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HP-4077-3

SUPER VEXTA®

5 Phase Stepping Motor and Driver

UPK Series

- Standard Type
- High Speed Type
- Electromagnetic Brake • Standard Type
- Electromagnetic Brake • High Speed Type

OPERATING MANUAL

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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.

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1. Precautions

Precautions for Installation

- Do not use in a place where there is flammable gas and/or corrosive gas.
- Products are 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.

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℃ (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

2. Product Verification

2.1 Equipment Checklist

Confirm that the following equipment is included in your package.

Contact your nearest sales office as listed at the back of this manual if something is either not included or damaged.

- Motor 1
- Driver 1
- Driver Mounting Brackets ..... 2 types, 2 brackets for each
- M3 Screws for Mounting Brackets 4
- Operating Manual 1

2.2 Model Numbers and Motor/Driver Combinations

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

This operating manual is designated for the following products.

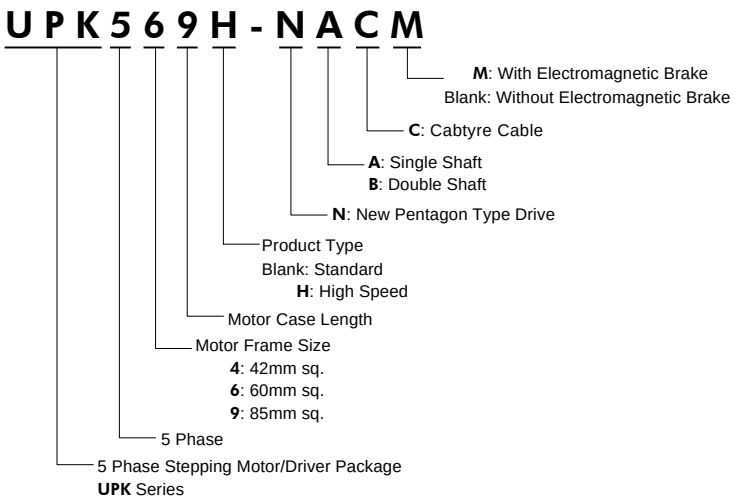
Product Type	Package Model Number	Motor		Driver	
		Model Number	Rated Current	Model Number	Output Current
Standard	**UPK543-NAC**	PK543-NAC	0.75A/phase	UDK5107N	0.75A/phase (max.)
	UPK543-NBC	PK543-NBC			
	UPK544-NAC	PK544-NAC			
	UPK544-NBC	PK544-NBC			
	UPK545-NAC	PK545-NAC			
	UPK545-NBC	PK545-NBC			
	UPK564-NAC	PK564-NAC	1.4A/phase	UDK5114N	1.4A/phase (max.)
	UPK564-NBC	PK564-NBC			
	UPK566-NAC	PK566-NAC			
	UPK566-NBC	PK566-NBC			
	UPK569-NAC	PK569-NAC			
	UPK569-NBC	PK569-NBC			
	UPK596-NAC	PK596-NAC			
	UPK596-NBC	PK596-NBC			
	UPK599-NAC	PK599-NAC			
	UPK599-NBC	PK599-NBC			
	UPK5913-NAC	PK5913-NAC			
	UPK5913-NBC	PK5913-NBC			
High Speed	**UPK569H-NAC**	PK569H-NAC	2.8A/phase	UDK5128N	2.8A/phase (max.)
	UPK569H-NBC	PK569H-NBC			
	UPK596H-NAC	PK596H-NAC			
	UPK596H-NBC	PK596H-NBC			
	UPK599H-NAC	PK599H-NAC			
	UPK599H-NBC	PK599H-NBC			
	UPK5913H-NAC	PK5913H-NAC			
	UPK5913H-NBC	PK5913H-NBC			

Product Type	Package Model Number	Motor		Driver	
		Model Number	Rated Current	Model Number	Rated Current
Electromagnetic Brake Standard	**UPK564-NACM**	PK564-NACM	1.4A/phase	UDK5114N-M	1.4A/phase (max.)
	UPK566-NACM	PK566-NACM			
	UPK569-NACM	PK569-NACM			
	UPK596-NACM	PK596-NACM			
	UPK599-NACM	PK599-NACM			
	UPK5913-NACM	PK5913-NACM			
Electromagnetic Brake High Speed	**UPK569H-NACM**	PK569H-NACM	2.8A/phase	UDK5128N-M	2.8A/phase (max.)
	UPK596H-NACM	PK596H-NACM			
	UPK599H-NACM	PK599H-NACM			
	UPK5913H-NACM	PK5913H-NACM			

Note

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

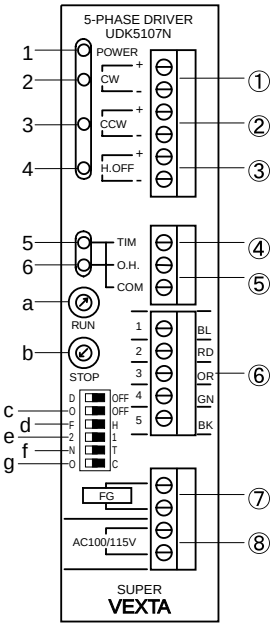
2.3 Interpreting the Model Number



3. Names and Functions of Driver Parts

Driver Front Panel

Standard Type Driver: UDK5107N



Standard Type Driver: UDK5114N
High Speed Type Driver: UDK5128N

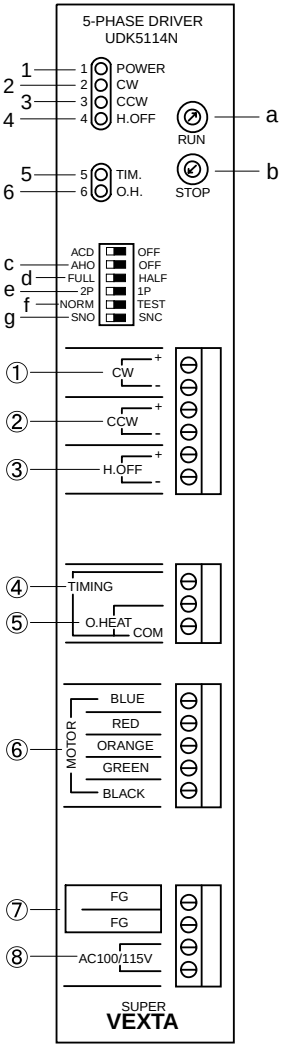


Illustration shows UDK5114N.

Electromagnetic Brake
Standard Type Driver: UDK5114N-M
Electromagnetic Brake
High Speed Type Driver: UDK5128N-M

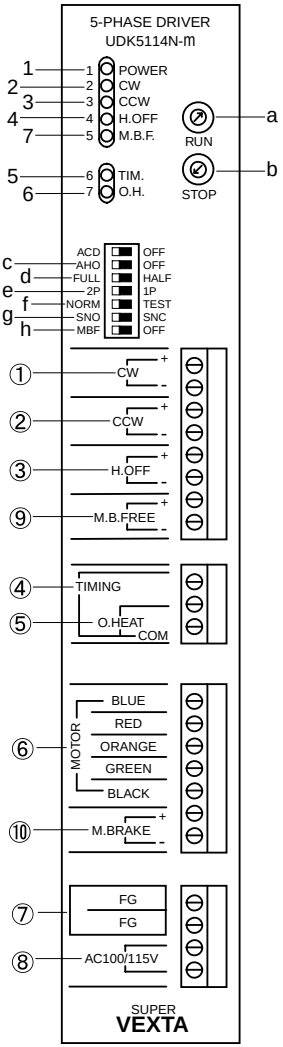


Illustration shows UDK5114N-M.

3.1 LED Indicators

The LED indicators show the state of various input/output signals etc.
They are indicated on page 6 as 1～6 (1～7 for the electromagnetic brake type).

Information within the brackets [ ] refers to driver model UDK5107N only.

LED Name	Indication	Color	Condition When LED ON	Page Reference
1 Power Input LED	POWER	Green	Lights when single phase 100V ± 15% (50/60Hz) or single phase 115V ± 15% (60Hz) is input.	——
2 CW Pulse Signal Input LED	CW	Green	Lights when a CW pulse signal is input. (In 1 pulse input mode, indicates a pulse signal is input.)	Page 22, 23
3 CCW Pulse Signal Input LED	CW	Green	Lights when a CCW pulse signal is input. (In 1 pulse input mode, indicates a rotation direction signal is input)	Page 22, 23
4 Output Current Off Signal Input LED	H.OFF	Green	Lights when the output current off signal is input.	Page 24
5 Excitation Timing Signal Output LED	TIM.	Green	Lights when the excitation timing signal is output.	——
6 Overheat Signal Output LED	O.H.	Red	Lights when the overheat signal is output.	Page 27, 28
7 Electromagnetic Brake Release Signal Input LED (For electromagnetic brake type only)	M.B.F.	Green	Lights when the electromagnetic brake release signal is input.	Page 25, 26

3.2 Switches

The switches are indicated on page 6 as a～h (a～i for the electromagnetic brake type).

Information within the brackets [ ] refers to driver model UDK5107N only.

Switch Name	Indication	Factory setting	Function	Page Reference
a Motor Running Current Adjustment Rotary Switch	RUN	F	The motor running current can be adjusted with this digital switch. Adjustment is simple and an ammeter is not necessary.	Page 38, 39
b Motor Standstill Current Adjustment Rotary Switch	STOP	7	The motor standstill current can be reduced with this digital switch. Adjustment is simple and an ammeter is not necessary. Be sure to keep the switch set to 7 or below.	Page 38, 39
c Automatic Current Off Function Switch	AHO/OFF [O/OFF]	AHO [O]	This function will automatically cut the power to the motor when the internal temperature of the driver rises above 80℃. This function can be enabled or disabled with this switch.	Page 18, 19
d Step Angle Switch	FULL/HALF [F/H]	FULL [F]	The motor step angle can be set to full step or half step with this switch.	Page 18, 19
e Pulse Input Mode Switch	2P/1P [2/1]	2P [2]	The pulse signal input mode can be set to 1 pulse input mode or 2 pulse input mode with this switch.	Page 18, 20
f Self Test Function Switch	NORM/TEST [N/T]	NORM [N]	This function allows for verification of correct wiring connections between the motor and driver. The test can be enabled and disabled with this switch.	Page 18, 20
g Overheat Output Logic Switch	SNO/SNC [O/C]	SNO [O]	This switch sets the output logic for the overheat signal. SNO [O] : Normal open SNC [C] : Normal closed Match the setting to your equipment.	Page 18, 21
h Electromagnetic Brake Function Switch (For electromagnetic brake type only)	MBF/OFF	MBF	This switch sets the electromagnetic brake operation mode. MBF: Normally released, engaged when power is off OFF: Normally engaged, released through the M.B.FREE signal	Page 18, 21

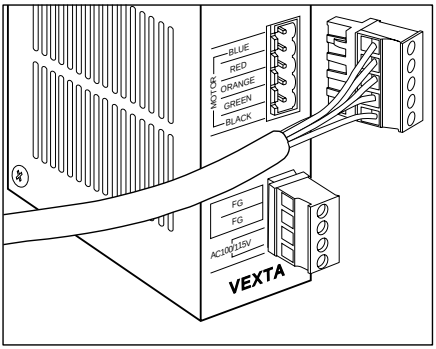
3.3 Terminals

The input and output terminals are indicated on page 6 as ①～⑧ (①～⑩ for the electromagnetic brake type).

Information within the brackets [ ] refers to driver model UDK5107N only.

Terminal Name	Indication	Function	Page Reference
①CW Pulse Signal Input Terminal	CW	The CW direction command 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 22, 23
②CCW Pulse Signal Input Terminal	CCW	The CCW direction command 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 22, 23
③Output Current Off Signal Input Terminal	H.OFF	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 manually setting the motor to the home position etc.	Page 24
④Excitation Timing Signal Output Terminal	TIMING [TIM]	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.	——
⑤Overheat Signal Output Terminal	O.HEAT [O.H.]	The overheat signal is output from this terminal. This signal is output when the internal temperature of the driver rises above 80℃. This is used to prevent excess heat from damaging the driver.	Page 27, 28
⑥Motor Connection Terminal	MOTOR [1, 2, 3, 4, 5]	This is the output terminal for the motor. The colors indicated on this terminal are matched to the motor lead wires for connection.	Page 30～32
⑦Frame Ground Terminal	FG	This terminal is used to ground the driver case. Make a one point ground between this terminal and the controller FG terminal.	Page 34
⑧Power Source Connection Terminal	AC100/115V	Connect this terminal to a power source of either single phase 100V ± 15% 50/60Hz or 115V ± 15% 60Hz.	Page 35
⑨Electromagnetic Brake Release Signal Input Terminal (For electromagnetic brake type only)	M.B.FREE	The electromagnetic brake release signal is input to this terminal. Inputting this signal will release the electromagnetic brake. This terminal is used to release and engage the brake by means of an external signal.	Page 25, 26
⑩Electromagnetic Brake Connection Terminal (For electromagnetic brake type only)	M.BRAKE	This is the output terminal for the electromagnetic brake. Connect it to the electromagnetic brake.	Page 30～32

3.4 Connector



Two types of combination connectors are used on the driver.
These combination connectors are very easy to use and have the benefits of both a conventional terminal block and a connector type terminal. Simply insert the signal lines, motor lead wires, and power lines into the connector and tighten the screws. The combination connector incorporates a mechanism to prevent loosening, and is very dependable without the use of a crimp terminal.
The connectors used for the motor leads (cabtyre cable) and power line have a screw flange. Be sure to properly tighten the flange screws.

