

GENERAL CATALOGUE

DELPHI SERIES ASYNCHRONOUS THREE-PHASE ELECTRIC MOTORS





CERTIFICATO ◆ CERTIFICADO ◆ CERTIFIKAT ◆ CERTIFICATE ◆ ZERTIFIKAT ◆



CERTIFICATO

Nr. 50 100 1188 - Rev. 03

Si attesta che (This is to certify that)
 IL SISTEMA QUALITÀ DI
 THE QUALITY SYSTEM OF
MOTIVE S.r.l.



VIA ARTIGIANALE 110/112
 I-25010 MONTURONE (BS)

È CONFORME AI REQUISITI DELLA NORMA
 HAS BEEN FOUND TO CONFORM TO THE REQUIREMENTS OF
UNI EN ISO 9001:2000

Questo certificato è valido per i seguenti campi di applicazione
 This certificate is valid for the following product or service range

**Progettazione, gestione produzione e assistenza di motori
 elettrici, riduttori meccanici ed accessori per la trasmissione
 di potenza (da 15, 18)**
**Design, manufacture management and service of electrical
 motors, mechanical reducers and accessories for power
 transmission (da 15, 18)**

Validità:
 2006-06-01

Per l'Organismo di Certificazione
 For the Certification Body
TUV Italia S.r.l.



[Signature]
 Massimo Cristofari
 Responsabile

Emissione del certificato SINCERT per la prima volta in data 2001-07-20
 La validità del presente certificato è subordinata e condizionata periodicamente a 12 mesi al rinnovo
 completo del sistema di gestione aziendale con procedure approvate





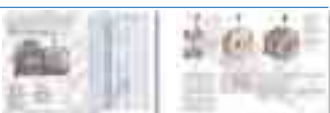







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TECHNICAL CHARACTERISTICS

Motive motors are built according to international standard regulations; each size throughout the construction forms is calculated with reference to the tables of standard IEC 72-1.

Motive asynchronous three-phase Delphi series motors are closed, and externally ventilated.

The frame, up to 132 included, is made in die casting aluminium alloy, from size 160 up to 355 the frame is made in cast iron.

All motors are multiple voltage multi-frequency 50/60Hz, F class insulation, S1 continuous duty service, IP55 protection 1 or 2 efficiency class tropicalized.

EFF 1

EFF 2



PATENTED



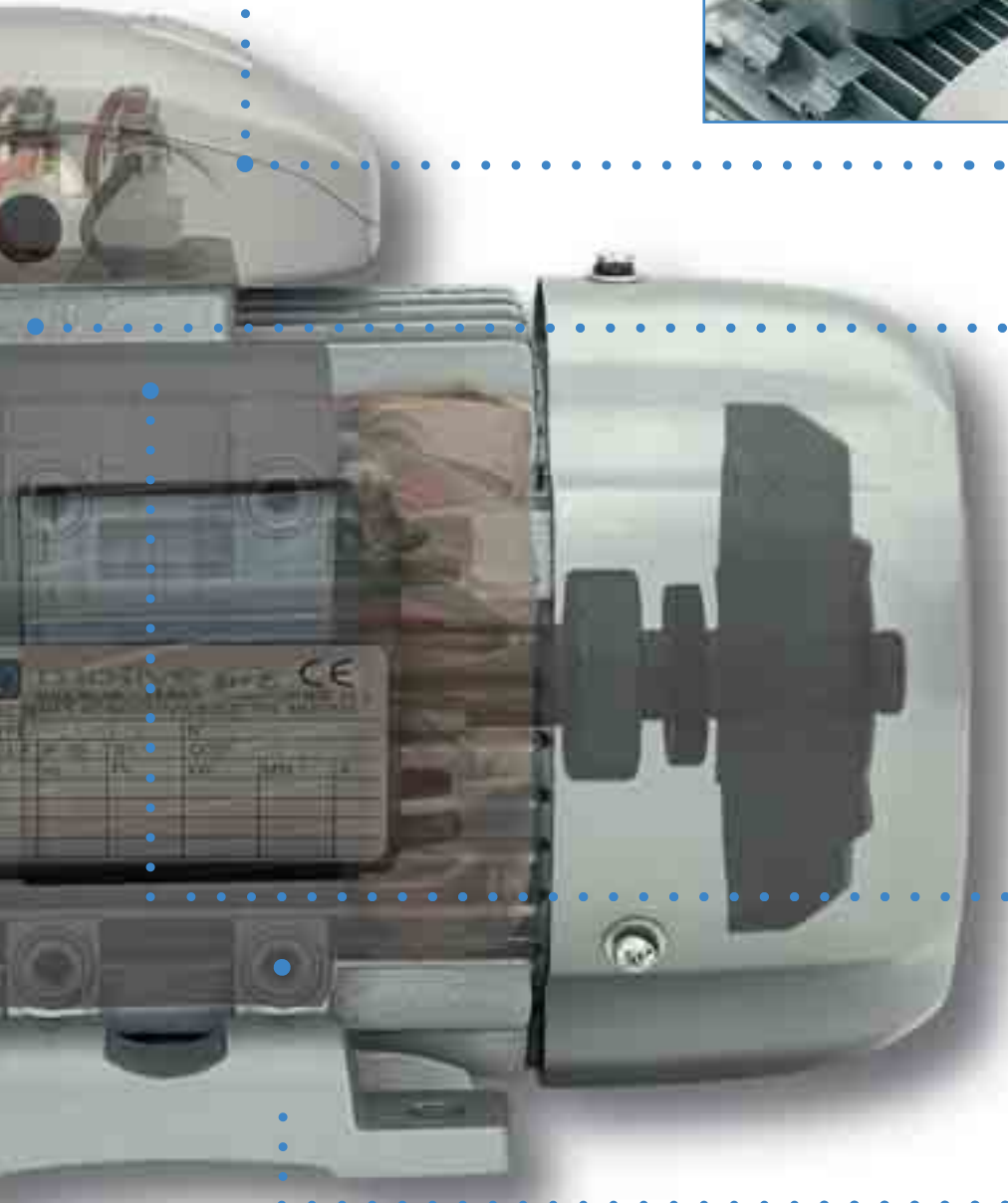
The copper is impregnated with a double layer of H class insulating enamel to ensure high resistance to electrical, thermal and mechanical stress.

The phases are further isolated by another layer of Nomex film to protect the motors from the voltage peaks that usually occur when the motor is controlled by an inverter.

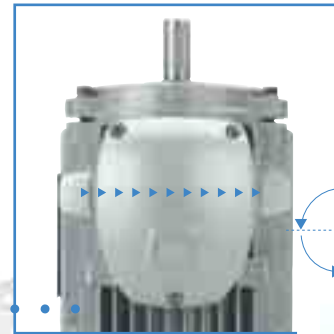
motive motors adopt only bearings selected for their silence and reliability and, for the same objectives, the cage rotor is dynamically balanced according to IEC 34-14 and ISO 9921 norms



Blocking the bearings into their slots with snap rings prevents them from moving axially. From type 90, a steel insert is provided in the bearing slot of the aluminum flanges, to resist to radial mechanical forces with a fair degree of security



Aiming the maximum protection, the motors are equipped with important details like the pull-resistant cable press and the combination of bearings with two shields each with rubber seal rings



Cable press can be easily moved on both the sides of the connection box, thanks to the screw cap



the connection box can be rotated of 360° with steps of 90°

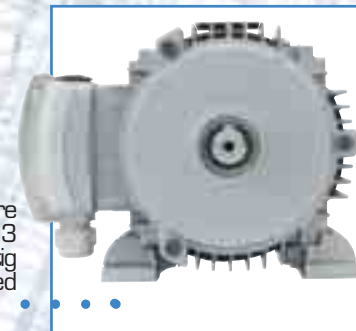
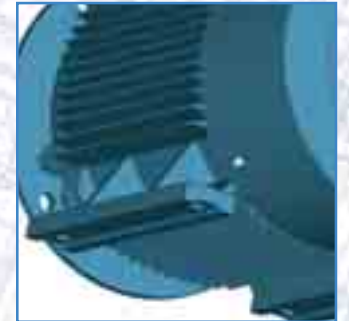


To protect them by the rust, motive motors are painted in silver RAL9006 colour



Performance excellence is granted by the FeV magnetic lamination sheets adoption, instead then the usual normal FePO1, FeV lamination sheets provide higher efficiency, lower heating, energy saving and longer life to isolation materials

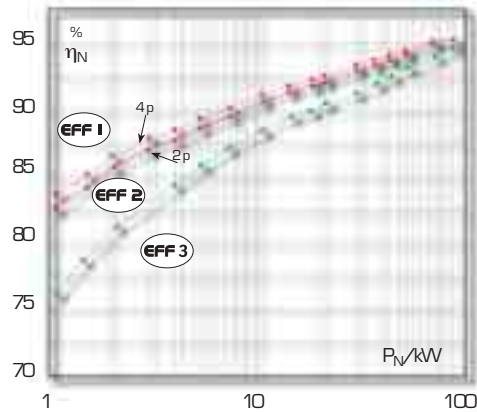
From size 160 and up, due to the high torque, the motors are fixed by feet that are die-casted with the iron frame



From size 56 to size 132, feet are detachable, and can be fixed on 3 sides of the housing, thus permitting the terminal box to be positioned up, right or left.

EFFICIENCY

The European Agreement issued by the European Commission and CEMEP (European Committee of Manufacturers of Electrical Machines and Power Electronics), establishes a new classification system of electric motors based on the efficiency. The reference values are shown by the attached diagram and the following paragraph.



There are no requests about minimum efficiency, but it is defined clearly which are the motors classified efficiency 1, 2 and 3.

Motive has organized its production respecting the parameters indicated by the new European classification. Client's benefits are of many kinds

Motors 2 poles			
kW	efficiency		
	eff3	eff2	eff1
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	>91.8
22	<90.5	≥90.5	>92.2
30	<91.4	≥91.4	>92.9
37	<92.0	≥92.0	>93.3
45	<92.5	≥92.5	>93.7
55	<93.0	≥93.0	>94.0
75	<93.6	≥93.6	>94.6
90	<93.9	≥93.9	>95.0

Motors 4 poles			
kW	efficiency		
	eff3	eff2	eff1
1.1	<76.2	≥76.2	>83.8
1.5	<78.5	≥78.5	>85.0
2.2	<81.0	≥81.0	>86.4
3	<82.6	≥82.6	>87.4
4	<84.2	≥84.2	>88.3
5.5	<85.7	≥85.7	>89.2
7.5	<87.0	≥87.0	>90.1
11	<88.4	≥88.4	>91.0
15	<89.4	≥89.4	>91.8
18.5	<90.0	≥90.0	>92.2
22	<90.5	≥90.5	>92.6
30	<91.4	≥91.4	>93.2
37	<92.0	≥92.0	>93.6
45	<92.5	≥92.5	>93.9
55	<93.0	≥93.0	>94.2
75	<93.6	≥93.6	>94.7
90	<93.9	≥93.9	>95.0

BILL EFFECTS

Bill effects are the first to be in evidence. The calculation changes depending by the use circumstances, but we can say that efficiency 2 motors allow a saving of about 20%. For instance, a 15kW motor, for an operation period of 6.000 hours per year, can save about 2 MWh/a or more: about 100 Euro of yearly operation costs

DURABILITY EFFECTS

Higher efficiency motors heat less, slowing down the aging cycle of the insulating materials and living longer. Average operating life of Eff.2 Motive motors is:

2500 hours/ year for motors up to 15kW

4000 hours/year for bigger motors
The average life is approximately from 25 to 30.000 hours for the first and 50,000 for the second ones

AMBIENT EFFECTS

Efficiency 2 motors guarantee great energy and money savings, with an objective of sustainable development, reduction of CO₂ emissions and consequent improvement of the quality of the atmosphere

HOW TO MAKE A MORE EFFICIENT MOTOR?

High efficiency can be seen in many ways: like the relation between output power and input absorbed power, or like a measure of the losses that born when converting the electric power in mechanical energy.

From another perspective, high efficiency motors consume less energy to produce the same torque

on the shaft. Basically, an high efficiency motor is the result of precise workings, lower frictions, a dynamically balanced rotor, smaller space between rotor and stator and of the use of better materials. The main factors for the design are based on the choice of the type of lamination sheets and windings with a greater coil number and a bigger diameter wire..

Among all materials that compose a motor, laminations have the highest influence on performance

SILICON MAGNETIC LAMINATIONS
Motive motors are made with FeV magnetic lamination sheets, rather than the customary normal Fe PO1 iron lamination sheets.

Further than raw material, the sheets thickness is another performance source. In fact, the thinner is the sheet, the higher are the performances.

The lamination sheets Fe PO1 can reach up to 1mm thickness.

FeV magnetic lamination sheets have a 0,5mm maximum thickness.

Composition and thickness give to magnetic lamination sheets a very low W/Kg loosing factor:

Lower specific losses mean less magnetising current for the same Power and torque (thus less heating).

EURO NORM	W/ Kg a 1T	W/ Kg a 1,5T
106- 84	1,70	4,00

data at 400V 50Hz

Instead, no standard prescribes a maximum loosing factor for Fe PO1 lamination sheets; although we can say that generally this is at least the double of FeV lamination sheets, not even this data can be guaranteed. This is a source of potential performance diversities between motor and motor.







The reason of a longer life is based on the lower heating that lengthens the ageing cycle of the insulation materials.

Between all the raw materials that compose an asynchronous electric motor, lamination sheets iron is the main performance discriminating factor.






