E320 DIAMETER FRAMES

MODEL NUMBER CODE…E320 FRAME

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

E 32 8 E 1 J 0 N 0 2 1 0 00

Motor Type
E = PM Brushless Motor NdFeB 8-Pole design

Frame Diameter
32 = NEMA 320

Stack Length
8 = 328
B = 3211
D = 3213

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)

Mounting Face & Shaft
0 = NEMA Foot Mount (no flange)
4 = Metric (IEC) FF500 Round Flange w/ Feet

Brake Option △4 △5
B = 100V dc
N = No Brake
S = Special

Bearing △1
0 = Heavy Duty Ball Bearing

Primary Feedback △2
0 = Hall Sensors/Thermal switch
2 = Resolver/NTC Thermistor (standard). For use without brake option
5 = Resolver/NTC Thermistor (standard option). For use with brake or double shaft extension
6 = No Primary

Terminations △3
1 = Terminal box F1 (Standard)
2 = Terminal box F2
3 = MS feedback connector F1 (*)
4 = MS feedback connector F2 (*)
7 = Terminal box top mounted
8 = Terminal box, top mounted with MS feedback connector
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

Factory Assigned
Insert 00 if all parts are standard. Factory-assigned if any parts are custom

Note:

△1 Bearing selection may be application dependent. Refer to page 71 for maximum shaft radial loading. Belted application requires a roller bearing. Consult application engineering with special considerations.

△2 5 = Large-bore resolver when using double shaft extension or brake option.

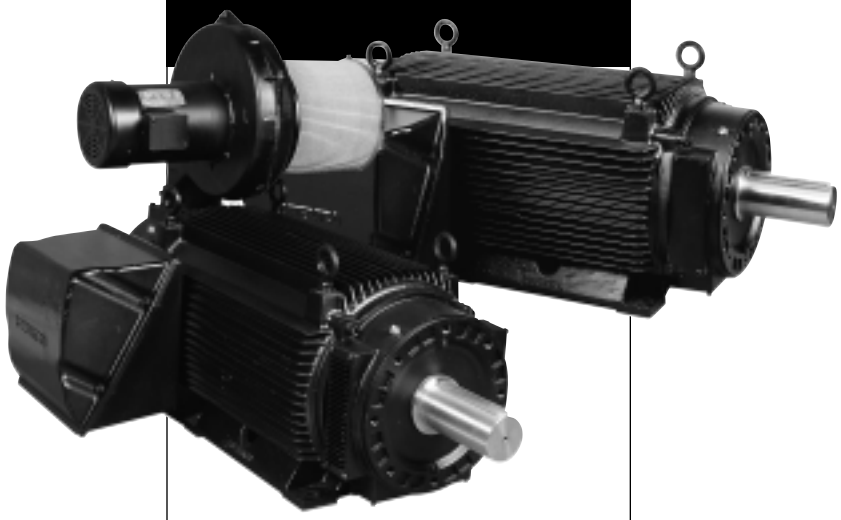
△3 Terminal box, top option not available with DPBV motor enclosures.

△4 Brake option requires "5" resolver. See Primary Feedback.

△5 See page 68 for a detailed list of special options.

(*) 3,4,8: Terminal block mounted in terminal box for motor power and MS connector for feedback.

E320 DIAMETER FRAMES



RATINGS AND CHARACTERISTICS

Motor parameters and winding data

		ENGLISH				METRIC				
Parameters, DPBV & TENV	**Symbol**	**Units**	**E328**	**E32B**	**E32D**	**Symbol**	**Units**	**328**	**E32B**	**E32D**
Continuous stall torque △2 △1	T_{CS}	lb-ft	900 (440)	1089 (530)	1367 (680)	T_{CS}	Nm	1220 (596)	1476 (718)	1852 (921)
Peak Torque (theoretical) △6	T_{PK}	lb-ft	1955	2276	2982	T_{PK}	Nm	2649	3084	4041
Inertia (motor only)	J_M	lb-ft-sec^2	.437	.513	.664	J_M	kgm^2 x 10^{-3}	593	696	900
Static friction (max.)	T_f	lb-ft	3.3	3.4	3.5	T_f	Nm	4,5	4,6	4,7
Viscous Damping coefficient △1	K_{DV}	lb-ft/Krpm	4.73	5.69	7.60	K_{DV}	Nm/Krpm	6,4	7,7	10,3
Thermal resistance △2	R_{TH}	°C/Watt	.012 (.048)	.010 (.042)	.0095 (.038)	R_{TH}	°C/Watt	,012 (,048)	,010 (,042)	,0095 (,038)
Thermal time constant △2	τ_{TH}	min.	46 (180)	45 (190)	52 (200)	τ_{TH}	min.	46 (180)	45 (190)	52 (200)
Weight △2	W	lbs.	842 (785)	993 (936)	1227 (1170)	M (mass)	kg	383 (357)	451 (425)	558 (532)

