

# AXD-ERA SERIES

- ▶ Absolute encoder (BiSS-C)
- ▶ Strong resistance to contamination
- ▶ Direct drive brushless motor
- ▶ Low cogging torque
- ▶ Optional for low speed and high speed windings
- ▶ High torque density

EN-25.9.1

## Introduction

The AXD-ERA series represents a type of iron core motor featuring an absolute encoder utilizing the BiSS-C protocol.

One of its advantages over the AXD series is the absolute encoder, which provides accurate position information even in the event of power loss.

With a repeatability of  $\pm 1.5$  arcsec (where 1 arcsec equals  $1/3600$  degree), the motor delivers a high level of precision. Its accuracy can range from  $\pm 15$  arcsec (without error mapping) to  $\pm 3$  arcsec (with error mapping).

And besides, the resistance to contamination and reliability of motor is improved tremendously by innovative design. Despite slight pollution in certain environments, the motor is capable of operating normally.

This feature makes it suitable for a wide range of applications where  $\pm 15$  arcsec of absolute positioning accuracy can be achieved without error compensation.

Continuous Torque  $T_{cn} = 3.4\text{Nm} \sim 250.6\text{Nm}$






Peak Torque  $T_{pk} = 10\text{Nm} \sim 648.9\text{Nm}$

## Features

- ▶ Absolute encoder (BiSS-C)
- ▶ Strong resistance to contamination
- ▶ Direct drive brushless motor
- ▶ Low cogging torque
- ▶ Optional for low speed and high speed windings
- ▶ High torque density

## Applications

It is suitable for all kinds of industrial applications, even though in some slightly polluted environment that involves dust and oil. It is also suitable for application that requires absolute encoder with high repeatability and accuracy requirement without error mapping.

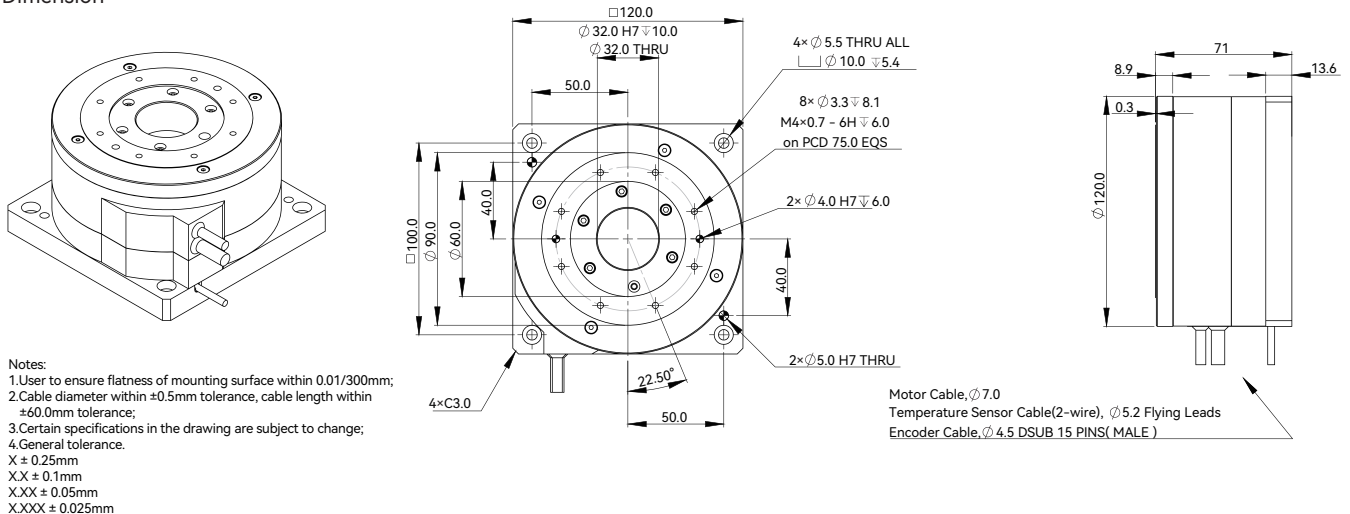
|                                                                                     | Model      | Diameter<br>(mm) | Height<br>(mm) | Continuous Torque( $T_{cn}$ ) / Peak Torque( $T_{pk}$ ) |    |     |               |     |     | Unit: Nm |
|-------------------------------------------------------------------------------------|------------|------------------|----------------|---------------------------------------------------------|----|-----|---------------|-----|-----|----------|
|                                                                                     |            |                  |                | 10                                                      | 50 | 100 | 200           | 300 | 400 | ....     |
|  | AXD120-ERA | 120              | 71             | 3.4 / 10                                                |    |     |               |     |     |          |
|  | AXD160-ERA | 160              | 77             | 9.4 / 27                                                |    |     |               |     |     |          |
|  | AXD200-ERA | 200              | 87             | 18.8 / 54.3                                             |    |     |               |     |     |          |
|  | AXD280-ERA | 280              | 100            | 51.1 / 150.3                                            |    |     |               |     |     |          |
|  | AXD400-ERA | 400              | 180            |                                                         |    |     | 250.6 / 648.9 |     |     |          |

