Low Voltage
General Purpose Motors

Steel motors section

Making you more competitive

ABB's General purpose motor is designed for use in general industry, meeting the demands of standard applications for OEM's. Motors are readily available from central stock locations and distributors around the world. The motors have high build quality, are available with all the features needed by the OEM market and can be modified to meet most specifications.

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 103,000 people.

Low Voltage General Purpose Motors

Sizes 56 to 400, from 0.055 to 630 kW

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General information

Standards

ABB motors are of the totally enclosed and open drip proof, single or 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

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

ABB AUTOMATION PRODUCTS, S.A.
(Divisiones Máquinas Eléctricas y Accionamientos)
Sant Quirze del Vallés (Barcelona)
Spain

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

UNE EN ISO 9001: 2000

The Quality Management System is applicable to:

Design, production and sales of electrical motors and generators, drives and power electronical equipment, capacitors, automatic banks, in low, middle and high voltage.

Approval Certificate No: 772585

Original Approval: 7 April 1993
Current Certificate: 11 June 2003
Certificate Expiry: 31 May 2006

Issued by: LRQA, Ltd. Operaciones España

M000001

IQNet CQC

QUALITY SYSTEM CERTIFICATE

Certificate No.:0104Q18612R1M/3100

We hereby certify that

ABB Shanghai Motors Company Limited

8 Guangxing Road, Rongbei Songjiang Shanghai China

by reason of its

Quality Management System

has been awarded this certificate for compliance with the standard

ISO9001:2000

The Quality Management System Applies in the following area:

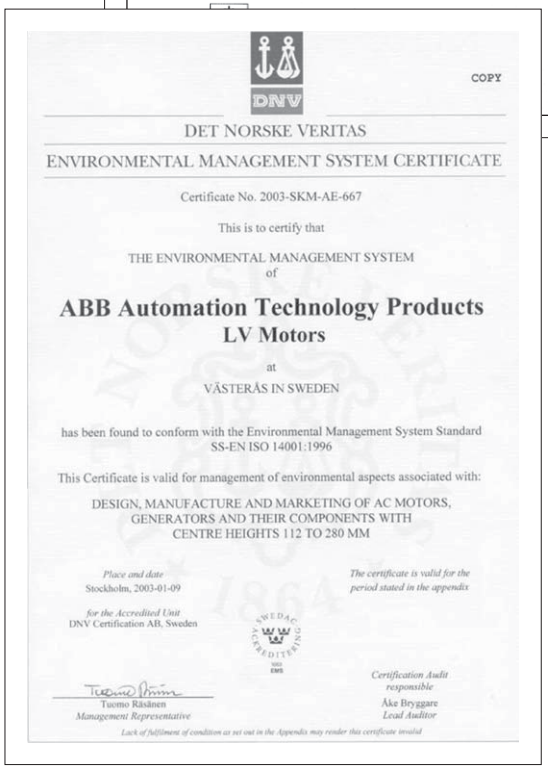
Design Manufacture & Service for Three Phase Induction Motor

Date of Issue: Nov. 30, 2004 Valid Until: Nov. 29, 2007

CNAB

Signed by: Li huailin

M000002



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DNV

DET NORSKE VERITAS

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 2003-SKM-AE-667

This is to certify that

THE ENVIRONMENTAL MANAGEMENT SYSTEM of

ABB Automation Technology Products
LV Motors

at

VÄSTERÅS IN SWEDEN

has been found to conform with the Environmental Management System Standard SS-EN ISO 14001:1996

This Certificate is valid for management of environmental aspects associated with:

DESIGN, MANUFACTURE AND MARKETING OF AC MOTORS, GENERATORS AND THEIR COMPONENTS WITH CENTRE HEIGHTS 112 TO 280 MM

Place and date: Stockholm, 2003-01-09

The certificate is valid for the period stated in the appendix

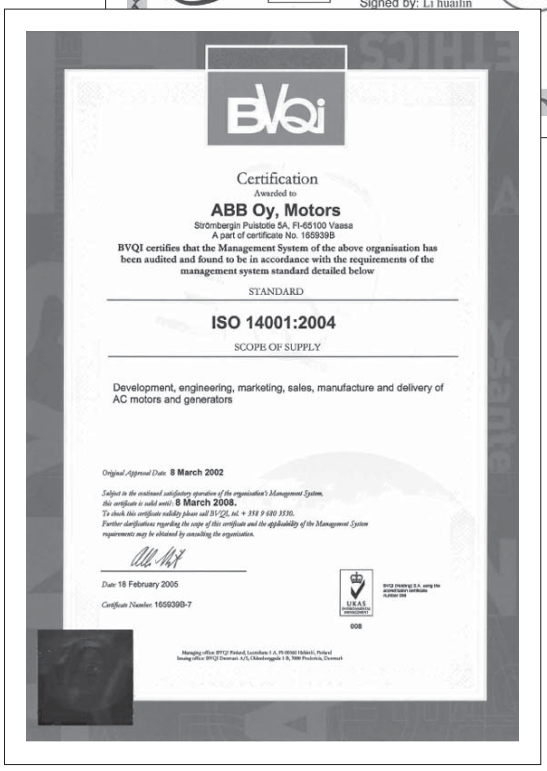
for the Accredited Unit
DNV Certification AB, Sweden

Tuomo Räsänen
Management Representative

Certification Audit responsible
Åke Bryggare
Lead Auditor

Lack of fulfilment of condition as set out in the Appendix may render this certificate invalid

M000003



BVQI

Certification

Awarded to

ABB Oy, Motors

Strömbergin Puistotie 5A, FI-65100 Vaasa
A part of certificate No. 165939B

BVQI certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standard detailed below

STANDARD

ISO 14001:2004

SCOPE OF SUPPLY

Development, engineering, marketing, sales, manufacture and delivery of AC motors and generators

Original Approval Date: 8 March 2002

Subject to the continued satisfactory operation of the organisation's Management System, this certificate is valid until: 8 March 2008.
To check this certificate validity please call FI/SE, tel. + 358 9 680 3530.
Further clarifications regarding the scope of this certificate and the applicability of the Management System requirements may be obtained by consulting the organisation.

Date: 18 February 2005

Certificate Number: 165939B-7

UKAS

008

M000329

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, 50Hz with S1 duty class with the output 1.1 to 90 kW, which account for the largest volume on the market.

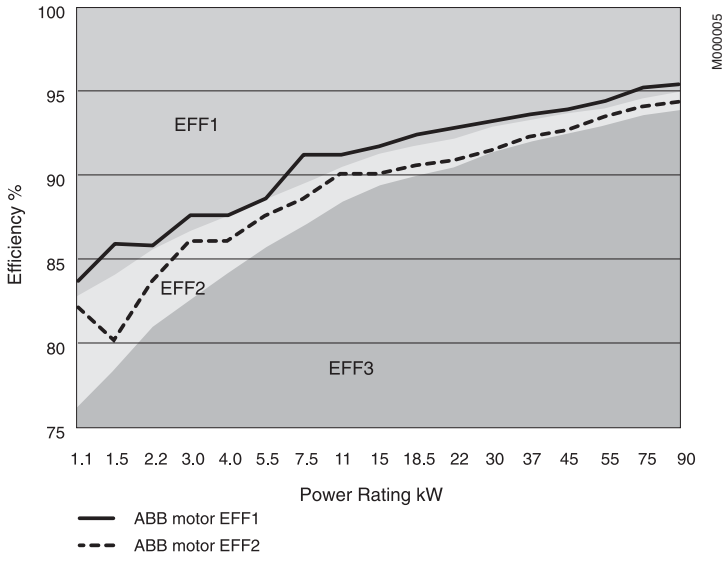
The efficiency of motors from different manufacturers are collated in a database, EURODEEM, published by the European Commission. It is accessible over the Internet at http://iamest.jrc.it/projects/eem/eurodeem.htm.

