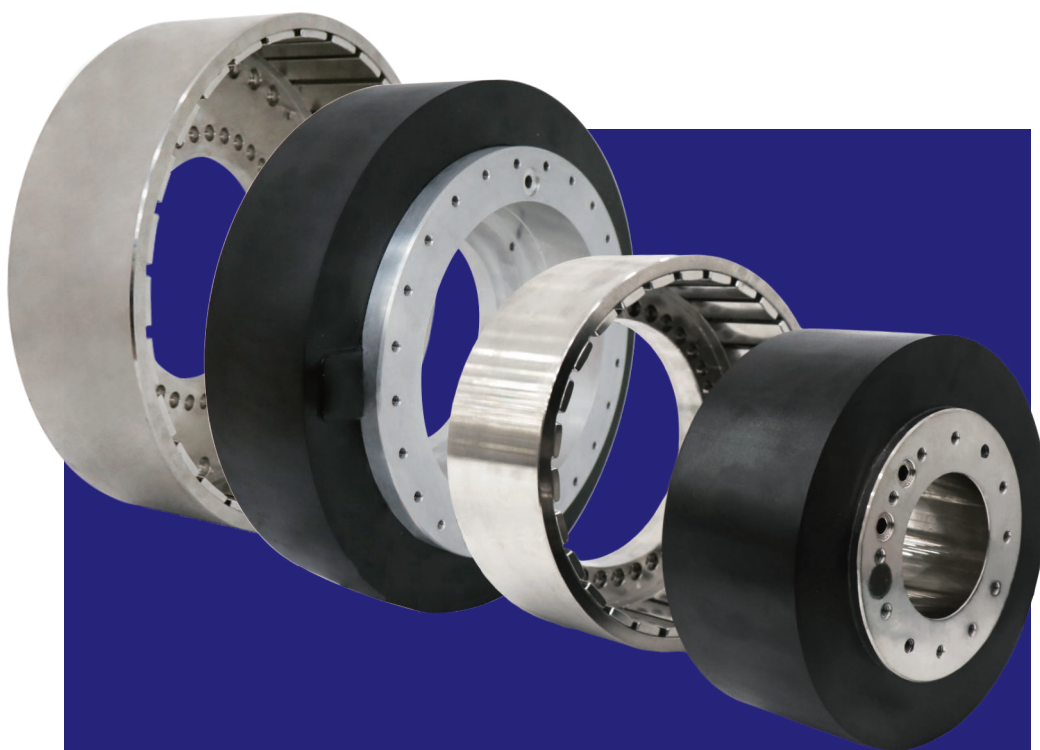




AER-F SERIES

- ▶ Outer rotor PMSM
- ▶ Water cooling design
- ▶ High torque density
- ▶ Suitable for CNC rotary table

EN-23.2.1

Introduction

AER-F series motors consist of stator and rotor, and can be easily integrated into complex systems.

Compared with traditional frameless torque motors, AER-F series motors have an external rotor, whose torque density is higher than inner rotor structure. In addition, the imbedded water cooling channel greatly enhances the heat dissipation efficiency, thus increasing the motor torque density largely.

Due to the outer rotor, this series is more suitable for those applications which need a big outer diameter rotary table.

Continuous Torque $T_{cw} = 149.5 \text{ Nm} \sim 613.8 \text{ Nm}$

Peak Torque $T_{pk} = 299 \text{ Nm} \sim 1227.6 \text{ Nm}$

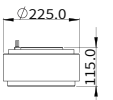
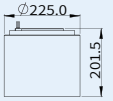
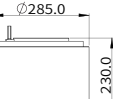
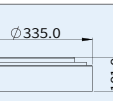
Features

- ▶ Outer rotor PMSM
- ▶ Water cooling design
- ▶ High torque density

Applications

The motor has very high torque density and it is an outer rotor motor. It is suitable for those applications which need high torque density and big OD rotary table.

