Keeping industry turning

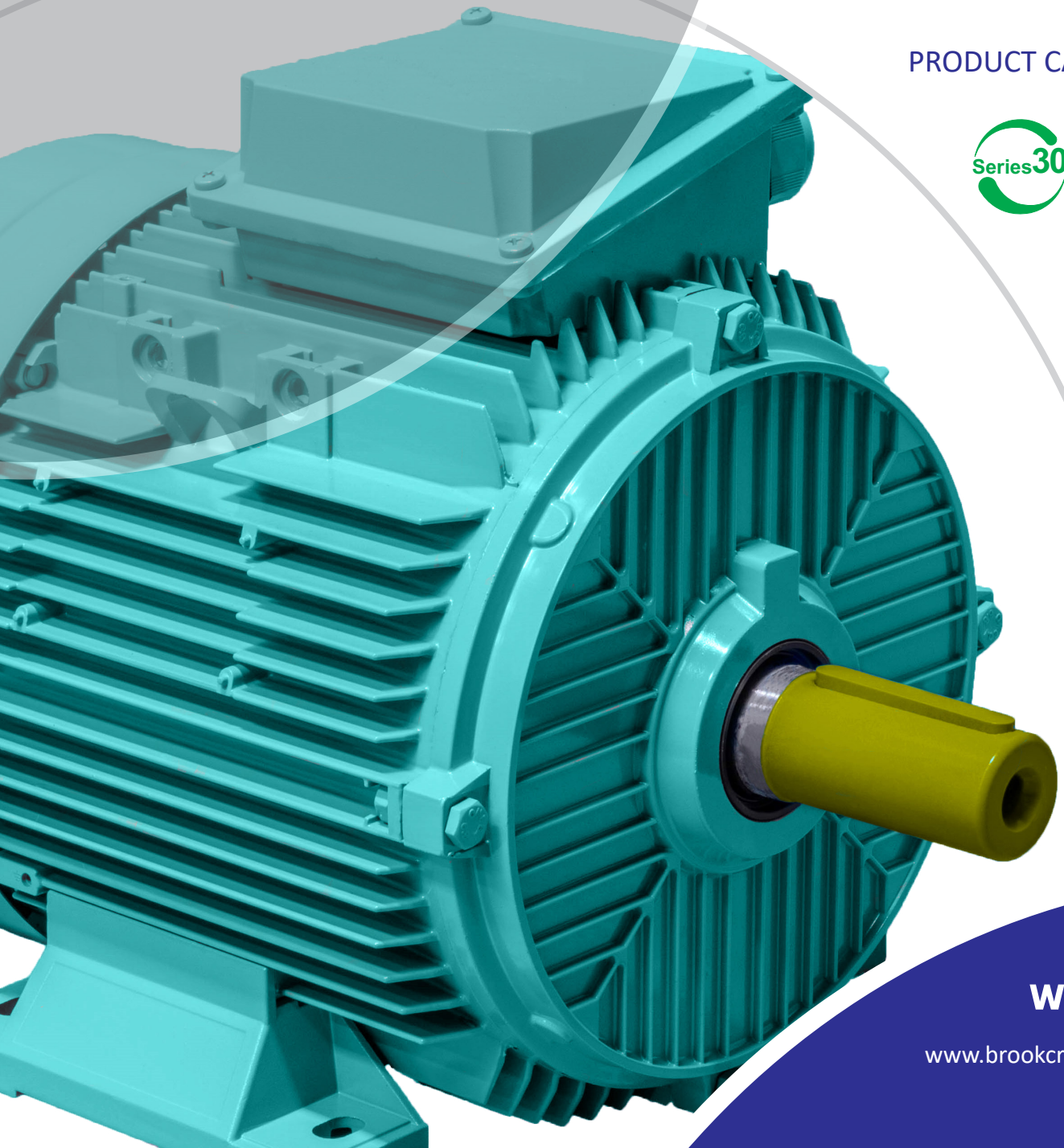
BROOK CROMPTON
Keeping Industry Turning

S30 & S40 Range

High efficiency aluminium motors

PRODUCT CATALOGUE

Series30 Series40



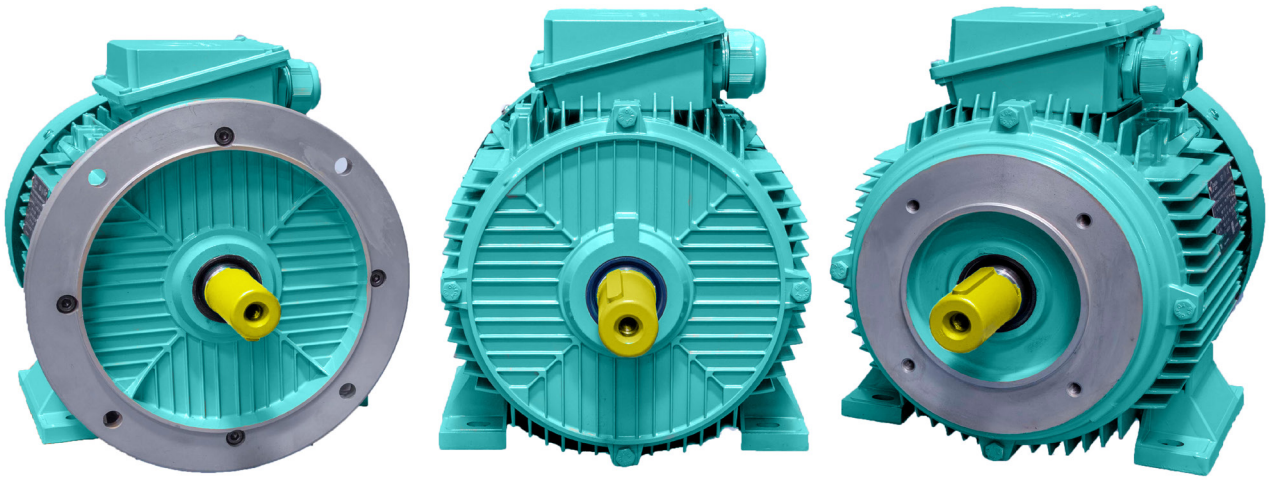
WOLONG
Power your future

www.brookcrompton.com

CONTENTS

STANDARDS

Standards name	Title
IEC 60034-1	Rating and performance
IEC 60034-2-1	Standard methods for determining losses and efficiency from tests
IEC 60034-5	Degrees of protection provided by the integral design of rotating electrical machines (IP Code)
IEC 60034-6	Methods of cooling (IC Code)
IEC 60034-7	Classification of types of construction, mounting arrangements and terminal box position (IM Code)
IEC 60034-8	Terminal markings and direction of rotation
IEC 60034-9	Noise limits
IEC 60034-11	Thermal protection
IEC 60034-12	Starting performance of single-speed three-phase cage induction motors
IEC 60034-14	Measurement, evaluation and limits of vibration severity
IEC 60034-26	Effects of unbalanced voltages on the performance of three-phase cage induction motors
IEC 60034-30-1	Efficiency classes of line operated AC motors (IE Code)
IEC 60034-31	Selection of energy-efficient motors including variable speed applications - Application guide
IEC 60038	Standard voltages
IEC 60072-1	Dimensions and output series for rotating electrical machines - Frame numbers 56 to 400 and flange numbers 55 to 1080
IEC 60072-2	Dimensions and output series for rotating electrical machines - Frame numbers 355 to 1000 and flange numbers 1180 to 2360
IEC 60085	Electrical insulation - Thermal evaluation and designation
IEC 60947-8	Control units for built-in thermal protection (PTC) for rotating electrical machines
EN ISO 1680	Test code for the measurement of airborne noise emitted by rotating electrical machines



ECODESIGN REGULATION (EU) 2019/1781

The previous Ecodesign Regulation [EC] 640/2009 expired on the 30th June 2021. This has now been replaced by Ecodesign Regulation [EU] 2019/1781.

Stage one

Stage one came into effect on the 1st July 2021. This stage introduced efficiency requirements for motors 0.12 to 0.74kW, which must now meet IE2 efficiency levels. Previously the IE3 efficiency requirement stopped at 375kW, this has now been increased to 1000kW.

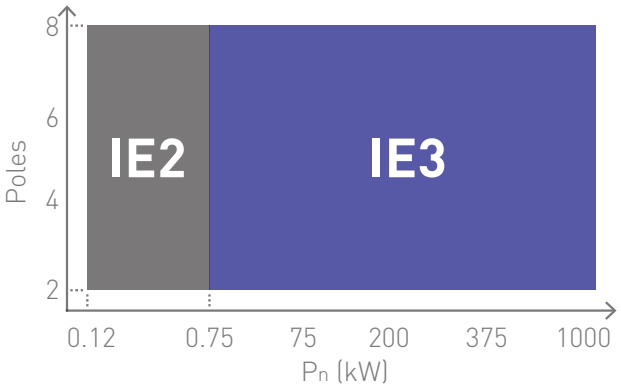
In addition to the efficiency level changes above, the following motor types have been introduced:

- 8 pole speeds
- brake motors
- hazardous area motors: Ex ec, Ex tb, Ex tc, Ex db & Ex dc
- Totally Enclosed Air Over motors
- motors with duty cycles: S1, S3 ≥ 80%.

Please note: IE2 +VSD is no longer applicable.

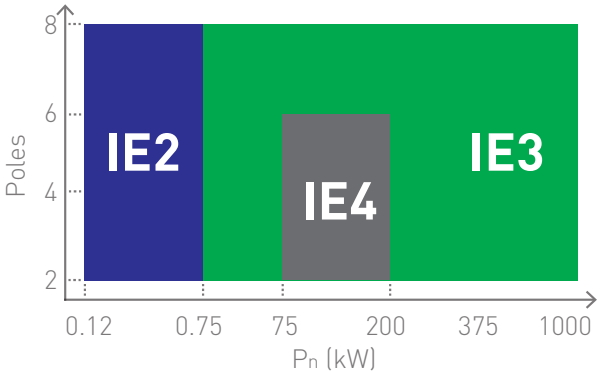
Motors exempt from the new regulation:

- high voltage motors
- mining motors
- Totally Enclosed Non-Ventilated (IC410) motors



Stage two

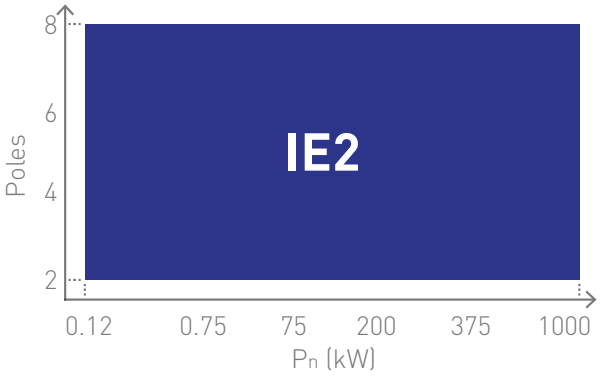
Stage two comes into effect on the 1st July 2023. IE4 is introduced, this will be mandatory for motor outputs 75kW to 200kW in 2, 4 & 6 poles. This is applicable to all the motors listed in stage one.



Stage two also introduces a minimum efficiency value of IE2 for single phase motors and Ex eb (increased safety) motors.

As in stage one, the following motors are exempt:

- high voltage motors
- mining motors
- Totally Enclosed Non-Ventilated (IC410) motors



Minimum efficiency level at rated output power (P_N) for each energy efficiency class

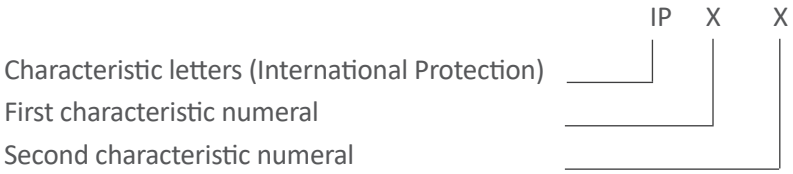
50 Hz								
	IE2 - high efficiency				IE3 - premium efficiency			
kW	2 pole	4 pole	6 pole	8 pole	2 pole	4 pole	6 pole	8 pole
0.12	53.6	59.1	50.6	39.8	60.8	64.8	57.7	50.7
0.18	60.4	64.7	56.6	45.9	65.9	69.9	63.9	58.7
0.20	61.9	65.9	58.2	47.4	67.2	71.1	65.4	60.6
0.25	64.8	68.5	61.6	50.6	69.7	73.5	68.6	64.1
0.37	69.5	72.7	67.6	56.1	73.8	77.3	73.5	69.3
0.40	70.4	73.5	68.8	57.2	74.6	78.0	74.4	70.1
0.55	74.1	77.1	73.1	61.7	77.8	80.8	77.2	73.0
0.75	77.4	79.6	75.9	66.2	80.7	82.5	78.9	75.0
1.1	79.6	81.4	78.1	70.8	82.7	84.1	81.0	77.7
1.5	81.3	82.8	79.8	74.1	84.2	85.3	82.5	79.7
2.2	83.2	84.3	81.8	77.6	85.9	86.7	84.3	81.9
3.0	84.6	85.5	83.3	80.0	87.1	87.7	85.6	83.5
4.0	85.8	86.6	84.6	81.9	88.1	88.6	86.8	84.8
5.5	87.0	87.7	86.0	83.8	89.2	89.6	88.0	86.2
7.5	88.1	88.7	87.2	85.3	90.1	90.4	89.1	87.3
11	89.4	89.8	88.7	86.9	91.2	91.4	90.3	88.6
15	90.3	90.6	89.7	88.0	91.9	92.1	91.2	89.6
18.5	90.9	91.2	90.4	88.6	92.4	92.6	91.7	90.1
22	91.3	91.6	90.9	89.1	92.7	93.0	92.2	90.6
30	92.0	92.3	91.7	89.8	93.3	93.6	92.9	91.3
37	92.5	92.7	92.2	90.3	93.7	93.9	93.3	91.8
45	92.9	93.1	92.7	90.7	94.0	94.2	93.7	92.2
55	93.2	93.5	93.1	91.0	94.3	94.6	94.1	92.5
75	93.8	94.0	93.7	91.6	94.7	95.0	94.6	93.1
90	94.1	94.2	94.0	91.9	95.0	95.2	94.9	93.4
110	94.3	94.5	94.3	92.3	95.2	95.4	95.1	93.7
132	94.6	94.7	94.6	92.6	95.4	95.6	95.4	94.0
160	94.8	94.9	94.8	93.0	95.6	95.8	95.6	94.3
200 - 1000	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6