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

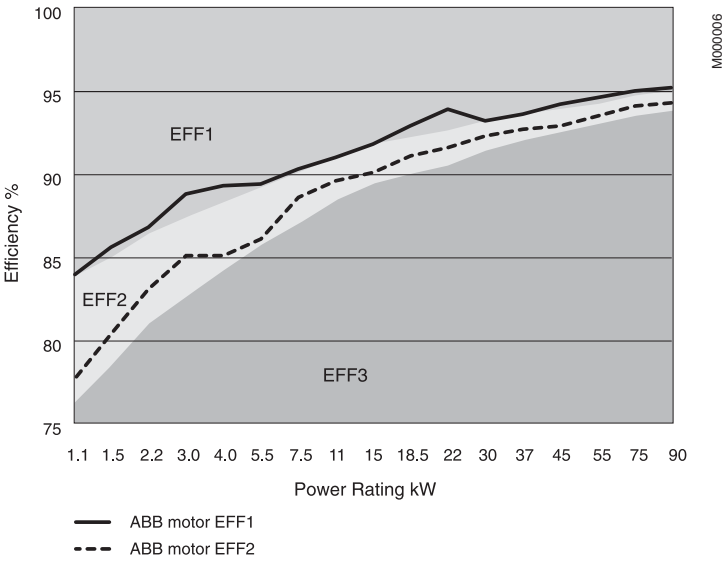
2-pole



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

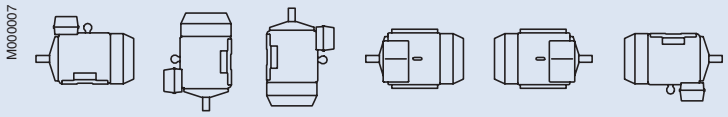
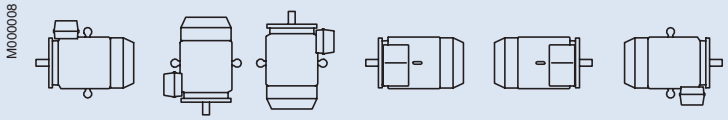
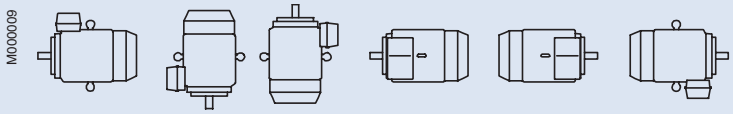
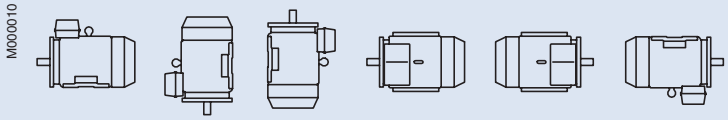
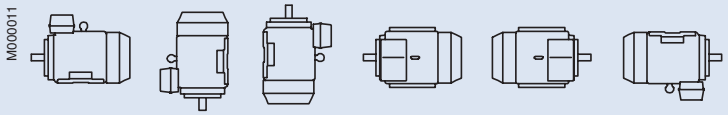
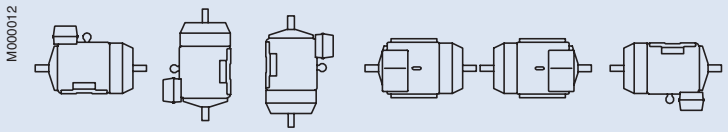
4-pole



General technical specification

Mechanical and electrical design

Mounting arrangements

	CodeI/CodeII						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
	 M000007						
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
	 M000008						
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
	 M000009						
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
	 M000010						
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
	 M000011						
Foot-mounted motor, shaft with free extensions	IM 1002	IM 1012	IM 1032	IM 1052	IM 1062	IM 1072	
	 M000012						

*) 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

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

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

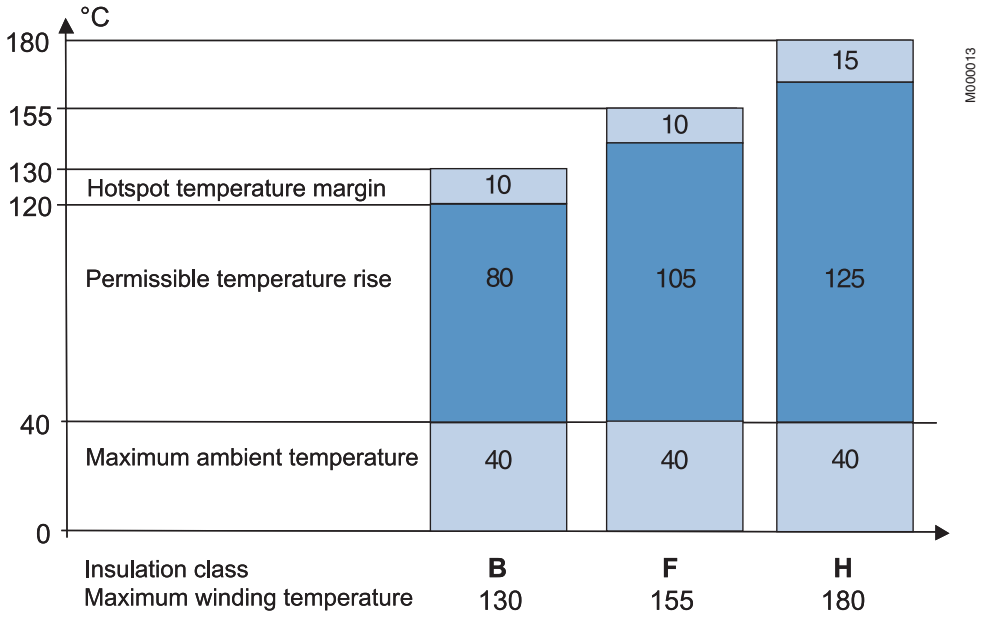
ABB uses class F insulation systems, which, with temperature rise B, is the most common requirement among industry today.

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

When selecting general purpose motors to variable speed drives, following points shall be taken into consideration:

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 to the temperature rise of the motor. 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 800- frequency converters with DTC-control 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 General purpose aluminum motors described in figure 1. Exact values are available on request.

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

Motor size	Speed r/min	
	2-pole	4-pole
63-80	6000	4500
90-100	6000	6000
112-200	4500	4500
225-280	3600	3600

At low speed operation the cooling capacity of the fan decreases, which may cause higher temperature rises in the motor. 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.

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 and converter type. For selection of insulation system and filters, see figure 2.

5. Bearing currents

Bearing voltages and currents must be avoided in all motors. For reliability issues, insulated bearings and/or properly dimensioned filters at the converter output must be used according to the instructions in figure 2. 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 B) 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 of figure 2

Measures mentioned in Figure 2 apply to the applicable motors within the General motors range (not high-output versions) with ACS 800 and ACS 550 drives with uncontrolled DC-voltage. For other alternatives and converter types, please contact ABB.

