

**IE2 - IE3**

**FLAMEPROOF MOTORS**

Aluminium 56 - 180

# 1. Tolerances and standards of reference

## 1.1 Mechanical and Electrical tolerances

Symbol	Description	Tolerance	
<b>A</b>	Distance between centre-lines of fixing holes (end view)	± 1 mm	
<b>AB</b>	Overall dimensions across the feet (end view)	+ 2 %	
<b>AC</b>	Diameter of the motor (without terminal box)	+ 2 %	
<b>B</b>	Distance between centre-lines of fixing holes (side view)	± 1 mm	
<b>C - CA</b>	Distance from the shaft end shoulder to the centre-line of nearest mounting holes in the feet	± 3 mm	
<b>D - DA</b>	Diameter of the shaft extension.	∅ 11 – 28 ∅ 32 – 48 ∅ ≥ 55	j6 k6 m6
<b>E - EA</b>	Length of the shaft extension from the shoulder	∅ < 55 mm ∅ > 60 mm	0,3 mm + 0,5 mm
<b>F - FA</b>	Width of the keyway of the shaft extension	h9	
<b>GA - GC</b>	Distance from the top of the key to the opposite surface of the shaft extension	+ 0,2 mm	
<b>H</b>	Distance between the centre-line of the shaft to the bottom of the feet	H ≤ 250 H ≤ 280	- 0,5 mm - 1 mm
<b>HD</b>	Distance from the top of the terminal box and to the bottom of the feet	+ 2 %	
<b>K</b>	Diameter of the holes or width of the slots in the feet of the motor	+ 3 %	
<b>L</b>	Overall length of the motor with a single shaft extension	+ 1 %	
<b>M</b>	Pitch circle diameter of the fixing holes	± 0,8 mm	
<b>N</b>	Diameter of the spigot	∅ < 230 ∅ ≥ 250	j6 h6
<b>P</b>	Outside diameter of the flange	± 1 mm	
<b>R</b>	Distance from the shaft shoulder to the mounting surface of the flange	± 3 mm	
<b>S</b>	Diameter of the fixing holes in the mounting flange or nominal diameter of thread	+ 3 %	
	Distance from the shaft shoulder to the mounting surface of the flange with locked bearing	± 0,5 mm	
	Mass of the motor	- 5 a + 10 %	
<b>Nominal voltage, <math>V_N</math></b>		± 5%	
<b>Efficiency, <math>\eta</math></b>		-15% of (1- $\eta$ )	
<b>Power factor, <math>\cos \phi</math></b>		-1/6 of (1-cos $\phi$ ) min 0.02, max 0.07	
<b>Slip (rpm) (full load and nominal ambient temperature), <math>P_N</math></b>		± 20% if $P_N \geq 1$ kW ± 30% if $P_N < 1$ kW	
<b>Locked rotor current, <math>I_A</math></b>		+20%	
<b>Locked rotor torque, <math>M_A</math></b>		-15% +25%	
<b>Breakdown torque, <math>M_{max}</math></b>		-10% con $M_{max}/M_N \geq 1.6$	
<b>Minimum torque, <math>M_{min}</math></b>		-15%	
<b>Moment of Inertia, <math>J</math></b>		± 10%	
<b>Sound intensity level (sound pressure) <math>L_{pFA}</math></b>		+3 dBA	

## 1.2 Standards of reference

Title	EU CENELEC	International IEC
EU	EN 60034-1	IEC 60034-1
CENELEC	EN 60034-2	IEC 60034-2
International	EN 60034-5	IEC 60034-5
IEC	EN 60034 -6	IEC 60034 -6
Rotating electrical machines / Part 7: Classification of types of construction, mounting arrangements and terminal box position (IM Code)	EN 60034-7	IEC 60034-7
Rotating electrical machines / Part 9: Noise limits	EN 60034-9	IEC 60034-9
Rotating electrical machines / Part 12: Starting performance of single-speed three-phase cage induction motors	EN 60034-12	IEC 60034-12
Rotating electrical machines / Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher Measurement, evaluation and limits of vibration severity	EN 60034-14	IEC 60034-14
General purpose three-phase induction motors having standard dimensions and outputs. Frame numbers 56 to 315 and flange numbers 65 to 740	EN 50347	IEC 60072-1
Degrees of protection provided by enclosures (IP Code)	EN 60259	IEC 60529
Electrical apparatus for explosive gas atmospheres / Part 0: General requirements	EN 60079-0	IEC 60079-0
Electrical apparatus for explosive gas atmospheres / Part 1: Flameproof enclosures 'db'	EN 60079-1	IEC 60079-1
Electrical apparatus for explosive gas atmospheres / Part 7: Increased safety "eb" and "ec"	EN 60079-7	IEC 60079-7
Explosive atmospheres / Part 31: Equipment dust ignition protection by enclosure "ta"	EN 60069-31	IEC 60079-31

## 2. Guide to motor choice

**First step is the classification of hazardous places in zones. The end user shall classify the hazardous areas under his own responsibility.** Directive 1999/92/EC provides information regarding 'Classification of places where explosive atmosphere may occur'. The corresponding standards of reference are EN 60079-10-1 for gas and EN 60079-10-2 for dust. Here below we give you a synthetic step by step guide to the choice of the motors.

Zone Classification (presence of explosive atmosphere)		Electrical apparatus ATEX marking					
		(1) Group	(2) Category	(3) Type of protection	(4) Gas group Dust group	IP Degree	(5) GAS Temperature class (6) DUST Surface temperature
GAS	0	II	1G	Electrical apparatus not allowed			
	1	II	2G	Ex eb 'increased safety'	IIA, IIB, IIC	IP54	T1=450°C T2=300°C T3=200°C T4=135°C T5=100°C T6=85°C
				Ex db 'flameproof enclosure'		-	
2	II	3G	Ex ec 'non sparking'	IIA, IIB, IIC	IP54	T1=450°C T2=300°C T3=200°C T4=135°C T5=100°C T6=85°C	
POWDER	20	II	1D	Electrical apparatus not allowed			T125°C
	21	II	2D	Ex tb 'protection by enclosure t'	IIIC, IIIB, IIIA	IP6X	
	22	II	3D	Ex tc 'protection by enclosure t'	IIIB, IIIA	IP5X	

### (1) Group II

Includes equipment intended for use in other places likely to become endangered by explosive atmospheres (surface plants different from mines).

### (2) Group II is sub-divided into 3 categories:

**Category 1:** very high level of protection / **Category 2:** high level of protection / **Category 3:** normal level of protection

### (3) Electric Motors O-M series can have the following types of protection:

**Ex db** motor and terminal box (GAS)

**Ex db eb** motor Ex d and terminal board Ex e (GAS)

**Ex tb** protection by enclosure t (DUST)

### (4) GAS group

**IIC** Hydrogen, Acetylene, carbon disulfide

**IIB** Diethyl ether, Ethylene etc.

**IIA** Propane, Butane, pentane, natural gas etc.

### DUST group

**IIIC** Conductive dust

**IIIB** Non-conductive dust

**IIIA** Combustible fibers

### (5) (GAS)

In function of their maximum surface temperature the motors are classified in a temperature class.

### (6) (DUST)

The surface temperature must be less or equal than the minimum value between Tmax1 e Tmax2 where:

**Tmax1 = 2/3 Tcl** with Tcl ignition temperature in °C of the dust cloud.

**Tmax2 = TI - 75 °C** with TI ignition temperature in °C of a 5mm layer of dust.

## GAS- Main inflammable substances

Inflammable substance	Group of GAS	temperature of ignition	Temp. Class	Inflammable substance	Group of GAS	temperature of ignition	Temp. Class
2-Methylpentane	IIA	300	T2	Ethyl formate	IIA	440	T2
Amyl acetate	IIA	360	T2	Methyl formate	IIA	450	T1
Butyl-n acetate	IIA	425	T2	Natural gas	IIA	482	T1
Ethyl acetate	IIA	426	T2	Isobutane	IIA	460	T1
Isobutyl acetate	IIA	420	T2	Isoheptane	IIA	220	T3
Methyl acetate	IIA	502	T1	Isohexane	IIA	264	T3
Propil acetate	IIA	430	T2	Isooctane	IIA	410	T2
Vinyl acetate	IIA	425	T2	Isoprene	IIA	220	T3
Acetone	IIA	465	T1	Methane	IIA	537	T1
Methanol	IIA	464	T1	Methylcyclopentane	IIA	258	T3
Brome thane	IIA	511	T1	Methylamine	IIA	430	T2
Butane	IIA	287	T3	Methylmetacrylate	IIA	430	T2
Butane - 1	IIA	384	T2	Paraldehyde	IIA	239	T3
Butane - 2	IIA	325	T2	Pentane	IIA	258	T3
Cycloexano	IIA	259	T3	Pyridine	IIA	483	T1
Cycloexanol	IIA	300	T2	Propane	IIA	470	T1
Cyclohexanone	IIA	419	T2	Propylamine	IIA	318	T2
Cyclohexene	IIA	244	T3	Propylbenzene	IIA	450	T1
Cyclopropane	IIA	498	T1	Propylene	IIA	455	T1
Cymene (p)	IIA	436	T2	Styrene	IIA	490	T1
Chloro-benzene	IIA	637	T1	Toluene	IIA	480	T1
Acetyl chloride	IIA	390	T2	m-Xylene	IIA	522	T1
Allyl chloride	IIA	390	T2	o-Xylene	IIA	464	T1
Chlorbutane	IIA	240	T3	p-Xilene	IIA	528	T1
Chloroethane	IIA	495	T1	1,2 Butadiene	IIB	430	T2
Vinyl chloride	IIA	472	T1	1,3 Butadiene	IIB	430	T2
Dichlorobenzene	IIA	648	T1	Dioxane	IIB	245	T3
Dichloroethylene 1,1	IIA	570	T1	Diethyl ether	IIB	160	T4
Dichloroethylene 1,2	IIA	441	T2	Ethyl vinyl ether	IIB	200	T3
Diethylamine	IIA	312	T2	Methyl vinyl ether	IIB	350	T2
Dimethylamine	IIA	400	T2	Acrylate ethyl	IIB	350	T2
Dimethylaniline	IIA	371	T2	Ethylene	IIB	425	T2
Dimethylbutane 2,3	IIA	405	T2	LPG	IIB	365	T2
Dimethylpentane 2,3	IIA	330	T2	Sulphurated Hydrogen	IIB	260	T3
Heptane	IIA	215	T3	Methylacrylate	IIB	415	T2
Hexane	IIA	233	T3	Carbon monoxide	IIB	605	T1
Heptane	IIA	515	T1	Ethylene oxide	IIB	435	T2
Ethylacetoacetate	IIA	350	T2	Propylene oxide	IIB	430	T2
Ethylamine	IIA	385	T2	Acetylene	IIC	305	T2
Ethylmercaptane	IIA	295	T3	Hydrogen	IIC	500	T1
Butyl formate	IIA	320	T2	Carbon disulfide	IIC	95	T6

## DUST- Main inflammable substances

Substance	Medium largeness particles (µm)	LEL (g/m3)	Cloud ignition temperature T <sub>cl</sub> (°C)	Layer 5mm thick ignition temperature T <sub>I</sub> (°C)
Aluminium	10	60	560	430
Bronze	18	750	390	260
Iron	12	500	580	>450
Graphite	7	30	600	680
Lamp-black (carbon black)	13	15	620	435
Sulphur	20	30	280	260
Paper		100	620	370
Cellulose (93% sweet wood, 6% hard wood)	14	15	420	335
wood flour	60		470	305
Wood (50% pear tree and 50% kernel)	35	100	500	340
Wood (beech)	61		490	310
Wood (pear tree)	27	100	500	320
Sawdust of wood	65		470	290
Cork	42	30	470	300
Cacao	3	125	460-540	245
Coffee	10	25	360	450
Cereals (mixed powders)	37	125	510	300
Wheat flour	56-125	60	480	>450
Soy flour	20	200	620	280
Gelatine	65	60	560	>450
Wheat		100	470	220
Dry milk	165	60	460	330
Milk sugar	22	60-125	450	>450
Rye			415-470	325
Buttermilk	400		450	420
Tobacco		60	485	290
Black tea	76	125	510	300
Sugar	32	30	360	>450
Powdered sugar	17	60	350	>450



## 3. Motor characteristics

### 3.1 Range of motors

Electric Motors are manufactured in compliance with all the European standards concerning equipment and protective systems for potentially explosive atmosphere in compliance with the European Directive ATEX 94/9/CE (better known as ATEX) and IECEx Scheme. Here below in the table we show you the range of motors for each type of protection. In the following pages we will talk about testing and certificates, main features of these motors and possible options always depending on the type of protection.

Type	Frame size	Pole N°	Output range (kW)	Type of protection	Temperature class Surface temperature	Tamb max range (°C)
<b>3-ph (*) 1 speed</b>	56-180	2	0,12 – 30	Ex db Ex db eb Ex tb	T3 T4 T5 T125°C	Ta –40°C +60°C Ta –40°C +60°C Ta –40°C +40°C Ta –40°C +60°C
	56-180	4	0,12 – 22			
	56-180	6	0,18 – 15			
	71-180	8	0,18 – 11			
<b>3-ph 2 speeds Constant Torque</b>	71-180	4/2	0,22/0,33 – 18,5/22	Ex db Ex db eb Ex tb	T3 T4 T125°C	Ta –40°C +60°C Ta –40°C +60°C Ta –40°C +60°C
	71-180	8/4	0,11/0,18 – 9,9/16			
	71-180	6/4	0,11/0,18 – 8,1/13			
	71-180	8/6	0,08/0,12 – 6/8			
<b>3-ph 2 speeds Quadratic Torque</b>	71-180	4/2	0,06/0,25 – 6/24	Ex db Ex db eb Ex tb	T3 T4 T125°C	Ta –40°C +60°C Ta –40°C +60°C Ta –40°C +60°C
	71-180	8/4	0,05/0,25 – 5,5/22			
	80-180	6/4	0,1/0,3 – 6,25/18,5			
	80-180	8/6	0,09/0,33 – 5,2/10			
<b>1-ph (**) 1 speed</b>	56-112	2	0,09 – 4	Ex db Ex db eb Ex tb	T3 T4 T125°Ca	Ta –40°C +60°C Ta –40°C +60°C Ta –40°C +60°C
	56-112	4	0,06 – 3			
	71-100	6	0,12 – 1,1			

(\*) If provided of Thermal Protection (normally PTC) inside the windings, can be driven by frequency converters.

(\*\*) The capacitor of the single phase motors is put inside a special Ex d cylindrical enclosure fitted on the motor itself. Otherwise it must be placed in a safe area.

### 3.2 Testing and certificates

Motors for hazardous areas have to be officially approved by a recognized test organization, authorized to issue test certificates, to ensure compliance with standards for this type of equipment. Motors are defined and classified according to the categories and protection type which are defined in the corresponding standards. Depending on the nature of the atmosphere, it is responsibility of the user to determine which group and which maximum surface temperature should be specified for the motor installation. The Ex motors manufactured by Electric Motors are manufactured in compliance with all the European and International standards concerning equipments and protective systems for explosive atmosphere (European Directive 2014/34 EU better known as ATEX, and IECEx Scheme and EAC).

**The motors have been tested by a Notified Laboratory which released:**

- EC Type Certificate , Product Quality assurance Notification (ATEX)
- CoC Certificate of Conformity, ExTR Test Report, QAR Quality assurance Report
- EAC certificate

It means that all the Ex motors are manufactured in compliance with the technical drawings and documents approved by the Notified Body after testing the motors (performing type test as written in the EN standards) and the production of such motors follows all the procedures requested by the Directive. Every year the Production of Ex motors is evaluated by a Notified Body in order to verify that all the procedures are constantly respected.

**Each motor or batch of motors will be despatched together with the following documents:**

- EC Declaration of Conformity / IECEx CoC copy / EAC certificate
- Installation manual and safety instructions where are written all the indication regarding the installations of the motors and the important instructions regarding the type/s of protection of the motors.

### 3.3 Main features

Electric Motors Ex electric motors are manufactured and tested in compliance with all the EN/IEC standards and also in compliance with the main European Directives (2014/35 EU 'LVD', 2014/30 EU 'EMC Electro Magnetic Compatibility', 2006/42/EC 'Machinery', 2015/863 EU, RoHS III and with IECEx Scheme and EAC standards).

**ATEX characteristics:**

Suitable for Surface plants different from mines (Group II)

<b>Presence of GAS:</b>	<b>Zone 1 and Zone 2</b>
Type of protection	'Ex db' or 'Ex db eb'
GAS group	IIC
Temperature class	T3, T4 E T5 (suitable also for T2, T1)
Ambient temperature range	-40°C +60°C for temperature class T3 -40°C +60°C for temperature class T4 -40°C +40°C for temperature class T5

<b>Presence of DUST:</b>	<b>Zone 21 and Zone 22</b>
Type of protection	Ex tb IP66 (IP65 for Ex db eb)
DUST groups	IIIC
Surface Temperature	T125°C
Ambient temperature range	-40°C +60°C

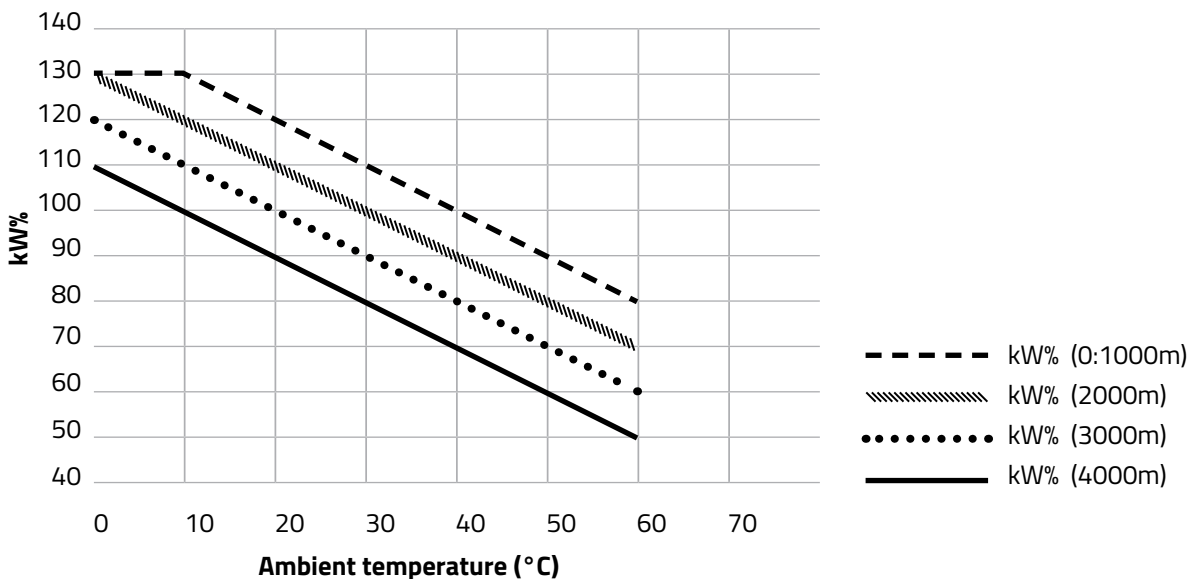
All the motors are asynchronous with squirrel cage rotor, wound stator, closed and externally ventilated in compliance with EN 60034-6 (IC 411).

