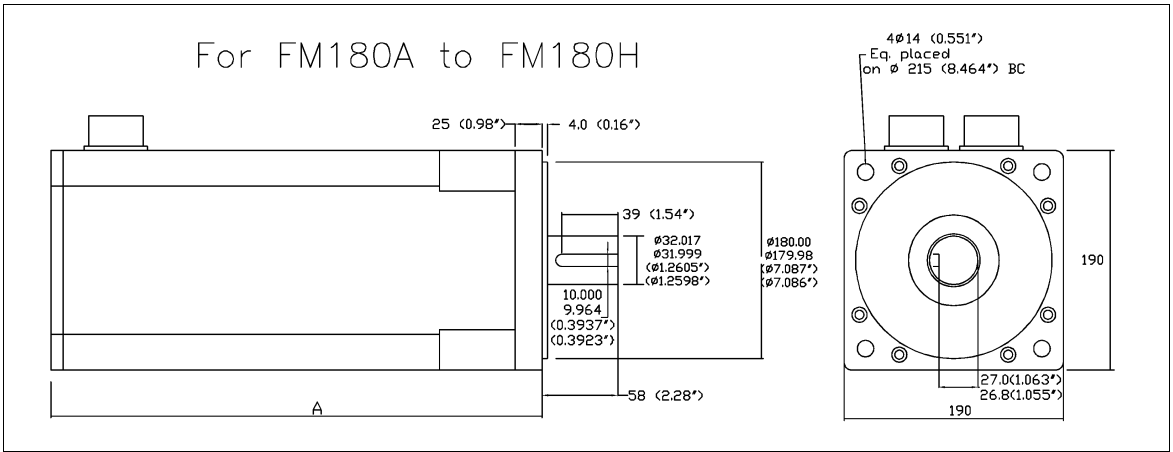
FM Brushless Motor Performance

FM180 Series Motor Data 190 mm Frame 230 V

Motor Parameters	Units	FM180D -88	FM180D -125	FM180I -85*	FM180I -141	FM180M -82*#	FM180M -122
Horsepower	HP	12.8	10.2	18.3	18.1	22.5	22.9
Kilowatts	KW	9.5	7.6	13.6	13.5	16.8	17.1
Max. Speed	RPM	2400	1500	2400	1500	2400	1500
Rated Speed	RPM	2400	1500	2400	1500	2400	1500
Continuous Rated Torque	Nm(In-Lbs)	37.9 (335)	48.6(430)	54.3 (480)	86.0 (760)	66.7 (590)	109 (960)
Continuous Stall Torque	Nm(In-Lbs)	54.3 (480)	54.3(480)	79.2 (700)	106 (940)	106 (940)	141 (1250)
Peak Torque	Nm(In-Lbs)	94.7 (838)	122 (1075)	136 (1200)	215 (1900)	167 (1475)	271 (2400)
Continuous Line Current	Amps RMS	29.8	26.8	44.2	42.1	56.6	61.3
Peak Current	Amps RMS	74.6	67.0	110	105	142	153
Torque Constant K_T	Nm/Amps (RMS)	1.28	1.82	1.23	2.05	1.18	1.77
Back EMF Constant K_B	Vrms/Krpm	87.8	125.4	84.8	141.1	81.5	122.3
DC Resistance	Ohms	0.13	0.27	0.07	0.11	0.04	0.05
Inductance	Millihenries	7.0	14.2	5.1	8.0	3.3	4.2
Rotor Inertia	Kg-M^2 (In-Lbs-Sec^2)	0.0084 (0.074)	0.0084 (0.074)	0.017 (0.15)	0.017 (0.15)	0.025 (0.22)	0.025 (0.22)
Static Friction	Nm(In-Lbs)	0.7 (6.2)	0.7 (6.2)	0.7 (6.2)	0.7 (6.2)	0.7 (6.2)	0.7 (6.2)
Motor Weight	Kg(Lbs)	32 (70)	32 (70)	56 (123)	56 (123)	75 (165)	75 (165)
Maximum Line Voltage	Vrms	250	250	250	250	250	250
Number of Poles		6	6	6	6	6	6

Notes:

1. Continuous rating @25°C. Motor mounted on a 360 mm X 360 mm X 12 mm Aluminum heatsink. Maximum winding temperature 155°C.
2. Test drive input voltage was 220 Vac..



