

Before Using a Stepping Motor

■ Precautions

1. Precautions for Installation

- Do not use in a place where there is flammable gas and/or corrosive gas.
- Products for use only in equipment of protection class. (**RK Series**)
- The motor and the driver must be properly grounded.
- When installing the motor into your equipment, ensure that the motor lead wires are fixed and do not move. In addition, do not apply any pressure to these lead wires.
- Installation must be performed by a qualified installer.
- Ensure the driver's terminal cover is attached before using.
- For the five-phase and two-phase 24 VDC stepping motor and driver packages and stepping motors alone, use a DC power supply with reinforced insulation for the primary side. Otherwise, there is a danger of electrical shock.

2. Precautions for Operation

- Always turn off the power to the driver before conducting checks or performing work on the product.
- The surface temperature of motors and drivers can exceed 70°C (depending on operation conditions). In case this product is accessible during operation, please attach the following warning label so that it is clearly visible.



Warning Label

- Do not touch these terminals while the power is ON. Contact could cause electric shock or fire.

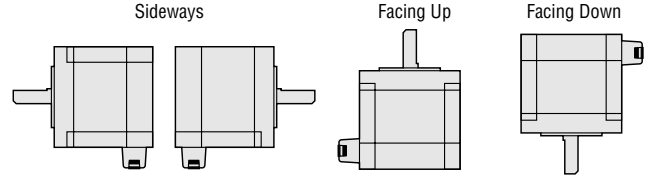
3. Precautions for Troubleshooting

- Refer to the troubleshooting section of the operation manual if the motor or driver is not functioning properly. If the problem cannot be corrected, contact your nearest Oriental Motor office. Do not disassemble the motor or driver.
- The driver incorporates double-pole/neutral fusing for the power input. If the driver POWER LED is OFF, it is possible that only the neutral fuse is tripped. High voltage supplied on the hot side may cause electric shock. Turn the power OFF immediately and request service.

■ Motor Installation

1. Direction of mounting

There are no restrictions on the direction of mounting, but motors are usually mounted sideways. They can also be mounted facing up or down. Regardless of how the motor is mounted, take care not to apply an overhung load or thrust load on the shaft.



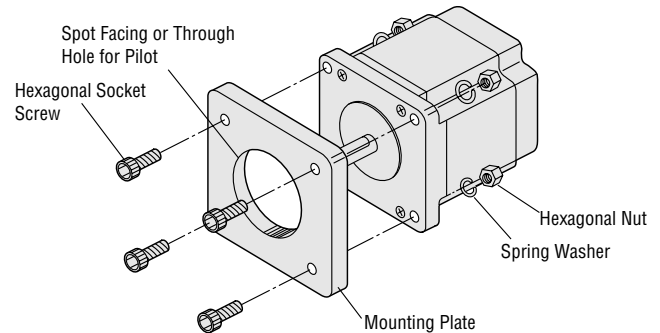
Note:

1. Do not disassemble the motors.
2. Do not apply any type of shock to the motor shaft.

2. Mounting

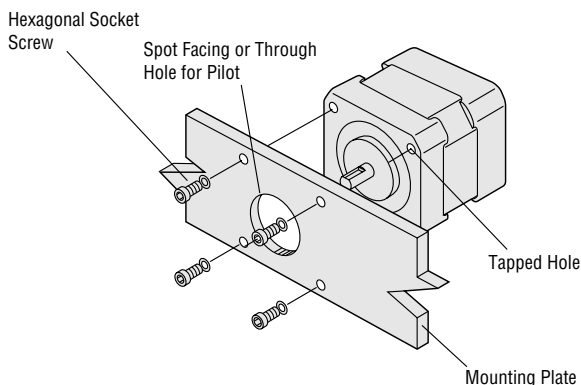
Mount the motor tightly against a metal surface with good thermal conductivity such as steel or aluminum. Secure the motor firmly using a hexagonal socket screw, nut, etc. Refer to the table below to determine the proper thickness of the mounting plate.