## AXD120-71

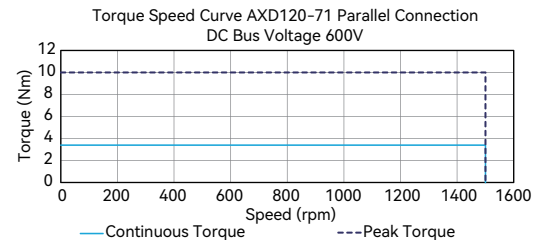
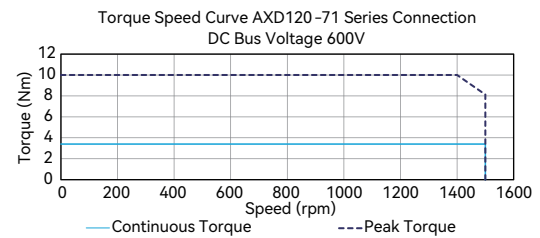
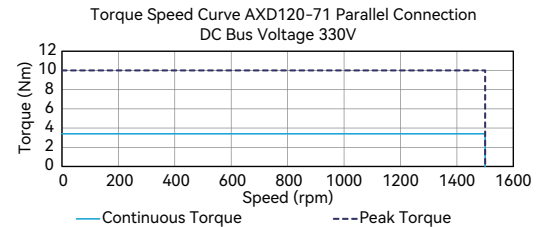
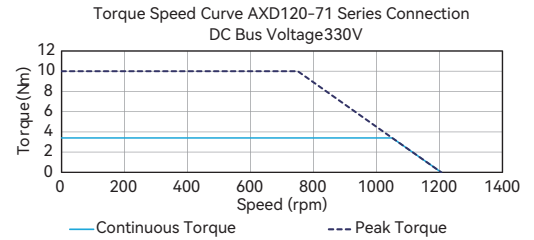
| AXD120-71                                             |           |                  |                                                                                      |          |
|-------------------------------------------------------|-----------|------------------|--------------------------------------------------------------------------------------|----------|
| Performance Parameters                                |           | Symbol           | Unit                                                                                 | Series   |
| Continuous Torque (NC) @100°C <sup>①</sup>            |           | T <sub>cn</sub>  | Nm                                                                                   | 3.4      |
| Peak Torque                                           |           | T <sub>pk</sub>  | Nm                                                                                   | 10.0     |
| Torque Constant ±10%                                  |           | K <sub>t</sub>   | Nm/Arms                                                                              | 3.0      |
| Back EMF Constant ±10%                                |           | K <sub>e</sub>   | Vpeak/rpm                                                                            | 0.26     |
| Motor Constant @25°C                                  |           | K <sub>m</sub>   | Nm/Sqrt(W)                                                                           | 0.64     |
| Resistance (L-L) @25°C ±10% <sup>②</sup>              |           | R <sub>25</sub>  | Ω                                                                                    | 15.2     |
| Inductance (L-L) ±20% <sup>③</sup>                    |           | L                | mH                                                                                   | 47.7     |
| Electrical Time Constant                              |           | τ <sub>e</sub>   | ms                                                                                   | 3.1      |
| Continuous Current (NC) @100°C <sup>①</sup>           |           | I <sub>cn</sub>  | Arms                                                                                 | 1.1      |
| Peak Current                                          |           | I <sub>pk</sub>  | Arms                                                                                 | 3.9      |
| Continuous Power Dissipation (NC) @100°C <sup>①</sup> |           | P <sub>cn</sub>  | W                                                                                    | 36.4     |
| Max. Coil Temperature                                 |           | T <sub>max</sub> | °C                                                                                   | 100      |
| Thermal Dissipation Constant (NC) <sup>①</sup>        |           | K <sub>thn</sub> | W/°C                                                                                 | 0.5      |
| Max. Bus Voltage                                      |           | U <sub>bus</sub> | Vdc                                                                                  | 600      |
| Pole Number                                           |           | 2p               | -                                                                                    | 14       |
| Max. Speed @Continuous Torque <sup>④</sup>            |           | Ω <sub>max</sub> | rpm                                                                                  | 1500     |
| Max. Speed @Peak Torque <sup>⑤</sup>                  |           | Ω <sub>max</sub> | rpm                                                                                  | 1400     |
| Mechanical Parameters                                 |           |                  |                                                                                      |          |
| Overall Mass (NC)                                     |           | m <sub>n</sub>   | kg                                                                                   | 3.1      |
| Rotor Inertia                                         |           | J <sub>r</sub>   | kg·m <sup>2</sup>                                                                    | 1.18E-03 |
| Axial Runout <sup>⑥</sup>                             |           | -                | μm                                                                                   | 20(10)   |
| Radial Runout <sup>⑥</sup>                            |           | -                | μm                                                                                   | 20(10)   |
| Max. Axial Load (Upright Mounting) <sup>⑦</sup>       |           | -                | N                                                                                    | 500      |
| Max. Axial Load (Inverted / Wall Mounting)            |           | -                | N                                                                                    | 150      |
| Max. Moment Load (Upright Mounting)                   |           | -                | Nm                                                                                   | 30       |
| Max. Moment Load (Inverted / Wall Mounting)           |           | -                | Nm                                                                                   | 10       |
| Encoder Parameters                                    |           |                  |                                                                                      |          |
| Absolute Encoder                                      |           | -                | bit                                                                                  | 23       |
| Communication Protocol                                |           | -                | -                                                                                    | BiSS-C   |
| Accuracy after Error Mapping <sup>⑦</sup>             |           | -                | arc sec                                                                              | ±4(±3)   |
| Accuracy without Error Mapping <sup>⑦</sup>           |           | -                | arc sec                                                                              | ±20(±15) |
| Repeatability <sup>⑦</sup>                            |           | -                | arc sec                                                                              | ±2(±1.5) |
| Other Information                                     |           |                  |                                                                                      |          |
| Insulation Class                                      |           |                  | Class B (130°C)                                                                      |          |
| Protection Grade                                      |           |                  | IP40                                                                                 |          |
| Compliance with Global Standards                      |           |                  | RoHS, CE                                                                             |          |
| Ambient Temperature                                   | Operation |                  | 0°C to 40°C (non-freezing)                                                           |          |
|                                                       | Storage   |                  | -15°C to 70°C (non-freezing)                                                         |          |
| Ambient Humidity                                      | Operation |                  | 10%RH to 80%RH (non-condensing)                                                      |          |
|                                                       | Storage   |                  | 10%RH to 90%RH (non-condensing)                                                      |          |
| Recommended Ambience                                  |           |                  | Indoor (no direct sunlight);<br>No corrosive gas, inflammable gas, oil mist or dust. |          |

- ① Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.  
 ② Resistance is measured by DC current with standard 0.5m cable.  
 ③ Inductance is measured by current frequency of 1 kHz.  
 ④ The value is based on absolute encoder under max. bus voltage.  
 ⑤ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).  
 ⑥ Please refer to the illustration for different mountings.  
 ⑦ The value outside the parenthesis is based on absolute encoder (S405) with the standard runout. The value in parenthesis is based on absolute encoder (S305) with the standard runout.  
 The contents of datasheet are subject to change without prior notice.

