



5-PHASE HIGH-TORQUE STEPPING MOTOR AND DRIVER PACKAGE

UPK·W Series

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The **UPK•W** series is a new generation of compact, high torque, low vibration, 5-phase stepping motor and driver packages.



■ FEATURES

1. Compact Drivers

The **UPK•W** series drivers are only 5.31 inch (135mm) high and therefore keep the installation area small. They also come with a built-in mounting bracket for easy installation.

2. High Torque

The **UPK•W** series is based on the **UPK** series of high-torque, 5-phase stepping motor package, so they have the same high torque. Now devices can be made smaller and more lightweight.

3. Low Vibration

The **UPK•W** series does more than provide higher torque. It is also designed so that the motor produces less vibration, and a new driver has been developed to include a vibration control circuit to dramatically reduce vibration in the mid-speed range (1~5kHz).

4. Low Noise

The motor is designed on a new principle to produce excellent sound performance. The motor components are more rigid and the motor structure has been redesigned to achieve a significant reduction in audible noise.

5. Wide range of power supply voltage

In addition to single-phase 100-115VAC $\pm 15\%$ (50/60 Hz) power input, the product line also has 200-230VAC $\begin{matrix} +10\% \\ -15\% \end{matrix}$ (50/60 Hz) models.

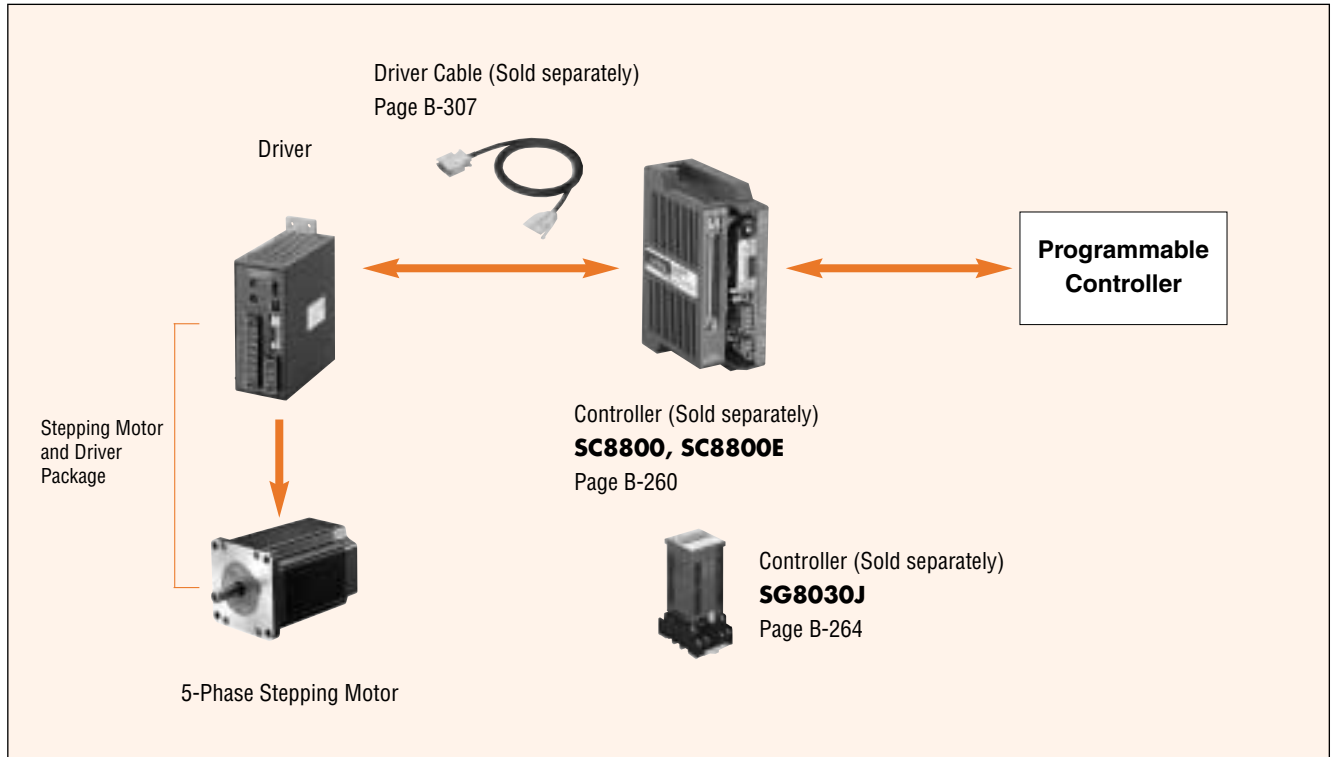
The models with installation dimensions of 1.65inch (42mm) square and the high-speed types only accept single-phase 100-115 VAC input.

6. Standard certified products

These products are certified to meet the world's most common standards. Also, the product has been CE marked according to the low voltage directive. (Certification for some products is pending, so for a list of certified products, see Page D-15.)

■ UPK • W SYSTEM CONFIGURATION

A high-torque 5-phase stepping motor and driver are combined to make high-precision positioning with open loop control possible.



■ ACCESSORIES (Sold separately)

This section lists various accessories available for the system:

- Motor Mounting Bracket**: A black plastic bracket used to mount the motor. **Motor mounting bracket and flexible coupling cannot be fitted on to geared type.**
- Flexible Coupling**: A black cylindrical component used to connect the motor to the load.
- Clean Damper**: A black cylindrical component used to suppress motor vibration and improve performance.
- Extension Cable**: A black cable used to extend the distance between the driver and the controller. Available in lengths of 16.4 feet (5m), 32.8 feet (10m), and 65.6 feet (20m).
- MC Motor Couplings**: A black cylindrical component used to connect the motor to the load.
- Driver Cables**: A black cable used to connect the driver and the controller. Available in lengths of 16.4 feet (5m), 32.8 feet (10m), and 65.6 feet (20m).

The UPK•W Series Drivers. Designed with User-Friendly Functions.

The UPK•W series has four types of drivers. The functions listed below are common to all types. The drivers shown below are the UDK5114NW2 and the UDK5214NW.

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

Driver operating status is visible at a glance

Signal monitor display ————— 1

Easy to confirm I/O signals.

POWER: Power input display
TIM.: Excitation timing output display
O.H.: Overheat output display

Motor operating current adjustment switch
Motor stop current adjustment switch ————— 2

The motor current is easy to adjust with digital switches. No ammeter necessary.

RUN : Can be adjusted the motor running current.
STOP : Can be adjusted the current at the motor standstill.

Pulse input mode switch ————— 3

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

Step angle switch ————— 4

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

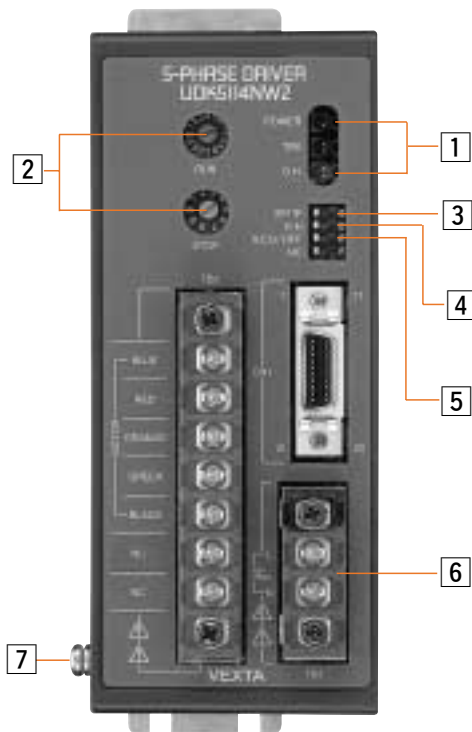
Automatic current off function switch ————— 5

When the temperature inside the driver reaches 176°F (80°C), this function automatically switches the motor current off. The function can be set and released with this switch.

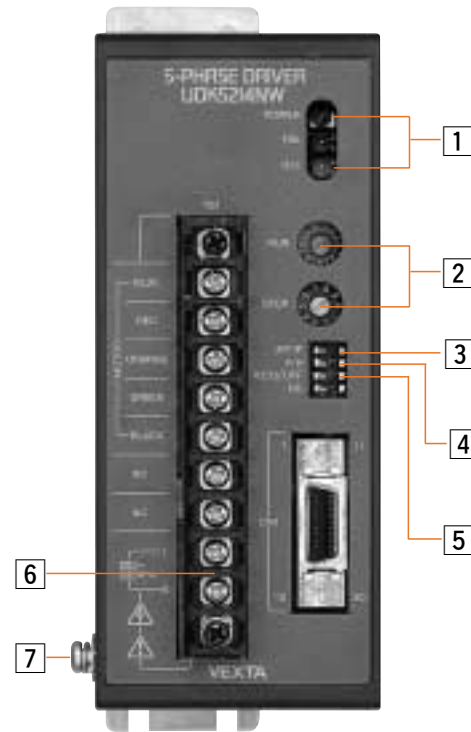
Power Supply Terminals ————— 6

Drivers are available for use with single-phase 100-115VAC ± 15% (50/60 Hz) and 200-230VAC ± 10%
± 15% (50/60 Hz) models.

Protective Earthing Terminal ————— 7



Single-Phase 100-115VAC Input Driver



Single-Phase 200-230VAC Input Driver







UPK • W Series Product Line

* T_H : Maximum Holding Torque

Mounting Frame Size inch (mm)

1.65(42)

		T _H * oz-in (N•m)	18 (0.13)	24.9 (0.18)	33.3 (0.24)	58.3 (0.42)
Standard Type Page B-68 	Single-Phase 100V-115VAC Input		UPK543AW UPK543BW	UPK544AW UPK544BW	UPK545AW UPK545BW	UPK564AW2 UPK564BW2
	Single-Phase 200V-230VAC Input					UPK564AJW UPK564BJW
High-Speed Type Page B-68 	Single-Phase 100V-115VAC Input					
TH Geared Type Page B-80 	Single-Phase 100V-115VAC Input	T _H * lb-in (N•m)	3.03 (0.35)	6.07 (0.7)	8.67 (1)	13 (1.5)
	Single-Phase 200V-230VAC Input					
PN Geared Type Page B-80 	Single-Phase 100V-115VAC Input	T _H * lb-in (N•m)				
	Single-Phase 200V-230VAC Input					

2.36(60)

3.35(85)/3.54(90)

115 (0.83)				230 (1.66)				291 (2.1)			569 (4.1)			874 (6.3)		
UPK566AW2				UPK569AW2				UPK596AW2			UPK599AW2			UPK5913AW2		
UPK566BW2				UPK569BW2				UPK596BW2			UPK599BW2			UPK5913BW2		
UPK566AJW				UPK569AJW				UPK596AJW			UPK599AJW			UPK5913AJW		
UPK566BJW				UPK569BJW				UPK596BJW			UPK599BJW			UPK5913BJW		
				UPK569AHW2				UPK596AHW2			UPK599AHW2			UPK5913AHW2		
				UPK569BHW2				UPK596BHW2			UPK599BHW2			UPK5913BHW2		
21.6 (2.5)		26 (3)		30.3 (3.5)		34.7 (4)		39 (4.5)			78.1 (9)			104 (12)		
UPK564AW-T7.2	UPK564AW-T10	UPK564AW-T20	UPK564AW-T30	UPK596AW-T3.6	UPK596AW-T7.2	UPK596AW-T20										
UPK564BW-T7.2	UPK564BW-T10	UPK564BW-T20	UPK564BW-T30	UPK596BW-T3.6	UPK596BW-T7.2	UPK596BW-T20										
					UPK596AW-T10	UPK596AW-T30										
					UPK596BW-T10	UPK596BW-T30										
UPK564AJW-T7.2	UPK564AJW-T10	UPK564AJW-T20	UPK564AJW-T30	UPK596AJW-T3.6	UPK596AJW-T7.2	UPK596AJW-T20										
UPK564BJW-T7.2	UPK564BJW-T10	UPK564BJW-T20	UPK564BJW-T30	UPK596BJW-T3.6	UPK596BJW-T7.2	UPK596BJW-T20										
					UPK596AJW-T10	UPK596AJW-T30										
					UPK596BJW-T10	UPK596BJW-T30										
30.3 (3.5)				52 (6)												
UPK566AW-N5				UPK564AW-N25												
UPK566BW-N5				UPK564BW-N25												
UPK566AW-N7.2				UPK564AW-N36												
UPK566BW-N7.2				UPK564BW-N36												
UPK566AW-N10				UPK564AW-N50												
UPK566BW-N10				UPK564BW-N50												
UPK566AJW-N5				UPK564AJW-N25												
UPK566BJW-N5				UPK564BJW-N25												
UPK566AJW-N7.2				UPK564AJW-N36												
UPK566BJW-N7.2				UPK564BJW-N36												
UPK566AJW-N10				UPK564AJW-N50												
UPK566BJW-N10				UPK564BJW-N50												

UPK • W Geared Type

In addition to the high resolution of 0.72°/step for full-step operation and 0.36°/step for half-step operation, the **UPK•W** series of 5-phase stepping motor packages include two types of gears units, **TH** and **PN**. In addition to single-phase 100-115VAC (50/60 Hz) models, there are also 200-230VAC (50/60 Hz) models and standard certified models. (Certification for some products is pending.)

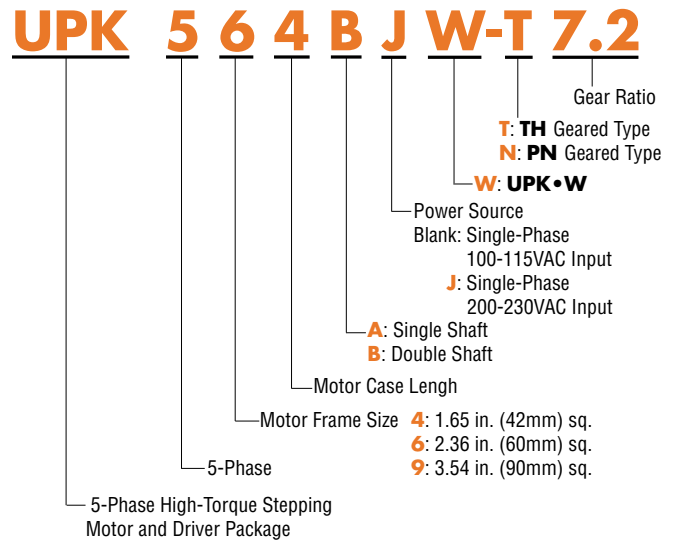


■ SAFETY STANDARDS AND CE MARKING

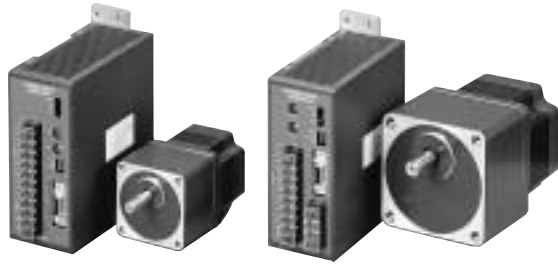
Products	Applicable Standards	Authorizing Organization	Standards File No.	CE Marking
Stepping Motor	UL1004, UL519	UL	E64199	Low Voltage Directive
	CAN/CSA-C22.2 No.100 CNA/CSA-C22.2 No.77			
TH Geared	EN60950	VDE	6763ÜG	Low Voltage Directive
	PN Geared			
Driver for Stepping Motor	UL508C	UL	E171462	Low Voltage Directive
	CAN/CSA-C22.2 No.14			
	EN60950, EN50178	DEMKO	See page D-15	

- See page D-9 for more information on operating conditions of EN/IEC standards.
- The EN/IEC standard certification depends on the type and installation size. For details, see Page D-15.
- Motor and drivers are recognized individually.

■ PRODUCT NUMBER CODE



TH Geared Type



* See page B-84 to B-95 for products specifications, characteristics and dimensions.

● High-precision positioning

A tapered gear is used for the gear output stage and the gear that merges with it to obtain high precision and low backlash operation. The backlash is 35 arc minutes (0.584°) - 10 arc minutes (0.167°) for a motor installation dimension of 2.36 in. (60mm) square and 25 arc minutes (0.417°) - 10 arc minutes (0.167°) for 3.54 in. (90mm). Backlash decreases as the speed reduction ratio increases.

