



5 Phase Stepping Motor and Driver

UPK·W Series

Single Phase 200V—230V Input

- Standard Type

OPERATING MANUAL

Table of Contents

1. Precautions	Page 2
2. Product Verification	Page 4
3. Names and Functions of Driver Parts	Page 6
4. Installation	Page 10
5. Driver Function Switches	Page 18
6. Input/Output Signals	Page 20
7. Connections	Page 26
8. Motor Current Adjustment	Page 34
9. Troubleshooting	Page 36
10. Specifications	Page 40
11. Dimensions	Page 44

Thank you for purchasing ORIENTAL MOTOR products.

Please read this operating manual thoroughly before installing and operating products,
and always keep the manual where it is readily accessible.

1. Precautions

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 I .
- 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 products.

Precautions for Operation

- Always turn off the power to the driver before conducting checks or performing work on the product.
- The enclosure temperature of this motor and driver 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

- The   markings on the driver's front panel indicate high voltage terminals. Do not touch these terminals while the power is ON. Contact could cause electric shock or fire.

Precautions for Troubleshooting

- Refer to *Troubleshooting* (chapter 9) if the motor or driver is not functioning properly. If the problem can not be corrected, contact your nearest ORIENTAL MOTOR office as indicated at the back of this manual. 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.

2. Product Verification

2.1 Equipment Checklist

Confirm that the following equipment is included in your package.

Contact your nearest sales office if something is either not included or damaged.

- Motor 1
- Driver 1
- Connector for I/O Signals
 - ┌ Connector (Sumitomo 3M) 1
 - └ Connector Cover (Sumitomo 3M) 1
- Operating Manual 1

2.2 Model Numbers and Motor/Driver Combinations

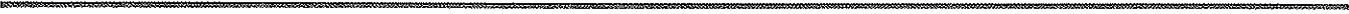
The UPK·W series is a combined package which includes a stepping motor and driver.

This operating manual is designated for the following products.

Product Type	Package Model Number	Motor		Driver	
		Model Number	Rated Current	Model Number	Output Current
Standard	UPK564AJW	PK564AW	1.4A/phase	UDK5214NW	1.4A/phase (max.)
	UPK564BJW	PK564BW			
	UPK566AJW	PK566AW			
	UPK566BJW	PK566BW			
	UPK569AJW	PK569AW			
	UPK569BJW	PK569BW			
	UPK596AJW	PK596AW			
	UPK596BJW	PK596BW			
	UPK599AJW	PK599AW			
	UPK599BJW	PK599BW			
	UPK5913AJW	PK5913AW			
	UPK5913BJW	PK5913BW			

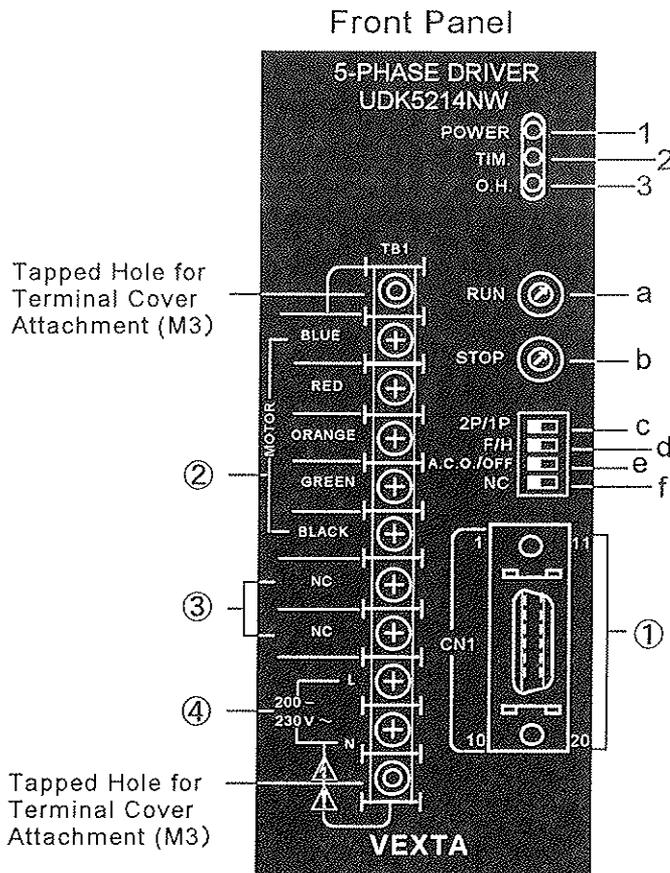
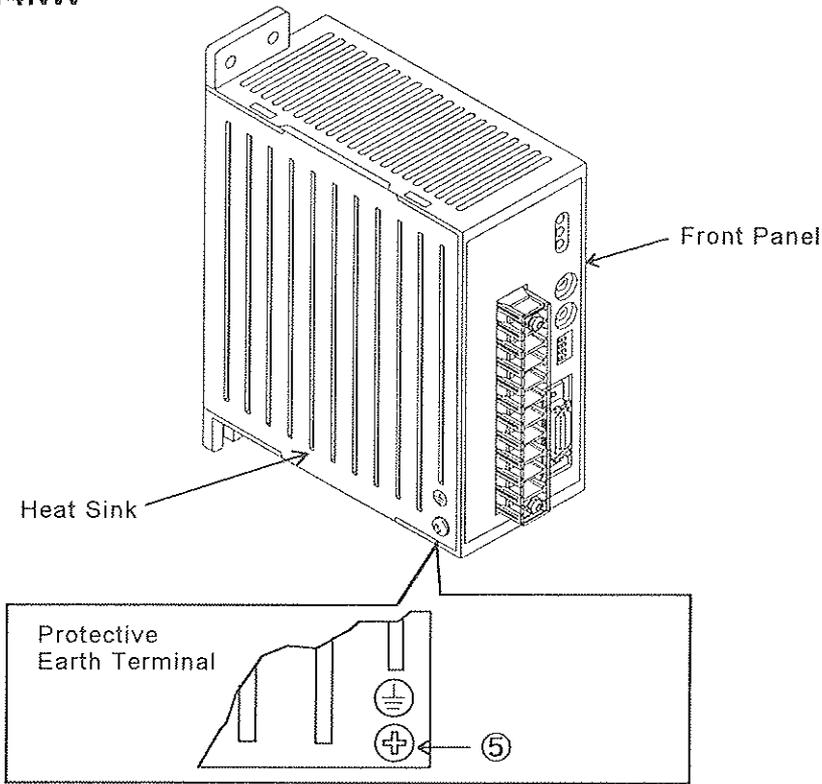
Note

- The driver and motor is precision equipment and should not be dropped or subject to any physical shocks.

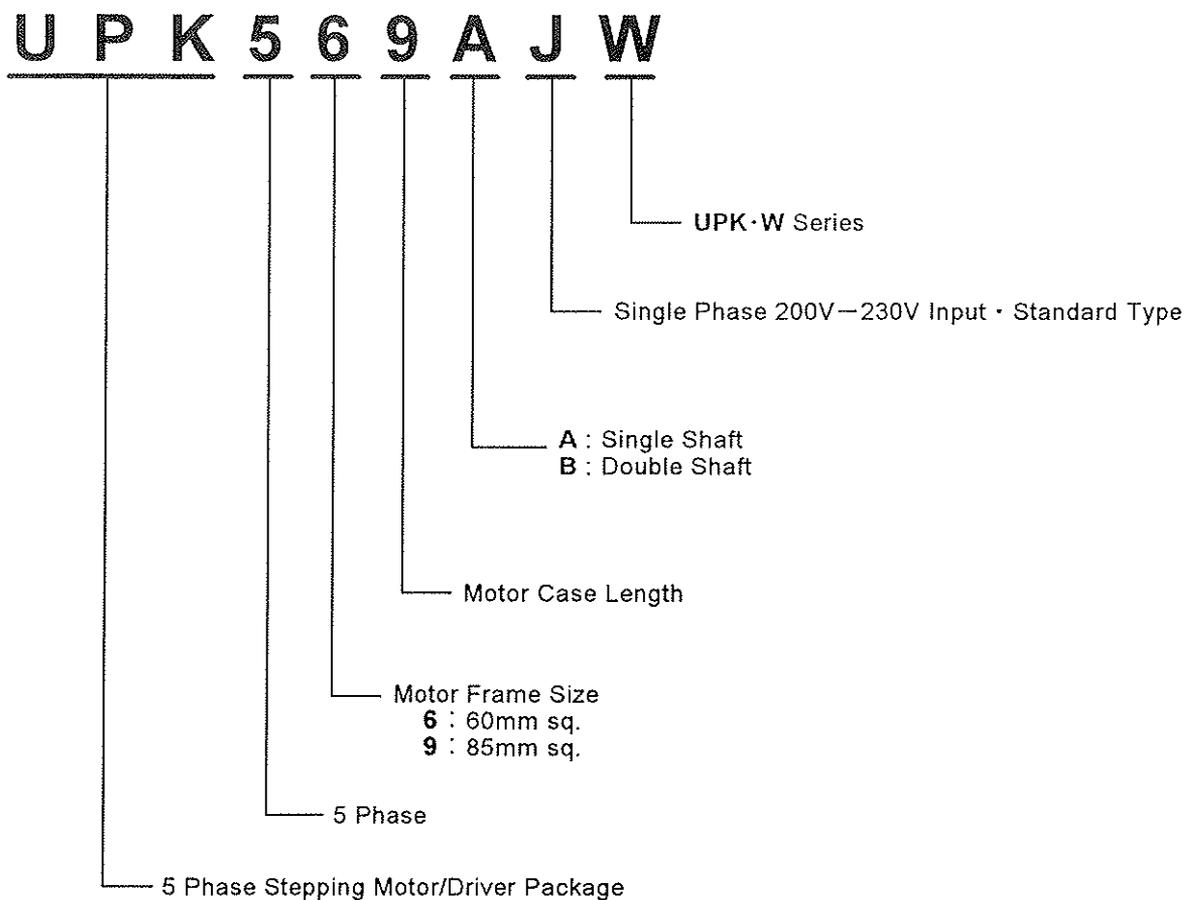


3. Names and Functions of Driver Parts

UDK5214NW



2.3 Interpreting the Model Number

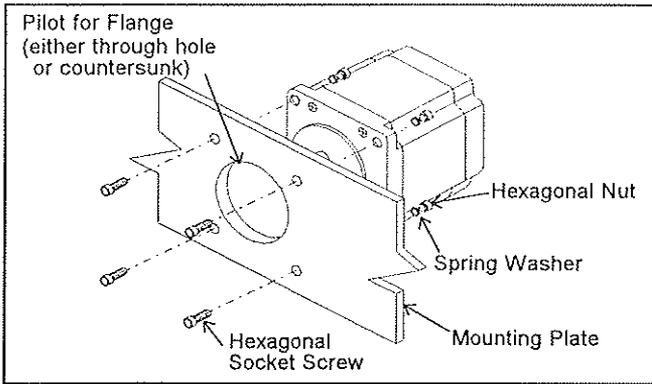


4. Installation

4.1 Motor Installation

4.1.1 How to Install the Motor

To allow for heat dissipation and to prevent vibration, be sure to securely attach the motor to solid metal surface. The motor flange incorporates a pilot diameter. Use this pilot diameter as a guide for alignment when mounting the motor.



The following hardware (not supplied) is needed to mount the motor.

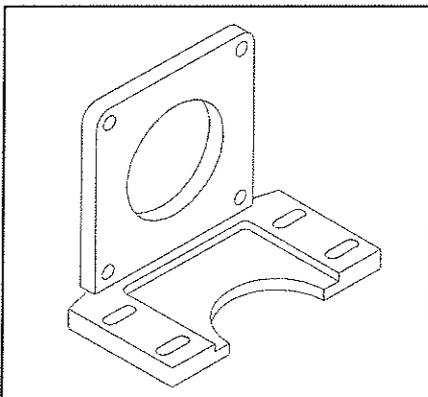
- Hexagonal Socket Screws 4
- Spring Washers 4
- Hexagonal Nuts 4

Select hexagonal socket screws with a length appropriate for the thickness of the mounting plate.

Enter A (single shaft) or B (double shaft) in the within the model numbers.

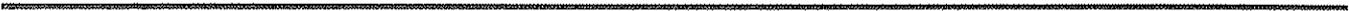
Motor Frame Size	Package Model Number	Screw Type	Tightening Torque
60mm	UPK564 <input type="checkbox"/> JW, UPK566 <input type="checkbox"/> JW, UPK569 <input type="checkbox"/> JW	M4	2 N·m (20kgcm)
85mm	UPK596 <input type="checkbox"/> JW, UPK599 <input type="checkbox"/> JW, UPK5913 <input type="checkbox"/> JW	M5	3 N·m (30kgcm)

An optional (sold separately) motor mounting bracket is available for your convenience.

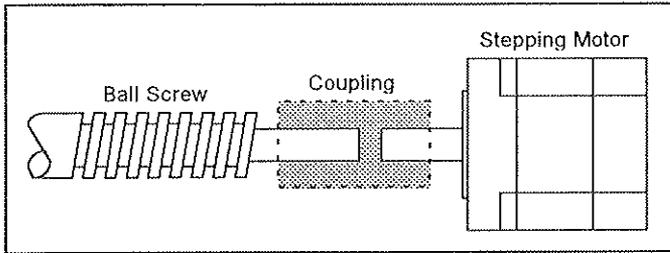


Mounting Bracket Model Number	Motor Frame Size	Stepping Motor/Driver Package Model Number
PAL2P-5	60mm	UPK564 <input type="checkbox"/> JW, UPK566 <input type="checkbox"/> JW, UPK569 <input type="checkbox"/> JW
PAL4P-5	85mm	UPK596 <input type="checkbox"/> JW, UPK599 <input type="checkbox"/> JW, UPK5913 <input type="checkbox"/> JW

Enter A (single shaft) or B (double shaft) in the within the model numbers.