For example: Suitable for CNC rotary table.

	Model	OD (mm)	Height (mm)	Continuous Torque (T_{cw})			Peak Torque (T_{pk})			Unit: Nm
				100	200	300	500	600	700	
	AER225-F-060	225	115	■ 149.5 / ■ 299						
	AER225-F-160	225	201.5			■ 389.4 / ■ 778.8				
	AER285-F-180	285	230					■ 613.8 / ■ 1227.6		
	AER335-F-055	335	101		■ 277.1 / ■ 554.2					

AER225-F-060

Performance Parameters	Symbol	Unit	AER225-F-060
Continuous Torque (WC) @100°C ^{①⑤}	T_{cw}	Nm	149.5
Peak Torque	T_{pk}	Nm	299.0
Torque Constant $\pm 10\%$	K_t	Nm/Arms	6.5
Back EMF Constant $\pm 10\%$	K_e	Vpeak/rpm	0.56
Motor Constant @25°C	K_m	Nm/Sqrt(W)	5.7
Resistance (L-L) 25°C $\pm 10\%$ ^②	R_{25}	Ω	0.9
Inductance (L-L) $\pm 20\%$ ^③	L	mH	6.7
Electrical Time Constant	τ_e	ms	7.8
Continuous Current (WC) @100°C ^{①⑤}	I_{cw}	Arms	23
Peak Current	I_{pk}	Arms	50.6
Continuous Power Dissipation (WC) @100°C ^{①⑤}	P_{cw}	W	883.0
Max. Coil Temperature	t_{max}	°C	100
Thermal Dissipation Constant (WC) ^{①⑤}	K_{thw}	W/°C	11.8
Max. Bus Voltage	U_{bus}	Vdc	600
Pole Number	$2p$	-	28
Max.Speed @Continuous Torque ^④	Ω_{max}	rpm	700

Mechanical Parameters

Overall Mass (WC)	m_w	kg	18.5
Rotor Inertia	J_r	kg·m ²	8.20E-02

Other Information

Insulation Class		Class B(130°C)
Compliance with Global Standards		RoHS, REACH,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.
Abbreviations: WC-Water Cooling.

② Resistance is measured by DC current with standard 0.5m cable.

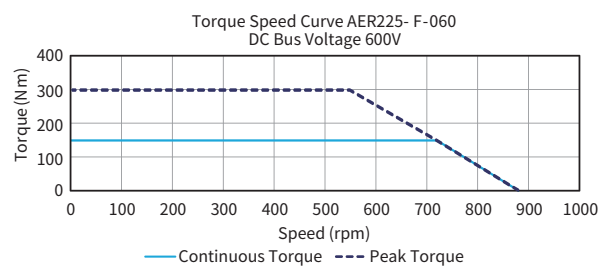
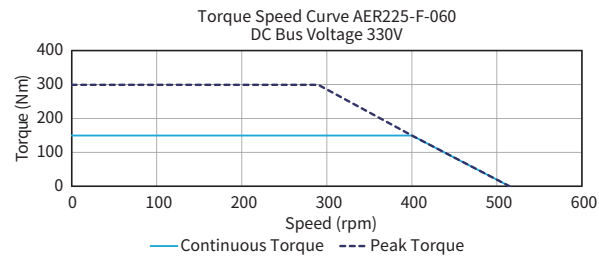
③ Inductance is measured by current frequency of 1 kHz.

④ The value is based on max. bus voltage.

