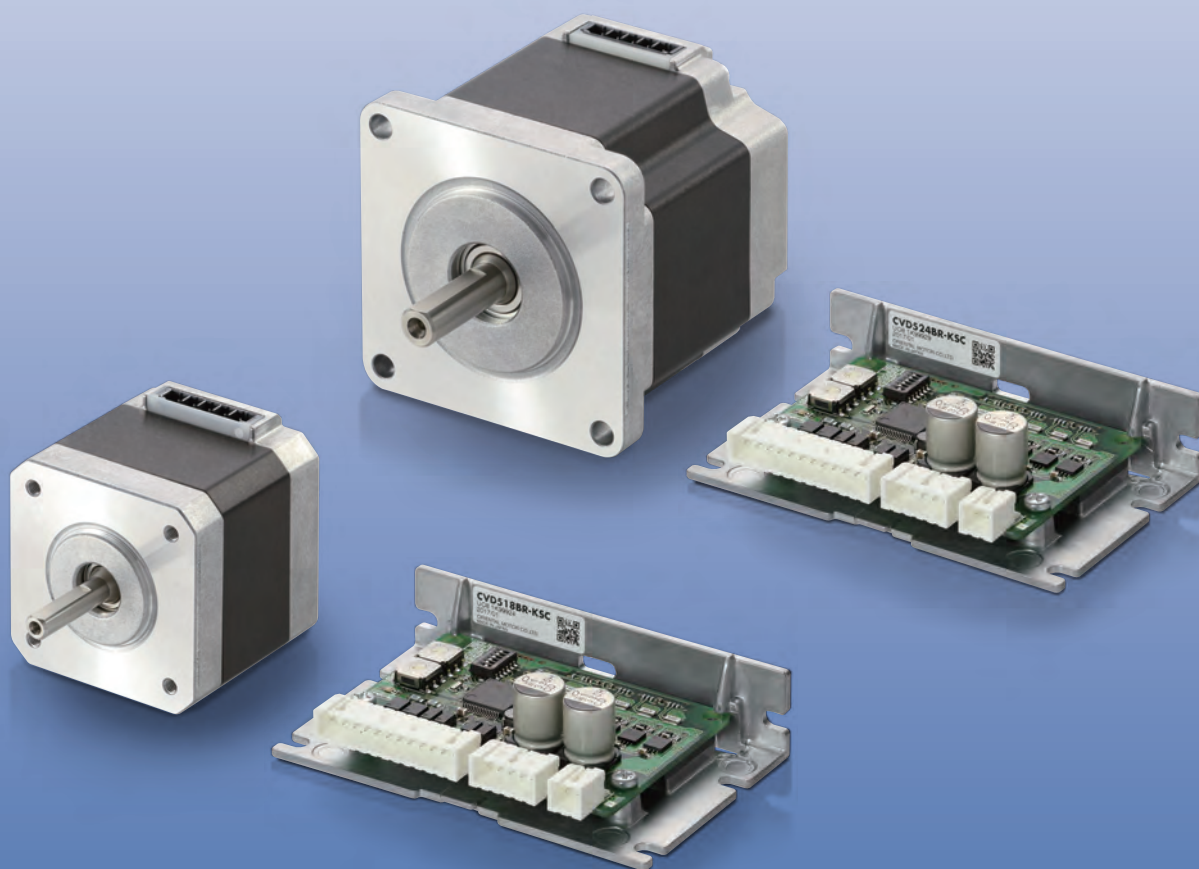


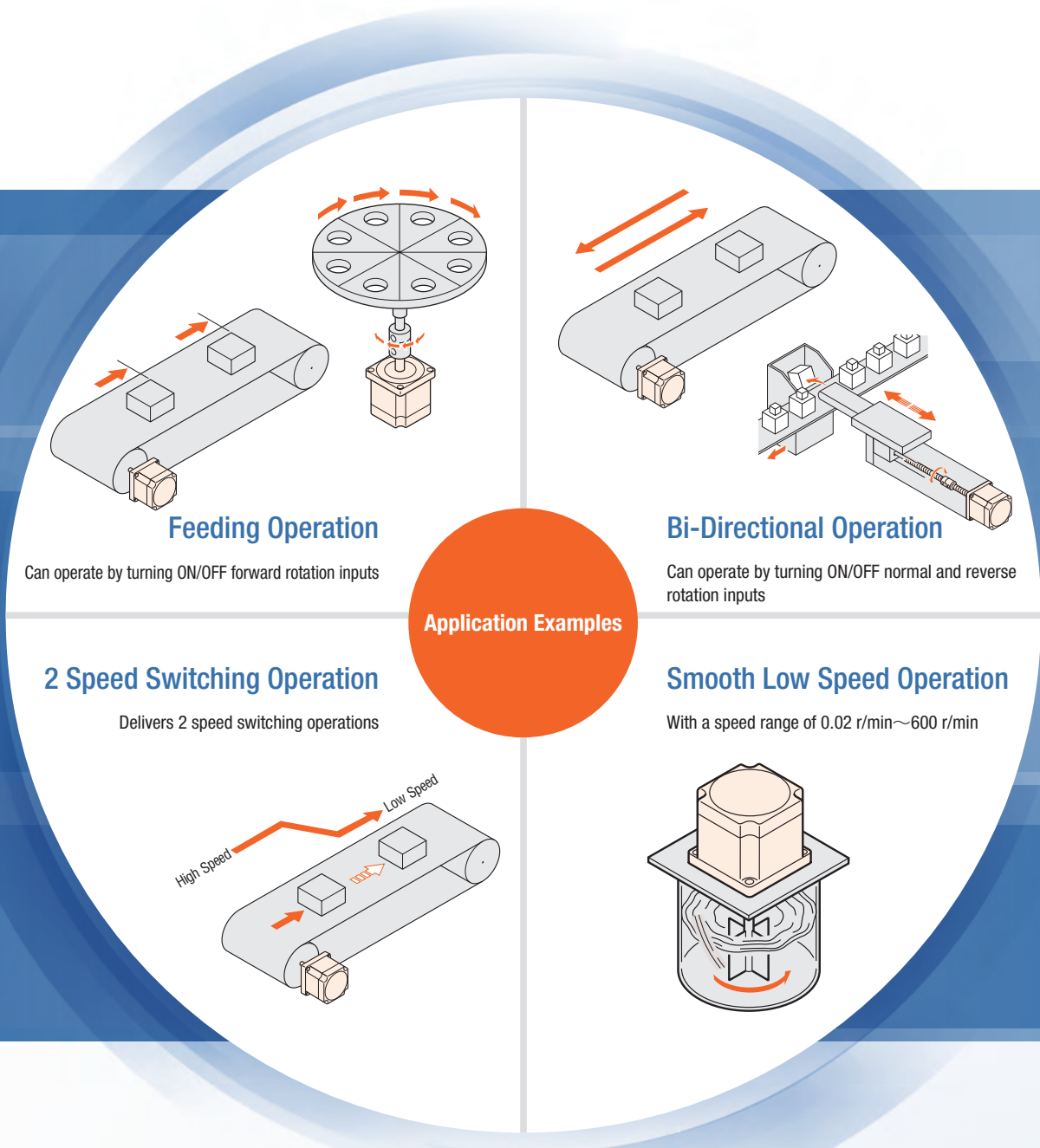
5-Phase Stepping Motor and Driver Packages  
DC Power Supply Input

# **CVK Series SC Type**

Easily Control the Speed Similar to a Speed Control Motor.



Simple configuration of the motor and driver controls the speed.  
 You can easily control by just selecting 2 speeds by turning ON/OFF.

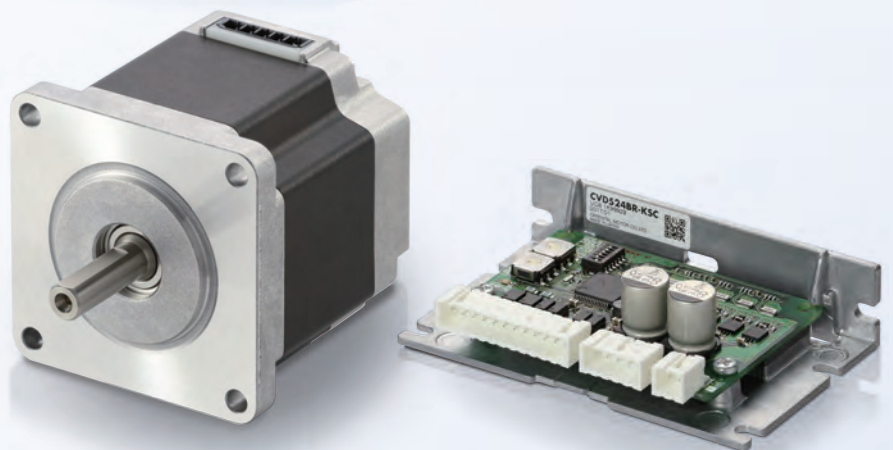


5-Phase Stepping Motor and Driver Packages  
 DC Power Supply Input

## CVK Series SC Type

Stepping Motor & Driver Operable with  
 Forward & Reverse Rotation Inputs

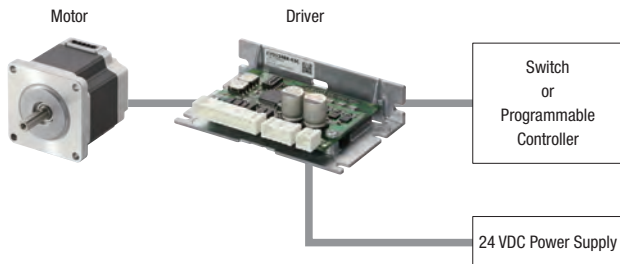
- No pulse oscillator required
- Set 2 types of speeds
- Compact, high torque motor
- Improved repeatability for stop position
- Holding torque at standstill



# Similar to a Speed Control Motor

## Simple configuration to control using I/Os

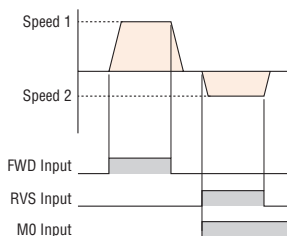
The configuration is simple with a motor, driver, and programmable controller. Easily control by setting the operating speed, the acceleration/deceleration time, and operating current with the driver switch and turning ON or OFF the FWD (RVS) inputs.



