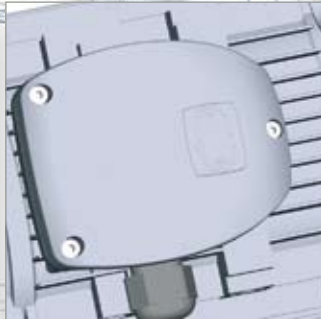
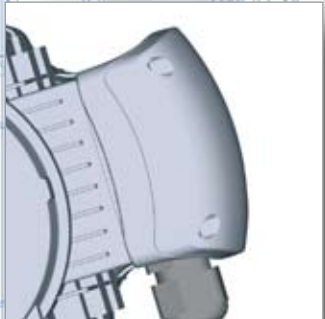


GENERAL CATALOGUE

DELPHI SERIES ASYNCHRONOUS THREE-PHASE ELECTRIC MOTORS





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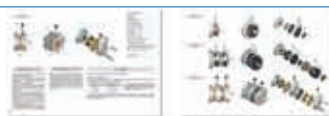


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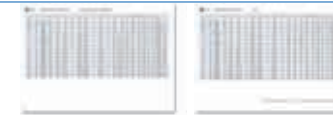
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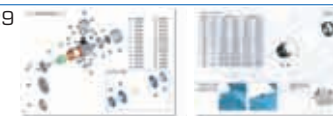


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TECHNICAL CHARACTERISTICS

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, (H on request)
S1 continuous duty service,
IP55 protection (IP56, 66, 67, and 68 on request)
1 or 2 efficiency class (CEMEP)
IE1, IE2 or IE3 efficiency class (IEC 60034-30)
tropicalized winding
suitable for inverter power supply

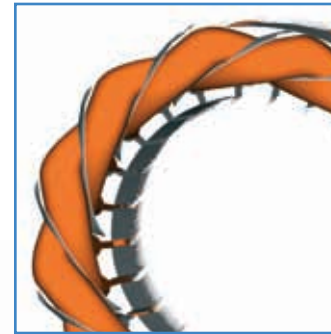
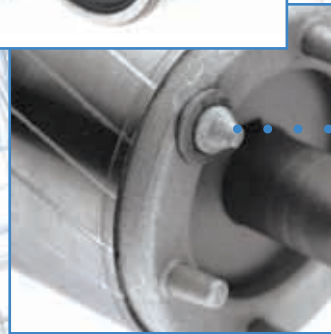
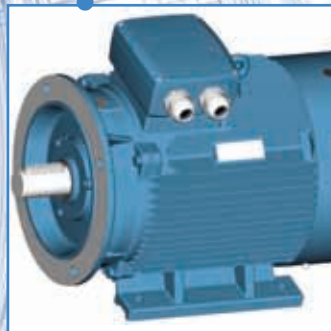
EFF 1

EFF 2

IE1, standard efficiency class IE 60034-30

IE2, high efficiency class IE 60034-30

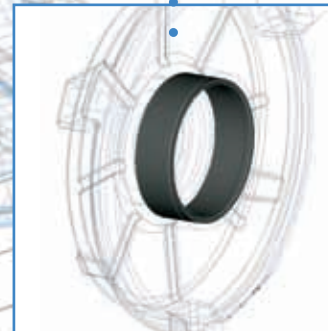
IE3, premium efficiency class IE 60034-30



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

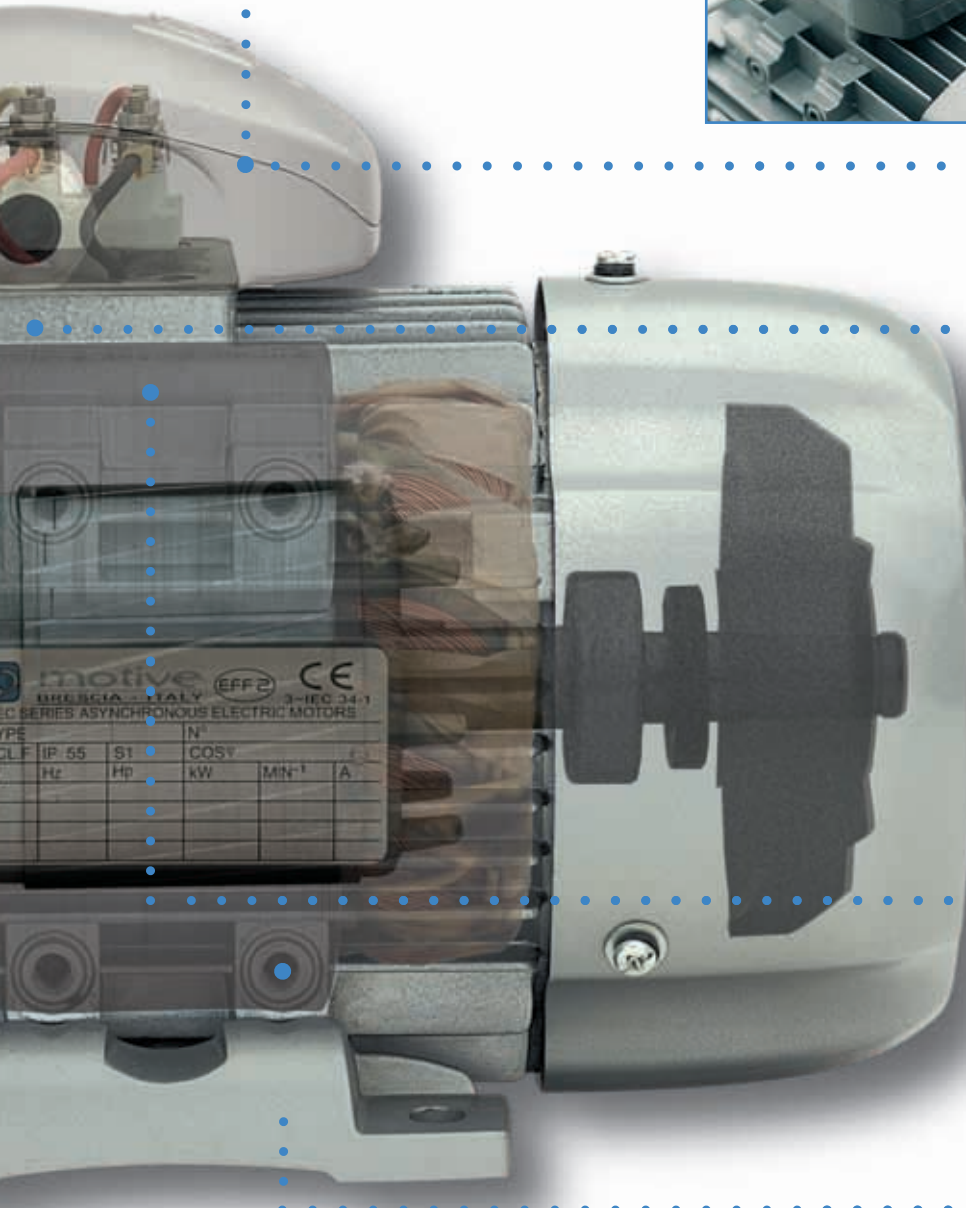
The phases are further isolated by another layer of Nomex film to protect the motors from the voltage peaks that usually occur when the motor is controlled by an inverter.

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

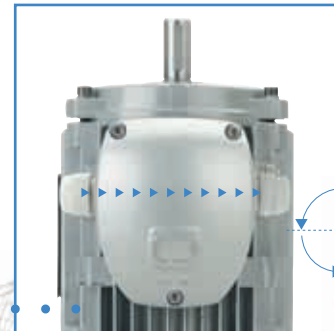


From type 90, a steel insert is provided in the bearing slot of the aluminum flanges, to resist to radial mechanical forces with a fair degree of security

REGISTERED DESIGN



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

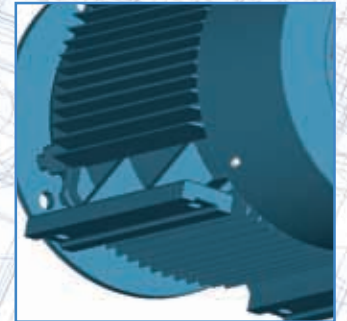


the connection box can be rotated of 360° with steps of 90°

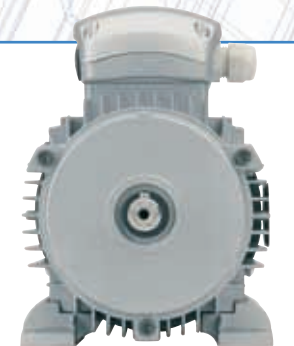
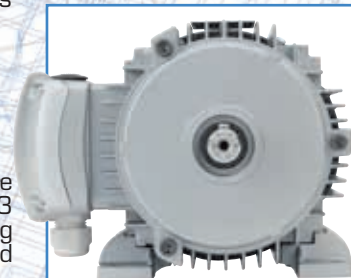


To protect them by the rust, motive motors are painted in silver RAL9006 colour

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



Performance excellence is granted by the low loss CRNO "FeV" magnetic laminations adoption, instead then the usual Semi Processed/Decarb "FePO1". FeV laminations provide higher efficiency, lower heating, energy saving and longer life to insulation materials



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

Worldwide there are several classification systems of induction motors efficiencies. In order to create a common system, IEC (International Electrotechnical Commission) issued in October 2008 the norm IEC 60034-30 "Rotating electrical machines – Part 30: Efficiency classes of single-speed, three-phase, cage-induction motors (IE-code)". It's a classification system of efficiency that replaces the CEMEP one (to be clear, the one of "Eff. 1, Eff. 2, and Eff. 3" motors) and that, furthermore, recalls a new measuring and calculation way of efficiency, the one of the norm IEC 60034-2-1 (Rotating electrical machines – Part 2-1: Standard methods for determining losses and efficiency from tests), of September 2007.

In Europe it's a step ahead in the application of the Directive 2005/32/CE of 6 July 2005 "establishing a framework for the setting of ecodesign requirements for energy-using products".

It's based on such a normative picture and on the Regulation (EC) nr 640/2009 of 22 July 2009 that:

- From June 2011, the motors with efficiency lower than IE-2 will be forbidden
- From 2015, the minimum efficiency for motors from 7,5 to 375kW will be IE-3, and
- From 2017, the obligation of IE-3 will be extended to the motors from 0,75kW to 5,5kW

IEC classification and CEMEP classification

KW	Hp	efficiency classes IEC 60034-20:2008 (at 50Hz)									efficiency classes CEMEP voluntary agreement					
		IE-1 standard efficiency			IE-2 high efficiency			IE-3 premium efficiency			Eff.3		Eff.2		Eff.1	
		2 poles	4 poles	6 poles	2 poles	4 poles	6 poles	2 poles	4 poles	6 poles	2 poles	4 poles	2 poles	4 poles	2 poles	4 poles
0,75	1	72,1	72,1	70,0	77,4	79,6	75,9	80,7	82,5	78,9	-	-	-	-	-	-
1,1	1,5	75,0	75,0	72,9	79,6	81,4	78,1	82,7	84,1	81,0	<76,2	<76,2	≥76,2	≥76,2	>82,8	>83,8
1,5	2	77,2	77,2	75,2	81,3	82,8	79,8	84,2	85,3	82,5	<78,5	<78,5	≥78,5	≥78,5	>84,1	>85,0
2,2	3	79,7	79,7	77,7	83,2	84,3	81,8	85,9	86,7	84,3	<81,0	<81,0	≥81,0	≥81,0	>85,6	>86,4
3	4	81,5	81,5	79,7	84,6	85,5	83,3	87,1	87,7	85,6	<82,6	<82,6	≥82,6	≥82,6	>86,7	>87,4
4	5,5	83,1	83,1	81,4	85,8	86,6	84,6	88,1	88,6	86,8	<84,2	<84,2	≥84,2	≥84,2	>87,6	>88,3
5,5	7,5	84,7	84,7	83,1	87,0	87,7	86,0	89,2	89,6	88,0	<85,7	<85,7	≥85,7	≥85,7	>88,6	>89,2
7,5	10	86,0	86,0	84,7	88,1	88,7	87,2	90,1	90,4	89,1	<87,0	<87,0	≥87,0	≥87,0	>89,5	>90,1
11	15	87,6	87,6	86,5	89,4	89,8	88,7	91,2	91,4	90,3	<88,4	<88,4	≥88,4	≥88,4	>90,5	>91,0
15	20	88,7	88,7	87,7	90,3	90,6	89,7	91,9	92,3	91,2	<89,4	<89,4	≥89,4	≥89,4	>91,3	>91,8
18,5	25	89,3	89,3	88,6	90,9	91,2	90,4	92,4	92,6	91,7	<90,0	<90,0	≥90,0	≥90,0	>91,8	>92,2
22	30	89,9	89,9	89,2	91,3	91,6	90,9	92,7	93,0	92,2	<90,5	<90,5	≥90,5	≥90,5	>92,2	>92,6
30	40	90,7	90,7	90,2	92,0	92,3	91,7	93,3	93,6	92,9	<91,4	<91,4	≥91,4	≥91,4	>92,9	>93,2
37	50	91,2	91,2	90,8	92,5	92,7	92,2	93,7	93,9	93,3	<92,0	<92,0	≥92,0	≥92,0	>93,3	>93,6
45	60	91,7	91,7	91,4	92,9	93,1	92,7	94,0	94,2	93,7	<92,5	<92,5	≥92,5	≥92,5	>93,7	>93,9
55	75	92,1	92,1	91,9	93,2	93,5	93,1	94,3	94,6	94,1	<93,0	<93,0	≥93,0	≥93,0	>94,0	>94,2
75	100	92,7	92,7	92,6	93,8	94,0	93,7	94,7	95,0	94,6	<93,6	<93,6	≥93,6	≥93,6	>94,6	>94,7
90	120	93,0	93,0	92,9	94,1	94,2	94,0	95,0	95,2	94,9	<93,9	<93,9	≥93,9	≥93,9	>95,0	>95,0
110	150	93,3	93,3	93,3	94,3	94,5	94,3	95,2	95,4	95,1	-	-	-	-	-	-
132	180	93,5	93,5	93,5	94,6	94,7	94,6	95,4	95,6	95,4	-	-	-	-	-	-
160	220	93,8	93,8	93,8	94,8	94,9	94,8	95,6	95,8	95,6	-	-	-	-	-	-
200	270	94,0	94,0	94,0	95,0	95,1	95,0	95,8	96,0	95,8	-	-	-	-	-	-
250	335	94,0	94,0	94,0	95,0	95,1	95,0	95,8	96,0	95,8	-	-	-	-	-	-
315	423	94,0	94,0	94,0	95,0	95,1	95,0	95,8	96,0	95,8	-	-	-	-	-	-
355	483	94,0	94,0	94,0	95,0	95,1	95,0	95,8	96,0	95,8	-	-	-	-	-	-

The following chart tries to synthesize a comparison between yesterday and today.

	world IEC 60034-30	Europe (50Hz) CEMEP	USA (60Hz) Epact	Further classification
IE-3 premium efficiency			Identical to NEMA Premium efficiency	AS in Australia NBR in Brasile BG/T in China IS in India JIS in Japan MEPS in Korea
IE-2 high efficiency		comparable to Eff. 1	Identical to NEMA energy efficiency/EPACT	
IE-1 standard efficiency		comparable to Eff. 2		

In our field, we list 5 main changes in Europe :

- The classification is now extended to 6 poles motors
- The powers range is wider
- In a direct comparison between Eff.2" and "IE-1" or between "Eff.1" and "IE-2" , we find that the first, the CEMEP values, are higher; but this is also a consequence of the
- Change in the measurement and calculation system of such values, that must now be made with the method of the new norm IEC 60034-2-1:2007, and
- Introduction of the IE3 "Premium efficiency" level.

