



OPERATING MANUAL

Drivers for 2-Phase, 5-Phase Stepping Motors

CVD Series RS-485 communication type

Driver Edition



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Introduction

■ Before use

Only qualified personnel of electrical and mechanical engineering should work with the product.

Use the product correctly after thoroughly reading the section "Safety precautions" In addition, be sure to observe the contents described in warning, caution, and note in this manual.

The product described in this manual is designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose. Oriental Motor Co., Ltd. is not responsible for any compensation for damage caused through failure to observe this warning.

■ Related operating manuals

For operating manuals not included with the product, contact your nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.

Operating manual name	Included or not included with product
CVD Series RS-485 communication type OPERATING MANUAL Driver Edition (this document)	Included
CVD Series RS-485 communication type USER MANUAL	Not included
CVD Series RS-485 communication type OPERATING MANUAL Function Edition	Not included

Safety precautions

The precautions described below are intended to ensure the safe and correct use of the product, and to prevent the customer and others from exposure to the risk of injury. Use the product only after carefully reading and fully understanding these instructions.

	Handling the product without observing the instructions that accompany a "WARNING" symbol may result in serious injury or death.
	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
	The items under this heading contain important handling instructions that the user should observe to ensure the safe use of the product.
	The items under this heading contain related information and contents to gain a further understanding of the text in this manual.

Thank you for purchasing an Oriental Motor product.

This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

WARNING

General

- Do not use the driver in explosive or corrosive environments, in the presence of flammable gases, in places subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock or injury.
- Assign qualified personnel to the task of installing, wiring, operating/controlling, inspecting, and troubleshooting the driver. Failure to do so may result in fire, electric shock, injury or damage to equipment.
- When an alarm is generated in the driver (any of the driver's protective functions is triggered), remove the cause before clearing the alarm (protective function). Continuing the operation without removing the cause of the problem may cause malfunction of the motor and driver, leading to injury or damage to equipment.

Installation

- Install the driver inside an enclosure. Failure to do so may result in electric shock or injury.

Connection

- Always keep the power supply voltage of the driver within the specified range. Failure to do so may result in fire or electric shock.
- Connect the cables securely according to the wiring diagram. Failure to do so may result in fire or electric shock.
- Do not forcibly bend, pull, or pinch the cable. Doing so may result in fire or electric shock.

Operation

- Turn off the main power supply in the event of a power failure. Failure to do so may result in injury or damage to equipment.
- Do not remove the motor excitation during operation. Doing so may cause the motor to stop and lose the holding force, resulting in injury or damage to equipment.
- For a main power supply, use a DC power supply with reinforced insulation on its primary and secondary sides. Failure to do so may result in electric shock.

Repair, disassembly and modification

- Do not disassemble or modify the driver. Doing so may result in injury or damage to equipment.

CAUTION

General

- Do not use the driver beyond its specifications. Doing so may result in electric shock, injury, or damage to equipment.
- Do not insert a finger or an object between the board and the heat sink. Doing so may result in fire, electric shock, or injury.
- Do not touch the driver during operation or immediately after stopping. Doing so may result in a skin burn(s).
- Do not forcibly bend or pull the cable that is connected to the driver. Doing so may result in damage to the product.

Installation

- Do not place combustibles around the driver. Doing so may result in fire or a skin burn(s).
- Do not leave anything around the driver that would obstruct ventilation. Doing so may result in damage to equipment.

Operation

- Use a motor and driver only in the specified combination. An incorrect combination may cause a fire.
- Provide an emergency stop device or emergency stop circuit external to the equipment so that the entire equipment will operate safely in the event of a system failure or malfunction. Failure to do so may result in injury.
- Before supplying main power to the driver, turn all input signals to the driver to OFF. Failure to do so may result in injury or damage to equipment.

- When moving the moving part manually, put the motor into a non-excitation state. Continuing the work while the motor is in an excitation state may result in injury.
- When an abnormal condition has occurred, immediately stop operation to turn off the main power supply. Failure to do so may result in fire, electric shock, or injury.

Precautions for use

This section covers restrictions and requirements the user should consider when using the product.

- **When conducting the insulation resistance measurement or the dielectric strength test, be sure to separate the connection between the motor and the driver.**

Conducting the insulation resistance measurement or dielectric strength test with the motor and driver connected may result in damage to the product.

- **Note on connecting a main power supply whose positive terminal is grounded**

The USB communication connector (CN3) of the driver is not electrically insulated. When grounding the positive terminal of the main power supply, do not connect any equipment (PC, etc.) whose negative terminal is grounded. Doing so may cause the driver and these equipment to short, damaging both. When connecting, do not ground equipment.

- **Storing data in non-volatile memory**

Do not turn off the main power supply while writing the data to the non-volatile memory, and also do not turn off for 5 seconds after the completion of writing the data. Doing so may abort writing the data and cause an alarm of the EEPROM error to generate. The non-volatile memory can be rewritten approximately 100,000 times.