The main advantages given by the adoption of silicon magnetic laminations are:

- higher efficiency
- better guarantees on the quality constancy, assured by tolerances reported in international norms

CE marking is referred to:

-  Community Low Voltage Directive (LVD) 73/23 EEC, modified by the Community Directive regarding marking 93/68 EEC
-  EN 50082-1 (last issue). Electromagnetic compatibility - Generic immunity standard - Part 1: residential and light industry environment
-  Community Electromagnetic Compatibility Directive (EMC) 89/336 EEC and its modifications 91/263 EEC, 92/31 EEC e 93/68 EEC
-  EN 50081-2 (last issue). Electromagnetic compatibility - Generic emission standard - Part 2: Industrial environment
-  Community Machinery Directive (MD) 89/392 EEC and its modifications 91/368 EEC, 93/44 EEC e 93/68 EEC
-  EN 50082-2 (last issue). Electromagnetic compatibility - Generic immunity standard - Part 2: Industrial environment





CE marking is put by Motive as a visible sign of the product compliance with the requirements of above mentioned directives. In order to reach this conformity, Motive products respect the following product standards:

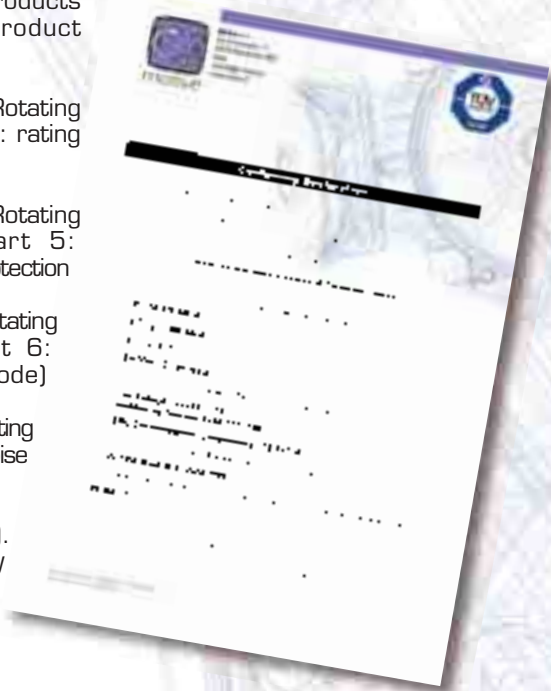
-  EN 60034-1 (last issue). Rotating electrical machines. Part 1: rating and performance
-  EN 60034-5 (last issue). Rotating electrical machines. Part 5: classification of degrees of protection
-  EN 60034-6 (last issue). Rotating electrical machines. Part 6: methods of cooling (IC code)
-  EN 60034-9 (last issue). Rotating electrical machines. Part 9: noise limits
-  EN 50081-1 (last issue). Electromagnetic compatibility - Generic emission standard - Part 1: residential and light industry environment



In order to meet the safety concerns in dust-filled atmospheres, the Delphi series motors are also available, upon request, in the version Delphi Ex. Conforming to the Essential safety requirement of the ATEX 94/9/EC European Directive (ATEX 95), these motors have been designed to operate in the zone 22 (Group II Category 3 D Tmax surf. 125°C).

Their "Ex" marking refers to the following norms:

-  CEI EN 50281-1-1 1999-11
 CEI EN 50281-1-1/A1 2002-10
 Electrical apparatus for use in the presence of combustible dust
 Part 1-1: Electrical apparatus protected by enclosures – Construction and testing
-  CEI EN 50281-2-1 1999-11
 Electrical apparatus for use in the presence of combustible dust.
 Part 2-1: Test methods – Methods for determining the minimum ignition temperatures of dust
-  CEI EN 50281-1-2 1999-09
 Electrical apparatus for use in the presence of combustible dust
 Part 1-2: Electrical apparatus protected by enclosures
 Selection, installation and maintenance
-  CEI EN 50014 1998-06
 CEI EN 50014/A1/A2 1999-08
 Electrical apparatus for potentially explosive atmospheres.
 General requirements



PROTECTION TYPE

The protection against people accidental contacts and/or the entry of corps and/or the entry of water is expressed at international level (EN60529) by a symbolic acronym composed by a group of 2 letters and 2 numbers.

IP index of protection reference letters

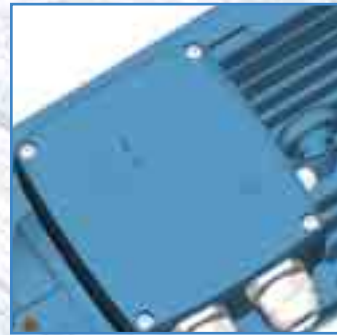
1° num. Protection of people against contacts and protection against the entry of solid corps

2° num. Protection against harmful entry of water

Motive motors are IP55 protected

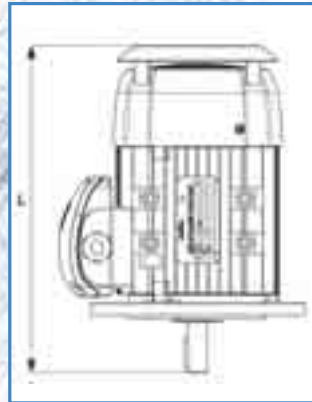
	1° number	2° number
0	no protection	no protection
1	protection against solid corps bigger than 50mm	protection against vertical water drops
2	protection against solid corps bigger than 12mm	protection against water drops fall up to 15° of inclination
3	protection against solid corps bigger than a 2,5mm	protection against water drops up to 60° of inclination
4	protection against solid corps bigger than 1 mm	protection against water sprayed by all directions
5	protection against harmful dust deposits	protection against water launched by a nozzle of 6,3mm D with a water capacity 12,5lt./min at a distance of maximum 3 mt. for 3 min
6*	complete protection against the total penetration of dust*	protection against water projections similar to sea waves*

* OPTIONAL



RAIN SHIELD OR CLEAN FLOW FAN COWL FOR TEXTILE INDUSTRY

For outdoor applications with V5 - V18 - V1 - V15 installation, we recommend to mount a rain shield. This configuration may also be used in textiles processing industry.

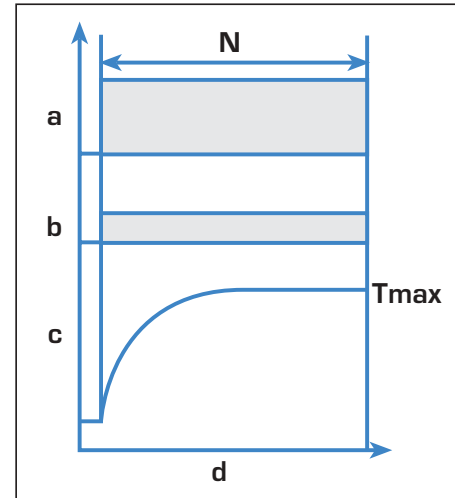


TYPE	L
63	215
71	323
80	369
90S	403
90L	428
100	469
112	453
132S	573
132M	613
160M	770
160L	825
180M	915
180L	955
200L	1025
225S	1155
225M	1160
250M	1220
280S	1265
280M	1315
315S	1540
315M	1570
315L	1680
355M	1840
355L	1870

DUTY SERVICE

All Motive motors shown in this catalogue are made for S1 continuous duty service, as per IEC 34-1 norm. The duty service class is shown on the rating plate. Below are described the various types of service:

S1 - Continuous service:
operating at constant load of duration N in order to reach a thermal balance.



a = load
b = electric losses
c = temperature
d = time
N = steady load operating time
Tmax = max temperature achieved

S2 Limited-duration service: operating at constant load of duration N, less than the time necessary to reach a thermal balance followed by a rest period sufficient in order to restore the balance between the machine temperature and that of the cooling fluid, with a tolerance of 2° C.

S3 Periodic intermittent service: sequence of identical operating cycles, each including a period of operation at constant load N and a rest period R.

In this type of service, the cycles is such that start-up does not significantly affect the peak temperature. For S2 or S3 duties, the rated powers mentioned in this catalogue for S1 service can be increased according to tables that you can ask to the R&D dpt of Motive.

S4 - Periodic intermittent service with start-up: sequence of identical operating cycles, each including a substantial start-up stage D, a constant-load operating period N and a rest period R.

S5 - Periodic intermittent service with electric braking: sequence of operating cycles as for S4, with the addition of a rapid electric braking F.

S6 Uninterrupted periodic service with intermittent load: sequence of identical operating cycles, each including a constant load operating period N and a no-load period V. No rest time is included

S7 Uninterrupted periodic service with electric braking: sequence of operating cycles as for S5, but without a rest period

S8 Uninterrupted periodic service with correlated load and velocity variations: sequence of identical operating cycles, each of which includes a constant-load operating period N corresponding to a pre-set rotation speed, followed by one or more operating periods with other constant loads N2, N3, et., corresponding to different rotation speeds. There is no rest period.

S9 Service with non-periodic variations in load and speed: service in which the load and speed generally vary in a non-periodic fashion within the admissible operating field. This service includes frequently applied overloads which may be greatly superior to the full load.

WORKING CONDITIONS

HUMIDITY:

The electrical equipment must be able to work with a relative humidity between 30 and 95% (without condensation). Damaging effects of occasional condensation must be avoided by adequate equipment design or, if necessary, by additional measures (for example, built-in heating or air-conditioning equipment, drainage holes).

ALTITUDE AND TEMPERATURE:

the powers indicated are intended for regular use at altitudes below 1000 mt above sea level and a room temperature between +5°C and +40°C for motors having a rated power below 0.6 kW, or between -15°C and 40°C for motors having a rated power equal to or greater than 0.6 kW (IEC 34-1): For working conditions rather than those specified (higher altitude and/or temperature) the power decreases of 10% each 10°C of higher temperature, and of 8% for each 1000 mt of higher altitude.

It is not necessary to reduce the rated power if at an altitude higher than 1000mt and lower than 2000mt there is a max ambient temperature of 30°C or; in altitudes from 2000 mt to 3000mt there is a max ambient temperature of 19°C.

VOLTAGE - FREQUENCY:

The maximum variation of the supply voltage is +10%.

Within this tolerance Motive motors supply the rated power.



INSULATION:

The copper is impregnated with a double layer of H class insulating enamel to ensure high resistance to electrical, thermal and mechanical stress.

A NOMEX*/D.M./D.M.D./N.M./N.M.N./M. film that wraps entirely around the coil side insulates the copper and iron from one another.

The phases are further isolated by another layer of NOMEX*/D.M./D.M.D./N.M./N.M.N./M. to protect the motors from voltage peaks that usually occur when the motor is controlled by inverter.

Below is a graph showing the operating temperatures possible for stator windings based on the insulation rating shown on the machine plate

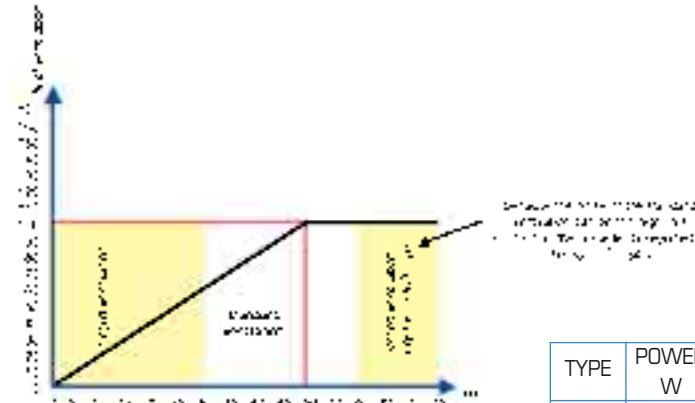
Classe	ΔT (°C)	Tmax (°C)
A	60+5°	105
E	75+5°	120
B	80+5	130
F	105+5°	155
H	125	180

Motive motors are designed to conserve wide margins against eventual overloads, having a temperature rise that is, at rated power, much lower than the operating temperature limit given by their insulation class. This fact increases considerably the motors life length. Such "ΔT" values are evidenced in the following performance charts. (See further details about "ΔT" at page 19)

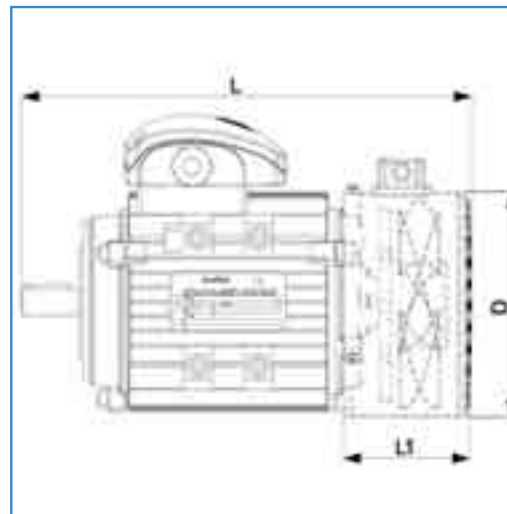
ASSISTED POWER COOLING

three-phase 400/50 400/60, IP 55, with separate terminal box

For application with a power supply at certain frequencies (see following graph), a power cooling system must be used

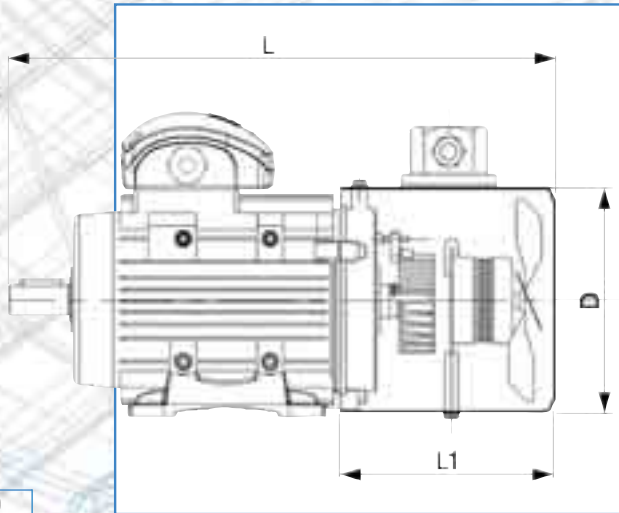


TYPE	POWER W	CAPACITY m³/h	L mm	L1 mm	D mm
63	21	140	300	145	120
71	30	300	320	145	135
80	35	350	366	160	155
90S	50	500	400	165	175
90L	50	500	425	165	175
100	65	650	466	170	195
112	65	1000	450	160	220
132S	90	880	570	180	260
132M	90	880	610	180	260
160M	90	1100	710	250	314
160L	90	1100	765	250	314
180M	100	1200	805	275	360
180L	100	1200	845	275	355
200L	180	2500	910	350	397
225S	200	3800	1035	350	446
225M	200	3800	1040	350	446
250M	320	4200	1110	350	485
280S	370	5000	1160	450	547
280M	370	5000	1210	450	547
315S	500	6000	1410	540	620
315M	500	6000	1440	540	620
315L	500	6000	1550	540	620
355M	600	6500	1735	620	698
355L	600	6500	1765	620	698



ENCODER

motors with encoder or special shaft configurations for encoder mounting are available upon request. In this case, assisted power cooling is also available, supported by brackets on the fan cover



TYPE	L mm	L1 mm	D mm
63	300	145	120
71	320	145	135
80	366	160	155
90S	400	165	175
90L	425	165	175
100	466	170	195
112	450	160	220
132S	570	180	260
132M	610	180	260
160M	710	250	314
160L	765	250	314
180M	805	275	360
180L	845	275	355
200L	910	350	397
225S	1035	350	446
225M	1040	350	446
250M	1110	350	485
280S	1160	450	547
280M	1210	450	547
315S	1410	540	620
315M	1440	540	620
315L	1550	540	620
355M	1735	620	698
355L	1765	620	698

MOTIVE MOTORS PROTECTION

protections must be chosen based on the specific running conditions, according to standards EN 60204-1.

