Two-Axis Controller for Remote-Micrometer

# **RMC-102**

User's Manual



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# For Your Safety

Before using this product, read this manual and all warnings or cautions in the documentation provided. Only Factory Authorized Personnel should be changes and/or adjust the parts of controller.

ed in This Manual
This symbol indicates where caution should be used
to avoid possible injury to yourself or others, or
damage to property.

The above indications are used together with the following symbols to indicate the exact nature of the warning or caution.

	Examples of Symbols Accompanying Warnings and Cautions
	riangleSymbols enclosed in a triangle indicate warnings and cautions. The exact nature of
14	the warning or caution is indicated by the symbol inside (the symbol at left indicates
	risk of electrocution).
	oSymbols enclosed in a circle mark indicate prohibitions(actions that must not be
	performed).The exact nature of the prohibition is indicates by the symbol inside or
	next to the circle mark (the symbol at left indicates that the product must not be
	disassembled).
	•Symbols inside a black circle mark actions that must be performed to ensure safety.
	The exact nature of the action that must be performed is indicated by the symbol
8-2	inside (the symbol at left is used in cases in which the AC adapter must be unplugged
	to ensure safety).

# Symbols on the product

The symbol mark on the product calls your attention. Please refer to the manual, in the case that you operate the part of the symbol mark on the product.



This symbol labeled on the portion calls your attention.



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- ① SIGMAKOKI CO., LTD. does not accept liability for damages resulting from the use of this product or the inability to use this product.
- ② SIGMAKOKI CO., LTD. does not accept liability for damages resulting from the use of this product that deviates from that described in the manual.
- ③ SIGMAKOKI CO., LTD. does not accept liability for damages resulting from the use of this product in extraordinary conditions, including fire, earthquakes, and other acts of God, action by any third party, other accidents, and deliberate or accidental misuse.
- ④ If the equipment is used in a manner not specified by the SIGMAKOKI CO., LTD., the protection provided by the equipment may be impaired.



- Do not use this product in the presence of flammable gas, explosives, or corrosive substances, in areas exposed to high levels of moisture or humidity, in poorly ventilated areas, or near flammable materials.
- Do not connect or check the product while the power is on.
- Installation and connection should be performed only by a qualified technician.
- Do not bend, pull, damage, or modify the power or connecting cables.
- Do not touch the products internal parts.
- Connect the earth terminal to ground.
- Should the product overheat, or should you notice an unusual smell, heat, or unusual noises coming from the product, turn off the power immediately.
- Do not turn on the power in the event that it has received a strong physical shock as the result of a fall or other accident.
- Do not touch the stage while operation.
- Use dry clothes only for cleaning the equipment.



# Introduction

RMC-102 is a two-axis controller for a Remote-Micrometer made by SIGMAKOKI CO., LTD. Remote-Micrometer is consisted with a small DC motor and a high resolution encoder.

RMC-102 is a high-precision feed-back controller. So positioning-time is not always same under the various conditions. This controller does not have a velocity control function, but has an easy velocity setting function.

This controller has two operation modes. One is 'Manual mode' in which using a joystick and buttons on the body. Another is 'Remote Mode' in which communicating commands with a PC with a USB cable.

Note) After positioning is completed, the feedback control is turned off, so the counter display may change if load is applied to the actuator drive section.

# **Before You Begin**

# **Package Contents**

Purchasers of the Remote-Micrometer Controller should find that the package contains the items listed below. Check the package contents using the following checklist. Contact your retailer as soon as possible in the event that you should find that any item is missing or damaged.

$\square$ RMC-102 $\operatorname{Remote-Micrometer}$ e Controller	:1
□User's Manual (This Manual)	:1
□AC Adapter	:1

Customers who control this product from a personal computer must separately purchase a USB 2.0 cable (mini-B).



# **Basic Operations**

Explained here are each part name and usage of this product.

# Power on

The procedure to turn on the power supply is as follows.