50 Hz				
IE4 - super premium				
kW	2 pole	4 pole	6 pole	8 pole
0.12	66,5	69.8	64.9	62.3
0.18	70,8	74.7	70.1	67.2
0.20	71.9	75.8	71.4	68.4
0.25	74.3	77.9	74.1	70.8
0.37	78.1	81.1	78.0	74.3
0.40	78.9	81.7	78.7	74.9
0.55	81.5	83.9	80.9	77.0
0.75	83.5	85.7	82.7	78.4
1.1	85.2	87.2	84.5	80.8
1.5	86.5	88.2	85.9	82.6
2.2	88.0	89.5	87.4	84.5
3.0	89.1	90.4	88.6	85.9
4.0	90.0	91.1	89.5	87.1
5.5	90.9	91.9	90.5	88.3
7.5	91.7	92.6	91.3	89.3
11	92.6	93.3	92.3	90.4
15	93.3	93.9	92.9	91.2
18.5	93.7	94.2	93.4	91.7
22	94.0	94.5	93.7	92.1
30	94.5	94.9	94.2	92.7
37	94.8	95.2	94.5	93.1
45	95.0	95.4	94.8	93.4
55	95.3	95.7	95.1	93.7
75	95.6	96.0	95.4	94.2
90	95.8	96.1	95.6	94.4
110	96.0	96.3	95.8	94.7
132	96.2	96.4	96.0	94.9
160	96.3	96.6	96.2	95.1
200 - 249	96.5	96.7	96.3	95.4
250 - 314	96.5	96.7	96.5	95.4
315 - 1000	96.5	96.7	96.6	95.4

DEGREES OF PROTECTION

IEC 60034-5 defines the degrees of protection provided by enclosures for rotating electrical machines.

Example of designation

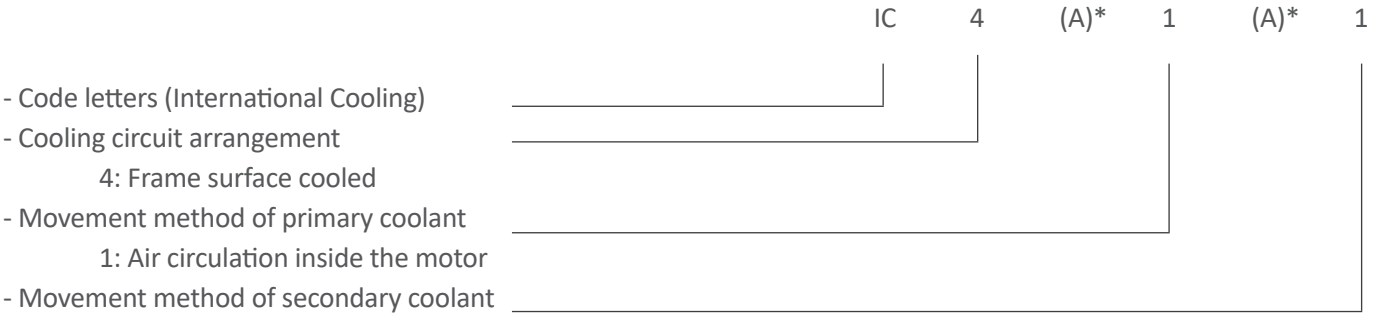


Motor	Degree of protection	First numeral		Second numeral
		Protection against contact	Protection against foregn bodies	Protection against water
Surface ventilated	IP55	Complete protection against contact with live or moving parts	Dust protected. Ingress of dust is not totally prevented but dust cannot enter in sufficient quantity to interfere with satisfactory operation of the motors	Protected against jets. Water projected by a nozzle against the motor from any direction shall not do any harmful effect.
	IP56			Protected against water from heavy seas.
	IP65		Dust tight. Ingress of dust is totally prevented	Water projected by a nozzle from any direction.

COOLING METHOD

IEC 60034-5 defines the degrees of protection provided by enclosures for rotating electrical machines.

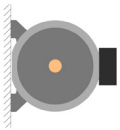
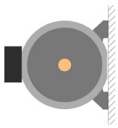
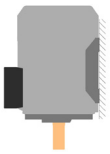
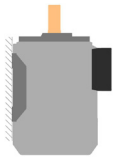
Brief information on the cooling methods, specified in IEC 60034-6, is given below.

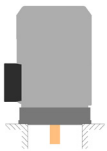
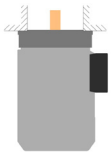
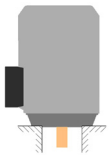
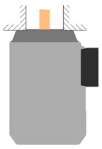


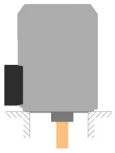
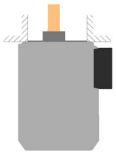
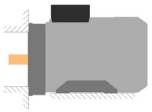
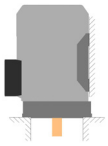
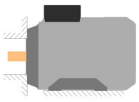
* (A): This letter indicates the surrounding medium (A for air. W for water). For air cooled motors, A is omitted for simpler designation.

TYPES OF CONSTRUCTION

Types of construction and mounting arrangements according to IEC 60034-7.

Foot mounted motors						
Example sketch						
Mounting arrangements	IM B3 IM 1001	IM B6 IM 1051	IM B7 IM 1061	IM B8 IM 1071	IM V5 IM 1011	IM V6 IM 1031
Frame size	80 - 225	80 - 225	80 - 225	80 - 225	80 - 225	80 - 225

Flange mounted motors						
Example sketch						
Mounting arrangements	IM B5 IM 3001	IM V1 IM 3011	IM V3 IM 3031	IM B14 IM 3601	IM V18 IM 3611	IM V19 IM 3631
Frame size	80 - 225	80 - 225	80 - 225	80 - 160	80 - 160	80 - 160

	Motors without foot and endshield at drive end			Foot and flange mounted motors		
Example sketch						
Mounting arrangements	IM B9 IM 9101	IM V8 IM 9111	IM V9 IM 9131	IM B35 IM 2001	IM V15 IM 2011	IM B34 IM 2101
Frame size	80 - 225	80 - 225	80 - 225	80 - 225	80 - 225	80 - 160

LIMITS OF VIBRATION SEVERITY

The permissible vibration severities for electric motors are specified in standard IEC 60034-14. All motors from frame size 80 to 225 already meet or remain below the limit values specified for vibration severity grade A (normal). Vibration severity grade A is the standard version and is valid up to a rated frequency of 60 Hz. Vibration severity grade B can be supplied on request. For converter operation with frequencies higher than 60 Hz, special balancing is required for compliance with the specified limit values.

IEC 60034-14 recommends the following maximum vibration magnitude limits in terms of displacement, speed and acceleration for a frame size H:

Vibration grade	Frame size	80 ≤ H ≤ 132			132 < H ≤ 225		
		Displacement µm	Velocity mm/s	Acceleration m/s2	Displacement µm	Velocity mm/s	Acceleration m/s2
A	Free suspension	25	1,6	2,5	35	2,2	3,5
	Rigid suspension	21	1,3	2,0	29	1,8	2,8
B	Free suspension	11	0,7	1,1	18	1,1	1,7
	Rigid suspension	-	-	-	14	0,9	1,4

Based on ISO 8821, the key convention “half key (H)” must be used for balancing. All rotors are balanced dynamically with an inserted half-key in place. Upon request, it is possible to perform balancing with or without a full key. Shaft fitments, such as couplings, pulleys, gears and fans must also be balanced likewise to prevent undue vibration and adverse effects on bearing life. A full feather is always inserted in the keyway on delivery.

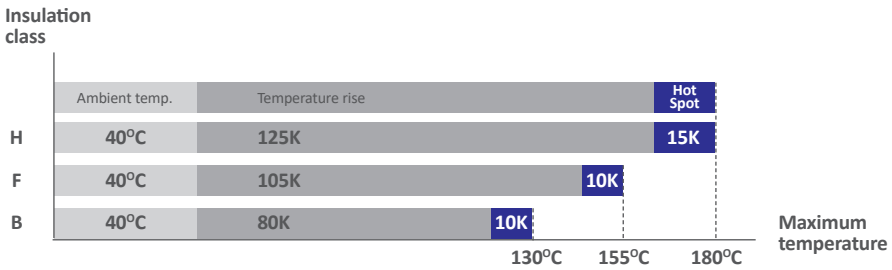
INSULATION SYSTEM

The insulation system applied in our motors ensures a high level of mechanical and electrical strength along with an extended service life. The winding insulation is resistant against aggressive gasses, vapors, dust, oil and humid air. It helps the windings to withstand against vibration stress. This system accomplished by using mainly high grade enameled copper wires, insulating sheets, sleeves and solvent free impregnating epoxy resin.

All standard range motors are of class F (155˚C) insulation with class B (80K) temperature rise which gives the product a 25˚C safety margin. This reserve of temperature allows the motors to operate continuously at;

- Up to 15% above its rated outputs
- Up to 55˚C ambient temperature at rated outputs
- Up to 3000m asl altitude at rated outputs

Furthermore, this temperature reserve permits the motor to withstand against greater voltage and frequency tolerances. The insulation life of the motor will extend if the safety margin is not utilised.



Insulation system in brief;

- Maximum temperature: 155°C
- Temperature rise: 80K
- Maximum ambient temperature: 40°C
- Safety margin: 35°C

VARIABLE SPEED DRIVES

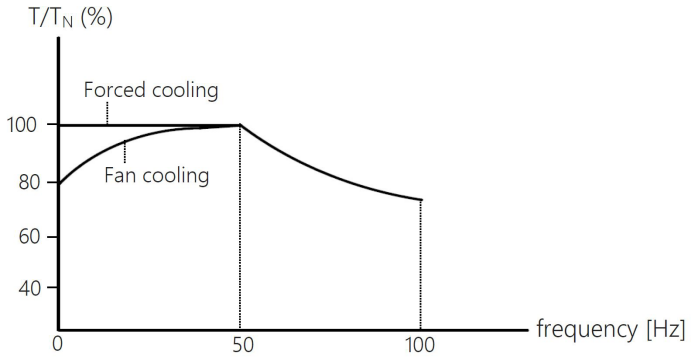
Squirrel cage induction motors used throughout industry offer highly efficient, robust and reliable operation. The performance of motors having constant speed and starting DOL can be further improved when used with a frequency converter. The VSD enables the process to be accurately controlled by adjusting the torque and speed. With the correct frequency converter, it is possible to increase the efficiency of the system and in some cases improve the capacity of the process by increasing the speed over nominal speeds.

With a VSD, it is possible optimise starting which helps to reduce significantly the stress on the motors and supply network.

Following points under related subtitles must be taken into consideration when motors are driven by frequency converter.

WINDING INSULATION

The output voltage waveform from a frequency converter is not fully sinusoidal. Further, harmonics will be produced in the inverter. This may affect the motor additional losses and increase the motor temperature rise. In this case, the motor must be correctly sized to compensate for the losses incurred. In addition to thermal dimensioning, an adequate torque margin must be maintained for stabilities which must be at least 30% higher than the load torque. However, standard production of S30 that are IE3 premium and IE4 super premium efficiency motors, may be enough to maintain the torque and output requirements over the whole duty range without the need to oversize the motor as the temperature rise is considerably reduced due to the lower losses.



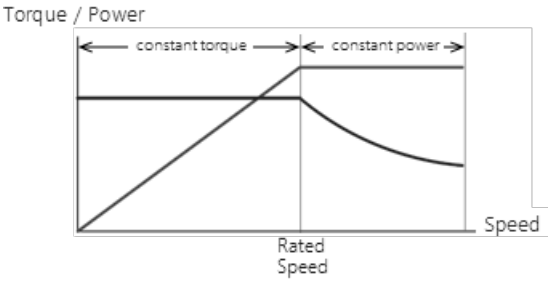
The adjacent figure gives an idea about the thermal capacity of a motor. Mechanical speed limits should be taken into consideration during the operation above nominal speeds.

COOLING

When the motor is operated at low speeds, the cooling capacity of the fan fitted on its shaft will decrease in a proportion, with the speed.

In variable torque loads, when the torque is reduced with decreasing speed, such as with centrifugal pumps and fans, this reduction in cooling air often stays in balance with the reduction in motor losses as the load is reduced with speed. In constant torque loads, the motor's temperature rise limits will likely to be exceeded if the low-efficiency motor is being used in which case a forced ventilation must be considered. However, IE3 premium efficiency and IE4 super premium efficiency motors generate less heat which means they have a higher thermal reserve and may not need forced ventilation but of course this depends on the extent of the speed reduction.

In high speed applications due to magnetic field weakening , the motor torque will reduce and can only supply constant power. The output of the motor will remain constant to a certain extent depending on the breakdown torque and then will start to reduce as illustrated on the below chart.



When the motor is operated in high speed (higher than 60Hz operation) standard fan will generate more noise and friction & windage losses will increase. In such cases forced ventilation is strongly recommended to prevent additional friction & windage losses and noise problem.

When placing the order, operating conditions must be stipulated.

BEARING LIFE - LUBRICATION

Bearing temperature varies as a function of motor load and speed, in variable speed applications. The ideal way to determine the bearing life expectancy of permanently lubricated bearings of frame sizes 80 to 225 is best done by measuring the bearing temperature during motor operation. Please note that the lubrication periods and grease amount will be different for variable speed applications than that given in the technical catalogue and motor label.

Bearing temperature of motors that are operated above their nominal speed will be higher due to friction and the lifetime of permanently lubricated bearings and lubrication period of re-greaseable bearings will become shorter.