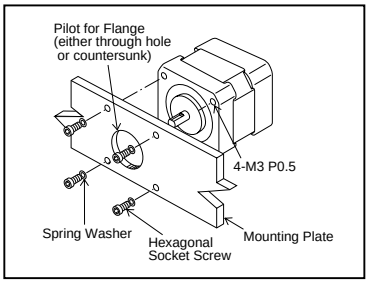
4. Installation

4.1 Motor Installation

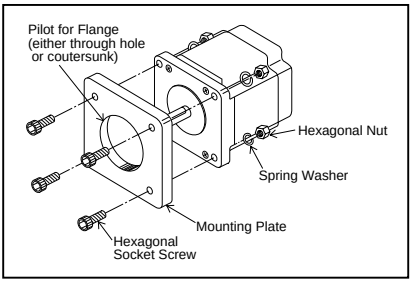
4.1.1 How to Install the Motor

To allow for heat dissipation and to prevent vibration, be sure to securely attach the motor to solid metal surface.

Installation Method A



Installation Method B



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

- Hexagonal Socket Screws 4

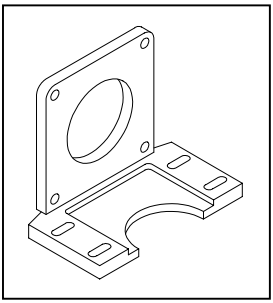
Enter **A** (single shaft) or **B** (double shaft) in the ☐ within the model numbers.

Motor Frame Size	Package Model Number	Installation Method	Screw Type	Tightening Torque
42mm	**UPK543-N ☐ C, UPK544-N ☐ C, UPK545-N ☐ C**	A	M3	1.0N・m (10kgcm)
60mm	**UPK564-N ☐ C, UPK564-NACM** **UPK566-N ☐ C, UPK566-NACM** **UPK569-N ☐ C, UPK569-NACM** **UPK569H-N ☐ C, UPK569H-NACM**	B	M4	2.0N・m (20kgcm)
85mm	**UPK596-N ☐ C, UPK596-NACM** **UPK596H-N ☐ C, UPK596H-NACM** **UPK599-N ☐ C, UPK599-NACM** **UPK599H-N ☐ C, UPK599H-NACM** **UPK5913-N ☐ C, UPK5913-NACM** **UPK5913H-N ☐ C, UPK5913H-NACM**	B	M5	3.0N・m (30kgcm)

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

- Spring Washers 4
- Hexagonal Nuts ..... 4 (only necessary for installation method B)

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



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

Mounting Bracket Model	Motor Frame Size	Package Model
PAF0P **PAL0P**	42mm	**UPK543-N ☐ C, UPK544-N ☐ C** **UPK545-N ☐ C**
PAL2P-5	60mm	**UPK564-N ☐ C, UPK564-NACM** **UPK566-N ☐ C, UPK566-NACM** **UPK569-N ☐ C, UPK569-NACM** **UPK569H-N ☐ C, UPK569H-NACM**
PAL4P-5	85mm	**UPK596-N ☐ C, UPK596-NACM** **UPK596H-N ☐ C, UPK596H-NACM** **UPK599-N ☐ C, UPK599-NACM** **UPK599H-N ☐ C, UPK599H-NACM** **UPK5913-N ☐ C, UPK5913-NACM** **UPK5913H-N ☐ C, UPK5913H-NACM**

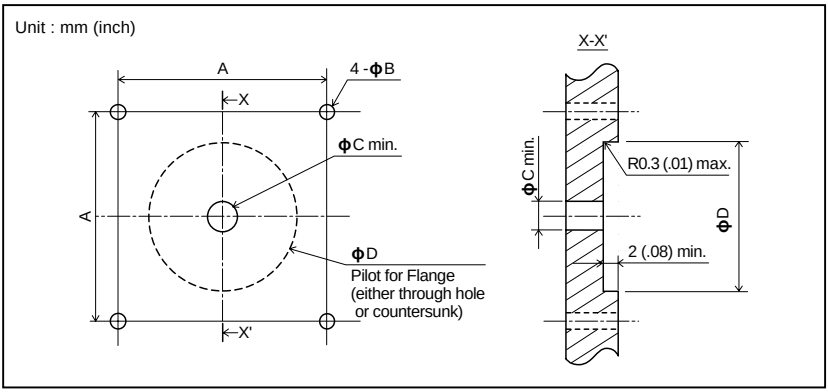
4.1.2 Motor Installation Location

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 operating temperature -10℃～ +50℃ (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.)
- 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

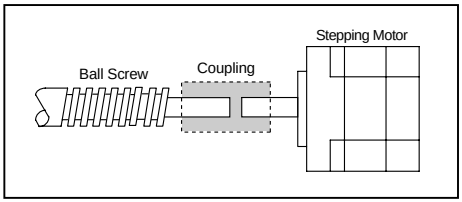
Unit : mm (inch)



Enter **A** (single shaft) or **B** (double shaft) in the ☐ within the model numbers. [Unit : mm (inch)]

Motor Size	Motor / Driver Package Model	Mounting Plate Thickness	A	ϕ B	ϕ C	ϕ D
42mm	**UPK543-N ☐ C, UPK544-N ☐ C** **UPK545-N ☐ C**	4min. (.16min.)	31 ± 0.1 (1.22 ± .014)	3.5 (.14DIA)	5.5min. (.22min.)	$22^{+0.033}_{0}$ ($^{0.8674DIA.}_{0.8661DIA.}$)
60mm	**UPK564-N ☐ C, UPK564-NACM** **UPK566-N ☐ C, UPK566-NACM** **UPK569-N ☐ C, UPK569-NACM** **UPK569H-N ☐ C, UPK569H-NACM**	5min. (.20min.)	50 ± 0.35 (1.97 ± .014)	4.5 (.18DIA)	8.5min. (.33min.)	$36^{+0.039}_{0}$ ($^{1.4189DIA.}_{1.4173DIA.}$)
85mm	**UPK596-N ☐ C, UPK596-NACM** **UPK596H-N ☐ C, UPK596H-NACM** **UPK599-N ☐ C, UPK599-NACM** **UPK599H-N ☐ C, UPK599H-NACM** **UPK5913-N ☐ C, UPK5913-NACM** **UPK5913H-N ☐ C, UPK5913H-NACM**	8min. (.31min.)	70 ± 0.35 (2.76 ± .014)	6.5 (.26DIA)	14.5min. (.57min.)	$60^{+0.046}_{0}$ ($^{2.3640DIA.}_{2.3622DIA.}$)

4.1.4 Connecting the Motor to the Drive Mechanism (Load)

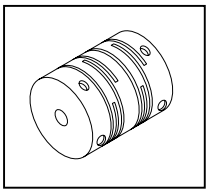


Proper alignment is necessary when connecting the drive mechanism (load) to the motor shaft. Use a flexible coupling.

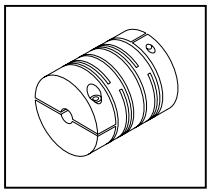
Note

• 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.



Set Screw Type



Clamp Type

Interpreting the Model Number

MC 25 08 08 C

- C: Fastening Method — Blank: Set Screw Type; **C**: Clamp Type
- 08: Shaft Diameter d2 (side of larger diameter)
- 08: Shaft Diameter d1 (side of smaller diameter)

Example) For the **UPK566-NAC** 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							
			ϕ 4	ϕ 5	ϕ 6	ϕ 8	ϕ 10	ϕ 12	ϕ 14	ϕ 16
MC12	**UPK543-N ☐ C** **UPK544-N ☐ C**	ϕ 5	◎	◎	○					
MC16	**UPK545-N ☐ C**	ϕ 5			◎					
MC20	**UPK564-N ☐ C, UPK564-NACM**	ϕ 8			◎	◎	◎			
MC25	**UPK566-N ☐ C, UPK566-NACM**	ϕ 8			◎	◎	◎			
MC32	**UPK569-N ☐ C, UPK569-NACM** **UPK569H-N ☐ C, UPK569H-NACM**	ϕ 8			◎	◎	◎			
MC40	**UPK596-N ☐ C, UPK596-NACM** **UPK596H-N ☐ C, UPK596H-NACM** **UPK599-N ☐ C, UPK599-NACM** **UPK599H-N ☐ C, UPK599H-NACM**	ϕ 14						◎	◎	◎
MC50	**UPK5913-N ☐ C, UPK5913-NACM** **UPK5913H-N ☐ C, UPK5913H-NACM**	ϕ 14						◎	◎	◎

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
42mm	**UPK543-N ☐ C, UPK544-N ☐ C, UPK545-N ☐ C**	20 (2)	25 (2.5)	34 (3.4)	52 (5.2)	——
60mm	**UPK564-N ☐ C, UPK564-NACM** **UPK566-N ☐ C, UPK566-NACM** **UPK569-N ☐ C, UPK569-NACM** **UPK569H-N ☐ C, UPK569H-NACM**	63 (6.3)	75 (7.5)	95 (9.5)	130 (13)	190 (19)
85mm	**UPK596-N ☐ C, UPK596-NACM** **UPK596H-N ☐ C, UPK596H-NACM** **UPK599-N ☐ C, UPK599-NACM** **UPK599H-N ☐ C, UPK599H-NACM** **UPK5913-N ☐ C, UPK5913-NACM** **UPK5913H-N ☐ C, UPK5913H-NACM**	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 Driver Installation

4.2.1 How to Install the Driver

Use mounting brackets type " A " (see pages 57～61 for dimensions) when mounting the driver to a vertical surface, and use mounting brackets type " B " (see pages 57～61 for dimensions) when mounting the driver to a horizontal surface.

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

The following hardware is needed to mount the driver.

- M3 Screws ..... 4 (supplied)
- M4 Screws ..... 4* (not supplied)
- M4 Flat Washers ..... 4* (not supplied)
- M4 Spring Washers ..... 4* (not supplied)

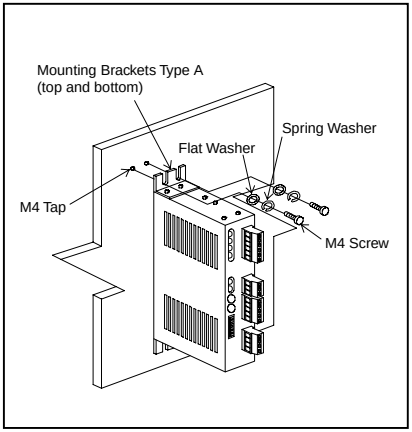
* Only 3 screws/washers are needed when mounting the driver base down to a horizontal surface.

When mounting the driver to a vertical surface (Using mounting brackets type " A ")

Attach the provided mounting brackets type " A " to the driver as shown below, and then secure the driver to the equipment mounting plate. (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.

Standard Type Driver: UDK5107N

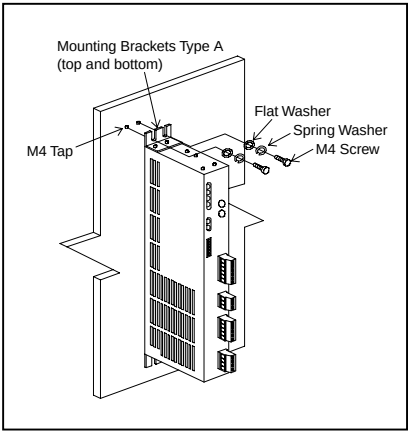


Standard Type Driver: UDK5114N

Electromagnetic Brake
Standard Type Driver: UDK5114N-M

High Speed Type Driver: UDK5128N

Electromagnetic Brake
High Speed Type Driver: UDK5128N-M



When mounting the driver base down to a horizontal surface
(Using mounting brackets type " B ")

Attach the provided mounting brackets type" B "to the driver as shown below, and then secure the driver to the equipment mounting plate. (Secured through 3 screws)

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

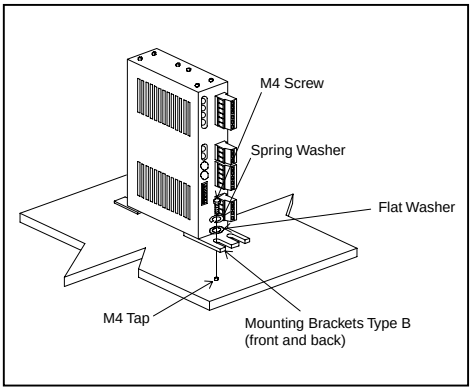
Standard Type Driver: UDK5114N

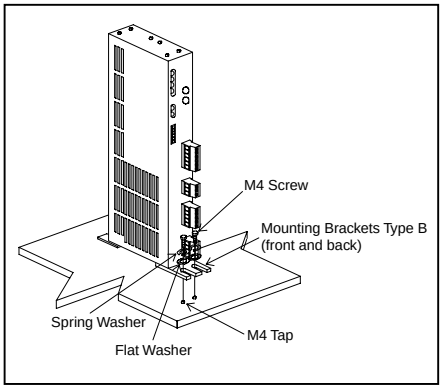
Electromagnetic Brake
Standard Type Driver: UDK5114N-M

High Speed Type Driver: UDK5128N

Electromagnetic Brake
High Speed Type Driver: UDK5128N-M

Standard Type Driver: UDK5107N





4.2.2 Driver Installation Location

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

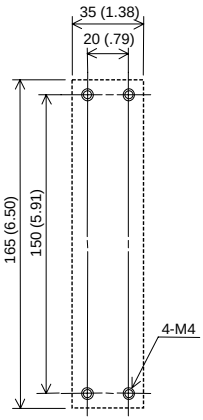
- Indoors (The driver is designed and manufactured to be used as an internal component within other equipment.)
- Ambient temperature range 0℃～+50℃ (non-freezing). Install a forced-air cooling fan if ambient temperatures exceed 50℃.
- Ambient humidity below 85%(non-condensing)
- No explosive, combustible, on corrosive gases
- No direct sunlight
- No dust or conductive particles (i.e. metal chips or shavings, pins, or wire fragments etc.)
- Where the motor 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, and near a heat source, be sure to establish ventilation holes. The heat generated by the driver will cause the ambient temperature to rise which could consequently damage the driver.
- 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 20mm between the driver base and other equipment or structure. Otherwise heat generated by a driver may damage a driver.
- If using more than one driver, leave a space of at least 20mm between each driver and at least 25mm between a driver and other equipment. The heat generated by the drivers will cause the ambient temperature to rise which could consequently cause driver damage.