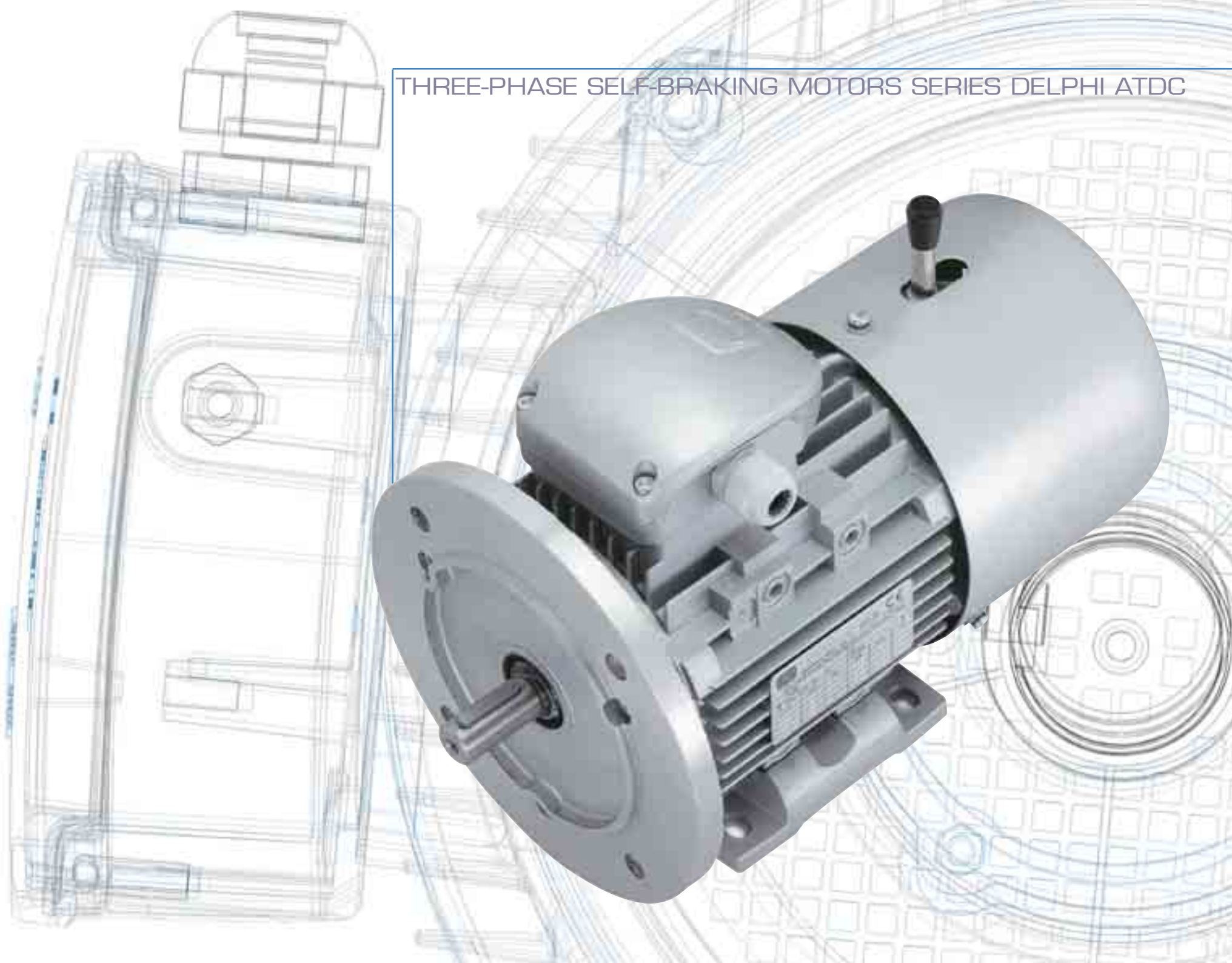
- Protection for motors with a shaft power greater than or equal to 0.5 kW with continuous S1 service. This protection may be achieved by means of a thermal cut-out relay, which automatically control a knife switch.
- Protection against peak currents by magnetic relay that controls an automatic knife switch, or by fuses; these must be set to the locked rotor current.
- If the application requires, protection against excessive speed of the electric motor, for example if the mechanical load may drive the electric motor itself and thereby create a hazardous situation.
- If special conditions or synchronised operation with other machines or parts of machines require it, protection against power failures or dips by means of a minimum voltage relay that controls an automatic power knife switch.

The electrical protections on the motor power line may not be sufficient to protect against overloads. If the cooling conditions worsen, the motor overheats but the electrical conditions do not change, which inhibits line protections. Installing built-in protections on the windings solves this problem:

- **PTO bimetallic device**
this is a normally-closed electromechanical device that opens electrically when the threshold temperature is reached; it automatically resets when the temperature falls below the threshold level. Bimetallic devices are available with various intervention temperatures and without automatic reset, per EN 60204-1.
- **PTC thermistor device**
this device promptly, positively adjusts its resistance once the threshold temperature is reached. Motive motors from type 160 to type 355L are equipped with 3 PTC thermistors in the winding, with temperature intervention of 150°C in Class F motors (standard), or 180°C in H Class motors.
- **PT100 device**
this is a device that continuously, increasingly adjusts its resistance according to the temperature. It is useful for constant measuring of the winding temperatures using electronic equipment.



THREE-PHASE SELF-BRAKING MOTORS SERIES DELPHI ATDC



DELPHI ATDC

Delphi ATDC series self-braking motors use spring-pressure brakes, firmly spliced onto a cast iron shield at the back of the motor.

These motors include a series of characteristics normally considered options by other brands, like:

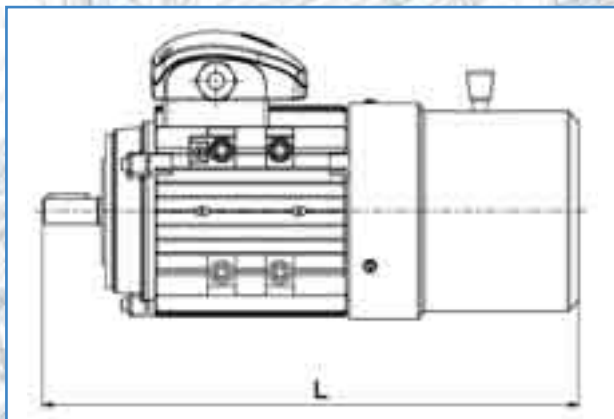
The hand release lever permits to release the brake, making it possible to move the shaft.

The separate brake power supply is achieved, whenever needed, by connecting directly to the brake terminal board located inside the motor terminal box.

The PTO thermal protectors in the winding



TYPE	L
ATDC 63	240
ATDC 71	270
ATDC 80	375
ATDC 90S	400
ATDC 90L	426
ATDC 100L	465
ATDC 112M	495
ATDC 132S	570
ATDC 132M	610
ATDC 160M	715
ATDC 160L	760
ATDC 180M	790
ATDC 180L	830
ATDC 200L	900

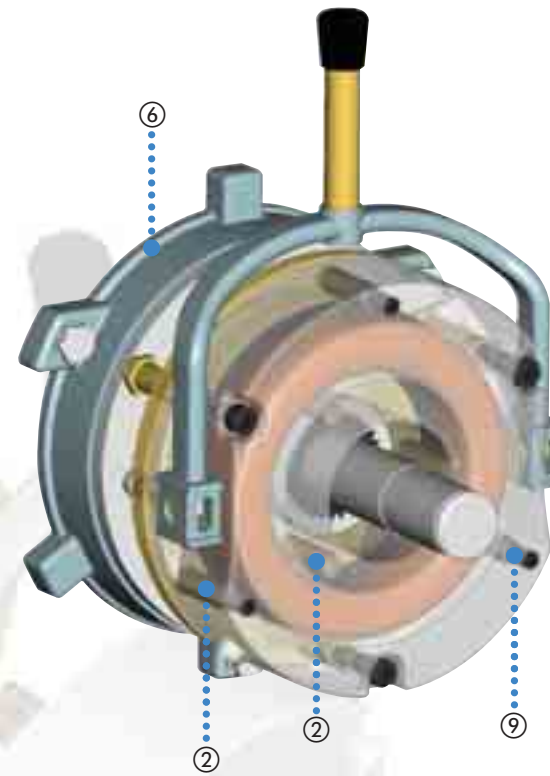
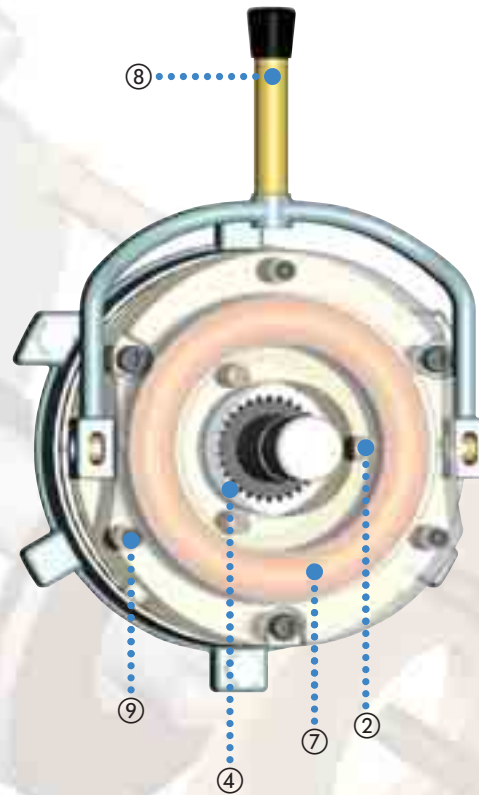
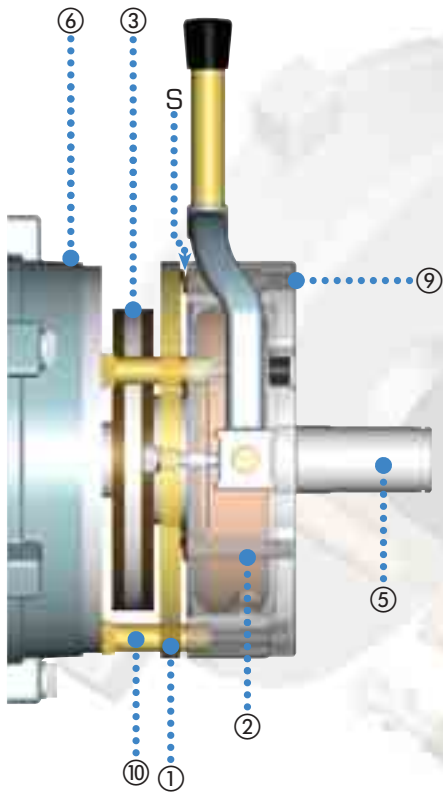


KW	HP	Type	Braking torque full-load Nm	Braking torque no-load sec	Brake input power W	Kg
0,18	0,25	ATDC 63A-2	4,5	0,15	22	7,8
0,25	0,35	ATDC 63B-2	4,5	0,15	22	8,1
0,37	0,5	ATDC 71A-2	8,0	0,15	28	9,0
0,55	0,75	ATDC 71B-2	8,0	0,15	28	9,5
0,75	1	ATDC 80A-2	12,5	0,20	30	12,7
1,1	1,5	ATDC 80B-2	12,5	0,20	30	13,5
1,5	2	ATDC 90S-2	25,0	0,25	45	16,3
2,2	3	ATDC 90L-2	25,0	0,25	45	18,0
3	4	ATDC 100L-2	38,0	0,30	60	27,0
4	5,5	ATDC 112M-2	70,0	0,35	65	37,0
5,5	7,5	ATDC 132SA-2	140,0	0,40	88	49,1
7,5	10	ATDC 132SB-2	140,0	0,40	88	54,5
11	15	ATDC 160MA-2	210,0	0,50	110	130,0
15	20	ATDC 160MB-2	210,0	0,50	110	140,0
18,5	25	ATDC 160L-2	210,0	0,50	110	155,0
22	30	ATDC 180M-2	210,0	0,50	130	195,0
30	40	ATDC 200LA-2	420,0	0,50	140	253,0
37	50	ATDC 200LB-2	420,0	0,50	140	265,0

