

# Bipolar Driver for 1.8°/0.9° Stepper Motors Unipolar Driver for 1.8°/0.9° Stepper Motors Driver for 0.72°/0.36° Stepper Motors



These are DC power supply input drivers for stepper motors. The bipolar/unipolar driver for 1.8°/0.9° stepper motor and the driver for 0.72°/0.36° stepper motor are available. Using the microstep drive function for a low-vibration driver reduces vibration and noise.

## Features and Types

### ● Bipolar/Unipolar Driver for 1.8°/0.9° Stepper Motor Driver for 0.72°/0.36° Stepper Motor

Driver Type	External View	Introduction	Driver Installation Direction
<p>● Bipolar Driver for 1.8°/0.9° Stepper Motor ● Driver for 0.72°/0.36° Stepper Motor Page A-439~A-444</p> <p>52.5 mm 24.5 mm 85 mm</p> <ul style="list-style-type: none"> <li>Mass 20 g~70 g (The value differs according to the driver type.)</li> <li>The driver cannot be shared by both a 1.8°/0.9° stepper motor and 0.72°/0.36° stepper motor. Each must use its respective dedicated driver.</li> </ul>	<p>Right Angle Type with Installation Plate</p> <p>The connector points outward.</p>	<ul style="list-style-type: none"> <li>Compact and lightweight driver with a full-time microstep</li> <li>Using the smooth drive function reduces the vibration and noise more than conventional products.</li> <li>The driver is equipped with a protective function that enables you to find driver errors early.</li> <li>Running current can be easily set with the digital switch.</li> </ul>	<ul style="list-style-type: none"> <li>Horizontal direction installation</li> <li>Vertical direction installation</li> </ul>
<p>With Installation Plate</p> <p>The connector points upward.</p>			
<p>Without Installation Plate</p> <p>The connector points upward.</p>			
<p>● Unipolar Driver for 1.8°/0.9° Stepper Motor Page A-445~A-447</p> <p>50.5 mm 33 mm 65 mm</p> <ul style="list-style-type: none"> <li>Mass 50g</li> </ul>	<p>The connector points upward.</p>	<ul style="list-style-type: none"> <li>Compact and lightweight driver with a microstep</li> <li>Running current can be easily set with the digital switch.</li> </ul>	

## Bipolar Driver for 1.8°/0.9° Stepper Motor Driver for 0.72°/0.36° Stepper Motor

### Product Number

**CVD 2 23 F B R - K**

①      ②      ③      ④      ⑤      ⑥      ⑦

①	Driver Type
②	<b>2:</b> 1.8°/0.9° Stepper Motor <b>5:</b> 0.72°/0.36° Stepper Motor
③	Rated Current
④	Driver Identification
⑤	Driver Configuration <b>B:</b> With Installation Plate Blank: Without Installation Plate
⑥	Connector Configuration <b>R:</b> Right Angle
⑦	Power Supply Input <b>K:</b> DC Power Supply

### Product Line

#### ● Bipolar Driver for 1.8°/0.9° Stepper Motor

##### ◇ Right Angle Type with Installation Plate

Product Name	List Price
<b>CVD205BR-K</b>	€116.00
<b>CVD206BR-K</b>	
<b>CVD215BR-K</b>	
<b>CVD223BR-K</b>	
<b>CVD223FBR-K</b>	
<b>CVD228BR-K</b>	
<b>CVD242BR-K</b>	€132.00
<b>CVD245BR-K</b>	

##### ◇ With Installation Plate

Product Name	List Price
<b>CVD205B-K</b>	€116.00
<b>CVD206B-K</b>	
<b>CVD215B-K</b>	
<b>CVD223B-K</b>	
<b>CVD223FB-K</b>	
<b>CVD228B-K</b>	
<b>CVD242B-K</b>	€132.00
<b>CVD245B-K</b>	

##### ◇ Without Installation Plate

Product Name	List Price
<b>CVD205-K</b>	€110.00
<b>CVD206-K</b>	
<b>CVD215-K</b>	
<b>CVD223-K</b>	
<b>CVD223F-K</b>	
<b>CVD228-K</b>	

#### ● Driver for 0.72°/0.36° Stepper Motor

##### ◇ Right Angle Type with Installation Plate

Product Name	List Price
<b>CVD503BR-K</b>	€127.00
<b>CVD507BR-K</b>	
<b>CVD512BR-K</b>	
<b>CVD514BR-K</b>	
<b>CVD518BR-K</b>	
<b>CVD524BR-K</b>	
<b>CVD528BR-K</b>	€143.00
<b>CVD538BR-K</b>	

##### ◇ With Installation Plate

Product Name	List Price
<b>CVD503B-K</b>	€127.00
<b>CVD507B-K</b>	
<b>CVD512B-K</b>	
<b>CVD514B-K</b>	
<b>CVD518B-K</b>	
<b>CVD524B-K</b>	
<b>CVD528B-K</b>	€143.00
<b>CVD538B-K</b>	

##### ◇ Without Installation Plate

Product Name	List Price
<b>CVD503-K</b>	€121.00
<b>CVD507-K</b>	
<b>CVD512-K</b>	
<b>CVD514-K</b>	
<b>CVD518-K</b>	
<b>CVD524-K</b>	

### Included

Type	Connector for Driver Connection	Operating manual
Common to All Types	For CN1 (1 Piece) For CN2 (1 Piece) For CN3 (1 Piece)	1 set

Overview, Product Series

AC Input Motor & Driver

0.36°/Geared  
**Q<sub>STEP</sub>**  
Absolute  
**AZ**

0.36°/Geared  
**Q<sub>STEP</sub>**  
**AR**

0.72°/Geared  
**RKII**

DC Input Motor & Driver

0.36°/Geared  
**Q<sub>STEP</sub>**  
Absolute  
**AZ**

0.36°/Geared  
**Q<sub>STEP</sub>**  
**AR**

1.8°/0.72°  
/0.36°  
**CVK**

0.72°/0.36°  
/Geared  
**CRK**

1.8°/Geared  
**RBK**

Motor Only /Driver Only

1.8°/0.9°  
**PKP/PK**

Geared  
**PKP/PK**

0.72°/0.36°  
**PKP/PK**

Driver

Accessories

## Specifications

### ● Bipolar Driver for 1.8°/0.9° Stepper Motor

Product Name	CVD205□□-K	CVD206□□-K	CVD215□□-K	CVD223□□-K CVD223F□□-K	CVD228□□-K	CVD242B□□-K	CVD245B□□-K
Drive Method	Microstep Drive, Bipolar Constant Current Drive Method						
Motor Drive Current (Factory setting)	0.5 A/Phase	0.6 A/Phase	1.5 A/Phase	2.3 A/Phase	2.8 A/Phase	4.2 A/Phase	4.5 A/Phase
Power Supply Voltage	24 VDC±10%						
Input Current A	0.5	0.5	1.3	2.0	3.0	3.6	3.9
Maximum Input Pulse Frequency	Line driver output by programmable controller: 1 MHz (When the pulse duty is 50%) Open-collector output by programmable controller: 250 kHz (When the pulse duty is 50%) Negative logic pulse input						
Operating Environment (In operation)	Ambient Temperature	0~+50°C (Non-freezing)					
	Ambient Humidity	85% or Less (Non-condensing)					
	Atmosphere	No corrosive gases or dust. The product should not be exposed to water, oil or other liquids.					

- For the type with installation plate, **B** (with installation plate) indicating the diver configuration is specified where the box □ is located in the product name.  
For the right angle type with installation plate, an **R** (right angle) indicating the connector configuration is specified where the box □ is located in the product name.

### ● Driver for 0.72°/0.36° Stepper Motor

Product Name	CVD503□□-K	CVD507□□-K	CVD512□□-K	CVD514□□-K	CVD518□□-K	CVD524B□□-K	CVD528B□□-K	CVD538B□□-K
Drive Method	Microstep Drive, Bipolar Constant Current Drive Method							
Motor Drive Current (Factory setting)	0.35 A/Phase	0.75 A/Phase	1.2 A/Phase	1.4 A/Phase	1.8 A/Phase	2.4 A/Phase	2.8 A/Phase	3.8 A/Phase
Power Supply Voltage	24 VDC±10%							
Input Current A	0.6	1.4	1.7	1.8	2.8	3.0	4.8	4.8
Maximum Input Pulse Frequency	Line driver output by programmable controller: 1 MHz (When the pulse duty is 50%) Open-collector output by programmable controller: 250 kHz (When the pulse duty is 50%) Negative logic pulse input							
Operating Environment (In operation)	Ambient Temperature	0~+50°C (Non-freezing)						
	Ambient Humidity	85% or Less (Non-condensing)						
	Atmosphere	No corrosive gases or dust. The product should not be exposed to water, oil or other liquids.						