4. 1. 4 Connecting the Motor to the Drive Mechanism (Load)



Proper alignment is necessary when connecting the drive mechanism (load) to the motor shaft. Use a flexible coupling.

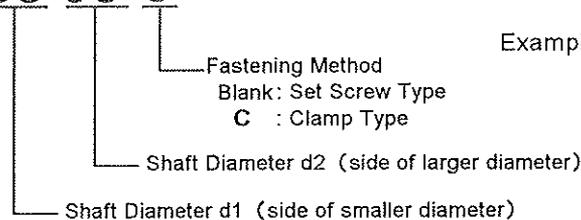
Note

- Inadequate alignment may reduce the life span of the motor bearings or damage the motor shaft.

For connection to the load, an optional (sold separately) non-backlash type flexible coupling especially designed for stepping motors is available.

Interpreting the Model Number

MC 25 08 08 C



Example) For the **UPK566AJW** motor (shaft diameter ϕ 8) with a load shaft diameter of ϕ 10mm, use coupling model **MC250810(C)**.

Enter A (single shaft) or B (double shaft) in the within the model numbers.

⊙: Available in both set screw and clamp types
○: Available in set screw type only

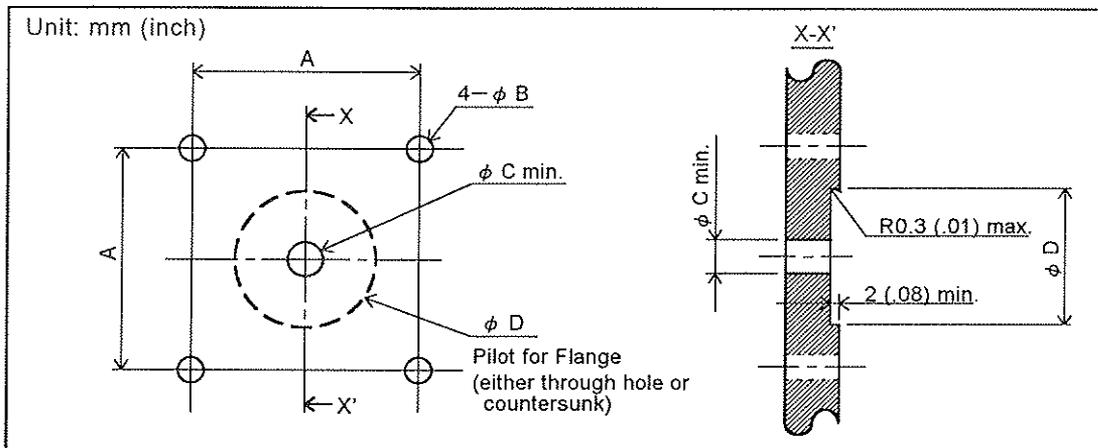
Coupling Type	Motor/Driver Package Model	Motor Shaft Diameter [mm]	Load Shaft Diameter [mm]							
			ϕ 4	ϕ 5	ϕ 6	ϕ 8	ϕ 10	ϕ 12	ϕ 14	ϕ 16
MC20	UPK564□JW	ϕ 8			⊙	⊙	○			
MC25	UPK566□JW	ϕ 8			⊙	⊙	⊙			
MC32	UPK569□JW	ϕ 8			⊙	⊙	⊙			
MC40	UPK596□JW, UPK599□JW	ϕ 14						⊙	⊙	⊙
MC50	UPK5913□JW	ϕ 14						⊙	⊙	⊙

4.1.2 Motor Installation Location

To prevent motor damage, install in a location with the following conditions.

- Indoors (The motor is designed and manufactured to be used as an internal component within other equipment.)
- Ambient temperature range $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$ (non-freezing)
- Ambient humidity below 85% (non-condensing)
- No explosive, combustible, or corrosive gases
- No direct sunlight
- No dust or conductive particles (i.e. metal chips or shavings, pins, or wire fragments etc.)
- No water, oil, or other fluids
- Where the motor is able to dissipate heat easily
- No continuous vibration or sudden shocks
- No nearby radiation, magnetic field, or air vacuum environment

4.1.3 Motor Mounting Plate Dimensions



Enter A (single shaft) or B (double shaft) in the \square within the model numbers.

Unit: mm (inch)

Motor Frame Size	Package Model Number	Mounting Plate Thickness	A	ϕB	ϕC	ϕD
60mm	UPK564 \square JW UPK566 \square JW UPK569 \square JW	5 (.20) min.	50 ± 0.35 (1.97 \pm .014)	4.5 (.18DIA.)	8.5 (.33DIA.) min.	$36^{+0.039}_0$ (1.4189DIA.) (1.4173DIA.)
85mm	UPK596 \square JW UPK599 \square JW UPK5913 \square JW	8 (.31) min.	70 ± 0.35 (2.76 \pm .014)	6.5 (.26DIA.)	14.5 (.57DIA.) min.	$60^{+0.046}_0$ (2.3640DIA.) (2.3622DIA.)

3.3 Terminals

I/O Signals

Indication	Signal Type	Pin No.	Terminal Name	Function	Page Reference
① CN1	Input Signals	1	CW Pulse/ Pulse Signal Input Terminal	The CW direction command pulse signal is input to this terminal. When a pulse is input to the terminal the motor output shaft will rotate one step in the clockwise direction. (When in 1 pulse input mode a pulse signal is input to this terminal.)	Page 20,21
		2			
		3	CCW Pulse/ Rotation Direction Signal Input Terminal	The CCW direction command pulse signal is input to this terminal. When a pulse is input to the terminal the motor output shaft will rotate one step in the counterclockwise direction. (When in 1 pulse input mode a rotation direction signal is input to this terminal.)	Page 20,21
		4			
		5	Output Current Off Signal Input Terminal	The output current off signal is input to this terminal. When a signal is input to the terminal the driver will cut the power supply to the motor. The motor torque will then be reduced to zero and the motor shaft can be rotated freely for adjustment. This function is used when manual positioning etc. is required.	Page 22
		1 0	+ Common Terminal	This is the positive common terminal for the input signal (output current off signal).	—
	Output Signals	1 1	Excitation Timing Signal Output Terminal	The excitation timing signal is output from this terminal. This signal is output when the motor excitation (current running through the winding) is in the initial stage.	Page 23
		1 2	Overheat Signal Output Terminal	The overheat signal is output from this terminal. This signal is output when the internal temperature of the driver rises above 80°C. This is used to prevent excess heat from damaging the driver.	Page 24,25
		2 0	— Common Terminal	This is the negative common terminal for the output signals.	—

Motor/Power Supply

Indication		Terminal Name	Function	Page Reference
② TB1	MOTOR	Motor Connection Terminal	This is the output terminal for the motor. Match the colors indicated on the driver front panel to the motor lead wires for connection.	Page 26~28
③ TB1	NC	No Connection	This terminal is not used. It is a open terminal which is not connected to the driver's circuitry.	—
④ TB1	200— 230V~	Power Supply Connection Terminal	Connect this terminal to a power source of single phase 200—230V ^{+10%} / _{-15%} (50/60Hz).	Page 26~28
⑤		Protective Earth Terminal	This terminal is connected to the driver casing. (M4 screw size)	Page 32

3.1 LED Indicators

The LED indicators show the state of various input/output signals.
They are indicated on page 6 as 1~3.

LED Name	Indication	Color	Condition When LED ON	Page Reference
1 Power Input LED	POWER	Green	Lights when single phase 200 – 230V $\begin{matrix} +10\% \\ -15\% \end{matrix}$ (50/60Hz) is input.	—
2 Excitation Timing Signal Output LED	TIM.	Green	Lights when the excitation timing signal is output.	Page 23
3 Overheat Signal Output LED	O.H.	Red	Lights when the overheat signal is output.	Page 24,25

3.2 Switches

The switches adjust the motor current and enable/disable various functions.
They are indicated on page 6 as a~f.

Switch Name	Indication	Factory Setting	Function	Page Reference
a Motor Running Current Adjustment Rotary Switch	RUN	F	The motor's running current can be adjusted with this digital switch. Adjustment is simple, and an ammeter is not necessary.	Page 34,35
b Motor Standstill Current Adjustment Rotary Switch	STOP	9	The motor's standstill current can be adjusted with this digital switch. Adjustment is simple and an ammeter is not necessary.	Page 34,35
c Pulse Input Mode Switch	2P/1P	2P	The pulse signal input mode can be set to 1 pulse input mode or 2 pulse input mode with this switch.	Page 18
d Step Angle Switch	F/H	F	The motor step angle can be set to full step or half step with this switch.	Page 18
e Automatic Current Off Function Switch	A.C.O./OFF	A.C.O.	This function will automatically cut off the power to the motor when the internal temperature of the driver rises above 80 °C. This function can be enabled or disabled with this switch.	Page 18,19
f No Connection	NC	NC	This switch is not used. It is an open terminal which is not connected to the driver's circuitry.	—

4.2 Driver Installation

4.2.1 How to Install the Driver

The driver is designed to cool naturally by convection.
Be sure to install the driver in an upright position as indicated below.

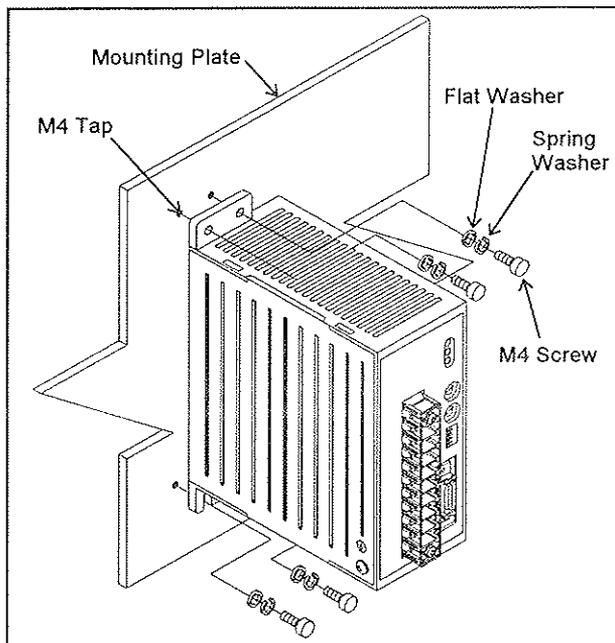
The following hardware (not supplied) is needed to mount the driver.

- M4 Screws 4
- M4 Flat Washers 4
- M4 Spring Washers 4

When mounting the driver to a vertical surface

Secure the driver to a mounting plate within your equipment. (Secured through 4 screws)
The mounting plate should be at least 2mm thick and be made of steel, aluminum or other material having good thermal conductivity.

UDK5214NW



Permissible overhung load and permissible thrust load

Do not exceed the permissible overhung load as indicated in the following chart. The thrust load should not exceed the weight of your motor.

When attaching a coupling, timing pulley, or other equipment, do not jolt the motor shaft by abruptly adding weight etc., or exceed the permissible overhung and thrust loads as this may damage the motor.

Enter A (single shaft) or B (double shaft) in the □ within the model numbers. [Unit: N (kg)]

Motor Frame Size	Package Model Number	Distance from the End of the Shaft [mm]				
		0	5	10	15	20
60mm	UPK564□JW, UPK566□JW UPK569□JW	63 (6.3)	75 (7.5)	95 (9.5)	130 (13)	190 (19)
85mm	UPK596□JW, UPK599□JW UPK5913□JW	260 (26)	290 (29)	340 (34)	390 (39)	480 (48)

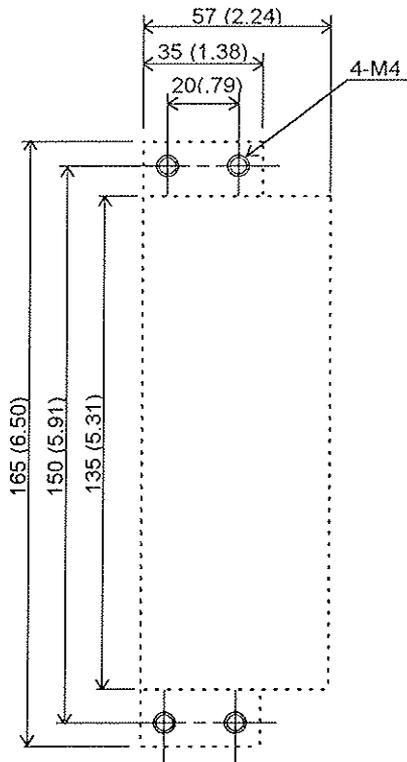
Note

- Exceeding the permissible overhung load or permissible thrust load will damage or shorten the life span of the bearings and motor shaft.