0,12	0,18	ATDC 63A-4	4,5	0,15	22	7,8
0,18	0,25	ATDC 63B-4	4,5	0,15	22	8,1
0,25	0,35	ATDC 71A-4	8,0	0,15	28	9,0
0,37	0,5	ATDC 71B-4	8,0	0,15	28	9,5
0,55	0,75	ATDC 80A-4	12,5	0,20	30	13,4
0,75	1	ATDC 80B-4	12,5	0,20	30	14,8
1,1	1,5	ATDC 90S-4	25,0	0,25	45	16,5
1,5	2	ATDC 90L-4	25,0	0,25	45	18,3
2,2	3	ATDC 100LA-4	38,0	0,30	60	26,8
3	4	ATDC 100LB-4	38,0	0,30	60	29,5
4	5,5	ATDC 112M-4	70,0	0,35	65	37,5
5,5	7,5	ATDC 132S-4	140,0	0,40	88	51,5
7,5	10	ATDC 132M-4	140,0	0,40	88	57,5
11	15	ATDC 160M-4	210,0	0,50	110	138,0
15	20	ATDC 160L-4	210,0	0,50	110	152,0
18,5	25	ATDC 180M-4	210,0	0,50	130	194,0
22	30	ATDC 180L-4	210,0	0,50	130	212,0
30	40	ATDC 200L-4	420,0	0,50	140	280,0

0,37	0,5	ATDC 80A-6	12,5	0,20	30	12,9
0,55	0,75	ATDC 80B-6	12,5	0,20	30	14,4
0,75	1	ATDC 90S-6	25,0	0,25	45	16,6
1,1	1,5	ATDC 90L-6	25,0	0,25	45	18,2
1,5	2	ATDC 100L-6	38,0	0,30	60	29,0
2,2	3	ATDC 112M-6	70,0	0,35	65	36,2
3	4	ATDC 132S-6	140,0	0,40	88	50,2
4	5,5	ATDC 132MA-6	140,0	0,40	88	53,0
5,5	7,5	ATDC 132MB-6	140,0	0,40	110	57,2
7,5	10	ATDC 160M-6	210,0	0,50	110	140,0
11	15	ATDC 160L-6	210,0	0,50	110	165,0
15	20	ATDC 180L-6	210,0	0,50	130	208,0
18,5	25	ATDC 180LA-6	420,0	0,50	140	235,0
22	30	ATDC 200LB-6	420,0	0,50	140	263,0

0,75	1	ATDC 100LA-8	44,0	0,30	60	29,0
1,1	1,5	ATDC 100LB-8	44,0	0,30	60	31,1
1,5	2	ATDC 112M-8	70,0	0,35	65	38,2
2,2	3	ATDC 132S-8	140,0	0,40	88	50,3
3	4	ATDC 132M-8	140,0	0,40	88	55,0
4	5,5	ATDC 160MA-8	210,0	0,50	110	130,0
5,5	7,5	ATDC 160MB-8	210,0	0,50	110	140,0
7,5	10	ATDC 160L-8	210,0	0,50	110	155,0



- ① Mobile armature
 - ② springs
 - ③ Brake disc
 - ④ Driver
 - ⑤ Motor shaft
 - ⑥ Motor flange
 - ⑦ Electromagnet
 - ⑧ Release lever
 - ⑨ Adjuster screws
 - ⑩ Threaded bush
- S Air gap

BRAKE DESCRIPTION

The Delphi ATDC series brake is an electromagnetic brake with negative operation, whose braking action is exercised in the absence of power supply. The brake insulation class is F. The brake lining is asbestos-free, as per most recent EEC Directives in terms of Workplace Hygiene and Safety. The rectifier is of Mosfet type, with protection varistors at the entry and the exit. All brake assemblies are protected against corrosion by painting and/or heat galvanizing. The parts most subject to wear are treated in special atmospheres that provide considerable wear resistance to the parts.

BRAKE OPERATION

When the power supply is interrupted, the excitation coil ⑦ is no longer powered and therefore doesn't exert the magnetic force necessary to restrain the mobile armature ①, which, pushed by the pressure springs ②, compresses the brake disc ③ against the motor flange ④ on one side and the armature itself on the other, thereby creating a braking action.

ADJUSTMENT

Two different types of adjustment are possible

S air gap adjustment

For proper operation, the air gap S between electromagnet ⑦ and the mobile armature ① must be between the following indicated limits:

MOTOR TYPE	S AIR GAP (mm)
63-71	0.40-0.50
80-160	0.50-0.60

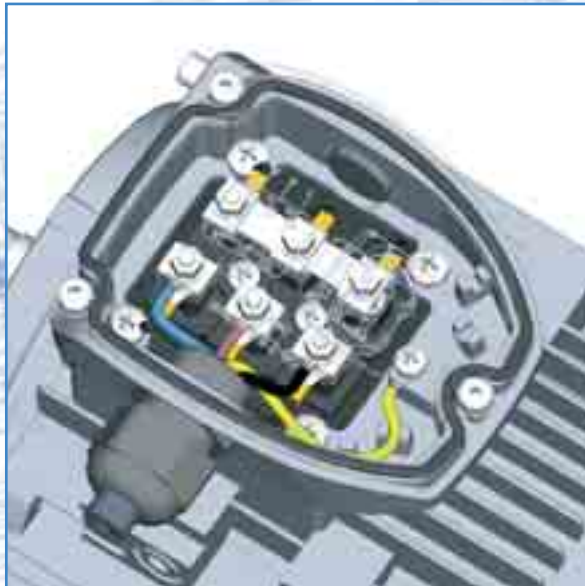
The adjustment is made by using the threaded bushes ⑩, using a thickness gauge to make sure that the wished air gap is reached.

Braking torque adjustment

The braking torque can be increased by tightening the adjuster screws ⑨.

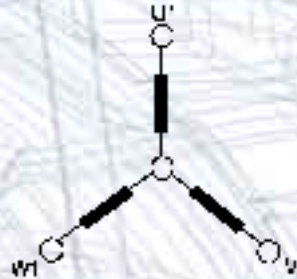
WIRING DIAGRAMS

Motive three phase motors can be connected "Star" or "Delta".



STAR CONNECTION

Star connection is obtained by connecting together the terminals W2, U2, V2 and supplying the terminals U1, V1, W1. The phase current and voltage are respectively:
 $I_{ph} = I_n$
 $U_{ph} = U_n / \sqrt{3}$
 where I_n is the supply line current and U_n is the supply line voltage of Star connection

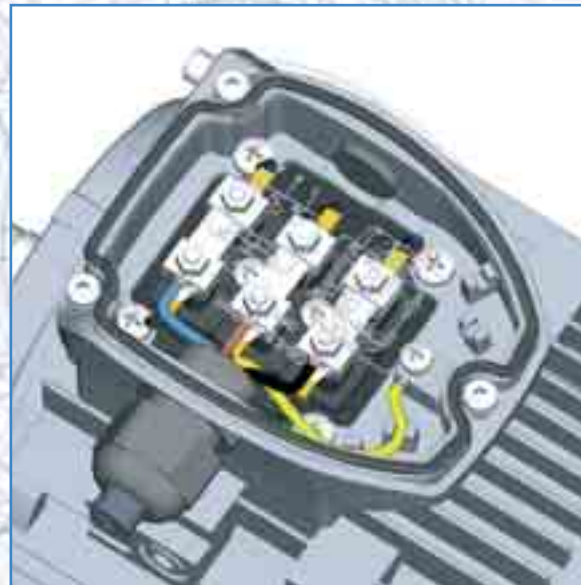
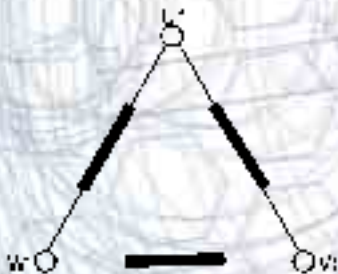


the following voltages and frequencies are inside the standard power supply of all three-phase motive motors, under S1 duty service:


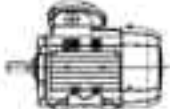

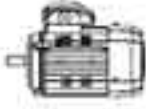
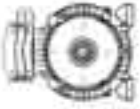

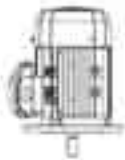



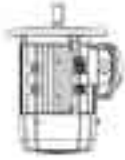

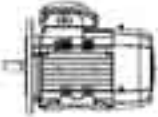
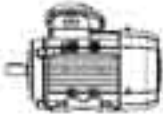


Size	Hz	Volts	
56-132	50	230	400
		220	380
		240	415
	60	260	440
		265	460
		280	480
132-355	50	400	690
		380	660
		415	720
	60	440	760
		460	795
		480	830

DELTA CONNECTION

Delta connection is obtained by connecting the end of a phase with the beginning of the following one. The phase current I_{ph} and the phase voltage U_{ph} are respectively:
 $I_{ph} = I_n / \sqrt{3}$
 $U_{ph} = U_n$
 where I_n and U_n are referred to Delta connection.



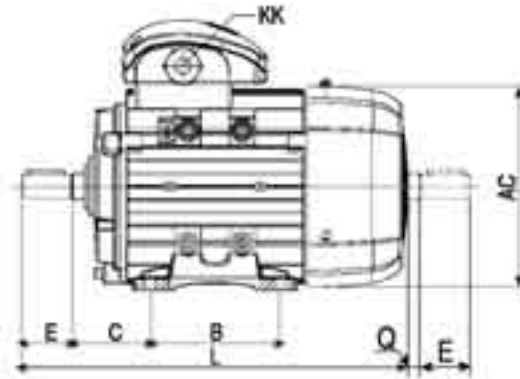
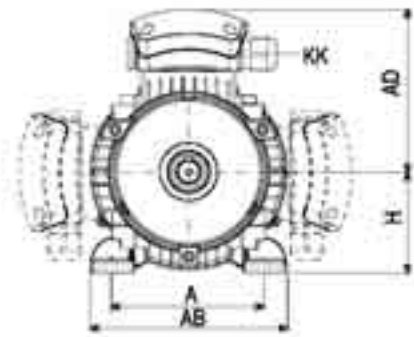
MOTOR CONFIGURATIONS AND INSTALLATION POSITIONS (IEC 34-7)

MOTORS WITH FEET B3		FLANGE-MOUNTED MOTORS B5	FLANGE-MOUNTED MOTORS B14
 IM1051 (IM B6)	 IM1001 (IM B3)	 IM3001 (IM B5)	 IM3601 (IM B14)
 IM1061 (IM B7)	 IM1011 (IM V5)	 IM3011 (IM V1)	 IM3611 (IM V18)
 IM1071 (IM B8)	 IM1031 (IM V6)	 IM3031 (IM V3)	 IM3631 (IM V19)
B3/B5  IM2001 (IM B35)	B3/B14  IM2101 (IM B34)	V1/V5  IM2011 (IM V15)	V3/V6  IM2031 (IM V36)

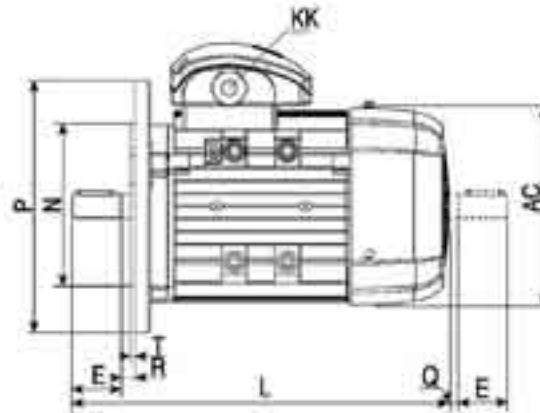
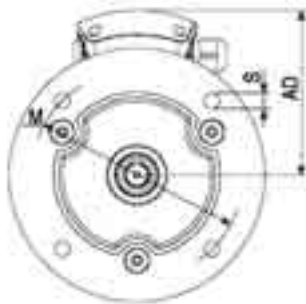