Nevertheless, local legislations of some Countries inside and outside Europe, and the specific requirements of some associations, maintain often incentivized or even compulsory those motors called "Eff.1" according to the CEMEP system.

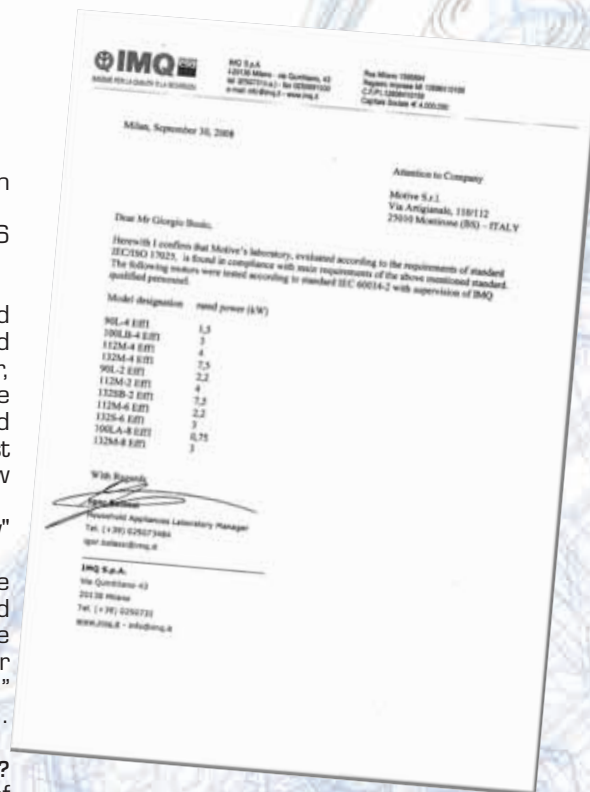
What does Motive do in this scenario?

- The measuring and calculation system of Motive motors efficiency is already conform to the norm 60034-2-1:2007. That's the one behind the data declared in the probative test-reports uploaded in motive web-site (each declared data, we remind it, is in fact supported, detailed and proven by such test reports)

- This, together with the fact that Eff.2 Motive motors are often offering an efficiency abundantly above the min allowed level, permits to several Eff.2 Motive motors to be already classifiable as IE-2 "high efficiency". Before 2011, anyway, all those motors that do not yet reach IE-2 efficiency level will be improved.

- "Eff.1" motors are already available, and most of them are already IE3 "premium efficiency".

- The test reports end data truth of Eff1 Motive motors has been certified by IMQ, the main Italian certification body for electrical appliances. The same, in fact, in September 2008 has firstly inspected



and qualified our internal laboratory according to the norm IEC/ISO17025, and then supervised the internal tests on a sampling list of Eff.1 motors, including some 6 and 8 poles in order to enclose further values that, out of CEMEP classifications, were already established by some Countries laws.

Clients benefits are of many kinds:

BILL EFFECTS

The purchase cost of a motor is about 2-3% of the total costs of its life. The balance is energy consumption costs. Comparing Eff.1 motors to Eff.2, the purchase price difference is recovered in about one year of energy saving. Of course, such period length depends by the specific motor, the use of it and the local energy costs of each Country. Motive can give you a tool in xls format to support you in this calculation.

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. Eff.1 motors can live approx 40% longer than Eff.2 motors.

AMBIENT EFFECTS

Electric motors use 65% of all electricity in industry. Higher efficiency motors have the further objective of sustainable development, reduction of CO₂ emissions and consequent improvement of the quality of the atmosphere with an objective of sustainable development, Reduction of CO₂ emissions and consequent improvement of the quality of the atmosphere.

Motive motors are made with CRNO "FeV" magnetic lamination sheets, rather than the customary 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 Semi Processed/Decarb 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).

Instead, no standard prescribes a maximum loosing factor for Fe PO1 lamination sheets; not even this data can be guaranteed. This is a source of potential performance diversities between motor and motor.

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

data at 400V 50Hz














The main advantages given by the adoption of silicon magnetic laminations are: higher efficiency better guarantees on the quality consistency, assured by tolerances reported in international norms.

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 machining, 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 turns number and a bigger diameter wire.

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

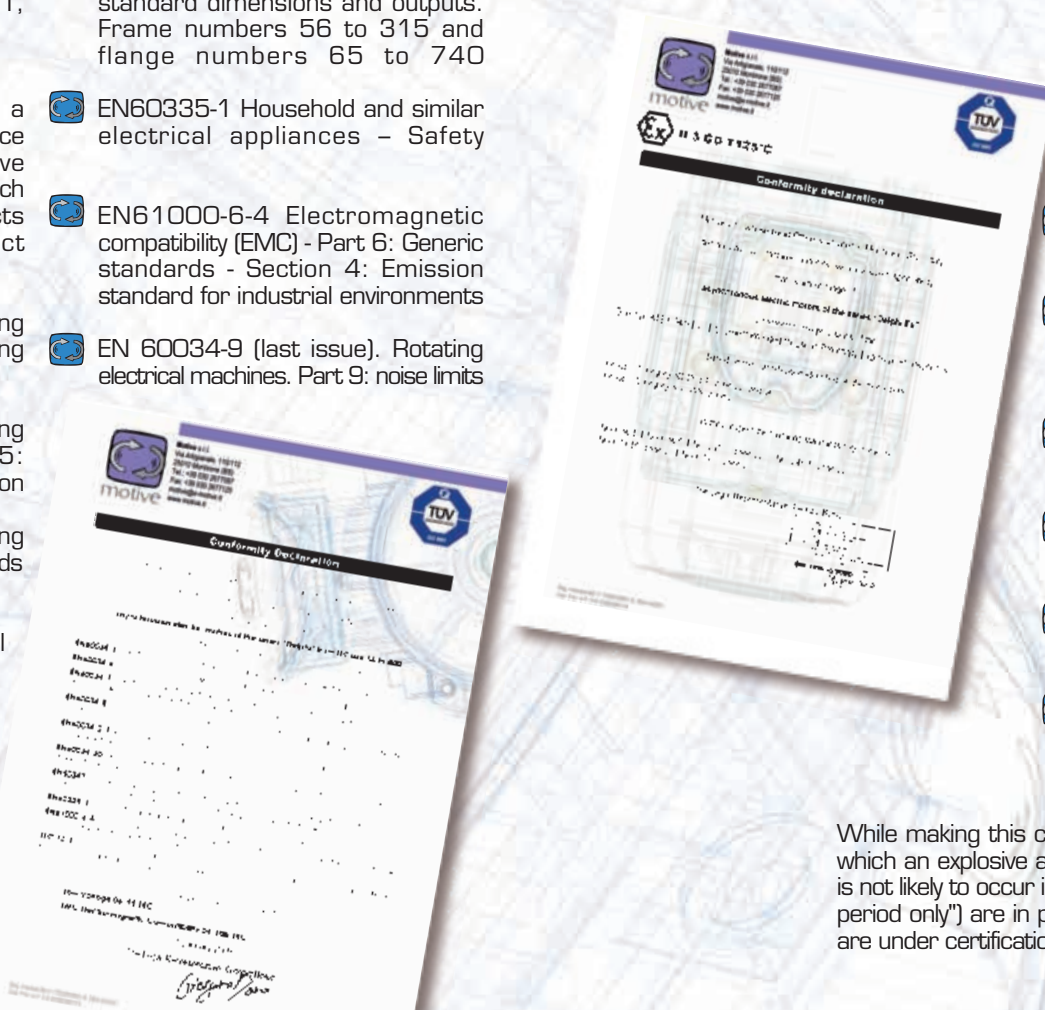
CE marking is referred to:







-  Low Voltage Directive (LVD) 2006/95/EC
-  Electromagnetic Compatibility Directive (EMC) 89/336 EC and its modifications 91/263 EC, 92/31 EC e 93/68 EC
- NB: The Machinery Directive (MD) 2006/42/EC excludes from its scope the electric motors (Art. 1, comma 2)
- 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)
-  EN60034-7 Rotating Electrical Machines - Part 7: Classification of Types of Construction, Mounting Arrangements and Terminal Box Position (IM Code)
-  EN60034-8 Rotating electrical machines-Part 8: Terminal markings and direction of rotation
-  EN60034-2-1 (last issue). Rotating electrical machines. Standard methods for determining losses and efficiency from tests
-  EN60034-30 (last issue). Rotating electrical machines - Part 30: Efficiency classes of single-speed, three-phase, cage-induction motors
-  EN50347 General purpose three-phase induction motors having standard dimensions and outputs. Frame numbers 56 to 315 and flange numbers 65 to 740
-  EN60335-1 Household and similar electrical appliances – Safety
-  EN61000-6-4 Electromagnetic compatibility (EMC) - Part 6: Generic standards - Section 4: Emission standard for industrial environments
-  EN 60034-9 (last issue). Rotating electrical machines. Part 9: noise limits



ATEX is the conventional name of the Directive 94/9/EC for the equipment intended for use in potentially explosive atmospheres. The name comes from the words ATmosphères and EXplosibles. It became compulsory in all the European Union from 1st March 1996, imposing the evaluation of the risk for all the equipment operating in such environments. It classifies several levels of "danger" (zones): to every zone it corresponds a different typology of explosive atmosphere, according to its composition and to its probability and time of appearance. The client is responsible of the choice of the right motor based on the criteria described in the norm EN 61241-14.

Motive delphi Ex motors are designed to be used in the zone 22 (II 3 D T125°a1C) and/or zone 2 (II 3 G T125°a1C), according to the classification stated in the plate, and for the voltage and frequency field A described by the norm EN 60034 part 1 Cap. 6.3.



-  EN60079-0 Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
-  EN60079-15 Electrical apparatus for explosive gas atmospheres - Part 15: Construction, test and marking of type of protection, "n" electrical apparatus
-  EN61241-0 Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements
-  EN61241-1 Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures "tD"
-  EN61241-14 Electrical apparatus for use in the presence of combustible dust - Part 14: Selection and installation
-  EN50281-2-1 Electrical apparatus for use in the presence of combustible dust. Test methods. Methods of determining minimum ignition temperatures

While making this catalogue, the motor "Delphi Ex", category 3 (for "a place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but if it does occur, will persist for a short period only") are in production, while the motors range "delphi Exd", category 2, are under certification.

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.

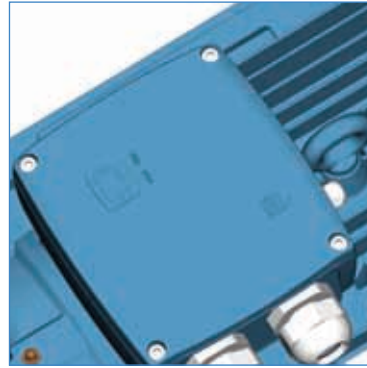
IP index of protection reference letters

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

2° num. Protection against harmful entry of water

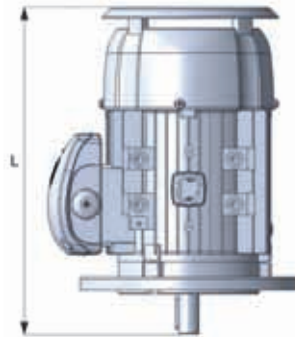
Motive motors are IP55 protected

	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
STANDARD	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
OPTIONAL	6 complete protection against the total penetration of dust	protection against water projections similar to sea waves
OPTIONAL	7	protection from temporary submersion in water, up to 1 meter in depth
OPTIONAL	8	protection from extended periods of immersion, up to a specific depth



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
400	2290



TOTAL SEALING

Resin coated stator is a safe solution to the presence of very strong humidity or aggressive environments (for instance, carwash systems or chemical plants). It offers also a lower heating thanks to the thermal dissipation capacity of the resin.



The ideal combination is the resin-filled terminal box. In this case, according to the customer needs, the terminal block can be partially immersed, or totally immersed in such insulating and protective resin. In alternative, the terminal box and block can be taken off and the motor frame be closed by a sealed plate from which a cable can come out.

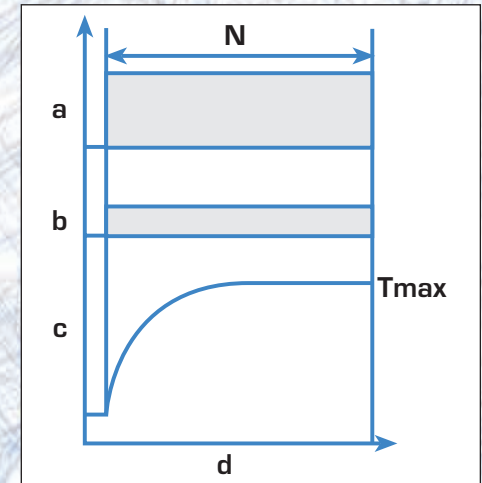
Note: rotors are painted against oxidation as a standard

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.
- S3 - Periodic intermittent service. S4 - Periodic intermittent service with start-up.
- S5 - Periodic intermittent service with electric braking.
- S6 - Uninterrupted periodic service with intermittent load.
- S7 - Uninterrupted periodic service with electric braking.
- S8 - Uninterrupted periodic service with correlated load and velocity variations.
- S9 - Service with non-periodic variations in load and speed.

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, Motive offers anti-condensation heaters, drain holes, resin coated stators, and resin filled terminal boxes).

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 admitted variation of supply voltage and frequency is established by the norm EN60034-1

Within this tolerance del phi motors provide the rated power reported in the plate.



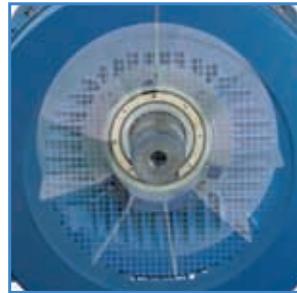
INSULATION:

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 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 to protect the motors from voltage peaks that usually occur when the motor is controlled by inverter.

In case that motors with more than 75 kW are controlled by inverter, we recommend to request the electrically insulated bearing on the non drive end.



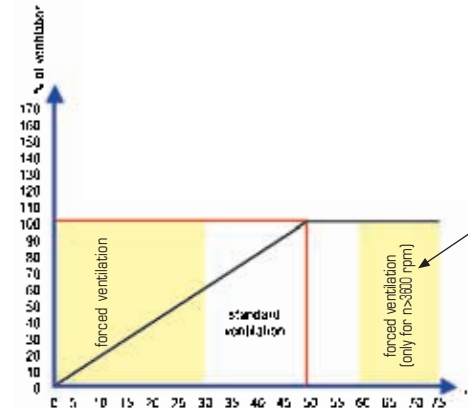
Its purpose is to open the electric circuit between the rotor and the motor frame, thus preventing that the shaft currents go through the bearings and damage their balls surface and roll tracks.

The section "technical data" of this catalogue shows the max operating temperatures according to the Class insulation shown on the plate.