4.2.3 Driver Mounting Plate Dimensions

[Unit : mm (inch)]

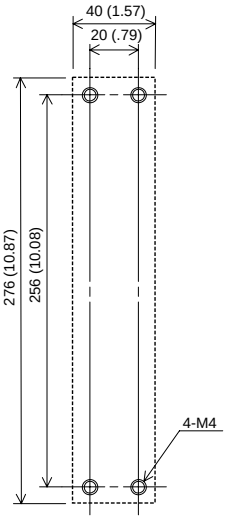
When mounting the driver to a vertical surface (Using mounting brackets type " A ")

Standard Type Driver:
UDK5107N



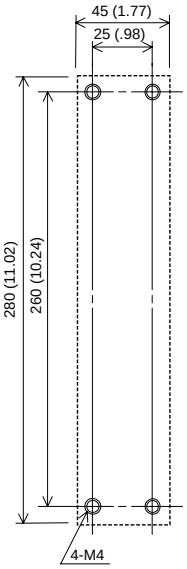
Standard Type Driver:
UDK5114N

Electromagnetic Brake
Standard Type Driver:
UDK5114N-M



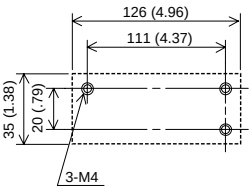
High Speed Type Driver:
UDK5128N

Electromagnetic Brake
High Speed Type Driver:
UDK5128N-M



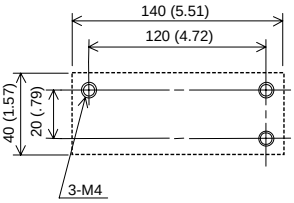
When mounting the driver base down to a horizontal surface
(Using mounting brackets type " B ")

Standard Type Driver:
UDK5107N



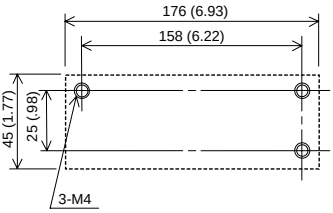
Standard Type Driver:
UDK5114N

Electromagnetic Brake
Standard Type Driver:
UDK5114N-M



High Speed Type Driver:
UDK5128N

Electromagnetic Brake
High Speed Type Driver:
UDK5128N-M

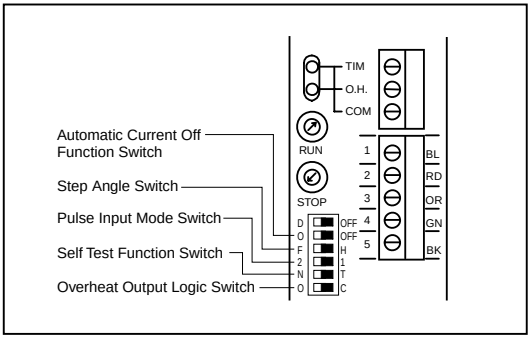


5. Driver Function Switches

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

Driver Front Panel

Standard Type Driver: UDK5107N



Standard Type Driver: UDK5114N
High Speed Type Driver: UDK5128N

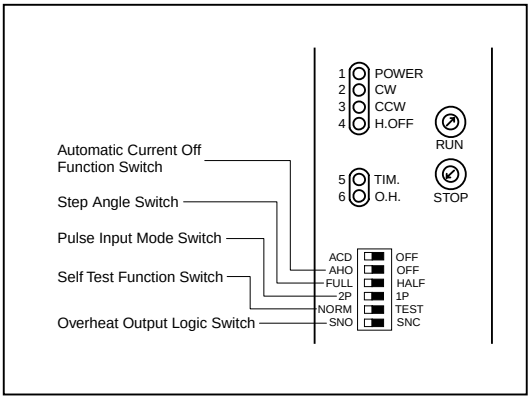


Illustration shows UDK5114N.

Electromagnetic Brake
Standard Type Driver: UDK5114N-M

Electromagnetic Brake
High Speed Type Driver: UDK5128N-M

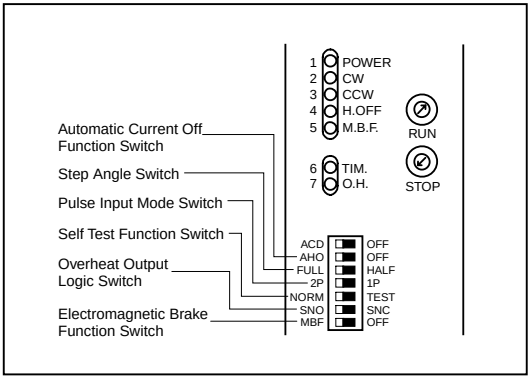
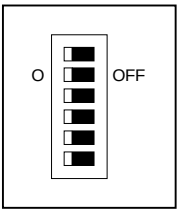


Illustration shows UDK5114N-M.

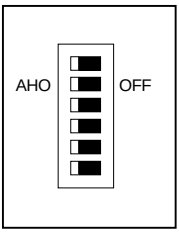
The white square section of the function switch represents the switch lever.

5.1 Automatic Current Off Function Switch

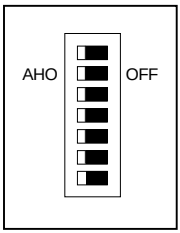
UDK5107N



UDK5114N
UDK5128N



UDK5114N-M
UDK5128N-M



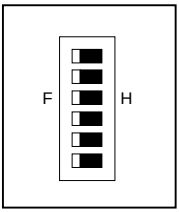
(Factory Setting: AHO [O])

information within the brackets [ ] refers to driver model UDK5107N only.

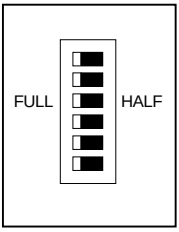
When the automatic function switch is set to the AHO [O] position, the automatic current off function is enabled. While enabled, if the internal temperature of the driver rises above 80**℃**, the overheat signal will be output, and the current to the motor will be cut off. (Refer to pages 27, 28 for 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.

5.2 Step Angle Switch

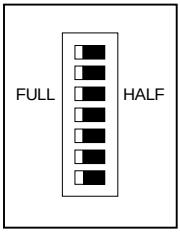
UDK5107N



UDK5114N
UDK5128N



UDK5114N-M
UDK5128N-M



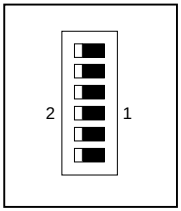
(Factory Setting: FULL [F])

information within the brackets [ ] refers to driver model UDK5107N only.

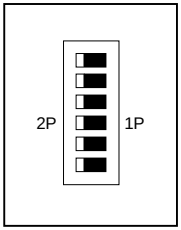
When the switch is set to:
FULL [F] → 1 step = 0.72 ° (1 rotation = 500 pulses)
HALF [H] → 1 step = 0.36 ° (1 rotation = 1000 pulses)

5.3 Pulse Input Mode Switch

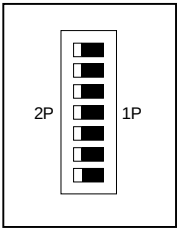
UDK5107N



UDK5114N
UDK5128N



UDK5114N-M
UDK5128N-M



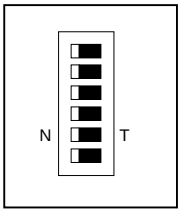
(Factory Setting: 2P [2])

information within the brackets [ ] refers to driver model UDK5107N only.

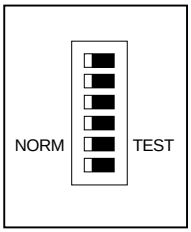
Select the appropriate pulse input mode to correspond to your controller with this switch.
When the pulse input mode switch is set to the 2P [2] position, 2 pulse input mode is established and motor rotation is controlled by CW and CCW pulse signals.
When the switch is set to the 1P [1] position, 1 pulse input mode is established and motor rotation is controlled by pulse signals and rotation direction (CW/CCW) signals.
(Refer to pages 22, 23 for a detailed explanation.)

5.4 Self Test Function Switch

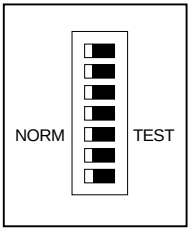
UDK5107N



UDK5114N
UDK5128N



UDK5114N-M
UDK5128N-M



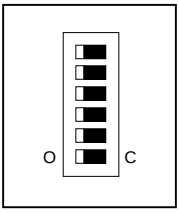
(Factory Setting: NORM [N])

information within the brackets [ ] refers to driver model UDK5107N only.

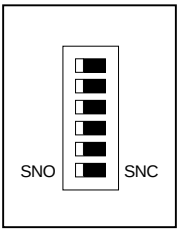
When the self test function switch is set to the TEST [T] position, the self test function is activated. The self test is used to verify that the connections between the motor and driver are correct.
(For instructions, refer to page 36, “ Executing the Self Test Function ”.)
When the self test function switch is set to the NORM [N] position, the self test function is disabled.
During normal operation be sure to keep the switch set to the NORM [N] position.

5.5 Overheat Output Logic Switch

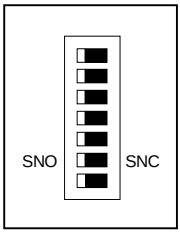
UDK5107N



UDK5114N
UDK5128N



UDK5114N-M
UDK5128N-M



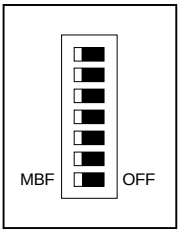
(Factory Setting: SNO [O])

information within the brackets [ ] refers to driver model UDK5107N only.

When the overheat output logic switch is set to the SNO [O] position, " H " level (photocoupler OFF) is the normal condition, and " L " level (photocoupler ON) is the condition when the overheat signal is output.
When the overheat output logic switch is set to the SNC [C] position, " L " level (photocoupler ON) is the normal condition, and " H "level (photocoupler OFF) is the condition when the overheat signal is output.
(For details on the overheat signal refer to pages 27, 28)

5.6 Electromagnetic Brake Function Switch

UDK5114N-M
UDK5128N-M



(Factory Setting: MBF)

When the electromagnetic function switch is set to the MBF position, the electromagnetic brake is released (free) under normal conditions. If the driver power is cut off by a power failure etc., the brake will engage and hold the motor and load in position.
When the switch is set to the OFF position the electromagnetic brake is engaged, and the motor shaft is held in position. To release the brake for motor operation, input the electromagnetic brake release signal. (For instructions refer to pages 25, 26, " Electromagnetic Brake Release Signal ")

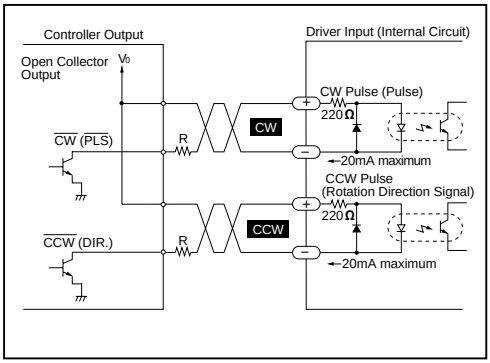
6. Input / Output Signals

6.1 Input Signals

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

6.1.1 CW Pulse (CW) / Pulse (PLS) Signals
CCW Pulse (CCW) / Rotation Direction (DIR.) Signals

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



indicates the terminals as they appear on the front panel of the driver.

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 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 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 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 input terminal.

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

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

Relation to the CW Pulse Signal LED (See pages 6, 7)

The LED lights when a CW pulse signal is input.

(In 1 pulse input mode, the LED indicates input of a pulse signal.)

Relation to the CCW Pulse Signal LED (See pages 6, 7)

The LED lights when a CCW pulse signal is input.

(In 1 pulse input mode, the LED indicates input of a rotation direction signal.)

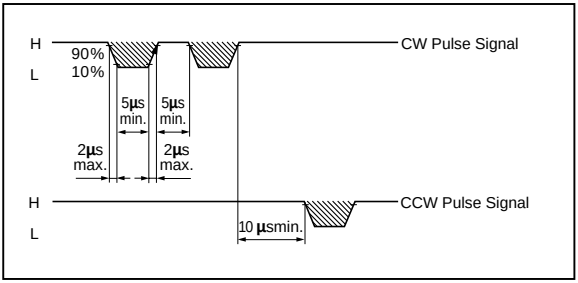
Relation to the Pulse Input Mode Switch (See pages 18, 20)

information within the brackets [ ] refers to driver model UDK5107N only.

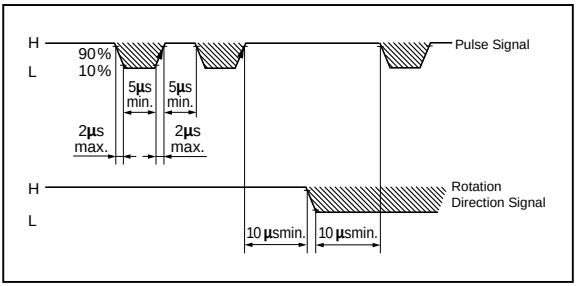
When the switch is set to the 2P [2] position, motor rotation is controlled by CW pulse signals and CCW pulse signals.
When the switch is set to the 1P [1] position, motor rotation is controlled by pulse signals and rotation direction signals.