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

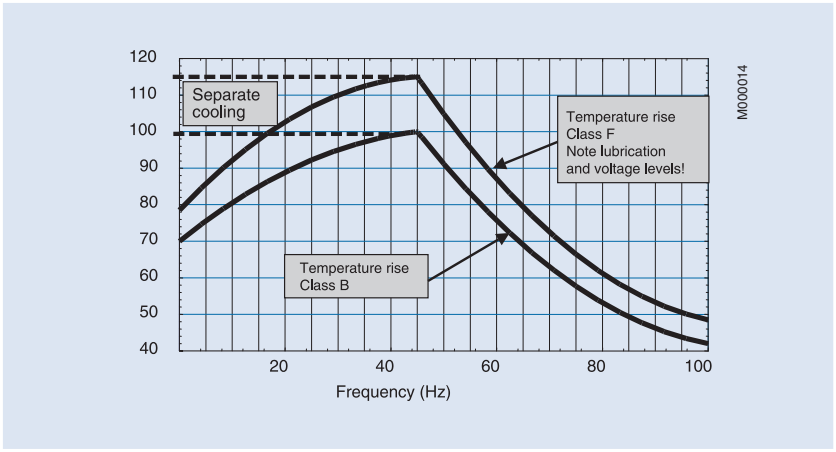
	Motor nominal power P_N or frame size		
	P_N < 100 kW	**$P_N \geq$ 100 kW or $\geq$ IEC 315**	**$P_N \geq$ 350 kW or $\geq$ IEC 400**
$U_N \leq$ 500 V	Standard motor	Standard motor + Insulated N-bearing	Standard motor + Insulated N-bearing + Common mode filter
$U_N \leq$ 600 V	Standard motor + dU/dt-filter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

Common mode
Common mode 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.

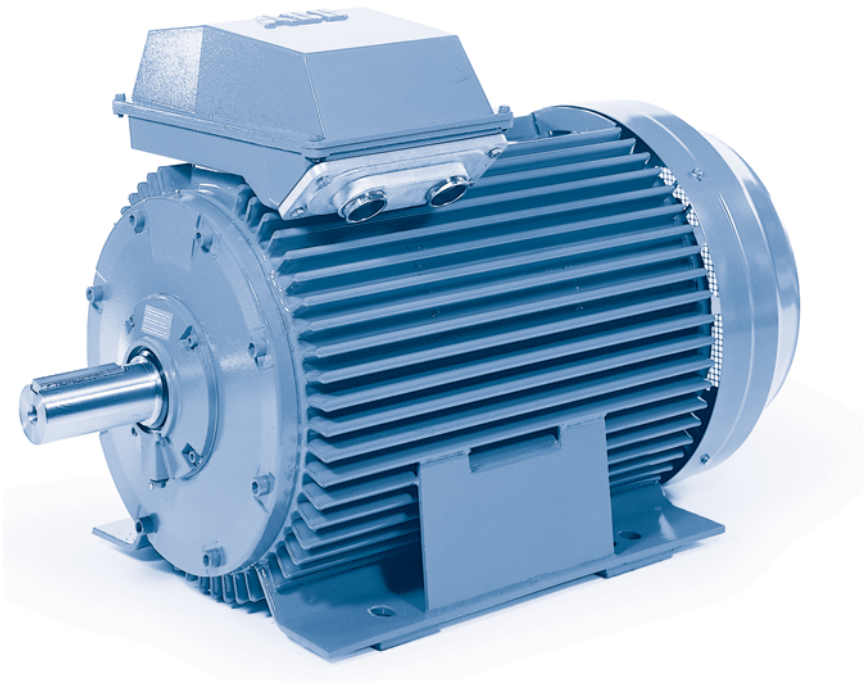
Insulated Bearings
Bearings with insulated inner or outer races are used as the standard solution. So-called hybrid bearings, i.e. bearings with non-conductive ceramic balls, can also be used in special applications. More information for spare part selection is available on request.

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



General Purpose Steel Motors

Totally enclosed squirrel cage three phase low voltage motors, Sizes 280 - 400, 75 to 630 kW



www.abb.com/motors&drives
> Motors
> Low voltage motors
> General purpose motors

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Dimension drawings 96
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Mechanical design

Stator

The stator frame is made of profile-pressed sheet steel, giving the motor high mechanical strength, low weight and a good surface finish. The stator core is welded into the stator frame and contributes to its excellent mechanical properties.

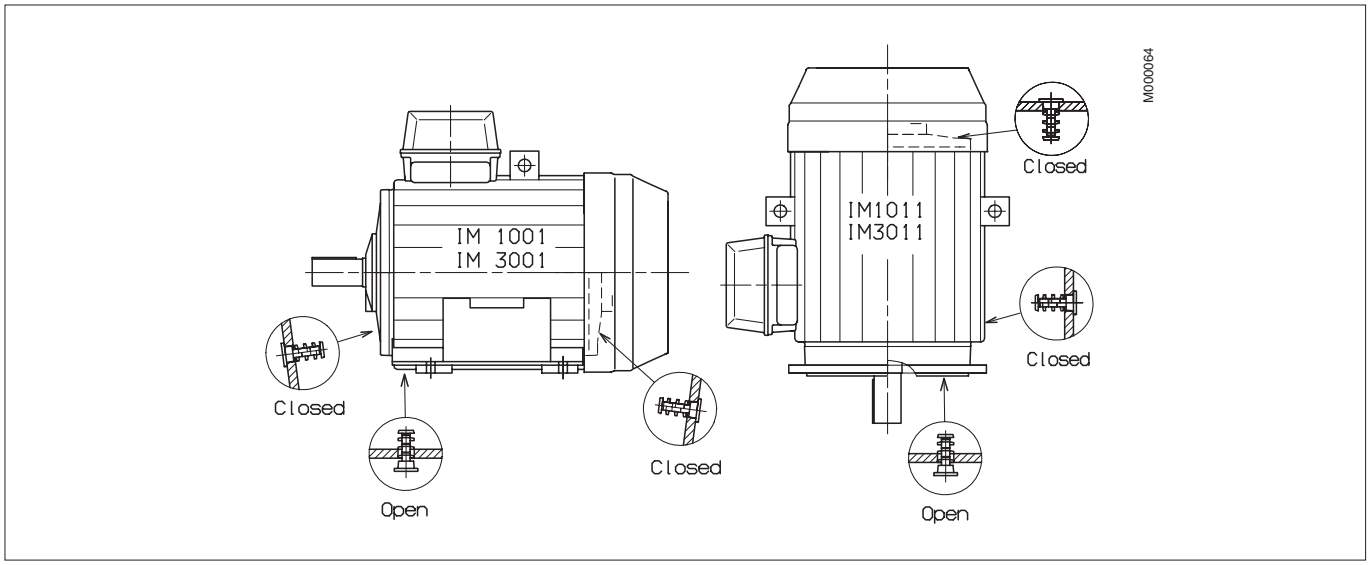
Feet and lifting eyes are welded to the stator frame. The terminal box and end shields are of cast iron.

Drain holes

Motors that will be operated in very humid or wet environments, and especially under intermittent duty, should be provided with drain holes. The appropriate IM designation, such as IM V3 (IM 3031), is specified, on the basis of the method of motor mounting.

