

NC rotary table controller

# Quinte

**QTC101CS** (30A 1 axis controller)

**QTC201CS** (30A\*30A 2 axes controller)

**QTC300** (100A 1 axis controller)

Instruction Manual



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# **1** Forward

- ◆ Safety warning terms and safety warning symbols
- ◆ About disclaimer and how to use the Instruction Manual
- ◆ About warranty and disclaimer
- ◆ Information concerning disposal
- ◆ Others

## ◆ Forward

This Manual provides detailed information for understanding performance and functions and proper use of the round table controller (Quinte).

Before using this product, be sure to fully read this Instruction Manual and correctly understand how to use it.

And be sure to observe the instructions and warnings described in “**Importance related to safety**” and “**Cautions for use**” with regard to the headings. Disregard of these descriptions may result in serious physical injury.

## Safety warning terms and safety warning symbols

This Manual classifies cautions for handling specifically considered to be important depending on the extent of danger (degree of anticipated damage). Fully understand meanings of these terms and follow the instructions to perform safe operations.



### **Safety alerts and symbols**

These are safety warning symbols. These symbols are used to remind of cautions regarding potential danger of physical injury. In order to avoid possible injury or death, observe all safety messages following these safety alerts and symbols.



Disregard of these cautions may result in serious physical accident such as death or serious injury.



Disregard of these cautions may result in physical accident such as death or serious injury.



Disregard of these cautions may result in minor injury or moderate injury.



Disregard of these cautions may result in failure of this product, damage to this product, reduction in life or damage to peripheral equipment.

## About disclaimer and how to use the Instruction Manual

We shall assume no responsibility for physical injury, death, damage or loss caused by disregard of warnings in this Manual.

The content of this Manual does not predict all potential dangers in running, operation, inspection and maintenance in every environment. There are many reasons beyond the scope of this Manual of what this product cannot do and what you must not do.

Accordingly, unless this Manual explicitly describes “can do” or “may do”, you shall consider other actions to be “cannot do” or “must not do.” If you have any question related to safety when performing running, operation, inspection or maintenance which this Manual does not describe, confirm with us or our distributors.

## About warranty and disclaimer

The warranty period of the product is one year after delivery.

Use all parts which our company delivered. We shall assume no responsibility for physical injury, death, damage or loss caused by use of parts other than genuine parts which our company manufactured. And use of parts other than genuine parts which our company manufactured will void all warranties.

**Information concerning disposal**

Dispose of this product in accordance with the laws of the country where it is used.

**Others**

Please note that the contents of this Manual may be subject to change without prior notice for the purpose of improvement or change in specifications.


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## **2** Important warnings related to safety

- ◆ Warning
- ◆ Caution



As important warnings related to safety, in particular what you are requested to know and what you are requested to observe are summarized. Be sure to read them before use.

- Types of content of what you are requested to observe are classified by “graphic symbol” for description.



	<p>What you must not do is shown.</p>		<p>What you must do is shown.</p>
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## **WARNING**

### When Using

 <small>Be sure to carry out</small>	<ul style="list-style-type: none"> <li>■ <b>Operate in a state that you can press the [Emergency stop] button at any time.</b> (Physical accident or machine damage may result)</li> <li>■ <b>Even if you pressed the [Emergency stop] button, confirm that all operations have stopped before approaching the machine.</b> (Physical accident may result)</li> <li>■ <b>Confirm that jackets on the power cable and electric wire are not damaged before use.</b> (Electric shock may result)</li> <li>■ <b>Start the operation after confirming that there are no people or obstacles around the operating machine.</b> (Physical accident, machine damage or interference may result)</li> <li>■ <b>Carry out wiring so that it will not be strongly pulled, pinched or damaged the cable.</b> (Electric shock or failure may result)</li> </ul>
 <small>Prohibition</small>	<ul style="list-style-type: none"> <li>■ <b>Do not place any obstacle near the [Emergency stop] button.</b> (Physical accident or machine damage may result)</li> <li>■ <b>Do not operate with wet hands.</b> (Electric shock may result)</li> <li>■ <b>Do not operate under the influence of alcohol or drugs.</b> (Physical accident or machine damage may result)</li> </ul>

### Installation

 <small>Be sure to carry out</small>	<ul style="list-style-type: none"> <li>■ <b>Connect electric cable to a leakage breaker for insulation according to IEC60947-2.</b> (Fire may result)</li> <li>■ <b>Install a strong and insulated cover on the electric cable routing on the floor.</b> (Electric shock may result)</li> <li>■ <b>Carry out grounding work with the grounding resistance 100Ω or less.</b> (Electric shock or machine malfunction may result)</li> </ul>
 <small>Prohibition</small>	<ul style="list-style-type: none"> <li>■ <b>Do not apply any voltage other than the specified voltage to each terminal.</b> (Failure, fire or electric shock may result)</li> <li>■ <b>Do not install near inflammable material.</b> (Fire may result)</li> </ul>



## Maintenance



Be sure to carry out

- When the controller fails, shut off the power supply. (Fire may result)
- Be sure to shut off main breaker when doing maintenance/inspection work on controllers, motors, etc. (Electric shock may result)
- When doing maintenance/inspection work on electrical carrying locations, check electrical state with a tester before the actual work. (Electric shock may result)
- If it is unavoidable to do maintenance work with the power-on, entrust to the certified electrician. (Electric shock may result)
- Contact our service department before replacing parts. (Reduced functionality and safety may result)
- Use replacement parts specified by us (Reduced functionality and safety may result)



Prohibition

- Do not disassemble the controller. (Electric shock, burn, failure or ignition may result)
- Do not touch servo motor or other hot parts immediately after turning off the power. (Burn may result)



## CAUTION

## When using



Be sure to carry out

- Use the product under the environmental conditions described in the [Operational Environment/Physical Environment] section. (Failure may result)
- Securely check the position and function of each switch, button and key before operating them. (Machine malfunction may result)



Prohibition

- Do not ride or put heavy objects on the product (Failure may result)
- Disconnect the power when installing jigs, etc. (Physical accident may result)

## Installation • Transportation • Storage



Be sure to carry out

- Storage and transportation environmental conditions should be performed under the environmental condition shown in the [Operational Environment/Physical Environment]. (Failure may result)
- Wiring should be done correctly and securely. (Failure or machine malfunction may result)
- Do not connect weak power wiring to the strong power wiring or run in the same duct (Machine malfunction may result)



Prohibition

- Do not drop and subject the product to the strong impact (Failure may result)
- Do not use machines that generated electromagnetic wave near the controller. (Unexpected operation of the machine may result)

## Data



Be sure to carry out

- Please back up and save all registered program, parameter and entered correction data (data corruption or loss may result)

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## **3** Specifications

- 3-1** Quinte model
- 3-2** Number of controlled axes
- 3-3** Combination of motors
- 3-4** Size
- 3-5** Operational environment/physical environment
- 3-6** Power supply
- 3-7** Input specifications
- 3-8** Output specifications
- 3-9** Clamp output specifications
- 3-10** Other

**3-1** Quinte model

QTC101CS	1 axis controller Emboss sheet type
QTC201CS	2 axes controller Emboss sheet type
QTC300	1 axis (High torque) controller Flat sheet type

**3-2** Number of controlled axes

Number of controlled axes	1 axis : QTC101CS / QTC300
	2 axes : QTC201CS

**3-3** Combination of motors

Combination of motors	QTC101CS : 200W / 400W / 750W / 1kW / 1.2kW
	QTC201CS : 200W / 400W / 750W / 1kW / 1.2kW <sup>*1</sup>
	QTC300 : 1.8kW / 2.0kW / 3.5kW

\*1 For QTC201CS, two motors are selected from the combinations of motors.

**3-4** Size

Dimensions(WxDxH) <sup>*1</sup>	QTC101CS : 320 x 290 x 190 (205) mm <sup>*2</sup>
	QTC201CS : 320 x 400 x 190 (205) mm <sup>*2</sup>
	QTC300 : 400 x 400 x 270 (285) mm <sup>*2</sup>
Mass	QTC101CS : 10kg
	QTC201CS : 13kg
	QTC300 : 19kg

\*1 These dimensions do not include projection parts (such as emergency stop button, back connector).

\*2 ( ) of the height dimensions indicate dimensions including rubber leg.

**3-5** Operational environment/physical environment

Operating temperature range	0°C to 45°C
Operating humidity range	20% to 80%RH or less (Shall not condense)
Operating altitude	1000m or lower
Vibration durability	0.5G or less
Impact durability	1.0G or less
Overtoltage category	Classification III
Environmental pollution level	Pollution level 3 (However, install in a place where water or oil does not make contact)
Waterproof structure	Protection class IP53 (However, this does not apply to the power supply operation part if it meets pollution level 3)
Storage temperature range	-10°C to 60°C
Storage humidity range	90%RH or less
Storage place	Store in a place which is free of water or oil leaks, condensation and freezing.

**3-6** Power supply

Input voltage	QTC101CS / QTC201CS : 1-phase / single-phase 200V AC to 230V AC QTC300 : 3-phase / single-phase 200V AC to 230V AC
Voltage variation	-10% to 10%
Frequency	50 / 60Hz $\pm$ 3Hz
Grounding condition	Grounding resistance value: 100 $\Omega$ or less
Input capacity (Max)	QTC101CS : 2.9KVA QTC201CS : 5.6KVA QTC300 : 6.2KVA
Leak current	QTC101CS : 2.8mA QTC201CS : 3.4mA QTC300 : 6.5mA



- Be sure to use input voltage in the specification range. (Failure of machine or fire may result)
- Be sure to carry out grounding work for the controller to avoid dangerous voltage on the machine body and operation panel if any electric leak should occur.(Electric shock may result)



- Because high frequency leak current flows depending on ground floating capacitance of servomotor winding, power cable or servo amplifier may cause malfunction of leakage breaker or leakage protection relay mounted in the electrical path on the power side, use a leakage breaker “ready for inverter load” for which measures have been taken to avoid malfunction.

### 3-7 Input specifications

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The CE mark specification for this product has been designed and inspected in accordance with the following standards and is a self-declaration of conformity to the EC directives.

Low Voltage Directive : 2014/35/EU

EN61800-5-1:2007/A11:A2021

Adjustable speed electrical power drive systems

- Part 5-1: Safety requirements - Electrical, thermal and energy.

EMC Directive : 2014/30/EU

EN61800-3:2004/A1:A2012

Adjustable speed electrical power drive systems

- Part 3: EMC requirements and specific test methods.

RoHS Directive : 2011/65/EU

EN IEC 63000:2018

Technical documentation for the assessment of electrical and

electronic products with respect to the restriction of hazardous substances

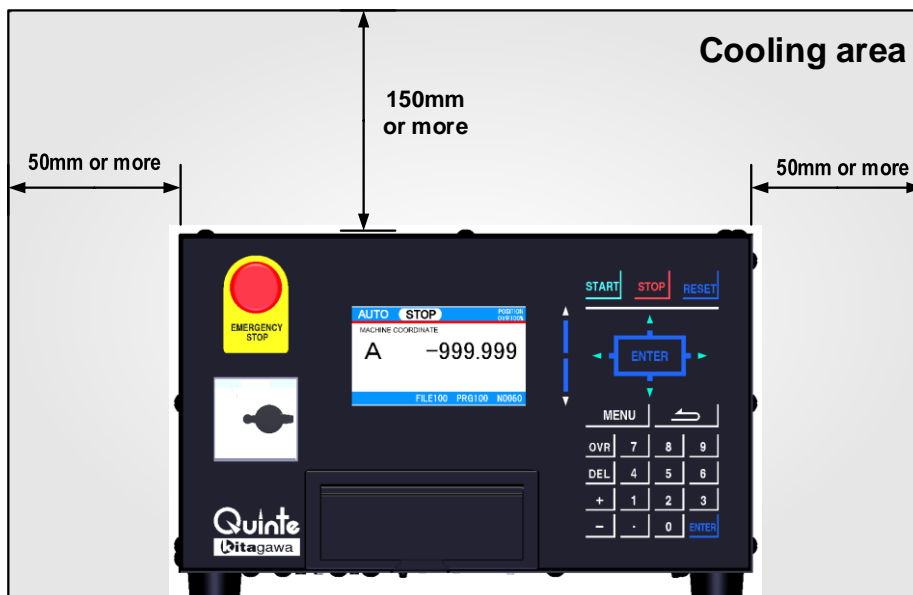
Sellers and users should be aware that this equipment is a commercial electromagnetic wave generator (Class A) intended to use in non-residential areas.

## **4** Installation

**4-1** *Installation*

**4-2** *Power Supply*

## 4-1 Installation



### Controller installation condition

- In order not to block heat radiation and air flow, provide a cooling space equivalent to or more than the specified dimensions. In addition, if heat is trapped around the controller, forcibly flow air.
- Be sure to set the peripheral temperature of the controller below 45°C.  
In addition, in order to ensure long life and high reliability, it is recommended to use at a temperature of 40°C or lower.
- Install under conditions meeting the installation items of “Important warnings related to safety” and the operating environment/physical environment items of the “Specifications.”

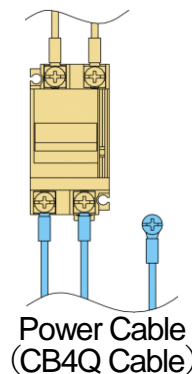
## 4-2 Power Supply

Customers are required to prepare their own circuit breakers. The capacity is as follows

Product	Supply Voltage	Circuit Breaker Capacity	Input voltage
QTC101CS	AC200V~ AC230V	10A	1-phase
QTC201CS		15A	1-phase
QTC300		20A	3-phase

For grounding, Carry out grounding work with the grounding resistance 100Ω or less.

To prevent the malfunction due to the motor high frequency, use the breaker with a sensitivity current of 30mA or more and an operating time of 0.1second or more, or use a breaker with high frequency countermeasures. For the overload protection, if the rated output of the motor exceeds 100% for a certain period of time, overload protection will be activated and alarm SV317 will occur.



- Input voltage must be used within the specification range. (Machine failure or fire may result)
- Be sure to ground the controller to prevent hazardous voltage from being generated in the machine body, operation panel due to the electrical leakage. (Electric shock may result)



---

# **A**      *Basic operation*

---

<b>A1</b>	Basic appearance .....	A1-1
<b>A2</b>	Power on/off.....	A 2-1
<b>A3</b>	Urgent stop/how to cancel .....	A 3-1
<b>A4</b>	How to set origins .....	A 4-1
<b>A5</b>	Manual origin return.....	A 5-1

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# **A1** Basic appearance

**A1-1** QTC101CS Overall appearance

**A1-2** QTC201CS Overall appearance

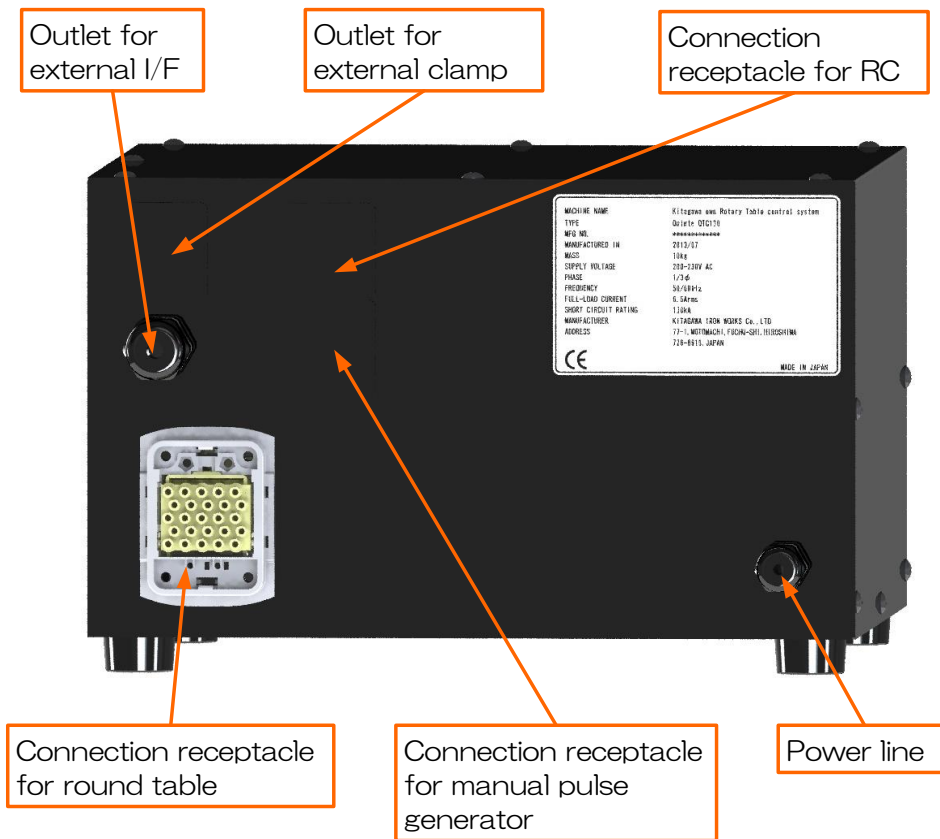
**A1-3** QTC300 Overall appearance

# A1-1 QTC101CS Overall appearance

Front surface



Back surface



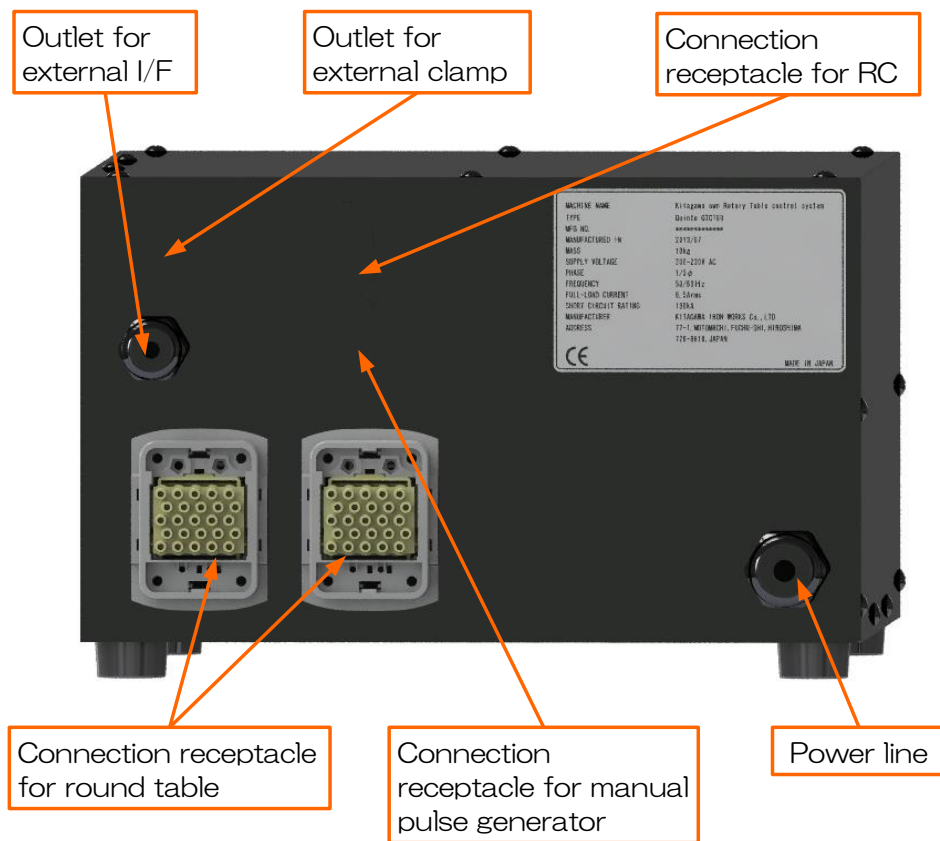
\* The functions of , and are customized, and BASIC functions do not have H/W. And as for the BASIC function, dustproof and waterproof measures are taken for this location with a cap and weather strip seal.

**A1-2** QTC201CS Overall appearance

Front surface



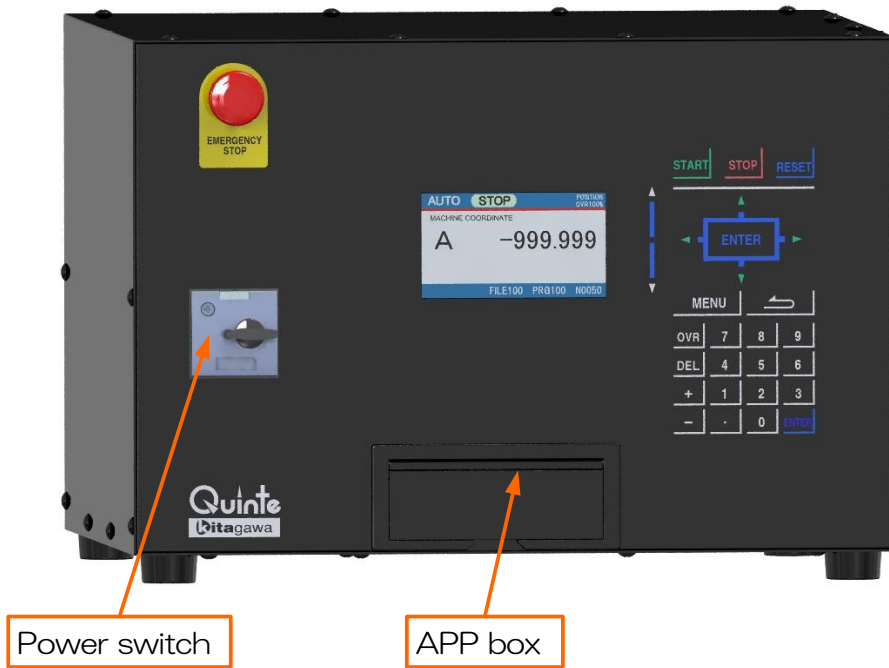
Back surface



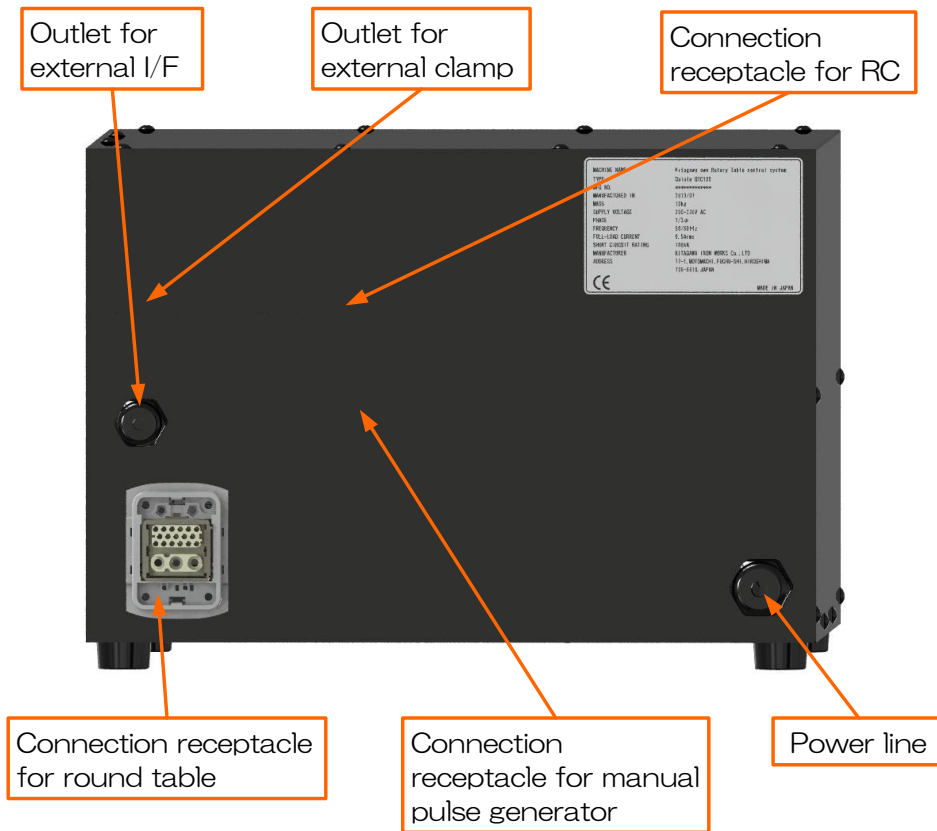
- \* The functions of , and are customized, and BASIC functions do not have H/W. And as for the BASIC function, dustproof and waterproof measures are taken for this location with a cap and weather strip seal.

### A1-3 QTC300 Overall appearance

Front surface



Back surface



\* The functions of , and are customized, and BASIC functions do not have H/W. And as for the BASIC function, dustproof and waterproof measures are taken for this location with a cap and weather strip seal.

## **A2** Power on/off

**A2-1** Flow of power on

**A2-2** Flow of power off

**A2-1** Flow of power on

---



- Do not touch the operation key until the screen normally starts after turning ON the breaker of Quinte when turning on the power.  
(Physical accident, breakdown of machine)
1. Turn on the power (breaker) on the factory side or the mounted machine power (breaker).
  2. Set the breaker of Quinte to the ON position.  
It takes approximately 1 minute 30 seconds until the logo of “Quinte” is displayed after the power is turned on, and it takes approximately another 1 minute while the logo of “Quinte” is displayed. Quinte carries out loading operation for the system during this period.  
When loading etc., are completed, Quinte starts up.  
[The alarm message screen (EM400) appears]
  3. Cancel the emergency stop button.
  4. Press the RESET key.  
[The emergency stop state is cancelled, the alarm disappears.]

## Precaution

- It takes approximately 2 minute 30 seconds of startup time for loading of system program etc., after the power is turned on.
- When the screen does not change from the Quinte logo screen even if 3 minute or longer passes, start up the power again.

**A2-2** Flow of power off

---



- The Emergency stop button is intended to stop all operations of this machine at the time of emergency, also inform sequentially operating machines of emergency stop state and suppress operations. Prepare to press the Emergency stop button reflexively at any time.  
(Physical accident, breakdown of machine)
1. Press the Emergency stop button.  
[All operations of the machine stop]
  2. Set the breaker of Quinte to the OFF position.  
[The power to Quinte is turned off]
  3. Turn off the power (breaker) on the factory side or the mounted machine power.



## **A3** Urgent stop/how to cancel

When the machine must be stopped during manual operation or automatic operation, there are methods to press [Emergency stop], the [RESET] key or the [STOP] key (automatic operation stop).

Because the contents of stop are different from each other depending on what method is taken to stop the machine, sufficiently understand the difference to properly operate.

- A3-1** Urgent stop/how to cancel by the [Emergency stop] button
- A3-2** Urgent stop/how to cancel by the [RESET] key
- A3-3** Urgent stop (automatic operation stop)/how to cancel by the [STOP] key

**A3-1** Urgent stop/how to cancel by the [Emergency stop] button

- Even if the [Emergency stop] button is pressed, operation may not instantaneously stop because the machine movable parts have inertia forces. Be sure to confirm that all operations stopped before approaching movable parts.  
(Caught in machine, cause of physical accident)

## &lt;Urgent stop&gt;

When the [Emergency stop] button is pressed, the machine stops.

## State of machine/control equipment

All operations immediately stop on the spot by servo brake regardless of manual operation or automatic operation.

Quinte is put into an alarm state, and EM400 appears on the alarm message screen.

## &lt;How to cancel&gt;

1. Turn the button part of [Emergency stop] clockwise to cancel.
2. Press the [RESET] key.

[The emergency stop state is cancelled, the alarm disappears]

**A3-2** Urgent stop/how to cancel by the [RESET] key

- Even if operation is stopped by the [RESET] key, sequentially operating machines are not stopped.  
Do not use this if sequential operations of machines are required for stop.  
(Work and tool collide and interfere, resulting in breakdown of machine)

## &lt;Urgent stop&gt;

When the [RESET] key is pressed, the machine stops.

## State of machine/control equipment

Operation of the machine at the time of automatic operation is decelerated and stopped.  
[The program is kept in a block at the time of reset]

## Reset state of control equipment

The status becomes "STOP". If the [RESET] key is pressed continuously, it will be in a RESET state.

<How to cancel>

1. Press the 【RESET】 key.

[The operation moves to the head block of the program.]

### **A3-3** Urgent stop (automatic operation stop)/how to cancel by the 【STOP】 key

---



- Even if operation is stopped by the 【STOP】 key, sequentially operating machines are not stopped.

Do not use this if sequential operations of machines are required for stop.

(Work and tool collide and interfere, resulting in breakdown of machine)

<Urgent stop>

When the 【STOP】 key is pressed, the machine stops.

State of machine / control equipment

Operation of the machine at the time of automatic operation is decelerated and stopped.

The control equipment is in a temporary stop state (HOLD).

<How to cancel>

1. Press the 【START】 (automatic operation stop) key.

[The rest of the program is executed.]

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## **A4** How to set origins

There are a machine origin and a machining origin as origins.

The machine origin is an origin position which the machine uniquely has and is a position which becomes a reference for the machining origin and pitch error correction. However, position of the machine origin can be set at any point.

The machining origin is an origin position which the user arbitrarily sets for machining work and jig, and is a position which becomes a reference for a program operation.

### **A4-1** How to set the machine origin

There are the following cases to set the machine origin.

- Set the machine origin again.
- Alarm "SV220"machine origin position setting request) occurred.  
(The machine origin position is lost, and it is necessary to set a machine origin position)

### **A4-2** How to set the machining origin

There are the following cases to set the machining origin.

- Machining work was changed and it is necessary to set again.
- The machine origin position was changed.

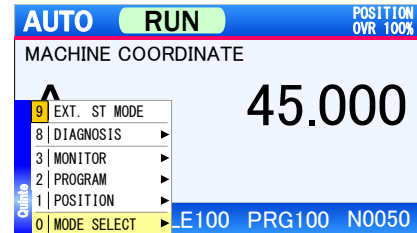
## A4-1 How to set the machine origin



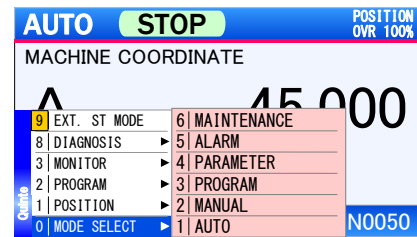
- When the machine origin is set, the previous positional reference is changed. Confirm whether there is interference by program operation. Furthermore, prepare to immediately press the Emergency stop button during a program operation. (Work and tool collide and interfere, resulting in breakdown of machine)

- Press the MENU key.  
[MENU tab appears on the screen]

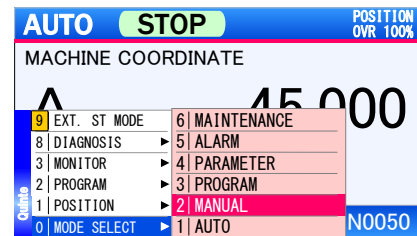
The right figure becomes the screen display of 1 axis specification.



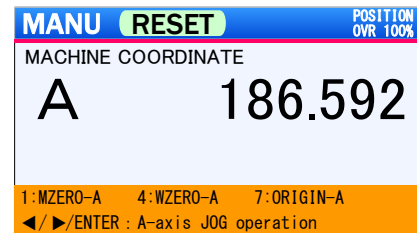
- Select "MODE SELECT" with the and press the key, or press the 0 key.  
[Sub-tab of MENU tab appears]



- Press the with sub-tab and select "MANUAL", then press ENTER, or determine with the 2 key.  
[The operation moves to MANUAL mode screen]

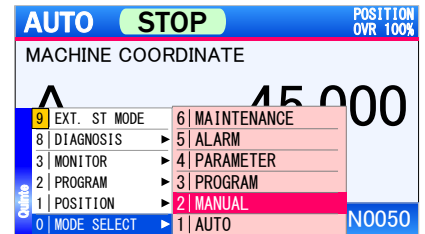


- Move to a position which you want to be the machine origin. Movement of the A-axis, and then carried out in the or the key. Movement of the B-axis, and then carried out in the or the key.



- Press the MENU key.  
[MENU tab appears on the screen]
- Select "MODE SELECT" with the and press the key, or press the 0 key.  
[Sub-tab of MENU tab appears]

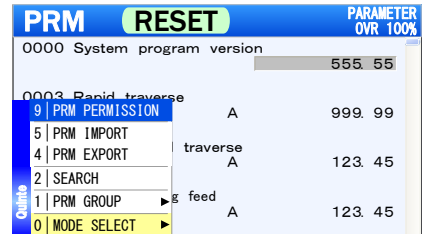
- Press the **▲** with sub-tab and select “PARAMETER,” then press **ENTER** , or determine with the **4** key. [The operation moves to PARAMETER mode screen]



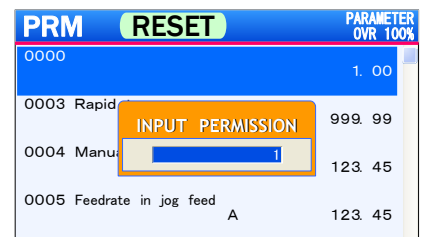
- In order to set parameter writable, press the **MENU** key to display MENU tab.

Select “PRM PERMISSION” with **▲** , **▶** and press **ENTER** , or press the **9** key to determine.

[The operation moves to permission number input popup.]

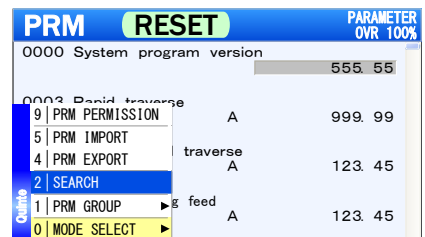


- Enable the input permission in the permission number popup with the **1** and the **ENTER** key.

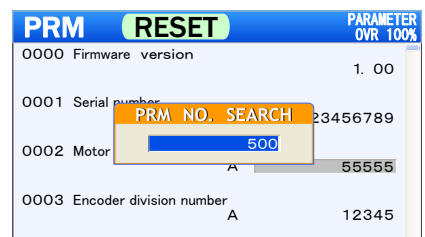


- In order to set a machine origin setting parameter (PRM0500), press the **MENU** key to display MENU tab. Select “SEARCH” with **▲** , **▶** and press **ENTER** , or press the **2** to determine.

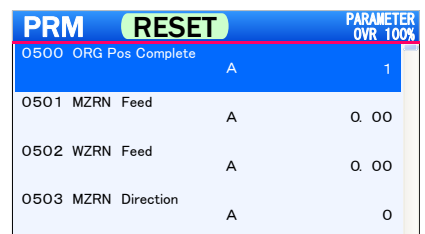
[The operation moves to a PRM500 display screen]



- You can set parameters after calling PRM500, select the axis to perform the mechanical origin setting, pressing the **ENTER** key. In the case of QTC200, choose an axis performing machine origin setting.



- Set “1” for machine origin setting. [See B10-1 How to input parameters]



## A4-2 How to set the machining origin



- When the machining origin is set, the previous positional reference is changed.

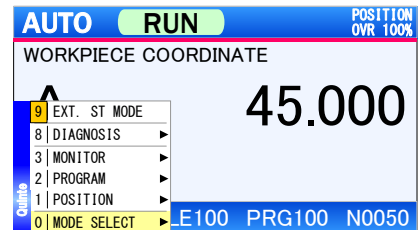
Confirm whether there is interference by program operation.

Furthermore, prepare to immediately press the Emergency stop button during a program operation.

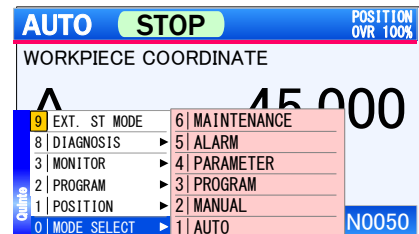
(Work and tool collide and interfere, resulting in breakdown of machine)

- Press the MENU key.  
[MENU tab appears on the screen]

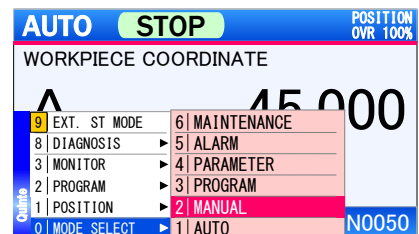
The right figure becomes the screen display of 1 axis specification.



- Select "MODE SELECT" with the ▲ key and press the ► key, or press the 0 key.  
[Sub-tab of MENU tab appears]



- Press the ▲ key with sub-tab and select "MANUAL", then press ENTER, or determine with the 2 key.  
[The operation moves to MANUAL mode screen]



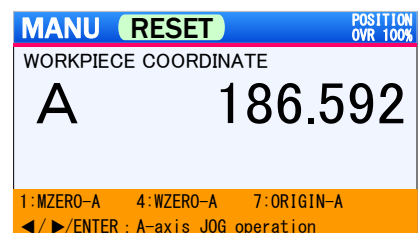
- Display the machining coordinate by the following method.

- MENU ⇒ (1 : POSITION) ⇒ ►  
(2 : WORKPIECE) ⇒ ENTER
- MENU ⇒ 1 ⇒ 2

- Move to a position which you want to be the workpiece origin.

Movement of the A-axis, and then carried out in the ◀ key or the ► key.

Movement of the B-axis, and then carried out in the ◀ key or the ► key.





6. When performing a workpiece origin setting of the A-axis, the 7 key is pressed, workpiece origin setting confirmation popup appears.

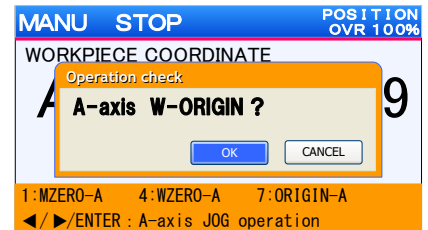
When performing a workpiece origin setting of the B-axis, the 9 key is pressed, workpiece origin setting confirmation popup appears.

When changing the workpiece origin, select "OK" and press ENTER .

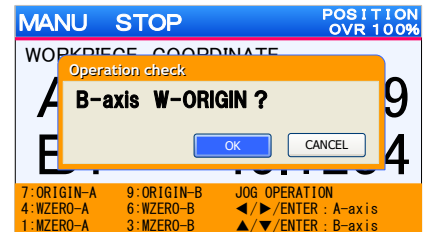
When cancelling, select "Cancel" with ► and press ENTER , then it is cancelled and the popup also closes.

[Machining origin setting confirmation popup screen appears]

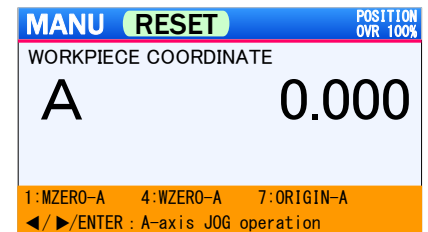
7. When the machining coordinate (WORKPIECE) becomes "0.000," machining origin setting is completed.



1 axis specification



2 axes specification



#### Precaution

- Workpiece origin cannot be set in other than the workpiece coordinate. In addition, the indication of "7: ORIGIN-A" and "9: ORIGIN-B" is grayed out and cannot be selected.
- When Return is pressed with the workpiece origin setting confirmation popup window displayed, the popup window is closed (Operates in the same manner as Cancel).

No text on this page

## **A5** Manual origin return

Procedures of each origin return in "MANUAL" are described.

**A5-1** Procedures of machine origin return by manual operation

**A5-2** Procedures of machining origin return by manual operation

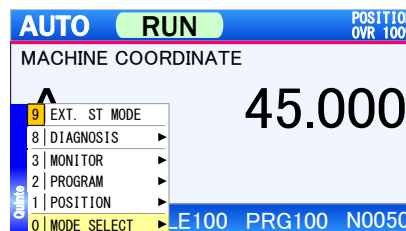
# A5-1 Procedures of machine origin return by manual operation



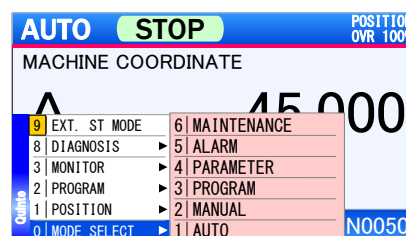
- Confirm whether there is interference by motion.  
In addition, prepare to immediately press the Emergency stop button during a machine origin return operation.  
(Work and tool collide and interfere, resulting in breakdown of machine)

- Press the MENU key.  
[MENU tab appears on the screen]

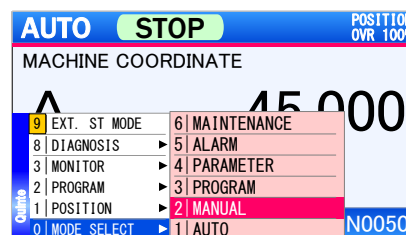
The right figure becomes the screen display of 1 axis specification.



- Select "MODE SELECT" with the [right arrow] key, or press the 0 key.  
[Sub-tab of MENU tab appears]



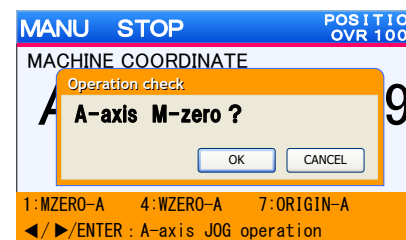
- Press the [right arrow] with sub-tab and select "MANUAL", then press ENTER, or determine with the 2 key.  
[The operation moves to MANUAL mode screen]



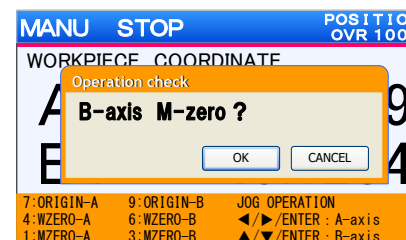
- In the machine-zero return of A axis, a push on the 1 key will display check pop-up.  
And in the machine-zero return of B axis, a push on the 3 key will display check pop-up.  
Select "OK" and press ENTER at the time of machine origin return.

When cancelling, select "Cancel" with [right arrow] and press ENTER, then it is cancelled and the popup also closes.

[Machine origin return confirmation popup screen appears]



axis specification



2 axes specification

### Precaution

- When Return is pressed with the origin return confirmation popup window displayed, the popup window is closed (Operates in the same manner as cancel).

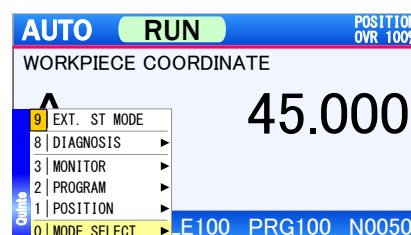
## A5-2 Procedures of machining origin return by manual operation



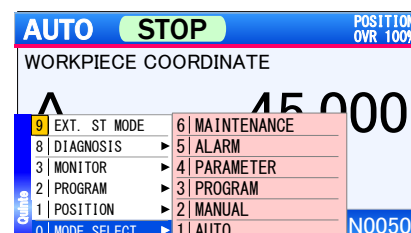
- Confirm whether there is interference by motion.  
In addition, prepare to immediately press the Emergency stop button during the workpiece origin return operation.  
(Work and tool collide and interfere, resulting in breakdown of machine)

- Press the MENU key.  
[MENU tab appears on the screen]

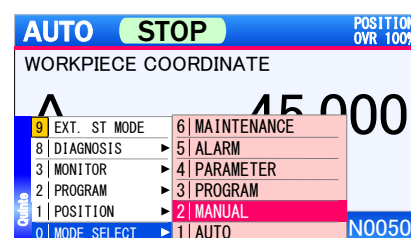
The right figure becomes the screen display of 1 axis specification.



- Select "MODE SELECT" with the and press the key, or press the 0 key.  
[Sub-tab of MENU tab appears]



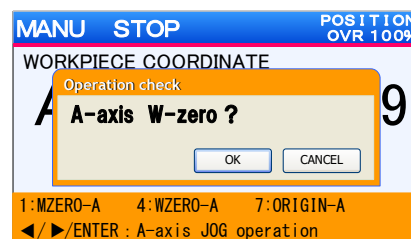
- Press the with sub-tab and select "MANUAL", then press ENTER, or determine with the 2 key.  
[The operation moves to MANUAL mode screen]



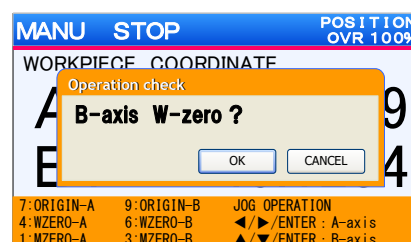
- In the workpiece-zero return of A axis, a push on the 4 key will display check pop-up.  
And in the workpiece-zero return of B axis, a push on the 6 key will display check pop-up.  
Select "OK" and press ENTER at the time of workpiece origin return.

When cancelling, select "Cancel" with and press ENTER, then it is cancelled and the popup also closes.

[workpiece origin return confirmation popup screen appears]



axis specification



2 axes specification

### Precaution

- When Return is pressed with the origin return confirmation popup window displayed, the popup window is closed (Operates in the same manner as Cancel).

No text on this page.

# **B**      *Detailed description*

<b>B1</b>	Appearance .....	B1-1
<b>B2</b>	Panel operation.....	B2-1
<b>B3</b>	Function key and display screen.....	B3-1
<b>B4</b>	Outline of file/program.....	B4-1
<b>B5</b>	File operation/editing.....	B5-1
<b>B6</b>	Program operation.....	B6-1
<b>B7</b>	Program edit .....	B7-1
<b>B8</b>	G function.....	B8-1
<b>B9</b>	M function .....	B9-1
<b>B10</b>	External program selection.....	B10-1
<b>B11</b>	Program input example .....	B11-1
<b>B12</b>	Pitch error correction function.....	B12-1
<b>B13</b>	Remote Control Function .....	B13-1
<b>B14</b>	Selection of clamping operation in manual mode .....	B14-1
<b>B15</b>	Control of motor with brake .....	B15-1
<b>B16</b>	External Mode Selecting Function .....	B16-1
<b>BOP1</b>	MOP(Manual Operation Pendant).....	BOP1-1

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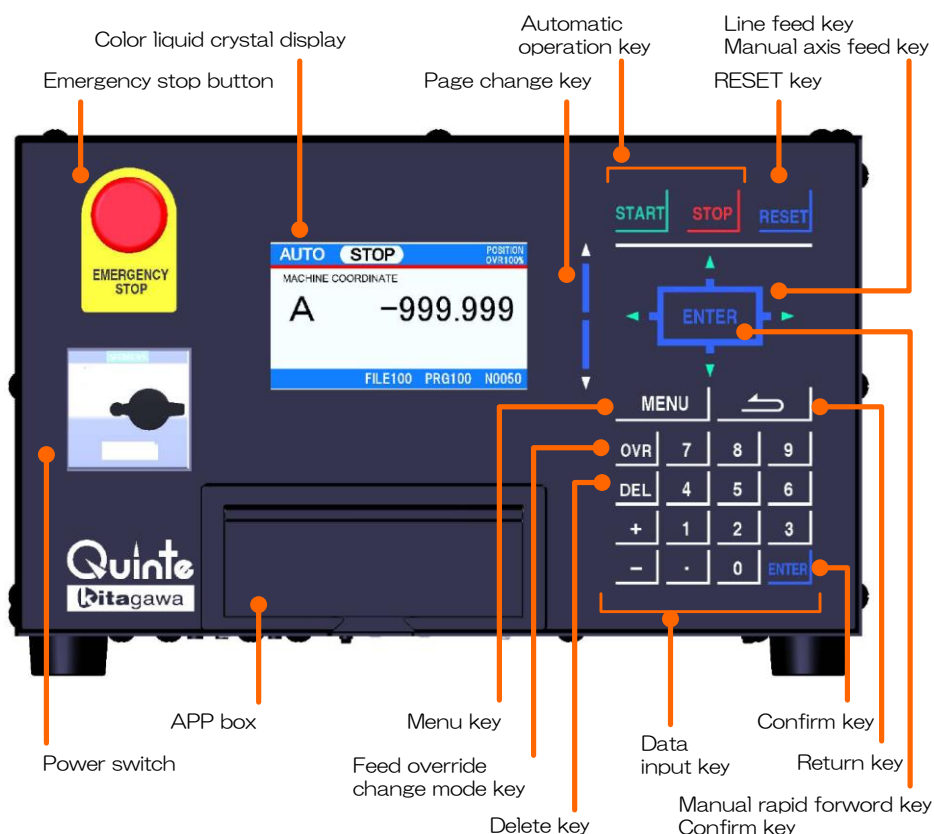


# **B1** Appearance

## **B1-1** Appearance of Quinte

**B1-1** Appearance of Quinte

Front surface

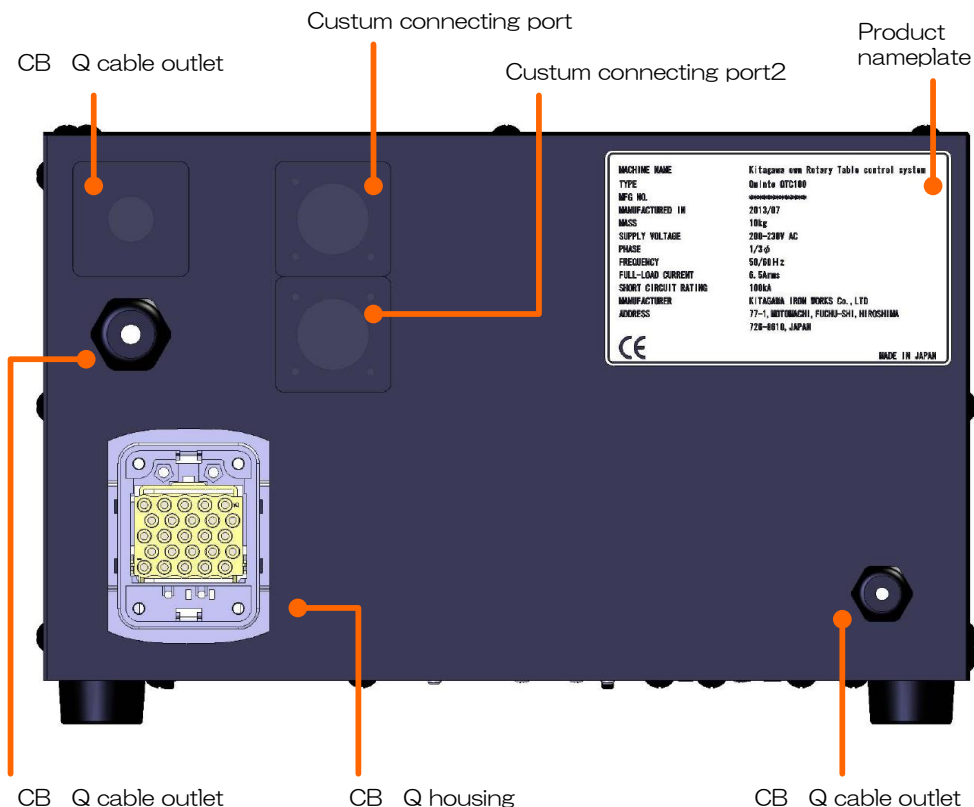


No.	Unit	Reference
	Emergency stop button	“ rgent stop/how to cancel by the Emergency stop button (Page A3-1)
	Power switch	“Power switch” (Page B2-2)
	Color liquid crystal display	
	APP box	“Battery replacement” (Page F1)
	Automatic operation key	“Automatic operation key” (Page B2-5)
	RESET key	“R eset (R ESET) key” (Page B2)
	Cursor movement key	“L ine feed key” (Page B2)
	Manual axis feed key	“Manual axis feed key” (Page B2-5)
	Manual rapid forward key	“R apid forward operation” (Page B26)
	Confirm key	“Confirm (E TER ) key” (Page B2)
	Confirm key	“Confirm (E TER ) key” (Page B2)
	Page operation key	“Page operation key” (Page B2-8)
	Menu key	“Mode select key” (Page B2-4)
	Return key	“R eturn (R ET R ) key” (Page B2)
	Feed override change mode key	“Feed override change mode key” (Page B2-7)
	OT release mode key	“O T release mode key” (Page B27)
	Numeric character key	“ umeric character key”(Page B2-8)
	Delete key	“D elete (D EL ) key” (Page B2)

Notes

- The above description is described in QTC100 , but it is the same key arrangement in all models .

Back surface 1 axis spec.

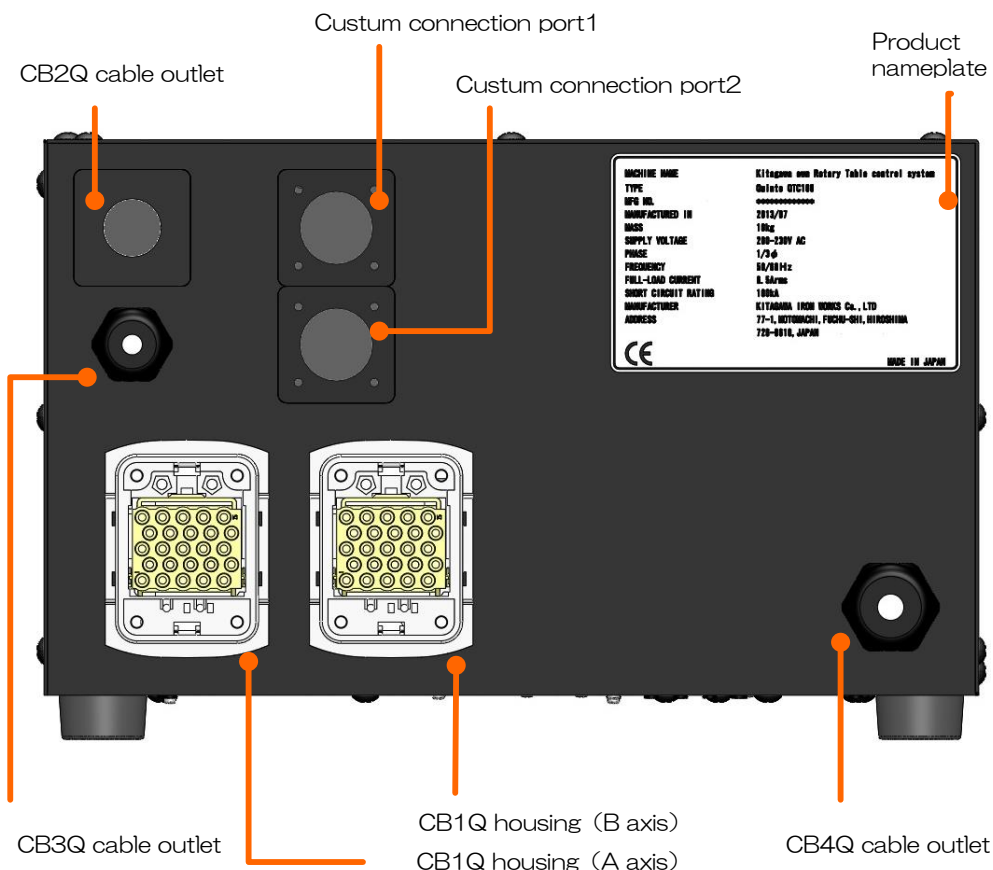


No.	Unit	Reference
	CB1Q housing	
	CB2Q cable outlet	
	CB3Q cable outlet	
	CB4Q cable outlet	
	Product nameplate	
	Custom connecting port 1	
	Custom connecting port 2	

Precaution

- Liquid crystal display may have a small number of normally lighting/non-lighting dots which occur in the manufacturing process and unevenness of color and brightness which occur depending on viewing angle, however, these are not a failure.
- When the custom port is not used, No. , and on the back surface are plugged with caps or plates.  
Caps and plates are displayed to be transparent on the above back view.

Back surface 2 axes spec.



No.	Unit	Reference
	CB1Q housing (A axis)	
	CB1Q housing (B axis)	
	CB2Q cable outlet	
	CB3Q cable outlet	
	CB4Q cable outlet	
	Product nameplate	
	Custom connecting port 1	
	Custom connecting port 2	

Precaution

- Liquid crystal display may have a small number of normally lighting/non-lighting dots which occur in the manufacturing process and unevenness of color and brightness which occur depending on viewing angle, however, these are not a failure.
- When the custom port is not used, No. , and on the back surface are plugged with caps or plates.  
Caps and plates are displayed to be transparent on the above back view.

## **B10** External program selection

This section describes how to select a program from the outside.

For how to select an external program, there are the following types.

Binary mode call (Program No. 001 to Maximum program No. 031) ※

M signal mode call (Program No. 001 to Maximum program No. 999)

※ Maximum number of calls depends on connected wiring.

In addition, when external program selection is used, full I/F cable (CB3Q) is required.

**B10-1** Binary mode call

**B10-2** M signal mode call

**B10-1** Binary mode call

Binary mode call means a function which recognizes a signal allotted to a general-purpose signal as a binary number and calls a program number corresponding to the number of inputs. Program to be selected for external program selection is limited to program of the presently called file. As a call condition, selection call is allowed only when the status is 『STOP』 and 『RESET』 in AUTO mode.

**B10-1-1** Parameter allotment

In order to call a binary mode, it is necessary to allot a binary bit and program set to a general-purpose input.

Parameters are described below.

Parameters described below are ones to which binary bits and a program set can be allotted. Use the required number of input signals, BLKFIN or one output signal according to the customer's specifications.

〔Allocable input signal〕 ····Required number

General-purpose input signal 1	PRM1100	General-purpose input signal 4	PRM1103
General-purpose input signal 2	PRM1101	General-purpose input signal 5	PRM1104
General-purpose input signal 3	PRM1102	General-purpose input signal 6	PRM1105

〔Output signal allotment〕 ····Please set to one of the general-purpose output signal.

General-purpose output signal 1	PRM1106	General-purpose output signal 4	PRM1109
General-purpose output signal 2	PRM1107	General-purpose output signal 5	PRM1110
General-purpose output signal 3	PRM1108	General-purpose output signal 6	PRM1111

And, binary mode call is allowed for each parameter by the following allotments.

〔Allocable input signal〕

Set value : 5	External program selection 1 〔PRGSEL1〕 This becomes a signal corresponding to binary bit 0 (B0).
Set value : 6	External program selection 2 〔PRGSEL2〕 This becomes a signal corresponding to binary bit 1 (B1).
Set value : 7	External program selection 3 〔PRGSEL3〕 This becomes a signal corresponding to binary bit 2 (B2).
Set value : 8	External program selection 4 〔PRGSEL4〕 This becomes a signal corresponding to binary bit 3 (B3).
Set value : 9	External program selection 5 〔PRGSEL5〕 This becomes a signal corresponding to binary bit 4 (B4).
Set value : 10	External program set 〔PRGSET〕 Calls program number selected by binary bit.

〔Allocable output signal〕

Set value : 22

External program selection finish 〔PRGFIN〕

Turns ON when external program selection is completed.

**B10-1-2** Binary table

Because external program selection can be set at a maximum 5 bits, PRG No.1 to No.31 in the Binary table can be selected. And because external program number output can be set at a maximum 6 bits, PRG No1 to 63 can be output.

※ ●mark indicates input state (ON).

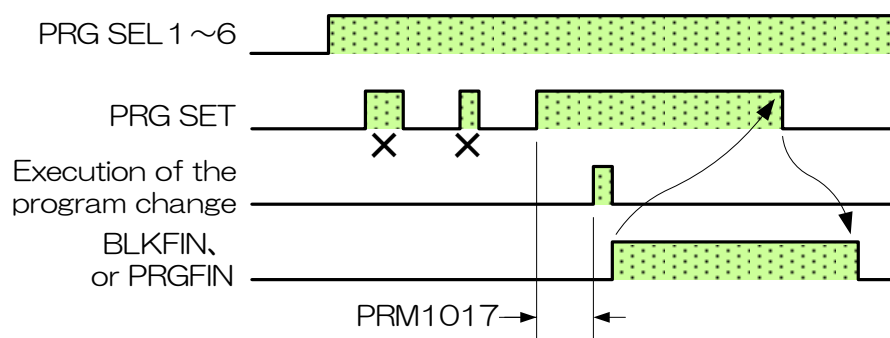
PRG NO.	B4	B3	B2	B1	B0
	16	8	4	2	1
1	—	—	—	—	●
2	—	—	—	●	—
3	—	—	—	●	●
4	—	—	●	—	—
5	—	—	●	—	●
6	—	—	●	●	—
7	—	—	●	●	●
8	—	●	—	—	—
9	—	●	—	—	●
10	—	●	—	●	—
11	—	●	—	●	●
12	—	●	●	—	—
13	—	●	●	—	●
14	—	●	●	●	—
15	—	●	●	●	●
16	●	—	—	—	—
17	●	—	—	—	●
18	●	—	—	●	—
19	●	—	—	●	●
20	●	—	●	—	—
21	●	—	●	—	●
22	●	—	●	●	—
23	●	—	●	●	●
24	●	●	—	—	—
25	●	●	—	—	●
26	●	●	—	●	—
27	●	●	●	—	—
28	●	●	●	—	●
29	●	●	●	●	—
30	●	●	●	—	●
31	●	●	●	●	●

PRG NO.	B5	B4	B3	B2	B1	B0
	32	16	8	4	2	1
32	●	—	—	—	—	—
33	●	—	—	—	—	●
34	●	—	—	—	●	—
35	●	—	—	—	●	●
36	●	—	—	●	—	—
37	●	—	—	●	—	●
38	●	—	—	●	●	—
39	●	—	—	●	●	●
40	●	—	●	—	—	—
41	●	—	●	—	—	●
42	●	—	●	—	●	—
43	●	—	●	—	●	●
44	●	—	●	●	—	—
45	●	—	●	●	—	●
46	●	—	●	●	●	—
47	●	—	●	●	●	●
48	●	●	—	—	—	—
49	●	●	—	—	—	●
50	●	●	—	—	●	—
51	●	●	—	—	●	●
52	●	●	—	●	—	—
53	●	●	—	●	—	●
54	●	●	—	●	●	—
55	●	●	—	●	●	●
56	●	●	●	—	—	—
57	●	●	●	—	—	●
58	●	●	●	—	●	—
59	●	●	●	—	●	●
60	●	●	●	●	—	—
61	●	●	●	●	—	●
62	●	●	●	●	●	—
63	●	●	●	●	●	●

**B10-1-3** Timing

Operation to change program by external input is described below.

- ① Call program number is determined by input of PRGSEL\*signal.
- ② Startup of PRGSET signal becomes a trigger and program call is started and executed.
- ③ BLKFIN signal or PRGFIN signal is output after completion of program change.  
(If PRGFIN (external program selection completion) is allotted to a general-purpose output, BLKFIN is not output)
- ④ Shutdown of PRGSET signal becomes a trigger, and BLKFIN signal or PRGFIN signal is turned OFF.



## [Precaution]

- Input signal of PRGSET shorter than a time of PRM1017 (input signal establishing time setting timer) becomes ineffective.



**B10-2** M signal mode call

M signal mode call is a function to call a program number according to the content of the M signal call assigned to each general-purpose input.

The number is added/subtracted one by one, added/subtracted ten by ten, and returns to the program number 001, depending on each input signal. A program is selected by combination of these.

When external channel is selected by M signal mode, PRG001 to PRG999 which is the maximum of expanded channel setting can be selected.

Program to be selected for external program selection is limited to program of the file presently called. And as call conditions, selection call is allowed only when the status is 『STOP』 and 『RESET』 in AUTO mode.

There are some restraint conditions listed below for program call by M signal mode.

Program call which is not less than PRG999 is ineffective.

Program call which is not more than PRG001 is ineffective.

Program number begins PRG001, is a continuous program number.

**B10-2-1** Parameter assignment

In order to perform M signal mode call, it is required to assign a call signal to the following general-purpose input, and to assign a selection completion signal to general-purpose output (Optionally to general-purpose output).

〔Allocable input signal〕

General-purpose input signal 1	PRM1100	General-purpose input signal 4	PRM1103
General-purpose input signal 2	PRM1101	General-purpose input signal 5	PRM1104
General-purpose input signal 3	PRM1102	General-purpose input signal 6	PRM1105

〔Output signal allotment〕 . . . . Please set to one of the general-purpose output signal.

General-purpose output signal 1	PRM1106	General-purpose output signal 4	PRM1109
General-purpose output signal 2	PRM1107	General-purpose output signal 5	PRM1110
General-purpose output signal 3	PRM1108	General-purpose output signal 6	PRM1111

M signal mode call is allowed by allotting parameters to each general-purpose input/output.

〔Allocable input signal〕

Set value : 11	External program selection clear	〔PRGCLEAR〕
	Calls program 001.	
Set value : 12	External program selection +1	〔PRGSEL+1〕
	Calls the presently called program number +1.	
Set value : 13	Set value: 12 External program selection -1	〔PRGSEL-1〕
	Calls the presently called program number -1.	

Set value : 14 External program selection +10 [PRGSEL+10]

Calls the presently called program number + 10.

Set value : 15 External program selection -10 [PRGSEL-10]

Calls the presently called program number - 10.

[Allocable output signal]

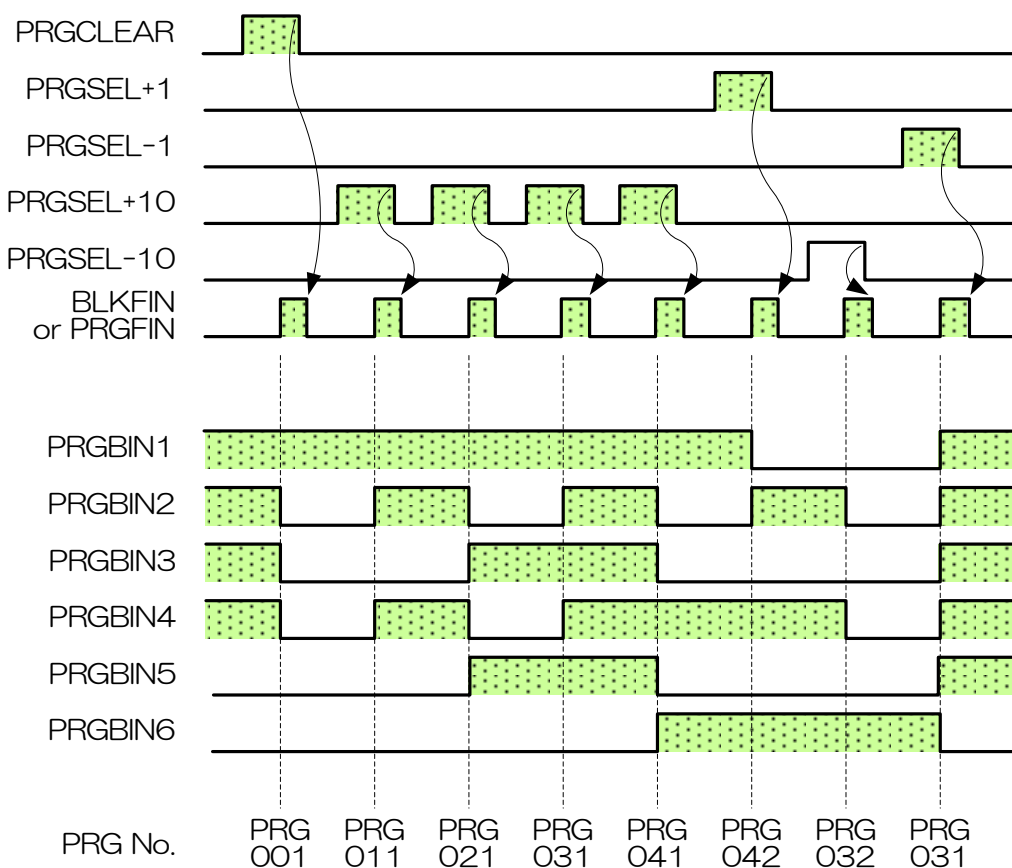
Set value : 22 External program selection complete

Turns ON when external program selection is completed.

**B10-2-2** Timing

Motion for change in programs by external input is described below.

- ① Program call increase /decrease amount is determined by input of PRGSEL\*\*signal, startup of PRGSEL\*\*signal becomes a trigger and program call is started and executed.
- ② BLKFIN signal or PRGFIN signal is output after completion of program change. (If PRGFIN (external program selection completion) is allotted to a general-purpose output, BLKFIN is not output)
- ③ Shutdown of PRGSET signal becomes a trigger, and BLKFIN signal or PRGFIN signal is turned OFF.



## **B11** Program input example

This section describes a procedure to input programs.

**B11-1** Program example

**B11-2** Program input example

**B11-1** Program example

---

```
PRG001
N0000 G90 A270.000 B90.000 F0.000
N0001 A-180.000 B-45.000 F5.000
N0002 G91 A-90.000 B-45.000 M30
```

Declares an absolute command, which is an angle command from the machining origin.

(G90)

Move clockwise to the angle position of 270 ° from the processing origin of the A-axis.

(A270.000)

And move clockwise to the angle position of 90 ° from the processing origin of the B-axis.

(B90.000)

Rotating speed is rapid feed speed. (F0.000)

Rotates counterclockwise to an angle position of 180° from the machining origin of the A-axis. (A-180.000)

And rotates counterclockwise to an angle position of 45° from the machining origin of the B-axis. (B-45.000)

Commands 5min<sup>-1</sup> as a rotating speed. (F5.000)

Declares an incremental command, which is a relative command from the present position.

(G91)

Rotates counterclockwise to an angle position of 90° from the machining origin of the A-axis. (A-90.000)

And rotates counterclockwise to an angle position of 45° from the machining origin of the B-axis. (B-45.000)

Returns to N0000 block after program end. (M30)

Because there is no G code command in N0001 block, G90 (absolute command) of N0000 which is modal information continues as modal information.

If there is no rotating speed command as in N0002, the rotating speed commanded in the block before N0002 continues as modal information.

**B11-2** Program input example

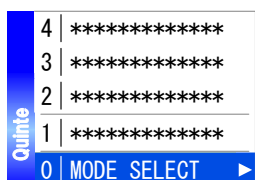
Input procedures for the above program example are shown below.

Also, there are "cursor input method" and "direct entry system" in the selection method of the MENU tab.

The following "program input example", I described in "direct input method".

1) Select a program mode.

◆ Program mode selection

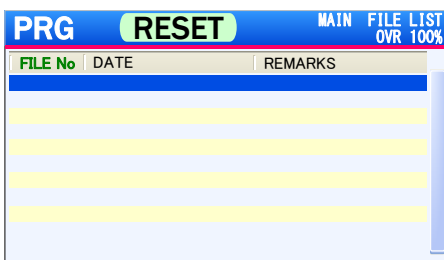


[ "Menu" tab indication ]

- Press the MENU key.
- Press the 0 (MODE SELECT) key
- Press the 3 (PROGRAM) key

2) Create a new file.

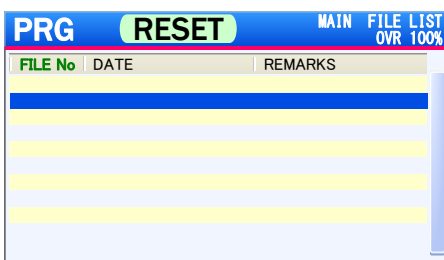
◆ File list selection



[ File list indication ]

- Press the MENU key.
- Press the 2 (FILE LIST) key.

◆ Create a new file.



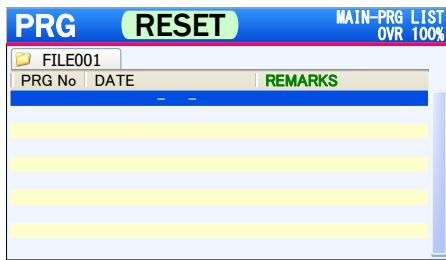
[New File Creation Item Selection]

- Press the MENU key.
- Press the 2 (OPERATION) key
- Press the 4 (NEW) key.

※ A new file has been created by this operation. File number is basically the last number, however, if files have been created up to 999, they are created in a smaller empty number order.

3) Create a new program.

◆ Program list selection

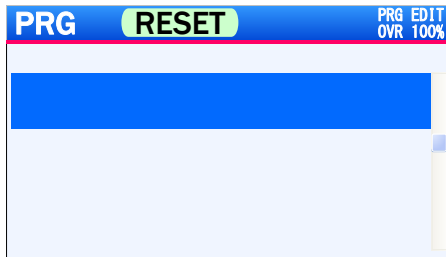


[Program list indication]

- Move the cursor to file number to be edited with  $\leftarrow$ ,  $\rightarrow$ , and press ENTER . (Hereinafter, described in FILE001)

4) Edit a program.

◆ Program editing selection



[ Program content indication ]

- Press ENTER with the cursor being at PRG001. (The cursor selects N0000 (state of no program)).

◆ Program block editing selection



[ Program block editing editor indication ]

- Press ENTER with the cursor being at N0000.

◆ Program editing

[ G90 ]

- Set the cursor to the address G with  $\leftarrow$ ,  $\rightarrow$ ,  $\leftarrow$ ,  $\rightarrow$ . Input 9, 0 and press ENTER .

[ A270.000 ]

- Set the cursor to the address A with  $\leftarrow$ ,  $\rightarrow$ ,  $\leftarrow$ ,  $\rightarrow$ . Input 2, 7, 0 and press ENTER .

[ B90.000 ]

- Set the cursor to the address B with  $\leftarrow$ ,  $\rightarrow$ ,  $\leftarrow$ ,  $\rightarrow$ . Input 9, 0 and press ENTER .

[ F0.000 ]

- Set the cursor to the address F with  $\leftarrow$ ,  $\rightarrow$ ,  $\leftarrow$ ,  $\rightarrow$ . Input 0 and press ENTER .

- [Block registration & program content indication]
- [Next block (N0001) selection]
- [A-180.000]
- [B-45.000]
- [F5.000]
- [Block registration & program content indication]
- [Next block (N0002) selection]
- [G91]
- [A-90.000]
- [B-45.000]
- [M30]
- ❑ Set the cursor to the Alter with ▲ ,  
 , ◀ , ▶ , and press ENTER .
  - ❑ On the screen which displays the contents of  
the program, the ENTER key is pressed,  
after chosen with .
  - ❑ Set the cursor to the address A with  
 , ◀ , ▶ .  
Input - , 1 , 8 , 0 and press  
ENTER .
  - ❑ Set the cursor to the address B with  
 , ◀ , ▶ .  
Input - , 4 , 5 and press ENTER .
  - ❑ Set the cursor to the address F with  
 , ◀ , ▶ .  
Input 5 and press ENTER .
  - ❑ Set the cursor to the Alter with  
 , ◀ , ▶ , and press ENTER .
  - ❑ On the screen which displays the contents of  
the program, the ENTER key is pressed,  
after chosen with .
  - ❑ Set the cursor to the address G with  
 , ◀ , ▶ .  
Input 9 , 1 and press ENTER .
  - ❑ Set the cursor to the address A with  
 , ◀ , ▶ .  
Input - , 9 , 0 and press ENTER .
  - ❑ Set the cursor to the address B with  
 , ◀ , ▶ .  
Input - , 4 , 5 and press ENTER .
  - ❑ Set the cursor to the address M with  
 , ◀ , ▶ .  
Input 3 , 0 and press ENTER .

[Block registration &  
program content indication]

◆ Program save

- ❑ Set the cursor to the Alter with ▲ ,  
◀ , ▶ , and press ENTER .
- ❑ Program is overwritten and saved by  
pressing MENU and pressing 7  
(SAVE).



## **B12** Pitch error correction function

### Precaution

- Pitch error correction is a function to correct the indexing accuracy of the rotary table body (not including jig), and not to correct indexing accuracy of jig and work attached to the rotary table. Please properly use the function of pitch error correction. Additionally, correction in consideration of other than the rotarytable body cannot be guaranteed.

### **B12-1** Outline

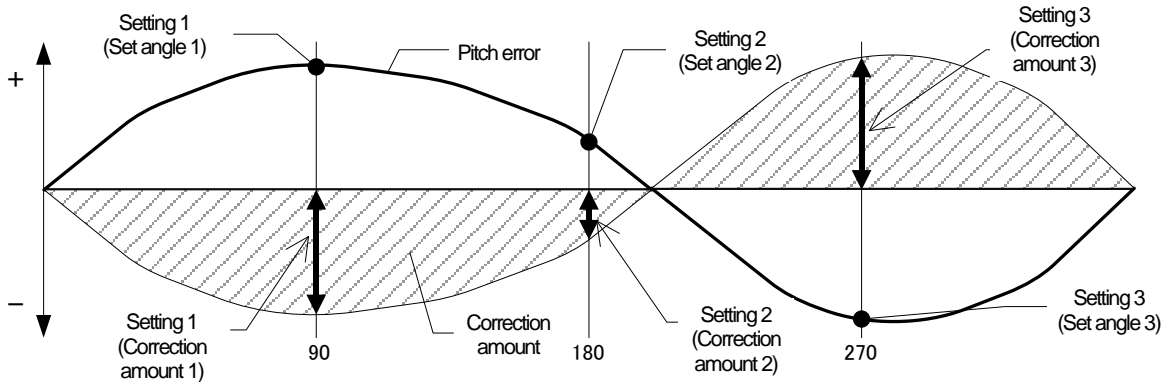
### **B12-2** Parameter

### **B12-3** Pitch error correction setting example

## B12-1 Outline

Pitch error correction allows enhancing the indexing accuracy by correcting mechanical variation of the rotary table, and pitch error correction of 62 points can be set by the parameters. It can be set at a correction amount of 0.0001 deg units with reference to the machine origin.

In addition, correction value which is linearly calculated from the set correction amount is reflected between the specified correction angles next to each other.



## B12-2 Parameter

Pitch error correction is set with parameters consisting of a set of “Correction set angle” and “Correction set amount.” The even-numbered parameters of PRM2000 to PRM2123 are allotted to “Correction set angle” and the odd-numbered parameters are allotted to “Correction set amount.” In addition, the even-numbered and even-numbered +1 (odd numbered) become one set and allows setting a pitch error correction of 62 points.

Pitch error correction configuration parameter

PRM No.	PRM name	Set range
0013	Pitch error correction control	0: Ineffective/1: Effective
2000	Set value 1 (Set angle 1)	0 to 359 deg
2001	(Correction amount 1)	±0.1000 deg
2002	Set value 2 (Set angle 2)	0 to 359 deg
2003	(Correction amount 2)	±0.1000 deg
2004	Set value 3 (Set angle 3)	0 to 359 deg
2005	(Correction amount 3)	±0.1000 deg
∫	∫	∫
2122	Set value 62 (Set angle 62)	0 to 359 deg
2123	(Correction amount 62)	±0.1000 deg

Correction amount is calculated from the correction amount set to the smallest angle between an angle of the smallest set angle and 0.0000 deg. Furthermore, correction amount is calculated from the correction amount set to the largest angle between an angle of the largest set angle and 360.0000 deg.

**B12-2-1** Parameter automatic sort function

The set angle for pitch error correction, even if set to an empty set number, is automatically sorted in a pair of “Correction set angle” and “Correction set amount” in the set angle smaller order.

However, set angle “0” is not a set angle and considered not to be a minimum angle.

If the already set angle parameter is changed to “0”, the “correction set amount” also becomes “0.000” and nothing is set at the time of automatic sort.

## Parameter automatic sort example

## ● Immediately after inputting parameter

PRM No.	PRM name	Set value
2000	Setting 1 (Set angle 1)	90
2001	(Correction amount 1)	0.0050
2002	Setting 2 (Set angle 2)	100 → 45
2003	(Correction amount 2)	0.0020
2004	Setting 3 (Set angle 3)	270
2005	(Correction amount 3)	-0.0050
2006	Setting 4 (Set angle 4)	135 → 0
2007	(Correction amount 4)	-0.0030
2008	Setting 5 (Set angle 5)	180
2009	(Correction amount 5)	-0.0020



## ● Parameter after automatic sort

PRM No.	PRM name	Set value
2000	Setting 1 (Set angle 1)	45
2001	(Correction amount 1)	0.0020
2002	Setting 2 (Set angle 2)	90
2003	(Correction amount 2)	0.0050
2004	Setting 3 (Set angle 3)	180
2005	(Correction amount 3)	-0.0020
2006	Setting 4 (Set angle 4)	270
2007	(Correction amount 4)	-0.0050

**B12-2-2** Precautions when changing parameter

- ◆ For a “set angle” of an even-numbered parameter of PRM2000 to 2122, duplicated angle cannot be set. When parameter setting is duplicated, an alarm of “OP000: Out of parameter setting range” occurs.
- ◆ In order to set the machine origin position (0.0000) to correction amount 0 as a reference position, “0” as a set angle cannot be set to “set angle” which is an even-numbered parameter of PRM 2000 to 2122. If 0 is set, the set angle is processed to be non-setting.

**B12-2-3** Parameter setting procedure

Procedure to set pitch error correction is described below.

1. Index the rotary table to the machine origin position.
2. Confirm that PRM0013 (pitch error correction control) is "0" (ineffective). If it is "1" (effective), change it to "0."
3. Set any value to "set angle" and "deviation amount" of PRM 2000 to 2122.
4. Turn on power again as an alarm of "SY100: POWER OFF ALARM" occurs.

When the change of the item 3 is made, the alarm of "SY100" always occurs. If there are some set angles, return to PARAMETER mode before turning on power again and input the remaining set angles.

5. Set PRM0013 to "1" after turning on power again.

## 【Precautions】

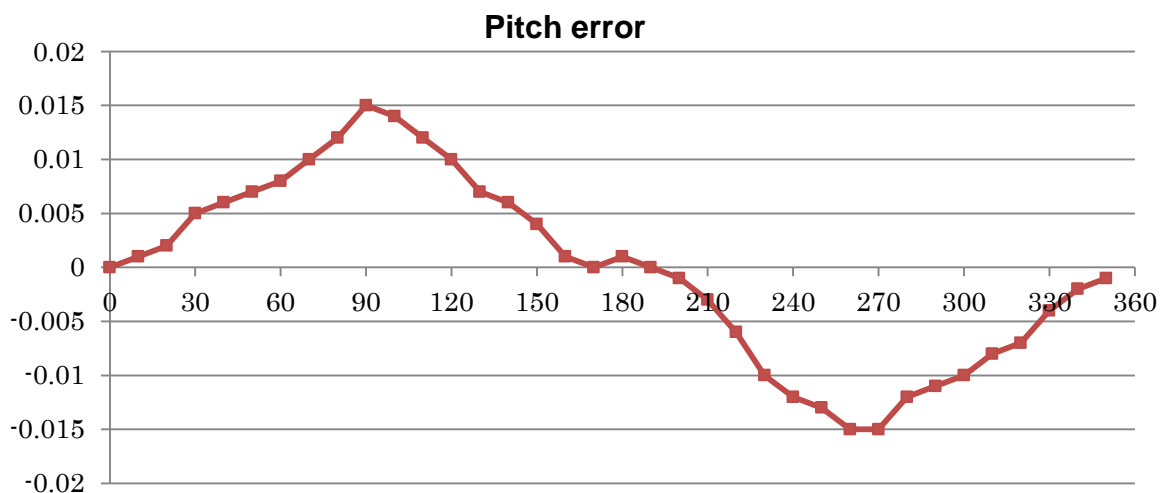
In the case of PRM0013 = 0, parameters of pitch error correction can be set.

**B12-3** Pitch error correction setting example

The following shows measured pitch errors and examples when pitch error corrections are set for the measured pitch errors.

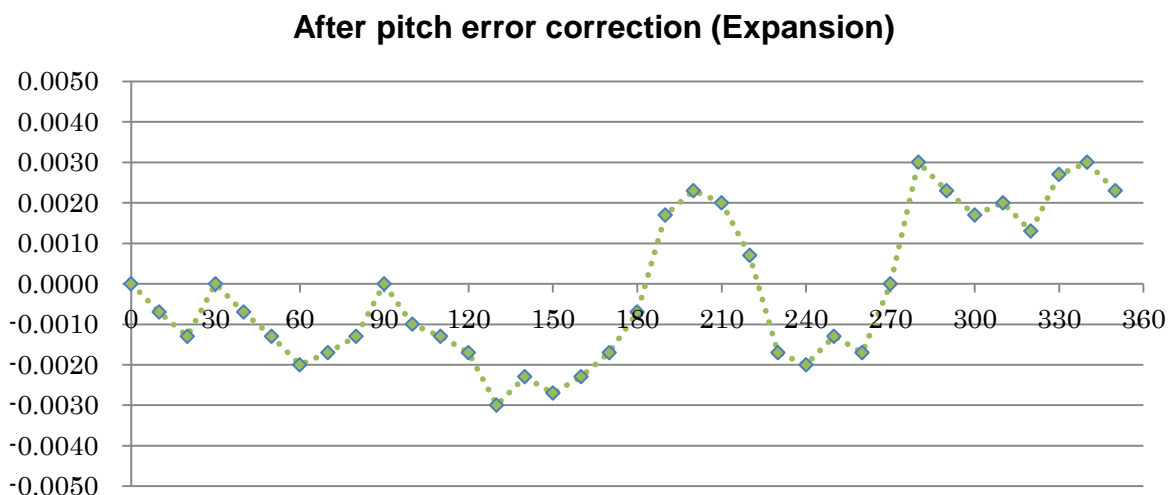
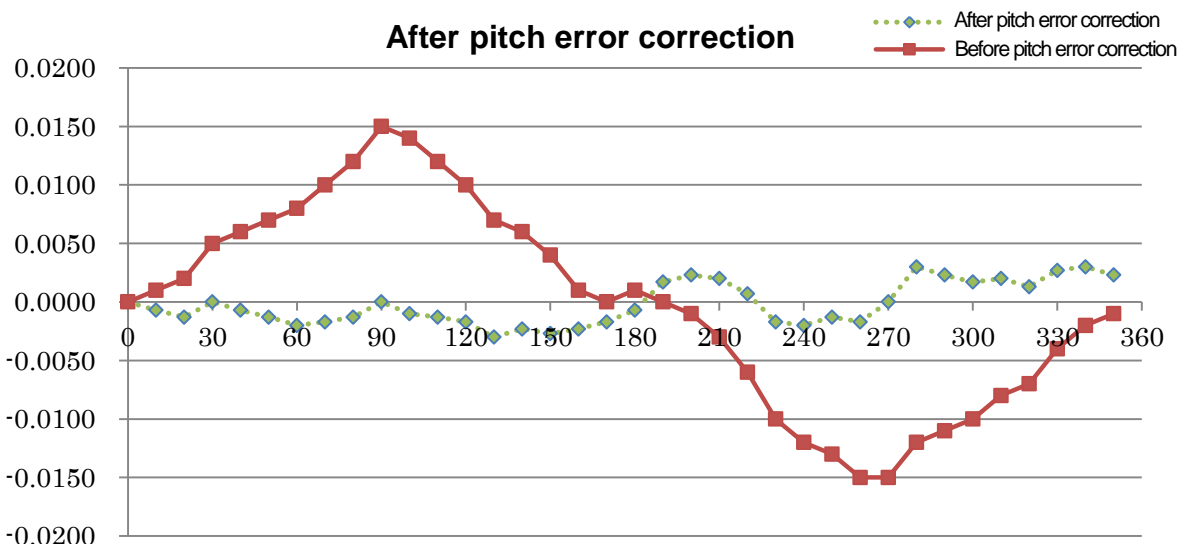
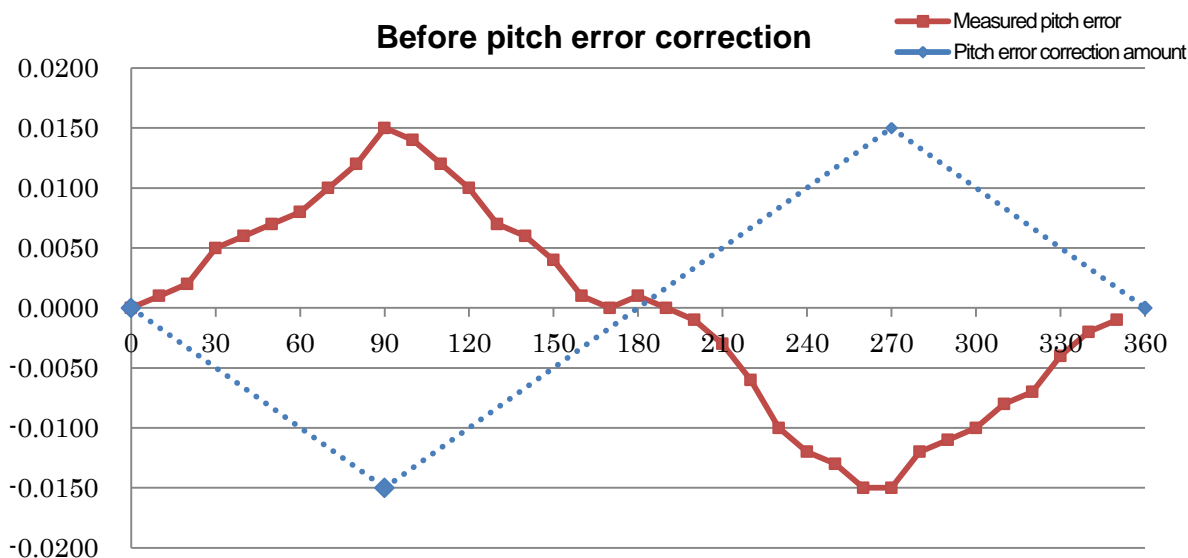
## ◆ Measured pitch error of rotary table

Command angle	Error	Command angle	Error	Command angle	Error	Command angle	Error
0.0000	0.0000	90.0000	0.0150	180.0000	0.0010	270.0000	-0.0150
10.0000	0.0010	100.0000	0.0140	190.0000	0.0000	280.0000	-0.0120
20.0000	0.0020	110.0000	0.0120	200.0000	-0.0010	290.0000	-0.0110
30.0000	0.0050	120.0000	0.0100	210.0000	-0.0030	300.0000	-0.0100
40.0000	0.0060	130.0000	0.0070	220.0000	-0.0060	310.0000	-0.0080
50.0000	0.0070	140.0000	0.0060	230.0000	-0.0100	320.0000	-0.0070
60.0000	0.0080	150.0000	0.0040	240.0000	-0.0120	330.0000	-0.0040
70.0000	0.0100	160.0000	0.0010	250.0000	-0.0130	340.0000	-0.0020
80.0000	0.0120	170.0000	0.0000	260.0000	-0.0150	350.0000	-0.0010



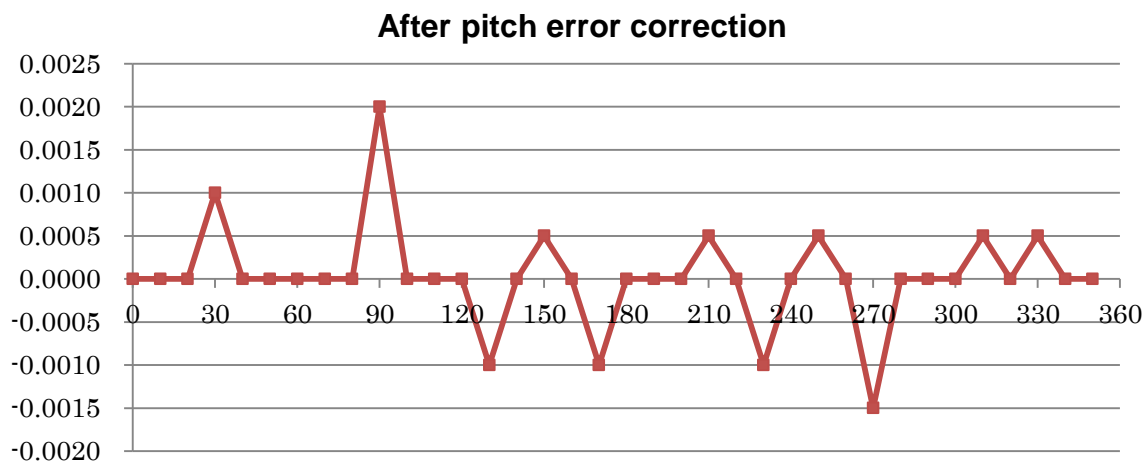
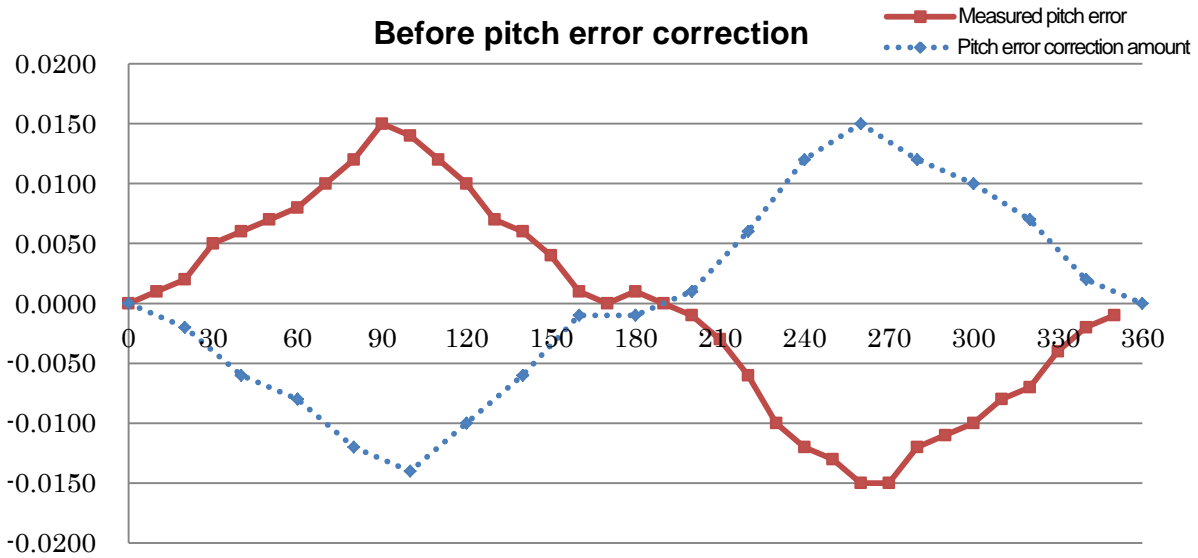
- ◆ When parameters are set from the measured data with reference to the “Maximum value” and “Minimum value” of the pitch error

PRM No.	PRM name	Set value	PRM No.	PRM name	Set value
2000	Setting 1 (Set angle 1)	90	2001	Setting 1 (Correction amount 1)	-0.0150
2002	Setting 2 (Set angle 2)	270	2003	Setting 2 (Correction amount 2)	0.0150



◆ When parameters are set in detail from the measured data for pitch error correction

PRM No.	PRM name	Set value	PRM No.	PRM name	Set value
2000	Setting 1 (Set angle 1)	20	2001	Setting 1 (Correction amount 1)	-0.0020
2002	Setting 2 (Set angle 2)	40	2003	Setting 2 (Correction amount 2)	-0.0060
2004	Setting 3 (Set angle 3)	60	2005	Setting 3 (Correction amount 3)	-0.0080
2006	Setting 4 (Set angle 4)	80	2007	Setting 4 (Correction amount 4)	-0.0120
2008	Setting 5 (Set angle 5)	100	2009	Setting 5 (Correction amount 5)	-0.0140
2010	Setting 6 (Set angle 6)	120	2011	Setting 6 (Correction amount 6)	-0.0100
2012	Setting 7 (Set angle 7)	140	2013	Setting 7 (Correction amount 7)	-0.0060
2014	Setting 8 (Set angle 8)	180	2015	Setting 8 (Correction amount 8)	-0.0010
2016	Setting 9 (Set angle 9)	200	2017	Setting 9 (Correction amount 9)	-0.0010
2018	Setting 10 (Set angle 10)	220	2019	Setting 10 (Correction amount 10)	0.0060
2020	Setting 11 (Set angle 11)	240	2021	Setting 11 (Correction amount 11)	0.0120
2022	Setting 12 (Set angle 12)	260	2023	Setting 12 (Correction amount 12)	0.0150
2024	Setting 13 (Set angle 13)	280	2025	Setting 13 (Correction amount 13)	0.0120
2026	Setting 14 (Set angle 14)	300	2027	Setting 14 (Correction amount 14)	0.0100
2028	Setting 15 (Set angle 15)	320	2029	Setting 15 (Correction amount 15)	0.0070
2030	Setting 16 (Set angle 16)	340	2031	Setting 16 (Correction amount 16)	0.0020



The accuracy may not become 0.0000 for angles such as 30, 90, 130, ... at which pitch error correction is not set as shown above. If you would like to further enhance the accuracy, the accuracy can be improved by also setting pitch error correction to the angles of 30, 90, 130, ...