4. 2. 3 Driver Mounting Plate Dimensions

Unit: mm (inch)

UDK5214NW

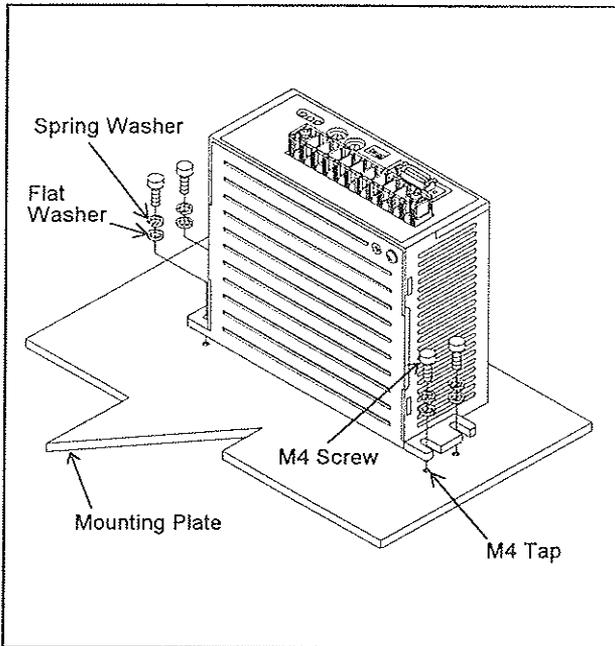


When mounting the driver to a horizontal surface

Secure the driver to a mounting plate within your equipment. (Secured through 4 screws)

The mounting plate should be at least 2mm thick and be made of steel, aluminum or other material having good thermal conductivity.

UDK5214NW



4. 2. 2 Driver Installation Location

To prevent driver damage, install in a location with the following conditions.

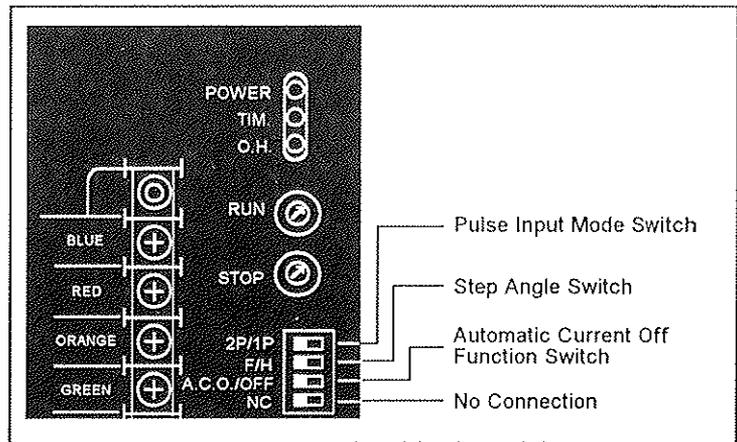
- Indoors (The driver is designed and manufactured to be used as an internal component within other equipment.)
- Ambient temperature range 0°C ~ +50°C (non-freezing). Install a forced-air cooling fan if ambient temperatures exceed 50°C.
- Ambient humidity below 85% (non-condensing)
- No explosive, combustible, or corrosive gases
- No direct sunlight
- No dust or conductive particles (i.e. metal chips or shavings, pins, or wire fragments etc.)
- No water, oil, or other fluids
- Where the driver is able to dissipate heat easily
- No continuous vibration or sudden shocks
- No nearby radiation, magnetic field, or air vacuum environment
- If the driver is installed in a switch box or other enclosed area, or near a heat source, be sure to establish ventilation holes. The heat generated by the driver will cause the ambient temperature to rise, and if the permissible ambient operating temperature is exceeded, driver damage may result.
- If the driver is installed near a source of vibration, and this vibration is transmitted to the driver, attach a shock absorber to prevent driver damage.
- If the driver is installed near a source of noise interference (i.e. high frequency welding machine, electromagnetic switch, etc.) install a noise filter, or connect it to a separate power source to reduce the effect of the interference, otherwise the motor may not operate correctly.
- Leave a space of at least 25mm between the driver and other equipment or structure. If using more than one driver, leave a space of at least 20mm between each driver. Driver heat generation will cause the ambient temperature to rise, and if the permissible ambient operating temperature is exceeded, driver damage may result.

5. Driver Function Switches

The driver has various operation functions which are set with the function switches.

Driver Front Panel

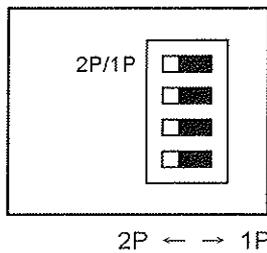
UDK5214NW



The white square section of the function switch represents the switch lever.

5.1 Pulse Input Mode Switch

(Factory Setting: 2P)



Select the appropriate pulse input mode to correspond to your controller with this switch.

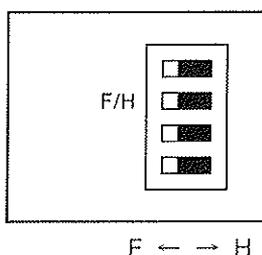
When the pulse input mode switch is set to the "2P" position, 2 pulse input mode is established and motor rotation is controlled by CW and CCW pulse signals.

When the switch is set to the "1P" position, 1 pulse input mode is established and motor rotation is controlled by pulse signals and rotation direction (CW/CCW) signals.

(Refer to pages 20, 21 for a detailed explanation.)

5.2 Step Angle Switch

(Factory Setting: F)



When the switch is set to:

"F" (full step) : 1 step = 0.72° (1 rotation = 500 pulses)

"H" (half step): 1 step = 0.36° (1 rotation = 1000 pulses)



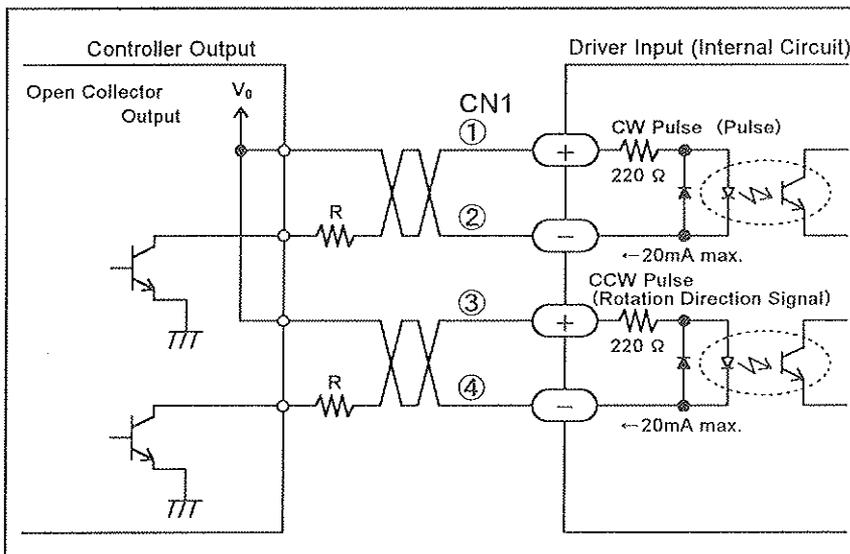
6. Input/Output Signals

6.1 Input Signals

The input signals to the driver and their functions are specified below.

6.1.1 CW Pulse / Pulse Signal CCW Pulse / Rotation Direction Signal

The diagram below shows the input circuits and an example connection to a controller.



The number within \bigcirc refers to the pin number of driver connector CN1.

The information in the brackets () refers to signals when in 1 pulse input mode.

Keep the voltage between DC5V and DC24V.

When voltage is equal to DC5V, external resistance R is not necessary. When voltage is above DC5V, connect external resistance R and keep the input current below 20mA.

2 Pulse Input Mode

CW* pulse signal

When a negative logic pulse is input to the CW pulse / pulse signal input terminal, the motor rotates one step in the clockwise direction on the pulse rising edge.

CCW* pulse signal

When a negative logic pulse is input to the CCW pulse / rotation direction signal input terminal, the motor rotates one step in the counterclockwise direction on the pulse rising edge.

* CW and CCW refer to clockwise and counterclockwise directions respectively, from a reference point of facing the motor output shaft.

1 Pulse Input Mode

Pulse signal

When a negative logic pulse is input to the CW pulse / pulse signal input terminal, the motor rotates one step on the pulse rising edge. The direction of rotation is determined by the following rotation direction signals.

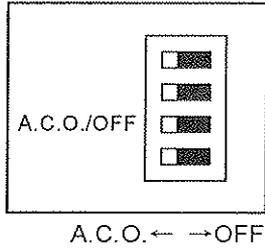
Rotation direction signal

The rotation direction signal is input to CCW pulse / rotation direction signal input terminal.

An "L" level signal input (photocoupler ON) commands a clockwise direction rotation.

An "H" level signal input (photocoupler OFF) commands a counterclockwise direction rotation.

5.3 Automatic Current Off Function Switch (Factory Setting: A.C.O.)



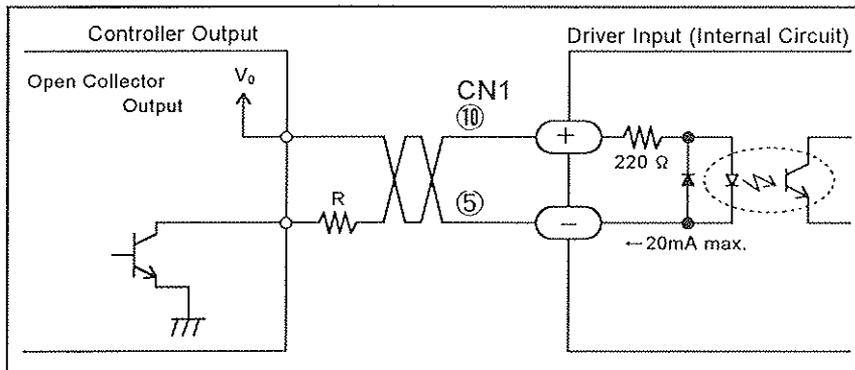
When the automatic current off function switch is set to the "A.C.O." position, the automatic current off function is enabled. While enabled, if the internal temperature of the driver rises above 80°C, the overheat signal will be output, and the current to the motor will be cut off. (Refer to pages 24, 25 for details on the overheat signal.)

Cutting off the current to the motor will prevent driver heat damage.

When the switch is set to the "OFF" position, the automatic current off function is disabled.

6. 1. 2 Output Current Off Signal

The diagram below shows the input circuit and an example connection to a controller.



The number within \bigcirc refers to the pin number of driver connector CN1.

Keep the voltage between DC5V and DC24V.

When voltage is equal to DC5V, external resistance R is not necessary. When voltage is above DC5V, connect external resistance R, and keep the input current below 20mA.

When the output current off signal is at "L" level (photocoupler ON), the current to the motor is cut off and motor torque is reduced to zero. The motor output shaft can then be rotated freely by hand.

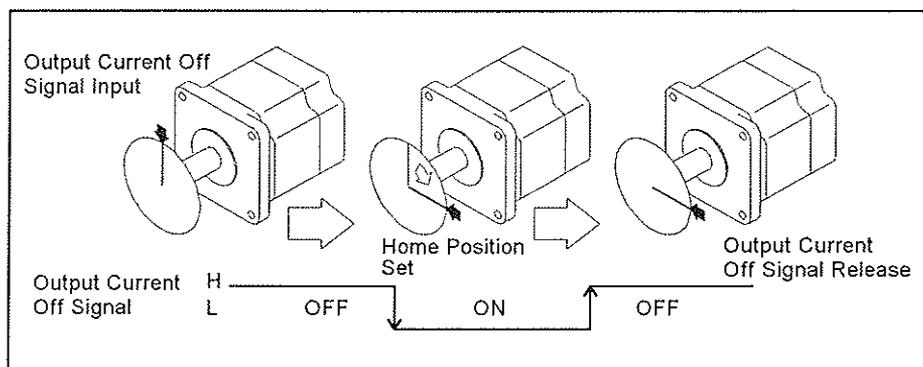
When the output current off signal is at "H" level (photocoupler OFF), the motor holding torque is proportional to the current set by the current adjustment rotary switches. During motor operation be sure to keep the signal at "H" level. This signal is used when moving the motor by external force or manual home positioning etc. is desired. If this function is not needed, it is not necessary to connect this terminal.

Switching the output current off signal from "L" level to "H" level does not alter the excitation sequence.

When the motor shaft is manually adjusted with the output current off signal input, the shaft will shift up to $\pm 3.6^\circ$ from the position set after the signal is released.

Manual Detection of the Home Position

Input the output current off signal, set the motor to the desired position, then release the signal.



Note

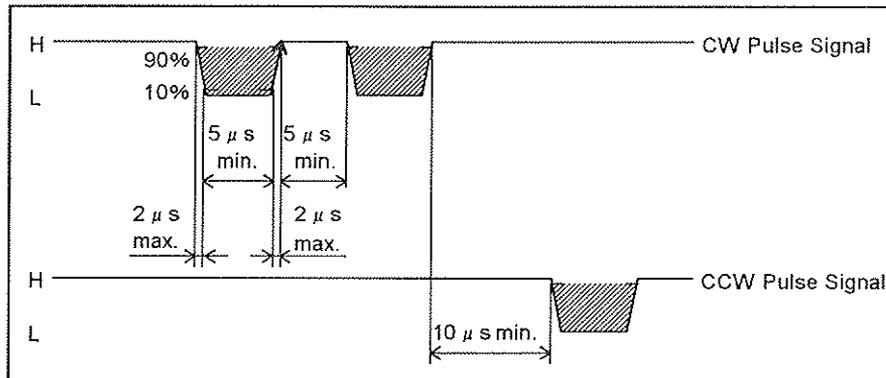
- When rotating the output shaft during manual detection, do so at a rotation speed below 100 rev/min, otherwise driver damage may result from the motor back EMF current.

