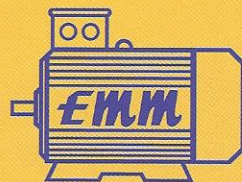


EMM HIGH EFFICIENCY (EFF1) AC MOTORS

The Driving Force
Behind Every Machine



Elektrim Motors & Machinery Pte Ltd

EU Efficiency Level Classification

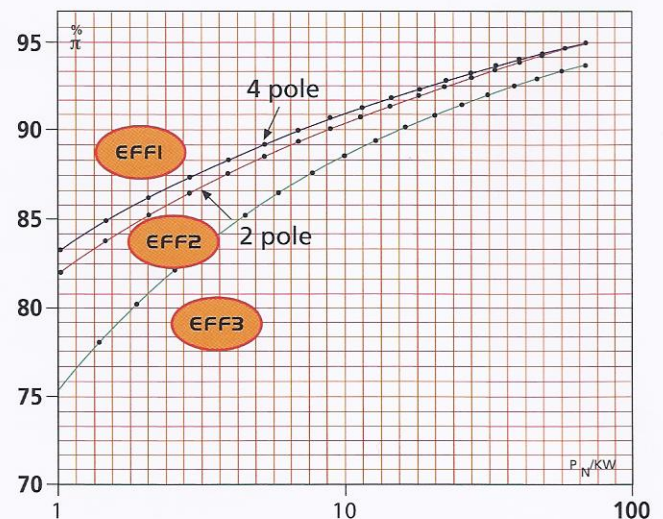
With the aim to reduce the power requirement of electric motors and to the energy consumption in Europe, CEMEP and the European Union reached an agreement, by which 2- and 4-pole three phase AC motors are affected, i.e. standard motors, defined as totally enclosed fan cooled, squirrel cage low voltage motors with 400V, 50Hz and S1 in the rated output range of 1.1 to 90kW.

In the 1.1 to 90kW output range, the 2- and 4-pole standard three phase motors described in this documentation correspond with the EU efficiency classification EFF1. Designation takes place with the EFF1 logo on the nameplate.

The nominal levels of efficiency, to which the individual rated outputs, pole numbers and classes are allocated, are contained in the following tables.

2-pole	EFF3	EFF2	EFF1
kw	$\pi\%$	$\pi\%$	$\pi\%$
1.1	<76.2	≥ 76.2	≥ 82.8
1.5	<78.5	≥ 78.5	≥ 84.1
2.2	<81.0	≥ 81.0	≥ 85.6
3	<82.6	≥ 82.6	≥ 86.7
4	<84.2	≥ 84.2	≥ 87.6
5.5	<85.7	≥ 85.7	≥ 88.6
7.5	<87.0	≥ 87.0	≥ 89.5
11	<88.4	≥ 88.4	≥ 90.5
15	<89.4	≥ 89.4	≥ 91.3
18.5	<90.0	≥ 90.0	≥ 92.2
22	<90.5	≥ 90.5	≥ 92.9
30	<91.4	≥ 91.4	≥ 93.3
37	<92.0	≥ 92.0	≥ 93.7
45	<92.5	≥ 92.5	≥ 94.0
55	<93.0	≥ 93.0	≥ 94.0
75	<93.6	≥ 93.6	≥ 94.6
90	<93.9	≥ 93.9	≥ 95.0

4-pole	EFF3	EFF2	EFF1
kw	$\pi\%$	$\pi\%$	$\pi\%$
1.1	<76.2	≥ 76.2	≥ 82.8
1.5	<78.5	≥ 78.5	≥ 84.1
2.2	<81.0	≥ 81.0	≥ 85.6
3	<82.6	≥ 82.6	≥ 86.7
4	<84.2	≥ 84.2	≥ 87.6
5.5	<85.7	≥ 85.7	≥ 88.6
7.5	<87.0	≥ 87.0	≥ 89.5
11	<88.4	≥ 88.4	≥ 90.5
15	<89.4	≥ 89.4	≥ 91.3
18.5	<90.0	≥ 90.0	≥ 92.2
22	<90.5	≥ 90.5	≥ 92.9
30	<91.4	≥ 91.4	≥ 93.3
37	<92.0	≥ 92.0	≥ 93.7
45	<92.5	≥ 92.5	≥ 94.0
55	<93.0	≥ 93.0	≥ 94.0
75	<93.6	≥ 93.6	≥ 94.6
90	<93.9	≥ 93.9	≥ 95.0

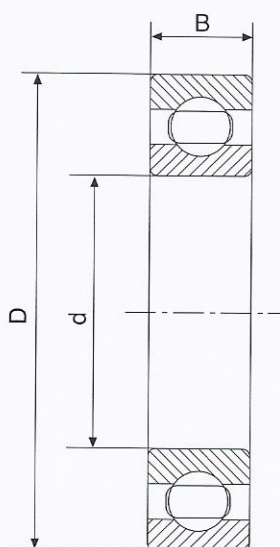


EMM series cast iron motors are totally enclosed fan cooled, 3 phase, squirrel cage induction motors.

EMM series cast iron motors are manufactured to High Efficiency (EFF1) and starting torque and are characterized by outstanding features such as : protection degree in IP55, insulation class F, low noise (test at load), optimized structure and artistic outline.

Its cooling method is IC411 and the rated output and mounting dimensions fully conformed to the standard IEC and DIN 42673. The EMM series cast iron motors are suitable for driving various kinds of machines or equipments without special requirements. They are rated at 400V, 50Hz, Y-connection for motors up to 3kw, Δ-connection for 4kw and above. The S1 duty operating condition is not more than 40°C ambient temperature and not exceeding 1,000 meters height above sea level.

