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Date: January 16, 2008

Announcement

Subject: Renewal of Elewave Series

This is to inform you that we will renew Elewave series as follows.

Discontinuation model: Electric Actuators Elewave Series
Main body: EWHRT□(Rotary Actuators), EWHA□(Electric Hands)
EWM5□□(NS Sliders)
Controller: EWHC-R (Controller for Rotary Actuators)
Cable: EWHK-□L (Catalog No. BK-C0024)

Discontinuation schedule: From March 1, 2008

Substitute model: Electric Actuators Elewave Series (Renewal products)
Main body: EWHRT□A (Rotary Actuators), EWHA□A (Electric Hands)
EWM5□□A (NS Sliders)
Controller: EWHC-RA (Controller for Rotary Actuators)
Cable: EWHKA-□L

Note1: The model code of EWHC-NH (Controller for NS Sliders and Electric Hands) is not changed but its case color will be changed (Blue → Silver gray)
Note2: As for other changing points of products, please refer to attached documents.

Please feel free to ask us for any questions.

Changing points of Elewave Series renewal

1. Model code will be changed

･Add "A" after model code of main body

･Example for change of model code

Products	Existing Model code	New Model code
Rotary Actuators main body	EWHRT3	EWHRT3A
Electric Hands main body	EWHA12	EWHA12A
NS Sliders main body	EWM5□S-20	EWM5□SA-20
Cable	EWHK-3L	EWHKA-3L

2. Detail of renewal

Items	Existing Model	New Model	Remarks
Outer appearance (Rotary)	Resin case 	Metal case 	Material of cover is changed from resin to metal.
Tube and connector (Common for All Elewave models)	Connector for existing model 	Connector for new model 	Down-sizing of the connector 
	Tube color: White 	Tube color: Black 	Change tube for wire protection In case of connecting new body to existing cable, conversion connector (EWTK) is necessary.
Controller	Blue color 	Silver gray color 	In accordance with changing color of actuator, color of the cover of controller is changed.

Elewave new & old conversion chart

How to check compatibility

Ex.) Controller model code "EWHC-NH(V2.00~) + EWHKA-□L" with main body model code "EWM5□□A"

When you see following compatibility chart, it is applicable because responding portion is marked "O"

Actuator model code	Actuator No.	Controller model (version) + Cable model			
		EWHC-H(~V1.01) + EWHK-□L	EWHC-H(V1.02~) + EWHK-□L	EWHC-NH(V2.00~) + EWHK-□L	EWHC-NH(V2.00~) + EWHA-□L
EWM5□□	30, 31, 32, 33	O[Note1]	O[Note1]	O	X
EWM5□□A		O[Note1,2]	O[Note1,2]	O[Note2]	**O**

Responding column

Note1: It is necessary to return the controller to manufacturer, to rewrite ROM data.
Note2: It is necessary to use with exchange cable "EWTK".

- **Explanation for each mark**

When responding column is marked "O", **it is applicable with the combination**
When responding column is marked with "Note", **it is applicable after adding parts, rewrite ROM data etc.**
When responding column is marked "X" **it is NOT applicable. Please contact us.**

- **Cautions**

This new & old conversion chart is as of Jan 7, 2008
Existing model as of Jan 7, 2008 is shown with red color.

1. Electric Rotary Actuators

(1) Point data input type controller

Actuator model code	Actuator No.	Controller model (version) + cable model				Actuator cable length	RoHS responding
		EWC-R + EWK-□L	EWHC-R + EWHK-□L	EWHC-RA + EWHKA-□L	EWHC-RS + EWHKA-□L		
EWRT3	60	O	O	X	X	250mm	X
EWHRT3, 5, 10, 20	61, 62, 63, 64	X	O	X	X	100mm	O[Note3]
EWHRT3A, 5A, 10A, 20A	61, 62, 63, 64	X	O[Note2]	O	X	100mm	O
EWHRT40A, 60A	65, 66	X	O[Note1,2]	O	X	100mm	O
EWHRT1A	50	X	X	X	O	100mm	O

(2) Pulse input type controller

Actuator model code	Actuator No.	Controller model (version) + cable model			Actuator cable length	RoHS Responding
		EWHCP-R + EWHK-□L	EWHCP-RA + EWHKA-□L	EWHCP-RS + EWHKA-□L		
EWRT3	60	X	X	X	250mm	X
EWHRT3, 5, 10, 20	61, 62, 63, 64	O	X	X	100mm	O[Note3]
EWHRT3A, 5A, 10A, 20A	61, 62, 63, 64	O[Note2]	O	X	100mm	O
EWHRT40A, 60A	65, 66	O[Note1,2]	O	X	100mm	O
EWHRT1A	50	X	X	O	100mm	O

Note1: It is necessary to return the controller to manufacturer, to rewrite ROM data.
Note2: It is necessary to use with exchange cable "EWTK".
Note3: Some were shipped without RoHS responding

2. Electric Hands

(1) Point data input type controller

Actuator model code	Actuator No.	Controller model (version) + cable model					Actuator cable length	RoHS responding
		EWC-H + EWK-□L	EWHC-H(~V1.01) + EWHK-□L	EWHC-H(V1.02~) + EWHK-□L	EWHC-NH(V2.00~) + EWHK-□L	EWHC-NH(V2.00~) + EWHKA-□L		
EWH12	83	O	O	O	O	X	250mm	X
EWHA12	83	O	O	O	O	X	250mm (100mm[Note3])	X
	84	O[Note1]	O	O	O	X	100mm	O
EWHA24	85	X	O[Note1,2]	O[Note2]	O	X	100mm	O
EWHA36	86	X	O[Note1,2]	O[Note2]	O	X	100mm	O
EWHA12A	84	X	O[Note1,2]	O[Note2]	O[Note2]	O	100mm	O
EWHA24A	85	X	O[Note1,2]	O[Note2]	O[Note2]	O	100mm	O
EWHA36A	86	X	O[Note1,2]	O[Note2]	O[Note2]	O	100mm	O

(2) Pulse input type controller

Actuator model code	Actuator No.	Controller model (version) + cable model		Actuator cable length	RoHS responding
		EWHCP-NH(V1.00~) + EWHK-□L	EWHCP-NH(V1.00~) + EWHKA-□L		
EWH12	83	X	X	250mm	X
EWHA12	83	X	X	250mm (100mm[Note3])	X
	84	O	X	100mm	O
EWHA24	85	O	X	100mm	O
EWHA36	86	O	X	100mm	O
EWHA12A	84	O[Note2]	O	100mm	O
EWHA24A	85	O[Note2]	O	100mm	O
EWHA36A	86	O[Note2]	O	100mm	O

Note1: It is necessary to return the controller to manufacturer, to rewrite ROM data.
Note2: It is necessary to use with exchange cable "EWTK".
Note3: The cable length of the products manufactured after June 2005 is 100mm.

3. NS Sliders

(1) Point data input type controller

Actuator model code	Actuator No.	Controller model (version) + cable model				Actuator cable length	RoHS responding
		EWHC-H(~V1.01) + EWHK-□L	EWHC-H(V1.02~) + EWHK-□L	EWHC-NH(V2.00~) + EWHK-□L	EWHC-NH(V2.00~) + EWHA-□L		
EWM5□□	30, 31, 32, 33	O[Note1]	O[Note1]	O	X	100mm	O
EWM5□□A		O[Note1,2]	O[Note1,2]	O[Note2]	O	100mm	O

(2) Pulse input type controller

Actuator model code	Actuator No.	Controller model (version) + cable model		Actuator cable length	RoHS responding
		EWHCP-NH(V1.00~) + EWHK-□L	EWHCP-NH(V1.00~) + EWHKA-□L		
EWM5□□	30, 31, 32, 33	O	X	100mm	O
EWM5□□A		O[Note2]	O	100mm	O

Note1: It is necessary to return the controller to manufacturer, to rewrite ROM data.
Note2: It is necessary to use with exchange cable "EWTK".

4. Teaching Box

Model code	Version	Controller model						RoHS responding
		EWC-R EWC-H	EWHC-R EWHC-H	EWHC-NH	EWHC-R□	EWHCP-R EWHCP-NH	EWHCP-R□	
EWTB	Ver. 1.00	O	O[Note3]	O[Note2]	X	X	X	X
	Ver. 2.00	O	O	O[Note2]	X	X	X	X
EWHTB	Ver. 1.00	X	O	O[Note2]	O[Note1]	O[Note1]	O[Note1]	O
	Ver. 2.00	X	O	O	O[Note1]	O[Note1]	O[Note1]	O
	Ver. 3.00	X	O	O	O[Note1]	O	O[Note1]	O
	Ver. 4.00	X	O	O	O	O	O	O

Note1: It is necessary to return the teaching box to manufacturer, to rewrite ROM data.
Note2: When connecting actuator is EWHA12, it is available. When connecting actuator is EWHA24, EWHA36, it is not available.
Note3: It is available except for additional function of controller

KOGANEI

ELEWAVE SERIES
NS SLIDERS

OWNER'S MANUAL Ver.2.0

Contents

Chapter 1 Safety Precautions

Thank you for purchasing the Elewave Series NS Sliders. This OWNER'S MANUAL describes the features and how to operate this product. Please read the manual carefully and use the product in a correct manner.

1-1 Safety

Always observe the safety instructions and precautions listed in this manual. Neglect of necessary safety measures or improper handling could result in product breakdown or damage, or in accidents that lead to injury to the user (person to set up, operator, or person to adjust or check, etc.).

1-2 Precautions

(1) Precaution for automatic operations

・To prevent injury, install an interlock device to prevent the operator from touching the moving parts of the NS Sliders.

(2) Precaution against pinched fingers, etc.

・Be careful to prevent fingers, etc., from being pinched by the NS Sliders' moving parts during transportation, teaching, or during operation.

(3) Operation not allowed in ambient atmospheres containing flammable gases, etc.

・The NS Sliders are not an explosion-proof specification. Do not use in ambient atmospheres containing flammable gases, flammable dust, or flammable liquids, etc. It could result in ignitions or explosions.

(4) Operation not allowed in locations subject to electromagnetic interference, etc.

・Do not use in locations subject to electromagnetic interferences, static electric discharges, or radio frequency interferences. It could result in erratic operations.

(5) Safety measures for tooling (such as pushing portion, etc.)

・Design and manufacture the tooling to prevent the occurrence of dangerous situations (such as workpieces to pop out or fall) due to cut-off or fluctuation of the power supply (electrical power, air pressure, etc.).

・If there is a danger that items pushed by the tooling could pop out or fall, take appropriate safety measures taking into consideration the size, mass, temperature, and chemical properties of the items.

(6) Precautions for controller checks

・To prevent electric shock when touching the outside terminal and connector of the controller during controller checks, etc., always switch off the controller power and turn off the power supply.

・Never touch the inside of the controller.

(7) Response to a damaged or defective NS Slider

・If any of the damage or defects listed below have been found, continuing use of the NS Slider is dangerous. Immediately stop the operation and contact us.

Description of damage or defect	Type of danger
Damage to machine harness or motor wiring	Electric shock, NS Slider's erratic operation
Damage to outer components of NS Slider	Damaged parts flying off during NS Slider's operation
Abnormal operation of NS Slider (position deviation, vibrations, etc.)	NS Slider's erratic operation

(8) Precaution for contact with high-temperature portions of the motor or controller

•The motor and controller will be very hot in some areas after automatic operations, and touching those areas may cause burns. For checks, etc., first cut the power to the controller, wait for the areas to cool down, confirm the cooled temperature, and then handle those areas.

