

motion product specialists designed and manufacture this extensive line of High Performance Brushless DC Motors and Drives. These products are applied in a broad range of applications that require precision control with servo-like response, high efficiency, and smaller, high torque motors.

POWERTEC Brushless DC Motors provide very high horsepower in relatively small NEMA frame sizes. PACTORQ™ Brushless DC Motors, with an optimized neodymium magnetic design, boast the highest horsepower density in the industry. Trouble-free long life is assured, as the only motor maintenance requirement is infrequent bearing relubrication.

Two Series of Brushless DC Drives, employing full digital designs, have extensive control options to meet your most demanding application-specific requirements. The GENESIS Series utilizes an analog user interface in conjunction with option boards for versatile functionality. The MILLENNIUM® Series includes PowerTool software for easy setup and precision tuning. These are just a few of the many powerful features of these high performance drives.

Convenient Pre-Engineered Drive Systems combine flexibility with field-proven design. These industrial panel enclosures are configured with a large selection of drives and associated control options to meet your exacting control requirements.

years of experience in providing practical and cost effective solutions for a host of high performance motion control requirements. Take advantage of the edge these High Performance Brushless DC Motors and Drives will provide in your application.

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How to use this section

This section covers our extensive line of high performance POWERTEC and PACTORQ Brushless DC Motors. Select the proper motor using one of the following procedures.

- If you are already familiar with these motors and the available options, refer to the POWERTEC Model Number Codes beginning on page 6, or the PACTORQ Model Number Codes beginning on page 53 to verify the coded information.
- If you are not familiar with these motors and the available options refer to the POWERTEC general specifications on page 5, the PACTORQ general specifications on page 52 and/or the index at the right. Construct a model number after all the technical parameters, including options, are determined.

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Versatile Packaging

The POWERTEC motor line includes NEMA Totally Enclosed Non-Ventilated (TENV), Totally Enclosed Air Over (TEAO), Dripproof Fully Guarded (DPFG), and Dripproof Blower Ventilated (DPBV) enclosures. This broad array provides suitable motor enclosures and mounting for virtually any industrial environment. The motors are available with NEMA foot mountings, NEMA C face, and D flange mountings are also available.

High Efficiency

The brushless DC motor uses efficient ceramic ferrite permanent magnets bonded to the rotor to produce the magnetic field. Thus, there are no losses in the motor due to rotor induction currents. All of the current delivered to the brushless DC motor is used to develop torque.

Dynamic Response

The powerful and lightweight permanent magnet rotor design provides low rotor inertia providing high torque to inertia ratios in a relatively small frame. This high torque density equates to a very responsive motor with high starting and running torque, rapid start-stop capabilities, and smooth operation over the entire speed range.

Precision Control

The brushless DC motor is a true synchronous motor. The rotor field is always in sync with the excitation field; it does not have losses due to slip. This factor, inherent to brushless DC design, combined with various primary and secondary feedback options, allows for precise speed and torque control.

Low Maintenance

The brushless DC motor does not have any brushes to replace or a commutator to wear out. Little heat is generated in the rotor allowing the bearings to run cooler while increasing bearing life. Factory mounted feedback devices are integral to the motor and eliminate high maintenance couplings.



POWERTEC BRUSHLESS DC MOTORS
0.25-300 HP STANDARD

POWERTEC BRUSHLESS DC MOTORS

FEATURES

Brushless Technology

Optimum ferrite permanent magnet design

NEMA enclosures and mounting options

Patented double-finned, aluminum frame (US Patent No. 4,839,547)

Oversize bearings pressed into steel bearing insert, clamped rear bearing (NEMA 180-500 frames)

Integral shaft mounted
Hall Sensors or resolver and encoder

Four different wiring configurations for various horsepower and speed requirements

Robust stator
– Concentric coil windings
– Inverter duty insulation system
– Proprietary trickle varnish process

Class H insulated, conservatively rated for class F operation

Near unity power factor at all speeds and loads

0% speed regulation

Standard two year warranty

BENEFITS

Reliable, high-performance motor technology - long life, virtually maintenance free, cooler running, low acoustic noise, same HP as other motor technologies in smaller motor frame

– Low rotor inertia
– High power density
– High torque density

Satisfies broad end-use requirements

Efficient cooling of the stator assembly
Withstands higher shock loads than conventional cast iron enclosures

All thrust loads accommodated by rear bearing, increasing reliability and life

No coupling, yields higher feedback resolution and accuracy

Flexible and versatile

Stator better withstands high voltage transients of PWM waveforms

Additional assurance of motor integrity over broad temperature range

Eliminates costly power factor correction
Reduces power consumption for important energy savings

No slip, drift, higher throughput

Assured quality and reliability

POWERTEC BRUSHLESS DC MOTORS

FEATURES

- Optimum ferrite permanent magnet design
- High efficiency
- High dynamic response
- High power density
- Patented, double-finned aluminum frame for highest thermal efficiency and light weight (NEMA 42-500 frames)
- Four different wiring configurations for various horsepower and speed requirements
- Robust stator
 - Concentric coil windings
 - Inverter duty insulation system
 - Proprietary trickle varnish process
- NEMA mounting options
- Standard two year warranty

PRIMARY FEEDBACK OPTIONS

- Hall sensors (dual channel quadrature)
 - 30 ppr (120 ppr after 4x multiplication by the drive)
(NEMA 42-250 frames)
 - 60 ppr (240 ppr after 4x multiplication by the drive)
(NEMA 280-500 frames)
- Integral, through-shaft frameless resolver (transmitter type)

SECONDARY FEEDBACK OPTIONS

- Externally mounted 600 or 1024 ppr line driver encoder
- Encoder feedback mounting kit

OTHER OPTIONS

- NEMA C face and D flange mounting
- Maximum capacity ball bearings and roller bearings
- NTC or PTC thermistor
- 100 VDC fail-safe brake
- 115, 230, or 460 VAC fail-safe brake
- Custom terminations: F1, F2, or top mounted terminal box, MS connectors, explosion proof terminal box
- Slide base mounting
- Custom stator windings
- Custom mounting and shaft configurations
- Grease fittings and grease relief
- Special rotor balance
- Dripproof, Separately Ventilated
- Totally Enclosed, Pipe Ventilated
- Totally Enclosed, Water Proof
- Totally Enclosed, Dust Proof
- Totally Enclosed, Water Cooled (NEMA 250-320 frames)

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting
- Cranes
- Elevators

AGENCY APPROVALS

- UL Recognized (file #E130709)
- CSA Listed (file #LR103655-2)
- CE Certified (Pending)

GENERAL SPECIFICATIONS

Number of poles	4 (NEMA 42 - 250 frames) 8 (NEMA 280 - 500 frames)
Winding	3 phase Wye or Delta, series or parallel (12 lead reconnectable)
Magnet Type	Ferrite
Standard Enclosures . .	TENV, TEO, DPBV, DPFG
Mounting	NEMA foot mounting (NEMA 180-500) NEMA C face (NEMA 42-250) NEMA D flange (NEMA 210, 280, 320)
Terminations	Flying leads in terminal box: top mounted (NEMA TENV 42, 140) F1 mounted (NEMA 180-500)
Thermal Protection . . .	Normally closed thermostat with Hall Sensor Feedback NTC thermistor with Resolver Feedback

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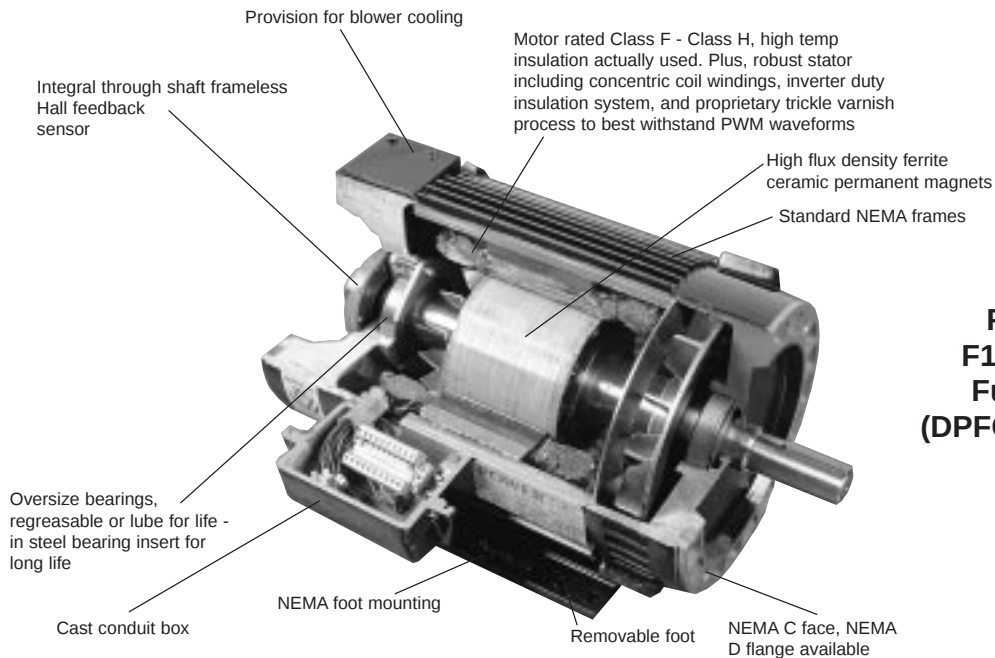
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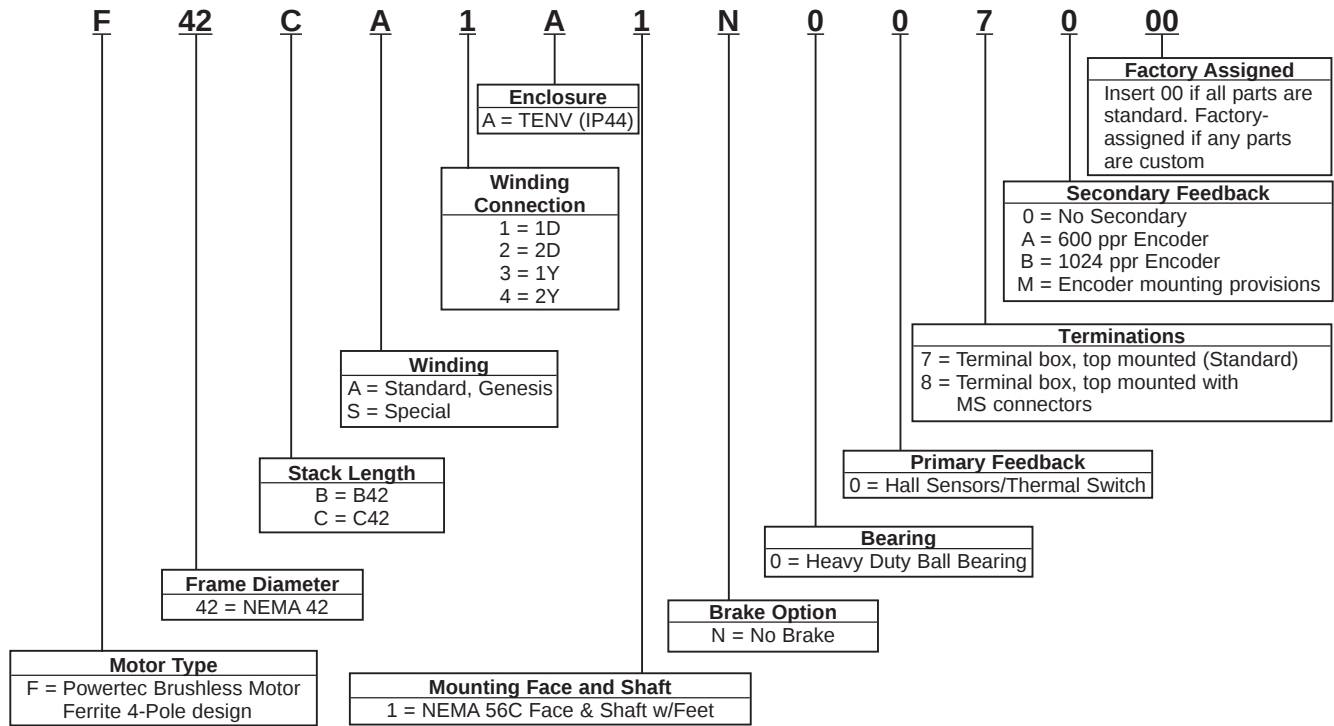
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POWERTEC MOTORS MODEL NUMBER CODES



**POWERTEC
F184 Dripproof,
Fully Guarded
(DPFG) Motor Shown**

POWERTEC FERRITE-NEMA 42 FRAME






 File #E130709 File #LR103655-2 (Pending)

NOTE: To construct a motor model number select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified motor.

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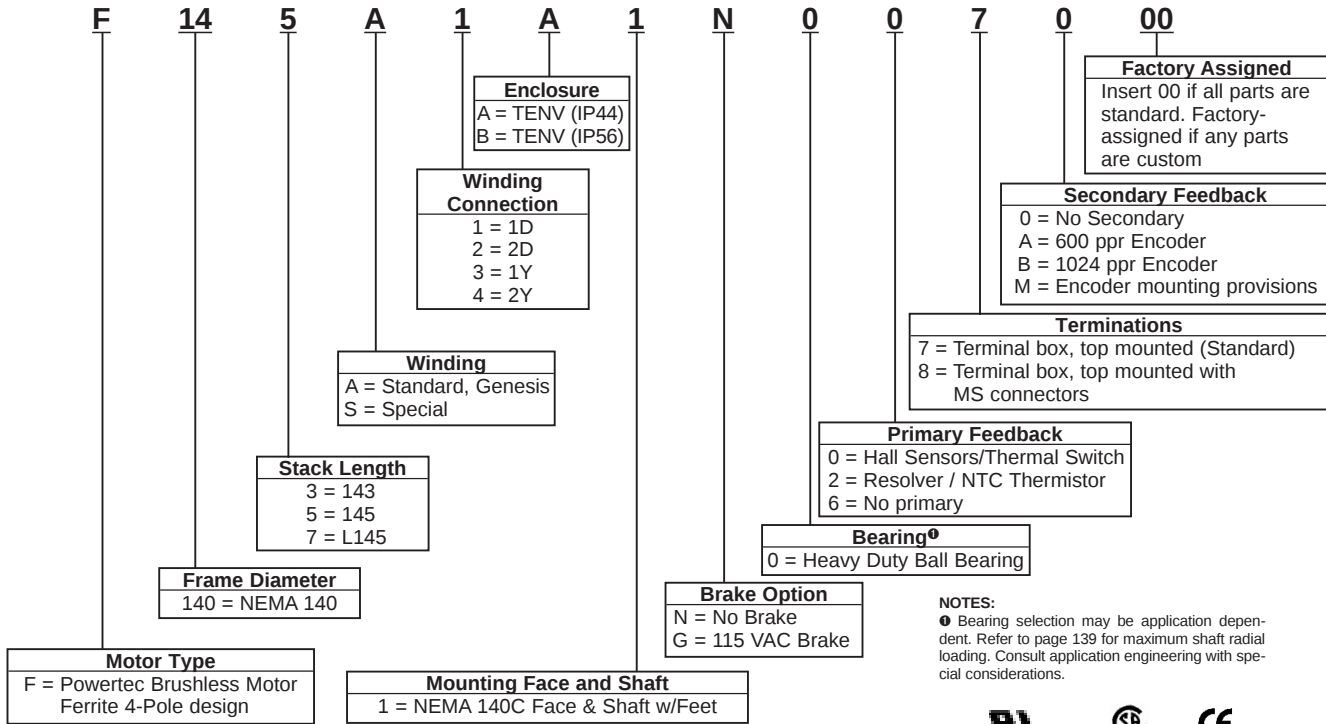
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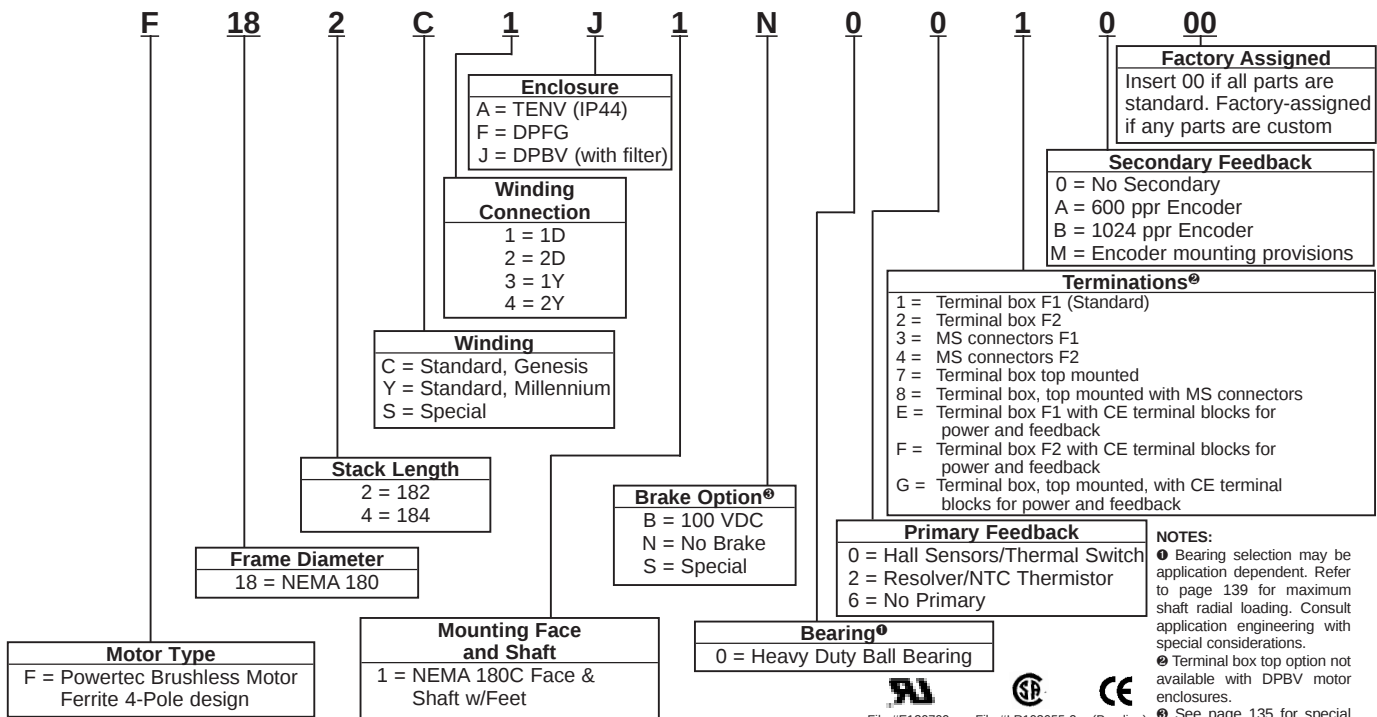
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POWERTEC FERRITE-NEMA 140 FRAME



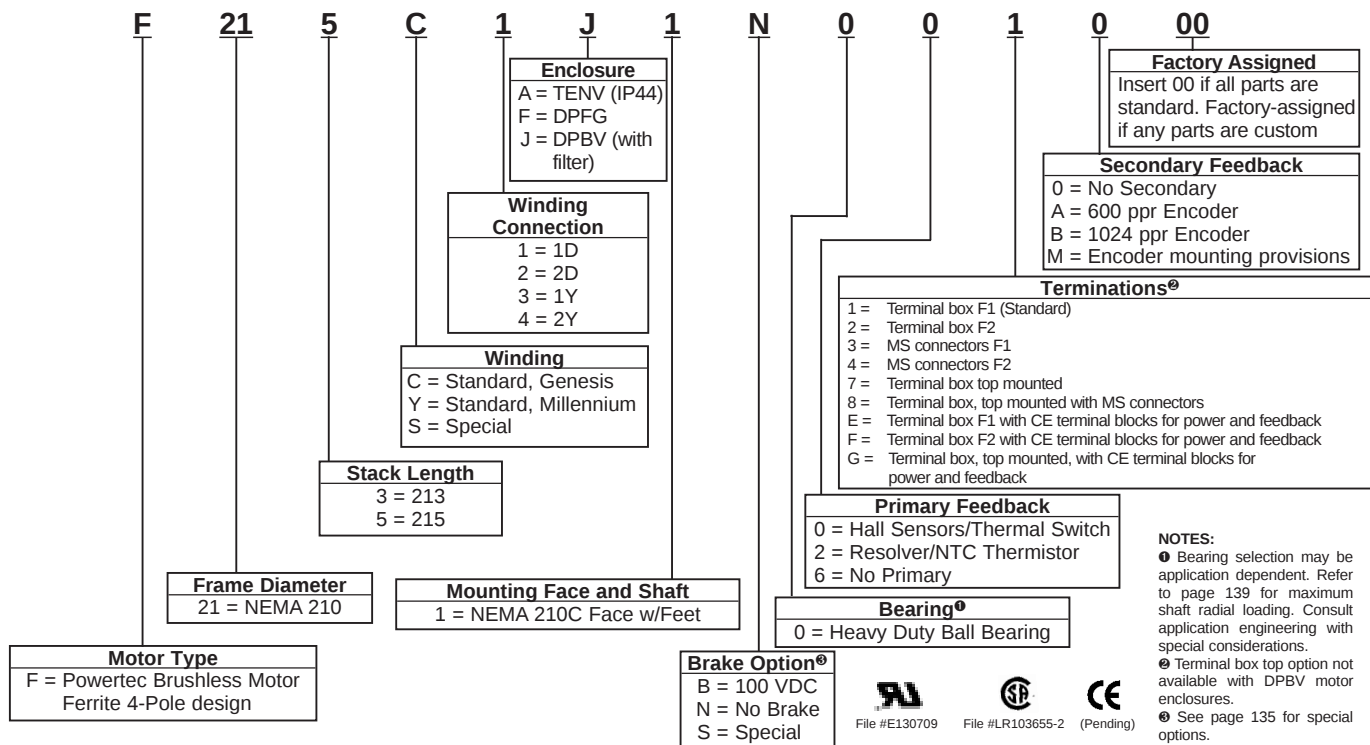
POWERTEC FERRITE-NEMA 180 FRAME



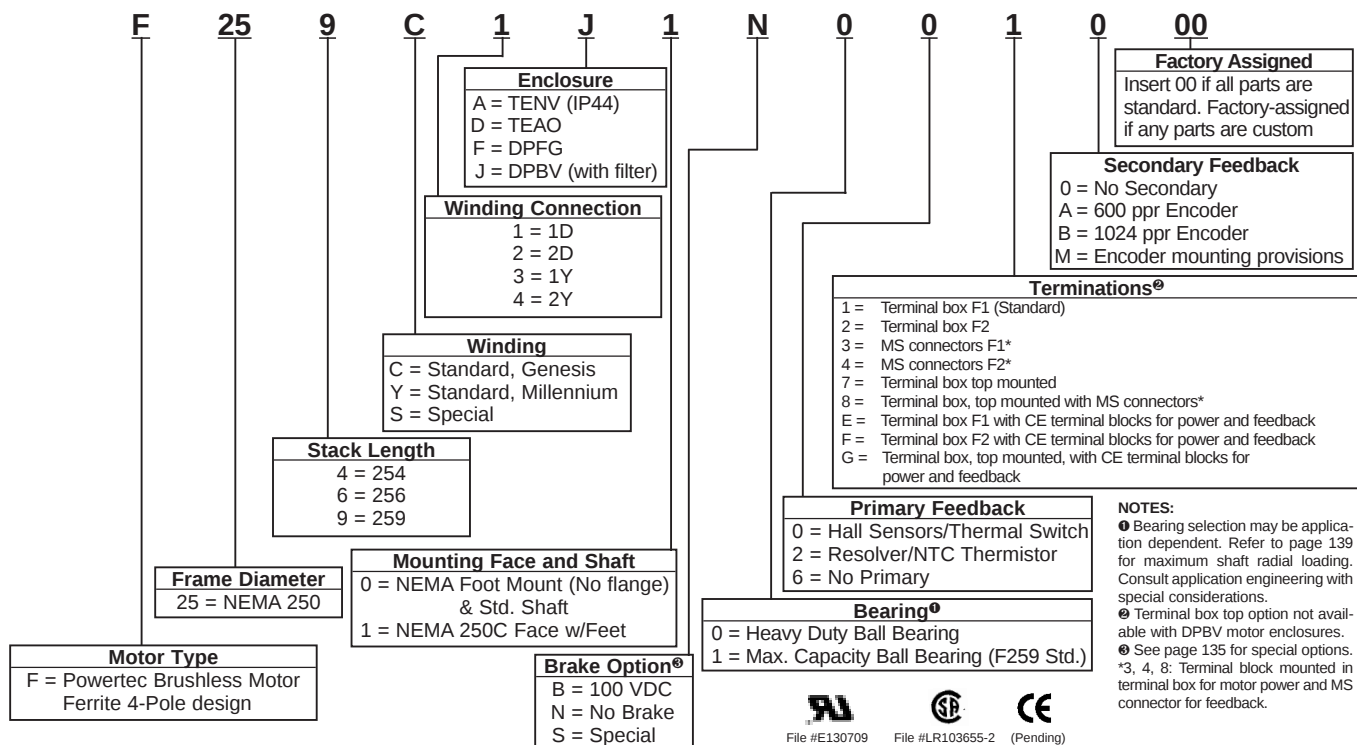
NOTE: To construct a motor model number select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified motor.

POWERTEC MOTORS MODEL NUMBER CODES

POWERTEC FERRITE-NEMA 210 FRAME



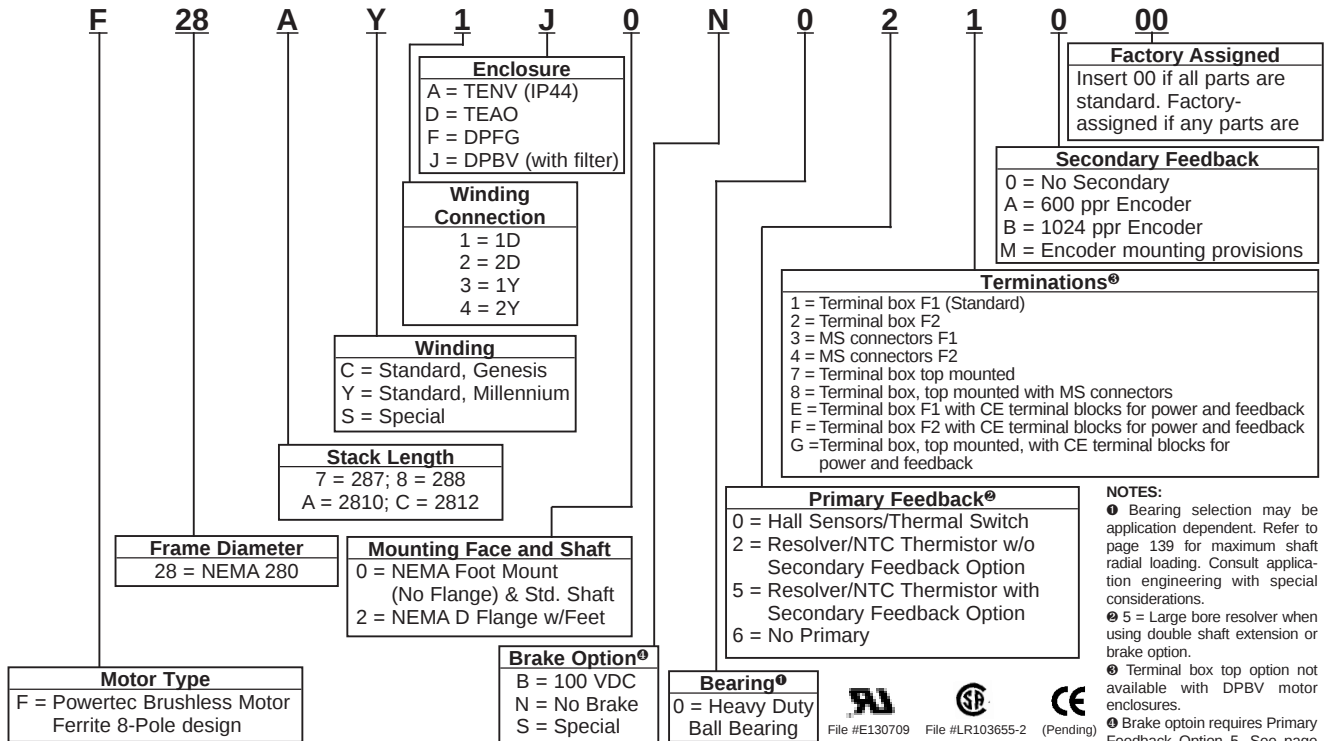
POWERTEC FERRITE-NEMA 250 FRAME



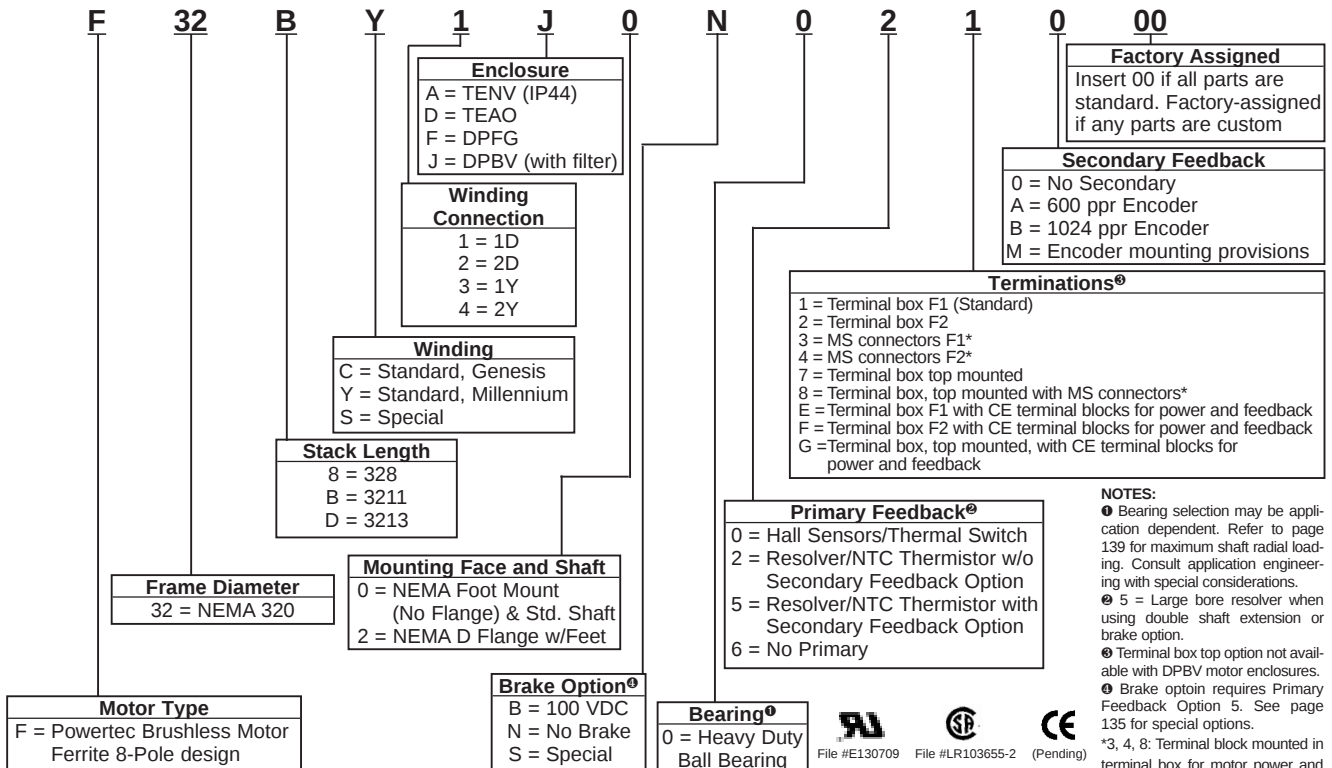
NOTE: To construct a motor model number select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified motor.

POWERTEC MOTORS MODEL NUMBER CODES

POWERTEC FERRITE-NEMA 280 FRAME



POWERTEC FERRITE-NEMA 320 FRAME



NOTE: To construct a motor model number select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified motor.

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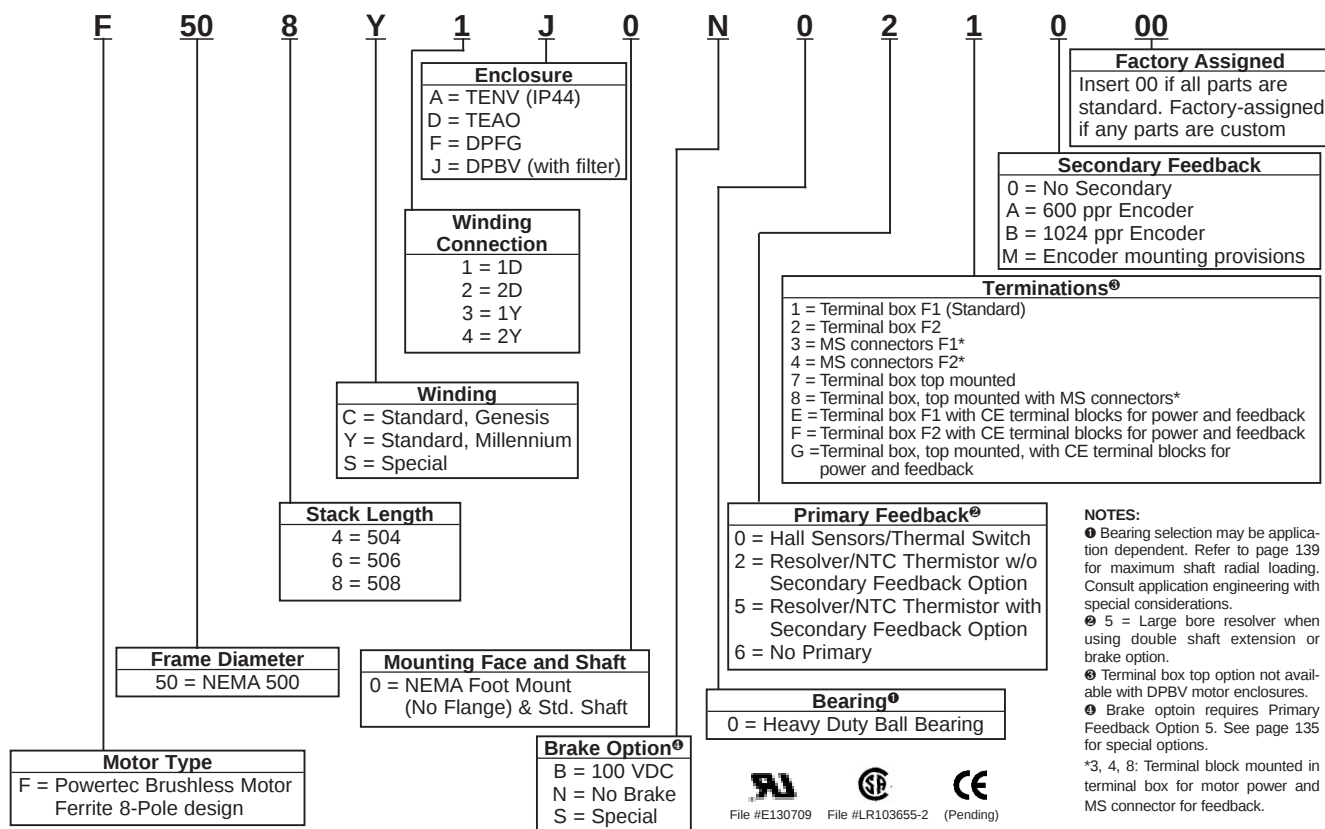
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POWERTEC MOTORS MODEL NUMBER CODES

POWERTEC FERRITE-NEMA 500 FRAME



NOTE: To construct a motor model number select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified motor.

POWERTEC MOTORS

Totally Enclosed, Non-Ventilated (TENV)



0.25 - 100 HP Standard

FEATURES

- High Efficiency Ferrite Permanent Magnets
- NEMA/IEC Totally Enclosed, Non-Ventilated enclosure (IP55, IC410)
- Troublefree, brushless construction
- High power density
- Long life regreasable, oversize bearings
- Class H insulated, rated for class F operation
- Normally closed thermal switch protection
- NEMA C face, D flange, and foot mounting available
- Standard two year warranty

PRODUCT DESCRIPTION

Powertec TENV motors offer high horsepower in a small frame size. From 0.25HP in a NEMA 42 frame to 100HP in a NEMA 500 frame, these motors are ideally suited for use in harsh industrial environments with unclean, or particle saturated air.

CONSTANT TORQUE SPEED RANGE

- 100:1 with Genesis Drives
- 1000:1 with Millennium Drives

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting
- Cranes
- Elevators

AGENCY APPROVALS

- UL Recognized (file #E130709)
- CSA Listed (file #LR103655-2)
- CE Certified (Pending)

RATINGS AND CHARACTERISTICS

Model Number Prefix	NEMA HP Rating	IEC kW Rating	Base Speed RPM	Rated Efficiency @ Base Speed	Rotor Inertia lb.-ft. ²	Approximate Weight lbs.	Rotor Inertia kg-m ²	Approximate Weight kg
F42B	0.25	0.187	1750	0.850	0.022	20	0.000927	9.1
F42B	0.33	0.25	1750	0.850	0.022	20	0.000927	9.1
F42B	0.5	0.37	1750	0.851	0.022	20	0.000927	9.1
F42C	0.75	0.56	1750	0.874	0.033	26	0.00139	11.8
F143	1	0.75	1750	0.880	0.042	34	0.00177	15.4
F145	1.5	1.1	1750	0.905	0.083	53	0.00350	24.0
F145	2	1.5	1750	0.896	0.083	53	0.00350	24.0
F147	3	2.2	1750	0.922	0.122	73	0.00514	33.1
F184	5	3.8	1750	0.931	0.520	120	0.0219	54.4
F213	7.5	5.6	1750	0.908	0.800	148	0.0337	67.1
F215	10	7.5	1750	0.925	1.13	196	0.0476	88.9
F256	15	11	1750	0.950	2.76	325	0.116	147
F259	20	15	1750	0.955	3.65	411	0.154	186
F287	25	19	1750	0.957	4.32	356	0.182	161
F288	30	22	1750	0.952	6.48	458	0.273	208
F28A	40	30	1750	0.971	8.63	560	0.364	254
F328	50	38	1750	0.966	18.0	669	0.759	303
F328	60	45	1750	0.968	18.0	669	0.759	303
F32B	75	56	1750	0.967	24.0	819	1.01	371
F506	100	75	1150	0.969	178	2460	7.50	1116

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RECOMMENDED TENV MOTOR / GENESIS SERIES DRIVE COMBINATIONS – 100:1 CTSR^①

POWERTEC Motors (ferrite magnets)					Motor List Price	Genesis Series Drive®	
TENV			Base Model Number®				
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
0.25	3600	B42	◆F 42B A2A1N0070XX	NA	1,338	500	NA
	2500	B42	F 42B B2A1N0070XX		1,338		
	1750	B42	◆F 42B A1A1N0070XX		1,338		
	1150	B42	F 42B B1A1N0070XX		1,338		
0.33	3600	B42	◆F 42B A2A1N0070XX	NA	1,338	500	NA
	2500	B42	F 42B B2A1N0070XX		1,338		
	1750	B42	◆F 42B A1A1N0070XX		1,338		
	1150	B42	F 42B B1A1N0070XX		1,338		
0.5	3600	B42	◆F 42B A2A1N0070XX	NA	1,338	500	NA
	2500	B42	F 42B B2A1N0070XX		1,338		
	1750	B42	◆F 42B A1A1N0070XX		1,338		
	1150	C42	F 42C B1A1N0070XX		1,477		
0.75	3600	B42	◆F 42B A2A1N0070XX	NA	1,338	500	NA
	2500	C42	F 42C B2A1N0070XX		1,477		
	1750	C42	◆F 42C A1A1N0070XX		1,477		
	1150	143T	F 143 B1A1N0070XX		2,174		
1	3600	C42	◆F 42C A2A1N0070XX	NA	1,477	500	1000
	2500	C42	F 42C B2A1N0070XX	NA	1,477		
	1750	143T	◆F 143 A1A1N0070XX	F 143 C1A1N0070XX	2,174		
	1150	145T	F 145 B1A1N0070XX	F 145 D1A1N0070XX	2,535		
1.5	3600	143T	◆F 143 A2A1N0070XX	F 143 C2A1N0070XX	2,174	500	1000
	2500	143T	F 143 B2A1N0070XX	F 143 D2A1N0070XX	2,174		
	1750	145T	◆F 145 A1A1N0070XX	F 145 C1A1N0070XX	2,535		
	1150	145T	F 145 B1A1N0070XX	F 145 D1A1N0070XX	2,535		
2	3600	143T	◆F 143 A2A1N0070XX	F 143 C2A1N0070XX	2,174	500	1000
	2500	145T	F 145 B2A1N0070XX	F 145 D2A1N0070XX	2,535		
	1750	145T	◆F 145 A1A1N0070XX	F 145 C1A1N0070XX	2,535		
	1150	L145T	F 147 B1A1N0070XX	F 147 D1A1N0070XX	3,282		
3	3600	145T	◆F 145 A2A1N0070XX	F 145 C2A1N0070XX	2,535	500	1000
	2500	145T	F 145 B2A1N0070XX	F 145 D2A1N0070XX	2,535		
	1750	L145T	◆F 147 A1A1N0070XX	F 147 C1A1N0070XX	3,282		
	1750	182T	F 182 A1A0N0010XX	◆F 182 C1A0N0010XX	3,599		
	1150	184T	F 184 A3A0N0010XX	◆F 184 C3A0N0010XX	4,965		
5	3600	L145T	◆F 147 A2A1N0070XX	◆F 147 C2A1N0070XX	3,282	1000	1000
	3600	182T	F 182 A2A0N0010XX	◆F 182 C2A0N0010XX	3,599		
	2500	184T	F 184 A4A0N0010XX	◆F 184 C4A0N0010XX	4,965		
	1750	184T	F 184 A1A0N0010XX	◆F 184 C1A0N0010XX	4,965		
	1150	213T	F 213 A4A0N0010XX	◆F 213 C4A0N0010XX	6,323		
7.5	3600	184T	F 184 A2A0N0010XX	◆F 184 C2A0N0010XX	4,965	1000	1000
	2500	184T	F 184 A4A0N0010XX	◆F 184 C4A0N0010XX	4,965		
	1750	213T	F 213 A1A0N0010XX	◆F 213 C1A0N0010XX	6,323		
	1150	254T	F 254 A3A0N0010XX	◆F 254 C3A0N0010XX	8,719		
10	3600	184T	F 184 A2A0N0210XX	◆F 184 C2A0N0210XX	4,965	1000A	1000
	2500	213T	F 213 A4A0N0210XX	◆F 213 C4A0N0210XX	6,323		
	1750	215T	F 215 A1A0N0210XX	◆F 215 C1A0N0210XX	7,281		
	1150	259TZ	F 259 A3A0N1210XX	◆F 259 C3A0N1210XX	11,363		
15	3600	215T	F 215 A2A0N0210XX	◆F 215 C2A0N0210XX	7,281	2000	1000A
	2500	254T	F 254 A4A0N0210XX	◆F 254 C4A0N0210XX	8,719		
	1750	256T	F 256 B4A0N0210XX	F 256 D4A0N0210XX	10,235		
	1150	259TZ	F 259 A3A0N1210XX	◆F 259 C3A0N1210XX	11,363		
20	3600	254T	F 254 A2A0N0210XX	◆F 254 C2A0N0210XX	8,719	2000	2000
	2500	256T	F 256 A4A0N0210XX	◆F 256 C4A0N0210XX	10,235		
	1750	287TZ	F 287 B4A0N0510XX	F 287 D4A0N0510XX	12,263		
	1150	288TZ	◆F 288 C4A0N0510XX	◆F 288 C3A0N0510XX	13,702		

① Constant Torque Speed Range

② To construct a complete motor model number see Model Number Codes beginning on page 6.

③ See Genesis Series Drives, Section B, page 78.

④ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

RECOMMENDED TENV MOTOR / GENESIS SERIES DRIVE COMBINATIONS – 100:1 CTSR^❶

POWERTEC Motors (ferrite magnets)					Motor List Price	Genesis Series Drive®	
TENV			Base Model Number®				
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
25	3600	256T	NA	◆F 256 C2A0N0210XX	10,235	NA	2000
	2500	256T		◆F 256 C4A0N0210XX	10,235		
	1750	287TZ		F 287 D4A0N0510XX	12,263		
	1150	288TZ		◆F 288 C3A0N0510XX	13,702		
30	3600	259TZ	NA	◆F 259 C2A0N1210XX	11,363	NA	2000
	2500	259TZ		F 259 D2A0N1210XX	11,363		
	1750	288TZ		◆F 288 C1A0N0510XX	13,702		
	1150	2810TZ		◆F 28A C3A0N0510XX	20,436		
40	2500	288TZ	NA	F 288 D2A0N0510XX	13,702	NA	2000
	1750	2810TZ		F 28A D4A0N0510XX	20,436		
	1150	2812TZ		◆F 28C C3A0N0510XX	21,853		
50	1750	328TZ	NA	F 328 D4A0N0510XX	27,758	NA	3000
	1150	3211TZ		◆F 32B C3A0N0510XX	36,699		
60	1750	328TZ	NA	F 328 D4A0N0510XX	27,758	NA	3000
	1150	3211TZ		◆F 32B C3A0N0510XX	36,699		
75	1750	3211TZ	NA	F 32B D4A0N0510XX	36,699	NA	3000
	1150	3213TZ		F 32D G1A0N0010XX	42,183		
100	1150	506T	NA	◆F 506 C1A0N0210XX	66,077	NA	3500

❶ Constant Torque Speed Range

❷ To construct a complete motor model number see Model Number Codes beginning on page 6.

❸ See Genesis Series Drives, Section B, page 78.

❹ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

RECOMMENDED TENV MOTOR / MILLENNIUM SERIES DRIVE COMBINATIONS – 1000:1 CTSR^❶

POWERTEC Motors (ferrite magnets)					Motor List Price	Millennium Series Drive®/Amperes	
TENV			Base Model Number®			230VAC	460VAC
HP	RPM	Frame®	230VAC	460VAC	\$		
10	3600	184T	F 184 W2A0N0210XX	◆F 184 Y2A0N0210XX	5,705	M4/30	NA
	2500	213T	F 213 X2A0N0210XX	F 213 Z2A0N0210XX	7,063		
	1750	215T	F 215 W1A0N0210XX	◆F 215 Y1A0N0210XX	8,021		
	1150	259TZ	F 259 X1A0N1210XX	F 259 Z1A0N1210XX	12,102		
15	3600	215T	F 215 W2A0N0210XX	◆F 215 Y2A0N0210XX	8,021	M4/40	NA
	2500	254T	F 254 X2A0N0210XX	F 254 Z2A0N0210XX	9,459		
	1750	256T	F 256 W1A0N0210XX	◆F 256 Y1A0N0210XX	10,974		
	1150	259TZ	F 259 X1A0N1210XX	F 259 Z1A0N1210XX	12,102		
20	3600	254T	F 254 W2A0N0210XX	◆F 254 Y2A0N0210XX	9,459	M4/50	NA
	2500	256T	F 256 X2A0N0210XX	F 256 Z2A0N0210XX	10,974		
	1750	287TZ	F 287 W1A0N0510XX	◆F 287 Y1A0N0210XX	13,248		
	1150	288TZ	F 288 X1A0N0510XX	F 288 Z1A0N0210XX	14,686		
25	3600	256T	NA	◆F 256 Y2A0N0210XX	10,974	NA	M4/40
	2500	256T		F 256 Z2A0N0210XX	10,974		
	1750	287TZ		◆F 287 Y1A0N0210XX	13,248		
	1150	288TZ		F 288 Z1A0N0210XX	14,686		
30	3600	259TZ	NA	◆F 259 Y2A0N1210XX	12,102	NA	M4/40
	2500	259TZ		F 259 Z2A0N1210XX	12,102		
	1750	288TZ		◆F 288 Y1A0N0210XX	14,686		
	1150	2810TZ		F 28A Z1A0N0210XX	21,420		
40	2500	288TZ	NA	F 288 Z2A0N0210XX	14,686	NA	M4/50
	1750	2810TZ		◆F 28A Y1A0N0210XX	21,420		
	1150	2812TZ		F 28C Z1A0N0210XX	22,838		
50	1750	328TZ	NA	◆F 328 Y1A0N0210XX	28,743	NA	M5/60
	1150	3211TZ		F 32B Z1A0N0210XX	37,683		
60	1750	328TZ	NA	◆F 328 Y1A0N0210XX	28,743	NA	M5/75
	1150	3211TZ		F 32B Z1A0N0210XX	37,683		
75	1750	3211TZ	NA	◆F 32B Y1A0N0210XX	37,683	NA	M5/90
	1150	3213TZ		F 32D Z1A0N0210XX	43,167		
100	1150	506T	NA	F 506 Z1A0N0210XX	67,062	NA	M6/120

❶ Constant Torque Speed Range

❷ To construct a complete motor model number see Model Number Codes beginning on page 6.

❸ See Millennium Series Drives, Section B, page 92.

❹ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

POWERTEC MOTORS

Dripproof, Fully Guarded (DPFG)



5-300 HP Standard

FEATURES

- High Efficiency Ferrite Permanent Magnets
- NEMA/IEC Dripproof Fully Guarded enclosure (IP22, IC01)
- Troublefree, brushless construction
- High power density
- Long life regreasable, oversize bearings
- Class H insulated, rated for class F operation
- Normally closed thermal switch protection
- NEMA or IEC (Metric) mounting
- NEMA C face, D flange, and foot mounting available
- Standard two year warranty

PRODUCT DESCRIPTION

Powertec DPFG motors offer high horsepower in a small frame size; from 5HP in a NEMA 180 frame to 300HP in a NEMA 320 frame. The motor is cooled by means of integral fans mounted to the motor shaft. Air is drawn into and exhausted through louvered covers in both ends of the motor enclosure. The larger fan incorporates a balanced, asymmetrical design. This design reduces audible resonance and causes turbulent airflow within the motor to eliminate hot spots. Our patented double finned aluminum frame allows more efficient cooling of the stator assembly.

