

## Brushless DC Motor Systems

# AXU Series

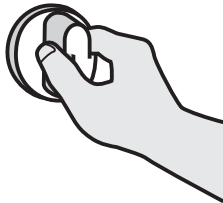
The **AXU** Series combines a compact, brushless DC motor with a speed control unit. These systems provide space savings, easy wiring and simple operation.



### Features

#### ● Easy Connection and Simple Operation

Just connect the motor connector to the control unit, and the **AXU** is ready for immediate use. The rate of rotation is easy to adjust using the speed control dial on the front of the speed control unit.



#### ● Thin and Compact

Compared to an AC speed control motor, the use of a brushless DC motor significantly reduces the size of the motor.

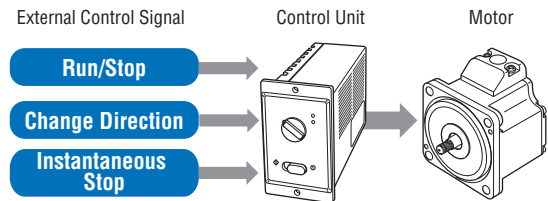
Motor Length: 1.65 inch (42 mm) for 10 W, 25 W  
2.24 inch (57 mm) for 40 W, 90 W

#### ● Wide Speed Range and Constant Torque

Even with an available speed range of 100~2000 r/min, the **AXU** Series motor maintains a constant torque.

#### ● External Control Possible

Run/Stop, rotation direction and instantaneous stops can be controlled with external signals.



#### ● Superior Speed Stability

Speed regulation characteristics are  $-2\%$  maximum with load,  $\pm 1\%$  maximum with voltage and  $\pm 1\%$  maximum with temperature.

#### ● Acceleration/Deceleration Functions

**AXU** Series motors can be set to accelerate and decelerate when the start and stop input is used.

#### ● Protective Functions

The **AXU** Series is equipped with protective functions to handle overload, overvoltage, out-of-phase, undervoltage and overspeed. When an abnormality is detected, an alarm is output and the motor comes to a stop.

#### ● Motor Construction IP65

A grade IP65 indicates protection against jets of water. It is safety if get splashed accidentally. However it is not suitable for washing the motor nor being operated under the circumstance of being splashed constantly.

### Safety Standards and CE Marking

	Standards	Certification Body	Standards File No.	CE Marking
Motor	UL1950	UL	E208200	Low Voltage Directives EMC Directives
	CSA C22.2 No.950			
	EN60950	Conform to EN/IEC Standards		
	EN60034-1			
	EN60034-5			
Control Unit	UL508C	UL	E171462	
	CSA C22.2 No.14			
	EN60950	Conform to EN/IEC Standards		
	EN50178			

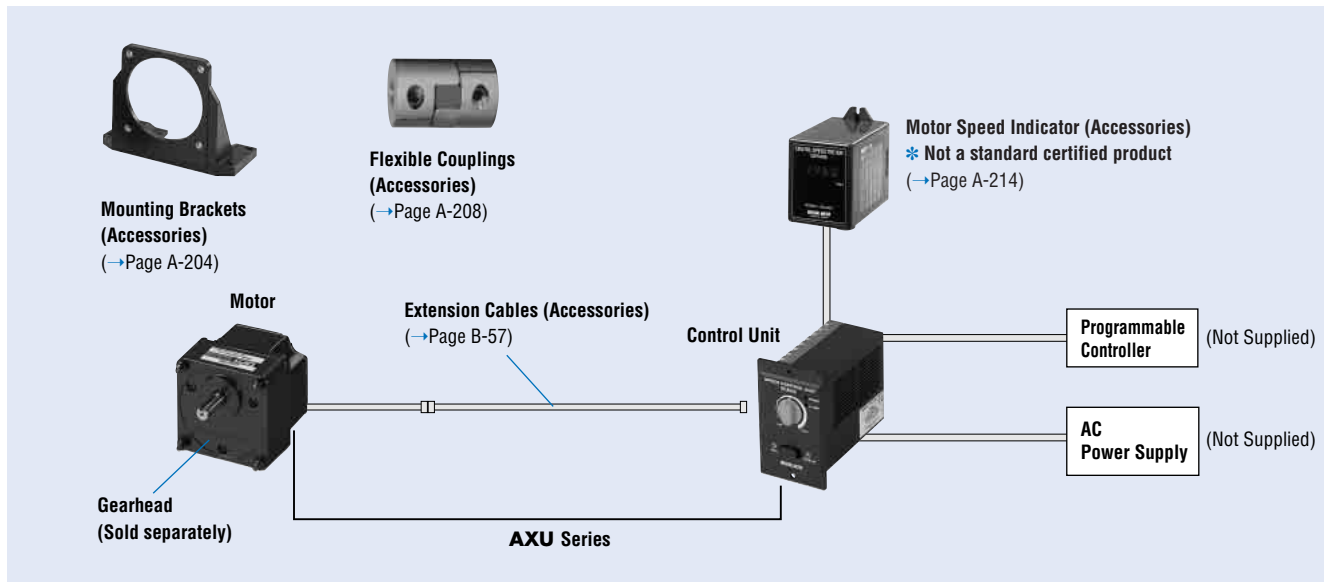
● When the system is approved under various safety standards, the model names on the motor and control unit nameplates are the approved model names.

● **List of Motor and Control Unit Combinations** → Page B-57

● **Details of Safety Standards** → Page G-2

● The EMC value changes according to the wiring and layout. Therefore, the final EMC level must be checked with the motor/control unit incorporated in the equipment.

## System Configuration



The system configuration shown is an example. Other configurations are available.

## Product Number Code

### Motor and Control Unit

# AXU 4 25 A - GN

Series	Motor Frame Size	Shaft Type	Voltage	Output Power
<b>AXU</b> : AXU Series	<b>2</b> : 2.36 in. sq. (60 mm sq.) <b>4</b> : 3.15 in. sq. (80 mm sq.) <b>5</b> : 3.54 in. sq. (90 mm sq.)	<b>GN</b> : Pinion Shaft (for use with <b>GN</b> gearhead) <b>GU</b> : Pinion Shaft (for use with <b>GU</b> gearhead) <b>A</b> : Round Shaft	<b>A</b> : Single-Phase 100-115 VAC <b>C</b> : Single-Phase 200-230 VAC <b>S</b> : Three-Phase 200-230 VAC	<b>10</b> : 10 W (1/75 HP) <b>25</b> : 25 W (1/30 HP) <b>40</b> : 40 W (1/19 HP) <b>90</b> : 90 W (1/8 HP)

### Gearhead

# 4 GN 50 KA

Gearhead Frame Size	Type of Bearings and Shaft Size	Gear Ratio	Gearhead Type
<b>2</b> : 2.36 in. sq. (60 mm sq.) <b>4</b> : 3.15 in. sq. (80 mm sq.) <b>5</b> : 3.54 in. sq. (90 mm sq.)	<b>KA</b> : Ball bearing type and inch-sized output shaft <b>KHA</b> : Ball bearing type and inch-sized output shaft for higher torque	<b>50</b> : Gear ratio of 50:1 (Example) <b>10X</b> : Denotes decimal gearhead with 10:1 gear ratio	<b>GN</b> : GN type (for use with <b>GN</b> -type pinion shaft motor) <b>GU</b> : GU type (for use with <b>GU</b> -type pinion shaft motor)

• Gearheads must match the motor installation dimensions and shaft type.

