Special Motors Autonomous & Controllable

SPECIAL MOTOR · AUTONOMOUS AND CONTROLLABLE

Worthy of Trust

Every customer deserves our respect and gratitude

Every order is trust and responsibility

Unity · Modesty

Sincerity · Progress

Forge Ahead

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JIANGSU WHEATSTONE ELECTRICAL TECHNOLIGY CO.,LTD.

Disc Motor



Special Motors · Autonomous & Controllable

THE SPECIAL MOTOR IS AUTONOMOUS AND CONTROLLABLE

Motors can be customized to meet customer requirements





Company Profile

Jiangsu Wheatstone Electrical Technology Co., Ltd.

- Founded in 2003, Jiangsu Wheatstone Electrical Technology Co., Ltd. started with stepper motors for embroidery machines. Over 20 years of pioneering work and industry accumulation, we have grown into a technology enterprise supported by three main product lines: special motors, laboratory equipment & online testing, and automation integration. Our products cover petrochemicals, aerospace, shipbuilding, coal mining and various automation fields. We currently have two factories in Wuxi and Changzhou. The company implements a comprehensive brand strategy and has obtained ISO9001 quality management, ISO14001 environmental management, national military standard certification, and is recognized as a Jiangsu Gazelle Enterprise, Little Giant Enterprise, specialized & innovative SME, and high-tech enterprise. and advanced science & technology manufacturing enterprise in Jiangsu Province.

- In the field of special motors, we offer frames from 40MM to 400MM, power from 50W to 200KW, and voltage from 24V to 3000V permanent magnet motors. Strong design capabilities handle gas explosion, dust explosion, vehicle motion, gamma-ray environments and cumulative radiation doses up to 1.0×10^{7} Gy, space radiation with high/low temperature vacuum environments, operating temperature -196°C to +200°C, and vacuum down to 1.0×10^{-7} Pa, enabling applications down to 3000 m underwater. We provide customers with various standard and custom motor solutions to meet diverse application needs. The motors hold China Classification Society type approval, China Compulsory product certifications, third-party radiation-resistant servo motor test reports, Class I coal mine safety & explosion-proof, Class II gas explosion-proof, Class III dust explosion-proof and international IECEx and EU ATEX explosion-proof certifications, helping customers reach the skies and the deep seas.

- In recent years, with the development of new energy, we have customized flat axial flux motors, frameless robot joint motors and self-locking high-overload control motors for our customers.

- Every customer deserves respect and gratitude, and every order is trust and responsibility! Drawing on 20 years of industry experience, we continuously explore, learning the most advanced technologies to design motor control application solutions, and through strict quality management, provide high-quality control actuators.

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This manual is provided by Jiangsu Wheatstone Electrical Technology Co., Ltd. with instructions and guidance on installation, wiring, operation and maintenance of Wheatstone motor products.

Motor Model Nomenclature

Axial Flux Motor Model Nomenclature

AFM 360- X 100 30 - B EXL-XXV-SSSR

Motor Type

AFM indicates axial flux motor

Motor Frame

360=360mm

Feedback Element (Encoder)

M = Incremental encoder X = Resolver

J = Absolute encoder G = mechanical absolute encoder

H = Hall sensor N = No feedback

(See ordering code for encoder details)

Torque

Rated torque, three digits X 0.1 in Nm

Note: torque > 100 Nm is expressed as two digits + A, e.g. 10A means 100 Nm

Speed

Rated speed, wo digits X 100 in rpm

(Speed customizable)

Stator/Rotor Topology

SSSP = single stator single rotor

SDSR = single stator dual rotor

DSSP = dual stator single rotor

MD = multi-disc

Voltage

AC: 220VAC 380VAC 660VAC 1140VAC

DC: 96VDC 72VDC 48VDC 36VDC 24VDC

Motor Type

EX = flameproof EXL = flameproof low temp EXH = flameproof high temp

MA = coal mine safety GW = high temp DW = low temp SS = deep water

Z = vacuum F = radiation resistant FTZ = radiation-resistant high-temp vacuum motor

Brake

B = motor with brak Default means no brake

See ordering code for brake details)

Ordering Code

MD3 -B1A-BA-D14E30-CH-B-IP68-A-N- L XXXX

Feedback Element (Encoder)