Bearing Data



Frame	DE	NDE	d	D	B
EM80	6204 ZZ C3	6204 ZZ C3	20	47	14
EM90	6205 ZZ C3	6205 ZZ C3	25	52	15
EM100	6206 ZZ C3	6206 ZZ C3	30	62	16
EM112	6306 ZZ C3	6306 ZZ C3	30	72	19
EM132	6308 ZZ C3	6308 ZZ C3	40	90	23
EM160	6309 C3	6309 C3	45	100	25
EM180	6311 C3	6311 C3	55	120	29
EM200	6312 C3	6312 C3	60	130	31
EM225	6313 C3	6313 C3	65	140	33
EM250 (Horizontal)	6314 C3	6314 C3	70	150	35
EM250 (Vertical)	6314 C3	7314	70	150	35
EM280-2P (Horizontal)	6314 C3	6314 C3	70	150	35
EM280-2P (Vertical)	6314 C3	7314	70	150	35
EM280-4-8P (Horizontal)	6317 C3	6317 C3	85	180	41
EM280-4-8P (Vertical)	6317 C3	7317	85	180	41
EM315-2P (Horizontal)	6316 C3	6316 C3	80	170	39
EM315-2P (Vertical)	6316 C3	7316	80	170	39
EM315-4-8P (Horizontal)	N319	6319 C3	95	200	45
EM315-4-8P (Vertical)	N319	7319	95	200	45
EM355-2P (Horizontal)	6319 C3	6319 C3	95	200	45
EM355-2P (Vertical)	6319 C3	7319	95	200	45
EM355-4-8P (Horizontal)	N322	6322 C3	110	240	50
EM355-4-8P (Vertical)	N322	7322	110	240	50

- EMM motors are equipped with bearings from excellent manufacturers.
- In general the bearings have C3 clearances.
- Motors of frame sizes 80-132 are fitted with life-lubricated bearings.
- Motors of frame sizes 160-355 are fitted with open bearings and regreasing device. Depending on the useful life of grease, open bearings must be regreased in good time so that the scheduled bearing service life is reached.

Frame size	Drive end bearing	Non-drive end bearing	Regreasing period hours for operating temperatures up to 70°C			Quantity of grease in bearing chamber grams
			<3600r/min	<1800r/min	<3600r/min	
EM160	6309 C3	6309 C3	6000	12000	18000	12
EM180	6311 C3	6311 C3	4000	11000	16000	15
EM200	6312 C3	6312 C3	3500	8500	13000	20
EM225	6313 C3	6313 C3	3000	6000	9000	22
EM250	6314 C3	6314 C3	2000	5000	8000	23
EM280 2P	6314 C3	6314 C3	1200	-	-	30
EM280 4-8P	6317 C3	6317 C3	-	4000	18000	30
EM315 2P	6316 C3	6316 C3	1200	-	-	30
EM315 4-8P	N319	6319 C3	-	2000	3000	45
EM355 2P	6319 C3	6319 C3	1200	-	-	30
EM355 4-8P	N322	6322 C3	-	1400	2200	60

Notes: 1. Vertical motors should be greased twice as often as horizontal motors.
2. Regreasing time should be reduced if bearing operating temperature is in excess of 70°C.

• EMM reserves right to make changes to this brochure without notice.

Standards and Regulations

Degrees of protection (IEC 60034-5)

Designation	First Numeral	Second Numeral
	Protection against contact and ingress of foreign bodies. Protection against hazardous "Live" parts and moving mechanical parts.	Protection against water
	5. Ingress of dust is not totally prevented, but dust shall not interfere with the satisfactory operation of equipment. A probe of 1mm diameter shall not penetrate the enclosure.	5. Water projected in jets against the enclosure from any direction will have no harmful effects.
	6. No ingress of dust	6. Water projected in power jets shall have no harmful effects.
IP55	Dust protected	Jetting water
IP56	Dust protected	Powerful jetting
IP65	Dust tight	Jetting water
IP66	Dust tight	Powerful jetting

Mounting Arrangements (IEC 60034-7)

FOOT MTG HORIZ	FLANGE MTG	FOOT/FLANGE MTG	FOOT MTG VERT
B3 IM1001 H80 ~ 355 	B5 IM3001 H80 ~ 280 	B35 IM2001 H80 ~ 355 	
B6 IM1051 H80 ~ 160 	V1 IM3011 H80 ~ 355 	V15 IM2011 H80 ~ 160 	V5 IM1011 H80 ~ 160
B7 IM1061 H80 ~ 160 			
B8 IM1071 H80 ~ 160 	V3 IM3031 H80 ~ 160 	V36 IM2031 H80 ~ 160 	V6 IM1031 H80 ~ 160

Connection Diagrams Three Phase Motors with Cage Rotor

			Multi-speed motors in dahlander connection (tapped winding).		Multi-speed motors with 2 separate windings.	
Star connection	Delta connection	Connection to Star-delta starter	Low speed	High speed	Low speed	High speed