## Product Line

### AXU Series

Output Power HP	W	Power Supply Voltage	Model	
			Pinion Shaft	Round Shaft
1/75	10	Single-Phase 100-115 VAC	<b>AXU210A-GN</b>	<b>AXU210A-A</b>
		Single-Phase 200-230 VAC	<b>AXU210C-GN</b>	<b>AXU210C-A</b>
		Three-Phase 200-230 VAC	<b>AXU210S-GN</b>	<b>AXU210S-A</b>
1/30	25	Single-Phase 100-115 VAC	<b>AXU425A-GN</b>	<b>AXU425A-A</b>
		Single-Phase 200-230 VAC	<b>AXU425C-GN</b>	<b>AXU425C-A</b>
		Three-Phase 200-230 VAC	<b>AXU425S-GN</b>	<b>AXU425S-A</b>
1/19	40	Single-Phase 100-115 VAC	<b>AXU540A-GN</b>	<b>AXU540A-A</b>
		Single-Phase 200-230 VAC	<b>AXU540C-GN</b>	<b>AXU540C-A</b>
		Three-Phase 200-230 VAC	<b>AXU540S-GN</b>	<b>AXU540S-A</b>
1/8	90	Single-Phase 100-115 VAC	<b>AXU590A-GU</b>	<b>AXU590A-A</b>
		Single-Phase 200-230 VAC	<b>AXU590C-GU</b>	<b>AXU590C-A</b>
		Three-Phase 200-230 VAC	<b>AXU590S-GU</b>	<b>AXU590S-A</b>

### Gearheads (Sold Separately)

Gearhead Model	Gear Ratio
<b>2GN</b> □ <b>KA</b>	<b>3~180</b>
<b>2GN10XK</b> (Decimal Gearhead)	
<b>4GN</b> □ <b>KA</b>	<b>3~180</b>
<b>4GN10XK</b> (Decimal Gearhead)	
<b>5GN</b> □ <b>KA</b>	<b>3~180</b>
<b>5GN10XK</b> (Decimal Gearhead)	
<b>5GU</b> □ <b>KA</b>	<b>3~180</b>
<b>5GU10XKB</b> (Decimal Gearhead)[for <b>5GU</b> □ <b>KA</b> ]	
<b>5GU</b> □ <b>KHA</b> (High Power Type)	<b>50~180</b>
<b>5GU10XK</b> (Decimal Gearhead)[for <b>5GU</b> □ <b>KHA</b> ]	

• Enter the appropriate gear ratio in the box (□) within the gearhead model name.

## Specifications

Package Model	Pinion Shaft Type	<b>AXU210A-GN</b>	<b>AXU210C-GN</b>	<b>AXU210S-GN</b>	<b>AXU425A-GN</b>	<b>AXU425C-GN</b>	<b>AXU425S-GN</b>
	Round Shaft Type	<b>AXU210A-A</b>	<b>AXU210C-A</b>	<b>AXU210S-A</b>	<b>AXU425A-A</b>	<b>AXU425C-A</b>	<b>AXU425S-A</b>
Rated Output Power	HP (W)	1/75 (10)			1/30 (25)		
Power Source	Voltage	Single-Phase 100-115 VAC±10%	Single-Phase 200-230 VAC±10%	Three-Phase 200-230 VAC±10%	Single-Phase 100-115 VAC±10%	Single-Phase 200-230 VAC±10%	Three-Phase 200-230 VAC±10%
	Frequency	50/60 Hz					
	Rated Input Current A	0.7	0.4	0.25	1.1	0.65	0.4
	Maximum Input Current A	1.2	0.8	0.6	1.9	1.2	0.9
Rated Torque	oz-in (N·m)	7.1 (0.05)			17.7 (0.125)		
Starting Torque	oz-in (N·m)	8.5 (0.06)			21 (0.15)		
Permissible Load Inertia J *	oz-in <sup>2</sup> (×10 <sup>-4</sup> kg·m <sup>2</sup> )	2.7 (0.5)			9.8 (1.8)		
Rated Speed	r/min	2000					
Variable Speed Range	r/min	100~2000 (speed ratio 20:1)					
Speed Regulation	Load	-2% Max. (0~ rated torque, at rated speed)					
	Voltage	±1% Max. (power supply voltage ±10 %, at rated speed with no load)					
	Temperature	±1% Max. (32°F~104°F [0°C~+40°C] at rated speed with no load)					

Package Model	Pinion Shaft Type	<b>AXU540A-GN</b>	<b>AXU540C-GN</b>	<b>AXU540S-GN</b>	<b>AXU590A-GU</b>	<b>AXU590C-GU</b>	<b>AXU590S-GU</b>
	Round Shaft Type	<b>AXU540A-A</b>	<b>AXU540C-A</b>	<b>AXU540S-A</b>	<b>AXU590A-A</b>	<b>AXU590C-A</b>	<b>AXU590S-A</b>
Rated Output Power	HP (W)	1/19 (40)			1/8 (90)		
Power Source	Voltage	Single-Phase 100-115 VAC±10%	Single-Phase 200-230 VAC±10%	Three-Phase 200-230 VAC±10%	Single-Phase 100-115 VAC±10%	Single-Phase 200-230 VAC±10%	Three-Phase 200-230 VAC±10%
	Frequency	50/60 Hz					
	Rated Input Current A	1.65	1.0	0.5	2.5	1.45	0.8
	Maximum Input Current A	2.4	1.5	1.0	3.8	2.4	1.5
Rated Torque	oz-in (N·m)	28 (0.20)			63 (0.45)		
Starting Torque	oz-in (N·m)	34 (0.24)			76 (0.54)		
Permissible Load Inertia J *	oz-in <sup>2</sup> (×10 <sup>-4</sup> kg·m <sup>2</sup> )	18.1 (3.3)			32 (5.8)		
Rated Speed	r/min	2000					
Variable Speed Range	r/min	100~2000 (speed ratio 20:1)					
Speed Regulation	Load	-2% Max. (0~ rated torque, at rated speed)					
	Voltage	±1% Max. (power supply voltage ±10 %, at rated speed with no load)					
	Temperature	±1% Max. (32°F~104°F [0°C~+40°C] at rated speed with no load)					

\* The Permissible Load Inertia specified above is only applicable to round shaft types. Permissible Load Inertia for Gearmotor Type →Page B-50

## Common Specifications

Item	Specifications
Acceleration/Deceleration Time	0.5~10 sec. (at 2,000 r/min with no load) set by a potentiometer
Speed Control Method	Speed potentiometer on front panel
Input Signal	Photocoupler Input, Input Impedance 2 kΩ, Operated by internal power supply Common Clockwise (CW) and Counterclockwise (CCW) Inputs
Output Signal	Open Collector Output, External Use Condition 26.4 VDC, 10 mA Max. Speed Signal Output (SPEED OUT) 30 P/R, Alarm Signal Output (ALARM OUT)
Protection Functions *1	When the following are activated, the alarm signal will be output and the motor will come to a stop: <ul style="list-style-type: none"> <li>● Overload Protection: Activated when the motor load exceeds rated torque for a minimum of 5 seconds.</li> <li>● Overvoltage Protection: Activated when the voltage applied to the control unit exceeds 115 VAC or 230 VAC by a minimum of 20%.</li> <li>● Out-of-Phase Protection: Activated when the sensor wire inside the motor cable is disconnected during motor operation.</li> <li>● Undervoltage Protection: Activated when the voltage applied to the control unit falls below 100 VAC or 200 VAC by a minimum of 30%.</li> <li>● Overspeed Protection: Activated when the speed exceeds 2800 r/min.</li> </ul>
Motor Insulation Class	Class E (248°F [120°C]) *2
Rating	Continuous

\*1 Motor speed cannot be controlled in applications where the motor's shaft is turned by the load, as in lowering operations. To prevent damage to the driver during lowering operations, the motor comes to a natural stop if the primary voltage of the driver's inverter exceeds the permissible value.

