Drive^{IT} Low Voltage
General Purpose Motors

Industrial IT enabled

ABB

Making you more competitive

ABB's General purpose motors are readily available from central stock locations and distributors throughout the world. While designed for standard and straightforward uses, the motors can be modified to meet most specifications. Built to the highest manufacturing standards, the General purpose motors use the best materials sourced from around the world. This brings a quality and reliability that can see motors operating for over 30 years. Competitively priced, the motors meet Eff2 energy efficient classification, with Eff1 as option.

Industrial^{IT}

As a key element of its business strategy, ABB has committed to a broad program of product development and positioning under the Industrial^{IT} umbrella. This initiative is geared towards increasing standardization of ABB products as the 'building blocks' of larger solutions, while incorporating functionality that will allow multiple products to interact seamlessly as components of real-time automation and information systems.
Motors and generators represent one of the fundamental building blocks in the Industrial^{IT} architecture.

ABB (www.abb.com) is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impacts. The ABB Group of companies operates in around 100 countries and employs around 133,000 people.

Drive^{IT} Low Voltage General Purpose Motors

Sizes 56 to 400, from 0.055 to 710 kW

Contents Page

General information

Standards

ABB motors are of the totally enclosed, three phase squirrel cage type, built to comply with international IEC and EN standards. Motors conforming to other national and international specifications are also available on request.

All production units are certified to ISO 9001 international quality standard as well ISO 14000 environmental standard and confirm to all applicable EU Directives.

IEC / EN

Electrical	Mechanical
IEC/EN 60034-1	IEC 60072
IEC/EN 60034-2	IEC/EN 60034-5
IEC 60034-8	IEC/EN 60034-6
IEC 60034-12	IEC/EN 60034-7
	IEC/EN 60034-9
	IEC 60034-14

Motors for EU motor efficiency levels

A Europe-wide agreement will ensure that the efficiency levels of electric motors manufactured in Europe are clearly displayed. In contrast to the American legislation on motor efficiency the European agreement does not establish mandatory efficiency levels.
It basically establishes three classes giving motor manufacturers an incentive to qualify for a higher class.

ABB is one of only a handful of leading motor manufacturers in Europe to have a motor range to meet or exceed the minimum efficiencies stated in the highest level of the EU agreement of LV motors.

These efficiency levels apply to 2- and 4-pole, three phase squirrel cage induction motors rated for 400V, 50 Hz with S1 duty class with the output 1.1 to 90 kW, which account for the largest volume on the market.

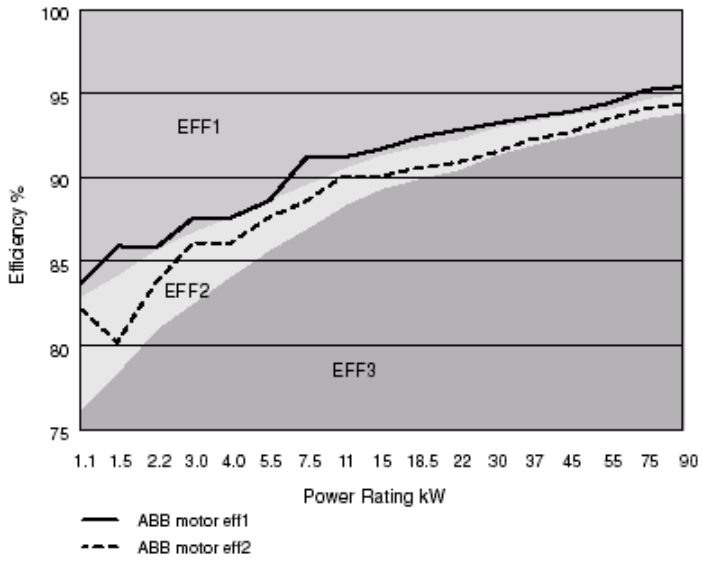
The efficiency of motors from different manufacturers are collated in a database, EURODEEM, published by the European Commission. It is accessible over the Internet at http://iamest.jrc.it/projects/eem/eurodeem.htm.

EU efficiency classes for 2-pole motors

Output kW	2-pole Boarderline EFF2/EFF3	EFF1/EFF2
1.1	76.2	82.8
1.5	78.5	84.1
2.2	81.0	85.6
3	82.6	86.7
4	84.2	87.6
5.5	85.7	88.6
7.5	87.0	89.5
11	88.4	90.5
15	89.4	91.3
18.5	90.0	91.8
22	90.5	92.2
30	91.4	92.9
37	92.0	93.3
45	92.5	93.7
55	93.0	94.0
75	93.6	94.6
90	93.9	95.0

ABB Three phase induction motors, 400 V 50 Hz - EU motor efficiency levels

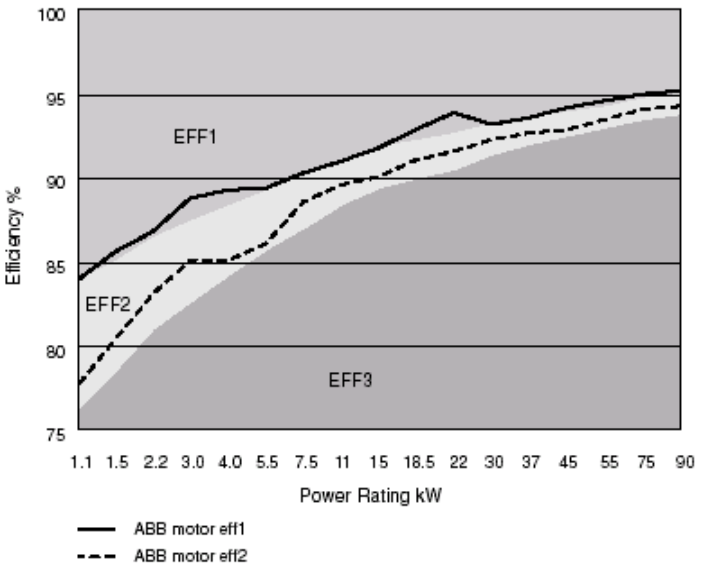
2-pole



EU efficiency classes for 4-pole motors

Output kW	4-pole Boarderline EFF2/EFF3	EFF1/EFF2
1.1	76.2	83.8
1.5	78.5	85.0
2.2	81.0	86.4
3	82.6	87.4
4	84.2	88.3
5.5	85.7	89.2
7.5	87.0	90.1
11	88.4	91.0
15	89.4	91.8
18.5	90.0	92.2
22	90.5	92.6
30	91.4	93.2
37	92.0	93.6
45	92.5	93.9
55	93.0	94.2
75	93.6	94.7
90	93.9	95.0

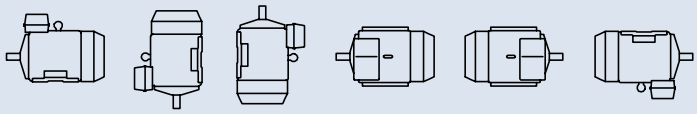
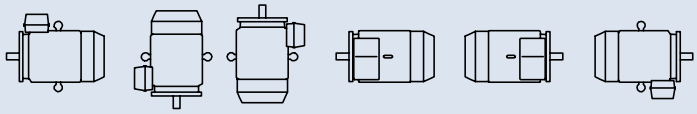
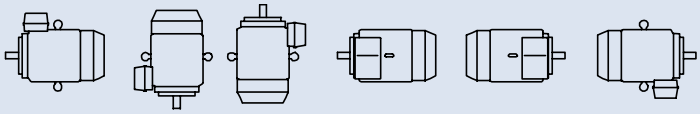
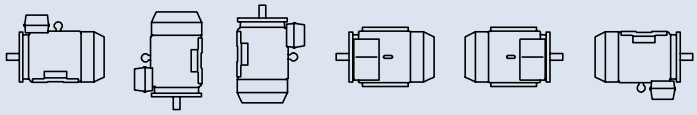
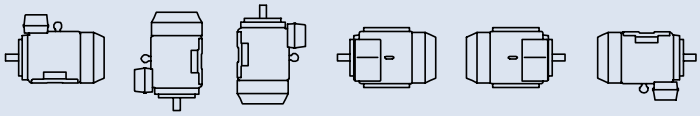
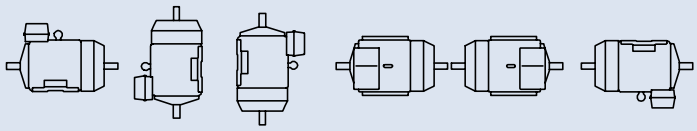
4-pole



General technical specification

Mechanical and electrical design

Mounting arrangements

	Code I/Code II						Product code pos. 12
Foot-mounted motor.	IM B3 IM 1001	IM V5 IM 1011	IM V6 IM 1031	IM B6 IM 1051	IM B7 IM 1061	IM B8 IM 1071	A = foot-mounted, term.box top R = foot-mounted, term.box RHS L = foot-mounted, term.box LHS
							
Flange-mounted motor, large flange	IM B5 IM 3001	IM V1 IM 3011	IM V3 IM 3031	*) IM 3051	*) IM 3061	*) IM 3071	B = flange mounted, large flange
							
Flange-mounted motor, small flange	IM B14 IM 3601	IM V18 IM 3611	IM V19 IM 3631	*) IM 3651	*) IM 3661	*) IM 3671	C = flange mounted, small flange
							
Foot- and flange-mounted motor with feet, large flange	IM B35 IM 2001	IM V15 IM 2011	IM V36 IM 2031	*) IM 2051	*) IM 2061	*) IM 2071	H = foot/flange-mounted, term.box top S = foot/flange-mounted, term.box RHS T = foot/flange-mounted, term.box LHS
							
Foot- and flange-mounted motor with feet, small flange	IM B34 IM 2101	IM V17 IM 2111	IM 2131	IM 2151	IM 2161	IM 2171	J = foot/flange-mounted, small flange
							
Foot-mounted motor, shaft with free extensions	IM 1002	IM 1012	IM 1032	IM 1052	IM 1062	IM 1072	
							

*) Not stated in IEC 60034-7.

Cooling

Designation system concerning methods of cooling refers to standard IEC 60034-6.

Example

IC 4 (A) 1 (A) 6

International Cooling

Circuit arrangement
0: Free circulation (open circuit)
4: Frame surface cooled

Primary coolant
A for air (omitted for simplified designation)

Method of movement of primary coolant
0: Free convection
1: Self-circulation
6: Machine-mounted independent component

Secondary coolant
A for air (omitted for simplified designation)
W for water

Method of movement of secondary coolant
0: Free convection
1: Self-circulation
6: Machine-mounted independent component
8: Relative displacement

Degrees of protection: IP code/IK code

Classification of degrees of protection provided by enclosures of rotating machines are refers to:

- Standard IEC 60034-5 or EN 60529 for IP code
- Standard EN 50102 for IK code

IP protection:
Protection of persons against getting in contact with (or approaching) live parts and against contact with moving parts inside the enclosure.

Also protection of the machine against ingress of solid foreign objects. Protection of machines against the harmful effects due to the ingress of water

IK code :
Classification of degrees of protection provided by enclosure for motors against external mechanical impacts.

IP 5 5

Characteristic letter

Degree of protection to persons and to parts of the motors inside the enclosure
2: Motors protected against solid objects greater than 12 mm
4: Motors protected against solid objects greater than 1 mm
5: Dust-protected motors

Degree of protection provided by the enclosure with respect to harmful effects due to ingress of water
3: Motors protected against spraying water
4: Motors protected against splashing water
5: Motors protected against water jets
6: Motors protected against heavy seas

IK 08

International mechanical protection

Characteristic group

Relation between IK code and impact energy:

IK cod	IK 0	IK 01	IK 02	IK 03	IK 04	IK 05	IK 06	IK 07	IK 08	IK 09	IK 10
Impact energy Joule	*	0.15	0.2	0.35	0.5	0.7	1	2	5 ABB Standard	10	20

** not protected according to EN 50102*

Insulation

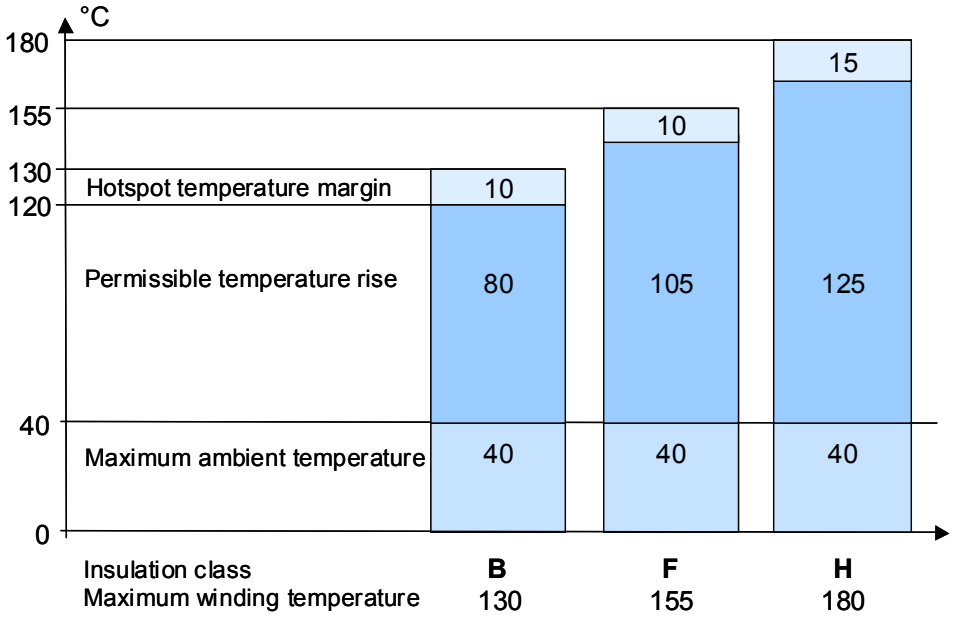
ABB uses class F insulation systems, which, with temperature rise B, is the most common requirement among industry today.

The use of Class F insulation with Class B temperature rise gives ABB products a 25° C safety margin. This can be used to increase the loading by up to 12 per cent for limited periods, to operate at higher ambient temperatures or altitudes, or with greater voltage and frequency tolerances. It can also be used to extend insulation life. For instance, a 10 K temperature reduction will extend the insulation life.

Class F insulation system
- Max ambient temperature 40° C
- Max permissible temperature rise 105 K
- Hotspot temperature margin + 10 K

Class B rise
- Max ambient temperature 40° C
- Max permissible temperature rise 80 K
- Hotspot temperature margin + 10 K

Insulation system temperature class
- Class F 155° C
- Class B 130° C
- Class H 180° C



Safety margins per insulation class

Frequency converter drives

Squirrel cage induction motors offer excellent availability, reliability and efficiency. With a frequency converter – a variable speed drive (VSD) – the motor will deliver even better value. A variable speed drive motor can be started softly with low starting current, and the speed can be controlled and adjusted to suit the application demand without steps over a wide range. Also the use of a frequency converter together with a squirrel cage motor usually leads to remarkable energy and environmental savings.

However, all motors are not suitable for variable speed drive. There are several points that have to be taken into account in the design and selection of the motor, if it is intended for variable speed operation.

Within the General purpose motor range ABB offers motors designed for both Direct On Line (DOL) and variable speed applications.

For demanding applications the use of ABB Process performance motors is recommended.

The following points must be taken into account, when selecting a motor to a variable speed drive:

1. Dimensioning

The voltage (or current) fed by the frequency converter is not purely sinusoidal. This may increase the losses, vibration, and noise of the motor. Furthermore, a change in the distribution of the losses may affect the motor temperature balance and lead to an increase in the temperature of the bearings. In each case, the motor must be correctly sized according to the instructions supplied with the selected frequency converter.

When using ABB converters, please use ABB's DriveSize dimensioning programme or the loadability curves of the corresponding converter type for sizing the motors. The loadability curve for applicable General purpose motors used with ABB's ACS 600- and ACS 800- frequency converters can be found in figure 3.

2. Speed range

In a frequency converter drive, the actual operating speed of the motor may deviate considerably from its nominal speed (i.e. the speed stamped on the rating plate).

For higher speeds, ensure that the highest permissible rotational speed of the motor or the critical speed of the entire equipment is not exceeded. When high speed operation exceeds the nominal speed of the motor, the following points should be checked:

– Maximum torque of the motor
– Bearing construction
– Lubrication
– Balancing
– Critical speeds
– Shaft seals
– Ventilation
– Fan noise

Guideline values of maximum speeds for M3AA motors within the General purpose motor range are described in figure 1 below. Exact values are available on request.

Figure 1. Guideline values of maximum speeds for General purpose motor in aluminium frame:

Motor size	Speed r/min	
	2-pole	4-pole
M3AA 90-100	6000	6000
M3AA 112-200	4500	4500
M3AA 225-280	3600	3600

At low speed operation the motor's ventilation fan looses its cooling capacity, which causes a higher temperature rise in the motor and in the bearings. A separate constant speed fan can be used to increase cooling capacity and loadability at low speed. It is also important to check the performance of the grease at low speeds.

3. Lubrication

Variable speed operation affects on the bearing temperature, which must be taken into account when selecting the lubrication method and grease type. For example the life time of sealed bearings can be remarkably shorter than in direct on line operation. More information can be found from product specific sections of this catalogue and from ABB's Low Voltage Motors Manual.

4. Insulation protection

Frequency converter supply causes higher voltage stresses at the windings of the motor than the sinusoidal supply. Thus, the insulation system and possible filters must be selected according to the used voltage, cable length and converter type.

When using ABB's low voltage frequency converters, selection criterias mentioned in figure 2 must be followed.

5. Bearing currents

Bearing voltages and currents must be avoided in all motors. Assuming the use of a standard ABB Single drive, with IGBT components and a 6-pulse diode supply unit, insulated bearings and/or properly dimensioned filters at the converter output must be used according to the instructions in figure 2. (For other alternatives and converter types, please contact ABB.) When ordering, clearly state which alternative will be used.

For more information about bearing currents and voltages, please contact ABB.

6. Cabling, grounding and EMC

The use of a frequency converter puts higher demands on the cabling and grounding of the drive system. The motor must be cabled by using shielded symmetrical cables and cable glands providing 360° bonding (also called EMC-glands). For motors up to 30 kW unsymmetrical cables can be used, but shielded cables are always recommended.

More information about grounding and cabling of a variable speed drive can be found from the manual "Grounding and cabling of the drive system" (Code: 3AFY 61201998 R0125 REV A) and the ABB's Low Voltage Motors Manual.