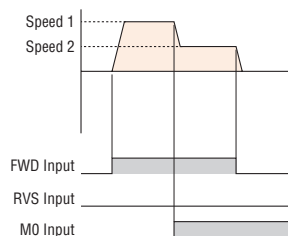
## Set 2 types of speeds

You can set 2 types of speeds for the driver and switch externally.

### ■ Reciprocating Operation



### ■ 2-Speed Switching Operation



## Holds the torque even while the motor is stopped

With the current supplied to the motor, the unit generates torque even while the motor is stopped, holding the load (with the holding force of 50% of the maximum static torque at excitation.)

## Lineup

### Motor

3 products, 18 models of motors, are available.



#### Frame Size

28 mm

42 mm

60 mm

#### Maximum Holding Torque N·m

0.052~0.091

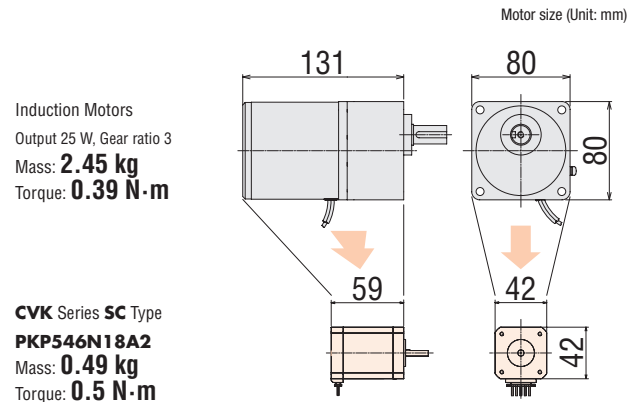
0.22~0.5

0.66~2.1

## Use of a compact, high torque motor able to downsize the application

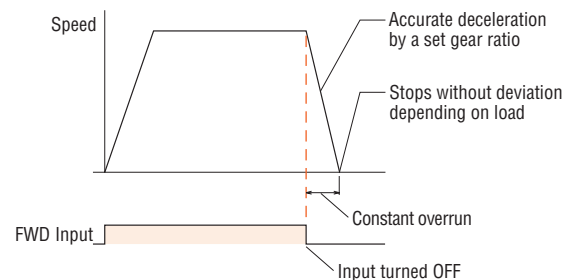
The unit operates at a low speed with a high torque stepper motor so it can be used without a gearhead. This allows the motor and the equipment to be downsized.

The size of the motor is almost halved compared to an induction motor with almost the same speed.



## When operation input is turned OFF, the overrun is constant so the repeatability of the stop position is improved.

When stopping the motor, the deceleration travel amount does not differ by changes in inertia or friction load so long as the operating conditions are the same even if the load weight differs. This improves the repeatability of the stop position.



### Driver

2 types of drivers are available.

#### ■ With Installation Plate

##### Right Angle Type

The connector is laterally oriented.

#### ■ With Installation Plate

The connector is vertically upward oriented.



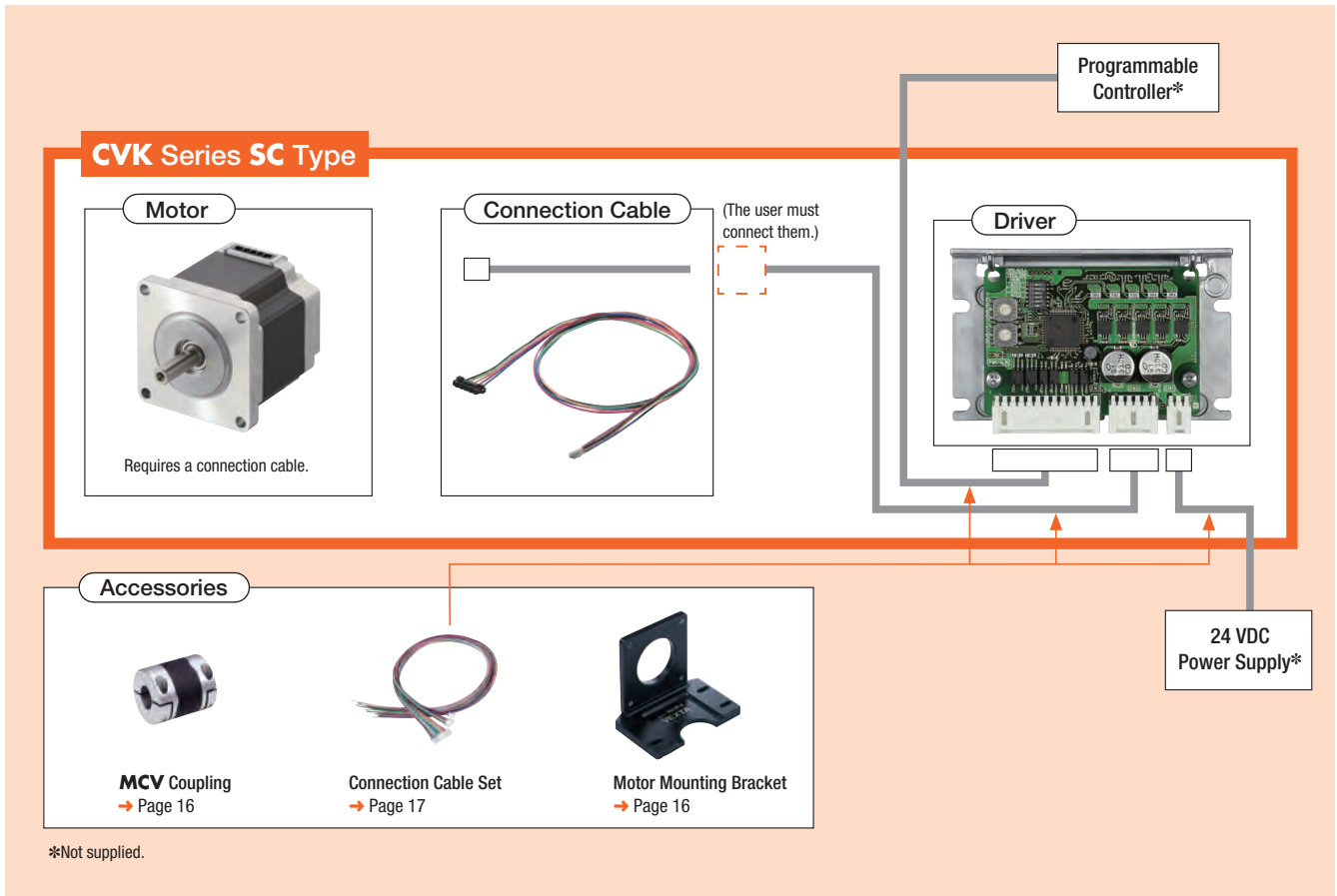
#### Dimensions mm

85 (W) × 24.5 (H) × 57.5 (D)

85 (W) × 24.5 (H) × 52.5 (D)

## System Configuration

This shows a configuration example using a programmable controller.  
The motor, connection cables, and driver need to be purchased separately.



### System Configuration Example

| CVK Series SC Type  |                  |                     | Accessories            |                   |                              |
|---------------------|------------------|---------------------|------------------------|-------------------|------------------------------|
| Motor               | Connection Cable | Driver              | Motor Mounting Bracket | Flexible Coupling | Connection Cable Set (0.6 m) |
| <b>PKP566FN24A2</b> | <b>LC5N06E</b>   | <b>CVD524BR-KSC</b> | <b>PAL2P-5</b>         | <b>MCV190808</b>  | <b>LCS04SD5</b>              |

The system configuration shown above is an example. Other combinations are available.

## Product Number Code

### Motor

**PKP 5 6 6 F N 24 A 2**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

|   |                              |   |
|---|------------------------------|---|
| ① | Series Name                  | <b>PKP: PKP Series</b>  |
| ② | 5: 5-Phase                   |   |
| ③ | Motor Frame Size             | <b>2:</b> 28 mm <b>4:</b> 42 mm <b>6:</b> 56.4 mm<br>(60 mm for the motor classification "F") |
| ④ | Motor Case Length            |   |
| ⑤ | Motor Classification         | <b>F:</b> Motor Frame Size 60 mm  |
| ⑥ | Number of Leads              | <b>N:</b> 5 Leads   |
| ⑦ | Motor Winding Specifications |   |
| ⑧ | Shape                        | <b>A:</b> Single Shaft <b>B:</b> Double Shaft   |
| ⑨ | Reference Number             |   |

### Driver

**CVD 5 18 B R - K SC**

① ② ③ ④ ⑤ ⑥ ⑦

|   |                    |                                   |
|---|--------------------|-----------------------------------|
| ① | Driver Type        | <b>CVD: CVK Series Driver</b>     |
| ② | 5: 5-Phase         |                                   |
| ③ | Rated Current      |                                   |
| ④ | Driver Shape       | <b>B:</b> With Installation Plate |
| ⑤ | Connector Shape    | <b>R:</b> Right Angle             |
| ⑥ | Power Supply Input | <b>K:</b> DC Power Supply         |
| ⑦ | Driver Type        | <b>SC:</b> Speed Control          |

### Connection Cable

**LC 5 N 06 E**

① ② ③ ④ ⑤

|   |                  |                                      |
|---|------------------|--------------------------------------|
| ① | Cable            | <b>LC:</b> Lead Wires with Connector |
| ② | 5: 5-Phase       |                                      |
| ③ | Cable Type       | <b>N:</b> For the 5-Phase            |
| ④ | Cable Length     | <b>06:</b> 0.6 m <b>10:</b> 1 m      |
| ⑤ | Reference Number |                                      |

## Product Line

A motor, driver, connection cable need to be purchase separately.

