穴付ボルト	BOLT	M5x20	18	UNBRAKO
K009	フレックスカバー	FLEXIBLE COVER	FC-17	1	TAIYO HATSUJO
K010	グリースニップル	GREASE NIPPLES	A TYPE PT1/8	1	
K011	ファイン U ナット	FAIN U-NUT	FU01SS	1	FUJI SEIMITSU
K012	KMT ナット	KMT NUT	M20 P1	1	SKF
K013	六角穴付止ネジ (平先)	SET SCREW	M10x6	2	GOSHO

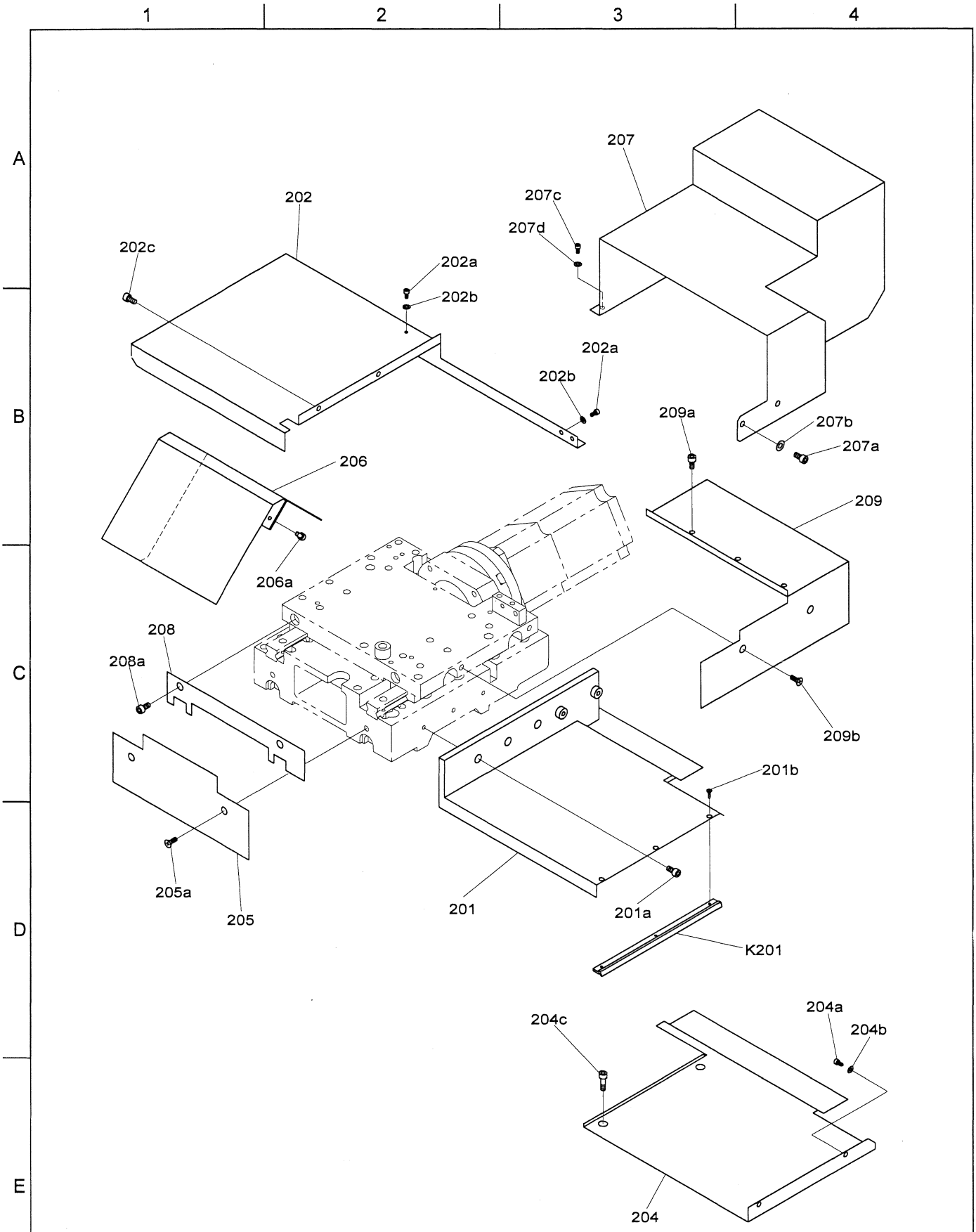
C1216 U11B	X3,Z3 軸送り機構部 X3,Z3-AXIS FEED MECHANISM	000



C1216 U11B	X3,Z3 軸送り機構部 X3,Z3-AXIS FEED MECHANISM	100 (C1216 U10A)

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
101	X_3 スライド	X_3 -SLIDE		1	
101a	六角穴付ボルト	BOLT	M5x20	16	
101b	六角穴付ボルト	BOLT	M10x30	2	
101c	塞ぎ栓	PLUG	ø5x8	1	
101d	六角ボルト	BOLT	M6x12	1	
102	コマ	BLOCK		10	
102a	六角穴付ボルト	BOLT	M6x16	10	
103	コマ	BLOCK		2	
103a	六角穴付ボルト	BOLT	M6x16	2	
104	ボールネジサポート	BALL SCREW SUPPORT		1	
104a	六角穴付ボルト	BOLT	M8x30	4	
104b	六角穴付ボルト	BOLT	M6x20	4	
105	ベアリング押え	NUT		1	
C1216U10A 003	スペーサー	SPACER		1	
C1216U10A 003a	六角穴付ボルト	BOLT	M8x20	4	
109	キー	KEY		1	
110	キー	KEY		1	
111	カラー	COLLAR		1	
112	調整駒	BLOCK		2	
112a	六角穴付ボルト	BOLT	M6x30	2	
112b	六角穴付ボルト	BOLT	M6x20	2	
113	位置決メピン	POSITIONING PIN		1	
113a	六角穴付ボルト	BOLT	M6x15	1	
K101	LM ガイド	LM GUIDE	HSR20LR2UUC0E +288LP-II	1set	THK
K102	ボールネジ	BALL SCREW	BS5420	1	CMJ
K102a	軸用 C トメワ	RETAINING RING (C TYPE)	12	1	
K102b	六角穴付ボルト	BOLT	M6x25	3	
K102c	六角穴付ボルト	BOLT	M6x30	1	
K103	ボールネジサポート軸受	BALL SCREW SUPPORT BEARING	20TAB04DB	1set	NACHI
K104	深溝玉軸受	BALL BEARING	6201ZZ	1	NACHI
K105	オイルシール SB 型	OIL SEAL (SB TYPE)	AB1679A3	1	NOK
K106	O リング	O-RING	S95	1	NOK
K107	LM ガイド取付用キャップ	LM CAP	C5	10	
K108	六角穴付ボルト	BOLT	M5x20	10	UNBRAKO
K109	グリースニップル	GREASE NIPPLES	A TYPE PT1/8	1	
K110	ロックナット	LOCK NUT	KTKA20x1	1	FUKUDA
K111	六角穴付ボルト	BOLT	M5x40	1	

C1216 U11B	X_3,Z_3 軸送り機構部 X_3,Z_3-AXIS FEED MECHANISM	100 (C1216 U10A)



C1216 U11B	X3,Z3 軸送り機構部 X3,Z3-AXIS FEED MECHANISM	200

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
201	Z_3スライドカバー (前)	Z_3 SLIDE COVER (FRONT)		1	
201a	六角穴付ボルト	BOLT	M6x10	3	
201b	皿小ネジ	SET SCREW	M3x8	3	
202	Z_3スライドカバー (後)	Z_3 SLIDE COVER (BACK)		1	
202a	六角穴付ボルト	BOLT	M4x6	3	
202b	平座金	WASHER	M4	3	
202c	六角穴付ボルト	BOLT	M6x12	2	
204	Z_3固定カバー	Z_3 FIXED COVER		1	
204a	六角穴付ボルト	BOLT	M4x6	2	
204b	平座金	WASHER	M4	2	
204c	六角穴付ボルト	BOLT	M6x20	2	
205	フタ	COVER		1	
205a	皿小ネジ	SET SCREW	M5x12	2	
206	モーターカバー	MOTOR COVER		1	
206a	六角穴付ボルト	BOLT	M5x10	1	
207	X_3モーターカバー	X_3 MOTOR COVER		1	
207a	六角穴付ボルト	BOLT	M6x12	2	
207b	平座金	WASHER	M6	2	
207c	六角穴付ボルト	BOLT	M4x6	1	
207d	平座金	WASHER	M4	1	
208	X_3スライドカバー (前)	X_3 SLIDE COVER (FRONT)		1	
208a	六角穴付ボルト	BOLT	M6x12	2	
209	X_3スライドカバー (後)	X_3 SLIDE COVER (BACK)		1	
209a	六角穴付ボルト	BOLT	M6x12	3	
209b	皿小ネジ	SET SCREW	M5x12	2	
K201	テレスコカバー用シール	SEAL	SH-8(L=223)	1	NITTA

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KR201	フロープロパーユニット	FLOW PROPER UNIT	PSS1	8	SHOWA YUKI
KR202	締付プラグ	PLUG	PA4	14	SHOWA YUKI
KR203	スリーブ	SLEEVE	PB4	16	SHOWA YUKI
KR204	チューブインサート	TUBE INSERT	AL4	4	SHOWA YUKI
KR205	プロパーナット	PROPER NUT	PAN4	2	SHOWA YUKI
KR206	ティー	TEE	PK4	7	SHOWA YUKI
KR207	エルボ	ELBOW	PL4	2	SHOWA YUKI
KR208	コネクタ	CONNECTOR	PQ8	3	SHOWA YUKI
KR209	ジャンクション	JUNCTION	JD2	1	SHOWA YUKI
KR210	正和ナイロンパイプ	SHOWA NYLON PIPE	ø4(11 NYLON)	1	SHOWA YUKI
KR211	保護スプリング	PROTECTIVE SPRING	FOR ø4	1	SHOWA YUKI
KR212	アルミパイプ	ALUMINUM PIPE	ALP4 3	1	SHOWA YUKI

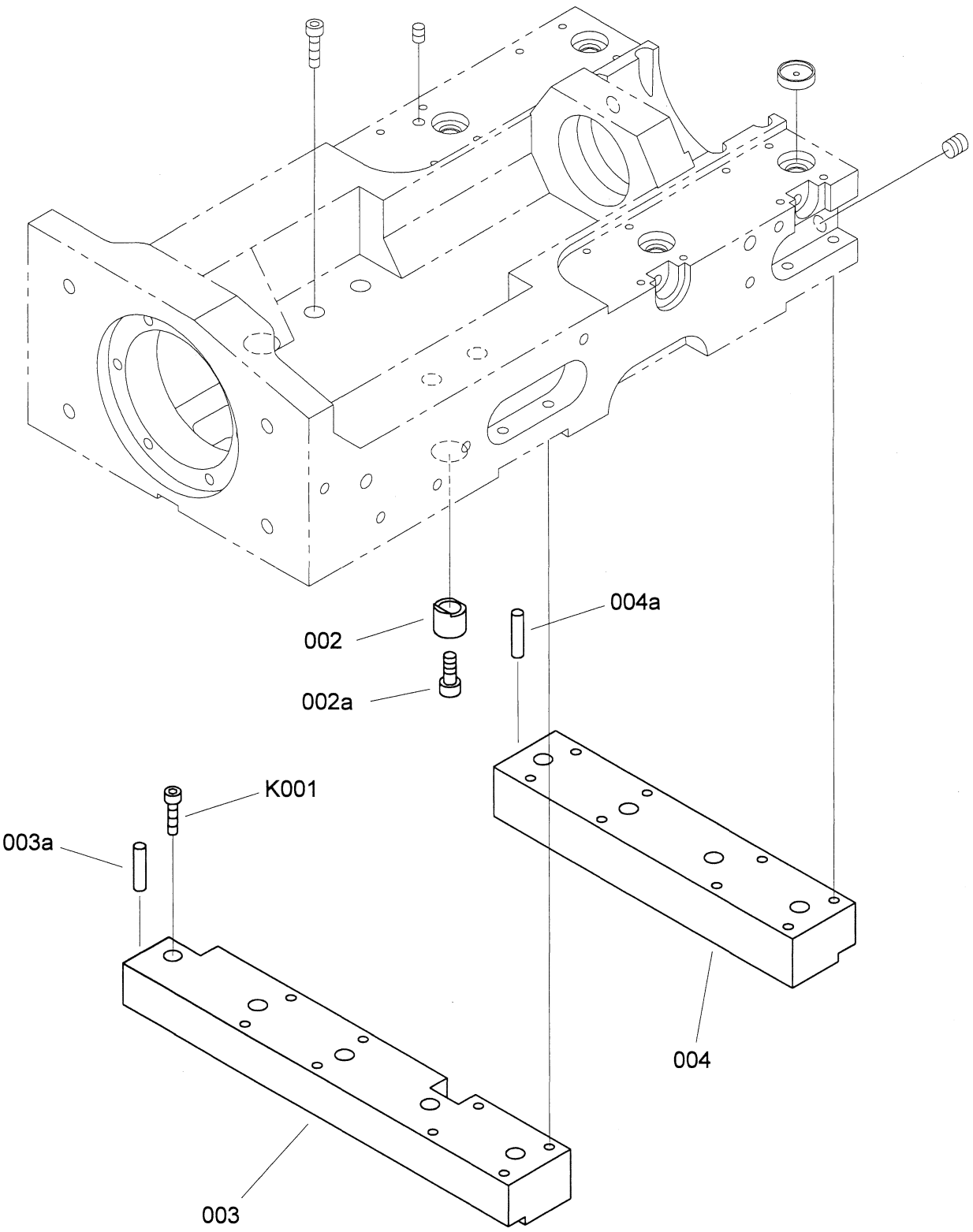
C1216 U11B	X_3,Z_3 軸送り機構部 X_3,Z_3-AXIS FEED MECHANISM	R200

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT001	MZ3	インテリジェントサーボモータ SERVO MOTOR	HS-RF73NX-S1	1	MITSUBISHI ELECTRIC
KCT002	MX3	インテリジェントサーボモータ SERVO MOTOR	HS-RF73BNX-S1	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	CNC2-2 CNC2-2	プラグ	PLUG	10120-3000VE	2	SUMITOMO 3M
KWT102		シェル	SHELL	10320-52A0-008	2	SUMITOMO 3M
KWT103	CNZ3	コネクタ	CONNECTOR	MS3106A 22-14S (D190)	1	DDK
KWT104		アングルバックシェル	ANGLE BACK SHELL	CE-22BA-S	1	DDK
KWT105		防水ケーブルクランプ	WATER PROOF CABLE CLAMP	CE3057-12A-2	1	DDK
KWT106	CNX3	アングルコネクタ	ANGLE CONNECTOR	MS3108B 22-14S	1	JAE
KWT107		サンフレキ	FLEXIBLE TUBE	NS#20	2.0m	SANKEI
KWT108		カップリング	COUPLING	NKM-20-20·22	1	SANKEI
WT101		Z3 軸モータケーブル	Z3 AXIS MOTOR CABLE		1	
WT102		X3 軸モータケーブル	X3 AXIS MOTOR CABLE		1	

C1216 U11B	X_3,Z_3 軸送り機構部 X_3,Z_3-AXIS FEED MECHANISM	WT100

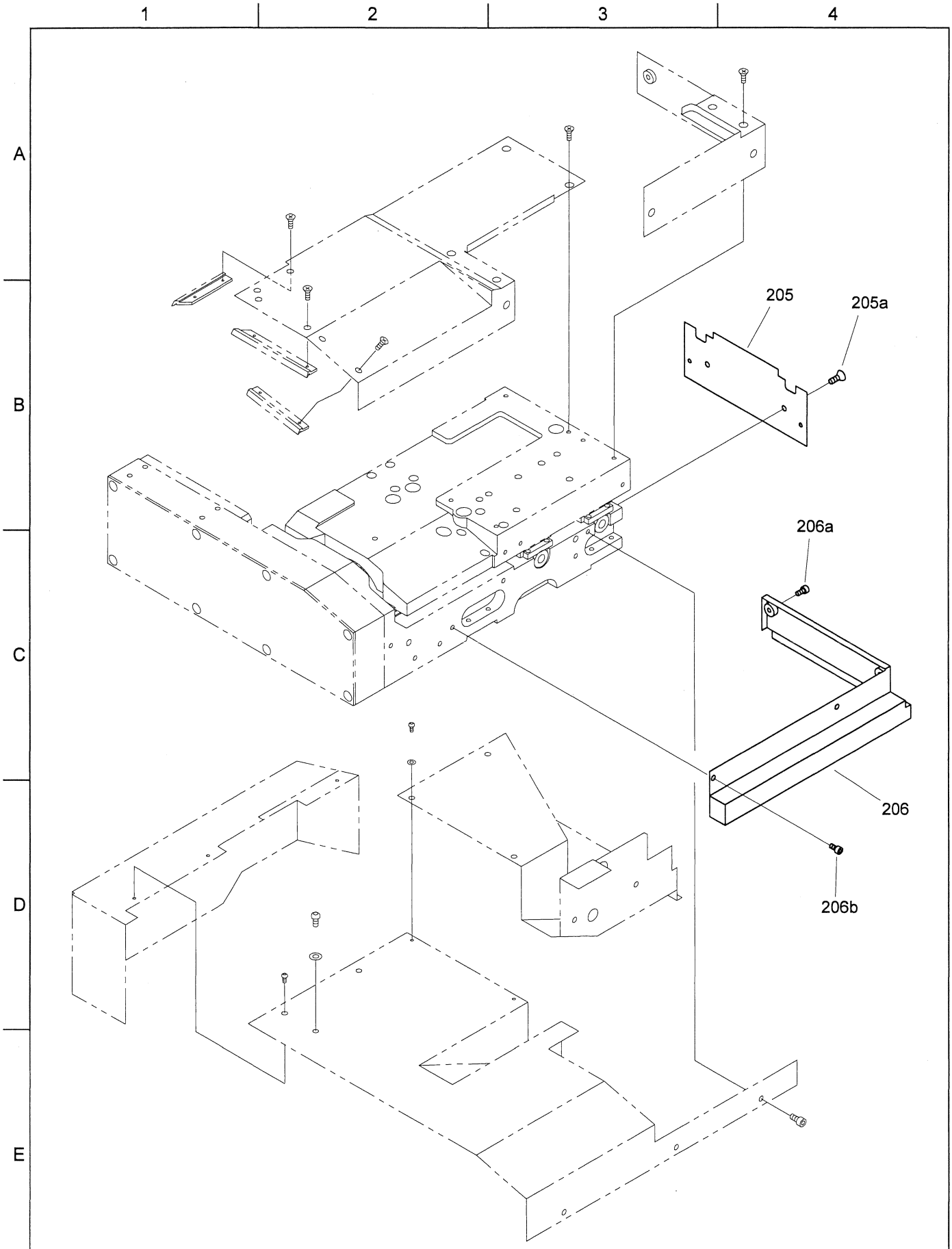
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C1216 U14B	対向刃物台 VII 型専用ブロック OPPOSITE TOOL POST (BLOCK DEDICATED TO TYPE VII)	000

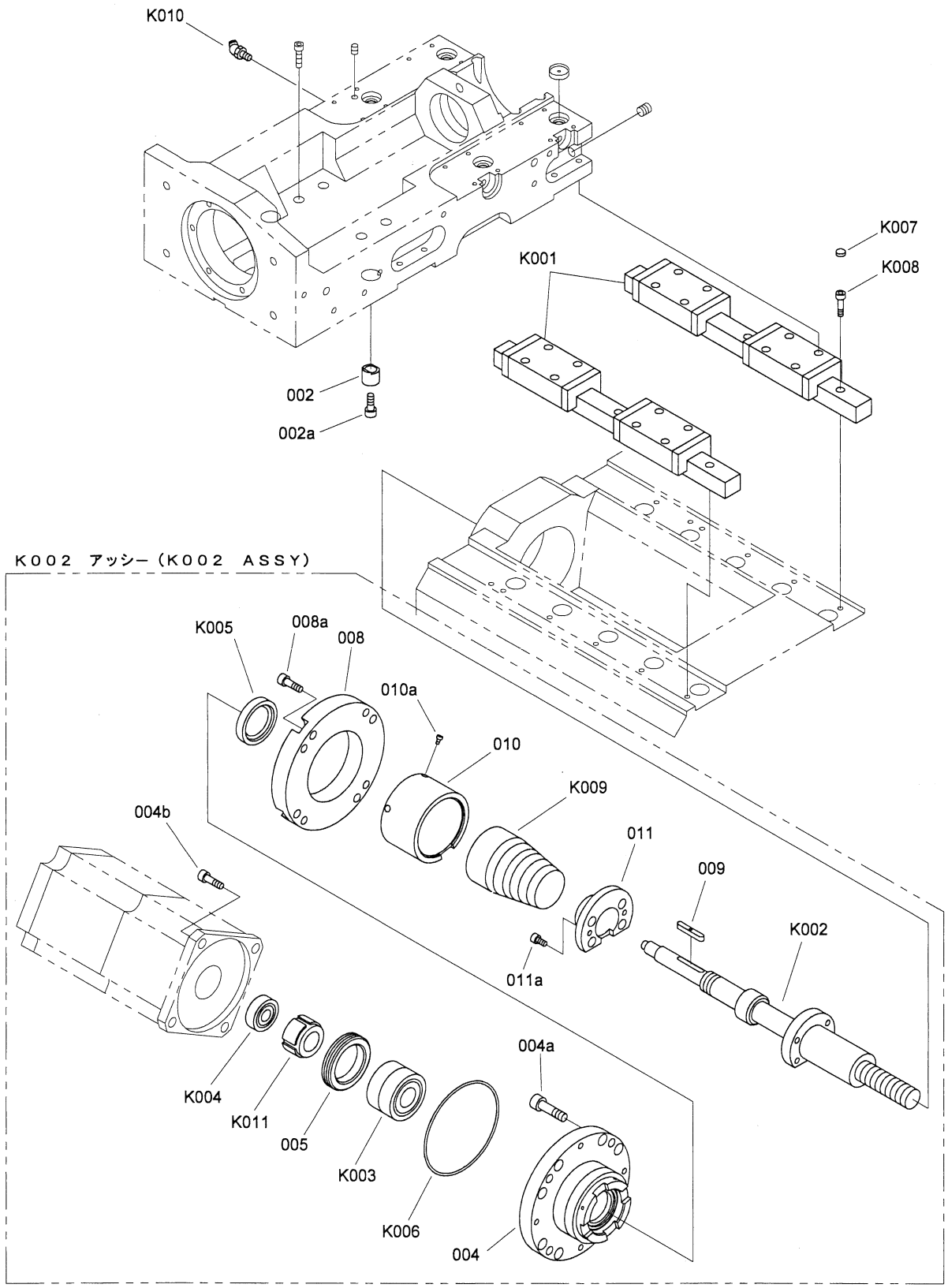
PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
002	コマ	BLOCK		4	
002a	六角穴付ボルト	BOLT	M6x16	4	
003	プレート (1)	PLATE (1)		1	
003a	平行ピン	PIN	ø5x25	1	
004	プレート (2)	PLATE (2)		1	
004a	平行ピン	PIN	ø5x25	1	
K001	六角穴付ボルト	BOLT	M5x20	9	UNBRAKO

C1216 U14B	対向刃物台 VII 型専用ブロック OPPOSITE TOOL POST (BLOCK DEDICATED TO TYPE VII)	000



C1216 U14B	対向刃物台 VII 型専用ブロック OPPOSITE TOOL POST (BLOCK DEDICATED TO TYPE VII)	200

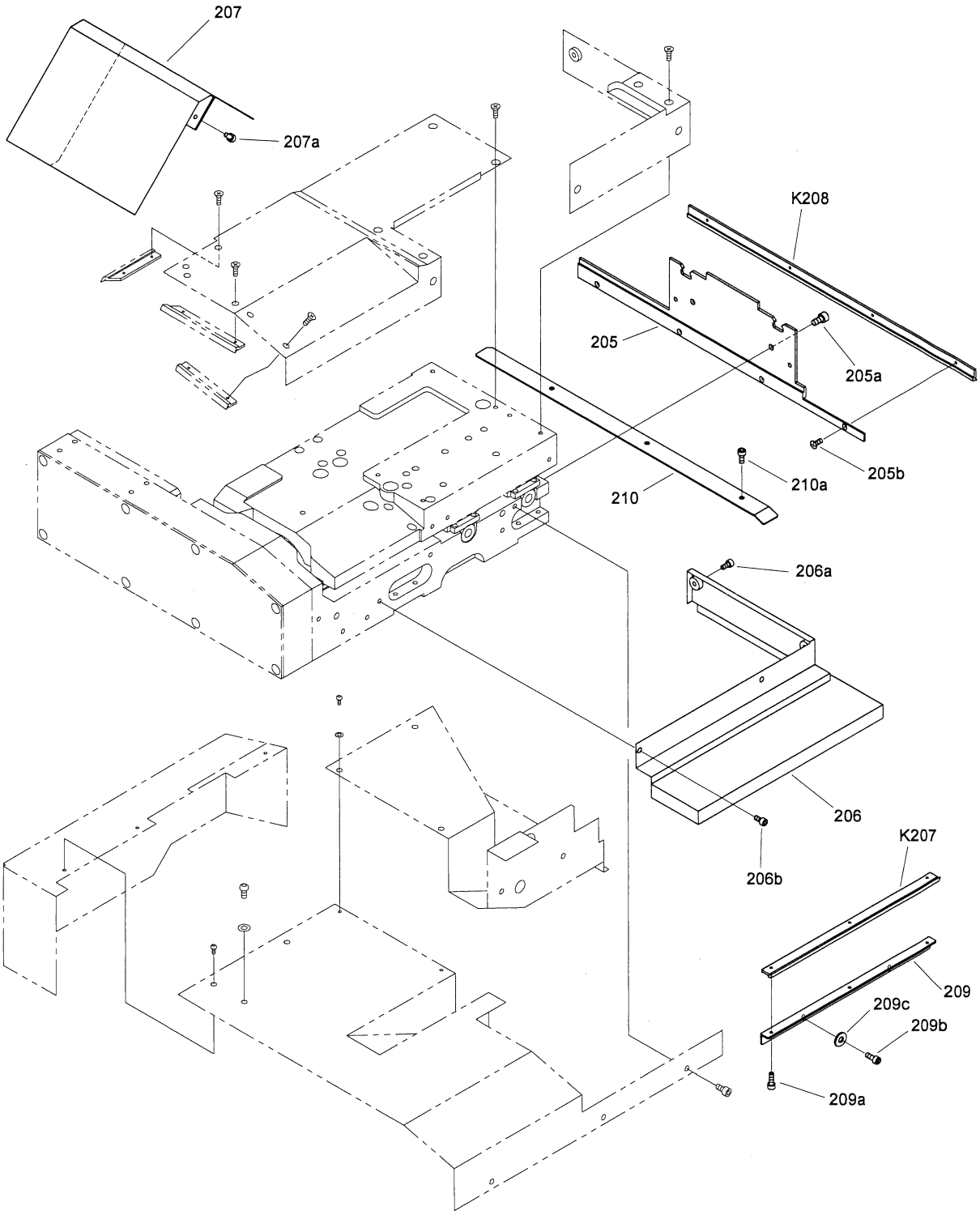
PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
205	クロススライドカバー	CROSS SLIDE COVER		1	
205a	皿小ネジ	COUNTER SUNK SCREW	M6x10	2	
206	Z_2 スライドカバー (前)	Z_2 SLIDE COVER (FRONT)		1	
206a	六角穴付ボルト	BOLT	M5x8	2	
206b	六角穴付ボルト	BOLT	M6x12	2	



C1216 U15B	対向刃物台 VIII, IX 型専用ブロック OPPOSITE TOOL POST (BLOCK DEDICATED TO TYPE VIII, IX)	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
002	コマ	BLOCK		12	
002a	六角穴付ボルト	BOLT	M6x16	12	
004	ボールネジサポート	BALL SCREW SUPPORT		1	
004a	六角穴付ボルト	BOLT	M8x30	4	
004b	六角穴付ボルト	BOLT	M6x20	4	
005	ベアリング押え	NUT		1	
008	スペーサー	SPACER		1	
008a	六角穴付ボルト	BOLT	M8x20	4	
009	キー	KEY		1	
010	スクリューカバー受け (外)	SCREW COVER RECEIVE (OUT)		1	
010a	六角穴付ボルト	BOLT	M3x5	4	
011	スクリューカバー受け (内)	SCREW COVER RECEIVE (IN)		1	
011a	六角穴付ボルト	BOLT	M5x10	2	
K001	LM ガイド	LM GUIDE	HSR20LR2UUC0E +302LP-II	1	THK
K002	ボールネジ	BALL SCREW	DIK2006S-6RRG0 +350.5LC5	1	THK
K003	ボールネジサポート軸受	BALL SCREW SUPPORT	20TAB04DB	1	NACHI
K004	深溝玉軸受	BALL BEARING	6201ZZ	1	NACHI
K005	オイルシール SB 型	OIL SEAL (SB TYPE)	AB1679A3	1	NOK
K006	O リング	O-RING	S95	1	NOK
K007	LM 用キャップ	LM CAP	C5	10	THK
K008	六角穴付ボルト	BOLT	M5x20	10	UNBRAKO
K009	フレックスカバー	FLEXIBLE COVER	FC-14	1	TAIYO HATSUJO
K010	グリースニップル	GREASE NIPPLES	B TYPE M6x1	1	
K011	KMT ナット	KMT NUT	M20 P1	1	SKF

C1216 U15B	対向刃物台 VIII, IX 型専用ブロック OPPOSITE TOOL POST (BLOCK DEDICATED TO TYPE VIII, IX)	000



C1216 U15B	対向刃物台 VIII, IX 型専用ブロック OPPOSITE TOOL POST (BLOCK DEDICATED TO TYPE VIII, IX)	200

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
205	クロススライドカバー	CROSS SLIDE COVER		1	
205a	六角穴付ボルト	BOLT	M6x10	2	
205b	皿小ネジ	COUNTER SUNK SCREW	M3x5	4	
206	Z_2スライドカバー (前)	Z_2 SLIDE COVER (FRONT)		1	
206a	六角穴付ボルト	BOLT	M5x8	2	
206b	六角穴付ボルト	BOLT	M6x12	2	
207	モーターカバー	MOTOR COVER		1	
207a	六角穴付ボルト	BOLT	M5x10	1	
209	ブラケット	BRACKET		1	
209a	六角穴付ボルト	BOLT	M3x5	3	
209b	六角穴付ボルト	BOLT	M4x6	2	
209c	平座金	WASHER	M4	2	
210	敷板	PLATE		1	
210a	六角穴付ボルト	BOLT	M5x8	3	
K207	テレスコカバー用シール	COVER SEAL	SH-8	1	
K208	テレスコカバー用シール	COVER SEAL	SH-8	1	

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KR205	締付プラグ	PLUG	PA4	8	SHOWA YUKI
KR206	スリーブ	SLEEVE	PB4	10	SHOWA YUKI
KR208	デスターユニ	JUNCTION	DB4D	1	SHOWA YUKI
KR209	ティー	TEE	PK4	2	SHOWA YUKI
KR210	フロープロパーユニット	FLOW PROPER UNIT	PSS1	4	SHOWA YUKI
KR211	プロパーナット	PROPER NUT	PAN4	2	SHOWA YUKI
KR212	アルミパイプ	ALUMINUM PIPE	ALP4	1	SHOWA YUKI

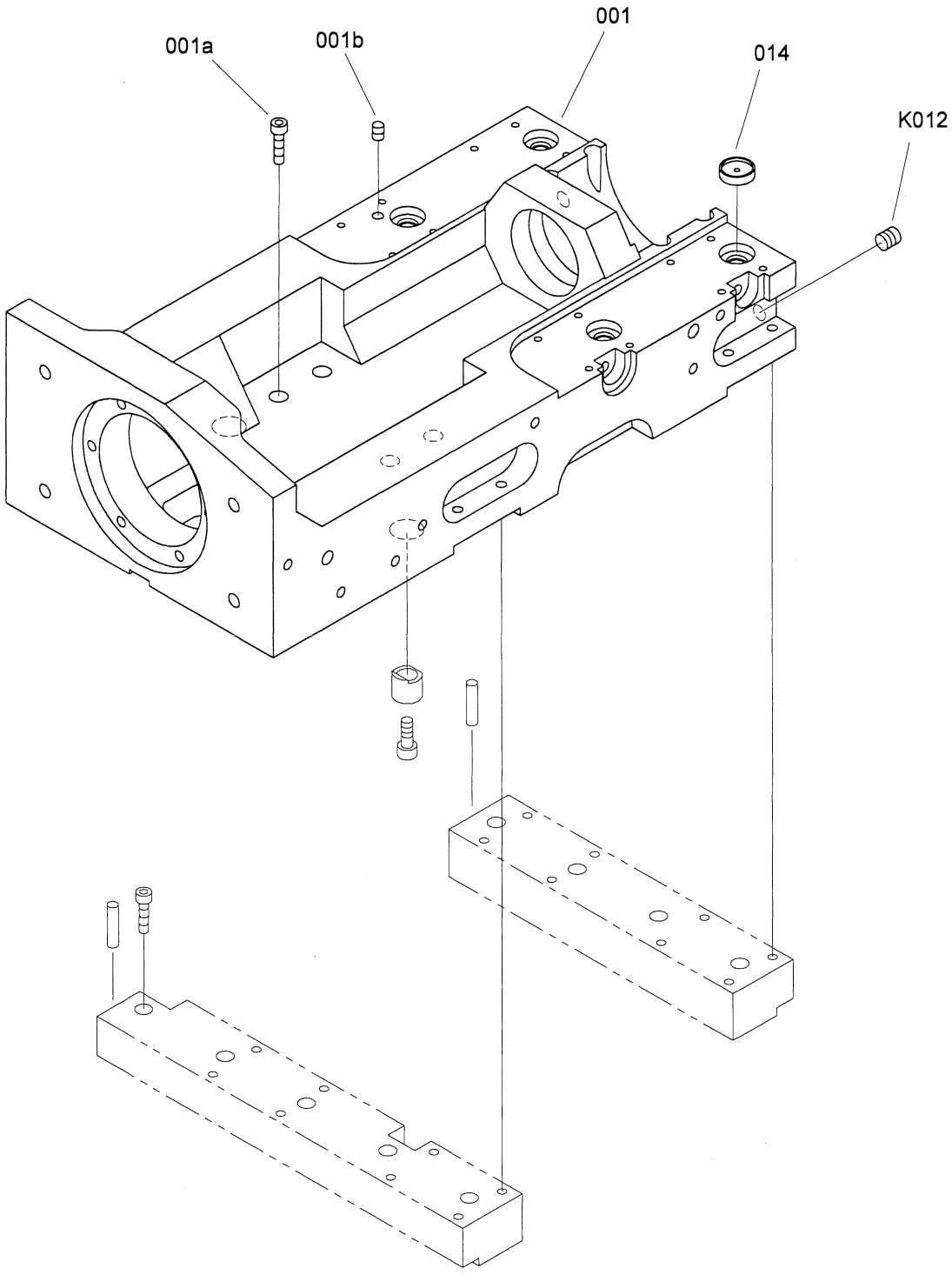
C1216 U15B	対向刃物台 VIII, IX 型専用ブロック OPPOSITE TOOL POST (BLOCK DEDICATED TO TYPE VIII, IX)	R200

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	MZ2	サーボモータ	SERVO MOTOR	HS-RF73-S1	1	MITSUBISHI ELECTRIC
KCT002	(MZ2)	アンプ	AMPLIFIER	MDS-B-ISV07NX	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	CNC1-5 CNC1-6	プラグ	PLUG	10120-3000VE	2	SUMITOMO 3M
KWT102		シェル	SHELL	10320-52A0-008	2	SUMITOMO 3M
KWT103	CNX2 CNZ2	コネクタ	CONNECTOR	MS3106A 22-14S (D190)	2	DDK
KWT104		アングルバックシェル	ANGLE BACK SHELL	CE-22BA-S	2	DDK
KWT105		防水ケーブルクランプ	WATER PROOF CABLE CLAMP	CE3057-12A-2	1	DDK

C1216 U15B	対向刃物台 VIII, IX 型専用ブロック OPPOSITE TOOL POST (BLOCK DEDICATED TO TYPE VIII, IX)	WT100

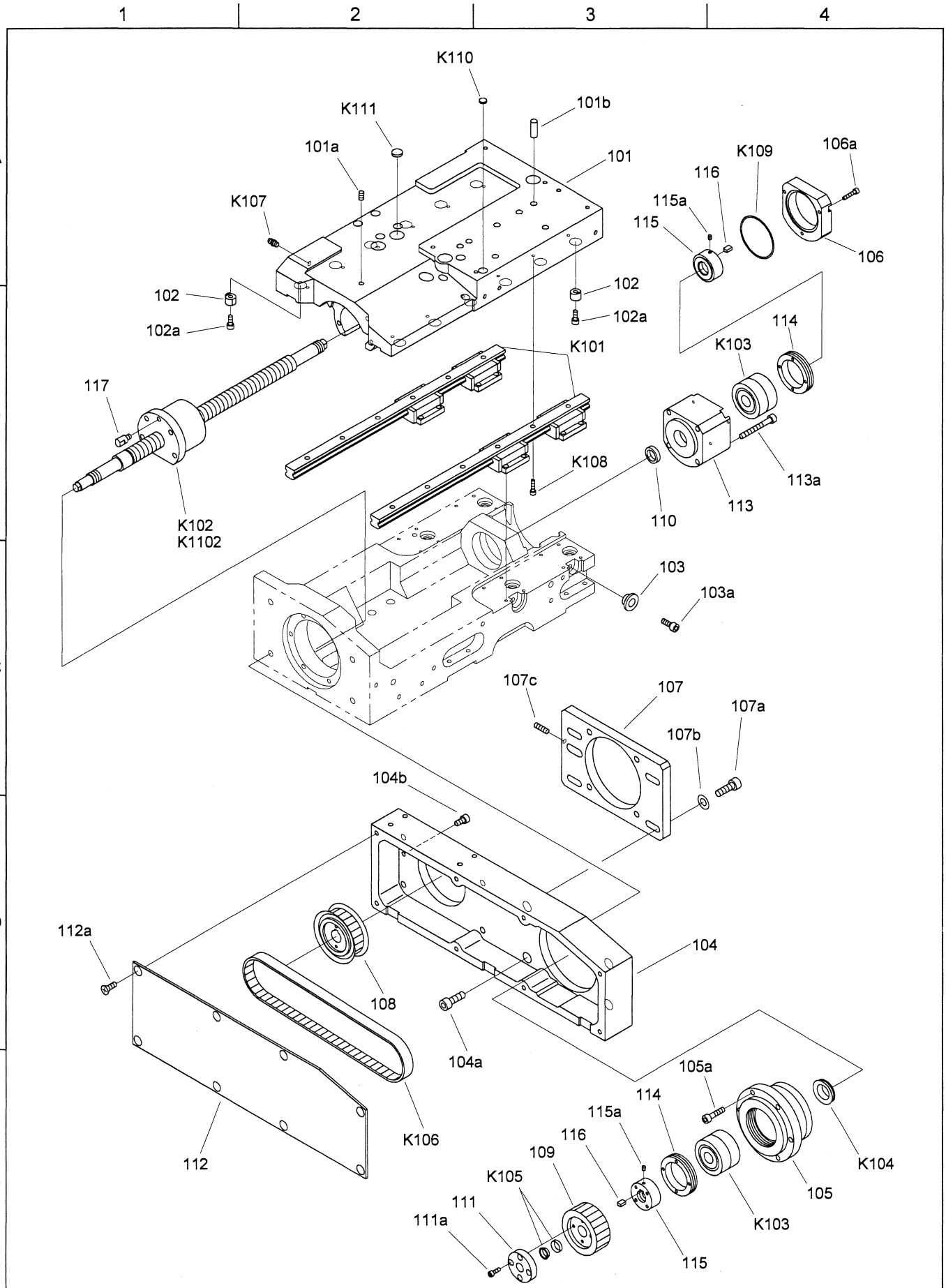
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C1216 U16B	対向刃物台共通ブロック OPPOSITE TOOL POST (COMMON BLOCK)	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	対向クロススライド	OPPOSITE CROSS SLIDE		1	
001a	六角穴付ボルト	BOLT	M5x20	16	
001b	六角穴付止ネジ (平先)	SET SCREW	M6x8	1	
014	ブッシュ	BUSH		4	
K012	六角穴付テーパねじプラグ	TAPERED PIPE PLUGS	TYPE GM 1/8-28	2	GOSHO

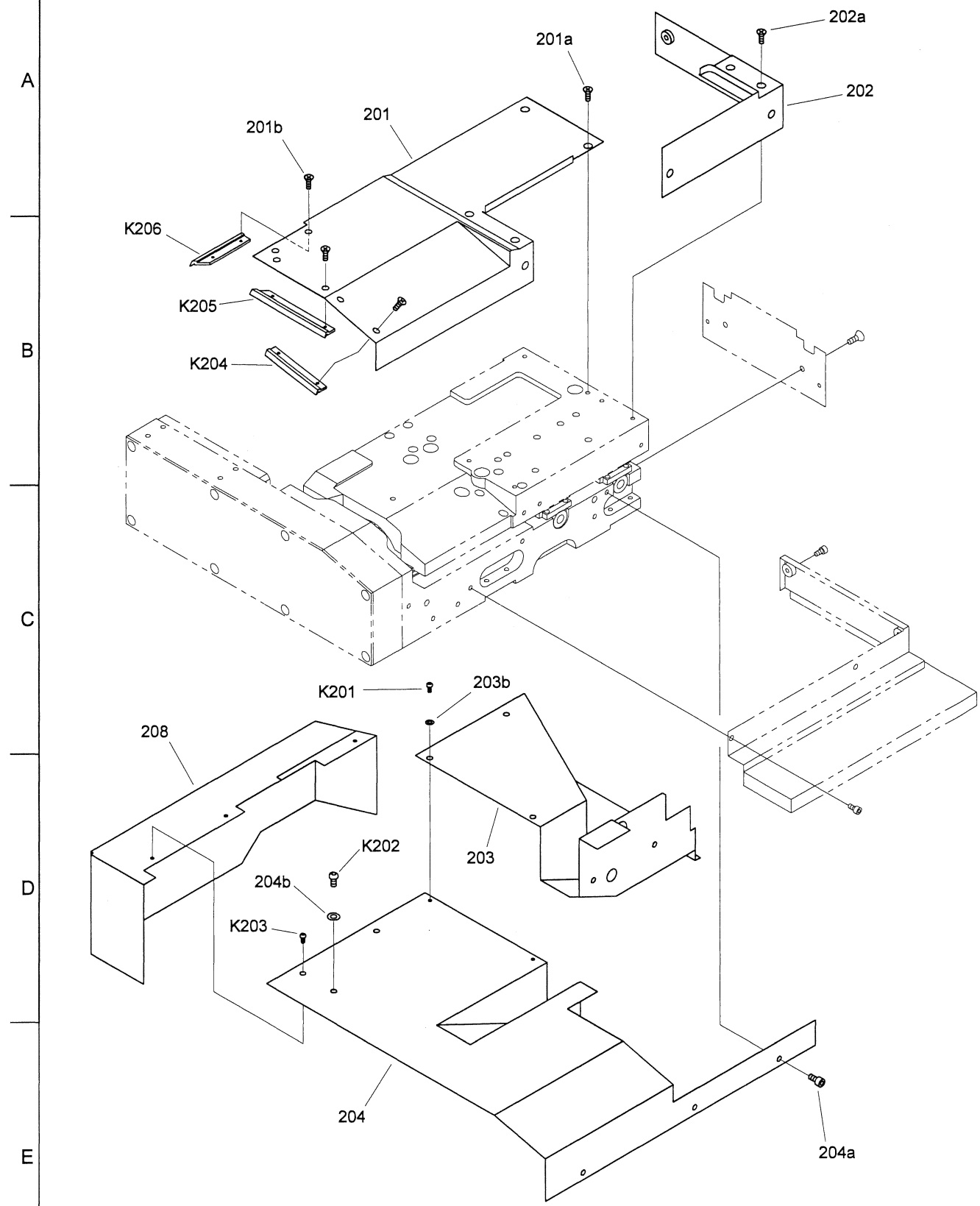
C1216 U16B	対向刃物台共通ブロック OPPOSITE TOOL POST (COMMON BLOCK)	000



C1216 U16B	対向刃物台共通ブロック OPPOSITE TOOL POST (COMMON BLOCK)	100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
101	X_2スライド	X_2 SLIDE		1	
101a	六角穴付止メネジ (平先)	SET SCREW	M6x10	1	
101b	平行ピン	PIN	ø8x22	3	
102	コマ	BLOCK		12	
102a	六角穴付ボルト	BOLT	M5x12	12	
103	コマ	BLOCK		2	
103a	六角穴付ボルト	BOLT	M6x16	2	
104	X_2モータブラケット	X_2 MOTOR BRACKET		1	
104a	六角穴付ボルト	BOLT	M8x25	4	
104b	六角穴付ボルト	BOLT	M6x12	8	
105	ボールネジサポート	BALL SCREW SUPPORT		1	
105a	六角穴付ボルト	BOLT	M6x25	6	
106	キャップ	CAP		1	
106a	六角穴付ボルト	BOLT	M4x20	3	
107	モーターベース	MOTOR BASE		1	
107a	六角穴付ボルト	BOLT	M8x25	4	
107b	平座金	WASHER	M8	4	
107c	六角穴付止メネジ (平先)	SET SCREW	M6x20	1	
108	モータープーリ	MOTOR PULLEY	P24-8YU-15-6F	1	UNITTA
109	タイミングプーリ	TIMING PULLEY	P24-8YU-15-33	1	UNITTA
110	スペーサー	SPACER		1	
111	シュパンリング押え	FLANGLE		1	
111a	六角穴付ボルト	BOLT	M4x12	4	
112	カバー	COVER		1	
112a	皿小ネジ	COUNTER SUNK SCREW	M6x12	8	
113	ボールネジサポート	BALL SCREW SUPPORT		1	
113a	六角穴付ボルト	BOLT	M6x50	4	
114	ベアリング押え	NUT		2	
115	ナット (JIS1 級)	NUT		2	
115a	六角穴付止メネジ (平先)	SET SCREW	M4x5	2	
116	ネジ座 (JIS1 級)	LOCK KEY		2	
117	ストッパー駒	STOPPER BLOCK		1	
K101	LM ガイド	LM GUIDE	HSR15B2SSCSS +360LP-II(A)	1	THK
K102	ボールネジ	BALL SCREW	BS2520	1	CPM
K103	ボールネジサポート軸受	BALL SCREW SUPPORT BEARING	15TAB04DF	2	NACHI
K104	V リング	V-RING	V20S	1	FUKUDA
K105	クランプエレメント	CLAMP ELEMENT	SCE300 12x15	1	SANKI
K106	タイミングベルト	TIMING BELT	624-8YU-15	1	UNITTA
K107	グリースニップル	GREASE NIPPLES	A TYPE M6x1	1	
K108	六角穴付ボルト	BOLT	M4x16	12	UNBRAKO
K109	O リング	O-RING	S53	1	NOK
K110	LM 用キャップ	LM CAP	C6	8	THK
K111	LM 用キャップ	LM CAP	C10	5	THK
K1102	ボールネジ	BALL SCREW	BIF2006E-5RRG0 +426LC5-b	1	THK

C1216 U16B	対向刃物台共通ブロック OPPOSITE TOOL POST (COMMON BLOCK)	100



C1216 U16B	対向刃物台共通ブロック OPPOSITE TOOL POST (COMMON BLOCK)	200

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
201	X2スライドカバー (1)	X2 SLIDE COVER (1)		1	
201a	皿小ネジ	COUNTER SUNK SCREW	M5x10	6	
201b	皿小ネジ	COUNTER SUNK SCREW	M3x5	6	
202	X2スライドカバー (2)	X2 SLIDE COVER (2)		1	
202a	皿小ネジ	COUNTER SUNK SCREW	M5x10	6	
203	X2スライドカバー (3)	X2 SLIDE COVER (3)		1	
203b	平座金	WASHER	M4	3	
204	X2スライドカバー (4)	X2 SLIDE COVER (4)		1	
204a	六角穴付ボルト	BOLT	M6x10	3	
204b	平座金	WASHER	M4	2	
208	X2モーターカバー	X2 MOTOR COVER		1	
K201	六角穴付ボタンボルト	BUTTON HEAD CAP SCREW	M4x6	2	
K202	六角穴付ボタンボルト	BUTTON HEAD CAP SCREW	M6x10	5	
K203	六角穴付ボタンボルト	BUTTON HEAD CAP SCREW	M4x8	3	
K204	テレスコカバー用シール	COVER SEAL	SH-8	1	
K205	テレスコカバー用シール	COVER SEAL	SH-8	1	
K206	テレスコカバー用シール	COVER SEAL	SH-8	1	

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KR201	フロープロパーユニット	FLOW PROPER UNIT	KPF1	4	SHOWA
KR202	O リング	O-RING	S5	4	NOK
KR203	O リング	O-RING	P12	4	NOK
KR204	ニップル	NIPPLE	PD54	1	SHOWA
KR205	締付プラグ	PLUG	PA4	1	SHOWA
KR206	スリーブ	SLEEVE	PB4	1	SHOWA
KR207	チューブインサート	TUBE INSERT	AL4	1	SHOWA

C1216 U16B	対向刃物台共通ブロック OPPOSITE TOOL POST (COMMON BLOCK)	R200

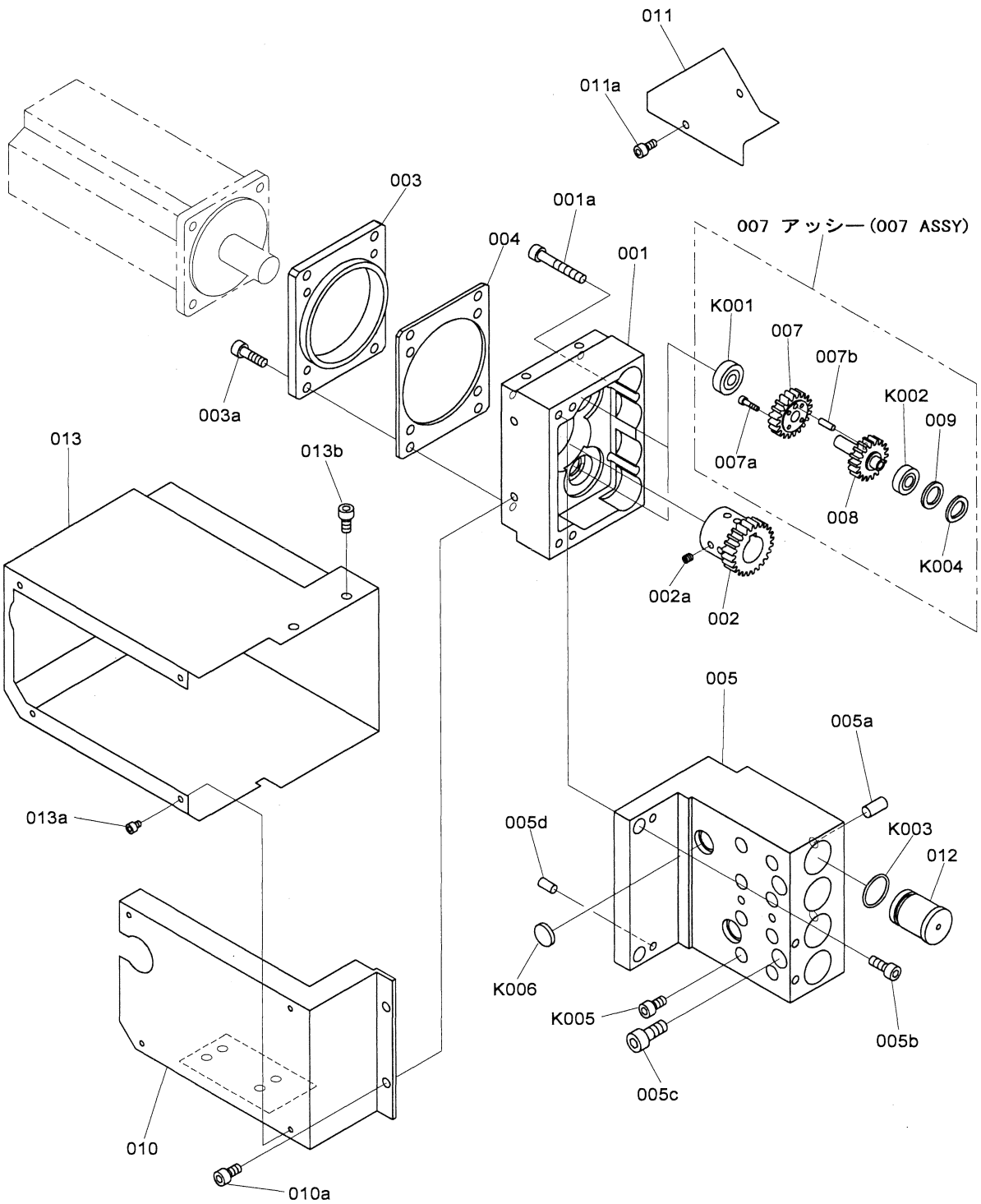
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	MX2	インテリジェントサーボモータ	SERVO MOTOR	HS-RF43BNXF-S2	1	MITSUBISHI ELECTRIC
SP1		モータ	MOTOR	HS-RF43B-S2	(1)	MITSUBISHI ELECTRIC
SP2		アンプ	AMPLIFIER	MDS-B-ISV04NXF	(1)	MITSUBISHI ELECTRIC

C1216 U16B	対向刃物台共通ブロック OPPOSITE TOOL POST (COMMON BLOCK)	CT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	CNC1-5	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT102		シェル	SHELL	10320-52A0-008	1	SUMITOMO 3M
KWT103	CNX2	コネクタ	CONNECTOR	MS3106A 22-14S (D190)	1	DDK
KWT104		アングルバックシェル	ANGLE BACK SHELL	CE-22BA-S	1	DDK
KWT105		サンフレキ	FLEXIBLE TUBE	NS#20	1	SANKEI
KWT106		カップリング	COUPLING	NKM-20-20-22	1	SANKEI

C1216 U16B	対向刃物台共通ブロック OPPOSITE TOOL POST (COMMON BLOCK)	WT100

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C1216 U30B	くし刃４本回転工具駆動装置 GANG 4PIECE TURN TOOL DRIVE DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	4本工具モーターブラケット	4PIECE MOTOR BRACKET		1	
001a	六角穴付ボルト	BOLT	M6x40	2	
002	平歯車	GEAR		1	
002a	六角穴付止メネジ (平先)	SET SCREW	M5x5	4	
003	モータースペーサー	MOTOR SPACER		1	
003a	六角穴付ボルト	BOLT	M6x20	4	
004	スペーサー	SPACER		1	
005	4本回転工具ホルダー	4PIECE TURN TOOL HOLDER		1	
005a	平行ピン	PARALLEL PIN	ø8x16	2	
005b	六角穴付ボルト	BOLT	M6x16	2	
005c	六角穴付ボルト	BOLT	M8x20	4	
005d	平行ピン	PARALLEL PIN	ø6x12	2	
007	平歯車	GEAR		2	
007a	六角穴付ボルト	BOLT	M3x12	8	
007b	平行ピン	PARALLEL PIN	ø4x12	2	
008	平歯車	GEAR		2	
009	スペーサー	SPACER		2	
010	ブラケット	BRACKET		1	
010a	六角穴付ボルト	BOLT	M6x12	2	
011	フタ	COVER		1	
011a	六角穴付ボルト	BOLT	M5x8	2	
012	キャップ	CAP		4	
013	カバー	COVER		1	
013a	六角穴付ボルト	BOLT	M4x5	4	
013b	六角穴付ボルト	BOLT	M6x10	2	
K001	深溝玉軸受	BALL BEARING	608-2NK P5	2set	NACHI
K002	深溝玉軸受	BALL BEARING	698-2NK P5	2set	NACHI
K003	Oリング	O-RING	P21	4	NOK
K004	波ワッシャー	WAVE WASHER	BWW-626	2	OCHIAI
K005	六角穴付ボルト	BOLT	M6x12	8	GOSHO
K006	LMレール取付穴専用キャップ	LM RAIL CAP	C10	2	THK

C1216 U30B	くし刃4本回転工具駆動装置 GANG 4PIECE TURN TOOL DRIVE DEVICE	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	UNIT6	AC サーボドライブユニット	AC SERVO DRIVE UNIT	MDS-B-SVJ2-07	1	MITSUBISHI ELECTRIC
KCT001a		ナベ小セムス B (小)	SCREW	M5x12	3	
KCT002	M3	サーボモーター	SERVO MOTOR	HC-MF73K-D52	1	MITSUBISHI ELECTRIC

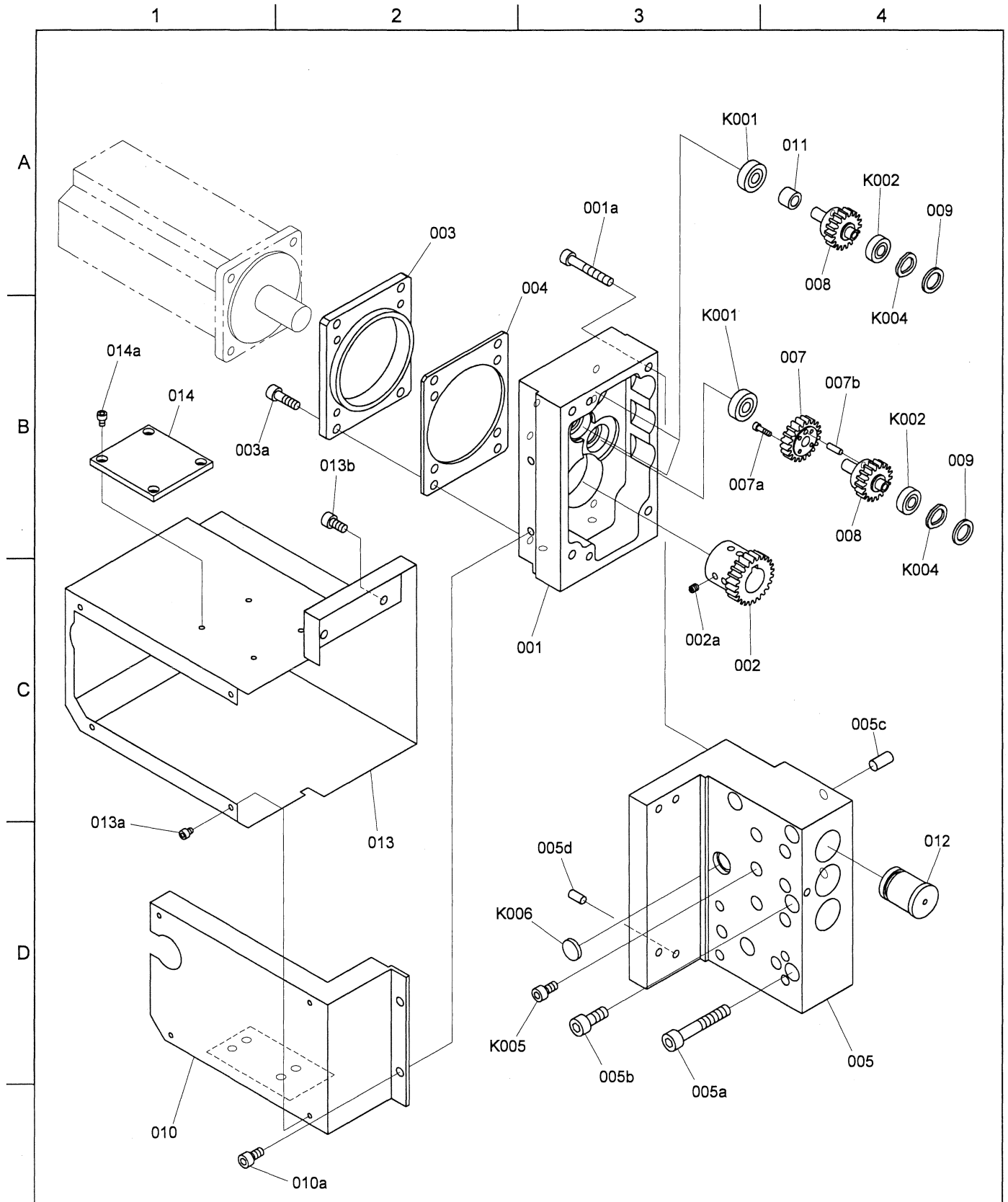
C1216 U30B	くし刃 4 本回転工具駆動装置 GANG 4PIECE TURN TOOL DRIVE DEVICE	CT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U8CN1B U6CN1A	プラグ	PLUG	10120-6000EL	2	SUMITOMO 3M
KWT002		シェル	SHELL	10320-3210-000	2	SUMITOMO 3M
WT004		バスケーブル	BUS CABLE		1	

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	U6CN2	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT102		シェル	SHELL	10620-5600-008	1	SUMITOMO 3M
KWT103		ラッチ	LATCH	10600-L0F0-8	2	SUMITOMO 3M
KWT104	M3CNPG	コネクタ	CONNECTOR	RM15WTJA-10S(8)(05)	1	HIROSE ELECTRIC
KWT105	M3CNM	コネクタ	CONNECTOR	RM15WTJA-4S	1	HIROSE ELECTRIC
KWT106		コードクランプ	CLAMP	RM15WTP-CP(10)	1	HIROSE ELECTRIC
KWT107		サンフレキ	FLEXIBLE TUBE	NS#25	0.5m	SANKEI
KWT108		回転型コネクタ	CONNECTOR	N90°RBG-25	1	SANKEI
KWT109		コネクタ	CONNECTOR	N90°BG-25	1	SANKEI
KWT110		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
WT101		工具主軸モータ動力ケーブル	TOOL SPINDLE MOTOR POWER CABLE		1	
WT102		工具主軸モータ信号ケーブル	TOOL SPINDLE MOTOR SIGNAL CABLE		1	
WT103		ケーブル固定板	CABLE FIXING PLATE		1	

C1216 U30B	くし刃４本回転工具駆動装置 GANG 4PIECE TURN TOOL DRIVE DEVICE	WT100

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C1216 U31B	くし刃３本回転工具駆動装置 GANG 3PIECE TURN TOOL DRIVE DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	3本工具モーターブラケット	3PIECE MOTOR BRACKET		1	
001a	六角穴付ボルト	BOLT	M6x50	4	
002	平歯車	GEAR		1	
002a	六角穴付止メネジ (平先)	SET SCREW	M5x5	4	
003	モータースペーサー	MOTOR SPACER		1	
003a	六角穴付ボルト	BOLT	M6x20	4	
004	スペーサー	SPACER		1	
005	3本回転工具ホルダー	3PIECE TURN TOOL HOLDER		1	
005a	六角穴付ボルト	BOLT	M8x50	4	
005b	六角穴付ボルト	BOLT	M8x20	2	
005c	平行ピン	PARALLEL PIN	ø8x16	2	
005d	平行ピン	PARALLEL PIN	ø6x12	2	
007	平歯車	GEAR		1	
007a	六角穴付ボルト	BOLT	M3x12	4	
007b	平行ピン	PARALLEL PIN	ø4x12	1	
008	平歯車	GEAR		3	
009	スペーサー	SPACER		3	
010	ブラケット	BRACKET		1	
010a	六角穴付ボルト	BOLT	M6x12	2	
011	カラー	COLLAR		2	
012	キャップ	CAP		3	
013	カバー	COVER		1	
013a	六角穴付ボルト	BOLT	M4x5	4	
013b	六角穴付ボルト	BOLT	M6x10	2	
014	保護カバー	COVER		1	
014a	六角穴付ボルト	BOLT	M4x6	4	
K001	深溝玉軸受	BALL BEARING	608-2NK P5	3set	NACHI
K002	深溝玉軸受	BALL BEARING	698-2NK P5	3set	NACHI
K004	波ワッシャー	WAVE WASHER	BWW-626	3	OCHIAI
K005	六角穴付ボルト	BOLT	M6x14	6	GOSHO
K006	LMレール取付穴専用キャップ	LM RAIL CAP	C10	1	THK

C1216 U31B	くし刃3本回転工具駆動装置 GANG 3PIECE TURN TOOL DRIVE DEVICE	000

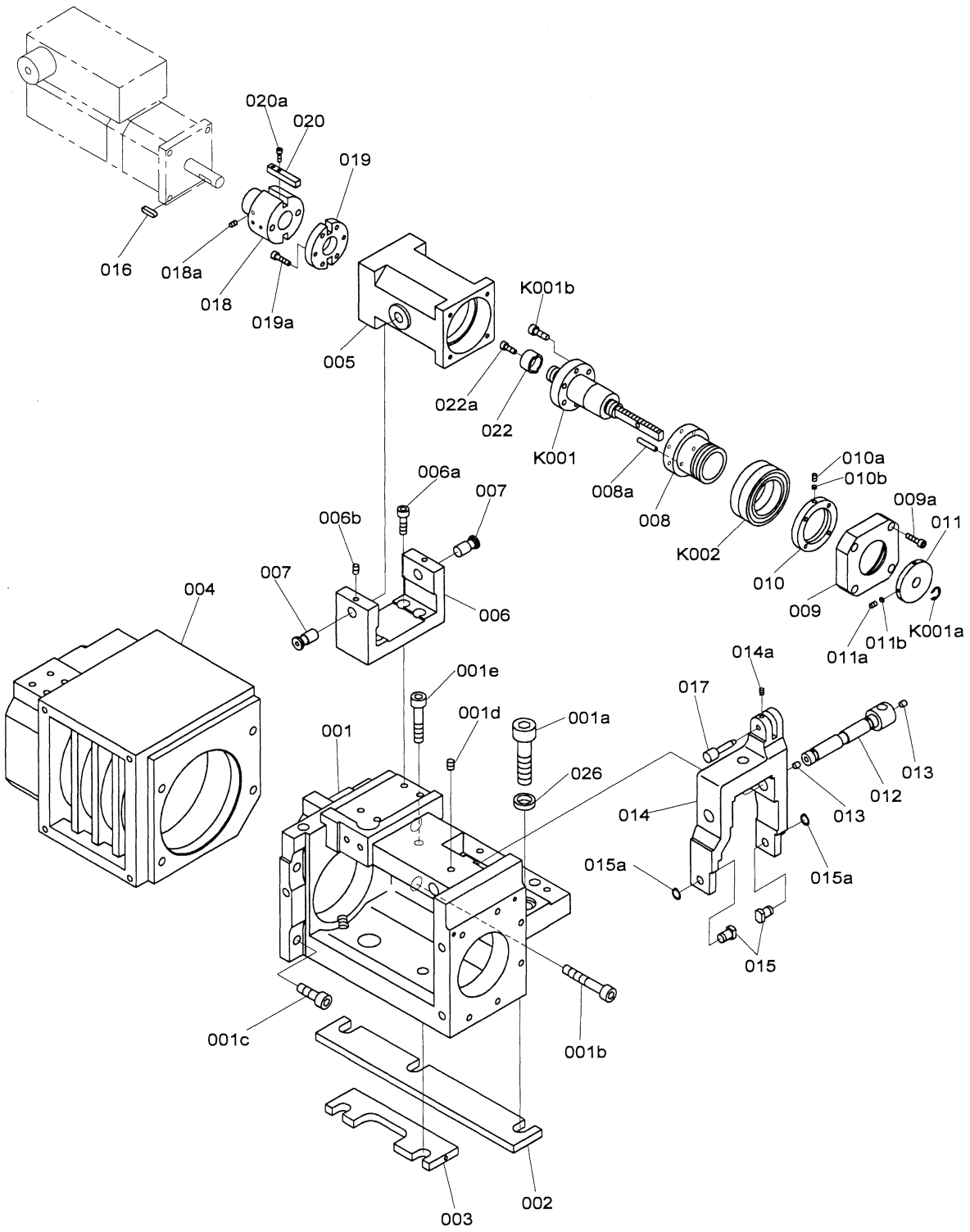
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	UNIT6	AC サーボドライブユニット	AC SERVO DRIVE UNIT	MDS-B-SVJ2-07	1	MITSUBISHI ELECTRIC
KCT001a		ナベ小セムス B (小)	SCREW	M5x12	3	
KCT002	M3	サーボモーター	SERVO MOTOR	HC-MF73K-D52	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U8CN1B U6CN1A	プラグ	PLUG	10120-6000EL	2	SUMITOMO 3M
KWT002		シェル	SHELL	10320-3210-000	2	SUMITOMO 3M
WT004		バスケーブル	BUS CABLE		1	

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	U6CN2	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT102		シェル	SHELL	10620-5600-008	1	SUMITOMO 3M
KWT103		ラッチ	LATCH	10600-L0F0-8	2	SUMITOMO 3M
KWT104	M3CNPG	コネクタ	CONNECTOR	RM15WTJA-10S(8)(05)	1	HIROSE ELECTRIC
KWT105	M3CNM	コネクタ	CONNECTOR	RM15WTJA-4S	1	HIROSE ELECTRIC
KWT106		コードクランプ	CLAMP	RM15WTP-CP(10)	1	HIROSE ELECTRIC
KWT107		サンフレキ	FLEXIBLE TUBE	NS#25	0.5m	SANKEI
KWT108		回転型コネクタ	CONNECTOR	N90°RBG-25	1	SANKEI
KWT109		コネクタ	CONNECTOR	N90°BG-25	1	SANKEI
KWT110		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
WT101		工具主軸モータ動力ケーブル	TOOL SPINDLE MOTOR POWER CABLE		1	
WT102		工具主軸モータ信号ケーブル	TOOL SPINDLE MOTOR SIGNAL CABLE		1	
WT103		ケーブル固定板	CABLE FIXING PLATE		1	

C1216 U31B	くし刃３本回転工具駆動装置 GANG 3PIECE TURN TOOL DRIVE DEVICE	WT100

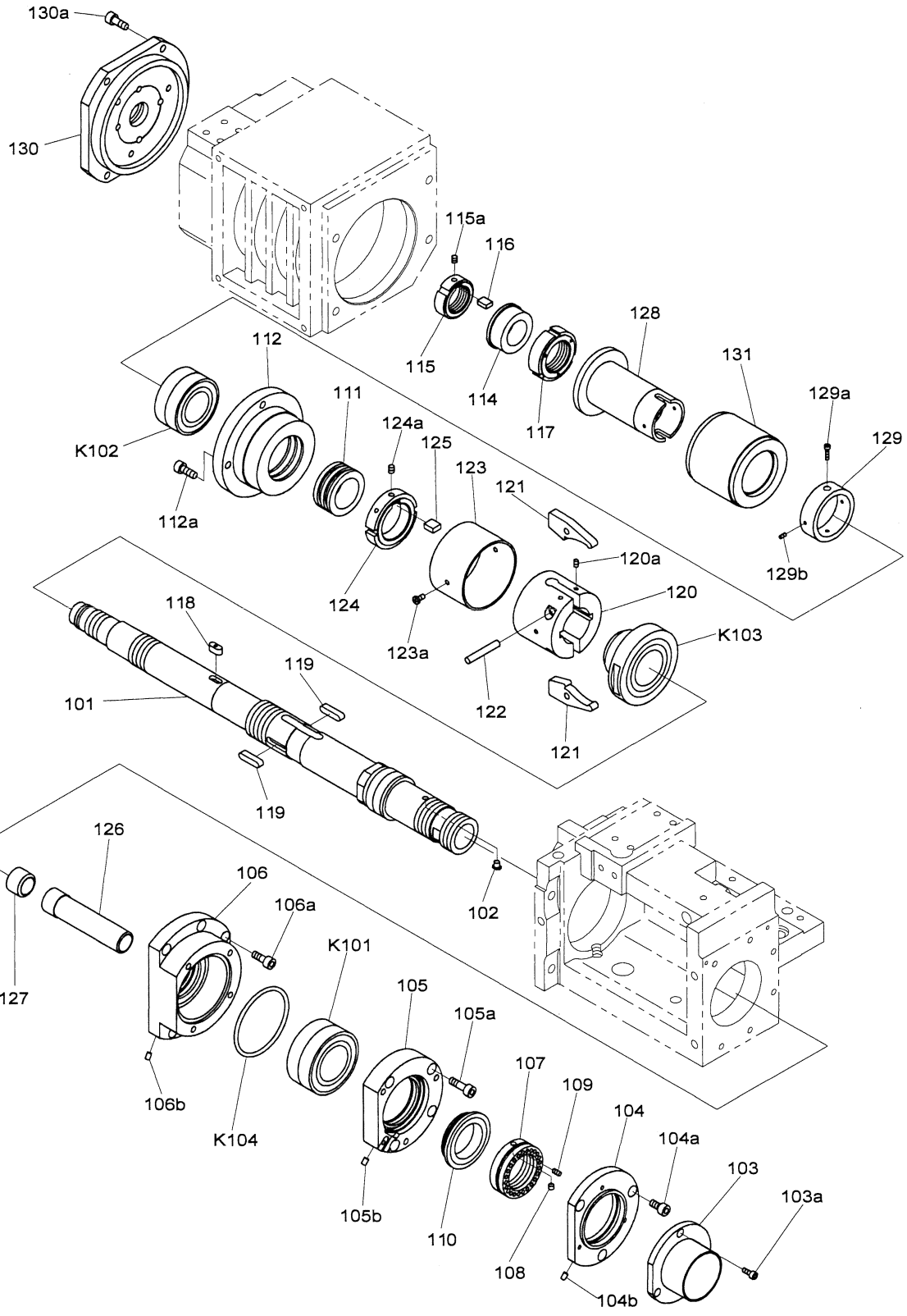
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C12 U40B	背面主軸装置 BACK SPINDLE DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	背面主軸台	BACK HEAD STOCK		1	
001a	六角穴付ボルト	BOLT	M12x50	2	
001b	六角穴付ボルト	BOLT	M8x50	2	
001c	六角穴付ボルト	BOLT	M8x25	2	
001d	六角穴付止メネジ (平先)	SET SCREW	M6x8	1	
001e	六角穴付ボルト	BOLT	M8x40	1	
002	スペーサー	SPACER		1	
003	スペーサー	SPACER		1	
004	モーターハウジング	MOTOR HOUSING		1	
005	ハウジング	HOUSING		1	
006	ブラケット	BRACKET		1	
006a	六角穴付ボルト	BOLT	M6x20	4	
006b	六角穴付止メネジ (平先)	SET SCREW	M5x8	2	
007	ピボット	PIVOT		2	
008	ホルダー	HOLDER		1	
008a	平行ピン	PARALLEL PIN	ø4x22	2	
009	ベアリング押さえ	FLANGE		1	
009a	六角穴付ボルト	BOLT	M4x16	4	
010	ナット (JIS1 級ネジ)	NUT		1	
010a	六角穴付止メネジ (平先)	SET SCREW	M4x5	1	
010b	真チュウ座	SEAT	M4	1	
011	ストッパー	STOPPER		1	
011a	六角穴付止メネジ(平先)	SET SCREW	M3x10	2	
011b	真チュウ座	SEAT	M3	2	
012	レバー軸	LEVER SHAFT		1	
013	塞ぎ栓	PLUG		2	
014	チャッキングレバー	CHUCKING LEVER		1	
014a	六角穴付止メネジ (平先)	SET SCREW	M4x5	1	
015	チャック作動ピン	PIN		2	
015a	軸用 C トメワ	RETAINING RING (C TYPE)	8	2	
016	キー	KEY		1	
017	連結軸	CONNECTING SHAFT		1	
018	カップリング	COUPLING		1	
018a	六角穴付止メネジ (平先)	SET SCREW	M4x5	1	
019	フランジ	FLANGE		1	
019a	六角穴付ボルト	BOLT	M4x20	4	
020	キー	KEY		2	
020a	六角穴付ボルト	BOLT	M3x10	8	
022	カラー	COLLAR		1	
022a	六角穴付ボルト	BOLT	M4x12	1	
026	座金	WASHER		2	
K001	転造ボールネジ (予圧タイプ)	ROLLING BALL SCREW	JPF1404-4RRGO +137LC7T	1	THK
K001a	E トメワ	RETAINING RING (E TYPE)	8	1	
K001b	六角穴付ボルト	BOLT	M5x20	4	
K002	アンギュラ玉軸受	ANGULAR BALL BEARING	7907T2DB/GMP5	1set	NTN

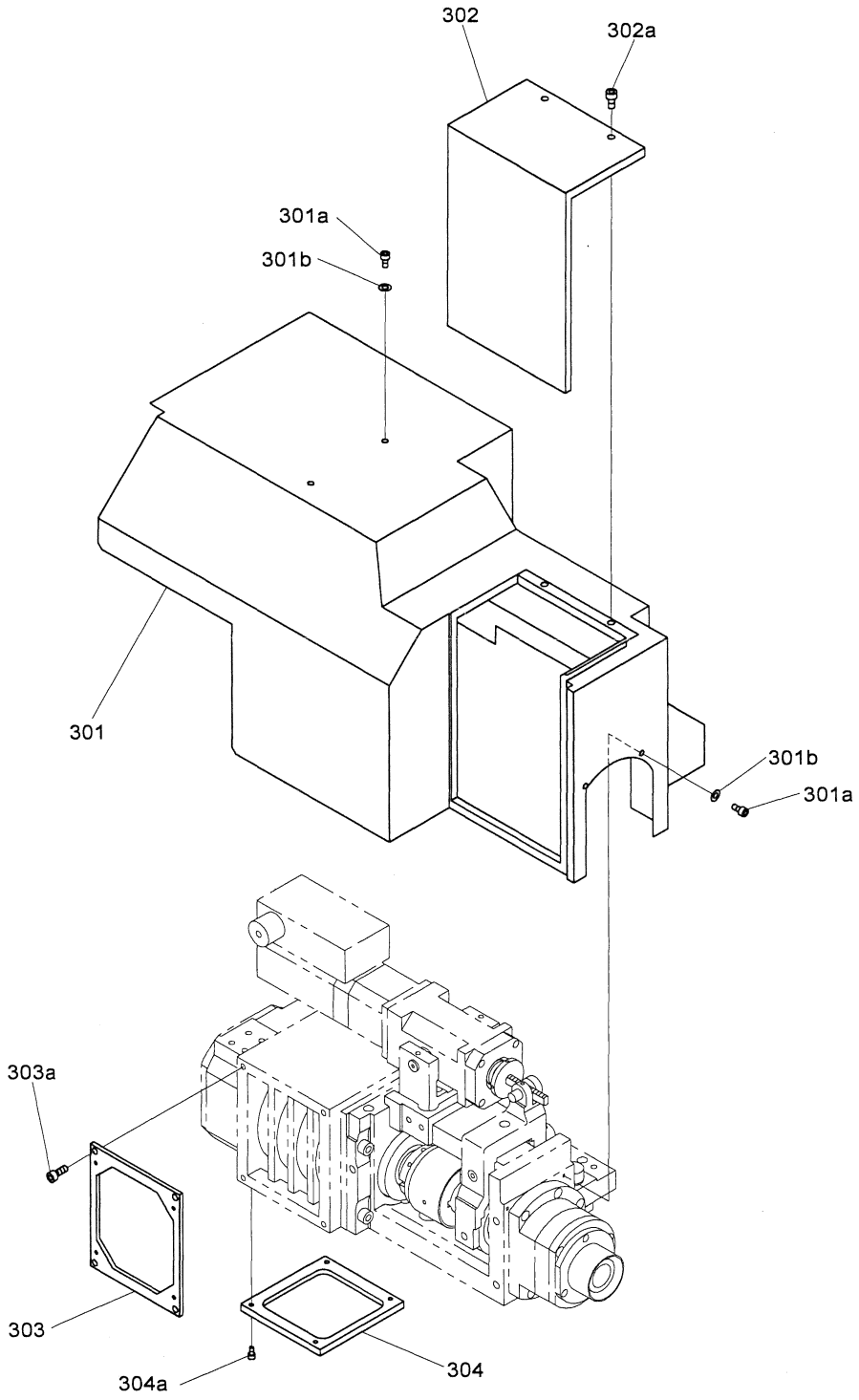
C12 U40B	背面主軸装置 BACK SPINDLE DEVICE	000



C12 U40B	背面主軸装置 BACK SPINDLE DEVICE	100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
101	主軸	SPINDLE		1	
102	キーピン	KEY PIN		1	
103	主軸キャップ	SPINDLE CAP		1	
103a	六角穴付ボルト	BOLT	M4x10	3	
104	シールフランジ	SEAL FLANGE		1	
104a	六角穴付ボルト	BOLT	M6x12	3	
104b	塞ぎ栓	PLUG	ø4.2x6	1	
105	ベアリング押え	FLANGE		1	
105a	六角穴付ボルト	BOLT	M6x20	4	
105b	塞ぎ栓	PLUG	ø4.2x6	1	
106	ハウジング (前)	HOUSING (FRONT)		1	
106a	六角穴付ボルト	BOLT	M6x16	6	
106b	塞ぎ栓	PLUG	ø4.2x6	1	
107	ナット (特級ネジ)	NUT		1	
108	ネジ座	LOCK KEY		6	
109	押ネジ	SCREW		6	
110	スペーサ	SPACER		1	
111	スペーサ	SPACER		1	
112	ハウジング (後)	HOUSING (BACK)		1	
112a	六角穴付ボルト	BOLT	M6x16	6	
114	エンコーダリング	ENCODER RING		1	
115	ナット (特級ネジ)	NUT		1	
115a	六角穴付止メネジ (平先)	SET SCREW	M5x5	1	
116	ネジ座	LOCK KEY		1	
117	ナット (特級ネジ)	NUT		1	
118	キー	KEY		4	
119	キー	KEY		2	
120	チャック爪ホルダー	CHUCKING HOLDER		1	
120a	六角穴付止メネジ (平先)	SET SCREW	M4x6	4	
121	チャック作動爪	FINGER		2	
122	レバー軸	LEVER SHAFT		2	
123	リングカバー	RING COVER		1	
123a	平小ネジ	SCREW	M4x8	2	
124	ナット (JIS1 級ネジ)	NUT		1	
124a	六角穴付止メネジ (平先)	SET SCREW	M5x6	1	
125	ネジ座	LOCK KEY		1	
126	中間スリーブ	MIDDLE SLEEVE		1	
127	バランススリーブ	BALANCE SLEEVE		1	
128	ロータースリーブ	ROTOR SLEEVE		1	
129	リング	RING		1	
129a	六角穴付ボルト	BOLT	M3x5	2	
129b	六角穴付止メネジ (平先)	SET SCREW	M3x6	2	
130	ハウジング	HOUSING		1	
130a	六角穴付ボルト	BOLT	M6x16	5	
131	ローター	ROTOR		1	
K101	高速組合せアンギュラ玉軸受	ANGULAR BALL BEARING	B7007C.TPAP4UL	1set	FUKUDA
K102	高速組合せアンギュラ玉軸受	ANGULAR BALL BEARING	7006CD/P4ADBB	1set	SKF
K103	ボビン	BOBBIN	35BCV07-2NK	1	NACHI
K104	O リング	O-RING	G60	1	NOK

C12 U40B	背面主軸装置 BACK SPINDLE DEVICE	100



C12 U40B	背面主軸装置 BACK SPINDLE DEVICE	300

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
301	背面主軸カバー	BACK SPINDLE		1	
301a	六角穴付ボルト	BOLT	M4x8	4	
301b	平座金	WASHER	M4	4	
302	フタ	COVER		1	
302a	六角穴付ボルト	BOLT	M6x12	2	
303	ガイド	GUIDE		1	
303a	六角穴付ボルト	BOLT	M6x16	4	
304	フタ	COVER		1	
304a	六角穴付ボルト	BOLT	M4x8	4	

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PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KR201	フロープロパーユニット	FLOW PROPER UNIT	PST1	1	SHOWA YUKI
KR203	スリーブ	SLEEVE	PB4	1	SHOWA YUKI
KR204	プロパーナット	PROPER NUT	PAN4	1	SHOWA YUKI

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	FAN5	ファンモーター	FAN MOTOR	S12D20-TW2G 120□x38t	1	STYLE ELECTRONICS
KBT002		ファンガード	FAN GUARD	PG-47-01	1	NMB
KBT002a		平座金	WASHER	M4	4	
KBT002b		バネ座	SPRING WASHER	M4	4	
KBT003		絶縁キャップ	INSULATION CAP	OA-QM4	2	OHM ELECTRIC
KBT004		絶縁キャップ	INSULATION CAP	OA-QM5	3	OHM ELECTRIC
KBT005		六角穴付ボルト	BOLT	M4x50	4	
KBT006	THP4	サーマルプロテクタ	THERMAL PROTECTOR	T70AR1U1	1	SAKAGUCHI DENNETSU

C12 U40B	背面主軸装置 BACK SPINDLE DEVICE	BT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	UNIT5	ACスピンドルドライブユニット	AC SPINDLE DRIVE UNIT	MDS-B-SPJ2X-075	1	MITSUBISHI ELECTRIC
KCT001a		ナベ小セムスB(小)	SCREW	M5x12	4	
KCT002	UNIT10	オプションユニット	OPTION UNIT	MDS-B-PJEX	1	MITSUBISHI ELECTRIC
KCT002a		ナベ小セムスB(小)	SCREW	M5x12	2	
KCT003	R2	回生抵抗	RESISTANCE UNIT	FCUA-RB075	1	MITSUBISHI ELECTRIC
KCT003a		ナベ小セムスB(大)	SCREW	M4x8	2	
KCT004	M2	ビルトインモーター	BUILT IN MOTOR	SJ-2B4002	1	MITSUBISHI ELECTRIC
KCT005	MA2	インテリジェントサーボモータ	SERVO MOTOR	HS-MF23EX-S2	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
FT001		中継ボックス	INTERMEDIATE BOX		1	
FT001a		六角穴付ボルト	BOLT	M6x10	3	
FT001b		平座金	WASHER	M6	3	
FT001c		六角穴付ボルト	BOLT	M4x10	2	
FT001d		平座金	WASHER	M4	2	
FT001e		ナベ小セムスB(小)	SCREW	M4x8	1	
FT001f		ナベ小セムスB(大)	SCREW	M4x8	4	
FT001g		ナベ小セムスB(大)	SCREW	M6x16	1	
FT002		フタ	COVER		1	
FT002a		ナベ小セムスB(小)	SCREW	M4x8	1	
KFT001	TB4	端子台	TERMINAL	C-TB4-0	1	KASUGA ELECTRIC
KFT001a		ナベ小セムスB(大)	SCREW	M4x8	2	
KFT002		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
KFT003		シールワッシャー	SEAL WASHER	W4	8	KEEPER
KFT004		マルチシール引出板	SEAL PLATE	EMS6M2	1	SANKEI
KFT004a		ナベ小セムスB(大)	SCREW	M5x16	4	
KFT005	BSCK	パッキン	PACKING	EM23P13	1	SANKEI
KFT006	FAN4	キャプコン	CAPCON	OA-W1608	1	OHM ELECTRIC
KFT007		電源マーク	POWER MARK	20MM	1	NIKKOUKAI
KFT008		バインド小ネジ	SCREW	M4x8	8	
KFT009		タイマウント	TIE MOUNT	TM2S8-M	4	PANDUIT
KFT010		ナベ小ネジ	SCREW	M4x6	4	
KFT011		NBR スポンジ	NBR SPONGE	10x10 L=96mm	1	BRIDGESTONE