**The supply voltages** allowed can exceed the nominal value of ±5%. On demand ±10%.

All the electrical and mechanical features and the testing methods comply with the standard EN 60034-1.

**The power ratings** of the motors is designed suitable for the following site operating (in according to EN 60034-1): ambient air temperature 40°C, altitude max 1000m above sea-level. For site operating conditions deviating from those values, below you find the diagram of the estimation of derating of the motor power (method 1a-Tab.9).

#### Derating of the Motor Power



**The dimensions** of the motors comply with EN 50347 and IEC 60072-1, the mounting arrangements B3, B5, B14 comply with EN 60034-7. All the geometrical dimensions are unified according to the tables UNEL 13113-71; 13117-71; 13118- 7; IEC 60072-1.

**The IP degrees of protection** of the motors comply with IEC/EN 60034-5 and EN 60259.

**Insulation class** All the motors have an insulation class F in compliance with IEC/EN 60034-1. Insulation class H on request.

**The bearings** are single row deep grooves ball bearings, preloaded by a wave spring.

**Duty** The motors are normally made for S1 duty; otherwise intermittent duties (S2, S3, S9 with motor protector).

**Single-phase motors** Capacitor placed in a safe Ex d cylindrical box fitted to the motor.

**Windings** Made using enamelled copper wires are insulated with two layers (insulation class H). They are painted with another layer of varnish and after this placed in an oven for the drying process. It is also possible to tropicalize the windings using special additional varnish with high hygroscopic characteristics so to be used in places with an humidity >60% (see options)

**Rotors** Die-cast aluminium squirrel cage or aluminium alloy (Al-Si Silumin).

**The shafts** of the motors and the keys-shaft comply IEC 60072-1. Special shaft are made on request (see options).

**Frame** (in compliance with EN 50347). Die-cast aluminium with high mechanical strength, with a good thermal conductivity and light weight. The feet can be mounted on the motor frame in 3 different positions, in the bottom or on right and left side.

**Terminal box** The terminal box in case of motor B3, is normally on the top of the motor. As the feet are removable also on the sides of the frame it is possible to have the terminal box on both sides of the motor too.

**Flanges and shields** (in compliance with EN 503471). Die-cast aluminium, with dimensions as per standard IEC 60072-1, or with special shapes on request: The motor is completely modular so that the flanges can be mounted or removed depending on the needs without affecting the Ex type of protection (as the flange are mounted on the front shield).

**Ventilation** (in compliance with EN 60034-6). Self-ventilated motors IC 411. Depending on the type of protection the fan can be in plastic or in aluminium. On demand: forced ventilation motors (IC 416). See the drawing in the catalogue.

Ex db, Ex db eb      Plastic fan  
Ex tb                    Antistatic plastic or aluminium fan

**Fan cover** Zinc-plated steel sheet.

**Noise** (in compliance with IEC/EN 60034-9)

**Efficiency** The new European regulations defines Minimum Efficiency Performance Standards, called MEPS. The obligatory dates for using motors with IE2 and IE3 efficiency level are in accordance with the below table:

Deadline	Application field	Nominal Efficiency
From 1st July 2021	Three-phase motors with or without brake which are not increased safety motors 'Ex eb' (but other types are included.. 'Ex ec', 'Ex db', etc, ) with 2, 4, 6 or 8 poles, equipped or not with a VSD and <div style="margin-left: 100px;">                     - Pn ≥0,12 kW and &lt;0,75 kW                      - Pn ≥0,75 kW and ≤1 000 kW                 </div>	IE2 IE3



## 3.4 Main Options

**Axially locked shaft** Motors with a locked bearing on the front shield using an elastic metal ring. This solution is necessary in case of alternative axial stress (ie. Bevel gear pinion with alternative load or motion, frequent start-up under load or with high inertia) so to create axial movement of the shaft and bumps on the bearings.

**Low temperatures motors (-40 °C)** They have to be fitted with special bearing, metallic fan, metallic cable gland and plugs or made with special plastic materials. In these cases, if there is a risk of condensation, it is better to fit the motors with "anti-condensation heaters".

**Anti-condensation Heaters** For motors installed in cold and wet places, with significant temperature ranges, moisture condensation can be dangerous for the resistance of the winding insulation. Upon request, we can apply appropriate heaters directly on the heads of winding. The terminals are connected to a terminal board inside the connection box of the motor. The heaters are available at 110V and 220 V, with a tolerance of +/- 10%

**Tropicalization of windings** If the motors are installed outdoors or in high humidity areas, the windings may be tropicalized with a special varnish with high hygroscopic characteristics in order to protect the insulation materials by the condensation. This protection avoids the reduction of the insulation properties of the windings.

**Inverter duty motors** All these motors can be driven by a converter. In this case they must be fitted with thermal protections inside the windings, as written on the certificates.

The maximum load of a converter-driven motor depends on:

- the kind of modulation, switching frequency of the converter and supply of the converter (single-phase or three-phase)
- design of the motor: temperature rise, level of magnet's flux, type of the forced ventilation.

See the table of the derating power on the electrical data section shows the estimation of the continuous torque of the motor as a function of frequency, with different cooling designation: IC 411 (self-ventilation) and IC 416 (forced ventilation).

**Special voltages and frequencies** - The standard three phase motors are produced at the following nominal voltages and frequencies: 230/400V-50 Hz and 265/460V-60Hz (Constant torque) upto MEC 112; 400/690V-50 Hz 460-60Hz (Constant torque) for MEC 132-180.

The standard single phase motors are produced at the following nominal voltages and frequencies: 230V-50Hz

The motors can run at a different nominal voltage with a tolerance of +/- 5%. On request ±10%. On customer request, we can produce motors with special voltage and frequency.

**Special shafts** - On customer request, it is possible to supply motors with special shaft (according to the customer drawing). It is necessary to send the drawing to our Technical Department for a feasibility study. It is possible to supply motors with shaft of different material from the standard (C40), using Stainless Steel or others, with standard or special dimensions.

**Special flanges** - Due to the modular flange assembling is possible to have, on request special flanges.

**Rain fan cover** - For outdoor applications, vertical mounting, DE shaft down (V5, V1, V18) it is suggested to assemble a special cowl with a rain cover. It is available for all the frame sizes.

**Thermistors (PTC Positive Temperature Coefficient)** - They must be used in case of motors driven by inverters.

They are fitted inside the windings in number of 3 with a series connection to be connected to an appropriate tripping device that cut off the motors supply in case the winding reach the thermal probe limit temperature. On request will be available protectors with different temperature setting in respect of the maximum Temperature class or surface temperature of the motor.

**Thermal cut-off (bimetallic probes)** - Motors with 1 or 2 thermal protectors with normally closed contact in series connection.

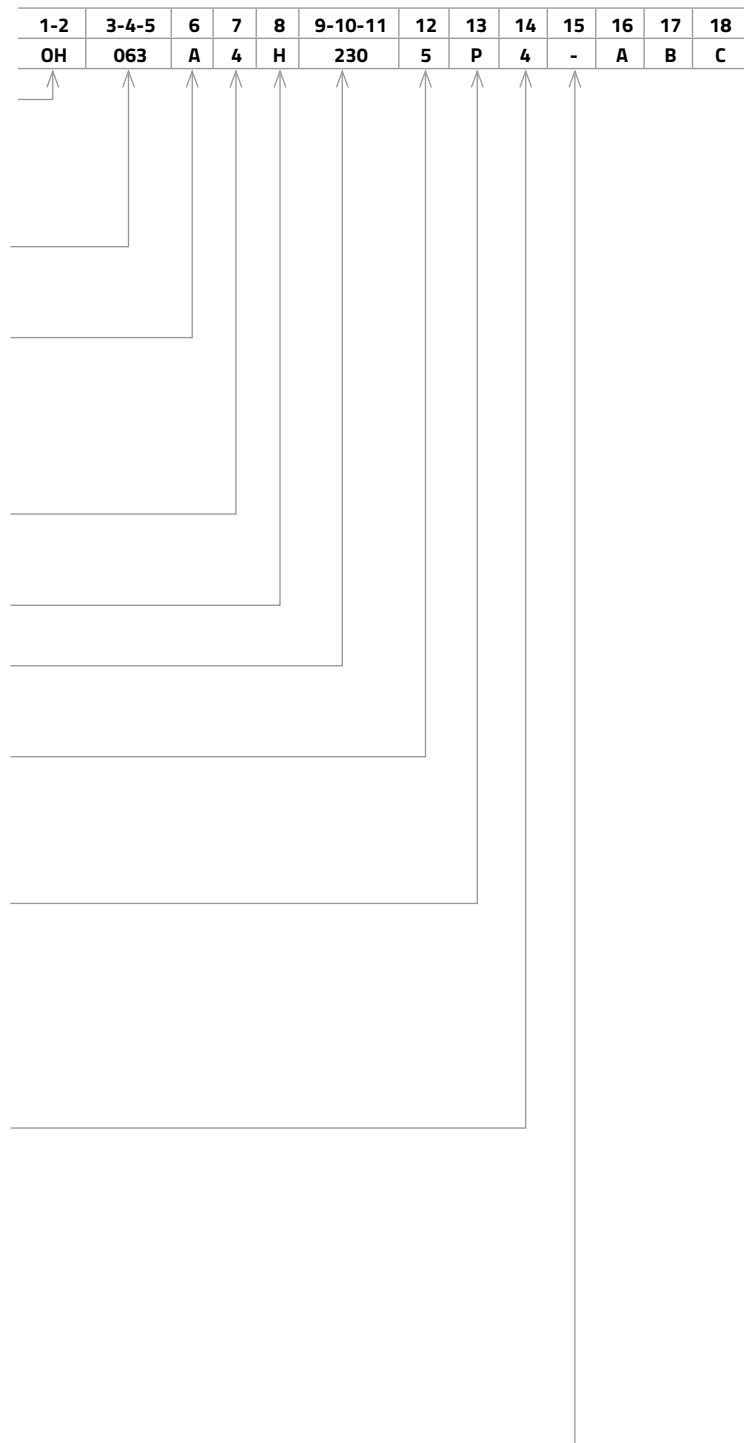
The series of contact shall be connected to an appropriate tripping device that cut off the motors supply in case the winding reaches the thermal probe limit temperature. On request will be available protectors with different temperature setting in respect of the maximum Temperature class or surface temperature of the motor.

**PT100** - It is a device that increase its resistance according with the increasing of the temperature. It is useful for continuous measuring of the winding temperature, properly connected to an electronic equipment.

**Painting (against corrosion)** - The Electric Motors have diecasted aluminium components and sandblasted. If it is not requested the motors are supplied unpainted. On specific request it is possible to have motors with epoxy paint, with the customer requested colour. Other paints with anti salt characteristics are available on request; contact our Technical Department.

### 3.5.1 Motors identification - IE3 and IE2 efficiency level

POSITION			
MOTOR TYPE			
Three phase motors Efficiency IE2 – IE3			
<b>OH</b>	Ex db	<b>OK</b>	Ex db eb
<b>OZ</b>	Ex db IEC ex	<b>OJ</b>	Ex db eb IEC ex
SHAFT HEIGHT			
56, 63, 71, 80, 90, 100, 112, 132, 160, 180			
MAIN STATOR DIMENSIONS (DEPENDING ON MOTOR POWER)			
<b>A,B</b>	56, 63, 71, 80		
<b>S,L</b>	90, 132		
<b>K,M</b>	100, 132, 160, 180		
<b>M</b>	112, 132, 160, 180		
POLES NUMBER			
<b>2, 4, 6, 8</b>	Threephase Motors - Single Speed		
MOUNTING - (SEE TABLE 1)			
VOLTAGE			
For double voltage is written the lower voltage (ex. 230 for 230/400)			
FREQUENCY			
<b>5</b>	50Hz		
<b>6</b>	60Hz		
<b>7</b>	50/60Hz		
PROTECTION AND TEMPERATURE CLASS			
<b>P</b>	II 2G Ex db (eb) IIC T4 Gb		
<b>Q</b>	II 2G Ex db (eb) IIC T4 Gb III 2D Ex tb IIIC 125°C Db		
<b>R</b>	II 2G Ex db (eb) IIC T5 Gb		
<b>S</b>	II 2G Ex db (eb) IIC T5 Gb III 2D Ex tb IIIC 125°C Db		
PROTECTION AND TEMPERATURE CLASS			
-	No thermal protection		
<b>3</b>	PTO 150°C		
<b>4</b>	PTO 130°C		
<b>5</b>	PTO 90°C		
<b>P</b>	PTC 150°C ; 5-50-87Hz Quadratic		
<b>U</b>	PTC 130°C ; 5-50-87Hz Quadratic		
<b>V</b>	PTC 90°C ; 5-50-87Hz Quadratic		
<b>A</b>	PTC 130°C ; 5-50Hz Constant		
<b>B</b>	PTC 130°C ; 5-50-87Hz Constant		
PROTECTION AND TEMPERATURE CLASS			
<b>CODE</b>	Tmin	Tmax	
<b>1</b>	-20	50	
<b>2</b>	-20	60	
<b>3</b>	-40	50	
<b>4</b>	-40	60	
<b>5</b>	-20	40	(Solo T5)
<b>6</b>	-40	40	(Solo T5)



## 3.5.2 Motors identification - single phase and double speed motors

MOTOR TYPE			
<b>MD</b>	Single phase Ex db	<b>ME</b>	Single phase Ex de
<b>OD</b>	Three phase Ex db	<b>OE</b>	Three phase Ex de
<b>MX</b>	IECEX Single phase Ex db	<b>MY</b>	IECEX Single phase Ex de
<b>OX</b>	IECEX Three phase Ex db	<b>OY</b>	IECEX Three phase Ex de

MOTOR SHAFT HEIGHT	
56, 63, 71, 80, 90, 100, 112, 132, 160, 180	

STATOR DIMENSION	
<b>A, B</b>	56-63-71-80
<b>S, L</b>	90 - 132 - 160 - 180
<b>K, M</b>	100 - 132 - 160 - 180

POLES	
<b>2, 4, 6</b>	Single phase motors
<b>3, 5, 7, 9</b>	Three phase motors, 2 speed (2/4, 4/8, 4/6, 6/8 poles). Constant torque
<b>C, D, E, F</b>	Three phase motors, 2 speed (2/4, 4/8, 4/6, 6/8 poles). Quadratic torque

MOUNTING ARRANGEMENTS (SEE TABLE 1)	

SUPPLY VOLTAGE	
Indicated the lower voltage (i.e.: 230 for 230/400)	

FREQUENCY	
<b>5</b>	50Hz
<b>6</b>	60Hz

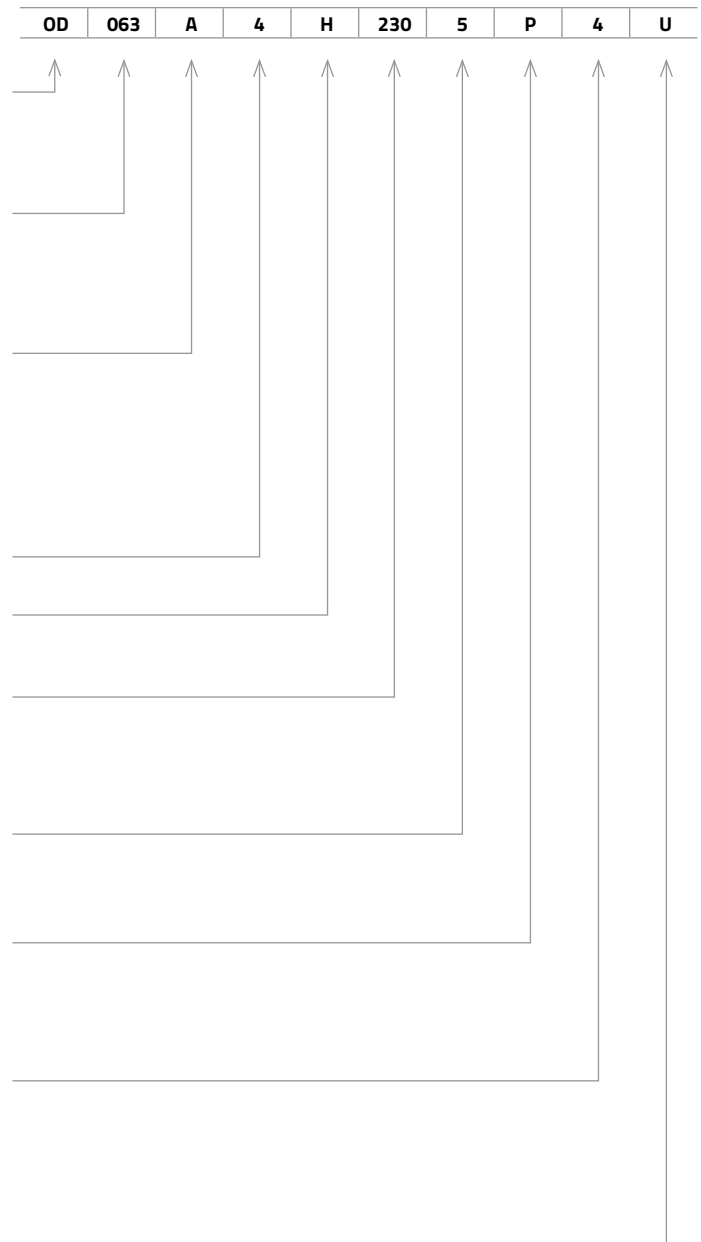
PROTECTION (IP AND EX)	
<b>P</b>	Motor 2G
<b>Q</b>	Motor 2GD