### Motor

| Product Name (Single Shaft) | Product Name (Double Shaft) |
|-----------------------------|-----------------------------|
| <b>PKP523N12A</b>           | <b>PKP523N12B</b>           |
| <b>PKP525N12A</b>           | <b>PKP525N12B</b>           |
| <b>PKP543N18A2</b>          | <b>PKP543N18B2</b>          |
| <b>PKP544N18A2</b>          | <b>PKP544N18B2</b>          |
| <b>PKP545N18A2</b>          | <b>PKP545N18B2</b>          |
| <b>PKP546N18A2</b>          | <b>PKP546N18B2</b>          |
| <b>PKP564FN24A2</b>         | <b>PKP564FN24B2</b>         |
| <b>PKP566FN24A2</b>         | <b>PKP566FN24B2</b>         |
| <b>PKP569FN24A2</b>         | <b>PKP569FN24B2</b>         |

### Driver

◇ Right Angle with Installation Plate

◇ With Installation Plate

| Product Name        | Product Name       |
|---------------------|--------------------|
| <b>CVD512BR-KSC</b> | <b>CVD512B-KSC</b> |
| <b>CVD518BR-KSC</b> | <b>CVD518B-KSC</b> |
| <b>CVD524BR-KSC</b> | <b>CVD524B-KSC</b> |

### Connection Cable

| Product Name   | Length L (m) |
|----------------|--------------|
| <b>LC5N06A</b> | 0.6          |
| <b>LC5N10A</b> | 1            |
| <b>LC5N06E</b> | 0.6          |

## Accessories

### Motor

| Type          | Accessories | Operating Manual |
|---------------|-------------|------------------|
| For All Types |             | 1 set            |

### Driver

| Type          | Accessories | Connector   | Operating Manual |
|---------------|-------------|---|------------------|
| For All Types |             | For CN1 (1 pc.)<br>For CN2 (1 pc.)<br>For CN3 (1 pc.) | 1 set            |

# Frame Size 28 mm

## 5-Phase Stepping Motor and Driver Packages

### Specifications

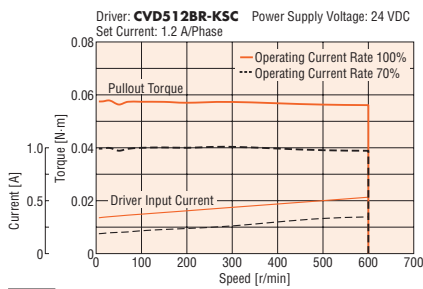


| Motor Product Name                 | Single Shaft         | <b>PKP523N12A</b>   | <b>PKP525N12A</b>   |
|------------------------------------|----------------------|---------------------|---------------------|
|                                    | Double Shaft         | <b>PKP523N12B</b>   | <b>PKP525N12B</b>   |
| Driver Product Name                |                      | <b>CVD512B□-KSC</b> | <b>CVD512B□-KSC</b> |
| Maximum Holding Torque             | N·m                  | 0.052               | 0.091               |
| Holding Torque at Motor Standstill | N·m                  | 0.026               | 0.045               |
| Rotor Inertial                     | J: kg·m <sup>2</sup> | 9×10 <sup>-7</sup>  | 18×10 <sup>-7</sup> |
| Rated Current                      | A/Phase              | 1.2                 |                     |
| Setting Speed Range                | r/min                | 0.02~600            |                     |
| Speed Accuracy *                   |                      | ±0.8%               |                     |
| Power Supply Input                 |                      | 24 VDC±10% 0.9 A    |                     |
| Excitation Mode                    |                      | Microstep           |                     |

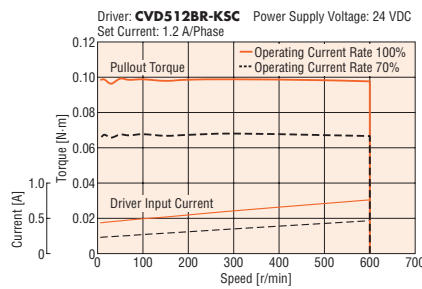
● For the right angle with installation plate, **R** (representing right angle) is filled in □ included in the driver product name to show the connector shape.  
 \*Up to ±0.8% of an error may occur at actual operating speed from the set speed.

### Speed – Torque Characteristics (Reference values)

**PKP523**



**PKP525**



**Note**

- The Speed - Torque characteristics are the data measured under the Oriental Motor's measurement conditions. The characteristics may vary as the conditions change.
- Depending on the driving conditions, the motor may produce a considerable amount of heat. Be sure to keep the motor case temperature at 100°C or less.

### Descriptions of the Terms on the Specification Table

|                                    |  |
|------------------------------------|--|
| Maximum Holding Torque             | : The maximum holding force when the motor is stopped while the power (rated current) is supplied.                 |
| Holding Torque at Motor Standstill | : Holding torque when the automatic current cutback function is active.  |
| Setting Speed Range                | : The speed range that can be set using the motor and the driver.  |
| Speed Accuracy                     | : The operating speed error coming from individual difference of the driver, temperature, and aging deterioration. |

# Frame Size 42 mm

## 5-Phase Stepping Motor and Driver Packages

### Specifications



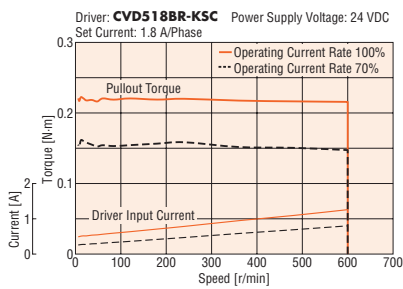
| Motor Product Name                 | Single Shaft         | PKP543N18A2         | PKP544N18A2         | PKP545N18A2         | PKP546N18A2          |
|------------------------------------|----------------------|---------------------|---------------------|---------------------|----------------------|
|                                    | Double Shaft         | PKP543N18B2         | PKP544N18B2         | PKP545N18B2         | PKP546N18B2          |
| Driver Product Name                |                      | CVD518B□-KSC        | CVD518B□-KSC        | CVD518B□-KSC        | CVD518B□-KSC         |
| Maximum Holding Torque             | N·m                  | 0.22                | 0.3                 | 0.37                | 0.5                  |
| Holding Torque at Motor Standstill | N·m                  | 0.11                | 0.15                | 0.19                | 0.25                 |
| Rotor Inertial                     | J: kg·m <sup>2</sup> | 35×10 <sup>-7</sup> | 55×10 <sup>-7</sup> | 71×10 <sup>-7</sup> | 110×10 <sup>-7</sup> |
| Rated Current                      | A/Phase              | 1.8                 |                     |                     |                      |
| Setting Speed Range                | r/min                | 0.02~600            |                     |                     |                      |
| Speed Accuracy *                   |                      | ±0.8%               |                     |                     |                      |
| Power Supply Input                 |                      | 24 VDC±10% 2.5 A    |                     |                     |                      |
| Excitation Mode                    |                      | Microstep           |                     |                     |                      |

● For the right angle with installation plate, **R** (representing right angle) is filled in □ included in the driver product name to show the connector shape.

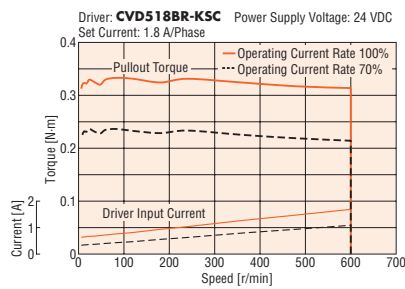
\*Up to ±0.8% of an error may occur at actual operating speed from the set speed.

### Speed – Torque Characteristics (Reference values)

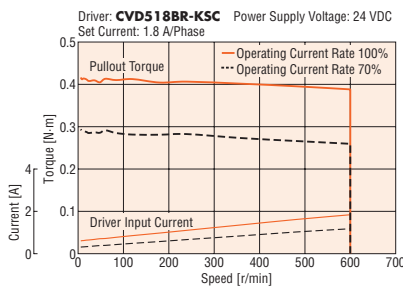
#### PKP543



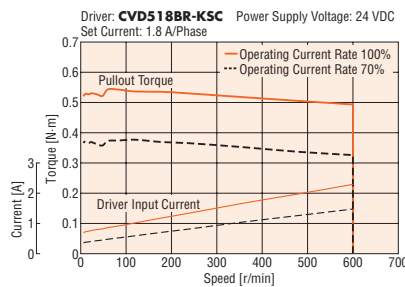
#### PKP544



#### PKP545



#### PKP546



#### Note

- The Speed - Torque characteristics are the data measured under the Oriental Motor's measurement conditions. The characteristics may vary as the conditions change.
- Depending on the driving conditions, the motor may produce a considerable amount of heat. Be sure to keep the motor case temperature at 100°C or less.

# Frame Size 60 mm

## 5-Phase Stepping Motor and Driver Packages

### Specifications



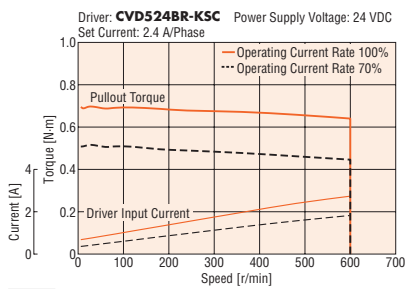
| Motor Product Name                 | Single Shaft         | PKP564FN24A2         | PKP566FN24A2         | PKP569FN24A2         |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|
|                                    | Double Shaft         | PKP564FN24B2         | PKP566FN24B2         | PKP569FN24B2         |
| Driver Product Name                |                      | CVD524B□-KSC         | CVD524B□-KSC         | CVD524B□-KSC         |
| Maximum Holding Torque             | N·m                  | 0.66                 | 1.15                 | 2.1                  |
| Holding Torque at Motor Standstill | N·m                  | 0.33                 | 0.58                 | 1.1                  |
| Rotor Inertial                     | J: kg·m <sup>2</sup> | 160×10 <sup>-7</sup> | 290×10 <sup>-7</sup> | 540×10 <sup>-7</sup> |
| Rated Current                      | A/Phase              | 2.4                  |                      |                      |
| Setting Speed Range                | r/min                | 0.02~600             |                      |                      |
| Speed Accuracy *                   |                      | ±0.8%                |                      |                      |
| Power Supply Input                 |                      | 24 VDC±10% 3.0 A     |                      |                      |
| Excitation Mode                    |                      | Microstep            |                      |                      |

● For the right angle with installation plate, **R** (representing right angle) is filled in □ included in the driver product name to show the connector shape.

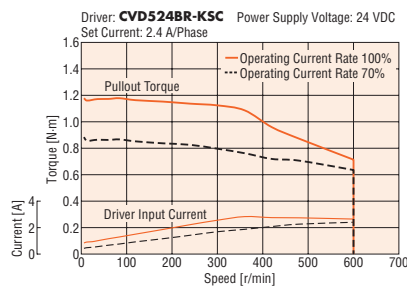
\*Up to ±0.8% of an error may occur at actual operating speed from the set speed.

