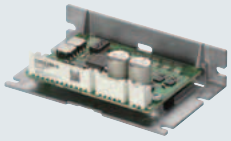
Oriental motor

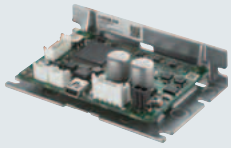
Stepper Motor Driver

CVD Series

A Wide Product Line
of Compact
Microstepper Drivers
To Suit Any Application

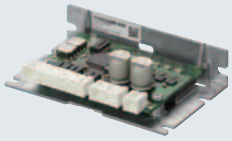


Pulse Input Type



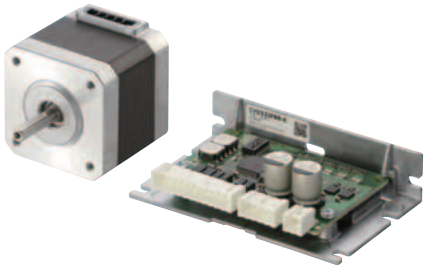
RS-485 Communication Type

S Type

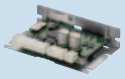
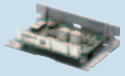


SC Type

The **CVD** Series is a compact line of stepper motor drivers capable of handling a wide variety of applications. When used with the **PKP** Series Stepper Motors or **DRLII** Series Motorized Cylinders, the **CVD** Series offer the lowest vibration and noise with advanced microstepping control and the highest torque output.

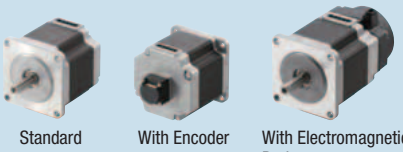
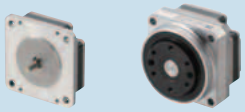
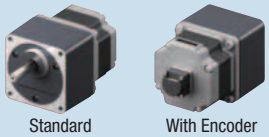
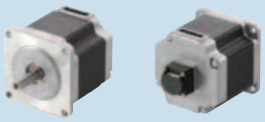


Product Line — CVD Series Stepper Motor Driver

Series Name		CVD Series				
		Pulse Input Type	RS-485 Communication Type	**S** Type (I/O Setting)	**S** Type (SPI Communication Setting)	**SC** Type (Speed Control)
Driver Type		 Right Angle Type with Installation Plate	 Right Angle Type with Installation Plate	 Horizontal Mounting	 Horizontal Mounting	 Right Angle Type with Installation Plate
		 With Installation Plate	 With Installation Plate	 Vertical Mounting	 Vertical Mounting	 With Installation Plate
		 Without Installation Plate	–	–	–	–
Price Range		$130.00~150.00	$190.00~201.00	$130.00~140.00		$188.00
Combinable Stepper Motors		2-Phase/5-Phase	2-Phase/5-Phase	2-Phase/5-Phase	2-Phase/5-Phase	5-Phase
Control Method	I/O Control	–	Return to Home Operation Positioning Operation Speed Control Operation	–	–	Speed Control Operation
	Pulse Input	●	–	●	●	–
	Modbus (RTU)	–	Return to Home Operation Positioning Operation Direct Data Operation* Speed Control Operation	–	–	–
Parameter Setting	Setting Method	Set via Switch	RS-485 Communication, **MEXE02**	(I/O Setting)	Set via SPI Communication	Set via Switch
	Pulse Input Mode	1 Pulse/2 Pulses	–	1 Pulse/2 Pulses	1 Pulse/2 Pulses	–
	Smooth Drive	Set/Cancel	Set/Cancel	Set/Cancel	Set/Cancel	–
	Standstill Current	25%/50%	0 to 50%	25%/50%	0.1 to 50%	–
	Resolution	200 to 125,000 P/R	200 to 125,000 P/R	200 to 125,000 P/R	200 to 125,000 P/R	–
	Running Current	25 to 100% (16 levels)	0 to 100%	0.1 to 100%	0.1 to 100%	70%/100%
	Command Filter	ON/OFF	LPF (Velocity filter)/ Movement Average Filter	Normally OFF	ON/OFF	–
	Operating Data	–	256 Points	–	–	–
	Speed	–	●	–	–	●
	Acceleration/ Deceleration Time	–	●	–	–	●
I/O Signal	IN Excitation ON/OFF	●	●	●	●	●
	IN Step Angle Select	●	–	–	–	–
	IN Speed Select	–	●	–	–	●
	IN Forward Rotation/ Reverse Rotation	●	●	●	●	●
	IN Instantaneous Stop/ Deceleration Stop	–	●	–	–	●
	OUT Alarm	●	●	●	●	●
	OUT Timing	●	●	●	●	●
	OUT MOVE	–	●	–	–	–

*Direct data operation is operation that overwrites the position and speed information each time.

Product Line — PKP Series Stepper Motors and DRLII Series Motorized Cylinders

	Type	Frame Size	Additional Function			
			Standard	With Encoder	With Electromagnetic Brake	With Adjusting Knob
2-Phase	**Standard Type** (Basic Step Angle: 1.8°/step)  Standard / With Encoder / With Electromagnetic Brake	20 mm (0.79 in.)	●	●	–	–
		28 mm (1.10 in.)	●	●	●	–
		35 mm (1.38 in.)	●	●	●	–
		42 mm (1.65 in.)	●	●	●	–
		50 mm (1.97 in.)	●	●	–	–
		56.4 mm (2.22 in.)	●	●	●	–
		60 mm (2.36 in.)*	●	–	–	–
		85 mm (3.35 in.)	●	–	–	–
	High-Resolution Type (Basic Step Angle: 0.9°/step)  Standard / With Encoder / With Electromagnetic Brake	42 mm (1.65 in.)	●	●	●	–
		56.4 mm (2.22 in.)	●	●	●	–
	Flat Type (Basic Step Angle: 0.018 to 1.8°/step)  Standard / With Harmonic Gear	42 mm (1.65 in.)	●	–	–	–
		60 mm (2.36 in.)	●	–	–	–
		51 mm (2.00 in.)	With Harmonic Gear			–
		61 mm (2.40 in.)	With Harmonic Gear			–
	SH Geared Type (Basic Step Angle: 0.05 to 0.5°/step)  Standard / With Encoder	28 mm (1.10 in.)	●	–	–	–
		42 mm (1.65 in.)	●	●	–	–
		60 mm (2.36 in.)	●	●	–	–
		90 mm (3.54 in.)*	●	–	–	–
	CS Geared Type (Basic Step Angle: 0.09 to 0.36°/step)  Standard	42 mm (1.65 in.)	●	–	–	–
5-Phase	**Standard Type** (Basic Step Angle: 0.72°/step)  Standard / With Encoder	20 mm (0.79 in.)*	●	●	–	–
		28 mm (1.10 in.)	●	–	–	–
		42 mm (1.65 in.)	●	●	–	–
		56.4 mm (2.22 in.)	●	●	–	–
		60 mm (2.36 in.)	●	●	–	–
		85 mm (3.35 in.)*	●	–	–	–
	High-Resolution Type (Basic Step Angle: 0.36°/step)  Standard	42 mm (1.65 in.)	●	–	–	–
		60 mm (2.36 in.)	●	–	–	–
	TS Geared Type (Basic Step Angle: 0.024 to 0.2°/step)  Standard	42 mm (1.65 in.)	●	–	–	–
		60 mm (2.36 in.)	●	–	–	–
	DRLII Series  Standard / With Electromagnetic Brake / With Adjusting Knob	20 mm (0.79 in.)	●	–	–	●
		28 mm (1.10 in.)	●	–	–	●
		42 mm (1.65 in.)	●	–	●	●
		60 mm (2.36 in.)	●	–	●	●

*Conventional **PK** Series.

● About Electromagnetic Brakes

- The electromagnetic brake is a non-excitation operation type, so while it is useful for holding loads while stopped, it is not a mechanism intended to reliably hold loads. Do not use as a safety brake. Wait until the motor has stopped when using the electromagnetic brake to hold a load.
- The **CVD** Series does not have a function to control electromagnetic brakes. The system to control the electromagnetic brake must be prepared by the customer.

The **CVD** Series drivers developed exclusively for the **PKP** Series stepper motors enables increased performance and functionality.

Features of the **CVD** Series

Industry's Top, Compact, High Performance Driver

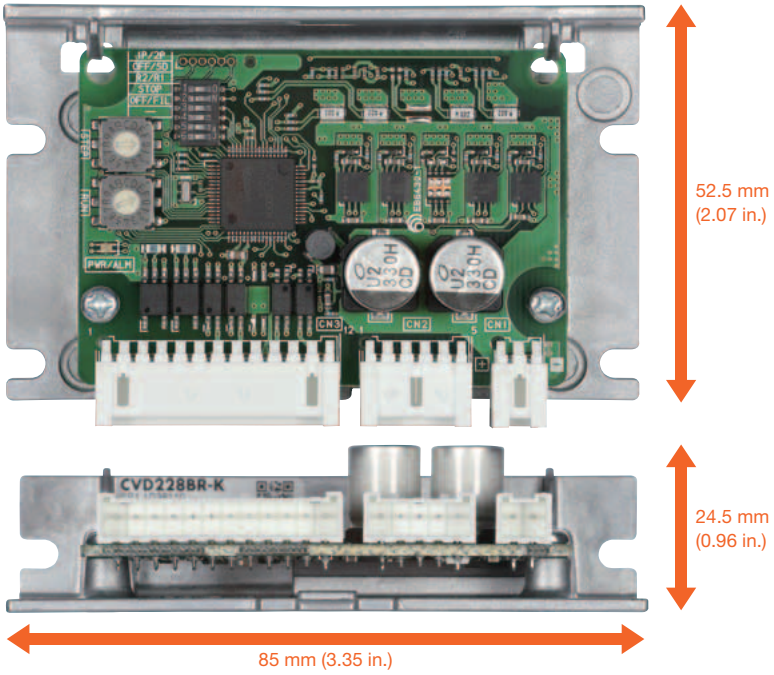
These compact and lightweight drivers contribute to saving space. The 2-phase and 5-phase drivers are identical in size, installation and I/O connectors. This allows for the selection and evaluation of 2-phase or 5-phase drivers based on the required specifications.