### Dimension



### Torque-Speed Curve



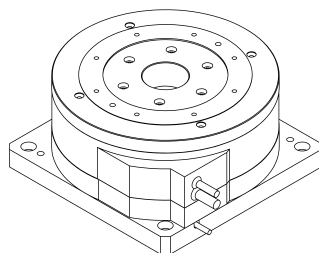
# AXD160-77

| AXD160-77                                             |           |                  |                                                                                      |          |
|-------------------------------------------------------|-----------|------------------|--------------------------------------------------------------------------------------|----------|
| Performance Parameters                                |           | Symbol           | Unit                                                                                 | Series   |
| Continuous Torque (NC) @100°C <sup>①</sup>            |           | T <sub>cn</sub>  | Nm                                                                                   | 9.4      |
| Peak Torque                                           |           | T <sub>pk</sub>  | Nm                                                                                   | 27.0     |
| Torque Constant ±10%                                  |           | K <sub>t</sub>   | Nm/Arms                                                                              | 5.8      |
| Back EMF Constant ±10%                                |           | K <sub>e</sub>   | Vpeak/rpm                                                                            | 0.50     |
| Motor Constant @25°C                                  |           | K <sub>m</sub>   | Nm/Sqrt(W)                                                                           | 1.24     |
| Resistance (L-L) @25°C ±10% <sup>②</sup>              |           | R <sub>25</sub>  | Ω                                                                                    | 14.9     |
| Inductance (L-L) ±20% <sup>③</sup>                    |           | L                | mH                                                                                   | 92.1     |
| Electrical Time Constant                              |           | τ <sub>e</sub>   | ms                                                                                   | 6.2      |
| Continuous Current (NC) @100°C <sup>①</sup>           |           | I <sub>cn</sub>  | Arms                                                                                 | 1.6      |
| Peak Current                                          |           | I <sub>pk</sub>  | Arms                                                                                 | 5.8      |
| Continuous Power Dissipation (NC) @100°C <sup>①</sup> |           | P <sub>cn</sub>  | W                                                                                    | 74.0     |
| Max. Coil Temperature                                 |           | T <sub>max</sub> | °C                                                                                   | 100      |
| Thermal Dissipation Constant (NC) <sup>①</sup>        |           | K <sub>thn</sub> | W/°C                                                                                 | 1.0      |
| Max. Bus Voltage                                      |           | U <sub>bus</sub> | Vdc                                                                                  | 600      |
| Pole Number                                           |           | 2p               | -                                                                                    | 14       |
| Max. Speed @Continuous Torque <sup>④</sup>            |           | Ω <sub>max</sub> | rpm                                                                                  | 850      |
| Max. Speed @Peak Torque <sup>④</sup>                  |           | Ω <sub>max</sub> | rpm                                                                                  | 550      |
| Mechanical Parameters                                 |           |                  |                                                                                      |          |
| Overall Mass (NC)                                     |           | m <sub>n</sub>   | kg                                                                                   | 6.1      |
| Rotor Inertia                                         |           | J <sub>r</sub>   | kg·m <sup>2</sup>                                                                    | 4.15E-03 |
| Axial Runout <sup>⑤</sup>                             |           | -                | μm                                                                                   | 30(10)   |
| Radial Runout <sup>⑤</sup>                            |           | -                | μm                                                                                   | 30(10)   |
| Max. Axial Load (Upright Mounting) <sup>⑥</sup>       |           | -                | N                                                                                    | 750      |
| Max. Axial Load (Inverted / Wall Mounting)            |           | -                | N                                                                                    | 225      |
| Max. Moment Load (Upright Mounting)                   |           | -                | Nm                                                                                   | 40       |
| Max. Moment Load (Inverted / Wall Mounting)           |           | -                | Nm                                                                                   | 12       |
| Encoder Parameters                                    |           |                  |                                                                                      |          |
| Absolute Encoder                                      |           | -                | bit                                                                                  | 23       |
| Communication Protocol                                |           | -                | -                                                                                    | BiSS-C   |
| Accuracy after Error Mapping <sup>⑦</sup>             |           | -                | arc sec                                                                              | ±4(±3)   |
| Accuracy without Error Mapping <sup>⑦</sup>           |           | -                | arc sec                                                                              | ±20(±15) |
| Repeatability <sup>⑦</sup>                            |           | -                | arc sec                                                                              | ±2(±1.5) |
| Other Information                                     |           |                  |                                                                                      |          |
| Insulation Class                                      |           |                  | Class B (130°C)                                                                      |          |
| Protection Grade                                      |           |                  | IP40                                                                                 |          |
| Compliance with Global Standards                      |           |                  | RoHS, CE                                                                             |          |
| Ambient Temperature                                   | Operation |                  | 0°C to 40°C (non-freezing)                                                           |          |
|                                                       | Storage   |                  | -15°C to 70°C (non-freezing)                                                         |          |
| Ambient Humidity                                      | Operation |                  | 10%RH to 80%RH (non-condensing)                                                      |          |
|                                                       | Storage   |                  | 10%RH to 90%RH (non-condensing)                                                      |          |
| Recommended Ambience                                  |           |                  | Indoor (no direct sunlight);<br>No corrosive gas, inflammable gas, oil mist or dust. |          |

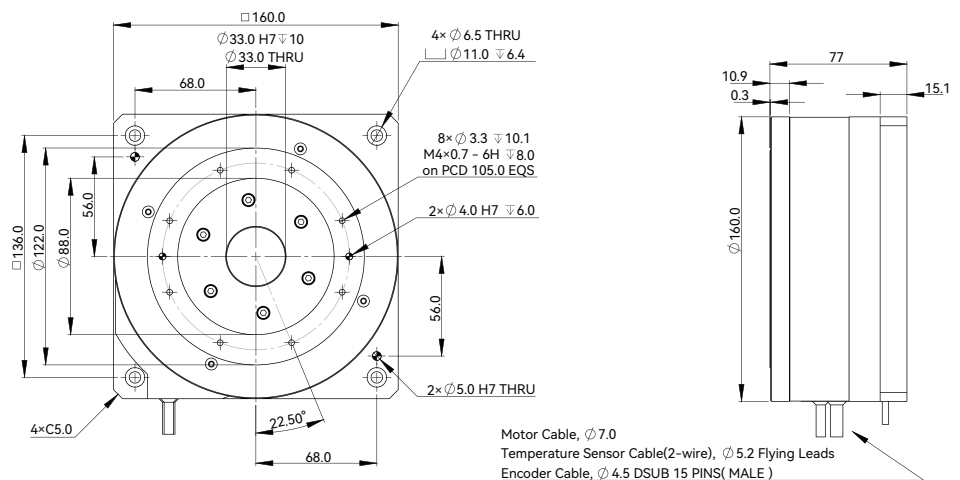
- ① Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.  
 ② Resistance is measured by DC current with standard 0.5m cable.  
 ③ Inductance is measured by current frequency of 1 kHz.  
 ④ The value is based on absolute encoder under max. bus voltage.  
 ⑤ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).  
 ⑥ Please refer to the illustration for different mountings.  
 ⑦ The value outside the parenthesis is based on absolute encoder (S405) with the standard runout. The value in parenthesis is based on absolute encoder (S305) with the standard runout.

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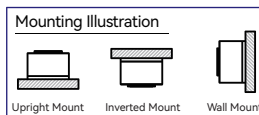
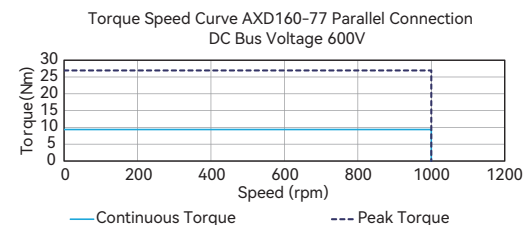
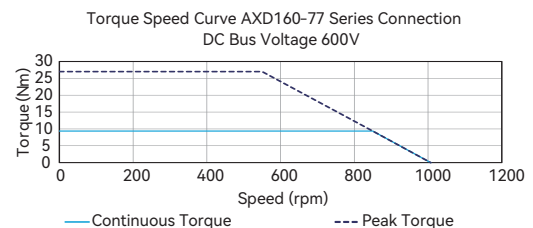
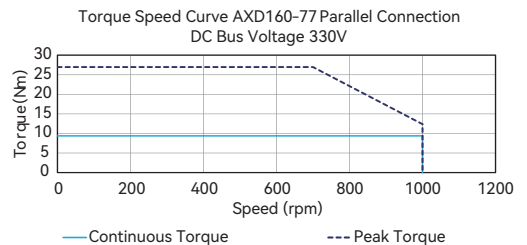
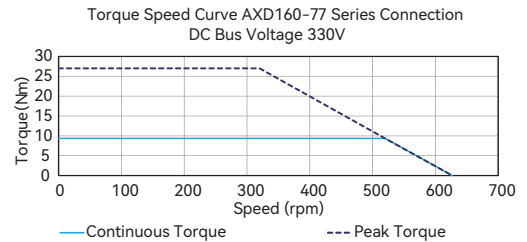
## Dimension



- Notes:  
 1. User to ensure flatness of mounting surface within 0.01/300mm;  
 2. Cable diameter within ±0.5mm tolerance, cable length within ±60.0mm tolerance;  
 3. Certain specifications in the drawing are subject to change;  
 4. General tolerance.  
 X ± 0.25mm  
 XX ± 0.1mm  
 XXX ± 0.05mm  
 XXXX ± 0.025mm