## **B13** Remote control function

- B13-1** Out line
- B13-2** Communication specification
- B13-3** Operation method
- B13-4** Instruction command (Machine CNC → Quinte)
- B13-5** Response (Quinte → Machine CNC)
- B13-6** G code, Address
- B13-7** Line monitor function
- B13-8** Sample program

**B13-1** Out line**B13-1-1** Objective

In the remote control function, a machine CNC can directly execute programmed instructions, control instruction by RS232C serial communication. According to this function, Quinte does not need to create and edit programs.

How to use the remote control function is concretely shown in following.

- ① Receiving only one block of program from a machine CNC, RC stores it in an internal memory.
- ② The operation starts by M signal (general use I/O) or a start command (instruction command issued from machine CNC).
  - \* The instruction command is supported in only case of Okuma.

**B13-1-2** Feature

The features of the remote control function are shown below.

- ① Conventionally, it was necessary to create a machine program and an NC rotary table program (stored in Quinte) separately. However, use of the remote control function enables similar use of the additional axes as shown below.

The operation program for the NC rotary table is also transferred from the machine side, enables centralized management with the machine side program. Even when restarting the machine program, after interruption, the operation of the NC rotary table is managed on the machine side, therefore, restart can be made without operating Quinte.

Operation details of the NC rotary table can be confirmed on the program screen on the machine side.
- ② The program is saved in the machine side, so it is not restricted by the number of blocks in the Quinte program.
- ③ According to command communication, a status confirmation, current position information of Quinte etc. can be exchanged. (Only for Okuma)

**【Precaution】**

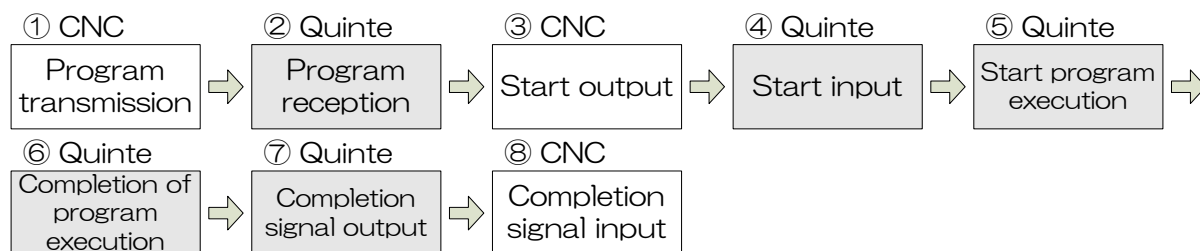
Please make sure that emergency stop signal and alarm signal connects as a higher rank equipment when using remote control function.

**B13-1-3** Operation sequence

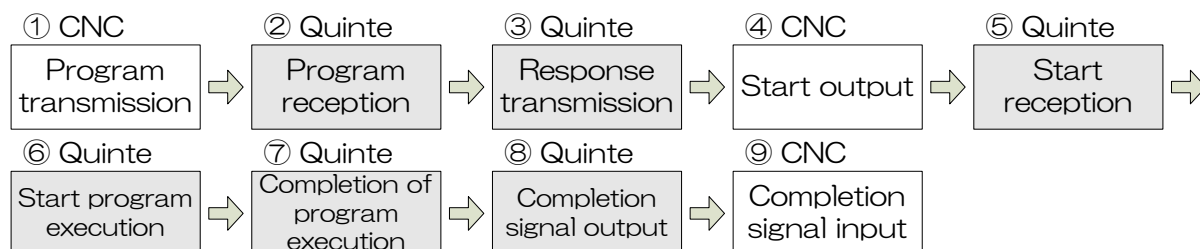
The remote control function operation sequence differs by machine CNC system.

In following, operation sequences are shown according to machine CNC system and control method.



**B13-1-3-1** FANUC, Mitsubishi, Mazak, brother

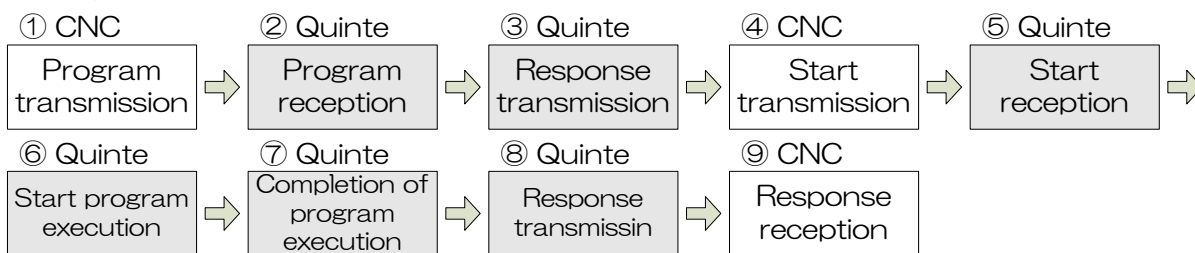
No.	Name	Transmission	Contents
①	Program transmission	CNC	The program for only one block is sent based on the data transfer format.
②	Program reception	Quinte	The program for one block is received and saved to a program storing area.
③	Start output	CNC	The machine outputs the start. (M signal)
④	Start input	Quinte	Quinte detects the start. (START-INCOM short circuit).
⑤	Start of program execution		Execution of the program for received one (1) block.
⑥	End of program execution		The executed program ended.
⑦	Completion signal output		Quinte outputs a completion signal (BLKFIN).
⑧	Completion signal input	CNC	A completion signal is received on the machine side and the program execution block is completed.

**B13-1-3-2** Okuma (Start signal specification)

No.	Name	Transmission	Contents
①	Program transmission	CNC	The program for only one block is sent based on the data transfer format.
②	Program reception	Quinte	The program for one block is received and it saves to a program storing area.
③	Response transmission		When the reception is completed normally, sends program reception completion to the machine side.
④	Start output		CNC
⑤	Start reception	Quinte	Quinte detects the start. (START-INCOM short circuit).
⑥	Start of program execution		Execution of the program for received one (1) block.
⑦	End of program execution		The executed program ended.
⑧	Completion signal output		Quinte outputs a completion signal (BLKFIN).
⑨	Completion signal input	CNC	A completion signal is received on the machine side and the program execution block is completed.

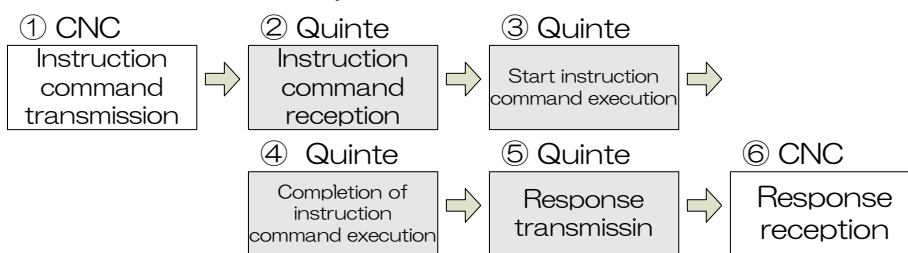
**B13-1-3-3** Okuma (Instruction command specification)

Program command operation



No.	Name	Trans mission	Contents
①	Program transmission	CNC	The program for only one block is sent based on the data transfer format.
②	Program reception	Quinte	The program for one block is received and it saves to a program storing area.
③	Response transmission		When the reception is completed normally, sends program reception completion to the machine side.
④	Start transmission	CNC	Transmission of start command ※ Refer to a clause of command for a start command.
⑤	Start reception	Quinte	Reception of start command
⑥	Start of program execution		Execution of the program for received one (1) block.
⑦	End of program execution		The executed program ended.
⑧	Response transmission		Transmission of start command A response command notifies CNC about the state of Quinte. ※ Refer to a clause of command for response command.
⑨	Response reception	CNC	A completion signal is received on the machine side and the program execution block is completed.

Instruction command operation



No.	Name	Trans mission	Contents
①	Instruction command transmission	CNC	Transmission of instruction command
②	Instruction command reception	Quinte	Reception of Instruction command
③	Start instruction command execution		Execute the received instruction command.
④	Completion of instruction command execution		Execution of the instruction command ends.
⑤	Response transmission		Transmission of start command A response command notifies CNC about the state of Quinte. ※ Refer to a clause of command for response command.
⑥	Response reception	CNC	A completion signal is received on the machine side and the program execution block is completed.

**B13-2** Communication specification

In order to establish the communication with Quinte and higher rank equipment Machine CNC, It is necessary to make mutual communication protocol accord.

**B13-2-1** Quinte communication protocol

The communication protocol of Quinte series controller is shown in following.

Item	Contents	Quinte initial value
Communication standard	RS232C	/
Control station/ Tributary station	Machine CNC/Quinte series 1 unit	
Synchronous system	asynchronous communication	
Start bit	1 bit	Fixed
Transmission rate	2400 /4800 /9600 /19200 38400/57600/115200 bps option	9600 bps
Stop bit	1 bit/2 bit option	2 bits
Data bit length	7 bits/8 bits option	7 bits
Parity	Even / Odd / no-parity option	Even parity
Transmission code	ASCII / ISO / EIA code select	ISO

Items of fixed default value cannot be changed by Quinte.

Other communications protocol is to be made accord with machine CNC.

**B13-2-2** FANUC communication protocol

Following shows a communication protocol corresponding to Quinte in CNC of FANUC.

However, since items shown as a reference below are the parameter of 30i series, in case of other CNC, change applicable parameters with reference to following parameters.

**B13-2-2-1** FANUC parameters

PRM	#7	#6	#5	#4	#3	#2	#1	#0
0000			SEQ			INI	ISO	TVC

ISO The code at a time of data output is

0 EIA code

[1] ISO code

PRM
0020

I/O CHANNEL

[1] I/O CHANNEL No. to be used

PRM	#7	#6	#5	#4	#3	#2	#1	#0
0100	ENS				NCR		CTV	

NCR at a time of output EOB by ISO code,  
 [0] "LF", "CR", "CR" are output.  
 1 Only "LF" is output.

※ The setting above is for your reference. Set the I/O CHANNEL number of the port that is actually connected by an RS232C cable. This parameter and PRM0111, 0112 and 0113 are related. When changing the I/O CHANNEL number, confirm the corresponding parameter before setting.

PRM	#7	#6	#5	#4	#3	#2	#1	#0
0111	NFD				ASI			SB2

SB2 The bit number of stop bit is  
 0 1 bit  
 [1] 2 bit

ASI The code at a time of data input  
 [0] EIA or ISO code (Automatic distinction)  
 1 ASCII code

NFD At a time of data output, the feed before and after data is  
 0 to be output  
 [1] not output

PRM  
 0112 The specification number (I/O CHANNEL=1) of input/output devices  
 [0] use RS-232C

PRM  
 0113 Baud rate (I/O CHANNEL=1)  
 [11] 9600bps

PRM	#7	#6	#5	#4	#3	#2	#1	#0
6001	CLV	CCV	TCS	CRO			PRT	

PRT The leading zero by DPRNT instructions at a time of data output  
 0 no output of space  
 [1] none of output

CRO After the data output completion in ISO code by BPRNT or DPRNT instructions,  
 0 Only "LF" is output.  
 [1] "LF", "CR" are output.

**B13-2-2-2** Quinte parameters corresponding to FANUC.

A communication protocol setup of Quinte corresponding to CNC of FANUC is shown below.

Parameter No.	Contents	Setting value (30i)
1200	Remote control function switchover	1
1202	Port specification of serial communication	0 (RS232C)
1300	RS232C Baud rate	2 (9600bps)
1301	RS232C Data length	1 (8bits)
1302	RS232C Parity bit	2 (no parity)
1303	RS232C Stop bit	0 (2 bits)
1306	RS232C Transmission code	2 (ISO)

**B13-2-3** Communication protocol for Mitsubishi

Following shows a communication protocol corresponding to Quinte in CNC of Mitsubishi. However, since items shown as a reference below are the parameter of M700, in case of other CNC, change applicable parameters with reference to following parameters.

**B13-2-3-1** Mitsubishi parameters

Parameter No.	Setting value	I/O application	Contents of parameter
9007	2	Macro print	Designation of the port output by the DPRNT command of user macro.
9008	1	Macro print	Designation of device number by DPRNT command

Parameter No.	Setting value	Contents over a preset value	Contents of parameter
9201	QTC		Device Name
9202	1	9600 bps	Transfer rate
9203	3	2 bit	Stop bit length
9204	0	Parity invalid	Parity check effective/invalid
9205	1	Even parity	Parity bit
9206	3	8 bits	Character length
9207	1	EOB or EOR	Terminator type
9208	1	RTS/CTSSystem	Handshake system
9209	0	DC code no-parity	DC code parity
9211	3	Exist/Exist	DC2/DC4output
9212	1	Adding	CR output
9213	0	ISO code	EIA output
9214	0		Number of feed
9215	0		Parity V
9216	10		Communication timeout
9217	0		DR invalid
9218	0	ISO code	Data ISO

**B13-2-3-2** Quinte parameter corresponding to Mitsubishi

A communication protocol setup of Quinte corresponding to CNC of Mitsubishi is shown below.

Parameter No.	Contents	Setting value
1200	Remote control function switchover	1
1202	Port specification of serial communication	0 (RS232C)
1300	RS232C Baud rate	2 (9600bps)
1301	RS232C Data length	1 (8bits)
1302	RS232C Parity bit	2 (no parity)
1303	RS232C Stop bit	0 (2 bits)
1306	RS232C Transmission code	2 (ISO)

**B13-2-4** Mazak communication protocol

Following shows a communication protocol corresponding to Quinte in CNC of Mazak.

However, since items shown as a reference below are the parameter of Fusion 640M, in case of other CNC, change applicable parameters with reference to following parameters.

**B13-2-4-1** Mazak Parameters

Parameter No.	Setting value	Contents over a preset value	Contents of parameter
DPR1	5	9600 bps	Baud rate (Communication speed)
DPR2	2	2 bit	Stop bit length
DPR3	0	None	Parity bit
DPR4	0	8bits	Character length (Data bit length)
DPR5	0		
DPR6	0		
DPR7	0		
DPR8	0		
DPR9	1	DC control	Handshake type
DPR10	0	No parity	DC code parity
DPR11	3	DC2/DC4 output	DC output of Feed portion
DPR12	10	10×0.1sec	Reply waiting time to I/O
DPR13	0	ISOformat output	Output format (EIA/ISO)
DPR14	0	COM1 CF22 serial CH3	Port selection
DPR15	0	0 Char.	The Null character number of fee portion
DPR16	0		

**B13-2-4-2** Quinte parameters corresponding to Mazak

A communication protocol setup of Quinte corresponding to CNC of Mazak is shown below.

Parameter No.	Contents	Setting value
1200	Remote control function switchover	1
1202	Port specification of serial communication	0 (RS232C)
1300	RS232CBaud rate	2 (9600bps)
1301	RS232CData length	1 (8bits)
1302	RS232CParity bit	2 (no parity)
1303	RS232CStop bit	0 (2 bits)
1306	RS232C Transmission code	2 (ISO)

**B13-2-5** Brother Industries, Ltd. protocol

A communication protocol corresponding to Quinte in CNC of Brother Industries, Ltd., is shown below

However, since the parameters shown below are for reference and are the parameters for CNC-C00, in case of other CNC, change applicable parameters with reference to the following parameters.

**B13-2-5-1** Brother Industries, Ltd. Parameters

Connecting destination device setting

- ① “Disable” the data protection.
- ② Press 【Program edit】 in the [mode] on the operation panel to display the <program edit menu> screen.
- ③ Press 【F3】 (External input/output) to display the <External input/output menu> screen.
- ④ Press 【F1】 (Program) to display the <Program detail (External input/output)> screen.
- ⑤ Press 【F7】 (connecting destination switching) to display the <connecting destination switching> screen.
- ⑥ Set the following set value for connecting destination switching.

Name	Set value	Details for set value	Parameter details
Connecting destination setting	0	General communication device	Selection of opposite party communicating

[ ] indicates the operation panel. 【 】 indicates the panel key and the function key, and < > indicates the screen name.

Communication parameter setting

- ① “Disable” the data protection.
- ② Press 【Data bank】 in the [mode] on the operation panel to display the <data bank menu> screen.
- ③ Press 【F6】 (Communication parameter) to display the screen. If any screen other than the <Serial port> screen is displayed, press 【F1】 (Serial port) to display the <Serial port> screen.

## ④ Set the following set values.

Name ※1	Set value	Details for set value	Parameter details
Connection name	QTC	Controller model name	Communication device name (optional input)
Baud rate	5	9600 bps	Sets data transfer rate.
Parity	0	None	Sets the type of parity bit.
Stop bit	1	2 bit	Sets the zone length to judge data end.
Character length	1	8 bit	Sets the data length.
communication method ※3	1	Code 1	Sets the communication method. Code 1: Control code method for main station side. Control line method for slave station side.
Response monitoring time	60	60 sec	Sets the allowable time of one character interval at the time of reception.
Transmission data code ※3	0	ISO	Specifies the transfer code of the data to be transferred.
End of block	0	CR,LF	Specifies the code of the block end.
TV check	0	None	Selects whether to execute parity check of one block.
Decorative characters output ※3	0	None	Specifies whether to output decorative characters at the time of data output.
Reset recovery time	1	1 sec	Turns off DR, RS signals of the machine under certain conditions.※2
DR signal check	1	Do	Selects whether to check DR signal at the time of communication.
End of communication DC3 code ※3	0	None	Sets whether to wait for sending and receiving of DC3 code.
DC1 code ※3	17	11H (Hexadecimal)	Sets control code. (Setting is performed in decimal number.)
DC2 code	18	12H (Hexadecimal)	
DC3 code	147	93H (Hexadecimal)	
DC4 code	20	14H (Hexadecimal)	
Reading zero suppress ※3	1	Type 2	Sets output method for upper digit 0 at the time of macro variable output in DPRNT command.

※1 Serial parameters not listed are parameters that do not relate to the remote control function.  
(The set values are not affected in particular.)

※2 Refer to the Instruction Manual of Brother Industries Ltd., for details about the conditions.

※3 Do not set values other than the specified set values for the shaded items.

[ ] indicates the operation panel. [ ] indicates the panel key and the function key, and < > indicates the screen name.



**B13-2-5-2** Quinte parameters corresponding to Brother Industries, Ltd.

A communication protocol setting for Quinte compatible with CNC of Brother Industries Ltd., is shown below.

Parameter No.	Contents	Setting value
1200	Remote control function switchover	1
1202	Port specification of serial communication	0 (RS232C)
1300	RS232C Baud rate	2 (9600bps)
1301	RS232C Data length	1 (8bits)
1302	RS232C Parity bit	2 (no parity)
1303	RS232C Stop bit	0 (2 bits)
1306	RS232C Transmission code	2 (ISO)

**B13-2-6** Okuma communication protocol

Following shows a communication protocol corresponding to Quinte in Okuma OSP. However, since items shown as a reference below are the parameter of OSP-U10M, in case of other CNC, change applicable parameters with reference to following parameters.

**B13-2-6-1** Okuma parameters

Optional parameters

Parameter No.	Contents	Setting value
A1	Setting a tape code	ISO
A2	ISO/EIA automatic distinction at a time of the reading	Exist
A3	Setting of tape TV check	No TV check
A4	A setup of the new-line at a time of tape code ISO	CRLF
A5	A setup of a tape separation (end) code	ER
A6	Special code	Special code alarm
A7	The punch of file name of program operation	File name exist
A8	Tape feed	Feed hole
A9	Feeding number	250

NC optional parameter (READ/WRITE)

Parameter No.	Contents	Setting value
2	RS232C STOP BIT	2
3	RS232C PARITY	EVEN
4	Baud rate	9600
6	Preparations completion waiting time (sec)	9999
7	Separation code	%

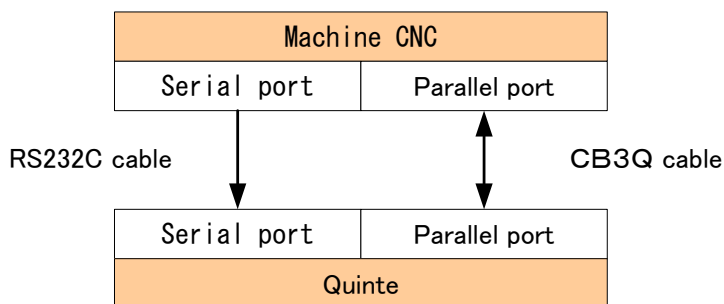
**B13-2-6-2** Quinte parameters corresponding to Okuma

A communication protocol setup of Quinte corresponding to CNC of Okuma OSP is shown below.

Parameter No.	Contents	Setting value
1200	Remote control function switchover	2 or 3
1202	Port specification of serial communication	0 (RS232C)
1300	RS232C Baud rate	2 (9600bps)
1301	RS232C Data length	1 (8bits)
1302	RS232C Parity bit	0 (Even)
1303	RS232C Stop bit	0 (2bits)
1306	RS232C Transmission code	0 (ASCII)

**B13-2-7** Hardware (H/W) composition

The hardware structure to enable this remote control is shown below.

**B13-2-8** Communication format

A communication format means the form of the program data transmitted from machine CNC to Quinte.

**B13-2-8-1** The program format

It consists of ①Communication start ②Program start declaration  
③Department of program data ④End mark ⑤End of communication

## 1) FANUC , Brother communication format

① [DC2]      ② [✓]      ③ [✓][Program][✓]      ④ [CR][LF]      ⑤ [DC4]

① , ⑤ are omissible.

## 2) Mitsubishi communication format

①	②	③	④	⑤
[DC2] [%]	[✓]	[✓][Program][✓]	[CR] [LF]	[%] [DC4]

①, ⑤ are omissible.

## 3) Mazak communication format

①	②	③	④	⑤
[DC2] [%]	[✓]	[✓][Program][✓]	[CR] [LF]	[%]

① ⑤ are omissible.

**B13-2-8-2** The program format (Okuma)

According to Okuma specification, the transfer data have the instruction command program transmitted from machine CNC to Quinte, and a response command transmitted from Quinte to machine CNC.

Moreover, two kinds of choices are possible for the format of a response by a parameter.

Please refer to each item for an instruction command and a response.

## 1) Okuma communication format

①	②	③	④	⑤
[DC2]	[✓]	[✓][Program][✓]	[%]	[DC4]

④ is omissible.

## 2) The instruction command format

It consists of ① Communication start ② Command name ③ End mark ④ End of communication.

①	②	③	④
[DC2]	[S][T][T]	[%]	[DC4]

③ is omissible.

**B13-2-8-3** The response format (Okuma)

It consists of ① Communication start ② Response name ③ Response number

④ Data (Alarm number, Coordinate position) ⑤ End mark ⑥ End of communication

## 1) The communication format of standard specification

①	②	③	④	⑤	⑥
[DC2]	[A][L][M]	[1][0]	[E][M][4][0][0]	[CR][LF]	[DC4]

## 2) The communication format of Okuma

①	②	③	④	⑤	⑥
None	[A][L][M]	[1][0]	[E][M][4][0][0]	[%]	None

**B13-3** Operation method**B13-3-1** Setting for use of remote control functions

In order to shift to remote control function, it is necessary to follow the next sequences.

- ① The change of the parameter for remote control function.
- ② Updated by power supply OFF/ON

When the system is started up (power is turned on), the remote control functions are put into a usable state, and then the mode indication becomes "RMT."

Also, the remote control function does not display file numbers or program numbers because there are no files or programs in Quinte.

**B13-3-2** Remote control function program execution operation

In the remote control function, execution operation according to external I/O (M signal input) is possible.

A basic sequence of automatic operation is as follows.

FANUC, Mitsubishi, Mazak, Brother

- ① Transmit communication start DC2 (POPEN command) from machine CNC.
- ② Transfer 1 block of execution program from machine CNC.
- ③ Transmit the end of communication DC4 (PCLOS command) from machine CNC.
- ④ Output M signal (Start) from machine CNC to Quinte series controller.
- ⑤ Output BLKFIN from Quinte series controller to machine CNC.

Okuma

- ① Transmit communication start DC2 from machine CNC.
- ② Transfer 1 block of execution program from machine CNC.
- ③ DC1 of Request to Send is transmitted from machine CNC, and reception is prepared for a response command (reply of reception completion) from Quinte notifying a completion of program reception.
- ④ Quinte transmits the response command.
- ⑤ HOST transfers a start-up command.
- ⑥ DC1 command of a Request to Send is transmitted from machine CNC, and reception is prepared for the program execution completion response from Quinte.
- ⑦ DC4 is transmitted from Quinte to machine CNC after program execution following a response command.

The program data transmitted from machine CNC by remote control are saved in the internal memory of Quinte until the data carry out the completion of execution or reset input is performed. The internal memory of Quinte is in an empty state until data is transferred from the machine CNC after power is turned on.

**B13-3-3** Key operation

The panel keys “START” and “STOP” can not be used when the remote control function is enabled.

For other keys than above can be used as usual.

**B13-3-4** PROGRAM screen

The program sent from the machine CNC can be confirmed on the program screen. When a program is received, the previous data is deleted, and only the currently received data is displayed.

The selection method is as follows.

【MENU】 ⇒

【2】 (2 : PROGRAM) ⇒

【\*】 (Subtab reference)

RMT		STOP		PRG LOG
				OVR 100%
G91	A-999.999	B-999.999	F999.999 M98 P1000	
G90	A90.000	B-45.000	F0	
G90	A90.000	B-45.000	F0	
WORKPIECE		MODAL INFO.		
A	-111.111	G08	G10	
B	987.654	G90	G91	

The sub-tab of the program screen enables use of the functions described below.

Sub-tab		Description
No.	Name	
1	MACHINE	A machine coordinate system display is performed and the program received now is displayed.
2	WOKPIECE	A processing coordinate system display is performed and the program received now is displayed.
3	DISTANCE	The remaining movement display is performed and the program received now is displayed.
4	RMT PROG LOG	Up to 3 blocks of history are displayed retroactively for received data. The history is displayed as follows sequentially from above. First stage : Second preceding program Second stage : Previously received program Third stage : Program which is currently being received (Displayed in pink)

**B13-4** Instruction command (Machine CNC → Quinte)**B13-4-1** Instruction command list

The instruction commands which directly order Quinte series controller from machine CNC are shown below.

Command	Function	Correspondence response		Effective status
		Instruction command (PRM1200=3)	External START signal (PRM1200=2)	
STT	Program execution	FIN01 ALM10	ALM10	RESET STOP HOLD
STP	Program stop	FIN01	ALM10	RUN
RDY	Status check		STP03 RDY04 RUN05 HLD06 ALM10	RESET STOP HOLD RUN ALARM
RST	Reset execution		FIN01 ALM10	STOP HOLD RUN ALARM
MMONA MMONB	Machine coordinates inquiry		POS13 ALM10	RESET STOP HOLD RUN ALARM
WMONA WMONB	Processing coordinates inquiry		POS14 ALM10	RESET STOP HOLD RUN ALARM

※ Please refer to the clause of a response command for the above-mentioned correspondence response.

**B13-4-2** The transmission format of an instruction command

The transmission format form at a time of an instruction command is shown below.

Starting program operation : [DC2] [S] [T] [T] [%] [DC4]

Status Request to Send : [DC2] [R] [D] [Y] [%] [DC4]

※ A data separation of [%] portion is omissible.

**B13-5** Response (Quinte → Machine CNC)

In remote control, Quinte returns character string data as a response to the command of which it was ordered from machine CNC.

The response consists of the response name, the identification number, and data (alarm, a position, etc.) which are called a response command.

**B13-5-1** Response command lists

Plural number of response commands to the instruction command exist.

The list of the response command is shown below.

Response command	Contents of response	Correspondence instruction command
Response name		
FIN01	Program reception completion	Program transmission
	Program execution completion	STT
	Program temporary stop completion	STP
	Alarm release completion Modal information clear Machining program clear	RST
STP03	Status : Return of STOP	RDY
RDY04	Status : Return of RESET	RDY
RUN05	Status : Return of RUN	RDY
HLD06	Status : Return of HOLD	RDY
ALM10+ Alarm number	Status : Return of ALARM and Alarm number	STT RDY RST Invalid program Invalid command
POS13+Machine coordinate	Machine coordinate value	MMONA MMONB
POS14+ Processing coordinate	Processing coordinate value	WMONA WMONB

A response is returned after DC1 reception.

However, DC1<sup>※1</sup> shall remain in effect when it has been sent after receiving a block and a command.

※1 DC1 shall be effective only once for command request. Therefore, there are following restrictions.

- ① When a response is once returned after DC1 reception, a response is no longer performed even if DC1 is transmitted again.
- ② If a response is once replied to DC1 in case of an alarm response also, an alarm response is no longer returned even if it receives DC1 after that.
- ③ Transmit the RDY command to know the state of alarm arbitrarily.

**B13-5-2** Response command reply conditions

The conditions at a time of sending a reply of response command are decided.

Provide a response command return to machine CNC by checking the following tables.

Response command	Return condition
FIN01	When DC1 is received after the end of program operation, and the completion of block reception
NOT02	When DC1 is received after RDY reception and status is NOT READY
STP03	When DC1 is received after RDY reception and status is STOP
RDY04	When DC1 is received after RDY reception and status is READY
RUN05	When DC1 is received after RDY reception and status is RUN
HLD06	When DC1 is received after RDY reception and status is HOLD
ALM10+No <sup>*1</sup>	When alarm was generated and DC1 is received, or when it receives DC1 after RDY reception and status is ALARM
POS13(14) <sup>*2</sup> + Coordinate position	When DC1 is received after MMONA, WMONA, MMONB, WMONB reception

※1 The number of times of which machine CNC can recognize the alarm generated arbitrarily is a limitation once. Once it is ordered by RDY command for a check, the response data of a Quinte series controller will be cleared.

※2 13 : machine coordinate, 14 : Processing coordinate

**B13-5-3** The output format of a response command

There are two kinds of output forms of the response, and it is possible to choose by parameter 1201.

Two kinds of response output form are shown below.

PRM1201=0 standard specification

[DC2][A][L][M][1][0][ ][ ] ··· · [ ][CR][LF][DC4]

Response name                      ↑                      Data  
Response number                      (Alarm, Coordinate position)

DC2 (communication start) and DC4 (end of communication) are output before and after a response (a response command, a number, data, end mark).

An end mark is output in CR, LF.

PRM1201=1 Okuma specification

[A][L][M][1][0][ ][ ] ··· · [ ][%]

Response name                      ↑                      Data  
Response number                      (Alarm, Coordinate position)

The DC code is not added before and after a response.

An end mark is output by %.

Since response output form is fixed, the selection of DC code existence and an end mark is not available.



The output reference example of each response output form is shown below.

In the case of the completion response (completion of execution, transmission receipt completion) of the Quinte

```
PRM1201=0 : [DC2][F][I][N][0][1][CR][LF][DC4]
PRM1201=1 : [F][I][N][0][1][CR][LF][%]
```

In the case of the response to the RDYA command from Quinte

```
PRM1201=0 : [DC2][N][O][T][0][2][CR][LF][DC4]
             [DC2][S][T][P][0][3][CR][LF][DC4]
             [DC2][R][D][Y][0][4][CR][LF][DC4]
             [DC2][R][U][N][0][5][CR][LF][DC4]
             [DC2][H][L][D][0][6][CR][LF][DC4]
PRM1201=1 : [N][O][T][0][2][%]
             [S][T][P][0][3][%]
             [R][D][Y][0][4][%]
             [R][U][N][0][5][%]
             [H][L][D][0][6][%]
```

Alarm command

Example: When alarm EM400 occurs on Quinte

```
PRM1201=0 : [DC2][A][L][M][1][0][E][M][4][0][0][CR][LF][DC4]
PRM1201=1 : [A][L][M][1][0][E][M][4][0][0][%]
```

Position command

Example: When a rotary table is in the 20.050 degree position of machine coordinates

```
PRM1201=0 : [DC2][P][O][S][1][3][0][2][0].[0][5][0][CR][LF][DC4]
PRM1201=1 : [P][O][S][1][3][0][2][0].[0][5][0][%]
             [1] and [3] show machine coordinates.
```

Example: When a rotary table is in the 123.456 degree position of processing coordinates

```
PRM1201=0 : [DC2][P][O][S][1][4][1][2][3].[4][5][6][CR][LF][DC4]
PRM1201=1 : [P][O][S][1][4][1][2][3].[4][5][6][%]
             [1] and [4] show processing coordinates.
```

**B13-6** G code, Address

In the remote control function, although programs are executed by using the G code which are fundamentally used in Quinte, however, because the program used in the remote control function is only 1 block, a part of G code and address relevant to continuous action cannot be used.

**B13-6-1** G code**B13-6-1-1** Effective G code

The G codes which are usable for remote control function are shown.

G code	Group	Function	Description
None		Positioning	Positioning to A and B (angle command).
04	※	Dwell	Waiting for time
07	※	Multi-rotation deduction	It operates in number of rotations, a direction, and an angle instruction.
10	1	A clamp is unused	A brake is not used when positioning.
11	1	Using Clamp	A brake is used when positioning.
21	※	Interlocking movement start	Before the BLKFIN's operating, a start of operation is outputted and carried out.
23	※	Return to machine zero position	A returning action is performed to a machine zero position.
24	※	Return to processing zero position	A returning action is performed to a processing zero position.
90	2	Absolute	A command method is made into an absolute.
91	2	Incremental	A command method is made into an incremental.
92	※	Coordinate system setup	A current position is set as the position from the processing zero position.

**B13-6-1-2** Invalid G code

The G code which cannot be used in remote control is shown.

G code	Function	Description
08,09	Buffer instructions	Handled as an alarm of an invalid G code.
22	Continuation start	Handled as an alarm of an invalid G code.

**B13-6-2** Address**B13-6-2-1** Effective Address

The addresses which can be used by remote control are shown.

Address	Function
A	Time setting in the instruction position and dwelling in positioning
B	The instruction position in positioning
D	Number of rotation at a time of execution of G07 instruction. ※Use of D address other than G07 cannot be performed.
F	Speed instructions in positioning
M	M code output

**B13-6-2-2** Invalid Address

The addresses which cannot be used in remote control are shown.

Address	Function
C	The position deviation check in a continuation buffer
D	Number of partitions
P	Sub-program number
L	The number of repetition of a sub-program

**B13-6-2-3** Special processing of address A and address B

In Quinte, when G90 is absolute at command or when modal information is absolute, “-0” for angle command has a special meaning (rotation direction relative to machine origin). However, since the CNC may not output the character “-0,” the “-360” output is internally converted to “-0” under the above-mentioned conditions.

Internal conversion state of angular command (A-360, B-360) by G code and modal information

G code at command	Modal information			
	Absolute		Incremental	
	CNC output	Quinte	CNC output	Quinte
G90	-360	-0 ※1	-360	-0 ※1
G91		-360		-360
Other than G90/G91		-0 ※1		-360

※1 Received “-360” is internally converted by “-0”.

**B13-7** Line monitor function

The line monitor function allows you to grasp the content by visualizing sent and received serial communication data executed by the remote control function. RMT mode enables real time monitor display that displays communication information with the CNC on the screen and buffering that records communication data. This buffered communication data can be confirmed in maintenance mode.

**B13-7-1** Line monitor screen display

The line monitor screen displays Received Data (RD) sent from the CNC and Sent Data (SD) sent from Quinte in response to the received data. At that time, communication data is constantly buffered. Also, the screen displays only one batch of received data (RD) and sent data (SD), when the next batch of data is received, RD and SD are cleared and the newly received data is displayed.

The line monitor screen is displayed by the following method.

[MENU] ⇒ [3] (3 : MONITOR) ⇒ [9] (9 : LINE MONITOR)

RMT		STOP		POS&LINE MONITOR	
				OVR 100%	
WORK					
A:		-111.1111		B: 987.6543	
RD	D2 % / / G 9 0 A - 1 9 0 . 1 2 3 4 B - 2				
Hex	12 A5 AF AF 47 39 30 41 2D 31 39 30 2E 31 32 33 34 42 2D 32				
RD	0 0 . 1 2 3 4 F 5 0 . 1 2 M 8 0 % D4 D1				
Hex	30 30 2E 31 32 33 34 46 35 30 2E 31 32 4D 38 30 A5 14 11				
SD	D2 A L M 1 0 E M 4 0 0 C R L F D 4				
Hex	12 41 CC 4D 31 30 C5 4D 34 30 30 8D 0A 14				
<input checked="" type="radio"/> RS <input type="radio"/> CS		Next process			
REMOTE CONTROL					

**B13-7-2** Single processing

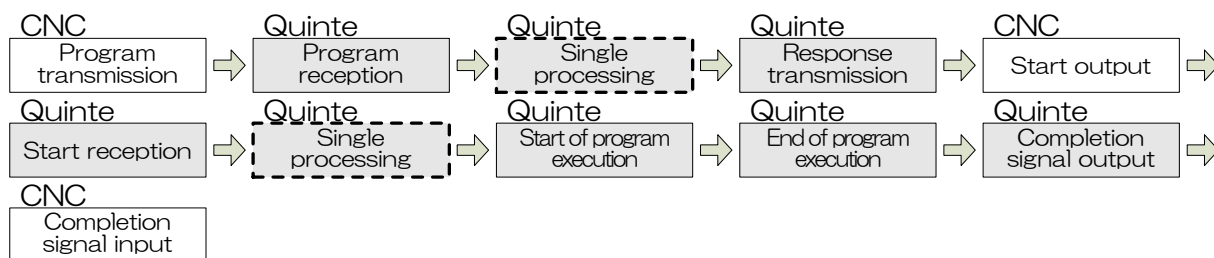
By the remote control function, commands from the CNC and responses from Quinte are processed in succession according to the operation sequence. Therefore, the display is switched soon after confirming the received data or sent data. Although this is not necessary for normal processing, a single processing function to confirm programs or perform maintenance while confirming each sent and received data is available. By starting single processing, the operation sequence can be stopped temporarily and operation can be restarted at any time the worker desires, even if data is being received from the CNC.

Single processing can be enabled or disabled by the following method:

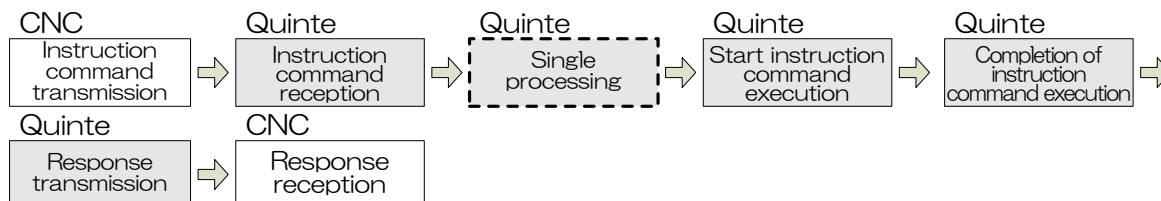
Enable [MENU] ⇒ [8] (8 : SINGLE START)

Disable [MENU] ⇒ [9] (9 : SINGLE STOP)

## Program command operation (PRM1200=1, 2)



## Instruction command operation (PRM1200=3)



The single processing operation method is as follows.

- ① Select "SINGLE START" in the menu tab to start single processing.  
(When single processing starts, "Next process" at the lower right side of the screen turns on.)
- ② When data is sent from the CNC, the content of the data is displayed and the operation sequence stops temporarily.  
(“Next process” flashes while the operation sequence is suspended.)
- ③ When the [ENTER] key is pressed, the operation sequence restarts.
- ④ Quinte executes processing content of the data that was sent from the CNC. When processing is completed, Quinte returns the data to the CNC.
- ⑤ After that, steps ② to ④ are repeated.
- ⑥ When "SINGLE STOP" is selected in the menu tab or when the screen transitions to any screen other than the line monitor screen, single processing ends.  
(When single processing ends, "Next process" turns off.)

RMT	STOP	POS&LINE MONITOR
OVR 100%		
WORK		
A:	-111.1111	B: 987.6543
9   SINGLE STOP	9 0 A - 1 9 0 . 1 2 3 4 B - 2	
8   SINGLE START	3 9 3 0 4 1 2 D 3 1 3 9 3 0 2 E 3 1 3 2 3 3 3 4 4 2 2 D 3 2	
7   BUFFER CLEAR	3 4 F 5 0 . 1 2 M 8 0 % D 4 D 1	
3   MONITOR	3 3 3 4 4 6 3 5 3 0 2 E 3 1 3 2 4 D 3 8 3 0 A 5 1 4 1 1	
2   PROGRAM	▶ O E M 4 O O C R L F D 4	
1   POSITION	▶ S	
0   MODE SELECT	▶ REMOTE CONTROL	

RMT	STOP	POS&LINE MONITOR
OVR 100%		
WORK		
A:	-111.1111	B: 987.6543
RD	D 2 % / / G 9 0 A - 1 9 0 . 1 2 3 4 B - 2	
Hex	1 2 A 5 A F A F 4 7 3 9 3 0 4 1 2 D 3 1 3 9 3 0 2 E 3 1 3 2 3 3 3 4 4 2 2 D 3 2	
RD	0 0 . 1 2 3 4 F 5 0 . 1 2 M 8 0 % D 4 D 1	
Hex	3 0 3 0 2 E 3 1 3 2 3 3 3 4 4 6 3 5 3 0 2 E 3 1 3 2 4 D 3 8 3 0 A 5 1 4 1 1	
SD		
Hex		
● RS ○ CS		
Next process		
REMOTE CONTROL		

**B13-7-3** Buffered data

Buffered data can be confirmed in maintenance mode.

Buffered communication data can also be displayed in ASCII code or hexadecimal code, and the display format can be selected from heap display or packet display. Although heap display in ASCII code is the initial value, the previous state of the display code and display format are stored in memory, and buffered data is displayed in the previous state even after the mode is changed. Line feed or page feed of displayed content is possible by scroll operation, enabling confirmation of up to 99 lines of the most recent data. Data of lines older than the 99 lines of recent data are deleted.

MNT		RESET		ASCII&HEX OVR 100%	
6	RD	D2 % // G 9 0 A 9 0 . 1 2 3 F 0 / %			
	Hex	12 A5 AF AF 47 39 30 41 39 30 2E 31 32 33 46 30 AF A5			
	SD	1 %			
	Hex	31 A5			
7	RD	D4	D2 % S T T % D4		
	Hex	14	12 A5 53 D4 D4 A5 14		
	SD	F I N O 1 %	F I N O 1 %		
	Hex	46 49 4E 30 31 A5	46 49 4E 30 31 A5		
8	RD	D2 % // G 9 0 A 1 0 . 4 5 0 F 0 / %			
	Hex	12 A5 AF AF 47 39 30 41 31 30 2E 34 35 30 46 30 AF A5			
	SD		F I		
	Hex		46 49		

ASCII + hexadecimal display

MNT		RESET		HEXADECIMAL OVR 100%	
12	SD	12 A5 AF AF 47 39 30 41 39 30 2E 31 32 33 46 30 AF A5			
	RD	31 A5			
13	SD	14 11	12 A5 53 D4 D4 A5 14 11		
	RD	46 49 4E 30 31 A5	46 49 4E 30		
14	SD	12 A5 AF AF 47 39 30 41 2D 31 30 2E 34 35 38 46 30 AF			
	RD	31 A5			
15	SD	A5 14 11	12 A5 53 D4 D4 A5 14 11		
	RD	46 49 4E 30 31 A5	46 49 4E		
16	SD	12 A5 57 4D 4F 4E 41 A5 14 11			
	RD	30 31 A5	50 4F 53 31 34 30 31 30		
17	SD				
	RD	2E 44 45 48 A5			

Heap display (hexadecimal code)

MNT		RESET		ASCII OVR 100%	
24	RD	D2 % // G 9 0 A - 1 0 . 4 5 8 F 0 / % D4			
	SD				
25	RD	D1			
	SD				
26	RD	F I N O 1 %			
	SD				
27	RD	D2 % S T T % D4 D1			
	SD				
28	RD	F I N O 1 %			
	SD				
29	RD	D2 % W M O N A % D4 D1			
	SD				

Packet display (ASCII code)

The display format code can be switched as follows:

Heap display                   【MENU】 ⇒ 【1】 (1 : DISPLAY) ⇒ 【1】 (1 : HEAP)

Packet display               【MENU】 ⇒ 【1】 (1 : DISPLAY) ⇒ 【2】 (2 : PACKET)

The display format code can be switched as follows:

ASCII display               【MENU】 ⇒ 【2】 (2 : CODE) ⇒ 【1】 (1 : ASCII)

Hexadecimal display       【MENU】 ⇒ 【2】 (2 : CODE) ⇒ 【2】 (2 : HEXADECIMAL)

ASCII & hexadecimal display 【MENU】 ⇒ 【2】 (2 : CODE) ⇒ 【3】 (3 : ASCII&HEX)

**B13-7-4** Buffer clear

While buffered data is deleted before buffering starts, it is also possible to delete sent and received data in the data buffer optionally.

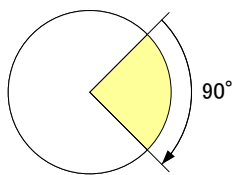
Data can be deleted by the following method:

【MENU】 ⇒ 【7】 (7 : BUFFER CLER)

**B13-8** Sample program

Sample programs registered on the machine side of each CNC manufacturer are shown below.

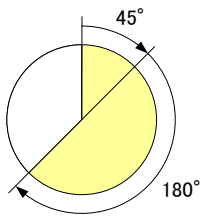
**B13-8-1** FANUC, Mitsubishi, Mazak, Brother sample program**B13-8-1-1** Basic program

Operation details	Program
	POPEN; ①
	★ ②
	DPRNT[//G91A90F30/]; ③
	PCLOS; ④
	M100; ⑤
	M30;

- ① The communication port of RS232C in the CNC opens by POPEN, and is enabled to communicate.
- ② For models that CNC performs pre-reading, set pre-reading prohibited before DPRNT command. (For example, FANUC ROBODRILL: M12, Brother Industries SPEEDIO: M159)
- ③ DPRNT[ ] becomes a program transfer unit.  
Register the rotary table operation in the broken line section in the above program.
- ④ The communication port of RS232C in the CNC is closed by PCLOS, and communication ends.
- ⑤ M100 (temporary name) is the M signal for start of the ③ program.

When data is transferred from the CNC of the machine, it is necessary to open the communication port of RS232C. However, it is not necessary to open and close the communication port by “POPEN” and “PCLOS” for each transfer program. Instruct “POPEN” at the head of the program, and instruct “PCLOS” before the end. (Refer to B13-8-1-2 Program.)

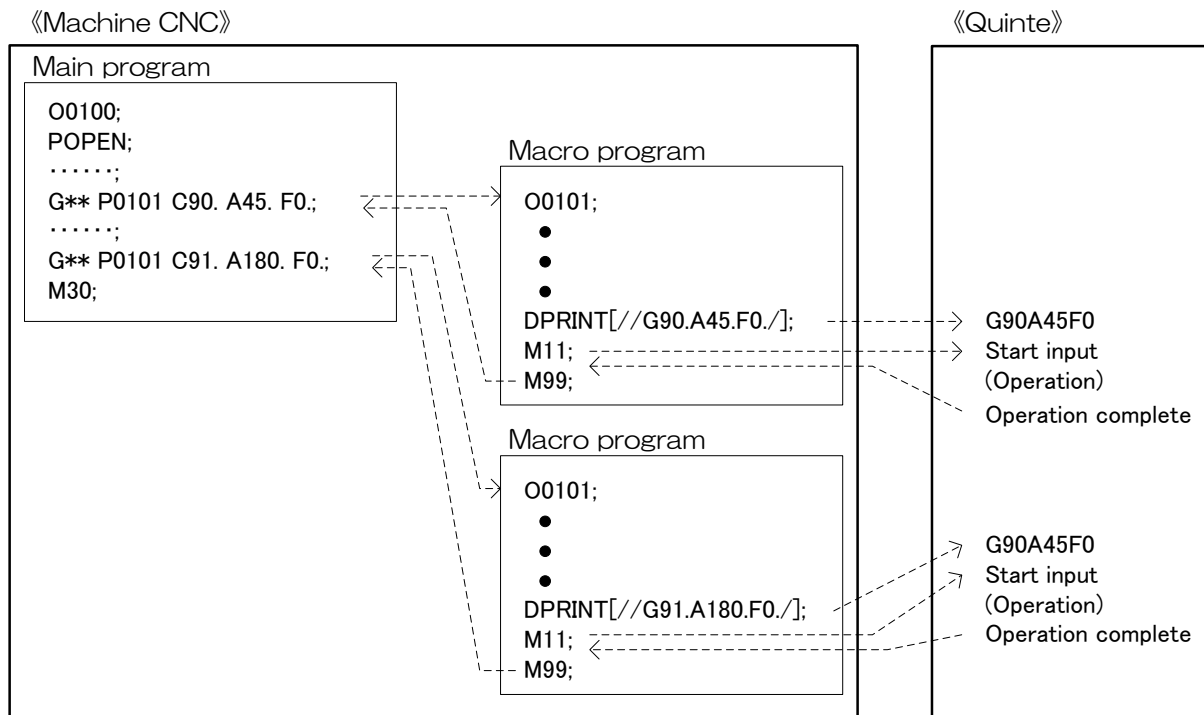
**B13-8-1-2** Example of operation program

Operation details	Program
	POPEN
	..... (Program on machine side)
	★ (Pre-reading prohibited setting)
	DPRNT[//G90A45F0/];
	M100;
	..... (Program on machine side)
	★ (Pre-reading prohibited setting)
	DPRNT[//G91A225F0/];
	M100;
	..... (Program on machine side)
PCLOS;	
M30;	

**B13-8-1-3** Macro program

In the previously explained program example, “POPEN,” “DPRNT” and “PCLOS” are entered each time. However, the operation command for the rotary table can be simplified by using a macro program of the CNC manufacturer.

A procedure (flow) when using the macro program is explained.



This manual does not explain the details of the macro program.

Refer to the instruction manuals of the CNC and equipment manufacturers for details, and use the program only after the customer fully understands the macro program and variables.



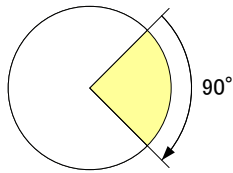
**B13-8-2** Okuma sample program**B13-8-2-1** Basic program

A program created for Okuma CNC consists of the following three programs.

NC rotary table operation program : Program of NC rotary table operation

NC rotary table control program : Program by program command  
(such as start and stop)

Receiving check program : Program which receives response from the table

Operation details	Program
	<pre> PUT '///' PUT 'G91A90F30' PUT '/' WRITE 0 PUT 'STT' WRITE 0 READ 0 GET ,3 GET VC128,2 </pre>

## NC rotary table operation program

```

PUT '//'
PUT 'G91A90F30'
PUT '/'
WRITE 0

```

- ※ The above PUT '' becomes a program transfer unit.
- ※ The NC rotary table operation program is inserted into the wave line part in the above program.
- ※ If data is transferred in any format other than the above program format, normal transfer cannot be performed and an alarm is generated. The program format is as explained above, therefore, do not use the following format.

PUT '//G91A90F30/' ( Not allowed to set. )

## NC rotary table control program

```

PUT 'STT'
WRITE 0

```

- ※ The above PUT '' becomes a program transfer unit.
- ※ The NC rotary table program command is inserted into the wave line part in the above program.

Receiving check program

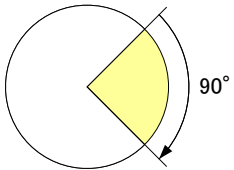
```
READ 0
GET ,3
GET VC128,2
```

- ※ The above READ '' becomes a response read (check number read) part.
- ※ The above GET '' becomes a response character row capture part.
- ※ The above 3, VC128,2 are set values for reference.

**【Precaution】**

“0” of WRITE 0, READ 0 explained above indicates the RS232C output port number. The number may differ depending on the machine used, therefore, match the output port with the machine being used.

**B13-8-2-2** Example of operation program

Operation details	Program	
	PUT '//'	
	PUT 'G91A90F0'	
	PUT '/'	
	WRITE 0	①
	READ 0	②
	GET ,3	
	GET VC128,2	
	IF[VC128 NE 1] NA00	③
	PUT 'STT' <sup>※1</sup>	④
	WRITE 0	
	READ 0	⑤
	GET ,3	
	GET VC128,2	
	IF[VC128 NE 1] NA00	⑥
	GOTO NM02	⑦
NA00	VDOUT[992]=9999	⑧
	M00	
NM02 M2		⑨

Explanation of program

- ① The operation program is output and transferred from the port 0 of RS232C.
- ② The CNC waits to receive a completion response with READ 0.  
When internal processing in Quinte is completed after transfer of the operation program of ①, received completion response<sup>※2</sup> of the operation program is returned to the CNC. When the CNC receives the completion response, it skips over three characters from the head of the received data and captures the subsequent two characters into variables (VC128).

- ③ The variables are collated, and checked if the data is 1(FIN01). If data of the variable is 1, the program continues, and if it is not 1, the program proceeds to error processing of NA00.
- ④ The start command is instructed to Quinte, and the operation program is executed.
- ⑤ The program remains in a waiting state until the next response comes from Quinte. When the NC rotary table completes operation, Quinte returns an operation completion response, and when the NC rotary table turns into an error state, Quinte returns an alarm response.
- ⑥ The variables are collated similarly to ③, and checked if the data is 1(FIN01). If data of the variable is 1, the program continues to be completed in M2 of ⑨. If it is not 1, the program proceeds to error processing of NA00.
- ⑦ Processing when it is judged not to be normal in collations of ③ and ⑥ is performed.

**【Precaution】**

“GET, 3”, “GET VC128,2” and “IF[VC128 NE 1] NA00” shown in the above program example are reference examples using the functions of Okuma CNC and the response format<sup>※3</sup> of Quinte.

In addition, refer to the Okuma instruction manual “READ/WRITE•GET/PUT functions” for details about commands such as PUT, WRITE, READ and GET.

※1 Refer to B13-4.

※2 Refer to B13-5.

※3 As a response format, three characters on the head are letters, and the next two characters are in numerical format.

< No text on this page. >

## **B14** Selection of clamping operation in manual mode

**B14-1** Outline

**B14-2** Specifications

**B14-3** Parameters

**B14-4** Timing charts

## **B14-1** Outline

---

In selection of clamping operation in manual mode, a high-workability clamping operation can be selected by selecting a clamping method at the time of manual operation.

There are the following types of clamping operations in manual mode:

- Constant unclamp
- Clamp after feed operation stops
- Clamp after feed operation stops and set time passes

In “normal unclamp” operation, the round table is normally in the unclamp state and the responsiveness to the next manual operation can be enhanced.

The round table is clamped after feed operation of round table stops except in the “normal unclamp” operation. However, in “Clamp after feed operation stops and set time passes” operation, the round table is not clamped within the set time even after feed operation.

Therefore, the next manual operation can be immediately performed.

## **B14-2** Specifications

---

The specifications for clamping operation selection in manual mode are shown below.

- When the parameter for “Initial mode at the time of power supply input” is set to Manual (PRM0009=1), the machine starts in the operation mode selected by this function.
- In the case of 2 axes specifications, unclamping operation is performed for only the axes indicated in the manual operation except in the setting of “Normal unclamp.”
- During transition to the clamp state (from clamp command after movement stops to confirmation of clamp-related signal), JOG feed, STEP feed and origin return operations are not accepted.
- This function does not include the handle mode.

**B14-3** Parameters

The parameters for “clamping operation selection in manual mode” are shown below.

**B14-3-1** Parameter list

The parameters for “clamping operation selection in manual mode” are shown below.

PRM No.	Name Message	Initial set value	Set unit	Set range	Set value
0410	Clamping operation selection in manual mode	0	-	0 to 2	-
	Clamping operation selection in manual mode				
0411	Unclamp holding time after manual operation	5.0	S	0.0 to 30.00	-
	Unclamp holding time after manual operation				

**B14-3-2** Details of parameter

The details of the parameter in the parameter list are shown below.

[ ] in the comments indicates the initial set value.

0410	Clamping operation selection in manual mode
	Clamping operation selection in manual mode
	[Data Unit] : - [Data Range] : 0, 1, 2

Comments Selects the clamp mechanism  
 [0] Normal unclamp (initial setting)  
 1 Clamp after feed operation stops  
 2 Clamp after feed operation stops and set time passes

**Precaution** As it takes a considerable amount of time to establish the clamping operation of large jigs and jigs with offset load, clamp may not be performed by the operation. In this case, apply the operation “2” .

0411	Unclamp holding time after manual operation
	Unclamp holding time after manual operation
	[Data Unit] : s [Data Range] : 0.0 to 30.00

Comments The unclamp state continues during this set time after feed operation by manual operation.  
 And in the case of 2 axes specifications, as unclamp duration is a common parameter, unclamp holding time starts when feed operation of both axes stops.

**Precaution** When PRM0400=2 is set by large jigs and jigs with offset load, do not set small values. It may cause the machine not to operate.

## B14-4 Timing charts

The timing chart of each operation in manual mode is shown below.

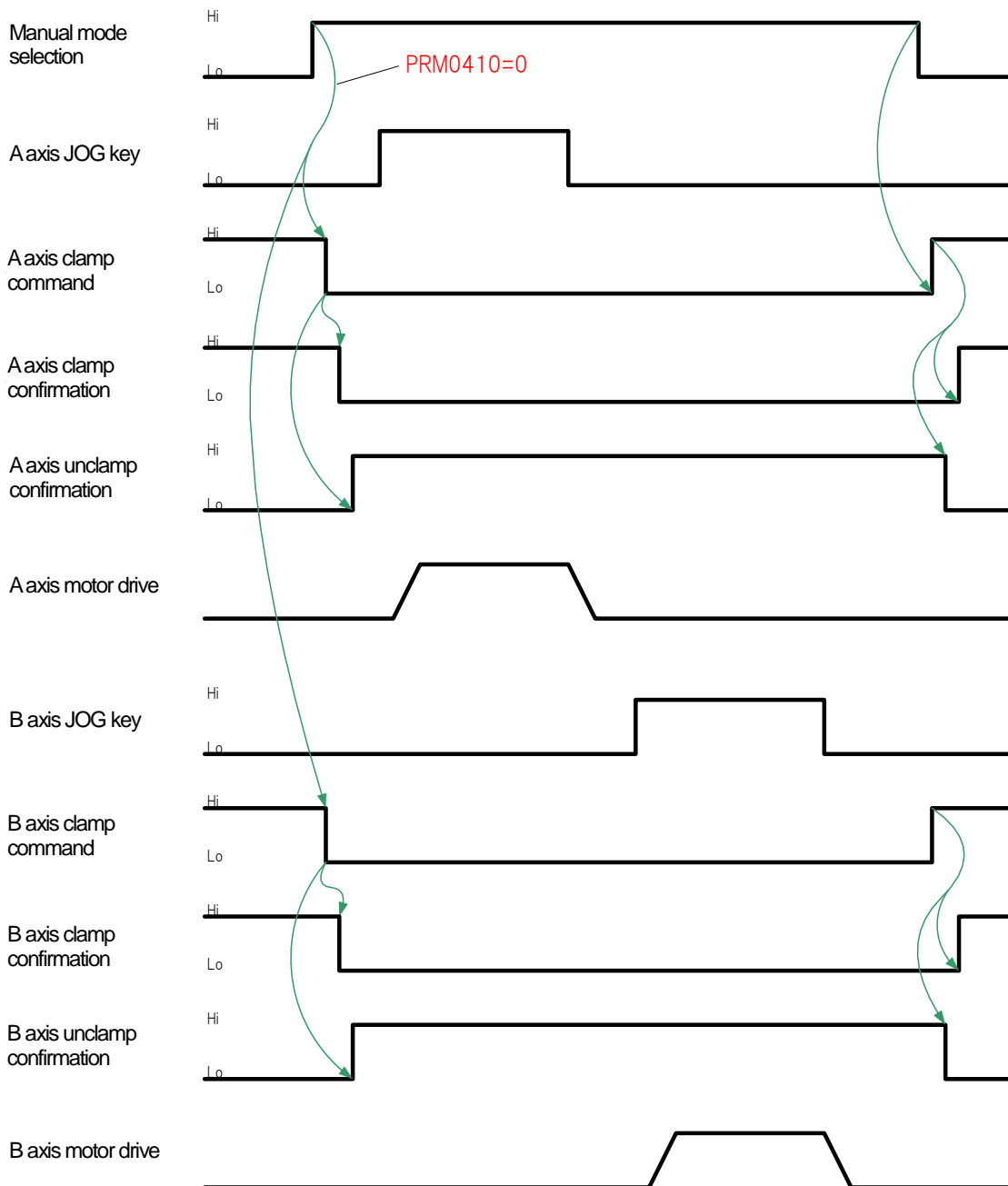
However, the following description is based on the assumption of “with clamp function (PRM0012=1)” .

### B14-4-1 Timing chart at the time of JOG operation

Timing chart at the time of JOG operation in manual mode is shown below.

#### B14-4-1-1 Normal unclamp 【PRM0410=0】

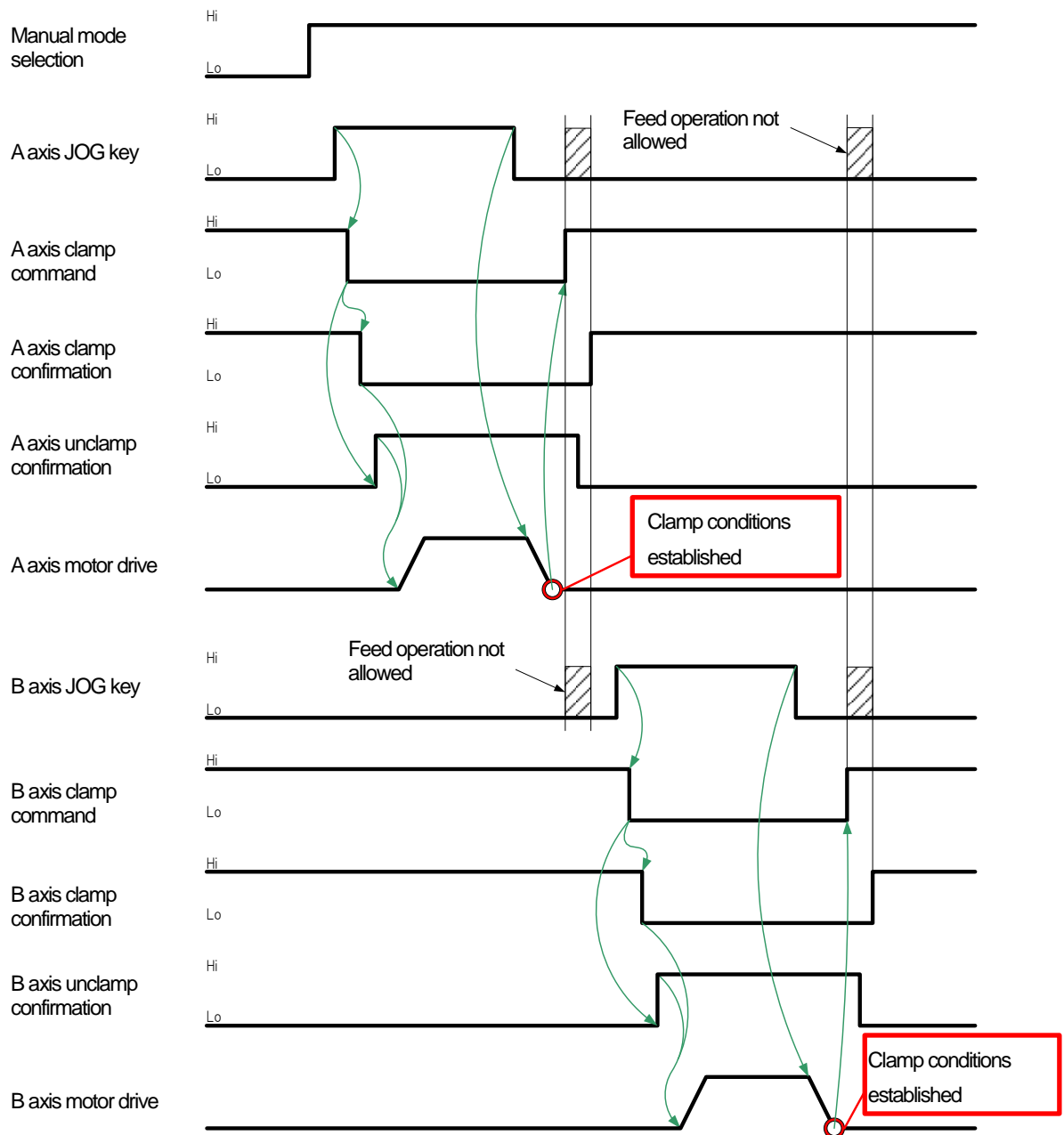
In manual mode, normal clamp command is turned off (unclamp command) to put the axis in the unclamp state. And it is clamped except when the manual mode is selected.





**B14-4-1-2** Clamp after feed operation stops [PRM0410=1]

The axis is clamped after JOG feed operation finishes in this setting.  
And it is in the clamp state after transition to manual mode.



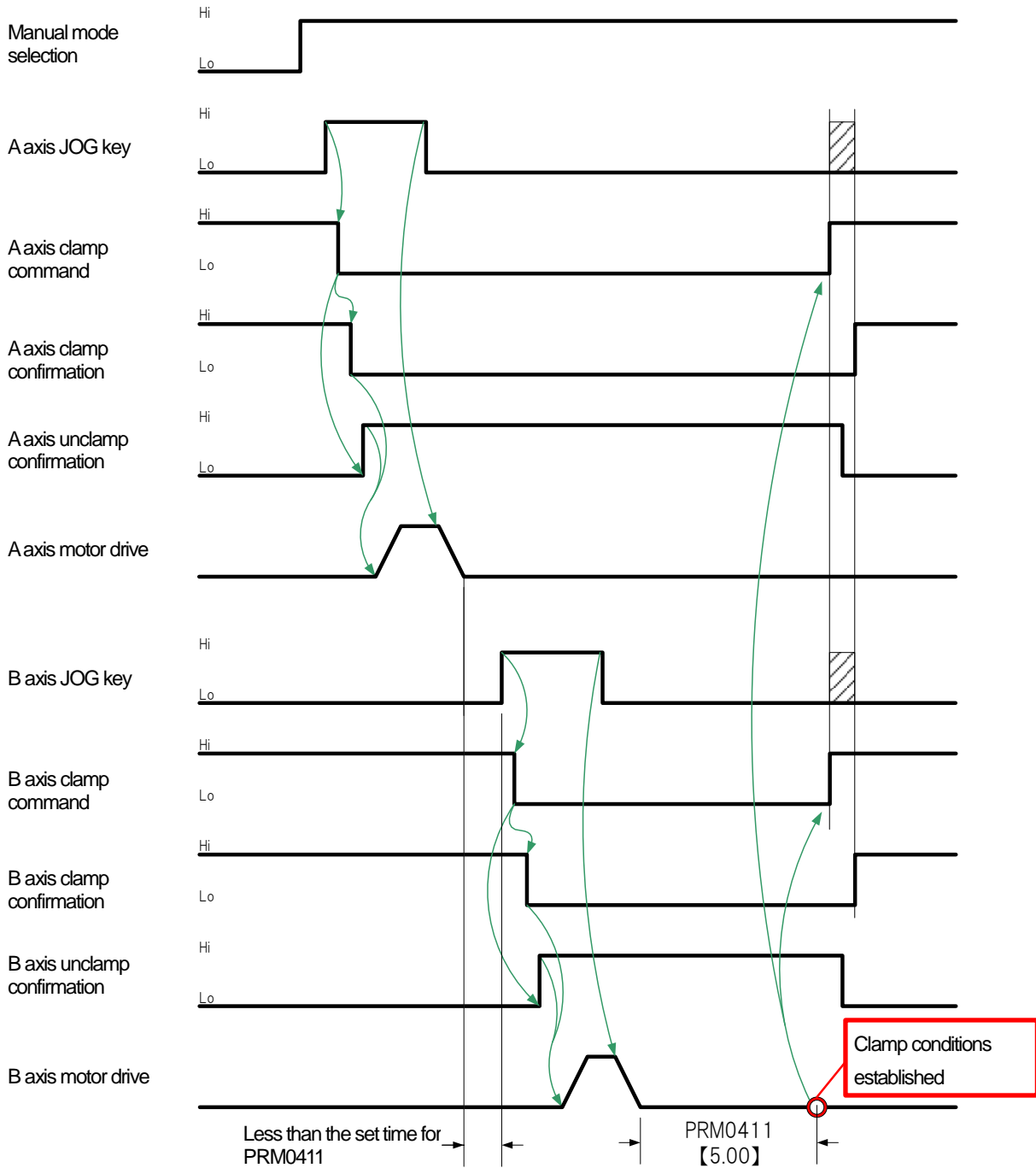
**B14-4-1-3** Clamp after feed operation stops and set time passes [PRM0410=2]

In this setting, the axis is clamped after JOG feed operation stops and the set time for PRM0411 passes.

When JOG operation is performed again during the time of PRM0411, the time of PRM0411 restarts after the operation stops.

When the mode is changed (except a handle) and an alarm occurs during the time of PRM0411, clamp operation starts without waiting for the time passing.

And it is in a clamp state after transition to manual mode.

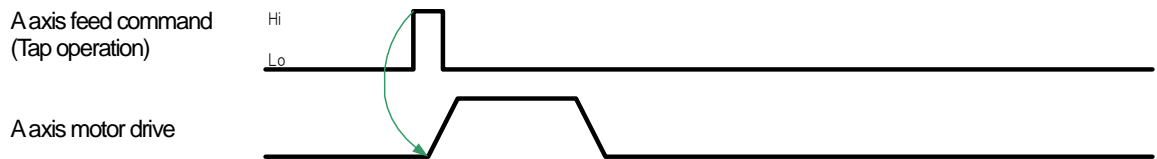


**B14-4-2** Timing chart at the time of tap operation

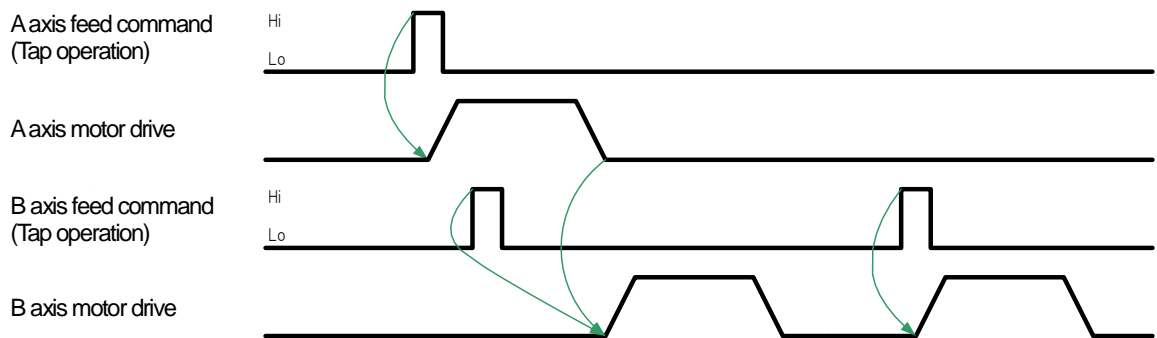
The timing chart of tap operation (step feed) in manual mode is shown below.  
 When tap operation is performed while the axis operates, the motor continuously operates for the frequency of tap operation.  
 When tap operation is performed during deceleration, the motor operates after the axis decelerates and stops.  
 When tap operation is performed for an axis different from the axis in operation, the motor operates after the axis in operation decelerates and stops.

**B14-4-2-1** Normal unclamp 【PRM0410=0】

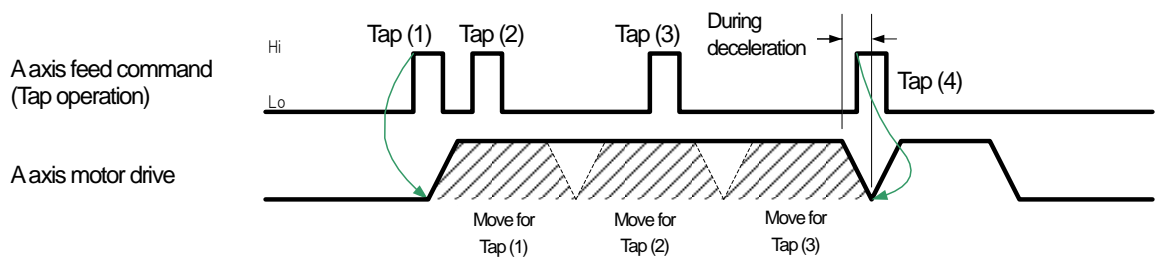
<Tap operation for 1 axis>



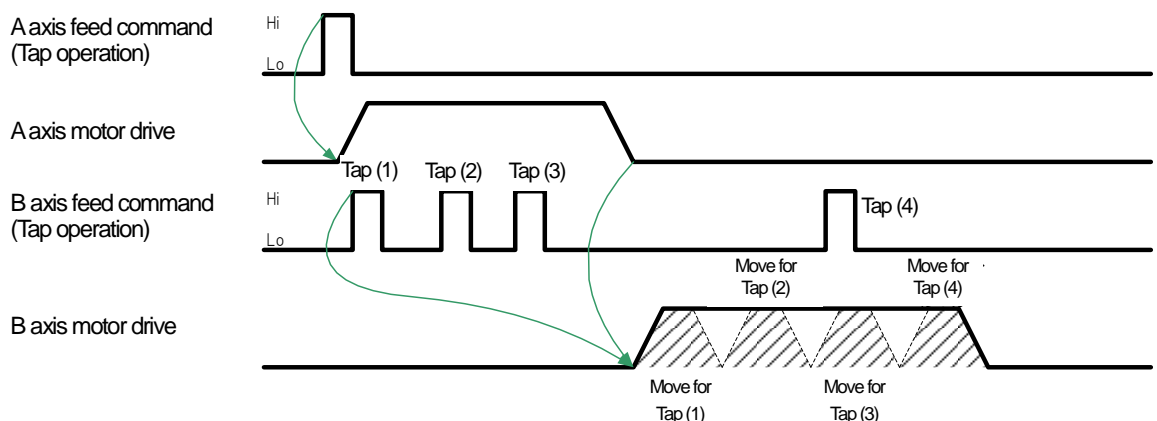
<Tap operation for 2 axes>



<Continuous tap operation for 1 axis>

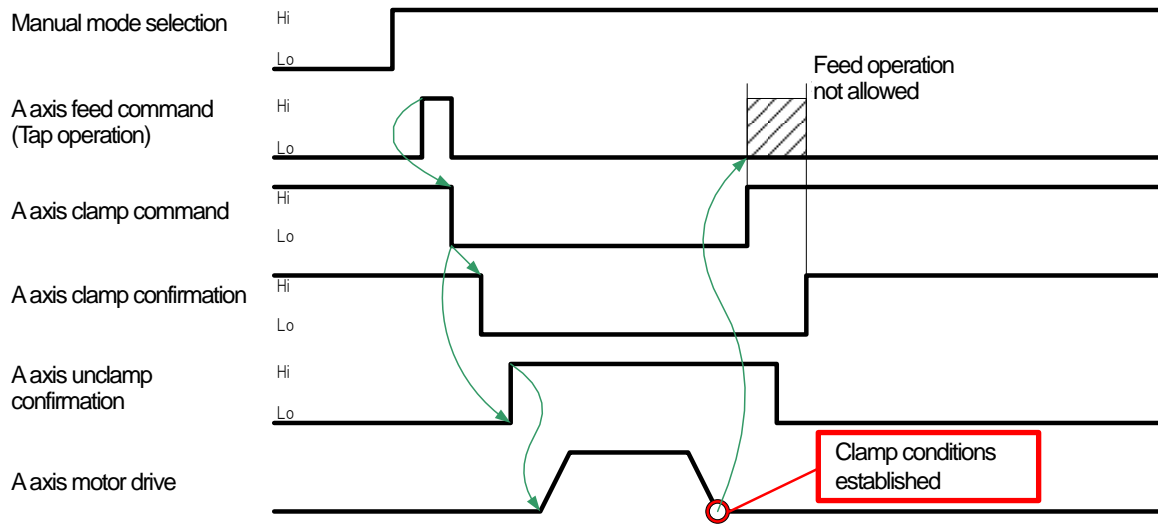


<Continuous tap operation for 2 axes>

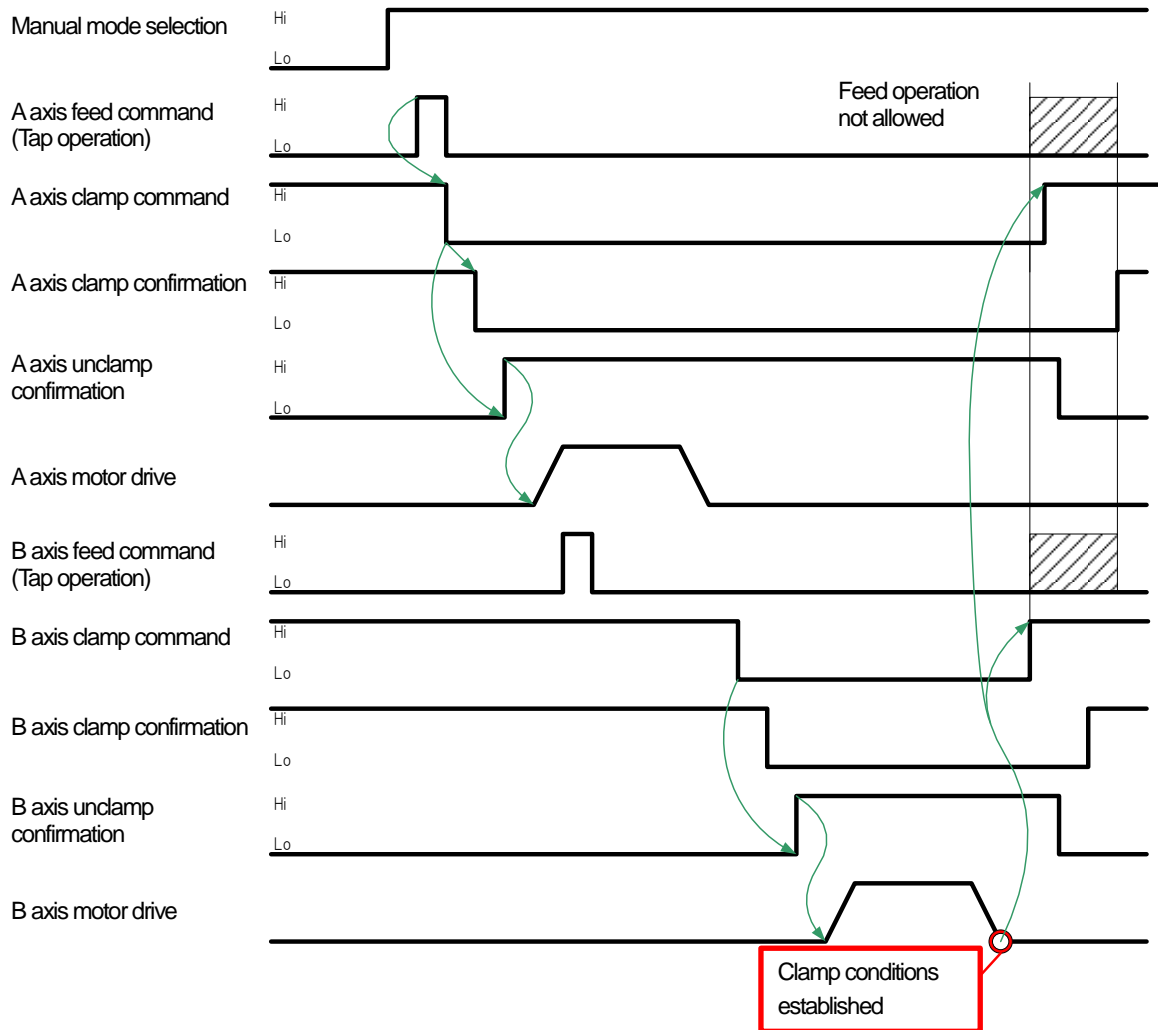


**B14-2-2** Clamp after feed operation stops [PRM0410=1]

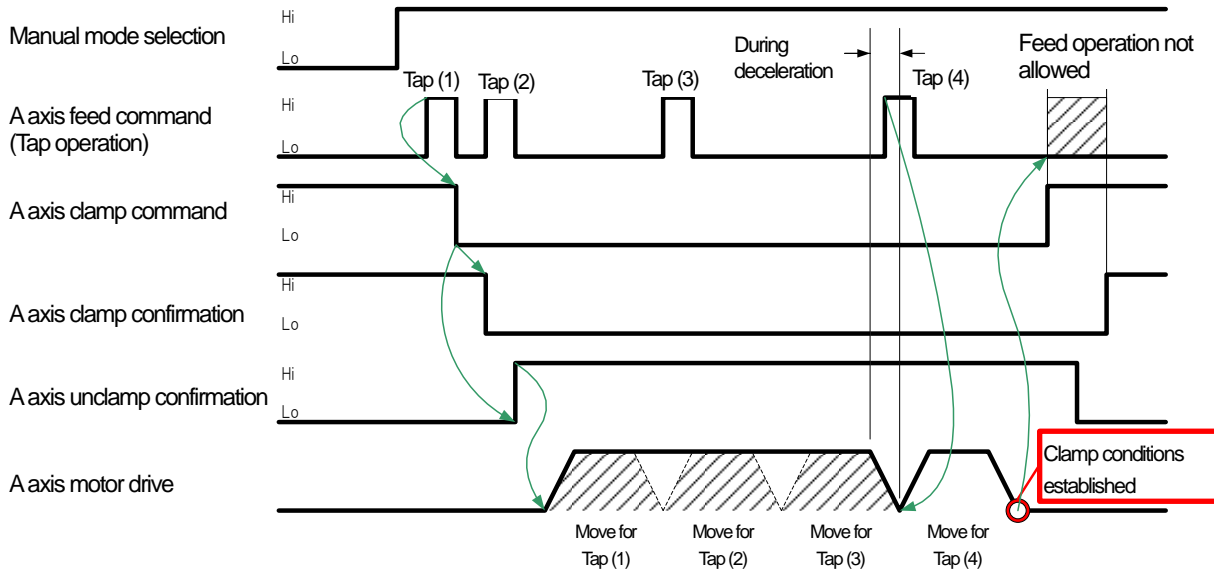
<Tap operation for 1 axis>



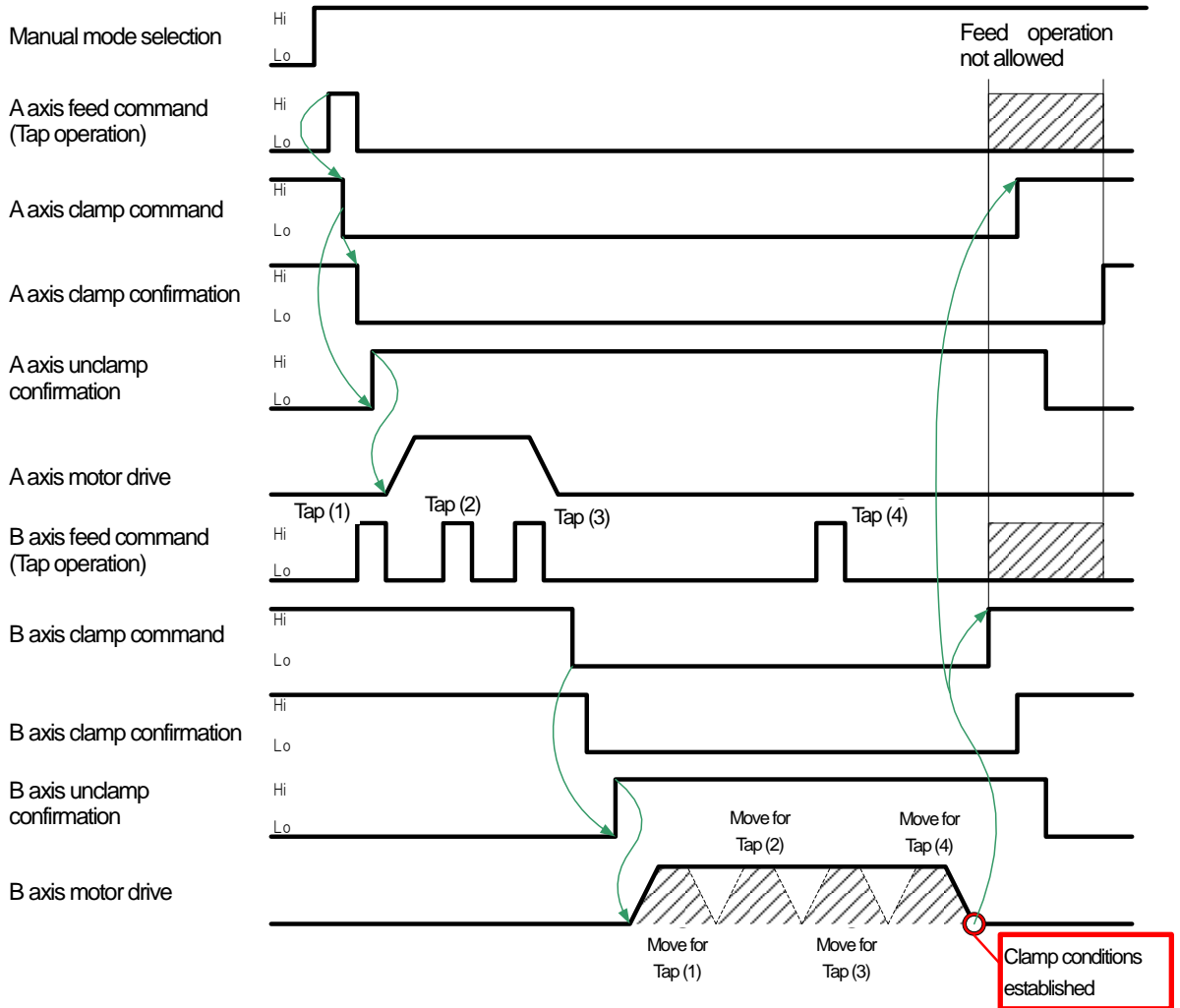
<Tap operation for 2 axes>



<Continuous tap operation for 1 axis>

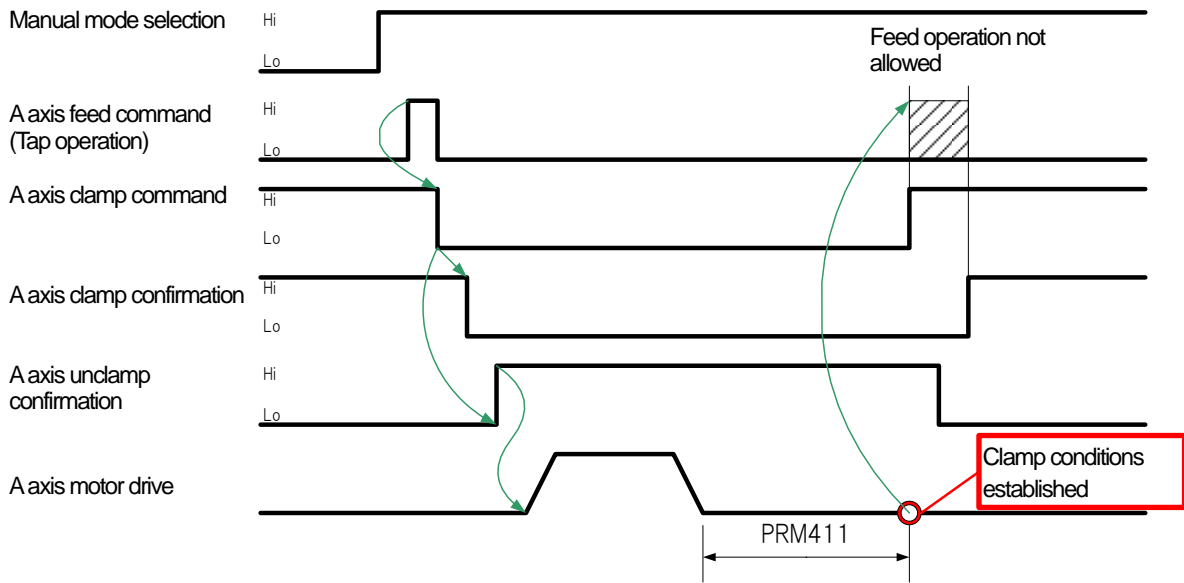


<Continuous tap operation for 2 axes>

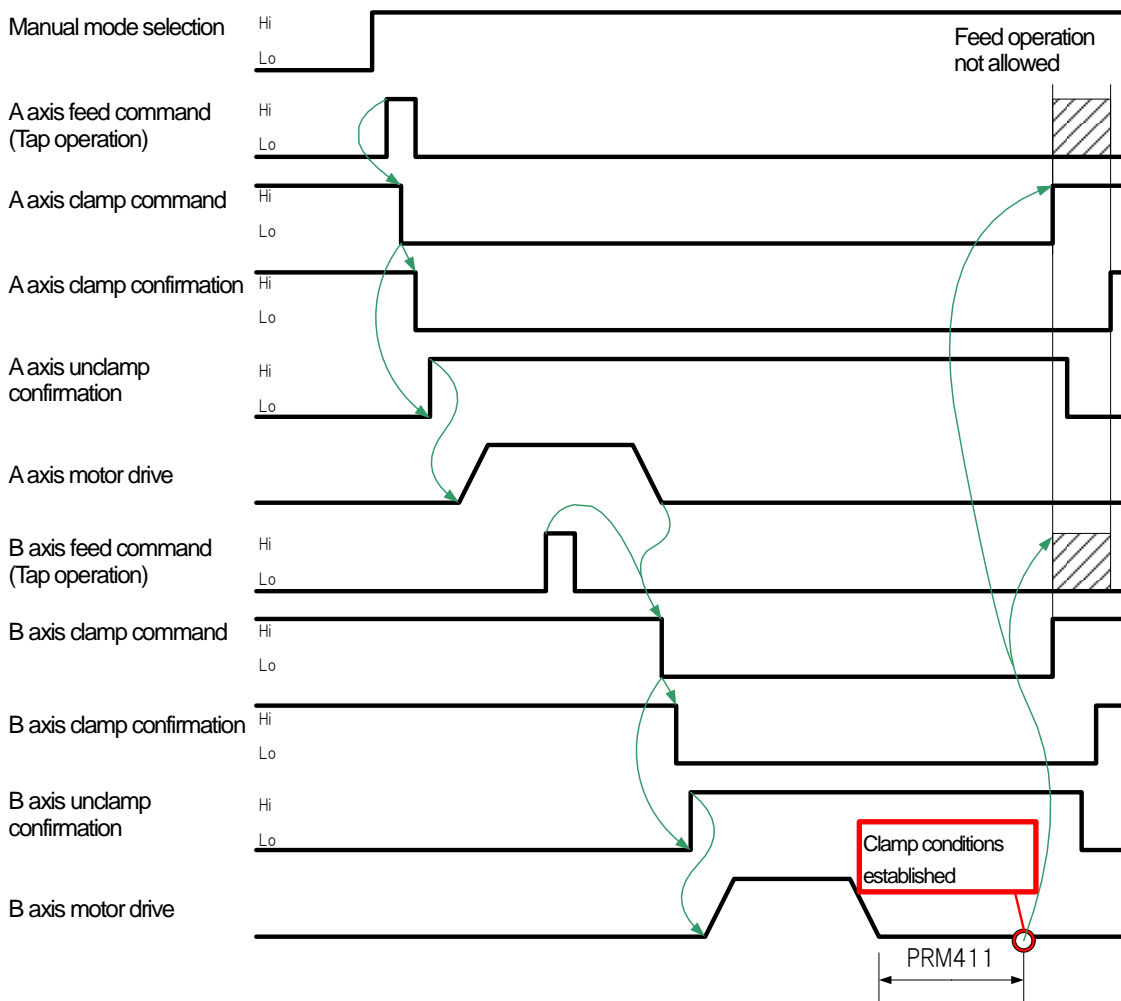


**B14-4-2-3** Clamp after feed operation stops and set time passes [PRM0410=2]

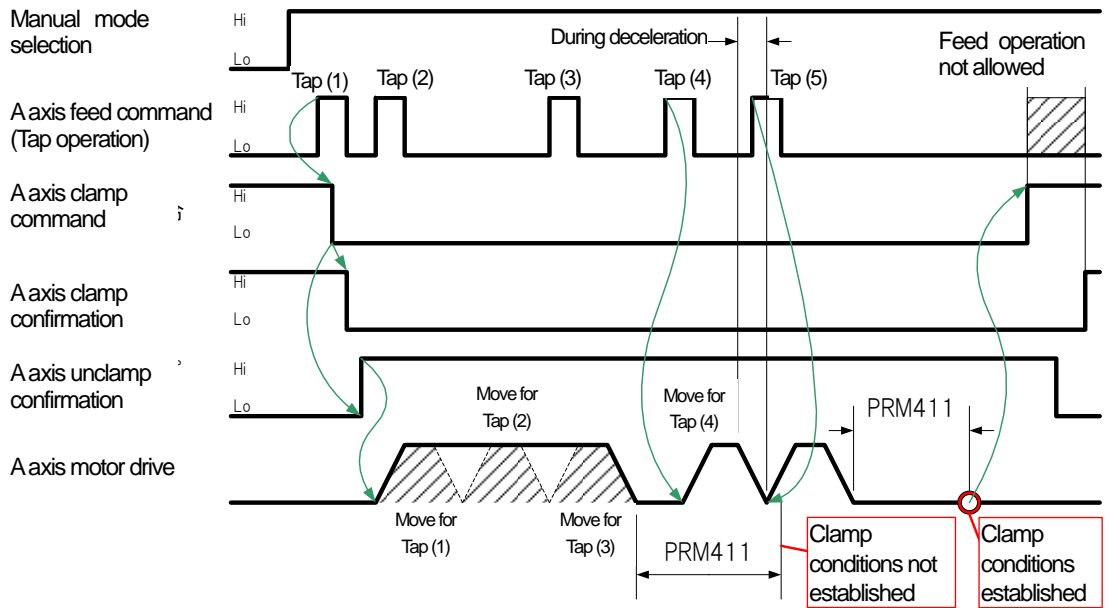
<Tap operation for 1 axis>



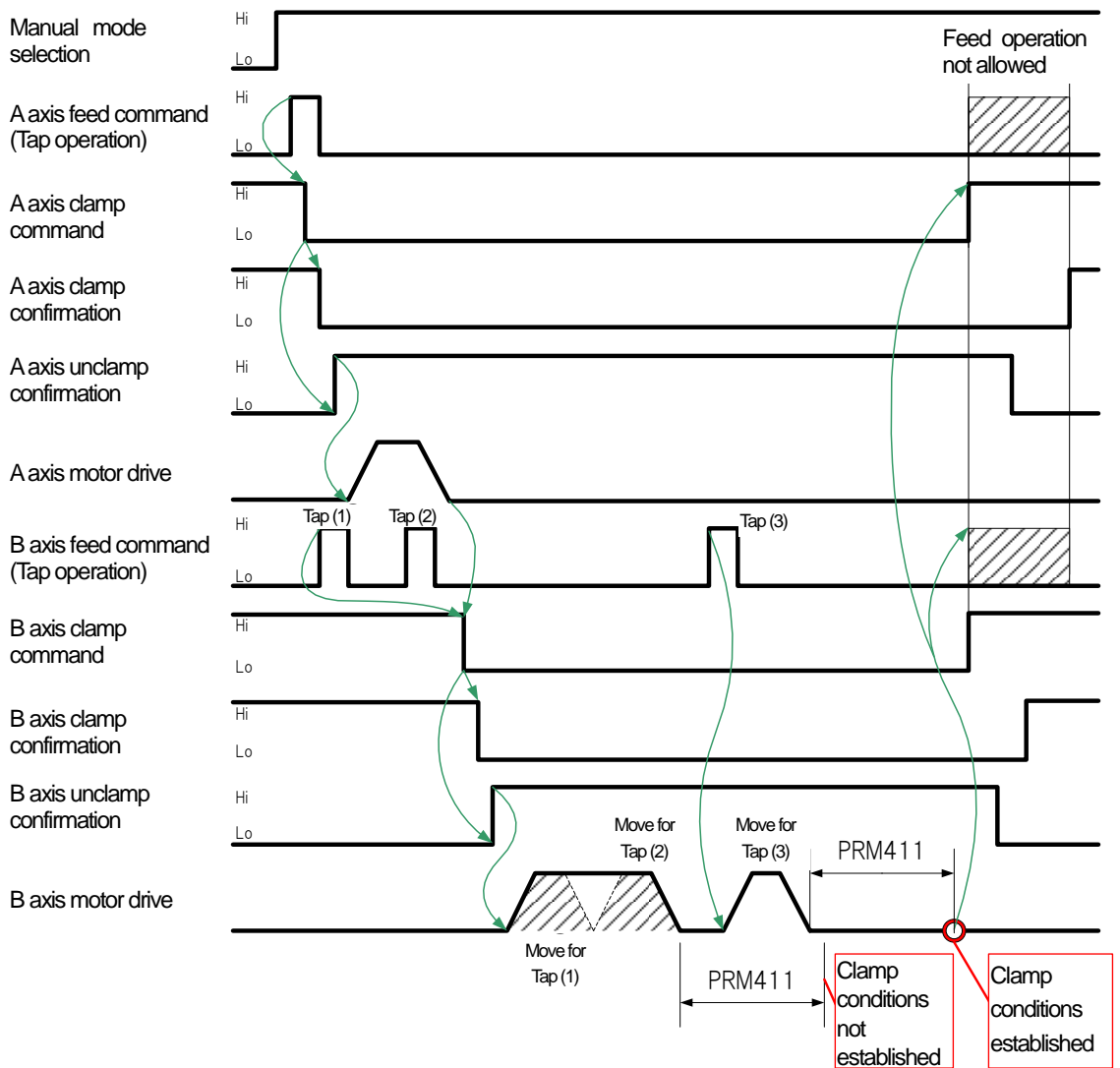
<Tap operation for 2 axes>



<Continuous tap operation for 1 axis>



<Continuous tap operation for 2 axes>



< No text on this page. >



## **B15** Control of motor with brake

- B15-1** Outline
- B15-2** Specifications
- B15-3** Parameter
- B15-4** Operation sequence

## **B15-1** Out line

---

Controls the hold brake of a motor with brake

The characteristics of specifications for control of motor with brake are shown as follows:

When the power supply of Quinte is off, the hold brake operates.