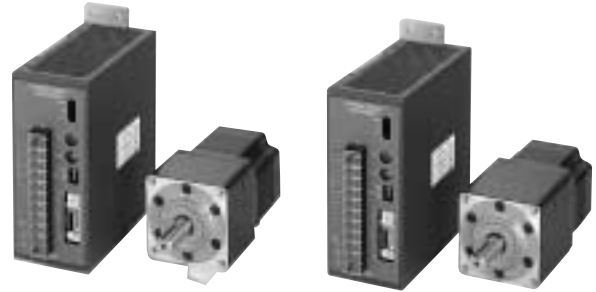
● Five Gear Ratios

Five low gear ratios of 3.6:1, 7.2:1, 10:1, 20:1 and 30:1 are available. These gear ratios are convenient for applications requiring gearing without reducing of the motor speed.

■ PRODUCT LINE

Power Source	Package Model		Permissible Torque		
	Single Shaft	Double Shaft	lb-in	N·m	
Single Phase 100 - 115VAC	UPK543AW-T3.6	UPK543BW-T3.6	3.03	0.35	
	UPK543AW-T7.2	UPK543BW-T7.2	6.07	0.7	
	UPK543AW-T10	UPK543BW-T10	8.67	1	
	UPK543AW-T20	UPK543BW-T20	13	1.5	
	UPK543AW-T30	UPK543BW-T30	13	1.5	
	UPK564AW-T3.6	UPK564BW-T3.6	10.8	1.25	
	UPK564AW-T7.2	UPK564BW-T7.2	21.6	2.5	
	UPK564AW-T10	UPK564BW-T10	26	3	
	UPK564AW-T20	UPK564BW-T20	30.3	3.5	
	UPK564AW-T30	UPK564BW-T30	34.7	4	
	UPK596AW-T3.6	UPK596BW-T3.6	39	4.5	
	UPK596AW-T7.2	UPK596BW-T7.2	78.1	9	
	UPK596AW-T10	UPK596BW-T10	78.1	9	
	UPK596AW-T20	UPK596BW-T20	104	12	
	UPK596AW-T30	UPK596BW-T30	104	12	
	Single Phase 200 - 230VAC	UPK564AJW-T3.6	UPK564BJW-T3.6	10.8	1.25
		UPK564AJW-T7.2	UPK564BJW-T7.2	21.6	2.5
		UPK564AJW-T10	UPK564BJW-T10	26	3
UPK564AJW-T20		UPK564BJW-T20	30.3	3.5	
UPK564AJW-T30		UPK564BJW-T30	34.7	4	
UPK596AJW-T3.6		UPK596BJW-T3.6	39	4.5	
UPK596AJW-T7.2		UPK596BJW-T7.2	78.1	9	
UPK596AJW-T10		UPK596BJW-T10	78.1	9	
UPK596AJW-T20		UPK596BJW-T20	104	12	
UPK596AJW-T30		UPK596BJW-T30	104	12	

PN Geared Type



* See page B-96 to B-101 for products specifications, characteristics and dimensions.

● Low backlash of 3 arc minutes or less

The **PN** geared type uses a newly developed backlash reduction structure to obtain backlash of 3 arc minutes (0.05°) or less. This is a major increase in precision compared to conventional planetary geared types with typical backlash of 20 arc minutes (0.33°).

● High permissible torque

Since the planetary gear structure transmits torque distributed over multiple planetary gears, it can provide large permissible torque.

For example **UPK564BW-N25** produces a maximum torque of 52 lb-in (6 N·m).

● Six gear ratios

The **PN** geared type, six gear ratios are available: 5:1, 7.2:1, 10:1, 25:1, 36:1 and 50:1. When the gear ratio of 7.2:1 is used, a step angle of 0.1° can be obtained for full step operation.

■ PRODUCT LINE

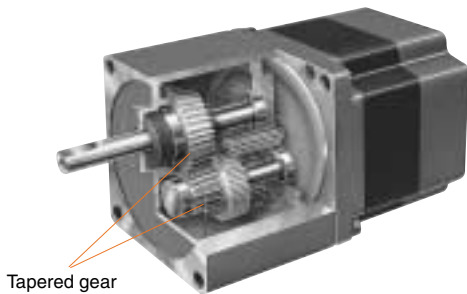
Power Source	Package Model		Permissible Torque	
	Single Shaft	Double Shaft	lb-in	N·m
Single Phase 100 - 115VAC	UPK566AW-N5	UPK566BW-N5	30.3	3.5
	UPK566AW-N7.2	UPK566BW-N7.2	30.3	3.5
	UPK566AW-N10	UPK566BW-N10	30.3	3.5
	UPK564AW-N25	UPK564BW-N25	52	6
	UPK564AW-N36	UPK564BW-N36	52	6
	UPK564AW-N50	UPK564BW-N50	52	6
Single Phase 200 - 230VAC	UPK566AJW-N5	UPK566BJW-N5	30.3	3.5
	UPK566AJW-N7.2	UPK566BJW-N7.2	30.3	3.5
	UPK566AJW-N10	UPK566BJW-N10	30.3	3.5
	UPK564AJW-N25	UPK564BJW-N25	52	6
	UPK564AJW-N36	UPK564BJW-N36	52	6
	UPK564AJW-N50	UPK564BJW-N50	52	6

■ ABOUT THE GEARS

●TH Gears

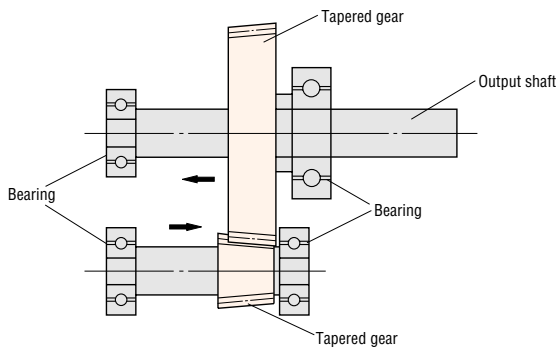
Tapered gears are used for the final stage of the spur gear speed reduction mechanism to reduce backlash.

Gaps are required between gears to allow them to rotate smoothly. However, on the gear output shaft, these gaps become play known as backlash, and this is a problem when a control gear motor is used in applications requiring high positioning precision. The tapered gears used in the final stage are adjusted in the direction of the arrows shown in the figure below to reduce backlash.



Tapered gear

TH gear sectional diagram



The structure of the final stage of the TH gear

●PN Gears

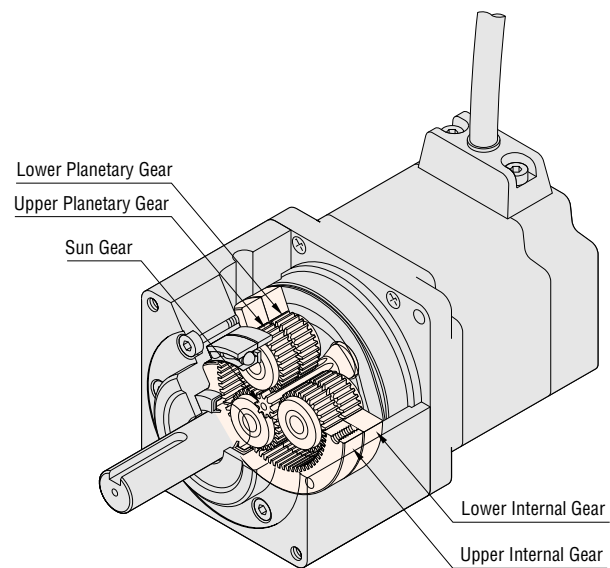
High-precision, high-strength **PN** (planetary) gears have been developed specially for five-phase stepping motors. Unlike ordinary spur gear mechanisms, planetary gears disperse torque over multiple planetary gears, so large torque can be obtained with minimal backlash. Moreover, since the gear output shaft is a center shaft, the same as the motor output shaft. This could be an advantage when mounting the motor.

Planetary gears have the following features.

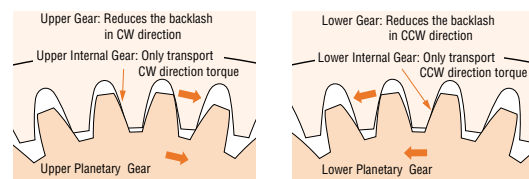
- The overall size is small.
- High power can be continuously obtained.
- Noise is low.
- Weight is low.
- The input shaft and output shaft are on the same axis.

The **PN** gear type uses newly developed gears that utilize a backlash reduction mechanism. In this new structure there are two stages, upper and lower, for the internal gears and planetary gears.

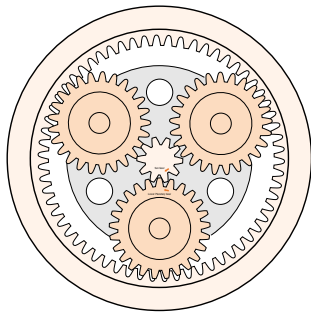
The upper level internal gears and planetary gears reduce clockwise backlash; the lower level internal gears and planetary gear reduce counterclockwise backlash to attain backlash of 3 arc minutes or less.



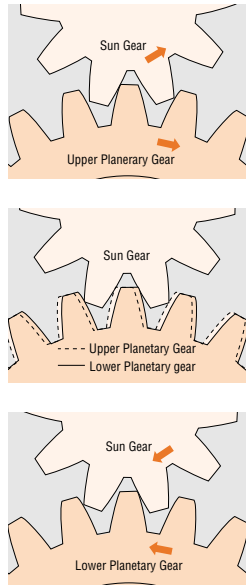
PN gear sectional diagram



Relationship between the internal gear and the planetary gear

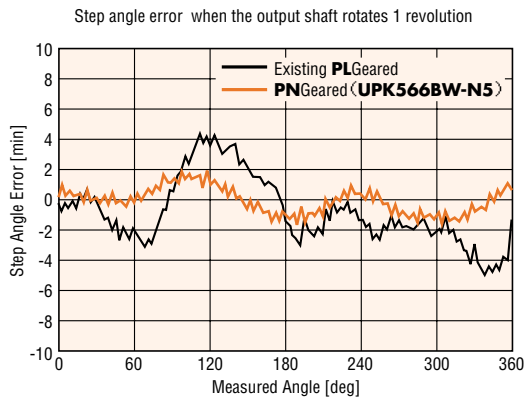


The structure of the PN gear



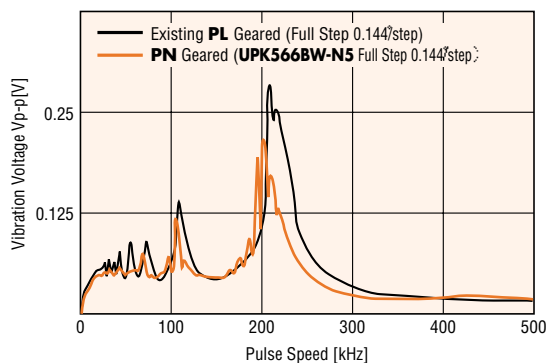
Angular transmission error 6 arc minutes

The difference between the theoretical rotation angle of the output shaft and the actual rotation angle is expressed as the angular transmission error. With the **PN** geared types, special gear machining technology is used and major improvements have been made at the part and the assembly levels in order to attain high-precision positioning with an error of 6 arc minutes or less.



Low-vibration operation

When a geared motor is used, the motor's low-speed vibration region is avoided and vibration is reduced. Since **PN** gears have backlash of less than 3 arc minutes, further reduction in vibration in the low-speed region is attained.



■ PRECAUTIONS

When using the **UPK•W** Geared Type, please note the following:

1. Do not exceed the maximum permissible torque:

Permissible torque represents the maximum value of the mechanical strength of the gear unit. 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 gear unit may fail.

2. Do not exceed the permissible speed range:

Do not exceed the maximum output speed of the gearhead indicated in the specifications on page B-84~B-88, B-96 and B-97. The speed affects the life the gearhead. Be sure to use the gear unit below the maximum permissible speed.

3. Be careful of backlash in positioning for both forward and reverse directions:

Backlash is the free rotation angle (i.e., play) of the output shaft when the input section of the reduction gear is fixed. The value for each geared type is shown below;

TH Geared: Backlash 10 arc minutes, 15 arc minutes, 25 arc minutes or 35 arc minutes depending on frame size and gear ratio
PN Geared: Backlash 3 arc minutes maximum

Each geared type of the **UPK•W** provides low backlash with high accuracy in positioning. If there is a problem with backlash in bi-directional positioning, be sure to stop the motor in one direction.

4. The direction of gear-shaft rotations differs according to the gear ratio:

When the **TH** geared type is used, the relationship between the rotating direction of the motor shaft and the rotating direction of the gear output shaft varies, depending on the gear ratio used.

Gear ratio	3.6:1, 7.2:1 and 10:1	Same as motor
Gear ratio	20:1 and 30:1	Opposite to motor

When the **PN** geared type is used, the motor and the output shaft of the gear rotate in the same direction with all gear ratios.

SPECIFICATIONS TH GEARED TYPE Single-Phase 100-115V AC Input



Package Model	Single Shaft	UPK543AW-T3.6	UPK543AW-T7.2	UPK543AW-T10	UPK543AW-T20	UPK543AW-T30
	Double Shaft	UPK543BW-T3.6	UPK543BW-T7.2	UPK543BW-T10	UPK543BW-T20	UPK543BW-T30
Maximum Holding Torque	lb-in (N·m)	3.03 (0.35)	6.07 (0.7)	8.67 (1)	13 (1.5)	13 (1.5)
Rotor Inertia	oz-in ² (kg·m ²)	0.192 (35×10 ⁻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	lb-in (N·m)	3.03 (0.35)	6.07 (0.7)	8.67 (1)	13 (1.5)	13 (1.5)
Permissible Thrust Load	lb. (N)	3.3 (15)				
Permissible Overhung Load	lb. (N)	4.4 (20)				
Backlash	Arc minute (degree)	45 (0.75°)	24 (0.417°)		15 (0.25°)	
Permissible Speed Range (Gear Output Shaft Speed)	Full Step	0~15000Hz (0~500r/min)	0~15000Hz (0~250r/min)	0~15000Hz (0~180r/min)	0~15000Hz (0~90r/min)	0~15000Hz (0~60r/min)
	Half Step	0~30000Hz (0~500r/min)	0~30000Hz (0~250r/min)	0~30000Hz (0~180r/min)	0~30000Hz (0~90r/min)	0~30000Hz (0~60r/min)
Insulation Class		Class B [266°F (130°C)] Recognized as Class A [221°F (105°C)] by UL and CSA standards.				
Power Source		Single-Phase 100-115V±15% 50/0Hz 1.5A				
Output Current	A/phase	0.75				
Excitation Mode	Full Step	0.2°/step	0.1°/step	0.072°/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				
	● CW Pulse Signal (Pulse Signal)	CW direction step command pulse signal (Step command signal at 1-pulse input mode) Pulse width: 5μs minimum, Pulse rise/fall: 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.				
	● CCW Pulse Signal (Rotation Direction Signal)	CCW direction step command signal (Rotation direction signal at 1-pulse input mode, Photocoupler ON: CW, Photocoupler OFF: CCW) 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.				
Functions	Automatic current cutback, All windings off, Pulse input mode switch, Step angle switch					
Indicator (LED)	Power source input, Excitation timing signal output, Overheat signal output					
Driver Cooling Method	Natural Ventilation					
Weight (Mass)	Motor lb. (kg)	0.78 (0.35)				
	Driver lb. (kg)	2.1 (0.95)				
Insulation Resistance	Motor	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.				
	Driver	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: ● Power input terminal — Protective earthing terminal ● Motor output terminal — Protective earthing terminal ● Signal input/output terminal — Power input terminal ● Signal input/output terminal — Motor output terminal				
Dielectric Strength	Motor	Sufficient to withstand 1.0kV, 60Hz applied between the motor coils and casing for one minute, under normal temperature and humidity.				
	Driver	Sufficient to withstand the following for one minute, under normal temperature and humidity. ● Power input terminal — Protective earthing terminal AC1.5kV 60Hz ● Motor output terminal — Protective earthing terminal AC1.5kV 60Hz ● Signal input/output terminal — Power input terminal AC3.0kV 60Hz ● Signal input/output terminal — Motor output terminal AC3.0kV 60Hz				
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 50%.
 - 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 0.39 inch (10mm) from the tip of the gear output shaft.
 - The direction of rotation of the motor and the gear output shaft are the same for the unit type with gear ratios of 3.6:1, 7.2:1 and 10:1. They are opposite for the 20:1 and 30:1 gear ratio types.
- Note :** Do not measure insulation resistance or perform the dielectric strength test while the motor and driver are connected.

