

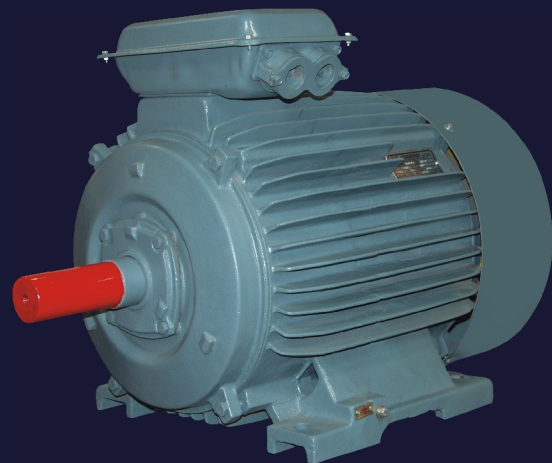
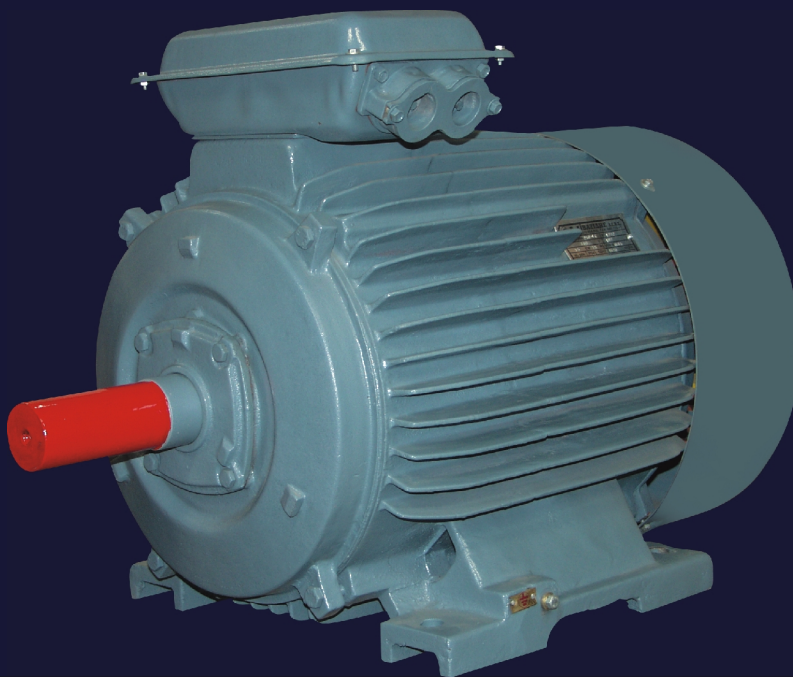


S. AIVAZIDIS S.A.

www.aivazidis.gr

 **MIRTEC**
ISO9001

ASYNCHRONOUS THREE PHASE TOTAL ENCLOSED SQUIRREL CAGE ELECTRIC MOTORS



- 15 frame sizes
- International standards
- 2poles/4poles/6poles/8poles motors
- IEC-publ.72-1.2 and DIN 42679B
- Asynchronous, three phase
- Protection degree IP54

DESCRIPTION OF THE MECHANICAL CONSTRUCTION

The electric motor series of S.AIVAZIDIS S.A. company includes 15 frame sizes, whose identification, arrangement and main dimensions are compatible with international standards IEC-publ.72-1.2 and DIN 42679B.

Casing, side shields and feet are made of high mechanical toughness cast iron, which is resistant to common ambient and chemical effects.

The cylindrical casing has cooling ribs set along and uniformly distributed in its whole surface. The right choice of height and thickness is of high importance for the sufficient cooling of the electric motor.

The mounting feet have three special designed heads, where the casing with its sturdy ribs abuts.

Also, two sturdy feet are included with three designed with special tool support heads at bigger frame sizes, from 200 up to 400.

LUBRICATING SYSTEM / MOUNTING SYSTEM

The electric motors abut in ball bearings. If bushings are to be used instead of ball bearings, great conversions have to be applied to the mounting system. The choice of ball bearings provides the greatest operation safety and life duration. Therefore, the determination of the bearings is according to the heaviest load conditions and 20.000-30.000 operation hours at least.

The sealing is assured by the bearing covers, which carry channels filled with grease or fibrous seal rings along their shaft according to DIN 5419.

Special steely spring O-rings absorb axial oscillations of rotating parts during operation for frame sizes from 63 up to 200 which carry ball bearings, allowing along thermal shaft expansions at the same time. Hence, the noise, which comes from the bearing during operation, is critically reduced. Also, the mentioned O-rings absorb random vibrations which can be caused during motor transportation and installation, ensuring the life time operation of the bearings.

Special lubricants, such as "Shell Alvania Grease 3", are used for bearing's lubrication.

Bearing's temperature must not exceed 95° C.