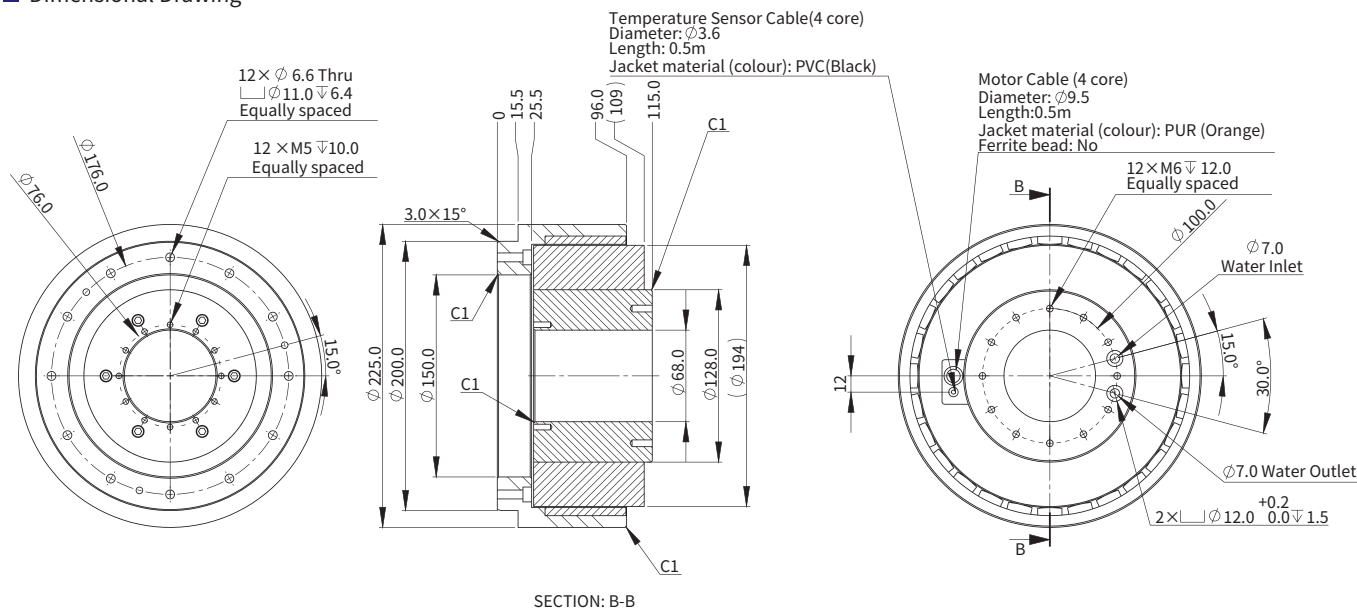
⑤ Water cooling test conditions: the inlet water temperature of motor is 20°C, and the flow rate is 6L/min.
(For detailed test conditions, please consult Akribis)

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

Torque-Speed Curve



Dimensional Drawing



AER225-F-160

Performance Parameters	Symbol	Unit	AER225-F-160
Continuous Torque (WC) @100°C ^{①⑤}	T _{cw}	Nm	389.4
Peak Torque	T _{pk}	Nm	778.8
Torque Constant ±10%	K _t	Nm/Arms	17.7
Back EMF Constant ±10%	K _e	Vpeak/rpm	1.51
Motor Constant @25°C	K _m	Nm/Sqrt(W)	10.9
Resistance (L-L) 25°C ±10% ^②	R ₂₅	Ω	1.77
Inductance (L-L) ±20% ^③	L	mH	15.9
Electrical Time Constant	τ _e	ms	9.0
Continuous Current (WC) @100°C ^{①⑤}	I _{cw}	Arms	22
Peak Current	I _{pk}	Arms	48.4
Continuous Power Dissipation (WC) @100°C ^{①⑤}	P _w	W	1662.8
Max. Coil Temperature	t _{max}	°C	100
Thermal Dissipation Constant (WC) ^{①⑤}	K _{thw}	W/°C	22.2
Max. Bus Voltage	U _{bus}	Vdc	600
Pole Number	2p	-	28
Max.Speed @Continuous Torque ^④	Ω _{max}	rpm	250

Mechanical Parameters

Overall Mass (WC)	m _w	kg	37
Rotor Inertia	J _r	kg·m ²	1.50E-01

Other Information

Insulation Class		Class B(130°C)
Compliance with Global Standards		RoHS, REACH,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.
Abbreviations: WC-Water Cooling.