When Quinte is in emergency stop status, the hold brake operates.

When the servo alarm occurs in Quinte, the hold brake operates.

This function cannot be used with the clamp mechanism of the rotary table.

## **B15-2** Specifications

---

In the specifications for control of the motor with brake, the brake of the servo motor is controlled using brake signals (BK+, BK-) of CB1Q cable of Quinte.

The power supply voltage of the brake signals and the operation sequence in the specifications for brake control are shown here.

### **B15-2-1** Power supply voltage

The power supply voltage of the brake signal is 24V DC (load current Max. 1A).

The voltage is output when the hold brake of the servo motor is released.

**B15-3** Parameter**B15-3-1** Transition to control function of motor with brake

To operate the function of the control of motor with brake, the sequences below must be followed.

- ① Change the parameter of the control of motor with brake
- ② Update by turning the power supply OFF or ON

Setting is applied by changing the parameter and restarting power supply.

After turning on the power supply, the hold brake is released at the same time as completion of system startup.

The specifications for control of motor with brake are selected by PRM0012 (clamp mechanism selection).

**B15-3-2** List of parameters

A list of parameters on specifications for brake control is shown below.

PRM No.	Name Message	Initial set value	Set unit	Set range	Set value
0012	Clamp mechanism selection	1	-	0 to 2	2
	Clamp specification				
5313	Hold brake operation delay time (holding delay time)	0	ms	0 to 1000	300
	Operation delay of hold brake 1				
5314	Hold brake operation release delay time (release delay time)	0	ms	0 to 1000	300
	Operation delay of hold brake 2				

**B15-3-3** Details of parameter

The details of the parameter in the parameter list are shown below.

[ ] in the comments indicates the initial set value.

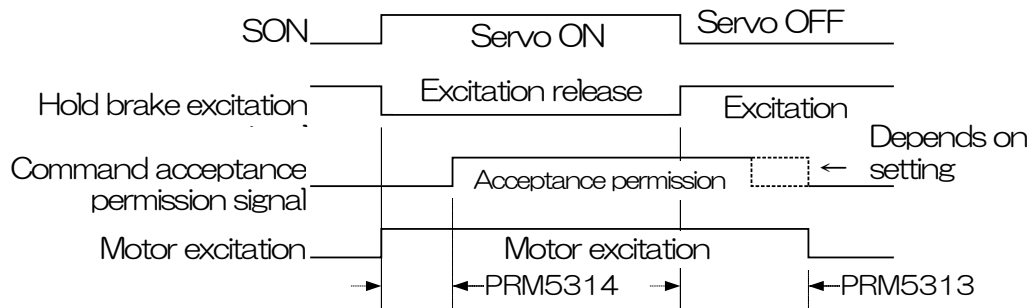
0012	Clamp mechanism selection Clamp specification	[Data Unit] :-	[Data Range] : 0 to 2
Comments	Selects the clamp mechanism 0 Without clamp mechanism [1] With clamp mechanism 2 Specifications for control of motor with brake (without clamp mechanism)		
Precaution	<input type="checkbox"/> To enable this parameter, the power supply must be turned off once.		

5313	Hold brake operation delay time (holding delay time) Operation delay of hold brake 1
5314	Hold brake operation release delay time (release delay time) Operation delay of hold brake 2
【Data Unit】 : ms                      【Data Range】 : 0 to 1000	

## Comments

At the time of transition from servo ON to servo OFF, the servo motor is excited for the set time of PRM5313. (Even if the servo is turned off, power is continuously supplied to the motor until this time passes.) This causes the servo motor to generate hold torque (thrust force) until the hold brake starts to operate.

At the time of transition from servo OFF to servo ON, the servo motor is excited with command zero during the set time of PRM5314. (Even if the servo is turned on, command acceptance is not permitted until this time passes. This causes the servo motor not to operate until the hold brake is released.)



The function is enabled when it is set to servo brake operation at the time of servo OFF in the setting of “dynamic brake operation.” (The function does not operate in dynamic brake operation and free run operation.)

**Precaution**

- ❑ As a set unit is enabled by the 4ms unit, the remainder when divided by 4 is rounded off.
- ❑ In the case of set value 0ms, a command is disabled (command zero) for approximately 4ms after servo ON.

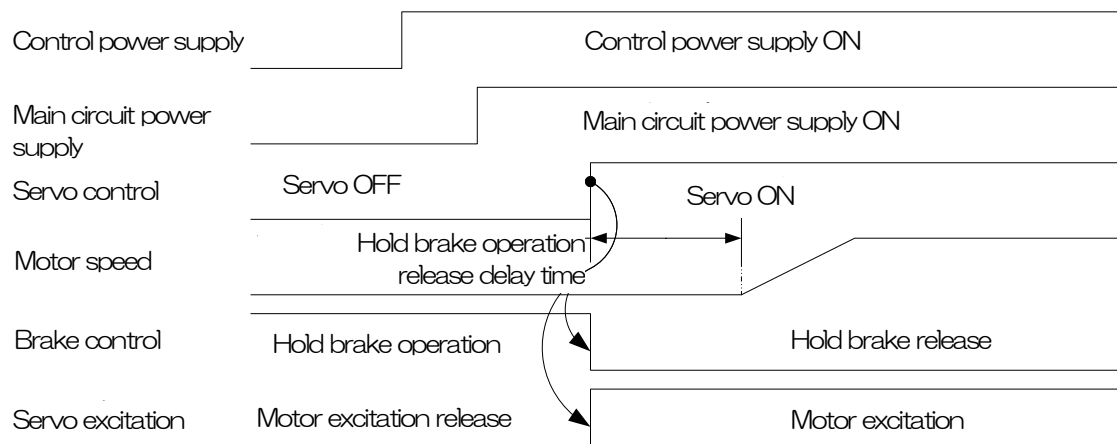
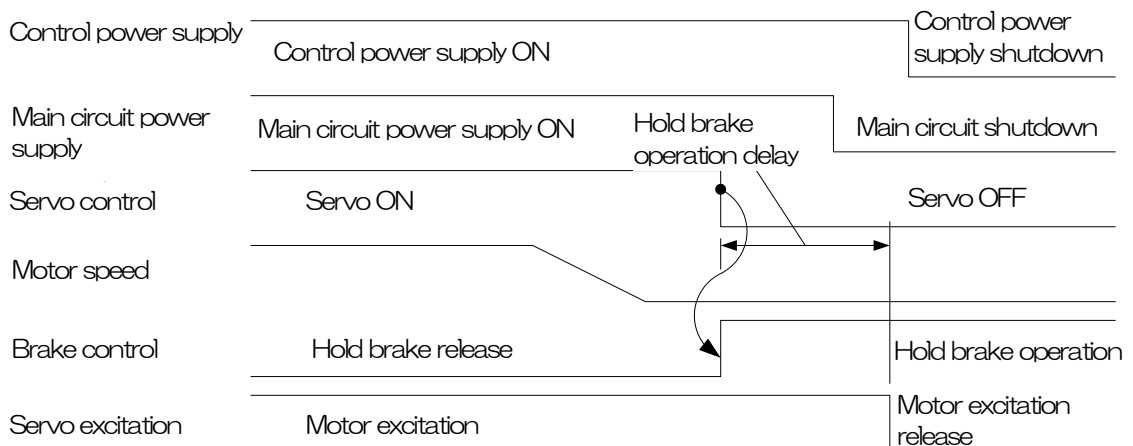
**B15-4** Operation sequence

The control sequences of motor with brake are shown below.

There are five patterns: when the power supply is turned on, when the power supply is shut down, DB stop when servo alarm occurs (dynamic brake stop), SB stop when servo alarm occurs (servo brake stop) and when emergency stop occurs

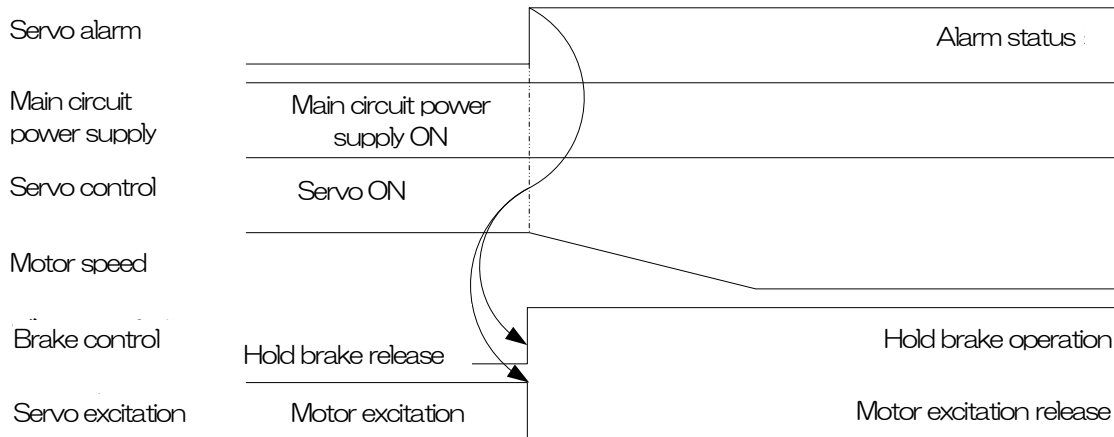
**B15-4-1** Sequence from power supply ON to servo ON

After the power supply is turned on, turning servo ON immediately releases the hold brake to hold the status.

**B15-4-2** Operation sequence from servo OFF to power supply shutdown

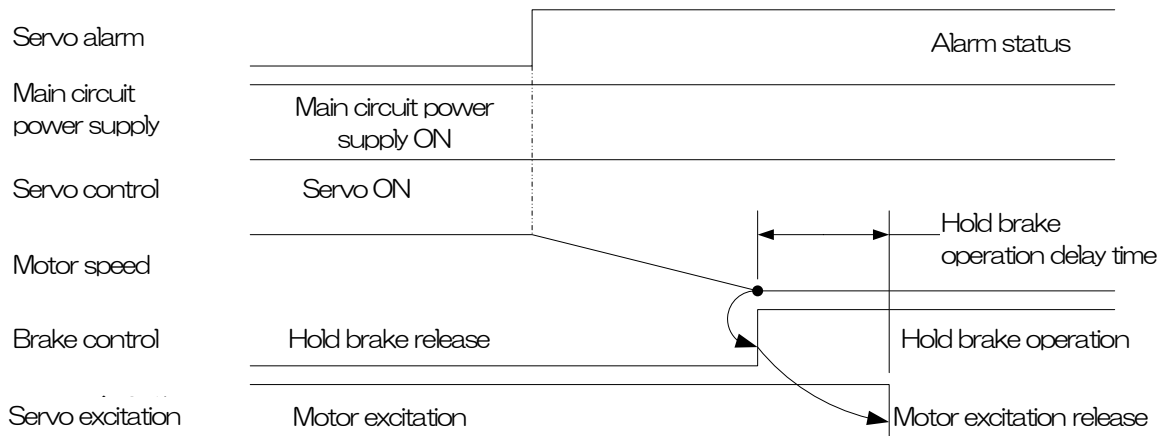
**B15-43** Operation sequence from servo OFF to power supply shutdown

- ◆ When the servo alarm (DB stop) occurs, the motor reduces its speed and stops by dynamic brake operation.
- ◆ Motor excitation is released and the hold brake is operated at the same time as the servo alarm occurs.



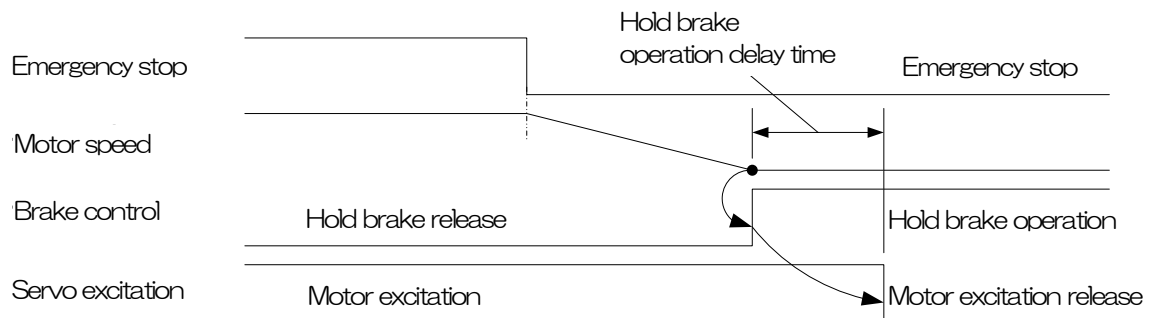
**B15-44** SB stop (servo brake stop) sequence when servo alarm occurs

- ◆ When the servo alarm (SB stop) occurs, the motor reduces its speed and stops by servo brake operation.
- ◆ When the motor speed is  $50\text{min}^{-1}$  or below, the hold brake operates.



**B15-4-5** Stop sequence in the event of emergency stop

- ◆ When emergency stop occurs, the motor reduces its speed and stops by servo brake operation.
- ◆ When the motor speed is  $50\text{min}^{-1}$  or below, the hold brake operates.
- ◆ When emergency stop occurs, the safe torque off function operates because of Quinte hardware configuration.
- ◆ If the safe torque off function operates during servo motor rotation, and if the hold brake operation delay time (PRM5313) is longer than the safe torque off delay time (internal processing time Max. 500ms), the motor excitation is released after the safe torque off delay time (Max. 500ms) passes.



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## **B16** External mode selecting function

- B16-1** Overview
- B16-2** Parameter
- B16-3** Detailed explanation

**B16-1** Overview

The external mode selecting function enables the user to change the mode with external signals.

In the external mode selecting function, external mode selecting signals are allocated to general-purpose input/output signals and used to switch and check modes. Note that when a mode selection signal is input from the outside, mode selection using the operation panel is impossible.

Externally selectable mode

- AUTO (RMT)
- MANUAL (HANDLE/OPERATION)
- PROGRAM
- PARAMETER
- ALARM
- MAINTENANCE

A full I/F cable (CB3Q) is required to use this function.

**B16-2** Parameter**B16-2-1** Allocation to general purpose input / output

To enable external mode selection, allocate the mode selection signals, external mode selection permission signals, and mode output signals to the general-purpose input/output signals. Never fail to allocate the external mode selection permission signals.

The parameters are explained below.

[Input signal allocation]...Mode selecting signal

General-purpose input signal 1	PRM1100	General-purpose input signal 4	PRM1103
General-purpose input signal 2	PRM1101	General-purpose input signal 5	PRM1104
General-purpose input signal 3	PRM1102	General-purpose input signal 6	PRM1105

[Output signal allocation]...External mode selection permission signal, mode output signal

General-purpose output signal 1	PRM1106	General-purpose output signal 4	PRM1109
General-purpose output signal 2	PRM1107	General-purpose output signal 5	PRM1110
General-purpose output signal 3	PRM1108	General-purpose output signal 6	PRM1111

Each parameter can be used for mode selection by the allocation shown below.

#### Allocatable input signal

Setting value: 40	AUTO mode selection	[AUTO MODE SEL]
	Input when the AUTO mode is selected	
Setting value: 41	MANUAL mode selection	[MANUAL MODE SEL]
	Input when the MANUAL mode is selected	
Setting value: 42	PROGRAM mode selection	[PROGRAM MODE SEL]
	Input when the PROGRAM mode is selected	
Setting value: 43	PARAMETER mode selection	[PARAMETER MODE SEL]
	Input when the PARAMETER mode is selected	
Setting value: 44	ALARM mode selection	[ALARM MODE SEL]
	Input when the ALARM mode is selected	
Setting value: 45	MAINTENANCE mode selection	[MAINTENANCE MODE SEL]
	Input when the MAINTENANCE mode is selected	

#### Allocatable output signal

Setting value: 24	In AUTO mode	[AUTO MODE]
	Output in the AUTO mode	
Setting value: 41	In MANUAL mode	[MANUAL MODE]
	Output in the MANUAL mode	
Setting value: 42	In PROGRAM mode	[PROGRAM MODE]
	Output in the PROGRAM mode	
Setting value: 43	In PARAMETER mode	[PARAMETER MODE]
	Output in the PARAMETER mode	
Setting value: 44	In ALARM mode	[ALARM MODE]
	Output in the ALARM mode	
Setting value: 45	In MAINTENANCE mode	[MAINTENANCE MODE]
	Output in the MAINTENANCE mode	
Setting value: 46	External mode selection permission signal	[Mandatory] [ALLOW MODE SELECT]
	Output when mode selection is enabled	

### **B16-2-2** How to display signals on I/O monitor screen

Signals can be displayed on the I/O monitor screen by allocating the general-purpose input/output signals to parameter 0800 to 0809.

The strings in the parentheses [ ] described in the above parameter explanation are displayed on the I/O monitor screen.

Displaying on the screen is not mandatory.

General-purpose input signal 1 to 6 : Setting value 9 to 14

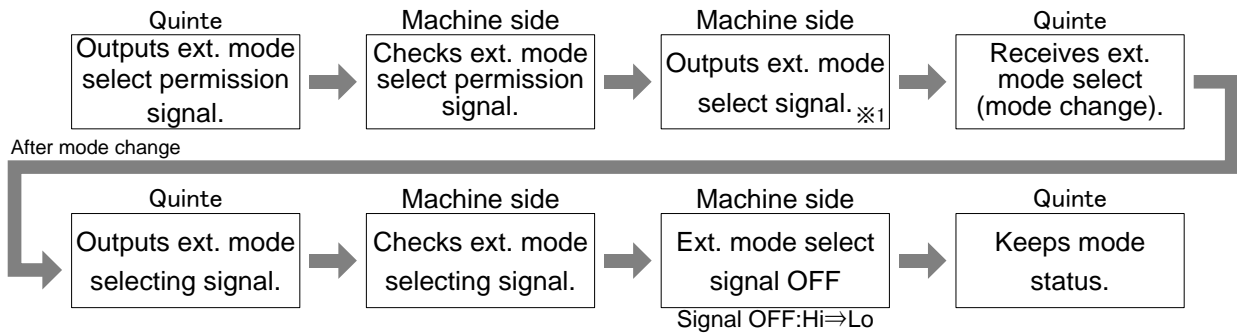
General-purpose output signal 1 to 6 : Setting value 35 to 40

**B16-3** Detailed Explanation

The operation sequence and timing chart examples are shown below. Prepare a control program for the machine side according to the operation sequence.

**B16-3-1** Operation sequence

The operation sequence of external mode selection is shown below.

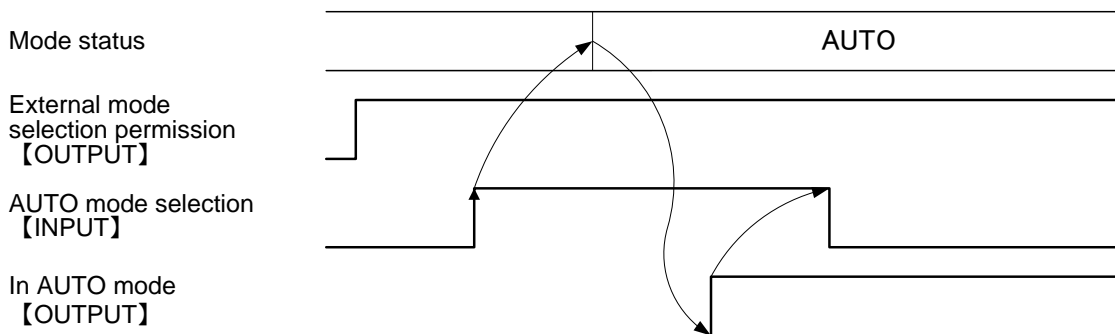


※1 If a Quinte program is edited but not saved, and external mode selection is performed from the machine side, the mode is changed to another mode with the program unsaved. The unsaved program will be deleted if the power is interrupted or a program file is opened.

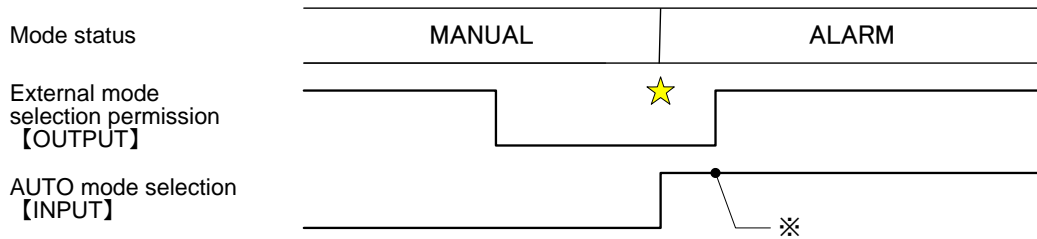
**B16-3-2** Timing chart example

Timing chart examples of mode change by external mode selection are shown below.

**B16-3-2-1** When mode selection signal is normally accepted



**B16-3-2-2** When mode selection signal is not accepted

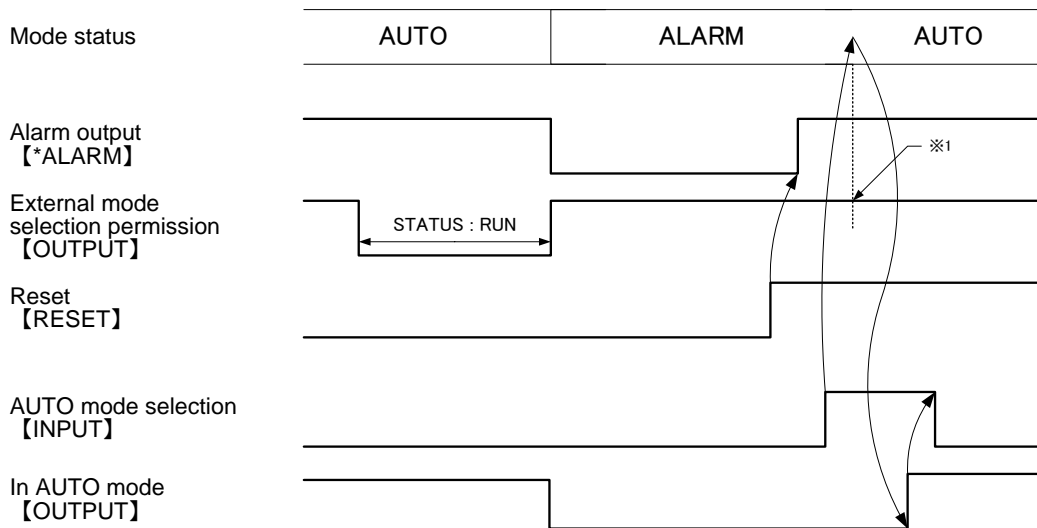


At the timing marked with ☆, the external mode selection permission signal is Lo and the mode is not changed.

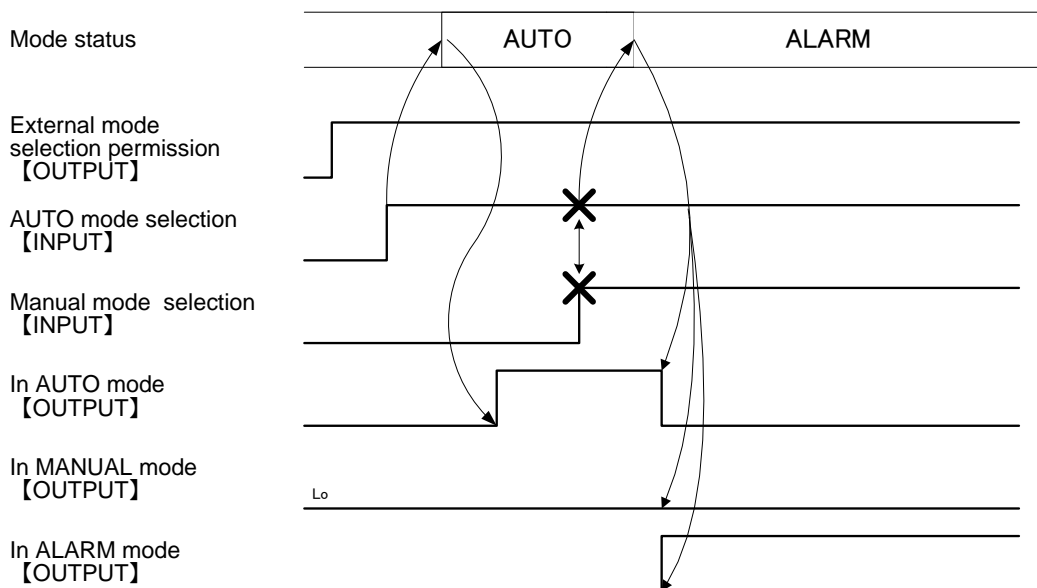
An alarm (IF240) is issued if a mode selection signal is input when the external mode selection permission signal is Lo.

The mode selection signal is not accepted at the point marked with ※ because the signal is not raised (Lo to Hi).

**B16-3-2-3** When an alarm occurs during AUTO mode operation and then the mode changes to AUTO

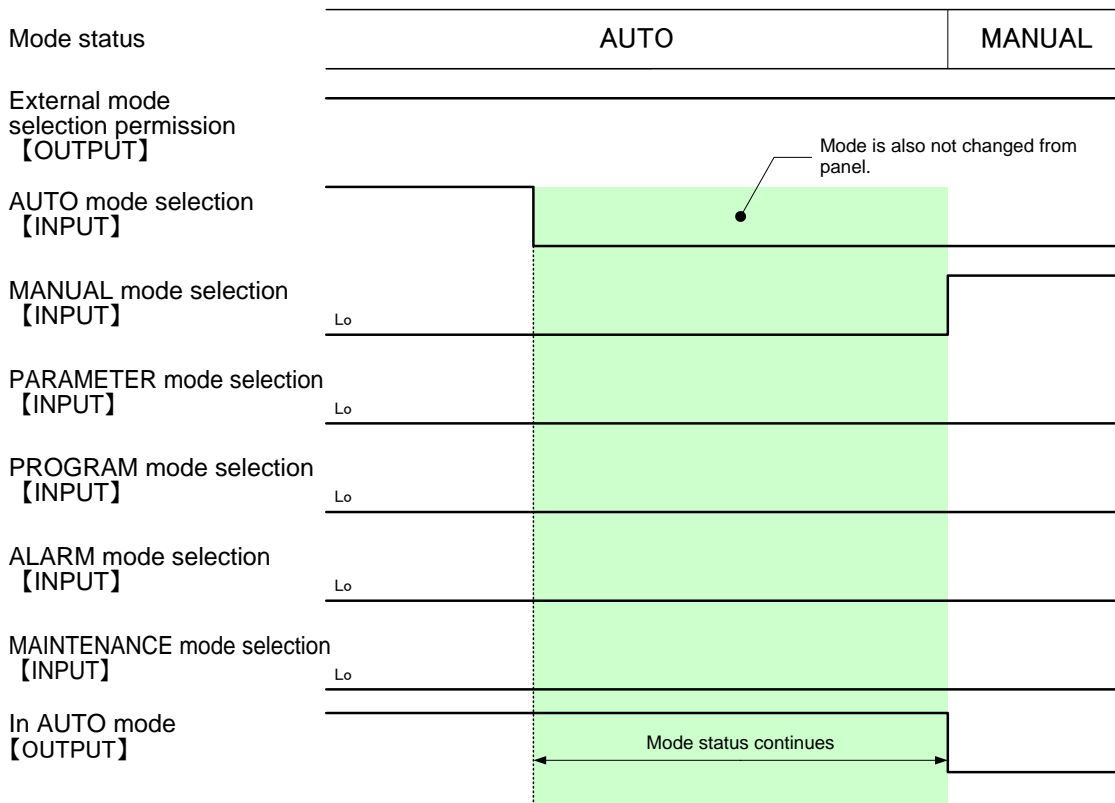


**B16-3-2-4** When mode selection signals are input simultaneously

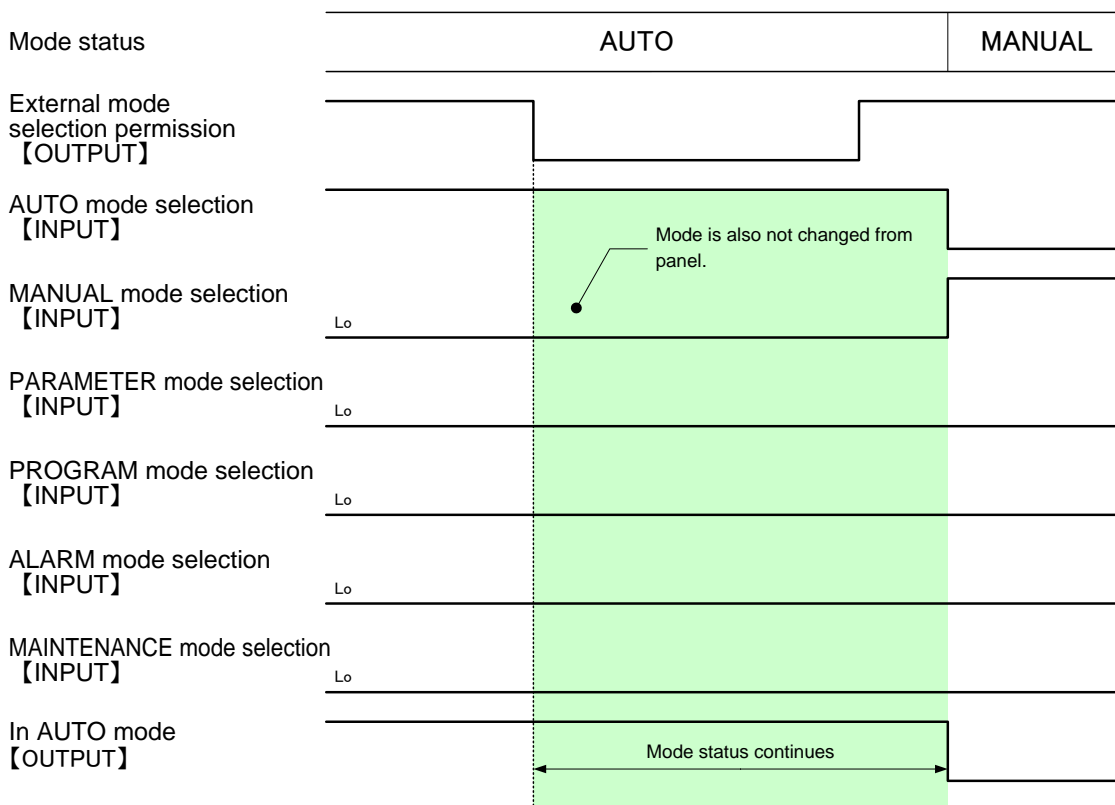


If multiple mode selection signals are input simultaneously, an alarm (IF240) occurs.

**B16-3-2-5** When all mode selection signals become Lo



**B16-3-2-6** When external mode selection permission signal becomes Lo



## **B2** Panel operation

- B2-1** Power switch
- B2-2** Controls related to key operation
- B2-3** Mode select key
- B2-4** Auto operation key
- B2-5** Manual axis feed key
- B2-6** Feed override change mode key
- B2-7** OT release mode key
- B2-8** Page operation key
- B2-9** Line feed key
- B2-10** Data input key
- B2-11** Confirm (ENTER) key
- B2-12** Reset (RESET) key
- B2-13** Delete (DEL) key
- B2-14** Return (RETURN) key

## B2-1 Power switch



- When the power switch is locked with a pad lock, maintenance work is performed, therefore, do not turn the power switch to the **ON** position.  
(Physical accident may result)
- Do not change the current limit setting power switch (breaker).  
(Damage of the device or burnout or fire may result)

When over-current flows through Quinte, the breaker function operates, and power is automatically shut down, then the power switch is turned to the **TRIPPED** position. To recover, return the knob **O (OFF)** once, and then turn it to **I (ON)**.

“A2 Power on/off” (Page A2-1)

### How to lock the power switch

Lock the power switch according to the following procedure at the time of maintenance work involving danger if the power is on.

- 1) Turn the power switch to the **O (OFF)** position.
- 2) Set a pad lock with the shutter plate pushed in the arrow direction.  
Customer should prepare the pad lock.

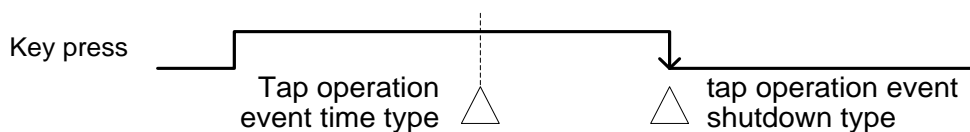
## B2-2 Controls related to key operation

Keys on the operation panel have key input methods corresponding to each of them and timing of the event varies depending on the key to be pressed.

Controls related to the key operation and key assignment corresponding to them are shown below.

### Tap operation

- There is a “tap operation event shutdown type” in which acceptance of key input is completed by continuously inputting with the associated button for the set time or longer and an event is triggered to be executed by key shutdown (state that the key is released) and a “tap operation event time type” in which an event is triggered at a certain time.



: Any event occurs.

- In case of tap operation, no action is executed at the time of shutdown if the key is pressed continuously for a certain time of key input time.



Scroll operation

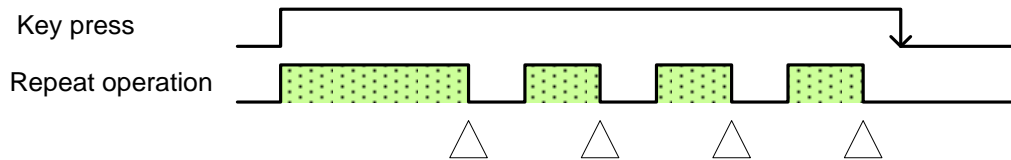
- There is a tap operation and slide operation for scroll operation.

Tap operation If normal tap operation (above tap operation) is performed, the screen is scrolled by one. When  is pressed, page goes up and if  is pressed, page goes down.

Slide operation Moving amount check is started from the time when the key is pressed, and slide operation is set in when moving amount is larger than a certain amount. If sliding is performed beyond the range of the slide operation, the screen also stops at a place where sliding exceeds the range.

Repeat operation

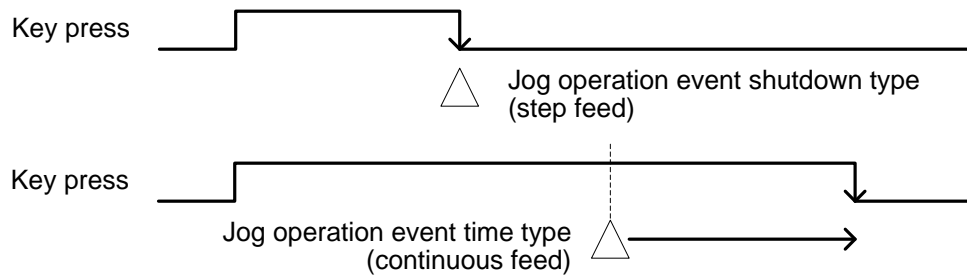
- Performing same operation as continuous input if the key is continuously pressed is called a repeat input type.



△ : Any event occurs.

Jog operation

- Operation performed with  key in manual mode is called jog operation.
- There is a jog operation event shutdown type (step feed) and a jog operation event time type (continuous feed) for jog operation.



△ : Any event occurs.

Operations assigned to each key are shown below.

Tap operation	Tap operation event shutdown type	Not specified below
	Tap operation event time type	START,STOP
Scroll operation	At the time of program, parameter list	<input type="button" value="Up"/> , <input type="button" value="Down"/> , scroll bar
Repeat operation	At the time of program, parameter list	<input type="button" value="Up"/> , <input type="button" value="Down"/>
	Feed override change mode	<input type="button" value="Up"/> , <input type="button" value="Down"/>
Jog operation	Tap operation event shutdown type	<input type="button" value="Left Arrow"/> , <input type="button" value="Right Arrow"/> , <input type="button" value="Up"/> , <input type="button" value="Down"/>
	Tap operation event time type	<input type="button" value="Left Arrow"/> , <input type="button" value="Right Arrow"/> , <input type="button" value="Up"/> , <input type="button" value="Down"/> , ENTER (large)

**B2-3** Mode select key

Key	Function
MENU	Tab to select mode is displayed from the left bottom of the screen.

**B2-3-1** Each mode selecting operation

Selection mode	Contents/How to select
AUTO	Select this to perform automatic operation. Select AUTO mode as follows. 1) Press MENU on the mode select key. 2) Press 0 and then 1 on the ME tab to select "A TO
MANUAL	Select this to perform manual operation.  Select MANUAL mode as follows. 1) Press MENU on the mode select key. 2) Press 0 and then 2 on the ME tab to select "MAM AL
PROGRAM	Select this to edit a program for automatic operation. Select PROGRAM mode as follows. 1) Press MENU on the mode select key. 2) Press 0 and then 3 on the ME tab to select "PR O G R"AM
PARAMETER	Select this to set various parameters and check. Select PARAMETER mode as follows. 1) Press MENU on the mode select key. 2) Press 0 and then 4 on the ME tab to select "PAR AMETER
ALARM	You can check alarm message, history and details. Select ALARM mode as follows. 1) Press MENU on the mode select key. 2) Press 0 and then 5 on the ME tab to select "AL AR'M
MAINTENANCE	Select this to perform various settings. Select MAINTENANCE mode as follows. 1) Press MENU on the mode select key. 2) Press 0 and then 6 on the ME tab to select "MAI TE A 'C

## Precaution

- Coordinate system after mode change takes over the coordinate system before change.
- Mode selection cannot be performed during automatic operation (status is "RUN").  
Also on the menu tab "MODE SELECT" is grayed out during automatic operation.

**B2-4** Auto operation key

- Note that, when round table meets the condition that it can start automatic operation and the auto operation key **Start** is pressed, auto operation is started.  
(Unexpected start of machine)

Key	Function
Start (START)	Use this to start program operation in AUTO mode.
Temporary stop (STOP)	Use this to temporarily stop axis rotation during auto operation. Prepare to press this key at any time when performing test machining and program check.

**B2-5** Manual axis feed key

- Note that the round table starts rotating operation when the manual axis feed key is pressed.  
(Unexpected start of machine)
- Confirm that the periphery of the movable parts is free of persons and obstacles and operate without mistaking the direction.  
(Caught, interference in machine)

Use the following keys for the following manual operations.

1. Jog feed operation
2. Rapid forward operation

Press the key in the direction in which you want to move and move the axis.



The ◀ & ▶ A axis moves.

The ▲ & ▼ B axis moves.

## Notes

- Tap operation in manual feed is valid. It will be added as a movement amount to the axis of the running.
- In 2 axes specification, when a tapping operation being performed with respect to the axis of the other during the operation, the other axis will operate after the operation is stopped.

**B2-5-1** Jog feed operation

- 1) Press **MENU** on the mode select key.
- 2) Press **0** and then **2** on the **ME** tab to select “**MA AL**” mode.
- 3) Set feed speed in feed override mode.
- 4) Keep pressing the key in direction of axis to be rotated ( **◀** [CCW], **▶** [CW] (A axis) or [CCW], [CW] (B axis)) while rotating the axis.

“Feed override change mode key” (Page B2-4)

## Precaution

- Jog feed is performed by continuously pressing **◀**, **▶** or **↶**, **↷**, while step feed is performed by pressing the key with one touch.
- Jog feed speed is determined by the set value and override value of PRM0202.
- In 1 axis specification, it does not move the axis when you operate the **↶**, **↷**.

**B2-5-2** Rapid forward operation

- 1) Press **MENU** on the mode select key.
- 2) Press **0** and then **2** on the **ME** tab to select “**MA AL**” mode.
- 3) Set feed speed in feed override mode.
- 4) If you want to fast-forward of A-axis, Press the key in the direction of axis to be rotated ( **◀** [CCW] **▶** [CW]), and slide your finger to the **ENTER** key position when axis rotation is started.

And If you want to fast-forward of B-axis, Press the key in the direction of axis to be rotated ( **↶** [CCW] **↷** [CW]), and slide your finger to the **ENTER** key position when axis rotation is started.

## Precautions

- Perform slide operation from **◀**, **▶** or **↶**, **↷** to **ENTER** in a state of continuous pressing. If pressing is stopped halfway, the operation is stopped without performing rapid forward.
- When sliding is performed from **ENTER** to **◀**, **▶** or **↶**, **↷** at the time of rapid forward in reverse operation, jog feed speed is set in.
- Jog rapid forward speed is determined by the set value and override value of PRM0201. It is “ jog rapid forward speed” “PRM0201” X “override value”, but PR M0200 becomes the upper limit.
- In 1 axis specification, it does not move the axis when you operate the **↶**, **↷**.

## B2-6 Feed override change mode key

Use the feed override change mode key in order to adjust the feed speed.

Use this key when searching the optimum feed speed during machining operation, etc.

Feed override can be set in a range from 10% to 200%.

The set feed override value is displayed on the override part (OVR\*\*\*%) on the right top of the screen.

- 1) Feed override change mode is set in by pressing **OVR** in AUTO mode or MANUAL mode.  
The override part on the right top of the screen is outlined.
- 2) Override amount is changed by pressing the increase/decrease key ( **▲** , **▼** )

### Precaution

- If override value does not change for 5 seconds or longer during feed override change mode or **OVR** is pressed again, the feed override change mode is cancelled.
- Feed override data is setup at the time of the last power supply interception when power is turned on.
- Increase/decrease amount is set in PRM0204. The initial value is 5%.

## B2-7 OT release mode key

If the "RT211" or "RT210" alarm occurs, this mode for forcibly moving the axis to avoid direction.

- 1) When an alarm of "RT211" or "RT210", is occurring, and presses the **OVR** key will be "OT release mode".  
The status at the top of the screen, it is displayed as "OT REL".
- 2) The manual feed shaft key, it becomes possible to move axis.  
When you release at least once a key "manual feed axis" to cancel the move, "OT release mode" is canceled.



- "OT release mode" is a mode that allows to force the movement of the axis.  
Because you can move to the collision direction in accordance with "movement direction" key, please pay close attention

**B2-8** Page operation key

For programs, parameters and alarms, content which cannot be displayed on one screen can be displayed by page feed and page scroll operation.

Key	Function
Scroll bar	Feed to the previous page by tapping this key one time. Scroll to the previous page and further by stroking the scroll bar upward.
Scroll bar	Feed to the next page by tapping this key one time. Scroll to the previous page and further by stroking the scroll bar downward.

## Precaution

- Screen scroll speed changes depending on speed at which you stroke the scroll bar.

**B2-9** Cursor movement key

Use this key to feed line of program, parameter or alarm.

Key	Function
	Move cursor to one previous line from the selected line.
	Move cursor to one next line from the selected line.

**B2-10** Numeric character key

Data input key consists of numerical character keys and signs, and is used to input program and data.

**B2-11** Confirm (ENTER) key

Use the ENTER (confirm) key to determine and confirm input for each part, popup etc., in various ways.

**B2-12** Reset (RESET) key

---

Use the **RESET** key to reset the control devices in such cases when canceling alarm or resetting executing program.

**B2-13** Delete (DEL) key

---

Use the **DEL** key to delete one letter of numerical value input such as program or parameter.

**B2-14** Return (RETURN) key

---

Use the **RETURN** key to return to the state before transition or change in such cases when returning to the screen before screen transition or tab before change.

Precaution

- If one previous screen was in a mode different from the present one, the screen cannot be transitioned to the previous one even if **RETURN** is pressed.

No text on this page.



## **B3** Function key and display screen

**B3-1** Mode and screen configuration

**B3-2** Screen and function key for AUTO mode

**B3-3** Screen and function key for MANUAL mode

**B3-4** Screen and function key for PROGRAM mode

**B3-5** Screen and function key for PARAMETER mode

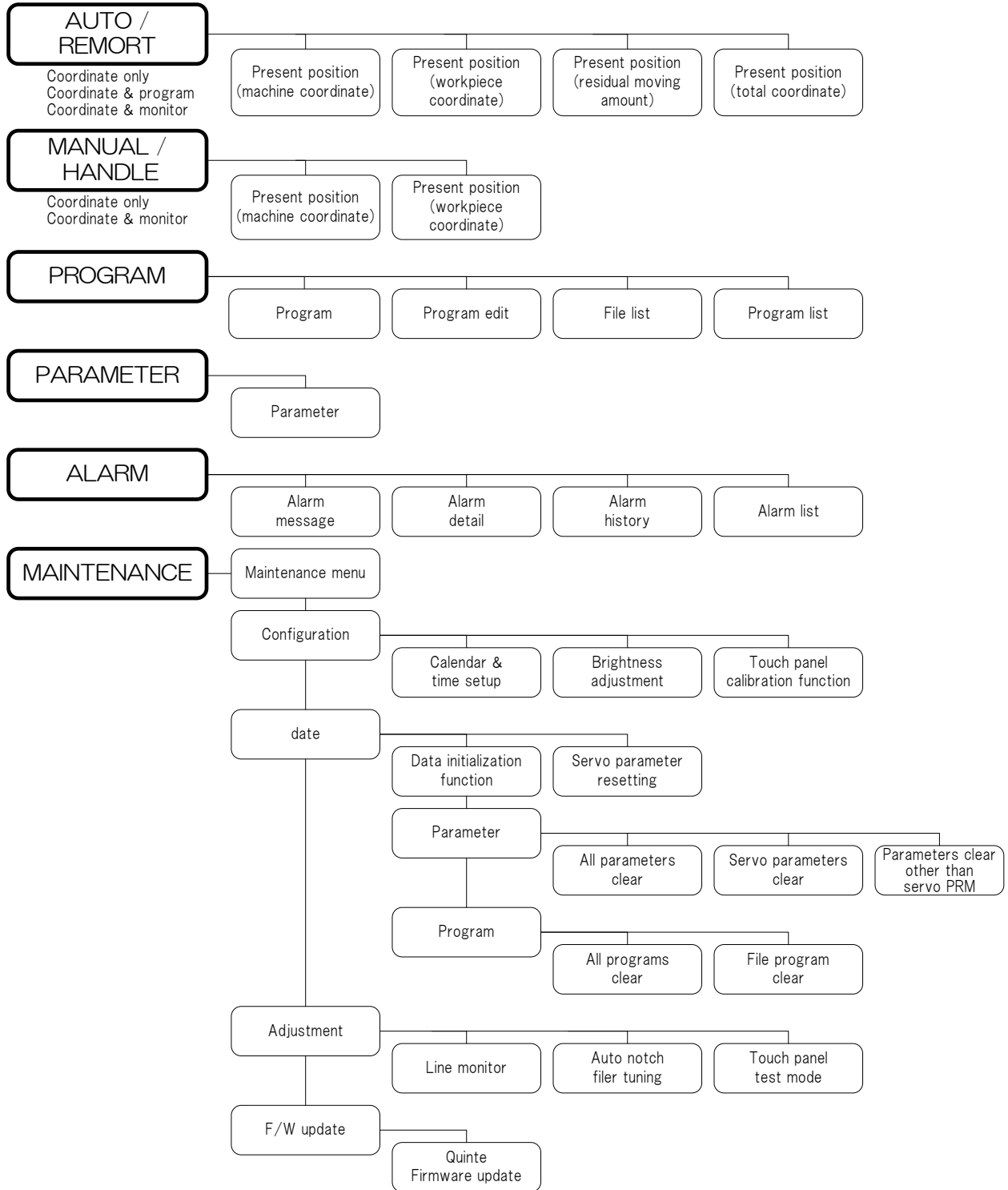
**B3-6** Screen and function key for ALARM mode

**B3-7** Screen and function key for MAINTENANCE mode

### B3-1 Mode and screen configuration

The following illustrations show screens displayed in each mode.

**□** indicates mode, and **□** indicates screen (standard) displayed in that mode.  
**□** indicates composite displayed screen.



**B3-2** Screen and function key for AUTO mode

The following description shows calling screen from a state that AUTO mode is selected.  
 The screen shown in this section shows the screen of 1axis specification.  
 The case of 2 axes specification, the coordinates of the B-axis and A-axis is displayed.

**B3-2-1** Present coordinate (machine) screen

This screen displays a position from the machine origin.

【MENU】 ⇒ 【▲】 (1 : POSITION) ⇒ 【▶】 (1 : MACHINE) ⇒ 【ENTER】  
 【MENU】 ⇒ 【1】 ⇒ 【1】

The above present coordinate (machine coordinate) is a method to show the coordinate system only, however, the coordinate system also shows “coordinate & program,” and “coordinate & monitor” etc.

<Coordinate & program>

【MENU】 ⇒ 【▲】 (2 : PROGRAM) ⇒ 【▶】 (1 : MACHINE) ⇒ 【ENTER】  
 【MENU】 ⇒ 【2】 ⇒ 【1】

<Coordinate & monitor>

【MENU】 ⇒ 【▲】 (3 : MONITOR) ⇒ 【▶】 ⇒ 【▲】 (Monitor content selection)  
 ⇒ 【ENTER】 ⇒ 【MENU】 ⇒ 【▲】 (1 : MACHINE)  
 【MENU】 ⇒ 【3】 ⇒ 【\*】 (Monitor content selection) ⇒ 【MENU】 ⇒ 【1】

There are the following items in the monitor content.

Servo monitor	Shows current value, positional deviation amount and feed speed.
I/O monitor	Shows maximum 10 signal states selected with parameter.
Rotary table signal monitor	Shows input/output state of the Rotary table.

<b>AUTO STOP</b> POSITION OVR 100% MACHINE COORDINATE <b>A -999.999</b> FILE100 PRG100 N0050	<b>AUTO STOP</b> *POS. PRG OVR 100% PRG100 (FILE010) N0050 G91 A-999.999 F999.999 M98 P1000 N0051 G90 A90.000 F0 MACHINE A -111.111 MODAL INFO. G08 G10 G90 G91	<b>AUTO RUN</b> POS LOAD OVR 100% MACHINE A -111.111 CURRENT (%) A 80 DEVIATION (deg) A -0.0012 FEED (min <sup>-1</sup> ) A 999.999 PRG100 (FILE010) N0050 G91 A-999.999 F999.999 M98 P1000
Machine coordinate	Coordinate & program	Coordinate & monitor

### B3-2-2 Present coordinate (machining coordinate) screen

This screen displays a position from the machining origin.

[MENU] ⇒ [▲] (1 : POSITION) ⇒ [▶] ⇒ [▲] (2 : WORKPIECE) ⇒ [ENTER]  
 [MENU] ⇒ [1] ⇒ [2]

This screen also displays “Coordinate & program” and “Coordinate & monitor” similarly as described before.

<Coordinate & program>

[MENU] ⇒ [▲] (2 : PROGRAM) ⇒ [▶] ⇒ [▲] (2 : WORKPIECE) ⇒ [ENTER]  
 [MENU] ⇒ [2] ⇒ [2]

<Coordinate & monitor>

[MENU] ⇒ [▲] (3 : MONITOR) ⇒ [▶] ⇒ [▲] (Monitor content selection) ⇒ [ENTER]  
 ⇒ [MENU] ⇒ [▲] (2 : WORKPIECE)  
 [MENU] ⇒ [3] ⇒ [\*] (Monitor content selection) ⇒ [MENU] ⇒ [2]

<b>AUTO STOP</b> POSITION OVR 100% WORKPIECE COORDINATE <b>A -999.999</b> FILE100 PRG100 N0050	<b>AUTO STOP</b> *POS PRG OVR 100% PRG100 (FILE010) N0050 G91 A-999.999 F999.999 M98 P1000 N0051 G90 A90.000 WORKPIECE A -111.111 MODAL INFO. G08 G10 G90 G91	<b>AUTO RUN</b> POS LOAD OVR 100% WORKPIECE A -111.111 CURRENT (%) A 80 DEVIATION (deg) A -0.0012 FEED (min <sup>-1</sup> ) A 999.999 PRG100 (FILE010) N0050 G91 A-999.999 F999.999 M98 P1000
Machine coordinate	Coordinate & program	Coordinate & monitor

### B3-2-3 Residual moving amount screen

This screen displays residual moving amount from command value.

[MENU] ⇒ [▲] (1 : POSITION) ⇒ [▶] ⇒ [▲] (3 : DISTANCE) ⇒ [ENTER]  
 [MENU] ⇒ [1] ⇒ [3]

This screen also displays “Coordinate & program” and “Coordinate & monitor” similarly as described before.

<Coordinate & program>

[MENU] ⇒ [▲] (2 : PROGRAM) ⇒ [▶] ⇒ [▲] (3 : DISTANCE) ⇒ [ENTER]  
 [MENU] ⇒ [2] ⇒ [3]

<Coordinate & monitor>

[MENU] ⇒ [▲] (3 : MONITOR) ⇒ [▶] ⇒ [▲] (Monitor content selection)  
 ⇒ [ENTER] ⇒ [MENU] ⇒ [▲] (3 : DISTANCE)  
 [MENU] ⇒ [3] ⇒ [\*] (Monitor content selection) ⇒ [MENU] ⇒ [3]

<b>AUTO STOP</b> POSITION OVR 100% DISTANCE COORDINATE <b>A -999.999</b> FILE100 PRG100 N0050	<b>AUTO STOP</b> *POS PRG OVR 100% PRG100 (FILE010) N0050 G91 A-999.999 F999.999 M98 P1000 N0051 G90 A90.000 DISTANCE A -111.111 MODAL INFO. G08 G10 G90 G91	<b>AUTO RUN</b> POS LOAD OVR 100% DISTANCE A -111.111 CURRENT (%) A 80 DEVIATION (deg) A -0.0012 FEED (min <sup>-1</sup> ) A 999.999 PRG100 (FILE010) N0050 G91 A-999.999 F999.999 M98 P1000
Machine coordinate	Coordinate & program	Coordinate & monitor

**B3-2-4** Present coordinate (Total coordinate) screen

This screen displays total coordinate from command value.

[MENU] ⇒ [▲] (1 : POSITION) ⇒ [▶] ⇒ [▲] (4 : ALL) ⇒ [ENTER]

[MENU] ⇒ [1] ⇒ [4]

AUTO STOP		POSITION OVR 100%
MACHINE A	-999.999	WORKPIECE A -111.111
DISTANCE A	-123.456	
FILE100 PRG100 N0050		

Total coordinate

**B3-2-5** Common function**B3-2-5-1** START Control Function

NC rotary table is operated by START from the machine while it is interlocked with the machine. However, there are also START keys on Quinte panel, which may cause rotary table to operate due to unintentional contact with the key, causing failure due to machine interference.

Therefore, by enabling "9 EXT.ST MODE" in the menu tabs of AUTO mode, only external START inputs can be accepted for START operation. When enabled, the background of "9" of "9 EXT.ST MODE" is selected and the color becomes orange. By selecting "9 EXT.ST MODE" again when it is enabled, START operation is accepted only by the panel input. By selecting "9 EXT.ST MODE", the operation reception of START alternates between "External START input only" and "Panel input only".

By Quinte, only the panel START or the external START is enabled.

When the status is RUN, "9 EXT.ST MODE" is grayed out and cannot be selected.

AUTO STOP		POSITION OVR 100%
MACHINE COORDINATE		
9 EXT. ST MODE	-999.999	
8 DIAGNOSIS	45.123	
3 MONITOR		
2 PROGRAM		
1 POSITION		
0 MODE SELECT	FILE100 PRG100 N0050	

External START input effective  
(PANEL START input not effective)

AUTO STOP		POSITION OVR 100%
MACHINE COORDINATE		
9 EXT. ST MODE	-999.999	
8 DIAGNOSIS	45.123	
3 MONITOR		
2 PROGRAM		
1 POSITION		
0 MODE SELECT	FILE100 PRG100 N0050	

PANEL START input effective  
(External START input not effective)

AUTO RUN		POSITION OVR 100%
MACHINE COORDINATE		
9 EXT. ST MODE	-999.999	
8 DIAGNOSIS	45.123	
3 MONITOR		
2 PROGRAM		
1 POSITION		
0 MODE SELECT	FILE100 PRG100 N0050	

Mode selection is impossible  
during automatic operation

### B3-3 Screen and function key for MANUAL mode

The following description shows calling screen from a state that MANUAL mode is selected. As a characteristic of the MANUAL mode screen, contents and operation keys which can be manually operated are displayed at the bottom of the screen.

The screen shown in this section shows the screen of 1 axis specification.

The case of 2 axes specification, the coordinates of the B-axis and A-axis is displayed.

#### B3-3-1 Present coordinate (machine coordinate) screen

This screen displays a position from the machine origin.

[MENU] ⇒ [▲] (1 : POSITION) ⇒ [▶] (1 : MACHINE) ⇒ [ENTER]

[MENU] ⇒ [1] ⇒ [1]

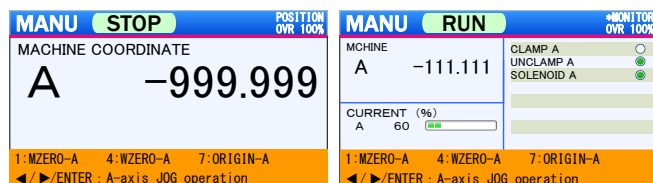
The above present coordinate (machine coordinate) is a method to show the coordinate system only, however, the coordinate system can also show “coordinate & program,” and “coordinate & monitor” etc.

<Coordinate & monitor>

[MENU] ⇒ [▲] (2 : MONITOR) ⇒ [▶] (1 : MACHINE) ⇒ [ENTER]

[MENU] ⇒ [2] ⇒ [1]

The monitor content shows the input/output state of the Rotary table.



Machine coordinate

Coordinate & monitor

#### B3-3-2 Present coordinate (machining coordinate) screen

This screen can displays a position from the machining origin.

[MENU] ⇒ [▲] (1 : POSITION) ⇒ [▶] ⇒ [▲] (2 : WORKPIECE) ⇒ [ENTER]

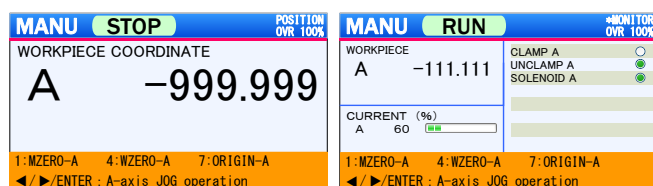
[MENU] ⇒ [1] ⇒ [2]

This screen also displays “Coordinate & monitor” similarly as described before.

<Coordinate & monitor>

[MENU] ⇒ [▲] (2 : MONITOR) ⇒ [▶] ⇒ [▲] (2 : WORKPIECE ) ⇒ [ENTER]

[MENU] ⇒ [2] ⇒ [2]



Machine coordinate

Coordinate & monitor

## B3-4 Screen and function key for PROGRAM mode

Screens other than B3-4-1 Program screen display calling screen from a state that program screen for Program MODE is selected (Displays standard screen transition).

The screen shown in this section shows the screen of 1 axis specification.

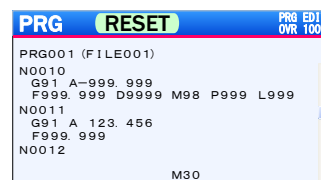
The case of 2 axes specification, the coordinates of the B-axis and A-axis is displayed.

### B3-4-1 Program screen

This screen displays a program called from the file

[MENU] ⇒ [▶] ⇒ [▲] (3 : PROGRAM) ⇒ [ENTER]

[MENU] ⇒ [0] ⇒ [3]

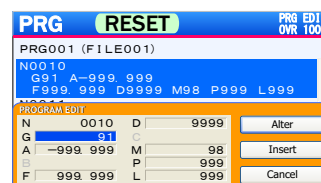


Program screen

### B3-4-2 Program edit screen

Display this screen to edit program.

Move cursor to a block which you want to edit with [▲] or [▼] on the program edit screen, and press [ENTER].



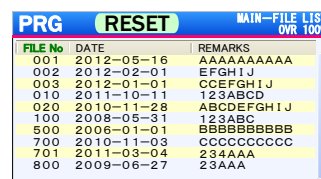
Program edit screen

### B3-4-3 File list screen

This screen displays a list of files to store programs.

[MENU] ⇒ [▲] (2 : FILE LIST) ⇒ [ENTER]

[MENU] ⇒ [2]



File list screen

### B3-4-4 Program list screen

This screen displays a list of programs in the file.

On the program screen,

[MENU] ⇒ [▲] (3:PRG LIST) ⇒ [ENTER]

On the program screen, [MENU] ⇒ [3]

On the file list screen, move cursor to file what you want to display with [▲] or [▼], and press [ENTER].



Program list screen

## B3-5 Screen and function key for PARAMETER mode

The screen shown in this section shows the screen of 1 axis specification.  
The case of 2 axes specification, the coordinates of the B-axis and A-axis is displayed.

### B3-5-1 Parameter screen

This screen displays a list of parameters.

[MENU] ⇒ [▶] ⇒ [▲] (4 : PARAMETER) ⇒ [ENTER]  
[MENU] ⇒ [0] ⇒ [4]

PRM	RESET	PARAMETER	OVR	100%
0000	System program version		1.	00
0001	Serial Number		J130001	
0002	Motor code	A	391	
0003	Encoder code	A	6	

Parameter screen

## B3-6 Screen and function key for ALARM mode

Screens other than B3-6-1 Alarm message screen display calling screen from a state that alarm related screen is selected. (Displays standard screen transition)

### B3-6-1 Alarm message screen

This screen displays presently occurring alarm message.

Automatically transitions to this screen when any alarm occurs.

[MENU] ⇒ [▶] ⇒ [▲] (5 : ALARM) ⇒ [ENTER]  
[MENU] ⇒ [0] ⇒ [5]

ALM	ALARM	ALM MESSAGE	OVR	100%
EM400	EMERGENCY STOP			

Alarm message screen

### B3-6-2 Alarm detail screen

This screen displays detailed contents of alarm.

On the alarm message screen, move cursor to alarm what you want to display with [▲] or [▼], and press [ENTER].

On the alarm history screen, move cursor to alarm what you want to display with [▲] or [▼], and press [ENTER].

On the alarm list screen, move cursor to alarm what you want to display with [▲] or [▼], and press [ENTER].

ALM	ALARM	ALM DETAIL	OVR	100%
SV015	<A>	2012-07-09T08:25		
OVERLOAD 1				
<ul style="list-style-type: none"> <li>■ Defect in internal circuit of servo amplifier.</li> <li>■ Defect in internal circuit of servo encoder.</li> <li>■ Effective torque exceeds the rated torque.</li> <li>■ Defect in servo motor-servo amplifier combination.</li> <li>■ Holding brake of servo motor does not release.</li> <li>■ Wiring of U/V/W-phase between servo amplifier and motor do not matet.</li> </ul>				
Current	200%	defect of zero phase	✓	
Internal defect (AMP/ENC)	—	Servo brake error	—	
Pulse setting mistake	—		—	

Alarm detail screen



**B3-6-3** Alarm history screen

This screen displays history of the past 100 alarms.

[MENU] ⇒ [▲] (1 : HISTORY) ⇒ [ENTER]

[MENU] ⇒ [1]

ALM No	AXIS	DATE
SV020	<A>	2012-07-09T08:25
SV020	<B>	2012-07-09T08:25
SV005		2012-06-25T13:40
SV022	<B>	2012-06-12T10:38
SV045	<A>	2012-05-30T19:20
SV071	<A>	2012-05-29T23:15
SV071	<A>	2012-05-29T23:01
SV071	<A>	2012-05-29T22:05
SV071	<A>	2012-05-29T21:45

Alarm history screen

**B3-6-4** Alarm list screen

This screen displays alarm list.

[MENU] ⇒ [▲] (2 : LIST) ⇒ [ENTER]

[MENU] ⇒ [2]

ALM No	MESSAGE
SV021	MC Power Device Error
SV022	Current Detection Error 0
SV023	Current Detection Error 1
SV024	Current Detection Error 2
SV025	Safe Torque Off Error 1
SV026	Safe Torque Off Error 2
SV041	Overload 1
SV042	Overload 2
SV043	Regenerative Overload

Alarm list screen

**B3-7** Screen and function key for MAINTENANCE mode

Screens other than B3-7-1 Maintenance menu screen display calling screen from the maintenance menu screen. (Displays standard screen transition).

**B3-7-1** Maintenance menu screen

This screen displays maintenance menu.

[MENU] ⇒ [▶] ⇒ [▲] (6 : MAINTENANCE) ⇒ [ENTER]

[MENU] ⇒ [0] ⇒ [6]

MAINTENANCE Menu			
Configuration	Calendar & time	Bright-ness	Calib-ration
Data	Initial-ization	SV PRM resetting	
Adjustment	Line monitor	Auto notch filter	Touch panel test
Update / Setting	Quinte F/W update	SV AMP F/W update	Rotary table PRM

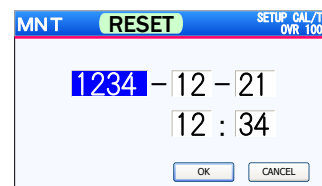
Maintenance menu screen

Auto notch filter tuning is available if the servo amplifier F/W version is 8205.0.7228 or older. The servo amplifier F/W version can be checked on the logo screen during the start-up process.

**B3-7-1-1** Calendar & time setup screen

This screen displays a screen to set calendar and time.

On the “Maintenance menu,” move cursor to < Calendar & Time Setup> with **[▲]** , **[▼]** , **[◀]** , **[▶]** , and press **[ENTER]** ..

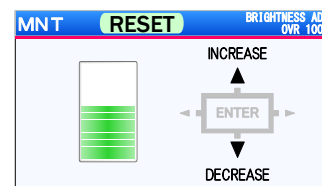


Calendar & time setup screen

**B3-7-1-2** Brightness adjustment screen

This screen displays brightness adjustment screen of liquid crystal display.

On the “Maintenance menu,” move cursor to < Brightness Adjustment> with **[▲]** , **[▼]** , **[◀]** , **[▶]** , and press **[ENTER]** .

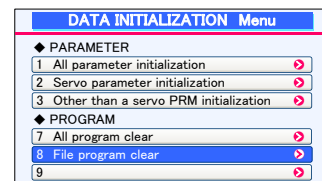


Brightness adjustment screen

**B3-7-1-3** Data initialization function screen

This screen displays a selection screen to initialize data for programs and parameters.

On the “Maintenance menu,” move cursor to < Initialization> with **[▲]** , **[▼]** , **[◀]** , **[▶]** , and press **[ENTER]** .



Initialization selection screen

**B3-7-1-4** Servo parameter reset screen

When this item is selected, a pop-up performing substitution servo parameters is displayed.

**B3-7-1-5** Touch panel test mode screen

The screen which confirm the operation range of the touch panel of an operation key is displayed.

On “Maintenance menu”, cursor movement to<Touch panel test > by **[▲]** , **[▼]** , **[◀]** , **[▶]** , and push **[ENTER]** .



Test mode screen

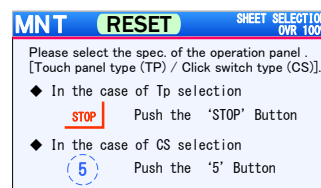
**B3-7-1-6** F/W update screen

This item is selected when updating the firmware of Quinte.

**B3-7-1-7** Touch panel calibration function screen

This screen displays a screen to set operation range of touch panel for operation key.

On the “Maintenance menu,” move cursor to < Touch panel calibration > with **[▲]**, **[▼]**, **[◀]**, **[▶]**, and press **[ENTER]**.

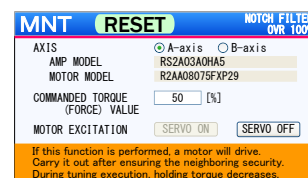


Calibration screen

**B3-7-1-8** Auto notch filter tuning function screen

This screen displays a selection screen to auto notch filter tuning.

On the “Maintenance menu,” move cursor to < Auto notch filter > with **[▲]**, **[▼]**, **[◀]**, **[▶]**, and press **[ENTER]**.

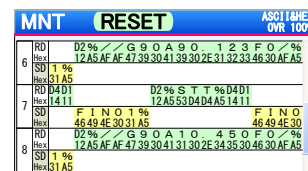


Auto notch filter tuning screen

**B3-7-1-9** Line monitor function screen

This screen displays line monitor screen that displays communication data that is buffered by remote control function.

On the “Maintenance menu,” move cursor to < Line monitor > with **[▲]**, **[▼]**, **[◀]**, **[▶]**, and press **[ENTER]**.



Line monitor screen

**B3-7-1-10** Servo AMP F/W update screen

Servo AMP F/W update function cannot be used now.

**B3-7-1-11** Rotary table PRM setup screen

Rotary table PRM setup function cannot be used now.

<No text is this page.>

## **B4** Outline of file/program

This section describes basic points when creating programs.

**B4-1** Program data structure

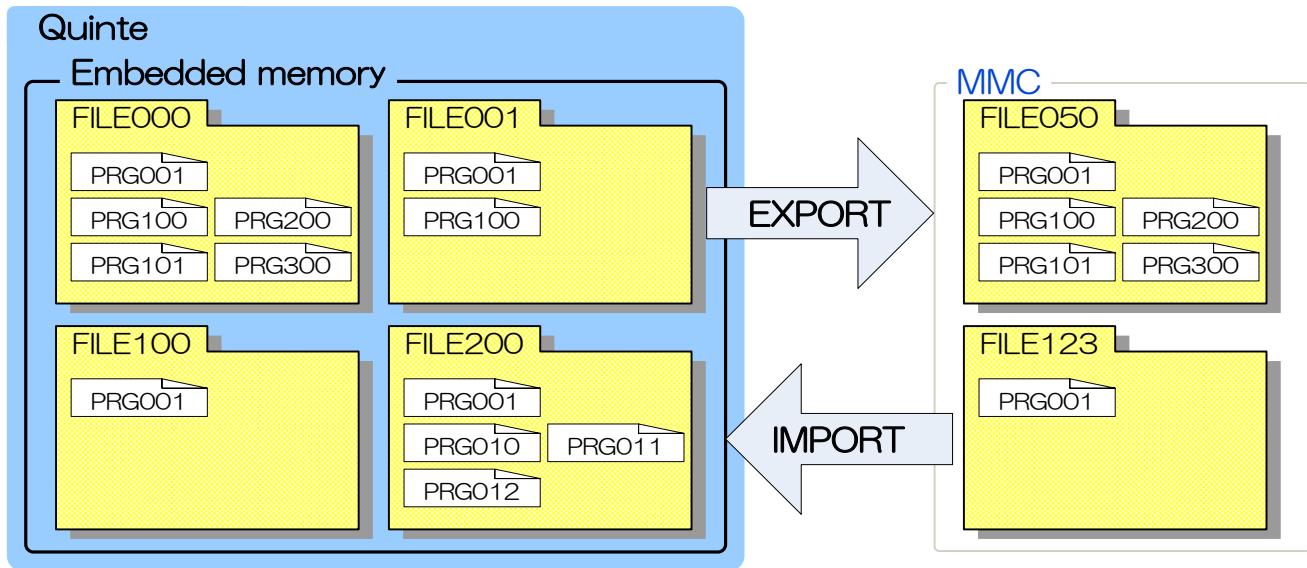
**B4-2** Program basic terms

**B4-3** File/program list

**B4-4** Program functions

**B4-1** Program data structure

This section describes a program structure of Quinte.



Machining data is managed in the unit of “Program (PR G\*\*).”

One or more programs are collectively managed by the unit of “(FILE \*\*).”

“IMPORT” and “EXPORT” which are delivery to external data are performed in the unit of files.

#### Examples of using program data

Work to be machined is assigned to FILE.

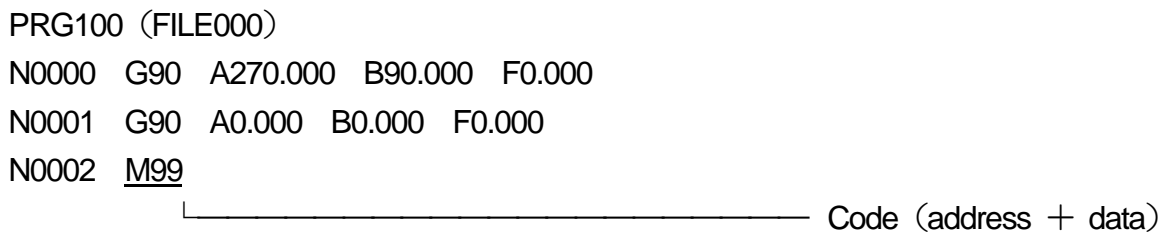
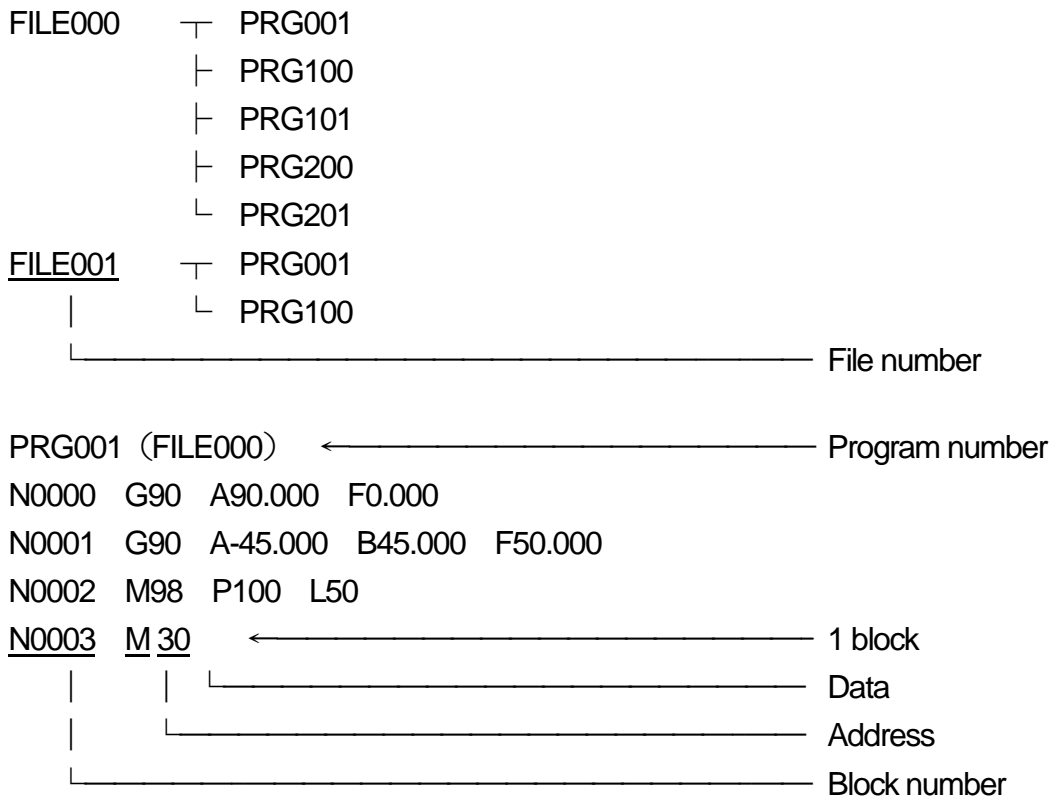
PRG001 will be the main program.

Programs other than PRG001 will be subprograms.

This is an example of managing method to successfully use relations between file and program in which a work of FILE\*\* is machined while subprograms call other than PRG001 are used by executing the main program of PRG001.

## **B4-2** Program basic terms

This section describes basic terms for programming.



### Description of basic terms

Term	Content
File number	This is a number to sort when some files are memorized in a control device, and programs are contained in the file. 3 or less digit number (0 to ) is attached after "FIL E."
Program number	This is a number to sort when some programs are memorized in a control device. 3 or less digit number (1 to ) is attached after "PR G ."
Block number	This is a number to sort sequence line of program. 4 or less digit number (0 to 1 ) is attached after " ."
Address	Alphabetically indicated part
Data	Part of numerical number following address (including sign and decimal point)
Code	One command consisting of address and data
Block	This is a necessary minimum command for operation, and consists of some codes.

**B4-3** File/program list

Files and programs registered in Quinte can be confirmed as a list as follows.

PRG	RESET	MAIN-FILE LIST	PRG	RESET	MAIN-PRG LIST	PRG	RESET	PRG EDIT
		OVR 100%			OVR 100%			OVR 100%
FILE	DATE	REMARKS	FILE001 [CYLINDER BLOCK ]	PRG	DATE	REMARKS	PRG001 (FILE001) [CYLINDER BLOCK02T]	
001	20120516	CYLINDER BLOCK	001	20120516	CYLINDER BLOCK02T	N0010	G91 A-999.999 B-999.999	
002	20120201	FACE PLATE	002	20120201	CYLINDER BLOCK33K	F999.999 D9999 M98 P999 L999		
003	20120101	ENGINE BLOCK	003	20120101	CYLINDER BLOCK09M	N0011	G91 A123.4567 B654.3219	
010	20111011	GEAR	004	20111011	CYLINDER BLOCK05L	F999.999		
020	20101128	CHACK BODY	005	20101128	CYLINDER BLOCK25A	N0012	G90 A100.000 B45.000	
			006	20080531	CYLINDER BLOCK15K	F999.000		

File list

Program list

Program

Files and programs registered in Quinte can be confirmed as a list as follows.

In this way, the file number, program number, date updated, and remarks are displayed in the list. Date updated means the date when files or programs are created by Quinte, or the date when files or programs are registered in data that was imported from an external source. Also, content that shows an outline of files or programs can be displayed in the remarks. However, the content can be displayed in the remarks only by registering files or programs in the data that is imported from an external source. Direct entry from Quinte is not possible.

In addition, remarks registered in the program are also displayed on the program screen so that you can confirm the content of the program.

For data to be imported from an external source, see “B5-5 Program (file data) input/output.”

**B4-4** Program functions

A program is created by combination of each function and numerical values.

G and M functions are used as main functions. The details are described in the Chapter of each function.

Code	Function
G code	Commands axes to perform what operation is to be made.
M code	Commands subprogram call, program stop and external output as auxiliary functions.



## **B5** File operation/editing

This section describes file operations which can be performed on file list screen.

- B5-1** File operation items
- B5-2** File operation device selection
- B5-3** (File) operation function
- B5-4** File sort function
- B5-5** File input/output

**B5-1** File operation items

File can be operated as follows on File list screen .

File list screen call

MENU	“0 : M O D E S E L E C T”	“3 : P R O G R A M”
MENU	“2 : F I L E L I S T”	

The following tabs are displayed on File list screen by pressing[MENU].

1 : DEVICE		Selects a file operation device.
B5-2	1 : MAIN MEMORY	Selects main memory.
	2 : MULTI MEDIA CARD	Selects MMC.
2 : OPERATION		File operation function
B5-3	1 : COPY	Copies file.
	2 : DELETE	Deletes file.
	3 : SEARCH	Searches file.
	4 : NEW	Creates new file.
	5 : No. CHANGE	Changes file number.
3 : SORT		Sorts file lists.
B5-4	1 : FILE No.	Sorts in “File number.”
	2 : DATE	Sorts in “File creation date.”
	3 : REMARKS	Sorts in “R emarks.”
	8 : ASC-ORDER	Sets sort order into ascending order (Order from A to Z in English, from 0 to 9 in numbers).
	9 : DESC-ORDER	Sets sort order into descending order (Order from 9 to 0 in numbers, from Z to A in English).
4 : PRG EXPORT		Outputs file data to MMC.
B5-6	1 : ALL FILE	Outputs all files to MMC.
	2 : SINGLE FILE	Outputs selected file to MMC
5 : PRG IMPORT		Inputs file data from MMC.
B5-6	1 : ALL FILE	Inputs all files into memory of main body.
	2 : SINGLE FILE	Inputs selected file into memory of main body.

## B5-2 File operation device selection

File typically uses memory in main body (MAIN MEMORY), however, can also start program in the MMC and transfer file data.

For this reason, it is necessary to select which device performs file operation.

### Precaution

- Unless the MMC is inserted, “2: MULTI MEDIA CARD” cannot be selected. Even when the MMC is inserted, pull out the MMC
- For how to confirm the selected device, select memory in the main body when “MAIN -FILE LIST” is displayed on the right top, and select MMC when “MMGFIL E L IST” is displayed.

## B5-3 (File) operation function

This section describes functions to operate files.

### B5-3-1 File copy and deletion

To copy a file, create a copy of the designated file (including program).

The copied file number is automatically generated in file final number +1.

To delete a file, delete the designated file (including program).

Designate a file which you want to edit with a cursor on File list screen .

#### File copy

MENU “2 : O PER ATIO ” “1 : CO PY ”

#### File deletion

MENU “2 : O PER ATIO ” “2 : D EL ETE”

Deletion confirmation popup indication

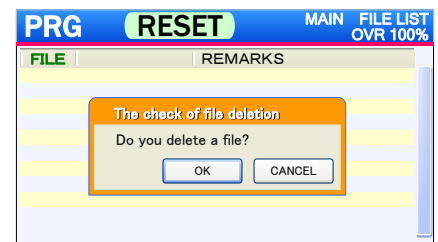
[When deleting]

ENTER (OK designation)

[When not deleting]

▶ (CANCEL Confirmation)

ENTER



### Precaution

- When the final file number is 999 at the time of file copy, the file is automatically generated to the smallest file number of the empty number.
- If the number of files is 1000 (0 to 999), alarm occurs when a file is copied and file copy operation is suspended.

**B5-3-2** File search

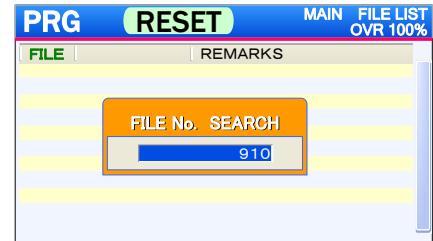
To search a file, designate a file number to be searched and indicate it at the top of the file list.

MENU "2 : O P E R A T I O " "3 : S E A R C H "

Search number input popup indication

Numerical value input

ENTER



Precaution

- When the search file number does not exist, a popup warning of "File number search error" occurs.
- When Return is pressed during search number popup, the screen returns to File list screen .

**B5-3-3** New file creation

When a new file is created, PRG001 is automatically created.

MENU "2 : O P E R A T I O " "4 : E W "

Precaution

- When the final file number is 999 at the time of new file creation, the smallest file number of the empty number is automatically generated.
- If the number of files is 1000 (0 to 999), alarm occurs when a file is newly created and new file creating operation is suspended.

**B5-3-4** File number change

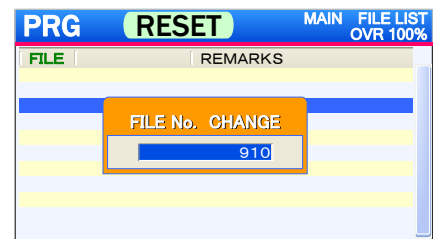
File number can be arbitrarily changed, and a file list is displayed with the changed file number placed at the head.

MENU "2 : O P E R A T I O " "5 : O . C H A N G E "

Number change input popup indication

Numerical value input

ENTER



Precaution

- When the changed file number is the same as the existing file number, a popup warning of "File number change error" occurs.
- When Return is pressed during number change input popup, the screen returns to File list screen .

**B5-4** File sort function

This section describes sort of file list.

**B5-4-1** File sort items

Sort items on file list are "File number," "File creation date" and "Remark." Files can be sorted according to the designated item.

In addition, name of item to be sorted is displayed in green.

**Sort in file number**

MENU "3 : SORT" "1 : FILE NO."

**Sort in file creation date**

MENU "3 : SORT" "2 : DATE"

**Sort in remark**

MENU "3 : SORT" "3 : REMARKS"

**B5-4-2** File sort order

On the file list, items to be sorted can be sorted in "ascending order" or "descending order."

**Ascending order**

MENU "3 : SORT" "8 : ASC-ORDER"

**Descending order**

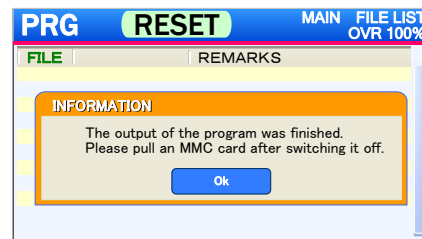
MENU "3 : SORT" "9 : DESC-ORDER"

**B5-5** Program (File Data) input/output

This section describes how to input and output files in the memory of the main body to the MMC.



- When the MMC has completely read or written the file data, an end message occurs. Do not pull out the MMC until then. The MMC may fail or the file data may be corrupted. (Cause of machine failure, or file or program data invalidity)



**B5-5-1** Program File data output

For file output, there is “all file output” and “single file output.”