MECHANICAL SPEED LIMITS

The permissible mechanical speed limits of S30 are given in the following table. The speed limits of the bearings, critical rotor speeds and rigidity of the rotating parts determines the maximum mechanical speeds. Please note that operation at speeds higher than nominal speed may cause higher mechanical vibrations.

Frame size	2 Pole	4 Pole	6 Pole	8 Pole	Frame size	2 Pole	4 Pole	6 Pole	8 Pole
80	4500	4500	4500	-	200	4500	4500	4500	4500
90	4500	4500	4500	-	225	3600	3600	3600	3600
100	4500	4500	4500	-	250	3600	3600	3600	3600
112	4500	4500	4500	-	280	3600	3600	3600	3600
132	4500	4500	4500	4500	315	3600	2300	2300	2300
160	4500	4500	4500	4500	355	3600	2300	2300	2300
180	4500	4500	4500	4500	-	-	-	-	-

TOLERANCES

According to IEC 60034-1, the following tolerances are permissible:

Parameters	Tolerances		
Efficiency (η) (when determined indirectly)			
-Motors PN ≤ 150kW	- 0,15 x (1-η)		
-Motors PN > 150kW	- 0,1 x (1-η)		
Power factor (cosϕ)	1/6 (1 - cosϕ)	minimum absolute value: 0,02	
		maximum absolute value: 0,07	
Total losses (applicable for machines with rated outputs > 150kW)	+10% of the total losses		
Slip (s)			
Motors PN < 1kW	±30% of the slip		
Motors PN ≥ 1kW	±20% of the slip		
Locked rotor current (IA)	+20% (without lower limit)		
Locked rotor torque (TA)	+25%* of the torque		
	-15% of the torque		
Breakdown torque (TK)	-10% (MK/MN still at least 1.6 after application of this tolerance)		
Moment of inertia (J)	± 10%		
Noise level (sound pressure level at measuring surface)	+ 3 dB (A)		

These tolerances are applicable to the warranted values for three-phase asynchronous motors, taking into account necessary manufacturing tolerances and possible deviations in the raw materials used.

* + 25% may be exceeded by agreement

MECHANICAL DESIGN

FRAME, ENDSHIELDS AND FLANGES

Frame size	80	90	100	112	132	160	180	200	225
Frame	Aluminium					Aluminium or cast iron			
End shields (DE/NDE Sides)	Aluminium					Aluminium or cast iron		Cast iron	
Flange (B5)	Aluminium					Cast iron			
Face (B14)	Aluminium				Cast iron		-		
Face (B14B) (up one frame)	Aluminium				Cast iron		-		

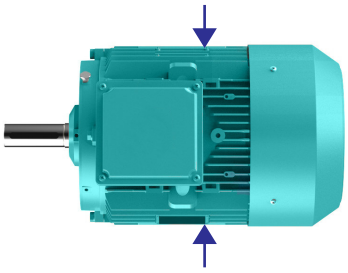
The motor frames are made of pressure die cast aluminium alloy from frame size 80 to 225. Frame sizes 80 to 112 have removable foot construction where terminal box is located on top. Frame sizes 132 to 225 are multi mount and have removable/bolt-on feet that allows the motor to be left, right or top terminal box mounting position. All removable feet are made of pressure die cast aluminium alloy. Multi mount frame motors are available on top terminal box position as standard. Please enquire if left or right terminal box position is required.

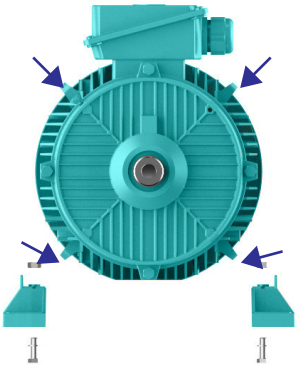
LIFTING LUGS

Eye bolts, lifting lugs or lifting openings, if provided, are intended only for lifting the motor. These lifting provisions should never be used when lifting or handling the motor and driven ancillary equipment together. Please refer to “Motor Installation and Maintenance Guide” for further information.

To facilitate lifting to the different mounting positions, the motors have multiple points where lifting lugs are available or eyebolts can be fitted.

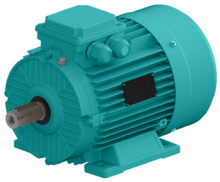
No lifting facility is provided in frame size 80 to 90S. Four lifting lugs integral with aluminium frame are available in frame size 90L to 225. Once feet are bolted onto the frame, two lifting lugs opposite to each other can be used to lift the horizontal motor no matter if the terminal box is on top, right or left position. Furthermore, two optional points are available for fitting eyebolts in aluminium frame motors from frame size 160 to 225 which has to be requested.

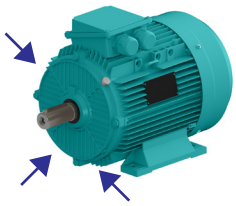


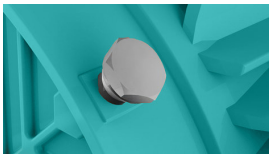


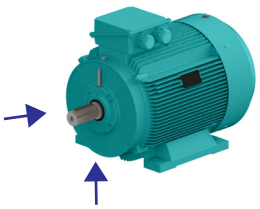
VIBRATION MEASURING POINTS AND NIPPLES

There is one flat area on the drive and non drive end of the motors from frame size 80 to 112, for better placement of accelerometer or vibration tester. Motors of frame size 132 to 225 have four of these flat areas on both ends. Measuring nipples for SPM shock pulse measurement are optionally possible to check the bearings.









EXTERNAL FINISH

S30 motors are protected with a range of surface finishes as shown below.

Surface	Parts	Treatment
Cast iron	End shields, housing	Shot blasting + Primer
Steel	Fan cover	Zinc galvanized
Aluminium alloy	Housing, end shields, terminal boxes, bearing caps	Shot blasting
Polymer	Ventilation fans	None

Paint specification

Motors	Atmosphere	Applications	Corrosivity category Acc. to ISO 12944-2
80 to 112 Aluminium frame	Non-harsh and not very harsh (indoors, industrial)	Solvent-based acrylic paint	C3
132 to 225 Aluminium frame	Moderately corrosive, humid and outdoors (temperate climate)	2 pack (water based) Epoxy top coat 50µm	C3
160 to 355 Cast iron			

Final paint colour is RAL 5021 with a RAL 9005 fan cowl

SHAFT EXTENSION

All standard design motors are produced with one shaft extension and fitted with a proper shaft key in accordance with IEC 60072-1. Motors with second standard shaft extension can be delivered upon request with special order code M30. The shaft ends have a 60° centre hole to DIN332, Part 2 with M5 to M24 tapped hole depending on the shaft diameter.

COOLING

All standard motors are totally enclosed and fan cooled (TEFC)-IC411 as per IEC 60034-6. Motors frame size 80 to 225 have radial flow fan, fitted on the non-drive end shaft of the motor and operate regardless of the direction of rotation. The air flows from the non-drive end (NDE) to drive end (DE) direction. Totally Enclosed Non-Ventilated (TENV) – IC410, Totally Enclosed Air Over (TEAO) – IC418 and Totally Enclosed Forced Ventilated (TEFV) – IC416 versions are also available on request.

The standard fan impeller is made out of plastic. Where necessary, metal fan impeller can also be supplied on request. The fan covers of all motors are made of sheet metal by drawing to its final shape.

For motors having vertical shaft extension pointing upwards, the end user must prevent, ingress of fluid along the shaft. Downwards, a protective cover (canopy) is recommended. When the motors are installed outdoors, over a long period of time, they must be protected with a sun canopy against direct intensive solar radiation, rain, snow, ice or dust.

When the motor is mounted to a place where the air intake is restricted, it must be ensured that minimum clearance is maintained between the fan cover and the restricted element. This restriction may be caused either by a wall or any adjacent part fitted on the non-drive end shaft of the motor like flywheels or large hand wheels. Recommended minimum clearance between the wall and fan cover;

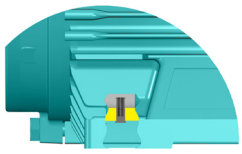
Frame Size	80	90	100	112	132	160	180	200	225
Clearance (mm)	25		30			45		60	

DRAIN HOLES

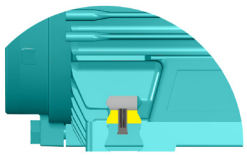
There are drain holes at both ends of the frame for drainage of water that may condense inside of the enclosure.

These drain holes are situated underneath of the frame as standard for horizontal mounting arrangement where the terminal box is on top. Condensation drain holes can also be implemented in motors designed for vertical operation (shaft up or down), feet located on side or top provided that it is enquired with the order. Motors with a protection degree of IP55 are delivered with plugs closed. It is advisable to periodically open the drain plugs in order to ensure that the condensed water drains out. When opened, the enclosure degree of protection will reduce to IP44.

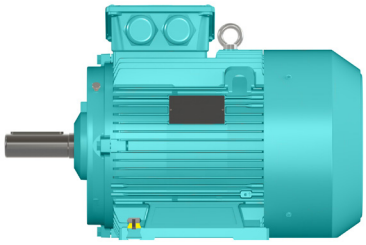
The open and closed positions of drain plugs are illustrated below.



Drain hole
open position



Drain hole
closed position



Location of drain hole depends on motor's mounting arrangement and frame material. These pictures are given for IM B3, aluminium frame motors.

CABLE GLAND

Cable entry to the terminal box is maintained by means of polyamide cable glands produced according to DIN EN 62444 and sealed with IP68 protection degree. Motors from frame size 80 and 90 have one and motors of frame sizes 100 and 112 have two snap-in glands and are fitted on right when viewed from drive end shaft extension. Motors from frame size 132 to 225 have two glands with thread and are flited on right when viewed from drive end shaft extension.

Frame size	80	90	100	112	132	160	180	200	225
Cable glands	1 x M25		2 x M25		2 x M32	2 x M40		2 x M50	
Max. Cable Outer Diameter [mm]	Ø18		Ø18		Ø25	Ø32		Ø39	
Min. Cable Outer Diameter [mm]	Ø10		Ø10		Ø12	Ø18		Ø27	

ANTI-CONDENSATION HEATING ELEMENTS

Heating elements are used to protect the windings of the motor against condensation. The use of anti-condensation heaters are recommended for motors installed in highly humid environments and left idle for long periods or for motors that are subjected to widely fluctuating temperatures. The supply voltage for anti-condensation heaters must be defined by the customer. It can be either 115V or 230V.

Anti-condensation heaters must be energised when the motor is switched off and de-energised when the motor is switched on.

An additional M16 cable gland is provided for the connecting cable in the terminal box.

The power rating and number of anti-condensation heaters corresponding to the frame sizes are indicated in the below table:

Frame size	80	90	100	112	132	160	180	200	225
No. of heaters and output power	2 x 20W			2 x 30W				2 x 40W	

TERMINAL BOX

The terminal box of all frame sizes is made of high pressure die-cast aluminium alloy and positioned towards the drive end of the motor. This arrangement improves the air flow over the cooling fins, and reduces the motor operating temperature.

From frame size 132 to 225, it is diagonally split for easier access and handling of leads and connections. It allows cable entry from both sides simply by rotating the terminal box 180°.

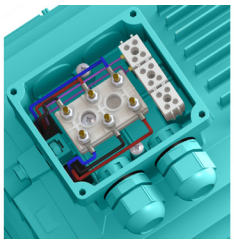
From frame size 80 to 112, the terminal box is integrally cast with the aluminium motor frame. Cable entry is maintained by means of readily fit snap-in cable gland. It also permits cable entry from the opposite side by removing the aluminium knockout.

All motors from frame size 80 to 225 are provided with earth terminal on the frame inside the terminal box.

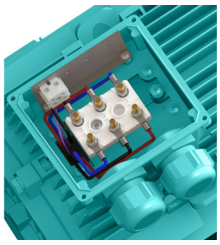
Accessory terminals are assembled on connectors whenever the motor is supplied with thermistors, thermostats, PT100 monitoring sensors or anti-condensation heaters. A M16 cable gland is fitted for the incoming connection leads.

The motor terminal block is made from thermoplastic material duly reinforced with fiber glass. It has six terminals with sizes given below.

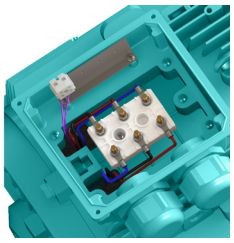
Frame size	80	90	100	112	132	160	180	200	225
Terminal size	M4 x 12				M5 x 15	M6 x 24		M8 x 28	



For **80 to 112** frame sizes terminal box, terminal and cable outputs are shown above.



For **132** frame size terminal box, terminal and cable outputs are shown above.



For **160 to 225** frame sizes terminal box, terminal and cable outputs are shown above.

BEARINGS

The standard bearing configuration of S10 is single row deep groove ball bearings. The maximum permissible radial and axial forces are given on pages 21 to 23. Reinforced design with cylindrical roller bearing at DE should be considered in applications where high radial load is available and exceeding the values given for standard design on page 21. Roller bearings are suitable for belt and pulley applications. When high axial loads greater than the values given for standard design on pages 21, 22 and 23 are available, then an angular contact ball bearing should be used. When ordering a motor with an angular contact ball bearing, specify also the method of mounting and the direction and magnitude of axial force.

Frame size	No. of poles	Standard design Deep groove ball bearing			Reinforced design for high radial forces NU bearing at DE			Reinforced design for high axial forces Angular contact ball bearing at DE		
		Drive end (DE) bearing	Non-drive end (NDE) bearing	Fig no.	Drive end (DE) bearing	Non-drive end (NDE) bearing	Fig no.	Drive end (DE) bearing	Non-drive end (NDE) bearing	Fig no.
80	2 to 8	6204 ZZ CM		1	-		-	-		-
90	2 to 8	6205 ZZ CM			-			-		
100	2 to 8	6206 ZZ CM			-			-		
112	2 to 8	6206 ZZ CM			-			-		
132	2 to 8	6208 ZZ C3			-			-		
160	2 to 8	6309 ZZ C3	6209 ZZ C3	2	NU 309 E / CN	6309 C3	5	6309 C3	7309 B	6
180	2 to 8	6310 ZZ C3	6210 ZZ C3		NU 310 E / CN	6310 C3		6310 C3	7310 B	
200	2 to 8	6312 ZZ C3	6212 ZZ C3		NU 312 E / CN	6312 C3		6312 C3	7312 B	
225	2 to 8	6313 ZZ C3	6213 ZZ C3		NU 313 E / CN	6313 C3		6313 C3	7313 B	

STANDARD DESIGN WITH DEEP GROOVE BALL BEARINGS

From frame size 80 to 225, the motors are fitted with double shielded (ZZ) deep groove ball bearings which are factory grease packed for life.

