

ARMSTRONG



High Efficiency Motors

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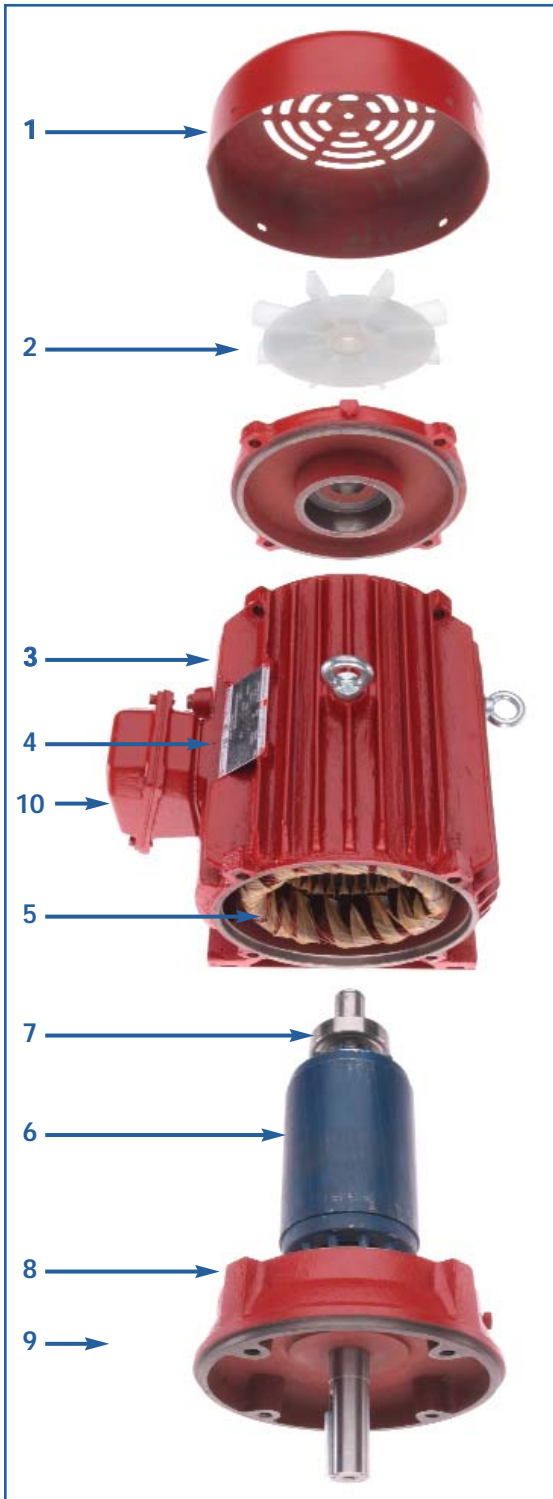
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Armstrong HE Series High-Efficiency Motors

Armstrong HE Series motors are general purpose polyphase squirrel cage induction motors meeting all required NEMA and IEEE standards. In addition to numerous in-factory sampling motor tests to verify and improve designs, motors were tested at Hydro-Quebec's independent motor testing laboratory in Canada. Armstrong HE Series TEFC motors from 1 hp to 100 hp currently meet or exceed the efficiency requirements of the US Energy Policy Act of 1992 (EPA) and Natural Resource Canada Standards (NRCan).



All Armstrong motors have TEFC enclosures, with IP54 protection and Class F insulation system, and meet class B temperature rise at full load. Armstrong motors have high starting and breakdown torque. The highest quality bearings are selected and each tested prior to installation in our motors. The very low noise and vibration levels make these motors suitable for various operations at high load rates and continuous running at 104°F (40°C) and lower ambient temperatures.

For assurance of low motor vibration and noise levels, dynamic balancing on every rotor and alignment checks are performed on the production line. Only high strength, non-metallic, non-sparking external fans are used on HE Series motors to enhance the ventilation, provide additional safety, and reduce noise levels.

For assurance of low motor vibration and noise levels, dynamic balancing on every rotor and alignment checks are performed on the production line. Only high strength, non-metallic, non-sparking external fans are used on HE Series motors to enhance the ventilation, provide additional safety, and reduce noise levels.