Delphi 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 lenght. Such "ΔT" values are evidenced in the following performance charts. (see further details about temperature rise in the "technical data" section of this catalogue)

ASSISTED POWER COOLING

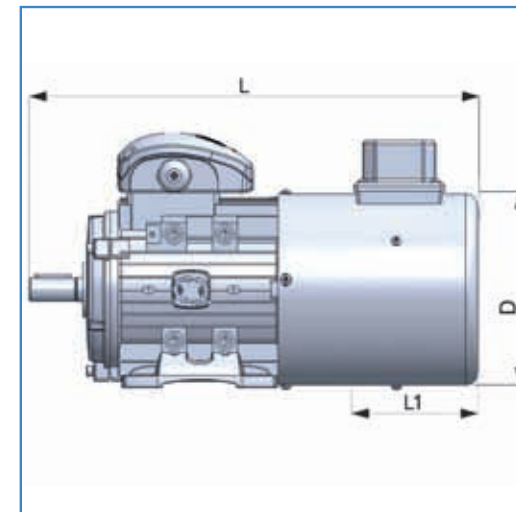
For application with a power supply at certain frequencies (see following graph), a power cooling system (IC-416) must be used.



because the noise of the standard ventilation can be too high, not conform to the noise limit reported in the norm IEC 34-9



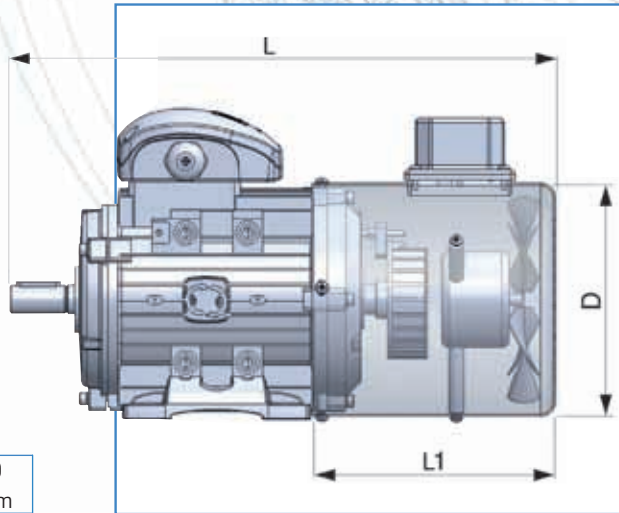
Motive power cooling systems are three-phase 400/50 400/60, IP 55, and with separate terminal box



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.

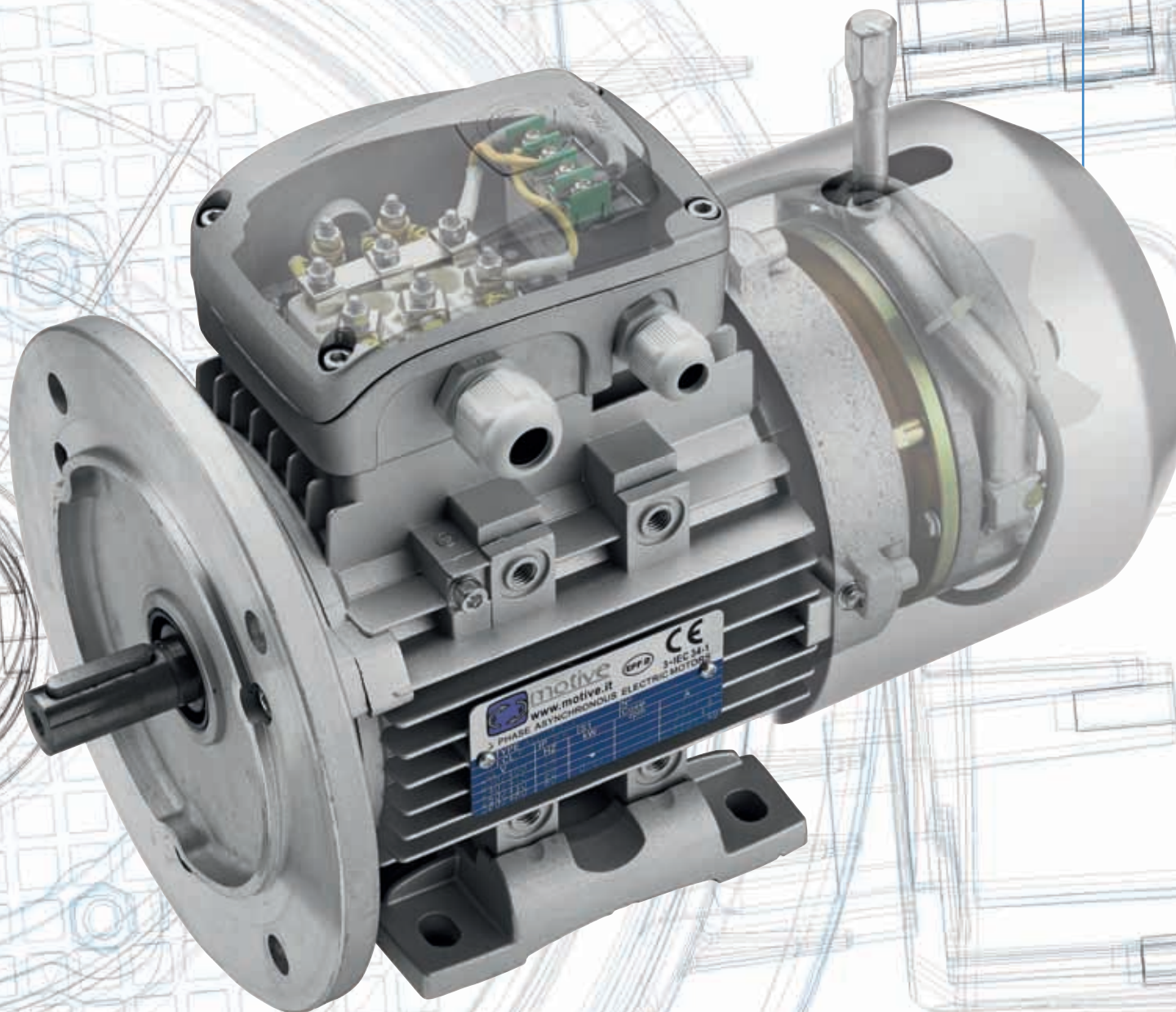
- Protection for motors with a shaft power greater than or equal to 0.5 kW with continuous S1 service. This protection may be achieved by means of a thermal cut-out relay, which automatically control a knife switch.
- Protection against peak currents by magnetic relay that controls an automatic knife 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 AT



DELPHI AT

Delphi ATDC, AT24, ATTD and ATTD24 series self-braking motors use one or 2 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 standard hand lever permits to release the brake, making it possible to move manually the shaft,
 -The PTO thermal protectors in the winding are a standard up to size 132. PTC are a standard from size 160 and up

-Easy separate connection of the brake in case that the motor is connected to an inverter.

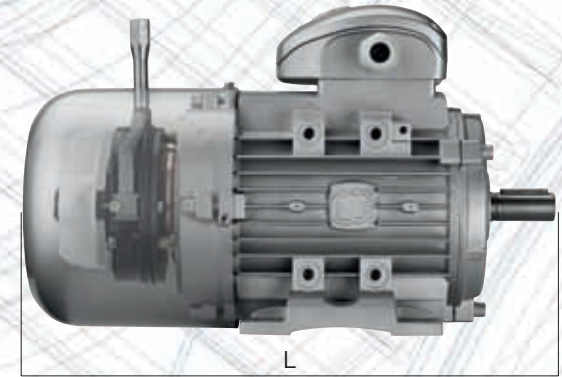
On ATDC and ATTD, the separate brake power supply is achieved, whenever needed, by connecting directly to the brake terminal board located inside the motor terminal box.

On AT24 and ATTD24, the 24Vdc single or double brakes are designed to be directly connected to an inverter (usually having a 24Vdc plug)

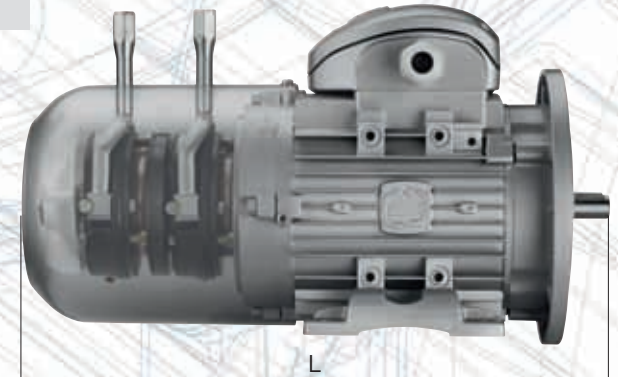
On request, the brakes can be modified to be extremely silent for usage in special environments like theatres

	ATDC/AT24	ATTD/ATTD24
TYPE	L	L
ATDC 63	240	290
ATDC 71	270	320
ATDC 80	375	475
ATDC 90S	400	500
ATDC 90L	426	530
ATDC 100L	465	560
ATDC 112M	495	610
ATDC 132S	570	690
ATDC 132M	610	730
ATDC 160M	715	845
ATDC 160L	760	900
ATDC 180M	790	930
ATDC 180L	830	970
ATDC 200L	900	1050
ATDC 225S	959	1100
ATDC 225M	964	1140
ATDC 250	1058	1210
ATDC 280S	1134	1300
ATDC 280M	1184	1350

ATDC/AT24

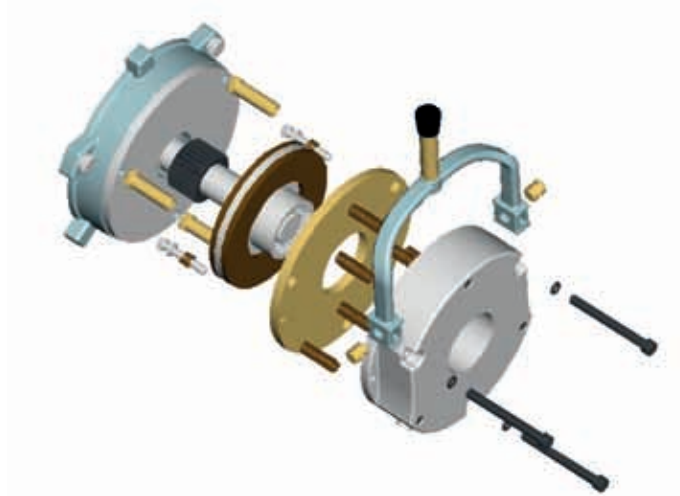
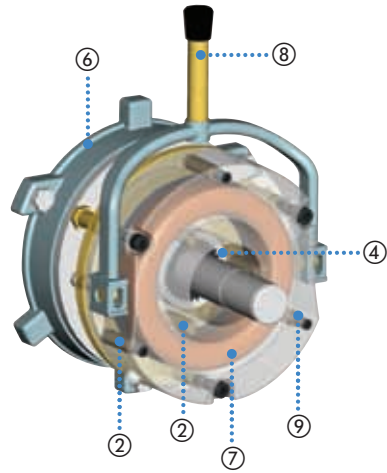
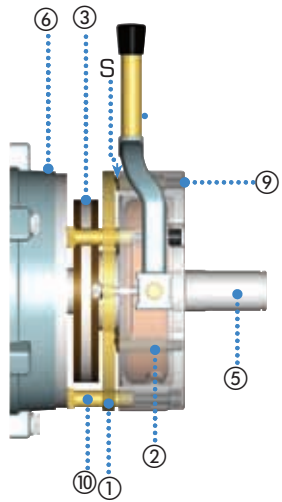


ATTD/ATTD24



IEC Type	ATDC					AT24				ATDC AT24	ATTD ATTD24
	Static max braking torque [Nm]	Braking time no-load [Sec]	Input voltage on rectifier [Vac]	output voltage to brake [Vdc]	Brake power W	Static max braking torque [Nm]	Static min braking torque [Nm]	Braking time no-load [Sec]	Brake power W	extra Kg on std	extra Kg on std
AT..63	4,5	0,15	230 (or 400)	104 (or 180)	22	7,0	4,5	0,06	20	+4	+3,5
AT..71	8,0	0,15	230 (or 400)	104 (or 180)	28	7,0	4,5	0,06	20	+5	+9
AT..80	12,5	0,20	230 (or 400)	104 (or 180)	30	14,0	9,5	0,09	25	+5,5	+10
AT..90	25,0	0,25	230 (or 400)	104 (or 180)	45	24,0	12,0	0,11	30	+6	+11
AT..100	38,0	0,30	230 (or 400)	104 (or 180)	60	60,0	28,0	0,14	45	+7	+12,5
AT..112	70,0	0,35	400	180	65	80,0	60,0	0,15	65	+10	+19
AT..132	140,0	0,40	400	180	88	120,0	110,0	0,16	85	+12	+23
AT..160	210,0	0,50	400	180	110	160,0	130,0	0,21	105	+22	+42
AT..180	210,0	0,50	400	180	130					+32	+62
AT..200	420,0	0,50	400	180	140					+40	+77
AT..225	450,0	0,50	400	180	200					+52	+100
AT..250	550,0	0,50	400	180	300					+80	+155
AT..280	900,0	0,50	400	180	300					+106	+209
ATTD/ATTD24	ATTD= ATDC x 2				ATTD= ATDC x 2	ATTD24= AT24 x 2			ATTD24= AT24 x 2		

ATDC



- 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
 - ⑪ braking torque setting knob
 - ⑫ ATTD connection plate
- S** Air gap

BRAKE DESCRIPTION

The Delphi AT... series brakes are electromagnetic brakes with negative operation, whose braking action is exercised in the absence of power supply. The brakes insulation class is F. The brakes lining is asbestos-free. The rectifier is of Mosfet type, with protection varistors at the entry and the exit. All brake assemblies are protected against corrosion by painting or heat galvanizing and resined winding. 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 ⑥ 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:

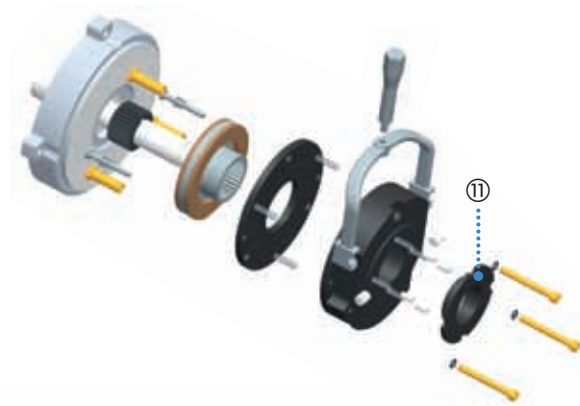
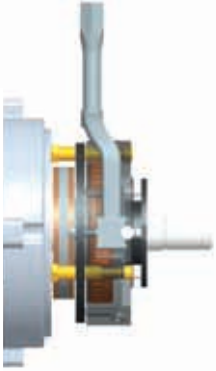
MOTOR TYPE	S AIR GAP (mm)
63-71	0.40-0.50
80-160	0.50-0.60

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

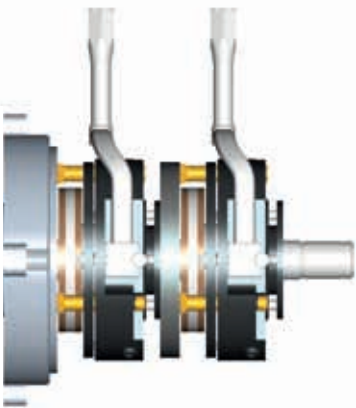
Braking torque adjustment

The braking torque is set to its max level by Motive, but it can be decreased by acting on the adjuster screws ⑨ (ATDC and ATTD motors) or on the knob ⑪ (AT24 and ATTD24).