TYPE	POLES	AC	AD	H	KK	L	D	DH	E	F	G	Q	B3				B5, B3/B5						B14						B5R/B14B						
													A	AB	B	C	K	M	N	P	R	S	T	M	N	P	R	S	T	M	N	P	R	S	T
56	2-8	120	102	56	M16	164	9	M4x12	20	3	7,2	3	90	111	71	36	5,8	100	80	120	0	7	3	65	50	80	0	M5	2,5	--	--	--	--	--	--
63	2-8	130	114	63	M20	212	11	M4x12	23	4	8,5	3	100	123	80	40	7	115	95	140	0	10	3	75	60	90	0	M5	2,5	100	80	120	0	M8	2,5
71	2-8	145	119	71	M20	240	14	M5X12	30	5	11,0	3	112	138	90	45	7	130	110	160	0	10	3,5	85	70	105	0	M6	2,5	115	95	140	0	M8	3,0
80	2-8	175	130	80	M20	276	19	M6X16	40	6	15,5	3	125	157	100	50	10	165	130	200	0	12	3,5	100	80	120	0	M6	3,0	130	110	160	0	M8	3,5
90S	2-8	195	145	90	M20	305	24	M8X19	50	8	20,0	5	140	173	100	56	10	165	130	200	0	12	3,5	115	95	140	0	M8	3,0	130	110	160	0	M8	3,5
90L	2-8	195	145	90	M20	330	24	M8X19	50	8	20,0	5	140	173	125	56	10	165	130	200	0	12	3,5	115	95	140	0	M8	3,0	130	110	160	0	M8	3,5
100	2-8	215	170	100	M20	371	28	M10X22	60	8	24,0	5	160	196	140	63	12	215	180	250	0	15	4	130	110	160	0	M8	3,5	165	130	200	0	M10	3,5
112M	2-8	240	177	112	M25	380	28	M10X22	60	8	24,0	5	190	227	140	70	12	215	180	250	0	15	4	130	110	160	0	M8	3,5	165	130	200	0	M10	3,5
132S	2-8	275	197	132	M32	455	38	M12X28	80	10	33,0	5	216	262	140	89	12	265	230	300	0	15	4	165	130	200	0	M10	3,5	215	180	250	0	M12	4,0
132M	2-8	275	197	132	M32	495	38	M12X28	80	10	33,0	5	216	262	178	89	12	265	230	300	0	15	4	165	130	200	0	M10	3,5	215	180	250	0	M12	4,0
160M	2-8	330	255	160	2xM40	615	42	M16X36	110	12	37,0	5	254	320	210	108	15	300	250	350	0	19	5	215	180	250	0	M12	4,0						
160L	2-8	330	255	160	2xM40	670	42	M16X36	110	12	37,0	5	254	320	254	108	15	300	250	350	0	19	5	215	180	250	0	M12	4,0						
180M	2-8	380	280	180	2xM40	700	48	M16X36	110	14	42,5	8	279	355	241	121	15	300	250	350	0	19	5												
180L	2-8	380	280	180	2xM40	740	48	M16X36	110	14	42,5	8	279	355	279	121	15	300	250	350	0	19	5												
200L	2-8	420	305	200	2xM50	770	55	M20X42	110	16	49,0	12	318	395	305	133	19	350	300	400	0	19	5												
225S	4-8	470	335	225	2xM50	815	60	M20X42	140	18	53,0	12	356	435	286	149	19	400	350	450	0	19	5												
225M	2	470	335	225	2xM50	820	55	M20X42	110	16	53,0	12	356	435	311	149	19	400	350	450	0	19	5												
225M	4-8	470	335	225	2xM50	845	60	M20X42	140	18	56,0	12	356	435	311	149	19	400	350	450	0	19	5												
250M	2	510	370	250	2xM63	910	60	M20X42	140	18	56,0	12	406	490	349	168	24	500	450	550	0	19	5												
250M	4-8	510	370	250	2xM63	910	65	M20X42	140	18	67,5	12	406	490	349	168	24	500	450	550	0	19	5												
280S	2	580	410	280	2xM63	985	65	M20X42	140	18	58,0	12	457	550	368	190	24	500	450	550	0	19	5												
280S	4-8	580	410	280	2xM63	985	75	M20X42	140	20	67,5	12	457	550	368	190	24	500	450	550	0	19	5												
280M	2	580	410	280	2xM63	1035	65	M20X42	140	18	58,0	12	457	550	419	190	24	500	450	550	0	19	5												
280M	4-8	580	410	280	2xM63	1035	75	M20X42	140	20	71,0	12	457	550	419	190	24	500	450	550	0	19	5												
315S	2	645	530	315	2xM63	1160	65	M20X42	140	18	58,0	15	508	635	406	216	28	600	550	660	0	24	6												
315S	4-8	645	530	315	2xM63	1270	80	M20X42	170	22	71,0	15	508	635	406	216	28	600	550	660	0	24	6												
315M	2	645	530	315	2xM63	1190	65	M20X42	140	18	58,0	15	508	635	457	216	28	600	550	660	0	24	6												
315M	4-8	645	530	315	2xM63	1300	80	M20X42	170	22	71,0	15	508	635	457	216	28	600	550	660	0	24	6												
315L	2	645	530	315	2xM63	1190	65	M20X42	140	18	58,0	15	508	635	508	216	28	600	550	660	0	24	6												
315L	4-8	645	530	315	2xM63	1300	80	M20X42	170	22	71,0	15	508	635	508	216	28	600	550	660	0	24	6												
355M	2	710	655	355	2xM63	1500	75	M20X42	140	20	67,5	15	610	730	500	254	28	740	680	800	0	24	6												
355M	4-8	710	655	355	2xM63	1530	95	M20X42	170	25	86,0	15	610	730	500	254	28	740	680	800	0	24	6												
355L	2	710	655	355	2xM63	1500	75	M20X42	140	20	67,5	15	610	730	630	254	28	740	680	800	0	24	6												
355L	4-8	710	655	355	2xM63	1530	95	M20X42	170	25	86,0	15	610	730	630	254	28	740	680	800	0	24	6												

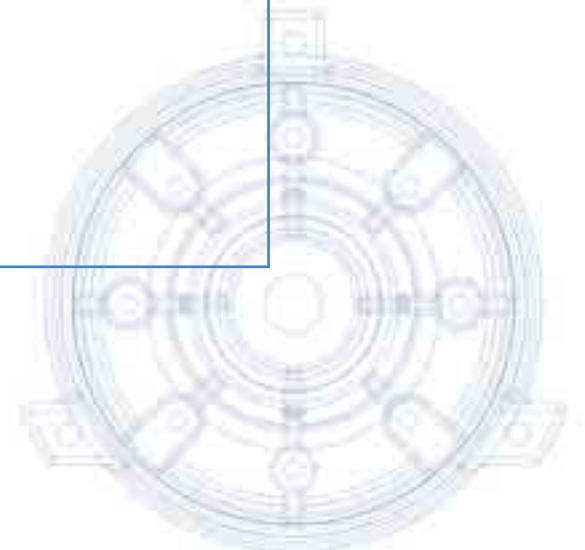
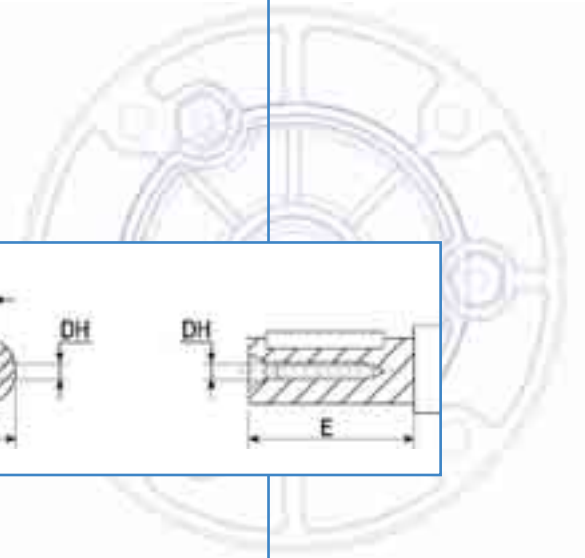
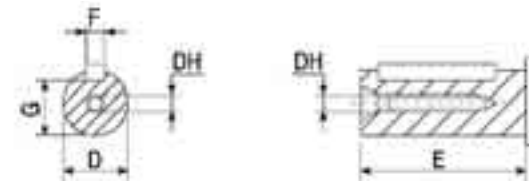
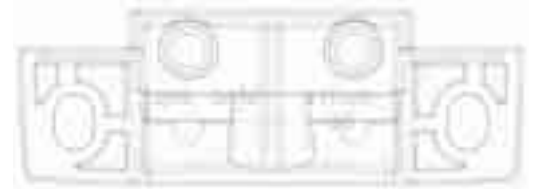
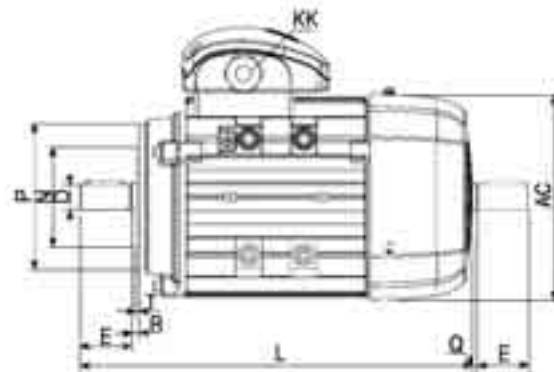
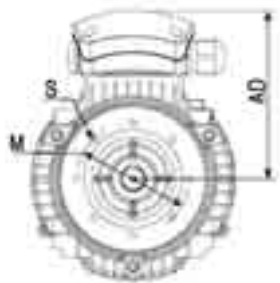
B3



B5, B3/B5





B14, B5R/B14B





TECHNICAL DATA

The general electrical specifications are listed in the performance charts that follow. To understand their contents, the following general definitions are provided.

 **Rated Power:**
it is the mechanical power measured at the shaft expressed, according to the latest indications of international Standards Committees, in Watts or Kwatts. However, in the engineering sector it is still common to refer to power in terms of HP

 **Rated Voltage:**
the voltage to be applied to the motor terminals in accordance with the specifications in the following tables


 **Frequency:**
All electrical data in this catalogue refer to three-phase wound motors at 50 Hz. These may be connected to 60 Hz, taking into account the multiplier coefficients in the table below

 **Rated Current:**
"In" is the Rated Current, expressed in Ampere, absorbed by the motor when supplied at Rated Voltage Vn (V) and giving the Rated Power Pn (W) and it is obtained by the formula

$$I_n = \frac{P_n}{\sqrt{3} \cdot V_n \cdot \eta \cdot \cos\varphi} \quad (A)$$


In the following tables, the rated currents are referred to a Voltage supply of 400V. For other voltage supplies the absorbed rated current can be considered inversely proportional to the voltage supply.
EX:

Volt	230	380	400	440	690
In	1,74	1,05	1,0	0,91	0,64

 **Rated torque:**
Cn is expressed in Nm, and it corresponds to the rated power and rated rpm. It is given by the multiplication of the force for the arm (distance) and it is measured in Nm because the force is expressed in Newton and the distance in metres. The rated torque value is obtained by the formula

$$C_n \text{ (Nm)} = P_n \times 9550 / \text{rpm}$$


Pn= Rated power in KW
rpm= rated rotation speed

 **Efficiency:**
 η is expressed in % and it is given by the relation between the output Power and the addition of output Power and the electric losses of the motor, that is the input power absorbed by the motor. The electric motors losses are mainly of two kinds: for joule effect (rotor and stator) and iron losses. The latest cause essentially heat. A higher efficiency means energy savings, lower heating, longer life of insulating materials.


The smaller a motor is, the more the presence of a double lip oil seal as the ones used on the drive end of Delphi flanged motors (B5 or B14) may affect, following the friction generated, performance. The motors B3 up to size 132, however, have V-rings with an almost non existent level of friction. For simplicity, the following performance tables indicate the levels of absorption and performance measured on B14 motors for size 56 and B3 motors for size 63 and above.

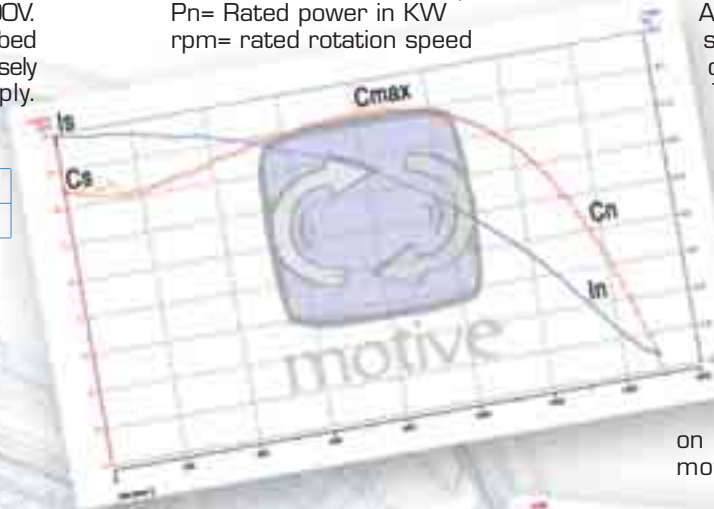
rated voltage at 50Hz	Volt at 60Hz	rated powerW	In (A)	Cn (Nm)	rpm	Is (A)	Cs (Nm)	Cmax (Nm)
230 ± 10%	230 ± 5%	1	1	0,83	1,2	0,83	0,83	0,83
230 ± 10%	230 ± 10%	1	0,95	0,83	1,2	0,83	0,83	0,83
230 ± 10%	240 ± 5%	1,05	1	0,87	1,2	0,87	0,87	0,87
400 ± 10%	380 ± 5%	1	1	0,83	1,2	0,83	0,83	0,83
400 ± 10%	400 ± 10%	1	0,95	0,83	1,2	0,83	0,83	0,83
400 ± 10%	415 ± 10%	1,05	1	0,87	1,2	0,87	0,87	0,87
400 ± 10%	440 ± 10%	1,10	1	0,90	1,2	0,93	0,93	0,93
400 ± 10%	460 ± 5%	1,15	1	0,96	1,2	0,96	0,96	0,96
400 ± 10%	480 ± 5%	1,20	1	1	1,2	1	1	1


for further information, see chapter "wiring diagrams" at page 14


 **Synchronous speed:**
is expressed in rpm and it is obtained by the formula
 $f \approx 120/p$
f= supply frequency Hz
p= number of poles pairs

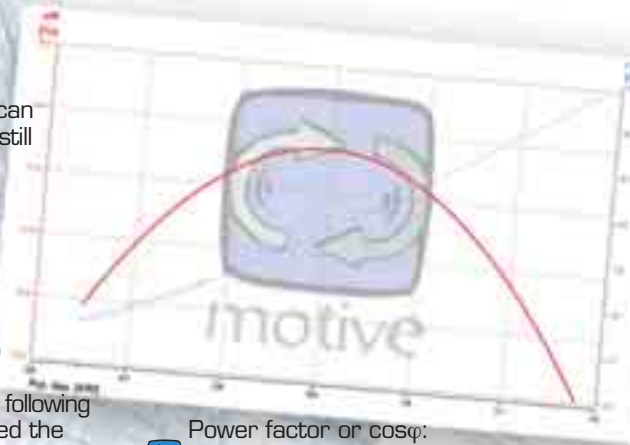
Motive motors can face also temporary overloads, with Current increases of 1.5 times the rated current for at least 2 minutes.


 **Starting current (or locked rotor current):**
(you see diagram)



 **Starting torque (or locked rotor torque):**
Cs is the torque that the motor can provide with the rotor at a standstill and the rated power supply.

