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, ±1% maximum with voltage and ±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**

<table>
<thead>
<tr>
<th>Standards</th>
<th>Certification Body</th>
<th>Standards File No.</th>
<th>CE Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UL1950</td>
<td>UL</td>
<td>E208200</td>
<td></td>
</tr>
<tr>
<td>CSA C22.2 No.950</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>EN60050</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN60034-1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>EN60034-5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UL508C</td>
<td>UL</td>
<td>E171462</td>
<td></td>
</tr>
<tr>
<td>CSA C22.2 No.14</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>EN60950</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN50178</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

  - Low Voltage Directives
  - EMC Directives

  ● 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 6-2
  ● 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.
The system configuration shown is an example. Other configurations are available.

### System Configuration

#### Product Number Code

**Motor and Control Unit**

**AXU 4 25 A - GN**

- **Shaft Type**
  - **GN**: Pinion Shaft (for use with GN gearhead)
  - **GU**: Pinion Shaft (for use with GU gearhead)
  - **A**: Round Shaft

- **Voltage**
  - **A**: Single-Phase 100-115 V AC
  - **C**: Single-Phase 200-230 V AC
  - **S**: Three-Phase 200-230 V AC

- **Output Power**
  - **10**: 10 W (1/75 HP)
  - **25**: 25 W (1/30 HP)
  - **50**: 50 W (2/30 HP)
  - **100**: 100 W (3/8 HP)
  - **150**: 150 W (3/4 HP)
  - **180**: 180 W (1 HP)

- **Motor Frame Size**
  - 2: 2.36 in. sq. (60 mm sq.)
  - 4: 3.15 in. sq. (80 mm sq.)
  - 5: 3.54 in. sq. (90 mm sq.)

#### Product Line

**AXU Series**

<table>
<thead>
<tr>
<th>Output Power</th>
<th>Power Supply Voltage</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/75 10</td>
<td>Single-Phase 100-115 V</td>
<td>AXU210A-GN, AXU210A-A</td>
</tr>
<tr>
<td></td>
<td>Single-Phase 200-230 V</td>
<td>AXU210C-GN, AXU210C-A</td>
</tr>
<tr>
<td></td>
<td>Three-Phase 200-230 V</td>
<td>AXU210S-GN, AXU210S-A</td>
</tr>
<tr>
<td>1/2 10</td>
<td>Single-Phase 100-115 V</td>
<td>AXU590A-GN, AXU590A-A</td>
</tr>
<tr>
<td></td>
<td>Single-Phase 200-230 V</td>
<td>AXU590C-GN, AXU590C-A</td>
</tr>
<tr>
<td></td>
<td>Three-Phase 200-230 V</td>
<td>AXU590S-GN, AXU590S-A</td>
</tr>
</tbody>
</table>

#### Gearhead

**4 GN 50 KA**

- **Type of Bearings and Shaft Size**
  - **KA**: Ball bearing type and inch-sized output shaft
  - **KHA**: Ball bearing type and inch-sized output shaft for higher torque

- **Gear Ratio**
  - **50**: Gear ratio of 50:1
  - **10X**: Denotes decimal gearhead with 10:1 gear ratio

- **Gearhead Frame Size**
  - 2: 2.36 in. sq. (60 mm sq.)
  - 4: 3.15 in. sq. (80 mm sq.)
  - 5: 3.54 in. sq. (90 mm sq.)

- **Gearheads must match the motor installation dimensions and shaft type.**

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Enter the appropriate gear ratio in the box ( ) within the gearhead model name.
### Specifications