SPEED 3000RPM 2-POLE 50HZ

Type	Output		Speed	Rated Current			Efficiency	Power Factor	Tn	Ts	Tmax	Is	Moment	Noise	Weight
	Kw	Hp	r/min	380V A	400V A	415V A	η % 100%	Cos ϕ 100%	Nm	Tn	Tn	In	J kgm ²	LwdB(A)	kg
EM80A-2	0.75	1	2840	1.7	1.62	1.56	80.6	0.83	2.54	2.2	2.3	6.1	0.0008	67	17
EM80B-2	1.1	1.5	2840	2.4	2.28	2.19	82.9	0.84	3.72	3	3.2	8	0.0009	67	18
EM90S-2	1.5	2	2840	3.22	3.06	2.95	84.2	0.84	5.04	3	3.2	8	0.0012	72	23
EM90L-2	2.2	3	2840	4.59	4.36	4.2	85.7	0.85	7.4	3	3.2	8	0.0014	72	26
EM100L-2	3	4	2860	6.04	5.73	5.53	86.8	0.87	9.95	2.8	3.2	8	0.0029	76	34
EM112M-2	4	5.5	2880	7.87	7.48	7.21	87.7	0.88	13.22	2.5	3.2	8	0.0055	77	41
EM132SA-2	5.5	7.5	2900	10.7	10.2	9.79	88.8	0.88	18.11	2.2	3.2	8	0.0109	80	65
EM132SB-2	7.5	10	2900	14.5	13.7	13.2	89.6	0.88	24.7	2.2	3.2	8	0.0126	80	72
EM160MA-2	11	15	2930	20.7	19.6	18.9	90.8	0.89	35.85	1.9	3	8	0.0377	86	112
EM160MB-2	15	20	2930	28	26.6	25.6	91.5	0.89	48.89	1.9	3	8	0.0499	86	122
EM160L-2	18.5	25	2930	33.9	32.3	31.1	92.0	0.90	60.3	1.9	3	8	0.055	86	136
EM180M-2	22	30	2940	40.2	38.2	36.8	92.3	0.90	71.46	1.9	3	8.2	0.075	89	172
EM200LA-2	30	40	2950	54.5	51.7	49.9	93.0	0.90	97.12	1.9	3	7.6	0.124	92	233
EM200LB-2	37	50	2950	66.8	63.5	61.2	93.5	0.90	119.78	1.9	3	7.6	0.139	92	242
EM225M-2	45	60	2960	81	76.9	74.2	93.8	0.90	144.7	1.8	2.5	7.6	0.233	92	326
EM250M-2	55	75	2965	98.6	93.6	90.3	94.2	0.90	176.85	1.8	2.5	8.2	0.312	93	382
EM280S-2	75	100	2970	134	127	122	94.8	0.90	241.16	1.7	2.5	7.6	0.579	94	525
EM280M-2	90	125	2970	158	150	145	95.2	0.91	289.39	1.7	2.5	7.6	0.675	94	570
EM315S-2	110	150	2975	193	183	177	95.2	0.91	352.51	1.6	2.2	7.2	1.18	96	930
EM315M-2	132	180	2975	231	219	211	95.5	0.91	423.02	1.6	2.2	7.2	1.82	96	990
EM315LA-2	160	220	2975	276	263	253	95.6	0.92	512.75	1.6	2.2	7.2	2.08	99	1090
EM315LB-2	200	270	2975	346	329	317	95.5	0.92	640.94	1.6	2.2	7.2	2.38	99	1120
EM355M-2	250	340	2980	430	409	394	96.0	0.92	799.83	1.6	2.2	7.2	3	103	1900
EM355L-2	315	430	2980	542	515	496	96.0	0.92	1007.9	1.6	2.2	7.2	3.5	103	2300

SPEED 1500RPM 4-POLE 50HZ

Type	Output		Speed	Rated Current			Efficiency	Power Factor	Tn	Ts	Tmax	Is	Moment	Noise	Weight
	Kw	Hp	r/min	380V A	490V A	415V A	$\eta\%$ 100%	cos ϕ 100%	Nm	Tn	Tn	In	J kgm ²	LwdB(A)	kg
EM80A-4	0.55	0.75	1390	1.38	1.31	1.26	80.6	0.75	3.78	2.4	2.3	5.2	0.0018	58	18
EM80B-4	0.75	1	1390	1.82	1.73	1.67	82.4	0.76	5.15	2.4	2.3	6.0	0.0021	58	19
EM90S-4	1.1	1.5	1390	2.59	2.46	2.37	83.9	0.77	7.5	2.7	3.0	7.0	0.0023	61	24
EM90L-4	1.5	2	1390	3.39	3.22	3.11	85.1	0.79	10.23	2.7	3.0	7.0	0.0027	61	29
EM100LA-4	2.2	3	1410	4.77	4.53	4.37	86.5	0.81	14.8	2.5	2.8	7.0	0.0054	64	35
EM100LB-4	3	4	1410	6.35	6.04	5.82	87.5	0.82	20.18	2.5	2.8	7.0	0.0067	64	39
EM112M-4	4	5.5	1435	8.37	7.96	7.67	88.5	0.82	26.53	2.2	2.8	7.0	0.0095	65	45
EM132S-4	5.5	7.5	1440	11.3	10.7	10.3	89.3	0.83	36.48	2.2	2.8	7.0	0.0214	71	70
EM132M-4	7.5	10	1440	15	14.3	13.8	90.2	0.84	49.74	2.2	2.8	7.0	0.0296	71	80
EM160M-4	11	15	1460	21.8	20.7	20.0	91.1	0.84	71.59	2.1	2.8	7.5	0.0747	75	123
EM160L-4	15	20	1460	29.1	27.7	26.7	92.0	0.85	98.12	2.1	2.8	7.5	0.0918	75	135
EM180M-4	18.5	25	1470	35.4	33.6	32.4	92.3	0.86	120.19	2.1	2.8	7.5	0.139	76	170
EM180L-4	22	30	1470	41.9	39.8	38.4	92.8	0.86	142.93	2.1	2.5	7.5	0.158	76	184
EM200L-4	30	40	1470	56.8	54	52	93.3	0.86	160.98	2.1	2.5	7.5	0.262	79	250
EM225S-4	37	50	1475	68.9	65.4	63.1	93.8	0.87	198.51	1.8	2.3	7.5	0.406	81	290
EM225M-4	45	60	1475	83.6	79.4	76.6	94.0	0.87	290.37	1.8	2.3	7.5	0.469	91	326
EM250M-4	55	75	1480	102	96.7	93.2	94.4	0.87	354.9	1.8	2.3	7.5	0.66	83	395
EM280S-4	75	100	1480	138	131	126	94.9	0.87	483.95	1.8	2.3	7.5	1.12	86	515
EM280M-4	90	125	1480	165	157	151	95.2	0.87	578.79	1.8	2.3	7.5	1.46	86	611
EM315S-4	110	150	1480	199	189	182	95.5	0.88	707.41	1.7	2.2	7.2	3.11	93	931
EM315M-4	132	180	1480	238	226	218	95.6	0.88	848.89	1.7	2.2	7.2	3.62	93	1017
EM315LA-4	160	220	1480	285	271	261	95.8	0.89	1029	1.7	2.2	7.2	4.13	97	1085
EM315LB-4	200	270	1480	357	339	327	95.6	0.89	1286.2	1.7	2.2	7.2	4.73	97	1200
EM355M-4	250	340	1490	440	418	403	96.0	0.90	1602.4	1.7	2.2	7.2	6.5	101	1700
EM355L-4	315	430	1490	554	526	507	96.0	0.90	2019	1.7	2.2	7.2	8.2	101	1900