- A 2-phase driver and 5-phase driver cannot be used together. Different phases require dedicated drivers.

Actual Size

Mass 20 g (0.71 oz) to 70 g (2.47 oz)

(Differs according to the driver type.)



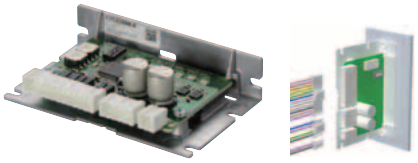
Select Drivers by Mounting Method

Drivers with different shapes and connector locations are available to match the mounting method.

- Available for both 2-phase and 5-phase.

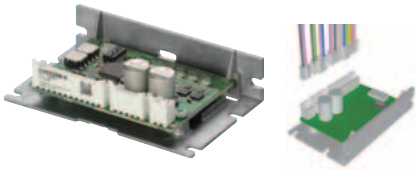
Right Angle Type with Installation Plate

The connector points outward.



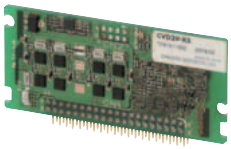
With Installation Plate

The connector points upward.



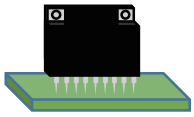
Board-Mount S Type

This is a board-mount type driver. For details, please contact your nearest Oriental Motor sales office.

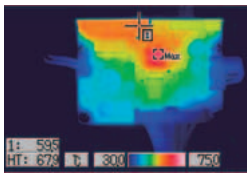


High-Efficiency Design

The **CVD** Series provides increased torque by increasing the output current compared to conventional products.
In order to allow the increase of output current, the design incorporates measures to reduce the amount of heat generated.



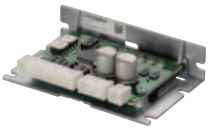
Conventional product or custom-built driver



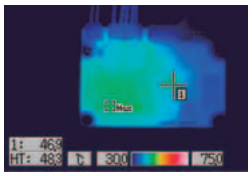
Thermographic driver heat distribution when operated under identical conditions

Lower Heat Generation

Increased Torque

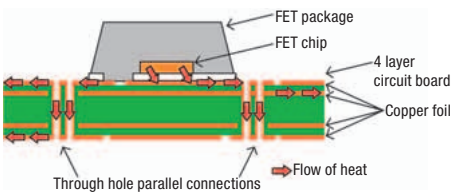


CVD Driver

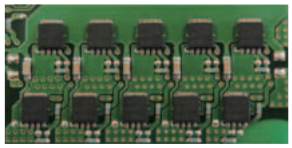


Thermographic driver heat distribution when operated under identical conditions

- Adoption of low-loss FET
- Pattern design that accounts of heat dissipation to the circuit board
- Adoption of FET with good heat dissipation properties



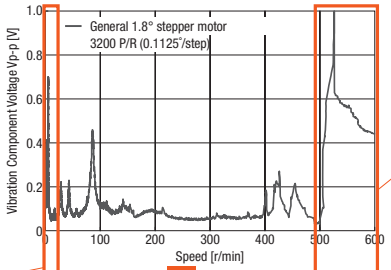
Cross section schematic view of FET and printed circuit board



Actual printed circuit board pattern

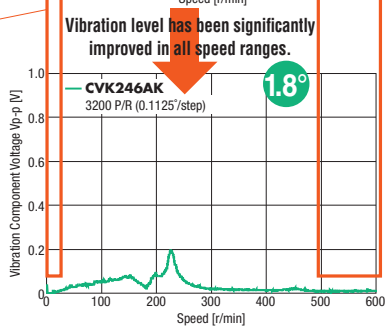
Low Vibration with Full-Time Microstepping

Low vibration and noise reduction have been achieved across all speed ranges by significantly improving the vibration level with the use of a fully digital-controlled full-time microstep driver. The **CVD** 5 phase driver and motor has further improved vibration characteristic.

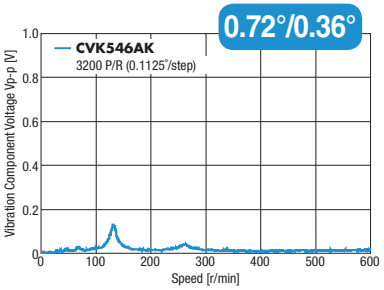


●Vibration Suppression Control
Common vibration that occurs in the mid-speed range has been suppressed. This enables more stable torque characteristics.

●Reduced Step Vibration
The new smooth drive control with higher current control increases the basic step angle to a maximum resolution of 2048. As a result, a reduction in step vibration in the low-speed range is achieved.



CVD/PKP
Vibration characteristics for 0.72°/0.36° stepper motors have been further improved.



For High Positioning Accuracy Use a 0.72°/0.36° Stepper Motor

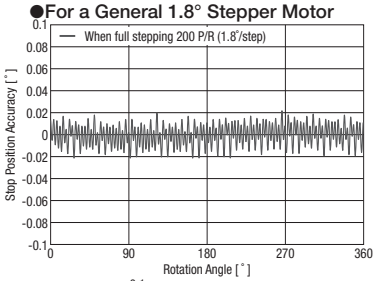
In general, stopping accuracy tends to be lower during microstep operation* than full step operation and this effect is more noticeable in a 1.8° motor. In this situation, using a **CVD** 5 phase driver and motor enables a higher positioning accuracy.

*Max. resolution 125000 P/R

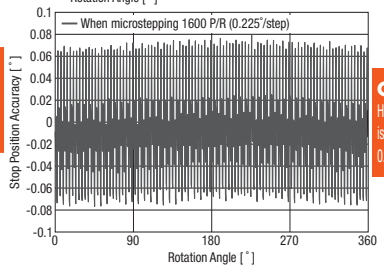
●Stopping Accuracy

0.72° stepper motor standard type	±0.05° (±3 min)
0.36° stepper motor high-resolution type	±0.034° (±2 min)

●For a General 1.8° Stepper Motor

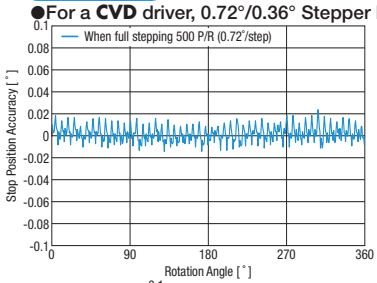


Microstepping reduces stopping accuracy.



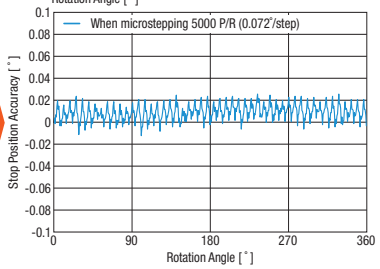
0.72°/0.36°

●For a **CVD** driver, 0.72°/0.36° Stepper Motor



Microstepping does not reduce stopping accuracy.

CVD/PKP
High positioning accuracy is now possible with 0.72°/0.36° stepper motors



There's a Wide Choice with 1.8° and 0.72°/0.36° Stepper Motors

The size, installation and I/O connectors for the **CVD** drivers and 1.8° or 0.72°/0.36° motors are the same. Because of this, it is easy to evaluate and select the proper package for the requirement.

*The driver for a 1.8° stepper motor and the driver for a 0.72°/0.36° stepper motor are not interchangeable. Each motor type has a dedicated driver. Use the Step Angle Setting Switch to set the proper resolution without changing your controller's pulse output.

CVD Drivers

CVD 1.8°
1.8° can be used for devices that require high torque at low speed.

Advantage of Selection
- ●Common platform design
- ●Optimum performance characteristics
- ●Guaranteed performance

CVD 0.72°/0.36°
0.72°/0.36° can be used for devices that require low vibration, high speed and high positioning accuracy.

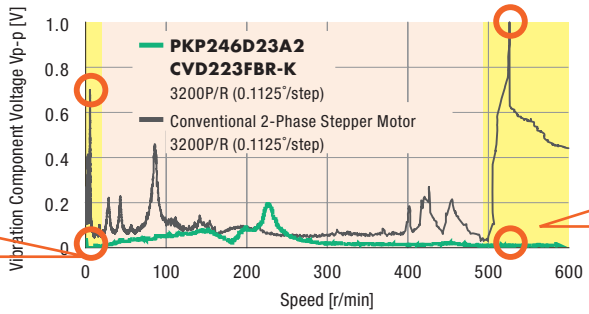
Device Advantages
Improved motion functionality and performance throughout.

Low Vibration Achieved by Full-Time Microstep Drive

The **CVD** Series is a fully digital control driver. Currents are controlled digitally and calculated by a high-performance CPU.
The waveform of the current for each phase is changed from the conventional trapezoidal to sinusoidal, which allows for micro-step driving in all speed regions, and has reduced vibration even more.

Reduction in Step Vibration

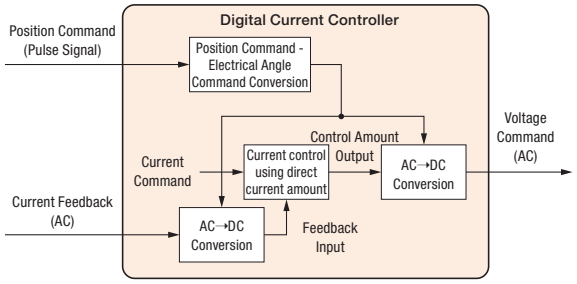
The new smooth drive control with its increased current control resolution allows the basic step angle to be divided into a max. of 2048 microstep angles. This has greatly reduced the step vibration at low speeds.