			E328				E32B				E32D			
Winding data	**Symbol**	**Units**	**E1**	**E2**	**E3**	**E4**	**E1**	**E2**	**E3**	**E4**	**E1**	**E2**	**E3**	**E4**
Torque Constant line-line △1	K_T rms	lb-ft/A Nm/A	6.41 8.69	3.21 4.35	11.10 15.05	5.55 7.53	5.92 8.03	2.96 4.01	10.25 13.90	5.13 6.95	5.92 8.03	2.96 4.01	10.25 13.90	5.13 6.95
Voltage Constant line-line △1	K_E rms	V/Krpm V/rad/sec	526 5.02	263 2.51	911 8.70	456 4.35	486 4.64	243 2.32	842 8.04	421 4.02	485 4.63	243 2.32	840 8.02	420 4.01
Continuous stall current △2 △3 △4	I_{CS}	A	156(76)	315(154)	93.6(44)	182(89)	204(99)	408(199)	117(57)	235(114)	256(127)	522(260)	148(74)	296(147)
Current at peak torque △3 △7	I_{PK}	A	308	617	178	356	385	769	222	444	513	1025	296	592
Hot Resistance line-line △1	R_H	Ohms	0.213	0.054	0.642	0.161	0.147	0.036	0.441	0.110	0.099	0.025	0.296	0.074
Cold Resistance line-line △1	R_C	Ohms	0.147	0.037	0.442	0.111	0.101	0.025	0.304	0.076	0.068	0.017	0.204	0.051
Inductance line-line	L	mH	4.363	1.091	13.09	3.273	3.372	0.843	10.12	2.529	2.518	0.629	7.553	1.888
Electrical time constant △1	τ_e	msec	29.6	29.5	29.5	29.5	33.3	33.3	33.3	33.3	37.4	37.4	37.4	37.4
Mechanical time constant △1	τ_m	msec	1.77	1.77	1.77	1.77	1.64	1.64	1.64	1.64	1.42	1.42	1.42	1.42
Rated base speed △5	ω_r	rpm	850	1750	500	1000	850	1750	500	1000	850	1750	500	1000
Rated current @ rated speed, RMS Amperes	I_R	A	156 (66)	286 (N/A)	92 (43)	178 (71)	195 (81)	357 (N/A)	116 (53)	223 (86)	242 (100)	435 (N/A)	144 (67)	276 (105)
Power @ rated speed △5	P_R	HP, DPBV (TENV)	139 (58)	263 (N/A)	84 (38)	162 (63)	168 (68)	315 (N/A)	101 (45)	195 (74)	209 (84)	384 (N/A)	127 (58)	242 (90)
Power @ rated speed △5	P_R	kW, DPBV (TENV)	103.7 (43.3)	196.2 (N/A)	62.7 (28.3)	120.9 (47.0)	125 (50.7)	235 (N/A)	75.3 (33.6)	195.5 (55.2)	156.0 (62.7)	286.5 (N/A)	94.7 (43.3)	180.5 (67.1)

Note: All values at 40°C unless otherwise noted.

△1 25°C ambient temperature

△2 ( ) denotes TENV when dual ratings are shown. Single ratings apply to both

△3 Based on RMS (sine wave) amps

△4 140°C winding temperature

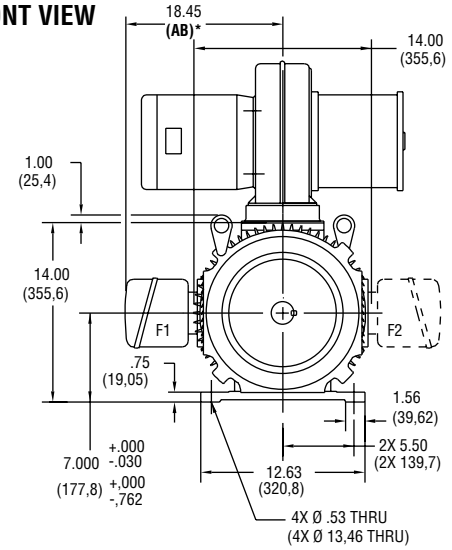
△5 640V dc

△6 Theoretical (cold) ratings at peak current, I_{PK}. For ratings at rated temperature, see Torque-Speed curves, pages 51-53

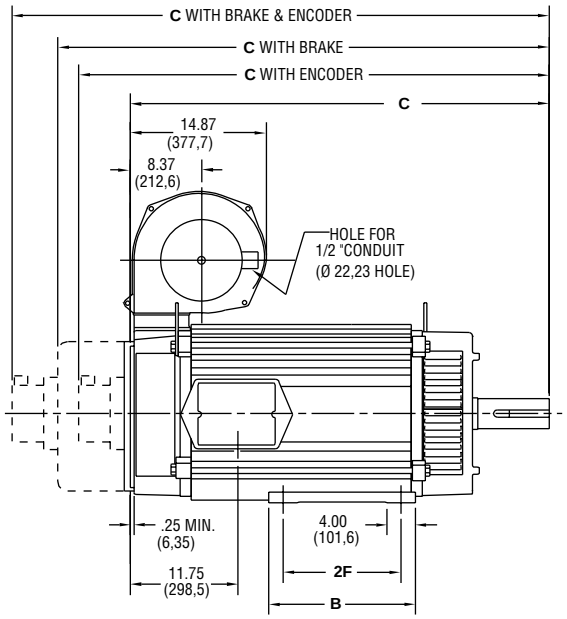
△7 Demagnetization current for 150°C magnet temperature

DIMENSIONS . . . E320 Diameter Frames; DPBV (Dripproof, Blower Ventilated)

FRONT VIEW



SIDE VIEW

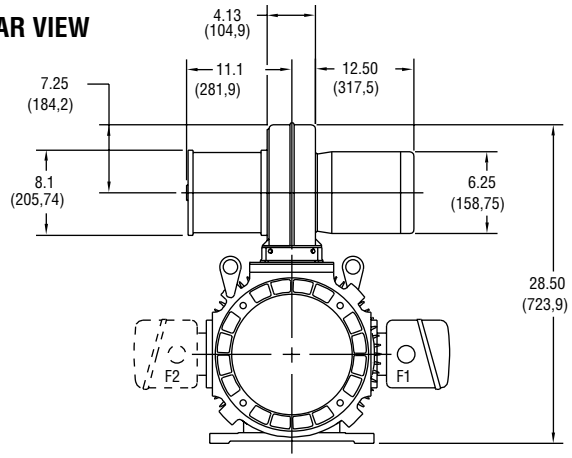


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E328	44.33 (1126)	47.12 (1196,8)	52.09 (1323,1)	54.06 (1373,1)
E32B	51.08 (1297,4)	53.87 (1368,3)	58.54 (1494,5)	60.81 (1544,6)
E32D	57.83 (1468,9)	60.62 (1539,7)	65.59 (1666)	67.56 (1716)

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

REAR VIEW

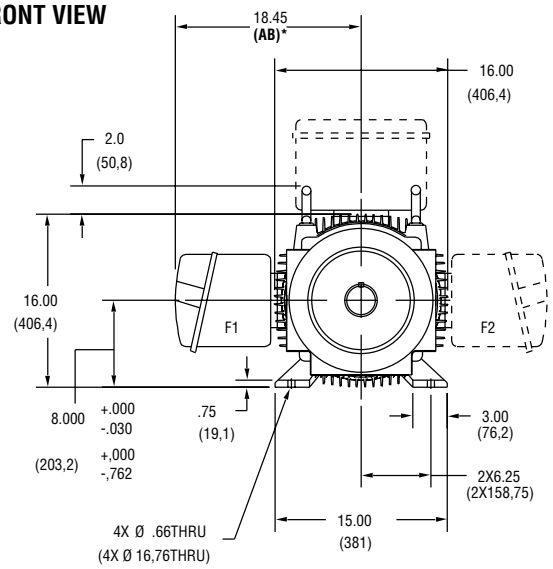


NOTE:
1. Reference pages 56, 57 for conduit box dimensions.
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.
3. Blower can be rotated 180° about its axis. Size #10 blower is used on E320 frames. See page 67.