C12 U40B	背面主軸装置 BACK SPINDLE DEVICE	FT000

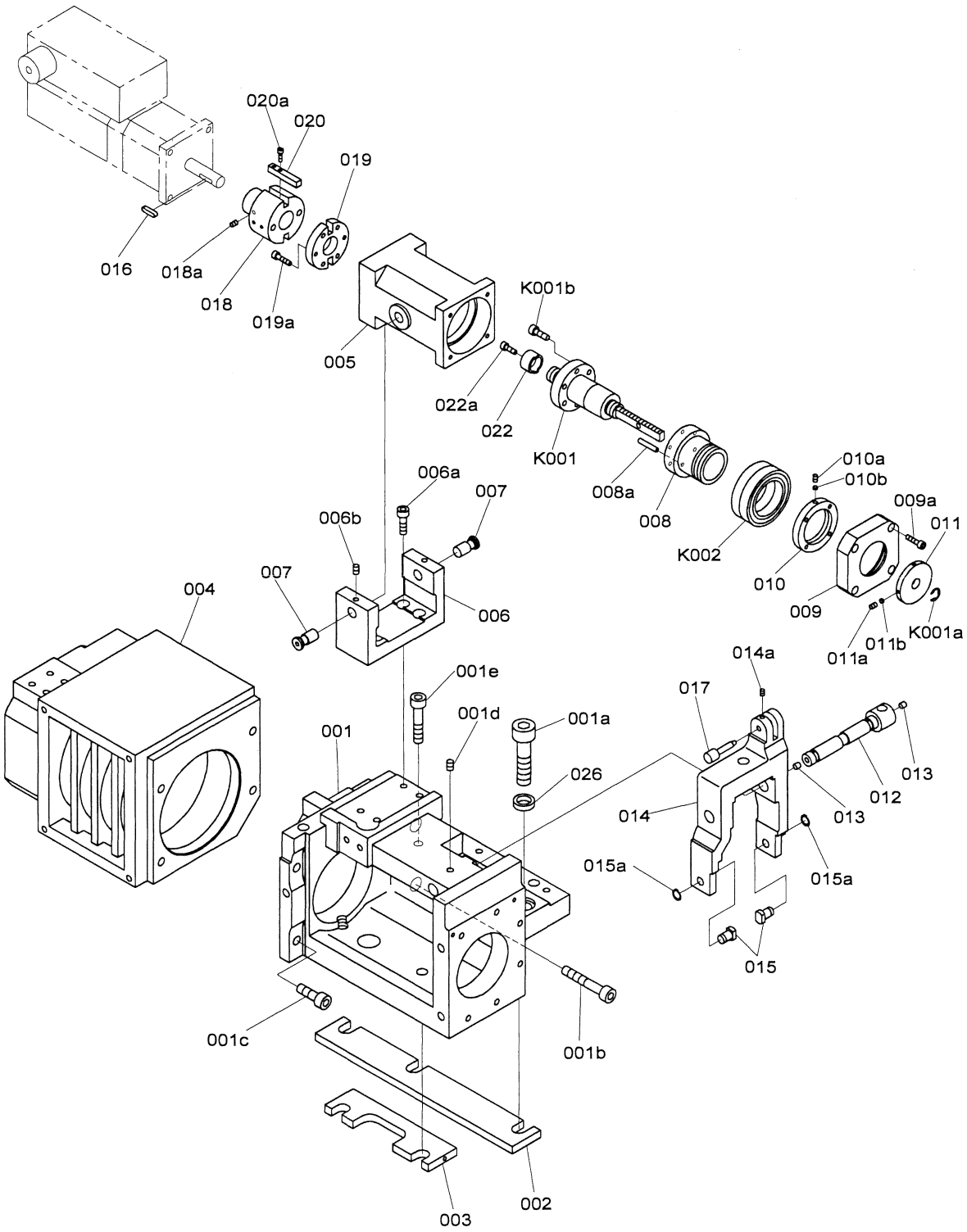
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U10CR30	リセハウジング	RECE HOUSING	2-178288-3	1	AMP
KWT002		コンタクト	CONTACT	1-175218-5	3	AMP
KWT003	U6CN1B U5CN1A U10CN3A U5CN3	プラグ	PLUG	10120-6000EL	4	SUMITOMO 3M
KWT004		シェル	SHELL	10320-3210-000	4	SUMITOMO 3M
WT004		バスケーブル	BUS CABLE		1	
WT005		DC 電源ケーブル	DC POWER CABLE		1	
WT006		バスケーブル	BUS CABLE		1	

C12 U40B	背面主軸装置 BACK SPINDLE DEVICE	WT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	U10CN5 CNC2-4	プラグ	PLUG	10120-3000VE	2	SUMITOMO 3M
KWT102		シェル	SHELL	10320-52A0-008	1	SUMITOMO 3M
KWT103		シェル	SHELL	10620-5600-008	1	SUMITOMO 3M
KWT104		ラッチ	LATCH	10600-L0F0-8	2	SUMITOMO 3M
KWT105	M2CNPG	プラグ	PLUG	350720-1	1	AMP
KWT106		ソケット	SOCKET	350689-1	8	AMP
KWT107	CNA2A	ハウジング	HOUSING	178289-3	1	AMP
KWT108	CNA2B	ハウジング	HOUSING	178289-6	1	AMP
KWT109		コンタクト	CONTACT	1-175216-5	13	AMP
KWT110		コンタクト	CONTACT	1-175218-5	5	AMP
KWT111		サンフレキ	FLEXIBLE TUBE	NSL40	0.77m	SANKEI
KWT112		回転型コネクタ	CONNECTOR	NRBG-40	1	SANKEI
KWT113		ストレートコネクタ	STRAGHT CONNECTOR	NBG-40	1	SANKEI
WT103		背面主軸モータ動力ケーブル	BACK SPINDLE MOTOR POWER CABEL		1	
WT104		背面主軸モータ信号ケーブル	BACK SPINDLE MOTOR SIGNAL CABEL		1	
WT105		背面主軸ファンケーブル	BACK SPINDLE FAN CABLE		1	
WT106		チャックモータケーブル	CHUCK MOTOR CABLE		1	
WT107		背面主軸回生抵抗ケーブル	BACK SPINDLE REGENERATIVE RESISTOR CABLE		1	

C12 U40B	背面主軸装置 BACK SPINDLE DEVICE	WT100

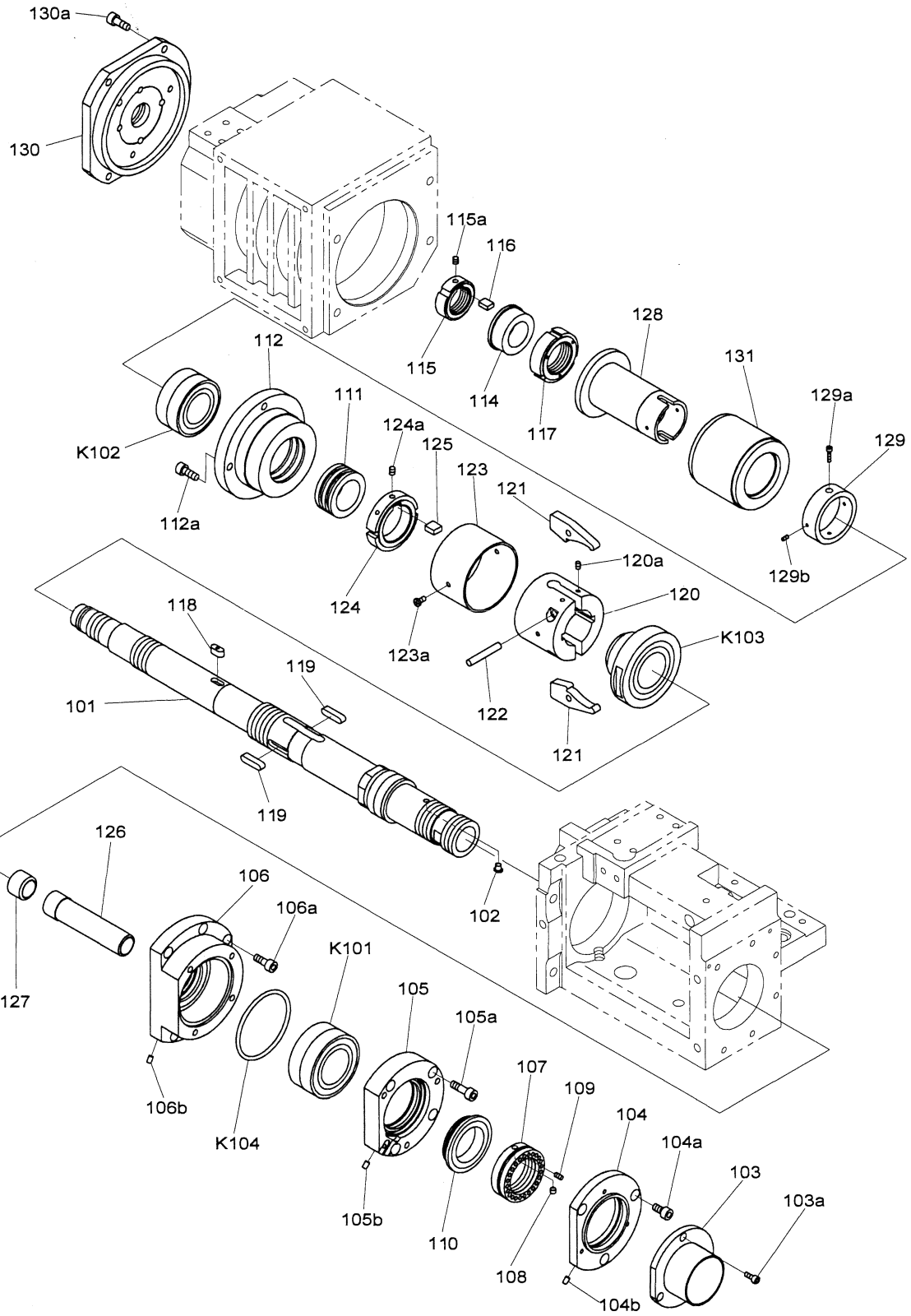
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C16 U40B	背面主軸装置 BACK SPINDLE DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	背面主軸台	BACK HEAD STOCK		1	
001a	六角穴付ボルト	BOLT	M12x50	2	
001b	六角穴付ボルト	BOLT	M8x50	2	
001c	六角穴付ボルト	BOLT	M8x25	2	
001d	六角穴付止メネジ (平先)	SET SCREW	M6x8	1	
001e	六角穴付ボルト	BOLT	M8x40	1	
002	スペーサー	SPACER		1	
003	スペーサー	SPACER		1	
004	モーターハウジング	MOTOR HOUSING		1	
005	ハウジング	HOUSING		1	
006	ブラケット	BRACKET		1	
006a	六角穴付ボルト	BOLT	M6x20	4	
006b	六角穴付止メネジ (平先)	SET SCREW	M5x8	2	
007	ピボット	PIVOT		2	
008	ホルダー	HOLDER		1	
008a	平行ピン	PARALLEL PIN	ø4x22	2	
009	ベアリング押さえ	FLANGE		1	
009a	六角穴付ボルト	BOLT	M4x16	4	
010	ナット (JIS1 級ネジ)	NUT		1	
010a	六角穴付止メネジ (平先)	SET SCREW	M4x5	1	
010b	真チュウ座	SEAT	M4	1	
011	ストッパー	STOPPER		1	
011a	六角穴付止メネジ (平先)	SET SCREW	M3x10	2	
011b	真チュウ座	SEAT	M3	2	
012	レバー軸	LEVER SHAFT		1	
013	塞ぎ栓	PLUG		2	
014	チャッキングレバー	CHUCKING LEVER		1	
014a	六角穴付止メネジ (平先)	SET SCREW	M4x5	1	
015	チャック作動ピン	PIN		2	
015a	軸用 C トメワ	RETAINING RING (C TYPE)	8	1	
016	キー	KEY		1	
017	連結軸	CONNECTING SHAFT		1	
018	カップリング	COUPLING		1	
018a	六角穴付止メネジ (平先)	SET SCREW	M4x5	1	
019	フランジ	FLANGE		1	
019a	六角穴付ボルト	BOLT	M4x20	4	
020	キー	KEY		2	
020a	六角穴付ボルト	BOLT	M3x10	8	
022	カラー	COLLAR		1	
022a	六角穴付ボルト	BOLT	M4x12	1	
026	座金	WASHER		2	
K001	転造ボールネジ (予圧タイプ)	ROLLING BALL SCREW	JPF1404-4RRGO +137LC7T	1	THK
K001a	E トメワ	RETAINING RING (E TYPE)	8	1	
K001b	六角穴付ボルト	BOLT	M5x20	4	
K002	アンギュラ玉軸受	ANGULAR BALL BEARING	7907T2DB/GMP5	1set	NTN

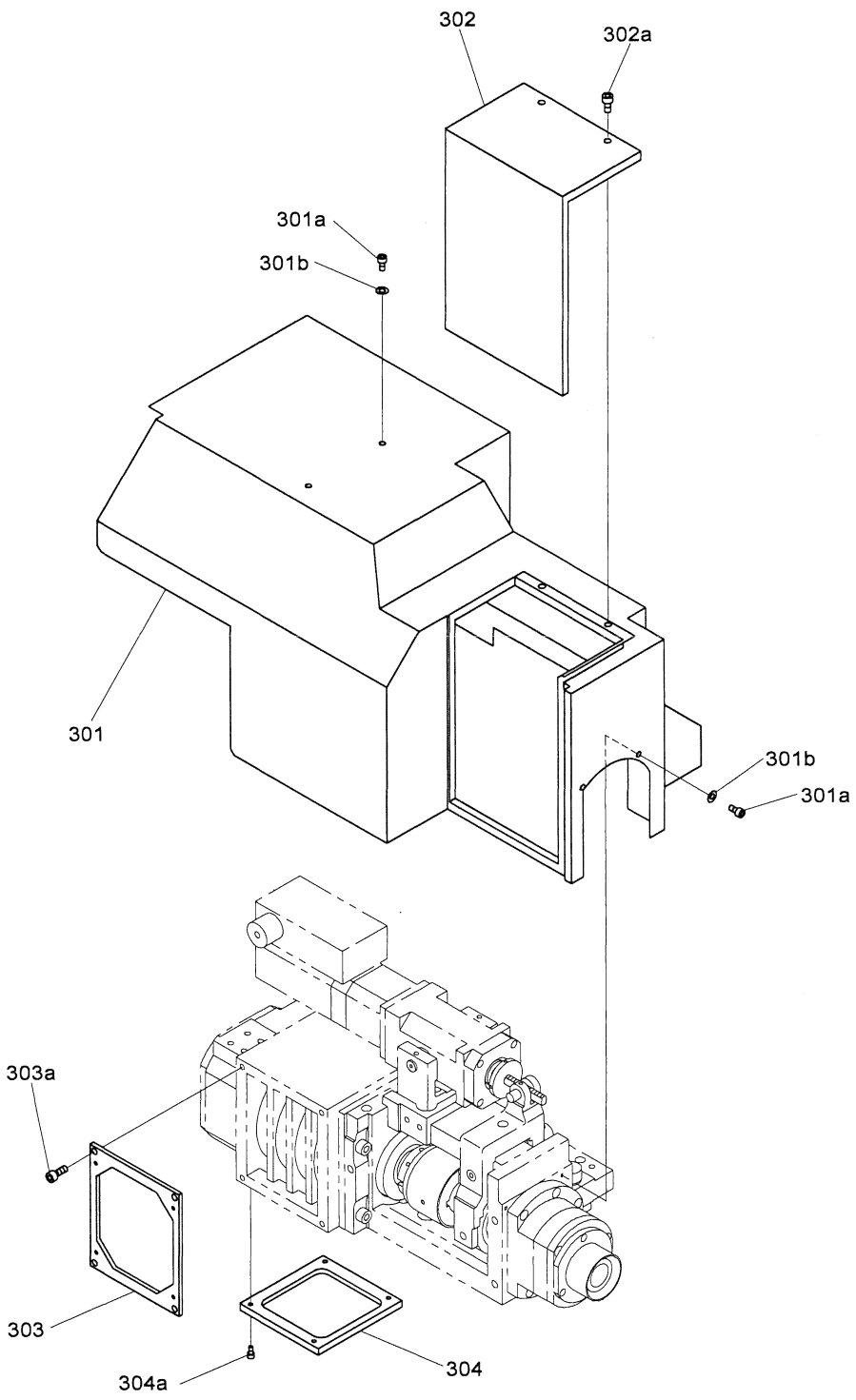
C16 U40B	背面主軸装置 BACK SPINDLE DEVICE	000



C16 U40B	背面主軸装置 BACK SPINDLE DEVICE	100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
101	主軸	SPINDLE		1	
102	キーピン	KEY PIN		1	
103	主軸キャップ	SPINDLE CAP		1	
103a	六角穴付ボルト	BOLT	M4x10	2	
104	シールフランジ	SEAL FLANGE		1	
104a	六角穴付ボルト	BOLT	M6x12	3	
104b	塞ぎ栓	PLUG	ø4.2x6	1	
105	ベアリング押え	FLANGE		1	
105a	六角穴付ボルト	BOLT	M6x20	4	
105b	塞ぎ栓	PLUG	ø4.2x6	1	
106	ハウジング (前)	HOUSING (FRONT)		1	
106a	六角穴付ボルト	BOLT	M6x16	6	
106b	塞ぎ栓	PLUG	ø4.2x6	1	
107	ナット (特級ネジ)	NUT		1	
108	ネジ座	LOCK KEY		6	
109	押ネジ	SCREW		6	
110	スペーサ	SPACER		1	
111	スペーサ	SPACER		1	
112	ハウジング (後)	HOUSING (BACK)		1	
112a	六角穴付ボルト	BOLT	M6x16	4	
114	エンコーダリング	ENCODER RING		1	
115	ナット (JIS1 級ネジ)	NUT		1	
115a	六角穴付止メネジ (平先)	SET SCREW	M5x5	1	
116	ネジ座 (JIS1 級ネジ)	LOCK KEY		1	
117	ナット (特級ネジ)	NUT		1	
118	キー	KEY		4	
119	キー	KEY		2	
120	チャック爪ホルダー	CHUCKING HOLDER		1	
120a	六角穴付止メネジ (平先)	SET SCREW	M4x4	4	
121	チャック作動爪	FINGER		2	
122	レバー軸	LEVER SHAFT		2	
123	リングカバー	RING COVER		1	
123a	平小ネジ	SCREW	M4x8	2	
124	ナット (JIS1 級ネジ)	NUT		1	
124a	六角穴付止メネジ (平先)	SET SCREW	M6x6	1	
125	ネジ座 (JIS1 級ネジ)	LOCK KEY		1	
126	中間スリーブ	MIDDLE SLEEVE		1	
127	バランススリーブ	BALANCE SLEEVE		1	
128	ロータースリーブ	ROTOR SLEEVE		1	
129	リング	RING		1	
129a	六角穴付ボルト	BOLT	M3x5	2	
129b	六角穴付止メネジ (平先)	SET SCREW	M3x6	2	
130	ハウジング	HOUSING		1	
130a	六角穴付ボルト	BOLT	M6x16	5	
131	ローター	ROTOR		1	
K101	高速組合せアンギュラ玉軸受	ANGULAR BALL BEARING	B71908C.TPAP4UL	1set	FUKUDA
K102	高速組合せアンギュラ玉軸受	ANGULAR BALL BEARING	B7007C.TPAP4UL	1set	FUKUDA
K103	ボビン	BOBBIN	SX08C04LLBPX1/5K	1	NTN
K104	O リング	O-RING	G60	1	NOK

C16 U40B	背面主軸装置 BACK SPINDLE DEVICE	100



C16 U40B	背面主軸装置 BACK SPINDLE DEVICE	300

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
301	背面主軸カバー	BACK SPINDLE		1	
301a	六角穴付ボルト	BOLT	M4x8	4	
301b	平座金	WASHER	M4	4	
302	フタ	COVER		1	
302a	六角穴付ボルト	BOLT	M6x12	2	
303	ガイド	GUIDE		1	
303a	六角穴付ボルト	BOLT	M6x16	4	
304	フタ	COVER		1	
304a	六角穴付ボルト	BOLT	M4x8	4	

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PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
KR201	フロープロパーユニット	FLOW PROPER UNIT	PST1	1	SHOWA YUKI
KR203	スリーブ	SLEEVE	PB4	1	SHOWA YUKI
KR204	プロパーナット	PROPER NUT	PAN4	1	SHOWA YUKI

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	FAN2	ファンモーター	FAN MOTOR	S12D20-TW2G 120□x38t	1	STYLE ELECTRONICS
KBT002		ファンガード	FAN GUARD	PG-47-01	1	NMB
KBT002a		バネ座	SPRING WASHER	M4	2	
KBT002b		平座金	WASHER	M4	2	
KBT003		絶縁キャップ	INSULATION CAP	OA-QM4	2	OHM ELECTRIC
KBT004		絶縁キャップ	INSULATION CAP	OA-QM5	3	OHM ELECTRIC
KBT005		六角穴付ボルト	BOLT	M4x50	2	
KBT006	THP4	サーマルプロテクタ	THERMAL PROTECTOR	T70AR1U1	1	SAKAGUCHI DENNETSU

C16 U40B	背面主軸装置 BACK SPINDLE DEVICE	BT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	UNIT5	ACスピンドルドライブユニット	AC SPINDLE DRIVE UNIT	MDS-B-SPJ2X-075	1	MITSUBISHI ELECTRIC
KCT001a		ナベ小セムスB(小)	SCREW	M5x12	4	
KCT002	UNIT10	オプションユニット	OPTION UNIT	MDS-B-PJEX	1	MITSUBISHI ELECTRIC
KCT002a		ナベ小セムスB(小)	SCREW	M5x12	2	
KCT003	R2	回生抵抗	RESISTANCE UNIT	FCUA-RB075	1	MITSUBISHI ELECTRIC
KCT003a		ナベ小セムスB(大)	SCREW	M4x8	2	
KCT004	M2	ビルトインモーター	BUILT IN MOTOR	SJ-2B4002	1	MITSUBISHI ELECTRIC
KCT005	MA2	インテリジェントサーボモータ	SERVO MOTOR	HS-MF23EX-S2	1	MITSUBISHI

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
FT001		中継ボックス	INTERMEDIATE BOX		1	
FT001a		六角穴付ボルト	BOLT	M6x10	3	
FT001b		平座金	WASHER	M6	3	
FT001c		六角穴付ボルト	BOLT	M4x10	2	
FT001d		平座金	WASHER	M4	2	
FT001e		ナベ小セムスB(小)	SCREW	M4x8	1	
FT001f		ナベ小セムスB(大)	SCREW	M4x8	4	
FT001g		ナベ小セムスB(大)	SCREW	M6x16	1	
FT002		フタ	COVER		1	
FT002a		ナベ小セムスB(小)	SCREW	M4x8	1	
KFT001		端子台	TERMINAL	C-TB4-0	1	KASUGA ELECTRIC
KFT001a		ナベ小セムスB(大)	SCREW	M4x8	2	
KFT002		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
KFT003		シールワッシャー	SEAL WASHER	W4	8	KEEPER
KFT004		ケーブルシール引出板	CABLE SEAL PLATE	EMS6M2	1	SANKEI
KFT004a		ナベ小セムスB(大)	SCREW	M5x16	4	
KFT005	BSCK	パッキン	PACKING	EM23P13	1	SANKEI
KFT006	FAN4	キャプコン	CAPCON	OA-W1608	1	OHM ELECTRIC
KFT007		電源マーク	POWER MARK	20MM	1	NIKKOUKAI
KFT008		バインド小ネジ	SCREW	M4x8	8	
KFT009		タイマウント	TIE MOUNT	TM2S8-M	2	PANDUIT
KFT010		ナベ小ネジ	SCREW	M4x6	2	

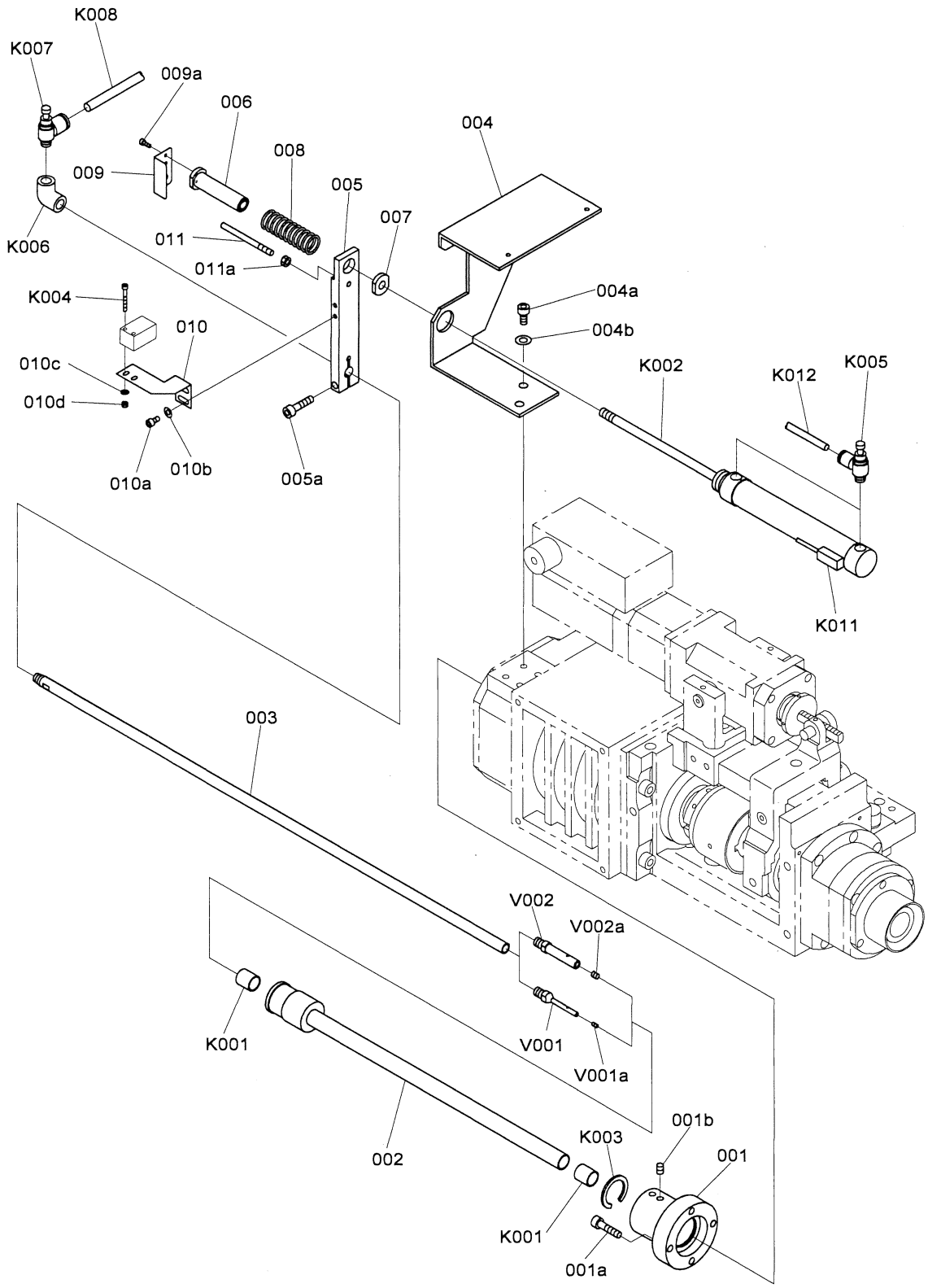
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U10CR30	リセハウジング	RECE HOUSING	2-178288-3	1	AMP
KWT002		コンタクト	CONTACT	1-175218-5	3	AMP
KWT003	U6CN1B U5CN1A U10CN3A U5CN3	プラグ	PLUG	10120-6000EL	4	SUMITOMO 3M
KWT004		シェル	SHELL	10320-3210-000	4	SUMITOMO 3M
WT004		バスケーブル	BUS CABLE		1	
WT005		DC 電源ケーブル	DC POWER CABLE		1	
WT006		バスケーブル	BUS CABLE		1	

C16 U40B	背面主軸装置 BACK SPINDLE DEVICE	WT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	U10CN5 CNC2-4	プラグ	PLUG	10120-3000VE	2	SUMITOMO 3M
KWT102		シェル	SHELL	10320-52A0-008	1	SUMITOMO 3M
KWT103		シェル	SHELL	10620-5600-008	1	SUMITOMO 3M
KWT104		ラッチ	LATCH	10600-L0F0-8	2	SUMITOMO 3M
KWT105	M2CNPG	プラグ	PLUG	350720-1	1	AMP
KWT106		ソケット	SOCKET	350689-1	8	AMP
KWT107	CNA2A	ハウジング	HOUSING	178289-3	1	AMP
KWT108	CNA2B	ハウジング	HOUSING	178289-6	1	AMP
KWT109		コンタクト	CONTACT	1-175216-5	13	AMP
KWT110		コンタクト	CONTACT	1-175218-5	5	AMP
KWT111		サンフレキ	FLEXIBLE TUBE	NSL40	0.77m	SANKEI
KWT112		回転型コネクタ	CONNECTOR	NRBG-40	1	SANKEI
KWT113		アングルコネクタ	ANGLE CONNECTOR	N90°BG-40	1	SANKEI
WT103		背面主軸モータ動力ケーブル	BACK SPINDLE MOTOR POWER CABLE		1	
WT104		背面主軸モータ信号ケーブル	BACK SPINDLE MOTOR SIGNAL CABLE		1	
WT105		背面主軸ファンケーブル	BACK SPINDLE FAN CABLE		1	
WT106		チャックモータケーブル	CHUCK MOTOR CABLE		1	
WT107		背面主軸回生抵抗ケーブル	BACK SPINDLE REGENERATIVE RESISTOR CABLE		1	

C16 U40B	背面主軸装置 BACK SPINDLE DEVICE	WT100

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C1216 U401B	エアー式背面ノックアウト装置 AIR BACK KNOCK-OUT DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	フランジ	FLANGE		1	
001a	六角穴付ボルト	BOLT	M6x25	4	
001b	六角穴付止メネジ (平先)	SET SCREW	M6x8	2	
002	ガイドスリーブ	GUIDE SLEEVE		1	
003	ノックアウトパイプ	KNOCK-OUT PIPE		1	
004	シリンダーブラケット	CYLINDER BRACKET		1	
004a	六角穴付ボルト	BOLT	M6x12	2	
004b	平座金	WASHER	M6	2	
005	連結板	CONNECTING PLATE		1	
005a	六角穴付ボルト	BOLT	M6x25	1	
006	シリンダージョイント	CYLINDER JOINT		1	
007	ロックナット	LOCK NUT		1	
008	圧縮コイルバネ (ノックアウト用)	COMPRESSION SPRING (KNOCK-OUT)		1	
009	ドグ	DOG		1	
009a	六角穴付ボルト	BOLT	M3x8	2	
010	近接スイッチブラケット	PROXIMITY SWITCH BRACKET		1	
010a	六角穴付ボルト	BOLT	M4x8	2	
010b	平座金	WASHER	M4	2	
010c	六角ナット	NUT	M3	2	
010d	平座金	WASHER	M3	2	
011	回り止めロッド	ROD		1	
011a	六角ナット	NUT	M5	1	
K001	含油軸受	BEARING	S10x14x16	2	NTN
K002	スリムシリンダー	SLIM CYLINDER	DA20X120-A -2796W	1	KOGANEI
K003	インバーテッドリング	INVERTED RING	IRTW30	1	OCHIAI
K004	六角穴付ボルト	BOLT	M3x25	2	
K005	スピードコントローラ	SPEED CONTROL	SC6-01A	2	KOGANEI
K006	エルボ	ELBOW	1/8"	1	
K007	スピードコントローラ	SPEED CONTROL	SC8-01B	1	KOGANEI
K008	ウレタンチューブ	TUBE	U8-B L=10m	1	KOGANEI
K009	クイック継手	JOINT	TL8-01	1	KOGANEI
K010	電磁弁	SOLENOID VALVE	M100E1-3W-SR -DC24V	1	KOGANEI
K012	ウレタンチューブ	TUBE	U6-B L=20m	1	KOGANEI
K013	クイック継手	JOINT	TL6-01	2	KOGANEI
V001	ノックアウト冶具	KNOCK-OUT JIG		1	
V001a	六角穴付止メネジ (平先)	SET SCREW	M3x6	1	
V002	ノックアウト冶具	KNOCK-OUT JIG		1	
V002a	六角穴付止メネジ (平先)	SET SCREW	M5x6	1	

C1216 U401B	エアー式背面ノックアウト装置 AIR BACK KNOCK-OUT DEVICE	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	FS2	近接スイッチ	PROXIMITY SWITCH	BES517-Q1603P	1	NIHON BALLUFF
KBT002	FS1	センサースイッチ	SENSOR SWITCH	CS11TA1-G5 -DA20	1	KOGANEI
KBT002SP1		ペンシリンダセンサ	SENSOR	CD11TA1	(1)	KOGANEI
KBT002SP2		取付金具	BAND	G5-DA20	(1)	KOGANEI

C1216 U401B	エアー式背面ノックアウト装置 AIR BACK KNOCK-OUT DEVICE	BT000

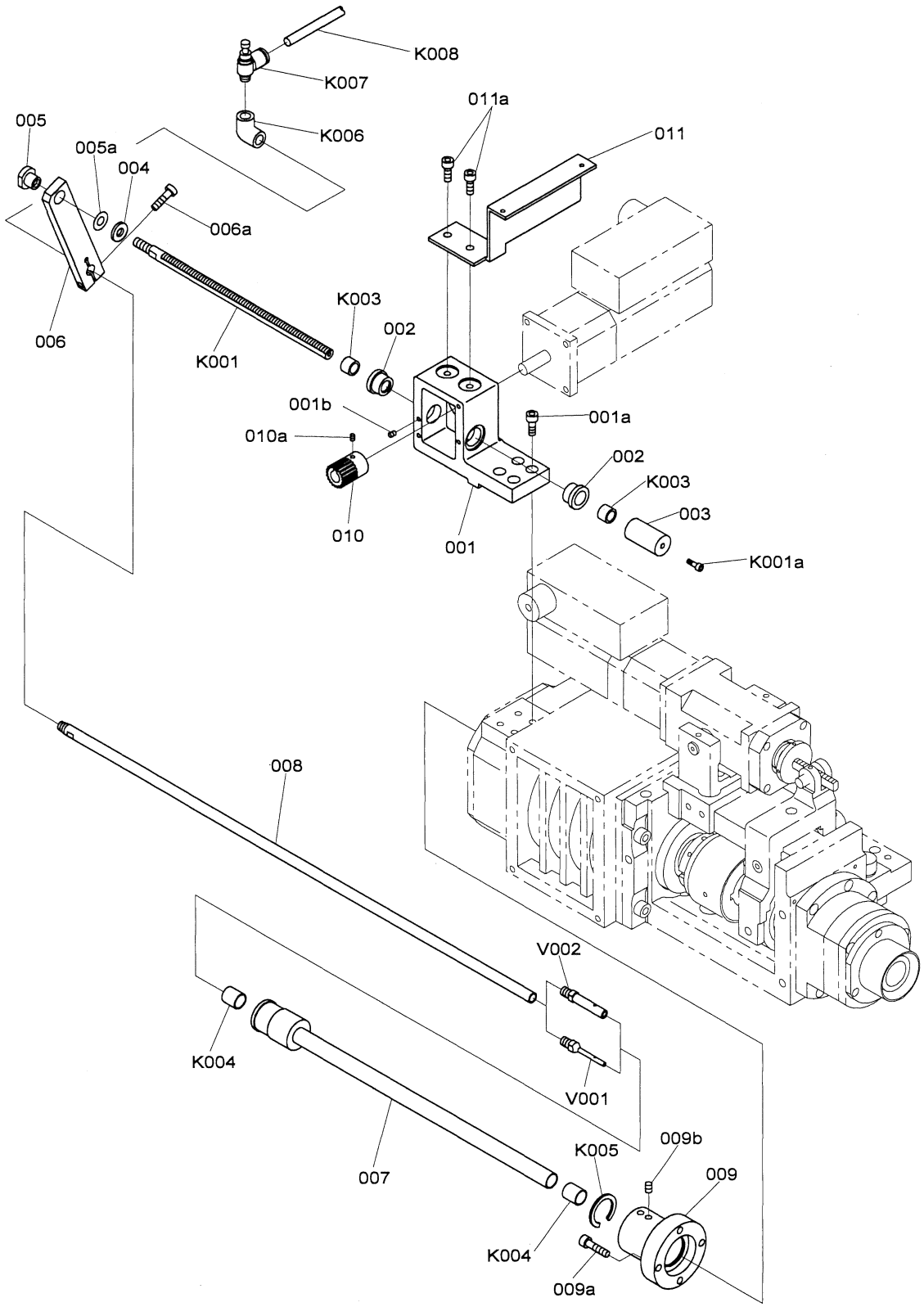
PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT301	Ry202 Ry212	リレー　RELAY	RB104-DE (DC24V)	2	FUJI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KFT001	KOUT	パッキン PACKING	EM23P7	1	SANKEI

C1216 U401B	エアー式背面ノックアウト装置 AIR BACK KNOCK-OUT DEVICE	FT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101		サンフレキ	FLEXIBLE TUBE	NS#25	0.77m	SANKEI
KWT102		回転型コネクタ	CONNECTOR	NRBG-25	1	SANKEI
KWT103		コネクタ	CONNECTOR	N90°BG-25	1	SANKEI
KWT104		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
WT101		電磁弁ケーブル	VALVE CABLE		1	
WT102		電磁弁ケーブル	VALVE CABLE		1	
WT103		センサケーブル	SENSOR CABLE		1	
WT104		ケーブル固定板	CABLE FIXING PLATE		1	

C1216 U401B	エアー式背面ノックアウト装置 AIR BACK KNOCK-OUT DEVICE	WT100



C1216 U402B	モーター式背面ノックアウト装置 MOTOR BACK KNOCK-OUT DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	モーターブラケット	MOTOR BRACKET		1	
001a	六角穴付ボルト	BOLT	M6x16	4	
001b	六角穴付止メネジ (平先)	SET SCREW	M4x6	2	
002	軸受ホルダー	BEARING HOLDER		2	
003	ストッパー	STOPPER		1	
004	座金	WASHER		1	
005	連結駒	CONNECTING PIECE		1	
005a	平座金	WASHER	M8	1	
006	連結板	CONNECTING PLATE		1	
006a	六角穴付ボルト	BOLT	M6x25	1	
007	ガイドスリーブ	GUIDE SLEEVE		1	
008	ノックアウトパイプ	KNOCK-OUT PIPE		1	
009	フランジ	FLANGE		1	
009a	六角穴付ボルト	BOLT	M6x25	4	
009b	六角穴付止メネジ (平先)	SET SCREW	M6x8	2	
010	平歯車	GEAR		1	
010a	六角穴付止メネジ (平先)	SET SCREW	M4x5	2	
011	ブラケット	BRACKET		1	
011a	六角穴付ボルト	BOLT	M6x16	2	
K001	SROS 丸ラック (S タイプ)	RACK	SROS1-500	1	KOHARA GEAR
K001a	六角穴付ボルト	BOLT	M4x12	1	
K003	含油軸受	BEARING	S10x14x10	2	NTN
K004	含油軸受	BEARING	S10x14x16	2	NTN
K005	インバーテッドリング	INVERTED RING	IRTW30	1	OCHIAI
K006	エルボ	ELBOW	1/8"	1	
K007	スピードコントローラ	SPEED CONTROL	SC8-01B	1	KOGANEI
K008	ウレタンチューブ	TUBE	U8-B L=10m	1	KOGANEI
K009	クイック継手	JOINT	TL8-01	2	KOGANEI
K010	電磁弁	SOLENOID VALVE	A111E1-25-54W -DC24V	1	KOGANEI
V001	ノックアウト冶具	KNOCK-OUT JIG		1	
V001a	六角穴付止メネジ (平先)	SET SCREW	M3x6	1	
V002	ノックアウト冶具	KNOCK-OUT JIG		1	
V002a	六角穴付止メネジ (平先)	SET SCREW	M5x6	1	

C1216 U402B	モーター式背面ノックアウト装置 MOTOR BACK KNOCK-OUT DEVICE	000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT001	MA3	インテリジェントサーボモータ　SERVO MOTOR	HS-MF23EX-S2	1	MITSUBISHI ELECTRIC

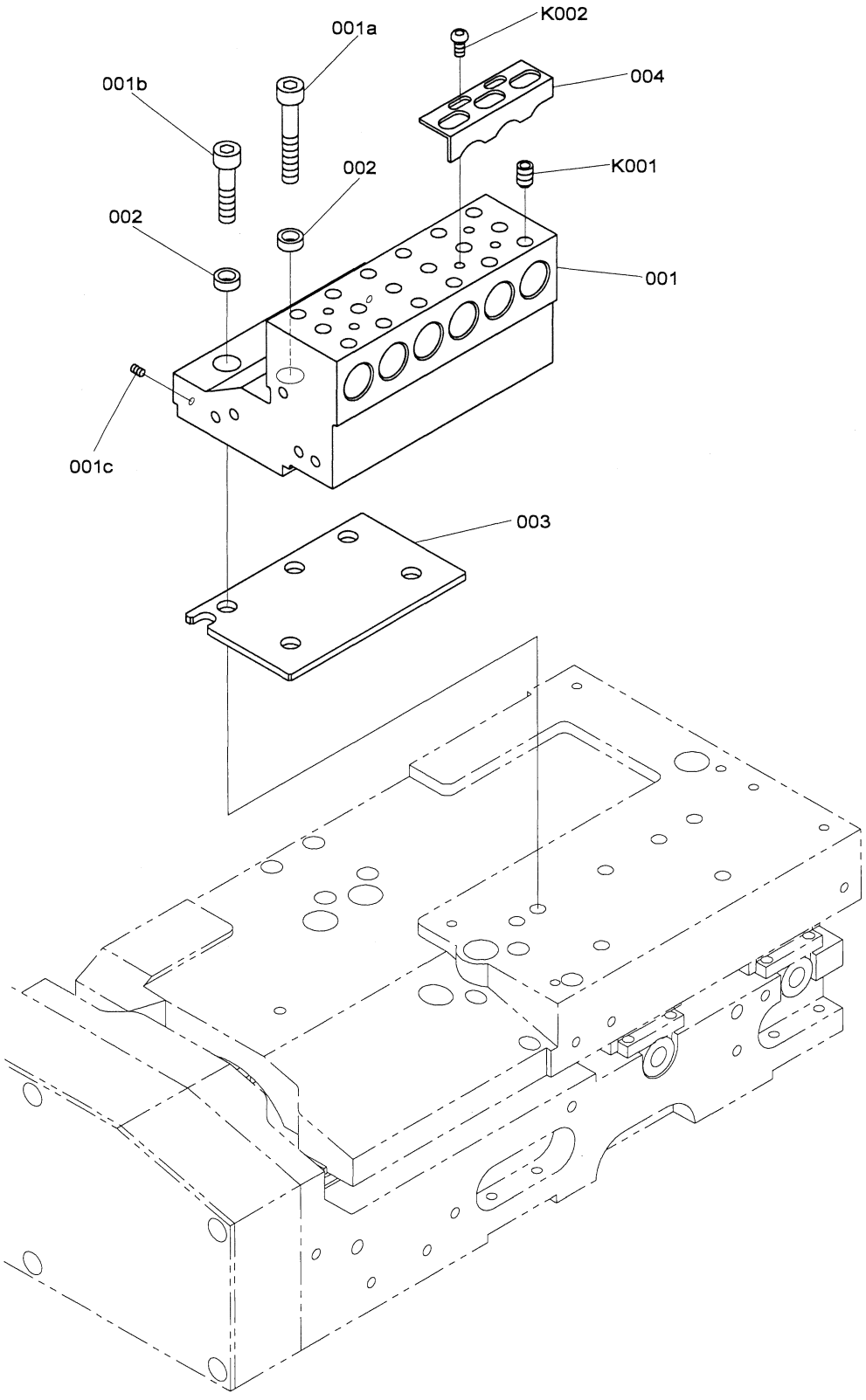
PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT301	Ry202	リレー　RELAY	RB104-DE (DC24V)	1	FUJI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KFT001	KOUT	パッキン PACKING	EM23P11	1	SANKEI

C1216 U402B	モーター式背面ノックアウト装置 MOTOR BACK KNOCK-OUT DEVICE	FT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101		サンフレキ	FLEXIBLE TUBE	NS#25	0.77m	SANKEI
KWT102		回転型コネクタ	CONNECTOR	NRBG-25	1	SANKEI
KWT103		コネクタ	CONNECTOR	N90°BG-25	1	SANKEI
KWT104		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
KWT105	CNC2-5	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT106		シェル	SHELL	1032052A0-008	1	SUMITOMO 3M
KWT107	CNA3A	ハウジング	HOUSING	178289-3	1	AMP
KWT108	CNA3B	ハウジング	HOUSING	178289-6	1	AMP
KWT109		コンタクト	CONTACT	1-175216-5	13	AMP
KWT110		コンタクト	CONTACT	1-175218-5	5	AMP
WT101		電磁弁ケーブル	VALVE CABLE		1	
WT102		ノックアウトモータケーブル	KNOCK-OUT MOTOR CABLE		1	
WT103		ケーブル固定板	CABLE FIXING PLATE		1	

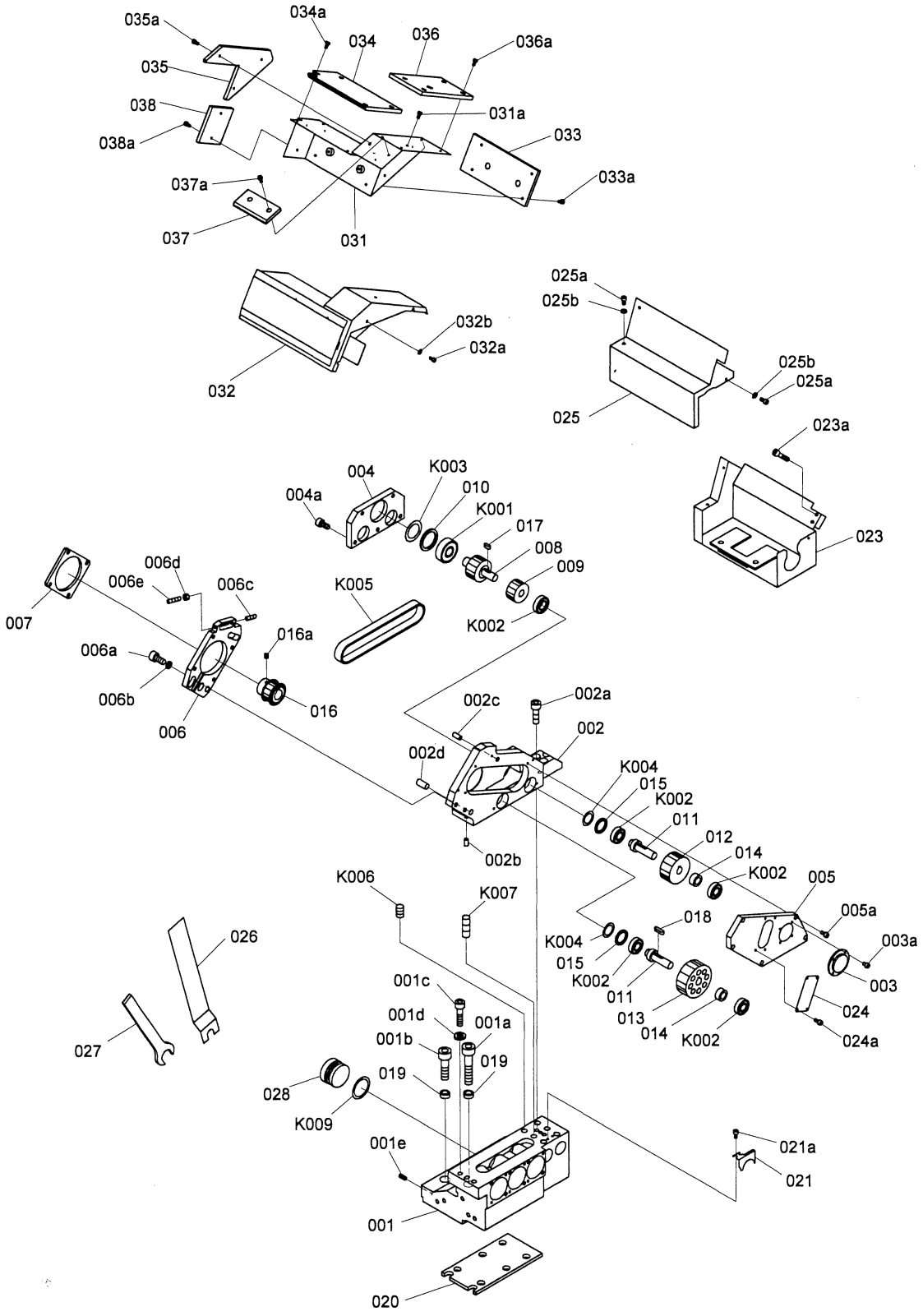
C1216 U402B	モーター式背面ノックアウト装置 MOTOR BACK KNOCK-OUT DEVICE	WT100



C1216 U120B	6 本軸ホルダー 6-SHAFT HOLDER	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	6本軸ホルダー	6-SHAFT HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x50	2	
001b	六角穴付ボルト	BOLT	M8x35	2	
001c	六角穴付止ネジ (平先)	SET SCREW	M4x6	2	
002	座金	WASHER		4	
003	スペーサー	SPACER		1	
004	ストッパー	STOPPER		1	
K001	エーストップ	ACE TOP	ASF812	18	JEC
K002	六角穴付ボタンボルト	BUTTON HEAD CAP SCREWS	M5x10	2	

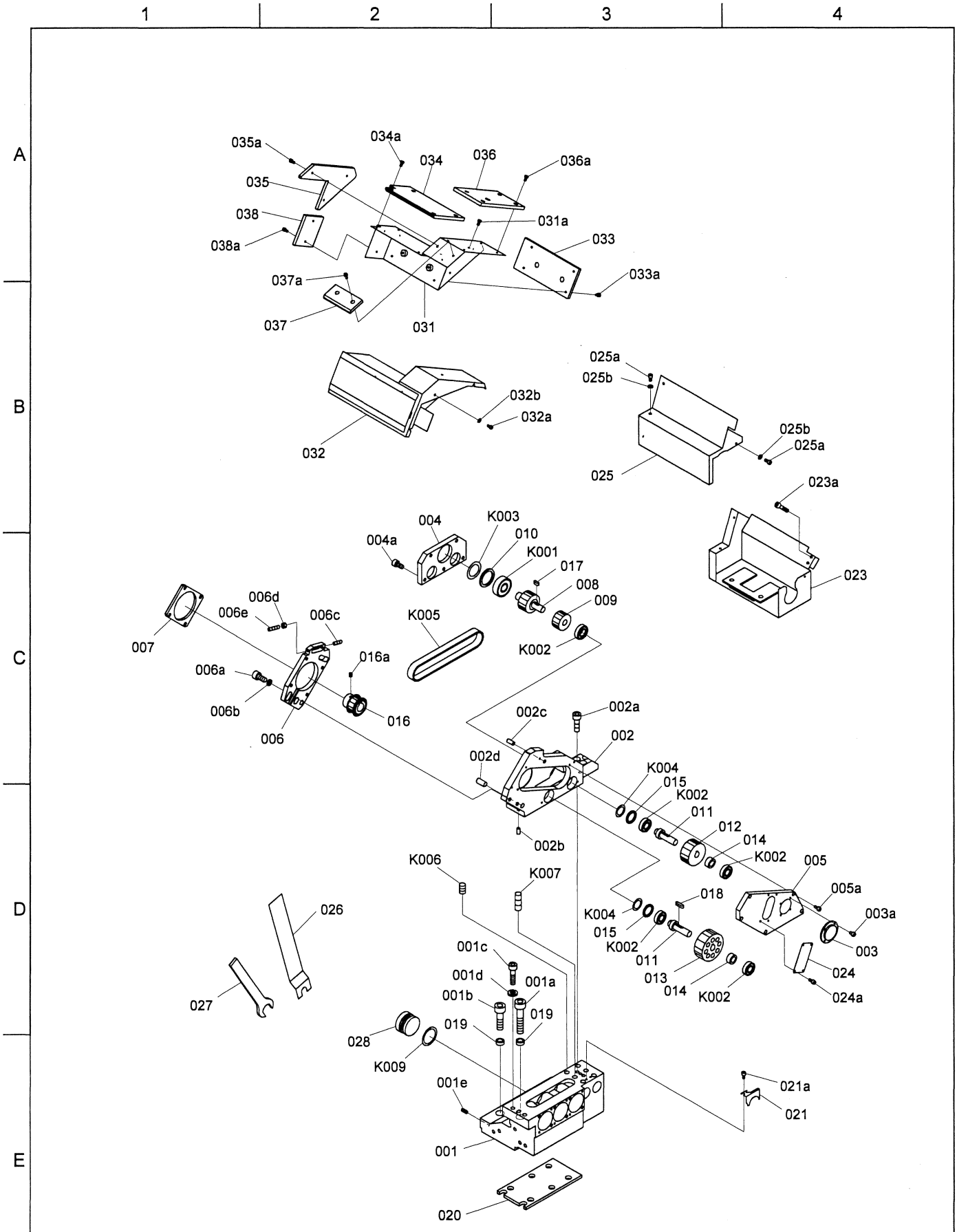
C1216 U120B	6本軸ホルダー 6-SHAFT HOLDER	000



C1216 U121B	正面/背面回転工具駆動装置 FRONT/BACK TURN TOOL DRIVE DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ホルダー	HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x50	2	
001b	六角穴付ボルト	BOLT	M8x35	2	
001c	六角穴付ボルト	BOLT	M6x30	2	
001d	平座金	WASHER	M6	2	
001e	六角穴付止メネジ (平先)	SET SCREW	M4x6	2	
002	ギヤボックス	GEAR BOX		1	
002a	六角穴付ボルト	BOLT	M6x25	2	
002b	平行ピン	PIN	ø5x10	1	
002c	平行ピン	PIN	ø6x12	1	
002d	平行ピン	PIN	ø8x16	1	
003	ハウジング	HOUSING		1	
003a	六角穴付ボルト	BOLT	M3x5	4	
004	プレート	PLATE		1	
004a	六角穴付ボルト	BOLT	M5x12	5	
005	フタ	COVER		1	
005a	六角穴付ボルト	BOLT	M3x10	5	
006	モータープレート	MOTOR PLATE		1	
006a	六角穴付ボルト	BOLT	M6x16	3	
006b	平座金	WASHER	M6	3	
006c	六角穴付止メネジ (平先)	SET SCREW	M4x18	1	
006d	六角ナット	NUT	M4	1	
006e	六角穴付止メネジ (平先)	SET SCREW	M4x20	1	
007	スペーサー	SPACER		1	
008	平歯車	GEAR		1	
009	タイミングプーリー	TIMING PULLEY	P30-3GT-12-6	1	UNITTA
010	スペーサー	SPACER		1	
011	軸	SHAFT		2	
012	平歯車	GEAR		1	
013	平歯車	GEAR		1	
014	スペーサー	SPACER		2	
015	スペーサー	SPACER		2	
016	タイミングプーリー	TIMING PULLEY	P30-3GT-12-6F	1	UNITTA
016a	六角穴付止メネジ (平先)	SET SCREW	M4x4	2	
017	キー	KEY		1	
018	キー	KEY		2	
019	座金	WASHER		4	
020	スペーサー	SPACER		1	
021	ストッパー	STOPPER		1	
021a	六角穴付ボルト	BOLT	M3x5	2	
023	フレキブラケット	FLEXIBLE BRACKET		1	
023a	六角穴付ボルト	BOLT	M4x20	2	
024	カバー	COVER		1	
024a	六角穴付ボルト	BOLT	M3x5	4	
025	コネクターカバー	CONNECTOR COVER		1	
025a	六角穴付ボルト	BOLT	M3x6	4	
025b	平座金	WASHER	M3	4	
026	片口スパナ	SINGLE SPANNER		1	
027	スパナ	SPANNER		1	
028	キャップ	CAP		6	

C1216 U121B	正面/背面回転工具駆動装置 FRONT/BACK TURN TOOL DRIVE DEVICE	000



C1216 U121B	正面/背面回転工具駆動装置 FRONT/BACK TURN TOOL DRIVE DEVICE	000

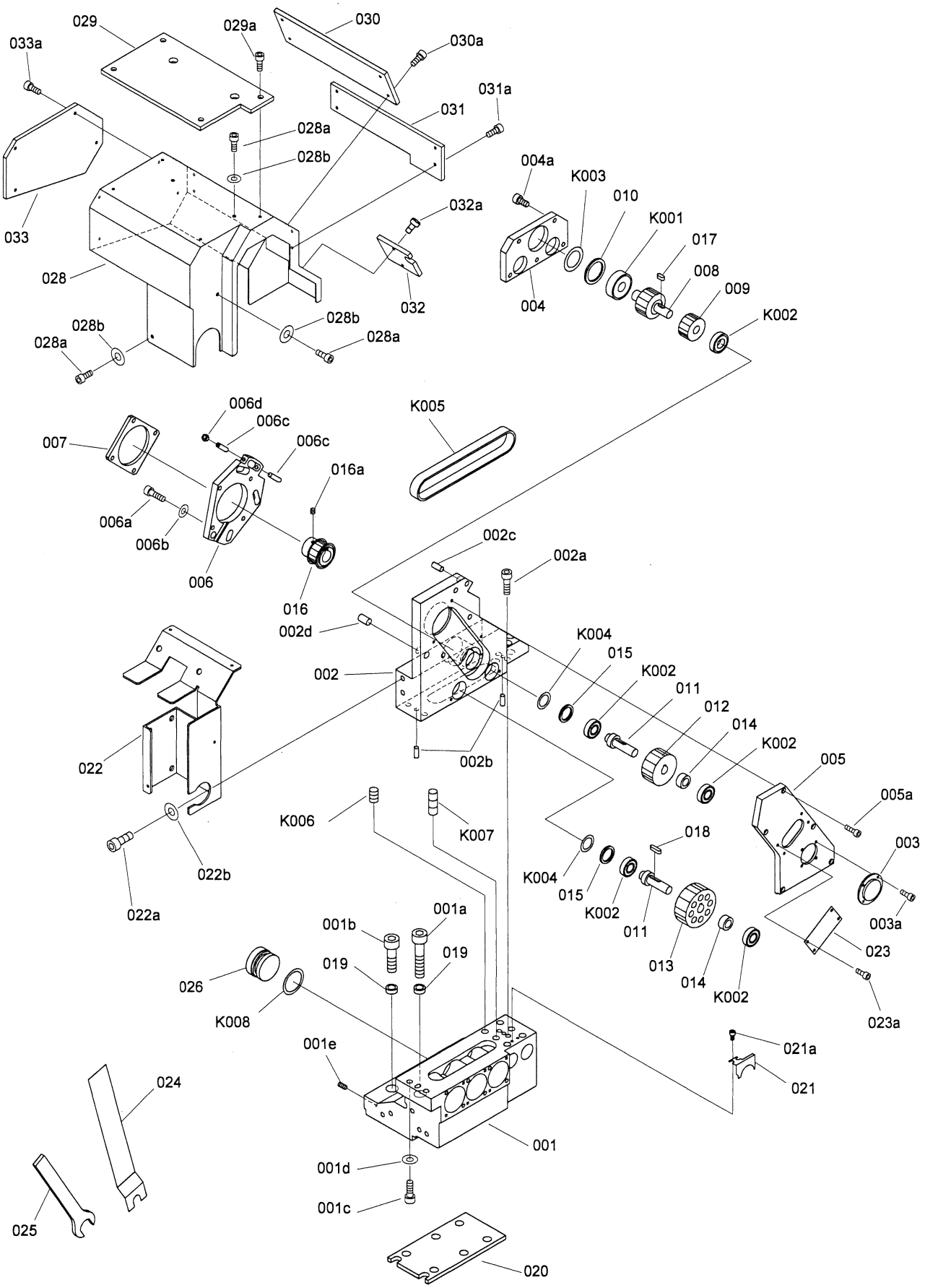
PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
030a	六角穴付ボルト	BOLT	M4x8	4	
030b	平座金	WASHER	M4	4	
030c	ナット	NUT	M4	4	
031	モーターカバー (上)	COVER (UPPER)		1	
031a	六角穴付ボルト	BOLT	M3x6	3	
032	モーターカバー (下)	COVER (LOWER)		1	
032a	六角穴付ボルト	BOLT	M3x6	3	
032b	平座金	WASHER	M3	3	
033	保護カバー (1)	COVER (1)		1	
033a	六角穴付ボルト	BOLT	M3x6	4	
034	保護カバー (2)	COVER (2)		1	
034a	六角穴付ボルト	BOLT	M3x6	4	
035	保護カバー (3)	COVER (3)		1	
035a	六角穴付ボルト	BOLT	M3x6	3	
036	保護カバー (4)	COVER (4)		1	
036a	六角穴付ボルト	BOLT	M3x6	4	
037	保護カバー (5)	COVER (5)		1	
037a	六角穴付ボルト	BOLT	M3x6	2	
038	保護カバー (6)	COVER (6)		1	
038a	六角穴付ボルト	BOLT	M3x6	2	
K001	深溝玉軸受	BALL BEARING	6201ZZ	1	NACHI
K002	深溝玉軸受	BALL BEARING	6900LLU	5	NTN
K003	波ワッシャー	WAVE WASHER	BWW-6201	1	OCHAI
K004	波ワッシャー	WAVE WASHER	BWW-608	2	OCHAI
K005	タイミングベルト	TIMING BELT	258-3GT-12	1	UNITTA
K006	ボールスクリュー	BALL SCREW	BSF8x12	4	IMAO
K007	ボールスクリュー	BALL SCREW	BSF8x30	2	IMAO
K009	O リング	O-RING	P26	1	JAPAN OIL SEAL
K011	警告ラベル	WARNING LABEL	JW11	1	TOIN
K1011	警告ラベル	WARNING LABEL	EW11	1	TOIN

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	UNIT7	サーボドライブユニット	SERVO DRIVE UNIT	MDS-B-SVJ2-04	1	MITSUBISHI ELECTRIC
KCT001a		ナベ小セムス B (小)	SCREW	M5x12	2	
KCT002	M4	サーボモータ	SERVO MOTOR	HC-MF43K-D5	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U5CN1B U7CN1A	プラグ	PLUG	10120-6000EL	2	SUMITIMO 3M
KWT002		シェル	SHELL	10320-3210-000	2	SUMITIMO 3M
WT004		バスケーブル	BUS CABLE		1	

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	M4CNM	コネクタ	CONNECTOR	RM15WTJA-4S	1	HIROSE ELECTRIC
KWT102		コードクランプ	CORD CLAMP	RM15WTP-CP(10)	1	HIROSE ELECTRIC
KWT103	M4CNPG	コネクタ	CONNECTOR	RM15WTJA-10S(8)(05)	1	HIROSE ELECTRIC
KWT104	U7CN2	プラグ	PLUG	10120-3000VE	1	SUMITIMO 3M
KWT105		シェル	SHELL	10620-5600-008	1	SUMITIMO 3M
KWT106		ラッチ	LATCH	10600-L0F0-8	2	SUMITIMO 3M
KWT107		サンフレキ	FLEXIBLE TUBE	NS#25	1	SANKEI
KWT108		回転コネクタ	CONNECTOR	N90°RBG-25	1	SANKEI
KWT109		コネクタ	CONNECTOR	N90°BG-25	1	SANKEI
KWT110		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER
WT101		工具主軸モータ動力ケーブル	TOOL SPINDLE MOTOR POWER CABLE		1	
WT102		工具主軸モータ信号ケーブル	TOOL SPINDLE MOTOR SIGNAL CABLE		1	
WT103		ケーブル固定板	CABLE FIXING PLATE		1	

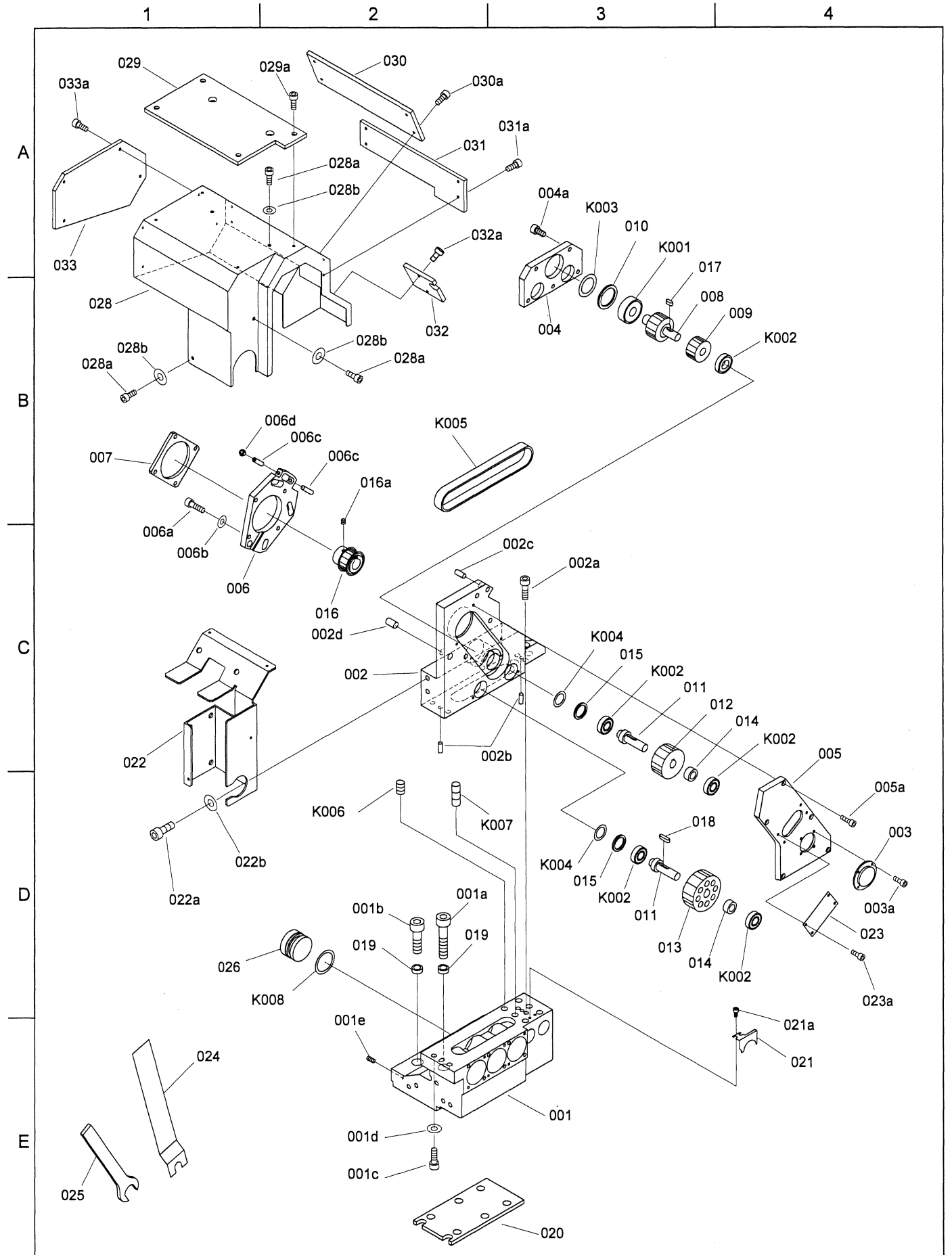
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C1216 U122B	正面/背面回転工具駆動装置 FRONT/BACK TURN TOOL DRIVE DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ホルダー	HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x50	2	
001b	六角穴付ボルト	BOLT	M8x35	2	
001c	六角穴付ボルト	BOLT	M6x30	2	
001d	平座金	WASHER	M6	2	
001e	六角穴付止メネジ (平先)	SET SCREW	M4x6	2	
002	ギヤボックス	GEAR BOX		1	
002a	六角穴付ボルト	BOLT	M6x25	2	
002b	平行ピン	PIN	ø5x10	2	
002c	平行ピン	PIN	ø6x12	1	
002d	平行ピン	PIN	ø8x16	1	
003	ハウジング	HOUSING		1	
003a	六角穴付ボルト	BOLT	M3x5	4	
004	プレート	PLATE		1	
004a	六角穴付ボルト	BOLT	M5x12	5	
005	フタ	COVER		1	
005a	六角穴付ボルト	BOLT	M3x10	5	
006	モータープレート	MOTOR PLATE		1	
006a	六角穴付ボルト	BOLT	M6x16	3	
006b	平座金	WASHER	M6	3	
006c	六角穴付止メネジ (平先)	SET SCREW	M4x20	2	
006d	六角ナット	NUT	M4	1	
007	スペーサー	SPACER		1	
008	平歯車	GEAR		1	
009	タイミングプーリー	TIMING PULLEY	P30-3GT-12-6	1	UNITTA
010	スペーサー	SPACER		1	
011	軸	SHAFT		2	
012	平歯車	GEAR		1	
013	平歯車	GEAR		1	
014	スペーサー	SPACER		2	
015	スペーサー	SPACER		2	
016	モータープーリー	MOTOR PULLEY	P30-3GT-12-6F	1	UNITTA
016a	六角穴付止メネジ (平先)	SET SCREW	M4x4	2	
017	キー	KEY		1	
018	キー	KEY		2	
019	座金	WASHER		4	
020	スペーサー	SPACER		1	
021	ストッパー	STOPPER		1	
021a	六角穴付ボルト	BOLT	M3x5	2	
022	フレキブラケット	FLEXIBLE BRACKET		1	
022a	六角穴付ボルト	BOLT	M6x12	2	
022b	平座金	WASHER	M6	2	
023	カバー	COVER		1	
023a	六角穴付ボルト	BOLT	M3x5	4	
024	片口スパナ	SINGLE SPANNER		1	
025	スパナ	SPANNER		1	
026	キャップ	CAP		6	
028	モーターカバー	MOTOR COVER		1	
028a	六角穴付ボルト	BOLT	M3x6	5	
028b	平座金	WASHER	M3	5	

C1216 U122B	正面/背面回転工具駆動装置 FRONT/BACK TURN TOOL DRIVE DEVICE	000



C1216 U122B	正面/背面回転工具駆動装置 FRONT/BACK TURN TOOL DRIVE DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
029	保護カバー (1)	COVER (1)		1	
029a	六角穴付ボルト	BOLT	M3x6	4	
030	保護カバー (2)	COVER (2)		1	
030a	六角穴付ボルト	BOLT	M3x6	4	
031	保護カバー (3)	COVER (3)		1	
031a	六角穴付ボルト	BOLT	M3x6	4	
032	保護カバー (4)	COVER (4)		1	
032a	六角穴付ボルト	BOLT	M3x6	2	
033	保護カバー (5)	COVER (5)		1	
033a	六角穴付ボルト	BOLT	M3x6	4	
K001	深溝玉軸受	BALL BEARING	6201ZZ	1	NACHI
K002	深溝玉軸受	BALL BEARING	6900LLU	5	NTN
K003	波ワッシャー	WAVE WASHER	BWW-6201	1	OCHAI
K004	波ワッシャー	WAVE WASHER	BWW-608	2	OCHAI
K005	タイミングベルト	TIMING BELT	258-3GT-12	1	UNITTA
K006	ボールスクリュー	BALL SCREW	BSF8x12	4	IMAO
K007	ボールスクリュー	BALL SCREW	BSF8x30	2	IMAO
K008	O リング	O-RING	P26	6	JAPAN OIL SEAL
K009	警告ラベル	WARNING LABEL	JW11	1	TOIN
K1009	警告ラベル	WARNING LABEL	EW11	1	TOIN

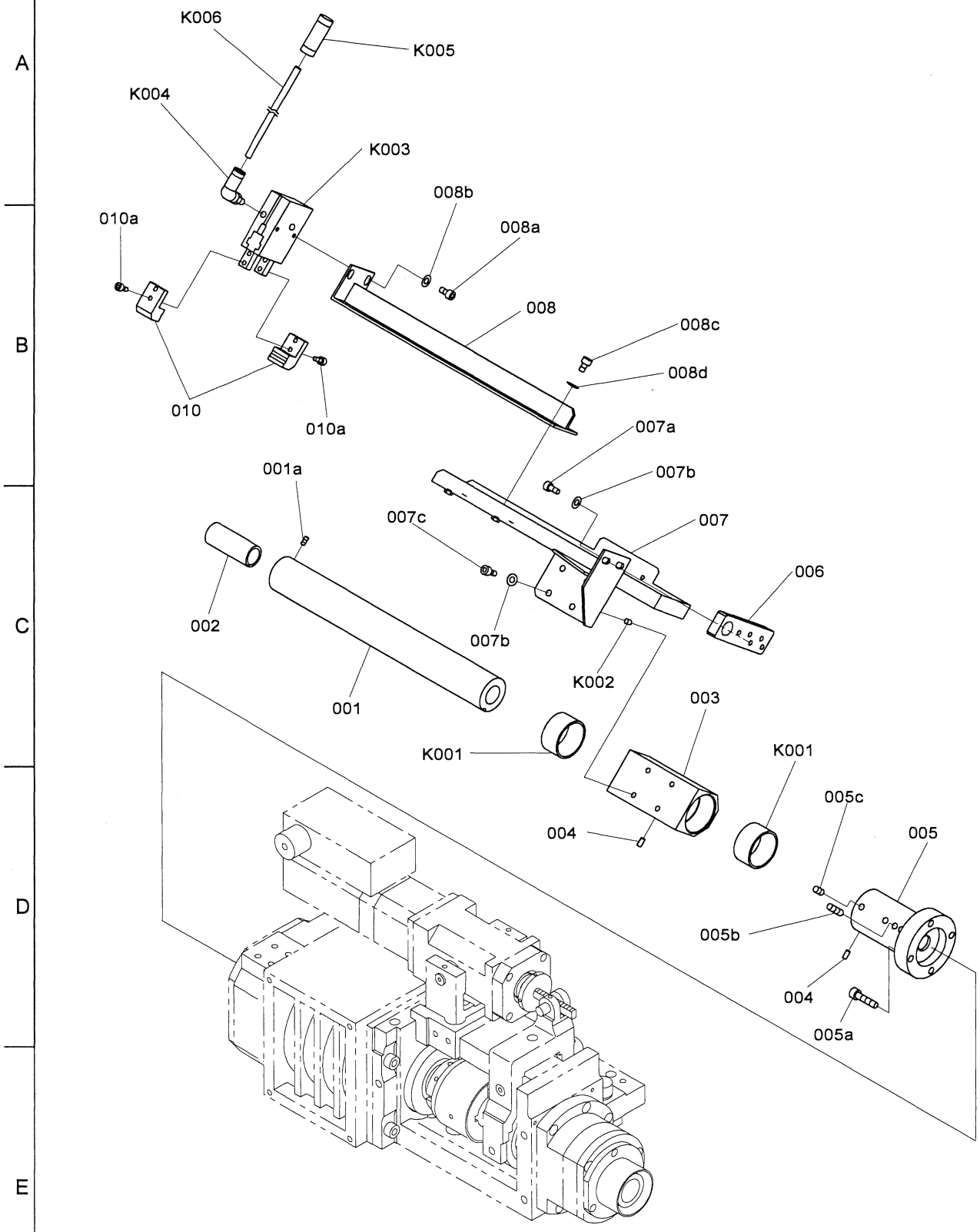
C1216 U122B	正面/背面回転工具駆動装置 FRONT/BACK TURN TOOL DRIVE DEVICE	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	UNIT7	サーボドライブユニット	SERVO DRIVE UNIT	MDS-B-SVJ2-04	1	MITSUBISHI ELECTRIC
KCT001a		ナベ小セムス B (小)	SCREW	M5x12	2	
KCT002	M4	サーボモータ	SERVO MOTOR	HC-MF43K-D5	1	MITSUBISHI ELECTRIC
KCT002a		六角穴付ボルト	BOLT	M5x16	4	

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
WT004		バスケーブル	BUS CABLE		1	
KWT001	U5CN1B U7CN1A	プラグ	PLUG	10120-6000EL	2	SUMITIMO 3M
KWT002		シェル	SHELL	10320-3210-000	2	SUMITIMO 3M

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
WT101		工具主軸モータ動力ケーブル	TOOL SPINDLE MOTOR POWER CABLE		1	
WT102		工具主軸モータ信号ケーブル	TOOL SPINDLE MOTOR SIGNAL CABLE		1	
WT103		ケーブル固定板	CABLE FIXING PLATE		1	
KWT101	M4CNM	コネクタ	CONNECTOR	RM15WTJA-4S	1	HIROSE ELECTRIC
KWT102		コードクランプ	CORD CLAMP	RM15WTP-CP(10)	1	HIROSE ELECTRIC
KWT103	M4CNPG	コネクタ	CONNECTOR	RM15WTJA-10S(8)(05)	1	HIROSE ELECTRIC
KWT104	U7CN2	プラグ	PLUG	10120-3000VE	1	SUMITIMO 3M
KWT105		シェル	SHELL	10620-5600-008	1	SUMITIMO 3M
KWT106		ラッチ	LATCH	10600-L0F0-8	2	SUMITIMO 3M
KWT107		サンフレキ	FLEXIBLE TUBE	NS#25 (L= 1.15m)	1	SANKEI
KWT108		回転コネクタ	CONNECTOR	N90°RBG-25	1	SANKEI
KWT109		コネクタ	CONNECTOR	N90°BG-25	1	SANKEI
KWT110		NBR ゴム	NBR RUBBER	t1.0	1	TIGERS POLYMER

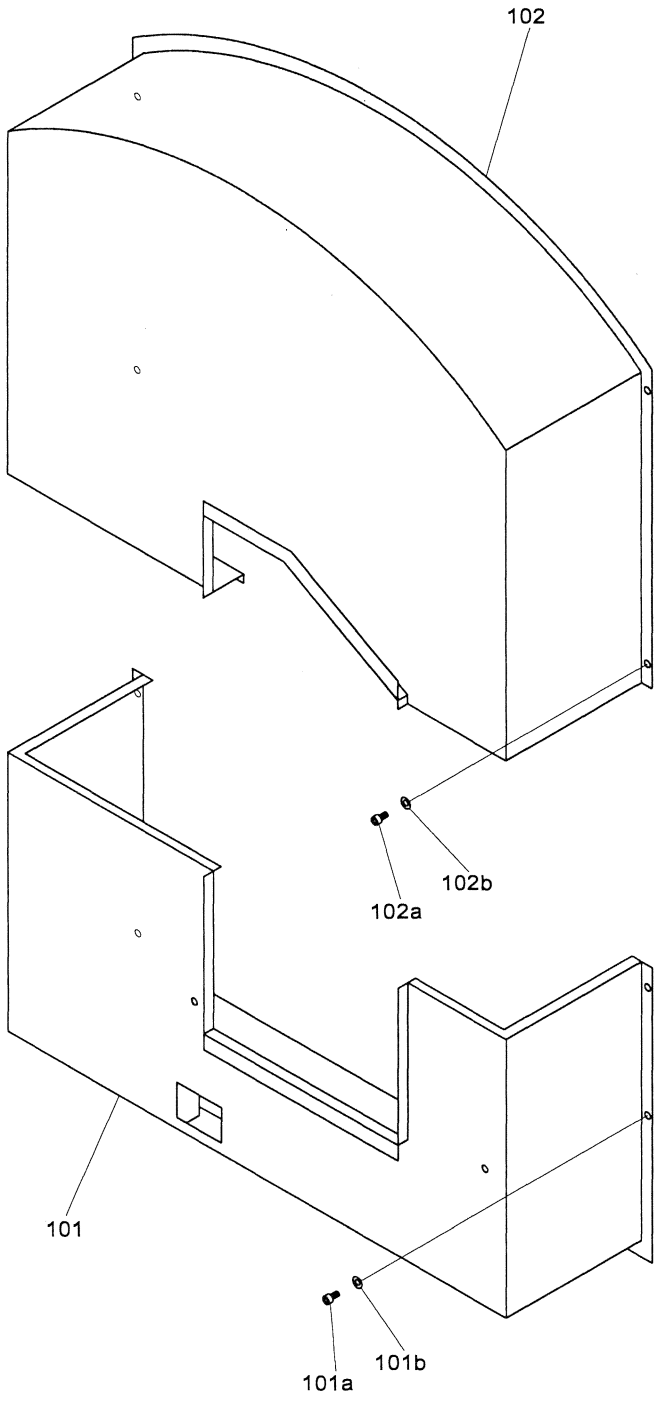
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C1216 U410B	長物装置本体 MACHINING LONG DEVICE	000

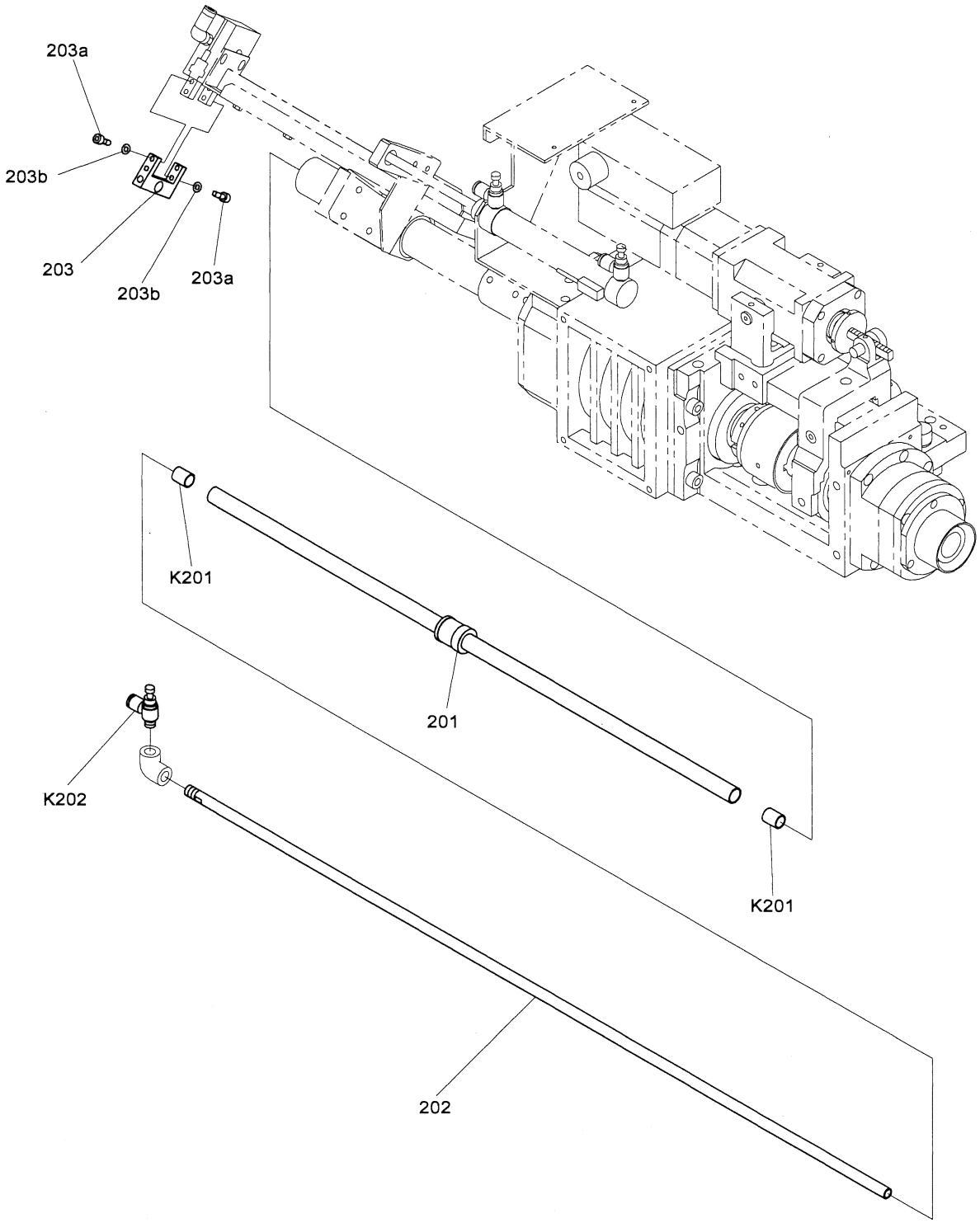
PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドパイプ	GUIDE PIPE		1	
001a	六角穴付止メネジ (平先)	SET SCREW	M4x4	1	
002	スリーブ	SLEEVE		1	
003	スライドブロック	SLIDE BLOCK		1	
004	キーピン	KEY PIN		2	
005	フランジ	FLANGE		1	
005a	六角穴付ボルト	BOLT	M6x25	4	
005b	六角穴付止メネジ (平先)	SET SCREW	M6x10	2	
005c	六角穴付止メネジ (平先)	SET SCREW	M6x6	2	
006	連結板	CONNECTING PLATE		1	
007	スライドブラケット	SLIDE BRACKET		1	
007a	六角穴付ボルト	BOLT	M5x10	4	
007b	平座金	WASHER	M5	4	
007c	六角穴付ボルト	BOLT	M5x8	4	
008	シリンダーブラケット	CYLINDER BRACKET		1	
008a	六角穴付ボルト	BOLT	M5x8	2	
008b	平座金	WASHER	M5	2	
008c	六角穴付ボルト	BOLT	M5x10	4	
008d	平座金	WASHER	M5	4	
010	チャック爪 (ø4~ø6)	PAWL (ø4~ø6)		2	
010a	六角穴付ボルト	BOLT	M4x10	4	
K001	MLC ベアリング	MLC BEARING	R-MLC3520	2	NTN
K002	ヘリサート	HELISERT	M5-0.8x1.5DNS	4	
K003	フェザーハンド	HAND	FH120-0-T2H-R	1	CKD
K004	クイック継手	QUICK FITTING	TL6-M5	1	KOGANEI
K005	違径ユニオン	UNION	USD8-6	1	KOGANEI
K006	ウレタンチューブ	TUBE	U6-B	1	KOGANEI