Refer to encoder table

Brake

Default = no brake

B1 = with brake 24V

B2 = with brake 48V

B3 = with brake 96V

B4 = manual release 24V

B5 = manual release 48V

Brake cable outlet

A = power cable out

B = Signal cable out

C = Separate out

Temperature Sensor

Default = no temperature sensor

K=KTY84-13

A=PT100

B=PT1000

Temperature sensor cable outlet

A = Power cable out

B = Signal cable out

C = Separate out

D = no outlet

Shaft Diameter & Extension

DXX = shaft extension diameter EXX = shaft extension length

HXX = spline outer diameter KXX = hole depth

NXX = internal spline (keyway ID)

BXX = flat wire width

OXX = closed key

Cable Details

Refer to cable code table

Cable Length

N = no cable, Z = terminal type, H = aviation plug

(ZLXX = terminal with XX m cable; Z alone = terminal without cable)

(HLXX = terminal with XX m cable; H alone = terminal without cable

LXX = with cable, XX = cable length in meters

Cooling Method

N = natural cooling F = air cooling Y = liquid cooling

Surface Treatment

A = powder coating B = natural anodizing D = painting

C = hard anodizing E = other custom

Class

F = indoor light anti-corrosion F1 = indoor medium anti-corrosion F2 = indoor heavy anti-corrosion

W = outdoor light anti-corrosion WF1 = outdoor medium anti-corrosion WF2 = outdoor heavy anti-corrosion

Default = IP65 IP66=IP66 IP67=IP67 IP68=IP68

Material

A = Titanium alloy B = Carbon steel C=304 D=316

Default = Aluminum

Cable Outlet

CQ = forward CH = backward WC = rear outlet Default = upward

CZ = left CY = right ZY = left/right

H1-P1-L1 - R1 - Z1 - S1A

Temperature rar Pressure Range

H1 = 80°C resistant H2 = 120°C resistant

H3 = 150°C resistant H4 = 180°C resistant

H5 = 200°C resistant H6 = 300°C resistant

P1 = 20 MPa P2 = 50 MPa

P3 = 100 MPa P4 = 200 MPa

P5 = 300 MPa

L1 = -40°C resistant L2 = -55°C resistant

L3 = -96°C resistant L4 = -196°C resistant

Radiation Resistance

F1 = radiation resistant 10⁴ Gy F2 = radiation resistant 10⁵ Gy F3 = radiation resistant 10⁶ Gy

Max. Water Depth

S1 = 0-20 m S2 = 20-200 m S3 = 200-1000 m

S4 = 1000-3000 m S5 = above 3000 m

A = dry seal B = dry oil-filled C = pressure compensation

D = potting pressure-resistant E = built-in compensation SS = underwater motor

Vacuum Level

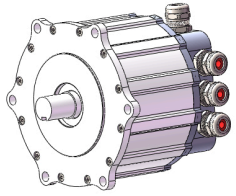
Z1 = low vacuum 10^{5}~10^{2}pa Z2 = medium vacuum 10^{2}~10^{-1}pa

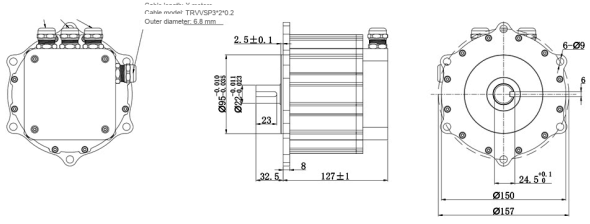
Z3 = high vacuum 10^{-1}~10^{-5}pa Z4 = ultra-high vacuum <10□⁸ Pa

Motor Mounting Dimensions

140 Series Disc Motor

140 Series Disc Motor





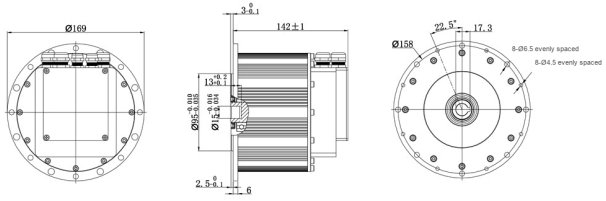
Motor Model	Outer Diameter (mm)	Voltage (V)
AFM140-X04030-EX-48V	157	48

Other speeds and voltages customizable

146 Series Disc Motor

146 Series Disc Motor





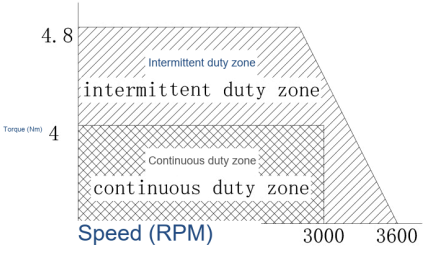
Motor Model	Outer Diameter (mm)	Voltage (V)
AFM146-X12030-48V	169	48