For fulfilling the EMC requirements, special EMC cable(s) must be used in addition to the correct cable gland mounting, with special, extra earthing pieces. Please refer to the manuals of the frequency converter.

1

Validity

Measures mentioned in Figure 2 apply to the applicable motors within the General motors range (not high-output versions) with a ABB's single drives, based on IGBT components and using 6-pulse diode supply unit. For other alternatives and converter types, please contact ABB.

Figure 2. Selection rules for insulation and filtering in variable speed drives

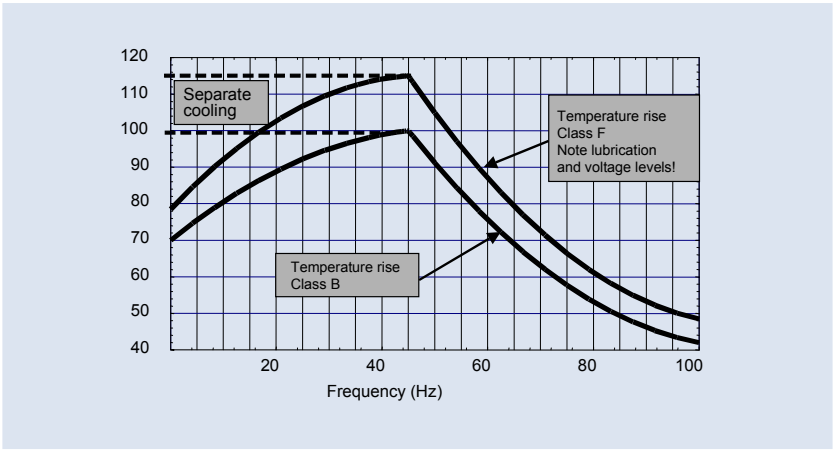
	Motor nominal power P_N or frame size P_N < 100 kW	P_N ≥ 100 kW or ≥ IEC 315	P_N ≥ 350 kW ≥ IEC 400
U_N ≤ 500 V	Standard motor	Standard motor + Insulated N-bearing	Standard motor + Insulated N-bearing + Common mode filter
U_N ≤ 600 V	Standard motor + dU/dt-filter **OR** Reinforced insulation	Standard motor + dU/dt-filter (reactor) + Insulated N-bearing **OR** Reinforced insulation + Insulated N-bearing	Standard motor + Insulated N-bearing + dU/dt-filter + Light Common mode filter **OR** Reinforced insulation + Insulated N-bearing + Common mode filter
U_N ≤ 690 V	Reinforced insulation + dU/dt-filter	Reinforced insulation + dU/dt-filter (reactor) + Insulated N-bearing	Reinforced insulation + Insulated N-bearing + dU/dt-filter + Light common mode filter

dU/dt filter (reactor)
Series reactor. DU/dt -filter decreases the changing rate of the phase and main voltages and thus reduces voltage stresses in the windings. DU/dt -filters also decrease so-called common mode currents and the risk of bearing currents. DU/dt -filters are designed so that dU/dt -rate of main voltages at motor terminals is less than 1 kV/s. See ABB manual, ACS 600 dU/dt -filter selection guide.

Common mode and light common mode filters
Common mode filters are made of toroidal cores installed around motor cables. These filters reduce so-called common mode currents in VSD applications and thus decrease the risk of bearing currents. Common mode filters do not significantly affect the phase or main voltages on the motor terminals.

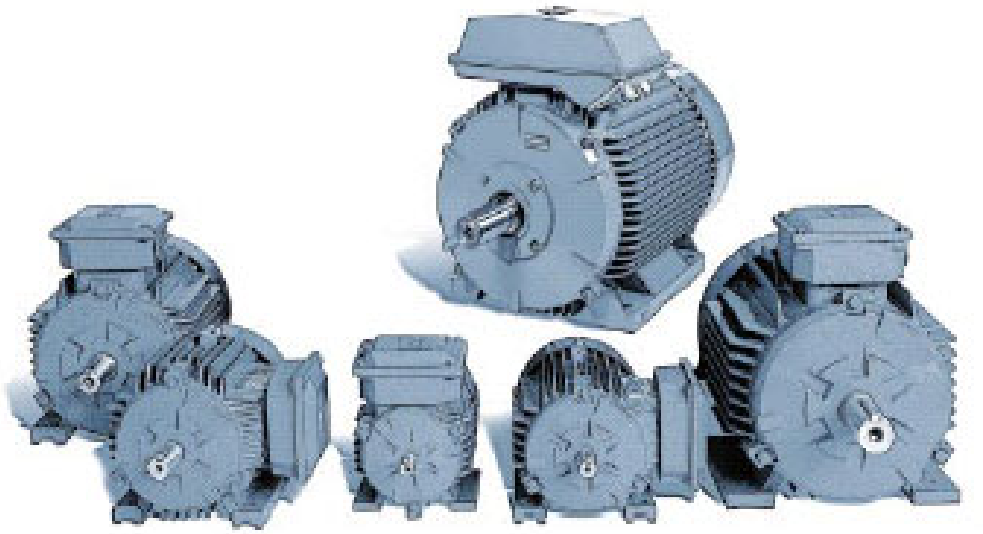
Insulated Bearings
Bearings with insulated inner or outer races are used as the standard solution. So-called hybrid bearings, i.e. bearings with non-conductive ceramic balls, can also be used in special applications. More information for spare part selection is available on request.

Figure 3. Motor loadability with ACS 600 and ACS 800, Field weakening point 50 Hz.



Drive^{IT} General Purpose Cast Iron Motors

Totally enclosed squirrel cage three phase low voltage motors, Sizes 71 - 355, 0.25 to 250 kW



4

Mechanical design

Stator

The motor frame including feet, bearing housing and terminal box is made of cast iron. Integrally cast feet allow a very rigid mounting and minimal vibration.

Motors can be supplied for foot mounting, flange mounting and combinations of these.

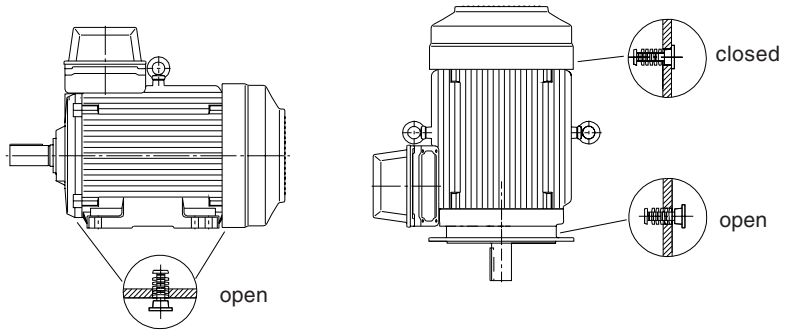
Drain holes

Motors, frame sizes 280 to 355, are fitted with drain holes and closable plugs. The plugs are open on delivery. When mounting the motors, ensure that the drain holes face downwards.

Drain holes for motors IEC frame sizes 71 to 250 are available as modification.

In the case of vertical mounting, the upper plug must be hammered home completely. In very dusty environments, both plugs should be hammered home.

Drain holes for motors IEC-frame sizes 280 to 355



4

Terminal boxes

Terminal boxes are mounted on top of the motor as standard. The terminal box can also be mounted on the left or right side, see ordering information.

The terminal box of motor sizes 71 to 250 can be turned 4x90° and in motors sizes 280 to 355 rotated 2x180°, to allow cable entry from either side of the motor.

Degree of protection of standard terminal box is IP 55.

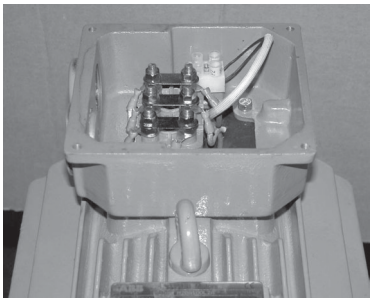
The terminal boxes in sizes 280 to 355 are equipped with cable glands or cable boxes as standard.

Terminations are suitable for Cu- and Al-cables. Cables are connected to the terminals by cable lugs which are not included with the motor.

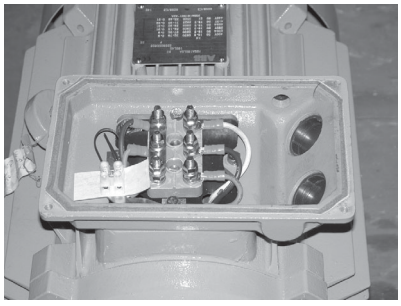
To enable the supply of suitable terminations for the motor, please state cable type, quantity and size when ordering. Non-standard design of terminal boxes; e.g. size, degree of protection, are available as options.

Please see variant codes for options.

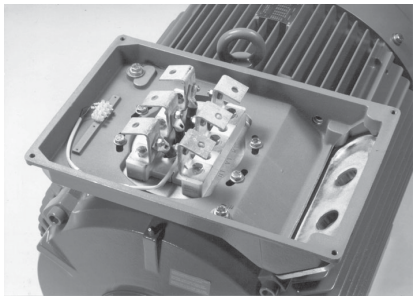
Terminal box examples



Motor sizes 71 to 132



Motor sizes 160 to 250



Motor sizes 280 to 355, provided either with a cable gland or a cable box.

Terminal boxes and cable entries

If no ordering information of the cable is given, it is assumed to be p.v.c.-insulated and termination parts are supplied according to the table below.

In motor sizes 280 to 355 the terminal box is equipped with cable glands or cable boxes as standard.

To enable the supply of suitable terminations for the motor, please state cable type, quantity and size when ordering.

The table below shows the different alternatives available for cable boxes and cable entries. Other types on request.

Cast iron motor sizes 71 to 250 with top-mounted terminal box

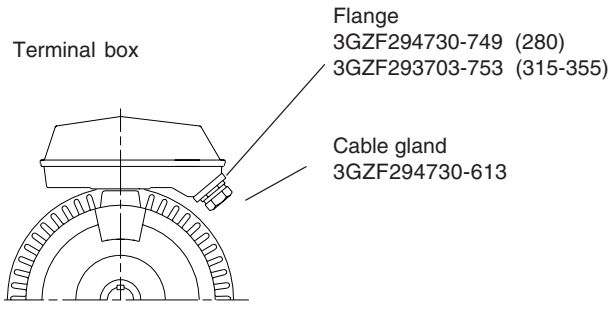
Motor size	Poles	Cable entry mm
71M	2,4,6	2xM16×1.5
80M	2,4,6	2xM25×1.5
90S	2,4,6	2xM25×1.5
90L	2,4,6	2xM25×1.5
100L	2,4,6,8	2xM32×1.5
112M	2,4,6,8	2xM32×1.5
132S	2,4,6,8	2xM32×1.5
132M	2,4,6,8	2xM32×1.5

Motor size	Poles	Cable entry mm
160M	2,4,6,8	2xM40×1.5
160L	2,4,6,8	2xM40×1.5
180M	2,4,6,8	2xM40×1.5
180L	2,4,6,8	2xM40×1.5
200L	2,4,6,8	2xM50×1.5
225S	4,6,8	2xM50×1.5
225M	2,4,6,8	2xM50×1.5
250M	2,4,6,8	2xM63×1.5

Cable entries for thermistors: 1xM16x1.5 (type 160 to 250)

Cast iron motor sizes 280 to 355 with top-mounted terminal box

Motor size	Terminal box	Flange	Cable gland	Cable entry	Cable diameter	Auxiliary entries	Terminal bolt
3000 r/min (2 poles)							
280 SM_	122/2	3GZF 294 730-749	3GZF 294 730-613	2 x M63	2 x Ø32-49	2 x M20	M8
315 SM_, ML_	142/1	3GZF 294 730-753	3GZF 294 730-613	2 x M63	3 x Ø32-49	2 x M20	M10
355 S	162/1	3GZF 294 730-753	3GZF 294 730-613	2 x M63	3 x Ø32-49	2 x M20	M12
1500 r/min (4 poles)							
280 SM_	122/2	3GZF 294 730-749	3GZF 294 730-613	2 x M63	2 x Ø32-49	2 x M20	M8
315 SM_, ML_	142/1	3GZF 294 730-753	3GZF 294 730-613	2 x M63	3 x Ø32-49	2 x M20	M10
355 S	162/1	3GZF 294 730-753	3GZF 294 730-613	2 x M63	3 x Ø32-49	2 x M20	M12
1000 r/min (6 poles)							
280 SM_	122/2	3GZF 294 730-749	3GZF 294 730-613	2 x M63	2 x Ø32-49	2 x M20	M8
315 SM_, ML_	142/1	3GZF 294 730-753	3GZF 294 730-613	2 x M63	3 x Ø32-49	2 x M20	M10
355 S	142/2	3GZF 294 730-753	3GZF 294 730-613	2 x M63	3 x Ø32-49	2 x M20	M10
750 r/min (8 poles)							
280 SM_	122/2	3GZF 294 730-749	3GZF 294 730-613	2 x M63	2 x Ø32-49	2 x M20	M8
315 SM_, ML_	142/1	3GZF 294 730-753	3GZF 294 730-613	2 x M63	3 x Ø32-49	2 x M20	M10
355 S	142/2	3GZF 294 730-753	3GZF 294 730-613	2 x M63	3 x Ø32-49	2 x M20	M10

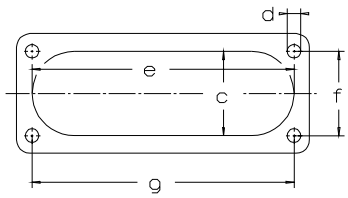


Alternatives for cable entries and cable boxes for motor sizes 280 to 355

Motor size	Terminal box on top side	on	Opening type (D/Y-conn.)	Max. rated current A mm²	Max connection cable area	Cable gland diameter	Auxliary cable entries	Cable box diameter	Blank plate
280	122/2	NA	C (FL 21)	363/210	2 x 150	2 x M40-63	2 x M20	max 2xØ60	MKLN 20
315	142/1	NA	D (FL33)	640/370	2 x 240	1 x M40-63	2 x M20	max 2xØ60	MKLN 30
355	142/2		D (FL33)	640/370	2 x 240	2 x M40-63	2 x M20	max 2xØ80	
	162/1		E-D	950/550	4 x 240			max 4xØ60	

Flange

Opening	c	e	f	g	d
C (FL 21)	62	193	62	193	M8
D (FL 33)	100	300	80	292	M10
E (FL 40)	115	370	100	360	M12



Bearings

The motors are normally fitted with single-row deep groove ball bearings as listed in the table below.

When there are high axial forces, angular-contact ball bearings should be used. This option is available on request.

When a motor with angular-contact ball bearings is ordered, the method of mounting and direction and magnitude of the axial force must be specified. For special bearings, please see the variant codes.

Basic version with deep groove ball bearings

Motor size	Number of poles	Deep groove ball bearings D-end	N-end
71M	2-6	6202 VV C3	6202 VV C3
80M	2-6	6204 DDU C3	6204 DDU C3
90S	2-6	6205 DDU C3	6205 DDU C3
90L	2-6	6205 DDU C3	6205 DDU C3
100L	2-8	6206 DDU C3	6206 DDU C3
112M	2-8	6207 DDU C3	6206 DDU C3
132S	2-8	6208 DDU C3	6207 DDU C3
132M	2-8	6208 DDU C3	6207 DDU C3
160M	2-8	6309 DDU C3	6209 DDU C3
160L	2-8	6309 DDU C3	6209 DDU C3

Motor size	Number of poles	Deep groove ball bearings D-end	N-end
180M	2-8	6310 DDU C3	6210 DDU C3
180L	2-8	6310 DDU C3	6210 DDU C3
200L	2-8	6312 DDU C3	6212 DDU C3
225S	4-8	6313 ZZ C3	6213 ZZ C3
225M	2-8	6313 ZZ C3	6213 ZZ C3
250M	2-8	6314/C3	6214/C3
280	2	6316/C4	6316/C4
	4-12	6316/C3	6316/C3
315	2	6316/C4	6316/C4
	4-12	6319/C3	6316/C3
355	2	6319M/C4	6319M/C4
	4-12	6322/C3	6319/C3

Axially-locked bearings

The D-end bearing is locked, in sizes 71 to 180 with the spring ring and in sizes 200 to 355 with the inner bearing cover. The inner ring is locked by tight tolerance to the shaft.

Transport locking

Motors that have roller bearings or an angular contact ball bearing are fitted with a transport lock before despatch to prevent damage to the bearings during transport. In case of transport locked bearing, motor sizes 280 to 355 are provided with a warning sign.

Locking may also be fitted in other cases where transport conditions are suspected of being potentially damaging.

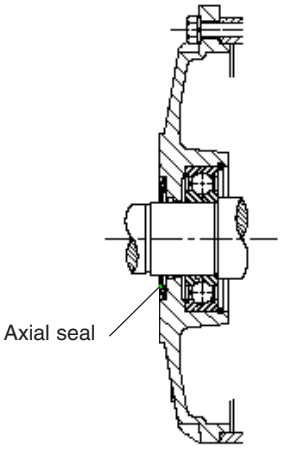
Bearing seals

The motors are as standard provided with seals according to table below.

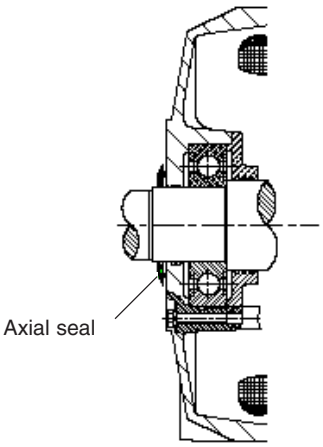
Motor size	Description D-end	**Standard design** **Axial seal** N-end		**Alternative design** **Radial seal (DIN 3760)** Variant code 072	Number of poles	d_1	d_2	B_1	b
71 to 132	Sealed bearings (2RS) and axial seal, gamma ring, at D-end								
160 to 225	Axial seal, gamma ring, at D-end								
250	Radial seal at D-end								
280	Axial seals at both ends	VS 80 VS 80	VS 80 VS 80	80x100x10[1)] 80x100x10	2 4-12	80 80	100 100	13.5 13.5	10 10
315	Axial seals at both ends	VS 80 VS 95	VS 80 VS 80	80x100x10[1)] 95x120x12	2 4-12	80 95	100 120	13.5 13.5	10 12
355	Axial seals at both ends	VS 95 VS 110	VS 95 VS 95	95x120x12[1)] 110x140x12[1)]	2 4-12	95 110	120 140	13.5 15.5	12 12

[1)] Viton-seal

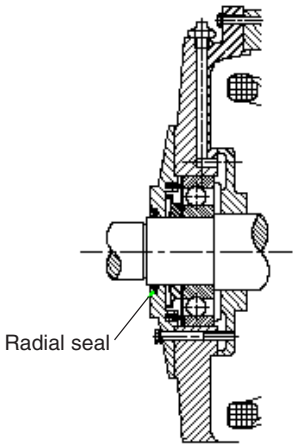
Motor sizes 71-132



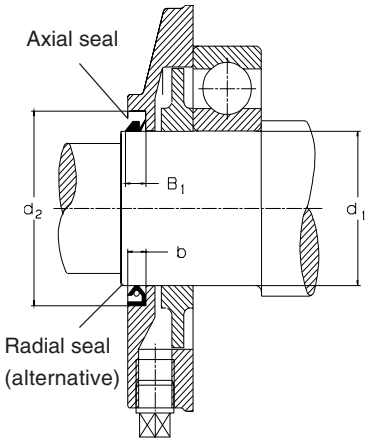
Motor sizes 160-225



Motor size 250



Motor sizes 280-355



Bearing life

The nominal life L_{10} of a bearing is defined according to ISO as the number of operating hours achieved or exceeded by 90% of identical bearings in a large test series under certain specified conditions. 50% of the bearings achieve at least five times this figure.