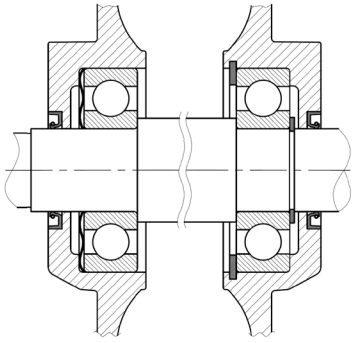
Motors from frame size 80 to 225 have NDE located bearings (see Fig.1). On request, axially-secured located bearing can be supplied on the drive end (DE) complete with a retaining ring to avoid the play of the shaft.

Motors from frame size 160 to 225 can be supplied with NDE bearing upgraded to the size of DE bearing on request.

In frame sizes 160 to 225, if required, the drive end (DE) bearing can be located with a retaining ring. A located bearing at the drive end (DE) is recommended when gearing is installed or pumps and fans are mounted directly on the motor shaft.

To compensate for any axial movement of the shaft, the motors are fitted with pre-load washers up to frame size 225 at DE.

Fig. 1



DE Floating bearing Pre load washer

NDE Located bearing

REINFORCED DESIGN WITH NU CYLINDRICAL ROLLER BEARING

Reinforced design with NU cylindrical roller bearing is recommended for belt and pulley application in cases where the permissible radial force values given for standard deep groove ball bearing design on page 21 is not enough.

Motors from frame size 160 upwards can be supplied with cylindrical roller bearings. The non-drive end (NDE) bearing is located and the axial movement is compensated by the axial play of the drive end (DE) roller bearing.

For NU cylindrical roller bearings, in contrast to ball bearings, a minimum radial force is required to ensure proper operation. Cylindrical roller bearings are not suitable for coupling arrangement and high speed operation.

REINFORCED DESIGN WITH ANGULAR CONTACT BALL BEARING

Reinforced design with angular contact ball bearing is recommended for applications where the permissible axial force values given on pages 21, 22 and 23 is not enough. When ordering a motor with an angular contact ball bearing, specify also the method of mounting, direction and magnitude of axial force.

Motors from frame size 160 upwards can be supplied with angular contact ball bearings. The non-drive end (NDE) bearing is located and the axial movement is compensated by the pre-load washers/springs at drive end (DE).

Motors with roller bearings or angular-contact ball bearings are fitted with a transport lock before dispatch to prevent damage to bearings during transport. The transport lock must be removed before operation.

BEARING LIFETIME AND LUBRICATION

The lifetime of a bearing is expressed as the number of revolutions or the number of operating hours at a given speed that the bearing can accomplish before the first sign of metal fatigue (spalling) begins to appear on a raceway of the inner or outer ring or a rolling element.

The nominal bearing lifetime L10h as defined in ISO 281 is the life that 90% of a sufficiently large group of apparently identical bearings can be expected to reach or exceed when operating under conventional conditions, i.e. after a stated amount of time 90% of a group of identical bearings will not yet have developed metal fatigue. The majority of bearings last much longer than the nominal lifetime; the average lifetime achieved or exceeded by 50% of bearings is around 5 times longer than the nominal lifetime.

Generally, the lifetime of the bearing is dependent on its type and size, the radial and axial mechanical loads it is submitted to, operating conditions (environment, temperature, mounting orientation), rotational speed and grease life. Therefore, bearing lifetime is closely related to its correct use, maintenance and lubrication. A bearing lifetime calculation is possible on request.

The approximate bearing life of four-pole motors at 50 Hz operation with horizontal mounting is about 40,000 hours if there is no additional axial or radial forces when direct coupled to the load and 20,000 hours when utilised according to the maximum admissible loads given on pages 20 to 23. The nominal bearing lifetime is reduced for converter operation at higher frequencies.

MOTORS WITH BEARINGS GREASED FOR LIFE

Motors in frame size 80 to 225, are fitted with double shielded (ZZ) deep groove ball bearings which are factory grease packed for life. The bearing grease lifetime is matched to the bearing lifetime. This can, however, only be achieved if the motor is operated in accordance with the catalogue specifications.

MOTORS WITH RELUBRICATION NIPPLES

On request, motors in frame size 160 to 225 can be equipped with greasing nipples. In aluminium frame motors, both DE and NDE end shields will be cast iron if regreasing facility is requested.

Bearings are lubricated with high quality grease containing lithium soap (thickener) and mineral oil (base).

The quantity of grease and lubrication intervals are stamped on the motor nameplate. The lubrication intervals are shown in the table below. It must be emphasised that excessive lubrication, i.e. a quantity of grease greater than that recommended in below table and on the motor nameplate, can result in the increase of bearing temperatures leading to reduced operating hours. Respecting the quantity of grease and lubrication intervals allows bearings to reach the lifetime given.

High speeds that exceed the rated speed with converter operation and the resulting increased vibrations alter the mechanical running smoothness and the bearings are subjected to increased mechanical stress. This reduces the grease lifetime and the bearing lifetime.

Lubrication intervals for deep groove ball bearing

Frame size	Grease amount		Lubrication intervals (hour)			
	Drive end (DE) bearing	Non-drive end NDE bearing	2 pole 3000 rpm	4 pole 1500 rpm	6 pole 1000 rpm	8 pole 750 rpm
	g	g	hour	hour	hour	hour
160	12	12	8500	16000	20000	22000
180	15	15	7500	15000	19000	21000
200	20	20	6000	13000	17000	20000
225	23	23	5000	12000	16500	19000

Lubrication intervals for roller bearing

Frame size	Grease amount		Lubrication intervals (hour)			
	Drive end (DE) bearing	Non-drive end NDE bearing	2 pole 3000 rpm	4 pole 1500 rpm	6 pole 1000 rpm	8 pole 750 rpm
	g	g	hour	hour	hour	hour
160	12	12	3000	8000	11000	13000
180	15	15	2500	7500	10000	12000
200	20	20	1900	6000	9000	11000
225	23	23	1600	5500	9000	11000

PERMISSIBLE RADIAL FORCES

In pulley and belt couplings, the drive shaft carrying the pulley is subjected to a radial force Fr applied at a distance X (mm) from the shoulder of the shaft extension (length E). The line of force (i.e. the centerline of the pulley) of the radial force must lie within the free shaft extension (dimension x).

The radial force Fr expressed in N applied to the drive shaft is found by the formula.

$$FR = 1{,}9 \cdot \frac{P \cdot k}{D \cdot n} \cdot 10^7$$

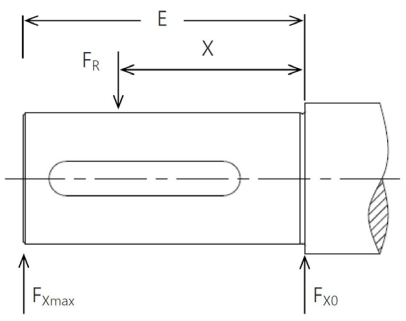
FR = radial force in N
n = rated motor speed in rpm
P = rated motor power (transmitted power) in kW
D = pulley diameter in mm
k = belt tension factor, dependent on belt type and type of duty

The belt tension factor k is a value gained from experience from the belt manufacturer. The following approximate value can be assumed:

- k = 1 to 1.5 for toothed belts
- k = 2 to 2.5 for V-belts
- k = 2.5 to 3 for flat belts with tensioner
- k = 3 to 4 for flat belts without tensioner

If the radial force is applied between points X_0 and X_{max}, the permissible force Fr can be calculated with the following formula:

$$FR = F_{XO} \frac{X}{E} \qquad F_{xo} - Fx_{max}$$



The following table shows permissible radial forces on the shaft in Newton, assuming zero axial force (Fa=0), 20,000 hours bearing life and 50 Hz operation. Please consult for values at 60 Hz operation.

Standard design with deep groove ball bearing (F_A = 0)

Pole number	2 pole			4 pole			6 pole			8 pole		
Frame size	F_{xo}	F_{max}	Shaft extension E	F_{xo}	F_{max}	Shaft extension E	F_{xo}	F_{max}	Shaft extension E	F_{xo}	F_{max}	Shaft extension E
	N	N	mm	N	N	mm	N	N	mm	N	N	mm
80	710	588	40	893	739	40	-	-	-	-	-	-
90	792	648	50	996	816	50	-	-	-	-	-	-
100	1095	877	60	1375	1101	60	-	-	-	-	-	-
112	1094	887	60	1376	1115	60	-	-	-	-	-	-
132	1610	1275	80	2000	1580	80	2300	1820	80	2530	2000	80
160	3000	2400	110	3750	3000	110	4300	3440	110	4730	3785	110
180	3500	2840	110	4370	3540	110	5045	4090	110	5570	4515	110
200	4580	3820	110	5700	4750	110	6600	5500	110	7280	6070	110
225	5095	4270	110	6400	5145	140	7430	5970	140	8230	6610	140

Reinforced design with NU cylindrical roller bearing (F_A = 0)

Pole number	2 pole			4 pole			6 pole			8 pole		
Frame size	F_{xo}	F_{max}	Shaft extension E	F_{xo}	F_{max}	Shaft extension E	F_{xo}	F_{max}	Shaft extension E	F_{xo}	F_{max}	Shaft extension E
	N	N	mm	N	N	mm	N	N	mm	N	N	mm
160	7505	6000	110	9200	7360	110	10400	8315	110	11330	9060	110
180	8430	6830	110	10330	8370	110	11700	9485	110	12775	10350	110
200	11490	9580	110	14070	11730	110	15955	13300	110	17410	14515	110
225	13637	11437	110	16765	13470	140	19025	15280	140	20780	16700	140

PERMISSIBLE AXIAL FORCES

The following table shows permissible axial forces on the shaft in Newton, assuming 20,000 hours bearing life and 50 Hz operation. Please consult for values at 60 Hz operation.

HORIZONTAL MOUNTING

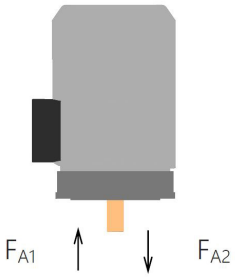
Standard design with deep groove ball bearing

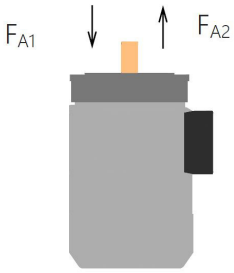
Pole number	2 pole				4 pole				6 pole				8 pole			
Frame size	F_{A1}			F_{A2}	F_{A1}			F_{A2}	F_{A1}			F_{A2}	F_{A1}			F_{A2}
	$F_R = 0$	F_R = max		$F_R = 0$	$F_R = 0$	F_R = max		$F_R = 0$	$F_R = 0$	F_R = max		$F_R = 0$	$F_R = 0$	F_R = max		$F_R = 0$
		F_{xo}	F_{xmax}			F_{xo}	F_{xmax}			F_{xo}	F_{xmax}			F_{xo}	F_{xmax}	
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
80	390	343	289	150	573	505	431	150	-	-	-	-	-	-	-	-
90	429	385	320	160	626	562	477	160	-	-	-	-	-	-	-	-
100	583	525	421	220	846	764	639	220	-	-	-	-	-	-	-	-
112	580	525	426	220	843	764	645	220	-	-	-	-	-	-	-	-
132	1050	970	840	1650	1475	1365	1190	2075	1814	1685	1465	2415	2060	1920	1690	2660
160	1155	1045	800	1655	1585	1435	1135	2085	1935	1740	1375	2435	2200	2000	1575	2700
180	1380	1260	990	1900	1880	1710	1380	2400	2300	2090	1650	2820	2625	2410	1930	3145
200	2065	1895	1595	2565	2760	2545	2175	3255	3340	3075	2615	3840	3825	3515	2980	4325
225	2345	2140	1815	2905	3160	2910	2420	3720	3835	3520	2915	4395	4405	4035	3325	4965

Reinforced design with NU cylindrical roller bearing

Pole number	2 pole				4 pole				6 pole				8 pole			
Frame size	F_{A1}			F_{A2}	F_{A1}			F_{A2}	F_{A1}			F_{A2}	F_{A1}			F_{A2}
	$F_R = 0$	F_R = max		$F_R = 0$	$F_R = 0$	F_R = max		$F_R = 0$	$F_R = 0$	F_R = max		$F_R = 0$	$F_R = 0$	F_R = max		$F_R = 0$
		F_{xo}	F_{xmax}			F_{xo}	F_{xmax}			F_{xo}	F_{xmax}			F_{xo}	F_{xmax}	
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
160	2445	2165	1570	2445	3210	2835	2105	3210	3825	3355	2790	3825	4275	3805	2805	4275
180	2830	2520	1900	2830	3710	3310	2540	3710	4420	3930	3015	4420	4980	4455	3400	4980
200	3690	3270	2535	2690	4815	4295	3380	4815	5735	5095	4015	5735	6490	5765	4525	6490
225	4160	3625	2795	4160	5460	4810	3505	5460	6505	5710	4215	6505	7380	6470	4755	7380