- 1. Depending on the configuration, connect the actuator to the MOTOR 1 connector and the MOTOR 2 connector on the back of the controller.
- 2. Connect the accessory AC adapter to DC 6V input plug on the back of the controller.
- 3. Connect the AC adapter to a power outlet.
- 4. Turn on the POWER switch on the left side of the controller.





# Names and Functions of Each Part Upper side view

This section explains the main screen displayed when the power is turned on. For other screens, please refer to "About setting function".

# A.Display panel

The coordinates and operation status of each axis and the function setting etc. are displayed.

# B.Button 1

Function name : Select axis

[Axis] is displayed on the display panel.

You can select the operation axis. The axis surrounded by the yellow frame is the selected axis.

Note: It does not affect joystick operation.



# C.Button 2

Function name : Theoretical origin return

[Zero] is displayed on the display panel.

Positioning starts toward the theoretical origin of the selected axis (the position of the coordinate value "0").

Refer to "Theoretical origin return" for details of operation.

# **D.Button 3**

Function name : Mechanical origin return

[Home] is displayed on the display panel.

Perform mechanical origin return of selected axis. Refer to "Mechanical origin return" for details of operation.

# **E.Shift Button**

Each time you press the button, it switches to the main button screen and the sub button screen. It can also be used in combination with other buttons.



For details on the function, refer to "About the setting function".



# **F.Stop Button**

Function name : All axis stop

Immediately stop the driving axis. This function always works in any state.

#### **G.Joystick**

The joystick can tilt the lever in four directions and rotate.

Tilting the lever drives the actuator. The axis and direction to be driven follow the settings on the display panel.

Rotate the lever slowly to move 1  $\mu$ m. When the lever is rotated while positioning is completed, movement of 1  $\mu$ m will start. The driving direction is positive for the clockwise rotation of the lever and negative for the counterclockwise rotation of the lever.

Operation of the joystick is not accepted when the actuator is in Busy state. (For the busy status, see "About the display panel".)

# Combined operation with Shift Button and other Buttons, Joystick Shift Button + Button 2

Function name : Theoretical origin position setting

Set the coordinate value displayed on the selected axis to "0".

# Shift Button + Stop Button

Function name : **Stop** 

Immediately stop only the selected axis. This function works even in remote mode, but when the panel lock function (see command list) is enabled, the Shift function is disabled, so only the Stop button function works.

#### Shift Button+Joystick lever rotation

#### Function name : Speed change

You can change the moving speed of the selected axis. The clockwise rotation of the lever changes to the high speed side, the counterclockwise rotation changes the speed bar to the low speed side.



# **Back side view**



# A.USB connector

USB 2.0 standard. The connector shape is USB Mini B female. %Supported drivers are only Microsoft Windows.

# **B.MOTOR1** connector

<u>Please connect our exclusive actuator.</u> The displayed axis is M1.

### C.MOTOR2 connector

Please connect our exclusive actuator. The displayed axis is M2.

# **D.DC6V** connector

Please connect the dedicated AC adapter included with this product.

# E.FG Terminal

This is a terminal for connecting the frame ground. Be sure to ground it before use depending on usage situation.

# Left side view



# A.POWER switch

Function name : Power button

When ON, the motor and the encoder are turned on and the connected actuator can be controlled. In addition, the coordinate value of each axis which was stored in memory last time is displayed.

When OFF, the coordinate value at power shutdown is stored. CAUTION: Connect the AC adapter and turn on the POWER switch. Doing it

in different order may cause malfunction.



# About setting function

Press the Shift button to switch to the sub button screen for use.



# A.Setting

When Button 1 is pressed, setting screen of each function is displayed. Yellow frame indicates currently selected function.

# **B.LED Off**

When Button 3 is pressed, the display panel turns off. While the display panel is off, only the joystick operation, Stop button and remote mode are enabled. Pressing any of the buttons light up again the display panel and restores all functions in manual mode.



# Setting 1/3

表示パネルの明るさの設定と制御する軸の指定を行います。



Joystick lever rotation: You can change the set value or select it.