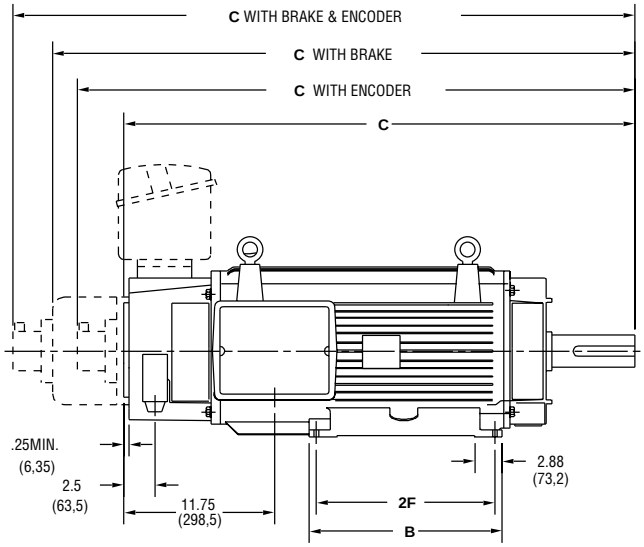
* See terminations, page 56.

DIMENSIONS . . . E320 Diameter Frames; TENV (Totally Enclosed, Non-Ventilated)

FRONT VIEW



SIDE VIEW

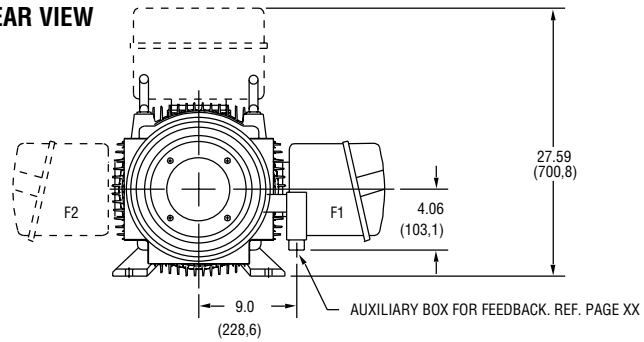


CALLOUT FOR "C" DIMENSION				
MODEL	MOTOR ONLY	WITH ENCODER	WITH BRAKE	WITH BRAKE & ENCODER
E328	44.33 (1126)	47.12 (1196,8)	52.09 (1323,1)	54.06 (1373,1)
E32B	51.08 (1297,4)	53.87 (1368,3)	58.54 (1494,5)	60.81 (1544,6)
E32D	57.83 (1468,9)	60.62 (1539,7)	65.59 (1666)	67.56 (1716)

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

REAR VIEW



NOTE:
1. Reference pages 56, 57 for conduit box dimensions.

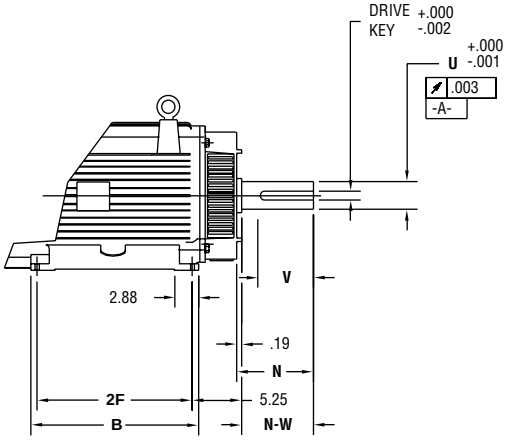
2. Conduit box can be rotated in 90° steps on its own axis and can be mounted on opposite side or top when specified.

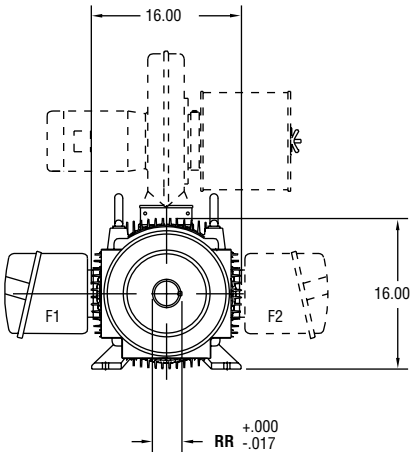
* See terminations, page 56.

DIMENSIONS . . . 320 Diameter Frame Mounting; NEMA and Metric

NEMA FOOT MOUNT

Dimensions in inches





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

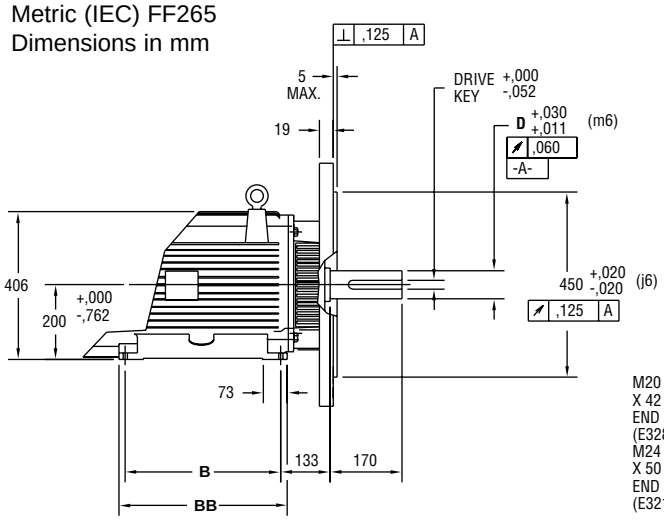
MODEL	2F	B	N	N-W	U	V	RR	Drive Key
E328	16.00	17.88	5.94	5.75	2.875	5.25	3.200	.750
E32B	22.00	23.88	6.69	6.50	3.250	6.00	3.581	.750
E32D	28.00	29.88	7.44	7.25	3.625	6.75	4.009	.875