Relation to the Pulse Input Mode Switch (See page 18)

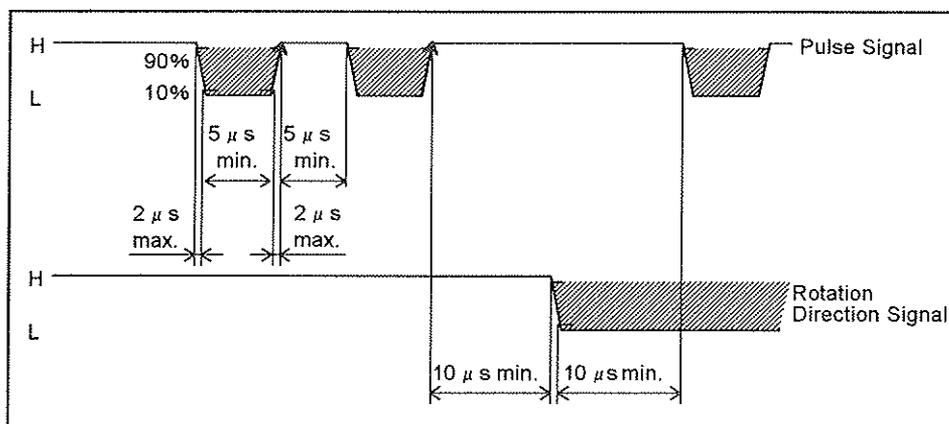
When the switch is set to the "2P" position, motor rotation is controlled by CW pulse signals and CCW pulse signals.
 When the switch is set to the "1P" position, motor rotation is controlled by pulse signals and rotation direction signals.

Pulse Waveform Characteristics

2 Pulse Input Mode



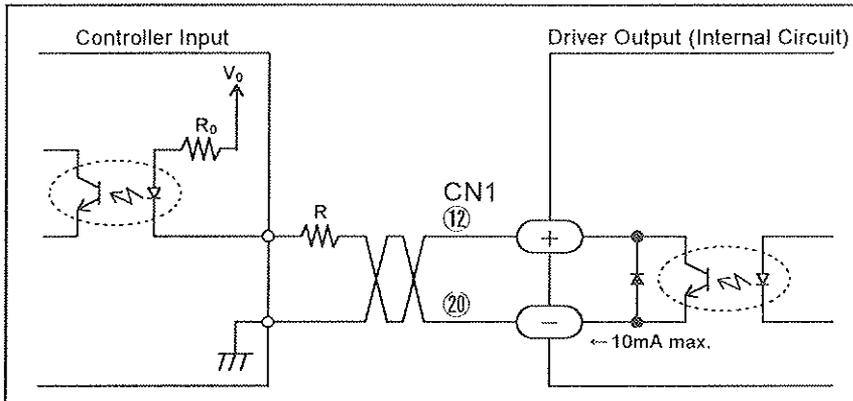
1 Pulse Input Mode



- The shaded area indicates when the photocoupler diode is ON. The motor moves on the pulse rising edge as indicated by the arrow.
- The pulse voltage is "H" level (photocoupler OFF) = 4~5V, "L" level (photocoupler ON) = 0~0.5V.
- Input pulse signals should have a pulse width over 5 μ sec., pulse rise/fall below 2 μ sec., and a pulse duty below 50%.
- Keep the pulse signal at "H" level when no pulses are being input.
- The minimum interval time when changing rotation directions is 10 μ sec.
 This value varies greatly depending on the motor type, pulse frequency, and load inertia. It may be necessary to increase this time interval if the motor can not follow commands.
- In 2 pulse input mode, do not input CW and CCW pulse signals at the same time. Inputting a pulse signal while the other pulse signal is already at "L" level will result in erratic motor rotation.
- In 1 pulse input mode, leave the pulse signal at rest ("H" level) when changing rotation directions.

6. 2. 2 Overheat Signal

The diagram below shows the output circuit and an example connection to a controller.



The number within \bigcirc refers to the pin number of driver connector CN1.

Terminal $\textcircled{20}$ is also the common for the excitation timing signal.

Keep the voltage between DC5V and DC24V.

Keep the current below 10mA.

If the current exceeds 10mA, connect external resistance R.

The overheat signal is output to protect the driver from heat damage if the internal temperature of the driver rises above 80°C.

When connected as shown in the example connection, the signal will be "H" level (photocopler OFF) during normal conditions, and "L" level (photocopler ON) when the temperature exceeds 80°C.

When the overheat signal is output, turn the driver power OFF, then adjust the operating conditions (ambient temperature, driver/controller settings, etc.), or use a fan etc. to cool the driver. After taking appropriate measures, turn the power ON. Turning the power ON will reset the overheat signal, and release the automatic current off condition.

Relation to the Overheat Signal Output (O.H.) LED (See pages 6, 7)

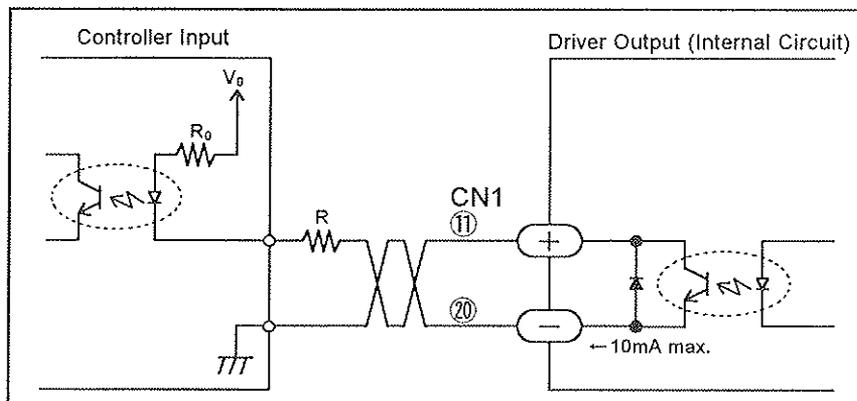
The LED lights when the overheat signal is output.

6.2 Output Signals

The output signals from the driver and their functions are specified below.

6.2.1 Excitation Timing Signal

The diagram below shows the output circuit and an example connection to a controller.



The number within \bigcirc refers to the pin number of driver connector CN1.

Terminal $\textcircled{20}$ is also the common for the overheat signal.

Keep the voltage between DC5V and DC24V.

Keep the current below 10mA.

If the current exceeds 10mA, connect external resistance R.

The excitation timing signal is output when the motor excitation (current flowing through the winding) is in the initial stage (step "0").

The excitation timing signal can be used to increase the accuracy of home position detection by setting the mechanical home position of your equipment to coincide with the excitation sequence initial stage (step "0").

The motor excitation stage changes simultaneously with pulse input, and returns to the initial stage for each 7.2° rotation of the motor output shaft.

When the power is turned ON, the excitation sequence is reset to step "0".

Relation to the Excitation Timing Signal Output (TIM.) LED (See pages 6, 7)

The TIM. LED lights when the excitation timing signal is output.

While the motor is rotating, the LED will turn ON and OFF at a high speed and will appear to be continuously lit.

Relation to the Step Angle Switch (See page 18)

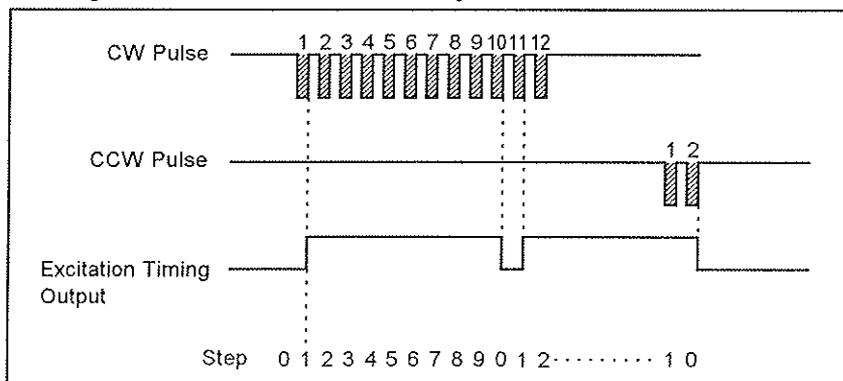
When the switch is set to the F position:

Full step (0.72° / step): signal is output once every 10 pulses

When the switch is set to the H position:

Half step (0.36° / step): signal is output once every 20 pulses

Timing chart when in full step mode



7. Connections

Make connections in the following order:

1. Connect the motor and driver.
2. Connect the driver and controller.
3. Ground the motor, driver, and controller.
4. Connect the power to the driver.

7.1 Example Connections

The connections between the motor, driver, and controller are explained below.

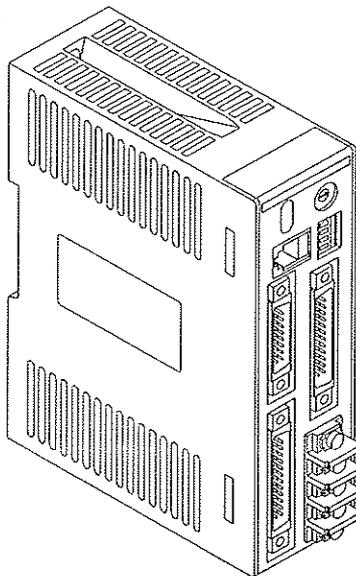
The illustration on the following page is a simplification of the front panel of the UDK5214NW driver.

7.1.1 Connections to the ORIENTAL MOTOR Controller SG9200-2G

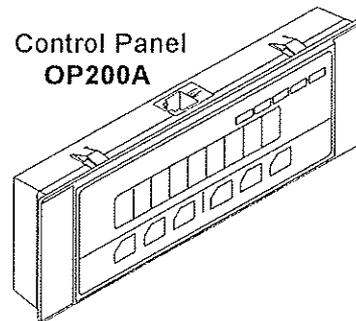
Oriental Motor offers the SG series controllers which are easy to connect and are specifically designed for use with stepping motors.

The illustration on the following page shows connections to the SG series SG9200-2G controller.

Controller
SG9200-2G



Control Panel
OP200A

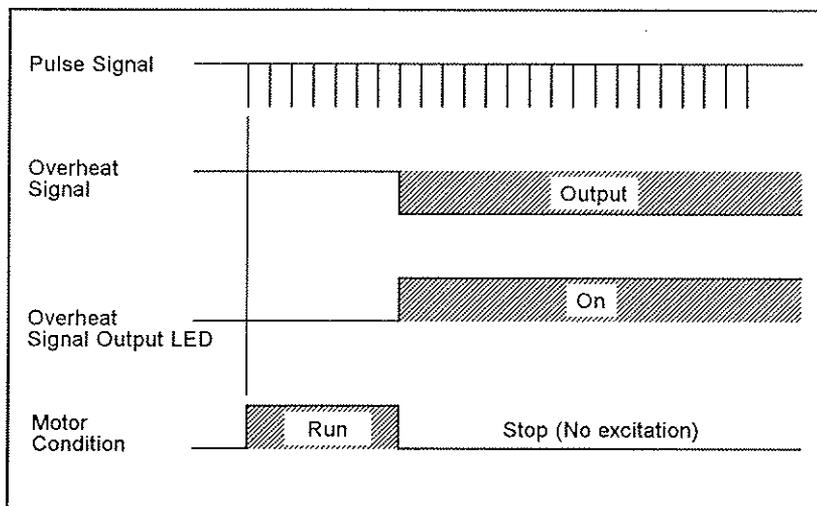


The **SG9200-2G** allows for programming and storage of up to 15 positioning sequences, with each sequence having up to 15 individual motion profiles (total of 225 profiles possible). The **OP200A** control panel is used in conjunction with the controller for setting the operation data. An optional cable for connecting the driver and controller is also available.

Relation to the Automatic Current Off Function Switch (See pages 18, 19)

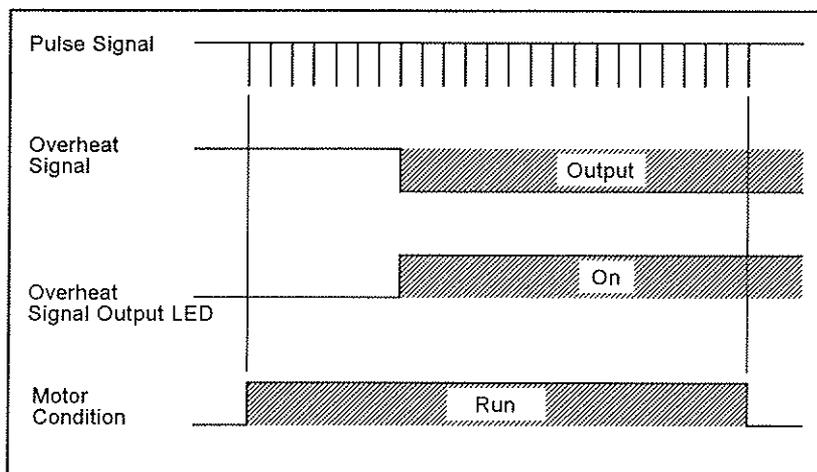
When set to A.C.O.