● Through Hole Type



Applicable Motor	Package Model	Minimum Thickness of the Mounting Plate
αSTEP	AS66 □ C, ASC66AK	5mm or more
	AS98AC	8mm or more
5-Phase	AS98 □ C-H	12mm or more
	RK56 □, RK56 □ AMC	5mm or more
	CSK56 □, RFK56 □	
	PK56 □	
	RK596 □, RK59 □ AMC	8mm or more
2-Phase	CSK59 □, PK59 □	12mm or more
	RK59 □-H	
	CSK26 □, CSK26 □ M	4mm or more
	PK26 □, PK26 □ M, PK26 □ J	8mm or more

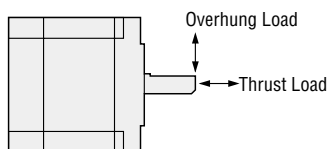
● Tapped Hole Type



Applicable Motor	Package Model	Minimum Thickness of the Mounting Plate
αSTEP	ASC3 □	3mm or more
	ASC46AK, ASC46AK-T	4mm or more
	AS66 □ C-T, ASC66AK-T	5mm or more
	AS66 □ C-P, AS66 □ C2-H	8mm or more
	AS98 □ C-T	8mm or more
5-Phase	AS98 □ C-P	12mm or more
	PMC3 □	2mm or more
	CSK54 □, CSK543TG	4mm or more
	PMC33MG, RFK54 □	
	PK54 □	5mm or more
	RK56 □-T, CSK564TG	8mm or more
	RK56 □-N, RK56 □-H	8mm or more
RK59 □-T	12mm or more	
2-Phase	RK59 □-N	12mm or more
	PK22 □ P, PK23 □ P, PK24 □ P	3mm or more
	CSK24 □, CSK24 □ M	
	PK24 □, PK24 □ M	
	CSK243SG, PK243SG, PK223P-SG	5mm or more
	CSK2645G, PK2645G	8mm or more
PK296SG	8mm or more	

3. Permissible Overhung Load and Permissible Thrust Load

Overhung loads and thrust loads that exceed the permitted values shorten bearing life and cause fatigue by repeated load on the output shaft. Keep overhung loads to within the permissible values of the tables below. Keep thrust loads below the weight of the motor used. (For geared types, see the motor's specifications.)



Permissible Overhung Load

● αSTEP

Package Model	Distance from shaft end (mm)				
	0	5	10	15	20
ASC3 □ AK	25	34	52	—	—
ASC46AK-T	10	14	20	30	—
ASC46AK	20	25	34	52	—
AS66 □ C, ASC66AK	63	75	95	130	190
AS98AC	260	290	340	390	480
AS66 □ C-T, ASC66AK-T	70	80	100	120	150
AS98 □ C-T	220	250	300	350	400
AS66 □ C-P5	200	220	250	280	320
AS66 □ C-P7.2, AS66 □ C-P10	250	270	300	340	390
AS66 □ C-P25, AS66 □ C-P36, AS66 □ C-P50	330	360	400	450	520
AS98 □ C-P5, AS98 □ C-P7.2, AS98 □ C-P10	480	540	600	680	790
AS98 □ C-P25	850	940	1050	1190	1380
AS98 □ C-P36	930	1030	1150	1310	1520
AS98 □ C-P50	1050	1160	1300	1480	1710
AS66 □ C2-H	320	370	440	550	720
AS98 □ C-H	1090	1150	1230	1310	1410

● 5-Phase Stepping Motor

Package Model	Distance from shaft end (mm)				
	0	5	10	15	20
PMC3 □	25	34	52	—	—
CSK54 □, RFK54 □, PK54 □	20	25	34	52	—
RK56 □, CSK56 □, RFK56 □, PK56 □	63	75	95	130	190
RK59 □, CSK59 □, PK59 □	260	290	340	390	480
PMC33MG	9.2	11.4	15	21.9	—
CSK543TG	10	14	20	30	—
RK564-T □, CSK564-TG	70	80	100	120	150
RK596-T □	220	250	300	350	400
RK566-N5	200	220	250	280	320
RK566-N7.2, RK566-N10	250	270	300	340	390
RK564-N25, RK564-N36, RK564-N50	330	360	400	450	520
RK599-N5	480	520	550	580	620
RK599-N7.2, RK599-N10	480	540	600	680	790
RK596-N25	850	940	1050	1110	1190
RK596-N36	930	1030	1150	1220	1300
RK596-N50	1050	1160	1300	1380	1490
RK564-H	320	370	440	550	720
RK596-H	1090	1150	1230	1310	1410