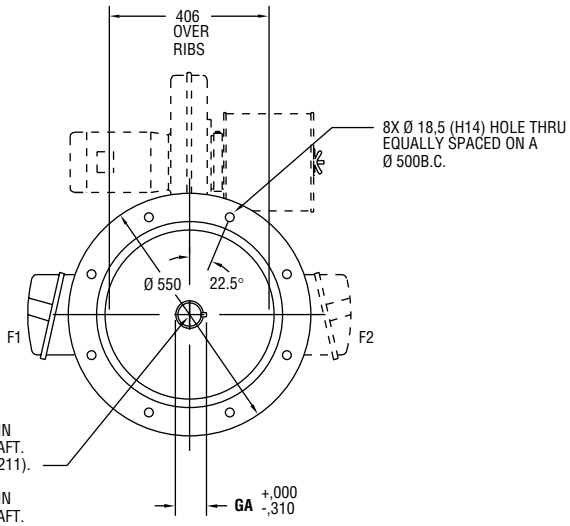
SHAFT DIMENSIONS FOR BELT DUTY						
MODEL	N	N-W	U	V	RR	Drive Key
E328	6.69	6.50	3.250	6.00	3.581	.750
E32B	7.44	7.25	3.625	6.75	4.009	.875
E32D	8.44	8.25	4.125	7.75	4.563	1.000

ALTERNATE MOUNTING

Metric (IEC) FF265

Dimensions in mm





EXCEPT FOR FOOT HEIGHT REFER TO DPBV, PAGE 48, 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

PERFORMANCE CURVES

320 FRAME
E328

Test Conditions
- Motor operated in ambient temperature of 40° C maximum that results in a maximum motor stator winding temperature of 140° C
- 640V dc bus applied
- Sinusoidal drive output

Intermittent duty
Continuous duty

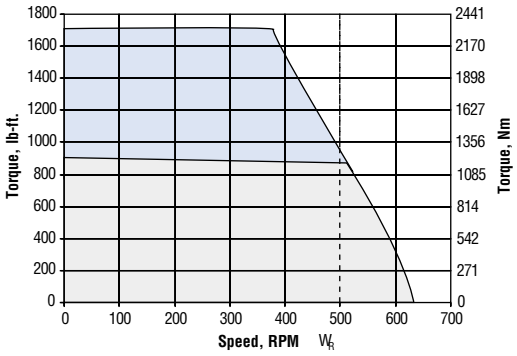
DPBV
DRIPPROOF
BLOWER VENTILATED

E328E3 [1] MOTOR

1Y WINDING CONNECTION

Reference Points	
T_{PK}	1700
T_{CS}	900
T_{CR}	880
W_R	500
I_{CS}	94.0
I_{CR}	92.0

[2]

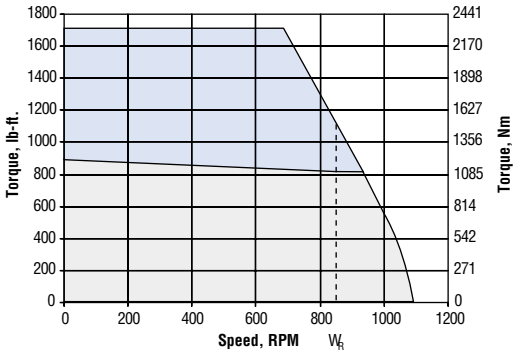


E328E1 [1] MOTOR

1D WINDING CONNECTION

Reference Points	
T_{PK}	1700
T_{CS}	900
T_{CR}	860
W_R	850
I_{CS}	156.0
I_{CR}	156.0

[2]

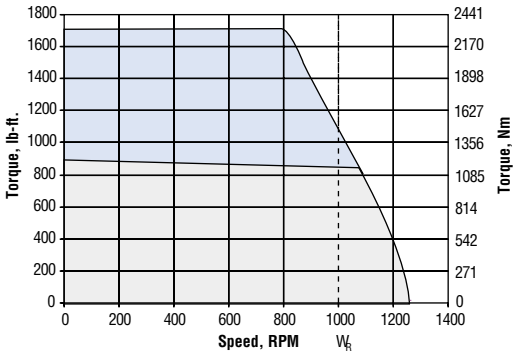


E328E4 [1] MOTOR

2Y WINDING CONNECTION

Reference Points	
T_{PK}	1700
T_{CS}	900
T_{CR}	850
W_R	1000
I_{CS}	182
I_{CR}	178

[2]

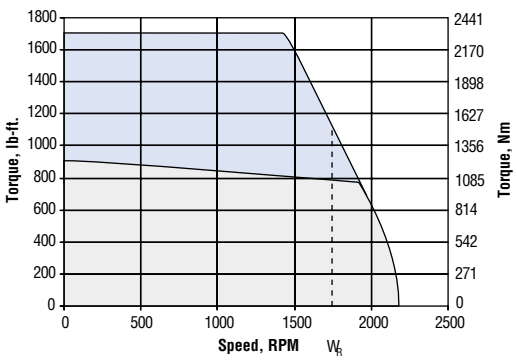


E328E2 [1] MOTOR

2D WINDING CONNECTION

Reference Points	
T_{PK}	1700
T_{CS}	900
T_{CR}	789
W_R	1750
I_{CS}	315
I_{CR}	286

[2]



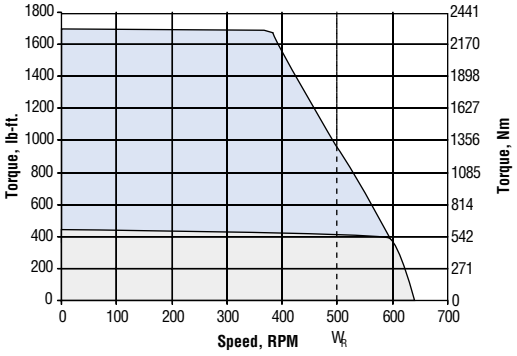
TENV
TOTALLY ENCLOSED
NON-VENTILATED

E328E3 [1] MOTOR

1Y WINDING CONNECTION

Reference Points	
T_{PK}	1700
T_{CS}	440
T_{CR}	400
W_R	500
I_{CS}	44.0
I_{CR}	43.0

[2]