Other speeds and voltages customizable

Electrical Parameters

Motor Model	AFM140-X04030-EX-48V
Rated Power (kW)	1.2
Rated Current (A)	29
Rated Speed (rpm)	3000
Max. Speed (rpm)	3600
Rated Torque (N·m)	4
Peak Torque (N·m)	12

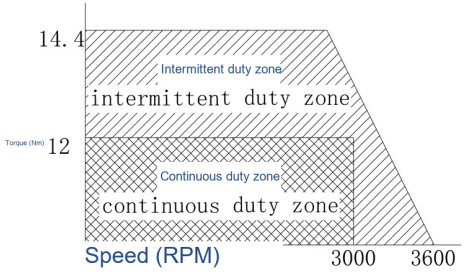
Torque-Speed Characteristic Curve



Electrical Parameters

Motor Model	AFM146-X12030-48V
Rated Power (kW)	3.7
Rated Current (A)	90
Rated Speed (rpm)	3000
Max. Speed (rpm)	3600
Rated Torque (N·m)	12
Peak Torque (N·m)	36

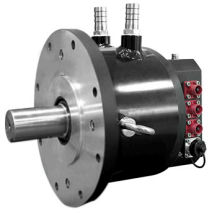
Torque-Speed Characteristic Curve

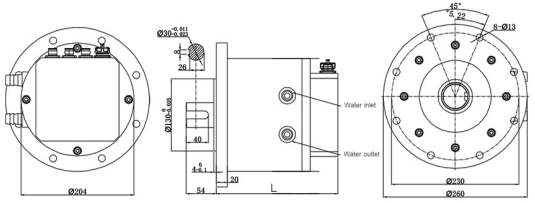


Motor Mounting Dimensions

180 Series Disc Motor

▶ 180 Series Disc Motor

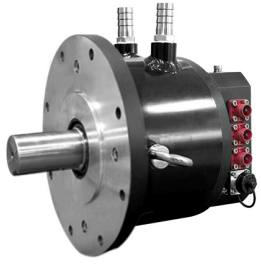


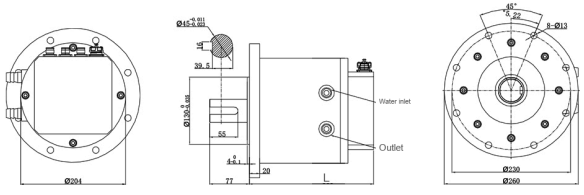


Motor Model	Outer Diameter (mm)	Voltage (V)
AFM180-X35030-600V	260	600

Other speeds and voltages customizable

▶ 180 Series Disc Motor





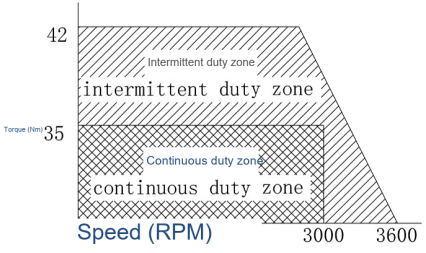
Motor Model	Outer Diameter (mm)	Voltage (V)
AFM180-X50030-600V	260	600

Other speeds and voltages customizable

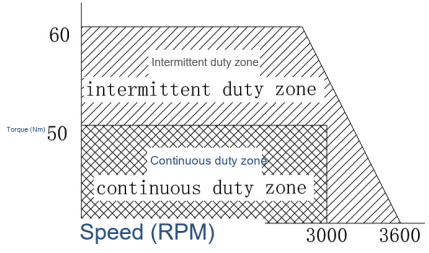
Electrical Parameters

Motor Model	AFM180-X35030-600V	AFM180-X50030-600V
Rated Power (kW)	11	15
Rated Current (A)	23	32
Rated Speed (rpm)	3000	3000
Max. Speed (rpm)	3600	3600
Rated Torque (N·m)	35	50
Peak Torque (N·m)	105	150
Rotor Inertia (kg·cm²)	77.5	97.8