● 2-Phase Stepping Motor

Package Model	Distance from shaft end (mm)				
	0	5	10	15	20
PK22 □ P	25	34	52	—	—
CSK24 □, CSK24 □ M	20	25	34	52	—
PK23 □ P, PK24 □					
PK24 □ P, PK24 □ M					
PK26 □ J	50	60	75	100	150
CSK26 □, CSK26 □ M	54	67	89	130	—
PK26 □, PK26 □ M					
PK29 □	260	290	340	390	480
PK223SG	15	17	20	23	—
CSK243SG, PK243SG	10	15	20	30	—
CSK2645G	3.6 ~ 10	30	40	50	70
PK2645G	18, 36	80	100	120	160
PK296SG	220	250	300	350	400

4. Installing Conditions

Install the motor in a location that meets the following conditions. Using the product under conditions other than this could cause it to be damaged.

- Indoors (this product is designed and manufactured to be installed within another device)
- Ambient temperature : $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$ [**RK** Series, **α STEP** Harmonic Geared Type : $0^{\circ}\text{C} \sim +40^{\circ}\text{C}$] (non-freezing)
- Ambient humidity : 85% maximum. (non-condensing)
- Not exposed to explosive, flammable, or corrosive gas
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed water or oil
- A place where heat can escape easily
- Not exposed to continuous vibration or excessive Impact

● Motor Mounting Brackets (Optional)

Five varieties of stepping motor fixtures are available. Refer to page B-248 for details.



● Coupling (Optional)

Flexible coupling for stepping motors are available. Refer to page B-252 for details.



■ Driver Installation : AC Input Type

1. Installation Direction and Method

Drivers are designed to dissipate heat through natural convection : AC Input Types, so be sure to follow the instructions below when installing them.

(1) Models With Built-in Brackets

- Driver Model
RK Series



(2) Installation Bracket Models

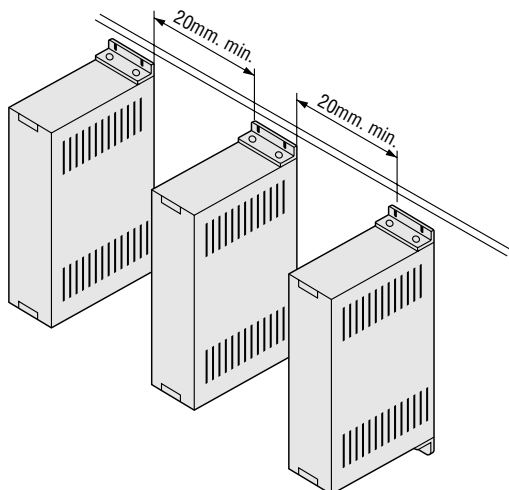
- Driver Model
 α STEP



- Firmly install on a metal plate that has good heat conductance, such as an iron or aluminum 2mm or more in thickness.
- To directly install the driver itself without using the screws provided, pay particular attention to the length of the screws.

2. Using Multiple Axis

When using multiple stepping motor axis, driver temperature rises will cause ambient temperatures to rise. At least 20mm must be allowed between driver units and at least 25mm between drivers and other equipment or structures. Install a forced-air cooling fan if ambient temperatures exceed 50°C (40°C for some products).



3. Installing Conditions

Install the driver in a location that meets the following conditions. Using the product under conditions other than this could cause it to be damaged.