Electric motors of frame sizes up to 200 doesn't carry special lubricator. The initial lubrication of the bearings from the factory does for 8.000 up to 12.000 hours operation at least, depending on the operating and ambient conditions (humidity, temperature, chemical effects). This stands for 2 up to 3 years of standard lubrication, if 8 hours of daily operation of electric motor is taken into consideration.

Evacuation of the used lubricant, careful clearance of the bearings and their covers, and filling with new lubricant are recommended after 8.000-12.000 hours of operation and time period not more that 2-2,5 years.

THREE PHASE MOTORS

Frame size	Nr. of poles	Type of bearing	
		Front	Rear
63	2.4	6201-2Z	6201-2Z
71	2.4	6202-2Z	6202-2Z
80	2.4.6	6204-2Z	6204-2Z
90	2.4.6.8	6205-2Z	6205-2Z
100	2.4.6.8	6206-2Z	6206-2Z
112	2.4.6.8	6306-2Z	6306-2Z
132	2.4.6.8	6308-2Z	6308-2Z
160	2.4.6.8	6309-2Z	6309-2Z
180	2.4.6.8	6310-Z	6310-Z
200	2.4.6.8	6312-Z	6312-Z
225	2	6312-Z	6312-Z
225	4.6.8	NU-313	6312-Z
250	2	6314-Z	6312-Z
250	4.6.8	NU-314	6314-Z
280	2	6314-Z	6314-Z
280	4.6.8	NU-316	6314-Z
315	2	6315-Z	6315-Z
355	2	6315-Z	6315-Z
315	4.6.8	NU-317	6315-Z
355	4.6.8	NU-317	6315-Z

Only the 1/3 of total space below the bearing is filled with lubricant. Greater amount of lubricant is unnecessary and damaging, because it might cause overheating of the bearing during the very first minutes of its operation. A bit of lubricant is loaded into the corrugations of the bearing covers, filling the half of the available space.

Relubrication is not necessary before 2.000-3.000 hours of operation. Evacuation of the used lubricant, clearance and relubrication are recommended at frame sizes from 255 up to 400.

after 12.000-15.000 hours. Same lubricants have to be used for the relubrication. Mixture of different lubricants is not allowed, ex. Lithium and Sodium.

BALANCING

DIN 45665 standard specifies the measurement methods and the allowable limits of the vibrations due to insufficient balancing of rotating parts of machinery. The rotors of all the electric motors are balanced using suitable feather key on high sensitive electro-dynamics balancing machine. Tackle blocks or couplings which may be mounted to the shaft end later, have to be severally and rightly balanced, without the use of the special feather key.

EXTERNAL PAINTING

The external painting of the electric motor is RAL 7031 grey by default according to DIN 1843 standard. Electric motor with different painting can be supplied on request.2

VENTILATION & COOLING

External ribbed frame and cooling fan directly fixed on the non-drive end of the motor shaft ensure the motor cooling. Cooling fans are radial and centrifugal and they ventilate the motor, irrespective of rotation. The steel cowl with standard test-finger proof openings of the cooling fan is suitably shaped so as objects with diameter or thickness greater than 8mm cannot be entered. However, under any circumstances sufficient and free air flow is accomplished.

CORES AND COILS

Stator and rotor core are manufactured from silicon according to ARMCO system, which ensures greater flat surface, higher insulation with smaller thickness and low losses from hysteresis and eddy currents for the same silicon content.

Significant reduction of harmonics and magnetic noise of the electric motor is achieved by the proper choice of coil step. The total coil consisted of wires, insulations and impregnation mass, is compatible with the requirements of insulation class B according to DIN and IEC standards, with allowable temperature rise of 80°C, when ambient temperature is 40°C. The rotors of the electric motors are squirrel cage.

INSULATION SYSTEM

The insulation of wires, corrugations, heads and impregnated mass are compatible with requirements of insulation class B (with maximum allowable temperature rise of 80°C for insulation class B and 100°C for insulation class F). However, due to the fact that temperature rise is substantially lower in most of the cases, greater life time operation is achieved, even when there are short overloads or operation of the electric motor under low voltage. The life time of the insulations depends on the ambient temperature rise. Also, electrical and mechanical strains, vibrations, ambient and chemical effects, fungi and feculences effects may affect lifetime of insulations considerably.

POWER AND TEMPERATURE

The rated power and the technical data operation and starting of the electric motors refer to (according VDE 0530 standard)

- Ambient temperature (especially the temperature of cooling air) 40°C.
- Altitude no more than 1.000m
- Continuous operation (of duty type S1)

The maximum allowable coil temperature rise (using resistance method) is 80grd. The maximum allowable coil temperature comes from the maximum temperature of insulation class (130°C for class B) deducting ambient temperature of 40°C.

Ambient temperature greater than 40°C means reduction of maximum allowable coil temperature rise. Especially speaking:

- By 5grd at ambient temperature 41-45°C.
 - By 10grd at ambient temperature over 50°C.
- Special agreement is necessary for each needful reduction of maximum allowable coil temperature rise at ambient temperature over 50°C.