Torque-Speed Characteristic Curve



AFM180-X35030-600V



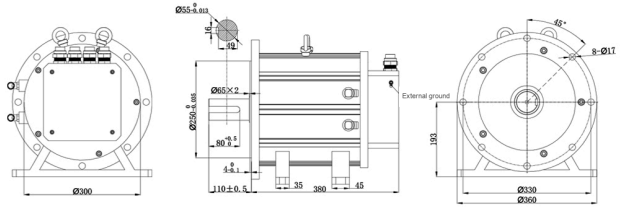
AFM180-X50030-600V

Motor Mounting Dimensions

260 Series Disc Motor

260 Series Disc Motor





Motor Model	Outer Diameter (mm)	Voltage (V)
AFM260-X70015-600V	265	600
AFM260-X75040-600V	360	600
AFM260-X10A30-600V	360	600
AFM260-X85050-EX-380V	360	600

Other speeds and voltages customizable

Electrical Parameters

Motor Model	AFM260-X70015-600V
Rated Power (kW)	11
Rated Current (A)	22
Rated Speed (rpm)	1500
Max. Speed (rpm)	1800
Rated Torque (N·m)	70
Peak Torque (N·m)	210

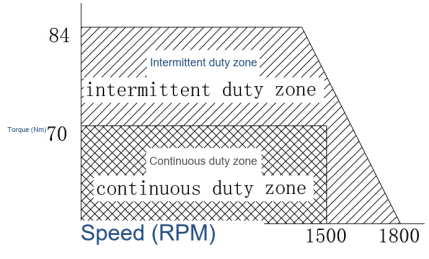
Motor Model	AFM260-X75040-600V
Rated Power (kW)	30
Rated Current (A)	59
Rated Speed (rpm)	4000
Max. Speed (rpm)	4800
Rated Torque (N·m)	75
Peak Torque (N·m)	216

Electrical Parameters

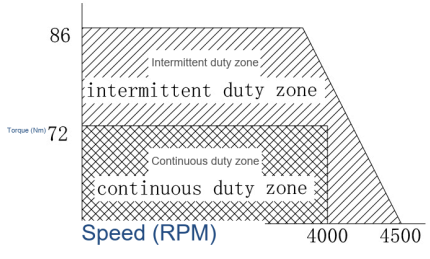
Motor Model	AFM260-X10A30-600V
Rated Power (kW)	30
Rated Current (A)	59
Rated Speed (rpm)	3000
Max. Speed (rpm)	3600
Rated Torque (N·m)	100
Peak Torque (N·m)	250

Motor Model	AFM260-X85050-EX-380V
Rated Power (kW)	45
Rated Current (A)	115
Rated Speed (rpm)	5000
Max. Speed (rpm)	6000
Rated Torque (N·m)	85
Peak Torque (N·m)	170

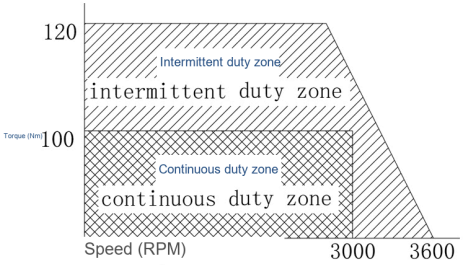
Torque-Speed Characteristic Curve



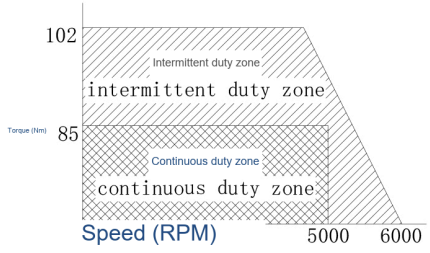
AFM260-X70015-600V



AFM260-X75040-600V



AFM260-X10A30-600V



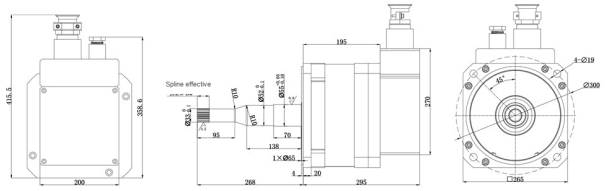
AFM260-X85050-EX-380V

Motor Mounting Dimensions

260 Series Mining Explosion-proof Disc Motor

260 Series Mining Explosion-proof Disc Motor





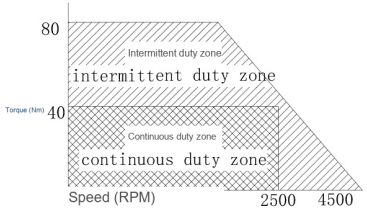
Motor Model	Outer Diameter (mm)	Voltage (V)
SB-10.5/220Y	265	220