② Resistance is measured by DC current with standard 0.5m cable.

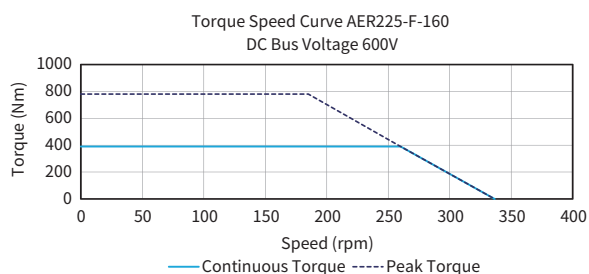
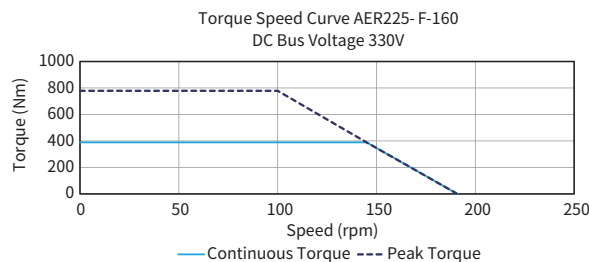
③ Inductance is measured by current frequency of 1 kHz.

④ The value is based on max. bus voltage.

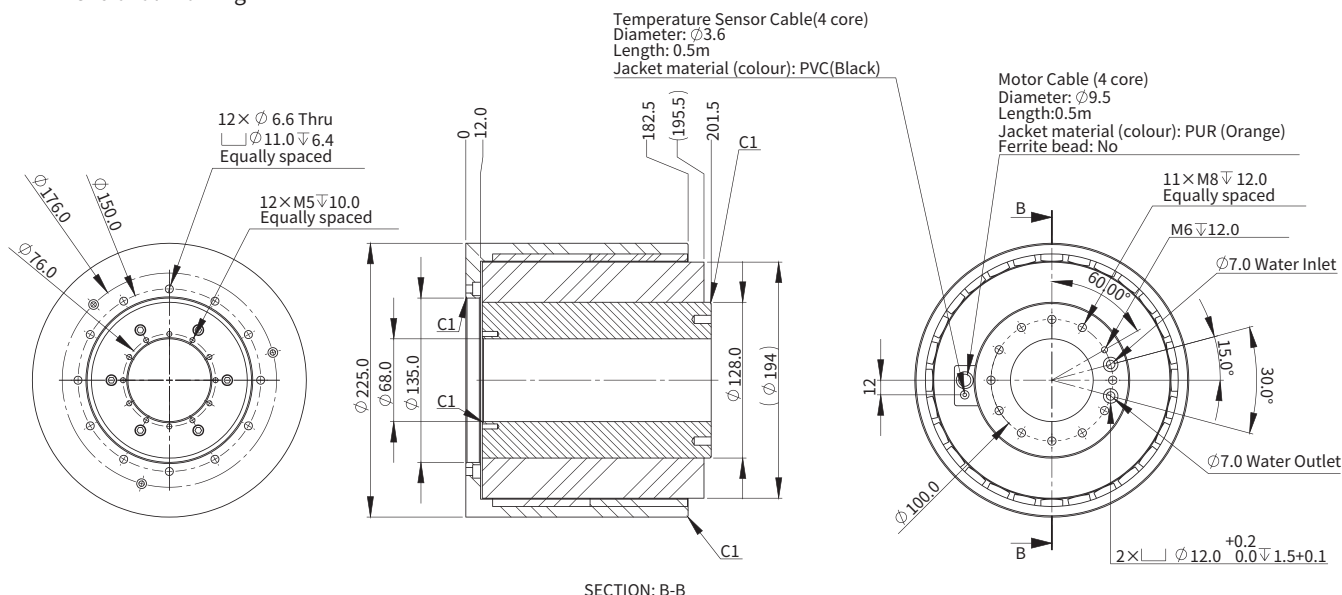
⑤ Water cooling test conditions: the inlet water temperature of motor is 20°C, and the flow rate is 6L/min.
(For detailed test conditions, please consult Akribis)