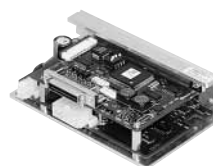
- Indoors (this product is designed and manufactured to be installed within another device)
- Ambient temperature : 0°C ~ +50°C (non-freezing)
- Ambient humidity : 85% maximum (non-condensing)
- Not exposed to explosive, flammable, or corrosive gas
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed to water or oil
- A place where heat can escape easily
- Not exposed to continuous vibration or excessive impact
- When attaching the driver in an enclosed space such as a control box, or somewhere close to a heat-radiating object, vent holes should be used to prevent the drivers from overheating.
- When the driver is to be installed in a location where a source of vibration will cause the driver to vibrate as well, install a shock absorber.
- In situations where drivers are located close to a large noise source such as high frequency welding machines or large electromagnetic switches, take steps to prevent noise interference, either by inserting noise filters or connecting the driver to a separate circuit.
- Take care that pieces of conductive material (filings, pins, pieces of wire, etc.). Do not enter the drivers.

■ Driver Installation: DC Input Types

1. Installation Direction and Method

Install the driver in the following manner to control overheating, as much as possible.

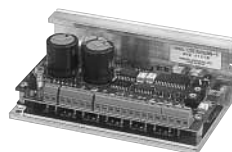
(1) Horizontal Installation



ASD10□-K
ASD18□-K
ASD36□-K



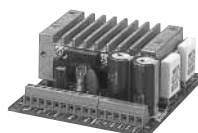
CSD5814N-T
CSD5807N-T



CSD5828N-T



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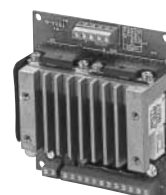


CSD21□□-T

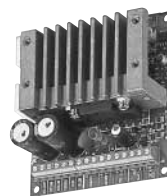
(2) Vertical Installation



ASD10□-K
ASD18□-K
ASD36□-K
CSD5828N-T



CSD5814N-T
CSD5807N-T



CSD21□□-T



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Caution:

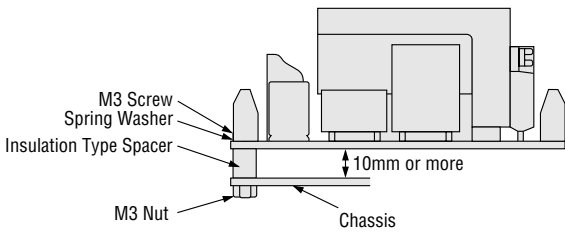
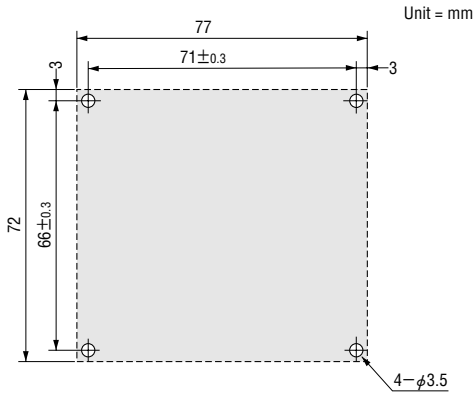
The driver can generate a great deal of heat depending on the operating conditions. Make sure that the temperature of the heat sink does not exceed 80°C. When the temperature of the heat sink exceeds 80°C*, forced cooling is required.