- ① The overheat signal is output when the internal temperature of the driver exceeds 80°C during operation.
- ② Regardless of any pulse signals input, motor excitation will cease (shaft free) and the motor will come to a natural stop.

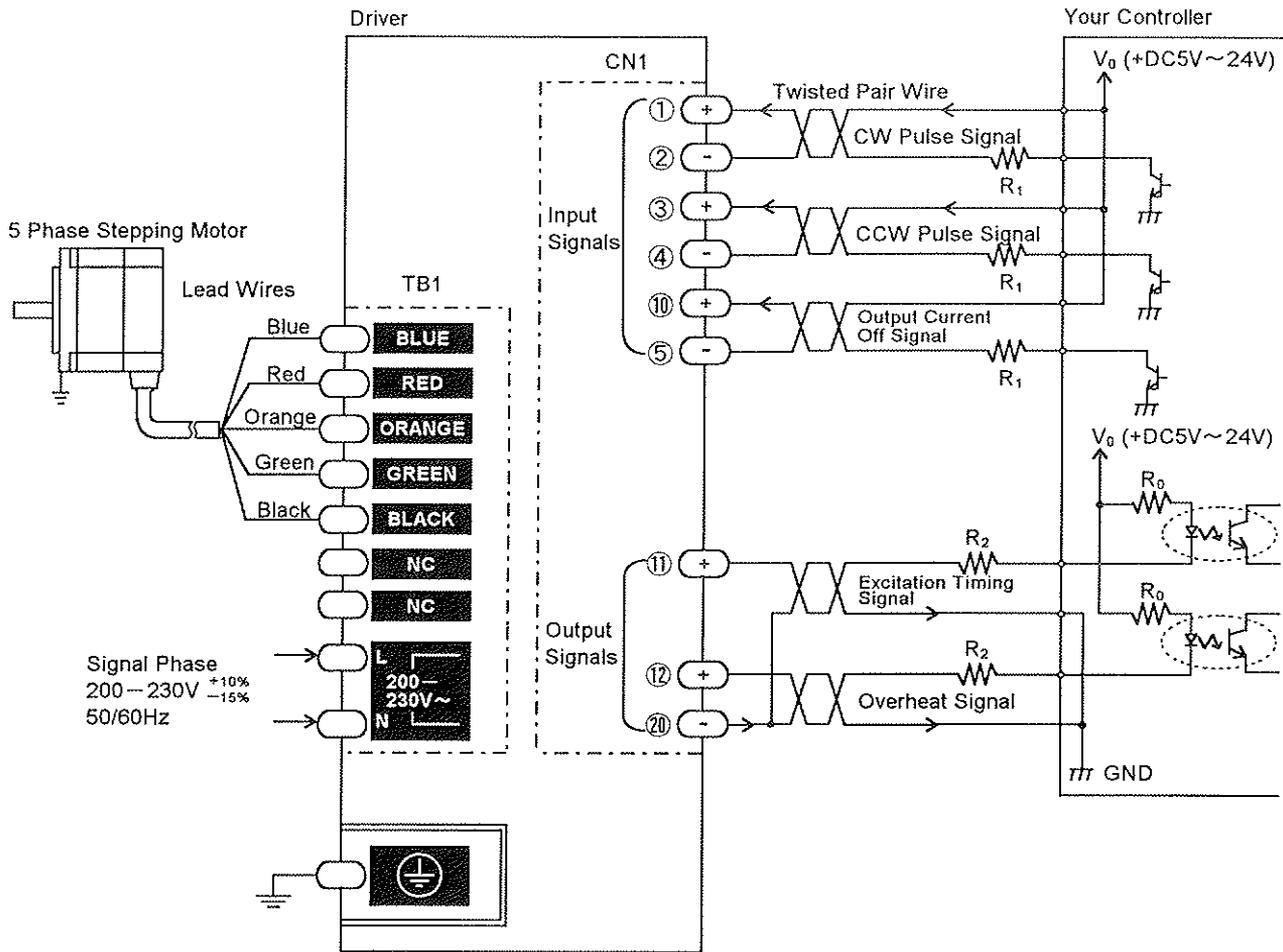


When set to OFF

- ① The overheat signal is output when the internal temperature of the driver exceeds 80°C during operation.
- ② The motor will continue to run regardless of the overheat signal output.



7. 1. 2 Connections to Your Controller



■ indicates the terminals as labeled on the driver front panel.

⌋ indicates the connector or terminal block.

▭ indicates the heat sink side of the driver.

The numbers within ○ on the driver indicate the pin number for connector CN1.

Input signal connections

Keep the voltage between DC5V and DC24V.

When voltage is equal to DC5V, external resistance R_1 is not necessary.

When voltage is above DC5V, connect external resistance R_1 and keep the input current below 20mA.

Output signal connections

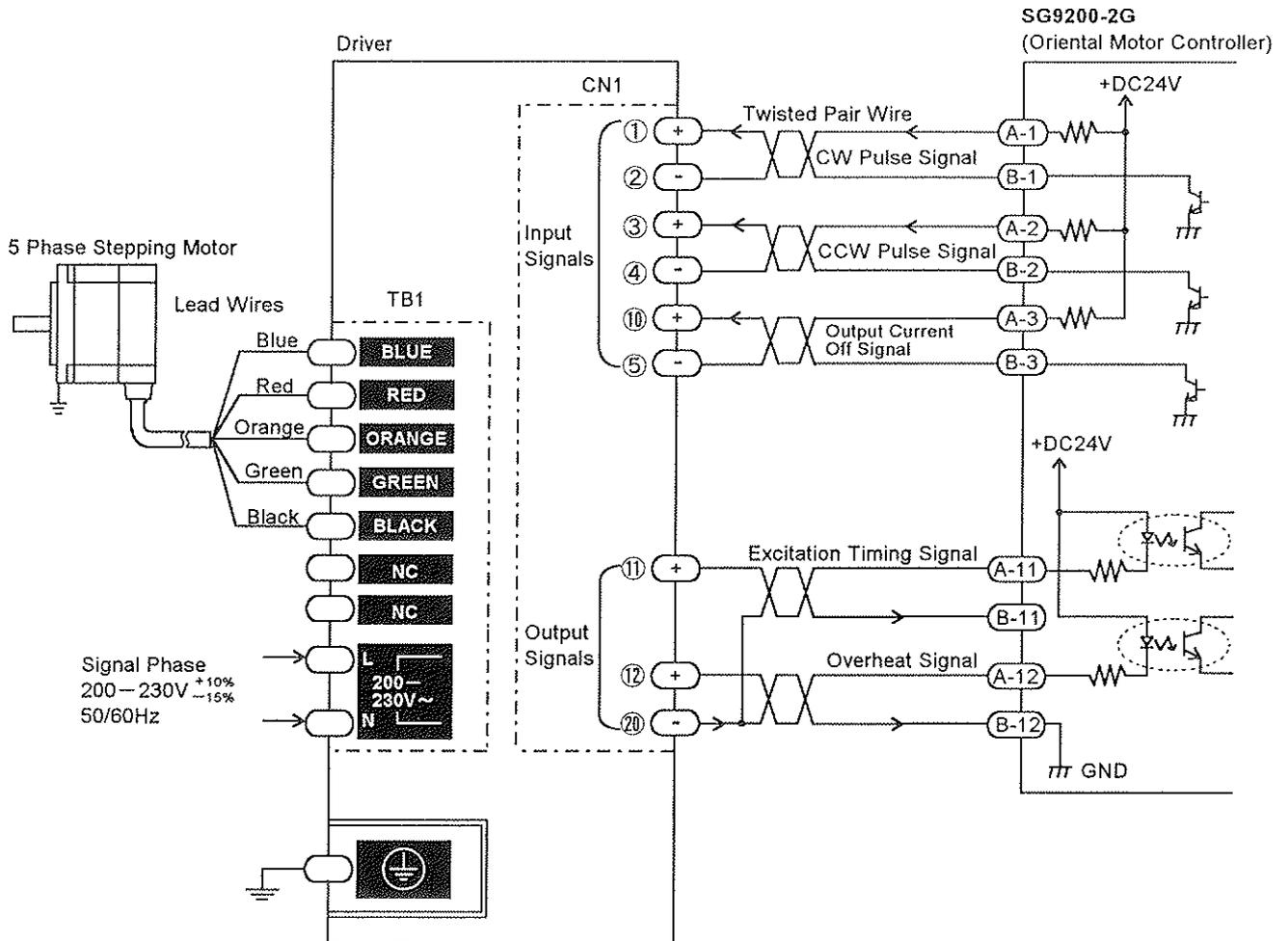
Keep the voltage between DC5V and DC24V.

Keep the current below 10mA.

If the current exceeds 10mA connect external resistance R_2 .

Terminal connections

Refer to pages 31, 32 and securely connect the terminals.



■ indicates the terminals as labeled on the driver front panel.

⋯ indicates the connector or terminal block.

▭ indicates the heat sink side of the driver.

The numbers within ○ on the driver indicate the pin number for connector CN1.

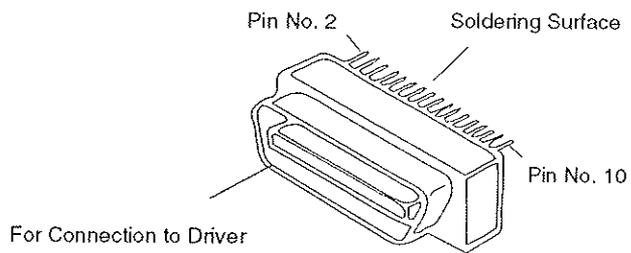
The numbers within ○ on the SG9200-2G controller indicate the pin number.

Terminal connections

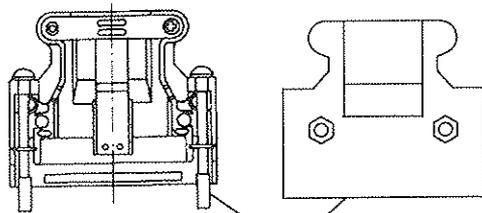
Refer to pages 31, 32 and securely connect the terminals.

7.2 Preparing the I/O Signal Connector

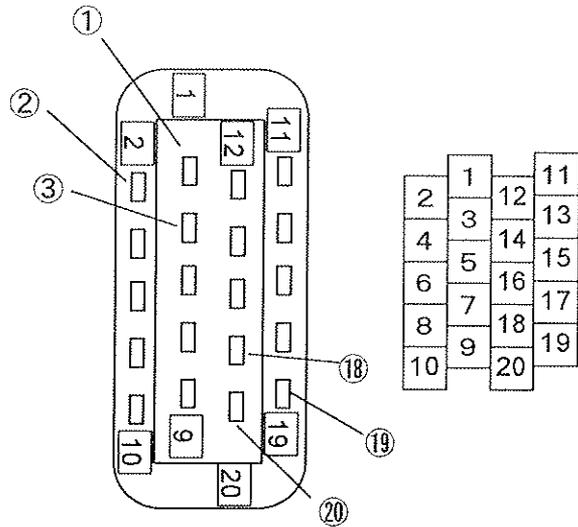
Refer to the terminal description chart (page 8) and solder the signal lines to the relevant pin numbers. After soldering, assemble the I/O signal connector and connect it to the driver connector CN1.



Connector



Connector Cover



I/O Signal Connector

Half pitch connector: 10120-3000VE (Sumitomo 3M)

Connector cover: 10320-52A0-008 (Sumitomo 3M)

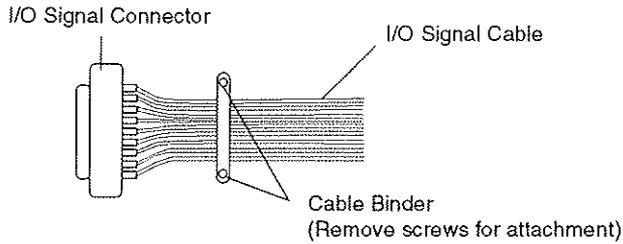
Connector Pin Arrangement

(As seen from side to be soldered)

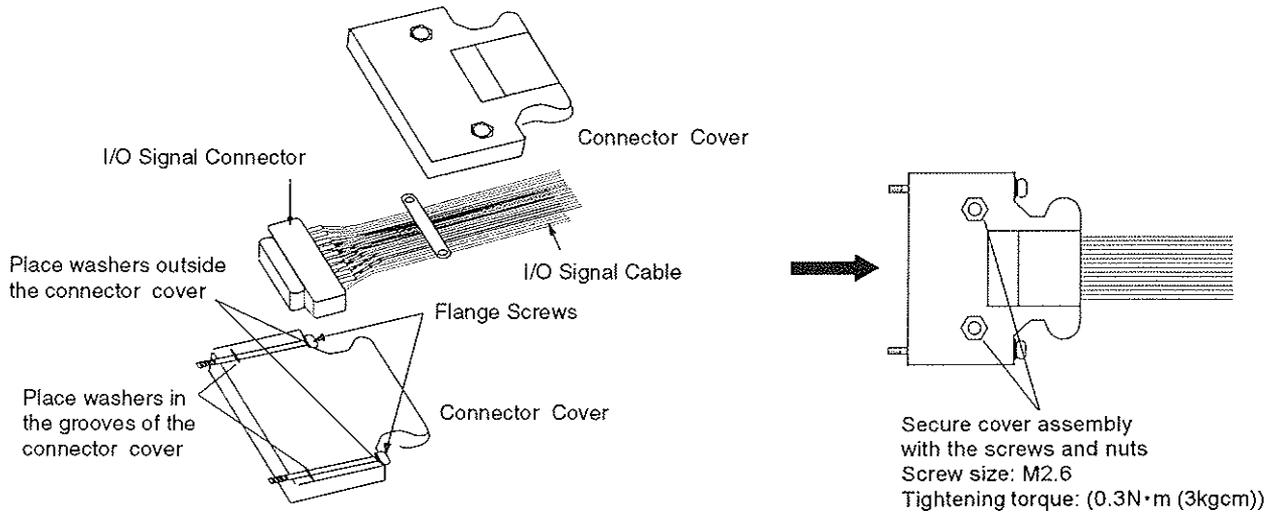
7.3 Connector Cover Attachment and Connection to the Driver

After soldering the signal lines to the I/O connector, attach the connector cover.