The calculated bearing life L_{10} for power transmission by means of a coupling (horizontal machine):

Motor sizes 280 to 355 $\geq$ 200,000 hours.

Lubrication

On delivery, the motors are lubricated with a type of grease intended for use in dry or humid environments, at normal ambient temperature.

Standard versions of motors 71 to 225 are lubricated for life, with lithium based grease.

Motors 160 to 225 are available with either permanent greased or, as against variant codes, with regreasable bearings.

Motors 250 to 355 have grease value lubrication for lubrication in service. The lubrication intervals and quantity are stated in the maintenance manual which comes with the motor.

Pulley diameter

When the desired bearing life has been determined, the minimum permissible pulley diameter can be calculated with FR (or FRX), according to the formula:

$$D = \frac{1.9 \cdot 10^7 \cdot K \cdot P}{N \cdot F_R}$$

Where:
D = diameter of pulley, mm
P = power requirement, kW
N = motor speed, r /min
K = belt tension factor, dependent on belt type and type of duty. A common value for V belts is K= 2.5
F_R = permissible radial force

Permissible loadings on shaft

4

The tables below give the permissible radial force in Newtons,assuming zero axial force. The values are based on normal conditions at 50 Hz and calculated bearing lives of 20,000 and 40,000 hours.

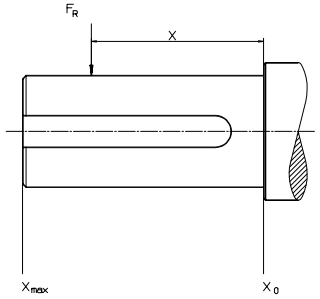
Motors are foot-mounted IM B3 version with force directed sideways. In some cases the strength of the shaft affects the permissible forces.

At 60 Hz the values must be reduced by 10 %.

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

$$F_R = F_{X0} - \frac{X}{E}(F_{X0} - F_{Xmax})$$

E = length of shaft extension in basic version



Permissible radial forces

Motor size	Poles	Length of shaft extension E (mm)	Radial forces Ball bearings 20,000 hours X_0 (N)	X_{max} (N)	40,000 X_0 (N)	X_{max} (N)
71 M	2	30	381	322	303	256
	4	30	480	405	381	322
	6	30	555	469	441	372
80 M	2	40	624	509	495	404
	4	40	788	643	626	511
	6	40	907	740	720	587
	8	40	997	813	791	646
90 S	2	40	686	542	545	430
	4	40	870	687	690	545
	6	40	1000	790	794	627
	8	40	1095	866	870	687

Permissible radial forces

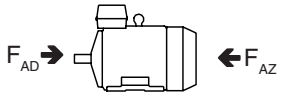
Motors size	Poles	Length of shaft extension E (mm)	Radial forces Ball bearings 20,000 hours X_0 (N)	X_{max} (N)	40,000 X_0 (N)	X_{max} (N)
90 L	2	50	696	564	553	448
	4	50	885	717	702	569
	6	50	1015	823	806	653
	8	50	1112	901	883	715
100 L	2	60	979	785	777	622
	4	60	1234	989	979	785
	6	60	1419	1137	1126	903
	8	60	1566	1255	1243	996
112 M	2	60	1258	1014	998	805
	4	60	1592	1284	1264	1019
	6	60	1831	1477	1453	1172
	8	60	2020	1629	1603	1293
132 S	2	80	1435	1122	1139	890
	4	80	1821	1423	1445	1130
	6	80	2079	1625	1650	1290
	8	80	2299	1797	1825	1427
132 M	4	80	1840	1476	1461	1172
	6	80	2107	1690	1672	1341
	8	80	2329	1869	1849	1483
160 M	2	110	1544	1200	1226	952
	4	110	1948	1513	1546	1201
	6	110	2232	1734	1772	1377
	8	110	2465	1916	1957	1520
160L	2	110	1563	1243	1240	987
	4	110	1971	1568	1565	1244
	6	110	2259	1797	1793	1426
	8	110	2495	1984	1980	1575
180M	2	110	2984	2371	2368	1882
	4	110	3759	2988	2984	2371
180L	4	110	3802	3073	3017	2439
	6	110	4352	3518	3454	2792
	8	110	4800	3881	3810	3080
200L	2	110	4090	3377	3246	2680
	4	110	5162	4262	4097	3383
	6	110	5909	4879	4690	3872
	8	110	6518	5382	5173	4272
225S	4	140	5763	4526	4574	4593
	8	140	7261	5703	5763	4526
225M	2	110	4591	3811	3644	3025
	4	110	5791	4594	4596	3646
	6	110	6644	5271	5273	4184
	8	110	7296	5788	5791	4594
250M	2	140	5112	4170	4057	3310
	4	140	6440	5254	5111	4170
	6	140	7388	6027	5864	4784
	8	140	8113	6619	6439	5253
280SM_	2	140	7300	6200	5800	4900
	4	140	9200	7800	7300	6200
	6	140	10600	8900	8400	7100
	8	140	11600	9800	9200	7800
315SM_	2	140	7300	6000	5800	4950
	4	170	11300	9400	9000	7500
	6	170	13000	10600	10300	8500
	8	170	14300	10400	11300	9400
315ML	2	140	7300	6000	5800	4950
	4	140	11300	9400	9000	7500
	6	140	13000	10600	10300	8500
	8	140	14300	10400	11300	9400
355 S_	2	140	9000	7900	6200	5300
	4	210	15200	12500	12000	9850
	6	210	17300	14200	13700	11300
	8	210	19000	15600	15200	12400

Permissible axial forces

The following tables give the permissible axial forces in Newton, assuming zero radial force. The values are based on normal conditions at 50 Hz with standard bearings and calculated bearing lives of 20,000 and 40,000 hours.
Motors are foot-mounted IM B3 version.

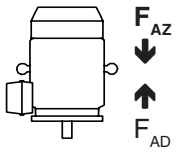
At 60 Hz the values are to be reduced by 10%.

Mounting arrangement IM B3



Motor size	20,000 hours 2-pole F_{AD} N	2-pole F_{AZ} N	4-pole F_{AD} N	4-pole F_{AZ} N	6-pole F_{AD} N	6-pole F_{AZ} N	8-pole F_{AD} N	8-pole F_{AZ} N	40,000 hours 2-pole F_{AD} N	2-pole F_{AZ} N	4-pole F_{AD} N	4-pole F_{AZ} N	6-pole F_{AD} N	6-pole F_{AZ} N	8-pole F_{AD} N	8-pole F_{AZ} N
71	270	270	360	360	440	440	-	-	200	200	270	270	320	320	-	-
80	430	430	590	590	710	710	800	800	320	320	440	440	530	530	600	600
90	470	470	650	650	780	780	870	870	350	350	470	470	580	580	650	650
100	650	650	880	880	1060	1060	1200	1200	480	480	650	650	780	780	890	890
112	840	840	1160	1160	1380	1380	1570	1570	620	620	850	850	1020	1020	1170	1170
132 S_	950	950	1300	1300	1540	1540	1760	1760	690	690	960	960	1140	1140	1310	1310
132 M_	-	-	1300	1300	1540	1540	1760	1760	-	-	950	950	1140	1140	1310	1310
160	1020	1020	1380	1380	1650	1650	1880	1880	740	740	1020	1020	1210	1210	1390	1390
180M	1970	1970	2660	2660	-	-	-	-	1440	1440	1970	1970	-	-	-	-
180L	-	-	2660	2660	3200	3200	3620	3620	-	-	1970	1970	2350	2350	2670	2670
200	2570	2570	3490	3490	4200	4200	4750	4750	1890	1890	2580	2580	3080	3080	3500	3500
225S	-	-	3900	3900	-	-	5310	5310	-	-	2880	2880	-	-	3900	3900
225M	2870	2870	3900	3900	4720	4720	5310	5310	2120	2120	2880	2880	3460	3460	3900	3900
250	3220	3220	4380	4380	5290	5290	5960	5960	2380	2380	3220	3220	3880	3880	4380	4380
280	7300	5300	8000	6000	9000	7000	10000	8000	5750	3750	6200	4200	6900	4900	7700	5700
315	7000	5000	9000	7000	10600	8600	11600	9600	5600	3600	6900	4900	7900	5900	8900	6900
355	10500	3500	13500	6500	15300	8300	16800	9800	8750	1750	10800	3800	12000	5000	13300	6300

Mounting arrangement IM V1



Motor size	20,000 hours 2-pole F_{AD} N	2-pole F_{AZ} N	4-pole F_{AD} N	4-pole F_{AZ} N	6-pole F_{AD} N	6-pole F_{AZ} N	8-pole F_{AD} N	8-pole F_{AZ} N	40,000 hours 2-pole F_{AD} N	2-pole F_{AZ} N	4-pole F_{AD} N	4-pole F_{AZ} N	6-pole F_{AD} N	6-pole F_{AZ} N	8-pole F_{AD} N	8-pole F_{AZ} N
71	280	260	380	350	450	420	-	-	210	190	280	250	340	310	-	-
80	450	410	620	560	740	560	830	770	340	300	460	410	550	500	620	560
90	500	440	590	600	820	730	920	830	380	320	510	440	620	530	690	600
100	710	590	950	800	1140	980	1280	1110	530	420	720	560	860	700	970	800
112	920	770	1260	1050	1490	1270	1680	1470	690	540	950	740	1130	910	1270	1060
132 S_	1050	830	1450	1160	1690	1400	1930	1600	800	570	1100	810	1280	990	1470	1140
132 M_	-	-	1480	1120	1730	1320	1950	1580	-	-	1130	770	1320	910	1490	1120
160 M_	1240	750	1670	1100	1960	1340	2140	1560	970	480	1300	730	1530	900	1650	1070
160 L_	1320	710	1730	1030	2050	1250	2260	1500	1050	440	1370	670	1610	820	1770	1010
180 M_	2320	1630	3100	2230	-	-	-	-	1780	1100	2400	1540	-	-	-	-
180 L_	-	-	3170	2150	3750	2650	4160	3100	-	-	2480	1460	2900	1800	3200	2140
200	3050	2050	4100	2880	4830	3510	5450	4060	2370	1370	3180	1970	3700	2390	4200	2800
225 S_	-	-	4680	3130	-	-	6120	4500	-	-	3650	2100	-	-	4720	3090
225 M_	3570	2180	4770	3040	5650	3790	6250	4370	2810	1420	3740	2020	4390	2530	4850	2960
250	4090	2360	5570	3180	6520	4070	7210	4700	3240	1520	4420	2030	5100	2650	5630	3120
280	8500	4300	9500	4600	11000	5500	12200	6600	6950	2700	7700	2800	8900	3350	9750	4200
315 SM_	9000	3700	11600	5400	13500	6200	14500	7500	7450	2100	9450	3200	10900	3650	11900	4650
315 ML_	9600	3400	12400	5000	14800	5600	16200	7000	8100	1850	10100	2850	12200	3150	13200	4150
355 S_	14100	1600	18500	3800	21200	5000	23000	6800	12200	[1]	15700	1000	18000	1750	19400	3100

Ordering information

Sample order

When placing an order, please state the following minimum data in the order, as in the example.

The product code of the motor is composed in accordance with the following example.

Motor type	M2QA 90S4A
Pole number	4
Mounting arrangement (IM-code)	IM B3 (IM 1001)
Rated output	1.1 kW
Product code	3GQA092101-ADA
Variant codes if needed	

A	B	C	D, E, F	G
M2QA	90S4A	3GQA 092 101 -	AD	A 003 etc.
		1-4 / 5-6 / 7 / 8-10 / 11 / 12 / 13 / 14		

A Motor type
B Motor size
C Product code
D Mounting arrangement code
E Voltage and frequency code
F Generation code
G Variant codes

Explanation of the product code (C, D, E, F):

Positions 1 to 4
M2QA = Totally enclosed fan cooled squirrel cage motor with cast iron frame

Positions 5 and 6
IEC frame

07 = 71	**11** = 112	**20** = 200	**31** = 315
08 = 80	**13** = 132	**22** = 225	**35** = 355
09 = 90	**16** = 160	**25** = 250	
10 = 100	**18** = 180	**28** = 280	

Position 7
Speed (Pole pairs)

1 = 2 poles	**6** = 12 poles
2 = 4 poles	**7** = >12 poles
3 = 6 poles	**8** = Two-speed motors
4 = 8 poles	**9** = Multi-speed motors
5 = 10 poles	

Positions 8 to 10
Serial number

Position 11
- (dash)

Position 12
Mounting arrangement
A = Foot-mounted, top-mounted terminal box
R = Foot-mounted, terminal box on RHS, seen from D-end
L = Foot-mounted, terminal box on LHS, seen from D-end
B = Flange-mounted, large flange
C = Flange-mounted, small flange sizes (71-112)
H = Foot- and flange-mounted

Position 13
Voltage and frequency code
See tables on appropriate page

Position 14
Generation code
A, B, C…

The product code must be, if needed, followed by variant codes.

Code letters for supplementing the product code for voltage and frequency:

A	B	D	E	F	H
380 VY 50 Hz	380 VΔ 50 Hz	380-420 VΔ 50 Hz 660-690 VY 50 Hz 440-480[1] VΔ 60 Hz	500 VΔ 50 Hz 575 VΔ 60 Hz	500 VY 50 Hz 575 VY 60 Hz	415 VΔ 50 Hz

S	T	U	X	
220-240 VΔ 50 Hz 380-420 VY 50 Hz 440-480 VY 60 Hz	660 VΔ 50 Hz	690 VΔ 50 Hz	Other rated voltage, connection or frequency, max. 690 V	[1] 480 V not stamped on sizes 160 to 250

General purpose cast iron motors

Technical data for totally enclosed squirrel cage three phase motors

EFF 2

IP 55 – IC 411 – Insulation class F, temperature rise class B

Output kW		Motor type		Product code	Speed r/min	Efficiency Full load 100%	Efficiency 3/4 load 75%	Power factor cos φ 100%	Current I_N A	Current $\frac{I_s}{I_N}$	Torque T_N Nm	Torque $\frac{T_s}{T_N}$	Torque $\frac{T_{max}}{T_N}$
3000 r/min = 2 poles					**400 V 50 Hz**								
0.37		**M2QA**	**71 M2A**	3GQA 071 301-••A	2780	70.0	68.0	0.81	0.94	6.1	1.27	2.2	3.0
0.55		**M2QA**	**71 M2B**	3GQA 071 302-••A	2785	73.0	72.4	0.82	1.33	6.1	1.89	2.2	2.7
0.75		**M2QA**	**80 M2A**	3GQA 081 301-••A	2840	75.0	75.5	0.85	1.7	6.1	2.52	2.2	3.0
1.1		**M2QA**	**80 M2B**	3GQA 081 302-••A	2855	78.0	77.9	0.85	2.4	7.0	3.68	2.2	2.2
1.5		**M2QA**	**90 S2A**	3GQA 091 101-••A	2850	79.0	79.0	0.87	3.15	7.0	5.03	2.2	2.5
2.2		**M2QA**	**90 L2A**	3GQA 091 501-••A	2850	81.5	81.8	0.86	4.53	7.0	7.37	2.2	3.5
3		**M2QA**	**100 L2A**	3GQA 101 501-••A	2860	83.0	83.2	0.88	5.93	7.0	10.02	2.2	3.0
4		**M2QA**	**112 M2A**	3GQA 111 301-••A	2900	85.0	84.6	0.90	7.55	7.0	13.17	2.2	3.2
5.5		**M2QA**	**132 S2A**	3GQA 131 101-••A	2920	87.5	87.9	0.89	10.2	7.0	17.99	2.2	3.0
7.5		**M2QA**	**132 S2B**	3GQA 131 102-••A	2920	88.5	90.1	0.90	13.6	7.0	24.53	2.2	3.5
11		**M2QA**	**160 M2A**	3GQA 161 301-••A	2930	90.0	90.5	0.89	19.82	6.5	35.85	2.5	3.1
15		**M2QA**	**160 M2B**	3GQA 161 302-••A	2920	90.0	90.1	0.89	27.03	6.5	49.06	2.5	2.6
18.5		**M2QA**	**160 L2A**	3GQA 161 501-••A	2930	90.5	90.9	0.90	32.78	6.5	60	2.5	2.7
22		**M2QA**	**180 M2A**	3GQA 181 301-••A	2940	90.8	91.0	0.90	38.86	6.5	71	2.3	2.5
30		**M2QA**	**200 L2A**	3GQA 201 501-••A	2955	91.4	91.1	0.90	52	6.5	96	2.2	2.6
37		**M2QA**	**200 L2B**	3GQA 201 502-••A	2955	92.2	91.8	0.90	64	6.5	119	2.3	2.6
45		**M2QA**	**225 M2A**	3GQA 221 301-••A	2970	92.6	92.2	0.89	78	7.0	144	2.5	2.7
55		**M2QA**	**250 M2A**	3GQA 251 301-••A	2960	93.4	91.7	0.89	96	7.5	177	2.4	2.7
75		**M2BAT**	**280 SMA**	3GBA 281 210-••D	2974	94.1	93.6	0.87	134	6.7	241	1.7	2.6
90		**M2BAT**	**280 SMB**	3GBA 281 220-••D	2970	94.5	94.2	0.89	156	6.4	289	1.7	2.5
110	[1]	**M2BAT**	**280 SMC**	3GBA 281 230-••D	2973	95.0	94.8	0.90	187	6.7	353	1.9	2.6
110		**M2BAT**	**315 SMA**	3GBA 311 210-••D	2979	94.1	93.4	0.85	198	6.3	353	1.5	2.5
132		**M2BAT**	**315 SMB**	3GBA 311 220-••D	2977	94.7	94.1	0.87	232	6.3	423	1.7	2.5
160		**M2BAT**	**315 SMC**	3GBA 311 230-••D	2976	95.1	94.8	0.88	273	6.2	513	1.7	2.4
200		**M2BAT**	**315 MLA**	3GBA 311 410-••D	2980	95.7	95.3	0.88	345	7.9	641	2.6	3.1
250		**M2BAT**	**355 S**	3GBA 351 100-••D	2983	95.7	95.3	0.89	424	6.8	800	1.5	2.8

[1] High-output design

[2] Temperature rise class F by voltage 380 V 50 Hz.