- Cast iron TEFC Three phase general purpose
- Class F insulation, class B temperature rise
- 1.15 Service factor
- 208 V, 230 V, 460 V, 575 V at 60 Hz
- Wye-Delta starting standard on frames 213TC and larger
- Rigid base F1 mounting
- C-face
- CSA and ISO 9001 certified

Features include:

1. Steel fan cover for optimum strength.
2. Small size, high strength non-sparking fan reduces noise and enhances efficiency. Fan is keyed to shaft.
3. Heavy-duty cast iron frame, end plates and conduit box.
4. Alloy aluminum nameplate with standard information on motor efficiency, wiring diagram, bearing size etc. See last page for details.
5. Copper magnet wire, high grade electromagnetic steel stator, lower resistance and FR losses, high efficiency design for 1.15 service factor, Class F insulation.
6. Cast aluminum rotor dynamically balanced, for reduced vibration and noise. Surface painted with a semigloss polyester finish.
7. Ball bearings meet all standards. 143TC-256TC frame motors use permanently lubricated ball bearings while 284TC frame and larger motors are regreasable.
8. Lubrication fittings on each end of motor (284TC frame and larger), Lithium base grease is used with range of -22°F to 230°F (-30°C to 110°C) ambient temperature.
9. One-way, corrosion resistant condensate drains to release condensation and moisture from the housing.
10. Oversized cast iron conduit box, double gaskets, can be rotated in 90° increments. NPT threaded entrance. Leads are extra long and permanently marked. Motors 213TC and larger are suitable for wye-delta starting as standard.

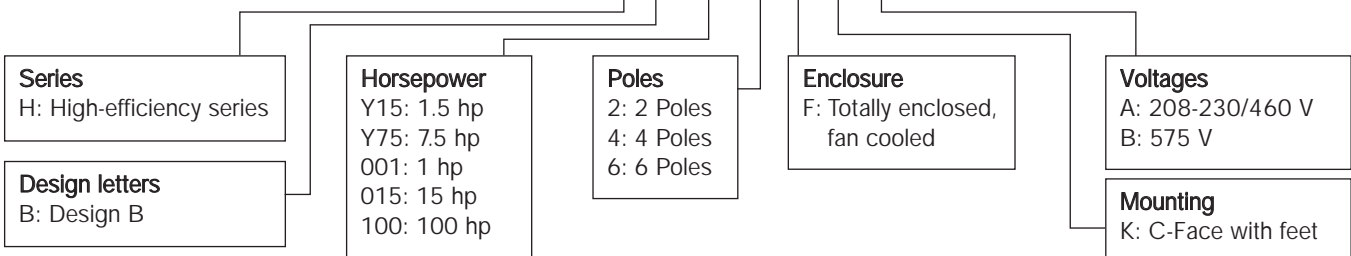
► Performance Data

Three Phase, 60 Hz, 208-230/460 V, 575 V, NEMA Design B, High Efficiency, Squirrel Cage, TEFC, Class F Insulation, 40°C Ambient, Continuous Duty, 1.15 Service Factor