In case of ambient temperature lower than 40°C is possible to be agreed especially for each case, greater maximum allowable coil temperature rise. The coil temperature is not allowed to exceed the maximum allowable temperature of insulation class under any circumstances.

Installation and operation of the electric motors at altitudes more than 1.000m from the sea level means reduction of rated power.

According VDE 0530 standard, the coil temperature rise of the electric motors, which are predestinate for operation at altitude 1.000 up to 4.000m, is not allowed to exceed the value:

$$80-8(h=1000)/1000(\text{grd})$$

when the electric motors are tested in normal altitude (under 1.000m) with insulation class B. For example: Predestinate electric motor for operation at altitude 2.000m is not allowed to appear temperature rise during its test greater than:

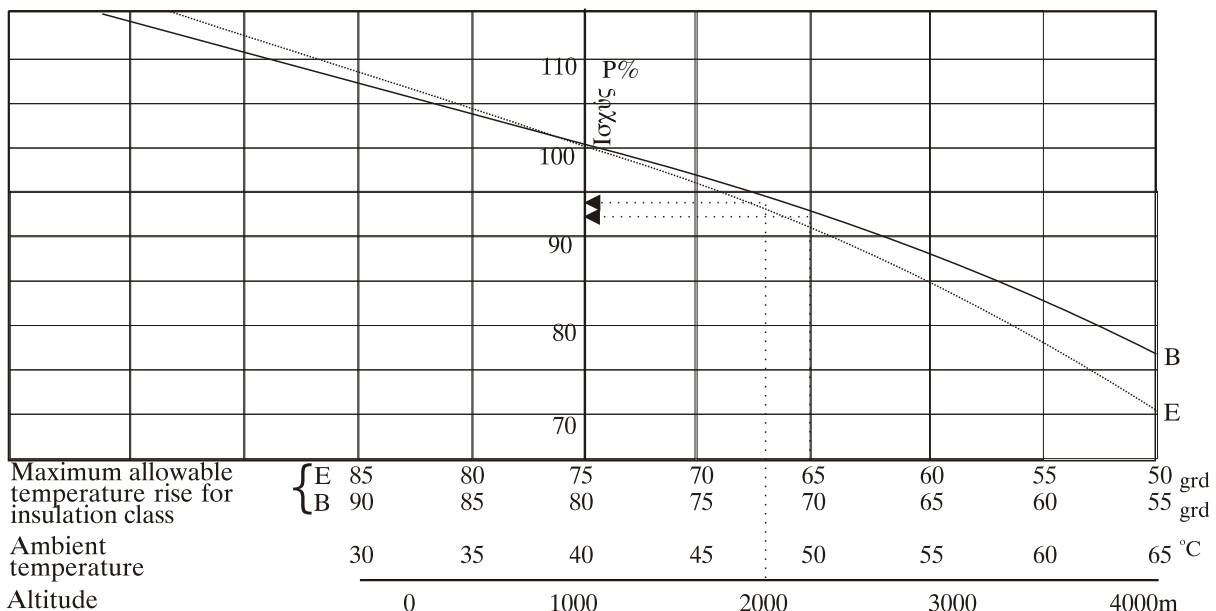
$$80-8(2.000-1.000)/1.000 = 72\text{grd}$$

The reduction of rated power for electric motor under ambient temperature over 40°C and altitude more than 1.000m is given in the next diagram.

For example: Ambient temperature 50°C means maximum allowable coil temperature rise reduction (for insulation class B) 80 up to 70grd and rated power reduction at 92% of the nominal. Installation of the electric motor at altitude 2.000m means maximum allowable coils temperature rise reduction (for insulation class B) 80 up to 70grd and rated power reduction at 94% of the nominal. The mentioned needful reduction of the maximum allowable temperature rise due to altitude installation more than 1.000m, takes into account the worst cooling conditions of electric motor in greater altitudes. However, if these worst cooling conditions at altitudes more than 1.000m are compensated for corresponding reduction in cooling air temperature, then it is possible for the electric motor to perform its nominal power. The related requested cooling temperatures are given in the next table

Installation Altitude	Maximum allowable air temperature for performing nominal power
0 εώς 1000m.....	40°C
1000 εώς 2000m	32°C
2000 εώς 3000m.....	24°C
3000 εώς 4000m.....	16°C

Electric motors of this catalogue are likely to withstand (according VDE 0530 standard) overload which corresponds to current up to 150% of its nominal value, for period time two (2) minutes



