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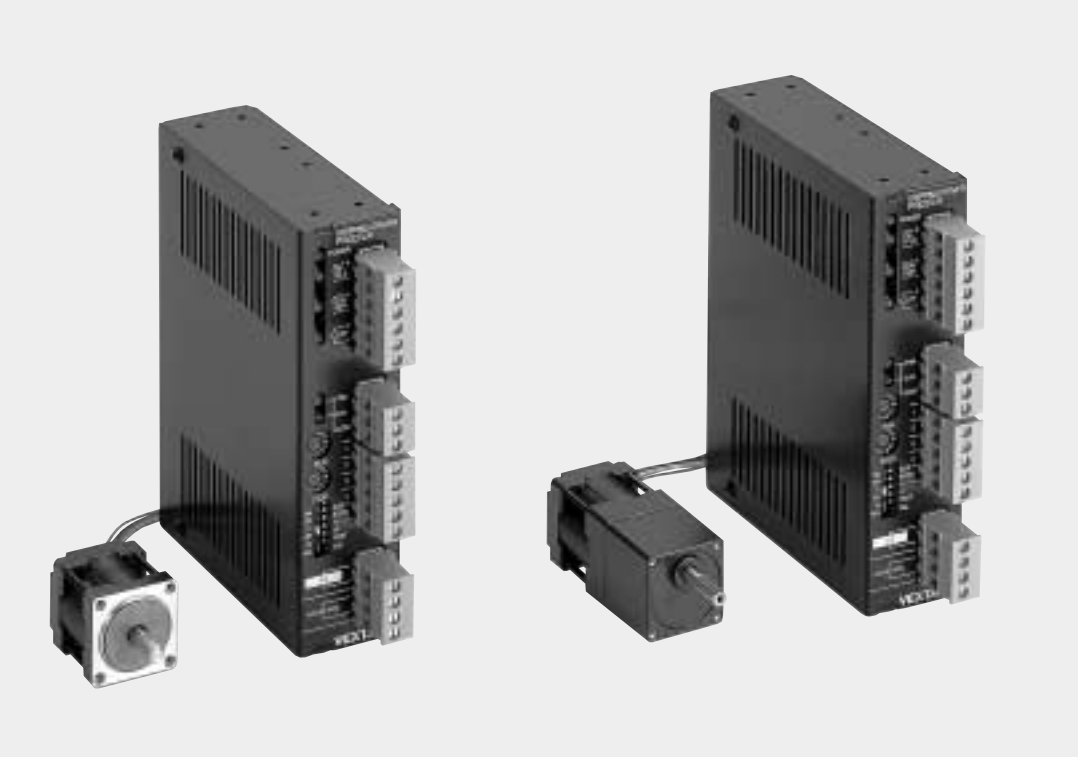
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COMPACT AND LIGHTWEIGHT
STEPPING MOTOR AND DRIVER PACKAGE

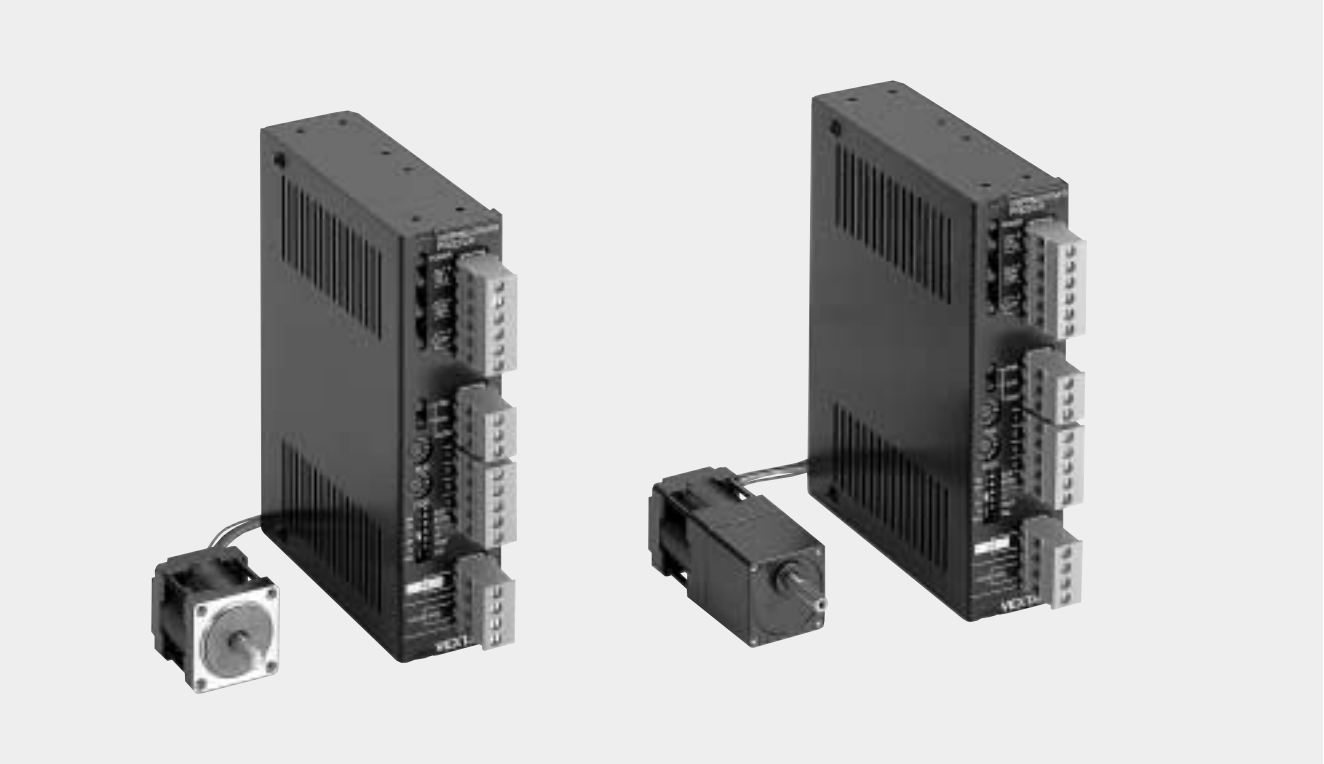
PMU *Series*

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COMPACT AND LIGHTWEIGHT STEPPING MOTOR AND DRIVER PACKAGE

EASY WIRING | GEAR | PLC DIRECT | RE-GENER-ATION | PACK-AGE | AC INPUT

PMU *Series*



1. Subminiature Size

Motor frame size is just 1.1 in. (28mm) sq.
The **PMU** series motors are the smallest and lightest 5-phase hybrid stepping motors available.