Pulse Waveform Characteristics

2 Pulse Input Mode



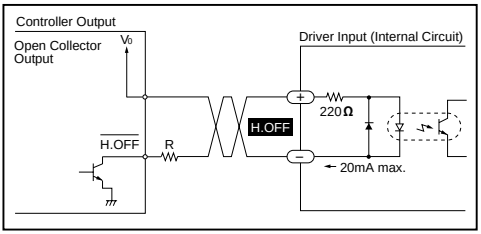
1 Pulse Input Mode



- 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 = 4～5V, "L" level = 0～0.5V.
- Input pulse signals should have a pulse width over 5μ, pulse rise/fall below 2μ, and a pulse duty below 50%.
- Keep the pulse signal at "H" level when no pulse is being input, otherwise the automatic current cutback function will not be activated.
- The minimum interval time when changing rotation directions is 10μ.
  This value varies greatly depending on the motor type, pulse frequency, and load inertia. It may be necessary to increase this time interval.
- When 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.
- When in 1 pulse input mode, leave the pulse signal at rest ("H" level) when changing rotation directions.

6.1.2 Output Current Off (H.OFF) Signal

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



■ indicates the terminals as they appear on the front panel of the driver.

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 H.OFF signal is at "L" level (photocoupler ON), the current to the motor is cut off and the motor torque is reduced to zero. The motor output shaft can then be rotated freely by hand.
When the H.OFF signal is at the "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, and for manual home positioning etc. If this function is not needed, it is not necessary to connect this terminal.

Switching the H.OFF signal from "L" level to"H" level does not alter the excitation sequence.
When the motor shaft is manually adjusted with the H.OFF signal input, the shaft will shift up to ±3.6° from the position set after the H.OFF signal is released.

Relation to the Output Current Off Signal LED (See pages 6, 7)

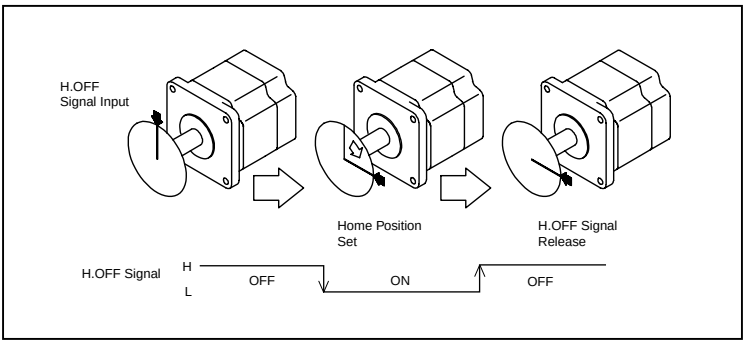
The LED lights when the H.OFF signal is input.

When Using the Electromagnetic Brake Type (See pages 18, 21)

Release the electromagnetic brake when inputting the H.OFF signal. To release the brake, either set the electromagnetic brake function switch to the MBF position, or set the switch to the OFF position and input ("L" level, photocoupler ON) the M.B. FREE signal.

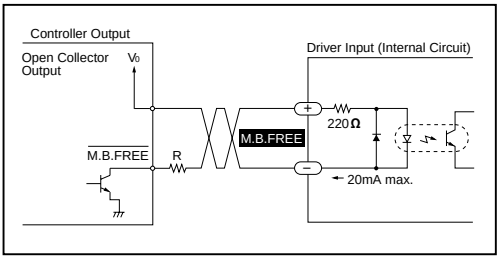
Manual Detection of the Home Position

Input the H.OFF signal, set the motor to the desired position, then release the H.OFF signal.



6.1.3 Electromagnetic Brake Release (M.B.FREE) Signal

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



[redacted] indicates the terminals as they appear on the front panel of the driver.

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 M.B.FREE signal is at " L " level (photocoupler ON), the electromagnetic brake is released and the motor is ready for operation.
When the M.B.FREE signal is at the " H " level (photocoupler OFF), the electromagnetic brake is engaged and the motor shaft is held in position.
When the motor is at rest (pulse signals at rest), using the H.OFF signal while the motor is held in position with the electromagnetic brake allows for a reduction in motor heat generation and power consumption.

Relation to the Electromagnetic Brake Release Signal LED (See pages 6, 7)

The LED lights when the M.B.FREE signal is input.

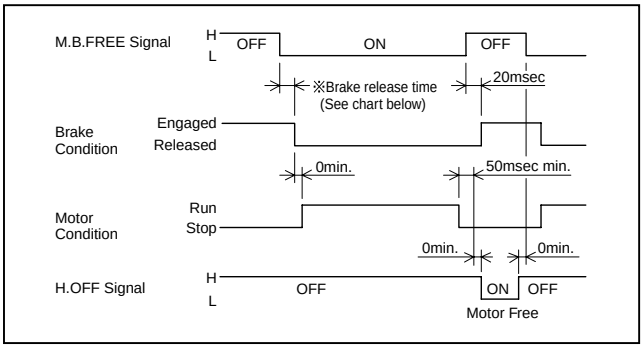
Relation to the Electromagnetic Brake Function Switch (See pages 18, 21)

When the switch is set to the OFF position, the brake is engaged and released through the M.B.FREE signal.
When the switch is set to the MBF position, the brake is only engaged when the driver power is OFF, and cannot be released through a signal. (The M.B.FREE signal is not valid.)
When using the M.B.FREE signal, be sure to keep the switch set the OFF position.

Timing Chart

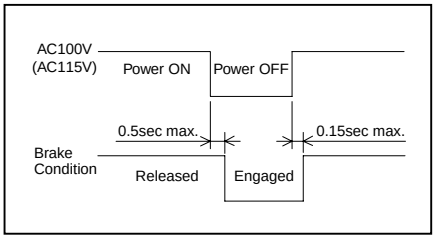
The timing charts below show conditions when the electromagnetic brake function switch is set to the OFF position.

During Normal Operation



Motor/Driver Package Model Number	Brake Release Time
UPK564-NACM **UPK566-NACM** **UPK569-NACM, UPK569H-NACM**	30msec
UPK596-NACM, UPK596H-NACM **UPK599-NACM, UPK599H-NACM** **UPK5913-NACM, UPK5913H-NACM**	50msec

During Power OFF/ON

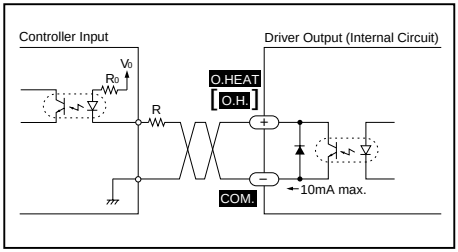


6.2 Output Signals

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

6.2.1 Overheat (O.HEAT) Signal

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



[redacted] indicates the terminals as they appear on the front panel of the driver.

The information in the brackets [ ] refers to driver model UDK5107N only.

Keep the voltage between DC5V and DC24V.
Keep the current below 10mA.
If the current exceeds 10mA, connect external resistance R.

The O.HEAT signal is output to protect the driver from heat damage when the internal temperature of the driver rises above 80**℃**.
When the O.HEAT 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.

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

The LED lights when the O.HEAT signal is output.

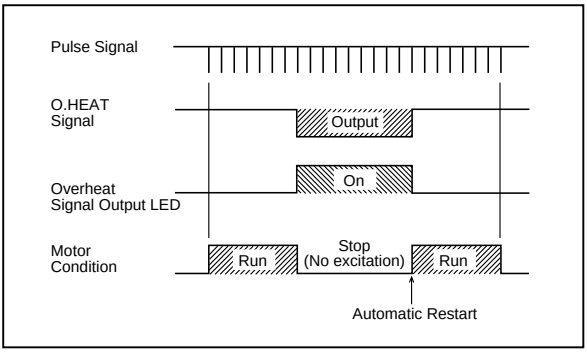
Relation to the Overheat Output Logic Switch (See pages 18, 21)

When the switch is set to the SNO [O] position, the O.HEAT signal is output as an **“** L **”** level signal (photocoupler ON).
When the switch is set to the SNC [C] position, the O.HEAT signal is output as an **“** H **”** level signal (photocoupler OFF).

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

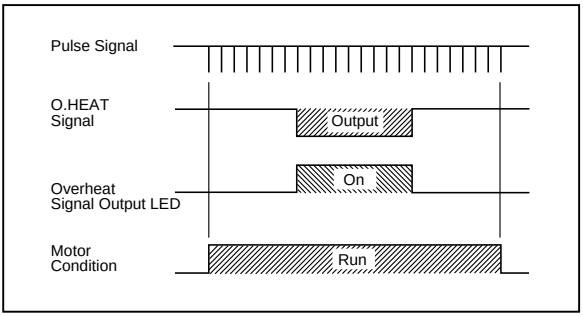
When set to AHO [O]

① The O.HEAT signal is output when the internal temperature of the driver exceeds 80℃ during operation.
② Regardless of any pulse signals input, motor excitation ceases (shaft becomes free) and the motor comes to a natural stop.
③ After operation stops, when the driver internal temperature returns to below 80℃ the O.HEAT signal is released.
④ Operation restarts (automatic restart)



When set to OFF

① The O.HEAT signal is output when the internal temperature of the driver exceeds 80℃ during operation.
② The motor will continue to run regardless of the O.HEAT signal output.
③ When the driver internal temperature returns to below 80℃ the O.HEAT signal is released.
④ Operation continues



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.

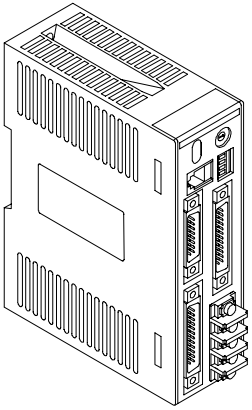
7.1 Example Connections

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 UDK5114N driver.

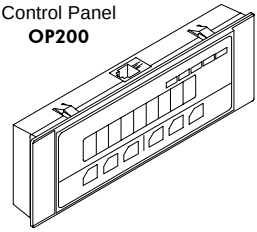
7.1.1 Connections to the ORIENTAL MOTOR Controller SG9200-G

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-G** controller.

Controller
SG9200-G

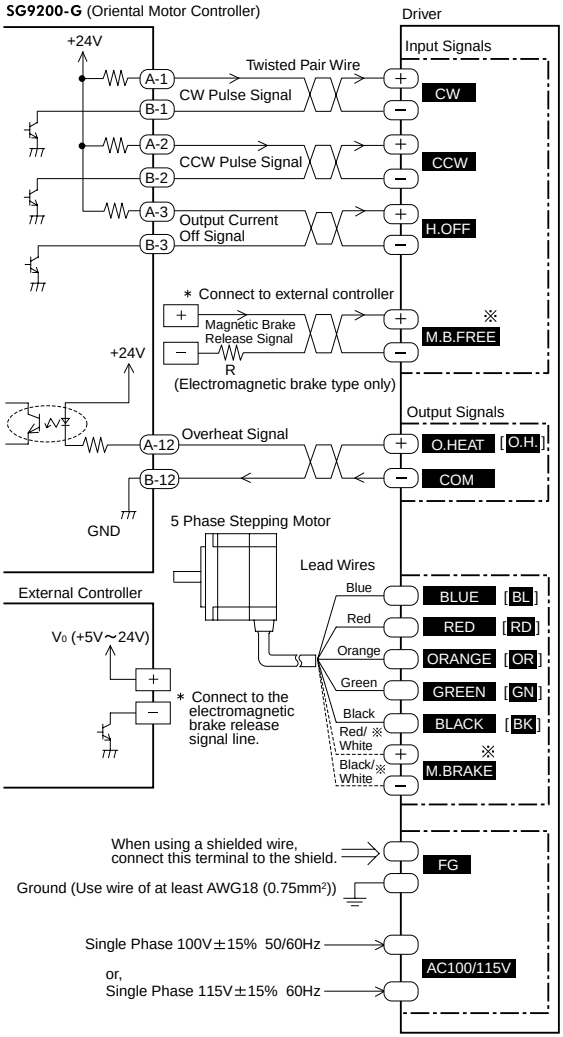


Control Panel
OP200



The **SG9200-G** offers a maximum of 15 different operation programs and can be DIN rail mounted.
(The **OP200** control panel is used in conjunction with the controller for setting operational data.)

An optional cable for connecting the driver and controller is also available.



■ indicates the terminals as they appear on the front panel of the driver.

Information within the brackets [ ] refers to driver model UDK5107N only.

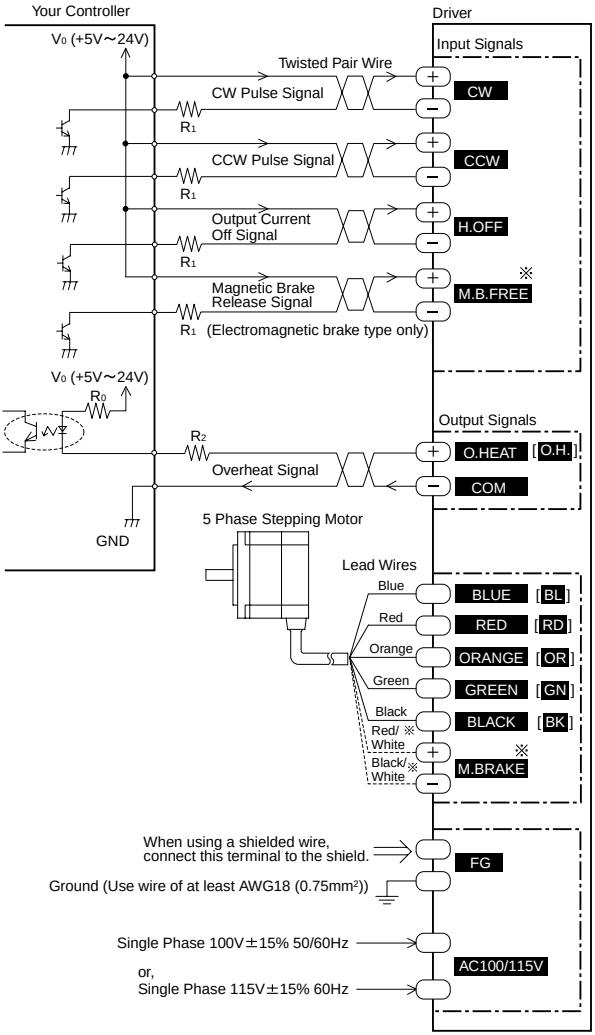
⬭ indicates the combination connector.