- For the type with installation plate, **B** (with installation plate) indicating the diver configuration is specified where the box □ is located in the product name.  
For the right angle type with installation plate, an **R** (right angle) indicating the connector configuration is specified where the box □ is located in the product name.

## Dimensions (Unit = mm)

### Right Angle Type with Installation Plate

Product Name	Mass kg
<b>CVD205BR-K</b>	0.06
<b>CVD206BR-K</b>	
<b>CVD215BR-K</b>	
<b>CVD223BR-K</b>	
<b>CVD223FBR-K</b>	
<b>CVD228BR-K</b>	
<b>CVD503BR-K</b>	
<b>CVD507BR-K</b>	
<b>CVD512BR-K</b>	
<b>CVD514BR-K</b>	
<b>CVD518BR-K</b>	
<b>CVD524BR-K</b>	

● Included

Connector Housing: 51103-0200 (Molex)  
51103-0500 (Molex)  
51103-1200 (Molex)

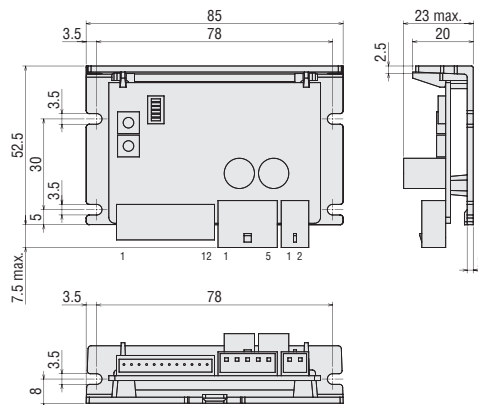
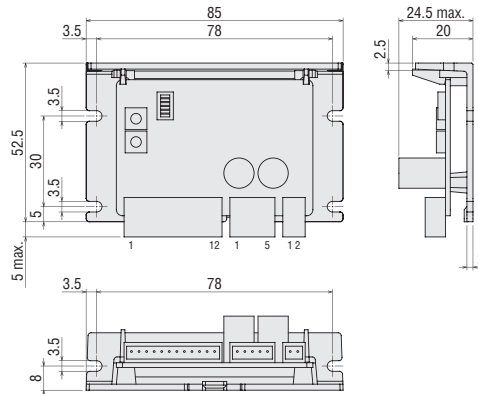
Contact: 50351-8100 (Molex)

Product Name	Mass kg
<b>CVD242BR-K</b>	0.07
<b>CVD245BR-K</b>	
<b>CVD528BR-K</b>	
<b>CVD538BR-K</b>	

● Included

Connector Housing: 51067-0200 (Molex)  
51067-0500 (Molex)  
51103-1200 (Molex)

Contact: 50217-9101 (Molex)  
50351-8100 (Molex)



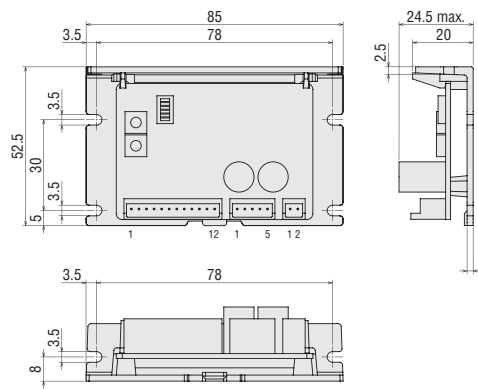
### With Installation Plate

Product Name	Mass kg
<b>CVD205B-K</b>	0.06
<b>CVD206B-K</b>	
<b>CVD215B-K</b>	
<b>CVD223B-K</b>	
<b>CVD223FB-K</b>	
<b>CVD228B-K</b>	
<b>CVD503B-K</b>	
<b>CVD507B-K</b>	
<b>CVD512B-K</b>	
<b>CVD514B-K</b>	
<b>CVD518B-K</b>	
<b>CVD524B-K</b>	

● Included

Connector Housing: 51103-0200 (Molex)  
51103-0500 (Molex)  
51103-1200 (Molex)

Contact: 50351-8100 (Molex)

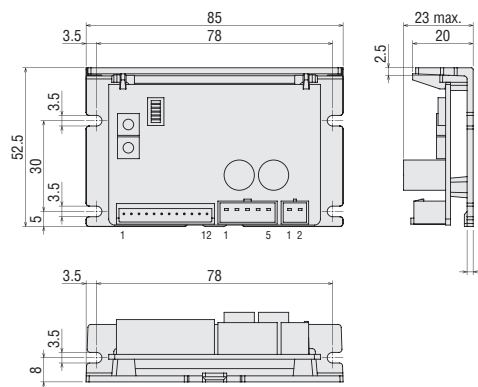


Product Name	Mass kg
<b>CVD242B-K</b>	0.07
<b>CVD245B-K</b>	
<b>CVD528B-K</b>	
<b>CVD538B-K</b>	

● Included

Connector Housing: 51067-0200 (Molex)  
51067-0500 (Molex)  
51103-1200 (Molex)

Contact: 50217-9101 (Molex)  
50351-8100 (Molex)



Overview,  
Product  
Series

AC Input  
Motor &  
Driver

0.36°/Geared  
**αSTEP**  
Absolute  
**AZ**

0.36°/Geared  
**αSTEP**  
**AR**

0.72°/Geared  
**RKII**

DC Input  
Motor &  
Driver

0.36°/Geared  
**αSTEP**  
Absolute  
**AZ**

0.36°/Geared  
**αSTEP**  
**AR**

1.8°/0.72°  
/0.36°  
**CVK**

0.72°/0.36°  
/Geared  
**CRK**

1.8°/Geared  
**RBK**

Motor Only  
/Driver Only

1.8°/0.9°  
**PKP/PK**

Geared  
**PKP/PK**

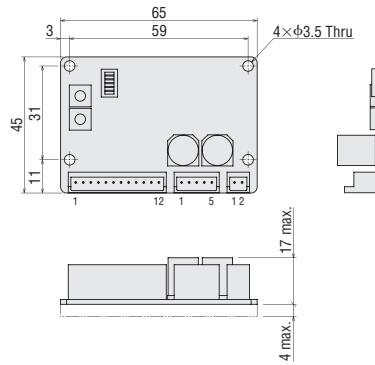
0.72°/0.36°  
**PKP/PK**

Driver

Accessories

● Without Installation Plate

Product Name	Mass kg
<b>CVD205-K</b>	0.02
<b>CVD206-K</b>	
<b>CVD215-K</b>	
<b>CVD223-K</b>	
<b>CVD223F-K</b>	
<b>CVD228-K</b>	
<b>CVD503-K</b>	
<b>CVD507-K</b>	
<b>CVD512-K</b>	
<b>CVD514-K</b>	
<b>CVD518-K</b>	
<b>CVD524-K</b>	



● Included

Connector Housing: 51103-0200 (Molex)  
 51103-0500 (Molex)  
 51103-1200 (Molex)  
 Contact: 50351-8100 (Molex)

■ List of Applicable Motors

● Bipolar Driver for 1.8°/0.9° Stepper Motor

Right Angle Type with Installation Plate	Driver Product Name		Motor Drive Current (Factory Setting)	Applicable Motor
	With Installation Plate	Without Installation Plate		
<b>CVD205BR-K</b>	<b>CVD205B-K</b>	<b>CVD205-K</b>	0.5 A/Phase	<b>PKP213D</b>
<b>CVD206BR-K</b>	<b>CVD206B-K</b>	<b>CVD206-K</b>	0.6 A/Phase	<b>PKP214D</b>
<b>CVD215BR-K</b>	<b>CVD215B-K</b>	<b>CVD215-K</b>	1.5 A/Phase	<b>PKP22□D15, PKP23□D15, PKP24□MD15, PKP262FD</b>
<b>CVD223BR-K</b>	<b>CVD223B-K</b>	<b>CVD223-K</b>	2.3 A/Phase	<b>PKP23□D23</b>
<b>CVD223FBR-K</b>	<b>CVD223FB-K</b>	<b>CVD223F-K</b>	2.3 A/Phase	<b>PKP24□D15■2, PKP24□D23■2</b>
<b>CVD228BR-K</b>	<b>CVD228B-K</b>	<b>CVD228-K</b>	2.8 A/Phase	<b>PKP26□D14■2, PKP26□D28■2, PKP26□MD28</b>
<b>CVD242BR-K</b>	<b>CVD242B-K</b>	-	4.2 A/Phase	<b>PKP26□D42</b>
<b>CVD245BR-K</b>	<b>CVD245B-K</b>	-	4.5 A/Phase	<b>PKP29□D</b>

- A number indicating the length of the motor case is entered where the box □ is located within the names of the applicable motors.
- Either **A** (single shaft) or **B** (double shaft) indicating the configuration is specified where the box ■ is located in the names of the applicable motors.
- The applicable motors are listed such that the available combinations with the driver are distinguishable.  
 Combinations with the encoder type and geared type are also available.  
 For details on the product name, please see the Oriental Motor website.