\*2 Motor insulation is recognized as Class A [221°F (105°C)] by UL and CSA standards.

## General Specifications

Item	Motor	Control Unit
Insulation Resistance	100 MΩ or more when 500 VDC megger is applied between the windings and the frame.	100 MΩ or more when 500 VDC megger is applied between the power supply input terminal and the ground terminal, and between the power supply input terminal and the I/O terminal.
Dielectric Strength	Sufficient to withstand 1.5 kVAC at 50 Hz applied between the windings and the frame for 1 minute.	Sufficient to withstand 1.8 kVAC at 50 Hz applied between the ground terminal and the power supply input terminal for 1 minute, and 3 kVAC at 50 Hz applied between the ground terminal and the I/O terminal for 1 minute.
Operating Environment	Ambient Temperature: 32°F~122°F (0°C~+50°C)* (nonfreezing)	32°F~104°F (0°C~+40°C)*(nonfreezing)
Conditions	Humidity: 85% maximum (noncondensing)	
	Atmosphere: No corrosive gases or dust	
Degree of Protection	IP65 (except for the mounting surface)	IP10

- For round shaft types: Please attach to the following sizes of heat sinks to maintain a maximum motor housing temperature of 194 °F (90 °C)
  - **AXU210□-A**: 5.31 in. ×5.31 in. (135 mm×135 mm), 0.20 in. (5 mm) thick
  - **AXU425□-A**: 6.50 in. ×6.50 in. (165 mm×165 mm), 0.20 in. (5 mm) thick
  - **AXU540□-A**: 7.87 in. ×7.87 in. (200 mm×200 mm), 0.20 in. (5 mm) thick
  - **AXU590□-A**: 7.87 in. ×7.87 in. (200 mm×200 mm), 0.20 in. (5 mm) thick
- \* Ambient temperature of the motor is recognized as 32 °F~104 °F (0 °C~+40 °C) by UL and CSA Standards.

## Gearmotor–Torque Table

Maximum Torque When Using a Decimal Gearhead

- **2GN□KA** with **2GN10XK**: 26 lb-in (3 N·m)
  - **4GN□KA\*** with **4GN10XK**: 70 lb-in (8 N·m)
  - **5GN□KA** with **5GN10XK**: 88 lb-in (10 N·m)
  - **5GU□KA** with **5GU10XKB**: 177 lb-in (20 N·m)
  - **5GU□KHA** with **5GU10XK**: 260 lb-in (30 N·m)
- \* All gear ratios except 25:1, 30:1, 36:1: 53 lb-in (6 N·m) Unit=Upper Values: lb-in/Lower Values: N·m

Model Motor/Gearhead	Speed Range r/min	33	28	20	17	13	11	8	6.7	5.6	4	3.3	2.8	2	1.7	1.3	1.1	1	0.83	0.67	0.56
		667	556	400	333	267	222	160	133	111	80	67	56	40	33	27	22	20	17	13	11
		Gear Ratio	3	3.6	5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150
<b>AXU210A-GN</b> <b>AXU210C-GN</b> <b>AXU210S-GN</b> / <b>2GN□KA</b>		1.06 0.12	1.32 0.15	1.77 0.2	2.1 0.24	2.6 0.3	3.1 0.36	4.5 0.51	5.3 0.61	6.4 0.73	8.0 0.91	9.7 1.1	11.5 1.3	15 1.7	17.7 2	22 2.5	26 3	26 3	26 3	26 3	26 3
<b>AXU425A-GN</b> <b>AXU425C-GN</b> <b>AXU425S-GN</b> / <b>4GN□KA</b>		2.6 0.3	3.1 0.36	4.5 0.51	5.3 0.61	6.7 0.76	8.0 0.91	11.5 1.3	13.2 1.5	15.9 1.8	20 2.3	23 2.7	29 3.3	36 4.1	44 5	54 6.2	65 7.4	70 8	70 8	70 8	70 8
<b>AXU540A-GN</b> <b>AXU540C-GN</b> <b>AXU540S-GN</b> / <b>5GN□KA</b>		4.3 0.49	5.1 0.58	7.1 0.81	8.5 0.97	10.6 1.2	13.2 1.5	17.7 2.0	21 2.4	25 2.9	32 3.7	38 4.4	46 5.3	58 6.6	69 7.9	87 9.9	88 10	88 10	88 10	88 10	88 10
<b>AXU590A-GU</b> <b>AXU590C-GU</b> <b>AXU590S-GU</b>	<b>5GU□KA</b>	9.7 1.1	11.5 1.3	15.9 1.8	19.4 2.2	23 2.7	29 3.3	36 4.1	43 4.9	52 5.9	65 7.4	78 8.9	94 10.7	131 14.9	157 17.8	176 19.9	177 20	177 20	177 20	177 20	177 20
	<b>5GU□KHA</b>	—	—	—	—	—	—	—	—	—	—	—	—	131 14.9	157 17.8	176 19.9	210 23.9	230 26.6	260 30	260 30	260 30

- Enter the appropriate gear ratio in the box (□) within the gearhead model name.
- A colored background indicates gear shaft rotation in the same direction as the motor shaft; a white background indicates rotation in the opposite direction.
- **KA** type is standard gearhead. **KHA** type is high-powered gearhead.

## Permissible Overhung Load and Permissible Thrust Load

### Gearheads

Model	Gear Ratio	Permissible Overhung Load				Permissible Thrust Load	
		0.39 in. (10 mm) from shaft end		0.79 in. (20 mm) from shaft end			
		lb.	N	lb.	N	lb.	N
<b>2GN□KA</b>	<b>3~18</b>	11.2	50	18	80	6.7	30
	<b>25~180</b>	27	120	40	180		
<b>4GN□KA</b>	<b>3~18</b>	22	100	33	150	11.2	50
	<b>25~180</b>	45	200	67	300		
<b>5GN□KA</b>	<b>3~18</b>	56	250	78	350	22	100
	<b>25~180</b>	67	300	101	450		
<b>5GU□KA</b>	<b>3~9</b>	90	400	112	500	33	150
	<b>12.5~18</b>	101	450	135	600		
	<b>25~180</b>	112	500	157	700		
<b>5GU□KHA</b>	<b>50~180</b>	90	400	135	600	33	150

- Enter the gear ratio in the box (□) within the model name.
- **KA** type is standard gearhead. **KHA** type is high-powered gearhead.

### ● Round Shaft Type

Model	Permissible Overhung Load			
	0.39 in. (10 mm) from shaft end		0.79 in. (20 mm) from shaft end	
	lb.	N	lb.	N
<b>AXU210</b> □-A	15.7	70	22	100
<b>AXU425</b> □-A	27	120	31	140
<b>AXU540</b> □-A	36	160	38	170
<b>AXU590</b> □-A	36	160	38	170

- Enter the appropriate letter in the box (□) within the motor model name. (**A**: Single-phase 100-115 VAC, **C**: Single-phase 200-230 VAC, **S**: Three-phase 200-230 VAC).
- Permissible Thrust Load: Avoid thrust loads as much as possible. If a thrust load is unavoidable, keep it to no more than half the motor weight.