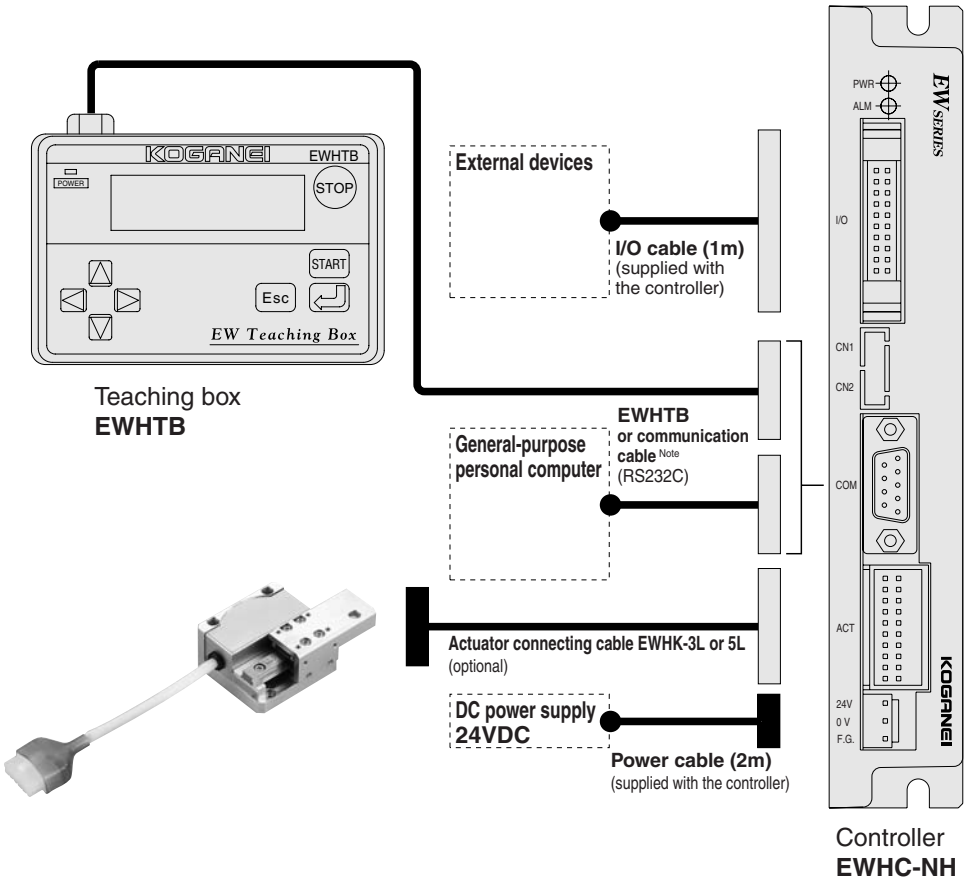
(9) Protective ground

•Always ground the controller to protect it against electric shock.

Chapter 2 System Configuration

2-1 Entire system configuration

The NS Slider consists of the following major components.



Note: RS232C cable (reference)
Specifications: D-sub 9 pin⟷D-sub 9 pin and cross cable
Model: C06N-09FS-09FS-CROSS
Manufacturer: Misumi Corp.
Regarding the communication cable, please purchase it separately.

2-2 Options and accessories

1. When Option -C (with controller EWHC-NH) is selected, the controller EWHC-NH and the following accessories are packaged together with the main unit. Please check that they are included with your unit at the time of unpacking.
   Power cable (1 piece)
   I/O cable (1 piece)

2. When Option -3L or -5L (the cable connecting the NS Sliders main unit and the controller) is selected, the cable (-3L: cable length 3m, -5L: cable length 5m) is included in the package. Please check that it is included with your unit at the time of unpacking.

2-3 Setting up for operation

	Procedures		Reference section
Installation and connection	Installation		3-2 4-2
	Wiring	Connect the power supply, controller, actuator, and personal computer or teaching box.	4-1 4-2
	Power supply on		4-2
Settings	Actuator number setting	Set the specified actuator number. Note	4-4
	Parameter changes	Set the parameter data in accordance with the operating conditions.	4-8
	Point data entry	Enter point data suitable for the operation.	4-5
	Test operations	Check that it operates normally.	4-3
Operations	Main operations	Use the set point data and START signal to run the desired operation. For continuous operations, use a programmable controller or other external devices to control operations.	4-3

Note: When you purchase the actuator and controller as a set, the controller's actuator number is set to the specified actuator number at the time of shipping.

Chapter 3 Main Unit

3-1 Handling main unit

3-1-1 Precautions

(1) Do not apply repeated bending or tensile force to the lead wire. Moreover, never grab the lead wire to carry the main unit. It could cause a broken wire.
(2) Do not apply an external force to the workpiece while the workpiece is attached. Applying excessive external force could cause damage to parts.
(3) Restrictions on operation
The stepping motor could cause a rise in temperature under certain operating conditions. Use the NS Sliders within the operating temperature range.
Use of the NS Sliders in conditions exceeding the operation limits could result in damage or in burning of the motor.
(4) Operating sound
Some operating conditions such as operating speed or a mounted workpiece etc., could cause the operating sound to be higher, but this is not a fault.

3-2 Mounting

3-2-1 Mounting the main unit

(1) The mounting surface should be flat. Twisting or bending during the mounting could result in defective operation or degraded performance.
(2) Avoid scratching or denting the mounting surface of the main unit, because this could cause a detrimental effect on mounting accuracy.
(3) In cases where screws may be loosened due to shocks or vibrations, consider taking the screw loosening preventive measures.
(4) Use the counterbores on the bottom to install the main unit in place.

3-2-2 Mounting a workpiece

(1) When mounting the workpiece, always use screws that are shorter than the thread depth. Using a screw longer than the thread depth could cause defective operations.
(2) When fastening screws for mounting the workpiece, tighten the screws within the allowable torque range.

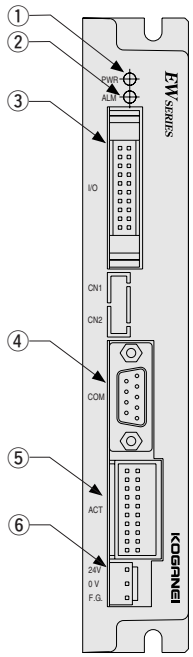
Mounting position	Screw size	Thread depth (mm)	Maximum tightening torque (N·m)
Tapped holes on the table	M3	4	0.63

※ For the outline drawings, see P. 34 and 35.

Chapter 4 Controller

4-1 Appearance and functions

① POWER LED
Lights up when the power supply is turned on.
② ALARM LED
Displays the controller state.
(See the table below.)
③ I/O connector
Use the supplied I/O cable for connecting to sensor switches or an external programmable controller, etc.
④ COM connector
This is the connector for connecting to the RS-232C terminal on a personal computer, or the teaching box, etc.
⑤ ACT connector
This is the connector for connecting to the main unit.
⑥ Power connector
Connects the supplied power cable to supply 24VDC.



Description	LED condition
Alarm occurs	Lights up
Error occurred	Quick blinking (ON: 0.25s, OFF: 0.25s)
Origin return not completed	Slow blinking (ON: 0.5s, OFF: 1.5s)
Normal	Not lit

4-2 Installation and connection to external devices

4-2-1 Controller installation

(1) Installation
Use M4 screws onto the 5mm U-groove on the back of the controller to secure it in place against an object with good thermal conductivity.
(2) Installation environment
- Install in locations with an ambient temperature of 0 to 40℃, humidity of 35 to 85%, and no condensation.
- Install providing adequate space around the controller (20mm or more) with good ventilation.
- Avoid installing locations subject to corrosive gases including sulfuric acid and hydrochloric acid, and in ambient atmospheres containing flammable gases or liquids, etc.
- Install in locations that are almost free of dust and particulates.
- Avoid installing in locations subject to metal chips, oil, or water from other equipment.
- Avoid installing in locations subject to electromagnetic or electrostatic noises.
- Install in locations that are free from large vibrations.

4-2-2 Connecting the power supply

(1) Power supply
- Connect the power cable to the power supply with a capacity of 24VDC±10% and 0.6A or more.
- Connector: B 3PS-VH (JST Mfg. Co., Ltd.)

The connector pin number table

No.	Signal name	Wire color	Description
1	24V	Red	Power supply
2	0V	Blue	
3	F.G	Green	Ground

Caution: Supply of an unstable power voltage to the controller will cause alarm shutdowns or abnormal operations. Take adequate care, therefore, in selecting a 24V power supply. Ensure a power supply with good stability as possible.

(2) Power supply connection method

- Use the supplied power cable for connecting to the power supply. Pay particular attention to the wire polarity to prevent mis-wiring when connecting wires. Wrong connections could result in fire or other dangerous conditions.

Caution: The EWHC-NH controller does not have a power switch and an emergency stop function. Always install an appropriate power cut-off (insulation) device for the machinery or equipment as an overall system.

Danger: Before wiring to the controller, always turn off the power to the whole machinery or equipment to avoid the danger of electric shock.

(3) Insulation resistance/Dielectric strength test

Never conduct an insulation resistance test or dielectric strength test on the controller.

4-2-3 Grounding work

- Always perform grounding work to prevent electric shock to the human body in case of electric leakage, and to prevent defective equipment operation due to electrical noise.
- We strongly recommend Type 3 grounding (grounding resistance of 100Ω or less) or better.
- For the controller's ground terminal, use the power cable's F.G. wire.

4-2-4 Connecting the communication unit

- The EWHC-NH can be connected to the equipment with RS-232C interface used in a personal computer, etc.
- For connection to a personal computer, etc., connect the RS-232C connector (9 pins) of the dedicated cable to the controller connector.

4-2-5 Connecting to the actuator

Connect the actuator connecting cable to the ACT connector on the front of the controller. Turn off the power supply before performing the connection. Ensure that the actuator connecting cable is firmly inserted into the connector.

No.	Signal name	Description	No.	Signal name	Description
A1	A＋	Motor output A＋	B1	B＋	Motor output B＋
A2	A－	Motor output A－	B2	B－	Motor output B－
A3	FG	Frame ground	B3	N.C.	N.C.
A4	COM1 (24V)	COM 24V	B4	COM2 (24V)	COM 24V
A5	N.C.	N.C.	B5	N.C.	N.C.
A6	FG	Frame ground	B6	GND 5V	Ground (5V)
A7	DV＋	Encoder power supply＋	B7	DV－ (GND 5V)	Encoder power supply－
A8	EA＋	Encoder signal A＋	B8	EA－	Encoder signal A－
A9	EB＋	Encoder signal B＋	B9	EB－	Encoder signal B－
A10	EC＋	Encoder signal C＋	B10	EC－	Encoder signal C－

4-2-6 Connecting the I/O connector

Connect the I/O connector to a programmable controller or other external devices.

4-3 I/O interface

4-3-1 I/O connector signal table

No.	Wire color	Signal name	Description	No.	Wire color	Signal name	Description
01	Brown	POS0	Point setting	02	Red	POS1	Point setting
03	Orange	POS2	Point setting	04	Yellow	POS3	Point setting
05	Green	POS4	Point setting	06	Blue	START	Start signal
07	Purple	STOP	Stop signal	08	Gray	ORG	Return to origin signal
09	White	RDY	Preparation completed output	10	Black	BUSY	Command execution in progress output
11	Brown	INPOS	Positioning completed output	12	Red	HOLD	Pushing completed output
13	Orange	24G	Negative common	14	Yellow	24G	Negative common
15	Green	24V GND	Ground	16	Blue	24V IN	24V input
17	Purple	POS5	Point setting	18	Gray	24V	＋24V
19	White	FG	Frame ground	20	Black	FG	Frame ground

4-3-2 Details of input signals

Input signals consist of 9 custom command inputs.

○Custom command inputs

Custom command inputs are the inputs to control from a programmable controller or other external devices. To accept the START and ORG inputs, the READY and BUSY signals must be set as follows.