A.Select: Press Button 1 to switch the selected function. When you go to the end, you will return to the first setting screen.

Yellow frame is indicating selected function.

B.Ok: When Button 2 is pressed, the settings of each changed function are saved and the screen returns to the sub button screen.

The setting function is changed immediately.

C.Cancel: When Button 3 is pressed, the setting returns to the setting Before entering the setting screen and returns to the sub button screen.

The following explains each function.

#### **Back Light**

Change the brightness of the display panel. The screen becomes dark when the bar is set to Low, and the screen becomes brighter when it is set to High. %The factory setting is the maximum on the High side.

#### Axis Enable

Specify the axis to be controlled.

M1: Only the M1 axis can be controlled. M2 axis is not displayed.

M2: Only the M2 axis can be controlled. M1 axis is not displayed.

All: Controls both M1 and M2 axis.

XThe factory setting is "All".

# Setting 2/3

Sets the moving speed of the M1 axis and M2 axis when returning to the mechanical origin.

		Set	ting 2/3	USB >
H	ome S Low	peed	M1	- High
H	lome S Low	peed	M2	— High
S	elect		0*	Carcel
А		В		С

The operations of the joystick and button are the same as the setting screen 1

# Home Speed M1

Sets the moving speed of the M1 axis when returning to the mechanical origin. At the maximum on the High side, the movement speed may be higher than the MAX speed of the actuator.

\*The factory setting is the maximum on the High side.

# Home Speed M2

Sets the moving speed of the M2 axis when returning to the mechanical origin. At the maximum on the High side, the movement speed may be higher than the MAX speed of the actuator.

\*The factory setting is the maximum on the High side.



# Setting 3/3

Set whether to confirm before operation.

	Setti	<b>ng</b> 3/3	USB >
Con	firm Menu Enat	oled Di	sabled
Sel	ect 0		Cance 1
	/		
А	В		С

The operations of the joystick and button are the same as the setting screen 1.

# **Confirm Menu**

Set whether to confirm before operation. Zero button, Shift button + Zero button, Home button are affected by this function.

Enabled : Assign OK to Button 2 and Cancel to Button 3. Press OK to execute the operation, and press Cancel will not execute the operation.

Disabled : Confirmation before operation is not done. Execute the function after pressing the button.

\*The factory setting is Enabled.



# Manual mode

The method of controlling the actuator connected by using the joystick and buttons on the main unit is called manual mode.

For the operation, please refer to the Upper side view section of " Names and Functions of Each Part ".

# About the display panel

"USB" is green when connected to the computer via USB, and red when not connected.

- A. Model name: This product number.
- B. Name of axis: Name can be changed from remote mode. Refer to "Axis name setting".
- C. Coordinate value: Displays the coordinate value of the encoder built into the connected actuator. The display unit is [mm].
- D. Busy state: "B" is displayed when the connected actuator is in the moving state. When positioning is completed, it will be in stopped state. "B" is not displayed when stopped.

X Feedback control is performed, and it may take time to complete positioning due to load conditions during driving.

\*Feedback control is turned off in the stopped state. When load is applied to the actuator drive part, the counter display may change.



E. Stroke end status: "L +" when sensing the positive stroke end, "L -" is displayed when sensing the negative direction stroke end, and the coordinate value is displayed in red. Coordinate values when the stroke end is not sensed are displayed in green.

When the stroke end is sensed, the moving actuator immediately stops.

F. Speed bar: Displays the currently set moving speed. This is the setting applied for moving operation other than the "mechanical origin return" and the "electrical origin return".

\*\*The Speed bar will be changed even if it is changed by "Speed setting" of remote mode.



# **Remote mode**

The method of sending and receiving communication commands to and from the PC via the USB cable to control the actuator is called remote mode.

When doing the remote mode, you need to install the device driver in the personal computer.

Install the device driver before connecting this product to the computer.

Please install the device driver with administrator privileges.

# Obtaining the device driver

Please download the device driver from our website below.

# <URL>

https://jp.optosigma.com/en\_jp/software\_\_usb

# Installing the device driver

To install the device driver, follow the procedure below.