 **Maximum torque:**
Cmax is the maximum torque developed by the motor at the rated power supply, at a certain speed. It represents also the value of the resistant torque after which the motor stops. In the following performance charts, it is indicated the relation between maximum torque and rated torque and maximum torque



 **Power factor or cosφ:**
it represents the coseno of the voltage and current gap angle.

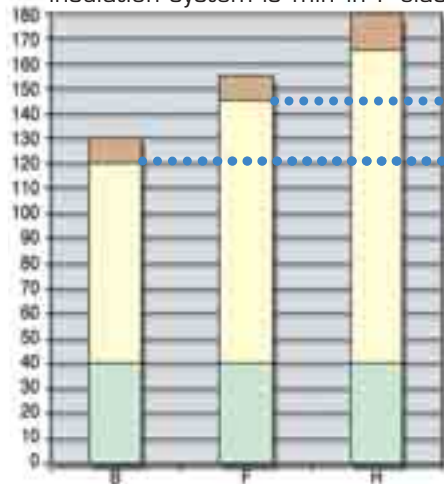
TECHNICAL DATA

temperature rise ΔT :

The temperature rise " ΔT " is the change in temperature of the entire winding of the motor, including the wire placed deep inside the stator slots, when it is being operated at full load.

For example: if a motor is located in a room with a temperature of 40°C, and then is started and operated continuously at the rated power, the winding temperature would rise from 40°C to a higher temperature. The difference between its starting temperature and the final inner elevated temperature, is the ΔT . Almost all our motors are designed to offer a temperature rise of B class or even lower, while their insulation system is min in F class.

Class	amb T (°C)	ΔT (°C)	hot spot allowance (°C)	Tmax (°C)
A	40	60	5	105
E	40	75	5	120
B	40	80	5	130
F	40	105	10	155
H	40	125	15	180



example of overload capability (=life bonus) of an F class motor, with B class temperature rise

■ hot spot allowance
□ ΔT
□ T. amb.

This extra margin gives the motor a "life bonus". As a rule of thumb, insulation life will be doubled for each 10 degrees of unused insulation temperature capability.

The most common method of measuring the temperature rise of a motor is based on the differences between the cold and hot ohmic resistance of the winding.

The formula is:

$$\Delta T [^{\circ}\text{C}] = (R2-R1)/R1 * (234,5+T1)-(T2-T1) \text{ Where:}$$

R1 = Cold winding resistance in Ohms (just before that the test begins)

R2= Hot winding resistance in Ohms (when the motor has reached its thermal equilibrium)

T1= ambient temperature in °C when test begins

T2= ambient temperature in °C when test is stopped

To change ΔT from Centigrade to Fahrenheit:
°C (ΔT) x 1,8

Note: The motor surface temperature will never exceed the internal temperature of the motor, and will depend upon the design and cooling arrangements.

Noise:

The noise is expressed in dB(A). The measures must be taken in accordance with the standard ISO 1680-2, in order to find the Sound Power level LwA measured at 1m of distance from the perimeter of the machine.

EN 60034-9 standard describes the acoustic Power limits to be respected, indicating the maximum sound power level **LwA**. The noise values indicated in the performance charts that follow are referred to a no-load motor working, supplied at 50Hz and with a tolerance of +3 dB(A).

The moment of inertia can be calculated in this way:

$$J = [1/2] \times M \times (R^2)$$

Where M [Kg] is the rotation mass, while R [m] is the ray of the volume at cylindrical symmetry.

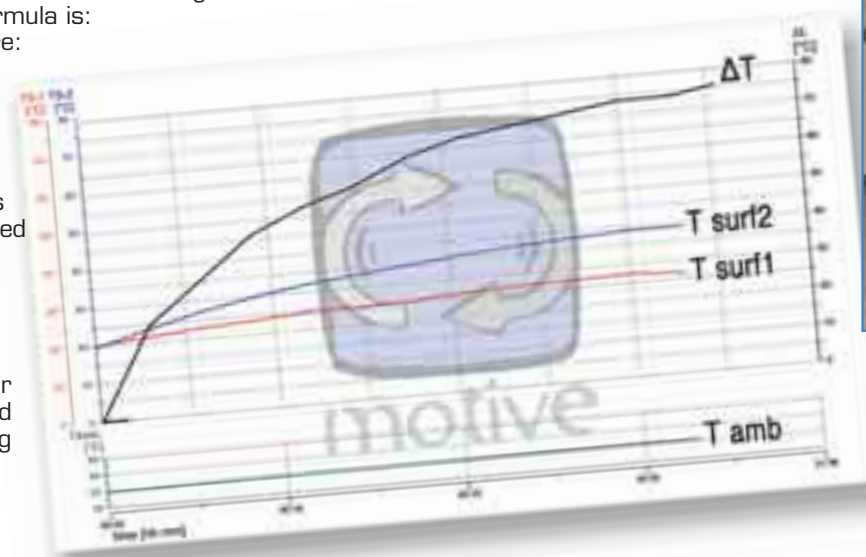
TOLERANCES

The data of each motor are specified in this catalogue like requested by the norm IEC 34-1. This describes, in particular, the following tolerances:

Efficiency (Output Power / input Power)	-15% di (1- n)
Power factor	1/ 6 of (1- cosφ) min. 0.02 max 0.07
Locked rotor torque	-15% of the guaranteed torque +25% of the guaranteed torque
Maximum torque	-10% -of the guaranteed torque, if torque is not less than 1,5- 1,6 the rated torque
Noise	+3dB
ΔT	+10°C



The test reports on which the following tables are based can be downloaded from the website www.motive.it





2 Poles asynchronous speed 3000 rpm



KW	HP	Type	rpm	I _n (A)	I _s (A)	I _s / I _n	C _n (Nm)	C _s (Nm)	C _s / C _n	C _{max} (Nm)	C _{max} / C _n	Efficiency η		Pwr. Fact. cosφ		ΔT (°C)	LwA (dB)	J Kgm ²	Kg
												100%	75%	100%	75%				
0,09	0,12	56A-2	2700	0,25	0,93	3,8	0,32	0,90	2,8	0,90	2,8	63,4	59,0	0,83	0,76	26	60	0,00008	3,5
0,13	0,18	56B-2	2760	0,34	1,46	4,3	0,45	1,20	2,7	1,40	3,1	64,0	62,0	0,86	0,82	27	60	0,00010	3,6
0,18	0,25	63A-2	2751	0,50	2,03	4,0	0,62	1,80	2,9	1,80	2,9	66,7	65,2	0,77	0,69	45	61	0,00021	4,5
0,25	0,35	63B-2	2769	0,70	2,83	4,1	0,86	2,50	2,9	2,50	2,9	67,3	66,5	0,77	0,67	47	61	0,00030	4,7
0,37	0,5	63C-2	2796	0,93	4,49	4,8	1,26	4,20	3,3	4,10	3,2	74,7	74,8	0,77	0,70	45	61	0,00043	5,7
0,37	0,5	71A-2	2810	1,06	4,44	4,2	1,26	3,80	3,0	4,10	3,3	70,9	69,8	0,71	0,63	67	64	0,00055	6,0
0,55	0,75	71B-2	2810	1,29	6,95	5,4	1,87	6,20	3,3	5,90	3,2	77,9	78,1	0,79	0,69	65	64	0,00060	6,3
0,75	1	71C-2	2780	1,74	10,43	6,0	2,58	7,21	2,8	7,73	3,0	75,0	75,0	0,83	0,77	80	64	0,00068	7,3
0,75	1	80A-2	2854	1,76	10,45	5,9	2,51	7,10	2,8	7,50	3,0	79,0	79,0	0,78	0,70	55	67	0,00075	10,0
1,1	1,5	80B-2	2861	2,45	14,61	6,0	3,67	10,10	2,8	11,00	3,0	81,0	80,5	0,80	0,73	55	67	0,00090	11,0
1,5	2	80C-2	2840	3,26	19,58	6,0	5,04	12,61	2,5	13,62	2,7	79,0	80,0	0,84	0,75	70	67	0,00105	12,5
1,5	2	90S-2	2834	3,28	18,34	5,6	5,05	12,40	2,5	13,60	2,7	79,3	80,8	0,83	0,77	69	72	0,00120	13,0
2,2	3	90L-2	2805	4,75	24,79	5,2	7,49	21,70	2,9	22,30	3,0	80,6	81,9	0,83	0,77	91	72	0,00140	14,0
3	4	90LB-2	2847	6,20	40,46	6,5	10,06	33,90	3,4	34,30	3,4	83,2	83,9	0,84	0,78	86	72	0,00215	16,0
3	4	100L-2	2885	6,06	41,17	6,8	9,93	29,60	3,0	32,20	3,2	83,1	81,0	0,86	0,82	80	76	0,00290	25,0
4	5,5	100LB-2	2885	7,86	52,07	6,6	13,24	39,00	2,9	43,30	3,3	84,4	83,7	0,87	0,83	78	76	0,00420	27,0
4	5,5	112M-2	2886	7,56	53,06	7,0	13,24	30,90	2,3	40,90	3,1	84,6	84,7	0,90	0,87	87	77	0,00550	28,0
5,5	7,5	112MB-2	2895	10,35	73,15	7,1	18,14	45,40	2,5	55,90	3,1	85,8	86,0	0,89	0,86	75	77	0,00820	34,0
5,5	7,5	132SA-2	2919	10,45	80,11	7,7	17,99	44,00	2,4	61,70	3,4	85,9	85,3	0,88	0,85	68	80	0,01090	40,0
7,5	10	112MC-2	2880	14,55	110,60	7,6	24,87	59,69	2,4	79,58	3,2	85,5	85,0	0,87	0,84	85	77	0,01000	37,0
7,5	10	132SB-2	2913	13,90	101,17	7,3	24,59	61,30	2,5	79,70	3,2	87,2	87,4	0,89	0,86	56	80	0,01260	45,0
9,2	12,5	132MA-2	2943	17,63	110,60	6,3	29,85	89,40	3,0	124,80	4,2	87,6	87,0	0,86	0,82	40	81	0,02000	53,0
11	15	132MB-2	2919	19,71	109,79	5,6	35,99	82,90	2,3	108,10	3,0	88,6	88,9	0,91	0,89	90	81	0,02500	55,0
11	15	160MA-2	2941	20,02	144,80	7,2	35,72	96,20	2,7	113,90	3,2	88,5	87,6	0,90	0,87	70	86	0,03770	110,0
15	20	132MC-2	2936	26,76	203,75	7,6	48,79	116,80	2,4	152,70	3,1	90,7	90,9	0,89	0,86	65	81	0,03200	58,0
15	20	160MB-2	2941	27,06	188,77	7,0	48,71	132,10	2,7	152,80	3,1	89,8	89,5	0,89	0,87	70	86	0,04990	120,0
18,5	25	160L-2	2950	32,68	229,00	7,0	59,89	150,60	2,5	179,00	3,0	90,8	90,5	0,90	0,88	60	86	0,05500	135,0
22	30	180M-2	2959	39,26	278,51	7,1	71,00	174,50	2,5	220,80	3,1	91,4	90,8	0,89	0,86	60	89	0,07500	165,0
30	40	200LA-2	2950	55,74	418,02	7,5	97,12	194,24	2,0	223,37	2,3	91,4	90,3	0,85	0,83	70	92	0,12400	217,0
37	50	200LB-2	2950	67,50	506,24	7,5	119,78	239,56	2,0	275,49	2,3	92,0	91,2	0,86	0,87	80	92	0,13900	243,0
45	60	225M-2	2970	81,65	612,37	7,5	144,70	289,39	2,0	332,80	2,3	92,5	90,9	0,86	0,88	80	92	0,23300	320,0
55	75	250M-2	2970	99,26	744,43	7,5	176,85	353,70	2,0	406,76	2,3	93,0	91,9	0,86	0,84	80	93	0,31200	390,0
75	100	280S-2	2970	132,94	997,03	7,5	241,16	482,32	2,0	554,67	2,3	93,6	93,1	0,87	0,88	70	94	0,57900	540,0
90	125	280M-2	2970	158,68	1190,07	7,5	289,39	578,79	2,0	665,61	2,3	94,1	93,1	0,87	0,87	80	94	0,67500	590,0
110	150	315S-2	2980	193,32	1372,58	7,1	352,52	634,53	1,8	775,54	2,2	94,4	93,9	0,87	0,87	80	96	1,18000	880,0
132	180	315MA-2	2980	231,01	1640,15	7,1	423,02	761,44	1,8	930,64	2,2	94,8	94,3	0,87	0,85	75	96	1,82000	1000,0
160	215	315LA-2	2980	279,42	1983,88	7,1	512,75	922,95	1,8	1128,05	2,2	95,0	94,5	0,87	0,88	75	99	2,08000	1055,0
200	270	315LB-2	2980	345,31	2451,67	7,1	640,94	1153,69	1,8	1410,07	2,2	95,0	94,5	0,88	0,88	80	99	2,38000	1110,0
250	335	355M-2	2985	431,63	3064,58	7,1	799,83	1279,73	1,6	1759,63	2,2	95,0	94,0	0,88	0,88	70	103	3,00000	1900,0
315	423	355L-2	2985	524,82	3726,23	7,1	1007,79	1612,46	1,6	2217,14	2,2	95,2	95,2	0,91	0,89	75	103	3,50000	2300,0