Other speeds and voltages customizable

Electrical Parameters

Motor Model	SB-10.5/220Y
Rated Power (kW)	10.5
Rated Current (A)	53
Rated Speed (rpm)	2500
Max. Speed (rpm)	3000
Rated Torque (N·m)	40
Peak Torque (N·m)	80

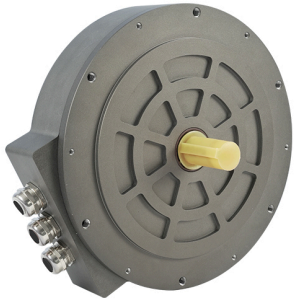
Torque-Speed Characteristic Curve

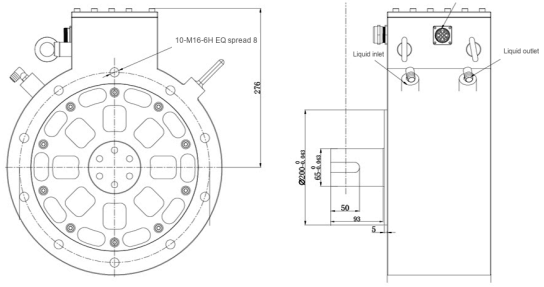


Motor Mounting Dimensions

Axial Flux Motor

Axial Flux Motor





Motor Model	Outer Diameter (mm)	Voltage (V)
260-AF	260	48

Other speeds and voltages customizable

Electrical Parameters

Motor Model	260-AF
Rated Power (kW)	4
Rated Current (A)	100
Rated Speed (rpm)	3000
Max. Speed (rpm)	3600
Rated Torque (N·m)	12
Peak Torque (N·m)	36

Multiple structures, sizes and power ratings, with special requirements such as explosion-proof and waterproof available to meet diverse applications

90 Series Joint Motor



Motor Model	Dimension (mm)	Voltage (V)
AFM90-X02016-48V	Ø99*42	48
AFM90-X02516-48V	Ø99*42	48

Other speeds and voltages customizable

Motor Model	AFM90-X02016-48V	AFM90-X02516-48V
Rated Power (kW)	0.35	0.45
Rated Current (A)	10	10
Rated Speed (rpm)	1600	1600
Max. Speed (rpm)	2800	2800
Rated Torque (N·m)	2.25	2.5
Peak Torque (N·m)	10	12

120 Series Joint Motor



Motor Model	Dimension (mm)	Voltage (V)
AFM120-X03010-48V	Ø128*50	48
AFM120-X03015-48V	Ø128*50	48
AFM120-X04010-48V	Ø128*50	48
AFM120-X04015-48V	Ø128*50	48

Other speeds and voltages customizable

Motor Model	AFM120-X03010-48V	AFM120-X03015-48V	AFM120-X04010-48V	AFM120-X04015-48V
Rated Power (kW)	0.3	0.45	0.4	0.6
Rated Current (A)	7.5	10.5	11	15
Rated Speed (rpm)	1000	1500	1000	1550
Max. Speed (rpm)	1500	2000	1500	2200
Rated Torque (N·m)	2.95	2.95	3.75	3.75
Peak Torque (N·m)	15.5	16	21.5	22

AFM Special Series Joint Motor



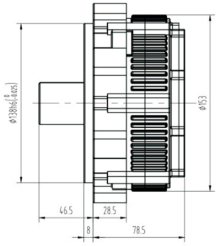
Motor Model	Dimension (mm)	Voltage (V)
AFM70-X01316-48V	¢78*35	48
AFM70-X01322-48V	¢78*35	48
AFM150-X07515-48V	¢165*55	48
AFM150-X30010-48V	¢220*68	96

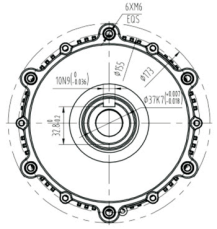
Other speeds and voltages customizable

Motor Model	AFM70-X01316-48V	AFM70-X01322-48V	AFM150-X07515-48V	AFM150-X30010-48V
Rated Power (kW)	0.2	0.3	1.15	3
Rated Current (A)	6.5	9	30	50
Rated Speed (rpm)	1600	2250	1500	1000
Max. Speed (rpm)	2800	4000	2000	1800
Rated Torque (N·m)	1.25	1.25	7.5	30
Peak Torque (N·m)	6.5	7	35	90