CONSTANT TORQUE SPEED RANGE

- 2:1 or 100:1 with Genesis Drives
- 2:1 or 1000:1 with Millennium Drives

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting
- Cranes
- Elevators

AGENCY APPROVALS

- UL Recognized (file #E130709)
- CSA Listed (file #LR103655-2)
- CE Certified (pending)

RATINGS AND CHARACTERISTICS

Model Number Prefix	NEMA HP Rating 2:1 CTSR	IEC kW Rating	Base Speed RPM	Rated Efficiency @ Base Speed	Rotor Inertia lb.-ft. ²	Approximate Weight lbs.	Rotor Inertia kg-m ²	Approximate Weight kg
F182	5	3.8	1750	0.891	0.255	72	0.0107	32.7
F184	7.5	5.6	1750	0.924	0.523	120	0.0220	54.4
F184	10	7.5	1750	0.902	0.523	120	0.0220	54.4
F215	15	11	1750	0.929	1.13	196	0.0476	89
F254	20	15	1750	0.939	1.85	242	0.0780	110
F256	25	19	1750	0.951	2.76	325	0.116	147
F256	30	22	1750	0.947	2.76	325	0.116	147
F259	40	30	1750	0.954	3.65	411	0.154	186
F287	50	38	1750	0.9556	4.32	356	0.182	161
F287	60	45	1750	0.949	4.32	356	0.182	161
F288	75	56	1750	0.963	6.48	458	0.273	208
F28A	100	75	1750	0.966	8.63	560	0.364	254
F28C	125	93	1750	0.967	10.8	662	0.455	300
F32B	150	112	1750	0.965	24	662	1.01	300
F32D	200	150	1750	0.966	28	950	1.18	431

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RECOMMENDED DPGF MOTOR / GENESIS SERIES DRIVE COMBINATIONS – 2:1 CTSR^①

POWERTEC Motors (ferrite magnets)					Motor List Price	Genesis Series Drive®	
DPFG			Base Model Number®				
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
5	3600	182T	F 182 A2F0N0010XX	◆F 182 C2F0N0010XX	4,087	1000	1000
	2500	182T	F 182 B2F0N0010XX	F 182 D2F0N0010XX	4,087		
	1750	184T	F 184 A1F0N0010XX	◆F 184 C1F0N0010XX	4,779		
	1150	184T	F 184 A3F0N0010XX	◆F 184 C3F0N0010XX	4,779		
7.5	3600	182T	F 182 A2F0N0010XX	◆F 182 C2F0N0010XX	4,087	1000	1000
	2500	184T	F 184 B2F0N0010XX	F 184 D2F0N0010XX	4,779		
	1750	184T	F 184 A1F0N0010XX	◆F 184 C1F0N0010XX	4,779		
	1150	213T	F 213 B1F0N0010XX	F 213 D1F0N0010XX	4,897		
10	3600	184T	F 184 A2F0N0010XX	◆F 184 C2F0N0010XX	4,779	1000A	1000
	2500	184T	F 184 B1F0N0010XX	F 184 D1F0N0010XX	4,779		
	1750	184T	F 184 A1F0N0010XX	◆F 184 C1F0N0010XX	4,779		
	1150	256T	F 256 B1F0N0010XX	F 256 D2F0N0010XX	7,981		
15	3600	184T	F 184 A2F0N0010XX	◆F 184 C2F0N0010XX	4,779	2000	1000A
	2500	215T	F 215 B2F0N0010XX	F 215 D2F0N0010XX	5,855		
	1750	256T	F 256 A1F0N0010XX	◆F 256 C1F0N0010XX	7,981		
	1150	259T	F 259 A3F0N1010XX	◆F 259 C3F0N1010XX	9,240		
20	3600	215T	F 215 A2F0N0210XX	◆F 215 C2F0N0210XX	5,855	2000	2000
	2500	254T	F 254 B2F0N0210XX	F 254 D2F0N0210XX	6,095		
	1750	256T	F 256 A1F0N0210XX	◆F 256 C1F0N0210XX	7,981		
	1150	287TZ	F 287 B1F0N0510XX	F 287 D1F0N0510XX	11,335		
25	3600	215T	NA	◆F 215 C2F0N0210XX	5,855	NA	2000
	2500	254T		F 254 D2F0N0210XX	6,095		
	1750	256T		◆F 256 C1F0N0210XX	7,981		
	1150	259TZ		F 259 D1F0N0510XX	9,240		
30	3600	215T	NA	◆F 215 C2F0N0210XX	5,855	NA	2000
	2500	254T		F 254 D2F0N0210XX	6,095		
	1750	256T		◆F 256 C1F0N0210XX	7,981		
	1150	287TZ		F 287 D1F0N0510XX	11,335		
40	3600	254T	NA	◆F 254 C2F0N0210XX	6,095	NA	2000
	2500	256T		F 256 D2F0N0210XX	7,981		
	1750	259TZ		◆F 259 C1F0N0210XX	9,240		
	1150	288TZ		F 288 D1F0N0510XX	13,732		
50	3600	256T	NA	◆F 256 C2F0N0210XX	7,981	NA	3000
	2500	259TZ		F 259 D2F0N0210XX	9,240		
	1750	287TZ		◆F 287 C1F0N0210XX	11,335		
	1150	2810TZ		◆F 28A C3F0N0510XX	16,177		
60	3600	259TZ	NA	◆F 259 C2F0N0210XX	9,240	NA	3000
	2500	259TZ		F 259 D2F0N0210XX	9,240		
	1750	287TZ		◆F 287 C1F0N0210XX	11,335		
	1150	2810TZ		F 28A D1F0N0510XX	16,177		
75	3600	259TZ	NA	◆F 259 C2F0N0210XX	9,240	NA	3000
	2500	287TZ		F 287 D2F0N0210XX	11,335		
	1750	288TZ		◆F 288 C1F0N0210XX	13,732		
	1150	2812TZ		F 28C D1F0N0510XX	20,046		
100	2500	288TZ	NA	F 288 B2F0N0210XX	13,732	NA	3500
	1750	2810TZ		◆F 28A C1F0N0210XX	16,177		
	1150	3211TZ		F 32B D1F0N0510XX	30,128		
125	2500	2810TZ	NA	F 28A D2F0N0210XX	16,177	NA	4000
	1750	2812TZ		◆F 28C C1F0N0210XX	20,046		
150	2500	2812TZ	NA	F 28C D2F0N0210XX	20,046	NA	4000
	1750	3211TZ		◆F 32B C1F0N0210XX	30,128		

① Constant Torque Speed Range

② To construct a complete motor model number see Model Number Codes beginning on page 6.

③ See Genesis Series Drives, Section B, page 78.

④ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

RECOMMENDED DPGF MOTOR / GENESIS SERIES DRIVE COMBINATIONS – 100:1 CTSR^①

POWERTEC Motors (ferrite magnets)					Motor List Price	Genesis Series Drive®	
DPFG			Base Model Number®				
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
5	3600	182T	F 182 A2F0N0010XX	◆F 182 C2F0N0010XX	4,087	1000	1000
	2500	182T	F 182 B2F0N0010XX	F 182 D2F0N0010XX	4,087		
	1750	184T	F 184 A1F0N0010XX	◆F 184 C1F0N0010XX	4,779		
	1150	184T	F 184 A3F0N0010XX	◆F 184 C3F0N0010XX	4,779		
7.5	3600	182T	F 182 A2F0N0010XX	◆F 182 C2F0N0010XX	4,087	1000	1000
	2500	184T	F 184 A1F0N0010XX	◆F 184 C1F0N0010XX	4,779		
	1750	184T	F 184 A1F0N0010XX	◆F 184 C1F0N0010XX	4,779		
	1150	215T	F 215 A3F0N0010XX	◆F 215 C3F0N0010XX	5,855		
10	3600	184T	F 184 A2F0N0010XX	◆F 184 C2F0N0010XX	4,779	1000A	1000
	2500	184T	F 184 B2F0N0010XX	F 184 D2F0N0010XX	4,779		
	1750	215T	F 215 B4F0N0010XX	◆F 215 C1F0N0010XX	5,855		
	1150	256T	F 256 A3F0N0010XX	◆F 256 C3F0N0010XX	7,981		
15	3600	184T	F 184 A2F0N0010XX	◆F 184 C2F0N0010XX	4,779	2000	1000A
	2500	215T	F 215 B2F0N0010XX	F 215 D2F0N0010XX	5,855		
	1750	256T	F 256 B4F0N0010XX	F 256 D4F0N0010XX	7,981		
	1150	259T	F 259 A3F0N1010XX	◆F 259 C3F0N1010XX	9,240		
20	3600	215T	F 215 A2F0N0010XX	◆F 215 C2F0N0010XX	5,855	2000	2000
	2500	254T	F 254 A4F0N0010XX	F 254 D2F0N0010XX	6,095		
	1750	256T	F 256 B4F0N0010XX	F 256 D4F0N0010XX	7,981		
	1150	287TZ	F 287 A3F0N0010XX	◆F 287 C3F0N0010XX	11,335		
25	3600	215T	NA	◆F 215 C2F0N0010XX	5,855	NA	2000
	2500	256T		◆F 254 C4F0N0010XX	7,981		
	1750	259TZ		F 259 D4F0N1010XX	9,240		
	1150	288TZ		◆F 288 C3F0N0010XX	13,732		
30	3600	256T	NA	◆F 256 C2F0N0010XX	7,981	NA	2000
	2500	256T		F 256 D2F0N0010XX	7,981		
	1750	287TZ		◆F 287 C1F0N0010XX	11,335		
	1150	288TZ		◆F 288 C3F0N0010XX	13,732		
40	3600	256T	NA	◆F 256 C2F0N1010XX	7,981	NA	2000
	2500	259TZ		F 259 D2F0N0010XX	9,240		
	1750	288TZ		◆F 288 C1F0N0010XX	13,732		
	1150	2810TZ		◆F 28A C3F0N0010XX	16,177		
50	3600	259TZ	NA	◆F 259 C2F0N1010XX	9,240	NA	3000
	2500	287TZ		F 287 D2F0N0010XX	11,335		
	1750	288TZ		◆F 288 C1F0N0010XX	13,732		
	1150	2812TZ		◆F 28C C3F0N0010XX	20,046		
60	2500	288TZ	NA	F 288 D2F0N0010XX	13,732	NA	3000
	1750	2810TZ		◆F 28A C1F0N0010XX	16,177		
	1150	328TZ		F 328 D1F0N0010XX	26,168		
75	2500	2810TZ	NA	◆F 28A C4F0N0010XX	16,177	NA	3000
	1750	2812TZ		◆F 28C C1F0N0010XX	20,046		
	1150	3211TZ		F 32B D1F0N0010XX	30,128		
100	2500	2812TZ	NA	F 28C D2F0N0010XX	20,046	NA	3500
	1750	328TZ		◆F 328 C1F0N0010XX	26,168		
	1150	3213TZ		F 32D D1F0N0010XX	34,093		
125	2500	328TZ	NA	F 328 D2F0N0010XX	26,168	NA	4000
	1750	3211TZ		◆F 32B C1F0N0010XX	30,128		
150	2500	3211TZ	NA	F 32B D2F0N1010XX	30,128	NA	4000

① Constant Torque Speed Range

② To construct a complete motor model number see Model Number Codes beginning on page 6.

③ See Genesis Series Drives, Section B, page 78.

④ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

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RECOMMENDED DPFG MOTOR / MILLENNIUM SERIES DRIVE COMBINATIONS – 2:1 CTSR^①

POWERTEC Motors (ferrite magnets)					Motor List Price	Millennium Series	
DPFG			Base Model Number®			Drive®/Amperes	
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
10	3600	182T	F 182 W2F0N0210XX	NA	4,827	M4/30	NA
	2500	184T	F 184 X2F0N0210XX		5,519		
	1750	184T	F 184 W1F0N0210XX		5,519		
	1150	215T	F 215 X1F0N0210XX		6,595		
15	3600	184T	F 184 W2F0N0210XX	NA	5,519	M4/40	NA
	2500	213T	F 213 X2F0N0210XX		5,637		
	1750	215T	F 215 W1F0N0210XX		6,595		
	1150	259T	F 259 X1F0N1210XX		9,980		
20	3600	213T	F 213W2F0N0210XX	NA	5,637	M4/50	NA
	2500	215T	F 215 X2F0N0210XX		6,595		
	1750	254T	F 254 W1F0N0210XX		6,835		
	1150	256T	F 256 X1F0N0510XX		8,720		
25	3600	215T	NA	◆F 215 Y2F0N0210XX	6,595	NA	M4/40
	2500	215T		F 215 Z2F0N0210XX	6,595		
	1750	256T		◆F 256 Y1F0N1210XX	8,720		
	1150	259TZ		F 259 Z1F0N0510XX	9,980		
30	3600	215T	NA	◆F 215 Y2F0N0210XX	6,595	NA	M4/40
	2500	254T		F 254 Z2F0N0210XX	6,835		
	1750	256T		◆F 256 Y1F0N0510XX	8,720		
	1150	287TZ		F 287 Z1F0N0510XX	12,320		
40	3600	254T	NA	◆F 254 Y2F0N0210XX	6,835	NA	M4/50
	2500	256T		F 256 Z2F0N1210XX	8,720		
	1750	259TZ		◆F 259 Y1F0N0510XX	9,980		
	1150	288TZ		F 288 Z1F0N0510XX	14,717		
50	3600	256TZ	NA	◆F 256 Y2F0N1210XX	8,720	NA	M5/60
	2500	259TZ		F 259 Z2F0N0510XX	9,980		
	1750	287TZ		◆F 287 Y1F0N0510XX	12,320		
	1150	2810TZ		F 28A Z1F0N0510XX	17,161		
60	3600	259TZ	NA	◆F 259 Y2F0N1210XX	9,980	NA	M5/75
	2500	259TZ		F 259 Z2F0N0510XX	9,980		
	1750	287TZ		◆F 287 Y1F0N0510XX	12,320		
	1150	2810TZ		F 28A Z1F0N0510XX	17,161		
75	3600	259TZ	NA	◆F 259 Y2F0N1210XX	9,980	NA	M5/90
	2500	287TZ		F 287 Z2F0N0510XX	12,320		
	1750	288TZ		◆F 288 Y1F0N0510XX	14,717		
	1150	2812TZ		F 28C Z1F0N0510XX	21,030		
100	2500	288TZ	NA	F 288 Z2F0N0510XX	14,717	NA	M6/120
	1750	2810TZ		◆F 28A Y1F0N0510XX	17,161		
	1150	3211TZ		F 32B Z1F0N0510XX	31,113		
125	2500	2810TZ	NA	F 28A Z2F0N0510XX	17,161	NA	M6/150
	1750	2812TZ		◆F 28C Y1F0N0510XX	21,030		
150	2500	2812TZ	NA	F 28C Z2F0N0510XX	21,030	NA	M6/175
	1750	3211TZ		◆F 32B Y1F0N0510XX	31,113		
200	2500	3211TZ	NA	F 32B Z2F0N0510XX	31,113	NA	M7/275
	1750	3213TZ		◆F 32D Y1F0N0510XX	35,077		
250	2500	3211TZ	NA	F 32B Z2F0N0510XX	31,113	NA	M7/275
300	2500	3211TZ	NA	F 32B Z2F0N0510XX	31,113	NA	M7/330

① Constant Torque Speed Range

② To construct a complete motor model number see Model Number Codes beginning on page 6.

③ See Millennium Series Drives, Section B, page 92.

④ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

RECOMMENDED DPFG MOTOR / MILLENNIUM SERIES DRIVE COMBINATIONS – 1000:1 CTSR^①

Powertec Motors (ferrite magnets)					Motor List Price	Millennium Series Drive®/Amperes	
DPFG			Base Model Number®				
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
10	3600	184T	F 184 W2F0N0210XX	NA	5,519	M4/30	NA
	2500	184T	F 184 X2F0N0210XX		5,519		
	1750	215T	F 215 W1F0N0210XX		6,595		
	1150	256T	F 256 X1F0N0210XX		8,720		
15	3600	184T	F 184 W2F0N0210XX	NA	5,519	M4/40	NA
	2500	215T	F 215 X2F0N0210XX		6,595		
	1750	256T	F 256 W1F0N0210XX		8,720		
	1150	259T	F 259 X1F0N1210XX		9,980		
20	3600	215T	F 215 W2F0N0210XX	NA	6,595	M4/50	NA
	2500	254T	F 254 X2F0N0210XX		6,835		
	1750	256T	F 256 W1F0N0210XX		8,720		
	1150	287TZ	F 287 X1F0N0210XX		12,320		
25	3600	215T	NA	◆F 215 Y2F0N0210XX	6,595	NA	M4/40
	2500	256T		F 256 Z2F0N0210XX	8,720		
	1750	259TZ		◆F 259 Y1F0N1210XX	9,980		
	1150	288TZ		F 288 Z1F0N0210XX	14,717		
30	3600	256T	NA	◆F 256 Y2F0N0210XX	8,720	NA	M4/40
	2500	256T		F 256 Z2F0N0210XX	8,720		
	1750	287TZ		◆F 287 Y1F0N0210XX	12,320		
	1150	288TZ		F 288 Z1F0N0210XX	14,717		
40	3600	256T	NA	◆F 256 Y2F0N0210XX	8,720	NA	M4/50
	2500	259TZ		F 259 Z2F0N1210XX	9,980		
	1750	288TZ		◆F 288 Y1F0N0210XX	14,717		
	1150	2810TZ		F 28A Z1F0N0210XX	17,161		
50	3600	259TZ	NA	◆F 259 Y2F0N1210XX	9,980	NA	M5/60
	2500	287TZ		F 287 Z2F0N0210XX	12,320		
	1750	288TZ		◆F 288 Y1F0N0210XX	14,717		
	1150	2812TZ		F 28C Z1F0N0210XX	21,030		
60	2500	288TZ	NA	F 288 Z2F0N0210XX	14,717	NA	M5/75
	1750	2810TZ		◆F 28A Y1F0N0210XX	17,161		
	1150	328TZ		F 328 Z1F0N0210XX	27,152		
75	2500	2810TZ	NA	F 28A Z2F0N0210XX	17,161	NA	M5/90
	1750	2812TZ		◆F 28C Y1F0N0210XX	21,030		
	1150	3211TZ		F 32B Z1F0N0210XX	31,113		
100	2500	2812TZ	NA	F 28C Z2F0N0210XX	21,030	NA	M6/120
	1750	328TZ		◆F 328 Y1F0N0210XX	27,152		
	1150	3213TZ		F 32D Z1F0N0210XX	35,077		
125	2500	328TZ	NA	F 328 Z2F0N0210XX	27,152	NA	M6/150
	1750	3211TZ		◆F 32B Y1F0N0210XX	31,113		
150	2500	3211TZ	NA	F 32B Z2F0N0210XX	31,113	NA	M6/175

① Constant Torque Speed Range

② To construct a complete motor model number see Model Number Codes beginning on page 6.

③ See Millennium Series Drives, Section B, page 92.

④ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

A

MOTORS

B

DRIVES

C

PRE-ENGINEERED
DRIVE SYSTEMS

D

GENERAL
INFORMATION

POWERTEC MOTORS

Totally Enclosed, Air Over Motors (TEAO)



10-250 HP Standard
(shown without shroud and blower)

FEATURES

- High Efficiency Ferrite Permanent Magnets
- NEMA/IEC Totally Enclosed, Air Over enclosure (IP44, IC416)
- Troublefree, brushless construction
- High power density
- Long life regreasable, oversize bearings
- Class H insulated, rated for class F operation
- Normally closed thermal switch protection
- NEMA C face, D flange, and foot mounting available
- Standard two year warranty

PRODUCT DESCRIPTION

Powertec TEAO motors offer high horsepower in a small frame size; from 10HP in a NEMA 250 frame to 250HP in a NEMA 500 frame. An aluminum shroud encloses a portion of the external finned aluminum motor housing. This design allows air to be moved over a large surface area of the motor for efficient cooling. This design also has the advantage of preventing dust particles from accumulating on the motor's surface, which act as an insulator and inhibit proper cooling of the motor.

CONSTANT TORQUE SPEED RANGE

- 100:1 with Genesis Drives
- 1000:1 with Millennium Drives

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting
- Cranes
- Elevators

AGENCY APPROVALS

- UL Recognized (file #E130709)
- CSA Listed (file #LR103655-2)
- CE Certified (pending)

RATINGS AND CHARACTERISTICS

Model Number Prefix	NEMA HP Rating	IEC kW Rating	Base Speed	Rated Efficiency @ Base Speed	Rotor Inertia	Approximate Weight	Rotor Inertia	Approximate Weight
			RPM		lb.-ft. ²	lbs.	kg-m ²	kg
F254	10	7.5	1150	0.927	1.85	257	0.0780	117
F254	15	11	1750	0.942	1.85	257	0.0780	117
F256	20	15	1750	0.952	2.76	340	0.116	154
F259	25	19	1750	0.957	3.65	426	0.154	193
F287	30	22	1750	0.959	4.32	376	0.182	171
F287	40	30	1750	0.958	4.32	376	0.182	171
F288	50	38	1750	0.965	6.48	478	0.273	217
F288	60	45	1750	0.964	6.48	478	0.273	217
F28A	75	56	1750	0.966	8.63	580	0.364	263
F328	100	75	1750	0.971	18.0	684	0.759	310
F32B	125	93	1750	0.971	24.0	834	1.01	378
F32B	150	112	1750	0.970	24.0	834	1.01	378
F504	200	150	1750	0.970	140	2030	5.90	921
F508	250	188	1750	0.974	216	2910	9.10	1320

RECOMMENDED TEAO MOTOR / GENESIS SERIES DRIVE COMBINATIONS – 100:1 CTSR^①

POWERTEC Motors (ferrite magnets)					Motor List Price	Genesis Series Drive®	
TEAO			Base Model Number®				
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
10	1150	254T	F 254 A3C0N0010XX	◆F 254 C3C0N0010XX	11,080	1000	1000
15	1750	254T	F 254 B4C0N0010XX	F 254 D4C0N0010XX	11,080	2000	1000A
	1150	256T	F 256 A3C0N0010XX	◆F 256 C3C0N0010XX	12,596		
20	2500	254T	F 254 A4C0N0010XX	◆F 254 C4C0N0010XX	11,080	2000	2000
	1750	256T	F 256 B4C0N0010XX	F 256 D4C0N0010XX	12,596		
	1150	259TZ	F 259 A3C0N0110XX	◆F 259 C3C0N0110XX	13,724		
25	3600	254T	NA	◆F 254 C2C0N0010XX	11,080	NA	2000
	2500	254T		F 254 D2C0N0010XX	11,080		
	1750	259TZ		F 259 D4C0N0110XX	13,724		
	1150	287TZ		◆F 287 C3C0N0010XX	15,028		
30	3600	256T	NA	◆F 256 C2C0N0010XX	12,596	NA	2000
	2500	256T		F 256 D2C0N0010XX	12,596		
	1750	287TZ		◆F 287 C1C0N0010XX	15,028		
	1150	288TZ		◆F 288 C3C0N0010XX	16,502		
40	3600	259TZ	NA	◆F 259 C2C0N0110XX	13,724	NA	2000
	2500	287TZ		◆F 287 C4C0N0010XX	15,028		
	1750	287TZ		F 287 D4C0N0010XX	15,028		
	1150	288TZ		F 288 D1C0N0010XX	16,502		
50	2500	287TZ	NA	◆F 287 C4C0N0010XX	15,028	NA	3000
	1750	288TZ		◆F 288 C1C0N0010XX	16,502		
	1150	2810TZ		◆F 28A C3C0N0010XX	23,202		
60	2500	288TZ	NA	F 288 D2C0N0010XX	16,502	NA	3000
	1750	288TZ		◆F 288 C1C0N0010XX	16,502		
	1150	2812TZ		◆F 28C C3C0N0010XX	24,620		
75	2500	288TZ	NA	F 288 D2C0N0010XX	16,502	NA	3000
	1750	2810TZ		◆F 28A C1C0N0010XX	23,202		
	1150	328TZ		F 328 D1C0N0010XX	30,301		
100	2500	328TZ	NA	F 328 D2C0N0010XX	30,301	NA	3500
	1750	328TZ		◆F 328 C1C0N0010XX	30,301		
	1150	3211TZ		F 32B D1C0N0010XX	39,242		
125	2500	328TZ	NA	F 328 D2C0N0010XX	30,301	NA	4000
	1750	3211TZ		◆F 32B C1C0N0010XX	39,242		
	1150	3213TZ		F 32D D2C0N0010XX	44,723		
150	2500	328TZ	NA	F 328 D2C0N0010XX	30,301	NA	4000
	1750	3211TZ		◆F 32B C1C0N0010XX	39,242		

① Constant Torque Speed Range

② To construct a complete motor model number see Model Number Codes beginning on page 6.

③ See Genesis Series Drives, Section B, page 78.

④ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

RECOMMENDED TEAO MOTOR / MILLENNIUM SERIES DRIVE COMBINATIONS – 1000:1 CTSR^①

POWERTEC Motors (ferrite magnets)					Motor List Price	Millennium Series Drive/Amperes®	
TEAO			Base Model Number®				
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
10	1150	254T	F 254 X1D0N0210XX	F 254 Z1D0N0210XX	11,820	M4/30	M4/30
15	1750	254T	F 254 W1D0N0210XX	◆F 254 Y1D0N0210XX	11,820	M4/40	M4/30
	1150	256T	F 256 X1D0N0210XX	F 256 Z1D0N0210XX	13,335		
20	2500	254T	F 254 X2D0N0210XX	F 254 Z2D0N0210XX	11,820	M4/50	M4/30
	1750	256T	F 256 W1D0N0210XX	◆F 256 Y1D0N0210XX	13,335		
	1150	259TZ	F 259 X1D0N1210XX	F 259 Z1D0N1210XX	14,463		
25	3600	254T	NA	◆F 254 Y2D0N0210XX	11,820	NA	M4/40
	2500	254T		F 254 Z2D0N0210XX	11,820		
	1750	259TZ		◆F 259 Y1D0N1210XX	14,463		
	1150	287TZ		F 287 Z1D0N0510XX	16,013		
30	3600	256T	NA	◆F 256 Y2D0N0210XX	13,335	NA	M4/40
	2500	256T		F 256 Z2D0N0210XX	13,335		
	1750	287TZ		◆F 287 Y1D0N0510XX	16,013		
	1150	288TZ		F 288 Z1D0N0510XX	17,486		
40	3600	259TZ	NA	◆F 259 Y2D0N1210XX	14,463	NA	M4/50
	2500	287TZ		F 287 Z2D0N0510XX	16,013		
	1750	287TZ		◆F 287 Y1D0N0510XX	16,013		
	1150	288TZ		F 288 Z1D0N0510XX	17,486		
50	2500	287TZ	NA	F 287 Z2D0N0510XX	16,013	NA	M5/60
	1750	288TZ		◆F 288 Y1D0N0510XX	17,486		
	1150	2810TZ		F 28A Z1D0N0510XX	24,187		
60	2500	288TZ	NA	F 288 Z2D0N0510XX	17,486	NA	M5/75
	1750	288TZ		◆F 288 Y1D0N0510XX	17,486		
	1150	2812TZ		F 28C Z1D0N0510XX	25,605		
75	2500	288TZ	NA	F 288 Z2D0N0510XX	17,486	NA	M5/90
	1750	2810TZ		◆F 28A Y1D0N0510XX	24,187		
	1150	328TZ		F 328 Z1D0N0510XX	31,286		
100	2500	328TZ	NA	F 328 Z2D0N0510XX	31,286	NA	M6/120
	1750	328TZ		◆F 328 Y1D0N0510XX	31,286		
	1150	3211TZ		F 32B Z1D0N0510XX	40,226		
125	2500	328TZ	NA	F 328 Z2D0N0510XX	31,286	NA	M6/150
	1750	3211TZ		◆F 32B Y1D0N0510XX	40,226		
	1150	3213TZ		F 32D Z1D0N0510XX	45,708		
150	2500	328TZ	NA	F 328 Z2D0N0510XX	31,286	NA	M6/175
	1750	3211TZ		◆F 32B Y1D0N0510XX	40,226		
	1150	504TZ		F 504 Z1D0N0210XX	61,117		
200	1750	504TZ	NA	◆F 504 Y1D0N0510XX	61,117	NA	M7/220
	1150	506TZ		F 506 Z1D0N0210XX	71,229		
250	1750	508TZ	NA	◆F 508 Y1D0N0210XX	82,242	NA	M7/275

① Constant Torque Speed Range

② To construct a complete motor model number see Model Number Codes beginning on page 6.

③ See Millennium Series Drives, Section B, page 92.

④ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

POWERTEC MOTORS

Dripproof, Blower Ventilated (DPBV)



5-300 HP Standard

FEATURES

- High Efficiency Ferrite Permanent Magnets
- NEMA/IEC Dripproof Blower Ventilated enclosure (IP22, IC06)
- Troublefree, brushless construction
- High power density
- Long life regreasable, oversize bearings
- Class H insulated, rated for class F operation
- Normally closed thermal switch protection
- NEMA C face, D flange, and foot mounting available
- Standard two year warranty

PRODUCT DESCRIPTION

Powertec DPBV motors offer high horsepower in a small frame size; from 5HP in a NEMA 180 frame to 300HP in a NEMA 500 frame. The motor is cooled by means of an external blower. Our patented double finned aluminum frame allows more efficient cooling of the stator assembly. Air is exhausted through louvered covers in the shaft end of the motor enclosure.

These motors are protected from solid particles greater than 12mm diameter and liquids striking or entering the enclosure at an angle of not more than 15 degrees from the vertical (NEMA IP22). The cooling of the motor is in accordance with NEMA IC06.

CONSTANT TORQUE SPEED RANGE

- 100:1 with Genesis Drives
- 1000:1 with Millennium Drives

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting
- Cranes
- Elevators

AGENCY APPROVALS

- UL Recognized (file #E130709)
- CSA Listed (file #LR103655-2)
- CE Certified (pending)

RATINGS AND CHARACTERISTICS

Model Number Prefix	NEMA HP Rating	IEC kW Rating	Base Speed RPM	Rated Efficiency @ Base Speed	Rotor Inertia lb.-ft. ²	Approximate Weight lbs.	Rotor Inertia kg-m ²	Approximate Weight kg
F182	5	3.8	1750	0.893	0.260	78	0.0110	35.4
F184	7.5	5.6	1750	0.924	0.530	126	0.0223	57.2
F184	10	7.5	1750	0.904	0.520	126	0.0219	57.2
F215	15	11	1750	0.929	1.13	208	0.0476	94.3
F254	20	15	1750	0.939	1.85	254	0.0780	115
F256	25	19	1750	0.952	2.76	337	0.116	153
F256	30	22	1750	0.948	2.76	337	0.116	153
F259	40	30	1750	0.955	3.65	428	0.154	194
F287	50	38	1750	0.956	4.32	370	0.182	168
F287	60	45	1750	0.949	4.32	370	0.182	168
F288	75	56	1750	0.963	6.48	472	0.273	214
F28A	100	75	1750	0.966	8.63	575	0.364	261
F28C	125	93	1750	0.967	10.8	681	0.455	309
F328	150	112	1750	0.969	18.0	695	0.759	315
F32B	200	150	1750	0.971	24.0	843	1.01	382
F32D	250	187	1750	0.973	28.0	975	1.18	442
F32D	300	220	1750	0.973	28.0	975	1.18	442

RECOMMENDED DPBV MOTOR / GENESIS SERIES DRIVE COMBINATIONS – 100:1 CTSR^①

POWERTEC Motors (ferrite magnets)					Motor List Price	Genesis Series Drive®	
DPBV			Base Model Number®				
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
5	3600	182T	F 182 A2J0N0010XX	◆F 182 C2J0N0010XX	4,612	1000	1000
	2500	182T	F 182 B2J0N0010XX	F 182 D2J0N0010XX	4,612		
	1750	182T	F 182 A1J0N0010XX	◆F 182 C1J0N0010XX	4,612		
	1150	184T	F 184 A3J0N0010XX	◆F 184 C3J0N0010XX	5,265		
7.5	3600	182T	F 182 A2J0N0010XX	◆F 182 C2J0N0010XX	4,612	1000	1000
	2500	182T	F 182 B2J0N0010XX	F 182 D2J0N0010XX	4,612		
	1750	184T	F 184 A1J0N0010XX	◆F 184 C1J0N0010XX	5,265		
	1150	213T	F 213 B1J0N0010XX	F 213 D1J0N0010XX	5,984		
10	3600	182T	F 182 A2J0N0010XX	◆F 182 C2J0N0010XX	4,612	1000A	1000
	2500	184T	F 184 B2J0N0010XX	F 184 D2J0N0010XX	5,265		
	1750	184T	F 184 A1J0N0010XX	◆F 184 C1J0N0010XX	5,265		
	1150	215T	F 215 B1J0N0010XX	F 215 D1J0N0010XX	6,788		
15	3600	184T	F 184 A2J0N0010XX	◆F 184 C2J0N0010XX	5,265	2000	1000A
	2500	213T	F 213 B2J0N0010XX	F 213 D2J0N0010XX	5,984		
	1750	215T	F 215 A1J0N0010XX	◆F 215 C1J0N0010XX	6,788		
	1150	256T	F 256 A3J0N0010XX	F 256 D3J0N0010XX	8,866		
20	3600	213T	F 213 A2J0N0010XX	◆F 213 C2J0N0010XX	5,984	2000	2000
	2500	215T	F 215 B2J0N0010XX	F 215 D2J0N0010XX	6,788		
	1750	254T	F 254 A1J0N0010XX	◆F 254 C1J0N0010XX	7,614		
	1150	256T	F 256 B1J0N0010XX	F 256 D1J0N0010XX	8,866		
25	3600	215T	NA	◆F 215 C2J0N0010XX	6,788	NA	2000
	2500	215T		F 215 D2J0N0010XX	6,788		
	1750	256T		◆F 256 C1J0N0010XX	8,866		
	1150	259TZ		F 259 D1J0N0010XX	9,788		
30	3600	215T	NA	◆F 215 C2J0N0010XX	6,788	NA	2000
	2500	254T		F 254 D2J0N0010XX	7,614		
	1750	256T		◆F 256 C1J0N0010XX	8,866		
	1150	259TZ		F 259 D1J0N0010XX	9,788		
40	3600	254T	NA	◆F 254 C2J0N0010XX	7,614	NA	2000
	2500	256T		F 256 D2J0N0010XX	8,866		
	1750	259TZ		◆F 259 C1J0N0010XX	9,788		
	1150	287TZ		F 287 D1J0N0010XX	12,494		
50	3600	256T	NA	◆F 256 C2J0N0010XX	8,866	NA	3000
	2500	259TZ		F 259 D2J0N0010XX	9,788		
	1750	287TZ		◆F 287 C1J0N0010XX	12,494		
	1150	288TZ		F 288 D1J0N0010XX	14,258		
60	3600	259TZ	NA	◆F 259 C2J0N0010XX	9,788	NA	3000
	2500	259TZ		F 259 D2J0N0010XX	9,788		
	1750	287TZ		◆F 287 C1J0N0010XX	12,494		
	1150	2810TZ		F 28A D1J0N0010XX	17,202		
75	3600	259TZ	NA	◆F 259 C2J0N0010XX	9,788	NA	3000
	2500	287TZ		F 287 D2J0N0010XX	12,494		
	1750	288TZ		◆F 288 C1J0N0010XX	14,258		
	1150	2810TZ		F 28A D1J0N0010XX	17,202		
100	2500	288TZ	NA	F 288 D2J0N0010XX	14,258	NA	3500
	1750	2810TZ		◆F 28A C1J0N0010XX	17,202		
	1150	328TZ		F 328 D1J0N0010XX	26,649		
125	2500	2810TZ	NA	F 28A D2J0N0010XX	17,202	NA	4000
	1750	2812TZ		◆F 28C C1J0N0010XX	21,619		
	1150	3211TZ		F 32B D1J0N0010XX	31,504		
150	2500	2812TZ	NA	F 28C D2J0N0010XX	21,619	NA	4000
	1750	328TZ		◆F 328 C1J0N0010XX	26,649		
	1150	3211TZ		F 32B D1J0N0010XX	31,504		

① Constant Torque Speed Range

② To construct a complete motor model number see Model Number Codes beginning on page 6.

③ See Genesis Series Drives, Section B, page 78.

④ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

RECOMMENDED DPBV MOTOR / MILLENNIUM SERIES DRIVE COMBINATIONS – 1000:1 CTSR^①

POWERTEC Motors (ferrite magnets)					Motor List Price	Millennium Series Drive®/Amperes	
DPBV			Base Model Number®				
HP	RPM	Frame®	230VAC	460VAC	\$	230VAC	460VAC
10	3600	182T	F 182 W2J0N0210XX	NA	5,352	M4/30	NA
	2500	184T	F 184 X2J0N0210XX		6,005		
	1750	184T	F 184 W1J0N0210XX		6,005		
	1150	215T	F 215 X1J0N0210XX		7,528		
15	3600	184T	F 184 W2J0N0210XX	NA	6,005	M4/40	NA
	2500	213T	F 213 X2J0N0210XX		6,724		
	1750	215T	F 215 W1J0N0210XX		7,528		
	1150	256T	F 256 X1J0N0210XX		9,605		
20	3600	213T	F 213 W2J0N0210XX	NA	6,724	M4/50	NA
	2500	215T	F 215 X2J0N0210XX		7,528		
	1750	254T	F 254 W1J0N0210XX		8,354		
	1150	256T	F 256 X1J0N0210XX		9,605		
25	3600	215T	NA	◆F 215 Y2J0N0210XX	7,528	NA	M4/40
	2500	215T		F 215 Z2J0N0210XX	7,528		
	1750	256T		◆F 256 Y1J0N0210XX	9,605		
	1150	259TZ		F 259 Z1J0N1210XX	10,527		
30	3600	215T	NA	◆F 215 Y2J0N0210XX	7,528	NA	M4/40
	2500	254T		F 254 Z2J0N0210XX	8,354		
	1750	256T		◆F 256 Y1J0N0210XX	9,605		
	1150	259TZ		F 259 Z1J0N1210XX	10,527		
40	3600	254T	NA	◆F 254 Y2J0N0210XX	8,354	NA	M4/50
	2500	256T		F 256 Z2J0N0210XX	9,605		
	1750	259TZ		◆F 259 Y1J0N1210XX	10,527		
	1150	287TZ		F 287 Z1J0N0510XX	13,479		
50	3600	256T	NA	◆F 256 Y2J0N0210XX	9,605	NA	M5/60
	2500	259TZ		F 259 Z2J0N1210XX	10,527		
	1750	287TZ		◆F 287 Y1J0N0510XX	13,479		
	1150	288TZ		F 288 Z1J0N0510XX	15,243		
60	3600	259TZ	NA	◆F 259 Y2J0N1210XX	10,527	NA	M5/75
	2500	259TZ		F 259 Z2J0N1210XX	10,527		
	1750	287TZ		◆F 287 Y1J0N0510XX	13,479		
	1150	2810TZ		F 28A Z1J0N0510XX	18,187		
75	3600	259TZ	NA	◆F 259 Y2J0N1210XX	10,527	NA	M5/90
	2500	287TZ		F 287 Z2J0N0510XX	13,479		
	1750	288TZ		◆F 288 Y1J0N0510XX	15,243		
	1150	2810TZ		F 28A Z1J0N0510XX	18,187		
100	2500	288TZ	NA	F 288 Z2J0N0510XX	15,243	NA	M6/120
	1750	2810TZ		◆F 28A Y1J0N0510XX	18,187		
	1150	328TZ		F 328 Z1J0N0510XX	27,634		
125	2500	2810TZ	NA	F 28A Z2J0N0510XX	18,187	NA	M6/150
	1750	2812TZ		◆F 28C Y1J0N0510XX	22,604		
	1150	3211TZ		F 32B Z1J0N0510XX	32,488		
150	2500	2812TZ	NA	F 28C Z2J0N0510XX	22,604	NA	M6/175
	1750	328TZ		◆F 328 Y1J0N0510XX	27,634		
	1150	3211TZ		F 32B Z1J0N0510XX	32,488		
200	2500	328TZ	NA	F 328 Z2J0N0510XX	27,634	NA	M7/275
	1750	3211TZ		◆F 32B Y1J0N0510XX	32,488		
	1150	504ATZ		F 504 Z1J0N0210XX	56,046		
250	2500	3211TZ	NA	F 32B Z2J0N0510XX	32,488	NA	M7/275
	1750	3213TZ		◆F 32D Y1J0N0510XX	38,689		
300	2500	3211TZ	NA	F 32B Z2J0N0510XX	32,488	NA	M7/330
	1750	504ATZ		◆F 504 Y1J0N0210XX	56,046		

① Constant Torque Speed Range

② To construct a complete motor model number see Model Number Codes beginning on page 6.

③ See Millennium Series Drives, Section B, page 92.

④ NEMA Frame Designation. See POWERTEC Motor Dimensions beginning on page 26.

◆ Denotes standard motors. Non-standard motors may have additional lead time.

POWERTEC

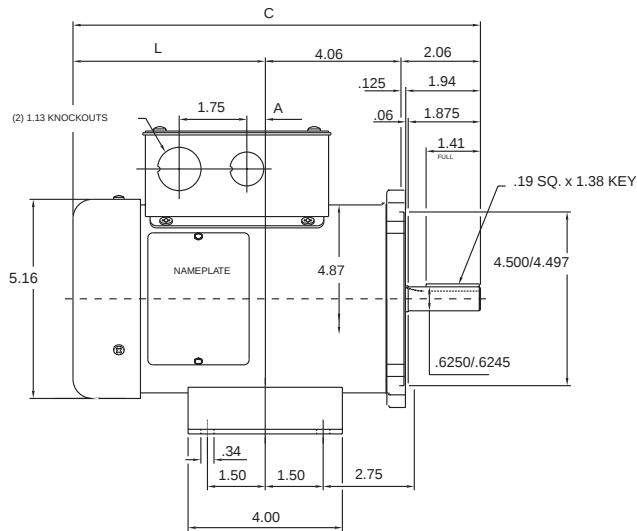
MOTOR

DIMENSIONS

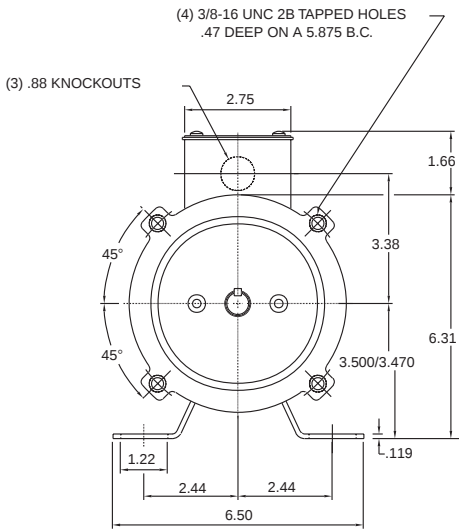
F42 Frames, TENV (Totally Enclosed, Non-Ventilated)

NEMA 56C Face Mounting

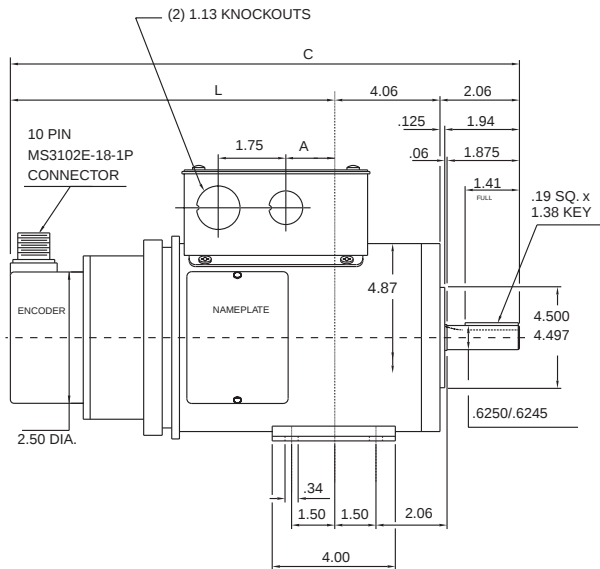
SIDE VIEW (STANDARD)



DRIVE END



SIDE VIEW (SERVO OPTION)



MODEL	C	L	AD
F42B	10.25	4.13	0.43
F42C	12.00	5.88	1.32

- NOTES
- 1) MAXIMUM FACE RUNOUT TO BE .004 T.I.R.
 - 2) MAXIMUM PILOT ECCENTRICITY TO BE .004 T.I.R.
 - 3) PERMISSIBLE SHAFT RUNOUT TO BE .002 T.I.R.
 - 4) TOTALLY ENCLOSED MOTOR - GASKETS THROUGHOUT.

POWERTEC MOTOR DIMENSIONS

A

MOTORS

B

DRIVES

C

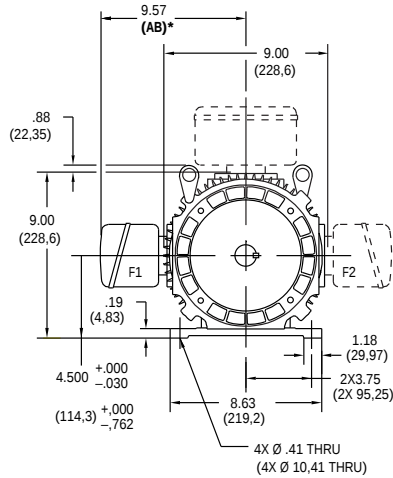
PRE-ENGINEERED
DRIVE SYSTEMS

D

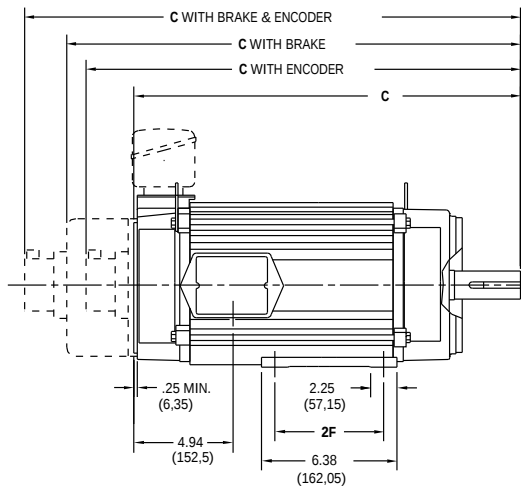
GENERAL
INFORMATION

F180 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW



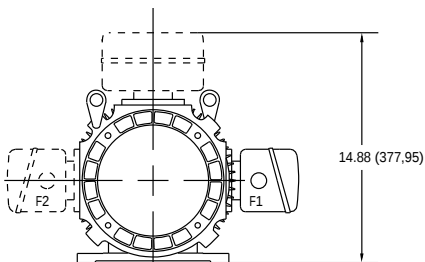
CALLOUT FOR "C" DIMENSION

MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE
F182	<u>16.63</u> (422,4)	<u>19.42</u> (493,3)	<u>20.52</u> (521,2)
F184	<u>20.44</u> (519,2)	<u>23.23</u> (590)	<u>24.33</u> (618)

MODEL	2F DIMENSION
F182	<u>4.50</u> (114,3)
F184	<u>5.50</u> (139,7)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

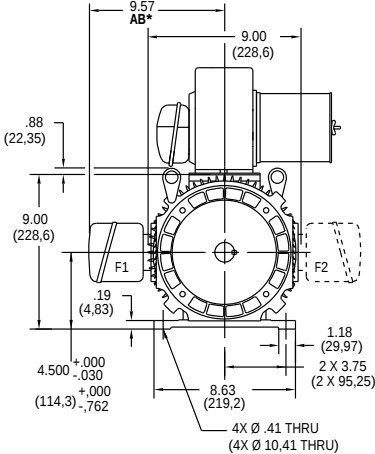
- Reference page 124 for conduit box dimensions.
- Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

* See terminations, page 126.

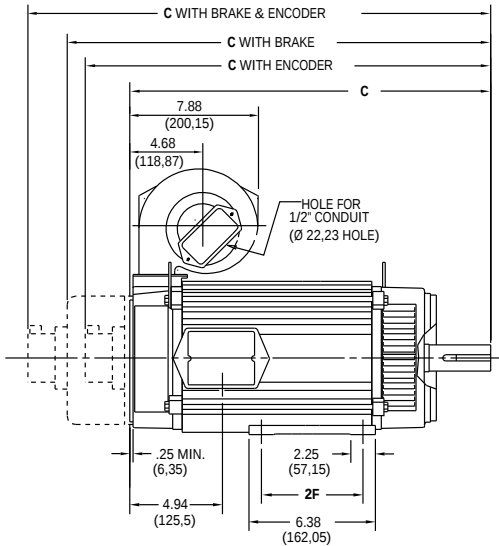
POWERTEC MOTOR DIMENSIONS

F180 Frames, DPBV (Dripproof, Blower Ventilated)

DRIVE END



SIDE VIEW

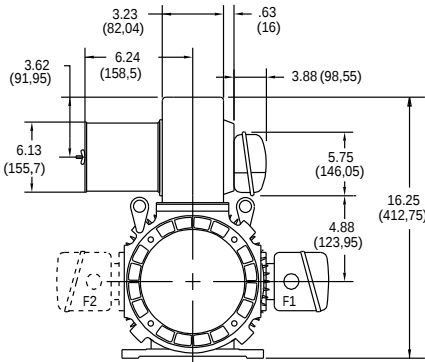


CALLOUT FOR "C" DIMENSION			
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE
F182	16.63 (422,4)	19.42 (493,3)	20.52 (521,2)
F184	20.44 (519,2)	23.23 (590)	24.33 (618)

MODEL	2F DIMENSION
F182	4.50 (114,3)
F184	5.50 (139,7)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

1. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
2. Blower can be rotated 180° about it's axis. Size #2 blower is used on F180 frames. See Page 133.

* See terminations, page 126.