## Torque-Speed Curve



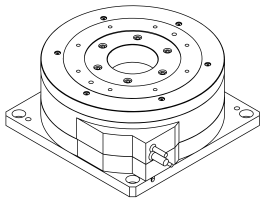
## AXD200-87

| AXD200-87                                             |                  |                                                                                      |          |          |
|-------------------------------------------------------|------------------|--------------------------------------------------------------------------------------|----------|----------|
| Performance Parameters                                | Symbol           | Unit                                                                                 | Series   | Parallel |
| Continuous Torque (NC) @100°C <sup>①</sup>            | T <sub>cn</sub>  | Nm                                                                                   | 18.8     | 18.8     |
| Peak Torque                                           | T <sub>pk</sub>  | Nm                                                                                   | 54.3     | 54.3     |
| Torque Constant ±10%                                  | K <sub>t</sub>   | Nm/Arms                                                                              | 9.4      | 4.7      |
| Back EMF Constant ±10%                                | K <sub>e</sub>   | Vpeak/rpm                                                                            | 0.81     | 0.40     |
| Motor Constant @25°C                                  | K <sub>m</sub>   | Nm/Sqrt(W)                                                                           | 2.13     | 2.13     |
| Resistance (L-L) @25°C ±10% <sup>②</sup>              | R <sub>25</sub>  | Ω                                                                                    | 13.0     | 3.3      |
| Inductance (L-L) ±20% <sup>③</sup>                    | L                | mH                                                                                   | 121.0    | 30.3     |
| Electrical Time Constant                              | τ <sub>e</sub>   | ms                                                                                   | 9.3      | 9.3      |
| Continuous Current (NC) @100°C <sup>①</sup>           | I <sub>cn</sub>  | Arms                                                                                 | 2.0      | 4.0      |
| Peak Current                                          | I <sub>pk</sub>  | Arms                                                                                 | 7.2      | 14.4     |
| Continuous Power Dissipation (NC) @100°C <sup>①</sup> | P <sub>cn</sub>  | W                                                                                    | 100.9    | 100.9    |
| Max. Coil Temperature                                 | T <sub>max</sub> | °C                                                                                   | 100      | 100      |
| Thermal Dissipation Constant (NC) <sup>①</sup>        | K <sub>thn</sub> | W/°C                                                                                 | 1.3      | 1.3      |
| Max. Bus Voltage                                      | U <sub>bus</sub> | Vdc                                                                                  | 600      | 600      |
| Pole Number                                           | 2p               | -                                                                                    | 14       | 14       |
| Max. Speed @Continuous Torque <sup>⑤</sup>            | Ω <sub>max</sub> | rpm                                                                                  | 520      | 600      |
| Max. Speed @Peak Torque <sup>⑤</sup>                  | Ω <sub>max</sub> | rpm                                                                                  | 330      | 600      |
| Mechanical Parameters                                 |                  |                                                                                      |          |          |
| Overall Mass (NC)                                     | m <sub>n</sub>   | kg                                                                                   | 9.5      | 9.5      |
| Rotor Inertia                                         | J <sub>r</sub>   | kg · m <sup>2</sup>                                                                  | 1.14E-02 | 1.14E-02 |
| Axial Runout <sup>⑥</sup>                             | -                | μm                                                                                   | 40(10)   | 40(10)   |
| Radial Runout <sup>⑥</sup>                            | -                | μm                                                                                   | 40(10)   | 40(10)   |
| Max. Axial Load (Upright Mounting) <sup>⑥</sup>       | -                | N                                                                                    | 1000     | 1000     |
| Max. Axial Load (Inverted / Wall Mounting)            | -                | N                                                                                    | 300      | 300      |
| Max. Moment Load (Upright Mounting)                   | -                | Nm                                                                                   | 50       | 50       |
| Max. Moment Load (Inverted / Wall Mounting)           | -                | Nm                                                                                   | 15       | 15       |
| Encoder Parameters                                    |                  |                                                                                      |          |          |
| Absolute Encoder                                      | -                | bit                                                                                  | 23       | 23       |
| Communication Protocol                                | -                | -                                                                                    | BiSS-C   | BiSS-C   |
| Accuracy after Error Mapping <sup>⑦</sup>             | -                | arc sec                                                                              | ±4(±3)   | ±4(±3)   |
| Accuracy without Error Mapping <sup>⑦</sup>           | -                | arc sec                                                                              | ±20(±15) | ±20(±15) |
| Repeatability <sup>⑦</sup>                            | -                | arc sec                                                                              | ±2(±1.5) | ±2(±1.5) |
| Other Information                                     |                  |                                                                                      |          |          |
| Insulation Class                                      |                  | Class B (130°C)                                                                      |          |          |
| Protection Grade                                      |                  | IP40                                                                                 |          |          |
| Compliance with Global Standards                      |                  | RoHS, CE                                                                             |          |          |
| Ambient Temperature                                   | Operation        | 0°C to 40°C (non-freezing)                                                           |          |          |
|                                                       | Storage          | -15°C to 70°C (non-freezing)                                                         |          |          |
| Ambient Humidity                                      | Operation        | 10%RH to 80%RH (non-condensing)                                                      |          |          |
|                                                       | Storage          | 10%RH to 90%RH (non-condensing)                                                      |          |          |
| Recommended Ambience                                  |                  | Indoor (no direct sunlight);<br>No corrosive gas, inflammable gas, oil mist or dust. |          |          |

- ➊ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
- ➋ Resistance is measured by DC current with standard 0.5m cable.
- ➌ Inductance is measured by current frequency of 1 kHz.
- ➍ The value is based on absolute encoder under max. bus voltage.
- ➎ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
- ➏ Please refer to the illustration for different mountings.
- ➐ The value outside the parenthesis is based on absolute encoder (S405) with the standard runout. The value in parenthesis is based on absolute encoder (S305) with the standard runout.

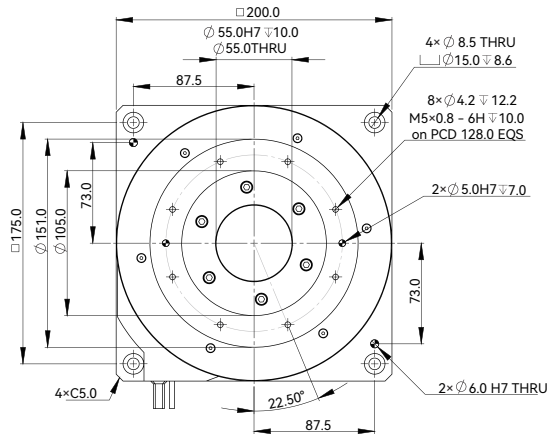
The contents of datasheet are subject to change without prior notice