2. High Output

High torque is achieved by optimizing the stator's plate design. High torque can be obtained even in high speed ranges by combining the motor with a driver that generates 0.75 A/phase.

3. Low Vibration

The driver has a vibration suppression circuit. This greatly reduces vibration in the mid-speed areas.

4. Loaded with Functions

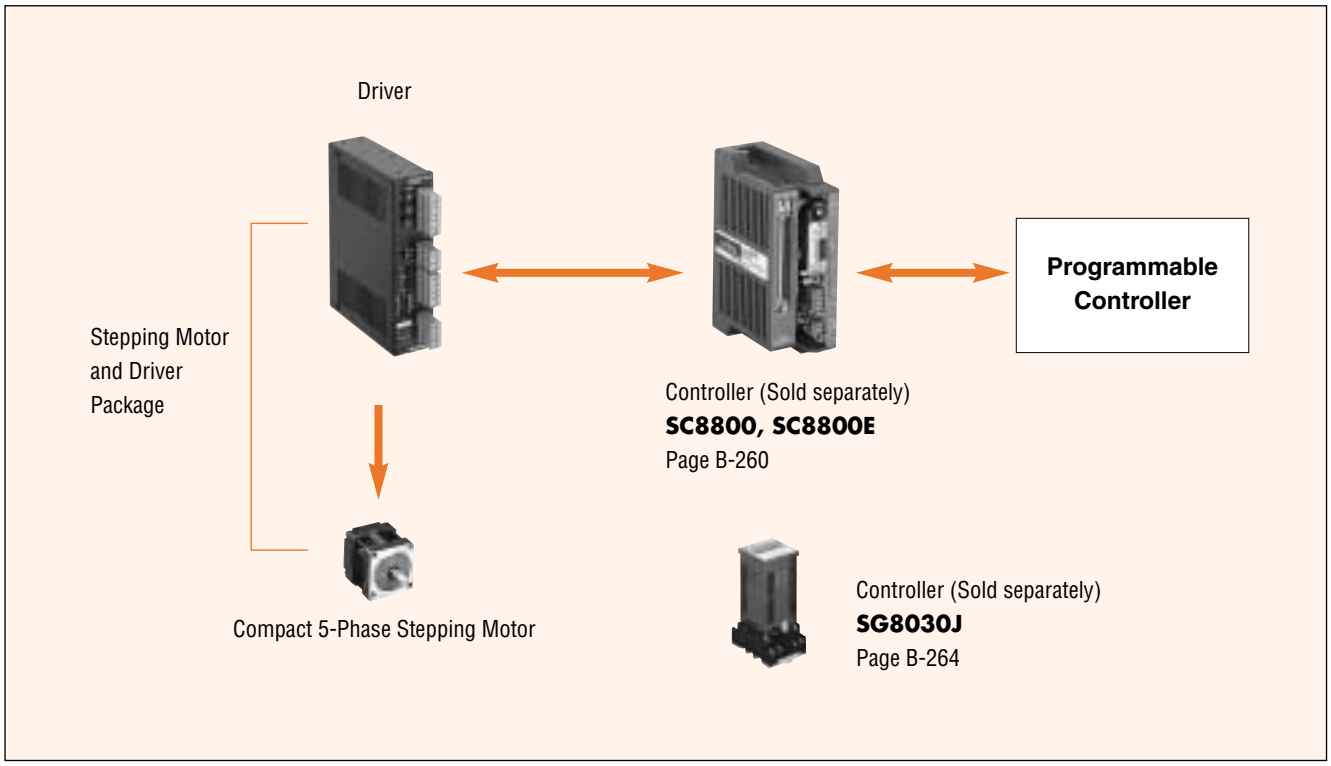
Basic functions like "All Windings off", "Pulse Input Mode Switching" and "Step Angle Switching" are supplemented by "Overheat Output Logic Switching" and "Self Test". All functions can be controlled from front panel switches.

5. Subminiature Gearmotors

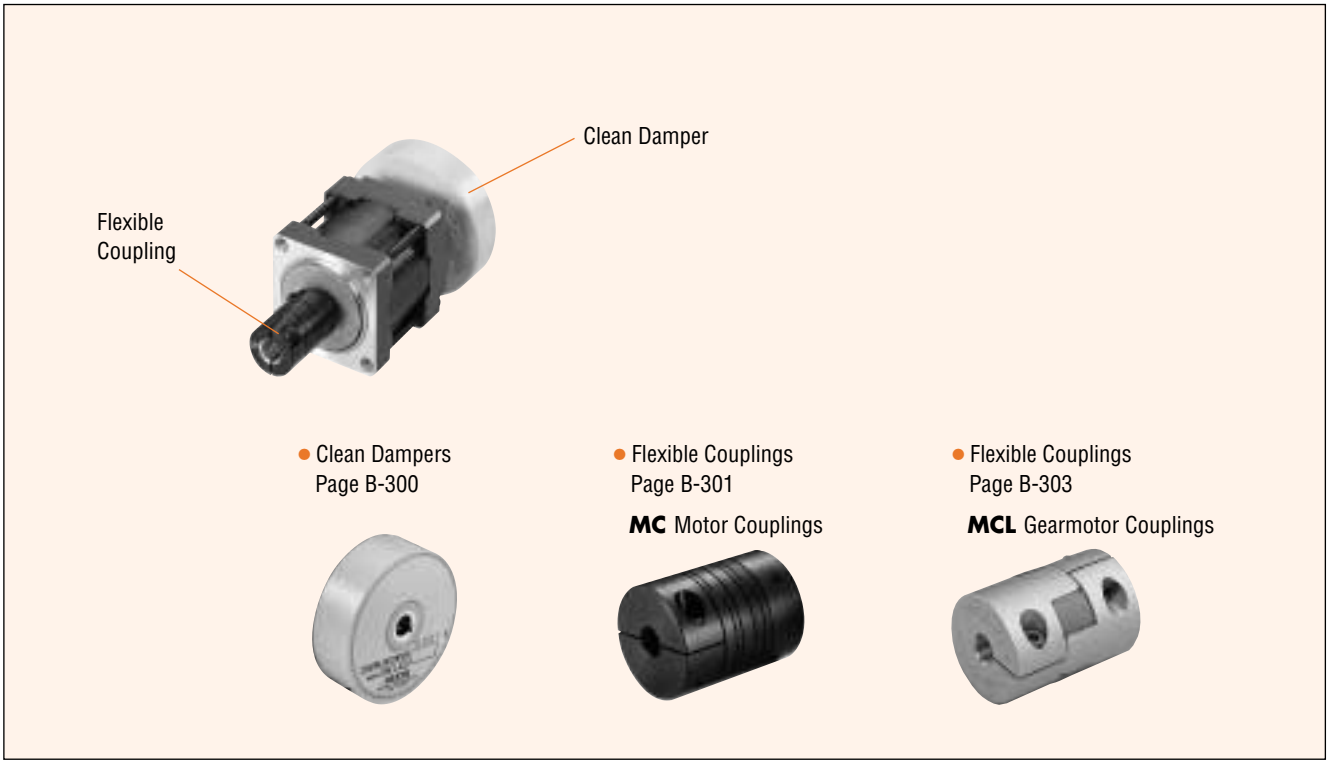
Gearmotors are also features a mounting frame just 1.1 in. (28mm) sq. Five gear ratios are available: 3.6:1, 7.2:1, 10:1, 20:1 and 30:1. The Lowness of the ratios means that speed can be reduced without slowing the motor too much, thus enabling more precise resolution and smoother rotation at low speed.