<table>
<thead>
<tr>
<th>Package Model</th>
<th>Pinion Shaft Type</th>
<th>Round Shaft Type</th>
<th>AXU210A-GN</th>
<th>AXU210C-GN</th>
<th>AXU210S-GN</th>
<th>AXU425A-GN</th>
<th>AXU425C-GN</th>
<th>AXU425S-GN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>AXU210A-A</td>
<td>AXU210C-A</td>
<td>AXU210S-A</td>
<td>AXU425A-A</td>
<td>AXU425C-A</td>
<td>AXU425S-A</td>
</tr>
<tr>
<td>Rated Output Power</td>
<td>HP (W)</td>
<td>1/75 (10)</td>
<td>1/30 (25)</td>
<td>1/30 (25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>Single-Phase</td>
<td>100-115 VAC ±10%</td>
<td>200-230 VAC ±10%</td>
<td>200-230 VAC ±10%</td>
<td>200-230 VAC ±10%</td>
<td>200-230 VAC ±10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td>50/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Input Current</td>
<td>A</td>
<td>0.7</td>
<td>0.4</td>
<td>0.25</td>
<td>1.1</td>
<td>0.65</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Maximum Input Current</td>
<td>A</td>
<td>1.2</td>
<td>0.8</td>
<td>0.6</td>
<td>1.9</td>
<td>1.2</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Rated Torque</td>
<td>oz-in (N·m)</td>
<td>7.1 (0.05)</td>
<td>17.7 (0.125)</td>
<td>21 (0.15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starting Torque</td>
<td>oz-in (N·m)</td>
<td>8.5 (0.06)</td>
<td></td>
<td>21 (0.15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible Load Inertia J</td>
<td>oz-in² (×10 kg·m²)</td>
<td>2.7 (0.5)</td>
<td></td>
<td>9.6 (1.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Speed</td>
<td>r/min</td>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable Speed Range</td>
<td>r/min</td>
<td>100–2000 (speed ratio 20:1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Power Source

- 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)

### Common Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleration/Deceleration Time</td>
<td>0.5–10 sec. (at 2,000 r/min with no load) set by a potentiometer</td>
</tr>
<tr>
<td>Speed Control Method</td>
<td>Speed potentiometer on front panel</td>
</tr>
<tr>
<td>Input Signal</td>
<td>Photocoupler Input, Input Impedance 2 kΩ, Operated by internal power supply</td>
</tr>
<tr>
<td></td>
<td>Common Clockwise (CW) and Counterclockwise (CCW) Inputs</td>
</tr>
<tr>
<td>Output Signal</td>
<td>Open Collector Output, External Use Condition 26.4 VDC, 10 mA Max.</td>
</tr>
<tr>
<td></td>
<td>Speed Signal Output (SPEED OUT) 30 P/R, Alarm Signal Output (ALARM OUT)</td>
</tr>
</tbody>
</table>

#### Protection Functions

- When the following are activated, the alarm signal will be output and the motor will come to a stop:
  - **Overload Protection**: Activated when the motor load exceeds rated torque for a minimum of 5 seconds.
  - **Overvoltage Protection**: Activated when the voltage applied to the control unit exceeds 115 VAC or 230 VAC by a minimum of 20%.
  - **Out-of-Phase Protection**: Activated when the sensor wire inside the motor cable is disconnected during motor operation.
  - **Undervoltage Protection**: Activated when the voltage applied to the control unit falls below 100 VAC or 200 VAC by a minimum of 30%.
  - **Overspeed Protection**: Activated when the speed exceeds 2800 r/min.

#### Motor Insulation Class

- Class E (248°F [120°C])

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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

<table>
<thead>
<tr>
<th>Item</th>
<th>Motor</th>
<th>Control Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation Resistance</td>
<td>100 MΩ or more when 500 VDC megger is applied between the windings and the frame.</td>
<td>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.</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>Sufficient to withstand 1.5 kVAC at 50 Hz applied between the windings and the frame for 1 minute.</td>
<td>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.</td>
</tr>
<tr>
<td>Operating Environment</td>
<td>32°F<del>122°F (0°C</del>+50°C) (nonfreezing)</td>
<td>32°F<del>104°F (0°C</del>+40°C) (nonfreezing)</td>
</tr>
<tr>
<td>Humidity</td>
<td>85% maximum (noncondensing)</td>
<td></td>
</tr>
<tr>
<td>Conditions</td>
<td>No corrosive gases or dust</td>
<td></td>
</tr>
<tr>
<td>Degree of Protection</td>
<td>IP65 (except for the mounting surface)</td>
<td>IP10</td>
</tr>
</tbody>
</table>