● Driver for 0.72°/0.36° Stepper Motor

Right Angle Type with Installation Plate	Driver Product Name		Motor Drive Current (Factory Setting)	Applicable Motor
	With Installation Plate	Without Installation Plate		
<b>CVD503BR-K</b>	<b>CVD503B-K</b>	<b>CVD503-K</b>	0.35 A/Phase	<b>PK513</b>
<b>CVD507BR-K</b>	<b>CVD507B-K</b>	<b>CVD507-K</b>	0.75 A/Phase	-
<b>CVD512BR-K</b>	<b>CVD512B-K</b>	<b>CVD512-K</b>	1.2 A/Phase	<b>PKP52□</b>
<b>CVD514BR-K</b>	<b>CVD514B-K</b>	<b>CVD514-K</b>	1.4 A/Phase	-
<b>CVD518BR-K</b>	<b>CVD518B-K</b>	<b>CVD518-K</b>	1.8 A/Phase	<b>PKP54□</b>
<b>CVD524BR-K</b>	<b>CVD524B-K</b>	<b>CVD524-K</b>	2.4 A/Phase	<b>PKP56□FN24, PKP56□FMN</b>
<b>CVD528BR-K</b>	<b>CVD528B-K</b>	-	2.8 A/Phase	<b>PKP56□N28, PK59□H</b>
<b>CVD538BR-K</b>	<b>CVD538B-K</b>	-	3.8 A/Phase	<b>PKP56□FN38</b>

- A number indicating the length of the motor case is entered where the box □ is located within the names of the applicable motors.
- The applicable motors are listed such that the available combinations with the driver are distinguishable.  
 Combinations with the encoder type and geared type are also available.  
 For details on the product name, please see the Oriental Motor website.

## Connection and Operation (Bipolar Driver for 1.8°/0.9° Stepper Motor and Driver for 0.72°/0.36° Stepper Motor)

### Names and Functions of Driver Parts

#### 1 Signal Monitor Indicators

##### ◇ LED Indicator

Indication	Color	Function	Lighting Condition
PWR/ALM	Green	Power supply indication	When power is applied
	Red	Alarm indication	When a protective function is activated (blinking)

##### ◇ Alarm Contents

Blink Count	Function	Operating Condition
2	Overheat Protection	When the temperature of the driver board reaches 85°C
3	Overvoltage Protection	When the power supply voltage exceeds its permissible value When a large inertial load is stopped suddenly When a large load is hoisted
5	Overcurrent Protection	When an excessive current flows to the motor's output circuit
9	EEPROM error	When data of the driver is damaged
Lighting	CPU error	When the CPU driver malfunctions

#### 2 Function Setting Switch

Indication	No.	Function
1P/2P	1	Switches the pulse input mode between 1-pulse input mode and 2-pulse input mode.
OFF/SD	2	Switches the smooth drive function between enabled and disabled.
R2/R1	3	Use in combination with the step angle setting switch to set the step angle.
STOP	4	Switches the standstill current of motors to 25% or 50%.
OFF/FIL	5	Switches the command filter between enabled and disabled.
-	6	Not used.

#### 3 Step Angle Setting Switch

Indication	Function
STEP	Use in combination with the R2/R1 switch to set the step angle.

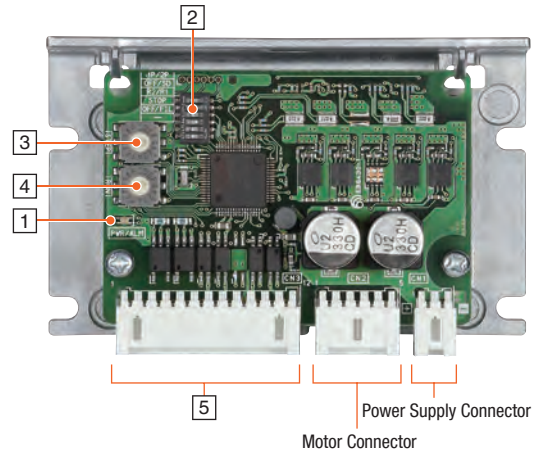
Step Angle Setting Switch (STEP) Scale	R2/R1 Switch: When Set to ON (R1)		R2/R1 Switch: When Set to OFF (R2)	
	Resolution (P/R)	Step Angle	Resolution (P/R)	Step Angle
0	500	0.72°	200	1.8°
1	1000	0.36°	400	0.9°
2	1250	0.288°	800	0.45°
3	2000	0.18°	1000	0.36°
4	2500	0.144°	1600	0.225°
5	4000	0.09°	2000	0.18°
6	5000	0.072°	3200	0.1125°
7	10000	0.036°	5000	0.072°
8	12500	0.0288°	6400	0.05625°
9	20000	0.018°	10000	0.036°
A	25000	0.0144°	12800	0.028125°
B	40000	0.009°	20000	0.018°
C	50000	0.0072°	25000	0.0144°
D	62500	0.00576°	25600	0.0140625°
E	100000	0.0036°	50000	0.0072°
F	125000	0.00288°	51200	0.00703125°

#### 4 Running Current Setting Switch

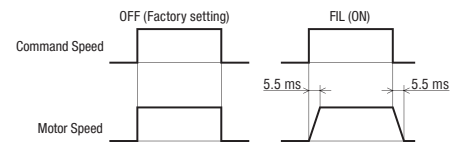
Indication	Function
RUN	Sets the motor running current.

#### 5 I/O Signal Connector

Indication	Pin No.	I/O	Signal Name	Function
CN3	1	Input	PLS+ (CW+)	Operation command pulse signal (Rotates the motor in the CW direction when in 2-pulse input mode.)
	2		PLS- (CW-)	
	3		DIR+ (CCW+)	Rotation direction signal
	4		DIR- (CCW-)	(Rotates the motor in the CCW direction when in 2-pulse input mode.)
	5		AWO+	Stop motor excitation.
	6		AWO-	
	7		CS+	Switches the step angle.
	8		CS-	
	9	Output	ALM+	Outputs the alarm status for the driver (normally closed).
	10		ALM-	
	11		TIM+	Output when the state of excitation of the motor is the excitation home position.
	12		TIM-	



● Difference in the Motor Responsiveness Depending on the Command Filter (OFF/FIL switch)



● Compared to the standard type, the high-resolution type has 2 times the resolution and 1/2 the step angle.

Example: When the R2/R1 switch is set to ON (R1) and the STEP switch is set to "0"

