

Driver for 5-Phase Stepper Motors

CVD Series Fully Closed-Loop Control Type

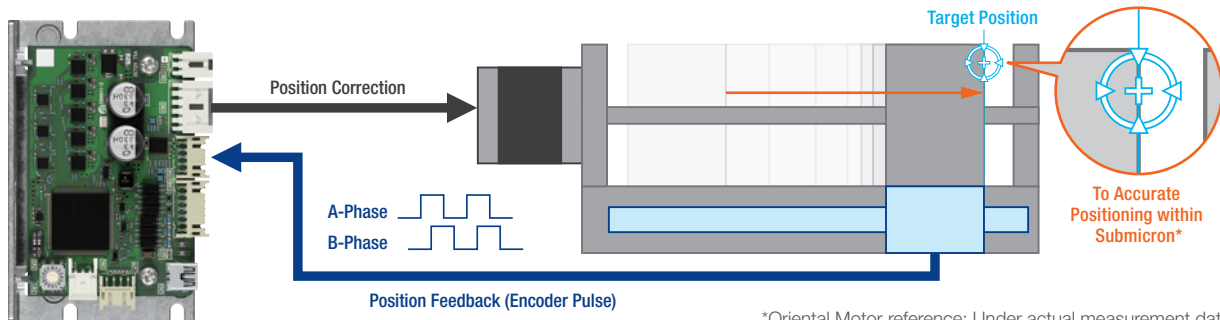
A fully closed-loop control type product line has been added to the **CVD** Series. It retains the ease of use of a stepper motor and enables high positioning accuracy operation when combined with external sensors. These are useful in facilities and equipment that require highly accurate control.



With Installation Plate: **CVD5B-KF**
Right Angle with Installation Plate: **CVD5BR-KF**

Enables High Positioning Accuracy

The use of fully closed-loop control, which provides direct feedback for the mechanism position, allows for the correction of any deviations between the command position and the detected position.

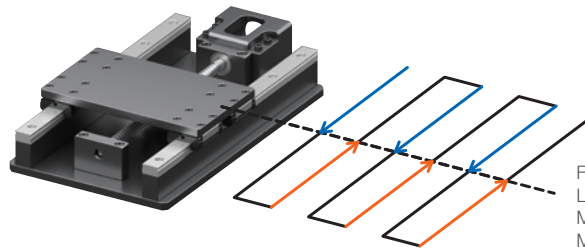


*Oriental Motor reference: Under actual measurement data conditions

Reference: Actual Measurement Data

Actual measurement data for lost motion (positioning of the motor in the CW and CCW directions compared to the target position, and the difference from the target position at that time).

| Open Loop Control | Fully Closed-Loop Control |
|---------------------|---------------------------|
| 0.726 μm | 0.014 μm |

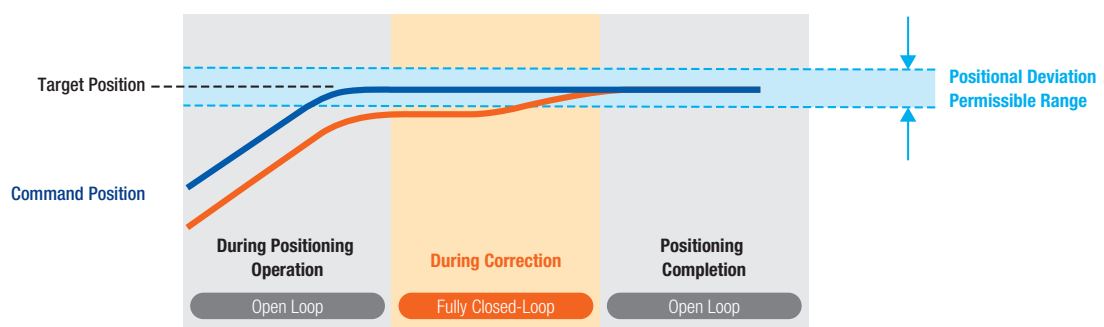


Feed screw lead 1 mm
Linear scale resolution 0.1 μm
Measurement using laser
Measurement error of ± 0.2 ppm for traveling amount

Fully Closed-Loop Stepper Motor Control

The **CVD** Series fully closed-loop control type uses open loop control at the start of positioning to take advantage of the high response of the stepper motor. After the positioning command has been completed, it transitions to fully closed-loop control using feedback from external sensors to correct the position.