C1216 U410B	長物装置本体 MACHINING LONG DEVICE	000



C1216 U410B	長物装置本体 MACHINING LONG DEVICE	100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
101	左側面カバー (下)	LEFT SIDE COVER (LOWER)		1	
101a	六角穴付ボルト	BOLT	M4x8	4	
101b	平座金	WASHER	M4	4	
102	左側面カバー (上)	LEFT SIDE COVER (UPPER)		1	
102a	六角穴付ボルト	BOLT	M4x8	4	
102b	平座金	WASHER	M4	4	



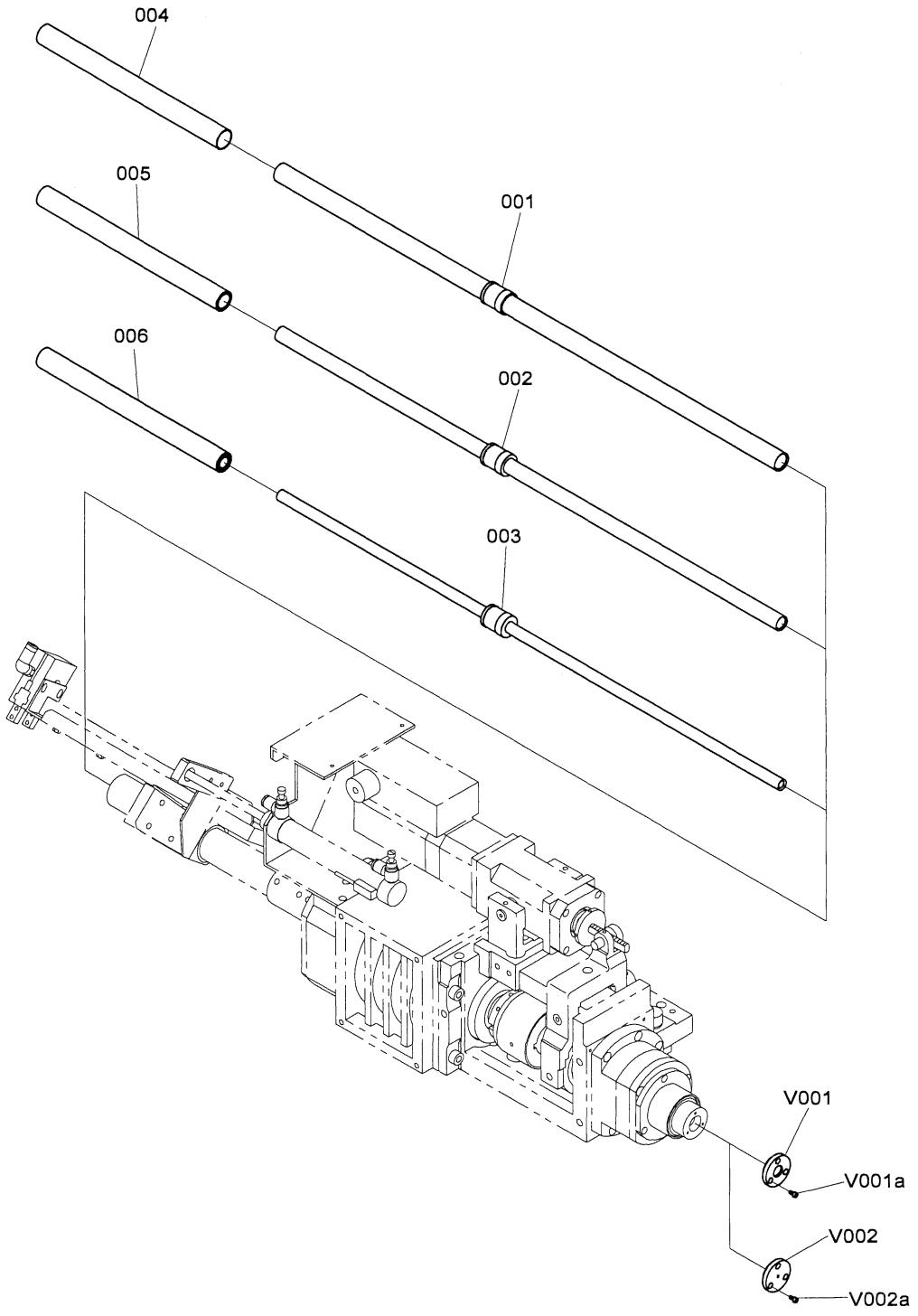
C1216 U410B	長物装置本体 MACHINING LONG DEVICE	200

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
201	ガイドスリーブ	GUIDE SLEEVE		1	
202	ノックアウトパイプ	KNOCK-OUT PIPE		1	
203	パイプブラケット	PIPE BRACKET		1	
203a	六角穴付ボルト	BOLT	M4x10	4	
203b	六角穴付止メネジ (平先)	SET SCREW	M6x16	1	
K201	含油軸受	BEARING	B-S10-17	2	NTN
K202	スピードコントローラー	SPEED CONTROL	SC6-01B	1	KOGANEI

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101		サンフレキ	FLEXIBLE TUBE	NS#12	1.8m	SANKEI
WT101		ハンドセンサケーブル	HAND SENSOR CABLE		1	

C1216 U410B	長物装置本体 MACHINING LONG DEVICE	WT100

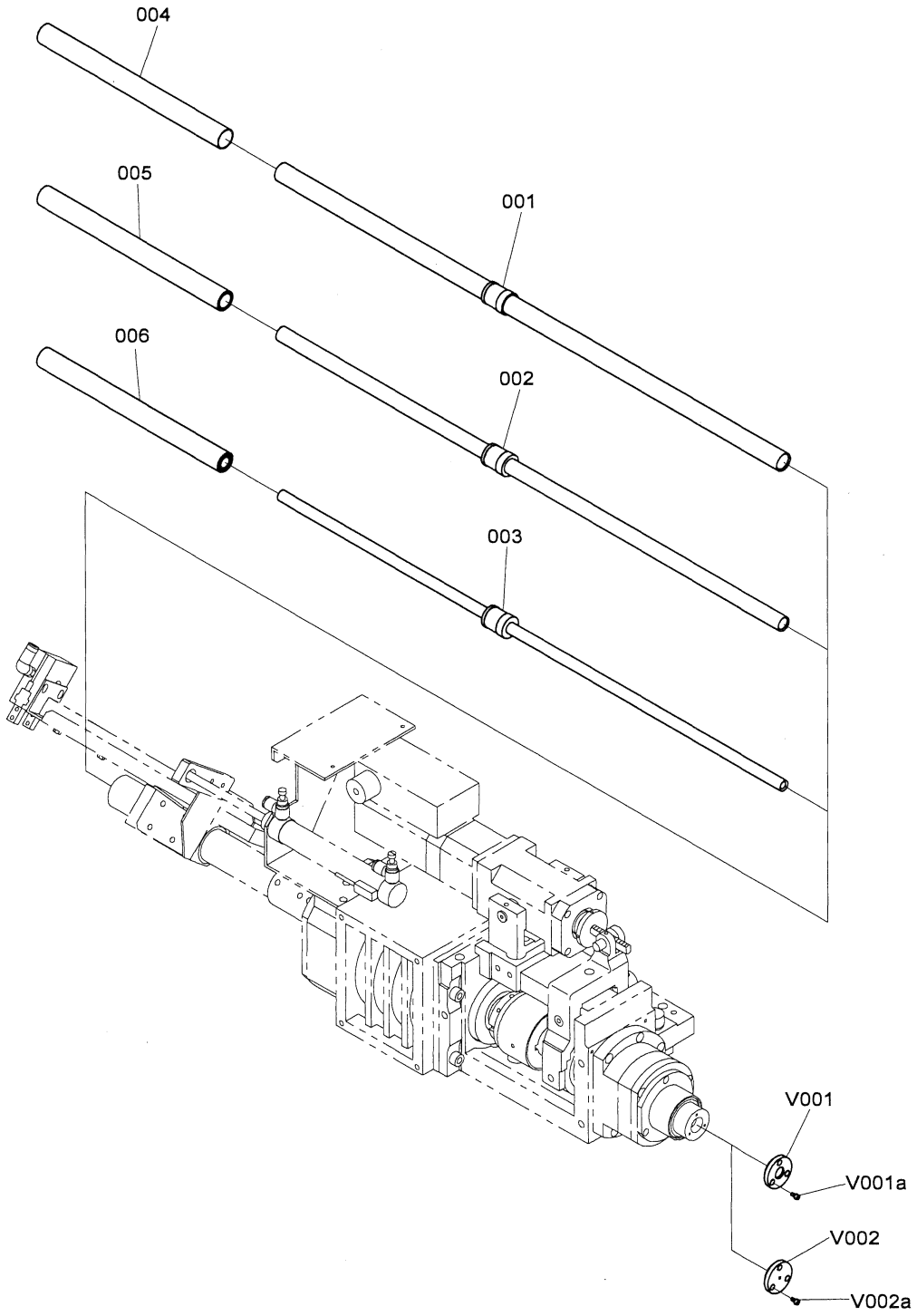
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C12 U4101B	長物装置用パイプ PIPE FOR MACHINING LONG DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ワークストックパイプ (ø13)	WORK STOCK PIPE (ø13)		1	
002	ワークストックパイプ (ø8)	WORK STOCK PIPE (ø8)		1	
003	サポートパイプ (ø16)	SUPPORT PIPE (ø16)		1	
004	サポートパイプ (ø11.9)	SUPPORT PIPE (ø11.9)		1	
V001	ブッシュ (ø12 用)	BUSH (ø12)		1	
V001a	六角穴付ボルト	BOLT	M3x5	3	
V002	ブッシュ	BUSH		1	
V002a	六角穴付ボルト	BOLT	M3x5	3	

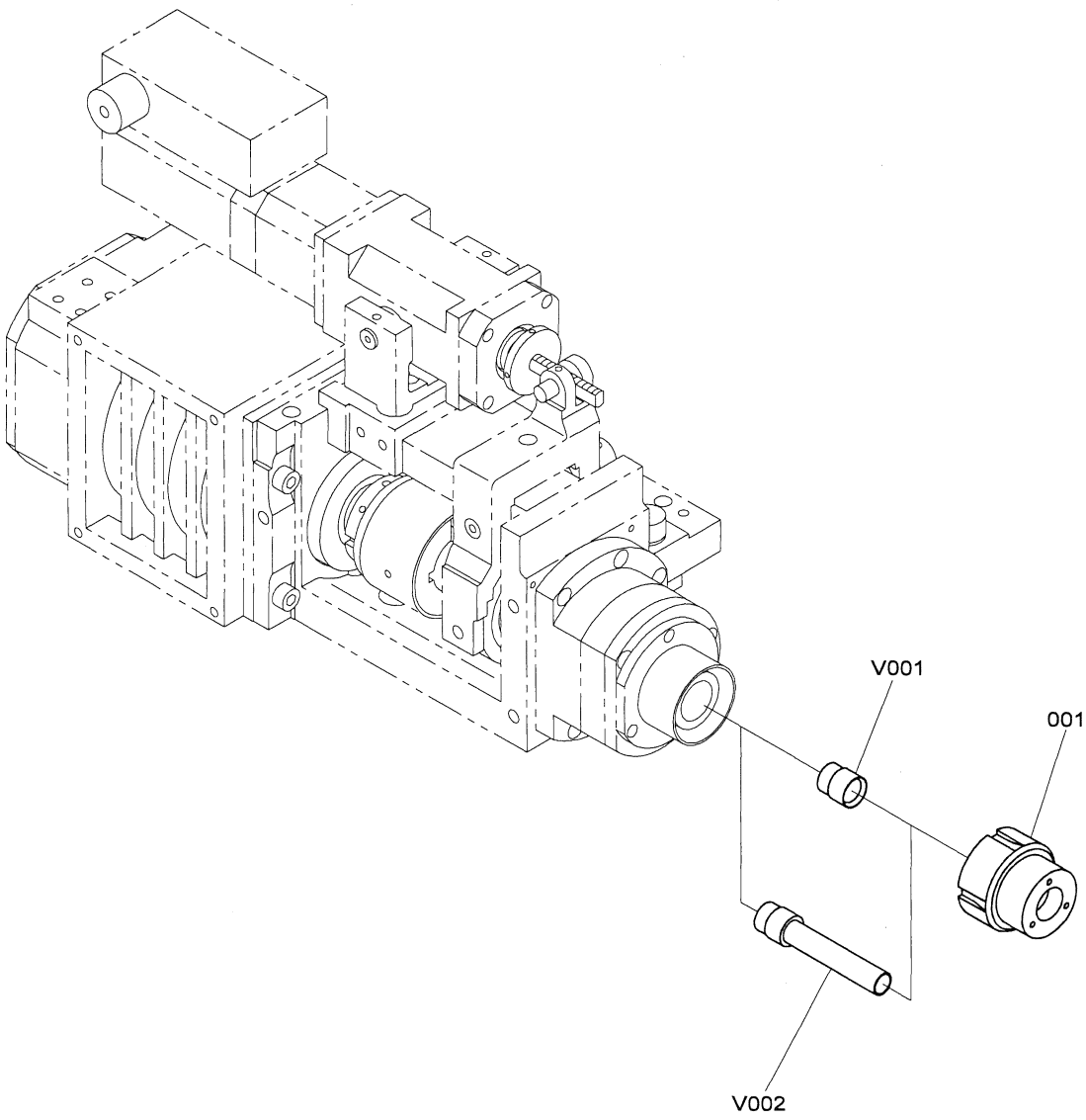
C12 U4101B	長物装置用パイプ PIPE FOR MACHINING LONG DEVICE	000



C16 U4101B	長物装置用パイプ PIPE FOR MACHINING LONG DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ワークストックパイプ (ø17)	WORK STOCK PIPE (ø17)		1	
002	ワークストックパイプ (ø13)	WORK STOCK PIPE (ø13)		1	
003	ワークストックパイプ (ø8)	WORK STOCK PIPE (ø8)		1	
004	サポートパイプ (ø20)	SUPPORT PIPE (ø20)		1	
005	サポートパイプ (ø16)	SUPPORT PIPE (ø16)		1	
006	サポートパイプ (ø11.9)	SUPPORT PIPE (ø11.9)		1	
V001	ブッシュ (ø16 用)	BUSH (ø16)		1	
V001a	六角穴付ボルト	BOLT	M3x5	3	
V002	ブッシュ	BUSH		1	
V002a	六角穴付ボルト	BOLT	M3x5	3	

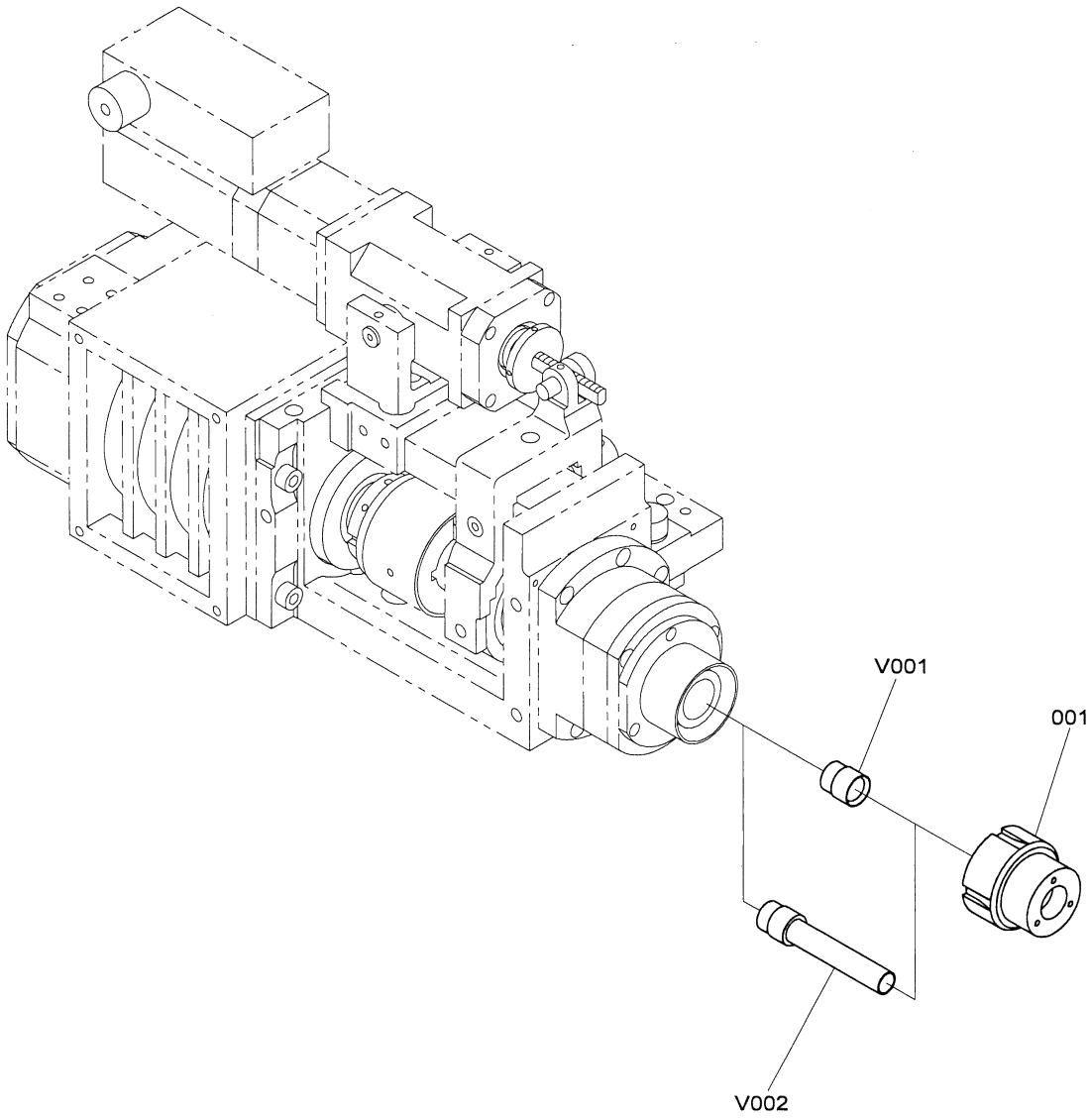
C16 U4101B	長物装置用パイプ PIPE FOR MACHINING LONG DEVICE	000



C12 U4102B	長物装置用キャップナット CAP NUT FOR MACHINING LONG DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	キャップナット	CAP NUT		1	
V001	カラー (ø12 用)	COLLAR (ø12)		1	
V002	カラー	COLLAR		2	

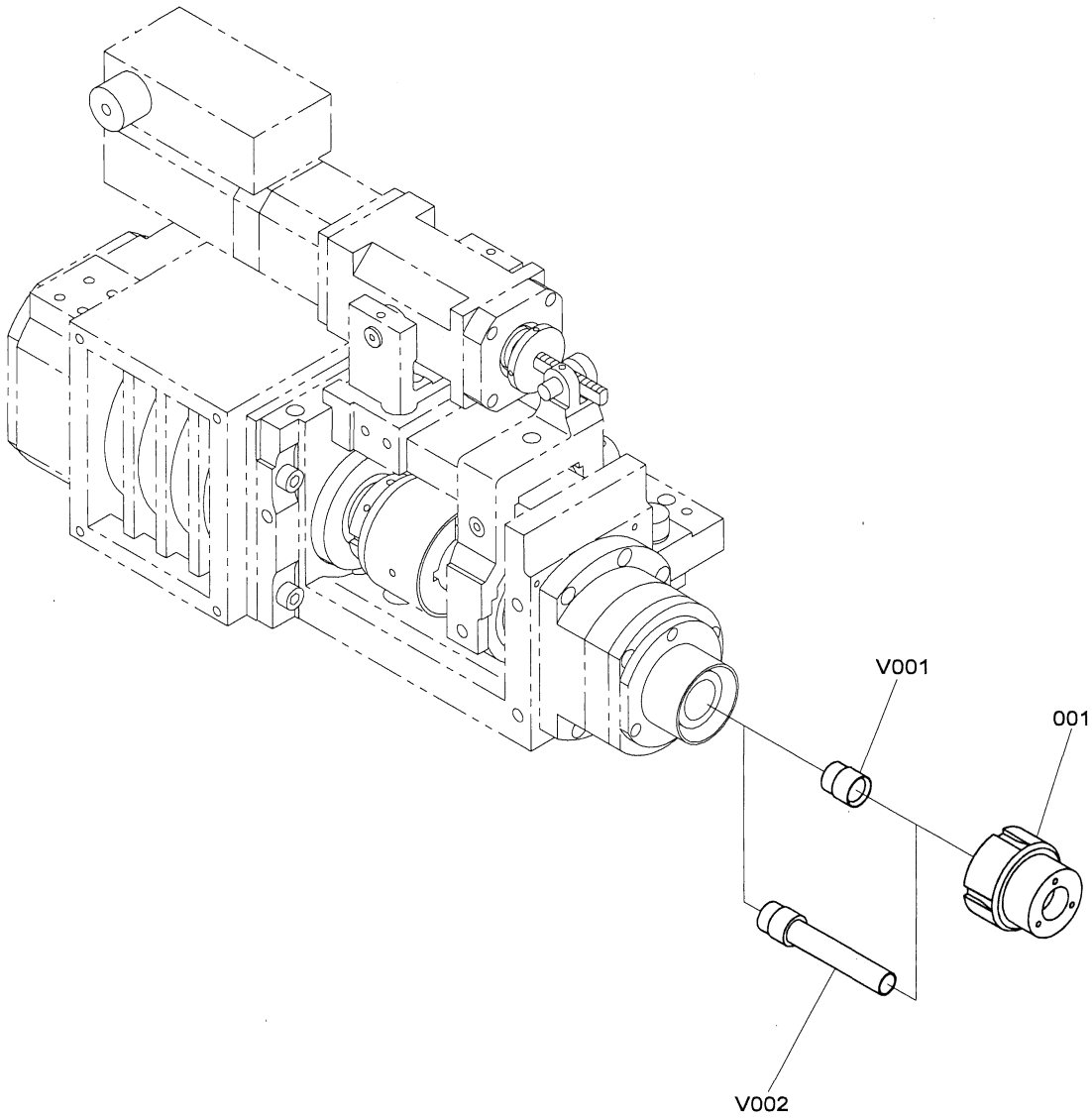
C12 U4102B	長物装置用キャップナット CAP NUT FOR MACHINING LONG DEVICE	000



C12 U4103B	長物装置用キャップナット(輸出用) CAP NUT FOR MACHINING LONG DEVICE (FOR EXPORT)	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	キャップナット	CAP NUT		1	
V001	カラー (ø12 用)	COLLAR (ø12)		1	
V002	カラー	COLLAR		2	

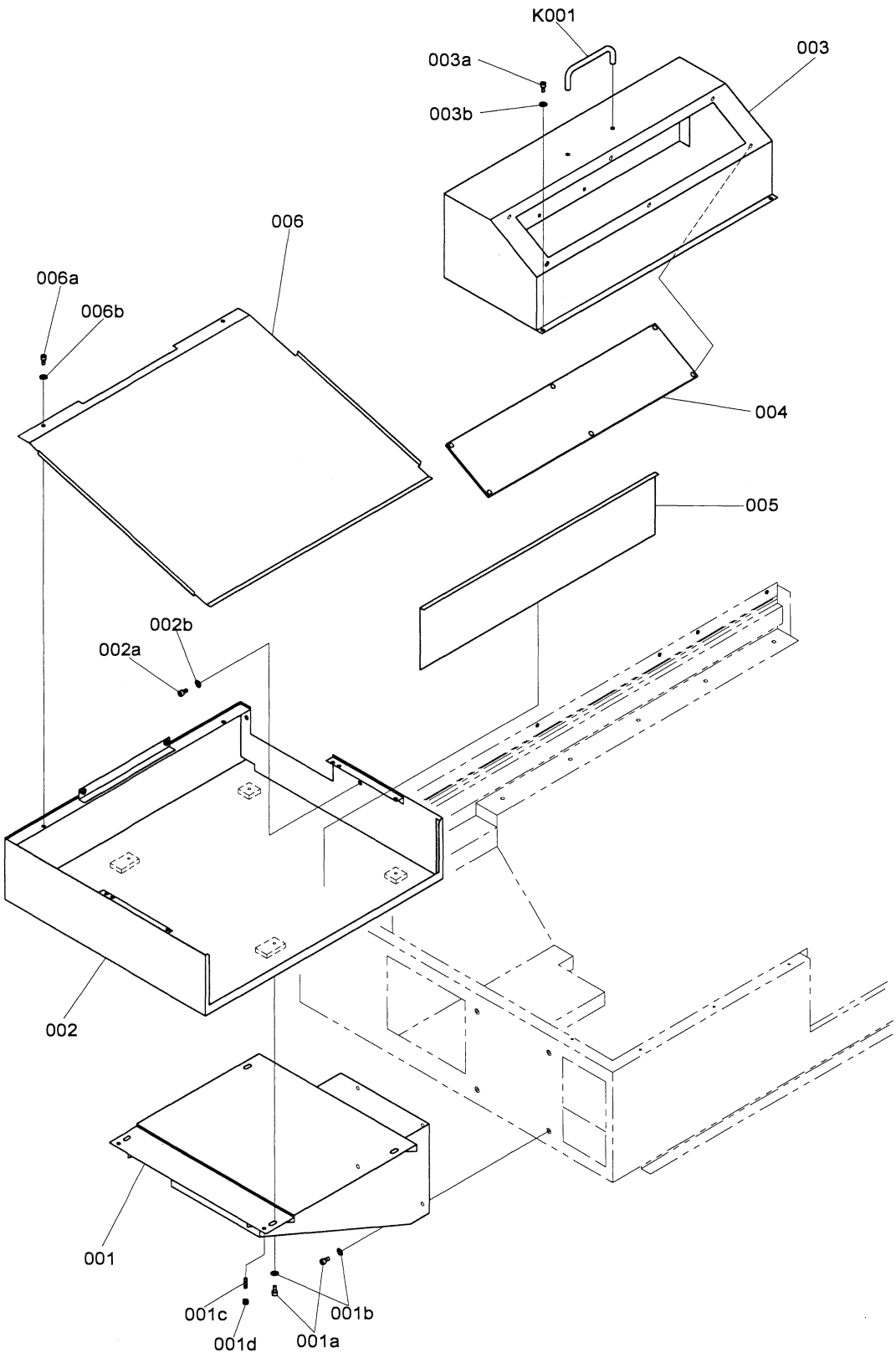
C12 U4103B	長物装置用キャップナット(輸出用) CAP NUT FOR MACHINING LONG DEVICE (FOR EXPORT)	000



C16 U4102B	長物装置用キャップナット CAP NUT FOR MACHINING LONG DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	キャップナット	CAP NUT		1	
V001	カラー (ø16 用)	COLLAR (ø16)		1	
V002	カラー	COLLAR		2	

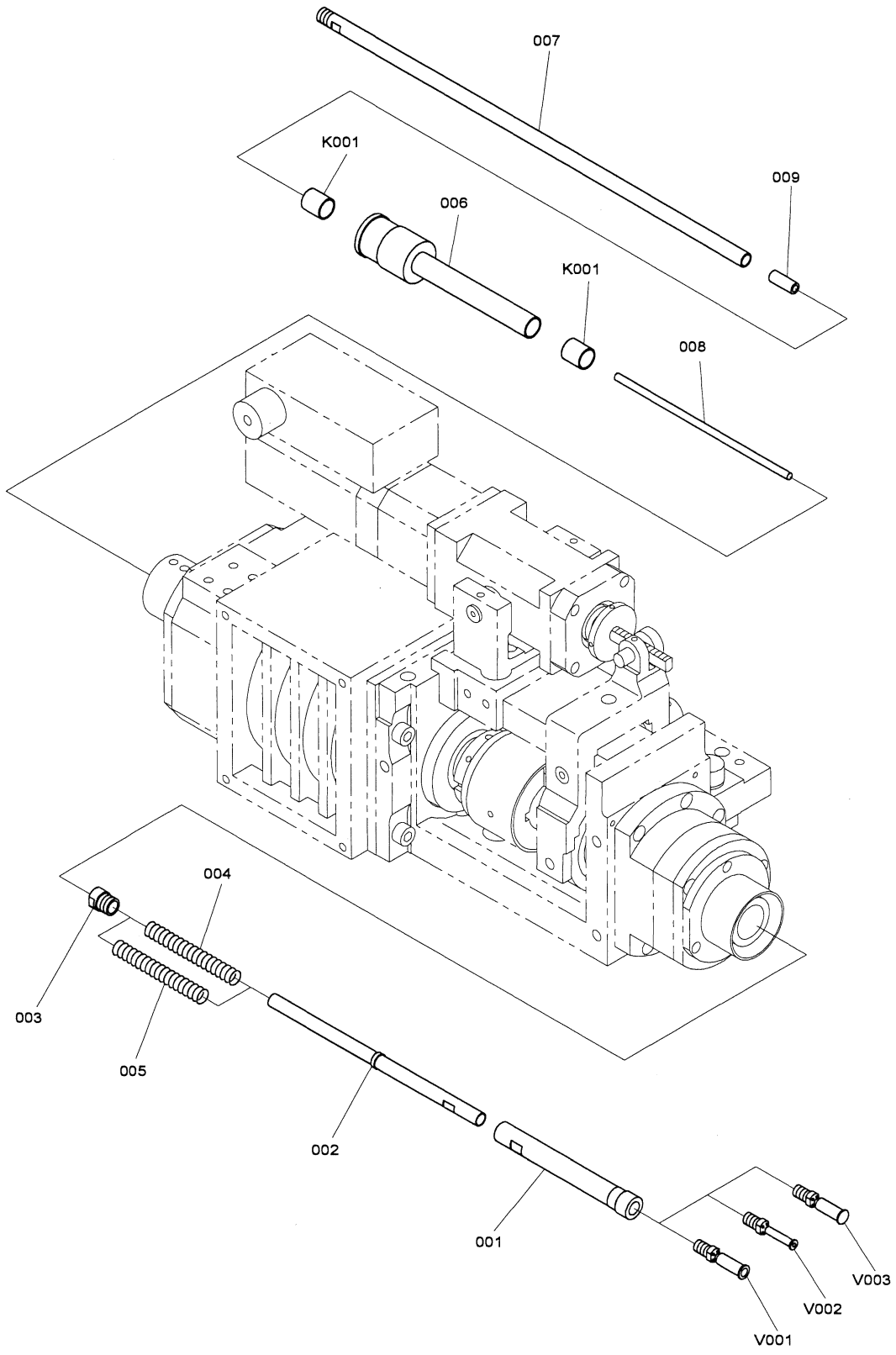
C16 U4102B	長物装置用キャップナット CAP NUT FOR MACHINING LONG DEVICE	000



C1216 U420B	長物装置用製品受け棚 RECEIVE SHELF FOR MACHINING LONG DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	架台	SPAN STAND		1	
001a	六角穴付ボルト	BOLT	M6x12	8	
001b	平座金	WASHER	M6	8	
001c	六角穴付止メネジ	SET SCREW	M6x20	2	
001d	六角ナット	NUT	M6	2	
002	製品受け台	WORK RECEIVER STAND		1	
002a	六角穴付ボルト	BOLT	M6x12	2	
002b	平座金	WASHER	M6	2	
003	チャックカバー	CHUCK COVER		1	
003a	六角穴付ボルト	BOLT	M6x12	6	
003b	平座金	WASHER	M6	6	
003c	六角ナット	NUT	M4	6	
004	マド	WINDOW		1	
005	フタ	COVER		1	
006	製品シュート	WORK CHUTE		1	
006a	六角穴付ボルト	BOLT	M6x12	2	
006b	平座金	WASHER	M6	2	
K001	ステンレス丸棒取手 (雌ネジ)	KNOB (FEMALE SCREW)	A-1042-C-4	1	TAKIGEN

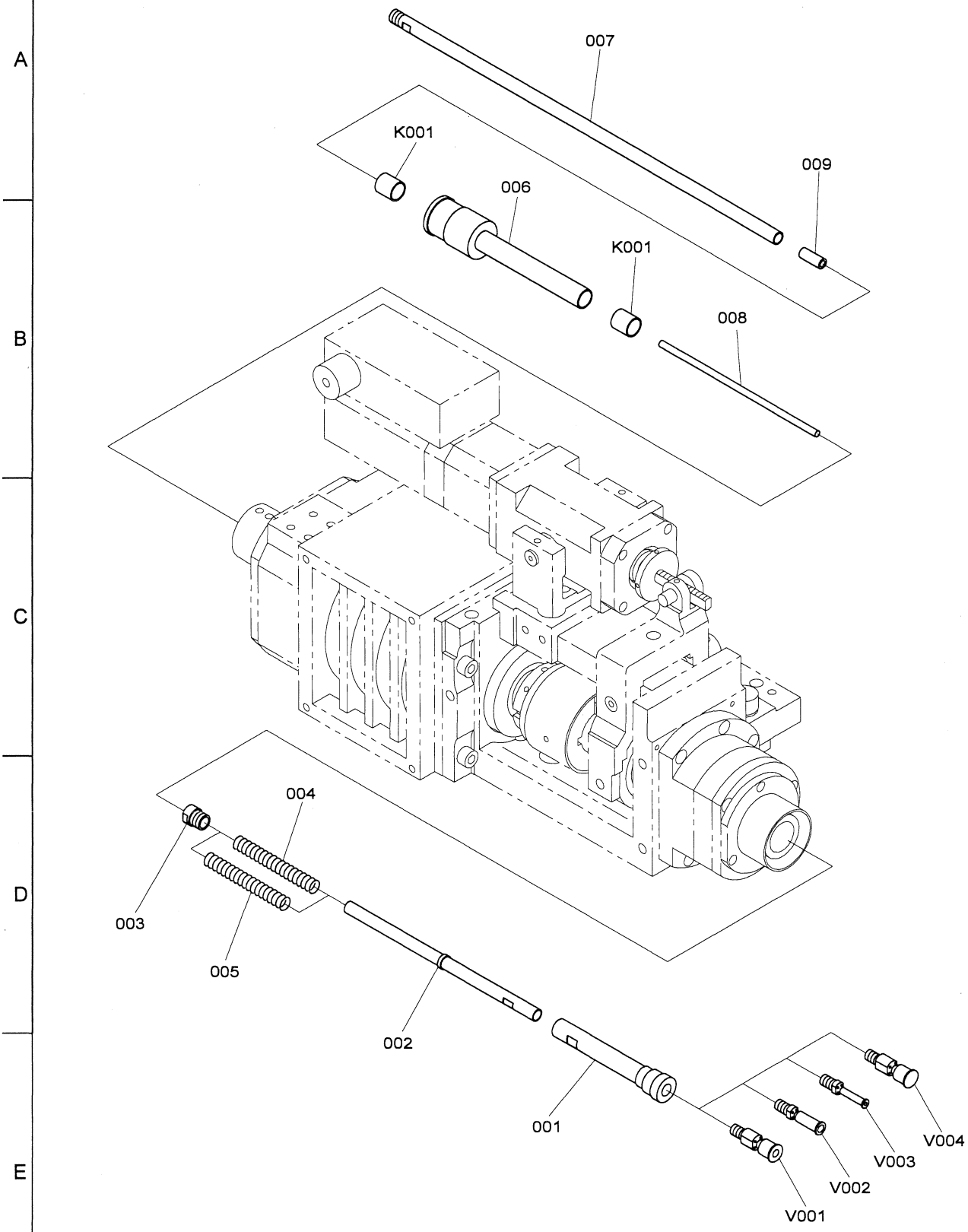
C1216 U420B	長物装置用製品受け棚 RECEIVE SHELF FOR MACHINING LONG DEVICE	000



C12 U550B	貫通穴ワーク用ノックアウト治具 KNOCK-OUT JIG	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	カートリッジ	CARTRIDGE		1	
002	シャフト	SHAFT		1	
003	キャップ	CAP		1	
004	圧縮コイルばね (ノックアウト用:弱)	SPRING (SOFT)		1	
005	圧縮コイルばね (ノックアウト用:強)	SPRING (HARD)		1	
006	ガイドスリーブ	GUIDE SLEEVE		1	
007	アシストバー	ASSIST BAR		1	
008	エアーパイプ	AIR PIPE		1	
009	スリーブ	SLEEVE		1	
K001	含油軸受	BEARING	S10x14x16	2	NTN
V001	ノックアウト治具 (ø12 用)	KNOCK-OUT JIG (ø12)		1	
V002	ノックアウト治具 (ø8 用)	KNOCK-OUT JIG (ø8)		1	
V003	ノックアウト治具 (ブランク)	KNOCK-OUT JIG (BLANK)		1	

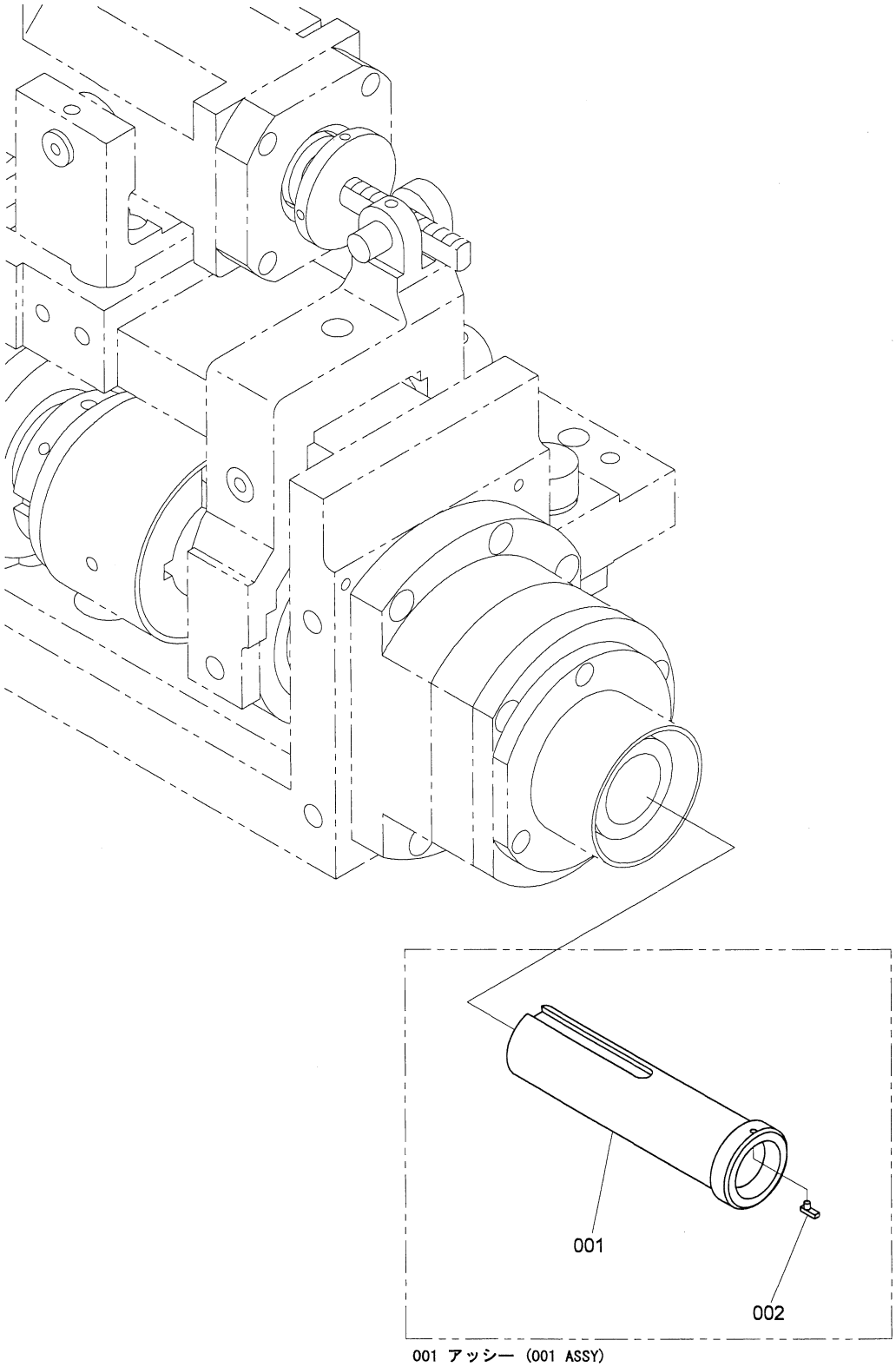
C12 U550B	貫通穴ワーク用ノックアウト治具 KNOCK-OUT JIG	000



C16 U550B	貫通穴ワーク用ノックアウト治具 KNOCK-OUT JIG	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	カートリッジ	CARTRIDGE		1	
002	シャフト	SHAFT		1	
003	キャップ	CAP		1	
004	圧縮コイルばね (ノックアウト用:弱)	SPRING (SOFT)		1	
005	圧縮コイルばね (ノックアウト用:強)	SPRING (HARD)		1	
006	ガイドスリーブ	GUIDE SLEEVE		1	
007	アシストバー	ASSIST BAR		1	
008	エアーパイプ	AIR PIPE		1	
009	スリーブ	SLEEVE		1	
K001	含油軸受	BEARING	S10x14x16	2	NTN
V001	ノックアウト治具 (ø16 用)	KNOCK-OUT JIG (ø16)		1	
V002	ノックアウト治具 (ø12 用)	KNOCK-OUT JIG (ø12)		1	
V003	ノックアウト治具 (ø8 用)	KNOCK-OUT JIG (ø8)		1	
V004	ノックアウト治具 (ブランク)	KNOCK-OUT JIG (BLANK)		1	

C16 U550B	貫通穴ワーク用ノックアウト治具 KNOCK-OUT JIG	000

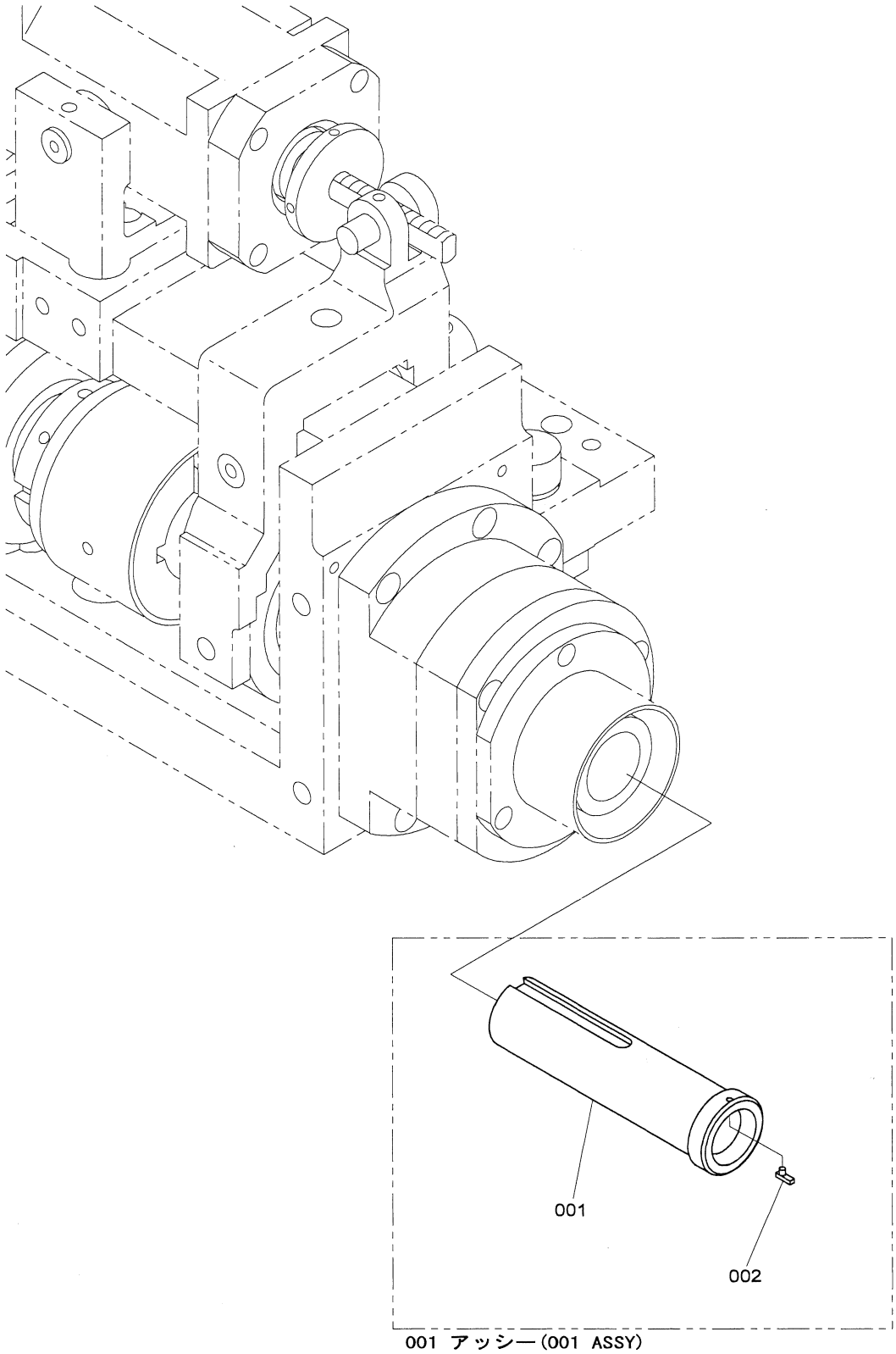


001 アッシー (001 ASSY)

M212 U610B	異形材用背面チャックスリーブ BACK CHUCK SLEEVE FOR SQUARE OR HEX/MATERIAL	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	ピン	PIN		1	

M212 U610B	異形材用背面チャックスリーブ BACK CHUCK SLEEVE FOR SQUARE OR HEX/MATERIAL	000

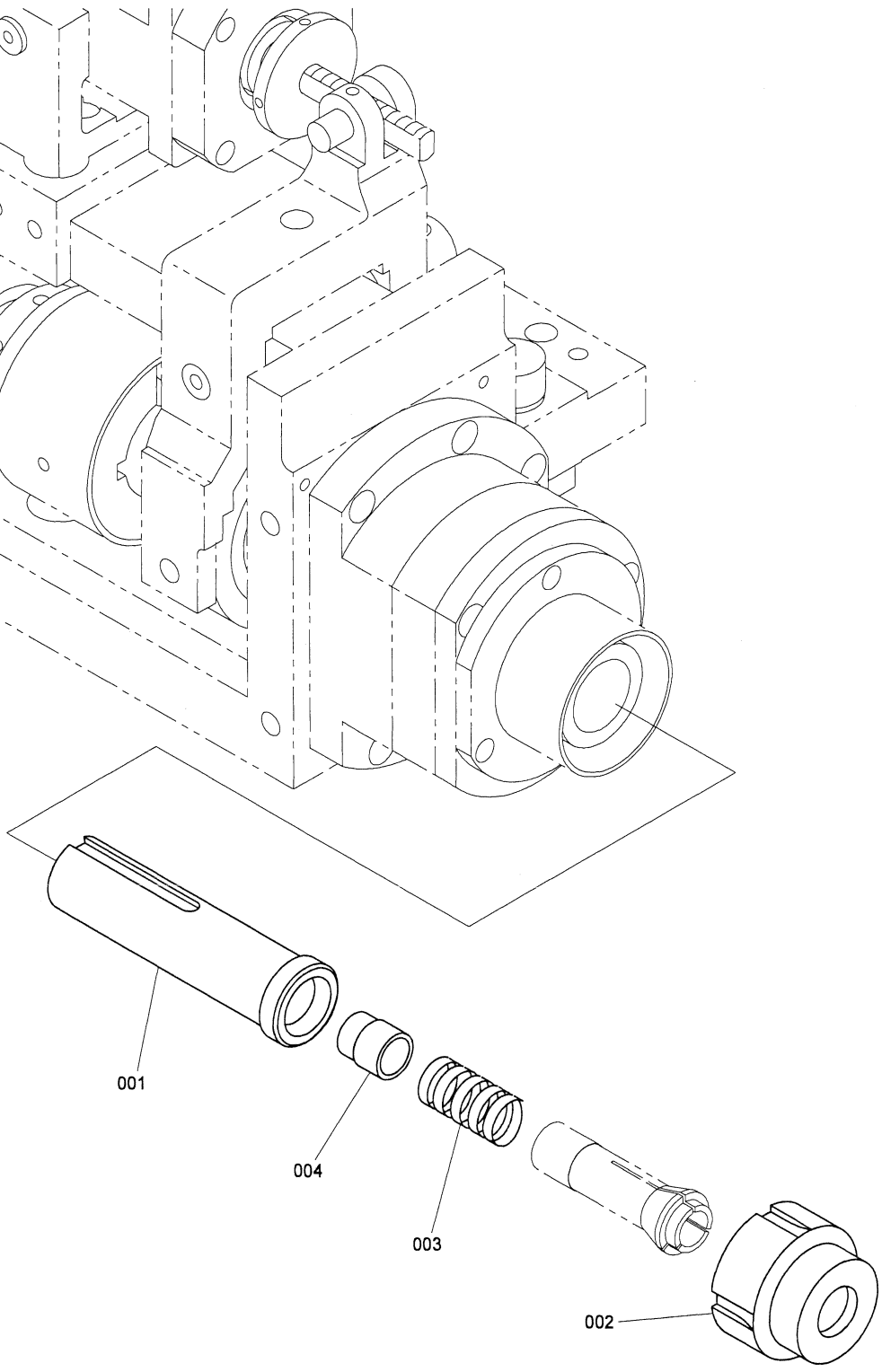


001 アッシー(001 ASSY)

M216 U6120B	異形材用背面チャックスリーブ BACK CHUCK SLEEVE FOR SQUARE OR HEX/MATERIAL	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	ピン	PIN		1	

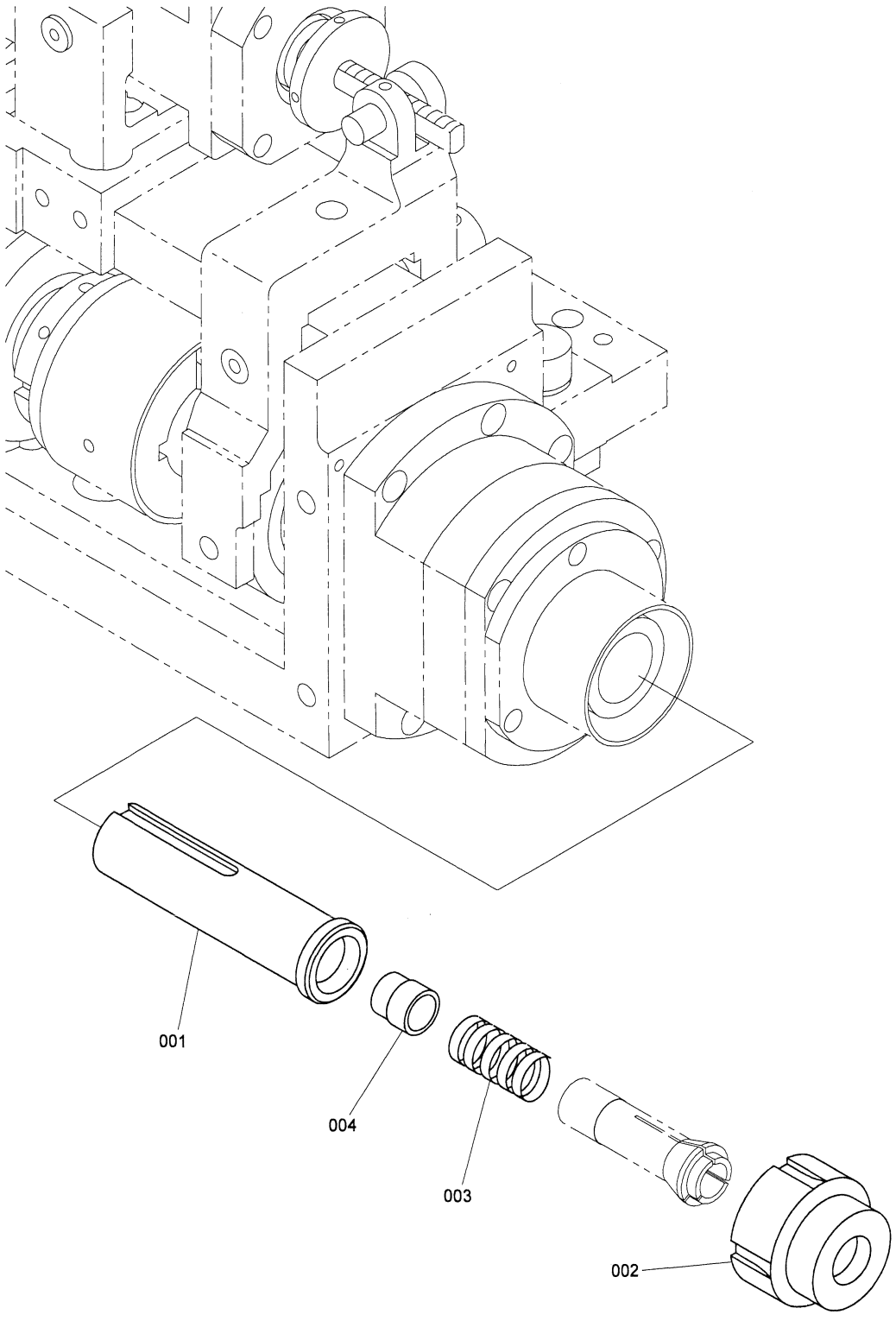
M216 U6120B	異形材用背面チャックスリーブ BACK CHUCK SLEEVE FOR SQUARE OR HEX/MATERIAL	000



M212 U910B	背面主軸チャック装置 BACK SPINDLE CHUCK DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	キャップナット	CAP NUT		1	
003	角バネ	SPRING		1	
004	カラー	COLLAR		1	

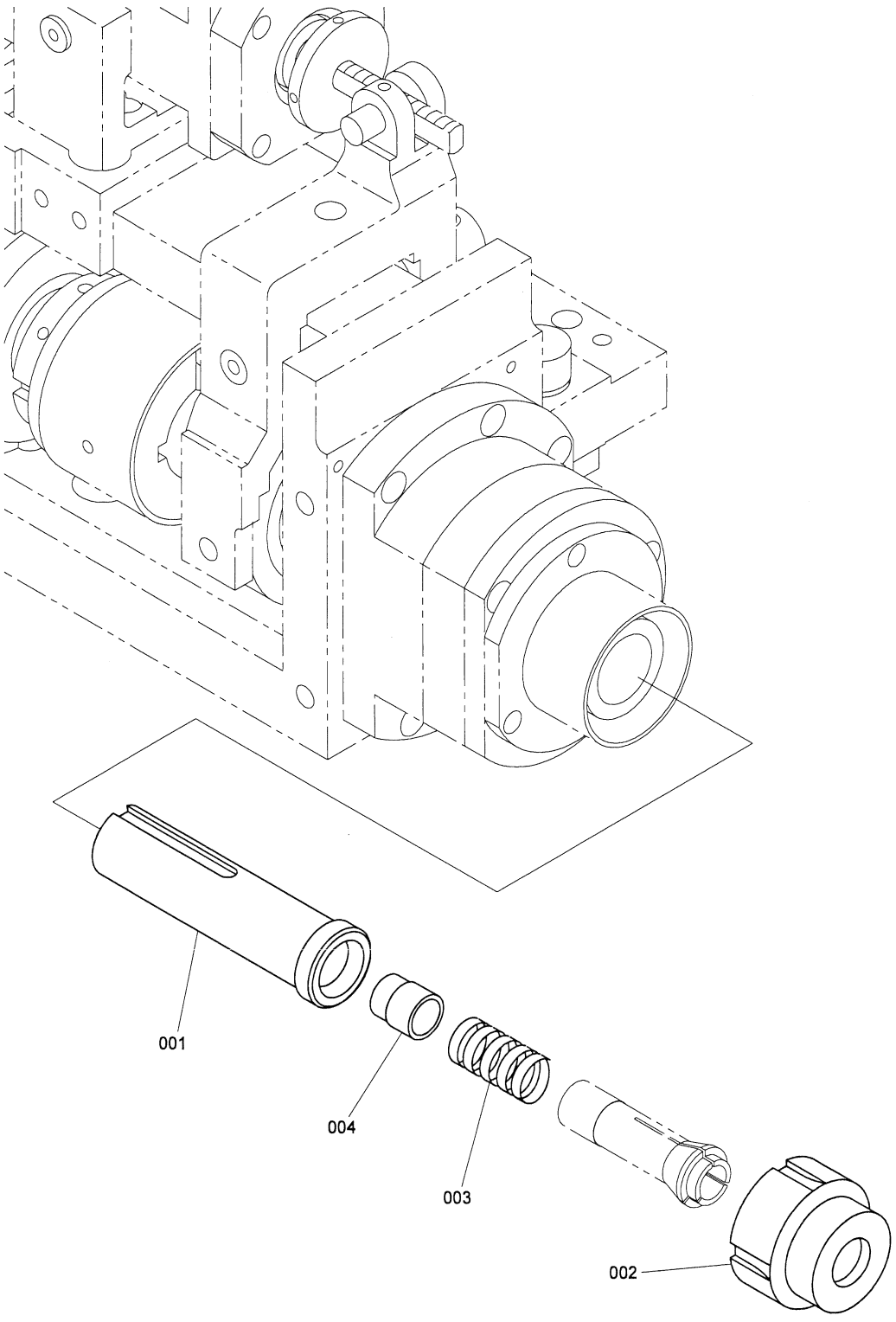
M212 U910B	背面主軸チャック装置 BACK SPINDLE CHUCK DEVICE	000



M212 U9110B	背面主軸チャック装置 BACK SPINDLE CHUCK DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	キャップナット	CAP NUT		1	
003	角バネ	SPRING		1	
004	カラー	COLLAR		1	

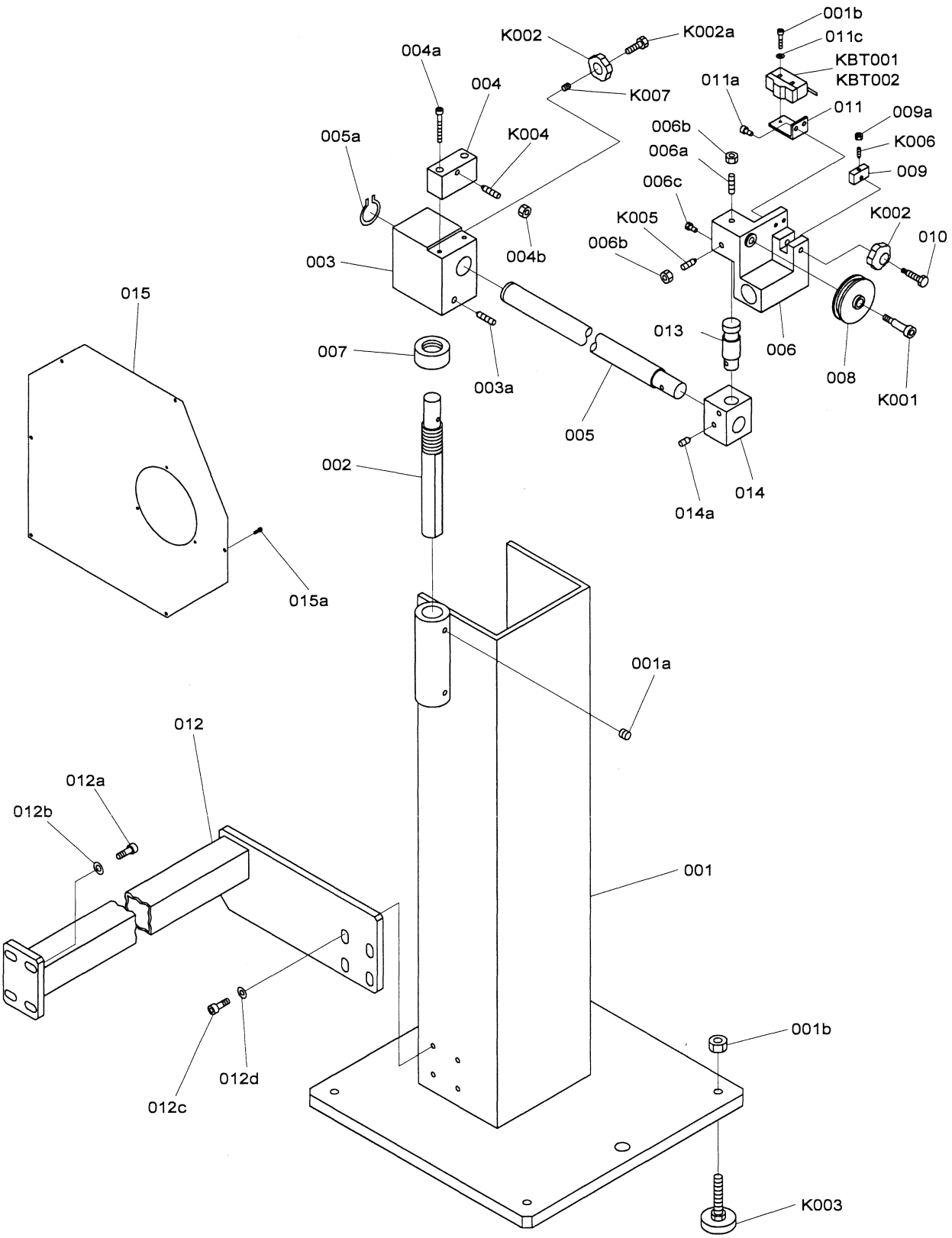
M212 U9110B	背面主軸チャック装置 BACK SPINDLE CHUCK DEVICE	000



M216 U9120B	背面主軸チャック装置 BACK SPINDLE CHUCK DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	キャップナット	CAP NUT		1	
003	角バネ	SPRING		1	
004	カラー	COLLAR		1	

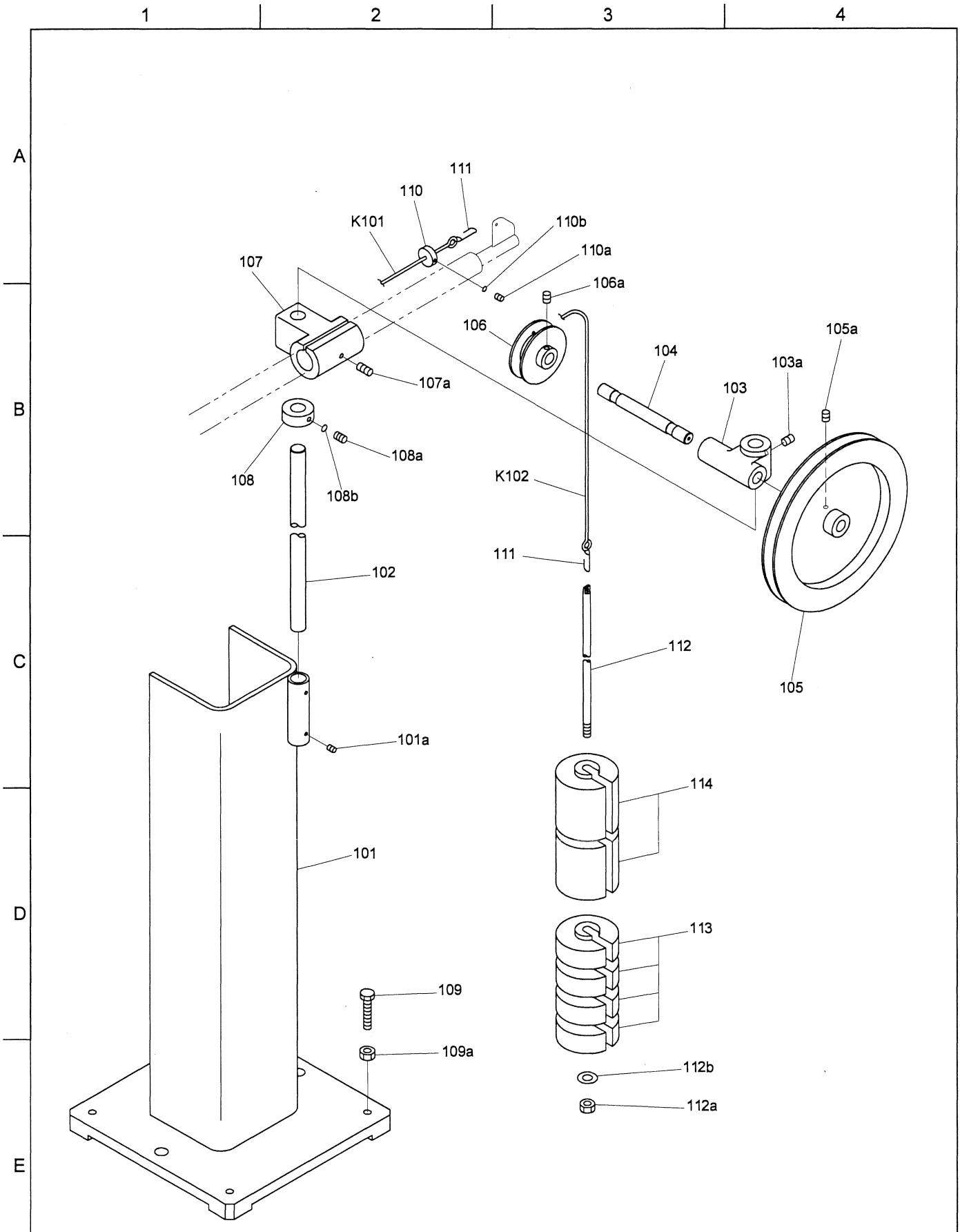
M216 U9120B	背面主軸チャック装置 BACK SPINDLE CHUCK DEVICE	000



C1216 U10J	単材用材料供給装置 MATERIAL SUPPLY DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	送り台取付台	FEEDER MOUNTING STAND		1	
001a	六角穴付止メネジ (平先)	SET SCREW	M8x12	2	
001b	六角ナット	NUT	M12	4	
002	支柱	SUPPORTING COLUMN		1	
003	材料送り台	MATERIAL FEEDER		1	
003a	六角穴付止メネジ (トガリ先)	SET SCREW	M8x30	2	
004	位置決めブロック	POSITIONING BLOCK		1	
004a	六角穴付ボルト	BOLT	M6x50	2	
004b	六角ナット	NUT	M8	1	
005	ロッド	ROD		1	
005a	軸用Cトメワ	RETAINING RING (C TYPE)	30	1	
006	チューブブラケット	TUBE BRACKET		1	
006a	六角穴付止メネジ (平先)	SET SCREW	M8x30	1	
006b	六角ナット	NUT	M8	2	
006c	六角穴付ボルト	BOLT	M6x10	1	
007	調整ナット	ADJUSTING NUT		1	
008	プーリー	PULLEY		1	
009	クランプゴマ	CLAMP BLOCK		1	
009a	六角ナット	NUT	M5	1	
010	クランプネジ	CLAMP SCREW		1	
011	LS 取付板	LS MOUNTING PLATE		1	
011a	六角穴付ボルト	BOLT	M6x12	2	
011b	六角穴付ボルト	BOLT	M4x25	2	
011c	平座金	WASHER	M4	2	
012	本体固定アーム	FIXED ARM		1	
012a	六角穴付ボルト	BOLT	M10x25	4	
012b	平座金	WASHER	M10	4	
012c	六角穴付ボルト	BOLT	M8x25	4	
012d	平座金	WASHER	M8	4	
013	ロッド	ROD		1	
014	パイプサポート	PIPE SUPPORT		1	
014a	六角穴付止メネジ (トガリ先)	SET SCREW	M8x12	4	
015	右側面カバー	RIGHT SIDE COVER		1	
015a	六角穴付ボルト	BOLT	M4x10	6	
K001	ストッパーボルト	STOPPER BOLT	TYPE ST	1	GOSHO S/S
K002	マテックススーパーノブ	KNOB	SK-38 YELLOW	2	NABEYA
K002a	六角穴付ボルト	BOLT	M8x20	1	
K003	アジャスターフット	ADJUSTER FOOT	TM-73-I-Z-4	4	TOCHIGIYA
K004	六角穴付止ネジ棒先	SET SCREW	M8x28	1	GOSHO S/S
K005	六角穴付止ネジ棒先	SET SCREW	M8x20	1	GOSHO S/S
K006	六角穴付止ネジ棒先	SET SCREW	M5x16	1	GOSHO S/S
K007	ヘリサート	HELISERT	M8x10	1	

C1216 U10J	単材用材料供給装置 MATERIAL SUPPLY DEVICE	000



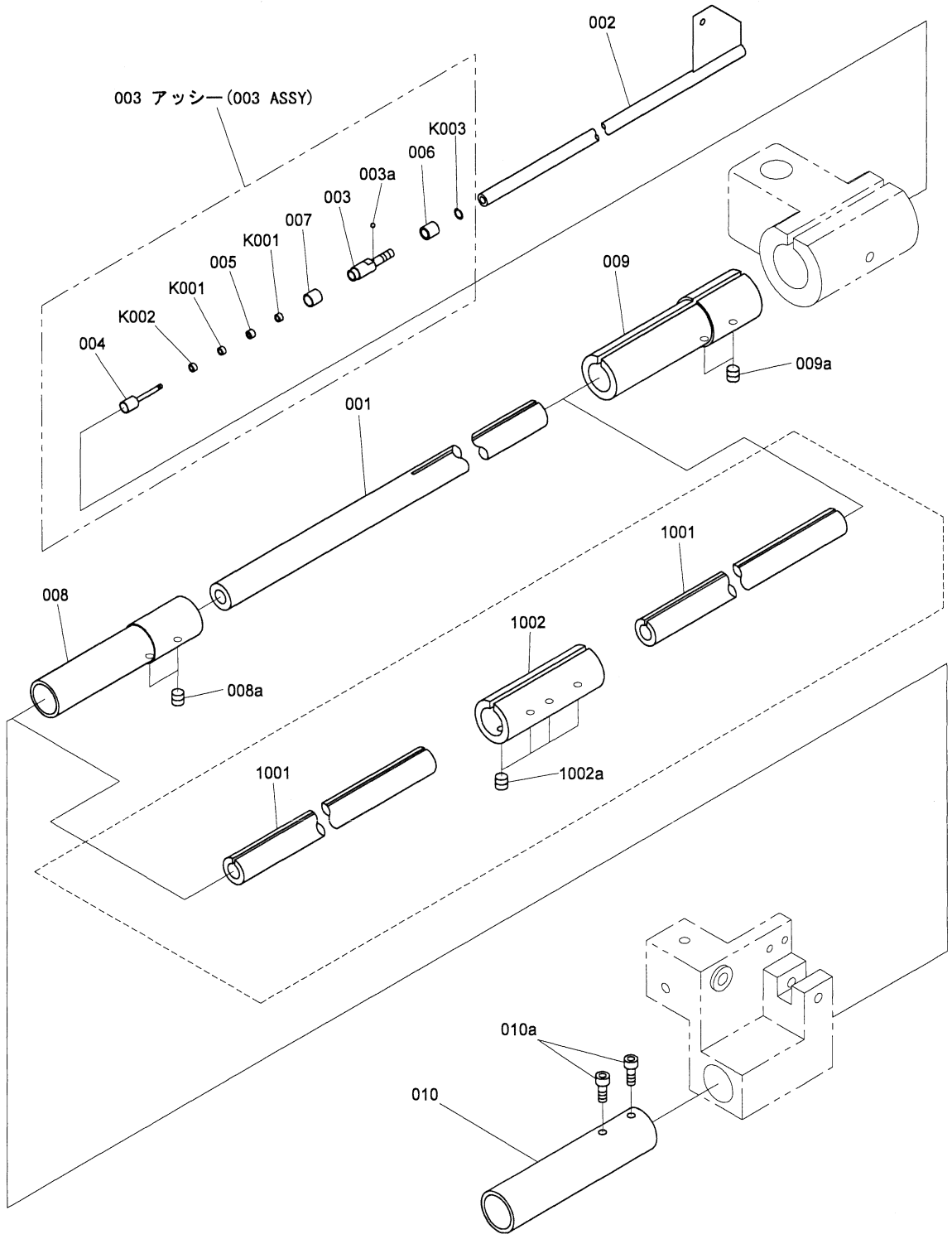
C1216 U10J	単材用材料供給装置 MATERIAL SUPPLY DEVICE	100

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
101	重鐘取付台	WEIGHT MOUNTING STAND		1	
101a	六角穴付止メネジ (平先)	SET SCREW	M6x8	2	
102	支柱	SUPPORTING COLUMN		1	
103	プーリーブラケット	PULLEY BRACKET		1	
103a	六角穴付止メネジ (平先)	SET SCREW	M8x12	1	
104	プーリー軸	PULLEY SHAFT		1	
105	大プーリー	PULLEY		1	
105a	六角穴付止メネジ (平先)	SET SCREW	M8x10	1	
106	小プーリー	PULLEY		1	
106a	六角穴付止メネジ (平先)	SET SCREW	M8x10	1	
107	チューブサポート	TUBE SUPPORT		1	
107a	六角穴付止メネジ (平先)	SET SCREW	M8x16	1	
108	カラー	COLLAR		1	
108a	六角穴付止メネジ (平先)	SET SCREW	M8x12	1	
108b	真チュウ座	SEAT	M8	1	
109	六角ボルト	BOLT		4	
109a	六角ナット	NUT	M12	1	
110	コード固定カラー	COLLAR		1	
110a	六角穴付止メネジ (平先)	SET SCREW	M6x8	2	
110b	真チュウ座	SEAT	M6	2	
111	フック	HOOK		2	
112	重錘通し棒	BAR		1	
112a	六角ナット (3 種)	NUT (TYPE 3)	M12	2	
112b	平座金	WASHER	M16	1	
113	重錘	WEIGHT		4	
114	重錘	WEIGHT		2	
K101	ナイロンコード	NYLON CORD	ø4x9500	1	
K102	ナイロンコード	NYLON CORD	ø4x2000	1	

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	LS3	リミットスイッチ	LIMIT SWITCH	Z-15GWA55-B5V	1	OMRON
KBT001a		六角穴付ボルト	BOLT	M4x25	2	
KBT001b		平座金	WASHER	M4	2	
WT101		LS ケーブル	LS CABLE		1	

C1216 U10J	単材用材料供給装置 MATERIAL SUPPLY DEVICE	BT000 WT100

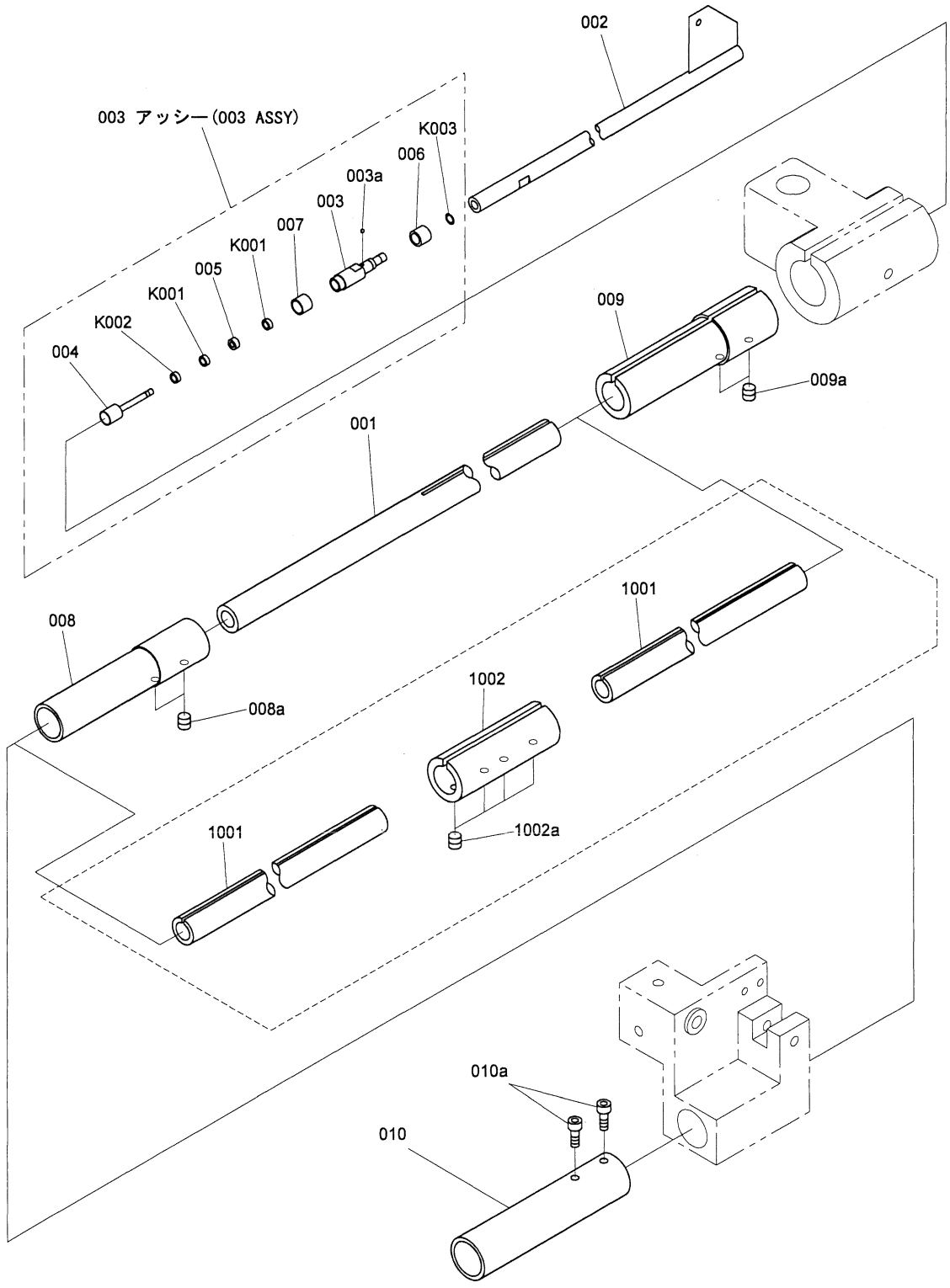
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M216 U21J	単材用材料パイプ (~ø16) MATERIAL PIPE (~ø16)	000 1000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	パイプ	PIPE		1	
002	材料送り棒	MATERIAL BAR FEEDER		1	
003	スリーブ (ø16)	SLEEVE (ø16)		1	
003a	鋼球	STEEL BALL	3/32	3	
004	センター (ø16)	CENTER (ø16)		1	
005	スペーサー	SPACER		1	
006	押えリング	FIXED RING		1	
007	カバー	COVER		1	
008	チューブサポート	TUBE SUPPORT		1	
008a	六角穴付止メネジ (平先)	SET SCREW	M6x6	2	
009	チューブサポート	TUBE SUPPORT		1	
009a	六角穴付止メネジ (平先)	SET SCREW	M6x6	2	
010	カバー	COVER		1	
010a	六角穴付ボルト	BOLT	M6x16	2	
K001	シェル型ニードルベアリング	BEARING	TLA69Z	2	IKO
K002	スラスト玉軸受	BALL BEARING	SST-1260DSG	1	NMB
K003	インバーテッドリング	INVERTED RING	ISTW-10	1	OCHIAI
1001	パイプ	PIPE		2	
1002	継ぎ	JOINT		1	
1002a	六角穴付止メネジ (平先)	SET SCREW	M6x6	4	

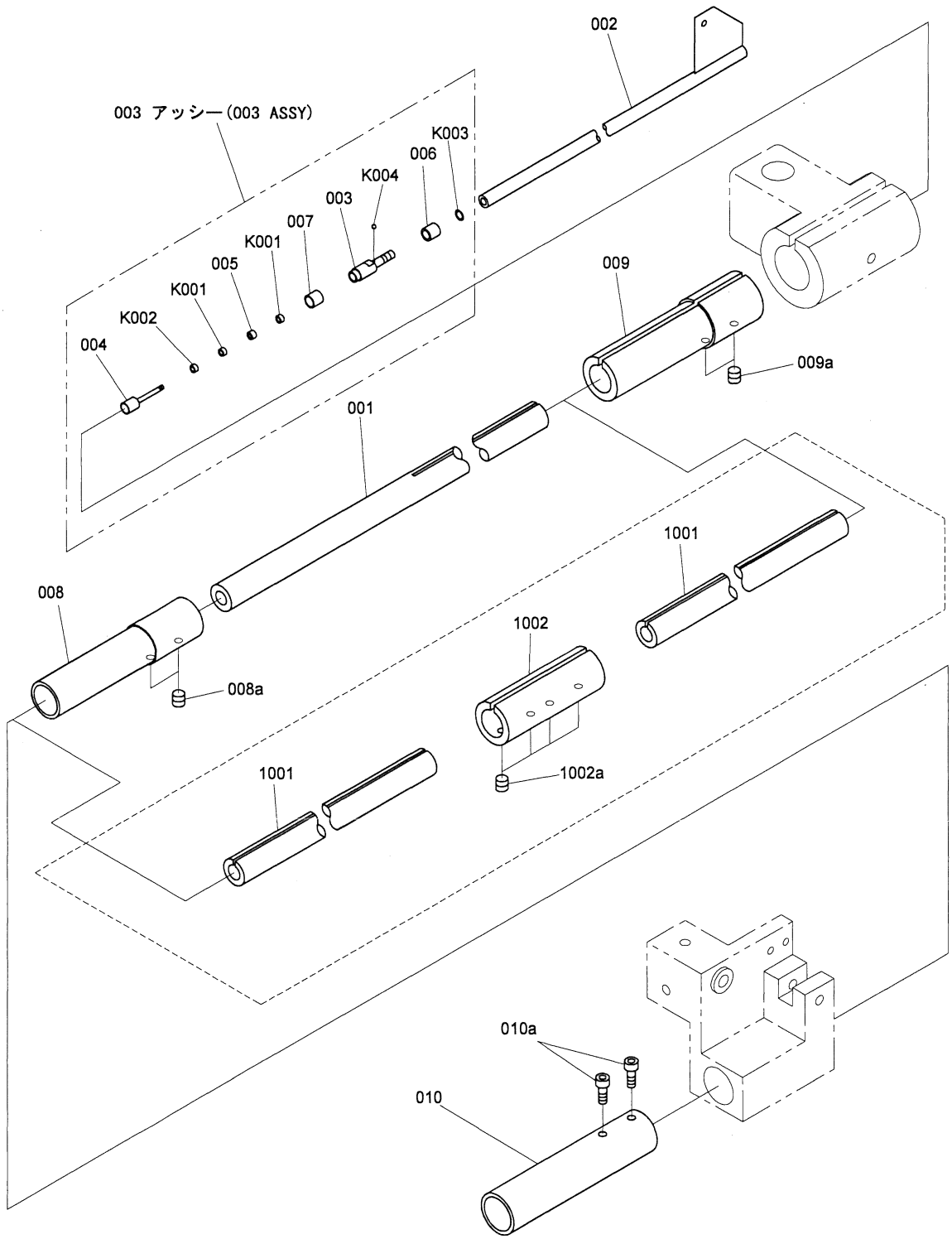
M216 U21J	単材用材料パイプ (~ø16) MATERIAL PIPE (~ø16)	000 1000



M212 U22J	単材用材料パイプ (~ø12) MATERIAL PIPE (~ø12)	000 1000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	パイプ	PIPE		1	
002	材料送り棒	MATERIAL BAR FEEDER		1	
003	スリーブ (ø12)	SLEEVE (ø12)		1	
003a	鋼球	STEEL BALL	3/32	3	
004	センター (ø12)	CENTER (ø12)		1	
005	スペーサー	SPACER		1	
006	押えリング	FIXED RING		1	
007	カバー	COVER		1	
008	チューブサポート	TUBE SUPPORT		1	
008a	六角穴付止メネジ (平先)	SET SCREW	M6x6	2	
009	チューブサポート	TUBE SUPPORT		1	
009a	六角穴付止メネジ (平先)	SET SCREW	M6x6	2	
010	カバー	COVER		1	
010a	六角穴付ボルト	BOLT	M6x16	2	
K001	シェル型ニードルベアリング	BEARING	TLA48ZN	2	IKO
K002	スラスト玉軸受	BALL BEARING	SST-1040DSG	1	NMB
K003	インバーテッドリング	INVERTED RING	ISTW-8	1	OCHIAI
1001	パイプ	PIPE		2	
1002	継ぎ	JOINT		1	
1002a	六角穴付止メネジ (平先)	SET SCREW	M6x6	4	