TECHNICAL DATA

ASYNCHRONOUS THREE PHASE TOTAL ENCLOSED SQUIRREL CAGE ELECTRIC MOTORS

2 POLE

3000RPM-50Hz

Frame Size	Type	Power		Current at 380V	Rotation RPM	Efficiency %	cosφ	Starting Characteristics			Weight Kg
		HP	KW					Ia/In	Ma/Mn	Mm/Mn	
63	0.25/2	0.16	0.18	0.51	2840	67	0.80	5	2	2.25	3.4
63	0.33/2	0.33	0.25	0.61	2840	73	0.85	6	2	2.25	3.8
71	0.50/2	0.50	0.37	0.94	2860	72	0.83	5.2	2	2.25	5.1
71	0.75/2	0.75	0.55	1.28	2870	75	0.87	5.5	2	2.25	6.3
80	1/2	1	0.75	1.85	2850	74	0.82	6	2.3	2.8	10.2
80	1.5/2	1.5	1.1	2.55	2850	77	0.85	5.5	2.7	3.0	12.0
90L	2/2	2	1.5	3.50	2840	79	0.89	6.1	2.6	3.0	15.2
90L	3/2	3	2.2	4.60	2840	81	0.89	6.6	2.8	2.8	18.8
100L	4/2	4	3.0	6.10	2860	83	0.91	7.4	2.5	2.7	21.0
112M	5.5/2	5.5	4.0	8.0	2870	84	0.92	6.9	2.7	2.9	29
132M	7.5/2	7.5	5.5	10.8	2910	86	0.90	7	2.6	2.5	41
132M	10/2	10	7.5	14.5	2910	87	0.90	7.2	2.7	2.9	47
160M	15/2	15	11	21.1	2920	88	0.90	6.6	2.6	2.8	93
160M	20/2	20	15	27.5	2920	90	0.92	7.3	2.9	2.8	104
160L	25/2	25	18.5	33.9	2920	90	0.92	7.3	2.9	2.2	123
180M	30/2	30	22	41.5	2930	90.5	0.89	6	2.1	2.3	175
200L	40/2	40	30	59.7	2940	89.5	0.86	5.3	2.2	2.2	225
200L	50/2	50	37	71.5	2940	90.2	0.87	5.3	2.1	2.1	238
225M	60/2	60	45	85.5	2940	91	0.88	6	2.3	2.2	280
250M	75/2	75	55	104	2960	91	0.89	6	2.1	2.1	360
280S	100/2	100	75	141	2960	91	0.89	6.8	2.1	2.4	450
280M	125/2	125	90	166	2960	91.5	0.90	6	2.1	2.4	505
315S	150/2	150	110	201	2960	92	0.90	7	2.5	3.3	695
315M	180/2	180	132	234	2960	93	0.92	6.6	2	2.7	775
355S	220/2	220	160	292	2965	93.5	0.89	6.5	1.5	2.0	930
355M	270/2	270	200	364	2965	94	0.89	6.5	1.5	2.0	1090
355L	340/2	340	250	426	2976	95	0.94	7	1.3	2.9	1600
355L	430/2	430	315	536	2976	95	0.94	7	1.3	2.8	1750

Ia- Starting current

In- Current at rated load

Ma- Starting torque

Mn- Torque at rated load

Mmax- Maximum running torque

TECHNICAL DATA

ASYNCHRONOUS THREE PHASE TOTAL ENCLOSED SQUIRREL CAGE ELECTRIC MOTORS

4 POLE

1500RPM-50Hz

Frame Size	Type	Power		Current at 380V	Rotation RPM	Efficiency %	cosφ	Starting Characteristics			Weight Kg
		HP	KW					Ia/In	Ma/Mn	Mm/Mn	
63	0.17/4	0.17	0.12	0.48	1360	58	0.65	4	2	2.1	3.6
63	0.25/4	0.25	0.18	0.67	1400	64	0.64	4	2	2.25	4.0
71	0.33/4	0.33	0.25	0.87	1370	64	0.68	4	2	2.4	5.3
71	0.50/4	0.50	0.37	1.16	1370	69	0.70	4	2	2.25	6.3
80	0.75/4	0.75	0.55	1.55	1400	70	0.77	3.8	2	2.4	8
80	1/4	1	0.75	2.10	1400	72	0.77	4.3	2.5	2.8	9
90L	1.5/4	0.5	1.1	2.8	1410	75	0.80	4.8	2.3	2.5	14
90L	2/4	2	1.5	3.7	1410	77	0.80	5.3	2.5	2.8	16
100L	3/4	3	2.2	5.4	1430	81	0.80	6	2.4	2.6	21
100L	4/4	4	3	6.09	1440	82	0.82	6	2.4	2.8	23
112M	5.5/4	5.5	4	8.6	1440	84	0.84	6.4	2.5	2.9	32
132M	7.5/4	7.5	5.5	11.5	1450	86	0.84	6.2	2.3	2.4	46
132M	10/4	10	7.5	15.4	1450	87	0.85	6.4	2.4	2.3	55
160M	15/4	15	11	22.6	1460	89	0.83	6.2	2.3	2.2	101
160L	20/4	20	15	30.1	1450	90	0.84	6.5	2.4	2.0	123
180M	25/4	25	18.5	37	1460	89.5	0.85	5.5	2.0	2.1	170
180L	30/4	30	22	43.5	1460	89.5	0.86	5.4	2.1	2.1	185
200L	40/4	40	30	59.5	1460	91	0.84	5.3	2.2	2.0	245
225S	50/4	50	37	71	1465	91	0.87	5.5	2.2	2.3	270
225M	60/4	60	45	86	1465	91.5	0.87	5.5	2.3	2.3	305
250M	75/4	75	55	104	1470	92	0.87	6	2.2	2.0	380
280S	100/4	100	75	143	1470	92	0.87	5.5	2.1	2.3	480
280M	125/4	125	90	169	1470	92.5	0.87	5.5	2.2	2.3	520
315S	150/4	150	110	194	1475	93	0.92	6.8	1.8	3.4	695
315M	180/4	180	132	229	1475	94	0.93	7	1.9	3.5	770
355S	220/4	220	160	292	1485	93.5	0.89	6.5	1.5	2.0	950
355M	270/4	270	200	364	1485	94	0.89	6.5	1.5	2.0	1100
355L	340/4	340	250	464	1485	94	0.88	6.5	2.6	2.3	1700
355L	430/4	430	315	588	1485	94.5	0.88	6.5	2.7	2.3	1850