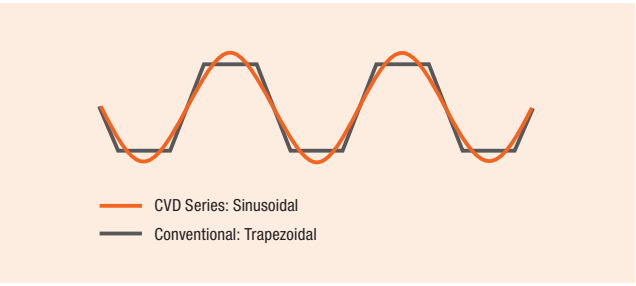
Vibration Suppression Control

Vibration in the medium speed regions, which generally occurs regardless of the number of phases and the drive system type, has been suppressed. This stabilizes the torque characteristics and allows the motor to operate at high speeds without mis-stepping.

■ Digital Current Controller Mechanism



■ Illustration of Motor Current Waveform

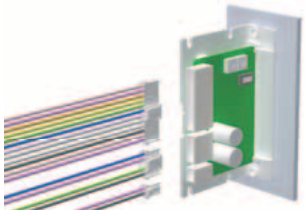


Select the Type that Best Suits the Mounting Method

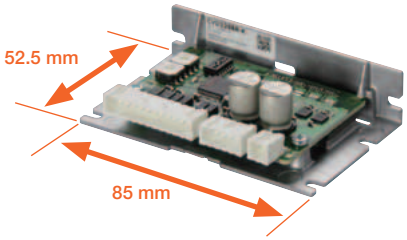
Different driver shapes and connection methods are available to meet a wide range of mounting locations.

Example — Driver is Mounted Vertically

The connectors point out from the side of the board. Oriental Motor also provides DIN rail mounting hardware and circuit covers (for pulse input type) as peripheral equipment.
Refer to the peripheral equipment page for details.

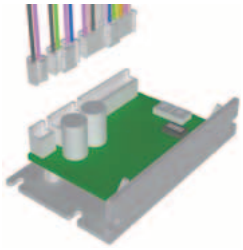


With Installation Plate
Right Angle

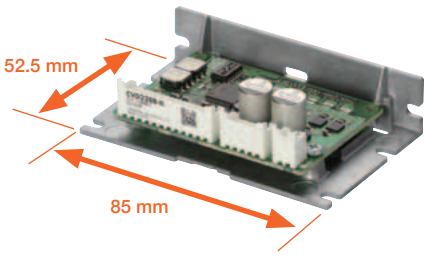


Example Driver is Mounted Horizontally

The connector points upward from the board.

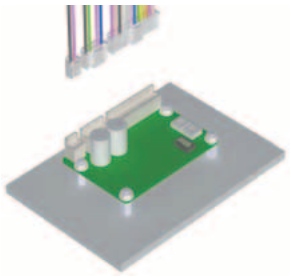


With Installation Plate

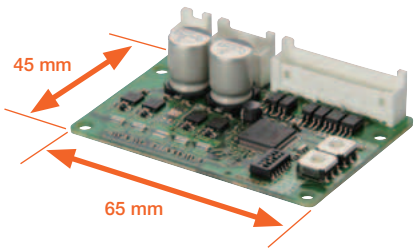


Example Driver is Mounted Horizontally on an Installation Plate

The connector points upward from the board. This type has no installation plate.



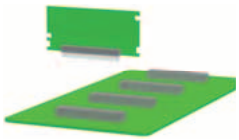
Without Installation Plate

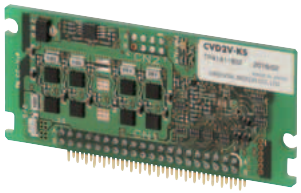


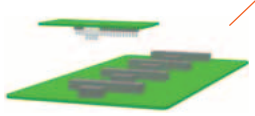
Example Driver Mounted to Printed Circuit Board

This type can be implemented into custom-made printed circuit boards. Both vertical mount and horizontal mount types are available.

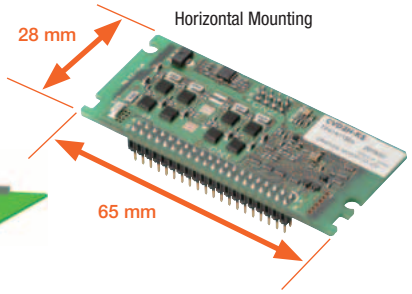
Vertical mounting







Horizontal Mounting



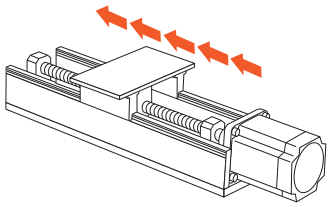
CVD Series **S** Type

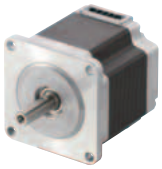
Number of Phases	Product Name				List Price
	I/O Setting		SPI Communication Setting		
	Horizontal mounting	Vertical mounting	Horizontal mounting	Vertical mounting	
2-Phase	**CVD2H-K**	**CVD2V-K**	**CVD2H-KS**	**CVD2V-KS**	$130.00
5-Phase	**CVD5H-K**	**CVD5V-K**	**CVD5H-KS**	**CVD5V-KS**	$140.00

A motor that Matches the Desired Specifications can be Selected from a Wide Range of Speed and Torque Variations

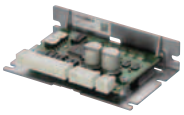
Example — Inching Operation Over Short Distances

For applications that require rapid acceleration and deceleration,
2-phase stepper motors with high torque at low speeds are recommended.



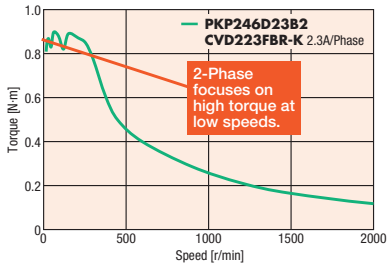


2-Phase Stepper Motor
PKP Series



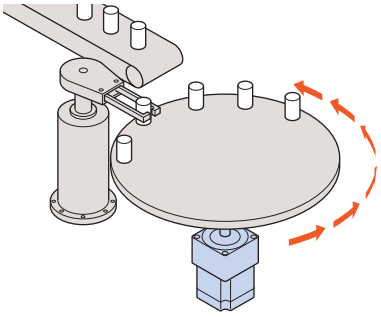
2-Phase Driver
CVD Series

■ High torque at low speeds

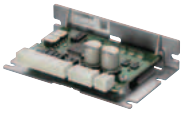


Example — Inching Operation Over Short Distances with Large Amount of Inertia

For applications that require rapid acceleration and deceleration with large amounts of inertia, 2-phase stepper motors with geared motors are recommended

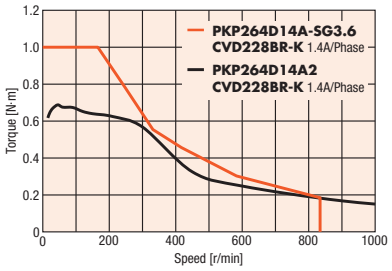


2-Phase Stepper Motor
PKP Series
SH Geared Type



2-Phase Driver
CVD Series

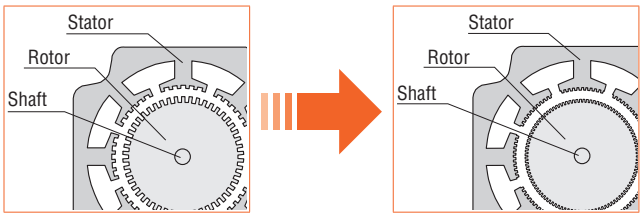
■ Comparison of Speed – Torque Characteristics



More powerful 5-phase **RKII** Series stepper motors (AC input type) are also available.

Example — Improved Stopping Accuracy 0.9°, High Resolution **PKP** Series

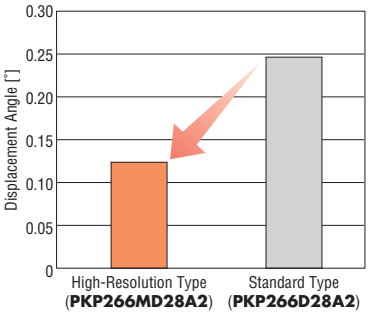
Increased Resolution (400 p/rev). The number of rotor teeth has doubled to 100 compared to 50 with the standard type. As a result, the basic step angle becomes 0.9˚/step, which is half that of the standard type.



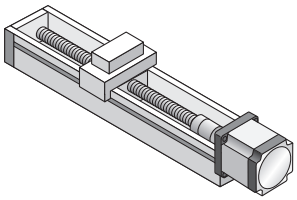
Standard Type (50 teeth)　　High-Resolution Type (100 teeth)

◇**Comparison of Displacement Angles Due to Frictional Load (Reference values)**

Frictional load 0.3 N·m (42.4 oz-in)

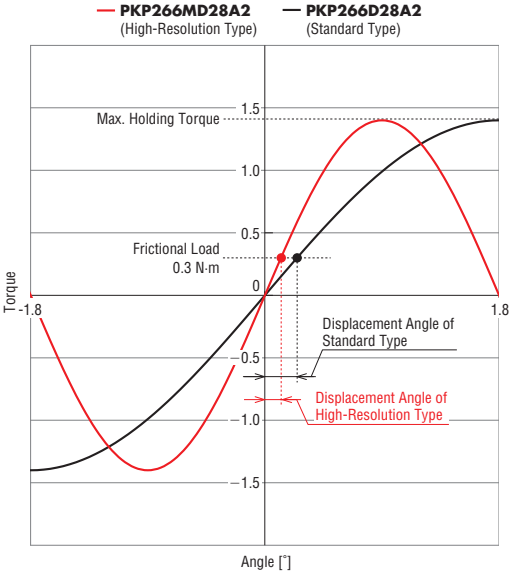


Example: Frictional load is constantly applied with a ball screw mechanism to the motor due to the guide block and guide rail.