■ PMU SERIES SYSTEM CONFIGURATION

A compact stepping motor and driver are combined to make high-precision positioning with open loop control possible.



■ ACCESSORIES (Sold separately)



■ PRODUCT LINE

PMU Series High-Speed Type

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This package combines a compact driver and the smallest and lightest 5-phase hybrid stepping motor, which has a motor dimensions of 1.1 in. (28 mm) square. With this package, high torque can be obtained even in the high-speed region. The design was optimized to attain an increase of approximately 40% in torque compared to previous models.



Package Model	Maximum Holding Torque	
	oz-in	N·m
PMU33AH3 (Single Shaft)	4.58	0.033
PMU33BH3 (Double Shaft)	4.58	0.033
PMU35AH3 (Single Shaft)	8.33	0.06
PMU35BH3 (Double Shaft)	8.33	0.06

PMU Series Geared Type

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There are five gear ratios: 3.6:1, 7.2:1, 10:1, 20:1 and 30:1. These are low-speed gear ratios, so the rotation speed can be reduced without dropping the pulse speed. This provides finer resolution and smooth rotation at low speed.



Package Model	Permissible Torque	
	oz-in	N·m
PMU33AH1-MG3.6 (Single Shaft)	11.1	0.08
PMU33BH1-MG3.6 (Double Shaft)	11.1	0.08
PMU33AH1-MG7.2 (Single Shaft)	22.2	0.16
PMU33BH1-MG7.2 (Double Shaft)	22.2	0.16
PMU33AH1-MG10 (Single Shaft)	29.1	0.21
PMU33BH1-MG10 (Double Shaft)	29.1	0.21
PMU33AH1-MG20 (Single Shaft)	47.2	0.34
PMU33BH1-MG20 (Double Shaft)	47.2	0.34
PMU33AH1-MG30 (Single Shaft)	70.8	0.51
PMU33BH1-MG30 (Double Shaft)	70.8	0.51

The PMU Series of Dedicated Drivers. Designed with User-Friendly Functions.

A full range of driver functions are on the front panel.

Driver operating status is visible at a glance

Signal Monitor Indicator

Easy-to-read I/O signals.

POWER:	Power input indicator.
CW/PLS:	Pulse/CW pulse input indicator
CCW/DIR.:	Rotational Direction/CCW pulse input indicator
C.OFF:	All windings off input indicator
TIM:	Excitation timing output indicator
O.H.:	Overheat output indicator

Motor Operating Current Potentiometer
Motor Stop Current Potentiometer

The motor current is easy to adjust with the potentiometer. No ammeter is necessary.

Automatic Output Current Off Function Switch

When the level of heat within the driver reaches abnormal levels, this function automatically switches the motor current off. The function can be set and disabled by this switch.

Step Angle Switch

Switches the motor's step angle.
FULL: 0.72˚/step, HALF: 0.36˚/step

Pulse Input Mode Switch

Switches between 1-pulse input and 2-pulse input.

Self-Test Function Switch

This function inspects and checks the connection between driver and motor using the driver's built-in oscillator.

Note : This should normally be set to "N".

Overheat Output Logic Switch

Switches the overheat alarm output logic.
NO: Normal open
NC: Normal closed
Match the setting to an external PLC or device.

Power Supply Terminals

Can be used with AC100V/115V±15%, 50/60Hz.



■ PRODUCT NUMBER CODE

PMU 3 3 A H 3

- 3 — Reference Number
- H — High-Speed Type
- A — A: Single Shaft, B: Double Shaft
- 3 — Motor Case Length
- 3 — Motor Frame Size : 1.1 in. (28mm) sq.
- PMU — PMU Series

PMU 3 3 A H 1 - MG 3.6

- 3.6 — Gear Ratio
- MG — Geared Type
- 1 — Reference Number
- H — High-Speed Type
- A — A: Single Shaft, B: Double Shaft
- 3 — Motor Case Length
- 3 — Motor Frame Size : 1.1 in. (28mm) sq.
- PMU — PMU Series