Insert an MMC in which files are stored into the MMC slot.

MENU “1 : D EVICE” “1 : MAIN MEMO R Y ”

**All file output**

MENU “4 : PR G EX PO R T” “1 : AL L FIL E”

**Single file output**

Select a file which you want to output from the file list.

MENU “4 : PR G EX PO R T” “2 : SI G L E FIL E”

## Precaution

- All files output to the MMC are overwritten. Understand the file output operation to perform the operation.
- Unless the MMC is inserted, “4: PR G EX PO R T” cannot be selected.

And it cannot also be selected when the device selection is “MMC” (“MMC-FIL E L IST” is displayed on the right top of the screen).

**B5-5-2** Text data structure

When a file is output to MMC, the text data of the output file is created in MMC. File control information is created in the first line, and programs are created in the second and subsequent lines. Program control information is created in the first line of each program.

FILE000	DATE16.01.01	(01234ABCDE)	File control information
PRG001	DATE16.01.01	(01234ABCDE)	PRG001 control information
N0000	G90 A90.000	F0.000	
N0001	G90 A-45.000	B45.000 F50.000	
N0002	M98 P100	L50	
N0003	M30		
PRG100	DATE16.01.01	(01234ABCDE)	PRG100 control information
N0000	G90 A270.000	B90.000 F0.000	
N0001	G90 A0.000	B0.000 F0.000	
N0002	M30		

**B5-5-3** Editing of text data

Text data can be edited on a PC.

Edit text data according to the following file control information format, program control information format and precautions. For program data format and precautions after program control information, see “B G function” and “B M function.”

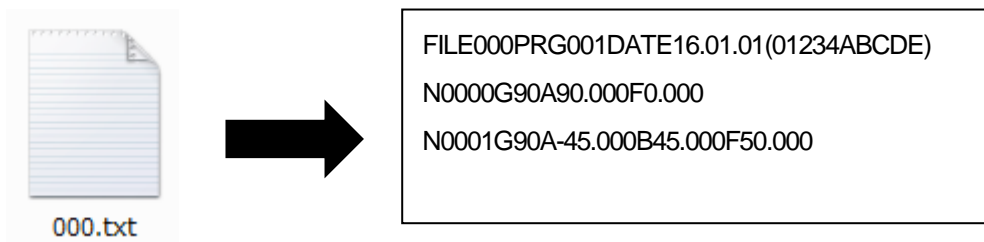
File control information format

FILE DATE )

FILE	File name	Not changeable
	File number	000 to 999
DATE	Date name	Not changeable
	Last 2 digits of the Western calendar year	00 to 99
	Month	00 to 99
	Day	00 to 99
( )	Remarks	(“ means remark start,”) ” means remark end. Up to 16 characters can be used. Usable characters are half-width alphanumeric characters and half-width symbols.

Precautions

- Make sure to write the file control information in the first line of the text data.
- The writing order of information cannot be changed. Write information according to the format numbers.
- Match the name displayed on the PC and the file number



The file name displayed on the PC, which is “###.txt” and the file number in the text data, which is “FIL #” must have the same number.

## Program control information format

PRG	DATE	)	
PRG	Program name	Not changeable	
	Program number	001 to 999	
DATE	Date name	Not changeable	
	Last 2 digits of the Western calendar year	00 to 99	
	Month	00 to 99	
	Day	00 to 99	
( )	Remarks	( " means remark start, ) " means remark end.	
		Up to 16 characters can be used.	
		Usable characters are half-width alphanumeric characters and half-width symbols.	

## Precautions

- Make sure to write the program control information in the first line of the program.
- The writing order of information cannot be changed. Write information according to the format numbers.
- Please do not create the same program number more than once in one file.

**B5-5-4** File input

For file input, there is "all file input" and "single file input."

Insert an MMC in which files are stored into the MMC slot.

MENU "1 : D EVICE" "2 : M L T I M E D I A C A R D "

**All file input**

MENU "5 : P R G I M P O R T" "1 : A L L F I L E "

**Single file input**

Select a file which you want to input from the file list.

MENU "5 : P R G I M P O R T" "2 : S I G L E F I L E "

## Precaution

- All files input from the MMC are overwritten into the memory in the main body. Understand the file input operation to perform the operation.
- When the device selection is "MAI " ("MMGFIL E L IST" is displayed on the right top of the screen), "5 P R G I M P O R T" cannot be selected.
- Make the assignment of the sequence number when import a program that is registered with the MMC. Please have a program that has been lined up correctly sequence number as the program that you want to import.

MMC registration program

N005 G90 A90 F0

N010 G91 A45

N001 G90 A20 F10 M30

Program after import

N001 G90 A90 F0

N002 G91 A45

N003 G90 A20 F10 M30



## **B6** Program operation

This section describes operations of the program which can be performed on the program list screen.

- B6-1** Program operation items
- B6-2** (Program) operation function
- B6-3** Program sort function

**B6-1** Program operation items

For the program, the following operations can be performed on Program list screen .

Program list screen call

MENU "0 : M O D E S E L E C T" "3 : P R O G R A M"  
 MENU "3 : P R G L I S T"

The following tabs are displayed by pressing MENU on Program list screen .

: OPERATION		Program operation function
B6-2	1 : COPY	Copies program.
	2 : DELETE	Deletes program.
	3 : SEARCH	Searches program.
	4 : NEW	Creates new program.
	5 : No. CHANGE	Changes program number.
: SORT		Sorts file lists.
B6-3	1 : PROGRAM No.	Sorts in "Program number."
	2 : DATE	Sorts in "Program creation date."
	3 : REMARKS	Sorts in "R emarks."
	8 : ASC-ORDER	Sets sort order into ascending order (Order from A to Z in English, from 0 to 9 in numbers).
	9 : DESC-ORDER	Sets sort order into descending order (Order from 9 to 0 in numbers, from Z to A in English).

**B6-2** (Program) operation function

This section describes functions to operate programs.

**B6-2-1** Program copy and deletion

To copy a program, create a copy of the designated program.

The copied program number is automatically generated in program final number +1.

To delete a program, delete the designated program.

Designate a program which you want to edit with a cursor on Program list screen .

**Program copy**

MENU "1 : O P E R A T I O " "1 : C O P Y "

**Program deletion**

MENU "1 : O P E R A T I O " "2 : D E L E T E "

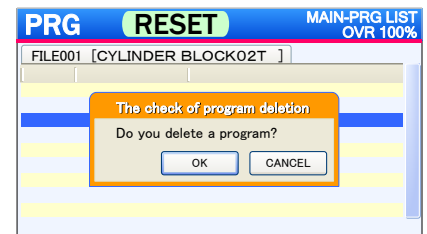
Deletion confirmation popup indication

[When deleting]

◀ (OK designation) ENTER

[When not deleting]

ENTER (CANCEL Confirmation)

**Precaution**

- When the final program number is 999 at the time of program copy, the program is automatically generated to the smallest program number of the empty number.
- If the number of programs is 999 (1 to 999), alarm occurs when a program is copied and program copy operation is suspended.

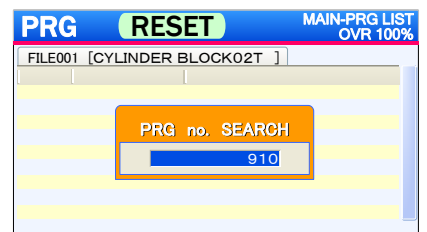
**B6-2-2** Program search

To search a program, designate a program number to be searched and indicate it at the top of the program list.

MENU "1 : O P E R A T I O " "3 : S E A R C H "

Search number input popup indication

Numerical input ENTER

**Precaution**

- When the search program number does not exist, a popup warning of "Program number search error" occurs.
- When Return is pressed during search number popup, the screen returns to Program list screen .

**B6-2-3** New program creation

When a new program is created, a program which has no block is created.

MENU "1 : O P E R A T I O " "4 : E W"

Precaution

- When the final program number is 999 at the time of new program creation, the smallest program number of the empty number is automatically generated.
- If the number of programs is 999 (1 to 999), alarm occurs when a program is newly created and new program creating operation is suspended.

**B6-2-4** Program number change

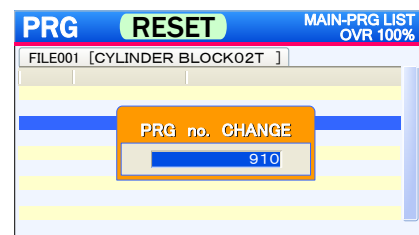
Program number can be arbitrarily changed, and a program list is displayed with the changed program number placed at the head.

MENU "1 : O P E R A T I O " "5 : N o . C H A N G E"

Number change input popup indication

Numeric value input

ENTER



Precaution

- When the changed program number is the same as the existing program number, a popup warning of "Program number change error" occurs.
- When Return is pressed during number change input popup, the screen returns to Program list screen .

**B6-3** Program sort function

This section describes sort of program list.

**B6-3-1** Program sort items

Sort items on program list are "Program number," "Program creation date" and "R emark."

Programs can be sorted according to the designated item.

In addition, name of item to be sorted is displayed in green.

**Sort in program number**

MENU	"2 : SO R T"	"1 : Program No."
------	--------------	-------------------

**Sort in program creation date**

MENU	"2 : SO R T"	"2 : D ATE"
------	--------------	-------------

**Sort in remark**

MENU	"2 : SO R T"	"3 : R EMAR K S"
------	--------------	------------------

**B6-3-2** Program sort order

O n the program list, items to be sorted can be sorted in "ascending order" or "descending order."

**Ascending order**

MENU	"2 : SO R T"	"8 : ASC-O R D ER "
------	--------------	---------------------

**Descending order**

MENU	"2 : SO R T"	"9 : DESC-O R D ER "
------	--------------	----------------------

No text on this page.

## **B7** Program edit

This section describes program edit which can be performed on the program screen.

- B7-1** Program edit items
- B7-2** Program block operation function
- B7-3** Program storage function
- B7-4** Program edit function
- B7-5** New program creation procedure

**B7-1** Program edit items

Program is created by block operation performed on Program screen and is created by interactive program edit performed with program editor.

Program screen call

MENU "0 : M O D E S E L E C T" "3 : P R O G R A M"  
 MENU "2 : F I L E L I S T" File selection ENTER  
 Program selection ENTER

The following tabs are displayed on Program screen by pressing MENU .

- |                     |  |
|---------------------|--|
| 1 : DEVICE ( B5-2)  | File operation device selection          |
| 2 : FILE LIST       | File list indication                     |
| 3 : PRG LIST        | Indicates program list of selecting file |
| 4 : OPERATION       | Block operation function                 |
| ( B7-2)             |  |
| 1 : COPY            | Memorizes designated block.              |
| 2 : DELETE          | Deletes designated block.                |
| 3 : COPY BLOCK      | Inserts and copies memorized block.      |
| 4 : EMPTY BLOCK     | Inserts empty block.                     |
| 5 : PASTE           | Overwrites to designated block.          |
| 7 : SAVE ( B7-3)    | Overwrites and saves file + program.     |
| 8 : SAVE AS ( B7-3) | Saves file + program with another name.  |



## B7-2 Program block operation function

This section describes block operation function of program in “4 : O P E R A T I O N ”.

### B7-2-1 Block copy and deletion

The block copy function memorizes a designated block.

Contents of the memorized block are used for insertion, copy and overwriting by functions of “3 : C O P Y B L O C K ” and “PASTE.”

And the block deletion function deletes a designated block.

Block number after deleted block is automatically modified to be moved to a higher digit.

Designate program block to be operated with the cursor on Program screen .

#### Block copy

MENU “4 : O P E R A T I O N ” “1 : C O P Y ”

#### Block deletion

MENU “4 : O P E R A T I O N ” “2 : D E L E T E ”

Deletion conformation popup indication

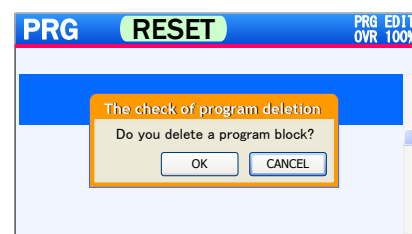
[When deleting]

ENTER (OK designation)

[When not deleting]

▶ (CANCEL confirmation)

ENTER



### B7-2-2 Block insertion copy

This function inserts and copies content of block memorized by the copy function before the program block designated by the cursor.

And the block number after the block in which insertion copy was performed is automatically modified to a block number added by +1.

MENU “4 : O P E R A T I O N ” “3 : C O P Y B L O C K ”

#### Precaution

- If temporary memorization of a block has never been performed by the COPY command, 3 : COPY BLOCK is grayed out and cannot be selected.

**B7-2-3** Empty block insertion

This function inserts an empty block before a program block designated with the cursor. And the block number after the block in which insertion was performed is automatically modified to a block number added by +1.

MENU            “4 : O P E R A T I O   ”    “4 : E M P T Y   B L O C K   ”

**B7-2-4** Block overwrite copy

This function overwrites and copies content of a block memorized by copy function to the program block designated with the cursor.

MENU            “4 : O P E R A T I O   ”    “5 : P A S T E ”

## Precaution

- If temporary memorization of a block has not been performed by the COPY command, 5 : PASTE is grayed out and cannot be selected.

**B7-3** Program storage function

This section describes the save function performed after program operation.

For how to save a program, there are two types of “O verwrite and save” and “Change name and save.”

Each of them is described below.

Unless another file is called, program change content is not lost, however, save after changing the program content.

## Precaution

- If a program which is not saved after program change is output in a file, program before change content is updated is output.

**B7-3-1** Overwrite and save

When a program is overwritten and saved, it is added and saved to the program name presently edited.

MENU            “7 : S A V E ”

**B7-3-2** Save with another name

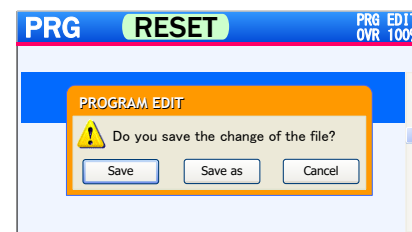
This method puts another file number on the program change content.

MENU "8 : SAVE AS"  
 Other file number input popup indication  
 [When deleting]  
 ENTER (OK designation)  
 [When not deleting]  
 ► (CANCEL conformation)  
 ENTER

[Numerical value input]

**B7-3-3** Save confirmation popup

It is allowed to change the mode and operate Return without saving during program change. In order to prevent program change content from being lost at that time, the save confirmation popup prompts to save when any mode is changed or Return is operated without saving. On the save confirmation popup, "Save (Overwrite and save)" and "Save as (Change name and save)" described above, or "Cancel" in case of not saving can be selected.



Save "Overwrite and save" (Page B7-4)

Save as "Save with another name" (Page B7-5)

## Precaution

- If program save is cancelled, the program presently edited is left as it is and does not return to the state before editing. If you want to return to the state before editing, read the file again.

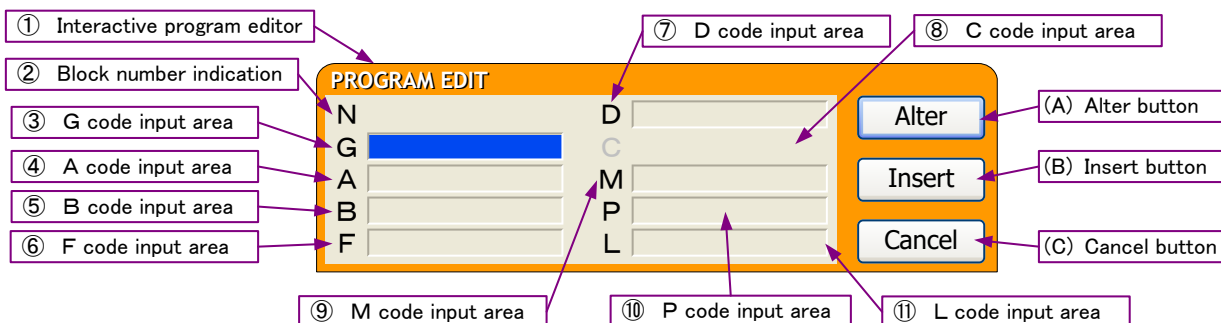
## B7-4 Program edit function

This section describes interactive program editing.

### B7-4-1 Interactive program editor

Interactive program editor means an editor dedicated to data input to edit program.

As a feature, when G code or M code is entered, entry can be made in the address space necessary for the code, and input is monitored so that an invalid numerical value is not entered in each data space.



No.	Name	Contents
	Interactive program editor	Editor window dedicated to edit and modify program block
	Block number indication	Indicates block number to be edited (not allowed to change).
	G code input area	Area for editing command value of address G. Entry can be made only formal G code number.
	A code input area	Area for editing command value of address A.
	B code input area	Area for editing command value of address B. In case of 1 axis specification, this is grayed out and not allowed to be selected.
	F code input area	Area for editing command value of address F.
	D code input area	Area for editing command value of address D.
	C code input area	Area for editing command value of address C. This is grayed out and cannot be selected unless " " is set in G code.
	M code input area	Area for editing command value of address M.
	P code input area	Area for editing command value of address P. This can be selected and entered only when " " is set in M code.
	L code input area	Area for editing command value of address L. This can be selected and entered only when " " is set in M code.
(A)	Alter button	Alter in the designated block by selecting this button and pressing ENTER .
(B)	Insert button	Inserts after the designated block by selecting this button and pressing ENTER .
(C)	Cancel button	Stops edit operation and returns to the program screen. Edited content is not registered.

### How to open interactive program editor

The interactive program editor is displayed on the screen by moving the cursor to a block which you want to edit on the Program screen and pressing ENTER .

### How to close interactive program editor

The program editor is closed when either "Alter" or "Cancel" on the right side is performed.

#### Precaution

- If any block is inserted by "Insert," the block number after insertion is automatically modified to a block number added by +1.
- Because the editor screen is not closed even if "Insert" is determined, continuous input is allowed.

## **B7-4-2** Address data clear

The following tabs are displayed by pressing MENU with the Program screen displayed.

- |                   |  |
|-------------------|--|
| 1 : ALL CLEAR     | Clears all address data of the selected block. |
| 2 : ADDRESS CLEAR | Clears data of the selected address.           |

#### All address data clear

MENU "1 : ALL CLEAR"

#### Designated address data clear

MENU "2 : ADDRESS CLEAR"

#### Precaution

- Data before clear can be recovered with Return key even after data clear at any time before determination by "Alter," "Insert".

**B7-5** New program creation procedure

This section describes a procedure up to creation of new program.

**When also newly creating a file and creating a program**

- 1) MENU 0 : MODE SELECT 3 : PROGRAM (PROGRAM mode selection)
- 2) MENU 2 : FILE LIST (File list indication)
- 3) MENU 2 : OPERATION 4 : NEW (New file creation)
- 4) Designate the newly created file and press ENTER (program in file list indication).
- 5) When a new file is created, a new program is also created. (PRG001)
- 6) Designate the newly created program and press ENTER (Program screen is displayed).
- 7) Interactive program editor is indicated by ENTER in N0000.

**When adding a new program to existing file**

- 1) MENU 0 : MODE SELECT 3 : PROGRAM (PROGRAM mode selection)
- 2) MENU 2 : FILE LIST (File list indication)
- 3) Designate a file on which a program is created and press ENTER (program in file list indication).
- 4) MENU 1 : OPERATION 4 : NEW (New program creation)
- 5) Designate the newly created program and press ENTER (Program screen is displayed).
- 6) Interactive program editor is indicated by ENTER in N0000.

## Precaution

- A new program number which was created in a new file is PRG001.
- A new program number which was created for the existing file is the maximum program number in the file +1. However, if PRG999 exists, the minimum empty number is assigned.
- A newly created new file number is the maximum file number +1. However, if FILE999 exists, the minimum empty number is assigned.

## **B8** G function

This section describes G function.

- B8-1** G code list
- B8-2** Without G code (without preparation function)
- B8-3** G04 (Dwell)
- B8-4** G07 (High rotation indexing)
- B8-5** G08/09 (Continuous buffer start/end)
- B8-6** G10/11 (Clamp not used/used)
- B8-7** G21 (Sequential operation start)
- B8-8** G22 (Continuous start)
- B8-9** G23 (Machine origin return)
- B8-10** G24 (Machining origin return)
- B8-11** G90/G91 (Absolute/Incremental)
- B8-12** G92 (Machining coordinate system setting)

**B8-1** G code list

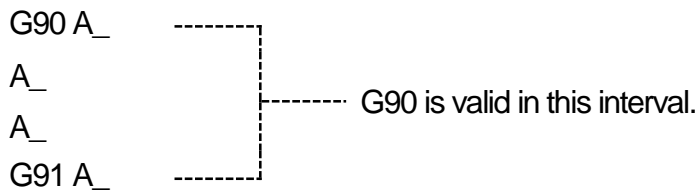
G code is also called a preparation function. This function prepares what machining method the designated block uses and how the axis moves by the address G and the subsequent numerical values. What meaning the command of the block has is instructed by the numerical value subsequent to the address G.

There are the following two types of G codes.

The G codes are classified into the following two types depending on how long the code is valid after it is commanded.

Classification	Function
One shot G code	Valid only for commanded block
Modal G code (G code other than 00 group)	Valid until the other G code in the same group is commanded

For example, G90 and G91 are modal G codes.



#### Precaution

- In case of input on screen, the following content does not occur by input restriction, however, in case of external input (IMPORT) by MMC, be careful of the following precautions.
  - Be sure to command a numerical value following immediately after the address G. If the program is executed with a numerical value following the address G not commanded, an alarm is displayed on the screen.
  - If G code not listed in the G code list is commanded, an alarm is displayed on the screen.
  - Be sure to command the address commanded subsequently to the G code according to the format.
- When power is turned on, or when a clear state is brought by reset, modal G codes are as follows.
  - They are in a state of G code marked with    in the list.
  - For G90 and G91, initial modal state can be set with the PRM0010.
- G code of 00 group is one shot G codes.



Code	Group	Function	Contents	Page
Absent	00	Without preparation function	Commands without using special preparation function.	B8-4
04	00	Dwell	Waits for a certain time without moving command.	B8-5
07	00	High rotation index	Can perform high rotation index.	B8-6
08	01	Continuous buffer start	Performs continuous operation of program block until G09 continuous buffer end is commanded.	B8-8
09		Continuous buffer end	Ends continuous operation of program block.	
10	02	Clamp is not used	Keeps clamp mechanism after indexing in non-use until use of clamp is commanded.	B8-11
11		Clamp is used	Cancels clamp non-use command by G10, and then uses clamp mechanism.	
21	00	Sequential operation start	Outputs completion signal in advance when program is executed and uses it for sequential operation with machine.	B8-13
22	00	Continuous start	Continuously rotates by continuous start command until the next start command is given.	B8-14
23	00	Machine origin return	Performs rotating operation relative to the machine origin position.	B8-15
24	00	Machining origin return	Performs rotating operation relative to the machining origin position.	B8-16
90	03	Absolute	Commands indexing end angle.	B8-17
91		Incremental	Commands indexing rotation angle.	
92	00	Machining coordinate setting	Changes machining coordinate system during programming.	B8-19

**B8-2** Without G code (without preparation function)

Program can be made without using preparation function (G code) such as positioning and dividing motion.

Program format

*A*\_\_ *B*\_\_ *F*\_\_ *D*\_\_ *M*\_\_

※Italic type address indicates that it can be omitted.

Address	Explanation	Set range	Set unit
A	Rotating angle	±359.999 (Absolute)	deg
B		±999.999 (Incremental)	
F	Rotating speed	0 to 999.999	min <sup>-1</sup>
D	Number of equal divisions	0 to 9999	-
M	It is described Section B9 M function .		

Comments

About address A , B (rotating angle)

When modal information is absolute

- Set the machining origin position to "0" and set the address A and B in a range (±359.999) within one turn.
- The sign indicates rotating direction.

For example, if the address A -30.000, rotation is made from the machining origin position to a position of 30.000 in – direction.

When modal information is incremental

- Set rotating amount from the present position in a range of ±999.999.

About address F (rotating speed)

- If F is not set, rotating speed set in the previous block continues as modal information.
- When "F0.000" is set, rotation is made at a rapid feed speed of PRM0200.

About address D (number of equal divisions)

- When D is not set, or "0" or "1" is set, it is considered to be no division and normal positioning is performed.

Precaution

- Either address A , B or M is required in the program
- Block without G code is operated in a modal state before executed block
- Rotating speed is not set in a state that rotating speed is never commanded with F code. In this state, if any block of unset F code is executed, an alarm (PG200) occurs.
- When a relationship between A , B , D code is  $A/D < \text{minimum motion unit}$ , an alarm occurs.
- Even when a division command (D) is given to the position the same as the present position if the modal information is absolute, an alarm (PG201) occurs when the program is executed.
- In 1-axis specification, you can not enter address B is masked.

**B8-3** G04 (Dwell)

Waits for a time specified in the address A, and delays to move to the next block motion.

Program format

**G04** *A*\_\_ *M*\_\_

※*Italic type address indicates that it can be omitted.*

Address	Explanation	Set range	Set unit
A	Waiting time	0 to 999.99	s
M	It is described Section B9	M function .	

Comments

About address A (Waiting time)

- Sets a time to keep the program in waiting.

Precaution

- When the A data is not set in G04 program editing, an alarm (PG001) occurs.
- When a block in which the A code does not exist is executed, an alarm (PG230) occurs.
- Unclamp operation is not performed.

**B8-4** G07 (High rotation indexing)

Up to 10,000 rotations (9,999 rotations + 359.999deg) can be executed by command G07, when more than  $\pm 999.999$ deg rotations are required.

Program format

**G07** *A*\_\_ *B*\_\_ *D*\_\_ *F*\_\_ *M*\_\_      ※Italic type address indicates that it can be omitted.

Address	Explanation	Set range	Set unit
A, B	Rotating direction & rotating angle	$\pm 359.999$	deg
D	Rotating number	0 to 9999	Rotation
F	Rotating speed	0 to 999.999	min <sup>-1</sup>
M	It is described Section B9 "M function".		

Comments

About address A, B (Rotating direction & rotating angle)

- "+" and "-" of sign of the address A, B indicate rotating directions.
- When modal information is absolute (G90), operation is performed by the rotation number of the address D in the rotating direction designated in the address A, B and then indexing is performed in the angle designated in the address A or B with reference to the machining origin in the same rotating direction.
- When modal information is incremental (G91), operation is performed by the rotation number of the address D in the rotating direction designated in the address A, B and then rotation is made by the angle designated in the address A. or B

About address D (rotating number)

- When the D code is not set, the rotating number is 0 and the A code and B code is indexed.

About address F (rotating speed)

- See B8-2 Command without G code.

Precaution

- When the A data and B data is not set in G07 program editing, an alarm (PG002) occurs.
- When a block in which the A code and B code does not exist is executed, an alarm (PG230) occurs.
- In 1 axis specification, you can not enter address B is masked.

Related parameters      (Confirm the chapter of "C parameter description" for details)

PRM1000      BLKFIN output timing selection at the time of G07  
 This sets what timing to output the block finish output timing dedicated to G07 (when lead cutting is performed) apart from the normal block finish output.

0 : Performs block finish (BLKFIN) output when G07 block execution **ends.**

1 : Performs block finish (BLKFIN) output when G07 block execution **starts.**

Operation reference example

Executing program : G07 A30.000 D2 F0.000	
Modal information : Incremental	Modal information : Absolute
Rotates by two revolutions in + direction from the present position (start position) and advances by 30deg.	Rotates by two revolutions in + direction from the present position and advances to a position of 30deg on the machining coordinate.
Executing program : G07 A-30.000 D2 F0.000	
Modal information : Incremental	Modal information : Absolute
Rotates by two revolutions in - direction from the present position (start position) and advances by 30deg.	Rotates by two revolutions in - direction from the present position and advances to a position of 30deg on the machining coordinate.

**B8-5** G08/09 (Continuous buffer start/end)

Continuously operates (advances blocks without ST input) blocks until end command (G09) by issuing continuous buffer start command (G08).

Program format

**G08** *C*\_\_ *M*\_\_

※*Italic type address indicates that it can be omitted.*

**G09** *M*\_\_

Address	Explanation	Set range	Set unit
C	During continuous buffer Positional deviation check function	0 (ineffective) 1 (effective)	
M	It is described Section B9 M function .		

Comments

About address C (Positional deviation check function during continuous buffer)

- When the address C set value is "1," positional deviation check is performed for every block while continuous operation is performed.
- In case that positional deviation check is effective, when motion command is divided, positional deviation relative to command angle of one division is 0 and moves to the next block.

In addition, when positional deviation is ineffective, deceleration is not performed for every division angle and the motion is the same as that of the division command 1 (not divided).

- The address C continues as modal information until the continuous buffer end command (G09) is issued or G08 is commanded again.
- When program end order is issued by M30, modal continuation is cancelled.

Precaution

- Whether finish signal output (BLKFIN) is at the time of G08 execution or at the time of G09 execution can be selected with the PRM1001.
- When program end order is issued by M30 which is executing G08, modal continuation is cancelled.
- If G09 is commanded when G08 is not executed, only BLKFIN is output.
- When the address C is not set, positional deviation check is ineffective.
- When BLKFIN is output at the time of G08 execution, it is output after unclamp is confirmed.
- When BLKFIN is output at the time of G09 execution, it is output after clamp is confirmed.

Related parameters

(Confirm the chapter of “C parameter description” for details)

PRM1001

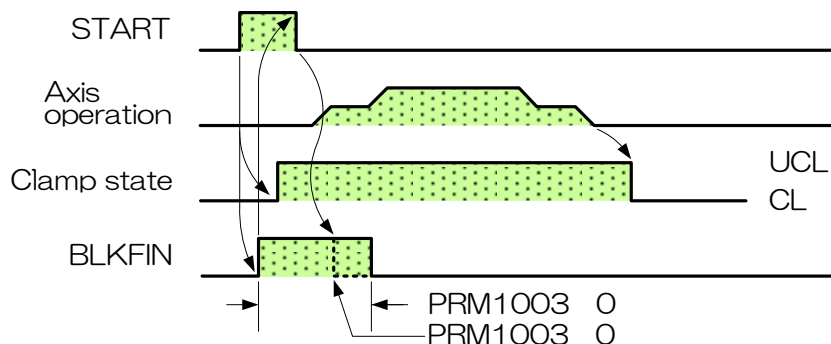
BLKFIN output timing selection at the time of G08, G09

This sets where to output the block finish at the time of G08, G09 commands

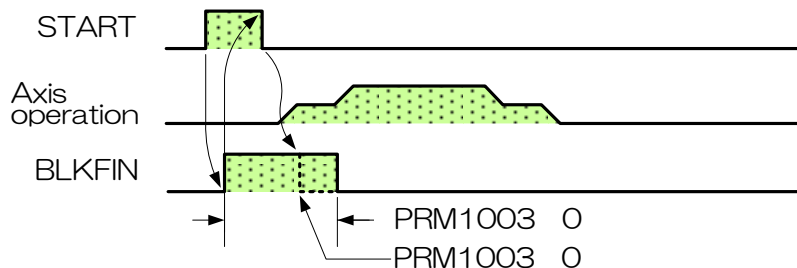
- 0 : BLKFIN is output when G08 block execution **starts**.
- 1 : BLKFIN is output when G09 block execution **ends**.

Timing chart

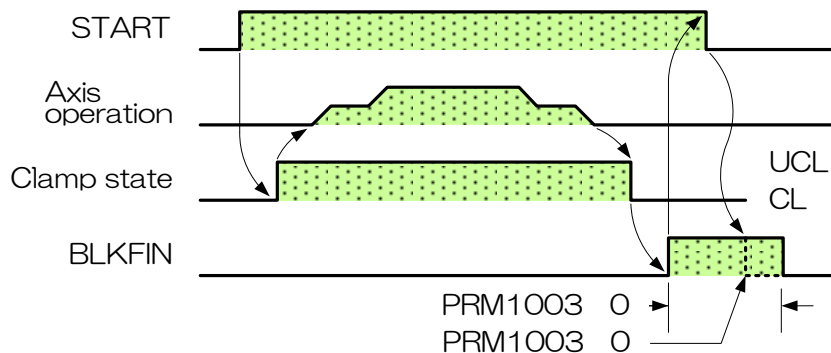
PRM1001 0 PRM0012 1 (With clamp mechanism)



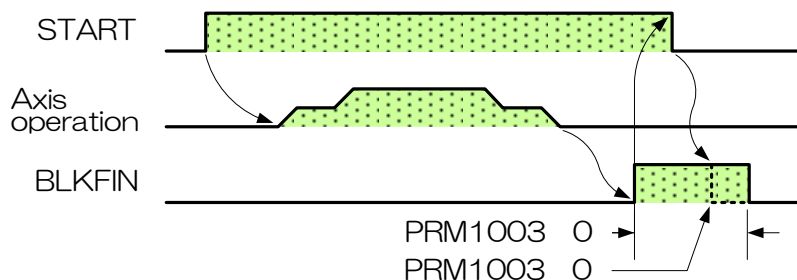
PRM1001 0 PRM0012 0 (Without clamp mechanism)



PRM1001 1 PRM0012 1 (With clamp mechanism)

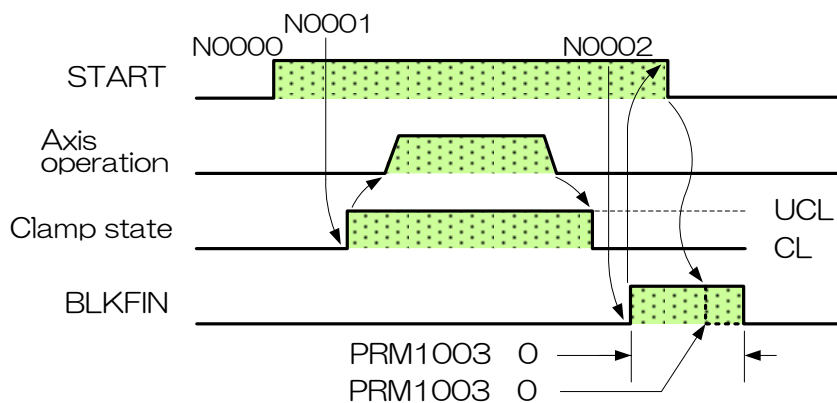


PRM1001 1 PRM0012 0 (Without clamp mechanism)



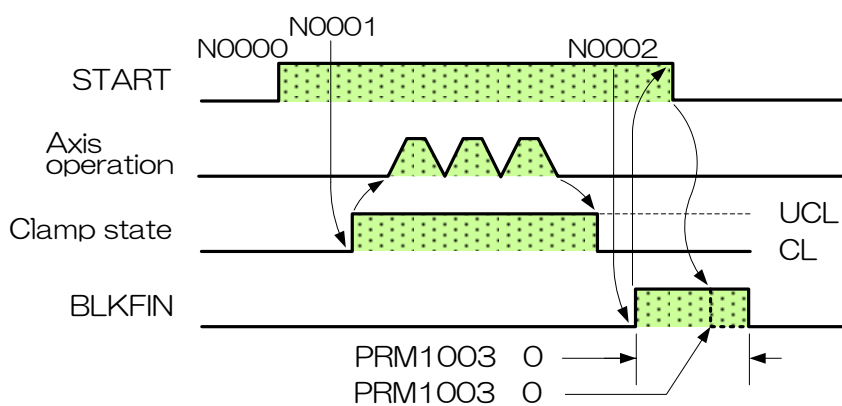
Motion of C0 (without positional deviation check function)

N0000 G08 C0  
 N0001 A360 D3 F0  
 N0002 G09 M30



Motion of C1 (with positional deviation check function)

N0000 G08 C1  
 N0001 A360 D3 F0  
 N0002 G09 M30





**B8-6** G10/11 (Clamp not used/used)

Normal unclamp state is set in with clamp non-use command (G10), thereby, clamp open time for every block is eliminated and sequential operation with machine can be smoothly performed from the next block.

What was turned into clamp non-use with G10 is turned into clamp use again with clamp use command (G11).

## Program format

**G10** *M*\_\_

※*Italic type address indicates that it can be omitted.*

**G11** *M*\_\_

Address	Explanation	Set range	Set unit
-	-	-	-
M	It is described Section B9	M function	.

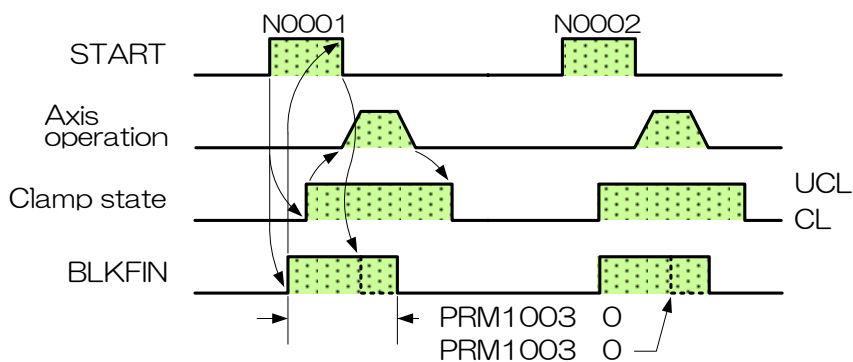
## Precaution

- G10 and G11 should be modal commands, and the command is continuously performed until the opposite command (G10 ⇔ G11) is issued.
- Even if jumped to subprogram by M98 during G10 execution, a state in clamp non-use continues.
- When program end command is issued by M30 during G10 execution, modal continuation is cancelled and clamp use state is set in.
- Unclamp state continues in unclamp state from G08 command (continuous buffer start) to G09 (continuous buffer end), therefore, G11 command becomes ineffective. G10 and G11 commands during G08 only update modal information and operate according to the modal information retained at the time of G09 (continuous buffer end).
- Positioning is retained during G10 only by motor torque, therefore, the motor is rotated if it is subject to cutting torque which cannot be retained by motor torque.

Timing chart

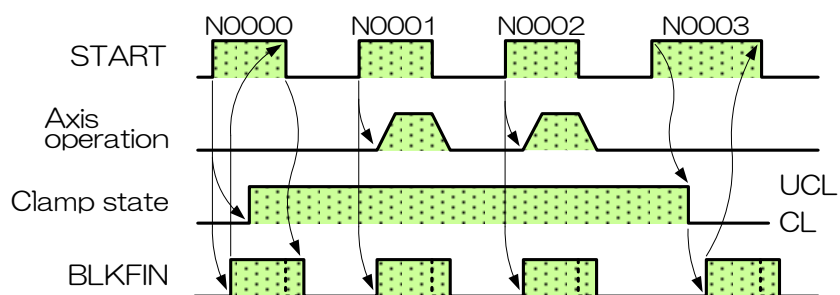
Motion without  
G10, G11

N0001 G21 A90 F0  
N0002 G21 A90 F0



Motion including  
G10, G11

N0000 G10  
N0001 G21 A90 F0  
N0002 G21 A90 F0  
N0003 G11



**B8-7** G21 (Sequential operation start)

Block finish (BLKFIN) is output at the time of motion execution start by sequential operation start command (G21), thereby, machining start can coincide with the external machine.

Program format

**G21** *A*\_\_ *B*\_\_ *D*\_\_ *F*\_\_ *M*\_\_ ※*Italic type address indicates that it can be omitted.*

Address	Explanation	Set range	Set unit
A,B	Rotating angle	±359.999 (Absolute) ±999.999 (Incremental)	deg
D	Number of equal divisions	0 to 9999	-
F	Rotating speed	0 to 999.999	min <sup>-1</sup>
M	It is described Section B9 M function .		

Comments

About address A,B (Rotating angle), D (Number of equal divisions), F (Rotating speed)

- See B8-2 Command without G code.

Precaution

- The operation is the same as that without G code during G08 or at the time of panel START.
- Output delay time of finish signal output (BLKFIN) can be set with PRM0700. However, it takes approximately 10 to 20ms necessary for actual internal processing. Accordingly, even when PRM0700 < 0.02 has been set, BLKFIN cannot be output as specified by the set time.
- If A data and B data is not set in program editing of G21, an alarm (PG007) occurs.
- When a block in which A code and B code does not exist is executed, an alarm (PG230) occurs.
- In 1 axis specification, you can not enter address B is masked.

Related parameters (Confirm the chapter of “C parameter description” for details)

PRM0700 BLKFIN output start delay timer (G21)

This sets block finish output delay time at the time of G21 program operation.

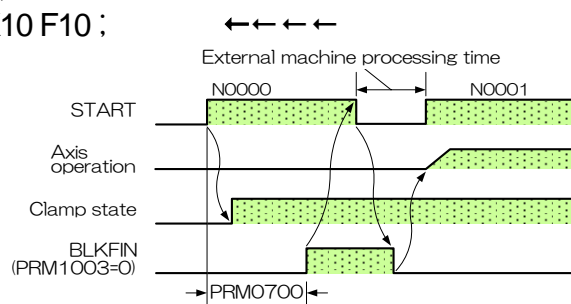
External machine program

N0000 M100 ;

N0001 G01 X10 F10 ;

Quinte

N0000 G21 A360.000 F0.000



**B8-8** G22 (Continuous start)

Rotation is started by ST signal input and is stopped by the next ST signal according to the “Rotating direction” and “Rotating speed” specified by the continuous start command.

Program format

**G22 A\_ B\_ F\_ M\_**      ※Italic type address indicates that it can be omitted.

Address	Explanation	Set range	Set unit
A, B	Rotating direction	0 (CW) -0 (CCW)	-
F	Rotating speed	0 to 999.999	min <sup>-1</sup>
M	It is described Section B9	M function	.

Comments

About address A, B (Rotating direction)

- The round table rotates in CW direction by setting “0,” and the round table rotates in CCW direction by setting “-0.”

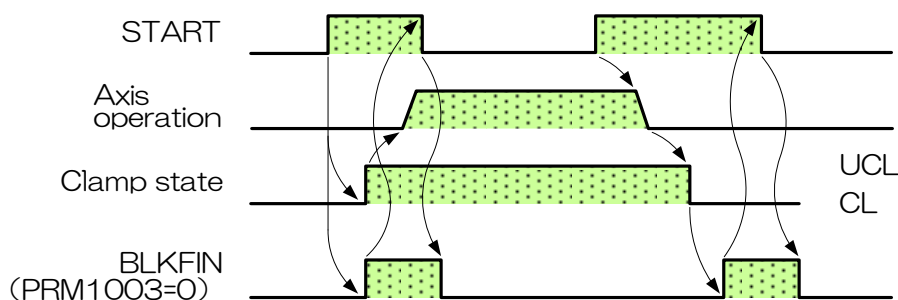
About address F (Rotating speed)

- See B8-2 Command without G code.

Precaution

- The finish signal (BLKFIN) is output one time when the first ST signal is ON, and it is output one time when the ST signal at the time of stop is ON.
- When G22 is commanded during G08 (continuous buffer), an alarm (PG240) occurs.
- If A or B code does not exist when G22 is commanded, an alarm (PG008) occurs.
- In 1 axis specification, you can not enter address B is masked.

Timing chart



**B8-9** G23 (Machine origin return)

Rotates to a position where machine origin is set.

Program format

**G23** *A*\_\_ *B*\_\_ *M*\_\_

※*Italic type address indicates that it can be omitted.*

Address	Explanation	Set range	Set unit
A, B	Machine origin return command	0	-
M	It is described Section B9 M function .		

Comments

About address A, B (Rotating direction)

- Use it as a motion axis of machine origin return command by setting "0."

Precaution

- When G23 is commanded at the machine origin position, machine origin return command is executed, however, BLKFIN is output without performing rotating operation.
- The machine origin return speed is set to PRM0501.
- The machine origin return direction is set to PRM0503.
- If A data is not set in program editing of G23, an alarm (PG009) occurs.
- When a block in which A code does not exist is executed, an alarm (PG230) occurs.
- When output signal dedicated to machine origin return finish is required, use M code.
- In 1 axis specification, you can not enter address B is masked.

Related parameters (Confirm the chapter of "C parameter description" for details)

PRM0501	Machine origin return speed Sets speeds for manual machine origin return operation, and G23 (machine origin return) command at the time of automation.
PRM0503	Machine origin return direction Sets machine origin return direction of the round table. 0 : + direction (clockwise viewing from top surface of the table) 1 : - direction (counterclockwise viewing from top surface of the table) 2 : Shortcut direction (180°boundary) 3 : Shortcut direction is determined by soft limit.

**B8-10** G24 (Machining origin return)

Rotates to a position where machining origin is set.

Program format

**G24** *A*\_\_ *B*\_\_ *M*\_\_      ※Italic type address indicates that it can be omitted.

Address	Explanation	Set range	Set unit
A, B	Machining origin return command	0	-
M	It is described Section B9 M function .		

Comments

About address A, B (Rotating direction)

- Use it as a motion axis of machining origin return command by setting "0."

Precaution

- When G24 is commanded at the machining origin position, machining origin return command is executed, however, BLKFIN is output without performing rotating operation.
- The machining origin return speed is set to PRM0502.
- The machining origin return direction is set to PRM0504.
- If A data is not set in program editing of G24, an alarm (PG010) occurs.
- When a block in which A code does not exist is executed , an alarm (PG230) occurs.
- When output signal dedicated to machining origin return finish is required, use M code.
- In 1 axis specification, you can not enter address B is masked.

Related parameters      (Confirm the chapter of "C parameter description" for details)

PRM0502	Machining origin return speed Sets speeds for manual machining origin return operation, and G24 (machining origin return) command at the time of automation.
PRM0504	Machining origin return direction Sets machining origin return direction of round table. 0 : + direction (clockwise viewing from top surface of the table) 1 : - direction (counterclockwise viewing from top surface of the table) 2 : Shortcut direction (180°boundary)

**B8-11** G90/G91 (Absolute/Incremental)

Absolute command (G90) becomes a command for absolute coordinate with reference to the machining origin position.

Incremental command (G91) becomes a command for rotation amount with reference to the present position.

Program format

**G90** *A*\_\_ *B*\_\_ *D*\_\_ *F*\_\_ *M*\_\_    ※Italic type address indicates that it can be omitted.  
**G91**

Address	Explanation	Set range	Set unit
A, B	Rotating angle	±359.999 (Absolute) ±999.999 (Incremental)	deg
D	Number of equal divisions	0 to 9999	-
F	Rotating speed	0 to 999.999	min <sup>-1</sup>
M	It is described Section B9 M function .		

Comments

About address A, B (Rotating direction)

- The sign of A, B code of G90 indicates rotating direction.

Precaution

- Because G90 and G91 are modal commands, they continuously continue unless the opposite commands (G90 ⇔ G91) are issued. And they also continue after jumping to the subprogram.
- Modal command of G90/G91 at the time of power on is set with PRM0010.  
It is set in absolute command (G90) as a standard setting.
- If the same coordinate value is designated at the time of absolute command (G90), block finish (BLKFIN) is output without performing moving motion. However, if PRM0102 (one direction positioning) is set, one direction positioning operation is performed.
- In 1 axis specification, you can not enter address B is masked.

Related parameters    (Confirm the chapter of “C parameter description” for details)

PRM0010    Initial modal command when power is turned on (G90/G91)  
 Selects initial modal command when power is turned on.  
 0 : G90 (Absolute command)  
 1 : G91 (Incremental command)

Operation reference example

Operation start position	Execution program	Stop position	
		G90 (Absolute command)	G91 (Incremental command)
A180.000	① A 90.000	Rotates by 270 deg in CW, stops at 90deg.	Rotates by 90 deg in CW, stops at 270deg.
	② A-90.000	Rotates by 90 deg in CCW, stops at 90deg.	Rotates by 90 deg in CCW, stops at 90deg.
	A 180.000	Does not rotate. <sup>Note 1)</sup>	Rotates by 180 deg in CW, stops at the machining origin position.
	A-180.000	Does not rotate. <sup>Note 1)</sup>	Rotates by 180 deg in CCW, stops at the machining origin position.
	③ A 0.000	Rotates by 180 deg in CW, stops at the machining origin position.	Does not rotate. <sup>Note 1)</sup>
	A-0.000	Rotates by 180 deg in CCW, stops at the machining origin position.	Does not rotate. <sup>Note 1)</sup>

※ All stop positions are indicated on the machining coordinate system.

Note 1 When one direction positioning is set, approach amount of one direction positioning moves.

	① G90 A90.000	② G90 A-90.000	③ G90 A0.000
(Absolute command) G90			
	① G91 A90.000	② G91 A-90.000	③ G91 A0.000
(Incremental command) G91			



**B8-12** G92 (Machining coordinate system setting)

Sets the present position to any coordinate on the machining coordinate.



- Machining origin position is changed by G92 command.  
Confirm whether there is interference by program operation.  
And because G92 also influences other programs, check interference with the other programs when using G92.  
(Cause that work and tool collide and interfere, and machine is broken)

Program format

**G92** *A*\_\_ *B*\_\_ *M*\_\_                      ※*Italic type address indicates that it can be omitted.*

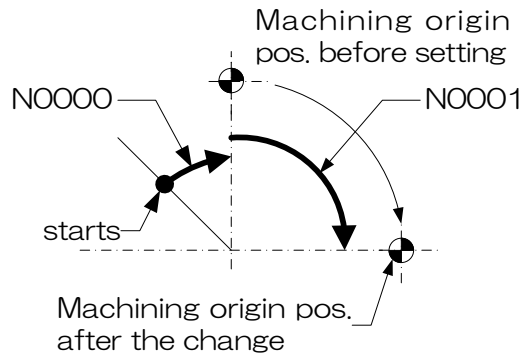
Address	Explanation	Set range	Set unit
A, B	Rotating angle	0.000 to 359.999	deg
M	It is described Section B9	M function	.

Precaution

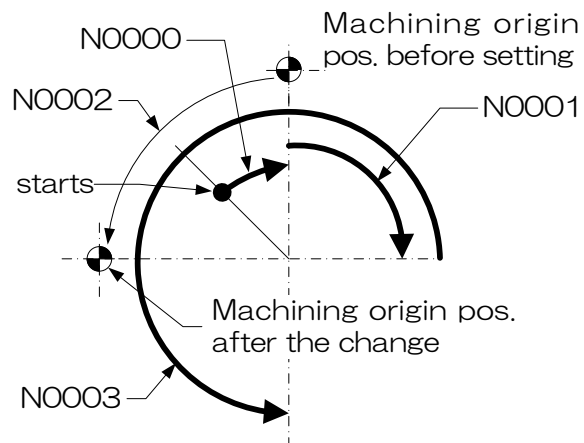
- When the A data is not set in G92 program editing, an alarm (PG013) occurs.
- When a block in which the A code does not exist is executed, an alarm (PG230) occurs.
- In 1 axis specification, you can not enter address B is masked.

Operation reference example

Program	Contents
N0000 G24	Machining origin return
N0001 G90 A90.000 F0	Rapid-feeds to a position of 90deg on machining coordinate to index.
N0002 G92 A0.000 M30	Sets the present position from the machining origin position to 0 deg. (The present position should be machining origin).



Program	Contents
N0000 G24	Machining origin return
N0001 G90 A90.000 F0	Rapid-feeds to a position of 90deg on machining coordinate to index.
N0002 G92 A180.000	Sets the present position from the machining origin position to 180 deg.
N0003 A-270.000 M30	Rapid-feeds to a position of 270deg on machining coordinate in CCW rotation to index.



## **B9** M function

This section describes M function.

- B9-1** M code list
- B9-2** M30 (Program end and rewind)
- B9-3** M98/M99 (Subprogram call/subprogram end)
- B9-4** ON/OFF type M code
- B9-5** FIN type M code

**B9-1** M code list

M code is also called an auxiliary function. It plays auxiliary roles of G code and further controls end of program and external output signal.

Code	Function	Contents	Page
30	Program end and rewind	Program end and reset & rewind	B9-3
80	External output	ON/OFF type M code	B9-7
82	External output	ON/OFF type M code	
84	External output	ON/OFF type M code	
86	External output	ON/OFF type M code	
88	External output	ON/OFF type M code	
90	External output	ON/OFF type M code	
92	External output	M FIN type M code	B9-8
93	External output	M FIN type M code	
94	External output	M FIN type M code	
95	External output	M FIN type M code	
96	External output	M FIN type M code	
97	External output	M FIN type M code	
98	Sub-program call	From main program to sub-program	B9-4
99	Sub-program end	Form sub-program to main program	

## Precaution

- M code marked with  in the list is an optional specification.

**B9-2** M30 (Program end and rewind)

---

If M30 is performed, the following are set.

**1)** All operations of machine stop.

Axis motion stop

External output stop

**2)** Control devices are put into the reset state.

G code is put into a state of power-on.

F code is cancelled.

**3)** The cursor returns to the head of the program (Rewind function).

**B9-3** M98/M99 (Subprogram call/subprogram end)

M98 : Calls programs in memory as subprograms.

M99 : Returns to one previous program when command is given in a subprogram.

Memory capacity can be saved by registering parts repetitively executed as subprograms. In addition, program can be simplified and possibility of improper programming is also reduced.

Program format

**M98** P\_\_ L\_\_

Address	Explanation	Set range	Set unit
P	Number of sub-program to be called	1 to 999	Program number
L	Number of sub-program repetition times	0 to 999	Number of times

Comments

About address P

- Designates number of sub-program to be called.

About address L

- In case of "0", sub-program is limitlessly repeated without exiting the sub-program.

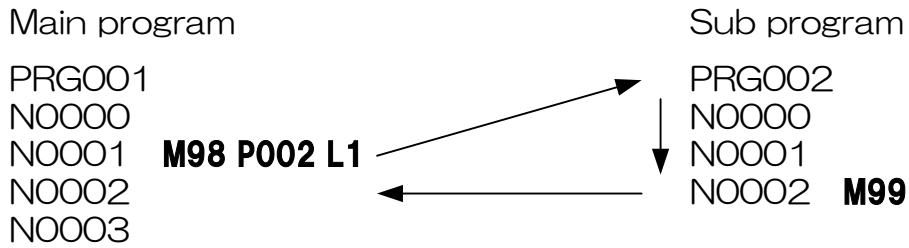
Precaution

- If non-existing program is called by P data, an alarm (PG221) occurs.
- When P data or L data is not set in program editing of M98 or non-existing block is executed, an alarm (PG014) occurs.
- In sub-program call of M98, Please do not call the program number of the master program numbers and their own.

If you make the call, an alarm (PG220) is generated after you run the nesting of 10 times.

**B9-3-1** How to use M98, M99

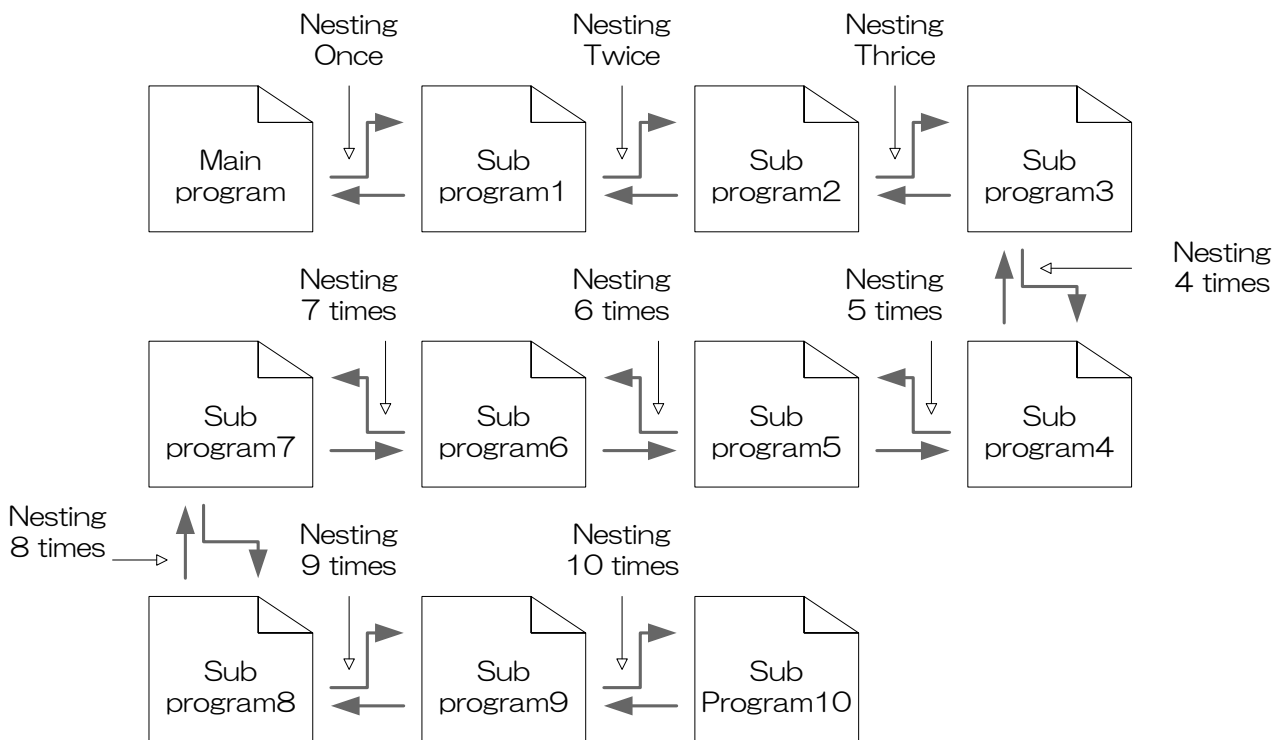
When M98 is commanded, a program in memory can be called as a subprogram. When M99 is commanded to the called subprogram, the program returns to one previous program.



By M98, the block returns to a block next to the block where the subprogram was called.

**B9-3-2** Nesting

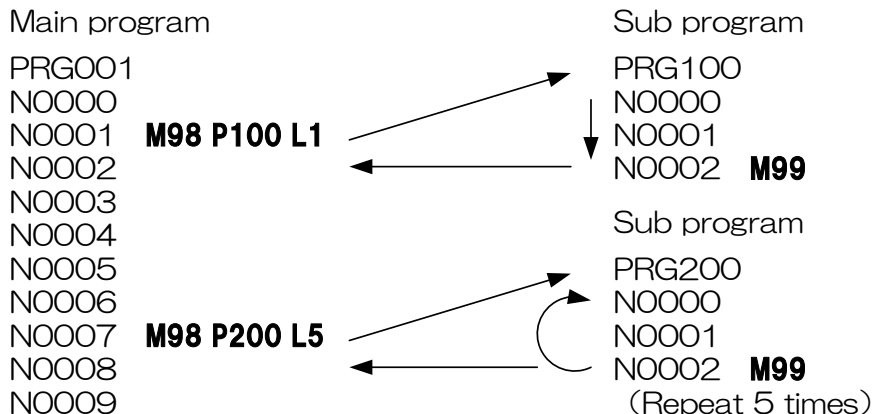
M98 is commanded as shown in the following Fig., the subprogram called from the main program can further call another subprogram. This is called nesting. Nesting can be performed up to 10 times, however, when it is repeated 11 or more times, an alarm (PG220) occurs when the program is executed.



**B9-3-3** Examples of using M98, M99

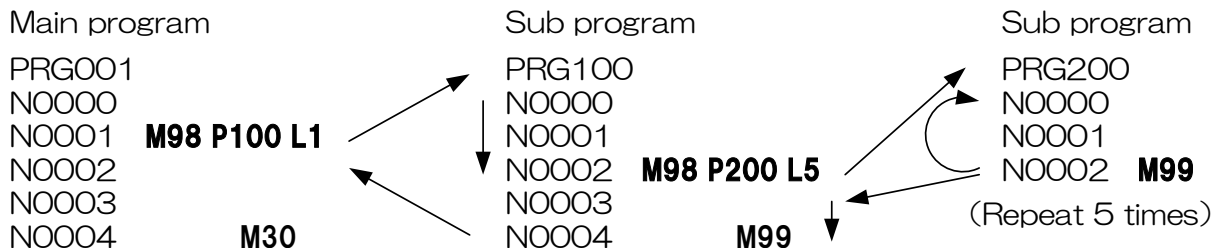
Example1

Calls another sub-program from the main program.



Example2

Calls a sub-program from the main program, and further calls another sub-program.





**B9-4** ON/OFF type M code

M code of ON/OFF type is established by a determined combination of M code dedicated to ON and M code dedicated to OFF. Assigned external output signal is turned ON by M code command dedicated to ON, and external output signal is turned OFF by M code command dedicated to OFF.

M code of ON/OFF type automatically advances to the next block after signal output ON/OFF.

Combinations of M code of ON/OFF type are as follows.

No.	M code dedicated to ON	M code dedicated to OFF
1	80	81
2	82	83
3	84	85
4	86	87
5	88	89
6	90	91

Related parameters (Confirm the chapter on parameters for details)

If M code of ON/OFF type is used, it is necessary to set parameters.

6 points are provided as general-purpose output signals, and any function selection is respectively assigned.

PRM1106 General-purpose output signal 1 function selection

PRM1111 General-purpose output signal 6 function selection

Selects what function is allotted to general-purpose output signal.

- 09 : ON/OFF type M code of M80 is allotted to a general-purpose output signal.
- 10 : ON/OFF type M code of M82 is allotted to a general-purpose output signal.
- 11 : ON/OFF type M code of M84 is allotted to a general-purpose output signal.
- 12 : ON/OFF type M code of M86 is allotted to a general-purpose output signal.
- 13 : ON/OFF type M code of M88 is allotted to a general-purpose output signal.
- 14 : ON/OFF type M code of M90 is allotted to a general-purpose output signal.

There are still some selection functions of a general-purpose output signal other than the above.

Output timing

PRG001

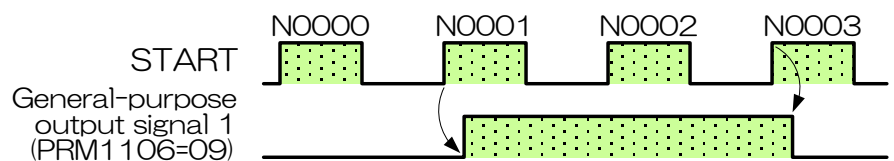
N0000

N0001 **M80**

N0002

N0003 **M81**

N0004



**B9-5** FIN type M code

M code of FIN type is a function which turns ON external output and turns OFF the external output by input of a dedicated finish signal from outside.

M code of FIN type waits until M code finish signal is input from the outside, and advances to the next block after the signal is input.

For M code of FIN type, M92 to M97 are prepared.

Related parameters (Confirm the chapter of “C parameter description” for details)

If M code of FIN type is used, it is necessary to set parameters. 6 points are provided as general-purpose input signals, and any function selection is respectively assigned.

PRM1100 General-purpose input signal 1 function selection

PRM1105 General-purpose input signal 6 function selection

Selects what function is allotted to a general-purpose input signal.

- 16 : Finish signal of M92 is allotted to a general-purpose input signal.
- 17 : Finish signal of M93 is allotted to a general-purpose input signal.
- 18 : Finish signal of M94 is allotted to a general-purpose input signal.
- 19 : Finish signal of M95 is allotted to a general-purpose input signal.
- 20 : Finish signal of M96 is allotted to a general-purpose input signal.
- 21 : Finish signal of M97 is allotted to a general-purpose input signal.

There are still some selection functions of a general-purpose input signal other than the above.

PRM1106 General-purpose output signal 1 function selection

PRM1111 General-purpose output signal 6 functions selection

Selects what function is allotted to a general-purpose output signal.

- 15 : FIN type M code of M92 is allotted to a general-purpose output signal.
- 16 : FIN type M code of M93 is allotted to a general-purpose output signal.
- 17 : FIN type M code of M94 is allotted to a general-purpose output signal.
- 18 : FIN type M code of M95 is allotted to a general-purpose output signal.
- 19 : FIN type M code of M96 is allotted to a general-purpose output signal.
- 20 : FIN type M code of M97 is allotted to a general-purpose output signal.

There are still some selection functions of a general-purpose output signal other than the above.

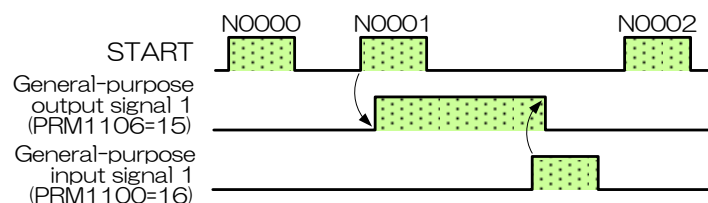
## Output timing

PRG001

N0000

N0001 **M92**

N0002



# **BOP1** MOP (Manual Operation Pendant)

- BOP1-1** Outline
- BOP1-2** Safety precautions
- BOP1-3** Installation and setup
- BOP1-4** Specifications
- BOP1-5** External dimension
- BOP1-6** Names of parts
- BOP1-7** Screens
- BOP1-8** Operation
- BOP1-9** Parameter
- BOP1-10** Alarm

## **BOP1-1** Outline

---

MOP (manual operation pendant) is a portable operation unit that enables operators to manually operate the rotary table while checking its status in the vicinity, which can reduce the burdens on the operators.

### **BOP1-1-1** Function

The safety function includes the following switches.

- Emergency stop switch
- Enable switch to prevent misoperation

The software includes the following functions.

- Performing jog operation and zero point return operation of rotary table
- Setting machine origin and workpiece origin
- Displaying position, mode, status, and error message of rotary table

## **BOP1-2** Safety precautions

---

### **BOP1-2-1** Action in emergency

Press the Emergency stop switch (red pushbutton in the upper part of MOP).

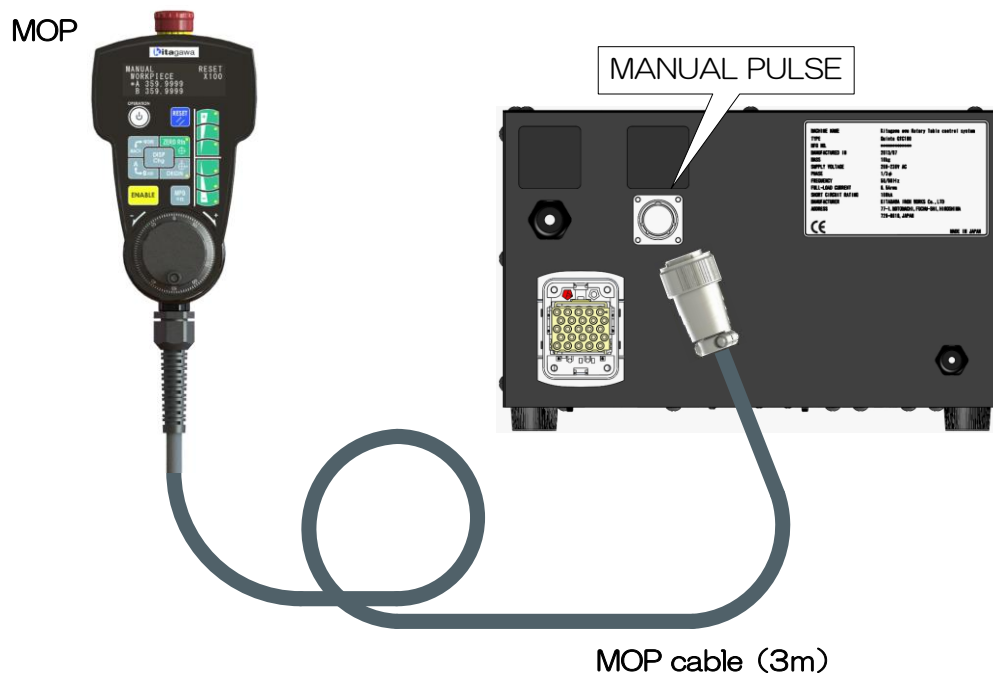
### **BOP1-2-2** Proper handling

To prevent malfunction, damage, and void warranty due to mishandling of MOP, follow the instructions below during operation.

- When not using MOP, securely hold it using the magnet on the back of MOP.
- Do not place MOP with the display screen faced downward to prevent damage to the operation keys and display screen.
- Do not place MOP on an unstable surface. Otherwise, it may fall to the ground or floor, resulting in damage.
- Do not place MOP near a heat source or in a place exposed to direct sunlight.
- Prevent MOP from being exposed to mechanical vibration, excessive dust, or moisture.
- Do not use solvent, polishing detergent, or washing sponge when cleaning the MOP surface.
- Confirm that no foreign matters or liquid will not enter MOP

## **BOP1-3** Installation and setup

### **BOP1-3-1** Mounting to / Demounting from Quinte



Connect the connector on the MOP side to the receptacle marked with "MANUAL PULSE" on Quinte.

The connector is the one-touch lock type.

When connecting the connector, align the plug with the receptacle guide and insert it straightforward.

(It has five keys. Apply the plug to the receptacle and turn the plug, and it can be aligned with the guide.)

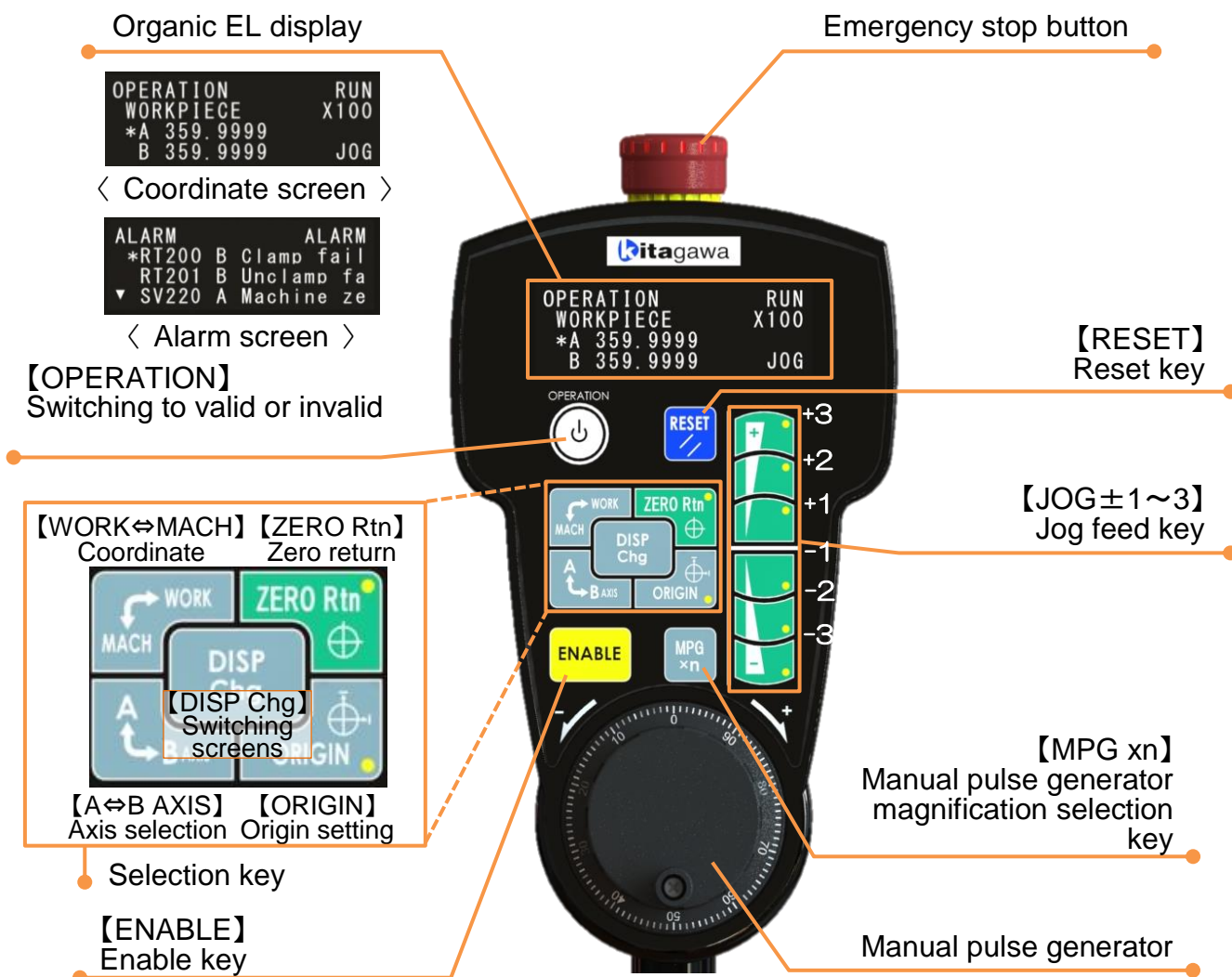
**Note: Do not turn the end bell when pulling out the connector.**

When disconnecting the connector, pull it out with the coupling nut turned counterclockwise by 45°.

**Note: Do not turn the end bell when pulling out the connector.**

### **BOP1-3-2** Installing MOP inside cable

Please refer to the manual included with the MOP.

**BOP1-4** Names of parts**BOP1-5** Screens

MOP has "Coordinate screen" and "Alarm screen".

**BOP1-5-1** Switching screens

The following screens are initially displayed on MOP when Quinte is turned ON or when the MANUAL mode is changed to the OPERATION mode.

When no alarm occurs "Coordinate screen" (workpiece coordinate)

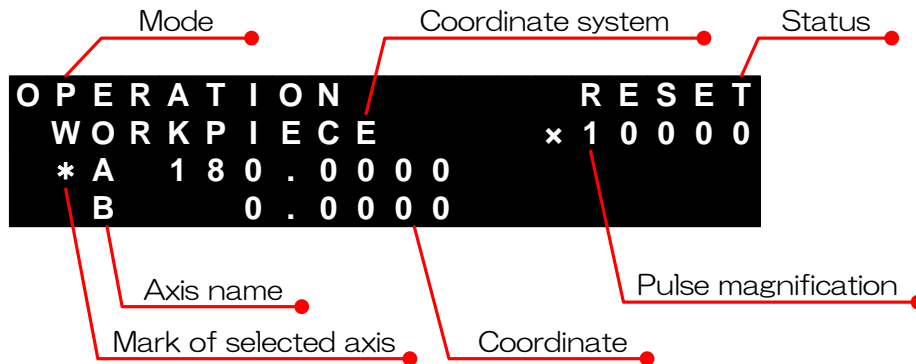
When an alarm is occurring "Alarm screen"

Upon occurrence of an alarm, the "Alarm screen" is displayed. The "Coordinate screen" and "Alarm screen" can be switched alternately by pressing 【DISP Chg】 key. If all alarms are reset while the "Alarm screen" is displayed, the "Coordinate screen" is displayed.

When no alarm occurs or when the status is RUN, the screens cannot be switched.

**BOP1-5-2** Screen display**BOP1-5-2-1** Coordinate screen

The Coordinate screen displayed on MOP is shown below.

**Mode**

When MOP is valid, "OPERATION" is displayed.

When MOP is invalid, the mode selected on the Quinte panel side is displayed.

**Status**

The status of Quinte is displayed.

**Coordinate system**

The following coordinate system selected with the MOP **【WORK ⇔ MACH】** key is displayed.

```

WORKPIECE      : Workpiece coordinate
MACHINE        : Machine coordinate
  
```

**Axis name**

For QTC100 series and QTC300, only the A-axis is displayed, and for QTC200 series, two axes (A-axis and B-axis) are displayed.

**Mark of selected axis**

The axis selected with the MOP **【A⇔B AXIS】** key is marked with " \* ".

When MOP is set to OFF (invalid), the " \* " mark disappears.

**Coordinate**

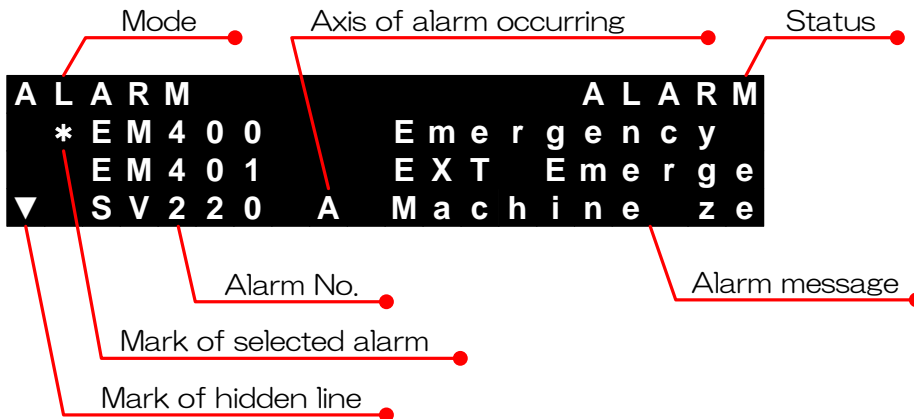
The angles of the A-axis and B-axis are displayed.

**Pulse magnification**

The pulse magnification selected with the MOP **【MPG xn】** key is displayed.

**BOP1-5-3** Alarm screen

The alarm screen display on MOP is shown below.

**Mode**

When the alarm screen is displayed, "ALARM" is displayed.

**Status**

When alarm screen is displayed, "ALARM" is displayed.

**Alarm number**

The alarm number of alarm occurring is displayed.

Alarms currently occurring are displayed from the top in the order of occurrence.

**Axis of Alarm occurring**

The axis of alarm occurring is displayed.

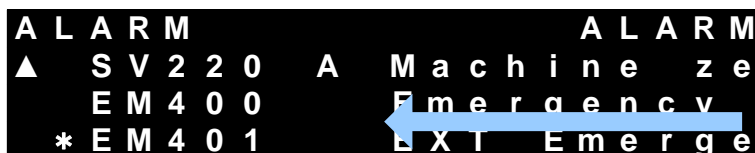
**Mark of selected alarm**

" \* " moves to upper line or lower line and the alarm is selected by pressing

【JOG+3】 key or 【JOG-3】 key.

**Alarm message**

The message of alarm occurring is displayed. Alarm messages cannot be displayed only one line. Therefore, only alarm message of selected alarm can be scrolled to the left.





Mark of hidden line

It indicates alarms are occurring more than four because the number of alarms that can be displayed is only three. Hidden alarms can be displayed by pressing 【JOG+3】 key or 【JOG-3】 key. A display example of a selected line and a screen transition example when 【JOG-3】 key is pressed are shown below.

```

A L A R M                A L A R M
 * R T 2 0 0  B  C l a m p  f a i l
   R T 2 0 1  B  U n c l a m p  f a
 ▼  S V 2 2 0  A  M a c h i n e  z e

A L A R M                A L A R M
   R T 2 0 0  B  C l a m p  f a i l
 * R T 2 0 1  B  U n c l a m p  f a
 ▼  S V 2 2 0  A  M a c h i n e  z e

A L A R M                A L A R M
   R T 2 0 0  B  C l a m p  f a i l
   R T 2 0 1  B  U n c l a m p  f a
 ▼ * S V 2 2 0  A  M a c h i n e  z e

A L A R M                A L A R M
 ▲   R T 2 0 1  B  U n c l a m p  f a
   S V 2 2 0  A  M a c h i n e  z e
 ▼ * E M 4 0 0           E m e r g e n c y

A L A R M                A L A R M
 ▲   S V 2 2 0  A  M a c h i n e  z e
   E M 4 0 0           E m e r g e n c y
 * E M 4 0 1           E X T E m e r g e

```

Alarm occurrence

" \* " moves down by one step.

" \* " further moves down by one step.

The alarm number, axis name, and message are scrolled up.

After alarms are scrolled up, the mark indicating hidden line disappears on the last line.

## **BOP1-6** Operation

The MOP operation functions are explained below.

Note that MOP operations are not processed in parallel. Even if a function is selected while another operation is being executed, it is not executed.

### **BOP1-6-1** Emergency stop button

All operations are stopped immediately by the servo brake regardless of manual operation or automatic operation. Alarm message "EM400" is displayed.

### **BOP1-6-2** 【OPERATION】 key

MOP operation is switched to valid or invalid.

In the MANUAL mode or ALARM mode, MOP operation functions become valid when 【OPERATION】 key is detected, and the mode is changed to the OPERATION mode.

In the OPERATION mode, MOP operation functions become invalid when 【OPERATION】 key is detected, and the mode is changed to the MANUAL mode.

**BOP1-6-3** 【RESET】 key

To reset the alarm, reset the control unit such as by resetting the running program.

The volume of the buzzer can be adjusted by pressing 【JOG+3】 key or 【JOG-3】 key while pressing 【RESET】 key.

**BOP1-6-4** 【DISP Chg】 key

Switch the MOP screen between the coordinate screen and alarm screen.

**BOP1-6-5** 【WORK⇔MACH】 key

Switch the coordinate systems displayed on MOP screen.

The workpiece coordinate and machine coordinate are switched alternately each time 【WORK⇔MACH】 key is detected.

**BOP1-6-6** 【A⇔B AXIS】 key

Select an axis to be operated on MOP.

When 【A⇔B AXIS】 is detected, the axis is switched to the B-axis when the A-axis is being selected and switched to the A-axis when the B-axis is being selected.

**BOP1-6-7** 【ORIGIN】 key

Set the origins (workpiece origin and machine origin) of the axis and coordinate system selected on MOP.

Origins are set by keeping pressing 【ORIGIN】 for three seconds while pressing 【ENABLE】 key. During the three seconds, the axis name for which the origin is being set and the angle flash.

When workpiece origin setting is executed, the coordinate changes to "0.000" after they flash.

When machine origin setting is executed, writing starts inside (see following screen) after they flash, and upon completion of writing, the coordinate changes to "0.000".

```

O P E R A T I O N           R E S E T
W O R K P I E C E           x 1 0 0 0 0
* A   C h a n g i n g   n o w . . .
  B       0 . 0 0 0 0

```

**BOP1-6-8** 【ZERO Rtn】 key

Perform zero point return operation of the axis and coordinate system selected on MOP.

Press 【ZERO Rtn】 key continuously while pressing 【ENABLE】 key, and the zero point return operation is executed.

When 【ZERO Rtn】 key is released during the zero point return operation, the operation decelerates and stops.

**BOP1-6-9** 【ENABLE】 key

This switch prevents failure in operations on MOP that are accompanied with motion and that may result in danger by an unintended change.

【ENABLE】 key must be pressed before operating an operation key marked with "○" on the upper right or lower right.

To stop a function being executed, release 【ENABLE】 key.

**BOP1-6-10** 【JOG+1】 / 【JOG+2】 / 【JOG+3】 / 【JOG-1】 / 【JOG-2】 / 【JOG-3】 key

This switch is used for jog operation and buzzer volume adjustment.

## Jog feed

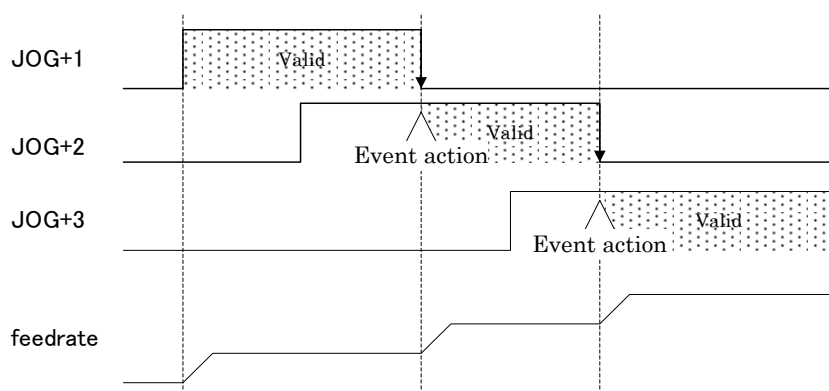
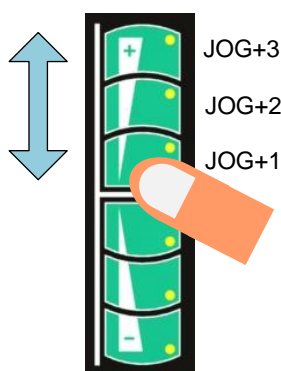
Press 【JOG】 key while pressing 【ENABLE】 key, and jog feed is executed.

There are three stages in jog feed: 【JOG±1】 key is low speed, 【JOG±2】 key is medium speed, and 【JOG±3】 key is high speed.

"+" and "-" on 【JOG】 key indicate rotation directions.

If 【JOG】 key is released or a different rotation direction is pressed during jog feed, the operation decelerates and stops.

Jog feedrate can be switched continuously by slide-operating the adjacent 【JOG】 key of the same rotation direction during jog feed.



## Buzzer volume adjustment

The volume of the buzzer can be adjusted (10 stages in total) by pressing 【JOG+3】 key or 【JOG-3】 key while pressing 【RESET】 key.

The volume is maintained even when the mode is changed or the power is interrupted.

**BOP1-6-11** 【MPG xn】 key

Select a pulse magnification of the MOP manual pulse generator.

When PRM0106 is set to 0 (coordinate system effective indication digit number), pulse magnification is switched from x1000 to x1 by the ring system.

“x1” (0.001deg) → “x10” (0.01deg) → “x100” (0.1deg) → “x1000” (1deg)

When PRM0106 is set to 1 (coordinate system effective indication digit number), pulse magnification is switched from x10000 to x1 by the ring system.

“x1” (0.0001deg) → “x10” (0.001deg) → “x100” (0.01deg) → “x1000” (0.1deg) → “x10000” (1deg)

**BOP1-6-12** Manual pulse generator

Operating the manual pulse generator generates pulses for pulse feed.

Manual pulse feed

Turn the handle, and the selected axis is unclamped and the rotary table rotates.

Clamp and unclamp operations after rotation (PRM0410≠0)

- The axis is clamped if no motion command is specified within three seconds after completion of the pulse command.
- The axis is clamped if any operation of MOP invalid (OFF), reset, axis selection (only for 2-axis type), and screen switching (when alarm is occurring) is performed within three seconds after the pulse command.
- The axis is clamped at the same time when angle display starts flashing if workpiece origin setting / machine origin setting is performed within three seconds after completion of the pulse command.
- Operation starts with the axis unclamped if motion command (handle feed, jog feed, workpiece zero point return, or machine zero point return) is specified within three seconds after completion of the pulse command.

OT release feed

OT release feed (avoiding operation) can be executed by performing pulse feed operation while pressing 【ENABLE】 key when alarm RT210 or RT211 is occurring (status "OTREL").

Even when an alarm is occurring, feed operation can be performed only in the direction avoiding the alarm.

The pulse magnification of avoiding feed is fixed to 0.01 deg / pulse.

**BOP1-7** Parameter

Parameters related to MOP are shown below.

For details of the setting, refer to Quinte instruction manual.

**BOP1-7-1** Parameter list**BOP1-7-1-1** Feed rate

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0205	Clamp ratio of MOP JOG feedrate [%]	50	%	1~100	
	Clamp ratio of MOP JOG feedrate				

**BOP1-7-1-2** Temporary memorization

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
8201	MOP Buzzer volume level	-	-	-	Not allowed to change
	MOP Buzzer volume level				

**BOP1-7-1-3** Maintenance by manufacturer

The MOP capacitance switches are allocated to groups (matrix) respectively and controlled. The switches and their matrix number allocation are explained below.

List of capacitance switch matrix and allocation in matrix

Matrix No. (m)	Name of key in matrix					
0	OPERATION	RESET	MACH↔ WORK	A↔B AXIS	Disp Chg	MPG Xn
1	JOG+3	JOG+2	JOG+1	JOG-1	JOG-2	JOG-3
2	ZERO Rtn	ENABLE				
3	ORIGIN					

※ The matrix numbers (m) in the above table correspond to "m" of the PRM numbers shown below.

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
920m	MOP Tap operation valid time(Mm) [s]	0.05	s	0.01 to 10.00	
	MOP Tap operation valid time(Mm)				
922m	MOP Touch operation OFF delay tm(Mm) [s]	0.06	s	0.00 to 10.00	
	MOP Touch operation OFF delay tm(Mm)				
923m	MOP Continuous touch cancel tm(Mm) [s]	3.00	s	0.00 to 10.00	
	MOP Continuous touch cancel tm(Mm)				
924m	MOP Drift correction selection (Mm)	0	-	0, 1	
	MOP Drift correction selection (Mm)				

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
925m	MOP Drift correction execution tm(Mm) [s]	3.00	s	0.00 to 10.00	
	MOP Drift correction execution tm(Mm)				
9260	MOP Buzzer sound generation time [s]	0.1	s	0.0 to 1.0	
	MOP Buzzer sound generation time				
9261	MOP Enable switch selection	0	-	0, 1	
	MOP Enable switch selection				

**BOP1-7-2** Parameter details**BOP1-7-2-1** Feed rate

0205	Clamp ratio of MOP JOG feedrate [%] Clamp ratio of MOP JOG feedrate
------	--

【Date unit】 : %                                  【Data range】 : 1 to 100

Comment                    Set the speed clamp amount when commanding high-speed jog feed and medium-speed jog feed by MOP.

High-speed jog feed = PRM0201 × PRM0205

Medium-speed jog feed = RM0201 × PRM0205 × 50%

**BOP1-7-2-2** Temporary memorization

Because this is a memory area for the manufacturer, detailed explanation is omitted.

**BOP1-7-2-3** Maintenance by manufacturer

920m	MOP Tap operation valid time(Mm) [s] MOP Tap operation valid time(Mm)
922m	MOP Touch operation OFF delay tm(Mm) [s] MOP Touch operation OFF delay tm(Mm)

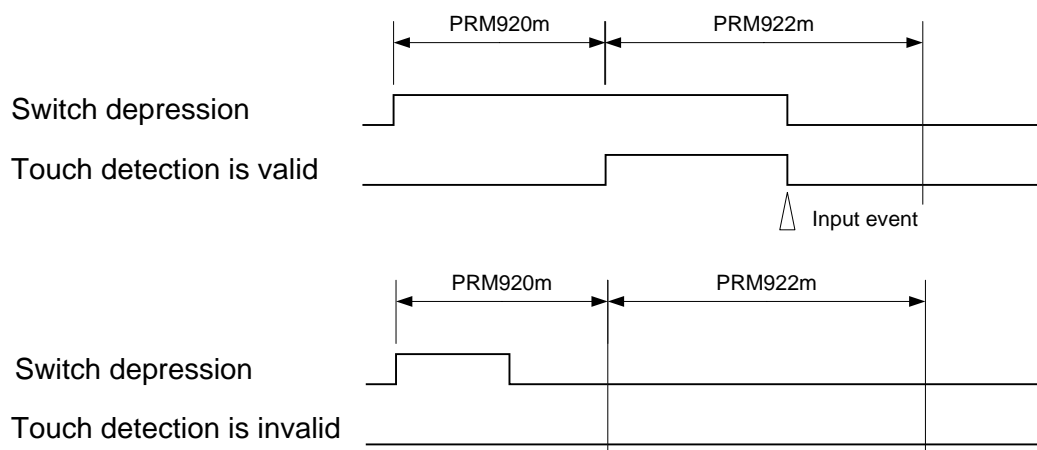
【Date unit】 : s

【Data range】 : 0.01~10.00

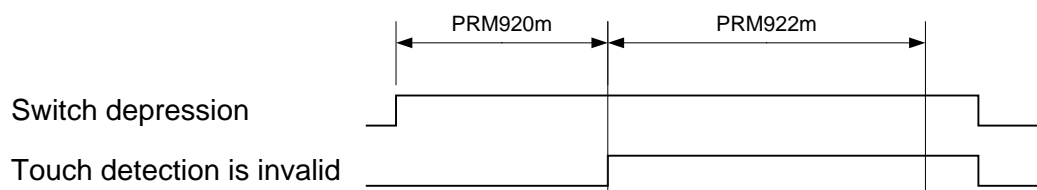
## Comment

Set the time from when the switch is pressed until when the corresponding action occurs.

It is necessary to set a proper length of time so that the switch does not respond only by slight touch by a finger.



Invalid in the above chart because switch depression exceeding the time of PRM920m was not confirmed.



Invalid in the above chart because switch depression fall was not confirmed within the time of PRM922m.

923m	MOP Continuous touch cancel tm(Mm) [s] MOP Continuous touch cancel tm(Mm)
------	--

【Date unit】 : s

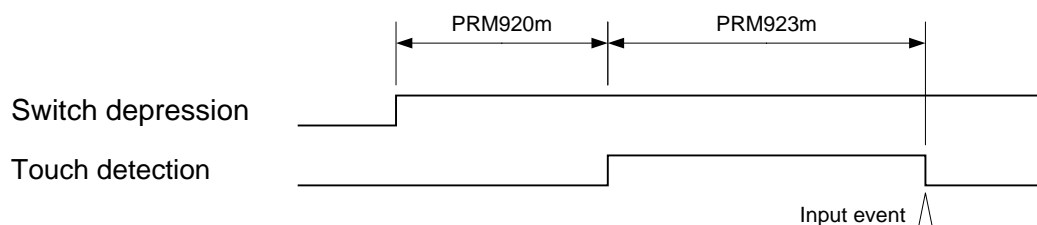
【Data range】 : 0.01~10.00

## Comment

When the switch is touched continuously, it is forcibly turned OFF at the set time.