hp	Frame	Full Load rpm	Catalog No.	Volt Code	Torque			Current Amps at 460 V		Efficiency %			Power Factor % Full Load	NEMA Code Letter	Approx. Net Weight lbs. (kg)
					Full Load ft.-lb.	Locked Rotor %	Break Down %	Full Load	Locked Rotor	100% Load	75% Load	50% Load			
1	143TC	3480	HB0012FKA	A,B	1.5	300	350	1.4	13.9	80.0	81.2	73.0	80.0	M	44 (20.0)
	143TC	1725	HB0014FKA	A,B	3.0	300	350	1.6	13.8	83.8	81.6	76.6	69.8	M	46 (20.9)
	145TC	1140	HB0016FKA	A,B	4.6	220	270	1.8	11.2	83.0	80.9	75.0	62.6	K	58 (26.3)
1.5	143TC	3480	HB0152FKA	A,B	2.3	300	310	2.1	19.5	84.2	82.2	78.6	79.4	M	47 (21.3)
	145TC	1725	HB0154FKA	A,B	4.5	280	290	2.2	18.5	84.5	83.6	80.4	75.5	L	56 (25.4)
	182TC	1160	HB0156FKA	A,B	6.8	210	280	2.4	16.5	86.0	85.1	79.3	68.0	K	85 (38.5)
2	145TC	3480	HB0022FKA	A,B	3.0	290	330	2.6	22.0	85.6	84.3	83.3	84.0	K	56 (25.4)
	145TC	1725	HB0024FKA	A,B	6.1	290	300	3.1	24.5	84.6	83.5	82.1	71.4	L	57 (25.9)
	184TC	1160	HB0026FKA	A,B	9.1	210	270	3.1	22.0	86.9	86.3	84.3	69.5	K	103 (46.7)
3	182TC	3500	HB0032FKA	A,B	4.5	230	300	3.6	31.0	85.9	87.5	84.3	90.8	K	87 (39.5)
	182TC	1740	HB0034FKA	A,B	9.1	240	300	4.0	31.0	87.7	88.2	84.3	80.0	K	90 (40.8)
	213TC	1170	HB0036FKA	A,B	13.5	230	330	4.6	31.0	87.9	87.1	85.3	69.4	K	154 (69.8)
5	184TC	3500	HB0052FKA	A,B	7.5	235	290	5.9	45.0	88.8	88.2	88.0	89.3	J	108 (49.0)
	184TC	1740	HB0054FKA	A,B	15.1	220	290	6.2	45.0	88.2	88.6	86.3	85.6	J	110 (49.9)
	215TC	1170	HB0056FKA	A,B	22.5	200	280	7.2	45.0	88.5	87.9	86.6	73.4	J	172 (78.0)
7.5	213TC	3500	HB0752FKA	A,B	11.3	190	280	8.8	62.0	88.5	89.5	88.7	90.1	H	147 (66.7)
	213TC	1750	HB0754FKA	A,B	22.5	190	250	10.0	63.0	89.5	90.3	89.8	78.4	H	157 (71.2)
	254TC	1170	HB0756FKA	A,B	33.7	180	230	10.3	62.0	89.7	89.8	88.7	76.0	H	230 (104.3)
10	215TC	3500	HB0102FKA	A,B	15.0	190	290	11.5	80.0	90.8	90.8	87.4	89.6	H	163 (73.9)
	215TC	1750	HB0104FKA	A,B	30.0	180	250	13.2	80.0	89.5	91.0	88.2	79.2	H	176 (79.8)
	256TC	1170	HB0106FKA	A,B	44.9	190	250	13.5	80.0	89.8	90.0	89.2	77.2	H	268 (121.5)
15	254TC	3525	HB0152FKA	A,B	22.4	190	280	17.1	113.0	90.5	91.3	90.8	90.7	G	253 (114.7)
	254TC	1750	HB0154FKA	A,B	45.0	200	270	17.7	113.0	91.0	91.1	90.4	87.2	G	252 (114.3)