TH GEARED TYPE Single-Phase 100-115VAC Input



Package Model	Single Shaft	UPK564AW-T3.6	UPK564AW-T7.2	UPK564AW-T10	UPK564AW-T20	UPK564AW-T30
	Double Shaft	UPK564BW-T3.6	UPK564BW-T7.2	UPK564BW-T10	UPK564BW-T20	UPK564BW-T30
Maximum Holding Torque	lb-in (N·m)	10.8 (1.25)	21.6 (2.5)	26 (3)	30.3 (3.5)	34.7 (4)
Rotor Inertia	oz-in ² (kg·m ²)	0.96 (175×10 ⁻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	lb-in (N·m)	10.8 (1.25)	21.6 (2.5)	26 (3)	30.3 (3.5)	34.7 (4)
Permissible Thrust Load	lb. (N)	8.81 (40)				
Permissible Overhung Load	lb. (N)	22 (100)				
Backlash	Arc minute (degree)	35 (0.584°)	15 (0.25°)		10 (0.167°)	
Permissible Speed Range (Gear Output Shaft Speed)	Full Step	0~15000Hz (0~500r/min)	0~15000Hz (0~250r/min)	0~15000Hz (0~180r/min)	0~15000Hz (0~90r/min)	0~15000Hz (0~60r/min)
	Half Step	0~30000Hz (0~500r/min)	0~30000Hz (0~250r/min)	0~30000Hz (0~180r/min)	0~30000Hz (0~90r/min)	0~30000Hz (0~60r/min)
Insulation Class		Class B [266°F (130°C)] Recognized as Class A [221°F (105°C)] by UL and CSA standards.				
Power Source		Single-Phase 100-115V±15% 50/0Hz 5.5A				
Output Current	A/phase	0.75				
Excitation Mode	Full Step	0.2°/step	0.1°/step	0.072°/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				
	● CW Pulse Signal (Pulse Signal)	CW direction step command pulse signal (Step command signal at 1-pulse input mode) Pulse width: 5μs minimum, Pulse rise/fall: 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.				
	● CCW Pulse Signal (Rotation Direction Signal)	CCW direction step command signal (Rotation direction signal at 1-pulse input mode, Photocoupler ON: CW, Photocoupler OFF: CCW) 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.				
Functions		Automatic current cutback, All windings off, Pulse input mode switch, Step angle switch				
Indicator (LED)		Power source input, Excitation timing signal output, Overheat signal output				
Driver Cooling Method		Natural Ventilation				
Weight (Mass)	Motor lb. (kg)	2.1 (0.95)				
	Driver lb. (kg)	2.1 (0.95)				
Insulation Resistance	Motor	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.				
	Driver	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: ● Power input terminal — Protective earthing terminal ● Motor output terminal — Protective earthing terminal ● Signal input/output terminal — Power input terminal ● Signal input/output terminal — Motor output terminal				
Dielectric Strength	Motor	Sufficient to withstand 1.5kV, 60Hz applied between the motor coils and casing for one minute, under normal temperature and humidity.				
	Driver	Sufficient to withstand the following for one minute, under normal temperature and humidity. ● Power input terminal — Protective earthing terminal AC1.5kV 60Hz ● Motor output terminal — Protective earthing terminal AC1.5kV 60Hz ● Signal input/output terminal — Power input terminal AC3.0kV 60Hz ● Signal input/output terminal — Motor output terminal AC3.0kV 60Hz				
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 50%.
- 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 0.39 inch (10mm) from the tip of the gear output shaft.
- The direction of rotation of the motor and the gear output shaft are the same for the unit type with gear ratios of 3.6:1, 7.2:1 and 10:1. They are opposite for the 20:1 and 30:1 gear ratio types.

TH GEARED TYPE Single-Phase 100-115VAC Input



Package Model	Single Shaft	UPK596AW-T3.6	UPK596AW-T7.2	UPK596AW-T10	UPK596AW-T20	UPK596AW-T30
	Double Shaft	UPK596BW-T3.6	UPK596BW-T7.2	UPK596BW-T10	UPK596BW-T20	UPK596BW-T30
Maximum Holding Torque	lb-in (N·m)	39 (4.5)	78.1 (9)	78.1 (9)	104 (12)	104 (12)
Rotor Inertia	oz-in ² (kg·m ²)	7.66 (1400×10 ⁻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	lb-in (N·m)	39 (4.5)	78.1 (9)	78.1 (9)	104 (12)	104 (12)
Permissible Thrust Load	lb. (N)	22 (100)				
Permissible Overhung Load	lb. (N)	66.1 (300)				
Backlash	Arc minute (degree)	25 (0.417°)	15 (0.25°)		10 (0.167°)	
Permissible Speed Range (Gear Output Shaft Speed)	Full Step	0~15000Hz (0~500r/min)	0~15000Hz (0~250r/min)	0~15000Hz (0~180r/min)	0~15000Hz (0~90r/min)	0~15000Hz (0~60r/min)
	Half Step	0~30000Hz (0~500r/min)	0~30000Hz (0~250r/min)	0~30000Hz (0~180r/min)	0~30000Hz (0~90r/min)	0~30000Hz (0~60r/min)
Insulation Class		Class B [266°F (130°C)] Recognized as Class A [221°F (105°C)] by UL and CSA standards.				
Power Source		Single-Phase 100~115V±15% 50/0Hz 1.5A				
Output Current	A/phase	0.75				
Excitation Mode	Full Step	0.2°/step	0.1°/step	0.072°/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				
	● CW Pulse Signal (Pulse Signal)	CW direction step command pulse signal (Step command signal at 1-pulse input mode) Pulse width: 5μs minimum, Pulse rise/fall: 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.				
	● CCW Pulse Signal (Rotation Direction Signal)	CCW direction step command signal (Rotation direction signal at 1-pulse input mode, Photocoupler ON: CW, Photocoupler OFF: CCW) Pulse width: 5μs minimum, Pulse rise/fall: 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.				
Output Signals	● 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 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				
Functions	● 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.				
	Functions	Automatic current cutback, All windings off, Pulse input mode switch, Step angle switch				
	Indicator (LED)	Power source input, Excitation timing signal output, Overheat signal output				
Driver Cooling Method		Natural Ventilation				
Weight (Mass)	Motor lb. (kg)	6.29 (2.85)				
	Driver lb. (kg)	2.1 (0.95)				
Insulation Resistance	Motor	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.				
	Driver	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: ● Power input terminal — Protective earthing terminal ● Motor output terminal — Protective earthing terminal ● Signal input/output terminal — Power input terminal ● Signal input/output terminal — Motor output terminal				
Dielectric Strength	Motor	Sufficient to withstand 1.5kV, 60Hz applied between the motor coils and casing for one minute, under normal temperature and humidity.				
	Driver	Sufficient to withstand the following for one minute, under normal temperature and humidity. ● Power input terminal — Protective earthing terminal AC1.5kV 60Hz ● Motor output terminal — Protective earthing terminal AC1.5kV 60Hz ● Signal input/output terminal — Power input terminal AC3.0kV 60Hz ● Signal input/output terminal — Motor output terminal AC3.0kV 60Hz				
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 50%.
- 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 0.39 inch (10mm) from the tip of the gear output shaft.
- The direction of rotation of the motor and the gear output shaft are the same for the unit type with gear ratios of 3.6:1, 7.2:1 and 10:1. They are opposite for the 20:1 and 30:1 gear ratio types.

TH GEARED TYPE Single-Phase 200-230VAC Input



Package Model	Single Shaft	UPK564AJW-T3.6	UPK564AJW-T7.2	UPK564AJW-T10	UPK564AJW-T20	UPK564AJW-T30
	Double Shaft	UPK564BJW-T3.6	UPK564BJW-T7.2	UPK564BJW-T10	UPK564BJW-T20	UPK564BJW-T30
Maximum Holding Torque	lb-in (N·m)	10.8 (1.25)	21.6 (2.5)	26 (3)	30.3 (3.5)	34.7 (4)
Rotor Inertia	oz-in ² (kg·m ²)	0.96 (175×10 ⁻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	lb-in (N·m)	10.8 (1.25)	21.6 (2.5)	26 (3)	30.3 (3.5)	34.7 (4)
Permissible Thrust Load	lb. (N)	8.81 (40)				
Permissible Overhung Load	lb. (N)	22 (100)				
Backlash	Arc minute (degree)	35 (0.584°)	15 (0.25°)		10 (0.167°)	
Permissible Speed Range (Gear Output Shaft Speed)	Full Step	0~15000Hz (0~500r/min)	0~15000Hz (0~250r/min)	0~15000Hz (0~180r/min)	0~15000Hz (0~90r/min)	0~15000Hz (0~60r/min)
	Half Step	0~30000Hz (0~500r/min)	0~30000Hz (0~250r/min)	0~30000Hz (0~180r/min)	0~30000Hz (0~90r/min)	0~30000Hz (0~60r/min)
Insulation Class		Class B [266°F (130°C)] Recognized as Class A [221°F (105°C)] by UL and CSA standards.				
Power Source		Single-Phase 200~230V ^{+10%} / _{-15%} 50/60Hz 3.5A				
Output Current	A/phase	0.75				
Excitation Mode	Full Step	0.2°/step	0.1°/step	0.072°/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				
	● CW Pulse Signal (Pulse Signal)	CW direction step command pulse signal (Step command signal at 1-pulse input mode) Pulse width: 5μs minimum, Pulse rise/fall: 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.				
	● CCW Pulse Signal (Rotation Direction Signal)	CCW direction step command signal (Rotation direction signal at 1-pulse input mode, Photocoupler ON: CW, Photocoupler OFF: CCW) 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.				
Functions		Automatic current cutback, All windings off, Pulse input mode switch, Step angle switch				
Indicator (LED)		Power source input, Excitation timing signal output, Overheat signal output				
Driver Cooling Method		Natural Ventilation				
Weight (Mass)	Motor lb. (kg)	2.1 (0.95)				
	Driver lb. (kg)	2.1 (0.95)				
Insulation Resistance	Motor	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.				
	Driver	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: ● Power input terminal — Protective earthing terminal ● Motor output terminal — Protective earthing terminal ● Signal input/output terminal — Power input terminal ● Signal input/output terminal — Motor output terminal				
Dielectric Strength	Motor	Sufficient to withstand 1.5kV, 60Hz applied between the motor coils and casing for one minute, under normal temperature and humidity.				
	Driver	Sufficient to withstand the following for one minute, under normal temperature and humidity. ● Power input terminal — Protective earthing terminal AC1.8kV 60Hz ● Motor output terminal — Protective earthing terminal AC1.8kV 60Hz ● Signal input/output terminal — Power input terminal AC3.2kV 60Hz ● Signal input/output terminal — Motor output terminal AC3.2kV 60Hz				
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 50%.
- 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 0.39 inch (10mm) from the tip of the gear output shaft.
- The direction of rotation of the motor and the gear output shaft are the same for the unit type with gear ratios of 3.6:1, 7.2:1 and 10:1. They are opposite for the 20:1 and 30:1 gear ratio types.

TH GEARED TYPE Single-Phase 200-230VAC Input



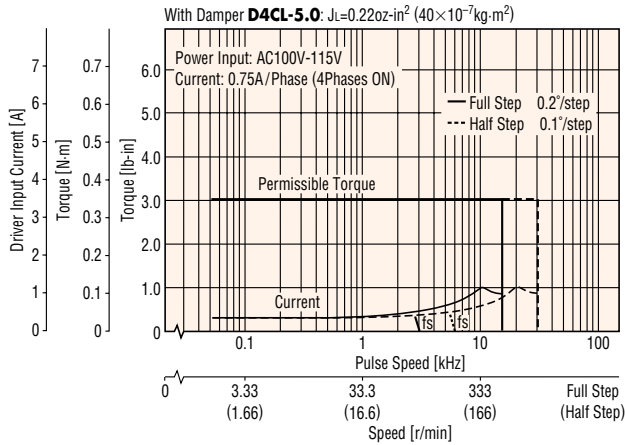
Package Model	Single Shaft	UPK596AJW-T3.6	UPK596AJW-T7.2	UPK596AJW-T10	UPK596AJW-T20	UPK596AJW-T30
	Double Shaft	UPK596BJW-T3.6	UPK596BJW-T7.2	UPK596BJW-T10	UPK596BJW-T20	UPK596BJW-T30
Maximum Holding Torque	lb-in (N·m)	39 (4.5)	78.1 (9)	78.1 (9)	104 (12)	104 (12)
Rotor Inertia	oz-in ² (kg·m ²)	7.66 (1400×10 ⁻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	lb-in (N·m)	39 (4.5)	78.1 (9)	78.1 (9)	104 (12)	104 (12)
Permissible Thrust Load	lb. (N)	22 (100)				
Permissible Overhung Load	lb. (N)	66.1 (300)				
Backlash	Arc minute (degree)	25 (0.417°)	15 (0.25°)		10 (0.167°)	
Permissible Speed Range (Gear Output Shaft Speed)	Full Step	0~15000Hz (0~500r/min)	0~15000Hz (0~250r/min)	0~15000Hz (0~180r/min)	0~15000Hz (0~90r/min)	0~15000Hz (0~60r/min)
	Half Step	0~30000Hz (0~500r/min)	0~30000Hz (0~250r/min)	0~30000Hz (0~180r/min)	0~30000Hz (0~90r/min)	0~30000Hz (0~60r/min)
Insulation Class		Class B [266°F (130°C)] Recognized as Class A [221°F (105°C)] by UL and CSA standards.				
Power Source		Single-Phase 200-230V ^{+10%} _{-15%} 60Hz 3.5A				
Output Current	A/phase	0.75				
Excitation Mode	Full Step	0.2°/step	0.1°/step	0.072°/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				
	● CW Pulse Signal (Pulse Signal)	CW direction step command pulse signal (Step command signal at 1-pulse input mode) Pulse width: 5μs minimum, Pulse rise/fall: 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.				
	● CCW Pulse Signal (Rotation Direction Signal)	CCW direction step command signal (Rotation direction signal at 1-pulse input mode, Photocoupler ON: CW, Photocoupler OFF: CCW) 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.				
Functions		Automatic current cutback, All windings off, Pulse input mode switch, Step angle switch				
Indicator (LED)		Power source input, Excitation timing signal output, Overheat signal output				
Driver Cooling Method		Natural Ventilation				
Weight (Mass)	Motor lb. (kg)	6.29 (2.85)				
	Driver lb. (kg)	2.1 (0.95)				
Insulation Resistance	Motor	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.				
	Driver	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the following places: ● Power input terminal — Protective earthing terminal ● Motor output terminal — Protective earthing terminal ● Signal input/output terminal — Power input terminal ● Signal input/output terminal — Motor output terminal				
Dielectric Strength	Motor	Sufficient to withstand 1.5kV, 60Hz applied between the motor coils and casing for one minute, under normal temperature and humidity.				
	Driver	Sufficient to withstand the following for one minute, under normal temperature and humidity. ● Power input terminal — Protective earthing terminal AC1.8kV 60Hz ● Motor output terminal — Protective earthing terminal AC1.8kV 60Hz ● Signal input/output terminal — Power input terminal AC3.2kV 60Hz ● Signal input/output terminal — Motor output terminal AC3.2kV 60Hz				
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 50%.
- 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 0.39 inch (10mm) from the tip of the gear output shaft.
- The direction of rotation of the motor and the gear output shaft are the same for the unit type with gear ratios of 3.6:1, 7.2:1 and 10:1. They are opposite for the 20:1 and 30:1 gear ratio types.