- 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
- AXU540-A: 7.87 in. × 7.87 in. (200 mm × 200 mm), 0.20 in. (5 mm) thick
- AXU425-A: 8.50 in. × 8.50 in. (215 mm × 215 mm), 0.20 in. (5 mm) thick
- AXU590-A: 8.77 in. × 8.77 in. (222 mm × 222 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— decal Gearhead

Maximum Torque When Using a Decimal Gearhead

- 2GNKA with 2GN10XX: 26 lb-in (3 N-m)
- 4GNKA with 4GN10XX: 70 lb-in (8 N-m)
- All gear ratios except 25.1, 30.1, 36.1: 53 lb-in (6 N-m)

<table>
<thead>
<tr>
<th>Model</th>
<th>Speed Range r/min</th>
<th>Gear Ratio</th>
<th>Permissible Overhang Load</th>
<th>Permissible Thrust Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXU210A-GN</td>
<td>667</td>
<td>3.6</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td>AXU210C-GN</td>
<td>556</td>
<td>5.5</td>
<td>20</td>
<td>28</td>
</tr>
<tr>
<td>AXU210S-GN</td>
<td>400</td>
<td>21.5</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>AXU425A-GN</td>
<td>333</td>
<td>12.5</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>AXU425C-GN</td>
<td>160</td>
<td>11.5</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>AXU425S-GN</td>
<td>133</td>
<td>7.5</td>
<td>5.6</td>
<td>6</td>
</tr>
<tr>
<td>AXU540A-GN</td>
<td>111</td>
<td>3.5</td>
<td>6.7</td>
<td>4</td>
</tr>
<tr>
<td>AXU540C-GN</td>
<td>80</td>
<td>3</td>
<td>7.87</td>
<td>5.9</td>
</tr>
<tr>
<td>AXU540S-GN</td>
<td>67</td>
<td>11.5</td>
<td>7.87</td>
<td>5.9</td>
</tr>
<tr>
<td>AXU590A-GU</td>
<td>11.5</td>
<td>12.5</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>AXU590C-GU</td>
<td>15.9</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>AXU590S-GU</td>
<td>15.9</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
</tr>
</tbody>
</table>

- 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 Overhang Load and Permissible Thrust Load

#### Gearheads

<table>
<thead>
<tr>
<th>Model</th>
<th>Gear Ratio</th>
<th>Permissible Overhang Load</th>
<th>Permissible Thrust Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.39 in. (10 mm) from shaft end</td>
<td>0.79 in. (20 mm) from shaft end</td>
</tr>
<tr>
<td></td>
<td>lb.</td>
<td>N</td>
<td>lb.</td>
</tr>
</tbody>
</table>

- 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

<table>
<thead>
<tr>
<th>Model</th>
<th>Permissible Overhung Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.39 in. (10 mm) from shaft end</td>
</tr>
<tr>
<td></td>
<td>lb.</td>
</tr>
<tr>
<td>AXU210-A</td>
<td>15.7</td>
</tr>
<tr>
<td>AXU425-A</td>
<td>27</td>
</tr>
<tr>
<td>AXU540-A</td>
<td>36</td>
</tr>
<tr>
<td>AXU590-A</td>
<td>36</td>
</tr>
</tbody>
</table>