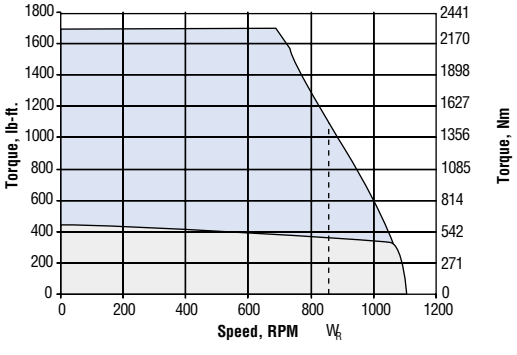


E328E1 [1] MOTOR

1D WINDING CONNECTION

Reference Points	
T_{PK}	1700
T_{CS}	440
T_{CR}	356
W_R	850
I_{CS}	76.0
I_{CR}	66.0

[2]

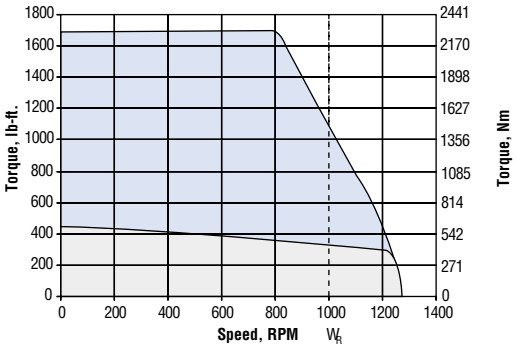


E328E4 [1] MOTOR

2Y WINDING CONNECTION

Reference Points	
T_{PK}	1700
T_{CS}	440
T_{CR}	333
W_R	1,000
I_{CS}	89.0
I_{CR}	71.0

[2]

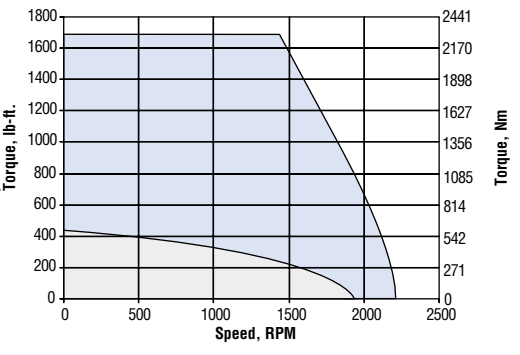


E328E2 [1] MOTOR

2D WINDING CONNECTION

Reference Points	
T_{PK}	1700
T_{CS}	440
T_{CR}	137
W_R	–
I_{CS}	154
I_{CR}	–

[2]



[1] See model number code, page 46.
[2] This is also the demagnetization limit. User should apply appropriate safety margins in its use.

Notes:
1. See Motor Performance Curves, page 76.
2. See Thermal Protection, page 69.
3. See Power Curves, page 54.
4. See Efficiency Curves, page 55.

Test Conditions
- Motor operated in ambient temperature of 40° C maximum that results in a maximum motor stator winding temperature of 140° C
- 640V dc bus applied
- Sinusoidal drive output
- 2Y & 2D windings suitable for use with dual drives

PERFORMANCE CURVES

320 FRAME
E32B

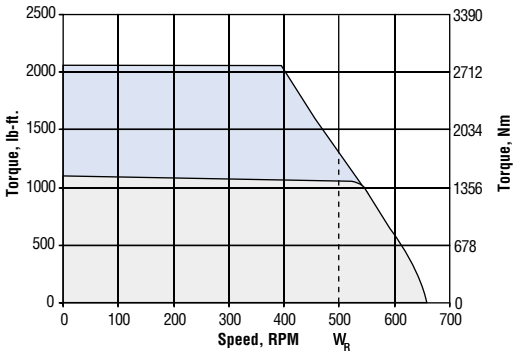
Intermittent duty
Continuous duty

DPBV
DRIPPROOF
BLOWER VENTILATED

E32BE3 [1] MOTOR

1Y WINDING CONNECTION

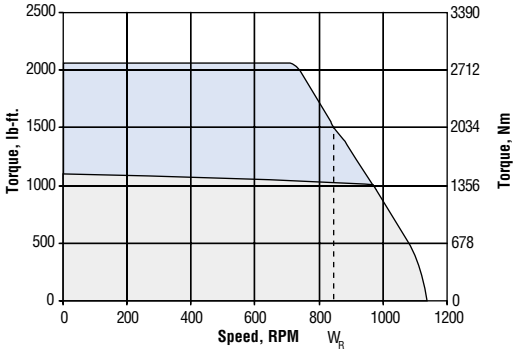
Reference Points	
T_{PK}	2050
T_{CS}	1090
T_{CR}	1063
W_R	500
I_{CS}	117.0
I_{CR}	116.0



E32BE1 [1] MOTOR

1D WINDING CONNECTION

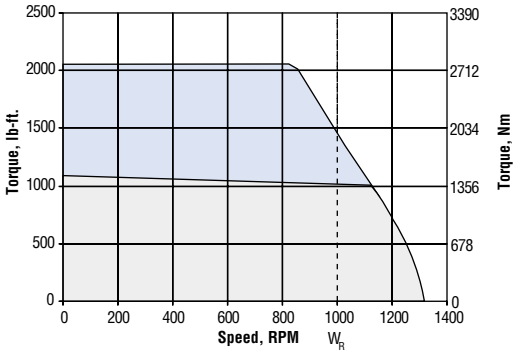
Reference Points	
T_{PK}	2050
T_{CS}	1090
T_{CR}	1036
W_R	850
I_{CS}	204
I_{CR}	195



E32BE4 [1] MOTOR

2Y WINDING CONNECTION

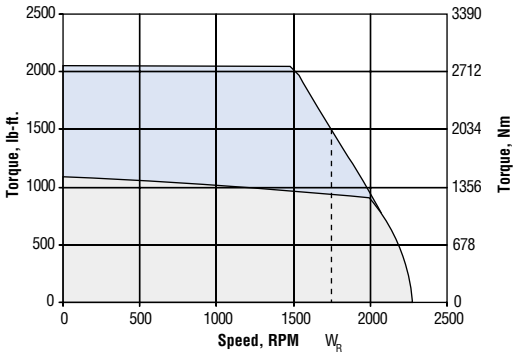
Reference Points	
T_{PK}	2050
T_{CS}	1090
T_{CR}	1023
W_R	1,000
I_{CS}	235.0
I_{CR}	223.0



E32BE2 [1] MOTOR

2D WINDING CONNECTION

Reference Points	
T_{PK}	2050
T_{CS}	1090
T_{CR}	943
W_R	1750
I_{CS}	408
I_{CR}	357