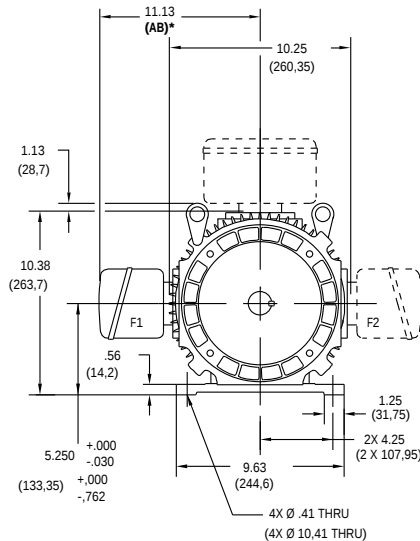
POWERTEC

MOTOR

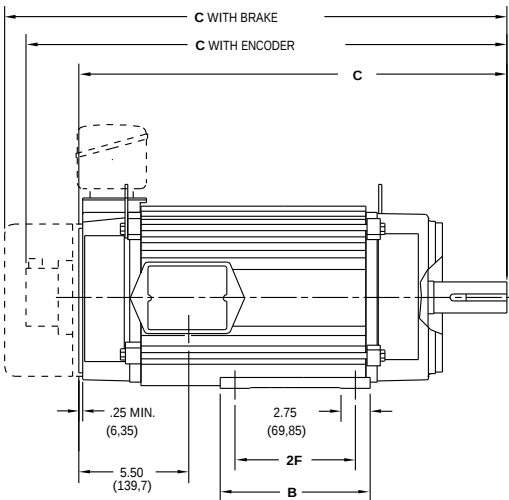
DIMENSIONS

F210 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW

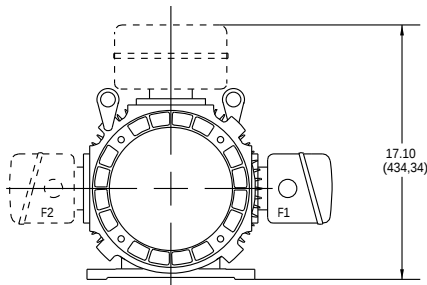


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
F213	22.25 (565,15)	25.04 (636)	26.14 (664)	28.10 (713,7)
F215	26.88 (682,75)	29.67 (753,6)	30.77 (781,6)	32.73 (831,3)

MODEL	2F DIMENSION	B DIMENSION
F213	5.50 (139,7)	8.38 (212,85)
F215	7.00 (177,8)	8.38 (212,85)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



- NOTE:
- Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

POWERTEC

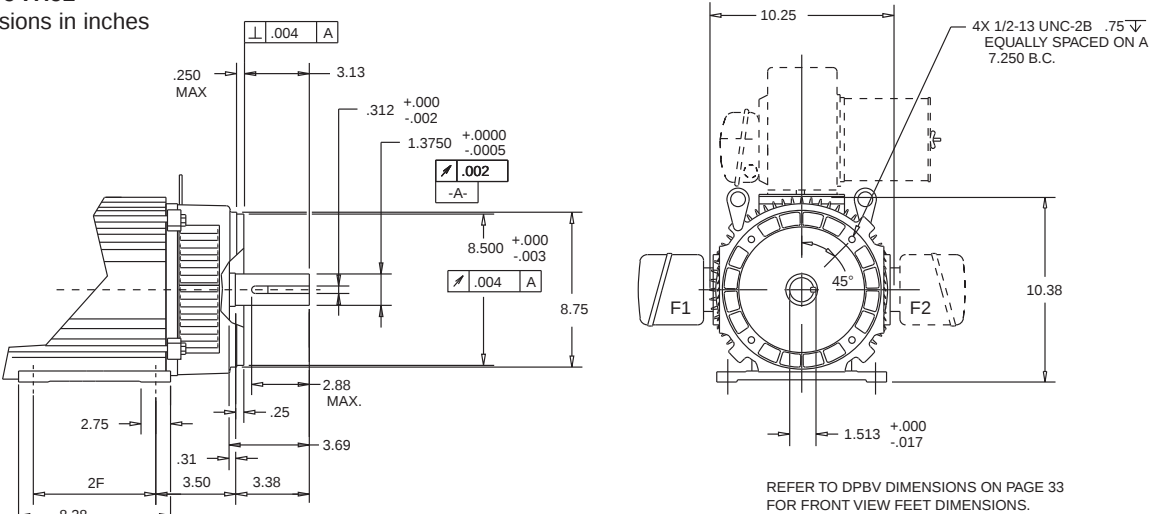
MOTOR

DIMENSIONS

F210 Frame Mounting, NEMA

NEMA C FACE

Dimensions in inches



MODEL	2F DIMENSION
F213	5.50
F215	7.00

POWERTEC MOTOR DIMENSIONS

A

MOTORS

B

DRIVES

C

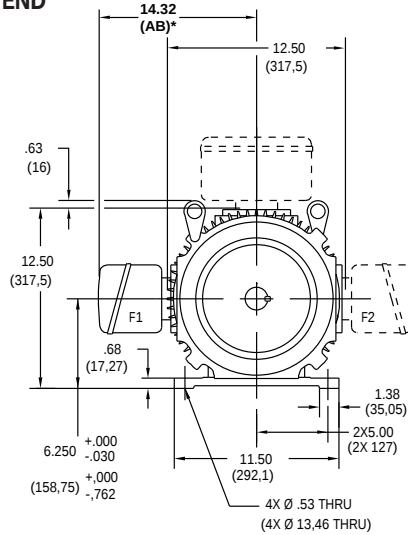
PRE-ENGINEERED
DRIVE SYSTEMS

D

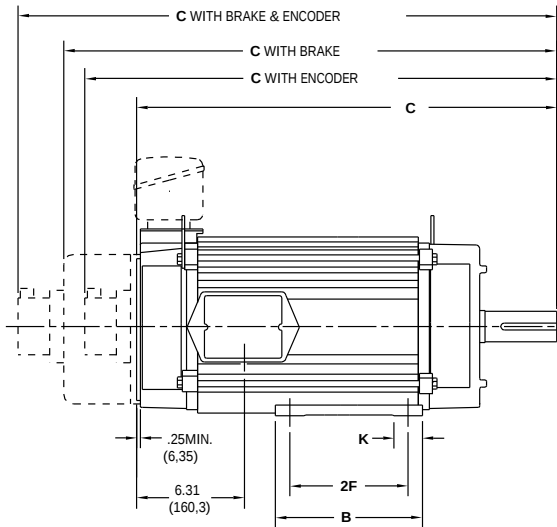
GENERAL
INFORMATION

F250 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW



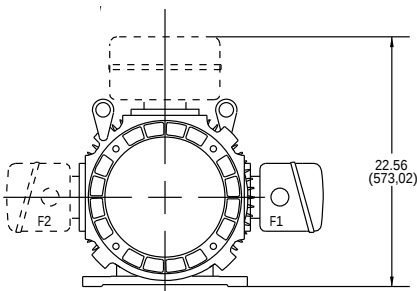
CALLOUT FOR "C" DIMENSION

MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
F254	26.94 (684,28)	29.73 (755,1)	31.88 (809,8)	33.85 (859,8)
F256	31.44 (798,58)	34.23 (869,4)	36.38 (924,1)	38.35 (974,1)
F259	36.81 (934,97)	39.60 (1005,8)	41.76 (1060,7)	43.72 (1110,5)

MODEL	2F DIMENSION	B	K
F254	8.25 (209,55)	12.00 (304,8)	3.38 (85,85)
F256	10.00 (254)	12.00 (304,8)	3.38 (85,85)
F259	14.00 (355,6)	16.00 (406,4)	2.00 (50,8)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

- Reference page 124 for conduit box dimensions.
- Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

* See terminations, page 126.

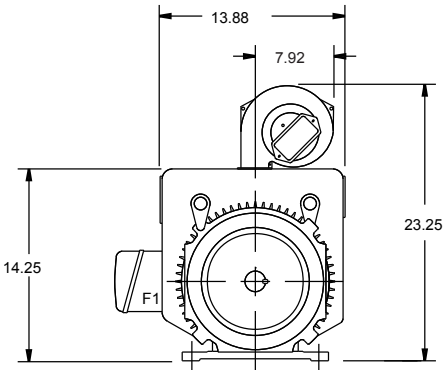
POWERTEC

MOTOR

DIMENSIONS

F250 Frames, TEAO (Totally Enclosed, Air Over)

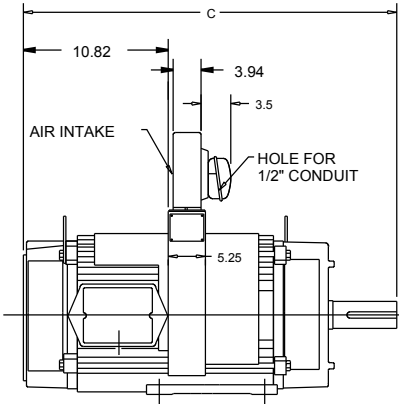
DRIVE END



REFERENCE PAGE 124 FOR
CONDUIT BOX DIMENSIONS.

REFER TO TENV DIMENSIONS ON PAGE 35 FOR FRONT VIEW FEET DIMENSIONS.

SIDE VIEW



MODEL	C DIMENSION
F254	25.69
F256	29.56
F259	34.69

1. CONDUIT BOX CAN BE ROTATED IN 90° STEPS
ON ITS OWN AXIS AND CAN BE MOUNTED ON
OPPOSITE SIDE WHEN SPECIFIED.
2. BLOWER CAN BE ROTATED 180° ABOUT ITS AXIS.

POWERTEC MOTOR DIMENSIONS

A

MOTORS

B

DRIVES

C

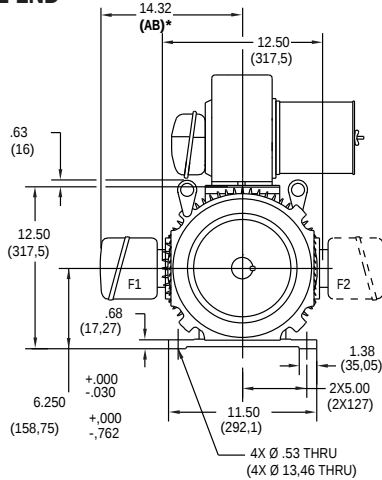
PRE-ENGINEERED
DRIVE SYSTEMS

D

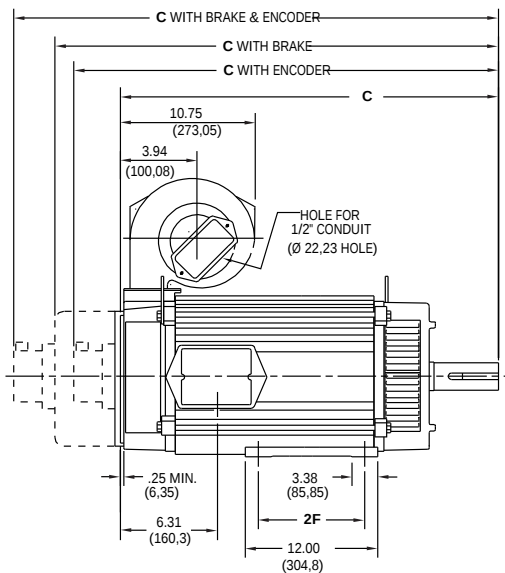
GENERAL
INFORMATION

F254 & F256 Frames, DPBV (Dripproof, Blower Ventilated)

DRIVE END



SIDE VIEW

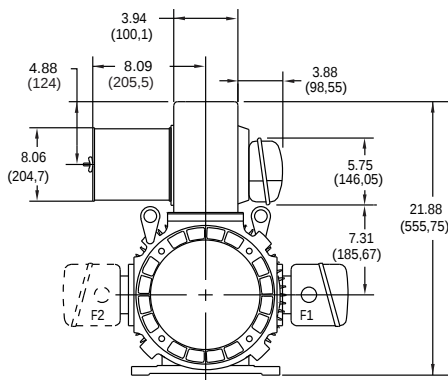


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
F254	<u>26.94</u> (684,28)	<u>29.73</u> (755,1)	<u>31.88</u> (809,8)	<u>33.85</u> (859,8)
F256	<u>31.44</u> (798,58)	<u>34.23</u> (869,4)	<u>36.38</u> (924,1)	<u>38.35</u> (974,1)

MODEL	2F DIMENSION
F254	<u>8.25</u> (209,56)
F256	<u>10.00</u> (254)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

1. Reference page 124 for conduit box dimensions.
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
3. Blower can be rotated 180° about its axis. Size #3 blower is used on F254 & F256 frames. See Page 133.

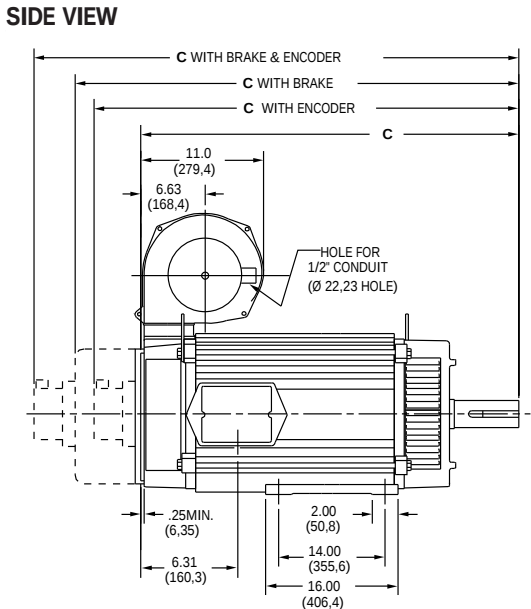
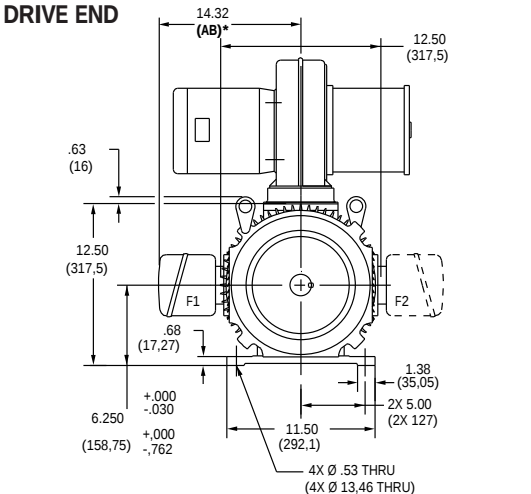
* See terminations, page 126.

POWERTEC

MOTOR

DIMENSIONS

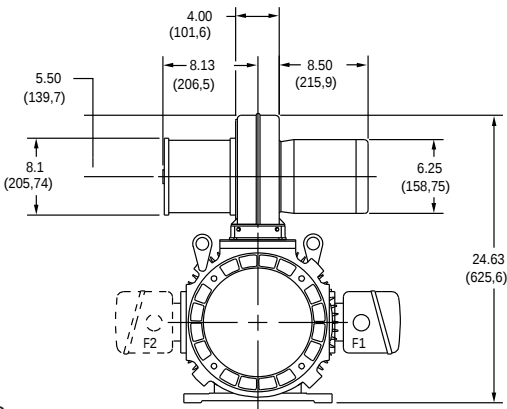
F259 Frames, DPBV (Dripproof, Blower Ventilated)



CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
F259	36.81 (934,97)	39.60 (1005,8)	41.76 (1060,7)	43.72 (1110,5)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



- NOTE:
- 1. Reference page 124 for conduit box dimensions.
 - 2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
 - 3. Blower can be rotated 180° about it's axis. Size #8 blower is used on F259 frames. See Frames 133.
- * See terminations, page 126.

POWERTEC MOTOR DIMENSIONS

A

MOTORS

B

DRIVES

C

PRE-ENGINEERED
DRIVE SYSTEMS

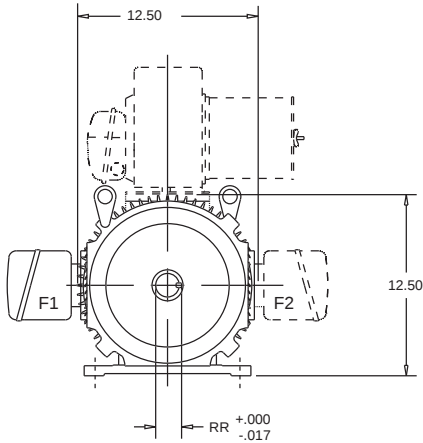
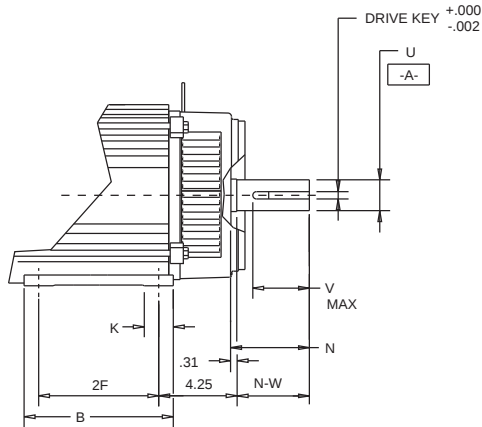
D

GENERAL
INFORMATION

F250 Frame Mounting, NEMA

NEMA FOOT MOUNT, NO FLANGE

Dimensions in inches



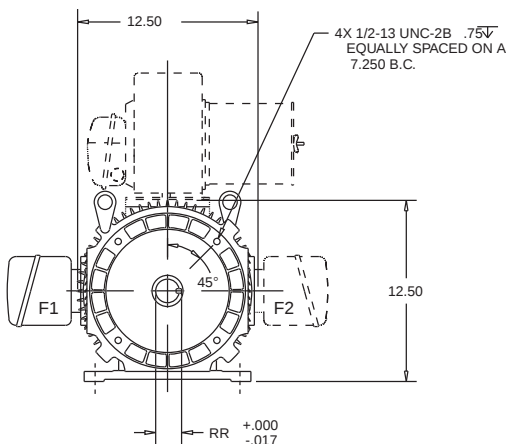
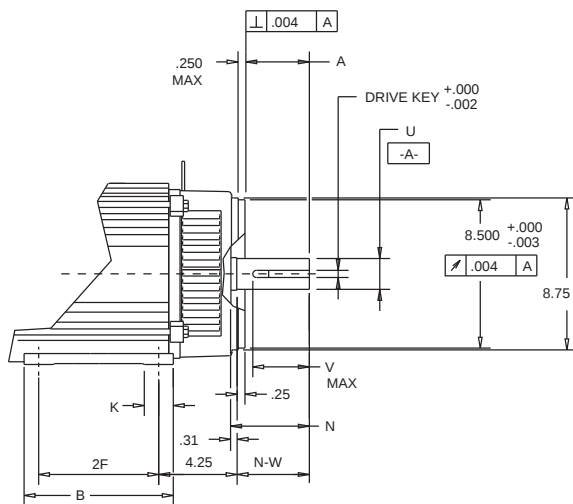
REFER TO DPBV DIMENSIONS ON PAGE 37 AND 38
FOR FRONT VIEW FEET DIMENSIONS.

MODEL	2F	B	K	N	N-W	U	V	RR	DRIVE KEY
F254	8.25	12.00	3.38	4.31	4.00	1.625	3.50	1.791	.375
F256	10.00	12.00	3.38	4.31	4.00	1.625	3.50	1.791	.375
F259	14.00	16.00	2.00	5.56	5.25	2.125	4.75	2.345	.500

SHAFT DIAMETER TOLERANCE
TO 1.500 DIA. +.0000 -.0005
ABOVE 1.500 DIA. +.000 -.001
SHAFT RUNOUT:
TO 1.625 DIA. .002 TIR
ABOVE 1.625 DIA. .003 TIR

NEMA C FACE

Dimensions in inches



REFER TO DPBV DIMENSIONS ON PAGE 37 AND 38
FOR FRONT VIEW FEET DIMENSIONS.

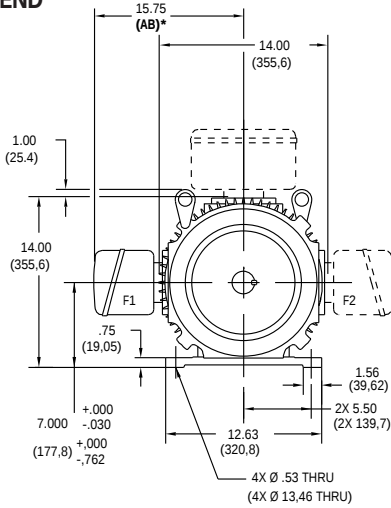
MODEL	2F	B	K	AH	N	N-W	U	V	RR	DRIVE KEY
F254	8.25	12.00	3.38	3.75	4.31	4.00	1.625	3.50	1.791	.375
F256	10.00	12.00	3.38	3.75	4.31	4.00	1.625	3.50	1.791	.375
F259	14.00	16.00	2.00	5.00	5.56	5.25	2.125	4.75	2.345	.500

SHAFT DIAMETER TOLERANCE
TO 1.500 DIA. +.0000 -.0005
ABOVE 1.500 DIA. +.000 -.001
SHAFT RUNOUT:
TO 1.625 DIA. .002 TIR
ABOVE 1.625 DIA. .003 TIR

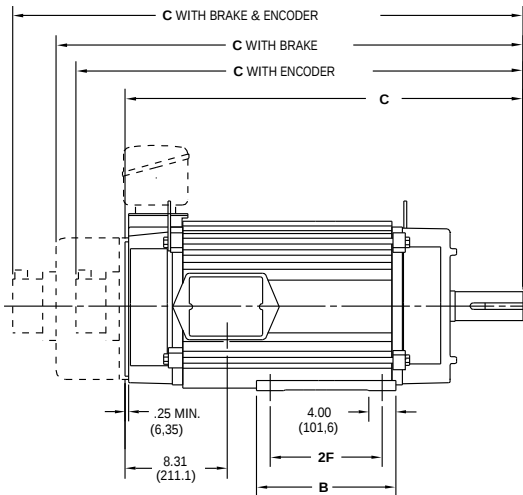
POWERTEC MOTOR DIMENSIONS

F280 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW

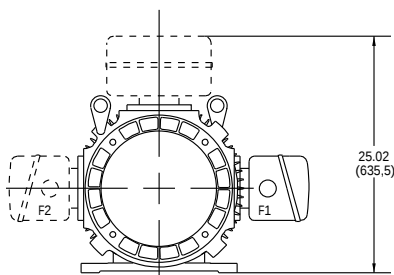


CALLOUT FOR "C" DIMENSION

MODEL	Motor ONLY	With ENCODER	With BRAKE
F287	31.69 (804,93)	35.81 (909,57)	Consult Factory
F288	36.44 (925,58)	40.56 (1030,22)	Consult Factory
F28A	40.56 (1030,22)	44.68 (1134,87)	Consult Factory
F28C	44.69 (1135,13)	48.81 (1239,77)	Consult Factory

MODEL	2F	B	J	K
F287	12.50 (317,5)	16.00 (406,4)	1.38 (35,05)	3.13 (79,50)
F288	14.00 (355,6)	16.00 (406,4)	1.38 (35,05)	3.13 (79,50)
F28A	18.00 (457,2)	20.00 (508)	1.56 (39,62)	4.00 (101,6)
F28C	22.00 (558,8)	24.00 (609,6)	1.56 (39,62)	4.00 (101,6)

OPPOSITE DRIVE END



Dimensions in () are mm, all others in inches

NOTE:

1. Reference page 124 for conduit box dimensions.
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

* See terminations, page 126.

POWERTEC MOTOR DIMENSIONS

A

MOTORS

B

DRIVES

C

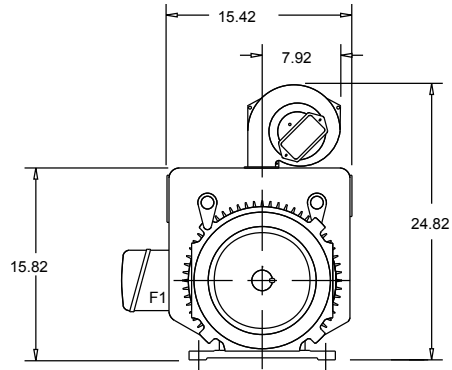
PRE-ENGINEERED
DRIVE SYSTEMS

D

GENERAL
INFORMATION

F280 Frames, TEAO (Totally Enclosed, Air Over)

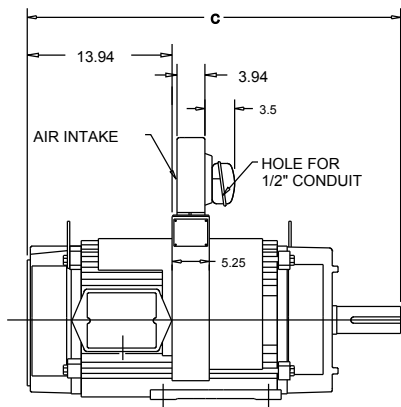
DRIVE END



REFERENCE PAGE 124 FOR
CONDUIT BOX DIMENSIONS

REFER TO TENV DIMENSIONS ON PAGE 40 FOR FRONT VIEW FEET DIMENSIONS

SIDE VIEW



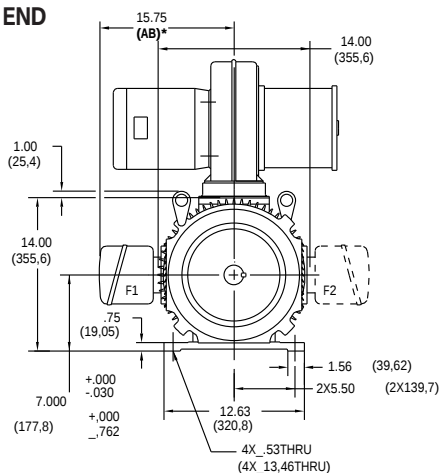
MODEL	C DIMENSION
F287	31.69
F288	36.44
F28A	40.56
F28C	44.69

1. CONDUIT BOX CAN BE ROTATED IN 90° STEPS ON ITS OWN AXIS AND CAN BE MOUNTED ON OPPOSITE SIDE WHEN SPECIFIED.
2. BLOWER CAN BE ROTATED 180° ABOUT ITS AXIS.

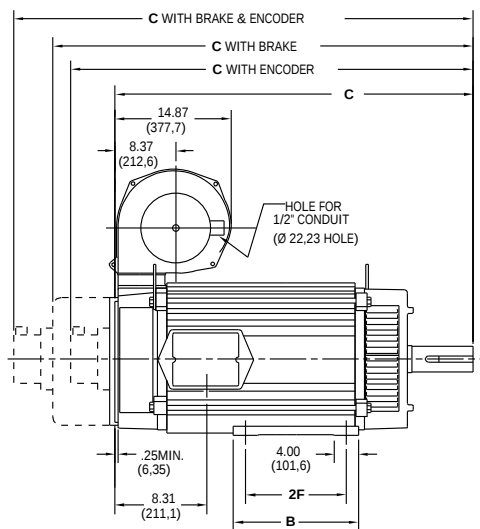
POWERTEC MOTOR DIMENSIONS

F280 Frames, DPBV (Dripproof, Blower Ventilated)

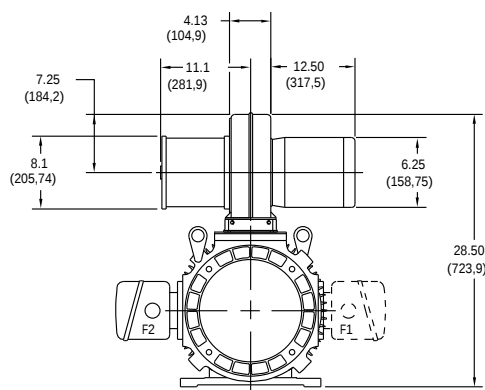
DRIVE END



SIDE VIEW



OPPOSITE DRIVE END



CALLOUT FOR "C" DIMENSION			
MODEL	Motor ONLY	With ENCODER	With BRAKE
F287	31.69 (804.93)	35.81 (909,57)	Consult Factory
F288	36.44 (925,58)	40.56 (1030,22)	Consult Factory
F28A	40.56 (1030,22)	44.68 (1134,87)	Consult Factory
F28C	44.69 (1135,13)	48.81 (1239,77)	Consult Factory

MODEL	2F	B	J	K
F287	12.50 (317,5)	16.00 (406,4)	1.38 (35,05)	3.13 (79,50)
F288	14.00 (355,6)	16.00 (406,4)	1.38 (35,05)	3.13 (79,50)
F28A	18.00 (457,2)	20.00 (508)	1.56 (39,62)	4.00 (101,6)
F28C	22.00 (558,8)	24.00 (609,6)	1.56 (39,62)	4.00 (101,6)

- NOTE:
- Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
 - Blower can be rotated 180° about it's axis. Size #9 blower is used on F280 frames. See Page 133.

POWERTEC MOTOR DIMENSIONS

A

MOTORS

B

DRIVES

C

PRE-ENGINEERED
DRIVE SYSTEMS

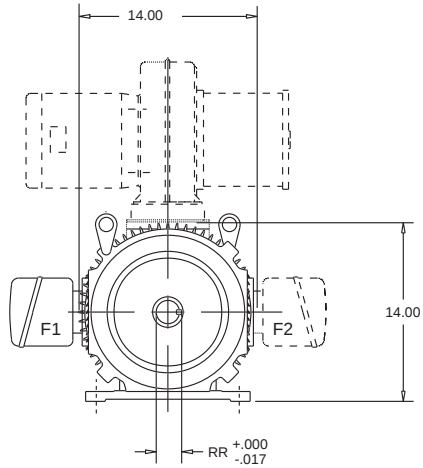
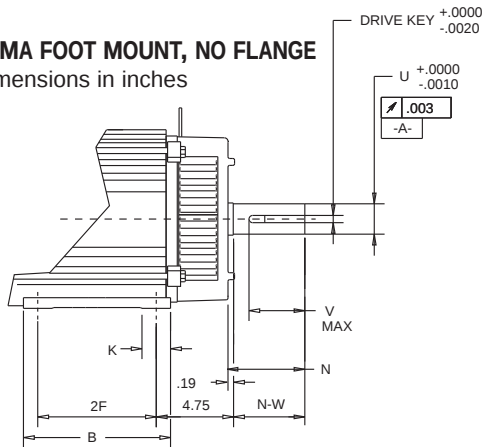
D

GENERAL
INFORMATION

F280 Frame Mounting, NEMA

NEMA FOOT MOUNT, NO FLANGE

Dimensions in inches

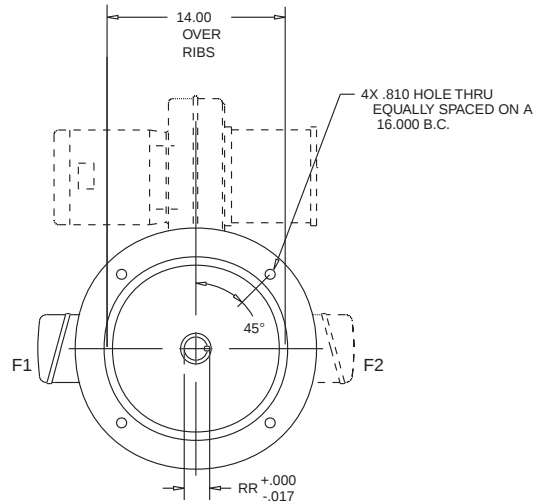
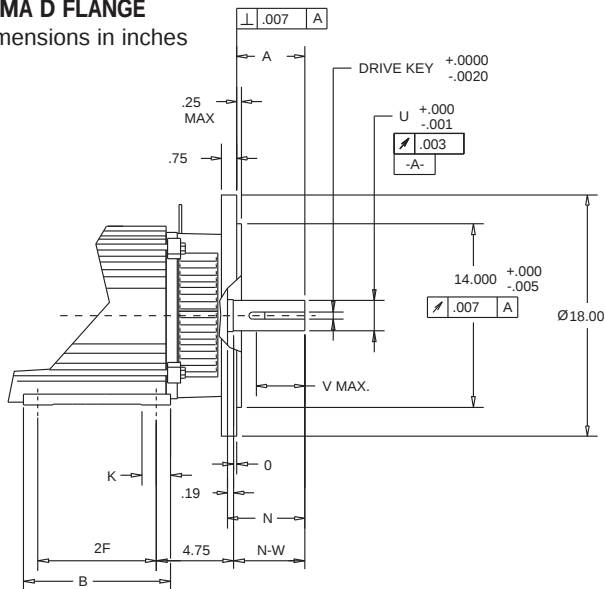


REFER TO DPBV DIMENSIONS ON PAGE 42
FOR FRONT VIEW FEET DIMENSIONS.

MODEL	2F	B	K	N	N-W	U	V	RR	DRIVE KEY
F287	12.50	16.00	3.13	5.44	5.25	2.125	4.75	2.345	.500
F288	12.50	16.00	3.13	6.06	5.87	2.375	5.37	2.646	.625
F28A	18.00	20.00	4.00	6.06	5.87	2.375	5.37	2.646	.625
F28	22.00	24.00	4.00	6.06	5.87	2.375	5.37	2.646	.625

NEMA D FLANGE

Dimensions in inches



REFER TO DPBV DIMENSIONS ON PAGE 42
FOR FRONT VIEW FEET DIMENSIONS.

MODEL	2F	B	K	N	AH	N-W	U	V	RR	DRIVE KEY
F287	12.50	16.00	3.13	5.44	5.25	5.25	2.125	4.75	2.345	.500
F288	12.50	16.00	3.13	6.06	5.87	5.87	2.375	5.37	2.646	.625
F28A	18.00	20.00	4.00	6.06	5.87	5.87	2.375	5.37	2.646	.625
F28C	22.00	24.00	4.00	6.06	5.87	5.87	2.375	5.37	2.646	.625

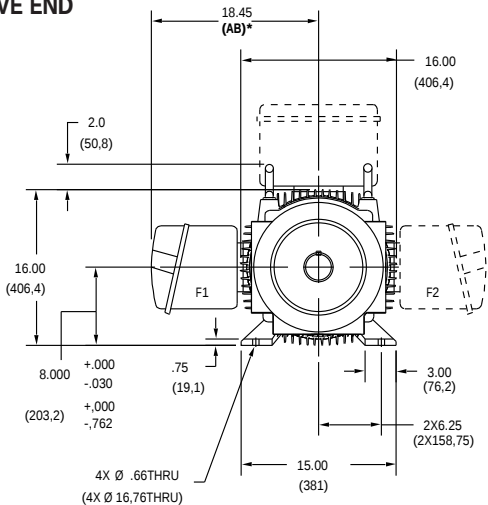
POWERTEC

MOTOR

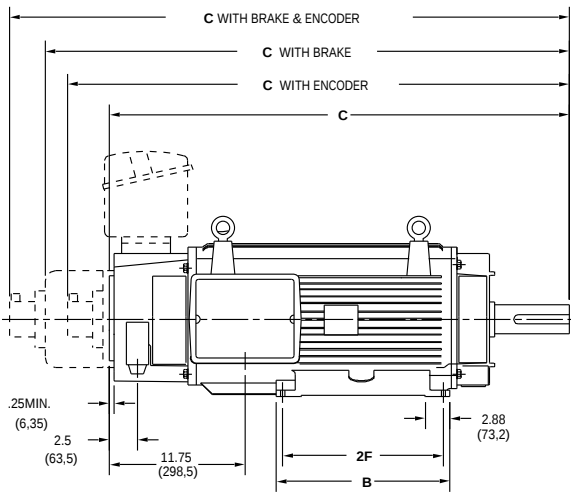
DIMENSIONS

F320 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW

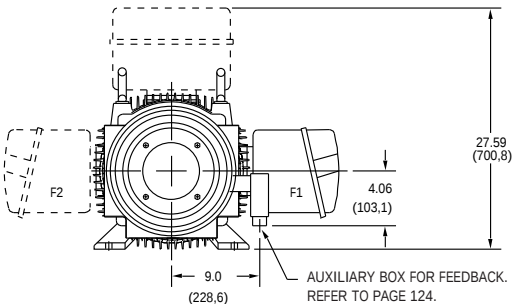


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
F328	44.33 (1126)	47.12 (1196,8)	52.09 (1323,1)	54.06 (1373,1)
F32B	51.08 (1297,4)	53.87 (1368,3)	58.54 (1494,5)	60.81 (1544,6)
F32D	57.83 (1468,9)	60.62 (1539,7)	65.59 (1666)	67.56 (1716)

MODEL	2F DIMENSION	B DIMENSION
F328	16.00 (406,4)	17.88 (454,2)
F32B	22.00 (558,8)	23.88 (607)
F32D	28.00 (711,2)	29.88 (759)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



- NOTE:
- Reference page 126 for conduit box dimensions.
 - Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

* See terminations, page 126.

POWERTEC MOTOR DIMENSIONS

A
MOTORS

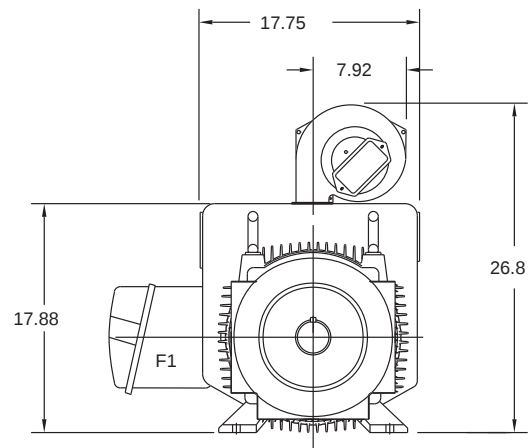
B
DRIVES

C
PRE-ENGINEERED
DRIVE SYSTEMS

D
GENERAL
INFORMATION

F320 Frames, TEAO (Totally Enclosed, Air Over)

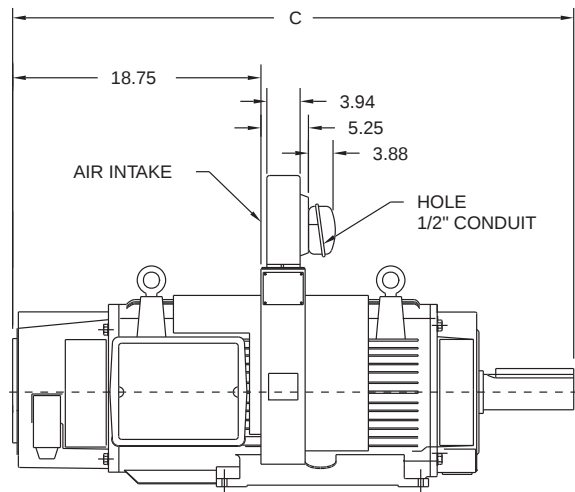
DRIVE END



REFERENCE PAGE 124 FOR
CONDUIT BOX DIMENSIONS

REFER TO TENV DIMENSIONS ON PAGE 44
FOR FRONT VIEW FEET DIMENSIONS.

SIDE VIEW



MODEL	C DIMENSION
F328	45.75
F32B	51.75
F32D	57.75

1. CONDUIT BOX CAN BE ROTATED IN 90° STEPS ON ITS OWN AXIS AND CAN BE MOUNTED ON OPPOSITE SIDE WHEN SPECIFIED.
2. BLOWER CAN BE ROTATED 180° ABOUT ITS AXIS.

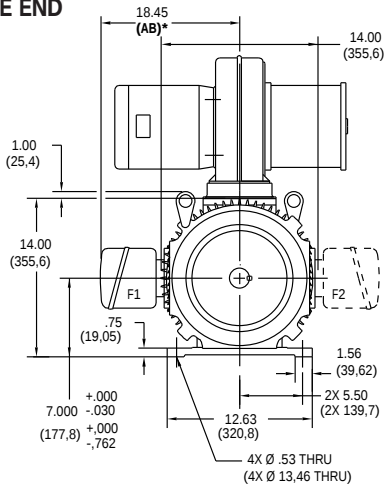
POWERTEC

MOTOR

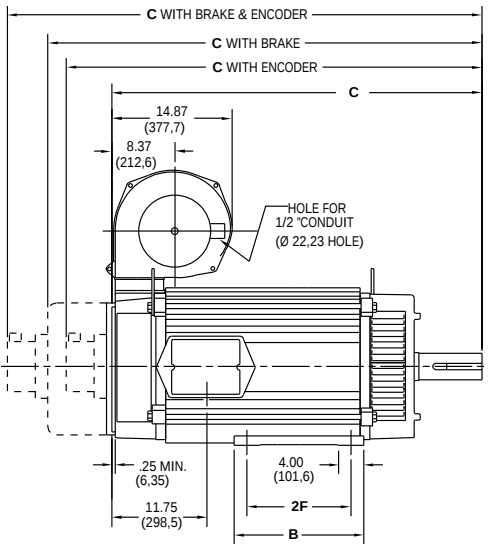
DIMENSIONS

F320 Frames, DPBV (Dripproof, Blower Ventilated)

DRIVE END



SIDE VIEW

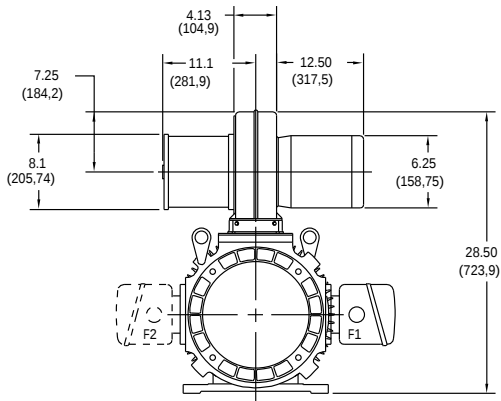


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
F328	44.33 (1126)	47.12 (1196,8)	52.09 (1323,1)	54.06 (1373,1)
F32B	51.08 (1297,4)	53.87 (1368,3)	58.54 (1494,5)	60.81 (1544,6)
F32D	57.83 (1468,9)	60.62 (1539,7)	65.59 (1666)	67.56 (1716)

MODEL	2F DIMENSION	B DIMENSION
F328	16.00 (406,4)	17.88 (454,2)
F32B	22.00 (558,8)	23.88 (607)
F32D	28.00 (711,2)	29.88 (759)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



- NOTE:
- Reference page 124 for conduit box dimensions.
 - Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
 - Blower can be rotated 180° about it's axis. Size #10 blower is used on F320 frames. See page 133.

* See terminations, page 126.

POWERTEC MOTOR DIMENSIONS

A

MOTORS

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DRIVES

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PRE-ENGINEERED
DRIVE SYSTEMS

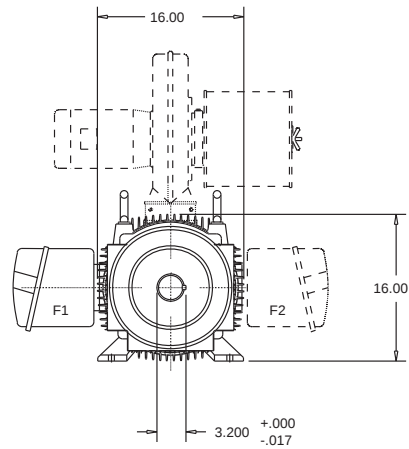
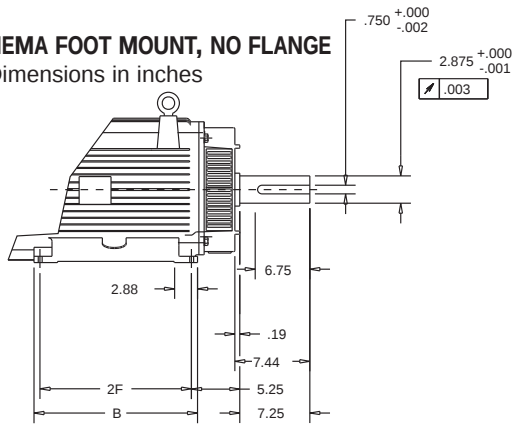
D

GENERAL
INFORMATION

F320 Frame Mounting, NEMA

NEMA FOOT MOUNT, NO FLANGE

Dimensions in inches

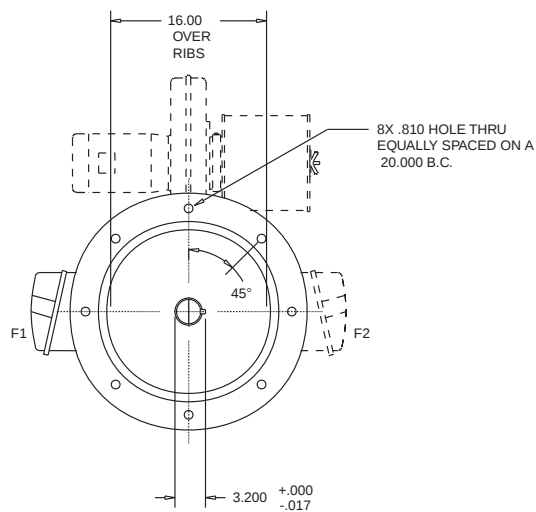
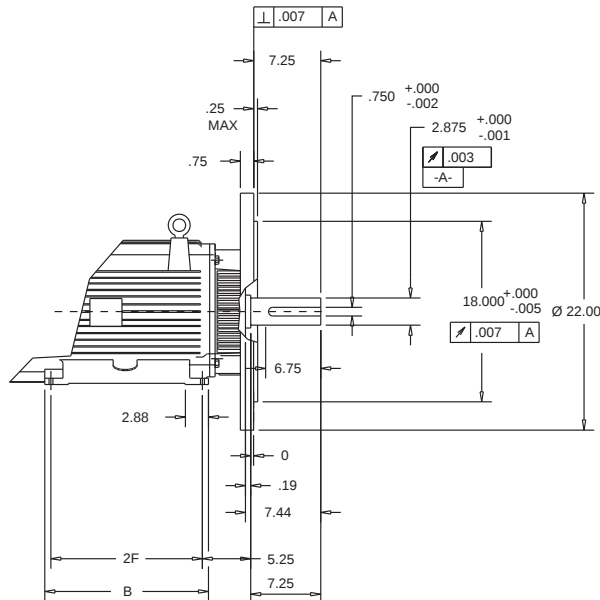


REFER TO DPBV DIMENSIONS ON PAGE 46
FOR FRONT VIEW FEET DIMENSIONS.

MODEL	2F	B
F328	16.00	17.88
F32B	22.00	23.88
F32D	28.00	29.88

NEMA D FLANGE

Dimensions in inches

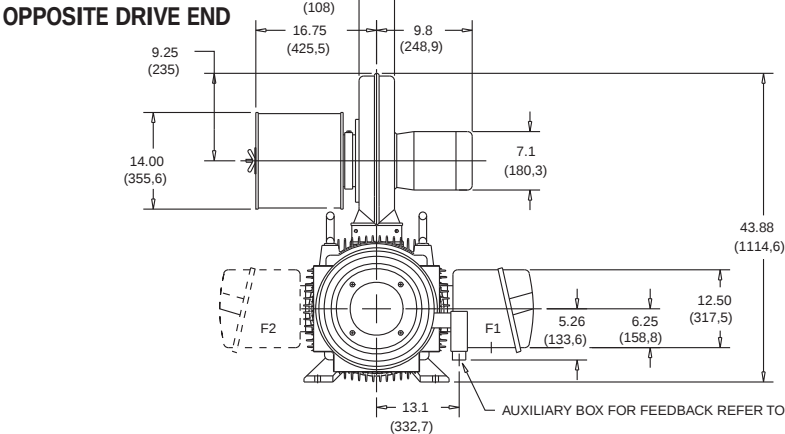
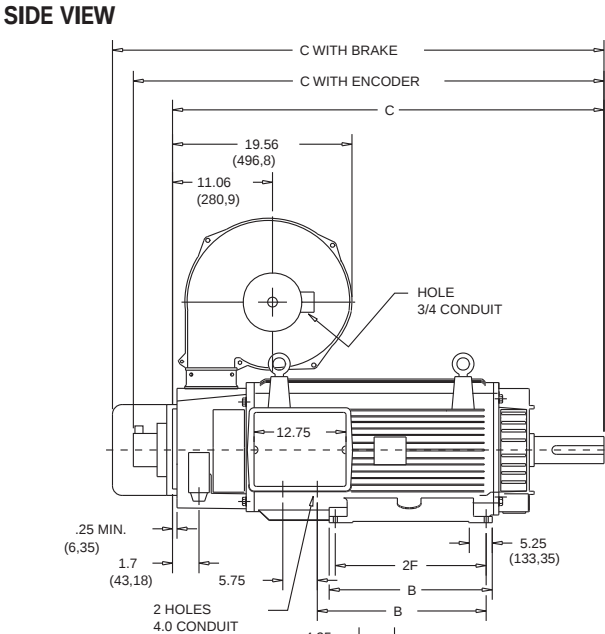
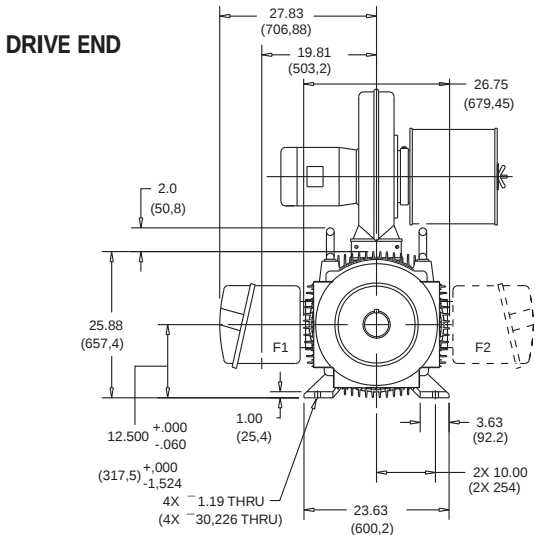


REFER TO DPBV DIMENSIONS ON PAGE 46
FOR FRONT VIEW FEET DIMENSIONS.

MODEL	2F	B
F328	16.00	17.88
F32B	22.00	23.88
F32D	28.00	29.88

POWERTEC
MOTOR
DIMENSIONS

F500 Frames, DPBV (Dripproof, Blower Ventilated)



CALLOUT FOR "C" DIMENSION			
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE
F504	49.75 (1263,65)	53.87 (1368,3)	Consult Factory
F506	55.38 (1406,65)	59.50 (1511,3)	Consult Factory
F508	61.25 (1555,75)	65.37 (1660,4)	Consult Factory

Dimensions in () are mm, all others in inches

MODEL	2F	B	B
F504	16.00 (406,4)	19.50 (495,3)	19.0 (482,6)
F506	20.00 (508)	23.50 (596,9)	23.87 (606,3)
F508	25.00 (635)	28.50 (723,9)	28.75 (730,3)

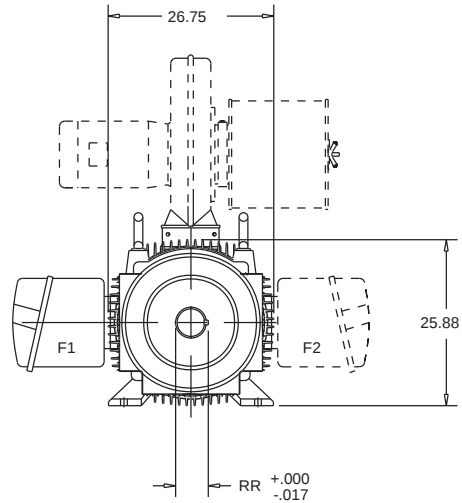
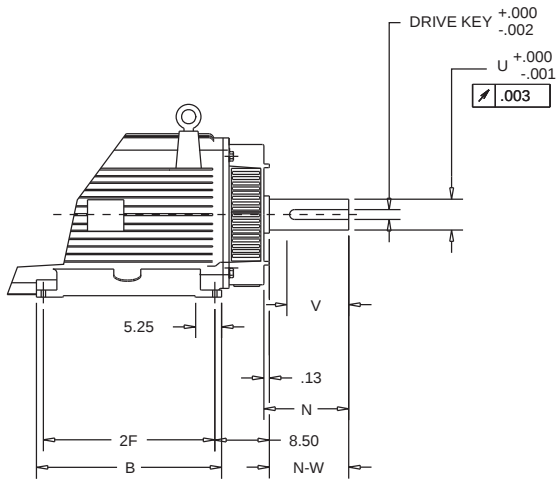
1. CONDUIT BOX CAN BE ROTATED IN 90° STEPS ON ITS OWN AXIS AND CAN BE MOUNTED ON OPPOSITE SIDE WHEN SPECIFIED.
2. BLOWER CAN BE ROTATED 180° ABOUT ITS AXIS. SIZE #12 BLOWER IS USED ON 500 FRAMES.