### ■ Permissible Load Inertia J

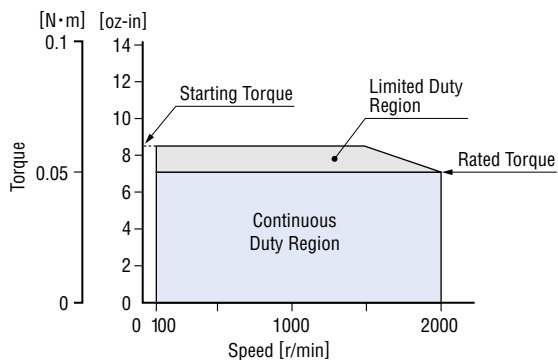
Unit=Upper Values: oz-in<sup>2</sup>/Lower Values: ×10<sup>-4</sup> kg-m<sup>2</sup>

Model Motor/Gearhead	Gear Ratio	3	3.6	5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180
<b>AXU210</b> □-GN/2GN□KA		3.1 0.558	4.4 0.804	8.5 1.55	12.2 2.23	19.1 3.49	27 5.02	53 9.69	77 14	110 20.1	210 38.8	310 55.8	440 80.4	850 155	850 155	850 155	850 155	850 155	850 155	850 155	850 155
<b>AXU425</b> □-GN/4GN□KA		10.8 1.98	15.6 2.85	30 5.5	43 7.92	68 12.4	97 17.8	188 34.4	270 49.5	390 71.3	750 138	1080 198	1560 285	3000 550	3000 550	3000 550	3000 550	3000 550	3000 550	3000 550	3000 550
<b>AXU540</b> □-GN/5GN□KA		19.7 3.6	28 5.18	55 10	79 14.4	123 22.5	177 32.4	340 62.5	490 90	710 130	1370 250	1970 360	2800 518	5500 1000	5500 1000	5500 1000	5500 1000	5500 1000	5500 1000	5500 1000	5500 1000
<b>AXU590</b> □-GU/5GU□KA		49 9	71 13	137 25	197 36	310 56.3	440 81	850 156	1230 225	1770 324	3400 625	4900 900	7100 1296	13700 2500	13700 2500	13700 2500	13700 2500	13700 2500	13700 2500	13700 2500	13700 2500
<b>AXU590</b> □-GU/5GU□KHA		—	—	—	—	—	—	—	—	—	—	—	—	13700 2500	13700 2500	13700 2500	13700 2500	13700 2500	13700 2500	13700 2500	13700 2500

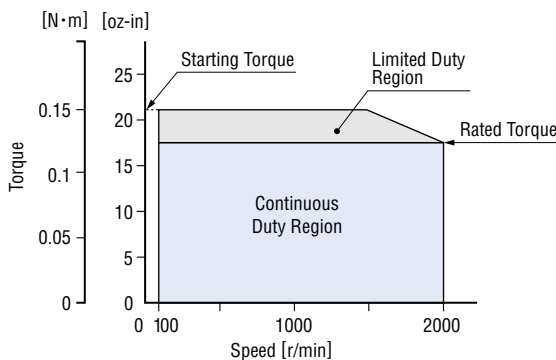
- Enter the appropriate letter in the box (□) within the motor model name. (**A**: Single-phase 100-115 VAC, **C**: Single-phase 200-230 VAC, **S**: Three-phase 200-230 VAC).
- Enter the appropriate gear ratio in the box (□) within the gearhead model name.

### ■ Speed-Torque Characteristics

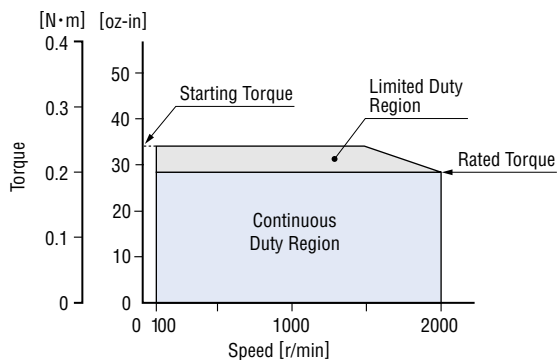
**AXU210A-GN/AXU210C-GN/AXU210S-GN**  
**AXU210A-A/AXU210C-A/AXU210S-A**



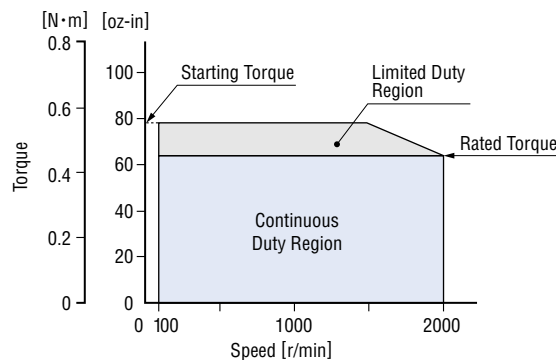
**AXU425A-GN/AXU425C-GN/AXU425S-GN**  
**AXU425A-A/AXU425C-A/AXU425S-A**



**AXU540A-GN/AXU540C-GN/AXU540S-GN**  
**AXU540A-A/AXU540C-A/AXU540S-A**



**AXU590A-GU/AXU590C-GU/AXU590S-GU**  
**AXU590A-A/AXU590C-A/AXU590S-A**



**Dimensions** Scale 1/4, Unit = inch (mm)

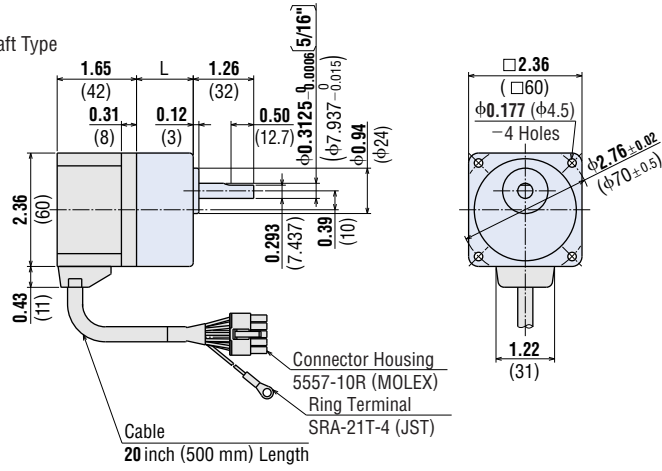
Mounting screws are included with gearheads. Dimensions for screws → Page B-133

**Motor/Gearhead**

**AXU210A-GN, AXU210C-GN, AXU210S-GN** Pinion Shaft Type

Motor: AXUM210-GN / Gearhead: **2GN□KA**  
 Weight: 1.1 lb. (0.5 kg) / Weight: 0.88 lb. (0.4 kg)