- 1. Extracting the acquired device driver.
- 2. Invoking the installer.

The explanation and screen are examples of Windows 10 64 bit version.



# Extracting the acquired device driver

First unzip the device driver compressed in ZIP format.

In this example, the decompression function of Windows 10 is used.



Stsw-stm32102 is created under the Download folder.



📕   🕗 📙 🖛	管理	en.stsw-stm32102				
ファイル ホーム 共有 表示	アプリケーション ツール					~ (
オ インクアクセス コピー 貼り付け □ ショート クリックアインス コピー おり付け □ ショート クリップボード	り コピー カットの貼り付け 移動	た コピー先 発 空 空 空 空 の 一 、 の に 一 、 の で 、 の で 、 の で の の の の の の の の の の の の の	10 新しいアイテム▼ 新しい フォルダー 新規	<ul> <li>ブロパティ</li> <li>○ 編集</li> <li>② 履歴</li> <li>聞く</li> </ul>		
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# Invoking the installer

Go to stsw-stm32102 and run VCP\_V1.5.0\_Setup\_W8\_x64\_64bits.

In the above example, VCP\_V1.5.0\_Setup\_W8\_x64\_64bits is executed with administrator privilege from the right-click menu.

If the User Account Control dialog box is displayed, please press "Yes" to proceed.





When the installer starts up, please press "Next>" to proceed.

The Customer Information, Choose Destination Location screen continues.

Enter the appropriate information and press "Next>" to proceed.

InstallShield Wizard	×
Customer Information	
Please enter your information.	
liser Name:	×
	es.
Company Name:	
	in the following folder.
	install to a different
Install this application for:	luer.
⊂ Only for <u>m</u> e (admin)	
InstallShield	
< Back Next > Cancel	B <u>r</u> owse
II Istalio fileto	
	Cancel



InstallShield Wizard	×
Setup Status	
Virtual Comport Driver Setup is perf	orming the requested operations.
Removing backup files	
InstallShield	Cancel

After the Setup Status screen above, you will see the following screen.

デバイス ドライバのインストール ウィザード	
	テバイス トライバのインストール ウィザートの開始
	このウィザードでは、いくつかのコンピュータ デバイスを動作させるために 必要なソフトウェア ドライバをインストールします。
	続行するには、「次へ」をクリックしてください。
	< 戻る( <u>B</u> ) 次へ( <u>N</u> ) > キャンセル

If you want to continue the installation, press "Next>" to proceed.

デバイス ドライバのインストール ウィザード		
	テバイストライバのイン	ストール ウィザードの完了
	ドライバは、正しくこのコンピュータ	にインストールされました。
	今、このコンピュータにデバイスを打 合は、最初に説明書をお読みくだ	接続できます。デバイス付属の説明書がある場 ざさい。
	ドライバ名	状態
	STMicroelectronics (us	使用できます
	< 戻る(」	3) 完了 キャンセル

When the installation is complete, the screen above will be displayed. Press "Finish" to proceed.

InstallShield Wizard	-
	InstallShield Wizard Complete Setup has finished installing Virtual Comport Driver on your computer.
	Your Internet connection can be used to make sure that you have the latest updates. Yes, check for program updates (Recommended). Please ensure that you're connected to the
	C No, skip this step.
	K Back Finish Cancel

When the installation is completed, it switches to the screen above. Press "Finish" Please finish installing the device driver.



If the installation is successful and the product is connected to the personal computer via USB, it will be recognized from the PC as virtual COM.

The virtual COM is recognized from the device manager as follows.





# About communication setting

USB is used as a virtual COM port. Communication settings for controlling as a serial port are as follows.

communication speed	9,600bps
data bit	8bit
parity	None
stop bit	1bit
flow control	None
delimiter	CR+LF

# **About Communication Command**

- The command format is text method and the data length is mainly variable type.
- The text you enter may be either uppercase or lowercase letters.
- Be sure to accompany the delimiter at the end of the transmission data.
  - There are two types of replay data, [command reception] and [acquired data], and delimiters are always attached to the end of the reply data.