The stopping accuracy improves as the torque increases while minimizing the negative effect of the frictional load.

Comparison of Angle – Torque Characteristics

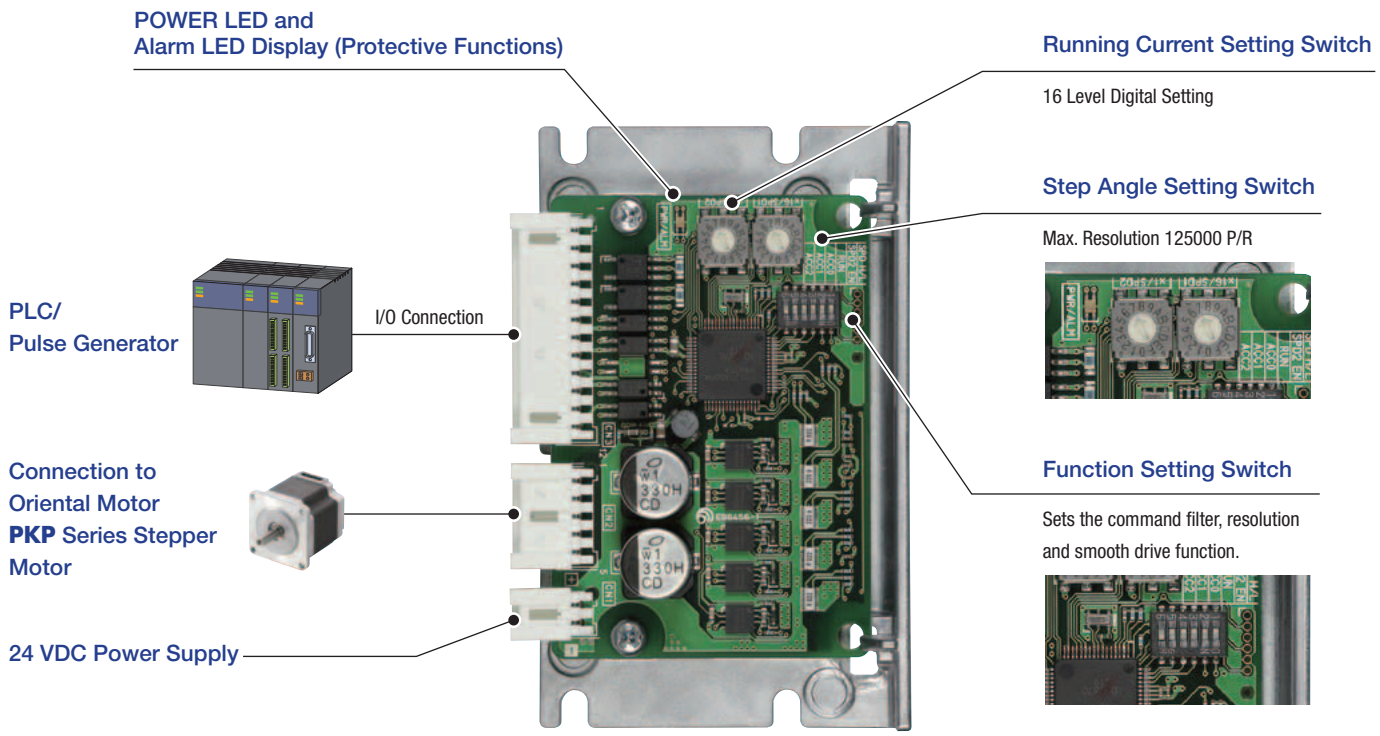


Stepper Motor Driver

CVD Series Pulse Input Type

This driver meets the need for easy synchronized operation with pulse input type drivers.

Names and Functions of Driver Parts



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–)	
	AWO+	Stops motor excitation.
	AWO–	
	CS+	Switches the step angle.
	CS–	
Output Signals	ALM+	Outputs the alarm status for the driver (normally closed).
	ALM–	
	TIM+	Output when the excitation state of the motor is step "0".
	TIM–	

For details of motor and driver combinations, refer to individual catalogs or the Oriental Motor website.

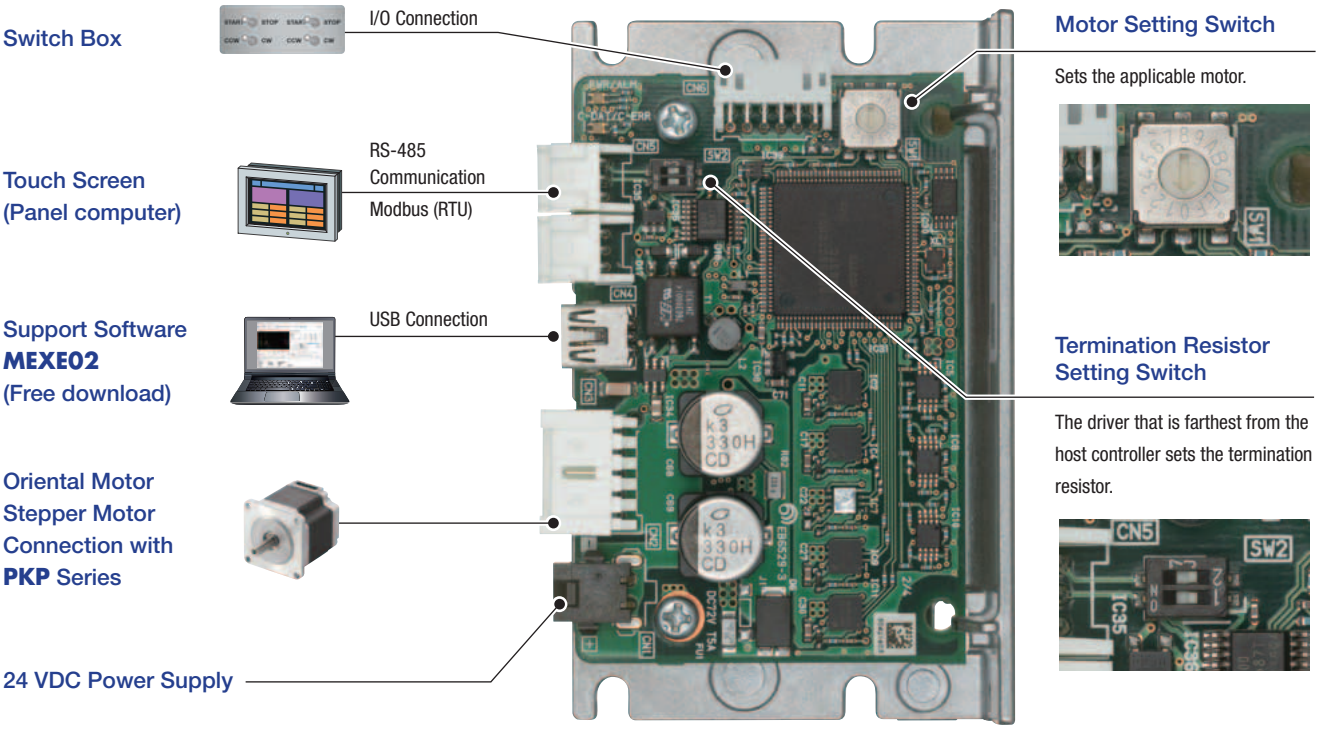
Compatible with the Modbus (RTU) Protocol.

Stepper Motor Drivers

CVD Series RS-485 Communication Type

Movement with Modbus (RTU) control?
Simple data setting with touch screen?
These drivers meet those needs.

Names and Functions of Driver Parts



Modbus (RTU)

- RS-485 communication, operation data and parameters can be set, and operation commands can be input.
- The protocol is compatible with Modbus (RTU), allowing for easy control from a PLC, etc.

Max. 31 Axes

- Up to 31 axes can be connected to one host control device.
  (Total extension distance: 10 m (32.8 ft) or less)

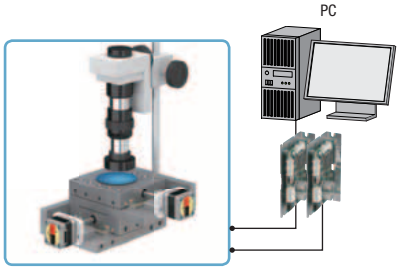
Pulse Generator Not Needed

- Operation data and parameters can be set, allowing for selected positioning operation.
  (Operation data settings: 256)
- RS-485 communication also supports direct data operations for writing position and speed data.

Movement Examples

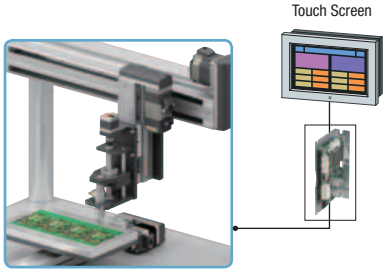
Movement from PC

Control the motor with RS-485 communication from a PC with imaging software



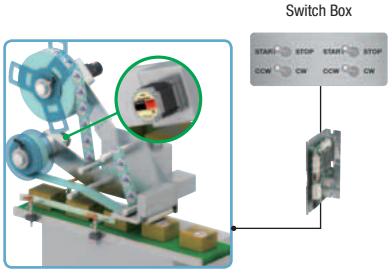
Movement from Touch Screen

End effect is also controlled from the touch screen along the X, Y, and Z axes



Movement by Switching a Switch

Easy control, just by switching a switch



Simple Editing and Setting of Operation Data and Parameters

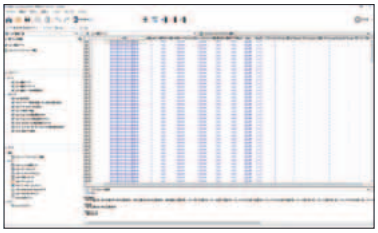
Support Software **MEXE02**

Basic settings, such as operation data editing and parameter settings, can be easily made from a computer.
Sequence control is also possible, making simple system configuration possible without a host sequence.
The support software can be downloaded from the Oriental Motor website.