- 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

<table>
<thead>
<tr>
<th>Model</th>
<th>Gearhead</th>
<th>Motor/Gearhead</th>
<th>Gear Ratio</th>
<th>3</th>
<th>3.6</th>
<th>5</th>
<th>6</th>
<th>7.5</th>
<th>9</th>
<th>12.5</th>
<th>15</th>
<th>18</th>
<th>25</th>
<th>30</th>
<th>36</th>
<th>50</th>
<th>60</th>
<th>75</th>
<th>90</th>
<th>100</th>
<th>120</th>
<th>150</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXU210-GN/2GN</td>
<td>AXU210A-GN/AXU210C-GN/AXU210S-GN</td>
<td>AXU210-A/AXU210C-A/AXU210S-A</td>
<td>3.1</td>
<td>4.4</td>
<td>8.5</td>
<td>12.2</td>
<td>22.1</td>
<td>19.1</td>
<td>27</td>
<td>53</td>
<td>6.9</td>
<td>14</td>
<td>21</td>
<td>10</td>
<td>21</td>
<td>30</td>
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<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>AXU540-GN/5GN</td>
<td>AXU210A-GN/AXU210C-GN/AXU210S-GN</td>
<td>AXU210-A/AXU210C-A/AXU210S-A</td>
<td>19.7</td>
<td>28</td>
<td>55</td>
<td>79</td>
<td>123</td>
<td>14.4</td>
<td>22.5</td>
<td>32.4</td>
<td>40.9</td>
<td>710</td>
<td>1370</td>
<td>1970</td>
<td>2800</td>
<td>360</td>
<td>518</td>
<td>850</td>
<td>1230</td>
<td>1770</td>
<td>2250</td>
<td>3000</td>
<td>4000</td>
</tr>
<tr>
<td>AXU590-GU/5GU</td>
<td>AXU590-GN/AXU590C-GN/AXU590S-GN</td>
<td>AXU590-A/AXU590C-A/AXU590S-A</td>
<td>49</td>
<td>71</td>
<td>137</td>
<td>197</td>
<td>310</td>
<td>40.9</td>
<td>61.3</td>
<td>80</td>
<td>1230</td>
<td>1770</td>
<td>2250</td>
<td>3000</td>
<td>3900</td>
<td>4900</td>
<td>4900</td>
<td>5500</td>
<td>7100</td>
<td>1296</td>
<td>2500</td>
<td>3000</td>
<td>3600</td>
</tr>
</tbody>
</table>

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

### Speed–Torque Characteristics

#### AXU210A-GN/AXU210C-GN/AXU210S-GN

- **Continuous Duty Region**
- **Starting Torque**
- **Limited Duty Region**
- **Rated Torque**

#### AXU425A-GN/AXU425C-GN/AXU425S-GN

- **Continuous Duty Region**
- **Starting Torque**
- **Limited Duty Region**
- **Rated Torque**

#### AXU540A-GN/AXU540C-GN/AXU540S-GN

- **Continuous Duty Region**
- **Starting Torque**
- **Limited Duty Region**
- **Rated Torque**

#### AXU590A-GN/AXU590C-GN/AXU590S-GN

- **Continuous Duty Region**
- **Starting Torque**
- **Limited Duty Region**
- **Rated Torque**
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
2GN3KA-GN
Weight: 1.1 lb. (0.5 kg) / Weight: 0.88 lb. (0.4 kg)

- AXF A289AU (2GN3KA-18KA)
- A289BU (2GN25KA-180KA)

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

Motor: AXU210A-A, AXU210C-A, AXU210S-A
Gearhead: AXUM210-GN
Weight: 1.1 lb. (0.5 kg)

- AXF A316

Decimal Gearhead
(Can be connected to AXU210GN pinion shaft type.)

2GN10XK
Weight: 0.44 lb. (0.2 kg)

- AXF A003

Motor/Gearhead
AXU425A-GN, AXU425C-GN, AXU425S-GN Pinion Shaft Type

Motor
AXUM425-GN
Gearhead
4GN3KA-GN
Weight: 1.76 lb. (0.8 kg) / Weight: 1.43 lb. (0.65 kg)

- AXF A291AU (4GN3KA-18KA)
- A291BU (4GN25KA-180KA)

- AXF A403

Systems
DC Input
AXU
BHF
US
Control
Motor Systems
DC Motor Systems
Motor Systems
Control Systems
**Round Shaft Type**

**AXU425A-A, AXU425C-A, AXU425S-A**
- **Round Shaft Type**
- **Motor:** AXU425-A
- **Weight:** 1.76 lb. (0.8 kg)

**Decimal Gearhead**

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

**4GN10XK**
- **Weight:** 0.88 lb. (0.4 kg)

**Motor/Gearhead**

**AXU540A-GN, AXU540C-GN, AXU540S-GN**
- **Pinion Shaft Type**
- **Motor:** AXU540A-GN
- **Weight:** 3.1 lb. (1.4 kg)
- **Gearhead:** AXUM540-GN
- **Weight:** 1.76 lb. (0.8 kg)