POWERTEC MOTOR DIMENSIONS

F500 Frame Mounting, NEMA

NEMA FOOT MOUNT, NO FLANGE

Dimensions in inches



REFER TO DPBV DIMENSIONS ON PAGE 48
FOR FRONT VIEW FEET DIMENSIONS.

MODEL	2F	B	N	N-W	U	V	RR	DRIVE KEY
F504	16.00	19.50	6.63	6.50	3.250	6.25	3.581	.750
F506	20.00	23.50	7.38	7.25	3.625	7.00	4.009	.875
F508	25.00	28.50	8.38	8.25	4.125	8.00	4.563	1.00

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GENERAL
INFORMATION

PACTORQ™ BRUSHLESS DC MOTORS

Versatile Packaging

The PACTORQ Motor Line includes NEMA Totally Enclosed Non-Ventilated (TENV), and Dripproof Blower Ventilated (DPBV) enclosures. These enclosures are suitable for virtually any industrial environment. The motors are available with NEMA foot mountings, NEMA C face and IEC D flange mountings are also available.

High Efficiency

The PACTORQ brushless DC motor uses efficient neodymium-iron-boron (rare-earth) permanent magnets bonded to the rotor to produce the magnetic field. Thus, there are minimal losses in the motor due to rotor induction currents. All of the current delivered to the brushless DC motor is used to develop torque.

Dynamic Response

The powerful and lightweight optimized permanent magnet circuit design provides the highest power density in the industry. This high power density provides servo-like response with high starting and running torque, rapid start-stop capabilities, and smooth operation over the entire speed range.

Precision Control

The brushless DC motor is a true synchronous motor. The rotor field is always in sync with the excitation field; it does not have losses due to slip. This factor, inherent to brushless DC design, combined with various primary and secondary feedback options, allows for precise speed and torque control.

Low Maintenance

The brushless DC motor does not have any brushes to replace or a commutator to wear out. Little heat is generated in the rotor allowing the bearings to run cooler while increasing bearing life.



PACTORQ BRUSHLESS DC MOTORS
10-400 HP STANDARD

PACTORQ BRUSHLESS DC MOTORS

FEATURES

Brushless Technology

Optimized magnetic design incorporating high energy Neodymium magnets

NEMA or IEC (Metric) enclosures and mounting options

Patented double-finned, aluminum frame (US Patent No. 4, 839, 547)

Oversize bearings pressed into steel bearing insert, clamped rear bearing (NEMA 180-320 frames)

Integral through shaft encoder/resolver

Four different wiring configurations for various horsepower and speed requirements

Robust Stator
- Concentric coil windings
- Inverter duty insulation system
- Proprietary trickle varnish process

Class H insulated, conservatively rated for class F operation

Flexible design incorporates many options

Near unity power factor at all speeds and loads

0% speed regulation

Standard two year warranty

BENEFITS

Reliable, high-performance motor technology - long life, virtually maintenance free, cooler running, low acoustical noise

- Highest dynamic response. Servo motor performance, rapid start-stop capability to position loads fast, quick speed changes for precise process control
- Highest power density. Extremely high torque in relatively small standard NEMA frame sizes minimizes machine size
- Highest efficiency motor technology. Significant energy savings at both base speed and much lower than base speed

Satisfies broad end-use requirements

Efficient cooling of the stator assembly
Withstands higher shock loads than conventional cast iron enclosures

All thrust loads accommodated by rear bearing, increasing reliability and life

No coupling, yields higher feedback resolution and accuracy

Flexible and versatile
Reduces need for large motor stock

Stator better withstands high voltage transients of PWM waveforms

Additional assurance of motor integrity over broad temperature range

Choices of mounting, terminations, feedback devices and holding brake to meet your application-specific requirements

Eliminates costly power factor correction
Reduces power consumption for important energy savings

No slip, drift, higher throughput

Assured quality and reliability

A

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GENERAL
INFORMATION

PACTORQ BRUSHLESS DC MOTORS

FEATURES

- High energy Neodymium permanent magnet design
- Highest efficiency
- Highest dynamic response
- Highest HP density in industry
- Selection of Industry Standard Enclosures
- NEMA and IEC mounting options
- Patented, finned aluminum frame for highest thermal efficiency and light weight
- Class H insulation system conservatively rated for Class F operation
- Location flexibility, with no brush maintenance requirements
- Standard two year warranty

PRIMARY FEEDBACK OPTIONS

- Integral, through shaft frameless resolver (transmitter type)
- Hall Sensors (dual channel quadrature)
 - 45 ppr (180 ppr after 4x multiplication by the drive) (NEMA 180 & 210 frames)
 - 60 ppr (240 ppr after 4x multiplication by the drive) (NEMA 250, 280, & 320 frames)

SECONDARY FEEDBACK OPTIONS

- 600 or 1024 line driver encoder

OTHER OPTIONS

- 100 VDC brakes
- Encoder feedback mounting kit
- Maximum capacity ball bearings and roller bearings
- Slide base mounting
- Custom termination options
- Custom stator windings
- Custom mounting and shaft configurations
- PTC thermistor
- Special high speed designs

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting
- Cranes
- Elevators

AGENCY APPROVALS

- UL Recognized (file #E130709)
- CSA Listed (pending)
- CE Certified (pending)

GENERAL SPECIFICATIONS

Number of poles	6 (NEMA 180 & 210 frames) 8 (NEMA 250, 280, & 320 frames)
Winding	3 phase Wye or Delta, series or parallel (12 lead reconnectable)
Magnet Type	Neodymium Iron Boron
Enclosures	TENV, DPBV (others available)
Mounting	NEMA C face, foot mounting, IEC D flange
Terminations	Terminal Box: F1, F2, top mounted, and MS Connectors
Thermal Protection	NTC thermistor with resolver Normally closed thermostat with Hall Sensor Feedback
Maximum Speed	Standard PACTORQ Motor designs are limited to: – 6,000 RPM, NEMA 180 frame – 4,500 RPM, NEMA 210 frame – 4,000 RPM, NEMA 250 frame – 3,600 RPM, NEMA 280 frame – 3,000 RPM, NEMA 320 frame

NOTE: Special High Speed Designs Available

PACTORQ MOTORS MODEL NUMBER CODES



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DRIVE SYSTEMS

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GENERAL
INFORMATION

Standard top speeds from 3000 to 6000 RPM—high speed options available.

Patented, double-finned aluminum frame (highest thermal efficiency and lighter weight)

Rugged IGBT Class H insulation but rated conservatively for Class F for added assurance of motor integrity over broad temperature range, longer life, reduced machine down time

Totally Enclosed, Non-Ventilated (TENV) motor shown in cutaway. The addition of a blower—our standard Dripproof Blower Ventilated (DPBV) motor significantly increases torque and HP ratings. See detailed specifications on pages 56 and 58

Primary feedback devices—frameless resolver or Hall Sensors

Optional secondary feedback device—factory mounted optical encoder or encoder mounting provisions on rear end bell.

Optional integral (rear mounted) holding brake

Rugged TENV construction, sealed per IP44 and IP56

Stator connection flexibility—four separate connections provide four different power and speed ratings

Termination versatility—to terminal block in oversized terminal box or MS connectors

Long maintenance-free brushless construction—no harmonically induced bearing pitting... no brushes to replace provides location flexibility

Optimized magnetic design using neodymium rare earth permanent magnets

Standard NEMA frames

Overtemperature protection—thermistor or thermostat

NEMA or Metric mounting

Custom shafts and mounting available

Standard two year warranty

High capacity ball bearings—roller bearings optional

PACTORQ NEODYMIUM-NEMA 180 FRAME

E	18	2	E	1	J	1	N	0	2	1	0	00
Motor Type E = PACTORQ Brushless Motor NdFeB 6-Pole design		Frame Diameter 18 = NEMA 180		Stack Length 2 = 182 3 = S184 4 = 184		Winding E = Standard S = Special		Winding Connection 1 = 1D 2 = 2D 3 = 1Y 4 = 2Y		Enclosure A = TENV (IP44) B = TENV (IP56) J = DPBV (with filter)		Factory Assigned Insert 00 if all parts are standard. Factory-assigned if any parts are custom
Mounting Face and Shaft 1 = NEMA 180C Face w/Feet 4 = Metric (IEC) FF265 Square Flange w/Feet		Brake Option® B = 100 VDC N = No Brake S = Special		Bearing® 0 = Heavy Duty Ball Bearing		Primary Feedback 0 = Hall Sensors/ Thermal Switch 2 = Resolver / NTC Thermistor 6 = No Primary		Terminations® 1 = Terminal box F1 (Standard) 2 = Terminal box F2 3 = MS connectors F1 4 = MS connectors F2 7 = Terminal box, top mounted 8 = Terminal box, top mounted with MS connectors E = Terminal box F1 with CE terminal blocks for power and feedback F = Terminal box F2 with CE terminal blocks for power and feedback G = Terminal box, top mounted, with CE terminal blocks for power and feedback		Secondary Feedback 0 = No Secondary A = 600 ppr Encoder B = 1024 ppr Encoder M = Encoder mounting provisions		

NOTES:

- ① Bearing selection may be application dependent. Refer to page 139 for maximum shaft radial loading. Consult application engineering with special considerations.
- ② Terminal box top option not available with DPBV motor enclosures.
- ③ See page 135 for special options.

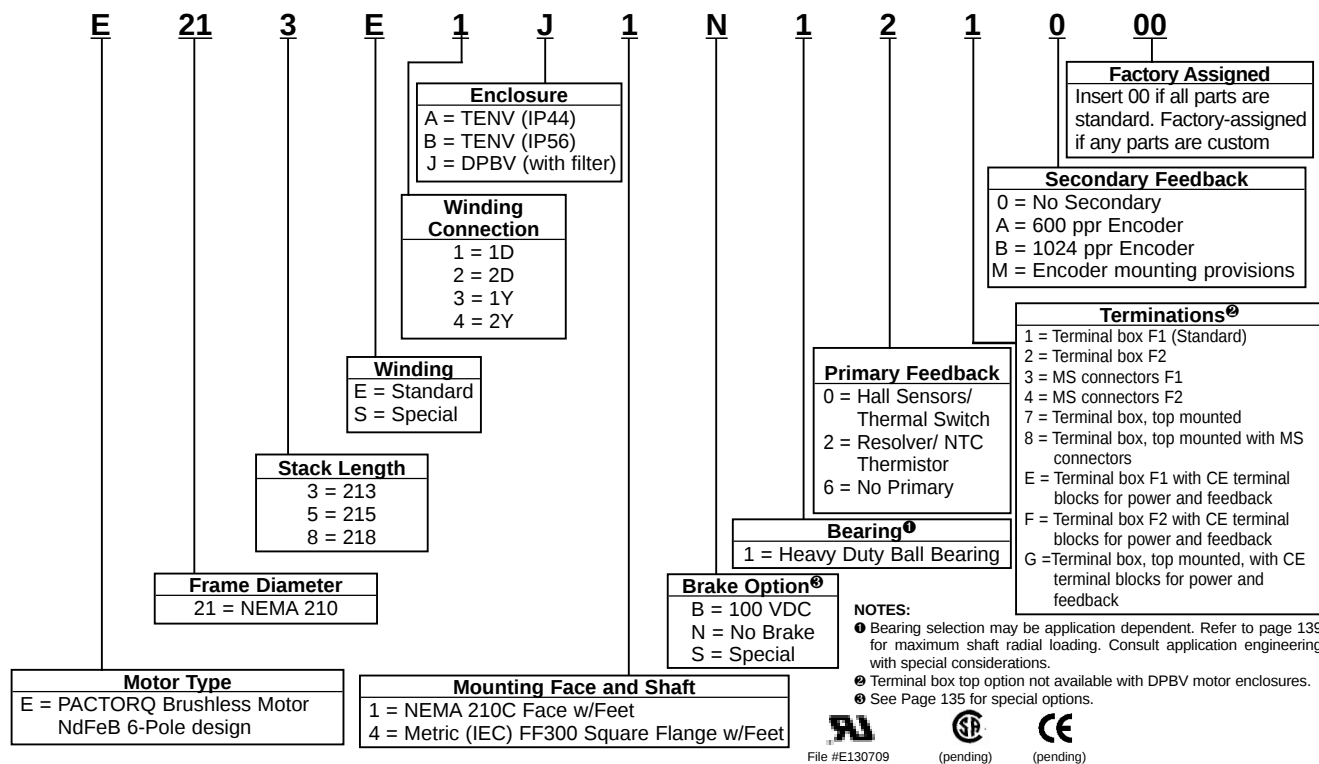
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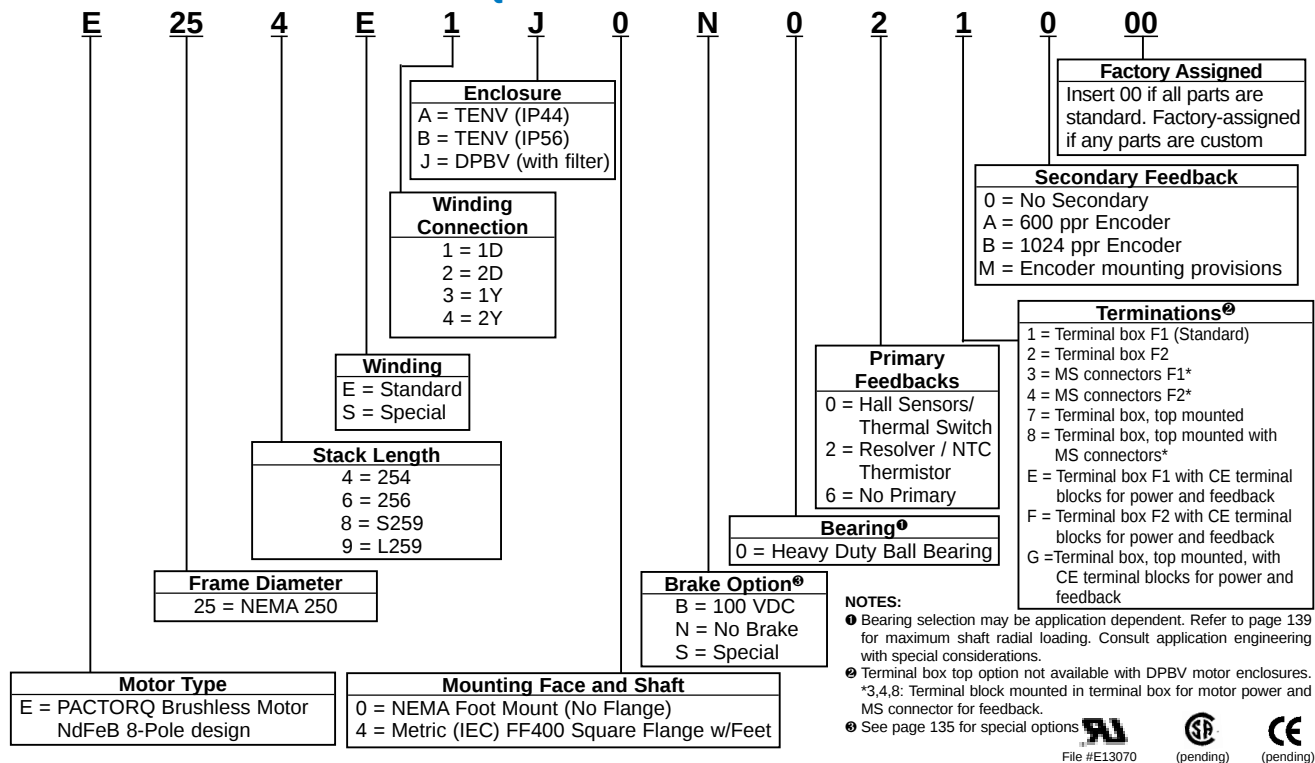
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PACTORQ MOTORS MODEL NUMBER CODES

PACTORQ NEODYMIUM-NEMA 210 FRAME

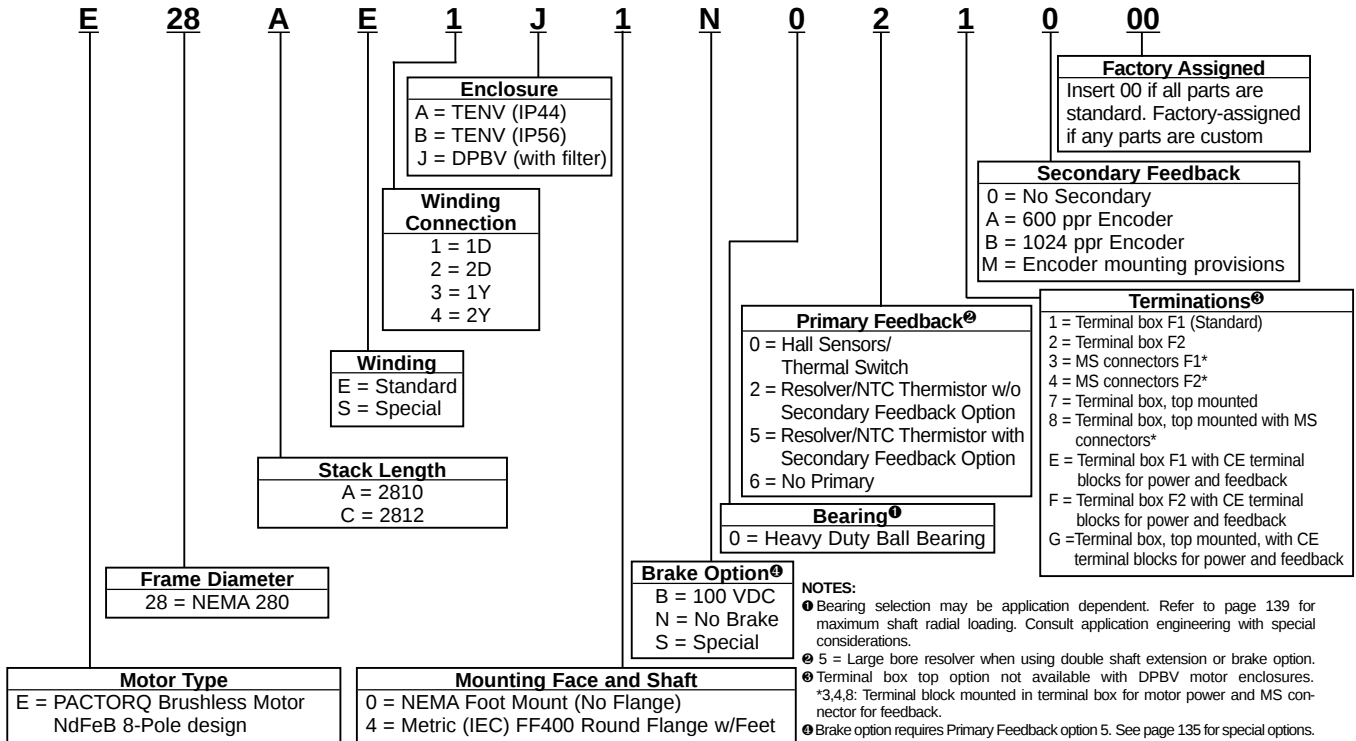


PACTORQ NEODYMIUM-NEMA 250 FRAME

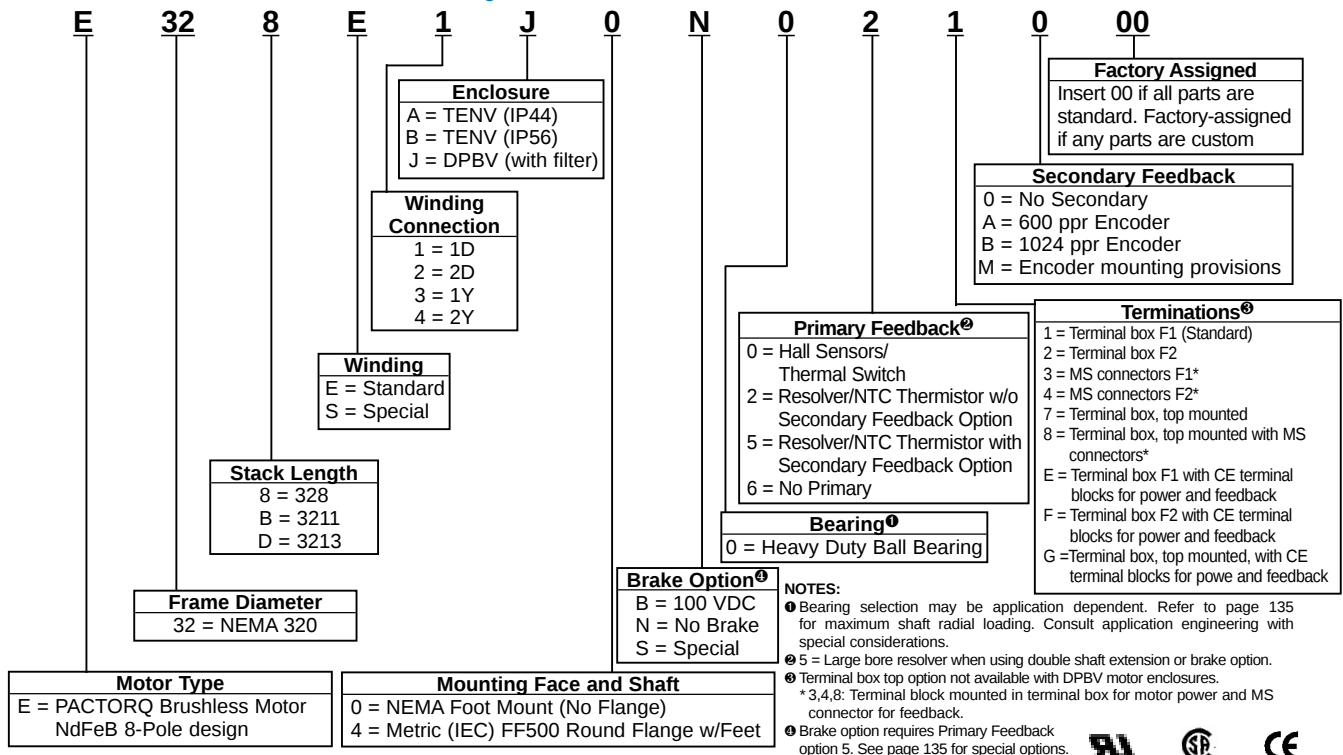


PACTORQ MOTORS MODEL NUMBER CODES

PACTORQ NEODYMIUM-NEMA 280 FRAME



PACTORQ NEODYMIUM-NEMA 320 FRAME



A

MOTORS

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DRIVES

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GENERAL
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PACTORQ MOTORS

Totally Enclosed, Non-Ventilated (TENV)



10–75 HP Standard

FEATURES

- Optimized magnetic design utilizing Neodymium (rare earth) permanent magnets
- NEMA/IEC Totally Enclosed Non-Ventilated enclosure (IP44, IC410)
- Troublefree, brushless construction
- Very high power density
- Long life regreasable, oversize bearings
- Class H insulated, rated for class F operation
- NTC thermistor thermal protection
- NEMA or IEC mounting
- NEMA C face, foot mounting, and IEC D flange available
- Standard two year warranty

PRODUCT DESCRIPTION

PACTORQ TENV motors offer very high horsepower in a small frame size and the highest power density in the industry. From 10HP in the NEMA 210 frame to 75HP in a NEMA 320 frame, these motors are ideally suited for use in harsh industrial environments with unclean, or particle saturated air.

CONSTANT TORQUE SPEED RANGE

- 1000:1 with Millennium Drives

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting
- Cranes
- Elevators

AGENCY APPROVALS

- UL Recognized (file #E130709)
- CSA Listed (pending)
- CE Certified (pending)

RATINGS AND CHARACTERISTICS

Model Number Prefix	Efficiency @1750 RPM	Winding Connection E1 (1-Delta)		Winding Connection E3 (1-Wye)		Winding Connection E4 (2-Wye)		Rotor Inertia	Weight	Rotor Inertia	Weight
		Rated Speed	Maximum HP	Rated Speed	Maximum HP	Rated Speed	Maximum HP	lb.-ft. ²	lbs.	kg-m ²	kg
E213	0.947	1750	15.7	1000	10.7	2000	16.5	0.825	164	0.0348	74
E215	0.951	1750	18.2	1000	13.2	2000	18.3	0.958	200	0.0404	91
E218	0.952	1750	19.9	1000	15.8	2000	18.5	1.14	250	0.0483	113
E254	0.956	1750	30.2	1000	22.5	2000	29.6	2.45	284	0.103	129
E256	0.959	1750	36.9	1000	27.9	2000	35.9	2.90	334	0.123	152
E258	0.958	1750	38.3	1000	32.8	2000	32.1	3.81	406	0.161	184
E259	NA	NA	NA	1000	36.5	NA	NA	4.72	481	0.199	218
E28A	NA	NA	NA	1000	40.1	NA	NA	8.18	630	0.345	286
E28C	NA	NA	NA	1000	53.2	NA	NA	10.8	787	0.456	357
E328	NA	NA	NA	1000	63.4	NA	NA	14.1	785	0.594	356
E32B	NA	NA	NA	1000	73.6	NA	NA	16.5	936	0.696	425
E32D	NA	NA	NA	1000	90.2	NA	NA	21.4	1170	0.901	531

RECOMMENDED TENV MOTOR / MILLENNIUM SERIES DRIVE COMBINATIONS – 1000:1 CTSR^❶

PACTORQ Motors (neodymium magnets)				Motor List Price	Millennium Series Drive/Amperes®
TENV			Base Model Number® ❸		
HP	RPM	Frame❶	460VAC	\$	460VAC
10	2000	E213TZ	E 213 E4A1N1210XX	7,940	M4/30
	1750	E213TZ	E 213 E1A1N1210XX	7,940	
	1000	E215TZ	E 215 E3A1N1210XX	9,070	
15	2000	E213TZ	E 213 E4A1N1210XX	7,940	M4/30
	1750	E215TZ	E 215 E1A1N1210XX	9,070	
	1000	E218TZ	E 218 E3A1N1210XX	10,200	
20	2000	E254TZ	E 254 E4A0N0210XX	10,390	M4/30
	1750	E254TZ	E 254 E1A0N0210XX	10,390	
	1000	E254TZ	E 254 E3A0N0210XX	10,390	
25	2000	E254TZ	E 254 E4A0N0210XX	10,390	M4/30
	1750	E254TZ	E 254 E1A0N0210XX	10,390	
	1000	E256TZ	E 256 E3A0N0210XX	11,490	
30	2000	E256TZ	E 256 E4A0N0210XX	11,490	M4/40
	1750	E256TZ	E 256 E1A0N0210XX	11,490	
	1000	ES259TZ	E 258 E3A0N0210XX	12,950	
40	1000	E2812TZ	E 28C E3A0N0210XX	25,140	M5/60
50	1000	E2812TZ	E 28C E3A0N0210XX	25,140	M5/75
60	1000	E328TZ	E 328 E3A0N0210XX	29,590	M5/75
75	1000	E3213TZ	E 32D E3A0N0210XX	41,070	M5/90

- ❶ Constant Torque Speed Range
❷ To construct a complete motor model number see Model Number Codes beginning on page 53.
❸ See Millennium Series Drives, Section B, page 92.
❹ NEMA Frame Designation. See PACTORQ Motor Dimensions beginning on page 60.
❺ All specified PACTORQ Motors are standard.
NOTE: PACTORQ Motors are rated for use with Millennium Drives only.

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MOTORS

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PRE-ENGINEERED
DRIVE SYSTEMS

D

GENERAL
INFORMATION

PACTORQ MOTORS

Dripproof, Blower Ventilated (DPBV)



10-400 HP Standard

FEATURES

- Optimized magnetic design utilizing Neodymium (rare earth) permanent magnets
- NEMA/IEC Dripproof Blower Ventilated enclosure (IP22, IC06)
- Troublefree, brushless construction
- Highest power density in the industry
- Long life regreasable, oversize bearings
- Class H insulated, conservatively rated for class F operation
- NTC thermistor thermal protection
- NEMA or IEC (Metric) mounting
- NEMA C face, foot mounting, and IEC D flange available
- Standard two year warranty

PRODUCT DESCRIPTION

PACTORQ DPBV motors offer the highest power density in the industry; from 10 HP in a NEMA 180 frame to 400 HP in a NEMA 320 frame. The motor is cooled by means of an external blower. Our patented double finned aluminum frame allows more efficient cooling of the stator assembly. Air is exhausted through finned plates in the shaft end of the motor enclosure.

These motors are protected from solid particles greater than 12mm diameter and liquids striking or entering the enclosure at an angle of not more than 15 degrees from the vertical (NEMA IP22). The cooling of the motor is in accordance with NEMA IC06.

CONSTANT TORQUE SPEED RANGE

- 1000:1 with Millennium Drives

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting
- Cranes
- Elevators

AGENCY APPROVALS

- UL Recognized (file #E130709)
- CSA Listed (pending)
- CE Certified (pending)

RATINGS AND CHARACTERISTICS

Model Number Prefix	Efficiency @1750 RPM	Winding Connection E1 (1-Delta)		Winding Connection E2 (2-Delta)		Winding Connection E3 (1-Wye)		Winding Connection E4 (2-Wye)		Rotor Inertia	Weight	Rotor Inertia	Weight
		Rated Speed	Maximum HP	Rated Speed	Maximum HP	Rated Speed	Maximum HP	Rated Speed	Maximum HP	lb.-ft. ²	lbs.	kg-m ²	kg
E182	0.895	1750	12.8	3600	23.7	1000	7.6	2000	14.5	0.301	86	0.0127	39
E183	0.902	1750	20.8	3600	38.7	1000	12.2	2000	23.5	0.380	113	0.0160	51
E184	0.917	1750	26.9	3600	49.0	1000	15.9	2000	30.3	0.458	129	0.0193	59
E213	0.921	1750	40.2	3600	73.4	1000	21.5	2000	45.3	0.825	175	0.0348	79
E215	0.933	1750	49.2	3600	86.2	1000	29.3	2000	55.3	0.958	211	0.0404	96
E218	0.943	1750	57.0	3600	92.7	1000	34.5	2000	63.6	1.14	261	0.0483	118
E254	0.945	1750	76.4	3600	124.8	1000	46.2	2000	85.4	2.45	295	0.103	134
E256	0.953	1750	81.4	3600	116.4	1000	50.2	2000	90.1	2.91	345	0.123	156
E258	0.956	1750	101.8	3600	132.6	1000	63.4	2000	112.1	3.81	440	0.161	200
E259	0.956	1750	138.2	3600	195.9	1000	85.2	2000	152.9	4.72	515	0.199	234
E28A	0.955	1750	153.1	3600	208.7	1000	94.9	2000	169.1	8.18	630	0.345	286
E28C	0.960	1750	205.1	3600	252.9	1000	128.4	2000	225.4	10.8	787	0.456	357
E328	0.964	850	139.3	1750	263.1	500	83.9	1000	161.9	14.1	842	0.594	382
E32B	0.965	850	167.7	1750	314.5	500	101.2	1000	194.8	16.5	993	0.696	450
E32D	0.968	850	208.8	1750	384.1	500	126.6	1000	242.0	21.4	1227	0.901	557

RECOMMENDED DPBV MOTOR / MILLENNIUM SERIES DRIVE COMBINATIONS – 1000:1 CTSR^①

PACTORQ Motors (neodymium magnets)				Motor	Millennium Series
DPBV			Base Part Number® ®	List Price	Drive/Amperes®
HP	RPM	Frame®	460VAC	\$	460VAC
10	3600	E182TZ	E 182 E2J1N0210XX	5,850	M4/30
	2000	E182TZ	E 182 E4J1N0210XX	5,850	
	1750	E182TZ	E 182 E1J1N0210XX	5,850	
	1000	ES184TZ	E 183 E3J1N0210XX	6,690	
15	3600	E182TZ	E 182 E2J1N0210XX	5,850	M4/30
	2000	ES184TZ	E 183 E4J1N0210XX	6,690	
	1750	ES184TZ	E 183 E1J1N0210XX	6,690	
	1000	E213TZ	E 213 E3J1N0210XX	9,200	
20	3600	E182TZ	E 182 E2J1N0210XX	5,850	M4/30
	2000	ES184TZ	E 183 E4J1N0210XX	6,690	
	1750	E184TZ	E 184 E1J1N0210XX	7,150	
	1000	E215TZ	E 215 E3J1N0210XX	10,340	
25	3600	ES184TZ	E 183 E2J1N0210XX	6,690	M4/30
	2000	E184TZ	E 184 E4J1N0210XX	7,150	
	1750	E213TZ	E 213 E1J1N0210XX	9,200	
	1000	E215TZ	E 215 E3J1N0210XX	10,340	
30	3600	ES184TZ	E 183 E2J1N0210XX	6,690	M4/40
	2000	E213TZ	E 213 E4J1N0210XX	9,200	
	1750	E213TZ	E 213 E1J1N0210XX	9,200	
	1000	E218TZ	E 218 E3J1N0210XX	11,470	
40	3600	E184TZ	E 184 E2J1N0210XX	7,150	M4/50
	2000	E215TZ	E 215 E4J1N0210XX	10,340	
	1750	E215TZ	E 215 E1J1N0210XX	10,340	
	1000	E254TZ	E 254 E3J0N0210XX	11,650	
50	3600	E213TZ	E 213 E2J1N0210XX	9,200	M5/60
	2000	E218TZ	E 218 E4J1N0210XX	11,470	
	1750	E218TZ	E 218 E1J1N0210XX	11,470	
	1000	E256TZ	E 256 E3J0N0210XX	12,820	
60	3600	E215TZ	E 215 E2J1N0210XX	10,340	M5/75
	2000	E254TZ	E 254 E4J0N0210XX	11,650	
	1750	E254TZ	E 254 E1J0N0210XX	11,650	
	1000	ES259TZ	E 258 E3J0N0210XX	14,150	
75	3600	E215TZ	E 215 E2J1N0210XX	10,340	M5/90
	2000	E256TZ	E 256 E4J0N0210XX	12,820	
	1750	E256TZ	E 256 E1J0N0210XX	12,820	
	1000	EL259TZ	E 259 E3J0N0210XX	15,820	
100	3600	E256TZ	E 256 E2J0N0210XX	12,820	M6/120
	2000	ES259TZ	E 258 E4J0N0210XX	14,150	
	1750	ES259TZ	E 258 E1J0N0210XX	14,150	
	1000	E2812TZ	E 28C E3J0N0210XX	26,150	
125	3600	ES259TZ	E 258 E2J0N0210XX	14,150	M6/150
	2000	EL259TZ	E 259 E4J0N0210XX	15,820	
	1750	EL259TZ	E 259 E1J0N0210XX	15,820	
	1000	E2812TZ	E 28C E3J0N0210XX	26,150	
150	3600	EL259TZ	E 259 E2J0N0210XX	15,820	M7/220
	2000	E2810TZ	E 28A E4J0N0210XX	22,340	M6/175
	1750	E2810TZ	E 28A E1J0N0210XX	22,340	
	1000	E328TZ	E 328 E4J0N0210XX	30,970	
200	3600	E2812TZ	E 28C E2J0N0210XX	26,150	M7/275
	2000	E2812TZ	E 28C E4J0N0210XX	26,150	
	1750	E2812TZ	E 28C E1J0N0210XX	26,150	
	1000	E3211TZ	E 32B E4J0N0210XX	34,000	
250	2000	E328TZ	E 328 E2J0N0210XX	30,970	M7/275
	1750	E328TZ	E 328 E2J0N0210XX	30,970	
300	2000	E3211TZ	E 32B E2J0N0210XX	34,000	NA
	1750	E3211TZ	E 32B E2J0N0210XX	34,000	
400	2000	E3213TZ	E 32D E2J0N0210XX	42,450	NA

① Constant Torque Speed Range.

② To construct a complete motor model number see Model Number Codes beginning on page 53.

③ See Millennium Series Drives, Section B, page 92.

④ NEMA Frame Designation. See PACTORQ Motor Dimensions beginning on page 60.

⑤ All specified PACTORQ Motors are standard.

NOTE: PACTORQ Motors are rated for use with Millennium Drives only.

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DRIVE SYSTEMS

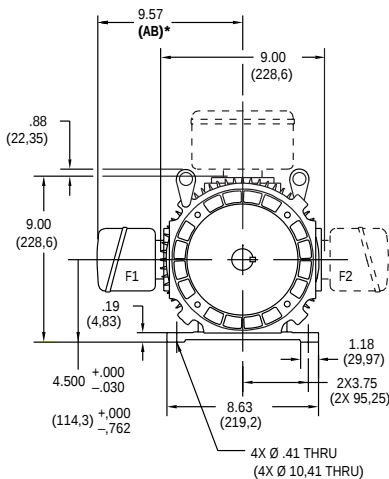
D

GENERAL
INFORMATION

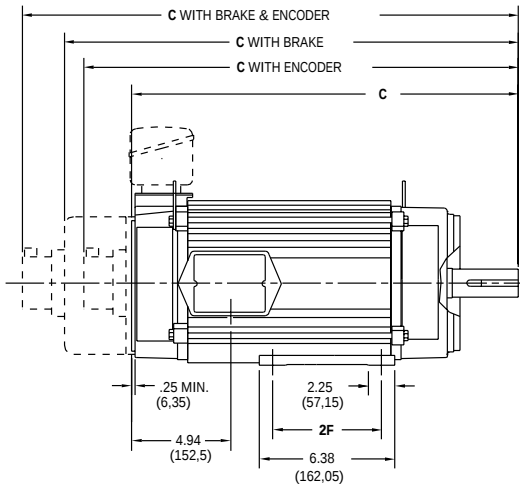
PACTORQ
MOTOR
DIMENSIONS

E180 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW

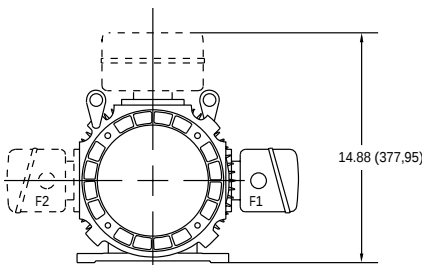


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E182	16.63 (422,4)	19.42 (493,3)	20.52 (521,2)	22.48 (571)
E183	20.44 (519,2)	22.23 (590)	24.33 (618)	26.29 (667,8)
E184	20.44 (519,2)	23.23 (590)	24.33 (618)	26.29 (667,8)

MODEL	2F DIMENSION
E182	4.50 (114,3)
E183	5.50 (139,7)
E184	5.50 (139,7)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:
1. Reference page 124 for conduit box dimensions.
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
* See terminations, page 126.

PACTORQ MOTOR DIMENSIONS

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MOTORS

B

DRIVES

C

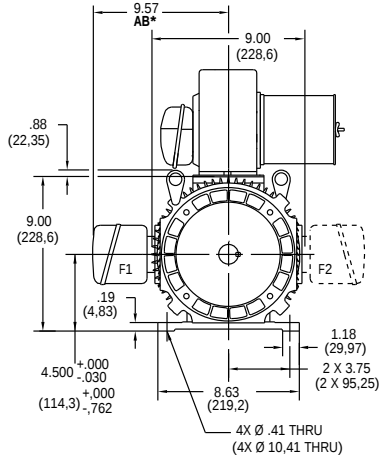
PRE-ENGINEERED
DRIVE SYSTEMS

D

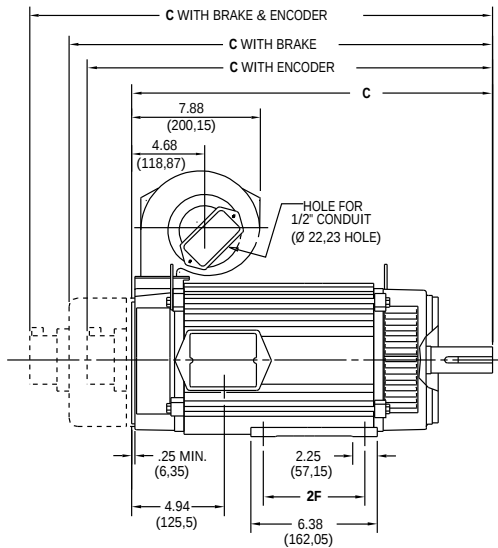
GENERAL
INFORMATION

E180 Frames, DPBV (Dripproof, Blower Ventilated)

DRIVE END



SIDE VIEW



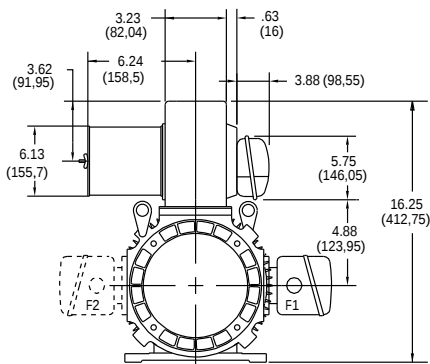
CALLOUT FOR "C" DIMENSION

MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E182	<u>16.63</u> (422,4)	<u>19.42</u> (493,3)	<u>20.52</u> (521,2)	<u>22.48</u> (571)
E183	<u>20.44</u> (519,2)	<u>22.23</u> (590)	<u>24.33</u> (618)	<u>26.29</u> (667,8)
E184	<u>20.44</u> (519,2)	<u>23.23</u> (590)	<u>24.33</u> (618)	<u>26.29</u> (667,8)

MODEL	2F DIMENSION
E182	<u>4.50</u> (114,3)
E183	<u>5.50</u> (139,7)
E184	<u>5.50</u> (139,7)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

- Reference page 124 for conduit box dimensions.
- Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
- Blower can be rotated 180° about its axis. Size #2 blower is used on E180 frames. See Page 133.

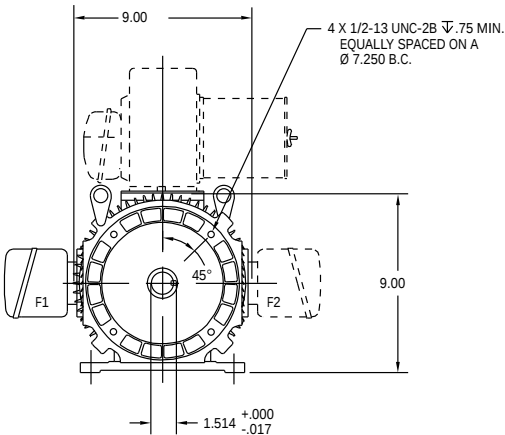
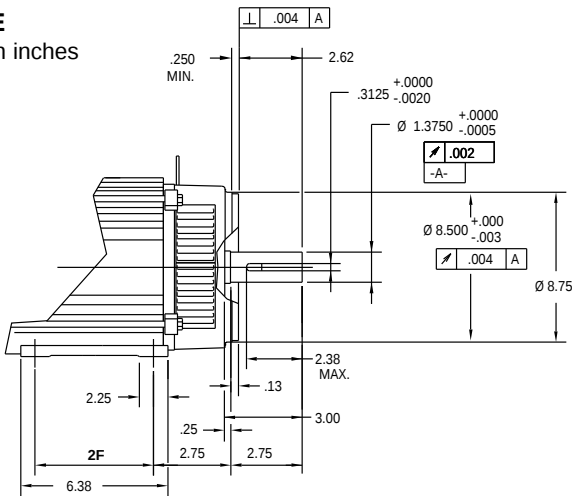
* See terminations, page 126.

PACTORQ MOTOR DIMENSIONS

E180 Frame Mounting, NEMA and Metric

NEMA C FACE

Dimensions in inches

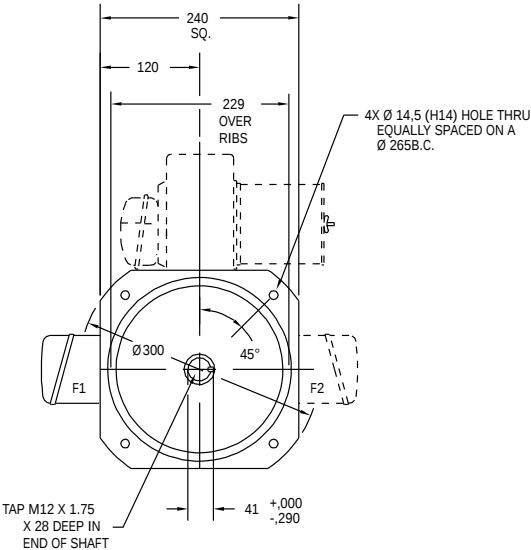
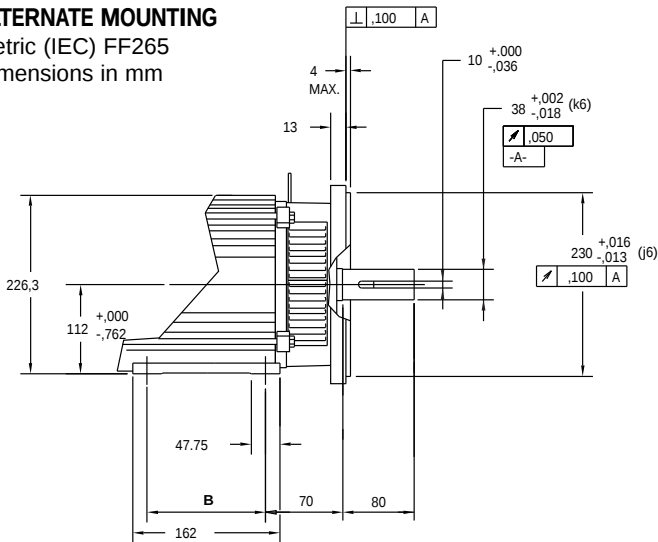


REFER TO DPBV DIMENSIONS ON PAGE 61 FOR FRONT VIEW FEET DIMENSIONS.

MODEL	2F DIMENSION
E182	4.50
E183	5.50
E184	5.50

ALTERNATE MOUNTING

Metric (IEC) FF265
Dimensions in mm



EXCEPT FOR FOOT HEIGHT REFER TO DPBV DIMENSIONS ON PAGE 61 FOR FRONT VIEW FEET DIMENSIONS.

MODEL	B DIMENSION
E182	114,3
E183	139,7
E184	139,7

PACTORQ MOTOR DIMENSIONS

A

MOTORS

B

DRIVES

C

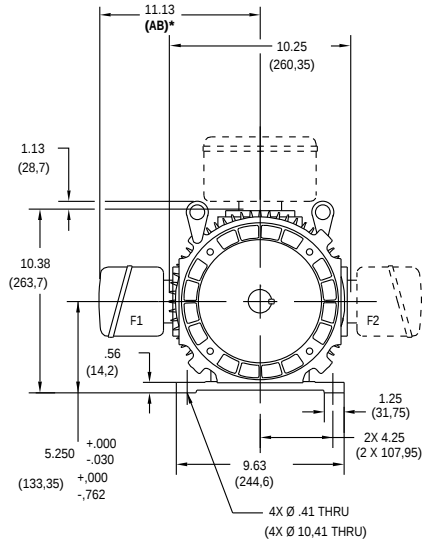
PRE-ENGINEERED
DRIVE SYSTEMS

D

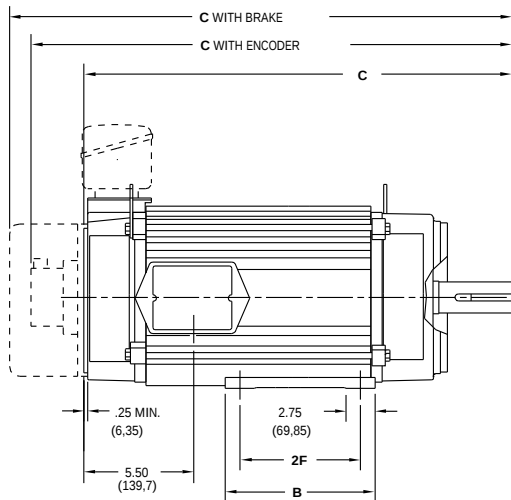
GENERAL
INFORMATION

E210 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW

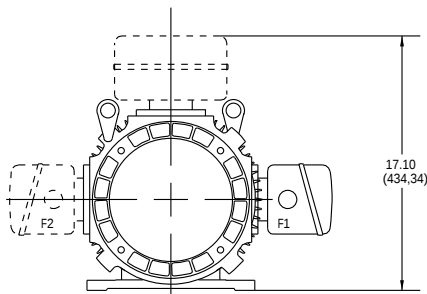


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E213	<u>22.25</u> (565,15)	<u>25.04</u> (636)	<u>26.14</u> (664)	<u>28.10</u> (713,7)
E215	<u>26.88</u> (682,75)	<u>29.67</u> (753,6)	<u>30.77</u> (781,6)	<u>32.73</u> (831,3)
E218	<u>29.25</u> (742,95)	<u>32.04</u> (813,8)	<u>33.14</u> (841,8)	<u>35.10</u> (891,5)

MODEL	2F DIMENSION	B DIMENSION
E213	<u>5.50</u> (139,7)	<u>8.38</u> (212,85)
E215	<u>7.00</u> (177,8)	<u>8.38</u> (212,85)
E218	<u>10.00</u> (254)	<u>11.38</u> (289,1)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

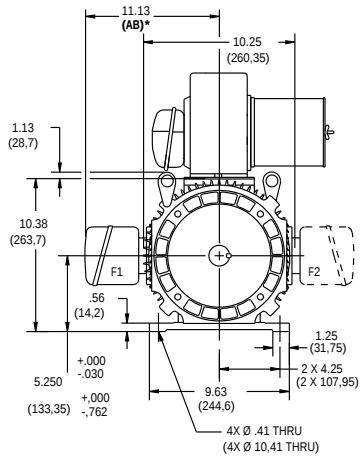
- Reference page 124 for conduit box dimensions.
- Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

* See terminations, page 126.

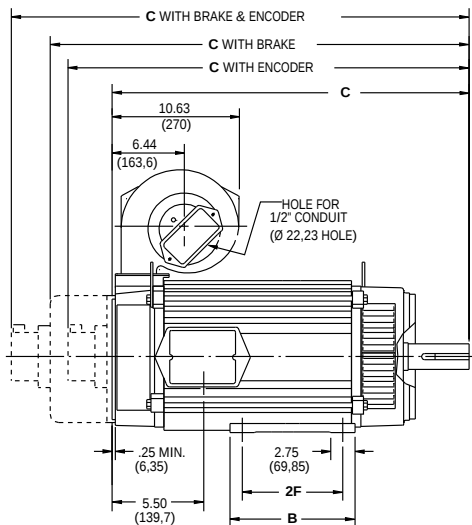
PACTORQ MOTOR DIMENSIONS

E210 Frames, DPBV (Dripproof, Blower Ventilated)

DRIVE END



SIDE VIEW



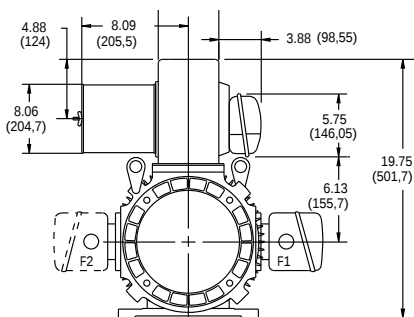
CALLOUT FOR "C" DIMENSION

MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E213	22.25 (565,15)	25.04 (636)	26.14 (664)	28.10 (713,7)
E215	26.88 (682,75)	29.67 (753,6)	30.77 (781,6)	32.73 (831,3)
E218	29.25 (742,95)	32.04 (813,8)	33.14 (841,8)	35.10 (891,5)

MODEL	2F DIMENSION	B DIMENSION
E213	5.50 (139,7)	8.38 (212,85)
E215	7.00 (177,8)	8.38 (212,85)
E218	10.00 (254)	11.38 (289,1)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

1. Reference page 124 for conduit box dimensions.
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
3. Blower can be rotated 180° about its axis. Size #3 blower is used on E210 frames. See Page 133.