CVD Series Fully Closed-Loop Control



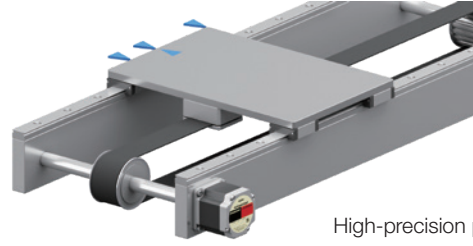
Retains the Advantages of Stepper Motors

Holding the Stop Position without Hunting

When positioning is completed, the motor stops with its own holding force without hunting. This is ideal for applications where absence of vibration upon stopping is required.

No Gain Adjustment Required

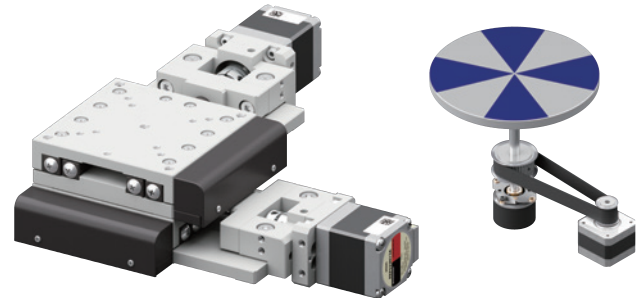
Unlike servo motors, gain adjustment to match the mechanism is not necessary. Because the positioning operation does not use the usual feedback from an encoder, there's no need for the adjustment of mechanisms, such as belt pulleys or cams, or for load adjustments.



High-precision positioning without gain adjustment, even with belt pulleys

Supports Various Encoders to Match the Mechanism

Compatible with various encoders from a variety of manufacturers, allowing for feedback from the encoder best suited to the mechanism to be used.

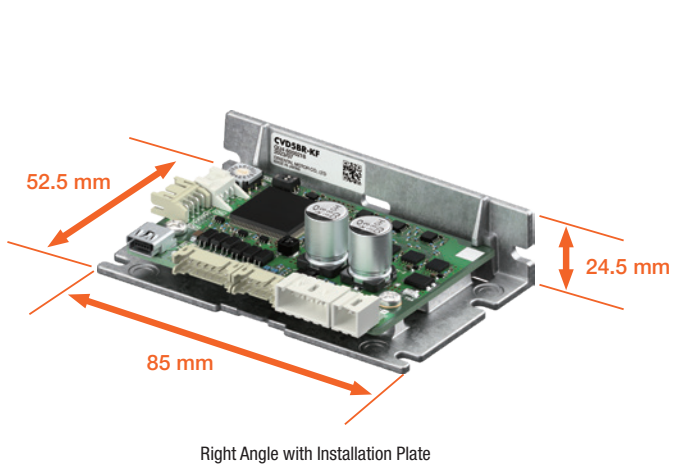


Linear Encoder

Rotary Encoder

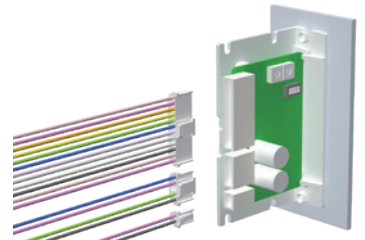
Common Driver Sizes and Installation Method

Drivers with different configurations and connector directions are available to match the end user's driver installation methods. The same installation plate as the rest of the **CVD** Series is used, with the same installation hole pitch.



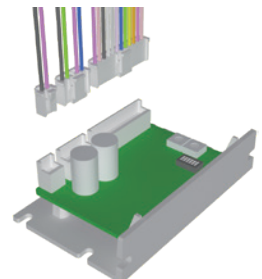
Installation Example > Vertically Aligned Driver Installation

The connector points outward from the board. DIN rail mounting brackets and circuit product covers are also available as accessories.