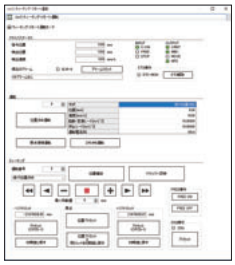
Popular for being easy to handle, even if you're not an electrical designer!

The program can be simplified with easy sequence functions

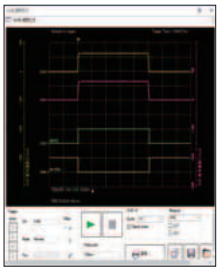
Settings can be copied and backed up



Easy to understand, easy to use
Intuitive operability



Teaching is also possible from a computer



Comes with a waveform monitor to check signal input conditions

Contributes to Visualization

Comes with a monitoring function that contributes to visualization.
See the operating manual for details.

Series Name / Type		**CVD** Series RS-485 Communication
Monitoring	Position	○*
	Speed	○*
	Driver temperature	○
	Travel distance Cumulative travel distance	○
Information	Driver overheat	○
	Travel distance Cumulative travel distance	○
Alarm	Driver overheat	○

*Only command values can be monitored

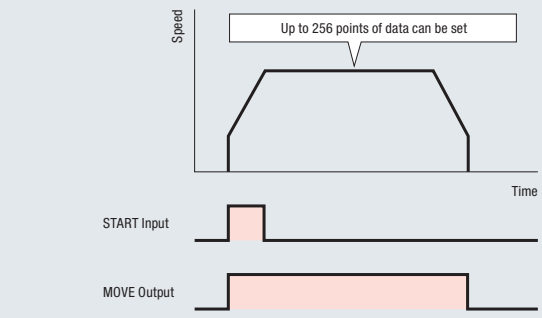
Check individual catalogs and the website for details about motor and driver combinations.

Pulse Generator not Needed

The RS-485 communication type can set operation data in the driver, allowing for operation data to be selected and executed from a host. Operation data can also be linked.

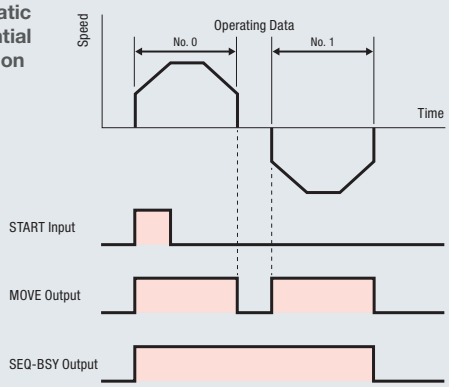
Operating Pattern

■ Positioning SD operation



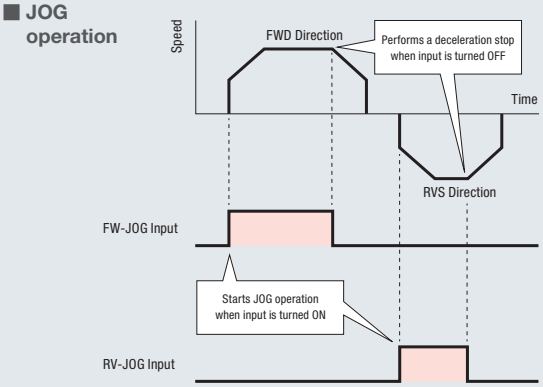
Performs trapezoidal drive from the present position to the target position by setting the motor's operating speed, position (travel amount), etc. in the operation data.

■ Automatic sequential operation



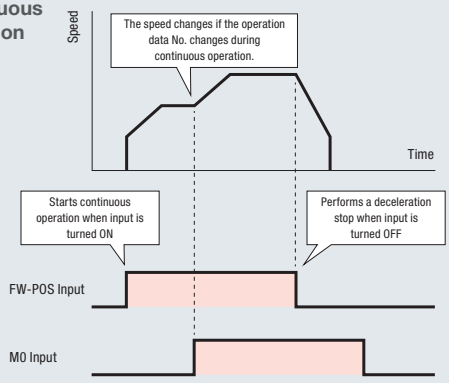
Automatically executes two or more operations sequentially. Once one operation ends, it stops for the “drive-complete delay time”, after which operation of the operation data set in the “next data number” commences. If operation data with “no link” set is generated partway through, positioning SD operation is performed up to that operation data, then the motor stops.

■ JOG operation



Continuously operates the motor while the input signal is ON. Performs a deceleration stop when the input signal is turned OFF.

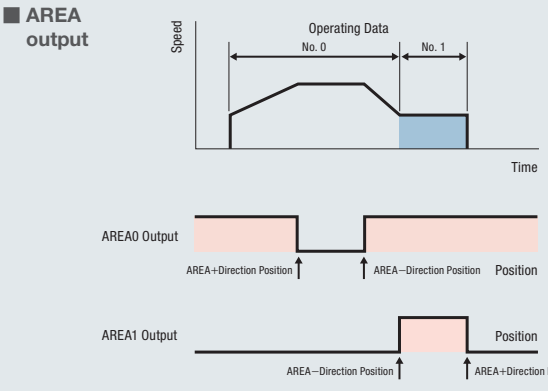
■ Continuous operation



Continuously operates the motor while the input signal is ON. The speed changes if the operation data number changes during continuous operation. The motor performs a deceleration stop when the input signal is turned OFF.

Output Signals

■ AREA output



AREA output turns ON when the motor’s position is within the area range set for each operation data. Check “AREA range setting mode” in the operating manual for setting details.

Many I/O Signals

The main I/O signals of the RS-485 communication type are described here. See the operating manual for details about all I/O signals.

	Signal Name	Function
Input Signals	AWO	Interrupts the motor current and places it into a non-excitation state. (Non-excitation when ON)
	STOP	Stop the motor.
	ALM-RST	Resets the alarm.
	P-PRESET	Executes the position preset.
	FW-BLK	Stops operation in the FWD direction.
	RV-BLK	Stops operation in the RVS direction.
	FW-LS	Inputs a limit sensor in the FWD direction (external sensor).
	RV-LS	Inputs a limit sensor in the RVS direction (external sensor).
	HOMES	Inputs a mechanical home sensor (external sensor).
	SLIT	Inputs a slit sensor in the RVS direction (external sensor).
	START	Executes a positioning SD operation.
	SSTART	Executes a positioning SD operation. Executes the next data number operation during manual sequential operation.
	HOME	Execute the return-to-home operation.
	FW-JOG	Executes a JOG operation in the FWD direction.
	RV-JOG	Executes a JOG operation in the RVS direction.
	FW-POS	Executes a continuous operation in the FWD direction.
	RV-POS	Executes a continuous operation in the RVS direction.
	M0~M7	Uses 8 bits to select the operation data No.
	R0~R7	General purpose signals.
Output Signals	CONST-OFF	Output function is not used.
	ALM-A	Outputs the driver alarm status (normally open).
	ALM-B	Outputs the driver alarm status (normally closed).
	READY	Output when driver operation preparations are complete.
	MOVE	Output when the motor is operating.
	VA	Output when the operating speed reaches the target speed. (Command speed reference)
	CRNT	Output when the motor is excited.
	AUTO-CD	Output when in an auto current cutback state.
	HOME-END	Output when a return-to-home operation finishes and the position preset is executed.
	ABSPEN	Output when the coordinates are fixed.
	PLS-OUT	50 pulses are output for every rotation of the motor output shaft.
	FW-SLS	Output when the FWD direction software limit is reached.
	RV-SLS	Output when the RVS direction software limit is reached.
	TIM	Output every time the motor output shaft rotates 7.2° from home.
	AREA0	Output when the motor is in the area. (Command position reference)
	AREA1	Output when the motor is in the area. (Command position reference)
	SEQ-BSY	Output when a positioning SD operation is performed.
	DELAY-BSY	Output when the driver is in a standby state (Drive-complete delay time, Dwell).
	DCMD-RDY	Output when direct data operation preparations are complete.
	INFO-DRVTMP	Output when the conditions set in “Driver temperature information” are satisfied.
	INFO-OVOLT	Output when the conditions set in “Overvoltage information” are satisfied.
	INFO-UVOLT	Output when the conditions set in “Undervoltage information” are satisfied.
	INFO-START	Output when an “Operation start failure” occurs.
	INFO-PR-REQ	Output when either the position present or the return-to-home operation preset is executed.
	INFO-MSET-E	Output when a “Motor setting error” occurs.
	INFO-NET-E	Output when an “RS-485 communication error” occurs.
	INFO-FW-OT	Output when a “Forward direction operation prohibited” occurs.
	INFO-RV-OT	Output when a “Reverse direction operation prohibited” occurs.
	INFO-TRIP	Output when the motor output shaft’s total amount of rotation (command position reference) satisfies the conditions set in “TRIP information”.
	INFO-ODO	Output when the motor output shaft’s cumulative amount of rotation (command position reference) satisfies the conditions set in “ODO information”.
	INFO-DSLMTD	Output when “Operation startup restriction mode” occurs.
	INFO-IOTEST	Output when “I/O test mode” occurs.
	INFO-CFG	Output when “Configuration required” occurs.
	INFO-RBT	Output when “Reboot required” occurs.