The numbers within ⬭ on the **SG9200-G** indicate the pin number.

※ indicates electromagnetic brake type only.

※For the electromagnetic brake release signal connections
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.

7.1.2 Connections to Your Controller



■ indicates the terminals as they appear on the front panel of the driver.

Information within the brackets [ ] refers to driver model UDK5107N only.

⬚ indicates the combination connector.

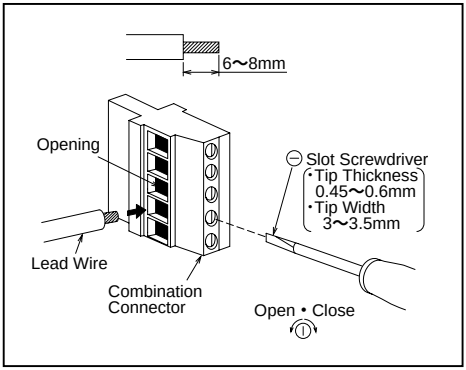
※ indicates electromagnetic brake type only.

For 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.

For 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.

7.2 Connections to the Combination Connector

It is not necessary to use a crimp terminal to connect the lead wires to the combination connector.
Follow the connection procedure below.



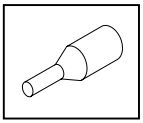
①Cut back the wire insulation 6〜8mm from the end of the wire and twist the wire strands together.
- Use wire type AWG28〜12 (0.08mm^2〜4mm^2)
- Be sure that no loose wire stands cause a short circuit with the adjacent terminal.
- Do not solder the ends of the lead wires as this may result in a poor connection contact.

②Use a slot screwdriver to loosen and fully open the combination connector opening.

③Insert the lead wire into the connector and tighten the screw.
- Tightening torque: 0.5〜0.6N・m (5〜6kgcm)

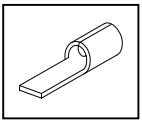
If using a crimp terminal for connection, use the type indicated in the illustration below.
The appropriate crimp terminal will vary according to the wire gage.

Pheonix terminal



AI 0.25-6
Appropriate Wire Gage: AWG24 (0.2mm^2)
AI 0.34-6
Appropriate Wire Gage: AWG22 (0.35mm^2)
AI 0.5-6
Appropriate Wire Gage: AWG20 (0.5mm^2)
AI 0.75-6
Appropriate Wire Gage: AWG18 (0.75mm^2)

Nichifu terminal



BT-1.25-9-1
Appropriate Wire Gage: AWG22〜16 (0.35〜1.5mm^2)

※ The Nichifu terminal can not be used for input signal connections.

7.3 Connecting the Motor and Driver

Connect the motor to the driver.
- When extending the motor lead wires use AWG20 (0.5mm^2) gage wire or greater.

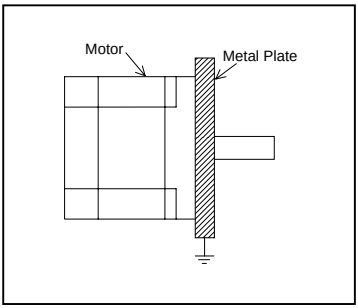
7.4 Connecting the Driver and Controller

Connect the driver to the controller.
Confirm the following when making connections.
- Use twisted pair wire type AWG24 (0.2mm^2) gage or greater, and 2m or less in length for all signal lines.
- 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 causing erratic motor operation.
- Use an open collector transistor (sink type) for the controller signal output.

If electrical noise generated by other equipment causes the motor to operate incorrectly, shield the signal lines with conductive tape or wire mesh etc. (not supplied)
To ground the shield material, connect it to the driver ⏚ FG terminal.

7.5 Ground

7.5.1 Grounding the Motor

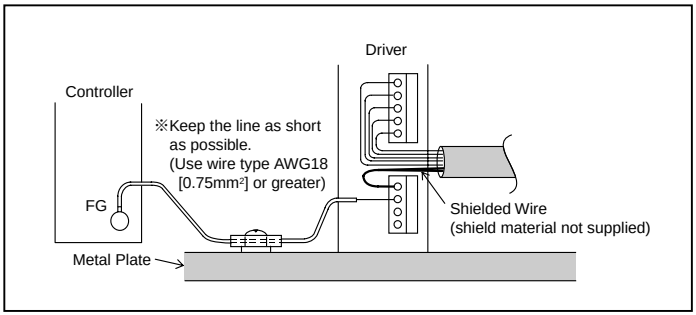


If electrical noise interference from the motor cable becomes a problem, shield the cable with conductive tape or wire mesh etc. (not supplied).

To ground the shield material, connect it to the driver's FG terminal.

7.5.2 Grounding the Driver

In order to prevent electrical noise interference from causing operational errors, ground the driver's FG terminal together with the controller's FG terminal to a common point.



7.6 Connecting the Power Source

Connect to a power source of single phase 100V ± 15% 50/60Hz or single phase 115V ± 15% 60Hz.
Use a power source which will supply sufficient input current.
The current value for input power as indicated in the specifications on pages 44 〜 50 is the maximum value.
The current value will vary according to the pulse frequency.
Refer to the speed-torque characteristics in the product guide or the general catalog for the relationship between the input current and pulse frequency.

Note

- Use wire type AWG20 (0.5mm^2) or greater for power lines.
- 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

7.7 Turning On The Power

Before turning on the power for the first time ensure that:

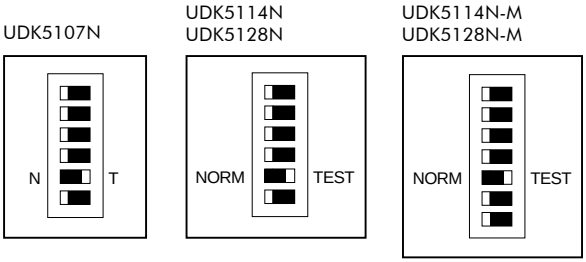
- the signal lines, motor leads, power line, and earth line are all connected properly;
- the self test function switch is set to the NORM [N] position.
  (Information within the brackets [ ] refers to driver model UDK5107N only.)

7.8 Executing the Self Test Function

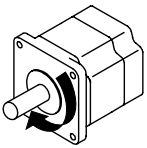
The self test function has been incorporated into the driver to allow for verification of correct connections between the motor and driver.

To execute the self test function follow the procedure below.
Information within brackets [ ] refers to driver model UDK5107N only.

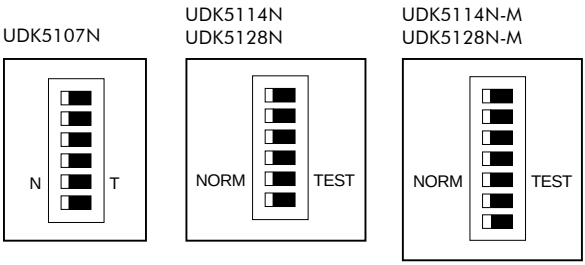
1. With the motor secured to the mounting plate, remove the coupling, etc. and disconnect the load.
2. Connect the motor to the driver.
3. After confirming that all the input/output signals are disconnected, turn the power ON.
4. Set the self test function switch to the TEST [T] position.



5. When the pulse mode switch is set to 2P [2], the motor should begin to rotate clockwise (counterclockwise when the pulse mode switch is set to 1P [1]) at a pulse speed of approximately 3Hz immediately after the self test switch is set to the TEST [T] position. This condition of operation indicates that all connections between the motor and driver are correct. However, if the motor shaft rotates in abrupt movements, or rotates in the opposite direction, connections are abnormal. Turn the power OFF immediately and check the connections.
   The motor will continue to rotate while the self test function switch is set to the TEST [T] position.



6. Return the self test switch from the TEST [T] position to the NORM [N] position. The self test is now complete.
   The motor will stop and the driver will be returned to normal operation mode.
   Be sure to keep the switch set to NORM [N] during operation.



8. Motor Current Adjustment

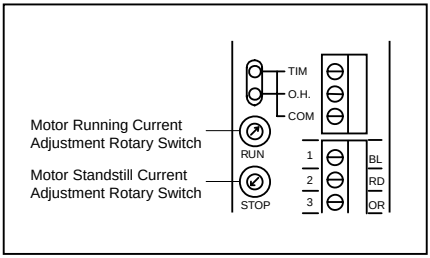
If maximum motor torque is not needed, adjustment of the motor running current or the motor standstill current can be used to reduce motor vibration and motor and driver heat generation.

To reduce temperature rise of the motor and driver ⇨ **Reduce the motor running current and the motor standstill current**

To reduce motor vibration due to excess torque ⇨ **Reduce the motor running current**

Driver Front Panel

Standard Type Driver: UDK5107N



Standard Type Driver: UDK5114N
High Speed Type Driver: UDK5128N

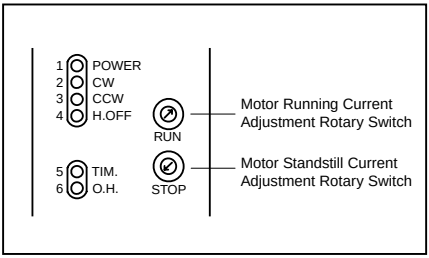


Illustration shows UDK5114N

Electromagnetic Brake
Standard Type Driver: UDK5114N-M

Electromagnetic Brake
High Speed Type Driver: UDK5128N-M

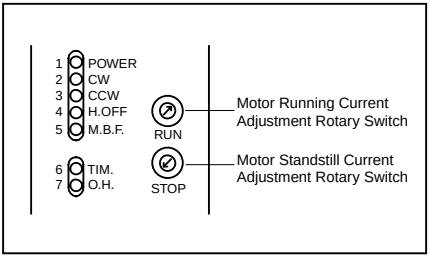


Illustration shows UDK5114N-M

8.1 Motor Running Current Adjustment

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

(Motor running current adjustment rotary switch RUN: 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 listed in the following chart.

RUN switch settings and corresponding current values (representative values)



RUN Switch Settings	Running Current [A/phase]		
	UDK5107N	UDK5114N UDK5114N-M	UDK5128N UDK5128N-M
0	0.21	0.45	0.76
1	0.25	0.52	0.90
2	0.28	0.58	1.04
3	0.32	0.64	1.17
4	0.36	0.71	1.31
5	0.39	0.77	1.44
6	0.43	0.83	1.58
7	0.46	0.89	1.72
8	0.50	0.96	1.85
9	0.54	1.02	1.99
A	0.57	1.09	2.13
B	0.61	1.15	2.26
C	0.64	1.21	2.39
D	0.68	1.27	2.53
E	0.72	1.33	2.67
F	0.75	1.40	2.80

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 40% of the rated current (standstill current adjustment switch "STOP" set to "7").

The current is automatically reduced approximately 0.1sec. after pulse signals stop. **Be sure to keep the switch set to 7 or below.**

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		
	UDK5107N	UDK5114N UDK5114N-M	UDK5128N UDK5128N-M
0	10	19	9
1	10	19	9
2	10	19	9
3	15	21	14
4	23	28	21
5	29	34	28
6	37	40	36
7	43	47	43
8	51	54	50
9	57	61	57
A	65	67	64
B	72	74	71
C	79	80	79
D	86	87	86
E	93	94	93
F	100	100	100

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.

Information within brackets [ ] refers to driver model UDK5107N only.

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 AC100V or AC115V is being input.
	2. Is the driver output current off signal input LED OFF? (If OFF, condition is normal)	When the H.OFF (output current off) signal is input the output current off signal input LED lights and the motor looses all excitation (no holding torque). Return the H.OFF signal to "H" level.
	3. Is the driver overheat LED OFF? (If OFF, condition is normal)	The overheat LED lights when the O.HEAT signal is output. If the automatic current off function switch is set to the AHO position when this signal is output, the motor will lose all excitation (no holding torque). Refer to items 26 ~ 29 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 and STOP) set too low?	These rotary switches control the output current to the motor (refer to pages 38, 39). 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 current 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 22, 23). 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 [2] position), are either the CW or CCW pulse signal inputs already at "L" level?	The motor will not rotate if a pulse signal is input when the other pulse signal is 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 [1] position), is the pulse signal connected to the CCW pulse signal terminal?	Connect the pulse signal to the CW pulse signal terminal.
	9. For the electromagnetic brake type, is the M.B.FREE signal (brake release) at "H" level while the electromagnetic brake function switch is set to OFF?	If the M.B.FREE signal is at "H" level, the brake is not released and the motor will not operate. Be sure to keep the M.B.FREE signal at "L" level during motor operation.
The motor rotates in the wrong direction.	10. While in 2 pulse input mode (pulse input mode switch set to the 2P [2] position) are the CW and CCW pulse signal lines connected backwards?	Connect the CW pulse signal line to the CW pulse signal input terminal and connect the CCW pulse signal line to the CCW pulse input terminal.
	11. While in 1 pulse input mode (pulse input mode switch set to the 1P [1] position) leave the CCW pulse signal terminal unconnected and try inputting a pulse signal to the CW pulse signal terminal.	If the motor rotates in a counterclockwise direction when a pulse signal is input, the motor and driver are normal. Recheck the rotation direction signal levels. ("L" level = clockwise, "H" level = counterclockwise)

Information within brackets [ ] refers to driver model UDK5107N only.