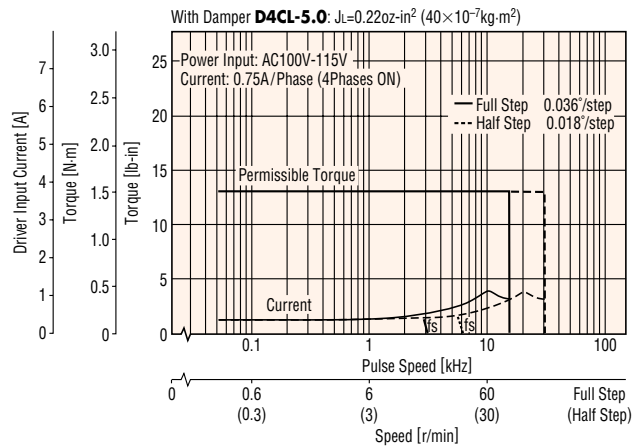
SPEED vs. TORQUE CHARACTERISTICS

fs: Maximum Starting Pulse Rate

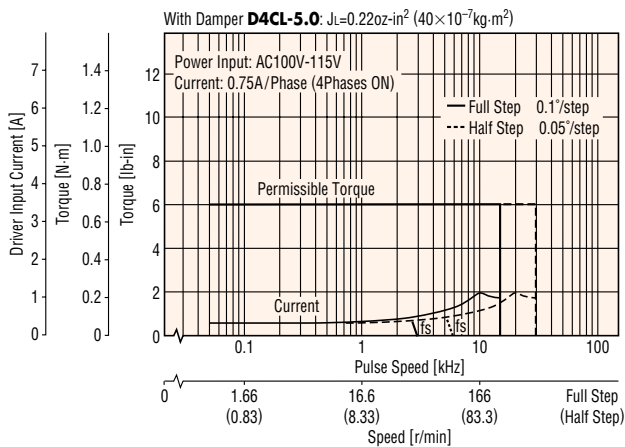
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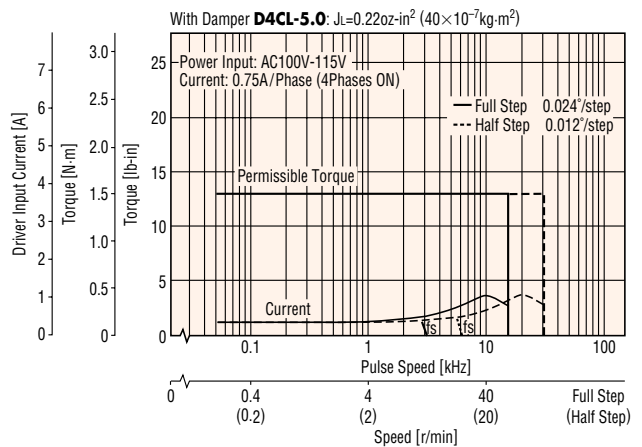
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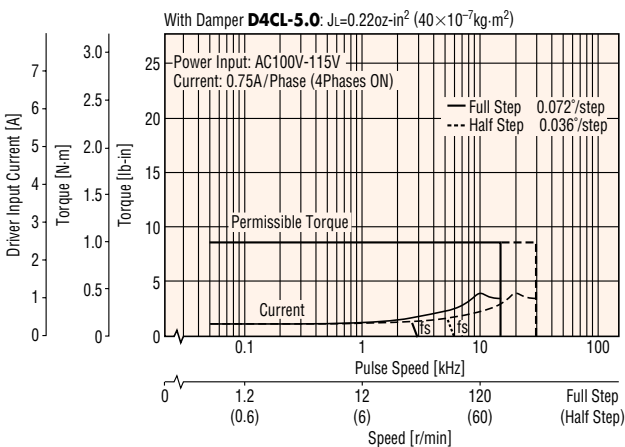
UPK543BW-T7.2



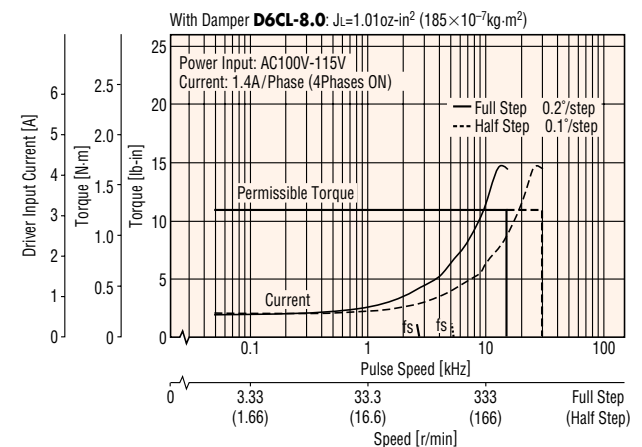
UPK543BW-T30



UPK543BW-T10



UPK564BW-T3.6



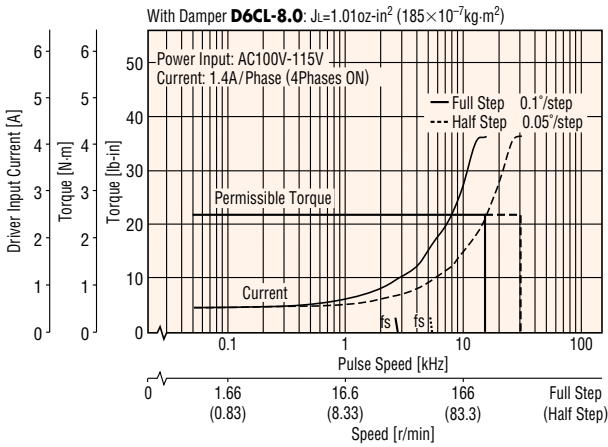
Note:

- 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). [Under 167°F (75°C) is required to comply with UL or CSA standards. **UPK54□W** is under application.]
- When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" at motor standstill reduces maximum holding torque by approximately 50%.

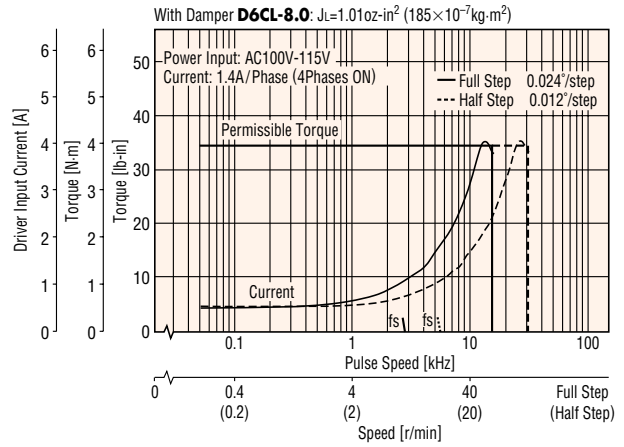
■ SPEED vs. TORQUE CHARACTERISTICS

fs: Maximum Starting Pulse Rate

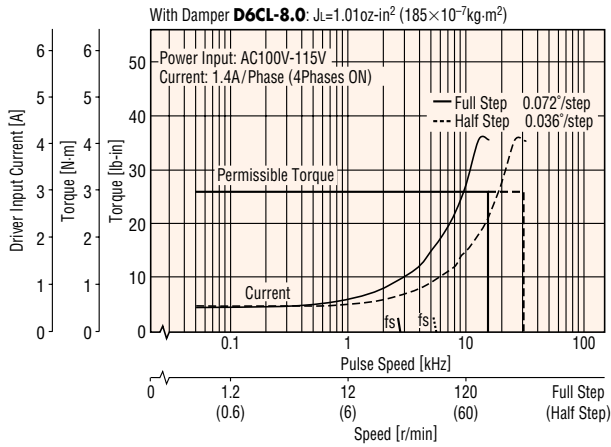
UPK564BW-T7.2



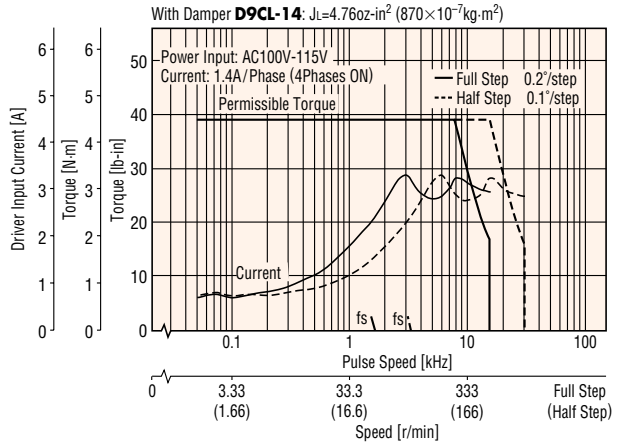
UPK564BW-T30



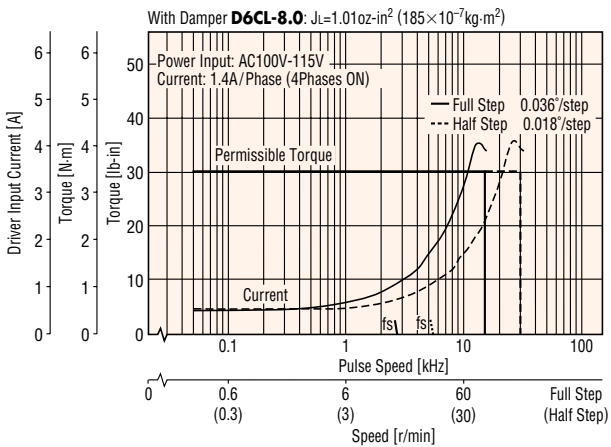
UPK564BW-T10



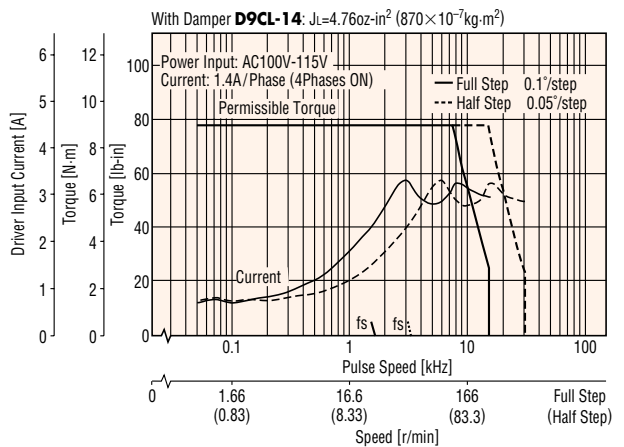
UPK569BW-T3.6



UPK564BW-T20



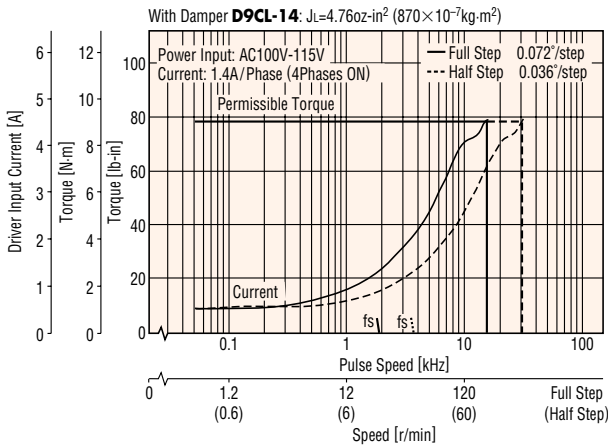
UPK569BW-T7.2



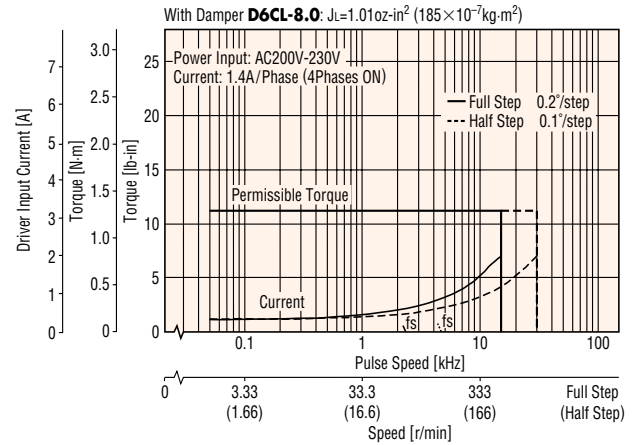
Note:

- 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). [Under 167°F (75°C) is required to comply with UL or CSA standards.]
- When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" function at motor standstill reduces maximum holding torque by approximately 50%.

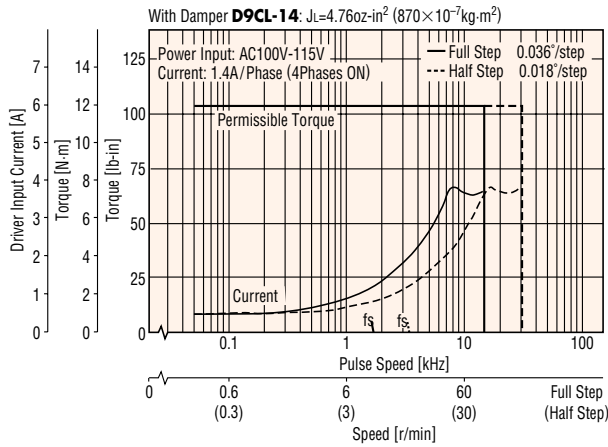
UPK596BW-T10



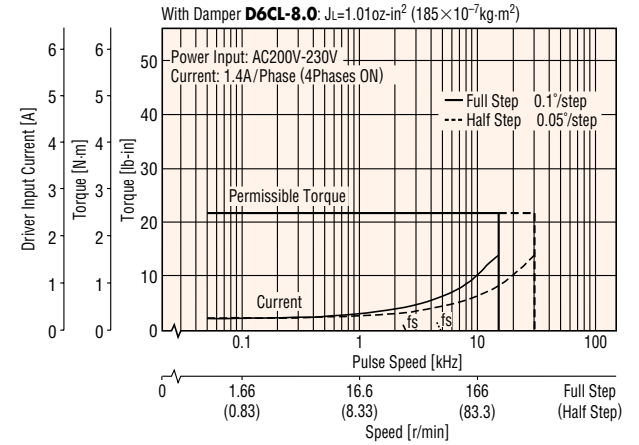
UPK564BJW-T3.6



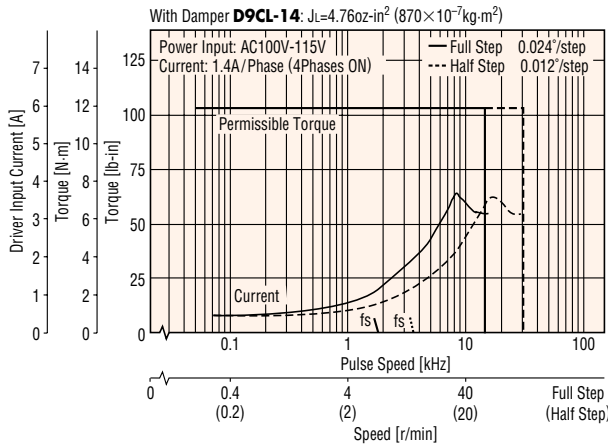
UPK596BW-T20



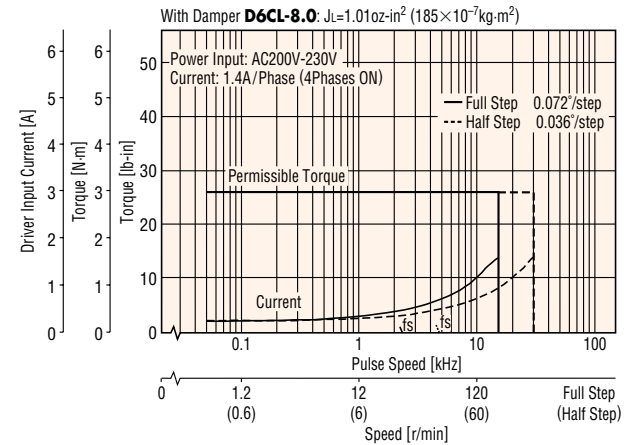
UPK564BJW-T7.2



UPK596BW-T30



UPK564BJW-T10



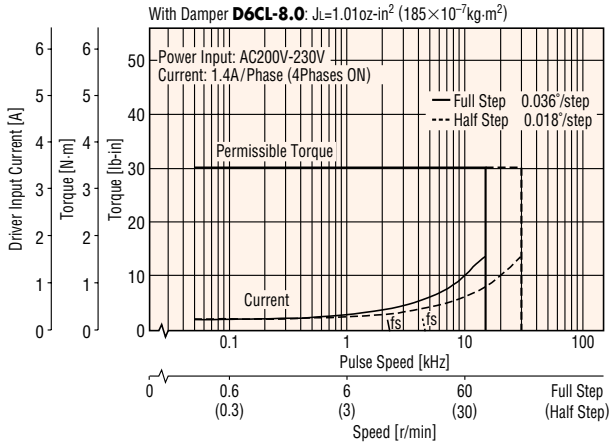
Note:

- 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). [Under 167°F (75°C) is required to comply with UL or CSA standards.]
- When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" function at motor standstill reduces maximum holding torque by approximately 50%.