**DXF** A289AU (**2GN3KA~18KA**)  
 A289BU (**2GN25KA~180KA**)



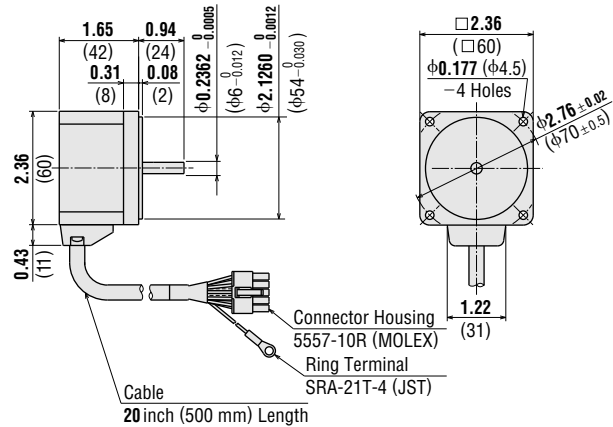
**2GN3KA~18KA:** L = 1.18 (30)  
**2GN25KA~180KA:** L = 1.57 (40)

**Round Shaft Type**

**AXU210A-A, AXU210C-A, AXU210S-A** Round Shaft Type

Motor: AXUM210-A  
 Weight: 1.1 lb. (0.5 kg)

**DXF** A316

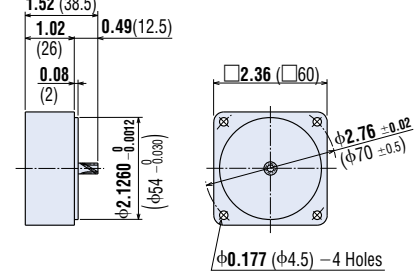


**Decimal Gearhead**

(Can be connected to **AXU210GN** pinion shaft type.)

**2GN10XX**  
 Weight: 0.44 lb. (0.2 kg)

**DXF** A003

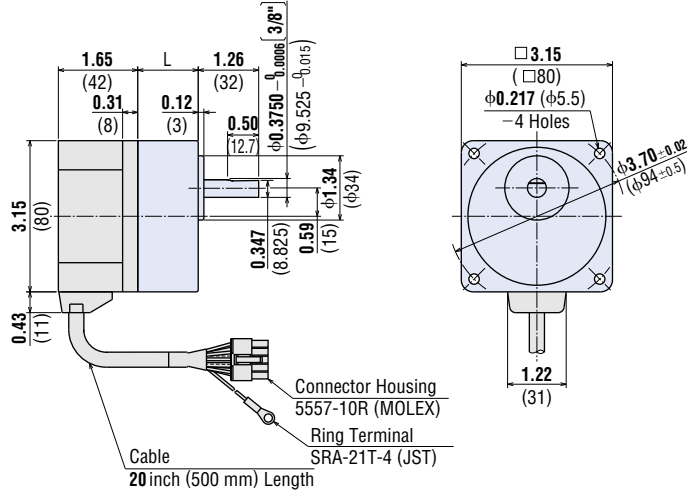


**Motor/Gearhead**

**AXU425A-GN, AXU425C-GN, AXU425S-GN** Pinion Shaft Type

Motor: AXUM425-GN / Gearhead: **4GN□KA**  
 Weight: 1.76 lb. (0.8 kg) / Weight: 1.43 lb. (0.65 kg)

**DXF** A291AU (**4GN3KA~18KA**)  
 A291BU (**4GN25KA~180KA**)



**4GN3KA~18KA:** L = 1.26 (32)  
**4GN25KA~180KA:** L = 1.67 (42.5)

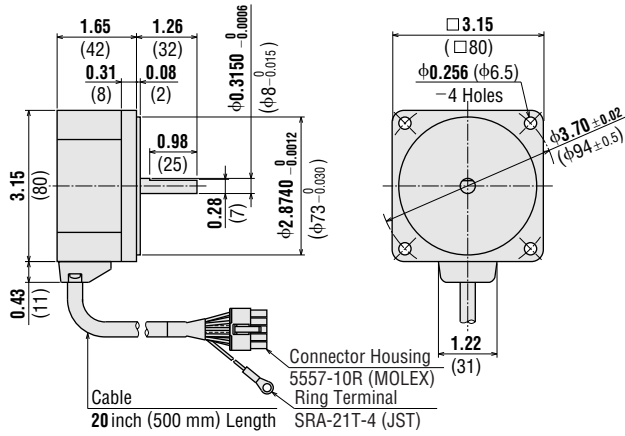
◆ Round Shaft Type

**AXU425A-A, AXU425C-A, AXU425S-A** Round Shaft Type

Motor: AXUM425-A

Weight: 1.76 lb. (0.8 kg)

**DXF** A317



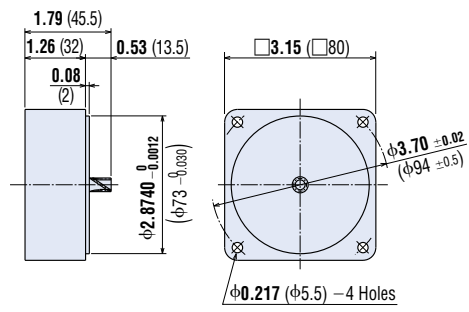
◆ Decimal Gearhead

(Can be connected to **AXU425GN** pinion shaft type.)

**4GN10XK**

Weight: 0.88 lb. (0.4 kg)

**DXF** A013



◆ Motor/Gearhead

**AXU540A-GN, AXU540C-GN, AXU540S-GN** Pinion Shaft Type

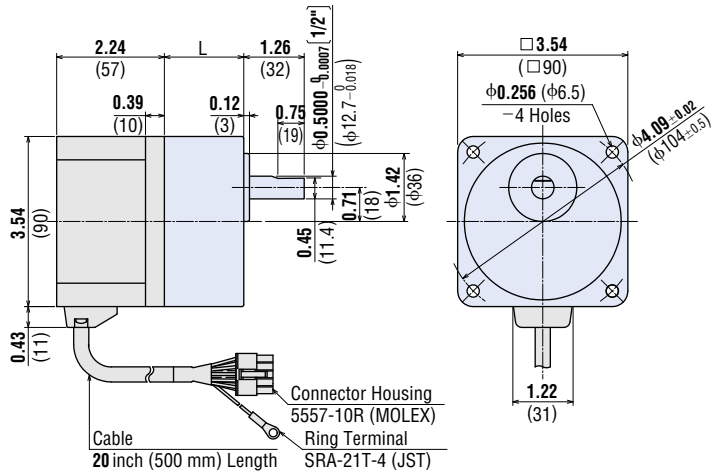
Motor  
AXUM540-GN

Gearhead  
**5GN□KA**

Weight: 3.1 lb. (1.4 kg)

Weight: 3.3 lb. (1.5 kg)

**DXF** A313AU (**5GN3KA~18KA**)  
A313BU (**5GN25KA~180KA**)



**5GN3KA~18KA** : L = 1.65 (42)  
**5GN25KA~180KA** : L = 2.36 (60)

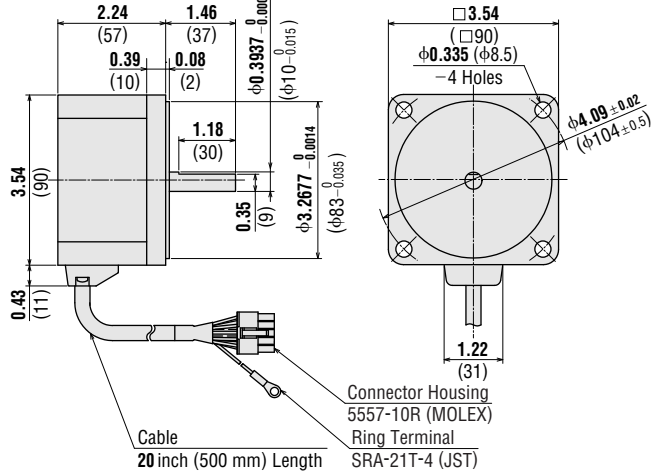
◆ Round Shaft Type

**AXU540A-A, AXU540C-A, AXU540S-A** Round Shaft Type

Motor: AXUM540-A

Weight: 3.1 lb. (1.4 kg)

**DXF** A318



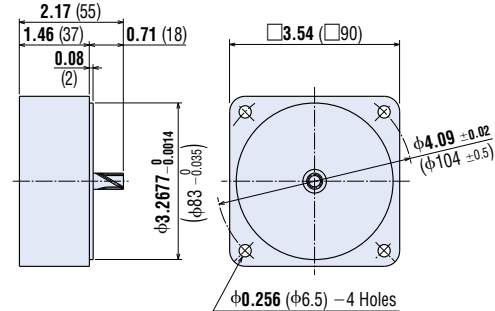
◆ Decimal Gearhead

(Can be connected to **AXU540GN** pinion shaft type.)

