KOGANEI

X667744
Ver.2.0

Controller for Electric Auto Hand Changer ECB-MJ□-NP
Controller for Electric Compliance module ECB-CPL□-NP

OWNER'S MANUAL Ver. 2.0 CE

Thank you for purchasing the controller for the Electric Auto Hand Changer/ Electric Compliance module. This OWNER'S MANUAL describes the features of and how to operate this product. Please read the manual carefully and use the product in the correct manner. Furthermore, keep this manual handy.

1. Safety Precautions

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 users (people who set up, operate, or adjust and check, etc.).

1-2 Precautions

1. Precautions for automatic operations
To prevent injury, install an interlock device to prevent the operator from touching the moving parts of the main unit.

2. Operation not allowed in ambient atmospheres containing flammable gases, etc.
The product is not built to explosion-proof specifications. Do not use in ambient atmospheres containing flammable gases, flammable dust, or flammable liquids, etc. It could result in ignitions or explosions.

3. Operation not allowed in locations subject to electromagnetic interference, etc.
Do not use in locations subject to electromagnetic interference, static electric discharge, or radio frequency interference. There is a risk of erratic operations.

4. Safety measures for end effectors
If there is a danger that items held by the end effector could pop out or fall, take appropriate safety measures that take into consideration the size, mass, temperature, and chemical properties of the items.

5. Precautions for controller checks
To prevent electric shock when touching the outside terminals and connectors of the controller during controller checks, etc., always switch off the controller power and disconnect the power supply.
Never touch the inside of the controller.

6. Response to a damaged or defective main unit
If any of the damage or defects listed below have been found, continuing use of the main unit is dangerous. Immediately stop operation and contact us.

Description of damage or defect	Type of danger
Damage to motor wiring	Electric shock, malfunction of main unit
Damage to exterior casing of main unit	Damaged parts flying off during operation

7. Protective grounding
Connect the frame ground (F.G) of the power cable to the ground terminal of the equipment for safety and to reduce noise. Without grounding, there is a risk of electric shock.

8. Fasten the cables so that large loads, such as from pulling or twisting, are not applied to the connectors.

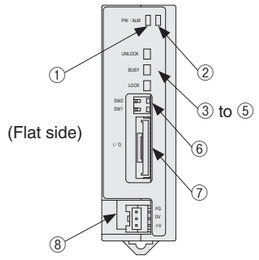
2. Product set contents

Before using the product when it is delivered, inspect whether any of the package's contents are missing or have been deformed or damaged during shipping. If they are damaged or do not operate correctly, contact your reseller (agent) or the nearest Koganei sales office.

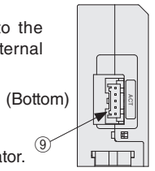
Name	Model	Quantity	Option
Controller	ECB-MJ□-NP	1 unit	—
	ECB-CPL□-NP		
Power cable	EKP	1 pc.	—
I/O cable	EKI	1 pc.	—
Mounting bracket	PSU-BR	1 pc.	When -BR selected
Bolts (M2.6×5)		2 pc.	When -BR selected

3. Controller

3-1 Appearance and functions



① POWER LED
Lights when the power supply is turned on.
(Refer to table 1)
② ALARM LED
Lights when an alarm occurs.
(Refer to table 1)
③ to ⑤ operation status display LED
(Refer to table 1)
⑥ SW1/SW2 Switch
(Refer to table 2)
⑦ I/O connector
Use the supplied I/O cable for connecting to the operation checker (sold separately) or an external programmable controller, etc.
⑧ Power connector
Connects the supplied cable to supply 24 VDC.
⑨ ACT connector
This is the connector for connecting to the actuator.



[Table 1]

Status	Display				
	Green (PW)	Red (ALM)	Yellow 1 (UNLOCK)	Blue (BUSY)	Yellow 2 (LOCK)
No current is flowing (power is OFF)	○	○	○	○	○
Current is flowing (power is ON)	●	○	○	○	○
Stopped in unlock position Reached unlock position	●	○	●	○	○
Motor is operating	●	○	○	●	○
Stopped in lock position Reached lock position	●	○	○	○	●
Disconnection, abnormal power supply voltage, abnormal temperature, idle spinning	●	●	○	○	○

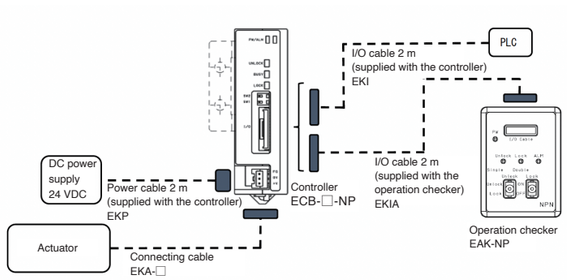
●: Light on ○: Light off

[Table 2] Bottom: SW1 Top: SW2

SW position		
Status	ON	OFF

* Regarding the functions, see section 3-4-5.