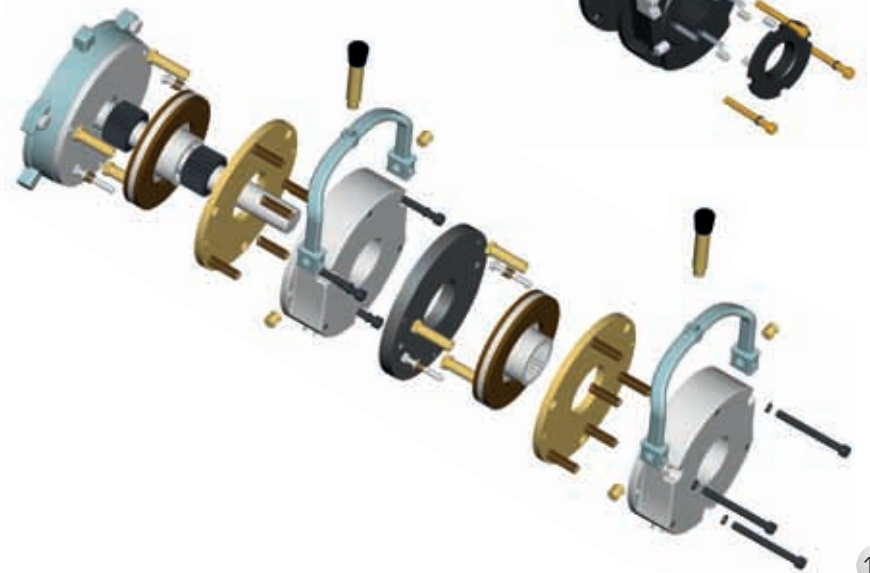
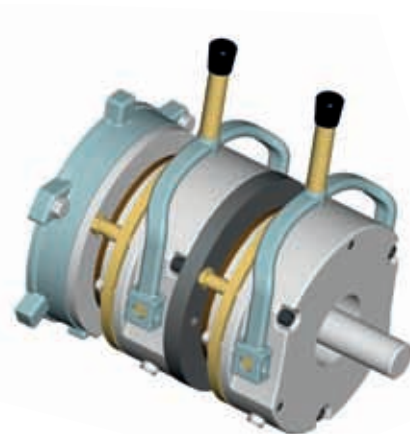
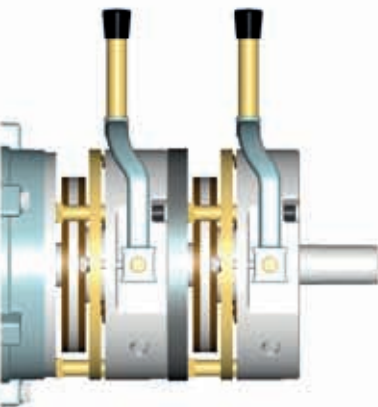
AT24



ATTD24

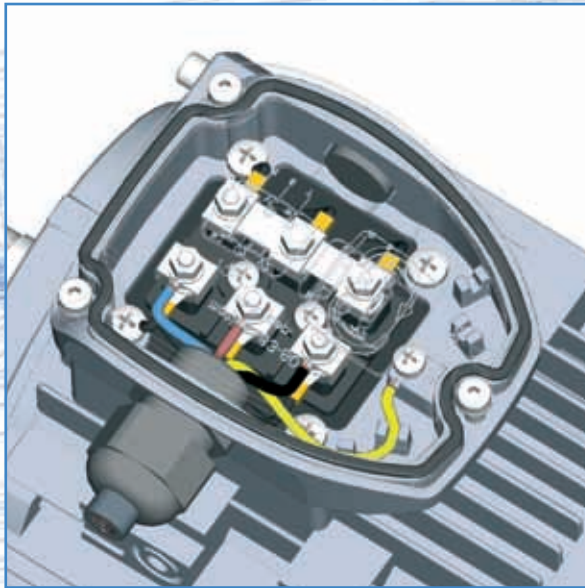


ATTD



WIRING DIAGRAMS

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



STAR CONNECTION

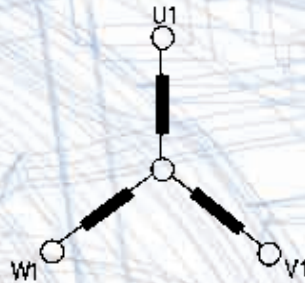
Star connection is obtained by connecting together the terminals W2, U2, V2 and supplying the terminals U1, V1, W1.

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 ±5%	230	400
		220	380
		240	415
	60 ±5%	260	440
		220	380
		265	460
132-355	50 ±5%	400	690
		380	660
		415	720
	60 ±5%	440	760
		380	660
		460	795
		480	830

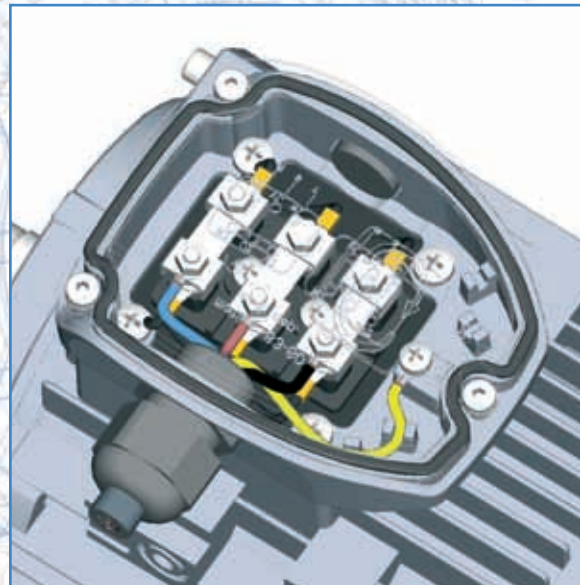
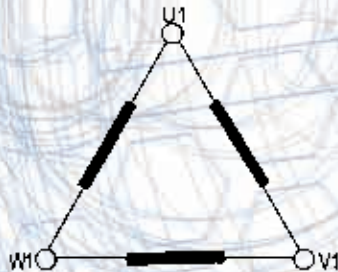
DELTA CONNECTION

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:

$$I_{ph} = I_n / \sqrt{3}$$

$$U_{ph} = U_n$$

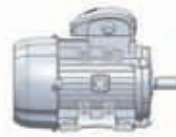
where I_n and U_n are referred to Delta connection.



MOTOR CONFIGURATIONS AND INSTALLATION POSITIONS (IEC 34-7)

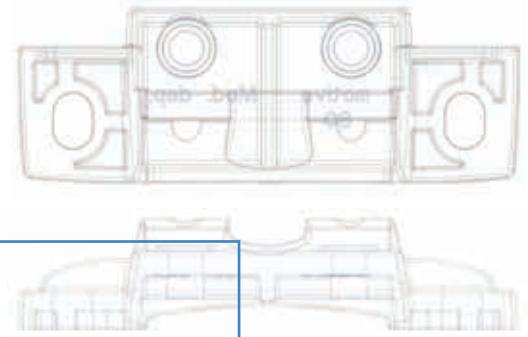
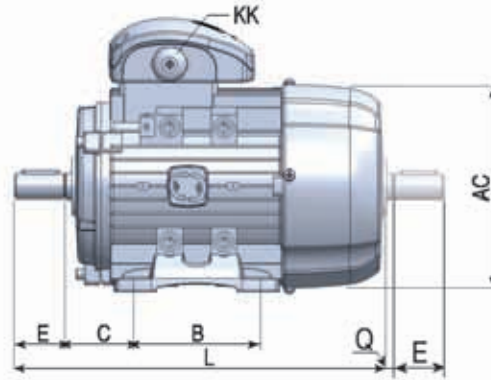
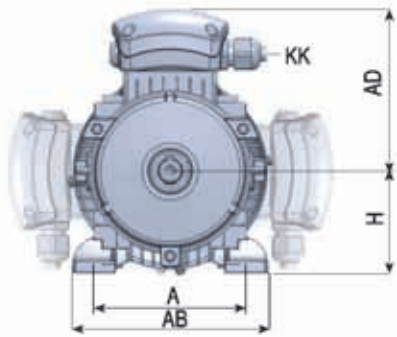
MOTORS WITH FEET B3		FLANGE-MOUNTED MOTORS B5	FLANGE-MOUNTED MOTORS B14
IM1051 (IM B6)	IM1001 (IM B3)	IM3001 (IM B5)	IM3601 (IM B14)
IM1061 (IM B7)	IM1011 (IM V5)	IM3011 (IM V1)	IM3611 (IM V18)
IM1071 (IM B8)	IM1031 (IM V6)	IM3031 (IM V3)	IM3631 (IM V19)
B3/B5 IM2001 (IM B35)	B3/B14 IM2101 (IM B34)	V1/V5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



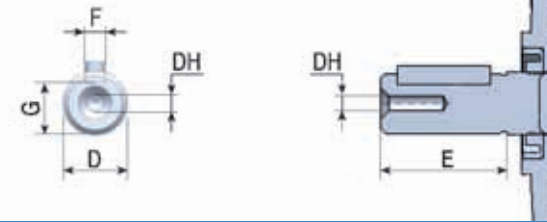
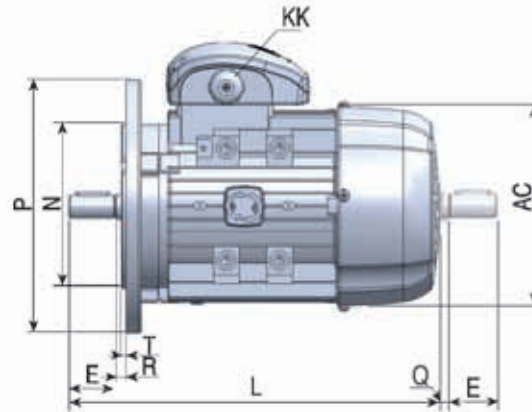
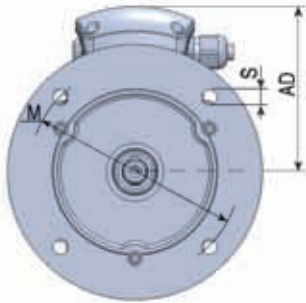


TYPE	POLES	AC	AD	H	KK	L	D	DH	E	Q	F	G	B3					B5						B14						B5R/B14B					
													A	AB	B	C	K	M	N	P	R	S	T	M	N	P	R	S	T	M	N	P	R	S	T
56	2-8	120	102	56	M16	198	9	M4x12	20	3	3	7,2	90	111	71	36	5,8	100	80	120	0	7x4	3	65	50	80	0	M5	2,5	-	-	-	-	-	-
63	2-8	130	107	63	M20	217	11	M4x12	23	3	4	8,5	100	123	80	40	7	115	95	140	0	10x4	3	75	60	90	0	M5	2,5	100	80	120	0	M6	2,5
71	2-8	145	119	71	M20	244	14	M5X12	30	3	5	11,0	112	138	90	45	7	130	110	160	0	10x4	3,5	85	70	105	0	M6	2,5	115	95	140	0	M8	3,0
80	2-8	155	130	80	M20	283	19	M6X16	40	3	6	15,5	125	157	100	50	10	165	130	200	0	12x4	3,5	100	80	120	0	M6	3,0	130	110	160	0	M8	3,5
90S	2-8	175	145	90	M20	305	24	M8X19	50	5	8	20,0	140	173	100	56	10	165	130	200	0	12x4	3,5	115	95	140	0	M8	3,0	130	110	160	0	M8	3,5
90L	2-8	175	145	90	M20	330	24	M8X19	50	5	8	20,0	140	173	125	56	10	165	130	200	0	12x4	3,5	115	95	140	0	M8	3,0	130	110	160	0	M8	3,5
100	2-8	215	157	100	M20	371	28	M10X22	60	5	8	24,0	160	196	140	63	12	215	180	250	0	15x4	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	5	8	24,0	190	227	140	70	12	215	180	250	0	15x4	4	130	110	160	0	M8	3,5	165	130	200	0	M10	3,5
132S	2-8	275	197	132	2xM32	455	38	M12X28	80	5	10	33,0	216	262	140	89	12	265	230	300	0	15x4	4	165	130	200	0	M10	3,5	215	180	250	0	M12	4,0
132M	2-8	275	197	132	2xM32	495	38	M12X28	80	5	10	33,0	216	262	178	89	12	265	230	300	0	15x4	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	5	12	37,0	254	320	210	108	15	300	250	350	0	19x4	5	215	180	250	0	M12	4,0						
160L	2-8	330	255	160	2xM40	670	42	M16X36	110	5	12	37,0	254	320	254	108	15	300	250	350	0	19x4	5	215	180	250	0	M12	4,0						
180M	2-8	380	280	180	2xM40	700	48	M16X36	110	8	14	42,5	279	355	241	121	15	300	250	350	0	19x4	5												
180L	2-8	380	280	180	2xM40	740	48	M16X36	110	8	14	42,5	279	355	279	121	15	300	250	350	0	19x4	5												
200L	2-8	420	305	200	2xM50	770	55	M20X42	110	12	16	49,0	318	395	305	133	19	350	300	400	0	19x4	5												
225S	4-8	470	335	225	2xM50	815	60	M20X42	140	12	18	53,0	356	435	286	149	19	400	350	450	0	19x8	5												
225M	2	470	335	225	2xM50	820	55	M20X42	110	12	16	53,0	356	435	311	149	19	400	350	450	0	19x8	5												
225M	4-8	470	335	225	2xM50	845	60	M20X42	140	12	18	56,0	356	435	311	149	19	400	350	450	0	19x8	5												
250M	2	510	370	250	2xM63	910	60	M20X42	140	12	18	56,0	406	490	349	168	24	500	450	550	0	19x8	5												
250M	4-8	510	370	250	2xM63	910	65	M20X42	140	12	18	67,5	406	490	349	168	24	500	450	550	0	19x8	5												
280S	2	550	410	280	2xM63	985	65	M20X42	140	12	18	58,0	457	550	368	190	24	500	450	550	0	19x8	5												
280S	4-8	550	410	280	2xM63	985	75	M20X42	140	12	20	67,5	457	550	368	190	24	500	450	550	0	19x8	5												
280M	2	550	410	280	2xM63	1035	65	M20X42	140	12	18	58,0	457	550	419	190	24	500	450	550	0	19x8	5												
280M	4-8	550	410	280	2xM63	1035	75	M20X42	140	12	20	71,0	457	550	419	190	24	500	450	550	0	19x8	5												
315S	2	615	530	315	2xM63	1160	65	M20X42	140	15	18	58,0	508	630	406	216	28	600	550	660	0	24x8	6												
315S	4-8	615	530	315	2xM63	1270	80	M20X42	170	15	22	71,0	508	630	406	216	28	600	550	660	0	24x8	6												
315M	2	645	530	315	2xM63	1190	65	M20X42	140	15	18	58,0	508	630	457	216	28	600	550	660	0	24x8	6												
315M	4-8	645	530	315	2xM63	1300	80	M20X42	170	15	22	71,0	508	630	457	216	28	600	550	660	0	24x8	6												
315L	2	645	530	315	2xM63	1320	65	M20X42	140	15	18	58,0	508	630	508	216	28	600	550	660	0	24x8	6												
315L	4-8	645	530	315	2xM63	1350	80	M20X42	170	15	22	71,0	508	630	508	216	28	600	550	660	0	24x8	6												
355M	2	710	655	355	2xM63	1500	75	M20X42	140	15	20	67,5	610	730	560/630	254	28	740	680	800	0	24x8	6												
355M	4-8	710	655	355	2xM63	1530	95	M20X42	170	15	25	86,0	610	730	560/630	254	28	740	680	800	0	24x8	6												
355L	2	710	655	355	2xM63	1500	75	M20X42	140	15	20	67,5	610	730	560/630	254	28	740	680	800	0	24x8	6												
355L	4-8	710	655	355	2xM63	1530	95	M20X42	170	15	25	86,0	610	730	560/630	254	28	740	680	800	0	24x8	6												
400S/M/L	4-8	860	680	400	3xM63	1945	110	M24X50	210	-	28	100,0	686	810	630/710	280	36																		