SPEED 1000RPM 6-POLE 50HZ

Type	Output		Speed	Rated Current			Efficiency	Power Factor	Tn	Ts	Tmax	Is	Moment	Noise	Weight
	Kw	Hp	r/min	380V A	400V A	415V A	$\eta\%$ 100%	Cos ϕ 100%	Nm	Tn	Tn	In	J kgm ²	LwdB(A)	kg
EM80A-6	0.37	0.5	885	1.29	1.23	1.18	62.5	0.70	3.93	1.9	2.0	4.7	0.0016	52	16
EM80B-6	0.55	0.75	885	1.54	1.46	1.41	75.5	0.72	5.84	1.9	2.1	4.7	0.0019	52	20
EM90S-6	0.75	1	910	2.03	1.93	1.86	77.8	0.72	7.87	2.5	2.5	5.5	0.0029	55	24
EM90L-6	1.1	1.5	910	2.86	2.72	2.62	80.0	0.73	11.54	2.5	2.5	5.5	0.0035	55	26
EM100L-6	1.5	2	920	3.72	3.53	3.41	81.7	0.75	15.24	2.2	2.5	5.5	0.0069	59	34
EM112M-6	2.2	3	935	5.26	5	4.82	83.6	0.76	22.35	2.2	2.5	5.5	0.014	63	44
EM132S-6	3	4	960	7.05	6.7	6.45	85.1	0.76	29.84	2.1	2.5	5.5	0.0286	67	68
EM132MA-6	4	5.5	960	9.27	8.8	8.48	86.3	0.76	39.79	2.1	2.5	6	0.0357	67	74
EM132MB-6	5.5	7.5	960	12.4	11.8	11.3	87.6	0.77	54.71	2.1	2.5	6	0.0449	67	85
EM160M-6	7.5	10	970	16.6	15.8	15.2	89.2	0.77	73.84	2.1	2.5	6	0.0081	71	135
EM160L-6	11	15	970	23.8	22.6	21.8	90.2	0.78	108.3	2.1	2.5	6.5	0.116	71	149
EM180L-6	15	20	970	30.9	29.3	28.2	91.2	0.81	147.68	2.1	2.5	6.5	0.207	71	183
EM200LA-6	18.5	25	980	37.8	36	34.7	91.7	0.81	182.14	2.1	2.5	7	0.315	74	219
EM200LB-6	22	30	980	43.7	41.5	40	92.2	0.83	216.6	2.1	2.5	7	0.36	74	233
EM225M-6	30	40	980	58.6	55.7	53.7	92.6	0.84	292.35	1.8	2.0	7	0.547	74	296
EM250M-6	37	50	980	70.1	66.6	64.2	93.2	0.86	360.26	1.8	2.0	7	0.843	76	380
EM280S-6	45	60	980	84.8	80.6	77.7	93.7	0.86	438.52	1.8	2.0	7	1.39	78	498
EM280M-6	55	75	980	103	98.2	94.7	94.0	0.86	535.97	1.8	2.0	7	1.65	78	545
EM315S-6	75	100	985	140	133	128	94.6	0.86	730.87	1.8	2.0	7	4.11	83	915
EM315M-6	90	125	985	167	159	153	95.0	0.86	872.59	1.8	2.0	7	4.78	83	993
EM315LA-6	110	150	985	204	194	187	95.2	0.86	1066.5	1.8	2.0	7	5.45	83	1065
EM315LB-6	132	180	985	241	229	221	95.5	0.87	1279.8	1.8	2.0	7	6.12	83	1185
EM355MA-6	160	220	990	288	274	264	95.8	0.88	1543.4	1.8	2.0	7	9.5	90	1550
EM355MB-6	200	270	990	363	345	332	95.4	0.88	1913.3	1.8	2.0	7	10.4	90	1600
EM355L-6	250	340	990	454	431	416	95.7	0.88	2411.6	1.8	2.0	7	12.4	90	1700