**5GN10XK**

Weight: 1.32 lb. (0.6 kg)

**DXF** A022



◆ Motor/Gearhead

**AXU590A-GU, AXU590C-GU, AXU590S-GU** Pinion Shaft Type

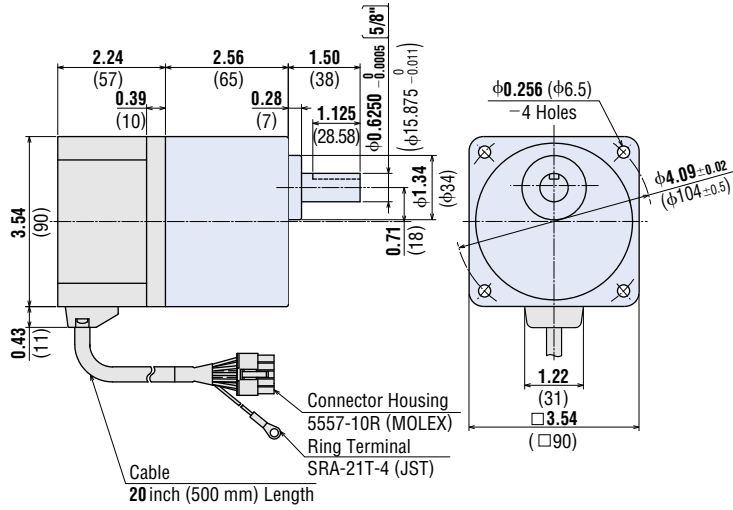
Motor  
AXUM590-GU

Weight: 3.1 lb. (1.4 kg)

Gearhead  
**5GU□KA**

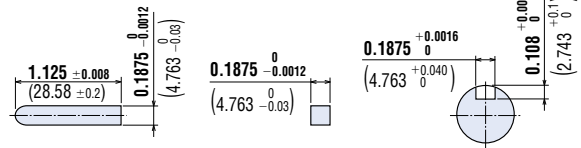
Weight: 3.3 lb. (1.5 kg)

DXF A315



● Key and Key Slot (Scale 1/2)

(The key is provided with the gearhead)



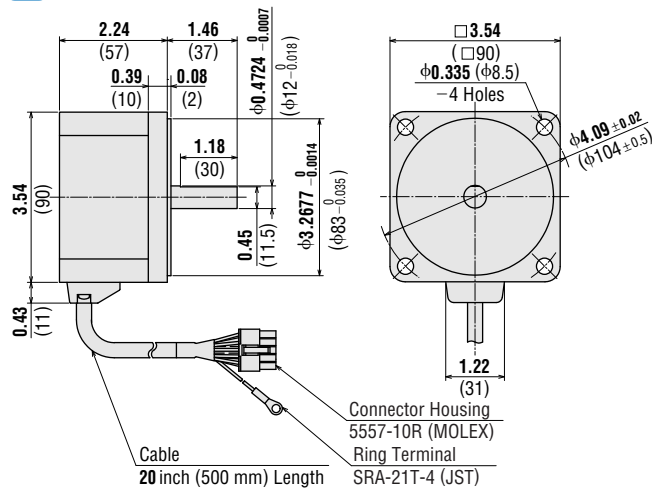
◆ Round Shaft Type

**AXU590A-A, AXU590C-A, AXU590S-A** Round Shaft Type

Motor: AXUM590-A

Weight: 3.1 lb. (1.4 kg)

DXF A314

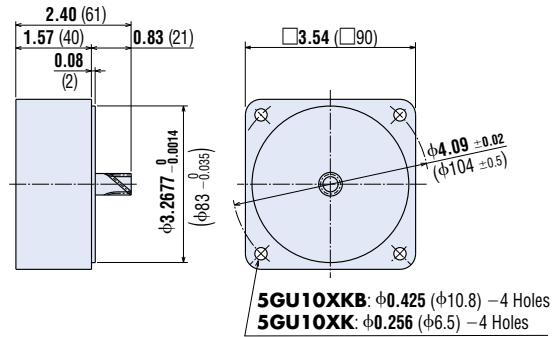


◆ Decimal Gearhead

**5GU10XKB** (for **5GU□KA**)  
**5GU10XK** (for **5GU□KHA**)

Weight: 1.32 lb. (0.6 kg)

DXF A029

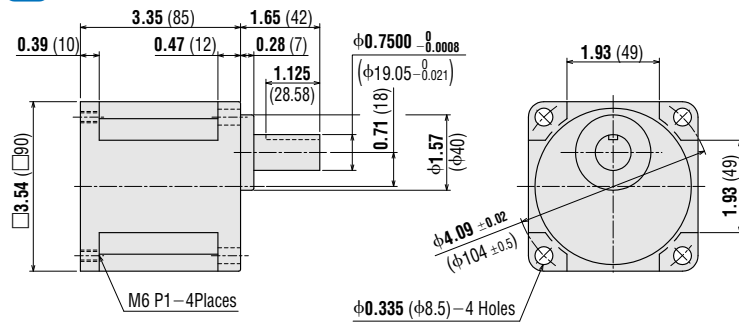


◆ High-Power Type Gearhead

**5GU□KHA** (For **AXU590GU** type)

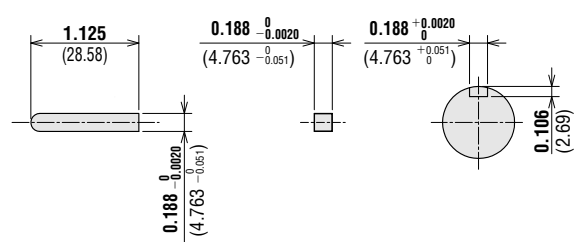
Weight: 4.2 lb. (1.9 kg)

DXF A038U



● Key and Key Slot (Scale 1/2)

(The key is provided with the gearhead)