■ READY output: ON
■ BUSY output: OFF
■ STOP input: OFF

The START and ORG inputs are accepted when the OFF state is switched to the ON state (the moment when the contact closes). Whether the controller has accepted the command or not can be confirmed by monitoring the BUSY output.

■ START

From the current position, the tooling moves by the data of the point No. specified from POS0 to POS5.

Caution: To execute START, it is necessary to confirm the entry states of POS0 to POS5.

■ ORG

Executes return to origin in the direction of the origin return specified in the parameters. It is always necessary to execute return to origin after the power is turned on.

Caution: When the actuator unit was changed in use, first perform initialization of the origin position data (INIT ORG), and then execute return to origin. (See P.26.)

■ STOP

This is an input to stop the actuator's movement temporarily.
Turning this input ON (closing the contact) while the actuator is in operation, or while it is executing return to origin, will temporarily stop the actuator's movement. While this is in the ON state (the contact is a closed state), no custom command from I/O, no program from a personal computer, or no return to origin command can be executed.

■ POS0～POS5

These are inputs for connecting to output circuits of the programmable controller or other devices, and for specifying the point No.

Examples of point specification

POS No. / Point No.	POS5 (2^5)	POS4 (2^4)	POS3 (2^3)	POS2 (2^2)	POS1 (2^1)	POS0 (2^0)
P0	OFF	OFF	OFF	OFF	OFF	OFF
P1	OFF	OFF	OFF	OFF	OFF	ON
P3	OFF	OFF	OFF	OFF	ON	ON
P7	OFF	OFF	OFF	ON	ON	ON
P15	OFF	OFF	ON	ON	ON	ON
P31	OFF	ON	ON	ON	ON	ON
P63	ON	ON	ON	ON	ON	ON

4-3-3 Details of output signals

Output signals are 4 signals, READY, BUSY, INPOS, and HOLD.
ON and OFF refer to the turning on and off of the output transistor.

◯Custom outputs

These outputs are for signal interaction with a programmable controller, etc.

■ Preparation completed output (READY)

When the controller system is operating normally, this output is set to ON. If an alarm has issued, this output is set to OFF and the motor enters a free state.

■ Command execution in progress output (BUSY)

This signal is set to ON when a custom command is being executed or when a command from a personal computer is being executed. This signal goes ON whenever a custom command input is accepted. As a result, when the BUSY signal is ON, the controller cannot accept another custom command input or a command from a personal computer.

Caution: Always turn off custom commands when BUSY is ON. Leaving input ON will prevent BUSY from switching to OFF even after execution of a command is completed.

■ Positioning operation completed output (INPOS)

This signal goes OFF whenever a custom command input is accepted, and comes ON when the positioning operation execution process has been completed normally, or when the size detecting function is set. If an error occurs during execution, or if STOP has been input, the signal remains unchanged in the OFF state.

■ Pushing operation completed output (HOLD)

When a custom command input is accepted, this signal temporarily turns OFF, and comes ON when the pushing operation execution process has been completed normally. If an error occurs during execution, or if STOP has been input, the signal remains unchanged in the OFF state.

4-3-4 Input/output circuits

Here describes the input/output circuit specifications and examples of connections. Refer to the examples when connecting to a programmable controller or other external devices.

(1) Input/output circuit specifications

◯Input power supply

Input voltage:	24V±10%

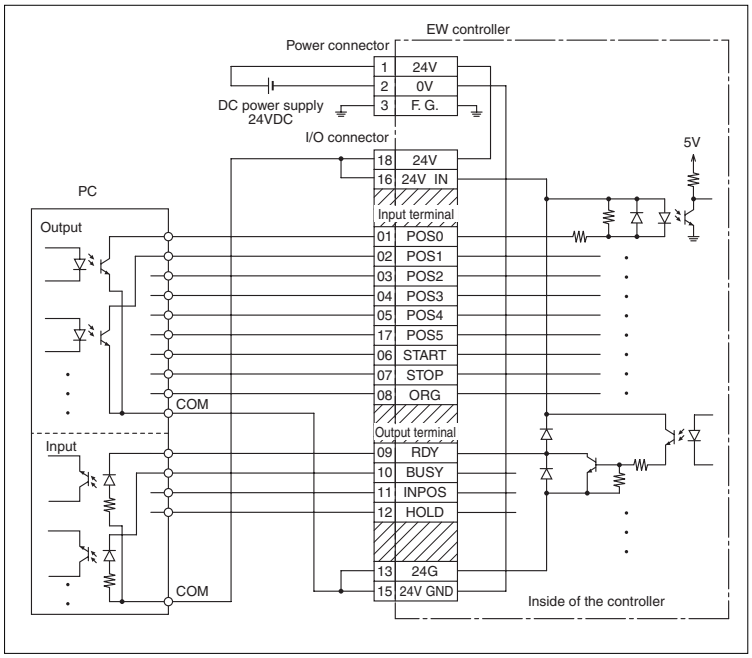
◯Input circuit

Insulation method:	Photocoupler insulation
Input response:	30ms or less
Input current:	5mA/24VDC
Input sensitivity:	ON current Min. 3mA OFF current Max. 1mA

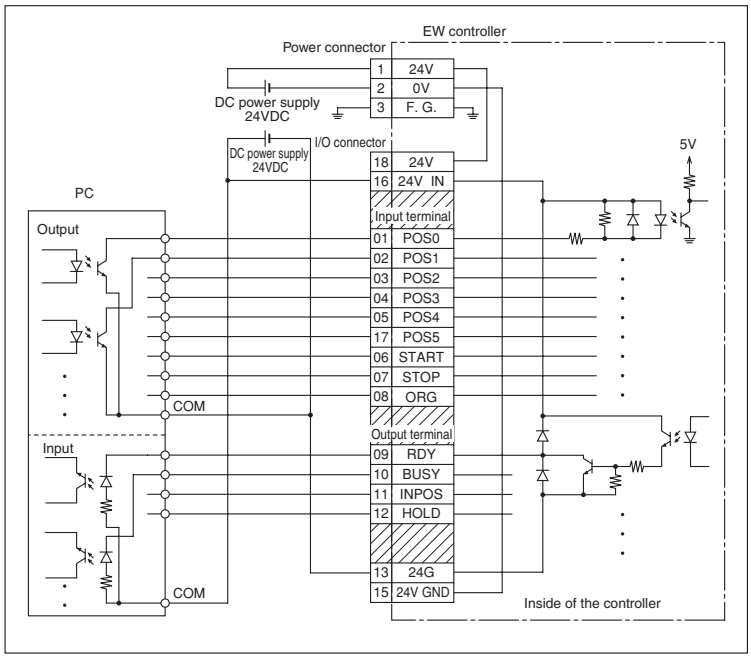
◯Output circuit

Insulation method:	Photocoupler insulation between the internal circuit and output transistor
Output terminals:	NPN open collector output for all output common terminals (0V side)
Output response:	1ms or less
Maximum output current:	30mA/24VDC per 1 output
Residual ON voltage:	1.5V or less

(2) Wiring system when using the controller's internal power supply



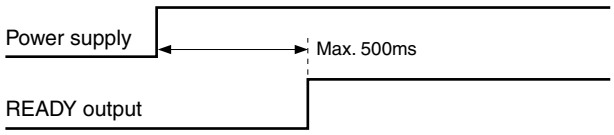
(3) Wiring system when using another power supply in place of the controller's internal power supply



4-3-5 Timing chart

(1) When the power is turned on

Normal condition



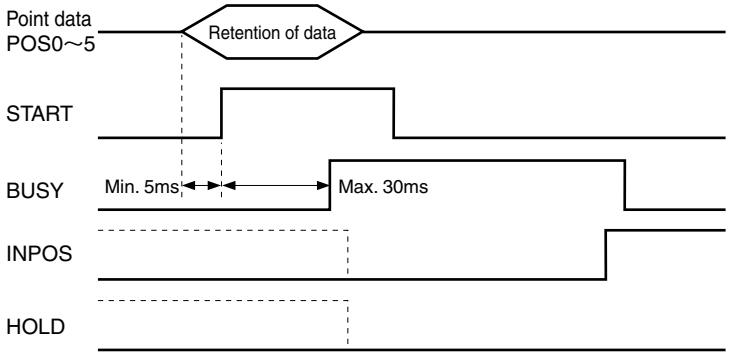
Alarmed condition

Before inputting a custom command, check that the READY output is turned ON after the power has been supplied. When the READY output remains OFF after the specified time has elapsed following the power turning on, it means that an alarmed condition has occurred.

(2) Execution of custom command

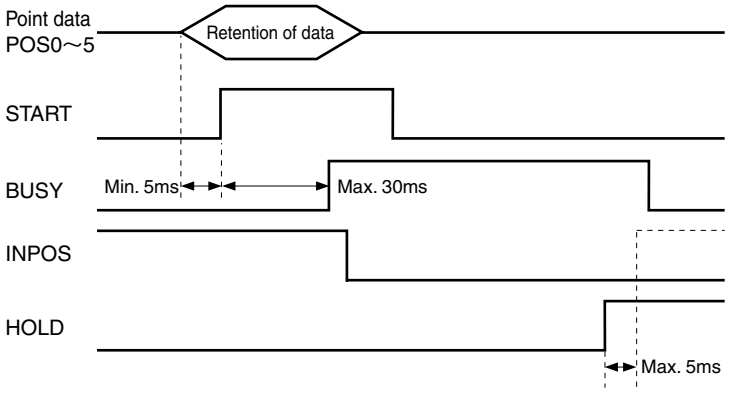
- When a custom command is received, the BUSY output turns ON. The BUSY output turning off means the command has ended normally.
- Always use pulse inputs for custom commands. Leaving input in the ON state will prevent BUSY from turning OFF even after execution of a command has been completed.

1. Positioning mode, for A,I



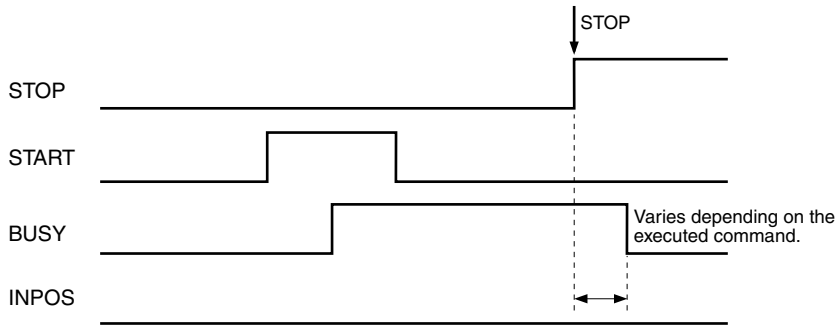
① Input point data in POS0 to POS5. Maintain this input state until BUSY turns ON. (Changing the input state too early could cause mis-recognition of data.)
② Introduce a delay of at least 5ms, then input START.
③ At the rise of a custom command input, BUSY turns ON.
④ Check that BUSY is ON, and then set the custom command input to OFF (open the contact). After this, the point data can be freely changed.
⑤ Wait until BUSY turns OFF.
⑥ When BUSY turns OFF, INPOS is ON, and this means that the operation has ended normally.