AFM150 Disc Motor







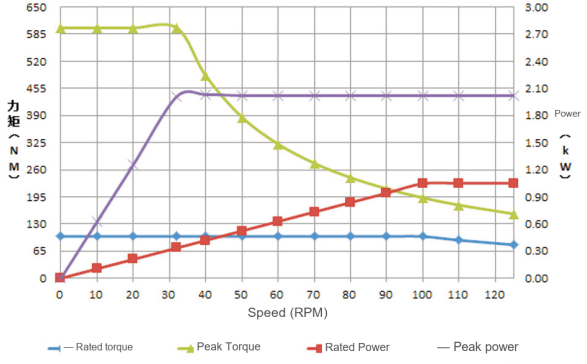
Motor Model	Application	Voltage (V)
AFM150-X03330-48V	AGV/UGV	48

Other speeds and voltages customizable

Electrical Parameters

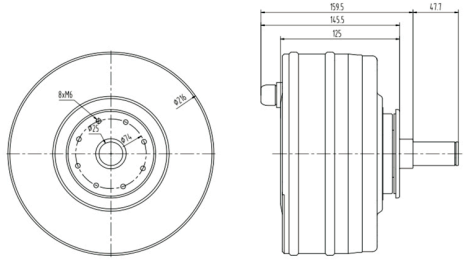
Motor Model	AFM150-X03330-48V
Rated Power (kW)	1
Rated Current (A)	20
Rated Speed (rpm)	Customized per request
Max. Speed (rpm)	Customized per request
Rated Torque (N·m)	3.3
Peak Torque (N·m)	600

Torque-Speed Characteristic Curve



AFM220 Disc Motor





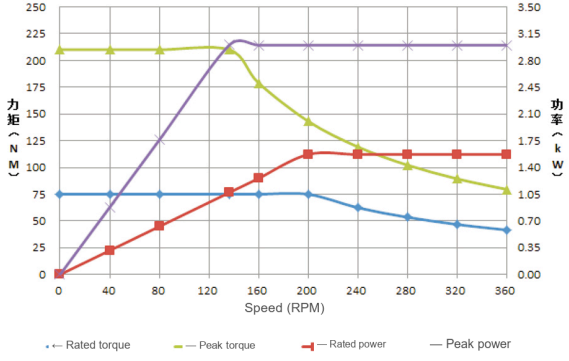
Motor Model	Application	Voltage (V)
AFM220-3A	AGV/UGV	48

Other speeds and voltages customizable

Electrical Parameters

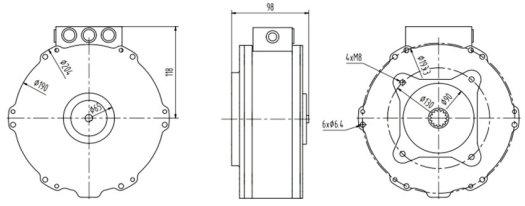
Motor Model	AFM220-3A
Rated Power (kW)	1.5
Rated Current (A)	65
Rated Speed (rpm)	Customized per request
Max. Speed (rpm)	Customized per request
Rated Torque (N·m)	15
Peak Torque (N·m)	210
Reduction Ratio	Customized per request

Torque-Speed Characteristic Curve



AFM200-17A Disc Motor





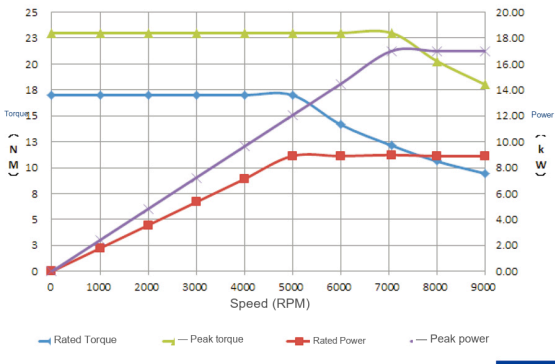
Motor Model	Application	Voltage (V)
AFM200-17A	High-speed Pump Drive	120

Other speeds and voltages customizable

Electrical Parameters

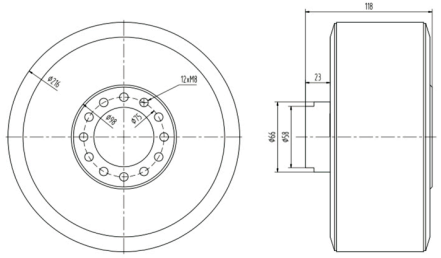
Motor Model	AFM200-17A
Rated Power (kW)	9
Rated Current (A)	130
Rated Speed (rpm)	5000
Max. Speed (rpm)	9000
Rated Torque (N·m)	17
Peak Torque (N·m)	23
Reduction Ratio	Customized per request