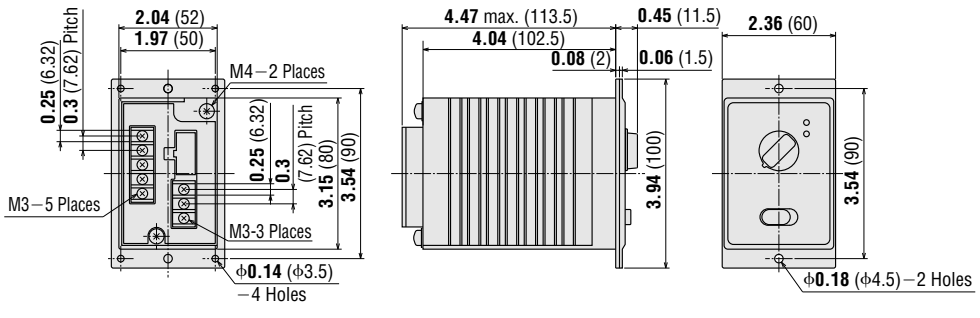




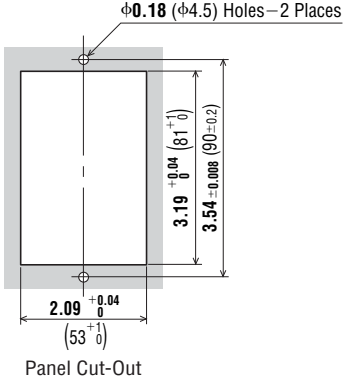
◆ **Control Unit**

AXUD10A, AXUD10C, AXUD10S  
 AXUD25A, AXUD25C, AXUD25S  
 AXUD40A, AXUD40C, AXUD40S  
 AXUD90A, AXUD90C, AXUD90S  
 Weight: 0.88 lb. (0.4 kg)

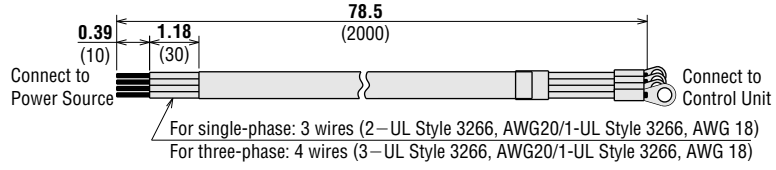
DXF A293



◆ **Control Unit Panel Cut-Out**



◆ **Connection Cable (included)**



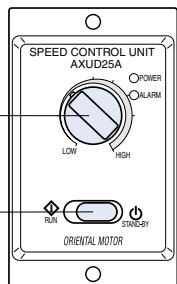
## Connection and Operation

### Names and Functions of Control Unit

#### Speed potentiometer

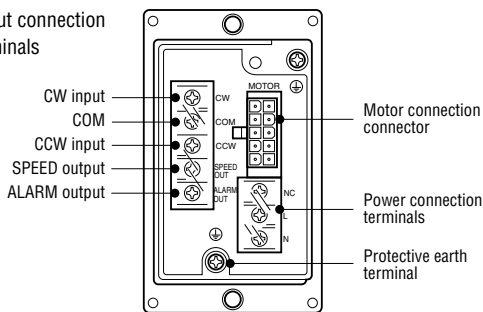
Turning the potentiometer clockwise causes the speed to increase.  
Speed setting range is 100~2000 r/min.  
The setting is 0 r/min at the time of shipment.

#### RUN/STAND-BY Switch



Front of Control Unit

#### Input/output connection signal terminals



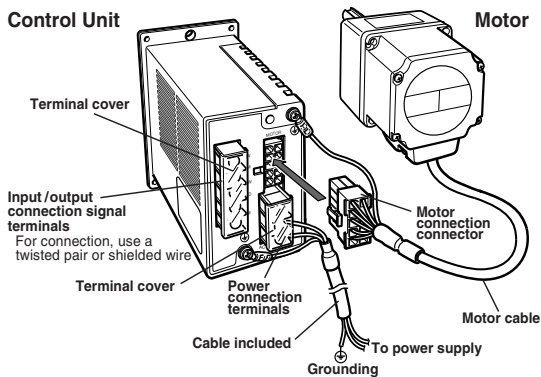
Back of Control Unit

#### Notes:

- The RUN/STAND-BY switch is not a power ON/OFF switch.
- When you want to stop the motor for an extended period, turn off the control unit power.

### Connection Diagrams

#### Motor and Control Unit Connection



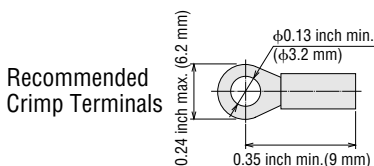
#### Motor Connection

Insert the motor cable connector into the motor connector (MOTOR) on the control unit. Insert it until a click sound is audible. To expand the distance between the motor and control unit, use an optional extension cable. The connection can be extended to a maximum of 34.4 feet (10.5 m).

Extension cable → Page B-57

#### Power Connection

Connect the included power supply cable to the power supply terminal of the control unit. When the included power supply cable is not used, use a cable with a diameter equivalent to AWG22 or more. In that case, round crimp terminals with insulation should be used.



#### Ground

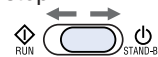
For the Protective Earth cable, use a cable with a diameter equivalent to AWG18 or more.

#### Operation

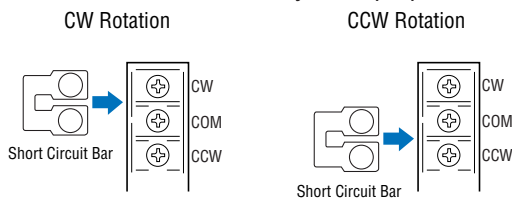
The direction of motor rotation is as viewed from the output shaft end of the motor. "CW" indicates clockwise direction, while "CCW" indicates counterclockwise direction.

#### Operation Using the RUN/STAND-BY Switch

When the RUN/STAND-BY switch is set to the "RUN" position, the motor will run. When it is set to the "STAND-BY" position, the motor will stop.

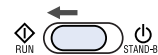


The direction of rotation depends on how the short circuit bar at the back of control unit is connected. Connect the short circuit bar between the CW and COM or CCW and COM. Do not use the short circuit bar for any other purpose.



#### Operating Using External Signals

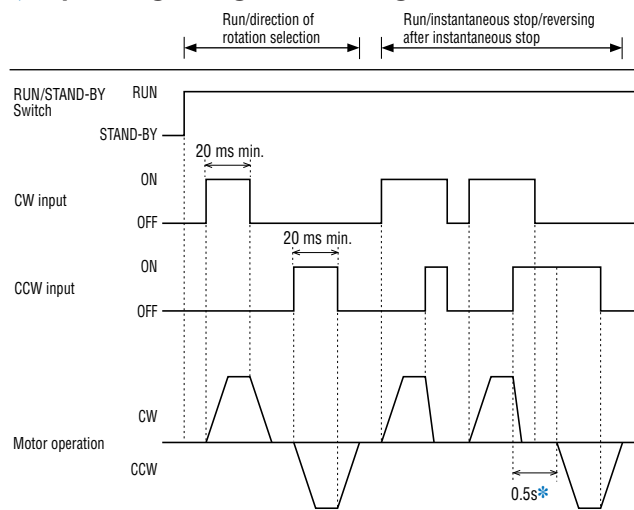
Set the RUN/STAND-BY switch to the "RUN" position.



- See "Input Circuit Connection Example" shown on the next page for connection.

#### Timing Chart

##### Operating Using External Signals



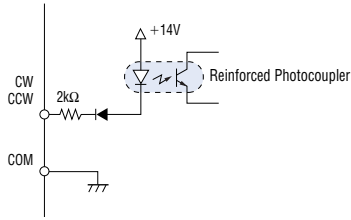
#### Note:

The CW and CCW input signals must be ON for at least 20 ms.