2. Pushing mode, for U, C, O



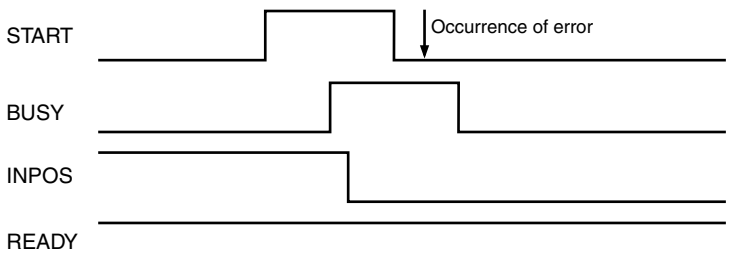
① Input point data in POS0 to POS5. Maintain this input state until BUSY turns ON. (Changing the input state too early could cause mis-recognition of data.)
② Introduce a delay of at least 5ms, and then input START.
③ At the rise of a custom command input, BUSY turns ON.
④ Check that BUSY is ON, and then set the custom command input to OFF (open the contact). After this, the point data can be freely changed.
⑤ Wait until BUSY turns OFF.
⑥ When BUSY turns OFF, HOLD is ON, and this means that the operation has ended normally.
※ When the size detecting function is effective, and the workpiece is pushed within the setting range, INPOS turns ON within 5ms after HOLD turns ON.

3. When STOP is input



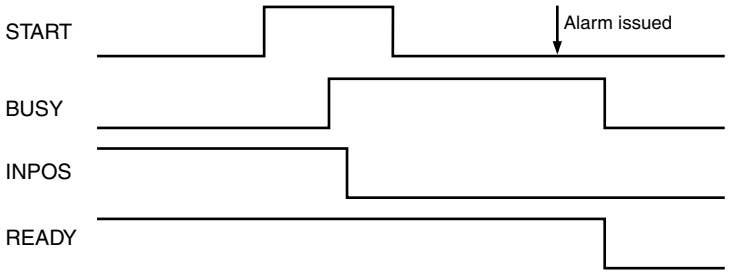
■ When inputting STOP during execution of a command, BUSY turns OFF. The READY output remains unchanged.

4. When an error has occurred



■ With the READY output is in the ON state, the BUSY, INPOS, and HOLD outputs are in the OFF state.

5. When an alarm is issued



■ The READY, BUSY, INPOS, and HOLD outputs all turn OFF.

4-4 Actuator number setting

Set the actuator No. using the number in the below table in accordance with the actuator type.

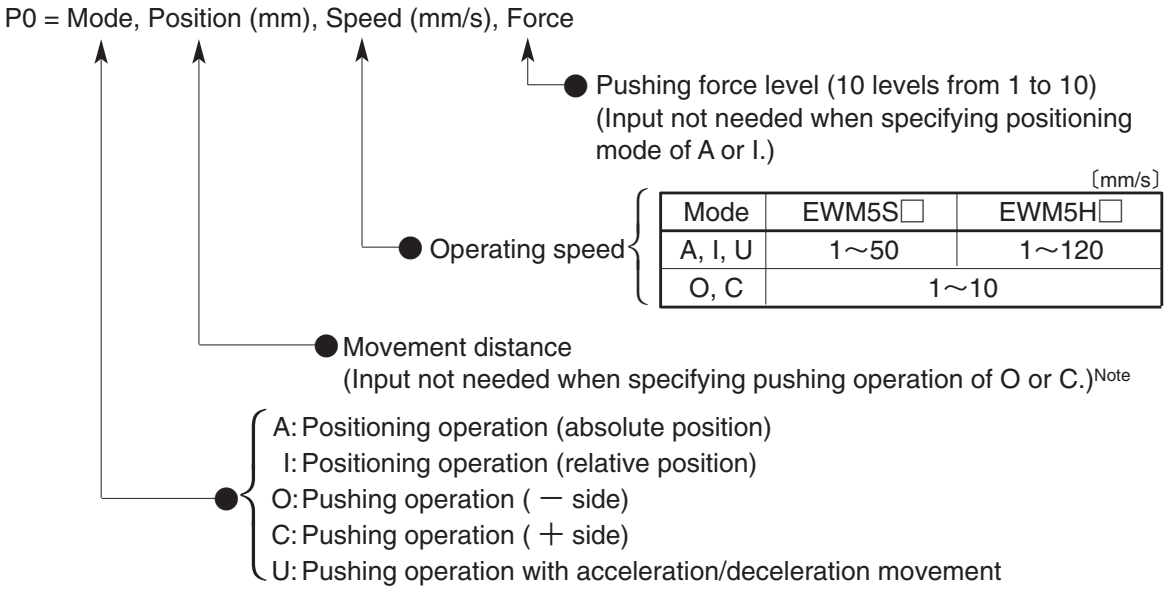
Model	Actuator No.
EWM5S□-20	30
EWM5S□-40	31
EWM5H□-20	32
EWM5H□-40	33

Actuator number setting method (Use either of the following 2 methods for the setting.)

1. Using the communication command @INIT PRM (See P. 26.)
2. Using the initialization command in the support software to initialize parameters
   (For details, see the support software Owner's Manual.)

Note: When you purchase the actuator and controller as a set, the controller's actuator number is set to the specified actuator number when shipping.

4-5 Point data specifications



Note: The opposite side to return to origin direction is the positive (+) direction.

4-5-1 Point setting method

Point editing is performed via the RS232C port, on either a personal computer or the teaching box.
For the communication parameters and cable specifications, see section “4-7 Communication with personal computer” on P. 18.
To perform point editing, use either general purpose communication software or dedicated support software.
For the support software instructions, see the separately available support software Owner’s Manual.
For the teaching box instructions, see the separately available teaching box Owner’s Manual.

Use the communication command @WRITE PNT to edit.

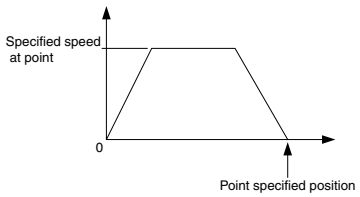
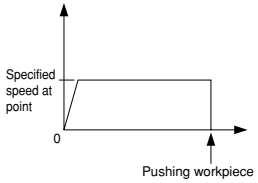
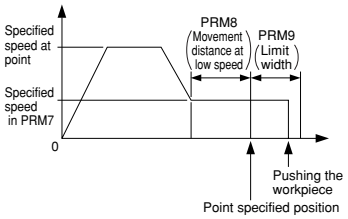
@WRITE PNT

Personal computer side	Controller side
@WRITE PNT c/r l/f	
	READY c/r l/f
P0 = A, 10.00,50 c/r l/f	
P1 = I, 3.00, 50 c/r l/f	
P2 = C, 10, 10 c/r l/f	
^Z	
	OK c/r l/f

After editing, use the communication command @READ PNT to check the point data.

Transmission example	@READ PNT c/r l/f
Response	P0 = A, 10.00, 50 c/r l/f
	P1 = I, 3.00, 50 c/r l/f
	P2 = C, 10, 10 c/r l/f
	P5 = O, 5, 5 c/r l/f
	P6 = U, 2.00, 40, 8 c/r l/f
	OK c/r l/f
	Reads all data that has been entered.

●NS Sliders operation mode

Mode	Positioning Moves to the specified point with acceleration/deceleration, and then stops.		Pushing Note Operates at constant speed, and pushes at the set force.		Pushing with acceleration/deceleration movement Performs pushing operation during acceleration/deceleration movement.
Setting value	A	I	C	O	U
Description	Moves to the specified point position in the coordinate system where the origin is 0.	Moves from the current position to the point specified position.	Operates to + side.	Operates to − side.	Moves to the specified point, and performs pushing operation at the speed set in PRM7 from the distance forward the point set in PRM8.
Operation pattern					
Remark	—		—		Suitable for soft pushing with high cycle operation

Caution: Pushing mode changes from C to O, and O to C cannot be performed.

4-6 How to use the size detecting function

4-6-1 When using an actual workpiece for size detecting range setting

Procedure	Communication command	Remark
①Execute return to origin.	@ORG	
②Place the minimum sample in place, and set the dimensions.	@GMIN C(O), speed, pushing force	Use HOLD ON to save the pushing position in PRM32.
③Execute return to origin.	@ORG	
④Place the maximum sample in place, and set the dimensions.	@GMAX C(O), speed, pushing force	Use HOLD ON to save the pushing position in PRM31.
⑤Activate the size detecting function.	@WRITE PRM PRM33=1	PRM33=0 deactivates the size detecting function.

●With the above settings, the size detecting function activates from the next pushing operation (in O, C, and U modes).(A and I modes are not covered by the function.)
●Use communication commands to specify the pushing direction at settings. (C: + side, O: − side)
●When the workpiece is pushed, HOLD turns ON, and satisfying the below,
Minimum sample dimension < Pushing dimension < Maximum sample dimension
INPOS turns ON, while at all other times INPOS remains in the OFF state.

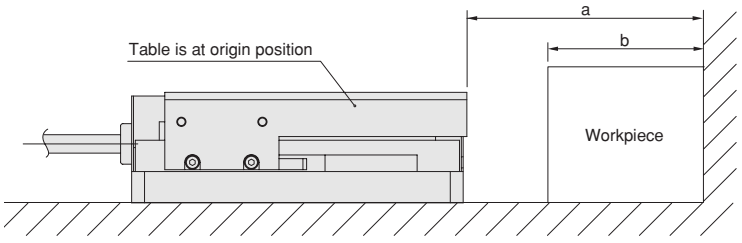
Caution 1: When the minimum sample dimension = maximum sample dimension, or when the minimum sample dimension > maximum sample dimension, the size detecting function becomes invalid.
Caution 2: Set the value of PRM31 and PRM32 to be the same sign (+ or −). (When either of the two is 0, or when they are of opposite sign, the size detecting function becomes invalid.)

4-6-2 When using direct input for size detecting function setting

Procedure	Example of communication command	Remark
①Input the pushing position when pushing the minimum sample.	@WRITE PRM PRM32=500 ^Z	The pushing position of the minimum sample is assumed to be 5mm.
②Input the pushing position when pushing the maximum sample.	@WRITE PRM PRM31=450 ^Z	The pushing position of the maximum sample is assumed to be 4.5mm.
③Activate the size detecting function.	@WRITE PRM PRM33=1 ^Z	PRM33=0 deactivates the size detecting function.

Caution: The values written in PRM31 and 32 are not workpiece dimensions. Instead, they are the pushed positions when pushing the workpiece. Input values based on calculations of the table position and workpiece dimensions after executing return to origin, or input values based on the confirmed movement distance when pushing the workpiece (at @?POS).

[Method for calculation of the movement distance]



a: Table position after executing return to origin
b: Workpiece dimension

Pushing position = a−b

Caution: Regarding how to use the support software and teaching box, see the Owner's Manual for each.

4-7 Communication with personal computer

4-7-1 Communication parameter specifications

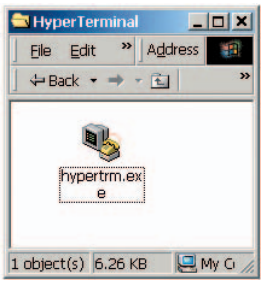
Make the communication parameter settings for a personal computer and other external devices in the following manner. Regarding how to make settings, see the instruction manual for each device.

■ Transmission rate	9600 bps
■ Data bit length	8 bits
■ Stop bit length	1 bit
■ Parity check	On
■ Parity setting	Odd parity (ODD)
■ Control method (X parameter)	XON/XOFF software control method (Effective)
■ Communication method	Full duplex
■ Synchronous method	Asynchronous method
■ Return key transmission	CR code
■ CR code reception	CR/LF reception Return + line feed CR reception Return

Setting method for Hyperterminal, as standard with Windows95* and later.

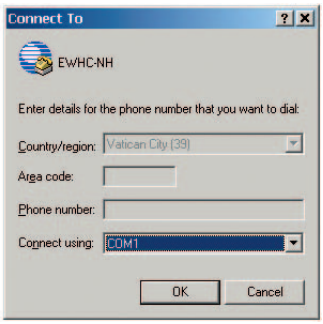
※ Windows is the registered trademark of the U.S. Microsoft Corp.