Resolution of High-Resolution Type:  $500 \times 2 = 1000$

Step Angle of High-Resolution Type:  $0.72^\circ / 2 = 0.36^\circ$

Overview, Product Series

AC Input Motor & Driver

0.36°/Geared

αSTEP Absolute AZ

0.36°/Geared

αSTEP AR

0.72°/Geared

RKII

DC Input Motor & Driver

0.36°/Geared

αSTEP Absolute AZ

0.36°/Geared

αSTEP AR

1.8°/0.72°

/0.36°

CVK

0.72°/0.36°

/Geared

CRK

1.8°/Geared

RBK

Motor Only /Driver Only

1.8°/0.9°

PKP/PK

Geared

PKP/PK

0.72°/0.36°

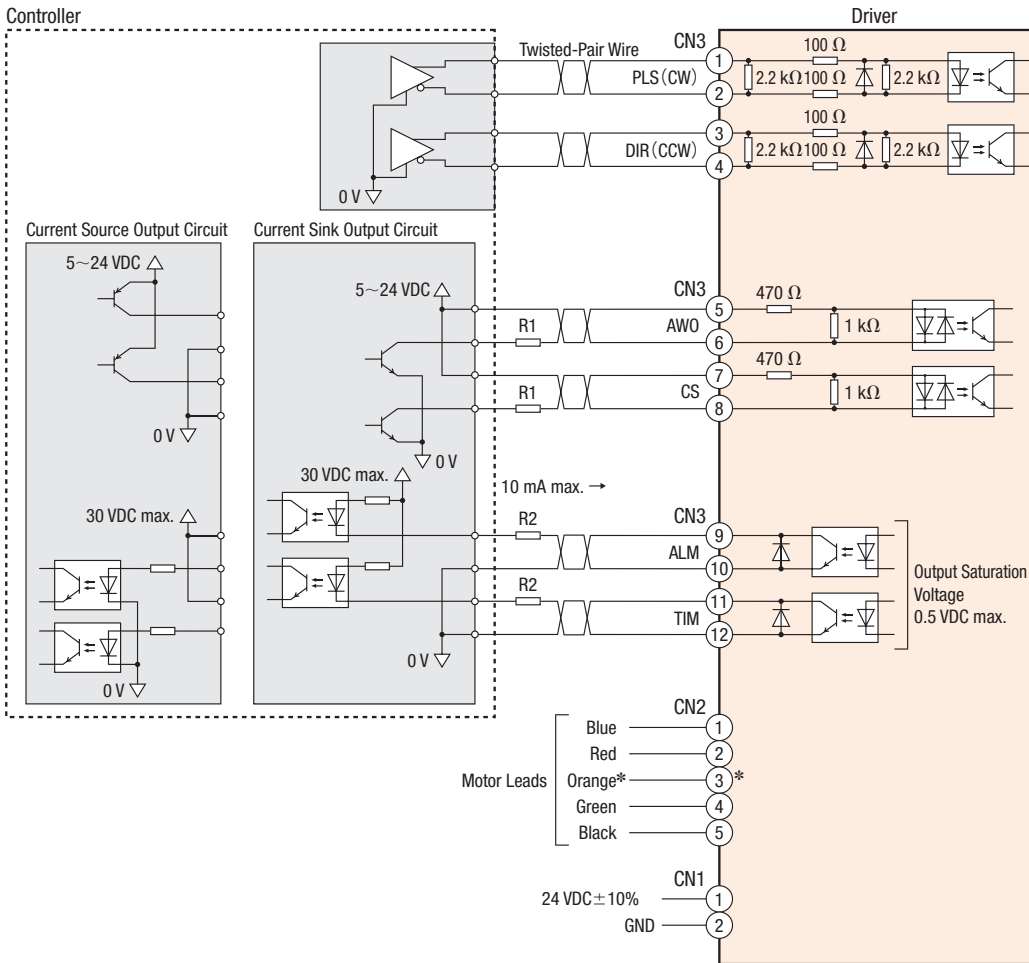
PKP/PK

Driver

Accessories

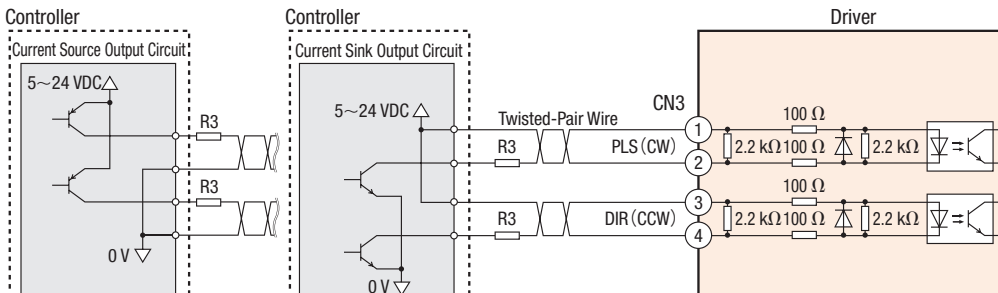
## Connection Diagram

### When the pulse input is the line driver



\*This is not available for 1.8° Stepper Motor. Do not connect anything to pin No. 3.

### When the pulse input is open collector



### [Notes on Wiring]

#### ◇ I/O Signal Connection

- Input signal
  - Use 5 VDC for the input signals.
  - If voltage exceeding 5 VDC is applied, connect an external resistor R1 so that the current becomes 5~15 mA. (AWO, CS)
  - If voltage exceeding 5 VDC is applied to CW input and CCW input when the pulse input is open collector, connect an external resistor R3 so that the current becomes 7~20 mA.
- Output signal
  - Use output signals at 30 VDC 10 mA max. When the current value exceeds 10 mA, connect an external resistor R2.
- Use twisted-pair cables of AWG24~22 (0.2~0.3 mm<sup>2</sup>).
- Note that as the length of the pulse line increases, the max. transmission frequency decreases, and keep the wiring length as short as possible (2 m max.).
- Provide a distance of 100 mm min. between the signal lines and power lines (such as power supply lines and motor lines).

#### ◇ Power Supply Connection

- Use a wire of AWG22 (0.3 mm<sup>2</sup>). Use a wire of AWG20 (0.5 mm<sup>2</sup>) for **CVD242**, **CVD245**, **CVD528** and **CVD538**.
- Incorrect polarities of the DC power-supply input will damage the driver. Make sure that the polarity is correct before turning the power on.

#### ◇ Motor Cable Extension

- Use a wire of AWG22 (0.3 mm<sup>2</sup>) min. Use a wire of AWG20 (0.5 mm<sup>2</sup>) min. for **CVD242**, **CVD245**, **CVD528** and **CVD538**.

#### ◇ General

- A separate hand crimp tool is required to crimp the connector and lead wires included with the driver. Connection cables which are available as accessories (sold separately) have already had their lead wires crimped.
- If a specific wiring and layout causes the motor cable or power supply cable to generate a noise problem, shield the cable or use ferrite cores.



## Unipolar Driver for 1.8°/0.9° Stepper Motor

### Product Number

**CMD 2 1 09 P**

①      ②      ③      ④      ⑤

①	Driver Type
②	<b>2</b> : 1.8°/0.9° Stepper Motor
③	Power Supply Input Voltage <b>1</b> : 24 VDC
④	Rated Current
⑤	Signal I/O Mode <b>P</b> : Photocoupler

### Product Line

Product Name	List Price
<b>CMD2109P</b>	€123.00
<b>CMD2112P</b>	€123.00
<b>CMD2120P</b>	€123.00

### Included

Type	Connector for Driver Connection	Operating Manual
Common to All Types	For CN1 (1 Piece) For CN2 (1 Piece) For CN3 (1 Piece)	1 set

### Specifications

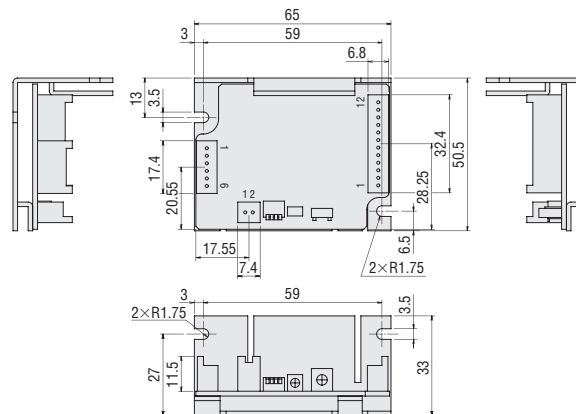
Product Name	CMD2109P	CMD2112P	CMD2120P
Drive Method	Microstep Drive, Unipolar constant-current drive method		
Motor Drive Current (Factory setting)	0.95 A/Phase	1.2 A/Phase	2 A/Phase
Power Supply Voltage	24 VDC±10%		
Input Current                      A	1.5	1.7	2.9
Max. Input Pulse Frequency	100 kHz (When the pulse duty is 50%) Negative Logic Pulse Input		
Operating Environment (In operation)	Ambient Temperature	0~+40°C (Non-freezing)	
	Ambient Humidity	85% or Less (Non-condensing)	
	Atmosphere	No corrosive gases or dust. The product should not be exposed to water, oil or other liquids.	

### Dimensions (Unit = mm)

Product Name	Mass kg
<b>CMD2109P</b>	0.05
<b>CMD2112P</b>	
<b>CMD2120P</b>	

● Included

Connector Housing: 51103-0200 (Molex)  
51103-1200 (Molex)  
51103-0600 (Molex)  
Contact: 50351-8100 (Molex)



### List of Applicable Motors

Driver Product Name	Motor Drive Current (Factory Setting)	Applicable Motor
<b>CMD2109P</b>	0.95 A/Phase	<b>PKP213U, PKP214U, PKP22□U, PKP243U09□2, PKP243MU</b>
<b>CMD2112P</b>	1.2 A/Phase	<b>PKP23□U, PKP24□U12□2, PKP244MU</b>
<b>CMD2120P</b>	2 A/Phase	<b>PK25□, PKP26□U10□2, PKP26□U20□2, PKP26□MU</b>

- A number indicating the length of the motor case is entered where the box □ is located within the names of the applicable motors.
- Either **A** (single shaft) or **B** (double shaft) indicating the configuration is specified where the box ■ is located in the names of the applicable motors.
- The applicable motors are listed such that the available combinations with the driver are distinguishable.  
Combination with the encoder type and geared type are also available.  
For details on the product name, please see the Oriental Motor website.