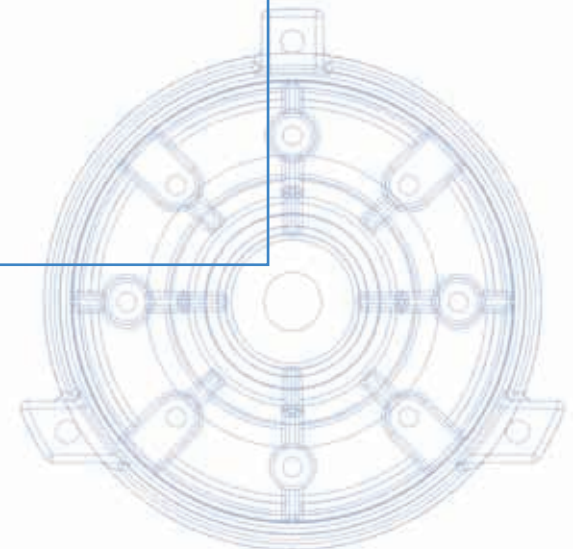
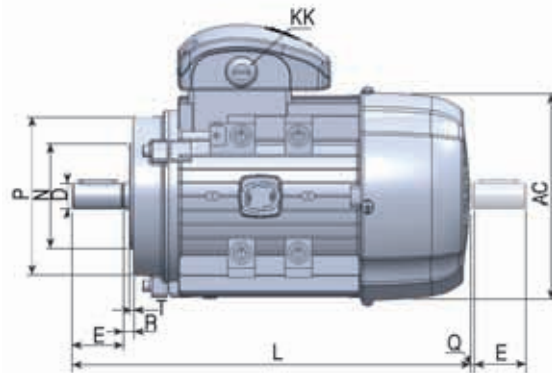
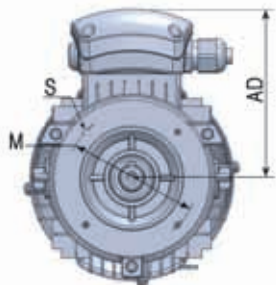
B3



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

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

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. An 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.

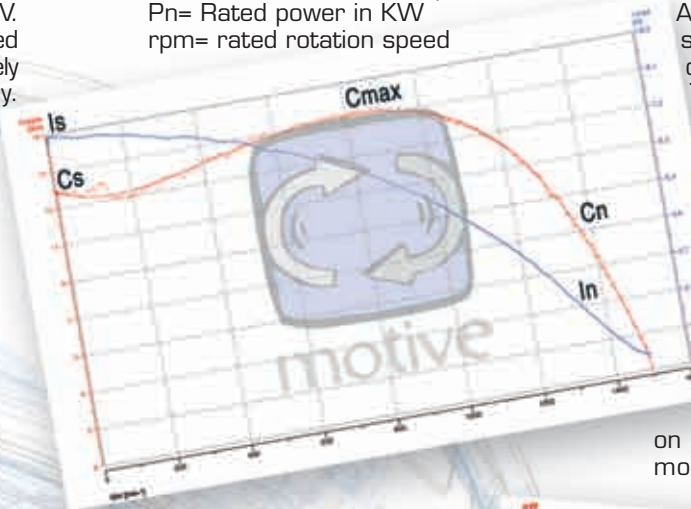
rated voltage at 50Hz	Volt at 60Hz	rated power W	In (A)	Cn (Nm)	rpm	Is (A)	Cs (Nm)	Cmax (Nm)
230 ± 10%	230 ± 5%	1	1	0,83	1,2	0,83	0,83	0,83
230 ± 10%	230 ± 10%	1	0,95	0,83	1,2	0,83	0,83	0,83
230 ± 10%	240 ± 5%	1,05	1	0,87	1,2	0,87	0,87	0,87
400 ± 10%	380 ± 5%	1	1	0,83	1,2	0,83	0,83	0,83
400 ± 10%	400 ± 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
 $f = 120/p$
f= supply frequency Hz
p= number of poles pairs

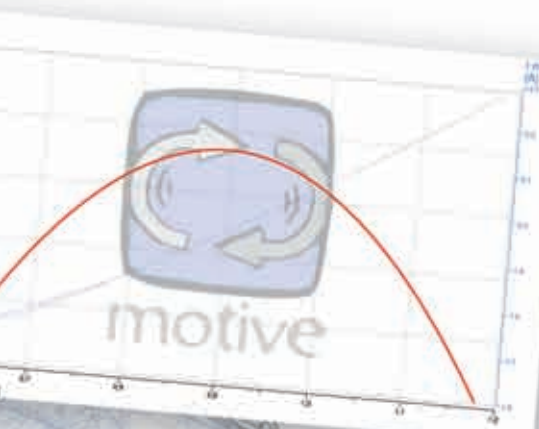
Motive motors can face also temporary overloads, with Current increases of 1.5 times the rated current for at least 2 minutes.

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.

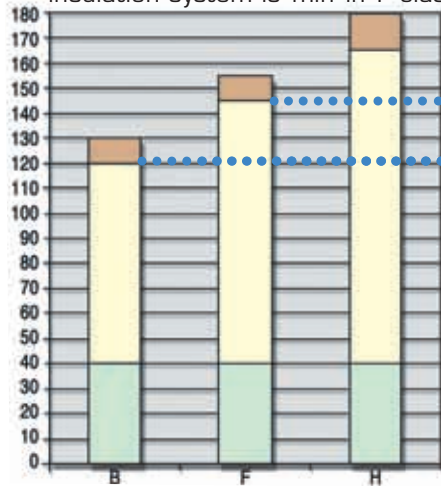
TECHNICAL DATA

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)	T _{max} (°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

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)

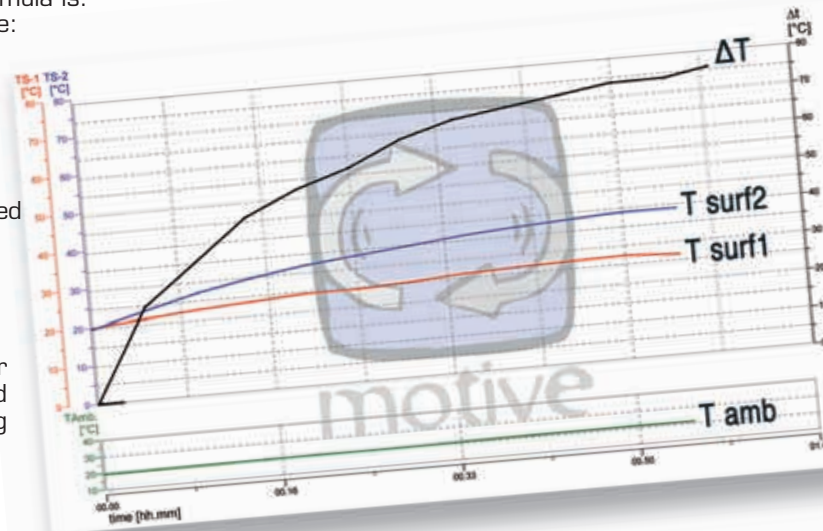
R2= Hot winding resistance in Ohms (when the motor has reached its thermal equilibrium)

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 L_{wA} 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 **L_{wA}**. 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- η)
Power factor	1/ 6 of (1- $\cos\phi$) 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



IE1, standard efficiency class IE 60034-30

IE2, high efficiency class IE 60034-30

IE3, premium efficiency class IE 60034-30

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	η %			Pwr. Fact. cosφ			ΔT (°C)	LwA (dB)	J Kgm ²	Kg	
												100%	75%	50%	100%	75%	50%					
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	50,0	0,83	0,76	0,60	26	60	0,00008	3,5
0,13	0,18	56B-2	2821	0,41	1,27	3,1	0,44	4,23	9,6	1,10	2,5	64,9	-	61,8	61,0	0,70	0,61	0,60	23	60	0,00010	3,6
0,18	0,25	63A-2	2808	0,47	2,03	4,3	0,61	1,60	2,6	1,68	2,7	71,8	-	70,8	67,0	0,77	0,68	0,56	27	61	0,00021	4,5
0,25	0,35	63B-2	2780	0,63	2,73	4,3	0,86	5,37	6,3	2,37	2,8	74,0	-	74,3	71,4	0,77	0,69	0,56	30	61	0,00030	4,7
0,37	0,5	63C-2	2791	0,93	4,13	4,5	1,27	3,60	2,8	3,67	2,9	76,4	-	76,3	72,8	0,76	0,65	0,51	51	61	0,00043	5,7
0,37	0,5	71A-2	2820	0,94	4,33	4,6	1,25	2,90	2,3	3,53	2,8	74,0	-	73,7	69,1	0,77	0,67	0,53	43	64	0,00055	6,0
0,55	0,75	71B-2	2844	1,27	6,94	5,5	1,85	5,60	3,0	5,56	3,0	82,1	-	83,6	82,0	0,76	0,68	0,52	51	64	0,00060	6,3
0,75	1	71C-2	2819	1,69	9,06	5,4	2,54	7,70	3,0	7,72	3,0	79,7	IE2	80,5	78,8	0,81	0,70	0,58	61	64	0,00068	7,3
0,75	1	80A-2	2890	1,76	10,64	6,1	2,48	5,90	2,4	7,80	3,1	80,0	IE2	79,0	75,2	0,77	0,70	0,56	42	67	0,00075	10,0
1,1	1,5	80B-2	2875	2,36	14,18	6,0	3,65	16,60	4,5	11,70	3,2	83,8	IE3	84,8	84,0	0,80	0,73	0,61	48	67	0,00090	11,0
1,5	2	80C-2	2876	3,17	19,72	6,0	4,98	22,80	2,5	15,60	2,7	82,5	IE2	82,6	80,1	0,83	0,76	0,64	54	67	0,00105	12,5
1,5	2	90S-2	2864	3,17	18,62	5,9	5,00	12,30	2,5	15,32	3,1	82,1	IE2	82,1	79,7	0,83	0,76	0,64	62	72	0,00120	13,0
2,2	3	90L-2	2859	4,51	28,31	6,3	7,35	22,30	3,0	23,16	3,2	83,6	IE2	85,0	83,9	0,84	0,78	0,66	70	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	IE1	83,9	83,7	0,84	0,78	0,67	86	72	0,00215	16,0
3	4	100L-2	2878	5,95	36,08	6,1	9,95	22,29	2,2	31,07	3,1	83,9	IE1	85,0	83,6	0,87	0,80	0,71	76	76	0,00290	25,0
4	5,5	100LB-2	2863	7,61	47,90	6,3	13,34	34,00	2,5	40,23	3,0	85,9	IE2	87,3	86,6	0,88	0,84	0,76	80	76	0,00420	27,0
4	5,5	112M-2	2887	7,49	46,28	6,2	13,23	28,70	2,2	41,00	3,1	85,8	IE2	86,8	85,9	0,90	0,86	0,77	72	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	IE1	86,0	84,8	0,89	0,86	0,79	75	77	0,00820	34,0
5,5	7,5	132SA-2	2903	10,26	67,73	6,6	18,09	37,80	2,1	58,20	3,2	85,9	IE1	86,5	84,5	0,90	0,87	0,78	75	80	0,01090	40,0
7,5	10	112MC-2	2877	13,67	103,87	7,6	24,90	59,75	2,4	79,67	3,2	88,2	IE2	89,4	89,3	0,90	0,87	0,80	85	77	0,01000	37,0
7,5	10	132SB-2	2865	13,64	84,70	6,2	25,00	59,40	2,4	79,02	3,2	87,2	IE1	88,2	87,8	0,91	0,88	0,80	95	80	0,01260	45,0
9,2	12,5	132MA-2	2906	16,16	126,72	7,8	30,23	77,40	2,6	90,70	3,0	89,3	-	90,0	89,9	0,92	0,90	0,87	72	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	IE1	88,9	87,8	0,91	0,89	0,85	90	81	0,02500	55,0
15	20	132MC-2	2936	26,76	203,75	7,6	48,79	116,80	2,4	152,70	3,1	90,7	IE2	90,9	90,0	0,89	0,86	0,80	65	81	0,03200	58,0
11	15	160MA-2	2932	19,82	127,63	6,4	35,83	78,40	2,2	56,10	1,6	89,5	IE2	89,3	87,3	0,90	0,87	0,81	56	86	0,03770	110,0
15	20	160MB-2	2941	27,06	188,77	7,0	48,71	132,10	2,7	152,80	3,1	89,8	IE1	89,5	87,4	0,89	0,87	0,81	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	IE1	90,5	86,5	0,90	0,88	0,83	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	IE2	90,8	88,4	0,89	0,86	0,80	60	89	0,07500	165,0
30	40	200LA-2	2952	52,18	391,37	7,5	97,05	194,11	2,0	223,22	2,3	92,2	IE2	91,9	90,4	0,90	0,87	0,82	70	92	0,12400	217,0
37	50	200LB-2	2949	64,57	484,25	7,5	119,82	239,64	2,0	275,59	2,3	92,5	IE2	92,4	91,0	0,89	0,88	0,81	77	92	0,13900	243,0
45	60	225M-2	2969	78,55	589,12	7,5	144,75	289,49	2,0	332,92	2,3	93,5	IE2	93,1	91,6	0,88	0,86	0,80	79	92	0,23300	320,0
55	75	250M-2	2970	96,61	724,60	7,5	176,85	353,70	2,0	406,76	2,3	93,5	IE2	93,0	91,3	0,88	0,89	0,85	76	93	0,31200	390,0
75	100	280S-2	2970	128,01	960,09	7,5	241,16	482,32	2,0	554,67	2,3	94,4	IE2	94,2	93,1	0,90	0,89	0,86	69	94	0,57900	540,0
90	125	280M-2	2970	153,26	1149,43	7,5	289,39	578,79	2,0	665,61	2,3	94,2	IE2	93,8	92,4	0,90	0,89	0,86	78	94	0,67500	590,0
110	150	315S-2	2980	185,05	1313,83	7,1	352,52	634,53	1,8	775,54	2,2	94,4	IE2	93,8	92,0	0,91	0,90	0,84	80	96	1,18000	880,0
132	180	315MA-2	2980	218,75	1553,14	7,1	423,02	761,44	1,8	930,64	2,2	95,0	IE2	94,4	93,0	0,92	0,91	0,90	75	96	1,82000	1000,0
160	215	315LA-2	2980	262,63	1864,69	7,1	512,75	922,95	1,8	1128,05	2,2	95,0	IE2	94,4	92,9	0,93	0,91	0,86	75	99	2,08000	1055,0
200	270	315LB-2	2980	334,84	2377,36	7,1	640,94	1153,69	1,8	1410,07	2,2	95,6	IE2	95,1	93,9	0,90	0,89	0,85	80	99	2,38000	1110,0
250	335	355M-2	2985	410,72	2916,11	7,1	799,83	1279,73	1,6	1759,63	2,2	95,6	IE2	95,1	93,8	0,92	0,91	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	IE2	94,9	94,0	0,91	0,89	0,87	75	103	3,50000	2300,0