VERTICAL MOUNTING





Standard design with deep groove ball bearings

Frame size	Pole number	Shaft down						Shaft up					
		F_{A1}			F_{A2}			F_{A1}			F_{A2}		
		F_R=max		F_R=0	F_R=max		F_R=0	F_R=max		F_R=0	F_R=max		F_R=0
		F_{xo}	F_{xmax}		F_{xo}	F_{xmax}		F_{xo}	F_{xmax}		F_{xo}	F_{xmax}	
		N	N	N	N	N	N	N	N	N	N	N	N
80	2	369	316	416	135	135	135	324	271	371	165	165	165
	4	541	467	609	125	125	125	479	405	547	170	170	170
90	2	426	362	470	135	135	135	355	291	399	180	180	180
	4	618	532	683	125	125	125	522	436	587	190	190	190
100	2	591	489	649	190	190	190	481	379	539	255	255	255
	4	850	724	933	165	165	165	703	577	786	265	265	265
112	2	607	509	662	175	175	175	471	373	526	265	265	265
	4	877	756	957	150	150	150	693	572	773	290	290	290
132	2	1120	990	1200	1450	1325	1530	850	720	930	1720	1590	1800
	4	1580	1405	1695	1760	1585	1870	1160	980	1270	1580	1405	2295
	6	1895	1670	2015	2080	1860	2205	1480	1260	1605	2495	2270	2615
	8	2180	1960	2320	2285	2070	2420	1685	1465	1820	2780	2560	2920
160	2	1325	1085	1440	1280	1040	1390	780	540	890	1825	1585	1940
	4	1840	1535	1995	1555	1250	1710	1055	750	1210	2340	2035	2495
	6	2160	1785	2355	1830	1455	2025	1330	955	1525	2660	2285	2855
	8	2470	2040	2660	2040	1610	2235	1540	1115	1735	2970	2540	3160
180	2	1700	1430	1825	1430	1160	1550	910	640	1030	2220	1950	2350
	4	2310	1970	2485	1725	1390	1900	1205	865	1380	2830	2490	3005
	6	2740	2320	2960	2110	1690	2330	1590	1170	1810	3260	2840	3480
	8	3070	2595	3285	2400	1925	2620	1880	1405	2100	3590	3115	3810
200	2	2525	2210	2680	1895	1585	2050	1395	1080	1550	3025	2710	3180
	4	3460	3080	3675	2285	1900	2500	1785	1405	2000	3960	3580	4175
	6	3960	3490	4235	2840	2365	3115	2340	1870	2615	4460	3990	4735
	8	4445	3885	4720	3260	2705	3535	2760	2200	3035	4945	4385	5220
225	2	3055	2715	3240	1930	1600	2115	1370	1035	1555	3615	3275	3800
	4	4010	3505	4265	2475	1975	2730	1915	1410	2170	4570	4065	4825
	6	4755	4125	5080	3135	3510	3460	2575	1950	2900	5315	4685	5640
	8	5300	4560	5630	3660	2925	3990	3100	2360	3430	5860	5120	6190

Reinforced design with NU cylindrical roller bearing

Frame size	Pole number	Shaft down						Shaft up					
		F_{A1}			F_{A2}			F_{A1}			F_{A2}		
		F_R=max		F_R=0	F_R=max		F_R=0	F_R=max		F_R=0	F_R=max		F_R=0
		F_{xo}	F_{xmax}		F_{xo}	F_{xmax}		F_{xo}	F_{xmax}		F_{xo}	F_{xmax}	
		N	N	N	N	N	N	N	N	N	N	N	N
160	2	2445	1850	2725	1900	1310	2185	1900	1310	2185	2445	1850	2725
	4	3240	2515	3625	2450	1730	2835	2450	1730	2835	3240	2515	3625
	6	3775	2895	4240	2940	2065	3410	2940	2065	3410	3775	2895	4240
	8	4275	3265	4735	3350	2340	3810	3350	2340	3810	4275	3265	4735
180	2	2970	2335	3270	2180	1545	2480	2180	1545	2480	2970	2335	3270
	4	3905	3135	4310	2800	2030	3205	2800	2030	3205	3905	3135	4310
	6	4575	3645	5080	3430	2495	3930	3430	2495	3930	4575	3645	5080
	8	5135	4055	5635	2870	3950	4450	2870	3950	4450	5135	4055	5635
200	2	3895	3145	4305	2760	2015	3175	2760	2015	3175	3895	3145	4305
	4	5205	4295	5735	3530	2625	4060	3530	2625	4060	5205	4295	5735
	6	5975	4880	6630	4355	3260	5005	4355	3260	5005	5975	4880	6630
	8	6690	5420	7390	5000	3730	5700	5000	3730	5700	6690	5420	7390
225	2	4535	3680	5055	2850	2000	3370	2850	2000	3370	4535	3680	5055
	4	5905	4605	6565	3805	2505	4470	3805	2505	4470	5905	4605	6565
	6	6930	5410	7750	4755	3235	5570	4755	3235	5570	6930	5410	7750
	8	7720	5970	8610	5520	3770	6410	5520	3770	6410	7720	5970	8610

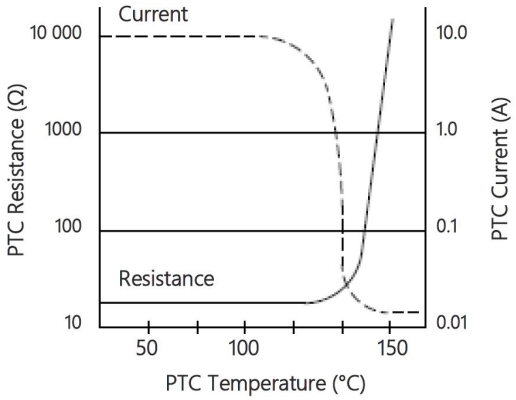
MOTOR PROTECTION

To protect the motor, fuses, thermal relays, thermal magnetic switches and thermal protectors could be used. Fuses protect energy lines (motor, relays, switches etc.) against the short circuit but they are not sufficient, just by themselves, in the case of overloading and overheating. Although it is possible to prevent over current on motor terminals with thermic relays and thermal magnetic switches, in the case of overheating they are not proper solution.

Long-term operating of motor under overload condition, with an unbalanced or low supply voltage, may cause current flow through the stator winding that is more than the nominal value. This in turn will raise the winding temperature over expected and permissible values. To prevent any damage caused by heating on stator winding thermal motor protectors should be used. They are placed in the motor windings and provide suitable motor thermal protection.

PTC (POSITIVE TEMPERATURE COEFFICIENT) THERMISTORS

PTC thermistors are thermal protectors consisting of semiconductor detectors and relays, installed in the motor winding (three in series, one per each phase winding). Their resistance rises suddenly at a certain critical temperature. This sudden resistance blocks the PTC current and casuses the main circuit to switch off.



Where thermistor protection is required to provide both alarm and trip operations, it is necessary to use two sets of thermistors (two thermistors per phase). For alarm operation the temperature should be 20K less than tripping temperature. When it reaches the critical temperature value a warning signal is sent to relay.

PTC thermistors should be chosen according to motor insulation class.

VOLTAGE AND FREQUENCY

S30 are designed for a rated supply of 400V and frequency of 50Hz. However, motors for any standard supply from 110V to 690V at frequencies of 50Hz or 60Hz may be supplied on request. Any request different than 400V 50Hz supply should be specified in the order.

Motors will operate satisfactorily within a voltage band of ±5% of the rated voltage and ±2% of the rated frequency. In case of continuous operation at the extreme voltage limits specified above, the temperature rise limits permitted for various insulation classes may be exceeded by 10K.

PERFORMANCE DATA

Series30 IE3

Standard 3 phase, squirrel cage induction motors
IP 55 protection, IC 411 cooling, class F insulation, B temperature rise
IE3: Premium Efficiency Class

2 Pole, 3000 rpm; 400 V 50 Hz

Aluminium frame

Standard motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
0,75	JP-DA80MA	2880	1,76	2,48	0,76	80,7	80,1	75,7	5,1	2,6	3,3	0,0009	9
1,1	JP-DA80MB	2870	2,52	3,65	0,76	82,7	82,4	78,9	5,8	3,0	3,6	0,0011	10
1,5	JP-DA90S	2870	3,13	4,99	0,82	84,2	84,9	83,2	6,2	2,7	3,4	0,0018	13
2,2	JP-DA90L	2875	4,45	7,31	0,83	85,9	86,9	85,8	7,0	2,8	3,6	0,0022	16
3	JP-DA100L	2900	5,77	9,87	0,86	87,1	87,8	86,8	8,0	3,0	3,8	0,0041	22
4	JP-DA112M	2910	7,44	13,1	0,88	88,1	88,9	88,2	8,0	3,0	3,8	0,0068	28
5,5	JP-DA132SA	2910	10,5	18,1	0,85	89,2	90,5	90,6	7,6	2,8	3,6	0,0146	43
7,5	JP-DA132SB	2920	14,0	24,6	0,86	90,1	91,3	91,4	7,4	3,0	3,7	0,0180	49
11	JP-DA160MA	2940	19,6	35,8	0,89	91,2	90,7	91,1	7,5	3,0	3,4	0,0385	81
15	JP-DA160MB	2940	26,5	48,8	0,89	91,9	92,8	92,7	7,1	2,4	3,0	0,0470	91
18,5	JP-DA160L	2940	32,1	60,1	0,90	92,4	93,3	93,3	8,3	2,8	3,4	0,0558	106
22	JP-DA180M	2960	38,1	71,0	0,90	92,7	93,2	93,0	7,8	2,4	3,3	0,101	132
30	JP-DA200LA	2960	52,2	96,9	0,89	93,3	93,5	93,1	7,2	2,6	3,1	0,151	197
37	JP-DA200LB	2955	64,3	120	0,89	93,7	94,3	94,0	7,3	2,7	3,1	0,172	212
45	JP-DA225M	2976	75,8	144	0,91	94,0	94,2	93,6	8,4	2,7	3,4	0,309	275

Increased output motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
1,5	JP-DA80MK	2870	3,30	5,00	0,78	84,2	84,7	82,8	6,6	3,4	3,8	0,0012	12
3	JP-DA90LK	2895	6,06	9,90	0,82	87,1	87,6	87,2	8,0	3,8	4,1	0,0024	18
4	JP-DA100LK	2900	7,63	13,2	0,86	88,1	88,8	88,0	7,2	3,2	4,1	0,0048	26
5,5	JP-DA112MK	2910	9,80	18,1	0,91	89,2	90,3	90,2	8,2	3,2	3,8	0,0089	33
11	JP-DA132MK	2910	19,8	36,1	0,88	91,2	92,6	93,1	7,9	3,0	3,6	0,0236	57
22	JP-DA160LK	2940	38,1	71,5	0,90	92,7	93,7	94,0	7,6	2,8	3,2	0,0643	125
30	JP-DA180MK	2955	52,8	97,0	0,88	93,3	93,0	92,8	8,7	2,9	3,4	0,116	155
45	JP-DA200LK	2952	77,0	146	0,90	94,0	94,6	94,5	7,5	2,6	3,1	0,224	244
55	JP-DA225MK	2972	92,6	177	0,91	94,3	94,7	94,5	8,0	2,6	3,4	0,347	312

PERFORMANCE DATA

Series30 IE3

Standard 3 phase, squirrel cage induction motors
IP 55 protection, IC 411 cooling, class F insulation, B temperature rise
IE3: Premium Efficiency Class

4 Pole, 1500 rpm; 400 V 50 Hz

Aluminium frame

Standard motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
0,55	JP-DA80MA	1429	1,40	3,67	0,70	80,8	80,4	76,8	5,4	2,8	3,2	0,0017	10
0,75	JP-DA80MB	1430	1,87	5,00	0,70	82,5	82,2	79,0	6,0	3,2	3,6	0,0022	12
1,1	JP-DA90S	1439	2,59	7,31	0,73	84,1	84,2	81,8	6,6	3,3	3,7	0,0035	14
1,5	JP-DA90L	1438	3,34	9,96	0,76	85,3	85,7	83,8	7,2	3,4	3,8	0,0042	17
2,2	JP-DA100LA	1444	4,83	14,6	0,76	86,7	86,6	85,2	7,0	2,9	3,5	0,0049	22
3	JP-DA100LB	1444	6,40	19,8	0,77	87,7	88,3	87,3	7,3	3,3	3,7	0,0062	25
4	JP-DA112M	1447	8,15	26,4	0,80	88,6	89,4	88,6	7,5	3,2	3,6	0,0124	31
5,5	JP-DA132S	1455	11,0	36,1	0,81	89,6	90,4	90,2	6,6	2,7	3,1	0,0279	45
7,5	JP-DA132M	1460	15,0	49,2	0,80	90,4	91,3	90,9	7,3	3,0	3,2	0,0361	58
11	JP-DA160M	1466	21,2	71,7	0,82	91,4	92,4	92,2	6,9	2,8	3,0	0,0770	89
15	JP-DA160L	1466	28,3	97,7	0,83	92,1	92,9	92,8	6,5	2,6	2,8	0,0986	111
18,5	JP-DA180M	1473	35,6	120	0,81	92,6	93,4	93,4	7,1	2,8	3,1	0,154	134
22	JP-DA180L	1473	42,5	142	0,80	93,0	93,8	93,9	7,2	2,6	3,2	0,177	152
30	JP-DA200L	1477	53,2	194	0,87	93,6	94,4	94,6	7,5	2,6	3,1	0,305	211
37	JP-DA225S	1480	66,1	239	0,86	93,9	94,2	93,8	7,5	2,6	3,1	0,465	260
45	JP-DA225M	1479	81,0	290	0,85	94,2	94,7	94,7	7,6	2,7	3,1	0,537	291

Increased output motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
10*	JP-DA132MK	1462	20,6	65,4	0,77	91,2	91,9	91,4	7,5	3,1	3,6	0,0431	62
18,5	JP-DA160LK	1475	35,2	120	0,82	92,6	93,0	92,7	7,8	2,8	3,4	0,132	119
30	JP-DA180LK	1472	56,2	194	0,82	93,6	93,8	93,0	7,9	2,6	2,8	0,236	185
37	JP-DA200LK	1478	64,6	239	0,88	93,9	94,7	95,0	7,5	2,4	2,9	0,360	234
55	JP-DA225MK	1478	97,5	355	0,86	94,6	95,3	95,4	6,8	2,5	2,9	0,652	325

* 132MK4 motor's output power is 10kW and it can be run under 11kW load with 1,10 service factor.