This parameter is allocated to switches of the long-press time setting type. (Ex: 【Origin】 key)

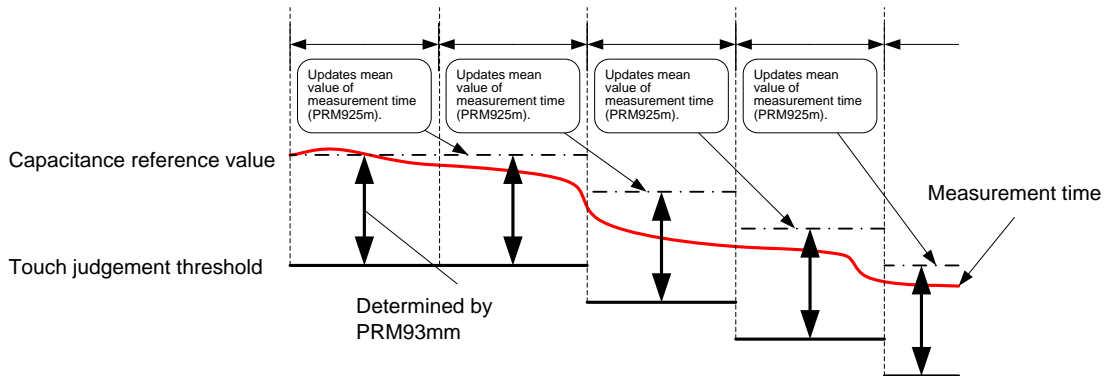
If this parameter is set to 0.00, cancellation by continuous touch becomes invalid, and touch detection is performed according to PRM920m.



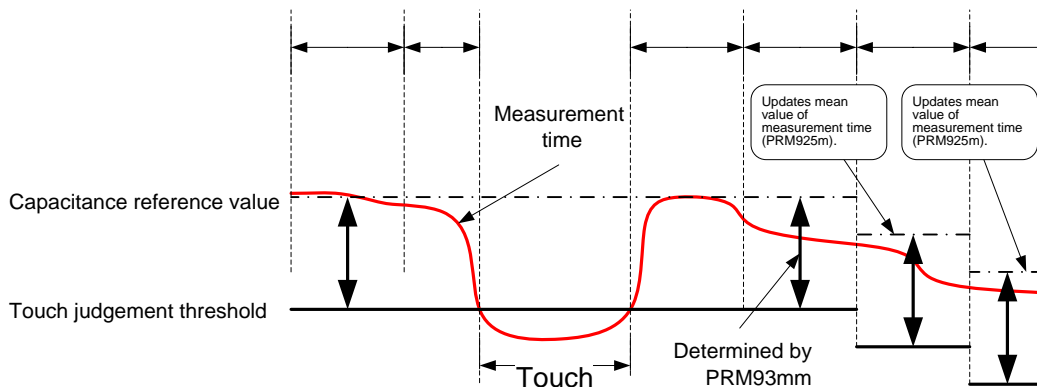
924m	MOP Drift correction selection (Mm) [s] MOP Drift correction selection (Mm)
[Date unit] : - [Data range] : 0, 1	

Comment In drift correction, capacitance data for the time of PRM925m is stored, and the mean value is used as the reference value. The reference value follows the change of the measurement values due to slight change of the environment so as to prevent erroneous touch detection. Also, undetectable touch phenomenon is prevented. Set drift correction to valid or invalid.

● Drift correction when no touch is detected



● Drift correction when touch is detected



925m	MOP Drift correction execution tm(Mm) [s] MOP Drift correction execution tm (Mm)
[Date unit] : s [Data range] : 0.01~10.00	

Comment Set the time for obtaining the mean value of capacitance data in drift correction.

9260	MOP Buzzer sound generation time MOP Buzzer sound generation time
[Date unit] : s [Data range] : 0.0~1.0	

Comment Set the time for buzzer sounding when the switch is operated.

9261	MOP Enable switch selection MOP Enable switch selection
[Date unit] : - [Data range] : 0, 1	

Comment Select enable switch type.  
 [0] Capacitance touch switch  
 [1] Optional additional enable switch



**BOP1-8** Alarm**BOP1-8-1** Alarm list**BOP1-8-1-1** Relevant to serial communication, Remote control (EX)

No.	Alarm content
	Message
EX300	MOP communication not established yet
	MOP communication not established yet

**BOP1-8-2** Alarm details**BOP1-8-2-1** Relevant to serial communication, Remote control (EX)

EX300	MOP communication not established yet
	MOP communication not established yet

- 【Cause】
- MOP cable is disconnected.
  - Connection failure (the back of Quinte or circuit board in MOP)
- 【Countermeasure】
- MOP cable replacement.
  - Reconnect to the connector (the back of Quinte or circuit board in MOP)

< No text on this page. >

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# **C** *Parameter description*

---

**C1** Parameter .....C1-1

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# **C1** Parameter

- C1-1** Parameter setup
- C1-2** Parameter Import, Export
- C1-3** Parameter list
- C1-4** Parameter details

## C1-1 Parameter setup

A parameter differs in a setup with combination with a circular table.

It is used in order to use properly various functions for performing each setup united with the circular table, or controlling.

### C1-1-1 Setting preparation

Parameter setup can be performed only in parameter mode.

Moreover, it can carry out regardless of status, such as alarm.

You will not be able to input parameters if you do not set the authorization code, 1 or 999.

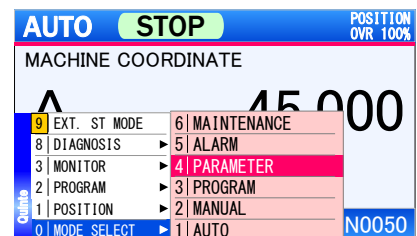
Please carry out a parameter input permission setup before a parameter input.

Parameter input permission will be write-protected automatically, if a mode change and the power supply OFF are performed.

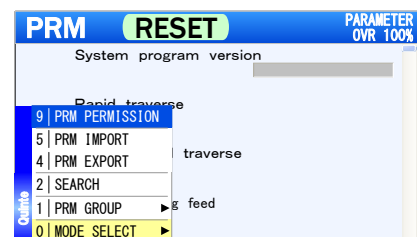
### C1-1-2 Setup steps

Parameter setting can only be executed at Parameter Mode, however, it can be done at any status like Alarm.

1. Press the **MENU** key.  
["Menu" tab indication.]
2. Selecting "MODE SELECT" by **0**, push **▶** key, or **0** key.  
[The subtab of a MENU tab is displayed.]
3. Press the **4** key on the sub tab, or press **▶** to select "PARAMETER" and then press **ENTER**.  
[It shifts to a PARAMETER mode screen.]

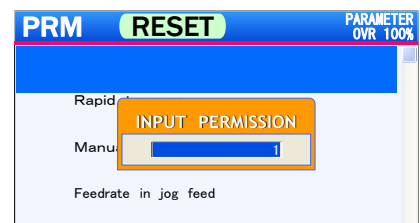


4. In order to perform a setup in which parameter writing is possible, the **MENU** key is pressed, and a MENU tab is displayed.  
Use the **9** key to select, or use **▶** and **▶** to select "PRM PERMISSION" and then press **ENTER**.  
[It shifts to permission number input pop-up.]



At the time of write-protected, even if it performs parameter selection, a selection frame becomes gray and it cannot perform change of a parameter. It becomes blue at the time of input permission.

5. Input permission is validated by **1** **ENTER** key at permission number input pop-up.  
**999** becomes effective.



## C1-2 Parameter Import, Export

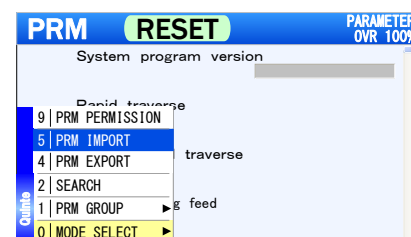
Import (Input) or Export (Output) of the parameter data can be performed by using MMC (Multi Media Card)

### C1-2-1 Parameter Input

The parameter input can be performed by selecting “PR MIMPO R T” command.

For the parameter input, only parameter recorded in MMC is input.

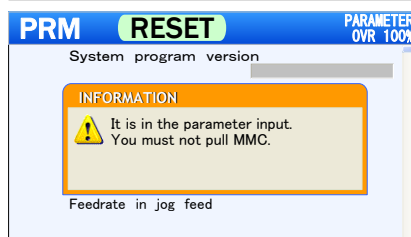
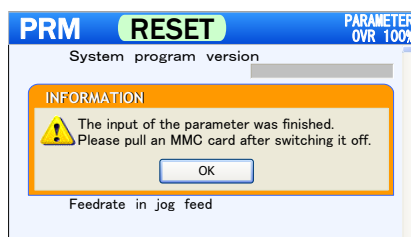
1. In the status of parameter displayed, push **MENU** key.  
[MENU tab is displayed on screen.]
2. Selecting “PR MIMPO R T” by **5** key, push **ENTER** key, or **5** key.  
[Selection of PRM IMPORT]



3. When parameter import is selected, the parameter input is performed.  
When a lower right screen is displayed, the parameter input is completion.

#### Precaution

- ◆ During displaying the upper right screen, do not remove MMC because data are being read from MMC
- ◆ After the parameter import, the alarm “SY 100” is generated.

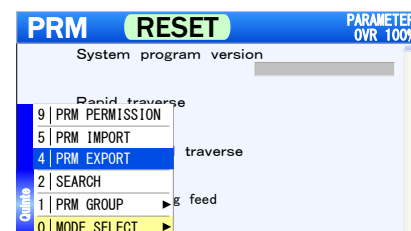


### C1-2-2 Parameter output

The parameter output can be performed by selecting “PR MEX PO R T” command.

For the parameter output, all parameters are output to MMC.

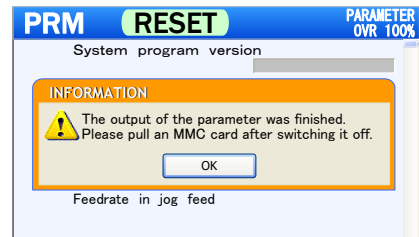
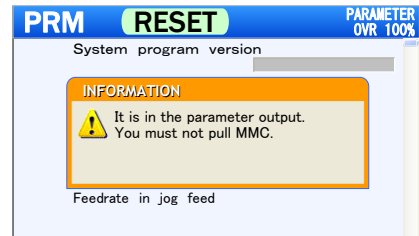
1. In the status of parameter displayed, push **MENU** key.  
[MENU tab is displayed on screen.]
2. Selecting “PR MEX PO R T” by **4** key, push **ENTER** key or **4** key.  
[Selection of PRM EXPORT]



3. When parameter export is selected, the parameter output is performed.  
When a lower right screen is displayed, the parameter output is completion.

#### Precaution

- ◆ During displaying the upper right screen, do not remove MMC because data are being read from MMC.



### C1-2-3 Parameter data

The data of parameter which perform input and output are text file, and its file name is "PR M.txt".  
When parameter is output, save by newly creating PRM.txt in MMC, or overwriting.  
And when parameter is input, the parameter data of PRM.txt in MMC are input to Quinte.

PRM.txt Data for reference

- ◆ Parameter data of QTC101CS / QTC300
  - PRM0000,A01.05.00
  - PRM0001,A1130029
  - PRM0002,A32768
  - PRM0003,A32768
  - PRM0004,A32768
  - PRM0005,ARS2A03A2HA5
  - PRM0006,A300H
  - PRM0007,A8201.2.4124
  - :
  - :
- ◆ Parameter data of QTC201CS
  - PRM0000,A01.05.00
  - PRM0001,A2130010
  - PRM0002,A32768,B32768
  - PRM0003,A32768,B32768
  - PRM0004,A32768,B32768
  - PRM0005,ARS2A03A2HA5,BRS2A03A2HA5
  - PRM0006,A300H,B300H
  - PRM0007,A8201.2.3B15,B8201.2.3B15
  - :
  - :



**C1-3** Parameter list**C1-3-1** System

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0000	Firmware version				Not allowed to change
	Firmware version				
0001	Serial No.				Not allowed to change
	Serial number				
0002	Motor code	32768		0 to 65535	Re-start
	Mocode				
0003	Sensor selection	32768		0 to 65535	Re-start
	Encode				
0004	Sensor type code	32768		0 to 65535	Re-start
	Entype				
0005	Servo amplifier model indication				Not allowed to change
	Device				
0006	Servo amplifier hardware version				Not allowed to change
	Hardver				
0007	Servo amplifier software version				Not allowed to change
	Softver				
0008	Power source type switching	1		0,1	Re-start
	Mpwrin				
0009	Initial mode when power is turned on	0		0 to 2	
	Start up mode select				
0010	Initial modal command when power is turned on (G90, G91)	0		0,1	
	Modal command select(G90, G91)				
0011	Display language switching	0		0 to 2	Re-start
	Language switching				
0012	Clamp mechanism selection	1		0 to 2	Re-start
	Clamp spec.				
0013	Pitch error compensation control	0		0,1	
	Pitch error compensation control				

**C1-3-2** Axis control

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0100	Gear ratio 1/X	72		1to999	Re-start
	Gear ratio 1/X				
0101	Motor rotating direction	0		0,1	Re-start
	Motor direction				
0102	One direction positioning specification	0		0 to 2	
	Unidirectional spec				
0103	One direction determining approach amount	0.0000	deg	0.0000 to 359.9999	
	Unidirectional angle				
0104	Backlash correction amount	0.0000	deg	0.0000 to 1.0000	Re-start
	Backlash comp amount				
0105	In-position width	0.005	deg	0.0001 to 1.0000	
	Imposition width				
0106	Coordinate system effective indication digit number	0		0,1	Re-start
	Coordinate display				

**C1-3-3** Feed rate

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0200	Rapid feed rate	41.66	min <sup>-1</sup>	0.01 to 999.99	
	Rapid traverse				
0201	JOG HI speed	41.66	min <sup>-1</sup>	0.01 to 999.99	
	HI JOG feed				
0202	JOG LO speed	1.00	min <sup>-1</sup>	0.01 to 999.99	
	LO JOG feed				
0203	Step feed amount	0.0010	deg	0.0001 to 1.0000	
	Step feed amount				
0204	Override pitch amount	5	%	1 to 100	
	Override the amount of increments				
0205	Clamp ratio of MOP JOG feedrate [%]	50	%	1 to 100	
	Clamp ratio of MOP JOG feedrate				

**C1-3-4** Acceleration/deceleration time constant

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0300	Rapid feed acceleration/deceleration time constant 1	100	ms	0 to 500	
	Rapid acc/dec constant 1				
0302	Cutting feed speed acceleration/deceleration time constant	100	ms	0 to 1000	
	Cutting acc/dec constant				

**C1-3-5** Clamp

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0400	Timer from unclamp operation to move start	0.00	s	0.00 to 10.00	
	Start timer from ucl				
0401	Clamp confirmation signal function selection	0		0 to 2	
	Clamp signal select				
0402	Clamp excitation polarity selection	1		0, 1	
	Clamp charge select				
0403	Selection of servo control specification at the time of clamp	0		0, 1	
	Clamp servo control				
0410	Clamping operation selection in manual mode	0		0 to 2	
	Clamping operation selection in manual mode				
0411	Unclamp holding time after manual operation	5.0	s	0.0 to 30.00	
	Unclamp holding time after manual operation				

**C1-3-6** Origin return

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0500	Machine origin position establishment	0		0, 1	
	Origin position complete				
0501	Machine origin return speed	0.00	min <sup>-1</sup>	0.00 to 999.99	
	MZRN feed				
0502	Machining origin return speed	0.00	min <sup>-1</sup>	0.00 to 999.99	
	WZRN feed				
0503	Machine origin return direction	0		0 to 3	
	MZRN direction				
0504	Machining origin return direction	0		0 to 2	
	WZRN direction				

**C1-3-7** Soft limit

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0600	Soft limit specifications	0		0,1	
	S/W limit spec				
0601	- side soft limit	0.0000	deg	0.0000 to 359.9999	
	S/W limit side				
0602	+ side soft limit	0.0000	deg	0.0000 to 359.9999	
	S/W limit + side				

**C1-3-8** Program

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0700	BLKFIN output start delay timer (G21)	0.00	s	0.00 to 10.00	
	BLK delay timer (G21)				

**C1-3-9** Indication on screen

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0800	Input/output signal indication allotment 1	5		0 to 99	
	I/O signal display 1				
0801	Input/output signal indication allotment 2	6		0 to 99	
	I/O signal display 2				
0802	Input/output signal indication allotment 3	32		0 to 99	
	I/O signal display 3				
0803	Input/output signal indication allotment 4	1		0 to 99	
	I/O signal display 4				
0804	Input/output signal indication allotment 5	2		0 to 99	
	I/O signal display 5				
0805	Input/output signal indication allotment 6	31		0 to 99	
	I/O signal display 6				
0806	Input/output signal indication allotment 7	7		0 to 99	
	I/O signal display 7				
0807	Input/output signal indication allotment 8	8		0 to 99	
	I/O signal display 8				
0808	Input/output signal indication allotment 9	33		0 to 99	
	I/O signal display 9				
0809	Input/output signal indication allotment 10	34		0 to 99	
	I/O signal display 10				

**C1-3-10** Alarm detection

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0900	Positioning wait timeout detection time	0.30	s	0.00 to 1.00	
	Positioning time-out				
0901	Positional deviation over detection range when moving	10.0000	deg	0.0001 to 359.9999	
	Excessive position deviation value				
0902	Positional deviation over timeout detection time when moving	0.00	s	0.00 to 0.00	Not allowed to change
	Excessive position deviation time-out				

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
0903	Positional deviation over detection range when stopping	0.0100	deg	0.0000 to 1.0000	
	Position window				
0904	Positional deviation over timeout detection time when stopping	0.10	s	0.00 to 1.00	
	Position window time-out				
0905	Alarm confirmation time for unclamp signal	3.00	s	0.00 to 10.00	
	Alarm scan unclamp				
0906	Alarm confirmation time for clamp signal	3.00	s	0.00 to 10.00	
	Alarm scan Clamp				
0907	BLKFIN signal timeout detection time	30.00	s	0.00 to 60.00	
	BLKFIN time out				
0908	START signal OFF detection time	0.00	s	0.00 to 10.00	
	ST off check timer				
0909	PRG SET signal timeout detection time	30.00	s	0.00 to 300.00	
	PRG SET time out				
0910	PRG CLEAR signal timeout detection time	30.00	s	0.00 to 300.00	
	PRG CLEAR time out				
0911	PRG SEL+1 signal timeout detection time	30.00	s	0.00 to 300.00	
	PRG SEL +1 time out				
0912	PRG SEL-1 signal timeout detection time	30.00	s	0.00 to 300.00	
	PRG SEL -1 time out				
0913	PRG SEL+10 signal timeout detection time	30.00	s	0.00 to 300.00	
	PRG SEL +10 time out				
0914	PRG SEL-10 signal timeout detection time	30.00	s	0.00 to 300.00	
	PRG SEL -10 time out				
0915	M92 timeout detection time	10.00	s	0.00 to 300.00	
	M92 time out				
0916	M93 timeout detection time	10.00	s	0.00 to 300.00	
	M93 time out				
0917	M94 timeout detection time	10.00	s	0.00 to 300.00	
	M94 time out				
0918	M95 timeout detection time	10.00	s	0.00 to 300.00	
	M95 time out				
0919	M96 timeout detection time	10.00	s	0.00 to 300.00	
	M96 time out				
0920	M97 timeout detection time	10.00	s	0.00 to 300.00	
	M97 time out				
0923	RS232C communication time-out	30.00	s	0.00 to 300.00	
	RS232C communication time-out				
0925	Execution program reception wait timeout	5.00	s	0.00 to 300.00	
	Execution program reception wait timeout				

### C1-3-11 External input/output

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
1000	BLKFIN output timing selection at the time of G07	0		0,1	
	BLKFIN output select (G07)				
1001	BLKFIN output timing selection at the time of G08, 09	0		0,1	
	BLKFIN output select (G08, G09)				
1002	Target signal for BLKFIN output	0		0,1	
	BLKFIN trigger				

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
1003	BLKFIN timer	0.00	s	0.00 to 1.00	
	BLKFIN timer				
1004	Machining origin position output contact point type selection	1		0,1	
	WZERO output contact				
1005	Machining origin position output specification	0		0,1	
	WZERO output spec				
1006	Machining origin position output range	0.0000	deg	0.0000 to 1.0000	
	WZERO output area				
1007	Machining origin position output timer	0.50	s	0.00 to 1.00	
	WZERO output timer				
1008	Machining origin position range reach timer	0.0	s	0.0 to 1.0	
	WZERO output area timer				
1009	Machine origin position output contact point type selection	1		0,1	
	MZERO output contact				
1010	Machine origin position output specification	0		0,1	
	MZERO output spec				
1011	Machine origin position output range	0.0000	deg	0.0000 to 1.0000	
	MZERO output area				
1012	Machine origin position output timer	0.50	s	0.00 to 1.00	
	MZERO output timer				
1013	Machine origin position range reach timer	0.0	s	0.0 to 1.0	
	MZERO output area timer				
1014	External remote operation specification	0		0,1	
	EXT operation spec				
1015	STOP signal function specification	0		0,1	
	STOP/EXT STOP func spec				
1016	OV RUN contact point type	1		0,1	Re-start
	OV RUN contact type				
1017	Input signal establishing time setting timer	0.10	s	0.00 to 0.50	
	Input signal complete timer				

### C1-3-12 General purpose input/output allotment

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
1100	General purpose input signal	0		0 to 99	
	Utility input 1				
1101	General purpose input signal 2	0		0 to 99	
	Utility input 2				
1102	General purpose input signal 3	0		0 to 99	
	Utility input 3				
1103	General purpose input signal 4	0		0 to 99	
	Utility input 4				
1104	General purpose input signal 5	0		0 to 99	
	Utility Input 5				
1105	General purpose input signal 6	0		0 to 99	
	Utility input 6				
1106	General purpose output signal	0		0 to 99	
	Utility output 1				
1107	General purpose output signal 2	0		0 to 99	
	Utility output 2				

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
1108	General purpose output signal 3	0		0 to 99	
	Utility output 3				
1109	General purpose output signal 4	0		0 to 99	
	Utility output 4				
1110	General purpose output signal 5	0		0 to 99	
	Utility output 5				
1111	General purpose output signal 6	0		0 to 99	
	Utility output 6				

**C1-3-13** Remote control function

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
1200	Remote control specification	0		0 to 3	Re-start
	RC model specification				
1201	Response specification	1		0,1	Re-start
	Response specification				
1202	Port settings for the serial communication	0		0,1	
	Serial communication port				

**C1-3-14** Serial communication

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
1300	RS232C baudrate	2		0 to 6	
	RS232C baud rate				
1301	RS232C data length	0		0,1	
	RS232C data head				
1302	RS232C parity bit	0		0 to 2	
	RS232C parity bit				
1303	RS232C stop bit	0		0,1	
	RS232C stop bit				
1304	RS232C receiver flow control	0		0 to 2	
	RS232C receiver flow control				
1305	RS232C transmitting end flow control	0		0 to 2	
	RS232C transmitting end flow control				
1306	RS232C transmission code	2		0 to 2	
	RS232C transmission code				

**C1-3-15** Pitch Error Compensation

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
2000 to 2123	Pitch-error-compensation setting angle	0	deg	0 to 359	Re-start
	Pitch error angle				
	The amount of pitch error compensation	0.0000	deg	-0.1000 to 0.1000	Re-start
	Pitch error offset				

**C1-3-16** Servo parameter

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5000	Abort Connection Option Code Abort connection option code	3		0 to 3	Not allowed to change
5001	Error code Error code	0		0 to 65535	Not allowed to change
5002	Control word Control word	0		0 to 65535	Not allowed to change
5003	Status word Status word	0		0 to 65535	Not allowed to change
5004	Quick stop option code Quick stop option code	2		0 to 7	Not allowed to change
5005	Shutdown option code Shutdown option code	0		0,1	Not allowed to change
5006	Disable operation option code Disable operation option code	0		0,1	Not allowed to change
5007	Halt option code Halt option code	2		1 to 3	Not allowed to change
5008	Fault reaction option code Fault reaction option code	2		0 to 3	
5009	Operation mode Operation mode	0		0 to 10	Not allowed to change
5010	Operation display Operation display	0		0 to 10	Not allowed to change
5011	Position demand value Position demand value		pulse	-2147483648 to 2147483647	Not allowed to change
5012	Internal actual position Internal actual position		pulse	-2147483648 to 2147483647	Not allowed to change
5013	Real position Real position		pulse	-2147483648 to 2147483647	Not allowed to change
5014	Excessive position deviation value Excessive position deviation value	5000000	pulse	1 to 2147483647	Not allowed to change
5015	Excessive position deviation time-out Excessive position deviation time-out	0	ms	0	Not allowed to change
5016	Position window(Positioning complete range) Position window	100	pulse	0 to 2147483647	Not allowed to change
5017	Position window time Position window time	0	ms	0	
5018	Sensor selection code Sensor selection code	0		0	
5019	Real velocity value(Velocity monitor) Real velocity value		pulse/s		Not allowed to change
5020	Velocity window(Velocity matching range) Velocity window	50	min <sup>-1</sup>	0 to 65535	
5021	Velocity window time Velocity window time	1	ms	1 to 5000	
5022	Velocity threshold Velocity threshold	50	min <sup>-1</sup>	5 to 500	
5023	Velocity threshold time Velocity threshold time	1	ms	1 to 5000	
5024	Target torque(force) Target torque	1.0	%	-3276.8 to 3276.7	



PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5025	Maximum torque(force) Maximum torque	500.0	%	0.0 to 500.0	
5026	Real torque(force)value Real torque value		%		Not allowed to change
5027	Target position(Position command) Targer position	0	pulse	-2147483648 to 2147483647	Not allowed to change
5028	Minimum position limit Minimum position limit		pulse	-2147483648 to 2147483647	Not allowed to change
5029	Maximum position limit Maximum position limit		pulse	-2147483648 to 2147483647	Not allowed to change
5030	Coordinates offset Coordinates offset	0	pulse	-2147483648 to 2147483647	Not allowed to change
5031	Software minimum position limit Software minimum position limit	0	pulse	-2147483648 to 2147483647	Not allowed to change
5032	Software maximum position limit Software maximum position limit	0	pulse	-2147483648 to 2147483647	Not allowed to change
5033	Polarity Polarity	0		0 to 224	Not allowed to change
5034	Max profile velocity Max profile velocity	4294967295	pulse/s	1 to 4294967295	
5035	Profile velocity Profile velocity	4294967295	pulse/s	0 to 4294967295	Not allowed to change
5036	Profile acceleration(Accelerating constant) Profile acceleration	4294967295	pulse/s <sup>2</sup>	0 to 4294967295	Not allowed to change
5037	Profile deceleration(Decelerating Constant) Profile deceleration	4294967295	pulse/s <sup>2</sup>	0 to 4294967295	Not allowed to change
5038	Quick stop deceleration Quick stop deceleration	4294967295	pulse/s <sup>2</sup>	0 to 4294967295	Not allowed to change
5039	Motion profile type Motion profile type	0		0	
5040	Torque(force)slope Torque slope	4294967295	0.1 %/s	0 to 4294967295	
5041	Position encoder resolution(Sensor Resolution) Position encoder resolution(sensor)		pulse	1 to 4294967295	
5042	Encoder resolution Position encoder resolution(rotary)	1		1	
5043	Gear ratio Gear ratio	1		1	
5044	Output axis revolutions Output axis revolutions	1		1	
5045	Feed constant Feed constant	1		1	
5046	Drive shaft resolution Drive shaft resolution	1		1	
5047	Homing method Homing method	35		-4 to 37	Not allowed to change
5048	Homing velocity(Switch search speed) Homing speed(switch)	655360	pulse/s	0 to 4294967295	Not allowed to change
5049	Homing velocity(Zero phase search speed) Homing speed(zero)	32768	pulse/s	0 to 4294967295	Not allowed to change
5050	Homing acceleration and deceleration Homing acceleration	4294967295	pulse/s <sup>2</sup>	0 to 4294967295	



PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5051	Position offset(Position Addition) Position offset	655360	pulse	-2147483648 to 2147483647	Not allowed to change
5052	Speed offset(Speed Addition) Speed offset	0	pulse/s	-2147483648 to 2147483647	Not allowed to change
5053	Torque(force)offset Torque offset	0.0	%	-500.0 to 500.0	
5054	Touch probe mode Touch probe mode	0		0 to 65535	
5055	Touch probe state Touch probe state	0		0 to 65535	
5056	Touch probe 1 positive edge position stored Touch probe 1 positive edge	0	pulse		Not allowed to change
5057	Touch probe 1 negative edge position stored Touch probe 1 negative edge	0	pulse		Not allowed to change
5058	Touch probe 2 positive edge position stored Touch probe 2 positive edge	0	pulse		Not allowed to change
5059	Touch probe 2 negative edge position stored Touch probe 2 negative edge	0	pulse		Not allowed to change
5060	Interpolation time period(Interpolation time period value) Interpolation time(unit)	1		1 to 250	Not allowed to change
5061	Interpolation time index Interpolation time(index)	-3		10 <sup>-6</sup> to 10 <sup>-3</sup>	Not allowed to change
5062	Forward torque(force)limit value Forward torque limit value	500.0	%	0.0 to 500.0	
5063	Backward torque(force)limit value Backward torque limit value	500.0	%	0.0 to 500.0	
5064	Support homing method 1to28 Support homing method 1to28	1		1 to 252	Not allowed to change
5065	Actual position deviation Actual position deviation	0	pulse	-2147483648 to 2147483647	Not allowed to change
5066	Control effort Control effort	0	pps		Not allowed to change
5067	Digital input Digital input	0			Not allowed to change
5068	Digital output(Physical output) Digital output	0		0 to 4294967295	
5069	Digital output(Bitmask) Digital output(bit mask)	4294967295		0 to 4294967295	
5070	Target velocity Target velocity		pulse/s	-2147483648 to 2147483647	Not allowed to change
5071	Support drive mode Support drive mode				Not allowed to change
5200	Clearance of location div enabled Clearance of location div enabled			0, 1	
5201	Proportional positioning control enabled Proportional pos control enabled	0		0, 1	
5202	Proportional-speed control enabled Proportional-speed control enabled	0		0, 1	
5203	Velocity limit command Velocity limit command	0		0, 1	
5204	Torque addition enabled Torque addition enabled	0		0, 1	

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5205	Speed addition enabled	0		0,1	
	Speed addition enabled				
5206	Location-complement enabled	0		0,1	
	Location-complement enabled				
5207	Compulsory discharge enabled	1		0,1	
	Compulsory discharge enabled				
5208	Highly compliant pos compensation enabled	0		0,1	
	Highly compliant pos compensation enabled				
5209	Highly compliant speed compensation enabled	0		0,1	
	Hi comp vel compensation enabled				
5210	FF vibration control enabled	0		0,1	
	FF vibration control enabled				
5211	Disturbance observer compensation enabled	0		0,1	
	Dis observer compensation enabled				
5216	Model suppression frequency switch selection	0		0 to 11	
	Model suppression FQ selection				
5218	FF suppresion frecency selection	0		0 to 11	
	FF suppresion FQ selection				
5220	Gain change selection	0		0 to 11	
	Gain change selection				
5232	Auto-tuning mode	2		0 to 2	
	Auto tuning mode				
5233	Auto-tuning characteristic	0		0 to 6	
	Auto tuning characteristic				
5234	Auto-tuning response	5		0 to 30	
	Auto tuning response				
5235	Position command smoothing constant	0.5	ms	0.0 to 500.0	Not allowed to change
	Position command smoothing TC				
5236	Position command filter	0.0	ms	0.0 to 2000.0	
	Position command filter				
5237	Position loop proportional gain 1	60	s <sup>-1</sup>	1 to 3000	
	Position loop proportional gain 1				
5238	Position loop proportional gain 2	30	s <sup>-1</sup>	1 to 3000	
	Position loop proportional gain 2				
5239	Position loop proportional gain 3	30	s <sup>-1</sup>	1 to 3000	
	Position loop proportional gain 3				
5240	Position loop proportional gain 4	30	s <sup>-1</sup>	1 to 3000	
	Position loop proportional gain 4				
5241	Position integral time constant 1	1000.0	ms	0.3 to 1000.0	
	Position integral time 1				
5242	Position integral time constant 2	1000.0	ms	0.3 to 1000.0	
	Position integral time 2				
5243	Position integral time constant 3	1000.0	ms	0.3 to 1000.0	
	Position integral time 3				
5244	Position integral time constant 4	1000.0	ms	0.3 to 1000.0	
	Position integral time 4				
5245	Higher tracking control position compensation gain	0	%	0 to 100	
	Higher tracking control position				
5246	Feed forward gain	0	%	0 to 100	
	Feed forward gain				
5247	Feed forward filter	4000	Hz	1 to 4000	
	Feed forward filter				

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5248	Velocity command filter	4000	Hz	1 to 4000	
	Velocity command filter				
5249	Velocity feedback filter	1500	Hz	1 to 4000	
	Velocity feedback filter				
5250	Velocity loop proportional gain 1	100	Hz	1 to 2000	
	Velocity loop proportional gain 1				
5251	Velocity loop proportional gain 2	50	Hz	1 to 2000	
	Velocity loop proportional gain 2				
5252	Velocity loop proportional gain 3	50	Hz	1 to 2000	
	Velocity loop proportional gain 3				
5253	Velocity loop proportional gain 4	50	Hz	1 to 2000	
	Velocity loop proportional gain 4				
5254	Velocity loop integral time constant 1	20.0	ms	0.3 to 1000.0	
	Velocity loop integral TC 1				
5255	Velocity loop integral time constant 2	20.0	ms	0.3 to 1000.0	
	Velocity loop integral TC 2				
5256	Velocity loop integral time constant 3	20.0	ms	0.3 to 1000.0	
	Velocity loop integral TC 3				
5257	Velocity loop integral time constant 4	20.0	ms	0.3 to 1000.0	
	Velocity loop integral TC 4				
5258	Load inertia moment ratio 1	100	%	0 to 15000	
	Load inertia moment ratio 1				
5259	Load inertia moment ratio 2	100	%	0 to 15000	
	Load inertia moment ratio 2				
5260	Load inertia moment ratio 3	100	%	0 to 15000	
	Load inertia moment ratio 3				
5261	Load inertia moment ratio 4	100	%	0 to 15000	
	Load inertia moment ratio 4				
5262	Higher tracking control velocity compensation gain	0	%	0 to 100	
	Hi comp vel compensation gain				
5263	Acceleration feedback gain	0.0	%	-100.0 to 100.0	
	Acceleration feedback gain				
5264	Acceleration feedback filter	500	Hz	1 to 4000	
	Acceleration feedback filter				
5265	Torque command filter 1	600	Hz	1 to 4000	
	Torque command filter 1				
5266	Torque command filter 2	600	Hz	1 to 4000	
	Torque command filter 2				
5267	Torque command filter 3	600	Hz	1 to 4000	
	Torque command filter 3				
5268	Torque command filter 4	600	Hz	1 to 4000	
	Torque command filter 4				
5269	FF vibration suppressor frequency 1	500	Hz	5 to 500	
	FF vibration suppressor frequency 1				
5270	FF vibration suppressor frequency 2	500	Hz	5 to 500	
	FF vibration suppressor frequency 2				
5271	FF vibration suppressor frequency 3	500	Hz	5 to 500	
	FF vibration suppressor frequency 3				
5272	FF vibration suppressor frequency 4	500	Hz	5 to 500	
	FF vibration suppressor frequency 4				
5278	Acceleration compensation	0	×50 pulse	-9999 to 9999	
	Acceleration compensation				

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5279	Deceleration compensation	0	x50 pulse	-9999 to 9999	
	Deceleration compensation				
5280	Command velocity low-pass filter	1000	Hz	1 to 4000	
	Command velocity low-pass filter				
5281	Command velocity threshold	20	min <sup>-1</sup>	0 to 65536	
	Command velocity threshold				
5282	Observer characteristic	0		0 to 2	
	Observer characteristic				
5283	Compensation gain for disturbance observer	0	%	0 to 100	
	Observer compensation gain				
5284	Observer output filter	50	Hz	1 to 4000	
	Observer output filter				
5285	Observer notch filter	4000	Hz	1 to 4000	
	Observer notch filter				
5286	Observer load inertia ratio	100	%	0 to 5000	
	Observer load inertia ratio				
5287	Observer proportional gain	300	Hz	1 to 2000	
	Observer proportional gain				
5288	Load torque (force) filter	50	Hz	1 to 2000	
	Low-pass filter for load torque				
5289	Model control gain 1	30	s <sup>-1</sup>	1 to 3000	
	Model control gain 1				
5290	Model control gain 2	30	s <sup>-1</sup>	1 to 3000	
	Model control gain 2				
5291	Model control gain 3	30	s <sup>-1</sup>	1 to 3000	
	Model control gain 3				
5292	Model control gain 4	30	s <sup>-1</sup>	1 to 3000	
	Model control gain 4				
5293	Overshoot suppressor filter	1500	Hz	1 to 4000	
	Overshoot suppressor filter				
5294	Model control antiresonance frequency 1	80.0	Hz	10.0 to 80.0	
	Model control antiresonance FQ 1				
5295	Model control antiresonance frequency 2	80.0	Hz	10.0 to 80.0	
	Model control antiresonance FQ 2				
5296	Model control antiresonance frequency 3	80.0	Hz	10.0 to 80.0	
	Model control antiresonance FQ 3				
5297	Model control antiresonance frequency 4	80.0	Hz	10.0 to 80.0	
	Model control antiresonance FQ 4				
5298	Model control resonance frequency 1	80.0	Hz	10.0 to 80.0	
	Model control resonance FQ 1				
5299	Model control resonance frequency 2	80.0	Hz	10.0 to 80.0	
	Model control resonance FQ 2				
5300	Model control resonance frequency 3	80.0	Hz	10.0 to 80.0	
	Model control resonance FQ 3				
5301	Model control resonance frequency 4	80.0	Hz	10.0 to 80.0	
	Model control resonance FQ 4				
5302	Gain switch filter	0	ms	0 to 100	
	Gain switch filter				
5303	Internal velocity command limit	65535	min <sup>-1</sup>	0 to 65535	
	Speed limit				
5304	Position Command error 1 level	4294967295	pulse/s	1 to 4294967295	
	Position command error setting				

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5305	Sequence Operation Torque (force) Limit Value Torque limit at sequence operation	120.0	%	10.0 to 500.0	
5306	Near Range In-position near range	500	pulse	0 to 2147483647	
5307	Speed zero range Speed zero range	50	min <sup>-1</sup>	5 to 500	
5308	Low speed range Low speed range	50	min <sup>-1</sup>	0 to 65535	
5309	Speed attainment setting (High speed range) Speed attainment setting	500	min <sup>-1</sup>	0 to 65535	
5310	Analog monitor select output 1 Analog monitor 1 select output	5		1 to 30	
5311	Analog monitor select output 2 Analog monitor 2 select output	2		1 to 30	
5312	Analog monitor output polarity selection Analog monitor output polarity	0		0 to 8	
5313	Delay time of engaging holding brake Operation delay of hold brake 1	0	ms	0 to 1000	
5314	Delay time of releasing holding brake Operation delay of hold brake 2	0	ms	0 to 1000	
5315	Brake operation beginning time Brake operation beginning time	10000	ms	0 to 65535	
5316	Power failure detection delay time Power failure detection delay time	32	ms	20 to 1000	
5317	Excessive deviation warning level Excessive deviation warning level	2147483647	pulse	0 to 2147483647	
5318	Overload warning level Overload warning level	90	%	20 to 100	
5319	Speed matching width Speed matching width	5.0	%	0.0 to 100.0	
5320	Torque command filter characteristic TQ command filter characteristic	2		1 to 3	
5321	Feed forward filter, depth selection Feed forward filter, depth selection	0		0 to 3	
5322	Velocity filter ON/OFF Velocity filter ON/OFF	0		0, 1	
5323	Velocity filter type Velocity filter type	4		1 to 5	
5324	Vel center FQ of notch filter Vel center FQ of notch filter	2000	Hz	10 to 2000	
5325	Velocity bawd width of notch filter Velocity bawd width of notch filter	1.6	1 / LSB	0.1 to 50.0	
5326	Torque attainment setting Torque attainment setting	100	%	0 to 500	
5327	Brake activation speed Motor brake speed	50	min <sup>-1</sup>	10 to 500	
5328	Position loop integral gain limit Position integration setting	0.3	ms	0.3 to 1000.0	
5329	Velocity control integral gain limit Velocity integration setting	3.2	ms	0.3 to 1000.0	
5330	Torque (force) control proportional gain Torque proportion gain setting	100	%	50 to 140	

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5338	Low pass filter off velocity for position loop / Velocity loop command. LPF-OFF for Pos/Vel loop command	0		0,1	
5339	Position/velocity command filter off speed Position/velocity command filter off speed	0	min <sup>-1</sup>	0 to 50	
5340	Number of motor pole Number of motor pole	0	Pole		Not allowed to change
5341	Phase resistance Phase resistance	0	mΩ		Not allowed to change
5342	Phase inductance Phase inductance	0	H		Not allowed to change
5343	Moment of inertia Moment of inertia	0	gmm <sup>2</sup>		Not allowed to change
5344	Voltage constant for each phase Voltage constant for each phase	0	Vrms /min <sup>-1</sup>		Not allowed to change
5345	Rated torque Rated torque	0	mN m /Arms		Not allowed to change
5346	Backlash correction function selection Backlash compensation function selection	1		0,1	Not allowed to change
5347	Backlash correction value Backlash compensation amount	0		0 to 4294967295	Not allowed to change
5348	Limit behavior selection Limit behavior selection	6		0 to 6	
5349	Positioning methods selection Positioning methods selection	0		0,1	Re-start
5350	In-position Signal/ position deviation monitor On-pos sig/pos deviation monitor	0		0,1	
5351	Velocity window unit output selection Velocity window unit output sel	0		0,1	Re-start
5352	Deviation clear selection Deviation clear selection	0		0 to 3	
5353	Torque attainment function selection TQ attainment function selection	0		0,1	
5354	Serial encoder clear function selection Serial-encoder clear function selection	0		0,1	
5355	Encoder digital filter selection Encoder digital filter selection	1		0 to 7	
5356	External encoder digital filter selection Ext encoder digital filter selection	1		0 to 7	
5357	External encoder polarity selection External encoder polarity selection	0		0 to 7	Re-start
5358	Linear encoder CS offset Linear encoder CS offset	0		0 to 359	Re-start
5359	CS normalization offset of phase Z CS normalization offset of phase Z	0		0 to 359	Re-start
5360	Polarity selection on linear encoder Polarity selection on linear encoder	0		0,1	Re-start
5361	Magnetic pole position estimation frequency Magnetic pole pos estimation FQ	50		5 to 100	Re-start
5362	Magnetic pole position estimation selection Magnetic pole position estimation sel	0		0,1	Re-start
5363	Main circuit under-voltage detection Main circuit under-voltage detection	1		0,1	



PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5364	Velocity control alarm detection	0		0,1	
	Velocity control alarm detection				
5365	Velocity feedback alarm detection	1		0,1	
	Velocity feedback alarm detection				
5366	Communication frame error detection	0		0 to 8	
	Communication frame error detection				
5367	Communication timeout (ALM_1A) detection	0		0 to 255	
	Communication timeout detection				
5368	Position control selection	0		0 to 2	Re-start
	Position control selection				
5369	Position loop control, encoder selection	0		0 to 2	Re-start
	Pos-loop control encoder selection				
5370	Servo loop delay time	239	0.5 s	0 to 239	
	Servo loop delay time				
5371	Torque limit at power supply shortage	0		0,1	
	TQ limit at power supply shortage				
5372	Actual position calculation method	0		0,1	Not allowed to change
	Actual position calculation method				
5373	Hard stop torque limit	100.0	%	0.0 to 500.0	
	Hard stop torque limit				
5374	Hard stop detection time	10	ms	10 to 65535	
	Hard stop detection time				
5375	Positive limit switch function	0		0 to 17	
	Positive limit switch function				
5376	Negative limit switch function	0		0 to 17	
	Negative limit switch function				
5377	External error input function	0		0 to 17	
	External error input function				
5378	Main power discharge function	1		0 to 17	
	Main power discharge function				
5379	Emergency stop function	0		0 to 17	
	Emergency stop function				
5380	Detection function of magnetic pole position	0		0 to 17	
	Magnetic pole position pointing function				
5381	General purpose output 1	66		0 to 85	
	General purpose output setting 1				
5382	General purpose output 2	68		0 to 85	
	General purpose output setting 2				
5383	Extend station alias	0		0 to 255	Re-start
	Extend station alias				
5385	Regenerative resistor selection	0		0 to 2	Re-start
	Regenerative resistor selection				
5386	Setup communication baud rate	5		3 to 6	Re-start
	Setup communication baud rate				
5390	External encoder resolution	2000	pulse	500 to 99999	
	External encoder resolution				
5391	In-position monitor			0,1	Not allowed to change
	In-position monitor				
5392	Near range monitor			0,1	Not allowed to change
	Near range monitor				
5393	Encoder C phase monitor			0,1	Not allowed to change
	Encoder C phase monitor				

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5394	Encoder clear monitor			0,1	Not allowed to change
	Encoder clear monitor				
5395	Brake control			0,1	Not allowed to change
	Brake control				
5396	Actual position effective monitor			0,1	Not allowed to change
	Actual position effective monitor				
5397	Command reception-enable monitor			0,1	Not allowed to change
	Command reception-enable monitor				
5398	Speed zero monitor			0,1	Not allowed to change
	Speed zero monitor				
5399	Low speed monitor			0,1	Not allowed to change
	Low speed monitor				
5400	Speed attainment monitor			0,1	Not allowed to change
	Speed attainment monitor				
5401	Speed matching monitor			0,1	Not allowed to change
	Speed matching monitor				
5402	Torque attainment monitor			0,1	Not allowed to change
	Torque attainment monitor				
5407	Alarm 1				Not allowed to change
	Alarm actual 1				
5408	Alarm 2				Not allowed to change
	Alarm actual 2				
5409	Alarm 3				Not allowed to change
	Alarm actual 3				
5410	Alarm 4				Not allowed to change
	Alarm actual 4				
5411	Now Status				Not allowed to change
	Now status				
5412	1st latest Alarm				Not allowed to change
	1st latest alarm				
5413	2nd latest Alarm				Not allowed to change
	2nd latest alarm				
5414	3rd latest Alarm				Not allowed to change
	3rd latest alarm				
5415	4th latest Alarm				Not allowed to change
	4th latest alarm				
5416	5th latest Alarm				Not allowed to change
	5th latest alarm				
5417	6th latest Alarm				Not allowed to change
	6th latest alarm				
5418	7th latest Alarm				Not allowed to change
	7th latest alarm				
5419	Temperature warning			0,1	Not allowed to change
	Temperature warning				
5421	While overload warning			0,1	Not allowed to change
	While overload warning				
5422	While regenerative overload warning			0,1	Not allowed to change
	While regenerative overload warning				
5423	Torque controlled			0,1	Not allowed to change
	Torque controlled				
5424	Velocity command controlled			0,1	Not allowed to change
	Velocity command controlled				



PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5426	Position deviation warning Position deviation warning			0,1	Not allowed to change
5427	Main circuit power being charged Main circuit power being charged			0,1	Not allowed to change
5429	Forward direction over-travel(positive direction) Forward direction over-travel			0,1	Not allowed to change
5430	Reverse direction over-travel(negative direction) Reverse direction over-travel			0,1	Not allowed to change
5431	While the minimum position is limited While minimum position is limited			0,1	Not allowed to change
5432	While the maximum position is limited While maximum position is limited			0,1	Not allowed to change
5433	While battery warning While battery warning			0,1	Not allowed to change
5434	Control electricity and voltage decrease warning Control voltage decrease warning			0,1	Not allowed to change
5435	Warning mask selection Warning mask selection	19597			
5436	Actual position loop proportional gain Actual pos-loop proportional gain	30	s <sup>-1</sup>	1 to 3000	
5437	Actual position integral time constant Actual position integral TC	1000.0	ms	0.3 to 1000.0	
5438	Actual velocity loop proportional gain Actual vel-loop proportional gain	50	Hz	1 to 2000	
5439	Actual velocity loop integral time constant Actual velocity loop integral TC	20.0	ms	0.3 to 1000.0	
5440	Actual load inertia moment ratio Actual load inertia moment ratio	100	%	0 to 15000	
5441	Actual torque (force) command filter Actual torque command filter	600	Hz	1 to 2000	
5442	Actual model control gain Actual model control gain	30	s <sup>-1</sup>	1 to 3000	
5443	C-phase signal base actual position C-phase signal base actual position		pulse	0 to 4294967295	Not allowed to change
5444	Internal velocity command monitor Internal velocity command monitor		pulse/s	-2147483648 to 2147483647	Not allowed to change
5445	Internal torque (force) command monitor Internal torque command monitor		%	-3276.8 to 3276.7	Not allowed to change
5446	Effective Torque (force) Estimated Value Effective torque estimated value		%	0.0 to 6553.5	Not allowed to change
5447	Fast effective torque (force) estimate value Fast effective torque estimate value		%	0.0 to 6553.5	Not allowed to change
5448	Temperature inside the servo amplifier Temperature inside the servo AMP			-32768 to 32767	Not allowed to change
5449	Regenerative resistor operation percentage monitor Regenerative resistor monitor		0.01%	0 to 65535	Not allowed to change
5450	Home index position detection value Home index position detection value		pulse	-2147483648 to 2147483647	Not allowed to change
5451	Internal control cycle actual position 1 Internal control cycle actual position 1		pulse	-2147483648 to 2147483647	Not allowed to change
5452	Internal control cycle actual position 2 Internal control cycle actual position 2		pulse	-2147483648 to 2147483647	Not allowed to change

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5453	Internal control cycle actual position 3		pulse	-2147483648 to 2147483647	Not allowed to change
	Internal control cycle actual position 3				
5454	Internal control cycle actual velocity 1		pulse/s	-2147483648 to 2147483647	Not allowed to change
	Internal control cycle actual velocity 1				
5455	Internal control cycle actual velocity 2		pulse/s	-2147483648 to 2147483647	Not allowed to change
	Internal control cycle actual velocity 2				
5456	Internal control cycle actual velocity 3		pulse/s	-2147483648 to 2147483647	Not allowed to change
	Internal control cycle actual velocity 3				
5457	Internal control cycle actual torque (force) 1		%	-3276.8 to 3276.7	Not allowed to change
	Internal control cycle actual torque 1				
5458	Internal control cycle actual torque (force) 2		%	-3276.8 to 3276.7	Not allowed to change
	Internal control cycle actual torque 2				
5459	Internal control cycle actual torque (force) 3		%	-3276.8 to 3276.7	Not allowed to change
	Internal control cycle actual torque 3				
5469	Actual velocity 2		pulse/s	-2147483648 to 2147483647	Not allowed to change
	Actual velocity value 2				
5470	Alarm mask	0			Not allowed to change
	Alarm mask				
5471	Control status	1			Not allowed to change
	AMP control condition				
5472	Amplifier running time		2hours		Not allowed to change
	AMP driving time				
5473	External regenerative resistance		MΩ	0 to 4294967295	Not allowed to change
	Ext regeneration resistance value				
5500	Torque command filter 1 ON/OFF	0		0,1	
	Torque command filter 1 ON/OFF				
5501	Torque command filter 1 type	4		1 to 5	
	Torque command filter 1 type				
5502	Center frequency of torque notch filter 1	2000	Hz	10 to 2000	
	Center frequency of torque notch filter 1				
5503	Band width of torque notch filter 1	1.0	0/LSB	0.1 to 50.0	
	Band width of torque notch filter 1				
5505	Torque command filter 2 ON/OFF	0		0,1	
	Torque command filter 2 ON/OFF				
5506	Torque command filter 2 type	4		1 to 5	
	Torque command filter 2 type				
5507	Center frequency of torque notch filter 2	2000	Hz	10 to 2000	
	Center frequency of torque notch filter 2				
5508	Band width of torque notch filter 2	1.0	1 / LSB	0.1 to 50.0	
	Band width of torque notch filter 2				
5510	Torque command filter 3 ON/OFF	0		0,1	
	Torque command filter 3 ON/OFF				
5511	Torque command filter 3 type	4		1 to 5	
	Torque command filter 3 type				
5512	Center frequency of torque notch filter 3	2000	Hz	10 to 2000	
	Center frequency of torque notch filter 3				
5513	Band width of torque notch filter 3	1.0	1 / LSB	0.1 to 50.0	
	Band width of torque notch filter 3				
5515	Torque command filter 4 ON/OFF	0		0,1	
	Torque command filter4 ON/OFF				
5516	Torque command filter 4 type	4		1 to 5	
	Torque command filter4 type				

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
5517	Center frequency of torque notch filter 4 Center frequency of torque notch filter 4	2000	Hz	10 to 2000	
5518	Band width of torque notch filter 4 Band width of torque notch filter 4	1.0	1 / LSB	0.1 to 50.0	
5520	Multi notch filter tuning mode Multi notch filter tuning mode	0		0,1	
5525	TQ command value of the auto NF tuning TQ command value of the auto NF tuning	50.0	%	10.0 to 100.0	

### C1-3-17 Temporary memorization

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
8000	Settings override the current Over ride storage		%	0 to 200	Not allowed to change
8001	Editing file No. Editing file No.			0 to 999	Not allowed to change
8002	Brightness level Brightness level			0 to 20	Not allowed to change
8003	Workpiece origin position Workpiece origin position				Not allowed to change
8004	Program number Program number				Not allowed to change
8201	MOP Buzzer volume leve MOP Buzzer volume leve				Not allowed to change

### C1-3-18 Maintenance by manufacturer

If you want to change the parameters of "manufacturer for maintenance", the "parameter permission" Please set the "999".

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
9000	Axis type Axis type	0		0,1	
9001	The valid start time of the tap operation Tap operation valid wait time	0.05	s	0.01 to 10.00	
9002	The invalid time of the tap operation & tap spec. changing Tap op. valid time & tap spec. changing	3.00	s	0.00 to 10.00	
9003	The valid time of the tap operation of [START] Key Tap operation valid time (START key)	0.30	s	0.01 to 10.00	
9004	The valid time of the tap operation of [STOP] Key Tap operation valid time (STOP key)	0.03	s	0.01 to 10.00	
9005	First valid time of the repeat input Repeat operation valid time 1	0.30	s	0.01 to 10.00	
9006	Second time the valid time of the repeat input Repeat operation valid time 2	0.20	s	0.01 to 10.00	
9007	Third valid time of the repeat input Repeat operation valid time 3	0.10	s	0.01 to 10.00	
9008	The valid time of the tap operation of slider key Slider operation valid time	3.00	s	0.01 to 10.00	
9009	Setting of the amount of movement of the slider Slider move volume	1.00	mm	0.01 to 10.00	
9010	The valid time of the tap operation of [JOG] key JOG tap operation valid time	0.03	s	0.01 to 10.00	

PRM No.	Name Message	Initial set value	Setting unit	Setting range	Remarks
9011	The valid time of the jog repeat input JOG repeat operation valid time	0.30	s	0.01 to 10.00	
9012	Clamp operation delay time Clamping delay timer	0.10	s	0.00 to 1.00	
9013	Start time of the luminance level decreases when not in use Lower luminance timer	1	min	0.00 to 10.00	
9014	Reference position of the X-axis upper right corner of the touch panel Touch panel X axis upper right				Not allowed to change
9015	Reference position of the X axis the lower right of the touch panel Touch panel X axis Lower right				Not allowed to change
9016	Reference position of the X-axis upper left corner of the touch panel Touch panel X axis upper left				Not allowed to change
9017	Reference position of the X axis the lower left of the touch panel Touch panel X axis Lower left				Not allowed to change
9018	Reference position of the Y-axis upper right corner of the touch panel Touch panel Y axis upper right				Not allowed to change
9019	Reference position of the Y axis the lower right of the touch panel Touch panel Y axis Lower right				Not allowed to change
9020	Reference position of the Y-axis upper left corner of the touch panel Touch panel Y axis upper left				Not allowed to change
9021	Reference position of the Y axis the lower left of the touch panel Touch panel Y axis Lower left				Not allowed to change
9022	Acceptance of the external panel START signal Reception desk of Ext ST & panel ST	0		0,1	
9023	Battery-powered possible time Battery drive possibility time	60	month	1 to 240	
9100	Selection of panel sheet Selection of panel sheet	0		0,1	
9110	Input detection area of the CS type Input detection area of the CS type	9	mm	8 to 15	
9111	Touch panel X axis upper right (3Pos CAL) Touch panel X axis upper right (3Pos CAL)				Not allowed to change
9112	Touch panel X axis lower left(3Pos CAL) Touch panel X axis lower left(3Pos CAL)				Not allowed to change
9113	Touch panel X axis center(3Pos CAL) Touch panel X axis center(3Pos CAL)				Not allowed to change
9114	Touch panel Y axis upper right(3Pos CAL) Touch panel Y axis upper right(3Pos CAL)				Not allowed to change
9115	Touch panel Y axis lower left(3Pos CAL) Touch panel Y axis lower left(3Pos CAL)				Not allowed to change
9116	Touch panel Y axis center(3Pos CAL) Touch panel Y axis center(3Pos CAL)				Not allowed to change
920m	MOP Tap operation valid time(Mm) [s] MOP Tap operation valid time(Mm)	0.05	s	0.01 10.00	Note 1
922m	MOP Touch operation OFF delay tm(Mm) [s] MOP Touch operation OFF delay tm(Mm)	0.06	s	0.00 10.00	Note 1
923m	MOP Continuous touch cancel tm(Mm) [s] MOP Continuous touch cancel tm(Mm)	3.00	s	0.00 10.00	Note 1
924m	MOP Drift correction selection (Mm) [s] MOP Drift correction selection (Mm)	0	-	0,1	Note 1
925m	MOP Drift correction execution tm(Mm) [s] MOP Drift correction execution tm(Mm)	3.00	s	0.00 10.00	Note 1

PRM No.	Name	Initial set value	Setting unit	Setting range	Remarks
	Message				
9260	MOP Buzzer sound generation time	0.1	s	0.0 1.0	
	MOP Buzzer sound generation time				
9261	MOP Enable switch selection	0	-	0,1	
	MOP Enable switch selection				

Note 1 The MOP capacitance keys are allocated to groups (matrix) respectively and controlled.  
The keys and their matrix number allocation are explained below.

List of capacitance switch matrix and allocation in matrix

Matrix No. (m)	Name of key in matrix					
	0	OPERATION	RESET	MACH WORK	A B AXIS	Disp Chg
1	JOG+3	JOG+2	JOG+1	JOG-1	JOG-2	JOG-3
2	ZERO Rtn	ENABLE				
3	ORIGIN					

※ The matrix numbers (m) in the above table correspond to "m" of the PRM numbers shown below.

**C1-4** Parameter details

See standard set values in the parameter table for initial values.

Parameter No. and name may be subject to change.

**C1-4-1** 0000 to 0013 : System

0000	Firmware version
Dedicated to monitors	Firmware version

Comment Indicates version of system software of the controller.

0001	Serial No.
Dedicated to monitors	Serial number

Comment Indicates serial No. of the controller.

0002	Motor code
	Mocode

0003	Sensor selection
	Encode

0004	Sensor type code
	Entype

Date unit : Data range : 0 to 65535

Comment PRM002 sets the motor code to be combined.  
 PRM003 selects the use of the motor sensor to be combined and driven and its function.  
 PRM004 selects the type of motor sensor.  
 The parameters above are automatically adjusted. After automatic adjustment, the code corresponding to the connected motor is indicated.

Motor type	Motor capacity (W)	Motor code	Sensor selection	Sensor type code
R2AD06020F***** R2AA06020F*****	200	29061	11bit : 0 12bit : 1 13bit : 2 14bit : 3 15bit : 4 16bit : 5 17bit : 6 18bit : 7 19bit : 8 20bit : 9	2.5MHz : 768 4.0MHz : 1024
R2AD08040F***** R2AA08040F*****	400	392		
R2AD08075F***** R2AA08075F*****	750	391		
R2ADB8100H***** R2AAB8100H*****	1000	404		
R2AA13120B*****	1200	401		
R2AA13180D*****	1800	283		
R2AA13200D*****	2000	400		
R2AA18350L*****	3500	284		

**Precautions**

- When PR M0007 is before " 203.0.5131" (value is smaller), motor code of 200W motor is not automatically set. Directly set the value above.
- When the alarms of SV342 (serial encoder communication abnormal), SV343 (encoder initial processing abnormal), SV354 (serial encoder internal abnormal 4) or SV361 (serial encoder internal abnormal 13) occur, no automatic setting is performed.  
Please perform automatic setting after releasing the alarm.
- When a motor is not detected, automatic setting code ("327 ") is indicated for the parameter above.
- When PRM0000 is 01.09.00 or over, "Changing parameter" pop-up is displayed during auto setting. After setting, turn the power off and then on again, as an SY100 will occur. If the servo alarm fails to detect the motor, automatic setting starts after the alarm is cancelled.

0005	Servo amplifier model indication
Dedicated to monitors	Device

Comment Indicates device model of servo amplifier.

0006	Servo amplifier hardware version
Dedicated to monitors	Hardver

Comment Indicates device hardware version of servo amplifier.

0007	Servo amplifier software version
Dedicated to monitors	Softver

Comment Indicates device software version of servo amplifier.

0008	Power source type switching
	Mpwrin
Date unit :	Data range : 0,1

Comment Switches power source type.  
 0 3-phase AC200 to 230V  
 1 Single-phase AC200 to 230V

- Precautions**
- Do not select single-phase 200V AC for high torque specification controller.
  - In order to make this parameter effective, it is necessary to turn off the power once.

0009	Initial mode when power is turned on
	Start up mode select
Date unit :	Data range : 0 to 2

Comment Selects initial startup mode after power is turned on.  
 0 AUTO  
 1 MANUAL  
 2 PROGRAM

0010	Initial modal command when power is turned on (G90, G91)
	Modal command select (G90,G91)
Date unit :	Data range : 0,1

Comment Selects initial modal command when power is turned on.  
 0 G90 (Absolute)  
 1 G91 (Incremental)

0011	Display language switching
	Language switching
Date unit :	Data range : 0 to 2

Comment A display language is changed.  
 0 English display  
 1 Japanese display  
 2 Korean display

0012	Clamp mechanism selection Clamp spec
Date unit : _____ Data range : 0 to 2	

Comment Selects presence/absence of clamp.  
 0 Absence of clamp mechanism  
 1 Presence of clamp  
 2 No clamp mechanism (servomotor brake control)

**Precautions**  It cannot be used with the clamp mechanism of the round table.

0013	Pitch error compensation control Pitch error compensation control
Date unit : _____ Data range : 0,1	

Comment Selects effective /ineffective of pitch error compensation function.  
 0 Ineffective  
 1 Effective

**Precautions**  When a "PRM0100:gear ratio" is changed, it is set automatically as 0.

**C1-4-2** 0100 to 0106 : Axis control

0100	Gear ratio 1/X Gear ratio 1/X
Date unit : _____ Data range : 1 to 999	

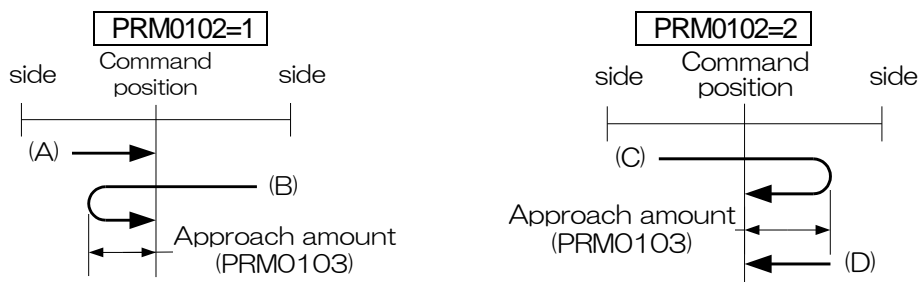
Comment Sets gear ratio of rotary table and motor.

0101	Motor rotating direction Motor direction
Date unit : _____ Data range : 0,1	

Comment Switches rotating direction of motor (table).  
 0 CW (Clockwise viewing from motor shaft side)  
 1 CCW (Counterclockwise viewing from motor shaft side)

0102	One direction positioning specification Unidirectional spec
Date unit : _____ Data range : 0 to 2	

Comment Set from which direction the positioning for machine origin return is performed during programmed operation.  
 0 Ineffective  
 1 + direction positioning  
 Perform normal positioning from positive direction, and, in case of positioning from negative direction, go beyond the command position once, and then invert to positive direction and approach to the command position.  
 2 - direction positioning  
 Perform normal positioning from negative direction, and, in case of positioning from positive direction, go beyond the command position once, and then invert to negative direction and approach to the command position.





0103	One direction determining approach amount
	Unidirectional angle

Date unit : deg Data range : 0.0000 to 359.9999

Comment Sets overrun (approach) amount when going beyond the target value once and returning when one direction positioning is effective (PRM0102=1, or 2).

**Precautions**  When the one direction determining approach amount is too small, it does not sometimes move.

0104	Backlash correction amount
	Backlash comp amount

Date unit : deg Data range : 0.0001 to 1.0000

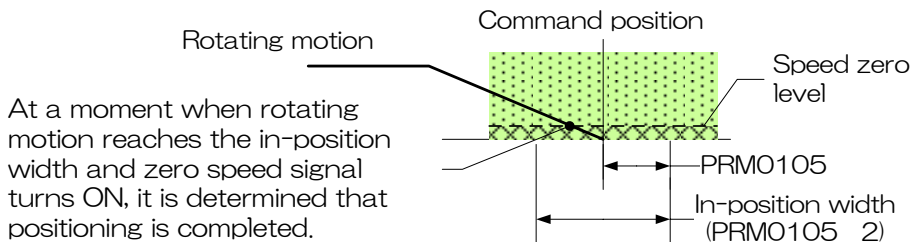
Comment Sets backlash amount of rotary table.

**Precautions**  Because backlash direction is memorized for normal power ON/OFF, it is not influenced by this parameter.  
 In order to make this parameter effective, it is necessary to turn off the power once.

0105	In-position width
	Imposition width

Date unit : deg Data range : 0.0001 to 1.0000

Comment Sets width to confirm whether rotating motion by program operation reaches the command position. This width to consider that positioning was done relative to the command position is called an in-position width.



0106	Coordinate system effective indication digit number
	Cordinate display

Date unit : Data range : 0,1

Comment Selects coordinate system effective indication digit number.  
 0 : 0.001[deg]  
 1 : 0.0001[deg]

Editing effective digit number of program axis is also according to this parameter. Even if this parameter is changed from "1" to "0", program in the unit of 0.0001 deg is operable. However, when a program is edited, input is controlled. Unless the indexed angle is changed even in case of a block to which input of 0.0001 deg is performed, no alarm occurs. For input data from the MMC, input is not controlled.

**Precautions**  In order to make this parameter effective, it is necessary to turn off the power once.

**C1-43** 0200 to 0205 : Feed speed

0200	Rapid feed rate
	Rapid traverse
Date unit : min <sup>-1</sup> Data range : 0.01 to 999.99	

Comment Sets maximum rotating speed of the rotary table.  
Operates at the maximum rotating speed in the following cases.

- When F0 is designated for feed speed of a program.
- Machine origin return when 0 is set to PRM0501 (machine origin return speed).
- Machining origin return when 0 is set to PRM0502 (machining origin return speed).

0201	JOG HI speed
	HI JOG feed
Date unit : min <sup>-1</sup> Data range : 0.01 to 999.99	

Comment Sets feed speed when high speed jog feed by manual operation (input is moved to ENTER while (CCW), ► (CW) of arrow is repeatedly input) is performed.

**Precautions**  Even if PRM0201 > PRM0200, upper limit clamp is performed at a value of PRM0200.

0202	JOG LO speed
	LO JOG feed
Date unit : min <sup>-1</sup> Data range : 0.01 to 999.99	

Comment Sets feed speed when low speed jog feed by manual operation ( (CCW), ► (CW) of arrow is repeatedly input) is performed.

**Precautions**  Even if PRM0202 > PRM0200, upper limit clamp is performed at a value of PRM0200.

0203	Step feed amount
	Step feed amount
Date unit : deg Data range : 0.0001 to 10.0000	

Comment Sets step feed amount by manual operation.

0204	Override pitch amount
	Motor direction
Date unit : % Data range : 1 to 100	

Comment When or on Scroll key is pressed, override can be increased or decreased in override change mode.  
Sets increase/decrease amount of one time at this time.

0205	Clamp ratio of MOP JOG feedrate [%]
	Clamp ratio of MOP JOG feedrate
Date unit : % Data range : 1 to 100	

Comment Set the speed clamp amount when commanding high-speed jog feed and medium-speed jog feed by MOP.

- High-speed jog feed = PRM0201 PRM0205
- Medium-speed jog feed = RM0201 PRM0205 50%

**C1-4-4** 0300 to 0302 : Acceleration/deceleration time constant

0300	Rapid feed acceleration/deceleration time constant 1 Rapid acc/dec constant 1
Date unit	: ms
Data range	: 0 to 1000

Comment This moving low-pass filter smoothes the position command pulse.  
Applies gradient to the condition positioning pulse.

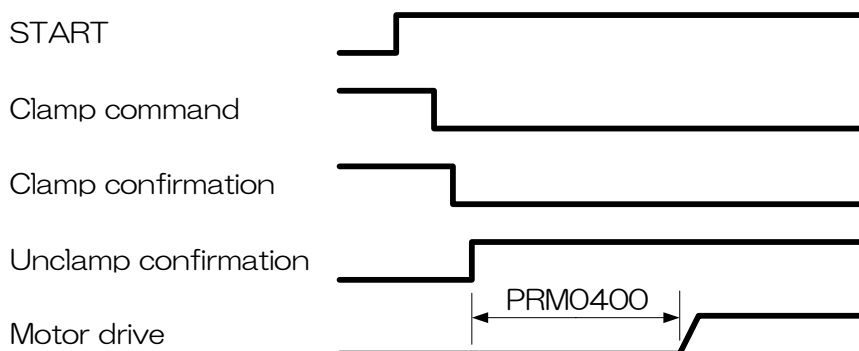
0302	Cutting feed speed acceleration/deceleration time constant Cutting acc/dec constant
Date unit	: ms
Data range	: 0 to 1000

Comment Sets cutting feed speed acceleration/deceleration time constant.

**C1-4-5** 0400 to 0411 : Clamp

0400	Timer from unclamp operation to move start Start timer from ucl
Date unit	: s
Data range	: 0.00 to 10.00

Comment Sets a time from unclamp operation to motor start.  
When the machine side is delayed more than the rotary table, this is used for adjustment to synchronize and start with the table.



**Precautions**  In case of PRM0401 = "2", unclamp detection that means Lo detection of clamp confirmation signal is more quickly than mechanical clamp operation. Because of that, PRM400 must be set more than 0.5s, if PRM0401 is set 2.

0401	Clamp confirmation signal function selection Clamp signal select
Date unit	:
Data range	: 0 to 2

Comment Selects whether to use the clamp confirmation signal or not in case of PRM012=1 (with clamp mechanism).

- 0 With clamp confirmation signal, without unclamp confirmation signal
- 1 Without clamp confirmation signal, with unclamp confirmation signal  
[Hi detection of unclamp confirmation signal means Lo detection of clamp confirmation signal. And Lo detection of unclamp confirmation signal means Hi detection of clamp confirmation signal.]
- 2 With clamp confirmation signal, without unclamp confirmation signal  
[Lo detection of unclamp confirmation signal means Hi detection of clamp confirmation signal, and Hi detection of unclamp confirmation signal means Lo detection of clamp confirmation signal.]

**Precautions**  In case of PR M0401 "2" please follow PRM0400 of Precautions.

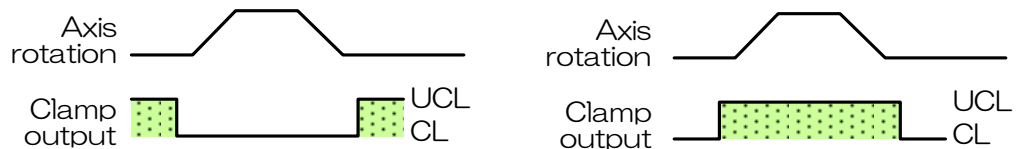
0402	Clamp excitation polarity selection Clamp change select
------	--

Date unit : Data range : 0,1

Comment Selects clamp excitation polarity selection.  
 0 Excitation clamp  
 1 Excitation unclamp

PRM0402=0 (Excitation clamp)

PRM0402=1 (Excitation unclamp)



0403	Selection of servo control specification at the time of clamp Clamp servo control
------	--

Date unit : Data range : 0,1

Comment Sets whether exciting / non-exciting motor or not during clamping in case of PRM0012=1 (with clamp mechanism).  
 0 Motor is OFF at the time of clamping.  
 1 Motor is always ON regardless of clamp state.

#### Precautions

- Positional misalignment at the time of clamp is left as positional deviation amount.
- When motor is always ON, operation is made so as to return the positional deviation to "0" if clamp is performed in a state that the positional deviation amount is not "0." For this reason, electric current continuously flows in the motor, resulting in heat generation.

0410	Clamping operation selection in manual mode Clamping operation selection in manual mode
------	--

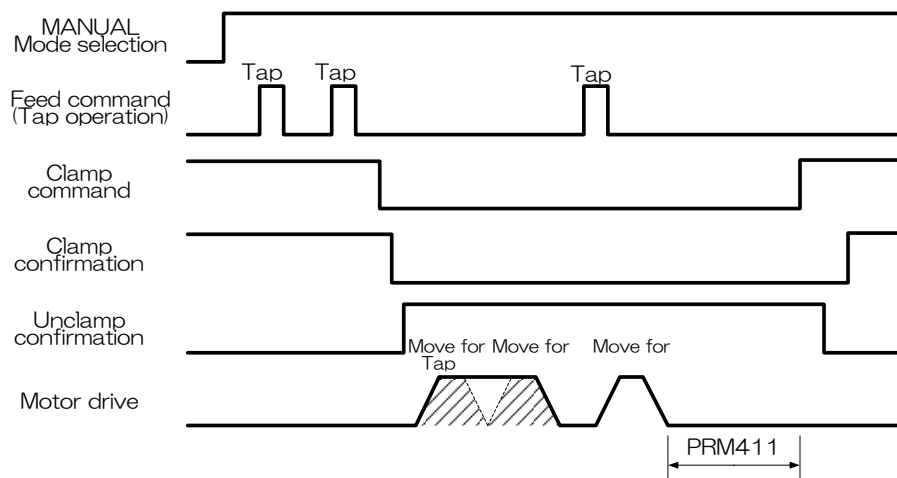
Date unit : Data range : 0 to 2

Comment Selects clamp operation in manual mode (except handle mode).  
 0 Normal unclamp  
 1 Clamp after feed operation stops  
 2 Clamp after feed operation stops and set time passes

0411	Unclamp holding time after manual operation Unclamp holding time after manual operation
------	--

Date unit : Data range : 0.0 to 30.0

Comment Sets the time until clamp after operation stop



### C1-4-6 0500 to 0504 : Origin return

0500	Machine origin position establishment Origin position complete
------	---

Date unit : Data range : 0,1

Comment Determines establishment/non-establishment of machine origin position.

- 0 Machine origin position not established  
[Machine origin position is not established.]
- 1 Machine origin position established  
[Machine origin position is established.]

#### Precautions

- When machine origin is not established, an alarm (SV220) occurs.
- When SV342 occurs, it is automatically changed to "0" (machine origin position not established).

0501	Machine origin return speed MZRN feed
------	--

Date unit :  $\text{min}^{-1}$  Data range : 0.01 to 999.99

Comment Sets speed of machine origin return by manual operation, and G23 (machine origin return) command of automatic operation.  
And, if 0 is set, the speed is the same as PRM0200 (rapid feed speed).

0502	Machining origin return speed WZRN feed
------	--

Date unit :  $\text{min}^{-1}$  Data range : 0.00 to 999.99

Comment Sets speed of machining origin return by manual operation, and G24 (machine origin return) command of automatic operation.  
And, if 0 is set, the speed is the same as PRM0200 (rapid feed speed).

0503

Machine origin return direction

MZR direction

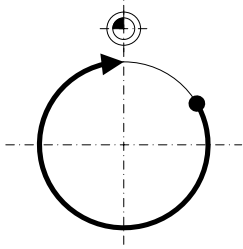
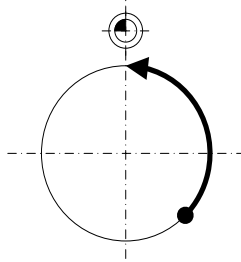
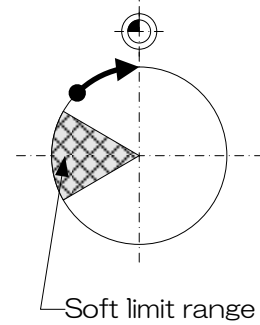
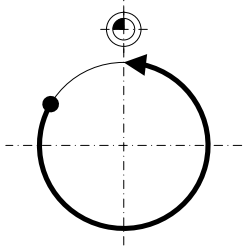
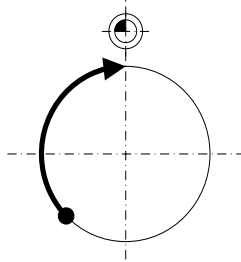
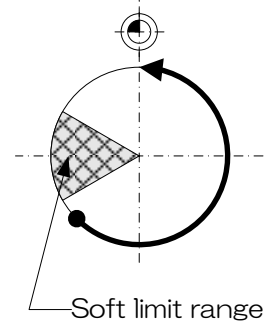
Data unit :

Data range : 0 to 3

Comment

Sets machine origin return start direction of the rotary table.

- 0 + direction (clockwise viewing from top surface of the table)
- 1 - direction (counterclockwise viewing from top surface of the table)
- 2 Shortcut direction (180° boundary)
- 3 Shortcut direction is determined by soft limit.

PRM0503=0  
(+ direction)PRM0503=2  
(179.999° or less)PRM0503=3  
(+ direction)PRM0503=1  
(- direction)PRM0503=2  
(180.000° or more)PRM0503=3  
(- direction)

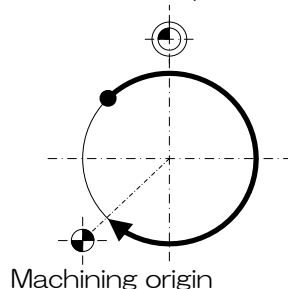
0504	Machining origin return direction WZRN direction
Date unit :	Data range : 0 to 2

## Comment

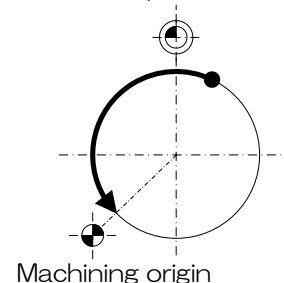
Sets machining origin return start direction of the rotary table.

- 0 + direction (clockwise viewing from top surface of the table)
- 1 - direction (counterclockwise viewing from top surface of the table)
- 2 Shortcut direction (180° boundary)

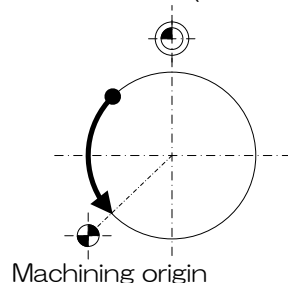
PRM0504=0 (+ direction)



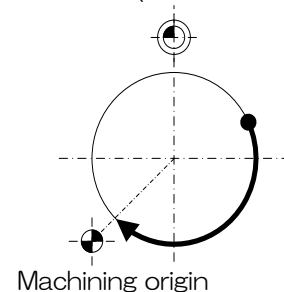
PRM0504=2 (179.999° or less)



PRM0504=1 (- direction)



PRM0504=2 (180.000° or more)

**C1-4-7** 0600 to 0602 : Soft limit

0600	Soft limit specifications SW limit spec
Date unit :	Data range : 0,1

## Comment

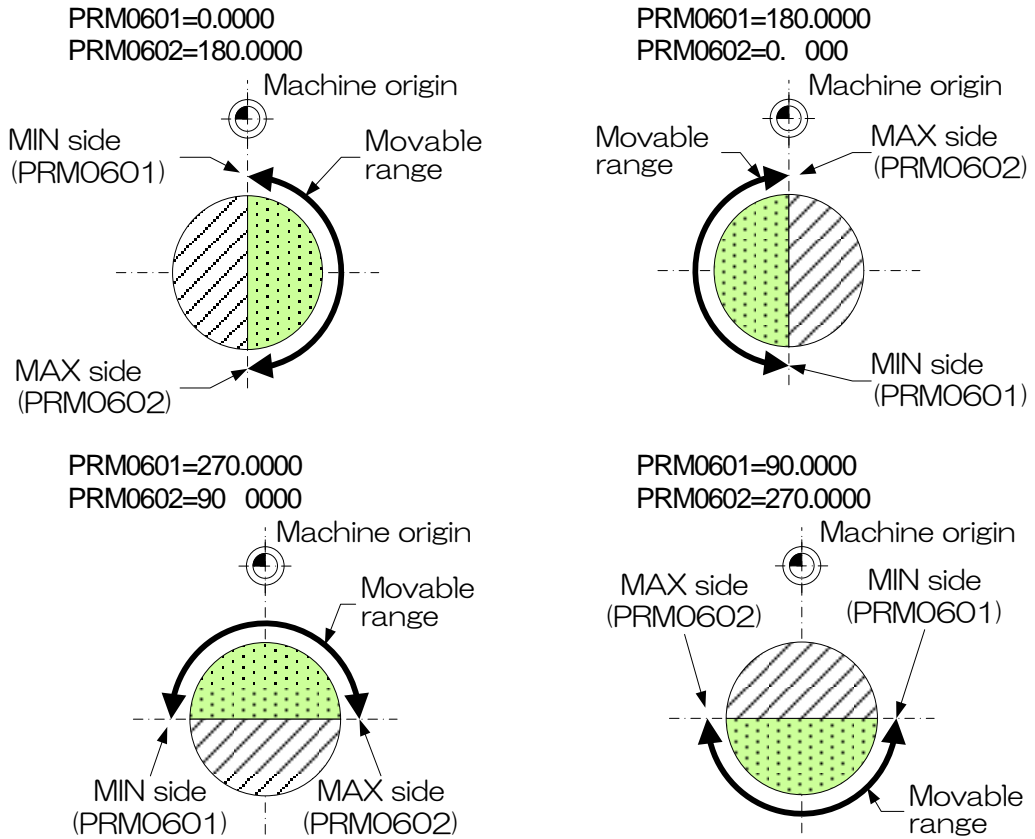
Selects effective/ineffective of software limit to limit machine operating range by software.

- 0 Ineffective
- 1 Effective

Confirm moving destination coordinate before operation at the time of program operation, and if PRM0601 (- side soft limit) or PRM0602 (+ side soft limit) is reached, and alarm occurs.

0601	- side soft limit S/W limit side
0602	+ side soft limit S/W limit + side
Date unit : deg Data range : 0.0000 to 359.9999	

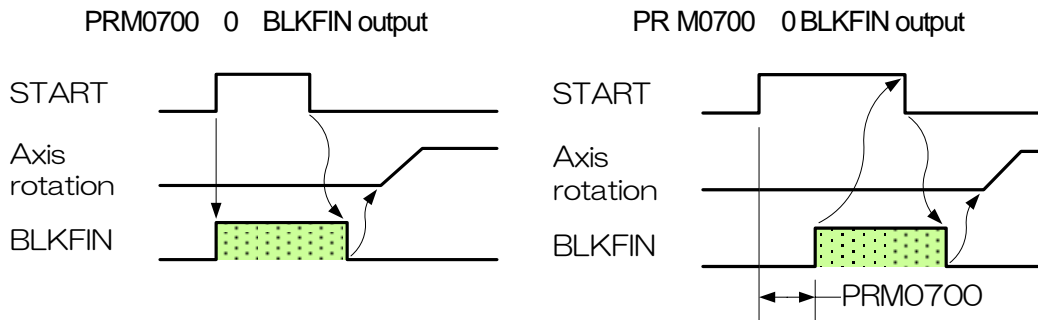
Comment Set - side movable limit angle of machine coordinate system to PRM0601.  
Set + side movable limit angle of machine coordinate system to PRM0602.



**C1-48** 0700 : Program

0700	BLKFIN output start delay timer (G21) BLK delay timer(G21)
Date unit : s Data range : 0.00 to 10.00	

Comment Sets an output delay time of block finish (BLKFIN) to be output when program operation of G21 is started.



**Precautions**  Delay is not performed when the set time is 0.



**C1-49** 0800 to 0809 : Indication on screen

0800	Input/output signal indication allotment 1 I/O signal display 1
0801	Input/output signal indication allotment 2 I/O signal display 2
0802	Input/output signal indication allotment 3 I/O signal display 3
0803	Input/output signal indication allotment 4 I/O signal display 4
0804	Input/output signal indication allotment 5 I/O signal display 5
0805	Input/output signal indication allotment 6 I/O signal display 6
0806	Input/output signal indication allotment 7 I/O signal display 7
0807	Input/output signal indication allotment 8 I/O signal display 8
0808	Input/output signal indication allotment 9 I/O signal display 9
0809	Input/output signal indication allotment 10 I/O signal display 10

Date unit : Data range : 0 to 99

Comment PRM0800 allots input/output signal indication 1.  
PRM0801 allots input/output signal indication 2.  
PRM0802 allots input/output signal indication 3.  
PRM0803 allots input/output signal indication 4.  
PRM0804 allots input/output signal indication 5.  
PRM0805 allots input/output signal indication 6.  
PRM0806 allots input/output signal indication 7.  
PRM0807 allots input/output signal indication 8.  
PRM0808 allots input/output signal indication 9.  
PRM0809 allots input/output signal indication 10.

Input signal	Output signal
1 : Inclined axis clamp confirmation	31 : Inclined axis clamp command
2 : Inclined axis unclamp confirmation	32 : Rotation axis clamp command
3 : Inclined axis + side over-travel	33 : Block finish
4 : Inclined axis - side over-travel	34 : Alarm
5 : Rotation axis clamp confirmation	35 : General-purpose output 1
6 : Rotation axis unclamp confirmation	36 : General-purpose output 2
7 : Start	37 : General-purpose output 3
8 : Stop	38 : General-purpose output 4
9 : General-purpose input 1	39 : General-purpose output 5
10 : General-purpose input 2	40 : General-purpose output 6
11 : General-purpose input 3	
12 : General-purpose input 4	
13 : General-purpose input 5	
14 : General-purpose input 6	

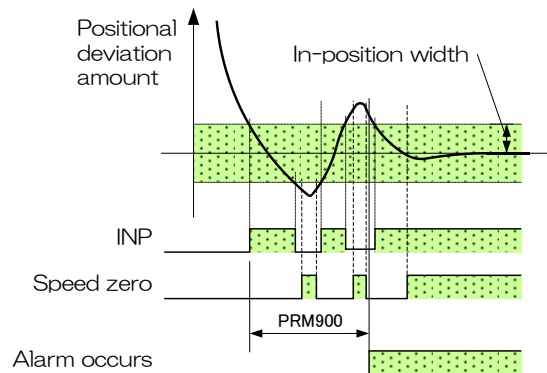
State in servo amplifier	
61 : A-axis positioning finish	71 : B-axis positioning finish
62 : A-axis near range	72 : B-axis near range
63 : A-axis encoder C phase	73 : B-axis encoder C phase
64 : A-axis encoder clear	74 : B-axis encoder clear
65 : A-axis brake control	75 : B-axis brake control
66 : A-axis real position effective	76 : B-axis real position effective
67 : A-axis command reception permission	77 : B-axis command reception permission
68 : A-axis zero speed	78 : B-axis zero speed

Allotment is not performed in case of set values other than the above.

**C1-4-10** 0900 to 0925 : Alarm detection

0900	Positioning wait timeout detection time Positioning time-out
Date unit : s	Data range : 0.00 to 1.00

**Comment** Operation finish sequence of the rotary table is put into command position reach finish when speed zero signal is turned ON while in in-position width. At this time, a time from getting into in-position width to speed zero signal O is set and an alarm "S200: Positioning wait timeout" occurs if the speed zero signal is turned ON within the set time.



0901	Positional deviation over detection range when moving Excessive position deviation value
Date unit : deg	Data range : 0.0001 to 359.9999

0902	Positional deviation over timeout detection time when moving Excessive position deviation time-out
Date unit : s	Data range : 0.00 to 0.00

**Comment** When continuous time of positional deviation amount during movement (actual measurement) > "Positional deviation over detection range when moving (PR M0 01)" exceeds this set time (PRM0902), an alarm occurs.

0903	Positional deviation over detection range when stopping Position window
Date unit : deg	Data range : 0.0000 to 1.0000

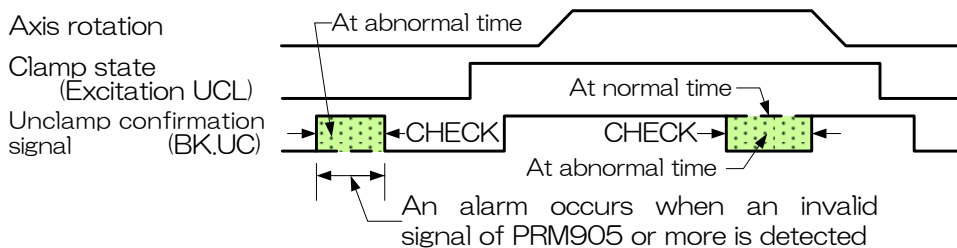
0904	Positional deviation over timeout detection time when stopping Position window time-out
Date unit : s	Data range : 0.00 to 1.00

**Comment** When continuous time of positional deviation amount during stop (actual measurement) > "Positional deviation over timeout detection time when stopping (PR M0 03)" exceeds this set time (PRM0904), an alarm occurs.

**Precautions**  It becomes invalid when PRM0903=0.

0905	Alarm confirmation time for unclamp signal Alarm scan unclamp
Date unit : s	Data range : 0.00 to 10.00

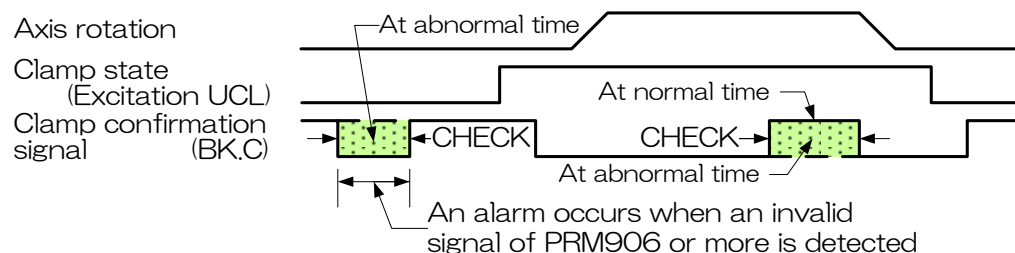
**Comment** The unclamp signal is always monitored, and sets detection time when detecting an invalid signal such as unclamp signal OFF during operation, and unclamp signal ON etc., during table clamp.



- Precautions**
- Ineffective in case of PRM0012=0 (clamp function selection) or PRM0401=2 (clamp state signal function selection)
  - In case of PRM0905=0, unclamp confirmation signal is monitored only at the time of operation start/stop.

0906	Alarm confirmation time for clamp signal Alarm scan clamp
Date unit : s	Data range : 0.00 to 10.00

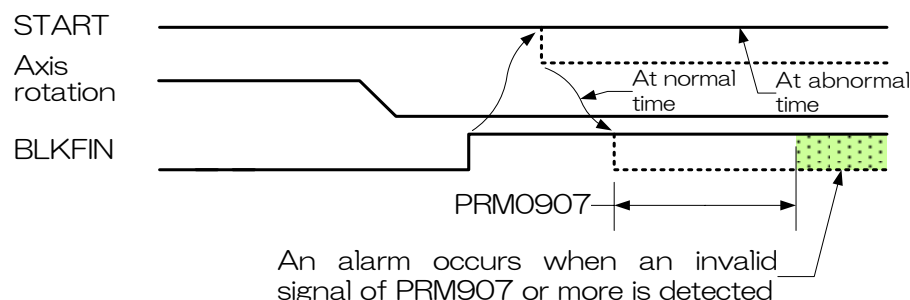
**Comment** The clamp signal is always monitored, and sets the detection time when detecting an invalid signal such as a clamp signal ON during operation, and unclamp signal OFF etc., during table clamp.



- Precautions**
- Ineffective in case of PRM0012=0 (clamp function selection) or PRM0401=1 (clamp state signal function selection)
  - In case of PRM0906=0, clamp confirmation signal is monitored only at the time of operation start/stop.