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

Torque-Speed Curve



Dimensional Drawing



AER285-F-180

Performance Parameters	Symbol	Unit	AER285-F-180
Continuous Torque (WC) @130°C ^{1 5}	T_{cw}	Nm	765.0
Peak Torque	T_{pk}	Nm	1446
Torque Constant $\pm 10\%$	K_t	Nm/Arms	30.0
Back EMF Constant $\pm 10\%$	K_e	Vpeak/rpm	2.6
Motor Constant @25°C	K_m	Nm/Sqrt(W)	20.0
Resistance (L-L) 25°C $\pm 10\%$ ²	R_{25}	Ω	1.5
Inductance (L-L) $\pm 20\%$ ³	L	mH	22.3
Electrical Time Constant	τ_e	ms	14.9
Continuous Current (WC) @130°C ^{1 5}	I_{cw}	Arms	25.5
Peak Current	I_{pk}	Arms	53.6
Continuous Power Dissipation (WC) @130°C ^{1 5}	P_{cw}	W	2065
Max. Coil Temperature	t_{max}	°C	130
Thermal Dissipation Constant (WC) ^{1 5}	K_{thw}	W/°C	19.7
Max. Bus Voltage	U_{bus}	Vdc	600
Pole Number	$2p$	-	28
Max.Speed @Continuous Torque ⁴	Ω_{max}	rpm	150

Mechanical Parameters

Overall Mass (WC)	m_w	kg	68
Rotor Inertia	J_r	kg·m ²	3.90E-01

Other Information

Insulation Class		Class B(130°C)	
Compliance with Global Standards		RoHS, REACH,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.

Abbreviations: WC-Water Cooling.

² Resistance is measured by DC current with standard 0.5m cable.

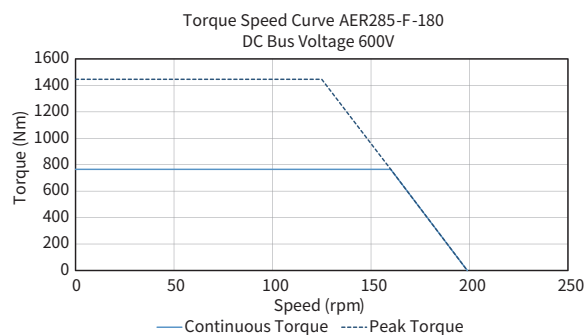
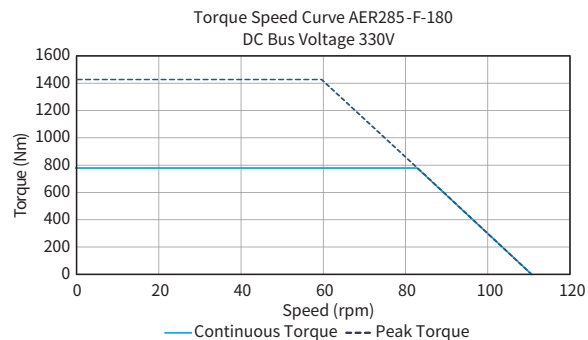
³ Inductance is measured by current frequency of 1 kHz.

⁴ The value is based on max. bus voltage.