PERFORMANCE DATA

Series30 IE3

Standard 3 phase, squirrel cage induction motors
IP 55 protection, IC 411 cooling, class F insulation, B temperature rise
IE3: Premium Efficiency Class

6 Pole, 1000 rpm; 400 V 50 Hz

Aluminium frame

Standard motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
3	JP-DA132S	970	6,92	29,5	0,73	85,6	87,2	86,2	5,8	2,4	3,1	0,0318	37
4	JP-DA132MA	970	8,78	39,5	0,76	86,8	87,5	86,9	6,5	2,3	3,4	0,0408	46
5,5	JP-DA132MB	972	12,2	54,1	0,74	88,0	88,7	87,9	6,6	2,7	3,5	0,0542	57
7,5	JP-DA160M	975	16,6	73,3	0,73	89,1	89,5	88,3	6,6	2,2	3,2	0,0784	77
11	JP-DA160L	975	22,6	108	0,78	90,3	90,9	90,2	7,0	2,4	3,3	0,114	103
15	JP-DA180L	976	30,5	147	0,78	91,2	92,1	93,2	6,1	2,4	3,0	0,181	131
18,5	JP-DA200LA	982	36,9	180	0,79	91,7	92,1	91,7	6,1	2,4	2,9	0,318	177
22	JP-DA200LB	985	43,5	213	0,79	92,2	92,7	92,4	7,3	2,7	3,4	0,373	199
30	JP-DA225M	985	60,4	290	0,77	92,9	93,5	93,0	7,0	2,6	3,2	0,584	263

Increased output motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
37	JP-DA225MK	985	72,7	360	0,79	93,3	93,6	93,4	7,0	2,8	3,2	0,706	276

PERFORMANCE DATA

Series30 IE3

Standard 3 phase, squirrel cage induction motors
IP 55 protection, IC 411 cooling, class F insulation, B temperature rise
IE3: Premium Efficiency Class

8 Pole, 750 rpm; 400 V 50 Hz

Aluminium frame

Standard motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
2,2	JP-DA132S	720	5,88	29,2	0,66	81,9	81,0	78,0	5,3	2,0	3,6	0,0460	27
3	JP-DA132M	720	7,74	39,8	0,67	83,5	83,0	81,2	5,6	2,1	3,7	0,0556	35
4	JP-DA160MA	730	9,86	52,3	0,69	84,8	85,0	84,0	5,2	2,0	2,8	0,108	58
5,5	JP-DA160MB	730	13,3	71,8	0,69	86,2	86,5	95,8	5,4	2,1	3,0	0,126	72
7,5	JP-DA160L	730	17,5	98,3	0,71	87,3	88,0	97,8	5,2	2,0	2,8	0,181	94
11	JP-DA180L	728	25,5	144	0,70	88,6	88,5	97,6	5,6	2,1	2,8	0,245	116
15	JP-DA200L	732	32,3	196	0,75	89,6	90,2	89,8	5,3	2,0	2,5	0,460	181
18,5	JP-DA225S	736	38,0	240	0,78	90,1	90,5	90,2	5,8	2,2	2,6	0,705	218
22	JP-DA225M	738	45,0	285	0,78	90,6	90,8	90,0	6,0	2,3	2,8	0,837	245

PERFORMANCE DATA

Series40 IE4

Standard 3 phase, squirrel cage induction motors
IP 55 protection, IC 411 cooling, class F insulation, B temperature rise
IE4: Super Premium Efficiency Class

2 Pole, 3000 rpm; 400 V 50 Hz

Aluminium frame

Standard motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
0,75	JSP-DA80MA	2875	1,54	2,49	0,84	83,5	84,0	83,3	7,7	3,6	4,0	0,0010	10
1,1	JSP-DA80MB	2875	2,21	3,65	0,84	85,2	85,9	85,0	8,0	3,6	4,0	0,0012	11
1,5	JSP-DA90S	2885	2,98	4,97	0,84	86,5	87,0	86,7	8,2	3,8	3,8	0,0019	15
2,2	JSP-DA90L	2890	4,25	7,27	0,85	88,0	88,5	88,1	9,3	3,9	4,4	0,0024	17
3	JSP-DA100L	2900	5,52	9,88	0,88	89,1	89,4	88,9	9,1	3,3	4,1	0,0048	26
4	JSP-DA112M	2915	7,21	13,1	0,89	90,0	90,4	90,1	9,0	3,2	4,0	0,0082	32
5,5	JSP-DA132SA	2925	10,3	18,0	0,85	90,9	91,5	90,7	7,8	2,9	3,8	0,0166	47
7,5	JSP-DA132SB	2925	13,8	24,6	0,86	91,7	92,6	92,5	8,2	3,3	3,8	0,0206	54
11	JSP-DA160MA	2960	19,3	35,6	0,89	92,6	92,7	91,7	8,4	3,2	3,7	0,0496	88
15	JSP-DA160MB	2960	26,1	48,5	0,89	93,3	93,6	92,9	8,5	3,3	3,7	0,0637	104
18,5	JSP-DA160L	2955	31,7	59,9	0,90	93,7	94,2	93,8	8,4	3,1	3,8	0,0753	122
22	JSP-DA180M	2960	37,1	70,9	0,91	94,0	94,5	94,3	8,4	3,2	3,5	0,115	160
30	JSP-DA200LA	2970	51,5	96,5	0,89	94,5	94,6	93,9	8,4	3,1	3,4	0,185	223
37	JSP-DA200LB	2970	63,3	119	0,89	94,8	94,9	94,2	8,5	3,2	3,5	0,209	254
45	JSP-DA225M	2975	74,9	144	0,91	95,0	95,3	95,0	8,3	2,7	3,3	0,349	337

PERFORMANCE DATA

Series40 IE4

Standard 3 phase, squirrel cage induction motors
IP 55 protection, IC 411 cooling, class F insulation, B temperature rise
IE4: Super Premium Efficiency Class

4 Pole, 1500 rpm; 400 V 50 Hz

Aluminium frame

Standard motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
0,55	JSP-DA80MA	1420	1,21	3,69	0,78	83,9	84,2	83,5	6,5	3,7	3,9	0,0019	11
0,75	JSP-DA80MB	1420	1,60	5,05	0,79	85,7	86,0	85,4	7,0	4,0	4,1	0,0027	14
1,1	JSP-DA90S	1440	2,25	7,30	0,81	87,2	87,5	86,8	8,1	3,9	4,3	0,0046	17
1,5	JSP-DA90L	1440	2,95	9,93	0,83	88,2	88,5	87,7	8,2	3,9	4,3	0,0059	20
2,2	JSP-DA100LA	1450	4,28	14,5	0,83	89,5	89,5	88,8	8,7	3,6	4,4	0,0068	26
3	JSP-DA100LB	1450	5,65	19,8	0,85	90,4	90,8	90,0	8,8	3,7	4,4	0,0085	31
4	JSP-DA112M	1450	7,36	26,3	0,86	91,1	91,5	90,8	8,7	3,3	4,3	0,0159	37
5,5	JSP-DA132S	1470	10,8	35,8	0,80	91,9	91,7	90,2	8,2	3,3	3,8	0,0391	55
7,5	JSP-DA132M	1470	14,8	48,8	0,79	92,6	92,9	92,1	8,2	3,4	3,8	0,0431	62
11	JSP-DA160M	1475	21,0	71,2	0,81	93,3	93,1	92,4	7,5	2,9	3,5	0,112	109
15	JSP-DA160L	1475	28,1	97,1	0,82	93,9	94,1	93,3	8,0	3,1	3,5	0,131	139
18,5	JSP-DA180M	1480	35,3	119	0,80	94,2	94,4	93,9	8,0	3,3	3,7	0,204	167
22	JSP-DA180L	1480	42,0	142	0,80	94,5	94,8	94,3	8,2	3,4	3,8	0,234	184
30	JSP-DA200L	1485	52,7	194	0,87	94,9	95,1	94,6	8,0	2,9	3,4	0,358	275
37	JSP-DA225S	1485	65,2	238	0,86	95,2	95,2	94,7	8,4	3,3	3,6	0,627	319
45	JSP-DA225M	1485	80,3	290	0,85	95,4	95,4	94,8	8,6	3,4	3,7	0,750	366

PERFORMANCE DATA

Series40 IE4

Standard 3 phase, squirrel cage induction motors
IP 55 protection, IC 411 cooling, class F insulation, B temperature rise
IE4: Super Premium Efficiency Class

6 Pole, 1000 rpm; 400 V 50 Hz

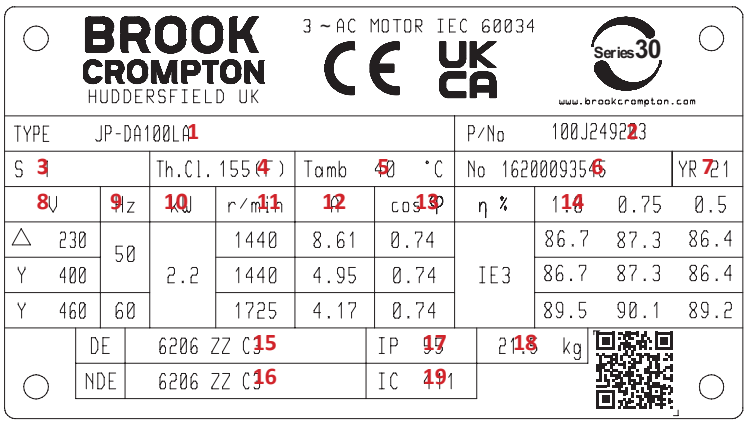
Aluminium frame

Standard motors

Output power	Motor type	Speed	Current	Torque	Power factor	Efficiency			Starting current ratio	Starting torque ratio	Breakdown torque ratio	Moment of interia J	Weight B3
		n	I_N	T_N		4/4 Load 100%	3/4 Load 75%	2/4 Load 50%					
kW		rpm	A	Nm	cosϕ				I_A / I_N	M_A / M_N	M_K / M_N	kgm^2	kg
3	JSP-DA132S	972	6,88	29,5	0,71	88,6	88,9	87,3	6,0	2,4	3,2	0,0331	42
4	JSP-DA132MA	975	8,60	39,2	0,75	89,5	89,5	88,7	6,2	2,3	2,7	0,0495	53
5,5	JSP-DA132MB	975	11,7	53,9	0,75	90,5	90,4	90,0	6,4	2,5	2,8	0,0657	66
7,5	JSP-DA160M	975	16,2	73,2	0,73	91,3	91,3	89,7	7,3	2,7	3,7	0,100	94
11	JSP-DA160L	980	22,3	107	0,77	92,3	92,4	91,3	7,6	2,8	3,8	0,168	133
15	JSP-DA180L	980	30,2	146	0,77	92,9	92,8	92,3	7,3	3,0	3,6	0,230	164
18,5	JSP-DA200LA	985	36,1	179	0,79	93,4	93,3	92,6	7,4	2,5	3,2	0,399	200
22	JSP-DA200LB	985	42,8	213	0,79	93,7	93,6	93,2	7,6	2,9	3,4	0,473	236
30	JSP-DA225M	986	59,4	291	0,78	94,2	94,0	93,6	7,3	3,0	3,4	0,716	318

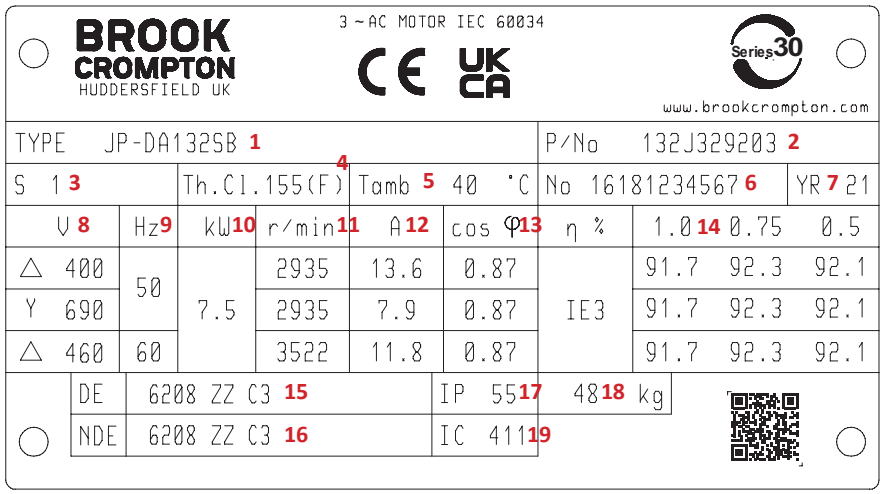
NAMEPLATE

Nominal efficiency values are determined according to IEC 60034-2-1:2014 and efficiency classes are based on IEC 60034-30-1:2014. Label material is aluminium as standard and is located on right hand side (viewed from DE side). Following nameplates are only samples.



70 mm

Rating plate for frame sizes 80 to 112 is given above.



94 mm

Rating plate for aluminium motors, frame sizes from 132 to 225, is given above.