	284TC	1170	HB0156FKA	A,B	67.4	190	270	18.5	113.0	91.0	91.2	91.1	83.4	G	413 (187.3)
20	256TC	3525	HB0202FKA	A,B	29.8	180	280	22.6	144.0	91.0	90.9	89.0	91.0	G	288 (130.6)
	256TC	1750	HB0204FKA	A,B	60.0	190	250	23.0	138.0	91.0	91.5	91.1	89.4	F	305 (138.3)
	286TC	1170	HB0206FKA	A,B	89.8	180	250	24.0	138.0	91.0	91.5	91.5	85.7	F	439 (199.1)
25	284TSC	3550	HB0252FKA	A,B	37.0	175	250	27.5	182.0	92.0	91.2	90.1	92.5	G	424 (192.3)
	284TC	1780	HB0254FKA	A,B	73.8	200	260	28.0	182.0	92.6	93.2	90.5	90.2	G	463 (210.0)
	324TC	1180	HB0256FKA	A,B	111.3	185	260	29.9	182.0	92.2	92.1	91.5	84.9	G	555 (251.7)
30	286TSC	3550	HB0302FKA	A,B	44.4	170	280	33.0	215.0	92.2	91.2	89.0	92.3	G	438 (198.6)
	286TC	1780	HB0304FKA	A,B	88.6	190	250	33.5	215.0	92.6	93.2	91.3	90.5	G	476 (215.9)
	326TC	1180	HB0306FKA	A,B	133.6	190	260	35.5	215.0	92.1	91.8	91.4	85.9	G	590 (267.6)
40	324TSC	3550	HB0402FKA	A,B	59.2	170	240	44.1	286.0	92.0	92.1	87.7	92.3	G	560 (254.0)
	324TC	1780	HB0404FKA	A,B	118.1	170	260	45.3	286.0	93.2	93.0	92.7	88.7	G	570 (258.5)
	364TC	1180	HB0406FKA	A,B	178.1	190	250	47.5	286.0	93.0	93.0	91.2	84.7	G	754 (342.0)
50	326TSC	3550	HB0502FKA	A,B	74.0	180	250	55.0	358.0	92.6	92.4	89.2	91.9	G	590 (267.6)
	326TC	1780	HB0504FKA	A,B	147.6	185	240	56.3	358.0	93.2	93.0	92.5	88.9	G	620 (281.2)
	365TC	1180	HB0506FKA	A,B	222.6	180	230	58.0	358.0	93.0	93.1	92.4	86.7	G	809 (366.9)
60	364TSC	3550	HB0602FKA	A,B	88.8	175	215	67.0	430.0	93.0	93.2	93.2	90.1	G	724 (328.3)
	364TC	1780	HB0604FKA	A,B	177.1	180	230	68.0	430.0	93.6	93.8	91.6	88.2	G	734 (332.9)
	404TC	1180	HB0606FKA	A,B	267.2	170	210	68.0	430.0	93.8	94.1	94.1	88.0	G	1024 (464.4)
75	365TSC	3550	HB0752FKA	A,B	111.0	170	230	83.0	536.0	93.0	93.3	92.5	90.9	G	782 (354.6)
	365TC	1780	HB0754FKA	A,B	221.4	185	250	84.0	536.0	94.1	94.2	93.8	88.8	G	805 (365.1)
	405TC	1180	HB0756FKA	A,B	334.0	165	230	84.0	518.0	93.8	94.3	94.4	89.1	F	1108 (502.5)
100	405TSC	3570	HB1002FKA	A,B	147.2	150	210	110.0	715.0	93.7	93.8	91.0	90.8	G	943 (427.7)
	405TC	1780	HB1004FKA	A,B	295.2	160	220	113.5	690.0	94.5	94.6	93.5	87.2	F	1097 (497.5)