- **Noise elimination measures**

Refer to the [USER MANUAL](#) for the noise elimination measures.

- **Regeneration**

When a large load inertia is operated at a high speed, the power supply voltage may increase by the regenerative energy generated, causing an alarm of overvoltage to generate. This may result in damage to the driver, so reconsider the operating condition so as not to generate the regenerative voltage.

Preparation

Package contents

Verify that the items listed below are included. Report any missing or damaged items to the Oriental Motor sales office from which you purchased the product.

- Driver..... 1 unit
- OPERATING MANUAL Driver Edition..... 1 copy (this document)



When taking out the driver from the electrostatic discharge (ESD) protection bag, make sure your hands are not charged with static electricity. Static electricity may cause damage to the driver.

How to identify the product model

Check the model name of the driver against the model name shown on the nameplate. Refer to "Information about nameplate" for how to identify the nameplate.

CVD 2 B R - K R
1 2 3 4 5 6

1	Series	CVD: CVD Series
2	Number of phases of motor	2: 2-phase 5: 5-phase
3	Driver shape	B: Driver with mounting plate
4	Connector shape	R: Right angle Blank: Vertical
5	Power supply input	K: DC power supply
6	Type	R: RS-485 communication type

Information about nameplate

The figure shows an example.



The position describing the information may vary depending on the product.

Products possible to combine

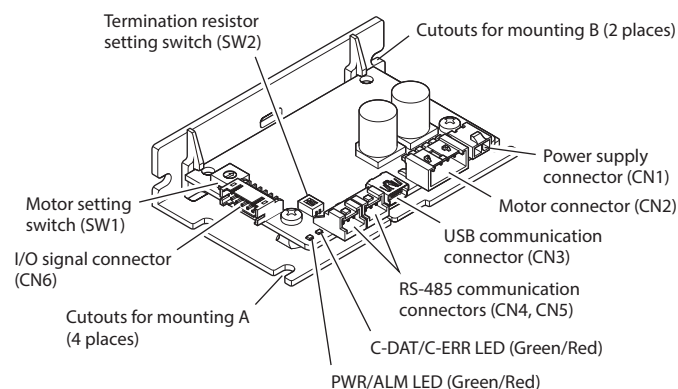
Products with which the driver can be combined are listed below. Check the model name of the product with the nameplate.

Driver model	Product type	Applicable Series	Motor model *1
CVD2B-KR CVD2BR-KR	2-phase stepping motor bipolar	PKP Series	PKP213D05■ PKP214D06■ PKP22□D15■ PKP22□D15■2 PKP22□MD15■ PKP23□D15■ PKP23□D23■ PKP24□D08■2 PKP24□D15■2 PKP24□D23■2 PKP24□MD15■2 PKP25□D28■A2 PKP26FD15A PKP26□D14■2 PKP26□D28■2 PKP26□MD28■2
CVD5B-KR CVD5BR-KR	5-phase stepping motor	PKP Series	PKP52□ PKP54□MN PKP54□N18■2 PKP56□FMN PKP56□FN24■2
		PK Series	PK513 PK52□H PK52□P PK54□ PK56□ *2

- *1 The motor model column in the table describes part of the entire name of models. Drivers can be combined with motors that include the model names listed here. The box (□) in the motor model indicates a number representing the motor length. The box (■) in the motor model indicates A (single shaft) or B (double shaft) representing the shape.
- *2 Motors with the rated current of 1.4 A/phase are available.

Names and functions of parts

The figure shows the driver which connector shape is of right angle.



Name	Description
PWR/ALM LED (Green/Red)	<ul style="list-style-type: none"> • This LED is lit in green while the main power supply is turned on. • If an alarm (protective function) is generated, the LED will blink in red. • If information is generated, the LED will simultaneously blink in red and green twice. (Green and red colors may overlap and it may be visible to orange.)
C-DAT/C-ERR LED (Green/Red)	<ul style="list-style-type: none"> • This LED will blink or illuminate in green when the driver is communicating with the host controller properly via RS-485 communication. • This LED will be lit in red if a RS-485 communication error occurs with the host controller.
Motor setting switch (SW1)	Sets an applicable motor. Factory setting: 0
Termination resistor setting switch (SW2)	Sets the termination resistor (120 Ω) of RS-485 communication. Factory setting: OFF for both No.1 and No.2 (termination resistor disabled)

Name	Description
Power supply connector (CN1)	Connects the main power supply.
Motor connector (CN2)	Connects the motor.
USB communication connector (CN3)	Connects a PC in which the support software MEXE02 has been installed. (USB2.0 mini-B port)
RS-485 communication connectors (CN4, CN5)	Connects the RS-485 communication compatible product.
I/O signal connector (CN6)	Connects when using direct I/O or sensors.