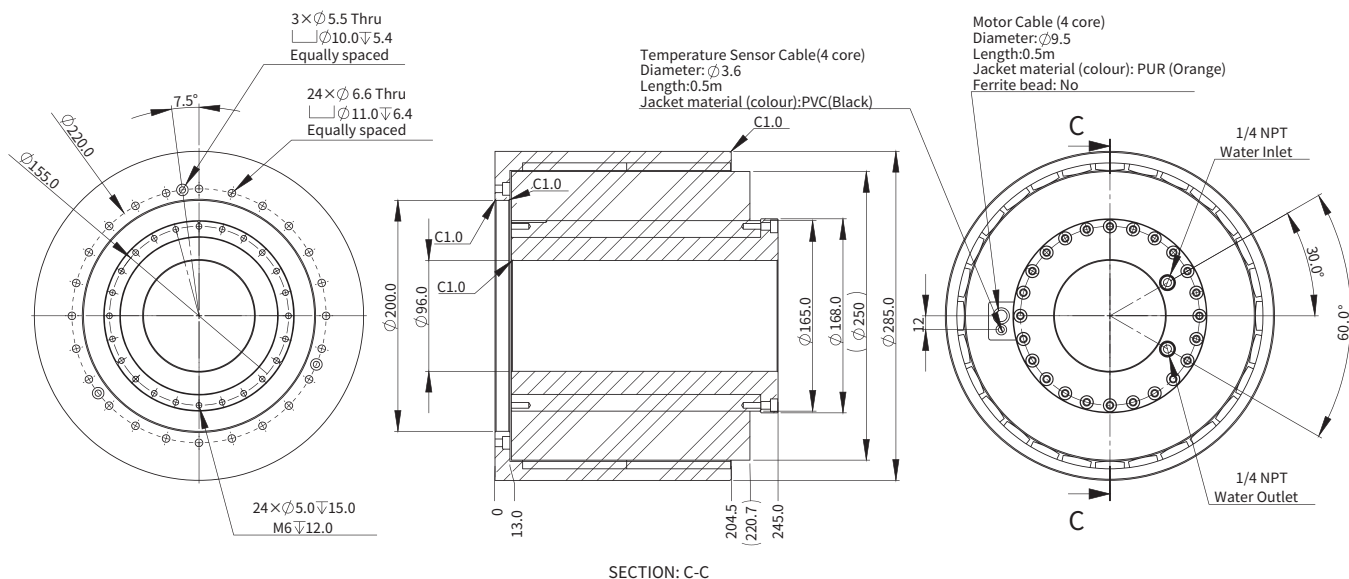
⁵ Water cooling test conditions: the inlet water temperature of motor is 20°C, and the flow rate is 8L/min.
(For detailed test conditions, please consult Akribis)

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

Torque-Speed Curve



Dimensional Drawing



AER335-F-055

Performance Parameters	Symbol	Unit	AER335-F-055
Continuous Torque (WC) @130°C ^{①⑤}	T _{cw}	Nm	349.2
Peak Torque	T _{pk}	Nm	699
Torque Constant ±10%	K _t	Nm/Arms	19.4
Back EMF Constant ±10%	K _e	Vpeak/rpm	1.7
Motor Constant @25°C	K _m	Nm/Sqrt(W)	10.7
Resistance (L-L) 25°C ±10% ^②	R ₂₅	Ω	2.2
Inductance (L-L) ±20% ^③	L	mH	22.0
Electrical Time Constant	τ _e	ms	10.0
Continuous Current (WC) @130°C ^{①⑤}	I _{cw}	Arms	18
Peak Current	I _{pk}	Arms	39.6
Continuous Power Dissipation (WC) @130°C ^{①⑤}	P _{cw}	W	1509
Max. Coil Temperature	t _{max}	°C	130
Thermal Dissipation Constant (WC) ^{④⑤}	K _{thw}	W/°C	14.4
Max. Bus Voltage	U _{bus}	Vdc	600
Pole Number	2p	-	28
Max.Speed @Continuous Torque ^⑥	Ω _{max}	rpm	250

Mechanical Parameters

Overall Mass (WC)	m _w	kg	40
Rotor Inertia	J _r	kg·m ²	1.50E-01

Other Information

Insulation Class		Class B(130°C)
Compliance with Global Standards		RoHS, REACH,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.
Abbreviations: WC-Water Cooling.