Model	FM180D-63	FM180D-88	FM180I-66	FM180I-85	FM180M-68	FM180M-82
A	325 (12.80")	325 (12.80")	450 (17.72")	450 (17.72")	550 (21.65")	550 (21.65")

Notes:
- **IEC mounting dimensions are shown. NEMA mountings are available, please contact Expro Engineering for information.**
- **Radial load on output shaft < 450 N (100 Lbs). Axial load should be < 230 N (50 Lbs).**
- **All data are subject to change without notice.**

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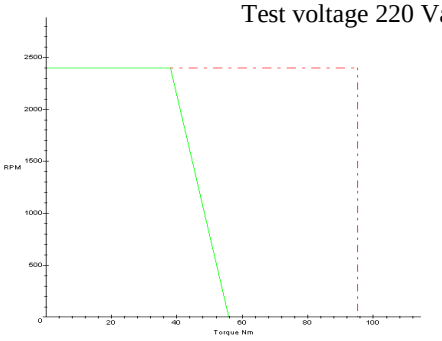
FM Brushless Motor Performance
FM180 Series Motor Data 190 mm Frame 230 Vac

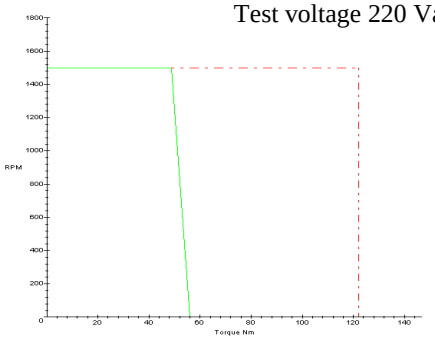
FM180D-88 PERFORMANCE

Test voltage 220 Vac



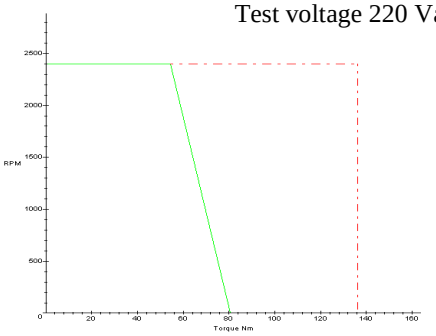
FM180D-125 PERFORMANCE

Test voltage 220 Vac



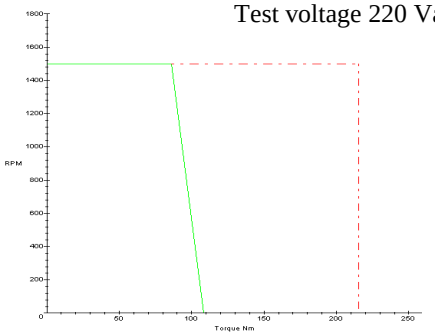
FM180I-85 PERFORMANCE

Test voltage 220 Vac



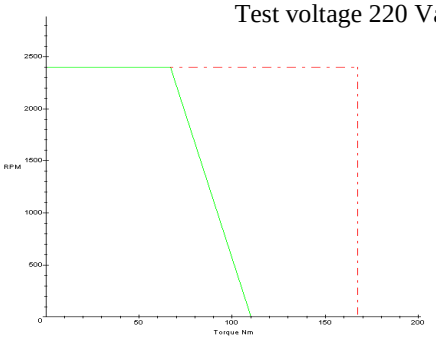
FM180I-141 PERFORMANCE

Test voltage 220 Vac



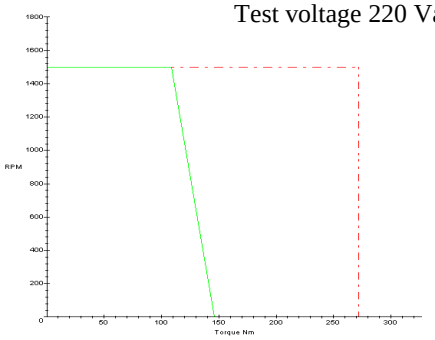
FM180M-82 PERFORMANCE

Test voltage 220 Vac



FM180M-122 PERFORMANCE

Test voltage 220 Vac



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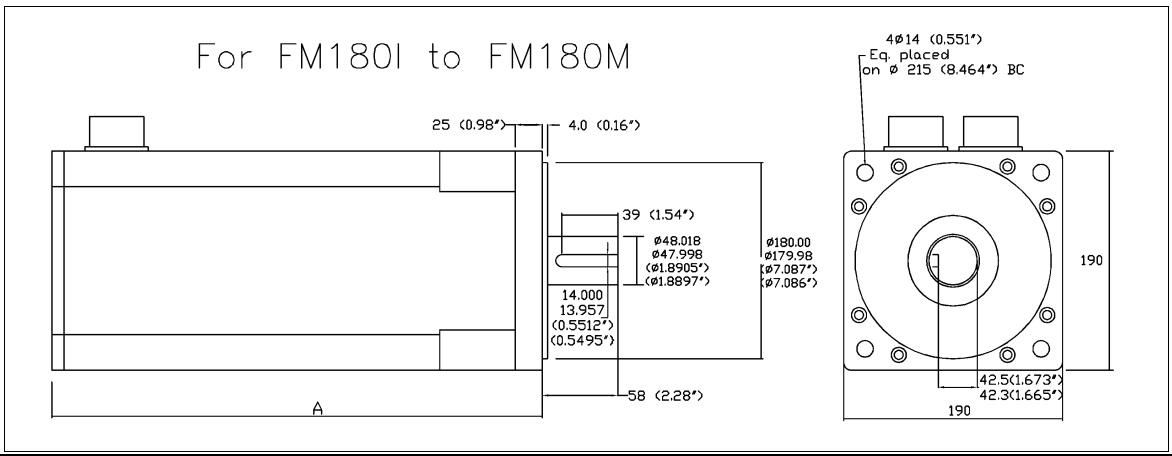
FM Brushless Motor Performance