M2CA motors are fitted with drain holes and plugs. The plugs are open on delivery. Check that the drain holes and grease outlet face downwards, when mounting designation differs from standard horizontal mounting.

In the case of vertical mounting, the upper plug must be hammered home completely. In very dusty environments the drain hole plug should be knocked in.



Terminal box

Terminal boxes are mounted either on the top of the motor, or on either side of the motor, see ordering information.

In basic version the terminal box can be rotated 2x180° to allow cable entry from either side of the motor, as option the terminal box can be turned 4x90°.

Degree of protection of standard terminal box is IP 55.

The terminal box is equipped with cable glands or cable boxes as standard, and 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 us to supply 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 and dimension drawings of terminal boxes.

Co-ordination of terminal boxes and cable entries

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

Deviations from standard design according to the following tables are available on request.

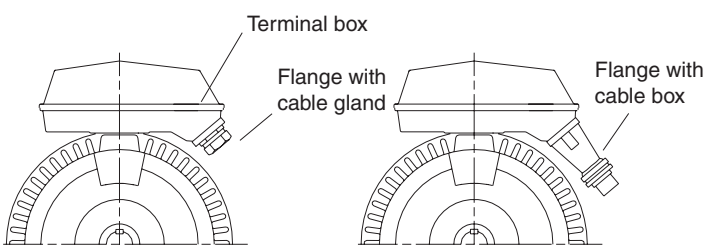
M2CA 280-400 motors with top-mounted terminal box
Standard cable entries and cable boxes

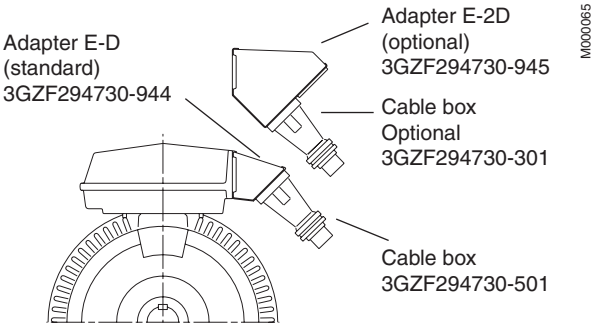
Voltage 220 - 690 V, 50 Hz

Motor size M2CA	Terminal box	Flange or adapter	Cable box or cable gland	Gland thread	Cable diameter	Max. connection cable area mm²	Terminal bolt size	Voltage/ freq. code
3000 r/min (2 poles)								
280	122/4	3GZF 294730-749	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x150	M12	
315 S_,M_,LA,LB	142/4	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
315 LC	162/4	3GZF 294730-944	3GZF 294730-301		2x Ø48-60	4x240	M12	
355 SA	142/4	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 M_	162/4	3GZF 294730-944	3GZF 294730-301		2x Ø48-60	4x240	M12	D
	142/4	-	3GZF 294730-301		2x Ø48-60	2x240	M12	E
355 L_	162/4	3GZF 294730-944	3GZF 294730-301		2x Ø48-60	4x240	M12	
400 M_	162/4	3GZF 294730-944	3GZF 294730-501		2x Ø60-80	4x240	M12	
400 LK_	162/9	3GZF 294730-944	3GZF 294730-501		2x Ø60-80	4x240	M12	
1500 r/min (4 poles)								
280	122/4	3GZF 294730-749	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x150	M12	
315 S_,M_,LA,LB	142/4	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
315 LC	162/4	3GZF 294730-944	3GZF 294730-301		2x Ø48-60	4x240	M12	
355 SA	142/4	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 M_	162/4	3GZF 294730-944	3GZF 294730-301		2x Ø48-60	4x240	M12	D
	142/4	-	3GZF 294730-301		2x Ø48-60	2x240	M12	E
355 LA, LB	162/4	3GZF 294730-944	3GZF 294730-301		2x Ø48-60	4x240	M12	
355 LKD	162/4	3GZF 294730-944	3GZF 294730-501		2x Ø60-80	4x240	M12	
400 M_	162/4	3GZF 294730-944	3GZF 294730-501		2x Ø60-80	4x240	M12	
400 LKA	162/9	3GZF 294730-944	3GZF 294730-501		2x Ø60-80	4x240	M12	D
	162/4	3GZF 294730-944	3GZF 294730-501		2x Ø60-80	4x240	M12	E
400 LKB, LKC	162/9	3GZF 294730-944	3GZF 294730-501		2x Ø60-80	4x240	M12	
1000 r/min (6 poles)								
280	122/4	3GZF 294730-749	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x150	M12	
315 S_,M_,LA	142/4	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 SA,SB	142/4	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 MA	142/4	-	3GZF 294730-301		2x Ø48-60	2x240	M12	
355 MB	162/4	3GZF 294730-944	3GZF 294730-301		2x Ø48-60	4x240	M12	D
	142/4	-	3GZF 294730-301		2x Ø48-60	2x240	M12	E
355 LKD	162/4	3GZF 294730-944	3GZF 294730-301		2x Ø48-60	4x240	M12	
400 MLA	162/4	3GZF 294730-944	3GZF 294730-301		2x Ø60-80	4x240	M12	D
400 MLB	162/4	-	3GZF 294730-501		2x Ø48-60	2x240	M12	E
400 LK_	162/9	3GZF 294730-944	3GZF 294730-501		2x Ø60-80	4x240	M12	D
400 LK_	162/4	3GZF 294730-944	3GZF 294730-501		2x Ø60-80	4x240	M12	E
750 r/min (8 poles)								
280	122/4	3GZF 294730-749	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x150	M12	
315	142/4	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 SA, SB	142/4	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 MA	142/4	-	3GZF 294730-301		2x Ø48-60	2x240	M12	
355 MB	142/4	-	3GZF 294730-301		2x Ø48-60	4x240	M12	D
355 MB	142/4	-	3GZF 294730-301		2x Ø48-60	2x240	M12	E

Voltage/frequency codes:
D - 380-420 VΔ 50 Hz, 660-690 VY 50 Hz, 440-480 VΔ 60 Hz
E - 500 VΔ 50 Hz, 575 VΔ 60 Hz

Examples:





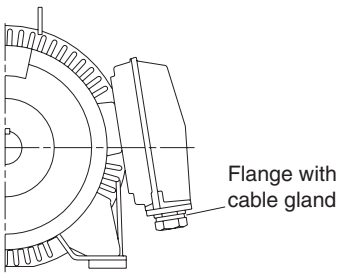
M2CA motors with side-mounted terminal box:

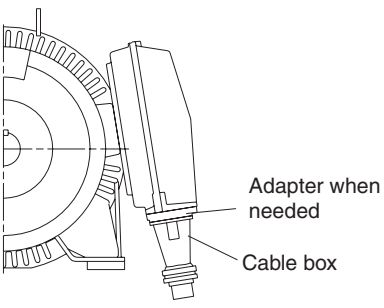
Standard cable entries and cable boxes — Voltage 220 - 690 V, 50 Hz