■ SPECIFICATIONS HIGH-SPEED TYPE

Package Model		Single Shaft	PMU33AH3	PMU35AH3
		Double Shaft	PMU33BH3	PMU35BH3
Maximum Holding Torque		oz-in	4.58	8.33
		N · m	0.033	0.06
Rotor Inertia		oz-in^2	0.05	0.099
		kg · m^2	9×10^{-7}	18×10^{-7}
Rated Current		A/phase	0.75	
Basic Step Angle			0.72°	
Insulation Class			Class B [266°F (130°C)]	
Power Source			Single-Phase 100V/115V±15% 50/60Hz 1.1A maximum	
Output Current		A/phase	0.75	
Excitation Mode			● Full Step (4 phase excitation): 0.72°/step ● Half Step (4-5 phase excitation): 0.36°/step (Switch selectable)	
Input Signals	Input Signal Circuit		Photocoupler input, Input resistance 220Ω, Input current 20mA maximum Signal voltage Photocoupler ON: +4~+5V, Photocoupler OFF: 0~+0.5V	
	● Pulse Signal (CW Pulse Signal)		Step command pulse signal (CW step command signal at 2-pulse input mode) Pulse width: 5μs minimum, Pulse rise/fall : 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.	
	● Rotational Direction Signal (CCW Pulse Signal)		Rotation direction signal, Photocoupler ON : CW, Photocoupler OFF : CCW (CCW step command signal at 2-pulse input mode, Pulse width : 5μs minimum, Pulse rise/fall : 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.)	
	● All Windings Off Signal		When in the "photocoupler ON" state, the current to the motor is cut off and the motor shaft can be rotated manually. When in the "photocoupler OFF" state, 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 : 24V DC maximum, 10mA maximum	
	● Excitation Timing Signal		The signal is output every time the excitation sequence returns to the initial stage "0". (Photocoupler : ON) Full step : signal output every 10 pulses, Half step : signal output every 20 pulses	
	● Overheat Signal		The signal is output when the internal temperature of the driver rises above approximately 176°F (80°C) (Photocoupler : ON). The motor stops automatically if the automatic current off function is ON. Output logic of photocoupler can be determined by overheat output logic switch.	
Functions			Automatic current cutback, All windings off, Self-test, Pulse input mode switch, Step angle switch, Overheat output logic switch	
Indicators (LED)			Power source input, Pulse input/CW pulse input, Rotational direction input/CCW pulse input, All windings off signal input, Excitation timing signal output, Overheat signal output	
Driver Cooling Method			Natural Ventilation	
Weight (Mass)		Motor lb. (kg)	0.22 (0.1)	0.38 (0.17)
		Driver lb. (kg)	1 (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.	
		Driver	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the case and power supply terminal, case and motor terminal, case and signal input/output terminal, power supply and signal input/output terminal, motor terminal and signal input/output terminal.	
Dielectric Strength		Motor	Sufficient to withstand 0.5kV, 60Hz applied between the motor coils and casing for one minute, under normal temperature and humidity.	
		Driver	Sufficient to withstand 1.0kV, 60Hz applied between the case and power supply terminal, case and motor terminal, case and signal input/output terminal, power supply terminal and signal input/output terminal, motor terminal and signal input/output terminal for one minute,under normal temperature and humidity.	
Ambient Temperature Range		Motor	14°F~+122°F (−10°C~+50°C)	
		Driver	32°F~+122°F (0°C~+50°C)	

- Maximum holding torque refers to the holding torque at motor standstill when the rated current is supplied to the motor (5-phase excitation). Use this value to compare motor torque performance. When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" function at motor standstill reduces maximum holding torque by approximately 40%.
- The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)

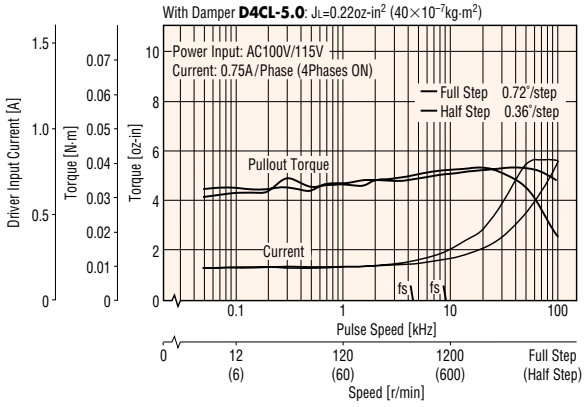
Note: Do not attempt to measure insulation resistance and/or dielectric strength while motor and driver are connected.

SPEED vs. TORQUE CHARACTERISTICS

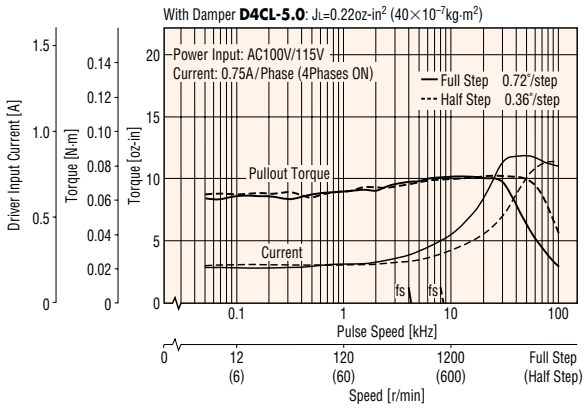
fs: Maximum Starting Pulse Rate

High-Speed Type

PMU33BH3



PMU35BH3



Note:

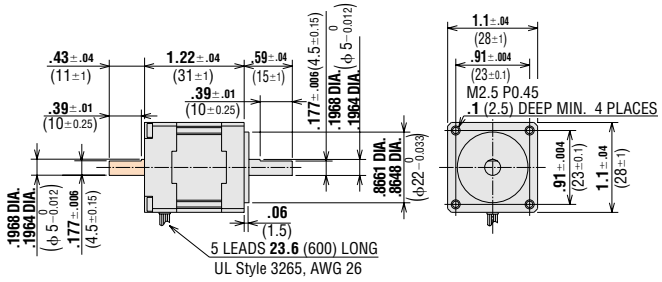
- Pay attention to heat dissipation from the motor and driver. The motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 212°F (100°C).
- When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" function at motor standstill reduces maximum holding torque by approximately 40%.

DIMENSIONS

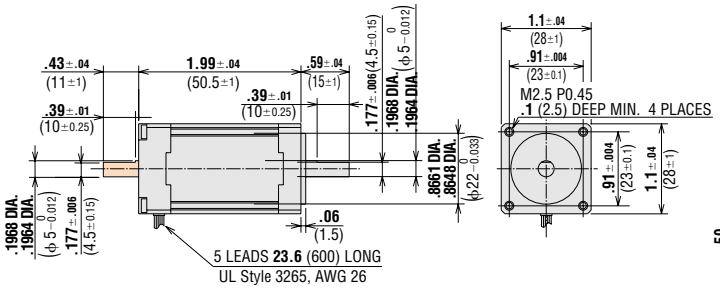
unit = inch (mm)

Motor scale : 1/2

PMU33AH3 (Single shaft)
Motor Model : PMM33AH2 Weight 0.22lb. (Mass 0.1kg)
PMU33BH3 (Double shaft)
Motor Model : PMM33BH2 Weight 0.22lb. (Mass 0.1kg)



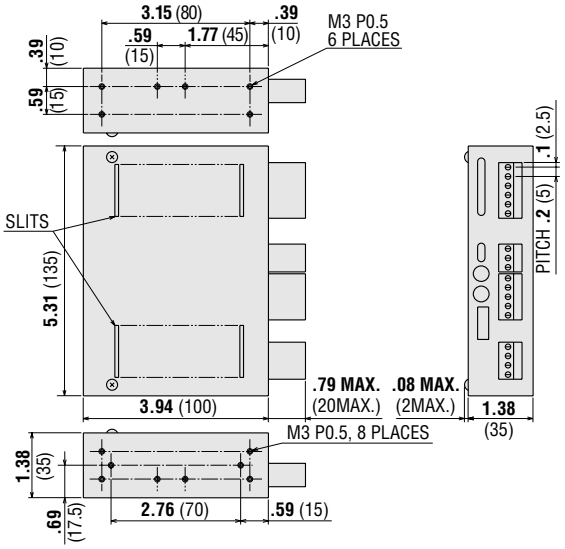
PMU35AH3 (Single shaft)
Motor Model : PMM35AH2 Weight 0.38lb. (Mass 0.17kg)
PMU35BH3 (Double shaft)
Motor Model : PMM35BH2 Weight 0.38lb. (Mass 0.17kg)



- These external appearance drawings are for double shaft models. For single shaft models ignore the colored areas.