Installation

■ Installation location

The driver is designed and manufactured to be incorporated in equipment. Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature 0 to +50 °C (+32 to +122 °F) (non-freezing)
- Operating ambient humidity 85 % or less (non-condensing)
- Area free of explosive atmosphere, toxic gas (such as sulfuric gas), or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to splashing water (rain, water droplets), oil (oil droplets), or other liquids
- Area free of excessive salt
- Area not subject to continuous vibrations or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum
- Up to 1,000 m (3,300 ft.) above sea level

■ Installation direction

Install the driver in vertical or horizontal position on a flat metal plate having excellent vibration resistance. If the driver is installed in a state other than vertical or horizontal position, its heat radiation effect will deteriorate.

The items shown below are necessary in order to install the driver. They must be provided by the customer.

Items to be prepared	Cutouts for mounting A	Cutouts for mounting B
M3 screw	4 pcs.	2 pcs.
M3 spring washer	4 pcs.	2 pcs.
M3 nut *	4 pcs.	2 pcs.

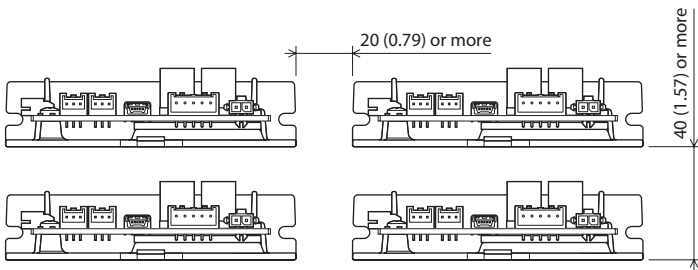
* Not necessary if screw holes are provided in the enclosure.

There must be clearances of at least 25 mm (0.98 in.) and 50 mm (1.97 in.) in the horizontal and vertical directions respectively, between the driver and enclosure or other equipment within the enclosure. When two or more drivers are to be installed side by side, provide clearances in the horizontal and vertical directions as shown in the figure. The figure shows the driver which connector shape is of right angle.

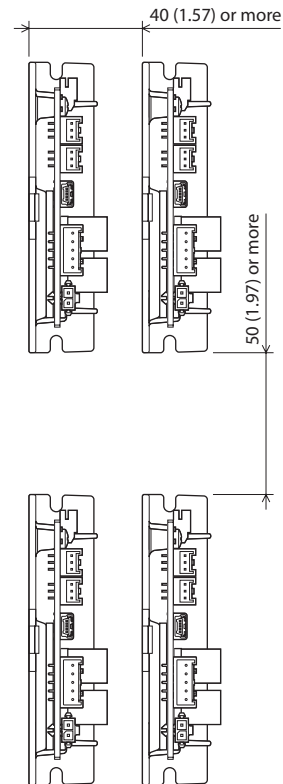


- Install the driver inside an enclosure
- Do not install any equipment that generates a large amount of heat or noise near the driver.
- If the ambient temperature of the driver exceeds 50 °C (122 °F), reconsider the ventilation condition.

• Horizontal installation [Unit: mm (in.)]



• Vertical installation [Unit: mm (in.)]



■ Installation method

Install the driver using either the "cutouts for mounting A" or "cutouts for mounting B." Torque the mounting screw to 0.5 N·m (71 oz·in).

The figure shows the driver which connector shape is of right angle.



If both cutouts A and B are used for installation, the heat sink is distorted, causing the board to apply stress.

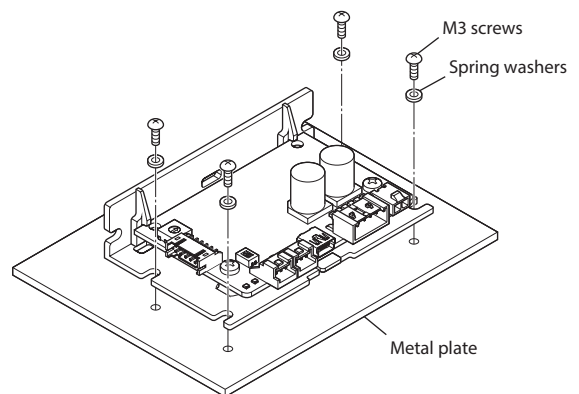


When tightening the screws, make sure that the screw tightening tool does not touch the I/O signal connector (CN6).

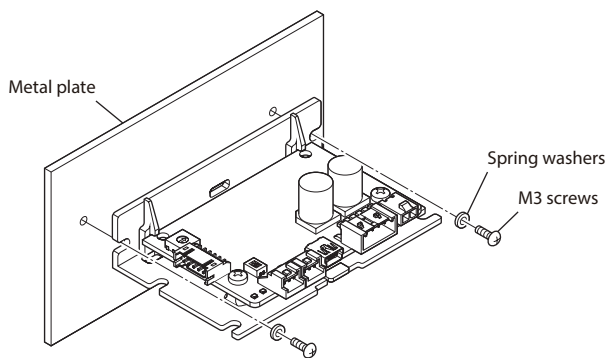
• Horizontal installation

Install the driver in a direction shown in the figure. Installing the driver upside down causes the heat radiation effect to deteriorate.