PROBLEM	CHECK POINTS	MEASURES
Motor rotation is erratic.	First check items 4, 5, and 6.	
Motor start up is unstable.	12. While In 2 pulse input mode (pulse input mode switch set to the 2P [2] position) are the driver ъ CW LED and CCW LED ON at the same time?	If both pulse signals are input at the same time motor operation will be unstable. Be sure to input only one pulse at a time.
	13. 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.	14. 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.
	15. Is the number of pulses set to match the amount of motor rotation?	Check the controller pulse setting.
The motor looses synchronization during acceleration or while running.	16. Is the driver 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 output current off function switch is set to the AHO [O] position when this signal is output the motor will lose all excitation (no holding torque). Refer to items 26 ～ 29 and take the necessary steps to prevent the overheat signal from being output.
	17. Is the starting pulse frequency too high?	Check this by decreasing the frequency.
	18. Is the acceleration or deceleration time too short?	Check this by increasing the acceleration/deceleration time.
	19. 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 very high.	20. Is the output torque too high?	Try reducing the motor running current with the “ RUN ” current adjustment rotary switch.
	21. 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.	22. Is the motor running time too long? (Is the temperature of the motor case below 100℃?)	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, and keep the temperature of the motor case below 100℃)
	23. Is the driver standstill current adjustment switch set to “ 8 ” or above?	Refer to pages 38, 39 and set the switch to “ 7 ” or below.
	24. Is the driver CW LED or CCW LED still ON after pulse signals are complete?	While the pulse signal is kept at “ L ” level the CW or CCW pulse LED remains ON, and the motor current is not reduced. Return the pulse signal to “ H ” level.

Information within brackets [ ] refers to driver model UDK5107N only.

PROBLEM	CHECK POINTS	MEASURES
The electromagnetic brake does not hold.	25. Is the electromagnetic brake function switch set to the MBF position while the M.B.FREE (brake release) signal is at " H " level?	Set the electromagnetic brake function switch to the OFF position and keep the M.B.FREE (brake release) signal at " H "level.
The overheat signal is output.	26. Is the driver ambient temperature 0℃～ 50℃?	If not, take the necessary steps to keep the ambient temperature within 0℃～ 50℃.
	27. 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 ventilation 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 indicated in the general catalog " speed vs. torque characteristics ".

10. Specifications

Standard Type

Model Number	single shaft / double shaft	UPK543-NAC / UPK543-NBC	UPK544-NAC / UPK544-NBC	UPK545-NAC / UPK545-NBC
Holding Torque	N·m (kgcm)	0.13 (1.3)	0.18 (1.8)	0.24 (2.4)
Rotor Inertia	kg·m² (gcm²)	35 × 10^{-7} (35)	54 × 10^{-7} (54)	68 × 10^{-7} (68)
Rated Current	A / phase	0.75		
Basic Step Angle		0.72 °		
Insulation Class		Class B (130℃)		
Power Source		Single phase 100V ± 15% 50/60Hz 1.1A, or, Single phase 115V ± 15% 60Hz 1.1A		
Output Current	A / phase	0.75		
Excitation Mode		• 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		
Input Signals	• CW Pulse Signal (Pulse Signal)	CW direction command pulse signal (movement command pulse signal when in 1 pulse input mode) Pulse width: 5μsec min., pulse rise / fall: 2μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
Input Signals	• 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: 5μsec min., pulse rise / fall: 2μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
Input Signals	• 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 min.		
Output Signals	• 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		
Output Signals	• Overheat Signal	The signal is output when the internal temperature of the driver rises to abnormally high levels. (photocoupler: ON or OFF selectable.) The motor stops automatically if the automatic current off function is ON. The photocoupler output logic is according to the overheat output logic switch setting.		
Functions		Automatic current off, step angle switch, pulse input mode switch, self test, overheat output logic switch		
Indicators (LED)		Power source input, CW pulse input, CCW pulse input, output current off signal input, excitation timing signal output, overheat signal output		
Cooling Method (Driver)		Convection		
Weight	Motor kg	0.25	0.3	0.4
Weight	Driver kg	0.45		
Insulation Resistance	Motor	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.		
Insulation Resistance	Driver	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: • Power input terminal ー FG terminal • Motor output terminal ー FG terminal • Signal I/O terminal ー FG terminal • Signal I/O terminal ー motor output terminal • Signal I/O terminal ー power input terminal		
Dielectric Strength	Motor	Under normal temperature and humidity, sufficient to withstand 50Hz, 0.5kV applied for one minute between the motor coils and casing.		
Dielectric Strength	Driver	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the case and power input terminal, the case and signal input terminal, and the power input terminal and signal input terminal.		
Ambient Operating Temperature	Motor	-10℃～ +50℃		
Ambient Operating Temperature	Driver	0℃～ +50℃		

• The value given for holding torque refers to when the dedicated driver is operated at the rated current in 5 phase excitation.
• The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)
Note: Do not measure insulation resistance or perform the dielectric withstand test while the motor and driver are connected.

Standard Type

Model Number	single shaft	UPK564-NAC	UPK566-NAC	UPK569-NAC
	double shaft	UPK564-NBC	UPK566-NBC	UPK569-NBC
Holding Torque	N・m (kgcm)	0.42 (4.2)	0.83 (8.3)	1.66 (16.6)
Rotor Inertia	kg・m² (gcm²)	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℃)		
Power Source		Single phase 100V ± 15% 50/60Hz 4.8A, or, Single phase 115V ± 15% 60Hz 4.8A		
Output Current	A / phase	1.4		
Excitation Mode		• 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		
Input Signals	• CW Pulse Signal (Pulse Signal)	CW direction command pulse signal (movement command pulse signal when in 1 pulse input mode) Pulse width: 5μsec min., pulse rise / fall: 2μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
Input Signals	• 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: 5μsec min., pulse rise / fall: 2μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
Input Signals	• 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 min.		
Output Signals	• 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		
Output Signals	• Overheat Signal	The signal is output when the internal temperature of the driver rises to abnormally high levels. (photocoupler : ON or OFF selectable.) The motor stops automatically if the automatic current off function is ON. The photocoupler output logic is according to the overheat output logic switch setting.		
Functions		Automatic current off, step angle switch, pulse input mode switch, self test, overheat output logic switch		
Indicators (LED)		Power source input, CW pulse input, CCW pulse input, output current off signal input, excitation timing signal output, overheat signal output		
Cooling Method (Driver)		Convection		
Weight	Motor kg	0.6	0.8	1.3
	Driver kg	0.9		
Insulation Resistance	Motor	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.		
Insulation Resistance	Driver	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: • Power input terminal ー FG terminal • Motor output terminal ー FG terminal • Signal I/O terminal ー FG terminal • Signal I/O terminal ー motor output terminal • Signal I/O terminal ー power input terminal		
Dielectric Strength	Motor	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the motor coils and casing.		
Dielectric Strength	Driver	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the case and power input terminal, the case and signal input terminal, and the power input terminal and signal input terminal.		
Ambient Operating Temperature	Motor	-10℃～ +50℃		
Ambient Operating Temperature	Driver	0℃～ +50℃		

• The value given for holding torque refers to when the dedicated driver is operated at the rated current in 5 phase excitation.
• The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)

Standard Type

Model Number	single shaft	UPK596-NAC	UPK599-NAC	UPK5913-NAC
	double shaft	UPK596-NBC	UPK599-NBC	UPK5913-NBC
Holding Torque	N・m (kgcm)	2.1 (21)	4.1 (41)	6.3 (63)
Rotor Inertia	kg・m² (gcm²)	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℃)		
Power Source		Single phase 100V ± 15% 50/60Hz 4.8A, or, Single phase 115V ± 15% 60Hz 4.8A		
Output Current	A / phase	1.4		
Excitation Mode		• 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		
Input Signals	• CW Pulse Signal (Pulse Signal)	CW direction command pulse signal (movement command pulse signal when in 1 pulse input mode) Pulse width: 5μsec min., pulse rise / fall: 2μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
Input Signals	• 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: 5μsec min., pulse rise / fall: 2μsec max. Motor moves on the pulse rising edge. (negative logic pulse input)		
Input Signals	• 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 min.		
Output Signals	• 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		
Output Signals	• Overheat Signal	The signal is output when the internal temperature of the driver rises to abnormally high levels. (photocoupler: ON or OFF selectable.) The motor stops automatically if the automatic current off function is ON. The photocoupler output logic is according to the overheat output logic switch setting.		
Functions		Automatic current off, step angle switch, pulse input mode switch, self test, overheat output logic switch		
Indicators (LED)		Power source input, CW pulse input, CCW pulse input, output current off signal input, excitation timing signal output, overheat signal output		
Cooling Method (Driver)		Convection		
Weight	Motor kg	1.7	2.8	3.8
Weight	Driver kg	0.9		
Insulation Resistance	Motor	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.		
Insulation Resistance	Driver	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: • Power input terminal ー FG terminal • Signal I/O terminal ー motor output terminal • Motor output terminal ー FG terminal • Signal I/O terminal ー power input terminal • Signal I/O terminal ー FG terminal		
Dielectric Strength	Motor	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the motor coils and casing.		
Dielectric Strength	Driver	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the case and power input terminal, the case and signal input terminal, and the power input terminal and signal input terminal.		
Ambient Operating Temperature	Motor	-10℃～ +50℃		
Ambient Operating Temperature	Driver	0℃～ +50℃		

• The value given for holding torque refers to when the dedicated driver is operated at the rated current in 5 phase excitation.
• The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)

High Speed Type

Model Number	single shaft	UPK569H-NAC	UPK596H-NAC	UPK599H-NAC	UPK5913H-NAC
	double shaft	UPK569H-NBC	UPK596H-NBC	UPK599H-NBC	UPK5913H-NBC
Holding Torque	N・m (kgcm)	1.66 (16.6)	2.1 (21)	4.1 (41)	6.3 (63)
Rotor Inertia	kg・m^2 (gcm^2)	560 × 10^{-7} (560)	1400 × 10^{-7} (1400)	2700 × 10^{-7} (2700)	4000 × 10^{-7} (4000)
Rated Current	A / phase	2.8			
Basic Step Angle		0.72 °			
Insulation Class		Class B (130℃)			
Power Source		Single phase 100V ± 15% 50/60Hz 7.5A, or, Single phase 115V ± 15% 60Hz 7.5A			
Output Current	A / phase	2.8			
Excitation Mode		• 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: 5μsec min., pulse rise / fall: 2μsec 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: CW, L: CW Pulse width: 5μsec min., pulse rise / fall: 2μsec 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 min.			
	• 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 to abnormally high levels. (photocoupler: ON or OFF selectable.) The motor stops automatically if the automatic current off function is ON. The photocoupler output logic is according to the overheat output logic switch setting.			
Functions		Automatic current off, step angle switch, pulse input mode switch, self test, overheat output logic switch			
Indicators (LED)		Power source input, CW pulse input, CCW pulse input, output current off signal input, excitation timing signal output, overheat signal output			
Cooling Method (Driver)		Internal fan			
Weight	Motor kg	1.3	1.7	2.8	3.8
	Driver kg	1.2			
Insulation Resistance	Motor	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.			
	Driver	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: • Power input terminal ー FG terminal • Signal I/O terminal ー motor output terminal • Motor output terminal ー FG terminal • Signal I/O terminal ー power input terminal • Signal I/O terminal ー FG terminal			
Dielectric Strength	Motor	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the motor coils and casing.			
	Driver	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the case and power input terminal, the case and signal input terminal, the power input terminal and signal input terminal.			
Ambient Operating Temperature	Motor	-10℃～ +50℃			
	Driver	0℃～ +50℃			

• The value given for holding torque refers to when the dedicated driver is operated at the rated current in 5 phase excitation.
• The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)

Electromagnetic Brake • Standard Type

Model Number		single shaft	UPK564-NACM	UPK566-NACM	UPK569-NACM
Holding Torque		N·m (kgcm)	0.42 (4.2)	0.83 (8.3)	1.66 (16.6)
Rotor Inertia		kg·m² (gcm²)	320 × 10^{-7} (320)	425 × 10^{-7} (425)	705 × 10^{-7} (705)
Rated Current		A / phase	1.4		
Basic Step Angle			0.72 °		
Insulation Class			Class B (130℃)		
Power Source			Single phase 100V ± 15% 50/60Hz 4.8A, or, Single phase 115V ± 15% 60Hz 4.8A		
Output Current		A / phase	1.4		
Excitation Mode			• 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: 5μsec min., pulse rise / fall: 2μsec 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: 5μsec min., pulse rise / fall: 2μsec 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.		
	• Electromagnetic Brake Release Signal		When at " L " level the brake is released and the motor is ready for operation. When at " H " level the brake is engaged and the motor shaft is held in position.		
Output Signals	Output Signal Circuit		Photocoupler·open collector output (emitter common) External use condition DC24V max.,10mA min.		
	• 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 to abnormally high levels. (photocoupler: ON or OFF selectable.) The motor stops automatically if the automatic current off function is ON. The photocoupler output logic is according to the overheat output logic switch setting.		
Functions			Automatic current off, step angle switch, pulse input mode switch, self test, overheat output logic switch		
Indicators (LED)			Power source input, CW pulse input, CCW pulse input, output current off signal input, excitation timing signal output, overheat signal output		
Cooling Method (Driver)			Convection		
Weight		Motor kg	0.9	1.1	1.6
		Driver kg	0.9		
Insulation Resistance		Motor	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.		
		Driver	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: • Power input terminal ー FG terminal • Signal I/O terminal ー motor output terminal • Motor output terminal ー FG terminal • Signal I/O terminal ー power input terminal • Signal I/O terminal ー FG terminal		
Dielectric Strength		Motor	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the motor coils and casing.		
		Driver	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the case and power input terminal, the case and signal input terminal, and the power input terminal and signal input terminal.		
Ambient Operating Temperature		Motor	-10℃～ +50℃		
		Driver	0℃～ +50℃		