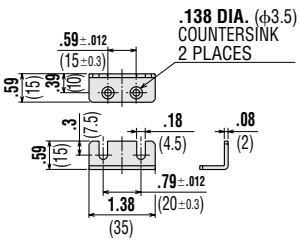
Driver scale : 1/4

Driver Model : PMD07UA Weight 1lb. (Mass 0.45kg)



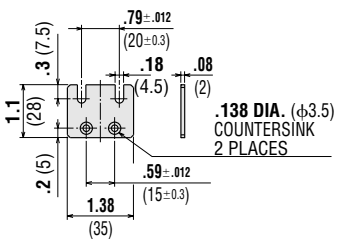
Mounting Bracket A

(2 pieces, included)



Mounting Bracket B

(2 pieces, included)



See page B-36 for information on motor installation, and page B-38 for information on driver installation.

■ SPECIFICATIONS GEARED TYPE

See page B-156 for product number codes for geared type.

Package Model		Single Shaft	PMU33AH1-MG3.6	PMU33AH1-MG7.2	PMU33AH1-MG10	PMU33AH1-MG20	PMU33AH1-MG30
		Double Shaft	PMU33BH1-MG3.6	PMU33BH1-MG7.2	PMU33BH1-MG10	PMU33BH1-MG20	PMU33BH1-MG30
Maximum Holding Torque		oz-in	11.1	22.2	29.1	47.2	70.8
		N · m	0.08	0.16	0.21	0.34	0.51
Rotor Inertia		oz-in^2/kg · m^2	$0.05/9\times10^{-7}$				
Rated Current		A/phase	0.75				
Basic Step Angle			0.2°	0.1°	0.072°	0.036°	0.024°
Gear Ratio			3.6:1	7.2:1	10:1	20:1	30:1
Permissible Torque		oz-in	11.1	22.2	29.1	47.2	70.8
		N · m	0.08	0.16	0.21	0.34	0.51
Permissible Thrust Load		lb./N	2.2/10				
Permissible Overhung Load		lb./N	3.3/15				
Permissible Speed Range (Gear Output Shaft Speed)		Full Step	0～25000Hz (0～833r/min)	0～25000Hz (0～416r/min)	0～25000Hz (0～300r/min)	0～25000Hz (0～150r/min)	0～25000Hz (0～100r/min)
		Half Step	0～50000Hz (0～833r/min)	0～50000Hz (0～416r/min)	0～50000Hz (0～300r/min)	0～50000Hz (0～150r/min)	0～50000Hz (0～100r/min)
Insulation Class			Class B [266°F(130°C)]				
Power Source			Single-Phase 100V/115V±15% AC 50/60Hz 1.1A maximum				
Output Current		A/phase	0.75				
Excitation Mode		Full Step	0.2° /step	0.1° /step	0.72° /step	0.036° /step	0.024° /step
		Half Step	0.1° /step	0.05° /step	0.036° /step	0.018° /step	0.012° /step
Input Signals	Input Signal Circuit		Photocoupler input, Input resistance 220Ω, Input current 20mA maximum Signal voltage Photocoupler ON: +4～+5V, Photocoupler OFF: 0～+0.5V				
	● Pulse Signal (CW Pulse Signal)		Step command pulse signal (CW step command signal at 2-pulse input mode) Pulse width: 5μs minimum, Pulse rise/fall: 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.				
	● Rotational Direction Signal (CCW Pulse Signal)		Rotation direction signal, Photocoupler ON : CW, Photocoupler OFF : CCW (CCW step command signal at 2-pulse input mode, Pulse width : 5μs minimum, Pulse rise/fall : 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.)				
	● All windings Off Signal		When in the "photocoupler ON" state, the current to the motor is cut off and the motor shaft can be rotated manually. When in the "photocoupler OFF" state, 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 : 24VDC maximum, 10mA maximum				
	● Excitation Timing Signal		The signal is output every time the excitation sequence returns to the initial stage "0". (Photocoupler: ON) Full step : signal output every 10 pulses, Half step: signal output every 20 pulses				
	● Overheat Signal		The signal is output when the internal temperature of the driver rises above approximately 176°F (80°C) (Photocoupler : ON). The motor stops automatically if the automatic current off function is ON. Output logic of photocoupler can be determined by overheat output logic switch.				
Functions			Automatic current cutback, All windings off, Self-test, Pulse input mode switch, Step angle switch, Overheat output logic switch				
Indicators (LED)			Power source input, Pulse input/CW pulse input, Rotational direction input/CCW pulse input, All windings off signal input, Excitation timing signal output, Overheat signal output				
Driver Cooling Method			Natural Ventilation				
Weight (Mass)		Motor lb. (kg)	0.36 (0.16)				
		Driver lb. (kg)	1 (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.				
		Driver	100MΩ minimum under normal temperature and humidity, when measured by a DC500V megger between the case and power supply terminal, case and motor terminal, case and signal input/output terminal, power supply terminal and signal input/output terminal, motor terminal and signal input/output terminal.				
Dielectric Strength		Motor	Sufficient to withstand 0.5kV, 60Hz applied between the motor coils and casing for one minute, under normal temperature and humidity.				
		Driver	Sufficient to withstand 1.0kV, 60Hz applied between the case and power supply terminal, case and motor terminal, case and signal input/output terminal, power supply terminal and signal input/output terminal, motor terminal and signal input/output terminal for one minute,under normal temperature and humidity.				
Ambient Temperature Range		Motor	14°F～+122°F (−10°C～+50°C)				
		Driver	32°F～+122°F (0°C～+50°C)				

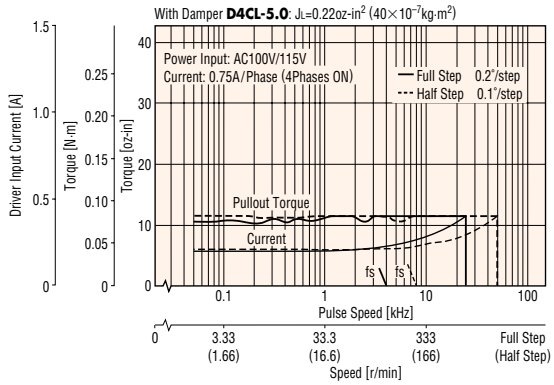
- Maximum holding torque refers to the holding torque at motor standstill when the rated current is supplied to the motor (5-phase excitation), with consideration given to the permissible strength of the gear. Use this value to compare motor torque performance. When using the motor with the dedicated driver, the driver's "Automatic current cutback" function at motor standstill reduces maximum holding torque by approximately 40%.
- The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)
- Permissible torque is the maximum value of the mechanical strength of the gear unit. Use the product with a total torque (load and acceleration) less than the permissible torque.
- Permissible overhung load indicates the value measured at 0.39in. (10mm) from the tip of the gear output shaft.
- Direction of rotation of the motor and that of the gear output shaft are the same for reduction ratios of 3.6:1, 7.2:1, 20:1 and 30:1. It is opposite for the 10:1 ratio.