- When using the cutouts for mounting A



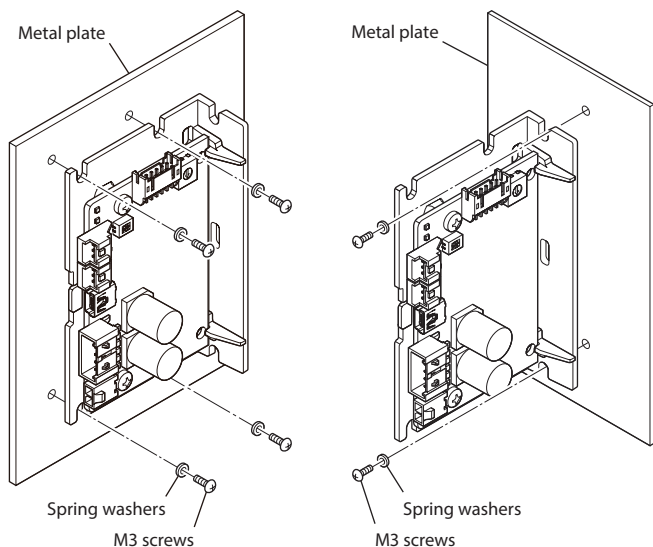
- When using the cutouts for mounting B



• Vertical installation

The driver can be installed in any direction.

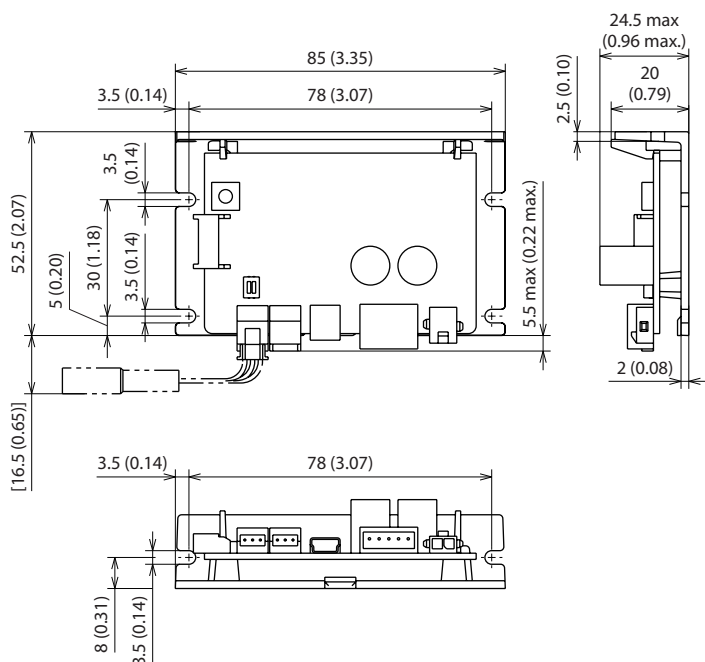
- When using the cutouts for mounting A
- When using the cutouts for mounting B



• Dimensions [Unit: mm (in.)]

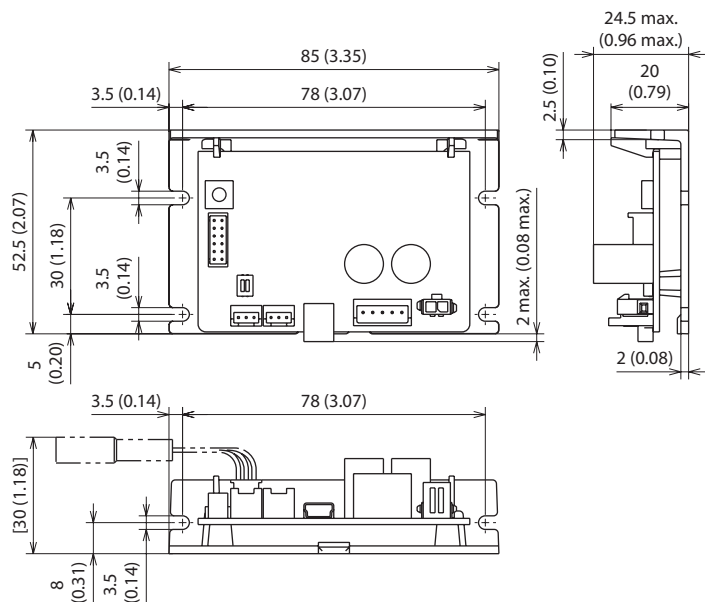
• Right angle

Mass: 0.065 kg (2.3 oz.)