Overview, Product Series

AC Input Motor & Driver

0.36°/Geared  
**αSTEP Absolute AZ**

0.36°/Geared  
**αSTEP AR**

0.72°/Geared  
**RKII**

DC Input Motor & Driver

0.36°/Geared  
**αSTEP Absolute AZ**

0.36°/Geared  
**αSTEP AR**

1.8°/0.72°/0.36°  
**CVK**

0.72°/0.36°/Geared  
**CRK**

1.8°/Geared  
**RBK**

Motor Only /Driver Only

1.8°/0.9°  
**PKP/PK**

Geared  
**PKP/PK**

0.72°/0.36°  
**PKP/PK**

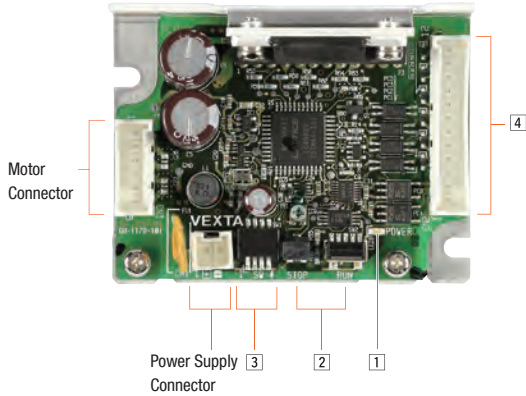
Driver

Accessories



## Connection and Operation (Unipolar Driver for 1.8°/0.9° Stepper Motor)

### Names and Functions of Driver Parts



#### 1 Power Supply Input Indicator

Color	Function	Lighting Condition
Green	Power Supply Indication	When power is applied

#### 2 Current Adjustment Switch

Indication	Switch Name	Function
RUN	Motor Running Current Adjustment Switch	The motor running current can be adjusted.
STOP	Motor Standstill Current Adjustment Potentiometer	The motor's standstill current can be adjusted.

#### 3 Function Switch

Indication	Switch Name	Function
1	Pulse Input Mode Select Switch	The pulse input mode can be switched to 1-pulse input mode or 2-pulse input mode.
2, 3, 4	Step Angle Setting Switch	The switches can set any of 5 step angles.

#### Step Angle Setting Switch

SW-2	SW-3	SW-4	Resolution	Resolution	Step Angle
OFF	OFF	OFF	1	200	1.8°
OFF	OFF	ON	2	400	0.9°
OFF	ON	OFF	4	800	0.45°
OFF	ON	ON	8	1600	0.225°
ON	OFF	OFF	16	3200	0.1125°

#### Note

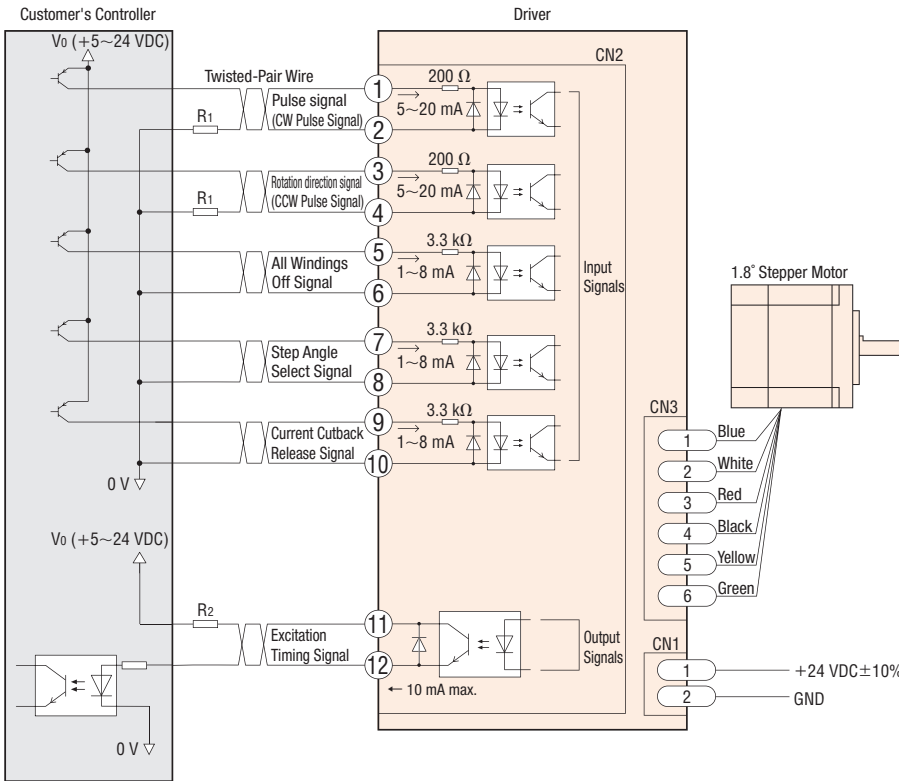
- If a combination not listed in the table is set, the resolution becomes 1, and the motor operates at the basic step angle.
- The step angle is calculated by dividing the basic step angle by the resolution number. The values above figures are based on a basic step angle of 1.8°.
- With the high-resolution type, the basic step angle is 0.9°, and the resolution is 400 at resolution 1.
- With geared types, the step angle/gear ratio is the actual step angle.
- The step angle set with the step angle setting switches is effective when the step angle select (CS) input signal is OFF.
- Do not change the step angle select input signal or step angle setting switches while the motor is running. The motor may misstep and stop. Change the step angle setting switches when the step angle select input signal is OFF and the excitation timing output signal is ON.

#### 4 I/O Signal

Indication	I/O	Pin No.	Signal Name	Function
CN2	Input Signals	1	Pulse Signal (CW Pulse Signal)	Operation command pulse signal (Rotates the motor in the CW direction when in 2-pulse input mode.)
		2		
		3	Rotation Direction Signal (CCW Pulse Signal)	Rotation direction signal Photocoupler "OFF": CCW and photocoupler "ON": CW (Rotates the motor in the CCW direction when in 2-pulse input mode.)
		4		
		5	All Windings Off Signal	All windings of the motor are set to OFF and the motor shaft can be rotated by external force.
		6		
		7	Step Angle Select Input Signal	The motor operates at the basic step angle regardless of how the step angle setting switches are set.
		8		
		9	Automatic Current Cutback Release Signal	This signal is used to disable the automatic current cutback function.
		10		
	Output Signals	11	Excitation Timing Signal	This signal is output when the excitation sequence is step "0".
		12		

## ● Connection Diagram

### ◇ Connection with Current Source Output Circuit



### [Notes on Wiring]

#### ◇ I/O Signal Connection

- **Input signal**  
The external resistor is not needed when 5 VDC is applied. If voltage exceeding 5 VDC is applied, connect an external resistor  $R_1$  so that the current becomes 5~20 mA. Example) When  $V_0$  is 24 VDC,  $R_1$ : 1.5~2.2 k $\Omega$  0.5 W min.
- **Output signal**  
Check the specifications of the connected devices, and if the current exceeds 10 mA, connect the external resistor  $R_2$ .
- Use twisted-pair cables of AWG24~22 (0.2~0.3 mm<sup>2</sup>).
- Note that as the length of the pulse line increases, the max. transmission frequency decreases, and keep the wiring length as short as possible (2 m max.).
- Provide a distance of 100 mm min. between the signal lines and power lines (such as power supply lines and motor lines).

#### ◇ Power Supply Connection

- Use a wire of AWG22 (0.3 mm<sup>2</sup>).
- Incorrect polarities of the DC power-supply input will damage the driver. Make sure that the polarity is correct before turning the power on.

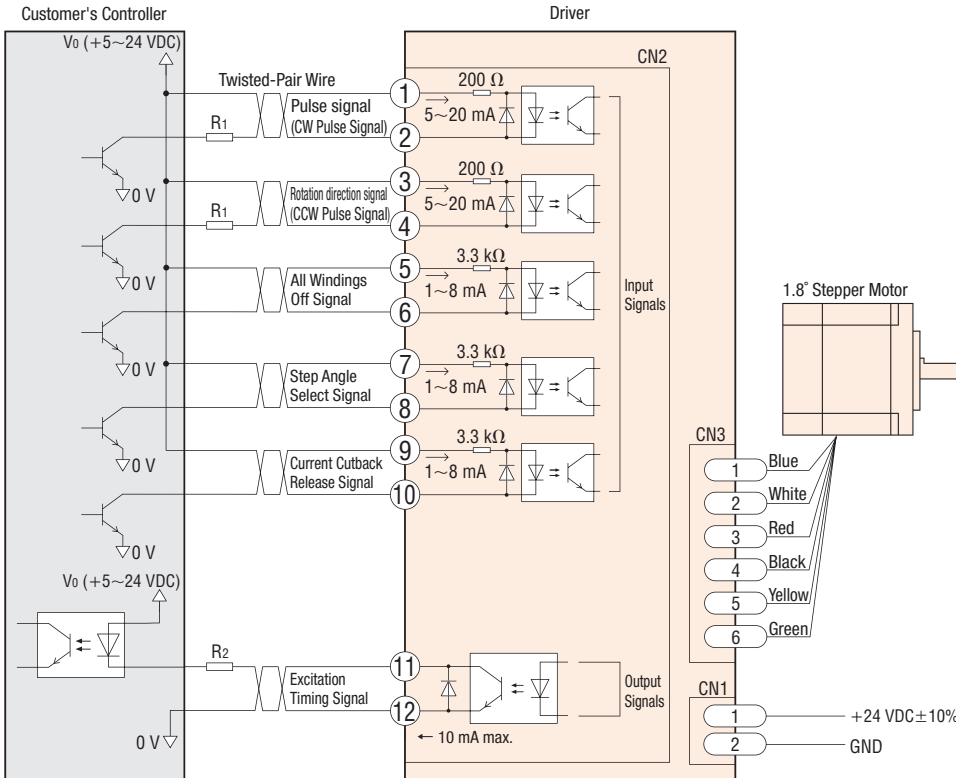
#### ◇ Motor Cable Extension

- Use a wire of AWG22 (0.3 mm<sup>2</sup>) min.