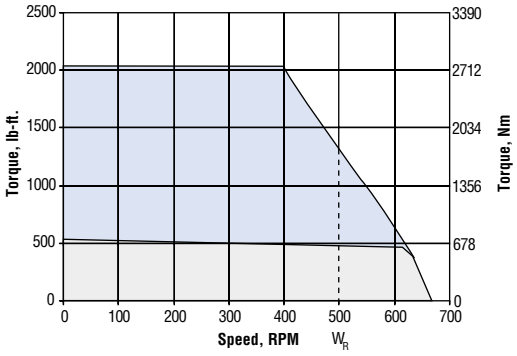


TENV
TOTALLY ENCLOSED
NON-VENTILATED

E32BE3 [1] MOTOR

1Y WINDING CONNECTION

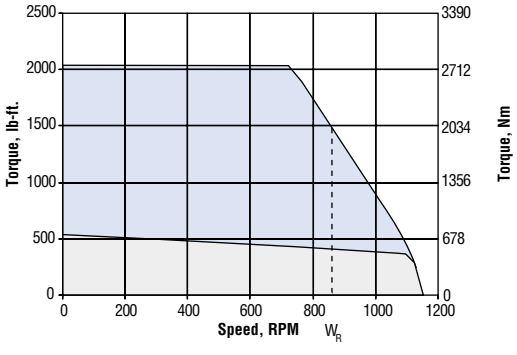
Reference Points	
T_{PK}	2050
T_{CS}	530
T_{CR}	477
W_R	500
I_{CS}	57.0
I_{CR}	53.0



E32BE1 [1] MOTOR

1D WINDING CONNECTION

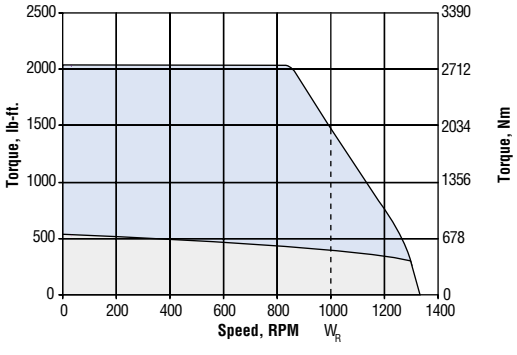
Reference Points	
T_{PK}	2050
T_{CS}	530
T_{CR}	418
W_R	850
I_{CS}	99.0
I_{CR}	81.0



E32BE4 [1] MOTOR

2Y WINDING CONNECTION

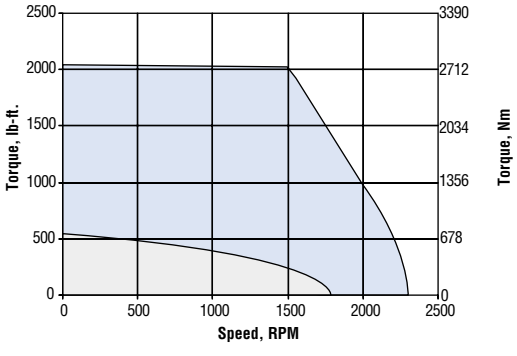
Reference Points	
T_{PK}	2050
T_{CS}	530
T_{CR}	387
W_R	1000
I_{CS}	114
I_{CR}	86.0



E32BE2 [1] MOTOR

2D WINDING CONNECTION

Reference Points	
T_{PK}	2050
T_{CS}	530
T_{CR}	79
W_R	–
I_{CS}	199
I_{CR}	–



[1] See model number code, page 46.
[2] This is also the demagnetization limit. User should apply appropriate safety margins in its use.

Notes:
1. See Motor Performance Curves, page 76.
2. See Thermal Protection, page 69.
3. See Power Curves, page 54.
4. See Efficiency Curves, page 55.

Test Conditions
- Motor operated in ambient temperature of 40° C maximum that results in a maximum motor stator winding temperature of 140° C
- 640V dc bus applied
- Sinusoidal drive output
- 2Y & 2D windings suitable for use with dual drives

PERFORMANCE CURVES

320 FRAME
E32D

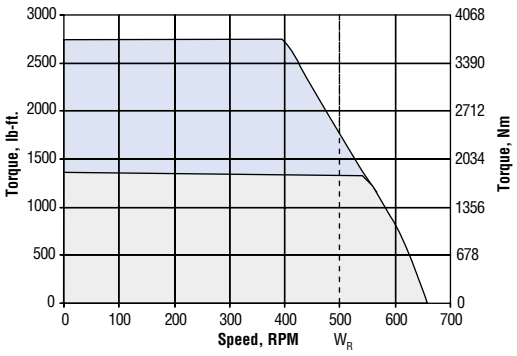
Intermittent duty
Continuous duty

DPBV
DRIPPROOF
BLOWER VENTILATED

E32DE3 [1] MOTOR

1Y WINDING CONNECTION

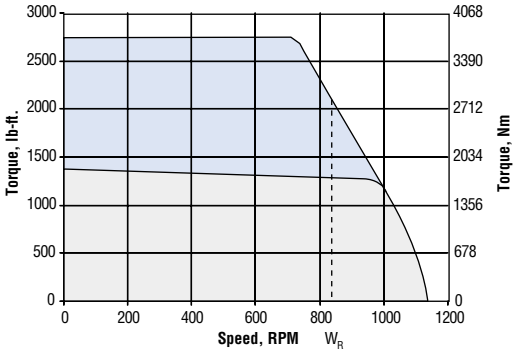
Reference Points	
T_{PK}	2730
T_{CS}	1368
T_{CR}	1329
W_R	500
I_{CS}	148.0
I_{CR}	144.0



E32DE1 [1] MOTOR

1D WINDING CONNECTION

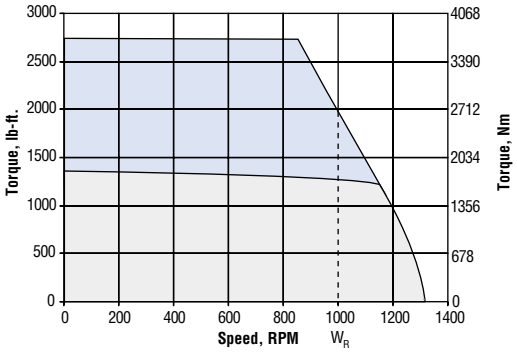
Reference Points	
T_{PK}	2730
T_{CS}	1368
T_{CR}	1290
W_R	850
I_{CS}	256.0
I_{CR}	243.0