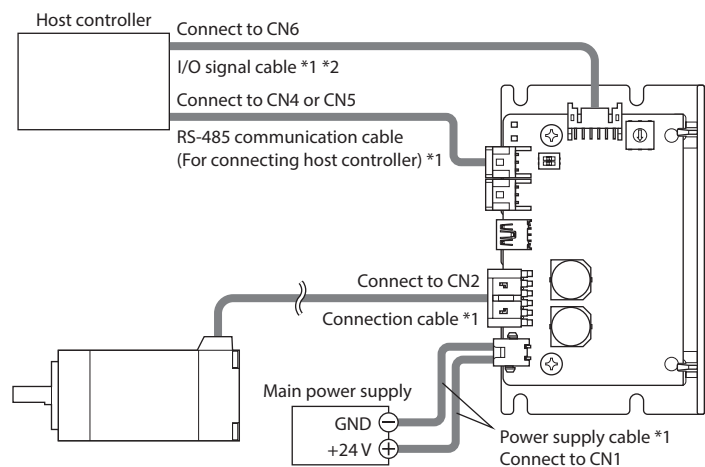
• Vertical

Mass: 0.065 kg (2.3 oz.)



Connection

■ Connection example



*1 These cables are provided as our products. Check on the Oriental Motor Website for the model name.

*2 Connect when using direct I/O or sensors.

Note

- When connecting, pay attention to the polarity of the main power supply. Reverse-polarity connection may cause damage to the driver.
- Connect the connectors securely. Insecure connections may cause malfunction or damage to the driver.

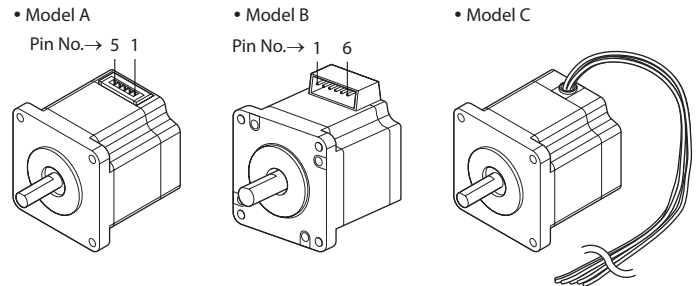
memo

- When disconnecting the connector, pull out while pressing the latches on the connector with fingers.
- When turning on the main power supply again or connecting/disconnecting the connector, turn off the main power supply and wait for the PWR/ALM LED to turn off.
- Separate an I/O signal cable at least 100 mm (3.94 in.) from inductance loads such as electromagnetic relays, and wire so that it is not in parallel with power supply cables and connection cables.
- Do not wire the power supply cable of the driver in the same cable duct with other power lines or connection cables.
- If the connection cable or power supply cable generates an undesirable amount of noise depending on the installation and wiring, shield the cable or install a ferrite core.
- Up to three pieces of cables can be used to connect between the motor and the driver. Keep 10 m (32.8 ft.) or less for the wiring distance between the motor and the driver.
- Keep 10 m (32.8 ft.) or less for the total wiring distance of the RS-485 communication cable. To extend more than 10 m (32.8 ft.) causes the driver to be affected easily by electrical noise.

■ Connecting the motor (CN2): 2-phase stepping motor

Connector pin assignments vary depending on the motor. Refer to the table when connecting. "Color" in the table shows the colors of lead wires of our connection cable. The pin number is shown in the figure.

Note The motors of the Model A and Model B are different in pin assignments. The motor does not rotate properly if the connection is wrong.



● Pin assignment

Driver CN2 pin No.	Model A		Model B		Model C
	Pin No.	Color	Pin No.	Color	
1	4	Blue	1	Blue	Blue
2	5	Red	3	Red	Red
3	—		—		—
4	2	Green	6	Green	Green
5	1	Black	4	Black	Black

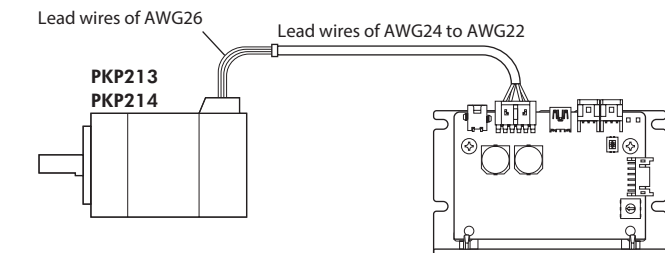
● Applicable connector

Manufacturer	Molex Incorporated
Connector housing	51103-0500
Contact	50351-8100
Designated crimping tool	63811-8100
Applicable lead wire	<ul style="list-style-type: none">• AWG24 to AWG22 (0.2 to 0.3 mm²)*• Outer sheath diameter: ø1.15 to 1.8 mm (ø0.045 to 0.071 in.)• Stripping length of wire insulation: 2.3 to 2.8 mm (0.091 to 0.11 in.)