#### ◇ General

- A separate hand crimp tool is required to crimp the connector and lead wires included with the driver. Connection cable sets which are available as accessories (sold separately) have already had their lead wires crimped.
- If a specific wiring and layout causes the motor cable or power supply cable to generate a noise problem, shield the cable or use ferrite cores.

### ◇ Connection with Current Sink Output Circuit



Overview, Product Series

AC Input Motor & Driver

0.36°/Geared  $\alpha$ STEP Absolute AZ

0.36°/Geared  $\alpha$ STEP AR

0.72°/Geared RKII

DC Input Motor & Driver

0.36°/Geared  $\alpha$ STEP Absolute AZ

0.36°/Geared  $\alpha$ STEP AR

1.8°/0.72°/0.36° CVK

0.72°/0.36°/Geared CRK

1.8°/Geared RBK

Motor Only /Driver Only

1.8°/0.9° PKP/PK

Geared PKP/PK

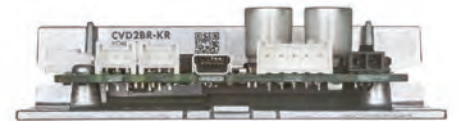
0.72°/0.36° PKP/PK

Driver

Accessories

**Bipolar Driver for 2-Phase Stepper Motors  
Driver for 5-Phase Stepper Motors**

**CVD Series**  
**RS-485 Communication Type**



# Bipolar Drivers for 1.8°/0.9° Stepper Motors

## Drivers for 0.36°/0.72° Stepper Motors

### CVD Series RS-485 Communication Type

#### Product Number

**CVD 2 B R - K R**

①    ②    ③    ④    ⑤    ⑥

①	Series Name	<b>CVD: CVD Series</b>
②	Motor	<b>2:</b> 1.8°/0.9° Stepper Motor <b>5:</b> 0.72°/0.36° Stepper Motor
③	Driver Type	<b>B:</b> With Installation Plate
④	Connector Type	<b>R:</b> Right Angle
⑤	Power Supply Input	<b>K:</b> DC Power Supply
⑥	Driver Type	<b>R:</b> RS-485 Communication Type

#### Product Line

Connector cable sets are available for the motor, power supply, I/O signals, and RS-485 communication (sold separately). The connectors are pre-crimped, making them easy to wire without crimp tools. For details, refer to page 2.

#### ● Bipolar Driver for 1.8°/0.9° Stepper Motors

##### ◇ Right Angle Type with Installation Plate

Product Name	List Price
<b>CVD2BR-KR</b>	163.00 €

##### ◇ With Installation Plate

Product Name	List Price
<b>CVD2B-KR</b>	163.00 €

#### ● Driver for 0.72°/0.36° Stepper Motors

##### ◇ Right Angle Type with Installation Plate

Product Name	List Price
<b>CVD5BR-KR</b>	173.00 €

##### ◇ With Installation Plate

Product Name	List Price
<b>CVD5B-KR</b>	173.00 €

#### Included

Type	Operating Manual
Common to all types	1 set

#### Specifications



Driver Product Name		<b>CVD2B□-KR</b>	<b>CVD5B□-KR</b>
Driving Method		Microstep Drive, Bipolar, Constant Current Drive Method	
Power Supply Voltage		24 VDC ± 10%	
Rated Current*		A	0.5 to 3.0      0.6 to 3.0
Interface	Direct Inputs	7, Photo-Coupler	
	Direct outputs	2, Photo-Coupler and Open-Collector	
	Communication	RS-485 (Modbus RTU)	
Operating Environment (In operation)	Ambient Temperature	0 to +50°C (Non-freezing)	
	Ambient Humidity	85% or less (Non-condensing)	
	Surrounding Atmosphere	No corrosive gas or dust. The product should not be exposed to water, oil or other liquids	

● For the right angle type with an installation plate, a code **R** (right angle) indicating the connector configuration is entered where the box □ is located within the driver product name.

\*The input current value differs depending on the motor used together with the driver.

Refer to page 6.

#### RS-485 Communication Specifications

Electrical Characteristics	EIA-485 Based Use a shielded twisted pair cable, and keep the total wiring distance including extension to 10 m or less.
Communication Mode	Half duplex, asynchronous communication (data: 8 bits, stop bit: 1 bit or 2 bits, parity: none, even or odd)
Transmission Rate	Select either from 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps, or 230400 bps.
Protocol	Modbus RTU Mode
Connection Units	Up to 31 drivers can be connected to a single host controller.

## Dimensions (Unit: mm)

### Right Angle Type with Installation Plate

Product Name	Mass [kg]
<b>CVD2BR-KR</b>	0.065
<b>CVD5BR-KR</b>	

#### ● Applicable Connectors

##### Power Connector (CN1)

Connector Housing: 43645-0200 (Molex)

Contact: 43030-0001 (Molex)

##### Motor Connector (CN2)

Connector Housing: 51103-0500 (Molex)

Contact: 50351-8100 (Molex)

##### RS-485 Communication Connectors (CN4, CN5)

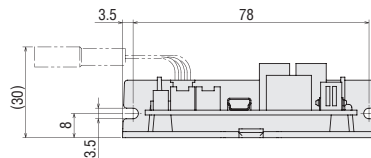
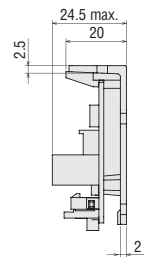
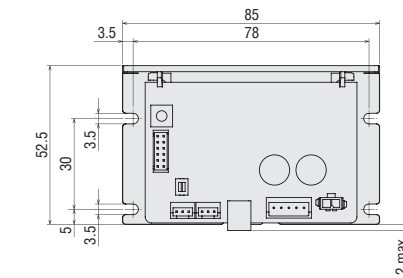
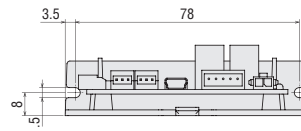
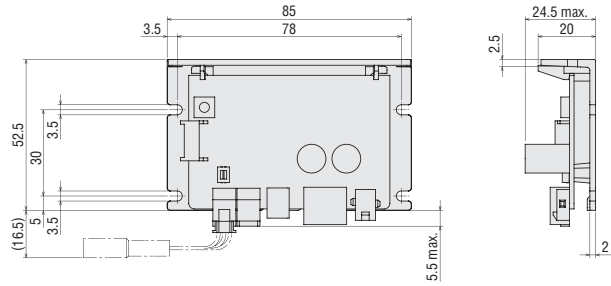
Connector Housing: PAP-03V-S (J.S.T. Mfg Co., Ltd.)

Contact: SPHD-001T-P0.5 or SPHD-002T-P0.5 (J.S.T. Mfg Co., Ltd.)

##### I/O Signal Connector (CN6)

Connector Housing: PHDR-12VS (J.S.T. Mfg Co., Ltd.)

Contact: SPHD-001T-P0.5 (J.S.T. Mfg Co., Ltd.)



● Connector cable sets are available for the motor, power supply, I/O signals, and RS-485 communication (sold separately). The connectors pre-cripped, making them easy to wire without crimp tools. For details, refer to page 6.