* See terminations, page 126.

PACTORQ MOTOR DIMENSIONS

A

MOTORS

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PRE-ENGINEERED
DRIVE SYSTEMS

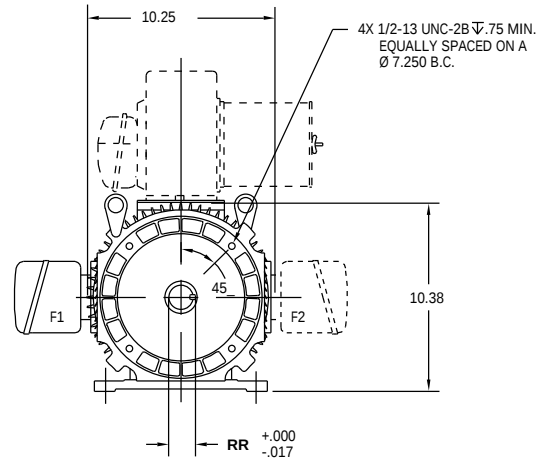
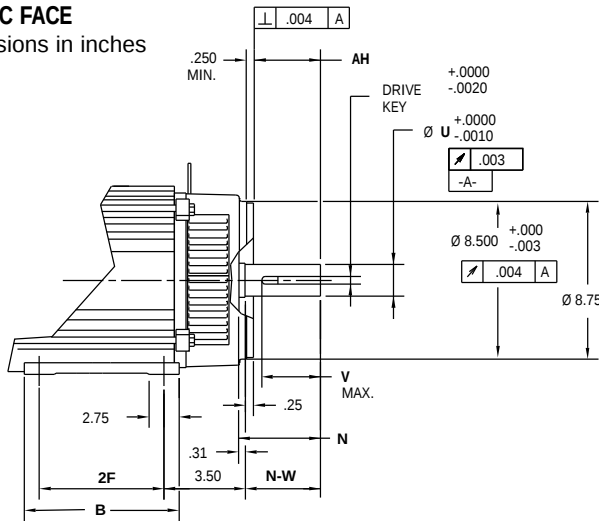
D

GENERAL
INFORMATION

E210 Frame Mounting, NEMA and Metric

NEMA C FACE

Dimensions in inches

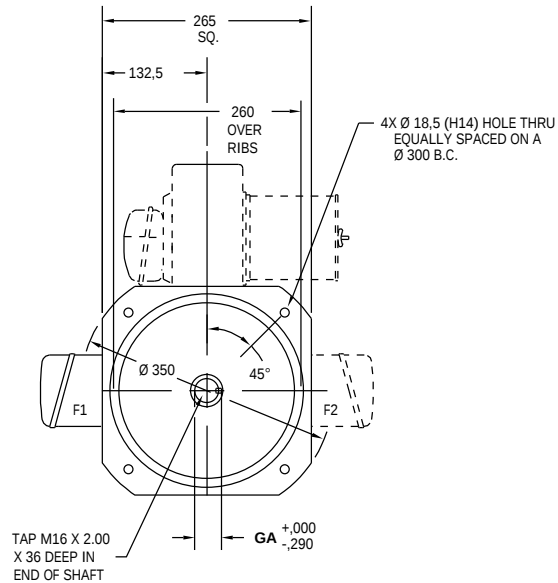
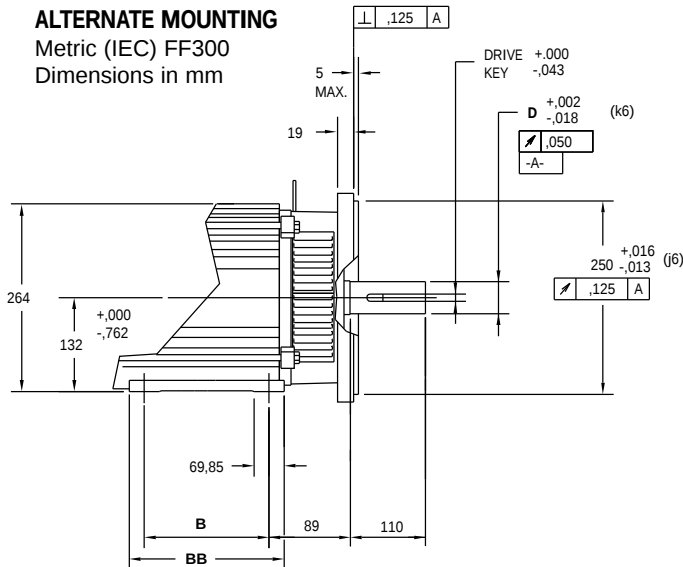


REFER TO DPBV DIMENSIONS ON PAGE 64 FOR FRONT VIEW FEET DIMENSIONS.

MODEL	2F	B	AH	N	N-W	U	V	RR	Drive Key
E213	5.50	8.38	3.75	4.31	4.00	1.625	3.5	1.791	.375
E215	7.00	8.38	5.00	5.56	5.25	2.125	4.75	2.345	.500
E218	10.00	11.38	5.00	5.56	5.25	2.125	4.75	2.345	.500

ALTERNATE MOUNTING

Metric (IEC) FF300
Dimensions in mm



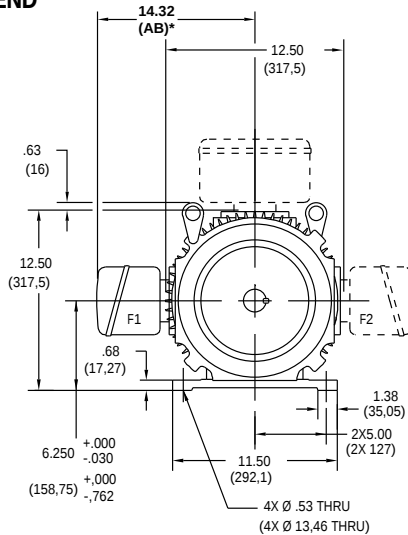
EXCEPT FOR FOOT HEIGHT REFER TO DPBV DIMENSIONS ON PAGE 64 FOR FRONT VIEW FEET DIMENSIONS.

MODEL	D	B	BB	GA	Drive Key
E213	42	139,7	213	45	12
E215	48	177,8	213	51,5	14
E218	48	254	289	51,5	14

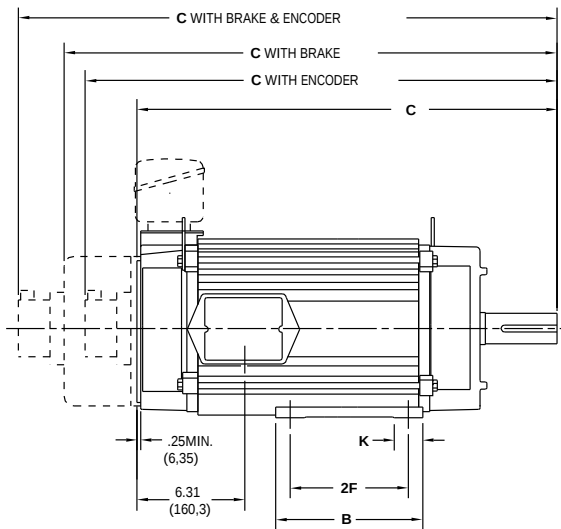
PACTORQ MOTOR DIMENSIONS

E250 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW

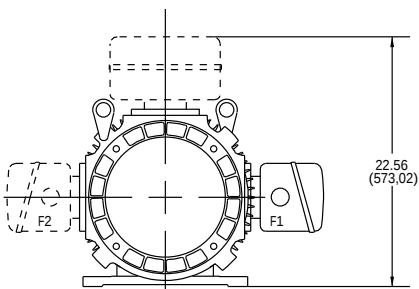


CALLOUT FOR "C" DIMENSION

MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
F254	26.94 (684,28)	29.73 (755,1)	31.88 (809,8)	33.85 (859,8)
F256	31.44 (798,58)	34.23 (869,4)	36.38 (924,1)	38.35 (974,1)
E258	33.81 (858,77)	36.60 (929,6)	38.76 (984,5)	40.72 (1034,3)
F259	36.81 (934,97)	39.60 (1005,8)	41.76 (1060,7)	43.72 (1110,5)

MODEL	2F DIMENSION	B	K
E254	8.25 (209,55)	12.00 (304,8)	3.38 (85,85)
E256	10.00 (254)	12.00 (304,8)	3.38 (85,85)
E258	14.00 (355,6)	16.00 (406,4)	2.00 (50,8)
E259	14.00 (355,6)	16.00 (406,4)	2.00 (50,8)

OPPOSITE DRIVE END



Dimensions in () are mm, all others in inches

NOTE:

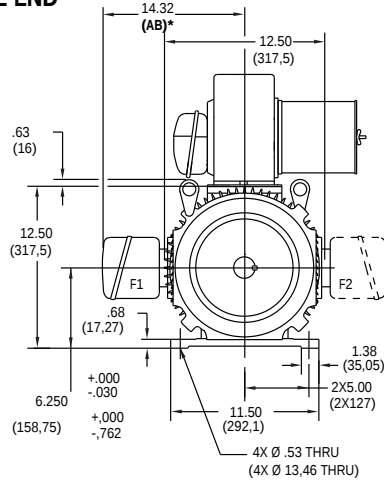
1. Reference page 124 for conduit box dimensions.
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

* See terminations, page 126.

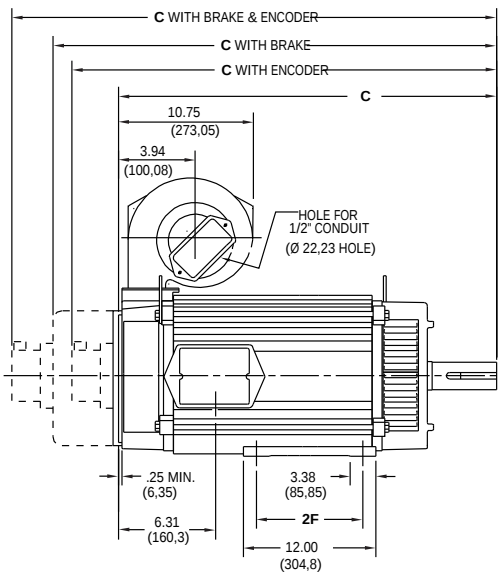
PACTORQ MOTOR DIMENSIONS

E254 & E256 Frames, DPBV (Dripproof, Blower Ventilated)

DRIVE END



SIDE VIEW



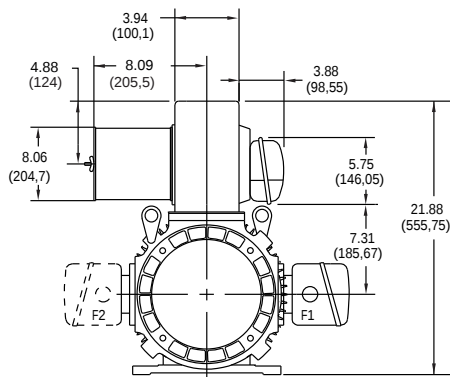
CALLOUT FOR "C" DIMENSION

MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E254	26.94 (684,28)	29.73 (755,1)	31.88 (809,8)	33.85 (859,8)
E256	31.44 (798,58)	34.23 (869,4)	36.38 (924,1)	38.35 (974,1)

MODEL	2F DIMENSION
E254	8.25 (209,56)
E256	10.00 (254)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

1. Reference page 124 for conduit box dimensions.
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
3. Blower can be rotated 180° about its axis. Size #3 blower is used on E254 & E256 frames. See Page 133.

* See terminations, page 126.

A

MOTORS

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PRE-ENGINEERED
DRIVE SYSTEMS

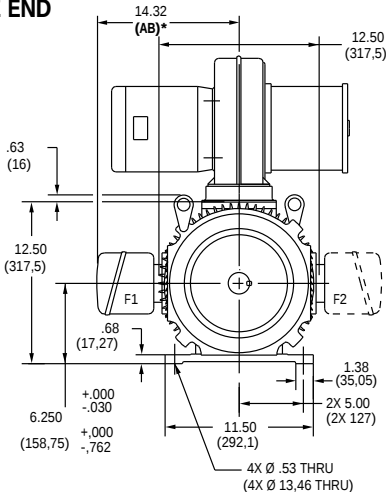
D

GENERAL
INFORMATION

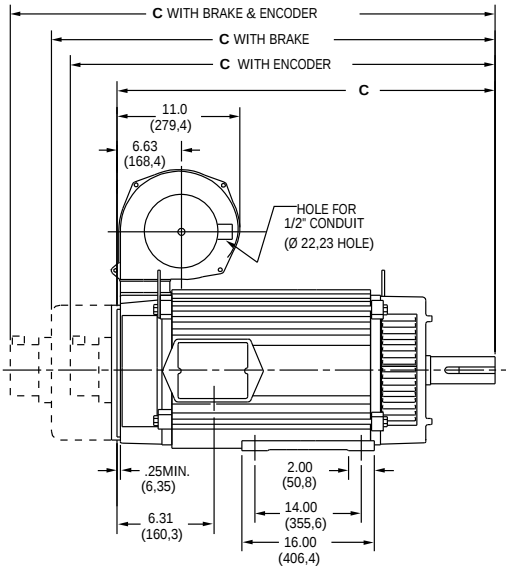
PACTORQ MOTOR DIMENSIONS

E258 & E259 Frames, DPBV (Dripproof, Blower Ventilated)

DRIVE END



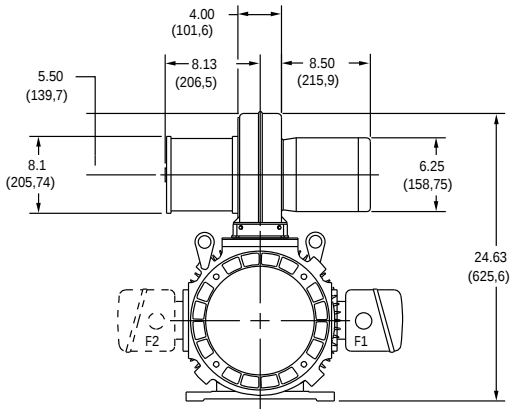
SIDE VIEW



CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E258	33.81 (858,77)	36.60 (929,6)	38.76 (984,5)	40.72 (1034,3)
E259	36.81 (934,97)	39.60 (1005,8)	41.76 (1060,7)	43.72 (1110,5)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



- NOTE:
- Reference page 124 for conduit box dimensions.
 - Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
 - Blower can be rotated 180° about it's axis. Size #8 blower is used on E259 frames. See Frames 133.

* See terminations, page 126.

PACTORQ MOTOR DIMENSIONS

A

MOTORS

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DRIVES

C

PRE-ENGINEERED
DRIVE SYSTEMS

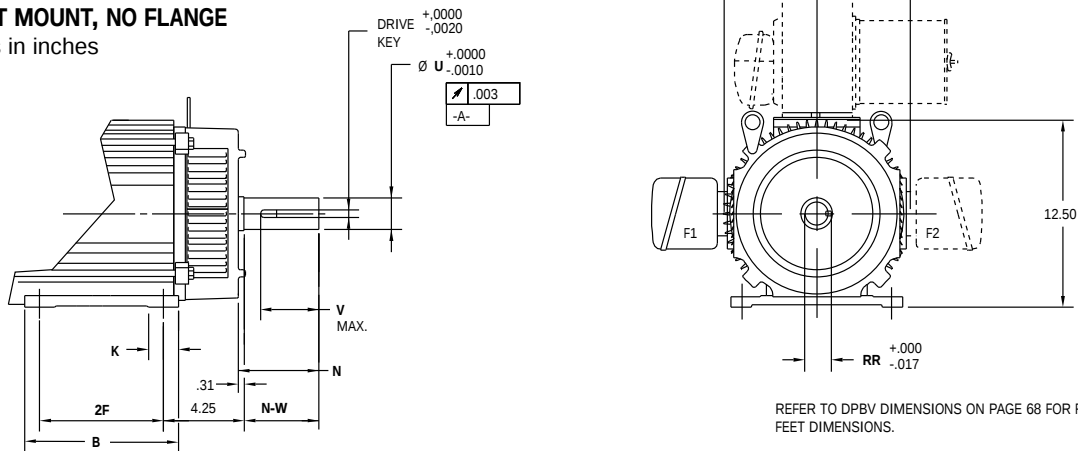
D

GENERAL
INFORMATION

E250 Frame Mounting, NEMA and Metric

NEMA FOOT MOUNT, NO FLANGE

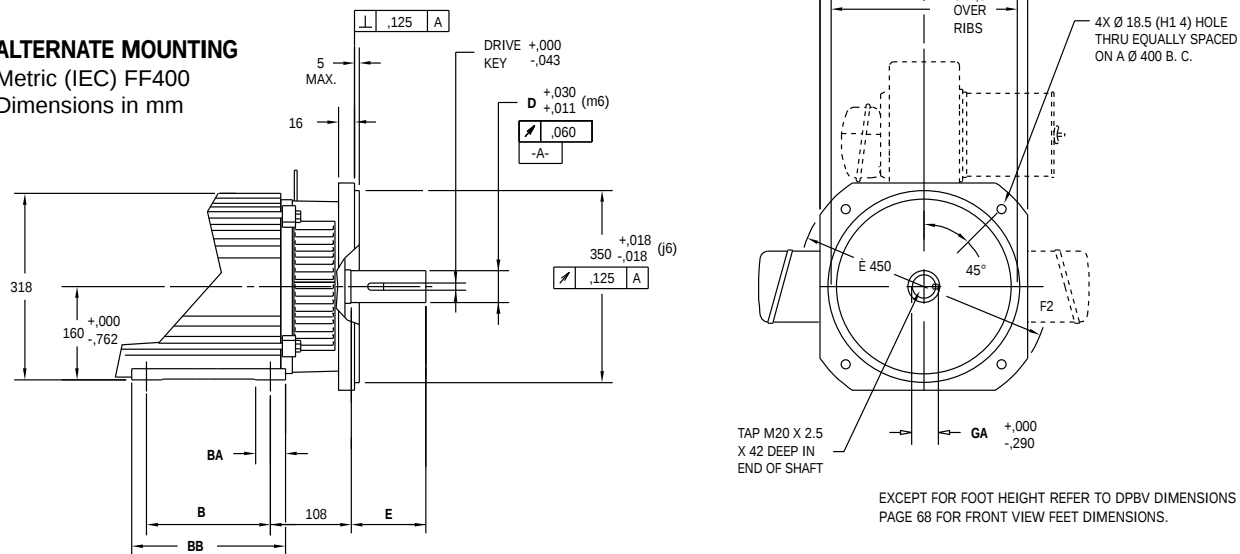
Dimensions in inches



MODEL	2F	B	K	N	N-W	U	V	RR	Drive Key
E254	8.25	12.00	3.38	5.56	5.25	2.125	4.75	2.345	.500
E256	10.00	12.00	3.38	6.18	5.87	2.375	5.37	2.646	.625
E258	14.00	16.00	2.00	6.18	5.87	2.375	5.37	2.646	.625
E259	14.00	16.00	2.00	6.18	5.87	2.375	5.37	2.646	.625

ALTERNATE MOUNTING

Metric (IEC) FF400
Dimensions in mm

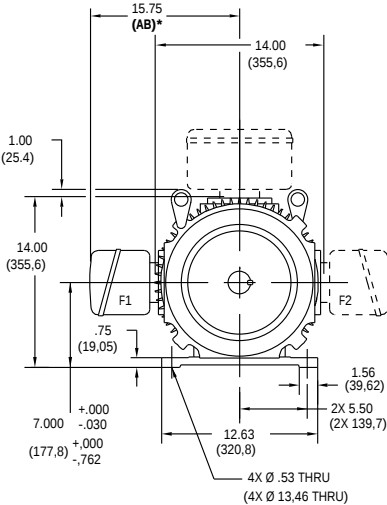


MODEL	D	E	BA	B	BB	GA	Drive Key
E254	55	110	86	209,5	305	59	16
E256	55	110	86	254	305	59	16
E258	60	140	51	355,6	406	64	18
E259	60	140	51	355,6	406	64	18

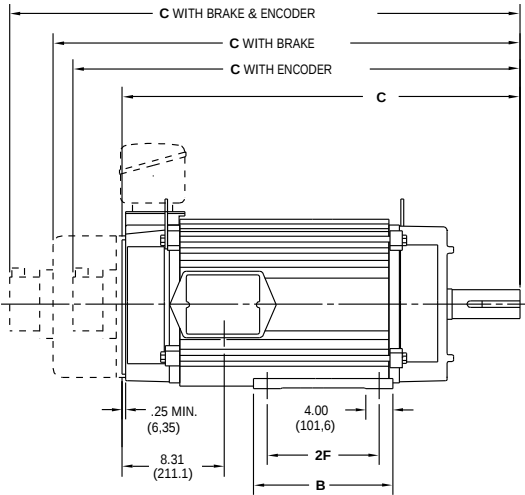
PACTORQ MOTOR DIMENSIONS

E280 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW

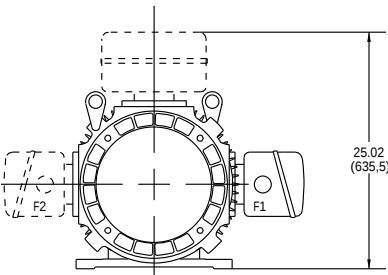


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E28A	42.00 (1066,8)	44.79 (1137,7)	48.57 (1233,7)	50.54 (1283,7)
E28C	46.12 (1171,4)	48.91 (1242,3)	52.69 (1338,3)	54.66 (1388,4)

MODEL	2F DIMENSION	B DIMENSION
E28A	18.00 (457,2)	20.00 (508)
E28C	22.00 (558,8)	24.00 (609,6)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



- NOTE:
1. Reference page 124 for conduit box dimensions.
 2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

* See terminations, page 126.

PACTORQ MOTOR DIMENSIONS

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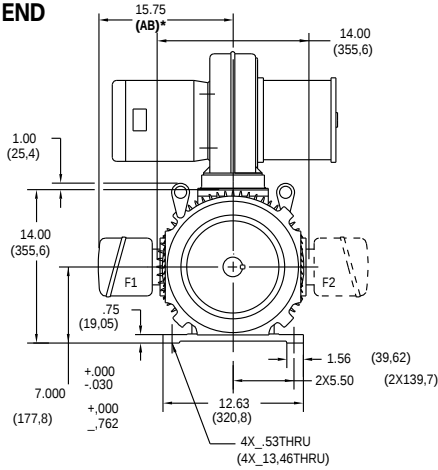
PRE-ENGINEERED
DRIVE SYSTEMS

D

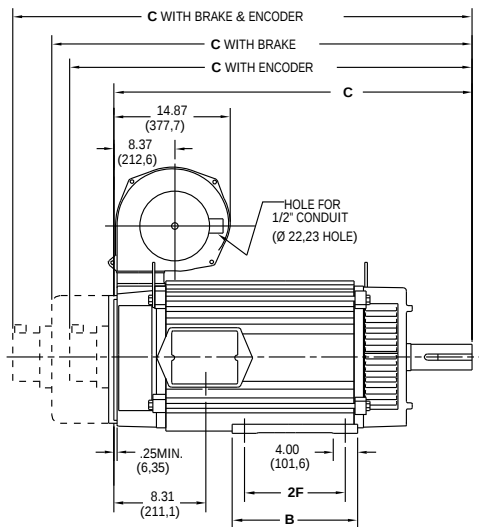
GENERAL
INFORMATION

E280 Frames, DPBV (Dripproof, Blower Ventilated)

DRIVE END



SIDE VIEW

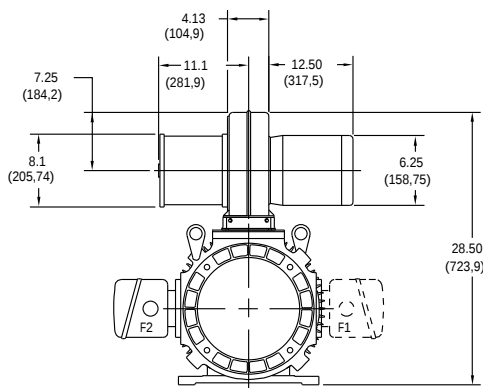


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E28A	42.00 (1066,8)	44.79 (1137,7)	48.57 (1233,7)	50.54 (1283,7)
E28C	46.12 (1171,4)	48.91 (1242,3)	52.69 (1338,3)	54.66 (1388,4)

MODEL	2F DIMENSION	B DIMENSION
E28A	18.00 (457,2)	20.00 (508)
E28C	22.00 (558,8)	24.00 (609,6)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

1. Reference page 124 for conduit box dimensions.
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
3. Blower can be rotated 180° about its axis. Size #9 blower is used on E280 frames. See Page 133.

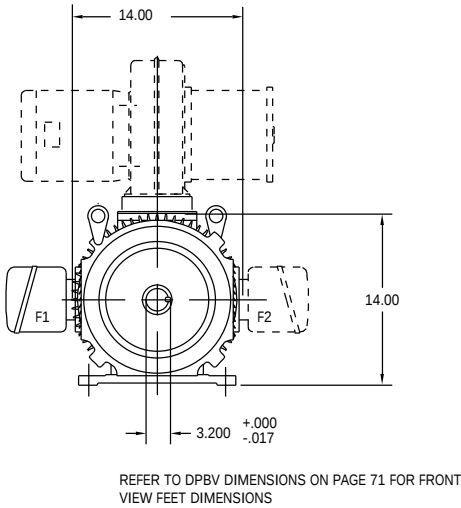
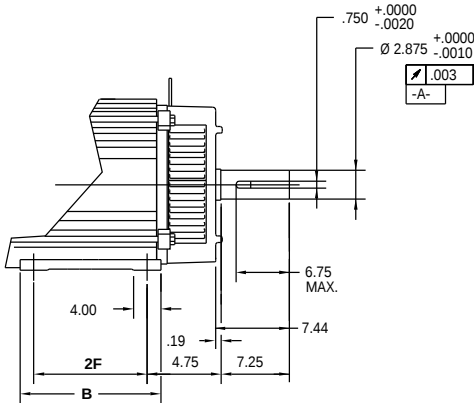
* See terminations, page 126.

PACTORQ MOTOR DIMENSIONS

E280 Frame Mounting, NEMA and Metric

NEMA FOOT MOUNT, NO FLANGE

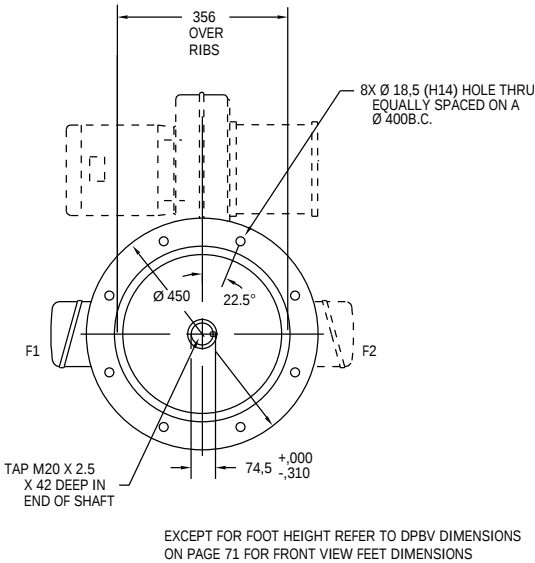
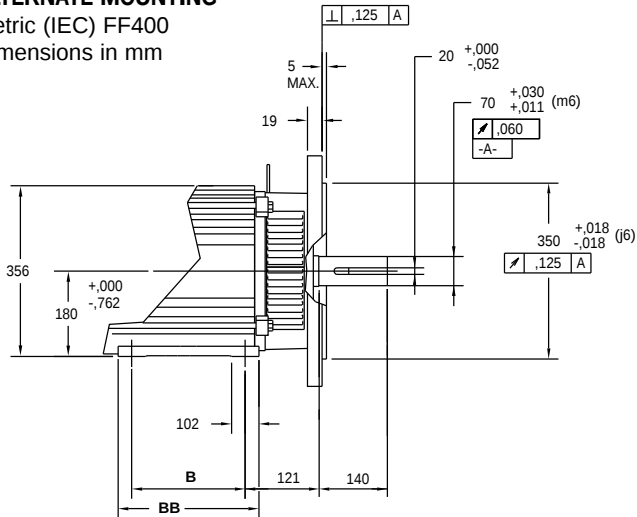
Dimensions in inches



MODEL	2F DIMENSION	B DIMENSION
E28A	18.00	20.00
E28C	22.00	24.00

ALTERNATE MOUNTING

Metric (IEC) FF400
Dimensions in mm



MODEL	B DIMENSION	BB DIMENSION
E28A	457,2	508,0
E28C	558,8	610,0

PACTORQ MOTOR DIMENSIONS

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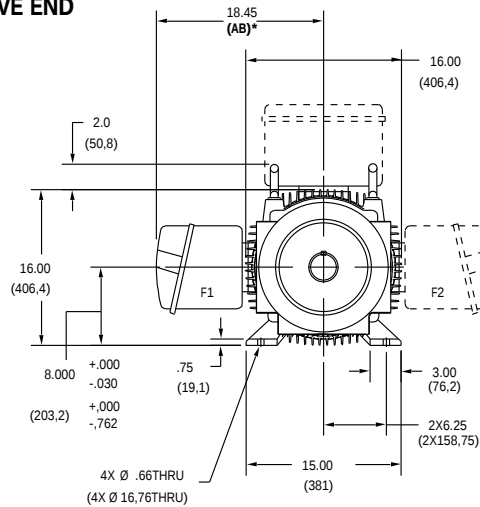
PRE-ENGINEERED
DRIVE SYSTEMS

D

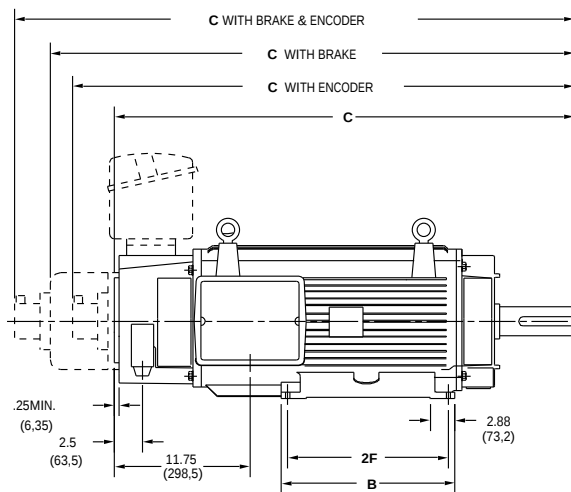
GENERAL
INFORMATION

E320 Frames, TENV (Totally Enclosed, Non-Ventilated)

DRIVE END



SIDE VIEW



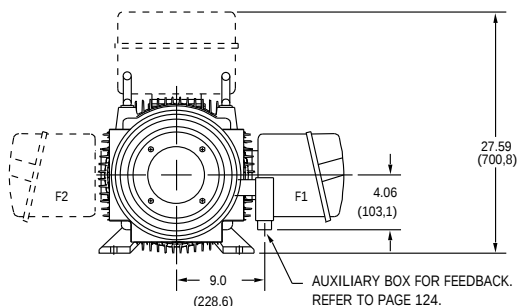
CALLOUT FOR "C" DIMENSION

MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E328	44.33 (1126)	47.12 (1196,8)	52.09 (1323,1)	54.06 (1373,1)
E32B	51.08 (1297,4)	53.87 (1368,3)	58.54 (1494,5)	60.81 (1544,6)
E32D	57.83 (1468,9)	60.62 (1539,7)	65.59 (1666)	67.56 (1716)

MODEL	2F DIMENSION	B DIMENSION
E328	16.00 (406,4)	17.88 (454,2)
E32B	22.00 (558,8)	23.88 (607)
E32D	28.00 (711,2)	29.88 (759)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



NOTE:

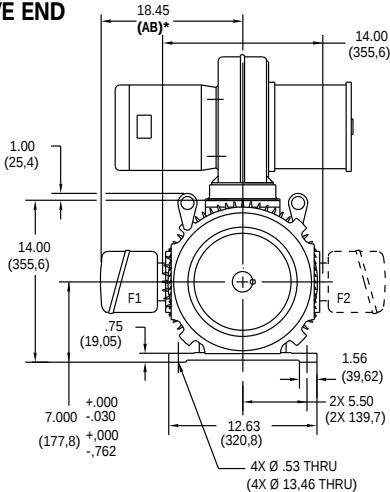
1. Reference page 124 for conduit box dimensions.
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

* See terminations, page 126.

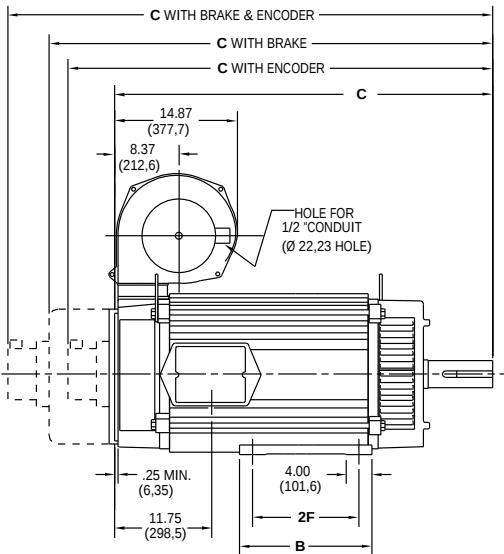
PACTORQ MOTOR DIMENSIONS

E320 Frames, DPBV (Dripproof, Blower Ventilated)

DRIVE END



SIDE VIEW

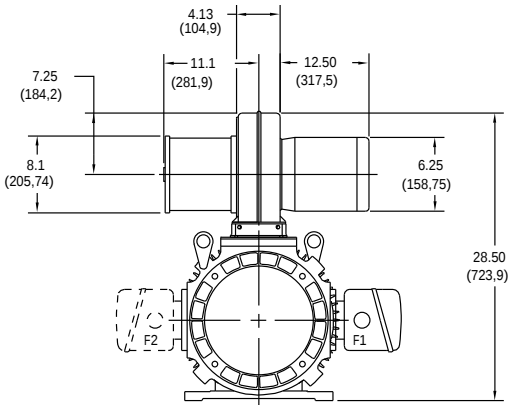


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E328	44.33 (1126)	47.12 (1196,8)	52.09 (1323,1)	54.06 (1373,1)
E32B	51.08 (1297,4)	53.87 (1368,3)	58.54 (1494,5)	60.81 (1544,6)
E32D	57.83 (1468,9)	60.62 (1539,7)	65.59 (1666)	67.56 (1716)

MODEL	2F DIMENSION	B DIMENSION
E328	16.00 (406,4)	17.88 (454,2)
E32B	22.00 (558,8)	23.88 (607)
E32D	28.00 (711,2)	29.88 (759)

Dimensions in () are mm, all others in inches

OPPOSITE DRIVE END



- NOTE:
- Reference page 124 for conduit box dimensions.
 - Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
 - Blower can be rotated 180° about it's axis. Size #10 blower is used on E320 frames. See page 133.

* See terminations, page 126.

PACTORQ MOTOR DIMENSIONS

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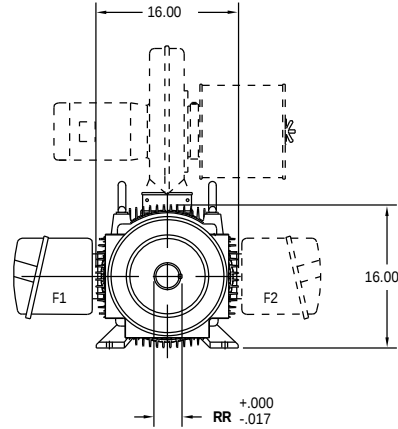
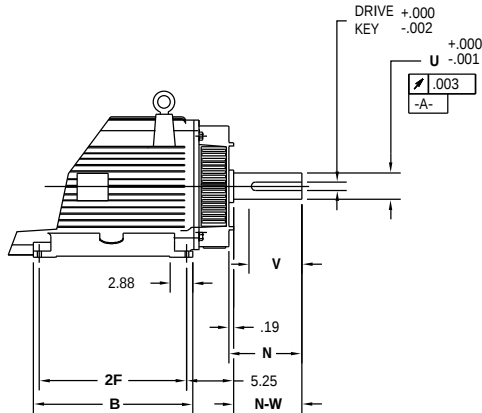
D

GENERAL
INFORMATION

E320 Frame Mounting, NEMA and Metric

NEMA FOOT MOUNT, NO FLANGE

Dimensions in inches



REFER TO DPBV DIMENSIONS ON PAGE 74 FOR FRONT VIEW FEET DIMENSIONS

MODEL	2F	B	N	N-W	U	V	RR	Drive Key
E328	16.00	17.88	5.94	5.75	2.875	5.25	3.200	.750
E32B	22.00	23.88	6.69	6.50	3.250	6.00	3.581	.750
E32D	28.00	29.88	7.44	7.25	3.625	6.75	4.009	.875

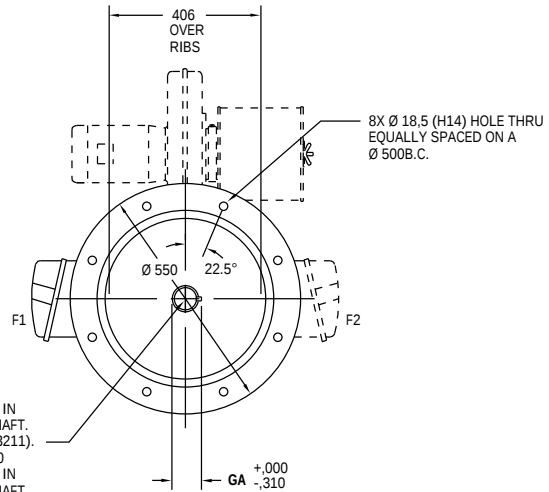
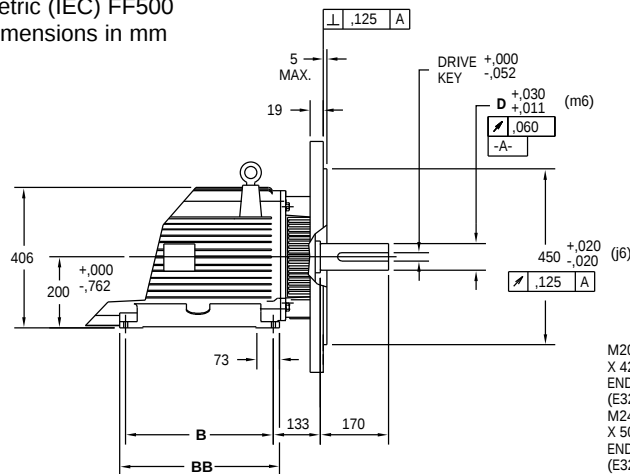
SHAFT DIMENSIONS FOR BELT DUTY

MODEL	N	N-W	U	V	RR	Drive Key
E328	6.69	6.50	3.250	6.00	3.581	.750
E32B	7.44	7.25	3.625	6.75	4.009	.875
E32D	8.44	8.25	4.125	7.75	4.563	1.000

ALTERNATE MOUNTING

Metric (IEC) FF500

Dimensions in mm



EXCEPT FOR FOOT HEIGHT REFER TO DPBV DIMENSIONS ON PAGE 74 FOR FRONT VIEW FEET DIMENSIONS

MODEL	D	B	BB	GA	Drive Key
E328	80	406,4	454	85	22
E32B	80	558,8	607	85	22
E32D	90	711,2	759	95	25

DRIVES INDEX

How to use this section

This section covers our extensive line of high performance GENESIS and MILLENNIUM Series Brushless DC Drives. Select the proper drive using one of the following procedures.

- If you are already familiar with these drives and the available options, refer to the GENESIS Model Number Codes beginning on page 81, or the MILLENNIUM Model Number Codes beginning on page 95 to verify the coded information.
- If you are not familiar with these drives and the available options refer to the GENESIS general specifications on page 80, the MILLENNIUM general specifications on page 94 and/or the index at the right. Construct a model number after all the technical parameters, including options, are determined.

GENESIS Series Brushless DC Drives

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GENESIS SERIES BRUSHLESS DC DRIVES

The Genesis Series Brushless DC Drive Family is constructed on a digital platform employing an analog user interface. This interface includes potentiometer adjustable gain, stability, current limit, acceleration, deceleration, jog speed, max speed, and min speed. Run speed is controlled using either an external potentiometer or a digital pulse train input.

With precise speed control and high torque at low speeds, the Genesis Series Drive Family provides servo-like response in a highly efficient and affordable package.

Simple Set-Up

The Genesis Series Brushless DC Drive Family was designed for easy configuration to your application. Set-up is completed in a matter of minutes by adjusting a few potentiometers to tailor the drive performance. The interface is clearly labeled and easily accessed on the speed controller board.

Precision Control

The Genesis Series Drive employs electromechanical Hall Sensor Feedback for motor commutation. Using an analog or digital pulse train speed input, the Hall Sensor Feedback circuitry provides for 0% Speed Regulation with a Constant Torque Speed Range of 100:1 or better.

Low Power Consumption

The Genesis Series Drive has a near unity power factor at all motor speeds and loads. The bottom transistors of the six-transistor power stage are controlled with pulse width modulation. Utilizing this design, the Genesis Series Drive draws only enough input current to provide torque to the motor.

Easy Maintenance

The same Speed Controller Board and Current Controller Board are used in the Genesis Series 1000, 2000, 3000, 3500, and 4000 Drives. These boards are readily accessible, easily connected, and simple to configure. This Family approach to the Genesis Series Drives means smaller spare parts stock and added familiarity with the board-level operations of the drive family.



GENESIS SERIES BRUSHLESS DC DRIVES

FEATURES

Two or four quadrant operation

Input AC line fusing

DC link choke

Separately adjustable min/max speed control, accel/decel time

Adjustable gain, stability, current limit, and jog speed

Bi-directional jog function

Analog speed input 0 to +10 VDC

Electronic gearing

Motor speed frequency output

Analog load output
(optional on some models)

Run relay output
(optional on Model 500)

Fault and zero speed open collector outputs

0% speed regulation

Constant Torque Speed Range (CTSR), 100:1

Standard two year warranty

BENEFITS

Excellent control for both regenerative and non-regenerative applications

Fast acting fusing provides very high interrupting capacity for ground or short circuits within or after the control input

Line transient protection limits the rate of change in the input current

Precise configuration to your application

Precise configuration to your application

Jog function operates in both forward and reverse in accordance with the forward/reverse input

Provides internal supply for analog speed pot operation or accepts 0 to +10 VDC external reference

Provides uni-directional digital follower mode

Open collector frequency output for metering or electronic gearing in a lead/follower system

Analog signal for metering represents 150% of output current or torque

External run contact for customer use: 125 VAC @ 1A or 30 VDC @ 2A

Digital outputs to indicate fault or zero speed conditions

Built in speed feedback/phase lock loop control provides precise speed control

Precise speed and current regulation through the entire motor speed-torque range

Assured quality and reliability

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GENESIS SERIES BRUSHLESS DC DRIVES



FEATURES

MODEL 500-4000

- Two- or four-quadrant operation
- Input AC line fusing
- DC link choke
- Analog speed input, 0 to +10 VDC
- External frequency speed input, 0-14 kHz
- Fault output (open collector)
- Motor speed frequency output
- 0% speed regulation
- 100:1 constant torque speed range

ADDITIONAL FEATURES

MODEL 1000-4000

- Bi-directional jog function
- Zero speed output (open collector)
- Run relay output
- Analog load output

PRODUCT DESCRIPTION

Pacific Scientific's Genesis Series Brushless DC Drives are high performance, closed loop drives designed for application flexibility. They are available as two quadrant, non-regenerative or four quadrant, resistor regenerative drives. Both configurations are offered in open chassis mountable enclosures. The Model 500 is also available in a NEMA 1 enclosure.

The Genesis Series offers slip-less speed control and full torque over its Constant Torque Speed Range of 100:1. This servo-like response makes it a good choice for applications requiring precise speed control and high torque at low speeds, with extremely high efficiency.

The Genesis Series offers such capabilities as analog or digital speed control. It also has several field-installable options that allow simple configuration to your specific applications.

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Pullers
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting

AVAILABLE OPTIONS

- Analog Interface Board
- Auxiliary Feedback Board
- Dancer Interface Board
- DC Relay Module
- Dual Ramp Accel/Decel Board
- Logic Extender Board
- Multiple Preset Speed Board
- Overspeed Board
- PID Board
- Power Supply Board
- Process Interface Board
- Signal Processor Board
- System Interface Board
- Threshold Detector Board
- Torque Controller Board
- BCDMax[®] BCD Speed Reference Input
- DigiMax[®] Digital Speed Reference Controller
- DigiTrak[®] Digital Speed and Load Display

AGENCY APPROVALS



E137798 vol. 3



C22.2 No. 142-M1987

GENESIS SERIES BRUSHLESS DC DRIVES

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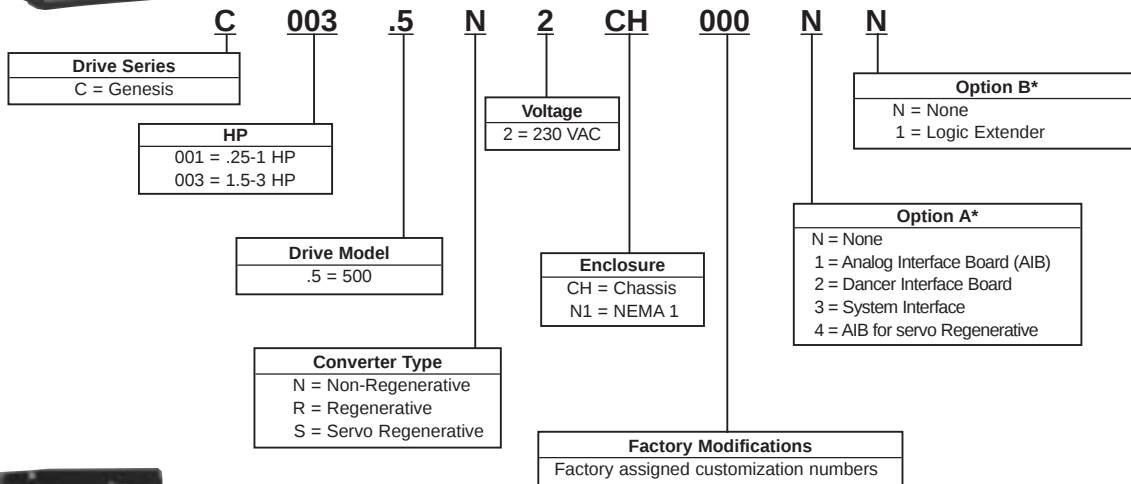
PRE-ENGINEERED
DRIVE SYSTEMS

D

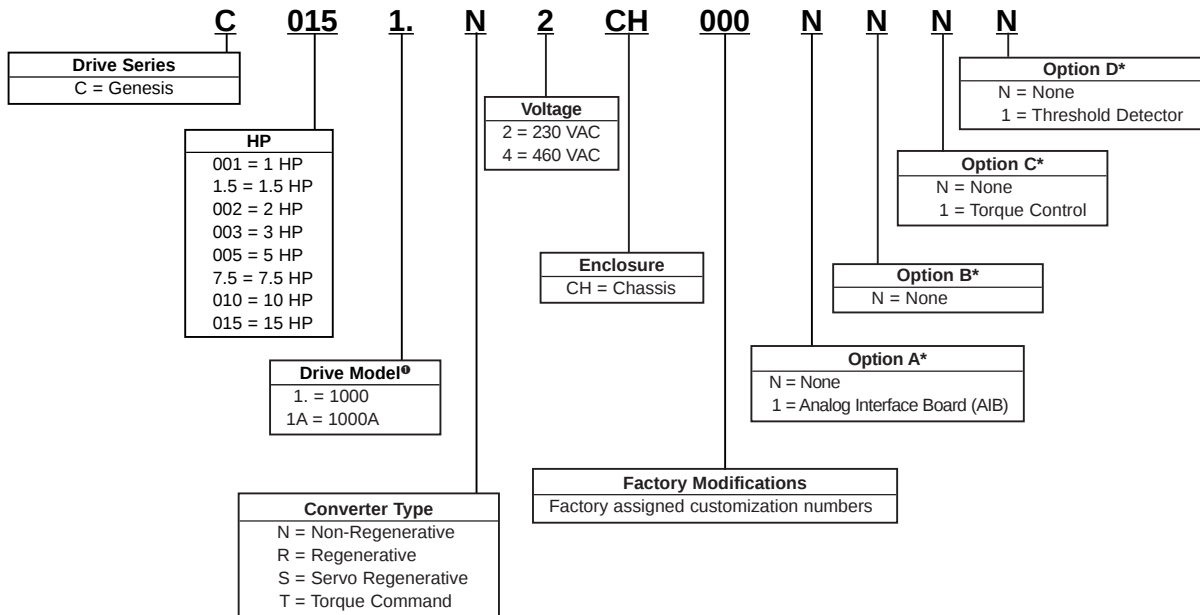
GENERAL
INFORMATION



GENESIS MODEL 500 DRIVE



GENESIS MODEL 1000 DRIVE



① Model 1000 Drive for non-regenerative 1-10 HP only.