► Armstrong Catalog Number Codes

Example: H B 015 4 F K A



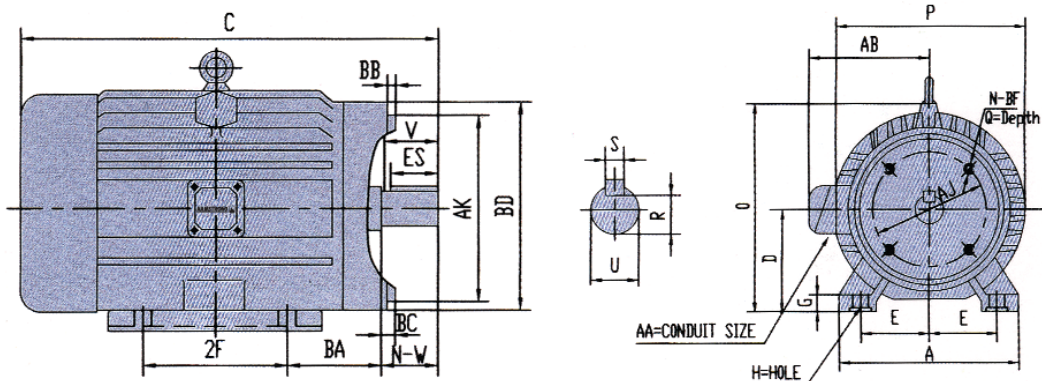
► Motor Dimensions

NEMA Frame	A	C	D	E	2F	G	H	AA	AB
143TC	6.90 (175)	13.20 (335)	3.50 (89)	2.75 (70)	4.00 (102)	0.59 (15)	0.34 (9)	0.75 (19)	6.20 (157)
145TC		14.40 (366)			5.00 (127)				
182TC	8.90 (226)	16.40 (417)	4.50 (114)	3.75 (95)	4.50 (114)	0.63 (16)	0.41 (10)	0.75 (19)	7.20 (183)
184TC		17.60 (447)			5.50 (140)				
213TC	10.40 (264)	18.50 (470)	5.25 (133)	4.25 (108)	5.50 (140)	0.71 (18)	0.41 (10)	1.25 (32)	8.80 (224)
215TC		20.00 (508)			7.00 (178)				
254TC	12.10 (307)	22.50 (572)	6.25 (159)	5.00 (127)	8.25 (210)	0.79 (20)	0.53 (13)	1.25 (32)	9.80 (249)
256TC		24.30 (617)			10.00 (254)				
284TC	14.00 (356)	28.80 (732)	7.00 (178)	5.50 (140)	9.50 (241)	0.86 (22)	0.53 (13)	1.50 (38)	11.10 (282)
286TC		28.80 (732)			11.00 (279)				
284TSC		27.40 (696)			9.50 (241)				
286TSC		27.40 (696)			11.00 (279)				
324TC	15.40 (391)	29.90 (759)	8.00 (203)	6.25 (159)	10.50 (267)	1.00 (25)	0.66 (17)	2.00 (51)	14.00 (356)
326TC		31.10 (790)			12.00 (305)				
324TSC		28.40 (721)			10.50 (267)				
326TSC		29.60 (752)			12.00 (305)				
364TC	17.10 (434)	32.20 (818)	9.00 (229)	7.00 (178)	11.25 (286)	1.10 (28)	0.66 (17)	3.00 (76)	14.80 (376)
365TC		33.60 (853)			12.25 (311)				
364TSC		30.10 (765)			11.25 (286)				
365TSC		31.50 (800)			12.25 (311)				
404TC	19.40 (493)	37.20 (945)	10.00 (254)	8.00 (203)	12.25 (311)	1.18 (30)	0.81 (21)	3.00 (76)	16.50 (419)
405TC		39.80 (1011)			13.75 (349)				
405TSC		36.20 (919)			13.75 (349)				

► C-Face Dimensions

NEMA Frame	AJ	AK	BB Min.	BC	BD Max.	O	P	BA	N	BF	Q	Shaft Dimension			Keyseat		
												N-W	U	V	R	ES	S
143TC	5.88	4.50	0.16	0.12	6.50	7.10	7.10	2.75	4	3/8-16	0.56	2.25	0.875	2.00	0.77	1.41	0.19
145TC	(149)	(114)	(4)	(3)	(165)	(180)	(180)	(70)			(14)	(57)	(22)	(51)	(20)	(36)	(5)
182TC	7.25	8.50	0.25	0.12	8.90	9.10	9.00	3.50	4	1/2-13	0.75	2.75	1.125	2.50	0.99	1.78	0.25
184TC	(184)	(216)	(6)	(3)	(226)	(231)	(229)	(89)			(19)	(70)	(29)	(64)	(25)	(45)	(6)
213TC	7.25	8.50	0.25	0.25	9.00	10.90	10.80	4.25	4	1/2-13	0.75	3.38	1.375	3.12	1.20	2.41	0.31
215TC	(184)	(216)	(6)	(6)	(229)	(277)	(274)	(108)			(19)	(86)	(35)	(79)	(31)	(61)	(8)
254TC	7.25	8.50	0.25	0.25	9.30	13.20	12.90	4.75	4	1/2-13	0.75	4.00	1.625	3.75	1.42	2.91	0.38
256TC	(184)	(216)	(6)	(6)	(236)	(335)	(328)	(121)			(19)	(102)	(41)	(95)	(36)	(74)	(10)
284TC	9.00	10.50	0.25	0.25	11.25	14.60	14.90	4.75	4	1/2-13	0.75	4.62	1.875	4.38	1.59	3.28	0.50
286TC												(117)	(48)	(111)	(40)	(83)	(13)
284TSC												3.25	1.625	3.00	1.42	1.91	0.38
286TSC												(83)	(41)	(76)	(36)	(49)	(10)
324TC	11.00	12.50	0.25	0.25	13.30	16.00	15.80	5.25	4	5/8-11	0.94	5.25	2.125	5.00	1.85	3.91	0.50
326TC												(133)	(54)	(127)	(47)	(99)	(13)
324TSC												3.75	1.875	3.50	1.59	2.03	0.50
326TSC												(95)	(48)	(89)	(40)	(52)	(13)
364TC	11.00	12.50	0.25	0.25	13.30	18.20	17.60	5.88	8	5/8-11	0.94	5.88	2.375	5.62	2.02	4.28	0.63
365TC												(149)	(60)	(143)	(51)	(109)	(16)
364TSC												3.75	1.875	3.50	1.59	2.03	0.50
365TSC												(95)	(48)	(89)	(40)	(52)	(13)
404TC	11.00	12.50	0.25	0.25	13.40	19.90	19.20	6.62	8	5/8-11	0.94	7.25	2.875	7.00	2.45	5.65	0.75
405TC												(184)	(73)	(178)	(62)	(144)	(19)
405TSC												4.25	2.125	4.00	1.85	2.78	0.50
	(279)	(318)	(6)	(6)	(340)	(505)	(488)	(168)			(24)	(108)	(54)	(102)	(47)	(71)	(13)