1.Double-click on Hyperterm.exe.

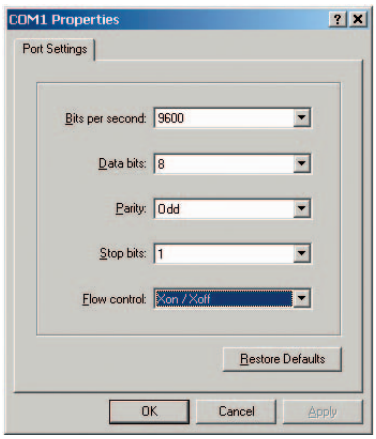


2.Type a name, select the icon, and click “OK”.

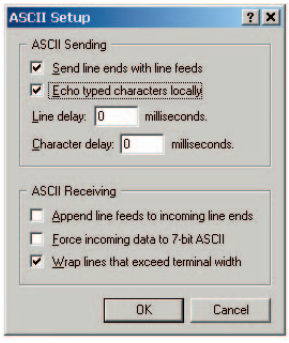
3.For the connection method, select “COM1” and click “OK”.



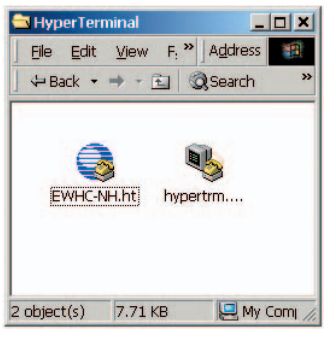
4.Set the port and click “OK”.



5.Click the “File”, “Properties”, and select “ASCII Setup”, and then add a check mark as shown in the figure at right, and click “OK”.

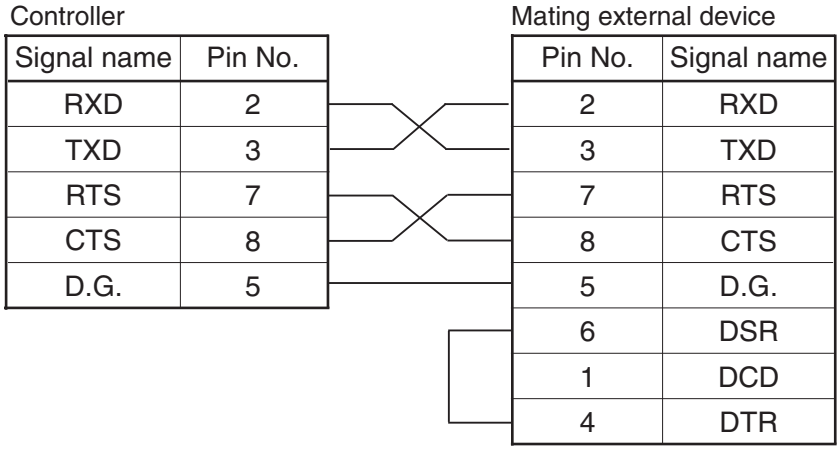


6.When starting up for the second time or later, double-click on the icon of the newly created file.



4-7-2 Communication cable

Applicable connector model
Applicable connector part No.: XM2D-0901 (OMRON-made) or equivalent products
Applicable connector cover part No.: XM2S-0911 (OMRON-made) or equivalent products



4-7-3 Communication commands

To facilitate communication with external devices, communication commands are as standard.

Communication commands are divided into the following 4 categories.

1. Robot language
2. Data handling
3. Utilities
4. Special codes

With the exception of the special codes, the format for communication commands is as follows.

@<Operation code>[<Operand 1>][,<Operand 2>][,<Operand 3>][,<Operand 4>]c/r l/f

- Basically, communication commands are executed by sending 1 line that begins with the start code '@'(=40H) and ends with the code c/r(=0DH) l/f(=0AH) to the controller. The special codes, however, do not require the start code and c/r l/f.
- Communication commands are composed of operation codes and operands. Depending on the command, either no operand is used or up to a maximum of 4 operands are used. The brackets [ ] refer to items that can be omitted.
- The character codes used are the JIS8 level codes (ASCII codes with katakana characters added). Input characters can be either capital letters or lower case letters.
- At least 1 space must be inserted between the operation code and the operand.
- Items with the < > mark (angle brackets) in the operand should be specified by you. Check the details of each communication command, and input the appropriate data. (See "4-7-4 List of communication commands" on P. 20.)
- When entering 2 or more operands, insert a comma "," between them.

4-7-4 List of communication commands

Classification	Command	Operand 1	Operand 2	Operand 3	Command description
Actuator operation	ORG				Returns to origin
	MOVD	Coordinate value (mm)	Speed (mm/s)		Executes coordinate specified movement
	MOVH	Coordinate value (mm)	Speed (mm/s)	Force	Executes coordinate specified pushing operation
	MOVP	Point No.			Moves to the specified point
	GMIN	Pushing direction	Speed (mm/s)	Force	Setting of minimum sample pushing position for the size detecting function
	GMAX	Pushing direction	Speed (mm/s)	Force	Setting of maximum sample pushing position for the size detecting function
	X＋				(＋) movement by specified distance
	X－				(－) movement by specified distance
	XINC				(＋) movement at constant speed
	XDEC				(－) movement at constant speed
	SRVO	Switch			Energizes motor
Data handling	?POS				Reads current position
	?PNO				Reads current point No.
	?PRM	Parameter No.			Reads specified parameter
	?P	Point No.			Reads specified point data
	?ORG				Confirms return to origin
	?SRVO				Confirms motor energized state
	?VER				Reads version number
	READ	PNT			Reads all point data
		PRM			Reads all parameters
		DIO			Reads I/O states
		ERR			Reads error history records
	WRITE	PNT			Writes all point data
		PRM			Writes all parameters
	PDEL	Point No.	Number of points		Deletes point data
Utility	INIT	PNT			Initializes all point data
		PRM	Actuator No.		Initializes all parameters
		ORG			Initializes origin position data

Classification	Code	Command description
Special code	^C (＝03H)	Interrupts ORG, XINC, XDEC
	^Z (＝1AH)	Ends data transmission

Classification	Response	Description
Response from the controller	OK	Normal completion of operation
	NG	Error occurred Contents of error at the next line (within 20 characters)
	STOP	Stop command Stopped cause at the next line (within 20 characters)
	READY	Completion of writing preparation
	CAUTION	Caution Contents at the next line

4-7-5 Details of communication commands

(1) @ORG

Function	Executes return to origin.
Format	@ORG c/r l/f
Transmission example	@ORG c/r l/f
Response	OK c/r l/f

(2) @MOVD

Function	Performs positioning to the specified position (absolute position of origin reference) at the specified speed.
Format	@MOVD position, speed c/r l/f
Transmission example 1	@MOVD 3.5, 50c/r l/f
Response	OK c/r l/f
Explanation	Moves at speed of 50mm/s to the 3.5mm position from the origin.
Transmission example 2	@MOVD 50,100 c/r l/f
Response	NG c/r l/f 23: Data error c/r l/f
Explanation	Data beyond the limit of the software cannot be entered.

(3) @MOVH

Function	Performs pushing operation at the specified speed and pushing force in direction to the specified position (absolute position of origin reference). (Mode U operation, see P. 16.)
Format	@MOVH position, speed, force c/r l/f
Transmission example 1	@MOVH 3.5, 35, 6 c/r l/f
Response	OK c/r l/f
Explanation	This command performs the pushing operation to the 3.5mm position from the origin at 35mm/s speed with a pushing force of 6.
Transmission example 2	@MOVH 3.5, 30, 6 c/r l/f
Response	NG c/r l/f 64: Stop limit c/r l/f
Explanation	This means that the pushing was unable to be performed.

(4) @MOVP

Function	Operates by using the specified POS No. data.
Format	@MOVP point No. c/r l/f
Transmission example 1	@MOVP 2 c/r l/f
Response	OK c/r l/f
Explanation	Performs operation specified at POS2.
Transmission example 2	@MOVP 12 c/r l/f
Response	NG c/r l/f 52: No point data c/r l/f
Explanation	No data at the point specified by POS12, causing an error.

(5) @GMIN (@GMAX)

Function	Sets the pushing position for the minimum sample (maximum sample) when using the size detecting function.
Format	@GMIN pushing direction, speed, pushing force c/r l/f
Transmission example	@GMIN C, 35, 10 c/r l/f
Response 1	OK c/r l/f
Explanation 1	This means normal pushing, and setting complete.
Response 2	NG c/r l/f 64: Stop limit c/r/ l/f
Explanation 2	This means that the pushing was unable to be performed. The setting was not executed.

(6) @X＋(@X－)

Function	Moves by only the specified distance to (＋) side ((－) side) at the speed shown below. Movement distance = PRM25/100[mm] Moving speed = PRM24[mm/s]
Format	@X＋ c/r l/f
Transmission example	@X＋ c/r l/f
Response	OK c/r l/f

(7) @XINC (@XDEC)

Function	Moves continuously at the speed shown in the following equation to (＋) side ((－) side). Stops when ^C is input or when tooling reaches the software limit. Moving speed = PRM24[mm/s]
Format	@XINC c/r l/f
Transmission example	@XINC c/r l/f
Response 1	STOP c/r l/f 63: Stop command c/r l/f
Response 2	STOP c/r l/f 64: Stop limit c/r l/f

(8) @SRVO

Function	Commands either for energizing the motor to perform feedback control, or for de-energizing the motor.
Format	@SRVO switch c/r l/f switch: 0: Frees the motor. 1: Energizes the motor and activates the servo lock.
Transmission example	@SRVO 1 c/r l/f
Response	OK c/r l/f

(9) @?VER

Function	Checks the controller software version No.
Format	@?VER c/r l/f
Transmission example	@?VER c/r l/f
Response	1.01 c/r l/f OK c/r l/f

(10) @?POS

Function	Reads the current position.
Format	@?POS c/r l/f
Transmission example	@?POS c/r l/f
Response	5.67 c/r l/f ····· Current position is 5.67mm from the origin. OK c/r l/f

(11) @?PNO

Function	Reads the current point No.
Format	@?PNO c/r l/f
Transmission example	@?PNO c/r l/f
Response	2 c/r l/f ····· Point No. is 2. OK c/r l/f

(12) @?PRM

Function	Reads the specified parameter.
Format	@?PRM parameter No. c/r l/f
Transmission example	@?PRM 25 c/r l/f
Response	100 c/r l/f OK c/r l/f

(13) @?P

Function	Reads the specified point data.
Format	@?P point No. c/r l/f
Transmission example	@?P 10 c/r l/f
Response	A, 5.00, 35 c/r l/f ····· Absolute position of 5mm, speed of 35mm/s OK c/r l/f
Explanation	For the contents of the response data, see P.15.