## ■ Dimension



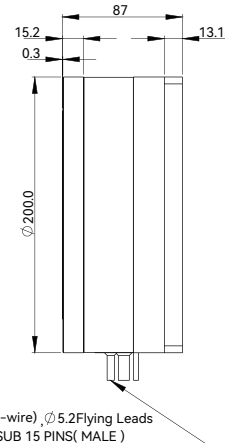
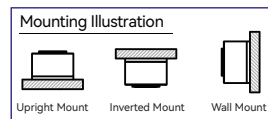
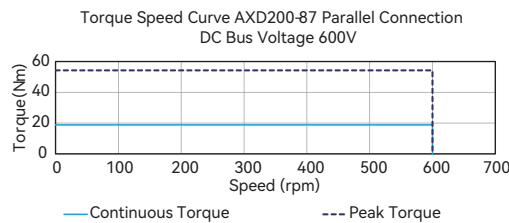
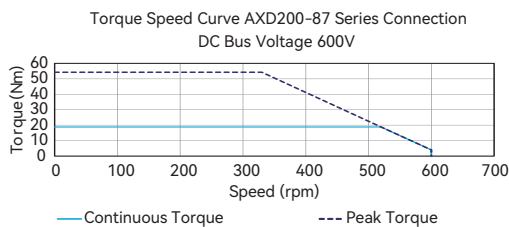
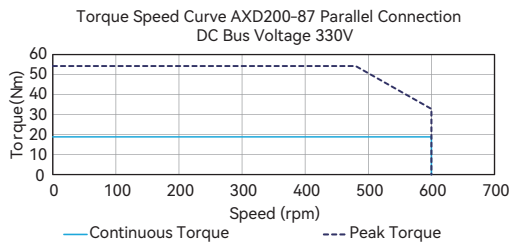
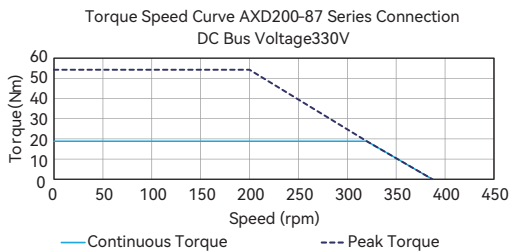
Notes:

1. User to ensure flatness of mounting surface within 0.01/300mm;
2. Cable diameter within  $\pm 0.5\text{mm}$  tolerance, cable length within  $\pm 60.0\text{mm}$  tolerance;
3. Certain specifications in the drawing are subject to change;
4. General tolerance.  
X  $\pm 0.25\text{mm}$   
XX  $\pm 0.1\text{mm}$   
XXX  $\pm 0.05\text{mm}$   
XXXX  $\pm 0.025\text{mm}$



Motor Cable,  $\varnothing 8.0$   
Temperature Sensor Cable (2-wire),  $\varnothing 5.2$  Flying Leads  
Encoder Cable, Black  $\varnothing 4.5$  DSUB 15 PINS( MALE )

- Torque-Speed Curve

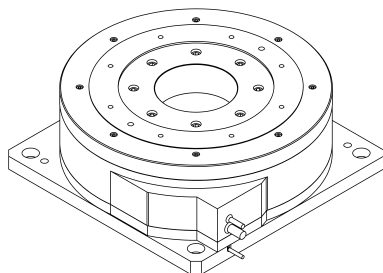


# AXD280-100

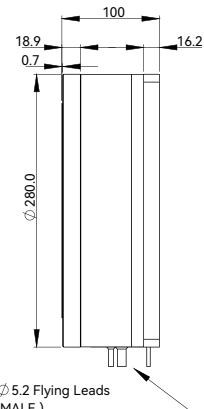
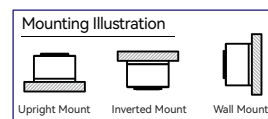
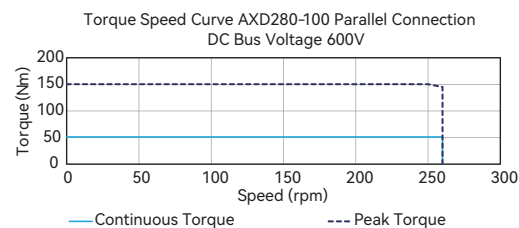
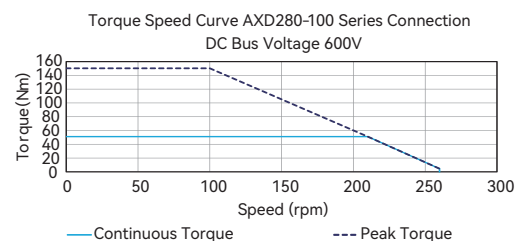
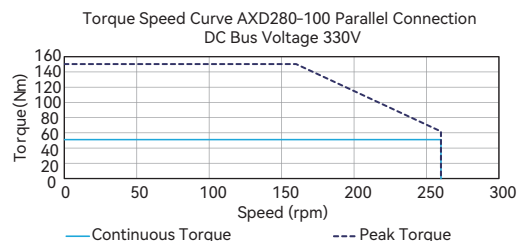
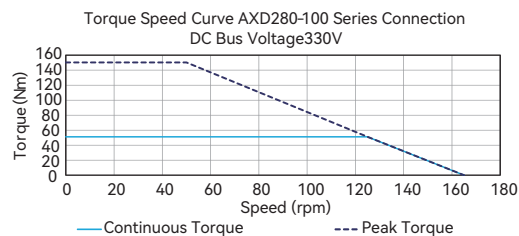
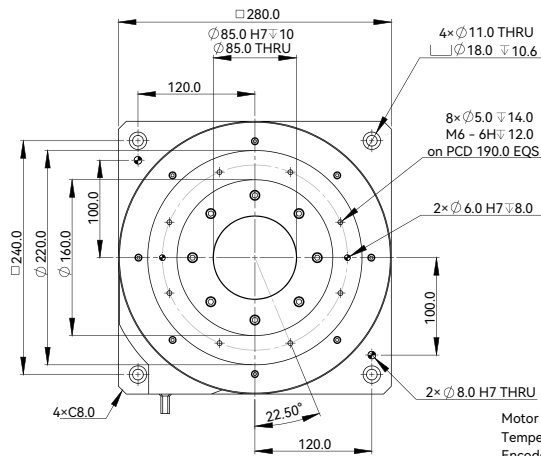
| AXD280-100                                            |                                                                                      |                                 |          |          |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------|----------|----------|
| Performance Parameters                                | Symbol                                                                               | Unit                            | Series   | Parallel |
| Continuous Torque (NC) @100°C <sup>①</sup>            | T <sub>cn</sub>                                                                      | Nm                              | 51.1     | 51.1     |
| Peak Torque                                           | T <sub>pk</sub>                                                                      | Nm                              | 150.3    | 150.3    |
| Torque Constant ±10%                                  | K <sub>t</sub>                                                                       | Nm/Arms                         | 22.2     | 11.1     |
| Back EMF Constant ±10%                                | K <sub>e</sub>                                                                       | Vpeak/rpm                       | 1.90     | 0.95     |
| Motor Constant @25°C                                  | K <sub>m</sub>                                                                       | Nm/Sqrt(W)                      | 4.34     | 4.34     |
| Resistance (L-L) @25°C ±10% <sup>②</sup>              | R <sub>25</sub>                                                                      | Ω                               | 17.5     | 4.4      |
| Inductance (L-L) ±20% <sup>③</sup>                    | L                                                                                    | mH                              | 194.0    | 48.5     |
| Electrical Time Constant                              | τ <sub>e</sub>                                                                       | ms                              | 11.1     | 11.1     |
| Continuous Current (NC) @100°C <sup>④</sup>           | I <sub>cn</sub>                                                                      | Arms                            | 2.3      | 4.6      |
| Peak Current                                          | I <sub>pk</sub>                                                                      | Arms                            | 8.0      | 16.0     |
| Continuous Power Dissipation (NC) @100°C <sup>①</sup> | P <sub>cn</sub>                                                                      | W                               | 179.7    | 179.7    |
| Max. Coil Temperature                                 | T <sub>max</sub>                                                                     | °C                              | 100      | 100      |
| Thermal Dissipation Constant (NC) <sup>①</sup>        | K <sub>thn</sub>                                                                     | W/°C                            | 2.4      | 2.4      |
| Max. Bus Voltage                                      | U <sub>bus</sub>                                                                     | Vdc                             | 600      | 600      |
| Pole Number                                           | 2p                                                                                   | -                               | 28       | 28       |
| Max. Speed @Continuous Torque <sup>⑤</sup>            | Ω <sub>max</sub>                                                                     | rpm                             | 210      | 260      |
| Max. Speed @Peak Torque <sup>⑥</sup>                  | Ω <sub>max</sub>                                                                     | rpm                             | 100      | 250      |
| Mechanical Parameters                                 |                                                                                      |                                 |          |          |
| Overall Mass (NC)                                     | m <sub>n</sub>                                                                       | kg                              | 30.0     | 30.0     |
| Rotor Inertia                                         | J <sub>r</sub>                                                                       | kg·m <sup>2</sup>               | 6.00E-02 | 6.00E-02 |
| Axial Runout <sup>⑦</sup>                             | -                                                                                    | μm                              | 50(15)   | 50(15)   |
| Radial Runout <sup>⑧</sup>                            | -                                                                                    | μm                              | 50(15)   | 50(15)   |
| Max. Axial Load (Upright Mounting) <sup>⑨</sup>       | -                                                                                    | N                               | 1800     | 1800     |
| Max. Axial Load (Inverted / Wall Mounting)            | -                                                                                    | N                               | 500      | 500      |
| Max. Moment Load (Upright Mounting)                   | -                                                                                    | Nm                              | 75       | 75       |
| Max. Moment Load (Inverted / Wall Mounting)           | -                                                                                    | Nm                              | 23       | 23       |
| Encoder Parameters                                    |                                                                                      |                                 |          |          |
| Absolute Encoder                                      | -                                                                                    | bit                             | 23       | 23       |
| Communication Protocol                                | -                                                                                    | -                               | BISS-C   | BISS-C   |
| Accuracy after Error Mapping <sup>⑩</sup>             | -                                                                                    | arc sec                         | ±4(±3)   | ±4(±3)   |
| Accuracy without Error Mapping <sup>⑪</sup>           | -                                                                                    | arc sec                         | ±20(±15) | ±20(±15) |
| Repeatability <sup>⑫</sup>                            | -                                                                                    | arc sec                         | ±2(±1.5) | ±2(±1.5) |
| Other Information                                     |                                                                                      |                                 |          |          |
| Insulation Class                                      |                                                                                      | Class B (130°C)                 |          |          |
| Protection Grade                                      |                                                                                      | IP40                            |          |          |
| Compliance with Global Standards                      |                                                                                      | RoHS, CE                        |          |          |
| Ambient Temperature                                   | Operation                                                                            | 0°C to 40°C (non-freezing)      |          |          |
|                                                       | Storage                                                                              | -15°C to 70°C (non-freezing)    |          |          |
|                                                       | Operation                                                                            | 10%RH to 80%RH (non-condensing) |          |          |
| Ambient Humidity                                      | Storage                                                                              | 10%RH to 90%RH (non-condensing) |          |          |
|                                                       | Indoor (no direct sunlight);<br>No corrosive gas, inflammable gas, oil mist or dust. |                                 |          |          |