Technical Data - EFF1

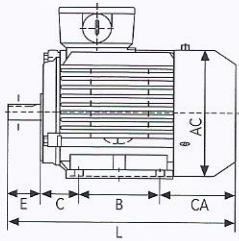
SPEED 750RPM 8-POLE 50HZ

Type	Output		Speed r/min	Rated Current			Efficiency η % 100%	Power Factor $\cos \phi$ 100%	Tn Nm	Ts Tn	Tmax Tn	Is In	Moment J kgm ²	Noise LwdB(A)	Weight kg
	Kw	Hp		380V A	400V A	415V A									
EM80A-8	0.18	0.25	645	0.88	0.83	0.8	51.2	0.61	2.49	1.8	1.9	3.3	0.0025	52	17
EM80B-8	0.25	0.37	645	1.57	1.09	1.05	54.2	0.61	3.46	1.8	1.9	3.3	0.003	52	19
EM90S-8	0.37	0.5	670	1.49	1.41	1.36	62.2	0.61	5.12	1.8	1.9	4.9	0.0051	56	24
EM90L-8	0.55	0.75	670	2.17	2.06	1.99	63.3	0.61	7.61	1.8	2	4	0.0065	56	26
EM100LA-8	0.75	1	680	2.31	2.2	2.12	73.6	0.67	10.23	1.8	2	4	0.009	59	33
EM100LB-8	1.1	1.5	680	3.17	3.01	2.9	76.5	0.69	15.00	1.8	2	5	0.011	59	36
EM112M-8	1.5	2	690	4.2	3.99	3.85	78.6	0.69	20.46	1.8	2	5	0.0245	61	43
EM132S-8	2.2	3	705	5.81	5.51	5.32	81.1	0.71	29.59	1.8	2	6	0.0314	64	68
EM132M-8	3	4	705	7.54	7.16	6.91	82.8	0.73	40.35	1.8	2	6	0.0395	64	83
EM160MA-8	4	5.5	720	9.86	9.37	9.03	84.4	0.73	53.06	1.9	2	6	0.0753	68	133
EM160MB-8	5.5	7.5	720	13.1	12.5	12	86.0	0.74	72.59	2	2	6	0.0931	68	155
EM160L-8	7.5	10	720	17.4	16.5	15.9	87.3	0.75	99.50	2	2	6	0.126	68	160
EM180L-8	11	15	730	24.7	23.5	22.6	89.0	0.76	143.90	2	2	6	0.203	70	173
EM200L-8	15	20	730	33.2	31.6	30.4	90.2	0.76	196.23	2	2	6.6	0.399	73	234
EM225S-8	18.5	25	730	40.7	38.7	37.3	90.8	0.76	242.02	1.9	2	6.6	0.491	73	276
EM225M-8	22	30	730	46.9	44.5	42.9	91.4	0.78	287.81	1.9	2	6.6	0.547	73	298
EM250M-8	30	40	735	62.5	59.4	57.2	92.3	0.79	382.47	1.9	2	6.6	0.834	75	375
EM280S-8	37	50	735	76.6	72.8	70.1	92.9	0.79	484.04	1.9	2	6.6	1.93	76	480
EM280M-8	45	60	735	92.7	88	84.8	93.4	0.79	580.74	1.8	2	6.6	3.65	76	560
EM315S-8	55	75	735	110	104	101	93.8	0.81	709.80	1.8	2	6.6	4.79	82	915
EM315M-8	75	100	735	149	141	136	94.5	0.81	967.91	1.8	2	6.6	5.58	82	1040
EM315LA-8	90	125	735	176	167	161	94.8	0.82	1161.49	1.8	2	6.6	6.37	82	1083
EM315LB-8	110	150	735	214	203	196	95.3	0.82	1419.60	1.8	2	6.4	7.23	82	1130
EM355MA-8	132	180	740	256	243	235	95.5	0.82	1692.08	1.8	2	6.4	7.9	90	2000
EM355MB-8	160	220	740	309	294	283	95.8	0.82	2051.00	1.8	2	6.4	10.3	90	2150
EM335L-8	200	270	740	382	363	350	95.8	0.83	2563.38	1.8	2	6.4	12.3	90	2250

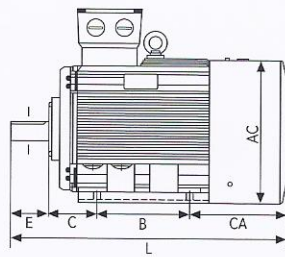
SPEED 600RPM 10-POLE 50HZ

Type	Output		Speed r/min	Rated Current			Efficiency η % 100%	Power Factor $\cos \phi$ 100%	Tn Nm	Ts Tn	Tmax Tn	Is In	Moment J kgm ²	Noise LwdB(A)	Weight kg
	Kw	Hp		380V A	400V A	415V A									
EM315S-10	45	60	590	99.6	94.7	91.2	91.5	0.75	728.39	1.5	2	6.2	5.23	82	900
EM315M-10	55	75	590	121	115	111	92.0	0.75	890.25	1.5	2	6.2	6.05	82	975
EM315LA-10	75	100	590	162	154	148	92.5	0.76	1213.98	1.5	2	6.2	6.98	82	1100
EM315LB-10	90	125	590	191	181	175	93.0	0.77	1456.78	1.5	2	6.2	7.21	82	1225
EM335MA-10	110	150	590	230	218	211	93.2	0.78	1765.55	1.3	2	6.0	13.80	90	1800
EM355MB-10	132	180	590	275	261	252	93.5	0.78	2118.66	1.3	2	6.0	15.00	90	2500
EM355L-10	160	220	590	333	317	305	93.5	0.78	2568.07	1.3	2	6.0	16.64	90	2500

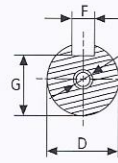
EFF1 HIGH EFFICIENCY (EFF 1) AC MOUNTING and Overall Dimensions - EFF1



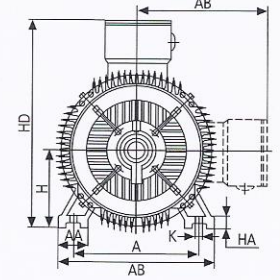
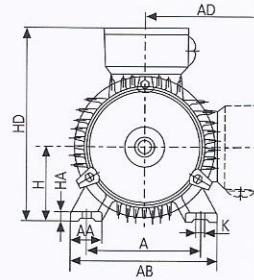
80-132