When both the CW and CCW inputs are turned on, the motor stops instantaneously.  
\*Motor does not run for 0.5 s after instantaneous stop, if a reversing run signal is input.

● Signal Input Circuit

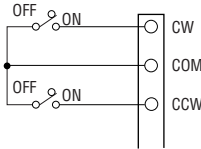
◆ Input Circuit



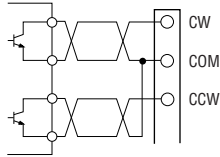
◆ Input Circuit Connection Example

Set the RUN/STAND-BY switch to the "RUN" position.

- Small-capacity switch and relay



- Use a small-capacity contact type relay capable of opening and closing 12 VDC, 5 mA.
- Transistor output type controller



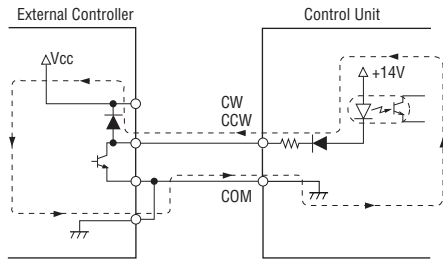
Rotation Direction of Motor

- CW (clockwise) directional operation  
When CW input is turned on, the motor runs in a clockwise direction. When CW input is turned off, the motor stops.
- CCW (counterclockwise) directional operation  
When CCW input is turned on, the motor runs in a counterclockwise direction. When CCW input is turned off, the motor stops.

When both the CW and CCW inputs are turned on simultaneously, the motor stops instantly. Instantaneous reversing operation is not possible.

Notes:

- Wait for more than 20 ms when changing input signals of CW and CCW.
- Do not use a solid state relay (SSR) to turn on or off power. The motor and control unit may be damaged if it is used.
- When you want to use the controller with a built-in clamp diode, pay attention to the sequence of turning on or off the power.  
Power ON : Controller ON → Control Unit ON  
Power OFF : Control Unit OFF → Controller OFF

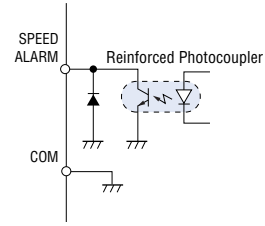


If the control unit power is turned on first when connected as shown above, or the controller power is turned off with the control unit power turned on, current will be applied, as indicated by the arrows in the diagram. This may cause the motor to run.

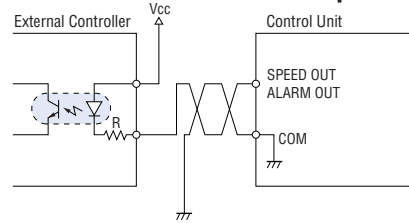
When the power is turned on or off simultaneously, the motor may run temporarily due to differences in power capacity. The controller power must be turned on first, and control unit power must be turned off first.

● Signal Output Circuit

◆ Output Circuit



◆ Output Circuit Connection Example



Notes:

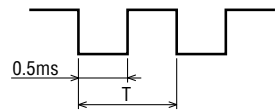
- The signal output is Open Collector Output.
- Use the power supply of 26.4 VDC or less to connect the limit resistance (R) so that output current does not exceed 10 mA.

SPEED Output

The speed output signal is synchronized with the motor speed. The system outputs pulses (with a width of approximately 0.5 ms) at a rate of 30 pulses per rotation of the motor output shaft. You can measure the speed output frequency and calculate motor speed.

$$\text{Motor Speed (r/min)} = \frac{\text{SPEED Output Frequency [Hz]}}{30} \times 60$$

$$\text{SPEED Output Frequency (Hz)} = \frac{1}{T}$$



To check the reduced motor speed visually (the speed at the motor output shaft or at the gearhead output shaft), connect a speed indicator **SDM496** (sold separately). Speed Indicator → Page A-214

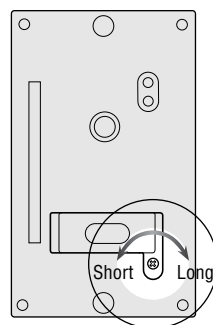
Notes for Connection:

- When you want to extend the input/output signal cable, the length must not exceed 6.6ft. (2m). The cable should be as short as possible in order to minimize noise.
- Signal wires and motor wires should be kept away from equipment, power cables and other sources of magnetic noise.

● Setting the Acceleration/Deceleration Time

The motor accelerates slowly when it starts up and decelerates slowly when it stops. This acceleration/ deceleration time can be set within the range from 0.5 to 10 sec (2000 r/min without load). The time can be set using the acceleration/deceleration potentiometer. Remove the front panel of control unit to access the potentiometer.

\* The figure shows the control unit with the front panel removed.



Acceleration/Deceleration time setting potentiometer

Time is increased by turning the switch clockwise. Use an insulated Phillips Screwdriver for this operation. The shortest time is selected at the time of shipment.

## List of Motor and Control Unit Combinations

### Pinion Shaft Type

Output Power		Model	Motor Model	Control Unit Model
HP	W			
1/75	10	<b>AXU210A-GN</b>	AXUM210-GN	AXUD10A
		<b>AXU210C-GN</b>		AXUD10C
		<b>AXU210S-GN</b>		AXUD10S
1/30	25	<b>AXU425A-GN</b>	AXUM425-GN	AXUD25A
		<b>AXU425C-GN</b>		AXUD25C
		<b>AXU425S-GN</b>		AXUD25S
1/19	40	<b>AXU540A-GN</b>	AXUM540-GN	AXUD40A
		<b>AXU540C-GN</b>		AXUD40C
		<b>AXU540S-GN</b>		AXUD40S
1/8	90	<b>AXU590A-GU</b>	AXUM590-GU	AXUD90A
		<b>AXU590C-GU</b>		AXUD90C
		<b>AXU590S-GU</b>		AXUD90S

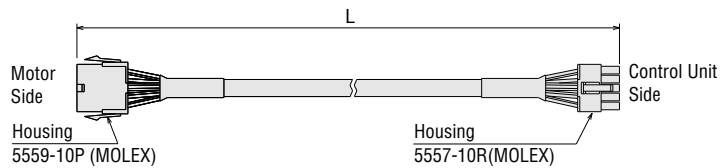
### Round Shaft Type

Output Power		Model	Motor Model	Control Unit Model
HP	W			
1/75	10	<b>AXU210A-A</b>	AXUM210-A	AXUD10A
		<b>AXU210C-A</b>		AXUD10C
		<b>AXU210S-A</b>		AXUD10S
1/30	25	<b>AXU425A-A</b>	AXUM425-A	AXUD25A
		<b>AXU425C-A</b>		AXUD25C
		<b>AXU425S-A</b>		AXUD25S
1/19	40	<b>AXU540A-A</b>	AXUM540-A	AXUD40A
		<b>AXU540C-A</b>		AXUD40C
		<b>AXU540S-A</b>		AXUD40S
1/8	90	<b>AXU590A-A</b>	AXUM590-A	AXUD90A
		<b>AXU590C-A</b>		AXUD90C
		<b>AXU590S-A</b>		AXUD90S

## Accessories (Sold Separately)

### Extension Cables

Model	Length: L [ft. (m)]
<b>CC01AXU</b>	3.3 (1)
<b>CC02AXU</b>	6.6 (2)
<b>CC03AXU</b>	9.8 (3)
<b>CC05AXU</b>	16.4 (5)
<b>CC10AXU</b>	32.8 (10)



- Maximum extension length is 34.4 ft. (10.5m).