TEMPERATURE CLASS	
<b>3</b>	Temperature class T3 (200°C)
<b>4</b>	Temperature class T4 (135°C)
<b>5</b>	Temperature class T5 (100°C)

THERMAL PROTECTOR	
<b>-</b>	without thermal protectors
<b>P</b>	PTC- temperature classe T3
<b>U</b>	PTC- temperature classe T4
<b>V</b>	PTC- temperature classe T5

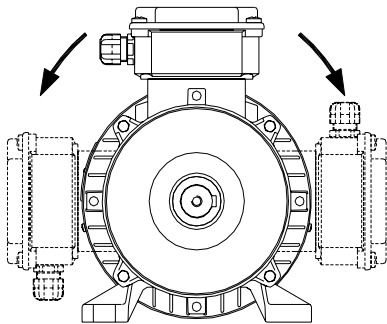


**Table 1 (mounting arrangements)**

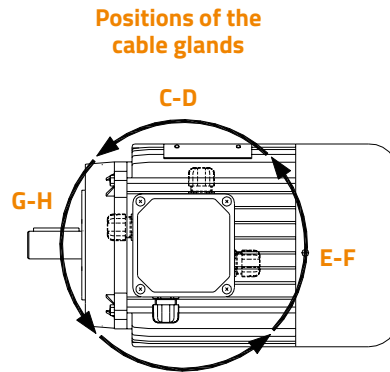
<b>A</b>	B14 rain canopy	<b>R</b>	B3/B5 lateral left terminal box
<b>B</b>	B3 lateral right terminal box	<b>S</b>	B3 lateral left terminal box
<b>C</b>	B14 Reduced standard shaft	<b>T</b>	B3+B5 lateral left terminal box
<b>D</b>	B14 Enlarged	<b>V</b>	B14 reduced shaft
<b>E</b>	B5 Reduced standard shaft	<b>W</b>	B3/B14
<b>F</b>	B5	<b>X</b>	B3/B5
<b>G</b>	B5 rain canopy	<b>Y</b>	B3/B5 Reduced flange and shaft
<b>H</b>	B3 terminal box on the top	<b>Z</b>	B14 Reduced flange and shaft
<b>I</b>	B3/B14 Reduced flange and shaft	<b>0</b>	Without flange and feet
<b>J</b>	B B3/B14 lateral left terminal box	<b>1</b>	B14 Enlarged two sizes
<b>K</b>	B3/B14 reduced flange	<b>2</b>	B14 reduced with reduced shaft
<b>L</b>	B5 Reduced flange and shaft	<b>3</b>	B3 rain canopy
<b>M</b>	B3/B14 lateral right terminal box	<b>4</b>	B3/B14 Enlarged flange
<b>P</b>	B5 Reduced shaft	<b>5</b>	B3/B14 rain canopy
<b>Q</b>	B14	<b>6</b>	B14 Enlarged two sizes + rain canopy

## 4. Terminal box, cable entries and connections

As the feet can be mounted on the frame, it is possible to fix them in 3 different positions so to have the possibility to have the terminal box on the top or on the right and left sides of the motor (see picture 1). At the same time the terminal box can be mounted on the motor so to have the cable entries where it is necessary. So the cable entries can be in the four different positions (see picture 2).



picture 1



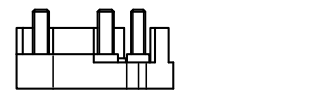
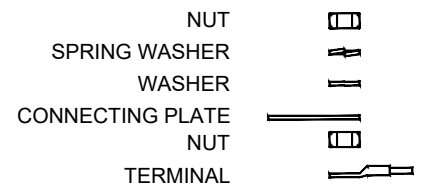
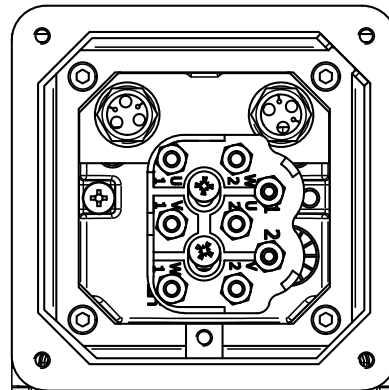
A-B

picture 2

Motor size	cable glands			
	Ex d motor		Ex de motor	
	Mains	Aux	Mains	Aux
63	M20	M20	M20	M20
71	M20	M20	M20	M20
80	M20	M20	M20	M20
90	M20	M20	M20	M20
100	M20	M20	M20	M20
112	M20	M20	M20	M20
132	M25/M32	M20	M25/M32	M20
160	M32	M20	M32	M20
180	M32	M20	M32	M20

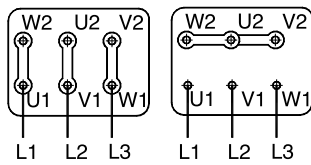
### Cable connection on the terminal board

In the picture you can see the special terminal board complying with EN 60079-7. In case of motor fitted with thermal protection heaters etc. the wires of these devices will be connected when possible to the auxiliary pins of a 8 pins terminal board. If it is not possible they must be connected to the cable by welding the wires of the device to the cable wires and insulating them using a thermo sheath.



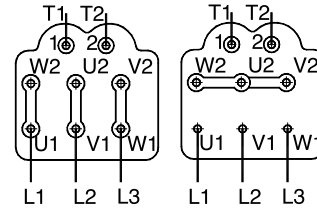
## Wiring diagrams

### Three phase 1 speed 2 - 4 - 6 - 8 poles (6 wires)



Delta Connection (Lower voltage)

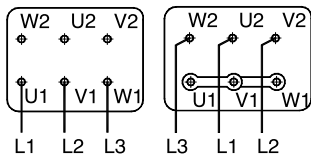
Star Connection (Higher voltage)



Delta Connection (Lower voltage)

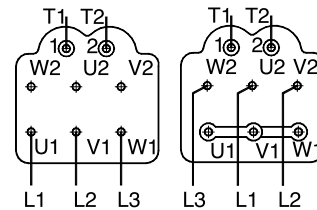
Star Connection (Higher voltage)

### Three phase double speed 1 winding



Low speed

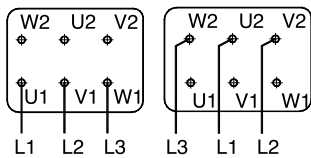
High speed



Low speed

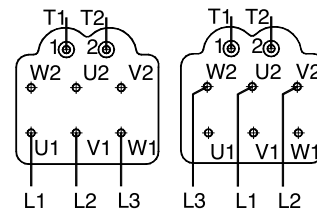
High speed

### Three phase double speed 2 separate windings



Low speed

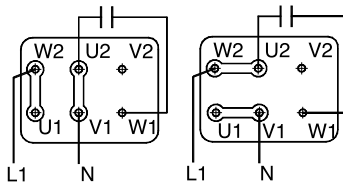
High speed



Low speed

High speed

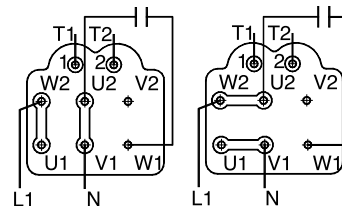
### Single phase 4 wires



Clockwise rotation

Counter clockwise rotation

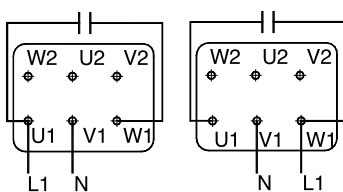
### Single phase 4 wires with thermal protection



Clockwise rotation

Counter clockwise rotation

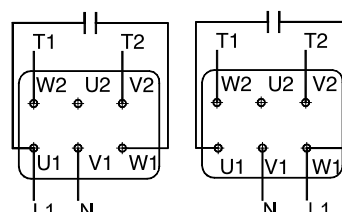
### Single phase 3 wires



Clockwise rotation

Counter clockwise rotation

### Single phase 3 wires with thermal protection



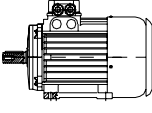
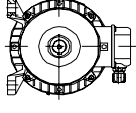
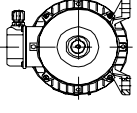
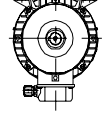
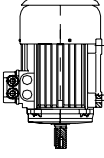
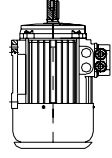
Clockwise rotation

Counter clockwise rotation

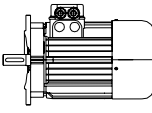
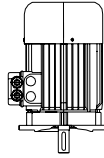
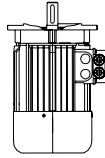
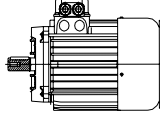
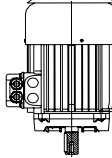
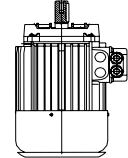
# 5. Mechanical Characteristics

## Mounting arrangements

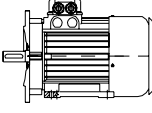
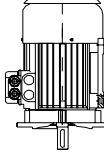
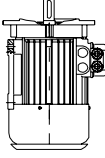
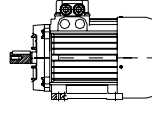
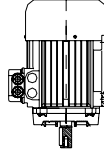
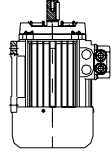
### Foot mounted

IM 1001 (IM B3)	IM 1051 (IM B6)	IM 1061 (IM B7)	IM 1071 (IM B8)	M 1011 (IM V5)	IM 1031 (IM V6)
					

### Flange mounted

IM 3001 (IM B5)	IM 3011 (IM V1)	IM 3031 (IM V3)	IM 3601 (IM B14)	IM 3611 (IM V18)	IM 3631 (IM V19)
					

### Foot-flange mounted

IM 2001 (IM B35)	IM 2011 (IM V15)	IM 2031 (IM V36)	IM 2101 (IM B34)	IM 2111 (IM V58)	IM 2131 (IM V69)
					

## Main components

In the table here below we show the main components of the motors and the material they are made of.

component	Material	Note
Frame	Aluminium	Removable feet (aluminium)
End- shields	Aluminium	
Flange B5	Aluminium	
Flange B14	Aluminium	
Terminal box	Aluminium	
Shaft	Steel C40	
Rotor	Magnetic lamination die-cast aluminium	
Stator	Magnetic lamination	
Windings	enamelled copper wires (two layers)	
V-Ring	NBR rubber	Special material: VITON
Bearings	Deep groove ball bearings	See Below
Fan	Plastic (Ex db, Ex db eb), Aluminium or antistatic plastic (Ex tb)	



## Bearings and seals

Motor size	Bearings		Seals	
	Drive end	Non-drive end	Drive end	Non-drive end
63	6202-ZZ	6202-ZZ	v-Ring Ø15	v-Ring Ø15
71	6202-ZZ	6202-ZZ	v-Ring Ø15	v-Ring Ø15
80	6204-ZZ	6204-ZZ	v-Ring Ø20	v-Ring Ø20
90	6205-ZZ	6205-ZZ	v-Ring Ø25	v-Ring Ø25
100	6206-ZZ	6206-ZZ	v-Ring Ø30	v-Ring Ø30
112	6306-ZZ	6306-ZZ	v-Ring Ø30	v-Ring Ø30
132	6308-ZZ	6308-ZZ	v-Ring Ø40	v-Ring Ø40
160	6309-ZZ	6309-ZZ	v-Ring Ø45	v-Ring Ø45
180	6310-ZZ	6310-ZZ	v-Ring Ø50	v-Ring Ø50

The motors are normally fitted with permanently greased bearings of type ZZ, lubricated with a special grease G-15 and have a service max temperature of 150°C.

The bearing life time for aluminium motors is approximately (depending on application and load conditions):

- 2 and 2/4 pole motors, 10 000 - 20 000 duty hours
- 4 to 8 pole motors, 20 000 - 40 000 duty hours

Both on drive end and non-drive end are mounted V-ring seals in order to have the IP66 protection.

## 5.1 Permissible radial and axial forces on the shaft end

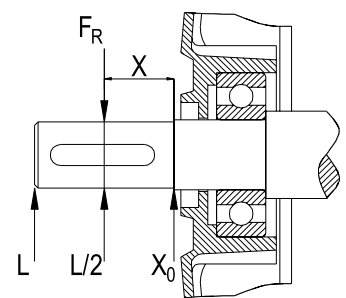
The following tables give the permissible radial and axial forces in Newton.

### 5.1.1 Permissible radial load

Here we show the permissible radial load (FR) that can be applied to three different positions (X0, L/2 and L where L is the length of the shaft axis) on the shaft-end, supposing motors running at 50Hz and bearings life time at least 20,000 hours for 2 poles motors and 40,000 hours for 4-6-8 poles. For service on 60Hz reduce values by 10%. Take the higher speed as reference for double pole motors.

This the formula to calculate FR in a point of the shaft with generic position X:  $F_R = F_{X0} - (F_{X0} - F_L)X/L$

Motor size	Shaft length L (mm)	2 poles			4 poles			6 poles			8 poles		
		X0	L/2	L	X0	L/2	L	X0	L/2	L	X0	L/2	L
63	23	390	365	340	390	365	340	450	420	390	-	-	-
71	30	490	450	410	490	450	410	560	515	470	610	565	520
80	40	650	590	530	650	590	530	750	680	610	820	745	670
90S	50	720	645	570	720	645	570	820	735	650	910	815	720
90L	50	720	650	580	720	650	580	830	750	670	920	830	740
100	60	1020	920	820	1020	920	820	1160	1045	930	1290	1165	1040
112	60	1410	1280	1150	1410	1280	1150	1610	1455	1300	1780	1610	1440
132	80	1510	1345	1180	1510	1345	1180	1510	1430	1350	1910	1700	1490
160	110	2810	2465	2195	2810	2465	2195	3217	2821	2512	3541	3105	2765
180	110	3239	3000	2794	3239	3000	2794	3708	3434	3198	4081	3780	3520



For Belt drive applications the maximum radial load  $F_R$  is given by:

$F_R = \text{maximum radial load [N]} = (P + F)$  where:

$P = \text{pulley weight [N]}$

$F = \text{belt tension [N]} = (2 \cdot K \cdot M)/D$  where:

$K = \text{belt tension factor (} K = 3 \text{ for normal flat belt without idler pulley; } K = 2,2 \text{ for V-belt; } K = 2 \text{ for normal flat belt with idler pulley)}$

$D = \text{pulley diameter [m]}$

$M = \text{torque [Nm]} = 9550 \cdot P/n$  where:

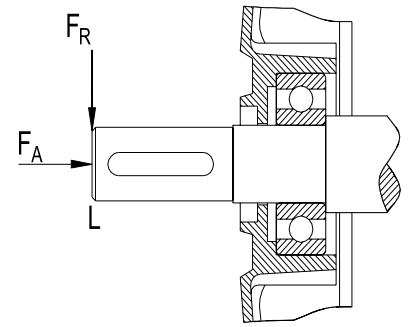
$P = \text{output [kW]}$

$n = \text{speed in [1/min]}$

## 5.1.2 Permissible axial load (with additional radial load applied at the end of the shaft)

In the table below we show the additional axial load ( $F_A$ ) allowable if the maximum radial load ( $F_R$ ) is applied on L. The lower is radial load, the bigger is allowable axial load. Axial load calculations have been carried out in three different foot mounting operating conditions:

horizontal (**B3**), vertical shaft-down (**V5**) and vertical shaft-up (**V6**), supposing the case of thrust **T** or pull **P** force.