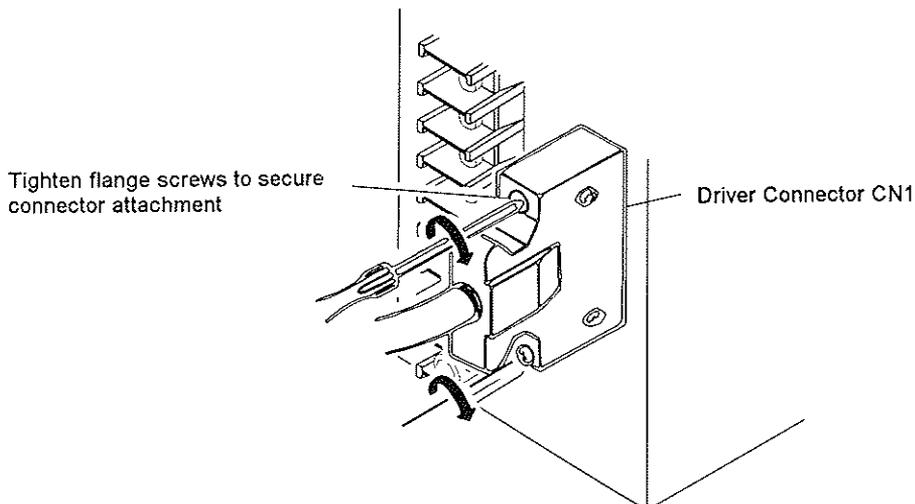
- (1) Attach the metal cable binder to the I/O cable.



- (2) Place the I/O cable and flange screws in the connector cover.
Place the washers as shown in the diagram below.
Connect both sides of the connector cover and secure the assembly with the screws and nuts.



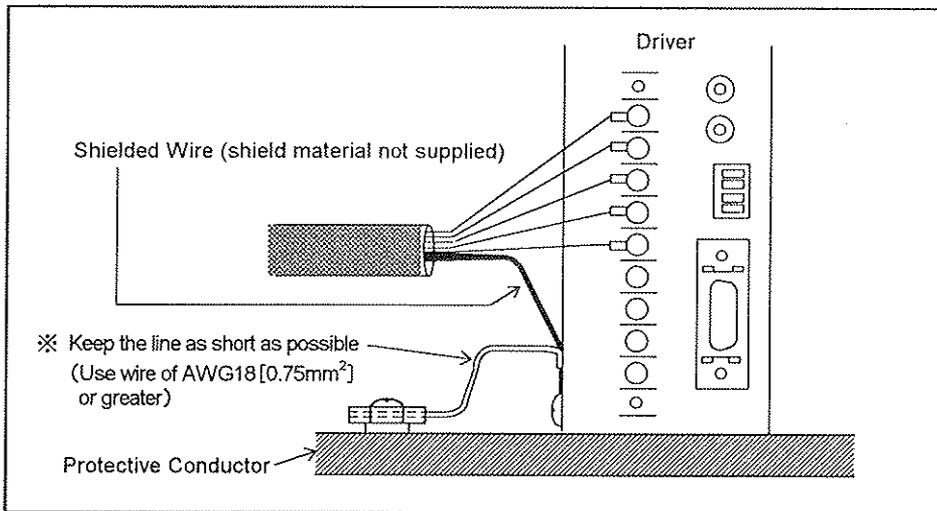
- (3) Plug the I/O connector into driver connector CN1, then tighten the flange screws to secure the connector to the driver. (Screw tightening torque: 0.15~0.25N·m (1.5~2.5kgcm))



7. 6. 2 Grounding the Driver

The driver is designed with a Class I basic insulation construction.

To prevent electric shock, connect the driver's protective earth terminal to a protective conductor.



7. 7 Connecting the Power Source

Connect to a power source of single phase 200—230V $\begin{matrix} +10\% \\ -15\% \end{matrix}$ 50/60Hz.

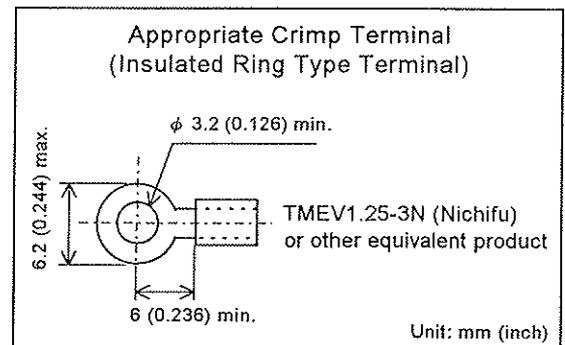
Use a power source which will supply sufficient input current.

The current value for input power as indicated in the specifications on pages 40, 41 is the maximum value.

The current value will vary according to the pulse frequency. Refer to the speed - torque characteristics in the product catalogue for the relationship between the input current and pulse frequency.

Connect the power source as follows:

1. Loosen the terminal cover screws (M3) and remove the terminal cover.
2. Attach crimp terminals to the power lines.
3. Loosen the terminal screws (M3), connect the power line crimp terminals to the driver terminals, and then tighten the terminal screws.
(Screw tightening torque: 0.5N · m (5kgcm))
Connect the motor lead wires at the same time. (See page 31)
4. Reattach the terminal cover, and tighten the terminal cover screws. (Screw tightening torque: 0.5N · m (5kgcm))



Note

- For power lines, use wire of AWG18 (0.75mm²) or greater .
- If the current from the power source is insufficient the motor torque will be reduced and the transformer may be damaged. The following abnormalities may also occur.
 - Erratic motor rotation during high speeds
 - Delayed motor start-up and stopping

7. 8 Turning On the Power

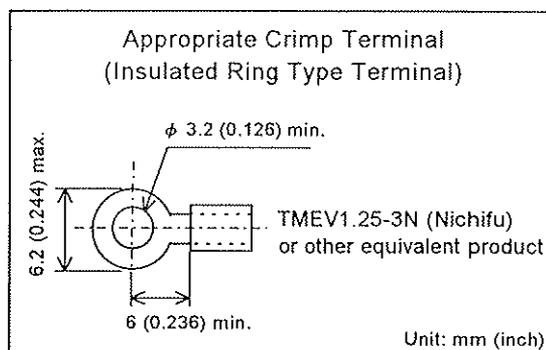
Before turning the power ON for the first time, be sure that the signal lines, motor lead wires, power line, and earth line are all properly connected, and that the terminal cover is attached.

7.4 Connecting the Motor and Driver

Connect the motor to the driver as follows:

1. Loosen the terminal cover screws (M3) and remove the terminal cover.
2. Attach crimp terminals to the motor lead wires.
3. Loosen the terminal screws (M3), connect the motor lead crimp terminals to the driver terminals, and then tighten the terminal screws. (Screw tightening torque: $0.5\text{N} \cdot \text{m}$ (5kgcm))
Connect the power lines at the same time. (See page 32)
4. Reattach the terminal cover, and tighten the terminal cover screws. (Screw tightening torque: $0.5\text{N} \cdot \text{m}$ (5kgcm))

- When extending the motor lead wires use wire of AWG20 (0.5mm^2) or greater.



7.5 Connecting the Driver and Controller

Connect the driver to the controller.

Confirm the following when making the connections:

- For signal lines, use wire of AWG24 (0.2mm^2) or greater, and 2m or less in length.
- Separate the signal lines from the power line and motor lead wires by at least 10cm. Do not band the wires together. This is to prevent noise interference from entering the signal lines and subsequent erratic motor operation.
- Use an open collector transistor (sink type) for the controller signal output.

If electrical noise generated by other equipment causes operational errors, shield the signal lines with conductive tape or wire mesh etc. (not supplied).

Connect the shield material to the driver's protective earth terminal for grounding.

Note: Do not excessively pull, bend, or pinch the signal lines. Damage may result.

7.6 Ground

7.6.1 Grounding the Motor

The motor is designed with a Class I basic insulation construction.

The protective earth is a terminal which provides a means of grounding the conductive parts which are capable of assuming hazardous voltages if the basic insulation fails.

If electrical noise interference from the motor cable becomes a problem, shield the cable with conductive tape or wire mesh (not supplied).

Connect the shield material to the driver's protective earth terminal for grounding.

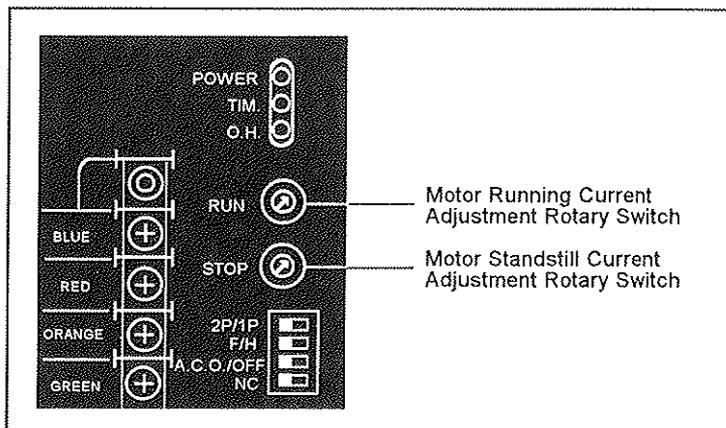
8. Motor Current Adjustment

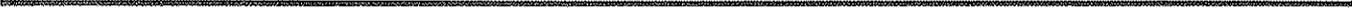
If maximum motor torque is not needed, the motor running current or the motor standstill current can be adjusted to reduce motor vibration and motor and driver heat generation.

- To reduce temperature rise of the motor and driver ⇒ Reduce the motor running current and the motor standstill current
- To reduce motor vibration ⇒ Reduce the motor running current

Driver Front Panel

UDK5214NW2





9. Troubleshooting

Consult the following chart if the motor is not functioning properly. If the motor is still not functioning properly after confirming the check points below, contact your nearest sales office as listed at the back of this manual.

PROBLEM	CHECK POINTS	MEASURES
No excitation in the motor. (The motor has no holding torque and the shaft can be turned freely by hand)	1. Is the driver POWER LED On? (If On, condition is normal)	If the POWER LED is not On, check if the power source is properly connected. Verify that AC200—230V power is being input. CAUTION: Double-pole/neutral fusing 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.
	2. Is the output current off signal being input to the driver?	When the output current off signal is input the motor will lose all excitation (no holding torque). Return the output current off signal to "H" level.
	3. Is the driver overheat LED Off? (If Off, condition is normal)	The overheat LED lights when the overheat signal is output. If the automatic current off function switch is set to the "A.C.O." position when this signal is output, the motor will lose all excitation (no holding torque). Refer to items 21 ~ 24 and take the necessary steps to prevent the overheat signal from being output.
	4. Are the driver and motor correctly connected?	Check the driver connection terminals. If the motor cable has been extended check the extension connection.
	5. Are the current adjustment rotary switches (RUN or STOP) set too low?	These rotary switches control the output current to the motor (refer to pages 34, 35). If they are set too low return them to the factory set positions.
Note: If the motor still has no torque after checking the above conditions, the driver is probably defective. After reconfirming that the power voltage and connections are correct, contact your nearest sales office for service.		
The motor does not rotate.	First check the 5 items above.	
The motor does not rotate when a pulse signal is input.	6. Are the pulse signal lines correctly connected? Are the pulse signal waveform characteristics correct?	Check the connections and pulse signal waveform characteristics (refer to pages 20, 21). Use a controller which is able to output a standard pulse signal.
	7. While in 2 pulse input mode (pulse input mode switch set to the "2P" position) is either the CW pulse/pulse input terminal or the CCW pulse/ rotation direction signal input terminal already at "L" level?	The motor will not rotate if a pulse signal is input when the other pulse signal input terminal is already at "L" level. Be sure to keep the pulse signal at "H" level.
	8. While in 1 pulse input mode (pulse input mode switch set to the "1P" position) is the pulse signal connected to the CCW pulse/rotation direction signal input terminal?	Connect the pulse signal to the CW pulse/pulse signal input terminal.

8.1 Motor Running Current Adjustment

The motor running current is factory set to the motor's rated current.

(Motor running current adjustment switch RUN set to "F")

Adjust the motor running current by turning the RUN rotary switch with a small slot screwdriver.

The RUN switch settings and corresponding current values are indicated in the following chart.

RUN switch settings and corresponding current values (representative values)



RUN Switch Settings	Running Current [A/phase]
	UDK5214NW
0	0.46
1	0.52
2	0.58
3	0.65
4	0.71
5	0.77
6	0.84
7	0.90
8	0.96
9	1.02
A	1.09
B	1.15
C	1.21
D	1.28
E	1.34
F	1.40

8.2 Motor Standstill Current Adjustment

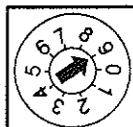
The current at motor standstill can be adjusted to reduce motor/driver heat generation. The motor standstill current is factory set to approximately 50% of the rated current. (Standstill current adjustment switch STOP set to "9").