(14) @?ORG

Function	Confirms whether return to origin has been completed or not.
Format	@?ORG c/r l/f
Transmission example	@?ORG c/r l/f
Response 1	0 c/r l/f ····· Return to origin not completed OK c/r l/f
Response 2	1 c/r l/f ····· Return to origin completed OK c/r l/f

(15) @?SRVO

Function	Can confirm the motor energized state.
Format	@?SRVO c/r l/f
Transmission example	@?SRVO c/r l/f
Response 1	0 c/r l/f ····· De-energized state OK c/r l/f
Response 2	1 c/r l/f ····· Energized state and executing feed back control OK c/r l/f

(16) @READ PNT

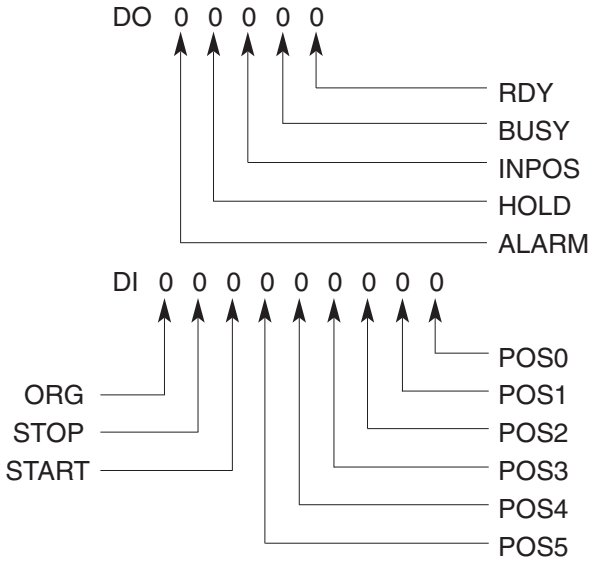
Function	Reads all point data.
Format	@READ PNT c/r l/f
Transmission example	@READ PNT c/r l/f
Response	P0=A, 6.00, 15, 0 c/r l/f P1=U, 3.00, 35, 8 c/r l/f P2=A, 6.00, 5, 0 c/r l/f P5=C, 20, 5 c/r l/f OK c/r l/f Reads all data that has been entered.
Explanation	For the contents of the response data, see P.15.

(17) @READ PRM

Function	Reads all parameter data.
Format	@READ PRM c/r l/f
Transmission example	@READ PRM c/r l/f
Response	PRM0=30 c/r l/f PRM1=2000 c/r l/f PRM2=—20 c/r l/f • • PRM63=10 c/r l/f OK c/r l/f

(18) @READ DIO

Function	Reads custom input/output status.
Format	@READ DIO [address] c/r l/f
Transmission example	@READ DIO c/r l/f
Response	DO 00001 c/r l/f DI 000000000 c/r l/f OK c/r l/f
Explanation	Contents of response data are shown below.



(19) @READ ERR

Function	Reads error history records. (Up to the latest 16 records. The latest record is displayed in the bottom line.)
Format	@READ ERR c/r l/f
Transmission example	@READ ERR c/f l/f
Response	32: Origin return not completed c/r l/f 01: Overload c/r l/f 03: Overheat c/r l/f OK c/r l/f

(20) @WRITE PNT

Function	Writes point data.	
Format	@WRITE PNT c/r l/f	
Transmission example	Personal computer side	Controller side
	@WRITE PNT c/r l/f	
		READY c/r l/f
	P0=A, 6.00, 35 c/r l/f	
	P1=U, 3.00, 15, 8 c/r l/f	
	^Z	
		OK c/r l/f
Explanation	For the data format, see P.15.	

(21) @WRITE PRM

Function	Writes parameters.	
Format	@WRITE PRM c/r l/f	
Transmission example	Personal computer side	Controller side
	@WRITE PRM c/r l/f	
		READY c/r l/f
	PRM1=1500 c/r l/f	
	PRM2=0 c/r l/f	
	^Z	
		OK c/r l/f
	Sends the only data that requires changes.	

(22) @PDEL

Function	Deletes point data from the specified “Point No.” by the number shown as “number of points.”
Format	@PDEL, point No., number of points c/r l/f
Transmission example	@PDEL 10, 5 c/r l/f
Response	OK c/r l/f

(23) @INIT PNT

Function	Deletes all point data.
Format	@INIT PNT c/r l/f
Transmission example	@INIT PNT c/r l/f
Response	OK c/r l/f

(24) @INIT PRM

Function	Resets parameters to their initial values.
Format	@INIT PRM actuator No. c/r l/f
Transmission example	@INIT PRM 30 c/r l/f
Response	OK c/r l/f

※ The first 2 digits in the serial No. on the actuator unit are the actuator No.
Check the actuator No. on the actuator unit, and then initialize the parameters.
When executing INIT PRM, the origin position data is also initialized.

Model	Actuator No.
EWM5S□-20	30
EWM5S□-40	31
EWM5H□-20	32
EWM5H□-40	33

(25) @INIT ORG

Function	Initializes the origin position data. Execute this command when the actuator unit was replaced during use.
Format	@INIT ORG c/r l/f
Transmission example	@INIT ORG c/r l/f
Response	OK c/r l/f

4-8 Parameters

The controller does not have any potentiometer, dip switch, or any other hardware adjustment mechanism. Instead, it uses parameters that can easily be set through a personal computer.
This section describes how to change and set the parameters, and gives details of each parameter.

Safety

Because software is used to detect motor overload and other abnormalities, the controller parameters must be set correctly to match the connected actuator.
When the controller was shipped with the actuator as a set, the controller parameters had already been initialized to match the then shipped actuator, but in any case other than that, first set the actuator No. in accordance with the using actuator before operating the controller. (See P. 14.) If any problem is found, please contact us.

Caution:

Changing parameters other than those described in this manual could result in fatal damage or defects in the actuator and controller.

4-8-1 Parameter setting method

Parameter editing is performed via the RS232C port on the personal computer. For communication parameters and cable specifications, see section “4-7 Communication with personal computer” on P. 18.
The editing parameter is carried out by using general-purpose communication software or dedicated support software.
For instructions of the software, see the separately available support software Owner’s Manual.

Parameter edit commands

@WRITE PRM

Function	Writes parameters.	
Format	@WRITE PRM c/r l/f	
Transmission example	Personal computer side	Controller side
	@WRITE PRM c/r l/f	
		READY c/r l/f
	PRM1=1500 c/r l/f	
	PRM2=0 c/r l/f	
	^Z	
		OK c/r l/f
	Sends the only data that requires changes.	

After editing, read and check the parameter data.

@READ PRM

Function	Reads all parameter data.
Format	@READ PRM c/r l/f
Transmission example	@READ PRM c/r l/f
Response	PRM0=30 c/r l/f
	PRM1=1500 c/r l/f
	PRM2=0 c/r l/f
	•
	•
	PRM63=10 c/r l/f
	OK c/r l/f

4-8-2 Explanation of parameters

PRM0: Actuator No.
Displays the actuator No. This parameter is only for reading.

PRM1: (＋) software limit
Sets the (＋) side actuator movement range. (Only effective in the A, I, C, or O operation mode.)
For safety, always set a suitable value.
Input range 0～9999 (×0.01mm)
Initial value

Actuator No.	30	31	32	33
Initial value	2000	4000	2000	4000

PRM2: (－) software limit
Sets the (－) side actuator movement range. (Only effective in the A, I, C, or O operation mode.)
For safety, always set a suitable value.
Input range －9999～0 (×0.01mm)
Initial value －20

PRM4: Acceleration
Sets the acceleration. When lower acceleration is required, change this parameter.
Input range 1～100 (%)
Initial value 100

PRM5: Origin return direction
Sets the origin return direction.
Input range 0, 1
Meaning 0：Cable side 1：Opposite to cable side
Initial value 0

PRM7: Pushing speed
Sets the pushing speed in the U mode.
Input range 1～10 (mm/s)
Initial value 10

PRM8: Low-speed movement distance
Sets the distance at low-speed movement from the position forward of the specified point in the U mode. (See P. 15.)
Input range 1～9999 (×0.01mm)
Initial value 200

PRM9: Limit width
Sets the range where pushing is performed from the specified position in the U mode. (See P. 15.) When the movement distance exceeds the limit width during pushing operation, an alarm is issued.
Input range 1～9999 (×0.01mm)
Initial value 200

PRM10: Origin return speed
Sets the speed when executing return to origin.
Input range 1～15 (mm/s)
Initial value 5

PRM22: Selecting English or Japanese
Sets the language used for response messages in the communication.
Input range 0, 1
Meaning 0: English 1: Japanese
Initial value 1

PRM24: Moving speed when teaching

Parameter for specifying the speed during movement by the communication command @X＋, @X－, @XINC, or @XDEC. This is also used during teaching playback for point.

Input range 1～15 (mm/s)
Initial value 5

PRM25: Movement unit when teaching

Sets the movement amount by the communication command @X＋, or @X－.

Input range 1～9999 (×0.01mm)
Initial value 10

PRM26: Pushing force during teaching movement

Sets the pushing force during movement by the communication command @X＋, @X－, @XINC, or @XDEC.

Input range 1～10
Initial value 5

PRM30: Maximum speed

Sets the maximum speed when the communication commands (@MOVD, or @MOVH), or the custom command (START) is being executed.

Input range 1～100 (%)
Initial value 100

$$\text{Maximum speed during execution} = \frac{\text{Command setting speed} \times \text{PRM30}}{100} \ (\text{mm/s})$$

PRM31: Maximum sample pushing position

Sets the pushing position when pushing a maximum sample on use of the size detecting function.

Input range －4000～4000 (×0.01mm)
Initial value 0

PRM32: Minimum sample pushing position

Sets the pushing position when pushing a minimum sample on use of the size detecting function.

Input range －4000～4000 (×0.01mm)
Initial value 0

PRM33: Size detecting function

Switches between enabling/disabling the size detecting function.

Input range 0, 1
Meaning 0：Function disabled 1：Function enabled
Initial value 0

PRM35: Origin shift

This sets the virtual origin. Always execute return to origin after settings. When executing return to origin, the NS Slider temporarily returns to its mechanical origin and moves to the origin shift set position to complete return to origin, and its position becomes 0.

For example, if an unwanted position shift occurred, it is ordinarily necessary to perform re-teaching for all point data. However, by setting this parameter to the value of the position shift amount, the operator can quickly correct the point data while eliminating the time required for re-teaching.

Input range －32768～32767 (×0.01mm)
Initial value 0

PRM36: Origin shift speed

Sets the speed for origin shift.

Input range 1～15 (mm/s)
Initial value 5

4-9 Message list

4-9-1 Error messages

(1) Command error

Error No.	Item	Description
21	Message	illegal type
	Cause	Erroneous command
	Remedy	Use the correct command.
23	Message	data error
	Cause	Error in the numerical data
	Remedy	Correct the data.

(2) Operation error

Error No.	Item	Description
31	Message	running
	Cause	Another command is already being executed, and the command cannot be accepted.
	Remedy	Wait until the current command finishes before inputting the new command.
32	Message	origin incomplete
	Cause	Command cannot be executed because the origin return has not been completed.
	Remedy	Execute origin return.
34	Message	servo off
	Cause	Command cannot be executed because the motor is in a free (servo off) state.
	Remedy	Return the motor to normal.
35	Message	can't execute
	Cause	The parameter is against the operation command.
	Remedy	Change the parameter or point data.
37	Message	too long
	Cause	The position to be moved is over the software limit.
	Remedy	Change the point data.

(3) System error

Error No.	Item	Description
52	Message	no point data
	Cause	No data has been registered at the specified point No.
	Remedy	Register the point data.
53	Message	no actuator type
	Cause	Setting error in actuator No.
	Remedy	Check the actuator No., and try the initialization again.

(4) Stop message

Error No.	Item	Description
61	Message	stop command
	Meaning	Execution has stopped due to the stop command.
63	Message	stop on
	Meaning	Execution has stopped due to the entry of a STOP input from I/O.
64	Message	limit stop
	Meaning	Stops at the limit position.

Chapter 5 Troubleshooting

5-1 If a problem occurs

When informing Koganei of a trouble, please provide as detailed information as possible about the following items.

Item	Description (Example)
What?	Controller model Actuator model Power supply
When?	Time of purchase (serial No.) Period of use, conditions of operation Did it happen when the power was turned on, or 1 hour after the power was turned on?
Under what conditions?	During operation The position of the NS Slider's tooling when the problem occurred
What happened?	Actuator does not move. Alarm is issued.
How frequently?	All the time About once an hours It cannot be reproduced.

5-2 Remedy for alarm

When the READY output is OFF, an alarm is assumed to have been issued. In addition, when an alarm is issued, the ALM LED on the front of the controller lights up.
When an alarm has been issued, turn the power off once, and then turn on the power supply again after first eliminating the trouble causing the alarm.