Note: Do not attempt to measure insulation resistance and/or dielectric strength while motor and driver are connected.

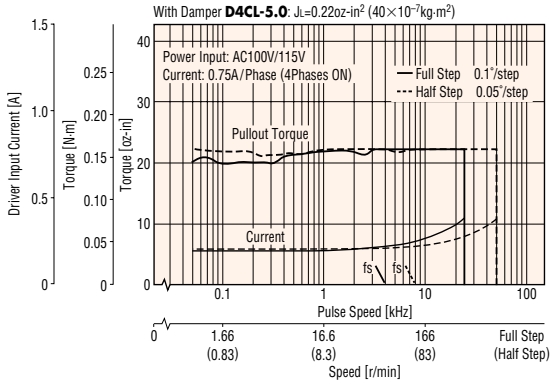
SPEED vs. TORQUE CHARACTERISTICS

fs: Maximum Starting Pulse Rate

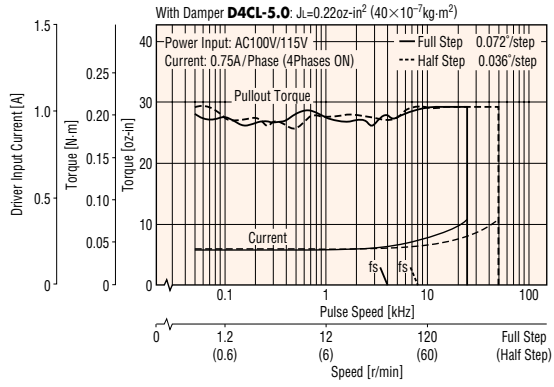
PMU33BH1-MG3.6



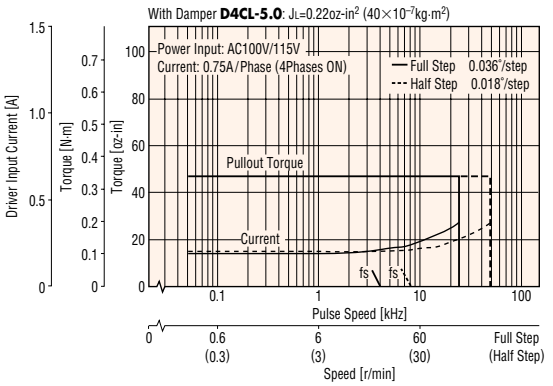
PMU33BH1-MG7.2



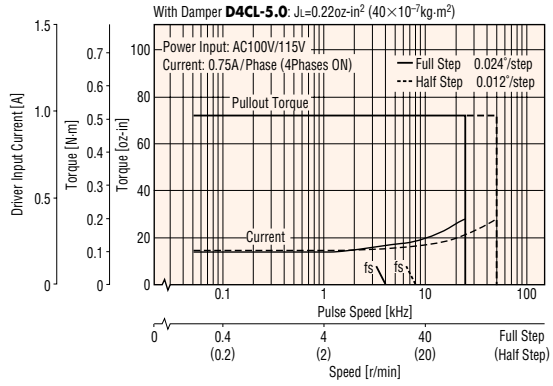
PMU33BH1-MG10



PMU33BH1-MG20



PMU33BH1-MG30



Note:

- Pay attention to heat dissipation from the motor and driver. The motor will produce a considerable amount of heat under certain conditions. Be sure to keep the temperature of the motor case under 212°F (100°C).
- When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" function at motor standstill reduces maximum holding torque by approximately 40%.

PRECAUTIONS

When using the **PMU** series, please note the following:

1. Do not exceed the maximum permissible torque:

Permissible torque represents the maximum value of the mechanical strength of the gearhead. Be sure to keep the total value of acceleration/deceleration torque and load (friction) torque at the shaft under the permissible torque value. If torque exceeding the permissible torque is applied, the gearhead may break down.

2. Be careful of backlash in bi-directional positioning:

Backlash is the free rotation angle (i.e., play) of the output shaft when the input section of the gearhead is fixed. If there is a problem with backlash in positioning in both forward and reverse directions, be sure to stop the motor in one direction.

3. Do not exceed the permissible speed range:

Do not exceed the maximum output speed of the gearhead indicated in the specifications on page B-158. The speed affects the life the gearhead (i.e., backlash becomes large). Be sure to use the gearhead within the maximum permissible speed range.

4. The direction of gear shaft rotation differs according to gear ratio:

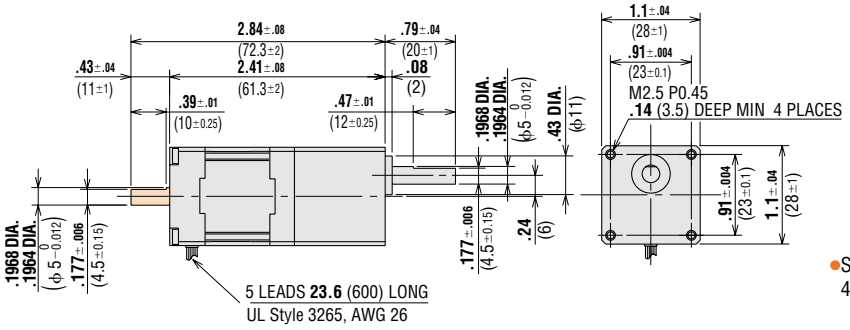
The direction of motor shaft rotation and gear shaft rotation depends on the gear ratio applied:
Gear ratio - 3.6:1, 7.2:1, 20:1 and 30:1 - Same as motor shaft
Gear ratio - 10:1 - Opposite of motor shaft

■ DIMENSIONS unit = inch (mm)