63-355



63-132



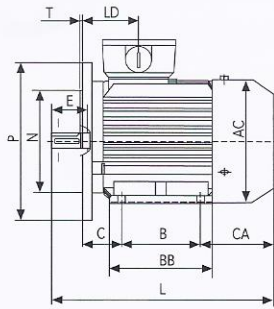
63-355

IM B3 H80-355

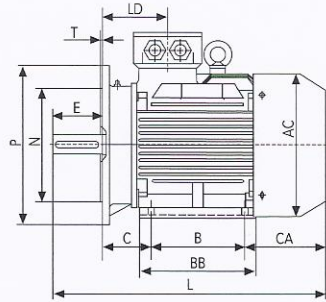
Type	Poles	Dimensions in mm																					
		A	AA	B	C	D	E	F	G	H	K	AB	AC	AD	HD	L	BB	CA	EA	DA	HA	LD	DH
80	2,4,6,8	125	34	100	50	19	40	6	15.5	80	10	165	167	143	223	303	130	101	40	19	10	69	M6X16
90S	2,4,6,8	140	36	100	56	24	50	8	20	90	10	180	184	155	250	335	130	110	50	24	12	76	M8X19
90L	2,4,6,8	140	36	125	56	24	50	8	20	90	10	180	184	155	250	360	155	110	50	24	12	76	M8X19
100L	2,4,6,8	160	40	140	63	28	60	8	24	100	12	205	206	180	270	406	176	125	60	28	14	75	M10X22
112M	2,4,6,8	190	45	140	70	28	60	8	24	112	12	230	220	190	300	453	180	132	60	28	15	82	M10X22
132S	2,4,6,8	216	55	140	89	38	80	10	33	132	12	270	259	210	345	470	230	169	80	38	18	88	M12X28
132M	2,4,6,8	216	55	178	89	38	80	10	33	132	12	270	259	210	345	510	238	169	80	38	18	88	M12X28
160M	2	254	65	210	108	42	110	12	37	160	15	320	315	255	420	615	260	190	110	42	20	132	M16X36
	4,6,8	254	65	210	108	42	110	12	37	160	15	320	315	255	420	615	260	190	110	42	20	135	M16X36
160L	2	254	65	254	108	42	110	12	37	160	15	320	315	255	420	670	304	224	110	42	22	132	M16X36
	4,6,8	254	65	254	108	42	110	12	37	160	15	320	315	255	420	670	304	224	110	42	22	135	M16X36
180M	2	279	70	241	121	48	110	14	42.5	180	15	355	355	280	455	700	311	220	110	48	25	138.5	M16X36
	4,6,8	279	70	241	121	48	110	14	42.5	180	15	355	355	280	455	740	349	220	110	48	28	136.5	M16X36
180L	4,6,8	279	70	279	121	48	110	14	42.5	180	15	355	355	280	455	740	349	220	110	48	28	139.5	M16X36
200L	2	318	70	305	133	55	110	16	49	200	19	395	397	305	505	779	369	241	110	55	30	149.5	M20X42
	4,6,8	318	70	305	133	55	110	16	49	200	19	395	397	305	505	779	369	241	110	55	30	158.5	M20X42
225S	4,8	356	75	286	149	60	140	18	53	225	19	435	445	335	555	815	368	241	140	60	28	156.5	M20X42
225M	2	356	75	311	149	55	110	16	49	225	19	435	445	335	555	820	304	241	110	55	28	154.5	M20X42
	4,6,8	356	75	311	149	60	140	18	53	225	19	435	445	335	555	845	304	241	140	60	28	156.5	M20X42
250M	2	406	80	349	168	60	140	18	53	250	24	490	485	370	615	915	445	263	140	60	30	170.5	M20X42
	4,6,8	406	80	349	168	65	140	18	58	250	24	490	485	370	615	915	445	263	140	65	30	172.5	M20X42
280S	2	457	85	368	190	65	140	18	58	280	24	550	547	410	680	985	485	283	140	65	35	170.5	M20X42
	4,6,8	457	85	368	190	75	140	20	67.5	280	24	550	547	410	680	985	485	283	140	75	35	179	M20X42
280M	2	457	85	419	190	65	140	18	58	280	24	550	547	410	680	1035	536	283	140	65	35	170.5	M20X42
	4,6,8	457	85	419	190	75	140	20	67.5	280	24	550	547	410	680	1035	536	283	140	75	35	179	M20X42
315S	2	508	120	406	216	65	140	18	58	315	28	635	620	530	845	1178	570	428	140	65	45	211	M20X42
	4,6,8,10	508	120	406	216	80	170	22	71	315	28	635	620	530	845	1224	570	428	170	80	45	211	M20X42
315M	2	508	120	457	216	65	140	18	58	315	28	635	620	530	845	1288	680	487	140	65	45	211	M20X42
	4,6,8,10	508	120	457	216	80	170	22	71	315	28	635	620	530	845	1334	680	487	170	80	45	211	M20X42
315L	2	508	120	508	216	65	140	18	58	315	28	635	620	530	845	1288	680	436	140	65	45	211	M20X42
	4,6,8,10	508	120	508	216	80	170	22	71	315	28	635	620	530	845	1334	680	436	170	80	45	211	M20X42
355M	2	610	116	560	254	75	140	20	67.5	355	28	730	698	655	1010	1496	760	544	140	75	52	234	M20X42
	4,6,8,10	610	116	560	254	95	170	25	86	355	28	730	698	655	1010	1536	760	544	170	95	52	234	M20X42
355L	2	610	116	630	254	75	140	20	67.5	355	28	730	698	655	1010	1496	760	474	140	75	52	234	M20X42
	4,6,8,10	610	116	630	254	95	170	25	86	355	28	730	698	655	1010	1536	760	474	170	95	52	234	M20X42

Notes: Frame below 160 is available in aluminum casing with the same mounting dimensions as in cast iron frame.

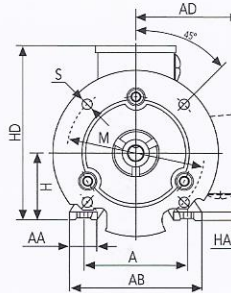
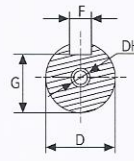
Mounting and Overall Dimensions - EFF1