Note: All dimensions are in inches (mm)



► Bearing Systems and Lubrication

Frame Sizes 143TC-256TC are supplied with oversized double shielded permanently lubricated ball bearings (No re-lubrication necessary). Frame Sizes 284TC and larger have oversized open type ball bearings with grease fittings for re-lubrication. Please note that Armstrong uses Lithium-based grease as standard.

Frame Size	Bearing Size		Bearing Type	Regreaseable
	D.E.	O.D.E.		
143TC-145TC	6205	6205	Double Shielded	No
182TC-184TC	6306	6306	Double Shielded	No
213TC-215TC	6308	6308	Double Shielded	No
254TC-256TC	6309	6309	Double Shielded	No
284TC-286TC	6311	6311	Open	Yes
324TC-326TC	6312	6312	Open	Yes
364TC-365TC	6313	6313	Open	Yes
405TSC	6314	6314	Open	Yes
404TC-405TC	6316	6314	Open	Yes

► Lubrication Schedule (284TC and larger)

Frame Size	Speed (rpm)	Type of Service		Volume (oz.)
		Standard	Severe	
284TSC-365TSC	3600	6 Months	2 Months	1.0
284TC-365TC	1800-1200	12 Months	4 Months	1.0
405TSC	3600	6 Months	2 Months	1.0
404TC-405TC	1800-1200	12 Months	4 Months	1.5

Standard Service

Motors run not more than 8 hours per day in an environment with low ambient temperature and low vibration

Severe Service

Motors run 24 hours per day and/or in a dusty, dirty environment with high ambient temperature and excessive vibration

► Recommended Greases

Mobil-Mobilux # 2, Exxon-Beacon325,
Chevron SRI # 2, Dow Corning-8R2-PLUS
and Shell-Alvania # 2

Do Not Over Grease!

Excessive lubrication can cause
premature motor failure

► Installation Connections

• Connections

Please see the diagrams below for detailed information on the various connections. All Armstrong motors have corresponding wiring diagrams on the nameplates.

• Voltage & Power Supply

Armstrong motors are three phase, AC, 60 Hz. Motors 143TC-405TC are 208-230/460 Volt. 575 Volt motors are also available in all horsepower ranges (1-100 hp).

• Belt Drives

Insure all pulley alignments are correct prior to operation. Use care to obtain proper belt tension, 1/2" of belt deflection is normal when thumb pressure is applied at the midway point of the belt & pulley.

► Connection Diagrams

Figure 1		Figure 2				Figure 3	Figure 4	
143TC - 184TC		213TC - 405TC				143TC - 184TC	213TC - 405TC	
DOUBLE VOLTAGE		DOUBLE VOLTAGE				SINGLE VOLTAGE	SINGLE VOLTAGE	
208 V - 230 V	460 V	208 V - 230 V		460 V		575 V	575 V	
STAR CONN.	STAR CONN.	STAR-DELTA STARTING	DELTA RUNNING	STAR-DELTA STARTING	DELTA RUNNING	STAR CONN.	STAR-DELTA STARTING	DELTA RUNNING
DIRECT-ON-LINE STARTING		STAR-DELTA STARTING				DIRECT-ON-LINE STARTING	STAR-DELTA STARTING	

► Typical Nameplate

ARMSTRONG		HIGH EFFICIENCY MOTOR EPACT / NRCAN	
CAT. NO.	H.P.	R.P.M.	Hz.
VOLTS	DES.	FRAME	PH. 3
AMPS	CODE	ENCLOSURE TEFC / DUTY CONTINUOUS	
BRG.	S.F.	P.F.	LOW VOLTAGE HIGH VOLTAGE
NEMA NOM. EFF.	LBS.		
CLASS F	RATING 40°C AMB - CONT		
SER.	LINE LINE		
PART NUMBER -			
ARMSTRONG PUMPS INC. NORTH TONAWANDA, N.Y.		S. A. ARMSTRONG LIMITED TORONTO, ONTARIO	
www.armstrongpumps.com			

EXPERIENCE BUILDING...



motralec

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