Ia= Starting current

In= Current at rated load

Ma= Starting torque

Mn= Torque at rated load

Mmax= Maximum running torque

TECHNICAL DATA

ASYNCHRONOUS THREE PHASE TOTAL ENCLOSED SQUIRREL CAGE ELECTRIC MOTORS

6 POLE

1000RPM-50Hz

Frame Size	Type	Power		Current at 380V	Rotation RPM	Efficiency %	cosφ	Starting Characteristics			Weight Kg
		HP	KW					Ia/In	Ma/Mn	Mm/Mn	
80	0.5/6	0.5	0.37	1.25	950	68	0.66	3.8	2.2	2.8	10
80	0.75/6	0.75	0.55	1.8	950	70	0.69	3.9	2.3	2.7	12
90L	1/6	1	0.75	2.3	940	71	0.71	3.8	2.2	2.6	14
90L	1.5/6	1.5	1.1	3	940	74	0.73	4.5	2.4	2.6	16
100L	2/6	2	1.5	4.1	950	77	0.76	5	2.2	2.4	23
112M	3/6	3	2.2	5.7	960	80	0.75	5.1	2.1	2.4	32
132M	4/6	4	3	7.1	950	82	0.78	5.8	2.2	2.4	42
132M	5.5/6	5.5	4	9.3	950	84	0.78	6	2.4	2.6	51
132M	7.5/6	7.5	5.5	12.6	950	85	0.78	6.1	2.4	2.6	56
160M	10/6	10	7.5	16.5	970	87	0.79	6	2.2	2.4	110
160L	15/6	15	11	23.7	970	88	0.80	6.1	2.2	2.4	130
180L	20/6	20	15	31.5	980	88.5	0.82	6.8	2.1	2.8	180
200L	25/6	25	18.5	37.6	975	89	0.84	5.5	2.2	2.4	230
200L	30/6	30	22	44	975	89.5	0.85	5.5	2.2	2.4	240
225M	40/6	40	30	58.5	975	90.5	0.86	5.5	2.1	2.0	290
250M	50/6	50	37	71.5	985	90.7	0.87	5	2.0	2.0	355
280S	60/6	60	45	89.5	985	91	0.84	5	2.3	2.2	420
280M	75/6	75	55	109	985	91.5	0.84	5.4	2.3	2.2	470
315S	100/6	100	75	142	985	92	0.87	5.9	2.3	2.3	615
315M	125/6	125	90	168	985	93	0.88	5.9	2.1	2.2	705
315M	150/6	150	110	203	985	93.6	0.88	7.4	1.6	2.0	900
355S	180/6	180	132	240	985	94	0.89	7.4	1.6	2.0	1100
355M	220/6	220	160	302	988	94	0.88	6.5	2.5	2.7	1300
355L	270/6	270	200	380	989	94	0.88	6.5	2.5	1.9	1500
355L	340/6	340	250	473	989	94.5	0.88	6.5	2.5	1.9	1600