E32DE4 [1] MOTOR

2Y WINDING CONNECTION

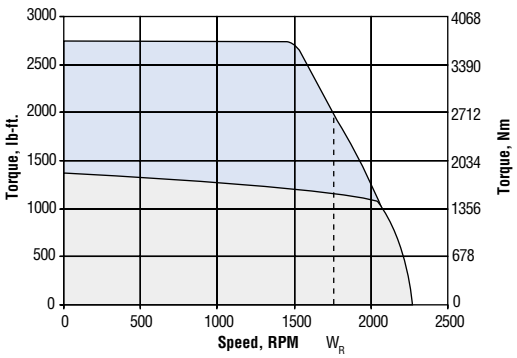
Reference Points	
T_{PK}	2730
T_{CS}	1368
T_{CR}	1240
W_R	1000
I_{CS}	296.0
I_{CR}	276.0



E32DE2 [1] MOTOR

2D WINDING CONNECTION

Reference Points	
T_{PK}	2730
T_{CS}	1368
T_{CR}	1152
W_R	1750
I_{CS}	522
I_{CR}	435

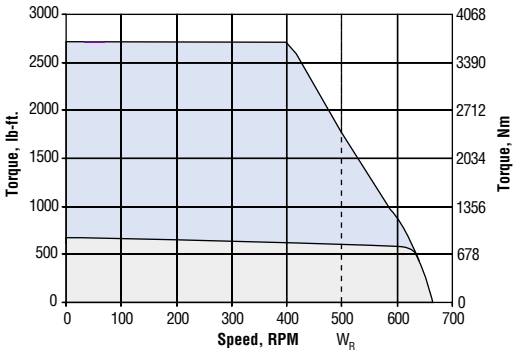


TENV
TOTALLY ENCLOSED
NON-VENTILATED

E32DE3 [1] MOTOR

1Y WINDING CONNECTION

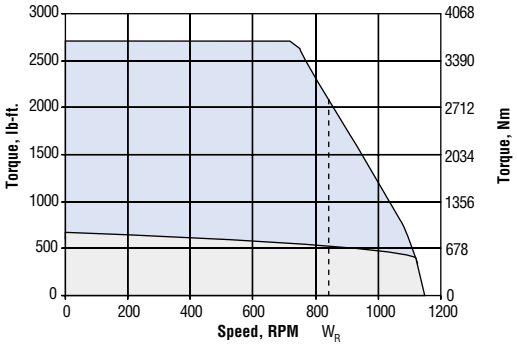
Reference Points	
T_{PK}	2730
T_{CS}	680
T_{CR}	605
W_R	500
I_{CS}	74.0
I_{CR}	67.0



E32DE1 [1] MOTOR

1D WINDING CONNECTION

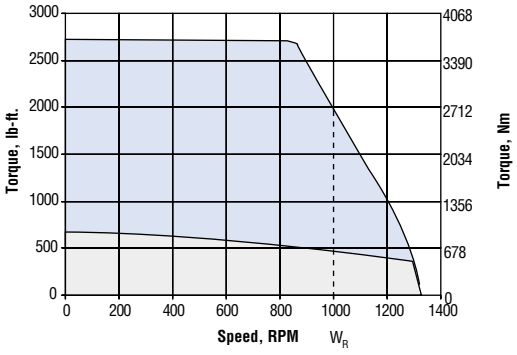
Reference Points	
T_{PK}	2730
T_{CS}	680
T_{CR}	520
W_R	850
I_{CS}	127.0
I_{CR}	100.0



E32DE4 [1] MOTOR

2Y WINDING CONNECTION

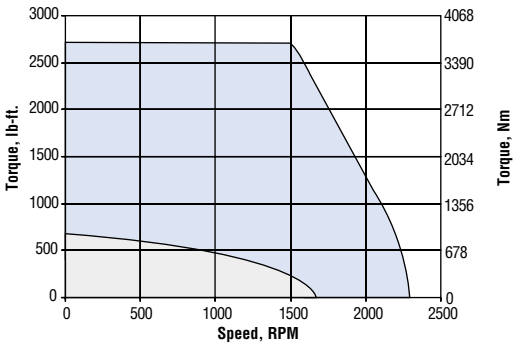
Reference Points	
T_{PK}	2730
T_{CS}	680
T_{CR}	473
W_R	1000
I_{CS}	147
I_{CR}	106



E32DE2 [1] MOTOR

2D WINDING CONNECTION

Reference Points	
T_{PK}	2730
T_{CS}	680
T_{CR}	–
W_R	–
I_{CS}	260
I_{CR}	–



[1] See model number code, page 46.
[2] This is also the demagnetization limit. User should apply appropriate safety margins in its use.

Notes:
1. See Motor Performance Curves, page 76.
2. See Thermal Protection, page 69.
3. See Power Curves, page 54.
4. See Efficiency Curves, page 55.

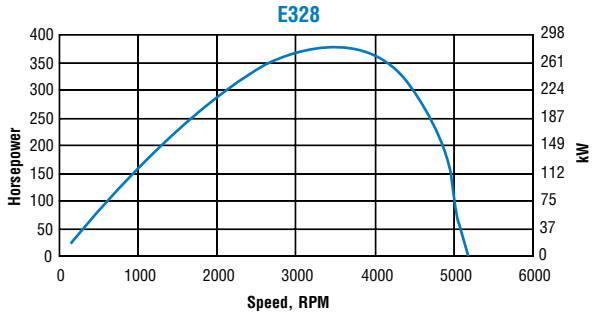
CONTINUOUS POWER CURVES

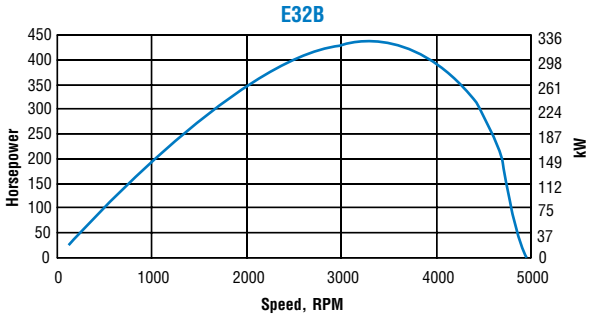
E320 DIAMETER FRAMES

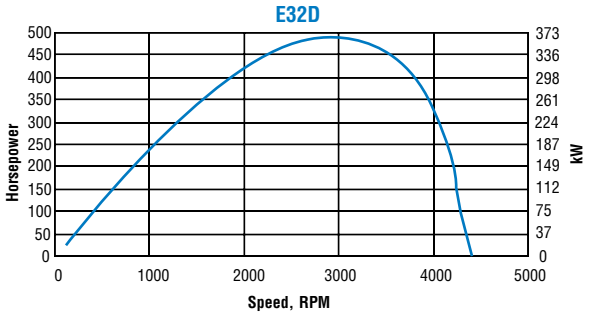
Standard E320 frame motors are limited (mechanical design) to 3000 RPM. Special designs are available that allow operation to speeds indicated in the individual curves.