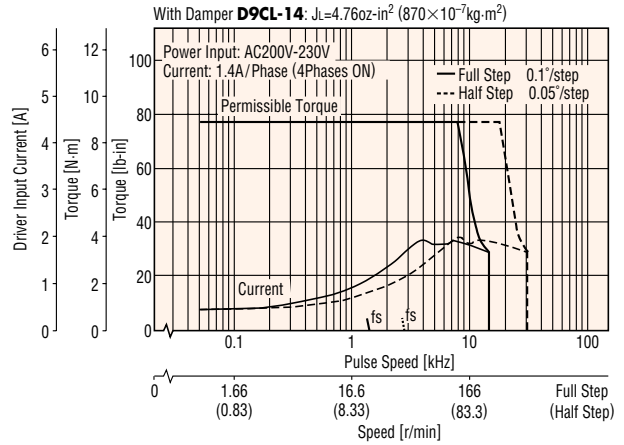
■ SPEED vs. TORQUE CHARACTERISTICS

fs: Maximum Starting Pulse Rate

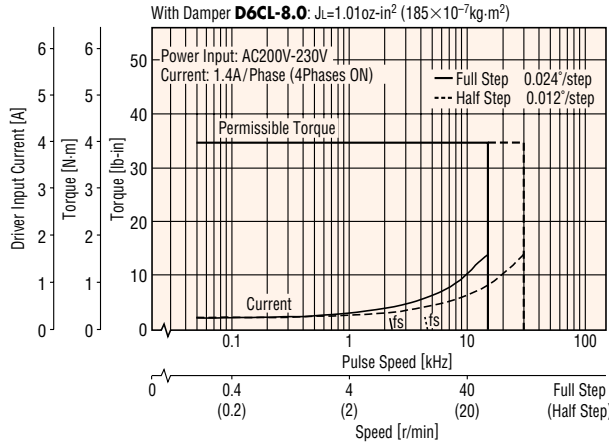
UPK564BJW-T20



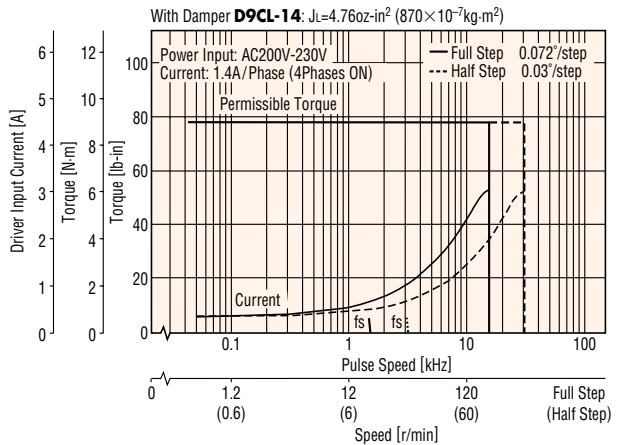
UPK596BJW-T7.2



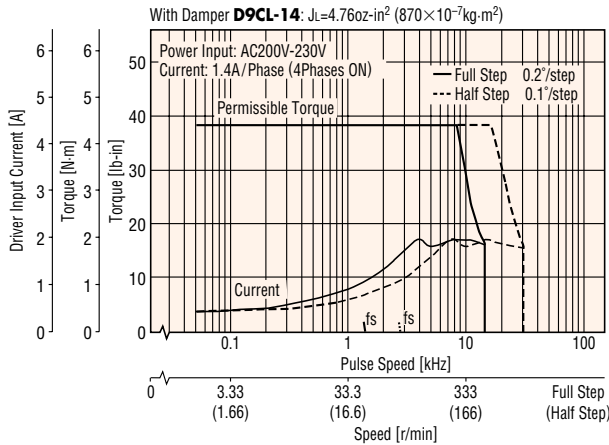
UPK564BJW-T30



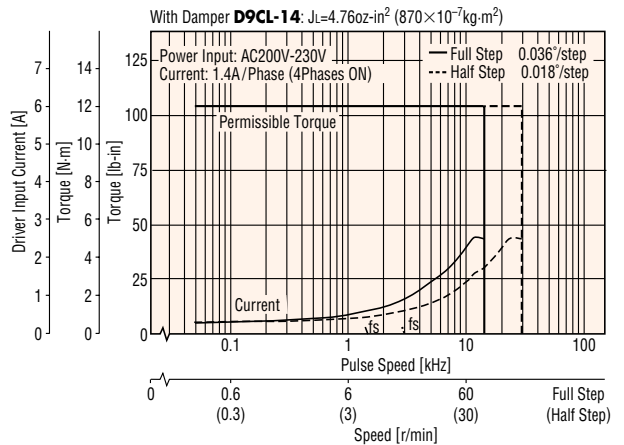
UPK596BJW-T10



UPK596BJW-T3.6



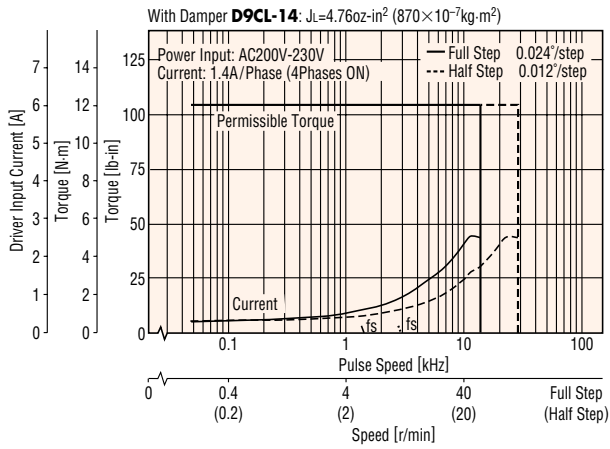
UPK596BJW-T20



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). [Under 167°F (75°C) is required to comply with UL or CSA standards.]
- When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" function at motor standstill reduces maximum holding torque by approximately 50%.

UPK596BJW-T30



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). [Under 167°F (75°C) is required to comply with UL or CSA standards.]
- When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" function at motor standstill reduces maximum holding torque by approximately 50%.

■ DIMENSIONS scale 1/4, unit = inch (mm)

● Motor

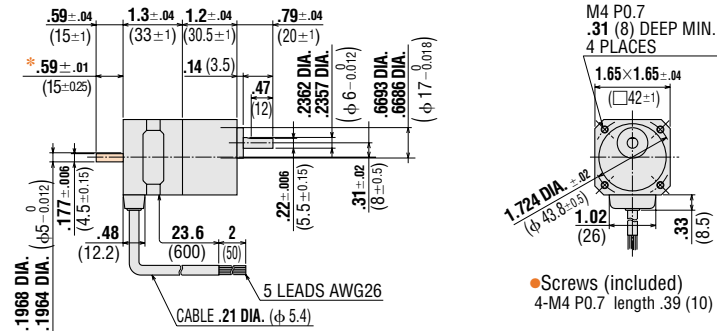
UPK543 □W-T Type

Single shaft Weight 0.76 lb. (Mass 0.35kg)

- UPK543AW-T3.6** Motor ModePK543AW-T3.6
- UPK543AW-T7.2** Motor ModePK543AW-T7.2
- UPK543AW-T10** Motor ModePK543AW-T10
- UPK543AW-T20** Motor ModePK543AW-T20
- UPK543AW-T30** Motor ModePK543AW-T30

Double shaft Weight 0.76 lb. (Mass 0.35kg)

- UPK543BW-T3.6** Motor ModePK543BW-T3.6
- UPK543BW-T7.2** Motor ModePK543BW-T7.2
- UPK543BW-T10** Motor ModePK543BW-T10
- UPK543BW-T20** Motor ModePK543BW-T20
- UPK543BW-T30** Motor ModePK543BW-T30



* .59±.01 (15±0.25) indicates the length of milling on motor shaft.

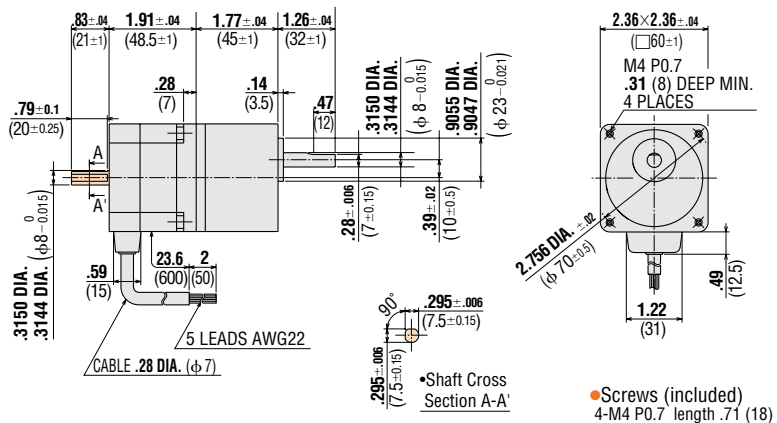
UPK564 □W-T Type

Single shaft Weight 2.1 lb. (Mass 0.95kg)

- UPK564AW-T3.6** Motor ModePK564AW-T3.6
- UPK564AJW-T3.6** Motor ModePK564AJW-T3.6
- UPK564AW-T7.2** Motor ModePK564AW-T7.2
- UPK564AJW-T7.2** Motor ModePK564AJW-T7.2
- UPK564AW-T10** Motor ModePK564AW-T10
- UPK564AJW-T10** Motor ModePK564AJW-T10
- UPK564AW-T20** Motor ModePK564AW-T20
- UPK564AJW-T20** Motor ModePK564AJW-T20
- UPK564AW-T30** Motor ModePK564AW-T30
- UPK564AJW-T30** Motor ModePK564AJW-T30

Double shaft Weight 2.1 lb. (Mass 0.95kg)

- UPK564BW-T3.6** Motor ModePK564BW-T3.6
- UPK564BJW-T3.6** Motor ModePK564BJW-T3.6
- UPK564BW-T7.2** Motor ModePK564BW-T7.2
- UPK564BJW-T7.2** Motor ModePK564BJW-T7.2
- UPK564BW-T10** Motor ModePK564BW-T10
- UPK564BJW-T10** Motor ModePK564BJW-T10
- UPK564BW-T20** Motor ModePK564BW-T20
- UPK564BJW-T20** Motor ModePK564BJW-T20
- UPK564BW-T30** Motor ModePK564BW-T30
- UPK564BJW-T30** Motor ModePK564BJW-T30



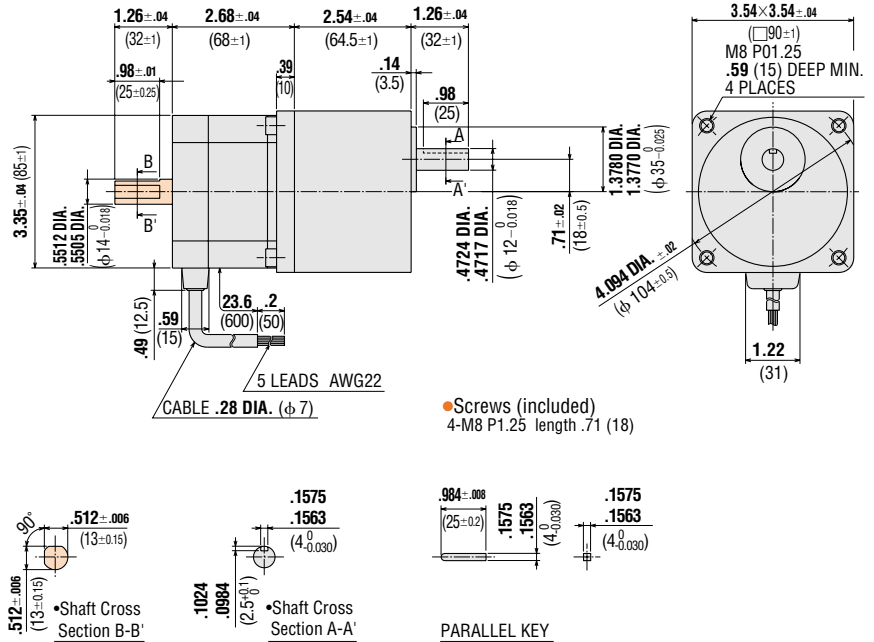
UPK596 □W-T Type

Single shaft Weight 6.29 lb. (Mass 2.85kg)

- UPK596AW-T3.6** Motor ModePK596AW-T3.6
- UPK596AJW-T3.6** Motor ModePK596AJW-T3.6
- UPK596AW-T7.2** Motor ModePK596AW-T7.2
- UPK596AJW-T7.2** Motor ModePK596AJW-T7.2
- UPK596AW-T10** Motor ModePK596AW1-T10
- UPK596AJW-T10** Motor ModePK596AJW1-T10
- UPK596AW-T20** Motor ModePK596AW1-T20
- UPK596AJW-T20** Motor ModePK596AJW1-T20
- UPK596AW-T30** Motor ModePK596AW1-T30
- UPK596AJW-T30** Motor ModePK596AJW1-T30

Double shaft Weight 6.29 lb. (Mass 2.85kg)

- UPK596BW-T3.6** Motor ModePK596BW-T3.6
- UPK596BJW-T3.6** Motor ModePK596BJW-T3.6
- UPK596BW-T7.2** Motor ModePK596BW-T7.2
- UPK596BJW-T7.2** Motor ModePK596BJW-T7.2
- UPK596BW-T10** Motor ModePK596BW1-T10
- UPK596BJW-T10** Motor ModePK596BW1-T10
- UPK596BW-T20** Motor ModePK596BW1-T20
- UPK596BJW-T20** Motor ModePK596BW1-T20
- UPK596BW-T30** Motor ModePK596BW1-T30
- UPK596BJW-T30** Motor ModePK596BW1-T30



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

See page B-36 for information on motor installation.