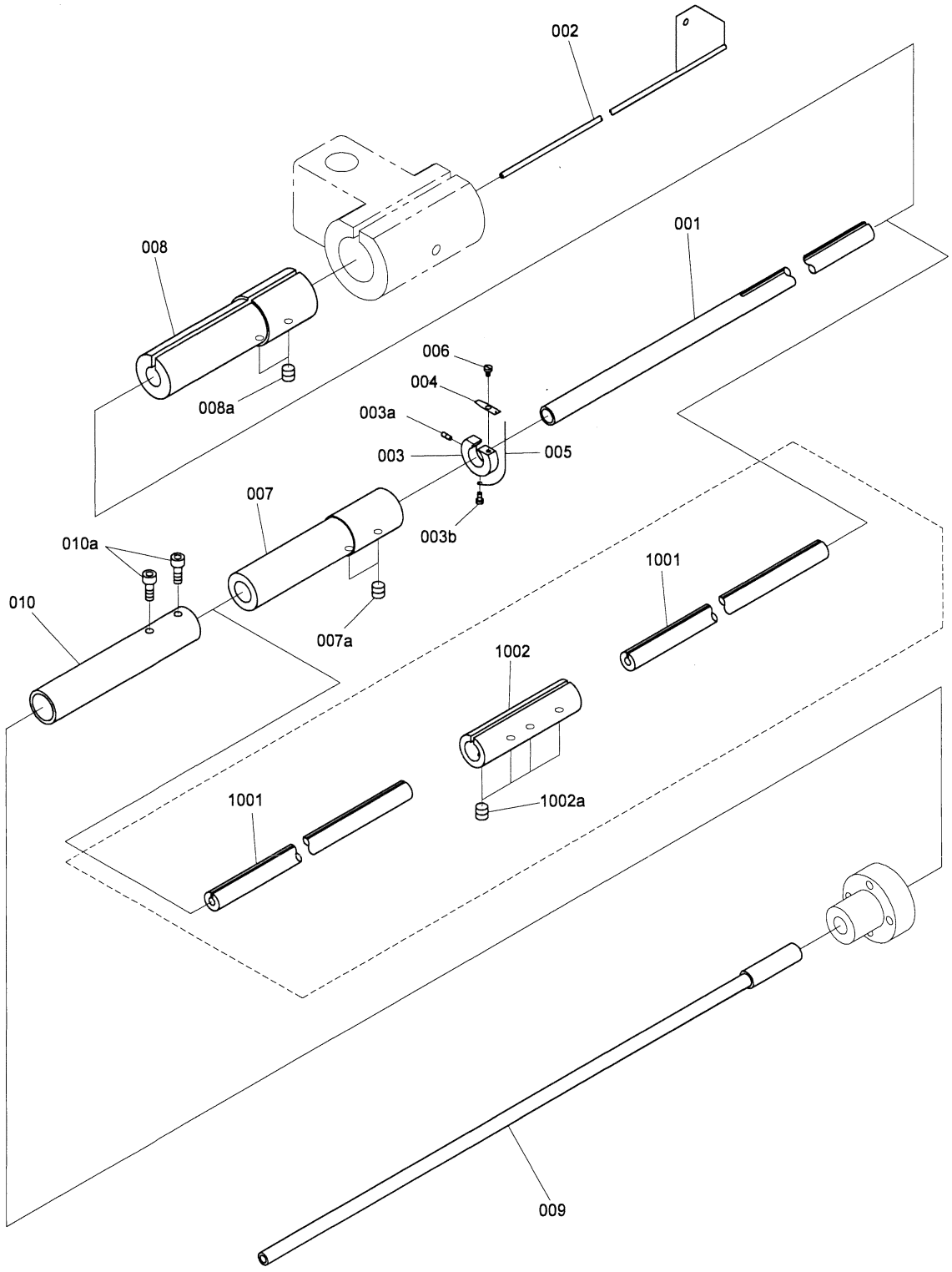
M212 U22J	単材用材料パイプ (~ø12) MATERIAL PIPE (~ø12)	000 1000



M212 U23J	単材用材料パイプ (~ø10) MATERIAL PIPE (~ø10)	000 1000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	パイプ	PIPE		1	
002	材料送り棒	MATERIAL BAR FEEDER		1	
003	スリーブ (ø10)	SLEEVE (ø10)		1	
004	センター (ø10)	CENTER (ø10)		1	
005	スペーサー	SPACER		1	
006	押えリング	FIXED RING		1	
007	カバー	COVER		1	
008	チューブサポート	TUBE SUPPORT		1	
008a	六角穴付止メネジ (平先)	SET SCREW	M6x6	2	
009	チューブサポート	TUBE SUPPORT		1	
009a	六角穴付止メネジ (平先)	SET SCREW	M6x6	2	
010	カバー	COVER		1	
010a	六角穴付ボルト	BOLT	M6x16	2	
K001	シェル型ニードルベアリング	BEARING	HK-0306T2	2	INA NTN
K002	スラスト玉軸受	BALL BEARING	SST·830DSG	1	NMB
K003	インバーテッドリング	INVERTED RING	ISTW6	1	OCHIAI
K004	鋼球	STEEL BALL	1/16	3	
1001	パイプ	PIPE		2	
1002	継ぎ	JOINT		1	
1002a	六角穴付止メネジ (平先)	SET SCREW	M6x6	4	

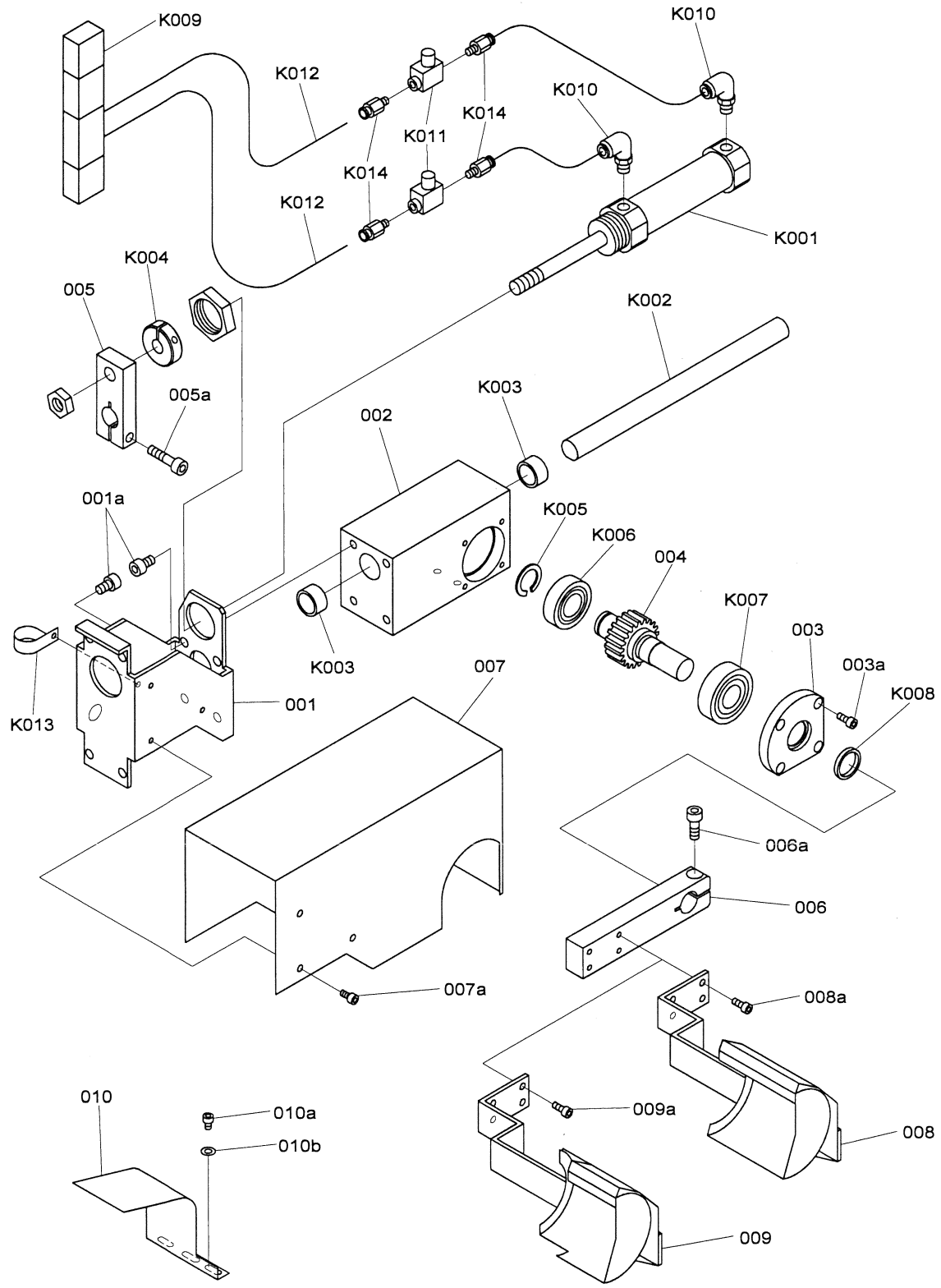
M212 U23J	単材用材料パイプ (~ø10) MATERIAL PIPE (~ø10)	000 1000



M212 U24J	単材用材料パイプ (~ø4) MATERIAL PIPE (~ø4)	000 1000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	パイプ	PIPE		1	
002	材料送り棒	MATERIAL BAR FEEDER		1	
003	抜け止めホルダー	STOP HOLDER		10	
003a	六角穴付止メネジ (平先)	SET SCREW	M3x8	10	
003b	平小ネジ	SCREW	M3x6	10	
004	押え板	FIXED PLATE		10	
005	戻しバネ	SPRING		10	
006	ピボットネジ	PIVOT SCREW		10	
007	チューブサポート	TUBE SUPPORT		1	
007a	六角穴付止メネジ (平先)	SET SCREW	M6x8	2	
008	チューブサポート	TUBE SUPPORT		1	
008a	六角穴付止メネジ (平先)	SET SCREW	M6x6	2	
009	固定パイプ	FIXED PIPE		1	
010	カバー	COVER		1	
010a	六角穴付ボルト	BOLT	M6x16	2	
1001	パイプ	PIPE		2	
1002	継ぎ	JOINT		1	
1002a	六角穴付止メネジ (平先)	SET SCREW	M6x6	4	

M212 U24J	単材用材料パイプ (~ø4) MATERIAL PIPE (~ø4)	000 1000



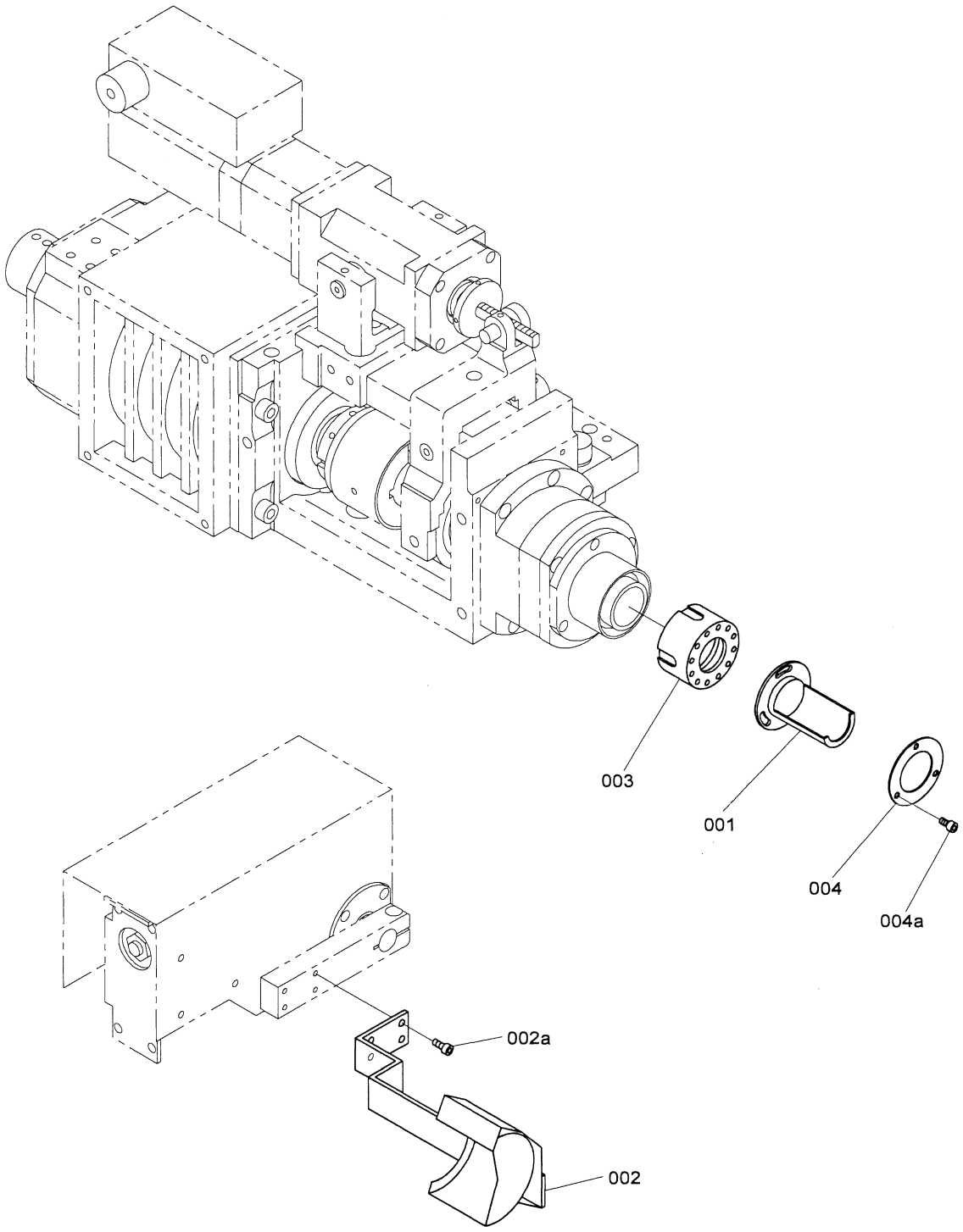
C1216 U30J	ワークセパレーター WORK SEPARATOR	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ブラケット	BRACKET		1	
001a	六角穴付ボルト	BOLT	M6x10	8	
002	ブロック	BLOCK		1	
003	ベアリング押え	FLANGE		1	
003a	六角穴付ボルト	BOLT	M4x10	4	
004	平歯車	GEAR		1	
005	連結板	CONNECTING PLATE		1	
005a	六角穴付ボルト	BOLT	M6x25	1	
006	アーム	ARM		1	
006a	六角穴付ボルト	BOLT	M6x16	1	
007	カバー	COVER		1	
007a	六角穴付ボルト	BOLT	M4x6	3	
008	製品受け	WORK RECEIVER		1	
008a	六角穴付ボルト	BOLT	M4x10	4	
009	製品受け	WORK RECEIVER		1	
009a	六角穴付ボルト	BOLT	M4x10	4	
010	切粉カバー	CHIP COVER		1	
010a	六角穴付ボルト	BOLT	M4x6	2	
010b	平座金	WASHER	M4	2	
K001	エアーシリンダー	AIR CYLINDER	CDM2BZ25-50A -XC22	1	SMC
K002	SROS 丸ラック	SROS ROUND RACK	SRO1.5-500	1	KOHARA GEAR INDUSTRY
K003	含油軸受	BEARING	B-S15-3	2	NTN
K004	セットカラー	COLLAR	SCS10-10	1	MISUMI
K005	インバーテッドリング	INVERTED RING	ISTW17	1	OCHIAI
K006	深溝玉軸受	BALL BEARING	6003ZZ	1	NACHI
K007	深溝玉軸受	BALL BEARING	6203ZZ	1	NTN
K008	シール	SEAL	OS16223F	1	IKO
K009	電磁弁	SOLENOID VALVE	113-4E2-J62 -57W-DC24V	1	KOGANEI
K010	クイック継手	QUICK FITTING	TL6-01	2	KOGANEI
K011	スピードコントローラー	SPEED CONTROL	SC0	2	KOGANEI
K012	ウレタンチューブ	TUBE	U6-B	1	KOGANEI
K013	ナイロンクランプ	NYLON CLAMP	NK-9N	6	KITAGAWA
K014	クイック継手	JOINT	TS6-M5	2	KOGANEI

C1216 U30J	ワークセパレーター WORK SEPARATOR	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	FS3 FS4	無接点オートスイッチ	NO-POINT OF FACT AUTO SWITCH	D-H7B	2	SMC
KBT002		オートスイッチ取付金具	AUTO SWITCH JOINT	BM2-025	2	SMC

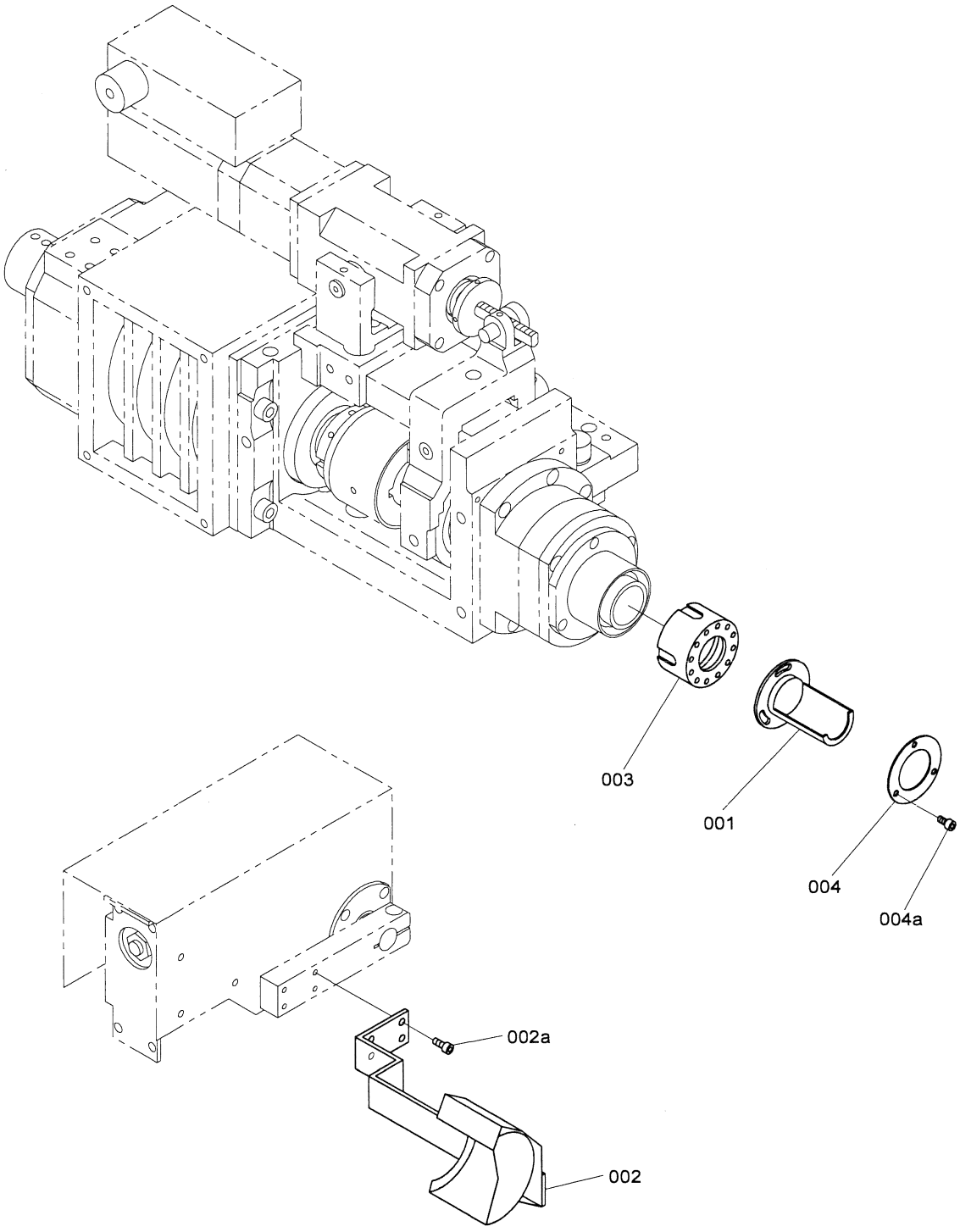
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KDT301	Ry214 Ry215	リレー	RELAY	RB104-DE	2	FUJI ELECTRIC
WT101		電磁弁ケーブル	VALVE CABLE		1	
WT102		センサケーブル	SENSOR CABLE		1	
WT9101		電磁弁ケーブル	VALVE CABLE		1	
WT9102		電磁弁ケーブル	VALVE CABLE		1	
WT9103		センサケーブル	SENSOR CABLE		1	



C12 U301J	製品受け WORK RECEIVER	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	製品受けカゴ (短)	RECEIVE BOX (SHORT)		1	
002	製品受け	WORK RECEIVER		1	
002a	六角穴付ボルト	BOLT	M4x10	4	
003	ナット	NUT		1	
004	リングワッシャ	WASHER		1	
004a	六角穴付ボルト	BOLT	M4x6	3	

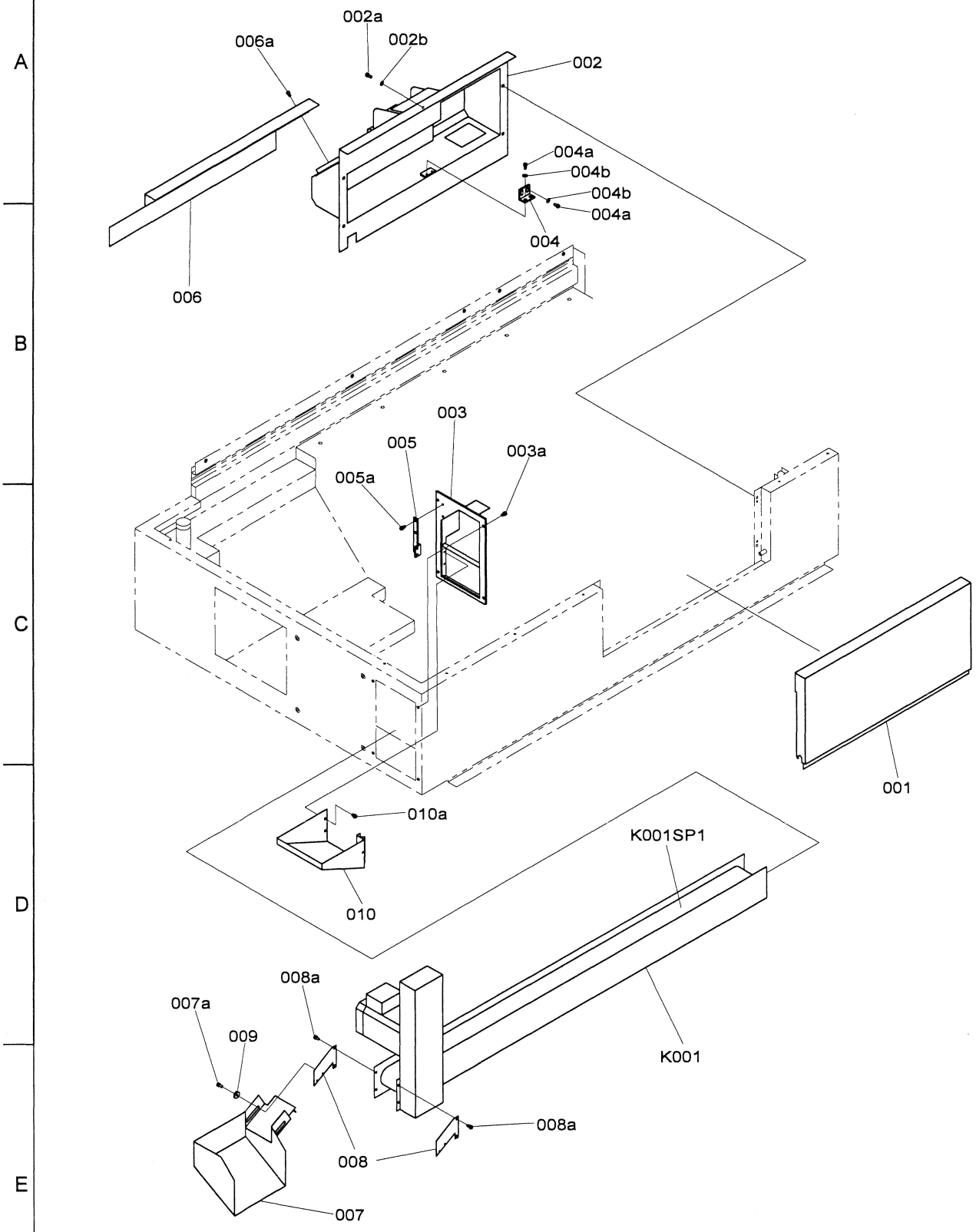
C12 U301J	製品受け WORK RECEIVER	000



C16 U301J	製品受け WORK RECEIVER	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	製品受けカゴ (短)	RECEIVE BOX (SHORT)		1	
002	製品受け	WORK RECEIVER		1	
002a	六角穴付ボルト	BOLT	M4x10	4	
003	ナット	NUT		1	
004	リングワッシャ	WASHER		1	
004a	六角穴付ボルト	BOLT	M4x6	3	

C16 U301J	製品受け WORK RECEIVER	000



C1216 U31J	ワークコンベアー WORK CONVEYOR	000

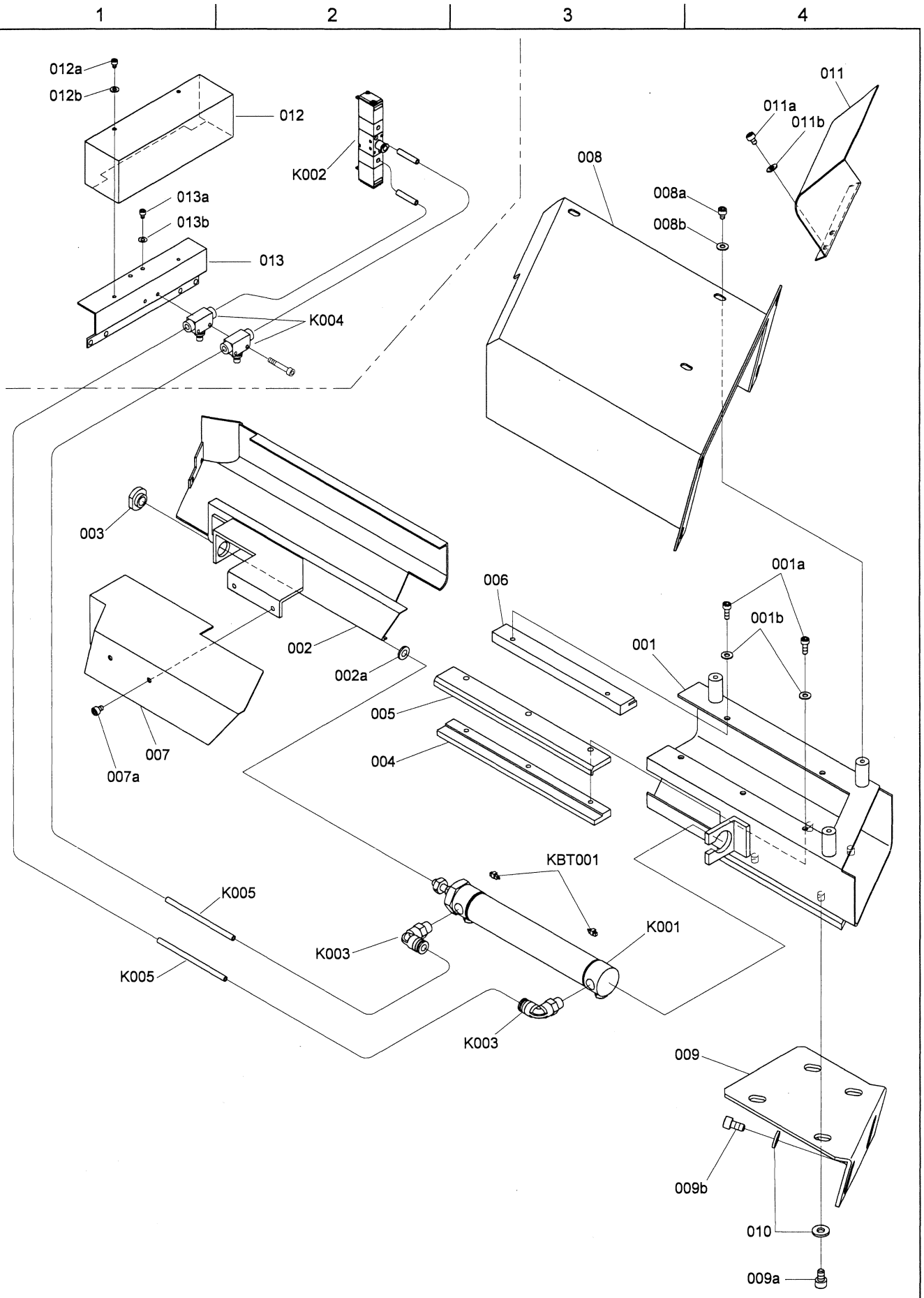
PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	前面カバー	FRONT COVER		1	
002	製品シュート	WORK CHUTE		1	
002a	六角穴付ボルト	BOLT	M4x10	1	
002b	平座金	WASHER	M4	1	
003	コンベアブラケット	CONVEYOR BRACKET		1	
003a	六角穴付ボルト	BOLT	M4x6	4	
004	固定ブラケット (1)	FIXING BRACKET (1)		1	
004a	六角穴付ボルト	BOLT	M4x8	4	
004b	平座金	WASHER	M4	4	
005	固定ブラケット (2)	FIXING BRACKET (2)		1	
005a	六角穴付ボルト	BOLT	M4x6	4	
006	コンベアカバー	CONVEYOR COVER		1	
006a	六角穴付ボルト	BOLT	M4x6	4	
007	コンベアシュート	CONVEYOR SHOOT		1	
007a	六角穴付ボルト	BOLT	M4x6	4	
008	シュートブラケット	SHOOT BRACKET		2	
008a	六角穴付ボルト	BOLT	M4x6	4	
009	平座金	WASHER		4	
010	油受け			1	
010a	六角穴付ボルト	BOLT	M4x5	4	
K001	ワークコンベアー	WORK CONVEYOR	FOR C1216	1	HITEC
K001SP1	ベルト (交換用)	BELT (FOR CHANGE)	F BELT(L-350) W60x2120E	(1)	

C1216 U31J	ワークコンベアー WORK CONVEYOR	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001		タイマウント	TIE MOUNT	TM2S8-M	3	PANDUIT
KBT002		バインド小ネジ	SCREW	M4x8	3	

C1216 U31J	ワークコンベアー WORK CONVEYOR	BT000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT201	Ry302	リレー RELAY	RB104-DE (DC24V)	1	FUJI ELECTRIC
WT9101		ワークコンベアケーブル WORK CONVEYOR CABLE		1	



C1216 U32J	シュート式ワークセパレータ WORKPIECE SEPARATOR WITH CHUTE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	フレーム	FRAME		1	
001a	六角穴付ボルト	BOLT	M4x12	5	
001b	平座金	WASHER	M4	5	
002	シュート	CHUTE		1	
002a	平座金	WASHER	M8	1	
003	ジョイント	JOINT		1	
004	ガイド (1)	GUIDE (1)		1	
005	ガイド (2)	GUIDE (2)		1	
006	ガイド (3)	GUIDE (3)		1	
007	ロッドカバー	ROD COVER		1	
007a	六角穴付ボルト	BOLT	M4x6	2	
008	シュートカバー	CHUTE COVER		1	
008a	六角穴付ボルト	BOLT	M4x6	7	
008b	平座金	WASHER	M4	7	
009	ブラケット	BRACKET		1	
009a	六角穴付ボルト	BOLT	M6x10	4	
009b	六角穴付ボルト	BOLT	M6x12	4	
010	座金	WASHER		8	
011	切粉カバー	CHIP COVER		1	
011a	六角穴付ボルト	BOLT	M4x6	2	
011b	平座金	WASHER	M4	2	
012	カバー	COVER		1	
012a	六角穴付ボルト	BOLT	M4x10	2	
012b	平座金	WASHER	M4	2	
013	ブラケット	BRACKET		1	
013a	六角穴付ボルト	BOLT	M4x10	2	
013b	平座金	WASHER	M4	2	
K001	スリムスリンダ	CYLINDER	DAC20x175 -A-4125W	1	KOGANEI
K002	電磁弁	SOLENOID VALVE	110-4E2-J62 -52W-DC24V	1	KOGANEI
K003	クイック継手	QUICK FITTING	TL6-01	2	KOGANEI
K004	スピードコントローラ	SPEED CONTROL	SSU6	2	KOGANEI
K005	ウレタンチューブ	TUBE	U6-B	1	KOGANEI

C1216 U32J	シュート式ワークセパレータ WORKPIECE SEPARATOR WITH CHUTE	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	FS3 FS4	センサースイッチ	SENSOR SWITCH	CS11TA1 -G5-DA20	2	KOGANEI
SP1		シリンダセンサ	SENSOR	CD11TA1	(1)	KOGANEI
SP2		取付金具	BAND	G5-DA20	(1)	KOGANEI
SP3		C1-PBDAS16 用金具	BLOCK	C1-PBDAS16	(1)	KOGANEI

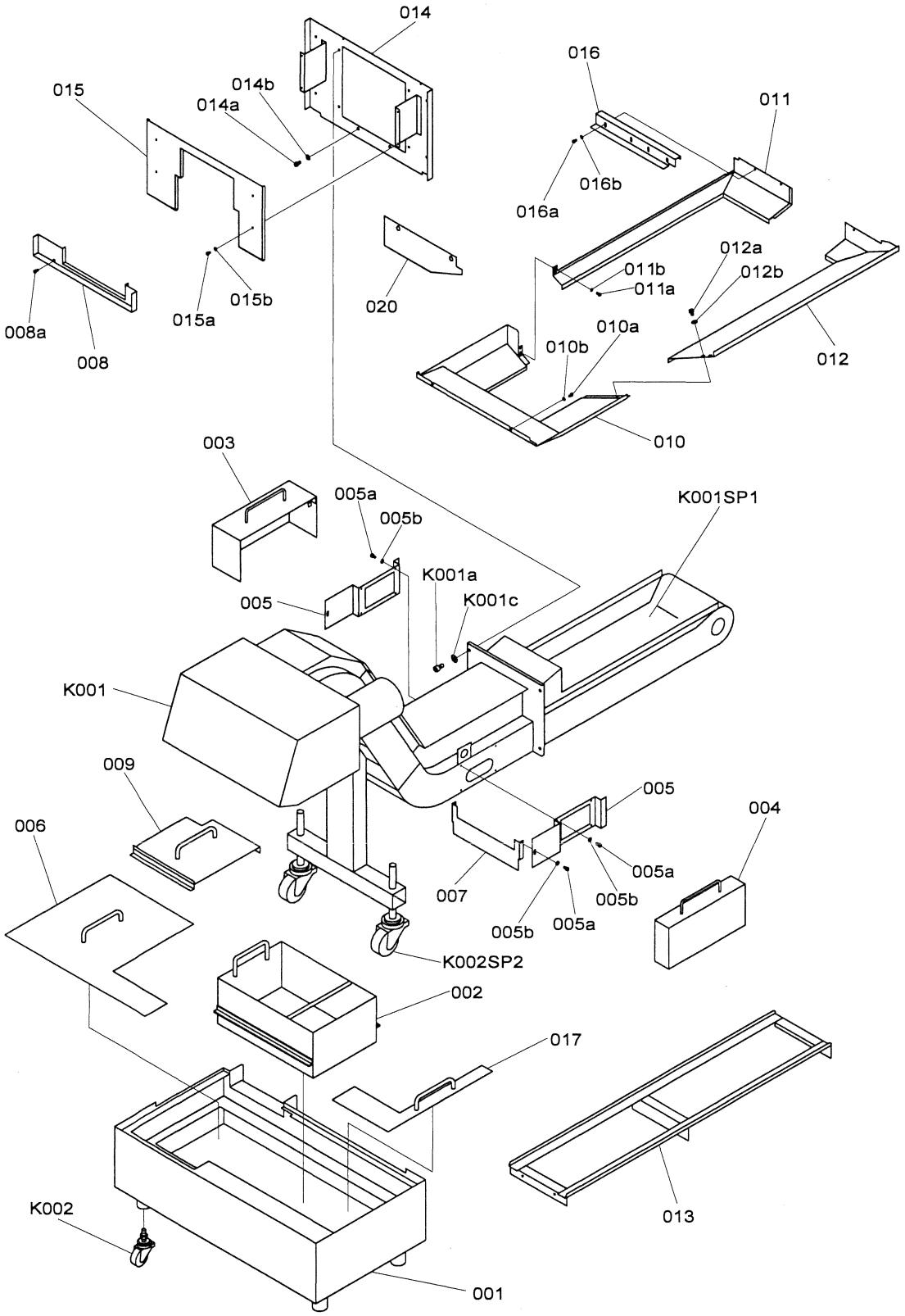
C1216 U32J	シュート式ワークセパレータ WORKPIECE SEPARATOR WITH CHUTE	BT000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT301	Ry214 Ry215	リレー　RELAY	RB104-DE (24V DC)	2	FUJI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
WT101		電磁弁ケーブル CABLE		1	
WT102		センサーケーブル CABLE		1	

C1216 U32J	シュート式ワークセパレータ WORKPIECE SEPARATOR WITH CHUTE	WT100

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C1216 U90J	チップコンベア CHIP CONVEYOR	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	切削油タンク	COOLANT TANK		1	
002	切粉受箱	CHIP RECEIVE BOX		1	
003	コンベアカバー	CONVEYOR COVER		1	
004	コンベアカバー	CONVEYOR COVER		1	
005	コンベアブラケット	CONVEYOR BRACKET		2	
005a	六角穴付ボルト	BOLT	M4x8	10	
005b	平座金	WASHER	M4	10	
006	フタ(1)	COVER(1)		1	
007	防油板 (1)	SPLASH PLATE (1)		1	
008	防油板 (2)	SPLASH PLATE (2)		1	
008a	六角穴付ボルト	BOLT	M4x10	2	
009	油ハネ防止カバー	COVER		1	
010	切粉シュート (1)	CHIP CHUTE (1)		1	
010a	六角穴付ボルト	BOLT	M4x8	2	
010b	平座金	WASHER	M4	2	
011	切粉シュート (2)	CHIP CHUTE (2)		1	
011a	六角穴付ボルト	BOLT	M4x8	2	
011b	平座金	WASHER	M4	2	
012	切粉シュート (3)	CHIP CHUTE (3)		1	
012a	六角穴付ボルト	BOLT	M4x8	2	
012b	平座金	WASHER	M4	2	
013	レール	RAIL		1	
014	コンベアフランジ	CONVEYOR FLANGE		1	
014a	六角穴付ボルト	BOLT	M6x10	2	
014b	平座金	WASHER	M6	2	
015	化粧板	PLATE		1	
015a	六角穴付ボルト	BOLT	M4x6	4	
015b	平座金	WASHER	M4	4	
016	連結板	CONNECTING PLATE		1	
016a	六角穴付ボルト	BOLT	M4x8	2	
016b	平座金	WASHER	M4	2	
017	フタ (2)	COVER (2)		1	
020	仕切板 (4)	PARTITION		1	
K001	チップコンベア	CHIP CONVEYOR	FOR C1216	1	CMTN
K001a	六角穴付ボルト	BOLT	M6x16	4	
K001b	六角穴付ボルト	BOLT	M6x12	2	
K001c	平座金	WASHER	M6	6	
K001SP1	コンベアチェーン	CONVEYOR CHAIN	31.75(P)x150(W) x138(L)	1	CMTN
K001SP2	キャスター	CASTER	415EA-N75 M12x1.25(BRAKE)	2	HAMMER CASTER
K002	自在キャスター	CASTER	415EA-N50	4	HAMMER CASTER

C1216 U90J	チップコンベア CHIP CONVEYOR	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001		タイマウント	TIE MOUNT	TM2S8-M	1	PANDUIT
KBT002		バインド小ネジ	SCREW	M4x8	1	
KBT003		ナイロンクランプ	NYLON CLAMP	NK-7N	2	KITAGAWA KOGYO
KBT003a		六角穴付ボルト	BOLT	M4x10	2	
KBT003b		平座金	WASHER	M4	2	

C1216 U90J	チップコンベア CHIP CONVEYOR	BT000

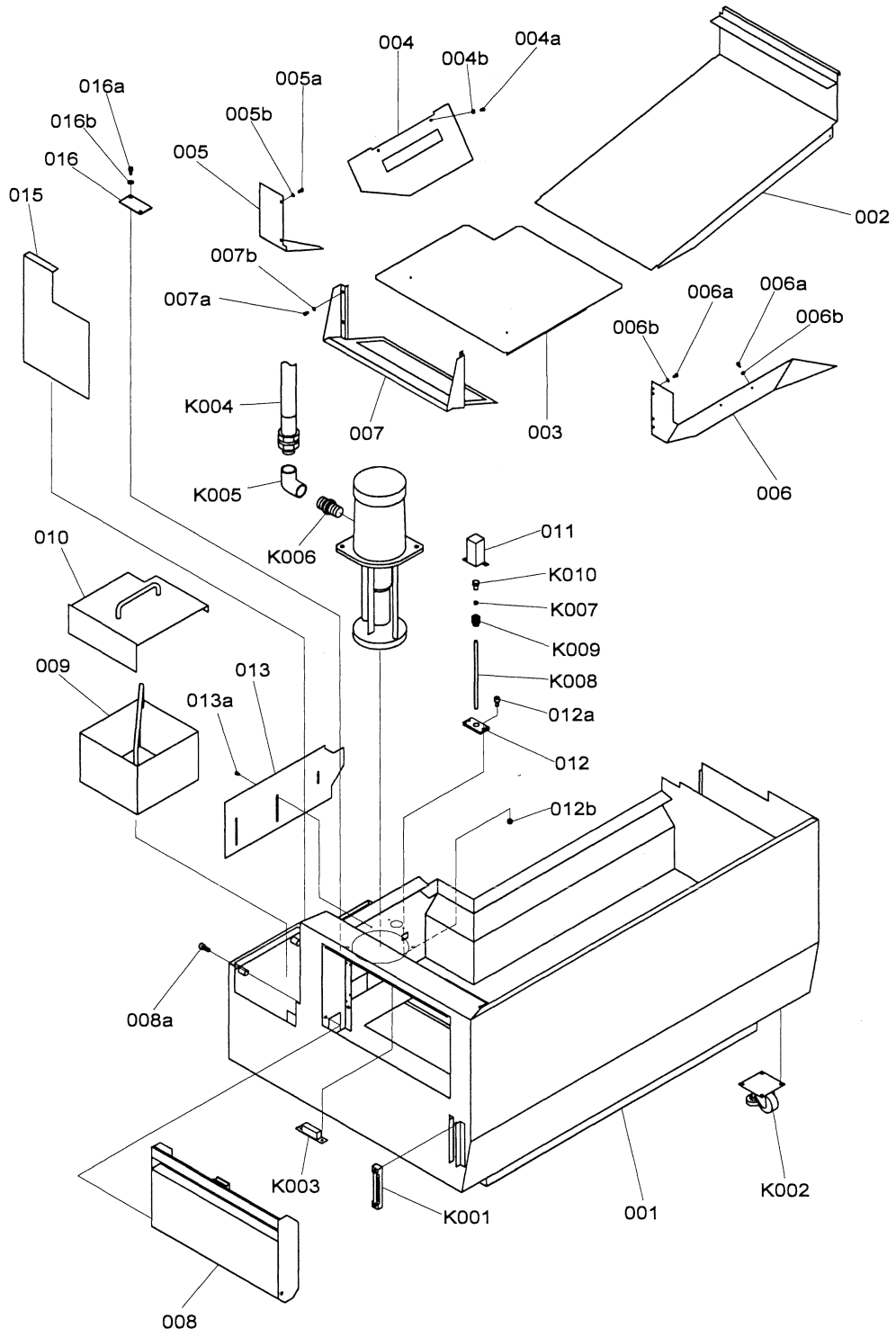
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	CNP4	ハウジング	HOUSING	178289-3	1	AMP
KWT002		コンタクト	CONTACT	1-175218-5	6	AMP
KWT003	CNCIP	レセプタクル	RECEPTACLE	MS3102A 20-15S	1	JAE
WT001		チップコンベアケーブル1	CHIP CONVEYOR CABLE 1		1	

C1216 U90J	チップコンベア CHIP CONVEYOR	WT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	CNCIP	コンタクト	CONTACT	MS3106B 20-15P	1	JAE
KWT102		ケーブルクランプ	CABLE CLAMP	MS3057-12A	1	JAE
WT101		チップコンベアケーブル2	CHIP CONVEYOR CABLE 2		1	

C1216 U90J	チップコンベア CHIP CONVEYOR	WT100

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C1216 U10R	切削油タンク装置 COOLANT TANK DEVICE	000

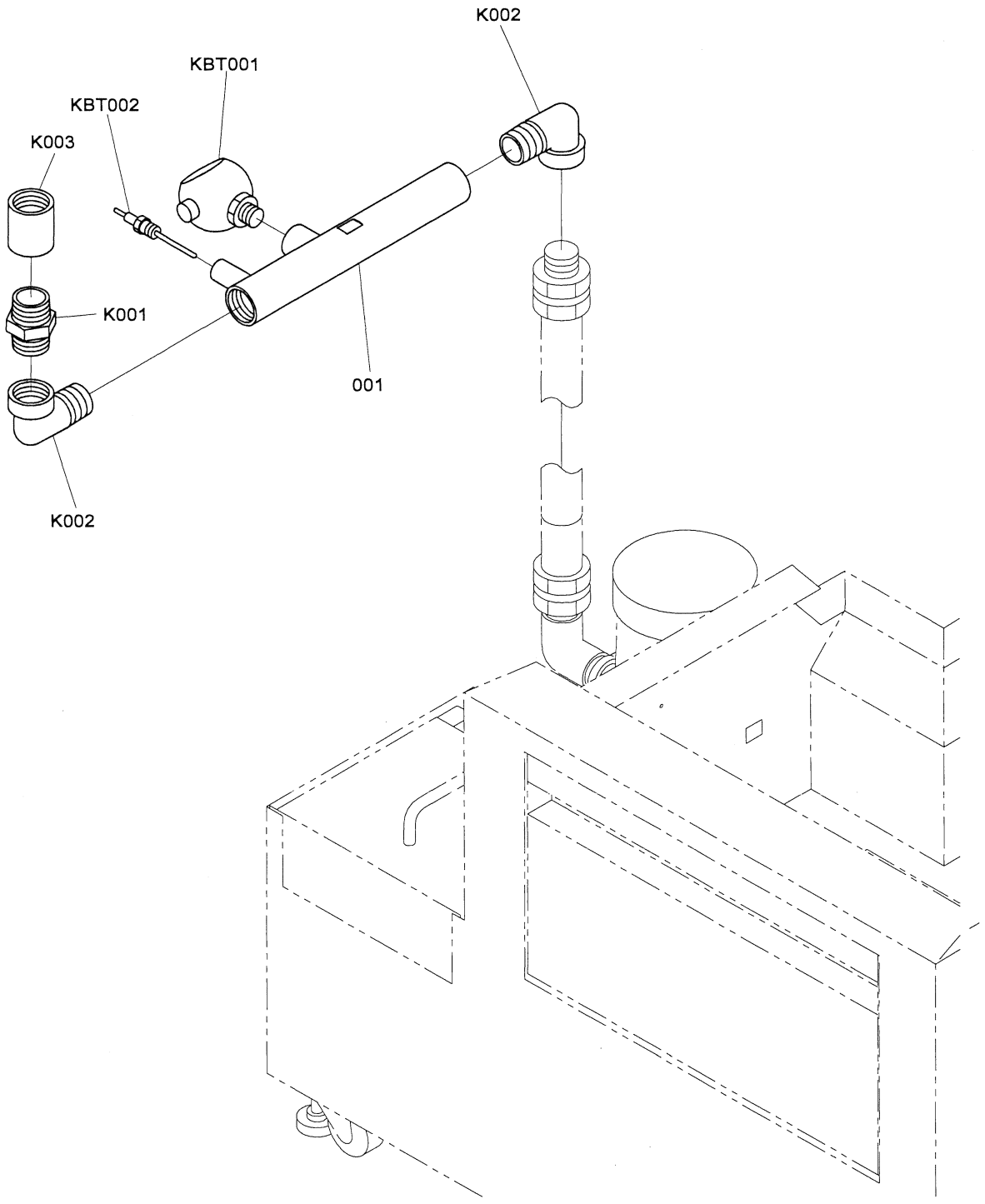
PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	切削油タンク	COOLANT TANK		1	
002	切粉シュート	CHIP CHUTE		1	
003	フタ	COVER		1	
004	仕切板	PARTITION		1	
004a	六角穴付ボルト	BOLT	M4x8	2	
004b	平座金	WASHER	M4	2	
005	切粉ガイド (左)	CHIP GUIDE (L)		1	
005a	六角穴付ボルト	BOLT	M4x8	2	
005b	平座金	WASHER	M4	2	
006	切粉ガイド (右)	CHIP GUIDE (R)		1	
006a	六角穴付ボルト	BOLT	M4x8	4	
006b	平座金	WASHER	M4	4	
007	切粉取出ガイド	CHIP TAKE-OUT GUIDE		1	
007a	六角穴付ボルト	BOLT	M4x8	4	
007b	平座金	WASHER	M4	4	
008	切粉取出し口フタ	CHIP OUTLET COVER		1	
008a	六角穴付ボルト	BOLT	M8x20	2	
009	切粉受け箱	CHIP RECEIVE BOX		1	
010	油ハネ防止カバー	COVER		1	
011	リード線カバー	LEAD WIRE COVER		1	
012	スイッチ取付板	SWITCH BRACKET		1	
012a	六角穴付ボルト	BOLT	M5x12	2	
012b	ナット	NUT	M5	2	
013	油ハネ防止板	PLATE		1	
013a	六角穴付ボルト	BOLT	M4x8	3	
015	仕切板	PARTITION		1	
016	フタ	COVER		1	
016a	六角穴付ボルト	BOLT	M6x12	2	
016b	平座金	WASHER	M6	2	
K001	クランプ型油面計	OIL GAUGE	ø6x100	1	MARUWA
K002	パッキングキャスター	PACKING CASTER	No.103AF-N	4	UCHIMURA
K003	ステンレスローラー締まり	ROLLER TIGHT	C-1052	1	TAKIGEN
K004	トヨスプリングホース	HOSE	1"	1	TOYO FLEX
K005	エルボ	ELBOW	1"	1	
K006	径違いニップル	REDUCING NIPPLE	1"x3/4"		
K007	スリーブ	SLEEVE	PB6	1	SHOWA YUKI
K008	アルミパイプ	ALUMINUM PIPE	ALP6	1	SHOWA YUKI
K009	コネクター	CONNECTOR	PM106	1	SHOWA YUKI
K010	締付プラグ	PLUG	PA6	1	SHOWA YUKI

C1216 U10R	切削油タンク装置 COOLANT TANK DEVICE	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001		クーラントポンプ	COOLANT PUMP	VKP085A	1	FUJI ELECTRIC
KBT002		スーパーシール	SUPER SEAL	NW-12R	1	NIX.INC.
KBT003	FLTS	フロートスイッチ	FLOAT SWITCH	OLV2B2	1	SHOWA YUKI

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101	CNC01	コネクタ	CONNECTOR	MS3106B 20-4P	1	JAE
KWT102	CNC02	コネクタ	CONNECTOR	MS3106B 12S-3P	1	JAE
KWT103		ケーブルクランプ	CABLE CLAMP	MS3057-12A	1	JAE
KWT104		ケーブルクランプ	CABLE CLAMP	MS3057-4A	1	JAE
WT101		切削油ポンプケーブル	COOLANT PUMP CABLE		1	
WT102		切削油レベル検出ケーブル	COOLANT LEVEL DETECTOR CABLE		1	

C1216 U10R	切削油タンク装置 COOLANT TANK DEVICE	WT100



C1216 U52R	切削油流量検出装置 COOLANT FLOW DETECTOR	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	センサー継手パイプ	PIPE		1	
K001	ニップル	NIPPLE	1"	1	
K002	めすおすエルボ	ELBOW	1"	2	
K003	ソケット	SOCKET	1"	1	

C1216 U52R	切削油流量検出装置 COOLANT FLOW DETECTOR	000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KBT001	FLC1	フローキャプター FLLOW CAPTER	4121.13	1	SKA
KBT002	TH1	サーミスタ THERMISTOR	E52-THE6D	1	OMRON

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
ET001		油温計パネル	PANEL		1	
ET001a		バインド小ネジ	BINDING HEAD SCREW	M4x8	4	
ET001b		平座金	WASHER	M3	2	
ET001c		ナット	NUT	M3	2	
KET001	UNIT16 THM	電子サーモ	ELECTRIC THERMOS	E5L-AS3	1	OMRON
KET002		ソケット	SOCKET	PTF14A	1	OMRON
KET002a		六角穴付ボルト	BOLT	M4x12	2	
KET003	SL3	LED 表示灯	LED INDICATOR LAMP	AP08-2RE2	1	FUJI ELECTRIC
KET004		NBR ゴム	NBR RUBBER	t1.0	1	BRIDGESTONE

C1216 U52R	切削油流量検出装置 COOLANT FLOW DETECTOR	ET000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	CNCOF	レセプタクル	RECEPTACLE	MS3102A14S-2SX	1	JAE
KWT002	CNTH	レセプタクル	RECEPTACLE	MS3102A14S-7S	1	JAE
WT001		電子サーモ電源ケーブル	ELECTRIC THERMOSTAT POWER CABLE		1	
WT002		電子サーモケーブル	ELECTRIC THERMOSTAT CABLE		1	
WT003		検出有効表示灯ケーブル	DETECTION INDICATE CABLE		1	
WT004		油温表示計ケーブル	OIL TEMPERATURE INDICATE CABLE		1	
WT005		フローセンサケーブル	FLOAT SENSOR CABLE		1	
WT006		サーミスタケーブル	THERMOSTAT CABLE		1	

C1216 U52R	切削油流量検出装置 COOLANT FLOW DETECTOR	WT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT201	CNCOF	コネクタ	CONNECTOR	MS3106B14S-2PX	1	JAE
KWT202	CNTH	コネクタ	CONNECTOR	MS3106B14S-7P	1	JAE
KWT203		ケーブルクランプ	CABLE CLAMP	MS3057-6A	2	JAE
KWT204		保護スプリング	SPRING	FOR ø4	1	SHOWA YUKI
KWT205		ビニールチューブ	TUBE	FOR ø6	1	AOTO VINYL

C1216 U52R	切削油流量検出装置 COOLANT FLOW DETECTOR	WT200

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
K001	フィルターレギュレータ	FILTER REGULATOR	AW2000-01BG	1	SMC
K002	マニホールド	MANIFOLD	110M5F	1	KOGANEI
	stn.1				
	stn.2				
	stn.3		BP		
	stn.4		BP		
	stn.5		BP		
K003	クイック継手	JOINT	TL8-01	2	KOGANEI
K004	めすおすエルボ	ELBOW	1/8"	1	
K005	ホース口	HOSE	BS0-3	1	TOYO FLEX
K006	ウレタンチューブ	TUBE	U8-B	1	KOGANEI
K007	クイック継手	QUICK FITTING	UY8	1	KOGANEI

C1216 U60R	エアー装置 AIR DEVICE	000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT001		オペレーティングシステム　OPERATING SYSTEM	Windows	1	Microsoft

C1216 U70T	和文シートキー SHEET KEYBOARD (JAPANESE)	CT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KET001		和文シートキーボード	SHEET KEY BOARD IN JAPANESE	AB12C-0395/DJ1	1	FUJI ELECTRIC
KET001SP1	P-ON	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-TGFG11	(1)	
KET001SP2	P-OFF	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-TGFR22	(1)	
KET001SP3	S169	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-SLG11E3	(2)	
	S173	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-SLG11E3	(2)	
KET001SP4	S170	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-SLR11E3	(1)	
KET001SP5	S172	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-SFR11	(1)	
KET001SP6	S174	押し釦スイッチ	PUSH BUTTON SWITCH	AR30V2R-02R	(1)	
KET001a		平座金	WASHER	M4	10	
KET001b		バネ座金	SPRING WASHER	M4	10	
KET001c		ナット	NUT	M4	10	

C1216 U70T	和文シートキー SHEET KEYBOARD (JAPANESE)	ET000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT001		オペレーティングシステム　OPERATING SYSTEM	Windows	1	Microsoft

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KET001		英文シートキーボード	SHEET KEY BOARD IN ENGLISH	AB12C-0395/DE1	1	FUJI ELECTRIC
KET001SP1	P-ON	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-TGFG11	(1)	
KET001SP2	P-OFF	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-TGFR22	(1)	
KET001SP3	S169	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-SLG11E3	(2)	
	S173	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-SLG11E3	(2)	
KET001SP4	S170	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-SLR11E3	(1)	
KET001SP5	S172	押し釦スイッチ	PUSH BUTTON SWITCH	AH165-SFR11	(1)	
KET001SP6	S174	押し釦スイッチ	PUSH BUTTON SWITCH	AR30V2R-02R	(1)	
KET001a		平座金	WASHER	M4	10	
KET001b		バネ座金	SPRING WASHER	M4	10	
KET001c		ナット	NUT	M4	10	

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT001	CF30-C3	リモート I/O カード　　I/O CARD	HR371	1	MITSUBISHI ELECTRIC

C1216 U80T	I/O 拡張基板 I/O ENLARGE BOARD	CT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
DT002		ブラケット	BRACKET		2	
DT002a		ナベ小セムスB(大)	SCREW		2	
KDT001		プリント基板	PRINTED BOARD	CC-PCB03-1	1	ELEX
KDT001a		ナベ小セムスB(大)	SCREW	M3x6	4	
KDT002	CNC4	ヘッダー	HEADER	7650-5002SC	1	SUMITOMO 3M
KDT003	CNC13 CNC20	リセプタクル	RECEPTACLE	10220-L8A9VE	1	SUMITOMO 3M
KDT004	CNC14 CNC16	リセプタクル	RECEPTACLE	10250-M218VE	1	SUMITOMO 3M
KDT005	CNC17 CNC12	基板取付タブヘッダー	CONNECTOR	178303-5	2	AMP
KDT006	CF30-C3 CF30-C4 CF30-C5	ソケット	SOCKET	9150-4500SC	3	SUMITOMO 3M
KDT007		カードコーナーホルダー	CARD CORNER HOLDER	KGCH-20-0	6	KITAGAWA KOGYO
KDT008	Ry701	ソケット	SOCKET	TP04	1	FUJI ELECTRIC
KDT009	L701	LED	LED	LT1K51A	1	SHARP
KDT010	D701 D702	ダイオード	DIODE	D1F20	2	SHINDENGEN
KDT011	PH701~ PH708	フォトカプラ	PHOTO COUPLER	PS2501L-4	8	NEC
KDT012	R701~ R733	抵抗	RESISTANCE	RK73H2H2.2KΩF	33	KOA
KDT013		セムスB(小)	SCREW	M2.6x5	4	

C1216 U80T	I/O 拡張基板 I/O ENLARGE BOARD	DT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	UNIT3	バッテリーユニット	BATTERY UNIT	A-BT-4	1	MITSUBISHI ELECTRIC
KCT001a		ナベ小セムス B (大)	SCREW	M5x8	2	

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U3CN1A CNC6-2	プラグ	PLUG	10120-6000EL	2	SUMITOMO 3M
KWT002		シェル	SHELL	10320-3210-000	1	SUMITOMO 3M
KWT003		シェル	SHELL	10320-52A0-008	1	SUMITOMO 3M
WT001		バスケーブル	BUS CABLE		1	

C1216 U82T	バッテリーユニット BATTERY UNIT	WT000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT001		ATA カード I/F　　ATA CARD I/F	FCU6-EP101-1	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KT001		データ＆FAX モデムカード　DATA & FAX MODEM CARD	IGM-PCM56KC	1	BUFFALO

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KT001		ロードウォーリアモデム 56K　RORD WARRIOR MODEM 56K	RW50	1	SHIROSHITA INDUSTRIAL

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KT001		PCMCIA ユニット PCMCIA UNIT	6PCM01A	1	MITSUBISHI ELECTRIC

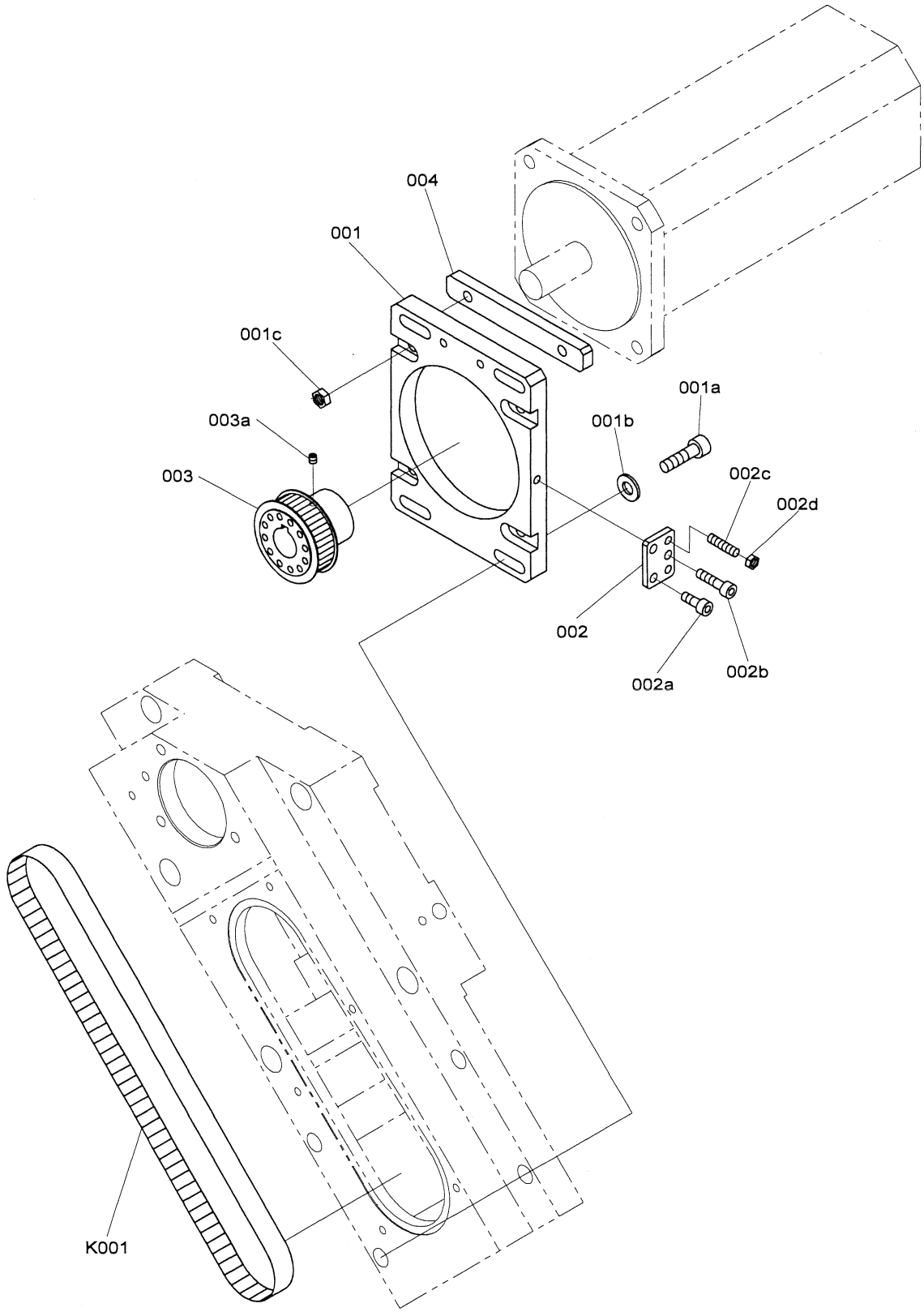
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
ET001		ブラケット	BRACKET		1	
KET001		フラッシュメモリードライブ	FLASH MEMORY DRIVE	MS7512FMD 100C	1	HITACHI ULSI SYSTEMS
KET002		マイクロセルポリマー シートポロン	PORON	SR-L-24 5Tx9x9	4	ROGERS INOAC
KET003		ケーブル指示シール	SEAL	SDISK001	1	YAMACS

L51620 U931T	シリコンディスク装置 SILICON DISK DEVICE	ET000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
WT001		シリコンディスクケーブ　CABLE		1	

L5 1620 U931T	シリコンディスク装置 SILICON DISK DEVICE	WT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KT001		50m ケーブル	50m CABLE	ICT CABLE 0.51P	1	SANKOU TSUUSHIN
KT002		ジャック式転換器	JACK SYSTEM COMMUTATOR	KG-MJ COMMUTATOR A	1	KAGATSURA
KT003		ツインジャック	TWIN JACK	BMJ-2	1	YAKOU ELECTRIC
KT004		シリコーン	SILICON	KE42W	1	SINETSU



C1216 U40Z	ロータリーガイドブッシュ駆動装置 ROTARY GUIDE BUSHING DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	モーターベース	MOTOR BASE		1	
001a	六角穴付ボルト	BOLT	M8x30	4	
001b	平座金	WASHER	M8	4	
001c	六角ナット	NUT	M8	4	
002	テンションプレート	TENSION PLATE		1	
002a	六角穴付ボルト	BOLT	M6x16	2	
002b	六角穴付ボルト	BOLT	M6x25	1	
002c	六角穴付止メネジ (平先)	SET SCREW	M6x25	2	
002d	六角ナット	NUT	M6	2	
003	モータープーリ	MOTOR PULLEY		1	
003a	六角穴付止メネジ (平先)	SET SCREW	M5x5	1	
004	ナット板	NUT PLATE		2	
K001	パワーグリップ GT ベルト	POWER GLIP GT BELT	750-U5GT-15	1	UNITTA

C1216 U40Z	ロータリーガイドブッシュ駆動装置 ROTARY GUIDE BUSHING DEVICE	000

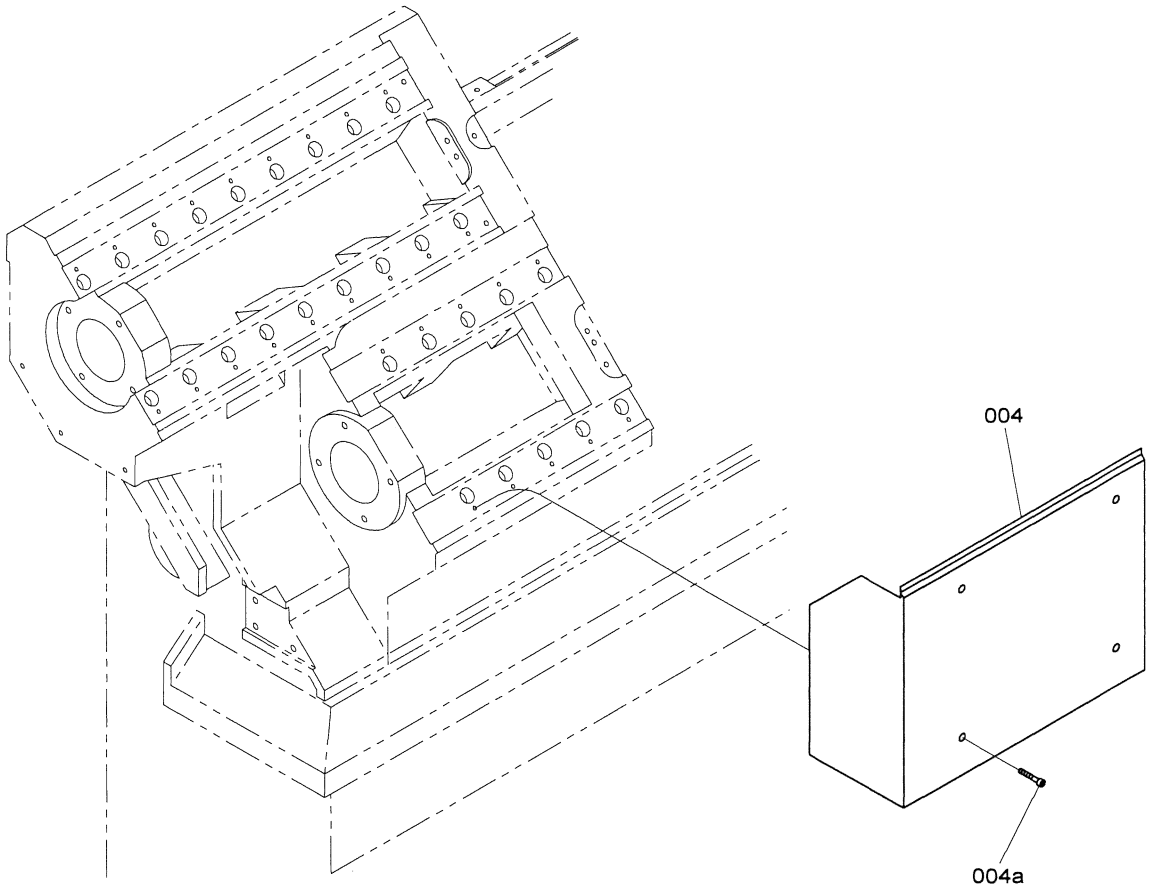
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001	UNIT8	ACスピンドルドライブユニット	AC SPINDLE DRIVE UNIT	MDS-B-SPJ2-15	1	MITSUBISHI ELECTRIC
KCT001a		ナベ小セムス B (小)	SCREW	M5x12	3	
KCT002	M5	スピンドルモータ	SPINDLE MOTOR	SJ-PF1.5-03GZ	1	MITSUBISHI ELECTRIC
KCT003	R3	回生抵抗	RESISTANCE UNIT	FCUA-RB15	1	MITSUBISHI ELECTRIC
KCT003a		ナベ小セムス B (大)	SCREW	M4x8	2	

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U4CN1B U8CN1A	プラグ	PLUG	10120-6000EL	2	SUMITOMO 3M
KWT002		シェル	SHELL	10320-3210-000	2	SUMITOMO 3M
WT004		バスケーブル	BUS CABLE		1	

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT101		ケーブルコンネ	CABLE KONNE	YL-28	1	DAIWA DENGYO
KWT102	U8CN2	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT103		シェル	SHELL	10620-5600-008	1	SUMITOMO 3M
KWT104		ラッチ	LATCH	10600-L0F0-8	2	SUMITOMO 3M
KWT105	M5CNPG	ハウジング	HOUSING	178289-6	1	AMP
KWT106		コンタクト	CONTACT	1-175216-5	11	AMP
WT101		G/B 主軸モータ動力ケーブル	G/B MOTOR POWER CABLE		1	
WT102		G/B 主軸モータ信号ケーブル	G/B MOTOR SIGNAL CABLE		1	
WT103		G/B 主軸ファンケーブル	G/B FAN CABLE		1	
WT104		G/B 主軸回生抵抗ケーブ	G/B REGENERATIVE RESISTOR CABLE		1	

C1216 U40Z	ロータリーガイドブッシュ駆動装置 ROTARY GUIDE BUSHING DEVICE	WT100

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C1216 U76Z	型式別専用ブロック EXCLUSIVE BLOCK	000 (C1216 U10A)

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
004	フタ	COVER		1	
004a	六角穴付ボルト	BOLT	M5x30	4	
C1216U10A K106	モデルナンバーシール	MODEL NUMBER SEAL	1M6A	1	UNIVERSAL DESIGN

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT001		専用ソフト SOFTWARE	SFT-C1216-6	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT301	P1-5,P1-6 P2-1,P2-3 P2-5,P2-6	短絡ケーブル CABLE	HKP-2FS01-L1	6	SANSEI

C1216 U76Z	型式別専用ブロック EXCLUSIVE BLOCK	DT300

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U2CN1A CNC6-1	プラグ	PLUG	10120-6000EL	2	SUMITOMO 3M
KWT002		シェル	SHELL	10320-3210-000	1	SUMITOMO 3M
KWT003		シェル	SHELL	10320-52A0-008	1	SUMITOMO 3M
KWT004	CNC6-2	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT005		シェル	SHELL	10320-42F0-008	1	SUMITOMO 3M
WT001		バスケーブル	BUS CABLE		1	
WT002		ダミーコネクタ	DUMMY CONNECTOR		1	

C1216 U76Z	型式別専用ブロック EXCLUSIVE BLOCK	WT000

PARTS NO.	PARTS NAME	TYPE	Q'TY	REMARKS
C1216U10A K107	モデルナンバーシール　MODEL NUMBER SEAL	1M7A	1	UNIVERSAL DESIGN

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT001		専用ソフト SOFTWARE	SFT-C1216-7	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT301	P1-6,P2-1 P2-3,P2-5 P2-6	短絡ケーブル CABLE	HKP-2FS01-L1	5	SANSEI

C1216 U77Z	型式別専用ブロック EXCLUSIVE BLOCK	DT300

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U2CN1A CNC6-1	プラグ	PLUG	10120-6000EL	2	SUMITOMO 3M
KWT002		シェル	SHELL	10320-3210-000	1	SUMITOMO 3M
KWT003		シェル	SHELL	10320-52A0-008	1	SUMITOMO 3M
KWT004	CNC6-2	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT005		シェル	SHELL	10320-42F0-008	1	SUMITOMO 3M
WT001		バスケーブル	BUS CABLE		1	
WT002		ダミーコネクタ	DUMMY CONNECTOR		1	

C1216 U77Z	型式別専用ブロック EXCLUSIVE BLOCK	WT000

PARTS NO.	PARTS NAME	TYPE	Q'TY	REMARKS
C1216U10A K108	モデルナンバーシール MODEL NUMBER SEAL	1M8A	1	UNIVERSAL DESIGN

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KCT001		専用ソフト SOFTWARE	SFT-C1216-8	1	MITSUBISHI ELECTRIC

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT301	P2-1,P2-3 P2-5,P2-6	短絡ケーブル CABLE	HKP-2FS01-L1	4	SANSEI

C1216 U78Z	型式別専用ブロック EXCLUSIVE BLOCK	DT300

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U2CN1A CNC6-1	プラグ	PLUG	10120-6000EL	2	SUMITOMO 3M
KWT002		シェル	SHELL	10320-3210-000	1	SUMITOMO 3M
KWT003		シェル	SHELL	10320-52A0-008	1	SUMITOMO 3M
KWT004	CNC6-2	プラグ	PLUG	10120-3000VE	1	SUMITOMO 3M
KWT005		シェル	SHELL	10320-42F0-008	1	SUMITOMO 3M
WT001		バスケーブル	BUS CABLE		1	
WT002		ダミーコネクタ	DUMMY CONNECTOR		1	

C1216 U78Z	型式別専用ブロック EXCLUSIVE BLOCK	WT000

PARTS NO.	PARTS NAME	TYPE	Q'TY	REMARKS
C1216U10A K109	モデルナンバーシール MODEL NUMBER SEAL	1M9A	1	UNIVERSAL DESIGN

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KCT001		専用ソフト	SOFTWARE	SFT-C1216-9	1	MITSUBISHI ELECTRIC
KCT003	UNIT3	バッテリーユニット	BATTERY UNIT	A-BT-4	1	MITSUBISHI ELECTRIC
KCT003a		ナベ小セムス B (大)	SCREW	M5x8	2	

C1216 U79Z	型式別専用ブロック EXCLUSIVE BLOCK	CT000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT301	P2-3,P2-5 P2-6	短絡ケーブル CABLE	HKP-2FS01-L1	3	SANSEI

C1216 U79Z	型式別専用ブロック EXCLUSIVE BLOCK	DT300

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	U2CN1A U3CN1A CNC6-1 CNC6-2	プラグ	PLUG	10120-6000EL	4	SUMITOMO 3M
KWT002		シェル	SHELL	10320-3210-000	2	SUMITOMO 3M
KWT003		シェル	SHELL	10320-52A0-008	2	SUMITOMO 3M
WT001		バスケーブル	BUS CABLE		1	
WT002		バスケーブル	BUS CABLE		1	

C1216 U79Z	型式別専用ブロック EXCLUSIVE BLOCK	WT000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	SL1	パトライト	PATROL LIGHT	SKH-102 YELLOW/DC24V	1	PATLITE
KBT002	SL1	パトライト	PATROL LIGHT	SKH-102 RED/DC24V	1	PATLITE
KBT002SP1		電球	BULB	D02401003A (24V10W)	(1)	PATLITE
KBT003		取付けポール	FIXING POLE	SZ-30L	1	PATLITE
KBT003a		六角穴付ボルト	BOLT	M8x16	2	
KBT003b		平座金	WASHER	M8	2	
KBT004		タイマウント	TIE MOUNT	TM2S8-M	6	PANDUIT
KBT005		バインド小ネジ	BINDING HEAD SCREW	M4x8	6	

C1216 U80Z	パトライト表示 POTROL LIGHT	BT000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT301	Ry205	リレー RELAY	RB104-DE	1	FUJI ELECTRIC
WT101		パトライト延長ケーブル PATROL LIGHT EXTENSION CABLE		1	

C1216 U80Z	パトライト表示 POTROL LIGHT	DT300 WT100

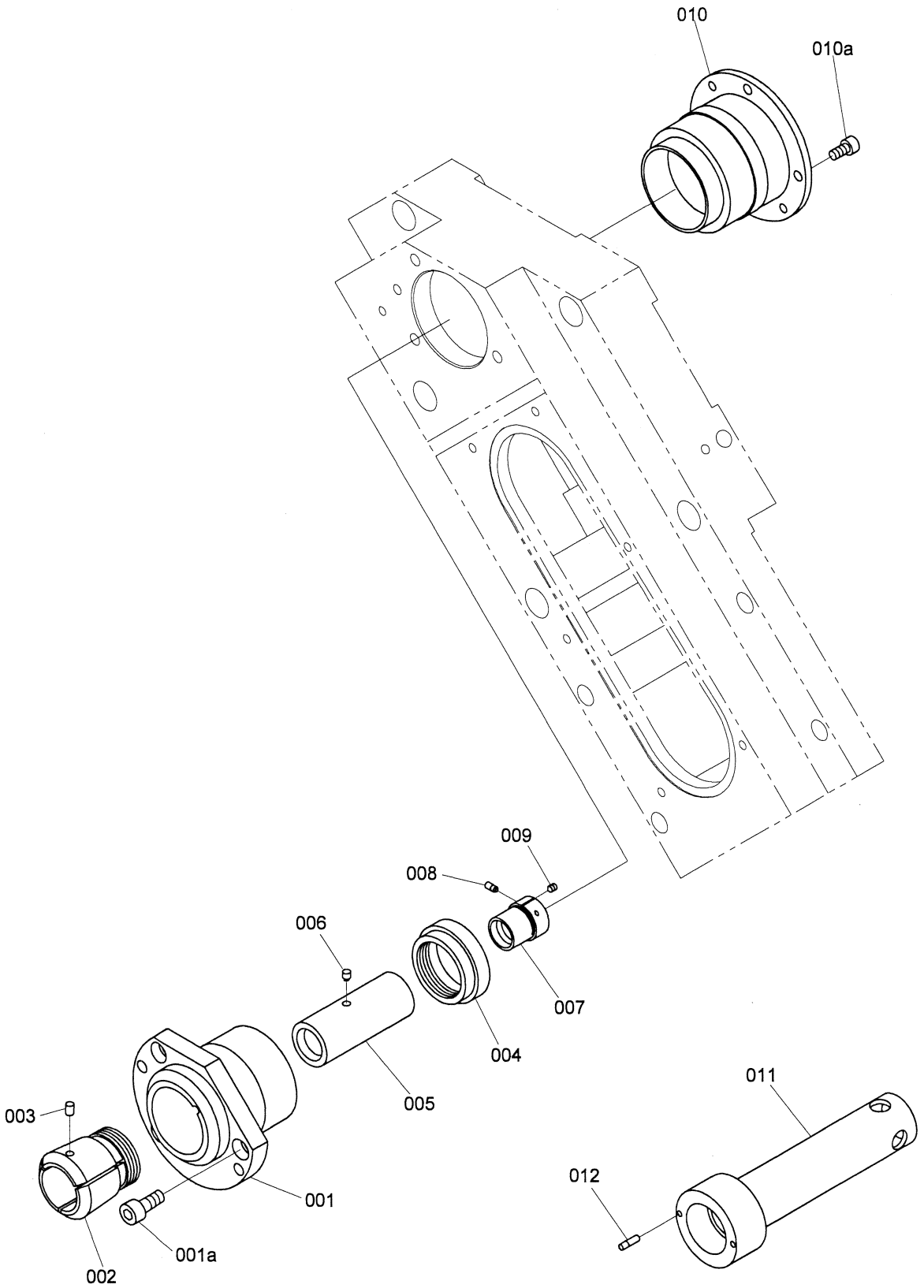
PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	SL2	シグナルタワー	SIGNAL TOWER	STFP-302	1	PATLITE
KBT001a		六角穴付ボルト	BOLT	M8x16	2	
KBT001b		平座金	WASHER	M8	2	
KBT001SP1		電球	BULB	D03001006A (30V10W)	(1)	PATLITE
KBT002		タイマウント	TIE MOUNT	TM2S8-M	6	PANDUIT
KBT003		バインド小ネジ	BINDING HEAD SCREW	M4x8	6	

C1216 U81Z	3段シグナルタワー機械関係 3 STEP SIGNAL TOWER	BT000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT301	Ry203 Ry204 Ry205	リレー RELAY	RB104-DE (DC24V)	3	FUJI ELECTRIC
WT101		シグナルタワー延長ケーブル SIGNAL TOWER EXTENSION CABLE		1	

C1216 U81Z	3段シグナルタワー機械関係 3 STEP SIGNAL TOWER	DT300 WT100

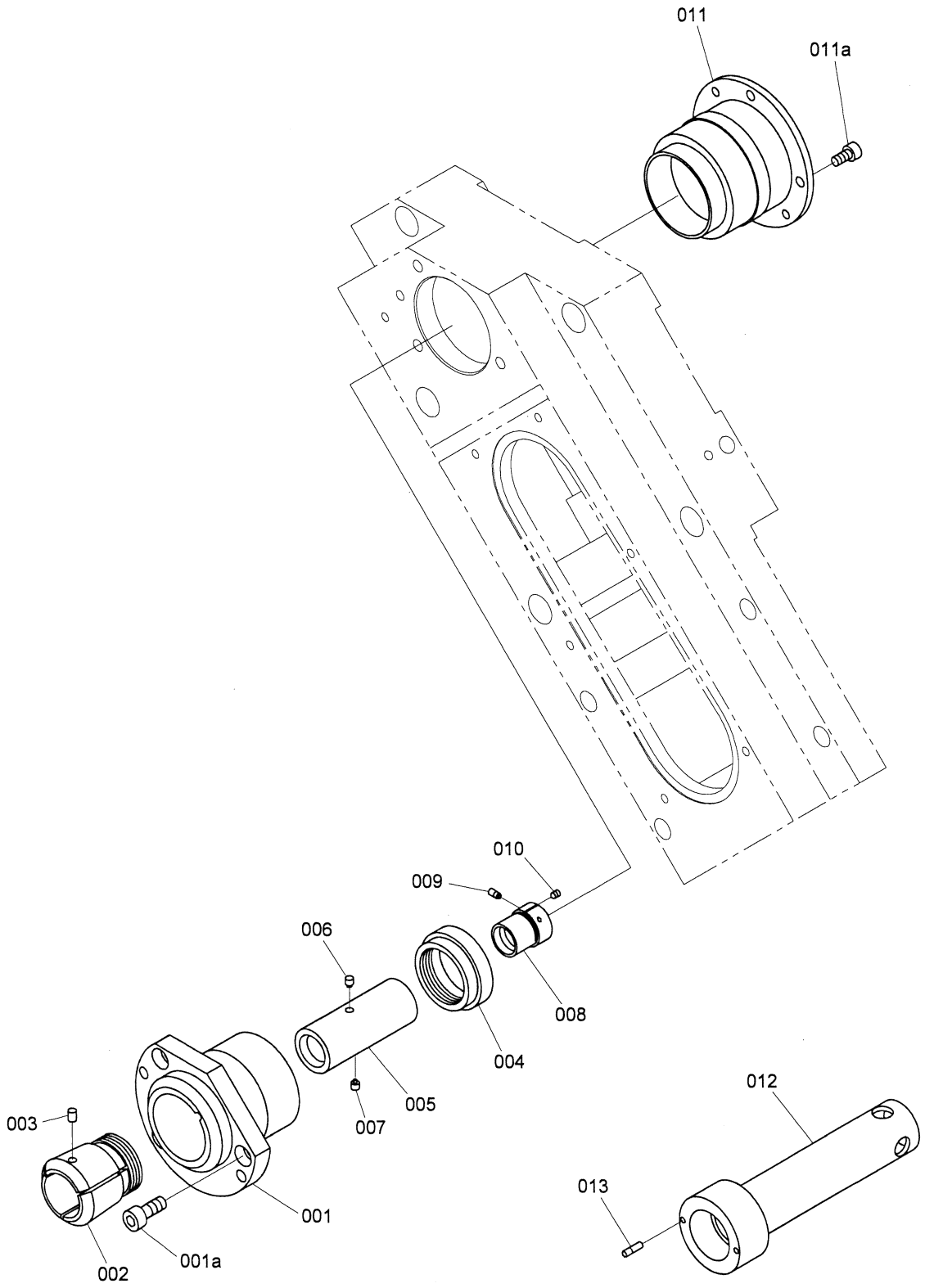
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C12 U110Z	固定型ガイドブッシュ装置 FIXED GUIDE BUSHING DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
002	スリーブホルダー	SLEEVE HOLDER		1	
003	キー	KEY		1	
004	ナット	NUT		1	
005	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
006	キー	KEY		1	
007	ドローバー	DRAWBAR		1	
008	押しピン	PIN		1	
009	クランプネジ	CLAMP SCREW		1	
010	フランジカバー	FLANGE COVER		1	
010a	六角穴付ボルト	BOLT	M6x10	4	
011	スパナ	SPANNER		1	
012	ピン	PIN		2	