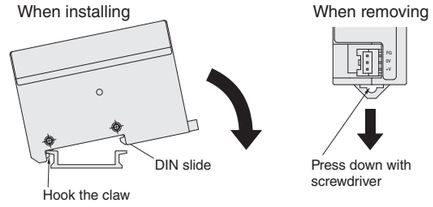
3-2 System configuration



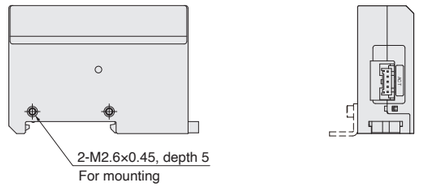
3-3 Installation and connection to external devices

3-3-1 Controller installation

1. Installation (DIN rail installation)
As shown in the illustration below, hook one side on the DIN rail, press the controller in the direction of the arrow until you hear a "click", and then lock the DIN slide. To remove the controller, use a flathead screwdriver, or something, to bring out the DIN slide claw, and then remove the controller from the DIN rail.



2. Installation (screw installation)
To install the controller directly or by using a bracket, use M2.6 × 0.45 screws at a tightening torque of 0.32 N·m. Tightening the screws in excess of the tightening torque could damage the controller.



3. Installation environment
- Install the controller in a location with an ambient temperature of 0 to 40°C, humidity of 35 to 85%, and no condensation.
- Install the controller so there is adequate space around it (20 mm or more) with good ventilation.
- Avoid installations in locations subject to corrosive gases, such as sulfuric acid or hydrochloric acid, as well as ambient atmospheres containing flammable gases or liquids, etc.
- Install the controller where there is little dust or dirt.
- Avoid installations in locations subject to metal chips, oil, or water from other equipment.
- Avoid installations in locations subject to electromagnetic or electrostatic noises.
- Install the controller in a location that is free from large vibrations.

3-3-2 Connecting the power supply

1. Power supply
- Connect the power cable to a power supply with a capacity of 24 VDC ±10% and 1.0 A or more.
- Connector: S03B-PASK-2 (JST Mfg. Co., Ltd.)

Connector pin number table

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

Note: Supply of an unstable power voltage to the controller may cause alarm shutdowns or abnormal operation. Use adequate care, therefore, in selecting a power supply. Ensure as stable a power supply as possible.

2. How to connect the power supply
- Use the supplied power cable to connect to the power supply. Connect the polarity correctly to prevent mis-wiring. Wrong connections could result in fire or other dangerous conditions.
- We recommend twisted cables for the "+V" and "0V" power cables.

Note: The controller does not have a power switch or an emergency stop function. Always install an appropriate power cut-off (isolator) device for the overall system of equipment.

Danger:
Before wiring to the controller, always turn off the power to the overall system of equipment. There is a risk of electric shock.

3. Insulation resistance/Dielectric strength test
Never conduct an insulation resistance test or dielectric strength test on the controller.

3-3-3 Connecting to the actuator

Connect the connecting cable to the ACT connector on the bottom of the controller. Turn OFF the power supply before performing the connection. Be sure that the actuator connecting cable is firmly inserted into the connector.
Connector: SM05B-PASS-TB (JST Mfg. Co., Ltd.)
[Connector pin number table]

Controller side

NO.	Name	Color
1	M+	Brown
2	M−	Blue
3	SEN1	-
4	SEN2	-
5	SENG	-

Main unit side

NO.	Name	Color
1	M+	Brown
3	M−	Blue
4	N.C.	Black

3-3-4 Connecting the I/O connector

Connect the I/O connector to an external device, such as an operation checker (sold separately), or programmable controller.
Connector: SM12B-GHS-TB (JST Mfg. Co., Ltd.)

3-4 I/O interface

3-4-1 Connector signal table

NO.	Wire color	Signal name	Input/ output	Description
01	Brown	ILK	Input	Not connected (lock signal)
02	Red	IULK	Input	Control signal (unlock signal)
03	Orange	N.C.	—	Not connected
04	Yellow	N.C.	—	Not connected
05	Green	OLK	Output	Lock sensor output
06	Blue	OULK	Output	Unlock sensor output
07	Purple	ALARM	Output	Alarm output
08	Gray	N.C.	—	Not connected
09	White	24VIN	—	24V input (power supply)
10	Black	24GIN	—	24GND input (power supply)
11	Brown	24VOUT	—	24V output (power supply)
12	Red	24GOUT	—	24GND output (power supply)

* No. 01 and 02 function when "Controller SW1: OFF state". The function when "Controller SW1: ON state", is in parentheses ().