5-3 Alarm specifications

The transmission format for an alarm message is as follows.

<Alarm No.>: <Alarm message> c/r l/f

When confirming the alarm contents
To confirm the contents of the alarm, connect to a personal computer using a communication cable, and then enter @READ ERR command. (See P. 25.)

5-3-1 Alarm message list

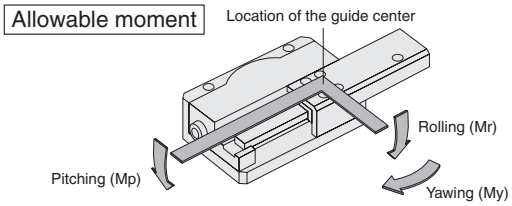
Alarm No.	Alarm message	Meaning	Probable cause	Remedy
01	overload	・Excessive load ・Cable disconnection	1) Problem with the application 2) Motor and/or encoder cable's broken wire or defective connection 3) Mechanical lock 4) Pushing at over the pushing range in the U mode 5) Too much friction in the actuator unit	1) Reduce the acceleration. 2) Check the cable continuity. 3) Check whether or not the moving part of the actuator is in mechanical lock. 4) Recheck the point data, low-speed movement distance, and limit width. 5) Check whether or not the friction resistance of the moving part of the actuator is too high, and adjust correctly.
03	overheat	Temperature rise in the circuitry	1) Overcurrent 2) Short circuit in cables	Check cables.
05	voltage over	Excessive input voltage	Power supply	Reduce the power supply voltage.
06	disconnection	・Excessive load during return to origin ・Cable disconnection	1) Motor and/or encoder cable's broken wire or defective connection 2) Mechanical lock	1) Check the cable continuity. 2) Check whether or not the moving part of the actuator is in mechanical lock.
08	point data error	Point data has been damaged.	Power supply was turned off while writing data.	Turn on the power supply again, and perform initialization for the point data.
09	param data error	Parameter data has been damaged.	Power supply was turned off while writing data.	Turn on the power supply again, and perform initialization for the parameter data.

Chapter 6 Specifications

6-1 Basic specifications of the main unit

Item/Model			EWM5HS・EWM5HL	EWM5SS・EWM5SL
Motor			2-phase stepping motor	
Maximum thrust Note1		N	18～27	42～65
Maximum allowable load mass Note2		kg	1 (horizontal), 0.4 (vertical)	2 (horizontal), 0.8 (vertical)
Maximum speed		mm/s	120	50
Minimum operating time		s	0.25 (st.20), 0.42 (st.40)	0.50 (st.20), 0.90 (st.40)
Minimum speed		mm/s	1	
Repeatability		mm	±0.03	
Operating temperature range		°C	0～40	
Allowable moment	My (yawing)	N・m	1	
	Mp (pitching)	N・m	1	
	Mr (rolling)	N・m	1.5	
Mass		kg	0.27 (st.20, short table type), 0.30 (st.20, long table type) 0.35 (st.40, short table type), 0.40 (st.40, long table type)	
Applicable controller			**EWHC-NH**	

Note: 1. For details of the thrust, see the graphs on P.37.
2. Holding function cannot be performed when the power is switched off.



6-2 Basic specifications of the controller

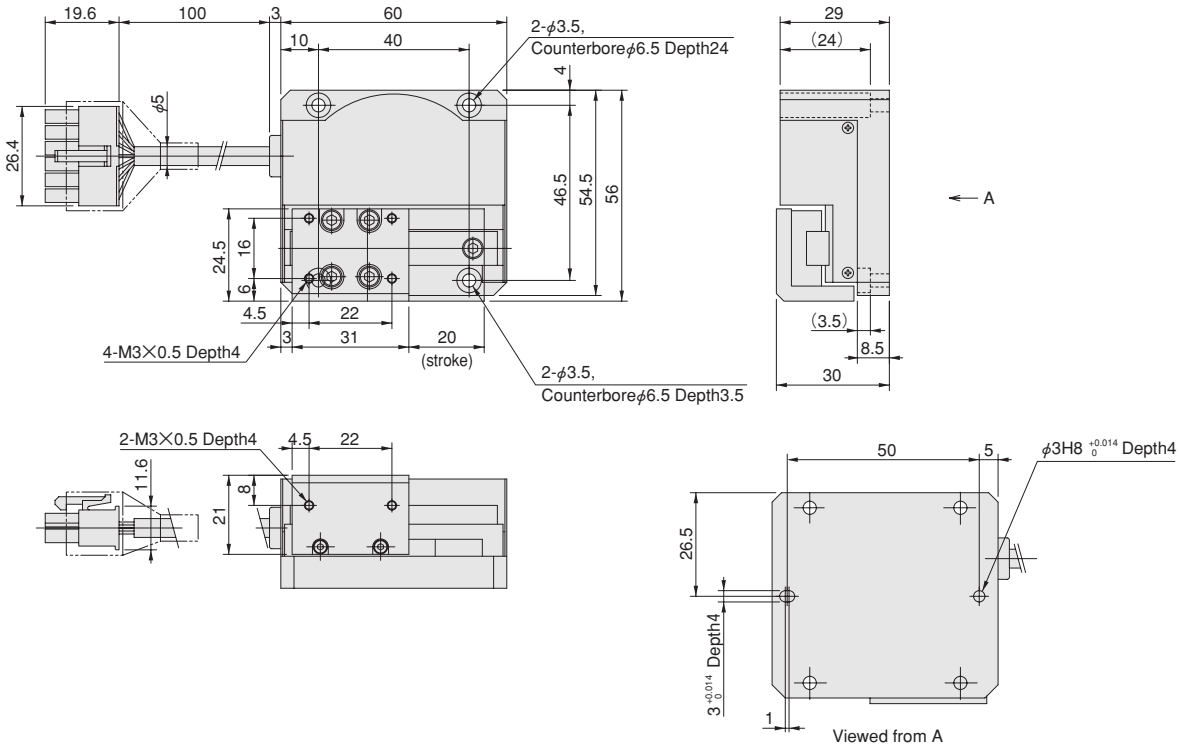
	Item/Model	EWHC-NH
Axis control	Motor drive method	Mierostep drive
	Control method	Closed loop control
	Operating method	PTP, force control
	Origin detection method	Detection at the stroke end
	Position detection method	Encoder A, B phase output
	Minimum setting distance	0.01 mm
	Acceleration setting	1～100%
	Point setting	64 points
	Point input method	Numeric input, teaching input, direct teaching
External input/output	Point setting input	6 inputs, photocoupler reception, 5mA TYP/1 input
	Control input	3 inputs (ORG, START, STOP) photocoupler reception, 5mA TYP/1 input
	Control output	4 outputs (READY, BUSY, HOLD, INPOS), 30mA MAX./1 output
	Abnormality detection output	Overload, disconnection, incorrect data, system abnormality
	External communications	RS232C 1ch (Communication with personal computer or teaching box)
	Motor drive output	Dedicated cable (with F.G.)
	Encoder input	Dedicated cable (with shield)
General specifications	Mass	0.2kg
	Power supply	24VDC±10%, 0.6A MAX. (Motor and I/O share the same power supply.)
	Operating temperature	0～40°C
	Operating humidity	35～85%RH (no condensation)
	Storage temperature	−10～65°C
	Back-up	EEPROM used to maintain setting conditions
	Noise resistance	IEC61000 -4-4 level 2
	Accessories	I/O cable, power cable