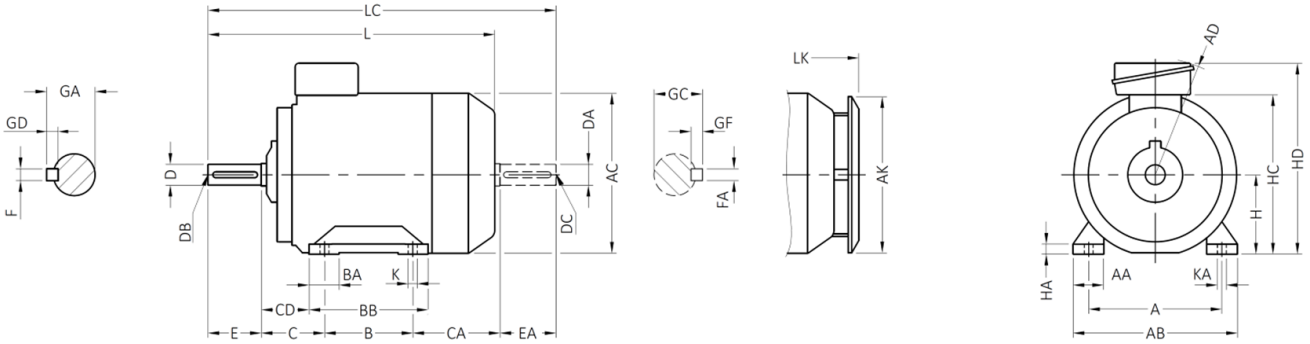
1. Motor type
2. Part number
3. Duty type
4. Thermal class
5. Ambient temperature (max)
6. Serial number
7. Year of manufacture
8. Voltage and connection type
9. Frequency
10. Rated output power
11. Full load speed
12. Full load current
13. Power factor at rated output
14. Efficiency class & efficiency ratings at 1.0x 0.75x 0.5x rated output
15. DE bearing size and type
16. NDE bearing size and type
17. Ingress protection level
18. Motor weight
19. Cooling code

DIMENSION DRAWINGS

80M - 225M
Aluminium frame

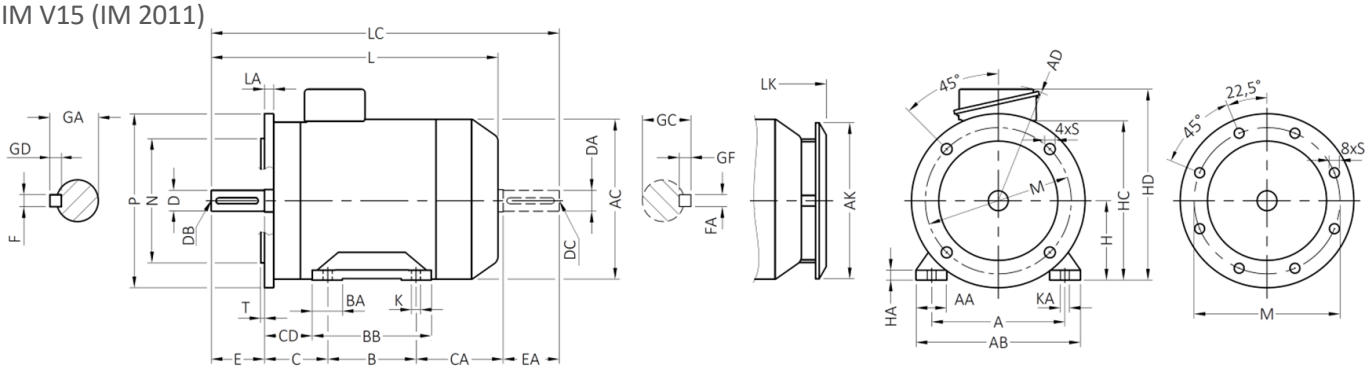
IM B3 (IM 1001)

IM B6 (IM 1051), IM B7 (IM 1061), IM B8 (IM 1071), IM V5 (IM 1011), IM V6 (IM 1031)



IM B35 (IM 2001)

IM V15 (IM 2011)



80 to 200
Frame sizes

225
Frame size

Tolerances

D, DA	ISO j6	80M - 112M
	ISO k6	132S - 180L
	ISO m6	225M
N	ISO j6	80M - 180L
	ISO h6	200L - 225M
H	-0.5	
F, FA	ISO h6	

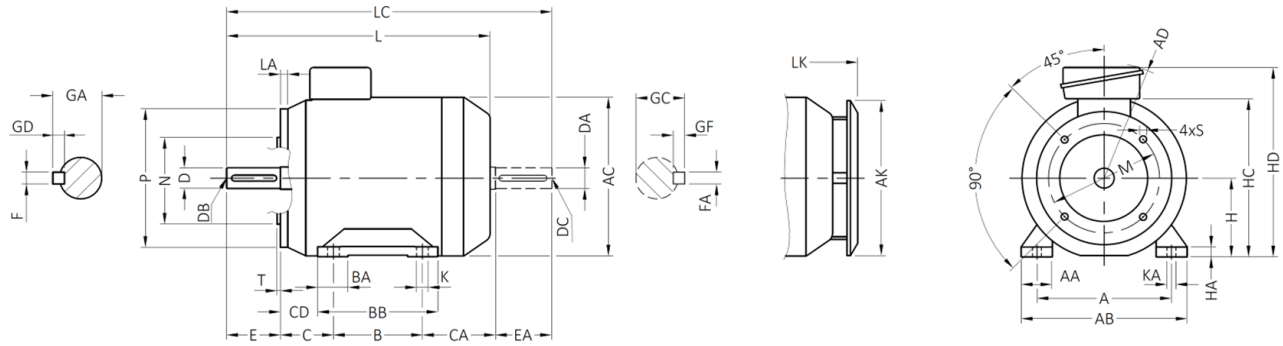
- Shoulder of shaft extension and contact surface of flange are in the same plane.
- The unit for all dimensions is mm.

Frame Size	Pole	A	AA	AB	AC	AD	B	BA	BB	C	CA	CD ~	D DA	DB DC	E EA	F x GD FA x GF	GA GC	H	HA	HC	HD
80 M	2-4	125	36	164	160	121	100	32	124	50	104	38	19	M6	40	6 x 6	21,5	80	12	174	194,5
90 S	2-4	140	40	184	180	130	100	32	124	56	112	44	24	M8	50	8 x 7	27	90	12	194,5	215
90 L	2-4	140	40	184	180	130	125	32	149	56	112	44	24	M8	50	8 x 7	27	90	12	194,5	215
100 L	2-4	160	45	208	204	141	140	42	174	63	117	46	28	M10	60	8 x 7	31	100	13	215,5	236
112 M	2-4	190	45	232	228	153	140	42	174	70	124,5	53	28	M10	60	8 x 7	31	112	13	239,5	260
132 S	2-4-6-8	216	50	274	270	195	140	46	174	89	128	71,5	38	M12	80	10 x 8	41	132	15	267	317,5
132 M	2-4-6-8	216	50	274	270	195	178	46	213	89	130	71,5	38	M12	80	10 x 8	41	132	15	267	317,5
160 M	2-4-6-8	254	62	332	328	252	210	60,5	255	108	189,5	85,5	42	M16	110	12 x 8	45	160	22	324	400
160 L	2-4-6-8	254	62	332	328	252	254	60,5	299	108	190,5	85,5	42	M16	110	12 x 8	45	160	22	324	400
180 M	2-4	279	64	364	358	264	241	65	286	121	237	98,5	48	M16	110	14 x 9	51,5	180	22	359	433
180 L	2-4-6-8	279	64	364	358	264	279	65	324	121	199	98,5	48	M16	110	14 x 9	51,5	180	22	359	433
200 L	2-4-6-8	318	69	408	408	300	305	67,5	355	133	243	108	55	M20	110	16 x 10	59	200	27	404	485
225 S	4-8	356	84	470	460	323	286	75	336	149	275,5	124	60	M20	140	18 x 11	64	225	30	455	534
225 M	2	356	84	470	460	323	311	75	361	149	250,5	124	55	M20	110	16 x 10	59	225	30	455	534
225 M	4-6-8	356	84	470	460	323	311	75	361	149	250,5	124	60	M20	140	18 x 11	64	225	30	455	534

DIMENSION DRAWINGS

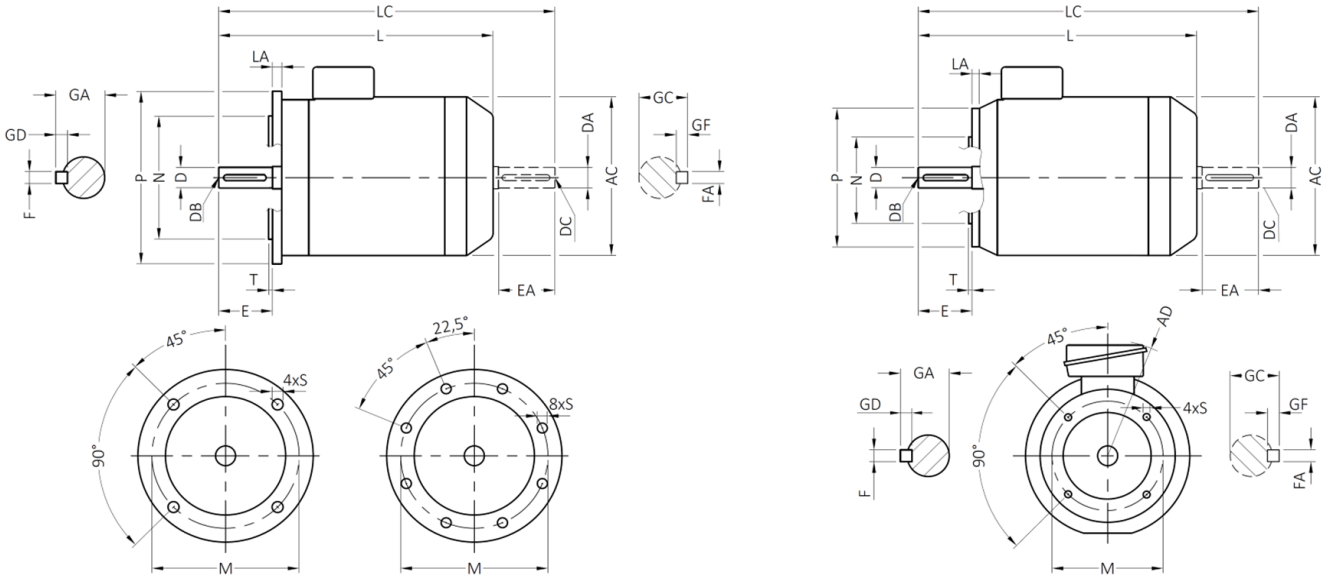
80M - 225M
Aluminium frame

IM B34 (IM 2101)



IM B5 (IM 3001)

IM V1 (IM 3011), IM V3 (IM 3031)



80 to 200
Frame sizes

225
Frame size

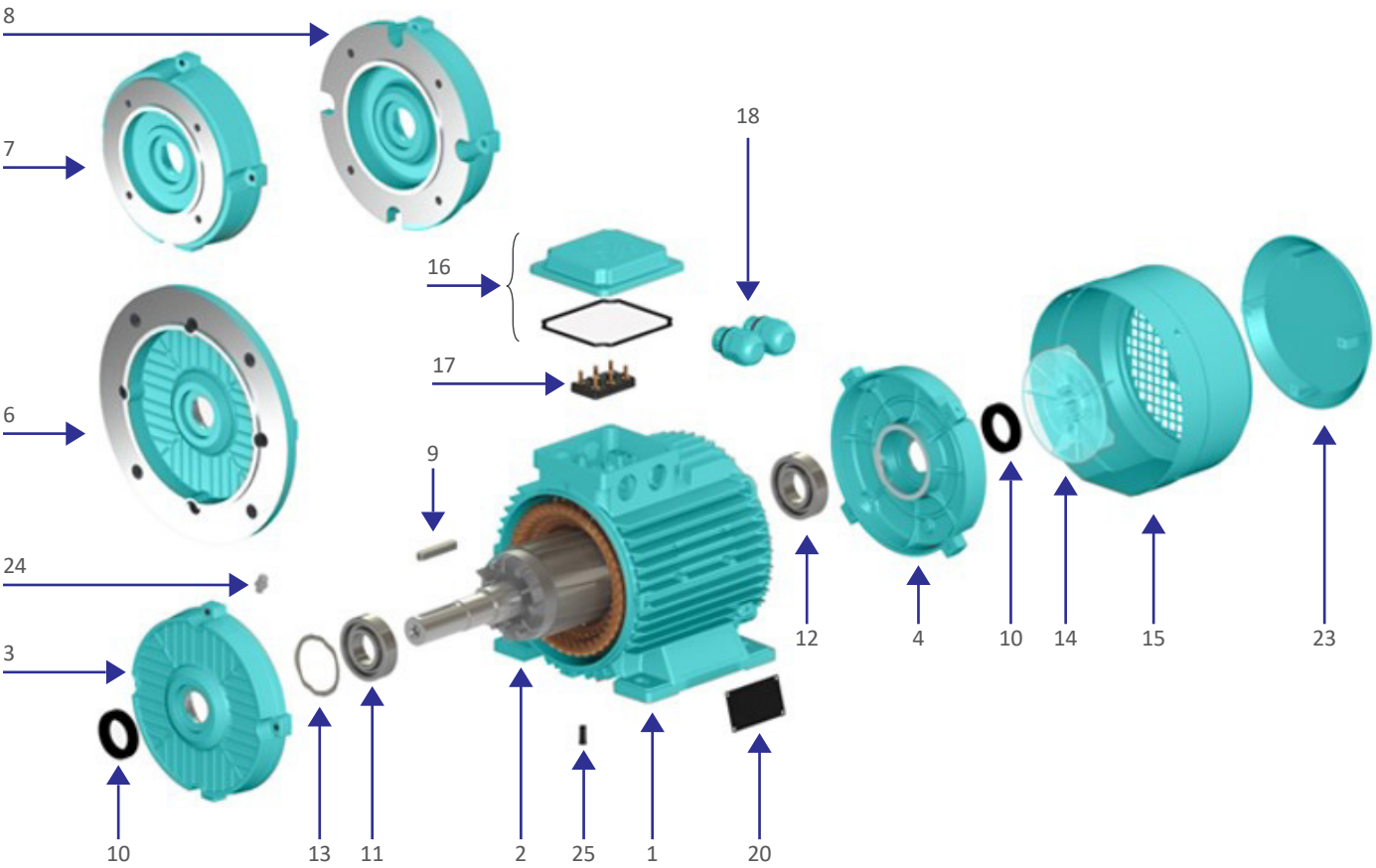
- Shoulder of shaft extension and contact surface of flange are in the same plane.
- The unit for all dimensions is mm.