Motor size M2CA	Ter-minal box	Flange or adapter	Cable box or cable gland	Gland thread	Cable diameter	Max. connection cable area mm²	Terminal bolt size	Voltage/ freq. code
3000 r/min (2 poles)								
280	122/5	3GZF 294730-749	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x150	M12	
315 S_,M_,LA,LB	142/6	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
315 LC	162/7	3GZF 294730-759	3GZF 294730-301		2x Ø48-60	4x240	M12	
355 SA	142/6	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 M_	162/7	3GZF 294730-759	3GZF 294730-301		2x Ø48-60	4x240	M12	D
	142/6	-	3GZF 294730-301		2x Ø48-60	2x240	M12	E
355 L_	162/7	3GZF 294730-759	3GZF 294730-301		2x Ø48-60	4x240	M12	
400 M_	162/7	3GZF 294730-759	3GZF 294703-501		2x Ø60-80	4x240	M12	
400 LK_	162/7	3GZF 294730-759	3GZF 294703-501		2x Ø60-80	4x240	M12	
1500 r/min (4 poles)								
280	122/5	3GZF 294730-749	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x150	M12	
315 S_,M_,LA,LB	142/6	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
315 LC	162/7	3GZF 294730-759	3GZF 294730-301		2x Ø48-60	4x240	M12	
355 SA	142/6	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 M_	162/7	3GZF 294730-759	3GZF 294730-301		2x Ø48-60	4x240	M12	D
	142/6	-	3GZF 294730-301		2x Ø48-60	2x240	M12	E
355 LA, LB	162/7	3GZF 294730-759	3GZF 294730-301		2x Ø48-60	4x240	M12	
355 LKD	162/7	3GZF 294730-759	3GZF 294703-501		2x Ø60-80	4x240	M12	
400 M_	162/7	3GZF 294730-759	3GZF 294703-501		2x Ø60-80	4x240	M12	
400 LKA	162/7	3GZF 294730-759	3GZF 294703-501		2x Ø60-80	4x240	M12	D
	162/7	3GZF 294730-759	3GZF 294703-501		2x Ø60-80	4x240	M12	E
400 LKB, LKC	162/7	3GZF 294730-759	3GZF 294703-501		2x Ø60-80	4x240	M12	
1000 r/min (6 poles)								
280	122/5	3GZF 294730-749	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x150	M12	
315 S_,M_,LA,LB	142/6	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 SA,SB	142/6	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 MA	142/6	-	3GZF 294730-301		2x Ø48-60	2x240	M12	
355 MB	162/7	3GZF 294730-759	3GZF 294730-301		2x Ø48-60	4x240	M12	D
	142/6	-	3GZF 294730-301		2x Ø48-60	2x240	M12	E
355 LKD	162/7	3GZF 294730-759	3GZF 294730-301		2x Ø48-60	4x240	M12	
400 ML_	162/7	3GZF 294730-759	3GZF 294703-501		2x Ø60-80	4x240	M12	D
	142/6	-	3GZF 294730-301		2x Ø48-60	2x240	M12	E
400 LK_	162/7	3GZF 294730-759	3GZF 294703-501		2x Ø60-80	4x240	M12	
750 r/min (8 poles)								
280	122/5	3GZF 294730-749	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x150	M12	
315	142/6	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 SA, SB	142/6	3GZF 294730-753	2x 3GZF 294730-613	**2x M63x1.5**	2x Ø32-49	2x240	M12	
355 MA	142/6	-	3GZF 294730-301		2x Ø48-60	2x240	M12	
355 MB	162/7	3GZF 294730-759	3GZF 294730-301		2x Ø48-60	4x240	M12	D
142/6	-	3GZF 294730-301	2x Ø48-60	2x240	M12	E		

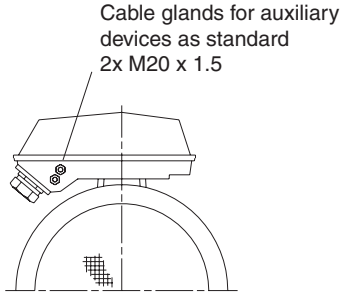
Voltage/frequency codes:
D - 380-420 VΔ 50 Hz, 660-690 VY 50 Hz, 440-480 VΔ 60 Hz
E - 500 VΔ 50 Hz, 575 VΔ 60 Hz

Examples:





Auxiliary devices (view from N-end):



M000066

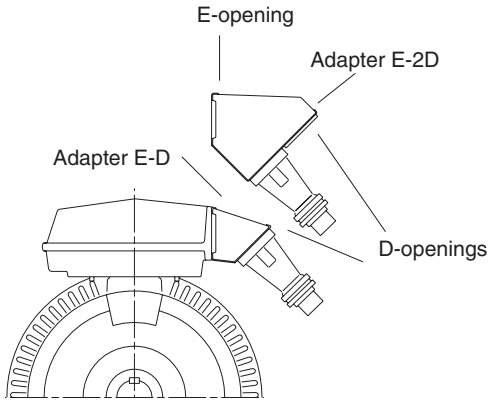
Alternatives for cable entries and cable boxes

The tables on previous pages show the standard terminal boxes and termination parts that are delivered when no information on the cable is given.
The table below shows the different alternatives available for cable boxes and cable entries. Other types on request.

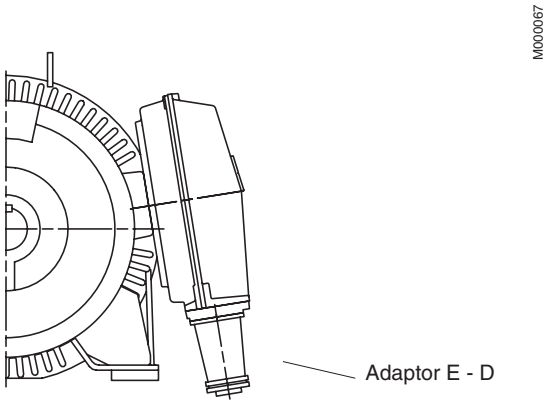
Motor size	Terminal box on top	Terminal box on side	Opening type	Max. rated current A (Δ/Y-conn.)	Max.size of conductor mm²	Cable gland	Cable box	Blank plate
280	122/4	122/5	C (FL 21)	360/210	2x150	2xPg29...42	1xØ36...52/Ø48...60	MKLN 20
315 S_, M_, LA, LB	142/4	142/6	D (FL33)	640/370	2x240	1xPg36...42 2xPg36...48	1xØ36...52/Ø48...60 2xØ48...60/Ø50...68 2xØ68.. .80	MKLN 30
315 LC 355, 400	142/4	142/6	D (FL33)	640/370	2x240	1xPg36...42 2xPg36...48	1xØ36...52/Ø48...60 2xØ48...60/Ø50...68 2xØ68.. .80	MKLN 30
	162/4	162/7	E-D [1]	950/550	4x240	2xPg36...48 1xPg36...42	1xØ36...52/Ø48...60 2xØ48...60/Ø50...68 2xØ68.. .80	
	162/4	162/7	E-D [1]	1300/750	4x240	2xPg36...48 1xPg36...42	1xØ36...52/Ø48...60 2xØ48...60/Ø50...68 2xØ68.. .80	
	162/4	162/7	E-2D [1]	1300/750	4x240	2x2xPg36...48 2x1xPg36...42	2x1xØ36...52/Ø48...60 2x2xØ48...60/Ø50...68 2x2xØ68.m. .80	

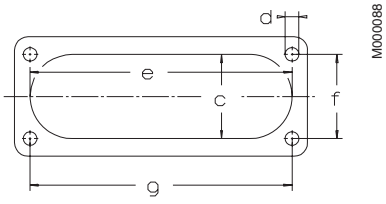
[1] Terminal box type 162 is used with a combination of one E-opening and one or two D-openings, see pictures below and drawing pages.