●Motor scale 1/2

PMU33AH1-MG3.6 (Single Shaft) Motor Model : PMM33AH-MG3.6
PMU33AH1-MG7.2 (Single Shaft) Motor Model : PMM33AH-MG7.2
PMU33AH1-MG10 (Single Shaft) Motor Model : PMM33AH-MG10
PMU33AH1-MG20 (Single Shaft) Motor Model : PMM33AH-MG20
PMU33AH1-MG30 (Single Shaft) Motor Model : PMM33AH-MG30
PMU33BH1-MG3.6 (Double Shaft) Motor Model : PMM33BH-MG3.6
PMU33BH1-MG7.2 (Double Shaft) Motor Model : PMM33BH-MG7.2
PMU33BH1-MG10 (Double Shaft) Motor Model : PMM33BH-MG10
PMU33BH1-MG20 (Double Shaft) Motor Model : PMM33BH-MG20
PMU33BH1-MG30 (Double Shaft) Motor Model : PMM33BH-MG30

Weight 0.36lb. (Mass 0.16kg)

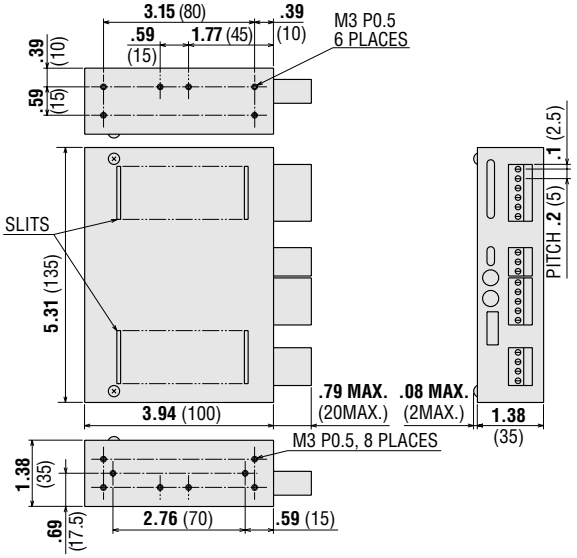


●Screws (included)
4-M2.5 P0.45 length .31 (8)

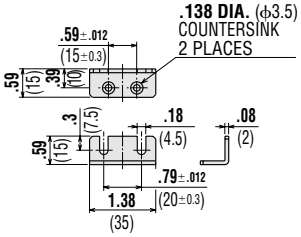
●This external appearance drawing is for a double shaft model.
For a single shaft model ignore the colored areas.

●Driver scale 1/4

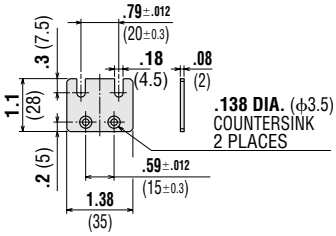
Driver Model : PMD07UA Weight 1lb. (Mass 0.45kg)



●Mounting Bracket A
(2 pieces, included)



●Mounting Bracket B
(2 pieces, included)



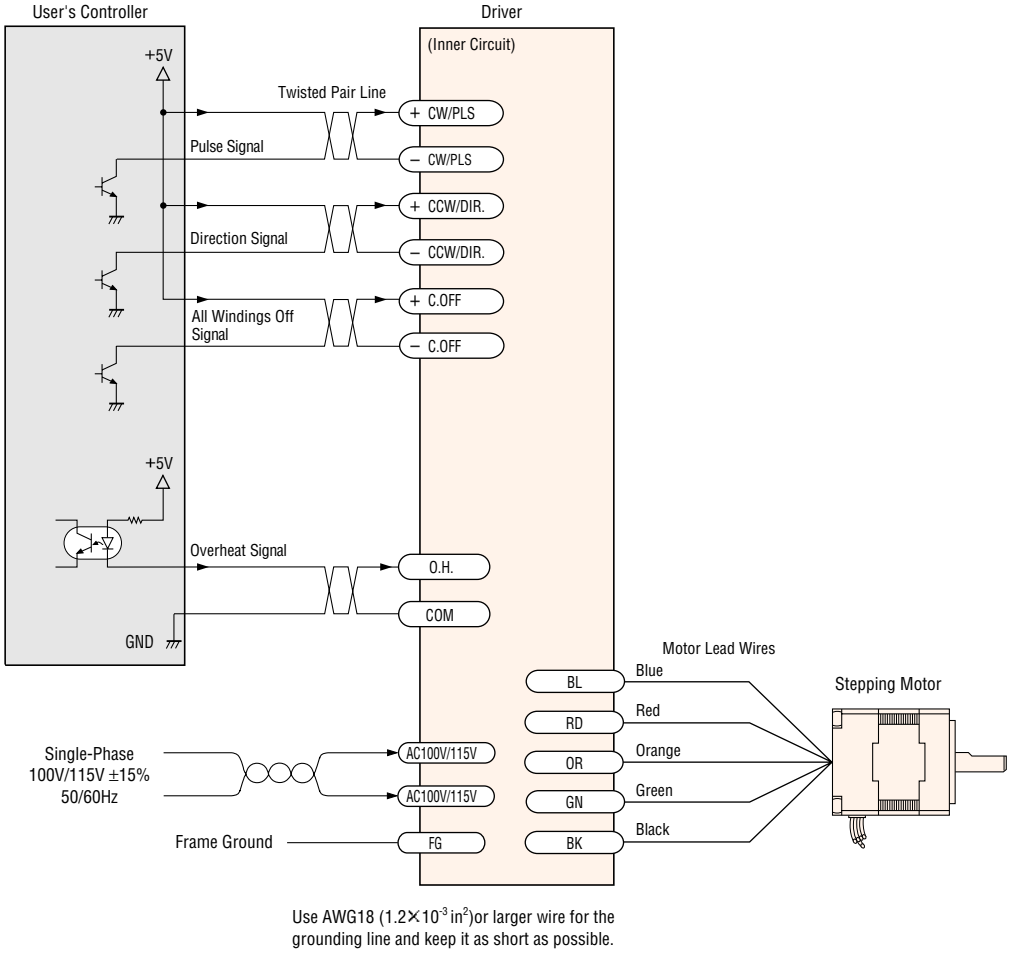
See page B-36 for information on motor installation and page B-38 for information on driver installation.

LIST OF MOTOR AND DRIVER COMBINATIONS

Type	Package model	Stepping motor		Driver
		Model	Current A/phase	Model
High-Speed	**PMU33□H3** **PMU35□H3**	PMM33□H2 PMM35□H2	0.75	PMD07UA
Geared	**PMU33□H1-MG3.6** **PMU33□H1-MG7.2** **PMU33□H1-MG10** **PMU33□H1-MG20** **PMU33□H1-MG30**	PMM33□H-MG3.6 PMM33□H-MG7.2 PMM33□H-MG10 PMM33□H-MG20 PMM33□H-MG30	0.75	PMD07UA

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

WIRING DIAGRAM



Use AWG18 (1.2×10^{-3} in^2)or larger wire for the grounding line and keep it as short as possible.