The two bullets in the product code indicate choice of mounting arrangement, voltage and frequency (see ordering information page).

General purpose cast iron motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 – IC 411 – Insulation class F, temperature rise class B

Output kW	Motor type	Speed r/min	Effi-ciency %	Power factor cos φ	Current I_N A	Speed r/min	Effi-ciency %	Power factor cos φ	Current I_N A	Moment of inertia J = ¼ D^2 kgm²	Weight kg	Sound pressure level L_P dB(A)
3000 r/min = 2 poles		**380 V 50 Hz**				**415 V 50 Hz**						
0.37	**M2QA 71 M2A**	2765	70.0	0.83	0.97	2795	70.0	0.79	0.93	0.0003	10	56
0.55	**M2QA 71 M2B**	2780	73.0	0.84	1.37	2800	73.0	0.79	1.33	0.00037	11	56
0.75	**M2QA 80 M2A**	2825	75.5	0.86	1.75	2855	75.0	0.85	1.64	0.00091	16	57
1.1	**M2QA 80 M2B**	2840	77.5	0.86	2.52	2870	78.0	0.83	2.37	0.00107	17	58
1.5	**M2QA 90 S2A**	2835	79.0	0.90	3.23	2865	79.0	0.86	3.08	0.00135	21	61
2.2	**M2QA 90 L2A**	2835	81.5	0.89	4.61	2865	81.0	0.83	4.56	0.00163	24	61
3	**M2QA 100 L2A**	2845	83.0	0.90	6.14	2875	83.5	0.86	5.85	0.00402	33	65
4	**M2QA 112 M2A**	2885	85.0	0.92	7.82	2915	85.0	0.87	7.53	0.00671	42	67
5.5	**M2QA 132 S2A**	2905	87.5	0.90	10.7	2935	88.0	0.88	9.94	0.01241	58	70
7.5	**M2QA 132 S2B**	2905	87.5	0.90	14.5	2935	89.0	0.90	13.1	0.01491	63	70
11	**M2QA 160 M2A**	2918	90.0	0.91	20.41	2930	90.0	0.87	19.54	0.0436	112	72
15	**M2QA 160 M2B**	2917	90.0	0.91	27.82	2932	90.0	0.88	26.35	0.0551	122	72
18.5	**M2QA 160 L2A**	2920	90.5	0.91	34.13	2935	90.5	0.89	31.95	0.06549	142	72
22	**M2QA 180 M2A**	2940	90.8	0.91	40.45	2955	90.8	0.88	38.3	0.08805	170	72
30	**M2QA 200 L2A**	2950	91.2	0.91	54	2960	91.3	0.89	51	0.14821	235	81
37	**M2QA 200 L2B**	2950	91.7	0.91	67	2960	92.3	0.89	62	0.16822	254	81
45	**M2QA 225 M2A**	2965	92.2	0.90	82	2975	92.6	0.87	77	0.29345	328	81
55	**M2QA 250 M2A**	2956	93.2	0.90	100	2962	93.5	0.88	93	0.3784	390	84
75	**M2BAT 280 SMA**	2970	94.0	0.88	137	2976	94.2	0.86	130	0.7	570	78
90 [2]	**M2BAT 280 SMB**	2966	94.2	0.89	163	2974	94.6	0.88	151	0.82	610	78
110 [2]	**M2BAT 280 SMC**	2968	94.8	0.90	198	2975	95.1	0.89	180	1.05	660	78
110	**M2BAT 315 SMA**	2976	94.1	0.86	208	2980	94.1	0.83	197	1.05	820	83
132 [2]	**M2BAT 315 SMB**	2974	94.5	0.87	243	2979	94.7	0.85	230	1.25	870	83
160 [2]	**M2BAT 315 SMC**	2972	95.0	0.88	290	2978	95.2	0.88	265	1.5	960	83
200 [2]	**M2BAT 315 MLA**	2978	95.6	0.89	358	2982	95.7	0.87	335	1.95	1130	83
250	**M2BAT 355 S**	2981	95.7	0.90	440	2984	95.7	0.88	412	2.7	1500	83

[1] High-output design

[2] Temperature rise class F by voltage 380 V 50 Hz.

General purpose cast iron motors

Technical data for totally enclosed squirrel cage three phase motors

EFF 2

IP 55 – IC 411 – Insulation class F, temperature rise class B

Output kW		Motor type	Product code	Speed r/min	Efficiency Full load 100%	Efficiency 3/4 load 75%	Power factor cos φ 100%	Current I_N A	Current I_s/I_N	Torque T_N Nm	Torque T_s/T_N	Torque T_{max}/T_N
1500 r/min = 4 poles				**400 V 50 Hz**					**Basic design**			
0.25		**M2QA 71 M4A**	3GQA 072 301-••A	1395	65.5	63.3	0.72	0.77	5.2	1.71	2.1	2.7
0.37		**M2QA 71 M4B**	3GQA 072 302-••A	1395	68.5	69.4	0.75	1.04	5.2	2.53	2.1	2.7
0.55		**M2QA 80 M4A**	3GQA 082 301-••A	1410	73.5	71.4	0.72	1.5	5.2	3.73	2.4	2.7
0.75		**M2QA 80 M4B**	3GQA 082 302-••A	1415	74.5	75.2	0.75	1.93	6.0	5.06	2.4	2.6
1.1		**M2QA 90 S4A**	3GQA 092 101-••A	1400	77.5	77.8	0.78	2.65	6.0	7.5	2.3	2.4
1.5		**M2QA 90 L4A**	3GQA 092 501-••A	1390	78.5	79.2	0.79	3.5	6.0	10.31	2.3	2.6
2.2		**M2QA 100 L4A**	3GQA 102 501-••A	1430	81.5	82.3	0.81	4.85	6.0	14.69	2.3	2.7
3		**M2QA 100 L4B**	3GQA 102 502-••A	1420	82.8	82.5	0.83	6.3	6.5	20.18	2.3	2.8
4		**M2QA 112 M4A**	3GQA 112 301-••A	1430	85.0	84.6	0.82	8.29	6.5	26.71	2.3	2.8
5.5		**M2QA 132 S4A**	3GQA 132 101-••A	1430	86.0	87.1	0.85	10.9	6.5	36.73	2.3	2.9
7.5		**M2QA 132 M4A**	3GQA 132 301-••A	1440	88.5	88.3	0.85	14.4	6.5	49.74	2.3	2.7
11		**M2QA 160 M4A**	3GQA 162 301-••A	1460	89.5	90.0	0.85	20.87	6.5	71	2.4	2.8
15		**M2QA 160 L4A**	3GQA 162 501-••A	1460	90.0	90.4	0.86	27.97	6.5	98	2.3	2.6
18.5		**M2QA 180 M4A**	3GQA 182 301-••A	1470	91.0	90.9	0.86	34.12	6.5	120	2.3	3.4
22		**M2QA 180 L4A**	3GQA 182 501-••A	1470	91.5	90.0	0.88	39.44	6.5	142	2.4	3.0
30		**M2QA 200 L4A**	3GQA 202 501-••A	1470	92.2	91.8	0.88	53	6.5	194	2.2	2.9
37		**M2QA 225 S4A**	3GQA 222 101-••A	1480	92.6	91.2	0.85	67	7.0	238	2.2	2.7
45		**M2QA 225 M4A**	3GQA 222 301-••A	1480	92.8	91.7	0.87	80	7.0	290	2.2	2.7
55		**M2QA 250 M4A**	3GQA 252 301-••A	1480	93.4	91.3	0.87	98	7.0	354	2.4	2.7
75		**M2BAT 280 SMA**	3GBA 282 210-••D	1483	94.2	94.2	0.83	138	6.3	483	2.1	2.6
90		**M2BAT 280 SMB**	3GBA 282 220-••D	1481	94.6	94.7	0.86	162	6.4	580	2.1	2.4
110	[1]	**M2BAT 280 SMC**	3GBA 282 230-••D	1484	95.1	95.1	0.85	196	7.1	708	2.7	2.8
110		**M2BAT 315 SMA**	3GBA 312 210-••D	1486	94.6	94.2	0.84	203	6.4	707	1.7	2.3
132		**M2BAT 315 SMB**	3GBA 312 220-••D	1485	94.9	94.7	0.85	239	6.1	849	1.9	2.4
160		**M2BAT 315 SMC**	3GBA 312 230-••D	1486	95.4	95.2	0.85	286	6.7	1028	2.1	2.6
200		**M2BAT 315 MLA**	3GBA 312 410-••D	1485	95.7	95.6	0.86	354	6.4	1286	2.1	2.5
250		**M2BAT 355 S**	3GBA 352 100-••D	1488	95.6	95.3	0.85	448	6.7	1604	2.0	2.6

[1] High-output design

[2] Temperature rise class F by voltage 380 V 50 Hz.

The two bullets in the product code indicate choice of mounting arrangement, voltage and frequency (see ordering information page).

General purpose cast iron motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 – IC 411 – Insulation class F, temperature rise class B

Output kW		Motor type		Speed r/min	Effi-ciency %	Power factor cos φ	Current I_N A	Speed r/min	Effi-ciency %	Power factor cos φ	Current I_N A	Moment of inertia J = ¼ D² kgm²	Weight kg	Sound pressure level L_p dB(A)
1500 r/min = 4 poles				**380 V 50 Hz**				**415 V 50 Hz**				**Basic design**		
0.25		**M2QA**	**71 M4A**	1385	66.0	0.74	0.78	1405	64.0	0.69	0.79	0.00053	11	43
0.37		**M2QA**	**71 M4B**	1385	69.0	0.78	1.05	1405	68.0	0.71	1.07	0.00066	11	45
0.55		**M2QA**	**80 M4A**	1400	73.5	0.75	1.52	1420	72.5	0.68	1.55	0.00145	16	46
0.75		**M2QA**	**80 M4B**	1405	74.5	0.78	1.97	1425	74.0	0.72	1.96	0.00174	17	46
1.1		**M2QA**	**90 S4A**	1390	77.0	0.80	2.72	1410	77.5	0.75	2.65	0.00254	21	52
1.5		**M2QA**	**90 L4A**	1380	78.5	0.80	3.64	1400	78.5	0.77	3.48	0.00317	25	52
2.2		**M2QA**	**100 L4A**	1420	81.5	0.82	4.98	1440	81.4	0.78	4.85	0.00679	32	53
3		**M2QA**	**100 L4B**	1410	82.5	0.85	6.5	1430	82.7	0.82	6.17	0.00862	36	53
4		**M2QA**	**112 M4A**	1420	84.5	0.84	8.57	1440	85.0	0.80	8.24	0.01306	45	56
5.5		**M2QA**	**132 S4A**	1420	85.5	0.87	11.3	1440	86.5	0.83	10.7	0.02673	60	59
7.5		**M2QA**	**132 M4A**	1430	88.0	0.85	15.2	1450	88.0	0.84	14.1	0.03432	73	59
11		**M2QA**	**160 M4A**	1455	89.5	0.87	21.5	1463	89.5	0.83	20.6	0.06543	116	66
15		**M2QA**	**160 L4A**	1452	90.0	0.88	28.8	1461	90.0	0.85	27.28	0.09349	137	66
18.5		**M2QA**	**180 M4A**	1465	91.0	0.88	35.1	1470	91.0	0.82	34.49	0.16049	170	66
22		**M2QA**	**180 L4A**	1465	91.5	0.90	40.6	1475	91.5	0.86	38.9	0.18046	186	66
30		**M2QA**	**200 L4A**	1465	92.3	0.89	55	1470	86.8	0.87	55	0.2819	254	71
37		**M2QA**	**225 S4A**	1475	92.3	0.85	71	1480	92.0	0.82	68	0.37	308	73
45		**M2QA**	**225 M4A**	1475	92.6	0.88	83	1480	92.8	0.85	79	0.42	335	73
55		**M2QA**	**250 M4A**	1477	93.2	0.88	102	1482	93.6	0.86	95	0.78	450	76
75	[2]	**M2BAT**	**280 SMA**	1480	94.0	0.85	143	1484	94.2	0.82	137	1.05	560	71
90	[2]	**M2BAT**	**280 SMB**	1478	94.2	0.86	169	1483	94.7	0.85	157	1.32	600	71
110	[2]	**M2BAT**	**280 SMC**	1481	94.8	0.86	204	1485	95.2	0.84	191	1.7	660	71
110	[2]	**M2BAT**	**315 SMA**	1484	94.5	0.85	209	1487	94.6	0.82	198	1.9	800	78
132	[2]	**M2BAT**	**315 SMB**	1483	94.8	0.86	248	1486	95.0	0.84	232	2.2	855	78
160	[2]	**M2BAT**	**315 SMC**	1483	95.0	0.86	300	1487	95.4	0.84	279	2.6	930	78
200	[2]	**M2BAT**	**315 MLA**	1482	95.2	0.86	375	1486	95.7	0.85	343	3.2	1030	78
250		**M2BAT**	**355 S**	1487	95.6	0.86	465	1489	95.6	0.84	438	5.4	1500	82

[1] High-output design

[2] Temperature rise class F by voltage 380 V 50 Hz.

General purpose cast iron motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 – IC 411 – Insulation class F, temperature rise class B

Output kW		Motor type		Product code	Speed r/min	Efficiency Full load 100%	Efficiency 3/4 load 75%	Power factor cos φ 100%	Current I_N A	Current $\frac{I_s}{I_N}$	Torque T_N Nm	Torque $\frac{T_s}{T_N}$	Torque $\frac{T_{max}}{T_N}$
1000 r/min = 6 poles					**400 V 50 Hz**					**Basic design**			
0.18		**M2QA**	**71 M6A**	3GQA 073 301-••A	910	55.0	50.1	0.65	0.73	4.0	1.89	1.8	2.4
0.25		**M2QA**	**71 M6B**	3GQA 073 302-••A	890	60.0	58.3	0.65	0.93	4.0	2.68	1.8	2.5
0.37		**M2QA**	**80 M6A**	3GQA 083 301-••A	930	63.0	63.2	0.66	1.29	5.0	3.8	1.9	2.0
0.55		**M2QA**	**80 M6B**	3GQA 083 302-••A	925	65.0	65.1	0.68	1.8	5.0	5.68	1.9	1.8
0.75		**M2QA**	**90 S6A**	3GQA 093 101-••A	920	71.0	70.2	0.72	2.12	5.0	7.79	2.0	2.3
1.1		**M2QA**	**90 L6A**	3GQA 093 501-••A	920	73.0	73.1	0.74	2.94	5.0	11.42	2.0	2.6
1.5		**M2QA**	**100 L6A**	3GQA 103 501-••A	940	76.0	75.3	0.77	3.78	5.5	15.24	2.0	2.4
2.2		**M2QA**	**112 M6A**	3GQA 113 301-••A	940	80.0	81.2	0.76	5.23	5.5	22.35	2.0	2.3
3		**M2QA**	**132 S6A**	3GQA 133 101-••A	960	82.5	83.5	0.78	6.73	6.5	29.84	2.0	2.4
4		**M2QA**	**132 M6A**	3GQA 133 301-••A	960	84.0	84.2	0.77	8.93	6.5	39.79	2.0	2.9
5.5		**M2QA**	**132 M6B**	3GQA 133 302-••A	960	86.0	85.6	0.79	11.7	6.5	54	2.0	3.0
7.5		**M2QA**	**160 M6A**	3GQA 163 301-••A	970	88.0	88.3	0.78	15.77	6.0	73	2.0	2.3
11		**M2QA**	**160 L6A**	3GQA 163 501-••A	970	88.5	88.6	0.78	23	6.0	108	2.2	2.4
15		**M2QA**	**180 L6A**	3GQA 183 501-••A	980	89.0	89.1	0.82	29.67	6.0	146	2.3	2.9
18.5		**M2QA**	**200 L6A**	3GQA 203 501-••A	980	90.3	90.2	0.82	36.06	6.0	180	2.2	2.5
22		**M2QA**	**200 L6B**	3GQA 203 502-••A	980	90.4	90.3	0.83	42.32	6.0	214	2.1	3.2
30		**M2QA**	**225 M6A**	3GQA 223 301-••A	980	90.8	89.2	0.78	61	6.6	292	2.2	2.9
37		**M2QA**	**250 M6A**	3GQA 253 301-••A	980	92.2	92.4	0.88	66	6.8	360	2.3	2.6
45		**M2BAT**	**280 SMA**	3GBA 283 210-••D	990	93.5	93.3	0.82	85	6.7	434	2.4	2.4
55		**M2BAT**	**280 SMB**	3GBA 283 220-••D	989	93.8	93.7	0.83	103	6.4	531	2.4	2.4
75	[1]	**M2BAT**	**280 SMC**	3GBA 283 230-••D	989	94.5	94.5	0.83	139	6.9	724	2.6	2.5
75		**M2BAT**	**315 SMA**	3GBA 313 210-••D	992	94.2	94.0	0.80	145	6.3	722	1.9	2.3
90		**M2BAT**	**315 SMB**	3GBA 313 220-••D	991	94.8	94.7	0.83	166	6.5	867	1.9	2.3
110		**M2BAT**	**315 SMC**	3GBA 313 230-••D	991	95.1	95.0	0.82	206	6.7	1060	2.1	2.6
132		**M2BAT**	**315 MLA**	3GBA 313 410-••D	991	95.3	95.2	0.83	242	6.5	1272	2.2	2.5
160		**M2BAT**	**355 S**	3GBA 353 100-••D	992	95.3	95.2	0.83	293	6.2	1540	1.8	2.3

[1] High-output design

[2] Temperature rise class F by voltage 380 V 50 Hz.

The two bullets in the product code indicate choice of mounting arrangement, voltage and frequency (see ordering information page).