• The value given for holding torque refers to when the dedicated driver is operated at the rated current in 5 phase excitation.
• The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)

Electromagnetic Brake Specifications

Brake Type	" Fail safe " (Non-excitation operation)
Supply Voltage	DC24V
Supply Current	0.25A
Holding Force	0.8N·m 8kgcm
Brake Time	20msec
Brake Release Time	30msec
Time Rating	Continuous

Electromagnetic Brake • Standard Type

Model Number		single shaft	UPK596-NACM	UPK599-NACM	UPK5913-NACM
Holding Torque		N・m (kgcm)	2.1 (21)	4.1 (41)	6.3 (63)
Rotor Inertia		kg・m² (gcm²)	2200 × 10^{-7} (2200)	3500 × 10^{-7} (3500)	4800 × 10^{-7} (4800)
Rated Current		A / phase	1.4		
Basic Step Angle			0.72 °		
Insulation Class			Class B (130℃)		
Power Source			Single phase 100V ± 15% 50/60Hz 4.8A, or, Single phase 115V ± 15% 60Hz 4.8A		
Output Current		A / phase	1.4		
Excitation Mode			• 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: 5μsec min., pulse rise / fall: 2μsec 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: 5μsec min., pulse rise / fall: 2μsec 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.		
	• Electromagnetic Brake Release Signal		When at " L " level the brake is released and the motor is ready for operation. When at " H " level the brake is engaged and the motor shaft is held in position.		
Output Signals	Output Signal Circuit		Photocoupler・open collector output (emitter common) External use condition DC24V max.,10mA min.		
	• 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 to abnormally high levels. (photocoupler: ON or OFF selectable.) The motor stops automatically if the automatic current off function is ON. The photocoupler output logic is according to the overheat output logic switch setting.		
Functions			Automatic current off, step angle switch, pulse input mode switch, self test, overheat output logic switch		
Indicators (LED)			Power source input, CW pulse input, CCW pulse input, output current off signal input, excitation timing signal output, overheat signal output		
Cooling Method (Driver)			Convection		
Weight		Motor kg	2.4	3.5	4.5
		Driver kg	0.9		
Insulation Resistance		Motor	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.		
		Driver	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: • Power input terminal − FG terminal • Signal I/O terminal − motor output terminal • Motor output terminal − FG terminal • Signal I/O terminal − power input terminal • Signal I/O terminal − FG terminal		
Dielectric Strength		Motor	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the motor coils and casing.		
		Driver	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the case and power input terminal, the case and signal input terminal, the power input terminal and signal input terminal.		
Ambient Operating Temperature		Motor	-10℃～ +50℃		
		Driver	0℃～ +50℃		

• The value given for holding torque refers to when the dedicated driver is operated at the rated current in 5 phase excitation.
• The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)

Electromagnetic Brake Specifications

Brake Type	" Fail safe " (Non-excitation operation)
Supply Voltage	DC24V
Supply Current	0.42A
Holding Force	4.0N・m 40kgcm
Brake Time	20msec
Brake Release Time	50msec
Time Rating	Continuous

Electromagnetic Brake • High Seed Type

Model Number		single shaft	UPK569H-NACM	UPK596H-NACM	UPK599H-NACM	UPK5913H-NACM
Holding Torque		N・m (kgcm)	1.66 (16.6)	2.1 (21)	4.1 (41)	6.3 (63)
Rotor Inertia		kg・m² (gcm²)	705 × 10^{-7} (705)	2200 × 10^{-7} (2200)	3500 × 10^{-7} (3500)	4800 × 10^{-7} (4800)
Rated Current		A / phase	2.8			
Basic Step Angle			0.72 °			
Insulation Class			Class B (130℃)			
Power Source			Single phase 100V ± 15% 50/60Hz 7.5A, or, Single phase 115V ± 15% 60Hz 7.5A			
Output Current		A / phase	2.8			
Excitation Mode			• 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: 5μsec min., pulse rise / fall: 2μsec 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: 5μsec min., pulse rise / fall: 2μsec 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.			
	• Electromagnetic Brake Release Signal		When at " L " level the brake is released and the motor is ready for operation. When at " H " level the brake is engaged and the motor shaft is held in position.			
Output Signals	Output Signal Circuit		Photocoupler・open collector output (emitter common) External use condition DC24V max.,10mA min.			
	• 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 to abnormally high levels. (photocoupler: ON or OFF selectable.) The motor stops automatically if the automatic current off function is ON. The photocoupler output logic is according to the overheat output logic switch setting.			
Functions			Automatic current off, step angle switch, pulse input mode switch, self test, overheat output logic switch			
Indicators (LED)			Power source input, CW pulse input, CCW pulse input, output current off signal input, excitation timing signal output, overheat signal output			
Cooling Method (Driver)			Internal fan			
Weight		Motor kg	1.6	2.4	3.5	4.5
		Driver kg	1.2			
Insulation Resistance		Motor	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.			
		Driver	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: • Power input terminal − FG terminal • Motor output terminal − FG terminal • Signal I/O terminal − FG terminal • Signal I/O terminal − motor output terminal • Signal I/O terminal − power input terminal			
Dielectric Strength		Motor	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the motor coils and casing.			
		Driver	Under normal temperature and humidity, sufficient to withstand 50Hz, 1.0kV applied for one minute between the case and power input terminal, the case and signal input terminal, the power input terminal and signal input terminal.			
Ambient Operating Temperature		Motor	-10℃～ +50℃			
		Driver	0℃～ +50℃			

• The value given for holding torque refers to when the dedicated driver is operated at the rated current in 5 phase excitation.
• The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)

Electromagnetic Brake Specifications

Brake Type	" Fail safe " (Non-excitation operation)
Supply Voltage	DC24V
Supply Current	0.42A (0.25A)
Holding Force	4.0N・m (0.8N・m) 40kgcm (8kgcm)
Brake Time	20msec (20msec)
Brake Release Time	50msec (30msec)
Time Rating	Continuous

Information in the brackets ( ) refers to the model **UPK569H-NACM** only.

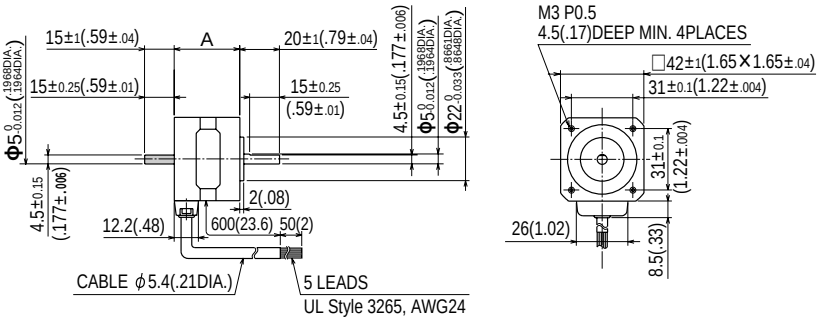
11. Dimensions

11.1 Motor

Unit: mm (inch)

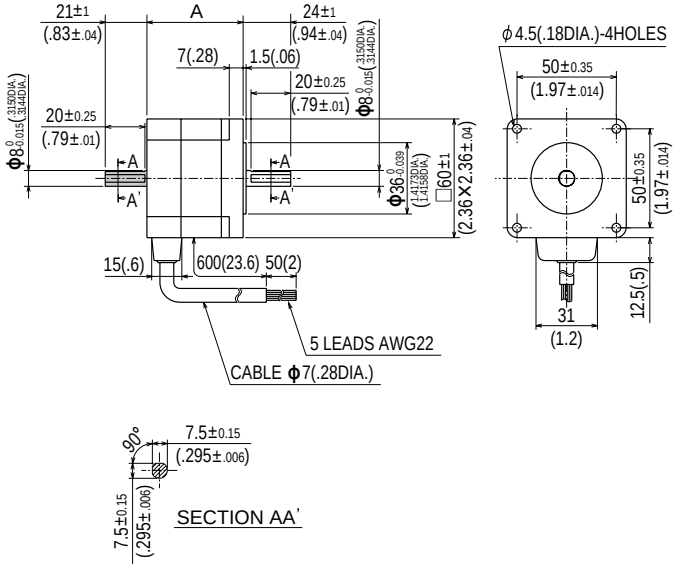
11. 1. 1 Standard Type / High Speed Type

Model	A
PK543-NAC, PK543-NBC	33 ± 1 (1.30 ± .04)
PK544-NAC, PK544-NBC	39 ± 1 (1.54 ± .04)
PK545-NAC, PK545-NBC	47 ± 1 (1.85 ± .04)



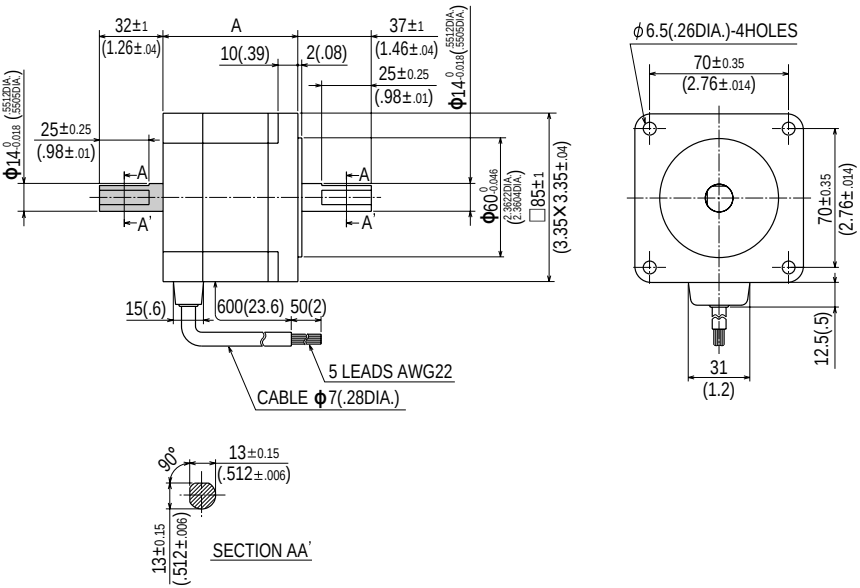
※ This is a dimensional drawing of the double shaft motor.
For the single shaft motor, there is no shaded area .

Model	A
PK564-NAC, PK564-NBC	48.5 ± 1 (1.91 ± .04)
PK566-NAC, PK566-NBC	59.5 ± 1 (2.34 ± .04)
PK569-NAC, PK569-NBC PK569H-NAC, PK569H-NBC	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 .

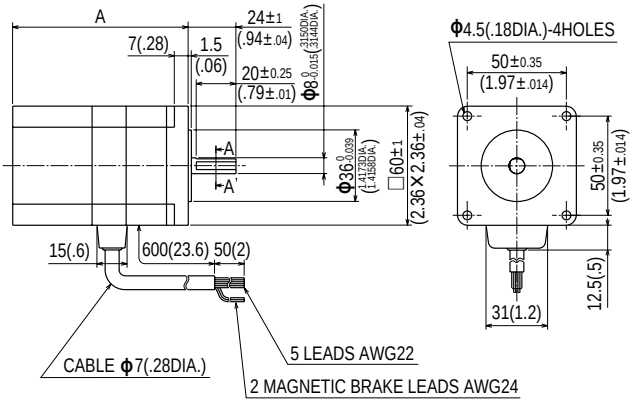
Model	A
PK596-NAC, PK596-NBC PK596H-NAC, PK596H-NBC	68 ± 1 (2.68 ± .04)
PK599-NAC, PK599-NBC PK599H-NAC, PK599H-NBC	98 ± 1 (3.86 ± .04)
PK5913-NAC, PK5913-NBC PK5913H-NAC, PK5913H-NBC	128 ± 1 (5.04 ± .04)

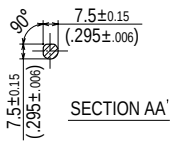


※ This is a dimensional drawing of the double shaft motor.
For the single shaft motor, there is no shaded area .