### Permissible axial load (with maximum radial load applied on L)

Dimensions in mm

		IM 1001 (IM B3)								M 1011 (IM V5)								IM 1031 (IM V6)							
		Thrust				Pull				Thrust				Pull				Pull				Thrust			
		2 poles		4 poles		6 poles		8 poles		2 poles		4 poles		6 poles		8 poles		2 poles		4 poles		6 poles		8 poles	
Motor Size		T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P
<b>63</b>		240	110	240	110	280	120	290	120	230	120	130	120	270	130	280	130	230	120	130	120	270	130	280	130
<b>71</b>		300	140	300	130	350	160	380	170	280	160	280	150	330	180	360	190	280	160	280	150	330	180	360	190
<b>80</b>		400	190	400	180	460	210	510	240	370	220	360	220	420	250	470	280	370	220	360	220	420	250	470	280
<b>90S</b>		430	200	430	210	500	230	550	260	400	230	390	250	460	270	510	300	400	230	390	250	460	270	510	300
<b>90L</b>		440	200	440	200	510	240	560	260	400	240	390	250	460	290	510	310	400	240	390	250	460	290	510	310
<b>100</b>		620	290	610	290	710	330	780	370	560	350	530	370	630	410	700	450	560	350	530	370	630	410	700	450
<b>112</b>		860	400	850	400	980	460	1080	500	780	480	740	510	870	570	970	610	780	480	740	510	870	570	970	610
<b>132</b>		910	440	910	430	1040	500	1150	550	770	590	740	610	870	670	960	720	770	590	740	610	870	670	960	720
<b>160</b>		1058	1058	1333	1333	1525	1525	1679	1679	1401	714	1676	989	1869	1182	2022	1336	1401	714	1676	989	1869	1182	2022	1336
<b>180</b>		1065	1065	1342	1342	1536	1536	1691	1691	1498	615	1772	889	1965	1082	2118	1643	1498	615	1772	889	1965	1082	2118	1643

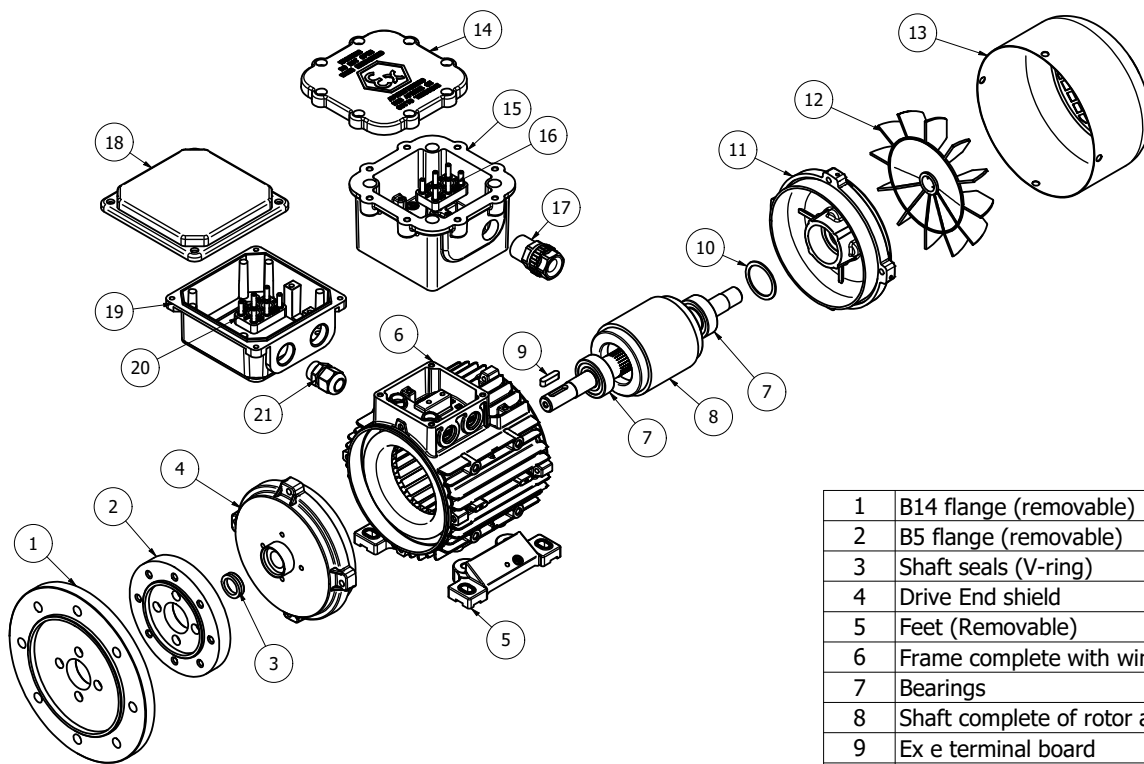
## 6. Spare parts, overhauls and repairs

### 6.1 Personnel qualification

Repairs must be carried out only by qualified people in accordance with the standard EN 60079-17 or national standards (last edition). Qualified people must have knowledge about explosion protection. Repairs must be made regarding the rules as define in EN 60079-19 standard. These repairs can only be done under the control or in agreement with us or by an ATEX and IECEx certified workshop. In case these rules are not respected, the product won't be covered by ATEX and IECEx certifications anymore.

### 6.2 Spare parts

All motors components must be replaced with original spare parts. In these case contact us directly and provide the serial number of the motor in order to be authorized for the repair or the motor itself.



1	B14 flange (removable)
2	B5 flange (removable)
3	Shaft seals (V-ring)
4	Drive End shield
5	Feet (Removable)
6	Frame complete with winding
7	Bearings
8	Shaft complete of rotor and key
9	Ex e terminal board
10	Wave spring
11	Non Drive End shield
12	Fan (complete of fixing collar)
13	Fan cover
14	Ex db Terminal box cover
15	Ex db Terminal box
16	Ex db Terminal board
17	Ex db Cable gland (metallic)
18	Ex eb Terminal box cover
19	Ex eb Terminal box
20	Ex eb Terminal board
21	Ex eb Cable gland (plastic)

## 7. Electrical data

Here below we give some information about all the types of motors.

### THREE PHASE 1 SPEED

- Asynchronous motor, squirrel cage rotor, self ventilated (IC411).
- Duty S1, Insulation class "F", 230/400V - 50 Hz.

In case of motors driven by INVERTER:

- Motor must be equipped with PTC thermistor.
- Motor driven by frequency converter means not to have a voltage and current not perfectly sinusoidal with consequently increase of losses and heating of the motor.
- Speed variation affects also the ventilation.
- The stress on the bearings increases and they shall be checked more frequently; for this reason the operating period with a speed above 3600 rpm shall never exceed 10% of the complete working cycle.

Normally the motors are 230/400V 50Hz but on request is possible to have special voltage and frequency.

### THREE PHASE 2 SPEEDS

- Asynchronous motor, squirrel cage rotor, self ventilated (IC411).
- Duty S1, Insulation class "F", 400V - 50 Hz

Poles	Connections	CONSTANT TORQUE (GENERAL PURPOSE)		QUADRATIC TORQUE (CENTRIFUGAL MACHINES)	
		High Speed	Low Speed	High Speed	Low Speed
2/4 – 4/8	Dahlander	YY	Δ	YY	Y
4/6 – 6/8	2 Separate windings	Y	Y	Y	Y

### SINGLE-PHASE MOTORS 1 SPEED

- Asynchronous motor, squirrel cage rotor, self ventilated (IC411).
- Duty S1, Insulation class "F", 230V - 50 Hz.

The capacitor will be fitted inside a special 'Ex d' box and mounted on the motor.

In case of external capacitor, it must be placed in a safe area where an explosive atmosphere is not present.

## IE3 and IE2 Three phase Motors - Flameproof - Electrical data

Single Speed - 2 poles - 3000rpm - 400V; 50Hz; S1 - Thermal class F; temperature rise B

Type	Rated Power		Rated current at 400V	Rated speed	Rated Torque	Efficiency			Power factor	Starting current / Rated current	Starting torque / Rated torque	Break-down torque / Rated torque	Moment of inertia	Weight
	Pn		In	n	Mn	η	η	η	COS φ	Is/In	Ms /Mn	Mb/Mn	j	kg
	kW	HP	A	min <sup>-1</sup>	Nm	100% pn	75% pn	50% pn					kgm <sup>2</sup>	
56M B2	0,12	0,16	0,48	2800	0,41	55,1	50,9	42,8	0,60	3,9	3,3	2,9	0,000183	5
63M A2	0,18	0,25	0,58	2800	0,61	64,0	61,2	54,4	0,71	3,9	3,1	3,0	0,000183	5,5
63M B2	0,25	0,35	0,75	2830	0,81	65,4	62,6	55,8	0,68	3,9	3,2	3,3	0,000214	5,5
71M A2	0,37	0,50	1,13	2890	1,22	69,5	63,5	55,4	0,68	6,7	3,6	3,8	0,000451	7,5
71M B2	0,55	0,75	1,49	2890	1,82	74,1	71,6	64,8	0,72	6,8	3,7	3,9	0,000542	7,5
80M A2	0,75	1,00	1,59	2885	2,49	84,2	84,8	83,3	0,81	7,2	3,2	3,5	0,001037	11
80M B2	1,10	1,50	2,50	2870	3,70	83,1	83,9	82,7	0,77	7,4	3,8	3,6	0,001201	12
90S A2	1,50	2,00	3,16	2885	5,00	84,8	85,4	84,1	0,79	7,9	3,6	3,7	0,001591	15
90L D2	2,20	3,00	4,84	2895	7,28	86,2	86,3	84,4	0,76	7,9	4,4	4,6	0,002022	19
100L A2	3,00	4,00	5,72	2885	9,95	87,9	88,9	88,5	0,86	8,8	4,0	3,8	0,003702	23
112M A2	4,00	5,50	7,64	2935	13,03	89,1	88,9	87,2	0,84	10,7	4,2	5,3	0,006303	31
132S A2	5,50	7,50	10,58	2935	17,90	89,2	88,8	87,2	0,84	7,7	3,2	4,6	0,012081	48
132S B2	7,50	10,00	14,20	2935	24,41	90,1	89,7	88,5	0,85	7,9	2,8	3,7	0,014739	51
132M D2	9,20	12,30	16,71	2945	29,84	91,3	90,6	89,3	0,87	8,0	3,2	3,9	0,019811	67
160M A2	11,0	15,00	20,35	2950	35,61	91,4	91,5	90,5	0,85	8,0	2,8	3,5	0,033698	123
160M B2	15,0	20,00	27,56	2950	48,56	92,0	91,4	90,1	0,85	10,3	4,4	4,3	0,044465	123
160L D2	18,5	24,80	33,59	2950	59,90	92,4	91,9	90,5	0,86	9,0	3,2	3,4	0,052002	133
180M A2	22,0	30,00	39,70	2955	71,11	92,7	92,1	91,2	0,86	8,0	3,3	3,5	0,088585	160
180L D2	30,0	40,00	51,70	2960	96,80	93,4	93,7	93,5	0,90	11,1	3,7	4,1	0,101235	180

Single Speed - 4 poles - 1500rpm - 400V; 50Hz; S1- Thermal class F; temperature rise B

Series Type	Rated Power		Rated current at 400V	Rated speed	Rated Torque	Efficiency			Power factor	Starting current / Rated current	Starting torque / Rated torque	Break-down torque / Rated torque	Moment of inertia	Weight
	Pn		In	n	Mn	η	η	η	COS φ	Is/In	Ms /Mn	Mb/Mn	j	kg
	kW	HP	A	min <sup>-1</sup>	Nm	100% pn	75% pn	50% pn					kgm <sup>2</sup>	
63M A4	0,12	0,16	0,49	1390	0,82	60,9	58,6	52,4	0,58	3,3	2,8	2,9	0,000268	5,5
63M B4	0,18	0,25	0,57	1340	1,28	64,7	62,4	56,4	0,70	3,3	2,1	2,2	0,000268	5,5
71M A4	0,25	0,35	0,79	1430	1,66	69,8	67,1	60,1	0,65	5,3	3,6	4,2	0,000836	7
71M B4	0,37	0,50	1,08	1420	2,49	72,8	71,6	66,2	0,67	5,4	3,9	3,9	0,001025	7
80M Z4	0,55	0,75	1,32	1440	3,65	77,8	76,7	72,7	0,78	5,9	2,7	3,4	0,002249	10
80M A4	0,75	1,00	1,85	1445	4,96	82,5	81,6	78,2	0,70	6,8	3,4	4,1	0,002644	13
90S A4	1,10	1,50	2,61	1440	7,30	84,1	84,1	81,6	0,72	6,6	2,8	2,8	0,002979	16
90L D4	1,50	2,00	3,40	1440	10,00	85,3	84,9	82,9	0,74	6,2	3,0	3,5	0,004034	19
100L A4	2,20	3,00	4,90	1440	14,60	86,7	87,6	87,0	0,75	7,0	2,4	3,9	0,006351	26
112M A4	3,00	4,00	6,05	1455	19,70	87,7	88,2	87,4	0,82	7,7	2,7	3,4	0,010989	34
112M B4	4,00	5,50	8,25	1455	26,27	88,6	88,7	87,6	0,79	7,3	3,1	3,8	0,011655	36
132S A4	5,50	7,50	11,77	1455	36,77	89,6	89,9	88,8	0,75	7,4	3,5	3,5	0,025533	40
132M D4	7,50	10,00	15,03	1465	48,86	90,7	91,1	90,4	0,79	8,1	2,7	4,0	0,036978	64
160M D4	11,0	15,00	21,50	1475	71,23	91,4	91,5	90,5	0,80	5,8	2,0	2,7	0,073039	121
160L E4	15,0	20,00	29,54	1474	97,31	92,1	92,2	91,1	0,79	8,0	3,5	3,3	0,086714	143
180M A4	18,5	24,80	33,91	1470	120,20	92,9	92,3	91,7	0,85	6,2	2,9	4,9	0,162167	168
180L D4	22,0	30,00	42,10	1472	142,72	93,1	93,5	93,1	0,81	8,7	3,9	3,5	0,185076	201

## IE3 and IE2 Three phase Motors - Flameproof - Electrical data

Single Speed - 6 poles - 1000rpm - 400V; 50Hz; S1 - Thermal class F; temperature rise B

Type	Rated Power		Rated current at 400V	Rated speed	Rated Torque	Efficiency			Power factor	Starting current / Rated current	Starting torque / Rated torque	Break-down torque / Rated torque	Moment of inertia	Weight
	Pn		In	n	Mn	η	η	η	COS φ	Is/In	Ms /Mn	Mb/Mn	j	kg
	kW	HP	A	min <sup>-1</sup>	Nm	100% pn	75% pn	50% pn					kgm <sup>2</sup>	
71M Z6	0,12	0,16	0,59	935	1,23	50,6	45,8	37,3	0,58	4,8	2,7	2,9	0,000360	6
71M A6	0,18	0,25	0,82	925	1,86	56,7	51,9	43,6	0,56	4,8	2,4	2,6	0,001088	7
80M Z6	0,25	0,35	0,80	920	2,59	61,8	58,3	50,9	0,73	3,2	2,5	2,6	0,001590	8
80M A6	0,37	0,50	1,05	945	3,74	72,6	72,3	67,8	0,70	4,2	2,1	2,5	0,002249	10
80M B6	0,55	0,75	1,50	910	5,77	73,1	71,8	67,2	0,72	5,3	2,6	2,7	0,002644	11
90L A6	0,75	1,00	1,96	945	7,58	79,1	78,8	76,0	0,70	5,7	3,1	3,7	0,005661	17
100L A6	1,10	1,50	2,70	950	11,06	81,0	80,8	78,4	0,73	5,9	2,7	3,6	0,010010	22
100L B6	1,50	2,00	3,75	945	15,16	82,5	81,2	78,5	0,70	5,9	2,6	3,4	0,013043	28
112M A6	2,20	3,00	5,2	955	21,89	84,3	84,4	83,5	0,72	5,2	1,9	2,7	0,018631	43
132S A6	3,00	4,00	6,32	965	29,69	85,7	86,2	85,4	0,80	6,6	1,8	3,2	0,033850	47
132M D6	4,00	5,50	8,18	965	39,59	86,8	86,9	85,8	0,81	6,9	1,8	3,3	0,045153	60
160M A6	5,50	7,50	11,4	970	54,14	88,6	88,8	87,5	0,79	7,6	2,9	3,7	0,093660	102
160L D6	7,50	10,00	15,11	970	73,85	89,1	89,4	88,8	0,81	7,9	2,8	4,0	0,132805	127
180M A6	11,0	15,00	22,36	975	107,76	90,3	90,4	89,9	0,79	4,6	2,7	3,9	0,192542	162
180L D6	15,0	20,00	29,15	975	146,94	91,2	91,3	90,8	0,82	4,9	2,8	4,0	0,255083	197

Single Speed - 8 poles - 750rpm - 400V; 50Hz; S1 - Thermal class F; temperature rise B

Type	Rated Power		Rated current at 400V	Rated speed	Rated Torque	Efficiency			Power factor	Starting current / Rated current	Starting torque / Rated torque	Break-down torque / Rated torque	Moment of inertia	Weight
	Pn		In	n	Mn	η	η	η	COS φ	Is/In	Ms /Mn	Mb/Mn	j	kg
	kW	HP	A	min <sup>-1</sup>	Nm	100% pn	75% pn	50% pn					kgm <sup>2</sup>	
71M B8	0,12	0,16	0,72	660	1,74	45,7	42,7	40,7	0,52	2,0	1,6	2,0	0,001088	8,5
80M A8	0,18	0,25	0,86	710	2,42	45,9	42,5	38,5	0,66	2,8	2,2	2,6	0,001854	10
80M B8	0,25	0,35	1,18	700	3,41	51,0	46,7	40,5	0,60	2,3	2,1	2,5	0,002381	11
90S A8	0,37	0,50	1,42	665	5,31	56,2	54,9	47,8	0,67	2,2	1,4	1,8	0,002588	13
90L D8	0,55	0,75	2,07	660	7,96	61,7	58,2	53,4	0,62	2,9	1,7	1,8	0,002993	15
100L A8	0,75	1,00	2,45	714	10,06	75,0	73,3	67,7	0,58	3,6	2,3	2,5	0,009251	23
100L B8	1,10	1,50	3,13	710	14,84	77,7	75,5	70,7	0,65	3,7	2,0	2,2	0,013043	28
112M B8	1,50	2,00	3,96	708	20,23	79,7	78,0	73,6	0,68	3,8	2,3	2,6	0,018631	39
132S A8	2,20	3,00	5,84	715	29,38	81,9	79,5	74,4	0,66	4,0	2,5	2,9	0,039399	57
132M D8	3,00	4,00	7,38	715	40,04	83,5	83,1	80,3	0,70	3,8	2,1	2,3	0,050703	70
160M A8	4,00	5,50	9,86	726	52,61	84,8	84,3	81,6	0,69	4,8	1,6	2,4	0,132751	101
160L D8	5,50	7,50	13,52	727	72,20	86,3	85,3	82,3	0,68	4,2	1,4	2,5	0,161236	115
180M A8	7,50	10,00	17,59	725	98,74	87,3	87,1	85,1	0,70	4,4	2,2	2,2	0,171185	127
180L D8	11,00	15,00	25,65	728	144,29	88,6	88,1	86,4	0,70	4,4	2,2	2,2	0,235444	155