●Driver

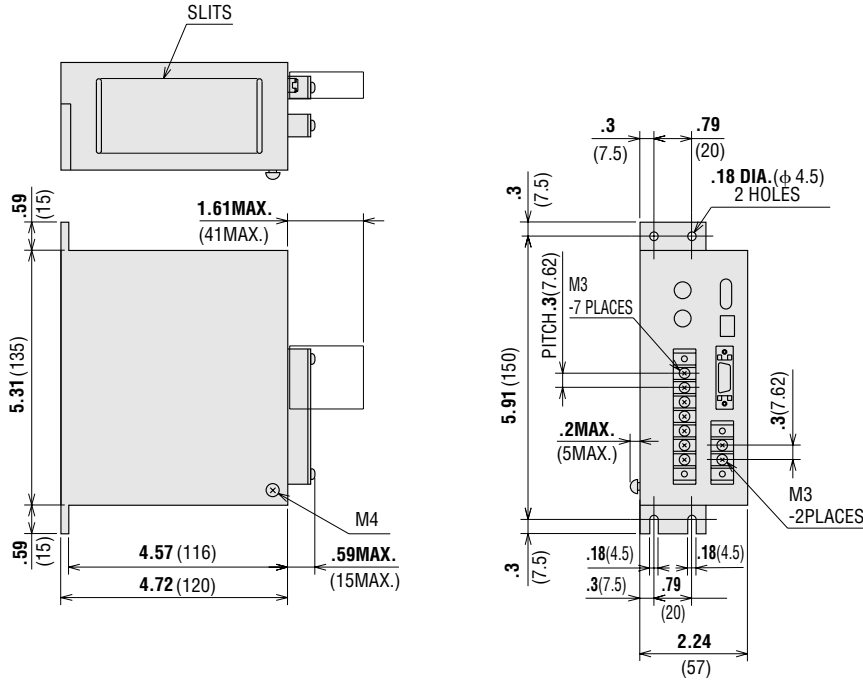
Single-Phase 100-115VAC Input Standard Type

For **UPK543□W-T**

Driver Model: UDK5107NW2 Waight 2.1 lb. (Mass 0.95kg)

For **UPK564□W-T, UPK596□W-T**

Driver Model: UDK5114NW2 Waight 2.1 lb. (Mass 0.95kg)

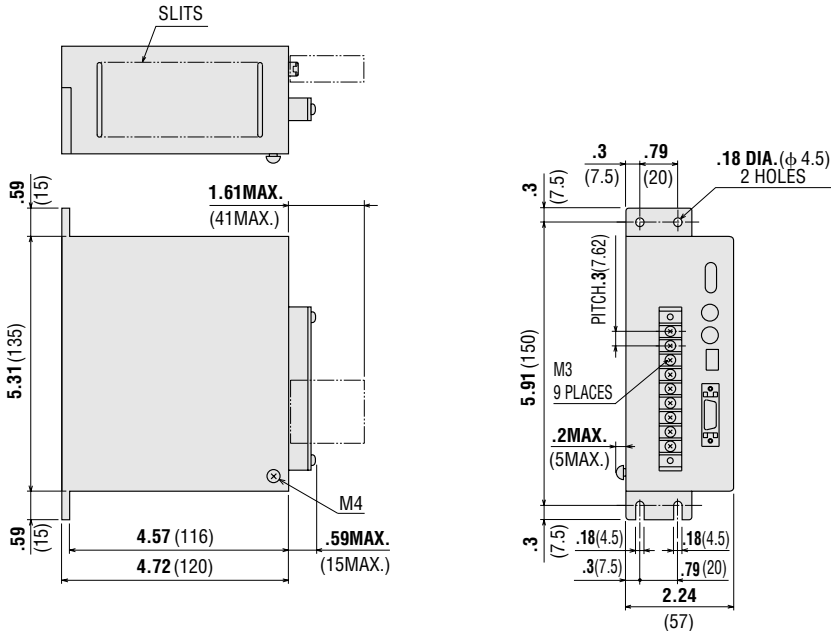


- I/O Connector (Included)
Connector : 54306-2011 (MOLEX)
Connector : 54331-1201 (MOLEX)

Single-Phase 200-230VAC Input Standard Type

For **UPK564□JW-T, UPK596□JW-T**

Driver Model : UDK5214NW Weight 2.1 lb. (Mass 0.95kg)



- I/O Connector (Included)
Connector : 54306-2011 (MOLEX)
Connector : 54331-1201 (MOLEX)

See page B-38 for information on driver installation.

SPECIFICATIONS PN GEARED TYPE Single-Phase 100-115VAC Input



Package Model	Single Shaft	UPK566AW-N5	UPK566AW-N7.2	UPK566AW-N10	UPK564AW-N25	UPK564AW-N36	UPK564AW-N50
	Double Shaft	UPK566BW-N5	UPK566BW-N7.2	UPK566BW-N10	UPK564BW-N25	UPK564BW-N36	UPK564BW-N50
Maximum Holding Torque	lb-in (N·m)	30.3 (3.5)			52 (6)		
Rotor Inertia	oz-in ² (kg·m ²)	1.54 (280×10 ⁻⁷)			0.96 (175×10 ⁻⁷)		
Rated Current	A/phase	1.4					
Basic Step Angle		0.144	0.1	0.072	0.0288	0.02	0.0144
Gear Ratio		5:1	7.2:1	10:1	25:1	36:1	50:1
Permissible Torque	lb-in (N·m)	30.3 (3.5)			52 (6)		
Permissible Thrust Load	lb. (N)	22 (100)					
Permissible Overhung Load	lb. (N)	55.1 (250)	66.1 (300)	66.1 (300)	88.1 (400)		
Backlash	Arc minute (degree)	3 (0.05°)					
Permissible Speed Range (Gear Output Shaft Speed)	Full Step	0~15000Hz (0~360r/min)	0~15000Hz (0~250r/min)	0~15000Hz (0~180r/min)	0~15000Hz (0~72r/min)	0~15000Hz (0~50r/min)	0~15000Hz (0~36r/min)
	Half Step	0~30000Hz (0~360r/min)	0~30000Hz (0~250r/min)	0~30000Hz (0~180r/min)	0~30000Hz (0~72r/min)	0~30000Hz (0~50r/min)	0~30000Hz (0~36r/min)
Insulation Class		Class B [266°F (130°C)] Recognized as Class A [221°F (105°C)] by UL and CSA standards.					
Power Source		Single-Phase 100~115V±15% 50/0Hz 5.5A					
Output Current	A/phase	1.4					
Excitation Mode	Full Step	0.144°/step	0.1°/step	0.072°/step	0.0288°/step	0.02 /step	0.0144 /step
	Half Step	0.072°/step	0.05°/step	0.036°/step	0.0144°/step	0.01 /step	0.0072 /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					
	● CW Pulse Signal (Pulse Signal)	CW direction step command pulse signal (Step command signal at 1-pulse input mode) Pulse width: 5μs minimum, Pulse rise/fall: 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.					
	● CCW Pulse Signal (Rotation Direction Signal)	CCW direction step command signal (Rotation direction signal at 1-pulse input mode, Photocoupler ON: CW, Photocoupler OFF: CCW) 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.					
Functions	Automatic current cutback, All windings off, Pulse input mode switch, Step angle switch						
Indicator (LED)	Power source input, Excitation timing signal output, Overheat signal output						
Driver Cooling Method	Natural Ventilation						
Weight (Mass)	Motor lb. (kg)	3.31 (1.5)			3.31 (1.5)		
	Driver lb. (kg)	2.1 (0.95)					
Insulation Resistance	Motor	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.					
	Driver	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the following places : ● Power input terminal — Protective earthing terminal ● Motor output terminal — Protective earthing terminal ● Signal input/output terminal — Power input terminal ● Signal input/output terminal — Motor output terminal					
Dielectric Strength	Motor	Sufficient to withstand 1.5kV, 60Hz applied between the motor coils and casing for one minute, under normal temperature and humidity.					
	Driver	Sufficient to withstand the following for one minute, under normal temperature and humidity. ● Power input terminal — Protective earthing terminal AC1.5kV 60Hz ● Motor output terminal — Protective earthing terminal AC1.5kV 60Hz ● Signal input/output terminal — Power input terminal AC3.0kV 60Hz ● Signal input/output terminal — Motor output terminal AC3.0kV 60Hz					
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 50%.
- 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 0.39 inch (10mm) from the tip of the gear output shaft.

PN GEARED TYPE Single-Phase 200-230VAC Input



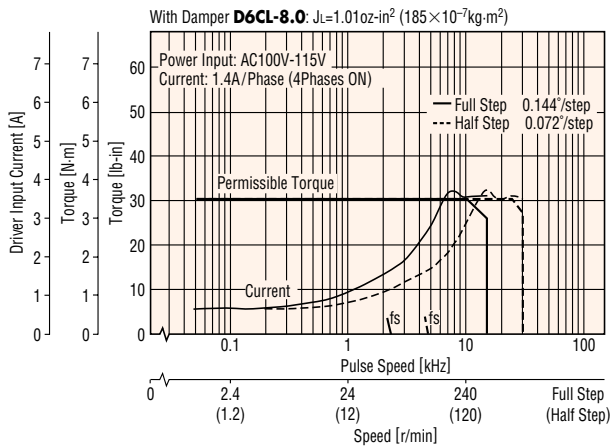
Package Model	Single Shaft	UPK566AJW-N5	UPK566AJW-N7.2	UPK566AJW-N10	UPK564AJW-N25	UPK564AJW-N36	UPK564AJW-N50
	Double Shaft	UPK566BJW-N5	UPK566BJW-N7.2	UPK566BJW-N10	UPK564BJW-N25	UPK564BJW-N36	UPK564BJW-N50
Maximum Holding Torque	lb-in (N·m)	30.3 (3.5)			52 (6)		
Rotor Inertia	oz-in ² (kg·m ²)	1.54 (280×10 ⁻⁷)			0.96 (175×10 ⁻⁷)		
Rated Current	A/phase	1.4					
Basic Step Angle		0.144	0.1	0.072	0.0288	0.02	0.0144
Gear Ratio		5 : 1	7.2 : 1	10 : 1	25 : 1	36 : 1	50 : 1
Permissible Torque	lb-in (N·m)	30.3 (3.5)			52 (6)		
Permissible Thrust Load	lb. (N)	22 (100)					
Permissible Overhung Load	lb. (N)	55.1 (250)	66.1 (300)	66.1 (300)	88.1 (400)		
Backlash	Arc minute (degree)	3 (0.05°)					
Permissible Speed Range (Gear Output Shaft Speed)	Full Step	0~15000Hz (0~360r/min)	0~15000Hz (0~250r/min)	0~15000Hz (0~180r/min)	0~15000Hz (0~72r/min)	0~15000Hz (0~50r/min)	0~15000Hz (0~36r/min)
	Half Step	0~30000Hz (0~360r/min)	0~30000Hz (0~250r/min)	0~30000Hz (0~180r/min)	0~30000Hz (0~72r/min)	0~30000Hz (0~50r/min)	0~30000Hz (0~36r/min)
Insulation Class		Class B [266°F (130°C)] Recognized as Class A [221°F (105°C)] by UL and CSA standards.					
Power Source		Single-Phase 200-230V ^{+10%} / _{-15%} 50/60Hz 3.5A					
Output Current	A/phase	1.4					
Excitation Mode	Full Step	0.144°/step	0.1°/step	0.072°/step	0.0288°/step	0.02 /step	0.0144 /step
	Half Step	0.072°/step	0.05°/step	0.036°/step	0.0144°/step	0.01 /step	0.0072 /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					
	● CW Pulse Signal (Pulse Signal)	CW direction step command pulse signal (Step command signal at 1-pulse input mode) Pulse width: 5μs minimum, Pulse rise/fall: 2μs maximum Motor moves when the photocoupler state changes from ON to OFF.					
	● CCW Pulse Signal (Rotation Direction Signal)	CCW direction step command signal (Rotation direction signal at 1-pulse input mode, Photocoupler ON: CW, Photocoupler OFF: CCW) 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.					
Functions	Automatic current cutback, All windings off, Pulse input mode switch, Step angle switch						
Indicator (LED)	Power source input, Excitation timing signal output, Overheat signal output						
Driver Cooling Method	Natural Ventilation						
Weight (Mass)	Motor lb. (kg)	3.31 (1.5)			3.31 (1.5)		
	Driver lb. (kg)	2.1 (0.95)					
Insulation Resistance	Motor	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the motor coils and the motor casing.					
	Driver	100M Ω minimum under normal temperature and humidity, when measured by a DC500V megger between the following places : ● Power input terminal — Protective earthing terminal ● Motor output terminal — Protective earthing terminal ● Signal input/output terminal — Power input terminal ● Signal input/output terminal — Motor output terminal					
Dielectric Strength	Motor	Sufficient to withstand 1.5kV, 60Hz applied between the motor coils and casing for one minute, under normal temperature and humidity.					
	Driver	Sufficient to withstand the following for one minute, under normal temperature and humidity. ● Power input terminal — Protective earthing terminal AC1.8kV 60Hz ● Motor output terminal — Protective earthing terminal AC1.8kV 60Hz ● Signal input/output terminal — Power input terminal AC3.2kV 60Hz ● Signal input/output terminal — Motor output terminal AC3.2kV 60Hz					
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 50%.
- 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 0.39 inch (10mm) from the tip of the gear output shaft.