3-4-2 Details of input signals

There are 2 dedicated command inputs as input signals.
○ Dedicated command inputs
Dedicated command inputs are inputs to control from an external device.
■ Operation input (ILK, IULK)
Operates according to operating method. *Regarding the operating method, see section 3-4-5.

3-4-3 Details of output signals

There are 3 output signals: OLK, OULK, and ALARM.
ON and OFF refer to the turning on and off of the output transistor.
○ Dedicated command outputs
Dedicated command outputs are outputs for signal interaction with external devices.
■ Lock sensor output (OLK)
This signal is ON when the lock side is reached.
■ Unlock sensor output (OULK)
This signal is ON when the unlock side is reached.
■ ALARM output (ALARM)
This output is ON when abnormality occurs in the system of the controller.

3-4-4 Input/Output circuits

This section provides the specifications for the Input/Output circuits and examples of wiring. Refer to this example when connecting to the programmable controller or other external equipment.

1. Input/Output circuit specifications

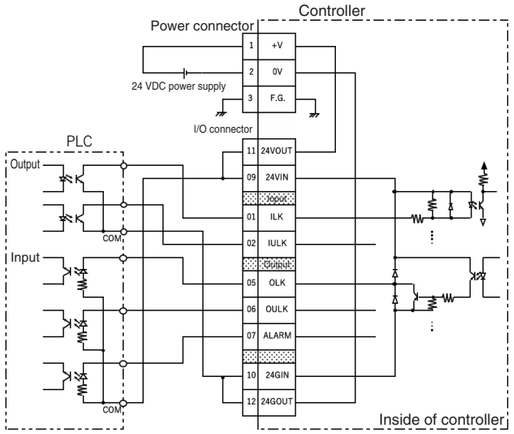
○Input power supply
Input voltage: 24 VDC ±10%

○Input circuit
Isolation method: Photocoupler isolation
Input response: 30 ms or less
Input current: 5 mA/24 VDC
Input sensitivity: ON current min. 3 mA, OFF current max. 1 mA

○Output circuit
Isolation method: Photocoupler isolation between internal circuits and output transistor
Output terminal: Open collector output(NPN output)
Output response: 1 ms or less
Maximum output current: 30 mA/24 VDC per 1 output
Residual ON voltage: 1.5 V or less

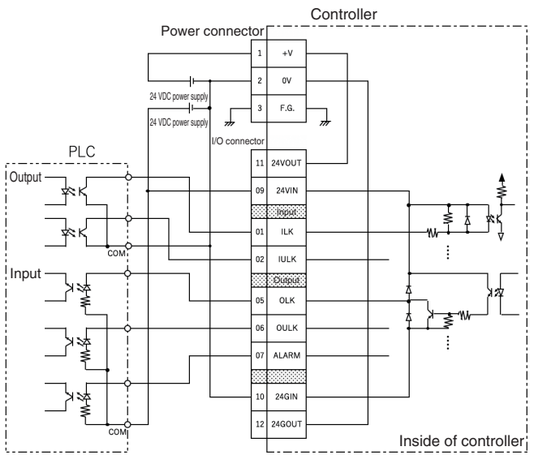
2. Wiring example

When using the controller's internal power supply



* Even when using just input or output, short circuit 09-11 and 10-12.

When a separate power supply is used without using the controller's internal power supply



* Even when using just input or output, connect power to 09 and 10.

3-4-5 Explanation of operating method

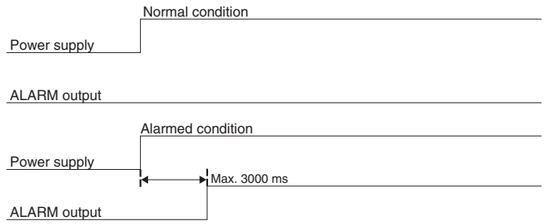
Two types of operating methods are available for controllers. Choose one according to how it will be used.
The operating method can be changed by the state of controller SW1.

State of SW1	Operating method	Description
OFF state	IULK signal — When OFF (Locked) / When ON (Unlocked)	Method that switches between lock/unlock by IULK signal only
ON state	ILK signal — When ON (Locked) IULK signal — When ON (Unlocked)	Method that does lock operation by ILK signal and does unlock operation by IULK signal

* The operating method is determined when the power is turned ON. Therefore, turn the power OFF and then turn it back ON to change.
* Put SW2 in the OFF state.