### Speed – Torque Characteristics (Reference values)

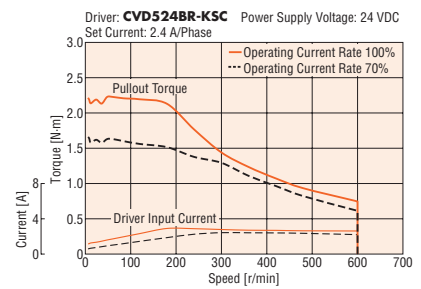
#### PKP564F



#### PKP566F



#### PKP569F



#### Note

- The Speed - Torque characteristics are the data measured under the Oriental Motor's measurement conditions. The characteristics may vary as the conditions change.
- Depending on the driving conditions, the motor may produce a considerable amount of heat. Be sure to keep the motor case temperature at 100°C or less.



## Driver Specifications

|                |   |
|----------------|---|
| Input Signals  | <ul style="list-style-type: none"> <li>Photocoupler input (FWD, RVS)</li> <li>Photocoupler "ON": Input voltage 3~5.25 VDC, Photocoupler "OFF": Input voltage 0~1 VDC (Voltage between terminals)</li> <li>Photocoupler input (AWO, MO)</li> <li>Photocoupler "ON": Input voltage 4.5~5.25 VDC, Photocoupler "OFF": Input voltage 0~1 VDC (Voltage between terminals)</li> </ul> |
| Output Signals | Photocoupler and open-collector output (ALM, PLS-OUT)<br>External use condition: 30 VDC or less, 10 mA or less  |

## General Specifications

|   | Motor   | Driver   |
|---|---|--|
| Heat-Resistant Class                                  | 130 (B)   | —  |
| Insulation Resistance                                 | The measured value is 100 MΩ or more when a 500 VDC megger is applied between the windings and the case under normal ambient temperature and humidity.  | —  |
| Dielectric Strength Voltage                           | No abnormality is recognized even by applying voltage between the windings and the case for 1 minute under normal ambient temperature and humidity.<br><ul style="list-style-type: none"> <li>PKP52□, PKP54□: 0.5 kVAC 50/60 Hz</li> <li>PKP56□: 1.0 kVAC 50/60 Hz</li> </ul> | —  |
| Operating Environment (In operation)                  | Ambient Temperature   | -10~+50°C (Non-freezing)   |
|   | Ambient Humidity  | 85% or less (Non-condensing)   |
|   | Atmosphere  | Use in an area without corrosive gases and dust. The product should not be exposed to water, oil or other liquids. |
| Temperature Rise                                      | Winding temperature rise is 80°C or less (Under the Oriental Motor's measurement conditions)  | —  |
| Shaft Runout  | 0.05 T.I.R (mm)*3   | —  |
| Radial Play*1   | 0.025 mm max. (5N load)   | —  |
| Axial Play*2  | 0.075 mm max. (10N load)<br>[PKP52□ 2.5N load]  | —  |
| Concentricity of Installation Pilot to the Shaft      | 0.075 T.I.R (mm)*3  | —  |
| Perpendicularity of Installation Surface to the Shaft | 0.075 T.I.R (mm)*3  | —  |

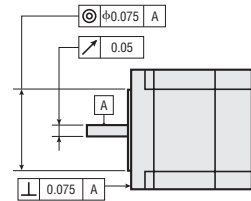
\*1 Radial play: Displacement in shaft position in the radial direction when a 5 N load is applied in the vertical direction to the tip of the motor shaft.

\*2 Axial play: Displacement in shaft position in the axial direction when a 10 N load (2.5 N in PKP52□) is applied to the motor shaft in the axial direction.

\*3 T.I.R. (Total Indicator Reading): The total dial gauge reading when the measurement section is rotated one revolution centered on the reference axis center.

### Note

● When measuring insulation resistance or performing a dielectric strength voltage test, be sure to disconnect the motor from the driver beforehand.



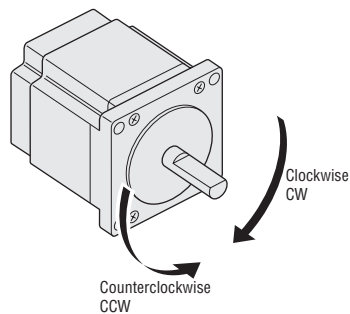
## Rotation Direction

The direction represents when the motor is viewed from the output shaft.

FWD input of the driver is ON: CW

RVS input of the driver is ON: CCW

● Motor



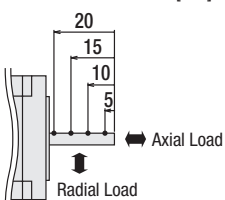
## Permissible Radial Load/Permissible Axial Load

Unit: N

| Motor Frame Size | Product Name                                   | Permissible Radial Load    |     |     |     |     | Permissible Axial Load |
|------------------|--|----------------------------|-----|-----|-----|-----|------------------------|
|                  |  | Distance from Shaft End mm |     |     |     |     |                        |
|                  |  | 0                          | 5   | 10  | 15  | 20  |                        |
| 28 mm            | <b>PKP523, PKP525</b>                          | 25                         | 34  | 52  | —   | —   | 5                      |
| 42 mm            | <b>PKP543, PKP544</b><br><b>PKP545, PKP546</b> | 35                         | 44  | 58  | 85  | —   | 15                     |
| 60 mm            | <b>PKP564, PKP566, PKP569</b>                  | 90                         | 100 | 130 | 180 | 270 | 30                     |

## Radial Load/Axial Load

Distance from Shaft End [mm]



## Dimensions (Unit = mm)

### Motor

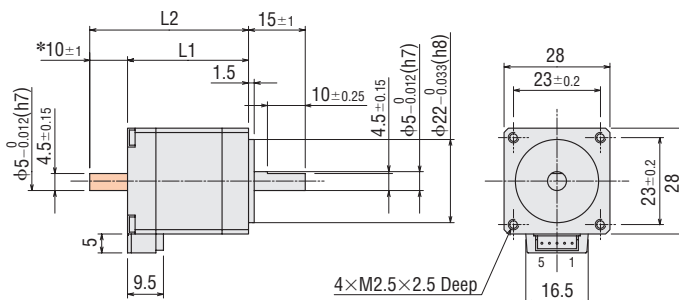
#### Frame Size 28 mm

2D & 3D CAD

| Product Name | L1   | L2   | Mass kg | 2D CAD |
|--------------|------|------|---------|--------|
| PKP523N12A   | 32   | —    | 0.11    | B1146  |
| PKP523N12B   |      | 42   |         |        |
| PKP525N12A   | 51.5 | —    | 0.2     | B1147  |
| PKP525N12B   |      | 61.5 |         |        |

● Connection cable (Sold separately)

Product name: **LC5N06A**



\* The length of the shaft flat on the Double Shaft model is  $10 \pm 0.25$ .

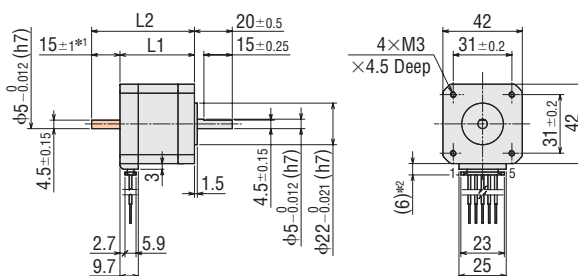
#### Frame Size 42 mm

2D & 3D CAD

| Product Name | L1 | L2 | Mass kg | 2D CAD |
|--------------|----|----|---------|--------|
| PKP543N18A2  | 33 | —  | 0.23    | B1264  |
| PKP543N18B2  |    | 48 |         |        |
| PKP544N18A2  | 39 | —  | 0.29    | B1265  |
| PKP544N18B2  |    | 54 |         |        |
| PKP545N18A2  | 47 | —  | 0.37    | B1266  |
| PKP545N18B2  |    | 62 |         |        |
| PKP546N18A2  | 59 | —  | 0.49    | B1267  |
| PKP546N18B2  |    | 74 |         |        |

● Connection cable (Sold separately)

Product name: **LC5N06E**



\*1 The length of the shaft flat on the Double Shaft model is  $15 \pm 0.25$ .

\*2 When a connection cable is attached

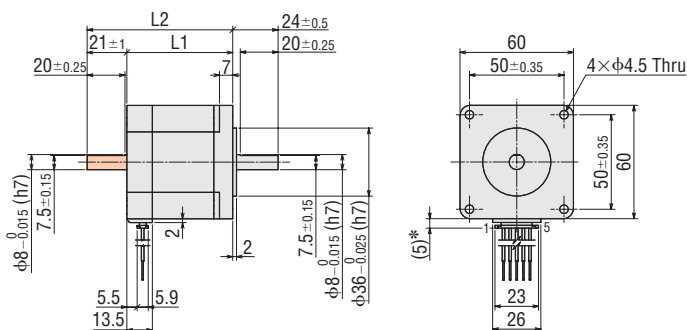
#### Frame Size 60 mm

2D & 3D CAD

| Product Name | L1   | L2    | Mass kg | 2D CAD |
|--------------|------|-------|---------|--------|
| PKP564FN24A2 | 44   | —     | 0.56    | B1252  |
| PKP564FN24B2 |      | 65    |         |        |
| PKP566FN24A2 | 56   | —     | 0.79    | B1253  |
| PKP566FN24B2 |      | 77    |         |        |
| PKP569FN24A2 | 84.5 | —     | 1.3     | B1254  |
| PKP569FN24B2 |      | 105.5 |         |        |

● Connection cable (Sold separately)

Product name: **LC5N06E**



\* When a connection cable is attached

● These dimensions are for Double Shaft models. For Single Shaft models, ignore the shaft in the shaded areas.