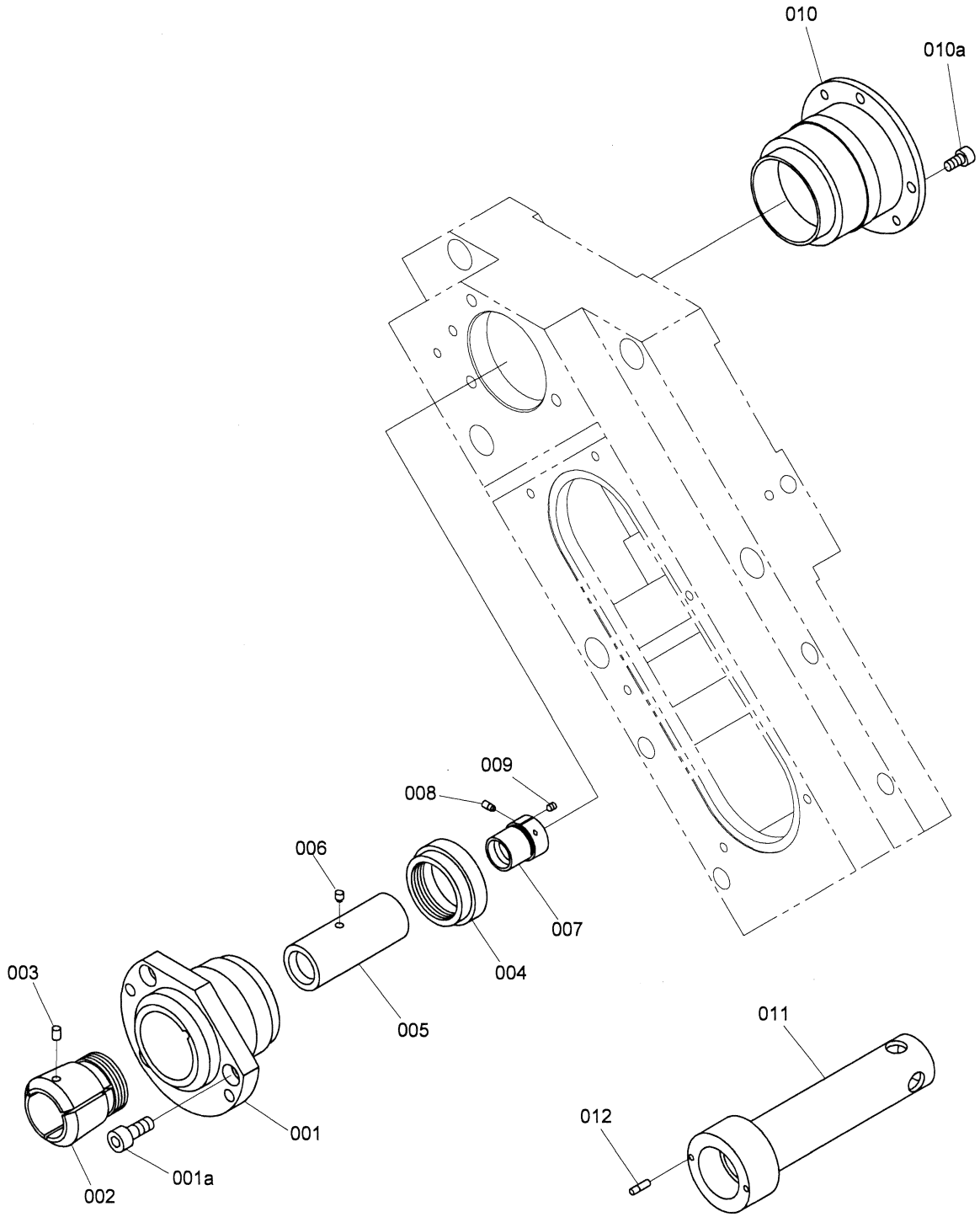
C12 U110Z	固定型ガイドブッシュ装置 FIXED GUIDE BUSHING DEVICE	000



C12 U160Z	固定型ガイドブッシュ装置 FIXED GUIDE BUSHING DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
002	スリーブホルダー	SLEEVE HOLDER		1	
003	キー	KEY		1	
004	ナット	NUT		1	
005	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
006	キー	KEY		1	
007	キー	KEY		1	
008	ドローバー	DRAWBAR		1	
009	押しピン	PIN		1	
010	クランプネジ	CLAMP SCREW		1	
011	フランジカバー	FLANGE COVER		1	
011a	六角穴付ボルト	BOLT	M6x10	4	
012	スパナ	SPANNER		1	
013	ピン	PIN		2	

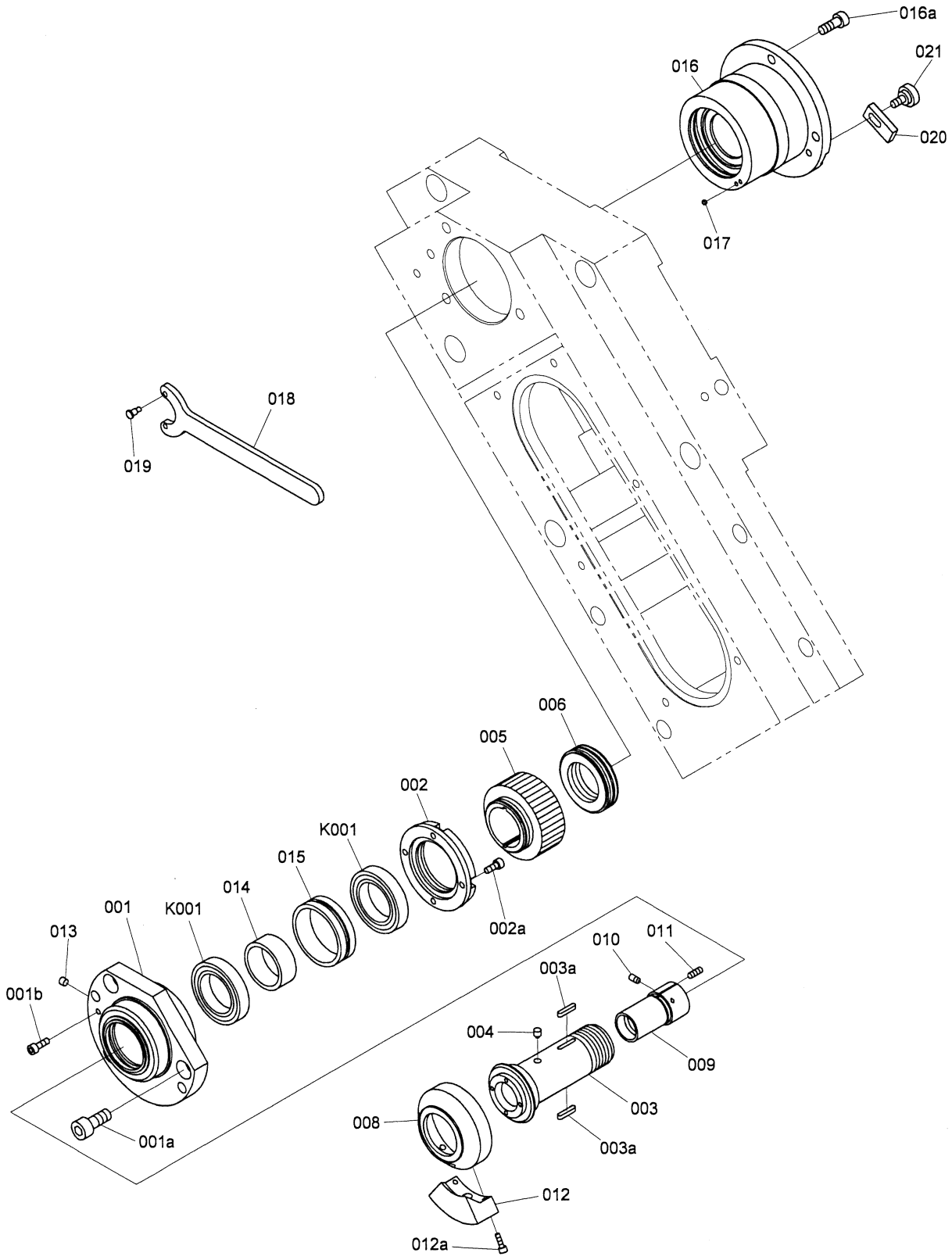
C12 U160Z	固定型ガイドブッシュ装置 FIXED GUIDE BUSHING DEVICE	000



C16 U1660Z	固定型ガイドブッシュ装置 FIXED GUIDE BUSHING DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
002	スリーブホルダー	SLEEVE HOLDER		1	
003	キー	KEY		1	
004	ナット	NUT		1	
005	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
006	キー	KEY		1	
007	ドローバー	DRAWBAR		1	
008	押しピン	PIN		1	
009	クランプネジ	CLAMP SCREW		1	
010	フランジカバー	FLANGE COVER		1	
010a	六角穴付ボルト	BOLT	M6x10	4	
011	スパナ	SPANNER		1	
012	ピン	PIN		2	

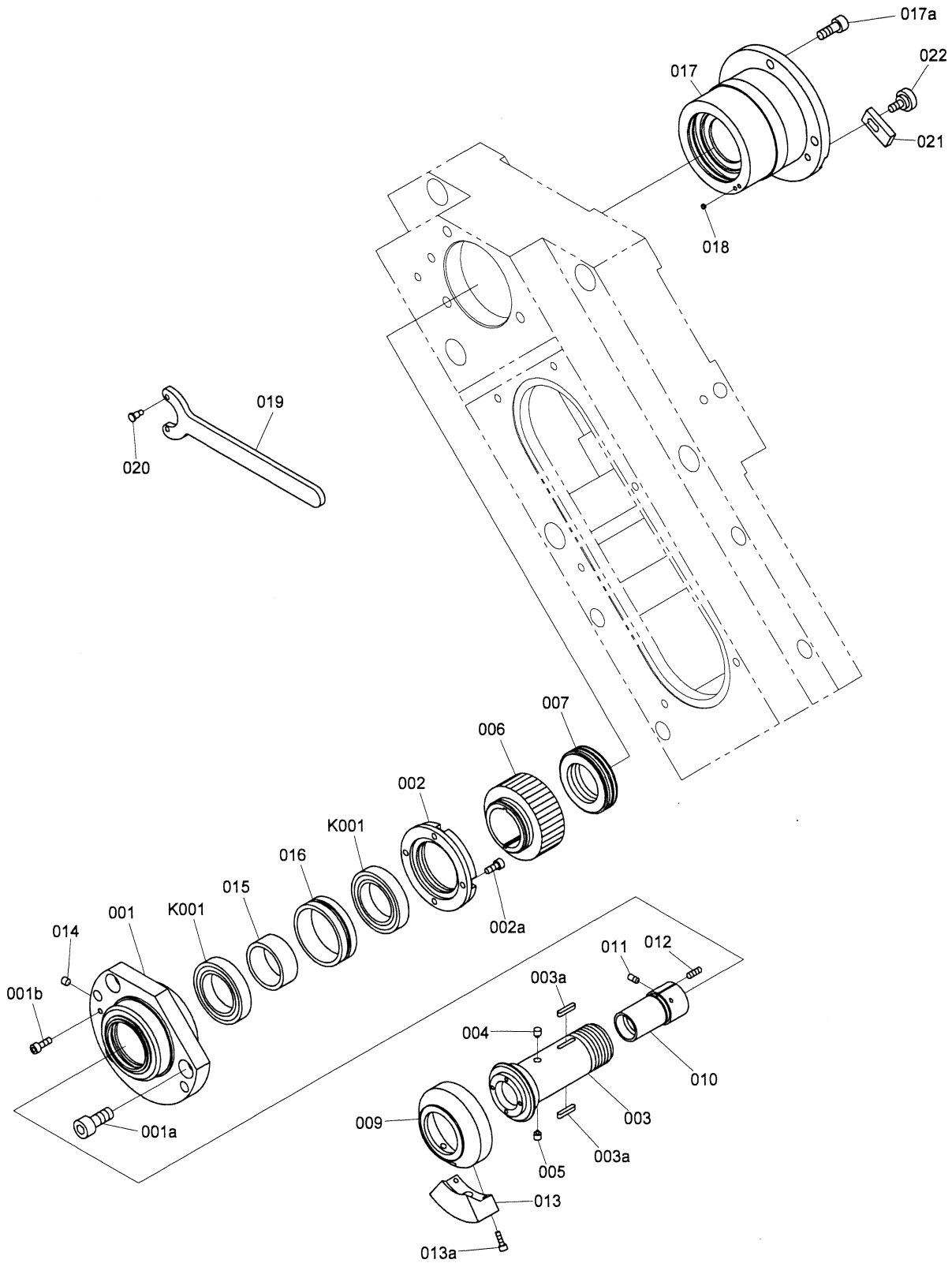
C16 U1660Z	固定型ガイドブッシュ装置 FIXED GUIDE BUSHING DEVICE	000



C12 U210Z	同期型ロータリーガイドブッシュ装置 ROTARY GUIDE BUSHING DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
001b	六角穴付ボルト	BOLT	M4x12	1	
002	ベアリング押え	FLANGE		1	
002a	六角穴付ボルト	BOLT	M4x10	4	
003	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
003a	キー (両丸)	KEY	$3^{+0.02}_{+0.01}$ x3x16	2	
004	キー	KEY		1	
005	タイミングプーリー	TIMING PULLEY		1	
006	ナット (特級ネジ)	NUT		1	
008	キャップ	CAP		1	
009	ドローバー	DRAWBAR		1	
010	押しピン	PIN		1	
011	クランプネジ	CLAMP SCREW		1	
012	カバー	COVER		1	
012a	六角穴付ボルト	BOLT	M3x12	2	
013	塞ぎ栓	PLUG		3	
014	内輪スペーサー	INNER SPACER		1	
015	外輪スペーサー	OUTER SPACER		1	
016	フランジカバー	FLANGE COVER		1	
016a	六角穴付ボルト	BOLT	M6x16	4	
017	塞ぎ栓	PLUG		3	
018	カニ目スパナ	WRENCH		1	
019	ピン	PIN		2	
020	プレート	PLATE		1	
021	クランプボルト	CLAMP BOLT		1	
K001	高速用組合せアンギュラ玉軸受	ANGULAR BALL BEARING	7906CDB/G8P4	1set	NTN

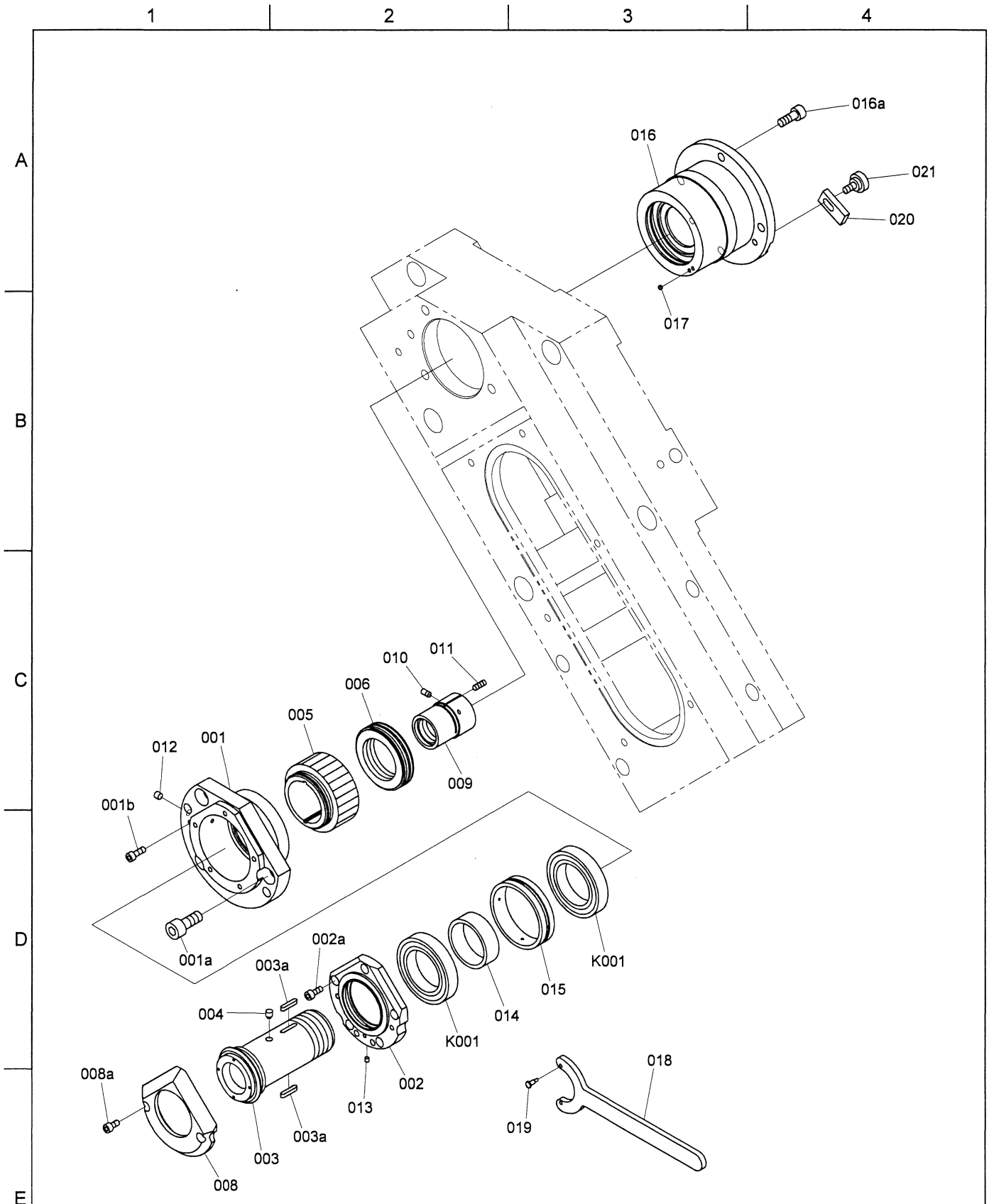
C12 U210Z	同期型ロータリーガイドブッシュ装置 ROTARY GUIDE BUSHING DEVICE	000



C12 U260Z	同期型ロータリーガイドブッシュ装置 ROTARY GUIDE BUSHING DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
001b	六角穴付ボルト	BOLT	M4x12	1	
002	ベアリング押え	FLANGE		1	
002a	六角穴付ボルト	BOLT	M4x10	4	
003	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
003a	キー (両丸)	KEY	$3^{+0.02}_{+0.01}$ x3x16	2	
004	キー	KEY		1	
005	キー	KEY		1	
006	タイミングプーリー	TIMING PULLEY		1	
007	ナット (特級ネジ)	NUT		1	
009	キャップ	CAP		1	
010	ドローバー	DRAWBAR		1	
011	押しピン	PIN		1	
012	クランプネジ	CLAMP SCREW		1	
013	カバー	COVER		1	
013a	六角穴付ボルト	BOLT	M3x12	2	
014	塞ぎ栓	PLUG		3	
015	内輪スペーサー	INNER SPACER		1	
016	外輪スペーサー	OUTER SPACER		1	
017	フランジカバー	FLANGE COVER		1	
017a	六角穴付ボルト	BOLT	M6x16	4	
018	塞ぎ栓	PLUG		3	
019	カニ目スパナ	WRENCH		1	
020	ピン	PIN		2	
021	プレート	PLATE		1	
022	クランプボルト	CLAMP BOLT		1	
K001	高速用組合せアンギュラ玉軸受	ANGULAR BALL BEARING	7906CDB/G8P4	1set	NTN

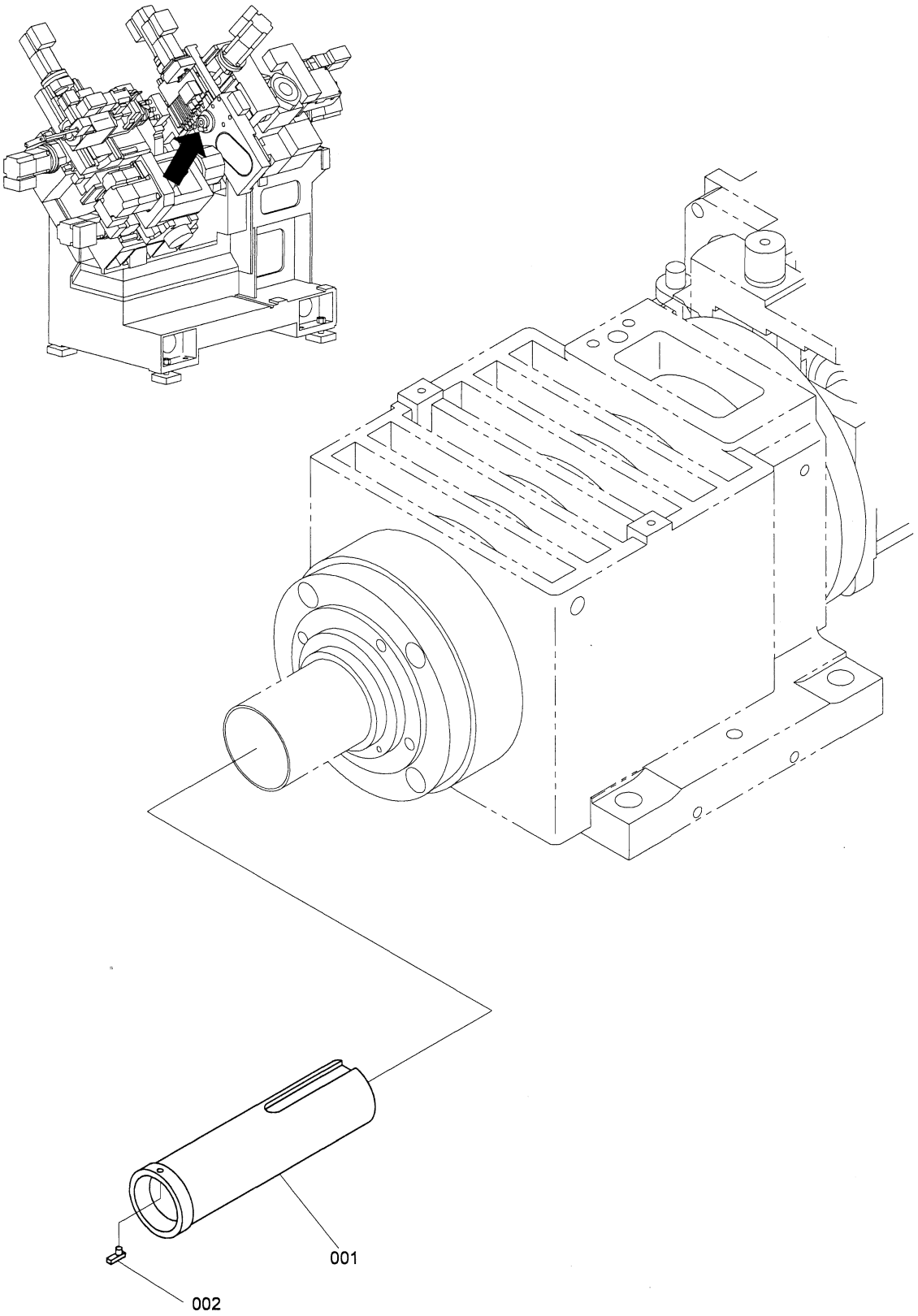
C12 U260Z	同期型ロータリーガイドブッシュ装置 ROTARY GUIDE BUSHING DEVICE	000



C16 U2660Z	同期型ロータリーガイドブッシュ装置 ROTARY GUIDE BUSHING DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
001b	六角穴付ボルト	BOLT	M4x12	1	
002	ベアリング押え	FLANGE		1	
002a	六角穴付ボルト	BOLT	M4x10	5	
003	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
003a	キー (両丸)	KEY	$3^{+0.02}_{+0.01}$ x3x16	2	
004	キー	KEY		1	
005	タイミングプーリー	TIMING PULLEY		1	
006	ナット (特級ネジ)	NUT		1	
008	キャップ	CAP		1	
008a	六角穴付ボルト	BOLT	M4x8	2	
009	ドローバー	DRAWBAR		1	
010	押しピン	PIN		1	
011	クランプネジ	CLAMP SCREW		1	
012	塞ぎ栓	PLUG		1	
013	塞ぎ栓	PLUG		1	
014	内輪スペーサー	INNER SPACER		1	
015	外輪スペーサー	OUTER SPACER		1	
016	フランジカバー	FLANGE COVER		1	
016a	六角穴付ボルト	BOLT	M6x16	4	
017	塞ぎ栓	PLUG		4	
018	カニ目スパナ	WRENCH		1	
019	ピン	PIN		2	
020	プレート	PLATE		1	
021	クランプボルト	CLAMP BOLT		1	
K001	高速用組合せアンギュラ玉軸受	ANGULAR BALL BEARING	7907CDB/GNP4	1set	NTN

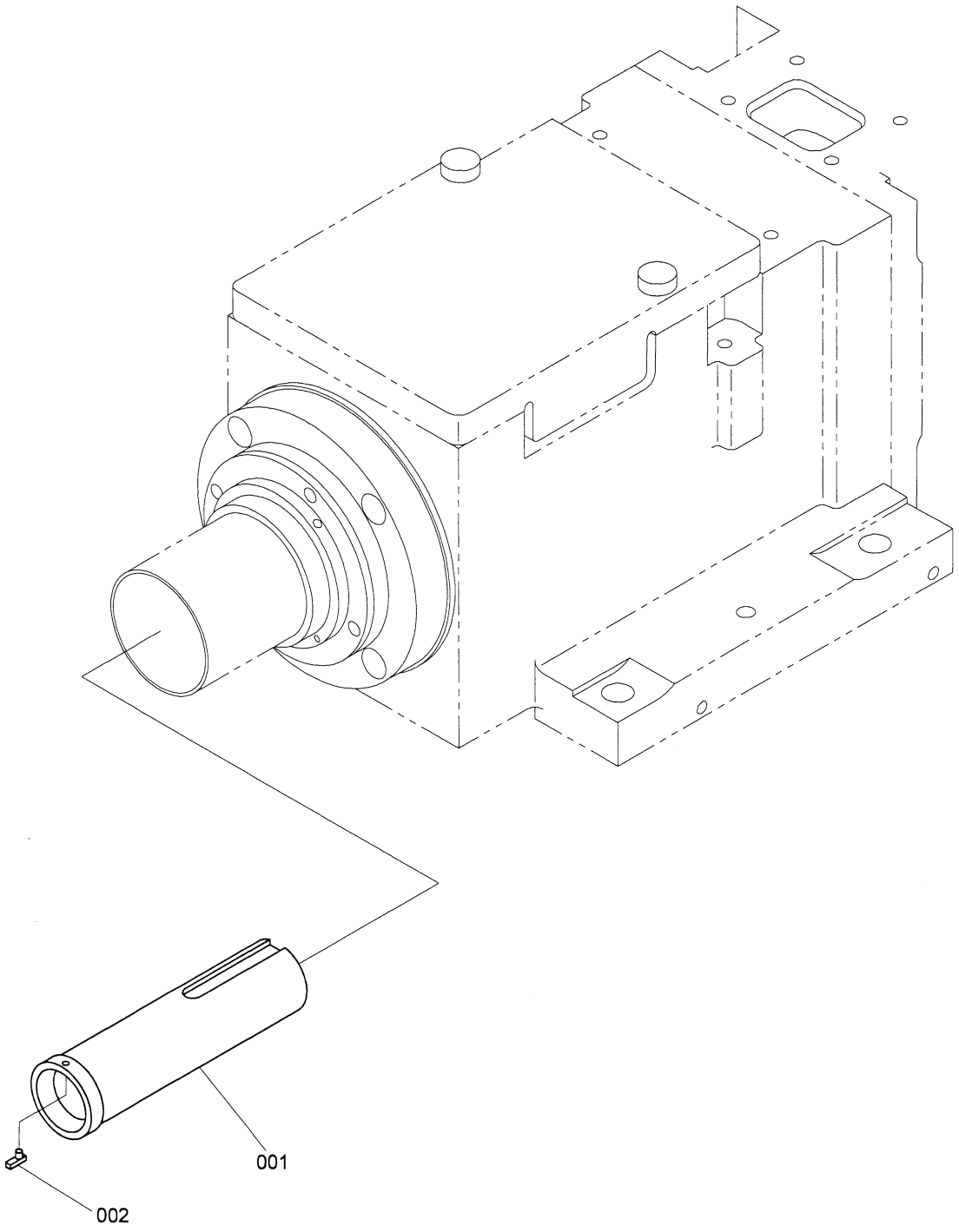
C16 U2660Z	同期型ロータリーガイドブッシュ装置 ROTARY GUIDE BUSHING DEVICE	000



B12 U610Z	異形材用チャックスリーブ CHUCK SLEEVE FOR HEX. MATERIAL	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	ピン	PIN		1	

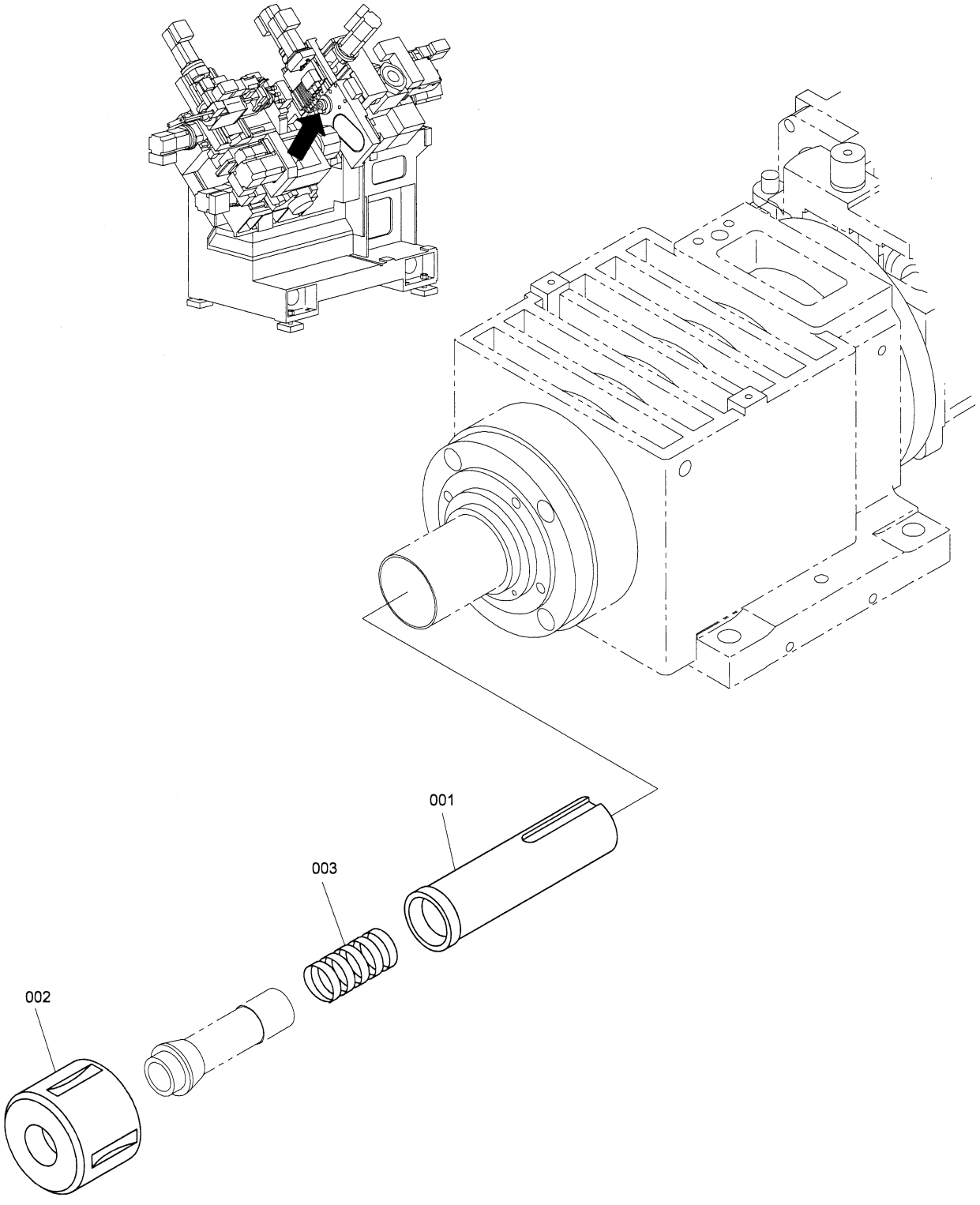
B12 U610Z	異形材用チャックスリーブ CHUCK SLEEVE FOR HEX. MATERIAL	000



M216 U6120Z	異形材用チャックスリーブ CHUCK SLEEVE FOR HEX. MATERIAL	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	ピン	PIN		1	

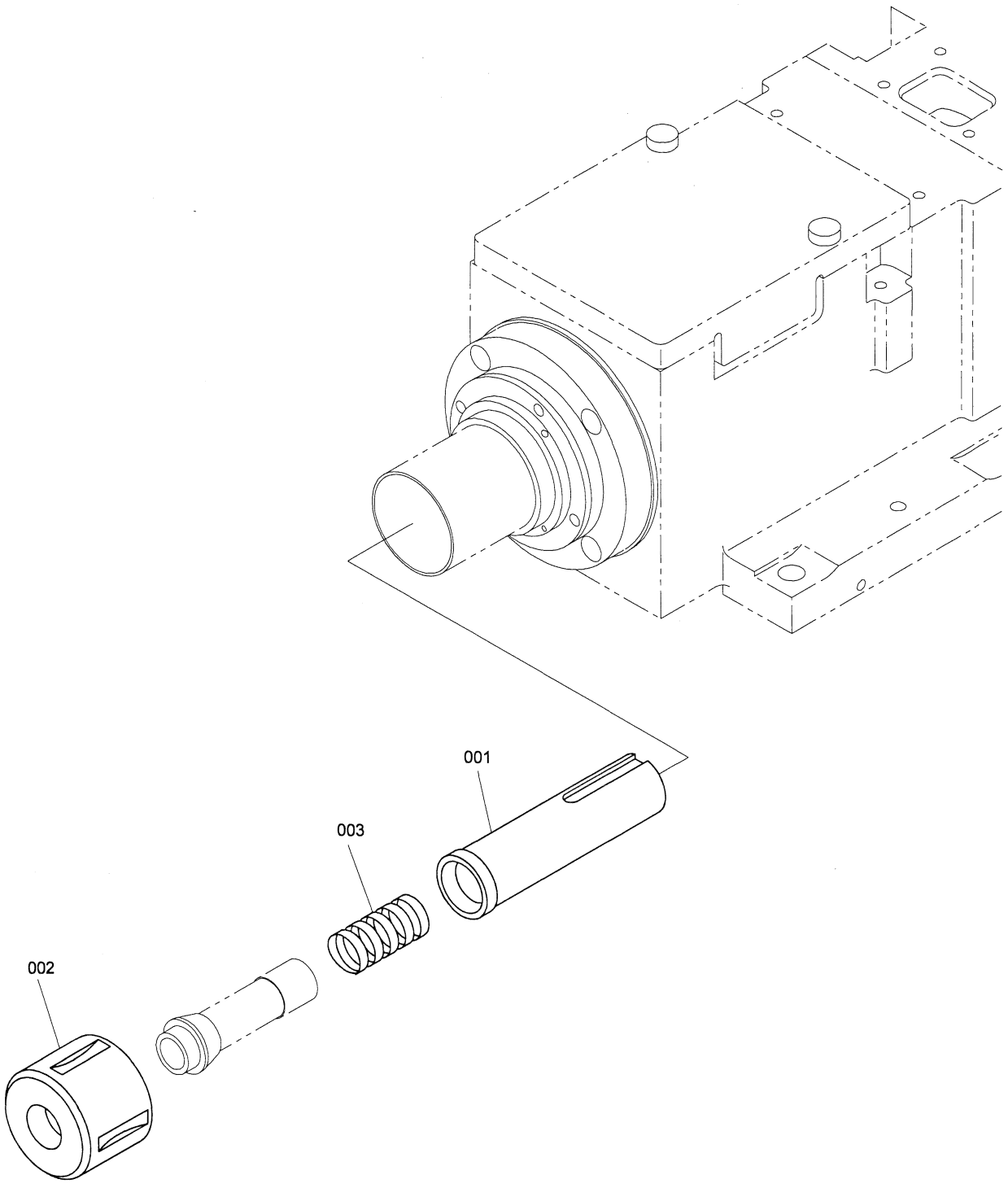
M216 U6120Z	異形材用チャックスリーブ CHUCK SLEEVE FOR HEX. MATERIAL	000



B12 U910Z	主軸チャック装置 MAIN SPINDLE CHUCK DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	キャップナット	CAP NUT		1	
003	角バネ	SPRING		1	

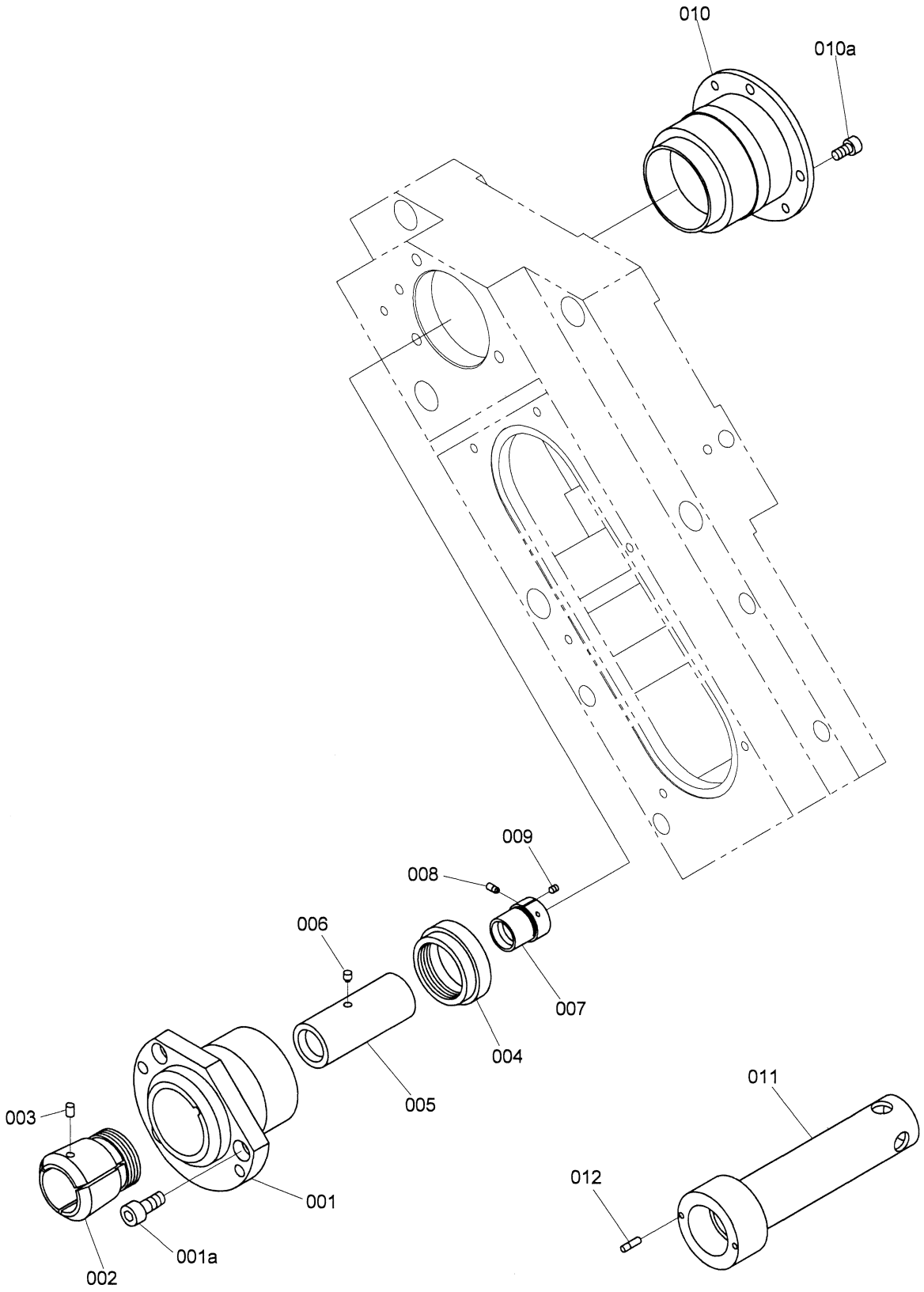
B12 U910Z	主軸チャック装置 MAIN SPINDLE CHUCK DEVICE	000



M216 U9120Z	主軸チャック装置 MAIN SPINDLE CHUCK DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	キャップナット	CAP NUT		1	
003	角バネ	SPRING		1	

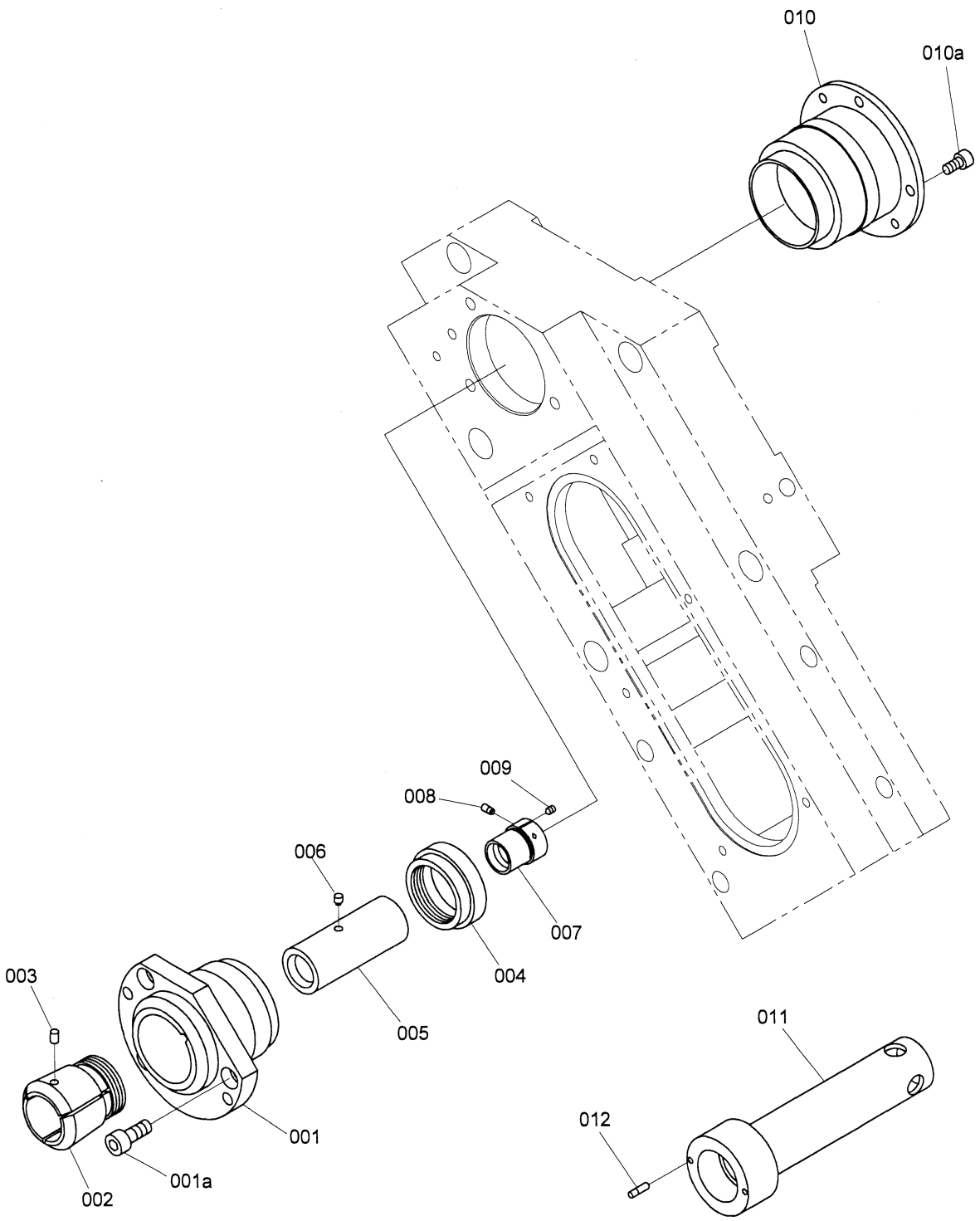
M216 U9120Z	主軸チャック装置 MAIN SPINDLE CHUCK DEVICE	000



C12 U1110Z	固定型ガイドブッシュ装置 (輸出用) FIXED GUIDE BUSHING DEVICE (FOR EXPORT)	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
002	スリーブホルダー	SLEEVE HOLDER		1	
003	キー	KEY		1	
004	ナット	NUT		1	
005	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
006	キー	KEY		1	
007	ドローバー	DRAWBAR		1	
008	押しピン	PIN		1	
009	クランプネジ	CLAMP SCREW		1	
010	フランジカバー	FLANGE COVER		1	
010a	六角穴付ボルト	BOLT	M6x10	4	
011	スパナ	SPANNER		1	
012	ピン	PIN		2	

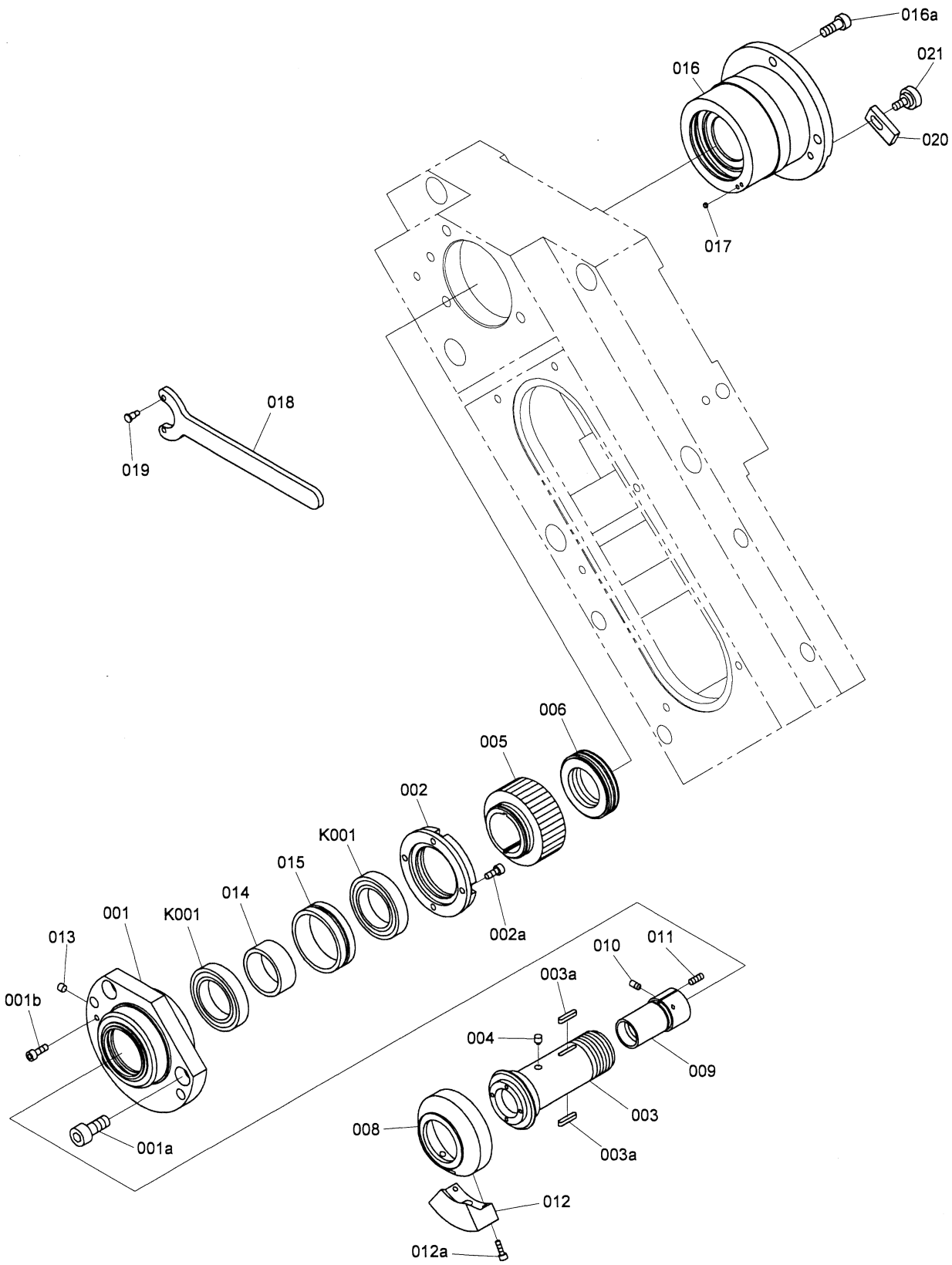
C12 U1110Z	固定型ガイドブッシュ装置 (輸出用) FIXED GUIDE BUSHING DEVICE (FOR EXPORT)	000



C16 U1120Z	固定型ガイドブッシュ装置 (輸出用) FIXED GUIDE BUSHING DEVICE (FOR EXPORT)	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
002	スリーブホルダー	SLEEVE HOLDER		1	
003	キー	KEY		1	
004	ナット	NUT		1	
005	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
006	キー	KEY		1	
007	ドローバー	DRAWBAR		1	
008	押しピン	PIN		1	
009	クランプネジ	CLAMP SCREW		1	
010	フランジカバー	FLANGE COVER		1	
010a	六角穴付ボルト	BOLT	M6x10	4	
011	スパナ	SPANNER		1	
012	ピン	PIN		2	

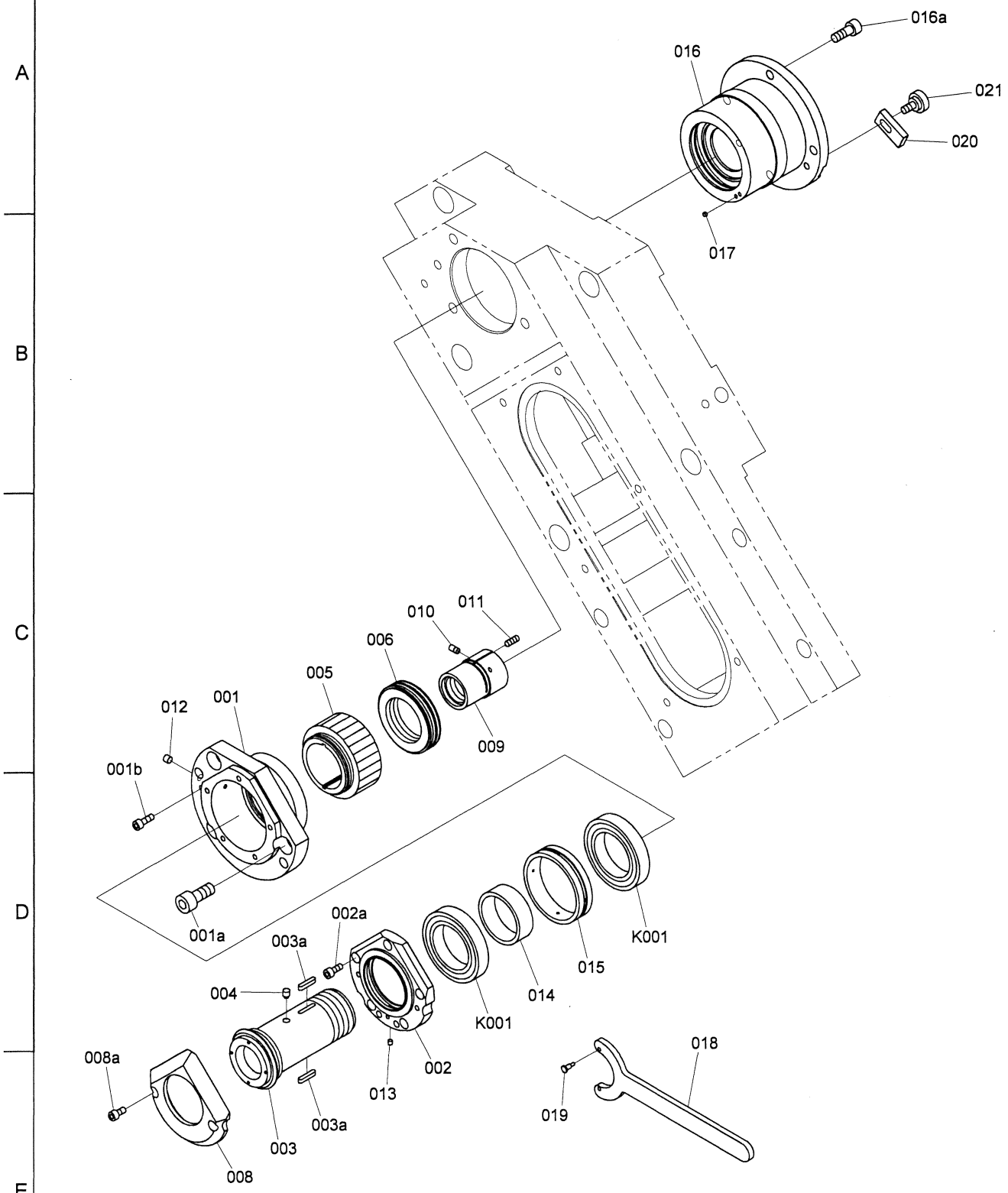
C16 U1120Z	固定型ガイドブッシュ装置 (輸出用) FIXED GUIDE BUSHING DEVICE (FOR EXPORT)	000



C12 U2110Z	同期型ロータリーガイドブッシュ装置 (輸出用) ROTARY GUIDE BUSHING DEVICE (FOR EXPORT)	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
001b	六角穴付ボルト	BOLT	M4x12	1	
002	ベアリング押え	FLANGE		1	
002a	六角穴付ボルト	BOLT	M4x10	4	
003	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
003a	キー (両丸)	KEY	$3^{+0.02}_{+0.01}$ x3x16	2	
004	キー	KEY		1	
005	タイミングプーリー	TIMING PULLEY		1	
006	ナット (特級ネジ)	NUT		1	
008	キャップ	CAP		1	
009	ドローバー	DRAWBAR		1	
010	押しピン	PIN		1	
011	クランプネジ	CLAMP SCREW		1	
012	カバー	COVER		1	
012a	六角穴付ボルト	BOLT	M3x12	2	
013	塞ぎ栓	PLUG		3	
014	内輪スペーサー	INNER SPACER		1	
015	外輪スペーサー	OUTER SPACER		1	
016	フランジカバー	FLANGE COVER		1	
016a	六角穴付ボルト	BOLT	M6x16	4	
017	塞ぎ栓	PLUG		4	
018	カニ目スパナ	WRENCH		1	
019	ピン	PIN		2	
020	プレート	PLATE		1	
021	クランプボルト	CLAMP BOLT		1	
K001	高速用組合せアンギュラ玉軸受	ANGULAR BALL BEARING	7906CDB/G8P4	1set	NTN

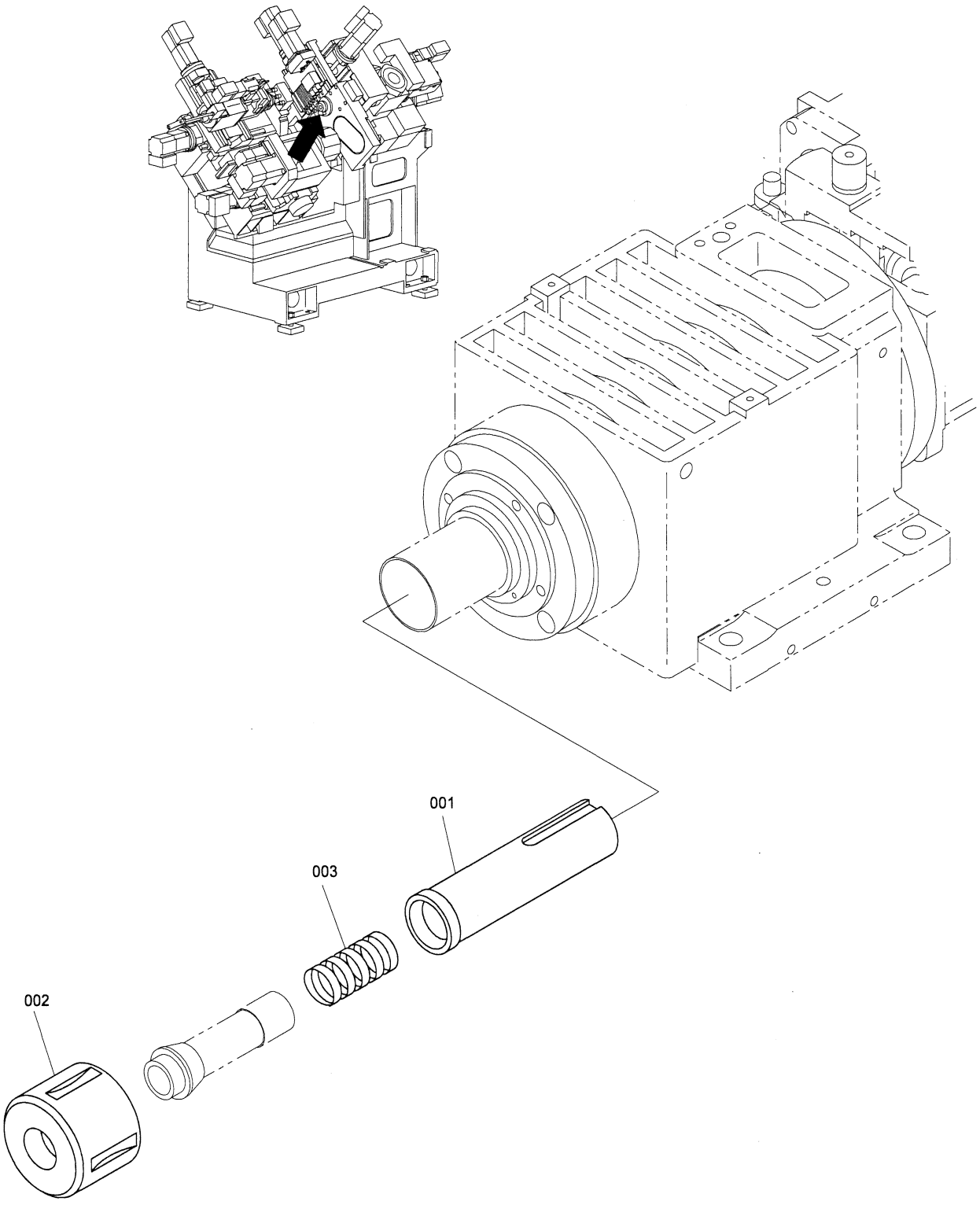
C12 U2110Z	同期型ロータリーガイドブッシュ装置 (輸出用) ROTARY GUIDE BUSHING DEVICE (FOR EXPORT)	000



C16 U2120Z	同期型ロータリーガイドブッシュ装置 (輸出用) ROTARY GUIDE BUSHING DEVICE (FOR EXPORT)	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	ガイドブッシュホルダー	GUIDE BUSH HOLDER		1	
001a	六角穴付ボルト	BOLT	M8x20	3	
001b	六角穴付ボルト	BOLT	M4x12	1	
002	ベアリング押え	FLANGE		1	
002a	六角穴付ボルト	BOLT	M4x10	5	
003	ガイドブッシュスリーブ	GUIDE BUSH SLEEVE		1	
003a	キー (両丸)	KEY	$3^{+0.02}_{+0.01}$ x3x16	2	
004	キー	KEY		1	
005	タイミングプーリー	TIMING PULLEY		1	
006	ナット (特級ネジ)	NUT		1	
008	キャップ	CAP		1	
008a	六角穴付ボルト	BOLT	M4x8	2	
009	ドローバー	DRAWBAR		1	
010	押しピン	PIN		1	
011	クランプネジ	CLAMP SCREW		1	
012	塞ぎ栓	PLUG		1	
013	塞ぎ栓	PLUG		1	
014	内輪スペーサー	INNER SPACER		1	
015	外輪スペーサー	OUTER SPACER		1	
016	フランジカバー	FLANGE COVER		1	
016a	六角穴付ボルト	BOLT	M6x16	4	
017	塞ぎ栓	PLUG		4	
018	カニ目スパナ	WRENCH		1	
019	ピン	PIN		2	
020	プレート	PLATE		1	
021	クランプボルト	CLAMP BOLT		1	
K001	高速用組合せアンギュラ玉軸受	ANGULAR BALL BEARING	7907CDB/GNP4	1set	NTN

C16 U2120Z	同期型ロータリーガイドブッシュ装置 (輸出用) ROTARY GUIDE BUSHING DEVICE (FOR EXPORT)	000



B12 U9110Z	主軸チャック装置 MAIN SPINDLECHUCK DEVICE	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	チャックスリーブ	CHUCK SLEEVE		1	
002	キャップナット	CAP NUT		1	
003	角バネ	SPRING		1	

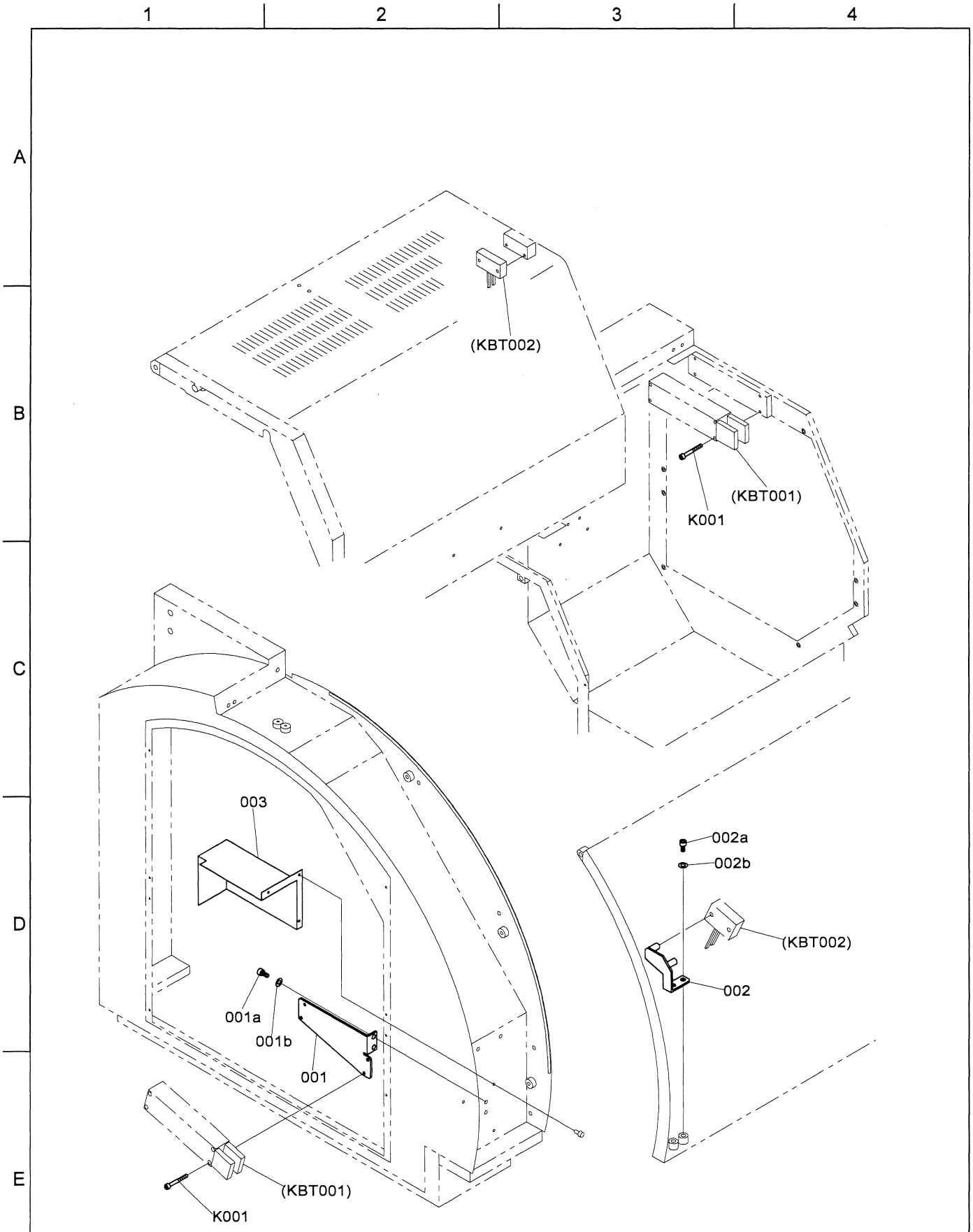
B12 U9110Z	主軸チャック装置 MAIN SPINDLECHUCK DEVICE	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
K001		機名銘板	NAME PLATE	CITIZEN	1	YATABE
K002		シンコムデザインステッカー	CINCOM DESIGN STICKER		1	UNIVERSAL DESIGN
K003		危険ラベル	DANGER LABEL	JD01	2	TOHIN
K004		警告ラベル	WARNING LABEL	JW201	1	
K005		警告ラベル	WARNING LABEL	JW01	3	
K006		警告ラベル	WARNING LABEL	JW02	1	
K007		警告ラベル	WARNING LABEL	JW03	1	
K008		警告ラベル	WARNING LABEL	JW04	1	
K009		警告ラベル	WARNING LABEL	JW05	1	
K010		警告ラベル	WARNING LABEL	JW07	1	
K011		警告ラベル	WARNING LABEL	JW11	1	
K012		アースシール	EARTH LABEL	A-001	1	CMTN

C1216 Y70S	警告ラベル WARNING LABEL	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
K101		機名銘板	NAME PLATE	CITIZEN	1	YATABE
K102		シンコムデザインステッカー	CINCOM DESIGN STICKER		1	UNIVERSAL DESIGN
K103		危険ラベル	DANGER LABEL	ED01	2	TOHIN
K104		警告ラベル	WARNING LABEL	EW201	1	
K105		警告ラベル	WARNING LABEL	EW01	3	
K106		警告ラベル	WARNING LABEL	EW02	1	
K107		警告ラベル	WARNING LABEL	EW03	1	
K108		警告ラベル	WARNING LABEL	EW04	1	
K109		警告ラベル	WARNING LABEL	EW05	1	
K110		警告ラベル	WARNING LABEL	EW07	1	
K111		警告ラベル	WARNING LABEL	EW11	1	
K112		アースシール	EARTH LABEL	A-002	1	CMTN

C1216 Y70S	警告ラベル WARNING LABEL	100



C1216 Y76Z	ドアロック DOOR LOCK	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	センサーブラケット	SENSOR BRACKET		1	
001a	六角穴付ボルト	BOLT	M6x12	2	
001b	平座金	WASHER	M6	2	
002	ドグブラケット	DOG BRACKET		1	
002a	六角穴付ボルト	BOLT	M6x12	2	
002b	平座金	WASHER	M6	2	
003	カバー	COVER		1	
K001	六角穴付ボルト	BOLT	M5x40	8	

C1216 Y76Z	ドアロック DOOR LOCK	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KBT001	DRLK1 DRLK2	セーフティスイッチ	SAFETY SWITCH	TP4-537A024PG	2	ENCHNER
KBT002		ヒンジアクチュエータ	ACTUATOR	No.070050	2	ENCHNER
KBT002a		六角穴付ボルト	BOLT	M5x20	8	
KBT003		ケーブルグランド	CABLE GROUND	EKP13/06	2	ENCHNER
KBT004		六角穴付ボルト	BOLT	M5x40	8	

C1216 Y76Z	ドアロック DOOR LOCK	BT000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT001	AVR4	スイッチング電源 SWITCHING POWER SUPPLY	S82J-05024D	1	OMRON

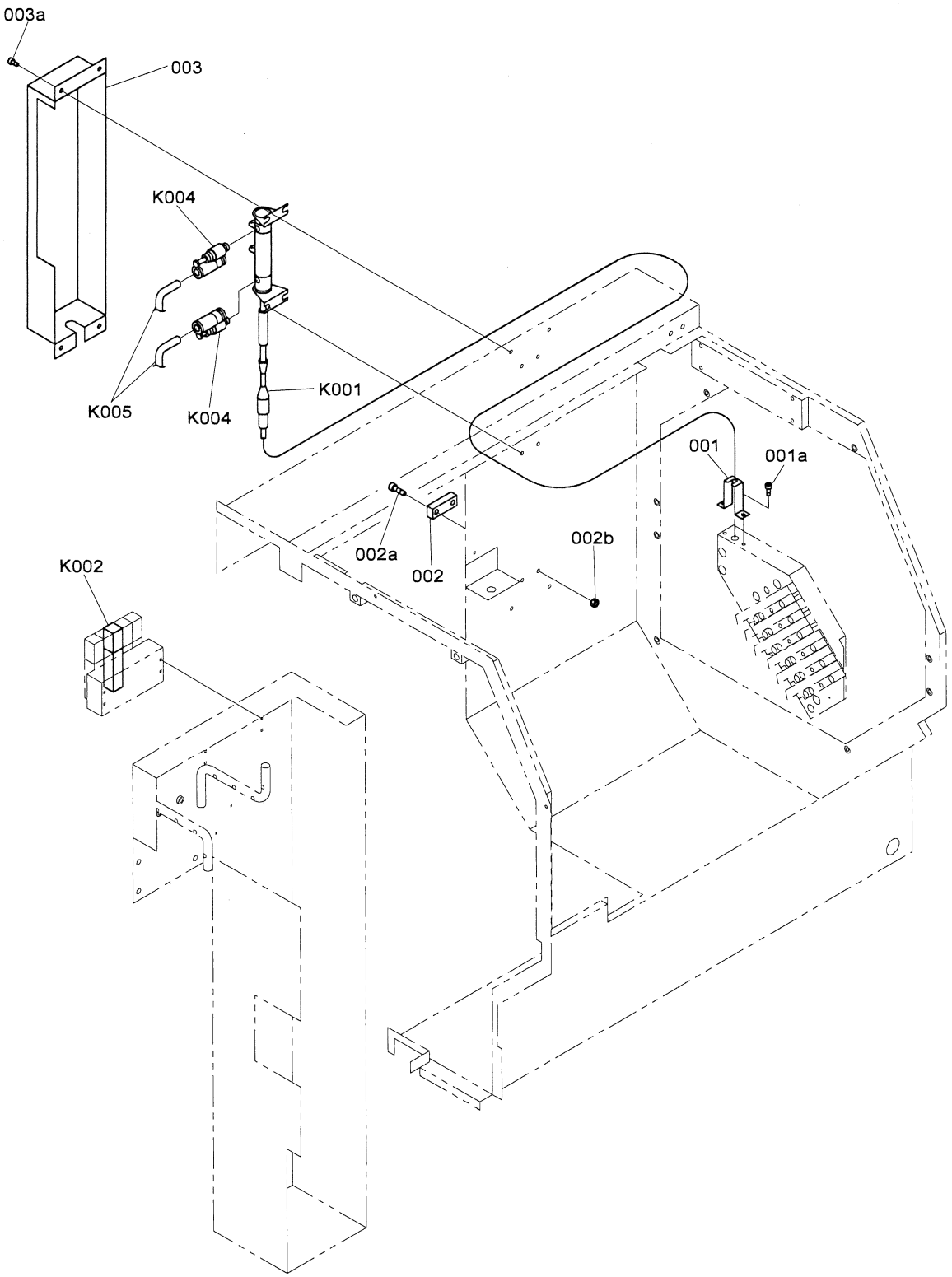
C1216 Y76Z	ドアロック DOOR LOCK	DT000

PARTS NO.	SYMBOL	PARTS NAME	TYPE	Q'TY	REMARKS
KDT201	Ry312	リレー　RELAY	G2R-2-S (DC24V)	1	OMRON

C1216 Y76Z	ドアロック DOOR LOCK	DT200

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KWT001	CNP8	ハウジング	HOUSING	1-178288-3	1	AMP
KWT002		コンタクト	CONTACT	1-175218-5	2	AMP
WT002		AVR4 出力ケーブル	ACR4 OUTPUT CABLE		1	
WT101		ドアロック 1 ケーブル	DOOR LOCK 1 CABLE		1	
WT102		ドアロック 2 ケーブル	DOOR LOCK 2 CABLE		1	

C1216 Y76Z	ドアロック DOOR LOCK	WT000 WT100



C1216 Y90Z	突切りバイト折れ検出 CUT-OFF TOOL BIT BREAK DETECTOR	000

PARTS NO.	PARTS NAME		TYPE	Q'TY	REMARKS
001	センサー押え板	SENSOR FIXED PLATE		1	
001a	六角穴付ボルト	BOLT	M4x10	2	
002	スペーサー	SPACER		1	
002a	六角穴付ボルト	BOLT	M5x16	2	
002b	六角ナット	NUT	M5	2	
003	シリンダーカバー	CYLINDER COVER		1	
003a	六角穴付ボルト	BOLT	M4x8	4	
K001	センサー用ケーブルアッシー	CABLE ASSY FOR SENSOR	1000253-00	1	MORSU
K002	電磁弁	SOLENOID VALVE	1104E1-J62 -57W-DC24V	1	KOGANEI
K004	クイック継手	QUICK FITTING	SS6-M5A	2	KOGANEI
K005	ウレタンチューブ	TUBE	U6-B	2m	KOGANEI

C1216 Y90Z	突切りバイト折れ検出 CUT-OFF TOOL BIT BREAK DETECTOR	000

PARTS NO.	SYMBOL	PARTS NAME		TYPE	Q'TY	REMARKS
KDT301	Ry210	リレー	RELAY	RB104-DE (DC24V)	1	FUJI ELECTRIC
WT101		電磁弁ケーブル	VALVE CABLE		1	
WT102		バイト折れセンサケーブル	TOOL BREAK DETECTOR CABLE		1	
WT9101		電磁弁ケーブル	VALVE CABLE		1	
WT9102		バイト折れセンサケーブル	TOOL BREAK DETECTOR CABLE		1	

C1216 Y90Z	突切りバイト折れ検出 CUT-OFF TOOL BIT BREAK DETECTOR	DT300 WT100 WT9100

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製品コード
Product code

C	−	C	1	2	1	6	VIA	VIIA	VIIIA	IXA				−	7	7	0

ドキュメントコード
Document code

6	J	3	−	0	6	0	3

6	E	3	−	0	6	0	3

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Code No.	C-C1216 VI VII VIII IX-770 6E1-0702 6E2-0702	MFG No.	C1216/0359 ~	Issue Date	2001.12

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7.1 Connecting Input/Output Devices

7.1.1 Connecting the IC card reader/writer

Procedure

1. Insert the one side of the cable, provided as an accessory with the IC card reader/writer into the connector of the IC card reader/writer.
2. Insert the other side of the cable into the RS232C connector of the communication terminal.
3. Tighten the setscrews of the connectors.

Note

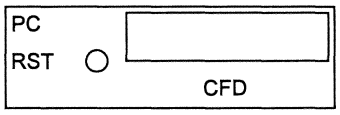
The RS232C connection of the IC card reader/writer has 25 pins.

7.1.2 Connecting the floppy disk drive

> **WARNING**
>
> Turn off the main breaker of the machine before attempting to mount/dismount an input/output device. Failure to do so could result in death or serious personal injury from electric shock.

Procedure

1. Turn off the main breaker of the machine. See <Section 7.1.2 Turning off the power> of Basic Manual.
2. Unlock the operation panel with the key handle provided as a standard attachment tool. The operation panel is locked/unlocked at the upper part.
3. Open the operation panel.
4. Insert the connector of the cable, provided as an accessory with the floppy disk drive, into the connector with "CFD" written at the lower part of the NC unit.



5. Close the operation panel, and lock the operation panel with the key handle.
6. Turn on the machine.
7. Press PRM. .
8. Press the menu key [MC-STRCT].
   The Machine Structure screen appears.
9. Press the menu key [Set].
10. Press ↑ and/or ↓ to select "Floppy Disk Drive Unit."
11. Press INPUT .

    The check box of " Floppy Disk Drive Unit" is checked. Do not turn off the power at this time.

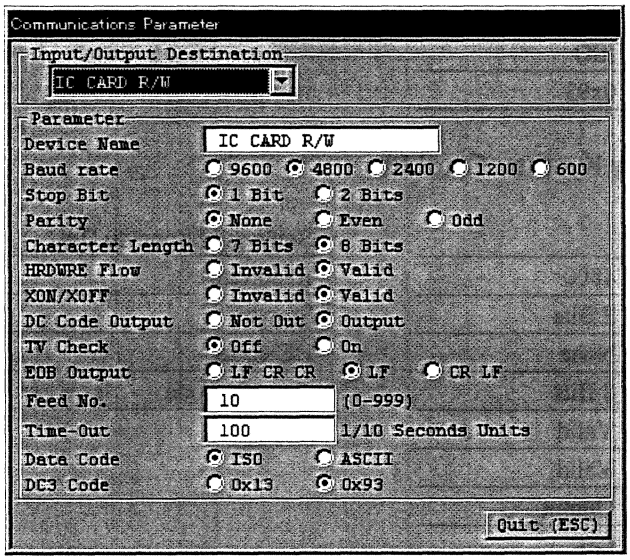
Notes

- To use the floppy disk drive, check the "Floppy Disk Drive Unit" item on the Machine Structure screen. The floppy disk drive becomes available. Floppy disk drive items are not displayed on screens such as the Input (FDD) screen unless the "Floppy Disk Drive Unit" item is checked on the Machine Structure screen.
- If you turn off the power, the "Floppy Disk Drive Unit" item is automatically unchecked.

7.1.3 Setting RS232C communications parameters

Procedure

1. Press EDIT.
   The previously selected screen appears.
2. Press the menu key [List].
   The List screen appears.
3. Press the menu key [I/O].
   The Input/Output screen appears.
4. Press ↑ and/or ↓ to select [Communications Parameter]. Press INPUT.
   The Communications Parameter screen appears.



7.1.4 RS232C communications parameters

With the IC card reader/writer produced by CITIZEN Watch Co., Ltd.

Settings of the machine	
Baud rate	4800
Stop Bit	1 Bit
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Output
TV Check	Off
EOB Output	LF
Feed No.	10
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Settings of Citizen IC card reader/writer	
Baud rate	4800
Stop bit	1 bit
Parity bit	None
Data length	8 bits

With the D-II produced by Kyoritsu Co., Ltd.

Settings of the machine	
Baud rate	4800
Stop Bit	2 Bits
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Output
TV Check	Off
EOB Output	CR LF
Feed No.	0
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Settings of Kyoritsu D-II	
Baud rate	4800
Stop bit	2 bits
DC code	Provided
Transfer code	ISO

With the D-III produced by Kyoritsu Co., Ltd.

Settings of the machine	
Baud rate	4800
Stop Bit	2 Bits
Parity	None
Character Length	7 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Output
TV Check	Off
EOB Output	CR LF
Feed No.	0
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Settings of Kyoritsu D-III	
Left counter switch	DC code (provided) ISO
Right counter switch	Baud rate 4000
Parity bit	Even parity
Character bit	7 bits
Stop bit	2 bits
EOB setting	LF CR

With the D-V produced by Kyoritsu Co., Ltd.

Settings of the machine	
Baud rate	4800
Stop Bit	1 Bit
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Output
TV Check	Off
EOB Output	LF
Feed No.	0
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Settings of Kyoritsu D-V		
Left counter switch	XON/XOFF	ISO/ASCII
Right counter switch	Baud rate 4800	
Stop bit	1 bit	
ISO/ASCII	ISO	
DC3	93H	
DC code provided (IN) Processing at receiving	DC3, DC1	
DC4	Disabled	
EOB setting	No.6	ON
CR/LF at sending	No.7	OFF
CR/LF at receiving	No.8	OFF

With the ED-8N produced by Kyoritsu Co., Ltd.

Settings of the machine	
Baud rate	4800
Stop Bit	2 Bits
Parity	Even parity
Character Length	7 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Output
TV Check	Off
EOB Output	LF
Feed No.	0
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Settings of Kyoritsu ED-8N	
Baud rate	4800
Stop bit	2 bits
Data bit	7 bits
Parity bit	ON
DC code	ON TERMINAL
Transfer code	ISO

Settings of Kyoritsu ED-8N DIP switch (at the rear of the device)	
No.7	ON
No.8	ON

Note

To set the line feed code to LF, open the rear cover of Kyoritsu ED-8N and set DIP switches No. 7 and No. 8 to ON.
The counter switch of Kyoritsu ED-8N is set to 16.

With the TACTX K-203

Settings of the machine	
Baud rate	4800
Stop Bit	2 Bits
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Output
TV Check	Off
EOB Output	CR LF
Feed No.	0
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Settings of the TACTX K-203	
Communication code	ISO
Communication speed	4800
Stop bit	2 bits
DC control	DC IN
% control	None
EOB	CR LF
NULL code	None

With the TACTX M-220

Settings of the machine	
Baud rate	4800
Stop Bit	2 Bits
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Output
TV Check	Off
EOB Output	CR LF
Feed No.	0
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Settings of the TACTX M-220	
1. Code	ISO
2. Baud rate	4800
3. Stop bit	2 bits
4. DC control	DC IN
5. % control	None
6. EOB code	CR LF
7. TV check	None
8. NUL code	None
9. Override	None
10. Nesting	None
11. Extension	NC
12. File name	Manual

Note

Auto is selected for item 12. File name in the M-220 standard settings. While Auto is set, all program numbers become 1.NC. (This is because the character following $ is automatically recognized as the program number.)
Select Manual for item 12. File name, and input the file name in manual mode.

With the Needs98

Settings of the machine	
Baud rate	4800
Stop Bit	2 Bits
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Not Out
TV Check	Off
EOB Output	CR LF
Feed No.	10
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Settings of the Needs98	
Communication code	ISO
Communication speed	4800
Stop bit	1 bit
Communication mode	Host
% code at receiving	Used
Line feed code at sending	LF
Delay at sending	None

Note

A timeout error occurs when a program is received. To prevent the error, "Disabled" is selected for "XON/XOFF" and "Not Out" is selected for "DC Code Output".

With the NC Densuke

Settings of the machine	
Baud rate	4800
Stop Bit	2 Bits
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Output
TV Check	Off
EOB Output	CR LF
Feed No.	10
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Settings of the NC Densuke	
Communication code	1
Communication speed	4800
Stop bit	3 bits
DC control	2
Communication code	1
Device classification	0

With the ETL produced by Hamamatsu Godo Co., Ltd.

Settings of the machine	
Baud rate	4800
Stop Bit	1 Bit
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Not Out
TV Check	Off
EOB Output	LF
Feed No.	0
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Setting of Hamamatsu Godo ETL	
Code	ISO
Speed	4800
Stop bit	1
DC code	IN
%	ON
Storage destination	Memory
Delimiter code	CR LF
TV check	OFF

Alternative settings

Settings of the machine	
Baud rate	4800
Stop Bit	2 Bits
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Not Out
TV Check	Off
EOB Output	CR LF
Feed No.	0
Time-Out	100
Data Code	ISO
DC3 Code	0x93

Setting of Hamamatsu Godo ETL	
Code	ISO
Speed	4800
Stop bit	2
DC code	IN
%	ON
Storage destination	Memory
Delimiter code	CR LF
TV check	OFF

With the MIKUNI

Settings of the machine	
Baud rate	4800
Stop Bit	2 Bits
Parity	None
Character Length	8 Bits
HRDWRE Flow	Valid
XON/XOFF	Valid
DC Code Output	Output
TV Check	Off
EOB Output	CR LF
Feed No.	10
Time-Out	100
Data Code	ISO
DC3 Code	0x93

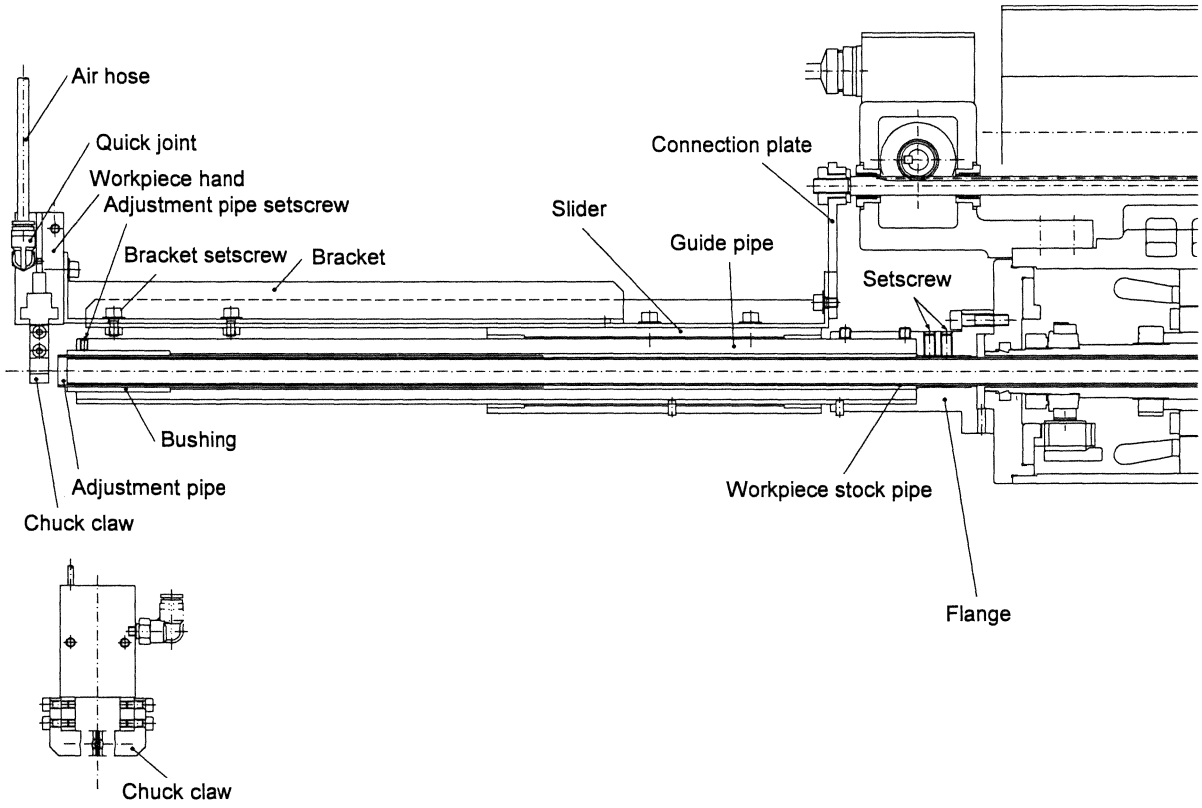
Settings of the MIKUNI	
Baud rate	4800
Data bit	8 bits
Stop bit	2 bits
Parity bit	None

7.2 Long Workpiece Device

The standard model of C16 contains a product separator which is able to unload products of workpieces in length up to 90 mm. The C16 needs a long workpiece device (optional) to machine and unload workpieces longer than 90 mm.
The long workpiece device is composed of the following attachments:

		C12			C16
C1216	U410B	Long workpiece device	C1216	U410B	Long workpiece device
C12	U4101B	Long workpiece stock pipe	C16	U4101B	Long workpiece stock pipe
C12	U4102B	Cap nut for long workpiece device	C16	U4102B	Cap nut for long workpiece device
C12	U4103B	Cap nut for long workpiece device (For export)			
C1216	U420B	Product receiver shelf for long workpiece device	C1216	U420B	Product receiver shelf for long workpiece device

7.2.1 Overview of the long workpiece device



* The illustration above shows an outline of long workpiece device with an optional C1216 U402B motor-driven knock-out device of the back spindle. This long workpiece device is also available for the machine with standard C1216 U401B air-driven knock-out device of the back spindle.

1. A machined workpiece is pushed into the back spindle when the next workpiece is picked off. Machined workpieces pass through the workpiece stock pipe, and they are sequentially sent to the rear of the pipe.
2. The workpiece hand chucks the part of a machined workpiece that extends from the workpiece stock pipe, and pulls out the workpiece from the pipe. The workpiece hand has a 120 mm stroke, and it re-chucks a workpiece depending on the length.
3. Workpieces are collected in the product receiver box on the left side of the machine. Customers are to provide the product receiver box.