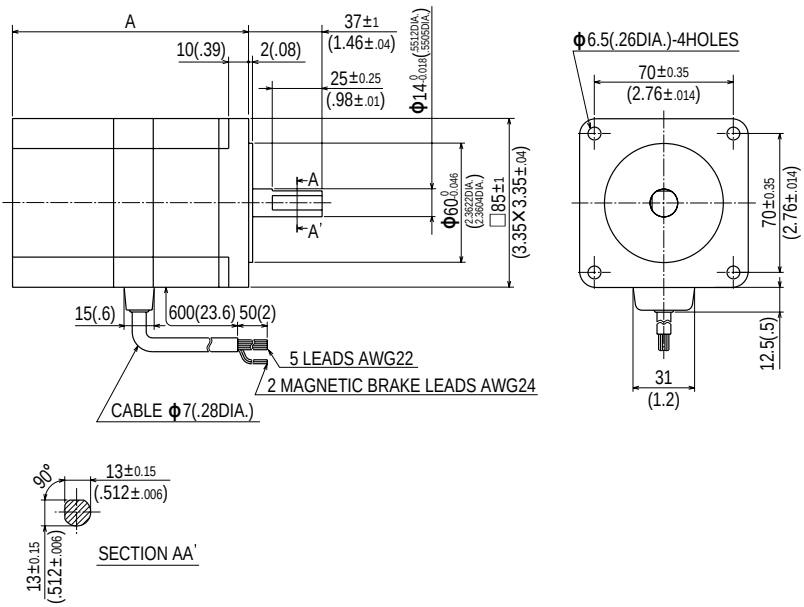
11.1.2 Electromagnetic Brake • Standard Type
Electromagnetic Brake • High Speed Type

Model	A
PK564-NACM	88.5 ± 1 (3.48 ± .04)
PK566-NACM	99.5 ± 1 (3.92 ± .04)
PK569-NACM, PK569H-NACM	129 ± 1 (5.08 ± .04)





Model	A
PK596-NACM, PK596H-NACM	119 ± 1 (4.69 ± .04)
PK599-NACM, PK599H-NACM	149 ± 1 (5.87 ± .04)
PK5913-NACM, PK5913H-NACM	179 ± 1 (7.05 ± .04)

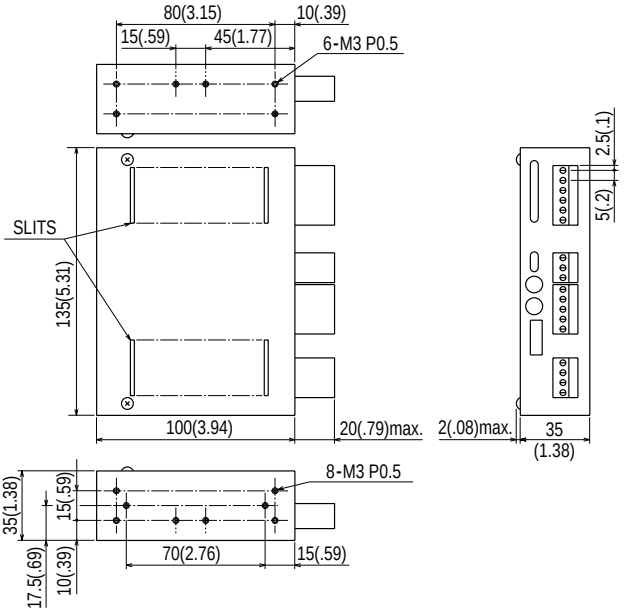


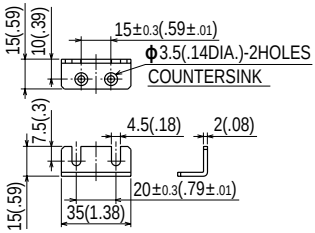
11.2 Driver

Unit: mm (inch)

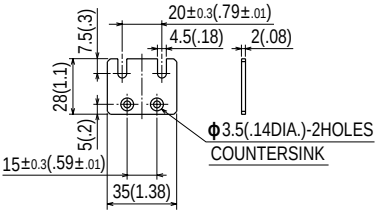
11.2.1 Standard Type

Model: UDK5107N



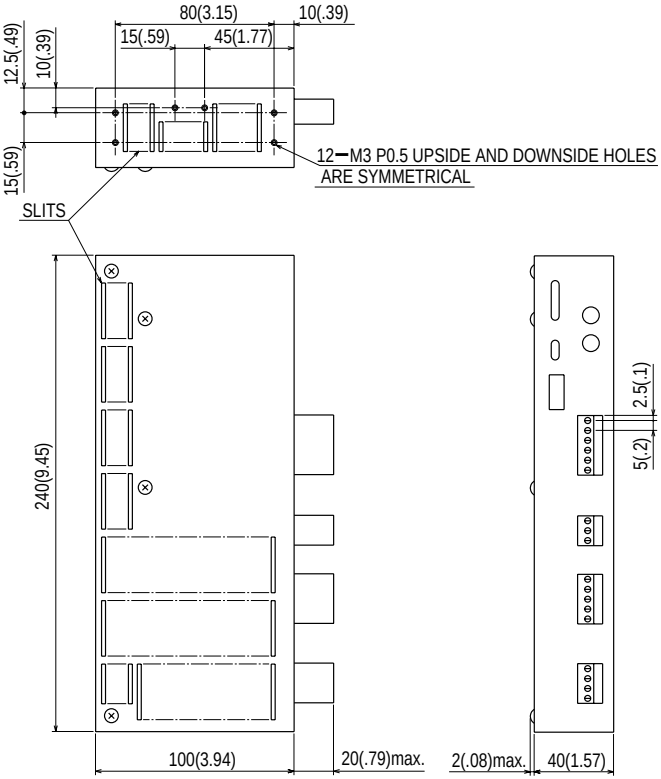


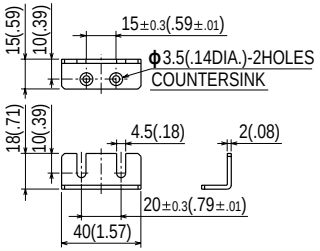
MOUNTING BRACKETS A



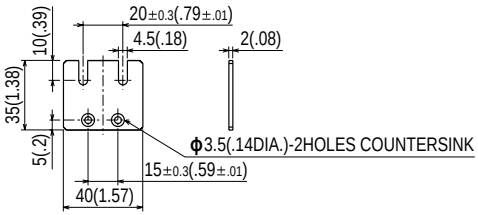
MOUNTING BRACKETS B

Model: UDK5114N





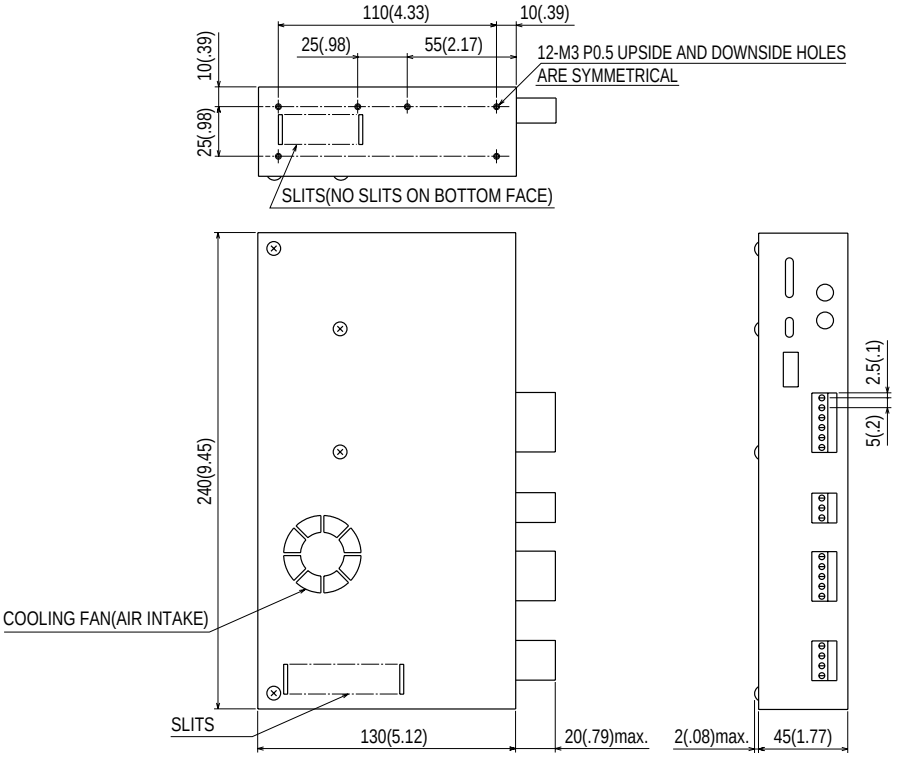
MOUNTING BRACKETS A

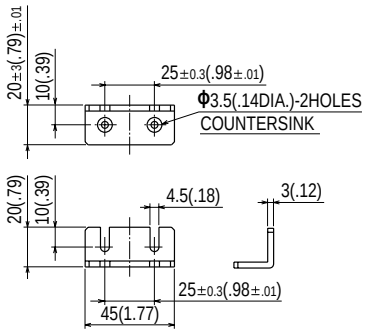


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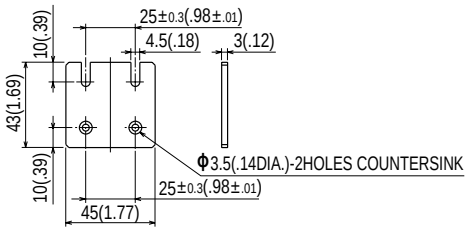
11.2.2 High Speed Type

Model: UDK5128N





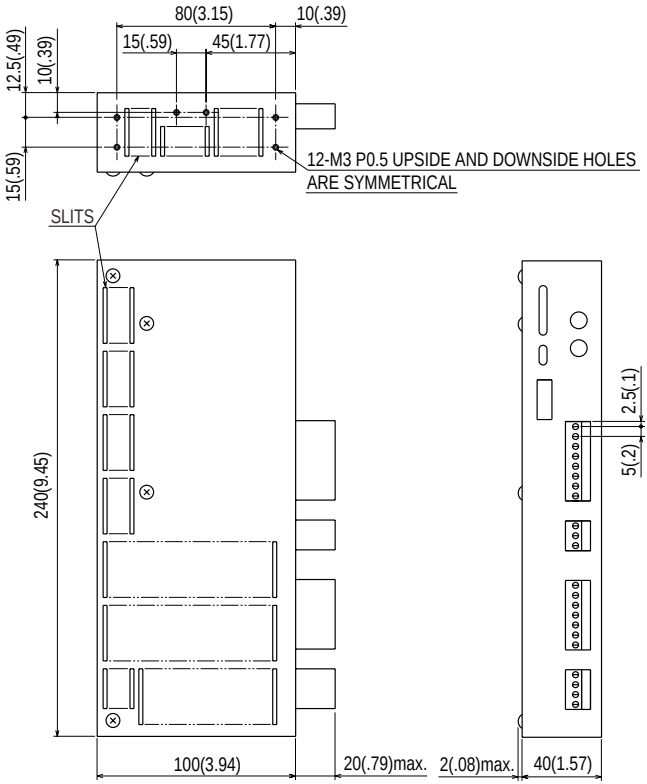
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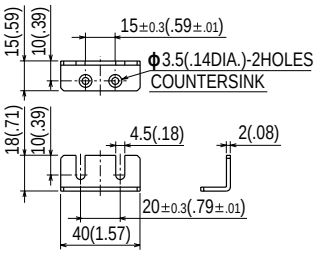


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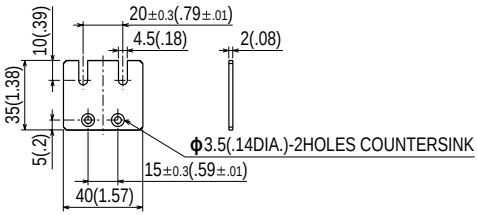
11.2.3 Electromagnetic Brake • Standard Type

Model: UDK5114N-M





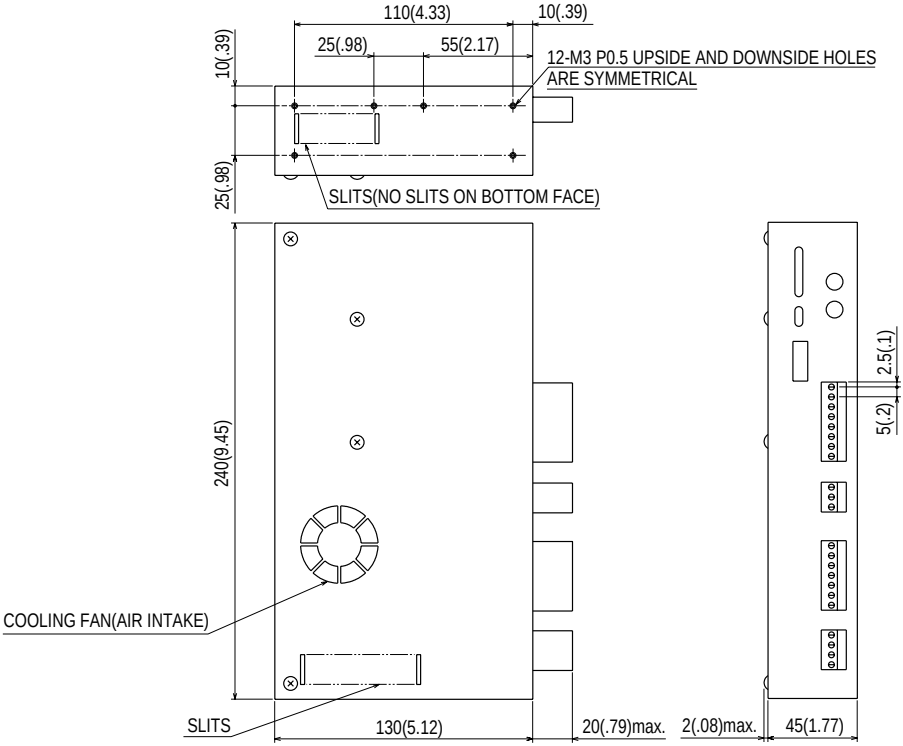
MOUNTING BRACKETS A

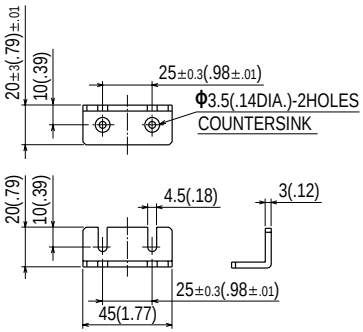


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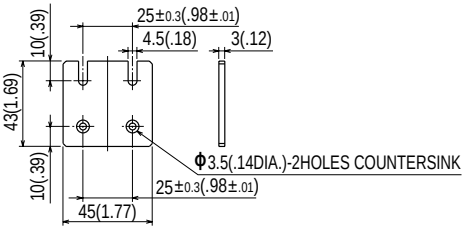
11.2.4 Electromagnetic Brake • High Speed Type

Model: UDK5128N-M





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