## Driver

### ◇ Right Angle with Installation Plate

2D & 3D CAD

| Product Name        | Mass kg | 2D CAD |
|---------------------|---------|--------|
| <b>CVD512BR-KSC</b> | 0.06    | B1210  |
| <b>CVD518BR-KSC</b> |         |        |
| <b>CVD524BR-KSC</b> |         |        |

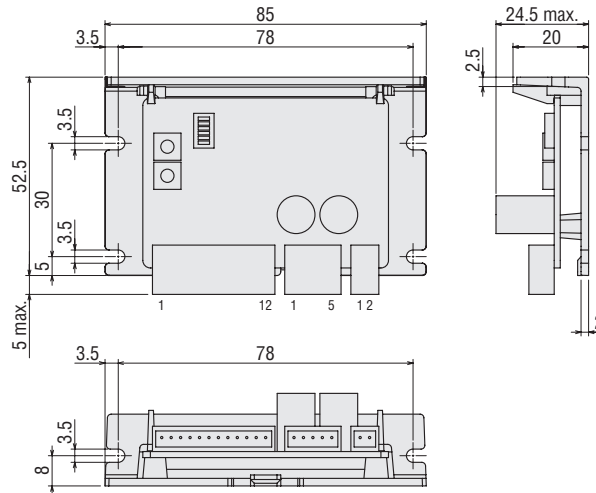
#### ● Accessories

Connector housing: 51103-0200 (Molex)

51103-0500 (Molex)

51103-1200 (Molex)

Contact: 50351-8100 (Molex)



● A connection cable set (sold separately) composed of cables for the motor, power supply, and I/O signals is available. With crimped connectors, connect wires easily without a crimp tool. For details, see page 17.

### ◇ With Installation Plate

2D & 3D CAD

| Product Name       | Mass kg | 2D CAD |
|--------------------|---------|--------|
| <b>CVD512B-KSC</b> | 0.06    | B1255  |
| <b>CVD518B-KSC</b> |         |        |
| <b>CVD524B-KSC</b> |         |        |

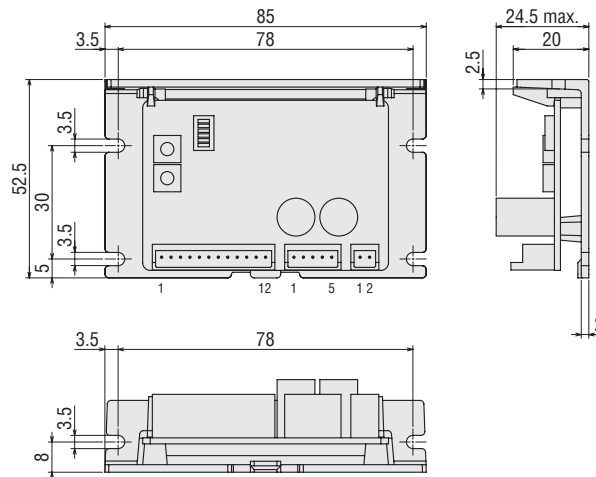
#### ● Accessories

Connector housing: 51103-0200 (Molex)

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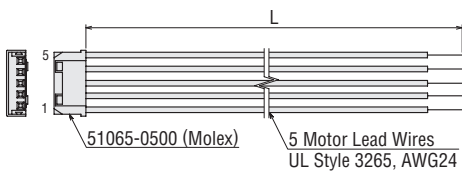
## ● Connection Cable

The connector connection types require connection cables.

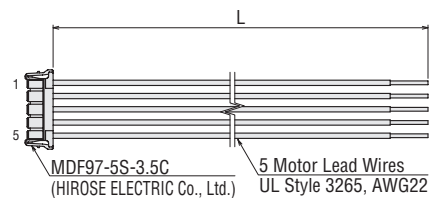
### ◇ Connection Cable for Motor (Sold separately)

| Frame Size   | Product Name   | Length L (m) |
|--------------|----------------|--------------|
| 28 mm        | <b>LC5N06A</b> | 0.6          |
|              | <b>LC5N10A</b> | 1            |
| 42 mm, 60 mm | <b>LC5N06E</b> | 0.6          |

Product Name: **LC5N06A/LC5N10A**



Product Name: **LC5N06E**



## ● Applicable Connector

The following table shows the applicable connectors.

### ◇ Motor

| Frame Size   | Connector Housing | Contact    | Crimp Tool      | Manufacturer              |
|--------------|-------------------|------------|-----------------|---------------------------|
| 28 mm        | 51065-0500        | 50212-8100 | 57176-5000      | Molex                     |
| 42 mm, 60 mm | MDF97-5S-3.5C     | MDF97-22SC | HT801/MDF97-22S | HIROSE ELECTRIC Co., Ltd. |

## Connection and Operation

### Names and Functions of Driver Parts

#### 1 Signal Monitor Indication

##### ◇ LED Indicators

| 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 Details

| Blink Count | Function               | Operating Condition   |
|-------------|------------------------|---|
| 2           | Overheat Protection    | When the board temperature of the driver reaches 85°C   |
| 3           | Overvoltage Protection | When the power supply voltage exceeds the permissible value<br>When a large inertial load is suddenly stopped<br>When a large load is lifted or lowered |
| 5           | Overcurrent Protection | When an excessive current flows through the motor output circuit<br>When the motor has come to a sudden stop or deceleration                            |
| 9           | EEPROM Error           | When the saved data for the driver is damaged   |
| Lighting    | CPU Error              | When the driver's CPU malfunctions  |

#### 2 Function Switch

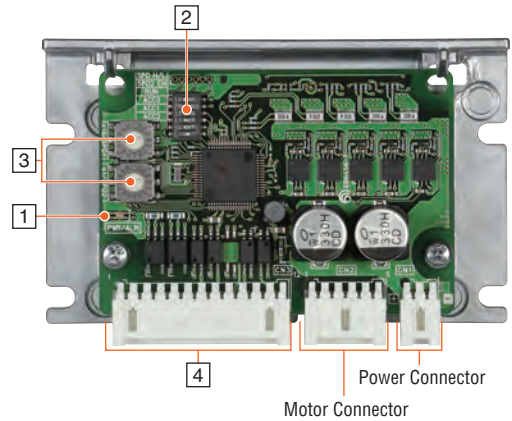
| Indication | No. | Function   |
|------------|-----|--|
| SPD H/L    | 1   | Select the maximum speed for Speed 1.<br>OFF: 600 r/min (Factory setting)<br>ON: 200 r/min   |
| SPD2 EN    | 2   | Select the setting method for Speed 2.<br>OFF: Automatically set to 10% speed of Speed 1 (Factory setting)<br>ON: Select a speed from 16 in a range between 0.5%~50% for Speed 1 |
| RUN        | 3   | Switches the motor operating current rate to 100% or 70%.<br>OFF: 100% (Factory setting)<br>ON: 70%  |
| ACC0       | 4   | Set the acceleration/deceleration time combining the 3 switches.<br>(Factory setting)<br>0.50 s (No.4: OFF, No.5: OFF, No.6: ON)   |
| ACC1       | 5   |  |
| ACC2       | 6   |  |

#### 3 Speed Switch

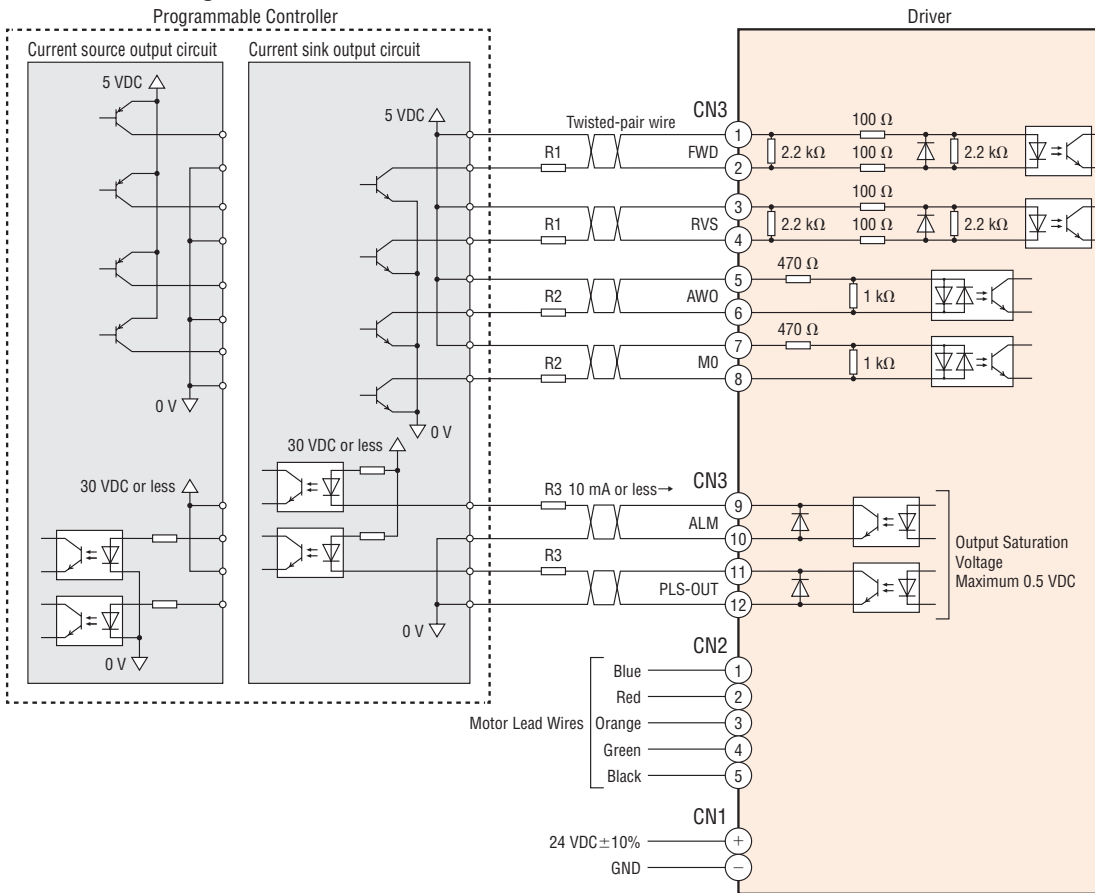
| Indication | Function                                 |
|------------|--|
| ×16/SPD1   | Sets Speed 1.<br>(Factory setting) 7     |
| ×1/SPD2    | Set Speed 1 or 2.<br>(Factory setting) 7 |

#### 4 I/O Signals Connector

| Indication | Pin No. | I/O      | Signal Name | Function  |  |
|------------|---------|----------|-------------|---|--|
| CN3        | 1       | Input    | FWD+        | Rotate the motor in the forward direction.                                |  |
|            | 2       |          | FWD-        |   |  |
|            | 3       |          | RVS+        | Rotate the motor in the reverse direction.                                |  |
|            | 4       |          | RVS-        |   |  |
|            | 5       | Output   | AWO+        | Stops motor excitation.   |  |
|            | 6       |          | AWO-        |   |  |
|            | 7       |          | M0+         | Switch the speed.   |  |
|            | 8       |          | M0-         |   |  |
|            | 9       | ALM+     | Output      | ALM+  | Outputs the alarm status of the driver (Normal close). |
|            | 10      | ALM-     |             |   |  |
|            | 11      | PLS-OUT+ |             | Output 50 PLS-OUT outputs for every revolution of the motor output shaft. |  |
|            | 12      | PLS-OUT- |             |   |  |



## ● Connection Diagram



### [Notes on Wiring]

#### ◇ I/O Signal Connection

##### ● Input signals

Use 5 VDC for input signal.