Recommended product receiver box
Dimension: 590 × 386 × 106 (mm)

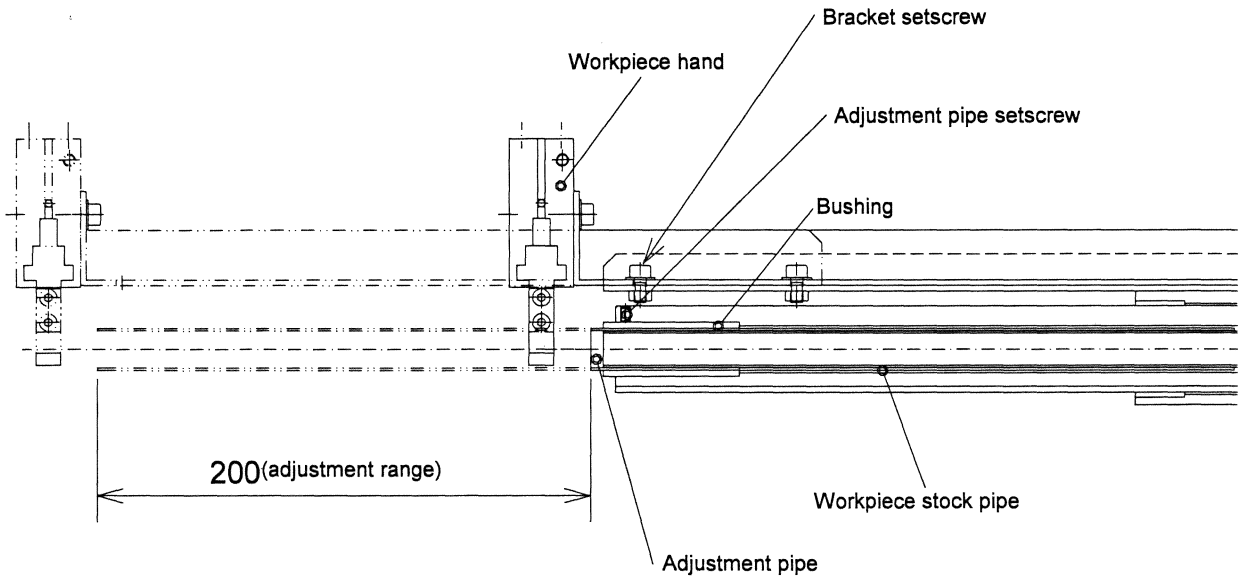
7.2.2 Replacing the workpiece stock pipe

Replace the workpiece stock pipe with new ones which match the workpiece diameter.

Procedure

1. Remove the chuck claws from the workpiece hand.
2. Loosen the adjustment pipe setscrew, then pull out the adjustment pipe.
3. Loosen the setscrew, then pull out the workpiece stock pipe.
4. Mount a workpiece stock pipe which matches the workpiece diameter, and mount an adjustment pipe which matches the new workpiece stock pipe, then tighten the screws of both pipes.
5. Mount chuck claws.
6. Confirm that the sensor LED lights while the work hand is open.

7.2.3 Positioning the adjustment pipe and workpiece hand

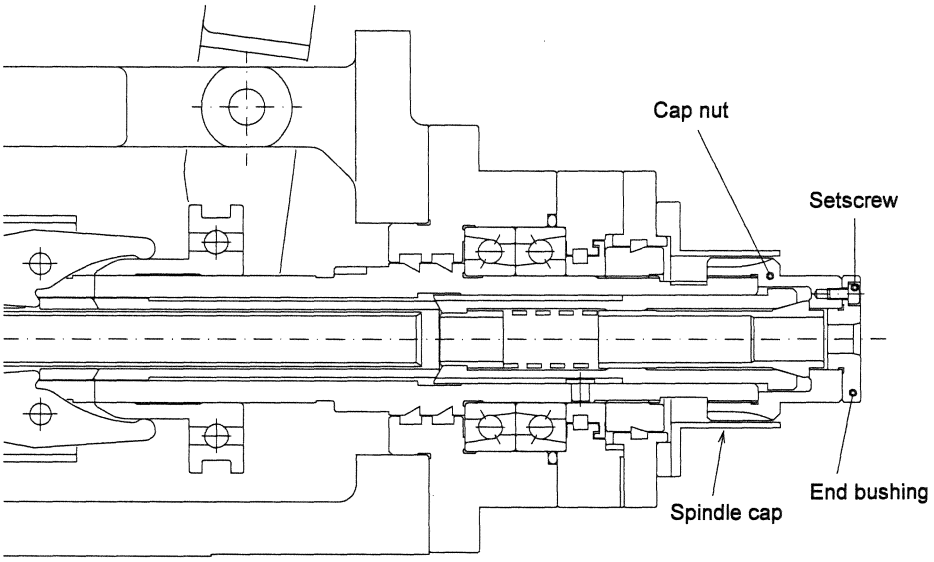


The workpiece length and the position of the back spindle chuck determine the workpiece protruded length from the workpiece stock pipe when pick-off operation is performed. At this time, if the protruded portion is too long, the workpiece inclines, and the workpiece hand is unable to chuck the workpiece normally. Conversely, if the protruded portion is too short, the workpiece hand has to repeat re-chucking many times until it can pull out the workpiece from the workpiece stock pipe. The position of the chuck varies depending on the workpiece length. A standard chuck position is 50 to 200 mm from the end face. Position the adjustment pipe and the workpiece hand in accordance with the chuck position.

When having positioned them, take action to prevent the work hand sensor cable from interfering with other mobile sections.

7.2.4 Replacing the cap nut and mounting an end bushing

When machining long workpieces, mount an end bushing for the stabilizer onto the cap nut of the back spindle.



Procedure

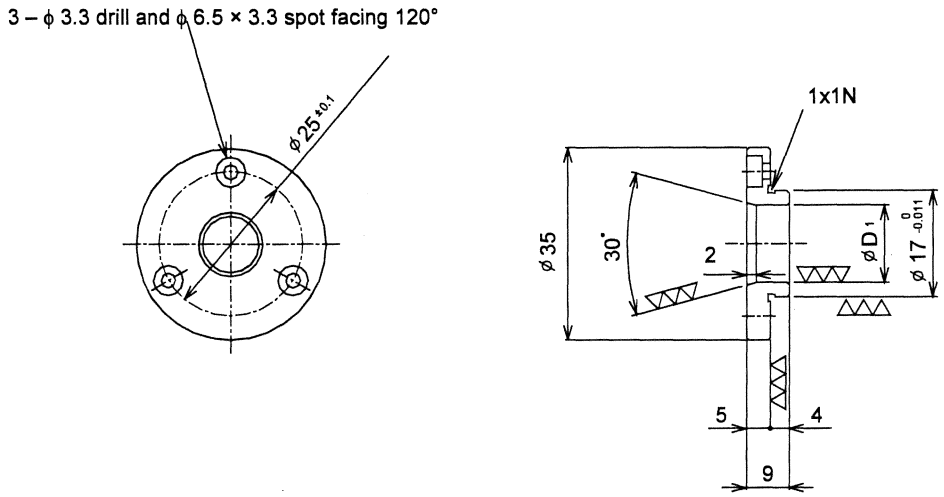
1. Replace the cap nut of the back spindle with the cap nut for the long workpiece device.
   See <Section 9.3.1 Mounting/replacing the back spindle chuck> of Basic Manual.
2. Mount an end bushing, which matches the workpiece diameter, in the direction shown in the above figure.
3. Secure the end bushing to the cap nut with the setscrew.

Note

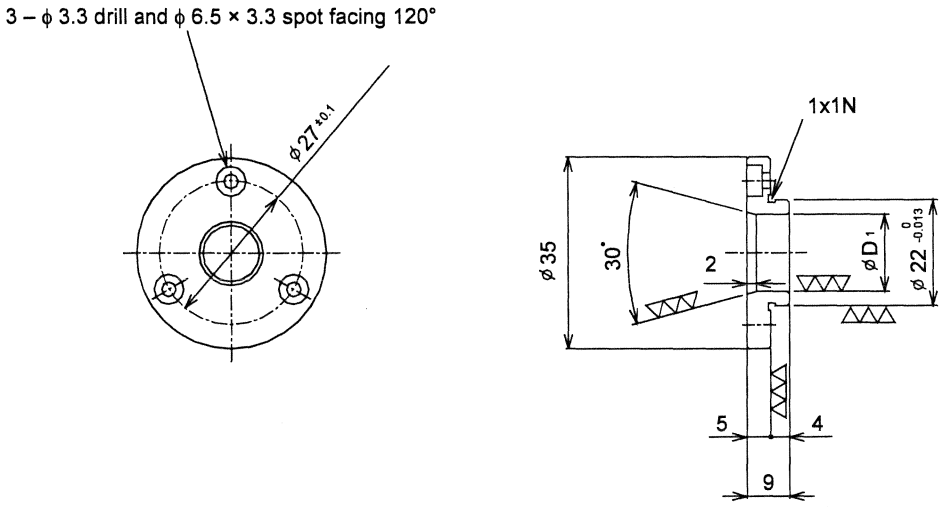
- The following end bushing is provided as a standard accessory with the long workpiece device:

		C12 U4101B	C16 U4101B
Nominal diameter (D)	ϕ12	1 piece	–
	ϕ16	–	1 piece
Blank		1 piece	1 piece

Before using the end bushing blank, machine the hole that satisfies the following conditions:
Hole diameter (ϕD1) = D + 0.5 ± 0.1
D = maximum workpiece diameter

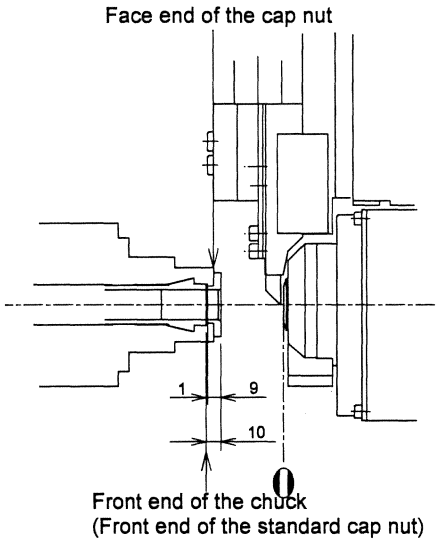


C12 U4101B

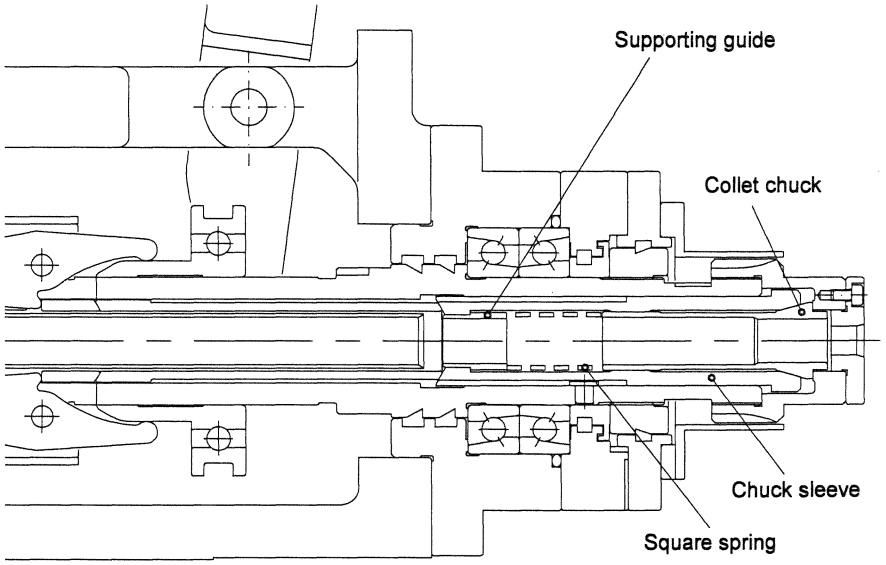


C16 U4101B

- When the end bushing is mounted, the protruded length from the standard cap nut position is 10 mm as shown in the following figure. Be careful of the forward end position of the back spindle during cut-off machining.



7.2.5 Replacing the supporting guide



Procedure

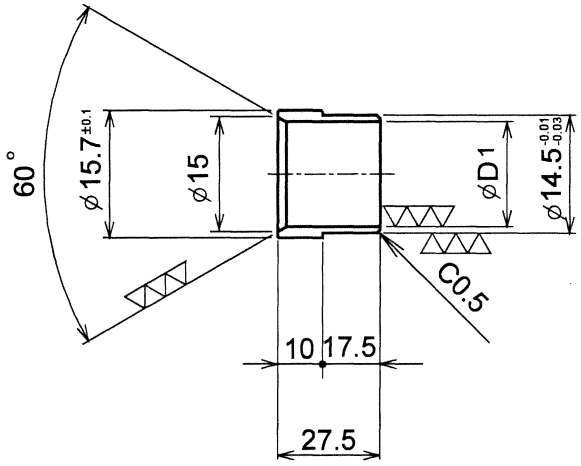
1. Remove the chuck sleeve from the back spindle.
   See <Section 9.3.1 Mounting/replacing the back spindle chuck> of Basic Manual.
2. Remove the chuck and square spring from the chuck sleeve, then replace the supporting guide.
3. Mount the chuck sleeve in reverse order of the removal steps.

Note

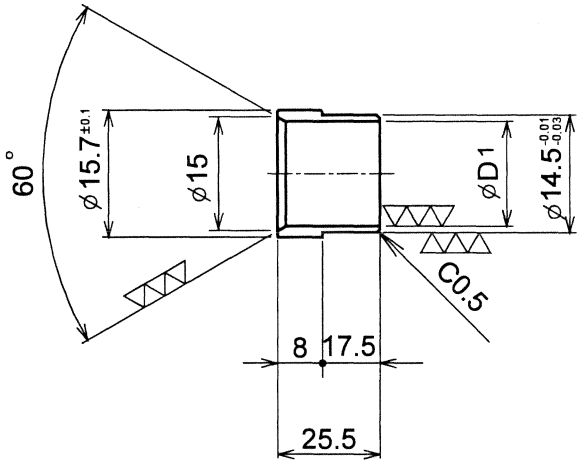
The following supporting guides are provided as standard accessories with the long workpiece device: Workpieces having a diameter of up to 12 mm and a length of 50 mm or more can be separated by using the long-body supporting guide.

		C12 U4102B C12 U4103B (For export)	C16 U4102B
Nominal diameter (D)	ϕ12.3 standard shape	1 piece	–
	ϕ16.3 standard shape	–	1 piece
Blank	long-body shape	2 pieces	2 pieces

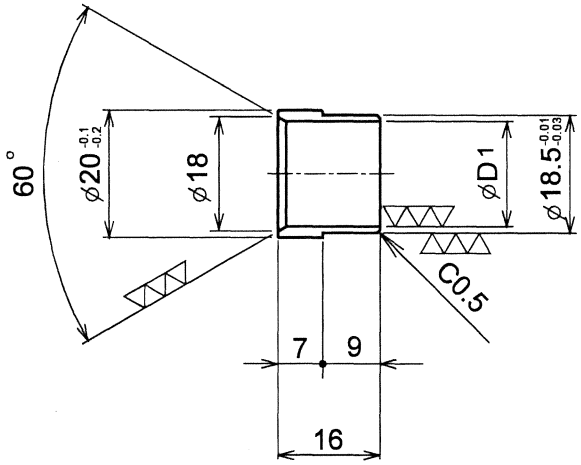
Before using the end bushing blank, machine the hole that satisfies the following conditions:
Hole diameter (ϕD1) = D + 0.3 ± 0.1
D = maximum workpiece diameter



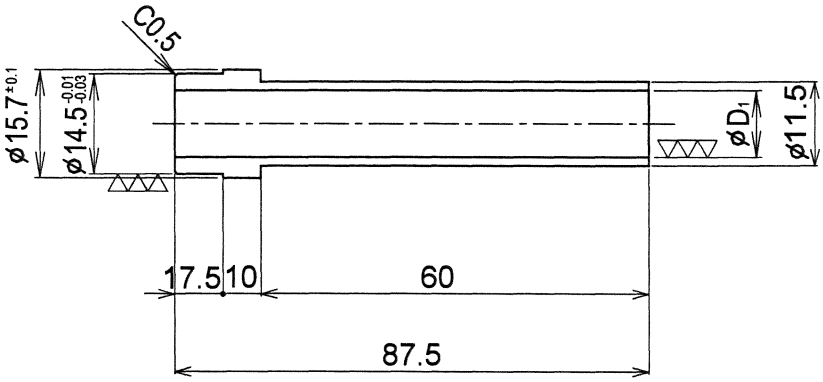
C12 U4102B Standard Shape



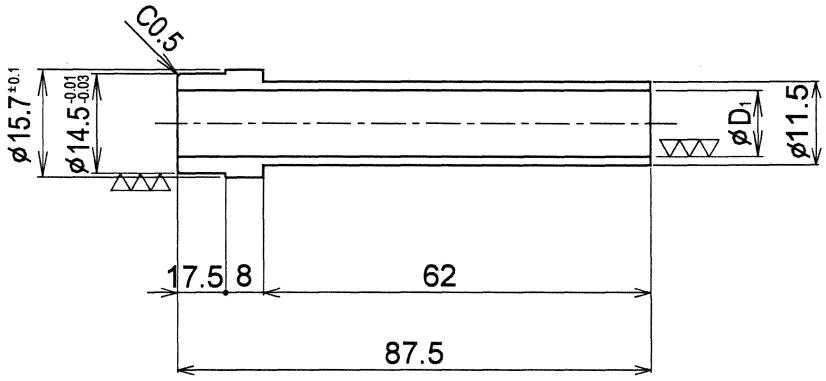
C12 U4103B (For export) Standard Shape



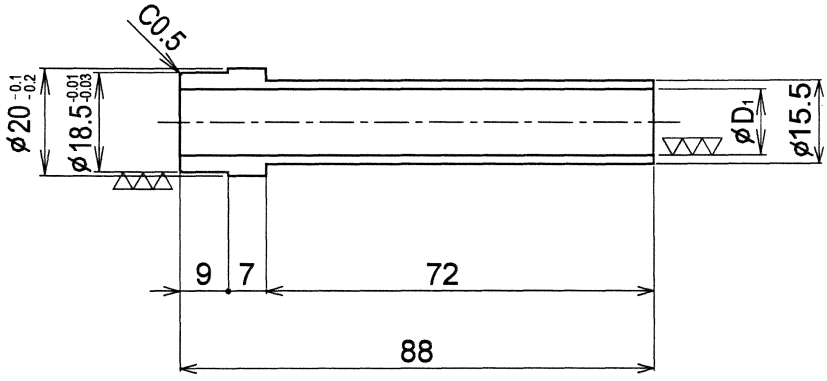
C16 U4102B Standard Shape



C12 U4102B Long-Body Shape



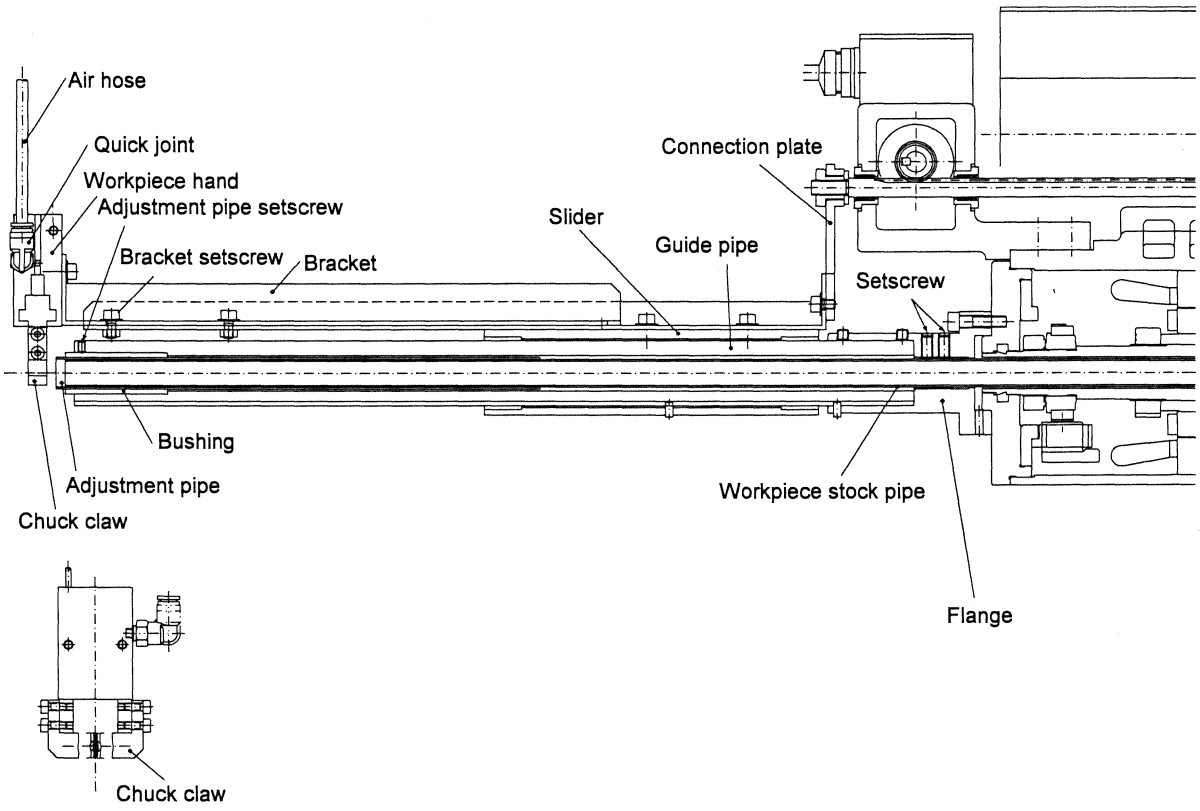
C12 U4103B (For export) Long-Body Shape



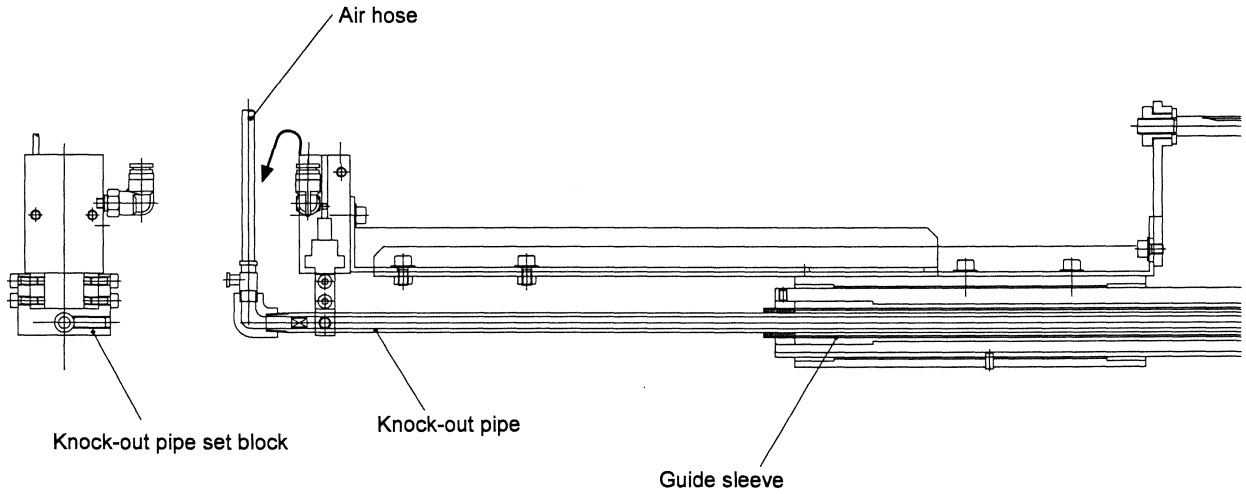
C16 U4102B Long-Body Shape

7.2.6 Re-arrangement for product separation using the standard knock-out jig

Take the following re-arrangement procedure when separating workpieces by the product separator (in the machine) with the standard knock-out jig while the long workpiece device is mounted.



* The illustration above shows an outline of long workpiece device with an optional C1216 U402B motor-driven knock-out device of the back spindle. This long workpiece device is also available for the machine with standard C1216 U401B air-driven knock-out device of the back spindle.



Procedure

1. Remove the chuck claws and air hose from the workpiece hand.
2. Loosen the adjustment pipe setscrew, then pull out the adjustment pipe.
3. Loosen the setscrew, then pull out the workpiece stock pipe.
4. Mount the guide sleeve at the location where the workpiece stock pipe was previously mounted, then tighten the adjustment pipe setscrew.
5. Mount the knock-out pipe set block on the workpiece hand.
6. Mount the knock-out pipe, then mount the air hose removed in step 1.
7. Tighten the setscrew of the knock-out pipe set block to secure the knock-out pipe.
8. Mount the knock-out front-end jig. See <Section 9.3.3 Replacing the knock-out jig> of Basic Manual.
9. Uncheck "Long Workpiece Device" on the Machine Structure screen. See <Section 6.22 Machine Structure Screen> of Basic Manual.

7.3 Setup of a Knock-out Jig for Through-hole Workpieces (C12 U550B, C16 U550B)

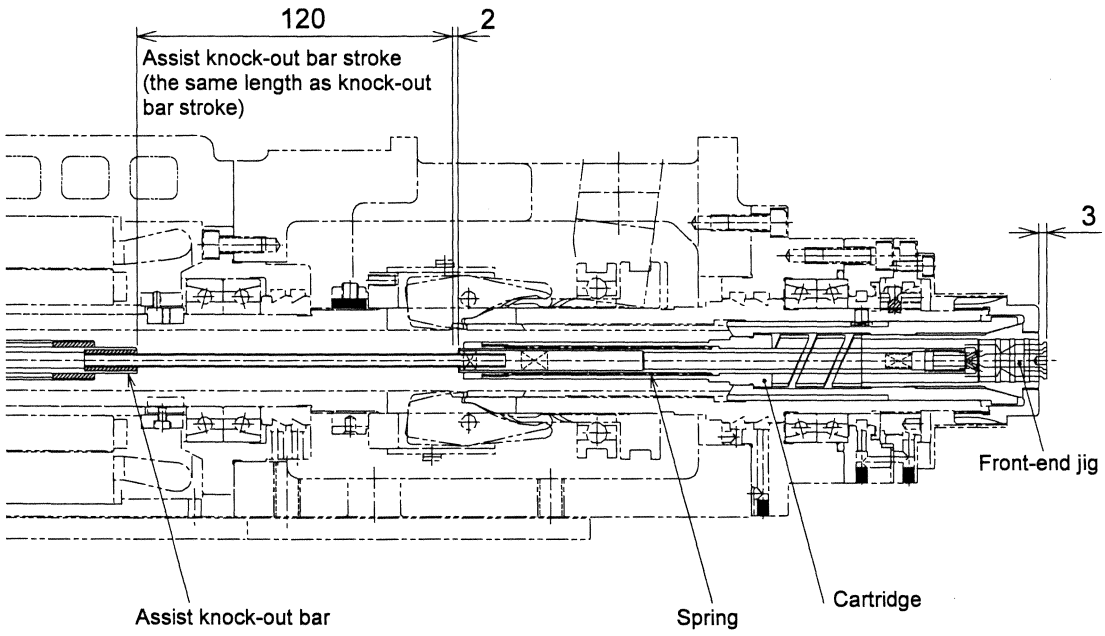
> **WARNING**
>
> Be sure to confirm that the spindles and machine have stopped before attempting to replace the knock-out jig.
> The work during machine operation could result in serious personal injury.

In order to prevent coolant and chips from going into the back spindle, the standard knock-out jig needs to be replaced with a knock-out jig (optional) for through-hole workpieces in the following cases:

- The back spindle is to chuck through-hole workpieces.
- Through-hole machining is to be performed.

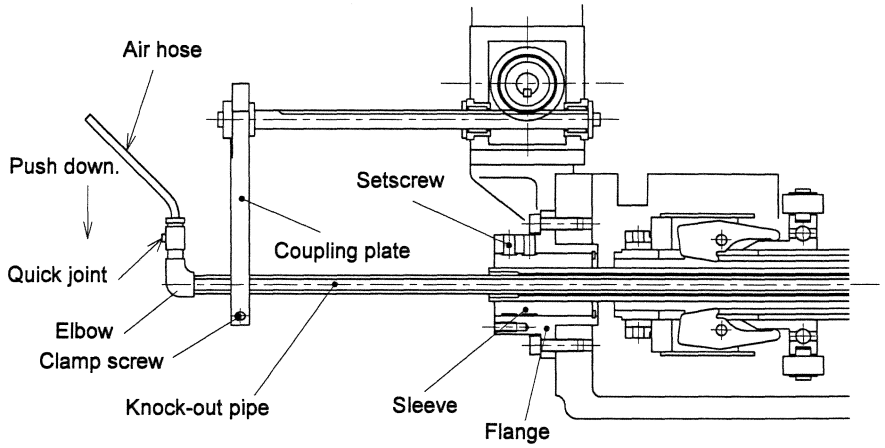
In the cases, a workpiece can go into the back spindle up to 45 mm.

7.3.1 Overview of the knock-out jig for through-hole workpieces



The knock-out front-end jig rotates while keeping in contact with the end face of the workpiece by the spring built in the knock-out jig. This feature prevents coolant and chips from going into the back spindle through the through holes in workpieces.

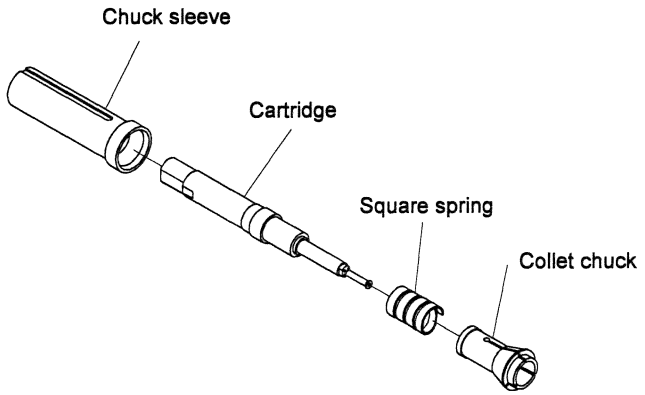
7.3.2 Mounting the knock-out jig for through-hole workpieces



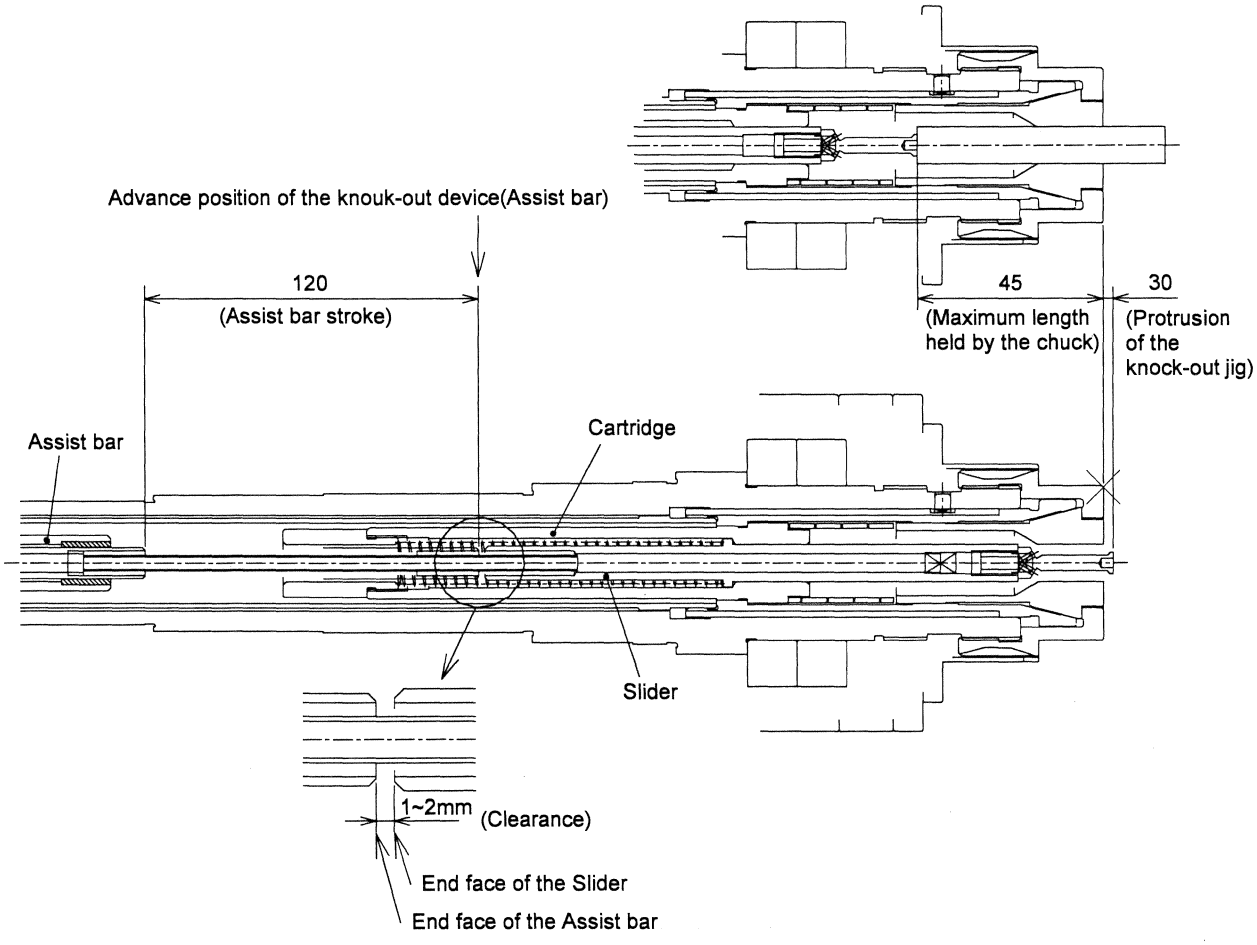
* The illustration above shows an outline of long workpiece device with an optional C1216 U402B motor-driven knock-out device of the back spindle. This long workpiece device is also available for the machine with standard C1216 U401B air-driven knock-out device of the back spindle.

The following explains the procedure for installing the knock-out device for through-hole workpieces. See the above figure and parts list.

1. Remove the left cover.
2. Remove back spindle cover.
3. Pull out the air hose while pushing the front end of the quick joint at the rear end of the knock-out pipe.
4. Loosen the clamp screw of the coupling plate, and pull out the knock-out pipe.
5. Loosen two setscrews, and pull out the guide sleeve from the flange.
6. Dismount the collet chuck and the chuck sleeve from the back spindle.



7. Remove the square spring and the stabilizer guide (collar) from the chuck sleeve.
8. Insert the cartridge of the knock-out device for through-hole workpieces into the chuck sleeve. After that, insert the square spring, and then the collet chuck.
9. Insert the chuck sleeve, partially assembled in step (8), into the back spindle, and then mount the cap nut and the spindle cap.
10. Mount the guide sleeve of the knock-out jig for through-hole workpieces on the flange, and tighten the setscrews to secure the guide sleeve.
11. Remove the elbow and the quick joint from the rear end of the standard knock-out pipe, and mount them at the rear end of the assist bar of the knock-out device for through-hole workpieces.
12. Execute " M10" on the MDI screen to advance the knock-out device.
13. Slowly insert the assist bar into the connection place and the guide sleeve, and into the bottom of the spindle and back 1 to 2 mm. Then tighten the clamp screw of the connection plate in the same manner as for the standard knock-out pipe.
14. Mount the air hose on the quick joint at the rear end of the assist bar.
15. Execute " M11" on the MDI screen to retract the knock-out device.
16. Mount back spindle cover and the left cover.

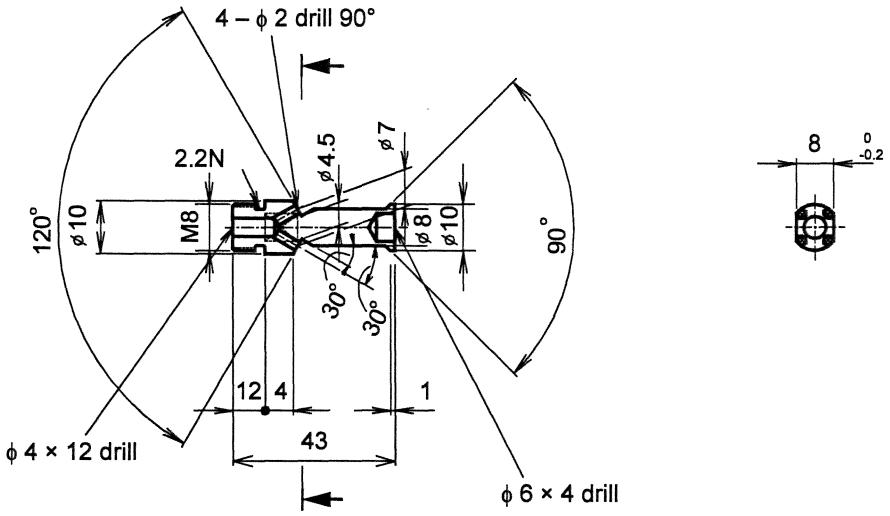


CAUTION

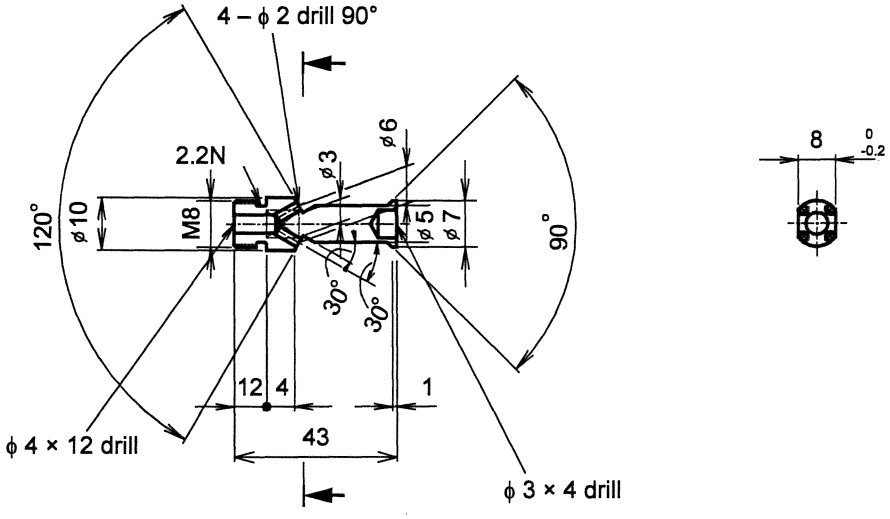
Do not use the knock-out device for through-hole workpieces and the standard knock-out device together. Doing so causes interference between the knock-out pipes, which may damage the machine.

7.3.3 Replacing the knock-out front-end jig

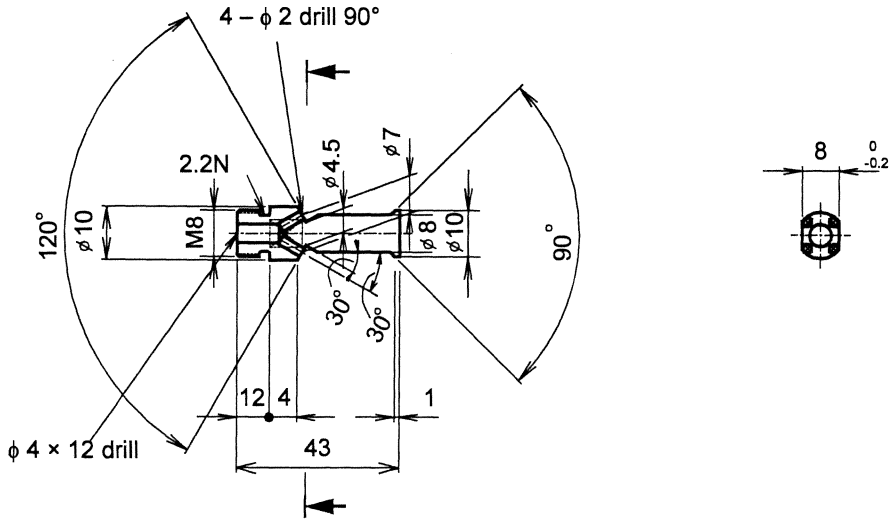
The knock-out front-end jig needs to be replaced depending on the workpiece shape (e.g., through-hole diameter).
The following types of jigs are provided as standard accessories. If the jigs are unable to knock out workpieces, a jig needs to be created in accordance with the shape of the workpieces.



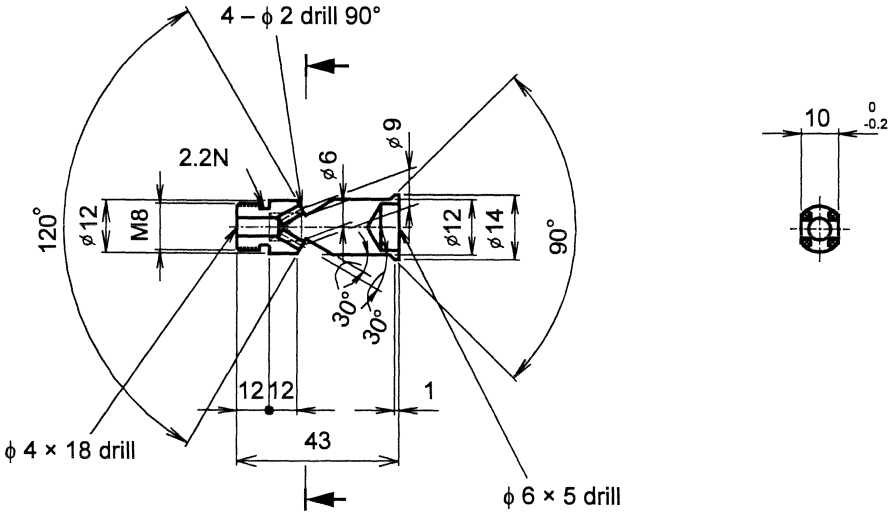
C12 U550B



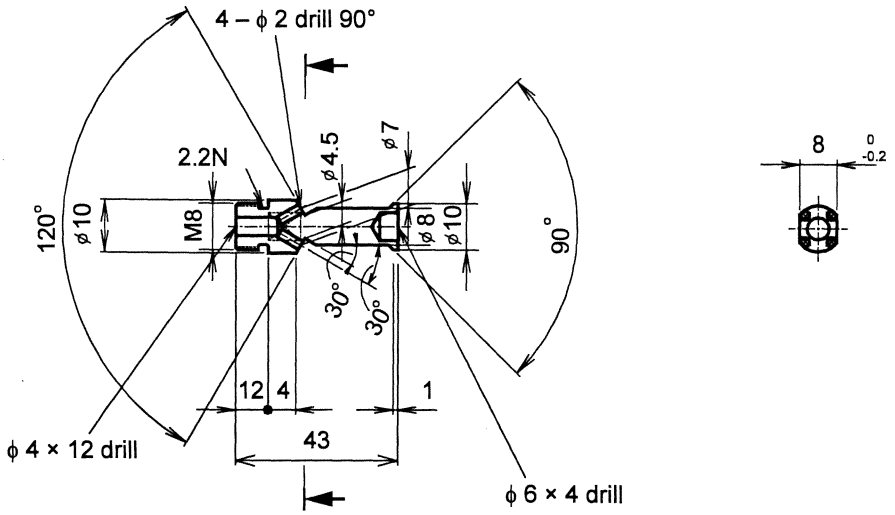
C12 U550B



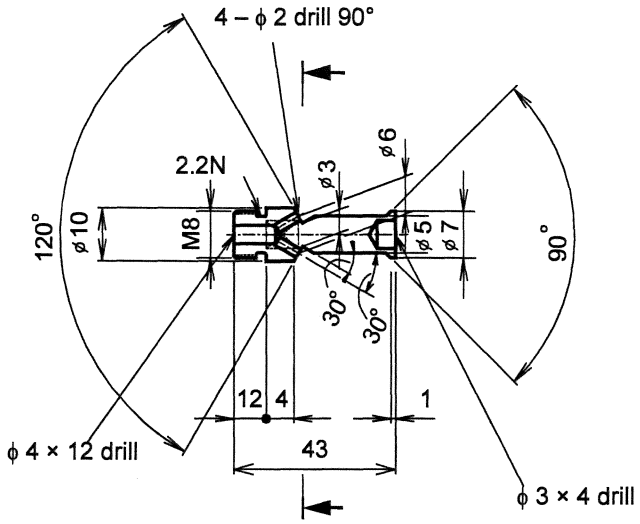
C12 U550B

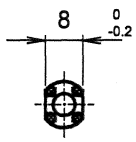


C16 U550B

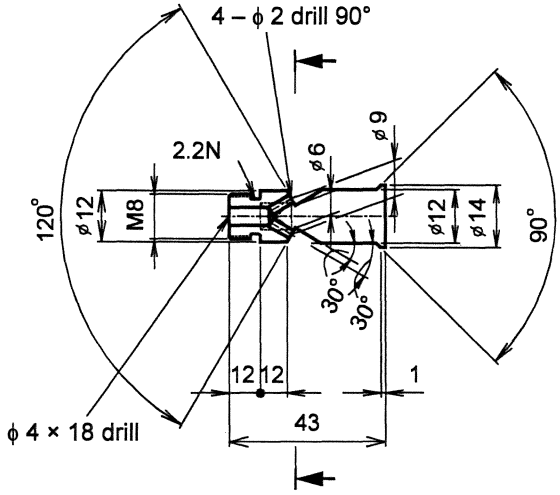


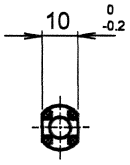
C16 U550B





C16 U550B





C16 U550B

7.4 Knockout device for long Workpiece device with through hole workpiece device.

> ⚠ WARNING
>
> Be sure to confirm that the spindles and machine have stopped before mounting the knock-out device. The work during machine operation could result in serious personal injury.

C1216 is able to attach the knock-out jig for through-hole workpiece with the long workpiece device. But it is not possible to use the knock-out devices which are attached for each, so use this knock-out device instead of them.

7.4.1 Remove the knock-out pipe of long workpiece device.

Remove the knock-out pipe of long workpiece device if it is mounted on the machine.
See <Section 7.2.6 Re-arrangement for product separation using the standard knock-out jig>, and remove in reverse order.

7.4.2 Remove the knock-out pipe of knock-out jig for through-hole workpieces.

Remove the knock-out pipe of knock-out jig for through-hole workpieces if it is mounted on the machine.
See <Section 7.3.2 Mounting the knock-out jig for through-hole workpieces>, and remove in reverse order.

7.4.3 Mount the knock-out device for long workpiece device with through hole workpiece device

Mount this device, see <Section 7.2.6 Re-arrangement for product separation using the standard knock-out jig> for reference as assembling process of back side of back spindle, and see <Section 7.3.2 Mounting the knock-out jig for through-hole workpieces> for reference as assembling process of front side of back spindle.

7.5 Setting Up the Workpiece Separator (U30J and U301J)

7.5.1 Product Collection Mode

This machine provides the following two methods for collecting the product.

[A] Pick-off collection mode

Holds a product with the back spindle (pick-off) and puts it in a product receiver (knock-out). This method is normally used for collecting a workpiece which can be chucked by the back spindle. Select <Standard> for <Back Spindle> item on [MC-Data] screen.

[B] Product receiver basket collection mode

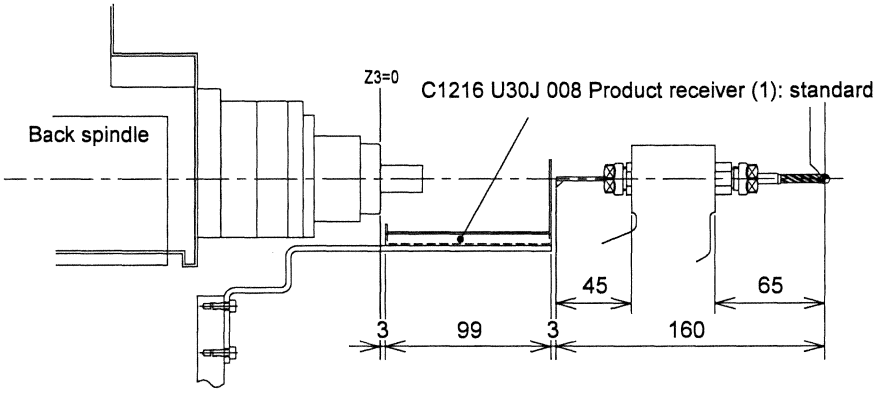
This method is used for collecting a workpiece (a short workpiece or disc shape workpiece) which cannot be chucked by the back spindle. The back spindle chucking device is removed and replaced with the product receiver basket. The finished workpiece is cut off and collected in this product receiver box. Select <Basket> for <Back Spindle> item on [MC-Data] screen.

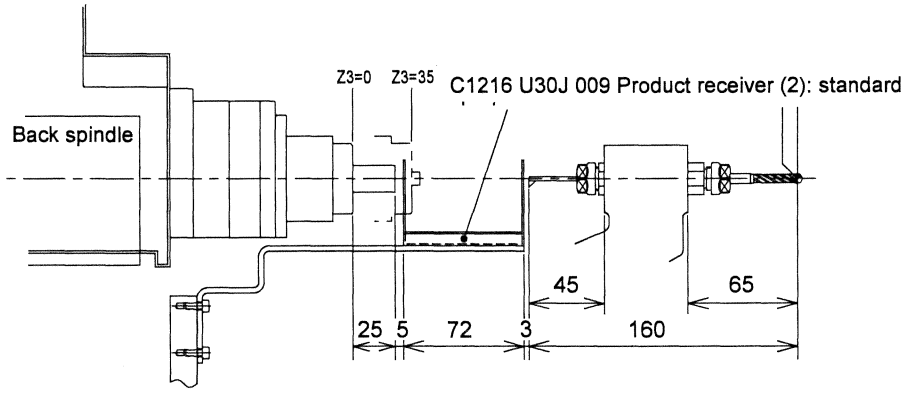
Note

In case of " [B] Product receiver basket collection mode", the product receiver basket can collect a workpiece of up to 35mm in legnth. When this method is used, however, back machining is disabled. Cut-off tool can be mounted at the position T01 or T04. Product receiver basket interferes in the tool when it moves forward the condition that cut-off tool is mounted at other position.

7.5.2 Collection in pick-off mode [A]

Two kinds of product receiver are provided. Choose either one according to the length of workpieces.





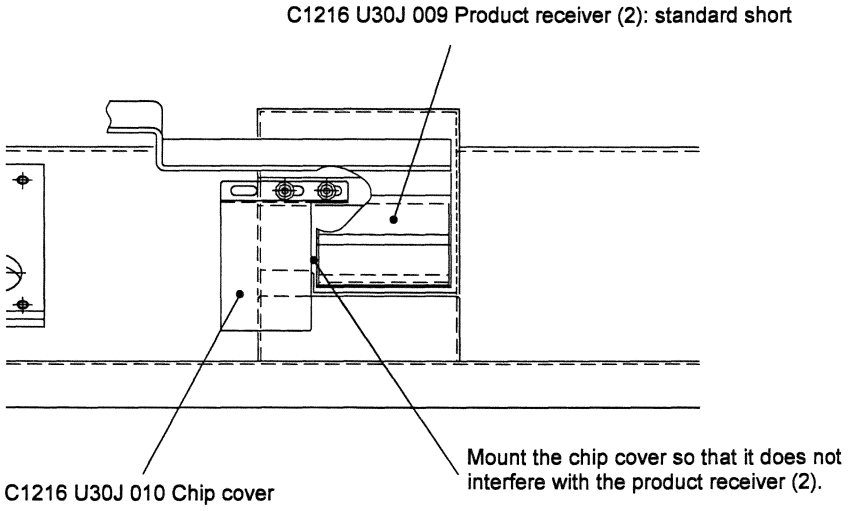
Product receiver (1) standard : Collects workpiece of up to 90-mm length. Normally this receiver is installed at shipment.

Product receiver (2) standard short : Collects workpiece of up to 60-mm length. Use this receiver to collect smaller workpieces that the product receiver (1) will fail to collect.

<Installing the product receiver (2): standard short>

1. Execute "RET POS" in preparation mode.
2. Remove the product receiver (1) by loosing four securing screws.
3. Execute "M108" on the MDI screen to advance the workpiece separator.
4. To disable the interference check function, click to put a check mark in the check box of "□11 Interfere Check Off" on the SET SW screen or press the menu key [INT.IVLD] (concave).
5. Move the Z3 axis to a position near 35.0 mm on the Handle Feed screen.
6. Mount the product receiver (2). Be careful for the product receiver's left wall not to interfere with the back spindle in mounting the product receiver.
7. Move the Z3 axis to the 0 position on the Handle Feed screen.
8. To enable the interference check function, click to remove a check mark from the check box of "□11 Interfere Check Off" on the SET SW screen or press the menu key [INT.IVLD] (convex).
9. Execute "M109" on the MDI screen to retract the workpiece separator.
10. Mount the chip cover.

Note: Follow the same procedure to mount the product receiver (1).



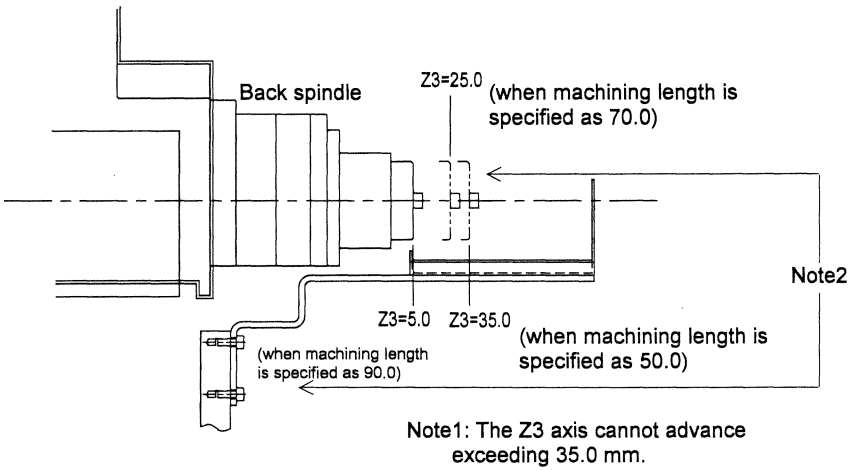
Workpiece retraction (Top view)

<Knock-out position of back spindle>

The knock-out position of the back spindle (where the Z3 axis advances) during knock-out operation by M33 command depends on the value set in <Machining Length> on [MC-Data] screen. Set <Standard> for <Back Spindle> item on [MC-Data] screen.

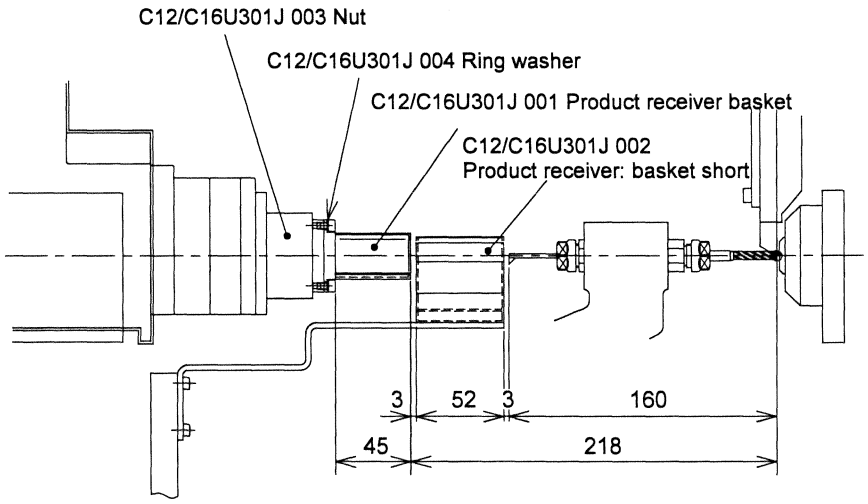
		< 60.0	→		35.0 mm
60.0 ≤	Machining length	< 90.0	→	Position of the Z3 axis	35.0 – (machining length – 60.0) mm
		≥ 90.0	→	(machine position)	5.0 mm

See <Chapter 5 Programming> of Basic Manual.



Note 2: Before mounting the product receiver (1) or (2), move the back spindle to a position near Z3=35.0 by operating the handle to avoid the interference between the product receiver's left wall and the back spindle.

7.5.3 Collection in product receiver basket collection mode

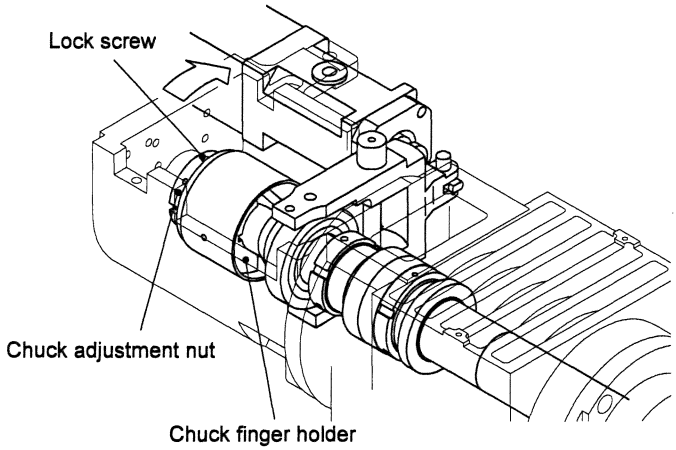


The workpiece is cut-off and put in the product receiver basket installed at the end of the back spindle. And the workpieces are transferred to the product receiver for collection. This product receiver differs from the one used in pick-off operation.
Cut-off tool can be mounted at the position T01 or T04. Product receiver basket interferes in the tool when it moves forward the condition that cut-off tool is mounted at other position.

<How to setup>

First, mount the product receiver basket to the front end of the back spindle.

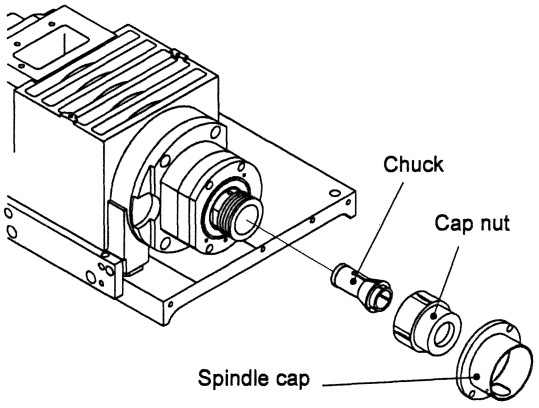
1. Press the Back SP.Chuck key  to open the back spindle chuck. Loosen the screw and remove the upper cover of the back spindle device.



2. Loosen the lock screw of the chuck adjustment nut on the rear side of the chuck finger holder.

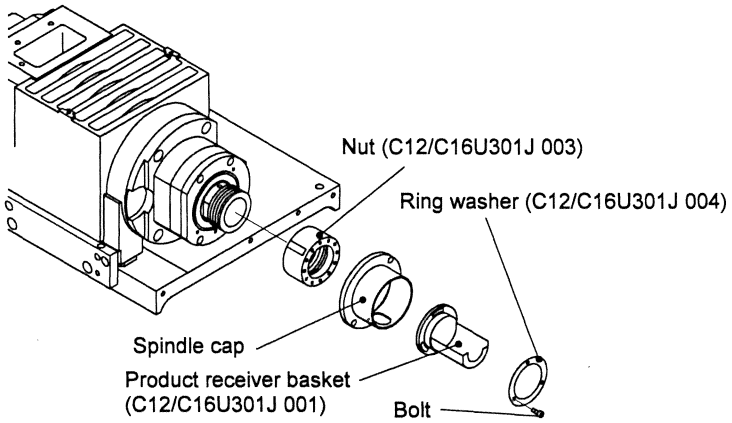
3. Turn the chuck adjustment nut away from you to the back end of the spindle and move the chuck finger holder to the most left side of the machine.

4. Remove the spindle cap and cap nut.



5. Pull out the chuck and square spring.
   And do not pull out the chuck sleeve.

6. Screw the nut into the front end of the back spindle (mount the nut in a direction that allows the 12 taps on the end face of the nut to be seen). Use the hook wrench and dedicated wrench to tighten it firmly.



7. Mount the spindle cap and firmly secure with the setscrew. Make sure to mount the spindle cap so that the oval oil drain hole is facing straight down.

8. Close all doors.

9. Move the X2 axis near zero point, and issue the M32 command to perform product collection. The back spindle will then be indexed. After that, issue the M171 command to retract the back spindle.

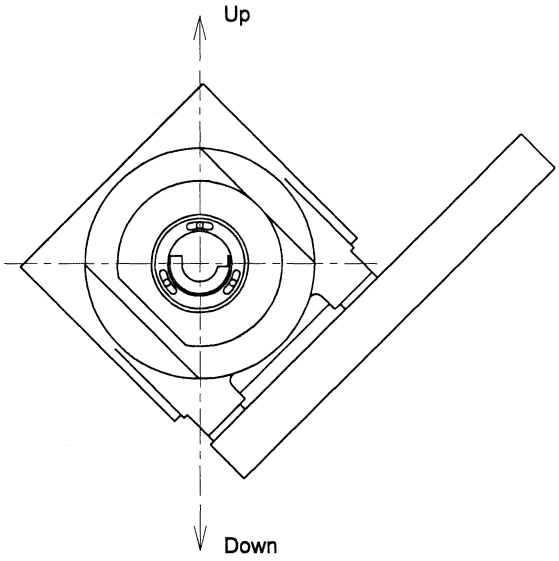
10. With door lock device (Option) or EC machine.

    Press the Back Spindle Stop key or 

    key to cancel indexing of the back spindle.

11. Put the ring washer on the product receiver basket flange.

12. Use the bolt to temporarily fix the product receiver basket and ring washer. Make sure to install the product receiver basket in a direction that makes the opening of the product receiver basket face up.



13. Press the Back Spindle Stop key or 

key to cancel indexing of the back spindle.

14. Insert the tommy rod into the chuck finger holder to hold the spindle while tightening the temporarily tightened bolt firmly with the wrench.

15. Turn the chuck adjustment nut toward yourself and tighten it lightly until it stops. Then, firmly tighten the lock screw.

Then, mount the product receiver and the chip cover.

16. Execute "RET POS" in preparation mode.

17. Remove the product receiver ((1) or (2)) by loosing four setscrews.

18. Execute "M108" on the MDI screen to advance the workpiece separator.

19. To disable the interference check function, click to put a check mark in the check box of "☐11 Interfere Check Off" on the SET SW screen or press the menu key [INT.IVLD] (concave).

20. Move the Z3 axis to a position near 45.0 mm on the Handle Feed screen.

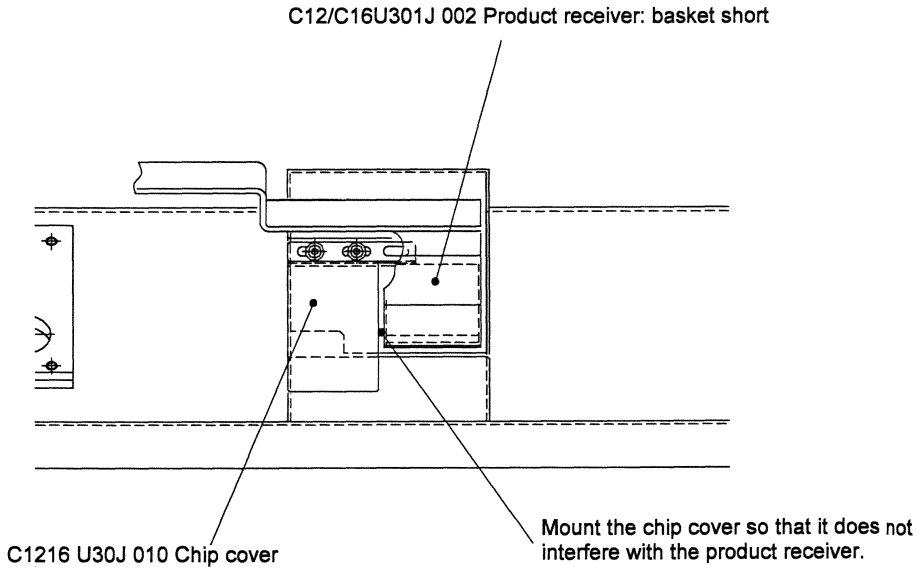
21. Mount the product receiver (basket short). Be careful for the product receiver's left wall not to interfere with the back spindle in mounting the product receiver.

22. Move the Z3 axis to the 0 position on the Handle Feed screen.

23. To enable the interference check function, click to remove a check mark from the check box of "☐11 Interfere Check Off" on the SET SW screen or press the menu key [INT.IVLD] (convex).

24. Execute "M109" on the MDI screen to retract the workpiece separator.

25. Mount the chip cover.



Separator retraction (Top view)

WARNING

Mount the spindle cap with its oil drain hole facing straight down. Otherwise, oil will enter the bearings and damage them.

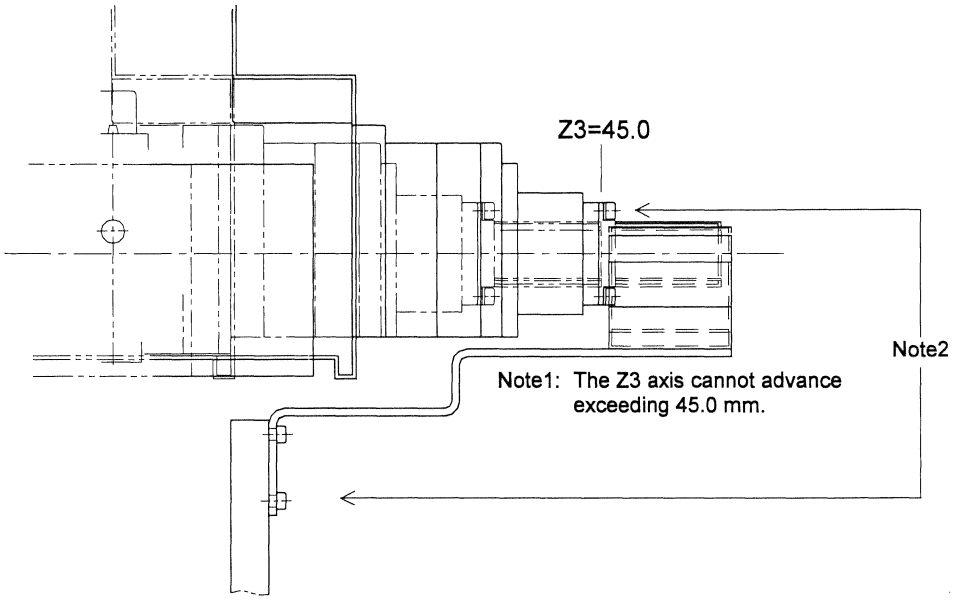
Note

With door lock device (Option) or EC machine.
If door lock release conditions are not fit, door locks will not be released.

If doors are locked, the lamp on the START key will blink (on 0.3 seconds and off 0.3 seconds).

<Position to transfer the workpiece from the back spindle>

Set <Basket> for <Back Spindle> item on [MC-Data] screen.
See <Chapter 5 Programming> of Basic Manual.

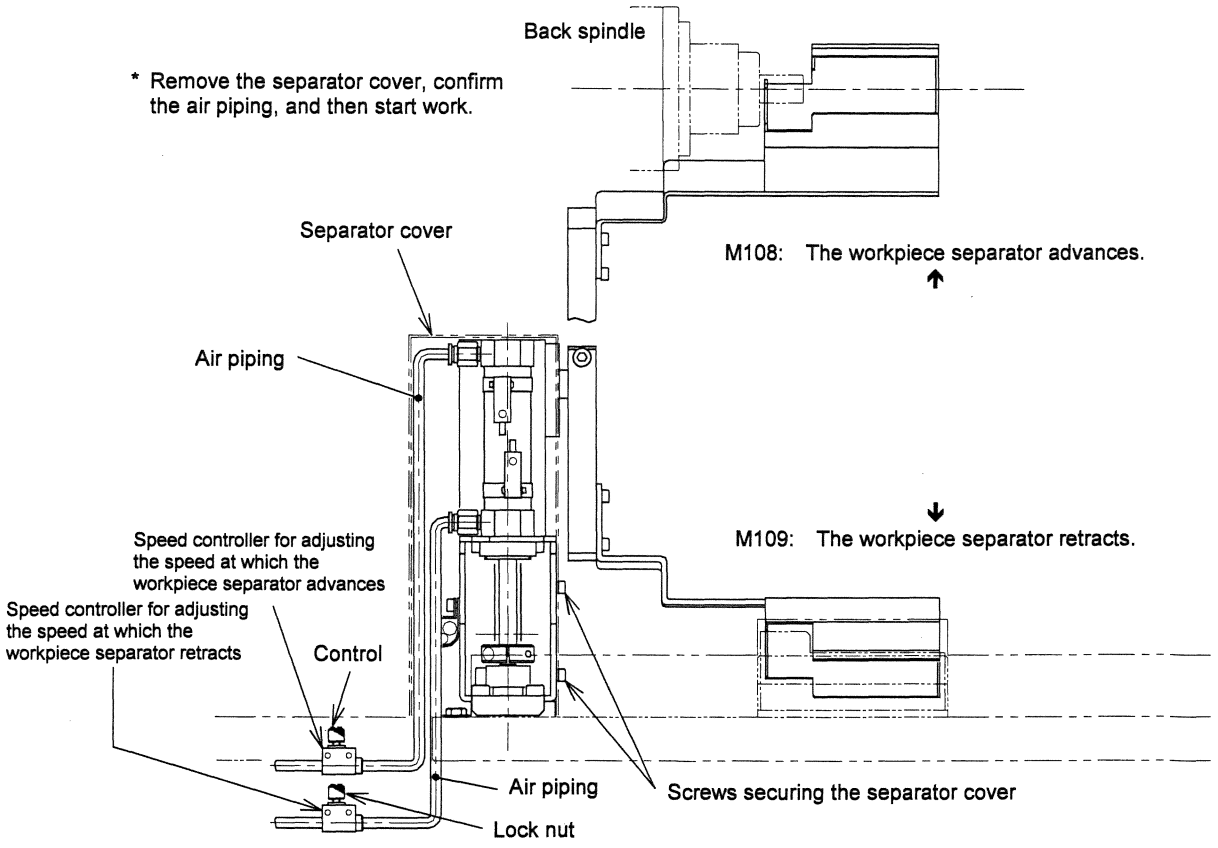


At transfer of the workpiece

Note 2: Before mounting the product receiver, move the back spindle to a position near Z3=45.0 by operating the handle to avoid the interference between the product receiver's left wall and the back spindle.

7.5.4 Adjustment of workpiece separator speed

The workpiece separator is driven by air. It is adjusted to an utmost speed at factory. However, the workpiece separator may fail to collect some workpieces to be machined. In this case, adjust the "Separator Retraction Speed."



Top view

<Procedure to adjust the workpiece separator speed>

1. Loosen the lock nut of the speed controller.
2. Turn the control with a standard screwdriver.


To decrease the speed, turn the screwdriver clockwise.

(Top view)


To increase the speed, turn the screwdriver counterclockwise.

3. To confirm the speed, execute the commands to advance and retract the workpiece separator in MDI mode.
   M108 Command to advance the workpiece separator
   M109 Command to retract the workpiece separator
   Repeat the operations in steps 2 and 3 until obtaining a suitable speed.
4. Tighten the lock nut of the speed controller when finishing speed adjustment.


CAUTION

Adjust a suitable speed. Advancing or retracting the workpiece separator too fast may cause damage to the separator.

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Product Code C – C 1 2 1 6 VI VII VIII IX – 7 7 0

Document Code 6 E 1 – 0 7 0 2

6 E 2 – 0 7 0 2

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8.1 Multi-axis Control

8.1.1 Machining patterns

To simplify a program used with a multi-axis machine, operations (machining) are grouped by purpose. An operational (machining) group is called a machining pattern. The following eight machining patterns are available: The machining pattern commands should be specified for all the three axis control groups.

- Machining pattern cancel,Free machining in three axis control groups (G600)
  G600 cancels the machining patterns G610 to G670. (Power-on state)
  Use this machining pattern command to perform machining with no particular machining pattern specified.

- $1 single machining,Front/back simultaneous machining (G610) : Type VII, VIII, IX
  This machining pattern command enables single machining with a front drill for front machining in $1, or front/back simultaneous machining with the front drill in $1 and a back drill for back machining in $2. In the case of type IX, X2 axis (opposite tool post) and X3 axis (back spindle) are superimposed, and enables ID machining for front and back simultaneously.

- Outer diameter/inner diameter simultaneous machining (G620) : Type VIII, IX
  This machining pattern command enables the following two types of machining at the same time while superimposing the Z2 axis on the Z1 axis:
  Outer diameter machining with a gang tool for front machining in $1
  Inner diameter machining with a front drill for front machining in $2

- Front/back parallel machining (G630) : Type VII, VIII, IX
  Use this machining pattern to perform front machining and back machining independently. The machining pattern command enables machining with a gang tool for front machining in $1 and machining with a back drill for back machining in $2.

- 3-line simultaneous machining (G640) : Type VIII, IX
  This machining pattern command enables the following three types of machining at the same time while superimposing the Z2 axis on the Z1 axis and the Z3 axis on the Z2 axis:
  Outer diameter machining with a gang tool for front machining in $1
  Inner diameter machining with a front drill for front machining in $2
  Inner diameter machining with a back drill for back machining in $3
  In the case of type IX, X2 axis (opposite tool post) and X3 axis (back spindle) are superimposed, and enables ID machining for front and back simultaneously.

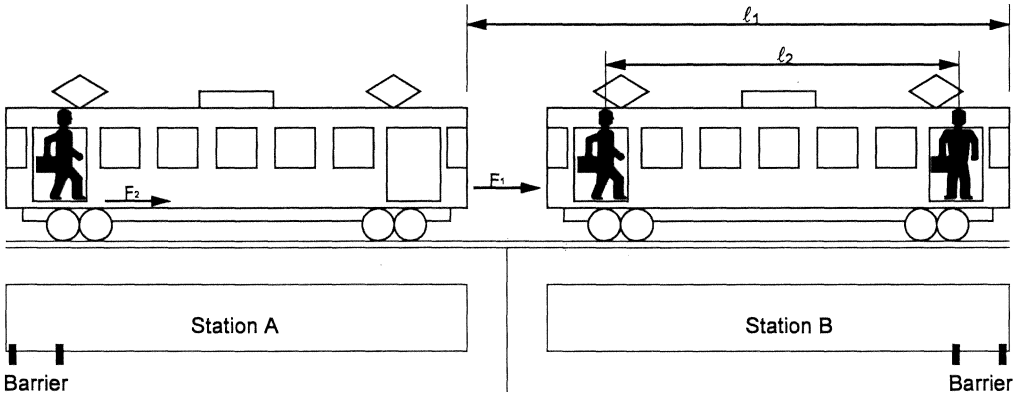
- Pick-off,Center-support (G650)
  This machining pattern enables the back spindle to pick off workpiece and support the long workpiece.

- Front/back simultaneous machining (G660) : Type VI
  This machining pattern command enables front/back simultaneous machining with a vertical front drill for front machining in $1 and a vertical back drill for back machining in $2.

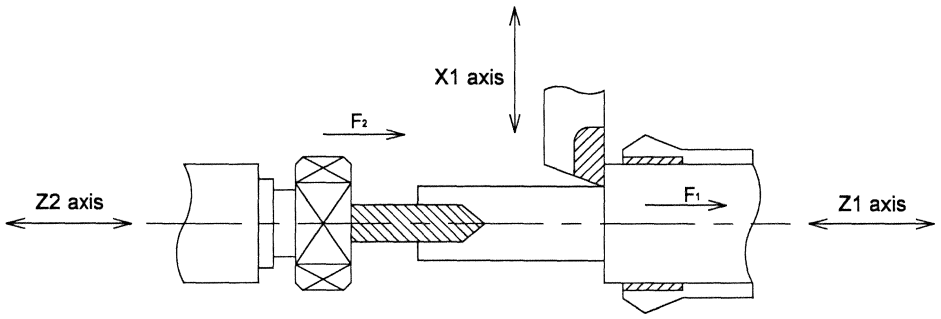
- Sequential machining in a single axis control group (G670)
  Specify this machining pattern command to create a program using only $1. The machining pattern command enables machining with a gang tool, a front drill, and a back drill, product collection, and pick-off by using only $1.

8.1.2 Superimpose control

This section explains superimpose control giving an example.
Mr. A got on the end of the train. He was getting off at the next station. The front end of the train is close to the barrier. So, he walked to the front end of the train and got off.
The following figure shows the work done by the train and Mr. A.
While the train was running the distance (work ℓ_1) at F1 speed, Mr. A disk his work for the distance of ℓ_2 at F2 speed. As a result, the work $\ell_1 + \ell_2$ was done. The train acts Z1 as the reference coordinate axis. Mr. A acts as the Z3 axis. Mr. A (Z3 axis) did his work while being on the train (Z1 axis). This is called superimpose control.
In terms of this machine, the train corresponds to the headstock (Z1 axis), and Mr. A corresponds to the back headstock (Z3 axis).



Specifying a machining pattern command of G610 (Type IX), G620 (Type VIII, IX), G640 (Type VIII, IX) or G650, the superimposition control function is enabled.
By executing the G610 command, X3 axis can be superimposed on the X2 axis.
By executing the G620 command, Z2 axis can be superimposed on the Z1 axis.
By executing the G640 command, Z2 axis can be superimposed on the Z1 axis, Z3 axis can be superimposed on the Z2 axis, furthermore X3 axis can be superimposed on the X2 axis.
By executing the G650 command, Z3 axis can be superimposed on the Z1 axis.



Example; Machining pattern command of G620.

- If Z2 axis movement is not specified and Z1 axis movement is specified, the Z2 axis moves synchronously with the Z1 axis.
- If Z2axis movement is specified and Z1 axis movement is not specified, only the Z2 axis moves.
- If both Z2 axis movement and Z1 axis movement are specified, the Z2 axis moves while being superimposed on the Z1 axis (being on the Z axis).

Explanation of the above figure:
When F1 = F2: The Z2 axis appears to be in stopped state.
When F1 < F2: The Z2 axis moves forward at speed of F2-F1.
When F1 > F2: The Z2 axis moves backward.
The queuing command is specified in the program for adjusting the timing of the Z1 and Z2 axes.

Notes

Conditions for C1216 to simultaneously perform front and back machining
Simultaneous machining may not be applicable depending on the machining conditions.
The following explains key points on deciding whether to perform simultaneous machining in the machining condition. You should actually perform the target machining and decide whether the simultaneous machining is acceptable. If there is any problem, stop either front or back machining, and operate the machine in single machining mode.

(1) Performing outer-diameter rough machining with front and back machining in parallel
There is no machining problem.

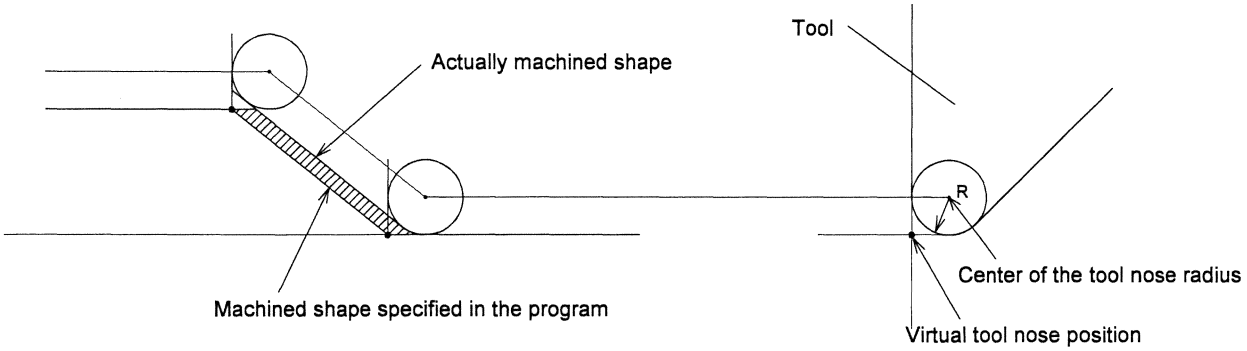
(2) Performing outer-diameter finish machining with front and back machining in parallel
Simultaneous machining causes an error in the machining diameter or a striped pattern on the machined surface of a workpiece.

(3) Performing two of center drilling, end-face drilling, and inner-diameter reaming in parallel
Simultaneous machining may cause a slight error in the machining diameter.

(4) Performing two of outer-diameter grooving, thread cutting, end-face machining, and boring in parallel
Simultaneous machining may cause a dimensional error or a striped pattern on the machined surface of a workpiece.

8.2 Nose R Compensation (Tool Nose R Compensation)

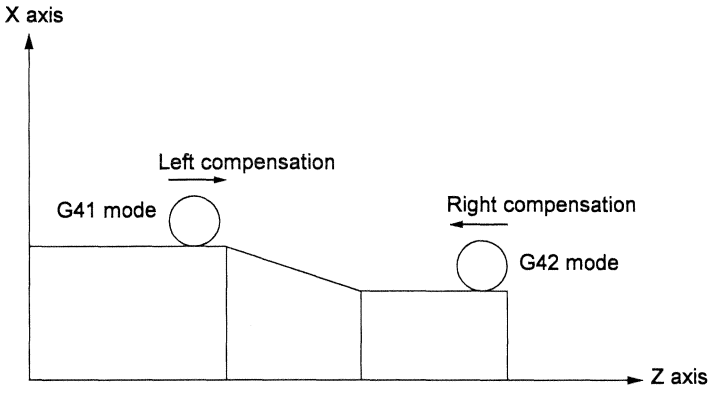
If the tool nose is round when turning is performed, the roundness (R) of the tool nose causes an error. The shape of a workpiece after tapering or arc cut-off machining is completed is different from the workpiece shape specified in the program.



The nose R compensation function automatically calculates an error if you set nose radius data. Input the nose radius data for R (tool nose radius) and P (virtual tool nose number) in the tool data before hand.

Command format

G40	Nose R compensation cancel
G41	Nose R compensation mode (left) ON
G42	Nose R compensation mode (right) ON

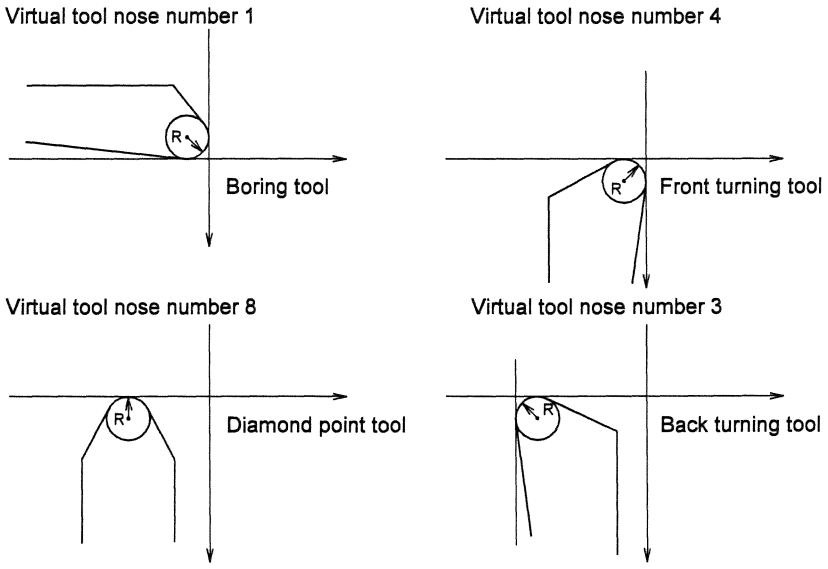


Notes

- Be careful of interference in executing the rapid feed positioning command or nose R compensation cancel command. As a rule, keep the tool nose at least the distance equivalent to the tool nose radius away from the workpiece.
- Execution of some G commands is not permitted during nose R compensation. Issuing any of the G commands causes an alarm during nose R compensation. For details, see the <Programming Manual> issued by MITSUBISHI ELECTRIC CORPORATION.