② Resistance is measured by DC current with standard 0.5m cable.

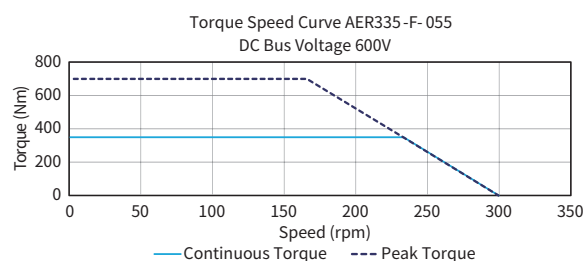
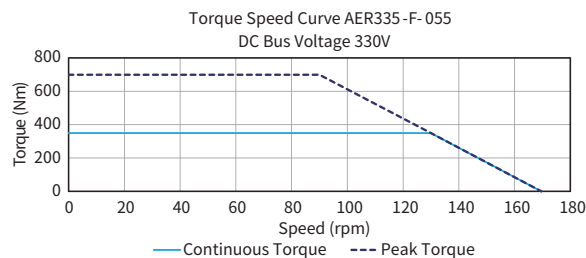
③ Inductance is measured by current frequency of 1 kHz.

④ The value is based on max. bus voltage.

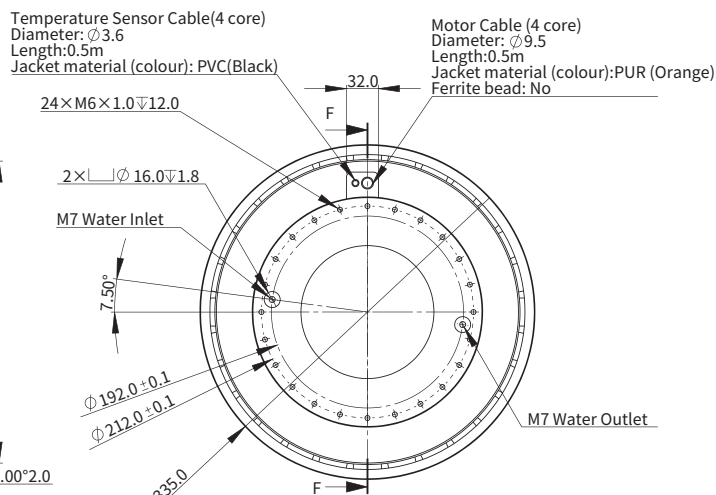
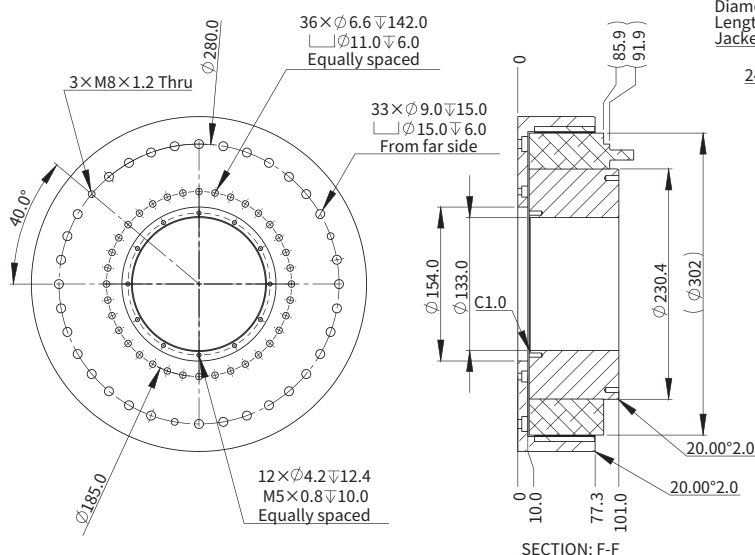
⑤ Water cooling test conditions: the inlet water temperature of motor is 20°C, and the flow rate is 8L/min.
(For detailed test conditions, please consult Akribis)