When applying a voltage that exceeds 5 VDC to the FWD or RVS input, connect an external resistor R1 so that the current is between 7~20 mA.

Example: When connecting a 24 VDC source, the R1 must be 1.5~2.2 kΩ, 0.5 W or more.

When applying a voltage that exceeds 5 VDC to the AWO or M0 input, connect an external resistor R2 so that the current is between 5~15 mA.

Example: When connecting a 24 VDC source, the R2 must be 1.5~2.2 kΩ, 0.5 W or more.

##### ● Output signals

Use 30 VDC, 10 mA or less for output signal. When the current value exceeds 10 mA, connect the external resistor R3.

##### ● Use a twisted-pair wire AWG24~22 (0.2~0.3 mm<sup>2</sup>).

##### ● Provide a distance of 100 mm or longer between the I/O signal lines and power lines (power supply lines, motor lines, etc.).

#### ◇ Power Supply Connection

##### ● Use AWG22 (0.3 mm<sup>2</sup>) wires.

##### ● Incorrect polarities of the DC power supply input will lead to driver damage. Make sure that the polarity is correct before turning the power on.

#### ◇ Extension of Motor Cable

##### ● Use AWG22 (0.3 mm<sup>2</sup>) or thicker wires.

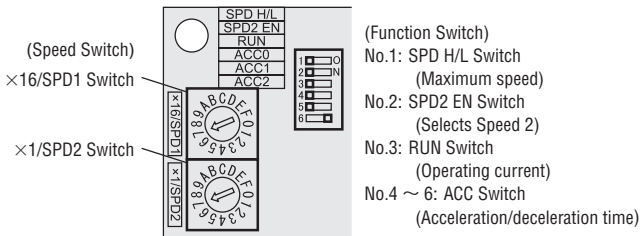
##### ● The maximum extension length is 10 m.

#### ◇ General

##### ● A separate hand crimp tool is required to crimp the included connector and lead wire. The accessory connection cable set (sold separately) comes with all lead wires already crimped.

##### ● If noise generated by the motor cable or power supply cable causes a problem with the specific wiring or layout, shield the cable or use ferrite cores.

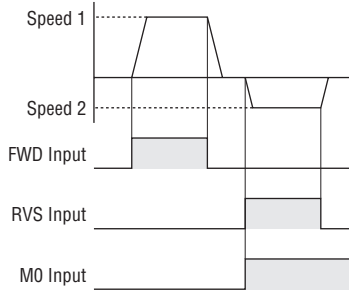
## Speed Setting Method



You can set 2 operating speeds, high and low, for the **CVK Series SC** Type. The high speed is assigned as "Speed 1" and the low speed "Speed 2" with the following definitions.

Speed 1....High operating speed when M0 is turned OFF.

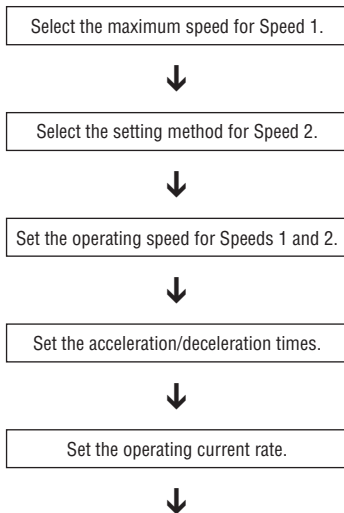
Speed 2....Low operating speed when M0 is turned ON.



There are 2 setting patterns to set Speed 1 and Speed 2 depending on the SPD2 EN switch setting (Function switch 2).

| Setting Pattern | SPD2 EN Switch | How to Set Speed  | Switch Used                   |
|-----------------|----------------|---|-------------------------------|
| Pattern 1       | OFF            | Speed 1:<br>Select a speed from 256                                       | Use both ×16/SPD1 and ×1/SPD2 |
|                 |                | Speed 2:<br>Automatically set to 10% speed of Speed 1                     | Not provided                  |
| Pattern 2       | ON             | Speed 1:<br>Select a speed from 16  | ×16/SPD1                      |
|                 |                | Speed 2:<br>Select a speed from 16 in a range between 0.5~50% for Speed 1 | ×1/SPD2                       |

## Setting Workflow



That is all for the settings.

## Setting Items

### Maximum Speed

Select the maximum speed for Speed 1 with the SPD H/L switch (Function switch 1).

Select either of 200 r/min or 600 r/min for the maximum speed.

Selecting 200 r/min or 600 r/min determines speeds that can be set with the speed switch.

OFF: 600 r/min (Factory setting)

ON: 200 r/min

### How to Set Speed 2

Select the setting method for Speed 2 with the SPD2 EN switch (Function switch 2).

OFF: Automatically set to 10% speed of Speed 1 (Factory setting)

ON: Select a speed from 16 in a range between 0.5~50% for Speed 1

### Operating Speed

The operating speed varies by the setting pattern.

[Pattern 1]

Speed 1 . . . Find your desired speed from 256 speeds in the setting value list and set both the "×16/SPD1 switch" and the "×1/SPD2 switch".

Speed 2 . . . Automatically set to 10% speed of Speed 1.

[Pattern 2]

Speed 1 . . . Find your desired speed from 16 speeds in the setting value list and set the "×16/SPD1 switch".

Speed 2 . . . Find your desired speed from 16 speeds in the setting value list and set the "×1/SPD2 switch".

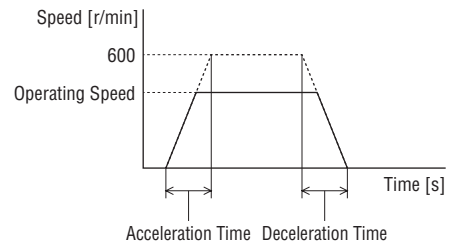
### Acceleration Time/Deceleration Time

The acceleration time is the time required for the motor speed to reach 600 r/min from 0 r/min.

The deceleration time is the time required for the motor speed to reach 0 r/min from 600 r/min.

The same time applies to all acceleration, deceleration, and gear changes.

Set using ACC0~2 (Function switch No. 4~6).



| ACC0 (No.4) | ACC1 (No.5) | ACC2 (No.6) | Acceleration Time<br>Deceleration Time |
|-------------|-------------|-------------|--|
| OFF         | OFF         | OFF         | 0.00 s                                 |
| ON          | OFF         | OFF         | 0.05 s                                 |
| OFF         | ON          | OFF         | 0.10 s                                 |
| ON          | ON          | OFF         | 0.20 s                                 |
| OFF         | OFF         | ON          | 0.50 s                                 |
| ON          | OFF         | ON          | 1.00 s                                 |
| OFF         | ON          | ON          | 2.00 s                                 |
| ON          | ON          | ON          | 3.00 s                                 |

●Operating Current And Standstill Current Rates

[Operating Current Rate]

When the load is light and the torque does not reach the maximum, rise in the temperature of the motor can be reduced by setting a small operating current rate. Actual operating current is obtained by multiplying the driver rated current by the operating current rate.

$$\text{Actual Operating Current} = \text{Driver Rated Current} \times \text{Operating Current Rate}$$

Set the RUN switch (Function switch 3) to select a current rate.

OFF: Operating current rate 100% (Factory setting)

ON: Operating current rate 70%

**Note**

When using an accessory circuit product cover attached to **CVD524BR-KSC**, set the operating current rate to 70%.

[Standstill Current Rate]

When the motor stops, the current down function works to lower the motor current to the standstill current. The standstill current rate is 50% of the operating current.

$$\text{Standstill Current Rate} = \text{Operating Current} \times 50\%$$

◇Operating Speed Setting Value List

When the maximum speed is 600 r/min

|           |  |
|-----------|--|
| Pattern 1 | Speed 1: Select a speed from 256                                       |
|           | Speed 2: Automatically set to 10% speed of Speed 1                     |
| Pattern2  | Speed 1: Select a speed from 16  |
|           | Speed 2: Select a speed from 16 in a range between 0.5~50% for Speed 1 |