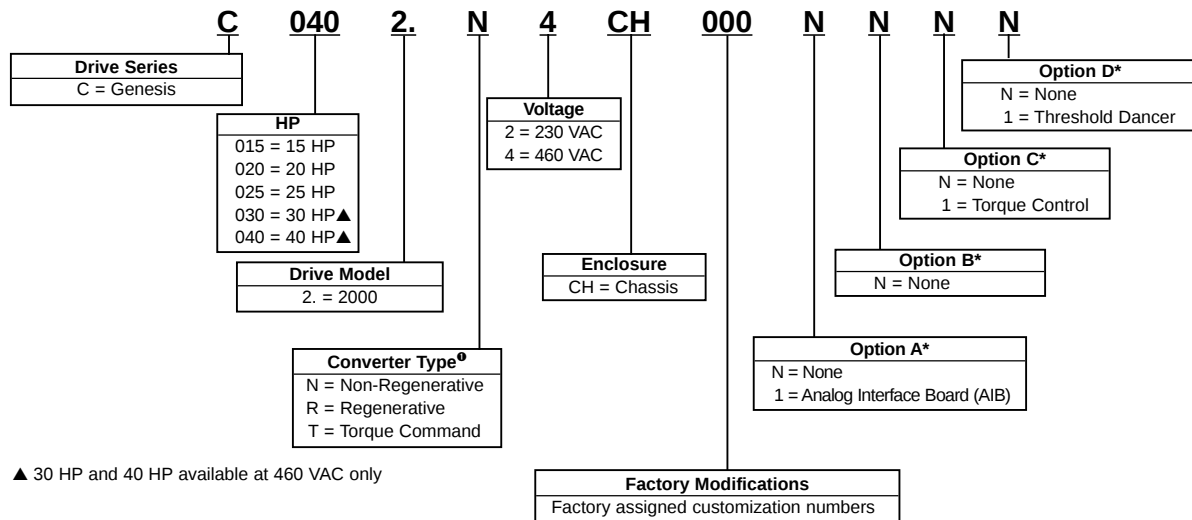
*For option descriptions and pricing refer to page 103.

NOTE: To construct a drive model number select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified drive.

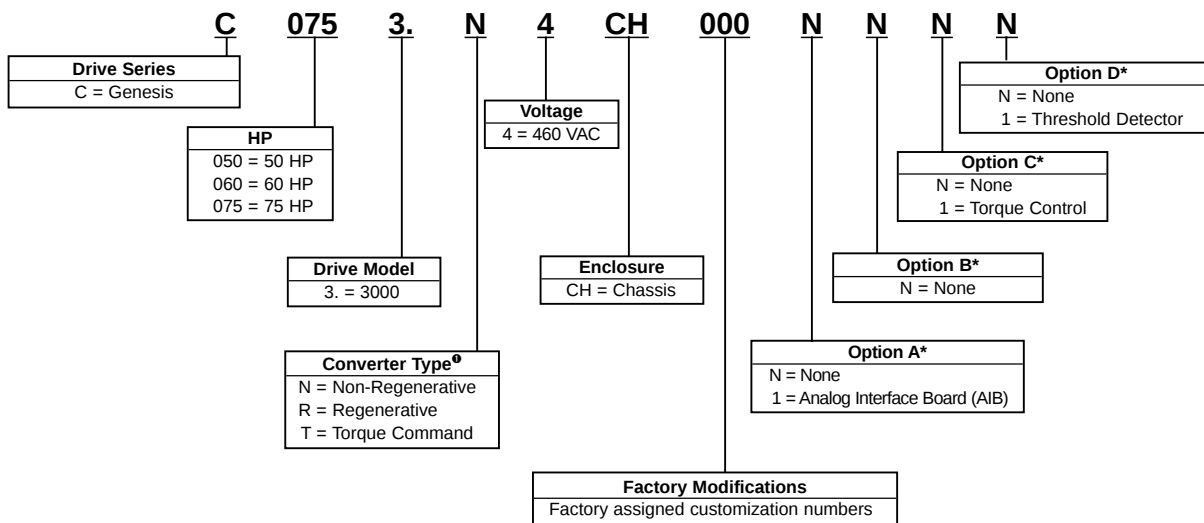
GENESIS SERIES BRUSHLESS DC DRIVES



GENESIS MODEL 2000 DRIVE



GENESIS MODEL 3000 DRIVE

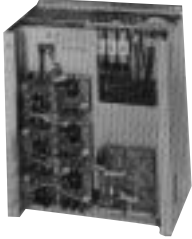


① Regenerative Drives include separate Bus Loader and Resistor Cage. Refer to page 87 for dimensions.

*For option descriptions and pricing refer to page 103.

NOTE: To construct a drive part number select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified drive.

GENESIS SERIES BRUSHLESS DC DRIVES



GENESIS MODEL 3500 DRIVE

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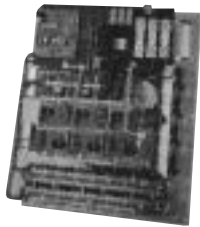
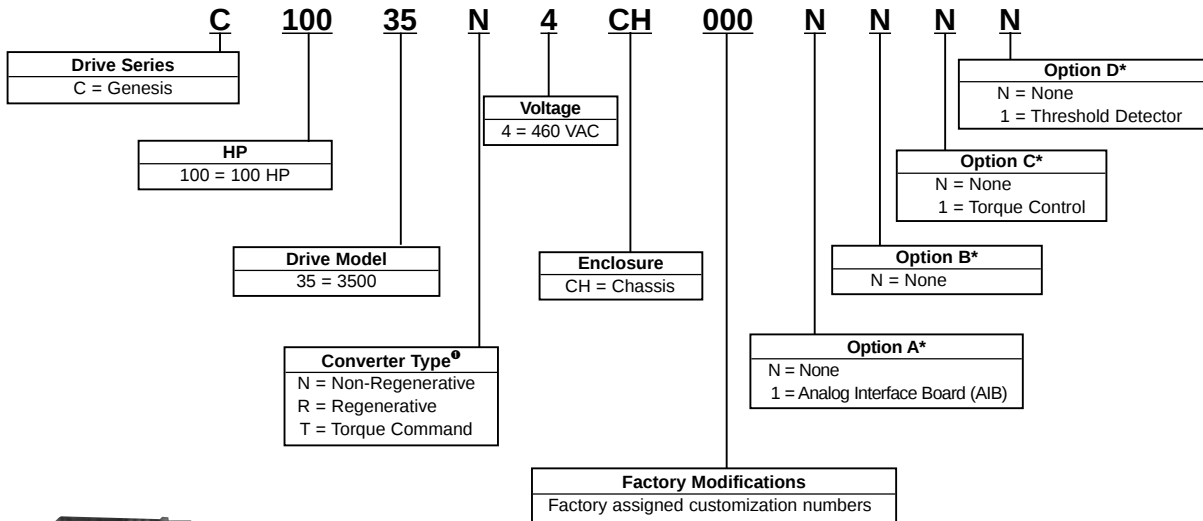
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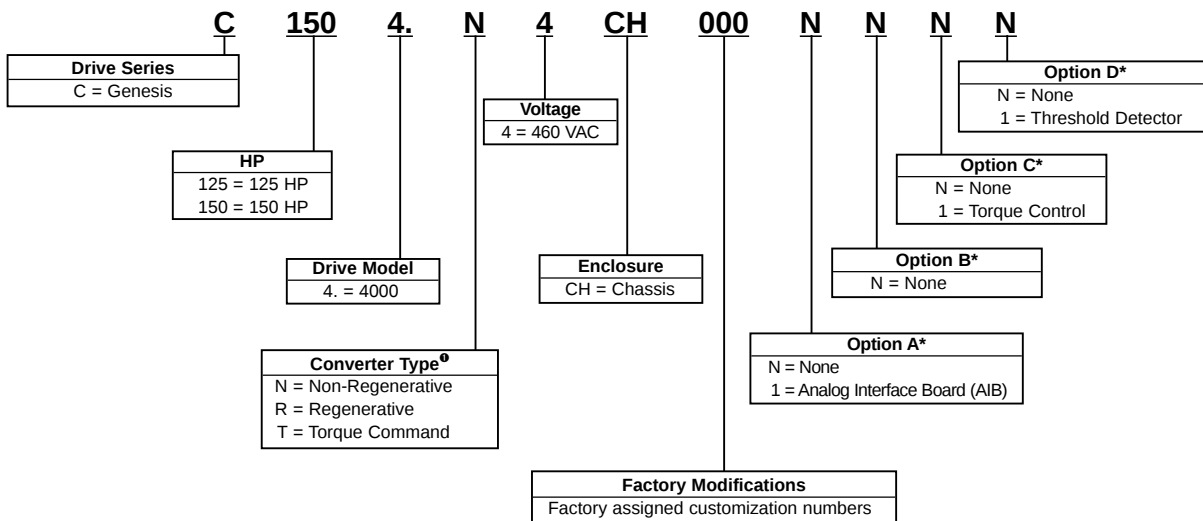
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GENESIS MODEL 4000 DRIVE



● Regenerative Drives include separate Bus Loader and Resistor Cage. Refer to page 87 for dimensions.

*For option descriptions and pricing refer to page 103.

NOTE: To construct a drive part number select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified drive.

GENESIS SERIES DRIVES PRICING

Drive/ Voltage	HP	Converter Type	Enclosure	Base Model ^① Number	List Price
					\$
Model 500 230 VAC	.25-1	Non-Regenerative	Chassis	C001.5N2CH000NN	2,225
	.25-1	Regenerative	Chassis	C001.5R2CH000NN	2,695
	.25-1	Servo Regenerative	Chassis	C001.5S2CH000NN	2,895
	.25-1	Non-Regenerative	NEMA 1	C001.5N2N1000NN	2,335
	.25-1	Regenerative	NEMA 1	C001.5R2N1000NN	2,795
	.25-1	Servo Regenerative	NEMA 1	C001.5S2N1000NN	2,995
	1.5-3	Non-Regenerative	Chassis	C003.5N2CH000NN	2,225
	1.5-3	Regenerative*	Chassis	C003.5R2CH000NN	2,695
	1.5-3	Servo Regenerative*	Chassis	C003.5S2CH000NN	2,895
	1.5-3	Non-Regenerative	NEMA 1	C003.5N2N1000NN	2,335
	1.5-3	Regenerative*	NEMA 1	C003.5R2N1000NN	2,795
	1.5-3	Servo Regenerative*	NEMA 1	C003.5S2N1000NN	2,995
Model 1000 230 VAC	1	Non-Regenerative	Chassis	C0011.N2CH000NNNN	2,347
	1.5	Non-Regenerative	Chassis	C1.51.N2CH000NNNN	2,347
	2	Non-Regenerative	Chassis	C0021.N2CH000NNNN	2,347
	3	Non-Regenerative	Chassis	C0031.N2CH000NNNN	2,347
	5	Non-Regenerative	Chassis	C0051.N2CH000NNNN	3,162
	7.5	Non-Regenerative	Chassis	C7.51.N2CH000NNNN	4,017
	10	Non-Regenerative	Chassis	C0101.N2CH000NNNN	4,639
Model 1000 460 VAC	1	Non-Regenerative	Chassis	C0011.N4CH000NNNN	3,162
	1.5	Non-Regenerative	Chassis	C1.51.N4CH000NNNN	3,162
	2	Non-Regenerative	Chassis	C0021.N4CH000NNNN	3,162
	3	Non-Regenerative	Chassis	C0031.N4CH000NNNN	3,162
	5	Non-Regenerative	Chassis	C0051.N4CH000NNNN	3,563
	7.5	Non-Regenerative	Chassis	C7.51.N4CH000NNNN	3,658
	10	Non-Regenerative	Chassis	C0101.N4CH000NNNN	3,658
Model 1000A 230 VAC	1	Regenerative	Chassis	C0011AR2CH000NNNN	3,520
	1	Torque Command	Chassis	C0011AT2CH000NNNN	3,791
	1	Servo Regenerative	Chassis	C0011AS2CH000NNNN	3,900
	1.5	Regenerative	Chassis	C1.51AR2CH000NNNN	3,520
	1.5	Torque Command	Chassis	C1.51AT2CH000NNNN	3,791
	1.5	Servo Regenerative	Chassis	C1.51AS2CH000NNNN	3,900
	2	Regenerative	Chassis	C0021AR2CH000NNNN	3,520
	2	Torque Command	Chassis	C0021AT2CH000NNNN	3,791
	2	Servo Regenerative	Chassis	C0021AS2CH000NNNN	3,900
	3	Regenerative	Chassis	C0031AR2CH000NNNN	3,520
	3	Torque Command	Chassis	C0031AT2CH000NNNN	3,791
	3	Servo Regenerative	Chassis	C0031AS2CH000NNNN	3,900
	5	Regenerative	Chassis	C0051AR2CH000NNNN	4,110
	5	Torque Command	Chassis	C0051AT2CH000NNNN	4,380
	5	Servo Regenerative	Chassis	C0051AS2CH000NNNN	4,490
	7.5	Regenerative	Chassis	C7.51AR2CH000NNNN	5,221
	7.5	Torque Command	Chassis	C7.51AT2CH000NNNN	5,492
	7.5	Servo Regenerative	Chassis	C7.51AS2CH000NNNN	5,601
	10	Regenerative	Chassis	C0101AR2CH000NNNN	6,031
	10	Torque Command	Chassis	C0101AT2CH000NNNN	6,368
	10	Servo Regenerative	Chassis	C0101AS2CH000NNNN	6,411

① To construct a complete model number with available options refer to the Model Number Codes beginning on page 81.

* Externally mounted regenerative resistor

GENESIS SERIES DRIVES PRICING

Drive/ Voltage	HP	Converter Type	Enclosure	Base Model ^① Number	List Price
					\$
Model 1000A 460 VAC	1	Regenerative	Chassis	C0011AR4CH000NNNN	4,335
	1	Torque Command	Chassis	C0011AT4CH000NNNN	4,608
	1	Servo Regenerative	Chassis	C0011AS4CH000NNNN	4,715
	1.5	Regenerative	Chassis	C1.51AR4CH000NNNN	4,335
	1.5	Torque Command	Chassis	C1.51AT4CH000NNNN	4,608
	1.5	Servo Regenerative	Chassis	C1.51AS4CH000NNNN	4,715
	2	Regenerative	Chassis	C0021AR4CH000NNNN	4,335
	2	Torque Command	Chassis	C0021AT4CH000NNNN	4,608
	2	Servo Regenerative	Chassis	C0021AS4CH000NNNN	4,715
	3	Regenerative	Chassis	C0031AR4CH000NNNN	4,335
	3	Torque Command	Chassis	C0031AT4CH000NNNN	4,608
	3	Servo Regenerative	Chassis	C0031AS4CH000NNNN	4,715
	5	Regenerative	Chassis	C0051AR4CH000NNNN	4,631
	5	Torque Command	Chassis	C0051AT4CH000NNNN	4,902
	5	Servo Regenerative	Chassis	C0051AS4CH000NNNN	5,011
	7.5	Regenerative	Chassis	C7.51AR4CH000NNNN	4,755
	7.5	Torque Command	Chassis	C7.51AT4CH000NNNN	5,026
	7.5	Servo Regenerative	Chassis	C7.51AS4CH000NNNN	5,135
	10	Regenerative	Chassis	C0101AR4CH000NNNN	4,755
	10	Torque Command	Chassis	C0101AT4CH000NNNN	5,026
	10	Servo Regenerative	Chassis	C0101AS4CH000NNNN	5,135
	15	Non-Regenerative	Chassis	C0151AN4CH000NNNN	4,378
	15	Regenerative	Chassis	C0151AR4CH000NNNN	5,691
	15	Torque Command	Chassis	C0151AT4CH000NNNN	5,961
Model 2000 230 VAC	15	Non-Regenerative	Chassis	C0152.N2CH000NNNN	6,190
	15	Regenerative	Chassis	C0152.R2CH000NNNN	8,046
	15	Torque Command	Chassis	C0152.T2CH000NNNN	8,501
	20	Non-Regenerative	Chassis	C0202.N2CH000NNNN	9,122
	20	Regenerative	Chassis	C0202.R2CH000NNNN	11,858
	20	Torque Command	Chassis	C0202.T2CH000NNNN	12,305
Model 2000 460 VAC	20	Non-Regenerative	Chassis	C0202.N4CH000NNNN	5,860
	20	Regenerative	Chassis	C0202.R4CH000NNNN	7,618
	20	Torque Command	Chassis	C0202.T4CH000NNNN	7,960
	25	Non-Regenerative	Chassis	C0252.N4CH000NNNN	6,986
	25	Regenerative	Chassis	C0252.R4CH000NNNN	8,388
	25	Torque Command	Chassis	C0252.T4CH000NNNN	8,730
	30	Non-Regenerative	Chassis	C0302.N4CH000NNNN	7,346
	30	Regenerative	Chassis	C0302.R4CH000NNNN	8,748
	30	Torque Command	Chassis	C0302.T4CH000NNNN	9,090
	40	Non-Regenerative	Chassis	C0402.N4CH000NNNN	9,122
	40	Regenerative	Chassis	C0402.R4CH000NNNN	11,858
	40	Torque Command	Chassis	C0402.T4CH000NNNN	12,200

① To construct a complete model number with available options refer to the Model Number Codes beginning on page 81.

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GENESIS SERIES DRIVES PRICING

Drive/ Voltage	HP	Converter Type	Enclosure	Base Model ^① Number	List Price \$
Model 3000 460 VAC	50	Non-Regenerative	Chassis	C0503.N4CH000NNNN	10,096
	50	Regenerative	Chassis	C0503.R4CH000NNNN	13,125
	50	Torque Command	Chassis	C0503.T4CH000NNNN	13,461
	60	Non-Regenerative	Chassis	C0603.N4CH000NNNN	11,956
	60	Regenerative	Chassis	C0603.R4CH000NNNN	15,542
	60	Torque Command	Chassis	C0603.T4CH000NNNN	15,878
	75	Non-Regenerative	Chassis	C0753.N4CH000NNNN	13,897
	75	Regenerative	Chassis	C0753.R4CH000NNNN	18,066
	75	Torque Command	Chassis	C0753.T4CH000NNNN	18,402
Model 3500 460 VAC	100	Non-Regenerative	Chassis	C10035N4CH000NNNN	18,722
	100	Regenerative	Chassis	C10035R4CH000NNNN	22,634
	100	Torque Command	Chassis	C10035T4CH000NNNN	22,552
Model 4000 460 VAC	125	Non-Regenerative	Chassis	C1254.N4CH000NNNN	24,422
	125	Regenerative	Chassis	C1254.R4CH000NNNN	29,525
	125	Torque Command	Chassis	C1254.T4CH000NNNN	29,418
	150	Non-Regenerative	Chassis	C1504.N4CH000NNNN	27,136
	150	Regenerative	Chassis	C1504.R4CH000NNNN	32,806
	150	Torque Command	Chassis	C1504.T4CH000NNNN	32,687

① To construct a complete model number with available options refer to the Model Number Codes beginning on page 81.

GENESIS SERIES DIMENSIONS AND WEIGHTS

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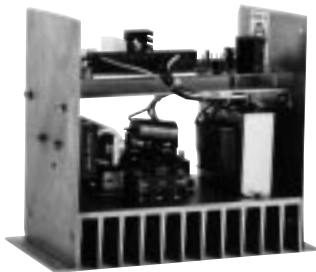
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Drive Model	Height		Width		Depth		Weight	
	inches	cm	inches	cm	inches	cm	lbs.	kg
500 (open chassis)	12.50	31.75	9.13	23.19	4.88	12.40	10	4.3
500 (NEMA 1)	13.00	33.02	9.13	23.19	4.88	12.40	10	4.3
1000	13.00	33.02	9.85	25.02	9.13	23.19	32	14.5
1000A	18.00	45.72	9.85	25.02	9.13	23.19	43	19.5
2000	19.50	49.53	13.75	34.93	13.38	33.99	95	43.1
3000	25.25	64.14	13.75	34.93	13.38	33.99	115	52.2
3500	28.00	71.12	24.13	61.29	14.00	35.56	207	93.9
4000	39.00	99.06	33.00	83.82	13.00	33.02	242	109.8



For Bus Loader diagram and pricing see page 91.

STANDARD BUS LOADERS

Model 500 and Model 1000A regenerative drives less than 10 HP @ 230 VAC and less than 15 HP @ 460 VAC have integral Bus Loaders. All other drives have separately mounted bus loaders. Standard Bus Loaders are specified for 10% duty cycle.

Motor HP	Height		Width		Depth		Weight	
	inches	cm	inches	cm	inches	cm	lbs.	kg
All	8.15	20.70	9.82	24.94	5.07	12.88	10	4.54

STANDARD RESISTOR CAGES

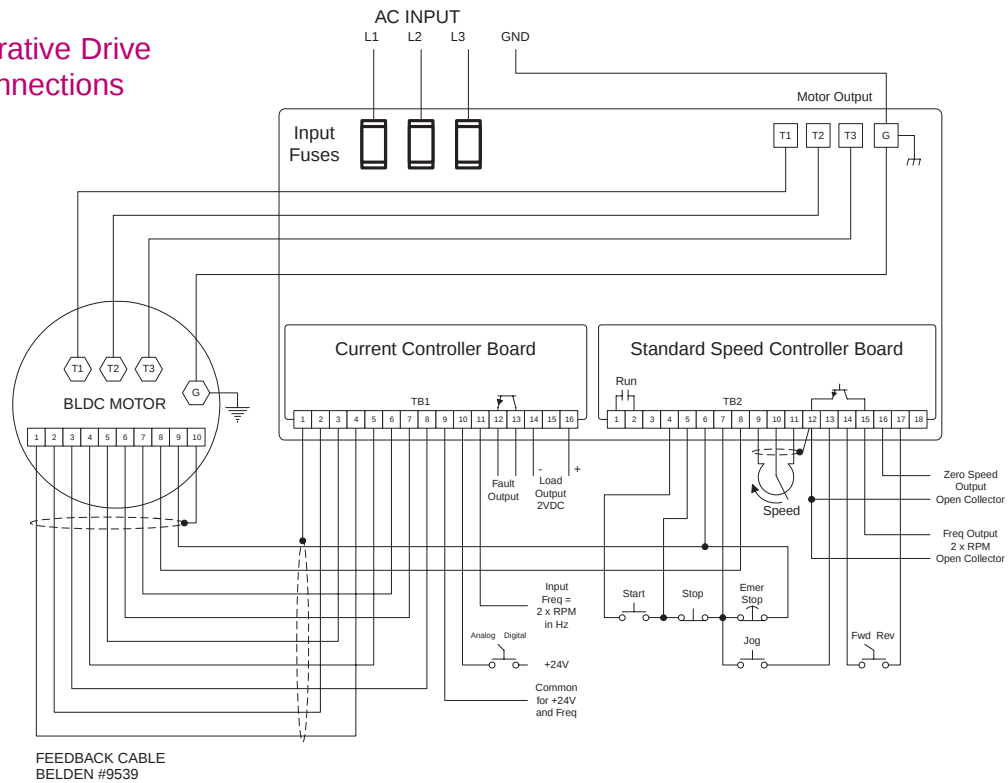
Standard regenerative drives require 1 resistor for each 5 horsepower, except 60 HP @ 460 VAC uses 11 and 75 HP @ 460 VAC uses 12. Standard 460 VAC drives use 70 ohm resistors rated at 375 watts. Standard 230 VAC drives use 25 ohm resistors rated at 375 watts.

Number of Resistors	Height		Width		Depth		Weight	
	inches	cm	inches	cm	inches	cm	lbs.	kg
1-4	5.81	14.76	7.13	18.11	16.36	41.55	24	10.89
5-8	5.81	14.76	11.38	28.91	16.36	41.55	38	17.24
9-12	7.75	19.69	11.38	28.91	16.36	41.55	52	23.59

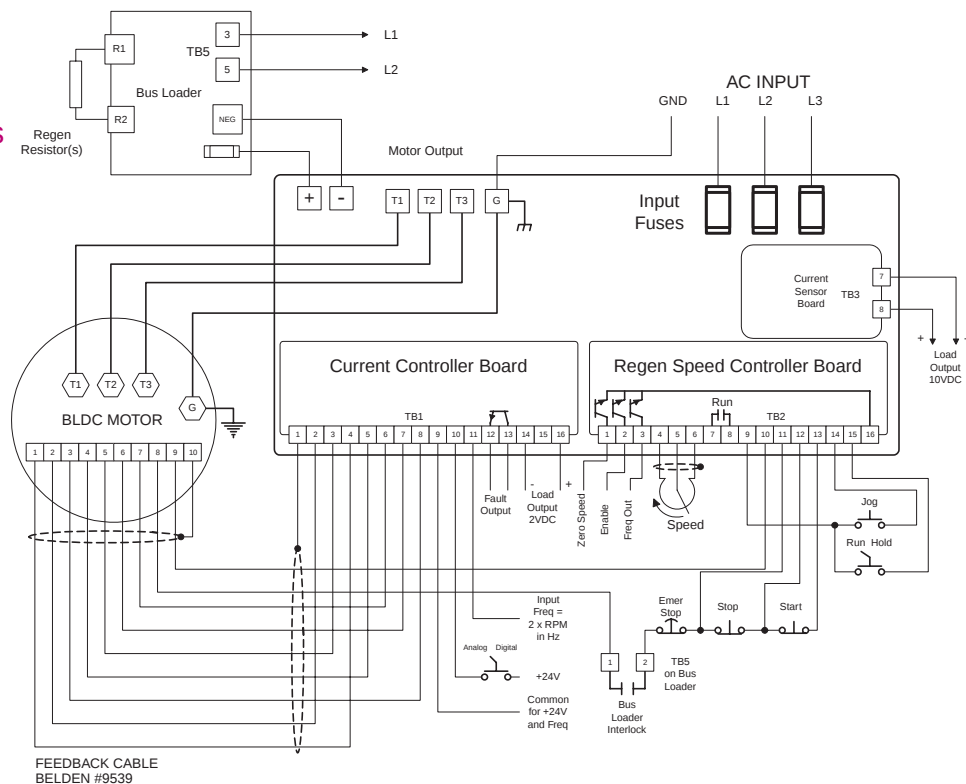
NOTE: All dimensions and weights are approximate.

GENESIS SERIES TYPICAL CONNECTION DIAGRAMS

Non-Regenerative Drive Typical Connections



Regenerative Drive with External Bus Loader Typical Connections



GENESIS SERIES EFFICIENCY RATINGS

Motor HP	Drive Model	Typical ^❶ Drive Efficiency	Typical Input kVA Per HP	AC Input Line Current amps/line
1	500	92.0	0.98	1.2
1	1000	90.5	0.99	1.2
1.5	500	92.2	0.94	1.8
2	500	92.4	0.92	2.3
2	1000	90.9	0.93	2.3
3	500	92.6	0.90	3.4
3	1000	93.9	0.88	3.4
5	1000	93.9	0.88	5.5
7.5	1000	94.9	0.86	8.1
10	1000	95.9	0.85	10.6
15	1000	96.1	0.84	15.9
20	2000	96.1	0.84	21.1
25	2000	96.2	0.84	26.4
30	2000	96.2	0.84	31.6
40	2000	96.3	0.84	42.1
50	3000	96.3	0.84	52.6
60	3000	96.4	0.84	63.0
75	3000	96.6	0.83	78.6
100	3500	96.7	0.83	104.6
125	4000	96.9	0.83	130.5
150	4000	97.1	0.83	156.2

❶ Efficiency ratings at motor base speed, full load operation. Actual efficiency may vary.

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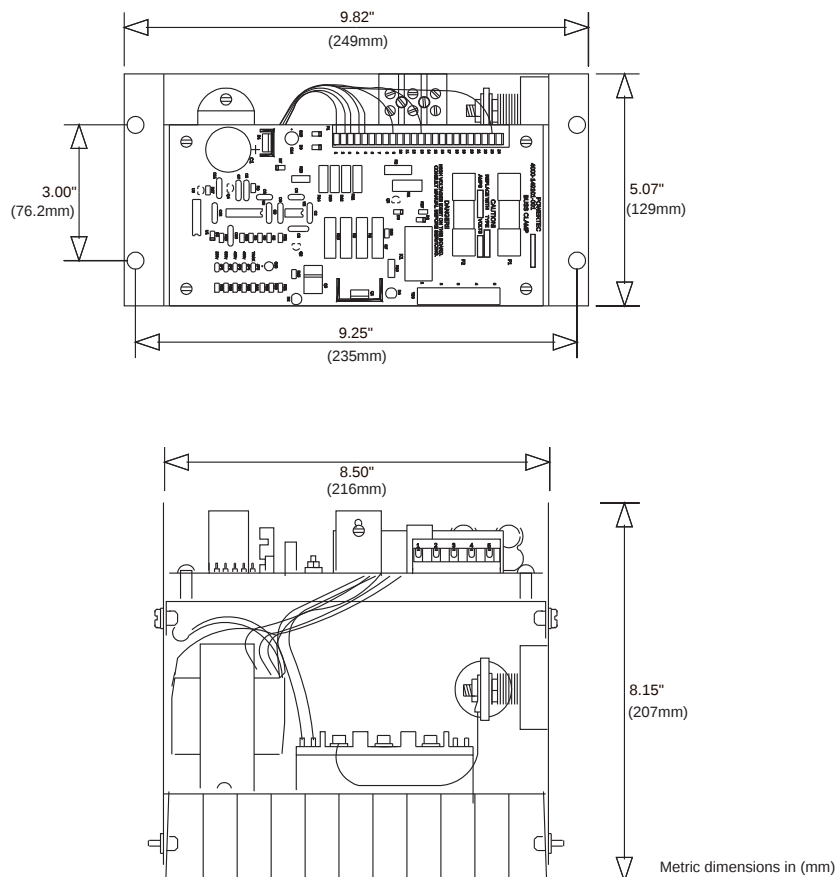
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GENESIS SERIES TECHNICAL SPECIFICATIONS

DRIVE MODEL	500	1000(A)	2000	3000	3500	4000
SERVICE FACTOR	1.0	1.0	1.0	1.0	1.0	1.0
ALTITUDE	Use above 3300 feet (1000 meters) requires de-rating De-rate at 3% of full rating for each additional 1100 ft. (330 m)					
RELATIVE HUMIDITY	Less than 95%, non-condensing					
AMBIENT TEMPERATURE						
Air Surrounding Chassis Units	32 to 131°F 0 to 55°C	32 to 131°F 0 to 55°C	32 to 131°F 0 to 55°C	32 to 131°F 0 to 55°C	32 to 131°F 0 to 55°C	32 to 131°F 0 to 55°C
Air Surrounding NEMA 1 Enclosures	32 to 104°F 0 to 40°C	NA NA	NA NA	NA NA	NA NA	NA NA
INPUT VOLTAGE						
VAC (3 Phase) (±10%)	115-230 VAC [●]	230, 460 VAC	230, 460 VAC	230, 460 VAC	230, 460 VAC	230, 460 VAC
AC Frequency	50-400 Hz	48-62 Hz	48-62 Hz	48-62 Hz	48-62 Hz	48-62 Hz
DC	180-350 VDC	NA	NA	NA	NA	NA
ACCEL/DECAL TIME	0.2-60 sec	0.2-30 sec	2-30 sec	2-30 sec	2-30 sec	2-30 sec
ADJUSTABLE CURRENT LIMIT (% rated)						
Motoring	0-150%	0-150%	0-150%	0-150%	0-150%	0-150%
Regenerative (regen drives only)	0-150%	0-150%	0-150%	0-150%	0-150%	0-150%
INPUT REFERENCE						
Analog (bipolar differential input)	0 to ±10 VDC	0 to ±10 VDC	0 to ±10 VDC	0 to ±10 VDC	0 to ±10 VDC	0 to ±10 VDC
Digital (optically isolated square wave)	0-14,000 Hz	0-14,000 Hz	0-14,000 Hz	0-14,000 Hz	0-14,000 Hz	0-14,000 Hz
ANALOG REFERENCE						
Linearity (output speed to input frequency)	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
Speed Regulation (constant reference)	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
Speed Drift (referenced to input frequency)	±0.25%	±0.25%	±0.25%	±0.25%	±0.25%	±0.25%
DIGITAL REFERENCE						
Linearity (output speed to input frequency)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Speed Regulation (constant reference)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Speed Drift (referenced to input frequency)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
MAX LOAD (max 1 minute of 10 minutes)	150%	150%	150%	150%	150%	150%
INSTANTANEOUS TRIP (% RMS rating)	250%	300%	300%	300%	300%	300%
POWER LOSS COAST-THROUGH	100 msec	80 msec	80 msec	80 msec	80 msec	80 msec
STABILITY ADJUSTMENT (dynamic range)	20:1	20:1	20:1	20:1	20:1	20:1
GAIN ADJUSTMENT (shaft error angle)	10:1	10:1	10:1	10:1	10:1	10:1
DISPLACEMENT POWER FACTOR	0.955	>0.96	>0.96	>0.96	>0.96	>0.96

● 1 or 3 Phase

GENESIS SERIES BUS LOADERS



GENESIS SERIES BUS LOADERS

HP	Drive Model	230VAC	List Price	460VAC	List Price
			\$		\$
1/2 to 5	1000	RxxxA21000 ^❶	1,304	RxxxA41000 ^❶	1,267
7.5	1000	R7.5A21000	1,304	R7.5A41000	1,267
10	1000	R010A21000	1,304	R010A41000	1,267
15	2000	R015A21000	1,680	R015A41000	1,304
20	1000	NA	NA	R020A41000	1,304
20	2000	R0200A1000	1,680	NA	NA
25	2000	NA	NA	R025A41000	1,680
30	2000	NA	NA	R030A41000	1,680
40	2000	NA	NA	R040A41000	1,680
50	3000	NA	NA	R050A41000	1,715
60	3000	NA	NA	R060A41000	1,715
75	3000	NA	NA	R075A41000	1,715
100	3000	NA	NA	R100A41000	1,800

❶ Complete the part number by entering the HP required. 1/2 HP = 0.5, 1.5 HP = 1.5, etc.
NOTE: All Bus Loaders are rated for 10% Duty Cycle.

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MILLENNIUM® SERIES BRUSHLESS DC DRIVES

The Millennium Series of high performance, brushless adjustable speed drives combines ease of set-up, an intelligent command interface, and servo-like response to meet your most demanding adjustable speed applications.

Simple software provides easy set-up to your application-specific requirements. A Digital Signal Processor controls torque, velocity and position. Millennium Series drives cover a range from 10 to 300 HP and are power-matched to our broad selection of brushless motors for optimum motor/drive configurations.

Simple Set-Up, Diagnostics

With many drives, you spend hours configuring the hardware. Millennium set-up is easy. Millennium PowerTool software includes preset application templates that eliminate the need for programming expertise. Motor Key

Codes, standard on all our brushless motors, are loaded into the drive to eliminate the need for tuning. Once the drive is enabled, on-line diagnostics monitor critical drive functions.

High Performance, Precision Control

Millennium high performance brushless drives and Pacific Scientific's motor technology provide key features for precise motion control. Millennium features digital speed control with a Constant Torque Speed Range of 1000:1, ultra-smooth low speed operation without derating, and full torque at 0 speed. Speed regulation is 0% with this synchronous drive/motor combination. A high dynamic response is achieved by matching the drive with our high torque-to-inertia brushless motors. The result is

servo-like response to speed and load changes, an important requirement for a growing number of precision motion control systems.

Low Power Consumption

Count on significant energy savings with Millennium's low power consumption. High efficiency is achieved with a pulse width modulated motor power circuit. The circuit has a near unity power factor, resulting in considerably less current draw than other drives and less heat generation.

Innovative Packaging

Millennium's modular architecture means unmatched flexibility and reduced package size. These high-powered, rugged drives are available in open-chassis or totally-enclosed chassis and may be wall mounted or inside your machine.



MILLENNIUM SERIES BRUSHLESS DC DRIVES

FEATURES

Open chassis or totally enclosed chassis

Two or four quadrant operation

Seven programmable template settings

Motor Key Codes

5 isolated programmable logic inputs

Pulse train input 0-255kHz:
quadrature signal or step and direction

Analog input: 0 to ± 10 VDC
differential or 4-20mA

- 2-75Hz velocity loop bandwidth
- 600Hz current loop bandwidth

Three relay outputs
(one programmable)

Speed and load analog outputs

Torque or velocity control

Electronic gearing

Automatic fault logging

Power loss coast through

0% speed regulation

Constant Torque Speed Range
(CTSR), 1000:1

Standard two year warranty

BENEFITS

Flexible packaging: chassis mount for customer designed system or totally enclosed for external mounting, eliminating the need for expensive and large cabinets

Excellent control for both regenerative and non-regenerative applications

Software configurable user connections for simple yet versatile interface

Configures drive to motor's specific operating parameters

- User selectable sourcing or sinking operation
- Functionality determined by template setting

Digital speed references provide the capability of speed accuracies to 0% regulation

Differential input amplifier eliminates electrical noise

High dynamic response

Two assigned digital outputs (READY, ENABLE) one is programmable:
125 VAC @ 0.5A or 30 VDC @ 2A

0 to ± 10 VDC @ 5mA metering outputs representing motor speed and load

Simple programming change will provide torque command or velocity command

Provides bi-directional digital and position follower modes

Logs fault codes and time of occurrence to aid in troubleshooting

Drive will continue to operate during momentary power loss

Built in speed feedback/phase lock loop control provides precise speed control

Precise speed and current regulation through the entire motor speed-torque range

Assured quality and reliability

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MILLENNIUM SERIES BRUSHLESS DC DRIVES



FEATURES

- Brushless servo performance
- Programmable power loss coast-through
- Seven programmable template settings
- Five isolated programmable logical inputs
- 0 to ± 10 VDC or 4–20 mA differential analog input
- Torque or velocity control
- Automatic fault logging
- Two- or four-quadrant operation
- Typical 2–75 Hz velocity loop bandwidth; 600 Hz current loop
- Pulse train input: quadrature signal or step-and-direction, 0–255 kHz (requires pulse train I/O board)
- Electronic gearing
- Three relay outputs (one programmable)
- Speed and load analog outputs
- Chassis or totally enclosed

PRODUCT DESCRIPTION

Pacific Scientific's Millennium Series Brushless DC Drives are premium performance, closed loop, software-configurable drives designed for application flexibility. Models M5, M6 and M7 employ a modular design consisting of a Bus Converter Module and a Power Bridge Module. All drives are available in open chassis or totally-enclosed designs, ideally suited for harsh industrial environments.

Motors are power matched to the Millennium Series Drives and are supplied with Motor Key Codes which eliminate the need for tuning. Drive set-up is simplified with Application Template selection using Millennium PowerTool software. This allows velocity or torque control using analog or digital references with a variety of control switch configurations.

The Millennium Series uses three microprocessors to control such functions as the programmable analog and digital inputs and outputs, inter-drive communications, and output waveform manipulation. This superior drive intelligence uses resolver feedback from the brushless motor for a digital feedback signal of 65,536 counts per revolution. This produces ultra-smooth operating speeds as low as 0.01 RPM. This servo-like response makes the Millennium Series the ideal choice for applications requiring precise speed control and high torque at very low speeds with premium efficiency.

TYPICAL APPLICATIONS

- Test stands
- Extruders
- Electronic line shafting
- Winders
- Wire drawing
- Printing
- Forest Industry machinery
- Tube and rolling mills
- Textile machinery
- Punch presses
- Paper converting

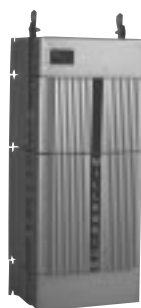
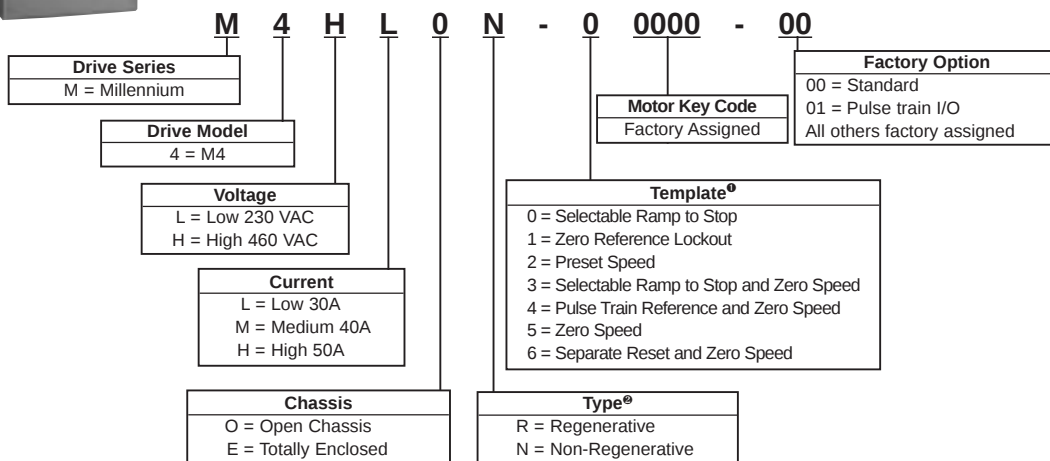
AVAILABLE OPTIONS

- Pulse Train I/O Board

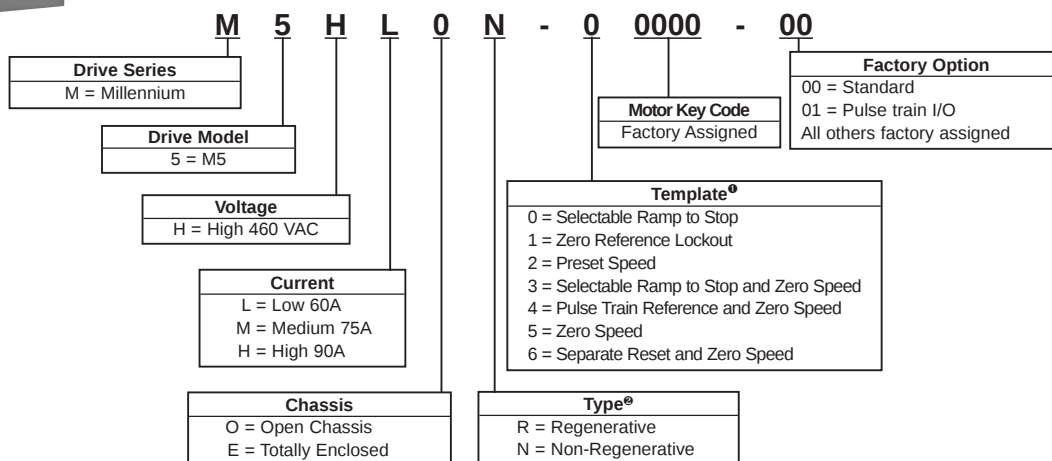
MILLENNIUM SERIES BRUSHLESS DC DRIVES



MILLENNIUM M4



MILLENNIUM M5



① See MILLENNIUM Application Templates for the Standard Interface beginning on page 101.
 ② Resistor Regenerative Drives include separate Regenerative Resistor Modules. Refer to page 99 for dimensions.

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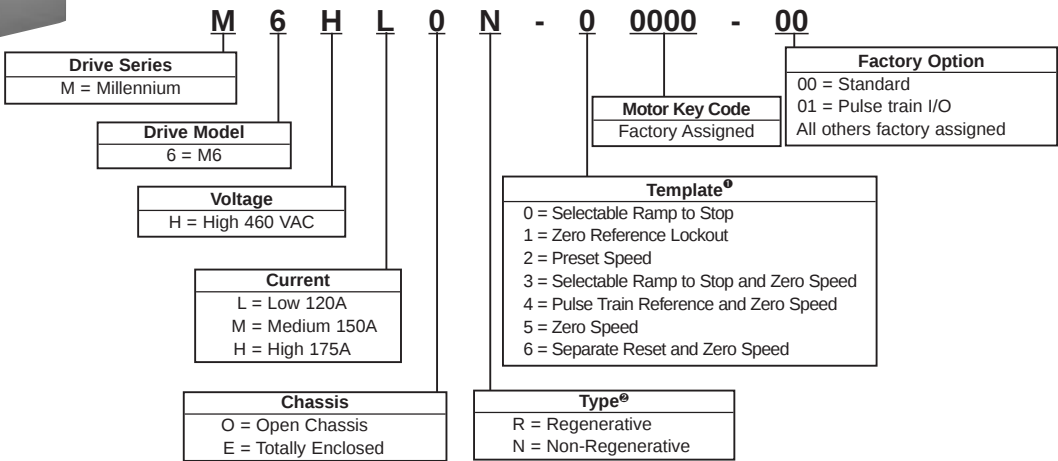
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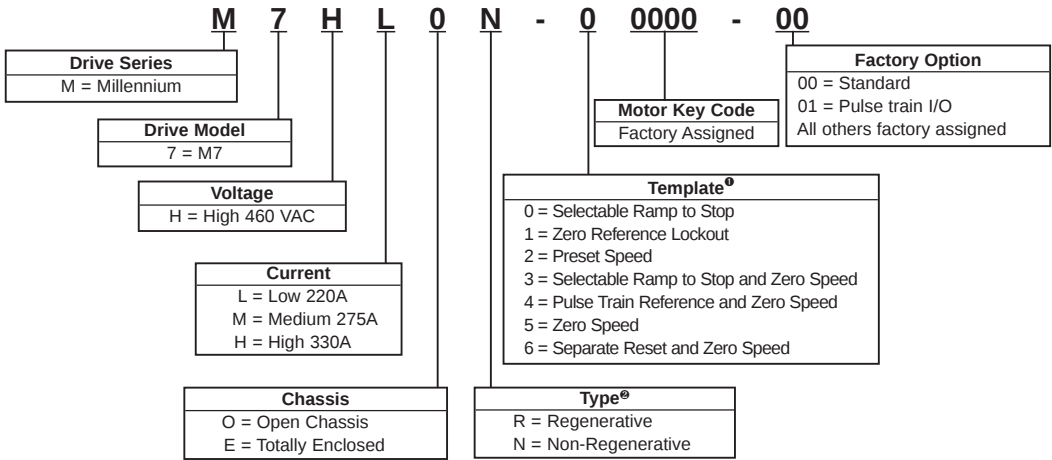
MILLENNIUM SERIES BRUSHLESS DC DRIVES



MILLENNIUM M6



MILLENNIUM M7



Ⓢ See MILLENNIUM Application Templates for the Standard Interface beginning on page 101.
 Ⓢ Resistor Regenerative Drives include separate Regenerative Resistor Modules. Refer to page 99 for dimensions.

MILLENNIUM SERIES DRIVES PRICING

Drive/ Voltage	Amperes Rated/Max	Converter Type	Chassis	Base Model ^① Number	List Price
					\$
M4 230 VAC	30/45	Non-Regenerative	Open	M4LLON-XXXXX-XX	11,432
	30/45	Non-Regenerative	Totally Enclosed	M4LLEN-XXXXX-XX	13,032
	30/45	Regenerative	Open	M4LLOR-XXXXX-XX	12,084
	30/45	Regenerative	Totally Enclosed	M4LLER-XXXXX-XX	13,442
	40/60	Non-Regenerative	Open	M4LMON-XXXXX-XX	12,893
	40/60	Non-Regenerative	Totally Enclosed	M4LMEN-XXXXX-XX	14,193
	40/60	Regenerative	Open	M4LMOR-XXXXX-XX	13,632
	40/60	Regenerative	Totally Enclosed	M4LMER-XXXXX-XX	14,990
	50/75	Non-Regenerative	Open	M4LHON-XXXXX-XX	13,290
	50/75	Non-Regenerative	Totally Enclosed	M4LHEN-XXXXX-XX	14,690
	50/75	Regenerative	Open	M4LHOR-XXXXX-XX	14,011
	50/75	Regenerative	Totally Enclosed	M4LHER-XXXXX-XX	15,669
M4 460 VAC	30/45	Non-Regenerative	Open	M4HLON-XXXXX-XX	11,432
	30/45	Non-Regenerative	Totally Enclosed	M4HLEN-XXXXX-XX	13,032
	30/45	Regenerative	Open	M4HLOR-XXXXX-XX	12,084
	30/45	Regenerative	Totally Enclosed	M4HLER-XXXXX-XX	13,442
	40/60	Non-Regenerative	Open	M4HMON-XXXXX-XX	12,893
	40/60	Non-Regenerative	Totally Enclosed	M4HMEN-XXXXX-XX	14,193
	40/60	Regenerative	Open	M4HMOR-XXXXX-XX	13,632
	40/60	Regenerative	Totally Enclosed	M4HMER-XXXXX-XX	14,990
	50/75	Non-Regenerative	Open	M4HHON-XXXXX-XX	13,290
	50/75	Non-Regenerative	Totally Enclosed	M4HHEN-XXXXX-XX	14,690
	50/75	Regenerative	Open	M4HHOR-XXXXX-XX	14,011
	50/75	Regenerative	Totally Enclosed	M4HHER-XXXXX-XX	15,669
M5 460 VAC	60/90	Non-Regenerative	Open	M5HLON-XXXXX-XX	15,390
	60/90	Non-Regenerative	Totally Enclosed	M5HLEN-XXXXX-XX	16,106
	60/90	Regenerative	Open	M5HLOR-XXXXX-XX	17,114
	60/90	Regenerative	Totally Enclosed	M5HLER-XXXXX-XX	18,092
	75/113	Non-Regenerative	Open	M5HMON-XXXXX-XX	16,150
	75/113	Non-Regenerative	Totally Enclosed	M5HMEN-XXXXX-XX	17,015
	75/113	Regenerative	Open	M5HMOR-XXXXX-XX	18,023
	75/113	Regenerative	Totally Enclosed	M5HMER-XXXXX-XX	19,212
	90/135	Non-Regenerative	Open	M5HHON-XXXXX-XX	17,950
	90/135	Non-Regenerative	Totally Enclosed	M5HHEN-XXXXX-XX	18,711
	90/135	Regenerative	Open	M5HHOR-XXXXX-XX	19,903
	90/135	Regenerative	Totally Enclosed	M5HHER-XXXXX-XX	22,703

① To construct a complete model number with available options refer to the Model Number Codes beginning on page 95.

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MILLENNIUM SERIES DRIVES PRICING

Drive/ Voltage	Amperes Rated/Max	Converter Type	Chassis	Base Model ^① Number	List Price
					\$
M6 460 VAC	120/180	Non-Regenerative	Open	M6HLON-XXXXXX-XX	23,617
	120/180	Non-Regenerative	Totally Enclosed	M6HLEN-XXXXXX-XX	25,885
	120/180	Regenerative	Open	M6HLOR-XXXXXX-XX	26,897
	120/180	Regenerative	Totally Enclosed	M6HLER-XXXXXX-XX	29,071
	150/206	Non-Regenerative	Open	M6HMON-XXXXXX-XX	26,103
	150/206	Non-Regenerative	Totally Enclosed	M6HMEN-XXXXXX-XX	26,987
	150/206	Regenerative	Open	M6HMOR-XXXXXX-XX	29,551
	150/206	Regenerative	Totally Enclosed	M6HMER-XXXXXX-XX	32,135
	175/206	Non-Regenerative	Open	M6HHON-XXXXXX-XX	27,554
	175/206	Non-Regenerative	Totally Enclosed	M6HHEN-XXXXXX-XX	29,312
	175/206	Regenerative	Open	M6HHOR-XXXXXX-XX	31,193
	175/206	Regenerative	Totally Enclosed	M6HHER-XXXXXX-XX	33,920
M7 460 VAC	220/275	Non-Regenerative	Open	M7HLON-XXXXXX-XX	45,925
	220/275	Non-Regenerative	Totally Enclosed	M7HLEN-XXXXXX-XX	47,392
	220/275	Regenerative	Open	M7HLOR-XXXXXX-XX	47,461
	220/275	Regenerative	Totally Enclosed	M7HLER-XXXXXX-XX	50,869
	275/344	Non-Regenerative	Open	M7HMON-XXXXXX-XX	48,544
	275/344	Non-Regenerative	Totally Enclosed	M7HMEN-XXXXXX-XX	52,131
	275/344	Regenerative	Open	M7HMOR-XXXXXX-XX	52,204
	275/344	Regenerative	Totally Enclosed	M7HMER-XXXXXX-XX	55,791
	330/413	Non-Regenerative	Open	M7HHON-XXXXXX-XX	51,028
	330/413	Non-Regenerative	Totally Enclosed	M7HHEN-XXXXXX-XX	54,814
	330/413	Regenerative	Open	M7HHOR-XXXXXX-XX	54,891
	330/413	Regenerative	Totally Enclosed	M7HHER-XXXXXX-XX	58,677

① To construct a complete model number with available options refer to the Model Number Codes beginning on page 95.