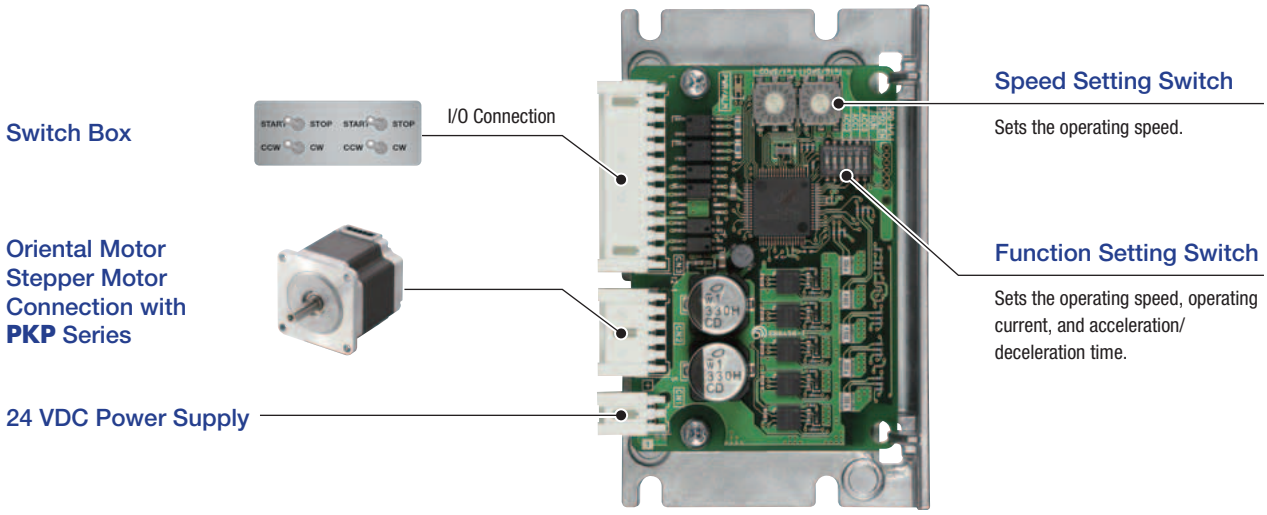
Easy control with speed control motor sensing.

Stepper Motor Drivers

CVD Series SC Type

Simple speed control with a stepper motor.
Suppression of stop position variation in constant speed motors.
These drivers meet those needs.

Names and Functions of Driver Parts

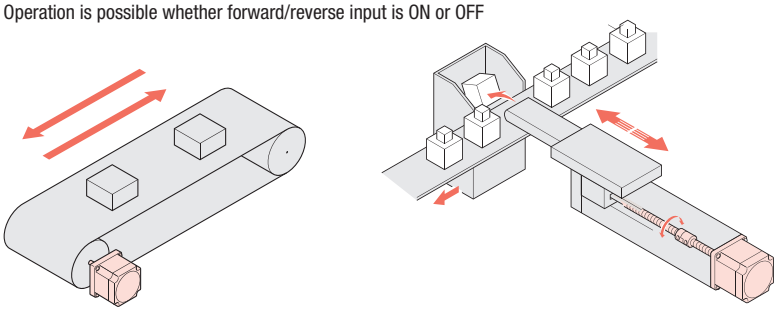


Simple Speed Control

This product continues to rotate at the setting speed while forward (reverse) input is ON, but instantly stops when the input is OFF. Various operations can be achieved from the PLC depending on the length of time the forward (reverse) input is ON.

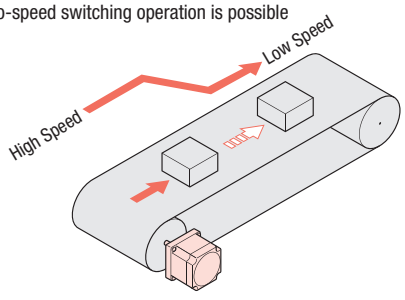
Back-and-forth operation

Operation is possible whether forward/reverse input is ON or OFF



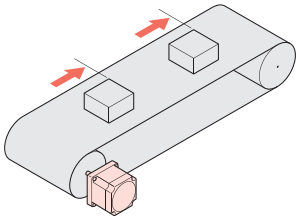
Two-speed switching operation

Two-speed switching operation is possible



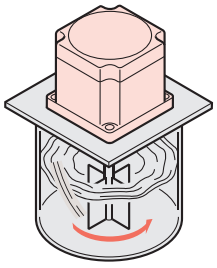
Regular feed operation

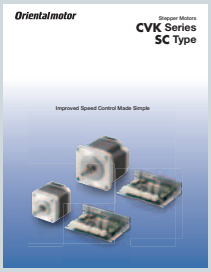
Operation is possible whether forward input is ON or OFF



Smooth low speed operation

The speed range is 0.02 r/min to 600 r/min





Check individual catalogs and the website for details about motor and driver combinations.

Contributes to Cost Reduction, Simple Control, and Improved Stopping Accuracy in Speed Control

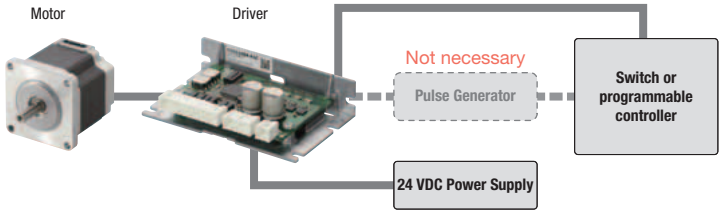
Using Stepper Motors

These motors are the answer to demands like keeping costs down with simple operations, and having a position holding function while stopped.

Pulse Generator Not Needed

Direct data can be set in the driver, so control is possible without a pulse generator.

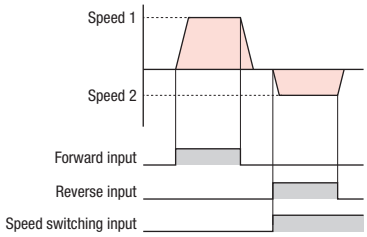
Direct settings with a driver switch
- Operating speed (0.02 r/min~600 r/min)
- Acceleration/deceleration time (0.00 s~3.00 s)
- Operating current (100% or 70%)



Back-and-Forth Operation Achieved with Only Three Input Signals

The operating speed and rotation direction can be switched externally.

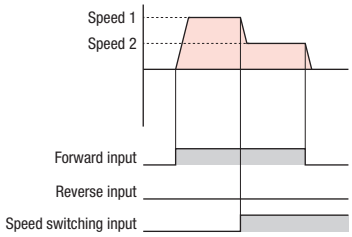
■ Back-and-forth operation



Two Speeds can be Set

The speed can even be switched during driving.

■ Two-speed switching operation



The Position is Also Held When Stopped

Because stepper motors supply current to the motor even when stopped, the position can be held.

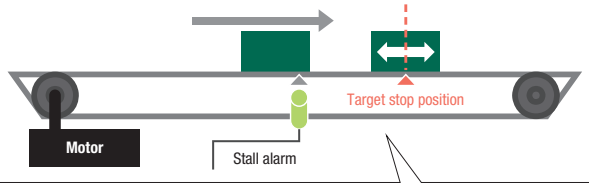
Using Constant Speed Motors and Inverters

Using a Stepper motor vs other motor types can improve stop position variation and sensor stopping accuracy.

Improved Stop Position Reproducibility

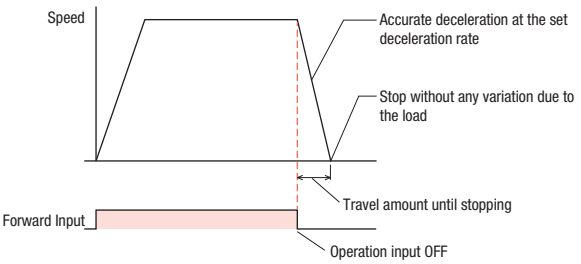
Because the travel amount is constant from the time the operation input is turned OFF until stopping, stop position reproducibility is improved.
This allows the time needed to adjust the stall alarm's position to be reduced.

■ When the alarm is stopped with a belt conveyor



- Difficult to adjust the position of the alarm to get close to the intended stop position
- Variation in stop position due to weight of load

■ Travel amount from the time the operation input is turned OFF until stopping



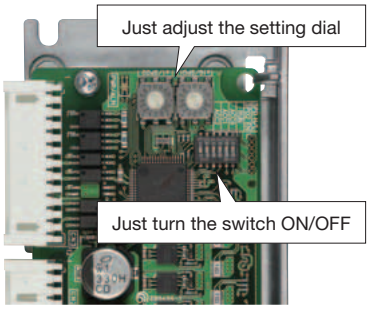
Easy Settings

Three types* of operation settings.

■ Setting Item

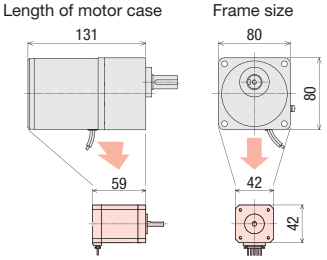
Set the operating speed
↓
Set the acceleration/ deceleration time
↓
Set the operating current

*Settings are not needed if the initial setting values are used



Also Reduces the Motor Space

Motor downsizing is achieved with the same rotation speed and torque as an induction motor.



(Unit: mm)

Induction motor

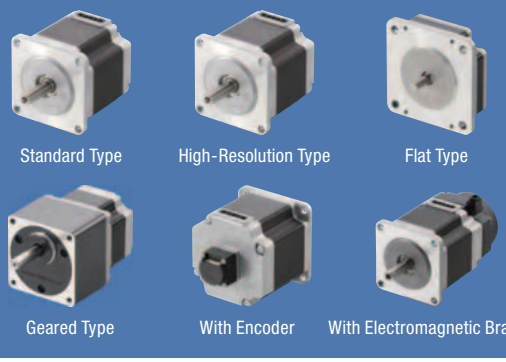
Output 25 W, Gear ratio 3
Mass: 2.45 kg
Torque: 0.39 N·m

CVD Series SC Type

PKP546N18A2
Mass: 0.49 kg
Torque: 0.5 N·m

Stepper Motor
PKP Series

A wide variety of products is available for selecting the optimal motor that needs your design specifications.