**Round Shaft Type**

**AXU425A-A, AXU425C-A, AXU425S-A**
- **Round Shaft Type**
- **Motor:** AXU425A-A
- **Weight:** 3.1 lb. (1.4 kg)

**Decimal Gearhead**

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

**5GN10XK**
- **Weight:** 1.32 lb. (0.6 kg)
Motor/Gearhead
AXUS590A-GU, AXUS590C-GU, AXUS590S-GU Pinion Shaft Type

Motor
AXUM590-GU
Weight: 3.1 lb. (1.4 kg)

Gearhead
SGU10XK
Weight: 3.3 lb. (1.5 kg)

AXUM590-GU
AXU590A-GU, AXU590C-GU, AXU590S-GU

Intrusion Protection: 4.2 lb. (1.9 kg)

Dimensions
Motor: AXUM590-GU

AXU590A-GU, AXU590C-GU, AXU590S-GU

Round Shaft Type
AXUS590A, AXUS590C, AXUS590S-A Round Shaft Type
Motor: AXUM590-A

Weight: 3.1 lb. (1.4 kg)

Round Shaft Type
AXUS590A-A, AXUS590C-A, AXUS590S-A

High-Power Type Gearhead
SGU10XK (For AXUS590GU type)
Weight: 4.2 lb. (1.9 kg)

Key and Key Slot (Scale 1/2)
The key is provided with the gearhead.

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)

Control Unit Panel Cut-Out

Connection Cable (included)

For single-phase: 3 wires (2 – UL Style 3266, AWG20/1-UL Style 3266, AWG 18)
For three-phase: 4 wires (3 – UL Style 3266, AWG20/1-UL Style 3266, AWG 18)
Connection and Operation

Names and Functions of Control Unit

Motor Connection

Insert the motor cable connector into the motor connector (MOTOR) on the control unit. Insert 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.

CW Rotation

CCW Rotation

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**

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

**Input Circuit Connection Example**

Set the RUN/STAND-BY switch to the “RUN” position.

- Small-capacity switch and relay

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

**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.

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

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](Page A-214) (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 6.6 ft. (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

<table>
<thead>
<tr>
<th>Output Power</th>
<th>Model</th>
<th>Motor Model</th>
<th>Control Unit Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/75</td>
<td>AXU210A-GN</td>
<td>AXUM210-GN</td>
<td>AXUD10A</td>
</tr>
<tr>
<td></td>
<td>AXU210C-GN</td>
<td>AXUM210-C</td>
<td>AXUD10C</td>
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<tr>
<td></td>
<td>AXU210S-GN</td>
<td>AXUM210-S</td>
<td>AXUD10S</td>
</tr>
<tr>
<td>1/30</td>
<td>AXU425A-GN</td>
<td>AXUM425-GN</td>
<td>AXUD25A</td>
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<tr>
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<td>AXU425C-GN</td>
<td>AXUM425-C</td>
<td>AXUD25C</td>
</tr>
<tr>
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<td>AXU425S-GN</td>
<td>AXUM425-S</td>
<td>AXUD25S</td>
</tr>
<tr>
<td>1/19</td>
<td>AXU540A-GN</td>
<td>AXUM540-GN</td>
<td>AXUD40A</td>
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<tr>
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#### Round Shaft Type

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<th>Control Unit Model</th>
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<td>AXU590S-A</td>
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### Accessories (Sold Separately)

#### Extension Cables

<table>
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<td>3.3 (1)</td>
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<tr>
<td>CC02AXU</td>
<td>6.6 (2)</td>
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<tr>
<td>CC03AXU</td>
<td>9.8 (3)</td>
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<tr>
<td>CC05AXU</td>
<td>16.4 (5)</td>
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<tr>
<td>CC10AXU</td>
<td>32.8 (10)</td>
</tr>
</tbody>
</table>

![Diagram](Image)  
- Maximum extension length is 34.4 ft. (10.5m).