* CSD5828N-T:90°C

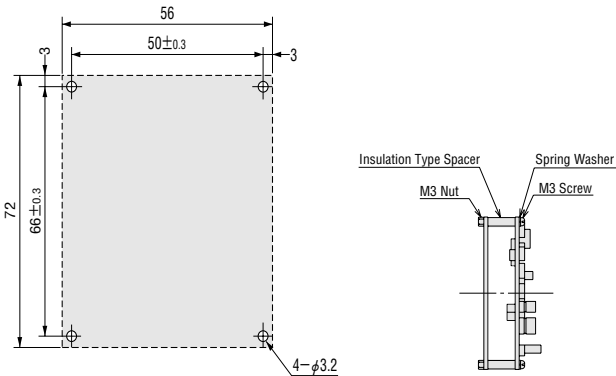
2. Securing the Driver

(1) Mounting with the circuit board

CSD5807N-T, CSD5814N-T, CSD21□□-T



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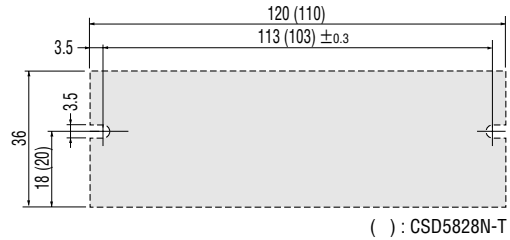
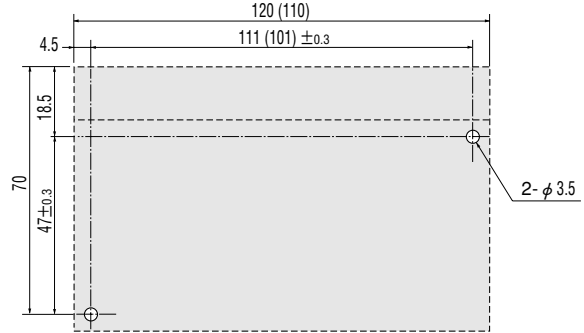


(2) Mounting with the heatsink

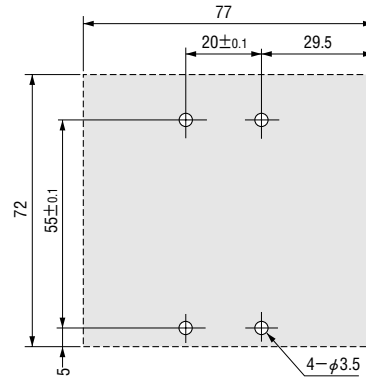
(The heat sink should always be installed to good heat conducting metal)

ASD10□-K, ASD18□-K, ASD36□-K, CSD5828N-T

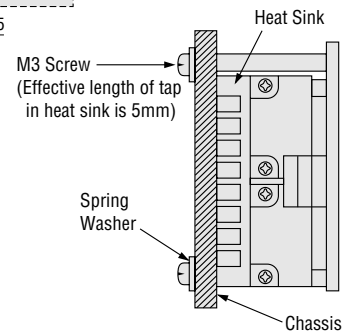
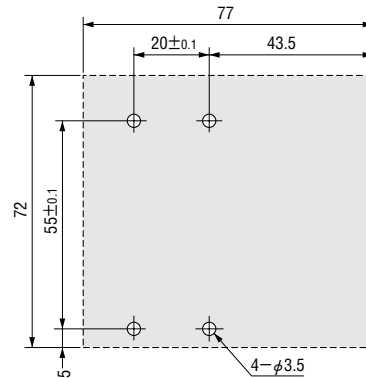
This driver is designed to be used screwed directly to the metal chassis (box-shaped object) in order to ensure heat radiation. Always install the driver bottom surface or side surface against the metal chassis.



CSD5814N-T, CSD5807N-T



CSD21□□-T



Note :

When using long screws, be sure they don't touch any components. The screw length should be less than the thickness of the chassis plus 5mm.

3. Installing Conditions

Install the driver in a location that meets the following conditions. Using the product under conditions other than this could cause it to be damaged.

- Indoors (this product is designed and manufactured to be installed within another device)
- Ambient temperature : 0°C ~ +40°C (non-freezing)
- Ambient humidity : 85% maximum (non-condensing)
- Not exposed to explosive, flammable, or corrosive gas
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed to water or oil
- A place where heat can escape easily
- Not exposed to continuous vibration or excessive impact
- When attaching the driver in a close space such as a control box, or somewhere close to a heat-radiating object, vent holes should be used to prevent overheating of the drivers.
- When the driver is to be installed in a location where a source of vibration will cause the driver to vibrate as well, install a shock absorber.
- In situations where drivers are located close to a large noise source such as high frequency welding machines or large electromagnetic switches, take steps to prevent noise interference, either by inserting noise filters or connecting the driver to a separate circuit.
- Take care that pieces of conductive material (filings, pins, pieces of wirings, etc.) do not enter the drivers.