* If a motor whose motor setting switch (SW1) is set to "A" is used, use the lead wires of AWG22 (0.3 mm²). Refer to p.7 for the motor setting switch.

● Motors of frame size 20 mm (0.79 in.)

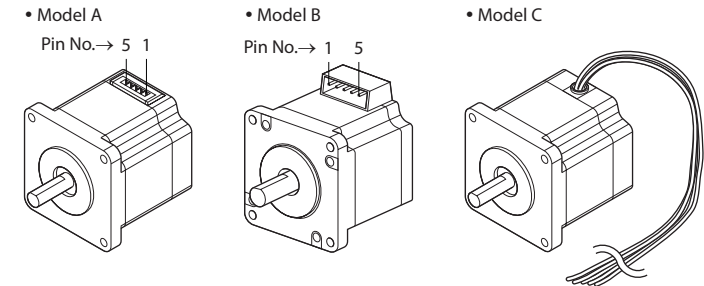
When motors of the frame size 20 mm (0.79 in.) (PKP213, PKP214) are used, connect by relaying lead wires of AWG24 to AWG22 (0.2 to 0.3 mm²) since the wire diameter of the motor lead wires is as small as AWG26 (0.14 mm²). Connection cables (without termination processing) provided by us can also be used. Check on the Oriental Motor Website for the model name.



■ Connecting the motor (CN2): 5-phase stepping motor

Connector pin assignments vary depending on the motor. Refer to the table when connecting. "Color" in the table shows the colors of lead wires of our connection cable. The pin number is shown in the figure.

Note The motors of the Model A and Model B are different in pin assignments. The motor does not rotate properly if the connection is wrong.



● Pin assignment

Driver CN2 pin No.	Model A		Model B		Model C
	Pin No.	Color	Pin No.	Color	
1	5	Blue	1	Blue	Blue
2	4	Red	2	Red	Red
3	3	Orange	3	Orange	Orange
4	2	Green	4	Green	Green
5	1	Black	5	Black	Black

● Applicable connector

Manufacturer	Molex Incorporated
Connector housing	51103-0500
Contact	50351-8100
Designated crimping tool	63811-8100
Applicable lead wire	<ul style="list-style-type: none">• AWG24 to AWG22 (0.2 to 0.3 mm²)*• Outer sheath diameter: ø1.15 to 1.8 mm (ø0.045 to 0.071 in.)• Stripping length of wire insulation: 2.3 to 2.8 mm (0.091 to 0.11 in.)

* If a motor whose motor setting switch (SW1) is set to "7" is used, use the lead wires of AWG22 (0.3 mm²). Refer to p.7 for the motor setting switch.

■ Connecting the main power supply (CN1)

● Power supply current capacity

The current capacity of the main power supply varies depending on the product to be combined.

● 2-phase stepping motor

Motor model *	Input power supply voltage	Power supply current capacity
PKP213D05■ PKP214D06■	24 VDC±10 %	0.5 A or more
PKP22□D15■ PKP22□D15■2 PKP22□MD15■ PKP23□D15■		1.9 A or more
PKP23□D23■		2.0 A or more
PKP24□D08■2		0.8 A or more
PKP24□D15■2		1.4 A or more
PKP24□D23■2		2.0 A or more
PKP24□MD15■2		1.4 A or more
PKP25□D28■A2		3.0 A or more
PKP262FD15A		1.9 A or more
PKP26□D14■2		1.3 A or more
PKP26□D28■2 PKP26□MD28■2		3.0 A or more

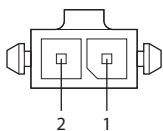
* The motor model column in the table describes part of the entire name of models. The box (□) in the motor model indicates a number representing the motor length. The box (■) in the motor model indicates **A** (single shaft) or **B** (double shaft) representing the shape.

● 5-phase stepping motor

Motor model *	Input power supply voltage	Power supply current capacity
PK513	24 VDC±10 %	0.6 A or more
PK52□H		1.4 A or more
PK52□P		0.6 A or more
PK54□		1.4 A or more
PK56□		1.8 A or more
PKP52□		1.7 A or more
PKP54□MN PKP54□N18■2		2.8 A or more
PKP56□FMN PKP56□FN24■2		3.0 A or more

* The motor model column in the table describes part of the entire name of models. The box (□) in the motor model indicates a number representing the motor length. The box (■) in the motor model indicates **A** (single shaft) or **B** (double shaft) representing the shape.

● Pin assignment



Pin No.	Description
1	+24 VDC Power supply input
2	Power supply GND

● Applicable connector

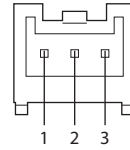
Manufacturer	Molex Incorporated
Connector housing	43645-0200
Contact	43030-0001
Designated crimping tool	638190000
Applicable lead wire	<ul style="list-style-type: none"> • AWG22 (0.3 mm²) • Outer sheath diameter: ø1.85mm (ø0.073 in.) • Stripping length of wire insulation: 2.54 to 2.92 mm (0.1 to 0.115 in.)

memo Keep the wiring distance as short as possible [less than 2 m (6.6 ft.)] to suppress the effect of noise.