[Acquired data] is replying the acquired contents of each command, see the description of each command for the details.

[Command acceptance] returns the acceptance status of transmission data.

OK ••• Successful command acceptance

NG ••• Command acceptance failed

When NG is returned, the format of the communication command is incorrect. Please check that there is no mistake of the input format, the value is not outside the input range and the presence or absence of the delimiter.

- For the reply data format of each command, refer to "Communication command list".



Item	Function	Command	Reply data
Drive related	Mechanical origin return	H:	OK or NG
	Relative movement setting	M:	OK or NG
	Absolute movement setting	A:	OK or NG
	Jog move setting	J:	OK or NG
	Start movement	G:	OK or NG
Control	Electric home position setting	R:	OK or NG
setting	Stop	L:	OK or NG
related	Speed setting	D:	OK or NG
	Manual mode switching	Р:	OK or NG
Status	Acquire overall status	Q:	Acquired data
	Acquisition of positioning status	!:	Acquired data
Equipment	Axis name setting	Z:AA	OK or NG
settings	Control axis setting	Z:EA	OK or NG
	Display panel brightness setting	Z:BL	OK or NG
Equipment	Get product name	?:N	Acquired data
information	Get serial number	?:S	Acquired data
	Get date of manufacture	?:B	Acquired data
	Get version information	?:V	Acquired data
	Get revision information	?:-	Acquired data
	Get axis name	?:AA	Acquired data
	Get control axis	?:EA	Acquired data
	Get brightness of display panel	?:BL	Acquired data

# **Communication command list**



# Axis movement related command description

# Mechanical origin return

Function: Start mechanical origin return of the specified axis. For details, refer to "Mechanical origin return".

When this command is sent to the axis in the busy state, "NG" is returned.

Format : H: [axis]

Parameters

[axis] : Axis specification

 $1 \cdot \cdot \cdot M1$  axis

 $2 \cdot \cdot \cdot M2$  axis

 $W \cdot \cdot \cdot All axes (M1, M2)$ 

Example : H:2 Start mechanical origin return of M2 axis.



#### **Relative movement setting**

Function: Sets the direction and amount of movement from the current position of the specified axis. There are two types of formats, single axis setting and all axis setting. The movement speed depends on the value of the Speed bar on the display panel.

\*Movement will not start unless driving is started immediately after relative movement setting.

Format 1 : M: [axis][dir]U[posi]

Parameters

[axis] : Axis specification

 $1 \cdot \cdot \cdot M1$  axis

```
2 \cdot \cdot \cdot M2 axis
```

*[dir]* : Direction of movement

+ • • • Positive counting direction

• • • • Negative counting direction

*[posi]* : Amount of movement

 $0 \sim 9999999 \cdots$  Unit [µm], number only

XSigns and symbols cannot be added.

Example : M:1-U1050 Movement setting -1.05 mm from current value of M1 axis.

Format 2 : M:W[dir1]U[posi1] [dir2]U[posi2]

#### Parameters

[dir1] [dir2] : M1 axis movement direction, M2 axis movement direction

+ • • • Positive counting direction

• • • • Negative counting direction

[posi2] [posi2]: M1 axis movement amount, M2 axis movement amount

0∼9999999 · · · Unit [µm], number only

XSigns and symbols cannot be added.

Example : M:W-U1050+U382 The movement setting is -1.05 mm from the current value of the M1 axis and +0.382 mm from the current value of the M2 axis.

#### Absolute movement setting

Function: Sets the direction and amount of movement from the electrical home position (coordinate value 0) of the specified axis. There are two types of formats, single axis setting and all axis setting. The movement speed depends on the value of the Speed bar on the display panel. \*Move does not start unless driving is started immediately after absolute movement setting.