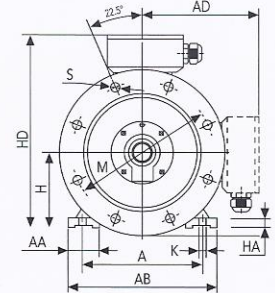
80-132



160-355



80-132

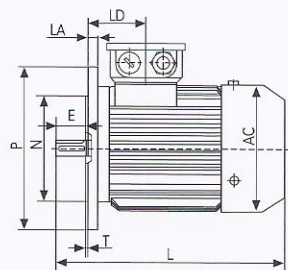


160-355

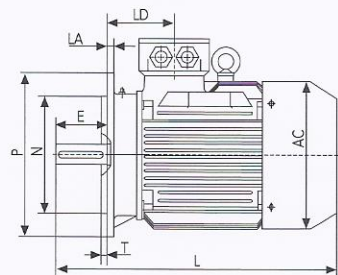
IM B35 H80-355

Type	Flange No.	Poles	Dimensions in mm																												
			A	AA	B	C	D	E	F	G	H	K	AB	AC	AD	HD	L	BB	CA	EA	DA	HA	LD	Flange holes	M	N	P	R*	S	T	DH
80	FF165	2,4,6,8	125	34	100	50	19	40	6	15.5	80	10	165	167	143	223	303	130	101	40	19	10	71.5	4	165	130	200	0	12	3.5	M6X16
90S	FF165	2,4,6,8	140	36	100	56	24	50	8	20	90	10	180	184	155	250	335	130	110	50	24	12	79.5	4	165	130	200	0	12	3.5	M8X19
90L	FF165	2,4,6,8	140	36	125	56	24	50	8	20	90	10	180	184	155	250	360	155	110	50	24	12	79.5	4	165	130	200	0	12	3.5	M8X19
100L	FF215	2,4,6,8	160	40	140	63	28	60	8	24	100	12	205	206	180	270	406	176	125	60	28	14	78.5	4	215	180	250	0	15	4	M10X22
112M	FF215	2,4,6,8	190	45	140	70	28	60	8	24	112	12	230	220	190	300	453	180	132	60	28	15	86.5	4	215	180	250	0	15	4	M10X22
132S	FF265	2,4,6,8	216	55	140	89	38	80	10	33	132	12	270	259	210	345	470	230	169	80	38	18	92	4	265	230	300	0	15	4	M12X28
132M	FF265	2,4,6,8	216	55	178	89	38	80	10	33	132	12	270	259	210	345	510	238	169	80	38	18	92	4	265	230	300	0	15	4	M12X28
160M	FF300	2	254	65	210	108	42	110	12	37	160	15	320	315	255	420	615	260	190	110	42	20	146	4	300	250	350	0	19	5	M16X36
	FF300	4,6,8	254	65	210	108	42	110	12	37	160	15	320	315	255	420	615	260	190	110	42	20	146	4	300	250	350	0	19	5	M16X36
160L	FF300	2	254	65	254	108	42	110	12	37	160	15	320	315	255	420	670	304	224	110	42	22	146	4	300	250	350	0	19	5	M16X36
	FF300	4,6,8	254	65	254	108	42	110	12	37	160	15	320	315	255	420	670	304	224	110	42	22	146	4	300	250	350	0	19	5	M16X36
180M	FF300	2	279	70	241	121	48	110	14	42.5	180	15	355	355	280	455	700	311	220	110	48	25	158	4	300	250	350	0	19	5	M16X36
	FF300	4,6,8	279	70	241	121	48	110	14	42.5	180	15	355	355	280	455	740	311	220	110	48	25	158	4	300	250	350	0	19	5	M16X36
180L	FF300	4,6,8	279	70	279	121	48	110	14	42.5	180	15	355	355	280	455	740	349	220	110	48	28	158	4	300	250	350	0	19	5	M16X36
200L	FF350	2	318	70	305	133	55	110	16	49	200	19	395	397	305	505	779	369	241	110	55	30	186	4	350	300	400	0	19	5	M20X42
	FF350	4,6,8	318	70	305	133	55	110	16	49	200	19	395	397	305	505	779	369	241	110	55	30	186	4	350	300	400	0	19	5	M20X42
225S	FF400	4,8	356	75	286	149	60	140	18	53	225	19	435	445	335	555	815	368	241	140	60	28	189	8	400	350	450	0	19	5	M20X42
225M	FF400	2	356	75	311	149	55	110	16	49	225	19	435	445	335	555	820	304	241	110	55	28	189	8	400	350	450	0	19	5	M20X42
	FF400	4,6,8	356	75	311	149	60	140	18	53	225	19	435	445	335	555	845	304	241	140	60	28	189	8	400	350	450	0	19	5	M20X42
250M	FF500	2	406	80	349	168	60	140	18	53	250	24	490	485	370	615	915	445	263	140	60	30	116	8	500	450	550	0	19	5	M20X42
	FF500	4,6,8	406	80	349	168	65	140	18	58	250	24	490	485	370	615	915	445	263	140	65	30	116	8	500	450	550	0	19	5	M20X42
280S	FF500	2	457	85	368	190	65	140	18	58	280	24	550	547	410	680	985	485	283	140	65	35	215.5	8	500	450	550	0	19	5	M20X42
	FF500	4,6,8	457	85	368	190	75	140	20	67.5	280	24	550	547	410	680	985	485	283	140	75	35	215.5	8	500	450	550	0	19	5	M20X42
280M	FF500	2	457	85	419	190	65	140	18	58	280	24	550	547	410	680	1035	536	283	140	65	35	215.5	8	500	450	550	0	19	5	M20X42
	FF500	4,6,8	457	85	419	190	75	140	20	67.5	280	24	550	547	410	680	1035	536	283	140	75	35	215.5	8	500	450	550	0	19	5	M20X42
315S	FF600	2	508	120	406	216	65	140	18	58	315	28	635	620	530	845	1178	570	428	140	65	45	257	8	600	550	660	0	24	6	M20X42
	FF600	4,6,8,10	508	120	406	216	80	170	22	71	315	28	635	620	530	845	1224	570	428	170	80	45	257	8	600	550	660	0	24	6	M20X42
315M	FF600	2	508	120	457	216	65	140	18	58	315	28	635	620	530	845	1288	680	487	140	65	45	257	8	600	550	660	0	24	6	M20X42
	FF600	4,6,8,10	508	120	457	216	80	170	22	71	315	28	635	620	530	845	1334	680	487	170	80	45	257	8	600	550	660	0	24	6	M20X42
315L	FF600	2	508	120	508	216	65	140	18	58	315	28	635	620	530	845	1288	680	436	140	65	45	257	8	600	550	660	0	24	6	M20X42
	FF600	4,6,8,10	508	120	508	216	80	170	22	71	315	28	635	620	530	845	1334	680	436	170	80	45	257	8	600	550	660	0	24	6	M20X42
355M	FF740	2	610	116	560	254	75	140	20	67.5	355	28	730	698	655	1010	1496	760	544	140	75	52	284	8	740	680	800	0	24	6	M20X42
	FF740	4,6,8,10	610	116	560	254	95	170	25	86	355	28	730	698	655	1010	1536	760	544	170	95	52	284	8	740	680	800	0	24	6	M20X42
355L	FF740	2	610	116	630	254	75	140	20	67.5	355	28	730	698	655	1010	1496	760	474	140	75	52	284	8	740	680	800	0	24	6	M20X42
	FF740	4,6,8,10	610	116	630	254	95	170	25	86	355	28	730	698	655	1010	1536	760	474	170	95	52	284	8	740	680	800	0	24	6	M20X42