4 Poles asynchronous speed 1500 rpm



KW	HP	Type	rpm	In (A)	Is (A)	Is / In	Cn (Nm)	Cs (Nm)	Cs / Cn	Cmax (Nm)	Cmax / Cn	Efficiency η		Pwr. Fact. $\cos\phi$		ΔT (°C)	LwA (dB)	J Kg ^{m²}	Kg
												100%	75%	100%	75%				
0,06	0,09	56A-4	1332	0,23	0,65	2,8	0,43	1,20	2,8	1,20	2,8	56,0	52,0	0,67	0,56	25	52	0,00015	3,5
0,09	0,12	56B-4	1346	0,33	0,97	2,9	0,64	1,80	2,8	1,80	2,8	60,7	58,0	0,65	0,54	36	52	0,00015	3,6
0,13	0,18	63A-4	1355	0,40	1,28	3,2	0,92	2,10	2,3	2,10	2,3	64,7	63,9	0,72	0,62	30	52	0,00030	4,5
0,18	0,25	63B-4	1393	0,56	2,02	3,6	1,23	2,90	2,4	3,10	2,5	68,2	65,9	0,68	0,55	38	52	0,00040	4,7
0,25	0,35	63C-4	1380	0,74	2,50	3,4	1,73	4,00	2,3	4,00	2,3	69,5	69,1	0,70	0,61	45	52	0,00045	5,7
0,25	0,35	71A-4	1370	0,78	2,62	3,4	1,74	4,50	2,6	4,50	2,6	70,2	69,8	0,66	0,57	52	55	0,00050	6,0
0,37	0,5	71B-4	1366	1,04	3,72	3,6	2,59	6,00	2,3	6,10	2,4	71,5	72,0	0,72	0,63	65	55	0,00080	6,3
0,55	0,75	71C-4	1364	1,51	5,68	3,8	3,85	9,60	2,5	10,00	2,6	73,3	74,2	0,72	0,61	76	55	0,00150	7,3
0,55	0,75	80A-4	1391	1,49	6,46	4,3	3,78	9,10	2,4	10,20	2,7	75,0	75,4	0,71	0,61	50	58	0,00180	10,0
0,75	1	80B-4	1413	2,02	9,03	4,5	5,07	13,00	2,6	14,60	2,9	77,7	77,2	0,69	0,60	70	58	0,00210	11,0
1,1	1,5	80C-4	1376	2,89	12,08	4,2	7,63	20,50	2,7	21,00	2,8	76,4	77,3	0,72	0,62	80	58	0,00220	12,5
1,1	1,5	90S-4	1362	2,73	11,01	4,0	7,71	20,70	2,7	18,40	2,4	76,5	78,2	0,76	0,67	92	61	0,00240	13,0
1,5	2	90L-4	1413	3,62	17,80	4,9	10,14	26,70	2,6	27,80	2,7	78,7	79,6	0,76	0,70	78	61	0,00300	14,0
2,2	3	90LB-4	1412	5,32	27,92	5,3	14,88	47,20	3,2	44,40	3,0	80,7	81,2	0,74	0,65	75	61	0,00410	16,0
2,2	3	100LA-4	1431	5,00	25,61	5,1	14,68	33,60	2,3	40,10	2,7	81,4	81,4	0,78	0,71	76	64	0,00540	23,0
3	4	100LB-4	1418	6,55	35,54	5,4	20,20	54,10	2,7	57,80	2,9	82,6	83,7	0,80	0,71	84	64	0,00670	25,0
4	5,5	100LC-4	1415	8,36	50,17	6,0	27,00	80,99	3,0	80,99	3,0	84,2	83,3	0,82	0,74	89	64	0,00810	27,0
4	5,5	112M-4	1453	8,52	54,37	6,4	26,29	65,80	2,5	85,20	3,2	85,8	85,8	0,79	0,73	67	65	0,00950	28,0
5,5	7,5	112MB-4	1448	11,64	75,83	6,5	36,27	126,70	3,5	125,40	3,5	86,3	86,7	0,79	0,73	76	65	0,01500	35,0
5,5	7,5	132S-4	1455	11,42	73,70	6,5	36,10	86,70	2,4	114,10	3,2	87,8	89,0	0,79	0,73	66	71	0,02140	45,0
7,5	10	112MC-4	1453	15,68	108,96	6,9	49,29	146,50	3,0	169,50	3,4	87,4	87,7	0,79	0,73	80	67	0,02230	37,0
7,5	10	132MA-4	1462	15,02	102,89	6,9	48,99	120,10	2,5	160,10	3,3	87,9	88,1	0,82	0,78	75	71	0,02960	55,0
9,2	12,5	132MB-4	1470	19,32	137,05	7,1	59,77	152,70	2,6	189,00	3,2	88,1	87,7	0,78	0,71	65	72	0,03100	56,0
11	15	132MC-4	1460	22,78	141,01	6,2	71,95	169,00	2,3	212,30	3,0	88,9	89,1	0,78	0,72	80	73	0,04000	57,0
11	15	160M-4	1466	21,61	155,99	7,2	71,66	195,40	2,7	223,10	3,1	89,4	89,5	0,82	0,76	50	75	0,06100	118,0
15	20	132MD-4	1457	30,62	193,79	6,3	98,32	235,70	2,4	282,50	2,9	89,5	89,9	0,79	0,72	92	74	0,05000	58,0
15	20	160L-4	1470	28,77	189,86	6,6	97,45	207,70	2,1	269,00	2,8	89,6	89,9	0,84	0,80	65	75	0,09180	132,0
18,5	25	180M-4	1476	34,45	215,02	6,2	119,70	220,90	1,8	334,30	2,8	91,2	91,1	0,85	0,81	60	76	0,13900	164,0
22	30	180L-4	1470	40,31	302,32	7,5	142,93	314,44	2,2	328,73	2,3	91,6	91,7	0,86	0,85	80	76	0,15800	182,0
30	40	200L-4	1480	53,75	386,99	7,2	193,58	425,88	2,2	445,24	2,3	92,6	92,4	0,87	0,84	80	79	0,26200	245,0
37	50	225S-4	1480	66,15	476,26	7,2	238,75	525,25	2,2	549,13	2,3	92,8	92,7	0,87	0,84	75	81	0,40600	258,0
45	60	225M-4	1480	78,14	562,58	7,2	290,37	638,82	2,2	667,85	2,3	93,4	93,3	0,89	0,87	80	81	0,46900	290,0
55	75	250M-4	1480	94,89	683,21	7,2	354,90	780,78	2,2	816,27	2,3	94,0	94,2	0,89	0,88	75	83	0,66000	388,0
75	100	280S-4	1480	129,40	931,66	7,2	483,95	1064,70	2,2	1113,09	2,3	94,0	93,5	0,89	0,89	70	86	1,12000	510,0
90	120	280M-4	1485	157,04	1130,69	7,2	578,79	1273,33	2,2	1331,21	2,3	94,0	93,5	0,88	0,86	65	86	1,46000	606,0
110	150	315S-4	1485	191,94	1324,37	6,9	707,41	1485,56	2,1	1556,30	2,2	94,0	93,5	0,88	0,87	75	93	3,11000	910,0
132	180	315M-4	1485	220,85	1523,89	6,9	848,89	1782,67	2,1	1867,56	2,2	94,8	94,8	0,91	0,88	65	93	3,62000	1000,0
160	220	315LA-4	1485	276,24	1906,08	6,9	1028,96	2160,81	2,1	2263,70	2,2	95,0	94,5	0,88	0,85	80	97	4,13000	1055,0
200	270	315LB-4	1485	341,43	2355,83	6,9	1286,20	2701,01	2,1	2829,63	2,2	95,0	94,1	0,89	0,87	75	97	4,73000	1128,0
250	335	355M-4	1485	426,78	2944,79	6,9	1607,74	3376,26	2,1	3537,04	2,2	95,0	94,4	0,89	0,87	80	101	6,50000	1700,0
315	423	355L-4	1485	537,74	3710,44	6,9	2025,76	4254,09	2,1	4456,67	2,2	95,0	95,0	0,89	0,86	70	101	8,20000	1900,0



6 Poles asynchronous speed 1000 rpm



KW	HP	Type	rpm	In (A)	Is (A)	Is / In	Cn (Nm)	Cs (Nm)	Cs / Cn	Cmax (Nm)	Cmax / Cn	Efficiency η		Pwr. Fact. $\cos\phi$		ΔT (°C)	LwA (dB)	J Kg ^{m²}	Kg
												100%	75%	100%	75%				
0,18	0,25	71A-6	929	0,76	2,20	2,9	1,85	5,00	2,7	5,20	2,8	61,2	57,4	0,56	0,47	37	51	0,00110	6,0
0,25	0,35	71B-6	933	0,94	3,19	3,4	2,56	6,90	2,7	7,50	2,9	66,5	63,0	0,58	0,48	42	51	0,00140	6,3
0,37	0,5	80A-6	924	1,15	3,87	3,4	3,82	8,00	2,1	8,80	2,3	70,5	67,7	0,66	0,62	37	53	0,00160	10,0
0,55	0,75	80B-6	920	1,69	5,92	3,5	5,71	11,42	2,0	13,13	2,3	69,0	68,4	0,68	0,60	52	53	0,00190	11,0
0,75	1	90S-6	935	2,19	7,94	3,6	7,66	15,30	2,0	17,80	2,3	74,5	73,9	0,67	0,64	32	57	0,00290	13,0
1,1	1,5	90L-6	922	3,09	11,57	3,7	11,39	24,70	2,2	27,30	2,4	75,0	74,7	0,69	0,66	62	57	0,00350	14,0
1,5	2	100L-6	939	4,05	16,22	4,0	15,26	34,60	2,3	36,80	2,4	77,7	77,3	0,69	0,58	85	58	0,00690	23,0
2,2	3	112M-6	940	5,30	29,14	5,5	22,35	46,94	2,1	53,64	2,4	79,9	79,9	0,75	0,66	85	61	0,01400	25,0
3	4	132S-6	969	6,95	38,23	5,5	29,57	62,40	2,1	81,20	2,7	84,5	84,6	0,74	0,71	63	64	0,02860	28,0
4	5,5	132MA-6	969	8,85	56,55	6,4	39,42	89,90	2,3	121,80	3,1	84,7	84,5	0,77	0,69	76	64	0,03570	45,0
5,5	7,5	132MB-6	972	12,19	73,04	6,0	54,04	84,90	1,6	143,00	2,6	84,6	84,9	0,77	0,71	63	64	0,04490	55,0
7,5	10	160M-6	976	16,57	107,69	6,5	73,39	154,11	2,1	154,11	2,1	88,3	87,0	0,74	0,71	50	71	0,00810	78,0
11	15	160L-6	970	22,87	148,66	6,5	108,30	227,43	2,1	227,43	2,1	89,0	89,5	0,78	0,73	70	71	0,11600	125,0
15	20	180L-6	970	30,76	215,31	7,0	147,68	310,13	2,1	310,13	2,1	89,1	89,1	0,79	0,79	75	73	0,20700	160,0
18,5	25	200LA-6	970	36,63	256,40	7,0	182,14	382,49	2,1	382,49	2,1	90,0	90,2	0,81	0,78	70	76	0,31500	217,0
22	30	200LB-6	970	42,98	300,86	7,0	216,60	454,86	2,1	454,86	2,1	90,1	90,1	0,82	0,78	80	76	0,36000	244,0
30	40	225M-6	980	56,83	397,81	7,0	292,35	584,69	2,0	613,93	2,1	91,8	91,5	0,83	0,79	80	76	0,54700	295,0
37	50	250M-6	980	68,51	479,57	7,0	360,56	757,18	2,1	757,18	2,1	92,8	92,8	0,84	0,86	65	78	0,84300	365,0
45	60	280S-6	980	84,15	589,02	7,0	438,52	920,89	2,1	920,89	2,1	93,0	92,5	0,83	0,83	60	80	1,39000	500,0
55	75	280M-6	980	101,62	711,34	7,0	535,97	1125,54	2,1	1125,54	2,1	93,0	92,5	0,84	0,85	60	80	1,65000	545,0
75	100	315S-6	980	133,91	937,37	7,0	730,87	1461,73	2,0	1461,73	2,0	94,0	93,5	0,86	0,85	75	85	4,11000	810,0
90	125	315MA-6	985	160,69	1076,64	6,7	872,59	1745,18	2,0	1745,18	2,0	94,0	93,5	0,86	0,85	75	85	4,78000	900,0
110	150	315LA-6	985	195,78	1311,71	6,7	1066,50	2132,99	2,0	2132,99	2,0	94,3	93,9	0,86	0,84	80	85	5,45000	1010,0
132	180	315LB-6	985	233,94	1567,40	6,7	1279,80	2559,59	2,0	2559,59	2,0	94,7	94,2	0,86	0,84	80	85	6,12000	1140,0
160	220	355MA-6	990	279,71	1874,08	6,7	1543,43	2932,53	1,9	3086,87	2,0	94,9	94,2	0,87	0,87	80	92	9,50000	1550,0
200	270	355MB-6	990	341,79	2289,96	6,7	1929,29	3665,66	1,9	3858,59	2,0	94,9	94,5	0,89	0,87	80	92	10,40000	1600,0
250	335	355L-6	990	431,63	2891,93	6,7	2411,62	4582,07	1,9	4823,23	2,0	95,0	95,0	0,88	0,86	80	92	12,40000	1700,0