- ➊ Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
  - ➋ Resistance is measured by DC current with standard 0.5m cable.
  - ➌ Inductance is measured by current frequency of 1 kHz.
  - ➍ The value is based on absolute encoder under max. bus voltage.
  - ➎ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).
  - ➏ Please refer to the illustration for different mountings.
  - ➐ The value outside the parenthesis is based on absolute encoder (S405) with the standard runout. The value in parenthesis is based on absolute encoder (S305) with the standard runout.
- The contents of datasheet are subject to change without prior notice.

## ■ Dimension



- Notes:
1. User to ensure flatness of mounting surface within 0.01/300mm;
  2. Cable diameter within  $\pm 0.5\text{mm}$  tolerance, cable length within  $\pm 60.0\text{mm}$  tolerance;
  3. Certain specifications in the drawing are subject to change;
  4. General tolerance.
- X  $\pm 0.25\text{mm}$   
X.X  $\pm 0.1\text{mm}$   
X.XX  $\pm 0.05\text{mm}$   
X.XXX  $\pm 0.025\text{mm}$

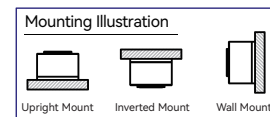
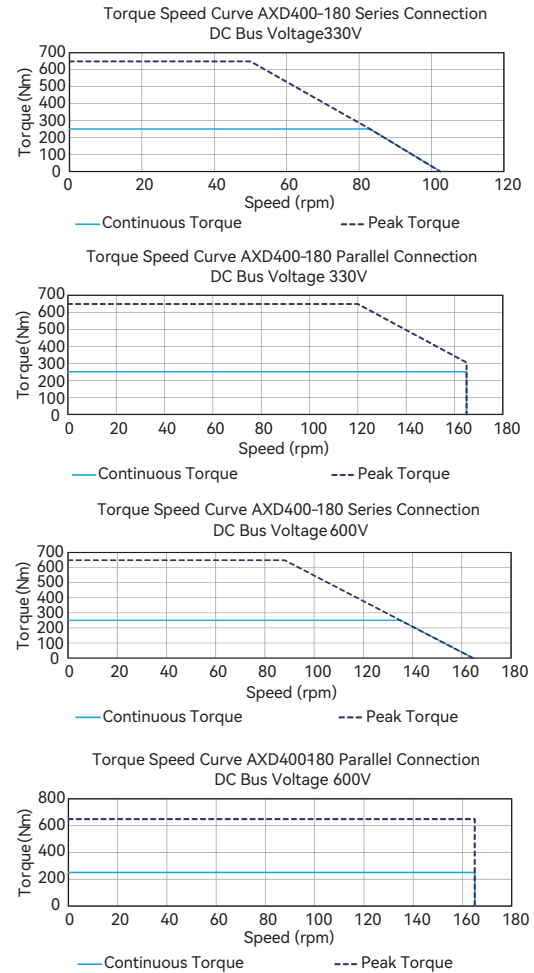