Format 1 : A: [axis][dir]U[posi]

#### Parameters

[axis] : Axis specification

 $1 \cdot \cdot \cdot M1$  axis

```
2 \cdot \cdot \cdot M2 axis
```

*[dir]* : Direction of movement

+ • • • Positive counting direction

• • • Negative counting direction

*[posi]* : Amount of movement

 $0 \sim 9999999 \cdots$  Unit [µm], number only

XSigns and symbols cannot be added.

Example : A:1-U500 Move Set to the absolute coordinate value of M1 axis to -0.5 mm.

Format 2 : A:W [dir1]U [posi1] [dir2]U [posi2]

#### Parameters

[dir1] [dir2] : M1 axis movement direction, M2 axis movement direction

+ • • • Positive counting direction

• • • • Negative counting direction

[posi2] [posi2]: M1 axis movement amount, M2 axis movement amount

0~999<del>,</del>999 · · · Unit [µm], number only

XSigns and symbols cannot be added.

Example : A:W-U500+U10010 Movement setting is made to absolute coordinate value of M1 axis - 0.5 mm, absolute coordinate value of M 2 axis +10.01 mm.

# Jog move setting

Function: Set to start jog movement for the specified axis specified direction. After sending the "Start movement" command, it moves until the stop command is accepted. There are two types of formats, single axis setting and all axis setting. The movement speed depends on the value of the Speed bar on the display panel.

\*The jog movement does not start unless it is started immediately after jog movement setting.

\*Changing the speed setting while the axis is moving will take effect immediately.

#### Format 1 : J: [axis][dir]

#### Parameters

[axis]: Axis specification

 $1 \cdot \cdot \cdot M1$  axis

 $2 \cdot \cdot \cdot M2$  axis

*[dir]* : Direction of movement

+ • • Positive counting direction

••• Negative counting direction

Example : J:1- M1 axis is set for driving in the Negative counting direction.

#### Format 2 : J:W[*dir1*] [*dir2*]

#### Parameters

[dir1] [dir2] : M1 axis movement direction, M2 axis movement direction

+ • • • Positive counting direction

• • • Negative counting direction

Example : J:W-+ M1 axis is set to negative counting direction, and M2 axis is set to positive counting direction.



# Start movement

Function: When transmitting immedia	ately after "Relative movement			
setting" "Absolute movement setting"	"Jog movement setting", the			
actuator starts moving according to the setting.				
${\ensuremath{\mathbb K}}$ If this command is sent other that	n immediately after the above			
command, "NG" will be returned.				
$\ensuremath{\textup{\ensuremath{\mathbb{K}}}}$ "NG" will be returned if the busy state axis is included in the axis to				
start movement.				
Format : G:				
Example : Send 1 J: 2+ Re	eceived OK			
Jog movement setting in M2 axis + direction				
Send 2 G: Re	eceived OK			
Jog start movement started				
Send 3 M: W + U1000 - U1000 Re	eceived OK			
M1 axis + 1 mm, M2 axis - 1 mm Relative movement setting				
Send 4 G: Re	eceived NG			
Error because M2 axis is Busy state				
Send 5 M: 1 + U1000 Re	eceived OK			
M1 axis +1 mm relative movement setting				
Send 6 G: Re	eceived OK			
Although the M2 axis is in Busy state, the M1 axis is in a				
stopped state and relative movement is started.				



# Control setting command description Electric origin setting

Function: Replaces the current coordinate value of the specified axis with "0".

When this command is sent to the axis in the busy state, "NG" is returned.

Format : R: [axis]

Parameters

[axis]: Axis specification

 $1 \cdot \cdot \cdot M1 \text{ axis}$   $2 \cdot \cdot \cdot M2 \text{ axis}$  $W \cdot \cdot \cdot \text{All axes (M1, M2)}$ 

Example : R:W Set electric origin of M1 axis and M2 axis.

#### Stop

Function: Immediately stop the specified axis while driving.

Format : L: [axis]

Parameters

[axis] : Axis specification

 $1 \cdot \cdot \cdot M1$  axis

- $2 \cdot \cdot \cdot M2$  axis
- $W \cdot \cdot \cdot All axes (M1, M2)$

Example : L:1 Immediately stop M1axis.