General purpose cast iron motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 – IC 411 – Insulation class F, temperature rise class B

Output kW	Motor type	Speed r/min	Effi-ciency %	Power factor cos φ	Current I_N A	Speed r/min	Effi-ciency %	Power factor cos φ	Current I_N A	Moment of inertia J = ¼ D^2 kgm²	Weight kg	Sound pressure level L_P dB(A)
1000 r/min = 6 poles		**380 V 50 Hz**				**415 V 50 Hz**				**Basic design**		
0.18	**M2QA 71 M6A**	905	55.5	0.69	0.72	915	52.5	0.62	0.77	0.00056	10	42
0.25	**M2QA 71 M6B**	885	60.0	0.65	0.98	895	59.0	0.62	0.95	0.00074	11	42
0.37	**M2QA 80 M6A**	925	63.5	0.70	1.29	935	62.0	0.62	1.33	0.00159	17	45
0.55	**M2QA 80 M6B**	920	65.0	0.71	1.82	930	65.5	0.66	1.79	0.00196	18	45
0.75	**M2QA 90 S6A**	915	71.0	0.75	2.13	925	70.5	0.69	2.15	0.00292	21	48
1.1	**M2QA 90 L6A**	915	73.0	0.77	2.98	925	73.0	0.70	2.98	0.00379	25	48
1.5	**M2QA 100 L6A**	935	76.0	0.79	3.8	945	75.5	0.75	3.73	0.00999	32	51
2.2	**M2QA 112 M6A**	935	79.0	0.77	5.5	945	80.0	0.75	5.14	0.03116	40	54
3	**M2QA 132 S6A**	955	82.0	0.81	6.87	965	82.5	0.76	6.66	0.03116	55	56
4	**M2QA 132 M6A**	955	84.0	0.77	9.39	965	84.0	0.75	8.84	0.04074	65	56
5.5	**M2QA 132 M6B**	945	85.5	0.80	12.3	955	86.0	0.78	11.4	0.05332	75	56
7.5	**M2QA 160 M6A**	968	88.0	0.79	16.4	975	88.0	0.75	15.81	0.09231	119	61
11	**M2QA 160 L6A**	966	88.5	0.80	23.6	975	88.5	0.75	23.06	0.1297	140	62
15	**M2QA 180 L6A**	980	89.0	0.84	30.5	985	89.0	0.79	29.68	0.2418	180	63
18.5	**M2QA 200 L6A**	975	90.6	0.84	36.9	980	90.1	0.79	36.16	0.34174	231	64
22	**M2QA 200 L6B**	975	90.9	0.84	43.8	980	90.1	0.81	41.93	0.46837	254	64
30	**M2QA 225 M6A**	980	90.5	0.78	64	980	90.9	0.76	60	0.62691	308	66
37	**M2QA 250 M6A**	978	92.0	0.90	68	982	92.3	0.86	64	0.97	382	68
45	**M2BAT 280 SMA**	988	93.9	0.83	89	990	93.5	0.80	84	1.6	540	71
55	**M2BAT 280 SMB**	987	93.5	0.84	108	990	93.8	0.82	101	1.9	580	71
75	**M2BAT 280 SMC**	987	94.3	0.84	144	990	94.6	0.82	135	2.6	660	71
75 [2]	**M2BAT 315 SMA**	990	94.1	0.82	148	992	94.2	0.77	143	2.8	780	75
90 [2]	**M2BAT 315 SMB**	990	95.7	0.84	174	992	94.8	0.81	163	3.6	870	75
110 [2]	**M2BAT 315 SMC**	990	94.9	0.83	215	991	95.0	0.80	203	4.4	930	75
132 [2]	**M2BAT 315 MLA**	989	95.1	0.83	255	991	95.3	0.82	237	5.3	1040	75
160	**M2BAT 355 S**	991	95.2	0.83	307	993	95.3	0.82	287	7.3	1500	77

[1] High-output design

[2] Temperature rise class F by voltage 380 V 50 Hz.

General purpose cast iron motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 – IC 411 – Insulation class F, temperature rise class B

Output kW		Motor type		Product code	Speed r/min	Efficiency Full load 100%	Efficiency 3/4 load 75%	Power factor cos φ 100%	Current I_N A	Current $\frac{I_s}{I_N}$	Torque T_N Nm	Torque $\frac{T_s}{T_N}$	Torque $\frac{T_{max}}{T_N}$
750 r/min = 8 poles					**400 V 50 Hz**					**Basic design**			
0.18		**M2QA**	**80 M8A**	3GQA 084 301-••A	700	51.0	50.1	0.60	0.85	3.3	2.46	1.8	1.9
0.25		**M2QA**	**80 M8B**	3GQA 084 302-••A	700	54.5	53.3	0.60	1.11	3.6	3.41	1.8	1.9
0.37		**M2QA**	**90 S8A**	3GQA 094 101-••A	700	62.5	62.1	0.60	1.42	4.4	5.05	1.8	1.9
0.55		**M2QA**	**90 L8A**	3GQA 094 501-••A	700	63.5	63.3	0.60	2.07	4.7	7.5	1.8	2.0
0.75		**M2QA**	**100 L8A**	3GQA 104 501-••A	700	70.0	70.1	0.64	2.42	5.0	10.23	1.8	2.2
1.1		**M2QA**	**100 L8B**	3GQA 104 502-••A	700	71.5	70.3	0.65	3.45	5.0	15.01	1.8	2.4
1.5		**M2QA**	**112 M8A**	3GQA 114 301-••A	700	75.0	75.4	0.68	4.27	5.0	20.46	1.8	2.4
2.2		**M2QA**	**132 S8A**	3GQA 134 101-••A	710	81.0	81.8	0.70	5.6	5.5	29.59	1.8	2.5
3		**M2QA**	**132 M8A**	3GQA 134 301-••A	710	81.0	81.4	0.75	7.13	5.5	40.35	1.8	2.2
4		**M2QA**	**160 M8A**	3GQA 164 301-••A	720	84.0	84.0	0.73	9.42	5.5	53	2.1	2.6
5.5		**M2QA**	**160 M8B**	3GQA 164 302-••A	720	85.5	85.6	0.74	12.55	5.5	72	2.1	2.8
7.5		**M2QA**	**160 L8A**	3GQA 164 501-••A	720	86.5	85.8	0.74	16.91	5.5	99	2.1	2.5
11		**M2QA**	**180 L8A**	3GQA 184 501-••A	730	87.7	87.0	0.77	23.51	5.4	143	2.0	2.8
15		**M2QA**	**200 L8A**	3GQA 204 501-••A	730	89.0	89.4	0.76	32.009	5.5	196	2.3	2.8
18.5		**M2QA**	**225 S8A**	3GQA 224 101-••A	740	90.0	89.1	0.75	39.56	5.5	238	2.1	2.7
22		**M2QA**	**225 M8A**	3GQA 224 301-••A	740	90.5	88.2	0.75	46.78	6.0	283	2.2	2.7
30		**M2QA**	**250 M8A**	3GQA 254 301-••A	740	91.3	90.1	0.79	60	6.5	387	2.3	2.4
37		**M2BAT**	**280 SMA**	3GBA 284 210-••D	741	93.5	93.3	0.78	74	7.3	477	1.8	3.0
45		**M2BAT**	**280 SMB**	3GBA 284 220-••D	741	94.0	93.8	0.78	90	7.6	580	1.9	3.2
55	[1]	**M2BAT**	**280 SMC**	3GBA 284 230-••D	741	94.4	94.3	0.79	108	7.8	709	1.9	3.2
55		**M2BAT**	**315 SMA**	3GBA 314 210-••D	740	94.1	94.0	0.81	104	7.1	710	1.6	2.7
75		**M2BAT**	**315 SMB**	3GBA 314 220-••D	740	94.4	94.3	0.82	140	7.1	968	1.7	2.7
90		**M2BAT**	**315 SMC**	3GBA 314 230-••D	740	94.8	94.7	0.82	167	7.4	1161	1.8	2.7
110		**M2BAT**	**315 MLA**	3GBA 314 410-••D	740	95.1	95.1	0.83	202	7.3	1420	1.8	2.7
132		**M2BAT**	**355 S**	3GBA 354 100-••D	743	95.0	94.9	0.81	247	6.5	1697	1.3	2.3

[1] High-output design

The two bullets in the product code indicate choice of mounting arrangement, voltage and frequency (see ordering information page).

General purpose cast iron motors

Technical data for totally enclosed squirrel cage three phase motors

IP 55 – IC 411 – Insulation class F, temperature rise class B

Output kW	Motor type	Speed r/min	Effi-ciency %	Power factor cos φ	Current I_N A	Speed r/min	Effi-ciency %	Power factor cos φ	Current I_N A	Moment of inertia J = ¼ D^2 kgm^2	Weight kg	Sound pressure level L_P dB(A)
750 r/min = 8 poles		**380 V 50 Hz**				**415 V 50 Hz**				**Basic design**		
0.18	**M2QA 80 M8A**	695	51.0	0.61	0.88	705	51.5	0.60	0.82	0.00111	16	42
0.25	**M2QA 80 M8B**	695	54.0	0.61	1.16	705	54.5	0.60	1.08	0.00326	17	42
0.37	**M2QA 90 S8A**	695	62.0	0.61	1.49	705	62.5	0.60	1.38	0.00541	21	46
0.55	**M2QA 90 L8A**	695	63.0	0.61	2.18	705	63.5	0.60	2.01	0.00756	24	46
0.75	**M2QA 100 L8A**	695	70.0	0.67	2.43	705	69.0	0.64	2.39	0.00971	31	53
1.1	**M2QA 100 L8B**	695	71.5	0.68	3.45	705	70.5	0.62	3.47	0.01186	34	53
1.5	**M2QA 112 M8A**	695	75.0	0.68	4.47	705	75.0	0.67	4.16	0.01559	42	55
2.2	**M2QA 132 S8A**	705	80.5	0.75	5.6	715	80.5	0.69	5.55	0.03625	56	55
3	**M2QA 132 M8A**	705	81.0	0.78	7.22	715	81.0	0.72	7.11	0.04141	64	56
4	**M2QA 160 M8A**	715	84.0	0.76	9.52	720	84.0	0.70	9.46	0.0676	105	58
5.5	**M2QA 160 M8B**	715	85.5	0.76	12.9	720	85.5	0.70	12.78	0.09524	125	58
7.5	**M2QA 160 L8A**	715	86.5	0.77	17.1	722	86.5	0.70	17.23	0.12122	142	58
11	**M2QA 180 L8A**	725	87.7	0.79	24.1	730	87.7	0.74	23.58	0.23645	176	61
15	**M2QA 200 L8A**	725	88.9	0.78	32.9	730	88.8	0.74	31.75	0.37103	235	63
18.5	**M2QA 225 S8A**	740	89.9	0.75	41.7	745	90.3	0.71	40.14	0.53287	290	65
22	**M2QA 225 M8A**	740	90.4	0.76	48.7	745	90.3	0.71	47.74	0.65825	302	65
30	**M2QA 250 M8A**	738	91.1	0.80	63	741	91.4	0.78	58	0.975	392	67
37	**M2BAT 280 SMA**	740	93.2	0.80	75	742	93.4	0.76	73	1.85	570	65
45	**M2BAT 280 SMB**	740	93.8	0.80	92	742	94.0	0.75	90	2.2	610	65
55	**M2BAT 280 SMC**	740	94.2	0.81	110	742	94.4	0.77	106	2.85	690	65
55	**M2BAT 315 SMA**	739	93.9	0.83	108	741	94.1	0.80	102	3.2	820	65
75	**M2BAT 315 SMB**	739	94.3	0.83	146	741	94.4	0.81	137	4.1	910	65
90	**M2BAT 315 SMC**	739	94.6	0.84	173	741	94.8	0.81	164	4.9	980	65
110	**M2BAT 315 MLA**	739	94.9	0.84	209	741	95.1	0.82	196	5.8	1100	72
132	**M2BAT 355 S**	742	94.9	0.82	258	743	95.0	0.80	244	7.3	1500	75

[1] High-output design

General purpose cast iron motors - Variant codes

Code/ Variant *)		Motor size 71-80	90-100	112-132	160-180	200-250	280-355
	Balancing						
052	Balancing to grade R (IEC 60034-14).	M	M	M	NA	NA	NA
424	Balancing to grade S (IEC 60034-14).	M	M	M	R	R	NA
417	Full key balancing.	M	M	M	R	R	NA
	Bearings and lubrication						
036	Transport lock for bearings.	NA	NA	NA	M	M	M
037	Roller bearing at D-end.	NA	NA	NA	M	M	M
039	Cold resistant grease .	M	M	M	M	M	M
040	Heat resistant grease	M	M	M	M	M	M
041	Bearings regreasable via grease nipples. Frame size 250 as standard.	NA	NA	NA	M	M	S
043	SPM-nipples. Frame size 355 as standard.	NA	NA	M	NA	NA	M
	Branch standard designs						
178	Stainless steel/acid proof bolts.	M	M	M	M	M	M
209	Non-standard voltage or frequency, (special winding).	M	M	M	M	M	NA
425	Corrosion protected stator and rotor core.	M	M	M	M	M	S
785	Reinforced tropicalisation.	S	S	S	S	S	S
	Cooling system						
068	Metal fan.	M	M	M	M	M	M
183	Separate motor cooling fan (fan axial, N-end).	P	M	M	P	P	NA
	Dimension drawing						
141	Binding dimension drawing.	M	M	M	M	M	M
	Drain holes						
065	Plugged existing drain holes.	NA	NA	NA	NA	NA	M
066	Modified drain hole position (for specified IM xxxx).	NA	NA	NA	NA	NA	M
076	Draining holes with plugs.	M	M	M	M	M	S
	Earthing bolt						
067	External earthing bolt.	M	M	M	M	M	M
	Heating elements						
450	Heating element, 100-120 V.	M	M	M	M	M	M
451	Heating element, 200-240 V.	M	M	M	M	M	M
	Insulation system						
014	Winding insulation class H.	P	P	P	P	P	NA
405	Special winding insulation for frequency converter supply.	P	P	P	P	P	NA

*) Certain variant codes cannot be used simultaneously.

S = Included as standard
M = On modification of a stocked motor, or on new manufacture,the number per order may be limited.
P = New manufacture only.
R = On request.
NA = Not applicable

Code/ Variant *)		Motor size 71-80	90-100	112-132	160-180	200-250	280-355
	Mounting arrangements						
008	IM2101 foot/flange mounted, IEC flange, from IM1001(B34 from B3). Not possible for frame size 132.	M	M	M	NA	NA	NA
009	IM2001 foot/flange mounted, IEC flange, from IM1001(B35 from B3).	M	M	M	M	M	M
047	IM 3601 flange mounted, IEC flange, from IM3001 (B14 from B5). Not possible for frame size 132.	M	M	M	NA	NA	NA
078	(IM 3601) flange mounted, DIN C-flange. Larger flange than standard version. Not possible for frame size 132.	M	M	M	NA	NA	NA
090	(IM 2101) foot/flange mounted, DIN C-flange, from IM 1001 (B34 from B3). Not possible for frame size 132.	M	M	M	NA	NA	NA
	Painting						
114	Special paint colour, standard grade.	M	M	M	M	M	M
	Protection						
005	Protective roof, vertical motor, shaft down.	M	M	M	M	M	M
072	Radial seal at D-end.	M	M	M	M	M	M
073	Sealed against oil at D-end.	P	P	P	P	P	P
211	Weather protected, IP xx W.	M	M	M	M	M	NA
401	Protective roof, horizontal motor.	M	M	M	M	M	M
403	Degree of protection IP56.	M	M	M	M	M	NA
158	Degree of protection IP65.	M	M	M	M	M	NA
	Rating & instruction plates						
001	Restamping voltage and output from 50 to 60 Hz or from 60 to 50 Hz.	M	M	M	M	M	M
002	Restamping voltage, frequency and output, continuous duty.	M	M	M	M	M	M
013	Restamping to output for class F temperature rise.	M	M	M	M	M	M
095	Restamping output (maintained voltage, frequency) intermittent duty.	M	M	M	M	M	M
138	Mounting of additional identification plate.	M	M	M	M	M	M
139	Additional identification plate delivered loose.	M	M	M	M	M	M
161	Additional rating plate delivered loose.	M	M	M	M	M	M
212	Restamping to output for class B temperature rise.	M	M	M	M	M	M
	Stator winding temperature sensors						
121	Bimetal detectors, break type (NCC), (3 in series), 130°C, in stator winding.	M	M	M	M	M	M
122	Bimetal detectors, break type (NCC), (3 in series), 150°C, in stator winding.	M	M	M	M	M	M
123	Bimetal detectors, break type (NCC), (3 in series), 170°C, in stator winding.	M	M	M	M	M	M
125	Bimetal detectors, break type (NCC), (2x3 in series), 150°C, in stator winding.	M	M	M	M	M	M
127	Bimetal detectors, break type (NCC), (3 in series, 130°C, & 3 in series, 150°C), in stator winding.	M	M	M	M	M	M

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Code/Variant *)		Motor size 71-80	90-100	112-132	160-180	200-250	280-355
321	Bimetal detectors, closing type (NO), (3 in parallel), 130°C, in stator winding.	M	M	M	M	M	M
322	Bimetal detectors, closing type (NO), (3 in parallel), 150°C, in stator winding.	M	M	M	M	M	M
323	Bimetal detectors, closing type (NO), (3 in parallel), 170°C, in stator winding.	M	M	M	M	M	M
325	Bimetal detectors, closing type (NO), (2x3 in parallel), 150°C, in stator winding.	M	M	M	M	M	M
327	Bimetal detectors, closing type (NO), (3 in parallel, 130°C, & 3 in parallel 150°C), in stator winding.	M	M	M	M	M	M
435	PTC-thermistors (3 in series), 130°C, in stator winding.	M	M	M	M	M	M
436	PTC-thermistors (3 in series), 150°C, in stator winding.	M	M	M	S	S	S
437	PTC-thermistors (3 in series), 170°C, in stator winding.	M	M	M	M	M	M
439	PTC-thermistors (2x3 in series), 150°C, in stator winding.	M	M	M	M	M	M
441	PTC-thermistors (3 in series 150°C & 3 in series 150°C, in stator winding.	M	M	M	M	M	M
442	PTC-thermistors (3 in series 150°C & 3 in series 150°C, in stator winding.	M	M	M	M	M	M
445	Pt100 (1per phase) in stator winding. Only for frame size 80.	M	M	M	M	M	M
446	Pt100 (2 per phase) in stator winding.	-	-	-	M	M	M
	Terminal box						
015	Motor supplied in D-connection.	M	M	M	M	M	M
017	Motor supplied in Y-connection.	M	M	M	M	M	M
021	Terminal box LHS, seen from D-end (= L in product code).	P	P	P	P	P	NA
137	Extended cable connection, low terminal box.	P	P	P	P	P	NA
157	Terminal box degree of protection IP65.	M	M	M	M	M	M
180	Terminal box RHS, seen from D-end (= R in product code).	M	M	M	M	M	NA
230	One standard cable gland or cable box.	M	M	M	M	M	S
231	Standard cable glands with clamping device.	M	M	M	M	M	R
400	4 x 90 degrees turnable terminal box.	S	S	S	M	M	NA
418	Separate terminal box for temperature detectors.	M	M	M	P	P	M
467	Lower than standard terminal box and rubber extended cable, length 2 m included.	P	P	P	P	P	NA
468	Cable entry from D-end.	M	M	M	M	M	M
469	Cable entry from N-end.	M	M	M	NA	NA	NA
731	Two standard cable glands.	M	M	M	M	M	S
	Testing						
145	Type test report from test of identical motor.	M	M	M	M	M	M
146	Type test with report for motor from specific delivery batch.	R	R	R	R	R	P
148	Routine test report.	M	M	M	M	M	M
760	Vibration level test.	M	M	M	M	M	M
762	Noise level test.	NA	NA	NA	NA	NA	M