## AXD400-180

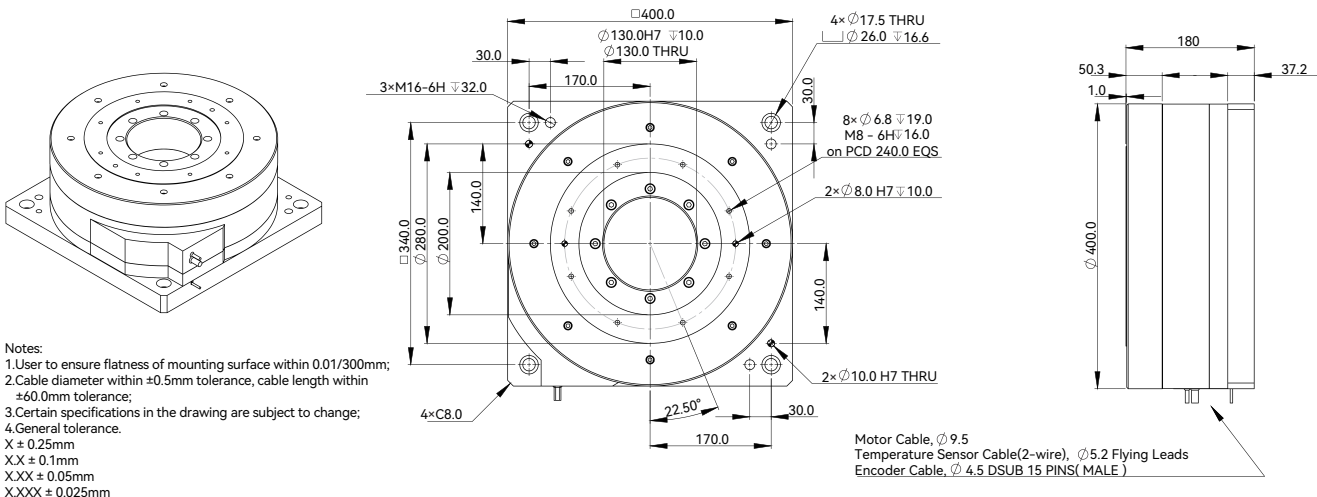
| AXD400-180                                  |           |                                                                                   |                   |          |
|---------------------------------------------|-----------|-----------------------------------------------------------------------------------|-------------------|----------|
| Performance Parameters                      |           | Symbol                                                                            | Unit              | Series   |
| Continuous Torque (NC) @100°C               |           | T <sub>cn</sub>                                                                   | Nm                | 250.6    |
| Peak Torque                                 |           | T <sub>pk</sub>                                                                   | Nm                | 648.9    |
| Torque Constant ±10%                        |           | K <sub>t</sub>                                                                    | Nm/Arms           | 35.8     |
| Back EMF Constant ±10%                      |           | K <sub>e</sub>                                                                    | Vpeak/rpm         | 3.06     |
| Motor Constant @25°C                        |           | K <sub>m</sub>                                                                    | Nm/Sqrt(W)        | 15.62    |
| Resistance (L-L) @25°C ±10%                 |           | R <sub>25</sub>                                                                   | Ω                 | 3.5      |
| Inductance (L-L) ±20%                       |           | L                                                                                 | mH                | 74.0     |
| Electrical Time Constant                    |           | τ <sub>e</sub>                                                                    | ms                | 21.1     |
| Continuous Current (NC) @100°C              |           | I <sub>cn</sub>                                                                   | Arms              | 7.0      |
| Peak Current                                |           | I <sub>pk</sub>                                                                   | Arms              | 25.0     |
| Continuous Power Dissipation (NC) @100°C    |           | P <sub>cn</sub>                                                                   | W                 | 332.9    |
| Max. Coil Temperature                       |           | T <sub>max</sub>                                                                  | °C                | 100      |
| Thermal Dissipation Constant (NC)           |           | K <sub>thn</sub>                                                                  | W/°C              | 4.4      |
| Max. Bus Voltage                            |           | U <sub>bus</sub>                                                                  | Vdc               | 600      |
| Pole Number                                 |           | 2p                                                                                | -                 | 28       |
| Max. Speed @Continuous Torque               |           | Ω <sub>max</sub>                                                                  | rpm               | 135      |
| Max. Speed @Peak Torque                     |           | Ω <sub>max</sub>                                                                  | rpm               | 90       |
| Mechanical Parameters                       |           |                                                                                   |                   |          |
| Overall Mass (NC)                           |           | m <sub>n</sub>                                                                    | kg                | 100.0    |
| Rotor Inertia                               |           | J <sub>r</sub>                                                                    | kg·m <sup>2</sup> | 5.15E-01 |
| Axial Runout                                |           | -                                                                                 | μm                | 70(20)   |
| Radial Runout                               |           | -                                                                                 | μm                | 70(20)   |
| Max. Axial Load (Upright Mounting)          |           | -                                                                                 | N                 | 8000     |
| Max. Axial Load (Inverted / Wall Mounting)  |           | -                                                                                 | N                 | 1500     |
| Max. Moment Load (Upright Mounting)         |           | -                                                                                 | Nm                | 100      |
| Max. Moment Load (Inverted / Wall Mounting) |           | -                                                                                 | Nm                | 30       |
| Encoder Parameters                          |           |                                                                                   |                   |          |
| Absolute Encoder                            |           | -                                                                                 | bit               | 23       |
| Communication Protocol                      |           | -                                                                                 | -                 | BiSS-C   |
| Accuracy after Error Mapping                |           | -                                                                                 | arc sec           | ±3       |
| Accuracy without Error Mapping              |           | -                                                                                 | arc sec           | ±15      |
| Repeatability                               |           | -                                                                                 | arc sec           | ±1.5     |
| Other Information                           |           |                                                                                   |                   |          |
| Insulation Class                            |           | Class B (130°C)                                                                   |                   |          |
| Protection Grade                            |           | IP40                                                                              |                   |          |
| Compliance with Global Standards            |           | RoHS, CE                                                                          |                   |          |
| Ambient Temperature                         | Operation | 0°C to 40°C (non-freezing)                                                        |                   |          |
|                                             | Storage   | -15°C to 70°C (non-freezing)                                                      |                   |          |
| Ambient Humidity                            | Operation | 10%RH to 80%RH (non-condensing)                                                   |                   |          |
|                                             | Storage   | 10%RH to 90%RH (non-condensing)                                                   |                   |          |
| Recommended Ambience                        |           | Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust. |                   |          |

- ① Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.  
 ② Resistance is measured by DC current with standard 0.5m cable.  
 ③ Inductance is measured by current frequency of 1 kHz.  
 ④ The value is based on absolute encoder under max. bus voltage.  
 ⑤ Runout specification define in the datasheet is based on constant loading and temperature condition (the value in parenthesis is optional).  
 ⑥ Please refer to the illustration for different mountings.  
 ⑦ Based on S305 absolute encoder with standard runout.  
 The contents of datasheet are subject to change without prior notice.

### Torque-Speed Curve

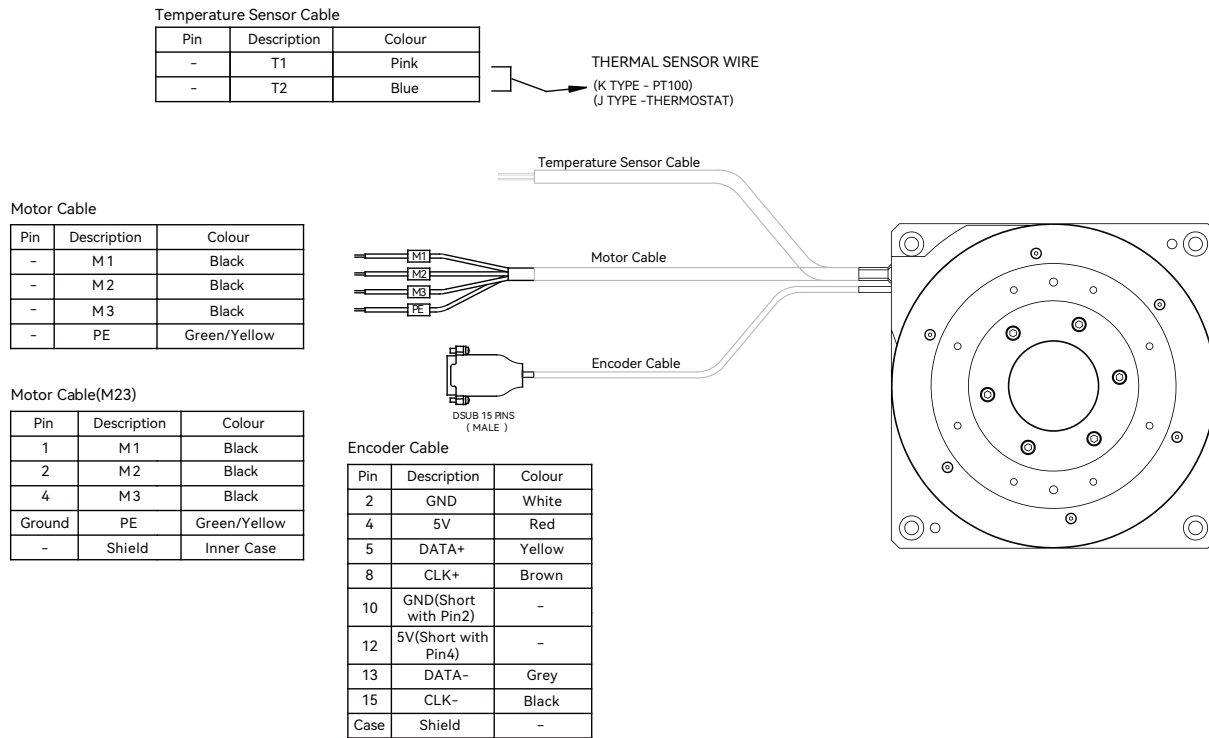


### Dimension





## Motor Cable Connection



## Motor Power Cable Information

| Specification          | Unit |                                                                                |
|------------------------|------|--------------------------------------------------------------------------------|
| Cable Diameter         | mm   | "A" ①                                                                          |
| Cable Length           | m    | 0.5 ①                                                                          |
| Number of Cores        | -    | "B"                                                                            |
| Cable Colour           | -    | Grey                                                                           |
| Minimum Bending Radius | mm   | Moving:Cable diameter $\phi \times 12$<br>Fixed:Cable diameter $\phi \times 6$ |
| Termination Type       | -    | Flying Leads                                                                   |
| Ferrite Bead           | -    | Yes                                                                            |
| CE Compliance          | -    | Yes                                                                            |

## Encoder Cable Information

| Specification          | Unit |                                                                                |
|------------------------|------|--------------------------------------------------------------------------------|
| Cable Diameter         | mm   | 4.5 ①                                                                          |
| Cable Length           | m    | 0.5 ①                                                                          |
| Number of Cores        | -    | 6                                                                              |
| Cable Colour           | -    | Black                                                                          |
| Minimum Bending Radius | mm   | Moving:Cable diameter $\phi \times 12$<br>Fixed:Cable diameter $\phi \times 6$ |

## Temperature Sensor Cable Information

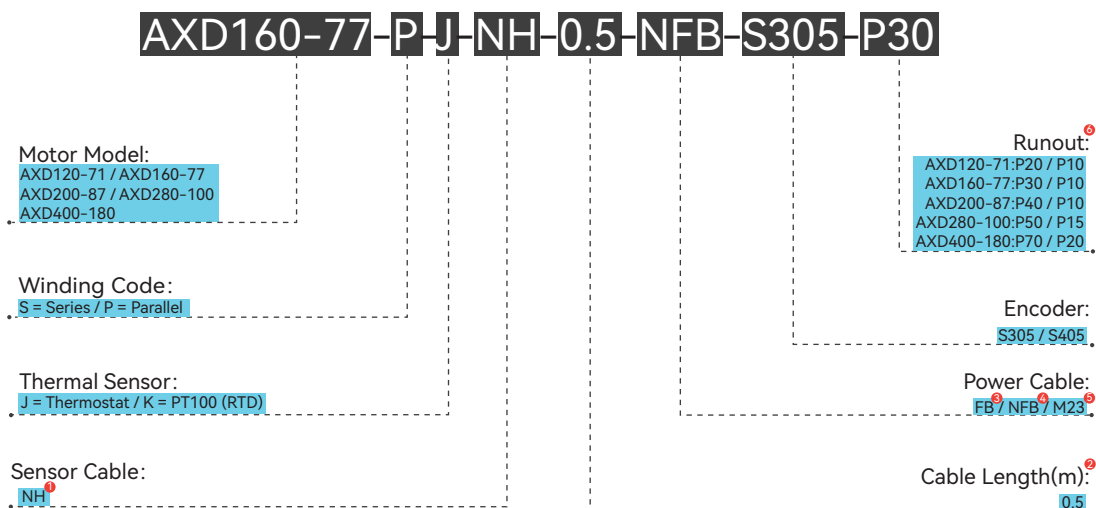
| Specification          | Unit |                                                                                |
|------------------------|------|--------------------------------------------------------------------------------|
| Cable Diameter         | mm   | 5.2 ①                                                                          |
| Cable Length           | m    | 0.5 ①                                                                          |
| Number of Cores        | -    | 2×0.14mm <sup>2</sup>                                                          |
| Cable Colour           | -    | Grey                                                                           |
| Minimum Bending Radius | mm   | Moving:Cable diameter $\phi \times 12$<br>Fixed:Cable diameter $\phi \times 6$ |
| CE Compliance          | -    | Yes                                                                            |

① Cable Diameter within±0.5mm Tolerance, Cable Length within ±60.0mm Tolerance.  
Certain specifications in the drawing are subject to change.

| Motor      | AXD120               | AXD160               | AXD200               | AXD280               | AXD400               |
|------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| $\phi$ "A" | $\phi$ 7.0           | $\phi$ 7.0           | $\phi$ 8.0           | $\phi$ 9.5           | $\phi$ 9.5           |
| "B"        | 4×1.0mm <sup>2</sup> | 4×1.0mm <sup>2</sup> | 4×1.5mm <sup>2</sup> | 4×2.5mm <sup>2</sup> | 4×2.5mm <sup>2</sup> |



## Part Numbering



- ① NH = Without Built-in Hall Sensor C/W Flying Leads
- ② Cable Diameter within ±0.5mm Tolerance, Cable Length within ±60.0mm
- ③ FB = With Ferrite Bead C/W Flying Leads
- ④ NFB = Without Ferrite Bead C/W Flying Leads
- ⑤ M23 = Without Ferrite Bead C/W M23 Receptacle
- ⑥ AXD120-71:P20 = Axial Runout 20µm, Radial Runout is 20µm; P10 = Axial Runout 10µm, Radial Runout is 10µm  
 AXD160-77:P30 = Axial Runout 30µm, Radial Runout is 30µm; P10 = Axial Runout 10µm, Radial Runout is 10µm  
 AXD200-87:P40 = Axial Runout 40µm, Radial Runout is 40µm; P10 = Axial Runout 10µm, Radial Runout is 10µm  
 AXD280-100:P50 = Axial Runout 50µm, Radial Runout is 50µm; P15 = Axial Runout 15µm, Radial Runout is 15µm  
 AXD400-180:P70 = Axial Runout 70µm, Radial Runout is 70µm; P20 = Axial Runout 20µm, Radial Runout is 20µm