# Three phase Motors - Flameproof - Electrical data

Constant Torque ; Double Speed (YY/Δ) - 2/4 poles - 3000/1500rpm - 400V; 50Hz; S1

Type	Size	[kW]	Poles	rpm	η(%)	Cosφ	IN [A]	MN [Nm]	IA/IN	MA/MN	Jrotor [kgm <sup>2</sup> ]	[kg]
71A3	71	0,22	4	1380	57	0,66	0,8	1,1	3,2	1,9	0,0005	7
		0,33	2	2760	53	0,71	1	1,4	3,8	1,8		
71B3	71	0,4	4	1380	68	0,62	1,2	1,6	3,2	1,9	0,0008	7,5
		0,5	2	2800	60	0,7	1,25	2,1	4,2	1,8		
80A3	80	0,45	4	1430	68	0,62	1,5	1,9	3,9	2	0,0014	9
		0,6	2	2880	67	0,76	1,9	2,6	4,1	2		
80B3	80	0,6	4	1450	67	0,71	2,2	2,6	4	2	0,0017	11
		0,8	2	2890	72	0,81	2,6	3,9	4,3	2		
90S3	90S	0,8	4	1440	69	0,72	2,6	4,4	4,5	2,3	0,0033	13
		1,1	2	2890	73	0,82	3,4	6,4	5	2		
90L3	90L	1,1	4	1420	69	0,76	3,2	5,6	4,3	2,4	0,004	15
		1,6	2	2880	70	0,81	4,8	8,5	4,9	2,3		
100M3	100	1,5	4	1430	75	0,79	4	10,5	6	2,4	0,0075	20
		2,2	2	2850	77	0,85	5,7	16,8	6	2,3		
100L3	100	2,2	4	1440	77	0,85	5,7	13,8	6,2	2,5	0,0086	25
		3	2	2870	77	0,84	8,1	23	6	2,3		
112M3	112	3,3	4	1450	78	0,87	7	1,1	6,2	2,5	0,013	30
		4	2	2900	77	0,88	9,1	1,4	6	2,3		
132S3	132S	4,8	4	1450	84	0,87	9,5	32	6,3	2,2	0,02311	42
		5,9	2	2840	84	0,85	12,1	19,5	7,1	2,3		
132M3	132M	5,5	4	1440	85	0,84	11,1	44	6,5	2,1	0,02953	56
		7,5	2	2860	86	0,86	13,9	25	7,3	2,3		
132L3	132M	6	4	1450	85	0,84	12,1	50	6,2	2,2	0,032	60
		8	2	2900	85	0,87	14,9	30,5	7,4	2,3		
160M3	160M	8,8	4	1460	88	0,85	17	58,5	6,4	2,2	0,0627	100
		11	2	2915	82	0,89	22	36	7,2	2,2		
160L3	160L	12	4	1450	87	0,84	23,7	79	6,5	2,4	0,0801	110
		15	2	2910	84	0,91	28,3	49	7,4	2,5		
180M3	180L	15	4	1460	83	0,88	29,5	98	5,6	2	0,127	160
		18,5	2	2930	82	0,9	36	60	6,4	2,1		
180L3	180L	18,5	4	1460	90	0,78	38	121	5,8	2,1	0,1488	180
		v	2	2960	89	0,84	42,5	71	6,6	2,2		

Constant torque; Double Speed (YY/Δ) - 4/8 poles - 1500/750rpm - 400V; 50Hz; S1

Type	Size	[kW]	Poles	rpm	η(%)	Cosφ	IN [A]	MN [Nm]	IA/IN	MA/MN	Jrotor [kgm <sup>2</sup> ]	[kg]
71A5	71	0,11	8	670	40	0,72	0,8	1,3	2,4	1,4	0,0018	7
		0,18	4	1370	68	0,62	0,9	1,4	3,4	1,1		
71B5	71	0,15	8	670	42	0,71	1,1	1,5	2,4	1,4	0,002	7,5
		0,3	4	1370	70	0,75	1,2	1,5	3,5	1,1		
80A5	80	0,22	8	700	50	0,67	1,3	2,2	2,4	1,6	0,0023	10
		0,45	4	1420	71	0,75	1,4	2,3	3,5	1,5		
80B5	80	0,37	8	700	54	0,69	2	3,1	2,6	1,6	0,003	11
		0,55	4	1410	75	0,74	1,4	3,7	3,6	1,5		
90S5	90S	0,37	8	680	62	0,7	3	4,5	3,2	1,7	0,0035	13
		0,75	4	1400	71	0,75	4,9	4,4	4	2		
90L5	90L	0,6	8	700	60	0,89	2,50	7,8	3,5	1,4	0,0043	15
		1,1	4	1350	71	0,60	2,45	8,2	2,7	1,8		
100M5	100	0,7	8	700	70	0,68	5	6,9	5	2,5	0,0077	20
		1,1	4	1430	79	0,77	5,2	6,8	5,2	2,2		
100L5	100	1,1	8	710	72	0,74	5,2	9,1	5,2	2,4	0,0086	22
		1,8	4	1430	80	0,81	5,5	8,9	5,5	2,3		
112M5	112	1,4	8	710	78	0,65	5,3	11,5	5,2	2,5	0,012	37
		2,6	4	1430	81	0,85	5,7	12	5,5	2,3		
132S5	132S	1,85	8	700	82	0,75	4,4	25	4,1	1,6	0,03	50
		3,3	4	1440	83	0,83	6,8	22	4,9	1,6		
132M5	132M	2,4	8	710	82	0,76	5,5	33	4,3	1,7	0,04	55
		4,8	4	1430	85	0,81	10	32	5,2	1,7		
132L5	132M	3	8	720	84	0,75	7	40	4,5	1,8	0,045	59
		5,5	4	1440	85	0,83	11,5	36	5,5	1,8		
160M5	160M	4,8	8	715	86	0,76	10,7	63	4,7	1,8	0,919	100
		7,5	4	1450	87	0,84	17,1	49	5,7	1,9		
160L5	160L	6,6	8	720	86	0,87	12,8	88	5,6	1,9	0,1218	110
		10	4	1450	83	0,84	20,7	66	6,8	1,9		
180M5	180L	8,1	8	730	85	0,61	22,5	84	5,3	2	0,2067	160
		13	4	1460	81	0,87	26,5	105	6,6	2		
180L5	180L	9,9	8	730	87	0,61	27	129	5,3	1,9	0,2067	180
		16	4	1460	85	0,88	31	104	6,5	1,9		

## Three phase Motors - Flameproof - Electrical data

### Constant torque; Double Speed - 4/6 poles - 1500/1000rpm - 400V; 50Hz; S1

Type	Size	[kW]	Poles	rpm	$\eta$ (%)	Cos $\phi$	IN [A]	MN [Nm]	IA/IN	MA/MN	Jrotor [kgm <sup>2</sup> ]	[kg]
71BL	71	0,1	6	900	53	0,71	0,38	1,1	2,4	1,4	0,001	7,5
		0,2	4	1400	70	0,75	0,55	1,3	3,3	1,4		
80AL	80	0,2	6	905	62	0,72	0,65	2,1	2,5	1,5	0,002	9
		0,4	4	1400	71	0,75	1,1	2,9	3,4	1,4		
80BL	80	0,3	6	910	66	0,73	0,9	3	3,1	1,5	0,003	10
		0,5	4	1405	71	0,74	1,38	3,4	3,6	1,5		
90SL	90S	0,45	6	910	70	0,73	1,26	4,6	4,3	1,5	0,003	13
		0,65	4	1405	76	0,75	1,65	4,5	5,8	1,6		
90LL	90L	0,6	6	910	70	0,74	1,66	6,3	3,6	1,6	0,003	16
		0,95	4	1400	77	0,76	2,36	6,4	5,5	1,5		
100ML	100	0,9	6	910	74	0,74	2,4	9,3	4,1	1,7	0,008	22
		1,4	4	1415	81	0,73	3,2	9,4	5,7	1,8		
100LL	100	1,1	6	910	74	0,74	2,9	12,1	2,9	1,6	0,010	26
		1,85	4	1415	80	0,81	4,1	12,4	5,8	1,6		
112ML	112	1,6	6	940	81	0,77	3,66	16,2	4,3	1,7	0,016	37
		2,4	4	1420	82	0,85	4,95	16,5	6,1	1,8		
132KL	132S	2	6	940	81	0,8	4,46	20,2	3,9	1,6	0,032	48
		3	4	1450	82	0,87	6	20	5,9	1,9		
132SL	132S	2,6	6	940	83	0,77	5,8	25,9	4,5	1,8	0,036	54
		4	4	1450	83	0,82	8,4	26,3	6,1	2		
132ML	132M	3	6	960	80	0,8	6,6	30,3	4,4	1,7	0,038	59
		4,4	4	1440	84	0,89	9	29	6,3	1,9		
132LL	132M	3,3	6	940	85	0,76	7,3	33	4,7	1,7	0,04	62
		5,15	4	1440	84	0,82	10,7	33,5	6,8	1,9		
160ML	160M	4,4	6	950	82	0,79	9,9	43,9	4,4	1,8	0,919	100
		6,6	4	1460	86	0,83	13,4	43	6,8	1,9		
160LL	160L	5,9	6	950	81	0,8	13,2	58	4,9	1,8	0,122	110
		8,8	4	1460	83	0,84	18,2	57,7	6,8	1,9		
180ML	180L	7,5	6	970	84	0,7	18,5	73	5,2	1,9	0,207	160
		11	4	1460	88	0,84	21,5	71	6,6	2		
180LL	180L	8,8	6	960	86	0,72	20,5	86	5	1,8	0,207	180
		13	4	1470	88	0,85	25	84	6,5	2		

### Constant torque; Double Speed - 6/8 poles - 1000/750rpm - 400V; 50Hz; S1

Type	Size	[kW]	Poles	rpm	$\eta$ (%)	Cos $\phi$	IN [A]	MN [Nm]	IA/IN	MA/MN	Jrotor [kgm <sup>2</sup> ]	[kg]
71BM	71	0,08	8	690	49	0,61	0,44	1,1	2,2	1,3	0,001	7,5
		0,12	6	900	50	0,71	0,53	1,3	2,4	1,4		
80BM	80	0,13	8	690	52	0,6	0,63	1,9	2,1	1,5	0,002	9
		0,15	6	935	50	0,71	0,68	1,5	2,6	1,5		
80BM	80	0,15	8	685	49	0,6	0,82	2,2	2,2	1,4	0,003	10
		0,25	6	930	52	0,72	1	2,7	3,2	1,5		
90SM	90S	0,25	8	650	60	0,6	1	3,8	3,1	2,5	0,003	13
		0,35	6	910	55	0,74	1,35	3,6	3,8	1,4		
90LM	90L	0,3	8	685	61	0,6	1,35	4,3	3,4	1,6	0,003	16
		0,6	6	935	60	0,76	2	6,1	3,8	1,5		
100MM	100	0,55	8	700	68	0,63	1,9	7,4	3,6	1,6	0,008	22
		0,8	6	920	65	0,77	2,35	8,2	4	1,5		
100LM	100	0,65	8	700	68	0,66	2,2	8,8	3,7	1,6	0,010	26
		1	6	930	67	0,75	2,9	10,5	4,1	1,6		
112MM	112	1	8	710	65	0,7	3,3	13,4	3,9	1,6	0,016	37
		1,5	6	960	75	0,72	4,2	15	4	1,7		
132SM	132S	1,3	8	720	68	0,65	4,1	17,4	4	1,8	0,036	54
		1,85	6	950	73	0,71	5,2	18,5	4,2	1,6		
132MM	132M	1,85	8	720	70	0,67	5,9	24,7	4,2	1,8	0,038	59
		2,55	6	960	75	0,73	6,9	25,2	4,1	1,8		
132LM	132M	2	8	730	74	0,65	5,9	26,4	4,1	1,9	0,04	62
		3	6	980	79	0,75	7,3	29,6	4,2	1,8		
160MM	160M	2,8	8	725	78	0,7	7,5	37,2	4,2	1,9	0,919	100
		4	6	980	82	0,75	9,4	39,3	4,3	1,9		
160LM	160L	4	8	730	78	0,75	9,9	53	4,2	1,9	0,122	110
		5,5	6	985	84	0,74	12,9	53,5	4,3	1,9		
180MM	180L	5	8	720	77	0,75	12,5	66	4,3	1,8	0,207	160
		6,5	6	970	83	0,75	15	64	4,1	1,7		
180LM	180L	6	8	715	78	0,74	15	80	4,2	1,9	0,207	180
		8	6	960	85	0,78	17,5	79	4,4	1,8		

## Three phase Motors - Flameproof - Electrical data

### Quadratic torque; Double Speed (YY/Y) - 2/4 poles - 3000/1500rpm - 400V; 50Hz; S1

Type	Size	[kW]	Poles	rpm	$\eta$ (%)	Cos $\phi$	IN [A]	MN [Nm]	IA/IN	MA/MN	Jrotor [kgm <sup>2</sup> ]	[kg]
71AC	71	0,09	4	1410	33	0,7	0,4	0,6	2,8	1,8	0,005	72
		0,37	2	2790	59	0,8	1,1	1,3	3,5	1,8		
71BC	71	0,14	4	1410	65	0,7	0,45	1	2,9	1,9	0,001	7,5
		0,5	2	2800	60	0,7	1,9	1,7	3,6	1,8		
80AC	80	0,18	4	1415	66	0,79	0,5	1,2	3,5	2,2	0,001	10
		0,75	2	2800	63	0,76	2,26	2,6	4	1,8		
80BC	80	0,25	4	1415	70	0,81	0,64	1,7	3,7	2,2	0,002	11
		1,1	2	2810	66	0,81	3	3,7	4,1	1,8		
90SC	90S	0,37	4	1420	64	0,81	1	2,5	3,9	2,2	0,003	13,5
		1,5	2	2820	66	0,82	4	5,1	4,5	2		
90LC	90L	0,55	4	1400	67	0,87	1,3	3,7	4,4	2,1	0,004	16,5
		2,2	2	2860	70	0,89	5	7,5	4,4	1,9		
100MC	100	0,62	4	1420	73	0,89	1,42	4,2	5,3	2	0,005	20
		2,6	2	2820	77	0,92	5,3	8,8	5,6	2,1		
100LC	100	0,75	4	1415	73	0,9	1,6	5,1	5	2	0,008	22
		3,3	2	2800	78	0,92	6,64	11,3	5,6	2,1		
112MC	112	1,1	4	1425	79	0,85	2,4	7,5	5	2,3	0,009	37
		4,4	2	2900	80	0,82	9,5	14,5	5,6	2,1		
132SC	132S	2	4	1450	75	0,81	4,7	13,1	5,9	2,1	0,023	42
		6,5	2	2890	83	0,92	12,4	21,5	6,1	2,2		
132MC	132M	2,5	4	1440	89	0,8	4,9	16,5	6,4	2,3	0,030	56
		8,5	2	2900	91	0,83	15,9	28,2	6,7	2,3		
132LC	132M	2,8	4	1440	85	0,83	5,6	18,6	6,5	2,3	0,032	60
		9,2	2	2900	88	0,85	17,4	30,5	6,8	2,4		
160MC	160M	3	4	1450	69	0,82	7,9	19,6	4,3	2,2	0,036	100
		12	2	2930	76	0,9	25,9	39	6,1	3,5		
160LC	160L	4,4	4	1460	79	0,8	10,4	28,5	6,9	2	0,053	110
		16	2	2930	86	0,94	28,4	52	7,3	2,1		
180MC	180L	5	4	1460	75	0,85	11,4	32,6	7,1	2,3	0,075	160
		18	2	2960	79	0,89	37	58	8,3	2,6		
180LC	180L	6	4	1480	89	0,83	11,8	39	9,6	3,1	0,075	180
		24	2	2960	90	0,87	44,5	77,4	9,6	3,3		

### Quadratic torque; Double Speed (YY/Y) - 4/8 poles - 1500/750rpm - 400V; 50Hz; S1

Type	Size	[kW]	Poles	rpm	$\eta$ (%)	Cos $\phi$	IN [A]	MN [Nm]	IA/IN	MA/MN	Jrotor [kgm <sup>2</sup> ]	[kg]
71AD	71	0,05	8	700	28	0,68	0,36	0,7	2,3	2,8	0,002	7
		0,25	4	1400	70	0,75	0,69	1,7	3	2,2		
71BD	71	0,07	8	680	33	0,7	0,45	1,1	1,4	1,2	0,002	7,5
		0,37	4	1380	59	0,8	1,1	2,6	2,5	1,2		
80AD	80	0,1	8	700	38	0,66	0,58	1,4	2	2,3	0,002	10
		0,55	4	1405	75	0,74	1,43	3,7	4,4	2,2		
80BD	80	0,15	8	690	48	0,66	0,7	2,1	2,4	1,5	0,003	11
		0,75	4	1410	70	0,76	1,9	5,1	4,1	1,7		
90SD	90S	0,25	8	710	54	0,7	0,96	3,4	2,9	2,8	0,004	13,5
		0,9	4	1415	77	0,75	2,75	6,1	4	2,3		
90LD	90L	0,3	8	710	57	0,7	1,1	4	1,3	3	0,005	16,5
		1,2	4	1420	80	0,79	3,4	8,1	4,2	2,3		
100MD	100	0,45	8	710	61	0,68	1,6	6,1	3	2	0,008	20
		1,9	4	1390	80	0,8	4,1	13,1	5	3		
100LD	100	0,55	8	720	68	0,7	1,68	7,3	3	2,4	0,009	22
		2,2	4	1440	84	0,85	4,86	14,6	6	2,5		
112MD	112	0,75	8	720	70	0,68	2,27	9,9	3	2,4	0,012	37
		3	4	1450	83	0,85	6,6	19,8	6	2,6		
132SD	132S	1,1	8	710	72	0,73	3,1	15	3,5	1,9	0,03	50
		4,4	4	1450	85	0,82	9,2	29	5,8	2,2		
132MD	132M	1,5	8	700	79	0,64	4,33	20	3,9	1,8	0,04	55
		5,9	4	1440	86	0,84	11,9	39	6,2	2,1		
132LD	132M	1,85	8	700	80	0,7	4,9	25	4,3	1,9	0,045	59
		7,5	4	1450	87	0,84	14,9	50	6,7	2,1		
160MD	160M	2,5	8	710	82	0,75	6	32,8	3,9	2,9	0,063	100
		8,8	4	1450	83	0,84	18,4	58,3	6,8	2,2		
160LD	160L	3,2	8	715	83,5	0,74	7,48	42,2	4	2,1	0,080	110
		12	4	1460	88	0,85	23,3	78,6	6,8	2,2		
180MD	180L	4	8	730	66	0,7	12,5	53,5	4,6	2	0,127	160
		16	4	1460	89	0,85	30,5	103,5	7	2,6		
180LD	180L	5,5	8	730	82	0,56	17,2	71,8	4,2	3,1	0,149	180
		22	4	1460	89	0,8	45	143	6,7	3,7		