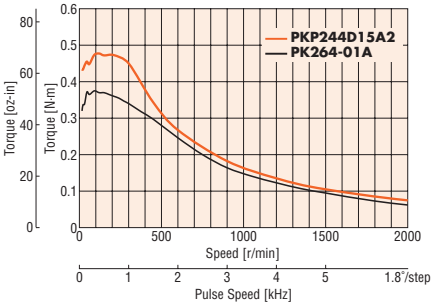
The **PKP** Series is smaller, has higher torque, and has improved basic performance over the conventional model.
The product line can be incorporated into equipment with a variety of restrictions, such as the “Flat type” for extremely short motors, and the “High-resolution type” for motors resistant to frictional load.

Smaller

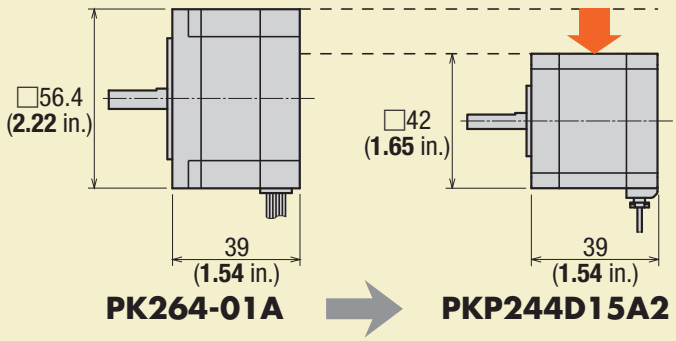
Contributes to more Compact Equipment

Use a **PKP** Series motor in place of a standard motor from the **PK** Series with the equivalent torque in order to downsize motors.

Torque Characteristics Comparison of
PKP244D15A2 and **PK264-01A**



Provides torque equivalent to the next larger frame size!

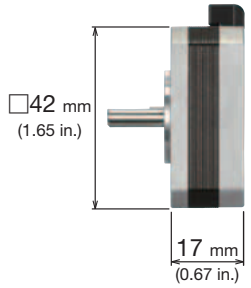


Flat Type, for Limited Space

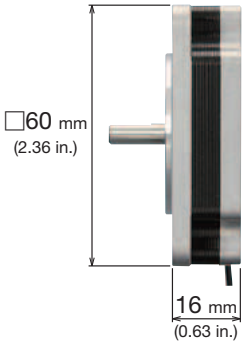
This is Oriental Motor's flattest type of 2-phase stepper motors.

●Flat and Lightweight Design

The motor can be installed in a narrow space.



Maximum Holding Torque: 0.1 N·m (14.2 oz-in)
Mass: 0.11 kg (0.24 lbs)



Maximum Holding Torque: 0.18 N·m (25.5 oz-in)
Mass: 0.2 kg (0.44 lbs)

●With Harmonic Gears

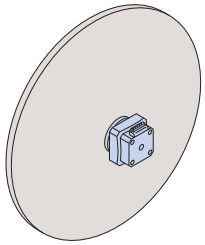
◇Attach the load to the surface of the flange to fix the load.

Example: Frame size 51 mm (2.01 in.)

Gear ratio 100
Max. holding torque: 2.4 N·m (339 oz-in)
Mass: 0.32 kg (11.3 oz)

◇Capable of Large Inertial Driving.

Example: Frame size 51 mm (2.01 in.)



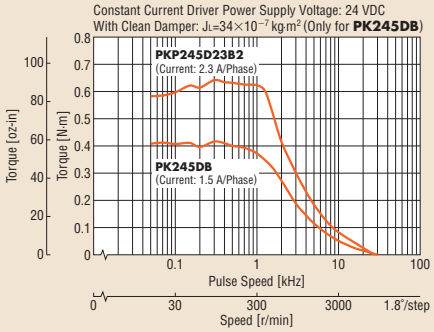
Inertia 0.12 kg·m^2 (2.84 lb-ft^2)
(Approximately 7 times the rotor inertia)
Inertial load: Diameter 0.35 m (13.8 in.),
Thickness 0.01 m (0.39 in.)
Mass 7.6 kg (268 oz),
Material iron
Motor: Length 17 mm (0.67 in.)
Gear ratio 100

Increase Torque Over the Entire Speed Range, from Low to High

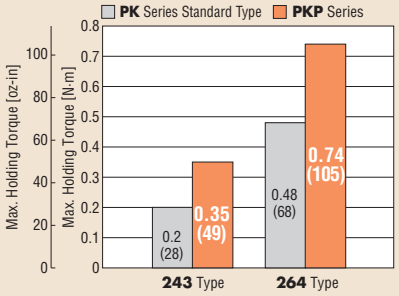
More Torque for Increased Performance

After revising the magnetic and structure design of the **PKP** Series, it produces much more torque than the standard **PK** Series motors of the same size. In addition, torque can be increased in the high-speed range by using high current motors.

Comparison of Speed – Torque Characteristics of the Same Size Motors



Comparison of Maximum Holding Torque



High current is possible due to the revised motor winding design and the highly efficient design of the drive circuit that can be combined. Increased torque over the entire speed range from low to high is achieved.

PKP Motors with Encoders or Brakes for more Application Support

●With Encoder

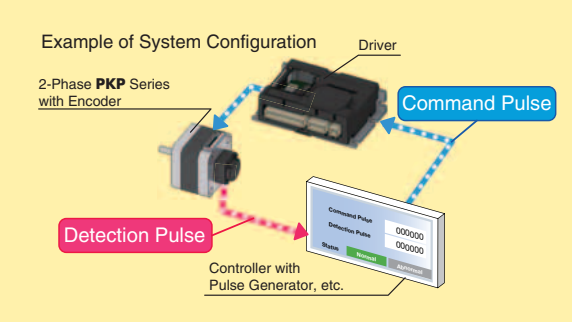
(Provided for standard type, high-resolution type, and **SH** Geared Type)

●Main Specifications

Type	Standard Type	High-Resolution Type, **SH** Geared Type
Resolution	200 P/R, 400 P/R	400 P/R
Output Signals	A phase, B phase, Z phase (3ch)	

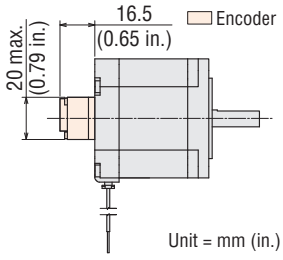
◇Motor Position Detection is Possible

Monitoring the current position and detecting positional errors is possible. For example, comparing the command position and current position enables you to check the normal operation of the motor.



◇Equipped with a Compact Encoder

●When frame size is 56.4 mm (2.22 in.)



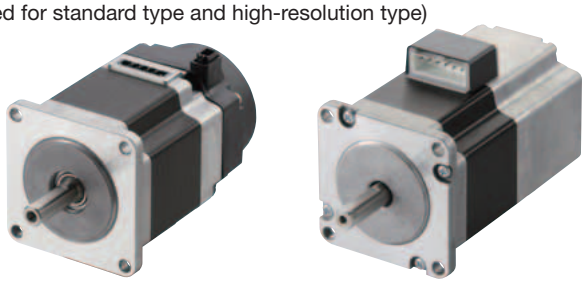
◇High Reliability with Line Driver Output Circuit Type

Noise resistance is improved by differential output, and the wiring distance can be longer than with the voltage output type.

●The cables, which are convenient for wiring with an encoder, are available, sold separately.

●With Electromagnetic Brake

(Provided for standard type and high-resolution type)



◇Position Can Be Held When the Power Is OFF or a Power Failure Occurs

This type features an electromagnetic brake that activates when the power is off.

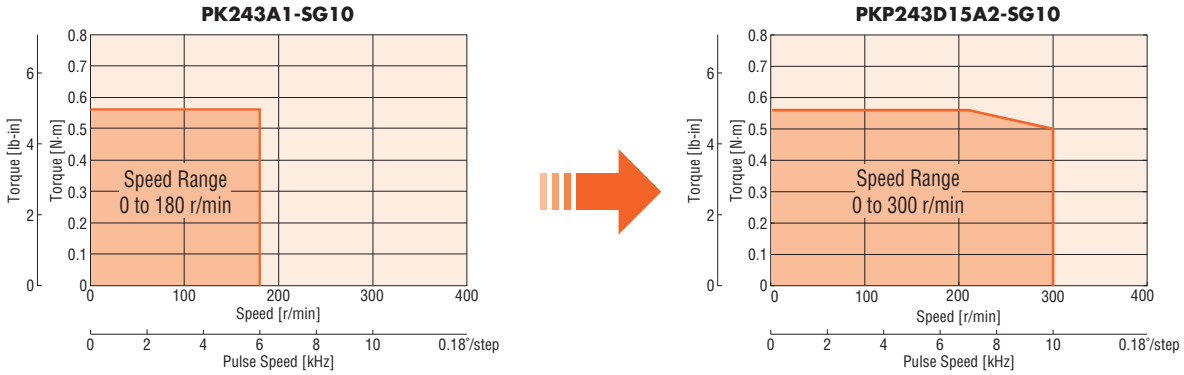
When the power is accidentally cut off due to a power failure or other unexpected event, the electromagnetic brake holds the load in position to prevent it from dropping or moving. Also, the load can be held by the electromagnetic brake when the motor is stopped, and the heat generated by the motor can be curtailed by switching the motor current off.