●Pattern 1

Unit: r/min

|                 |   | ×1/SPD2 Switch |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|-----------------|---|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                 |   | 0              | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | A      | B      | C      | D      | E      | F      |
| ×16/SPD1 Switch | 0 | 0.90           | 1.00   | 1.10   | 1.20   | 1.30   | 1.40   | 1.50   | 1.60   | 1.70   | 1.80   | 1.90   | 2.00   | 2.10   | 2.20   | 2.30   | 2.40   |
|                 | 1 | 2.50           | 5.00   | 7.50   | 10.00  | 12.50  | 15.00  | 17.50  | 20.00  | 22.50  | 25.00  | 27.50  | 30.00  | 32.50  | 35.00  | 37.50  | 40.00  |
|                 | 2 | 42.50          | 45.00  | 47.50  | 50.00  | 52.50  | 55.00  | 57.50  | 60.00  | 62.50  | 65.00  | 67.50  | 70.00  | 72.50  | 75.00  | 77.50  | 80.00  |
|                 | 3 | 82.50          | 85.00  | 87.50  | 90.00  | 92.50  | 95.00  | 97.50  | 100.00 | 102.50 | 105.00 | 107.50 | 110.00 | 112.50 | 115.00 | 117.50 | 120.00 |
|                 | 4 | 122.50         | 125.00 | 127.50 | 130.00 | 132.50 | 135.00 | 137.50 | 140.00 | 142.50 | 145.00 | 147.50 | 150.00 | 152.50 | 155.00 | 157.50 | 160.00 |
|                 | 5 | 162.50         | 165.00 | 167.50 | 170.00 | 172.50 | 175.00 | 177.50 | 180.00 | 182.50 | 185.00 | 187.50 | 190.00 | 192.50 | 195.00 | 197.50 | 200.00 |
|                 | 6 | 202.50         | 205.00 | 207.50 | 210.00 | 212.50 | 215.00 | 217.50 | 220.00 | 222.50 | 225.00 | 227.50 | 230.00 | 232.50 | 235.00 | 237.50 | 240.00 |
|                 | 7 | 242.50         | 245.00 | 247.50 | 250.00 | 252.50 | 255.00 | 257.50 | 260.00 | 262.50 | 265.00 | 267.50 | 270.00 | 272.50 | 275.00 | 277.50 | 280.00 |
|                 | 8 | 282.50         | 285.00 | 287.50 | 290.00 | 292.50 | 295.00 | 297.50 | 300.00 | 302.50 | 305.00 | 307.50 | 310.00 | 312.50 | 315.00 | 317.50 | 320.00 |
|                 | 9 | 322.50         | 325.00 | 327.50 | 330.00 | 332.50 | 335.00 | 337.50 | 340.00 | 342.50 | 345.00 | 347.50 | 350.00 | 352.50 | 355.00 | 357.50 | 360.00 |
|                 | A | 362.50         | 365.00 | 367.50 | 370.00 | 372.50 | 375.00 | 377.50 | 380.00 | 382.50 | 385.00 | 387.50 | 390.00 | 392.50 | 395.00 | 397.50 | 400.00 |
|                 | B | 402.50         | 405.00 | 407.50 | 410.00 | 412.50 | 415.00 | 417.50 | 420.00 | 422.50 | 425.00 | 427.50 | 430.00 | 432.50 | 435.00 | 437.50 | 440.00 |
|                 | C | 442.50         | 445.00 | 447.50 | 450.00 | 452.50 | 455.00 | 457.50 | 460.00 | 462.50 | 465.00 | 467.50 | 470.00 | 472.50 | 475.00 | 477.50 | 480.00 |
|                 | D | 482.50         | 485.00 | 487.50 | 490.00 | 492.50 | 495.00 | 497.50 | 500.00 | 502.50 | 505.00 | 507.50 | 510.00 | 512.50 | 515.00 | 517.50 | 520.00 |
|                 | E | 522.50         | 525.00 | 527.50 | 530.00 | 532.50 | 535.00 | 537.50 | 540.00 | 542.50 | 545.00 | 547.50 | 550.00 | 552.50 | 555.00 | 557.50 | 560.00 |
|                 | F | 562.50         | 565.00 | 567.50 | 570.00 | 572.50 | 575.00 | 577.50 | 580.00 | 582.50 | 585.00 | 587.50 | 590.00 | 592.50 | 595.00 | 597.50 | 600.00 |

●Pattern 2

Unit: r/min

| ×16/SPD1 Switch (Speed 1) |           | ×1/SPD2 Switch (Speed 2) |        |         |         |         |         |         |         |         |          |          |          |          |          |          |          |
|---------------------------|-----------|--------------------------|--------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|
|                           |           | 0                        | 1      | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9        | A        | B        | C        | D        | E        | F        |
| 0                         | 225 r/min | 1.1250                   | 2.2500 | 4.5000  | 6.7500  | 9.0000  | 11.2500 | 16.8750 | 22.5000 | 33.7500 | 45.0000  | 56.2500  | 67.5000  | 78.7500  | 90.0000  | 101.2500 | 112.5000 |
| 1                         | 250 r/min | 1.2500                   | 2.5000 | 5.0000  | 7.5000  | 10.0000 | 12.5000 | 18.7500 | 25.0000 | 37.5000 | 50.0000  | 62.5000  | 75.0000  | 87.5000  | 100.0000 | 112.5000 | 125.0000 |
| 2                         | 275 r/min | 1.3750                   | 2.7500 | 5.5000  | 8.2500  | 11.0000 | 13.7500 | 20.6250 | 27.5000 | 41.2500 | 55.0000  | 68.7500  | 82.5000  | 96.2500  | 110.0000 | 123.7500 | 137.5000 |
| 3                         | 300 r/min | 1.5000                   | 3.0000 | 6.0000  | 9.0000  | 12.0000 | 15.0000 | 22.5000 | 30.0000 | 45.0000 | 60.0000  | 75.0000  | 90.0000  | 105.0000 | 120.0000 | 135.0000 | 150.0000 |
| 4                         | 325 r/min | 1.6250                   | 3.2500 | 6.5000  | 9.7500  | 13.0000 | 16.2500 | 24.3750 | 32.5000 | 48.7500 | 65.0000  | 81.2500  | 97.5000  | 113.7500 | 130.0000 | 146.2500 | 162.5000 |
| 5                         | 350 r/min | 1.7500                   | 3.5000 | 7.0000  | 10.5000 | 14.0000 | 17.5000 | 26.2500 | 35.0000 | 52.5000 | 70.0000  | 87.5000  | 105.0000 | 122.5000 | 140.0000 | 157.5000 | 175.0000 |
| 6                         | 375 r/min | 1.8750                   | 3.7500 | 7.5000  | 11.2500 | 15.0000 | 18.7500 | 28.1250 | 37.5000 | 56.2500 | 75.0000  | 93.7500  | 112.5000 | 131.2500 | 150.0000 | 168.7500 | 187.5000 |
| 7                         | 400 r/min | 2.0000                   | 4.0000 | 8.0000  | 12.0000 | 16.0000 | 20.0000 | 30.0000 | 40.0000 | 60.0000 | 80.0000  | 100.0000 | 120.0000 | 140.0000 | 160.0000 | 180.0000 | 200.0000 |
| 8                         | 425 r/min | 2.1250                   | 4.2500 | 8.5000  | 12.7500 | 17.0000 | 21.2500 | 31.8750 | 42.5000 | 63.7500 | 85.0000  | 106.2500 | 127.5000 | 148.7500 | 170.0000 | 191.2500 | 212.5000 |
| 9                         | 450 r/min | 2.2500                   | 4.5000 | 9.0000  | 13.5000 | 18.0000 | 22.5000 | 33.7500 | 45.0000 | 67.5000 | 90.0000  | 112.5000 | 135.0000 | 157.5000 | 180.0000 | 202.5000 | 225.0000 |
| A                         | 475 r/min | 2.3750                   | 4.7500 | 9.5000  | 14.2500 | 19.0000 | 23.7500 | 35.6250 | 47.5000 | 71.2500 | 95.0000  | 118.7500 | 142.5000 | 166.2500 | 190.0000 | 213.7500 | 237.5000 |
| B                         | 500 r/min | 2.5000                   | 5.0000 | 10.0000 | 15.0000 | 20.0000 | 25.0000 | 37.5000 | 50.0000 | 75.0000 | 100.0000 | 125.0000 | 150.0000 | 175.0000 | 200.0000 | 225.0000 | 250.0000 |
| C                         | 525 r/min | 2.6250                   | 5.2500 | 10.5000 | 15.7500 | 21.0000 | 26.2500 | 39.3750 | 52.5000 | 78.7500 | 105.0000 | 131.2500 | 157.5000 | 183.7500 | 210.0000 | 236.2500 | 262.5000 |
| D                         | 550 r/min | 2.7500                   | 5.5000 | 11.0000 | 16.5000 | 22.0000 | 27.5000 | 41.2500 | 55.0000 | 82.5000 | 110.0000 | 137.5000 | 165.0000 | 192.5000 | 220.0000 | 247.5000 | 275.0000 |
| E                         | 575 r/min | 2.8750                   | 5.7500 | 11.5000 | 17.2500 | 23.0000 | 28.7500 | 43.1250 | 57.5000 | 86.2500 | 115.0000 | 143.7500 | 172.5000 | 201.2500 | 230.0000 | 258.7500 | 287.5000 |
| F                         | 600 r/min | 3.0000                   | 6.0000 | 12.0000 | 18.0000 | 24.0000 | 30.0000 | 45.0000 | 60.0000 | 90.0000 | 120.0000 | 150.0000 | 180.0000 | 210.0000 | 240.0000 | 270.0000 | 300.0000 |

● For setting values for the maximum speed 200 r/min, see the operating manual.

# Accessories (Sold separately)

For details, check the Oriental Motor website or contact the Oriental Motor sales office. <http://www.orientalmotor.com.sg>

## Flexible Couplings

A flexible coupling ideal for **CVK** series is available.

Once you have decided on a type and/or applications of motor, you can select the recommended size of coupling easily. All motor shaft diameters of stepping motor packages are available.

### MCV Coupling

This one-piece coupling is made with anti-vibration rubber molded between aluminum alloy hubs.



#### Product Line

| Product Name   |
|----------------|
| <b>MCV15</b> □ |
| <b>MCV19</b> □ |

● A number indicating the coupling inner diameter is entered in the box □ located within the product name.

### MC Coupling

This is a slit-type one-piece coupling.



Set Screw Type



Clamp Type

#### Product Line

##### ◇ Set Screw Type

| Product Name           |
|------------------------|
| <b>MC12</b> □ <b>S</b> |
| <b>MC20</b> □ <b>S</b> |
| <b>MC25</b> □ <b>S</b> |
| <b>MC32</b> □ <b>S</b> |

##### ◇ Clamp Type

| Product Name            |
|-------------------------|
| <b>MC12</b> □ <b>C2</b> |
| <b>MC20</b> □ <b>C2</b> |
| <b>MC25</b> □ <b>C2</b> |
| <b>MC32</b> □ <b>C2</b> |

● A number indicating the coupling inner diameter is entered in the box □ located within the product name.