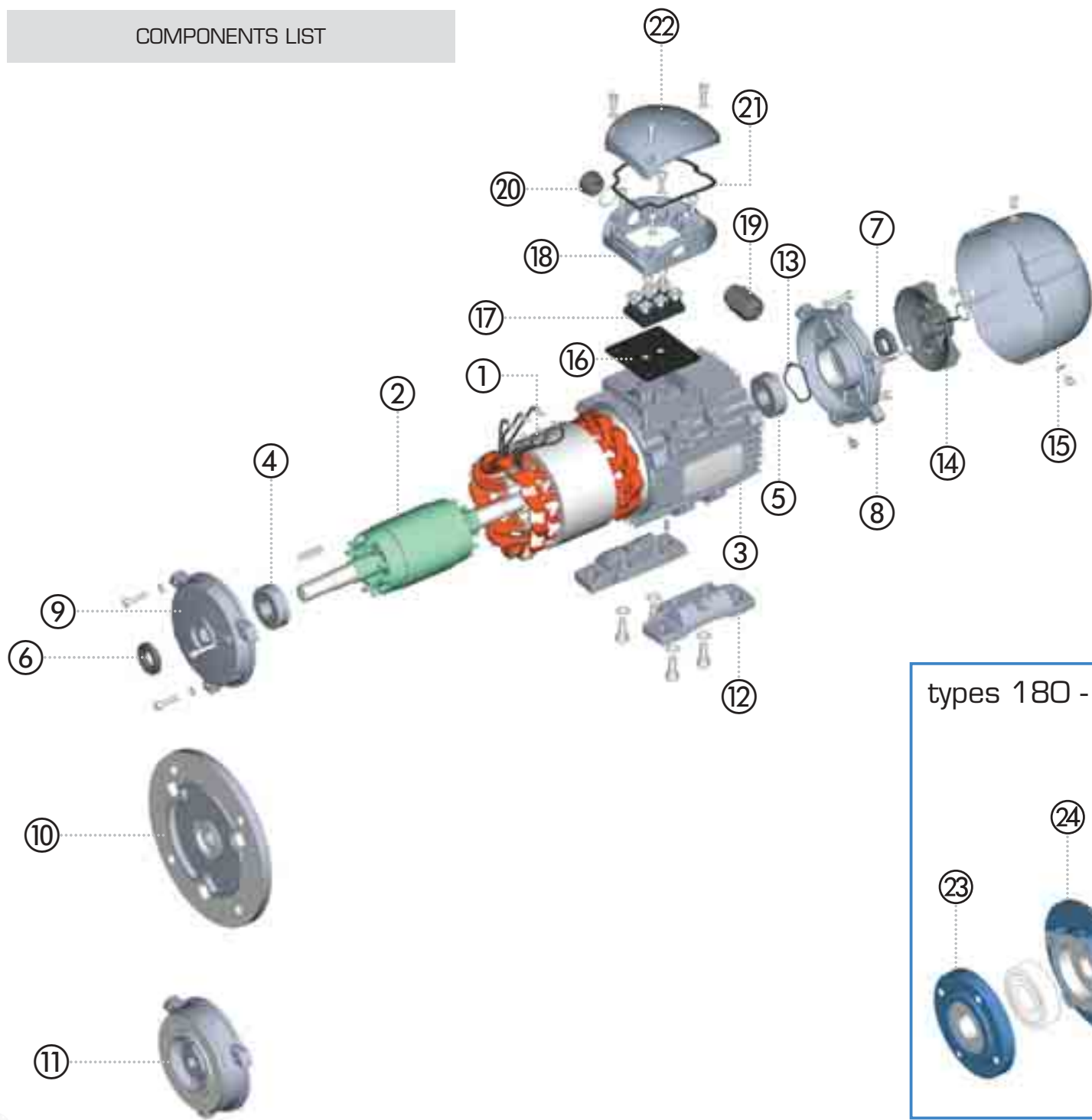
8 Poles asynchronous speed 750 rpm



KW	HP	Type	rpm	In (A)	Is (A)	Is / In	Cn (Nm)	Cs (Nm)	Cs / Cn	Cmax (Nm)	Cmax / Cn	Efficiency η		Pwr. Fact. $\cos\phi$		ΔT (°C)	LwA (dB)	J Kg m^2	Kg
												100%	75%	100%	75%				
0,37	0,5	90S-8	670	1,41	5,65	4,0	5,27	10,55	2,0	10,55	2,0	62,0	61,0	0,61	0,55	40	54	0,00210	13,0
0,55	0,75	90L-8	705	2,04	6,25	3,1	7,45	15,50	2,1	18,00	2,4	68,3	66,0	0,57	0,49	22	54	0,00240	14,0
0,75	1	100LA-8	715	2,57	9,48	3,7	10,02	22,80	2,3	26,60	2,7	72,6	71,0	0,58	0,50	37	57	0,00900	23,0
1,1	1,5	100LB-8	716	3,59	14,13	3,9	14,67	34,20	2,3	40,00	2,7	73,1	71,3	0,61	0,53	44	57	0,01000	25,0
1,5	2	112M-8	711	4,21	16,94	4,0	20,15	43,80	2,2	50,70	2,5	79,2	79,8	0,65	0,55	48	61	0,02450	28,0
2,2	3	132S-8	710	5,54	33,23	6,0	29,59	53,26	1,8	59,18	2,0	81,9	82,2	0,70	0,66	80	64	0,03140	45,0
3	4	132M-8	710	7,25	43,48	6,0	40,35	72,63	1,8	80,70	2,0	83,0	83,4	0,72	0,67	80	64	0,03950	55,0
4	5,5	160MA-8	720	9,32	55,94	6,0	53,06	100,81	1,9	106,11	2,0	86,0	85,8	0,72	0,64	75	68	0,07530	105,0
5,5	7,5	160MB-8	720	12,22	73,34	6,0	72,95	145,90	2,0	145,90	2,0	86,6	87,3	0,75	0,71	75	68	0,09310	78,0
7,5	10	160L-8	720	16,33	98,01	6,0	99,48	198,96	2,0	198,96	2,0	87,2	88,1	0,76	0,74	75	68	0,12600	90,0
11	15	180L-8	730	23,48	129,17	5,5	143,90	287,81	2,0	287,81	2,0	87,8	87,9	0,77	0,70	80	70	0,20300	160,0
15	20	200L-8	730	31,88	210,40	6,6	196,23	392,47	2,0	392,47	2,0	88,2	88,7	0,77	0,70	75	73	0,33900	235,0
18,5	25	225S-8	730	38,48	253,99	6,6	242,02	459,84	1,9	484,04	2,0	91,3	91,5	0,76	0,72	80	73	0,49100	242,0
22	30	225M-8	730	45,23	298,54	6,6	287,81	546,84	1,9	575,62	2,0	90,0	90,7	0,78	0,75	70	73	0,54700	285,0
30	40	250M-8	730	59,32	391,51	6,6	392,47	745,68	1,9	784,93	2,0	92,4	92,3	0,79	0,76	80	75	0,84300	390,0
37	50	280S-8	730	74,02	488,53	6,6	484,04	919,68	1,9	968,08	2,0	92,5	92,4	0,78	0,73	80	76	1,93000	500,0
45	60	280M-8	740	89,93	593,51	6,6	580,74	1045,34	1,8	1161,49	2,0	92,6	92,6	0,78	0,73	80	76	1,65000	580,0
55	75	315S-8	740	104,10	687,05	6,6	709,80	1277,64	1,8	1419,59	2,0	93,0	93,0	0,82	0,76	80	82	4,79000	790,0
75	100	315M-8	740	141,19	931,88	6,6	967,91	1742,23	1,8	1935,81	2,0	93,5	93,5	0,82	0,78	70	82	5,58000	970,0
90	125	315LA-8	740	169,07	1115,87	6,6	1161,49	2090,68	1,8	2322,97	2,0	93,7	93,5	0,82	0,78	75	82	6,37000	1055,0
110	150	315LB-8	740	203,28	1301,02	6,4	1419,59	2555,27	1,8	2839,19	2,0	94,1	94,5	0,83	0,80	80	82	7,23000	1118,0

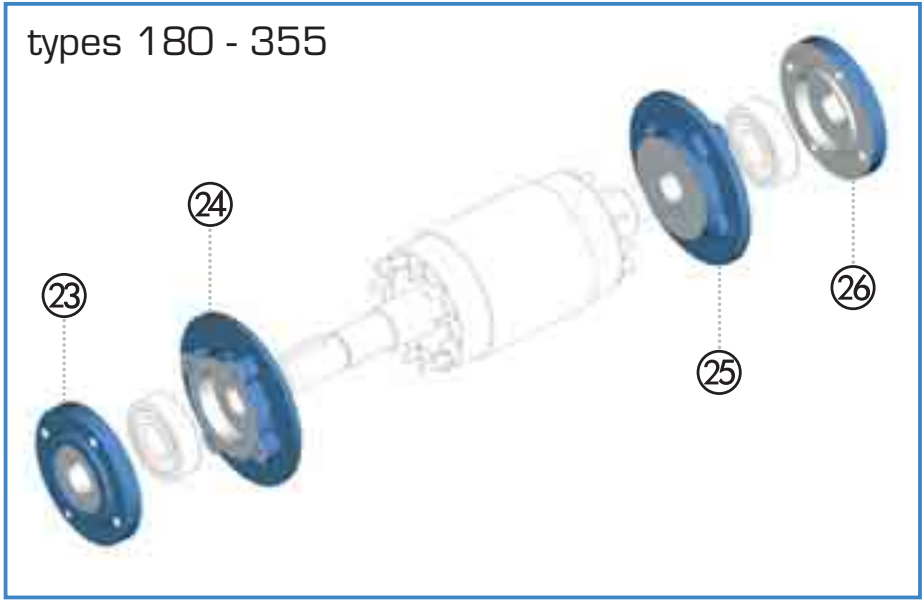
to get the data of  and double polarity motors, contact our export office.

COMPONENTS LIST



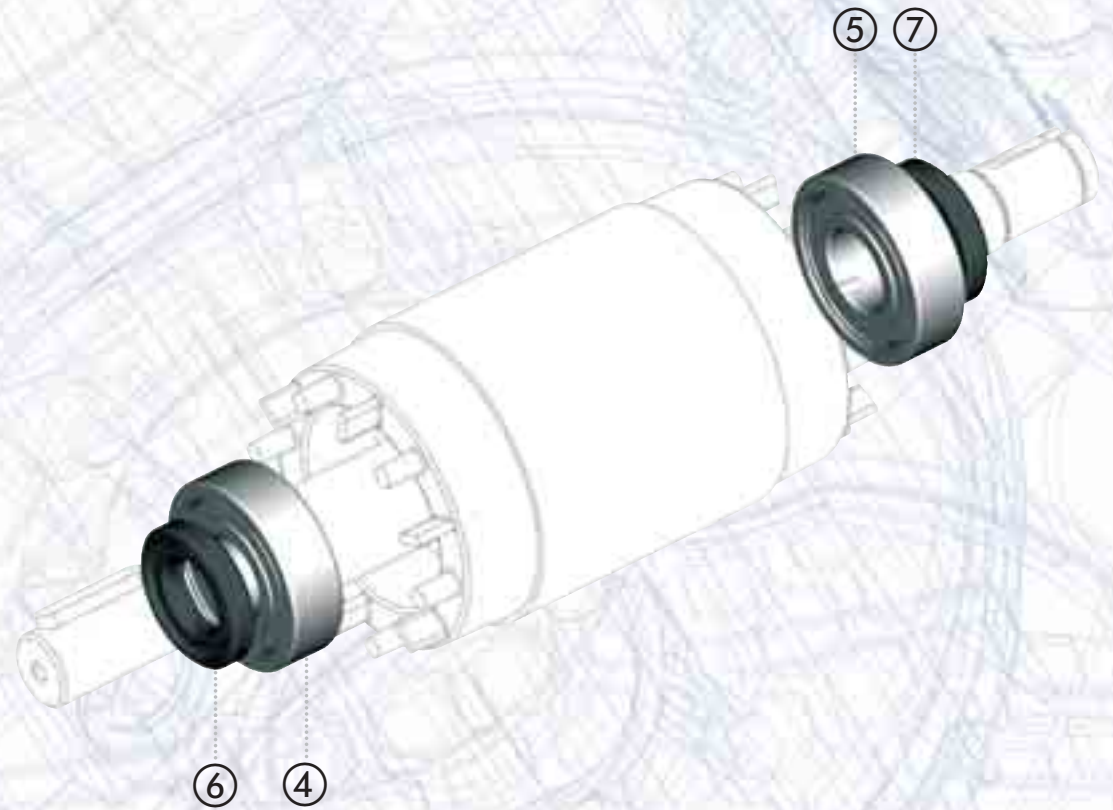
N°	CODE
1	3PNSTA
2	3PNROT
3	3PNFRA
4	3PNFBE
5	3PNBBE
6	3PNFOS
7	3PNBOS
8	3PNBSH
9	3PNBO3
10	3PNBO5
11	3PNB14
12	3PNFEE
13	3PNWAV

N°	CODE
14	3PNFAN
15	3PNFCV
16	3PNUCB
17	3PNTER
18	3PNBCB
19	3PNCMP
20	3PNCAP
21	3PNSCB
22	3PNCCB
23	3PNFOB
24	3PNFIB
25	3PNBIB
26	3PNBOB



RUBBER SEAL RINGS AND BEARINGS

FRAME SIZE	POLES NUMBER	RUBBER SEAL RING		BEARINGS	
		⑥	⑦	④	⑤
56	2 - 8	12x25x7	12x25x7	6201 ZZ-C3	6201 ZZ-C3
63	2 - 8	12x25x7	12x25x7	6201 ZZ-C3	6201 ZZ-C3
71	2 - 8	15x30x7	15x30x7	6202 ZZ-C3	6202 ZZ-C3
80	2 - 8	20x35x7	20x35x7	6204 ZZ-C3	6204 ZZ-C3
90	2 - 8	25x40x7	25x40x7	6205 ZZ-C3	6205 ZZ-C3
100	2 - 8	30x47x7	30x47x7	6206 ZZ-C3	6206 ZZ-C3
112	2 - 8	30x47x7	30x47x7	6206 ZZ-C3	6206 ZZ-C3
132	2 - 8	40x62x7	40x62x7	6208 ZZ-C3	6208 ZZ-C3
160	2 - 8	45x62x12	45x62x12	6209 ZZ-C3	6209 ZZ-C3
180	2 - 8	55x75x12	55x75x12	6311-C3	6211-C3
200	2 - 8	60x80x12	60x80x12	6312-C3	6212-C3
225	2 - 8	65x90x12	65x90x12	6312-C3	6312-C3
250	2 - 8	70x90x12	70x90x12	6313-C3	6313-C3
280	2	80x110x12	80x110x12	6314-C3	6314-C3
	4 - 8	85x100x10	80x110x12	6317-C3	6314-C3
315	2	95x120x12	95x120x12	6316-C3	6316-C3
	4 - 8	95x120x12	95x120x12	NU 319	6319-C3
355	2	95x120x12	95x120x12	6319-C3	6319-C3
	4 - 8	95x120x12	95x120x12	NU 322	6322-C3



2 bearings lubrication devices on the front and the back shield are provided in motors from size 180 and up. Other motors mount staunch bearings pre-lubricated for life