Ia- Starting current

In- Current at rated load

Ma- Starting torque

Mn- Torque at rated load

Mmax- Maximum running torque

TECHNICAL DATA

ASYNCHRONOUS THREE PHASE TOTAL ENCLOSED SQUIRREL CAGE ELECTRIC MOTORS

8 POLE

750RPM-50Hz

Frame Size	Type	Power		Current at 380V	Rotation RPM	Efficiency %	cosφ	Starting Characteristics			Weight Kg
		HP	KW					Ia/In	Ma/Mn	Mm/Mn	
90L	0.50/8	0.50	0.37	1.4	700	64	0.63	3.2	1.9	2.3	13
90L	0.75/8	0.75	0.55	2	700	64	0.64	3.2	1.9	2.3	14
100L	1/8	1	0.75	2.8	710	69	0.64	3.8	1.9	2.4	21
100L	1.5/8	1.5	1.1	3.3	710	73	0.71	3.9	1.8	2.4	23
112M	2/8	2	1.5	4.3	710	75	0.70	4.4	2.1	2.5	32
132M	3/8	3	2.2	6	710	78	0.72	4.5	1.9	2.1	42
132M	4/8	4	3	7.9	710	80	0.72	4.5	1.9	2.1	51
160M	5.5/8	5.5	4	10.1	720	83	0.72	4.6	1.9	2.2	90
160M	7.5/8	7.5	5.5	13.5	720	83.5	0.74	4.7	2.0	2.2	110
160L	10/8	10	7.5	17.9	720	86	0.74	5.2	2.1	2.3	130
180L	15/8	15	11	25	730	87	0.77	5.3	1.8	2.5	180
200L	20/8	20	15	34.4	730	87.5	0.76	4.5	1.9	2.0	240
225S	25/8	25	18.5	41	730	87.5	0.78	4.5	2.0	2.0	260
225M	30/8	30	22	48	730	88	0.79	4.8	2.0	2.0	280
250M	40/8	40	30	66.5	735	89.5	0.78	5	2.0	2.0	355
280S	50/8	50	37	81	735	90	0.77	5	2.3	1.9	445
280M	60/8	60	45	96	735	91	0.78	5	2.3	2.0	495
315S	75/8	75	55	116	740	91	0.79	5	2.4	2.4	620
315M	100/8	100	75	156	740	92	0.80	5	2.3	2.3	765
315M	125/8	125	90	175	740	93	0.81	5	1.5	2.0	970
355S	150/8	150	110	220	740	94	0.81	5	1.5	2.0	1180
355M	180/8	180	132	266	739	93	0.81	5.5	2.2	2.5	1200
355L	220/8	220	160	332	741	93.5	0.93	5	2.4	1.7	1400
355L	270/8	270	200	415	741	94	0.93	5	2.4	1.7	1500