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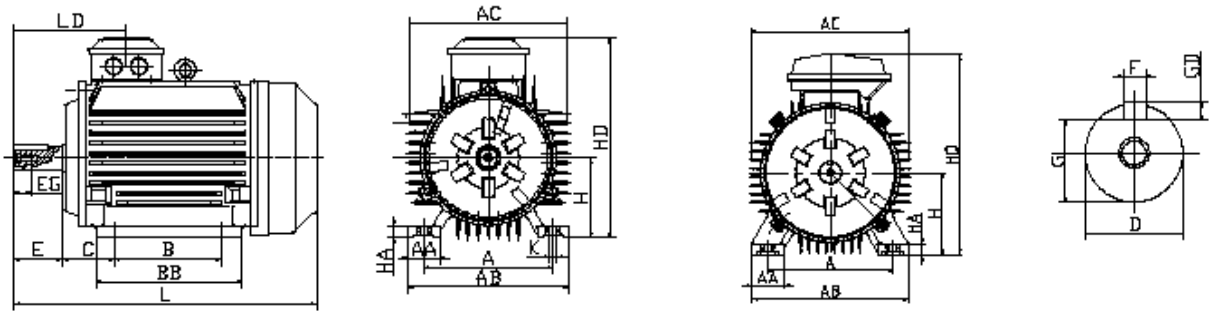
NA = Not applicable

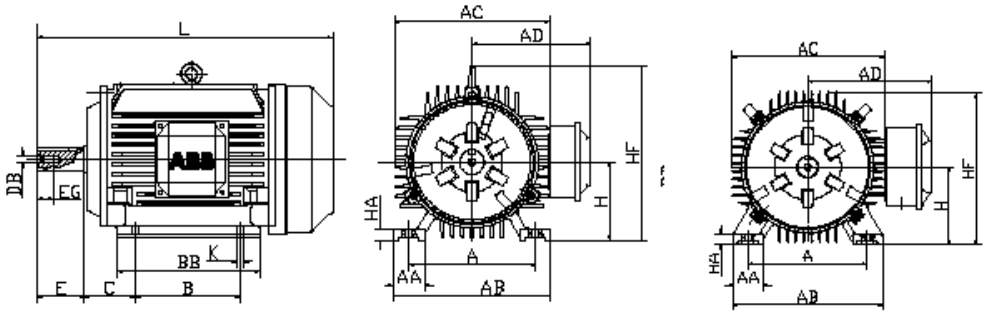
Dimension drawings

Foot-mounted; IM B3 (IM 1001), IM B6 (IM 1011), IM B7 (IM 1061), IM B8 (IM 1071), IM V5 (IM 1011), IM V6 (IM 1031)

Three phase motor, foot-mounted, terminal box top-mounted



Three phase motor, foot-mounted, terminal box on right hand side



4

Motor size	Poles	A	AA	AB	AC	AD	B	BB	C	D	DB	E	EG
71M	2-6	112	30	145	145	120	90	110	45	14	M5	30	12.5
80M	2-6	125	35	160	165	145	100	135	50	19	M6	40	16
90S	2-6	140	35	175	180	150	100	140	56	24	M8	50	19
90L	2-6	140	35	175	180	150	125	165	56	24	M8	50	19
100L	2-6	160	40	200	205	175	140	180	63	28	M10	60	22
112M	2-8	190	50	235	225	185	140	190	70	28	M10	60	22
132S	2-8	216	55	270	265	205	140	205	89	38	M12	80	28
132M	2-8	216	55	270	265	205	178	240	89	38	M12	80	28

Motor size	Poles	F	G	GD	H	HA	HD	HF	K	L	LD
71 M	2-6	5	11	5	71	10	200	-	7	255	100
80 M	2-6	6	15.5	6	80	12	225	170	10	285	116
90 S	2-6	8	20	7	90	12	240	185	10	310	128
90 L	2-6	8	20	7	90	12	240	185	10	335	128
100 L	2-6	8	24	7	100	14	275	245	12	380	144
112 M	2-6	8	24	7	112	15	290	265	12	380	144
132 S	2-6	10	33	8	132	18	335	300	12	465	169
132 M	2-6	10	33	8	132	18	335	300	12	505	169

Tolerances:

A, B, C	+, - 0.8	H	+ 0, - 0.5
D,DA	ISO m6	N	ISO j6
F, FA	ISO h9		

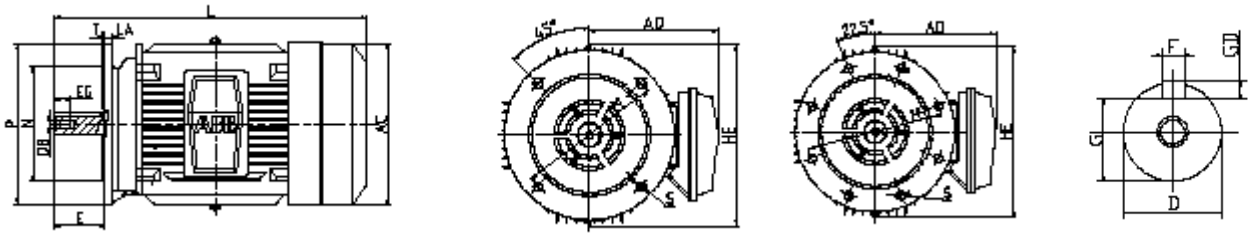
Above table gives the main dimensions in mm.

For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

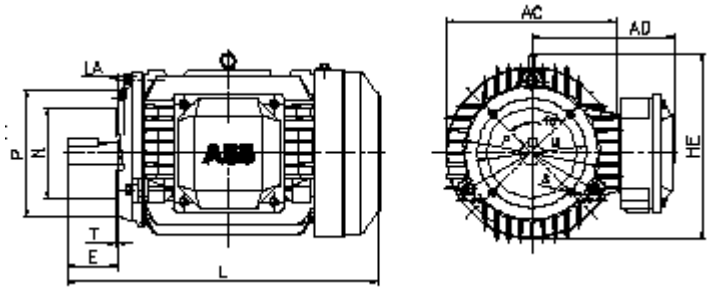
Dimension drawings

Flange-mounted; IM B5 (IM 3001), IM V1 IM 3001), IM V3 (IM 3031)
IM B14 (IM 3601), IM V18 (IM 3611), IM V19 (IM 3631)

Three phase motor, flange- mounted



Three phase motor, flange-mounted, small flange (B14)



4

IM B5 (IM3001), IM V1 (IM3011), IM V3 (IM3031)

Type M2QA	Poles	AC	AD	D	DB	E	EG	F	G	GD	HE	L	LA	M	N	P	S	T
71M	2-6	145	120	14	M5	30	12.5	5	11	5	165	255	9	130	110	160	10	3.5
80M	2-8	165	145	19	M6	40	16	6	15.5	6	200	285	9	165	130	200	12	3.5
90S	2-8	180	150	24	M8	50	19	8	20	7	200	310	10	165	130	200	12	3.5
90L	2-8	180	150	24	M8	50	19	8	20	7	200	335	10	165	130	200	12	3.5
100L	2-8	205	175	28	M10	60	22	8	24	7	265	380	11	215	180	250	15	4
112M	2-8	225	185	28	M10	60	22	8	24	7	270	395	11	215	180	250	15	4
132S	2-8	265	205	38	M12	80	28	10	33	8	320	465	12	265	230	300	15	4
132M	2-8	265	205	38	M12	80	28	10	33	8	320	505	12	265	230	300	15	4

IM B14 (IM3611), IM V19 (IM3631)

Motor size	Poles	Flange size	HE	P	M	N	S	T
71M	2-6	C105	145	105	85	70	M6	2.5
		C140	145	140	115	95	M8	3
80M	2-8	C120	165	120	100	80	M6	3
		C160	165	160	130	110	M8	3.5
90S	2-8	C140	185	140	115	95	M8	3
		C160	185	160	130	110	M8	3.5
90L	2-8	C140	185	140	115	95	M8	3
		C160	185	160	130	110	M8	3.5
100L	2-8	C160	255	160	130	110	M8	3.5
		C200	255	200	165	130	M10	3.5
112M	2-8	C160	265	160	130	110	M8	3.5
		C200	265	200	165	130	M10	3.5

Tolerances:

D,DA	ISO m6
F, FA	ISO h9
N	ISO j6

Above table gives the main dimensions in mm.

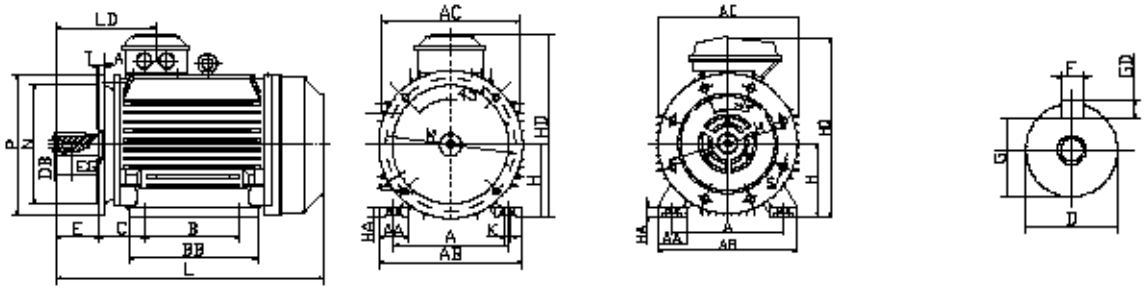
For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

General purpose cast iron motors Sizes 71-132

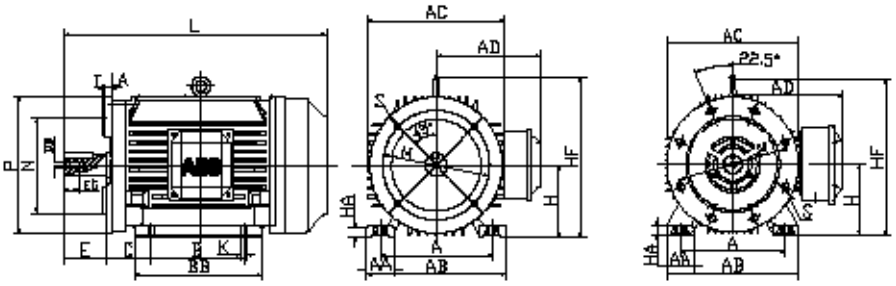
Dimension drawings

Foot- and flange-mounted; M B35 (IM 2001), IM V15 (IM 2011), IM V 36 (IM 2031)

Three phase motor, foot- and flange-mounted, terminal box top-mounted



Three phase motor, foot- and flange-mounted, terminal box on right



Motor size	Poles	A	AA	AB	AC	AD	B	BB	C	D	DB	E	EG	F
71M	2-6	112	30	145	145	120	90	110	45	14	M5	30	12.5	5
80M	2-8	125	35	160	165	145	100	135	50	19	M6	40	16	6
90S	2-8	140	35	175	180	150	100	140	56	24	M8	50	19	8
90L	2-8	140	35	175	180	150	125	165	56	24	M8	50	19	8
100L	2-8	160	40	200	205	175	140	180	63	28	M10	60	22	8
112M	2-8	190	50	235	225	185	140	190	70	28	M10	60	22	8
132S	2-8	216	55	270	265	205	140	205	89	38	M12	80	28	10
132M	2-8	216	55	270	265	205	178	240	89	38	M12	80	28	10

Motor size	Poles	G	GD	H	HA	HD	HF	K	L	LA	LD	M	N	P	S	T
71M	2-6	11	5	71	10	200	-	7	255	9	100	130	110	160	10	3.5
80M	2-8	15.5	6	80	12	225	170	10	285	9	116	165	130	200	12	3.5
90S	2-8	20	7	90	12	240	185	10	310	10	128	165	130	200	12	3.5
90L	2-8	20	7	90	12	240	185	10	335	10	128	165	130	200	12	3.5
100L	2-8	24	7	100	14	275	245	12	380	11	138	215	180	250	15	4
112M	2-8	24	7	112	15	290	265	12	395	11	144	215	180	250	15	4
132S	2-8	33	8	132	18	335	300	12	465	12	169	265	230	300	15	4
132M	4-8	33	8	132	18	335	300	12	505	12	169	265	230	300	15	4

Tolerances:

A, B, C	+- 0.8	H	+ 0, -0.5
D,DA	ISO m6	N	ISO j6
F, FA	ISO h9		

Above table gives the main dimensions in mm.

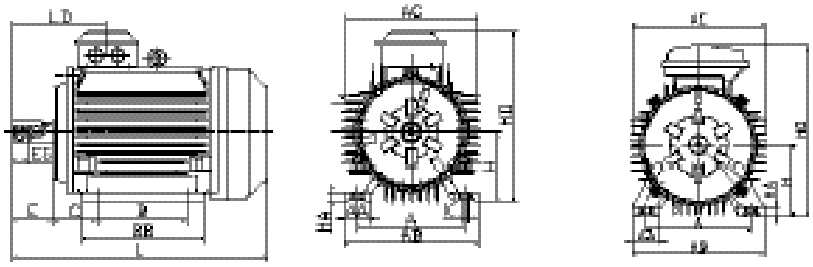
For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

General purpose cast iron motors Sizes 160-250

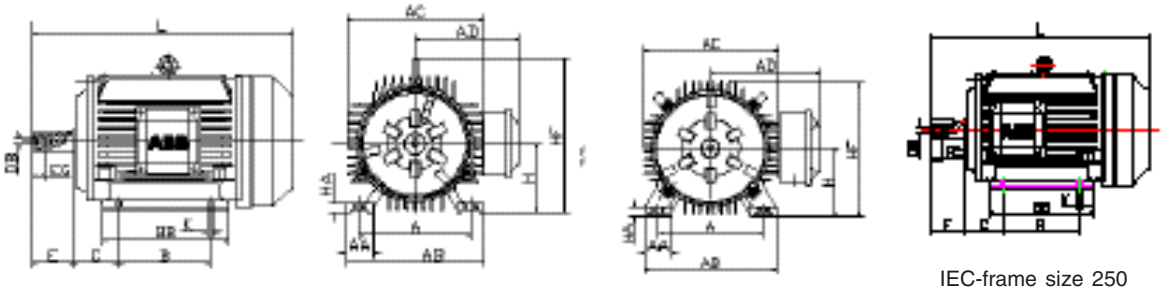
Dimension drawings

Foot-mounted; IM B3 (IM 1001), IM B6 (IM 1051), IM B7 (IM 1061), IM B8 (IM 1071), IM V5 (IM 1011), IM V6 (IM 1031)

Three phase motor, foot-mounted, terminal box top-mounted



Three phase motor, foot-mounted, terminal box on right hand side



IEC-frame size 250

Motor size	Poles	A	AA	AB	AC	AD	B	BB	C	D	DB	E	EG
160 M	2-8	254	60	325	330	255	210	265	108	42	M16	110	36
160 L	2-8	254	60	325	330	255	254	310	108	42	M16	110	36
180 M	2-4	279	70	350	355	270	241	315	121	48	M16	110	36
180 L	4-8	279	70	350	350	270	279	350	121	48	M16	110	36
200 L	2-8	318	70	390	395	305	305	380	133	55	M20	110	39
225 S	4-8	356	75	435	440	335	286	380	149	60	M20	140	39
225 M	2	356	75	435	450	335	311	405	149	55	M20	110	39
225 M	4-8	356	75	435	450	335	311	405	149	60	M20	140	39
250 M	2	406	80	490	515	395	349	455	168	60	M20	140	39
250 M	4-8	406	80	490	515	395	439	455	168	55	M20	140	39

Motor size	Poles	F	G	GD	H	HA	HD	HF	K	L	LD
160 M	2-8	12	47	8	160	22	415	380	15	600	250
160 L	2-8	12	47	8	160	22	415	380	15	645	250
180 M	2-4	14	42.5	9	180	22	450	420	15	670	270
180 L	4-8	14	42.5	9	180	22	450	420	15	710	270
200 L	2-8	16	49	10	200	25	510	470	19	770	285
225 S	4-8	18	53	11	225	28	560	520	19	820	340
225 M	2	16	49	10	225	28	560	520	19	815	310
225 M	4-8	18	53	11	225	28	560	520	19	840	340
250 M	2	18	53	11	250	30	645	580	24	930	360
250 M	4-8	18	58	11	250	30	645	580	24	930	360

Tolerances:

A, B, C	+, - 0.8	F, FA	ISO h0
D,DA	ISO k6 < Ø 50 mm	H	+ 0, - 0.5
	ISO h9 > Ø 50 mm		

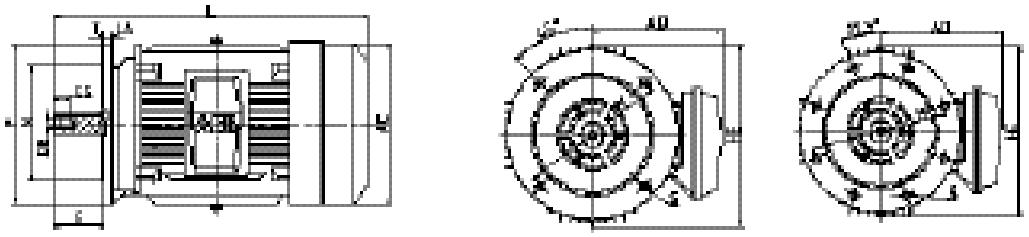
Above table gives the main dimensions in mm.