						Canopy		B5 flange dimensions							B14 flange dimensions										
Frame Size	Pole Number	K	KA	L ~	LC	AK	LK	Flange No.	LA	M	N	P	S	T	Flange No.	M	N	P	S	T	Flange No.	M	N	P	S	T
80 M	2-4	10	15	289	334	152	326	FF165	12	165	130	200	12	3,5	FT100	100	80	120	M6	3	FT130	130	110	160	M8	3,5
90 S	2-4	10	15	313	368	174	350	FF165	12	165	130	200	12	3,5	FT115	115	95	140	M8	3	FT130	130	110	160	M8	3,5
90 L	2-4	10	15	338	393	174	375	FF165	12	165	130	200	12	3,5	FT115	115	95	140	M8	3	FT130	130	110	160	M8	3,5
100 L	2-4	12	18	375	440	196	412	FF215	15	215	180	250	14,5	4	FT130	130	110	160	M8	3,5	FT165	165	130	200	M10	3,5
112 M	2-4	12	18	389,5	454,5	218	426,5	FF215	15	215	180	250	14,5	4	FT130	130	110	160	M8	3,5	FT165	165	130	200	M10	3,5
132 S	2-4-6-8	12	18	429	517	258	466	FF265	15	265	230	300	14,5	4	FT165	165	130	200	M10	3,5	FT215	215	180	250	M12	4
132 M	2-4-6-8	12	18	469	557	258	506	FF265	15	265	230	300	14,5	4	FT165	165	130	200	M10	3,5	FT215	215	180	250	M12	4
160 M	2-4-6-8	15	19	609,5	727,5	314	665,5	FF300	18	300	250	350	18,5	5	FT215	215	180	250	M12	4	-	-	-	-	-	-
160 L	2-4-6-8	15	19	654,5	772,5	314	710,5	FF300	18	300	250	350	18,5	5	FT215	215	180	250	M12	4	-	-	-	-	-	-
180 M	2-4	15	19	701	819	350	757	FF300	18	300	250	350	18,5	5	-	-	-	-	-	-	-	-	-	-	-	-
180 L	2-4-6-8	15	19	701	819	350	757	FF300	18	300	250	350	18,5	5	-	-	-	-	-	-	-	-	-	-	-	-
200 L	2-4-6-8	19	24	781	901	390	837	FF350	22	350	300	400	18,5	5	-	-	-	-	-	-	-	-	-	-	-	-
225 S	4-8	19	24	840,5	960,5	440	896,5	FF400	22	400	350	450	18,5	5	-	-	-	-	-	-	-	-	-	-	-	-
225 M	2	19	24	810,5	930,5	440	866,5	FF400	22	400	350	450	18,5	5	-	-	-	-	-	-	-	-	-	-	-	-
225 M	4-6-8	19	24	840,5	990,5	440	896,5	FF400	22	400	350	450	18,5	5	-	-	-	-	-	-	-	-	-	-	-	-

SPECIFICATION: IE3 & IE4 MOTORS

Frame size		80	90	100	112
Frame		Pressure die-cast aluminium alloy			
End shields	Material	Pressure die-cast aluminium alloy			
Flange (B5)	Material	Pressure die-cast aluminium alloy			
Face (B14)	Material	Pressure die-cast aluminium alloy			
Face (B14B) (up one frame)	Material	Cast iron GG 20			
Feet		Integrated, pressure die-cast aluminium feet			
Painting	Material	Solvent-based acrylic paint, RAL 5021			
	Corrosion class	C3; ISO 12944-2:2007			
Bearings	Location	NDE			
	DE side	6204 ZZ	6205 ZZ	6206 ZZ	
	NDE side	6204 ZZ	6205 ZZ	6206 ZZ	
	Seal	Radial seals on both DE and NDE sides			
Lubrication	Grease	Sealed for life bearings			
Vibration measurement nipples	On request	SPM			
Terminal box	Materials	Pressure die-cast aluminium alloy			
	Position	Top as standard			
Cable connections	Cable glands	1 x M25		2 x M25	
	Terminal	6 terminals for connection with cable lugs (lugs not included)			
Stator winding	Material	Enameled copper wire			
	Insulation	Insulation class F, temperature rise B			
	Winding protection	PTC			
Anti-condensation heaters	On request	110v or 240v			
Rotor winding	Material	Medium pressure die-cast, pure aluminium			
Shaft	Screw hole	M6	M8	M10	
Vibration		Grade A			
Balance		Half key method			
Shaft key		Closed profile keyway			
Rating plate	Material	Aluminium plate; 0,5 mm			
Earthing		One inside the terminal box and one on the frame next to the foot			
Protection degree		IP 55 as standard, higher protection on request			
Cooling method		Totally enclosed, fan cooled - IC 411			
Fan	Material	Polypropylene			
Fan cover	Material	Steel			
Drain holes	Material	PA 6			

PARTS LIST



Standard design motors
80 - 112 frame sizes

1. Frame and complete stator
2. Rotor with shaft
3. End shield, DE side
4. End shield, NDE side
6. B5 Flange
7. B14 Flange
8. B14 2nd Flange
9. Shaft key
10. Radial seal
11. Bearing, DE side
12. Bearing, NDE side
13. Preload washer
14. Fan
15. Fan cover

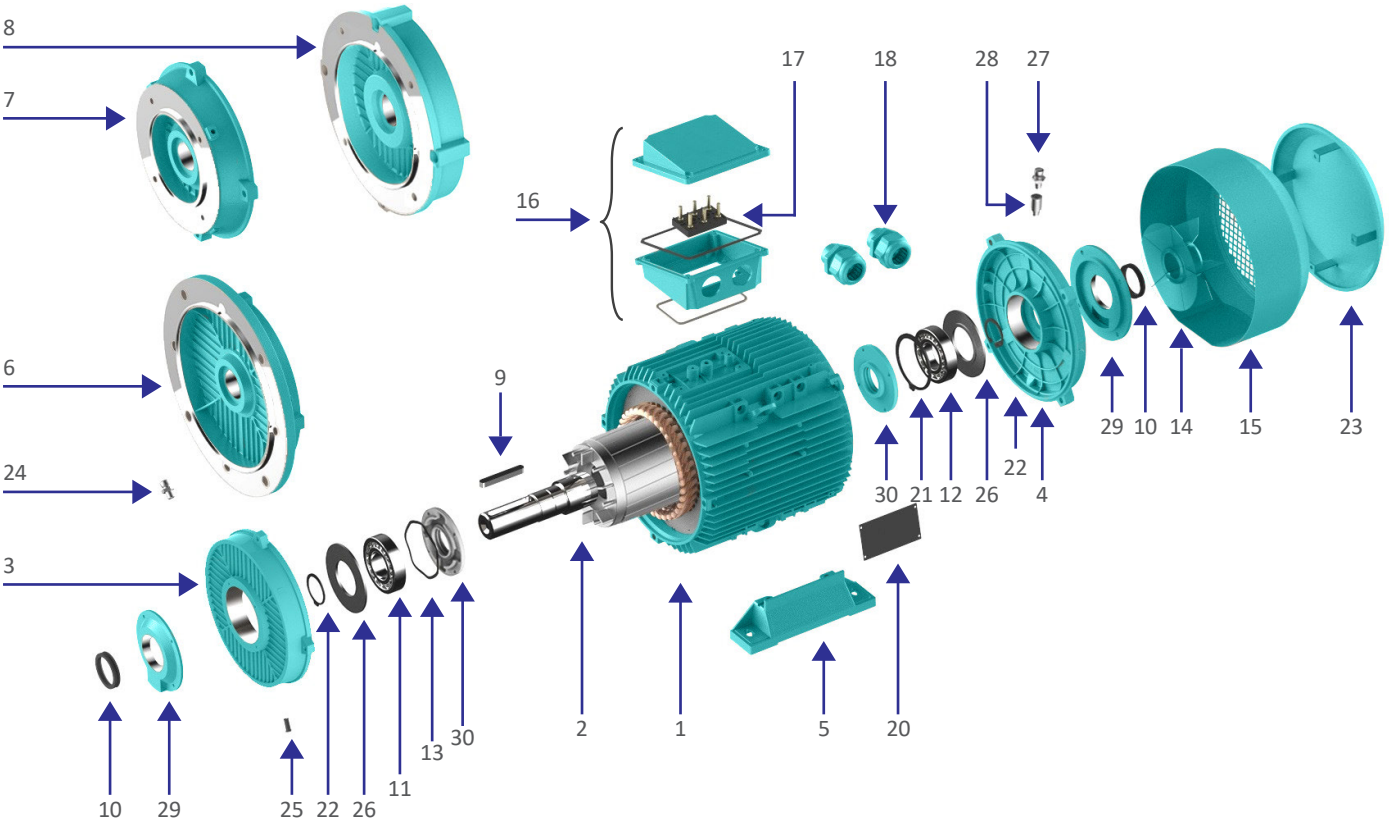
16.1 Terminal box cover

17. Terminal
18. Cable glands
20. Rating plate
23. Canopy
24. Vibration measurement nipple
25. Plug for drain hole

MOTORS IN BRIEF: IE3 & IE4 MOTORS

Frame size		132	160	180	200	225
Frame		Pressure die-cast aluminium alloy				
End shields	Material	Pressure die-cast aluminium alloy			Cast iron GG 20	
Flange (B5)	Material	Pressure die-cast aluminium alloy	Cast iron GG 20			
Face (B14)	Material	Pressure die-cast aluminium alloy	Cast iron GG 20	---		
Face (B14B) (up one frame)	Material	Pressure die-cast	---			
Feet		Feet bolted to the frame, pressure die-cast aluminium				
Painting	Material	Water based, RAL 5021				
	Corrosion class	C3; ISO 12944-2:2007				
Bearings	Location	NDE				
	DE side	6208 ZZ C3	6309 ZZ C3	6310 ZZ C3	6312 ZZ C3	6313 ZZ C3
	NDE side	6208 ZZ C3	6209 ZZ C3	6210 ZZ C3	6212 ZZ C3	6213 ZZ C3
	Seal	Radial seals on both DE and NDE sides				
Lubrication	Grease	Sealed for life bearings				
	Relubrication	-	M8x1 greasing nipples on request			
Vibration measurement nipples	On request	SPM				
Terminal box	Material	Pressure die-cast aluminium alloy				
	Position	Top as standard, changeable to LHS and RHS positions by simply bolting the feet accordingly				
Cable connections	Cable glands	2 x M32	2 x M40		2 x M50	
	Terminal	6 terminals for connection with cable lugs (lugs not included)				
Stator winding	Material	Enameled copper wire				
	Insulation	Insulation class F, Temperature rise B				
	Winding protection	PTC (thermistors)				
Anti-condensation heaters	On request	110v or 240v				
Rotor winding	Material	Medium pressure die-cast, pure aluminium				
Shaft	Screw hole	M12	M16		M20	
Vibration		Grade A				
Balance		Half key method				
Shaft key		Closed profile keyway				
Rating plate	Material	Aluminium plate; 0,5 mm				
Earthing		One inside the terminal box and one on the frame next to the foot				
Protection degree		IP 55 as standard, higher protection on request				
Cooling method		Totally enclosed, fan cooled - IC 411				
Fan	Material	Polypropylene				
Fan cover	Material	Steel				
Drain holes	Material	PA 6				

PARTS LIST



Standard design motors
132 - 225 frame sizes

1. Frame and complete stator
2. Rotor with shaft
3. End shield, DE side
4. End shield, NDE side
5. Feet
6. B5 Flange
7. B14 Flange (for frame sizes 132 and 160)
8. B14 2nd Flange (for frame size 132)
9. Shaft key
10. Radial seal
11. Bearing, DE side
12. Bearing, NDE side
13. Preload washer
14. Fan
15. Fan cover
16. Terminal box
17. Terminal
18. Cable glands
20. Rating plate
21. Internal circlip (NDE side)
22. External circlip
23. Canopy
24. Vibration measurement nipple
25. Plug for drain hole

Motors with greasing nipples
160 - 225 frame sizes

1. Frame and complete stator
2. Rotor with shaft
3. End shield, DE side
4. End shield, NDE side
5. Feet
6. B5 Flange
9. Shaft key
10. Radial seal
11. Bearing, DE side
12. Bearing, NDE side
13. Preload washer
14. Fan
15. Fan cover
16. Terminal box
17. Terminal
18. Cable glands
20. Rating plate
22. External circlip
23. Canopy
24. Vibration measurement nipple
25. Plug for drain hole
26. Grease retaining disc
27. Grease nipple
28. Extension part for greasing nipple
29. Outer bearing cover
30. Inner bearing cover

NOTES

NOTES

Contact

Asia

Brook Crompton Asia Pacific Pte Ltd
19 Keppel Road #08-01, Jit Poh Building
Singapore 089058
T: +65 6227 0308
F: +65 6227 0605
E: marketing@brookcrompton-ap.com
www.brookcrompton.com

Brook Crompton Australia Pty Ltd
4 Corymbia Street, Croudace Bay
NSW, 2280
Australia
T: +61 (02) 4946 1108
E: australia@brookcrompton.com
www.brookcrompton.com

Europe

Brook Crompton UK Ltd
St. Thomas' Road
Huddersfield, HD1 3LJ, UK
T: +44 (0)1484 557200
F: +44 (0)1484 557201
E: sales@brookcrompton.com
www.brookcrompton.com

Brook Crompton UK LTD - Sede secondaria in Italia
Via De Chirico, 9/11
42124 – Reggio Emilia (RE)
T: +39 0522 345055
E: italy@brookcrompton.com
www.brookcrompton.com

Americas

Brook Crompton Inc
1100 E. 222nd Street
Euclid, Ohio 44117, USA
T: +1 800 668 6779
T: +1 - 800 463 8917
E: sales@brookcromptonna.com
www.brookcromptonna.com

Brook Crompton Ltd
264 Attwell Drive
Toronto, Ontario, M9W 5B2, Canada
T: + 416 675 3844 (Toronto)
T: +1 888 668 9843 (Quebec)
E: sales@brookcromptonna.com
www.brookcromptonna.com

BROOK CROMPTON
a WOLONG company

BC_ID_01_LV_202109_EN_VER1.0