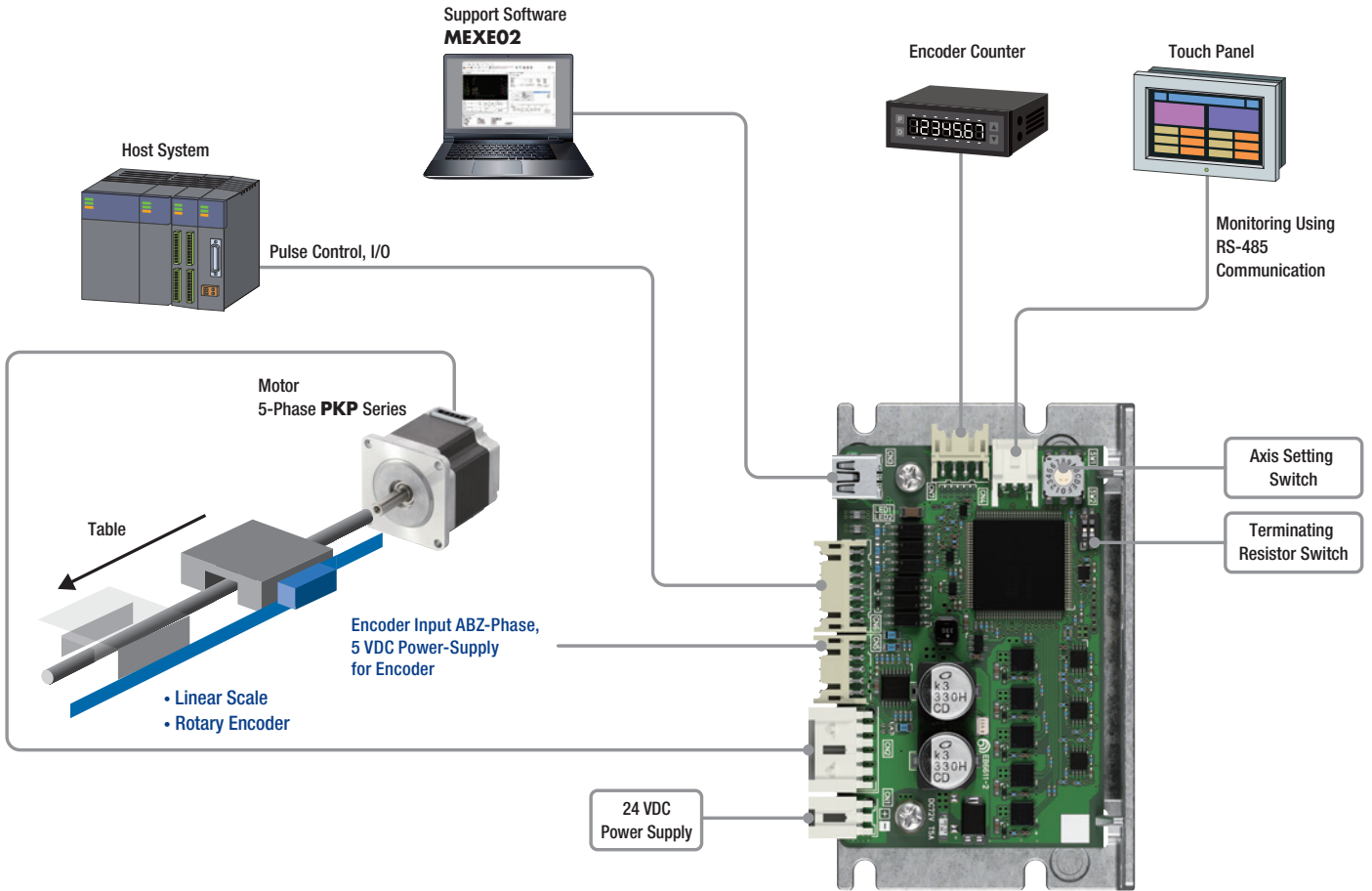


Installation Example > Horizontally Aligned Driver Installation

The connector points upward from the board.