## Three phase Motors - Flameproof - Electrical data

Quadratic torque; Double Speed - 4/6 poles - 1500/1000rpm - 400V; 50Hz; S1

Type	Size	[kW]	Poles	rpm	$\eta$ (%)	Cos $\phi$	IN [A]	MN [Nm]	IA/IN	MA/MN	Jrotor [kgm <sup>2</sup> ]	[kg]
71BE	71	0,1	6	900	63	0,72	0,5	1,4	1,4	1,8	0,0008	7,5
		0,3	4	1400	71	0,75	0,95	2,1	2,6	2		
80AE	80	0,13	6	900	33	0,7	0,5	1,4	1,7	1,1	0,0022	10
		0,44	4	1405	59	0,8	1:02:00	3	3,2	1,5		
80BE	80	0,18	6	905	72	0,75	0,65	1,9	2,3	1,2	0,00282	11
		0,59	4	1405	76	0,8	1,6	3,9	3,5	1,7		
90SE	90S	0,3	6	900	68	0,76	0,83	3,1	3,1	1,6	0,00265	13,5
		0,9	4	1400	77	0,75	2,25	6,1	4,1	2,1		
90LE	90L	0,4	6	910	74	0,74	1,1	4,2	2,9	1,3	0,00342	16,5
		1,15	4	1420	80	0,79	2,6	7,5	4,1	1,8		
100ME	100	0,6	6	930	80	0,75	1,44	6,1	3,9	1,8	0,00775	20
		1,8	4	1410	80	0,83	3,67	12,1	5,1	2,1		
100LE	100	0,7	6	940	80	0,75	2,1	7,5	3	1,5	0,01033	22
		2,2	4	1440	82	0,87	4,9	15,2	3,8	1,7		
112ME	112	0,9	6	940	81	0,79	2	9,1	4	1,9	0,01603	37
		3	4	1450	84	0,82	6,3	19,8	5,5	2		
132KE	132S	1,2	6	945	80	0,75	2,9	11,8	4,9	1,7	0,03223	48
		4	4	1450	84	0,82	8,4	26	6,3	2,1		
132SE	132S	1,4	6	970	69	0,6	5	14	5,2	1,9	0,036	54
		4,8	4	1460	75	0,81	11,3	31,2	6,6	1,9		
132ME	132M	1,7	6	960	64	0,62	6,4	17	4,8	1,9	0,038	59
		5,5	4	1455	77	0,81	12,8	36	5,4	2,1		
132LE	132M	2	6	950	78	0,55	7,9	20,1	5,2	1,9	0,04	62
		6,6	4	1460	89	0,72	15,3	43,2	6,7	1,9		
160ME	160M	2,5	6	985	72	0,72	7,2	24,2	5,9	2,3	0,0627	100
		7,5	4	1470	81	0,85	16,4	49	7,2	2,2		
160LE	160L	3,3	6	960	73	0,72	9,3	32	6,1	2,3	0,0801	110
		11	4	1450	84	0,85	22,8	72	6,9	2,2		
180ME	180L	5,2	6	960	65	0,57	21	51,7	6	1,6	0,127	160
		15	4	1450	81	0,85	31,5	98,8	6,9	1,8		
180LE	180L	6,25	6	960	66	0,62	22	61,8	6,2	1,6	0,1488	180
		18,5	4	1450	84	0,88	36	122	7	1,8		

Quadratic torque; Double Speed - 6/8 poles - 1000/750rpm - 400V; 50Hz; S1

Type	Size	[kW]	Poles	rpm	$\eta$ (%)	Cos $\phi$	IN [A]	MN [Nm]	IA/IN	MA/MN	Jrotor [kgm <sup>2</sup> ]	[kg]
80BF	80	0,09	8	680	57	0,62	0,4	1,3	1,9	1,4	0,0022	10
		0,33	6	920	55	0,7	1,32	3,4	3,1	1,8		
80BF	80	0,12	8	685	55	0,63	0,5	1,7	2,1	1,4	0,00282	11
		0,4	6	935	58	0,7	1,48	4	2,9	1,8		
90SF	90S	0,19	8	690	55	0,62	0,85	2,7	2,1	1,5	0,00265	13,5
		0,48	6	925	61	0,65	1,78	4,8	3,1	1,9		
90LF	90L	0,25	8	700	52	0,62	1,2	3,5	2,3	1,7	0,00342	16,5
		0,66	6	900	60	0,8	2	7,1	3,2	2		
100MF	100	0,37	8	720	50	0,65	1,75	4,8	3,5	1,8	0,00775	20
		0,9	6	960	67	0,68	2,85	8,9	4,1	1,9		
100LF	100	0,45	8	720	52	0,64	2,1	5,9	3,4	1,4	0,01033	22
		1,1	6	950	70	0,7	3,35	11,2	3,9	1,6		
112M	11	0,75	8	720	61	0,68	2,8	10,1	3,5	1,7	0,01603	37
		1,5	6	970	75	0,74	3,9	15,1	4,4	2,1		
132SF	132S	0,9	8	720	62	0,66	3,2	11,9	3,7	1,8	0,036	54
		2,2	6	960	75	0,75	5,6	22,2	4,4	2,2		
132MF	132M	1,2	8	730	61	0,63	4,8	15,6	3,8	1,8	0,038	59
		3	6	970	77	0,82	6,9	29,7	4,8	2,1		
132LF	132M	1,5	8	720	65	0,7	4,9	20,1	3,8	2,1	0,04	62
		3,7	6	970	80	0,77	8,8	36,5	5,1	2,1		
160MF	160M	2,5	8	730	84	0,65	6,7	32,5	4,2	2,3	0,092	100
		5,5	6	980	88	0,75	12,3	53,5	5,5	2,2		
160LF	160L	4	8	720	81	0,8	9,1	53,2	3,9	2,1	0,1218	110
		7,5	6	970	84	0,85	15,3	73,5	5,7	2,1		
180MF	180M	4,5	8	725	80	0,75	11	59	4,3	2,2	0,2067	160
		9	6	960	83	0,78	20	89	5,8	2,3		
180LF	180L	5,2	8	720	80	0,72	23,5	69	4,1	2	0,2067	180
		10	6	960	79	0,78	13	99	5,6	2,1		

# IE2 Single phase Motors - Flameproof - Electrical data

## Single Speed - 2 poles - 3000rpm - 230V; 50Hz; S1; Permanent capacitor

Series Type	Rated Power		Rated current at 230V	Rated speed	Rated Torque	Efficiency			Power factor	Starting current / Rated current	Starting torque / Rated torque	Break-down torque / Rated torque	Running capacitor	Moment of inertia	Weight
	Pn		In	n	Mn	η	η	η	COS φ	Is/In	Ms / Mn	Mb/Mn	Cr	j	kg
	kW	HP	A	min <sup>-1</sup>	Nm	% full load	% 3/4 load	% 1/2 load					μF	10 <sup>-3</sup> kgm <sup>2</sup>	
MH 63M A2	0,18	0,25	1,26	2820	0,61	64,5	57,8	45,8	0,970	3,5	0,6	2,1	12,5	0,230	6,0
MH 63M B2	0,25	0,35	1,68	2720	0,88	66,5	65,2	56,3	0,980	2,7	0,4	1,5	12,5	0,230	6,0
MH 71M A2	0,37	0,50	2,37	2800	1,26	69,5	66,8	56,8	0,970	3,5	0,4	1,7	12,5	0,490	8,0
MH 71M B2	0,55	0,75	3,50	2850	1,85	74,1	70,3	61,6	0,920	4,8	0,7	2,3	20,0	0,600	8,0
MH 80M A2	0,75	1,00	4,45	2880	2,45	77,4	74,7	67,7	0,940	5,4	0,4	2,3	20,0	1,201	10,0
MH 90S A2	1,10	1,50	5,90	2860	3,67	79,6	80,0	75,0	0,990	4,5	0,4	2,0	35,0	1,590	14,0
MH 90L B2	1,50	2,00	8,00	2860	5,00	81,9	80,8	75,7	0,990	5,0	0,4	2,1	40,0	2,022	16,0
MH 100L A2	2,20	3,00	11,60	2900	7,24	83,2	82,6	77,3	0,990	6,0	0,3	1,9	60,0	3,702	25,0

## Single Speed - 4 poles - 1500rpm - 230V; 50Hz; S1; Permanent capacitor

Series Type	Rated Power		Rated current at 230V	Rated speed	Rated Torque	Efficiency			Power factor	Starting current / Rated current	Starting torque / Rated torque	Break-down torque / Rated torque	Running capacitor	Moment of inertia	Weight
	Pn		In	n	Mn	η	η	η	COS φ	Is/In	Ms / Mn	Mb/Mn	Cr	j	kg
	kW	HP	A	min <sup>-1</sup>	Nm	% full load	% 3/4 load	% 1/2 load					μF	10 <sup>-3</sup> kgm <sup>2</sup>	
MH 63M B4	0,12	0,15	1,05	1390	0,82	59,1	52,1	41,5	0,850	2,4	0,5	1,7	5,0	0,280	4,0
MH 71M A4	0,18	0,25	1,22	1420	1,21	67,7	62,2	51,9	0,940	3,6	0,6	2,0	10,0	0,970	7,0
MH 71M B4	0,25	0,35	1,60	1420	1,68	70,6	66,2	56,3	0,960	3,7	0,5	1,8	12,5	1,200	7,0
MH 80M Z4	0,37	0,50	2,20	1430	2,47	72,7	71,2	63,7	0,990	3,2	0,4	1,9	14,0	2,249	10,0
MH 80M A4	0,55	0,75	3,15	1430	3,67	77,1	72,6	67,9	0,990	3,1	0,4	1,9	16,0	2,830	10,0
MH 90L A4	0,75	1,00	4,10	1420	5,04	79,6	78,6	70,8	0,960	3,5	0,4	1,7	35,0	3,330	16,0
MH 90L B4	1,1	1,50	6,00	1420	7,40	81,4	80,9	72,8	0,980	3,5	0,4	1,6	40,0	4,100	16,0
MH 100L A4	1,5	2,00	8,65	1430	10,02	82,8	81,8	78,1	0,910	4,3	0,3	2,1	40,0	6,351	25,0

# Derating of the power as a function of frequency

## 2 Poles Motors

Motor type	P [kW] 50Hz	rpm	Mn [Nm]	IC411 Self-ventilated				IC411 Self-ventilated			
				Constant Torque Range Frequency (Hz) 5÷50 Range Speed (rpm) 300÷3000				Constant Torque Range Frequency (Hz) 10÷50 Range Speed (rpm) 600÷3000			
				P [kW]		M/Mn %	Mn [Nm]	P [kW]		M/Mn %	Mn [Nm]
				Min Speed	Max Speed			Min Speed	Max Speed		
63M A2	0,18	2800	0,61	0,012	0,12	65,0	0,40	0,026	0,13	72,5	0,44
63M B2	0,25	2830	0,87	0,016	0,16	65,0	0,55	0,036	0,18	72,5	0,61
71M A2	0,37	2890	1,24	0,024	0,24	65,0	0,79	0,054	0,27	72,5	0,88
71M B2	0,55	2890	1,85	0,035	0,35	65,0	1,18	0,080	0,40	72,5	1,32
80M A2	0,75	2885	2,5	0,048	0,48	65,0	1,62	0,109	0,55	72,5	1,81
80M B2	1,10	2870	3,68	0,07	0,70	65,0	2,41	0,161	0,81	72,5	2,68
90S A2	1,50	2885	5,1	0,096	0,96	65,0	3,25	0,219	1,10	72,5	3,63
90L D2	2,20	2895	7,2	0,14	1,41	65,0	4,73	0,320	1,60	72,5	5,28
100L A2	3,00	2885	10	0,19	1,92	65,0	6,47	0,436	2,18	72,5	7,21

112M A2	4,0	2935	13,2	0,26	2,56	65,0	8,5	0,581	2,90	72,5	9,4
132S A2	5,5	2935	18,1	0,35	3,5	65,0	11,6	0,798	3,99	72,5	13,0
132M D2	7,5	2935	24,7	0,48	4,8	65,0	15,9	1,09	5,44	72,5	17,7
132M D2	9,2	2945	30	0,60	6,0	65,0	19,4	1,33	6,67	72,5	21,6

160K2	11,0	2950	36,2	0,70	7,0	65,0	23,1	1,60	7,98	72,5	25,8
160M2	15,0	2950	48,9	0,96	9,6	65,0	31,6	2,18	10,9	72,5	35,2
160L2	18,5	2950	60,7	1,18	11,8	65,0	38,9	2,68	13,4	72,5	43,4
180N2	22,0	2955	71,7	1,40	14,0	65,0	46,2	3,19	16,0	72,5	51,6
180L2	30,0	2960	97,8	1,92	19,2	65,0	62,9	4,35	21,8	72,5	70,2



IC411 Self-ventilated				IC 411 Self-ventilated or IC 416 Forced ventilation				IC 411 Self-ventilated or IC 416 Forced ventilation				IC411 Self-ventilated		
Constant Torque Range Frequency (Hz) 25+50 Range Speed (rpm) 1500+3000				Constant Torque Range Frequency (Hz) 50+87 Range Speed (rpm) 3000+5200 Motor at 400V at Y and inverter supply 400Vac				Constant Torque Range Frequency (Hz) 50+87 Range Speed (rpm) 3000+5200 Motor at 230V at Δ and inverter supply 400Vac				Quadratic Torque Range Frequency (Hz) 5+50 Range Speed (rpm) 300+3000		
P [kW]		M/Mn %	Mn [Nm]	P [kW]		M/Mn %	Mn [Nm]	P [kW]		M/Mn %	Mn [Nm]	P [kW]	M/Mn %	Mn [Nm]
Min Speed	Max Speed			Min Speed	Max Speed			Min Speed	Max Speed					
0,080	0,159	89,0	0,54	0,09	0,16	53,0	0,32	0,15	0,26	85,0	0,52	0,18	100,0	0,61
0,111	0,222	89,0	0,77	0,13	0,23	53,0	0,45	0,21	0,37	85,0	0,71	0,25	100,0	0,84
0,164	0,329	89,0	1,1	0,20	0,34	53,0	0,65	0,31	0,55	85,0	1,04	0,37	100,0	1,22
0,245	0,490	89,0	1,65	0,29	0,51	53,0	0,96	0,47	0,81	85,0	1,55	0,55	100,0	1,82
0,335	0,670	89,0	2,23	0,40	0,69	53,0	1,32	0,64	1,11	85,0	2,12	0,75	100,0	2,49
0,495	0,990	89,0	3,29	0,59	1,03	53,0	1,96	0,95	1,64	85,0	3,15	1,10	100,0	3,70
0,672	1,34	89,0	4,54	0,80	1,39	53,0	2,65	1,28	2,23	85,0	4,25	1,50	100,0	5,00
0,982	1,96	89,0	6,41	1,17	2,04	53,0	3,86	1,88	3,26	85,0	6,19	2,20	100,0	7,28
1,34	2,68	89,0	8,9	1,59	2,77	53,0	5,27	2,56	4,45	85,0	8,46	3,00	100,0	9,95
				Range Frequency (Hz) 50-70** Range Speed (rpm) 3000+4200				Range Frequency (Hz) 50-70** Range Speed (rpm) 3000+4200						
1,78	3,56	89,0	11,75	3,0	5,2	75,0	9,8	3,76	6,6	94,0	12,2	4,00	100,0	13,0
2,45	4,90	89,0	16,11	4,1	7,2	75,0	13,4	5,17	9,0	94,0	16,8	5,50	100,0	17,9
3,34	6,68	89,0	21,98	5,6	9,8	75,0	18,3	7,05	12,3	94,0	22,9	7,50	100,0	24,4
4,10	8,19	89,0	26,7	6,9	12,0	75,0	22,4	8,65	15,1	94,0	28,0	9,30	100,0	29,8
				Range Frequency (Hz) 50-60** Range Speed (rpm) 3000+3600				Range Frequency (Hz) 50-60** Range Speed (rpm) 3000+3600						
4,90	9,79	89,0	32,2	9,9	17,2	90,0	32,0	11,0	19,1	100,0	35,6	11,0	100,0	35,6
6,68	13,4	89,0	43,5	13,5	23,5	90,0	43,7	15,0	26,1	100,0	48,6	15,0	100,0	48,6
8,23	16,5	89,0	53,7	16,7	29,0	90,0	53,9	18,5	32,2	100,0	59,9	18,5	100,0	59,9
9,79	19,6	89,0	63,7	19,8	34,5	90,0	64,0	22,0	38,3	100,0	71,1	22,0	100,0	71,1
13,4	26,7	89,0	87,1	27,0	47,0	90,0	87,1	30,0	52,2	100,0	96,8	30,0	100,0	96,8

Table of the derating power on the electrical data section shows the estimation of the continuous torque of the motor as a function of frequency, with different cooling designation: IC 411 (self-ventilation) and IC 416 (forced ventilation).