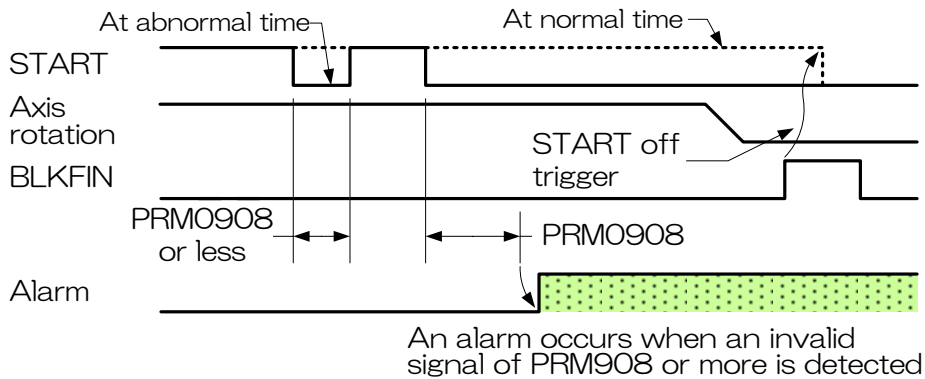
0907	BLKFIN signal timeout detection time BLKFIN time out
Date unit : s	Data range : 0.00 to 60.00

**Comment** Sets alarm output delay time when START signal is not turned OFF in a state that rotary table operation is finished.



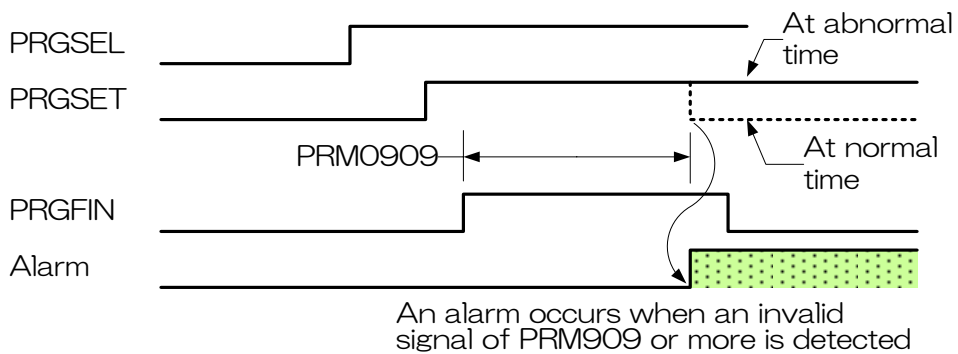
0908	START signal OFF detection time ST off check timer
Date unit : s	Data range : 0.00 to 10.00

Comment Sets alarm output delay time when START signal is turned OFF before BLKFIN signal is output during operation of rotary table.



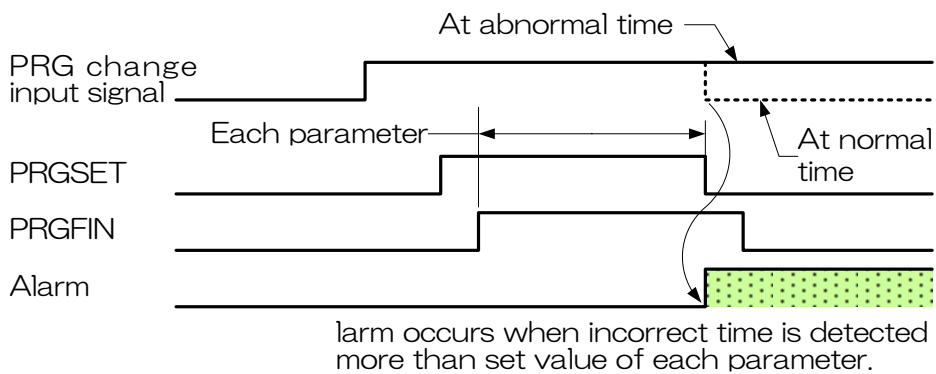
0909	PRG SET signal timeout detection time PRG SET time out
Date unit : s	Data range : 0.00 to 300.00

Comment Sets alarm output delay time when PRG SET signal is not turned OFF although PRG SET signal is turned ON, program No. change is finished and PRG FIN signal is output.



0910	PRG CLEAR signal timeout detection time PRG CLEAR time out
Date unit : s	Data range : 0.00 to 300.00

Comment Sets alarm output delay time when PRG CLEAR signal is not turned OFF although PRG CLEAR signal is turned ON, program No. change is finished and PRG FIN signal is output.



0911	PRG SEL+1 signal timeout detection time PRG SEL +1 time out
	Date unit : s Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when PRG SEL+1 signal is not turned OFF although PRG SEL+1 signal is turned ON, program No. change is finished and PRG FIN signal is output. See PRM0910 for time chart.
0912	PRG SEL-1 signal timeout detection time PRG SEL -1 time out
	Date unit : s Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when PRG SEL-1 signal is not turned OFF although PRG SEL-1 signal is turned ON, program No. change is finished and PRG FIN signal is output. See PRM0910 for time chart.
0913	PRG SEL+10 signal timeout detection time PRG SEL +10 time out
	Date unit : s Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when PRG SEL+10 signal is not turned OFF although PRG SEL+10 signal is turned ON, program No. change is finished and PRG FIN signal is output. See PRM0910 for time chart.
0914	PRG SEL-10 signal timeout detection time PRG SEL -10 time out
	Date unit : s Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when PRG SEL-10 signal is not turned OFF although PRG SEL-10 signal is turned ON, program No. change is finished and PRG FIN signal is output. See PRM0910 for time chart.
0915	M92 timeout detection time M92 time out
	Date unit : s Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when M92 finish signal is not input after M92 command.
	<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p>M92 (General-purpose output signal 15)</p> <p>M92FIN (General-purpose input signal 16)</p> </div> <div style="margin-right: 20px;"> <p>Alarm</p> </div> <div> <p style="text-align: center;">An alarm occurs when an invalid signal of PRM915 or more is detected</p> </div> </div>
0916	M93 timeout detection time M93 time out
	Date unit : s Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when M93 finish signal is not input after M93 command. See PRM0915 for time chart.

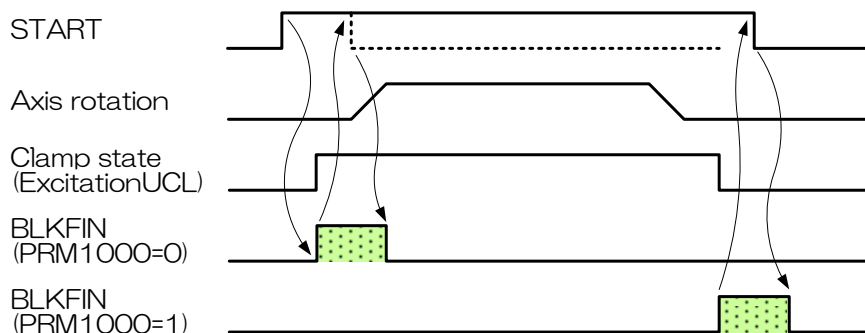
0917	M94 timeout detection time M94 time out	Date unit : s	Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when M94 finish signal is not input after M94 command. See PRM0915 for time chart.		
0918	M95 timeout detection time M95 time out	Date unit : s	Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when M95 finish signal is not input after M95 command. See PRM0915 for time chart.		
0919	M96 timeout detection time M96 time out	Date unit : s	Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when M96 finish signal is not input after M96 command. See PRM0915 for time chart.		
0920	M97 timeout detection time M97 time out	Date unit : s	Data range : 0.00 to 300.00
Comment	Sets alarm output delay time when M97 finish signal is not input after M97 command. See PRM0915 for time chart.		
0923	RS232C communication time-out RS232C communication time-out	Date unit : s	Data range : 0.00 to 300.00
Comment	If the communication time is not completed within the set time, communication timeout occurs. In case of remote control of OKUMA, from communication start code (DC2) to the end of communication code (DC4). In case of remote control of FANUC, Mitsubishi and MAZAK, from program start code (/) to line feed code (LF). If "0" is set, timeout monitoring is not performed.		
0925	Execution program reception wait timeout Execution program reception wait timeout	Date unit : s	Data range : 0.00 to 300.00
Comment	When START signal turns on during program communication with remote control (start signal specification). If the reception is not completed within the time set by this parameter from the time when the START signal is turned on, the program reception timeout occurs.		
<b>Precautions</b>	<input type="checkbox"/> Valid when PRM1200=1 or 2.		

**C1-4-11** 1000 to 1017 : External input/output

1000	BLKFIN output timing selection at the time of G07 BLKFIN output select (G07)
Date unit	: Data range : 0,1

Comment Sets what timing to output block finish dedicated to G07 (when lead cutting is executed) apart from normal block finish output.

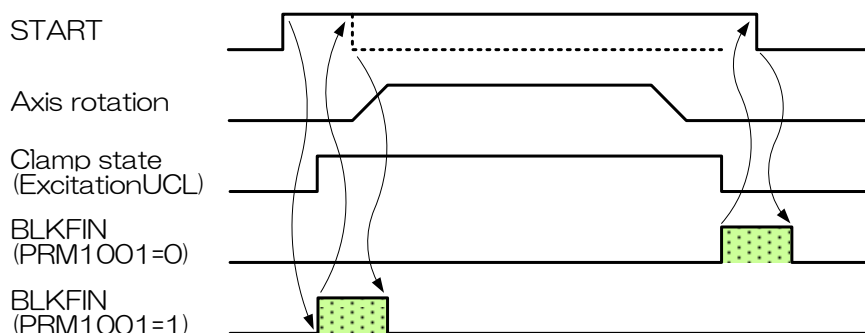
- 0 Outputs block finish (BLKFIN) when G07 block execution is ended.
- 1 Outputs block finish (BLKFIN) when G07 block execution is started.



1001	BLKFIN output timing selection at the time of G08, 09 BLKFIN output select (G08,G09)
Date unit	: Data range : 0,1

Comment Sets what timing to output block finish (BLKFIN) when G08, G09 are commanded by a program.

- 0 Outputs BLKFIN when G08 block execution is started  
(Does not output BLKFIN when G09 block execution is ended).
- 1 Outputs BLKFIN when G08 block execution is ended  
(Does not output BLKFIN when G09 block execution is started).

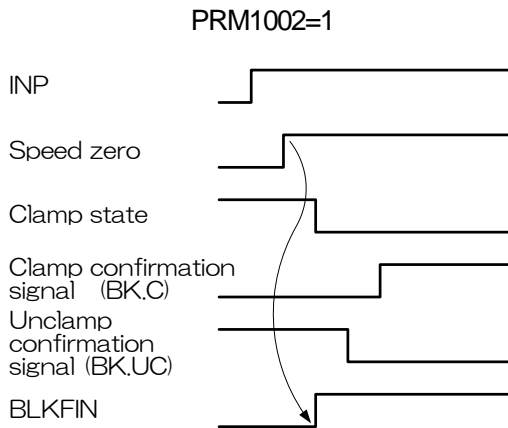
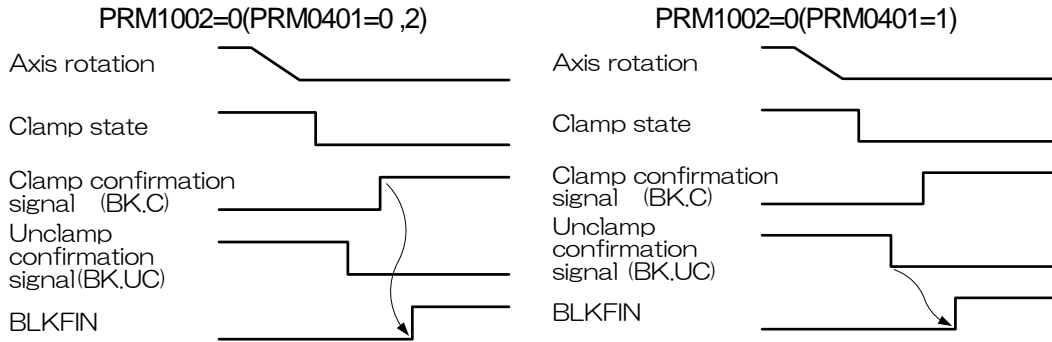


1002	Target signal for BLKFIN output BLKFIN trigger	
	Date unit :	Data range : 0,1

Comment

Sets what confirmation signal to output general finish other than G07, G08 and G09.

- 0 Clamp confirmation signal monitor.  
"Effective only at the time of PR M012 1 (clamp mechanism selection)"
- 1 INP (positioning finished) + zero speed monitor (both signals are servo outputs)



In case of PRM1002=1, block finish signal is output by rotation operation finish, therefore, block finish signal can be output faster than the type of PRM1002=0. However, there also occurs a period when clamp operation is not performed after block finish signal is output.



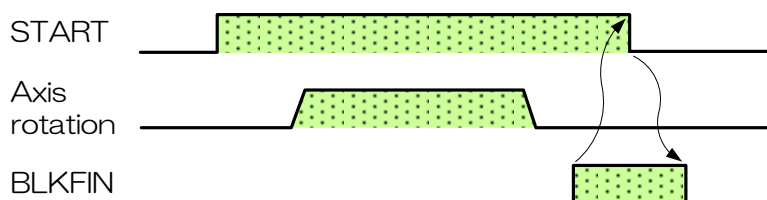
1003	BLKFIN timer
	BLKFIN timer
	Date unit : s
	Data range : 0.00 to 1.00

## Comment

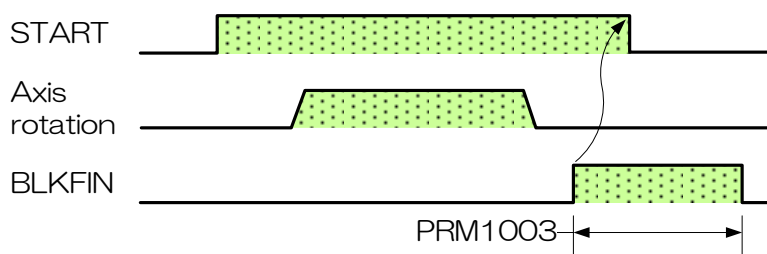
Sets output time of BLKFIN signal to be output when block operation is finished by program operation in AUTO mode.

And, BLKFIN signal is output in conjunction with START signal or PRGSET signal by putting the set value to [0.00].

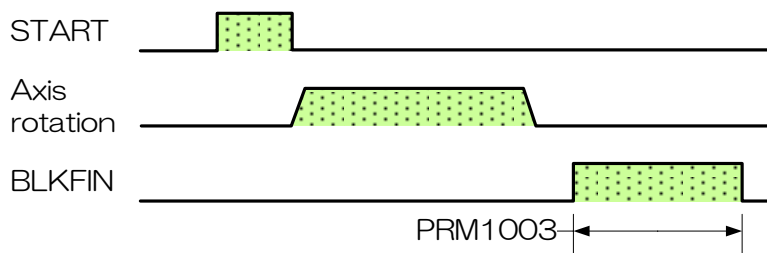
PRM1003=0 (Target signal : START)



PR M1003 0 (ST is a type to turn OFF with BLKFIN)



PR M1003 0 (ST is of one-shot type)



PRM1003=0 (Target signal : PRGSET)

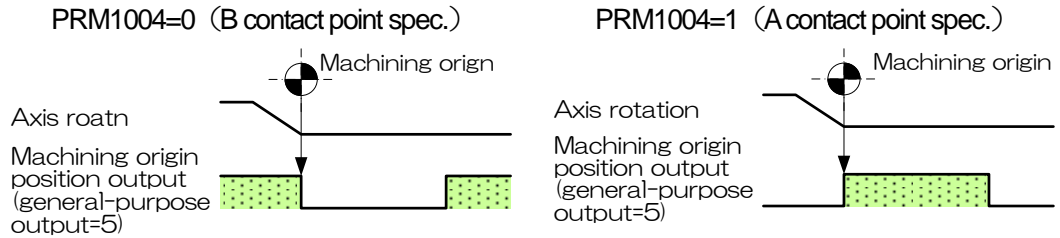
**Precautions**

- ❑ As for finish output signal, if start signal turns off within PRM1003 time, the output time becomes PRM1003 set time. However, if the start signal does not turn off even when PRM1003 time passes, the finish output signal is output until the start signal turns off.
- ❑ When the start signal is input while the finish output signal is output with PR M1003 0, an alarm (IF200) occurs.
- ❑ When the START is not turned off even if a certain time (PRM0907) passes after BLKFIN is output with PRM1003=0, an alarm (IF201) occurs.
- ❑ If a program is executed in ST of one shift type with PRM1003=0, an alarm (IF202) occurs.
- ❑ When setting PR M1003 0, set a proper output time because external equipment may not read the finish output signal if setting an excessively short time.

1004	Machining origin position output contact point type selection WZERO output contact
------	---

Date unit : Data range : 0,1

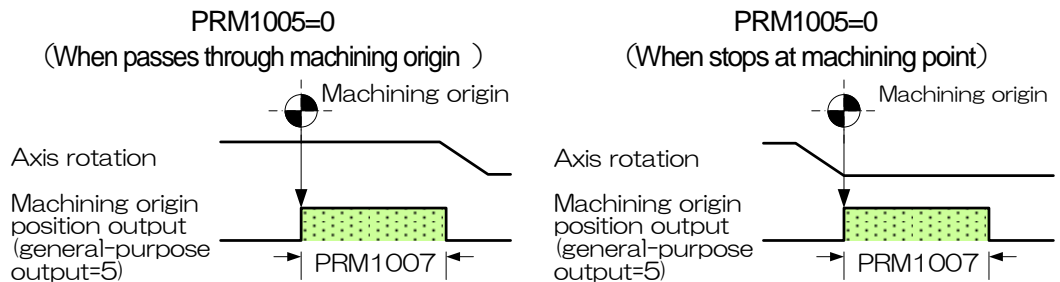
Comment  
 Selects contact point type of machining origin position output signal.  
 0 B contact point  
 1 A contact point



1005	Machining origin position output specification WZERO output spec
------	---

Date unit : Data range : 0,1

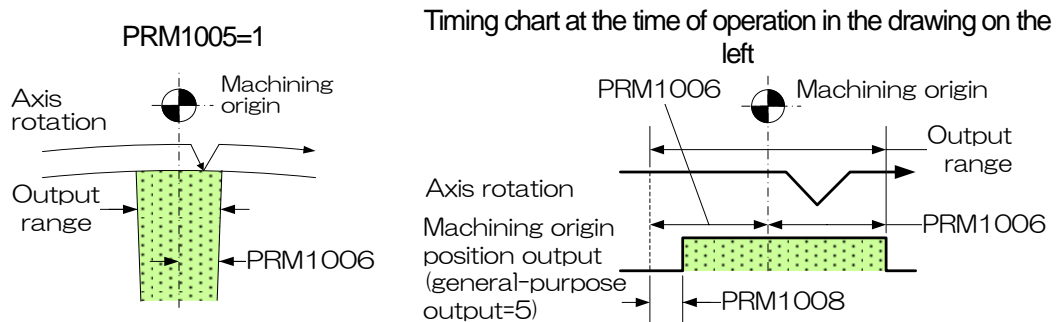
Comment  
 Selects output specification of machining origin position signal.  
 0 One shot output  
 When stops at or passes through the machining origin position, the machining origin position signal is output for the PRM1007 set time.  
 1 Continuous output  
 The present position is always monitored, and when it is within the set range (PRM1006), machining origin position signal is output and, on the other hand, if it is out of the range, output is turned off.



1006	Machining origin position output range WZERO output area
------	---

Date unit : deg Data range : 0.0000 to 1.0000

Comment  
 Sets an output range to continuously output machining origin position signal with PRM1005=1.  
 The set value of PRM1006 is based on the machining origin, and is in a range of ±



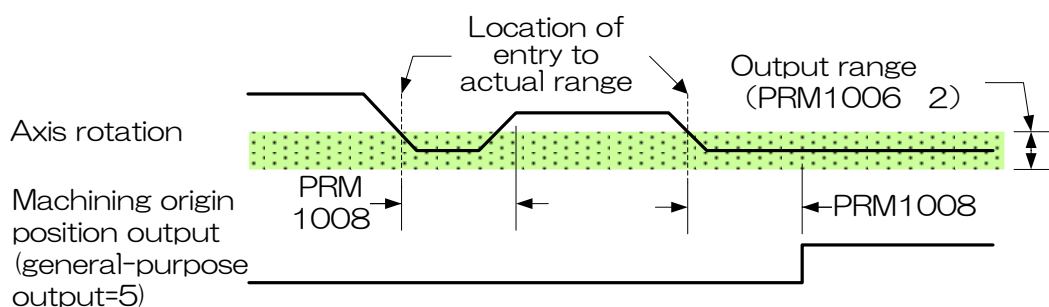
1007	Machining origin position output timer WZERO output timer
Date unit	: s
Data range	: 0.0 to 1.0

**Comment** Sets output time of machining origin position signal when stops at or passes through the machining origin position.  
See PRM1005=0 drawing for operation content of the timer.

**Precautions**  In case of PRM1005=1, the timer of this parameter becomes ineffective.

1008	Machining origin position range reach timer WZERO output area timer
Date unit	: s
Data range	: 0.0 to 1.0

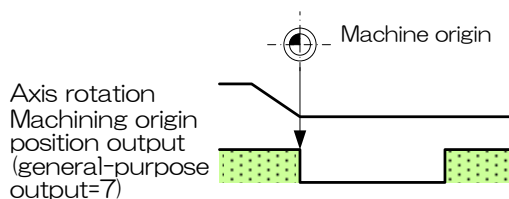
**Comment** Machining origin position signal is continuously output by setting PRM1005=1, however, this continuous output enters PRM1006 setting range, and confirms that it stays for the set time of PRM1008 or longer, then starts output, thereby prevents frequent ON/OFF of signal.



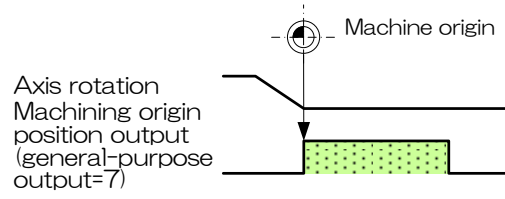
1009	Machine origin position output contact point type selection MZERO output contact
Date unit	:
Data range	: 0,1

**Comment** Selects contact point type of machine origin position output signal.  
0 B contact point  
1 A contact point

PRM1009=0(B contact point spec.)



PRM1009=1(A contact point spec.)



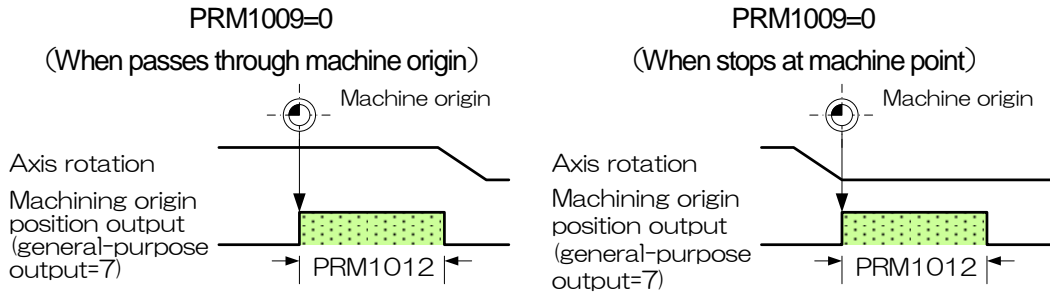
1010	Machine origin position output specification MZERO output spec
------	---

Date unit : Data range : 0,1

Comment

Selects output specification of machine origin position signal.

- 0 One shot output  
When stops at or passes through the machining origin position, the machining origin position signal is output for PRM1012 set time.
- 1 Continuous output  
The present position is always monitored, and when it is within the set range (PRM1011), machine origin position signal is output and, on the other hand, if it is out of the range, output is turned OFF.

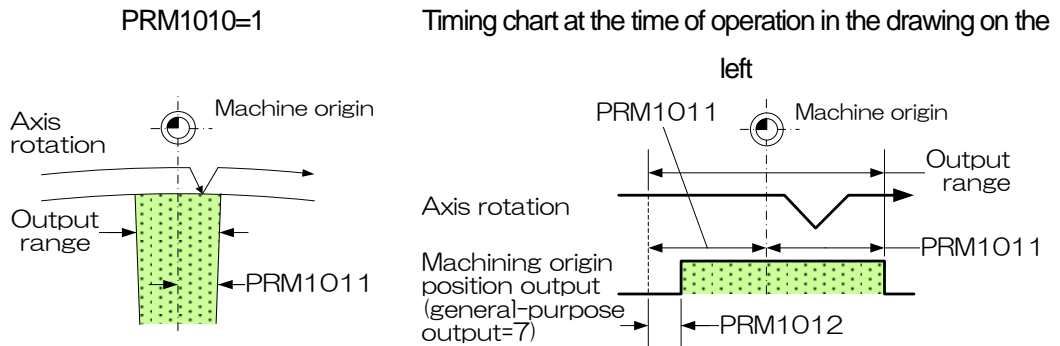


1011	Machine origin position output range MZERO output area
------	---

Date unit : deg Data range : 0.0000 to 1.0000

Comment

Sets output range to continuously output machine origin position signal of PRM1010=1. The set value of PRM1011 is based on the machine origin, and is in a range of ±.



1012	Machine origin position output timer MZERO output timer
------	--

Date unit : s Data range : 0.00 to 1.00

Comment

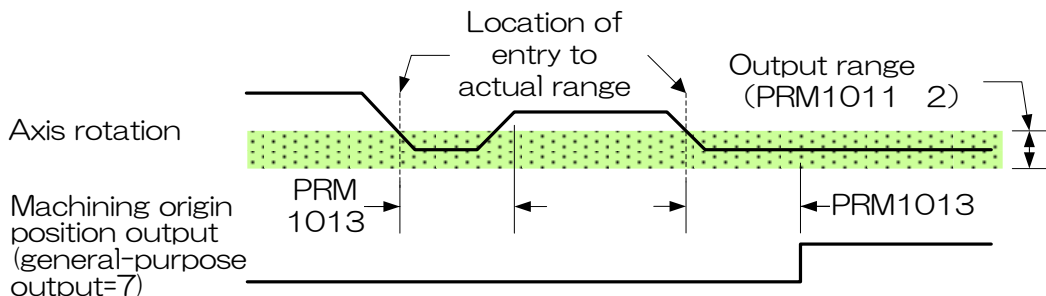
Sets output time of machine origin position signal when stops at or passes through the machining origin position. See PRM1010=1 drawing for operation content of the timer.

Precautions

- ❑ In case of PRM1010=1, the timer of this parameter becomes ineffective.

1013	Machine origin position range reach timer MZERO output area timer
Date unit : s Data range : 0.00 to 1.00	

Comment Machining origin position signal is continuously output by setting PRM1010=1, however, this continuous output enters PRM1011 setting range, and confirms that it stays for the set time of PRM1013 or longer, then starts output, thereby prevents frequent ON/OFF of signal.



1014	External remote operation specification EXT operation spec
Date unit : Data range : 0,1	

Comment Sets operation specification of the panel key from outside. When "23 external automatic operation specification" is selected for any parameter of PRM1100 to PRM1105, this parameter becomes effective.

Set value	External input signal		Panel key	
	START	STO	START	STOP
0	Effective	Effective	1	<i>Ineffective</i>
1				<i>Effective</i>

1 If general-purpose input (input assigned with PRM1100 to PRM1105) is ON, it becomes ineffective, and if the input is OFF, it becomes effective.

Related parameters PRM1100 to PRM1105

1015	STOP signal function specification STOP/EXT STOP func spec
Date unit : Data range : 0,1	

Comment Selects functions when receiving panel STOP or external STOP signal during operation.

- 0 Temporarily stops by STOP input. Status is in "H O L D" state.
- 1 Stops + resets program by STOP input. Status is in "R ESET" state.

1016	OV RUN contact point type OV RUN contact type
Date unit : Data range : 0,1	

Comment

- 0 A contact point
- 1 B contact point

1017	Input signal establishing time setting timer Input signal complete time
Date unit : s Data range : 0.00 to 0.50	

Comment Input signals of START, RESET and PRGSET are processed as normal input signals if continuous input longer than this parameter set time is confirmed. They are not recognized as input signals in case of input time shorter than the parameter set time.

### **C1-4-12** 1100 to 1111 : General purpose input/output allotment

1100	General purpose input signal 1 Utility input 1
1101	General purpose input signal 2 Utility input 2
1102	General purpose input signal 3 Utility input 3
1103	General purpose input signal 4 Utility input 4
1104	General purpose input signal 5 Utility input 5
1105	General purpose input signal 6 Utility input 6
Date unit : Data range : 0 to 99	

Comment PRM1100, allots general-purpose input signal 1.  
PRM1101, allots general-purpose input signal 2.  
PRM1102, allots general-purpose input signal 3.  
PRM1103, allots general-purpose input signal 4.  
PRM1104, allots general-purpose input signal 5.  
PRM1105, allots general-purpose input signal 6.

[\*\*] represents screen indication name.

0 Not set

1 External machining origin return requestA [WZRNA]

2 External machining origin return requestB [WZRN B]

1 to 2

Executes machining origin return request by external input.

This is effective at the time of "STOP" or "RESET" in MA AL mode.

3 External machine origin return requestA [MZRNA]

4 External machine origin return requestB [MZRNB]

3 to 4

Executes machine origin return request by external input.

This is effective at the time of "STOP" or "RESET" in MA AL mode.

5 External program selection 1 (binary) [PRGSEL1]

6 External program selection 2 (binary) [PRGSEL2]

7 External program selection 4 (binary) [PRGSEL4]

8 External program selection 8 (binary) [PRGSEL8]

9 External program selection 16 (binary) [PRGSEL16]

10 External program set [PRGSET]

5 to 10

Program of selecting file can be selected with binary code. Refer to the chapter on program selection for details.

11 External program selection clear (M code) [PRGCLEAR]

12 External program selection +1 (M code) [PRGSEL+1]

- 13 External program selection -1 (M code) [PRGSEL-1]  
 14 External program selection +10 (M code) [PRGSEL+10]  
 15 External program selection -10 (M code) [PRGSEL-10]  
     11 to 15  
     Program of selecting file can be selected with M code. Refer to the chapter on program selection for details.
- 16 M92 finish (FIN type) [M92FIN]  
 17 M93 finish (FIN type) [M93FIN]  
 18 M94 finish (FIN type) [M94FIN]  
 19 M95 finish (FIN type) [M95FIN]  
 20 M96 finish (FIN type) [M96FIN]  
 21 M97 finish (FIN type) [M97FIN]  
     16 to 21  
     These are confirmation signals to inform finish to M code commanded by M9\*.
- 22 External reset [EXTRESET]  
     Function the same as "R ESET" on the panel can be given from the outside.
- 23 External automatic operation specification EXTSTART  
     External automatic operation specification changes by ON/OFF of signal.  
     ON : According to PRM1014  
     OFF : Screen switching effective
- 24 Axis + side over-travel [OVRUN1A]  
 25 Axis - side over-travel [OVRUN1B]  
     24 to 25  
     Over-travel can be detected.  
     In case of PRM1016="1" (Initial set value), when general purpose input signal changes from Hi to Lo, "R T210" (Set value 24), "R T211" (Set value 25) generated. And in case of PRM1016="0" (A contact point), when general purpose input signal changes from Lo to Hi, similarly, alarms are generated.
- 26 Workpiece origin setting [ORG]  
     Respect to the axis that has been selected in the handle mode, this signal is input, perform the workpiece origin setting.
- 27 OT release [OTREL]  
     If the hard overtravel occurs in handle mode or manual mode, if you enter this signal, it will be "OT release mode".
- 28 Workpiece zero return [PWZRN]  
     Axis that is selected in handle mode, this signal is input will be carried out workpiece origin return.
- 29 Machine zero return [PMZRN]  
     Axis that is selected in handle mode, this signal is input will be carried out machining origin return.
- 40 AUTO mode selection [AUTO MODE SEL]  
     Input when the AUTO mode is selected.
- 41 MANUAL mode selection [MANUAL MODE SEL]  
     Input when the MANUAL mode is selected.
- 42 PROGRAM mode selection [PROGRAM MODE SEL]  
     Input when the PROGRAM mode is selected.

- 43 PARAMETER mode selection [PARAMETER MODE SEL]  
Input when the PARAMETER mode is selected.
- 44 ALARM mode selection [ALARM MODE SEL]  
Input when the ALARM mode is selected.
- 45 MAINTENANCE mode selection [MAINTENANCE MODE SEL]  
Input when the MAINTENANCE mode is selected.

1106	General purpose output signal 1 Utility output 1
1107	General purpose output signal 2 Utility output 2
1108	General purpose output signal 3 Utility output 3
1109	General purpose output signal 4 Utility output 4
1110	General purpose output signal 5 Utility output 5
1111	General purpose output signal 6 Utility output 6

Date unit : Data range : 0 to 99

## Comment

PRM1106, allots general-purpose output signal 1.  
PRM1107, allots general-purpose output signal 2.  
PRM1108, allots general-purpose output signal 3.  
PRM1109, allots general-purpose output signal 4.  
PRM1110, allots general-purpose output signal 5.  
PRM1111, allots general-purpose output signal 6.

0 Not set

1 Machining origin return finish A [WZEROA]

2 Machining origin return finish B [WZEROB]

1 to 2

Outputs for a time of PRM1007 when machining origin return is finished.

3 Machine origin return finish A [MZEROA]

4 Machine origin return finish B [MZEROB]

3 to 4

Outputs for a time of PRM1012 when machine origin return is finished.

5 Machining origin position confirmation A [WZPA]

6 Machining origin position confirmation B [WZPB]

5 to 6

This is an output method according to PRM1005, and outputs when stops at or passes through the machining origin.

7 Machine origin position confirmation A [MZPA]

8 Machine origin position confirmation B [MZPB]

7 to 8

This is an output method according to PRM1010, and outputs when stops at or passes through the machine origin.

9 M80 command [M80OP]

10 M82 command [M82OP]

11 M84 command [M84OP]



- 12 M86 command [M86OP]  
 13 M88 command [M88OP]  
 14 M90 command [M90OP]  
9 to 14  
 Sets M code command of ON/OFF type. Output turns ON at the time of M code command.
- 15 M92 command [M92OP]  
 16 M93 command [M93OP]  
 17 M94 command [M94OP]  
 18 M95 command [M95OP]  
 19 M96 command [M96OP]  
 20 M97 command [M97OP]  
15 to 20  
 Sets M code command of MFIN type. Output turns ON at the time of M code command.
- 21 ALMOUT (A contact point) [ALARM]  
 Output turns ON when an alarm occurs.
- 22 External program selection finish [PRGFIN]  
 Output turns ON when external program selection is finished.
- 24 In AUTO mode [AUTO MODE]  
 Output in the AUTO mode.
- 25 External program No. output 1 (binary) [PRG BIN1]  
 26 External program No. output 2 (binary) [PRG BIN2]  
 27 External program No. output 4 (binary) [PRG BIN4]  
 28 External program No. output 8 (binary) [PRG BIN8]  
 29 External program No. output 16 (binary) [PRG BIN16]  
 30 External program No. output 32 (binary) [PRG BIN32]  
25 to 30  
 Presently selected program No. is indicated in binary.  
 See the "B10-1-2 binary table" for details.
- 31 During workpiece zero return & completion [WZR&F]  
 In handle mode, a flicker output is outputted by the specification of PRM1005=1 after enforcement and workpiece-zero completion during a workpiece-zero return.
- 32 During machine zero return & completion [MZR&F]  
 In handle mode, a flicker output is outputted by the specification of PRM1005=1 after enforcement and machine-zero completion during a machine-zero return.
- The spacing of the ON / OFF of the flicker of the above, a 1-second intervals, flicker will be conducted during workpiece zero return.
- 33 Workpiece origin setting is completed [ORGSET]  
 AUTO mode, manual mode, and in handle mode, it outputs one seconds after setting the machining origin.
- 41 In MANUAL mode [MANUAL MODE]  
 Output in the MANUAL mode.
- 42 In PROGRAM mode [PROGRAM MODE]  
 Output in the PROGRAM mode.
- 43 In PARAMETER mode [PARAMETER MODE]  
 Output in the PARAMETER mode.
- 44 In ALARM mode [ALARM MODE]  
 Output in the ALARM mode.

45 In MAINTENANCE mode [MAINTENANCE MODE]

Output in the MAINTENANCE mode.

46 External mode selection permission signal [ALLOW MODE SELECT]

Output when mode selection is enabled

### **C1-4-13** 1200 to 1202 : Remote control function

1200	Remote control specification switchover RC model specification
Date unit :	Data range : 0 to 3

Comment Setting up for remote control operation.

- 0 Remote control is not used.
- 1 FUNUC, Mitsubishi, MAZAK specification
- 2 Okuma specification (External START specification)
- 3 Okuma specification (Instruction command specification)

1201	Response specification Response specification
Date unit :	Data range : 0,1

Comment Setting up output format of response when using PRM1200=2 (OKUMA spec. RC)

- 0 Standard spec. communication format  
([DC2][Response name][Response No.][CR][LF][DC4])
- 1 OKUMA spec. Communication format  
([Response name][ Response No.][%])

1202	Serial communication port set up Serial communication port
Date unit :	Data range : 0,1

Comment Selecting communication port to be used by remote control.

- 0 RS232C Communication port
- 1 RS422 communication port

### **C1-4-14** 1300 to 1316 : Serial communication

1300	RS232C baudrate RS232C baud rate
Date unit :	Data range : 0 to 6

Comment The Baud rate of communication protocol is set.

- 0 2400 bps
- 1 4800 bps
- 2 9600 bps
- 3 19200 bps
- 4 38400 bps
- 5 57600 bps
- 6 115200 bps

1301	RS232C data length RS232C data head
	Date unit : Data range : 0,1
Comment	The data length of communication protocol is set. 0 7 bit 1 8 bit
1302	RS232C parity bit RS232C parity bit
	Date unit : Data range : 0 to 2
Comment	The parity bit of communication protocol is set. 0 Even 1 Uneven 2 None
1303	RS232C stop bit RS232C stop bit
	Date unit : Data range : 0,1
Comment	The stop bit of communication protocol is set. 0 2 bit 1 1 bit
1304	RS232C receiver flow control RS232C receiver flow control
	Date unit : Data range : 0 to 2
Comment	Setting up flow control of reception side 0 None 1 Software 2 Hard ware
1305	RS232C transmitting end flow control RS232C transmitting end flow control
	Date unit : Data range : 0 to 2
Comment	Setting up flow control of transmission side. 0 None 1 Software 2 Hard ware
1306	RS232C transmission code RS232C transmission code
	Date unit : Data range : 0 to 2
Comment	Select RS232C transmission code. 0 ASCII 1 EIA 2 ISO

- Precautions**
- When 1 or 2 is set, the transmission code is automatically determined by the received data, and the parameter is automatically changed according to the received data.

**C1-4-15** 2000 to 2123 : Pitch error correction

Please refer to Section B12 "Pitch error correction function".

**C1-4-16** 5000 to 5999 : Servo parameter

5216	Model suppression frequency switch selection
	Model suppression FQ selection

Date unit : Data range : 0,1,10,11

Comment Under the model control, resonance/anti-resonance frequency 1-4 to be used is selected.

0	frequency 1	Use the setting	: PRM5294(anti-resonance)/PRM5298(resonance).
1	frequency 2	Use the setting	: PRM5295(anti-resonance)/PRM5299(resonance).
10	frequency 3	Use the setting	: PRM5296(anti-resonance)/PRM5300(resonance).
11	frequency 4	Use the setting	: PRM5297(anti-resonance)/PRM5301(resonance).

5218	FF suppression frequency selection
	FF suppression FQ selection

Date unit : Data range : 0,1,10,11

Comment The suppression frequency value to be used is selected from sub-Index 1-4.

0	frequency 1	Use the setting	: PRM5269
1	frequency 2	Use the setting	: PRM5270
10	frequency 3	Use the setting	: PRM5271
11	frequency 4	Use the setting	: PRM5272

5220	Gain change selection
	Gain change selection

Date unit : Data range : 0,1,10,11

Comment The value to be used is selected by various gain settings from Sub-Index 1-4.

0	gain1	Use the setting	: PRM5237/5241/5250/5254/5265/5289
1	gain2	Use the setting	: PRM5238/5242/5251/5255/5266/5290
10	gain3	Use the setting	: PRM5239/5243/5252/5256/5267/5291
11	gain4	Use the setting	: PRM5240/5244/5253/5257/5268/5292

5232	Auto-tuning mode
	Auto tuning mode

Date unit : Data range : 0 to 2

Comment Set the validity, invalidity of Auto-tuning, and Load inertia moment rate estimation.

0	AutoTun (Automatic Tuning)
1	AutoTun_JRAT-Fix (Automatic Tuning JRAT Manual Setting)
2	ManualTun (Manual Tuning)

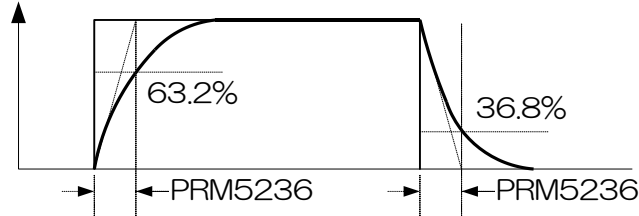
- ◆ Under the following operating conditions, Load inertia rate is not estimated properly: operation at low velocity, at low acceleration and at low acceleration/deceleration torque (force).
- ◆ Load inertia moment ratio of machines applied large disturbance torque (force), machine with major backlash, and machine whose moving part vibrate partially cannot correctly estimated.
- ◆ If you use model following vibration suppressor control, set manual tuning.
- ◆ If auto tun is selected, vibration suppressor control will be disabled though state feedback model following vibration suppressor control (base vibration suppressor) is selected.

5233	Auto-tuning characteristic Auto tuning characteristic
	Date unit : Data range : 0 to 6
Comment	<p>Selects the tuning characteristic.</p> <ul style="list-style-type: none"> <li>0 Positioning Control 1 (General Purpose) For general-purpose positioning like fast forward operations.</li> <li>1 Positioning Control 2 (High Response) For high-response positioning like fast forward operations (gravity axis or external force axis.)</li> <li>2 Positioning Control 3 (High Response, FFGN Manual Setting) For further adjusting FFGN.</li> <li>3 Positioning Control 4 (High Response, Horizontal Axis Limited) When "Tuning mode" is set at "Automatic Tuning R AT Manual Setting " in a machine which R AT is fixed by "Automatic Tuning R AT Manual Setting " but the actual mo of inertia of the load vary during the operation. When the estimation accuracy of the Inertial moment ratio of the load is low or cannot be obtained due to operation patterns or machine characteristics.</li> <li>4 Positioning Control 5 (High Response, Horizontal Axis Limited) When you want to adjust forward gain in case of the horizontal axis without external forces.</li> <li>5 Trajectory Control 1 When there is no need to follow position commands and coordination with other axes</li> <li>6 Trajectory Control 2 (KP, FFGN Manual Setting) For coordination with other axes (please adjust KPPGIN.) For following position commands. Do not use at "model following vibration suppressor control." At Model following vibration suppressor control, tra ectory will be out of alignment.</li> </ul>
Precautions	<ul style="list-style-type: none"> <li><input type="checkbox"/> When "Tuning mode" is set at "02 manual tuning," the set value will not be reflected.</li> <li><input type="checkbox"/> According to the characteristics selected, parameters will be set automatically. Position Loop Proportional Control Switch Function, Proportional Control Switch Function, Low Speed Setting, Higher Tracking Velocity Compensation Gain, Feed Forward Gain, as well as Higher Tracking Position, Acceleration Feedback, and Gain Parameter (regardless of selected conditions) are regarded as 0[%] internally.</li> </ul>
5234	Sets the Auto-Tuning Response Auto tuning response
	Date unit : Data range : 0 to 30
Comment	<ul style="list-style-type: none"> <li>◆ The larger the set value, the higher the response.</li> <li>◆ Caution, if the response is set too high, the machine may oscillate.</li> <li>◆ Make the setting suitable for rigidity of the device.</li> </ul>

5236	Position command filter
	Position command filter

Date unit : ms      Data range : 0.0 to 20000

**Comment**      This low-pass filter suppresses any sudden change of the position control pulse. Sets time constants.  
Filter will be invalid at the set value 0.0 ms.  
Does not influence Feed Forward.

**Precautions**

- This parameter setting is valid when the value of Higher Tracking Control Position Compensation Gain is set at 0%.
- When Higher Tracking Control Position Compensation Gain is 0%, value is set at 0.0ms, the filter becomes invalid.
- This filter can suppress overshoot caused by the rise of the feed forward compensation gain.

5237	Position loop proportional gain 1
	Position loop proportional gain 1

5238	Position loop proportional gain 2
	Position loop proportional gain 2

5239	Position loop proportional gain 3
	Position loop proportional gain 3

5240	Position loop proportional gain 4
	Position loop proportional gain 4

Date unit : s<sup>-1</sup>      Data range : 1 to 3000

**Comment**      Proportional gain for position controller.  
By setting parameter selection (PRM5220), the position loop proportional gain to be used is selected.

- At the time of PRM5220=0, it operates by setup of PRM5237.
  - At the time of PRM5220=1, it operates by setup of PRM5238.
  - At the time of PRM5220=10, it operates by setup of PRM5239.
  - At the time of PRM5220=11, it operates by setup of PRM5240.
- ◆ Automatically saved by Auto-tuning result saving.
  - ◆ When Auto-tuning function is valid, this setting value is not applied.

5241	Position integral time constant 1 Position integral time 1
5242	Position integral time constant 2 Position integral time 2
5243	Position integral time constant 3 Position integral time 3
5244	Position integral time constant 4 Position integral time 4
	Date unit : ms    Data range : 0.3 to 10000

- Comment                      Integral time constant for position controller.  
By setting parameter selection (PRM5220), the position integral time constant to be used is selected.
- At the time of PRM5220=0, it operates by setup of PRM5241.
  - At the time of PRM5220=1, it operates by setup of PRM5242.
  - At the time of PRM5220=10, it operates by setup of PRM5243.
  - At the time of PRM5220=11, it operates by setup of PRM5244.
  - ◆ Automatically saved by Auto-tuning result saving.
  - ◆ When Auto-tuning function is valid, this setting value is not applied.

5245	Higher tracking control position compensation gain Higher tracking control position
	Date unit : %    Data range : 0 to 100

- Comment                      Improves the Command Tractability using Compensation Gain Parameter to the position system. The larger value can raise command tracking performance.  
When higher tracking control position compensation bit is enabled, Feed Forward Gain (FFGN), Position Command Filter Time Constant (PCFIL) will be automatically set to the intended proportion.
- $KVFF [\%] = 0.9 \times \text{Setting value} [\%]$   
 $PCLPF [\text{Hz}] = \text{Velocity Loop Proportional Gain} / \text{Setting value} [\%] / 100$   
 When the value is greater, Command Track ability will be improved.
- ◆ When a value other than 0% is set, Position Command Filter and Feed Forward Gain are automatically set in the servo amplifier.
  - ◆ When Auto-tuning function is valid, this setting value not applied.

5246	Feed forward gain Feed forward gain
	Date unit : %    Data range : 0 to 100

- Comment                      Sets feed forward compensation gain to position control system.  
Model control system compensates for feed forward to Model following system when Position Control Selection is at Model following control.
- ◆ Valid when Higher Tracking Control Position Compensation Gain is set at 0%.
  - ◆ The setting value is not applied when using the Auto-Tuning Characteristics listed below.  
Positioning Control 1/2/4/Trajectory Control 1

5247	Feed forward filter Feed forward filter												
	Date unit : Hz Data range : 1 to 4000												
Comment	<p>First low-pass filter to eliminate pulsed ripple caused by the position command pulse included in the feed forward command. Sets the cutoff frequency.</p> <p>◆ Sets values to disable the filter differ according to the setting of PRM5368(position control selection).</p> <table border="1"> <thead> <tr> <th>PRM5368</th> <th>Position Control Selection</th> <th>Value when the filter is invalid</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Standard</td> <td>2000Hz or more</td> </tr> <tr> <td>1</td> <td>Model Following Control</td> <td>500Hz or more</td> </tr> <tr> <td>2</td> <td>Model Flowing Vibration Suppress Control</td> <td>500Hz or more</td> </tr> </tbody> </table>	PRM5368	Position Control Selection	Value when the filter is invalid	0	Standard	2000Hz or more	1	Model Following Control	500Hz or more	2	Model Flowing Vibration Suppress Control	500Hz or more
PRM5368	Position Control Selection	Value when the filter is invalid											
0	Standard	2000Hz or more											
1	Model Following Control	500Hz or more											
2	Model Flowing Vibration Suppress Control	500Hz or more											
5248	Velocity command filter Velocity command filter												
	Date unit : Hz Data range : 1 to 4000												
Comment	This primary low pass filter to suppress the sudden changes of the velocity command. Sets the cutoff frequency.												
<b>Precautions</b>	<input type="checkbox"/> When sets over 2000Hz then setting become disable.												
5249	Velocity feedback filter Velocity feedback filter												
	Date unit : Hz Data range : 1 to 4000												
Comment	<p>First low-pass filter to eliminate ripples caused by encoder pulse included in the velocity control system feedback. Sets the cutoff frequency.</p> <p>◆ When the encoder resolution is low, lowering the setting value and suppressor the ripples can suppress motor drive noise. In addition, when the encoder resolution is high, raising the setting value may improve the response of the velocity control system. For general use, set at the Standard value.</p>												
<b>Precautions</b>	<input type="checkbox"/> Setting value: the filter will be disabled at 2000Hz or greater.												
5250	Velocity loop proportional gain 1 Velocity loop proportional gain 1												
5251	Velocity loop proportional gain 2 Velocity loop proportional gain 2												
5252	Velocity loop proportional gain 3 Velocity loop proportional gain 3												
5253	Velocity loop proportional gain 4 Velocity loop proportional gain 4												
	Date unit : Hz Data range : 1 to 2000												
Comment	<p>Proportional gain of velocity controller.</p> <p>By setting the parameter selection (PRM5220), the Position Loop Proportional Gain to be used is selected.</p> <ul style="list-style-type: none"> <li>➢ At the time of PRM5220=0, it operates by setup of PRM5250.</li> <li>➢ At the time of PRM5220=1, it operates by setup of PRM5251.</li> <li>➢ At the time of PRM5220=10, it operates by setup of PRM5252.</li> <li>➢ At the time of PRM5220=11, it operates by setup of PRM5253.</li> </ul> <p>◆ Automatically saved by Auto-tuning result saving.</p> <p>◆ When Auto-tuning function is valid, this setting value is not applied.</p>												



5254	Velocity loop integral time constant 1 Velocity loop integral TC 1
5255	Velocity loop integral time constant 2 Velocity loop integral TC 2
5256	Velocity loop integral time constant 3 Velocity loop integral TC 3
5257	Velocity loop integral time constant 4 Velocity loop integral TC 4

Date unit : ms

Data range : 0.3 to 10000

## Comment

Integral time constant of velocity controller.

By setting the parameter selection (PRM5220), the Velocity loop integral time constant to be used is selected.

- At the time of PRM5220=0, it operates by setup of PRM5254.
- At the time of PRM5220=1, it operates by setup of PRM5255.
- At the time of PRM5220=10, it operates by setup of PRM5256.
- At the time of PRM5220=11, it operates by setup of PRM5257.
- ◆ Integral term is invalid with the setting value of 10000(1000ms)
- ◆ Automatically saved by Auto-tuning result saving.
- ◆ When Auto-tuning function is valid, this setting value is not applied.

5258	Load inertia moment ratio 1 Load inertia moment ratio 1
5259	Load inertia moment ratio 2 Load inertia moment ratio 2
5260	Load inertia moment ratio 3 Load inertia moment ratio 3
5261	Load inertia moment ratio 4 Load inertia moment ratio 4

Date unit : %

Data range : 0 to 15000

## Comment

Sets inertia moment of the loading device to the servo motor inertia moment.

Setting value= $JL/JM \times 100\%$  (JL : Load inertia moment, JM : Motor inertia moment)

By setting the parameter selection (PRM5220), the Load Inertia Moment Ratio to be used is selected.

- At the time of PRM5220=0, it operates by setup of PRM5258.
- At the time of PRM5220=1, it operates by setup of PRM5259.
- At the time of PRM5220=10, it operates by setup of PRM5260.
- At the time of PRM5220=11, it operates by setup of PRM5261.
- ◆ For velocity control parameters.
- ◆ Automatically saved by Auto-tuning result saving.
- ◆ When Auto-tuning function is valid, this setting value is not applied.

5262	Higher tracking control velocity compensation gain Hi comp vel compensation gain
------	---

Date unit : %

Data range : 0 to 100

## Comment

Parameter to adjust command following performance of velocity control.

- ◆ The higher the value, the more improved command following performance.
- ◆ When using Velocity Loop Proportional Control Switching Function, set it to 0%.
- ◆ When synchronizing with other axes, set it to 0%.
- ◆ When auto-tuning enabled, this setting value is not reflected.
- ◆ The setting value is invalid with Model following control or Model following vibration suppressor control.

5263	Acceleration feedback gain Acceleration feedback gain
	Date unit : % Data range : -100.0 to 100.0
Comment	<p>Sets acceleration feedback compensation gain to make the velocity loop stable. Sets the cutoff frequency.</p> <p>Multiply this gain with the detected acceleration to compensate torque (force) command.</p> <ul style="list-style-type: none"> <li>◆ When Auto-tuning function is valid, this setting value not applied.</li> <li>◆ If the value is too large, the motor may oscillate. Set within range <math>\pm 15.0\%</math> for general use.</li> </ul>
5264	Acceleration feedback filter Acceleration feedback filter
	Date unit : Hz Data range : 1 to 4000
Comment	<p>First low-pass filter to eliminate ripples caused by encoder pulse included in acceleration feedback compensation. Sets the cutoff frequency.</p> <ul style="list-style-type: none"> <li>◆ Lower this setting value when the encoder resolution is low.</li> </ul>
<b>Precautions</b>	<input type="checkbox"/> Setting value: the filter will be disabled at 2000Hz or greater.
5265	Torque command filter 1 Torque command filter 1
5266	Torque command filter 2 Torque command filter 2
5267	Torque command filter 3 Torque command filter 3
5268	Torque command filter 4 Torque command filter 4
	Date unit : Hz Data range : 1 to 4000

Comment

Low-pass filter to eliminate high frequency component included in the torque (force) command. Sets cutoff frequency.

By setting parameter selection (PRM5220), the Torque (force) Command Filter to be used is selected.

- At the time of PRM5220=0, it operates by setup of PRM5265.
- At the time of PRM5220=1, it operates by setup of PRM5266.
- At the time of PRM5220=10, it operates by setup of PRM5267.
- At the time of PRM5220=11, it operates by setup of PRM5268.

- ◆ Automatically saved by Auto-tuning result saving.
- ◆ When Auto-tuning function is valid, this setting value is not applied.

5269	FF vibration suppressor frequency 1 FF vibration suppressor frequency 1
5270	FF vibration suppressor frequency 2 FF vibration suppressor frequency 2
5271	FF vibration suppressor frequency 3 FF vibration suppressor frequency 3
5272	FF vibration suppressor frequency 4 FF vibration suppressor frequency 4

Date unit : Hz

Data range : 5 to 500

## Comment

Sets the frequency of the machine vibration to be suppressed by FF vibration suppressor function. Shows the center frequency of the notch filter in response to the position command and set the frequency of the resonance to be constrained (anti-resonance frequency).

By setting parameter selection (PRM5218), the notch filter to be used is selected.

- At the time of PRM5218=0, it operates by setup of PRM5269.
- At the time of PRM5218=1, it operates by setup of PRM5270.
- At the time of PRM5218=10, it operates by setup of PRM5271.
- At the time of PRM5218=11, it operates by setup of PRM5272.
- ◆ This parameter is automatically saved by executing FF vibration suppressor frequency tuning.
- ◆ Tuning result will be automatically saved in this parameter.

**Precautions**

- Setting value can be input by 1Hz; inside the servo amplifier, the units listed below are used.

Setting range	Unit value inside servo amplifier
5 to 99Hz	Valid by 1Hz
100 to 499Hz	Valid by 5Hz and drop less than 5
- Setting value: FF vibration suppressor control is invalid at 500Hz
- Do not use while synchronizing with other axis such as controlling XY table trajectory for cutting operation.
- Change this while the servo motor is OFF.

5278	Acceleration compensation Acceleration compensation
5279	Deceleration compensation Deceleration compensation

Date unit : x50 pulse

Data range : -9999 to 9999

## Comment

Parameter setting to implement high setting control by adding position deviation to Acceleration and Deceleration Compensation Values.

In case at PRM5278, sets the Acceleration Compensation Value using high-stabilized control.

In case at PRM5279, Sets the Deceleration Compensation Value with high stabilized control.

- ◆ Set with the Position Deviation Pulse unit
- ◆ Compensation is provided in response to position deviation.
- ◆ Greater setting values result in increased compensation.
- ◆ Greater accelerations converted from the Position Command Pulse result in increased compensation.
- ◆ Greater Load inertia moments result in increased compensation.
- ◆ High Stabilized Control results in Position Deviation.
- ◆ In case of model following control or model following anti-resonance control, this setting value is not reflected.

5280	Command velocity low-pass filter Command velocity low-pass filter
	Date unit : Hz Data range : 1 to 4000
Comment	Sets the cutoff frequency of the primary low-pass filter to eliminate high-frequency component (ripples etc.) included in the Velocity (Command Velocity) calculated from the position command inside the higher established control. ◆ When the encoder resolution is low, lower the cutoff frequency
<b>Precautions</b>	<input type="checkbox"/> The filter is disabled by setting value 2000Hz or more. <input type="checkbox"/> It becomes effective at PRM5212=1.
5281	Command velocity threshold Command velocity threshold
	Date unit : min <sup>-1</sup> Data range : 0 to 65536
Comment	Sets the Velocity Threshold to validate the Acceleration and Deceleration Compensation Values in the higher established control. ◆ When the velocity (command velocity) converted from the Position Command is higher than this velocity, implement the Acceleration or Deceleration Compensations.
5282	Observer characteristic Observer characteristic
	Date unit : Data range : 0 to 2
Comment	Sets various parameters in the disturbance suppression observer. 0 For Low Frequency 1 For Middle Frequency 2 For High Frequency ◆ Observer compensation operates with PRM5211=1. ◆ Select 0 for Load torque (force) monitor (estimate value). ◆ Select 2, when the encoder resolution is over 1048576P/R (20bit).
5283	Compensation gain for disturbance observer Observer compensation gain
	Date unit : % Data range : 0 to 100
Comment	Observer Compensation gain in response to the Torque (force) command. ◆ The larger the value, the higher the suppression performance. By making this too large to oscillate, the disturbance suppression characteristics improve.
5284	Observer output filter Observer output filter
	Date unit : Hz Data range : 1 to 4000
Comment	First low-pass filter to eliminate high frequency elements included in the observer compensation. Sets the cutoff frequency. ◆ The larger the value is, the faster the response of disturbance observer suppression. However, it may cause a louder driving sound depending on the ripple components included in disturbance observer output.
<b>Precautions</b>	<input type="checkbox"/> Filter is invalid at the setting value more than 2000Hz. <input type="checkbox"/> It becomes effective at PRM5212=1. <input type="checkbox"/> Filter is invalid when observer characteristic is set to [01 Middle, For Middle Frequency], or [02 High, For High Frequency].

5285	Observer notch filter Observer notch filter
------	--

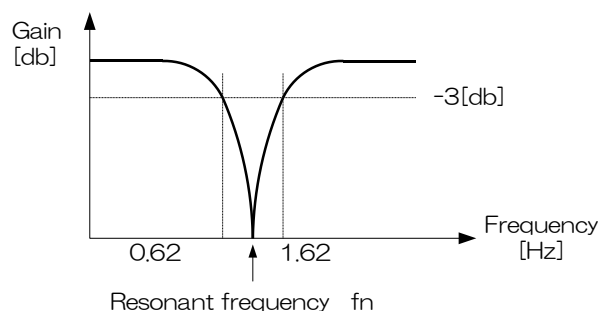
Date unit : Hz

Data range : 1 to 4000

## Comment

Notch filter to eliminate arbitrarily selected frequency from observer compensation. Set the center frequency of the filter.

- ◆ When resonance appears in disturbance observer output, such as sympathetic vibration with the mechanical system, this notch filter sometimes suppresses the vibration.

**Precautions**

- Setting value can be input by 1Hz; inside the servo amplifier, the units listed below are applied.

Setting value	Unit value inside servo amplifier
100-1999Hz	Valid by 10Hz and drop less than 10
2000-4000Hz	Filter invalid

5286	Observer load inertia ratio Observer load inertia ratio
------	--

Date unit : %

Data range : 0 to 5000

## Comment

Sets the Inertia moment (Load Inertia) of the loading device for the motor inertia moment at the disturbance suppression observer.

Setting value= $JL/JM \times 100\%$  (JL : Load inertia moment, JM : Motor inertia moment)

- ◆ Selection of disturbance suppression observer characteristics: JLAT 1-4 are used when frequency setting is made.

5287	Observer proportional gain Observer proportional gain
------	--

Date unit : Hz

Data range : 1 to 2000

## Comment

Proportional gain of the observer control.

5288	Load torque (force) filter Low-pass filter for load torque
------	---

Date unit : Hz

Data range : 1 to 2000

## Comment

After the disturbance suppression observer output low-pass filter, set the cutoff frequency of the primary low-pass filter against the Load torque (force) estimate

**Precautions**

- Setting value: the filter will be disabled at 2000Hz or greater.

5289	Model control gain 1 Model control gain 1
5290	Model control gain 2 Model control gain 2
5291	Model control gain 3 Model control gain 3
5292	Model control gain 4 Model control gain 4
	Date unit : s <sup>-1</sup> Data range : 1 to 3000
Comment	<p>Proportional gain of the Model Following Control Position Controller. By setting parameter selection (PRM5220), the model control gain to be used is selected.</p> <ul style="list-style-type: none"> <li>➤ At the time of PRM5220=0, it operates by setup of PRM5289.</li> <li>➤ At the time of PRM5220=1, it operates by setup of PRM5290.</li> <li>➤ At the time of PRM5220=10, it operates by setup of PRM5291.</li> <li>➤ At the time of PRM5220=11, it operates by setup of PRM5292.</li> </ul>
<b>Precautions</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Depends on the setting value of Position control selection (PRM5368), the range is different. <ul style="list-style-type: none"> <li>1 : In case at Model Following Control, 1-3000 /s</li> <li>2 : In case at Condition Feedback Model Following Vibration Suppress Control , 15-315</li> </ul> </li> <li><input type="checkbox"/> In case of operating at Model following anti-resonance control, use in the range of 15 - 315/s.</li> <li><input type="checkbox"/> Change value while the servo motor is OFF.</li> </ul>
5293	Overshoot suppressor filter Overshoot suppressor filter
	Date unit : Hz Data range : 1 to 4000
Comment	<p>Filter to suppress overshoot with Model following control or Model following vibration suppressor control. Sets cutoff frequency.</p> <ul style="list-style-type: none"> <li>◆ If any overshoots occur on position deviation, lower the setting value.</li> </ul>
<b>Precautions</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Filter is invalid at the setting value more than 2000Hz.</li> </ul>

5294	Model control antiresonance frequency 1 Model control antiresonance FQ 1
5295	Model control antiresonance frequency 2 Model control antiresonance FQ 2
5296	Model control antiresonance frequency 3 Model control antiresonance FQ 3
5297	Model control antiresonance frequency 4 Model control antiresonance FQ 4

Date unit : Hz

Data range : 10.0 to 80.0

## Comment

Sets antiresonance frequency to the mechanical device with Model following vibration suppressor control.

PRM5210 (damping control enable) = 1 to compensate for damping control.

By setting parameter selection (PRM5216), the model control antiresonance frequency to be used is selected.

- At the time of PRM5216=0, it operates by setup of PRM5294.
- At the time of PRM5216=1, it operates by setup of PRM5295.
- At the time of PRM5216=10, it operates by setup of PRM5296.
- At the time of PRM5216=11, it operates by setup of PRM5297.

**Precautions**

- Setting value is invalid with Model following control(PR M53 0).
- If the sitting value is over the Model Control Resonance Frequency, vibration suppressor control is invalid.
- Change value while the servo motor is OFF.

5298	Model control resonance frequency 1 Model control resonance FQ 1
5299	Model control resonance frequency 2 Model control resonance FQ 2
5300	Model control resonance frequency 3 Model control resonance FQ 3
5301	Model control resonance frequency 4 Model control resonance FQ 4

Date unit : Hz

Data range : 10.0 to 80.0

## Comment

Sets resonance frequency of the mechanical device with Model following vibration suppressor control.

PRM5210 (damping control enable) = 1 to compensate for damping control.

By setting parameter selection (PRM5216), the model control anti-resonance frequency to be used is selected.

- At the time of PRM5216=0, it operates by setup of PRM5298.
- At the time of PRM5216=1, it operates by setup of PRM5299.
- At the time of PRM5216=10, it operates by setup of PRM5300.
- At the time of PRM5216=11, it operates by setup of PRM5301.

**Precautions**

- Setting value is invalid with Model following control(PR M53 0).
- The filter is disabled by setting value 80Hz or more.
- Change value while the servo motor is OFF.

5302	Gain switch filter
	Gain switch filter
	Date unit : ms Data range : 0 to 100

**Comment** By setting parameter selection (PRM5220), the time constant at the parameter switching is set.

- ◆ The larger the value, the gentler the gain changes.
- ◆ When the mechanical system is shocked by the change of gain resulted from gain switching, making a moderate gain change will modify the shock.

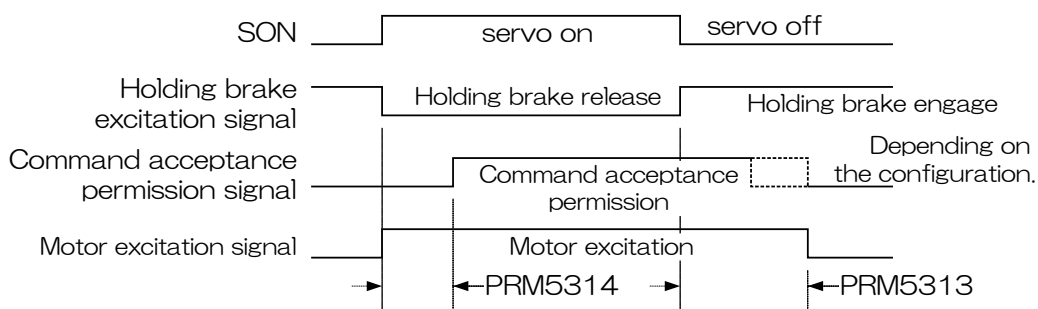
**Precautions**  The filter is disabled at the setting value 0ms.

5313	Delay time of engaging holding brake
	Operation delay of hold brake 1

5314	Delay time of releasing holding brake (Holding brake releasing delay time)
	Operation delay of hold brake 2

Date unit : ms Data range : 0 to 1000

**Comment** While shifting from servo ON to servo OFF, during the setting time (PRM5313), Excitation command 0 is given to servo motor. (Even when servo is turned OFF, power is supplied to the motor until the setting time is over.)  
 While shifting from servo OFF to servo ON, during the setting time (PRM5314), Excitation command 0 is given to servo motor. (Even when servo is turned ON, command is not accepted until the setting time is complete.)



This is valid when servo brake operation at servo OFF condition is set in the "dynamic brake operation setting" (This does not function in the dynamic brake operation and the free-run operation.)

**Precautions**  When the setting value is 0ms, after servo OFF, command is invalid (command 0) for approximately 4ms.  
 Because the setting unit is valid in 4ms steps, the remainder, divided by 4, is cut off inside the amplifier.

5315	Brake operation beginning time
	Brake operation beginning time

Date unit : ms Data range : 0 to 65535

**Comment** Sets permissible time from servo OFF until servo motor stop.

- ◆ At the time of Emergency Stop (EMR), Servo brake stop alarm occurrence, if motor velocity does not reach less than  $50\text{min}^{-1}$ , it signals the Dynamic brake operation and the Holding brake operation that are then output and motor excitation is discharged.
- ◆ This is the limit when, if the speed is not zero at the setting time after the transition from servo ON to servo OFF (ex. when the motor does not stop after servo OFF at the gravity axis etc.) the Holding brake and the Dynamic brake operate and compulsorily brake.

**Precautions**  If the servo motor velocity reaches below  $50\text{min}^{-1}$  Brake Activation Speed within the set time, this function does not operate



5500	Torque command filter 1 ON/OFF Torque command filter 1 ON/OFF
Date unit :	Data range : 0,1

Comment Select filter ON/OFF.  
0 Disable                      1 Enable

5501	Torque command filter 1 type Torque command filter 1 type
Date unit :	Data range : 1 to 5

Comment Select the type of filter to be used.  
1 Low pass filter  
2 High pass filter  
3 Band pass filter  
4 Notch filter  
5 BiQuad filter

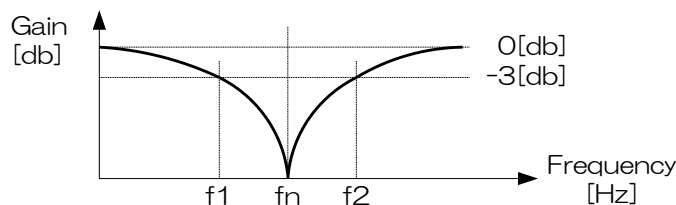
5502	Center frequency of torque notch filter 1 Center frequency of torque notch filter1
Date unit : Hz	Data range : 10 to 2000

Comment Set the center frequency of notch filter 1 (fn).

**Precautions**  When the set value is 2000Hz or more, the setting becomes invalid.

5503	Band width of torque notch filter 1 Band width of torque notch filter 1
Date unit : 1/LSB	Data range : 0.0 to 50.0

Comment Set the notch filter band width.  
The smaller the value is, the narrower the width is.



Setting Value	f1	f2	Setting Value	f1	f2
0.1	$f_n \times 0.95$	$f_n \times 1.05$	1.8	$f_n \times 0.44$	$f_n \times 2.25$
0.2	$f_n \times 0.90$	$f_n \times 1.11$	2.0	$f_n \times 0.41$	$f_n \times 2.42$
0.4	$f_n \times 0.82$	$f_n \times 1.22$	5.0	$f_n \times 0.19$	$f_n \times 5.18$
0.6	$f_n \times 0.74$	$f_n \times 1.35$	10.0	$f_n \times 0.098$	$f_n \times 9.66$
0.8	$f_n \times 0.67$	$f_n \times 1.49$	20.0	$f_n \times 0.050$	$f_n \times 17.1$
1.0	$f_n \times 0.62$	$f_n \times 1.63$	30.0	$f_n \times 0.033$	$f_n \times 22.2$
1.2	$f_n \times 0.57$	$f_n \times 1.77$	40.0	$f_n \times 0.025$	$f_n \times 25.6$
1.4	$f_n \times 0.52$	$f_n \times 1.94$	50.0	$f_n \times 0.020$	$f_n \times 28.1$
1.6	$f_n \times 0.48$	$f_n \times 2.08$			

5505	Torque command filter 2 ON/OFF
	Torque command filter 2 ON/OFF
	Date unit : Data range : 0,1

Comment Select filter ON/OFF.  
 0 Disable                      1 Enable

5506	Torque command filter 2 type
	Torque command filter 2 type
	Date unit : Data range : 1 to 5

Comment Select the type of filter to be used.  
 1 Low pass filter  
 2 High pass filter  
 3 Band pass filter  
 4 Notch filter  
 5 BiQuad filter

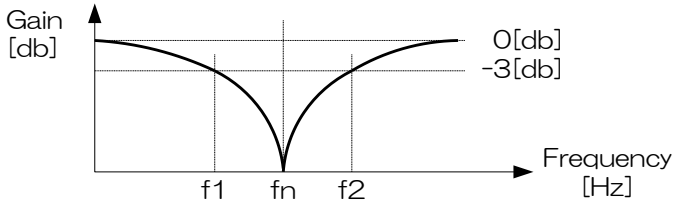
5507	Center frequency of torque notch filter 2
	Center frequency of torque notch filter 2
	Date unit : Hz Data range : 10 to 2000

Comment Set the center frequency of notch filter 2 (fn).

**Precautions**     When the set value is 2000Hz or more, the setting becomes invalid.

5508	Band width of torque notch filter 2
	Band width of torque notch filter 2
	Date unit : 1/LSB Data range : 0.0 to 50.0

Comment Set the notch filter band width.  
 The smaller the value is, the narrower the width is.



Setting Value	f1	f2	Setting Value	f1	f2
0.1	fn × 0.95	fn × 1.05	1.8	fn × 0.44	fn × 2.25
0.2	fn × 0.90	fn × 1.11	2.0	fn × 0.41	fn × 2.42
0.4	fn × 0.82	fn × 1.22	5.0	fn × 0.19	fn × 5.18
0.6	fn × 0.74	fn × 1.35	10.0	fn × 0.098	fn × 9.66
0.8	fn × 0.67	fn × 1.49	20.0	fn × 0.050	fn × 17.1
1.0	fn × 0.62	fn × 1.63	30.0	fn × 0.033	fn × 22.2
1.2	fn × 0.57	fn × 1.77	40.0	fn × 0.025	fn × 25.6
1.4	fn × 0.52	fn × 1.94	50.0	fn × 0.020	fn × 28.1
1.6	fn × 0.48	fn × 2.08			

5510	Torque command filter 3 ON/OFF Torque command filter 3 ON/OFF
Date unit :	Data range : 0,1

Comment Select filter ON/OFF.  
0 Disable                      1 Enable

5511	Torque command filter 3 type Torque command filter 3 type
Date unit :	Data range : 1 to 5

Comment Select the type of filter to be used.  
1 Low pass filter  
2 High pass filter  
3 Band pass filter  
4 Notch filter  
5 BiQuad filter

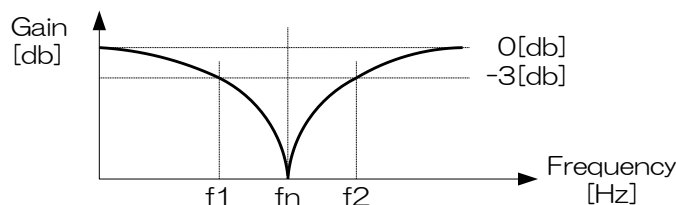
5512	Center frequency of torque notch filter 3 Center frequency of torque notch filter 3
Date unit : Hz	Data range : 10 to 2000

Comment Set the center frequency of notch filter 3 (fn).

**Precautions**  When the set value is 2000Hz or more, the setting becomes invalid.

5513	Band width of torque notch filter 3 Band width of torque notch filter 3
Date unit : 1/LSB	Data range : 0.0 to 50.0

Comment Set the notch filter band width.  
The smaller the value is, the narrower the width is.



Setting Value	f1	f2	Setting Value	f1	f2
0.1	$f_n \times 0.95$	$f_n \times 1.05$	1.8	$f_n \times 0.44$	$f_n \times 2.25$
0.2	$f_n \times 0.90$	$f_n \times 1.11$	2.0	$f_n \times 0.41$	$f_n \times 2.42$
0.4	$f_n \times 0.82$	$f_n \times 1.22$	5.0	$f_n \times 0.19$	$f_n \times 5.18$
0.6	$f_n \times 0.74$	$f_n \times 1.35$	10.0	$f_n \times 0.098$	$f_n \times 9.66$
0.8	$f_n \times 0.67$	$f_n \times 1.49$	20.0	$f_n \times 0.050$	$f_n \times 17.1$
1.0	$f_n \times 0.62$	$f_n \times 1.63$	30.0	$f_n \times 0.033$	$f_n \times 22.2$
1.2	$f_n \times 0.57$	$f_n \times 1.77$	40.0	$f_n \times 0.025$	$f_n \times 25.6$
1.4	$f_n \times 0.52$	$f_n \times 1.94$	50.0	$f_n \times 0.020$	$f_n \times 28.1$
1.6	$f_n \times 0.48$	$f_n \times 2.08$			

5515	Torque command filter 4 ON/OFF
	Torque command filter 4 ON/OFF

Date unit : Data range : 0,1

Comment Select filter ON/OFF.  
0 Disable                      1 Enable

5516	Torque command filter 4 type
	Torque command filter 4 type

Date unit : Data range : 1 to 5

Comment Select the type of filter to be used.  
1 Low pass filter  
2 High pass filter  
3 Band pass filter  
4 Notch filter  
5 BiQuad filter

5517	Center frequency of torque notch filter 4
	Center frequency of torque notch filter 4

Date unit : Hz Data range : 10 to 2000

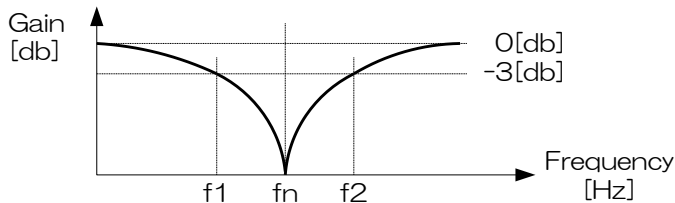
Comment Set the center frequency of notch filter 4 (fn).

**Precautions**  When the set value is 2000Hz or more, the setting becomes invalid.

5518	Band width of torque notch filter 4
	Band width of torque notch filter 4

Date unit : 1/LSB Data range : 0.0 to 50.0

Comment Set the notch filter band width.  
The smaller the value is, the narrower the width is.



Setting Value	f1	f2	Setting Value	f1	f2
0.1	$fn \times 0.95$	$fn \times 1.05$	1.8	$fn \times 0.44$	$fn \times 2.25$
0.2	$fn \times 0.90$	$fn \times 1.11$	2.0	$fn \times 0.41$	$fn \times 2.42$
0.4	$fn \times 0.82$	$fn \times 1.22$	5.0	$fn \times 0.19$	$fn \times 5.18$
0.6	$fn \times 0.74$	$fn \times 1.35$	10.0	$fn \times 0.098$	$fn \times 9.66$
0.8	$fn \times 0.67$	$fn \times 1.49$	20.0	$fn \times 0.050$	$fn \times 17.1$
1.0	$fn \times 0.62$	$fn \times 1.63$	30.0	$fn \times 0.033$	$fn \times 22.2$
1.2	$fn \times 0.57$	$fn \times 1.77$	40.0	$fn \times 0.025$	$fn \times 25.6$
1.4	$fn \times 0.52$	$fn \times 1.94$	50.0	$fn \times 0.020$	$fn \times 28.1$
1.6	$fn \times 0.48$	$fn \times 2.08$			

5520	Multi notch filter tuning mode Multi notch filter tuning mode
Date unit :	Data range : 0,1

Comment Set whether to enable notch filter of auto notch tuning.  
0 Notch filter disabled      1 Notch filter enabled

5525	TQ command value of the auto NF tuning TQ command value of the auto NF tuning
Date unit : %	Data range : 10.0 to 100.0

Comment Auto notch filter Set the torque command value for tuning.

### **C1-4-17** 8000 to 8201 : Temporary memorization

Because this is a memory area for the manufacturer, detailed explanation is omitted.

### **C1-4-18** 9000 to 9261 : Maintenance by manufacturer

Because this is a memory area for manufacturer, detailed explanation is omitted.

Do not change this parameter area. If this is changed, proper operation cannot be performed.

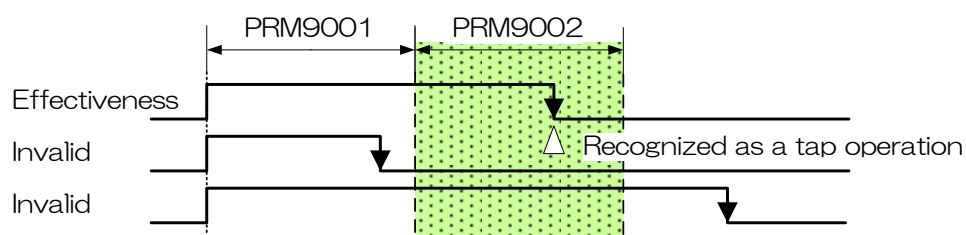
9000	Axis type select Axis type
Date unit :	Data range :

Comment Set the controller.  
0 QTC100 series / QTC300  
1 QTC200 series

**Precautions**  Even if this parameter carries out parameter initialization, the set point does not change.

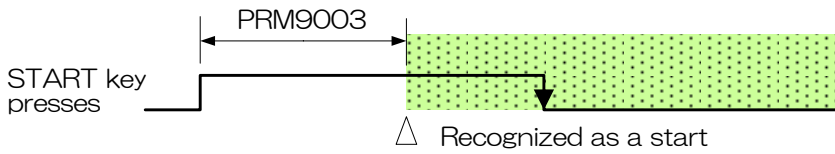
9001	Effective start time of tap operation Tap operation valid START time
Date unit : s	Data range : 0.01 to 10.00

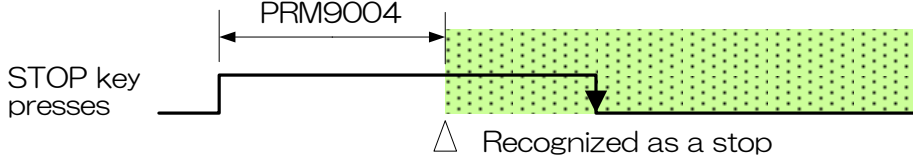
Comment Setting the time to prevent chattering of the tap operation.  
It is necessary to set the appropriate time so as not to react just by touching the key.



**Precautions**  At the time of the setting less than 0.03[s], it becomes 0.03[s].

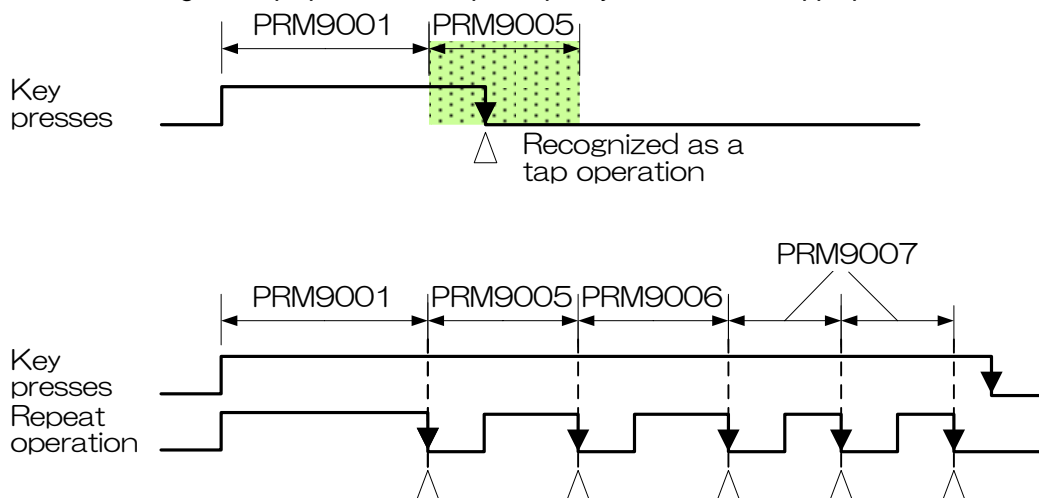
9002	Effective time of tap operation & tap spec. changing Tap op. valid time & tap spec. changing
	Date unit : s                                      Data range : 0.00 to 10.00
Comment	Setting of the time when tap operation is possible. In order to distinguish normal tap operation, or state that or you press the key, you must set the appropriate time. Please set the reference to the time chart of "9001 : Effective start time of tap operation". At the time of the setting of 0.00[s], When key pressing time reaches PRM9001, an action occurs.
<b>Precautions</b>	<input type="checkbox"/> At the time of the setting of 0.01 - 0.04[s], it becomes 0.05[s].

9003	The time when tap operation becomes effective for START key Tap operation valid time (START key)
	Date unit : s                                      Data range : 0.01 to 10.00
Comment	Set the effective time of the tap operation of the START key-only. It is necessary to set the appropriate time so as not to react just by touching the key.
	 <p>The diagram shows a pulse for 'START key presses'. A horizontal arrow labeled 'PRM9003' indicates a delay time from the leading edge of the pulse to the start of a shaded green rectangular region. A triangle points to the right edge of this region with the text 'Recognized as a start'.</p>

9004	The time when tap operation becomes effective for STOP key Tap operation valid time (STOP key)
	Date unit : s                                      Data range : 0.01 to 10.00
Comment	Set the effective time of the tap operation of the STOP key-only. It is necessary to set the appropriate time so as not to react just by touching the key.
	 <p>The diagram shows a pulse for 'STOP key presses'. A horizontal arrow labeled 'PRM9004' indicates a delay time from the leading edge of the pulse to the start of a shaded green rectangular region. A triangle points to the right edge of this region with the text 'Recognized as a stop'.</p>

9005	The time when the first "repeat input" becomes effective Repeat operation valid time 1
Date unit : s	Data range : 0.01 to 10.00

Comment Set the time until the "repeat input" from "tap operation" key operation.  
In order to distinguish "tap operation" or "repeat input", you must set the appropriate time.



9006	The time when the second "repeat input" becomes effective Repeat operation valid time 2
Date unit : s	Data range : 0.01 to 10.00

Comment Set the time interval between the second time from the "input repeat" for the first time.  
Please set the reference to the time chart of " 005: The time when the first "repeat input" becomes effective".

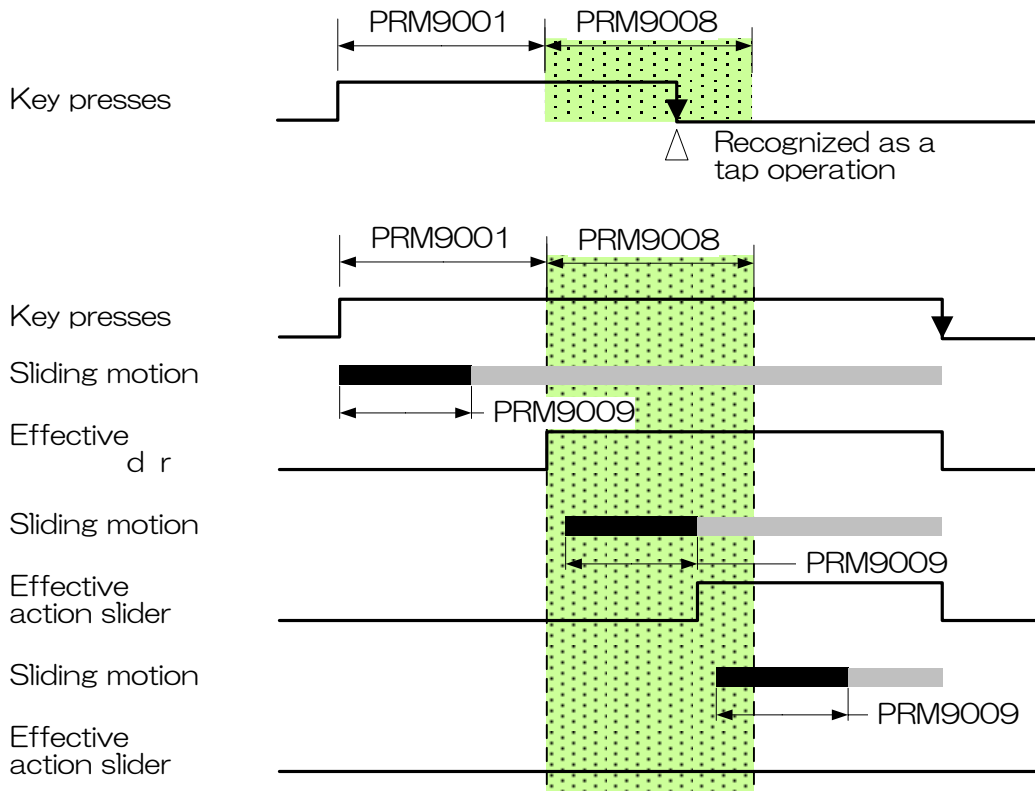
9007	The time when the third "repeat input" becomes effective Repeat operation valid time 3
Date unit : s	Data range : 0.01 to 10.00

Comment Set the time interval between the third time from the "input repeat" for the second time.  
Time interval beyond the third will be set to the same time.  
Please set the reference to the time chart of " 005: The time when the first "repeat input" becomes effective".

9008	The time when operation becomes effective for slider Slider operation valid time
Date unit : s	Data range : 0.01 to 10.00

Comment

There are two ways to operate the slider.  
 Perform one screen scroll When you do "tap operation" of the slider key.  
 It becomes " slider operation" when you move " slider key" more than a set position. PRM9009 : Time to start lowering the brightness level when not in use".  
 PRM9008 set the effective time of the slider operation.



**Precautions**



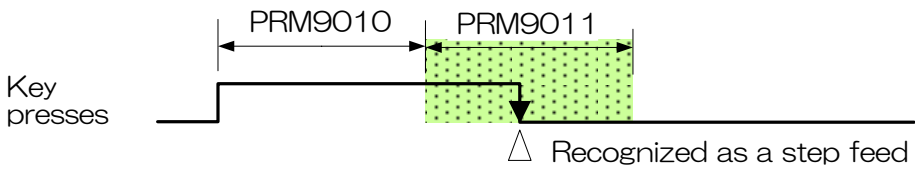
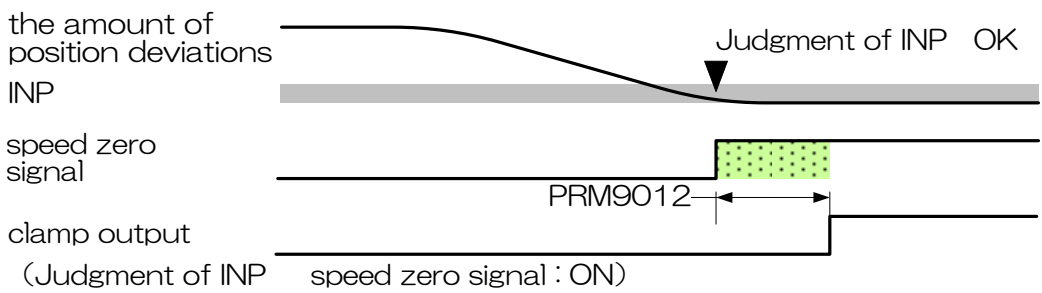
- If it exceeds the amount of movement of "PRM9009" within the set time "PRM9001", after having counted up the set time of "PRM9001", it becomes the slider operations. (Slider behavior enabled )
- If it exceed the amount of movement of the "PRM9009" within the set time of "PRM9001 + PRM9008", you will slider operation at that point. (Slider behavior enabled )
- If it reach the amount of movement of the "PRM9009" after the set time of "PRM9001 + PRM9008", slider operation is disabled. (Slider behavior enabled )

9009	Setting of the quantity of slider movement Slider move volume
Date unit : mm	Data range : 0.01 to 10.00

Comment

Set the amount of movement for switching "slider operation" to "tap operation" of the slider key.  
 Please set the reference to the time chart of " 00 : The time when operation becomes effective for slider".



9010	The time when tap operation becomes effective for JOG JOG tap operation valid time
	Date unit : s Data range : 0.01 to 10.00
Comment	<p>If the "window menu" in the "manual mode" is not displayed, , , (arrow key) is the key operation of the jog feed. It becomes step feed by performing a "tap operation" of the [arrow] keys, and will be jog feed in the "Repeat input operation".</p> <p>PRM9010 sets the effective time of the tap operation of the jog key.</p> <p>Please set a reference to the time chart shown below</p>
	
9011	The time when "repeat input" of JOG becomes effective JOG repeat operation valid time
	Date unit : s Data range : 0.01 to 10.00
Comment	<p>Set the amount of movement for switching "jog repeat input" to "tap operation" of the jog key.</p> <p>Please set the reference to the time chart of " 010 The time when tap operation becomes effective for JOG".</p>
9012	Time to delay a clamp Clamping delay timer
	Date unit : s Data range : 0.00 to 10.00
Comment	<p>In stop operation of a rotary table, when "the amount of position deviations" is within the limits of "imposition" and the "speed zero signal" turns on, a clamp output is performed after the set period of "PRM9012."</p>
	
9013	Time to start lowering the brightness level when not in use Lower luminance timer
	Date unit : min Data range : 0 to 10
Comment	<p>In not performing key operation, it becomes the power-saving mode.</p> <p>Brightness level is 50% down after a lapse of PRM9013.</p> <p>If key operation is not performed for a further 10 minutes, dropping to the brightness level of 90% from the original luminance.</p> <p>However, if key operation is performed, it will return to the original luminance level.</p> <p>Brightness level is not lowered when the setting value is 0.</p>
<b>Precautions</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Higher values the life of the LCD will be shorter.</li> <li><input type="checkbox"/> Life of the LCD will drop significantly if set to 0. Do not set basically.</li> </ul>

9014	Reference position of the X-axis upper right corner of the touch panel
Dedicated to monitors	Touch panel X axis upper right
9015	Reference position of the X-axis lower right corner of the touch panel
Dedicated to monitors	Touch panel X axis lower right
9016	Reference position of the X-axis upper left corner of the touch panel
Dedicated to monitors	Touch panel X axis upper right
9017	Reference position of the X-axis lower left corner of the touch panel
Dedicated to monitors	Touch panel X axis lower right
9018	Reference position of the Y-axis upper right corner of the touch panel
Dedicated to monitors	Touch panel Y axis upper right
9019	Reference position of the Y-axis lower right corner of the touch panel
Dedicated to monitors	Touch panel Y axis lower right
9020	Reference position of the Y-axis upper left corner of the touch panel
Dedicated to monitors	Touch panel Y axis upper right
9021	Reference position of the Y-axis lower left corner of the touch panel
Dedicated to monitors	Touch panel Y axis lower right

Date unit : Data range :

Comment Coordinate position after the calibration of the touch panel.