Ia- Starting current

In- Current at rated load

Ma- Starting torque

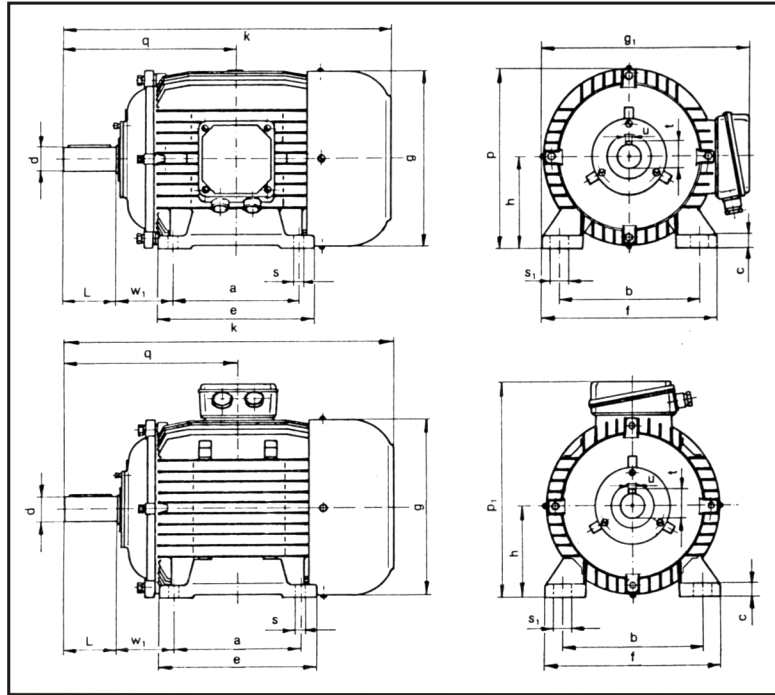
Mn- Torque at rated load

Mmax- Maximum running torque

EFFICIENCY AND PERFORMED POWER UNDER SEVERAL LOAD CONDITIONS

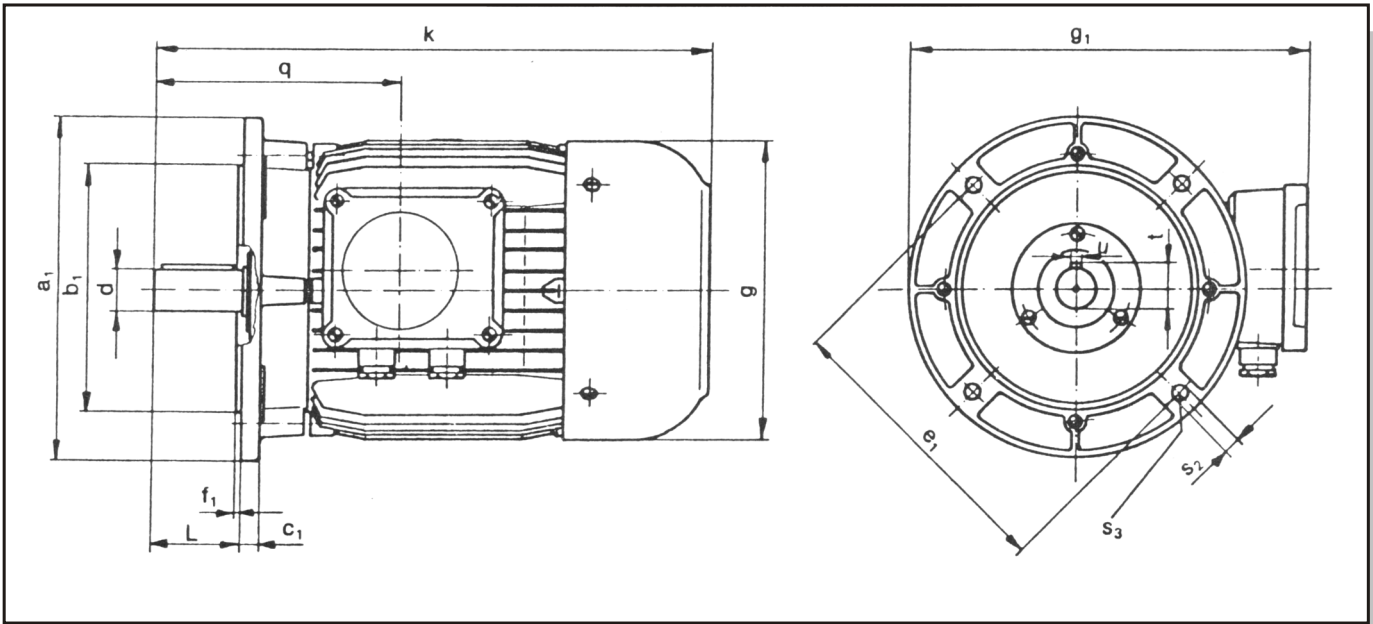
EFFICIENCY $\eta\%$					PERFORMED POWER $\cos\phi$				
1/4	2/4	3/4	4/4	5/4	1/4	2/4	3/4	4/4	5/4
91	95	96	95	94	0.62	0.80	0.89	0.92	0.92
90	94	95	94	93	0.61	0.79	0.88	0.91	0.91
89	93	94	93	91	0.60	0.78	0.87	0.90	0.90
88	92	93	92	90	0.59	0.77	0.86	0.89	0.90
85	91	92	91	89	0.58	0.76	0.85	0.88	0.89
83	90	91	90	88	0.57	0.75	0.84	0.87	0.88
82	89	90	89	87	0.56	0.74	0.83	0.86	0.87
81	88	89	88	86	0.53	0.72	0.81	0.85	0.86
80	87	88	87	85	0.52	0.71	0.80	0.84	0.85
79	86	87	86	84	0.51	0.70	0.79	0.83	0.84
78	86	87	85	83	0.50	0.70	0.78	0.82	0.83
77	84	85	84	82	0.48	0.67	0.76	0.81	0.83
76	83	84	83	81	0.45	0.59	0.73	0.80	0.82
84	82	83	82	80	0.39	0.56	0.70	0.79	0.82
72	81	82	81	79	0.38	0.55	0.69	0.78	0.81
70	80	81	80	77	0.37	0.54	0.68	0.77	0.80
68	78	81	79	76	0.36	0.53	0.66	0.76	0.79
64	75	79	78	75	0.35	0.52	0.65	0.75	0.78
62	74	78	77	74	0.34	0.51	0.64	0.74	0.77
60	73	77	76	73	0.33	0.50	0.63	0.73	0.75
58	72	76	75	72	0.32	0.48	0.62	0.72	0.75
57	71	75	74	71	0.31	0.47	0.61	0.71	0.74
56	70	74	73	70	0.31	0.47	0.60	0.70	0.73
55	69	73	72	69	0.30	0.46	0.59	0.69	0.72
54	68	72	71	68	0.30	0.46	0.58	0.68	0.71
53	67	71	70	67	0.29	0.45	0.57	0.67	0.70
52	66	70	69	66	0.29	0.45	0.56	0.66	0.69
52	65	69	68	65	0.28	0.44	0.55	0.65	0.68
51	64	68	67	64	0.28	0.44	0.54	0.64	0.67
51	64	67	66	63	0.27	0.43	0.53	0.63	0.66
50	63	66	65	62	-	-	-	-	-
49	63	65	64	61	-	-	-	-	-
47	61	64	63	60	-	-	-	-	-
45	60	63	62	59	-	-	-	-	-
43	60	62	61	58	-	-	-	-	-
42	59	61	60	57	-	-	-	-	-
41	58	60	59	55	-	-	-	-	-
41	57	59	58	54	-	-	-	-	-
40	56	58	57	53	-	-	-	-	-
40	55	57	56	52	-	-	-	-	-
39	54	56	55	51	-	-	-	-	-