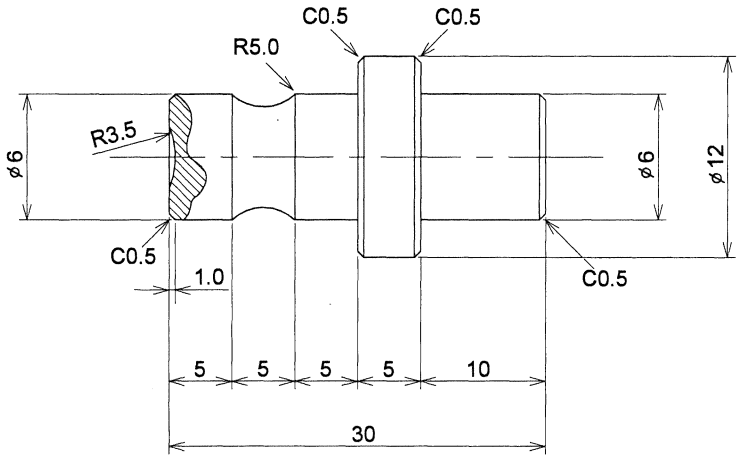
8.2.1 Virtual tool nose numbers

The direction of a virtual tool nose viewed from the center of tool nose radius is determined as a virtual tool nose number.
Values 0 to 9 can be specified as virtual tool nose numbers. Specify virtual tool nose numbers in accordance with the tool nose.
The following figure shows a popular tool nose and virtual tool nose numbers:

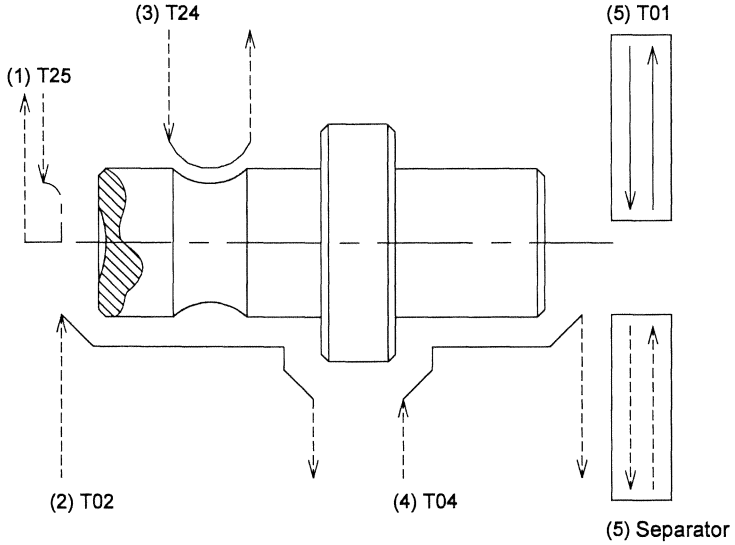


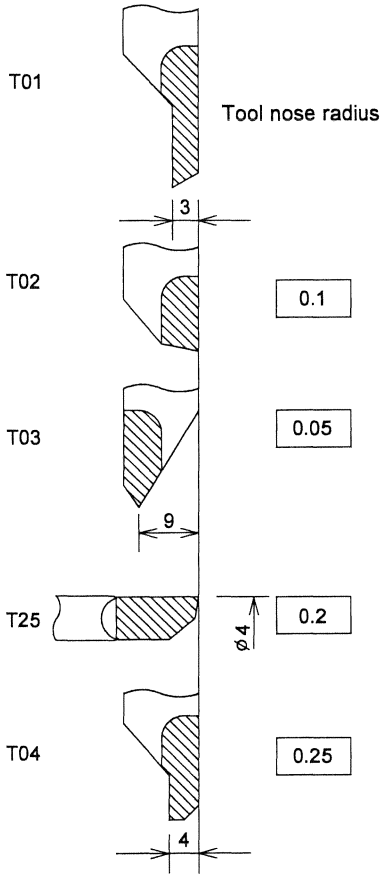
8.2.2 Example of using the nose R compensation

Drawing



Machining layout





Program sample

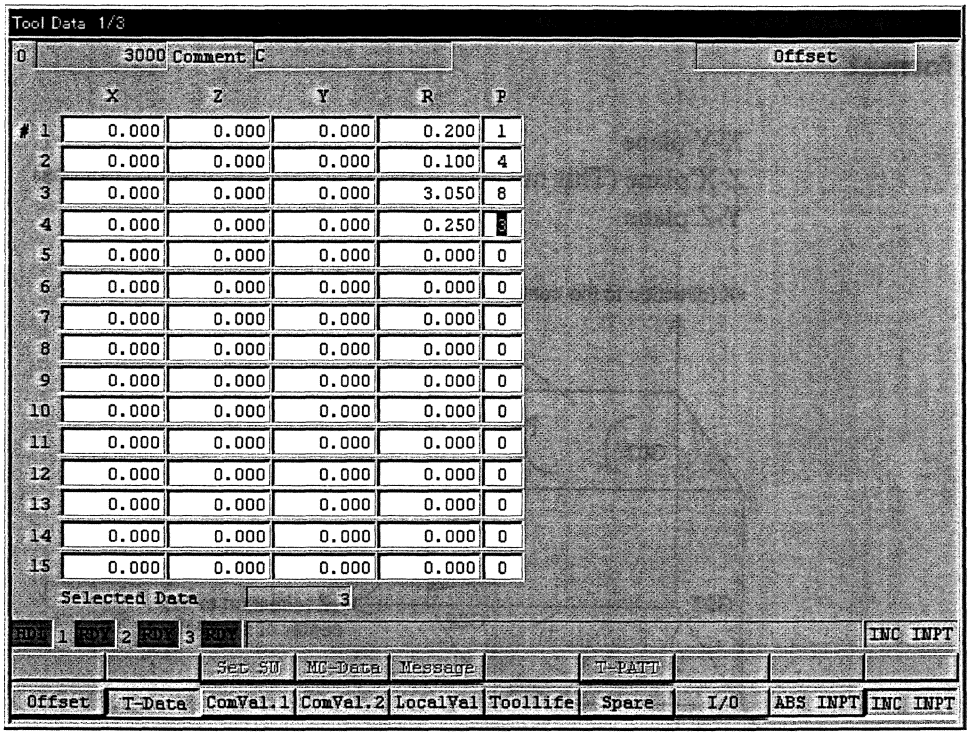
O3110

$1	$2	$3
G50 Z–0.1 M33 D1 M06 G00 X13.0 Z–0.6 M03 S1=[ ] G99 T2500 R1 N0125 G00 G42 X14.0 Z–0.6 T25 ..... Nose R compensation mode command G42 (ON), compensation number 25 G01 Z0 F0.1 — Tool data: R 0.2, P 1 G01 X4.898 F[ ] G02 X0 Z1.0 R3.5 G01 Z–0.6 G00 G40 X14.0 ..... Nose R compensation cancel command G40 M147 S1=[ ] N0202 T0200 G00 G42 X13.0 Z–0.5 T02 ..... Nose R compensation mode command G42 (ON), compensation number 2 X4.0 — Tool data: R 0.1, P 4 G41 G01 X6.0 Z0.5 F[ ] Z15.0 X11.0 X13.0 Z16.0 G00 G40 ..... Nose R compensation cancel command N0303 T0300 G50 W–9.0 G00 G41 Z13.0 T03 ..... Nose R compensation mode command G41 (ON), compensation number 3 G01 X7.0 Z4.286 F0.2 — Tool data: R 0.05, P 8 G03 X7.0 Z10.714 R5.0 F[ ]		

$1	$2	$3
G50 W9.0		
G00 G40 X13.0 ..... Nose R compensation cancel command		
N0404		
T0400		
G50 W-4.0		
G00 G41 X13.0 Z19.0 T04 ..... Nose R compensation mode command G41 (ON), compensation number 4		
G01 X11.0 Z20.0 F[ ] Tool data R 0.25 P 3		
X6.0		
Z29.5 F[ ]		
X4.8 Z30.1 F[ ]		
X13.0 F0.2		
G50 W4.0		
G00 G40 ..... Nose R compensation cancel command G40		
T0100		
N0501		
G00 X13.0 Z33.0 T01		
G01 X7.0 F0.2		
M32 X1.0		
G01 X-3.0 F[ ]		
M171		
M05		
M07		
G00 X-3.0 Z-0.1 T00		
M56		
G999		
N999		
M02		
M99		
%		

Note

Pre-register the tool nose R value in the tool data when creating the program.

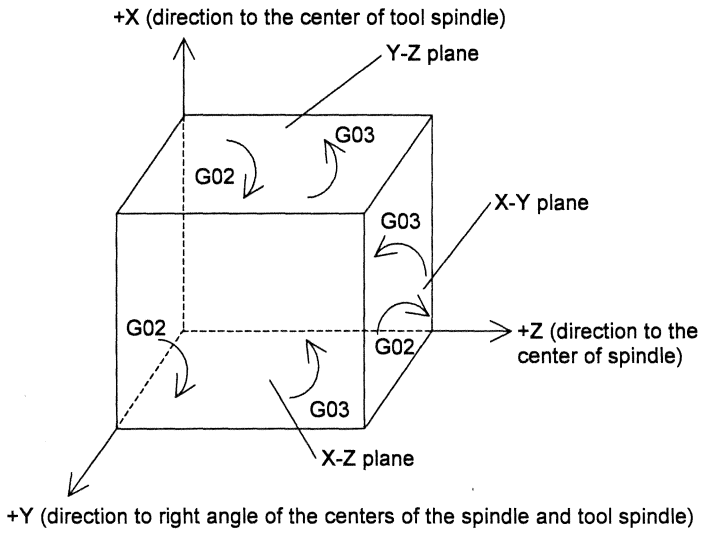


8.3 Circular Interpolation in a Secondary Machining Process

The circular interpolation feed is enabled on the following three planes in the secondary machining process:

Command format

G17	X-Y plane
G18	Z-X plane (This mode selected for ordinary turning process)
G19	Y-Z plane



8.3.1 Selecting a plane

Generally, the Z-X plane (G18) is selected at power-on or reset. This plane is used for circular interpolation (G02 or G03) in the turning process.
To use the circular interpolation on a different plane in the secondary machining process, execute the plane selection command G17 or G19.
Be sure to reselect the Z-X plane (G18) to return to the turning process.

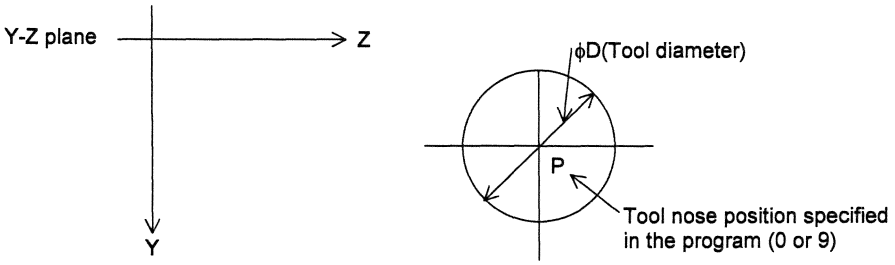
8.3.2 Tool diameter compensation

To use the tool diameter compensation function, program tool diameter compensation with the nose R compensation function used when turning is performed.

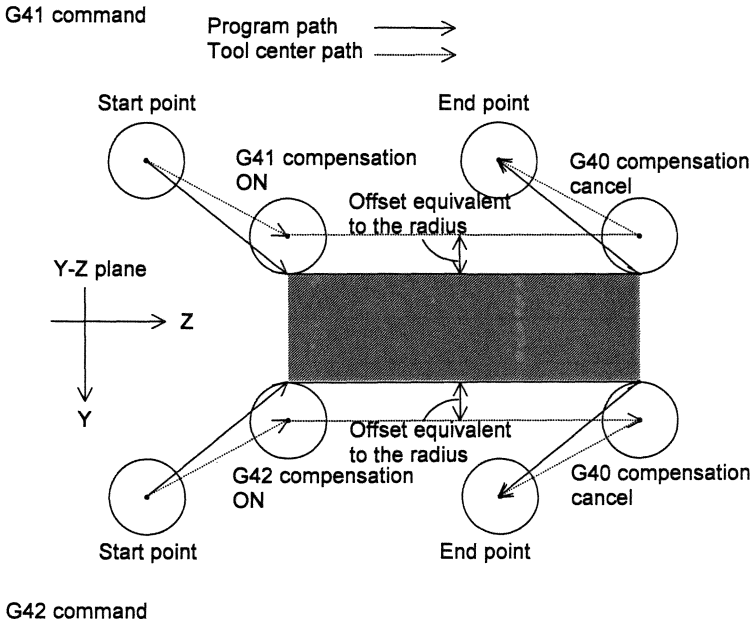
Command format

G40	Tool diameter compensation (nose R compensation) mode cancel
G41	Tool diameter compensation (nose R compensation) mode (left) ON
G42	Tool diameter compensation (nose R compensation) mode (right) ON

The following shows the relation between the tool diameter and the cutting position specified in the program.
Pre-set 0 or 9 as the virtual tool nose number for the item of Tool Data screen.

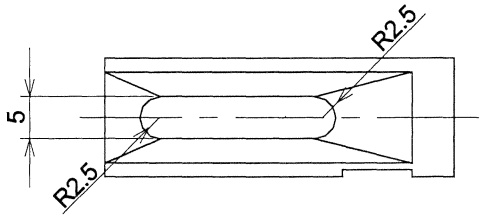


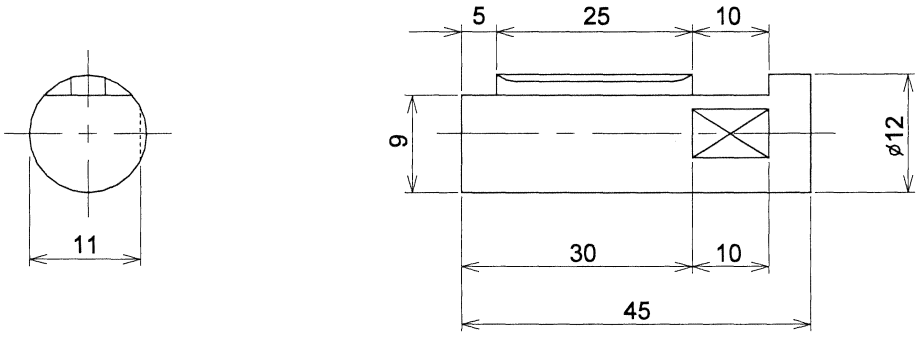
The following figure shows the tool cutting point and compensation operation:
G41: Offset on the left side of the direction in which the tool moves
G42: Offset on the right side of the direction in which the tool moves



8.3.3 Example of using arc interpolation in a secondary process

Drawing

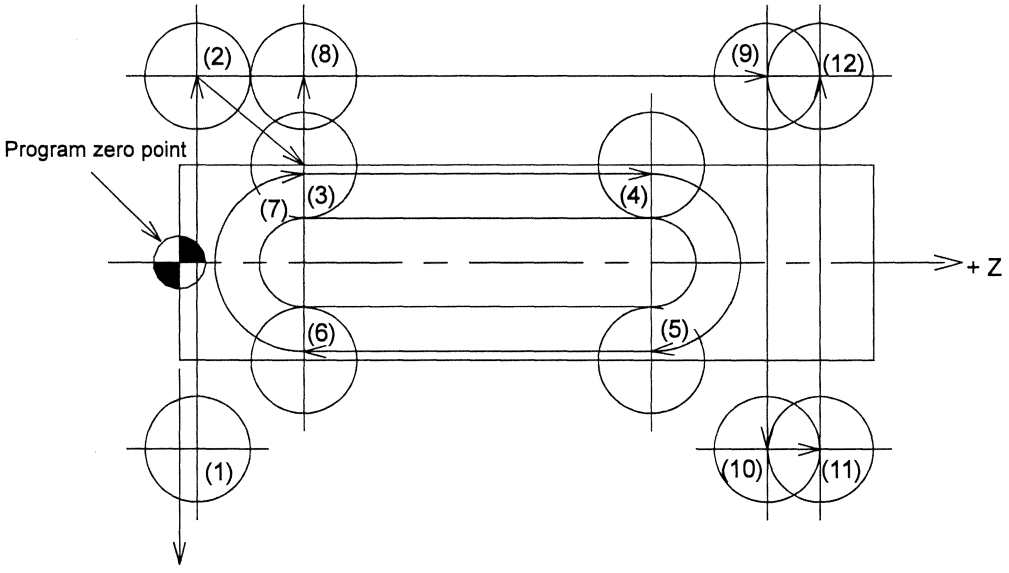




Tool data

Tool diameter	ϕ 6 (end mill)
Tool number	T11
Compensation number	11
Tool nose radius (tool radius value)	3.0
Virtual tool nose number	0

The numbers (1) to (12) in the figure indicate how the end mill moves when the program is executed.



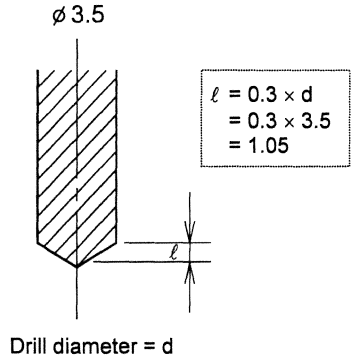
Program sample

This program sample is for $1.

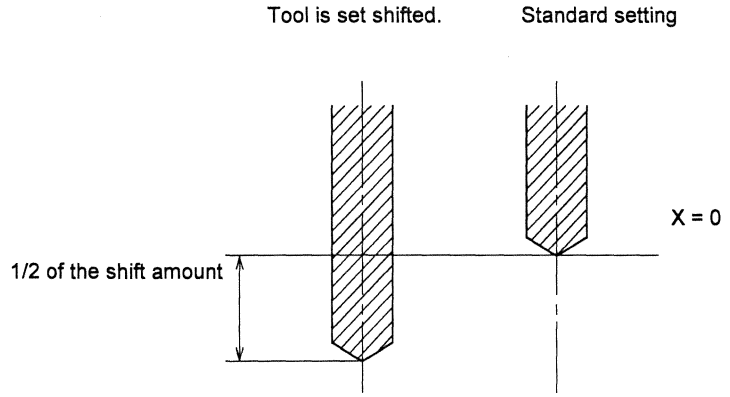
$1	
M05 ..... The spindle stops.	
M28 S0 ..... Spindle 0-degree indexing	
S3=[ ] M58 G98 ..... The tool spindle rotates forward.	
T1111 ..... Selection of the tool spindle and compensation number	
G50 W-10.0 ..... Coordinate system setting for the tool spindle	
G19 G00 Y9.0 Z1.0 ..... Selection of plane Y-Z, and determination of the cutting start position in the Y-Z plane	
X6.0 ..... Positioning of the direction (X axis) in which the tool cuts into the workpiece	
G01 Y-9.0 F[ ]	
G41 Y-2.5 Z7.5 ..... Tool diameter compensation	
Z27.5	
G02 Y2.5 R2.5 F[ ]	
G01 Z7.5 F[ ]	
G02 Y-2.5 R2.5 F[ ]	
G40 G1 Y-9.0 F[ ] ..... Tool diameter compensation cancel	
G00 Z34.0	
G01 Y9.0 F[ ]	
G00 Z37.0	
G01 Y-9.0 F[ ]	
M28 S90.0 ..... Spindle 90-degree indexing	
G00 X10.0	
Y-7.0 X33.0	
G01 Y7.0 F[ ]	
G00 Z37.0	
G01 Y-7.0 F[ ]	
G18 G00 X13.0 T00 ..... Switching of plane specification back to the turning mode, and compensation cancel to return to the positioning point in the diametrical direction	
M60 G99 ..... The tool spindle stops.	
G50 W10.0 ..... Setting of the coordinate system shift back to the original	

8.4 Through-hole (Cross-hole) Machining in a Secondary Process

This section explains machining of a cross-drilled through-hole in a 12.0 mm diameter material with a 3.5 mm diameter drill.
The X1 stroke of the gang tool is up to X–4.0. Therefore, the ordinary tool setting is unable to machine a through-hole in a workpiece. In this case, the ordinary tool setting must be modified so that the drill is set (shifted) extending longer than the standard in the minus direction.



If no shift amount is considered, the X value of a program for through-hole machining is calculated as shown below.
$-12.0 - (1.05 \times 2) = -14.1$
Specifying X–14.1 will make the X1 axis to overrun because the maximum X1 stroke is X–4.0. Thus, shifting the drill 10.1 mm (14.1 – 4.0) further in the minus direction will enable the dill to reach to X–14.1 when X–4.0 is specified. However, in consideration of leeway, the drill should be shifted 15.0 mm.
Then, mount the tool for machining a cross hole the equivalent to the shift amount (calculated in the above) longer than the standard. The tool must be actually mounted the half of the shift amount longer than the standard because the X value is specified for the diameter. Specify 7.5 mm in this example.
The left figure below shows the status when the G00 X0.0 command is executed for this tool. Before using this tool, specify 15.0 for the diameter of Tool Set so that the center of the material is positioned to X0.0.



Notes

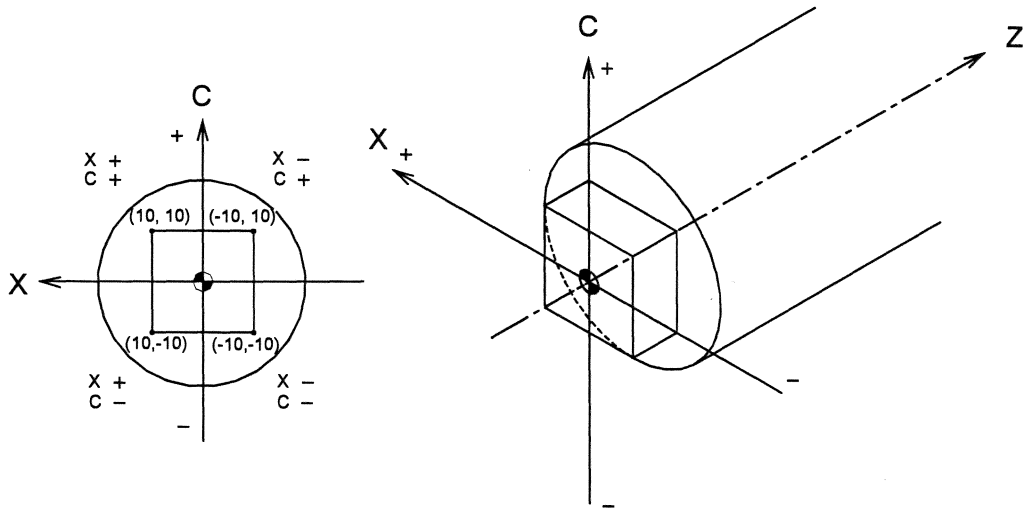
Input the shift amount to the Manual Tool Set screen, then set the tool.

8.5 Milling Interpolation — Optional

Generally, the X and Z axes are controlled as linear axes and the C axis is controlled as the rotary axis of the spindle. The milling interpolation function permits the C axis to be used as a linear axis at right angles to the X and Z axes, and enables the creation of a three-dimensional program with the three axes X, Z, and C.

8.5.1 Milling coordinates

Milling interpolation is performed between when G12.1 (milling interpolation ON) is executed and when G13.1 (milling interpolation cancel) is executed. Specify the coordinates of X, (Z,) and C axes with values calculated for the radius.
The plus and minus signs of X and C are as shown in the figure below.



Command format

G12.1 D□ E=□	Milling interpolation ON
G13.1	Milling interpolation cancel

Arguments

- D□: Selects the name of a milling virtual axis. Specify "0" to select Y axis, and specify "1" to select C axis. The default is C axis.
- E=□: Specify an axis for milling interpolation. The default is the axis determined by the milling axis number specified in the basic specification parameter #1125.

For the E argument, specify "E=C" if the axis number of C axis is different between the axis control group and the tool holder.
For example, if a gang tool holder is used with $1, the axis number of C axis is identical; 3 for both the axis control group and the tool holder. Thus, there is no need to specify the E argument. (Specifying the argument does not cause any problem.)
If a front drill holder is used with $1, the axis number of C axis is different between the axis control group and the drill holder. In this case, "E=C" must be specified.
In general, you do not have to specify the D argument.
When specifying both D and E arguments, be sure to specify in the order of D and then E.

Relationship between the axis numbers of C axis and the axis control groups

	$1	$2	$3
Axis number of C axis	3	2	2

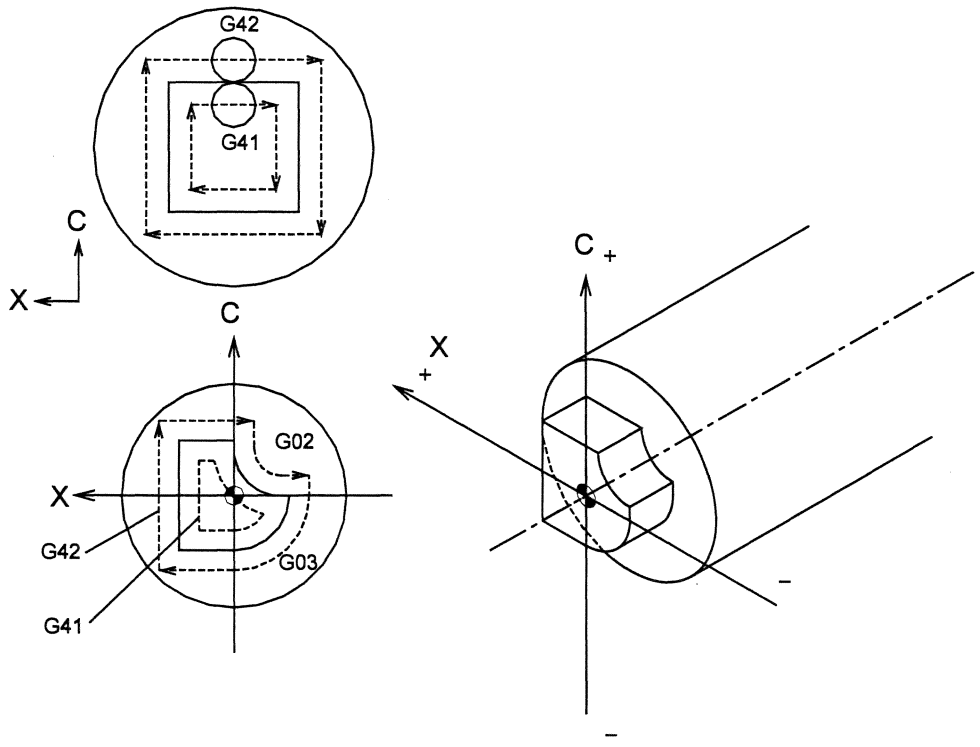
Relationship between the axis numbers of C axis and the tool holders

	Axis number of C axis
Gang tool holder (T0100 to T0600) (T1100 to T1400) (Type VII, VIII) (T1100 to T1700, T5400 to T5700) (Type VI)	3
Front drill holder (T2100 to T2600) (Type VII, VIII)	2
Back drill holder (T3100 to T3600) (Type VII, VIII)	2

8.5.2 Milling plane

To perform end-face machining, execute the G17 command to select the X-Y plane, and program the coordinate values viewed from the end face of the workpiece.

	At end-face machining	Compensation mode (operation)
Tool diameter compensation	G40	Compensation cancel
	G41	Right compensation
	G42	Left compensation
Arc interpolation	G02	CCW (counterclockwise)
	G03	CW (clockwise)



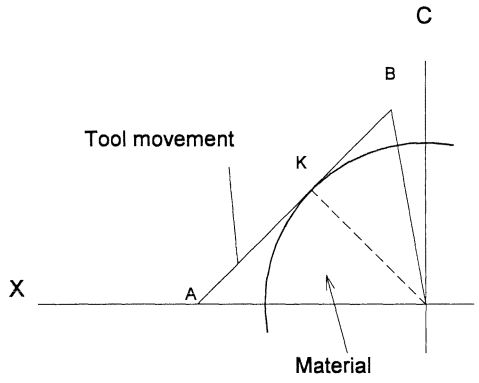
8.5.3 Programming of a milling process

Consider the following points in programming a milling process:

When starting a milling process, move the X axis away from the workpiece to obtain an enough approach distance. The X axis makes an approach to the workpiece, and then moves to the specified position. Therefore, if the approach distance is not enough as shown in the following figure, the tool and workpiece interfere with each other.

During the positioning of the X axis from point A to point B in the following figure, the X axis makes an approach to the workpiece in the range from point A to point K, and moves away from the workpiece in the range from point K to point B.
The milling start position (point A) for avoiding interference with the workpiece must be obtained by calculation.

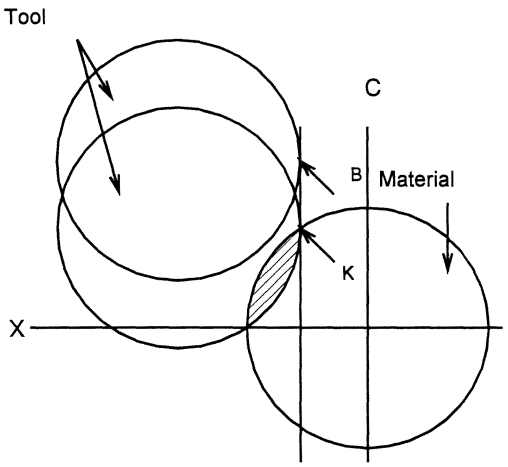
Point A = Ps position



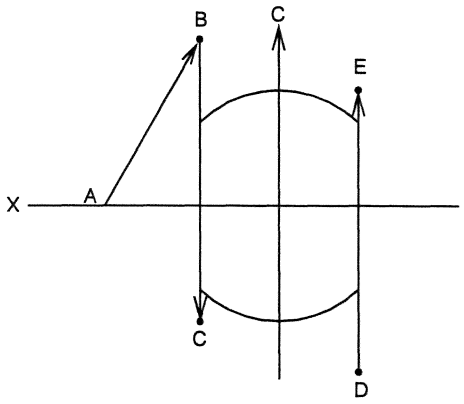
Determine the milling start position in consideration of the diameter of the rotary tool to be used and the diameter of the workpiece to be machined. If the start position is not suitable, the tool and workpiece may interfere with each other.

If the machining start position is point K for making the D cut as shown in the following figure, the tool and material interfere with each other in the shaded area when the X axis makes an approach to the workpiece.
To prevent the interference, obtain the machining start position (point B) by calculation.

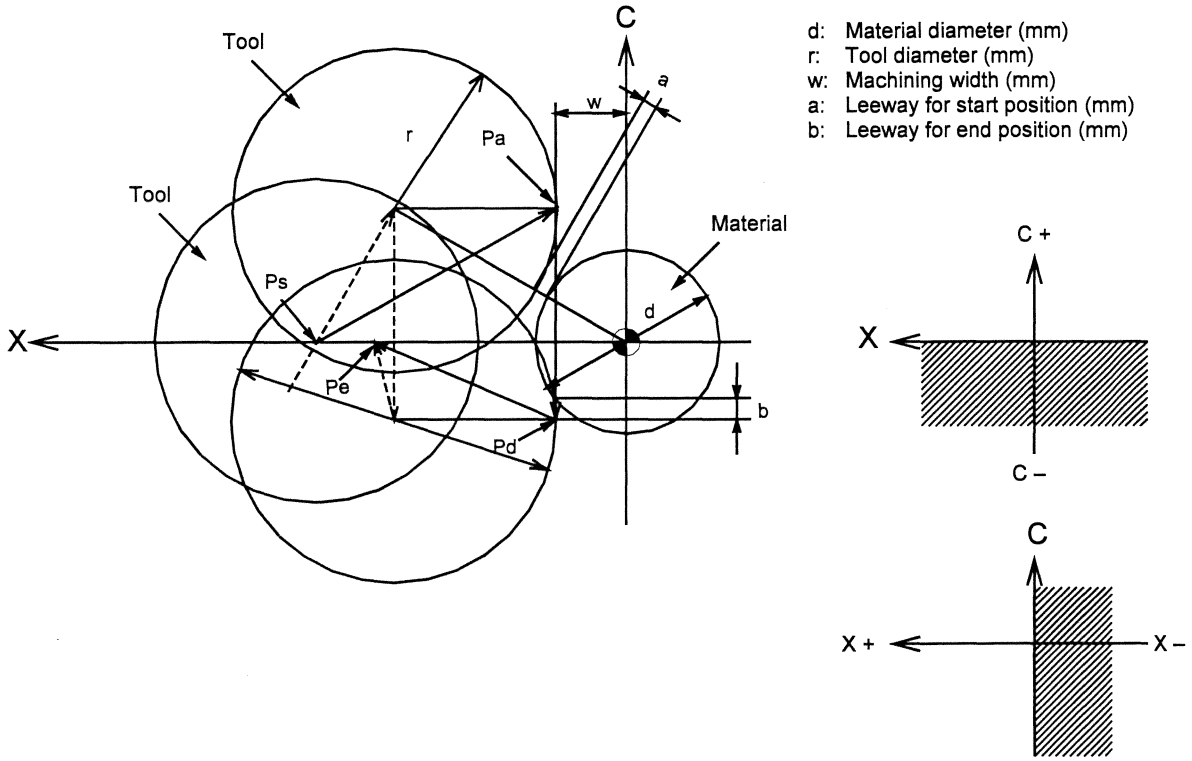
Point B = Pa position



When performing machining both sides of a workpiece (e.g., 2-face width machining), cancel milling interpolation at completion of machining one side, rotate the C axis 180 degrees, then start machining the other side. If both sides are machined continuously without milling interpolation cancel, the tool and workpiece may interfere with each other.



8.5.4 Calculation of milling coordinates



Example: When d = 20 mm, r = 30 mm, w = 12 mm, a = 2 mm, and b = 2 mm:
Ps = (42.0, 0) Pa = (12.0, 0)
Pd = (12.0, –4.63) Pe = (42.51, 0)

Obtain machining positions suitable for the milling process from the formulas shown in the following table:

Machining position	X axis coordinate	C axis coordinate
Milling start positions Ps = (Xs, Cs)	$Xs > (d/2 + r + a)^2 / (w + r)$	Cs = 0
Machining start position Pa = (Xa, Ca)	Xa = w	$Ca > \sqrt{(d/2 + r + a)^2 - (w + r)^2}$
Machining end position Pd = (Xd, Cd)	Xd = w	$Cd > \sqrt{(d/2)^2 - w^2} + b$
Milling end position Pe = (Xe, Ce)	$Xe > (w + r) + (Cd^2 / (w + r))$	Ce = 0

Notes

- The results of the above formulas are free from the plus and minus signs. When changing the results to coordinates, assign signs to them in consideration of the tool position.
- The coordinate Xs of Ps is moved before milling interpolation ON is specified. Therefore, be sure to change the coordinate to a value calculated for the diameter when specifying it.
  The other values of Xa, Xd, and Xe are calculated for the radius. The calculated values can be used as they are.

8.5.5 Program format

Previous process

```
  :
  :
M05 G98 M58 S3=[    ]   .....Spindle stop, feed per minute, and gang tool spindle rotation
M18 C0                  .....Sequential operation of spindle C axis ON (optional)
G50 C0                  .....C axis coordinate system setting
```

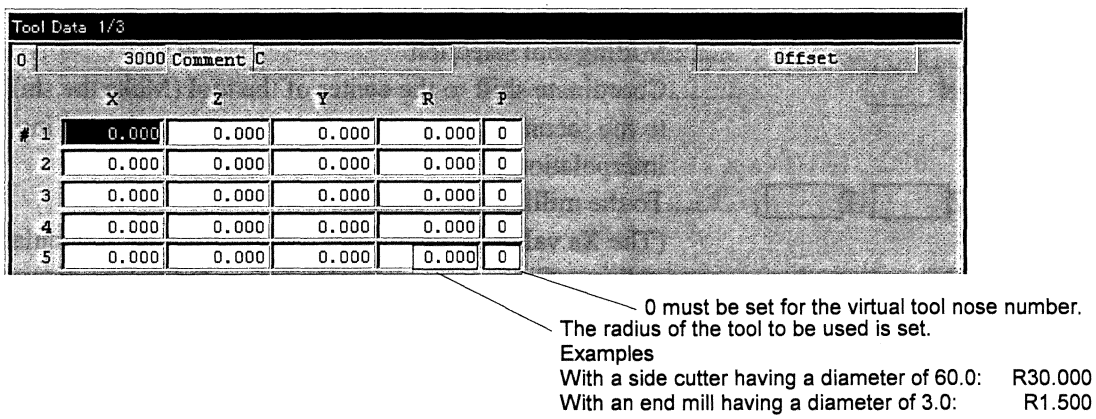
Milling process

```
N[    ] T[    ]          .....Milling tool selection
G50 U[    ] W[    ]      .....Coordinate shift to the center of the tool (Make the shift equivalent
                               to the secondary machining spindle amount for milling
                               interpolation.)
G00 X[    ] Z[    ] T[    ]  .....To the milling start position (Ps)
                               (The Xs value of the milling start position Ps is calculated for the
                               radius.  Change Xs to a value calculated for the diameter when
                               specifying it.
                               The other values of Xa, Xd, and Xe are calculated for the radius.
                               They can be specified as they are.)
G12.1                   .....Milling interpolation ON
G17                     .....X-Y plane selection (end face machining)
G41 G00 X[    ] C[    ]  .....Tool diameter compensation ON, and to the machining start
                               position (Pa)
  :                            (G42 may be executed instead.)
  :
G01 X[    ] C[    ]      .....Milling
  :
  :
G40 G00 X[    ] C[    ]  .....Tool diameter compensation OFF, and to the milling end position
                               (Pe)
G13.1                   .....Milling interpolation cancel
G18                     .....Z-X plane selection
G50 U[    ] W[    ]      .....Coordinate system shift cancel
M20 M60                 .....C axis release, Gang tool spindle stop
  :
  :
```

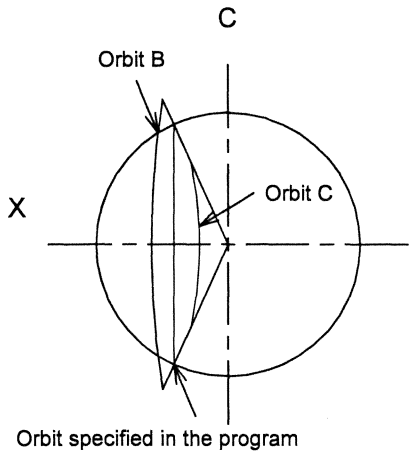
8.5.6 Milling compensation

The tool nose is programmed as the center of a rotary tool for a milling process.
The nose R compensation commands (G40, G41, and G42) are used during the milling process. Thus, be sure to read the explanation of nose R compensation in the <Programming Manual> issued by MITSUBISHI ELECTRIC CORPORATION. The following shows the setting of nose R compensation:

Example: When T05 is used:



If the coordinate system shift in the diametrical direction of the tool is different from the actual shift, the workpiece is cut in an invalid shape.
For example, if linear interpolation is performed for the end face as shown in the following figure, the workpiece has the externally round shape like orbit B when the coordinate system shift is too large. Conversely, the workpiece has the internally round shape like orbit C when the coordinate system shift is too small. If linear interpolation causes a round shape, the coordinate system shift is invalid. Correct the coordinate system shift.



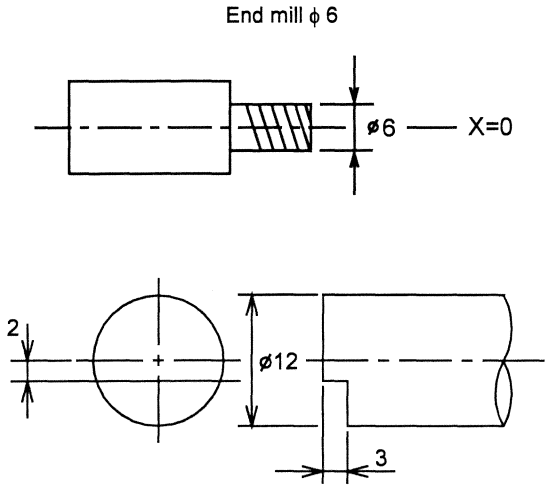
To compensate the dimensions of a finished workpiece, change the tool data R.
When a dimension of an actually machined workpiece is greater than the specified value, decrease the value specified in the tool data by the error. When a dimension of an actually machined workpiece is smaller than the specified value, increase the value specified in the tool data by the error.

8.5.7 List of NC unit errors during milling interpolation

The following table lists alarms which may be issued during automatic operation. A program error is posted if a program creation error occurs or if a program is not created in accordance with the NC specifications.

Error no.	Message displayed on the screen	Description	Procedure
P480	NO. MILL SPEC	The milling command (G12.1 or G13.1) was executed when the milling function was not specified.	Check the specification.
P481	MILL ILL. G	A G code, which must not be executed during milling interpolation, was executed.	Delete the invalid G code.
P482	MILL ILL. AXIS	The command was executed for the rotary axis during milling interpolation.	Delete the command for the rotary axis.
P484	INCOMPLETE RETURN AXIS (MILL)	When the milling interpolation process starts, there is an axis which has not returned to the reference point.	Return the axis to the reference point in manual or automatic mode.
P485	INVALID MODAL (MILL)	• When the milling interpolation process starts, tool diameter compensation, constant surface speed control, or the boring cycle is in progress. • A T command was executed during milling interpolation.	• Execute the cancel command (G40, G97, or G80) before the G12.1 command. • Execute the T command before the G12.1 command.

8.5.8 Example of using the milling interpolation function 1 (D cut)



Ps: $Xs > (12/2 + 3 + 2)^2 / (3 + 2) = 24.2$
The following is obtained since Xs is specified with a value calculated for the diameter.
$24.2 \times 2 \approx 49.0$

Pa: $Xa = 2$(from the above figure)
$Ca > \sqrt{(12/2 + 3 + 2)^2 - (2 + 3)^2} = 9.797 \approx 9.8$

Pd: $Xd = 2$
$Cd > \sqrt{(12/2)^2 - 2^2} + 2 = 7.65 \approx 7.7$

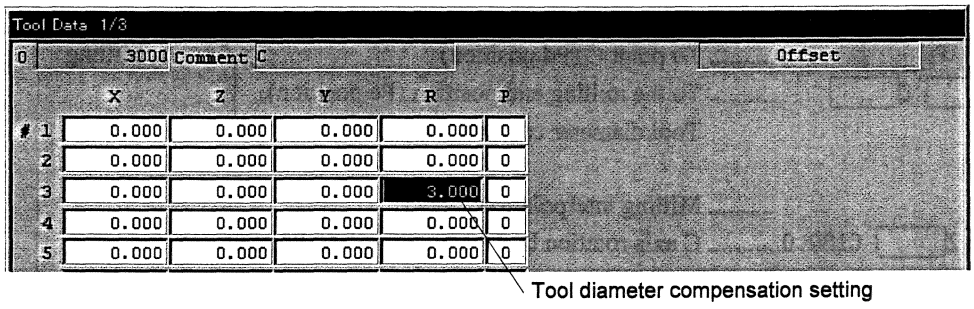
Pe: $Xe > (2 + 3) + \{7.7^2 / (2 + 3)\} \approx 16.858 \approx 17.0$
Set about 20.0 with leeway added.

Note

When specifying the Xs value of the milling start position Ps obtained from the formula, change it to a value calculated for the diameter.

Program sample

$1	
: : M05 G98 M80 S4 = 1260 ..... Front/back face tool spindle rotation (optional) M18 C0 G50 C0 N322 T2200 R1 G00 X49.0 Z3.0 T03 ..... Ps milling start position G12.1 E=C G17 G41 G00 X2.0 C9.8 ..... Pa machining start position G01 C-7.7 F80 ..... Pd machining end position G40 G00 X20.0 C0 ..... Pe milling end position G13.1 G18 M20 M82 M03 S1=3000 G99 : :	



8.5.9 Example of using the milling interpolation function 2

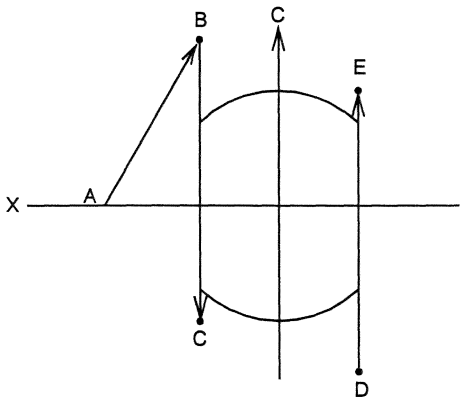
This section shows an example of 2-face width machining. Note that milling interpolation is canceled before the spindle rotates 180°.

Program sample

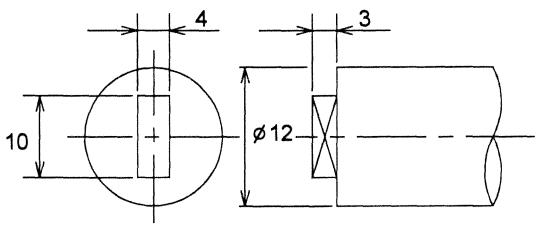
$1		
Previous process		
:		
:		
M05 G98 M80 S4=□	..... Spindle stop, feed per minute, and front/back face tool spindle rotation (optional)	
M18 C0	..... Sequential operation of spindle C axis ON (optional)	
G50 C0	..... C axis coordinate system setting	
Milling process		
N□	..... Machining pattern setting	
T□	..... Milling tool selection	
G50 U□ W□	..... Coordinate system shift to the center of the tool	
G00 X□ Z□ T□	..... To point A (Ps position)	
G12.1 E=C	..... Milling interpolation ON	
G17	..... X-Y plane selection (end face machining)	Milling
G41 G00 X□ C□	..... To point B (Pa position), tool diameter compensation ON.	Milling
G01 C□ F□	..... To point C (Pd position)	Milling
G40 G00 X□ C□	..... To the milling end position (Pe position), Tool diameter compensation OFF	Milling
G13.1	..... Milling interpolation cancel	
G00 X□ Z□ C180.0	..... C axis rotation by 180.0° at point A (Ps position)	
G12.1 E=C	..... Milling interpolation ON	
G17	..... X-Y plane selection (end face machining)	Milling
G41 G00 X□ C□	..... To point D (Pa position), Tool diameter compensation ON	Milling
G01 C□	..... To point E (Pd position)	Milling
G40 G00 X□ C□	..... Tool diameter compensation OFF To the milling end position (Pe)	Milling
G13.1	..... Milling interpolation cancel	
G18	..... Z-X plane selection	
G00 X□ Z□		
G50 U□ W□	..... Coordinate system shift cancel	
M20 M82	..... C axis release and front tool spindle stop	

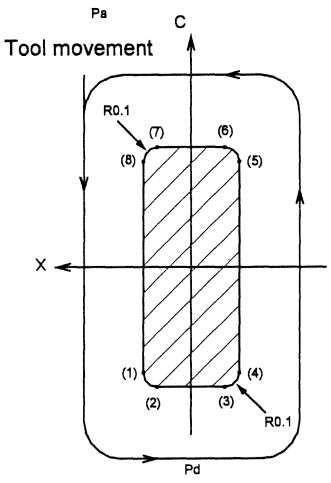
Note

Machining from point D to Point E is performed after the workpiece is rotated by 180°. Be careful of the coordinates of X and C.
B = D and C = E



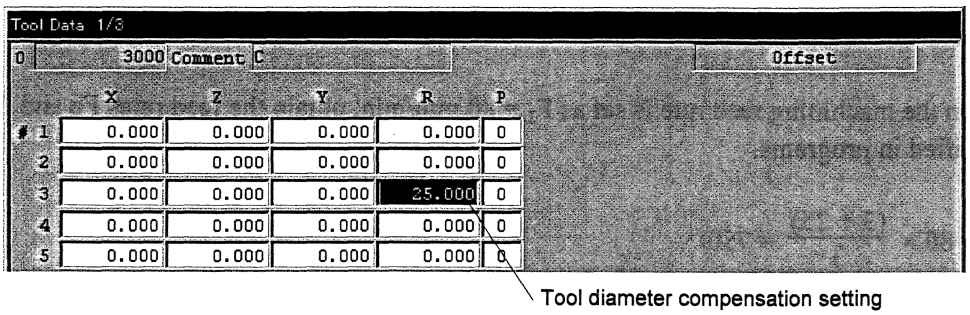
8.5.10 Example of using the milling interpolation function 3





Program sample

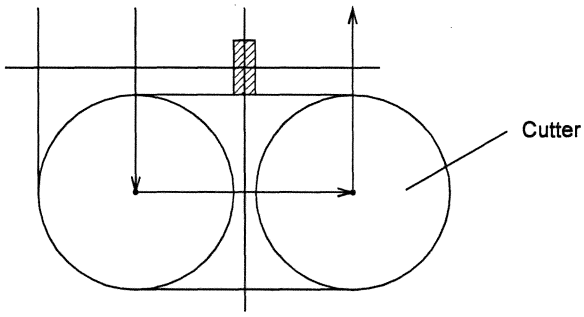
$1	
:	
:	
M05 G98 M80 S4=1260	
M18 C0	
G50 C0	
N0322	
T2200 R1	
G50 U10.0 W-5.0	
G00 X81.0 Z3.0 T03	..... Ps milling start position
G12.1 E=C	
G17	
G41 G00 X2.0 C23.0	..... Pa machining start position
G01 X2.0 C-4.9 F80	..... (1)
G02 X1.9 C-5.0 R0.1 F750	(2)
G01 X-1.9 F80	..... (3)
G02 X-2.0 C-4.9 R0.1 F410	..... (4)
G01 C4.9 F80	..... (5)
G02 X-1.9 C5.0 R0.1 F750	(6)
G01 X1.9 F80	..... (7)
G02 X2.0 C4.9 R0.1 F410	(8)
G01 X2.0 C-23.0 F500	..... Pd machining end position
G40 G00 X34.0 C-23.0	..... Pe milling end position
G13.1	
G18	
G50 U-10.0 W5.0	
M20 M82	
M03 S1=3000 G99	
:	
:	



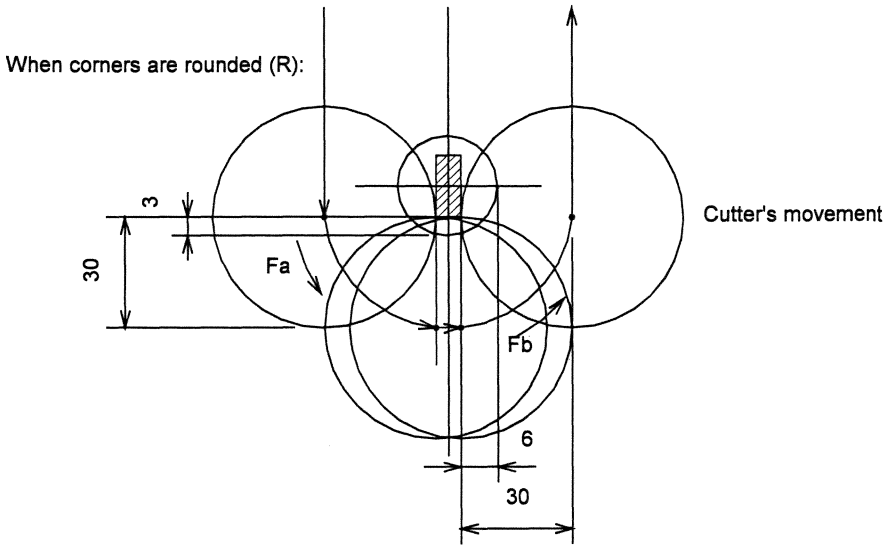
Note

- If the R setting value of tool diameter compensation is too large, the cutter makes unnecessary movement when cutting each corner of the workpiece. As a result, machining takes more time than it should. To minimize the machining time and have corners well finished, specify such a value for R that the corners are finely rounded.

Specification for the cutter to move at right angles



The cutter once moves away from the workpiece, and then makes an approach to the workpiece to start machining. This cutter's movement is unnecessary.



To eliminate the cutter's unnecessary movement when specification is made for the cutter to move at right angles, move the cutter circularly (as if it draws arcs) as shown in the above figure.
The feed rate specified in a program indicates a speed at which the center of the cutter moves, thus differs from the actual feed rate at the machining point in the circular motion. The feed rate to be specified in the program must be calculated.

– With an arc circumscribed with the outer diameter of the cutter:

When the machining feed rate is set as $F_2 = 80$ mm/min, obtain the feed rates Fa and Fb to be specified in programs.

$$Fa = 80 \times \frac{(3 + 25)}{3} = 750$$

$$Fb = 80 \times \frac{(6 + 25)}{6} \approx 413.3 \approx 410$$

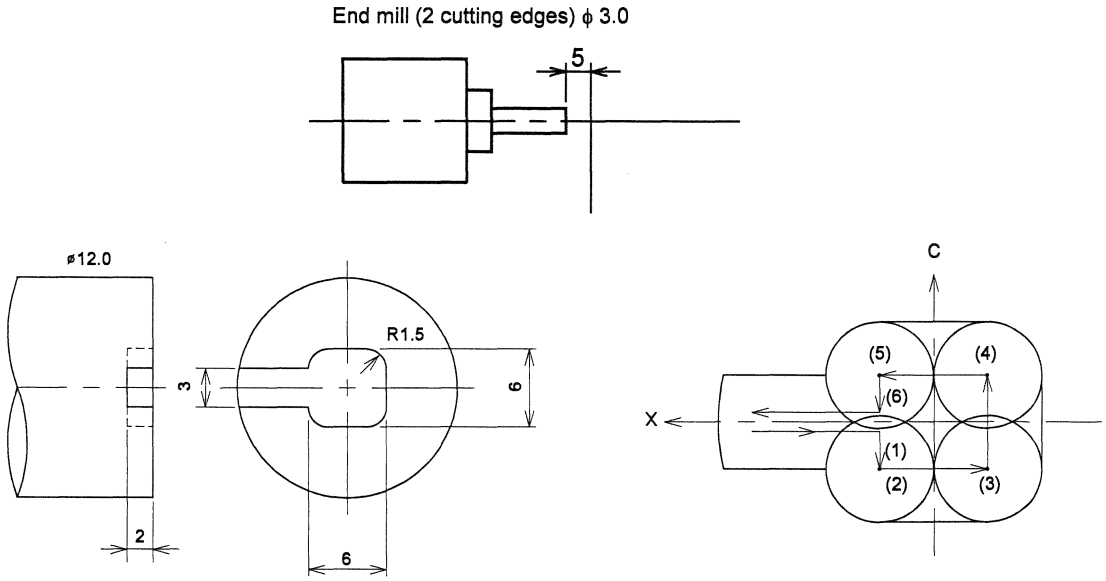
– Obtaining the feed rate for the machining diameter:

d_1	Cutter diameter	r_1	Cutter radius
d_3	Machining diameter	r_3	Machining radius
ℓ	Eccentricity		
F_1	Feed rate specified in the program		
F_2	Feed rate at which you want to machine workpieces		

$$F_1 = F_2 \times \frac{(d_3 + d_1)}{d_3} = F_2 \times \frac{(r_3 + r_1)}{r_3}$$

- The machining feed rate (80 mm/min) is a standard value.
  If you move the cutter circularly to machine corners, the cutter cuts more part of the next machining face as the cutter diameter becomes greater. Decrease the feed rate (calculated in the above) in accordance with the allowance, then specify the decreased feed rate.

8.5.11 Example of using the milling interpolation function 4



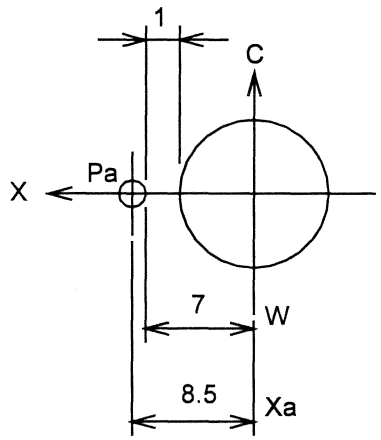
Program sample

$1	
:	
:	
M05 G98 M58 S3=2700	
M18 C0	
G50 C0	
N411	
T1100	
G50 W-5.0	
G00 X17.0 Z2.0 T04	..... Ps milling start position
G12.1	
G17	
G42 G00 X7.0 C-1.5	..... Pa machining start position
G01 X3.0 F200	..... (1)
C-3.0	..... (2)
X-3.0	..... (3)
C3.0	..... (4)
X3.0	..... (5)
C1.5	..... (6) The value, instead of C0, is set in consideration of tool diameter compensation.
X7.0 F500	
G40 G00 X7.0 C0	..... C0 is acceptable because the tool diameter compensation is canceled.
G13.1	
G18	
G50 W5.0	
M20 M60	
M03 S1=3000 G99	
:	
:	

Ps: $Xs > (6 + 1.5 + 1)^2 / (7 + 1.5) \approx 8.5$

Pa: Xa (See the following figure.)

Ca is 0 according to the following figure, but –1.5 should be set in consideration of tool diameter compensation.



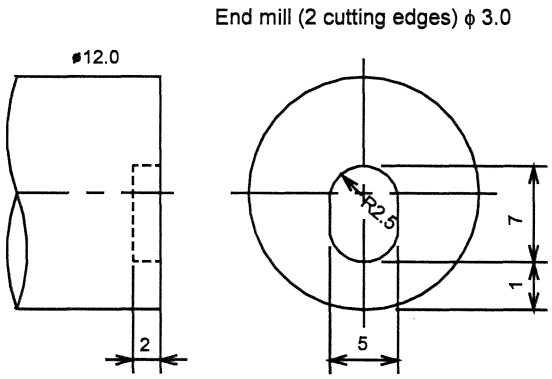
Tool Data 1/3

0 | 3000 | Comment | C | Offset

#	X	Z	Y	R	P
1	0.000	0.000	0.000	0.000	0
2	0.000	0.000	0.000	0.000	0
3	0.000	0.000	0.000	0.000	0
4	0.000	0.000	0.000	1.500	0
5	0.000	0.000	0.000	0.000	0

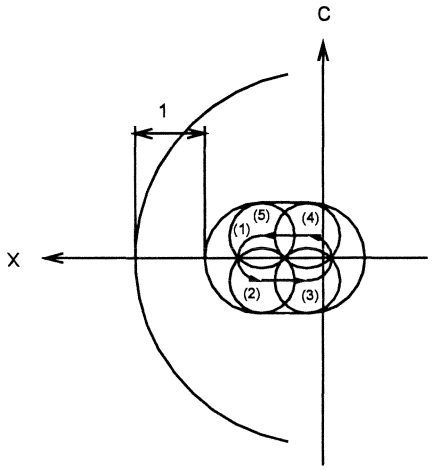
Tool diameter compensation setting

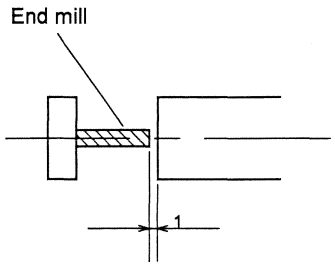
8.5.12 Example of using the milling interpolation function 5



Program sample

$1	
:	
:	
M05 G98 M80 S4=2700	
M18 C0	
G50 C0	
N0222	
T2200 R1	
G50 U20.0 W-5.0	
G00 X16.0 Z1.0 T02	..... Ps milling start position
G12.1 E=C	
G17	
G42 G00 X2.5 C2.5	..... (1)
G01 Z2.0 F125	..... (a)
G02 C-2.5 R2.5 F160	..... (2)
G01 X-0.5	..... (3)
G02 C2.5 R2.5	..... (4)
G01 X1.5	..... (5)
Z-1.0 F1000	..... (b)
G40	
G13.1	
G18	
G50 U-20.0 W5.0	
M20 M82	
M03 S1=3000 G99	
:	
:	





(a) The tool cuts into the workpiece until Z2.0.
(b) The tool returns to Z–1.0.

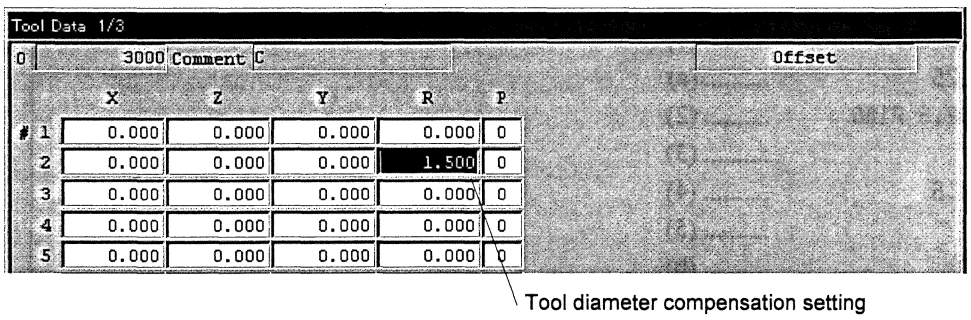
- With an arc inscribed with the inner diameter of the cutter:

d_1	Cutter diameter	r_1	Cutter radius
d_3	Machining diameter	r_3	Machining radius

F_1	Feed rate specified in the program
F_2	Feed rate at which you want to machine workpieces

- Obtaining the feed rate for the machining diameter:

$$F_1 = F_2 \times \frac{(d_3 + d_1)}{d_3} = F_2 \times \frac{(r_3 + r_1)}{r_3}$$



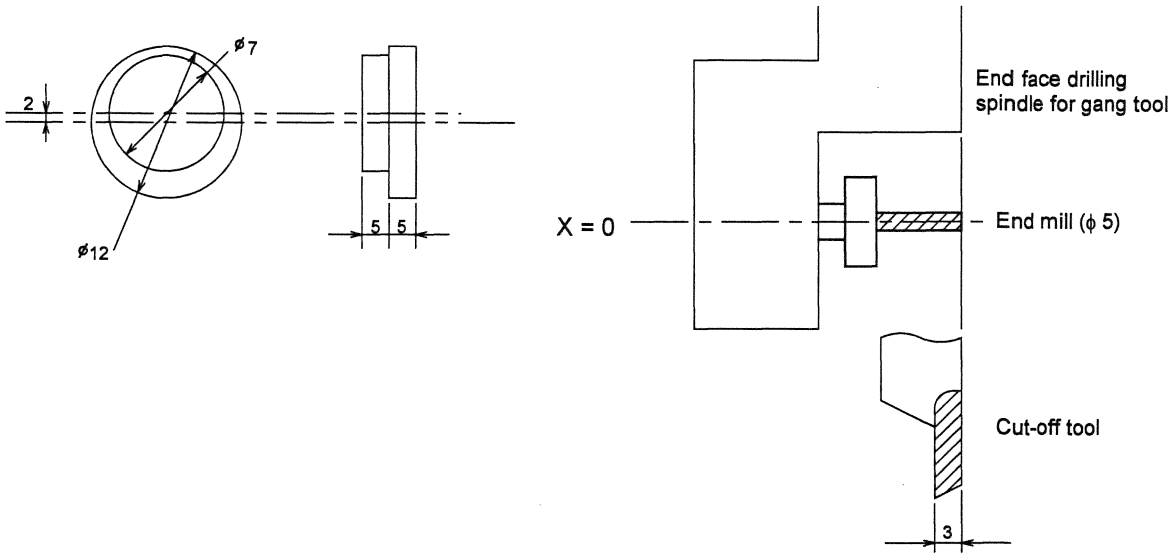
The feed rate for the machining diameter (F_2) is set as 100 mm/min.

$$F_1 = 100 \times \frac{2.5 + 1.5}{2.5} = 160$$

Note: The machining feed rate (100 mm/min) is one example.

8.5.13 Example of using the milling interpolation function 6

Milling interpolation with a gang tool



Tool Data 1/3

0	3000	Comment	C			Offset
	X	Z	Y	R	P	
# 1	0.000	0.000	0.000	0.000	0	
2	0.000	0.000	0.000	1.500	0	
3	0.000	0.000	0.000	0.000	0	
4	0.000	0.000	0.000	0.000	0	
5	0.000	0.000	0.000	0.000	0	

Enter the radius of the tool.

Ps $Xs > (d/2 + r + a)^2 / (w + r)$
$= (12/2 + 2.5 + 1)^2 / (5.5 + 2.5) = 11.281$
11.281×2 (diameter value specification) $= 22.562 \approx 22.6$
$Cs = 0$ (C coordinate)

Pa $Xa = w = 5.5$
$Ca > \{(d/2 + r + a)^2 - (w + r)^2\}^{1/2}$
$= \{(12/2 + 2.5 + 1)^2 - (5.5 + 2.5)^2\}^{1/2} = 5.12 \approx 5.2$ (C coordinate)

Pd $Xd = w = 5.5$
$Cd > \{(d/2)^2 + w^2\}^{1/2} + b$
$= \{(12/2)^2 - 5.5^2\}^{1/2} + 1 = 3.39 \approx 3.4$ (C coordinate)

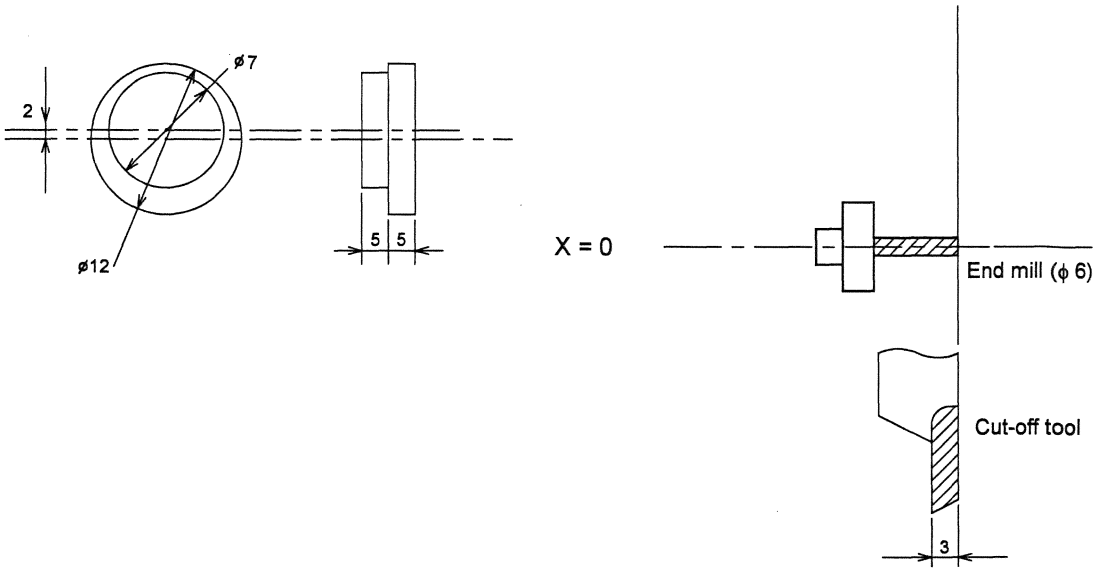
Pe $Xe > (w + r) + Cd^2 / (w + r)$
$= (5.5 + 2.5) + 3.4^2 / (5.5 + 2.5) = 9.44 \approx 9.5$
$Ce = 0$ (C coordinate)

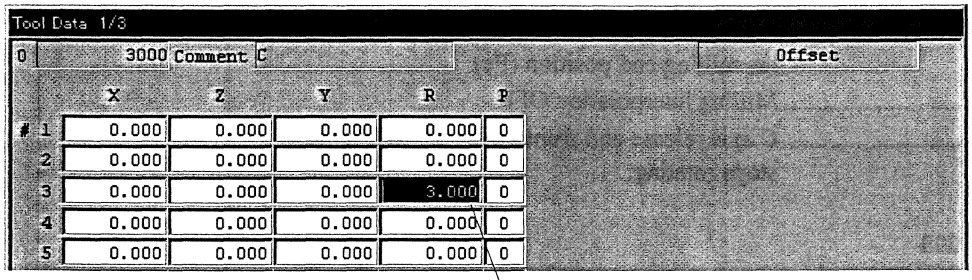
Program sample

$1	$2	$3
G50 Z-0.1		
M33		
M6		
G0 X26.0 Z-0.5		
M18 C0 ..... Sequential operation with spindle C axis ON (optional)		
G50 C0 ..... Coordinate system setting		
G98 M58 S3=2000		
G17 ..... X-Y plane selection (end face machining)		
Milling process		
N0211 T1100		
G0 X22.6 Z5.0 T02 ..... To the milling start position (Ps), and tool data (tool diameter compensation) call		
G12.1 ..... Milling interpolation ON		
G41 G0 X5.5 C5.2 ..... Right compensation, and to the machining start position (Pa)		
G1 C0 F60 G2 X5.5 C0 I-3.5 F60 G1 C-3.4 F300 } Milling interpolation machining, machining end position (Pd)		
G40 G0 X9.5 C0 ..... Compensation cancel, and to the milling end position (Pe)		
G13.1 ..... Milling interpolation OFF		
M60		
M3 S1=3000 G99		
M20 ..... C axis release		
G18 ..... X-Z plane selection (turning)		
Cut-off process		
N0211 T0100		
G0 X21.0 Z13.0		
M32 X1.0		
G1 X-3.0 F0.03		
M171		
M5		
M7		
G0 X-3.0 Z-0.1 T00		
G999		
N999		
M2		
M99		
%		

8.5.14 Example of using the milling interpolation function 7

Milling interpolation with a front drilling holder





Ps $Xs > (d/2 + r + a)^2 / (w + r)$

$= (12/2 + 3 + 1)^2 / (5.5 + 3) = 11.76$

11.76×2 (diameter value specification) $= 23.52 \approx 23.6$

$Cs = 0$ (C coordinate)

Pa $Xa = w = 5.5$

$Ca > \{(d/2 + r + a)^2 - (w + r)^2\}^{1/2}$

$= \{(12/2 + 3 + 1)^2 - (5.5 + 3)^2\}^{1/2} = 5.26 \approx 5.3$ (C coordinate)

Pd $Xd = w = 5.5$

$Cd > \{(d/2)^2 + w^2\}^{1/2} + b$

$= \{(12/2)^2 - 5.5^2\}^{1/2} + 1 = 3.39 \approx 3.4$ (C coordinate)

Pe $(Xe > (w + r) + Cd^2 / (w + r)$

$= (5.5 + 3) + 3.4^2 / (5.5 + 3) = 9.86 \approx 9.9$

$Ce = 0$ (C coordinate)

Program sample

$1	$2	$3
G50 Z-0.1		
M6		
G0 X27.0 Z-0.5		
M18 C0 ..... Sequential operation with spindle C axis ON (optional)		
G50 C0 ..... Coordinate system setting		
G98 M80 S4=2000		
Milling process		
N0222 T2200 R1		
G0 X23.6 Z10.0 T03 ..... To the milling start position (Ps), and tool data (tool diameter compensation) call		
G12.1 E=C ..... Milling interpolation ON		
G41 G0 X5.5 C5.3 ..... Right compensation, and to the machining start position (Pa)		
G1 C0 F600 G2 X9.5 C0 I-3.5 F600 G1 C-3.4 F800 } Milling interpolation machining, machining end position (Pd)		
G40 G0 X9.9 C0 ..... Compensation cancel, and to the milling end position (Pe)		
G13.1 ..... Milling interpolation OFF		
M20 M82 ..... C axis release and front/back face tool spindle stops rotating.		
M85		
M3 S1=3000 G99		
Cut-off process		
N0311 T0100		
G0 X21.0 Z13.0 T01		
M32 X1.0		
G01 X-3.0 F0.03		
M171		
M5		
M7		
G0 X-3.0 Z-0.1 T00		
G999		
N999		
M2		
M99		
%		

8.6 Spindle Synchronization Control (G114.1, G814, and G113) — Optional

These commands control the speed and phase of a spindle in synchronous with another spindle.
Use a spindle synchronization control command when you need to synchronize two spindles with each other. For example, use the command in the following cases: the back spindle pick-off the workpiece that is now chucked by the main spindle, a workpiece is machined chucked by both the main spindle and the back spindle, and a non-conform workpiece is picked-off by adjusting the phases of the two spindles.
The G814 command defines the main spindle (S1) as the reference spindle and the back spindle (S2) as the synchronized spindle, and synchronizes the two spindles with each other.
The G114.1 command specifies a reference spindle and synchronized spindle, and places the two specified spindles in the synchronized status.
The G113 command cancels the synchronization of two spindles that was specified by a spindle synchronization control command.

Command format

G814 R□	Spindle synchronization control
G114.1 H□ D±□ R□	Spindle synchronization control
G118	Spindle synchronization control cancel
G113	Spindle synchronization control cancel

Arguments

- R□: Specify the amount (angle) of the phase shift between synchronous spindles. The R argument is automatically added to the phase difference calculated and stored by the non-conform material phase adjustment command (G899). Specify a positive R argument for the phase shift in the clockwise direction (the direction of forward rotations of the main spindle). If no R argument is specified, the phase difference calculated and stored by the non-conform material phase adjustment command (G899) will be automatically used.
  Setting range: 0 to 359.999°
- H□: Specify the reference spindle. 1 is the main spindle.
- D±□: Specify the spindle to be synchronized and the direction in which the spindle rotates. When –2 is specified, the back spindle rotates backward.

Notes

- The spindle rotating under spindle synchronization control stops when the machine enters the emergency stop state. The spindle synchronization control mode is canceled at the same time.
- The speed clamp during spindle synchronization follows the reference spindle speed clamp value or the synchronized spindle speed clamp value whichever is smaller.
- Indexing for the reference spindle or the synchronized spindle is not permitted in the spindle synchronization control mode. To index either spindle, cancel the spindle synchronization control mode.

- To get the back spindle to pick-off a workpiece under spindle synchronization control, set the spindle speed to 2500 min^{-1} or less. (Speed-regulated area)
- The R argument specifies an amount (angle) of the phase shift between synchronous spindles. The synchronized spindle is shifted from the reference spindle by the phase shift amount specified by the R argument and rotates synchronizing with the reference spindle.
  Unless the R argument is specified in the G814 command, the value stored by executing the non-conform material phase adjustment command (G899) in the MDI mode is used as the amount of shift.
  Unless the R argument is specified in the G114.1 command, the phase is not shifted.
- The spindle synchronization control is canceled by pressing the reset key when all spindles stop (0 min^{-1} ,indexing excluded).
- G813 and G113 have the same functions.

Program sample

$1	$2
!2L1 ..... Queuing state	!1L1 ..... Queuing state
M3 S1=1000 ..... The spindle rotates forward.	M24 S2=1000 ..... The back spindle rotates backward.
!2L2 ..... Queuing state	!1L2 ..... Queuing state
M97 ..... Spindle speed change detection OFF	
M87 ..... Back spindle speed change detection OFF	
G96 S150 ..... Constant surface speed control	
G50 S2500 ..... Maximum spindle speed clamp command	
G814 R[ ] ..... Spindle synchronization control	
T0100 ..... Cut-off tool selection	
G0 X[ ] Z[ ] T01 ..... Cut-off tool positioning	
G650 ..... Pick-off	G650 ..... Pick-off
	G00 Z-1.0
M88 ..... Back spindle torque lower limit L selection	G98 G01 Z[ ] F1000
	G4 U0.5
	M77 ..... Waiting for completion of spindle synchronization
	M15 ..... The back spindle chuck closes.
!2L3 ..... Queuing state	!1L3 ..... Queuing state
G1 X-1.0 F0.03 ..... Cut-off machining	
G600 ..... Machining pattern cancel	G600 ..... Machining pattern cancel
X-3.0 F0.05 ..... Cut-off machining	
G97 ..... Constant surface speed control cancel	
M96 ..... Spindle speed change detection ON	
M86 ..... Back spindle speed change detection ON	
M90 ..... Back spindle torque limit OFF	
!2L4 ..... Queuing state	!1L4 ..... Queuing state
G113 ..... Spindle synchronization control cancel	
M5 ..... The spindle stops.	M25 ..... The back spindle stops.

Notes

- This program does not include a product separation program.
- M77 (waiting for completion of spindle synchronization) command position
  The following conditions must be satisfied for picking-off a non-conform material: the phase adjustment of both spindle must be completed, and then the back spindle is moved to the position where it chucks the product. In the program sample, the M77 command is executed immediately before the back spindle moves to the position where it chucks the product.
  To pick-off a round material, the M77 command can also be executed immediately before the M15 (back spindle chuck close) command.
- The operation enclosed in the broken lines [ ] is performed under constant surface speed control.
- The back spindle torque is limited to 25% by executing the M123 command.

8.7 Synchronized Tapping Functions (G88, G84, and G80) — Optional

The synchronized tapping functions perform tapping while fully controlling the feed and rotational phase. This feature brings about merits such as the use of an ordinary drill holder instead of a floating tap holder. The thread length is easily calculated by using an ordinary drill holder.

Note: The tapping speed becomes slower or faster than the value specified in the program, depending on the type of the holder to be used. When using holders with which the tapping speed changes, specify the tapping speed in consideration of deceleration or acceleration. For example, if the holder of 1/2 deceleration is used, specify the value for F[ ] argument as a half of the standard value. Specify the tool spindle speed S[ ] in consideration of deceleration ratio (twice as standard value in case of 1/2 deceleration).

8.7.1 Synchronized tapping for outer circumference with a rotary tool (G88 and G80)

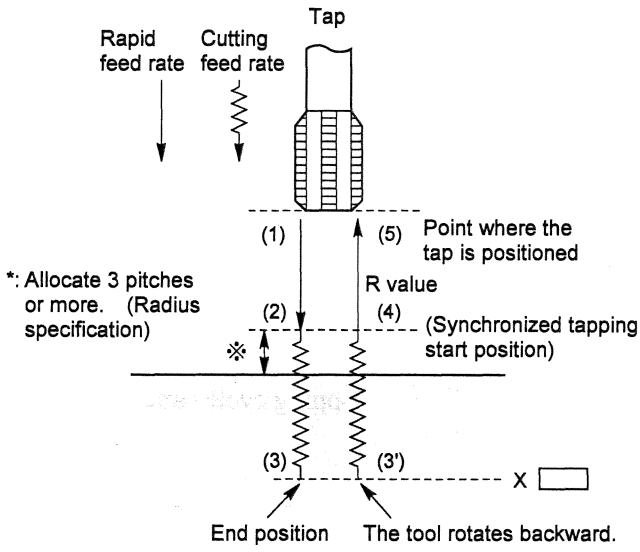
This function performs tapping while synchronously controlling the tool spindle and the X axis (NC axis). This function enables tapping for outer circumference, which makes a tapped hole in highly accurate depth.

Command format

G88 X[ ] R[ ] F[ ] D±[ ] S[ ], R1	Tapping cycle
G80	Tapping cycle cancel

Arguments

- X[ ]: Specify the tapping end position. The value must be specified for the diameter.
- R[ ]: Specify the distance from the point where the tap is positioned to the position where synchronized tapping starts. The distance must be specified with a value for the radius.
- F[ ]: Specify a screw pitch.
- D±[ ]: Specify the tool spindle and the rotation in which the spindle rotates. When 3 is specified, the gang tool spindle rotates forward.
- S[ ]: Specify the tool spindle speed.
- R1: Specify the synchronized tapping mode. Unless ",R1" is specified, the feed with the G98 command specified is used in the previous mode. If only "G88,R1" is specified, the mode is switched, but tapping is not performed.



(1) Point where the tap spindle is positioned (diameter specification)

(2) Rapid feed positioning (radius specification) for the amount equivalent to the R value (synchronized tapping start position). The distance between the position (2) and the material outer diameter must be as long as 3 pitches or more.

(3)(3)' Tapping end position (Tapping end position and tool backward rotation)

(4) The tool moves by the amount equivalent to the R value and returns to the synchronized tapping start position.

(5) The tool returns to the point where the tap spindle is positioned, at the rapid feed rate.

Program sample

When the material diameter is 12.0, and the screw pitch is 0.7:

$1	
:	
M5	Clearance between the workpiece and tap
M28 S0	Pitch × 3
S3=1000 M58 G98	Doubled because of diameter specification
N0711 T1100	
G00 X18.2 Z25.0 T11 ..... X18.2 = ϕ 12.0 + {(1 + 2.1) × 2} = 18.2	
G88 X0.0 R1.0 F0.7 D3 S500, R1	
G80	
G00 X18.2	
M60	
M20	
:	

8.7.2 Synchronized tapping for the end face of a workpiece with a rotary tool (G84 and G80)

While stopping the main spindle from rotating and synchronously controlling the tool spindle and the Z1 axis, this function performs tapping for the end face of the workpiece (center or eccentric). This function makes a tapped hole in highly accurate depth.

Command format

G84 Z□ R□ F□ D□ S□, R1	Tapping cycle
G80	Tapping cycle cancel

Arguments

- Z□: Specify the tapping end position.
- R□: Specify the distance from the point where the Z1 axis is positioned to the position where synchronized tapping starts.
- F□: Specify a screw pitch.
- D±□: Specify the tool spindle and the rotation in which the spindle rotates. When –4 is specified, the front/back face tool spindle (optional) rotates backward.
- S□: Specify the tool spindle speed.
- R1: Specify the synchronized tapping mode.

Program sample

When the screw pitch is 0.7:

```
  :
  :                                  Clearance between the workpiece and tap
M5                                                 | Pitch × 3
M28 S0                                             |
S4=1000 M81 G98                                    |
N1 T2100 R1                                        |
G0 X0 Z-3.1 T21          ..... Z–3.1 = – (1 + 2.1) = – 3.1
G84 Z15.0 R1.0 F0.7 D-4 S500, R1
G80
G0 Z-3.1
M82
M20
  :
  :
```

8.7.3 Synchronized tapping for the center of the end face of a workpiece (main or back) (G84 and G80)

While rotating the spindle (main or back) and synchronously controlling the spindle and the Z axis (Z1 axis for main spindle, Z3 axis for back spindle), this function performs tapping for the center of the end face of the workpiece (main or back). This function makes a tapped hole in highly accurate depth.

Command format

M97(M87)	Spindle speed fluctuation change OFF (back spindle speed change detection OFF)
G84 Z□ R□ F□ D±□ S□, R1	Tapping cycle
G80	Tapping cycle cancel
M96(M86)	Spindle speed change detection ON (back spindle speed change detection ON)

Arguments

- Z□: Specify the tapping end position.
- R□: Specify the distance from the point where the Z1 axis is positioned to the position where synchronized tapping starts.
- F□: Specify a screw pitch.
- D±□: Specify the spindle and the rotation in which the spindle rotates. When 1 is specified, the main spindle rotates forward. When 2 is specified, the back spindle rotates forward.
- S□: Specify the spindle speed.
- R1: Specify the synchronized tapping mode.

Note

Be sure to execute the M97 (M95) command (spindle speed change detection OFF) before the G84 command. If the spindle speed change detection is not OFF, synchronized tapping ends up with an alarm.

Program sample

When the screw pitch is 0.7:

```
  :
  :
S1=500 M3 G99
M97
N1 T2100 R1
G0 X0 Z-3.1 T21
G84 Z10.0 R1.0 F0.7 D1 S500, R1
G80
M5
M96
  :
  :
```

8.7.4 Continuously synchronized tapping

This function performs synchronized tapping continuously. If ordinary synchronized tapping is unable to make a tapped hole in desired depth because the cutting load, this function achieves the desired depth by performing synchronized tapping continuously while changing the amount of infeed.

Command format

G88 X□ R□ F□ D±□ S□,R1	Tapping cycle
X□ R□	Continuous tapping cycle
G80	Tapping cycle cancel

Arguments

- X□: Specify the tapping end position. The value must be specified for the diameter.
- R□: Specify the distance from the point where the tap is positioned to the position where synchronized tapping starts. The distance must be specified with a value for the radius.
- F□: Specify a screw pitch.
- D±□: Specify the spindle and the rotation in which the spindle rotates. When 3 is specified, the gang tool spindle rotates forward.
- S□: Specify the spindle speed.
- R1: Specify the synchronized tapping mode. Unless ",R1" is specified, the feed rate is used in the previous mode. If only "G88,R1" is specified, the mode is switched, but tapping is not performed.

Program sample

When the material diameter is 12.0 and the screw pitch is 0.7:

$1	
: : M5 M28 S0 S3=1000 M58 G98 N0711 T1100 G00 X18.2 Z25.0 T11 G88 X5.0 R1.0 F0.7 D3 S500, R1 X0.0 R1.0 G80 G00 X18.2 M60 M20 : :	

8.8 Differential Rotary Tool Function — Optional

This function controls spindles by superimposing the speed of a spindle on the speed of another spindle. Use this function when you need to rotate a tool spindle by imposing it on the rotation of the main spindle. For example, the function performs tapping at the center of the workpiece with the tool spindle while the workpiece chucked by the main spindle is rotating.
The G164 command specifies the reference spindle and superimposed spindle, and places the two specified spindles in the superimposed status.
The G113 command frees the two spindles from the superimposed status in which they are rotating by the differential rotary tool command.

Command format

G164 H1 D±□	Differential rotary tool command
G113	Differential rotary tool cancel command

Arguments

- H1: Specify the reference spindle. 1 is the main spindle, 2 is the back spindle.
- D±□: Specify the spindle to be superimposed and the direction to the reference spindle in which the spindle rotates. When -3 is specified, the gang tool spindle rotates backward. When –4 is specified, the front/back face tool spindle rotates backward (optional).

Program sample

$1	
:	
:	
M3 S1=2000	····· The main spindle rotates forward at the speed of 2000min^{-1}. (1)
:	
:	
:	
G164 H1 D–4	····· The rotary tool S4 (superimposed spindle) is superimposed on the main spindle S1 (reference spindle) in rotates backward.
G98 M83 S4=1200	····· Rotary tool spindle speed: 800 min^{-1} in rotates backward. (2) Tool speed for workpiece: 1200 min^{-1} in rotates forward. (1)−(2)
N30 T□□00 (drill ϕ 5)	
G0 Z–1.0	
G1 Z10.5 F150 T□□	
G0 Z–0.5	
G4 U0.1	
G0 Z10.0	
G1 Z19.0 F150	
G4 U0.1	
G0 Z–2.0 T0	
G113	····· Differential rotary tool cancel command.

	$1
G164 H1 D–4	····· The rotary tool S4 (superimposed spindle) is superimposed on the main spindle S1 (referenced spindle) in rotates backward.
G98M83S4=500	····· The superimposed spindle rotates backward at the speed of 1500 min^{-1}, and rotates forward at the speed of 500 min^{-1} after it is superimposed.
N40 T□00 (M6 tap)	
G0 Z–3.0 T□	
G84 Z17.5 F1.0 Q300 D4 S500, R1	
	····· Synchronized tapping (The reference spindle S1 rotates forward at the speed of 2000 min^{-1}; the superimposed spindle S4 rotates backward at the speed of 1500 min^{-1},and performs tapping at the speed of 500 min^{-1} after it is superimposed.)
G80	
G0 Z–2.0 T0	
G113	····· Differential rotary tool cancel command.
:	
:	

Notes

- The spindle rotating by the differential rotary tool function stops when the machine enters the emergency stop state. The differential rotary tool mode is canceled at the same time.
- Be careful of the maximum spindle speed clamp when specifying the differential rotary function. While the maximum spindle speed clamp command is active, the superimposed spindle is unable to maintain the speed difference specified for the reference spindle.
- Indexing for the reference spindle is not permitted in the differential rotary tool mode. To index the reference spindle, cancel the differential rotary tool mode.
- An alarm is issued if the spindle speed is clamped when a synchronized tapping command is executed in the differential rotary tool mode.

```
M3 S1=5000
G164 H1 D–4
G0 Z–2.0
G84 X0 Z10.0 F1.0 Q300 D4 S2000,R1
G80
G113
```

In the above example, the spindle speed is 5000 min^{-1}, the rotary tool spindle speed is 3000 min^{-1}, and the superimposed spindle speed is 2000 min^{-1} (during cutting with a tap). The tap is returned at the speed of 8000 min^{-1} that exceeds the clamping speed of the superimposed spindle (rotary tool spindle), so an alarm is issued before tapping is started.

If a value specified in the argument Q (tap return speed) exceeds the speed defined in the specification, the upper limit value is applied.

8.9 Hobbing Function — Optional

The hobbing function enables machining for spur gears and helical gears by controlling C-axis rotation synchronously with the rotation of the tool spindle (hob cutter).
This function also enables the Z axis to move under synchronization control.

Command format

G114.3 H□ D±□ E□ L□ P□ Q□	Hobbing mode (spindle synchronization III) ON
G113	Spindle synchronization control cancel

Arguments

- H□: The H argument defines the tool spindle as the hobbing axis. Specify 3 when using the gang tool spindle.
- D±□: Specify the direction to the spindle and hobbing axis rotating. When -9 is specified, the C axis rotates backward.
- E□: Specify the rotational rate (the number of hob cutter's threads) of the hobbing axis in the range from 1 to 10. The default is 1.
- L□: Specify the rotational rate (the number of gear teeth to be machined) of the spindle in the range from 1 to 999. The default is 1.
- P±□: Specify the helix angle of a gear in the range from –89.000 to 89.000. The minimum specification unit is 0.001 degree. If an input value includes decimal places, you can specify the angle directly. A spur gear is assumed unless the P argument is specified or if P0 is specified.
- Q□: Specify the gear module in the range from 100 to 25000 (0.1 to 25 mm). The minimum specification unit is 0.001 mm. When an input value includes decimal places, you can specify the dimension (mm) directly.