4 Poles asynchronous speed 1500 rpm



IE1, standard efficiency class IE 60034-30
IE2, high efficiency class IE 60034-30

KW	HP	Type	rpm	In (A)	Is (A)	Is / In	Cn (Nm)	Cs (Nm)	Cs / Cn	Cmax (Nm)	Cmax / Cn	η %			Pwr. Fact. cosφ			ΔT (°C)	LwA (dB)	J Kgm²	Kg	
												100%	IE	75%	50%	100%	75%					50%
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	49,0	0,67	0,56	0,50	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	43,0	0,65	0,54	0,36	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	62,0	0,72	0,62	0,59	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	58,0	0,68	0,55	0,40	38	52	0,00040	4,7
0,25	0,35	63C-4	1380	0,72	2,41	3,3	1,73	4,10	2,4	4,00	2,3	71,0	-	71,3	67,6	0,70	0,60	0,47	51	52	0,00045	5,7
0,25	0,35	71A-4	1400	0,69	2,90	4,2	1,71	4,30	2,5	4,57	2,7	72,7	-	72,0	68,0	0,72	0,62	0,50	41	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	61,2	0,72	0,63	0,41	65	55	0,00081	6,3
0,55	0,75	71C-4	1400	1,47	5,78	3,9	3,75	6,90	1,8	6,60	1,8	74,9	-	75,3	72,0	0,72	0,65	0,50	80	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	73,0	0,71	0,61	0,50	50	58	0,00182	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	IE1	77,2	76,0	0,69	0,60	0,53	70	58	0,00212	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	IE1	77,3	71,6	0,72	0,62	0,42	80	58	0,00222	12,5
1,1	1,5	90S-4	1368	2,52	9,75	3,9	7,68	14,75	1,9	16,65	2,2	76,9	IE1	80,0	79,5	0,82	0,75	0,61	75	61	0,00242	13,0
1,5	2	90L-4	1413	3,60	17,72	4,9	10,14	26,38	2,6	30,08	3,0	80,2	IE1	80,8	78,2	0,75	0,67	0,52	42	61	0,00303	14,0
2,2	3	90LB-4	1392	4,96	27,47	5,5	15,09	38,00	2,5	40,48	2,7	81,0	IE1	82,8	81,7	0,79	0,70	0,57	84	61	0,00414	16,0
2,2	3	100LA-4	1429	5,03	25,62	5,1	14,70	32,00	2,2	40,10	2,7	82,0	IE1	82,8	80,4	0,77	0,69	0,54	76	64	0,00545	23,0
3	4	100LB-4	1424	6,65	34,30	5,2	20,12	49,00	2,4	58,00	2,9	82,9	IE1	83,9	82,3	0,79	0,71	0,55	80	64	0,00677	25,0
4	5,5	100LC-4	1415	8,75	52,53	6,0	27,00	74,24	2,8	78,00	2,9	83,8	IE1	85,0	84,0	0,79	0,71	0,59	90	64	0,00818	27,0
4	5,5	112M-4	1444	8,90	49,64	5,6	26,45	74,20	2,8	76,20	2,9	85,8	IE1	86,0	83,7	0,76	0,68	0,52	78	65	0,00960	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	IE1	86,7	85,0	0,79	0,73	0,60	76	65	0,01515	35,0
5,5	7,5	132S-4	1446	10,74	61,43	5,7	36,32	69,00	1,9	74,88	2,1	87,8	IE2	89,5	88,5	0,84	0,78	0,66	83	71	0,02161	45,0
7,5	10	112MC-4	1452	15,52	108,96	7,0	49,33	146,50	3,0	169,50	3,4	87,2	IE1	87,7	86,1	0,80	0,73	0,60	80	67	0,02252	37,0
7,5	10	132M-4	1451	14,53	106,40	7,3	49,36	59,20	1,2	100,02	2,0	88,7	IE1	89,4	89,0	0,84	0,80	0,69	84	71	0,02990	47,0
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	IE1	87,7	85,8	0,78	0,71	0,57	65	72	0,03131	55,0
11	15	132MC-4	1461	22,25	170,43	7,7	71,90	196,40	2,7	186,95	2,6	89,2	IE1	89,4	87,2	0,80	0,74	0,61	80	73	0,04040	57,0
15	20	132MD-4	1457	30,62	193,79	6,3	98,32	235,70	2,4	282,50	2,9	89,5	IE1	89,9	88,6	0,79	0,72	0,59	92	74	0,05050	58,0
11	15	160M-4	1460	21,69	134,07	6,2	71,95	153,40	2,1	208,66	2,9	89,7	IE2	89,4	87,6	0,82	0,78	0,65	70	75	0,06161	118,0
15	20	160L-4	1470	28,67	189,86	6,6	97,45	207,70	2,1	269,00	2,8	89,7	IE1	89,7	88,2	0,84	0,79	0,71	65	75	0,09272	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	IE2	91,1	89,9	0,85	0,81	0,72	51	76	0,14039	164,0
22	30	180L-4	1470	39,26	294,46	7,5	142,93	314,44	2,2	328,73	2,3	91,4	IE2	91,4	90,0	0,89	0,85	0,75	80	76	0,15958	182,0
30	40	200L-4	1480	53,60	385,91	7,2	193,58	425,88	2,2	445,24	2,3	92,3	IE2	92,4	91,5	0,88	0,85	0,77	85	79	0,26462	245,0
37	50	225S-4	1480	65,40	470,85	7,2	238,75	525,25	2,2	549,13	2,3	92,8	IE2	92,3	90,4	0,88	0,86	0,78	75	81	0,41006	258,0
45	60	225M-4	1480	78,42	564,64	7,2	290,37	638,82	2,2	667,85	2,3	93,3	IE2	93,3	92,1	0,89	0,86	0,80	80	81	0,47369	290,0
55	75	250M-4	1480	95,30	686,17	7,2	354,90	780,78	2,2	816,27	2,3	93,7	IE2	93,5	92,3	0,89	0,88	0,84	75	83	0,66660	388,0
75	100	280S-4	1480	128,82	927,49	7,2	483,95	1064,70	2,2	1113,09	2,3	94,0	IE2	93,6	92,2	0,89	0,88	0,84	80	86	1,30000	510,0
90	120	280M-4	1485	152,28	1096,41	7,2	578,79	1273,33	2,2	1331,21	2,3	94,7	IE2	94,7	94,0	0,90	0,89	0,85	70	86	1,49000	606,0
110	150	315S-4	1485	187,88	1296,35	6,9	707,41	1485,56	2,1	1556,30	2,2	95,1	IE2	95,0	94,2	0,89	0,88	0,83	75	93	3,13000	910,0
132	180	315M-4	1485	225,10	1553,17	6,9	848,89	1782,67	2,1	1867,56	2,2	95,2	IE2	95,1	94,0	0,89	0,87	0,81	65	93	3,65000	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	IE2	94,5	94,0	0,88	0,85	0,80	80	97	4,11200	1055,0
200	270	315LB-4	1481	339,92	2345,45	6,9	1289,67	2708,31	2,1	2837,27	2,2	95,1	IE2	94,7	93,8	0,89	0,89	0,84	75	97	4,81000	1128,0
250	335	355M-4	1483	420,03	2898,23	6,9	1609,91	3380,82	2,1	3541,81	2,2	95,6	IE2	95,4	94,7	0,90	0,90	0,87	80	101	6,53000	1700,0
315	423	355L-4	1490	524,91	3621,87	6,9	2018,96	4239,82	2,1	4441,71	2,2	95,7	IE2	95,5	94,7	0,91	0,88	0,82	70	101	8,24000	1900,0
355	483	400M-4	1485	598,04	4066,65	6,8	2283,00	4337,69	1,9	5022,59	2,2	95,2	IE2	95,1	95,0	0,90	0,89	0,88	80	111	14,70000	2860,0
400	544	400MA-4	1490	673,63	4580,70	6,8	2563,76	4871,14	1,9	5640,27	2,2	96,3	-	96,2	96,1	0,89	0,88	0,87	80	111	14,98000	2980,0
455	620	400MB-4	1490	766,26	5210,55	6,8	2916,28	5540,92	1,9	6415,81	2,2	96,3	-	96,2	96,0	0,89	0,88	0,87	80	111	15,80000	3080,0
500	675	400LA-4	1490	842,04	5725,88	6,8	3204,70	6088,93	1,9	7050,34	2,2	96,3	-	96,2	96,0	0,89	0,88	0,86	80	111	18,50000	3348,0
560	760	400LB-4	1490	943,09	6412,98	6,8	3589,26	6819,60	1,9	7896,38	2,2	96,3	-	96,2	96,1	0,89	0,88	0,87	80	111	19,90000	3400,0
630	857	400LC-4	1490	1060,97	7214,60	6,8	4037,92	7672,05	1,9	8883,42	2,2	96,3	-	96,2	96,1	0,89	0,88	0,87	80	112	21,50000	3590,0



6 Poles asynchronous speed 1000 rpm



IE1, standard efficiency class IE 60034-30
IE2, high efficiency class IE 60034-30

KW	HP	Type	rpm	In (A)	Is (A)	Is / In	Cn (Nm)	Cs (Nm)	Cs / Cn	Cmax (Nm)	Cmax / Cn	η %				Pwr. fact. cosφ			ΔT (°C)	LwA (dB)	J Kg·m ²	Kg
												100%	IE	75%	50%	100%	75%	50%				
0,18	0,25	71A-6	921	0,66	1,93	2,9	1,87	4,20	2,3	4,30	2,3	62,7		61,1	53,7	0,63	0,54	0,42	41	51	0,00110	6,0
0,25	0,35	71B-6	910	0,87	2,62	3,0	2,62	6,00	2,3	6,00	2,3	64,0		62,5	57,1	0,65	0,55	0,43	54	51	0,00140	6,3
0,37	0,5	80A-6	928	1,20	3,58	3,0	3,81	6,80	1,8	8,10	2,1	67,3		66,0	60,9	0,66	0,56	0,45	58	53	0,00160	10,0
0,55	0,75	80B-6	917	1,71	4,72	2,8	5,73	10,40	1,8	10,60	1,9	70,5		71,4	67,7	0,66	0,57	0,44	80	53	0,00190	11,0
0,75	1	90S-6	934	2,20	7,85	3,6	7,67	15,93	2,1	19,04	2,5	74,5	IE1	73,0	68,7	0,66	0,55	0,43	52	57	0,00290	13,0
1,1	1,5	90L-6	924	3,03	11,36	3,7	11,37	24,42	2,1	28,17	2,5	76,4	IE1	76,9	73,7	0,69	0,58	0,44	57	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	IE1	77,3	73,6	0,69	0,58	0,47	85	58	0,00690	23,0
2,2	3	112M-6	951	5,45	25,84	4,7	22,09	45,40	2,1	57,79	2,6	81,9	IE2	82,7	80,4	0,71	0,61	0,48	74	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	IE2	84,6	82,1	0,74	0,71	0,54	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	IE2	84,5	82,0	0,77	0,69	0,57	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	IE1	84,9	83,2	0,77	0,71	0,58	63	64	0,04490	55,0
7,5	10	160M-6	978	16,97	88,24	5,2	73,24	109,85	1,5	146,47	2,0	88,6	IE2	89,2	88,5	0,72	0,67	0,60	50	71	0,00810	118,0
11	15	160L-6	970	22,87	148,66	6,5	108,30	227,43	2,1	227,43	2,1	89,0	IE2	89,5	89,3	0,78	0,73	0,70	70	71	0,11600	125,0
15	20	180L-6	970	30,51	213,56	7,0	147,68	310,13	2,1	310,13	2,1	89,8	IE2	89,0	87,9	0,79	0,75	0,67	75	73	0,20700	160,0
18,5	25	200LA-6	970	34,33	240,34	7,0	182,14	382,49	2,1	382,49	2,1	91,0	IE2	90,8	89,7	0,86	0,81	0,72	70	76	0,31500	217,0
22	30	200LB-6	970	42,51	297,56	7,0	216,60	454,86	2,1	454,86	2,1	91,1	IE2	90,1	89,0	0,82	0,78	0,75	80	76	0,36000	244,0
30	40	225M-6	983	55,95	391,68	7,0	291,45	582,91	2,0	612,05	2,1	91,8	IE2	91,3	89,5	0,84	0,81	0,73	80	76	0,54700	295,0
37	50	250M-6	980	64,07	448,52	7,0	360,56	757,18	2,1	757,18	2,1	92,6	IE2	93,0	92,4	0,90	0,89	0,83	65	78	0,84300	365,0
45	60	280S-6	988	79,63	557,43	7,0	434,97	913,44	2,1	913,44	2,1	93,1	IE2	93,0	91,9	0,88	0,86	0,80	60	80	1,39000	500,0
55	75	280M-6	980	101,51	710,58	7,0	535,97	1125,54	2,1	1125,54	2,1	93,1	IE2	92,5	92,0	0,84	0,85	0,82	60	80	1,65000	545,0
75	100	315S-6	986	133,74	936,17	7,0	726,42	1452,84	2,0	1452,84	2,0	94,5	IE2	94,7	94,1	0,86	0,85	0,80	75	85	4,11000	810,0
90	125	315MA-6	985	159,67	1069,81	6,7	872,59	1745,18	2,0	1745,18	2,0	94,6	IE2	94,5	93,6	0,86	0,83	0,77	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	IE2	93,9	93,7	0,86	0,84	0,82	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	IE2	94,2	93,7	0,86	0,84	0,81	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	IE2	94,2	93,3	0,87	0,87	0,85	80	92	9,50000	1550,0
200	270	355MB-6	990	341,43	2287,55	6,7	1929,29	3665,66	1,9	3858,59	2,0	95,0	IE2	94,5	94,0	0,89	0,87	0,85	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	IE2	95,0	94,0	0,88	0,86	0,84	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	η %			Pwr. fact. cosφ			ΔT (°C)	LwA (dB)	J Kg·m²	Kg
												100%	75%	50%	100%	75%	50%				
0,13	0,18	71B-8	651	0,71	1,48	2,1	1,91	3,80	2,0	3,93	2,1	48,2	44,9	39,0	0,55	0,46	0,39	76	52	0,00080	6,3
0,18	0,25	80A-8	694	0,83	2,01	2,4	2,48	4,70	1,9	5,50	2,2	56,1	51,0	44,7	0,56	0,46	0,39	54	52	0,00180	10,0
0,25	0,35	80B-8	691	1,10	2,62	2,4	3,46	6,90	2,1	7,06	2,2	61,0	58,2	52,2	0,54	0,45	0,37	56	52	0,00190	11,0
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	54,0	0,61	0,55	0,35	40	54	0,00210	13,0
0,55	0,75	90L-8	701	2,04	6,25	3,1	7,49	15,50	2,1	18,00	2,4	68,3	66,0	58,1	0,57	0,49	0,37	22	54	0,00240	14,0
0,75	1	100LA-8	712	2,24	8,66	3,9	10,06	21,70	2,2	25,09	2,5	75,9	75,1	70,3	0,64	0,55	0,43	47	57	0,00900	23,0
1,1	1,5	100LB-8	702	3,38	12,14	3,6	14,96	31,30	2,1	35,91	2,4	73,9	73,4	68,5	0,64	0,52	0,40	65	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	79,0	0,65	0,55	0,50	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	80,0	0,70	0,66	0,48	80	64	0,03140	45,0
3	4	132M-8	716	7,25	31,48	4,3	40,01	71,90	1,8	93,01	2,3	83,0	83,9	82,2	0,72	0,65	0,49	63	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	84,0	0,72	0,64	0,60	75	68	0,07530	110,0
5,5	7,5	160MB-8	720	12,22	53,10	4,3	72,95	145,90	2,0	145,90	2,0	86,6	87,3	85,0	0,75	0,71	0,61	75	68	0,09310	120,0
7,5	10	160L-8	720	16,33	70,97	4,3	99,48	198,96	2,0	198,96	2,0	87,2	88,1	85,0	0,76	0,74	0,72	75	68	0,12600	135,0
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	87,5	0,77	0,70	0,65	80	70	0,20300	160,0
15	20	200L-8	730	31,03	204,78	6,6	196,23	392,47	2,0	392,47	2,0	89,5	89,4	87,8	0,78	0,71	0,58	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	90,5	0,76	0,72	0,68	80	73	0,49100	242,0
22	30	225M-8	730	44,84	295,97	6,6	287,81	546,84	1,9	575,62	2,0	91,3	91,6	90,6	0,78	0,73	0,61	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	91,0	0,79	0,76	0,72	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	91,0	0,78	0,73	0,67	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	89,7	0,78	0,73	0,68	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	92,0	0,82	0,76	0,65	80	82	4,79000	790,0
75	100	315M-8	740	142,91	943,23	6,6	967,91	1742,23	1,8	1935,81	2,0	93,4	92,8	91,1	0,81	0,74	0,61	70	82	5,58000	970,0
90	125	315LA-8	740	168,57	1112,56	6,6	1161,49	2090,68	1,8	2322,97	2,0	93,8	93,3	91,6	0,82	0,77	0,64	75	82	6,37000	1055,0
110	150	315LB-8	740	205,82	1317,24	6,4	1419,59	2555,27	1,8	2839,19	2,0	94,4	94,1	92,7	0,82	0,75	0,63	80	82	7,23000	1118,0
132	180	355MA-8	740	247,97	1587,01	6,4	1703,51	3066,32	1,8	3407,03	2,0	93,7	93,7	93,1	0,82	0,82	0,76	80	82	7,60000	2000,0
160	220	355MB-8	740	298,97	1913,44	6,4	2064,86	3716,76	1,8	4129,73	2,0	94,2	94,2	93,5	0,82	0,82	0,76	80	82	7,70000	2150,0
200	270	355L-8	740	368,04	2355,48	6,4	2581,08	4645,95	1,8	5162,16	2,0	94,5	94,5	93,0	0,83	0,83	0,79	80	82	8,20000	2250,0
250	335	355LB-8	740	467,15	2989,75	6,4	3226,35	5807,43	1,8	6452,70	2,0	94,2	94,2	93,1	0,82	0,82	0,78	80	82	8,30000	2350,0