**Precautions**  Even if this parameter carries out parameter initialization, the set point does not change.

9022	Reception desk permission of the signal of the external start and panel start
	Reception desk of Ext ST & Panel ST

Date unit : Data range : 0,1

Comment Setting of the START reception desk permission of the controller.

- 0 Selection of program start method ("START external" or "panel START"), changes in the "EXT.ST MODE" of the screen.
- 1 The program start, "START of the panel" and "START external" is effective (Grayed out "EXT.ST MODE")

9023	Battery drive possibility time
	Battery drive possibility time

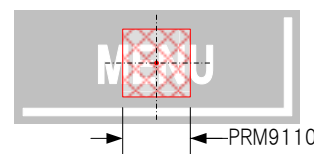
Date unit : month Data range : 1 to 240

Comment Set the drive possible time of the battery.

9100	Selection of panel sheet Selection of panel sheet
	Date unit : Data range : 0,1
Comment	Choose a panel sheet of the front panel. 0 Sheet of the Touch panel 1 Sheet of Click switch emboss  It switched the next control content by the sheet type selection. ✓ Position of calibration ✓ Operation screen of calibration settings (Maintenance mode) ✓ Key input recognition area

**Precautions**  Even if this parameter carries out parameter initialization, the set point does not change.

9110	Input detection area of the Click switch emboss type Input detection area of the CS type
	Date unit : mm Data range : 8 to 15
Comment	You set the input sensing area from the center point of the "click switch emboss". Input of outside this range will be invalid.



9111	Touch panel X axis upper right(3 Position Calibration)
Dedicated to monitors	Touch panel X axis upper right(3Pos CAL)
9112	Touch panel X axis lower left(3 Position Calibration)
Dedicated to monitors	Touch panel X axis lower left(3Pos CAL)
9113	Touch panel X axis center(3 Position Calibration)
Dedicated to monitors	Touch panel X axis center(3Pos CAL)
9114	Touch panel Y axis upper right(3 Position Calibration)
Dedicated to monitors	Touch panel Y axis upper right(3Pos CAL)
9115	Touch panel Y axis lower left(3 Position Calibration)
Dedicated to monitors	Touch panel Y axis lower left(3Pos CAL)
9116	Touch panel Y axis center(3 Position Calibration)
Dedicated to monitors	Touch panel Y axis center(3Pos CAL)
	Date unit : Data range :

Comment It will remember the coordinates in three-point calibration.

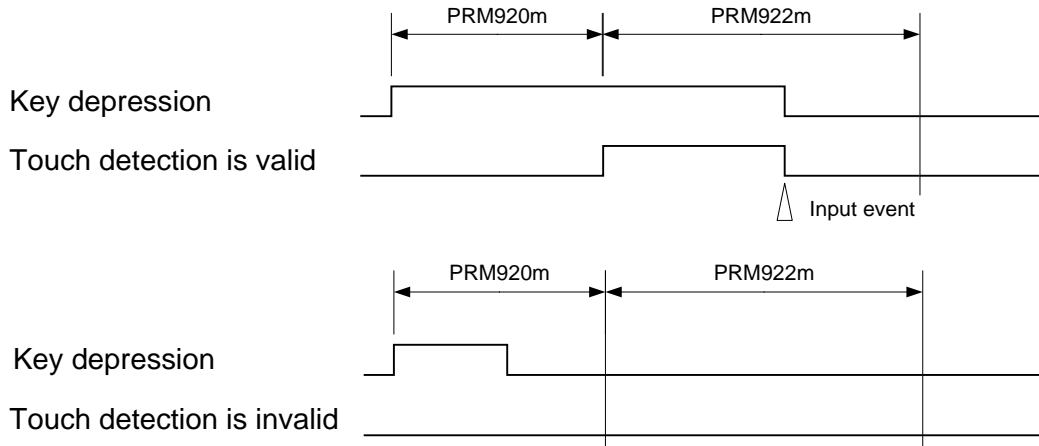
**Precautions**  Even if this parameter carries out parameter initialization, the set point does not change.

920m	MOP Tap operation valid time(Mm) [s] MOP Tap operation valid time(Mm)
922m	MOP Touch operation OFF delay tm(Mm) [s] MOP Touch operation OFF delay tm(Mm)

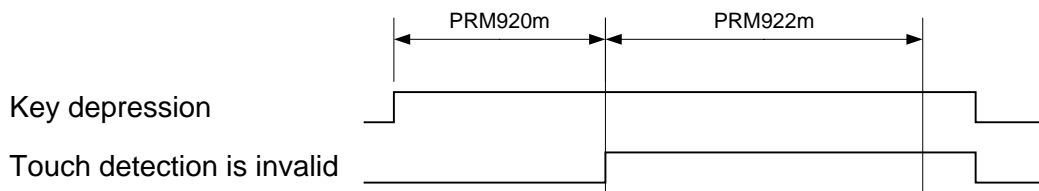
Date unit : s Data range : 0.01 10.00

Comment

Set the time from when the key is pressed until when the corresponding action occurs. It is necessary to set a proper length of time so that the key does not respond only by slight touch by a finger.



Invalid in the above chart because switch depression exceeding the time of PRM920m was not confirmed.



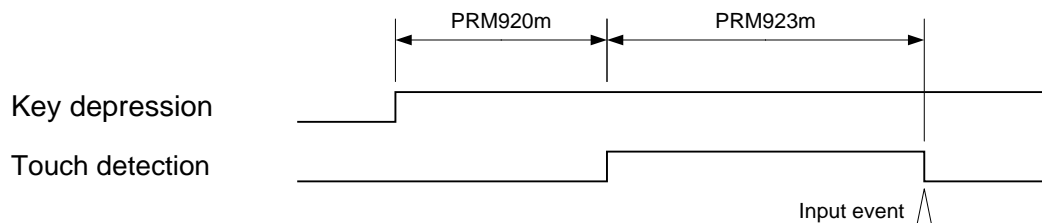
Invalid in the above chart because switch depression fall was not confirmed within the time of PRM922m.

923m	MOP Continuous touch cancel tm(Mm) [s] MOP Continuous touch cancel tm(Mm)
------	--

Date unit : s Data range : 0.01 to 10.00

Comment

When the key is touched continuously, it is forcibly turned OFF at the set time. This parameter is allocated to keys of the long-press time setting type. (Ex: Origin key) If this parameter is set to 0.00, cancellation by continuous touch becomes invalid, and touch detection is performed according to PRM920m.



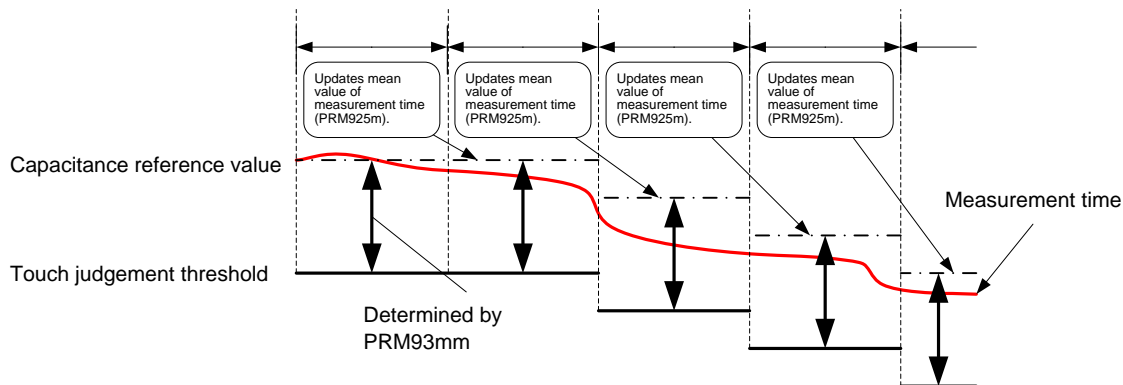
924m	MOP Drift correction selection (Mm) [s]
	MOP Drift correction selection (Mm)

Date unit : Data range : 0,1

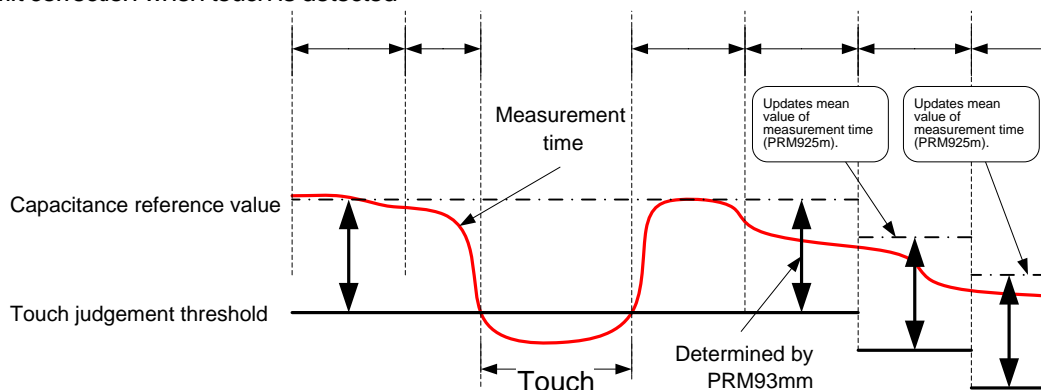
Comment

In drift correction, capacitance data for the time of PRM925m is stored, and the mean value is used as the reference value. The reference value follows the change of the measurement values due to slight change of the environment so as to prevent erroneous touch detection. Also, undetectable touch phenomenon is prevented. Set drift correction to valid or invalid.

● Drift correction when no touch is detected



Drift correction when touch is detected



925m	MOP Drift correction execution tm(Mm) [s]
	MOP Drift correction execution tm (Mm)

Date unit : s Data range : 0.01 to 10.00

Comment

Set the time for obtaining the mean value of capacitance data in drift correction.

9260	MOP Buzzer sound generation time
	MOP Buzzer sound generation time

Date unit : s Data range : 0.0 to 1.0

Comment

Set the time for buzzer sounding when the key is operated.

9261	MOP Enable switch selection
	MOP Enable switch selection

Date unit : Data range : 0,1

Comment

Select enable switch type.  
 0 Capacitance touch switch  
 1 Optional additional enable switch

No text on this page.

---

# ***D***    ***Alarm description***

---

***D1*** Alarm.....D1-1

< No text on this page. >

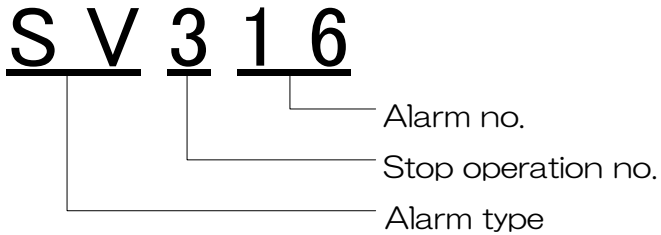


## **D1** Alarm

- D1-1** Alarm indication content
- D1-2** The alarm release method
- D1-3** Alarm list
- D1-4** Alarm details

**D1-1** Alarm indication content**D1-1-1** Alarm system

Alarm consists of combination of letters and numbers, which respectively have their meanings. Each meaning is explained in each item.

**D1-1-2** Alarm type

Alarm types are expressed in letters.

Type	Contents
EM	Related to emergency stop
SY	Related to processing of CPU
RT	Related to clamp operation and restrictions of movable range
OP	Related to operation by user
PG	Related to syntax of program
IF	Related to exchange of signal with machine
EX	Related to serial communication, remote control
MT	Related to maintenance
SV	Related to servo

**D1-1-3** Stop operation No.

Stop operation when an alarm occurs is expressed by one number.

No.	Stop operation	Alarm history
5	It was in an uncontrollable state and in a state where it could not safely stop.	Remains.
4	Emergency stop operation, emergency stop input, etc. were made, and the emergency stop state was entered.	
3	An abnormality related to servo and control occurred.	
2	An error related to input / output signals and program execution occurred.	
1	Notifications / warnings related to operation errors, misconfiguration, maintenance occurred.	
0		Does not remain.


The larger the number, the higher the risk.

Alarm rank number "0" is displayed as alarm indication by pop-up, no alarm output is generated.

Alarm rank number "1" to "5" is displayed as alarm indication, alarm output is generated.

**D1-1-4** Combination of mode and alarm rank to perform stop operation

Alarm rank	AUTO	MANUAL	HANDLE	PROGRAM	PARAMETER	MENTENANCE
5				—	—	—
4				—	—	—
3				—	—	—
2				—	—	—
1	—	—	—	—	—	—
0	—	—	—	—	—	—

※ Stop operation is performed with , and stop operation is not performed with —.

**D1-2** The alarm release method

If an alarm occurs, please release the cause by referring to the "D1-4 Alarm details".

The alarm is canceled when you press the panel **【RESET】** key after removing the cause.

**D1-3** Alarm list**D1-3-1** Emergency stop state (EM)

No.	Alarm content
	Message
EM400	Emergency stop input is checked Emergency stop
EM401	Emergency stop is inputted from outside External emergency stop
EM402	Emergency stop is inputted from outside Emergency stop circuit error was detected

**D1-3-2** Alarm related to processing of CPU (SY)

No.	Alarm content
	Message
SY001	Watchdog activated during previous operation Watch dog time out
SY100	Please the power turned off Power off alarm
SY200	Nothing can be written in the EEPROM EEPROM writing error
SY201	Nothing can be read from the EEPROM EEPROM reading error
SY202	Parameter read from the EEPROM is out of the range PRM range over(EEPROM)
SY203	Program management domain of the EEPROM is broken EEPROM program management area is broken
SY204	EEPROM data checksum error EEPROM program data checksum error
SY210	File system error File system error
SY211	Firmware update error Firmware update error
SY300	Ether communication with servo amplifier cannot be performed Ether communication with the servo amplifier is impossible

**D1-3-3** Alarm related to clamp operation and restrictions of movable range (RT)

No.	Alarm content
	Message
RT200	Clamp abnormality Clamp failure occurred
RT201	Unclamp abnormality Unclamp failure occurred
RT210	Over travel + Over travel +
RT211	Over travel - Over travel -
RT220	Software limit + Software limit +
RT221	Software limit - Software limit -

**D1-3-4** Alarm related to operation by user (OP)

No.	Alarm content
	Message
OP000	Parameter range over
	Parameter range over
OP001	Unmodifiable parameters
	Parameter read only
OP011	The set angle of pitch error compensation is smaller than the minimum interval
	Pitch error setting error
OP020	The program capacity reached the upper limit
	The program capacity reached the upper limit
OP021	The total number of files reached the upper limit
	The number of files reached the upper limit
OP022	The total number of programs reached the upper limit
	The number of programs reached the upper limit
OP023	The total number of blocks reached the upper limit
	The number of blocks reached the upper limit
OP040	The file number to be edited is duplicate
	File number is duplicate
OP041	The program number to be edited is duplicate
	Program number is duplicate
OP050	The searched parameter number is not found
	The parameter number is not found
OP051	The searched file number is not found
	The file number is not found
OP052	The searched program number is not found
	The program number is not found
OP060	Panel START was executed with panel START operation disabled
	Panel START cannot be executed
OP070	MMC is not recognizable
	MMC is not recognizable
OP071	MMC was recognized
	MMC was inserted
OP072	MMC was removed
	MMC was removed
OP073	MMC cannot be written on because it is write protected
	MMC cannot be written on
OP074	MMC was removed during MMC data reading or writing
	MMC was removed during data reading/writing
OP075	Program imported from MMC is invalid
	The program is incorrect imported from MMC
OP076	Parameter imported from MMC is invalid
	The parameter is incorrect imported from MMC
OP080	The operation cannot be executed
	The operation cannot be executed
OP081	External mode selection signal is input
	External mode selection signal is input
OP100	EXT START cannot be executed
	EXT START cannot be executed
OP101	Auto mode is not selected
	AUTO mode is not selected
OP200	Firmware update key error
	Firmware update key error
OP210	M code is not set
	M code is not set

**D1-3-5** Alarm related to syntax of program (PG)

No.	Alarm content Message
PG000	There is something wrong in format without G The format without G is incorrect
PG001	There is something wrong in G04 format The format G04 is incorrect
PG002	There is something wrong in G07 format The format G07 is incorrect
PG007	There is something wrong in G21 format The format G21 is incorrect
PG008	There is something wrong in G22 format The format G22 is incorrect
PG009	There is something wrong in G23 format The format G23 is incorrect
PG010	There is something wrong in G24 format The format G24 is incorrect
PG011	There is something wrong in G90 format The format G90 is incorrect
PG012	There is something wrong in G91 format The format G91 is incorrect
PG013	There is something wrong in G92 format The format G92 is incorrect
PG014	There is something wrong in M98 format The format M98 is incorrect
PG020	The set value of G address is out of range The value entered in G address is out of range
PG023	A address input value is out of range The value entered in A address is out of range
PG024	B address input value is out of range The value entered in B address is out of range
PG027	C address input value is out of range The value entered in C address is out of range
PG028	M address input value is out of range The value entered in M address is out of range
PG200	Rev speed is not set during the program Speed is not set
PG201	Divid command value is incorrect Equal divide angle is smaller than the minimum command
PG202	Absolute command angle is out of range Angle error in ABS
PG210	The program end command (M30) is not specified in the last block of the program Program end (M30) command is not specified
PG211	Subprogram end (M99) is not commanded Subprogram end (M99) command is not specified
PG220	The number of subprogram calls exceeded the limit The number of subprogram calls reached the upper limit
PG221	The subprogram number called by M98 is not found The called subprogram is not found
PG222	The externally called program number is not found The externally called program is not found
PG230	An address unavailable in the program was detected An unavailable address was detected
PG231	B-axis angle command cannot be specified B-axis angle command cannot be specified
PG240	G22 command cannot be specified in G08 continuous buffer G22 command was specified when G08 was being executed

**D1-3-6** Alarm related to exchange of signal with machine (IF)

No.	Alarm content Message
IF100	START condition error (input signal) START condition error (input signal)
IF200	Detects START signal abnormal ON START signal output error
IF201	START signal timeout START signal timeout
IF202	START signal was turned OFF during execution of a program Detects the open of START signal
IF210	PRG SET signal turned ON while PRG FIN signal was output PRG SET signal output error
IF211	PRG SET signal timeout PRG SET signal timeout
IF212	PRG CLEAR signal turned ON while PRG FIN signal was output PRG 0 CLEAR signal output error
IF213	PRG CLEAR signal timeout PRG 0 CLEAR signal timeout
IF214	PRG SEL+1 signal turned ON while PRG FIN signal was output PRG SEL +1 signal output error
IF215	PRG SEL+1 signal timeout PRG SEL +1 signal timeout
IF216	PRG SEL-1 signal turned ON while PRG FIN signal was output PRG SEL -1 signal output error
IF217	PRG SEL-1 signal timeout PRG SEL -1 signal timeout
IF218	PRG SEL+10 signal turned ON while PRG FIN signal was output PRG SEL +10 signal output error
IF219	PRG SEL+10 signal timeout PRG SEL +10 signal timeout
IF220	PRG SEL-10 signal turned ON while PRG FIN signal was output PRG SEL -10 signal output error
IF221	PRG SEL-10 signal timeout PRG SEL -10 signal timeout
IF222	PRG SEL signal(M code) of multiple is ON Multiple PRG SEL (M code) signals were turned ON
IF230	M92 FIN signal timeout M92 FIN signal timeout
IF231	M93 FIN signal timeout M93 FIN signal timeout
IF232	M94 FIN signal timeout M94 FIN signal timeout
IF233	M95 FIN signal timeout M95 FIN signal timeout
IF234	M96 FIN signal timeout M96 FIN signal timeout
IF235	M97 FIN signal timeout M97 FIN signal timeout
IF240	External mode selection is abnormal External mode selection is abnormal

**D1-3-7** Relevant to serial communication, Remote control (EX)

No.	Alarm content
	Message
EX100	Transmission code does not match
	Transmission code does not match
EX200	Communication start signal of RS232C is not transmitted
	RS232C Communication start signal is not transmitted
EX201	RS232C Communication time out
	RS232C Communication timeout
EX202	RS232C The numer of characters transmitted has reached upper limit
	RS232C The number of transmitted characters reached the upper limit
EX203	RS232C Flow control time out
	RS232C Flow control timeout
EX204	RS232C framing error
	RS232C Framing alarm
EX205	RS232C Parity error
	RS232C Parity alarm
EX206	RS232C CRC check error
	RS232C CRC Check error
EX220	The "STT" command was received during program execution
	STT command program is running
EX221	The command which cannot be used was transmitted
	An unavailable command
EX222	Program is established
	Program is established
EX223	Program reception finished
	Program received
EX300	MOP communication not established yet
	MOP communication not established yet

**D1-3-8** Alarm related to maintenance (MT)

No.	Alarm content
	Message
MT000	Battery voltage is less than the specified value when the power is turned on
	Battery voltage is low
MT001	Time is not set when the power is turned on
	The calendar and time are not set
MT002	Input to the touch sheet was detected when the power is turned on
	Input to the touch sheet was detected at start-up

**D1-3-9** Alarm related to servo (SV)

No.	Alarm content	Stop operation
	Message	
SV030	Internal overflow occurred	—
	Internal overflow occurred	
SV200	Positioning wait timeout	—
	Waiting pos error	
SV210	Extant interlock	—
	Interlock is active	
SV220	Machine origin position setting request	—
	Machine zero point position setting request	
SV230	Encoder resolution setting error	—
	Encoder resolution setting error	
SV300	Received invalid frame successively at Port 0	SB
	Port 0 Rx invalid frame error	
SV301	Received invalid frame successively at Port 1	SB
	Port 1 Rx invalid frame error	



No.	Alarm content Message	Stop operation
SV302	Port 0 Successive Rx error Port 0 CRC error	SB
SV303	Port 1 Successive Rx error Port 1 CRC error	SB
SV304	Port 0 Successive Tx error Port 0 Tx error	SB
SV305	Port 1 Successive Tx error Port 1 Tx error	SB
SV306	Port 0 lostlink Port 0 lostlink	SB
SV307	Port 1 lostlink Port 1 lostlink	SB
SV308	Communication time-out Communication time-out	SB
SV309	Position synchronization communication error timeout Location synchronization communication fault timeout	SB
SV310	Over current of drive module Main circuit power device error	DB
SV311	Abnormality of electric current detection value Current detection error 0	DB
SV312	Abnormality of Electric current detection 1 Current detection error 1	DB
SV313	Abnormality of Electric current detection 2 Current detection error 2	DB
SV314	Safe torque (force) off error 1 Safe torque (force) off error 1	SB
SV315	Safe torque (force) off error 2 Safe torque (force) off error 2	SB
SV316	Over load 1 Over load 1	SB
SV317	Over load 2 Over load 2	DB
SV318	Regenerative overload Regenerative overload	DB
SV319	Magnetic pole position detection error Magnetic pole position detection error	—
SV320	Over speed in average rotational speed Average continuous over speed	SB
SV321	Servo amplifier temperature error Servo amplifier temperature error	SB
SV322	Detection of in-rush prevention resistance overheating Rs overheat	SB
SV324	Internal regenerative resistor overheat Internal regenerative resistor overheat	DB
SV325	External error External error	SB
SV326	Main circuit power device overheat Main circuit power device overheat	DB
SV327	Over voltage Over voltage	DB
SV328	Main circuit under-voltage Main circuit under-voltage	DB
SV329	Main power supply fail phase Main power supply fail phase	SB
SV330	Control power supply under-voltage Control power supply under-voltage	DB

No.	Alarm content Message	Stop operation
SV331	Control power supply under-voltage 1 Control power supply under-voltage 1	SB
SV332	Control power supply under-voltage 2 Control power supply under-voltage 2	DB
SV340	Encoder connector 1 disconnection Encoder connector 1 disconnection	DB
SV341	Encoder connector 2 disconnection Encoder connector 2 disconnection	DB
SV342	Serial encoder communication error Serial encoder communication error	DB
SV343	Initial processing abnormality of Absolute encoder Encoder initial process error	—
SV350	Serial encoder internal error 0 Encoder error 0	DB
SV351	Serial encoder internal error 1 Encoder error 1	DB
SV352	Serial encoder internal error 2 Encoder error 2	DB
SV353	Serial encoder internal error 3 Encoder error 3	DB
SV354	Serial encoder internal error 4 Encoder error 4	DB
SV355	Serial encoder internal error 5 Encoder error 5	DB
SV356	Serial encoder internal error 6 Encoder error 6	DB
SV357	Serial encoder internal error 9 Encoder error 9	DB
SV358	Serial encoder internal error 10 Encoder error 10	DB
SV359	Serial encoder internal error 11 Encoder error 11	DB
SV360	Serial encoder internal error 12 Encoder error 12	DB
SV361	Serial encoder internal error 13 Encoder error 13	DB
SV370	Over speed Over speed	DB
SV371	Velocity control error Velocity control error	DB
SV372	Velocity feedback error Velocity feedback error	DB
SV374	Excessive location deviation during movement Error excessive (moving)	DB
SV375	Excessive location deviation during stop Error excessive (stopped)	DB
SV376	Position command error 1 Position command error 1	SB
SV377	Position command error 2 Position command error 2	SB
SV378	Excessive position synchronization deviation Excessive location synchronization deviation	DB
SV379	Parameter change completion Parameter change completion	—
SV382	EEPROM check sum error EEPROM check sum error	—
SV383	Memory error 1 Memory error 1	—

No.	Alarm content Message	Stop operation
■ SV384	Memory error 2 Memory error 2	—
■ SV385	System parameter error 1 System parameter error 1	—
■ SV386	System parameter error 2 System parameter error 2	—
■ SV387	Motor parameter error Motor parameter error	—
■ SV388	Cpu circumference circuit error Cpu circumference circuit error	—
■ SV389	System code error System code error	—
■ SV390	Motor code setting error Motor code setting error	—
■ SV391	Sensor code setting error Sensor code setting error	—
■ SV392	Motor parameter automatic setting error 1 Auto setting error 1	—
■ SV393	Motor parameter automatic setting error 2 Auto setting error 2	—
■ SV394	Task process error Task process error	DB
■ SV395	Initial process timeout Initial time out	—
SV500	Dynamic brake resistance overheat Dynamic brake resistance overheat	SB

## 【Notes】

The alarm which has a notation of ■ in the number column needs power supply interception for alarm release.

Explanation of the stop operation written on SV alarm is shown below.

SB : Carry out the slowdown stop of the servo motor with a sequence current limiting value.

DB : Carry out the slowdown stop of the servo motor in alarm developmental time dynamic brake operation.

**D1-4** Alarm details**D1-4-1** Emergency stop state (EM)

EM400	Emergency stop input is checked Emergency stop
-------	---

- [Cause]**
- Emergency stop button on the panel is pushed.
  - The contact point of the emergency stop button is broken.
  - The emergency stop cable in the controller is broken.
  - DC24V power supply is faulty.
  - External input signal is shorted to ground, power supply is in alarm state

- [Countermeasure]**
- Check the safety around the area and release the emergency stop. Turn the emergency stop button clockwise to release it..
  - Replace the emergency stop button.
  - Replace the cable.
  - Replace the DC24V power supply(AVR).
  - Check the DC24V circuit for short-circuit.

EM401	Emergency stop is inputted from outside Ext emergency stop
-------	---

- [Cause]**
- Emergency stop (\*EMG1 IN or \*EMG2 IN) is not input from the outside.
  - CB3Q cable is broken.
  - The contact point for the external output on the other machine is opened.

- [Countermeasure]**
- Confirm that there is danger in periphery and cancel the external emergency stop.
  - When CB3Q cable is disconnected, replace the CB3Q wiring.
  - If there is an external output contact point on the opposite machine side, contact the machine manufacturer.

EM402	Emergency stop is inputted from outside Emergency stop circuit error was detected
-------	--

- [Cause]**
- Short-circuit of emergency stop circuit is detected.

- [Countermeasure]**
- Replace the emergency stop switch.
  - Improve the short-circuit state of the emergency stop circuit.

**D1-4-2** Alarm related to processing of CPU (SY)

SY001	Watchdog activated during previous operation Watch dog time out
-------	--

- [Cause]**
- A watch dog occurred at the previous operation, and occurrence flag is recorded in the EEPROM, thereby a watch dog alarm is generated.It is estimated to be caused by noise or thunder.

- [Countermeasure]**
- Cancel the popup window with the **[ENTER]** key.
  - If it frequently occurs, internal abnormality is estimated, therefore, it is necessary to replace the controller.

SY100	Please the power turned off Power off alarm
-------	--

- [Cause]**
- Changed the parameters that need to be power cycled.
  - Rewrite process of the firmware (FW、RECOVERY FW、Boot loader) version has been completed .

- [Countermeasure]**
- Turn on the power again.

SY200	Nothing can be written in the EEPROM EEPROM writing error
[Cause]	<ul style="list-style-type: none"> <li>The matching check of write-in data is mismatch.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Turn on the power again or reset operation.</li> </ul>
SY201	Nothing can be read from the EEPROM EEPROM reading error
[Cause]	<ul style="list-style-type: none"> <li>I2C communication error.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Turn on the power again or reset operation.</li> </ul>
SY202	Parameter read from the EEPROM is out of the range PRM range over(EEPROM)
[Cause]	<ul style="list-style-type: none"> <li>Parameters read from the EEPROM at the start-up is a value out of range.</li> <li>Different version upgrades of parameter data were performed at the time of firmware update.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Turn on the power again or reset operation.</li> <li>Initialize and re-set the parameter.</li> </ul>
SY203	Program management domain of the EEPROM is broken EEPROM program management area is broken
[Cause]	<ul style="list-style-type: none"> <li>Management area of program data read from the EEPROM to the start-up time is error.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Turn on the power again or reset operation.</li> <li>Please execute the program deleted in the maintenance screen.</li> </ul>
SY204	EEPROM data checksum error EEPROM program data checksum error
[Cause]	<ul style="list-style-type: none"> <li>Checksum of the data read from the EEPROM is abnormal.</li> <li>Check sum value of the data read from the EEPROM to the start-up time is abnormal.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Turn on the power again or reset operation.</li> </ul>
SY210	File system error File system error
[Cause]	<ul style="list-style-type: none"> <li>File access to SPI-FLASHROM failed.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Turn on the power again.</li> </ul>
SY211	Firmware update error Firmware update error
[Cause]	<ul style="list-style-type: none"> <li>Update of firmware failed.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Turn on the power again.</li> </ul>
SY300	Ether communication with servo amplifier cannot be performed. Ether communication with the servo amplifier is impossible
[Cause]	<ul style="list-style-type: none"> <li>LinkDown of servo amplifier communication is detected.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Connect a communication cable between the CPU board and amplifier.</li> <li>Replace the communication cable.</li> <li>Replace the servo amplifier.</li> </ul>

**D1-43** Alarm related to clamp operation and restrictions of movable range (RT)

RT200	Clamp abnormality Clamp failure occurred
-------	---

## 【Cause】

- PRM0012 (Clamp mechanism selection), PRM0401 (Clamp state signal function selection), clamp operation, BK.C signal and BK.UC signal are in the following state, a time longer than the time set with PRM0906 (Alarm confirmation time of clamp signal) passed.

PRM012 set value	PRM401 set value	Clamp operation	BK.C signal
1= With clamp mechanism	0= With BK.C signal, with BK.UC signal	Clamp	Lo
	2= With BK.C signal, without BK.UC signal	Clamp	Lo
	2= With BK.C signal, without BK.UC signal	Unclamp	Hi

- When unclamp transitioned to clamp, clamp confirmation signal does not change from Lo to Hi, or unclamp confirmation signal does not change from Hi to Lo although 5 seconds passed.

## 【Countermeasure】

- Confirm the clamp pressure.
- Confirm the solenoid valve wiring.
- Replace the pressure switch for clamp.
- Replace the CB1Q cable.

RT201	Unclamp abnormality Unclamp failure occurred
-------	---

## 【Cause】

- PRM0012 (Clamp mechanism selection), PRM0401 (Clamp state signal function selection), clamp operation, BK.C signal and BK.UC signal are in the following state, a time longer than the time set with PRM0905 (Alarm confirmation time of unclamp signal) passed.

PRM012 set value	PRM401 set value	Clamp operation	BK.UC signal
1= With clamp mechanism	0= With BK.C signal, with BK.UC signal	Unclamp	Lo
	1= Without BK.C signal, with BK.UC signal	Unclamp	Lo
	1= Without BK.C signal, with BK.UC signal	Clamp	Hi

- When clamp transitioned to unclamp, unclamp confirmation signal does not change from Lo to Hi, or clamp confirmation signal does not change from Hi to Lo although 5 seconds passed.

## 【Countermeasure】

- Confirm the clamp pressure.
- Confirm the solenoid valve wiring.
- Replace the pressure switch for clamp.
- Replace the CB1Q cable.

RT210	Over travel+ Over travel+
-------	------------------------------

RT211	Over travel- Over travel-
-------	------------------------------

## 【Cause】

In case of PRM1016=0 (A contact point), over-travel (OVRUNA2) became Hi.  
In case of PRM1016=1 (B contact point), over-travel (OVRUNA2) became Lo.  
An alarm occurs at a position where the machine is at the over-travel position

- Over-travel is detected.

If the alarm occurs even though the machine is not in the over travel position, the following causes may be considered.

- Over-travel detection switch is defective.
- Over-travel signal line is disconnected.
- Parameter setting mistake.

## 【Countermeasure】

- If overtravel is detected, release the over-travel according to the following procedure.
- Press the " O G key in evacuation direction", and move to a position where over-travel is not detected, then press "R ESET" to release the alarm.

When any alarm is detected, release the over-travel according to the following procedure when moving in a direction which cannot be evacuated.

- Press "O VR" to set "O T release mode." (The status becomes "O T R EL .")
- Press the "Moving direction key" to move to a position where over-travel is not detected, and press "R ESET" to release the alarm.
- At this time, if the "Moving direction key" is released even once, O T release mode is released.

- ④ Since movement can be performed even in a collision direction according to the "Moving direction key" in "O T release mode," pay close attention.
- Over-travel detection switch replacement.
  - A confirmation of wiring, and modify.
  - A confirmation of PRM1016, and to change.

RT220	Software limit + Software limit +
RT221	Software limit - Software limit -

- [Cause]**
- In case of PRM0600=1, reached the limit of software CW direction in manual operation.
  - In case of PRM0600=1, the instructions which reach the software limit of the CW direction in automatic operation were carried out.
  - Main board is broken.
- [Countermeasure]**
- Confirm the set value of PRM0600.
  - Confirm the set value of PRM0602. (At the time of RT220)
  - Confirm the set value of PRM0601. (At the time of RT221)
- [Note]**
- In case of 0.001 deg (PRM1006=0) unit of display, as 0.0001 digit control unit is not displayed, though it looks digits not exceeding software limit, there is a case of exceeding limit in controller.

#### D1-4-4 Alarm related to operation by user (OP)

OP000	Parameter range over Parameter range over
-------	--

- [Cause]**
- The preset value of the parameter exceeded the setting range.
- [Countermeasure]**
- The value in the setting range of a parameter is inputted.

OP001	Unmodifiable parameters Parameter read only
-------	--

- [Cause]**
- The cursor was set to unmodifiable parameters and the **[ENTER]** key was pressed.

OP011	The set angle of pitch error compensation is smaller than the minimum interval. Pitch error setting error.
-------	---

- [Cause]**
- It was detected at the power activation that Angle set distance at "PRM 2000 to 2127: Pitch Error Compensation Value" is smaller than  $\lceil (\text{Max. Speed of Servo motor}[\text{min}^{-1}] \times \text{Encoder resolution}[\text{pulse}] / 60[\text{s}]) / 8000 \times 1 \text{ Rotation Angle per Pulse}[\text{deg}] \rceil$ .
- [Countermeasure]**
- Input an appropriate value into a parameter.

OP020	The program capacity reached the upper limit The program capacity reached the upper limit
-------	--

- [Cause]**
- Blocks were attempted to be added with no free space in EEPROM program area.
- [Countermeasure]**
- Delete unnecessary programs to create free space.

OP021	The total number of files reached the upper limit The number of files reached the upper limit
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- [Cause]**
- File was copied while in a state that file total number is 1000.
- [Countermeasure]**
- Erase unnecessary files to ensure empty capacity.

OP022	The total number of programs reached the upper limit The number of programs reached the upper limit
[Cause]	<ul style="list-style-type: none"> <li>Program was copied while in a state that program total number is 999.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Erase unnecessary programs to ensure empty capacity.</li> </ul>
OP023	The total number of blocks reached the upper limit The number of blocks reached the upper limit
[Cause]	<ul style="list-style-type: none"> <li>New creation was performed although the block total was 2000 blocks.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Erase unnecessary block to ensure empty capacity.</li> </ul>
OP040	The file number to be edited is duplicate File number is duplicate
[Cause]	<ul style="list-style-type: none"> <li>The file number was attempted to be changed to an existing one.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Acquire unused file number.</li> </ul>
OP041	The program number to be edited is duplicate Program number is duplicate
[Cause]	<ul style="list-style-type: none"> <li>The program number was attempted to be changed to an existing one.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Acquire unused program number.</li> </ul>
OP050	The searched parameter number is not found The parameter number is not found
[Cause]	<ul style="list-style-type: none"> <li>Non-existing parameter number was searched.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirm the searched parameter number.</li> </ul>
OP051	The searched file number is not found The file number is not found
[Cause]	<ul style="list-style-type: none"> <li>Non-existing file number was searched.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirm the searched file number.</li> </ul>
OP052	The searched program number is not found The program number is not found
[Cause]	<ul style="list-style-type: none"> <li>Non-existing program number was searched.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirm the searched program number.</li> </ul>
OP060	Panel START was executed with panel START operation disabled Panel START cannot be executed
[Cause]	<ul style="list-style-type: none"> <li>START on the panel is pressed in a state that external START input is enabled.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Check the setting of "EXT.ST MODE" on the menu window.</li> </ul>
OP070	MMC is not recognizable MMC is not recognizable
[Cause]	<ul style="list-style-type: none"> <li>MMC cannot be recognized when it is selected.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Check that MMC is inserted correctly.</li> </ul>



OP071	MMC was recognized MMC was inserted
[Content]	<ul style="list-style-type: none"> <li>• MMC was inserted and normally recognized.</li> </ul>
OP072	MMC was removed MMC was removed
[Content]	<ul style="list-style-type: none"> <li>• MMC was removed when data communication was not executed.</li> </ul>
OP073	MMC cannot be written on because it is write protected MMC cannot be written on
[Cause]	<ul style="list-style-type: none"> <li>• Data write command was specified with MMC write-protected.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>• Reset write protect of MMC.</li> </ul>
OP074	MMC was removed during MMC data reading or writing MMC was removed during data reading/writing
[Cause]	<ul style="list-style-type: none"> <li>• MMC was removed during reading of data or writing.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>• Do not remove MMC during reading of data or writing.</li> </ul>
OP075	Program imported from MMC is invalid The program is incorrect imported from MMC
[Cause]	<ul style="list-style-type: none"> <li>• In case of PRG IMPORT, this alarm occurs when any abnormality in the format of the file to be imported is detected.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>• Confirm the program format of the import data and modify.</li> </ul>
OP076	Parameter imported from MMC is invalid The parameter is incorrect imported from MMC
[Cause]	<ul style="list-style-type: none"> <li>• The abnormalities in a file format at the time of a parameter input were detected.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>• Check and correct the parameter format to import.</li> </ul>
OP080	The operation cannot be executed The operation cannot be executed
[Cause]	<ul style="list-style-type: none"> <li>• During origin return operation of MANUAL mode, I detected the operation of the "JOG Feed" and "STEP Feed", "Origin return (at the time of the numeric keys 1, 3, 4, 6 pressed)".</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>• Please operate after the origin return movement.</li> </ul>
OP081	External mode selection signal is input. External mode selection signal is input.
[Cause]	<ul style="list-style-type: none"> <li>• The mode selection tab was selected from the operation panel while the mode selection signal was input.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>• Set the mode select signal input to Lo.</li> </ul>
OP100	EXT START cannot be executed EXT START cannot be executed
[Cause]	<ul style="list-style-type: none"> <li>• External START signal was turned on by the machine side with external START input invalid.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>• Check the setting of "EXT.ST MODE" on the menu window. See "B3-2-5-1 START Control Function".</li> </ul>

OP101	Auto mode is not selected AUTO mode is not selected
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- [Cause]                   • Program start was performed in the status that AUTO mode is not selected.
- [Countermeasure]       • Change the mode to AUTO mode.

OP200	Firmware update key error Firmware update key error
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- [Cause]                   • Input was performed with the improper firmware update key.
- [Countermeasure]       • Re-enter.

OP210	M code is not set M code is not set
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- [Cause]                   • Parameter settings are not in the general-purpose input and output.
- [Countermeasure]       • Confirm the set value of PRM1100 to 1111.

#### **D1-45** Alarm related to syntax of program (PG)

PG000	There is something wrong in format without G The format without G is incorrect
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- [Cause]                   • Required address is not set on format without G.
- [Countermeasure]       • Modify after confirming the program.

PG001	There is something wrong in G04 format The format G04 is incorrect
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- [Cause]                   • Required address (A) is not set for G04 format.
- [Countermeasure]       • Modify after confirming the program.

PG002	There is something wrong in G07 format The format G07 is incorrect
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- [Cause]                   • Address which can be used for G07 format is set.
- [Countermeasure]       • Modify after confirming the program.

PG007	There is something wrong in G21 format The format G21 is incorrect
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- [Cause]                   • Required address (A) or (B) is not set for G21 format.
- [Countermeasure]       • Modify after confirming the program.

PG008	There is something wrong in G22 format The format G22 is incorrect
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- [Cause]                   • Required address (A) or (B) is not set for G22 format.
- [Countermeasure]       • Modify after confirming the program.

PG009	There is something wrong in G23 format The format G23 is incorrect
[Cause]	<ul style="list-style-type: none"> <li>The address required for G23 format is not set up.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG010	There is something wrong in G24 format The format G24 is incorrect
[Cause]	<ul style="list-style-type: none"> <li>The address required for G24 format is not set up.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG011	There is something wrong in G90 format The format G90 is incorrect
PG012	There is something wrong in G91 format The format G91 is incorrect
[Cause]	<ul style="list-style-type: none"> <li>Division (D) is set up although there is no angle setup.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG013	There is something wrong in G92 format The format G92 is incorrect
[Cause]	<ul style="list-style-type: none"> <li>The address required for G92 format is not set up.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG014	There is something wrong in M98 format The format M98 is incorrect
[Cause]	<ul style="list-style-type: none"> <li>Required address is not set for M98 format.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG020	The set value of G address is out of range The value entered in G address is out of range
[Cause]	<ul style="list-style-type: none"> <li>A value other than the available values (4, 7, 8, 9, 10, 11, 21, 22, 23, 24, 90, 91, and 92) is entered in G address.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG023	A address input value is out of range The value entered in A address is out of range
[Cause]	<ul style="list-style-type: none"> <li>Setting out of the input range was performed for A address.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG024	B address input value is out of range The value entered in B address is out of range
[Cause]	<ul style="list-style-type: none"> <li>Setting out of the input range was performed for B address.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>

PG027	C address input value is out of range The value entered in C address is out of range
[Cause]	<ul style="list-style-type: none"> <li>Setting out of the input range was performed for C address.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG028	M address input value is out of range The value entered in M address is out of range
[Cause]	<ul style="list-style-type: none"> <li>A value other than the available values (30, 80 to 99) was set to M address.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG200	Rev. speed is not set during the program Speed is not set
[Cause]	<ul style="list-style-type: none"> <li>Rev. speed is not commanded to the address F when the program is executed.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG201	Divid command value is incorrect Equal divide angle is smaller than the minimum command
[Cause]	<ul style="list-style-type: none"> <li>Processed angular value of divide command becomes 0.0001° or less.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Command angular/divide &lt; 0.0001°.</li> </ul>
PG202	Absolute command angle is out of range Angle error in ABS
[Cause]	<ul style="list-style-type: none"> <li>Angle more than 360 was commanded with absolute (G90) command.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Don't perform 360 or more angle setup to the block which carried out absolute instructions.</li> </ul>
PG210	The program end command (M30) is not specified in the last block of the program Program end (M30) command is not specified
[Cause]	<ul style="list-style-type: none"> <li>Completion command (M30) is not specified in the last block of the program.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Set M30 to the final block of the program.</li> </ul>
PG211	Subprogram end (M99) is not commanded Subprogram end (M99) command is not specified
[Cause]	<ul style="list-style-type: none"> <li>Subprogram finish command (M99) is not commanded in the final block of the subprogram.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Set M99 to the final block of the subprogram.</li> </ul>
PG220	The number of subprogram calls exceeded the limit The number of subprogram calls reached the upper limit
[Cause]	<ul style="list-style-type: none"> <li>Nesting exceeds 10 while repeating M98.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG221	The subprogram number called by M98 is not found The called subprogram is not found
[Cause]	<ul style="list-style-type: none"> <li>A non-existent sub program is attempted to be called.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Specify the P number "M98 P****" to the existing subprogram number.</li> </ul>

PG222	The externally called program number is not found The externally called program is not found
[Cause]	<ul style="list-style-type: none"> <li>Executed call-out of a non-existent program.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG230	An address unavailable in the program was detected An unavailable address was detected
[Cause]	<ul style="list-style-type: none"> <li>An address not to be used is included in the machining program imported from MMC.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>
PG231	B-axis angle command cannot be specified B-axis angle command cannot be specified
[Cause]	<ul style="list-style-type: none"> <li>Angle command for 2 axes specification (B address) was specified to the controller of 1 axis specification.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirm the program imported from the MMC, and modify it.</li> </ul>
PG240	G22 command cannot be specified in G08, G09 continuous buffer G22 command was specified when G08 was being executed
[Cause]	<ul style="list-style-type: none"> <li>A block in which G22 command was specified was executed when G08 was being executed.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Modify after confirming the program.</li> </ul>

#### **D1-4-6** Alarm related to exchange of signal with machine side (IF)

IF100	START condition error (input signal) START condition error (input signal)
[Cause]	<ul style="list-style-type: none"> <li>When the external STOP signal was Lo in a auto mode, a START signal was input(Hi).</li> <li>When the external RESET signal was Hi in a auto mode, a START signal was input(Hi).</li> <li>When the external PRG SET signal was Hi in a auto mode, a START signal was input(Hi).</li> <li>When the program received and the external STOP signal was Lo in a remote control mode, a "STT" command or a external START signal was input(Hi).</li> <li>When the program received and the external RESET signal was Hi in a remote control mode, a "STT" command or a external START signal was input(Hi).</li> <li>When the program received and the external PRG SET signal was Hi in a remote control mode, a "STT" command or a external START signal was input(Hi).</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>The machine side sequence checks and corrects.</li> <li>Repair the machine side output part.</li> <li>Connect CB3Q cable definitely. Or replace the CB3Q cable.</li> </ul>
IF200	Detects START signal abnormal ON The START signal output error
[Cause]	<ul style="list-style-type: none"> <li>START signal was turned ON again while BLKFIN was being input.</li> <li>START signal ON (startup) was detected while the rotary table was operating (during RUN).</li> <li>During the program transfer in the remote control specification, the START signal became Hi and PRM 0925 was executed but Lo of the START signal was detected during the timer count.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirm short-circuit of START signal on CBQ3 cable and modify.</li> <li>Replace the CB3Q cable.</li> <li>Repair the machine side output part.</li> </ul>

IF201	START signal timeout START signal timeout
[Cause]	<ul style="list-style-type: none"> <li>In case of PRM1003 (BLKFIN timer)=0, START signal does not turn OFF even if the time set in PRM0907 (BLKFIN timeout detecting time) passed from a time when BLKFIN signal turned ON.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirm the set value of PRM0907 and modify.</li> <li>Replace the CB3Q cable.</li> <li>Replace the I/O board.</li> <li>The machine side sequence checks and corrects.</li> </ul>
IF202	START signal was turned OFF during execution of a program Detects the open of START signal
[Cause]	<ul style="list-style-type: none"> <li>In case of PRM1003 (BLKFIN timer)=0, START signal was continuously turned OFF for the time set in PRM0908 (START signal OFF detecting time) or longer before BLKFIN signal was turned ON.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirm the set value of PRM0908 and modify.</li> <li>Replace the CB3Q cable.</li> <li>Replace the I/O board.</li> <li>The machine side sequence checks and corrects.</li> </ul>
IF210	PRG SET signal turned ON while PRG FIN signal was output PRG SET signal output error
IF211	PRG SET signal timeout PRG SET signal timeout
[Cause]	<ul style="list-style-type: none"> <li>It was detected that PRG SET signal was ON (startup) while PRG FIN signal was ON after program change was finished.</li> <li>It was detected that PRG SET signal was ON, and PRG FIN signal was ON after program change was finished, however, PRG SET signal does not turn OFF even if the time set in PRM0909 (PRG SET timeout detecting time) passed.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirm the set value of PRM0909 and modify.</li> <li>The machine side sequence checks and corrects.</li> <li>Replace the CB3Q cable.</li> <li>Repair the machine side output part.</li> </ul>
IF212	PRG CLEAR signal turned ON while PRG FIN signal was output PRG CLEAR signal output error
IF213	PRG CLEAR signal timeout PRG CLEAR signal timeout
[Cause]	<ul style="list-style-type: none"> <li>It was detected that PRG CLEAR signal was ON (startup) while PRG FIN signal was ON after program change was finished.</li> <li>It was detected that PRG CLEAR signal was ON, and PRG FIN signal was ON after program change was finished, however, PRG CLEAR signal does not turn OFF even if the time set in PRM0910 (PRG CLEAR timeout detecting time) passed.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirm the set value of PRM0910 and modify.</li> <li>Replace the CB3Q cable.</li> <li>Replace the I/O board.</li> <li>The machine side sequence checks and corrects.</li> </ul>
IF214	PRG SEL +1 signal turned ON while PRG FIN signal was output PRG SEL +1 signal output error
IF215	PRG SEL +1 signal timeout PRG SEL +1 signal timeout

- [Cause]
- It was detected that PRG SEL +1 signal was ON (startup) while PRG FIN signal was ON after program change was finished.
  - It was detected that PRG SEL +1 signal was ON, and PRG FIN signal was ON after program change was finished, however, PRG SEL +1 signal does not turn OFF even if the time set in PRM0911(PRG SEL +1 timeout detecting time) passed.
- [Countermeasure]
- Confirm the set value of PRM0911 and modify.
  - Replace the CB3Q cable.
  - Replace the I/O board.
  - The machine side sequence checks and corrects.

IF216	PRG SEL -1 signal turned ON while PRG FIN signal was output PRG SEL -1 signal output error
IF217	PRG SEL -1 signal timeout PRG SEL -1 signal timeout

- [Cause]
- It was detected that PRG SEL -1 signal was ON (startup) while PRG FIN signal was ON after program change was finished.
  - It was detected that PRG SEL -1 signal was ON, and PRG FIN signal was ON after program change was finished, however, PRG SEL-1 signal does not turn OFF even if the time set in PRM0912(PRG SEL -1 timeout detecting time) passed.
- [Countermeasure]
- Confirm the set value of PRM0912 and modify.
  - Replace the CB3Q cable.
  - Replace the I/O board.
  - The machine side sequence checks and corrects.

IF218	PRG SEL +10 signal turned ON while PRG FIN signal was output PRG SEL +10 signal output error
IF219	PRG SEL +10 signal timeout PRG SEL +10 signal timeout

- [Cause]
- It was detected that PRG SEL +10 signal was ON (startup) while PRG FIN signal was ON after program change was finished.
  - It was detected that PRG SEL +10 signal was ON, and PRG FIN signal was ON after program change was finished, however, PRG SEL +10 signal does not turn OFF even if the time set in PRM0913(PREL +10 timeout detecting time) passed.
- [Countermeasure]
- Confirm the set value of PRM0913 and modify.
  - Replace the CB3Q cable.
  - Replace the I/O board.
  - The machine side sequence checks and corrects.

IF220	PRG SEL -10 signal turned ON while PRG FIN signal was output PRG SEL -10 signal output error
IF221	PRG SEL -10 signal timeout PRG SEL -10 signal timeout

- [Cause]
- It was detected that PRG SEL -10 signal was ON (startup) while PRG FIN signal was ON after program change was finished.
  - It was detected that PRG SEL -10 signal was ON, and PRG FIN signal was ON after program change was finished, however, PRG SEL -10 signal does not turn OFF even if the time set in PRM0914(PRG SEL -10 timeout detecting time) passed.
- [Countermeasure]
- Confirm the set value of PRM0914 and modify.
  - Replace the CB3Q cable.
  - Replace the I/O board.
  - The machine side sequence checks and corrects.

IF222	PRG SEL signal (M code) of multiple is ON Multiple PRG SEL (M code) signals were turned ON
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- 【Cause】
- Failure of an I/O board.
  - The malfunction of the machine side sequence.
- 【Countermeasure】
- Replace the I/O board.
  - The machine side sequence checks and corrects.

IF230	M92 FIN signal timeout M92 FIN signal timeout
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IF231	M93 FIN signal timeout M93 FIN signal timeout
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IF232	M94 FIN signal timeout M94 FIN signal timeout
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IF233	M95 FIN signal timeout M95 FIN signal timeout
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IF234	M96 FIN signal timeout M96 FIN signal timeout
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IF235	M97 FIN signal timeout M97 FIN signal timeout
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- 【Cause】
- Even when M output of MFIN type was turned ON and the time set by the parameters passed, MFIN signal does not turn ON.
- 【Countermeasure】
- Confirming the setting of parameters(Over-timer detection time), and to fix.
  - Replace the CB3Q cable.
  - Replace the I/O board.
  - The machine side sequence checks and corrects.

IF240	External mode selection is abnormal External mode selection is abnormal
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- 【Cause】
- A mode selection signal was input when the mode selection enable signal was Lo.
  - Two or more mode selection inputs are Hi at the same time.
- 【Countermeasure】
- The machine side sequence checks and corrects.
  - Replace the CB3Q cable.
  - Replace the I/O board.

### **D1-4-7** Relevant to serial communication, Remote control (EX)

EX100	Transmission code does not match Transmission code does not match
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- 【Cause】
- After the transmission code ISO was determined, the number of bits in the code became an odd number.
  - After the transmission code EIA was determined, the number of bits in the code became an even number.
- 【Countermeasure】
- Improve the noise source.
  - Improve noise resistance of the communication cable.

EX200	Communication start signal of RS232C is not transmitted RS232C start signal is not send
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- 【Cause】
- The data missing 「DC2」 in the head of transmission code was received from HOST.
- 【Countermeasure】
- Confirmation and correction for data of transmission source.



EX201	RS232C Communication timeout RS232C Communication timeout
【Cause】	<ul style="list-style-type: none"> <li>Start code 「//」 was received from HOST, a line feed code was unable to be received even if the set period of PRM923 passed.</li> <li>Start code 「DC2」 was received from HOST, a completion code 「DC4」 was unable to be received even if the set period of PRM923 passed.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Confirmation and correction for data of transmission source.</li> <li>Confirm communication cable connection.</li> <li>Noise resistance treatment of the communication cable.</li> </ul>
EX202	The numer of characters transmitted by RS232C has reached upper limit RS232C characters upper limit.
【Cause】	<ul style="list-style-type: none"> <li>When received communication message transmitted after output of 「//」 exceeded 256 characters.</li> <li>When received communication message transmitted after output of 「DC2」 exceeded 256 characters.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Confirmation and correction for data of transmission source.</li> </ul>
EX203	RS232C Flow control timeout RS232C Flow control timeout
【Cause】	<ul style="list-style-type: none"> <li>Although the controller sent a Request-to-Send (RS) signal after an instruction command or program reception from the host, even if a time set up by PRM924 (RS232C flow control timeout detection time) elapsed, the permission of data transmission (DC1) from the host is not transmitted.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Confirmation and correction for data of transmission source.</li> </ul>
EX204	RS232C framing error RS232C Framing alarm
【Cause】	<ul style="list-style-type: none"> <li>A transfer speed between HOST and controller does not accord.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Adjust parameter setting between transmission source and controller.</li> </ul>
EX205	RS232C Parity error RS232C Parity alarm
【Cause】	<ul style="list-style-type: none"> <li>The data parity bit transmitted from HOST does not accord with the controller.</li> <li>Defect of communication cable.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Make matching communication protocol between transmission source and controller.</li> <li>Replacement of communication cable.</li> </ul>
EX206	RS232C CRC check error RS232C CRC check error
【Cause】	<ul style="list-style-type: none"> <li>The cRC check result of the data transmitted by the host and the cRC check result after the data reception by a controller are not in agreement.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Replacement of communication cable.</li> </ul>
EX220	The "STT" command was received during program execution STT command program is running
【Cause】	<ul style="list-style-type: none"> <li>The "STT" command was received during program execution. (Only on OKUMA instruction command specification)</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Confirmation and correction of the data of a transmitting source.</li> </ul>

EX221	The command which cannot be used was transmitted An unavailable command
[Cause]	<ul style="list-style-type: none"> <li>The command which is not used for remote control from a host was transmitted. (Only on OKUMA specification)</li> <li>The "STT" command was received during program execution. (Only on OKUMA instruction command specification)</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirmation and correction of the data of a transmitting source.</li> </ul>
EX222	Program is established Program is established
[Cause]	<ul style="list-style-type: none"> <li>The program start code [/] is not indicated in the data transmitted by the host.</li> <li>The program completion code [/] is not indicated in the data transmitted by the host.</li> <li>The machining program is not indicated in the data transmitted by the host.</li> <li>Characters that can not be used in the machining program are indicated in the data transmitted by the host.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Confirmation and correction of the data of a transmitting source.</li> </ul>
EX223	Program reception finished Program received
[Cause]	<ul style="list-style-type: none"> <li>There was program transmission from a host in the state where the program has already been received.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>The check of the sequence of a transmission source of operation.</li> </ul>
EX300	MOP communication not established yet MOP communication not established yet
[Cause]	<ul style="list-style-type: none"> <li>MOP cable is disconnected.</li> <li>Connection failure (the back of Quinte or circuit board in MOP)</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>MOP cable replacement.</li> <li>Reconnect to the connector (the back of Quinte or circuit board in MOP)</li> </ul>
<b>D1-4-8 Alarm related to maintenance (MT)</b>	
MT000	Battery voltage is less than the specified value when the power is turned on Battery voltage is low
[Cause]	<ul style="list-style-type: none"> <li>Battery voltage is 3.27V or lower.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Battery replacement is necessary. Contact our service center.</li> </ul>
MT001	Time is not set when the power is turned on The calendar and time are not set
[Cause]	<ul style="list-style-type: none"> <li>The calendar and time are not set.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Set the calendar and time.</li> <li>Battery replacement is necessary. Contact our service center.</li> </ul>
MT002	Input to the touch sheet was detected when the power is turned on Input to the touch sheet was detected at start-up
[Cause]	<ul style="list-style-type: none"> <li>The touch sheet is pressed down when the power is turned on.</li> </ul>
[Countermeasure]	<ul style="list-style-type: none"> <li>Do not contact the touch sheet when turning the power on.</li> <li>When there has been no contact with a human body or components, it is necessary to replace the components. Contact our service center.</li> </ul>

**D1-4-9** Alarm related to servo (SV)

SV030	Internal overflow occurred Internal overflow occurred
【Cause】	<ul style="list-style-type: none"> <li>The internally calculated values at the time of input of the parameters (gear ratio, sensor division number, rapid traverse speed) corresponded to the following. <ul style="list-style-type: none"> <li>Gear ratio(PRM0100) * The encoder division number &gt; 32bit (2147483647)</li> <li>Gear ratio(PRM0100) * The encoder division number * rapid traverse speed (PRM0200)/60 &gt; 32bit (2147483647)</li> </ul> </li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Check the specifications of the rotary table and set encoder code (PRM0003).</li> <li>Check the specifications of the rotary table and set gear ratio (PRM0100).</li> <li>Check the specifications of the rotary table and set rapid traverse speed (PRM0200).</li> </ul>
SV200	Positioning wait timeout Waiting pos error
【Cause】	<ul style="list-style-type: none"> <li>Even if the time set up by PRM0900 (waiting check set period for positioning) within imposition width at the time of a slowdown stop passes, speed does not stop.</li> <li>The completion conditions of positioning were satisfied and having separated from imposition width with the deviation check after the time of PRM9012 was checked.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Decrease the load on the machine.</li> <li>If the set value of PRM0900 (positioning wait check set time) is not proper, increase the set value.</li> <li>If the set value of PRM0105 (in-position width) is not proper, increase the set value.</li> </ul>
SV210	Extant interlock Interlock is active
【Cause】	<ul style="list-style-type: none"> <li>A signal of extant interlock (*EXT INT) was input from the machine side.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>It is turned ON the *EXT INT signal.</li> <li>Exchange, when a CB3Q cable is disconnection.</li> </ul>
SV220	Machine origin position setting request Machine zero point position setting request
【Cause】	<ul style="list-style-type: none"> <li>Setting of machine origin position is not established.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Connect a CB1Q cable and perform a machine origin position setup.</li> <li>Exchange batteries and perform a machine origin position setup.</li> </ul>
SV230	Encoder resolution setting error Encoder resolution setting error
【Cause】	<ul style="list-style-type: none"> <li>The internally calculated values at the time of input of the parameters (gear ratio, sensor division number, rapid traverse speed) corresponded to the following. <ul style="list-style-type: none"> <li>Gear ratio(PRM0100) * The encoder division number &gt; 32bit (2147483647)</li> <li>Gear ratio(PRM0100) * The encoder division number * rapid traverse speed (PRM0200)/60 &gt; 32bit (2147483647)</li> </ul> </li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>Check the specifications of the rotary table and use a motor with a suitable encoder.</li> <li>Check the specifications of the rotary table and set gear ratio (PRM0100).</li> <li>Check the specifications of the rotary table and set rapid traverse speed (PRM0200).</li> </ul>
SV300	Received invalid frame successively at Port 0 Port 0 Rx invalid frame error
SV301	Received invalid frame successively at Port 1 Port 1 Rx invalid frame error
SV302	Port 0 Successive Rx error Port 0 CRC error

SV303	Port 1 Successive Rx error Port 1 CRC error
SV304	Port 0 Successive Tx error Port 0 Tx error
SV305	Port 1 Successive Tx error Port 1 Tx error

**【Cause】**

Status at the time of alarm	Cause		
	1	2	3
The error occurred when the power was turned on.	✓	✓	✓
The error occurred during rotary table is running.	✓	✓	✓

- 1 ■ A servo amplifier communication error has occurred.
- 2 ■ Malfunction due to noise.
- 3 ■ Defective servo amplifier (control printed circuit board)

**【Countermeasure】**

- 1 ■ Check that there is no contact failure in the communication cable wiring.
- 2 ■ Confirm proper grounding of the amplifier
  - Check encoder cable shield.
  - Add a ferrite core etc., and implement a countermeasure for noise.
- 3 ■ Replace the servo amplifier.

SV306	Port 0 lostlink Port 0 lostlink
SV307	Port 1 lostlink Port 1 lostlink

**【Cause】**

Port 0/1 cable was disconnected or unplugged in servo-on state. Host power supply was shutdown.

- Communication error of the servo amplifier has occurred.

**【Countermeasure】**

- Check the wiring of motor encoder and servo amplifier, and correct the wiring if needed.
- Check the Ether cable of the servo amplifier is connected properly.
- Although it is a model other than QTC 200 / QTC 200 CS, PRM 9000 is "1" (2 axes specification).

SV308	Did not receive output data within regulatedcycle time Communication time-out
-------	--

**【Cause】**

Could not receive command within the prescribed time of the Communication Timeout value.

- Malfunction due to noise.

**【Countermeasure】**

- Confirm proper grounding of the amplifier.
- Check encoder cable shield.
- Add a ferrite core etc., and implement a countermeasure for noise.

SV309	Position synchronization communication error timeout Location synchronization communication fault timeout
-------	--

**【Cause】**

The port 0/1 cable is disconnected or removed in a servo-on state.

Status at the time of alarm	Cause	
	1	2
The error occurred while rotary table is stopped (servo-off).	✓	✓
The error occurred during rotary table is running.		✓

- 1 ■ Data transmission from synchronization target amplifier could not be received continuously for 4ms after position synchronization enable.
- 2 ■ Malfunction due to noise.

**【Countermeasure】**

- 1 ■ Check that the communication cable is connected between CN4 of the amplifiers to be synchronized.
  - Check and revise the cable wiring.
- 2 ■ Check that the earth wire of the servo amplifier is grounded correctly.
  - Check the shield treatment of the communication cable.
  - Add a ferrite core etc., and implement a countermeasure for noise.

SV310	Over current of drive module Main circuit power device error
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**[Cause]** Over current of drive module.  
Abnormality in drive power supply.  
Overheating of drive module.

Status at the time of alarm	Cause			
	1	2	3	4
The error occurred when the power was turned on.	✓		✓	✓
The error occurred when the servo is turned on (e.g. in MANUAL mode).	✓	✓	✓	
The error occurred when starting or stopping rotary table operation.	✓	✓	✓	
The error occurred during rotary table is running.	✓	✓	✓	✓

- 1 ■ U/V/W-phase of amplifier is short circuited due to the wiring in amplifier and motor. Also, U/V/W-phases are grounded in the earth.
- 2 ■ Short circuit or fault in U/V/W phases on servo motor side.
- 3 ■ Defect in internal circuit of servo amplifier.
- 4 ■ Overheating detection of the main circuit power device functioned.

**[Countermeasure]**

- 1 ■ Check the wiring and eliminate the short circuit condition. (e.g. cable replacement)
- 2 ■ Replace the servo motor
- 3 ■ Replace the servo amplifier.
- 4 ■ Lower the ambient temperature around the controller.  
■ Confirm whether the cooling fan motor rotates or not, and replace the servo amplifier if it does not rotate.

SV311	Abnormality of electric current detection value Current detection error 0
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**[Cause]** Abnormality of electric current detection value.

Status at the time of alarm	Cause	
	1	2
The error occurred when servo-on.	✓	✓

- 1 ■ Defect in internal circuit of servo amplifier.
- 2 ■ Servo amplifier and motor are not combined properly. Electric current has exceeded maximum current (IP) of combined motor. (MOC: Motor Overcurrent)  
■ Combination of servo amplifier and servo motor is incorrect.

**[Countermeasure]**

- 1 ■ Replace the servo amplifier.
- 2 ■ Check that the motor cord of PRM0002 is correct.  
■ Verifying the combination of the motor and the amplifier.

SV312	Abnormality of Electric current detection 1 Current detection error 1
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SV313	Abnormality of Electric current detection 2 Current detection error 2
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**[Cause]** Abnormality of Electric current detection circuit. (Current detection error 1)  
Abnormality in communication with Electric current detection circuit. (Current detection error 2)

Status at the time of alarm	Cause	
	1	2
The error occurred when servo-on.	✓	
The error occurred during rotary table is running.	✓	✓

- 1 ■ Data cannot be acquired from a current detector due to defect of internal circuit in servo amplifier.
- 2 ■ Malfunction due to noise.

**[Countermeasure]**

- 1 ■ Replace the servo amplifier.
- 2 ■ Confirm proper grounding of the amplifier.  
■ Add a ferrite core etc., and implement a countermeasure for noise.

SV314	Timing error 1 of safe torque (force) off input Safe torque (force) off error 1
-------	--

- [Cause]** Timing error of safe torque (force) off input.
- Input logic of safe torque off 1 is not coincident with that of safe torque off 2.
  - Defective of internal circuit for the servo amplifier.
- [Countermeasure]**
- Replace the servo amplifier.

SV315	Safe torque (force) off error 2 Safe torque (force) off error 2
-------	--

- [Cause]** Failure of safe torque (force) off circuit.
- | Status at the time of alarm                        | Cause |   |
|--|-------|---|
|  | 1     | 2 |
| The error occurred when the power was turned on.   | ✓     | ✓ |
| The error occurred during rotary table is running. |       | ✓ |
- 1 ■ Defect in internal circuit of servo amplifier.  
2 ■ Malfunction due to noise.
- [Countermeasure]**
- 1 ■ Replace the servo amplifier.  
2 ■ Check that the earth wire of the servo amplifier is grounded correctly.  
■ Add a ferrite core etc., and implement a countermeasure for noise.

SV316	Over load 1 Over load 1
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SV317	Over load 2 Over load 2
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- [Cause]** Current detection value is abnormal.
- | Status at the time of alarm   | Cause |   |   |   |   |   |   |   |   |
|---|-------|---|---|---|---|---|---|---|---|
|   | 1     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| The error occurred when servo-on.。  | ✓     | ✓ |   |   |   |   |   |   | ✓ |
| The error occurred without operation even after rotary table operating commended. |       | ✓ |   |   | ✓ | ✓ | ✓ |   | ✓ |
| The error occurred during rotary table is running.                                |       |   | ✓ | ✓ | ✓ |   | ✓ | ✓ |   |
- 1 ■ Defect in internal circuit of servo amplifier.  
2 ■ Defect in internal circuit of motor encoder.  
3 ■ Effective torque exceeds the rated torque.  
■ Rotation is less than 50min<sup>-1</sup> and torque (force) command exceeds approx. 2 times of rated torque (force)  
4 ■ Defect in servo motor-servo amplifier combination.  
5 ■ Holding brake of servo motor does not release.  
6 ■ Wiring of U/V/W phase between servo amplifier and motor do not match.  
7 ■ One or all connections of U/V/W phase wiring of servo amplifier / motor is disconnected.  
8 ■ Machines collided.  
9 ■ Motor encoder pulse number setting does not match with the servo motor.
- [Countermeasure]**
- 1 ■ Replace the servo amplifier.  
2 ■ Replace the servo motor.  
3 ■ Calculate effective torque of the servo motor from load conditions and running conditions, and if it exceeds the rated torque, decrease the load. Or decrease the feed speed, or extend the acceleration/deceleration time constant. Or replace with a large capacity servo motor.  
4 ■ Confirm whether the motor code of PRM002 matches with the servo motor, modify if it does match.  
5 ■ Confirm that wiring and applied voltage of the hold brake are correct.  
6 ■ Confirm the wiring, and wire correctly if it is incorrect.  
7 ■ Confirm the wiring, and wire correctly if it is incorrect.  
8 ■ Check the operation program condition and interference.  
9 ■ Adjust to the number of encoder pulse of the servo motor.

SV318	Regenerative overload Regenerative overload
-------	--

**[Cause]** Regeneration load ratio exorbitance.

Status at the time of alarm	Cause					
	1	2	3	4	5	6
The error occurred when the power was turned on.		✓	✓	✓	✓	✓
The error occurred during rotary table is running.	✓		✓		✓	

- 1 ■ Exceeded permitted value of regenerating power in built-in regenerative resistance specifications.
  - Excessive load inertia, or tact time is short.
- 2 ■ Regenerative resistance wiring conflicts with built-in regenerative resistance specifications.
- 3 ■ Regeneration resistor is disconnected.
- 4 ■ Input power supply voltage exceeds the specified range.
- 5 ■ Defect in internal circuit of servo amplifier.
- 6 ■ PRM5385 (regeneration resistance selection) is external regeneration resistance (2).

**[Countermeasure]**

- 1 ■ Review the load conditions and operating conditions.
  - Set load inertia within the specification range.
  - Extend the deceleration time.
  - Extend the tact time.
- 2 ■ Confirm the wiring, and wire correctly if it is incorrect.
- 3 ■ Replace the servo amplifier.
- 4 ■ The power supply voltage of an input is improved.
- 5 ■ Replace the servo amplifier.
- 6 ■ Set the regenerative resistance selection of PR M535 to "0."

SV319	Magnetic pole position detection error Magnetic pole position detection error
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**[Cause]** • Control circuit fault of servo amplifier.

**[Countermeasure]** • Replace the servo amplifier.

SV320	Over speed in average rotational speed Average continuous over speed
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**[Cause]** • The average speed exceeds the maximum speed of continuous rotation speed range.

**[Countermeasure]** • Revise parameters 0200, 0201, and 0202.

SV321	Servo amplifier temperature error Servo amplifier temperature error
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**[Cause]** Overheating detection of amplifier ambienttemperature.

Status at the time of alarm	Cause				
	1	2	3	4	5
The error occurred when the power was turned on.	✓		✓	✓	
The error occurred during rotary table is running.	✓	✓	✓	✓	
The error occurred after emergency stop.					✓

- 1 ■ Defect in internal circuit of servo amplifier.
- 2 ■ Regenerating power exceeded.
- 3 ■ Ambient temperature of servo amplifier is out of specified range.
- 4 ■ Built-in cooling fan of servo amplifier is stopped.
- 5 ■ Regeneration energy during emergency stop exceeded.

**[Countermeasure]**

- 1 ■ Replace the servo amplifier.
- 2 ■ Check the operating conditions.
- 3 ■ Lower the ambient temperature around the amplifier.
- 4 ■ Change the servo amplifier.
- 5 ■ Change the servo amplifier.
  - Reduce the load.

SV322	Rs overheat
	Rs overheat

**【Cause】** Detection of in-rush prevention resistance overheating.

Status at the time of alarm	Cause		
	1	2	3
The error occurred when the power was turned on.	✓	✓	✓
The error occurred during rotary table is running.			

- 1 ■ Defect in internal circuit of servo amplifier.
- 2 ■ Power turning ON is repeated too frequently.
- 3 ■ Ambient temperature is high.

**【Countermeasure】**

- 1 ■ Replace the servo amplifier.
- 2 ■ Turn ON/OFF the power less frequently.
- 3 ■ If the cooling fan for servo amplifier is stopped, replace the servo amplifier.  
■ Lower the ambient temperature around the Amplifer.

SV324	Internal regenerative resistor overheat
	Internal regenerative resistor overheat

**【Cause】** Overheating detection of Internal regenerationresistor.

Status at the time of alarm	Cause		
	1	2	3
The error occurred when the power was turned on.	✓		✓
The error occurred during rotary table is running.	✓	✓	✓

- 1 ■ Defect in internal circuit of servo amplifier.
- 2 ■ Regenerating power excessive.
- 3 ■ Improper wiring of built-in regeneration resistor.

**【Countermeasure】**

- 1 ■ Replace the servo amplifier.
- 2 ■ Check the operating conditions, so that regenerating power is within permitted absorption power.
- 3 ■ Confirm improper condition and repair if necessary.

SV325	External error
	External error

**【Cause】** Abnormality of external regenerative resistor, etc.

- 1 ■ Validity condition for external trip function is set to Valid .
- 2 ■ Defect in internal circuit of servo amplifier.

**【Countermeasure】**

- 1 ■ Set PRM5377 setting to "0".
- 2 ■ Replace the servo amplifier.

SV326	Main circuit power device overheat
	Main circuit power device overheat

**【Cause】** Overheating detection of Drive module.

Status at the time of alarm	Cause			
	1	2	3	4
The error occurred when the power was turned on.	✓		✓	✓
The error occurred when the servo is turned on (e.g. in MANUAL mode).	✓	✓	✓	
The error occurred when starting or stopping rotary table operation.	✓	✓	✓	
The error occurred during rotary table is running.	✓	✓	✓	✓

- 1 ■ U/V/W-phase of amplifier is short circuited due to the wiring in amplifier and motor.  
Also, U/V/W-phases are grounded in the earth.
- 2 ■ Short circuit or fault in U/V/W phases on servo motor side.
- 3 ■ Defect in internal circuit of servo amplifier.
- 4 ■ Ambient temperature is high.



- [Countermeasure]
- 1 ■ Check wiring and replace if necessary.
  - 2 ■ Replace the servo motor.
  - 3 ■ Replace the servo amplifier.
  - 4 ■ Lower the ambient temperature around the Amplifier.  
 ■ Confirm whether the cooling fan motor rotates or not, and replace the servo amplifier if it does not rotate.

SV327	Over voltage
	Over voltage

[Cause] DC Excess voltage of main circuit.

Status at the time of alarm	Cause			
	1	2	3	4
The error occurred when the power was turned on.	✓	✓		
The error occurred when slow down rotary table.		✓	✓	✓

- 1 ■ Defect in internal circuit of servo amplifier.
- 2 ■ The power supply voltage of main circuit is out of the specification.
- 3 ■ Excessive load inertia.
- 4 ■ Incorrect wiring for regeneration resistance.  
 ■ Built-in regeneration circuit is not functioning.

- [Countermeasure]
- 1 ■ Replace the servo amplifier.
  - 2 ■ Reduce the power supply voltage to within the specified range.
  - 3 ■ Reduce the load inertia to within the specified range.
  - 4 ■ Replace the servo amplifier.

SV328	Main circuit under-voltage
	Main circuit under-voltage

[Cause] DC Main circuit low voltage.

Status at the time of alarm	Cause				
	1	2	3	4	5
The error occurred when the power was turned on.	✓	✓	✓	✓	✓
The error occurred when slow down rotary table.		✓	✓		

- 1 ■ Input power supply voltage is below the specified range.
- 2 ■ Rectifier of main circuit is broken.
- 3 ■ Input power supply voltage is reduced and/or blinking.
- 4 ■ Low voltage outside of the specified range is supplied to the main circuit (R/S/T).
- 5 ■ Defect in internal circuit of servo amplifier.

- [Countermeasure]
- 1 ■ Check the power supply and set it within the specified range.
  - 2 ■ Replace the servo amplifier.
  - 3 ■ Check the power supply and confirm that there is no blinking or low voltage.
  - 4 ■ Check the main circuit voltage. Confirm that there is no external power supply to R/S/T when the main circuit is OFF.
  - 5 ■ Replace the servo amplifier.

SV329	Main power supply fail phase
	Main power supply fail phase

[Cause] 1 phase of the 3 phase main circuit power supply disconnected.

Status at the time of alarm	Cause		
	1	2	3
The error occurred when the power was turned on.	✓	✓	✓
The error occurred during rotary table is running.	✓		
The Alarm occurred even the specification is Single-phase power input Specification (PRM0008=1).			✓

- 1 ■ One out of 3 phases (R/S/T) is not inserted.
- 2 ■ Defect in internal circuit of Servo amplifier.
- 3 ■ Servo amplifier is not specified for single phase.

- [Countermeasure]**
- 1 ■ Check the wiring and repair if necessary.
  - 2 ■ Replace the servo amplifier.
  - 3 ■ Back up the Quinte parameter, and then clear the parameter, and re-set the parameter.

SV330	Control power supply under-voltage Control power supply under-voltage
-------	--

**[Cause]** Control power supply low voltage or instantaneous stoppage occurred.

Status at the time of alarm	Cause		
	1	2	3
The error occurred when the power was turned on.	✓	✓	
The error occurred during rotary table is running.	✓		✓

- 1 ■ Defect in internal circuit of servo amplifier.
- 2 ■ Input power supply voltage is below the specified range.
- 3 ■ Input power supply voltage is fluctuating or blinking.

- [Countermeasure]**
- 1 ■ Replace the servo amplifier.
  - 2 ■ Confirm that the power supply is set within the specified range.
  - 3 ■ Confirm that the power supply is not going to neither blink nor reduce the power.

SV331	Control power supply under-voltage 1 Control power supply under-voltage 1
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SV332	Control power supply under-voltage 2 Control power supply under-voltage 2
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**[Cause]** Under voltage of ±12V of control switching power supply.(Control power supply under-voltage 1)  
Under voltage of ±5V of control switching power supply.(Control power supply under-voltage 2)

Status at the time of alarm	Cause	
	1	2
The error occurred when the power was turned on.	✓	✓

- 1 ■ Defect in internal circuit of servo amplifier.
- 2 ■ Defect in external circuit.

- [Countermeasure]**
- 1 ■ Replace the servo amplifier.
  - 2 ■ Replace the servo motor, and turn on power again, and then if there is no alarm, the encoder internal circuit is in failure.
    - Check the external circuit up to the servo amplifier.

SV340	Encoder connector 1 disconnection Encoder connector 1 disconnection
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SV341	Encoder connector 2 disconnection Encoder connector 2 disconnection
-------	--

**[Cause]** Power supply cable break. (Encoder connector 1 disconnection/Encoder connector 2 disconnection)

Status at the time of alarm	Cause				
	1	2	3	4	5
The error occurred when the power was turned on.	✓	✓	✓	✓	✓
The error occurred during rotary table is running.	✓		✓	✓	

- 1 ■ For motor encoder wiring:
  - Improper wiring.
  - Connector is removed.
  - Connector is loose.
  - Encoder cable is too long.
- 2 ■ Servo amplifier and motor encoder are not combined properly.
- 3 ■ Defect in internal circuit of servo amplifier.
- 4 ■ Defect in internal circuit of motor encoder.
- 5 ■ Parameter set to Full closed servo system .

- [Countermeasure]
- 1 ■ Check the wiring between the motor encoder and the servo amplifier. If it is incorrect, connect correctly.
  - Confirm that the encoder power supply voltage of the motor is above 4.75 V; increase it if below 4.75 V.
  - 2 ■ Replace with servo motor equipped with proper encoder.
  - 3 ■ Replace the servo amplifier.
  - 4 ■ Replace the servo motor.
  - 5 ■ Change of PRM to “Semi-close Control / Motor Encoder”.

SV342	Serial encoder communication error
	Serial encoder communication error

[Cause] CRC, SYNC, FORM, Command error occurrence in communication with sensor.

Status at the time of alarm	Cause		
	1	2	3
The error occurred when the power was turned on.	✓	✓	✓

- 1 ■ Defect in internal circuit of motor encoder.
- 2 ■ Malfunction due to noise.
- 3 ■ Motor encoder wiring has abnormalities.

- [Countermeasure]
- 1 ■ Replace the servo motor.
  - 2 ■ Confirm proper grounding of the amplifier.
  - Check the shielding of the encoder cable.
  - Add a ferrite core etc., and implement a countermeasure for noise.
  - 3 ■ Check the wiring of motor encoder and servo amplifier, and correct the wiring if needed.

SV343	Encoder initial process error
	Encoder initial process error

[Cause] Initial processing abnormality of absolute encoder.  
Cable is broken.

Status at the time of alarm	Cause				
	1	2	3	4	5
The error occurred when the power was turned on.	✓	✓	✓	✓	✓

- 1 ■ For motor encoder wiring;
  - Improper wiring.
  - Connector is removed.
  - Connector is loose.
  - Encoder cable is too long.
- 2 ■ Servo amplifier and motor encoder are not combined properly.
- 3 ■ Defect in internal circuit of servo amplifier.
- 4 ■ Defect in internal circuit of motor encoder.
- 5 ■ The initial setting of the position data could not be done because the servo motor was rotating at 250 min<sup>-1</sup> or more when turning on the power.

- [Countermeasure]
- 1 ■ Check the wiring between the motor encoder and the servo amplifier. If it is incorrect, connect correctly.
  - Confirm that the encoder power supply voltage of the motor is above 4.75 V; increase it if below 4.75 V.
  - 2 ■ Replace with servo motor equipped with proper encoder.
  - 3 ■ Replace the servo amplifier.
  - 4 ■ Replace the servo motor.
  - 5 ■ Restart the power supply after motor is stopped.

SV350	Serial encoder internal error 0 Serial encoder internal error 0
-------	--

**[Cause]** Absolute encoder rotation overflow.  
Frequent rotation counter overflow.

Status at the time of alarm	Cause	
	1	2
The error occurred when the power was turned on.	✓	✓
The error occurred during rotary table is running.	✓	✓

- 1 ■ Defect in internal circuit of motor encoder.
- 2 ■ Malfunction due to noise.

**[Countermeasure]** 1 ■ Turn ON the power supplies again; if not restored, replace the servo motor.  
2 ■ Confirm proper grounding of the amplifier.  
■ Check the shielding of the encoder cable.  
■ Add a ferrite core etc., and implement a countermeasure for noise.

SV351	Serial encoder internal error 1 Serial encoder internal error 1
-------	--

**[Cause]** Multi-turn error.  
Battery low voltage.

Status at the time of alarm	Cause			
	1	2	3	4
The error occurred when the power was turned on.	✓	✓		
The error occurred during rotary table is running.			✓	✓

- 1 ■ Loose connection of battery cable.
- 2 ■ The fall of battery voltage.
- 3 ■ Loose connection of encoder connector.
- 4 ■ Defect in internal circuit of motor encoder.

**[Countermeasure]** 1 ■ Check the battery connector of encoder cable attachment.  
2 ■ Check the voltage of battery.  
3 ■ Check the wiring of motor encoder and servo amplifier, and correct the wiring if needed.  
4 ■ Turn ON the power supplies again; if not restored, replace the servo motor.

SV352	Serial encoder internal error 2 Serial encoder internal error 2
-------	--

SV353	Serial encoder internal error 3 Serial encoder internal error 3
-------	--

**[Cause]** Accelerate error (SV352)  
Over-speed error (SV353)

Status at the time of alarm	Cause		
	1	2	3
The error occurred when the power was turned on.	✓		✓
The error occurred while rotary table was stopped.	✓	✓	
The error occurred during rotary table is running.	✓	✓	✓

- 1 ■ Defect in internal circuit of motor encoder.
- 2 ■ Malfunction due to noise.
- 3 ■ The acceleration of motor rotation exceeds the permitted acceleration. (SV352)  
■ Number of motor rotations exceeds the permitted velocity. (SV353)

**[Countermeasure]** 1 ■ Turn ON the power supplies again; if not restored, replace the servo motor.  
2 ■ Confirm proper grounding of the amplifier.  
■ Check the shielding of the encoder cable.  
■ Add a ferrite core etc., and implement a countermeasure for noise.  
3 ■ Check the operation condition, and extend the acceleration and deceleration time.  
■ Check the operation condition, and lower the maximum rotation speed.

SV354	Serial encoder internal error 4 Serial encoder internal error 4
SV355	Serial encoder internal error 5 Serial encoder internal error 5
SV356	Serial encoder internal error 6 Serial encoder internal error 6
SV358	Serial encoder internal error 10 Serial encoder internal error 10
SV359	Serial encoder internal error 11 Serial encoder internal error 11
SV360	Serial encoder internal error 12 Serial encoder internal error 12
SV361	Serial encoder internal error 13 Serial encoder internal error 13

- [Cause] Access error of Encoder internal EEPROM (SV354)  
 Detection of single rotation coefficient incorrect (SV355)  
 Detection of multiple rotation coefficient incorrect (SV356)  
 Incremental error (Position data error) (SV358)  
 Encoder error (SV359)  
 Multi-rotation error generation (SV360)  
 Encoder built-in EEPROM data is not set (SV361)

Status at the time of alarm	Cause	
	1	2
The error occurred when the power was turned on.	✓	
The error occurred during rotary table is running.	✓	✓

- 1 ■ Defect in internal circuit of motor encoder.
- 2 ■ Malfunction due to noise.

- [Countermeasure]
- 1 ■ Turn ON the power supplies again; if not restored, replace the servo motor.
  - 2 ■ Confirm proper grounding of the amplifier.
    - Check the shielding of the encoder cable.
    - Add a ferrite core etc., and implement a countermeasure for noise.

SV357	Serial encoder internal error 9 Serial encoder internal error 9
-------	--

- [Cause] Overheating of encoder with built-in servo motor.

Status at the time of alarm	Cause		
	1	2	3
The error occurred when the power was turned on.	✓	✓	
The error occurred while rotary table was stopped.	✓	✓	
The error occurred during rotary table is running.		✓	✓

- 1 ■ Defect in internal circuit of motor encoder.
- 2 ■ Servo motor is not generating heat, but encoder ambient temperature is too high.
- 3 ■ Servo motor is overheated.

- [Countermeasure]
- 1 ■ Turn ON the power supplies again; if not restored, replace the servo motor.
  - 2 ■ Confirm that the cooling method keeps the motor encoder ambient temperature below 80°C.
  - 3 ■ Review the operating conditions to prevent the servo motor from overheating.

SV370	Over speed
	Over speed

**[Cause]** Motor rotation speed is 120 % more than the highest speed limit.

Status at the time of alarm	Cause			
	1	2	3	4
The error occurred when a command is input after the servo is turned on.	✓	✓		
This error occurred when the servomotor was started.			✓	✓
The error occurred during other than operation and startup.		✓	✓	

- 1 ■ Defect in internal circuit of servo amplifier.
- 2 ■ Defect in internal circuit of motor encoder.
- 3 ■ Excessive overshoot while starting.
- 4 ■ Wiring of U/V/W -phase between servo amplifier and motor do not match.

- [Countermeasure]**
- 1 ■ Replace the servo amplifier or the servo motor.
  - 2 ■ Adjust the servo parameters.
  - 3 ■ Reduce the load inertia.  
■ Check the wiring and repair any irregularities.  
■ Replace the acceleration and deceleration time of PRM0300 , 0301 and 0302.
  - 4 ■ Confirm that wiring and applied voltage of the hold brake are correct.

SV371	Velocity control error
	Velocity control error

**[Cause]** Nonconformity of electrical current command and acceleration signs.

Status at the time of alarm	Cause		
	1	2	3
The error occurred when servo-on was input.	✓	✓	
The error occurred when a command is input.	✓	✓	
This error occurred when the servomotor was started or stopped.			✓

- 1 ■ Wiring of U/V/W -phase between servo amplifier and motor do not match.
- 2 ■ The servo motor is vibrating (oscillating).
- 3 ■ Excessive overshoot and undershoot.

- [Countermeasure]**
- 1 ■ Check the wiring and repair any irregularities.
  - 2 ■ Adjust the servo parameters so that servo motor will not vibrate (oscillate).
  - 3 ■ Adjust the servo parameters to reduce overshoot and undershoot.  
■ Replace the acceleration and deceleration time of PRM0300 , 0301 and 0302.  
■ Loosen the acceleration/deceleration pattern of the command.

SV372	Velocity feedback error
	Velocity feedback error

**[Cause]** Servo motor power line is disconnected.

Status at the time of alarm	Cause		
	1	2	3
The error occurred when a command is input.	✓	✓	✓
The error occurred when the power was turned on.		✓	

- 1 ■ Motor cord (PRM002) does not accord with a motor.
- 2 ■ Motor is not rotating.
- 3 ■ Defect in internal circuit of servo amplifier.
- 4 ■ The motor is vibrating (oscillating).

- [Countermeasure]**
- 1 ■ To restart Enter 32768 into motor code parameters(PRM002) .
  - 2 ■ Confirm that the power line is properly connected.  
■ Replace the servo motor.
  - 3 ■ Replace the servo amplifier.
  - 4 ■ Adjust the servo parameter so that servo motor will not vibrate (oscillate).

SV374	Excessive location deviation during movement Error excessive (moving)
-------	--

**[Cause]** Position deviation amount exceeds PRM0901.

Status at the time of alarm	Cause						
	1	2	3	4	5	6	7
This error occurred during high-speed startup and shutdown.	✓	✓	✓	✓	✓	✓	✓
The error occurred during rotary table is running.		✓	✓	✓		✓	

- 1 ■ Change in position command is too large, or acceleration/deceleration time is too short.
- 2 ■ Load inertia is excessively large, or motor capacity is too small.
- 3 ■ Set value of speed limit command is too small.  
■ Encoder pulse number setting does not match the servo motor.
- 4 ■ Setting of servo parameter (such as position loop gain) is incorrect.
- 5 ■ Excessive deviation set value is too small.
- 6 ■ Defective motor encoder internal circuit
- 7 ■ Decrease in main circuit power voltage.

**[Countermeasure]**

- 1 ■ Check the position command.
- 2 ■ Check the load condition (decrease the cutting speed of the machine, or decrease the cutting amount) or increase the servo motor capacity.
- 3 ■ Increase the set value of the speed limit command.  
■ Adjust to the number of encoder pulses of the servo motor.
- 4 ■ Adjust the servo parameter. (Increase the position loop gain, etc.)
- 5 ■ Set deviation excessive set value (PRM0901).
- 6 ■ Replace the servo motor.
- 7 ■ Check the main circuit power voltage.