Terminal box 162 with adapting flange 3GZF 294730-501 (E-D) or optional 3GZF 294730-301 (E-2D) :



Terminal box 162 with adapting 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. The complete ball bearing designation is stated on the rating plate.

If the bearing at the D-end is replaced with a roller bearing (NU- or NJ-), higher radial forces can be handled. Roller bearings are suitable for belt drive applications.

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.

Bearing types

		Standard design		**Alternative designs**
		Deep groove ball bearings		**Roller bearings variant code 037**
Motor size	Number of poles	D-end	N-end	D-end
280	2	6316/C4	6316/C4	[1]
	4-12	6316/C3	6316/C3	NU 316/C3
315	2	6316/C4	6316/C4	[1]
	4-12	6319/C3	6316/C3	NU319/C3
355	2	6316M/C4	6316M/C4	[1]
	4-12	6322/C3	6319/C3	NU 322/C3
400	2	6317M/C4	6317M/C4	[1]
	4-12	6322/C3	6319/C3	NU 322/C3

[1] On request

3

Axially-locked bearings

The outer bearing ring at the D-end is axially locked with an inner bearing cover. The inner ring is locked by tight tolerance to the shaft.

All motors are equipped as standard with an axially-locked bearing at the D-end.

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, the motor is provided with a warning sign.

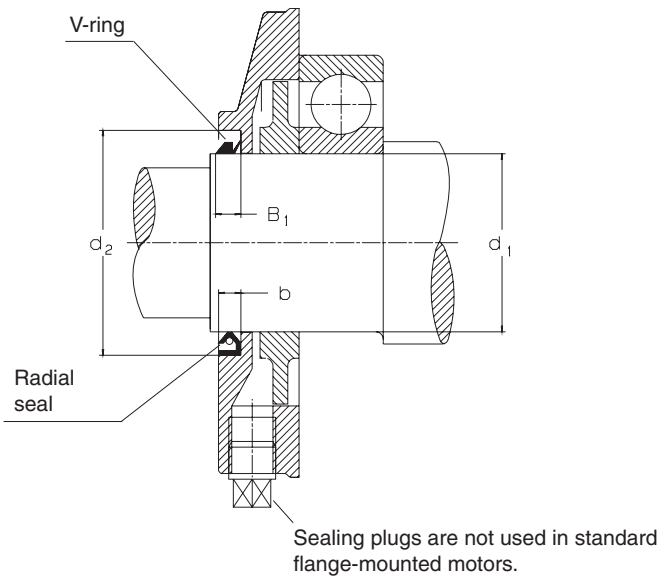
Locking may also be fitted in other cases where transport conditions are suspected of being potentially damaging.

Bearing seals

M2CA motors have, as standard, V-rings at both ends. The size and type of suitable seals are in accordance with the table below:

Motor size	Number of poles	d_1	d_2	B_1	b	Standard design Axial seal D-end	Standard design Axial seal N-end	Alternative design Radial seal (DIN 3760) Variant code 072
280	2	80	100	13.5	10	VS 80	VS 80	80x100x10[1)]
	4-12	80	100	13.5	10	VS 80	VS 80	80x100x10
315	2	80	100	13.5	10	VS 80	VS 80	80x100x10[1)]
	4-12	95	120	13.5	12	VS 95	VS 80	95x120x12
355	2	95	120	13.5	12	VS 80	VS 80	80x100x10[1)]
	4-12	110	140	15.5	12	VS 110	VS 95	110x140x12[1)]
400	2	95	120	13.5	12	VS 85	VS 85	85x110x12[1)]
	4-12	110	140	15.5	12	VS 110	VS 95	110x140x12[1)]

[1)] Viton-seal



Sealing plugs are not used in standard flange-mounted motors.

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 M2CA 280 to 400 ≥ 200.000 hours.

Pulley diameter

When the desired bearing life has been determined, the minimum permissible pulley diameter can be calculated using F_R, as follows:

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

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 2.5.
F_R = permissible radial force

Permissible loading on shaft

The table below gives the permissible radial and axial forces in Newtons, assuming the occurrence of only radial or axial force. In case of simultaneous radial and axial forces, information can be supplied on request. The values are based on normal conditions at 50 Hz and calculated bearing lives of 40,000 h.

Motors are 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 %. For two-speed motors, the values must be based on the higher speed. When there are high axial forces, angular contact ball bearings should be used.

Permissible loads of simultaneous radial and axial forces will be supplied on request.

Permissible radial and axial force for a bearing life of 40,000 hours

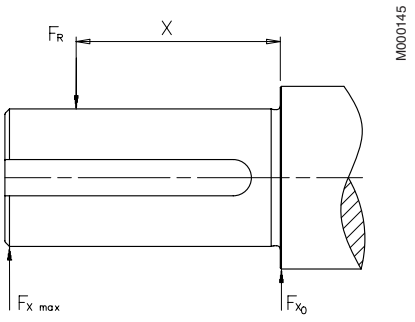
			Permissible radial force:				**Permissible axial force:**		
			Horizontal mounting, sideways direction of force				Horizontal mounting	Vertical mounting with shaft extension downwards	
		Length of shaft	Ball bearing at point of application:		Roller bearing at point of application:		Direction of force		
Motor	Number	extension	FX_0	FX_{max}	FX_0	FX_{max}	Outwards	Upwards	Downwards
size	of poles	E (mm)	N	N	N	N	N	N	N
280	2	140	5800	4800	–	–	3700	7050	2600
	4	140	7300	6100	20000	10500	4000	7650	2800
	6	140	8300	6800	22500	10500	4900	8800	3400
	8	140	9200	7500	24700	10500	5700	9750	4100
315	2	140	5800	4900	–	–	3600	7400	1800
	4	170	8900	7300	26500	10500	4900	9200	2800
	6	170	10300	8500	29800	10500	6150	10700	3300
	8	170	11300	9300	32500	11000	6900	11800	4300
355	2	140	5800	5100	–	–	2400	[1]	[1]
	4	210	12000	9800	36700	17500	3900	[1]	[1]
	6	210	13500	11300	41500	17000	5100	[1]	[1]
	8	210	15000	12500	45200	17500	6350	[1]	[1]
400	2	170	5800	5100	–	–	6700	[1]	[1]
	4	210	11800	10200	37300	16700	3450	[1]	[1]
	6	210	13600	11700	42000	13500	4750	[1]	[1]
	8	210	15100	12900	45700	16800	5700	[1]	[1]

[1] On request

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



Ordering information

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	M2CA 315SMA
Pole number	4
Mounting arrangement (IM-code)	IM B3 (IM 1001)
Rated output	132 kW
Product code	3GCA312210-ADA
Variant codes if needed	

A	B	C	D,E,F, G
M2CA	**315 SMA**	**3GCA 312 210 - ADA, 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/frequency code
F Generation code
G Variant code

Explanation of the product code:

Positions 1 to 4
3GCA = Totally enclosed fan cooled squirrel cage motor with steel stator frame

Positions 5 and 6
IEC-size

28	= 280	**35**	= 355
31	= 315	**40**	= 400

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		

Position 8 to 10
Serial number

Position 11
- (dash)