Power Supply

Use a power supply that can supply sufficient input current.
When power supply capacity is insufficient, a decrease in motor output can cause the following malfunctions:

- Motor does not rotate properly at high-speed (insufficient torque)
- Motor startup and stopping is slow.

Use open collector transistors (sink type) for the signal output sections of the controller.

Note :

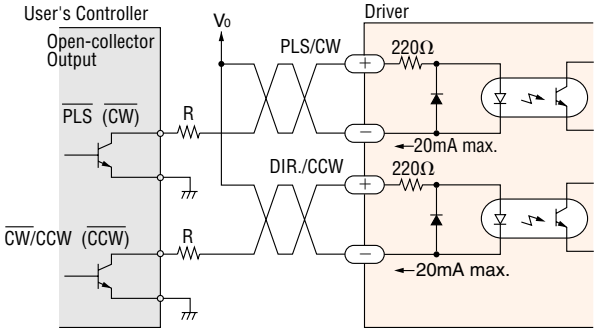
- Use twisted-pair wire of 6.6 feet (2m) or less in length for the signal line.
- Use wire of 7.8×10^{-4} in^2 (0.5mm^2) or thicker for motor lines (when extended) and power supply lines, and use 1.2×10^{-3} in^2 (0.75mm^2) or thicker for the wire for the grounding line.
- Use spot grounding for the grounding of the driver and external controller.
- Signal lines should be kept at least 3.94 inch (10cm) away from power lines (power supply lines and motor lines). Do not bind the signal line and power line together.

Do not turn on the power or operate the motor until confirming that the self-inspection switch is set to "N". If it is set to TEST, there is a danger that the motor will start rotating as soon as the power to the driver is turned on.

■ DESCRIPTION OF INPUT/OUTPUT SIGNALS

1. Pulse Input

■ Input circuit and sample connection



Keep the voltage between DC 5V and DC 24V.
When voltage is equal to DC 5V, external resistance (R) is not necessary. When voltage is above DC 5V, connect external resistance (R) and keep the input current below 20mA.

■ 1-Pulse Input Mode

Pulse Signal

"Pulse" signal is input to the pulse signal terminal. When the photocoupler state changes from "ON" to "OFF", the motor rotates one step. The direction of rotation is determined by the following rotation direction signal.

Rotation Direction Signal

The "Rotational Direction" signal is input to the rotation direction signal input terminal. A "photocoupler ON" signal input commands a clockwise direction rotation. A "photocoupler OFF" signal input commands a counterclockwise direction rotation.

■ 2-Pulse Input Mode

CW Pulse Signal

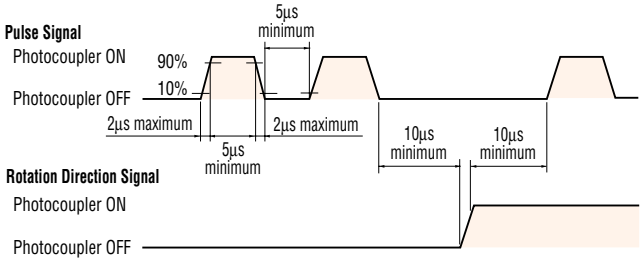
When the photocoupler state changes from "ON" to "OFF", the motor rotates one step in the clockwise direction.

CCW Pulse Signal

When the photocouple state changes from "ON" to "OFF", the motor rotates one step in the counterclockwise direction.

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

■ Pulse Waveform Characteristics

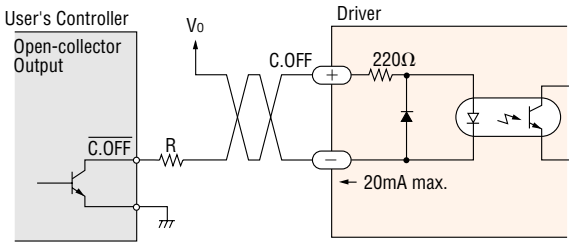


The shaded area indicates when the photocoupler diode is ON. The motor moves when the photocoupler state changes from ON to OFF as indicated by the arrow.

- The pulse voltage is 4~5V in the "photocoupler ON" state, and 0~0.5V in the "photocoupler OFF" state.
- Input pulse signals should have a pulse width over 5μs, pulse rise/fall below 2μs, and a pulse duty below 50%.
- Keep the pulse signal at "photocoupler OFF" when no pulse is being input.
- The minimum interval time when changing rotation direction is 10μs. This value varies greatly depending on the motor type, pulse frequency, and load inertia. It may be necessary to increase this time interval.
- In 1-pulse input mode, leave the pulse signal at rest ("photocoupler OFF") when changing rotation directions.

2. C.OFF (All Windings Off) Input

■ Input circuit and sample connection



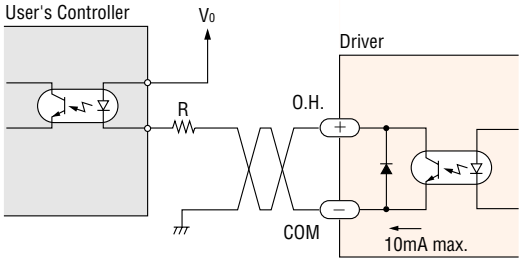
Keep the voltage between DC 5V and DC 24V.
When voltage is equal to DC 5V, external resistance (R) is not necessary. When voltage is above DC 5V, connect external resistance (R) and keep the input current below 20mA.

When the "All Windings Off" signal is in the "photocoupler ON" state, the current to the motor is cut off and motor torque is reduced to zero. The motor output shaft can then be rotated freely by hand.
When the "All Windings Off" signal is in the "photocoupler OFF" state, 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 in the "photocoupler OFF" state.
This signal is used when moving the motor by external force or manual home position is desired. If this function is not needed, it is not necessary to connect this terminal.

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

3. O.H. (Overheat) Output

■ Output circuit and sample connection



Keep the voltage between DC 5V and DC 24V.
Keep the current below 10mA. If the current exceeds 10mA, connect external resistance (R).

The "Overheat" signal is output to protect the driver from heat damage if the internal temperature of the driver rises above 176°F (80°C).
When connected as shown in the example connection, the signal will be "photocoupler OFF" during normal conditions, and "photocoupler ON" when the temperature exceeds 176°F (80°C).

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

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