\*\* on demand frequency till 87Hz (5200rpm)

# Derating of the power as a function of frequency

## 4 Poles Motors

Motor type	P [kW] 50Hz	rpm	Mn [Nm]	IC411 Self-ventilated				IC411 Self-ventilated			
				Constant Torque Range Frequency (Hz) 5+50 Range Speed (rpm) 300+3000				Constant Torque Range Frequency (Hz) 10+50 Range Speed (rpm) 600+3000			
				P [kW]		M/Mn %	Mn [Nm]	P [kW]		M/Mn %	Mn [Nm]
				Min Speed	Max Speed			Min Speed	Max Speed		
63M A4	0,12	1390	0,82	0,008	0,078	65,0	0,53	0,017	0,087	72,5	0,59
63M B4	0,18	1395	1,24	0,012	0,12	65,0	0,81	0,026	0,13	72,5	0,90
71M A4	0,25	1430	1,66	0,016	0,16	65,0	1,1	0,036	0,18	72,5	1,2
71M B4	0,37	1410	2,51	0,024	0,24	65,0	1,6	0,054	0,27	72,5	1,8
80M Z4	0,55	1440	3,65	0,036	0,36	65,0	2,4	0,080	0,40	72,5	2,6
80M A4	0,75	1445	4,96	0,049	0,49	65,0	3,2	0,109	0,54	72,5	3,6
90S A4	1,1	1440	7,30	0,072	0,72	65,0	4,7	0,16	0,80	72,5	5,3
90L D4	1,5	1440	10,0	0,10	1,0	65,0	6,5	0,22	1,1	72,5	7,3
100L A4	2,2	1435	14,6	0,14	1,4	65,0	9,5	0,32	1,6	72,5	10,6
112M A4	3,0	1455	19,7	0,20	2,0	65,0	12,8	0,44	2,2	72,5	14,3
112M B4	4,0	2935	26,3	0,52	5,2	65,0	17,1	1,17	5,9	72,5	19,0
132S A4	5,5	1455	36,8	0,36	3,6	65,0	23,9	0,81	4,1	72,5	26,7
132M D4	7,5	1465	48,9	0,49	4,9	65,0	31,8	1,09	5,4	72,5	35,4
160M B4	9,2	1475	59,6	0,60	6,0	65,0	38,7	1,33	6,7	72,5	43,2
160M D4	11,0	1475	71,2	0,72	7,2	65,0	46,3	1,60	8,0	72,5	51,6
160L E4	15,0	1474	97,3	0,98	9,8	65,0	63,3	2,18	10,9	72,5	70,5
180M A4	18,5	1470	120,2	1,20	12,0	65,0	78,1	2,68	13,4	72,5	87,1
180L D4	22,0	1472	142,7	1,43	14,3	65,0	92,8	3,19	15,9	72,5	103,5

## 6 Poles Motors

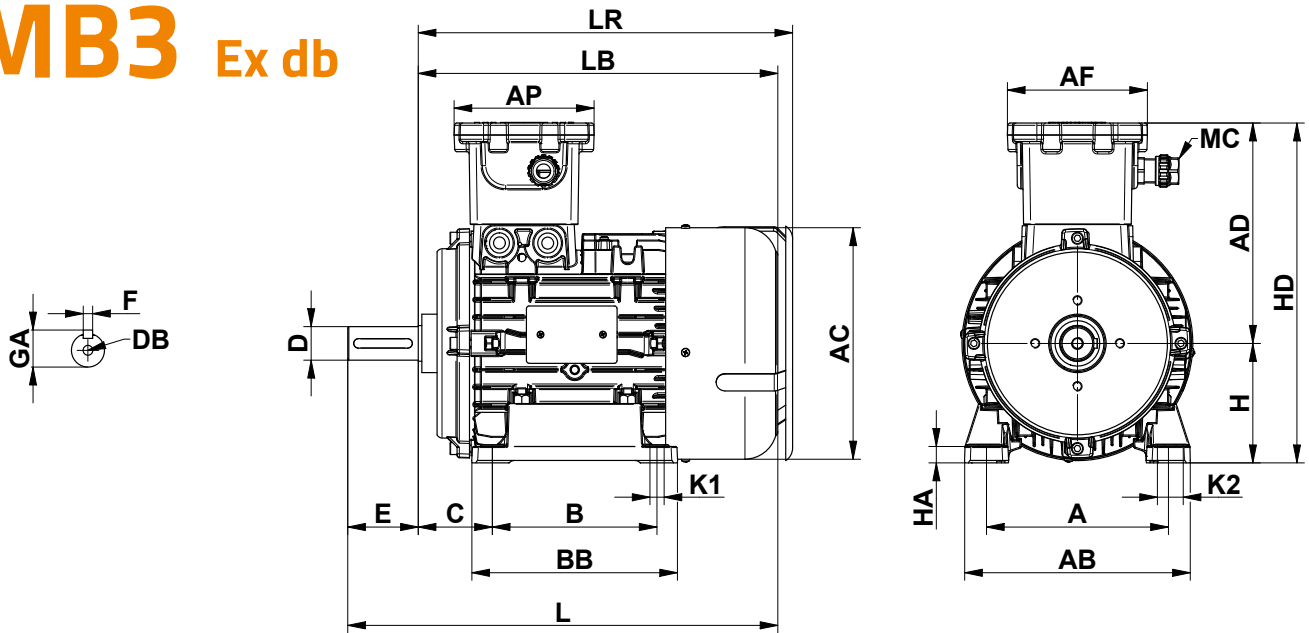
71M Z6	0,12	935	1,2	0,004	0,036	30,0	0,37	0,017	0,087	72,5	0,89
71M A6	0,18	925	1,9	0,005	0,054	30,0	0,56	0,026	0,13	72,5	1,35
80M Z6	0,25	930	2,6	0,008	0,075	30,0	0,8	0,036	0,18	72,5	1,9
80M A6	0,37	925	3,8	0,011	0,11	30,0	1,1	0,054	0,27	72,5	2,8
80M B6	0,55	910	5,8	0,016	0,16	30,0	1,7	0,080	0,40	72,5	4,2
90L A6	0,75	945	7,6	0,023	0,23	30,0	2,3	0,109	0,54	72,5	5,5
100L A6	1,1	950	11,1	0,033	0,33	30,0	3,3	0,16	0,80	72,5	8,0
100L B6	1,5	945	15,2	0,045	0,45	30,0	4,5	0,22	1,09	72,5	11,0
112M A6	2,2	955	21,9	0,066	0,66	30,0	6,6	0,32	1,6	72,5	15,9
132S A6	3,0	965	29,7	0,090	0,90	30,0	8,9	0,44	2,2	72,5	21,5
132M D6	4,0	2935	39,6	0,37	3,7	30,0	11,9	1,76	8,8	72,5	28,7
160M A6	5,5	970	54,1	0,16	1,6	30,0	16,2	0,80	4,0	72,5	39,3
160L D6	7,5	970	73,9	0,23	2,3	30,0	22,2	1,09	5,4	72,5	53,5
180M A6	11,0	975	107,8	0,33	3,3	30,0	32,3	1,60	8,0	72,5	78,1
180L D6	15,0	975	146,9	0,45	4,5	30,0	44,1	2,18	10,9	72,5	106,5

IC411 Self-ventilated				IC 411 Self-ventilated or IC 416 Forced ventilation				IC 411 Self-ventilated or IC 416 Forced ventilation				IC411 Self-ventilated		
Constant Torque Range Frequency (Hz) 25+50 Range Speed (rpm) 1500+3000				Constant Torque Range Frequency (Hz) 50+87 Range Speed (rpm) 3000+5200 Motor at 400V at Y and inverter supply 400Vac				Constant Torque Range Frequency (Hz) 50+87 Range Speed (rpm) 3000+5200 Motor at 230V at Δ and inverter supply 400Vac				Quadratic Torque Range Frequency (Hz) 5+50 Range Speed (rpm) 300+3000		
P [kW]		M/Mn %	Mn [Nm]	P [kW]		M/Mn %	Mn [Nm]	P [kW]		M/Mn %	Mn [Nm]	P [kW]	M/Mn %	Mn [Nm]
Min Speed	Max Speed			Min Speed	Max Speed			Min Speed	Max Speed					
0,053	0,11	89,0	0,7	0,063	0,11	53,0	0,43	0,10	0,18	85,0	0,70	0,12	100,0	0,82
0,081	0,16	89,0	1,1	0,10	0,17	53,0	0,66	0,15	0,27	85,0	1,05	0,18	100,0	1,24
0,11	0,22	89,0	1,5	0,13	0,23	53,0	0,88	0,21	0,37	85,0	1,4	0,25	100,0	1,66
0,16	0,33	89,0	2,2	0,20	0,34	53,0	1,3	0,32	0,55	85,0	2,1	0,37	100,0	2,51
0,24	0,49	89,0	3,2	0,29	0,51	53,0	1,9	0,47	0,81	85,0	3,1	0,55	100,0	3,65
0,33	0,67	89,0	4,4	0,40	0,69	53,0	2,6	0,64	1,1	85,0	4,2	0,75	100,0	4,96
0,49	1,0	89,0	6,5	0,58	1,0	53,0	3,9	0,94	1,6	85,0	6,2	1,1	100,0	7,30
0,67	1,3	89,0	8,9	0,80	1,4	53,0	5,3	1,3	2,2	85,0	8,5	1,5	100,0	10,0
0,98	2,0	89,0	13,0	1,2	2,0	53,0	7,7	1,9	3,2	85,0	12,4	2,2	100,0	14,6
1,3	2,7	89,0	17,5	1,6	2,8	53,0	10,4	2,6	4,4	85,0	16,7	3,0	100,0	19,7
3,6	7,2	89,0	23,4	4,3	7,4	53,0	13,9	6,9	11,9	85,0	22,3	4,0	100,0	26,3
2,5	5,0	89,0	32,7	3,0	5,2	53,0	19,5	4,8	8,3	85,0	31,3	5,5	100,0	36,8
3,3	6,7	89,0	43,5	4,0	6,9	53,0	25,9	6,4	11,1	85,0	41,5	7,5	100,0	48,9
4,1	8,2	89,0	53,0	4,9	8,5	53,0	31,6	7,8	13,6	85,0	50,6	9,2	100,0	59,6
4,9	9,8	89,0	63,4	5,8	10,1	53,0	37,8	9,4	16,3	85,0	60,5	11,0	100,0	71,2
6,7	13,4	89,0	86,6	8,0	13,9	53,0	51,6	12,8	22,2	85,0	82,7	15,0	100,0	97,3
8,2	16,5	89,0	107,0	9,8	17,1	53,0	63,7	15,7	27,4	85,0	102,2	18,5	100,0	120,2
9,8	19,6	89,0	127,0	11,7	20,3	53,0	75,6	18,7	32,5	85,0	121,3	22,0	100,0	142,7
0,045	0,09	75,0	0,9	0,069	0,12	57,0	0,70	0,11	0,20	95,0	1,17	0,12	100,0	1,2
0,068	0,14	75,0	1,4	0,10	0,18	57,0	1,06	0,17	0,30	95,0	1,77	0,18	100,0	1,9
0,094	0,19	75,0	1,9	0,14	0,25	57,0	1,46	0,24	0,41	95,0	2,4	0,25	100,0	2,6
0,14	0,28	75,0	2,9	0,21	0,37	57,0	2,2	0,35	0,61	95,0	3,6	0,37	100,0	3,8
0,21	0,41	75,0	4,3	0,31	0,55	57,0	3,3	0,52	0,91	95,0	5,5	0,55	100,0	5,8
0,28	0,56	75,0	5,7	0,43	0,74	57,0	4,3	0,71	1,2	95,0	7,2	0,75	100,0	7,6
0,41	0,83	75,0	8,3	0,63	1,1	57,0	6,3	1,05	1,8	95,0	10,5	1,1	100,0	11,1
0,56	1,1	75,0	11,4	0,86	1,5	57,0	8,6	1,4	2,5	95,0	14,4	1,5	100,0	15,2
0,82	1,6	75,0	16,4	1,2	2,2	57,0	12,5	2,1	3,6	95,0	20,8	2,2	100,0	21,9
1,1	2,3	75,0	22,3	1,7	3,0	57,0	16,9	2,9	5,0	95,0	28,2	3,0	100,0	29,7
4,6	9,1	75,0	29,7	6,9	12,1	57,0	22,6	11,6	20,1	95,0	37,6	4,0	100,0	39,6
2,1	4,1	75,0	40,6	3,1	5,5	57,0	30,9	5,2	9,1	95,0	51,4	5,5	100,0	54,1
2,8	5,6	75,0	55,4	4,3	7,4	57,0	42,1	7,1	12,4	95,0	70,2	7,5	100,0	73,9
4,1	8,3	75,0	80,8	6,3	10,9	57,0	61,4	10,5	18,2	95,0	102,4	9,2	100,0	107,8
5,6	11,3	75,0	110,2	8,6	14,9	57,0	83,8	14,3	24,8	95,0	139,6	11,0	100,0	146,9

Table of the derating power on the electrical data section shows the estimation of the continuous torque of the motor as a function of frequency, with different cooling designation: IC 411 (self-ventilation) and IC 416 (forced ventilation).

## 8. Overall dimensions - three phase motors

### IMB3 Ex db



IMB3 - Ex db - Dimensions in mm

Size	B	A	HA	BB	AB	AvC	AD	AF	C	H	HD	LB	LR	L	K1	K2	MC	D	E	GA	F	DB
56M	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
63M	80	100	10	105	120	121	150	119	40	63	203	193	194	216	7	12	M20	11	23	12,5	4	M4X10
71M	90	112	11	108	136	136	159	119	45	71	220	223	226	253	7	12	M20	14	30	16	5	M5X25
80M	100	125	11	125	154	154	163	119	50	80	243	245	253	285	9,5	17,5	M20	19	40	21,5	6	M6X16
90S	100	140	13	130	174	174	173	119	56	90	263	265	266	315	9,5	17,5	M20	24	50	27	8	M8X19
												270**	283**	320**								
90L	125	140	13	155	174	174	173	119	56	90	263	291	292	341	9,5	17,5	M20	24	50	27	8	M8X19
												296**	309**	346**								
100L	140	160	14	175	192	192	186	119	63	100	286	320	319	380	11,2	21,2	M20	28	60	31	8	M10X22
												339**	352**	399**								
112M	140	190	14	175	224	216	195	119	70	112	307	333	336	393	11,2	21,2	M20	28	60	31	8	M10X22
												353**	363**	413**								
132S	140	216	17	180	260	255	221	136	89	132	353	389	402	469	12,5	30	M25	38	80	41	10	M12X28
												396**	411**	476**								
132M	178	216	17	218	260	255	221	136	89	132	353	426	439	506	12,5	30	M25/32	38	80	41	10	M12X28
												434**	448**	514**								
160M	210	254	23	264	318	318	299	199	108	160	459	509	505	619	14,5	30	M32	42	110	45	12	M16X36
160L	254	254	23	308	318	318	299	199	108	160	459	553	549	663	14,5	30	M32	42	110	45	12	M16X36
180M	241	279	25	291	318	346	316	199	121	180	496	613	643	723	13	38	M32	48	110	52	14	M16X36
180L	279	279	25	329	318	346	316	199	121	180	496	613	643	723	13	38	M32	48	110	52	14	M16X36

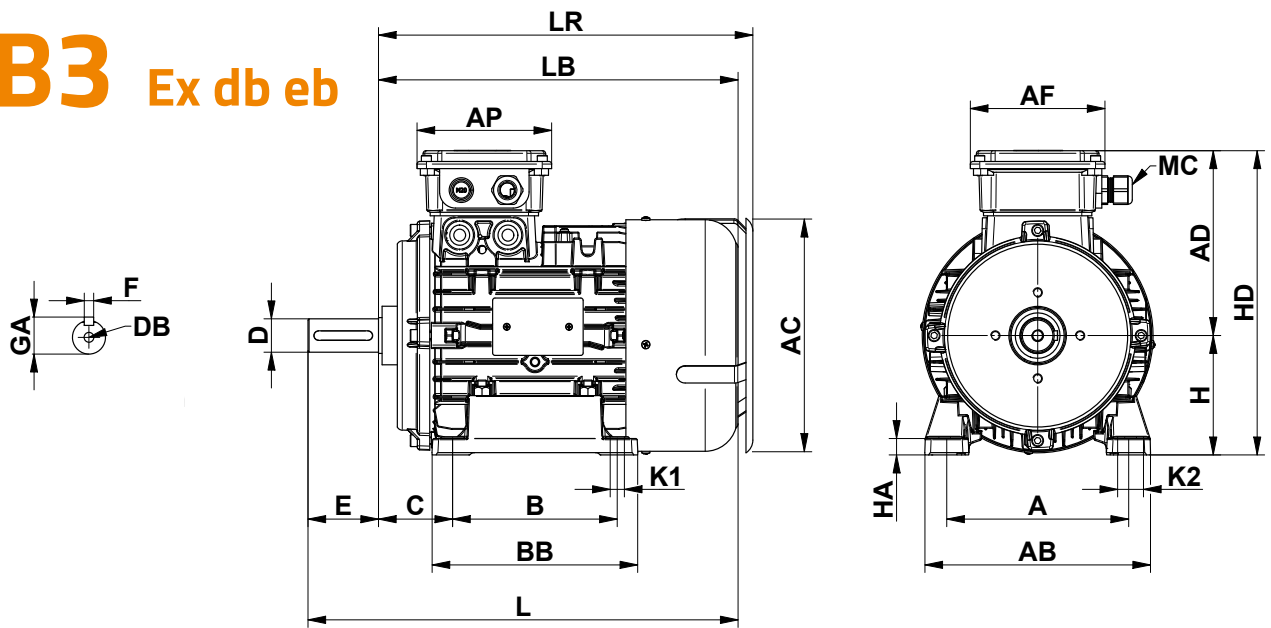
\* Size 56 only flanged motors

\*\* Valid only for the IE3 motors listed in the table below

Size	90S	90L	100L				112M				132S		132M
Type - kW	90S A4 - 1,1	90L D4 - 1,5	100L A2 - 3,0	100L A4 - 2,2	100L B6 - 1,5	100L B8 - 1,1	112M A4 - 3,0	112M B4 - 4,0	112M A6 - 2,2	112M B8 - 1,5	132M D6 - 4,0	132S A8 - 2,2	132M D8 - 3,0