\*Feedback control is turned off in the stopped state. When load is applied to the actuator drive part, the counter display may change.



# Speed setting

Function: The movement speed of the specified axis is set, and the Speed bar of the display panel is also changed. If you specify a moving axis, change the moving speed to the moving actuator immediately after accepting the command. There are two types of formats, single axis setting and all axis setting.

**CAUTION**: Even for the actuators with the same product model number, the moving speed may be different depending on the individual difference. Format 1 : D: *[axis]* J*[spd]* 

Parameters

[axis] : Axis specification

1 • • • M1 axis

 $2 \cdot \cdot \cdot M2$  axis

*[spd]* : Step speed

 $1 \sim 8 \cdot \cdot \cdot 1$  is the lowest speed, 8 is the maximum speed %When it is 8, it may be the speed equal to or higher than the MAX speed of the actuator.

Example : D:1J5 Change the movement speed of M1 axis to 5.

Format 2 : D:WJ[spd1] J [spd2]

#### Parameters

[spd1] [spd2]: M1 axis step speed, M2 axis step speed

 $1 \sim 8 \cdot \cdot \cdot 1$  is the lowest speed, 8 is the maximum speed

When it is 8, it may be moving speed more than the MAX

speed of the actuator.

Example : D:WJ5J8 Change M1 axis to 5, M2 axis 8 moving speed.



# Manual mode switching

Function: You can change the operation and the enable or disable of the function of the manual mode. When disabled, "Lock" is displayed on the upper right of the display panel.



\*The Stop button is valid in any state.

When there is an axis in the busy state, "NG" is returned when this command is transmitted.

Format : P:[sw]

Parameters

*[sw]* : Enable / Disable

 $0 \cdot \cdot \cdot$  Manual mode enabled

 $1 \cdot \cdot \cdot$  Manual mode disabled

Example : P:0 Disable manual mode function.

# Status command description

When the actuator is moving, use the two types of status commands to check the busy status of each axis. There are communication commands that can not be accepted in Busy state when sending movement and control related commands subsequently.

Since the feedback control is off at the completion of positioning, even if the movement state is R, the counter display may fluctuate if load is applied to the actuator drive section. Even if the counter display fluctuates, the moving state remains R.



#### Acquire overall status

Function: Returns the coordinates and status of the actuator.

Format : Q:

Reply format : [cont1], [cont2], [err], [stat1], [stat2]

#### Parameters

[cont1] [cont2] : Encoder coordinate value of M1 axis, Encoder coordinate value of M2 axis

 $0 \sim \pm 999,999 \quad \cdot \quad \cdot \quad \text{Unit [µm], fixed length of 7 digits}$ 

The format consists of signs (+, -) and spaces.

*[err]* : Error detection

- K  $\cdot \cdot \cdot$  Normal state
- $O \cdot \cdot \cdot Overflow$
- A • Other

[stat1] [stat1]: M1 axis movement state, M2 axis movement state

- B  $\cdot \cdot \cdot$  Busy state, actuator moving
- R  $\cdot \cdot \cdot$  Positioning completed, actuator stopped state
- $C \quad \cdot \quad \cdot \quad \text{Detects the stroke end on the positive side}$
- W ••• Detects the stroke end on the negative side
- E ••• Invalid axis control

It is not set with "Axis Enabled" from "Setting" of control axis setting command or display panel.

Example : Send Q:

Receive + 10044, - 444, K, R, W :: Represents a space The coordinate of M1 axis is +10.044 mm, positioning is completed.

The coordinate of M2 axis is -0.444 mm, negative side stroke end detection.

The controller operates normally.



# Acquisition of positioning status

Function: Returns the state of the actuator.