FM180 Series Motor Data 190 mm Frame 460 V

Motor Parameters	Units	FM180D -151	FM180D -259	FM180I -169*	FM180I -282	FM180M -153*	FM180M -285
Horsepower	**HP**	12.8	10.2	18.3	18.1	22.5	22.9
Kilowatts	**KW**	9.5	7.6	13.6	13.5	16.8	17.1
Max. Speed	**RPM**	2400	1500	2400	1500	2400	1500
Rated Speed	**RPM**	2400	1500	2400	1500	2400	1500
Continuous Rated Torque	**Nm(In-Lbs)**	37.9 (335)	48.6(430)	54.3 (480)	86.0 (760)	66.7 (590)	109 (960)
Continuous Stall Torque	**Nm(In-Lbs)**	54.3 (480)	54.3(480)	79.2 (700)	106 (940)	106 (940)	141 (1250)
Peak Torque	**Nm(In-Lbs)**	94.7 (838)	122 (1075)	136 (1200)	215 (1900)	167 (1475)	271 (2400)
Continuous Line Current	**Amps RMS**	17.4	13.0	22.1	21.1	30.2	26.3
Peak Current	**Amps RMS**	43.5	32.4	55.3	52.6	75.5	65.7
Torque Constant K_T	**Nm/Amps (RMS)**	2.19	3.77	2.46	4.09	2.22	4.14
Back EMF Constant K_B	**Vrms/Krpm**	150.5	259.1	169.3	282.2	152.9	285.4
DC Resistance	**Ohms**	0.39	1.15	0.28	0.43	0.14	0.28
Inductance	**Millihenries**	20.5	60.6	20.5	32.0	11.6	22.6
Rotor Inertia	**Kg-M^2 (In-Lbs-Sec^2)**	**0.0084 (0.074)**	**0.0084 (0.074)**	**0.017 (0.15)**	**0.017 (0.15)**	**0.025 (0.22)**	**0.025 (0.22)**
Static Friction	**Nm(In-Lbs)**	0.7 (6.2)	0.7 (6.2)	0.7 (6.2)	0.7 (6.2)	0.7 (6.2)	0.7 (6.2)
Motor Weight	**Kg(Lbs)**	32 (70)	32 (70)	56 (123)	56 (123)	75 (165)	75 (165)
Maximum Line Voltage	**Vrms**	460	460	460	460	460	460
Number of Poles		6	6	6	6	6	6

Notes:

1. Continuous rating @25°C. Motor mounted on a 360 mm X 360 mm X 12 mm Aluminum heatsink. Maximum winding temperature 155°C.
2. Test drive input voltage was 460 Vac.



Model	FM180D-125	FM180D-201	FM180I-141	FM180I-198	FM180M-122	FM180M-204
A	325 (12.80")	325 (12.80")	450 (17.72")	450 (17.72")	550 (21.65")	550 (21.65")

Notes:
- **IEC mounting dimensions are shown. NEMA mountings are available, please contact Expro Engineering for information.**
- **Radial load on output shaft < 450 N (100 Lbs). Axial load should be < 230 N (50 Lbs).**
- **All data are subject to change without notice.**

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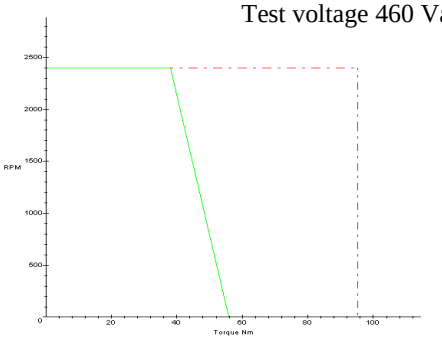
FM Brushless Motor Performance
FM180 Series Motor Data 190 mm Frame 460 Vac