To get the data double polarity motors, contact our export office.



IE2, high efficiency class IE 60034-30
IE3, premium efficiency class IE 60034-30

KW	HP	Type	rpm	In (A)	Is (A)	Is / In	Cn (Nm)	Cs (Nm)	Cs / Cn	Cmax (Nm)	Cmax / Cn	η %				min eff1	min IE2	min IE3	Pwr. fact. cosφ			ΔT (°C)	LwA (dB)	J Kgm ²	Kg
												100%	IE	75%	50%				100%	75%	50%				
0,75	1	80A-2	2892	1,74	11,84	6,8	2,48	8,60	3,5	9,18	3,7	80,9	IE3	79,6	76,4	-	77,4	80,7	0,77	0,70	0,57	35	65	0,00080	17,0
1,1	1,5	80B-2	2885	2,26	16,74	7,4	3,64	10,90	3,0	12,74	3,5	84,5	IE3	84,7	82,8	>82,8	79,6	82,7	0,83	0,77	0,65	41	65	0,00090	18,0
1,5	2	90S-2	2855	2,98	22,10	7,4	5,02	13,05	2,6	12,55	2,5	84,3	IE3	84,6	84,0	>84,1	81,3	84,2	0,86	0,83	0,80	45	71	0,00120	23,0
2,2	3	90L-2	2891	4,58	35,20	7,7	7,27	30,30	4,2	30,83	4,2	86,2	IE3	86,4	84,7	>85,6	83,2	85,9	0,81	0,71	0,61	43	71	0,00140	26,0
3	4	100L-2	2898	5,80	44,87	7,7	9,89	30,80	3,1	35,98	3,6	87,1	IE3	87,7	86,8	>86,7	84,6	87,1	0,86	0,81	0,69	51	75	0,00300	35,0
4	5,5	112M-2	2894	7,48	59,55	7,0	13,20	33,05	2,8	37,02	3,5	89,6	IE3	90,5	90,2	>87,6	85,8	88,1	0,86	0,81	0,72	52	77	0,00570	43,0
5,5	7,5	132SA-2	2910	10,18	79,40	7,8	18,05	39,84	2,2	50,71	2,8	88,6	IE2	89,2	88,0	>88,6	87,0	89,2	0,88	0,87	0,80	46	78	0,01190	66,0
7,5	10	132SB-2	2925	13,35	95,00	7,1	24,49	53,50	2,2	78,50	3,2	91,6	IE3	92,4	92,9	>89,5	88,1	90,1	0,89	0,85	0,76	60	78	0,01470	73,0
11	15	160MA-2	2940	19,69	155,55	7,9	35,73	82,18	2,3	113,90	3,2	90,6	IE2	89,7	89,5	>90,5	89,4	91,2	0,89	0,90	0,90	65	81	0,03845	112,2
15	20	160MB-2	2938	26,29	150,23	5,7	48,76	95,08	2,0	121,89	2,5	92,0	IE3	92,6	91,8	>91,3	90,3	91,9	0,90	0,88	0,84	61	81	0,05090	122,4
18,5	25	160L-2	2942	32,15	192,92	6,0	60,05	124,31	2,1	179,00	2,1	93,0	IE3	93,7	93,0	>91,8	90,9	92,4	0,89	0,88	0,83	58	81	0,05610	137,7
22	30	180M-2	2950	38,66	313,11	8,1	71,22	163,81	2,3	220,80	3,1	92,3	IE2	91,7	89,3	>92,2	91,3	92,7	0,89	0,86	0,81	55	83	0,07650	168,3
30	40	200LA-2	2940	51,73	388,00	7,5	97,45	224,13	2,3	223,37	2,3	93,0	IE2	92,7	91,2	>92,9	92,0	93,3	0,90	0,87	0,82	65	84	0,12648	221,3
37	50	200LB-2	2960	63,53	476,49	7,5	119,38	274,56	2,3	275,49	2,3	93,4	IE2	93,3	91,8	>93,3	92,5	93,7	0,90	0,88	0,82	65	84	0,14178	247,9
45	60	225M-2	2960	76,94	584,74	7,6	145,19	333,93	2,3	332,80	2,3	93,8	IE2	93,3	91,9	>93,7	92,9	94,0	0,90	0,88	0,82	65	86	0,23766	326,4
55	75	250M-2	2970	94,89	711,68	7,5	176,85	406,76	2,3	406,76	2,3	94,0	IE2	93,5	91,8	>94,0	93,2	94,3	0,89	0,90	0,86	65	89	0,31824	397,8
75	100	280S-2	2970	127,01	876,39	6,9	241,16	530,56	2,2	554,67	2,3	94,7	IE3	94,5	93,5	>94,6	93,8	94,7	0,90	0,90	0,86	55	91	0,59058	550,8
90	125	280M-2	2970	151,93	1078,73	7,1	289,39	636,67	2,2	665,61	2,3	95,0	IE3	94,6	93,2	>95,0	94,1	95,0	0,90	0,89	0,86	65	91	0,68850	601,8

KW	HP	Type	rpm	In (A)	Is (A)	Is / In	Cn (Nm)	Cs (Nm)	Cs / Cn	Cmax (Nm)	Cmax / Cn	η %				min eff1	min IE2	min IE3	Pwr. fact. cosφ			ΔT (°C)	LwA (dB)	J Kgm ²	Kg
												100%	IE	75%	50%				100%	75%	50%				
0,75	1	80B-4	1430	1,87	11,24	6,0	5,01	16,90	3,4	12,80	2,6	82,9	IE3	82,6	79,2	-	79,6	82,5	0,70	0,60	0,45	38	56	0,00190	18,0
1,1	1,5	90S-4	1431	2,54	15,83	6,2	7,34	25,60	3,5	24,50	3,3	84,8	IE3	86,2	85,5	>83,8	81,4	84,1	0,74	0,66	0,52	44	61	0,00240	25,0
1,5	2	90L-4	1438	3,38	19,62	5,8	9,96	32,11	3,2	34,90	3,5	85,9	IE3	86,3	85,1	>85,0	82,8	85,3	0,75	0,66	0,57	47	61	0,00280	30,0
2,2	3	100LA-4	1425	4,35	34,15	7,8	14,74	41,27	2,8	41,27	2,8	86,7	IE3	86,9	86,0	>86,4	84,3	86,7	0,84	0,78	0,70	53	64	0,00550	36,0
3	4	100LB-4	1450	6,07	46,83	7,7	19,76	54,30	2,7	56,31	2,8	89,0	IE3	89,3	88,0	>87,4	85,5	87,7	0,80	0,72	0,70	57	64	0,00690	40,0
4	5,5	112M-4	1442	7,95	54,51	6,9	26,49	74,03	2,9	74,22	3,3	89,1	IE3	90,3	90,5	>88,3	86,6	88,6	0,82	0,76	0,64	53	65	0,01000	46,0
5,5	7,5	132S-4	1454	10,64	68,01	6,4	36,12	75,86	2,1	101,15	2,8	89,9	IE3	92,1	92,4	>89,2	87,7	89,6	0,83	0,77	0,68	61	71	0,02200	70,0
7,5	10	132M-4	1441	14,29	87,68	6,1	49,71	113,60	2,4	123,50	2,7	90,2	IE2	91,4	90,0	>90,1	88,7	90,4	0,84	0,80	0,75	80	71	0,02820	81,0
11	15	160M-4	1468	20,76	121,31	5,8	71,56	121,50	1,7	193,21	2,7	91,8	IE3	91,7	90,4	>91,0	89,8	91,4	0,83	0,79	0,68	52	73	0,06222	122,7
15	20	160L-4	1460	28,19	140,97	5,0	98,12	166,60	1,7	255,100	2,6	92,3	IE3	93,1	92,3	>91,8	90,6	92,3	0,83	0,78	0,68	61	75	0,05202	137,3
18,5	25	180M-4	1476	34,07	215,02	6,3	119,70	220,90	1,8	334,30	2,8	92,2	IE2	91,1	89,9	>92,2	91,2	92,6	0,85	0,81	0,72	60	76	0,09551	170,6
22	30	180L-4	1470	39,83	298,73	7,5	142,93	314,44	2,2	328,73	2,3	92,7	IE2	91,7	91,0	>92,6	91,6	93,0	0,86	0,82	0,72	80	76	0,14462	189,3
30	40	200L-4	1480	53,48	385,07	7,2	193,58	425,88	2,2	445,24	2,3	93,6	IE3	93,8	92,8	>93,2	92,3	93,6	0,87	0,84	0,76	80	79	0,16438	254,8
37	50	225S-4	1480	65,37	470,68	7,2	238,75	525,25	2,2	549,13	2,3	93,9	IE3	92,7	92,0	>93,6	92,7	93,9	0,87	0,85	0,77	75	81	0,27258	268,3
45	60	225M-4	1480	77,72	559,59	7,2	290,37	638,82	2,2	667,85	2,3	93,9	IE2	93,3	92,8	>93,9	93,1	94,2	0,89	0,86	0,80	80	81	0,42240	301,6
55	75	250M-4	1480	94,69	681,76	7,2	354,90	780,78	2,2	816,27	2,3	94,2	IE2	94,2	93,5	>94,2	93,5	94,6	0,89	0,88	0,84	75	83	0,48795	403,5
75	100	280S-4	1480	127,90	920,88	7,2	483,95	1064,70	2,2	1113,09	2,3	95,1	IE3	93,5	91,0	>94,7	94,0	95,0	0,89	0,88	0,84	70	86	0,68666	530,4
90	120	280M-4	1485	155,06	1116,44	7,2	578,79	1273,33	2,2	1331,21	2,3	95,2	IE3	93,5	92,0	>95,0	94,2	95,2	0,88	0,87	0,83	65	86	1,16525	630,2