Adjust the motor standstill current by turning the STOP rotary switch with a small slot screwdriver.

The amount of current reduction is proportional to the setting of the motor running current.

$$\text{Standstill Current [A/phase]} = \frac{\text{Running Current Setting [A/phase]} \times \text{Standstill Current Setting [\%]}}{100}$$

STOP switch settings and corresponding rate of current reduction (representative values)



STOP Switch Settings	% of Running Current
	UDK5214NW
0	19
1	19
2	22
3	26
4	30
5	33
6	37
7	41
8	45
9	48

The overheat signal is output.	21. Is the driver ambient temperature 0°C ~ +50°C?	If not, take the necessary steps to keep the ambient temperature within 0°C ~ +50°C.
	22. Is the driver located in an enclosed or poorly ventilated area?	Install the driver in a well ventilated area, or install a ventilation fan.
	23. Is the driver mounted to a metal surface?	If not, mount the driver to a metal surface or install a forced-air cooling fan.
	24. Is the driver continuously operating at a pulse rate which requires the maximum input current?	If changing the pulse rate is a possibility, try adjusting it enough to decrease the input current. For details refer to the driver input current values indicated in the "speed vs. torque characteristics" in the product catalogue.

PROBLEM	CHECK POINTS	MEASURES
The motor rotates in the wrong direction.	9. While in 2 pulse input mode (pulse input mode switch set to the "2P" position) are the CW and CCW pulse signal lines connected backwards?	Connect the CW pulse signal line to the CW pulse/pulse signal input terminal, and connect the CCW pulse signal line to the CCW pulse/rotation direction signal input terminal.
	10. While in 1 pulse input mode (pulse input mode switch set to the "1P" position) leave the CCW pulse/rotation direction signal input terminal unconnected and try inputting a pulse signal to the CW pulse/pulse signal input terminal.	If the motor rotates in a counterclockwise direction at this time, the motor and driver are normal. Recheck the rotation direction signal levels. ("L" level = clockwise, "H" level = counterclockwise)
Motor rotation is erratic.	First check items 3, 4, and 5.	
Motor start up is unstable.	11. Are the motor shaft and load properly aligned? Is the load too heavy for the motor?	Make sure the motor shaft and load are securely attached and properly aligned. Recheck the operating conditions, and if necessary lighten the load.
The motor rotates too far or not far enough.	12. Does the step angle required by your equipment match the step angle of the stepping motor?	Check the setting of the step angle switch located on the driver.
	13. Is the number of pulses set to match the amount of motor rotation?	Check the controller pulse setting.
The motor loses synchronization during acceleration or while running.	14. Is the overheat signal output LED Off? (If Off, condition is normal)	The overheat signal output LED lights when the overheat signal is output. If the automatic current off function switch is set to the "A.C.O." position when this signal is output, the motor will lose all excitation (no holding torque). Refer to items 21~24 and take the necessary steps to prevent the overheat signal from being output.
	15. Is the starting pulse frequency too high?	Check this by decreasing the frequency.
	16. Is the acceleration/deceleration time too short?	Check this by increasing the acceleration/deceleration time.
	17. Is the motor being affected by noise interference?	Check this by running the motor while the machine suspected of producing the noise interference is off.
Motor vibration is high.	18. Is the output torque too high?	Try reducing the motor running current with the RUN current adjustment switch .
	19. Try changing the pulse frequency.	If the vibration decreases after the pulse frequency has been adjusted, this means the motor is resonating. Either adjust the frequency or change the step angle. Also try installing the optional (sold separately) clean damper (for double shaft model only).
Motor temperature is very high.	20. Is the motor running time too long?	Shorten the running time or increase the resting time. (The temperature of the motor may rise considerably depending on the operating conditions. During high speeds and depending on the duty drive cycle, the motor could be susceptible to heat damage. Allow for sufficient heat dissipation from the motor.) For UL and CSA standards, insulation is Class A (105°C). (Keep the temperature of the motor case below 75°C) For other standards insulation is Class B (130°C) (Keep the temperature of the motor case below 100°C)

10. Specifications

Standard Type

Model Number	Single Shaft	UPK564AJW	UPK566AJW	UPK569AJW
	Double Shaft	UPK564BJW	UPK566BJW	UPK569BJW
Maximum Holding Torque	N·m (kgcm)	0.42 (4.2)	0.83 (8.3)	1.66 (16.6)
Rotor Inertia	kg·m ² (gcm ²)	175 × 10 ⁻⁷ (175)	280 × 10 ⁻⁷ (280)	560 × 10 ⁻⁷ (560)
Rated Current	A/phase	1.4		
Basic Step Angle		0.72°		
Insulation Class		Class B (130°C)		
Power Source		Single phase 200~230V ^{+10%} / _{-15%} 50/60Hz 3.5 A		
Output Current	A/phase	1.4		
Excitation Mode		<ul style="list-style-type: none"> · Full step 0.72° /step (4 phase excitation) · Half step 0.36° /step (4-5 phase excitation) (Selectable through built-in switch)		
Input Signals	Input Signal Circuit	Photocoupler input, input resistance 220 Ω, input current 20mA max. Signal voltage H: +4~+5V, L: 0~+0.5V		
	· CW Pulse Signal (Pulse Signal)	CW direction command pulse signal (movement command pulse signal when in 1 pulse input mode) Pulse width: 5 μsec min., pulse rise/fall: 2 μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
	· CCW Pulse Signal (Rotation Direction Signal)	CCW direction command pulse signal (rotation direction signal when in 1 pulse input mode, H: CCW, L: CW) Pulse width: 5 μsec min., pulse rise/fall: 2 μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
	· Output Current Off Signal	When at "L" level the current to the motor is cut off and the motor shaft can be rotated manually. When at "H" level the current level set by the RUN switch is supplied to the motor.		
Output Signals	Output Signal Circuit	Photocoupler · open collector output (emitter common) External use condition DC24V max., 10mA max.		
	· Excitation Timing Signal	The signal is output every time the excitation sequence returns to the initial stage "0". (photocoupler: ON) Full step: signal output every 10 pulses, Half step: signal output every 20 pulses		
	· Overheat Signal	The signal is output when the internal temperature of the driver rises above approximately 80°C. (photocoupler: ON) The motor stops automatically if the automatic current off function is ON.		
Functions		Automatic current cutback, pulse input mode switch, step angle switch, automatic current off,		
Indicators (LED)		Power input, excitation timing signal output, overheat signal output		
Cooling Method (Driver)		Convection		
Weight	Motor kg	0.6	0.8	1.3
	Driver kg	0.95		
Insulation Resistance	Motor	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.		
	Driver	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: <ul style="list-style-type: none"> · Power input terminal --- protective earth terminal · Motor output terminal --- protective earth terminal · Signal input/output terminal --- power input terminal · Signal input/output terminal --- motor output terminal 		
Dielectric Strength	Motor	Sufficient to withstand 1.5kV, 50Hz applied for one minute between the motor coils and casing under normal temperature and humidity.		
	Driver	Sufficient to withstand the following for one minute, under normal temperature and humidity. <ul style="list-style-type: none"> · Power input terminal --- protective earth terminal AC1.8kV 50Hz · Motor output terminal --- protective earth terminal AC1.8kV 50Hz · Signal input/output terminals --- power input terminal AC3.2kV 50HZ · Signal input/output terminals --- motor output terminal AC3.2kV 50HZ 		
Ambient Temperature Range	Motor	-10°C ~ +50°C		
	Driver	0°C ~ +50°C		

- Maximum holding torque refers to the holding torque at motor standstill when the rated current is supplied to the motor (5 phase excitation). Use this value to compare motor torque performance. When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.
- The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)
- Motor insulation is recognized as Class A (105°C) by UL and CSA standards.
- UL, CSA, and EN safety standard approvals for the driver are pending.



Standard Type

Model Number	Single Shaft	UPK596AJW	UPK599AJW	UPK5913AJW
	Double Shaft	UPK596BJW	UPK599BJW	UPK5913BJW
Maximum Holding Torque	N·m (kgcm)	2.1 (21)	4.1 (41)	6.3 (63)
Rotor Inertia	kg·m ² (gcm ²)	1400 × 10 ⁻⁷ (1400)	2700 × 10 ⁻⁷ (2700)	4000 × 10 ⁻⁷ (4000)
Rated Current	A / phase	1.4		
Basic Step Angle		0.72°		
Insulation Class		Class B (130°C)		
Power Source		Single phase 200—230V ^{+10%} / _{-15%} 50/60Hz 3.5A		
Output Current	A / phase	1.4		
Excitation Mode		<ul style="list-style-type: none"> • Full Step 0.72° /step (4 phase excitation) • Half Step 0.36° /step (4-5 phase excitation) (Selectable through built-in switch)		
Input Signals	Input Signal Circuit	Photocoupler input, input resistance 220 Ω, input current 20mA max. Signal voltage H : +4~+5V, L : 0~+0.5V		
	• CW Pulse Signal (Pulse Signal)	CW direction command pulse signal (movement command pulse signal when in 1 pulse input mode) Pulse width: 5 μsec min., pulse rise/fall: 2 μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
	• CCW Pulse Signal (Rotation Direction Signal)	CCW direction command pulse signal (rotation direction signal when in 1 pulse input mode) H : CCW, L : CW Pulse width: 5 μsec min., pulse rise/fall: 2 μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
	• Output Current Off Signal	When at "L" level the current to the motor is cut off and the motor shaft can be rotated manually. When at "H" level the current level set by the RUN switch is supplied to the motor.		
Output Signals	Output Signal Circuit	Photocoupler · open collector output (emitter common) External use condition DC24V max., 10mA max.		
	• Excitation Timing Signal	The signal is output every time the excitation sequence returns to the initial stage. (photocoupler: ON) Full step: signal output every 10 pulses, Half step: signal output every 20 pulses		
	• Overheat Signal	The signal is output when the internal temperature of the driver rises above approximately 80°C. (photocoupler: ON) The motor stops automatically if the automatic current off function is ON.		
Functions		Automatic current cutback, pulse input mode switch, step angle switch, automatic current off		
Indicators (LED)		Power input, excitation timing signal output, overheat signal output		
Cooling Method (Driver)		Convection		
Weight	Motor	kg	1.7	2.8
	Driver	kg	0.95	
Insulation Resistance	Motor	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.		
	Driver	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: <ul style="list-style-type: none"> • Power input terminal — protective earth terminal • Motor output terminal — protective earth terminal • Signal input/output terminal — power input terminal • Signal input/output terminal — motor output terminal 		
Dielectric Strength	Motor	Sufficient to withstand 1.5kV at 50Hz applied for one minute between the motor coils and casing under normal temperature and humidity.		
	Driver	Sufficient to withstand the following for one minute, under normal temperature and humidity. <ul style="list-style-type: none"> • Power input terminal — protective earth terminal AC1.8kV 50Hz • Motor output terminal — protective earth terminal AC1.8kV 50Hz • Signal input/output terminal — power input terminal AC3.2kV 50Hz • Signal input/output terminal — motor output terminal AC3.2kV 50Hz 		
Ambient Temperature Range	Motor	-10°C ~ +50°C		
	Driver	0°C ~ +50°C		

- Maximum holding torque refers to the holding torque at motor standstill when the rated current is supplied to the motor (5 phase excitation). Use this value to compare motor torque performance. When using the motor with the dedicated driver, the driver's automatic current cutback at motor standstill function reduces maximum holding torque by approximately 50%.
- The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)
- Motor insulation is recognized as Class A (105°C) by UL and CSA standards.
- UL, CSA, and EN safety standard approvals for the driver are pending.

Stepping Motor

Model Number	Single Shaft	PK564AW PK566AW PK569AW PK596AW PK599AW PK5913AW
	Double Shaft	PK564BW PK566BW PK569BW PK596BW PK599BW PK5913BW
Protective Range		IP30 (when cable strain relief is facing downwards)
Operation Environment	Ambient Temperature	-10°C ~ +50°C (non-freezing)
	Humidity	85% max. (non-condensing)
Altitude	Surrounding Atmosphere	Up to 1000m above sea level No corrosive gas, dust, water or oil
	Surrounding Atmosphere	
Storage Environment	Ambient Temperature	-25°C ~ +70°C
	Humidity	85% max. (non-condensing)
Altitude	Surrounding Atmosphere	Up to 3000m above sea level No corrosive gas, dust, water or oil
	Surrounding Atmosphere	
Shipping Environment	Ambient Temperature	-25°C ~ +70°C
	Humidity	85% max. (non-condensing)
Altitude	Surrounding Atmosphere	Up to 3000m above sea level No corrosive gas, dust, water or oil
	Surrounding Atmosphere	
Applicable Standards	UL, CSA Standards	UL1004, UL519 CAN/CSA-C22.2 No.17, 100
	EN/IEC Standards	EN60950 (approvals received) IEC34-1, IEC34-5 (approvals pending)
Standard File No.		E64199
Installation Conditions		Motor is to be used as a component within other equipment Equipment category (over voltage category): II Pollution degree: Class 2 Class: I

Stepping Motor Driver

Model Number	UDK5214NW	
Protective Range		
Operation Environment	Ambient Temperature	0°C ~ +50°C (non-freezing)
	Humidity	85% max. (non-condensing)
Altitude	Surrounding Atmosphere	Up to 1000m above sea level No corrosive gas, dust, water or oil
	Surrounding Atmosphere	
Storage Environment	Ambient Temperature	-25°C ~ +70°C
	Humidity	85% max. (non-condensing)
Altitude	Surrounding Atmosphere	Up to 3000m above sea level No corrosive gas, dust, water or oil
	Surrounding Atmosphere	
Shipping Environment	Ambient Temperature	-25°C ~ +70°C
	Humidity	85% below (non-condensing)
Altitude	Surrounding Atmosphere	Up to 3000m above sea level No corrosive gas, dust, water or oil
	Surrounding Atmosphere	
Applicable Standards (approvals pending)		UL508C CAN/CSA-C22.2 No.14 EN60950, EN50178
Installation Conditions		Driver is to be used as a component within other equipment Equipment category (over voltage category): II Pollution degree: Class 2 Class: I

- Motors and drivers are not measured individually for EMC. Perform the EMC test when products are incorporated into the final equipment.
- UL, CSA, and EN safety standard approvals for the driver are pending.