Notes

- When G114.3 commands the number of hob threads and the number of gear teeth, the rotating speed of the C axis is determined.

  C axis speed SW (min^{-1}) = Sh × $\frac{E}{Z}$

  Sh: Tool spindle speed (min^{-1})
  E: Number of hob cutter's threads
  Z: Number of gear teeth

- If the speed is changed in the cutting feed block with the hobbing mode (spindle synchronization III) active, it is not guaranteed that the gear is cut successfully. To cut the gear successfully, the Hold key (field hold) must be disabled and the override must be always set to 100% in the cutting feed block with the hobbing mode (spindle synchronization III) active.

- The move command cannot be executed for the C axis while the hobbing mode (spindle synchronization III) is active.

- The speed of the C axis is determined by the speed of the tool spindle. Specify the speed of the tool spindle that does not exceed the speed clamp value of the C axis.

  Hobbing speed N_1 (min^{-1}) = $\frac{1000V}{\pi d}$

  C axis speed N_2 (min^{-1}) = $\frac{N_1}{Z}$ < 100 min^{-1} (upper limit of rapid feed)

  V: Cutting speed (mm/min)
  d: Cutter diameter (ϕ 32 mm)
  Z: Number of teeth (number of thread ridges)

- You can use the C axis in the hobbing mode (spindle synchronization III) even if it has not returned to the zero point.

- The hobbing mode (spindle synchronization III) is using the C axis. Therefore, if you want to use the C axis after canceling the hobbing mode, you need to index the C axis and set the coordinate system again.

- Specify the P and Q arguments when using helical gears.

- You cannot specify the hobbing mode (spindle synchronization III) while the spindle synchronization mode (spindle synchronization I) mode or the polygon machining mode (spindle synchronization II) is active.
  You can specify only one of the three spindle synchronization control modes at a time.

- The phase is not adjusted in the hobbing mode (spindle synchronization III).

- Do not change the spindle speed while the hobbing mode is active.

- The feed per rotation command (G99) is unable to feed correctly a helical gear. Switch the feed per minute command (G98) when cutting a helical gear.

8.9.1 Gear formula

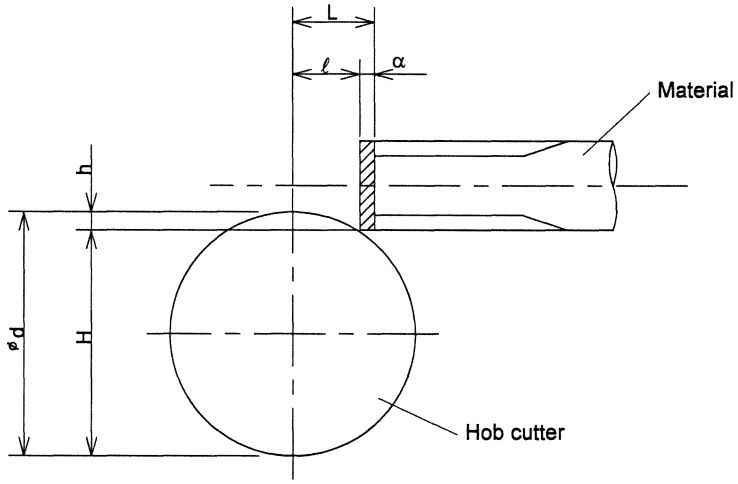
Outer diameter of gear ϕD (mm) = (Z + 2) m

Number of teeth Z (number of thread ridges) = $\frac{\phi D}{m} - 2$

Module $m = \frac{\phi D}{(Z+2)}$

Tooth height h = 2 m + 0.2

When a gear is machined in actual operation, an approach distance is necessary. When calculating the dimensions of a gear, consider the approach distance.



ϕd: Hob cutter diameter 32

α: Safety distance 1.5 mm

$\ell = \sqrt{(d-h)\,h} = \sqrt{Hh}$

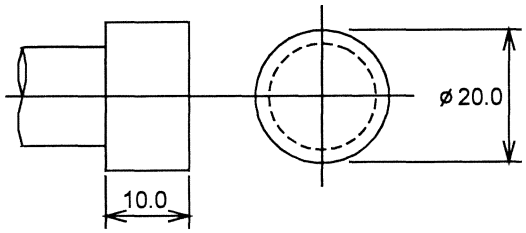
$L = \ell + \alpha$

8.9.2 Cutting condition table (reference)

Rank	Material	Module	Feed rate (mm/rev)	Cutting speed (mm/min)
1	Non-ferrous material (brass, aluminum)	0.5	0.4 to 1.0	150 to 300
		1.0	0.5 to 1.0	150 to 300
2	Free-cutting ferrous material (SUM)	0.5	0.5 to 0.75	80 to 150
		1.0	0.5 to 1.25	60 to 120
3	General ferrous material (SUS303)	0.5	0.5 to 0.75	50 to 90
		1.0	0.5 to 1.25	40 to 80
4	Heavy-cutting ferrous material (SUS304)	0.5	0.5 to 0.75	30 to 60
		1.0	0.5 to 1.25	25 to 50

8.9.3 Example of using the hobbing function

ϕ20
Brass
Module: m = 1.0
Number of cutting edges: 18
Spur gear



$$C\ (min^{-1}) = \frac{\text{tool spindle speed}}{\text{number of hob teeth}}$$

$$F = \frac{\text{tool spindle speed}}{\text{number of hob teeth}} \times \text{millimeters per revolution feed}$$

(according to < 8.9.2 Cutting condition table>)

$$F = \frac{1800}{18} \times 0.6 = 60$$

Program sample

$1	
:	
:	
M05 M58	
S3=1800 G98	
M18 C0	..... C axis zero point return
T□	
N□	
G114.3 H3 D-9 E1 L18	..... Hobbing mode ON
	The hob cutter rotates, and the C axis rotates at the same time.
G00 X15.6 Z-9.3 T□	
G01 Z11.0 F60	..... Hobbing
X22.0 F500	
G00 Z-9.3	
X15.6	
G01 Z11.0 F300	..... Zero cut
X22.0 F500	
S3=0	
M20 M60	
G4 U0.1	
G113	..... Hobbing mode OFF
T□	
:	
:	

8.10 Polygon Machining Function — Optional

The polygon machining function enables machining for polygonal workpieces by controlling spindle rotation synchronously with the rotation of the tool spindle.
This function also enables the Z axis to move under synchronization control.

Command format

G114.2 H□ D±□ E□ L□	Polygon machining mode (spindle synchronization II) ON
G113	Spindle synchronization control cancel

Arguments

- H□: Specify the tool spindle as the polygon machining axis. Specify 3 when using the gang tool spindle.
- D□: Specify the direction to the spindle and polygon machining axis rotating. Be sure to specify 1 (main spindle forward rotation) or 2 (back spindle forward rotation) for the D argument.
- E□: Specify the rotational rate (the number of teeth of the polygon machining cutter) of the polygon machining axis in the range from 1 to 10. The default is 1.
- L□: Specify the rotational rate (the number of corners of a polygon to be machined) of the spindle in the range from 1 to 999. The default is 1.

Notes

- If the speed is changed in the cutting feed block with the polygon machining mode (spindle synchronization II) active, it is not guaranteed that the polygonal workpiece is cut successfully. To cut the polygonal workpiece successfully, the Hold key (field hold) must be disabled and the override must be always set to 100% in the cutting feed block with the polygon machining mode (spindle synchronization II) active.
- You cannot specify the polygon machining mode (spindle synchronization II) while the spindle synchronization mode (spindle synchronization I) mode or the hobbing mode (spindle synchronization III) is active.
  You can specify only one of the three spindle synchronization control modes at a time.
- The phase is not adjusted in the polygon machining mode (spindle synchronization II).
- Do not change the spindle speed while the polygon machining mode is active.

8.10.1 Example of using the polygon machining function

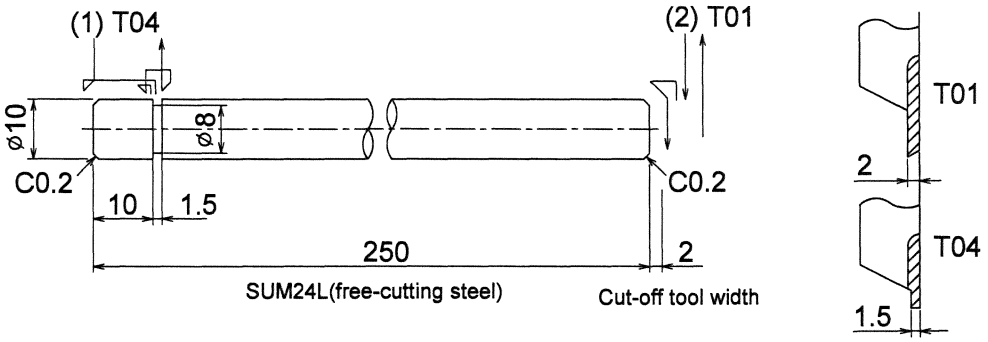
Program sample

$1	
: : M05 M59 S3=500 T□□□□ G114.2 H3 D1 E3 L6 ..... Polygon machining mode ON G00 X15.6 Z-9.3 T□□ G99 G01 Z11.0 F0.04 ..... Polygon machining X22.0 S3=0 M5 M60 G4 U0.1 G113 ..... Polygon machining mode OFF T□□□□ : :	

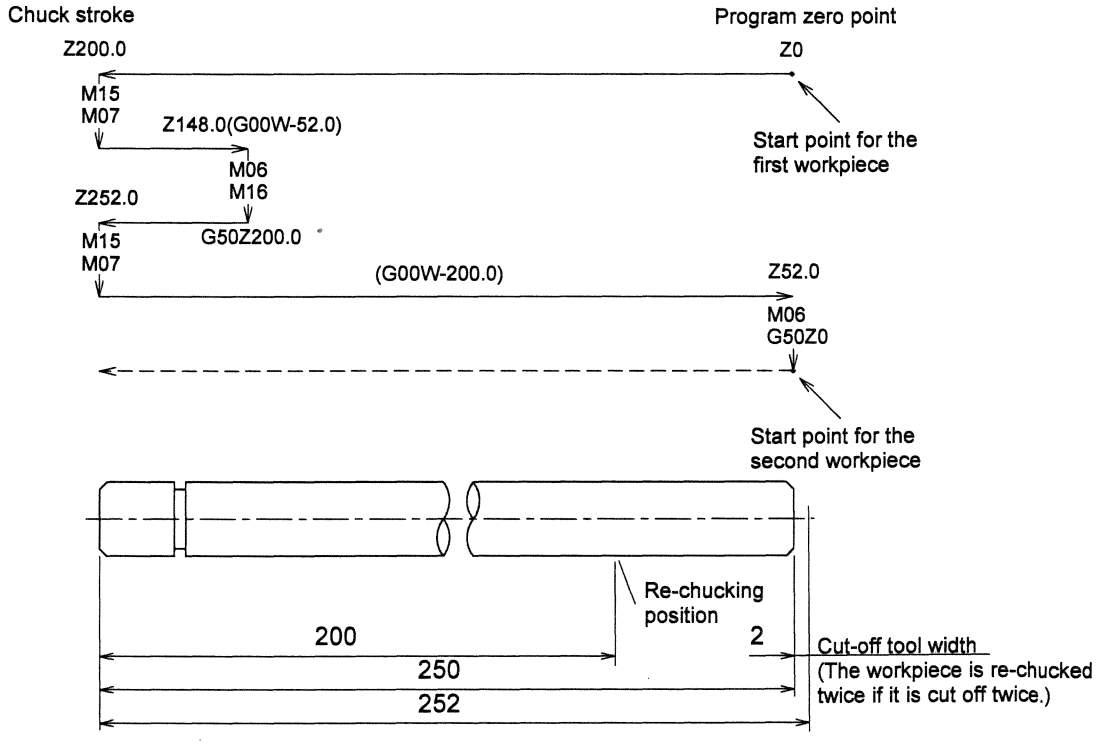
8.11 Re-chucking of a Long Workpiece

In general, the machining length of a workpiece must be within the Z1 axis stroke. If the machining length of a workpiece exceeds the Z1 axis stroke, the workpiece needs to be re-chucked by the main spindle and the back spindle. In this case, create the program including the re-chucking process as shown below.

Machining layout



Operation sequence



Requirements for program creation:

- Specify the total length of the workpiece + the cut-off tool width, as the maximum move distance. (Including end-face turning and cut-off machining which is performed twice)
- The move distance of a chuck must be within the maximum machining length not including the machining position when the workpiece is re-chucked.
- The workpiece machining completion point must be identical to the program zero point of the start point.

Program sample

O0001

$1		$2		$3
G50 Z0 M06 G00 Z11.0 Z-0.5 S1=3300 M03 G99				
N0104 T0400 G00 Z11.0 Z0.7 T04 G01 X8.6 Z-0.5 F0.03 X11.0 F0.2 Z11.5 X8.0 F0.03 X11.0 F0.2 W-0.7 X9.6 W0.7 F0.03 X11.0 F0.2 W0.7 X9.6 W-0.7 F0.03 X11.0 F0.2				
N0201 T0100	..... Cut-off tool selection	T3000		
M05	..... The main spindle stops.	G50 Z0		
!2L1	..... Waiting for $2L1	!1L1	..... Waiting for $1L1	
		M16	..... The back spindle chuck opens.	
		G0 Z230.0	..... The back spindle advances 230 mm from the Z3 axis zero point.	
		G04 U0.5		
!2L2	..... Waiting for $2L2	!1L2	..... Waiting for $1L2	
G00 Z200.0 T00	..... Determination of the re-chucking position, and compensation cancel			
G04 U0.5				
M15	..... The back spindle chuck closes.			
G04 U0.5				
M07	..... The main spindle chuck opens.			
G04 U0.5				
G00 Z148.0 (W-52.0)	..... The main spindle returns to Z148.0.			
M06	..... The main spindle chuck closes.			
G04 U0.5				
M16	..... The back spindle chucks opens.			
G04 U0.5				
G50 W52.0	..... Z axis coordinate system setting			
S1=3300 M03 S2=3300 M24	The main spindle rotates forward at the speed of 3,300 min^{-1}. The back spindle rotates backward at the speed of 3,300 min^{-1}.			

$1	$2	$3
G00 X11.0 Z252.0 T01		
G650	G650	G650 W0
	G98 G1 Z200.0 F3000	
	G04 U0.5	
	M15	
!2L3	!1L3	
G01 X9.6 F0.03		
X11.0 F0.2		
W-0.7		
X9.6 W0.7 F0.03		
X-0.5		
G600	G600	G600
X-3.0		
M05 M25		
M07		
G50 W-52.0		
G0 Z0 (W-200.0) T00		
M56		
G999	G999	G999
N999	N999	N999
M02	M2	M2
M99	M99	M99
%	%	%

: Program portion for long workpieces

8.12 Long Workpiece Separation (M113) — Optional

If a long workpiece device (optional) is mounted, you can execute the M113 command to collect long workpieces in the product receiver shelf mounted on the left side of the machine.

Command format

M113 K[ ] T[ ] D1 Z[ ] W[ ] R[ ] H[ ] F[ ] A1

M10 Retraction of the long workpiece separator
M11 Advancement of the long workpiece separator
M72 Closing of the long workpiece separator's hand
M73 Opening of the long workpiece hand

If a long workpiece separator is mounted, M10 retracts the long workpiece separator, M11 advances it, M72 closes the long workpiece separator's hand, and M73 opens it. Use M10, M11, M72, and M73 when collecting long workpieces without executing M113. See the program sample below.

Axis control groups

$1, $2, and $3

Arguments

- K[ ]: Specify the number of times the workpiece is drawn. The default is 1.
- T[ ]: Specify the dwell time after drawing the long workpiece. The default is 0.5 second.
- D1: This argument determines when to execute the blocks following M113. If the D1 argument is specified, the system executes the blocks following M113, in parallel to the M113 operation.

The K, T and D1 arguments are valid when the long workpiece separator in use is driven by air.

- Z[ ]: Specify the amount by which the workpiece is drawn for the first time. The axis moves 120.0 mm unless the Z argument is specified.
- W[ ]: Specify the amount by which the workpiece is drawn for the second time. The axis does not move unless the W argument is specified.
- R[ ]: Specify the amount by which the workpiece is drawn for the third time. The axis does not move unless the R argument is specified.
- H[ ]: Specify the amount by which the workpiece is drawn for the forth time. The axis does not move unless the H argument is specified.
- F[ ]: Specify the drawing feed rate (feed per minute). The rapid feed rate is assumed unless the F argument is specified. The rapid feed rate is used for the return (Specification not permitted).

The Z, W, R, H, and F arguments are valid when the long workpiece separator in use is driven by a servo motor.

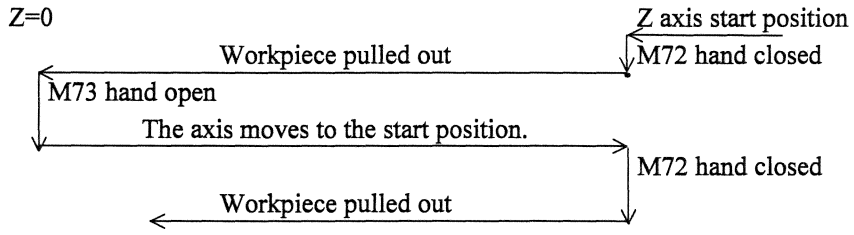
- A1: The operation terminates while the workpiece is chucked after it is drawn.

Operation sample

```
M113 W100.0 A1
```

In-macro operation

1) The hand closes to chuck the workpiece. (M72)
2) The A3 axis moves backward to pull out the workpiece by 120 mm.
3) The hand opens. (M73)
4) The A3 axis advances to the start position.
5) The hand closes to chuck the workpiece. (M72)
6) The A3 axis moves backward to pull out the workpiece by 100 mm. (The operation terminates while the workpiece is chucked.)



Program sample

$1	$2	$3
: M03 M24 G114.1 H1 D-2 T0100 G00 X13.0 Z30.0 T1	:	:
G650	G650 G00 Z-2.0 G98 G01 Z35.0 F5000 G04 U0.5 M77 M15	G650
!2L1 G01 X-3.0 F0.03	!1L1 M113 K2 A1 (M113 W100.0 A1) Drawing of long workpieces (The command in parenthesis is for a motor-driven.)	
G600 G113 M05 M25	G600 M113 (M113 Z100.0) ..... The back spindle moves to the long workpiece device positioning point after product separation.	G600

When programming with no M113 used:

```
M113 K2 A1 ⟶ M72
             G4 U0.3
             M11
             G4 U0.3
             M73
             G4 U0.3
             M10
             G4 U0.3
             M72
             G4 U0.3
             M11
```

Note

Workpieces having a length up to 400.0 mm can be machined.

8.13 Multiple Workpiece Machining

Multiple workpieces can be continuously machined without re-chucking for each workpiece machining. In other words, a bar material is chucked only once for machining multiple workpieces.

Program sample

Total length of the workpiece: 25.0 mm
Cut-off tool width: 2.0 mm
Shift amount: 0.1 mm (end-face turning 0.1 mm)
Pieces/1 Chuck (number of workpieces machined with a chuck): 3

Main program
O0001

$1		
G50 Z0		
M06		
G99	..... Feed per rotation	
M98 P5 L3	..... Subprogram O0005 call Number of repetitions: 3	
M8	..... Enable bar stock exchange program	
M8		
/M98 P7000		
M9		
M05	..... The main spindle stops.	
M07	..... The main spindle chuck opens.	
G0 X-3.0 W-81.3 T00	..... Move to the main spindle start position (25.0 + 2.0 + 0.1) × 3 = 81.3	
G999		
N999		
M02	..... 1-cycle stop	
M99		
%		

Subprogram (with end-face turning performed)

O0005

$1	
G50 Z–0.1 ..... When the coordinate system setting is shifted in order to perform end-face turning, obtain [ ] of G0 X–3.0 W–[ ] T00 in the main program from the following formula: [ ] = (total length of the workpiece + cut-off tool width + shift amount) × the value specified for " Pieces/1 Chuck" on the Machining Data screen. : : : M56 M99 %	

Subprogram (with end-face turning not performed)

O0005

$1	
G50 Z0 : : : M56 M99 %	

Note

Enter values for the machining data of the main program. The subprograms do not need the input of machining data.

8.14 Simplified Cut-off Tool Breakage Detection (M50)

Operation flow of the simplified cut-off tool breakage detection function:

1. Cut-off machining is performed.
2. When cut-off machining is completed, the main spindle and the back spindle stop, and spindle synchronization control is canceled.
3. The main spindle rotates, and the M50 is executed.
4. If the workpiece has not been cut off completely, main spindle rotation involves back spindle rotation (50 min^{-1} or more), and an alarm is issued.

Program sample

This program sample is for a basic operation.

```
  :
  :
T□□00                    ..... Cut-off tool selection
G01 X□□□□ F□□□□          ..... Cut-off machining
M05 M25                  ..... The main spindle and the back spindle stop.
G113                     ..... Spindle synchronization control cancel
M03 S1=500               ..... The main spindle rotates forward.
G4 U5.0                  ..... Dwell time
M50                      ..... Cut-off tool breakage detection
  :
  :
```

8.15 Cut-off Tool Breakage Detection (M51) — Optional

If a cut-off tool breakage detector (optional) is mounted, you can check for cut-off tool breakage by executing the M51 command.
Operation flow of the cut-off tool breakage detector:

1. The workpiece moves back to the detector. (The Z1 axis moves.)
2. The currently selected tool moves to the positioning point. (The X1 axis moves.)
3. The detection axis of the cut-off tool breakage detector is selected. (The Y1 axis moves.)
4. The cut-off tool breakage detector moves to the positioning point or to the position specified by the X argument. (The X1 axis moves.)
5. The cut-off tool breakage detector is activated.
6. The workpiece returns to the position where started the detection. (The Z1 axis moves.)

Command format

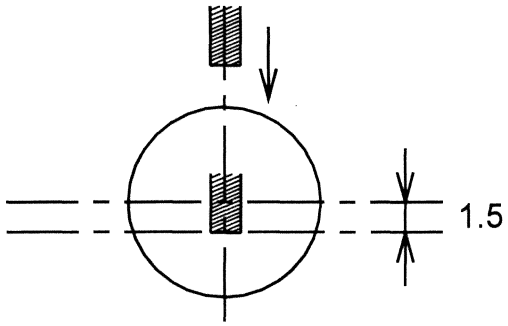
M51 X[ ] W[ ] C1 Cut-off tool breakage detection

Axis control groups

$1, $2 and $3

Arguments

- X[ ]: Specify the point (X1 axis work coordinates) where the cut-off tool breakage detector is positioned after the detection axis is selected. Unless the X argument is specified, the cut-off tool breakage detector moves to a position 1.5 mm beyond the center of the guide bushing.



- W[ ]: Specify the distance by which the material is moved backward (relative move distance). The material does not move backward unless the W argument is specified. See the program sample below.
- C1: The cut-off tool breakage detector generally detects cut-off tool breakage without moving. Specify the C1 argument when the program moves the cut-off tool breakage detector to detect cut-off tool breakage. For example, the argument should be specified when the cut-off tool breakage detector is not mounted at the position defined for the standard tool holder. When the C1 argument is specified, the X and W arguments are invalid. See the program sample below.

Program sample

$1	$2	$3
G50 Z0 M06 M51 W-0.5 .....Cut-off tool breakage detection G00 X13.0 Z-0.5 M03 S1=3000 G99		

When mounting the cut-off tool breakage detector at the T06 position and specifying the C1 argument:

$1
G50 Z0 M06 G0 W-0.5 .....Z axis retraction. T0500 .....Specification of the tool near the cut-off tool breakage detector G00 V40.0 .....Positioning of the cut-off tool breakage detector to the Y axis M51 C1 .....The cut-off tool breakage detector works. G0 W0.5 .....The Z axis returns. :

Note

When specifying the W argument to move the Z axis backward, determine the move distance in the range in which the material does not come out from the guide bushing.

8.16 Interference Check Function

This machine makes a check on interference between components. The interference check function roughly recognizes the shape of the machine by the machining data. The function checks the machine for interference on the basis of the recognized machine shape. By doing so, the function stops the machine before interference occurs.
The interference check function checks the positions of components (e.g., tool posts and the back headstock), and issues an alarm when detecting a wrong position. When making a check, the function uses the data, which has been set on the Machining Data screen and Machine Structure screen, and the pre-determined data of components (e.g., back headstock). Consequently, an interference check alarm is issued at a position where interference is unlikely to occur, depending on the usage of the interference check function. In this case, disable the interference check function.
In general, the interference check function is enabled when the power is turned on.

Notes

- Set the machining data correctly.
- The NC unit recognizes the machine in relatively rough shape when using the interference check function.
  Consequently, interference may occur even when an interference check alarm is not issued, or an interference check alarm may be issued when interference is unlikely to occur.
  When using the interference check function, also make visual inspection to prevent interference.

8.16.1 Enabling/disabling the interference check function

The following two methods are available for enabling/disabling the interference check function:

- Set SW screen
  To disable the interference check function, switch "11 Interference Check Off" to ON on the Set SW screen. An alarm is not issued in this status when you feed axes with the handle in the manual operation mode. However, you cannot operate programs in this status.

- Specification in the program
  To temporarily disable the interference check function, specify the M code in the program.

If components come close to each other, an interference check alarm may be issued even when they are not in the interference area.
If it is confirmed that interference will not occur, specify the M118 command (interference check disabled) before the operation in the program.
Also, be sure to specify the M119 command (interference check enabled) after the operation.

Command format

M118	Interference check disabled
M119	Interference check enabled

Note

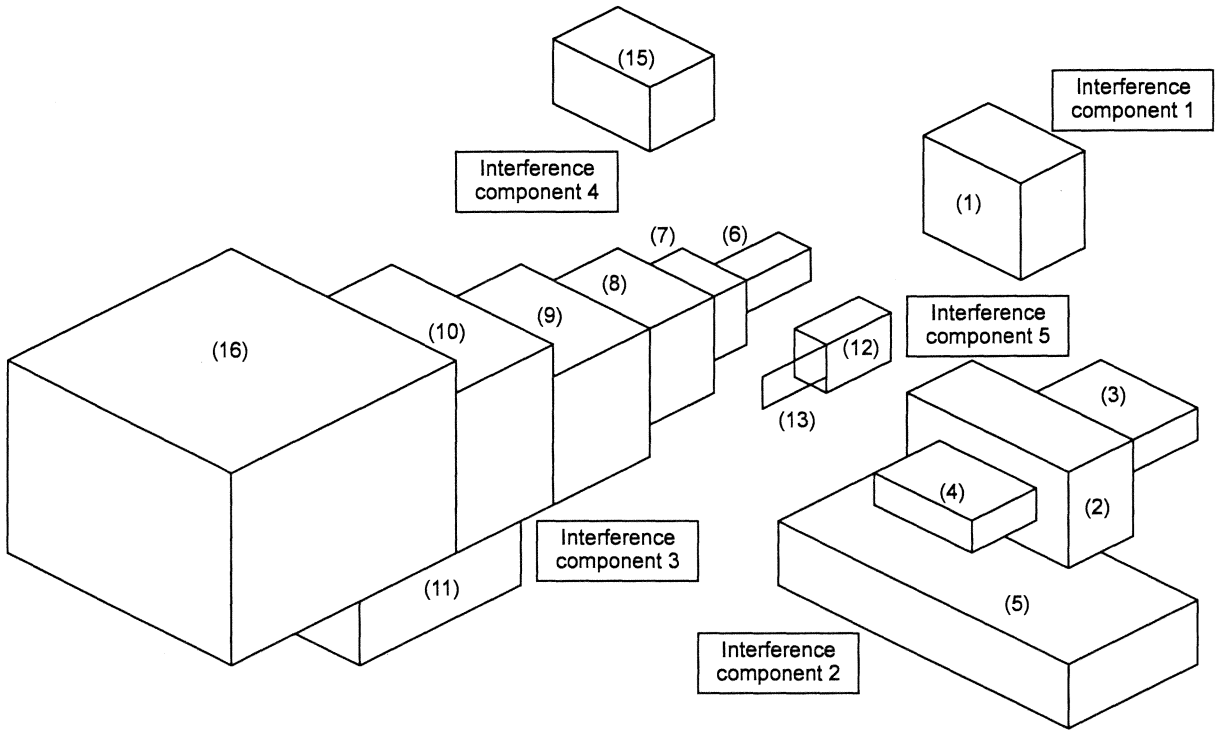
Once you specify "interference check disabled" in the program, the interference check function is not enabled when control returns to the beginning of the program after terminating the cycle. Enable the interference check function when completing the execution of the block that needs the interference check function to be disabled.
Specifying the M88 command (interference check disabled) disables the interference check function in all the axis control groups ($1, $2, and $3).

8.16.2 Interference components on which checks are made

The following are five major interference components:
- Interference component 1: Guide bushing
- Interference component 2: Opposite tool post (Type VII, VIII)
- Interference component 3: Back spindle
- Interference component 4: (Reserved)
- Interference component 5: Workpiece separator

For the back spindle, the data changes in accordance with the settings of "Bar Stock O.D.," "Back Spindle Chuck POS," and "Back Spindle" on the Machining Data screen.

An interference component consists of several solids.
An alarm is issued if solids interfere with each other. A message appears indicating the solids that are interfering with each other.
The interference components are rectangular parallelepiped in parallel with the machine coordinate system.



Solids of interference components:

(1) Solid 1: Guide bushing
(2) Solid 2: Front/back drilling holder (Type VII, VIII)
(3) Solid 3: Front drilling tool (Type VII, VIII)
(4) Solid 4: Back drilling tool (Type VII, VIII)
(5) Solid 5: Opposite tool post feed mechanism (Type VII, VIII)
(6) Solid 6: Back workpiece
(7) Solid 7: Cap nut
(8) Solid 8: Cap nut cover
(9) Solid 9: Back spindle
(10) Solid 10: Back headstock
(11) Solid 11: Back spindle feed machanism
(12) Solid 12: Workpiece separator
(13) Solid 13: Mounting of the workpiece separator
(14) Solid 14: (Reserved)
(15) Solid 15: (Reserved)
(16) Solid 16: Back headstock cover

The back workpiece (a solid is created by the back spindle chuck position and the material diameter) need to be excluded from interference components during machining. They are automatically excluded during program operation.
They are recognized as interference components when the power is tuned on or when the machine is reset.

Each interference component has a machine shape in size including a specified margin, which is calculated based on the part dimensions. The margin enables the interference check function to issue an alarm before interference occurs. Generally, a margin of 1 mm is given.
The interference check function issues an alarm by monitoring the machine coordinates. Even if the same interference components interfere with each other repeatedly, the position where an alarm is issued varies depending on the feed rate and the handle magnification.

8.16.3 Alarms

The interference check function issues the following two major types of alarms:

- Interference check alarm
  A command, which would cause two components to interfere with each other, was issued.

- Interference area alarm
  Two components are in an interference area. (For example, this alarm occurs if the machine is reset during program operation.)

The following are details about interference check alarms:

OP016	Guide bush and work on back chuck are interfered.
OP017	Front/back drill holder and work on back chuck are interfered.
OP018	Front/back drill holderand back spindle cap are interfered.
OP019	Front/back drill holder and back spindle cap cover are interfered.
OP020	Front/back drill holder and back spindle are interfered.
OP021	Interference between front/back drill holder and back headstock.
OP022	Back drill sleeve and work on back chuck are interfered.
OP023	Back drill sleeve and back spindle cap are interfered.
OP024	Back drill sleeve and back sp. cap cover are interfered.
OP025	Back drill sleeve and back spindle are interfered.
OP026	Back drilling tool and back headstock are interfered.
OP027	Opposite tool post feed mechinism and the back spindle feed mechanism are interfered.
OP028	Product chute and front/back drill holder are interfered.
OP029	Product chute and back srilling tool are interfered.
OP030	Product chute and back spindle cap nut are interfered.
OP031	Product chute and back spindle cap nut cove are interfered.
OP032	Product chute and back spindle are interfered.
OP033	Product chute and back headstock are interfered.
OP034	Product chute and back headstock cover are interfered.

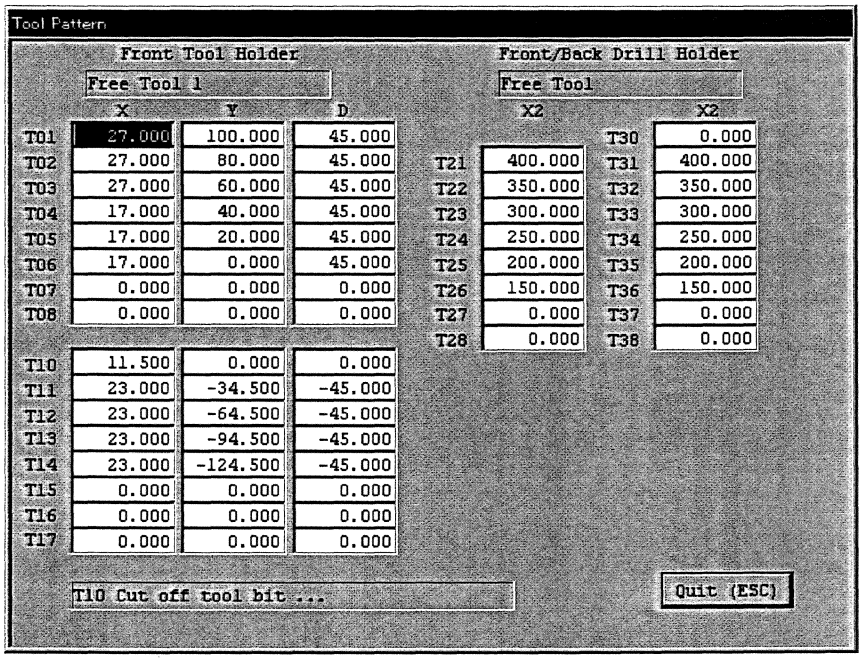
8.17 Free Tool Layout Pattern

You can increase the number of tools by changing the gang tool intervals or front/back drilling tool intervals. In general, up to 15 gang tools can be used. Enter "Free tool" for "Front Mach Holder Name" and "Back Drill Holder Name" on the Machining Data screen. In this case, a special holder needs to be created clearing your requirements.

Command format

T□□□□ (4-digit number following T)

The specification method is the same as for ordinary tool selection.
Tool numbers T01 to T08, T11 to T17, T21 to T28, T30 to T38 and T5100 to T5700 (type VI) can be used.
Be sure to enter tool position data on the Tool Pattern screen as shown below.
For the tool position X, Y, specify the distance from the machine zero point to the tool nose with a radius value.
For X, enter the X component in the virtual coordinate system. For Y, enter the Y component in the virtual coordinate system. For the tool position D, enter the angle of the virtual coordinate system to the motor shaft.
For the tool position data X2, enter the distance from the center of each tool to the center of the guide bushing when the X2 axis is positioned at the machine zero point. The distance must be entered with a value calculated for the diameter.
After tool selection, ordinary specification using X-Z coordinates can be made in the same manner as for ordinary machining, and a program can be created as usual.



Notes

- Be careful that the tool moves when the T□□□□ command is executed.
- When using a free tool layout pattern, be sure to check the following before starting machining:
  - Check if "Free tool" is specified for "Front Mach Holder Name" and "Front/back Drill Holder Name" on the Machining Data screen.
  - Check if each tool is positioned correctly with the center of the guide bushing.

8.18 Helical Interpolation — Optional

The machine can provide the circular interpolation for arbitral two axes among the three axes (X1, Y1, and Z1 or Z3 axes) which are perpendicular with one another and also the linear interpolation for the remaining axis in synchronization with the circular rotation. For the end-face helical interpolation process, use the end-face drilling spindle for vertical machining.

8.18.1 End-face helical interpolation process

Command format

G2/G3 X(U)[ ] Y(V)[ ] Z(W)[ ] I[ ] J[ ] K[ ] P[ ] F[ ]

Relation between circular plane and linear interpolation axis

	Circular plane	Linear interpolation axis
G17	X-Y plane	Z axis
G18	Z-X plane	Y axis
G19	Y-Z plane	X axis

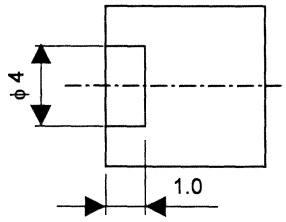
Arguments

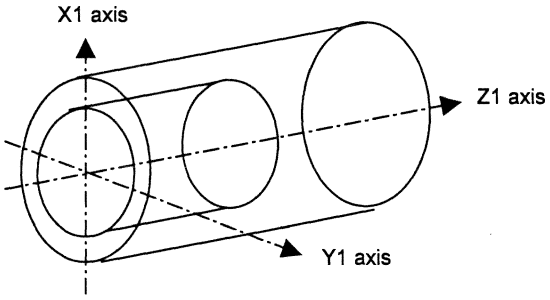
For circular plane G17 (X-Y plane):

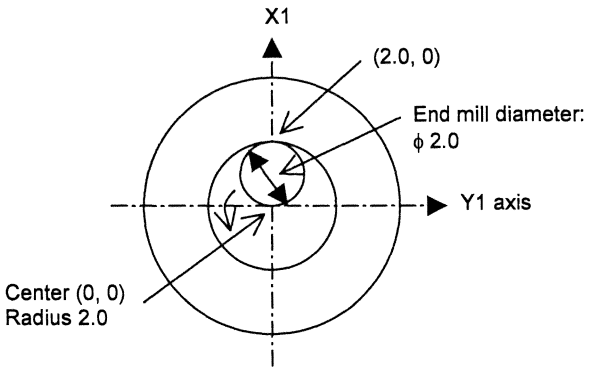
- X(U)[ ]: Specify the end-point coordinate of the circular arc based on the diameter.
- Y(V)[ ]: Specify the end-point coordinate of the circular arc based on the diameter.
- Z(W)[ ]: Specify the end-point coordinate of the linear axis based on the radius.
- I[ ]: Specify the center of the circular arc with the radius command increment in the X coordinate of the center viewed from the start point.
- J[ ]: Specify the center of the circular arc with the radius command increment in the Y coordinate of the center viewed from the start point.
- P[ ]: Specify the number of pitches. When no P argument is specified or P0 is specified, it causes the helical interpolation from the start to end points within a single circuit.
- F[ ]: Specify the feed rate.

Program sample

$1	
:	
M5 M58 S3=4000 G98	.....The gang tool spindle rotates forward.
M28 S0	.....Spindle 0-degree indexing
T1200	
G0 X0 Z-1.0 T12	
G17	.....X-Y plane selection
G41 G0 X4.0 Y0 Z-1.0	.....Positioning Nose R compensation mode ON (Specify R of tool data T12 to end mill radius 1.0.)
G3 X4.0 Y0 Z0 I-2.0 F300	Moves tool to start point by helical interpolation.
G3 X4.0 Y0 Z1.0 I-2.0 P10 F60	.....Cuts in 10 pitches of helical interpolation.
G3 X4.0 Y0 I-2.0	.....Circulates tool by a single circle on the bottom of hole.
G3 X4.0 Y0 Z-1.0 I-2.0 F500	Moves the tool away.
G40 G0 X4.0 Y0 Z-1.0 T0	.....Nose R compensation mode cancel.
G18	.....Z-X plane
G0 X0 Z-1.0	
G50 W5.0	
M60	.....The gang tool spindle stops.
M3 S1=3000 G99	
:	







Note

- X(U) and Y(V) should be specified based on the diameter commands.
- See <Section 8.2 Nose R Compensation (Tool Nose R Compensation)> for the nose R compensation.

8.18.2 Inclined helical interpolation process

The inclined rotation coordinate instruction allows the coordinate system to be rotated at the specified angle with the Y1 axis set to the center axis on the Z-X plane and the X1 axis set to the center axis on the Y-Z plane. The inclined rotation coordinate instruction can be combined with the helical interpolation to provide the inclined helical interpolation process.
Use "swing type end-face drilling spindle for vertical machining (optional)" for the inclined helical interpolation process.

Setting of inclined rotation coordinate

Command format

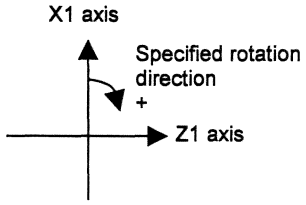
G173 X□ Z□ D□	Inclined rotation coordinate command for rotating Z-X plane with Y1 axis set to the center axis
G173 Y□ Z□ D□	Inclined rotation coordinate command for rotating Y-Z plane with Z1 axis set to the center axis
G173	Inclined rotation coordinate cancel command

Arguments

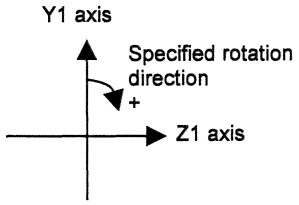
- X□: Specify the center-of-rotation coordinate on X1 axis. This argument should be specified for the rotation with Y1 axis set to the center axis.
- Y□: Specify the center-of-rotation coordinate on Y1 axis. This argument should be specified for the rotation with X1 axis set to the center axis.
- Z□: Specify the center-of-rotation coordinate on Z1 axis.
- D□: Specify the rotation angle. If no argument is specified, 0° is assumed.

Angular rotation direction

When rotating Z-X plane with Y1 axis set to the center axis



When rotating Y-Z plane with X1 axis set to the center axis



Helical interpolation command when inclined rotation coordinate is specified

Command format

G2/G3 X(U)[ ] Y(V)[ ] Z(W)[ ] I[ ] J[ ] K[ ] P[ ] F[ ]

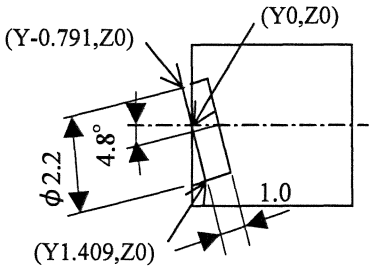
Arguments

For circular plane G17 (X-Y plane):

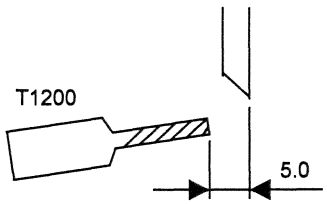
- X(U)[ ]: Specify the end-point coordinate of the circular arc based on the radius.
- Y(V)[ ]: Specify the end-point coordinate of the circular arc based on the radius.
- Z(W)[ ]: Specify the end-point coordinate of the linear axis based on the radius.
- I[ ]: Specify the center of the circular arc with the radius command increment in the X coordinate of the center viewed from the start point.
- J[ ]: Specify the center of the circular arc with the radius command increment in the Y coordinate of the center viewed from the start point.
- P[ ]: Specify the number of pitches. Specify the number of pitches in the range from 0 to 99. If no P argument is specified or P0 is specified, it causes the helical interpolation from the start to end points within a single circuit.
- F[ ]: Specify the feed rate.

Program sample

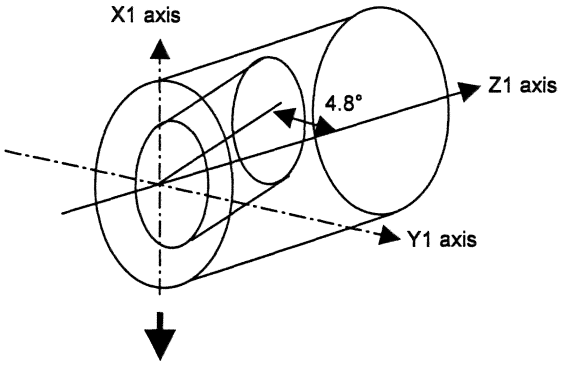
$1	
:	
M5 M58 S3=4000 G98	..... The gang tool spindle rotates forward.
M28 S0	..... Spindle 0-degree indexing
T1200	
G50 W-5.0	
G0 X0 Z-0.907 T12	
G173 Y0 Z0 D4.8	..... Inclined helical interpolation Inclines Y-Z plane by 4.8 with center-of-rotation coordinate in Y1Z1 axis being 0 and X1 axis set to center axis.
G41 G0 X0 Y1.409 Z-0.907	End mill positioning Nose R compensation mode ON (Specify R of tool data T12 to end mill radius 1.0.)
G3 X0 Y1.409 Z0 J-1.1 F300	Moves tool to start point by helical interpolation.
G3 X0 Y1.409 Z0.995 J-1.1 P25 F60	..... Cuts in 25 pitches of helical interpolation.
G3 X0 Y-0.791 W5 J-1.1 F100	
G3 X0 Y-0.791 J1.1	..... Circulates tool by a single circle on the bottom of hole.
G3 X0 Y-0.791 Z-0.907 J1.1 F500	..... Moves the end mill away.
G40 G0 X0 Y-0.791 Z-0.907 T0	Nose R compensation cancel
G173	..... Inclined helical compensation cancel
G0 X0 Z-0.907	
G50 W5.0	
M60	..... The gang tool spindle stops.
M3 S1=3000 G99	
:	

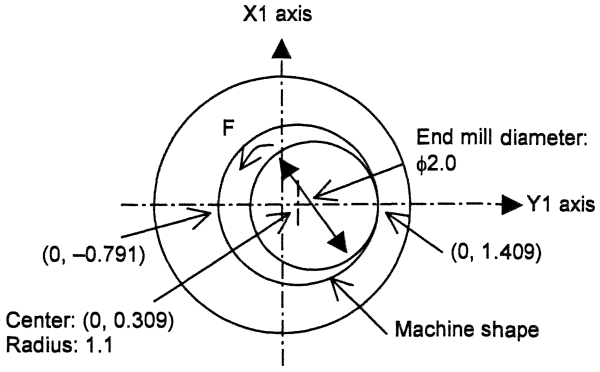


Incline Y-Z plane by 4.8° with center-of-rotation coordinate on Y1Z1 axis being 0 and Z1 axis set to center axis.



Swing type end-face rotary tool
(End mill diameter: ϕ2.0, angle: 4.8°)





Notes

- The axis addresses in the G173 command should be specified based on radius.
- The circular plane should be changed from one to another after G173 command is issued. The initial value of the circular plane is G17 (X-Y plane). After the inclined rotation coordinate is canceled, the circular plane is automatically returned to G18 (Z-X plane).
- See <Section 8.2 Nose R Compensation (Tool Nose R Compensation)> for the nose R compensation.

Product Code C – C 1 2 1 6 VI VII VIII IX – 7 7 0

Document Code 6 E 1 – 0 8 0 3

6 E 2 – 0 8 0 3

9. Relocating the NC Machine

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This chapter provides instructions for relocating the NC machine after it has been installed by the manufacturer. It tells you how to safely prepare the NC machine for relocation, relocate the machine, select a suitable site, and install the machine at the new site.
Be sure to read this chapter before relocating the NC machine.

> ⚠ CAUTION
>
> If you do not do the following, you will damage the machine.

9.1 Notes on Selecting the Installation Site

To ensure the high cutting precision of the NC machine, take into consideration the location of power outlets, foundation strength, environmental temperature and humidity, traffic, ventilation, direct sunlight, proximity to other electrical machines and equipment generating high-frequency noise, and all other considerations which may affect the machine's operation.
The site you select should meet the following requirements.

Site foundation

- The weight bearing capacity of the soil must be 1 ton/m^2 (205 ℓb/ft^2) and the foundation thickness must be 100 mm (3.94") or more.
- The foundation area must extend 300 mm (11.81") or more from the periphery of the NC machine.
- The NC machine must be installed on a sturdy, level surface which is not affected by vibrations of other machines.
  If you are going to provide an anti-vibration trench, dig it along the periphery of the machine's foundation area.
- Never place the NC machine on concrete blocks on the floor. Concrete blocks cannot serve as the foundation of the NC machine.
- Select an installation site that provides sufficient clearance around the NC machine to allow movement of a cart for removing chips and so that workers can perform maintenance tasks such as removing the panels without bumping into other machines. (The floor space required for the NC machine itself is 960 × 2255 mm (37.80" × 88.78")).

Installation environment

- The NC machine must not be installed in a place where there may be sharp temperature changes, such as near air conditioners.
- The NC machine must not be exposed to dust and direct sunlight or must not be placed near a ventilation opening or heat source or in a place of high humidity. A heavy curtain can protect the NC machine if it must be installed in such a location.
  Also, a screen may be used as a barrier against a ventilation opening or heat source.
- The work site should be well ventilated to prevent heat build-up.

NC machine installation standards

> **WARNING**
>
> If you do not follow the precautions, high-frequency noise may cause abnormal machine movements, resulting in severe personal injury or death.

- Power line
  Use a dedicated power line (200V AC ± 10%) of the NC machine separately from the power lines of other machines and equipment that generate high-frequency noise.

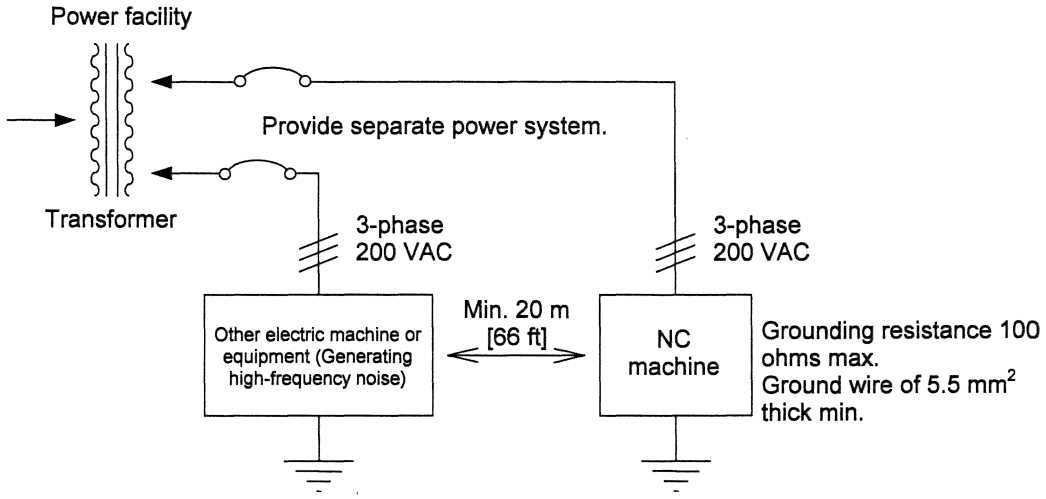
- Installation site
  Install the NC machine at least 20m [66ft] away from other machines and equipment that generate high-frequency noise.

- Grounding of the NC machine
  Use 5.5 mm^2 or more thick grounding wire and ground the NC machine separately from the ground of other machines and equipment. The ground resistance of the NC machine should be 100 ohms or less. (Class 3 grounding)
  If the NC machine is installed near machines and equipment that generate high-frequency noise, provide a separate ground terminal within 5m [16ft] of the NC machine. The ground resistance of the NC machine should be 100 ohms or less.
  Examples of equipment that generate high-frequency noise:
  - Arc welding machine
  - Resistance welding
  - High frequency dryer
  - Electric spark machine
  - Miscellaneous

- If a circuit breaker with an electric leakage detection function is used as the power circuit breaker on the factory side, the sensitivity current must be 100 mA. If the sensitivity current is less than 100 mA, the circuit breaker may be turned off abnormally.

Example of NC machine grounding

The figure below shows the conditions of NC machine grounding when it is installed closed to other machines or equipment.



WARNING

Operations for relocating the NC machine, such as crane or forklift operation and slinging work, must be performed by qualified personnel authorized by public organizations. Leaving such operations to unqualified persons could result in serious accidents such as letting the machine fall down.

9.2 Preparation

The following describes steps to prepare the machine for relocation.

Procedure

1. Make backup copies of data stored in the machine memory using an external storage device to store the copies to a tape paper or IC card.
   The NC machine will retain the data even if you disconnect it from the power outlet. However, to assure safety of the data, it is recommended to make backup copies before relocating the machine.
2. Disconnect the external tape reader or IC card unit.
3. Remove tools from the machine.
4. Move axes of the machine to their respective positions shown below.
   Z1 axis: · · · Return position
   X1 axis: · · Return position
   Y1 axis: · · · Y1=0 (machine coordinates)
   X2 axis: · · Return position : Type VII, VIII, IX
   Z2 axis: · · · Return position : Type VIII, IX
   X3 axis: · · Return position : Type IX
   Z3 axis: · · · Return position
5. Turn off the main circuit breaker of the machine and the breaker of the factory power outlet.

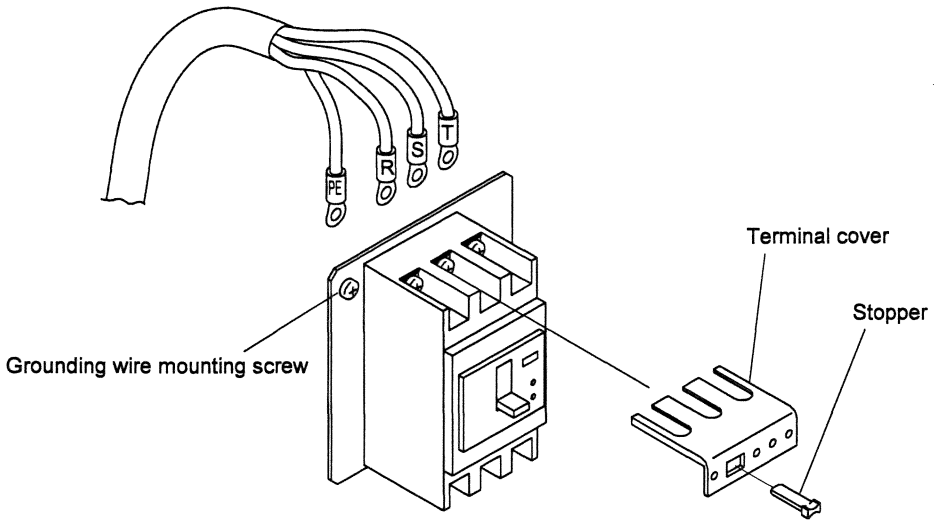
> ⚠ DANGER
>
> Make sure that the breaker of the factory power outlet and main circuit breaker of the NC machine are turned OFF before working with any power cable. Failure to do so will cause an electric shock, resulting in severe personal injury or death.

6. Disconnect the coolant pump hose.
7. Disconnect the coolant pump connector cable.
8. Disconnect the connector cable for the coolant level detection sensor.
   If the machine has a coolant flow rate detector (optional) installed, disconnect the cable from the flow rate sensor and the thermistor. If the machine has a chip conveyor (optional), also disconnect the connector cable from the chip conveyor.
9. Disconnect the hose from the pneumatic device.
10. Pull out the coolant tank and remove the chips and coolant.

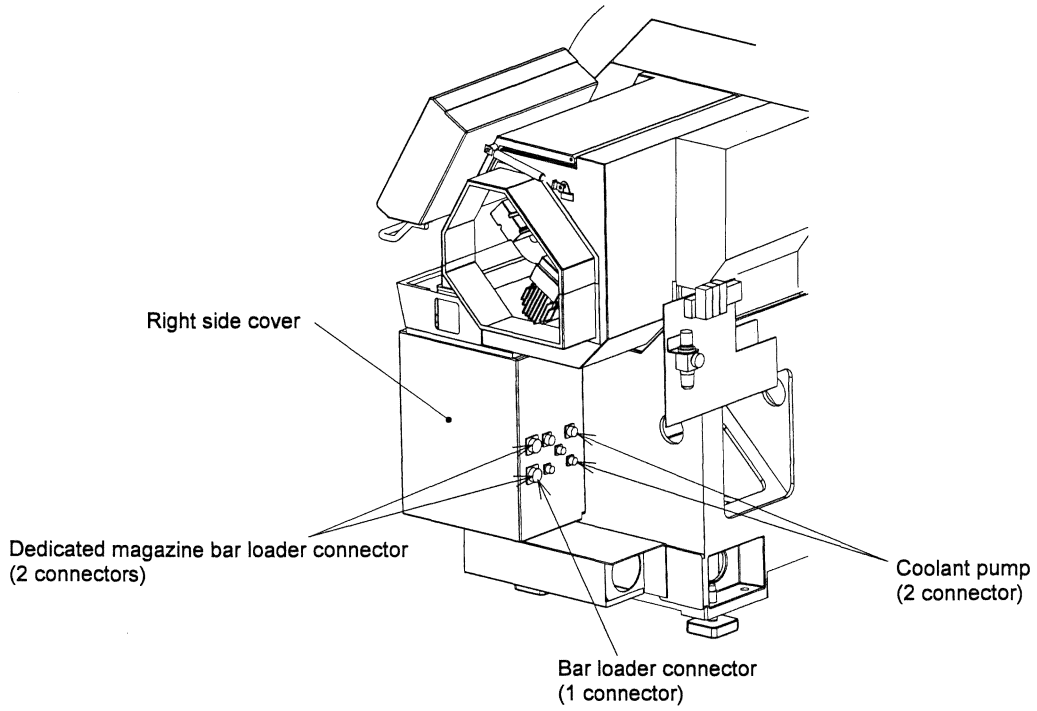
11.Disconnect the power cable and grounding wire.

> **DANGER**
>
> Make sure that the breaker of the factory power outlet and main circuit breaker of the NC machine are turned OFF before working with any power cable.
> Failure to do so will cause an electric shock, resulting in severe personal injury or death.

11-1 Remove the front cover of the control unit.
11-2 Remove the stopper, and then the breaker terminal cover by pulling up its click.
11-3 Disconnect the power cables and the grounding wire.
11-4 Replace the breaker terminal cover and the stopper.
11-5 Restore the front cover of the control unit.



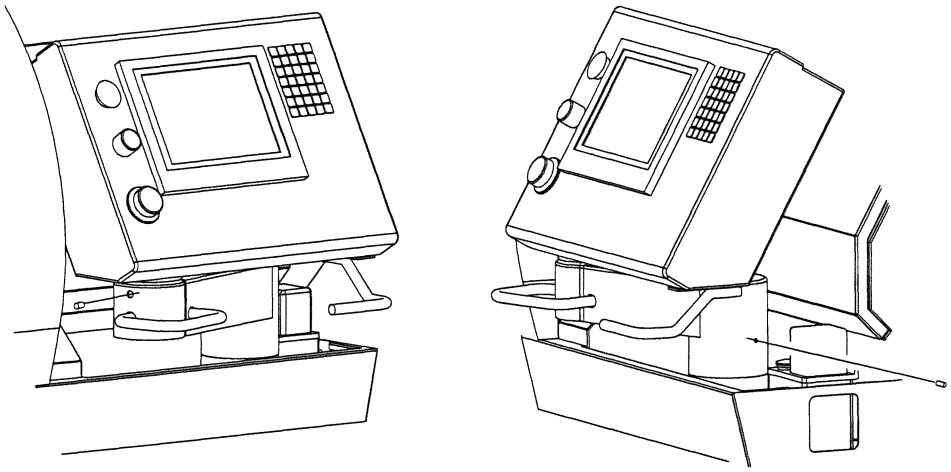
12. If the machine has a bar loader installed, plug out the bar loader connector on the back of the machine. If the bar loader is a dedicated magazine bar loader, open the right side-cover of the control unit and remove the servo motor cable, as well.
When you have removed the cable, replace the right side-cover of the control unit in place.



13. Remove chips and clean the whole machine.
14. Secure or protect the following parts against damage that may be caused by disloaction during relocation.
    14-1 Securing axes
    If transportation jigs are provided, mount the jigs to specified positions.
    14-2 Securing covers and doors
    Secure covers and doors gently with a paper adhesive tape to prevent them from moving during relocation.

> ⚠ CAUTION
>
> Do not use tapes with strong adhesives. Such tapes may peel off the paint on the machine when you pull them off at the delivery site. Also, do not leave tapes stuck on the machine for a long time. If you do so, the paint on the machine may peel off when you try to remove the tapes.

14-3 Protecting and securing the operation panel
Swivel the operation panel and the arm to fit them in parallel with the main body of the machine.
Secure the operation panel and the arm with bolts (M6 × 15).
Secure the arm and the column with bolts (M6 × 20).
Cover the LCD with styrofoam or another protective material.



15. Loose the four level adjustment bolts and remove them from the machine bed after ensuring safety.

9.3 Relocation

Use a hoist sling or fork-lift truck to remove the machine from the current site and move it to a new site or delivery vehicle.

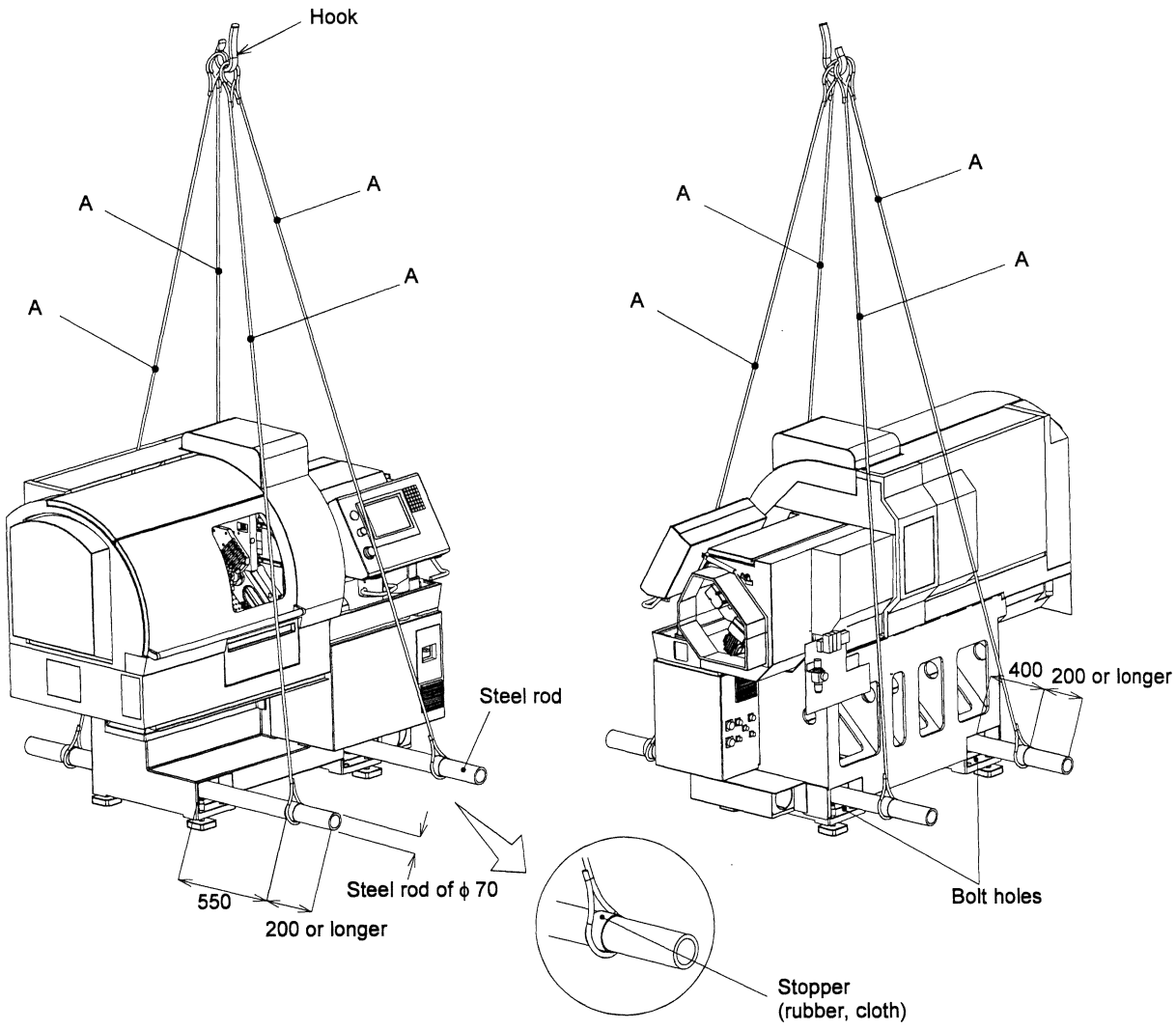
9.3.1 Hoist sling

WARNING

If you do not follow the precautions and instructions in this section, the machine could fall and cause severe personal injury or death.

- The maximum weight of the machine depends on the mounted optional devices:
  C12/C16 VI : 1,600 kg [3.53 klb]
  C12/C16 VII : 1,650 kg [3.64 klb]
  C12/C16 VIII: 1,675 kg [3.69 klb]
  C12/C16 IX : 1,700 kg [3.75 klb]
  To sling the machine, use nylon or wire ropes of at least 10 mm in diameter.
- Use a hook as shown below.
- Do not use rusted, worn, or torn wire ropes.

Rope A	3050 mm	4 pieces



Procedure

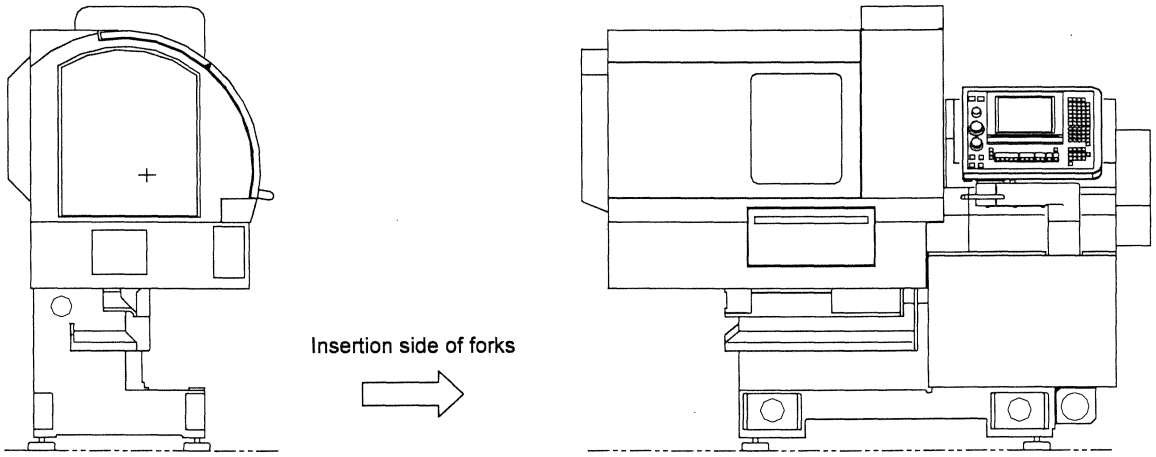
1. Insert steel rods of 70 mm (2.76") in diameter across the bolt holes on both sides of the machine.
2. Tie the slinging ropes to these steel rods as shown in the figure.
3. Hoist the rope gradually. Stop hoisting when the wire rope is stretched.
4. Check the sling security.
5. Hoist the rope until the machine is lifted off the floor.
6. Stop hoisting again to check the sling again for security.
7. If the sling is secure, hoist the rope to the required height.
8. Move the machine to a delivery vehicle or new site.
9. To place the machine on a vehicle or the ground, lower the machine gradually and stop just before the machine touches the surface.
10. Check the position of contact and adjust the position if necessary.
11. If the position is correct, lower the machine to the surface.

9.3.2 Fork-lift truck

WARNING

If you do not follow the precautions and instructions in this section, the machine could fall and cause severe personal injury or death.

- The maximum weight of the machine depends on the mounted optional devices:
  C12/C16 VI : 1,600 kg [3.53 klb]
  C12/C16 VII : 1,650 kg [3.64 klb]
  C12/C16 VIII: 1,675 kg [3.69 klb]
  C12/C16 IX : 1,700 kg [3.75 klb]
  Be sure to use a fork-lift truck that can handle this load.
- Be sure to have a supervisor attend the relocation work together with a driver of the fork-lift truck so that projecting portions of the machine are not damaged.
- Be sure to perform a trial lift before moving the machine. Try lifting the machine in a position in which its front, back, left, and right sides are balanced in a stable manner.



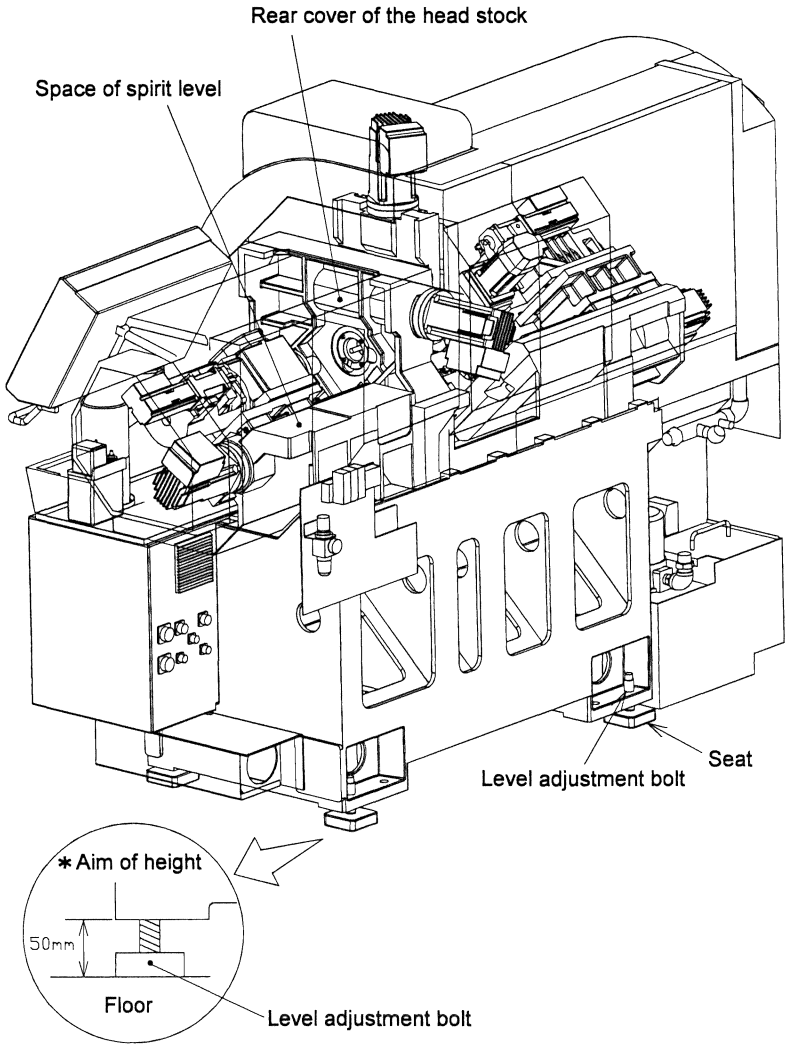
Procedure

1. Insert the forks under the machine bed from the left.
2. Find the most stable position and lift the machine.
3. Move the machine to the new site or delivery vehicle.
4. To place the machine on a vehicle or the ground, lower the machine gradually and stop just before the machine touches the surface.
5. Check the position of contact and adjust the position if necessary.
6. If the position is correct, lower the machine to the surface.

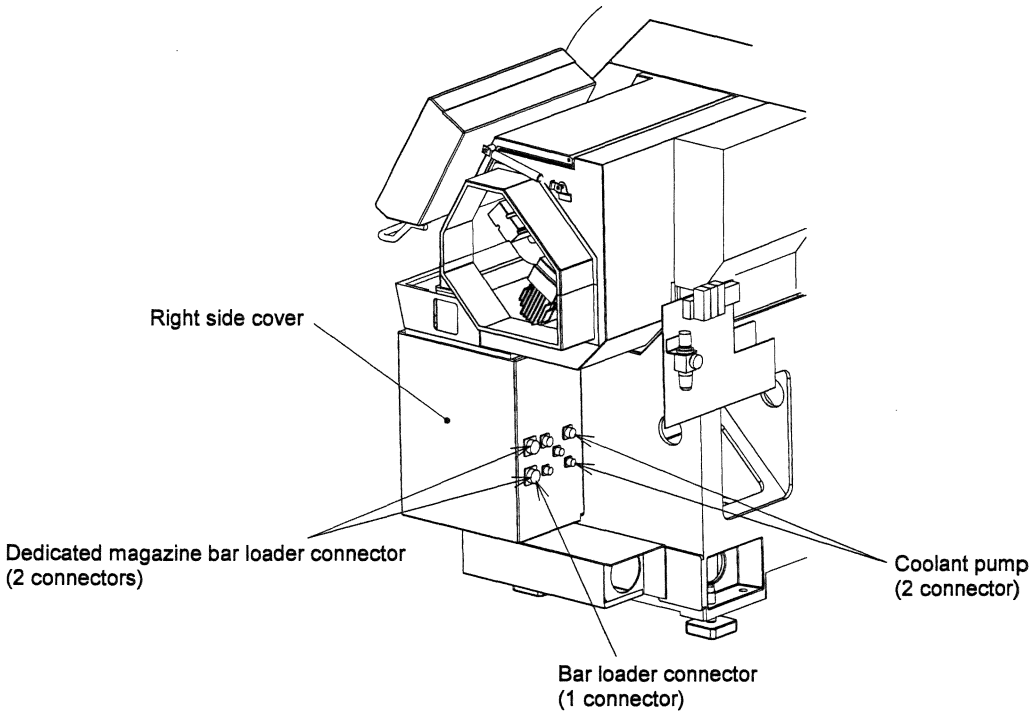
9.4 Installation

Procedure

1. Move the machine to the destination site by hoist sling or fork-lift.
2. While the machine is still in a raised position, mount the level adjustment bolts and hexagonal nuts (four locations).
3. Place four seats on the floor at the destination site.
4. Gradually lower the machine and adjust the seat positions so that each of the level adjustment bolts is positioned directly above the dent in the seat.
5. Adjust the level of the machine.
   - 5-1 When all four seats are positioned properly, lower the machine on the seats and adjust the level adjustment bolts so that the machine is approximately level.
     Note) As a guideline, place the coolant tank into position. If the coolant tank can be placed properly, the machine is approximately level.
   - 5-2 When the machine is leveled, remove the sling or withdraw the fork-lift.
   - 5-3 Remove the rear cover of the headstock. Place a spirit level on the finishing surface at the far end of the machine bed. Make sure to clean the finishing surface beforehand to avoid any foreign matter such as dust between the spirit level and the surface.
     The spirit level sensitivity should be approximately 0.02 mm per meter (0.0007 in./yd.) for each scale setting.
   - 5-4 Adjust the four level adjustment bolts so that the level is within 0.04 mm per meter (0.0014 in./yd.) on the surface of the machine. It should be level across the length and depth of the machine.
   - 5-5 Tighten the level adjustment bolts to the same torque. The bolts should be tightened in a crosswise order, or you can tighten three bolts first, then the fourth bolt to the desired level.
   - 5-6 Check the level to be sure it is correct.
   - 5-7 Check the tightening torque of the four bolts so that they are identical.
     Note) Do not fix the NC machine to the mortared floor. If the machine vibrates because of the bar material sway, fix the NC machine to the seats with anchor bolts in the holes next to the level adjustment bolt hole.



6. Undo the secured or protected parts for relocation.
   6-1 Undo the secured covers and doors.
   Remove the gummed paper tape and gummed tape from the secured doors.
   6-2 Undo the protected and secured operation panel.
   Remove the styrofoam or another protective material from the LCD.
   Remove the bolts securing the operation panel.
   6-3 Undo the secured axes.
   Remove all transportation jigs if mounted.
7. To connect the bar loader, connect the bar loader connector to the control unit.
   If the bar loader is a dedicated magazine bar loader, open the right side-cover of the control unit and connect the servo motor cable.
   When you have connected the cable, replace the right side-cover of the control unit in place.



8. Connect the coolant pump hose, coolant pump connector cable, and coolant level detection sensor cable.
   If the machine has a coolant flow rate detector (optional) installed, connect the flow rate sensor and thermistor connector cables. If the machine has a chip conveyor (optional), connect the chip conveyor connector cable.
9. Also, connect the pneumatic device hose.

10. Clean the machine.
The machine may collect dirt and dust during relocation. Before starting up the relocated machine, therefore, be sure to check the machine conditions not to use the machine left dirty.

> **CAUTION**
>
> Do not use compressed air to remove dust because foreign matter at the mouths of gaps between fittings will be pushed further inside the gap and may damage the fitting surface.

10-1 Use a dry waste cloth or a waste cloth soaked in neutral detergent to wipe off the dust and foreign matter.

10-2 After cleaning, lightly apply one of the lubricants listed in the table below to the finish surface.

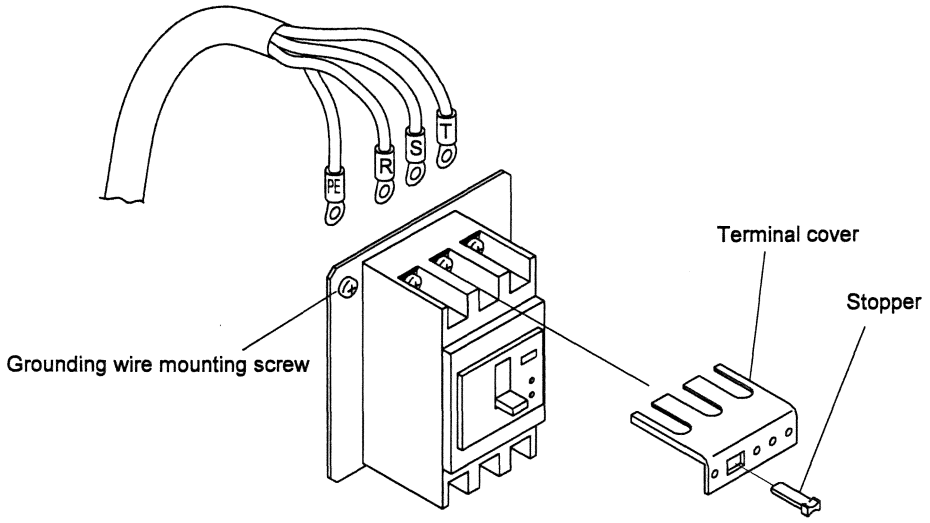
Supplier	Slide Lubricant
Mobil	Vactra No.2
Esso Standard Oil	Phoebis K68
Shell	Shell Tona Oil T68
British Petroleum	BPMaccurat 68

11.Open the front cover of the control unit and connect the power cables and grounding wire.

> **DANGER**
>
> Make sure that the breaker of the factory power outlet and main circuit breaker of the NC machine are turned OFF before working with any power cable.
> Failure to do so will cause an electric shock, resulting in severe personal injury or death.

11-1 Providing the power breaker
Provide a power breaker dedicated to the NC machine (isolated from other machines) nearby for easy access by a machine operator.
The breaker capacity depends on the machine: 30 A

11-2 Wiring from the power breaker to the NC machine
Wire the power breaker to the NC machine and connect the grounding wier to the grounding terminal. Make sure to use round terminals, not Y-shaped terminals. Y-shaped terminals are likely to be disconnected.



The power cable and grounding wire should conform to the following specifications:

Electric wire thickness (IV wire or VCT)

Overall capacity	6 KVA
R.S.T	5.5 mm^2
Grounding wire	5.5 mm^2

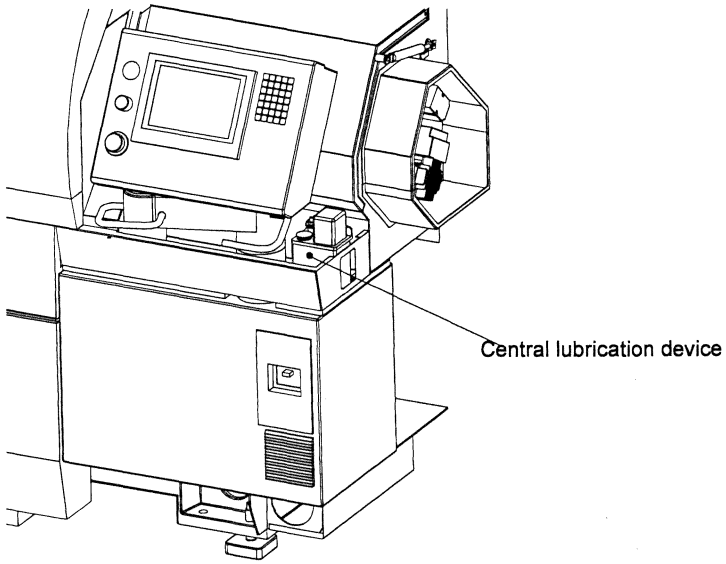
11-3 Mounting the control unit covers
After connecting cables, mount all control unit covers.

12. Apply one of the lubricants listed in the table of step 10-2 to the following parts.

12-1 Central lubricant device

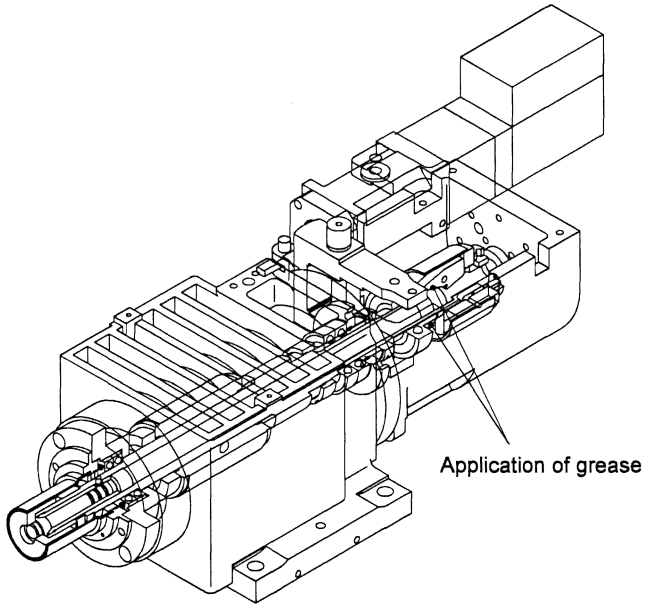
Fill the tank of the central lubrication device with the lubricant.

Tank capacities are as follows: 0.8 liters (0.2 gal.)



12-2 Spindle bobbin sliding portion

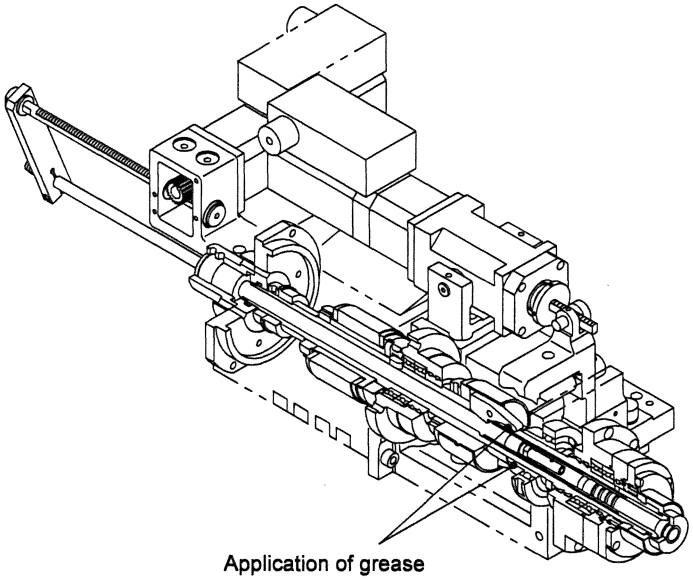
Loosen two screws and remove the safety cover from the spindle chuck section and apply grease or lubricant to the spindle bobbin sliding portion and the portion on which the chuck claw rides. The lubricant should have 60cst or more viscosity (under 40 degrees Celsius).



12-3 Back spindle bobbin sliding portion

Unscrew two screws and remove the back spindle headstock cover and apply grease or lubricant to the spindle bobbin sliding portion and the portion on which the chuck claw rides. The lubricant should have 60cst or more viscosity (under 40 degrees Celsius).

(The following shows an illustration when a motor-driven back knock-out device (optional) is mounted.)



Application of grease

13. Fill the coolant tank on the left side of the NC machine with coolant.

The tank capacity depends on the machine: About 100 liters

Oil-based coolant is recommended to prevent friction between material and guide bush sliding portions.

If you use a water-soluble coolant, however, comply with the following.

Notes on using water-soluble coolant

- Some components of the machine must be replaced to use water-soluble coolant for the NC machine. Be sure to contact the Citizen Service Center in advance.
- The recommended water-soluble coolants are listed below:

Supplier name	Product name
Castrol	HYSOL X
ASAHI DENKA	EMCO-800

  We have not finished evaluation on other water-soluble coolants. To use any other water-soluble coolant, select it in due consideration of the results of its past use in your company.
- When used also as lubricant, water-soluble coolant may have unexpected bad influence on the machine. Before using the coolant also as lubricant, contact to the coolant manufacturer to thoroughly check its influence on the materials of machine components and its correct usage.
- Use water-soluble coolant that provides measures for lubrication, rust prevention, foaming prevention, oil-separation characteristics, and stability.
- Before starting and after ending operations, remove chips and lightly apply lubricant on the sliding parts of the machine.
- If the surface of the water-soluble coolant appears to be unclean (abnormal), replace the coolant immediately.
- Water-soluble coolant offers protection against rust while the machine surface is wet. Once the machine surface dries, however, it could rust easily. When work completes, apply the rustproof oil while the machine surface is still wet to prevent rust.
- The dilution methods and diluents of water-soluble coolant vary depending on the type of coolant. Follow the instructions provided by the supplier of each coolant. Be sure to check the coolant diluted state every day to keep the appropriate strength of the coolant solution.



CAUTION

Water-soluble coolants have high degreasing strength due to their alkaline content and this may cause skin inflammation. Be sure to wash your hands with the neutral detergent when you finish working with the machine. Apply a skin cream to your hands if you have sensitive skin.

9.5 Pre-operation Check

Follow the procedure below to ensure that the NC machine functions properly before starting operations at the new work site.

Procedure

1. Turn on the breaker of the factory power outlet.
2. Confirm the power supply voltage. The power should be 3-phased and 200 VAC.
   Measure the voltage of each 3-phase power cable and make sure the fluctuation is within 200 VAC ± 10%.
3. Turn on the main circuit breaker of the NC machine.
4. Release the Emergency Stop button if it is pressed.
5. Press the Power ON switch on the operation panel.
6. Press the 

key on the operation panel to verify that it turns on and off the coolant motor. Make sure the coolant pump motor rotates in the direction of the arrow on top of the pump. If the power cables are connected improperly, the motor rotates in the reverse direction.
7. Start the regular test operation.

Notes

The following alarm may occur after the machine has been transferred:

"EX401 Detection of the machine moving."

This alarm occurs when the machine transfer detection function mounted on the machine detects the machine moving. If the alarm occurs, call the Cincom Service Office.

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