One power curve is shown for each stack length in both the DPBV and TENV enclosures. Four different winding connections are offered for each stack length, but the power curve is the same for all connections. Therefore, only one power curve is necessary for each stack length and enclosure.

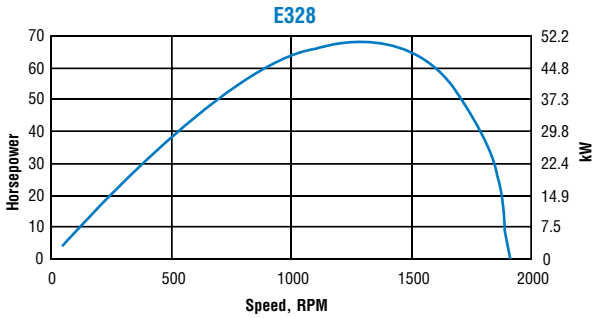
DPBV
DRIPPROOF
BLOWER VENTILATED

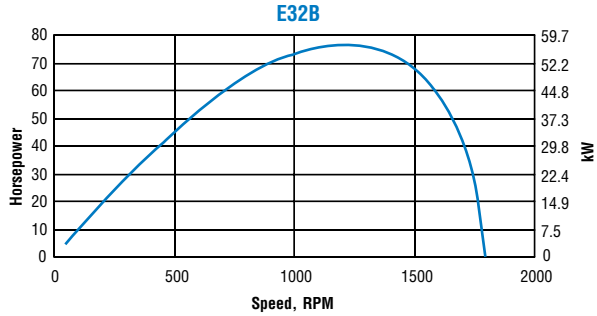


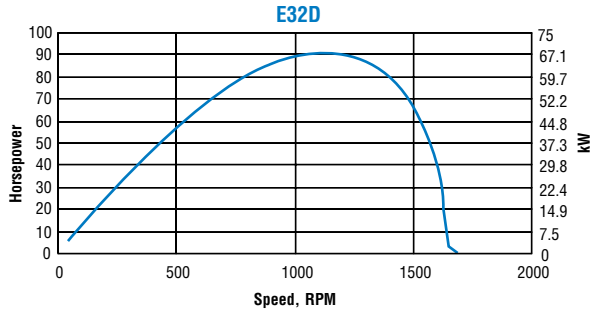




TENV
TOTALLY ENCLOSED
NON-VENTILATED







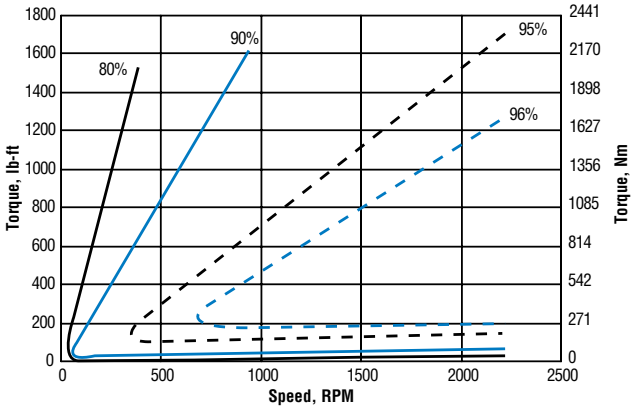
Note: see Motor Performance Curves, page 76.

EFFICIENCY CURVES

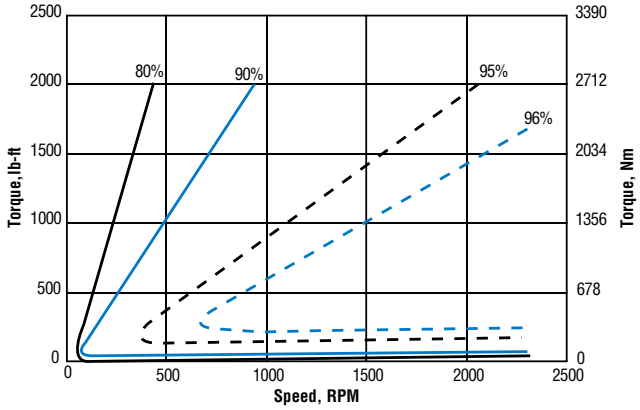
E320 DIAMETER FRAMES

One efficiency curve is shown for each stack length. Efficiencies for the DPBV and TENV enclosures are approximately the same, so a single curve represents both. In addition, although four different winding connections are offered for each stack length, the efficiency is the same for all connections.

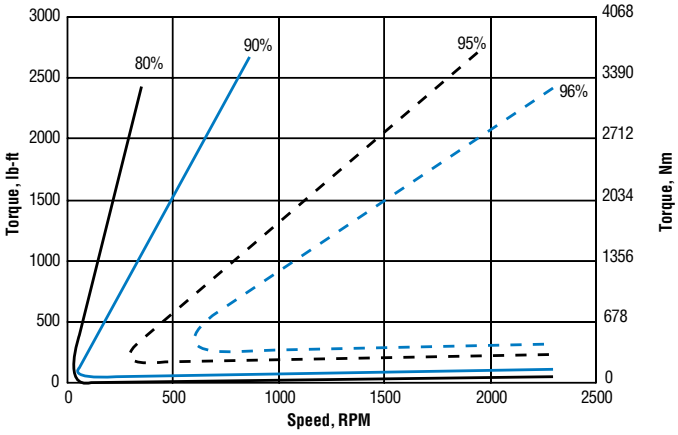
E328



E32B



E32D



Note: see Motor Performance Curves, page 76.