Position 12
Mounting arrangement
A = Foot-mounted, top-mounted terminal box
R = Foot-mounted, terminal box RHS seen from D-end
L = Foot-mounted, terminal box LHS seen from D-end
B = Flange-mounted, large flange
H = Foot- and flange-mounted, top-mounted terminal box
S = Foot- and flange-mounted, terminal box RHS seen from D-end
T = Foot- and flange-mounted, terminal box LHS seen from D-end

Position 13
Voltage and frequency code
See table below

Position 14
Generation code = A

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 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

General purpose steel 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 $\frac{T_{max}}{T_N}$
3000 r/min = 2-poles						**400 V 50 Hz**					**Basic design**			
75		**M2CA**	**280 SA**	3GCA	281 110-••A	2977	94.9	94.6	0.88	131	7.5	241	2.3	3.30
90		**M2CA**	**280 SMA**	3GCA	281 210-••A	2975	95.1	94.9	0.90	152	7.6	289	2.3	2.90
110		**M2CA**	**315 SA**	3GCA	311 110-••A	2982	95.1	94.4	0.86	194	7.6	352	2.0	3.00
132		**M2CA**	**315 SMA**	3GCA	311 210-••A	2982	95.4	94.9	0.88	228	7.4	423	2.2	3.00
160		**M2CA**	**315 MB**	3GCA	311 320-••A	2981	96.1	95.6	0.89	269	7.5	513	2.3	3.00
200		**M2CA**	**355 SA**	3GCA	351 110-••A	2977	95.5	95.1	0.92	330	6.6	641	1.3	2.80
200	2)	**M2CA**	**315 LA**	3GCA	311 510-••A	2978	96.3	95.9	0.90	334	7.8	641	2.6	3.00
250		**M2CA**	**355 MA**	3GCA	351 310-••A	2980	96.1	95.7	0.92	410	6.6	801	1.3	3.00
280		**M2CA**	**355 MB**	3GCA	351 320-••A	2978	96.1	95.9	0.92	470	5.7	897	1.1	2.70
315		**M2CA**	**355 LA**	3GCA	351 510-••A	2980	96.6	96.4	0.93	510	7.7	1009	1.3	3.30
355		**M2CA**	**355 LB**	3GCA	351 520-••A	2977	96.0	95.9	0.92	575	7.0	1138	1.0	3.10
400		**M2CA**	**400 MLA**	3GCA	401 410-••A	2982	96.6	96.5	0.92	655	7.6	1281	0.8	3.00
450	1)	**M2CA**	**400 MLB**	3GCA	401 420-••A	2980	96.6	96.5	0.92	730	7.4	1442	0.8	3.00
500	1)	**M2CA**	**400 LKA**	3GCA	401 510-••A	2984	96.6	96.5	0.91	815	7.2	1600	0.7	3.40
560	1)	**M2CA**	**400 LKB**	3GCA	401 520-••A	2983	96.7	96.6	0.92	910	7.3	1792	0.7	3.40
3000 r/min = 2-poles						**400 V 50 Hz**					**High-output design**			
110		**M2CA**	**280 MB**	3GCA	281 320-••A	2977	95.8	95.5	0.90	184	7.9	353	2.4	3.0
132		**M2CA**	**280 MC**	3GCA	281 330-••A	2976	96.0	95.7	0.91	222	7.7	424	2.6	3.0
160		**M2CA**	**280 MD**	3GCA	281 340-••A	2975	96.0	95.7	0.91	266	7.9	514	2.8	3.1
250	2)	**M2CA**	**315 LB**	3GCA	311 520-••A	2980	96.5	96.2	0.90	420	8.1	801	2.8	2.9
315	2)	**M2CA**	**315 LC**	3GCA	311 530-••A	2982	96.8	96.6	0.90	528	8.9	1009	3.4	3.1
1500 r/min = 4-poles						**400 V 50 Hz**					**Basic design**			
75		**M2CA**	**280 SA**	3GCA	282 110-••A	1483	95.0	94.9	0.84	137	6.8	483	2.4	2.8
90		**M2CA**	**280 SMA**	3GCA	282 210-••A	1484	95.2	95.1	0.85	163	7.1	579	2.7	2.9
110		**M2CA**	**315 SA**	3GCA	312 110-••A	1487	95.4	95.1	0.85	198	6.9	706	2.1	2.8
132		**M2CA**	**315 SMA**	3GCA	312 210-••A	1486	95.6	95.5	0.85	238	6.7	848	2.2	2.7
160	2)	**M2CA**	**315 MB**	3GCA	312 320-••A	1486	96.0	95.9	0.86	282	7.2	1028	2.4	2.9
200	2)	**M2CA**	**315 LA**	3GCA	312 510-••A	1486	96.2	96.2	0.86	351	7.2	1285	2.5	2.9
200		**M2CA**	**355 SA**	3GCA	352 110-••A	1487	95.8	95.6	0.87	345	7.0	1284	2.1	2.7
250		**M2CA**	**355 MA**	3GCA	352 310-••A	1487	96.5	96.4	0.87	430	7.2	1605	2.3	2.8
315		**M2CA**	**355 LA**	3GCA	352 510-••A	1488	96.5	96.4	0.87	545	7.4	2021	2.4	2.8
355		**M2CA**	**355 LB**	3GCA	352 520-••A	1489	96.5	96.4	0.88	605	7.2	2276	1.4	3.0
400	1)	**M2CA**	**355 LKD**	3GCA	352 540-••A	1489	96.7	96.5	0.88	680	7.5	2565	1.5	3.0
450		**M2CA**	**400 MLA**	3GCA	402 410-••A	1489	96.7	96.6	0.90	740	6.9	2886	1.2	2.8
500		**M2CA**	**400 MLB**	3GCA	402 420-••A	1489	96.8	96.7	0.89	830	7.3	3206	1.3	2.9
560		**M2CA**	**400 LKA**	3GCA	402 510-••A	1489	96.9	96.8	0.90	925	6.6	3591	1.1	2.6
630	1)	**M2CA**	**400 LKB**	3GCA	402 520-••A	1489	96.9	96.8	0.87	1080	6.9	4040	1.2	2.8
1500 r/min = 4-poles						**400 V 50 Hz**					**High-output design**			
110		**M2CA**	**280 MB**	3GCA	282 320-••A	1483	95.3	95.2	0.86	195	7.5	708	2.7	2.8
132		**M2CA**	**280 MC**	3GCA	282 330-••A	1483	95.6	95.5	0.86	235	7.1	850	2.8	2.9
160		**M2CA**	**280 MD**	3GCA	282 340-••A	1483	95.8	95.7	0.86	283	7.1	1030	2.8	3.1
250		**M2CA**	**315 LB**	3GCA	312 520-••A	1487	96.1	96.0	0.85	445	7.4	1605	2.5	2.9
315	2)	**M2CA**	**315 LC**	3GCA	312 530-••A	1487	96.4	96.2	0.85	560	7.8	2023	2.6	3.2

1) Temperature rise class F.
2) Temperature rise class F for 380 V.