Torque-Speed Characteristic Curve



AFM220-40A Disc Motor





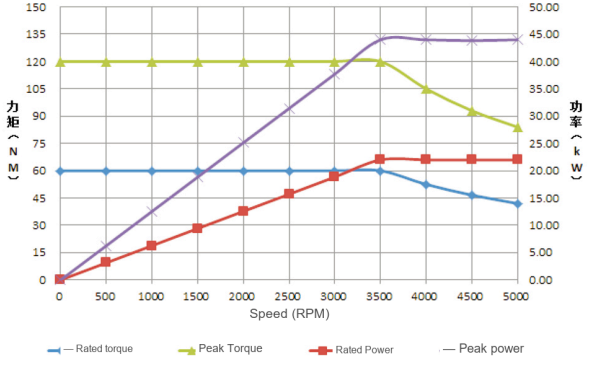
Motor Model	Application	Voltage (V)
AFM220-40A	Special Vehicles	120

Other speeds and voltages customizable

Electrical Parameters

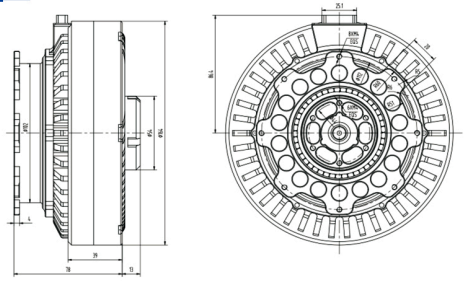
Motor Model	AFM220-40A
Rated Power (kW)	20
Rated Current (A)	230
Rated Speed (rpm)	3500
Max. Speed (rpm)	5000
Rated Torque (N·m)	60
Peak Torque (N·m)	120
Reduction Ratio	Customized per request

Torque-Speed Characteristic Curve



AFM160-0.4A Disc Motor





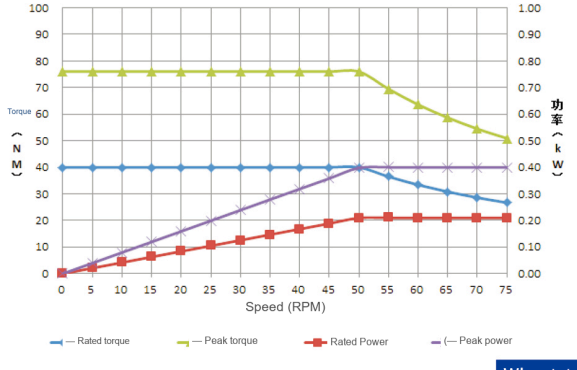
Motor Model	Application	Voltage (V)
AFM160-0.4A	Medical Robots	36

Other speeds and voltages customizable

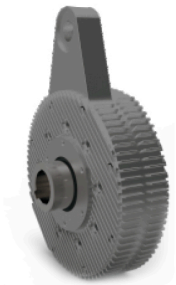
Electrical Parameters

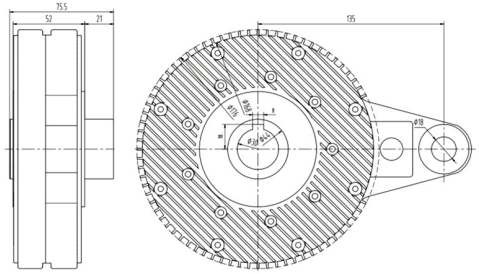
Motor Model	AFM160-0.4A
Rated Power (kW)	0.2
Rated Current (A)	8
Rated Speed (rpm)	Customized per request
Max. Speed (rpm)	Customized per request
Rated Torque (N·m)	2.5
Peak Torque (N·m)	76
Reduction Ratio	Customized per request

Torque-Speed Characteristic Curve



AFM170-0.5A Series





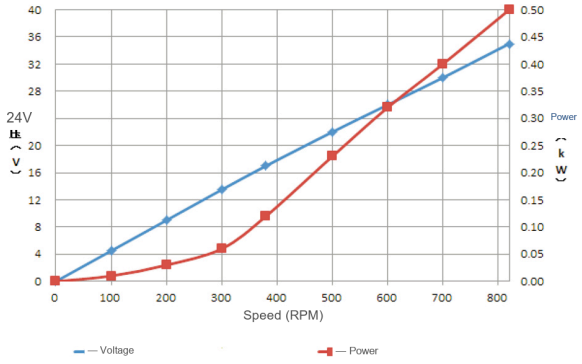
Motor Model	Application	Voltage (V)
AFM170-0.5A	Train Axle-end Power Generation	17