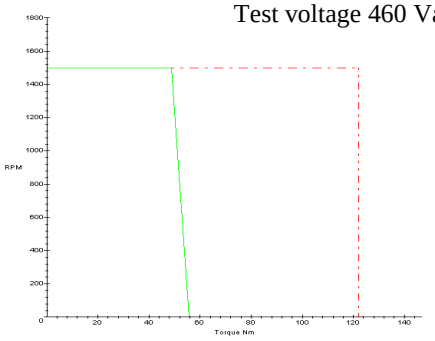
FM180D-151 PERFORMANCE

Test voltage 460 Vac



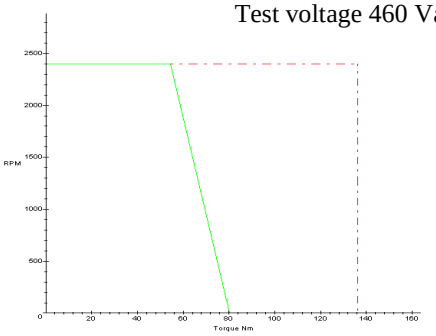
FM180D-259 PERFORMANCE

Test voltage 460 Vac



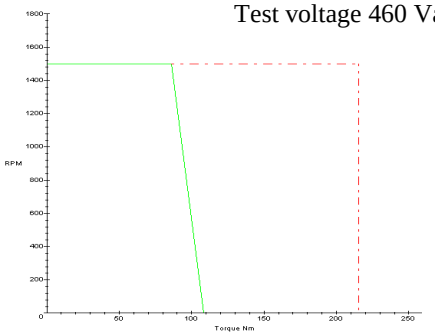
FM180I-169 PERFORMANCE

Test voltage 460 Vac



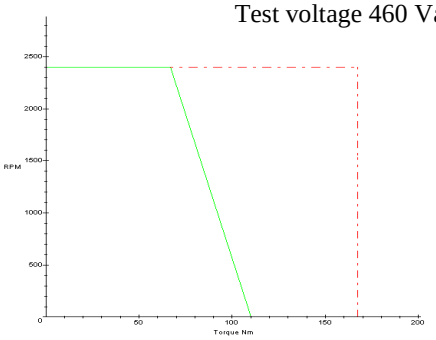
FM180I-282 PERFORMANCE

Test voltage 460 Vac



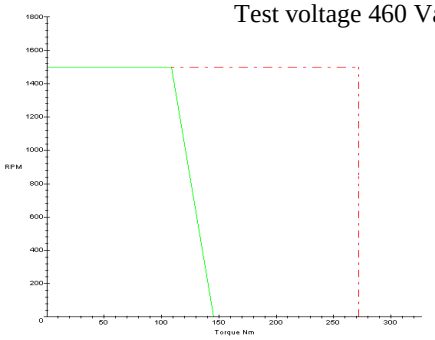
FM180M-153 PERFORMANCE

Test voltage 460 Vac



FM180M-285 PERFORMANCE

Test voltage 460 Vac



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FM180 Motor Connectors and Connector Pin Outs

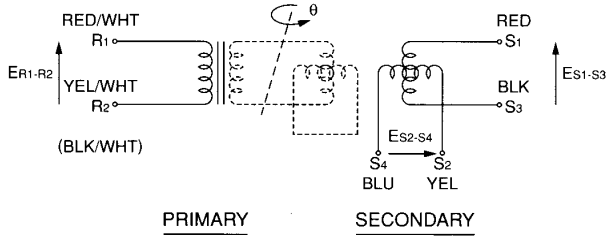
Motor Connector (MS3102E-32-17P) Straight Mating Plug: MS3106E-32-17S		
Pin	**Function**	**Wire Color**
A	ϕU	Red
B	ϕV	Black
C	ϕW	White
D	GND	Green

Resolver Connector(MS3102E-22-19P) Straight Mating Plug: MS3106E-22-19S		
Pin	**Function**	**Wire Color**
A	COS-(S1)	Red
B	COS+(S3)	Black
C	SIN-(S2)	Yellow
D	SIN+(S4)	Blue
E	Excit (R1)	Red/White
F	Excit GND (R2)	Yellow/White
G	THERM	Green
H	THERM	Green
J		
K	GND	Green
L		
M	* BRK(+)	
N	* BRK GND	
P	* BRK(-)	

* For brake option only.

RESOLVER ELECTRICAL SPECIFICATIONS:

1. Operation temperature: -55°C to 155°C
2. Maximum speed: 10,000 rpm
3. Dielectric strength: Vac 500, I minute
4. Excitation voltage: 7 Vrms 10 KHz
5. Electric error: ± 10' Max.
6. Transformation ratio: 0.5 nominal



Excitation : $E_{R1-R2}=E\sin \omega t$

Output : $E_{S1-S3}=K E_{R1-R2} \cos \theta$

$E_{S2-S4}=K E_{R1-R2} \sin \theta$

K : Transformation Ratio

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