Format : !:

Reply format : [stat1], [stat2]

#### Parameters

[stat1] [stat1]: M1 axis movement state, M2 axis movement state

- B • Busy state, actuator moving
- $R \cdot \cdot \cdot Positioning completed, actuator stopped state$
- $C \quad \cdot \quad \cdot \quad \text{Detects the stroke end on the positive side}$
- W  $\cdot \cdot \cdot$  Detects the stroke end on the negative side
- E ••• Invalid control axis setting

It is not set with "Axis Enabled" from "Setting" of control axis setting command or display panel.

Example : Send !:

Receive B,C M1 axis is moving in busy state, M2 axis detects plus side stroke end



# Equipment setting command description

# Axis name setting

Function: The name of the specified axis is reflected on the display panel.

Format : Z:AA [axis] [name]

Parameters

[axis] : Axis specification

 $1 \cdot \cdot \cdot M1$  axis

 $2 \cdot \cdot \cdot M2$  axis

*[name]*: Up to 3 letters in half size upper case letters, letters that can be entered are alphanumeric characters and symbols.

Example : Z:AA1[X] Change the name of M1 axis to "[X]".

# **Control axis setting**

Function: Enable the control of the specified axis. Disabled axes are not displayed.

"NG" is returned when this command is transmitted when there is an axis in the Busy state.

Format : Z:EA [axis]

Parameters

*[axis]* : Axis specification

 $1 \cdot \cdot \cdot$  Valid only for M1 axis

 $2 \cdot \cdot \cdot \text{Valid only for M2 axis}$ 

 $W \cdot \cdot \cdot Valid$  for all axes (M1, M2)

Example : Z:EA2 Only M2 axis control is valid.

# **Display panel brightness setting**

Function: Sets the brightness of the display panel.

Format : Z:BL [blgh]

Parameters

*[blgh]* : Brightness stage

 $1 \sim 100 \cdots$  Brightness of backlight, 100 is Max of brightness.

Even if it is set to 1, the display panel will not turn off.

Example : Z:BL30 Change the brightness of the display panel to 30.



# Equipment information command description Product name acquisition

Function: Returns the name of this product. Format : **?:N** Reply content : It is only "RMC - 102".

# Serial number acquisition

Function: Returns the serial number of this product. Format : **?:S** Reply contents: 6 digit fixed length, only numbers Example : Send ?:N Receive 000004

# Date of manufacture acquisition

Function: Returns the date of manufacture of this product.
Format : **?:B**Reply contents: 6 digit fixed length, only numbers.
Reply format : yymmdd Year 20yy, mm (month), dd (day)
Example : Send ?:B
Receive 170420 Manufacturing date 20th April 2017

# Version information acquisition

Function: Returns the firmware version of this product. Format : **?:V** Reply contents: All five characters starting with V Example : Send ?:V Receive V1.00

#### **Revision information acquisition**

Function: Returns the firmware revision number of this product. Format : **?:-**Reply contents: All three characters Example : Send ?:-Receive 000

#### Axis name acquisition

Function: Returns the name of the specified axis.

Format : **?:AA**[axis]

Parameters

[axis]: Axis specification

 $1 \cdot \cdot \cdot M1$  axis

 $2 \cdot \cdot \cdot M2$  axis

\*\*The factory setting is "M1" for M1 axis and "M2" for M2 axis.

Reply contents: All three characters

Example : Send ?:AA1

Receive M1 The name of M1 axis is "M1"

# **Control axis acquisition**

Function: Returns the controllable axis. Controllable axes are displayed on the display panel.

Format : **?:EA** 

Reply format : [axis]

Parameters

*[axis]* : Controllable axis

1 · · · M1 axis
2 · · · M2 axis
W · · · All axes (M1, M2)
※The factory setting is "W".

Example : Send ?: EA

Receive W

All axes can be controlled.



# Brightness acquisition of the display panel



# On the operation of "Origin return"

The origin has a mechanical origin and an electric origin. The operation at "Origin return" is different.

# About "Mechanical origin return"

After mechanical origin return, set the display coordinate value to "0" as the mechanical origin position.

For the operation, refer to the following figure.



# About "Electric origin return"

Electric origin return will move to the position of coordinate value "0". The speed at that time is fixed to Speed 100.