For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

General purpose cast iron motors Sizes 160-250

Dimension drawings

Flange-mounted; IM B5 (IM 3001), IM V1 (IM 3011), IM V3 (IM 3031), IM B14 (IM 3601), IM V18 (IM 3611), IM V19 (IM 3631)



Motor size	Poles	AD	D	DB	E	EG	F	G	GD	HE	L	LA	M	N	P	S	T
160 M	2-8	255	42	M16	110	36	12	47	8	400	600	15	300	250	350	19	5
160 L	2-8	255	42	M16	110	36	12	47	8	400	645	15	300	250	350	19	5
180 M	2-4	270	48	M16	110	36	14	42.5	9	420	670	18	300	250	350	19	5
180 L	4-8	270	48	M16	110	36	14	42.5	9	420	710	18	300	250	350	19	5
200 L	2-8	305	55	M20	110	39	16	49	10	470	770	20	350	300	400	19	5
225 S	4-8	335	60	M20	140	39	18	53	11	520	820	20	400	350	450	19	5
225 M	2	335	55	M20	110	39	16	49	10	520	815	20	400	350	450	19	5
225 M	4-8	335	60	M20	140	39	18	53	11	520	840	20	400	350	450	19	5
250 M	2	395	60	M20	140	39	18	53	11	655	930	22	500	450	550	19	5
250 M	4-8	395	65	M20	140	39	18	53	11	655	930	22	500	450	550	19	5

Tolerances:

D,DA	ISO k6 < Ø 50 mm
	ISO m6 > Ø 50 mm
F, FA	ISO h9
N	ISO j6

Above table gives the main dimensions in mm.

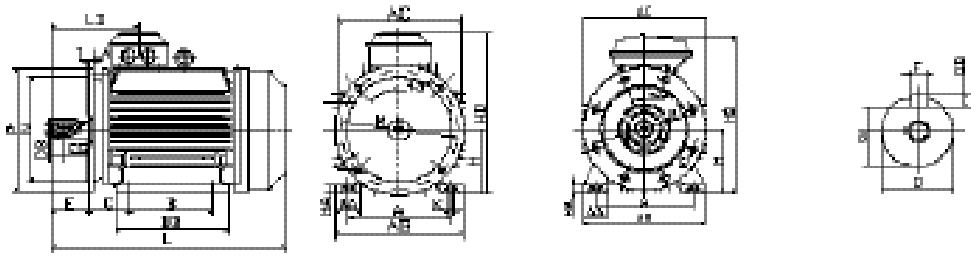
For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

General purpose cast iron motors Sizes 160-250

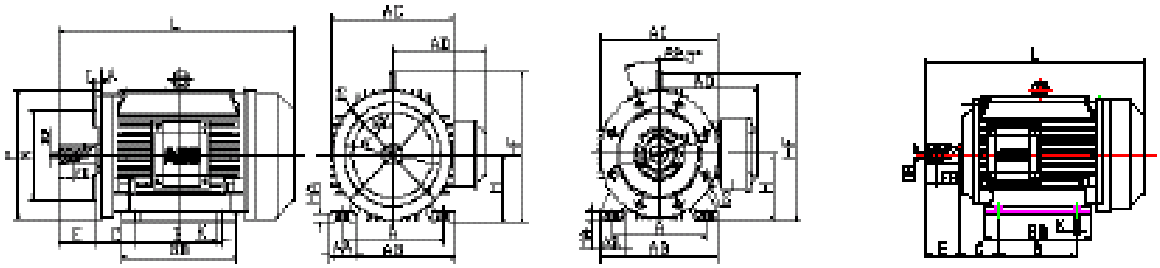
Dimension drawings

Foot- and flange-mounted; IM B35 (IM 2001), IM V15 (IM 2011), IM V36 (IM 2031)

Three phase motor, foot-mounted, terminal box top-mounted



Three phase motor, foot-mounted, terminal box on right hand side



IEC frame size 250

4

Motor size	Poles	A	AA	AB	AC	AD	B	BB	C	D	DB	E	EG	F	G
160 M	2-8	254	60	325	330	255	210	265	108	42	M16	110	36	12	47
160 L	2-8	254	60	325	330	255	254	310	108	42	M16	110	36	12	47
180 M	2-4	279	70	350	355	270	241	315	121	48	M16	110	36	14	42.5
180 L	4-8	279	70	350	350	270	279	350	121	48	M16	110	36	14	42.5
200 L	2-8	318	70	390	395	305	305	380	133	55	M20	110	39	16	49
225 S	4-8	356	75	435	440	335	286	380	149	60	M20	140	39	18	53
225 M	2	356	75	435	450	335	311	405	149	55	M20	110	39	18	49
225 M	4-8	356	75	435	450	335	311	405	149	60	M20	140	39	18	53
250 M	2	406	80	490	515	395	349	455	168	60	M20	140	39	18	53
250 M	4-8	406	80	490	515	395	439	455	168	55	M20	140	39	18	53

Motor size	Poles	GD	H	HA	HD	HF	K	L	LA	LD	M	N	P	S	T
160 M	2-8	8	160	22	415	380	15	600	15	250	300	250	350	19	5
160 L	2-8	8	160	22	415	380	15	645	15	250	300	250	350	19	5
180 M	2-4	9	180	22	450	420	15	670	18	270	300	250	350	19	5
180 L	4-8	9	180	22	450	420	15	710	18	270	300	250	350	19	5
200 L	2-8	10	200	25	510	470	19	770	20	285	350	300	400	19	5
225 S	4-8	11	225	28	560	520	19	820	20	340	400	350	450	19	5
225 M	2	10	225	28	560	520	19	815	20	310	400	350	450	19	5
225 M	4-8	11	225	28	560	520	19	840	20	340	400	350	450	19	5
250 M	2	11	250	30	645	580	24	930	22	360	500	450	550	19	5
250 M	4-8	11	250	30	645	580	24	930	22	360	500	450	550	19	5

Tolerances:

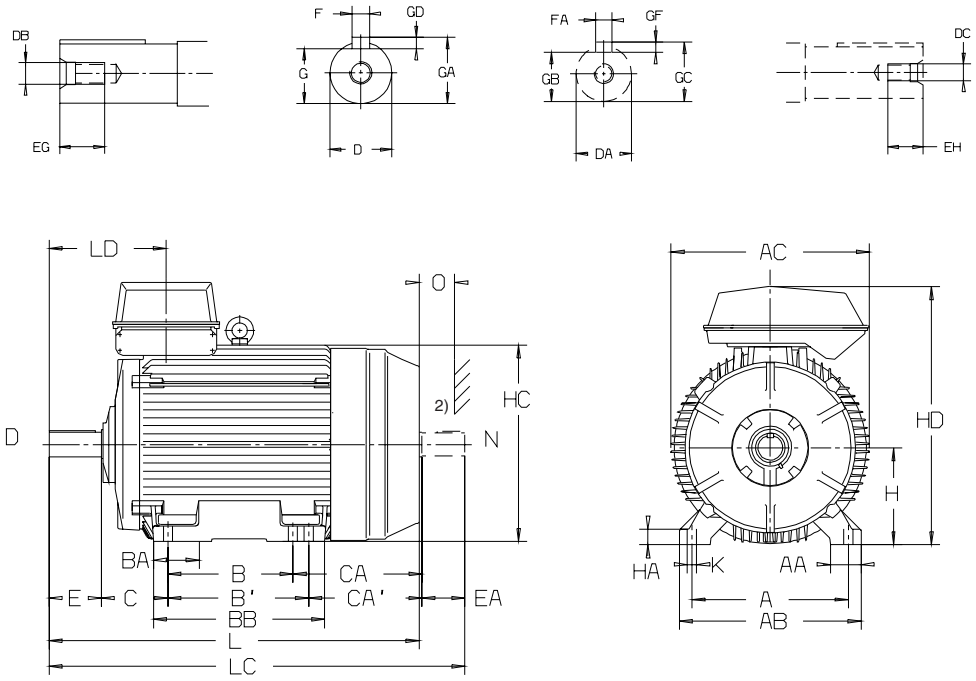
A, B, C	+, - 0.8	F, FA	ISO h9
D,DA	ISO k6 > Ø 50 mm	H	+ 0, - 0.5
	ISO m6 > Ø 50 mm	N	ISO j6

Above table gives the main dimensions in mm.

For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

Dimension drawings

Foot-mounted; IM B3 (IM 1001), IM B6 (IM 1051), IM B7 (IM 1061), IM B8 (IM 1071), IM V5 (IM 1011), IM V6 (IM 1031)



Motor size	Poles	A	AA	AB	AC	B	B '	BA	BB	C	CA	CA '	D	DA	DB	DC	E	EA	EG	EH
280 SM_	2	457	85	530	572	368	419	146	506	190	400	349	65	60	M20	M20	140	140	40	40
	4-12	457	85	530	572	368	419	146	506	190	400	349	75	65	M20	M20	140	140	40	40
315 SM_	2	508	100	590	645	406	457	163	556	216	465	414	65	60	M20	M20	140	140	40	40
	4-12	508	100	590	645	406	457	163	556	216	465	414	80	75	M20	M20	170	140	40	40
315 ML_	2	508	100	590	645	457	508	163	607	216	465	414	65	60	M20	M20	140	140	40	40
	4-12	508	100	590	645	457	508	163	607	216	465	414	90	75	M24	M20	170	140	48	40
355 _	2	610	120	700	740	500	-	161	662	254	460	-	70	70	M20	M20	140	140	40	40
	4-12	610	120	700	740	500	-	161	662	254	460	-	100	90	M24	M24	210	170	48	48

Motor size	Poles	F	FA	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LA	LC	LD	O [1]
280 SM_	2	18	18	58	69	53	64	11	11	280	40	566	745	24	1088	22	1238	332	100
	4-12	20	18	67.5	79.5	58	69	12	11	280	40	566	745	24	1088	22	1238	332	100
315 SM_	2	18	18	58	69	53	64	11	11	315	50	638	840	30	1218	25	1367	351	115
	4-12	22	20	71	85	67.5	79.5	14	12	315	50	638	840	30	1248	25	1397	381	115
315 ML_	2	18	18	58	69	53	64	11	11	315	50	638	840	30	1269	25	1418	351	115
	4-12	25	20	84	95	67.5	79.5	14	12	315	50	638	840	30	1299	25	1448	381	115
355 S_	2	20	20	62.5	74.5	62.5	74.5	12	12	355	55	725	955	35	1344	25	1494	397	130
	4-12	28	25	90	106	81	95	16	14	355	55	725	955	35	1414	25	1594	467	130

Tolerances:

D, DA ISO M6
H + 0, - 1.0

[1] Cooling distance.
[2] Second shaft end on request.

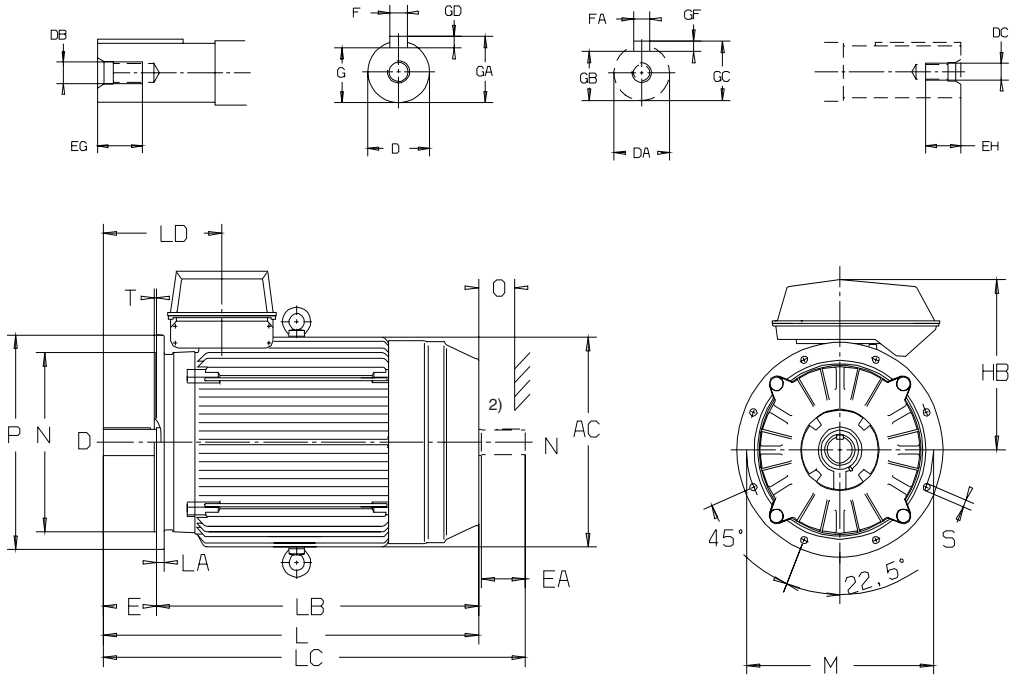
Above table gives the main dimensions in mm.

For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

General purpose cast iron motors Sizes 280-355

Dimension drawings

Flange-mounted; IM B5 (IM 3001), IM V1 IM 3001), IM V3 (IM 3031)
IM B14 (IM 3601), IM V18 (IM 3611), IM V19 (IM 3631)



Motor size	Poles	AC	D	DA	DB	DC	E	EA	EG	EH	F	FA	G	GA	GB	GC	GD	GF
280 SM_	2	572	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64	11	11
	4-12	572	75	65	M20	M20	140	140	40	40	20	18	67.5	79.5	58	69	12	11
315 SM_	2	645	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64	11	11
	4-12	645	80	75	M20	M20	170	140	40	40	22	20	71	85	67.5	79.5	14	12
315 ML_	2	645	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64	11	11
	4-12	645	90	75	M24	M20	170	140	48	40	25	20	81	95	67.5	79.5	14	12
355 S_	2	746	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5	12	12
	4-12	645	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95	16	14

Motor size	Poles	HB	L	LA	LB	LC	LD	M	N	O [1]	P	S	T
280 SM_	2	465	1088	22	938	1238	332	500	450	100	550	18	5
	4-12	465	1088	22	938	1238	332	500	450	100	550	18	5
315 SM_	2	525	1218	25	1078	1367	351	600	550	115	660	23	6
	4-12	525	1248	25	1078	1397	381	600	550	115	660	23	6
315 ML_	2	525	1269	25	1129	1418	351	600	550	115	660	23	6
	4-12	525	1299	25	1199	1448	381	600	550	115	660	23	6
355 S_	2	600	1344	25	1204	1494	397	740	680	130	800	23	6
	4-12	600	1414	25	1204	1594	467	740	680	130	800	23	6

Tolerances:

D, DA	ISO M6
F	ISO h9
H	+ 0, - 1.0
N	ISO j6 (280) ISO js6 (315)

[1] Cooling distance.
[2] Second shaft end on request.

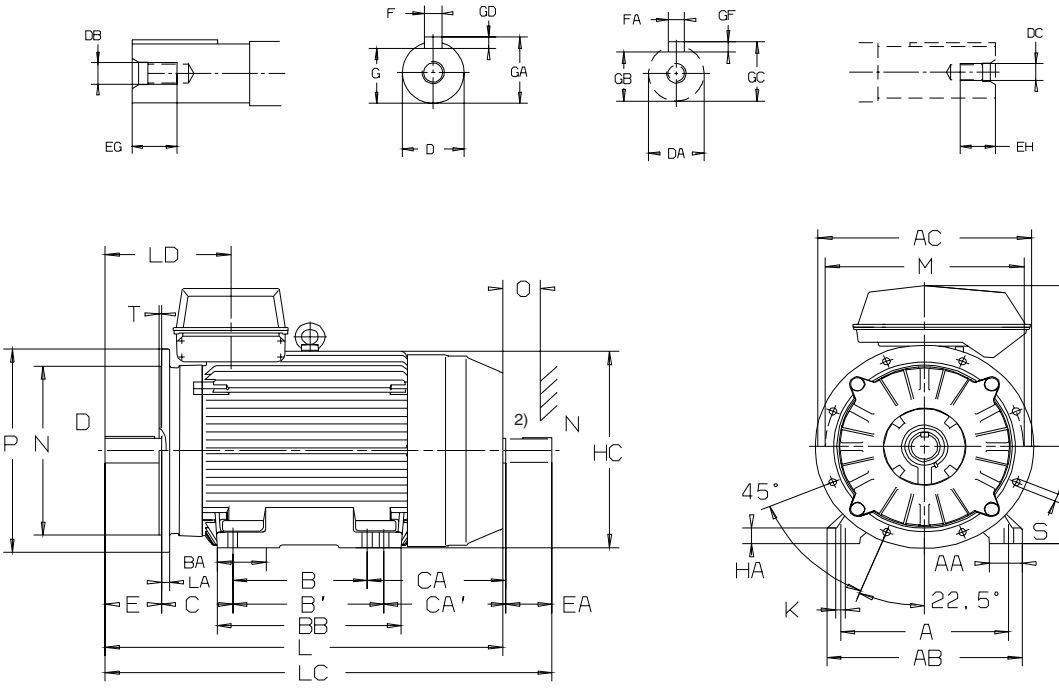
Above table gives the main dimensions in mm.