IE2, high efficiency class IE 60034-30
IE3, premium efficiency class IE 60034-30

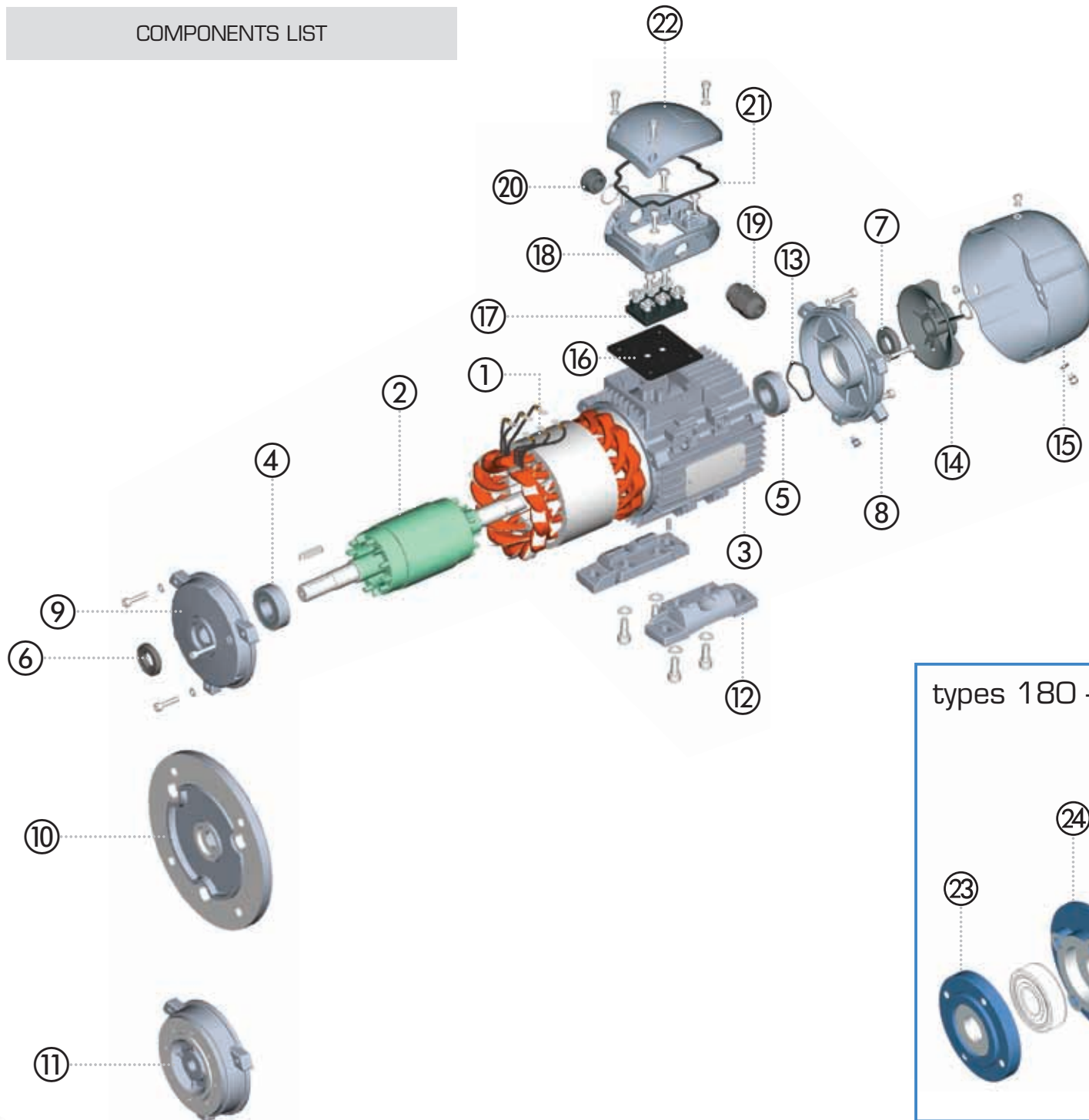
KW	HP	Type	rpm	In (A)	Is (A)	Is / In	Cn (Nm)	Cs (Nm)	Cs / Cn	Cmax (Nm)	Cmax / Cn	η %				min eff1	min IE2	min IE3	Pwr. fact. cosφ			ΔT (°C)	LwA (dB)	J Kgm ²	Kg
												100%	IE	75%	50%				100%	75%	50%				
0,75	1	90S-6	915	1,92	9,30	4,8	7,83	18,79	2,4	19,57	2,5	77,9	IE2	78,3	78,0	-	75,9	78,9	0,72	0,60	0,47	39	55	0,00300	23,0
1,1	1,5	90L-6	915	2,70	13,40	5,0	11,48	27,55	2,4	28,70	2,5	79,9	IE2	79,6	79,0	-	78,1	81,0	0,74	0,62	0,47	44	55	0,00360	26,0
1,5	2	100L-6	930	3,50	19,35	5,5	15,40	36,96	2,4	38,50	2,5	81,9	IE2	82,5	81,5	-	79,8	82,5	0,76	0,64	0,51	48	60	0,00850	35,0
2,2	3	112M-6	945	4,94	29,53	6,0	22,23	53,33	2,4	55,58	2,5	84,3	IE3	84,8	83,5	-	81,8	84,3	0,76	0,65	0,51	56	62	0,01600	44,0
3	4	132S-6	960	6,71	41,34	6,2	29,84	65,64	2,2	71,62	2,4	84,9	IE2	85,0	83,0	-	83,3	85,6	0,76	0,73	0,55	42	68	0,02930	67,0
4	5,5	132MA-6	960	8,81	59,93	6,8	39,79	87,54	2,0	95,50	2,4	86,2	IE2	86,0	85,0	-	84,6	86,8	0,76	0,68	0,56	47	68	0,03720	75,0
5,5	7,5	132MB-6	960	11,80	83,75	7,1	54,71	120,40	2,0	124,40	2,3	87,4	IE2	88,1	87,2	-	86,0	88,0	0,77	0,71	0,58	53	69	0,04780	86,0



Eff. 1 motors can be distinguished by the colour of their terminal box cap and the plate data

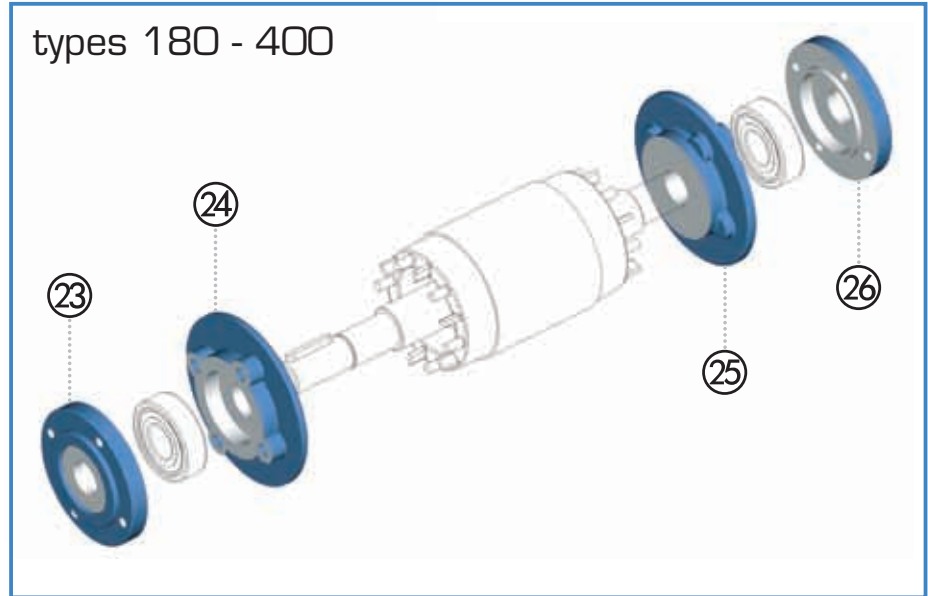
NOTE: motors can be improved in any moment. The data in www.motive.it can be more updated. Each data is even more detailed and proven by the type test reports loaded in www.motive.it

COMPONENTS LIST



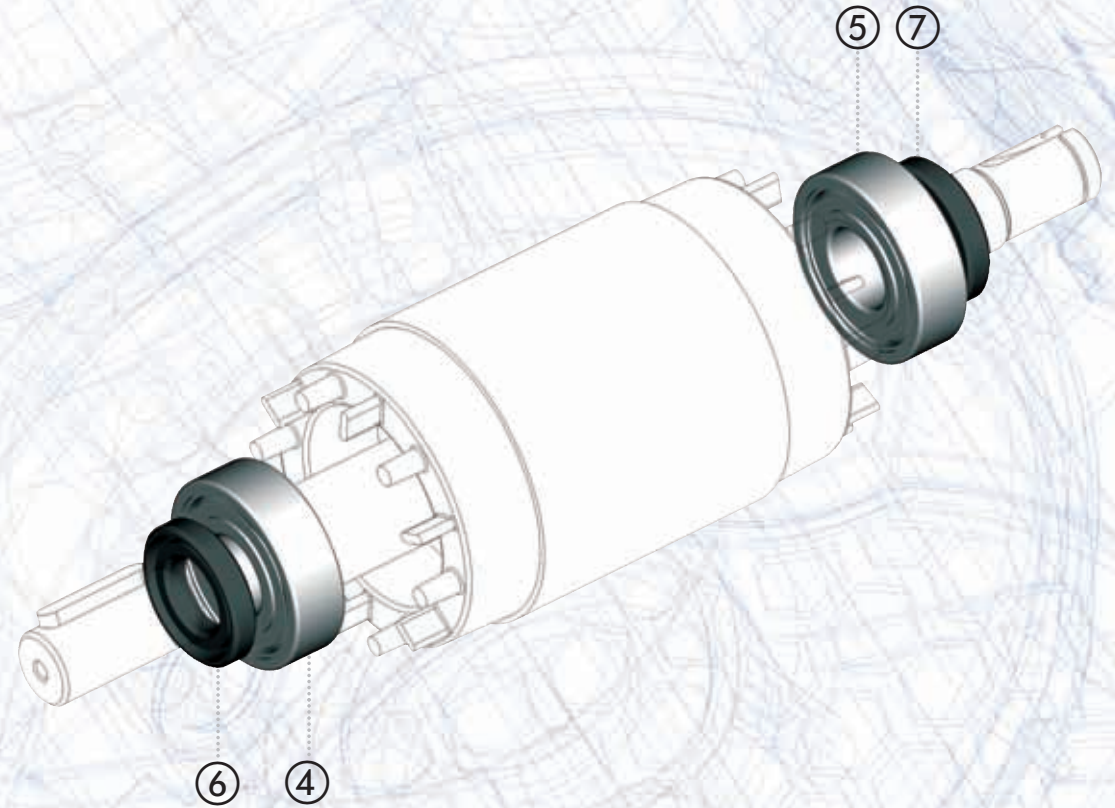
N°	CODE
1	3PNSTA
2	3PNROT
3	3PNFRA
4	3PNFBE
5	3PNBBE
6	3PNFOS
7	3PNBOS
8	3PNBSH
9	3PNBO3
10	3PNBO5
11	3PNB14
12	3PNFEE
13	3PNWAV

N°	CODE
14	3PNFAN
15	3PNFCV
16	3PNUCB
17	3PNTER
18	3PNBCB
19	3PNCMP
20	3PNCAP
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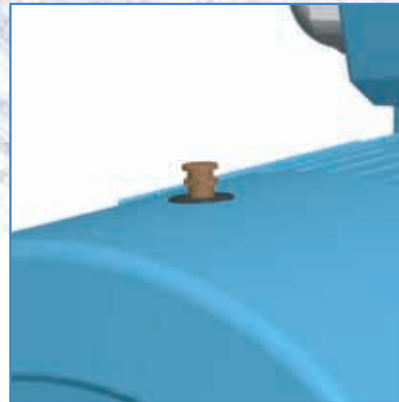
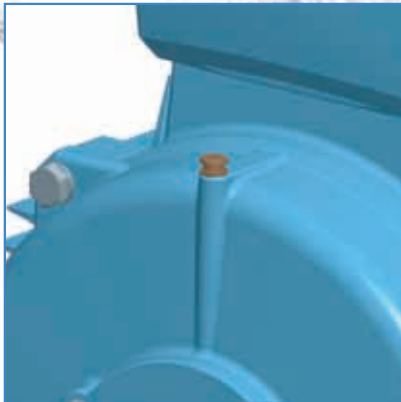


RUBBER SEAL RINGS AND BEARINGS

FRAME SIZE	POLES NUMBER	RUBBER SEAL RING		BEARINGS	
		⑥	⑦	④	⑤
56	2 - 8	12x25x7	12x25x7	6201 ZZ	6201 ZZ
63	2 - 8	12x25x7	12x25x7	6201 ZZ	6201 ZZ
71	2 - 8	15x30x7	15x30x7	6202 ZZ	6202 ZZ
80	2 - 8	20x35x7	20x35x7	6204 ZZ	6204 ZZ
90	2 - 8	25x40x7	25x40x7	6205 ZZ	6205 ZZ
100	2 - 8	30x47x7	30x47x7	6206 ZZ	6206 ZZ
112	2 - 8	30x47x7	30x47x7	6206 ZZ	6206 ZZ
132	2 - 8	40x62x8	40x62x8	6208 ZZ	6208 ZZ
160	2 - 8	45x62x8	45x62x8	6309 ZZ	6309 ZZ
180	2 - 8	55x72x12	55x72x12	6311-C3	6311-C3
200	2 - 8	60x80x8	60x80x8	6312-C3	6312-C3
225	2 - 8	65x80x10	65x80x10	6313-C3	6313-C3
250	2 - 8	70x90x10	70x90x10	6314-C3	6314-C3
280	2	70x90x10	70x90x10	6314-C3	6314-C3
280	4 - 8	85x100x12	80x100x12	6317-C3	6317-C3
315	2	85x110x12	85x110x12	6317-C3	6317-C3
315	4 - 8	95x120x12	95x120x12	NU 319-C3	6319-C3
355	2	95x120x12	95x120x12	6319-C3	6319-C3
355	4 - 8	110x130x12	110x130x12	NU 322-C3	6322-C3
400	4 - 8	130x160x12	130x160x12	NU 326-C3	6326-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



"bearing lubrication devices" are an optional on motors size 56-160.







TERMS OF SALE AND GUARANTEE

ARTICLE 1 GARANTEE

1.1. Barring written agreements, entered into between the parties hereto each time, Motive hereby guarantees compliance of products supplied and compliance with specific agreements. The guarantee for defects shall be restricted to product defects following design, materials or manufacturing defects leading back to Motive.

The Guarantee shall not include:

-  faults or damages ensuing from transport., faults or damages ensuing from installation defects; incompetent use of the product, or any other unsuitable use.
-  tampering or damages ensuing from use by non - authorised staff and/or use of non - original parts and/or spare parts;
-  Defects and/or damages ensuing from chemical agents and/or atmospheric phenomena (e.g. burnt out material, etc.); routine maintenance and required action or checks;
-  Products lacking a plate or having a tampered plate.

1.2. Returns to credit or replace will be accepted only in exceptional cases; However returns of goods already used to credit or replace won't be accepted in any case.

The guarantee shall be effective for all Motive products, with a term of validity of 12 months, starting from the date of shipment.

The guarantee shall be subject to specific written request for Motive to take action, according to statements, as described at the paragraphs hereinbelow. By virtue of aforesaid approval, and as regards the claim, Motive shall be bound, at its discretion, and within a reasonable time-limit, to alternatively take the following action:

- a) To supply the Buyer with products of the same type and quality as those having proven defective and not complying with agreements, free ex-works; in aforesaid case, Motive shall have the right to request, at the Buyer's charge, early return of defective goods, which shall become Motive's property;
- b) To repair, at its charge, the defective product or to modify the product which does not comply with agreements, by performing aforesaid action at its facilities; in aforesaid cases, all costs regarding product transport shall be sustained by the Buyer.
- c) To send spare parts free of charge: all costs regarding product transport shall be sustained by the Buyer.

1.3 The guarantee herein shall assimilate and replace legal guarantees for defects and discrepancies, and shall exclude any other eventual Motive liability, however caused by supplied products; in particular, the Buyer shall have no right to submit any further claims.

Motive shall not be liable for the enforcement of any further claims, as of the date the guarantee's term of validity expires.

ARTICLE 2 CLAIMS

2.1. Without prejudice to the application of provisions in Law, dated June 21, 1971, and as per Article 1: Claims, regarding quantity, weight, gross weight and colour, or claims regarding faults and defects in quality or compliance, and which the Buyer may discover on goods delivery, shall be submitted by a max. 7 days of aforesaid discovery, under penalty of nullity.

ARTICLE 3 DELIVERY

3.1. Any liability for damages ensuing from total or partial delayed or failed delivery, shall be excluded.

3.2. Unless differently communicated by written to the Client, the transport terms have to be intended ex-works

ARTICLE 4 PAYMENT

4.1. Any delayed or irregular payments shall entitle Motive to cancel ongoing agreements, including agreements which do not regard the payments at issue, as well as entitling Motive to claim damages, if any. Motive shall, however, have the right, as of the payment's due date and without placing in arrears, to claim interest for arrears, to the extent of the discount rate in force in Italy, increased by 5 points. Motive shall also have the right to withhold material under repair for replacement. In the case of failed payment, Motive shall have the right to cancel all guarantees on materials, as regards the insolvent Client.

4.2. The Buyer shall be bound to complete payment, including cases whereby claims or disputes are underway.

ALL DATA HAVE BEEN WRITTEN AND CHECKED WITH THE GREATEST CARE. WE DO NOT TAKE ANY RESPONSIBILITY FOR POSSIBLE ERRORS OR OMISSIONS. MOTIVE CAN CHANGE THE CHARACTERISTICS OF THE SOLD ITEMS ON HIS FIRM OPINION AND IN EVERY MOMENT.



ASK OUR FURTHER CATALOGUES:



® Motive s.r.l.

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