DIMENSION DRAWING



Frame Size	h	a	b	c	e	f	g	g1	k	q	p1	q	s	s1	t	u	w1	dxL	
																		2468	
63	63	80	100	10	105	125	123	175	210.5	124.5	175.5	98	7	12	12.6	4	40	11x23	
71	71	90	112	11	108	140	138	191.5	242	140	192.5	112.5			16.1	5	45	14x30	
80	80	100	125		13	125	160	156	218.5	273.5	158	218.5	124	9.5	17.5	21.5	6	50	19x40
90s	90		140	130		182	176	239.5	300.5	178	238.5	145.5	26.9			8	56	24x50	
90L		125	155	325.5	325.5	325.5	325.5	325.5	325.5					325.5	325.5			325.5	325.5
100L	100	140	160	14	175	200	194	257.5	365.5	197	257.5	162.5	11.2	21.2	30.9	10	89	28x60	
112M	112		190		218	260	258	322.5	447	485	262	324.5			194			41.3	38x80
132S	132	178	216	16	218	260	258	322.5	447	262	324.5	194	13	23	45.1	12	108	42x110	
132M																		210	254
160M	160	254	254	22	304	318	310	385	588	315	386	323	13	23	45.1	12	108	42x110	
160L																		241	279
180M	180	279	279	24	329	360	351	435	653	355	435	351	13	23	51.5	14	121	48x110	
180L																		291	360
200L	200	305	318	26	365	400	385	475	746	394	475	396	18	33	58.8	16	133	55x110	
225S	225	286	356	30	346	436	433	517	777	443	524	402			18	33	63.8	18	149
225M		311			371				777			807	415	445			58.8	16	
250M	250	349	406	35	410	485	480	570	889	491	577	483	22	40	63.8	18	168	55	60
280S	280	368	457	38	439	536	537	649	970	548	661	514			22			40	69.2
280M		419			490				1021			540	69.2	79.6		18	140		140
315S-2	315	406	508	40	500	608	630	760	1048	760	915	630	26	45	69	18	216	65x140	
-4.6.8									1114			668			85			22	80x170
315M-2	315	457	538	40	538	608	630	760	1122	760	915	673	26	45	69	18	216	65x140	
-4.6.8									1152			692			85			22	80x170
355L-2	355	630	610	40	880	720	760	915	1352	915	915	611	28	50	74.5	20	254	70x140	
-4.6.8									1480			888			106			28	100x210

DIMENSION DRAWING



Frame Size	A	a ₁	b ₁	e ₁	c ₁	f ₁	g	g ₁	k	q	s ₂	d x L		t	u	S3
												2	4 6 8			
63	A140	140	95	115	10	3	123	182.5	210.5	98	9	11x23	12.6	4	4xM 8	
71	A160	160	110	130			138	201.5	242	112.5		124	14x30	16.1		5
80	A200	200	130	160	12	3.5	156	238.5	273.5	124	11	19x40	21.5	6	4xM 10	
90s					176		248.5	300.5	145.5	24x50		26.9	8			
90L	A250	250	180	215	10	4	194	254.5	365.5	162.5	13	28x60	30.9	4xM 12		
100L					218		294.5	383.5	157.5	38x80		41.3	10			
112M	A300	300	230	265	12	5	258	342.5	447	194	17	42x110	45.1	12	4xM 18	
132S					485		588	323	632	346		48x110	51.5	14		
132M	A350	350	250	300	13	5	310	401	653	351	17	55x110	58.8	16	8xM 18	
160M					351		430	691	370	60		65	63.8	18		
160L	A400	400	300	350	15	5	386	475	746	396	17	x x	58.8	16	8xM 18	
180M					747		402	777	432	60		65	63.8	18		
180L	A450	450	350	400	16	5	433	524	777	415	17	110	140	58.8	16	8xM 18
200L					807		445	60	65	68.8		18				
225S	A550	550	450	500	18	5	480	802	889	483	17	x x	68.8	18	8xM 18	
225M							970	514	140	140		69.2	20			
250M	A550	550	450	500	18	5	557	656	970	514	17	65	75	79.6	20	8xM 18
280S							1021	540	140	140		69.2	18			
280M	A660	660	550	600	22	6	630	420	1084	575	24	140	140	79.6	20	50
315S-2									1114	589		65x140	69	18		
315S-4.6.8	A660	660	550	600	22	6	630	420	1122	595	24	80x170	85	22	50	
315M-2									1152	610		65x140	69	18		
315M-4.6.8	A660	660	550	600	22	6	630	420	1122	595	24	80x170	85	22	50	
315M-4.6.8									1152	610		80x170	85	22		



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