Chapter 7 Outline Drawings

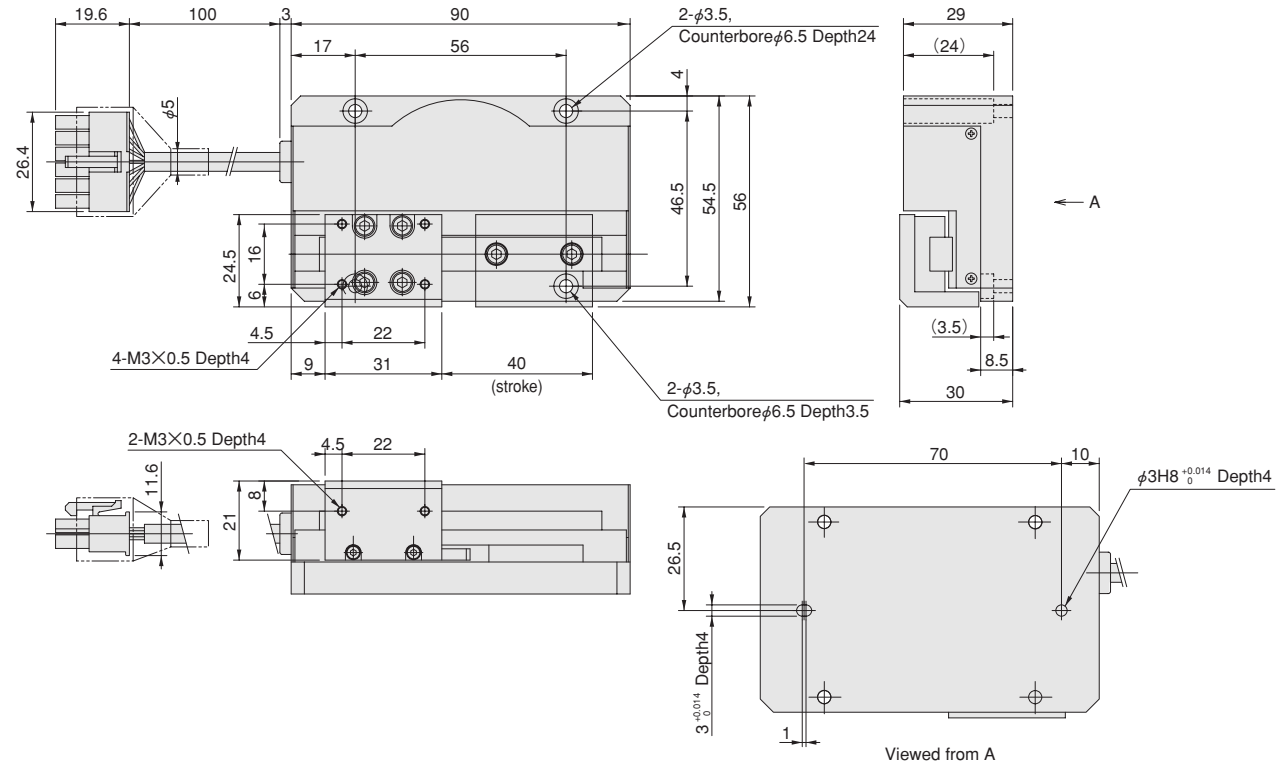
7-1 Main unit

Unit: mm

EWM5HS-20
EWM5SS-20

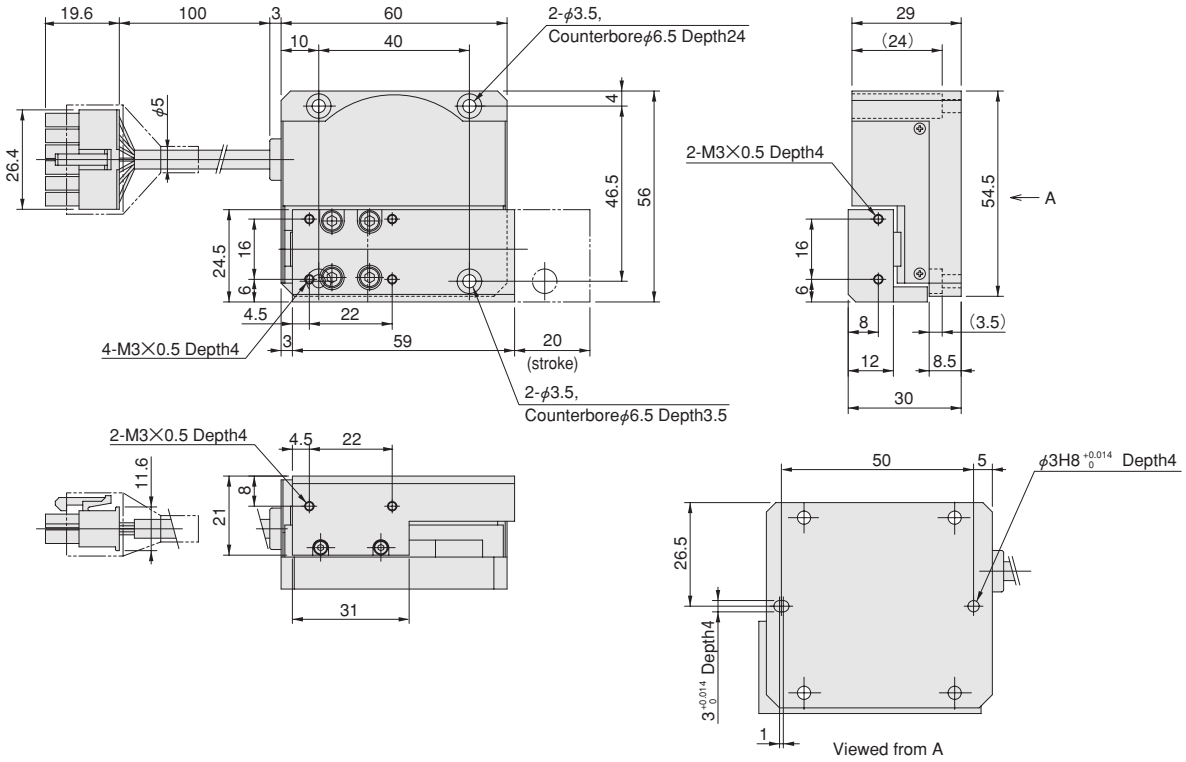


EWM5HS-40
EWM5SS-40

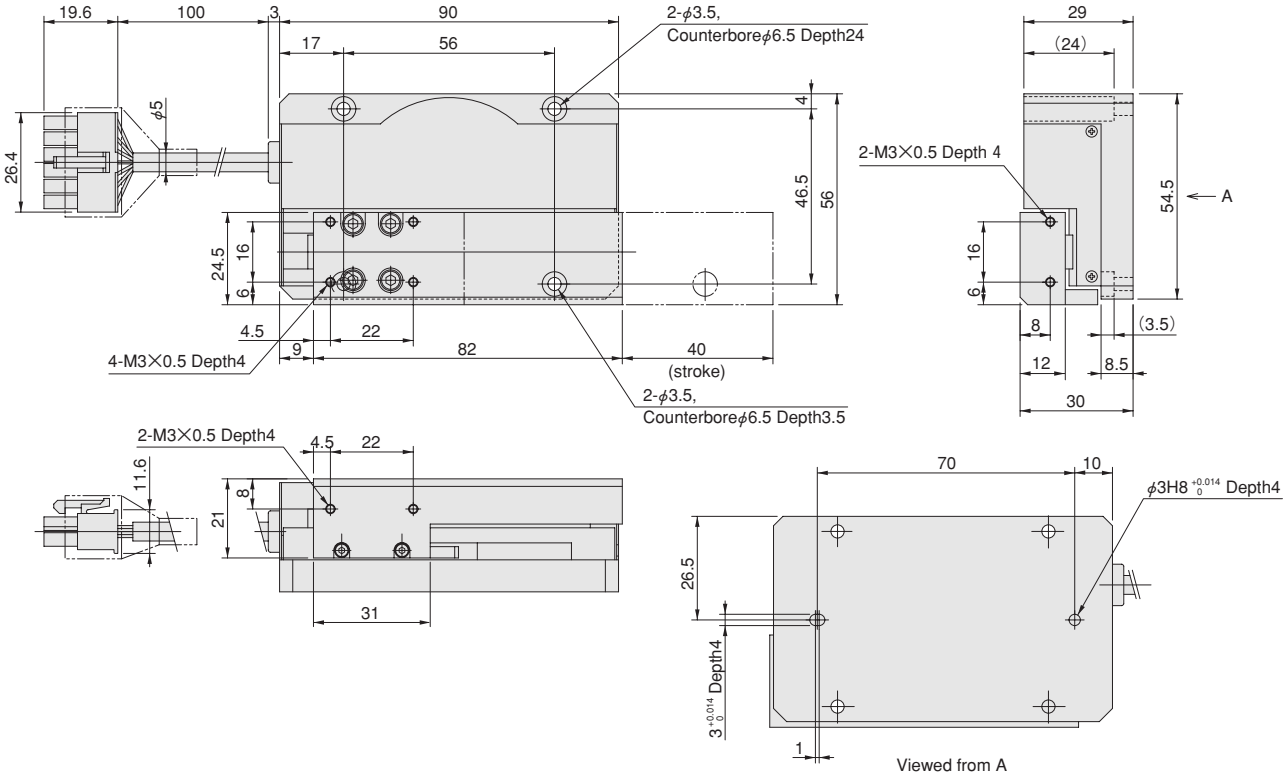


Unit: mm

EWM5HL-20
EWM5SL-20

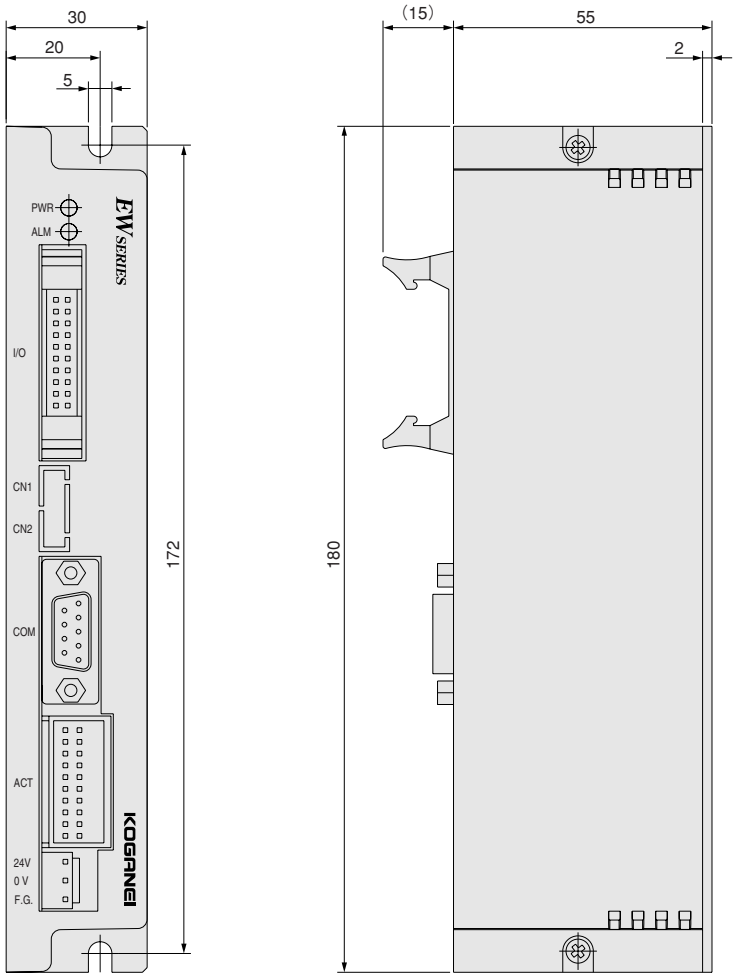


EWM5HL-40
EWM5SL-40

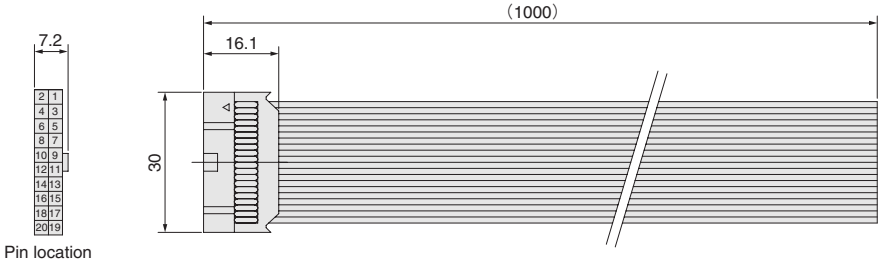


7-2 Controller

Unit: mm



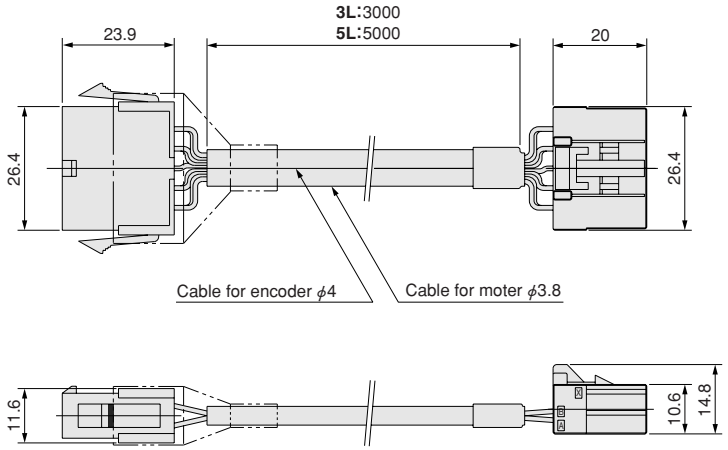
I/O cable supplied with the controller



Pin location

Cable

EWHK-□

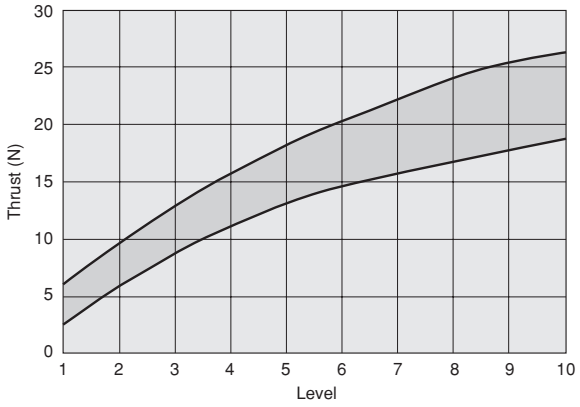


Chapter 8 Technical Data

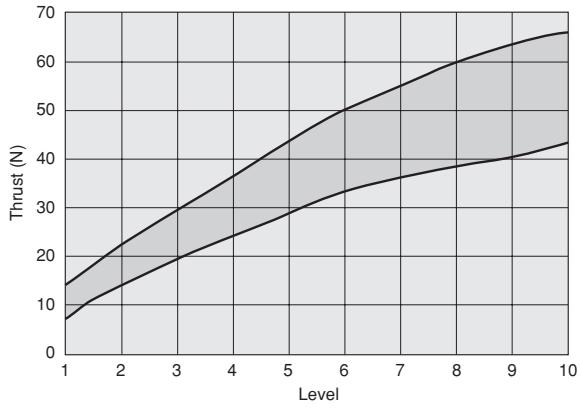
8-1 Thrust range

Forces are generated within the range shown in the graphs below at each set level. Note that the thrust repeatability at the same position is 5% or less.

EWM5H



EWM5S



A Revision History

Ver.2.0
p.29 PRM31 Input range -1000～1000 →-4000～4000
PRM32 Input range -1000～1000 →-4000～4000

If you have questions about the contents of this manual, or
about other technical issues, please consult the OVERSEAS DEPARTMENT
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