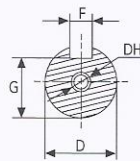
Notes: R is the distance from the flange mounting-plane to the shaft-extension shoulder.



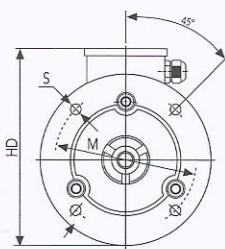
80-132



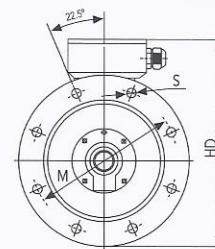
160-355



80-132

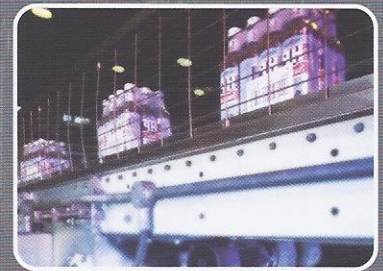


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Type	Flange No	Poles	Dimensions in mm																	
			D	E	F	G	M	N	P	S	T	Flange holes	AC	HD	L	EA	DA	LD	LA	DH
80	FF165	2,4,6,8	19	40	6	15.5	165	130	200	12	3.5	4	167	243	303	40	19	71.5	12	M6X16
90S	FF165	2,4,6,8	24	50	8	20	165	130	200	12	3.5	4	184	250	335	50	24	79.5	12	M8X19
90L	FF165	2,4,6,8	24	50	8	20	165	130	200	12	3.5	4	184	250	360	50	24	79.5	12	M8X19
100L	FF215	2,4,6,8	28	60	8	24	215	180	250	15	4	4	206	270	406	60	28	78.5	13	M10X22
112M	FF215	2,4,6,8	28	60	8	24	215	180	250	15	4	4	220	300	453	60	28	86.5	14	M10X22
132S	FF265	2,4,6,8	38	80	10	33	265	230	300	15	4	4	259	345	470	80	38	92	14	M12X28
132M	FF265	2,4,6,8	38	80	10	33	265	230	300	15	4	4	259	345	510	80	38	92	14	M12X28
160M	FF300	2,4,6,8	42	110	12	37	300	250	350	19	5	4	315	420	615	110	42	146	15	M16X36
160L	FF300	2,4,6,8	42	110	12	37	300	250	350	19	5	4	315	420	670	110	42	146	15	M16X36
180M	FF300	2,4,6,8	48	110	14	42.5	300	250	350	19	5	4	355	455	700	110	48	158	15	M16X36
180L	FF300	2,4,6,8	48	110	14	42.5	300	250	350	19	5	4	355	455	740	110	48	158	15	M16X36
200L	FF350	2,4,6,8	55	110	16	49	350	300	400	19	5	4	397	505	779	110	55	186	17	M20X42
225S	FF400	4,8	60	140	18	53	400	350	450	19	5	8	445	555	815	140	60	189	20	M20X42
225M	FF400	2	55	110	16	49	400	350	450	19	5	8	445	555	820	110	55	189	20	M20X42
	FF400	4,6,8	60	140	18	53	400	350	450	19	5	8	445	555	845	140	60	189	20	M20X42
250M	FF500	2	60	140	18	53	500	450	550	19	5	8	485	615	915	140	60	116	22	M20X42
	FF500	4,6,8	65	140	18	58	500	450	550	19	5	8	485	615	915	140	65	116	22	M20X42
280S	FF500	2	65	140	18	58	500	450	550	19	5	8	547	680	985	140	65	215.5	22	M20X42
	FF500	4,6,8	75	140	20	67.5	500	450	550	19	5	8	547	680	985	140	75	215.5	22	M20X42
280M	FF500	2	65	140	18	58	500	450	550	19	5	8	547	680	1035	140	65	215.5	22	M20X42
	FF500	4,6,8	75	140	20	67.5	500	450	550	19	5	8	547	680	1035	140	75	215.5	22	M20X42
315S	FF600	2	65	140	18	58	600	550	660	24	6	8	620	845	1178	140	65	257	22	M20X42
	FF600	4,6,8,10	80	170	22	71	600	550	660	24	6	8	620	845	1224	170	80	257	22	M20X42
315M	FF600	2	65	140	18	58	600	550	660	24	6	8	620	845	1288	140	65	257	22	M20X42
	FF600	4,6,8,10	80	170	22	71	600	550	660	24	6	8	620	845	1334	170	80	257	22	M20X42
315L	FF600	2	65	140	18	58	600	550	660	24	6	8	620	845	1288	140	65	257	22	M20X42
	FF600	4,6,8,10	80	170	22	71	600	550	660	24	6	8	620	845	1334	170	80	257	22	M20X42
355M	FF740	2	75	140	20	67.5	740	680	800	24	6	8	698	1010	1496	140	75	284	25	M20X42
	FF740	4,6,8,10	95	170	25	86	740	680	800	24	6	8	698	1010	1536	170	95	284	25	M20X42
355L	FF740	2	75	140	20	67.5	740	680	800	24	6	8	698	1010	1496	140	75	284	25	M20X42
	FF740	4,6,8,10	95	170	25	86	740	680	800	24	6	8	698	1010	1536	170	95	284	25	M20X42



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