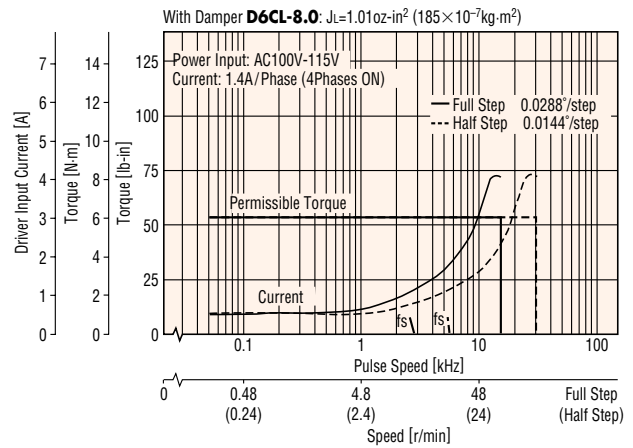
SPEED vs. TORQUE CHARACTERISTICS

fs: Maximum Starting Pulse Rate

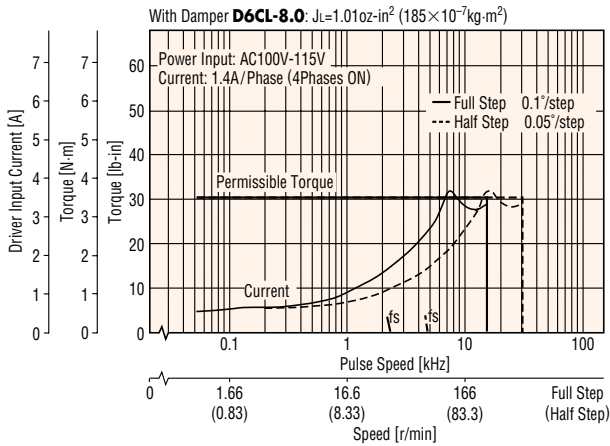
UPK566BW-N5



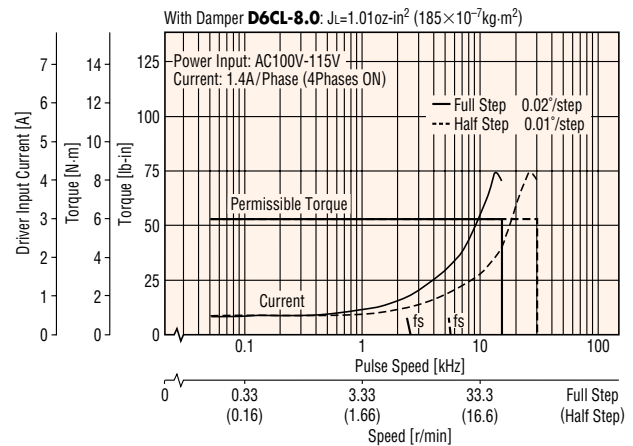
UPK564BW-N25



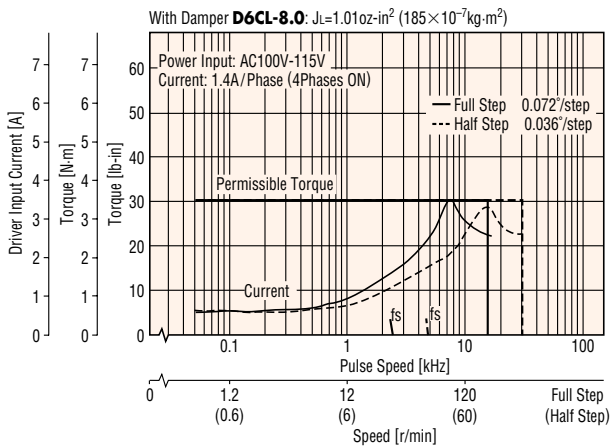
UPK566BW-N7.2



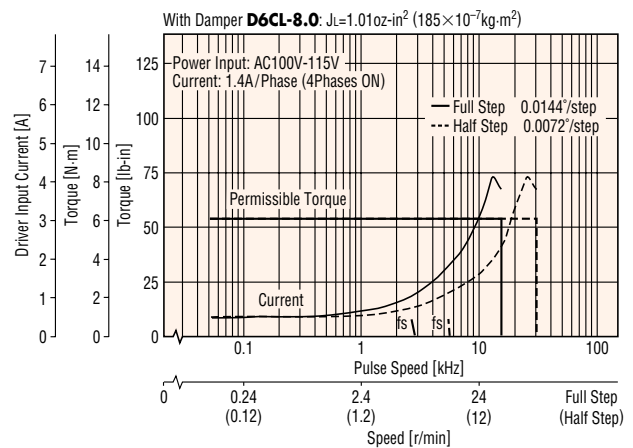
UPK564BW-N36



UPK566BW-N10



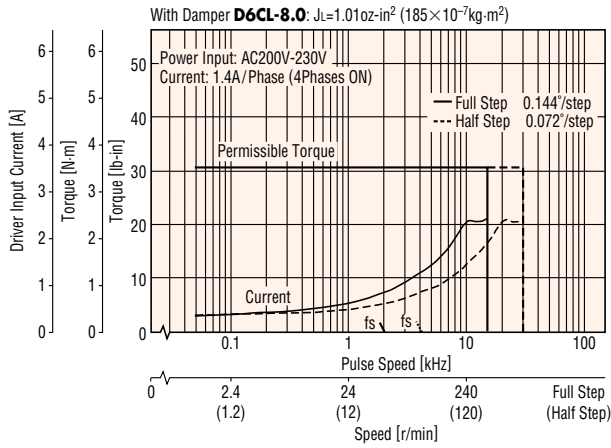
UPK564BW-N50



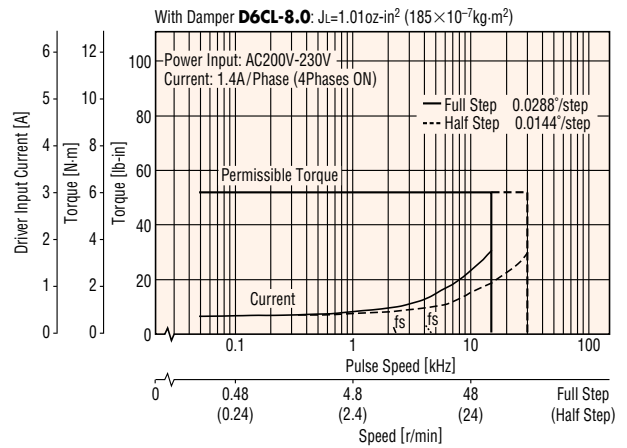
Note:

- 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). [Under 167°F (75°C) is required to comply with UL or CSA standards.]
- When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" function at motor standstill reduces maximum holding torque by approximately 50%.

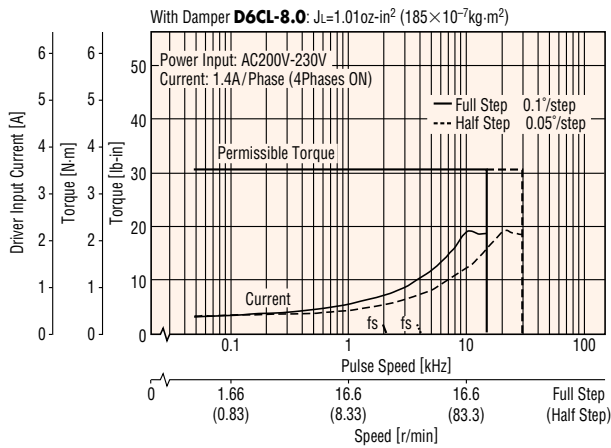
UPK566BJW-N5



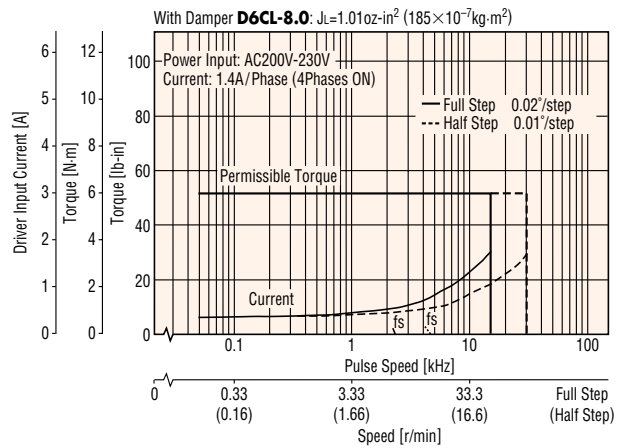
UPK564BJW-N25



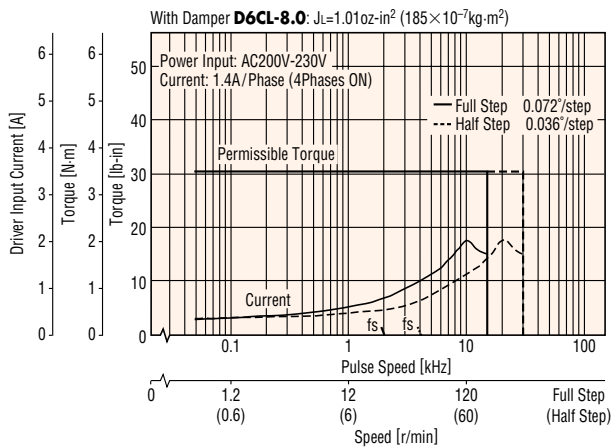
UPK566BJW-N7.2



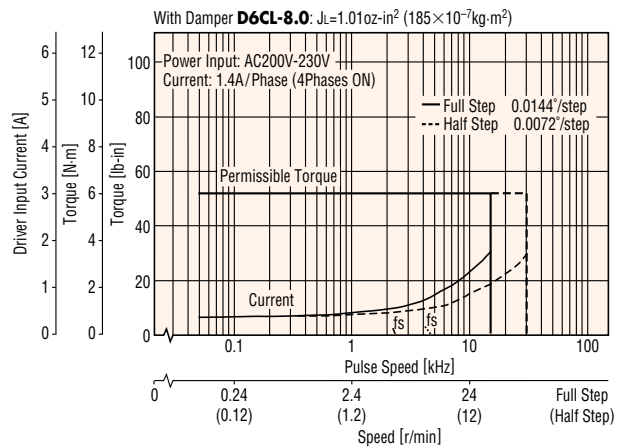
UPK564BJW-N36



UPK566BJW-N10



UPK564BJW-N50



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). [Under 167°F (75°C) is required to comply with UL or CSA standards.]
- When using the motor with the dedicated driver, the driver's "Automatic Current Cutback" function at motor standstill reduces maximum holding torque by approximately 50%.

DIMENSIONS scale 1/4, unit = inch (mm)

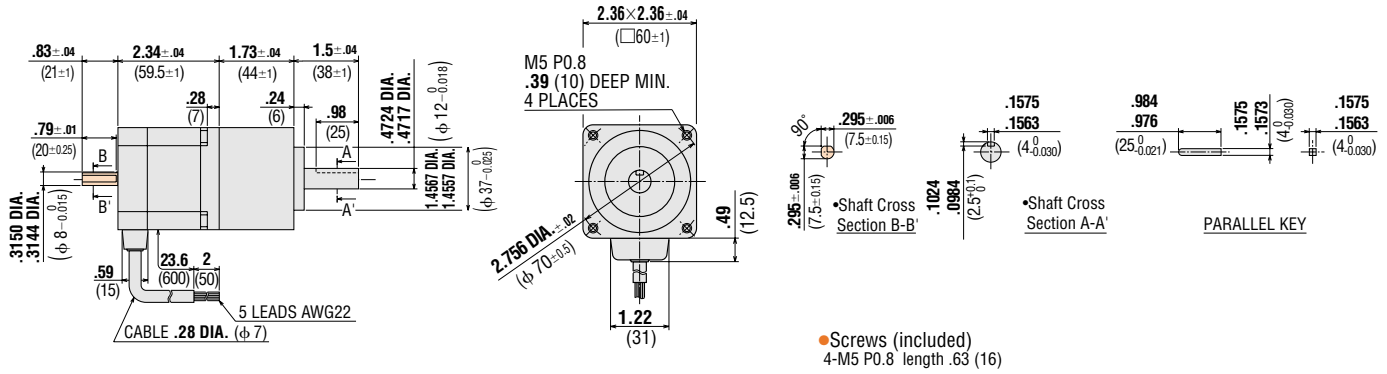
Motor

Single shaft Weight 3.31 lb. (Mass 1.5kg)

UPK566AW-N5	Motor Model : PK566AW-N5
UPK566AJW-N5	Motor Model : PK566AW-N5
UPK566AW-N7.2	Motor Model : PK566AW-N7.2
UPK566AJW-N7.2	Motor Model : PK566AW-N7.2
UPK566AW-N10	Motor Model : PK566AW-N10
UPK566AJW-N10	Motor Model : PK566AW-N10

Double shaft Weight 3.31 lb. (Mass 1.5kg)

UPK566BW-N5	Motor Model : PK566BW-N5
UPK566BJW-N5	Motor Model : PK566BW-N5
UPK566BW-N7.2	Motor Model : PK566BW-N7.2
UPK566BJW-N7.2	Motor Model : PK566BW-N7.2
UPK566BW-N10	Motor Model : PK566BW-N10
UPK566BJW-N10	Motor Model : PK566BW-N10

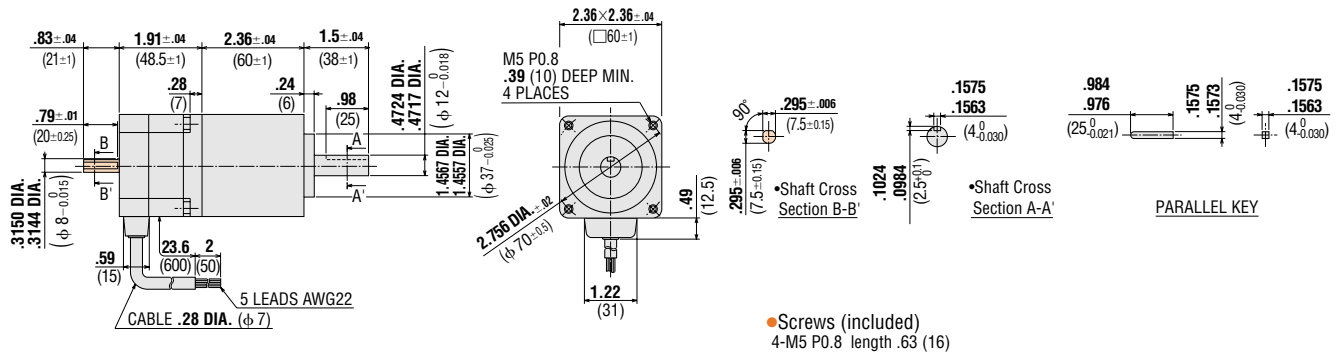


Single shaft Weight 3.31 lb. (Mass 1.5kg)

UPK564AW-N25	Motor Model : PK564AW-N25
UPK564AJW-N25	Motor Model : PK564AW-N25
UPK564AW-N36	Motor Model : PK564AW-N36
UPK564AJW-N36	Motor Model : PK564AW-N36
UPK564AW-N50	Motor Model : PK564AW-N50
UPK564AJW-N50	Motor Model : PK564AW-N50

Double shaft Weight 3.31 lb. (Mass 1.5kg)

UPK564BW-N25	Motor Model : PK564BW-N25
UPK564BJW-N25	Motor Model : PK564BW-N25
UPK564BW-N36	Motor Model : PK564BW-N36
UPK564BJW-N36	Motor Model : PK564BW-N36
UPK564BW-N50	Motor Model : PK564BW-N50
UPK564BJW-N50	Motor Model : PK564BW-N50



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

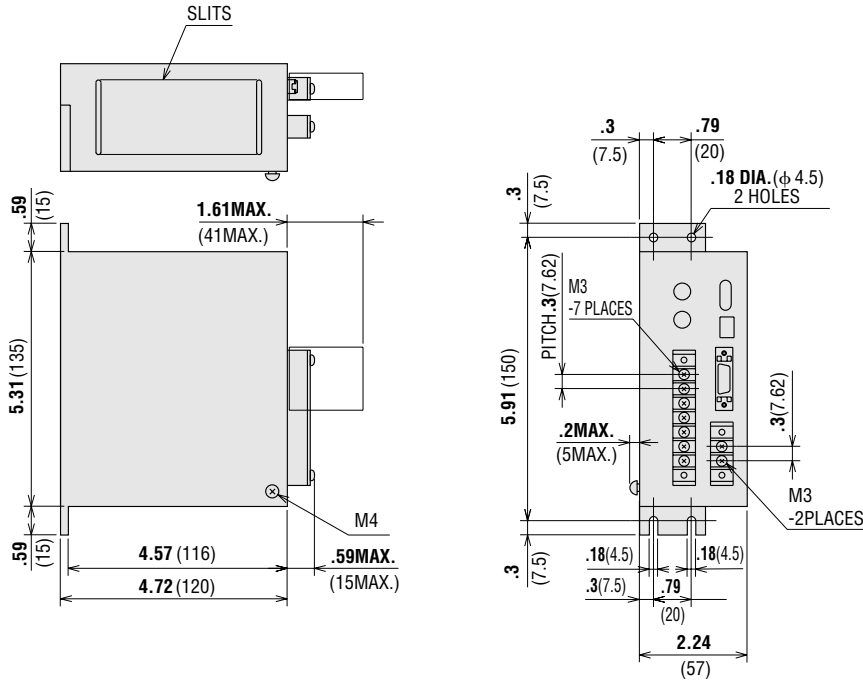
See page B-36 for information on motor installation.

● Driver

Single-Phase 100-115VAC Input Standard Type

For **UPK566□W-N, UPK564□W-N**

Driver Model: UDK5114NW2 Weight 2.1 lb. (Mass 0.95kg)

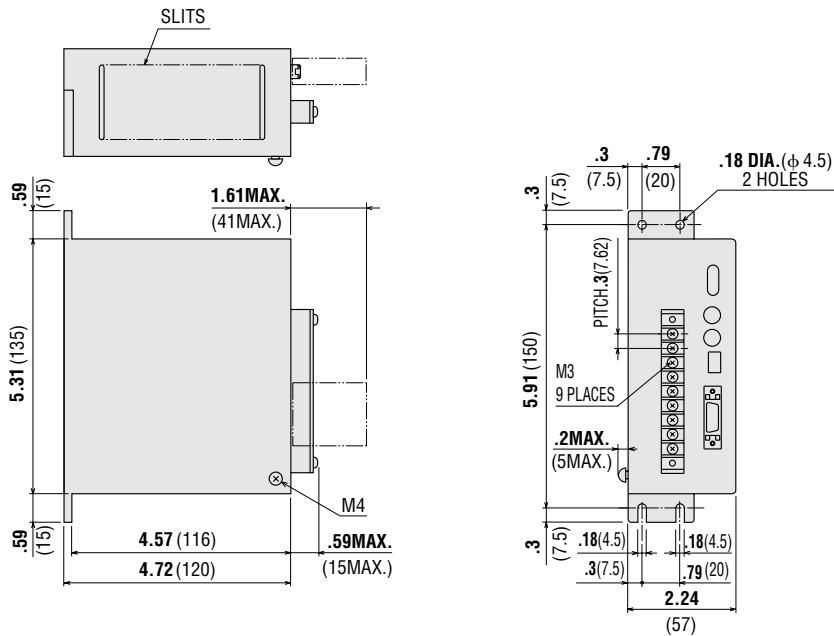


- I/O Connector (Included)
Connector: 54306-2011 (MOLEX)
Connector: 54331-1201 (MOLEX)

Single-Phase 200-230VAC Input Standard Type

For **UPK566□JW-N, UPK564□JW-N**

Driver Model: UDK5214NW Weight 2.1 lb. (Mass 0.95kg)



- I/O Connector (Included)
Connector: 54306-2011 (MOLEX)
Connector: 54331-1201 (MOLEX)

See page B-38 for information on driver installation.