Geared Type

●SH Geared Type

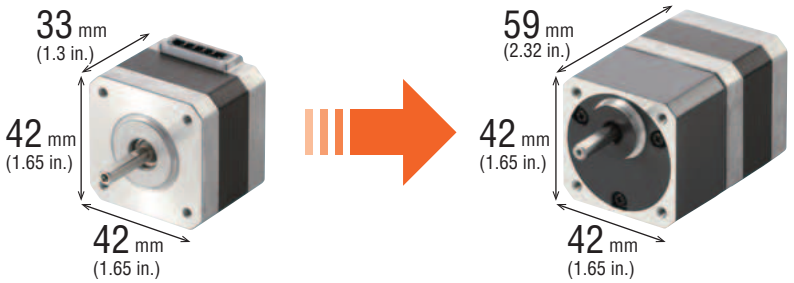
This type is well-suited for deceleration, increased torque, high resolution, and limited vibration.
It experiences less backlash than conventional products.

◇The Increased Speed Range Compared to Conventional Products



◇Increased Torque with the Same Motor Frame Size

With the **SH** Geared Type, torque can be increased without changing the motor frame size.
This is effective when motor installation space is limited and the frame size cannot be large.



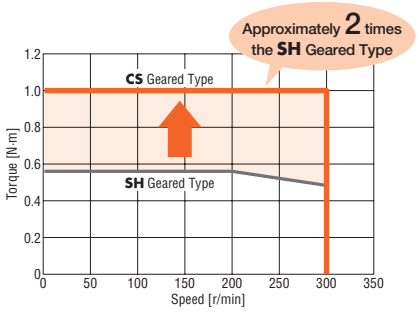
Standard Type	Motor Type	**SH** Geared Type
PKP243D15A2	Product Name	**PKP243D15A2-SG18**
0.35 N·m (49.5 oz-in)	Max. Holding Torque	**0.8 N·m (113.2 oz-in)**

●CS Geared type

The **CS** geared type has increased torque and a large shaft for greater loads without the requirement for a larger gear frame size.

◇Permissible Torque

Product Name: **PKP243** Rated Current: 2.3 A for Gear Ratio 10

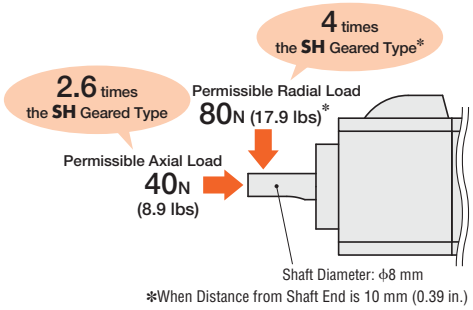


●Neugart Planetary **PLE** Geared Type

When more torque is required, consider the **PKP** Series with **PLE** Gearheads.

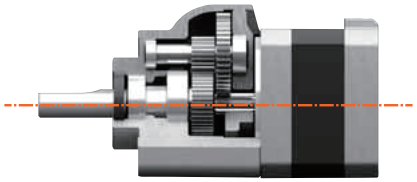
Visit the Oriental Motor website for more information.

◇Permissible Radial Load and Permissible Axial Load



*When Distance from Shaft End is 10 mm (0.39 in.)

- As shown in the structural drawing, by losing gears, the output shaft can be placed at the central axis.

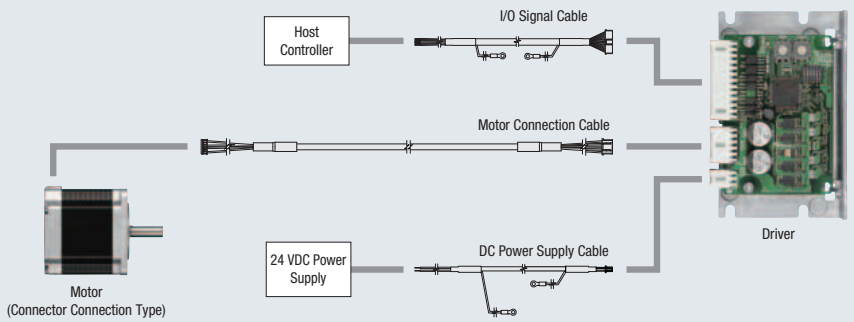


Gearhead Internal Structure Diagram

Peripheral Equipment

Oriental Motor has a wide range of peripheral equipment to ensure that you achieve the motion control system you want.

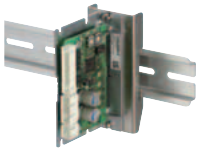
● 2-phase stepper motor **PKP** series and **CVD** series Example of pulse input type driver



Product Type		Product Name	List Price
Motor	2-phase stepper motor Connector connection type	**PKP264D28B2**	$57.00
Driver	With mounting plate Right angle	**CVD228BR-K**	$135.00
I/O Signal Cable	Connector type Length 1 m	**CC12D010-2**	$36.00
Motor Connection Cable	Connection cable Length 1 m	**CCM010V2AEF**	$25.00
DC Power Supply Cable	Connector type Length 1 m	**CC02D010-2**	$20.00
Circuit Product Cover	Pulse input type With mounting plate Right angle	**PADC-CVD**	$14.00
Mounting Brackets for Circuit Products	DIN rail mounting bracket	**MADP07**	$11.00

Circuit Product Cover

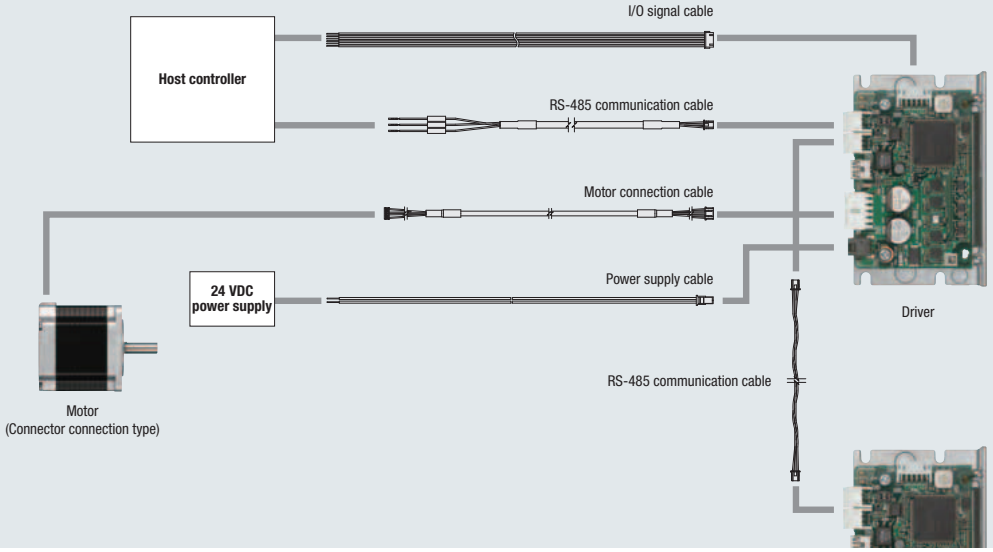
DIN Rail Mounting Bracket



✻The RS-485 communication type cannot be used.

For details, check the Oriental Motor website.
https://www.orientalmotor.com

● 2-phase stepper motor **PKP** series and **CVD** series Example of RS-485 communication type driver



Product Type		Product Name	List Price
Motor	2-phase stepper motor Connector connection type	**PKP264D28B2**	$57.00
Driver	With mounting plate Right angle	**CVD2BR-KR**	$190.00
RS-485 Communication Cable	For connection to host controller Length 3 m	**CC030-RS**	$23.00
RS-485 Communication Cable	For connection between drivers Length 0.15 m	**LH0015-RWN**	$10.00
Motor Connection Cable	Connection cable Length 1 m	**CCM010V2AEF**	$25.00
Power Supply Cable/ I/O Signal Cable Set	Connector type Length 1 m	**LHS010CC**	$14.00
Mounting Brackets for Circuit Products	DIN rail mounting bracket	**MADP07**	$11.00

Check individual catalogs and the website for details about cables.

Controller

Universal Controller

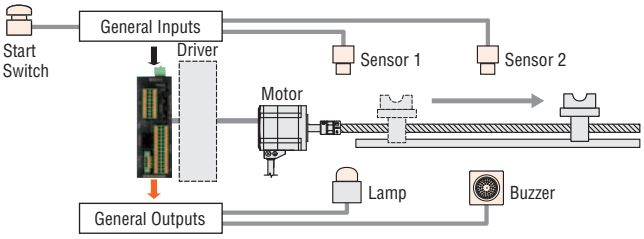
SCX11

The **SCX11** Universal Controller is a highly functional and sophisticated controller, equipped with program editing and execution functions. The **SCX11** is also able to control the motor via various serial ports such as USB, RS-232C and CANopen. Use the **SCX11** to support Oriental Motor's Pulse Input Type drivers.

Features

- 100 Sequence Programs can be Stored
- Stored Program with GUI
- USB Connection to PC
- Various Interfaces for Operation
- External Encoder Input

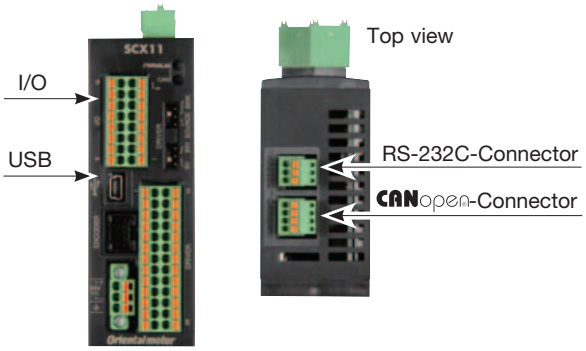
Stand Alone Operation Using Sensors and Switches



Product Line

Product Name	List Price
SCX11	$349.00

Various Interfaces for Operation



- Direct Command Operation via CANopen
- Operations Using a PC or PLC

Specifications are subject to change without notice. This catalog was published in Jan, 2021.

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