SV375	Excessive location deviation during stop Error excessive (stopped)
-------	---

**[Cause]** Position deviation amount exceeds PRM0903.

Status at the time of alarm	Cause										
	1	2	3	4	5	6	7	8	9	10	11
The error occurred when the power was turned on.										✓	
The error occurred while the servo-on was stopped.						✓					✓
The error occurred immediately at the start of command input.	✓	✓	✓	✓	✓		✓	✓	✓		✓

- 1 ■ Change in position command is too large, or acceleration/deceleration time is too short. ◦
- 2 ■ Load inertia is excessively large, or motor capacity is too small.◦
- 3 ■ The hold brake is not released.
- 4 ■ The rotary table is clamped, or there is a mechanical collision.
- 5 ■ One or all connections of U/V/W phase wiring between the servo amplifier and the motor is disconnected.
- 6 ■ The servo motor is rotated by an external force at the time of stop (when positioning is completed).
- 7 ■ Set value of speed limit command is too small.  
■ Encoder pulse number setting does not match the servo motor.
- 8 ■ Setting of servo parameter (such as position loop gain) is incorrect.
- 9 ■ Excessive deviation set value is too small.
- 10 ■ Defective servo amplifier internal circuit
- 11 ■ Defective motor encoder internal circuit.

**[Countermeasure]**

- 1 ■ Check the position command.
- 2 ■ Check the load condition (decrease the cutting speed of the machine, or decrease the cutting amount) or increase the servo motor capacity.
- 3 ■ Confirm that wiring and applied voltage of the hold brake are correct. Replace the servomotor if correct.
- 4 ■ Set the appropriate clamping pressure. Or recover a mechanical collision.
- 5 ■ Review and correct the wiring.
- 6 ■ Reduce the amount of cutting.

- [Countermeasure]
- 7 ■ Increase the set value of the speed limit command.
  - Adjust to the number of encoder pulses of the servo motor.
  - 8 ■ Adjust the servo parameter. (Increase the position loop gain, etc.)
  - 9 ■ Set deviation excessive set value (PRM0901).
  - 10 ■ Defective servo amplifier internal circuit
  - 11 ■ Defective motor encoder internal circuit.

SV376	Position command error 1 Position command error 1
SV377	Position command error 2 Position command error 2

- [Cause]
- Position command exceeded setting range of PRM5304.  
Position command input exceeded processing range.

Status at the time of alarm	Cause	
	1	2
The error occurred after inputting a position command.	✓	✓

- 1 ■ The speed conversion value of the position command exceeds the position command error 1 setting.
- Excessive difference of recent command compared to previous position command.
- 2 ■ The servo amplifier may not be able to receive position commands due to CRC errors.

- [Countermeasure]
- 1 ■ Lower command input travel distance.
  - 2 ■ Add a ferrite core etc., and implement a countermeasure for noise.

SV378	Excessive position synchronization deviation Excessive location synchronization deviation
-------	--

- [Cause]
- Position Synchronization Deviation exceeds setup value.

Status at the time of alarm	Cause				
	1	2	3	4	5
The error occurred when the power was turned on.。	✓	✓	✓	✓	✓
This error occurred during high-speed startup and shutdown.	✓	✓			✓
The error occurred during rotary table is running.。	✓	✓			✓

- 1 ■ 2-axis position loop control parameters are not appropriate.
- Response setting of corrected position synchronization is too high.
- Parameters setting for corrected position synchronization are not appropriate.
- 2 ■ 2-axis load inertia balance is not appropriate.
- 3 ■ Setting of Velocity Limit Command is too low.
- No. of pulses of 2-axis sensor is not appropriate.
- 4 ■ Servo motor is mechanically locked or machine has a collision.
- The hold brake is not released.
- 5 ■ Setting of position synchronization deviation is too low.

- [Countermeasure]
- 1 ■ For mutual synchronization compensation mode, disable integral compensation. Also, set the parameters to the same value.
  - For master-slave mode location synchronization compensation, switch to mutual synchronization compensation mode.
  - 2 ■ Revise the load condition, increase the capacity of the servo motor, etc.
  - 3 ■ Increase the set value of speed limit command.
  - Replace with a motor with the same number of sensor pulse.
  - 4 ■ Recheck that the mechanical system is not locked.
  - Confirm that wiring and applied voltages of the hold brake are correct. Replace the servomotor if correct.
  - 5 ■ Set a larger value to excessive location synchronization deviation.

SV379	Parameter change completion Parameter change completion
-------	--

- [Cause]
- Setting of the motor code and sensor code was changed.  
(Set value considered to be an error because it is enabled by turning on the control power again.)

- [Countermeasure]
- Shut down control power supply and restart servo amplifier.



SV382	EEPROM check sum error EEPROM check sum error
【Cause】	EEPROM entire area check sum error <ul style="list-style-type: none"> <li>• Correct value not read by CPU by EEPROM built-in servo amplifier.</li> <li>• Failed to write into the EEPROM during last power supply cutoff.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>• Replace the servo amplifier.</li> </ul>
SV383	Memory error 1 Memory error 1
【Cause】	Access error in RAM built in CPU. <ul style="list-style-type: none"> <li>• Proper access failure of CPU internal RAM.</li> <li>• Defect in control board of servo amplifier.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>• Replace the servo amplifier.</li> </ul>
SV384	Memory error 2 Memory error 2
【Cause】	Error in check sum of Flash memory. <ul style="list-style-type: none"> <li>• Program check sum of flash memory was incorrect at control power input.</li> <li>• Firmware defect in amplifier CPU.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>• Replace the servo amplifier.</li> </ul>
SV385	System parameter error 1 System parameter error 1
【Cause】	System parameter is outside a setting range. <ol style="list-style-type: none"> <li>1 ■ Selected value is outside the specified range for a servo system parameter.</li> <li>2 ■ Defect in internal circuit of servo amplifier.</li> </ol>
【Countermeasure】	<ol style="list-style-type: none"> <li>1 ■ Confirm the model number of the servo amplifier. ■ Check the (PRM002-004, PRM5348-5390) setting servo system parameters, to modifyReplace the servo amplifier.</li> <li>2 ■ Replace the servo amplifier.</li> </ol>
SV386	System parameter error 2 System parameter error 2
【Cause】	Combination of a system parameter is abnormal. System parameter and amplifier mismatch. <ol style="list-style-type: none"> <li>1 ■ Selected values of system parameters and actual hardware do not match. ■ Improper assembly of system parameter settings.</li> <li>2 ■ Defect in internal circuit of servo amplifier.</li> </ol>
【Countermeasure】	<ol style="list-style-type: none"> <li>1 ■ Confirm the model number of the servo amplifier. ■ Check the setting servo system parameters, to modifyReplace the servo amplifier.</li> <li>2 ■ Replace the servo amplifier.</li> </ol>
SV387	Motor parameter error Motor parameter error
【Cause】	Check sum of a motor parameter is abnormal. <ul style="list-style-type: none"> <li>• Correct value not read by CPU by EEPROM built-in servo amplifier.</li> <li>• Failed to write into the EEPROM when changing motor parameter.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>• If control power supply is re-switched on and alarm recurs after re-setting a motor parameter, replace servo amplifier.</li> </ul>

SV388	Cpu circumference circuit error Cpu circumference circuit error
【Cause】	Abnormal access to CPU and peripheral devices. <ul style="list-style-type: none"> <li>• Access failure of CPU and peripheral devices at initialization.</li> <li>• Defect in control circuit board of servo amplifier.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>• Replace the servo amplifier.</li> </ul>
SV389	System code error System code error
【Cause】	The control board code does not match the sensor setting value. <ul style="list-style-type: none"> <li>• Corresponding sensor on servo amplifier control board and sensor setting value do not match.</li> <li>• Defect in control circuit board of servo amplifier.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>• Replace the servo amplifier.</li> </ul>
SV390	Motor code setting error Motor code setting error
【Cause】	Motor code is outside a setting range. <ul style="list-style-type: none"> <li>• Motor code is out of combination range.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>• That you set the motor code(PRM0002) that can be combined with the amplifier capacity.</li> </ul>
SV391	Sensor code setting error Sensor code setting error
【Cause】	Sensor code is outside a setting range. <ul style="list-style-type: none"> <li>• Sensor division number is out of range or is an unsupported sensor.</li> </ul>
【Countermeasure】	<ul style="list-style-type: none"> <li>• Please set up the sensor division number in which combination is possible, and a sensor code.</li> </ul>
SV392	Motor parameter automatic setting error 1 Auto setting error 1
【Cause】	Motor parameter automatic setting disabled. <ol style="list-style-type: none"> <li>1 ■ Encoder being connected is not supported by motor parameter automatic setting function.</li> <li>2 ■ Servo motor being connected is not supported by motor parameter automatic setting function.</li> <li>3 ■ Failure in internal circuit of motor encoder.</li> </ol>
【Countermeasure】	<ol style="list-style-type: none"> <li>1 ■ Replace with supported servo motor.</li> <li>2 ■ Set the motor parameters manually.</li> <li>3 ■ Replace the servo motor.</li> </ol>
SV393	Motor parameter automatic setting error 2 Auto setting error 2
【Cause】	The result of motor parameter automatic setting has an abnormality. <ol style="list-style-type: none"> <li>1 ■ Combination of servo amplifier and motor is incorrect.</li> <li>2 ■ Failure in internal circuit of motor encoder.</li> </ol>
【Countermeasure】	<ol style="list-style-type: none"> <li>1 ■ Check the model number of servo amplifier and servo motor, and correct the combination.</li> <li>2 ■ Replace the servo motor.</li> </ol>

SV394	Task process error
	Task process error

- [Cause] Error in interruption process of CPU.
- Defect in internal circuit of servo amplifier.
- [Countermeasure]
- Replace the servo amplifier.

SV395	Initial process timeout
	Initial time out

- [Cause] Initial process does not end within initial process time.
- 1 ■ Defect in internal circuit of servo amplifier.
  - 2 ■ Malfunction due to noise.
- [Countermeasure]
- 1 ■ Replace the servo amplifier.
  - 2 ■ Confirm proper grounding of the servo amplifier.

SV500	Dynamic brake resistance overheat
	Dynamic brake resistance overheat

- [Cause] Detection of overheating in dynamic brake resistor.
- 1 ■ Failure in the internal circuit of servo amplifier.
  - 2 ■ Overheating detection of dynamic brake resistor.
- [Countermeasure]
- 1 ■ Replace the servo amplifier.
  - 2 ■ Use the dynamic brake so as not to exceed the permissive frequency.

#### **D1-4-10** Other

- [Phenomenon] • Stopped on the start screen (logo screen) when power was turned on.
- [Cause] • Power for Quinte was started with the axis selection for the manual pulse generator not turned off.
- [Countermeasure] • Turn off the axis selection for the manual pulse generator, and start power for Quinte.

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# ***E***    ***Hardware specifications***

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<b><i>E1</i></b>	Input/output specifications.....	E1-1
<b><i>E2</i></b>	External connection details.....	E2-1
<b><i>E3</i></b>	Rotary table connection cable specifications .....	E3-1
<b><i>E4</i></b>	External I/F cable (CB3Q).....	E4-1
<b><i>E5</i></b>	Power cable (CB4Q).....	E5-1
<b><i>E6</i></b>	External solenoid cable (CB2Q).....	E6-1

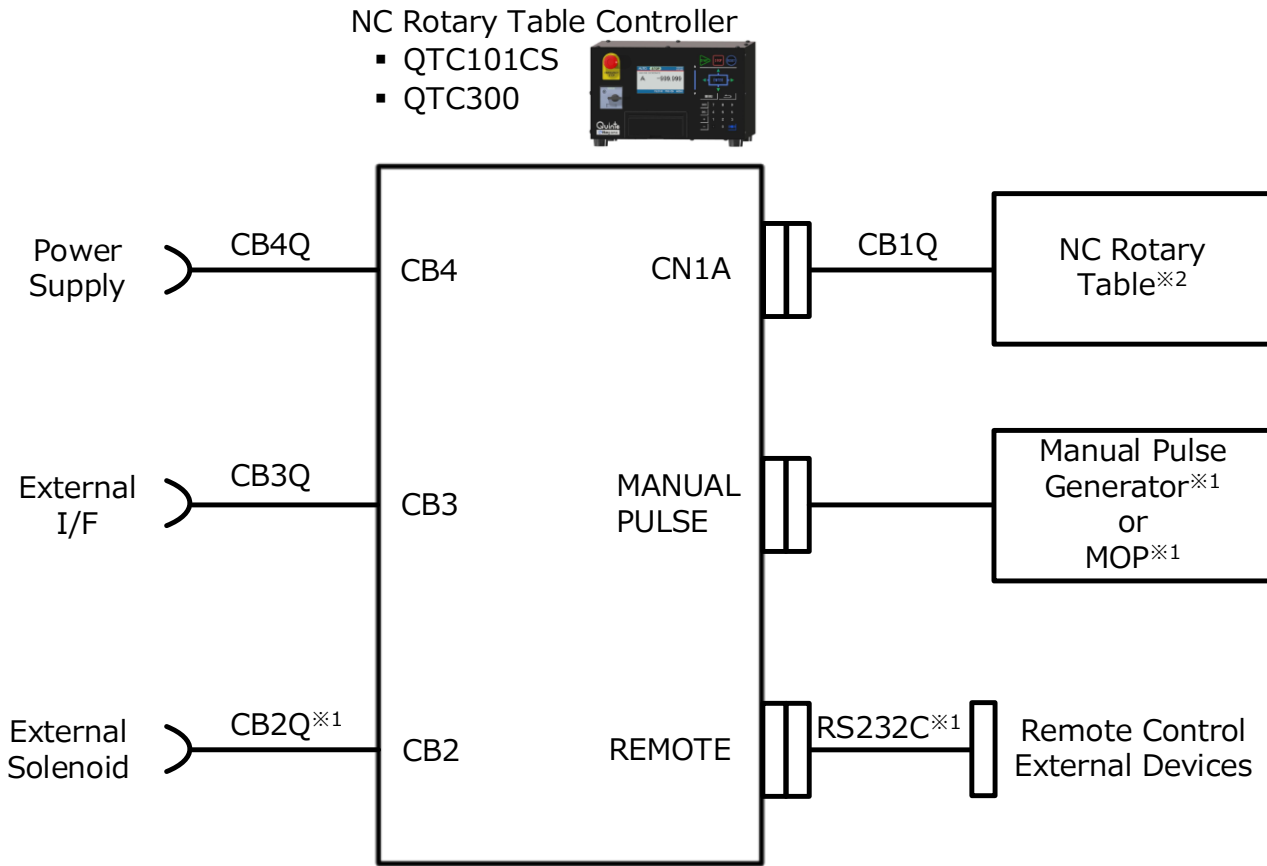
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# **E1** Interconnection diagram

**E1-1** Interconnection diagram QTC101CS / QTC300

**E1-2** Interconnection diagram QTC201CS

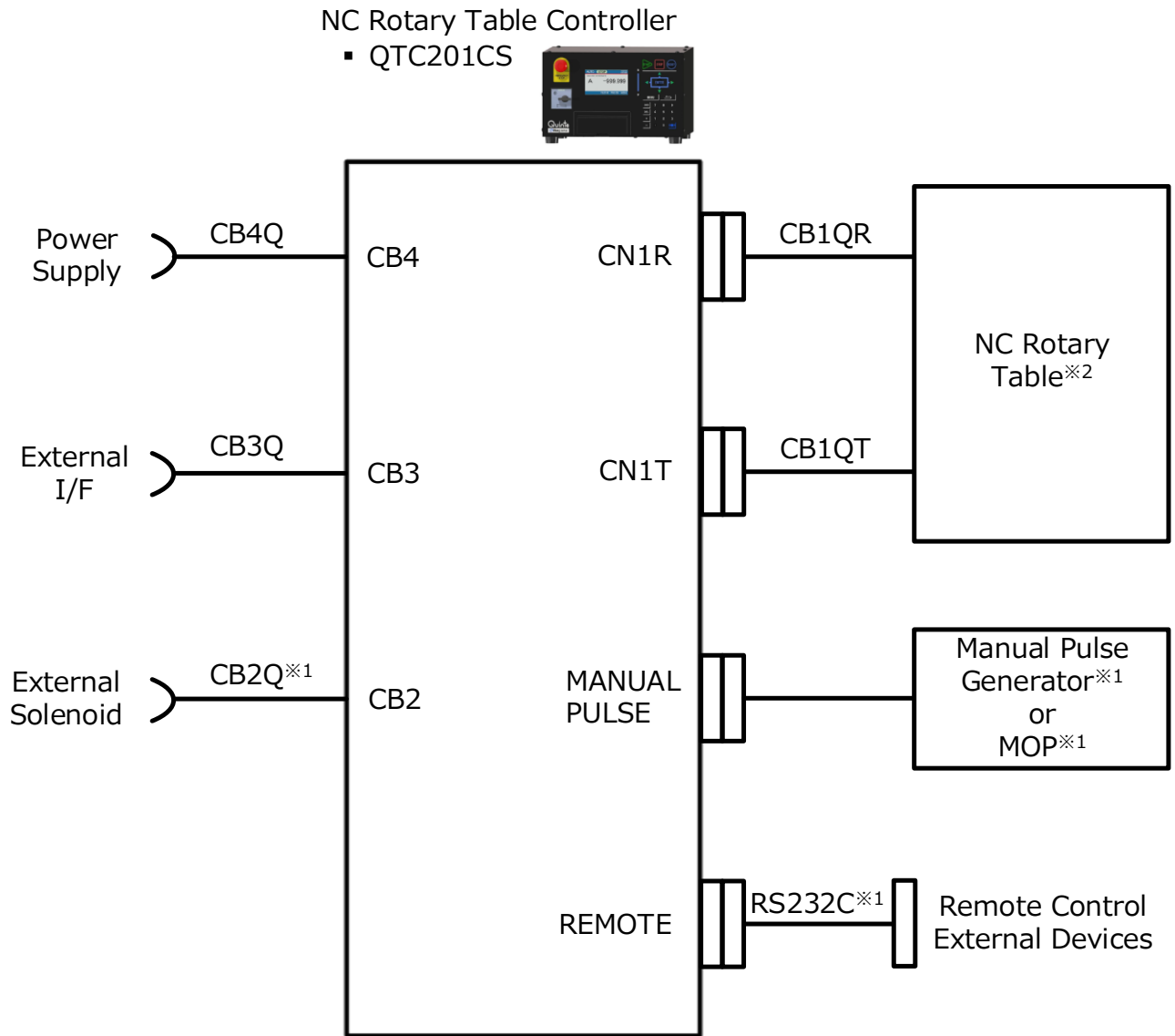
**E1-1** Interconnection diagram QTC101CS / QTC300



- 1 This is an option.
- 2 For the NC rotary table connection, please refer to the NC rotary table instruction manual.



**E1-2** Interconnection diagram QTC201CS



- 1 This is an option
- 2 For the NC rotary table connection, please refer to the NC rotary table instruction manual.

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## **E10** MOP (Manual Operation Pendant) 【OPTION】

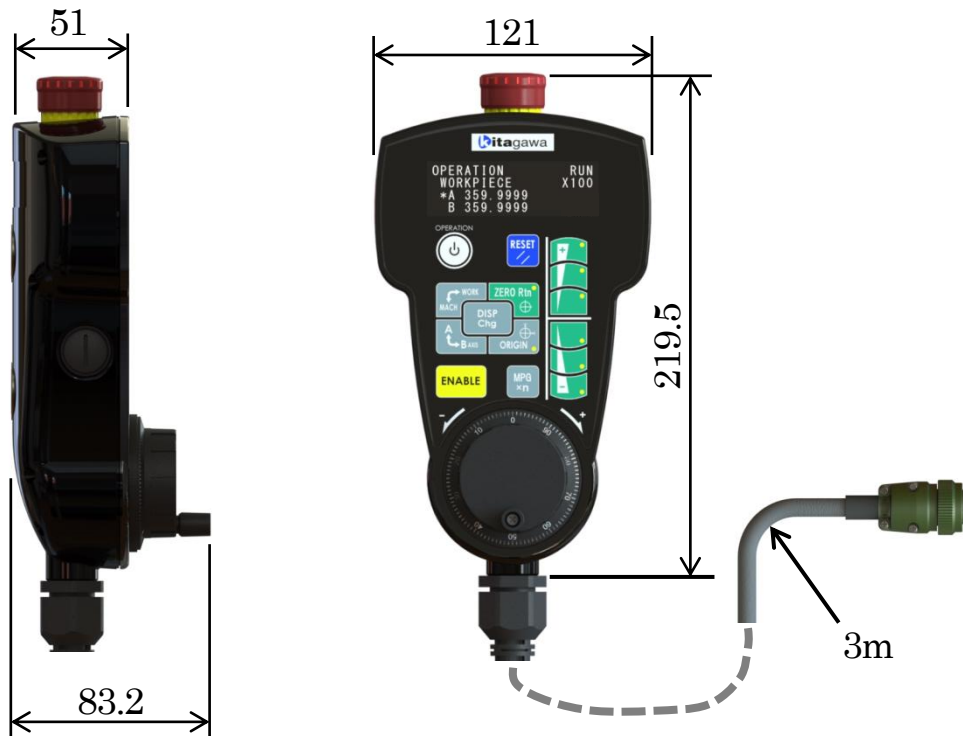
**E10-1** MOP Specifications

**E10-2** MOP external dimension

**E10-1** MOP Specifications

Operating temperature range	0°C to 45°C
Operating humidity range	20% to 80%RH or less (Condensation not to be occurred.)
Weight	450g (excluding cable)
Waterproof structure	Protection class IP54
Power Supply Voltage	DC24V±10%
Maximum Current Consumption	100mA
Wire Rated Voltage	300V
Safety function	Emergency stop switch    Enable switch
Display	Organic EL 20 characters × 4 lines
Operation part	key                      Capacitance touch sensor (mutual capacitive method)
	Buzzer                  Frequency : 3520Hz
	Sound pressure : 0 to 75dB (10-stage switching)
Dial	Number of Clicks        : 100 / 1 revolution
	Number of Pulses        : 100 pulses / 1 revolution
Communication part	RS422
Dial Rotating Life	More than 1,000,000 round trip revolutions

**E10-2** MOP external dimension



## **E2** Input/output specifications

### **E2-1** Input/output specifications

**E2-1** Input/output specifications

The input/output board has been designed to use devices and elements taking external influence and durability into account and so as to be insulated from external circuits to avoid failure, and to be highly reliable.

If the input/output board breaks down, the board can be easily replaced because the board has been unitized.

		Input signal name	Symbol
RT	1	1 axis clamp	BK.C1
	2	1 axis unclamp	BK.UC1
External I/F side	3	Start	START
	4	Stop	*STOP
	5	External interlock	*EXT INT
	6	Emergency stop input 1	*EMG1 IN
	7	Emergency stop input 2	*EMG2 IN
		General-purpose input 1	DI01X
		General-purpose input 2	DI02X
		General-purpose input 3	DI03X
		General-purpose input 4	DI04X
		General-purpose input 5	DI05X
	General-purpose input 6	DI06X	

		Output signal name	Symbol
RT	1	1 axis clamp	BK1
	2		
External I/F side	3	Block finish	BLKFIN
	4	Alarm	*ALARM
	5		
	6	Emergency stop output 1	*EMG1 OUT
	7	Emergency stop output 2	*EMG2 OUT
		General-purpose output 1	DO01Y
		General-purpose output 2	DO02Y
		General-purpose output 3	DO03Y
		General-purpose output 4	DO04Y
		General-purpose output 5	DO05Y
	General-purpose output 6	DO06Y	

RT : Rotary table side

Inputs to , and outputs to are custom selecting functions, and the purchase of the CB3Q cable is necessary separately.

**E2-1-1** Input specifications

Specifications of external inputs of Quinte are as follows.

Input type	Photocoupler insulation input (Current sink/source output selection type: Switchable by I/O board)
Power source voltage	DC24V±10%
Input current	Approx. 10mA
Response time	Within 500 s
Operating range (O FF O )	20 to 30V
Operating range (O O FF)	0 to 5V

**E2-1-2** Output specifications

Specifications of external outputs of Quinte are as follows.

**E2-1-2-1** I/F output specifications

Output type	Non-polar insulation semiconductor relay output
Power source voltage	DC24V±10%
Output current	100mA
ON resistance	10Ω or less
OFF leak current	1.0 A or less
Response time	Within 1.5ms

**E2-1-2-2** Output specifications for clamp

Specifications of outputs for external clamp are as follows.

Output type	Switch power source output by insulation semiconductor relay
Power source voltage	DC24V±10%
Maximum current	500mA
Response time	Within 1.5ms

**E2-1-2-3** Output specifications for emergency stop

Specifications of external outputs for emergency stop pushbutton are as follows.

Withstand voltage	200V AC/DC or more
Contact point rating	24V DC 1A or more

**E2-1-3** Description of external I/F signals

Input/output signals for external interface of Quite are as follows.

**E2-1-3-1** Fixed input signals

Name	Signal name	Description
Start	START	Executes contents of program by this signal at the time of "A TO" mode.
Temporary stop	*STOP	Decelerates and stops operation of the rotary table by this signal at the time of "A TO" mode.
External interlock	*EXT INT	When this signal is put into OPEN, interlock state is set and auto operation or manual operation cannot be performed. In case of moving, it will decelerate to a stop
Emergency stop 1 Emergency stop 2	*EMG1 IN *EMG2 IN	When this signal does OFF, it becomes the emergency stop state. Moreover, it stops in Dynamic brake while moving. Uses in duplication of external emergency stop inputs. This cannot be used as a separate emergency stop input.

**E2-1-3-2** Selection input signals

These selection input signals are of custom-specifications.

Name	Signal name	Description
General-purpose input signal 1	DIO1X	For general-purpose input signals 1 to 6, input signal can be allotted by each parameter. Allocable input signals are shown below.
General-purpose input signal 2	DIO2X	
General-purpose input signal 3	DIO3X	
General-purpose input signal 4	DIO4X	
General-purpose input signal 5	DIO5X	
General-purpose input signal 6	DIO6X	

It is possible to respond to any input by allotting the following set values to the above selection input signals with PRM1100 to PRM1105.

PRM value	Name	Description
01	External machining origin return request A	It is possible to perform machining origin return from the outside at the time of "R ESET" or "STOP" in MANUAL mode.
02	External machining origin return request B	
03	External machine origin return request A	It is possible to perform machine origin return from the outside at the time of "R ESET" or "STOP" in MA A mode.
04	External machine origin return request B	
05	External program selection (binary 1)	It is possible to call a program by external signal. To call a program, select the program number in binary mode. Selectable program numbers are 1 to 31.
06	External program selection (binary 2)	
07	External program selection (binary 4)	
08	External program selection (binary 8)	
09	External program selection (binary 16)	



PRM value	Name	Description
10	External program set (binary)	Confirms, calls and executes a binary-selected program number.
11	External program selection (M code: clear)	Calls 1 of program by this signal.
12	External program selection (M code: +1)	Calls program of the present program+1 by this signal.
13	External program selection (M code: -1)	Calls program of the present program-1 by this signal.
14	External program selection (M code: +10)	Calls program of the present program+10 by this signal.
15	External program selection (M code: -10)	Calls program of the present program-10 by this signal.
16	M92FIN	Uses as an operation finish signal of M92.
17	M93FIN	Uses as an operation finish signal of M93.
18	M94FIN	Uses as an operation finish signal of M94.
19	M95FIN	Uses as an operation finish signal of M95.
20	M96FIN	Uses as an operation finish signal of M96.
21	M97FIN	Uses as an operation finish signal of M97.
22	External reset	It is possible to reset Quinte from the outside.
23	External automatic operation specification	When the external automatic operation signal is ON, START input on the panel is not accepted.
24	+ side over-travel	When this turns ON, an alarm (RT210) occurs.
25	- side over-travel	When this turns ON, an alarm (RT211) occurs.
26	Workpiece origin setting	Respect to the axis that has been selected in the handle mode, this signal is input, perform the workpiece origin setting.
27	OT release	If the hard overtravel occurs in handle mode or manual mode, if you enter this signal, it will be "OT release mode".
28	Workpiece zero return	Axis that is selected in handle mode, this signal is input will be carried out workpiece origin return.
29	Machine zero return	Axis that is selected in handle mode, this signal is input will be carried out machining origin return.
40	AUTO mode selection	Input when the AUTO mode is selected.
41	MANUAL mode selection	Input when the MANUAL mode is selected.
42	PROGRAM mode selection	Input when the PROGRAM mode is selected.
43	PARAMETER mode selection	Input when the PARAMETER mode is selected.
44	ALARM mode selection	Input when the ALARM mode is selected.
45	MAINTENANCE mode selection	Input when the MAINTENANCE mode is selected.

### E2-1-3-3 Fixed output signal

Name	Signal name	Description
Block finish	BLKFIN	This signal is output when 1 block operation of program operation is finished at the time of "A TO" mode.
Alarm	*ALARM	This signal is output in s state that no alarm occurs.
Emergency stop output 1	*EMG1OUT	Uses in duplication of emergency stop pushbutton outputs.
Emergency stop output 2	*EMG2OUT	

**E2-1-3-4** Selection output signals

These selection output signals are of custom-specifications.

Name	Signal name	Description
General-purpose output signal 1	DO01Y	For general-purpose output signals 1 to 6, output signal can be allotted by each parameter. Allocable output signals are shown below.
General-purpose output signal 2	DO02Y	
General-purpose output signal 3	DO03Y	
General-purpose output signal 4	DO04Y	
General-purpose output signal 5	DO05Y	
General-purpose output signal 6	DO06Y	

It is possible to respond to any input by allotting the following set values to the above selection input signals with PRM1106 to PRM1111.

PRM value	Name	Description
01	Machining origin return finish A	This is output when machining origin return is finished.
02	Machining origin return finish B	
03	Machine origin return finish A	This is output when machine origin return is finished.
04	Machine origin return finish B	
05	Machining origin position confirmation A	This is output when the rotary table passes or stops at the machining origin.
06	Machining origin position confirmation B	
07	Machine origin position confirmation A	This is output when the rotary table passes or stops at the machine origin.
08	Machine origin position confirmation B	
09	M80 command	This is output by M80 command.
10	M82 command	This is output by M82 command.
11	M84 command	This is output by M84 command.
12	M86 command	This is output by M86 command.
13	M88 command	This is output by M88 command.
14	M90 command	This is output by M90 command.
15	M92 command	This is output by M92 command.
16	M93 command	This is output by M93 command.
17	M94 command	This is output by M94 command.
18	M95 command	This is output by M95 command.
19	M96 command	This is output by M96 command.
20	M97 command	This is output by M97 command.
21	Alarm output (A contact point)	This is output in alarm state.
22	External program selection finish	This is output when external program selection by binary type is finished.
24	In AUTO mode	This is output in the AUTO mode.
25	Program number output (binary 1)	Program number is output in binary. Program numbers which can be output are 1 to 63.
26	Program number output (binary 2)	
27	Program number output (binary 4)	
28	Program number output (binary 8)	
29	Program number output (binary 16)	
30	Program number output (binary 32)	

PRM value	Name	Description
31	During workpiece zero return & completion	In handle mode, a flicker output is outputted by the specification of PRM1005=1 after enforcement and workpiece-zero completion during a workpiece-zero return. The spacing of the ON / OFF of the flicker of the above, a 1-second intervals, flicker will be conducted during workpiece zero return.
32	During machine zero return & completion	In handle mode, a flicker output is outputted by the specification of PRM1005=1 after enforcement and machine-zero completion during a machine-zero return. The spacing of the ON / OFF of the flicker of the above, a 1-second intervals, flicker will be conducted during workpiece zero return.
33	Workpiece origin setting is completed	AUTO mode, manual mode, and in handle mode, it outputs one seconds after setting the machining origin.
41	In MANUAL mode	This is output in the MANUAL mode.
42	In PROGRAM mode	This is output in the PROGRAM mode.
43	In PARAMETER mode	This is output in the PARAMETER mode.
44	In ALARM mode	This is output in the ALARM mode.
45	In MAINTENANCE mode	This is output in the MAINTENANCE mode.
46	External mode selection permission signal	This is output when mode selection is enabled

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## **E3** External connection details



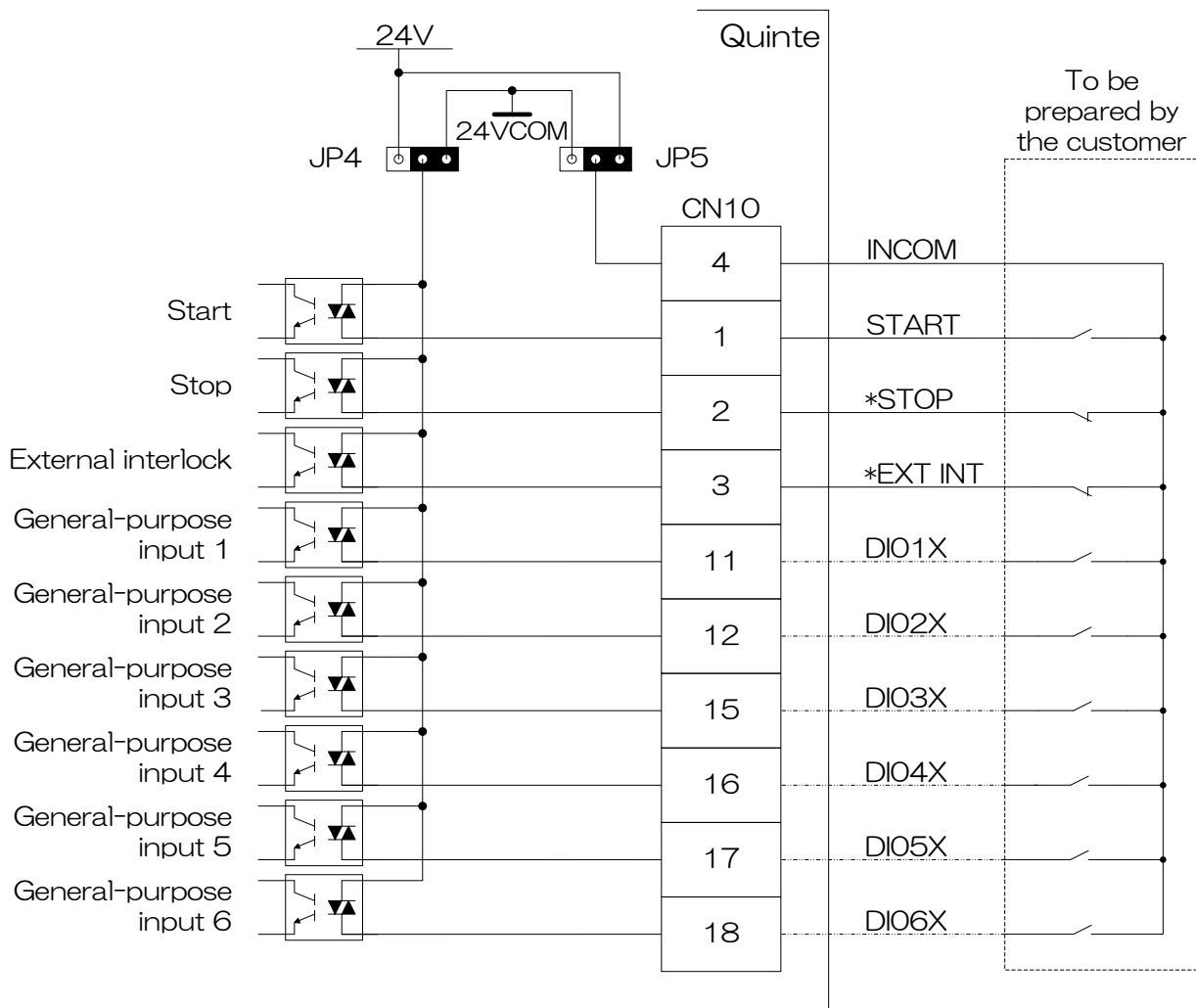
- Do not turn on power unless terminals of input/output cables are treated (Electric shock or breakdown of machine may result).

This section describes external connection specifications of Quinte.

**E3-1** Input connection

**E3-2** Output connection

**E3-3** Emergency stop connection

**E3-1** Input connection

The input circuit can switch sink input type/source input type by I/O board in the control device.

The input circuit can be adapted to any type depending on the customer's circuit.

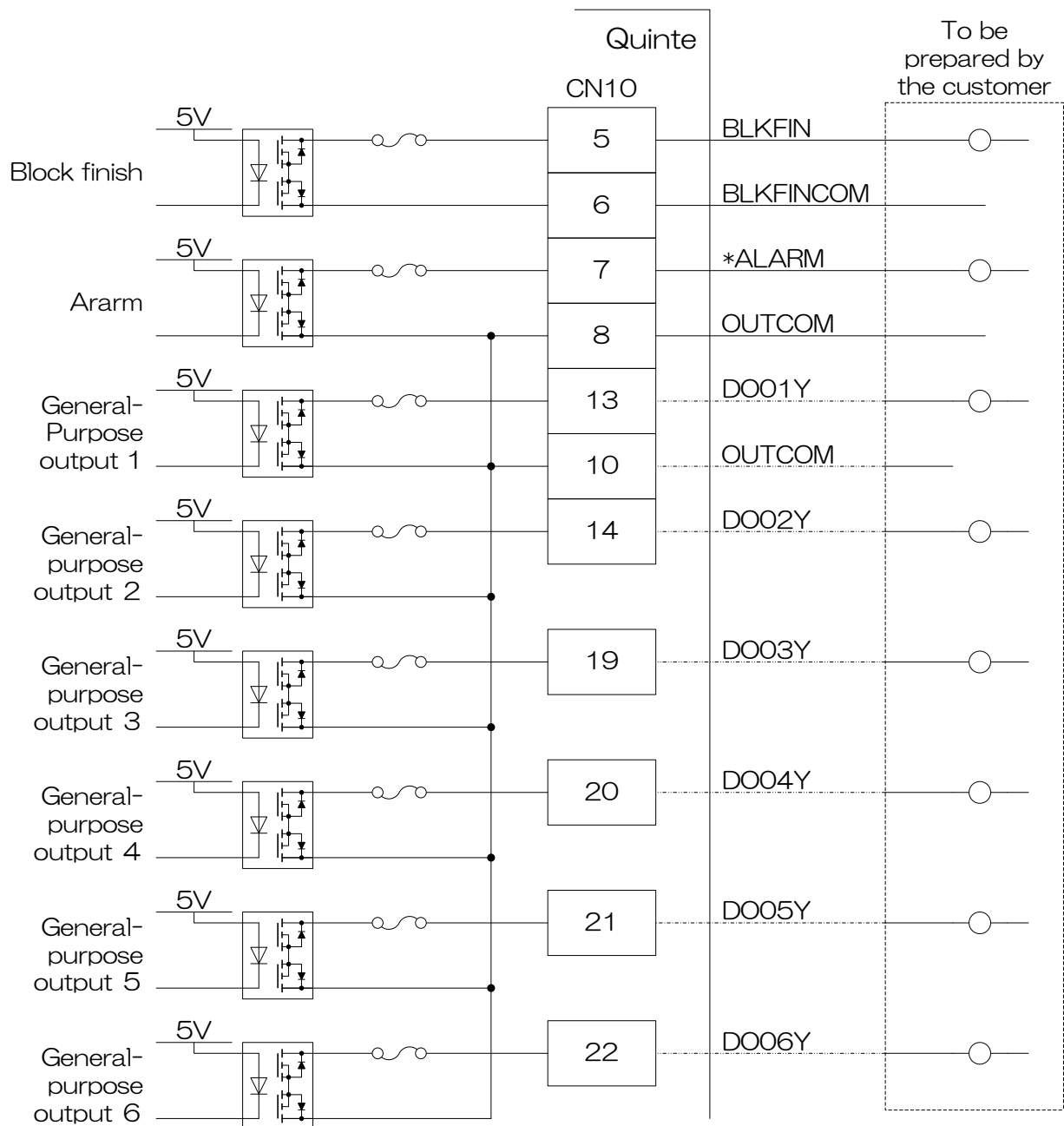
The input circuit before shipment is of a source input type.

The above general-purpose input 1 (DI01X) to general-purpose input 6 (DI06X) (two-dot chain line locations) are custom selecting functions.

Use of general-purpose input requires a CB3Q cable for full I/F.



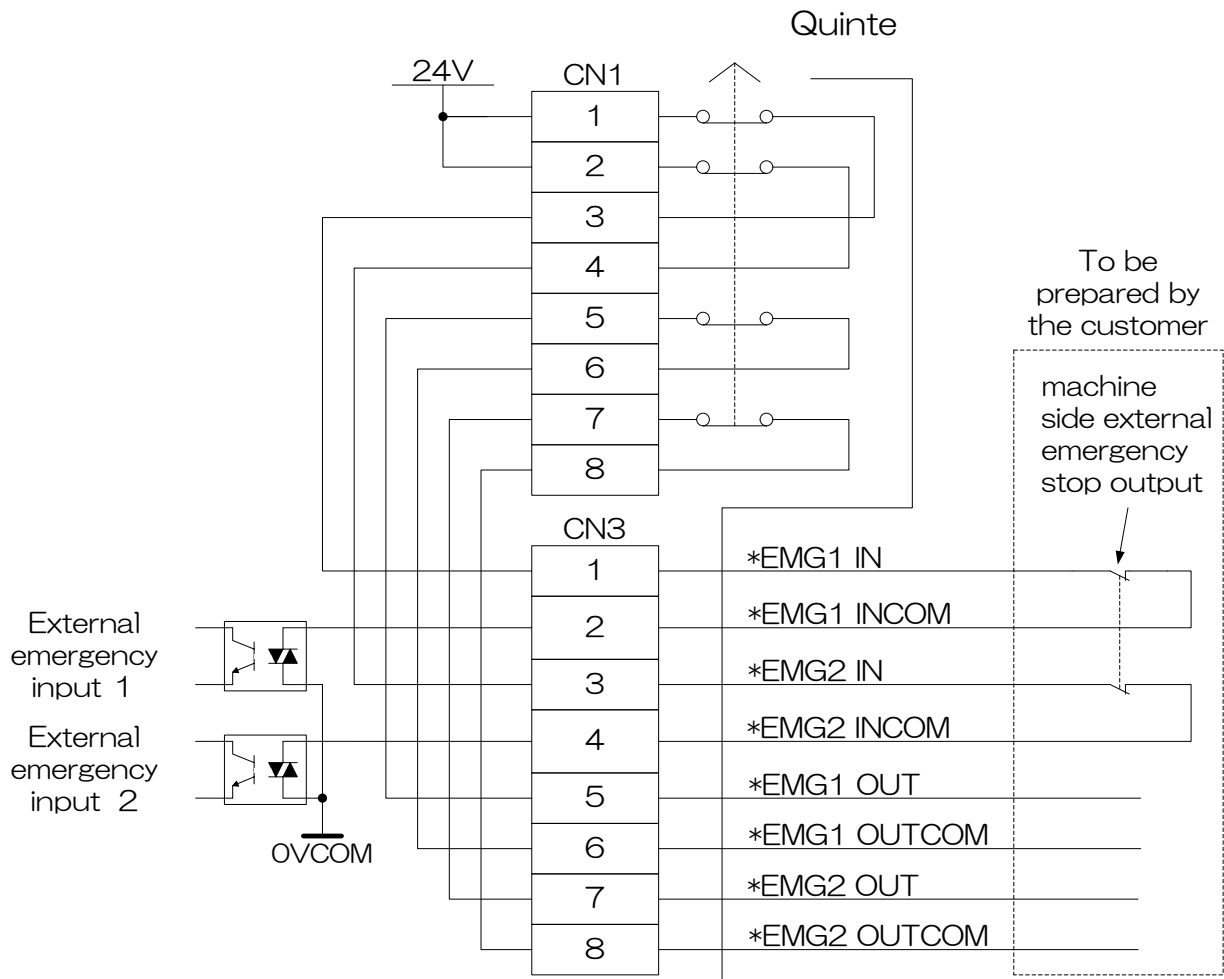
- For a source input type, 24VDC is supplied to INCOM, therefore, pay close attention to handling.

**E3-2** Output connection

The above general-purpose output 1 to general-purpose output 6, and OUTCOM [1 point] (two-dot chain line locations) are custom selecting functions.

Use of general-purpose output requires a CB3Q cable for full I/F.

**E3-3** Emergency stop connection



Emergency stop output and external emergency stop input are input/output ready for duplication of safety circuits (the function is not lost even if one safety circuit is defective).



## **E4** Rotary table connection cable specifications

### **E4-1** Rotary table connection cable (CB1Q)

**E4-1** Rotary table connection cable (CB1Q)

This is a cable to connect Quinte and rotary table.

There is CB1Q cable that complies with the motor because the motor connecting connector varies depending on the motor type.

**E4-1-1** Rotary table connection cable (QTC101CS QTC201CS)

When the motor of the axis of rotation is less than 1200W (CB1Q5AAAA / CB1Q5RAAA)

Signal name	Controller side		Table side		Cable spec.	Wire No. /wire color	Remarks
	Name	Pin No.	Name	Pin No.			
MU1		1		1	0.75SQ	Black (1)	Motor U
MV1		2		2		Black (2)	Motor V
MW1		3		3		Black (3)	Motor W
PE		PE		4		Earth	PE
BKC1		21	SP1	2	0.5SQ	Black	Clamp confirmation
BKC1COM		22		1		Black	Input common
BKUC1COM		17	SP2	1	0.5SQ	Black	Input common
BKUC1		16		2		Black	Unclamp confirmation
BK1+		11	YV1	2	0.5SQ	Black	Brake+ output
BK1-		12		1		Black	Brake- output
+5V1		14		1	0.2SQ	Sky blue/Black-	PG power+
0V1		15		2		Sky blue/Red-	PG power-
ES+1		19		3		Pink/Black-	Serial data signal
ES-1		20		4		Pink/Red-	
EBAT+1		24		5		Light green/Black-	Battery power+
EBAT-1		25		6		Light green/Red-	Battery power-
SHILD		18		Shell		Shield	PG shield

Signal name	Rated voltage of the cable	Rated temperature of the cable
MU1 MV1 MW1 PE	300V	105°C
BKC1 BKC1COM BKUC1 BKUC1COM BK1+ BK1-	300V	80°C
+5V1 0V1 ES+1 ES-1 EBAT+1 EBAT-1 SHILD	30V	80°C

When the motor of the axis of rotation is 1200W (CB1Q5AABA / CB1Q5RABA)

Signal name	Controller side		Table side		Cable spec.	Wire No. /wire color	Remarks
	Name	Pin No.	Name	Pin No.			
MU1		1		D	0.75SQ	Black (1)	Motor U
MV1		2		E		Black (2)	Motor V
MW1		3		F		Black (3)	Motor W
PE		PE		G,H		Earth	PE
BKC1		21	SP1 /SP3	2	0.5SQ	Black	Clamp confirmation
BKC1COM		22		1		Black	Input common
BKUC1COM		17	SP2/SP4	1	0.5SQ	Black	Input common
BKUC1		16		2		Black	Unclamp confirmation
BK1+		11	YV1/YV2	2	0.5SQ	Black	Brake+ output
BK1-		12		1		Black	Brake- output
+5V1		14		9	0.2SQ	Sky blue/Black-	PG power+
0V1		15		10		Sky blue/Red-	PG power-
ES+1		19		1		Pink/Black-	Serial data signal
ES-1		20		2		Pink/Red-	
EBAT+1		24		9		Light green/Black-	Battery power+
EBAT-1		25		4		Light green/Red-	Battery power-
SHILD		18		Shell		Shield	PG shield

Signal name	Rated voltage of the cable	Rated temperature of the cable
MU1 MV1 MW1 PE	300V	105°C
BKC1 BKC1COM BKUC1 BKUC1COM BK1+ BK1-	300V	80°C
+5V1 0V1 ES+1 ES-1 EBAT+1 EBAT-1 SHILD	30V	80°C

When the motor of the axis of tilting is less than 1200W (CB1Q5TAAA)

Signal name	Controller side		Table side		Cable spec.	Wire No. /wire color	Remarks
	Name	Pin No.	Name	Pin No.			
MU2		1		1	0.75SQ	Black (1)	Motor U
MV2		2		2		Black (2)	Motor V
MW2		3		3		Black (3)	Motor W
PE		PE		4		Earth	PE
BKC2		21	SP1	2	0.5SQ	Black	Clamp confirmation
BKC2COM		22		1		Black	Input common
BKUC2COM		17	SP2	1	0.5SQ	Black	Input common
BKUC2		16		2		Black	Unclamp confirmation
BK2+		11	YV1	2	0.5SQ	Black	Brake+ output
BK2-		12		1		Black	Brake- output
COM		9	SQ2	1	0.5SQ	Black	Input common
OVRUNA2		10		2		Black	Over travel
COM		13	SQ3	1	0.5SQ	Black	Input common
OVRUNB2		23		2		Black	Over travel
+5V2		14		1	0.2SQ	Sky blue/Black-	PG power+
0V2		15		2		Sky blue/Red-	PG power-
ES+2		19		3		Pink/Black-	Serial data signal
ES-2		20		4		Pink/Red-	
EBAT+2		24		5		Light green/Black-	Battery power+
EBAT-2		25		6		Light green/Red-	Battery power-
SHILD		18		Shell		Shield	PG shield

Signal name	Rated voltage of the cable	Rated temperature of the cable
MU2 MV2 MW2 PE	300V	105°C
BKC2 BKC2 BKC1COM BKUC1 BKUC1COM BK1+ BK1- OVRUNA2 OVRUNB2 COM	300V	80°C
+5V2 0V2 ES+2 ES-2 EBAT+2 EBAT-2 SHILD	30V	80°C

When the motor of the axis of tilting is 1200W (CB1Q5TABA)

Signal name	Controller side		Table side		Cable spec.	Wire No. /wire color	Remarks
	Name	Pin No.	Name	Pin No.			
MU2		1		D	0.75SQ	Black (1)	Motor U
MV2		2		E		Black (2)	Motor V
MW2		3		F		Black (3)	Motor W
PE		PE		G,H		Earth	PE
BKC2		21	SP1	2	0.5SQ	Black	Clamp confirmation
BKC2COM		22		1		Black	Input common
BKUC2COM		17	SP2	1	0.5SQ	Black	Input common
BKUC2		16		2		Black	Unclamp confirmation
BK2+		11	YV2	2	0.5SQ	Black	Brake+ output
BK2-		12		1		Black	Brake- output
COM		9	SQ2	1	0.5SQ	Black	Input common
OVRUNA2		10		2		Black	Over travel
COM		13	SQ3	1	0.5SQ	Black	Input common
OVRUNB2		23		2		Black	Over travel
+5V2		14		1	0.2SQ	Sky blue/Black-	PG power+
0V2		15		2		Sky blue/Red-	PG power-
ES+2		19		3		Pink/Black-	Serial data signal
ES-2		20		4		Pink/Red-	
EBAT+2		24		5		Light green/Black-	Battery power+
EBAT-2		25		6		Light green/Red-	Battery power-
SHILD		18		Shell		Shield	PG shield

Signal name	Rated voltage of the cable	Rated temperature of the cable
MU2 MV2 MW2 PE	300V	105°C
BKC2 BKC2 BKC1COM BKUC1 BKUC1COM BK1+ BK1- OVRUNA2 OVRUNB2 COM	300V	80°C
+5V2 0V2 ES+2 ES-2 EBAT+2 EBAT-2 SHILD	30V	80°C

**E4-1-2** Rotary table connection cable (QTC300)

Signal name	Controller side		Table side		Cable spec.	Wire No. /wire color	Remarks
	Name	Pin No.	Name	Pin No.			
MU1		1		D	4.0SQ	Black (1)	Motor U
MV1		2		E		Black (2)	Motor V
MW1		3		F		Black (3)	Motor W
PE		PE		G,H		Earth	PE
BKC1		12	SP1	2	0.5SQ	Black	Clamp confirmation
BKC1COM		13		1		Black	Input common
BKUC1COM		8	SP2	1	0.5SQ	Black	Input common
BKUC1		7		2		Black	Unclamp confirmation
BK1+		1	YV1	2	0.5SQ	Black	Brake+ output
BK1-		2		1		Black	Brake- output
+5V1		5		9	0.2SQ	Sky blue/Black-	PG power+
0V1		6		10		Sky blue/Red-	PG power-
ES+1		10		1		Pink/Black-	Serial data signal
ES-1		11		2		Pink/Red-	
EBAT+1		16		9		Light green/Black-	Battery power+
EBAT-1		17		4		Light green/Red-	Battery power-
SHILD		9		Shell		Shield	PG shield

Signal name	Rated voltage of the cable	Rated temperature of the cable
MU1 MV1 MW1 PE	300V	105°C
BKC1 BKC1COM BKUC1 BKUC1COM BK1+ BK1-	300V	80°C
+5V1 0V1 ES+1 ES-1 EBAT+1 EBAT-1 SHILD	30V	80°C

**E4-1-3** CB1Q appearance

CB1Q cable is of a polyamide flexible type.

In addition, the machine mounting portion is made of metal, and excellent in chemical resistance, weather resistance and external pressure resistance, prevents troubles due to intrusion of cutting water from mounting parts, and prevents troubles from defective connection due to insufficient tightening by changing the Quinte connection part from screw type to one-touch lock type.



※ In order to show an overview, this drawing is shown with the middle section cut out.

**E4-1-4** Rotary Table Connection Cable (CB1Q) Separation

Before separating the rotary table connection cable from the controller, please turn off the controller power.

## **E5** External I/F cable (CB3Q)

This cable is used to exchange signals between Quinte and external equipment. In addition to CB3Q cable, there are two types of full-spec type and saving wiring type. The saving wiring type is used for connection as a standard.

**E5-1** Saving wiring type (CB3Q5AA)

**E5-2** Full I/F type (CB3Q5BA)



When wiring the CB3Q cable, please follow the instruction below to avoid false detection or malfunction from the noise.

- Connect the CB3Q cable as far from machine's main power wires and AC power wires as possible.
- Do not bundle signal wires and power wires together.
- Do not route the CB3Q cable through the same duct as the AC power wiring on the machine side.
- Please lay the cable down to contact the bottom surface of the control panel.

**E5-1** Saving wiring type (CB3Q5AA)

No.	Signal name	Terminal expression	Power line color	Cable spec.	Length
1	Start	START	Sky blue B -	0.2SQ x16C	Length outside of panel 5000+ 【1000】 【 】 part indicates loose end length
2	Stop	*STOP	Pink B -		
3	External interlock	*EXT INT	Light green B -		
4	Input common	INCOM	Orange B -		
5	Block finish	BLKFIN	Gray B -		
6		BLKFINCOM	Sky blue B -x2		
7	Alarm	*ALARM	Pink B -x2		
8		OUTCOM	Light green B -x2		
9	Emergency stop 1	*EMG1 IN	Orange B -x2		
10		EMG1 INCOM	Gray B -x2		
11	Emergency stop 2	*EMG2 IN	Sky blue B -x3		
12		EMG2 INCOM	Pink B -x3		
13	Emergency stop output 1	*EMG1 OUT	Light green B -x3		
14		EMG1 OUTCOM	Orange B -x3		
15	Emergency stop output 1	*EMG2 OUT	Gray B -x3		
16		EMG2 OUTCOM	Sky blue B -x4		

As an example of wiring color, -x2 indicates that there are two (“bar”) (two-dot line). It is represented as “- -” on a wiring.

Rated voltage of the cable	Rated temperature of the cable
30V	80°C



**E5-2** Full I/F type (CB3Q5BA)

Full I/F cable is OPTION product.

No.	Signal name	Terminal expression	Power line color	Cable spec.	Length
1	Start	START	Sky blue B -	0.2SQ x30C	Length outside of panel 5000+ [1000] [ ] part indicates loose end length
2	Stop	*STOP	Pink B -		
3	External interlock	*EXT INT	Light green B -		
4	Input common	INCOM	Orange B - Orange B -x2		
5	Block finish	BLKFIN	Gray B -		
6		BLKFINCOM	Sky blue B -x2		
7	Alarm	*ALARM	Pink B -x2		
8		OUTCOM	Light green B -x2 Gray B -x2		
9	General-purpose input 1	DI01X	Sky blue B -x3		
10	General-purpose input 2	DI02X	Pink B -x3		
11	General-purpose output 1	DO01Y	Light green B -x3		
12	General-purpose output 2	DO02Y	Orange B -x3		
13	General-purpose input 3	DI03X	Gray B -x3		
14	General-purpose input 4	DI04X	Sky blue B -x4		
15	General-purpose input 5	DI05X	Pink B -x4		
16	General-purpose input 6	DI06X	Light green B -x4		
17	General-purpose output 3	DO03Y	Orange B -x4		
18	General-purpose output 4	DO04Y	Gray B -x4		
19	General-purpose output 5	DO05Y	Sky blue B -x6		
20	General-purpose output 6	DO06Y	Pink B -x6		
21	Emergency stop 1	*EMG1 IN	Light green B -x6		
22		EMG1 INCOM	Orange B -x6		
23	Emergency stop 2	*EMG2 IN	Gray B -x6		
24		EMG2 INCOM	Sky blue B -L		
25	Emergency stop output 1	*EMG1 OUT	Pink B -L		
26		EMG1 OUTCOM	Light green B -L		
27	Emergency stop output 1	*EMG2 OUT	Orange B -L		
28		EMG2 OUTCOM	Gray B -L		

As an example of wiring color, -x4 indicates that there are four (“bar”) (four-dot line).

It is represented as “- - - -” on a wiring.

In addition, -L shows the meaning of long chain line (“Long bar”).

It is represented as “— —” on a wiring.

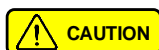
Rated voltage of the cable	Rated temperature of the cable
30V	80°C

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## **E6** Power cable (CB4Q)

**E6-1** Power cable for QTC101CS / QTC201CS

**E6-2** Power cable for QTC300



- The PE (ground wire) of the CB4Q cable must be connected to the ground on the machine side.  
Failure to connect to ground might cause the Quinte malfunction due to the noise.

**E6-1** Power cable for QTC101CS / QTC201CS

No.	Signal name	Terminal expression	Cable specifications	Power line color	Length
1	Input power 1	R	1.5SQ×4C (With shield)	Black (1)	Length outside of panel 5000 + [100] [ ] part indicates loose end length
2	Input power 3	T		Black (3)	
3	PE (Ground)	PE		Yellow/Green	

Rated voltage of the cable	Rated temperature of the cable
30V	80°C

**E6-2** Power cable for QTC300

No.	Signal name	Terminal expression	Cable specifications	Power line color	Length
1	Input power 1	R	4.0SQ×4C (With shield)	Black (1)	Length outside of panel 5000 + [100] [ ] part indicates loose end length
2	Input power 2	S		Black (2)	
3	Input power 3	T		Black (3)	
4	PE (Ground)	PE		Yellow/Green	

Rated voltage of the cable	Rated temperature of the cable
30V	80°C



- QTC300 is to be used in three-phase specification (PRM008=0).

## **E7** External solenoid cable (CB2Q) 【OPTION】

Because solenoid valves for clamp are installed on the outside of the NC rotary table for the NC rotary table of the hydraulic clamp specifications etc., it is necessary to output power for clamp from the controller.

For cable connection in that case, use the CB2Q cable.

**E7-1** External solenoid cable for 1 axis specification ( CB2Q5A)

**E7-2** External solenoid cable for 2 axes specification (CB2Q5T)

**E7-1** External solenoid cable for 1 axis specification(CB2Q5A)

Signal name	Controller side		SOL side	Cable spec.	Wire No. / Wire color	Remarks
	Name	Pin No	Terminal expression			
EXBK1+	CN12	1	BK1+	0.5SQ	Sky blue/Black-	Brake output+
EXBK1-		2	BK1-		Pink/Black-	Brake output-

Rated voltage of the cable	Rated temperature of the cable
30V	80°C

**E7-2** External solenoid cable for 2 axes specification(CB2Q5T)

In QTC200 series for, in order to cope (A axis, B axis) in two axes, each cable has been prepared.

Signal name	Controller side		SOL side	Cable spec.	Wire No. / Wire color	Remarks
	Name	Pin No	Terminal expression			
EXBK1+	CN12	1	BK1+	0.5SQ	Sky blue/Black-	Brake output+
EXBK1-		2	BK1-		Pink/Black-	Brake output-
EXBK2+	CN13	1	BK2+	0.5SQ	Sky blue/Black-	Brake output+
EXBK2-		2	BK2-		Pink/Black-	Brake output-
		3				

Rated voltage of the cable	Rated temperature of the cable
30V	80°C

## **E8** Remote control cable 【OPTION】

- E8-1** Remote Control Cable Specification
- E8-2** RS232C Cable connection diagram
- E8-3** Appearance of the remote control cable



When wiring the remote control cable, please follow the instructions below to avoid false detection or malfunction from the noise.

- Connect the remote control cable as far from machine's main power wires and AC power wires as possible.
- Do not bundle signal wires and power wires together.
- Do not run route the remote control cable through the same duct as the AC power wiring on the machine side.
- Please lay the cable down to contact the bottom surface of the control panel.

**E8-1** Remote Control Cable Specification

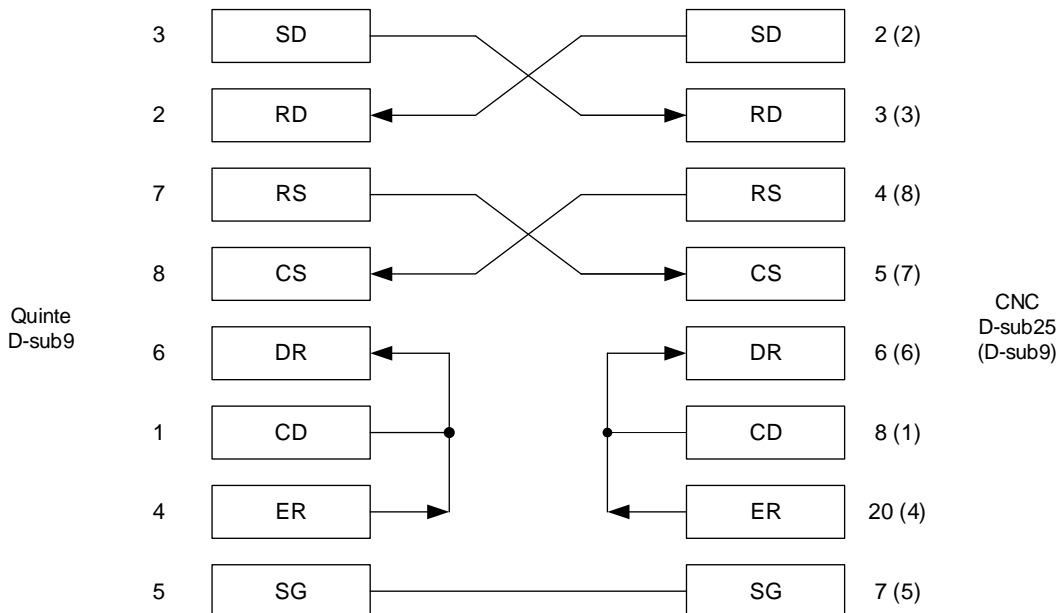
Signal name	Controller side		Host side		Cable Spec.	Description for signal
	9Pin type Pin No	9Pin type Pin No	9Pin type Pin No	25Pin type Pin No		
CD	1	1	1	8	0.2SQ	Career detection
RD	2	3	3	3		Receive data
SD	3	2	2	2		Transmission data
ER	4	4	4	20		Data terminal Ready (Quinte)
SG	5	5	5	7		Signal Ground
DR	6	6	6	6		Data set Ready
RS	7	8	8	4		Request to Send
CS	8	7	7	5		Clear to Send

Rated voltage of the cable	Rated temperature of the cable
30V	75°C

**Precaution**  
Please use our specified RS232C cable for the remote control.

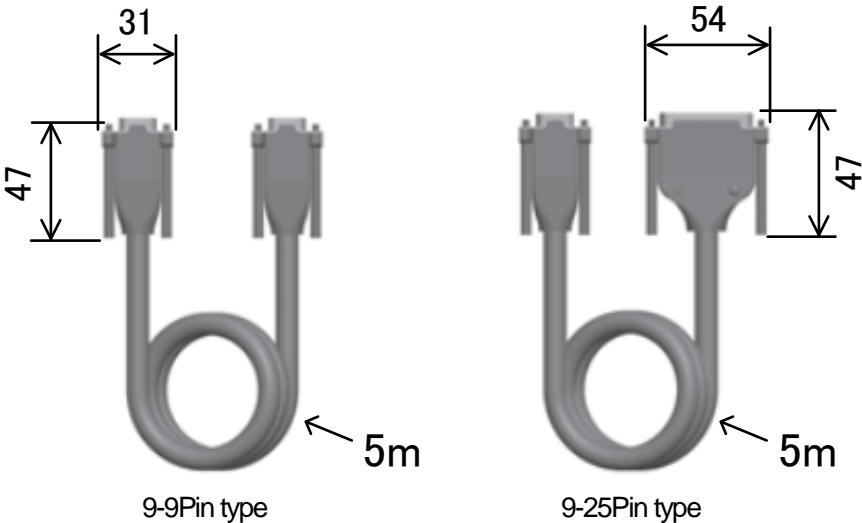
**E8-2** RS232C Cable connection diagram

The connection diagram of the RS232C cable is shown below.





**E8-3** Appearance of the remote control cable



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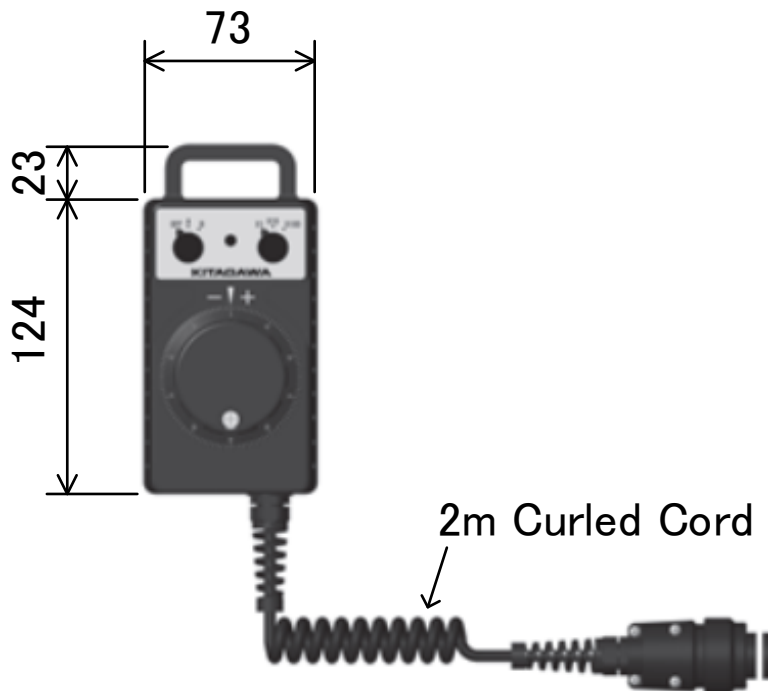
## **E9** Manual Pulse Generator 【OPTION】

**E9-1** 手動パルス発生器仕様

**E9-2** 手動パルス発生器外観

**E9-1** Manual Pulse Generator Specification

Operating Temperature Range	-10°C ~ 60°C
Storage Temperature Range	-40°C ~ 85°C
Weight	250g (excluding curled cord)
Protective Structure	Protection Class IP67
Power Supply Voltage	DC5V±10%
Maximum Current Consumption	150mA
Wire Rated Voltage	30V
Dial	Number of Clicks : 100 / 1 revolution Number of Pulses : 100Pulses / 1 revolution
Communication Type	Line Driver
Rotation Life Time	Dial : 1,000,000 rotation or more Selection Switch : 50,000 rotation or more

**E9-2** Manual Pulse Generator Appearance

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# ***F***      ***Maintenance***

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<b><i>F1</i></b>	Regular Inspection .....	F1-1
<b><i>F2</i></b>	Battery replacement .....	F2-1
<b><i>F3</i></b>	Setting and adjustment on maintenance menu .....	F3-1
<b><i>F4</i></b>	Memory card .....	F4-1
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# **F1** Regular Inspection

**F1-1** 定期点検

**F1-2** 寿命部品

**F1-1** Regular Inspection

The following is a description of the periodic inspections

Inspection Location	Time	Inspection Details	Response in case of abnormality
Enclosure	everyday	① Is there any dust accumulation? ② Is there any moisture or oil adhesion?	Cleaning by wiping with a rag.
All cables	Timely	① Are there any scratches or cracks on the cable exterior? ② Are there any loose connectors? ③ Are there any loose screws on the terminal block?	① Contact us if the cable needs to be replaced. ② Insert and connect the cable firmly all the way to the back. ③ Retighten the screws
Battery	Timely	Is the battery voltage 3.6VDC or higher?	Replace the battery



**F1-2** Lifetime Parts

Quinte has components that need to be replaced due to their life span. The estimated replacement time is as follows. The replacement time varies depending on usage conditions and installation environment.

Parts name	Standard Replacement Time	Description
Battery	4 Years	Remarks : The longer the controller is turned off, The earlier the replacement time. Solution : See [F2 Battery Replacement].
Servo Amplifier Main Circuit Smoothing Capacitor	5 Years	Usage Condition : Load Factor 50%, Ambient temperature 40°C Solution : For the servo amplifier replacement, Please contact us.
Servo Amplifier Cooling Fan Motor	5 Years	Usage Condition : Ambient temperature 40°C Solution : For the servo amplifier replacement, Please contact us.
Servo Amplifier Electrolytic capacitor in general	5 Years	Usage Condition : Ambient temperature 40°C, Annual operating time 4800h Solution : For the servo amplifier replacement, Please contact us.
Servo Amplifier Fuses	10 Years	Solution : For the servo amplifier replacement, Please contact us.
DC24V Power Supply Electrolytic Capacitor	10 Years	Usage Condition : Load Factor 60%, Ambient temperature 40°C Solution : For DC24V power supply replacement, Please contact us.
DC5V Power Supply Electrolytic Capacitor	10 Years	Usage Condition : Load Factor 60%, Ambient temperature 40°C Solution : For DC5V power supply replacement, Please contact us.
Surge Protector	—	Usage Condition : Impulse Current life (8/20 $\mu$ s 1000A) Approximate 500 times Solution : For surge protector replacement, Please contact us.

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## **F2** Battery replacement

**F2-1** Battery specifications

**F2-2** How to replace battery

## F2-1 Battery specifications

Quinte backs up data with a lithium battery.

For this reason, if any abnormality occurs to the lithium battery for backup, encoder data will be lost. If any defect occurs to the battery, replace the battery.

Battery details are described below.

Nominal voltage	3.6V
Standard capacity	2000mAh
Standard discharge current	10000 A
Operating temperature range	-55 to +85°C

## F2-2 How to replace battery

1. Open the cover of the APP box on the Quinte main body.(See Fig. F1-1)
2. Take out the lithium battery from the battery holder. (See Fig. F1-2)
3. Remove the connector connected to the lead wire on the battery.(See Fig. F1-3)
4. Connect a connector of the battery to be replaced and install the battery holder.

Securely connect so that the connector is not removed.



- Replace the battery when turning on the power.  
When replacing the battery with power OFF, it is necessary to re-set the machine origin position.

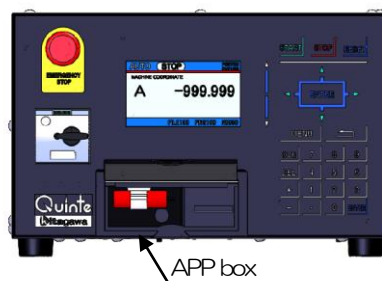


Fig F1-1 APP box

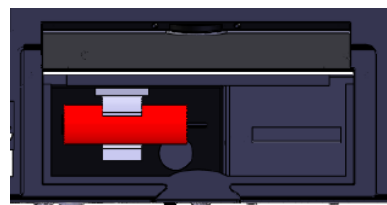


Fig F1-2 Battery holder



Fig F1-3 Connector

## **F3** Setting and adjustment on maintenance menu

Functions listed below can be set and adjusted at the time of maintenance.

(Refer to “B3-7” for how to display each maintenance screen)

- ◆ Configuration
  - Calendar & time setting
  - Brightness adjustment
  - Touch panel calibration
- ◆ DATA
  - Parameter initialization
  - Program clear
  - Servo parameter reset
- ◆ Adjustment
  - Line monitor
  - Auto notch filter tuning
  - Touch-panel test
- ◆ Update/setting
  - Firmware update
  - Servo amplifier firmware update
  - Rotary table parameter setting

**F3-1** Configuration

**F3-2** Data

**F3-3** Adjustment

**F3-4** Update/setting

## F3-1 Configuration

For configuration, various basic setting items for Quinte can be selected.





### F3-1-1 Calendar & time setting

Calendar and time such as alarm date and time, and program creating date and time use information displayed on this screen.

In addition, setting can be also performed on the “calendar & time screen” for maintenance.



How to set the calendar and time is described below.

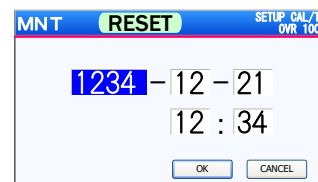
- ◆ When a screen is called, it is displayed as shown on the right. (How to call :  B3-7-1-1)

- ◆ Move the selected part (blue background) by cursor using  ,  ,  ,  .

The cursor moves in the order of Year - Month - Day - Hour - Minute - OK - Cancel .


- ◆ Move the cursor to the set and selected place and enter a numerical value.

Move the cursor to  after entering, and confirm with  .



Calendar & time setting screen






- Enter only last two digits of year.
- When any value exceeding each upper limit of month, day, hour or minute is entered, it becomes the maximum value (Example: If “20” is entered into the month column, “12” is set). When  is executed, the changed entered column is also not changed.

### F3-1-2 Brightness adjustment

Brightness of the liquid crystal display can be adjusted in 20 steps on the “Brightness adjustment screen.”

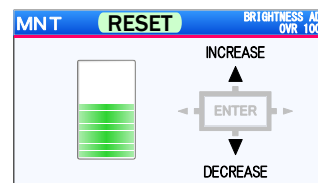
How to adjust is described below.

- ◆ When a screen is called, it is displayed as shown on the right (How to call :  B3-7-1-2)

- ◆ The screen increases brightness with  , and it decreases brightness with  .



- As brightness is increased, life of the liquid crystal becomes shorter. The life of a back light is in the state which luminosity deteriorates and becomes dark. However, it is not in the state where a screen becomes pitch-black.



Brightness adjustment screen

**F3-1-3** Touch panel calibration

- Touch panel calibration is an operation to correctly set an operation range of the touch panel. Improper operation causes incorrect key input.
- When performing this function, correctly set the position specified on the screen.

If there is any positional error between position on the touch panel and that on the panel sheet diagram, this function performs calibration by making the touch panel recognize the position on the front touch panel.

In addition, a method of a screen and the calibration displayed by the type of the software version and panel sheet of Quinte is different like the following table.

Quinte model	Panel sheet	
	QTC type	QTC**CS type
Quinte FW Ver	Sheet of touch panel (TP)	Sheet of Click emboss (CS)
FW 01.07.06	Method (B3-1-3-1) 4-point calibration	Not applicable ※1
FW 01.07.07	Method (B3-1-3-2) 3-point calibration of TP type	Method (B3-1-3-3) 3-point calibration of CS type

※ If it is not firmware after 01.07.07, the "sheet of the click emboss(CS)" cannot work normally.

**F3-1-3-1** Method A (Sheet of touch panel & Firmware of Quinte to 01.07.06)

## How to calibrate

- 1 When the touch panel calibration is selected on the maintenance menu screen, Fig. 1 Upper right is displayed. Press the upper right corner of the RESET key on the upper right of the touch panel as shown on the screen
- 2 Press the lower right corner of the ENTER key on the lower right of the touch panel subsequently after the screen is switched (Fig. 2 Lower right).
- 3 Press the lower left corner of the key on the lower left of the touch panel subsequently after the screen is switched (Fig. 3 Lower left).
- 4 Press the upper left corner of the START key on the upper left of the touch panel subsequently after the screen is switched (Fig. 4 Upper left).
- 5 When the screen returns to the maintenance menu screen, calibration is finished.

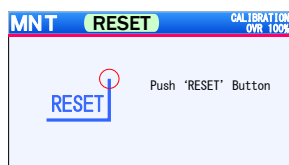


Fig F2-8-1\_1  
Upper right

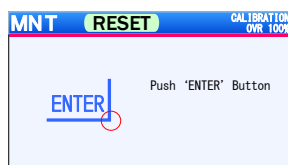


Fig F2-8-1\_2  
Lower right

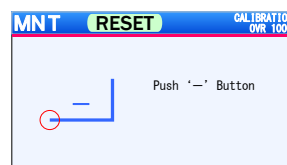


Fig F2-8-1\_3  
Lower left



Fig F2-8-1\_4  
Upper left

**F3-1-3-2** Method B (Sheet of Touch panel & Firmware of Quinte is after 01.07.07)

How to calibrate

- 1 When the calibration is selected on the maintenance menu screen, Fig. select is displayed.
- 2 In the case of a touch panel sheet , press the STOP .
- 3 It becomes the setting of calibration after the sheet selection.
- 4 As shown in the screen , and then press the top of the "S" of the RESET key on the upper right of the panel sheet. (Fig Upper right)
- 5 Press the center of the key on the lower right of the panel sheet after the screen is switched. (Fig. Lower left)
- 6 Press the center of the key on the center of the panel sheet after the screen is switched. (Fig. Center)
- 7 When the screen returns to the maintenance menu screen, calibration is finished.

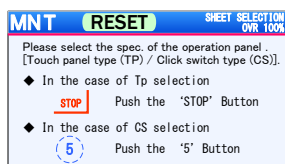


Fig select

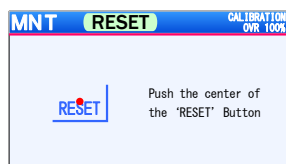


Fig Upper right

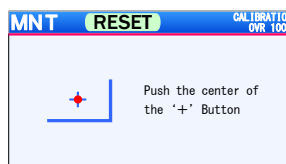


Fig Lower left

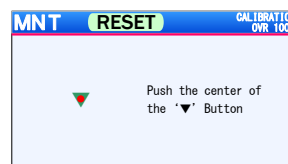


Fig Center

**F3-1-3-3** Method C (Sheet of click emboss & Firmware of Quinte is after 01.07.07)

How to calibrate

- 1 When the calibration is selected on the maintenance menu screen, Fig. select is displayed.
- 2 In the case of a sheet of click emboss , press the 5 .
- 3 It becomes the setting of calibration after the sheet selection.  
As shown in the screen , and then press the center of the RESET key on the upper right of the panel sheet. (Fig Upper right)
- 4 Press the center of the key on the lower right of the panel sheet after the screen is switched. (Fig. Lower left)
- 5 Press the center of the key on the center of the panel sheet after the screen is switched. (Fig. Center)
- 6 When the screen returns to the maintenance menu screen, calibration is finished.

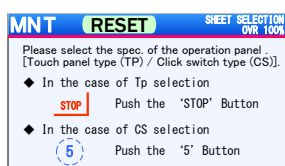


Fig select

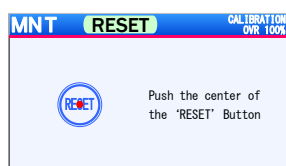


Fig Upper right

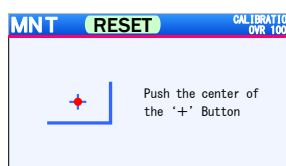


Fig Lower left

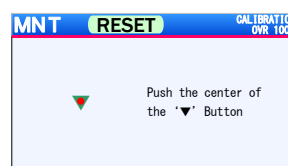


Fig Center

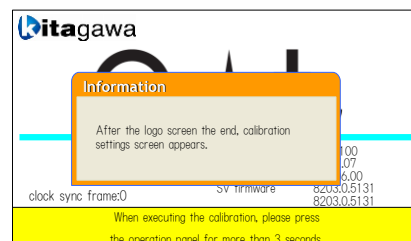
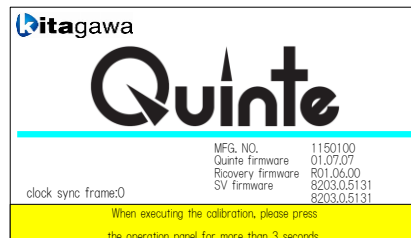


**F3-1-3-4** Method of forced execution of calibration

When an operation panel does not function, it is necessary to carry out calibration again. However, it is in condition not to be able to operate a panel and cannot call a calibration screen from a maintenance menu.

Therefore I show a method to launch it with a calibration mode at the time of power supply injection as follows.

1. Turn off a power supply of Quinte.
2. Start the power of Quinte, appears logo screen of Quinte from the loading screen appears.
3. When you press the logo screen at the operation panel for more than 3 seconds the pop-up is displayed . It will move to the logo screen after the end of calibration . After that please calibrate according to the setting method above.



**F3-2** Data

For data, initialization of programs, parameters, etc., for Quinte can be selected.

**F3-2-1** Data initialization function

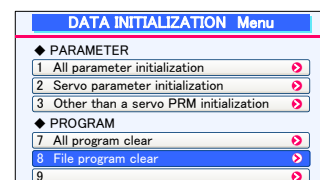


- When data is initialized, the parameters are initialized and the programs are cleared. There is no other method than recovery from the external data after execution, therefore, be sure to back up when performing this function.

This function can initialize programs, parameters and data.

Initialization items of the programs and parameters are as follows.

- ◆ Parameters
  - 1 All parameters clear
  - 2 Servo parameters clear
  - 3 Parameters clear other than servo parameters
- ◆ Programs
  - 1 All programs clear
  - 2 File program clear



Initialization selection screen

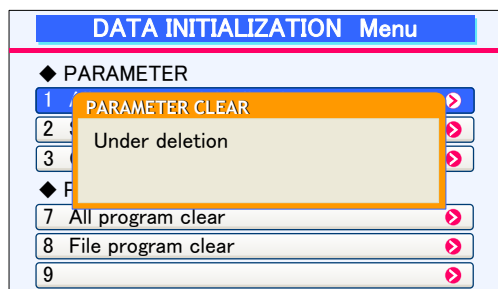
### F3-2-1-1 Parameters initialization

Types of initialization parameters for Quinte can be selected.

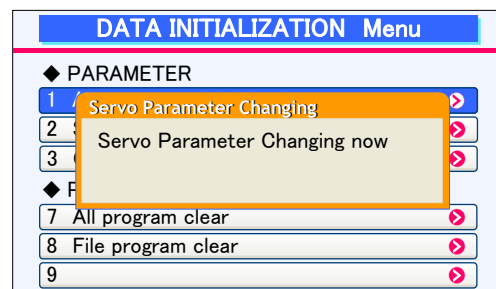
#### F3-2-1-1-1 All parameters clear (initialization)

This function can return all areas of the parameters to their initial values (How to call : B3-7-1-3)

During initialization, a popup of Parameter data clearing is displayed, and further a popup of Parameter data initializing is displayed.



Parameter data clearing



Parameter data initializing

#### How to clear

##### How to select with cursor

- 1 Display the initialization selection screen.
- 2 Set the cursor to “All parameters initialization” with , .
- 3 When ENTER is pressed, initialization is performed.

##### How to directly input

- 1 Display the initialization selection screen.
- 2 When 1 is pressed, initialization is performed.



- Execute initialization operation after sufficient confirmation.

#### F3-2-1-1-2 Servo parameters clear (initialization)

This function returns the areas (PRM5000 to PRM5999) of servo parameters to their initial values.

(How to call : B3-7-1-3)

#### How to clear

- 1 Display the initialization selection screen.

##### How to select with cursor

- 2 Set the cursor to “Servo parameters initialization” with , .
- 3 When ENTER is pressed, initialization is performed.


##### How to directly input

- 1 Display the initialization selection screen.
- 2 When 2 is pressed, initialization is performed.





- Execute initialization operation after sufficient confirmation.

**F3-2-1-1-3** Clear other than servo parameters (initialization)

This function returns the areas (Other than PRM5000 to PRM5999) other than servo parameters to their initial values. (How to call : B3-7-1-3)

How to clear

How to select with cursor

- 1 Display the initialization selection screen.
- 2 Set the cursor to “Other than servo PRM initialization” with  ,  .
- 3 When ENTER is pressed, initialization is performed.

How to directly input

- 1 Display the initialization selection screen.
- 2 When 3 is pressed, initialization is performed.




- Execute initialization operation after sufficient confirmation.

**F3-2-1-2** Program clear



Types of initialization parameters for Quinte can be selected.

**F3-2-1-2-1** All programs clear

This function clears all areas (file and program) of the programs. (How to call : B3-7-1-3)

How to clear

How to select with cursor

- 1 Display the initialization selection screen.
- 2 Set the cursor to “All programs clear” with  ,  .
- 3 When ENTER is pressed, initialization is performed.


How to directly input

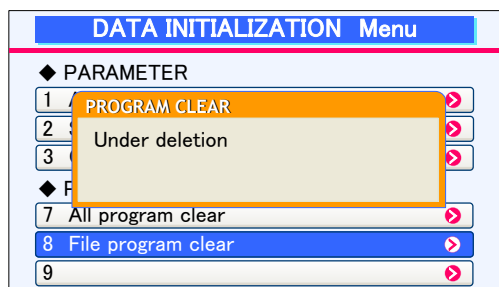
- 1 Display the initialization selection screen.
- 2 When 7 is pressed, initialization is performed.



- Execute initialization operation after sufficient confirmation.

**F3-2-1-2-2** File program clear


This function clears areas of the program presently selected. (How to call :  B3-7-1-3) During initialization, a popup of Program data clearing is displayed.



Program data clearing

## How to clear

## How to select with cursor

- 1 Display the initialization selection screen.
- 2 Set the cursor to "File program clear" with .
- 3 When ENTER is pressed, initialization is performed.

## How to directly input

- 1 Display the initialization selection screen.
- 2 When 8 is pressed, initialization is performed.



- Execute initialization operation after sufficient confirmation.

**F3-2-2** Servo parameter Reset

If you replaced the servo amplifier, such as maintenance, you will need to change the parameter settings in the servo amplifier.

Can be in the same state as the servo amplifier before replacement by writing the servo amplifier to force the values of servo parameters stored in Quinte by executing this command.

In F/W 01.09.00 or later, motor automatic setting starts when the power is turned on after resetting the servo parameter. During automatic setting, a pop-up "Servo parameter changing" is displayed. Alarm SY100 will occur after setting, please shut off and turn on the power again. If the motor can not be detected due to a servo alarm, automatic setting starts after the alarm is released.

**F3-3** Adjustment

For adjustment, various items used for startup or maintenance can be selected.

**F3-3-1** Line monitor

Communication data buffered in RMT mode can be displayed. For details of the line monitor functions, see "B13-7 Line monitor function".

**F3-3-2** Auto notch filter tuning

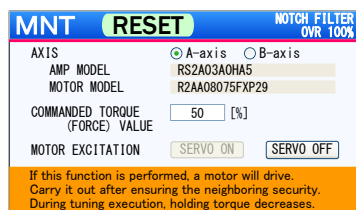
Mechanical systems have a resonance point (natural frequency), and loud sound (vibration) may occur due to amplification caused by the servo system. By setting notch filters for this kind of mechanical system resonance, vibration can be suppressed without lowering the overall servo gain. With the auto notch filter tuning function, notch filters are set automatically by operating the servo amplifier and servo motor for a short time to search for the resonance frequency of the mechanical system.


**CAUTION**

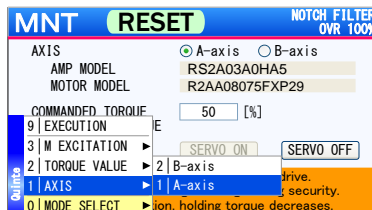
- Auto notch filter tuning is not possible while an alarm is occurring.
- If an alarm occurs during tuning or if the operation is cancelled, tuning is stopped and the notch filter setting is not changed.
- For 2 axes specifications, simultaneous tuning of both axes is not possible.
- When auto notch filter tuning is executed, 4 notch filters are tuned and they are automatically set as notch filters 1~4.
- When the extracted frequency is 2000Hz or more, notch filters are treated as disabled.

## Execution method

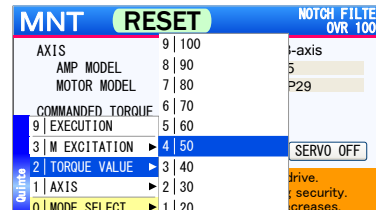
- 1 Select "Auto notch filter" with the cursor in the maintenance screen. When selected with the cursor, the auto notch filter tuning screen is displayed.
- 2 When [MENU] is pressed, the operation menu tab is displayed.
- 3 Select "1: AXIS" in the operation menu tab with the cursor.  
When selected with the cursor, the "1: AXIS" submenu tab is displayed.
- 4 Select the axis that will be tuned. (Initial value: A-axis)
- 5 Select "2: TORQUE VALUE" in the operation submenu with the cursor.  
When selected with the cursor, the "2: TORQUE VALUE" submenu is displayed.
- 6 Select a torque command value for executing tuning. (Initial value: 50%)
- 7 Select "3: M EXCITATION" in the operation submenu with the cursor.  
When selected with the cursor, the "3: M EXCITATION" submenu is displayed.
- 8 Select "2: SERVO ON" with the cursor. (Initial value: SERVO OFF)  
When selected with the cursor, the selected axis executes unclamping operation and excites the servo motor.
- 9 Select "9: EXECUTION" in the operation submenu with the cursor.  
When selected with the cursor, the servo motor starts operation, and executes tuning.  
While tuning, an "In progress" popup is displayed.  
※ If ENTER is pressed while tuning, tuning is cancelled. When cancellation processing is finished, the popup disappears and tuning ends.
- 10 If tuning ends normally, a "Completed" popup is displayed. The "Completed" popup displays the automatically set frequency value.
- 11 When ENTER is pressed, the "Completed" popup disappears and tuning ends.



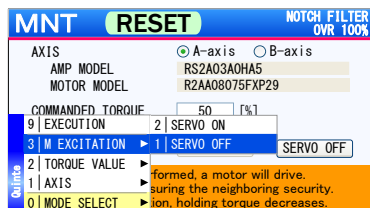
Auto notch filter tuning screen



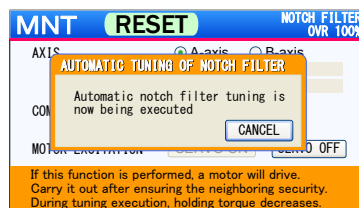
Shaft selection submenu



Torque command value submenu



Motor exciting submenu



Tuning in progress



Tuning completed

### F3-3-3 Touch-panel test mode

It is the mode which checks the reaction of a touch panel.

Selection of this command will display time on middle of the screen.

It displays the time when the key is pressed.

Because there is a problem with the touch panel if the time of the screen does not start, please contact our service department.

Moreover, if the key [returning] is depressed, it will return to a maintenance menu screen.

### F3-4 Update/setting

For update/setting, various update or parameter settings can be selected.

#### F3-4-1 Firmware update

This command is used when updating the firmware of Quinte.

For details, see the separate document indicated when the firmware is updated.

#### F3-4-2 Servo amplifier firmware update

Currently unavailable.

#### F3-4-3 Rotary table parameter setting

Currently unavailable.

## **F4** Memory card

### **F4-1** Prepare a memory card

**F4-1** Prepare a memory card

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Prepare a commercially available memory card in order to save parameters and backup of programs (export), and input parameters and programs from the outside (export) (Quinte has no attached memory card).

## ■ Memory specifications

Compatible format	FAT8	FAT16	FAT32	<sup>1</sup>
Memory capacity	Within 32GB <sup>2</sup>			
Form	Multimedia-card form			

- 1 Data quantity recordable in the memory depends on the format type.
- 2 The memory capacity has been confirmed for operation by us.
- 3 The small memory card which uses an adapter cannot be used.



## **F5** Holding servo motor position information

NC Rotary table servo motors are equipped with one of the following two encoders to hold the position data. Contact us if you are not sure which encoder-type motor is installed in your rotary table.

**F5-1** In the case of battery backup type encoder

**F5-2** In the case of battery less type encoder

**F5-1** In the case of battery backup type encoder

---

When Quinte power is turned off, the position of the encoders is retained by the power supply from the battery. In the following cases, the position information will be lost and the home position must be reset.

- The battery has reached the end of its service life. Or a fault has occurred.
- CB1Q cables have been disconnected.

To reset the origin, reset the alarm other than the alarm "SV220" (mechanical origin position setting request) and then refer to A4: How to set the origin.

**F5-2** In the case of battery less type encoder

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When Quinte power is turned off, the position of the encoders is retained even if no power is supplied from the battery. Therefore, any battery failure or disconnection of rotary table connection cable (CB1Q cable) will not lose its location.

However, in the following cases, the position information will be lost and the home position must be reset.

- An alarm "SV342" (serial-encoder communication error) has occurred.
  - The encoder cable is broken.
  - Quinte power was turned on when CB1Q cables were not connected.

To reset the home position, reset the alarm other than the alarm "SV220" (mechanical home position setting request), and then refer to A4: How to set the home position.

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