For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

General purpose cast iron motors Sizes 280-355

Dimension drawings

Foot- and flange-mounted; M B35 (IM 2001), IM V15 (IM 2011), IM V 36 (IM 2031)



Motor size	Poles	A	AA	AB	AC	B	B '	BA	BB	C	CA	CA '	D	DA	DB	DC	E	EA	EG	EH	F	FA
280 SM_	2	457	85	530	572	368	419	146	506	190	400	349	65	60	M20	M20	140	140	40	40	18	18
	4-12	457	85	530	572	368	419	146	506	190	400	349	75	65	M20	M20	140	140	40	40	20	18
315 SM_	2	508	100	590	645	406	457	163	556	216	465	414	65	60	M20	M20	140	140	40	40	18	18
	4-12	508	100	590	645	406	457	163	556	216	465	414	80	75	M20	M20	170	140	40	40	22	20
315 ML_	2	508	100	590	645	457	508	163	607	216	465	414	65	60	M20	M20	140	140	40	40	18	18
	4-12	508	100	590	645	457	508	163	607	216	465	414	90	75	M24	M20	170	140	48	40	25	20
355 _	2	610	120	700	740	500	-	161	662	254	460	-	70	70	M20	M20	140	140	40	40	20	20
	4-12	610	120	700	740	500	-	161	662	254	460	-	100	90	M24	M24	210	170	48	48	28	25

Motor size	Poles	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LA	LC	LD	M	N	P	S	T	O [1]
280 SM_	2	58	69	53	64	11	11	280	40	566	745	24	1088	22	1238	332	500	450	550	18	5	100
	4-12	67.5	79.5	58	69	12	11	280	40	566	745	24	1088	22	1238	332	500	450	550	18	5	100
315 SM_	2	58	69	53	64	11	11	315	50	638	840	30	1218	25	1367	351	600	550	660	23	6	115
	4-12	71	85	67.5	79.5	14	12	315	50	638	840	30	1248	25	1397	381	600	550	660	23	6	115
315 ML_	2	58	69	53	64	11	11	315	50	638	840	30	1269	25	1418	351	600	550	660	23	6	115
	4-12	84	95	67.5	79.5	14	12	315	50	638	840	30	1299	25	1448	381	600	550	660	23	6	115
355 S_	2	62.5	74.5	62.5	74.5	12	12	355	55	725	955	35	1344	25	1494	397	645	740	680	23	6	130
	4-12	90	106	81	95	16	14	355	55	725	955	35	1414	25	1594	467	715	740	680	23	6	130

Tolerances:

D, DA	ISO M6
F	ISO h9
H	+ 0, - 1.0
N	ISO j6 (280) ISO js6 (315)

[1] Cooling distance.
[2] Second shaft end on request.

Above table gives the main dimensions in mm.

For detailed drawings please see our web-pages 'www.abb.com/motors&drives' or contact us.

Rating plates

For motor sizes 71 to 132 the rating plate gives one current value for the voltage area. That is the highest current that can occur within the voltage area with the given output.

For motor sizes 160 to 355 the rating plate is in table form giving values for speed, current and power factor for six voltages.

Motor sizes 71 to 132

ABB	ABB Motors	CE
3~motor M2QA 90 S2 A		IEC 34-1
3GQA091101-ASA		EFF2
6205/C3	6205/C3 IP 55	Ins.cl F

V	Hz	r/min	kW	cosφ	A
220-240Δ	50	2850	1.5	0.87	5.58
380-420Y	50	2850	1.5	0.87	3.23
440-480Y	60	3420	1.73	0.87	3.30

No 329 11117711 — 21 kg

Motor sizes 160 to 250

ABB	ABB Motors	CE
3 ~ motor	M2QA 180 L4A	EFF2
	IEC 180 L 48	
S1	No 292229936	
Cert.no	Ins.cl. F	IP 55

V	Hz	kW	r/min	A	cos φ	IA/IN	tE/s
690 Y	50	22	1470	22.86	0.88		
400 Δ	50	22	1470	39.44	0.88		
660 Y	50	22	1465	23.37	0.90		
380 Δ	50	22	1465	40.59	0.90		
415 Δ	50	22	1475	38.90	0.86		
440 Δ	60	25.3	1764	40.06	0.89		

Cat. no 3GQA 182 501 - ADA

6310/C3 — 6210/C3 — 186 kg

IEC 34-1

Motor sizes 280 to 355

CE	ABB Oy, Electrical Machines LV Motors, Vaasa, Finland	
3~Motor	M2BAT 315SMB 6 B6	
IEC 315 S/M 80		
S1	No. 0230-060100089	
	Ins.cl. F	IP 55

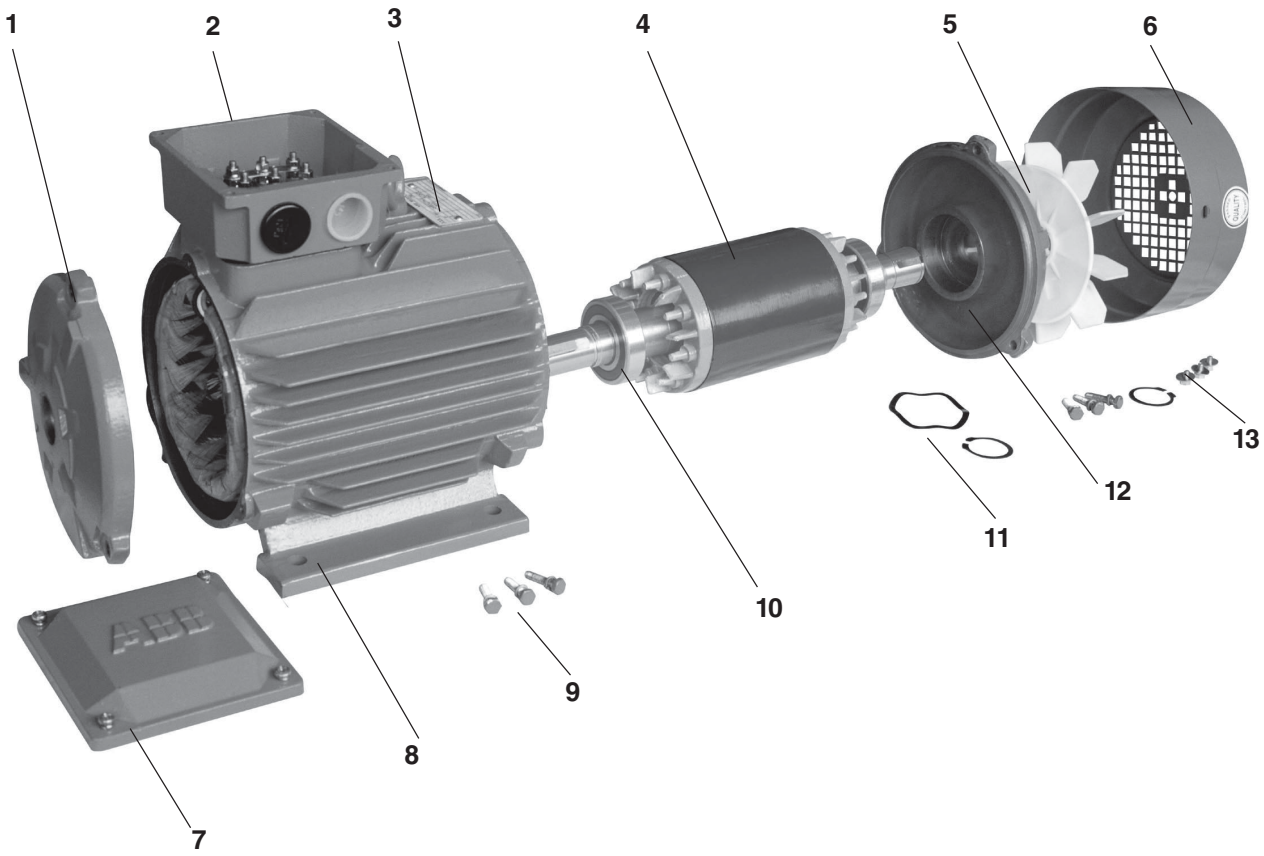
V	Hz	kW	r/min	A	cos φ	Duty
690 Y	50	90	991	96	0.83	
400 D	50	90	991	166	0.83	
660 Y	50	90	990	100	0.84	
380 D	50	90	990	174	0.84	
415 D	50	90	992	163	0.81	
440 D	60	103	1190	170	0.84	

Prod.code 3GBA313220-ADD

6319/C3 — 6316/C3 — 870 kg

ABB IEC 60034-1

Motor construction



1	Endshield, D-end	8	Stator
2	Terminal box	9	Bolt
3	Rating plate	10	Bearing
4	Rotor	11	Wave-shape spring ring
5	Fan	12	Endshield, N-end
6	Fan cover	13	Screw
7	Terminal box cover		

General purpose cast iron motors in brief, basic design

Motor size		71	80	90	100	112	132	160
Stator	Material	Cast iron HT150 GB5675-85						
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G						
	Paint thickness	Two-pack 821 Acid Polyurethane Lacquer Enamel, thickness ≥ 60 µm						
Bearing end shields	Material	Cast iron HT150 GB5675-85						
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G						
	Paint thickness	Two-pack 821 Acid Polyurethane Lacquer Enamel, thickness ≥ 60 µm						
Bearings	D-end	6202 DDU C3	6204 DDU C3	6205 DDU C3	6206 DDU C3	6207 DDU C3	6208 DDUC3	6309 DDU C3
	N-end	6202 DDU C3	6204 DDU C3	6205 DDU C3	6206 DDU C3	6206 DDU C3	6207 DDU C3	6209 DDU C3
Axially-locked bearings	Inner bearing cover	As standard, locked at D-end						
Lubrication		Greased for life.						
Rating plate	Material	Stainless steel						
Terminal box	Frame material	Cast iron HT150 GB5675-85						
	Cover material	Cast iron HT150 GB5675-85						
Connections	Cable entries	2xM16x1.5	2xM25x1.5	2xM32x1.5	2xM32x1.5	2xM32x1.5	2xM32x1.5	2xM40x1.5
	Terminals	6 terminals for connection						
Fan	Material	Reinforced glass fiber						
Fan cover	Material	Steel						
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G						
	Paint thickness	Two-pack 821 Acid Polyurethane Lacquer Enamel, thickness ≥ 60 µm						
Stator winding	Material Insulation	Copper Insulation class F						
	Winding protection	On request						
Rotor winding	Material	Pressure die-cast aluminium						
Balancing method		Half key balancing as standard						
Key ways		Open key way						
Enclosure		IP 55						
Cooling method		IC 411						

General purpose cast iron motors in brief, basic design

Motor size		180	200	225	250	280	315	355
Stator	Material	Cast iron HT150 GB5675-85				Cast iron GG 20/GRS 200		
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G						
	Paint thickness	Two-pack 821 Acid Polyurethane Lacquer Enamel, thickness ≥ 60 µm				Two-pack epoxy paint, thickness ≥ 70 µm		
Bearing end shields	Material	Cast iron HT150 GB5675-85				Cast iron GG 20/GRS 200, except flange-mounted		
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G						
	Paint thickness	Two-pack 821 Acid Polyurethane Lacquer Enamel, thickness ≥ 60 µm				Two-pack epoxy paint, thickness ≥ 70 µm		
Bearings	D-end 2 pole 4 to 8 pole	6310 DDU C3	6312 DDU C3	6313 ZZ C3	6314 C3	6316/C4 6316/C3	6316/C4 6319/C3	6319M/C4 6322/C3
	N-end 2 pole 4 to 8 pole	6210 DDU C3	6212 DDU C3	6213 ZZ C3	6214 C3	6316/C4 6316/C3	6316/C4 6316/C3	6319M/C4 6319/C3
Axially-locked bearings	Inner bearing cover	As standard, locked at D-end						
Lubrication		Greased for life or regreasable			Regreasable bearings			
Rating plate	Material	Stainless steel				Acid proof stainless steel		
Terminal box	Frame material	Cast iron HT150 GB5675-85				Cast iron GG 15/GRS 150		
	Cover material	Cast iron HT150 GB5675-85				Cast iron GG 15/GRS 150		
Connections	Cable entries	2xM40x1.5	2xM50x1.5	2xM50x1.5	2xM63x1.5	2xM63 + 2xM20		
	Terminals	6 terminals for connection						
Fan	Material	Reinforced glass fiber				Reinforced glass fiber or aluminium		
Fan cover	Material	Steel						
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G						
	Paint thickness	Two-pack 821 Acid Polyurethane Lacquer Enamel, thickness ≥ 60 µm				Two-pack epoxy polyester paint, thickness ≥ 80 µm		
Stator winding	Material	Copper						
	Insulation	Insulation class F						
	Winding protection	On request				3 PTC thermistors as standard, 150°C		
Rotor winding	Material	Pressure die-cast aluminium						
Balancing method		Half key balancing as standard						
Key way		Open key way						
Enclosure		IP 55				IP 55, higher protection on request		
Cooling method		IC 411						

Notes:

Notes:

ABB Motors' total product offer

ABB offers several comprehensive ranges of AC motors and generators. We manufacture synchronous motors for even the most demanding applications, and a full range of low and high voltage induction motors. Our in-depth knowledge of virtually every type of industrial processing ensures we always specify the best solution for your needs.

Low voltage motors and generators

General purpose motors for standard applications

– Aluminium motors
– Steel motors
– Cast iron motors
– Open drip proof motors
– Brake motors
– Single phase motors
– Integral motors

Process performance motors for more demanding applications

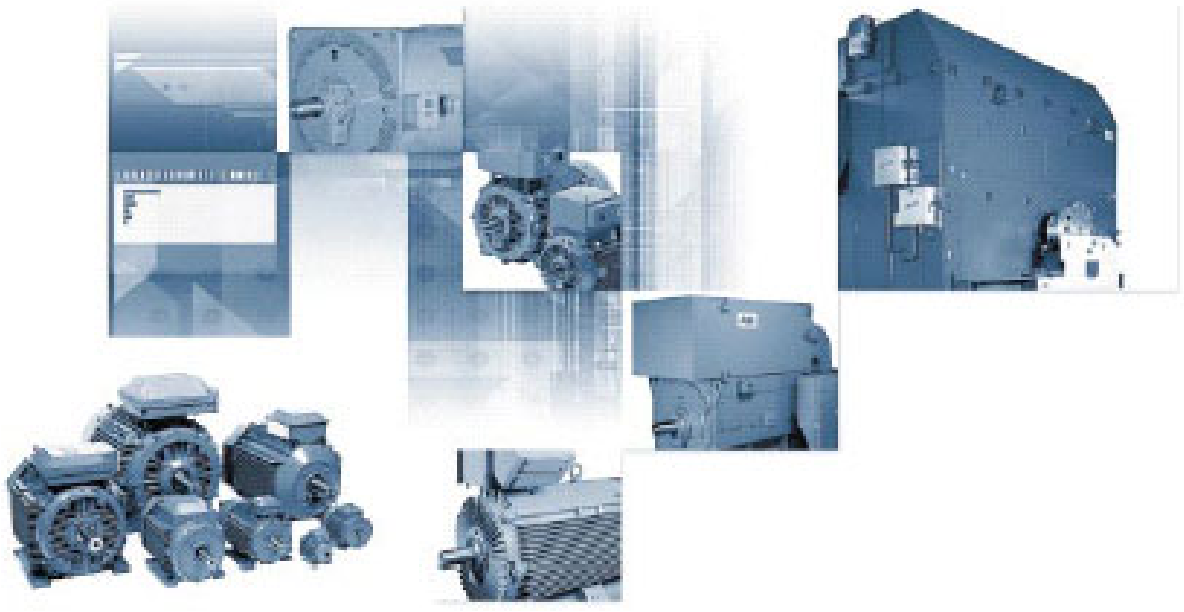
– Aluminium motors
– Cast iron motors

Other applications

– Motors for hazardous areas
– Marine motors
– Permanent magnet motors
– High speed motors
– Wind turbine generators
– NEMA motors
– Water cooled motors
– Motors for roller table drives
– Slip ring motors
– Wood dryer motors
– Fan application motors

High voltage and synchronous motors and generators

– High voltage cast iron motors
– Induction modular motors
– Slip ring motors
– Motors for hazardous areas
– Servomotors
– Synchronous motors and generators
– DC motors and generators



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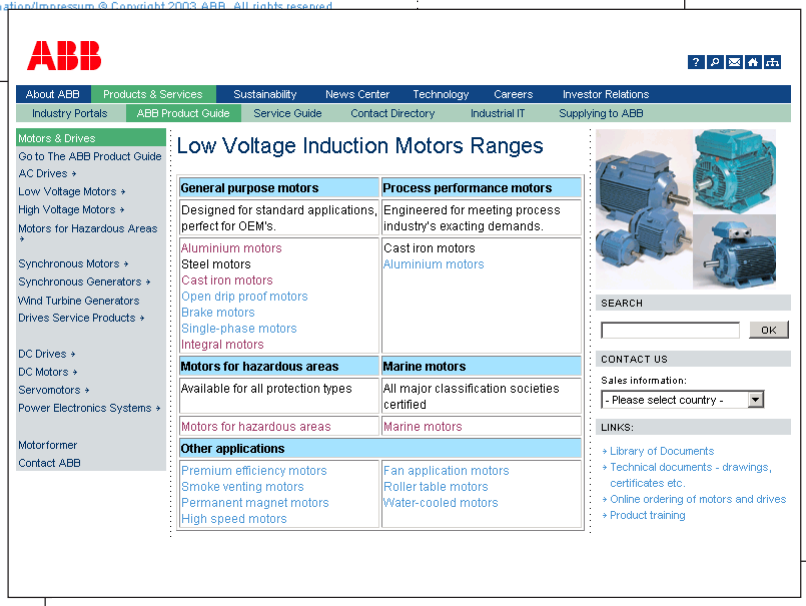

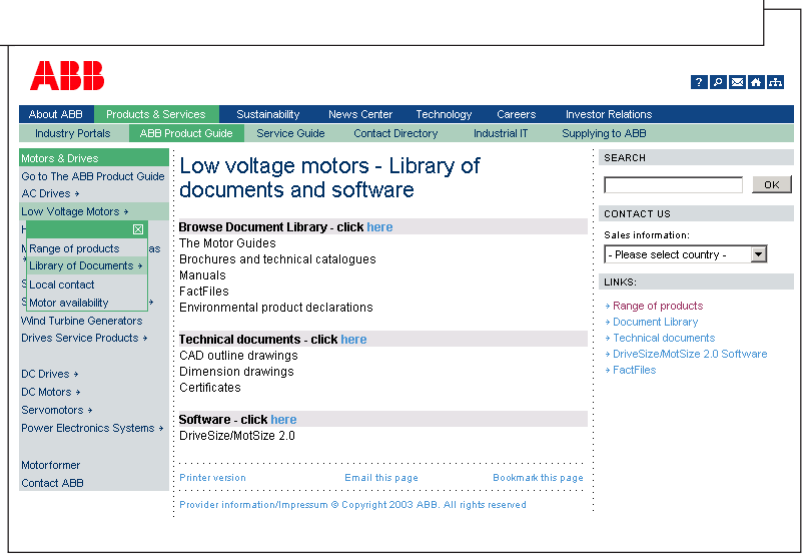

Motors & Drives
=> Low Voltage Motors
=> Range of Products
=> General purpose motors
- Aluminium motors
- Steel motors
- Cast iron area motors
- Open drip proof motors
- Brake motors
- Single phase motors
- Integral motors

Process performance motors
Motors for hazardous areas
Marine motors
Roller table motors
Water cooled motors
Permanent magnet motors
High speed motors
Wind turbine generators
Library of documents
=> Technical documents
Local contacts

Drive^{IT} Low Voltage Motors

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