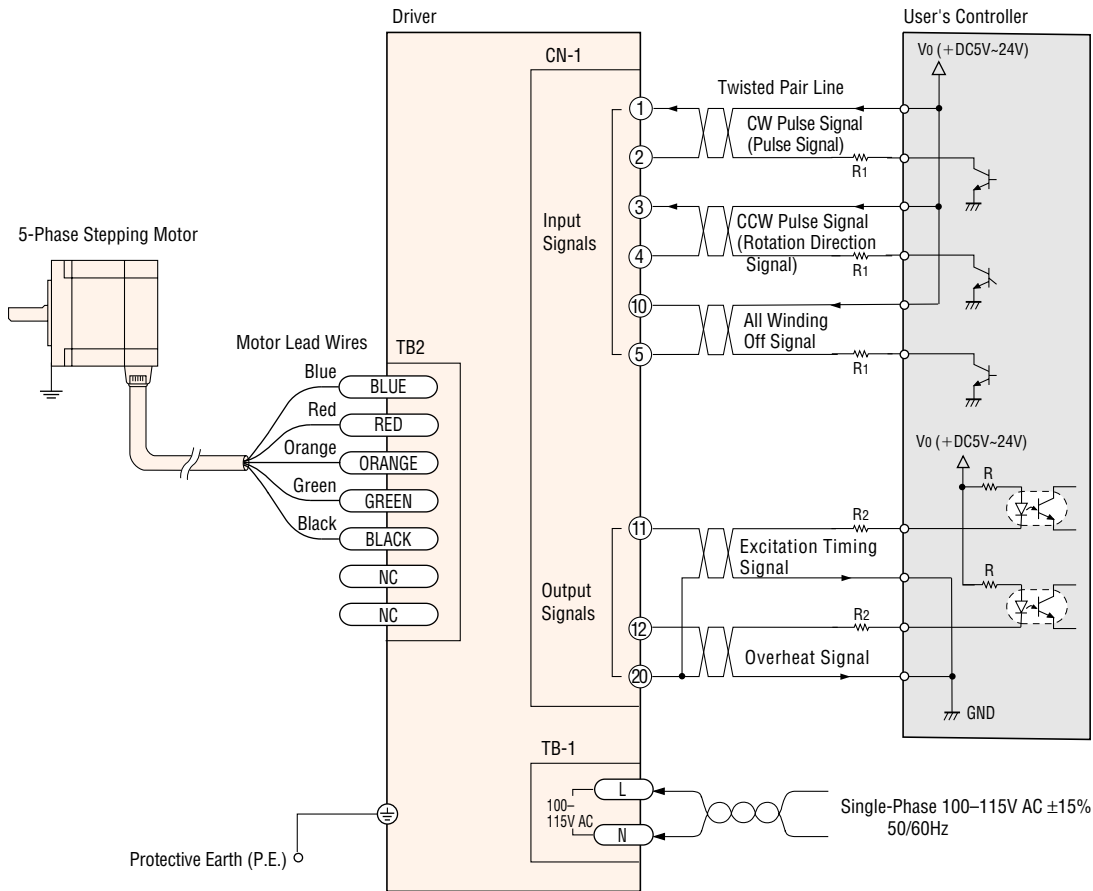
■ LIST OF MOTOR AND DRIVER COMBINATIONS

Type	Package Model	Stepping Motor		Driver
		Model	Current A/phase	Model
Standard	UPK543□W UPK544□W UPK545□W	PK543□W PK544□W PK545□W	0.75	UDK5107NW2
	UPK564□W2 UPK566□W2 UPK569□W2 UPK596□W2 UPK599□W2 UPK5913□W2	PK564□W PK566□W PK569□W PK596□W PK599□W PK5913□W	1.4	UDK5114NW2
	UPK564□JW UPK566□JW UPK569□JW UPK596□JW UPK599□JW UPK5913□JW	PK564□W PK566□W PK569□W PK596□W PK599□W PK5913□W	1.4	UDK5214NW
High-Speed	UPK569□HW2 UPK596□HW2 UPK599□HW2 UPK5913□HW2	PK569□HW PK596□HW PK599□HW PK5913□HW	2.8	UDK5128NW2
TH Geared	UPK543□W-T3.6 UPK543□W-T7.2 UPK543□W-T10 UPK543□W-T20 UPK543□W-T30	PK543□W-T3.6 PK543□W-T7.2 PK543□W-T10 PK543□W-T20 PK543□W-T30	0.75	UDK5107NW2
	UPK564□W-T3.6 UPK564□W-T7.2 UPK564□W-T10 UPK564□W-T20 UPK564□W-T30 UPK596□W-T3.6 UPK596□W-T7.2 UPK596□W-T10 UPK596□W-T20 UPK596□W-T30	PK564□W-T3.6 PK564□W-T7.2 PK564□W-T10 PK564□W-T20 PK564□W-T30 PK596□W-T3.6 PK596□W-T7.2 PK596□W1-T10 PK596□W1-T20 PK596□W1-T30	1.4	UDK5114NW2
	UPK564□JW-T3.6 UPK564□JW-T7.2 UPK564□JW-T10 UPK564□JW-T20 UPK564□JW-T30 UPK596□JW-T3.6 UPK596□JW-T7.2 UPK596□JW-T10 UPK596□JW-T20 UPK596□JW-T30	PK564□W-T3.6 PK564□W-T7.2 PK564□W-T10 PK564□W-T20 PK564□W-T30 PK596□W-T3.6 PK596□W-T7.2 PK596□W-T10 PK596□W-T20 PK596□W-T30	1.4	UDK5214NW
PN Geared	UPK566□W-N5 UPK566□W-N7.2 UPK566□W-N10 UPK564□W-N25 UPK564□W-N36 UPK564□W-N50	PK566□W-N5 PK566□W-N7.2 PK566□W-N10 PK564□W-N25 PK564□W-N36 PK564□W-N50	1.4	UDK5114NW2
	UPK566□JW-N5 UPK566□JW-N7.2 UPK566□JW-N10 UPK564□JW-N25 UPK564□JW-N36 UPK564□JW-N50	PK566□W-N5 PK566□W-N7.2 PK566□W-N10 PK564□W-N25 PK564□W-N36 PK564□W-N50	1.4	UDK5214NW

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

■ WIRING DIAGRAMS

● Single-Phase 100-115VAC Input



■ 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.

Note:

- Keep the voltage V_0 between DC 5V and DC 24V. When they are equal to DC 5V, the external resistances R_1 and R_2 are not necessary. When they are above DC 5V, connect R_1 to keep the current below 20mA, and connect R_2 to keep the current below 10mA.
- Use twisted-pair wire of $3 \times 10^{-4} \text{ in}^2$ (0.2 mm^2) or thicker and 6.6 feet (2m) or less in length for the signal line.
- Use wire $7.8 \times 10^{-4} \text{ in}^2$ (0.5 mm^2) or thicker for motor lines (when extended) and power supply lines, and use $1.2 \times 10^{-3} \text{ in}^2$ (0.75 mm^2) or thicker for the wire for the protective earthing line.
- Use spot grounding for the grounding of the driver and external controller.
- Signal lines should be kept at least 3.94inch (10cm) away from power lines (power supply lines and motor lines). Do not bind the signal line and power line together.

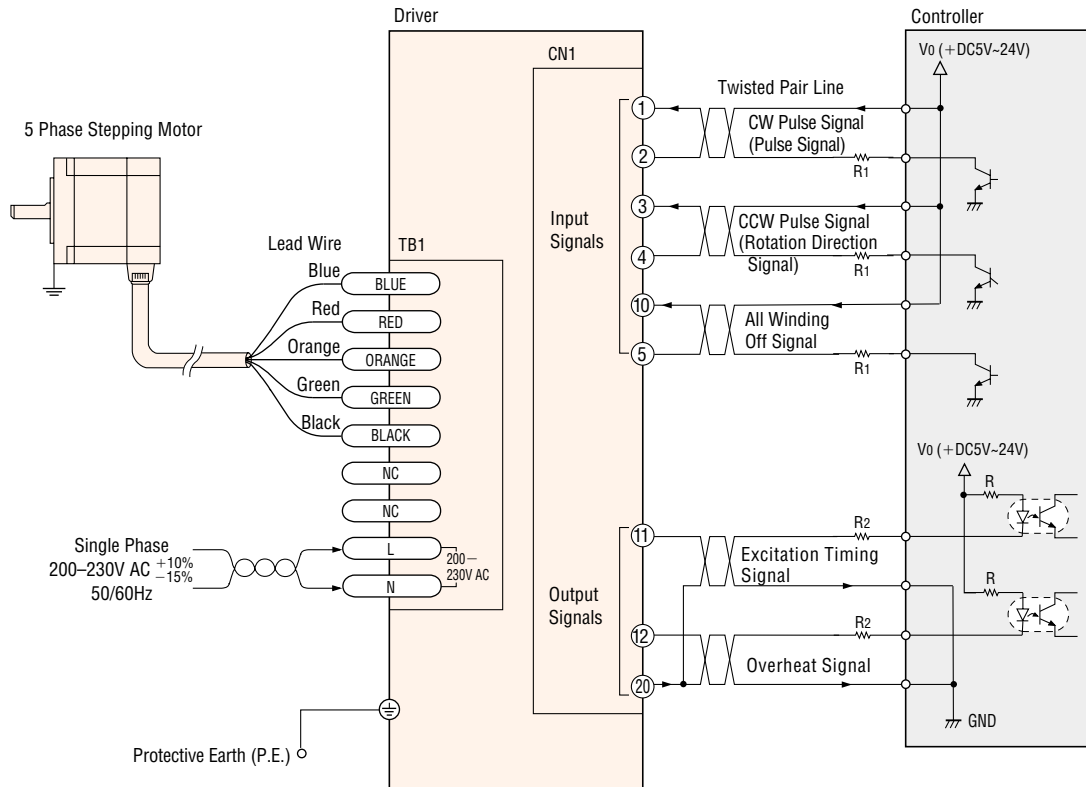
Use open collector transistors (sink type) for the signal output sections of the controller.

⚠ Caution

The driver incorporates double-pole/neutral fusing for the power input. If the driver POWER LED is off, it is possible that only the neutral fuse is tripped. High voltage supplied on the hot side may cause electric shock. Turn the power off immediately and request service.

■ WIRING DIAGRAMS

● Single-Phase 200-230VAC Input



■ 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.

Note:

- Keep the voltage V_0 between DC 5V and DC 24V. When they are equal to DC 5V, the external resistances R_1 and R_2 are not necessary. When they are above DC 5V, connect R_1 to keep the current below 20mA, and connect R_2 to keep the current below 10mA.
- Use twisted-pair wire of $3 \times 10^{-4} \text{ in}^2$ (0.2 mm^2) or thicker and 6.6 feet (2m) or less in length for the signal line.
- Use wire $7.8 \times 10^{-4} \text{ in}^2$ (0.5 mm^2) or thicker for motor lines (when extended) and power supply lines, and use $1.2 \times 10^{-3} \text{ in}^2$ (0.75 mm^2) or thicker for the wire for the protective earthing line.
- Use spot grounding for the grounding of the driver and external controller.
- Signal lines should be kept at least 3.94inch (10cm) away from power lines (power supply lines and motor lines). Do not bind the signal line and power line together.

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

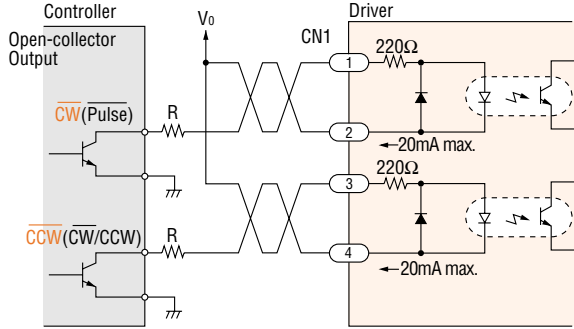
⚠ Caution

The driver incorporates double-pole/neutral fusing for the power input. If the driver POWER LED is off, it is possible that only the neutral fuse is tripped. High voltage supplied on the hot side may cause electric shock. Turn the power off immediately and request service.

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. 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 "Rotation 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. 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.

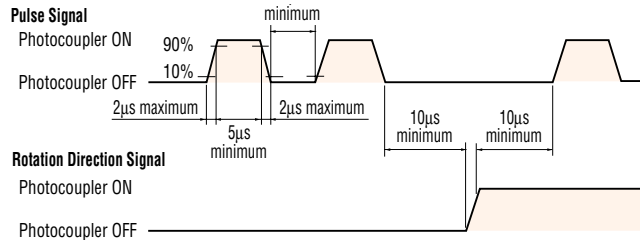
CCW Pulse Signal

When the photocoupler 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

(Photocoupler state corresponding the input pulse)



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

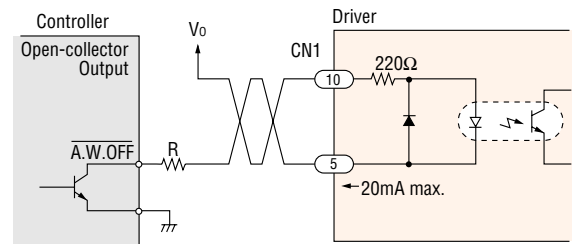
Pulse Signal Characteristics

- 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. A.W.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.

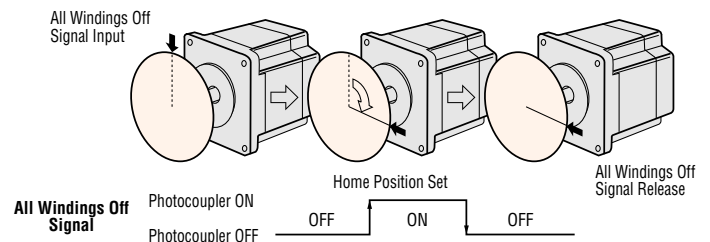
This signal is used when moving the motor by external force or manual home position is desired. If this function is not needed, it is not necessary to connect this terminal.

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.

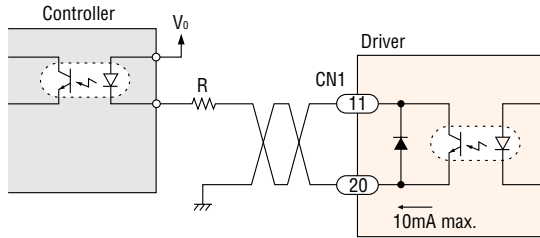
Manual Setting of the Home Position

Input the "All Windings Off" signal, set the motor to the desired position, then release the "All Windings Off" signal.



3. TIM. (Excitation Timing) 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 "Excitation Timing" signal is output to indicate when the motor excitation (current flowing through the winding) is in the initial stage (step "0" at power up).

The "Excitation Timing" signal can be used to increase the accuracy of home position detection by setting the mechanical home position of your equipment (for example, a photo-sensor) to coincide with the excitation sequence initial stage (step "0").

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

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

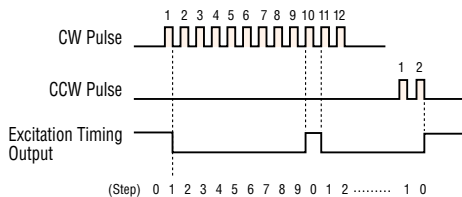
The TIM. LED lights when the "Excitation Timing" signal is output. While the motor is rotating, the LED will turn ON and OFF at a high speed and will appear to be continuously lit.

The "Excitation Timing" signal is output simultaneously with a pulse input each time the excitation sequence returns to step "0". The excitation sequence will complete one cycle for every 7.2° rotation of the motor output shaft.

Full Step (the switch is set to F position): Signal is output once every 10 pulses.

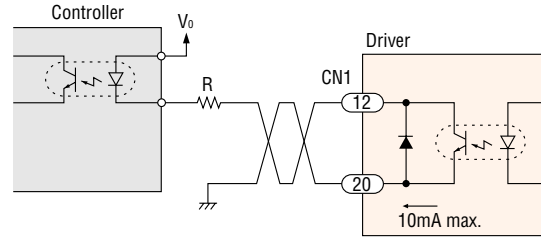
Half Step (the switch is set to H position): Signal is output once every 20 pulses.

Timing Chart at Full Step



4. O. HEAT (Overheat) Output

■ Output circuit and sample of 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), 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.