■ Connecting the RS-485 communication compatible product (CN4, CN5)

Connect the RS-485 communication cable to CN4 or CN5 connector. A vacant connector can be used to connect a different driver.

● Pin assignment



Pin No.	Signal name	Description
1	TR+	RS-485 communication signal (+)
2	TR-	RS-485 communication signal (-)
3	SG	Signal ground

● Applicable connector

Manufacturer	J.S.T. Mfg. Co., Ltd.
Connector housing	PAP-03V-S
Contact	SPHD-001T-P0.5 or SPHD-002T-P0.5
Designated crimping tool	<ul style="list-style-type: none"> • When the contact model is SPHD-001T-P0.5 AWG24 to AWG22: YC-611R AWG26 to AWG24: YC-610R • When the contact model is SPHD-002T-P0.5 YRS-620
Applicable lead wire	<ul style="list-style-type: none"> • When the contact model is SPHD-001T-P0.5 AWG26 to AWG22 (0.13 to 0.33 mm²) Outer sheath diameter: ø1 to 1.5 mm (ø0.039 to 0.059 in.) • When the contact model is SPHD-002T-P0.5 AWG28 to AWG24 (0.08 to 0.21 mm²) Outer sheath diameter: ø0.76 to 1.5 mm (ø0.03 to 0.059 in.)



Twisted-pair wires or shielded wires are recommended for RS-485 communication cable.

■ Connecting the USB cable (CN3)

Using a USB cable of the following specification, connect a PC in which the **MEXE02** has been installed to the USB communication connector (CN3).

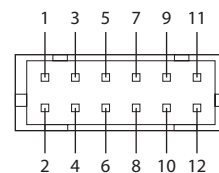
Specification	USB2.0 (full speed)
Cable	Length: 3 m (9.8 ft.) or less Shape: A to mini B



- Connect the driver and PC directly using the USB cable.
- In large electrically noisy environments, use the USB cable with a ferrite core or install a ferrite core to the USB cable.

■ Connecting the I/O signals (CN6)

● Pin assignment



Pin No.	Signal name	Description *
1	IN-COM	Input common
2	IN0	Control input 0 [FW-POS]
3	IN1	Control input 1 [RV-POS]
4	IN2	Control input 2 [STOP]
5	IN3	Control input 3 [ALM-RST]
6	IN4	Control input 4 [HOMES]
7	IN5	Control input 5 [FW-LS]
8	IN6	Control input 6 [RV-LS]
9	OUT0	Control output 0 [ALM-B]
10	OUT1	Control output 1 [TIM]
11	OUT-COM	Output common
12	N.C.	N.C.

* Values in brackets [] are initial values.

● Applicable connector

Manufacturer	J.S.T. Mfg. Co., Ltd.
Connector housing	PHDR-12VS
Contact	SPHD-001T-P0.5
Designated crimping tool	YC-610R
Applicable lead wire	<ul style="list-style-type: none"> • AWG26 (0.14 mm²) • Outer sheath diameter: ø1 to 1.5 mm (ø0.039 to 0.059 in.)



- Keep the wiring distance as short as possible [less than 2 m (6.6 ft.)] to suppress the effect of noise.
- Twisted-pair wires or shielded wires are recommended for I/O signal cable.

Setting

■ Setting the applicable motor

Set the motor setting switch (SW1) according to the motor used.
If the switch is set, the output current of the driver is automatically set.

⚠ CAUTION

- Be sure to set the switch according to the motor. If the output current of the driver is set to a value higher than the rated current of the motor by mistake, fire or a skin burn(s) may result.
- Turn off the main power supply of the driver before setting the switch. Failure to do so may result in electric shock.



- The set switch is enabled after the main power supply is turned on again.
- Setting the switch to a value not shown in the table causes the motor to remain in a non-excitation state, and the information of motor setting error is generated.

● 2-phase stepping motor

Factory setting 0 (No setting)

Setting of switch	Motor model *	Output current of driver to be set (A/phase)
2	PKP213D05■	0.5
3	PKP214D06■	0.6
4	PKP24□D08■2	0.85
5	PKP26□D14■2	1.4
6	PKP22□D15■ PKP22□D15■2 PKP22□MD15■ PKP23□D15■ PKP262FD15A	1.5
7	PKP24□D15■2 PKP24□MD15■2	1.5
8	PKP23□D23■	2.3
9	PKP24□D23■2	2.3
A	PKP25□D28■A2 PKP26□D28■2 PKP26□MD28■2	2.8

* The motor model column in the table describes part of the entire name of models.
The box (□) in the motor model indicates a number representing the motor length.
The box (■) in the motor model indicates **A** (single shaft) or **B** (double shaft) representing the shape.