## List of Applicable Motors

### Driver for 1.8°/0.9° Stepper Motors

Driver Product Name		Rated Current	Input Current [A]	Applicable Motor
Right Angle Type with Installation Plate	With Installation Plate			
<b>CVD2BR-KR</b>	<b>CVD2B-KR</b>	0.5 A/Phase	0.5	<b>PKP213D05</b> □
		0.6 A/Phase	0.5	<b>PKP214D06</b> □
		0.85 A/Phase	0.8	<b>PKP24</b> □ <b>D08</b> □ <b>2</b>
		1.4 A/Phase	1.3	<b>PKP26</b> □ <b>D14</b> □ <b>2</b>
		1.5 A/Phase	1.9	<b>PKP22</b> □ <b>D15</b> □, <b>PKP22</b> □ <b>D15</b> □ <b>2</b>
				<b>PKP23</b> □ <b>D15</b> □, <b>PKP262FD15A</b>
		2.3 A/Phase	2.0	<b>PKP24</b> □ <b>D15</b> □ <b>2</b> , <b>PKP24</b> □ <b>MD15</b> □ <b>2</b>
		2.8 A/Phase	3.0	<b>PKP23</b> □ <b>D23</b> □, <b>PKP24</b> □ <b>D23</b> □ <b>2</b>
		<b>PKP25</b> □ <b>D28</b> □ <b>A2</b> , <b>PKP26</b> □ <b>D28</b> □ <b>2</b>		
		<b>PKP26</b> □ <b>MD28</b> □ <b>2</b>		

### Driver for 0.72°/0.36° Stepper Motors

Driver Product Name		Rated Current	Input Current [A]	Applicable Motor
Right Angle Type with Installation Plate	With Installation Plate			
<b>CVD5BR-KR</b>	<b>CVD5B-KR</b>	0.35 A/Phase	0.6	<b>PK513</b> , <b>PK52</b> □ <b>P</b>
		0.75 A/Phase	1.4	<b>PK52</b> □ <b>H</b> , <b>PK54</b> □
		1.2 A/Phase	1.7	<b>PKP52</b> □
		1.4 A/Phase	1.8	<b>PK56</b> □
		1.8 A/Phase	2.8	<b>PKP54</b> □ <b>N18</b> □ <b>2</b> , <b>PKP54</b> □ <b>MN</b>
		2.4 A/Phase	3.0	<b>PKP56</b> □ <b>FN24</b> □ <b>2</b> , <b>PKP56</b> □ <b>FMN</b>

● A number indicating the length of the motor case is entered where the box □ is located within the names of the applicable motors.

● Either **A** (single shaft) or **B** (double shaft) indicating the configuration is specified where the box □ is located in the names of the applicable motors.

● Motors compatible with the driver are listed to easily distinguish motor and driver combinations.

Combinations with the encoder type and geared type are also available.

For details on the product name, please see the Oriental Motor website.

#### Note

● Keep the current setting of the driver to less than or equal to the rated current of the motor. If it exceeds the rated current of the motor, the product may be damaged.

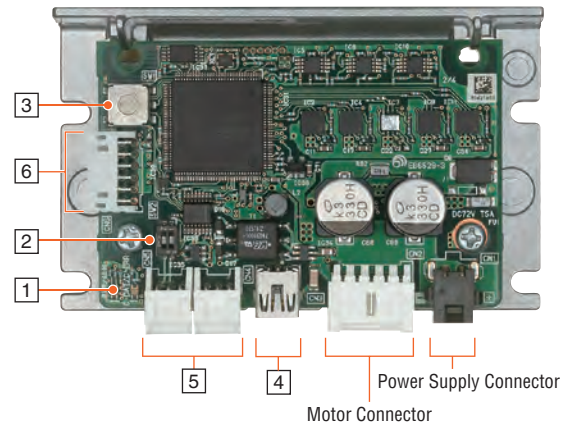
## Connection and Operation

### Names and Functions of Driver Parts

#### 1 Signal Monitor Indicators

##### ◇ LED Indicator

Indication	Color	Function	Lighting Condition
PWR/ALM	Green	Power Supply Indication	When power is applied
	Red	Alarm Indication	When a protective function is activated (blinking)
C-DAT/C-ERR	Green	Communication Indication	When communication data is exchanged
	Red	Communication Error Indication	When a communication data error occurs



#### 2 Terminating Resistor Setting Switch

Indication	No.	Function
SW2	1	Set the RS-485 communication termination resistor (120Ω) (Factory Setting: OFF) OFF: no termination resistor, ON: termination resistor connected.
	2	

#### 3 Motor Setting Switch

Indication	Function
SW1	Sets the applicable motor (Factory Setting: 0)

#### 4 USB Communication Connector (CN3)

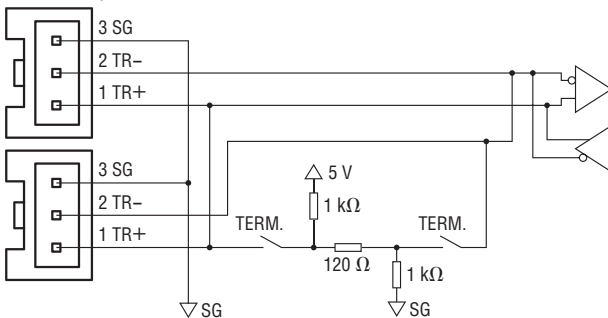
##### ◇ USB Communication Cable Specifications

Specification	USB 2.0 (Full Speed)
Cable	Length: 3 m or less
	Type: A to mini B

#### 5 RS-485 Communication Connectors (CN4, CN5)

These connectors are used when controlled via RS-485 communication. Connect RS-485 communication cable (sold separately) to either CN4 or CN5 connector. Connect to another driver with the other connector.

Internal Input Circuit



Pin No.	Signal Name	Function
1	TR+	RS-485 Communication Signal (+)
2	TR-	RS-485 Communication Signal (-)
3	SG	Signal GND

RS-485 Communication Cable



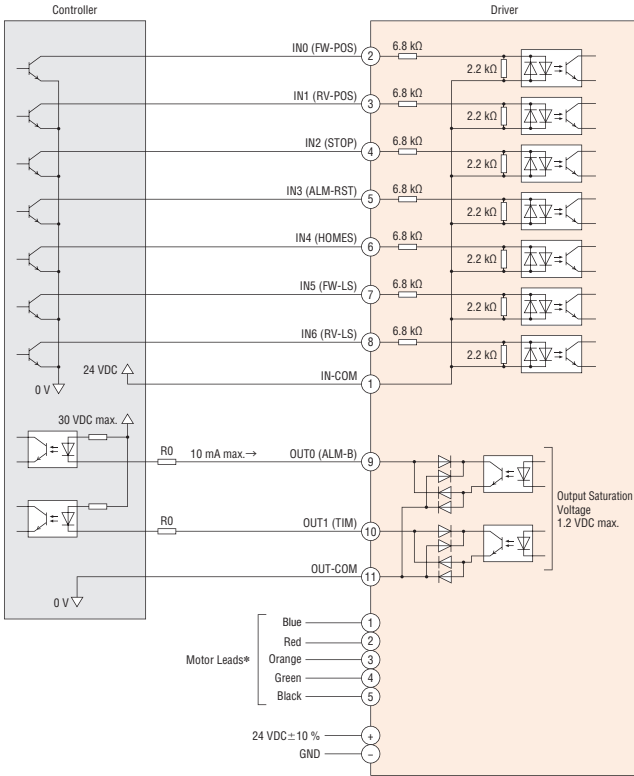
#### 6 I/O Signal Connector (CN6)

Indication	Pin No.	Signal Name	Description
CN6	1	IN-COM	Input Common
	2	IN0	Control Input 0 [FW-POS] Execute continuous operation in the FWD direction.
	3	IN1	Control Input 1 [RV-POS] Execute continuous operation in the RVS direction.
	4	IN2	Control Input 2 [STOP] Stop the motor.
	5	IN3	Control Input 3 [ALM-RST] Alarm reset.
	6	IN4	Control Input 4 [HOMES] Input for mechanical home sensor.
	7	IN5	Control Input 5 [FW-LS] Input for a limit sensor in FWD direction.
	8	IN6	Control Input 6 [RV-LS] Input for a limit sensor in RVS direction.
	9	OUT0	Control Output 0 [ALM-B] Driver alarm status output (normally closed).
	10	OUT1	Control Output 1 [TIM] Output when the excitation state of the motor is step "0".
	11	OUT-COM	Output Common
	12	N.C.	N.C.