# Overall dimensions - three phase motors

## IMB3 Ex db eb



IMB3 - Ex db eb - Dimensions in mm

Size	B	A	HA	BB	AB	AC	AD	AF	C	H	HD	LB	LR	L	K1	K2	MC	D	E	GA	F	DB
56M	*	*	*	*	*	121	113	101	*	*	*	199	200	219	*	*	M20	9	20	10,2	3	M4x10
63M	80	100	10	105	120	121	113	101	40	63	176	193	194	216	7	12	M20	11	23	12,5	4	M4X10
71M	90	112	11	108	136	136	122	101	45	71	193	223	226	253	7	12	M20	14	30	16	5	M5X25
80M	100	125	11	125	154	154	143	114	50	80	223	245	253	285	9,5	17,5	M20	19	40	21,5	6	M6X16
90S	100	140	13	130	174	174	144	114	56	90	238	265	266	315	9,5	17,5	M20	24	50	27	8	M8X19
												270**	283**	320**								
90L	125	140	13	155	174	174	144	114	56	90	238	296**	309**	346**	9,5	17,5	M20	24	50	27	8	M8X19
100L	140	160	14	175	192	192	159	114	63	100	259	320	319	380	11,2	21,2	M20	28	60	31	8	M10X22
												339**	352**	399**								
112M	140	190	14	175	224	216	171	114	70	112	283	333	336	393	11,2	21,2	M20	28	60	31	8	M10X22
												353**	363**	413**								
132S	140	216	17	180	260	255	194	124	89	132	326	389	402	469	12,5	30	M25	38	80	41	10	M12X28
												396**	411**	476**								
132M	178	216	17	218	260	255	194	124	89	132	326	426	439	506	12,5	30	M25/32	38	80	41	10	M12X28
												434**	448**	514**								
160M	210	254	23	264	318	318	244	186	108	160	404	509	505	619	14,5	30	M32	42	110	45	12	M16X36
160L	254	254	23	308	318	318	244	186	108	160	404	553	v549	663	14,5	30	M32	42	110	45	12	M16X36
180M	241	279	25	291	318	346	270	186	121	180	450	613	643	723	13	38	M32	48	110	52	14	M16X36
180L	279	279	25	329	318	346	270	186	121	180	450	613	643	723	13	38	M32	48	110	52	14	M16X36

\* Size 56 only flanged motors

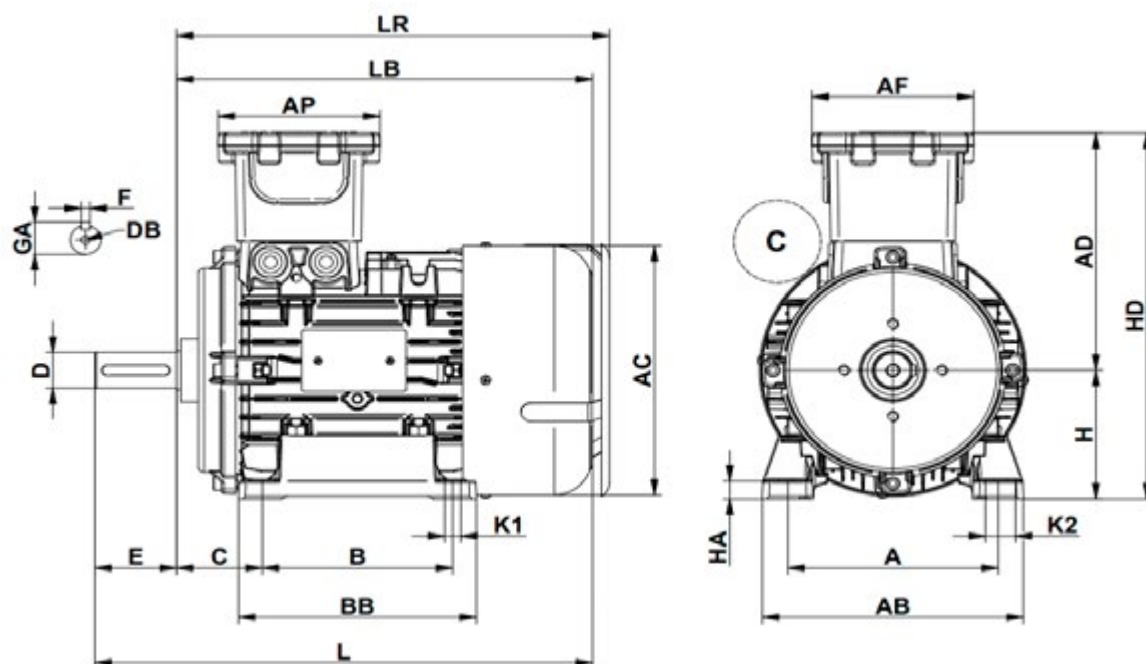
\*\* Valid only for the IE3 motors listed in the table below

Size	90S	90L	100L				112M				132S		132M
Type - kW	90S A4 - 1,1	90L D4 - 1,5	100LA2 - 3,0	100LA4 - 2,2	100LB6 - 1,5	100LB8 - 1,1	112MA4 - 3,0	112MB4 - 4,0	112MA6 - 2,2	112MB8 - 1,5	132M D6 - 4,0	132S A8 - 2,2	132M D8 - 3,0

## 8. Overall dimensions - single phase motors

# IMB3

Ex db



IMB3 - Ex db - Dimensions in mm

Size	B	A	HA	BB	AB	AC	AD	AF	AP	C	H	HD	LB	LR	L	K1	K2	MC	D	E	GA	GA	DB
56	*	*	*	*	*	121	150	119	119	*	*	*	199	200	219	*	*	M20	9	20	10,2	3	M4x10
63	80	100	10	105	120	121	150	119	119	40	63	203	193	194	216	7	12	M20	11	23	12,5	4	M4x10
71	90	112	11	108	136	136	159	119	119	45	71	220	223	226	253	7	12	M20	14	30	16	5	M5X25
80	100	125	11	125	154	154	163	119	119	50	80	243	245	253	285	9,5	17,5	M20	19	40	21,5	6	M6x16
90S	100	140	13	130	174	174	173	119	119	56	90	263	265	266	315	9,5	17,5	M20	24	50	27	8	M8X19
													270**	283**	320**								
90L	125	140	13	155	174	174	173	119	119	56	90	263	291	292	341	9,5	17,5	M20	24	50	27	8	M8X19
													296**	309**	346**								
100L	140	160	14	175	192	192	186	119	119	63	100	286	320	319	380	11,2	21,2	M20	28	60	31	8	M10X22

\* Size 56 only flanged motors

\*\* Valid only for the IE3 motors listed in the table below

Size	90S	90L
Type - kW	90S A4 - 0,75	90L B4 - 1,1

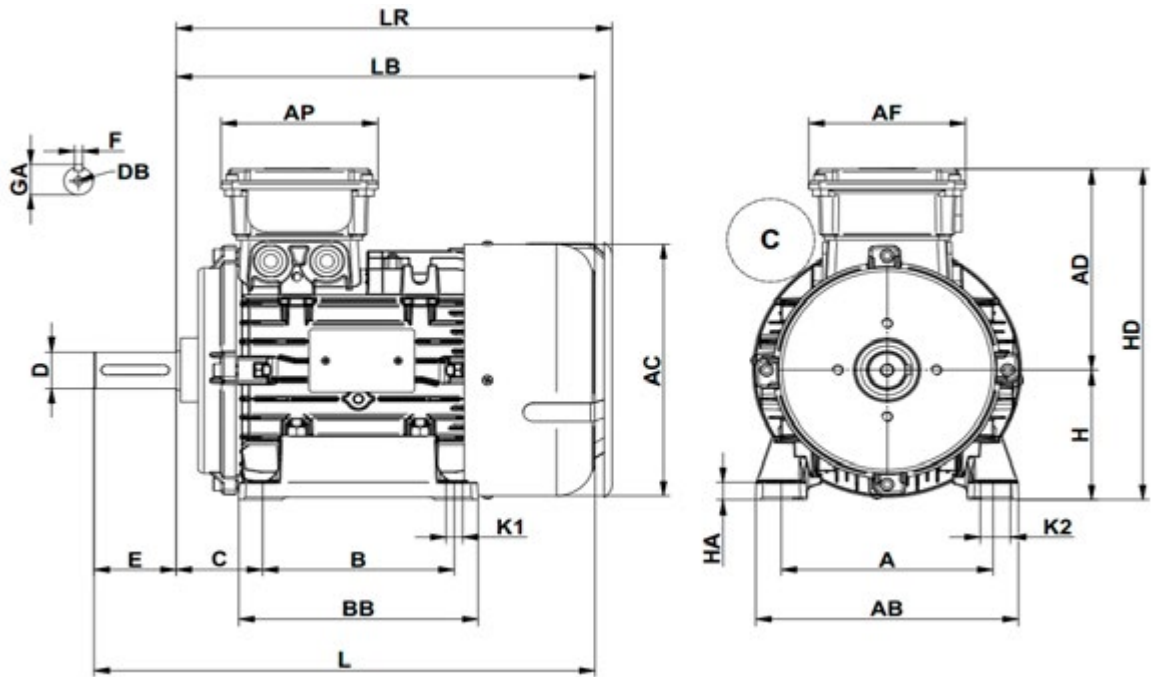


# Overall dimensions - single phase motors

## IMB3

Ex db

Ex db eb



IMB3 - Ex db - Ex db eb Dimensions in mm

Size	B	A	HA	BB	AB	AC	AD	AF	AP	C	H	HD	LB	LR	L	K1	K2	MC	D	E	GA	F	DB
56	*	*	*	*	*	121	113	100	100	*	*	*	199	200	219	*	*	M20	9	20	10,2	3	M4x10
63	80	100	10	105	120	121	113	100	100	40	63	176	193	194	216	7	12	M20	11	23	12,5	4	M4X10
71	90	112	11	108	136	136	122	100	100	45	71	193	223	226	253	7	12	M20	14	30	16	5	M5X25
80	100	125	11	125	154	154	143	114,5	114,5	50	80	223	245	253	285	9,5	17,5	M20	19	40	21,5	6	M6X16
90S	100	140	13	130	174	174	144	114,5	114,5	56	90	238	265	266	315	9,5	17,5	M20	24	50	27	8	M8X19
													270**	283**	320**								
90L	125	140	13	155	174	174	144	114,5	114,5	56	90	238	291	292	341	9,5	17,5	M20	24	50	27	8	M8X19
													296**	309**	346**								
100	140	160	14	175	192	192	159	114,5	114,5	63	100	259	320	319	380	11,2	21,2	M20	28	60	31	8	M10X22

\* Size 56 only flanged motors

\*\* Valid only for the IE3 motors listed in the table below

Size	90S	90L
Type - kW	90S A4 - 0,75	90L B4 - 1,1

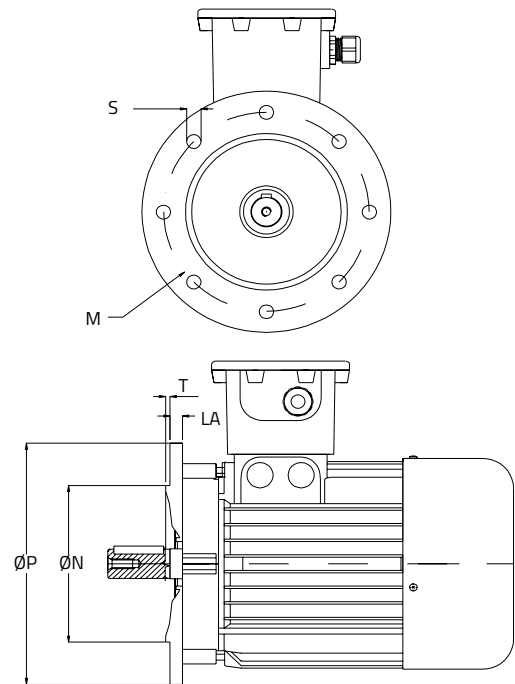
## Overall dimensions - Single phase and three phase motors

# IMB5 Ex db - Ex db eb

Dimensions in mm

Size	Ø P	Ø N	LA	M	T	S
56	120	80	10,5	100	3	7
63	140	95	10,5	115	3	9
	160*	110	10,5	130	3,5	9
71	140*	95	10,5	115	3	9
	160	110	10,5	130	3,5	9
	200*	130	11,5	165	3,5	12
80	160*	110	10,5	130	3,5	9
	200	130	11,5	165	3,5	12
90	160*	110	10,5	130	3,5	9
	200	130	11,5	165	3,5	12
100	200*	130	11,5	165	3,5	12
	250	180	15	215	4	13
112	200*	110	10,5	130	3,5	9
	250	180	15	215	4	13
132	250*	180	20	215	4	13
	300	230	20	265	4	13
160	350	250	22	300	5	18
180	350	250	22	300	5	18

\* Reduced or enlarged flange version

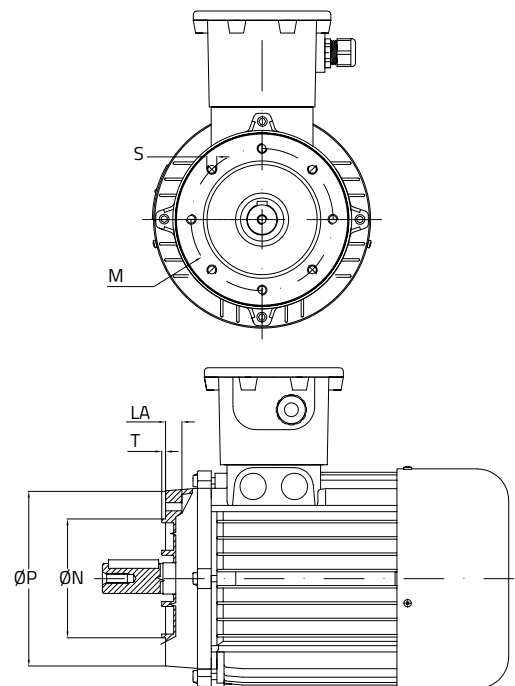


# IMB14 Ex db - Ex db eb

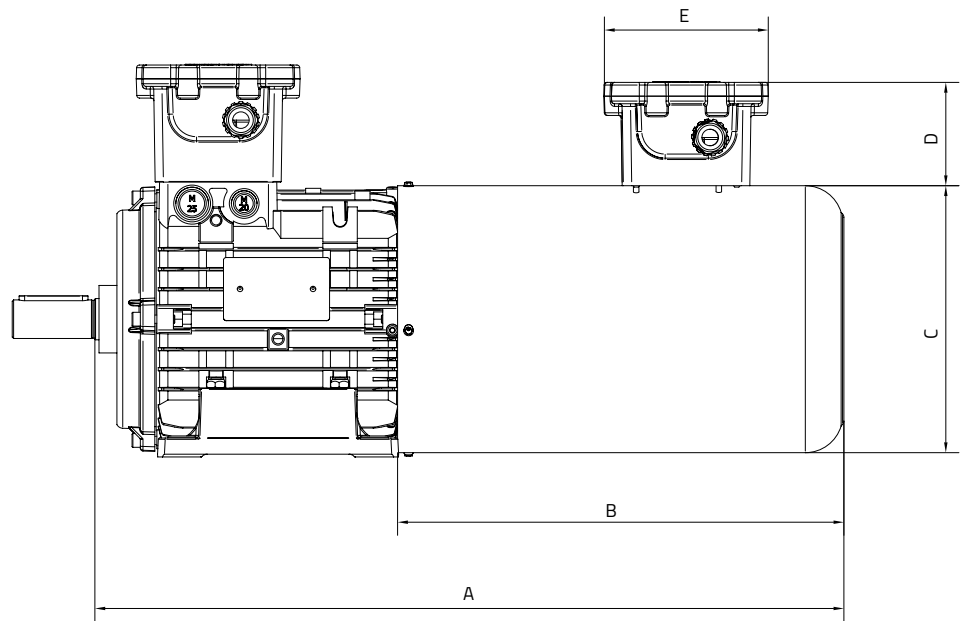
Dimensions in mm

Size	Ø P	Ø N	LA	M	T	S
56	80	50	13	65	2,5	M5
63	90	60	13	75	2,5	M5
	105*	70	13	85	2,5	M6
71	90*	60	13	75	2,5	M5
	105	70	13	85	2,5	M6
80	120*	80	13	100	3	M6
	105*	70	15	85	2,5	M6
	120	80	15	100	3	M6
90	140*	95	15	115	3	M8
	120*	80	15	100	3	M6
	140	95	15	115	3	M8
100	160*	110	16	130	3,5	M8
	140*	95	15	115	3	M8
	160	110	16	130	3,5	M8
112	140*	95	15	115	3	M8
	160	110	16	130	3,5	M8
132	160	110	20	130	3,5	M8
	200	130	20	165	4	M10
160	250	180	24	215	4	M12
180	250	180	24	215	4	M12

\* Reduced or enlarged flange version



# Overall dimensions



## Servoventilated motor Ex db

Dimensions in mm

Size	A	B	C	D	E
80	481	317	Ø154	75	119
90S	492	317	Ø174	75	119
90L	517	317	Ø174	75	119
100	544	324	Ø192	75	119
112	559	327	Ø216	75	119
132S	599	342	Ø255	75	119
132L	639	342	Ø255	75	119
160M	814	455	Ø309	75	119
160L	864	455	Ø309	75	119
180	904	455	Ø346	75	119