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

Torque-Speed Curve



Dimensional Drawing



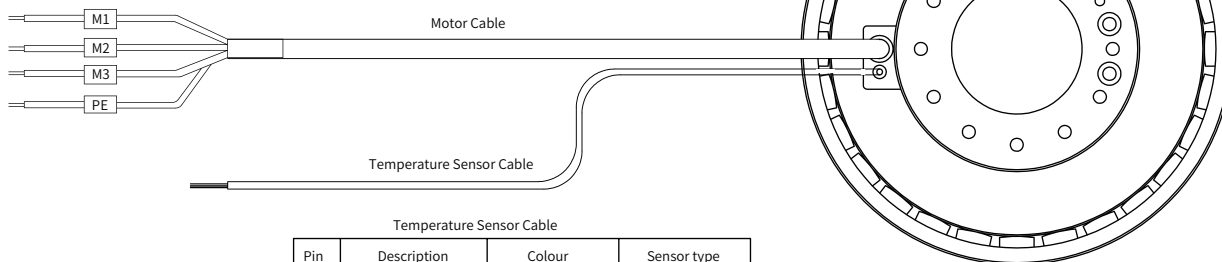
Motor Cable Connection

Motor Cable(9W4M)

Pin	Description	Colour
1	M1	Black
2	M2	Black
3	M3	Black
4	PE	Yellow/Green

Motor Cable

Pin	Description	Colour
-	M1	Black
-	M2	Black
-	M3	Black
-	PE	Yellow/Green



Temperature Sensor Cable

Pin	Description	Colour	Sensor type
-	T1	Pink	KTY84-130
-	T2	Blue	KTY84-130
-	T3	Yellow	PT100
-	T4	Gray	PT100

Table 1:
Motor Power Cable Information

Specification	unit		Remarks
Cable Diameter	mm	Ø 9.5	See Note 1
Cable Length	m	0.5	See Note 1
Number of Cores	-	4	
Cable Colour	-	Grey	
Minimum Bending Radius	mm	Moving: Cable diameter x 12 Fixed: Cable diameter x 6	
Ferrite Bead	-	NA	
CE Compliance	-	Yes	

Table 2:
Temperature Sensor Cable Information

Specification	unit		Remarks
Cable Diameter	mm	Ø 3.6	See Note 1
Cable Length	m	0.5	See Note 1
Number of Cores	-	4	
Cable Colour	-	Grey	
Minimum Bending Radius	mm	Moving: Cable diameter x 12 Fixed: Cable diameter x 6	
CE Compliance	-	Yes	

Notes:
1. Cable diameter within +/-0.3mm tolerance, cable length within +/-60.0mm tolerance;
2. Certain specifications in the drawing are subject to change.

Part Numbering

AER225-F-060-W-KT-M-NF-005-XF-000

Motor Model:

AER225-F /
AER285-F / AER335-F

Stack Height:

060/160/180/055

Cooling Type:

W

Thermal Sensor:

KT

Winding Code:

M

Design Control Code:

000

Power Cable:

XF / XW

Cable Length (m):

005

Sensor Cable:

NF

- ① W = Water Cooling
- ② KT = PT100(RTD)+KTY84
- ③ M = Mid Speed Winding
- ④ NF = Without Built-in Hall Sensor C/W Flying Leads
- ⑤ 005 = 0.5m
- ⑥ XF = Without Ferrite Bead C/W Flying Leads
- ⑦ XW = Without Ferrite Bead C/W D-Sub 9W4 Male Connector
- ⑧ 000 = Standard Model (for more options, please consult cust-service@akribis-sys.com)