MILLENNIUM SERIES DIMENSIONS AND WEIGHTS

DRIVE

Drive Model	Height		Width		Depth		Weight	
	inches	cm	inches	cm	inches	cm	lbs.	kg
M4 (open chassis)	19.50	49.53	16.00	40.64	10.50	26.67	75	34.0
(totally enclosed)	27.00	68.58	16.00	40.64	11.75	29.85	90	40.8
M5 (open chassis)	30.50	77.47	16.00	40.64	10.50	26.67	75	34.0
(totally enclosed)	37.00	93.98	16.00	40.64	11.75	29.85	90	40.8
M6 (open chassis)	43.00	109.22	16.00	40.64	10.50	26.67	200	90.7
(totally enclosed)	57.00	144.78	16.00	40.64	11.75	29.85	240	108.9
M7 (open chassis)	50.00	127.00	29.00	73.66	10.50	26.67	395	179.2
(totally enclosed)	70.00	177.80	29.00	73.66	11.75	29.85	480	217.7

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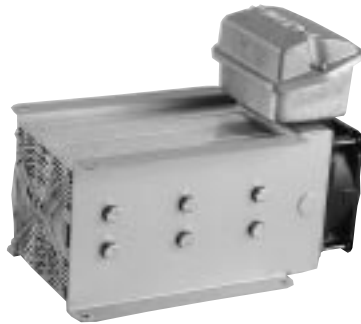
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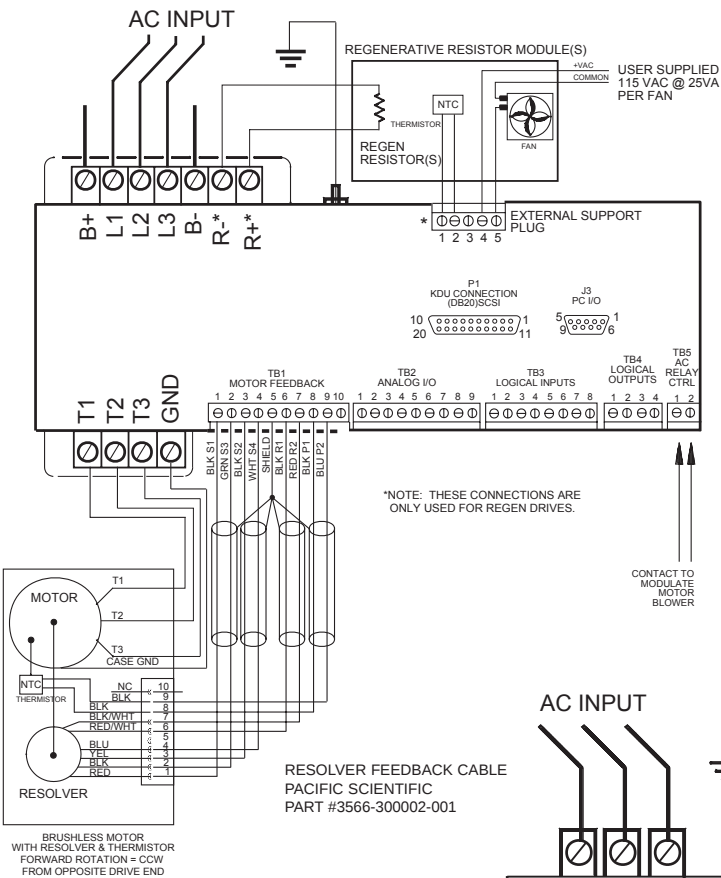
STANDARD REGENERATIVE RESISTOR MODULES

Drive Model	Motor HP	Module Number	Height [●]		Width		Depth		Weight	
			inches	cm	inches	cm	inches	cm	lbs.	kg
M4	10-40	RRM-11-12	8.75	22.23	6.63	16.83	11.88	30.16	12	5.5
M5	50-75	RRM-12-06	8.75	22.23	6.63	16.83	11.88	30.16	15	6.8
M6	100-150	RRM-24-03	8.75	22.23	11.38	28.89	11.88	30.16	25	11.4
M7	200	RRM-36-02	8.75	22.23	16.13	40.96	11.88	30.16	34	15.5
M7	250-300	RRM-48-01	8.75	22.23	21.63	54.94	11.88	30.16	45	20.5

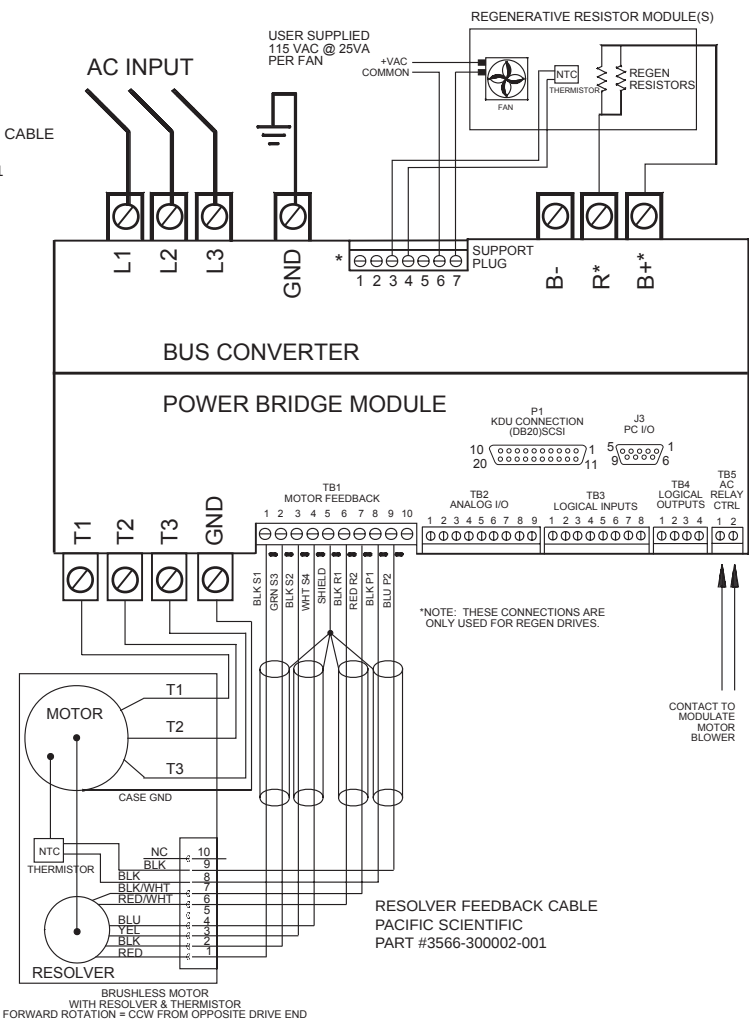
● Includes height of 3.25" (8.26 cm) terminal box.
NOTE: All dimensions and weights are approximate.

MILLENNIUM SERIES TYPICAL CONNECTION DIAGRAMS

MILLENNIUM M4 DRIVE WITH STANDARD INTERFACE



MILLENNIUM M5/M6/M7 DRIVE WITH STANDARD INTERFACE



MILLENNIUM SERIES TEMPLATES AND EFFICIENCY RATINGS

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APPLICATION TEMPLATES FOR THE STANDARD INTERFACE

Configuration Template		Digital Input Terminals on TB3 ^①				Digital Outputs on TB4		
No.	Motor Control Mode	3	4	5	6	1	2	3
0	Analog Speed Reference with Selectable Ramp Stop and Reverse	Start	Stop	Ramp Select	Reverse	Ready	Run	Full Load
1	Analog Speed Reference with Zero Speed Interlock and Reverse	Start	Stop		Reverse	Ready	Run	Full Load
2	Selectable Motor Operating Mode with Preset and Reverse	Start	Stop	Preset	Reverse	Ready	Run	Full Load
3	Analog Speed Reference with Selectable Ramp Stop and Zero Speed Interlock	Start	Stop	Ramp Select	Reverse	Ready	Run	Zero Speed
4	Digital Speed Reference with Pulse Train Input and Zero Speed Interlock	Start	Stop			Ready	Run	Zero Speed
5	Analog Torque Reference with Zero Speed Interlock	Start	Stop		Reverse	Ready	Run	Zero Speed
6	Analog Speed Reference with Reset and Two Wire Start/Stop Control	Run ^②	Reverse	Reset		Ready	Run	Zero Speed

① TB3 Terminal 2 is ENABLE, which cannot be changed

② Two-wire start/stop operation

EFFICIENCY RATINGS

Drive Model	Input Line Voltage VAC	Rated Current Output Amps	Peak Current Output Amps	Nominal ^① Motor HP	Typical ^② Drive Efficiency
M4	230	30	45	10	95.5
M4	230	40	60	15	95.8
M4	230	50	75	20	96.0
M4	460	30	40	25	97.5
M4	460	40	60	30	97.7
M4	460	50	75	40	97.8
M5	460	60	90	50	98.0
M5	460	75	113	60	98.0
M5	460	90	135	75	98.1
M6	460	120	180	100	98.0
M6	460	150	206	125	98.1
M6	460	165	206	150	98.1
M7	460	220	275	200	98.1
M7	460	275	344	250	98.2
M7	460	330	413	300	98.2

① Actual HP usage will be determined by motor full load current.

② Efficiency is calculated with non-regenerative drive at continuous current rating at motor base speed.

MILLENNIUM SERIES TECHNICAL SPECIFICATIONS

DRIVE MODEL	M4	M5	M6	M7
SERVICE FACTOR	1.0	1.0	1.0	1.0
ALTITUDE	Use above 3300 feet (1000 meters) requires de-rating De-rate at 3% of full rating for each additional 1100 ft. (330 m)			
RELATIVE HUMIDITY	Less than 95%, non-condensing			
AMBIENT TEMPERATURE				
Air Surrounding Open Chassis	41 to 122°F 5 to 50°C	41 to 122°F 5 to 50°C	41 to 122°F 5 to 50°C	41 to 122°F 5 to 50°C
Air Surrounding Totally Enclosed Chassis	41 to 104°F 5 to 40°C	41 to 104°F 5 to 40°C	41 to 104°F 5 to 40°C	41 to 104°F 5 to 40°C
INPUT VOLTAGE				
Low Voltage Units				
AC (3 Phase)	190-255 VAC	NA	NA	NA
AC Frequency	47-63 Hz	NA	NA	NA
High Voltage Units				
AC (3 Phase)	340-505 VAC	340-505 VAC	340-505 VAC	340-505 VAC
AC Frequency	47-63 Hz	47-63 Hz	47-63 Hz	47-63 Hz
DC BUS VOLTAGE				
Low Voltage Units				
DC.....	270-350 VDC	NA	NA	NA
High Voltage Units				
DC.....	460-720 VDC	460-720 VDC	460-720 VDC	460-720 VDC
INPUT REFERENCE				
Analog (differential).....	0 to ±10 VDC	0 to ±10 VDC	0 to ±10 VDC	0 to ±10 VDC
Analog.....	4-20 mA	4-20 mA	4-20 mA	4-20 mA
Digital (quadrature or step and direction)❶.....	0-255 kHz	0-255 kHz	0-255 kHz	0-255 kHz
MAX LOAD (max 1 minute of 10 minutes).....	150%	150%	125%	125%
POWER FACTOR (at full load)	>0.95	>0.95	>0.95	>0.95
RESOLVER (Transmitter type)				
Excitation Frequency	6.51 kHz	6.51 kHz	6.51 kHz	6.51 kHz
Output Ratio	0.5:1	0.5:1	0.5:1	0.5:1
RESOLVER FEEDBACK CABLE				
(Pacific Scientific Part #3566-300002-001)				
Capacitance.....	12.5 pF/ft.	12.5 pF/ft.	12.5 pF/ft.	12.5 pF/ft.
Impedance	100Ω	100Ω	100Ω	100Ω
Maximum Length.....	50 m (150 ft.)	50 m (150 ft.)	50 m (150 ft.)	50 m (150 ft.)

● Requires Pulse Train I/O Board

BRUSHLESS DC DRIVES OPTIONS AND PRICING

DRIVE OPTION BOARDS

Drive Option Boards are specified for retrofit or replacement purposes. Boards do not include accessory hardware or cables.

Option Board	Description	Part Number	Applicable Drive Model	List Price
				\$
Analog Interface Board	For accurate analog speed and load outputs. Speed output signal is 0 to ± 10 VDC for 0 to 100% speed. Load output signal is 0 to +10 VDC for 0 to 150% of load (this 0 to 10VDC is standard in the 2000, 3000, 3500, & 4000 Series). This option may also be used to provide a bipolar current analog signal for an analog meter for indicating regeneration on regenerative drives.	4001-154007-009	500	385
		4001-154007-002	1000-4000	385
Auxiliary Feedback Board	Used when the application requires feedback from a lay on roll or remote tach for operation. Most line speed winders (unless they are surface driven types) require that the feedback devices be driven independently of the motor shaft. This option provides for external summing of the normal analog reference with an analog tach feedback from a tach or other voltage source from 10VDC max. to 200VDC max. A PID loop is included on the board. Mounts onto snaptrack.	4001-148200-000	1000-4000	660
Dancer Interface Board	This option board plugs onto the 500 top board. It allows either full dancer or line speed following with dancer trim. Full PID loop control. No power supply is needed.	4001-154060-002	500	529
DC Relay Module	This is a relay mounted on a PC board which has a 110VDC relay mounted together with rectifier bridge and capacitor. It is meant to operate as a 115VAC relay replacement. The components will provide a relay hold of 100 milliseconds minimum after loss of AC power. This is necessary in systems when the drive is trying to ride through power dips. If run contacts to the drive are lost due to the power dip, the drive will stop even though the drive itself is capable of riding through.	4001-148210-001	1000-4000, M4-M7	357
Dual Ramp Accel/Decel Board	Used when the application requires more than one ramp rate for either accel or decel. The board is track-mounted and allows the setting and control of accel rate in one direction of rotation and a different rate of accel in the other direction of rotation. Decel can also be set in either direction.	4001-148204-000	1000-4000	417

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BRUSHLESS DC DRIVES OPTIONS AND PRICING

DRIVE OPTION BOARDS (Continued)

Option Board	Description	Part Number	Applicable Drive Model	List Price \$
Logic Extender Board	Used for Dynamic Braking. Jog clockwise, Jog counterclockwise, M-Contactor, Ramp to hold and hold functions. Includes outputs for zero speed, drive running, and fault output.	4001-1540080001	500	266
Multiple Preset Speed Board^①	(Analog Signal Switch). Up to five preset speeds can be selected by dry contacts from a remote location. Slide track mounted.	4001-148600-001	1000-4000	601
Overspeed Board	Used primarily for high speed applications but can be used anywhere that a limit on overspeed is required which is independent of other functions.	4001-152500-000	1000-4000	545
PID Board^①	Slide track mounted board that provides for line speed operation with dancer trim or full dancer control or load cell control. Previously called Dancer Control and 3 Mode Amplifier. Provides for proportional integral and derivative adjustments for the dance input.	4001-127109-001	1000-4000	920
Power Supply Board	Slide track mounted board that accepts 115VAC or 230VAC (must be specified at the time of order) and provides +24VDC, -24VDC, common outputs and also has card edge connects to mate with option boards. This will handle up to 2 option boards.	4001-127101-001	1000-4000, M4-M7	365
Process Interface Board	Provides several interface options. It provides two different 0 to 10VDC input channels each with 4-20 mA outputs with zero and span. It provides one 4-20 mA input with 0 to 10VDC output with zero and span. These inputs are differentially isolated to 20 volts. It provides one frequency input with 0 to 10VDC output, optically isolated.	4001148230-000	1000-4000	929
Signal Processor Board^①	Slide track mounted board to provide inputs from 4-20 mA or from voltage sources from 2VDC to 200VDC full scale. Provides for zero and span adjustments on 4-20 mA input.	4001-148300-000	1000-4000	620
System Interface Board	This board includes all the functions of the Analog Interface Board with the addition of torque control, 4-20 mA input and follower speed control functions.	4001-154036-xxx	500	537
Threshold Detector Board	Slide track mounted board that will sense two voltage "levels" or one "window" on two independent channels. Two output relays with form C-contacts powered by 115VAC.	4001-148400-000	1000-4000	585
Torque Controller Board	This board is an addition to the standard speed control board when it is necessary to control the torque limit externally. The torque control board is an extension of the current limit pot. Board is powered from the drive through ribbon cables.	4001-148101-000	1000-4000	1,210
Pulse Train I/O Board	This board is used to provide resolver/encoder input and output to and from Millennium Drives. It can be used for speed frequency following (velocity command), torque referencing (torque command), or position referencing (electronic gearing).	4001-200513-001	M4-M7	100

① Requires the use of the Power Supply Board

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DRIVE OPTION KITS

All Drive Option Kits include option board, required connector cables, and mounting hardware. Refer to Drive Option Boards for product descriptions.

Description	Part Number	Applicable Drive Model	List Price
			\$
Analog Interface	GKAIB-1000	1000-4000	415
Auxiliary Feedback	GKAIB	1000-4000	675
Dual Ramp Accel/Decel	GKDRADB	1000-4000	428
Multiple Preset Speed Board ^❶	GKMPSB	1000-4000	616
Overspeed Board	GKOSB	1000-4000	580
PID Board	GKPIDB	1000-4000	950
Power Supply Board	GKPSB	1000-4000, M4-M7	380
Process Interface	GKPIB	1000-4000	944
Signal Processor ^❶	GKSPB	1000-4000	635
Threshold Detector	GKTDB	1000-4000	600
Torque Control	GKTCB	1000-4000	1,250
Pulse Train I/O	GKPTIO	M4-M7	150

DRIVE ACCESSORIES

Accessory	Description	Part Number	Applicable Drive Model	List Price
				\$
DigiMax®	Keypad and display for use as a digital reference (set-point) command. Accepts a variety of digital and analog inputs and allows electronic gearing with settable gear ratio. Provides a selection of local/remote and master/slave operating modes. Includes RS-422 interface for remote communication with PLCs or host computers.	8003-153215-000	All Drives	2,150
BCDMax	Accepts BCD input for digital reference (set-point) command. Speed and ratios (master or slave) are set by a 20 line, 5 decade BCD input from either thumbwheels or PLC outputs.	4001-153400-003	1000-4000	1,803
DigiTrak®	Provides digital display of both motor speed in RPMs, and percentage of motor load. Speed is settable in Engineering units.	8003-153108-000	All Drives	574

❶ Requires the use of the Power Supply Board

❷ Units available for 115 VAC or 230 VAC input power. Units will be supplied for 115 VAC if not specified.

BRUSHLESS DC DRIVES DYNAMIC BRAKING KITS

Genesis and Millennium Series Drives may use passive dynamic braking to stop the motor and load. Dynamic braking is very effective on Brushless DC Motors even is power to the drive is absent because the permanent magnets on the rotor supply the necessary field flux without external power. The necessity to quickly stop a machine during a power failure, or operator safety issues, are generally examples of the need for this type of DB.

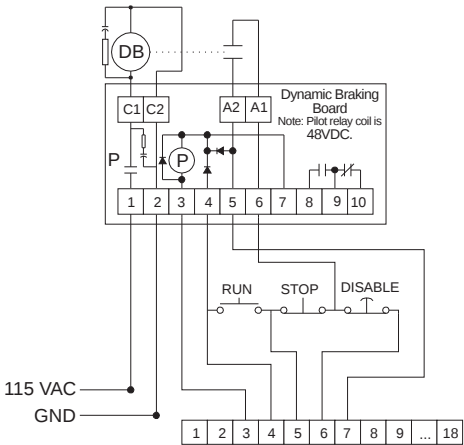
The dynamic braking contactor pulls in on any start. It does not drop out until a Drive Disable is initiated.

HP	Part Number					List Price
						\$
1-10	DB	X ^o	—	(Entire Motor Model Number)		1,068
15-40	DB	X ^o	—	(Entire Motor Model Number)		1,865
50-75	DB	X ^o	—	(Entire Motor Model Number)		2,420
100-200	DB	X ^o	—	(Entire Motor Model Number)		4,848
200-300	DB	X ^o	—	(Entire Motor Model Number)		8,080

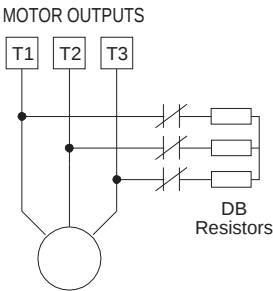
● G = Genesis Drive
M = Millennium Drive

NOTE: Standard dynamic braking is specified for load inertia equal to or less than the motor's rotor inertia. For special circumstances, such as high inertia loads, contact the factory. Additional resistors will be additional cost items.

Resistors and Output Contactor are included in Standard Dynamic Braking Kits

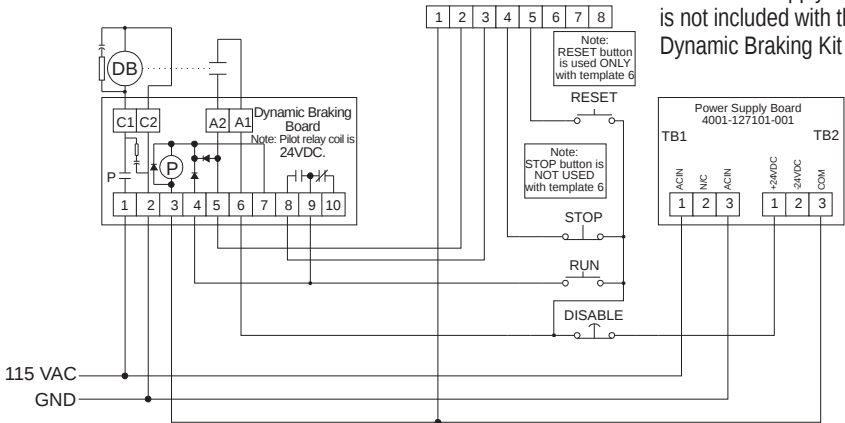


Connection to GENESIS Drive
Terminal TB2



- The DB contactor requires 3 normally closed power contacts and at least one normally open auxiliary.
- The use of a 115 VAC coil on the DB contactor is strongly recommended.
- The use of a surge suppressor across the coil of the DB contactor is REQUIRED.

Connection to MILLENNIUM Drive
Terminal TB3



The Power Supply Board is not included with the Dynamic Braking Kit

PRE-ENGINEERED DRIVE SYSTEMS INDEX

How to use this section

This section covers our MILLENNIUM COMPLETE, MILLENNIUM REMOTE, and GENESIS COMPLETE Pre-Engineered Drive Systems. Select the proper system using one of the following procedures.

- If you are already familiar with these systems and the available options, refer to the MILLENNIUM COMPLETE & REMOTE Model Number Codes beginning on page 110, or the GENESIS COMPLETE Model Number Codes beginning on page 116 to verify the coded information.
- If you are not familiar with these systems and the available options refer to the MILLENNIUM system options on page 111, the GENESIS system options on page 117 and/or the index at the right. Construct a model number after all the technical parameters, including options, are determined.

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Genesis Complete

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PRE-ENGINEERED DRIVE SYSTEMS

Pre-Engineered Drive Systems

Pacific Scientific offers a wide range of Pre-Engineered Drive Systems for the Millennium and Genesis Series of drives. We can also design custom systems specific to your demanding applications. Our systems save you time and money by providing you with a thoroughly tested drive system that is constructed to the highest standards in the industry.

Readily Available, Field-Proven Designs

Our Pre-Engineered Drive Systems are the fastest, most cost-effective way to get your drive into machine commissions. Expect superior system reliability from a field-proven design by the factory engineers that know the drive product best. Drive system

panels are repetitively constructed by factory trained technicians to complement overall reliability.

These Drive Systems provide a flexible selection of standard options including:

- a wide variety of application-specific controls
- dynamic brakes
- blower motor starter kits
- operator interface options

Easy To Order

Pre-Engineered Drive Systems are convenient to order. Select the motor and appropriate drive that your application requires, without any additional options. This determines your base system. Then, select from the many standard options required to complete your system.

Custom Systems

Should your application have special requirements, our engineering staff is available to design a system ideally suited to your needs. A custom panel might include a multiple drive system, special operator interface options or the inclusion of a PLC. Our engineers have many years of application experience in numerous fields including plastic extrusion, test stands, wire drawing, converting, and web handling. We have experience with major brands of PLCs, HMIs, and networks.

Highest Quality Construction

Each Drive System is constructed to the highest standards, providing years of maintenance free operation. Standard construction features on our systems include:

- NEMA 1 panel enclosures
- Through door circuit breaker
- Terminal blocks for user connections
- Control transformer
- Cooling fans
- Wire ferrules and tags on each conductor
- Device tags for each component
- Wire trays
- Terminal end stops
- Maximum of two conductors at any terminal

... These steps and 100% functional testing, implemented by our highly trained technicians, ensure you the highest quality system in the industry.



PRE-ENGINEERED DRIVE SYSTEMS

FEATURES

BENEFITS

Proven, fully engineered systems	– Provides a field-tested design with the assurance that details are not overlooked – Highest possible performance — systems are optimized by Pacific Scientific, the drive designer and manufacturer – Faster Delivery — time consuming process of design and quotation are eliminated – Lower cost — engineering development is eliminated – System UL Certification available
High Reliability	– Continuous quality refinements from years of design, material, and quality assurance improvements substantiated by formal test programs. – Fewer production interruptions and associated cost of scrap—conversely, more production hours, less maintenance, and higher profits.
Easy to Specify and Order	– Complete specifications in this catalog. Select the motor and drive, then choose the system options – Model number codes account for all standard and optional features. A single model number defines a complete system
Single Vendor Responsibility	– Never a question of who to contact should you need assistance with application engineering, quotations or delivery schedules – No duplicate orders, invoices and payments – No need to qualify multiple vendors
Standard two year warranty	– Assured quality and reliability

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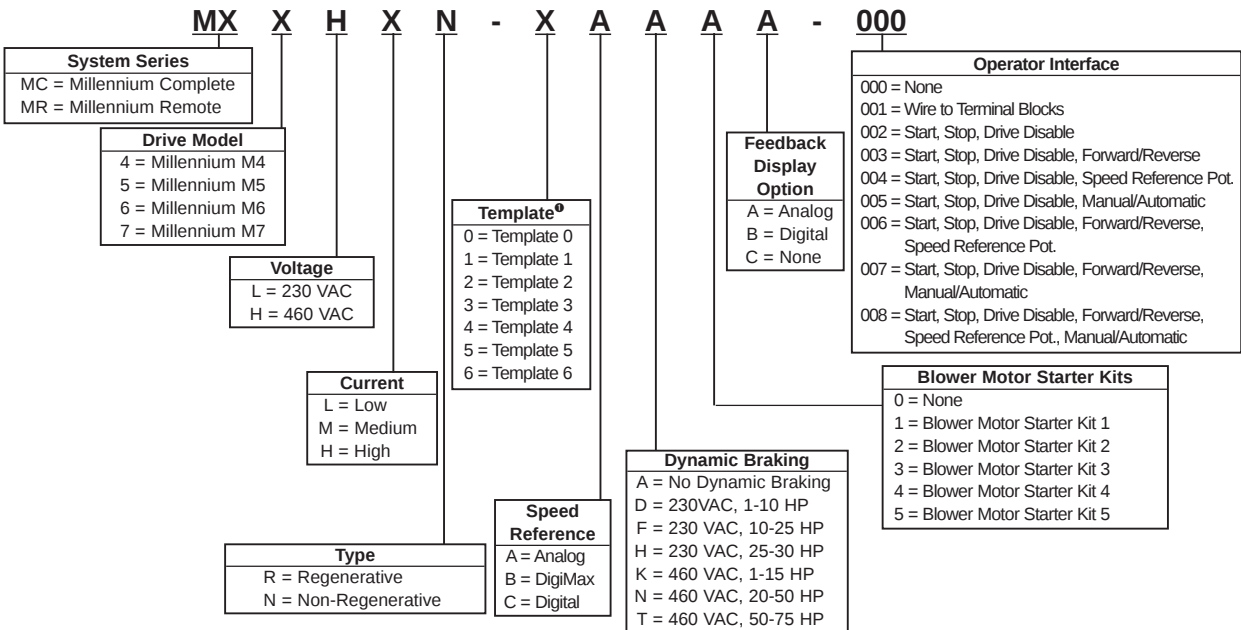
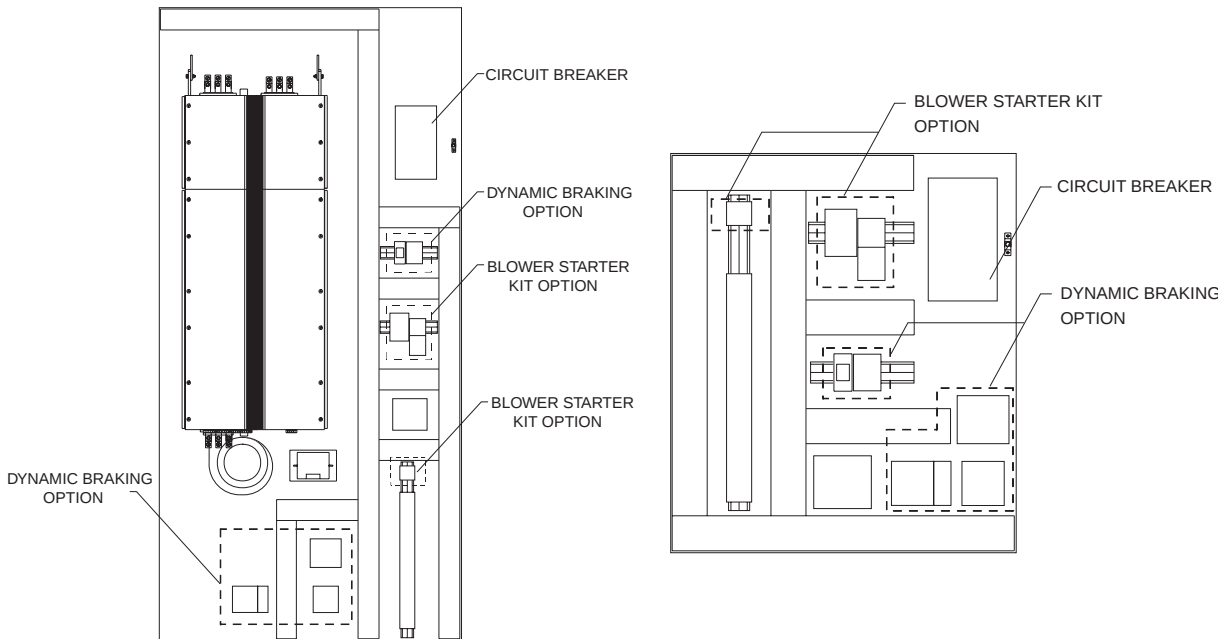
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MILLENNIUM COMPLETE & REMOTE MODEL NUMBER CODES

TYPICAL MILLENNIUM COMPLETE LAYOUT

TYPICAL MILLENNIUM REMOTE LAYOUT



① See MILLENNIUM Application Templates for the Standard Interface on page 101
NOTE: For proper Drive selection see Recommended Motor/Drive Specifications in the Motors section.

MILLENNIUM COMPLETE AND REMOTE OPTIONS

Millennium Complete Systems include the Millennium Drive and specified options in a single NEMA 1 enclosure. Millennium Remote Systems include the specified options in a single NEMA 1 enclosure and the Millennium Drive is a stand-alone unit.

APPLICATION TEMPLATES

For a complete description of the templates refer to page 101 in the drives section of this catalog. The choice of drive template will determine which options are available for Speed Reference, Feedback and Operator Interface. Refer to the table below.

Template	Speed Reference	Feedback Display Options	Operator Interface
1,2,3,5,6	Analog	None, Analog, Digital	0,1,2,3,4,5,6,7,8
4	DigiMax	None, Analog ^❶	2,3,5,7
	Digital	None, Analog, Digital ^❷	1,2,3,5,7

❶ The DigiMax speed reference provides a digital feedback display.

❷ If an externally mounted DigiMax is used for the speed reference, the DigiMax provides a digital feedback display.

SPEED REFERENCE

The drive speed reference may be analog, digital (refer to page 102 for details on these signals), or a panel mounted DigiMax Control. In an analog system, if operator interface option 4, 6, or 8 is selected, a ten-turn potentiometer is used to set the speed reference. Drive template 4 is required if a digital speed reference is desired.

DYNAMIC BRAKING

Dynamic Braking can be added to rapidly decelerate the motor in the event of stopping the motor, or system power loss. Standard Dynamic Braking options are available for systems under 75 HP. Dynamic braking is specified assuming 1750 RPM operation of a POWERTEC Dripproof, Blower Ventilated motor with load inertia equal to the motor inertia. If your system has different operating conditions contact the factory for assistance.

BLOWER MOTOR STARTER KITS

The proper blower motor starter kit is determined by motor frame size and motor enclosure (DPBV, TEAO).

DPBV - DRIPPROOF BLOWER VENTILATED

Motor Frame Size	Blower Motor Description	Blower Size	Kit
182T, 184T	1/10 HP, 115 VAC, 60Hz, 1 Phase	2	1
213T, 215T, 254T, 256T	1/3HP, 208-230/460 VAC, 60Hz, 3 Phase	3	2
259TZ	1/2HP, 208-230/460 VAC, 60Hz, 3 Phase	8	3
287TZ, 288TZ, 2812TZ	3/4HP, 208-230/460 VAC, 60Hz, 3 Phase	9	4
328TZ, 3211TZ	1.5HP, 208-230/460 VAC, 60Hz, 3 Phase	9	4

TEAO — TOTALLY ENCLOSED AIR OVER

Motor Frame Size	Blower Motor Description	Blower Size	Kit
ALL SIZES	1/3HP, 208-230/460 VAC, 60Hz, 3 Phase	3	2

FEEDBACK DISPLAY OPTIONS

The motor speed and load may be displayed digitally or on analog panel meters. A DigiTrak is used when the digital option is selected.

OPERATOR INTERFACE

Panel mounted operator interface options include: momentary switches for starting and stopping, selector switches for forward or reverse, and automatic or manual operation, maintained open mushroomhead switch for drive disable, and a ten-turn potentiometer to set an analog speed reference. If Template 4 is selected, some Operator Interface options are not available, please refer to the Application Templates description on page 101.

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MILLENNIUM COMPLETE AND REMOTE SPECIFICATIONS

MILLENNIUM COMPLETE PRE-ENGINEERED SYSTEM DIMENSIONS

Drive Model	Height		Width		Depth		Mounting
	inches	cm	inches	cm	inches	cm	
M4	48	121.9	36	91.4	12	30.5	Wall Mount
M5	60	152.4	36	91.4	12	30.5	Wall Mount
M6	71	180.3	36	91.4	12	30.5	Wall Mount
M7	71	180.3	47	119.4	20	50.8	Free Standing

MILLENNIUM REMOTE PRE-ENGINEERED SYSTEM DIMENSIONS

Drive Model	Height		Width		Depth		Mounting
	inches	cm	inches	cm	inches	cm	
M4	30	76.2	24	61.0	12.6	32.1	Wall Mount
M5	30	76.2	24	61.0	12.6	32.1	Wall Mount
M6	30	76.2	24	61.0	12.6	32.1	Wall Mount
M7	30	76.2	24	61.0	12.6	32.1	Wall Mount

NOTE: All dimensions are approximate.

MILLENNIUM COMPLETE AND REMOTE GENERAL SPECIFICATIONS

Drive Model	Base System Model	Power		Input Service	
		HP	kW	AC Voltage	F.L. Amps
M4	Mx4LL	10	7.5	230	25
	Mx4LM	15	11.3	230	37
	Mx4LH	20	15.0	230	48
	Mx4HL	25	18.8	460	30
	Mx4HM	30	22.5	460	36
	Mx4HH	40	30.0	460	47
M5	Mx5HL	50	37.5	460	58
	Mx5HM	60	45.0	460	70
	Mx5HH	75	56.3	460	86
M6	Mx6HL	100	75.0	460	111
	Mx6HM	125	93.8	460	138
	Mx6HH	150	112.5	460	166
M7	Mx7HL	200	150.0	460	220
	Mx7HM	250	187.5	460	274
	Mx7HH	300	225.0	460	327

MILLENNIUM COMPLETE PRICING

Drive Model	Base Drive Model Number	Base System Model Number	System Description	List Price*
M4	M4LLON-XXXXX-XX	MC4LLN-XXXXX-000	M4, 10HP, 230V, Non-Regen	18,095
	M4LLOR-XXXXX-XX	MC4LLR-XXXXX-000	M4, 10HP, 230V, Regenerative	18,921
	M4LMON-XXXXX-XX	MC4LMN-XXXXX-000	M4, 15HP, 230V, Non-Regen	19,556
	M4LMOR-XXXXX-XX	MC4LMR-XXXXX-000	M4, 15HP, 230V, Regenerative	20,469
	M4LHON-XXXXX-XX	MC4LHN-XXXXX-000	M4, 20HP, 230V, Non-Regen	19,953
	M4LHOR-XXXXX-XX	MC4LHR-XXXXX-000	M4, 20HP, 230V, Regenerative	20,848
	M4HLON-XXXXX-XX	MC4HLN-XXXXX-000	M4, 25HP, 460V, Non-Regen	18,095
	M4HLOR-XXXXX-XX	MC4HLR-XXXXX-000	M4, 25HP, 460V, Regenerative	18,921
	M4HMON-XXXXX-XX	MC4HMN-XXXXX-000	M4, 30HP, 460V, Non-Regen	19,556
	M4HMOR-XXXXX-XX	MC4HMR-XXXXX-000	M4, 30HP, 460V, Regenerative	20,469
	M4HHON-XXXXX-XX	MC4HHN-XXXXX-000	M4, 40HP, 460V, Non-Regen	19,953
	M4HHOR-XXXXX-XX	MC4HHR-XXXXX-000	M4, 40HP, 460V, Regenerative	20,848
M5	M5HLON-XXXXX-XX	MC5HLN-XXXXX-000	M5, 50HP, 460V, Non-Regen	22,490
	M5HLOR-XXXXX-XX	MC5HLR-XXXXX-000	M5, 50HP, 460V, Regenerative	24,384
	M5HMON-XXXXX-XX	MC5HMN-XXXXX-000	M5, 60HP, 460V, Non-Regen	23,250
	M5HMOR-XXXXX-XX	MC5HMR-XXXXX-000	M5, 60HP, 460V, Regenerative	25,293
	M5HHON-XXXXX-XX	MC5HHN-XXXXX-000	M5, 75HP, 460V, Non-Regen	25,050
	M5HHOR-XXXXX-XX	MC5HHR-XXXXX-000	M5, 75HP, 460V, Regenerative	27,173
M6	M6HLON-XXXXX-XX	MC6HLN-XXXXX-000	M6, 100HP, 460V, Non-Regen	32,150
	M6HLOR-XXXXX-XX	MC6HLR-XXXXX-000	M6, 100HP, 460V, Regenerative	35,616
	M6HMON-XXXXX-XX	MC6HMN-XXXXX-000	M6, 125HP, 460V, Non-Regen	36,273
	M6HMOR-XXXXX-XX	MC6HMR-XXXXX-000	M6, 125HP, 460V, Regenerative	39,907
	M6HHON-XXXXX-XX	MC6HHN-XXXXX-000	M6, 150HP, 460V, Non-Regen	38,280
	M6HHOR-XXXXX-XX	MC6HHR-XXXXX-000	M6, 150HP, 460V, Regenerative	42,104
M7	M7HLON-XXXXX-XX	MC7HLN-XXXXX-000	M7, 200HP, 460V, Non-Regen	58,147
	M7HLOR-XXXXX-XX	MC7HLR-XXXXX-000	M7, 200HP, 460V, Regenerative	59,868
	M7HMON-XXXXX-XX	MC7HMN-XXXXX-000	M7, 250HP, 460V, Non-Regen	62,618
	M7HMOR-XXXXX-XX	MC7HMR-XXXXX-000	M7, 250HP, 460V, Regenerative	66,500
	M7HHON-XXXXX-XX	MC7HHN-XXXXX-000	M7, 300HP, 460V, Non-Regen	65,102
	M7HHOR-XXXXX-XX	MC7HHR-XXXXX-000	M7, 300HP, 460V, Regenerative	69,187

*Does not include motor pricing.

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MILLENNIUM REMOTE PRICING

Drive Model	Base Drive Model Number	Base System Model Number	System Description	List Price* \$
M4	M4LLEN-XXXXX-XX	MR4LLN-XXXXX-000	M4, 10HP, 230V, Non-Regen	17,013
	M4LLER-XXXXX-XX	MR4LLR-XXXXX-000	M4, 10HP, 230V, Regenerative	17,609
	M4LMEN-XXXXX-XX	MR4LMN-XXXXX-000	M4, 15HP, 230V, Non-Regen	18,174
	M4LMER-XXXXX-XX	MR4LMR-XXXXX-000	M4, 15HP, 230V, Regenerative	19,157
	M4LHEN-XXXXX-XX	MR4LHN-XXXXX-000	M4, 20HP, 230V, Non-Regen	18,671
	M4LHER-XXXXX-XX	MR4LHR-XXXXX-000	M4, 20HP, 230V, Regenerative	19,836
	M4HLEN-XXXXX-XX	MR4HLN-XXXXX-000	M4, 25HP, 460V, Non-Regen	17,013
	M4HLER-XXXXX-XX	MR4HLR-XXXXX-000	M4, 25HP, 460V, Regenerative	17,609
	M4HMEN-XXXXX-XX	MR4HMN-XXXXX-000	M4, 30HP, 460V, Non-Regen	18,174
	M4HMER-XXXXX-XX	MR4HMR-XXXXX-000	M4, 30HP, 460V, Regenerative	19,157
	M4HHEN-XXXXX-XX	MR4HHN-XXXXX-000	M4, 40HP, 460V, Non-Regen	18,671
	M4HHER-XXXXX-XX	MR4HHR-XXXXX-000	M4, 40HP, 460V, Regenerative	19,836
M5	M5HLEN-XXXXX-XX	MR5HLN-XXXXX-000	M5, 50HP, 460V, Non-Regen	20,458
	M5HLER-XXXXX-XX	MR5HLR-XXXXX-000	M5, 50HP, 460V, Regenerative	22,629
	M5HMEN-XXXXX-XX	MR5HMN-XXXXX-000	M5, 60HP, 460V, Non-Regen	21,367
	M5HMER-XXXXX-XX	MR5HMR-XXXXX-000	M5, 60HP, 460V, Regenerative	23,749
	M5HHEN-XXXXX-XX	MR5HHN-XXXXX-000	M5, 75HP, 460V, Non-Regen	23,063
	M5HHER-XXXXX-XX	MR5HHR-XXXXX-000	M5, 75HP, 460V, Regenerative	27,240
M6	M6HLEN-XXXXX-XX	MR6HLN-XXXXX-000	M6, 100HP, 460V, Non-Regen	31,015
	M6HLER-XXXXX-XX	MR6HLR-XXXXX-000	M6, 100HP, 460V, Regenerative	34,386
	M6HMEN-XXXXX-XX	MR6HMN-XXXXX-000	M6, 125HP, 460V, Non-Regen	32,117
	M6HMER-XXXXX-XX	MR6HMR-XXXXX-000	M6, 125HP, 460V, Regenerative	37,450
	M6HHEN-XXXXX-XX	MR6HHN-XXXXX-000	M6, 150HP, 460V, Non-Regen	34,997
	M6HHER-XXXXX-XX	MR6HHR-XXXXX-000	M6, 150HP, 460V, Regenerative	39,790
M7	M7HLEN-XXXXX-XX	MR7HLN-XXXXX-000	M7, 200HP, 460V, Non-Regen	53,077
	M7HLER-XXXXX-XX	MR7HLR-XXXXX-000	M7, 200HP, 460V, Regenerative	56,739
	M7HMEN-XXXXX-XX	MR7HMN-XXXXX-000	M7, 250HP, 460V, Non-Regen	60,038
	M7HMER-XXXXX-XX	MR7HMR-XXXXX-000	M7, 250HP, 460V, Regenerative	63,884
	M7HHEN-XXXXX-XX	MR7HHN-XXXXX-000	M7, 300HP, 460V, Non-Regen	62,721
	M7HHER-XXXXX-XX	MR7HHR-XXXXX-000	M7, 300HP, 460V, Regenerative	66,770

*Does not include motor pricing.

MILLENNIUM COMPLETE AND REMOTE OPTIONS PRICING

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System Option	Option Designation	Description	Price Adder \$
Template	0	Template 0	—
	1	Template 1	—
	2	Template 2	—
	3	Template 3	—
	4	Template 4	—
	5	Template 5	—
	6	Template 6	—
Speed Reference	A	Analog	—
	B	DigiMax	4,074
	C	Digital	963
Dynamic Braking	A	No Dynamic Braking	—
	D	230VAC, 1-10 HP System	2,593
	F	230VAC, 10-25 HP System	2,778
	H	230VAC, 25-30 HP System	2,963
	K	460VAC, 1-15 HP System	2,593
	N	460VAC, 15-20 HP System	2,778
	R	460VAC, 20-50 HP System	3,056
	T	460VAC, 50-75 HP System	4,074
Blower Motor Starter Kits	0	None	—
	1	Blower Motor Starter Kit 1 (115 VAC)	278
	2	Blower Motor Starter Kit 2	889
	3	Blower Motor Starter Kit 3	889
	4	Blower Motor Starter Kit 4	889
	5	Blower Motor Starter Kit 5	889
Feedback Display Options	A	Analog	1,019
	B	Digital	1,630
	C	None	—
Operator Interface	000	None	—
	001	Wire to Terminal Blocks	—
	002	Start, Stop, Drive Disable	741
	003	Start, Stop, Drive Disable, Forward/Reverse	1,019
	004	Start, Stop, Drive Disable, Speed Reference Potentiometer	1,056
	005	Start, Stop, Drive Disable, Manual/Automatic	1,019
	006	Start, Stop, Drive Disable, Forward/Reverse, Speed Reference Potentiometer	1,333
	007	Start, Stop, Drive Disable, Forward/Reverse, Manual/Automatic	1,296
	008	Start, Stop, Drive Disable, Forward/Reverse, Speed Reference Potentiometer, Manual/Automatic	1,611

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GENESIS COMPLETE OPTIONS

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Genesis Complete Systems include the Genesis Drive and specified options in a single NEMA 1 enclosure.

SPEED REFERENCE

The drive speed reference may be analog, or a panel mounted DigiMax control. In an analog system, if operator interface option 4, 6, 8, 11 or 12 is selected, a ten-turn potentiometer is used to set the speed reference. These operator interface options should not be used with a DigiMax speed reference.

DYNAMIC BRAKING

Dynamic Braking can be added to rapidly decelerate the motor in the event of stopping the motor, or system power loss. Standard Dynamic Braking options are available for systems under 75 HP. Dynamic braking is specified assuming 1750 RPM operation of a POWERTEC Dripproof, Blower Ventilated motor with load inertia equal to the motor inertia. If your system has different operating conditions contact the factory for assistance.

BLOWER MOTOR STARTER KITS

The proper blower motor starter kit is determined by motor frame size and motor enclosure (DPBV,TEAO).

DPBV - DRIPPROOF BLOWER VENTILATED

Motor Frame Size	Blower Motor Description	Blower Size	Kit
182T, 184T	1/10 HP, 115 VAC, 60Hz, 1 Phase	2	1
213T, 215T, 254T, 256T	1/3HP, 208-230/460 VAC, 60Hz, 3 Phase	3	2
259TZ	1/2HP, 208-230/460 VAC, 60Hz, 3 Phase	8	3
287TZ, 288TZ, 2812TZ	3/4HP, 208-230/460 VAC, 60Hz, 3 Phase	9	4
328TZ, 3211TZ	1.5HP, 208-230/460 VAC, 60Hz, 3 Phase	9	4

TEAO — TOTALLY ENCLOSED AIR OVER

Motor Frame Size	Blower Motor Description	Blower Size	Kit
ALL SIZES	1/3HP, 208-230/460 VAC, 60Hz, 3 Phase	3	2

CONTROL OPTIONS°

Several control options may be added to the system. These include , PID Board, Torque Control Board, Signal Processor Board, or a combination of the Torque Control Board and Signal Processor Board. The PID Board requires an analog speed reference.

FEEDBACK OPTIONS°

The motor speed and load may be displayed digitally with a DigiTrak. An Analog Interface Board may be added to the system to provide analog outputs proportional to speed and load (terminal board connections). a drive ready relay may be added to the system to signal other equipment when the drive is ready. Any combination of these options may be selected.

OPERATOR INTERFACE

Panel mounted operator interface options include: momentary switches for starting and stopping, and jogging, selector switches for forward or reverse, and automatic or manual operation, maintained open mushroomhead switch for drive disable, and a ten-turn potentiometer to set an analog speed reference.

° For information on these options refer to page 103.

GENESIS COMPLETE SPECIFICATIONS

GENESIS COMPLETE PRE-ENGINEERED SYSTEM DIMENSIONS

Drive Model	Height		Width		Depth		Mounting
	inches	cm	inches	cm	inches	cm	
1000	42	106.7	36	91.4	12	30.5	Wall Mount
1000A	42	106.7	36	91.4	12	30.5	Wall Mount
2000	60	152.4	36	91.4	16	40.6	Wall Mount
3000	60	152.4	36	91.4	16	40.6	Wall Mount
3500	72	182.9	48	121.9	16	40.6	Free Standing ^①
4000	71	180.3	47	119.4	20	50.8	Free Standing

GENESIS COMPLETE GENERAL SPECIFICATIONS

^①12 inch welded floorstands included.

NOTE: All dimensions are approximate.