● 5-phase stepping motor

Factory setting 0 (No setting)

Setting of switch	Motor model *	Output current of driver to be set (A/phase)
2	PK513 PK52□P	0.35
3	PK52□H PK54□	0.75
4	PKP52□	1.2
5	PK56□	1.4
6	PKP54□MN PKP54□N18■2	1.8
7	PKP56□FMN PKP56□FN24■2	2.4

* The motor model column in the table describes part of the entire name of models.
The box (□) in the motor model indicates a number representing the motor length.
The box (■) in the motor model indicates **A** (single shaft) or **B** (double shaft) representing the shape.

■ Setting of termination resistor

Set the termination resistor (120 Ω) of RS-485 communication to the driver located the farthest away (positioned at the end) from the host controller.
Set both No.1 and No.2 of the termination resistor setting switch (SW2) to ON.

Factory setting OFF for both No.1 and No.2 (termination resistor disabled)

SW2 switch-No.1, No.2	Termination resistor (120 Ω)
Both are OFF	Disabled
Both are ON	Enabled

⚠ CAUTION

Turn off the main power supply of the driver before setting the switch. Failure to do so may result in electric shock.



If only one of the two is set to ON, a communication error may occur.

■ Setting of communication parameters

Refer to the [USER MANUAL](#) for setting of communication parameters.

Alarms

If an alarm is generated, the ALM-A output is turned ON and the ALM-B output is turned OFF to stop the motor. At the same time, the PWR/ALM LED blinks in red.
Before resetting an alarm, always remove the cause of the alarm and ensure safety.
Refer to the [USER MANUAL](#) for details about alarm.

Inspection and maintenance

■ Inspection

It is recommended that periodic inspections are conducted for the items listed below after each operation of the motor. If an abnormal condition is noted, discontinue any use and contact your nearest Oriental Motor sales office.

● Inspection item

- Check if the installation place of the driver is loose.
- Check if any of the connection parts of the connector is loose.
- Check if dust and others attach on the driver.
- Check if the driver has unusual smells or appearance defects.



The driver uses semiconductor components. Static electricity may damage the semiconductor components of the driver, so be extremely careful when handling the driver.

■ Warranty

Check on the Oriental Motor Website or General Catalog for the product warranty.

■ Disposal

Dispose the product correctly in accordance with laws and regulations, or instructions of local governments.

Specifications

■ Product specifications

Input voltage		24 VDC±10 %
Input current		2-phase: 0.5 to 3.0 A * 5-phase: 0.6 to 3.0 A *
Interface	Control input	Number of input points: 7, photocoupler
	Control output	Number of output points: 2, photocoupler/open collector
	Field network	Modbus RTU (RS-485 communication)

* A current value varies depending on a motor combined. Refer to p.6.

■ General specifications

Operating environment	Ambient temperature	0 to +50 °C (+32 to +122 °F) (non-freezing)
	Humidity	85 % or less (non-condensing)
	Altitude	Up to 1,000 m (3,300 ft.) above sea level
	Surrounding atmosphere	No corrosive gas, dust, water, or oil.
Storage environment Shipping environment	Ambient temperature	−25 to +70 °C (−13 to +158 °F) (non-freezing)
	Humidity	85 % or less (non-condensing)
	Altitude	Up to 3,000 m (10,000 ft.) above sea level
	Surrounding atmosphere	No corrosive gas, dust, water, or oil.

Regulations and standards

■ CE Marking

This product is affixed with the CE Marking under the EMC Directive.

• Low Voltage Directive

The input power supply voltage of this product is 24 VDC. Therefore this product is not subject to the Low Voltage Directive, but install and connect it as follows.

- This product is designed and manufactured to be incorporated in equipment. Be sure to install the product inside an enclosure.
- For the main power supply of the driver, use a DC power supply with reinforced insulation on its primary and secondary sides.

• EMC Directive

The EMC testing is conducted on this product under the conditions specified in "Example of installation and wiring" on the USER MANUAL. The conformance of your mechanical equipment to the EMC Directive will vary depending on such factors as the control system equipment used with this product, configuration of electrical parts, wiring, and layout. It therefore must be verified through conducting EMC testing in a state where all parts including this product have been installed in the equipment.

Applicable standards

EMI	EN 55011 Group1 Class A EN 61000-6-4
EMS	EN 61000-6-2



This equipment is not intended for use in residential environments nor for use on a low-voltage public network supplied in residential premises, and it may not provide adequate protection to radio reception interference in such environments.

■ Republic of Korea, Radio Waves Act

This product is affixed with the KC Mark under the Radio Waves Act, the Republic of Korea.

■ RoHS Directive

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).

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- Please contact your nearest Oriental Motor office for further information.

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