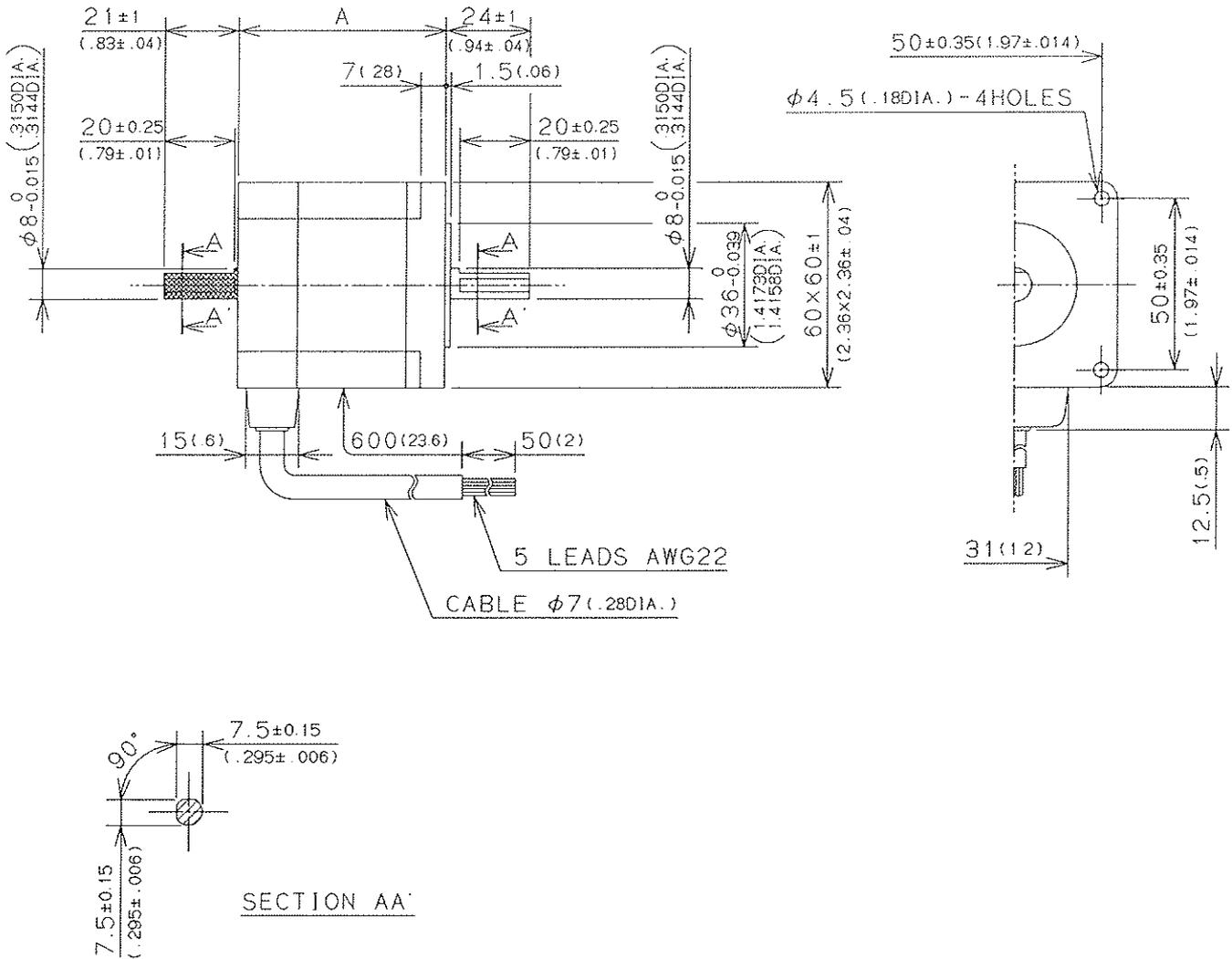


11. Dimensions

11.1 Motor Unit : mm (inch)

11.1.1 Standard Type

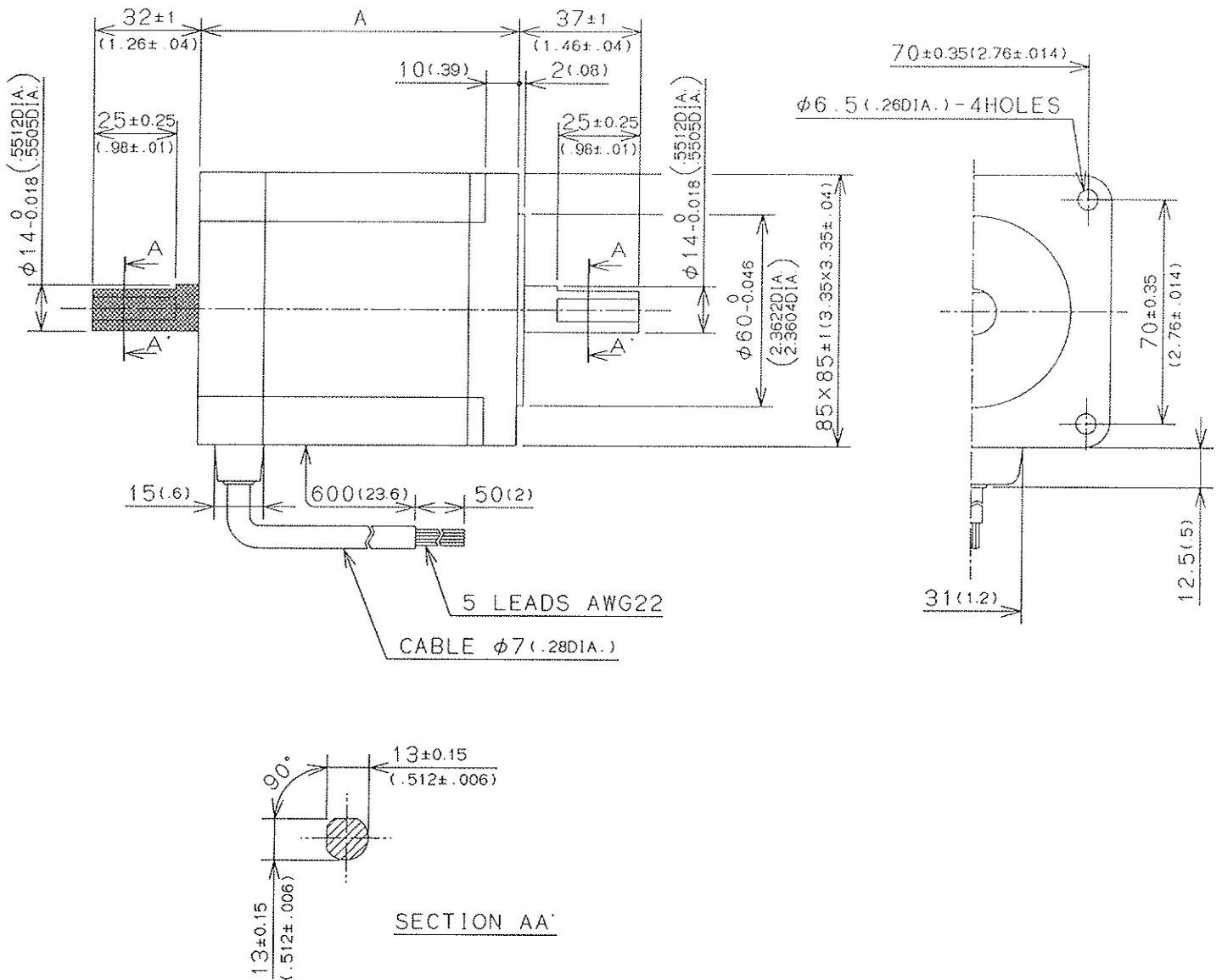
Model	A
PK564AW, PK564BW	48.5 ± 1 (1.91 ± .04)
PK566AW, PK566BW	59.5 ± 1 (2.34 ± .04)
PK569AW, PK569BW	89 ± 1 (3.50 ± .04)



※ This is a dimensional drawing of the double shaft motor.

For the single shaft motor, there is no shaded area .

Model	A
PK596AW, PK596BW	68±1 (2.68±.04)
PK599AW, PK599BW	98±1 (3.86±.04)
PK5913AW, PK5913BW	128±1 (5.04±.04)

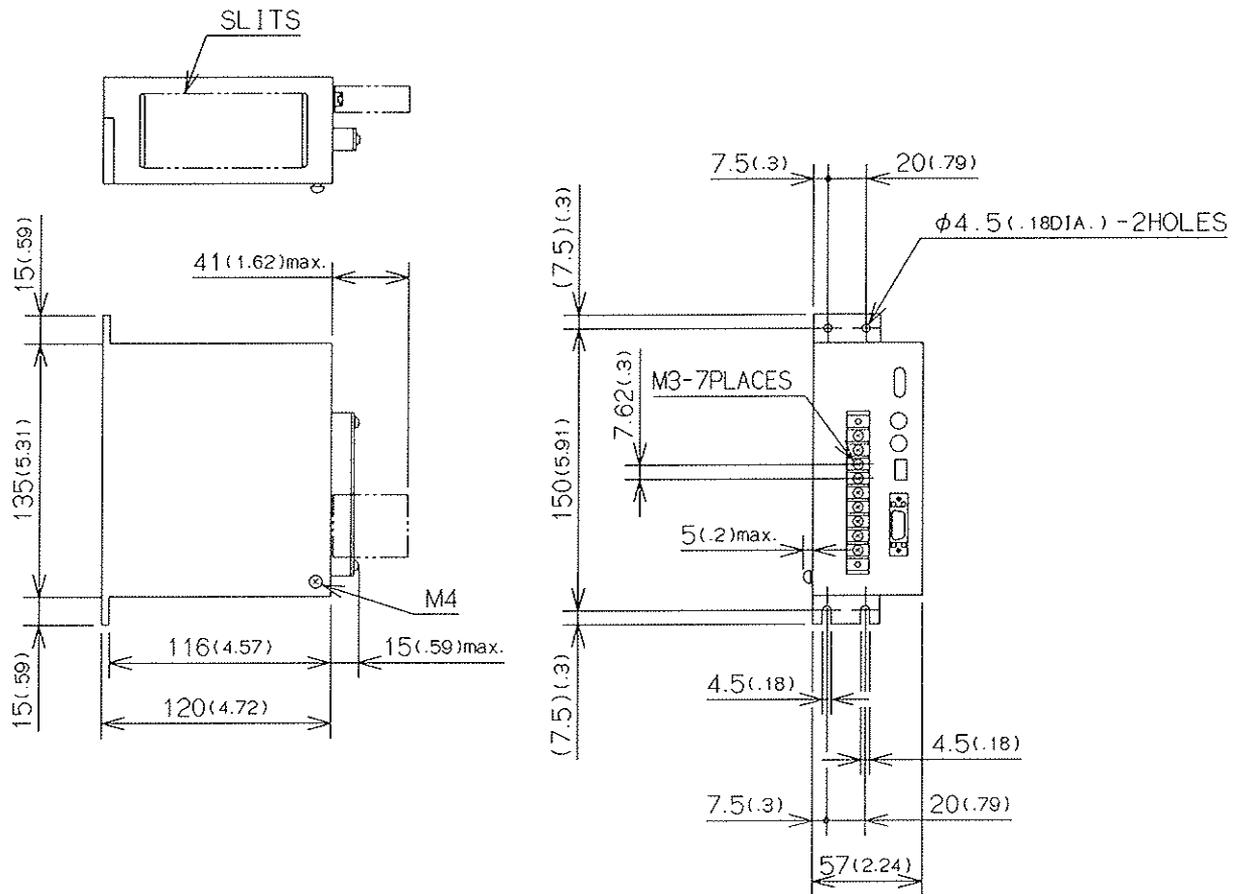


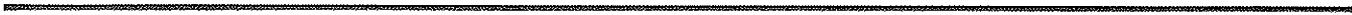
※This is a dimensional drawing of the double shaft motor.
 For the single shaft motor, there is no shaded area .

11.2 Driver Unit : mm (inch)

11.2.1 Standard Type

Model : UDK5214NW





-Characteristics, specifications and dimensions are subject to change without notice.
-Please contact your nearest ORIENTAL MOTOR office for further information.

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