Drive Model	Base System Model	Power		System Input Service	
		HP	kW	Voltage	Max. Cont. AC Line Current
1000	GC0011.N2	1	0.8	230	5
	GC1.51.N2	1.5	1.1	230	6
	GC0021.N2	2	1.5	230	7
	GC0031.N2	3	2.3	230	10
	GC0051.N2	5	3.8	230	15
	GC7.51.N2	7.5	5.6	230	21
	GC0101.N2	10	7.5	230	27
	GC0011.N4	1	0.8	460	5
	GC1.51.N4	1.5	1.1	460	6
	GC0021.N4	2	1.5	460	6
	GC0031.N4	3	2.3	460	7
	GC0051.N4	5	3.8	460	9
	GC7.51.N4	7.5	5.6	460	12
	GC0101.N4	10	7.5	460	15
1000A	GC0011AX2	1	0.8	230	5
	GC1.51AX2	1.5	1.1	230	6
	GC0021AX2	2	1.5	230	7
	GC0031AX2	3	2.3	230	10
	GC0051AX2	5	3.8	230	15
	GC7.51AX2	7.5	5.6	230	21
	GC0101AX2	10	7.5	230	27
	GC0011AX4	1	0.8	460	5
	GC1.51AX4	1.5	1.1	460	5
	GC0021AX4	2	1.5	460	5
	GC0031AX4	3	2.3	460	6
	GC0051AX4	5	3.8	460	9
	GC7.51AX4	7.5	5.6	460	12
	GC0101AX4	10	7.5	460	15
2000	GC0202.X4	20	15.0	460	27
	GC0252.X4	25	18.8	460	32
	GC0302.X4	30	22.5	460	37
	GC0402.X4	40	30.0	460	48
3000	GC0503.X4	50	37.5	460	56
	GC0603.X4	60	45.0	460	66
	GC0753.X4	75	56.3	460	82
3500	GC10035X4	100	75.0	460	110
4000	GC1254.X4	125	93.8	460	137
	GC1504.X4	150	112.5	460	163

GENESIS COMPLETE PRICING

Drive Model	Base Drive Model Number	Base System Model Number	System Description	List Price*
Model 1000 230 VAC	C0011.N2CH000NNNN	GC0011.N2-XXXXX-000	1000, 1 HP, 230V, Non-Regen	8,828
	C1.51.N2CH000NNNN	GC1.51.N2-XXXXX-000	1000, 1.5 HP, 230V, Non-Regen	8,828
	C0021.N2CH000NNNN	GC0021.N2-XXXXX-000	1000, 2 HP, 230V, Non-Regen	8,828
	C0031.N2CH000NNNN	GC0031.N2-XXXXX-000	1000, 3 HP, 230V, Non-Regen	8,828
	C0051.N2CH000NNNN	GC0051.N2-XXXXX-000	1000, 5 HP, 230V, Non-Regen	9,643
	C7.51.N2CH000NNNN	GC7.51.N2-XXXXX-000	1000, 7.5 HP, 230V, Non-Regen	10,498
	C0101.N2CH000NNNN	GC0101.N2-XXXXX-000	1000, 10 HP, 230V, Non-Regen	11,120
Model 1000 460 VAC	C0011.N4CH000NNNN	GC0011.N4-XXXXX-000	1000, 1 HP, 460V, Non-Regen	9,643
	C1.51.N4CH000NNNN	GC1.51.N4-XXXXX-000	1000, 1.5 HP, 460V, Non-Regen	9,643
	C0021.N4CH000NNNN	GC0021.N4-XXXXX-000	1000, 2 HP, 460V, Non-Regen	9,643
	C0031.N4CH000NNNN	GC0031.N4-XXXXX-000	1000, 3 HP, 460V, Non-Regen	9,643
	C0051.N4CH000NNNN	GC0051.N4-XXXXX-000	1000, 5 HP, 460V, Non-Regen	10,044
	C7.51.N4CH000NNNN	GC7.51.N4-XXXXX-000	1000, 7.5 HP, 460V, Non-Regen	10,139
	C0101.N4CH000NNNN	GC0101.N4-XXXXX-000	1000, 10 HP, 460V, Non-Regen	10,139
Model 1000A 230 VAC	C0011.AR2CH000NNNN	GC0011AR2-XXXXX-000	1000A, 1 HP, 230V, Regenerative	10,187
	C0011.AS2CH000NNNN	GC0011AS2-XXXXX-000	1000A, 1 HP, 230V, Servo	10,187
	C1.51.AR2CH000NNNN	GC1.51AR2-XXXXX-000	1000A, 1.5 HP, 230V, Regenerative	10,187
	C1.51.AS2CH000NNNN	GC1.51AS2-XXXXX-000	1000A, 1.5 HP, 230V, Servo	10,187
	C0021.AR2CH000NNNN	GC0021AR2-XXXXX-000	1000A, 2 HP, 230V, Regenerative	10,187
	C0021.AS2CH000NNNN	GC0021AS2-XXXXX-000	1000A, 2 HP, 230V, Servo	10,187
	C0031.AR2CH000NNNN	GC0031AR2-XXXXX-000	1000A, 3 HP, 230V, Regenerative	10,187
	C0031.AS2CH000NNNN	GC0031AS2-XXXXX-000	1000A, 3 HP, 230V, Servo	10,567
	C0051.AR2CH000NNNN	GC0051AR2-XXXXX-000	1000A, 5 HP, 230V, Regenerative	10,777
	C0051.AS2CH000NNNN	GC0051AS2-XXXXX-000	1000A, 5 HP, 230V, Servo	11,157
	C7.51.AR2CH000NNNN	GC7.51AR2-XXXXX-000	1000A, 7.5 HP, 230V, Regenerative	11,888
	C7.51.AS2CH000NNNN	GC7.51AS2-XXXXX-000	1000A, 7.5 HP, 230V, Servo	12,268
	C0101.AR2CH000NNNN	GC0101AR2-XXXXX-000	1000A, 10 HP, 230V, Regenerative	12,698
	C0101.AS2CH000NNNN	GC0101AS2-XXXXX-000	1000A, 10 HP, 230V, Servo	13,078
Model 1000A 460 VAC	C0011.AR4CH000NNNN	GC0011AR4-XXXXX-000	1000A, 1 HP, 460V, Regenerative	11,002
	C0011.AS4CH000NNNN	GC0011AS4-XXXXX-000	1000A, 1 HP, 460V, Servo	11,382
	C1.51.AR4CH000NNNN	GC1.51AR4-XXXXX-000	1000A, 1.5 HP, 460V, Regenerative	11,002
	C1.51.AS4CH000NNNN	GC1.51AS4-XXXXX-000	1000A, 1.5 HP, 460V, Servo	11,382
	C0021.AR4CH000NNNN	GC0021AR4-XXXXX-000	1000A, 2 HP, 460V, Regenerative	11,002
	C0021.AS4CH000NNNN	GC0021AS4-XXXXX-000	1000A, 2 HP, 460V, Servo	11,382
	C0031.AR4CH000NNNN	GC0031AR4-XXXXX-000	1000A, 3 HP, 460V, Regenerative	11,002
	C0031.AS4CH000NNNN	GC0031AS4-XXXXX-000	1000A, 3 HP, 460V, Servo	11,382
	C0051.AR4CH000NNNN	GC0051AR4-XXXXX-000	1000A, 5 HP, 460V, Regenerative	11,298
	C0051.AS4CH000NNNN	GC0051AS4-XXXXX-000	1000A, 5 HP, 460V, Servo	11,678
	C7.51.AR4CH000NNNN	GC7.51AR4-XXXXX-000	1000A, 7.5 HP, 460V, Regenerative	11,422
	C7.51.AS4CH000NNNN	GC7.51AS4-XXXXX-000	1000A, 7.5 HP, 460V, Servo	11,802
	C0101.AR4CH000NNNN	GC0101AR4-XXXXX-000	1000A, 10 HP, 460V, Regenerative	11,422
	C0101.AS4CH000NNNN	GC0101AS4-XXXXX-000	1000A, 10 HP, 460V, Servo	11,802
	C0151.AN4CH000NNNN	GC0151AN4-XXXXX-000	1000A, 15 HP, 460V, Non-Regen	10,859
	C0151.AR4CH000NNNN	GC0151AR4-XXXXX-000	1000A, 15 HP, 460V, Regenerative	12,358

*Does not include motor pricing.

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Drive Model	Base Drive Model Number	Base System Model Number	System Description	List Price* \$
Model 2000 230 VAC	C0152.N2CH000NNNN	GC0152.N2-XXXXX-000	2000, 15 HP, 230V, Non-Regen	13,523
	C0152.R2CH000NNNN	GC0152.R2-XXXXX-000	2000, 15 HP, 230V, Regenerative	15,565
	C0202.N2CH000NNNN	GC0202.N2-XXXXX-000	2000, 20 HP, 230V, Non-Regen	16,455
	C0202.R2CH000NNNN	GC0202.R2-XXXXX-000	2000, 20 HP, 230V, Regenerative	19,377
Model 2000 460 VAC	C0202.N4CH000NNNN	GC0202.N4-XXXXX-000	2000, 20 HP, 460V, Non-Regen	13,193
	C0202.R4CH000NNNN	GC0202.R4-XXXXX-000	2000, 20 HP, 460V, Regenerative	15,137
	C0252.N4CH000NNNN	GC0252.N4-XXXXX-000	2000, 25 HP, 460V, Non-Regen	14,319
	C0252.R4CH000NNNN	GC0252.R4-XXXXX-000	2000, 25 HP, 460V, Regenerative	15,907
	C0302.N4CH000NNNN	GC0302.N4-XXXXX-000	2000, 30 HP, 460V, Non-Regen	14,679
	C0302.R4CH000NNNN	GC0302.R4-XXXXX-000	2000, 30 HP, 460V, Regenerative	16,267
	C0402.N4CH000NNNN	GC0402.N4-XXXXX-000	2000, 40 HP, 460V, Non-Regen	16,455
	C0402.R4CH000NNNN	GC0402.R4-XXXXX-000	2000, 40 HP, 460V, Regenerative	19,377
Model 3000 460 VAC	C0503.N4CH000NNNN	GC0503.N4-XXXXX-000	3000, 50 HP, 460V, Non-Regen	17,874
	C0503.R4CH000NNNN	GC0503.R4-XXXXX-000	3000, 50 HP, 460V, Regenerative	21,088
	C0603.N4CH000NNNN	GC0603.N4-XXXXX-000	3000, 60 HP, 460V, Non-Regen	19,734
	C0603.R4CH000NNNN	GC0603.R4-XXXXX-000	3000, 60 HP, 460V, Regenerative	23,505
	C0753.N4CH000NNNN	GC0753.N4-XXXXX-000	3000, 75 HP, 460V, Non-Regen	21,675
	C0753.R4CH000NNNN	GC0753.R4-XXXXX-000	3000, 75 HP, 460V, Regenerative	26,029
Model 3500 460 VAC	C10035N4CH000NNNN	GC10035N4-XXXXX-000	3500, 100 HP, 460V, Non-Regen	29,463
	C10035R4C4000NNNN	GC10035R4-XXXXX-000	3500, 100 HP, 460V, Regenerative	33,560
Model 4000 460 VAC	C1254.N4CH000NNNN	GC1254.N4-XXXXX-000	4000, 125 HP, 460V, Non-Regen	38,089
	C1254.R4C4000NNNN	GC1254.R4-XXXXX-000	4000, 125 HP, 460V, Regenerative	43,377
	C1504.N4CH000NNNN	GC1504.N4-XXXXX-000	4000, 150 HP, 460V, Non-Regen	40,803
	C1504.R4C4000NNNN	GC1504.R4-XXXXX-000	4000, 150 HP, 460V, Regenerative	46,658

*Does not include motor pricing.

GENESIS COMPLETE OPTIONS PRICING

System Option	Option Designation	Description	Price Adder \$
Speed Reference	A	Analog	—
	B	DigiMax	3,704
Dynamic Braking	A	No Dynamic Braking	—
	D	230VAC, 1-10 HP System	2,593
	F	230VAC, 10-25 HP System	2,778
	H	230VAC, 25-30 HP System	2,963
	K	460VAC, 1-15 HP System	2,593
	N	460VAC, 15-20 HP System	2,778
	R	460VAC, 20-50 HP System	3,056
	T	460VAC, 50-75 HP System	4,074
Blower Motor Starter	0	None	—
	1	Blower Motor Starter Kit 1 (115 VAC)	278
	2	Blower Motor Starter Kit 2	889
	3	Blower Motor Starter Kit 3	889
	4	Blower Motor Starter Kit 4	889
	5	Blower Motor Starter Kit 5	889
Control Options	A	None	—
	C	PID	1,111
	D	Torque Control Board	1,019
	E	Signal Processor Board	1,019
	F	Control Option D and E combined	2,000
Feedback Options	A	None	—
	B	Drive Ready Relay	259
	C	Analog Interface Board	1,667
	D	DigiTrak	1,111
	E	Drive Ready Relay, Analog Interface Board	1,944
	F	Drive Ready Relay, DigiTrak	1,389
	G	Analog Interface Board, DigiTrak	1,926
	H	Drive Ready Relay, Analog Interface Board, DigiTrak	2,222
Operator Interface	000	None	—
	001	Wire to Terminal Blocks	—
	002	Start, Stop, Drive Disable	741
	003	Start, Stop, Drive Disable, Forward/Reverse	1,019
	004	Start, Stop, Drive Disable, Speed Reference Potentiometer	1,056
	005	Start, Stop, Drive Disable, Manual/Automatic	1,019
	006	Start, Stop, Drive Disable, Forward/Reverse, Speed Reference Potentiometer	1,333
	007	Start, Stop, Drive Disable, Forward/Reverse, Manual/Automatic	1,296
	008	Start, Stop, Drive Disable, Forward/Reverse, Speed Reference Potentiometer, Manual/Automatic	1,611
	009	Start, Stop, Drive Disable, Jog	1,019
	010	Start, Stop, Drive Disable, Forward/Reverse, Jog	1,296
	011	Start, Stop, Drive Disable, Forward/Reverse, Speed Reference Potentiometer, Jog	1,611
	012	Start, Stop, Drive Disable, Forward/Reverse, Speed Reference Potentiometer, Manual/Automatic, Jog	1,889

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How to use this section

This section covers a wide variety of technical data and general reference information. Much of this material is important to sizing considerations and maintenance strategies. Use it to assist you in motor, drive, and system selection.

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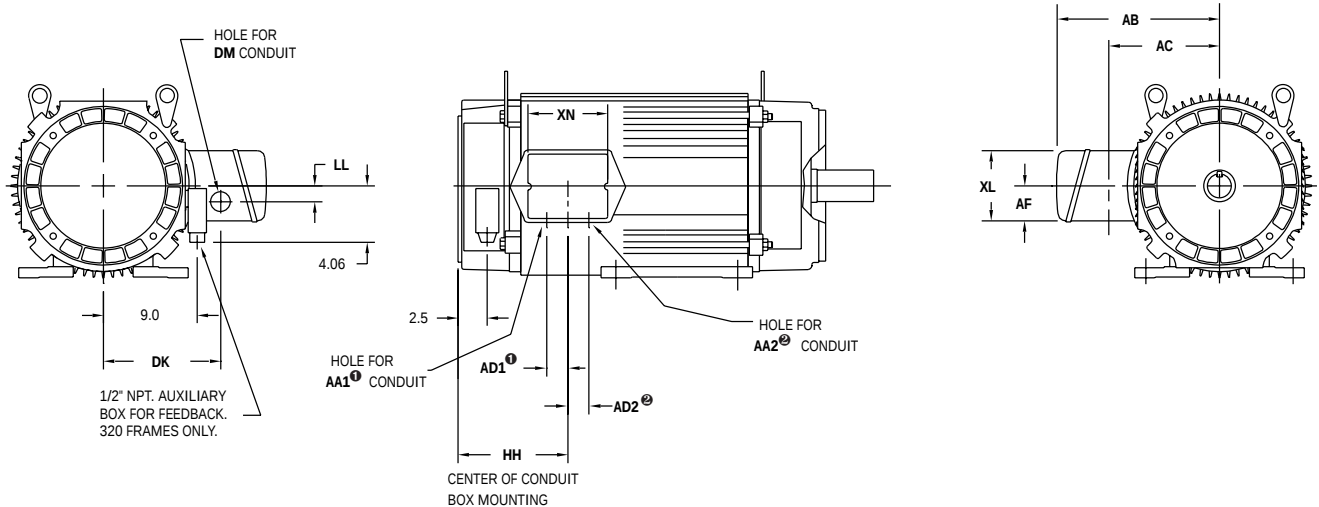
140

Warranty

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CONDUIT BOX DIMENSIONS

TERMINATIONS VIA CONDUITS ONLY (MODEL NUMBER CODE TERMINATION OPTIONS 1, 2, E, F)



STANDARD HIGH CAPACITY CONDUIT BOX														
FRAME	MAX. CONT. RMS AMPS	AB	AC	XL	AF	HH	AD1 ❶	AD2 ❷	XN	AA1 ❶	AA2 ❷	DM	DK	LL
180	65	9.57	7.03	4.00	2.00	4.94	.50	1.68	6.00	1 1/4	3/4	—	—	—
210	103	11.13	7.68	4.75	2.39	5.50	1.12	1.63	6.00	1 1/4	3/4	—	—	—
250	193	14.32	9.38	5.85	3.00	6.31	1.00	2.50	8.00	2 1/2	1/2	—	—	—
280	310	15.75	10.00	8.25	4.13	8.31	2.25	2.25	9.75	3	3	3/4	10.00	2.0
320	533	18.45	13.03	12.76	6.38	11.75	2.88	2.88	12.76	4	4	—	—	—

- ❶ AA1 and AD1 are for power.
❷ AA2 and AD2 are for feedback.
- All dimensions are in inches

NOTE: Conduit box in F1 position with conduit holes facing down is standard mounting. Conduit box can be rotated in 90° steps about its axis and can be mounted on opposite side when specified.

CONDUIT BOX DIMENSIONS

TERMINATION VIA CONDUITS AND MS CONNECTORS (MODEL NUMBER CODE TERMINATION OPTIONS 3, 4)

A

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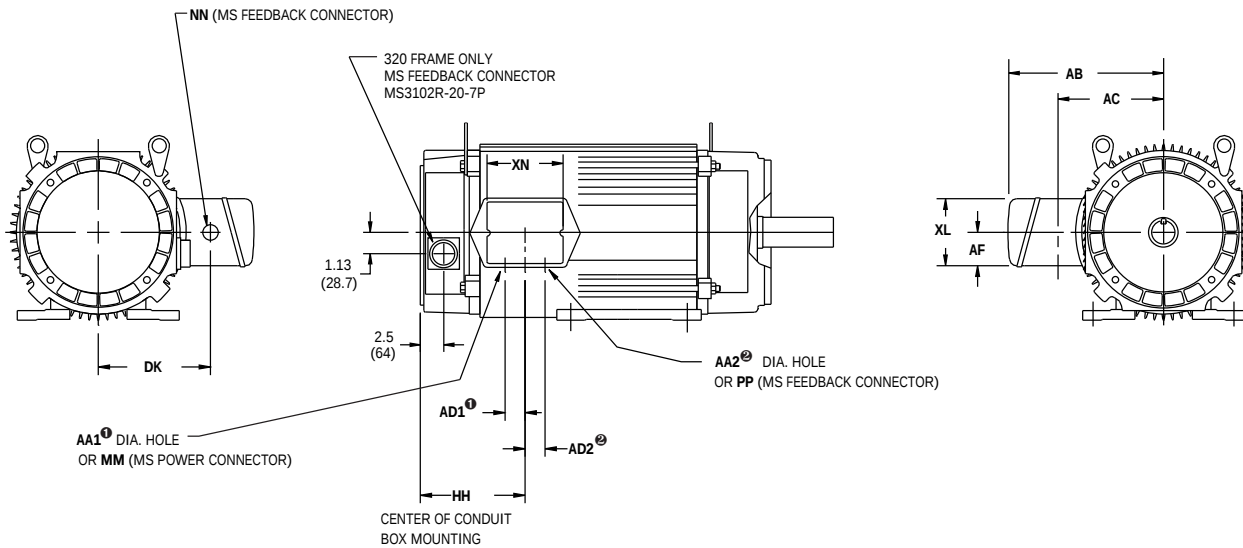
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STANDARD HIGH CAPACITY CONDUIT BOX															
FRAME	MAX. CONT. RMS AMPS	AB	AC	XL	AF	HH	AD1 ①	AD2 ②	XN	AA1 ①	AA2 ②	DK	NN MS connector	MM MS connector	PP MS connector
180	65	9.57 (243.1)	7.03 (178.56)	4.00 (101.6)	2.00 (50.8)	4.94 (125.48)	.50 (12.7)	1.68 (42.67)	6.00 (152.4)	-	-	-	-	MS3102R-32-17P	MS3102R-20-7P
210	103	11.13 (282.7)	7.68 (195.1)	4.75 (120.7)	2.39 (60.7)	5.50 (139.7)	1.12 (28.45)	1.63 (41.4)	6.00 (152.4)	-	-	-	-	MS3102R-36-5P	MS3102R-20-7P
250	193	14.32 (363.7)	9.38 (238.3)	5.85 (148.6)	3.00 (76.2)	6.31 (160.3)	1.00 (25.4)	2.50 (63.5)	8.00 (203.2)	2.92 (74.2)	-	-	-	-	MS3102R-20-7P
280	310	15.75 (400.1)	10.00 (254)	8.25 (209.6)	4.13 (104.9)	8.31 (211.1)	2.25 (57.2)	2.25 (57.2)	9.75 (247.7)	3.63 (92.2)	3.63 (92.2)	8.94 (271.1)	MS3102R-20-7P	-	-
320	533	18.45 (468.6)	13.03 (331)	12.76 (324.1)	6.38 (162.1)	11.75 (298.5)	2.88 (73.2)	2.88 (73.2)	12.76 (324.1)	4.69 (119.1)	4.69 (119.1)	-	-	-	-

- ① AA1 and AD1 are for power.
- ② AA2 and AD2 are for feedback.

All dimensions in () are mm, all others in inches

NOTE: Conduit box in F1 position with conduit holes facing down is standard mounting. Conduit box can be rotated in 90° steps about its axis and can be mounted on opposite side when specified.

TERMINATIONS

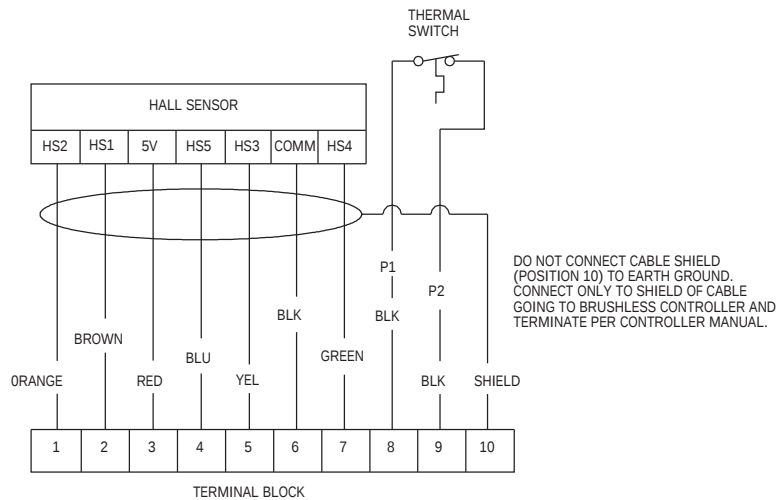
PRIMARY FEEDBACK TERMINATIONS VIA CONDUITS (MODEL NUMBER CODE TERMINATION OPTIONS 1, 2, 7, E, F, G)

PRIMARY FEEDBACK DEVICES/THERMAL SENSOR

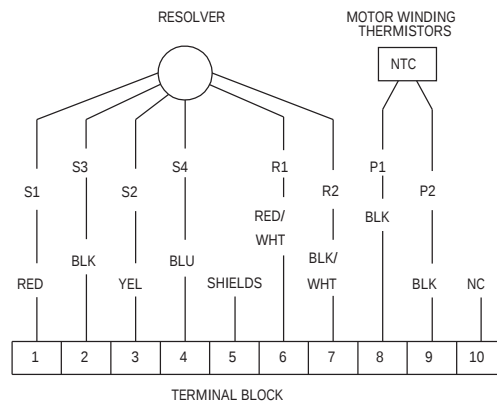
0° = Hall Sensors/thermal switch

2 or 5° = Resolver/NTC thermistor

MOTOR WITH HALL SENSOR



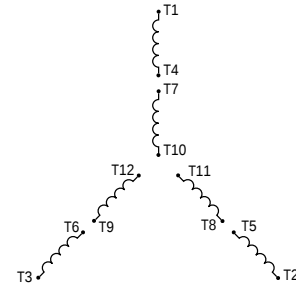
MOTOR WITH RESOLVER



① Model number code designation

TERMINATIONS

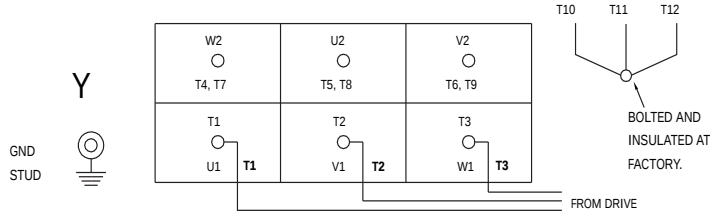
MOTOR POWER TERMINATIONS TO TERMINAL BLOCKS[Ⓢ] VIA CONDUITS (MODEL NUMBER CODE TERMINATION OPTIONS E, F, G)



WINDING CONNECTION[Ⓢ]

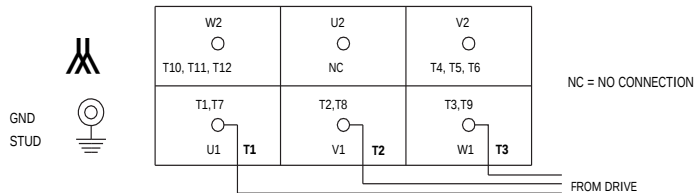
12 LEAD MOTOR POWER CONNECTIONS

3 1 WYE CONNECTION LOW SPEED



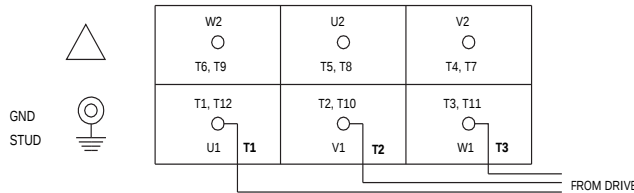
From Drive	Line Connections	Connect Together
T1	T1	T4-T7
T2	T2	T5-T8
T3	T3	T6-T9
		T10-T11-T12 (See diagram at left)

4 2 WYE CONNECTION MED-HIGH SPEED



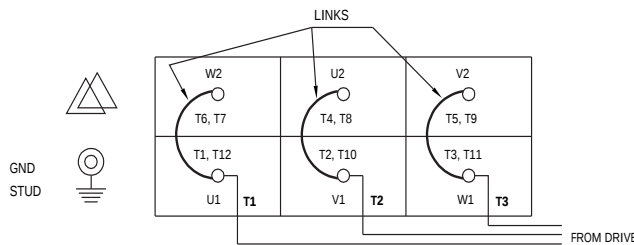
From Drive	Line Connections	Connect Together
T1	T1-T7	T10-T11-T12
T2	T2-T8	T4-T5-T6
T3	T3-T9	

1 1 DELTA CONNECTION MEDIUM SPEED



From Drive	Line Connections	Connect Together
T1	T1-T12	T6-T9
T2	T2-T10	T5-T8
T3	T3-T11	T4-T7

2 2 DELTA CONNECTION HIGH SPEED



From Drive	Line Connections	Connect Together
T1	T1-T7-T6-T12	NA
T2	T2-T8-T4-T10	
T3	T3-T9-T5-T11	

Ⓢ Power terminal block located in conduit box. These designations are molded into the power terminal block for reference.

W2	U2	V2
U1	V1	W1

Ⓢ Model number code designation.

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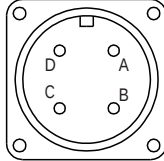
TERMINATIONS

MOTOR POWER AND PRIMARY FEEDBACK MS CONNECTOR PIN OUTS (MODEL NUMBER CODE TERMINATION OPTIONS 3, 4, 8)

MOTOR

FRAME 180 WITH STANDARD HIGH
CAPACITY CONDUIT BOX

MS3102R-32-17P

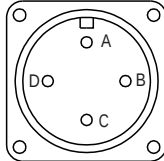


Standard pinouts - all series

CONNECTOR PIN	FUNCTION
A	T1
B	T2
C	T3
D	GROUND

FRAME 210 WITH STANDARD HIGH
CAPACITY CONDUIT BOX

MS3102R-36-5P



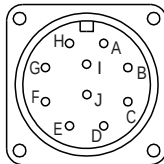
Suggested mating connector and clamp

FRAME	MATING CONNECTOR	CLAMP
180	MS3106F-32-17S	MS3057-20A
210	MS3106F-36-5S	MS3057-24A

PRIMARY FEEDBACK DEVICES

HALL SENSOR

MS3102R-18-1P

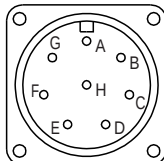


Standard pinouts - all series

CONNECTOR PIN	HALL SENSOR	RESOLVER
A	HS2	S4
B	HS1	S3
C	5V	S2
D	HS5	S1
E	HS3	R1
F	COMM	R2
G	HS4	THERMISTOR
H	SHIELD	THERMISTOR
I	THERMAL	NA
J	THERMAL	NA

RESOLVER

MS3102R-20-7P



Suggested mating connector and clamp

FEEDBACK	MATING CONNECTOR	CLAMP
HALL SENSOR	MS3106F-18-1S	MS3057-10A
RESOLVER	MS3106F-20-7S	MS3057-12A

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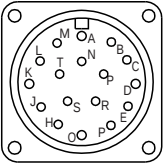
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SECONDARY FEEDBACK MS CONNECTOR PIN OUTS^① (MODEL NUMBER CODE SECONDARY FEEDBACK OPTIONS A, B)

SECONDARY FEEDBACK
CONNECTOR

MS3102E20-29P



SECONDARY FEEDBACK	
CONNECTOR PIN	ENCODER
A	CASE GND
B	N/C
C	S1 (U)
D	S2 (V)
E	S3 (W)
F	N/C
G	ENCODER A
H	ENCODER $\bar{A}$
J	ENCODER B
K	ENCODER $\bar{B}$
L	ENCODER Z
M	ENCODER $\bar{Z}$
N	$\bar{S1}$ (U)
P	$\bar{S2}$ (V)
R	$\bar{S3}$ (W)
S	ENCODER + V dc
T	ENCODER V dc RTN

Suggested mating connector and clamp

CONNECTOR WITH CABLE CLAMP
MS310GF-2029S

① E320 frame motors have this MS connector mounted on the motor rather than the conduit box. See Conduit Box Dimensions page 124.

SECONDARY FEEDBACK DEVICE SPECIFICATIONS

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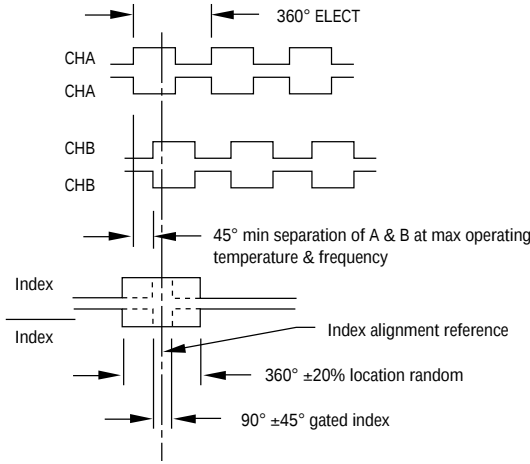
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SECONDARY FEEDBACK DEVICE. . . OPTIONAL ENCODER See SECONDARY FEEDBACK in Model Number Code to designate this standard option. In addition to a factory installed encoder, an option for encoder mounting provisions only is available. See page 132.

Typical output @ 25°C

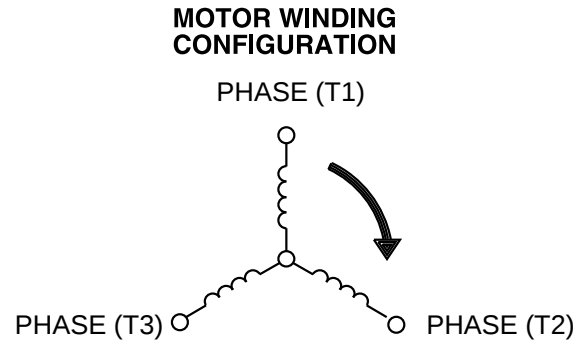
Parameter	A	B
Pulses per revolution	600	1024
Type	Incremental	
Supply voltage	+5VDC $\pm 5\%$ @270 mA nominal	
Output format	Dual channel quadrature and index with complements	
Output type	Line drivers (26LS31 for data and connections)	
Minimum edge separation	45° (channels A & B)	
Output frequency	300 kHz (all channels)	

For counterclockwise motor rotation viewed from opposite drive end.



NOTE:
Commutation output available, contact factory

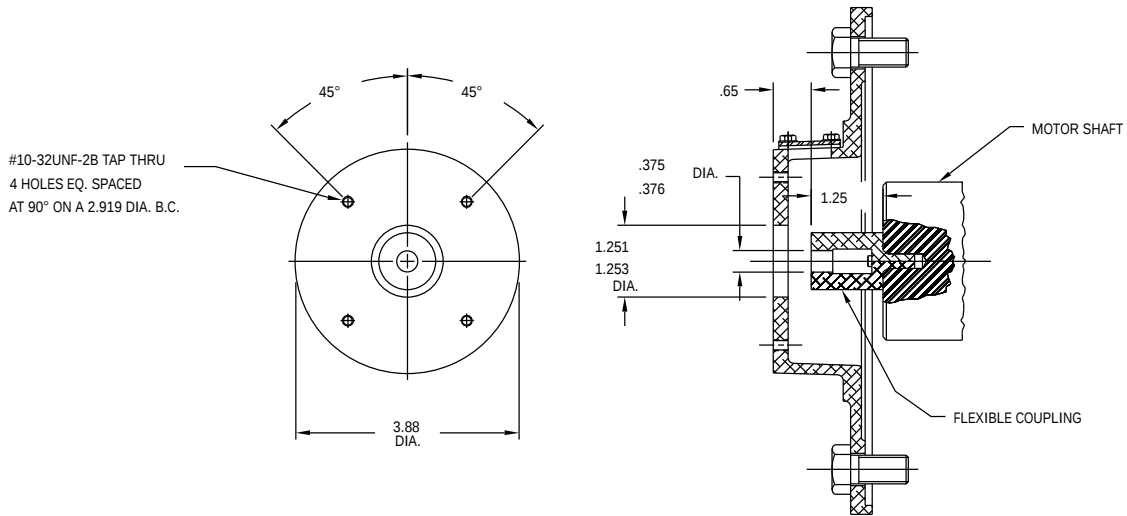
PHASING DIAGRAM. . . ALL MOTORS This is the phasing diagram for counterclockwise motor rotation viewed from opposite the drive end. This is the same phasing reference used for both primary and secondary feedback devices



SECONDARY FEEDBACK DEVICE MOUNTING

SECONDARY FEEDBACK . . . ENCODER MOUNTING PROVISIONS TO MOUNT NEMA SIZE 25 ENCODER.

See SECONDARY FEEDBACK in Model Number Code to designate this standard option.



BLOWER MOTOR DATA (DPBV MOTORS)

Model Number ^❶	Frame ^❷	Blower Size	HP	AC Voltage	Supply	Amps
F182	182T	2	1/10	115	Single Phase	1.0
F184	184T					
F213	213T	3	1/3	200-230, 460	Three Phase	.8-75, .5
F215	215T					
F254	254T					
F256	256T					
F259	259T	8	1/2	200-230, 460	Three Phase	2.1-2.0, 1.0
F287	287TZ	9	3/4	200-230, 460	Three Phase	2.7-2.6, 1.3
F288	288TZ					
F28C	2812TZ					
F328	328TZ	10	1 1/2	200-230, 460	Three Phase	4.9-4.6, 2.3
F32B	3211TZ					
F32D	3213TZ					
F504	504T	12	1 1/2	200-230, 460	Three Phase	4.9-4.6, 2.3
F506	506T					
F508	508T					
E182	182TZ	2	1/10	115	Single Phase	1.0
E183	182TZ					
E184	184TZ					
E213	213TZ	3	1/3	200-230, 460	Three Phase	.8-.75, .5
E215	215TZ					
E218	218TZ					
E254	254TZ					
E256	256TZ					
E258	S259TZ	8	1/2	200-230, 460	Three Phase	2.7-2.6, 1.3
E259	259TZ					
E328	328TZ	10	1 1/2	200-230, 460	Three	4.9-4.6, 2.3
E32B	3211TZ					
E32D	3213TZ					

❶ See POWERTEC Model Number Codes beginning on page 6, or PACTORQ Model Number Codes beginning on page 53.

❷ NEMA Frame Designation. See POWERTEC motor dimensions beginning on page 26, or PACTORQ motor dimensions beginning on page 60.

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BRAKE SPECIFICATIONS

STANDARD DC HOLDING DISC BRAKES

The holding brake is a standard option and is designed to provide a static holding torque to the motor shaft with the brake coil de-energized. The brake must be released (coil energized) prior to commanding motor rotation as determined by its dropout time. **The holding brake is limited to applying holding torque to a non-rotating motor and *must not* be used to stop a motor. In addition, the seller is not responsible for safety or any liability due to the delay time from between the time the brake coil voltage is removed and the torque is developed by the brake to prevent any further motor/load rotation.**

Model Number Prefix	Static Holding Torque (lb-ft.)		Voltage (VDC)	Current (Amps)	Inertia (ft-lb-sec ²)	Pull-in Time [®] (msec)	Drop-out Time [®] (msec)	Max. Speed [®] (RPM)	Weight Adder (lb)
	TENV	DPBV							
F140 (all)	3	3	100	Consult Factory					
	6	6							
	10	10							
F180 (all)	15	15	100	Consult Factory					
	35	35							
F210 (all)	30	30	100	0.39	0.0005	110	60	5000	15
	50	50	100	0.39	0.0005	110	60	5000	15
F250 (all)	50	50	100	0.39	0.0005	110	60	5000	15
	90	90	100	0.81	0.0009	200	110	4000	44
	150	150	100	0.81	0.0009	200	110	4000	44
F280 (all)	150	150	100	0.81	0.0009	200	110	4000	44
	300	300	100	1.57	0.0022	260	155	3800	80
	375	375	100	1.57	0.0022	260	155	3800	80
F320 (all)	300	300	100	2.04	0.0100	340	215	3200	160
	375	375							
	600	600							
E182	30	30	100	.39	.0005	110	60	5000	15
E183	30	50							
E184	30	75							
E213	90	90	100	.81	.0009	200	110	4000	44
E215	90	150							
E218	90	150							
E254	300	300	100	1.57	.0022	260	155	3800	80
E256	300	300							
E258	300	300							
E259	300	375							
E28A	450	450	100	2.04	.0100	340	215	3200	160
E28C	450	600							
E328	750	750	100	3.79	.0267	450	300	2900	260
E32B	750	900							
E32D	750	1200							

① Pull-in time is the normal brake armature plate pick-up time once voltage is applied (torque release).

② Drop-out time is the normal brake armature plate drop-out time once voltage is removed (torque applied).

③ Max. speed is the mechanical limiting speed of the brake.

NOTE:

1. All voltage and current values have a ±10% tolerance.
2. See individual motor dimensional drawings for motor with brake length adder.
3. Motor with brake may be mounted horizontally or vertically.
4. See "Special Options" on page 135.

BRAKE SPECIFICATIONS

SPECIAL OPTIONS, DC HOLDING DISC BRAKES

The following are available as special options. Please contact the factory at (803) 328-1888. **It is important to note that safety and liability issues associated with specifying and applying these options are the responsibility of the buyer.**

1. A manual release. The standard brake does not have a manual release.
2. Brakes with different Static Holding Torque ratings.
3. A rectifier module to convert 115 VAC to 90-100 VDC (mounted remotely and customer wired).

SPECIAL OPTIONS, AC HOLDING DISC BRAKES

In addition to the standard DC brake, AC brakes are available as a special option. Specifications must be finalized with the factory at (803) 328-1888. Prior to calling for a quotation, please prepare the following specifications for review with the factory. **It is important to note that safety and liability issues associated with specifying and applying the brake are the responsibility of the buyer.**

- Static holding torque rating
- Voltage (coil voltage)
- Frequency
- Brake enclosure rating — standard, dust tight, waterproof, or explosion proof
- Orientation — horizontal or vertical mounting, above or below the motor
- Manual release required?
- Modifications required, such as interlocking switches, space heaters, etc.
- Holding or stopping duty. If stopping, provide specifications
- Space limitations or mechanical design considerations

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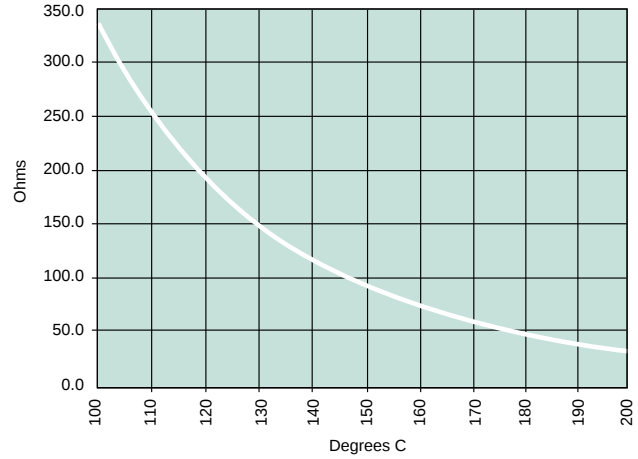
THERMAL PROTECTION

NTC THERMAL SENSOR (THERMISTOR)

Winding Temp. (Degrees C)	NTC Resistance (Ohms)	Winding Temp. (Degrees C)	NTC Resistance (Ohms)
-40	168,250.0	90	458.9
-30	88,500.0	100	340.0
-20	48,535.0	110	255.6
-10	27,665.0	120	194.7
0	16,325.0	130	150.5
10	9,950.0	140	117.4
20	6,245.0	150	92.7
30	4,028.5	160	74.0
40	2,663.5	170	59.6
50	1,801.5	180	48.4
60	1,244.0	190	39.7
70	876.0	200	32.8
80	629.0		

NOTES:

1. The NTC thermal sensor (thermistor) is used in conjunction with resolver primary feedback. A PTC thermal sensor is also available.
2. The NTC thermal sensor consists of two (10k Ω @ +25°C) Negative Temperature Coefficient thermistors, mounted so as to sense the temperature of the three stator phase windings. The two NTCs are wired in parallel, connected to terminals P1 (8) and P2 (9) in the motor terminal box.
3. The over-temperature threshold for totally enclosed motors is 145°C (104.2 Ω). The over-temperature threshold for drip-proof, blower ventilated motors is 130°C (150.5 Ω). Operation above these temperatures will cause damage to the motor.



THERMAL SWITCH (THERMOSTAT)

The Thermal Switch is normally closed and rated as follows:

Maximum current, breaking:

12A, 120VAC

8A, 240VAC

2A, 24VDC

Continuous current:

2A at all the above voltages

DE-RATING

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Motors are rated on their ability to dissipate heat. Two environmental factors that affect the motor's ability to dissipate heat are altitude and ambient temperature. These factors apply equally to both TENV and DPBV motors. In addition, de-rating is cumulative. See note below.

ALTITUDE DE-RATING^①

Air gets thinner at increasing altitudes above sea level. As pressure drops, the rate of heat removal by any form of convection cooling is reduced and it becomes more difficult to cool a motor. POWERTEC and PACTORQ motors are rated in accordance with NEMA Standard MG1-14.04.

The motors are rated for operation at altitudes from sea level up to 3300 feet (1000 meters). Above 3300 feet, the motors torque and power rating must be de-rated to allow for the reduced cooling effect. See the de-rating curve in Figure 1. Find the altitude at which the motor will be used on the horizontal axis and find the corresponding de-rating factor directly above it where the vertical axis intersects the curve.

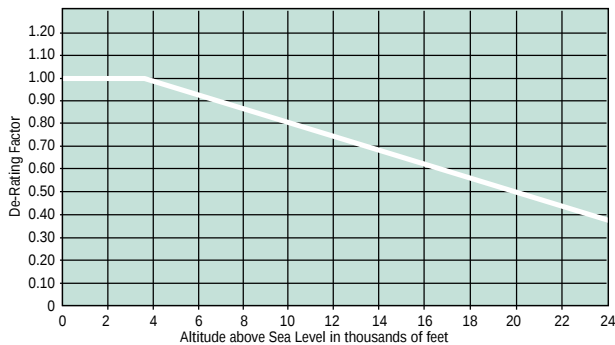


FIGURE 1

For example, the de-rating factor at 7000 feet is about 0.9. A motor rated at 30 HP up to 3300 feet is de-rated to 27 HP at 7000 feet. Below sea level use the standard motor rating. For altitudes above 24,000 feet consult our Application Engineering Group.

① CAUTION! De-rating is cumulative. First de-rate for altitude, then for temperature.

AMBIENT TEMPERATURE DE-RATING^①

The motor must be installed in a clean, dry, and well-ventilated area away from extreme heat sources. The air temperature surrounding the motor should be a maximum of 40°C (104°F). For higher ambient temperatures, the motor must be de-rated.

POWERTEC and PACTORQ motors are rated in accordance with NEMA Standard MG1-12.43. See Figure 2. Find the appropriate ambient temperature for the motor on the horizontal axis and find the corresponding de-rating factor directly above it where the vertical axis intersects the curve.

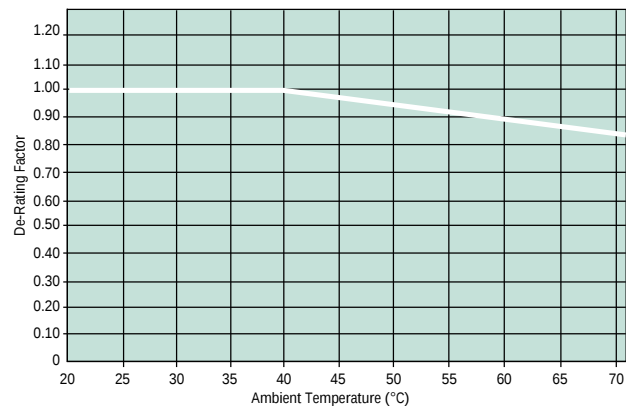


FIGURE 2

For example, the de-rating factor at 58°C ambient is about 0.9. A motor rated at 30 HP up to 40°C ambient is de-rated to 27 HP at 58°C.

If the motor is to be used at 7000 feet and 58°C ambient it will need to be cumulatively de-rated. An altitude de-rating of 0.9 results in a 27 HP rating (see previous example). The cumulative ambient temperature de-rating of 0.9 results in a 24 HP rating.

SEALING - TOTALLY ENCLOSED NON- VENTILATED MOTORS

TENV motors may be specified with IP44 or IP56 IEC ratings. See the individual frame size Model Number Codes for POWERTEC motors beginning on page 6, or PACTORQ motors beginning on page 53.

NEMA MG-1 section 5 and IEC Publication 529 Classification of Degrees of Protection of Enclosures provides a system for rating and specifying motors based on the degree of protection required by the application. IEC, however, does not specify degrees of protection against risk of explosions or moisture conditions (produced by condensation, for example). Consult the factory Application Engineering Group, at (803) 328-1888, if there are any uncertainties about motor sealing.

SPECIFICATION IDENTIFICATION

IP44

Protection against liquid splashed from any direction

Protection against contact with live or moving parts inside the enclosure by tools, wires or such objects of thickness greater than 1 mm. Protection against ingress of small foreign bodies

MOTOR SEALING

- Motors are fully gasketed with solid covers over all openings
- Gaskets between frame and terminal box - and between terminal box and terminal box cover
- Corrosion resistant zinc hardware is used

IP56

Protection against strong jets of water

Complete protection against contact with live or moving parts inside the enclosure. Protection against harmful deposits of dust.

- Sealed per above plus RTV sealant is used on both sides of all gaskets, between the frame to bracket fits, and around the flange of the optional encoder and brake end cover.
- Shaft slinger used on single or special double shaft extensions.
- Motors are intended to run with the drain (weep) holes open. The standard location for weep holes is at the lowest portion of the housing between the frame and end bells at both ends of the motor.

BEARINGS AND SHAFT LOADING

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BEARINGS

Long life electric motor heavy duty ball bearings have honed and polished raceways, are double shielded, and may be relubricated. Cooler rotor and shaft temperatures in the brushless motor (compared to other types of motors) insure longer bearing and grease life. The grease is suitable for operation over a wide temperature range.

Both bearings are in rugged steel inserts (lower thermal expansion than aluminum) that are cast into the aluminum end bells. The outer bearing races will not turn. The drive end is preloaded and the rear end is held by a retainer clamp to minimize axial end play. This permits both horizontal and vertical motor mounting and reliable operation of the optional secondary feedback device (optional encoder).

MAXIMUM SHAFT RADIAL LOADING

- Heavy Duty Ball Bearings
- Standard Shaft Extension
- Radial Load Centered at Tip of Shaft

Model Number Prefix	Shaft Diameter (in.)	Bearing #	20,000 Hour L ₁₀ Life Max. Radial Load (lbs.) ^①	40,000 Hour L ₁₀ Life Max. Radial Load (lbs.) ^①	Min. Sheave Diameter (in.) ^①
F140 (all)	0.875	205	180	144	2.40
F182, F184	1.125	207	280	224	4.60
F213, F215	1.375	209	440	352	4.40
F254, F256	1.625	211	600	480	6.50
F259	2.125	M211	1100	880	6.00
F287	2.125	313	1100	880	6.00
F288, F28A	2.375	313	1350	1080	9.60
F328, F32B, F32D	2.875	315	1800	1440	12.00
F504 ^②	3.250	6222	1600	1280	NA
F506 ^②	3.625	6222	1600	1280	NA
F508 ^②	4.125	6222	1600	1280	NA
E180 (all)	1.375	209	440	352	4.40
E213	1.625	211	600	480	6.50
E215, E218	2.125	M211	1100	880	6.00
E254	2.125	313	1100	880	6.00
E256, E258, E259	2.375	313	1350	1080	9.60
E28A, E28C	3.785	315	1800	1440	12.00
E328 ^②	3.250	6222	1500	1200	21.6
E32B ^②	3.625	6222	1400	1120	30.9
E32D ^②	4.125	6222	1300	1040	41.5

① If the radial load exceeds the Max. Radial Load, or the sheave diameter is too small, roller bearings are required. Contact the factory for assistance.

② Model numbers F504, F506, F508, E328, E32B and E32D with standard ball bearings are recommended for direct-coupled service only. Belt drives with these motors require roller bearings. Contact the factory for assistance.

BEARING RELUBRICATION INTERVALS

POWERTEC and PACTORQ motors are lubricated with Chevron "SRI" grease. The relubrication intervals suggested below are conservative with respect to the Chevron grease and can be exceeded in many applications.