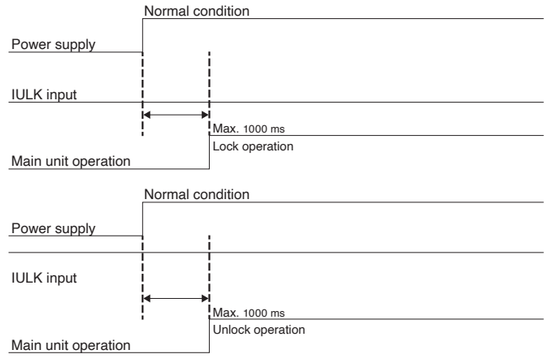
3-4-6 Timing chart

(1) When the power is turned ON



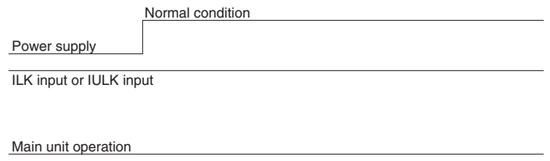
* Before operating, confirm that the ALARM output does not turn ON after the power is turned ON.

○When controller SW1: OFF state



* When "Controller SW1: OFF state", then operation starts according to IULK signal when power is turned ON.

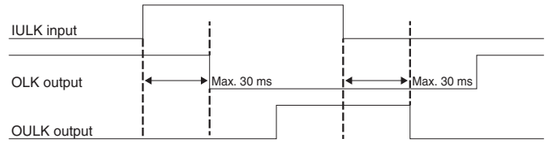
○When controller SW1: ON state



* When "Controller SW1: ON state", then does not operate regardless of input signal when power is turned ON.

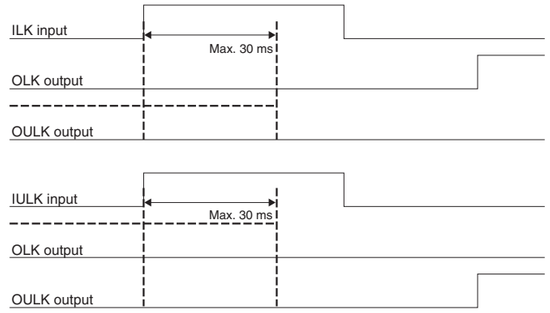
(2) Execution of custom command

○When controller SW1: OFF state



①While an unlock operation is being executed, keep the IULK input in the ON state.
To keep that state after the unlock operation, keep the input ON state.
②While a lock operation is being executed, keep the IULK input in the OFF state.
To keep that state after the lock operation, keep the input OFF state.

○When controller SW1: ON state



①While inputting an operation shift signal, keep the dedicated command input in an ON state for about 30 ms.
②After the operation, the OLK output or OULK output turns ON, indicating it ended normally.

4. Troubleshooting

When ALARM output is ON, an alarm is determined to have been issued. In addition, when an alarm is issued, the ALM LED on the front of the controller lights. When an alarm is issued, turn the power OFF temporarily, eliminate the cause of the alarm, and then turn ON the power again.

Symptom	Main source of trouble	Correction process
Power does not turn ON	Power not ON	Check whether power cable is connected.
Actuator does not operate Abnormal indicator LED (red) is OFF	Wiring not ON	Check whether I/O cable is connected.
	Wiring chart	Check whether I/O cable wiring is correct.
Actuator does not operate Abnormal indicator LED (red) is ON	Wiring not on	Check whether connecting cable is connected.
	Connecting cable is disconnected	Connecting cable may be disconnected. Replace the connecting cable.
	Actuator malfunction	Actuator may have malfunctioned. Replace the actuator.
Actuator is operating, but abnormal indicator LED (red) is ON	Applied voltage abnormal	Check the applied voltage of the power supply.
	Temperature abnormal	Check that the ambient temperature is appropriate.
Lock signal is not being output	Insufficient current	Check the capacity of the power supply being used.
	Actuator malfunction	Actuator may have malfunctioned. Replace the actuator.

5. Specifications

Item		Model: ECB-MJ□-NP / ECB-CPL□-NP
Control method	Motor drive method	Square-wave drive
	Control method	Current control method
	End detection method	Current detection method
	Number of points	2 points (both ends)
	Control input	2 points (ILK, IULK)
	Control output	3 points (OLK, OULK, ALARM)
	Abnormality detection output	Disconnection, abnormal temperature, abnormal voltage, idle spinning
	Connecting cable	Motor drive output dedicated cable
	Sensor cable	None
General specifications	Mass	40 g
	Power supply	24 VDC ±10% 1.0 A MAX
	Power supply indicator	+V / 0V / F.G.
	Operating temperature range	0 to 40°C
	Operating humidity range	35 to 85% RH (no condensation)
	Storage temperature range	-10 to 65°C
	Noise resistance (certified standard)	CE marking
	Accessories	I/O cable, power cable Mounting bracket (when -BR selected)
	Mounting methods	Direct mount (M2.6 x 0.45, 5 deep 2 locations) DIN rail mount Maunting bracket

If you have questions about the contents of this manual, or about other technical issues, please consult the KOGANEI overseas group shown below.

<<Contact information>>
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