System Configuration



I/O Signals

| | Signal Name | Function |
|----------------|-------------|-------------------------------------------------------------------------------------------------------|
| Input Signals | CW+ (PLS) | Rotates the motor in the CW direction. (Operation command pulse signal when in 1-pulse input mode) |
| | CW- (PLS-) | |
| | CCW+ (DIR+) | Rotates the motor in the CCW direction. (Rotation direction signal when in 1-pulse input mode) |
| | CCW- (DIR-) | |
| | IN-COM | Input common. |
| | P-PRESET | Presets command position and detection position to zero (establishes home). |
| | FCLOOP-DIS | Disables fully closed-loop control correction. |
| | AWO | Stops motor excitation. |
| Output Signals | ALM-B+ | Outputs the alarm status for the driver (normally closed). |
| | ALM-B- | |
| | ENC-IN-POS+ | Output when the positioning is completed. |
| | ENC-IN-POS- | |
| | TIM+ | Output when the excitation state of the motor is step "0". |
| TIM- | | |

Encoder Input Specifications

| | | |
|---------------------------|-----------------|--------------------------------------------------------|
| A-Phase B-Phase | Input Frequency | Max. 4 MHz (frequency for each of A-phase and B-phase) |
| | Count Range | -2,147,483,648~+2,147,483,647 pulses |
| | Count Method | 90-degree phase difference input |
| | Multiplier | 1×/2×/4× (can be set in parameters) |
| | Interface | Differential line receiver (26C32 or equivalent) |
| Z-Phase | Input Width | 1 ms min. |
| | Interface | Differential line receiver (26C32 or equivalent) |
| 5 VDC Power Supply Output | Output Current | 300 mA max. |

Combination Motors

| Type | Product Name | Frame Size [mm] | Rated Current [A/Phase] | Max. Holding Torque [Nm] |
|----------------------|--------------|-----------------|-------------------------|--------------------------|
| Standard Type | PKP52□N12■ | 28 | 1.2 | 0.052 - 0.091 |
| | PKP54□N18■ | 42 | 1.8 | 0.26 - 0.44 |
| | PKP54□N18■2 | 42 | 1.8 | 0.22 - 0.5 |
| | PKP56□FN24■2 | 60 | 2.4 | 0.66 - 2.1 |
| High-Resolution Type | PKP52□MN03■ | 28 | 0.35 | 0.042 - 0.09 |
| | PKP52□MN07■ | 28 | 0.75 | 0.042 - 0.09 |
| | PKP54□MN | 42 | 1.8 | 0.26 - 0.44 |
| | PKP56□FMN | 60 | 2.4 | 0.78 - 2.3 |

A number indicating the length of the motor case is entered where the box □ is located within the motor product name.
Either A (single shaft) or B (double shaft) indicating the configuration is specified where the box ■ is located in the motor product name.

General Specifications

| | | |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Product Name | CVD5□■-KF | |
| Drive Method | Microstep Drive, Bipolar Constant Current Drive Method | |
| Power Supply Voltage | 24 VDC±10% | |
| Input Current | Max. 3.0 A | |
| 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 driver 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.

Compatible with RS-485 Communication (Modbus RTU)

- Operating data, parameter settings and operation commands can be input via RS-485 communication.
- Use of remote I/O contributes to reduced wiring and space saving.
- Detection position, alarm information, driver temperature, etc., can be monitored.

<Communication Specifications>

Protocol : Modbus RTU

Electrical Characteristics: EIA-485 compliant

The maximum total extension length of the communication cable is 3 m when using a shielded cable or twisted-pair wires

Communication Format : Half duplex and start-stop synchronization (data: 8 bits, stop bit: 1 bit or 2 bits, parity: none, even, or odd)

Transmission Speed : Select from 9600 bps/19200 bps/38400 bps/57600 bps/115200 bps/230400 bps

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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 July 2024. Printed in Germany.

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