## Motor Mounting Bracket



#### Product Line

Material: Aluminum alloy (SPCC)\*

| Product Name                 | Motor Frame Size | Applicable Product      |
|------------------------------|------------------|-------------------------|
| <b>PFB28A</b>                | 28 mm            | <b>PKP52</b> □          |
| <b>PAFOP</b><br><b>PALOP</b> | 42 mm            | <b>PKP54</b> □          |
| <b>PAL2P-5</b>               | 60 mm            | <b>PKP56</b> □ <b>F</b> |

\*( ) indicate specifications for **PFB28A**.

- The product names of the applicable ones are described with text by which the product name can be identified.
- The installation bracket base is built with holes large enough to allow for adjustments of belt tension after a motor is installed.
- These installation brackets can be perfectly fitted to the pilot of the stepping motors. (excluding **PALOP**)

## Circuit Products Mounting Bracket

Mounts the DIN rails for the driver with installation plate.

- Metal build delivers solid mounting.
- No side slips even without an end plate.

<Application Example>



#### Product Line

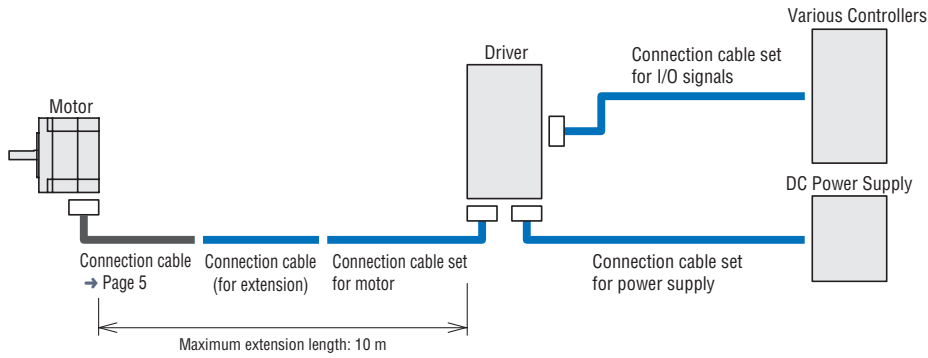
Material: SPCC Surface treatment: Electroless nickel plating

| Product Name  | Applicable Driver  |
|---------------|--|
| <b>MADP07</b> | Right Angle with Installation Plate<br>With Installation Plate |



# Cable

## ● Cable System Configuration



## ■ Connection Cable Set

Lead wires with a connector for drivers are available.

These lead wires allow for easy connection of the motor, power supply and I/O signals. A set of the connection cables includes a motor, a power supply and I/O signal cables. The lead wires crimped with connectors are ready for use without a special crimp tool.

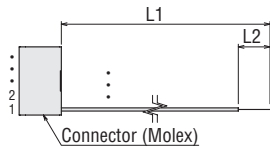


### ● Product Line

| Product Name    | Applicable Drivers               | Connector Name   | Connector Product Name | Length L1 | Length L2 | Conductor AWG             |
|-----------------|----------------------------------|------------------|------------------------|-----------|-----------|---------------------------|
| <b>LCS04SD5</b> | <b>CVD512, CVD518<br/>CVD524</b> | For motor        | 51103-0500             | 0.6 m     | 10 mm     | 22 (0.3 mm <sup>2</sup> ) |
|                 |                                  | For power supply | 51103-0200             |           |           |                           |
|                 |                                  | For I/O signals  | 51103-1200             |           |           |                           |

● The product names of the applicable drivers are described with text by which the product name can be identified.

### ● Dimensions



### ● Connector Layout

#### ◇ For Motor

| Pin No. | Wire Color |
|---------|------------|
| 1       | Blue       |
| 2       | Red        |
| 3       | Orange     |
| 4       | Green      |
| 5       | Black      |

#### ◇ For Power Supply

| Pin No. | Wire Color |
|---------|------------|
| 1       | Red        |
| 2       | Black      |

#### ◇ For I/O Signals

| Pin No. | Wire Color |
|---------|------------|
| 1       | Brown      |
| 2       | Red        |
| 3       | Orange     |
| 4       | Yellow     |
| 5       | Green      |
| 6       | Blue       |
| 7       | Purple     |
| 8       | Gray       |
| 9       | White      |
| 10      | Black      |
| 11      | Brown      |
| 12      | Red        |

## ■ Connection Cable (For extension)



Extends the connection between the motor and the driver. Keep the wiring distance between the motor and driver to 10 m or less.

### ● Product Line

| Product Name    | Cable Type                | Length m | Conductor AWG                | Finished Outer Diameter mm |
|-----------------|---------------------------|----------|------------------------------|----------------------------|
| <b>CC05PK5</b>  | Connection Cable          | 5        | 22<br>(0.3 mm <sup>2</sup> ) | φ7.2                       |
| <b>CC10PK5</b>  |                           | 10       |                              |                            |
| <b>CC05PK5R</b> | Flexible Connection Cable | 5        | 22<br>(0.3 mm <sup>2</sup> ) | φ5.8                       |
| <b>CC10PK5R</b> |                           | 10       |                              |                            |

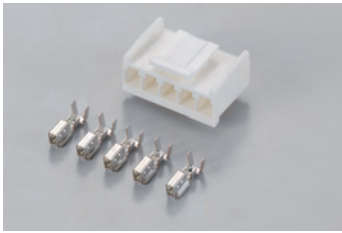
● Line core configuration: 5 cores (Blue, Red, Orange, Green, Black)

● Cable rating: 105°C

● Outer sheath: oil resistant, heat resistant, non-migratory vinyl

# Motor Connector Sets

A set of connector housings and contacts are for use with a connector-coupled motor. In addition to the set included in the product, use these extra sets as needed.



This photograph shows **CS5N30B**.

## Product Line

| Product Name   | Applicable Product    |
|----------------|-----------------------|
| <b>CS5N30A</b> | <b>PKP523, PKP525</b> |

- The product names of the applicable ones are described with text by which the product name can be identified.
- Each package contains enough housings and contacts for 30 motors. Please specify the number of packages when ordering.  
The price is for one package.

### Note

- The crimp tool is not included.  
Please provide them separately.

# Circuit Product Cover

Protects drivers and prevents unwanted contact. Use for right angle drivers with installation plates.



## Product Line

Material: Resin

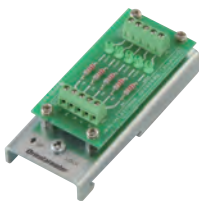
| Product Name    | Applicable Drivers                                 |
|-----------------|--|
| <b>PADC-CVD</b> | <b>CVD512BR-KSC, CVD518BR-KSC<br/>CVD524BR-KSC</b> |

### Note

- When using a circuit product cover attached to **CVD524BR-KSC**, set the operating current rate to 70%.

# External Resistor Module

Includes 5 current limiting resistors (2.2 kΩ, 1/2 W) required to connect a controller of 24 VDC output and a driver of 5 VDC input. Also includes LEDs for signal check. Mount on DIN rails.



## Product Line

Material: SPCC for metal parts

Surface treatment: Electroless nickel plating

| Product Name |
|--------------|
| <b>VCS01</b> |

### Note

- Use 24 VDC ±5% of input signals when connecting the external resistor module.



## Related Products

### Brushless Motor and Driver Packages

# BLH Series

- A unit composed of 24 VDC of a board-type driver and a thin, high power, brushless motor
- Speed control range 100~3000 r/min
- 15 W~100 W output



#### Safety Precautions

- To ensure correct operation, carefully read the Operating Manual before using it.
- The products listed in this catalogue are for industrial use and for built-in component. Do not use for any other applications.

- The factories which manufacture the products listed in this catalogue have obtained Quality Management Systems ISO9001 and Environment Management Systems ISO14001.
- The content listed in this catalogue such as performance and specifications of the products are subject to change without notice for improvements.
- The price of all products listed in this catalogue does not include the consumption tax etc.
- For details of the products, please contact the nearest dealer, sales office or the following "Order Support Center" or "Customer Support Center".
- **Orientalmotor** is registered trademark or trademark of Oriental Motor in Japan and other countries.

# Orientalmotor

#### **ORIENTAL MOTOR ASIA PACIFIC PTE. LTD.**

31 Kaki Bukit Road 3, #04-02/04  
Techlink, Singapore 417818  
TEL: +65-6745-7344 FAX: +65-6745-9405  
<http://www.orientalmotor.com.sg/>

#### **ORIENTAL MOTOR (THAILAND) CO., LTD.**

**Headquarters & Bangkok Office**  
900, 8th Floor Zone C, Tonson Tower, Ploenchit Road,  
Lumpini, Pathumwan, Bangkok 10330 Thailand  
TEL: +66-2-251-1871 FAX: +66-2-251-1872

#### **Lamphun Office**

238/4 Moo 4, Tambol Ban-Klang,  
Amphur Muang, Lamphun 51000 Thailand  
TEL: +66-(0)53-582-074 FAX: +66-(0)53-582-076  
<http://www.orientalmotor.co.th/>

#### **ORIENTAL MOTOR (INDIA) PVT. LTD.**

No.810, 8th Floor, Prestige Meridian-1 No.29,  
M.G.Road, Bangalore, 560001, India  
TEL: +91-80-41125586 FAX: +91-80-41125588  
<http://www.orientalmotor.co.in/>

#### **ORIENTAL MOTOR (MALAYSIA) SDN. BHD.**

**Headquarters & Kuala Lumpur Office**  
A-13-1, North Point Offices, Mid Valley City,  
No.1 Medan Syed Putra Utara 59200  
Kuala Lumpur, Malaysia  
TEL: +60-3-22875778 FAX: +60-3-22875528

#### **Penang Office**

1-4-14 Krystal Point II, Lebu Bukit Kecil 6, Bayan Lepas,  
11900 Penang, Malaysia  
TEL: +60-4-6423788 FAX: +60-4-6425788

#### **Customer Support Centre**

TEL: For Singapore: 1800-8420280 (Toll Free)  
For Malaysia: 1800-806161 (Toll Free)  
For Thailand: 1800-888881 (Toll Free)  
For India: 1800-1201995 (Toll Free)  
For Other Countries: +65-6842-0280

Mail to: [support@orientalmotor.com.sg](mailto:support@orientalmotor.com.sg)

#### **Japanese Customer Support Centre**

TEL: +65-6745-3008  
Mail to: [j-support@orientalmotor.com.sg](mailto:j-support@orientalmotor.com.sg)

For more information please contact: