

AXD SERIES

- ▶ Direct drive brushless motor
- ▶ Strong resistance to contamination
- ▶ Fully integrated with encoder and bearing
- ▶ Low cogging torque
- ▶ Precise homing through index pulse
- ▶ Optional for low speed and high speed windings
- ▶ High torque density
- ▶ Low profile with large centre hole

EN-26.3.1

- 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 1kHz.
- 4 The value is based on ABI optical SIN/COS encoder (4096x interpolation) 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 ABI optical SIN/COS encoder (4096x interpolation) with standard runout.

The contents of datasheet are subject to change without prior notice.

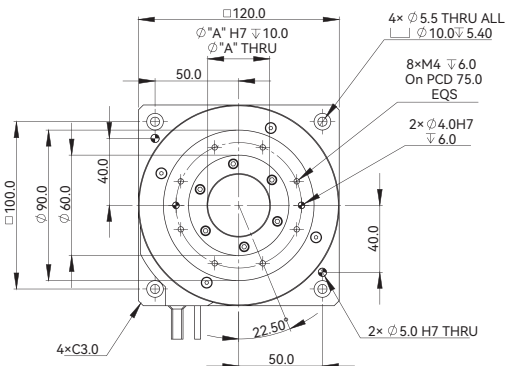
AXD120-61

AXD120-61

Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque (NC) @100°C ^①	T _{cn}	Nm	3.2	3.2
Peak Torque	T _{pk}	Nm	9.5	9.5
Torque Constant ±10%	K _t	Nm/Arms	2.89	1.44
Back EMF Constant ±10%	K _e	V _{peak} /rpm	0.25	0.12
Motor Constant @25°C	K _m	Nm/Sqrt(W)	0.60	0.60
Resistance (L-L) @25°C ±10% ^②	R ₂₅	Ω	15.2	3.8
Inductance (L-L) ±20% ^③	L	mH	47.7	11.9
Electrical Time Constant	τ _e	ms	3.1	3.1
Continuous Current (NC) @100°C ^①	I _{cn}	Arms	1.1	2.2
Peak Current	I _{pk}	Arms	3.9	7.8
Continuous Power Dissipation (NC) @100°C ^①	P _{cn}	W	36.4	36.4
Max. Coil Temperature	t _{max}	°C	100	100
Thermal Dissipation Constant (NC) ^④	K _{thn}	W/°C	0.5	0.5
Max. Bus Voltage	U _{bus}	V _{dc}	600	600
Pole Number	2p	-	14	14
Max. Speed @Continuous Torque(600V) ^⑤	Ω _{max}	rpm	1300	1300
Max. Speed @Peak Torque(600V) ^⑤	Ω _{max}	rpm	1300	1300
Mechanical Parameters				
Overall Mass (NC)	m _n	kg	2.7	2.7
Rotor Inertia	J _r	kg·m ²	1.02E-03	1.02E-03
Axial Runout ^⑥	-	μm	20 (10)	20 (10)
Radial Runout ^⑥	-	μm	20 (10)	20 (10)
Max Axial Load (Upright Mounting) ^⑦	-	N	500	500
Max Axial Load (Inverted / Wall Mounting)	-	N	150	150
Max Moment Load (Upright Mounting)	-	Nm	30	30
Max Moment Load (Inverted / Wall Mounting)	-	Nm	10	10
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines/rev	2052	2052
ABI Optical Incremental Encoder (80x)	-	counts/rev	164160	164160
ABI Optical Incremental Encoder (160x)	-	counts/rev	328320	328320
ABI Optical Incremental Encoder (400x)	-	counts/rev	820800	820800
ATOM DX Optical Incremental Encoder	-	lines/rev	4306	4306
ATOM DX Optical Incremental Encoder (200x)	-	counts/rev	861200	861200
Accuracy after Error Mapping ^⑧	-	arc sec	+/-6	+/-6
Repeatability ^⑨	-	arc sec	+/-3	+/-3
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 1kHz.
 ④ The value is based on ABI optical SIN/COS encoder (4096x interpolation) 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 ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
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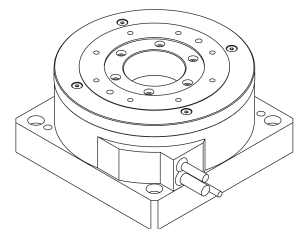
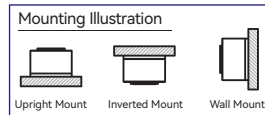
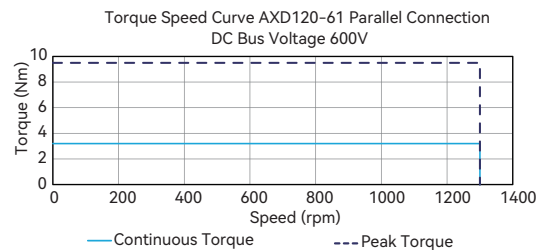
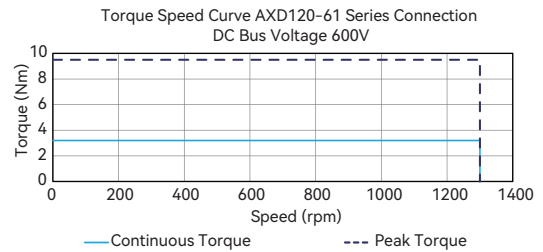
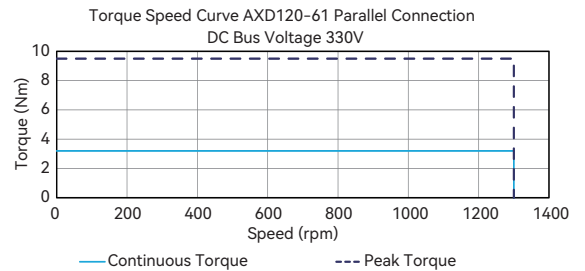
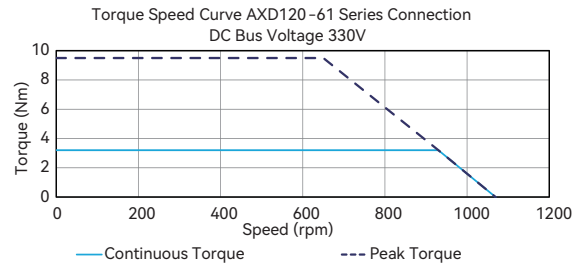
Dimension



- Notes:
 1. User to ensure flatness of mounting surface within 0.01 / 300mm;
 2. Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
 3. Certain specifications in the drawing are subject to change;
 4. General tolerance
 X ± 0.25mm
 X.X ± 0.1mm
 X.XX ± 0.05mm
 X.XXX ± 0.025mm.

Motor cable, Ø 7.0
 Hall cable, Ø 5.2 DSUB 9 PINS(MALE)
 Encoder cable, Ø 4.0 DSUB 15 PINS(MALE)

Torque-Speed Curve



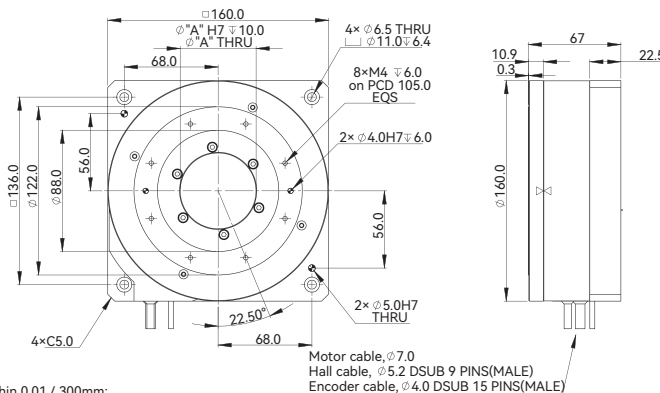
ENCODER	ABI	ATOM DX
Ø"A"	Ø37.0	Ø27.0

AXD160-67

AXD160-67				
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque (NC) @100°C ①	Tcn	Nm	9.4	9.4
Peak Torque	Tpk	Nm	27.0	27.0
Torque Constant ±10%	Kt	Nm/Arms	5.85	2.93
Back EMF Constant ±10%	Ke	Vpeak/rpm	0.50	0.25
Motor Constant @25°C	Km	Nm/Sqrt(W)	1.24	1.24
Resistance (L-L) @25°C ±10% ②	R25	Ω	14.9	3.7
Inductance (L-L) ±20% ③	L	mH	92.1	23.0
Electrical Time Constant	te	ms	6.2	6.2
Continuous Current (NC) @100°C ①	Icn	Arms	1.6	3.2
Peak Current	Ipk	Arms	5.8	11.5
Continuous Power Dissipation (NC) @100°C ①	Pcn	W	74.0	74.0
Max. Coil Temperature	tmax	°C	100	100
Thermal Dissipation Constant (NC) ①	Kthn	W/°C	1.0	1.0
Max. Bus Voltage	Ubus	Vdc	600	600
Pole Number	2p	-	14	14
Max. Speed @Continuous Torque(600V) ④	Ωmax	rpm	600	600
Max. Speed @Peak Torque(600V) ④	Ωmax	rpm	550	600
Mechanical Parameters				
Overall Mass (NC)	mn	kg	5.6	5.6
Rotor Inertia	Jr	kg·m²	3.72E-03	3.72E-03
Axial Runout ⑤	-	μm	30 (10)	30 (10)
Radial Runout ⑤	-	μm	30 (10)	30 (10)
Max Axial Load (Upright Mounting) ⑥	-	N	750	750
Max Axial Load (Inverted / Wall Mounting)	-	N	225	225
Max Moment Load (Upright Mounting)	-	Nm	40	40
Max Moment Load (Inverted / Wall Mounting)	-	Nm	12	12
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines/rev	2868	2868
ABI Optical Incremental Encoder (80x)	-	counts/rev	229440	229440
ABI Optical Incremental Encoder (160x)	-	counts/rev	458880	458880
ABI Optical Incremental Encoder (400x)	-	counts/rev	1147200	1147200
ATOM DX Optical Incremental Encoder	-	lines/rev	5900	5900
ATOM DX Optical Incremental Encoder (80x)	-	counts/rev	472000	472000
Accuracy after Error Mapping ⑦	-	arc sec	+/-5	+/-5
Repeatability ⑦	-	arc sec	+/-2.5	+/-2.5
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.			

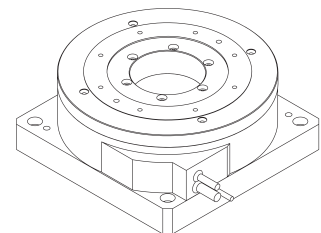
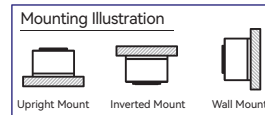
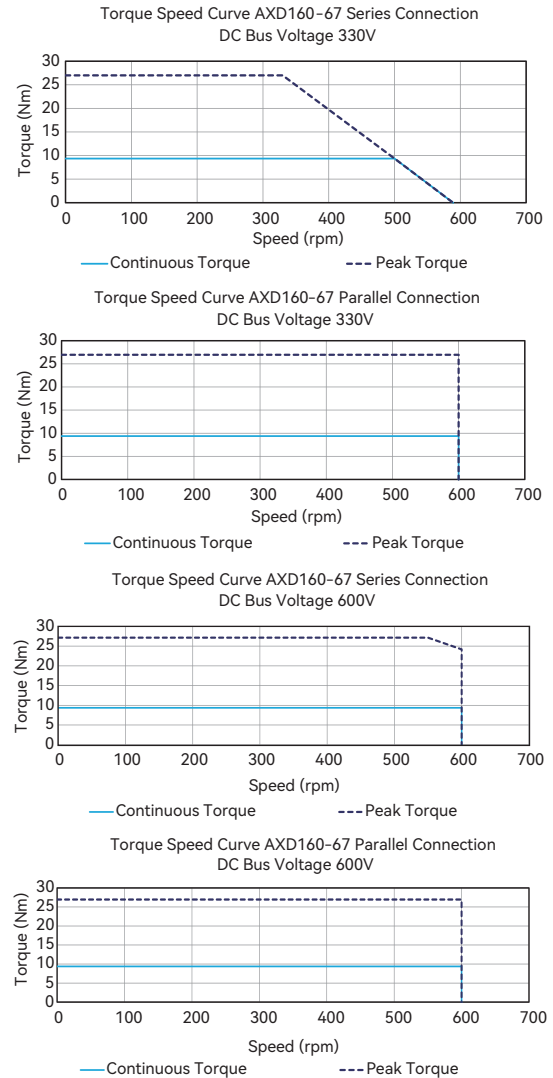
- ① Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
 ② Resistance is measured by DC current with standard 0.5m cable.
 ③ Inductance is measured by current frequency of 1kHz.
 ④ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
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 ⑥ Please refer to the illustration for different mountings.
 ⑦ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
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Dimension



- Notes:
 1. User to ensure flatness of mounting surface within 0.01 / 300mm;
 2. Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
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 X ± 0.25mm
 X.X ± 0.1mm
 X.XX ± 0.05mm
 X.XXX ± 0.025mm.

Torque-Speed Curve



ENCODER	ABI	ATOM DX
Ø"A"	Ø55.0	Ø48.0

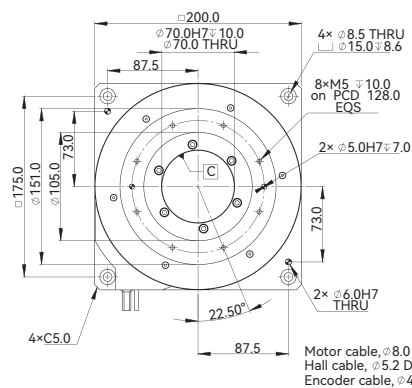
AXD200-77

AXD200-77

AXD200--77				
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque (NC) @100°C ❶	Tcn	Nm	18.8	18.8
Peak Torque	Tpk	Nm	54.3	54.3
Torque Constant ±10%	Kt	Nm/Arms	9.42	4.71
Back EMF Constant ±10%	Ke	Vpeak/rpm	0.81	0.40
Motor Constant @25°C	Km	Nm/Sqrt(W)	2.13	2.13
Resistance (L-L) @25°C ±10% ❷	R25	Ω	13.0	3.3
Inductance (L-L) ±20% ❸	L	mH	121.0	30.3
Electrical Time Constant	te	ms	9.3	9.3
Continuous Current (NC) @100°C ❶	Icn	Arms	2.0	4.0
Peak Current	Ipk	Arms	7.2	14.4
Continuous Power Dissipation (NC) @100°C ❶	Pcn	W	100.9	100.9
Max. Coil Temperature	tmax	°C	100	100
Thermal Dissipation Constant (NC) ❶	Kthn	W/°C	1.3	1.3
Max. Bus Voltage	Ubus	Vdc	600	600
Pole Number	2p	-	14	14
Max. Speed @Continuous Torque(600V) ❹	Ωmax	rpm	400	400
Max. Speed @Peak Torque(600V) ❹	Ωmax	rpm	330	400
Mechanical Parameters				
Overall Mass (NC)	mn	kg	8.8	8.8
Rotor Inertia	Jr	kg·m²	1.00E-02	1.00E-02
Axial Runout ❺	-	μm	40 (10)	40 (10)
Radial Runout ❺	-	μm	40 (10)	40 (10)
Max Axial Load (Upright Mounting) ❻	-	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				
ABI Optical Incremental Encoder (SIN/COS)	-	lines/rev	3934	3934
ABI Optical Incremental Encoder (80x)	-	counts/rev	314720	314720
ABI Optical Incremental Encoder (160x)	-	counts/rev	629440	629440
ABI Optical Incremental Encoder (400x)	-	counts/rev	1573600	1573600
ATOM DX Optical Incremental Encoder	-	lines/rev	7900	7900
ATOM DX Optical Incremental Encoder (80x)	-	counts/rev	632000	632000
Accuracy after Error Mapping ❷	-	arc sec	+/-4	+/-4
Repeatability ❷	-	arc sec	+/-2	+/-2
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.		

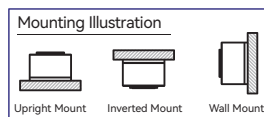
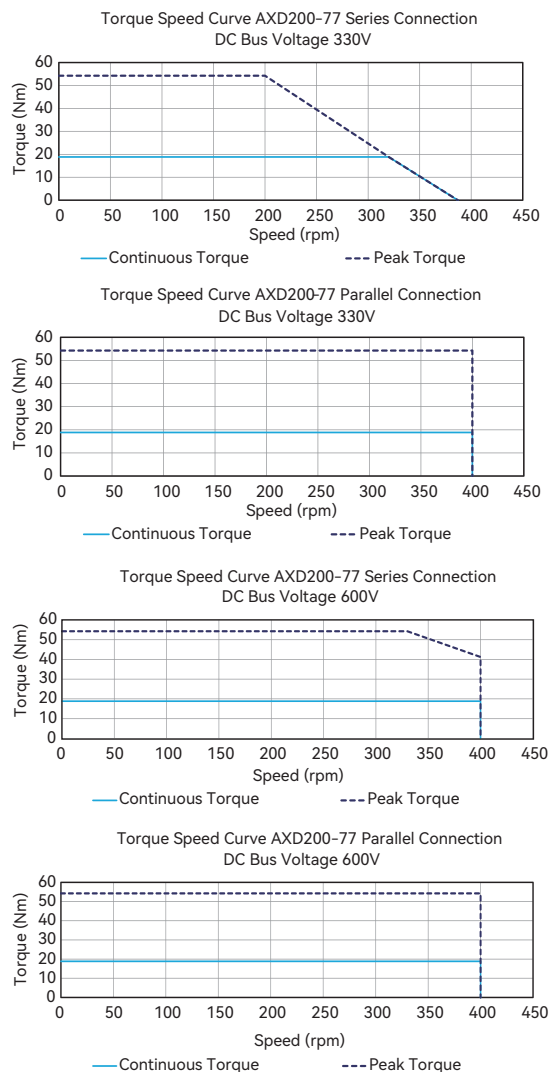
- ① Measurement is taken at ambient temperature 25°C. Value depends on the thermal environment.
 ② Resistance is measured by DC current with standard 0.5m cable.
 ③ Inductance is measured by current frequency of 1kHz.
 ④ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. 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 ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
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Dimension



- Notes:
 1. User to ensure flatness of mounting surface within 0.01 / 300mm;
 2. Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
 3. Certain specifications in the drawing are subject to change;
 4. General tolerance
 X ± 0.25mm
 X.X ± 0.1mm
 X.XX ± 0.05mm
 X.XXX ± 0.025mm.

Torque-Speed Curve

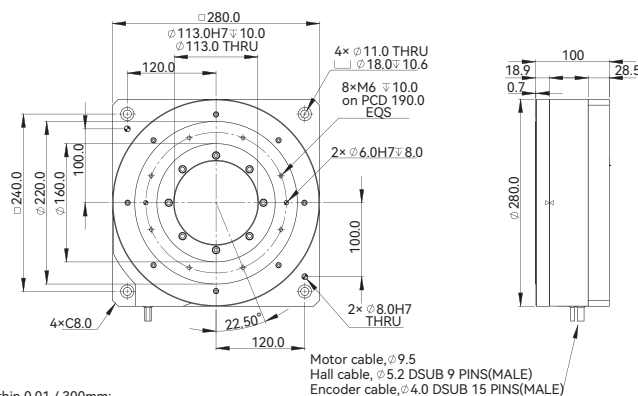


AXD280-100

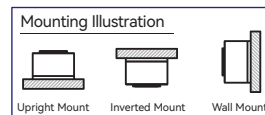
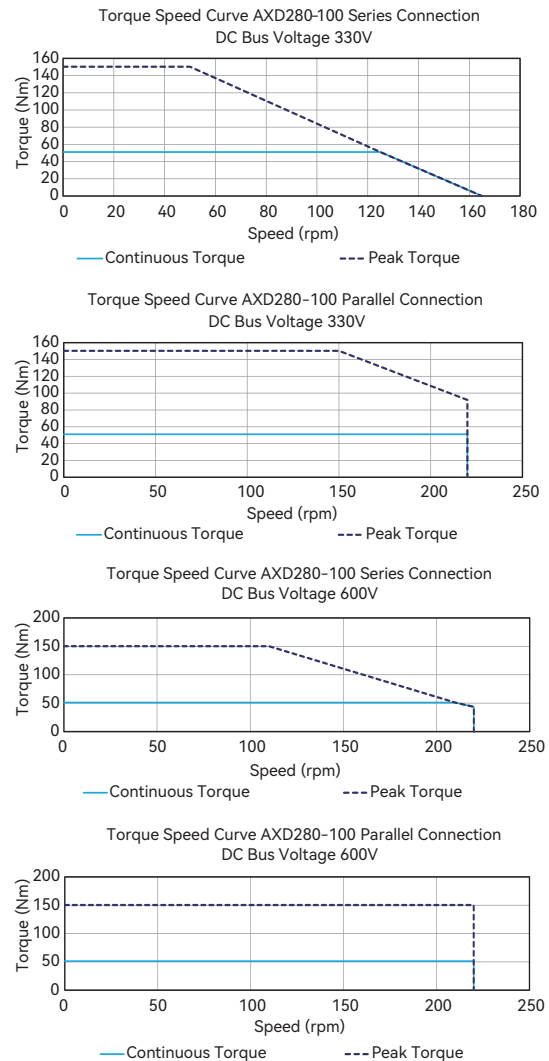
AXD280-100				
Performance Parameters	Symbol	Unit	Series	Parallel
Continuous Torque (NC) @100°C ①	T _{cn}	Nm	51.1	51.1
Peak Torque	T _{pk}	Nm	150.3	150.3
Torque Constant ±10%	K _t	Nm/Arms	22.23	11.12
Back EMF Constant ±10%	K _e	V _{peak} /rpm	1.90	0.95
Motor Constant @25°C	K _m	Nm/Sqrt(W)	4.34	4.34
Resistance (L-L) @25°C ±10% ②	R ₂₅	Ω	17.5	4.4
Inductance (L-L) ±20% ③	L	mH	194.0	48.5
Electrical Time Constant	τ _e	ms	11.1	11.1
Continuous Current (NC) @100°C ①	I _{cn}	Arms	2.3	4.6
Peak Current	I _{pk}	Arms	8.0	16.0
Continuous Power Dissipation (NC) @100°C ①	P _{cn}	W	179.7	179.7
Max. Coil Temperature	t _{max}	°C	100	100
Thermal Dissipation Constant (NC) ①	K _{thn}	W/°C	2.4	2.4
Max. Bus Voltage	U _{bus}	V _{dc}	600	600
Pole Number	2p	-	28	28
Max. Speed @Continuous Torque(600V) ④	Ω _{max}	rpm	210	220
Max. Speed @Peak Torque(600V) ④	Ω _{max}	rpm	110	220
Mechanical Parameters				
Overall Mass (NC)	mn	kg	23.0	23.0
Rotor Inertia	J _r	kg · m ²	6.00E-02	6.00E-02
Axial Runout ⑤	-	μm	50 (15)	50 (15)
Radial Runout ⑤	-	μm	50 (15)	50 (15)
Max Axial Load (Upright Mounting) ⑥	-	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				
ABI Optical Incremental Encoder (SIN/COS)	-	lines/rev	5560	5560
ABI Optical Incremental Encoder (80x)	-	counts/rev	444800	444800
ABI Optical Incremental Encoder (160x)	-	counts/rev	889600	889600
ABI Optical Incremental Encoder (400x)	-	counts/rev	2224000	2224000
ATOM DX Optical Incremental Encoder	-	lines/rev	11152	11152
ATOM DX Optical Incremental Encoder (80x)	-	counts/rev	892160	892160
Accuracy after Error Mapping ⑦	-	arc sec	+/-4	+/-4
Repeatability ⑦	-	arc sec	+/-2	+/-2
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.			

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 ② Resistance is measured by DC current with standard 0.5m cable.
 ③ Inductance is measured by current frequency of 1kHz.
 ④ The value is based on ABI optical SIN/COS encoder (4096x interpolation) under max. bus voltage.
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 ⑥ Please refer to the illustration for different mountings.
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Dimension



Torque-Speed Curve



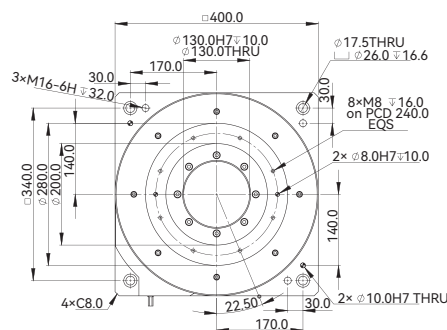
AXD400-155

AXD400-155

Performance Parameters				
Symbol	Unit	Series	Parallel	
Continuous Torque (NC) @100°C ^①	Tcn	Nm	250.6	250.6
Peak Torque	Tpk	Nm	648.9	648.9
Torque Constant ±10%	Kt	Nm/Arms	35.80	17.90
Back EMF Constant ±10%	Ke	Vpeak/rpm	3.06	1.53
Motor Constant @25°C	Km	Nm/Sqrt(W)	15.62	15.62
Resistance (L-L) @25°C ±10% ^②	R25	Ω	3.5	0.875
Inductance (L-L) ±20% ^③	L	mH	74.0	18.5
Electrical Time Constant	te	ms	21.1	21.1
Continuous Current (NC) @100°C ^①	Icn	Arms	7.0	14.0
Peak Current	Ipk	Arms	25.0	50.0
Continuous Power Dissipation (NC) @100°C ^①	Pcn	W	332.9	332.9
Max. Coil Temperature	tmax	°C	100	100
Thermal Dissipation Constant (NC) ^①	Kthn	W/°C	4.4	4.4
Max. Bus Voltage	Ubus	Vdc	600	600
Pole Number	2p	-	28	28
Max. Speed @Continuous Torque (600V) ^④	Ωmax	rpm	130	130
Max. Speed @Peak Torque(600V) ^④	Ωmax	rpm	90	130
Mechanical Parameters				
Overall Mass (NC)	mn	kg	80.0	80.0
Rotor Inertia	Jr	kg·m ²	5.12E-01	5.12E-01
Axial Runout ^⑤	-	μm	70 (20)	70 (20)
Radial Runout ^⑤	-	μm	70 (20)	70 (20)
Max Axial Load (Upright Mounting) ^⑥	-	N	8000	8000
Max Axial Load (Inverted / Wall Mounting)	-	N	1500	1500
Max Moment Load (Upright Mounting)	-	Nm	100	100
Max Moment Load (Inverted / Wall Mounting)	-	Nm	30	30
Encoder Parameters				
ABI Optical Incremental Encoder (SIN/COS)	-	lines/rev	7500	7500
ABI Optical Incremental Encoder (80x)	-	counts/rev	600000	600000
ABI Optical Incremental Encoder (160x)	-	counts/rev	1200000	1200000
ABI Optical Incremental Encoder (400x)	-	counts/rev	3000000	3000000
ATOM DX Optical Incremental Encoder	-	lines/rev	15000	15000
ATOM DX Optical Incremental Encoder (80x)	-	counts/rev	1200000	1200000
Accuracy after Error Mapping ^⑦	-	arc sec	+/-4	+/-4
Repeatability ^⑦	-	arc sec	+/-2	+/-2
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.
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 ⑦ Based on ABI optical SIN/COS encoder (4096x interpolation) with standard runout.
 The contents of datasheet are subject to change without prior notice.

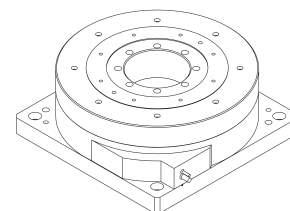
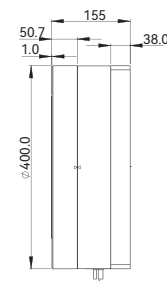
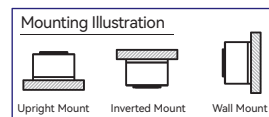
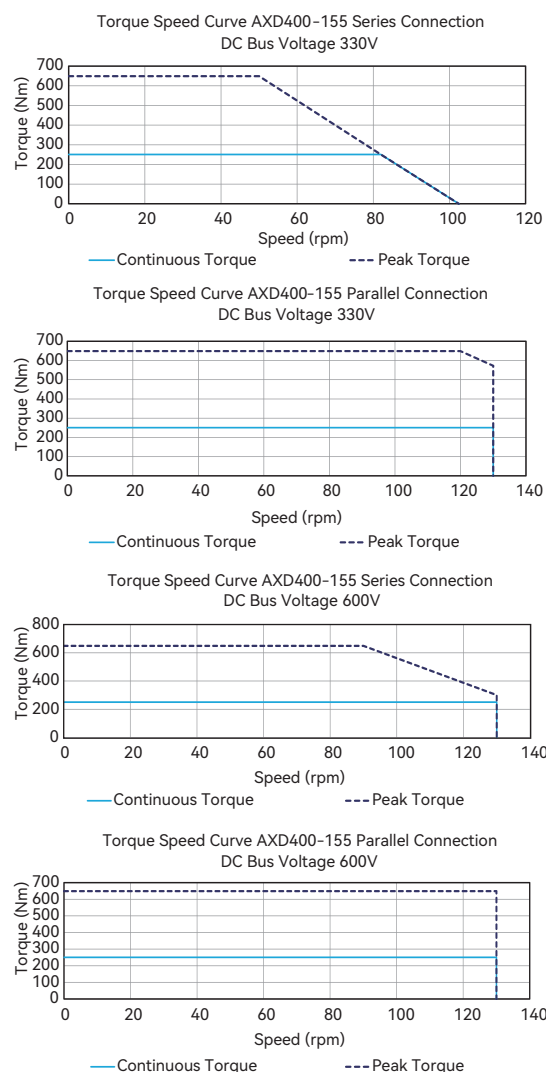
Dimension



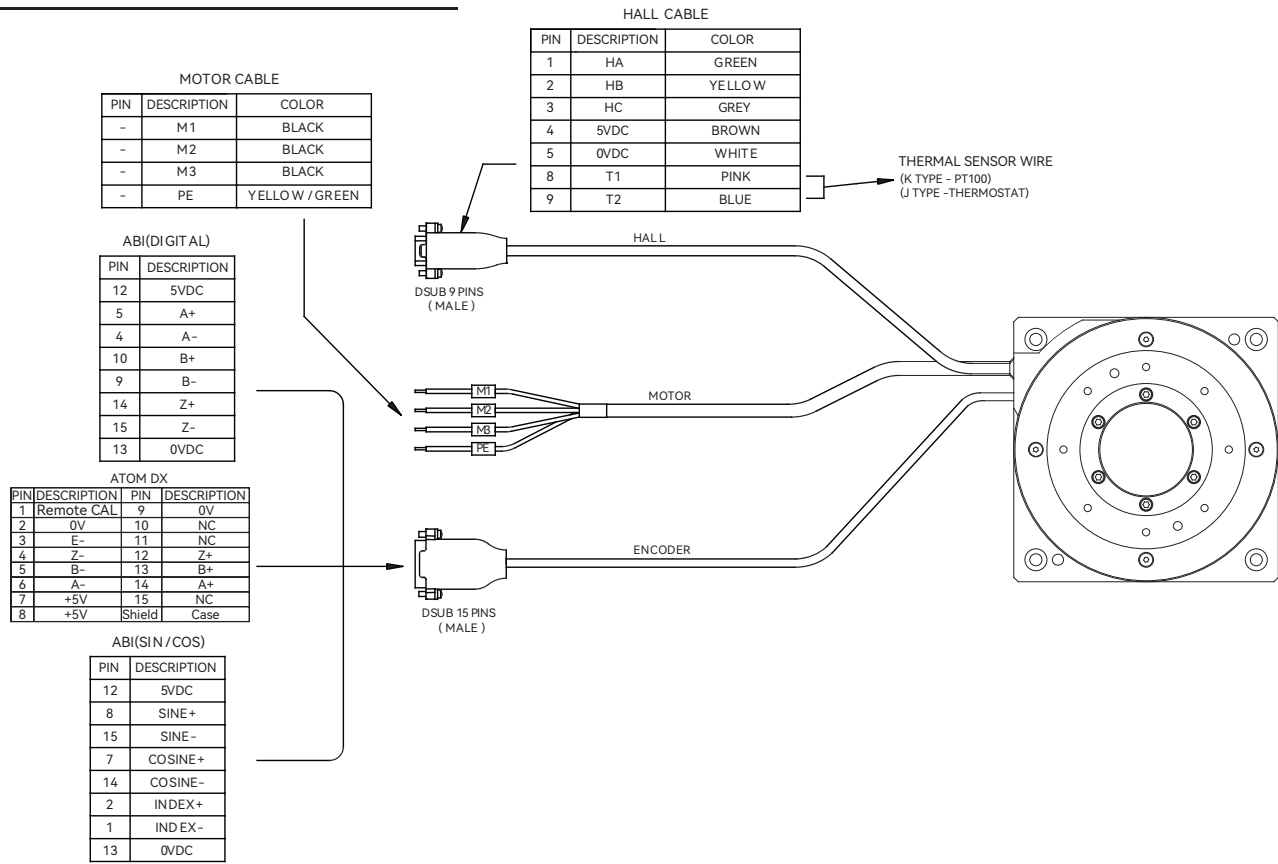
- Notes:
 1. User to ensure flatness of mounting surface within 0.01 / 300mm;
 2. Cable diameter within ±0.3mm tolerance, cable length within ±100.0mm tolerance;
 3. Certain specifications in the drawing are subject to change;
 4. General tolerance
 X ± 0.25mm
 X.X ± 0.1mm
 X.XX ± 0.05mm
 X.XXX ± 0.025mm.

Motor cable, φ9.5
 Hall cable, φ5.2 DSUB 9 PINS(MALE)
 Encoder cable, φ4.0 DSUB 15 PINS(MALE)

Torque-Speed Curve



Motor Cable Connection



Part Numbering

AXD160-67-P-J-H9D-0.5-NFB-AB-2868-400X-P30-0RB

Motor Model:

AXD80-56 / AXD120-61
AXD160-67 / AXD200-77
AXD280-100 / AXD400-155

Winding Code:

S = Low Speed Winding /
P = High Speed Winding

Thermal Sensor:

J = Thermostat
K = PT100(RTD)

Sensor Cable:

NH / H9D

Cable length (m):

0.5

Design Control Code:

0RB

Runout:

P15 / P20 / P30
P40 / P50 / P70

Interpolation:

80X / 160X / 400X / SINCOS

Encoder:

AXD80-56: AB-1062 / R5G2
AXD120-61: AB-2052 / R5G2
AXD160-67: AB-2868 / R5F2
AXD200-77: AB-3934 / R5F2
AXD280-100: AB-5560 / R5F2
AXD400-155: AB-7500 / R5F2

Power Cable:

NFB / 9W4M

- ① NH = Without Built-in Hall Sensor C/W Flying Leads
- ② H9D = With Built-in Hall Sensor C/W 9-Pins D-Sub Connector
- ③ NFB = Without Ferrite Bead C/W Flying Leads
- ④ 9W4M = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
- ⑤ This item should be empty when ATOM encoder is selected
- ⑥ AXD80:P15 = Axial Runout 15µm, Radial Runout is 15µm; P10 = Axial Runout 10µm, Radial Runout is 10µm
AXD120:P20 = Axial Runout 20µm, Radial Runout is 20µm; P10 = Axial Runout 10µm, Radial Runout is 10µm
AXD160:P30 = Axial Runout 30µm, Radial Runout is 30µm; P10 = Axial Runout 10µm, Radial Runout is 10µm
AXD200:P40 = Axial Runout 40µm, Radial Runout is 40µm; P10 = Axial Runout 10µm, Radial Runout is 10µm
AXD280:P50 = Axial Runout 50µm, Radial Runout is 50µm; P15 = Axial Runout 15µm, Radial Runout is 15µm
AXD400:P70 = Axial Runout 70µm, Radial Runout is 70µm; P20 = Axial Runout 20µm, Radial Runout is 20µm