Other speeds and voltages customizable

Electrical Parameters

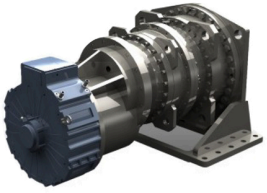
Motor Model	AFM170-0.5A
Rated Power (kW)	0.12
Rated Current (A)	4.5
Rated Speed (rpm)	380
Max. Speed (rpm)	820
Rated Capacity	0.126KVA
Peak Capacity	0.526KVA
Reduction Ratio	Customized per request

Torque-Speed Characteristic Curve



Application situation


Pulley


Gearbox




Integrated Water Pump


Motor-Fan-Controller Integration


Motor-Fan Integration (2-in-1)

AFM Series Disc Motor

Electrical Parameters

Item		Specification				
Energy Efficiency Class		All series are IE5 class				
Power Range		5.5–160KW				
Frame		160–315				
Insulation Class		H				
Protection Rating		IP67				
Duty Cycle		S1				
Speed		750–3000rpm				
Voltage		380V				
Ambient Temperature		0–40℃				
Ambient Humidity		15%–90%RH				
Altitude Derating Coefficient		Above 1000 m altitude, the derating factors are as follows				
	Altitude	1000m	2000m	3000m	4000m	5000m
	Derating Factor	1	0.95	0.9	0.83	0.65

AFM Series Disc Motor

Energy efficiency complies with IEC TS 60034-30-2 IE5 and GB 30253-2013 Grade 1

Energy efficiency requirements (90 kW and below)

Synchronous speed 3000 rpm 380V

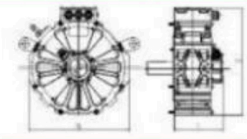


Electrical Parameters

Synchronous speed 3000 rpm **380V**

Model	Center Height	Rated Power	Rated Speed	Rated current per IE5 requirement	Efficiency	Power Factor	Frequency	Rated Torque	Weight	Cooling Method
		KW	r/min	A	(100%)	(Cosϕ)	Hz	N.m	Kg	
AFM215	132	5.5	3000	9.6	92.6	94	0.96	400	17.5	19	Natural cooling
AFM225	132	7.5	3000	13.2	93.3	94.5	0.96	400	23.9	22	Natural cooling
AFM255	160	15	3000	26.4	94.5	95.4	0.96	300	47.8	32	Liquid cooling
AFM275	160	22	3000	38.2	95.1	95.9	0.96	300	70	35	Liquid cooling
AFM320	180	30	3000	52.1	95.5	96.1	0.96	300	95.5	42	Air cooling
	180	45	3000	77.8	96	96.5	0.96	300	143	40	Liquid cooling
AFM345	200	55	3000	95.1	96.2	96.5	0.96	300	175	45	Liquid cooling
AFM380	225	90	3000	153	96.6	97	0.96	400	287	85	Liquid cooling
AFM400	250	75	3000	129.5	96.5	96.6	0.96	400	239	115	Air cooling
	250	110	3000	188	96.8	97.1	0.96	400	350	110	Liquid cooling
AFM435	250	132	3000	227	96.9	97.1	0.96	400	420	120	Liquid cooling
AFM460	280	110	3000	191	96.8	97.2	0.96	400	350	135	Air cooling
	280	160	3000	275	97	97.2	0.96	400	509	130	Liquid cooling
AFM500	280	200	3000	343	97.2	97.2	0.96	400	637	165	Liquid cooling
AFM538	315	250	3000	428	97.2	97.2	0.96	400	796	220	Liquid cooling

External drawing Motor Outline Drawing

Platform	AFM255	AFM275
Outline Drawing		
	L*B*H: 255*160*315	L*B*H: 390*166*385

AFMEX Dust Explosion-proof Disc Motor



Motor Model	Application	Voltage (V)
AFM568-X100A10-EX-380V	High-speed Pump Drive	380

Other speeds and voltages customizable

Electrical Parameters

Motor Model	AFM568-X100A10-EX-380V
Rated Power (kW)	90
Rated Current (A)	263
Rated Speed (rpm)	1000
Rated Efficiency	96.5%
Rated Torque	1095Nm
Protection Rating	IP67
Cooling Method	Liquid cooling