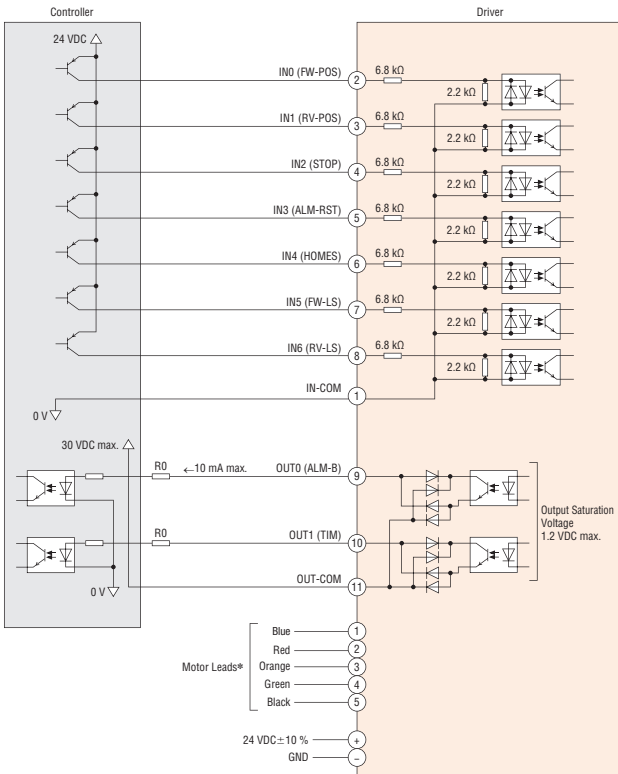
## Connection Diagrams

### Connecting to a Current Sink Output Circuit



\*The connector pin assignments vary depending on the motor. For details, refer to the connection table on page 5.

### Connecting to a Current Source Output Circuit



\*The connector pin assignments vary depending on the motor. For details, refer to the connection table on page 5.

### [Note on Wiring]

#### ◇ I/O Signal Connection

- Use output signals at 30 VDC or less, 10 mA or less. When the current value exceeds 10 mA, connect an external resistor R0.
- For the I/O signals cable, using a twisted pair cable or a shielded cable is recommended.
- Keep the wiring distance as short as possible (less than 2 m) to limit the effect of noise.
- Provide a distance of 100 mm or more between the control I/O signal lines and power lines (power supply lines, motor lines and other large-current circuits).

#### ◇ Power Supply Connection

- Reverse-polarity connection of DC power supply input may cause damage to the driver. When connecting, be sure to check the polarity of the power supply.

#### ◇ Motor Connection

- Up to three cables can be used for the connection between the motor and driver.
- Keep 10 m or less for the wiring distance between the motor and driver.

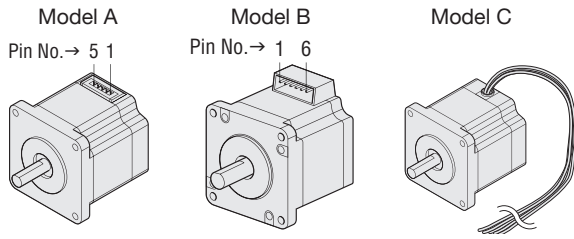
#### ◇ General

- A separate hand crimp tool is required to crimp the connector and lead wires included with the driver. Connection cables which are available as accessories (sold separately) have already had their lead wires crimped.
- If a specific wiring and layout causes the motor cable or power supply cable to generate a noise problem, shield the cable or use ferrite cores.



◇ Connection Table for 2-Phase CVD Driver

- Motor: 0.9°/1.8° PKP/PK Series Bipolar 4 Leads
- Driver: Bipolar Driver for 0.9°/1.8° Stepper Motors



Driver CN2 Pin No.	Model A		Model B		Model C
	Pin No.	Color	Pin No.	Color	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

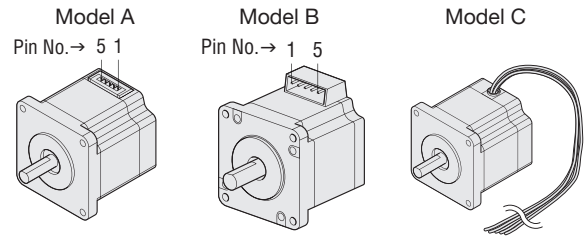
● The Colors in the table represent colors of the lead wires of the connection cables sold separately.

**Note**

● The motors shown in the model A and model B have different pin assignments. Incorrect connection will prevent the motor from operating correctly.

◇ Connection Table for 5-Phase CVD Driver

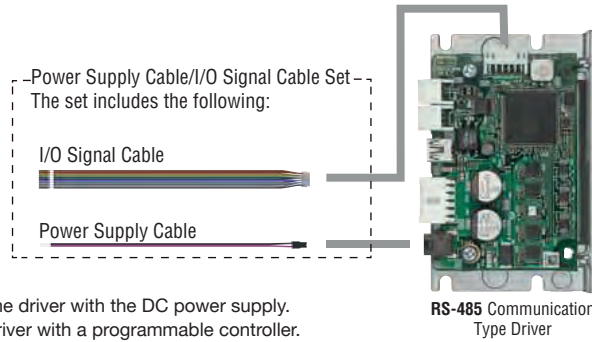
- Motor: 0.36°/0.72° PKP/PK Series
- Driver: Bipolar Driver for 0.36°/0.72° 0.36°/0.72° Stepper Motors



Driver CN2 Pin No.	Model A		Model B		Model C
	Pin No.	Color	Pin No.	Color	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

● The Colors in the table represent colors of the lead wires of the connection cables sold separately.

## Power Supply Cable/I/O Signal Cable Set (for RS-485 Communication Type)



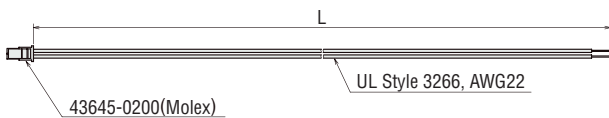
The power supply cable is for connecting the driver with the DC power supply.  
The I/O signal cable is for connecting the driver with a programmable controller.  
Power supply cable and I/O signal cable are coming as a set.

### Product Line

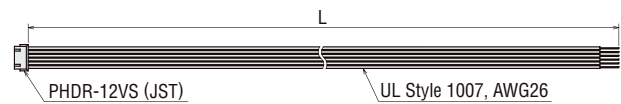
Product Name	Length L [m]	List Price
LHS003CC	0.3	8.00 €
LHS010CC	1	13.00 €

### Dimensions (Unit: mm)

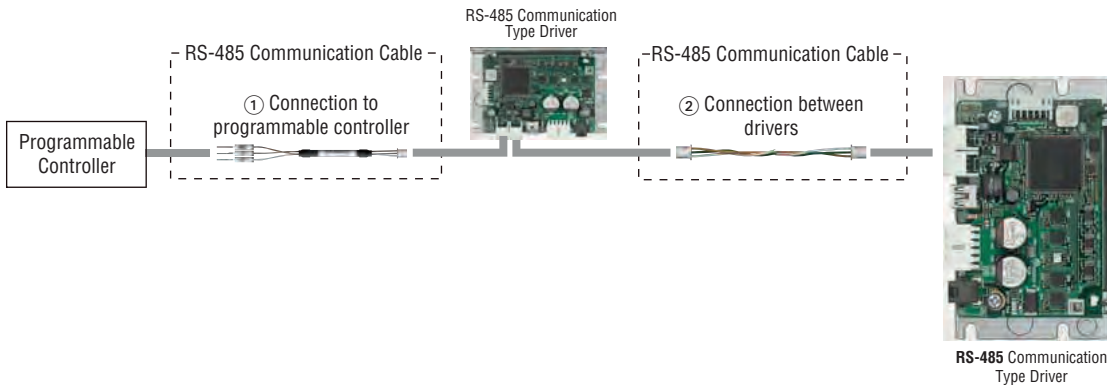
#### Power Supply Cable



#### I/O Signal Cable



## RS-485 Communication Cable (for RS-485 Communication Type)

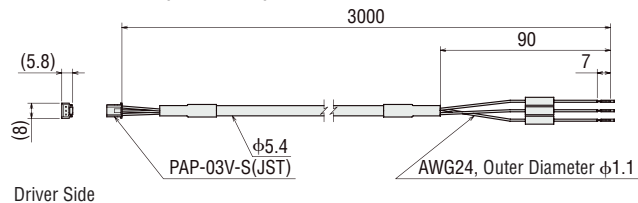


① For Connection to Programmable Controller  
Cable for connection to a programmable controller.

### Product Line

Product Name	Length L [m]	List Price
CC030-RS	3	21.00 €

### Dimensions (Unit: mm)

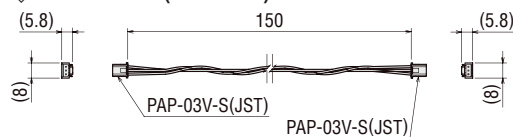


② For Connection between Drivers  
Cable for connection between drivers.

### Product Line

Product Name	Length L [m]	List Price
LH0015-RWN	0.15	10.00 €

### Dimensions (Unit: mm)



# Orientalmotor

These products are manufactured at plants certified with the international standards **ISO 9001** (for quality assurance) and **ISO 14001** (for systems of environmental management).

Specifications are subject to change without notice. This catalogue was published in November 2022.

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