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

General purpose steel 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 100%	Current I_N A	Speed r/min	Effi-ciency %	Power factor cos φ 100%	Current I_N A	Moment of inertia J = ¼ GD² kgm²	Weight kg	Sound pressure level L_P dB(A)
3000 r/min = 2-poles				**380 V 50 Hz**				**415 V 50 Hz**				**Basic design**		
75		**M2CA**	**280 SA**	2974	94.8	0.89	137	2980	94.8	0.87	127	0.8	480	77
90		**M2CA**	**280 SMA**	2970	95.1	0.90	159	2978	95.1	0.89	147	0.9	545	77
110		**M2CA**	**315 SA**	2980	95.1	0.87	202	2983	0.0	0.85	190	1.2	695	80
132		**M2CA**	**315 SMA**	2980	95.4	0.89	238	2983	95.7	0.87	222	1.4	770	80
160		**M2CA**	**315 MB**	2979	96.1	0.90	282	2982	96.1	0.89	262	1.7	840	80
200		**M2CA**	**355 SA**	2975	95.4	0.92	350	2979	95.5	0.91	325	3.2	1220	83
200		**M2CA**	**315 LA**	2977	96.3	0.90	350	2981	96.3	0.90	321	2.1	975	80
250		**M2CA**	**355 MA**	2978	96.0	0.92	430	2982	96.1	0.92	395	3.8	1320	83
280		**M2CA**	**355 MB**	2975	96.0	0.92	495	2980	96.1	0.92	450	3.8	1320	83
315		**M2CA**	**355 LA**	2976	96.5	0.93	540	2982	96.6	0.92	495	4.8	1530	83
355		**M2CA**	**355 LB**	2972	96.0	0.92	605	2974	96.1	0.92	550	4.8	1550	83
400		**M2CA**	**400 MLA**	2980	96.5	0.92	680	2983	96.5	0.92	630	7.2	2300	85
450	1)	**M2CA**	**400 MLB**	2978	96.6	0.92	770	2982	96.6	0.92	700	7.2	2300	85
500	1)	**M2CA**	**400 LKA**	2982	96.6	0.92	850	2985	96.6	0.91	790	8.5	2700	85
560	1)	**M2CA**	**400 LKB**	2981	96.7	0.92	965	2984	96.8	0.91	885	8.5	2700	85
3000 r/min = 2-poles				**380 V 50 Hz**				**415 V 50 Hz**				**High-output design**		
110		**M2CA**	**280 MB**	2974	95.7	0.91	193	2979	95.8	0.90	179	1.15	580	77
132		**M2CA**	**280 MC**	2972	95.9	0.91	233	2978	96.0	0.90	213	1.4	755	77
160		**M2CA**	**280 MD**	2971	95.9	0.91	280	2977	96.0	0.90	255	1.55	810	77
250	2)	**M2CA**	**315 LB**	2977	96.4	0.90	442	2982	96.5	0.89	404	2.65	1230	80
315	2)	**M2CA**	**315 LC**	2979	96.8	0.90	550	2983	96.8	0.90	508	3.3	1410	80
1500 r/min = 4-poles				**380 V 50 Hz**				**415 V 50 Hz**				**Basic design**		
75		**M2CA**	**280 SA**	1481	94.8	0.86	142	1485	95.0	0.82	134	1.15	445	68
90		**M2CA**	**280 SMA**	1482	95.1	0.86	169	1486	95.2	0.83	159	1.4	490	68
110		**M2CA**	**315 SA**	1486	95.3	0.86	204	1488	95.3	0.83	198	2	675	71
132		**M2CA**	**315 SMA**	1485	95.5	0.86	245	1487	95.5	0.84	232	2.3	730	71
160		**M2CA**	**315 MB**	1485	95.9	0.87	294	1487	96.0	0.85	277	2.9	850	71
200		**M2CA**	**315 LA**	1484	96.1	0.87	365	1487	96.2	0.85	342	3.5	970	71
200		**M2CA**	**355 SA**	1485	95.7	0.87	360	1488	95.8	0.86	340	5.5	1220	80
250		**M2CA**	**355 MA**	1486	96.4	0.87	455	1488	96.5	0.86	420	6.5	1350	80
315		**M2CA**	**355 LA**	1486	96.4	0.87	570	1489	96.5	0.86	530	7.8	1550	80
355		**M2CA**	**355 LB**	1487	96.4	0.89	630	1490	96.5	0.87	590	7.8	1550	80
400	1)	**M2CA**	**355 LKD**	1487	96.6	0.89	710	1490	96.7	0.87	660	10	1900	85
450		**M2CA**	**400 MLA**	1487	96.6	0.90	770	1490	96.7	0.90	720	13	2400	85
500		**M2CA**	**400 MLB**	1488	96.7	0.90	870	1490	96.8	0.89	800	13	2400	85
560		**M2CA**	**400 LKA**	1487	96.8	0.91	965	1490	96.9	0.90	890	14	2700	85
630	1)	**M2CA**	**400 LKB**	1488	96.8	0.88	1125	1490	96.9	0.87	1040	15	2800	85
1500 r/min = 4-poles				**380 V 50 Hz**				**415 V 50 Hz**				**High-output design**		
110		**M2CA**	**280 MB**	1481	95.2	0.87	204	1486	95.5	0.84	193	1.7	550	68
132		**M2CA**	**280 MC**	1481	95.4	0.87	245	1485	95.7	0.85	227	2.3	775	70
160		**M2CA**	**280 MD**	1482	95.6	0.87	295	1485	95.8	0.85	276	2.5	820	70
250		**M2CA**	**315 LB**	1485	95.9	0.86	463	1488	96.2	0.84	434	4.4	1200	78
315	2)	**M2CA**	**315 LC**	1485	96.1	0.86	582	1489	96.4	0.84	548	5.5	1380	78

General purpose steel 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**			
45		**M2CA**	**280 SA**	3GCA	283 110-••A	990	94.1	94.0	0.82	85	6.6	434	2.5	2.5
55		**M2CA**	**280 SMA**	3GCA	283 210-••A	989	94.4	94.3	0.83	102	6.6	531	2.5	2.5
75		**M2CA**	**315 SA**	3GCA	313 110-••A	992	94.9	94.7	0.80	143	7.1	722	2.3	2.7
90		**M2CA**	**315 SMA**	3GCA	313 210-••A	991	95.3	95.2	0.83	165	7.1	867	2.3	2.7
110		**M2CA**	**315 MB**	3GCA	313 320-••A	991	95.3	95.1	0.83	201	7.3	1060	2.5	2.8
132		**M2CA**	**355 SA**	3GCA	353 110-••A	992	95.3	95.1	0.85	235	6.8	1270	1.7	2.6
132		**M2CA**	**315 LA**	3GCA	313 510-••A	990	95.4	95.3	0.84	241	6.7	1273	2.4	2.7
160		**M2CA**	**355 SB**	3GCA	353 120-••A	992	95.9	95.7	0.85	280	6.8	1540	1.8	2.7
200		**M2CA**	**355 MA**	3GCA	353 310-••A	993	95.9	95.7	0.85	350	7.5	1923	2.0	2.8
250	[1]	**M2CA**	**355 MB**	3GCA	353 320-••A	991	95.9	95.8	0.80	475	7.3	2409	2.2	3.0
315		**M2CA**	**355 LKD**	3GCA	353 540-••A	991	96.2	96.1	0.84	565	7.3	3035	2.0	3.0
355		**M2CA**	**400 MLA**	3GCA	403 410-••A	992	96.4	96.3	0.85	625	6.4	3417	1.2	2.7
400	[1]	**M2CA**	**400 MLB**	3GCA	403 420-••A	992	96.5	96.4	0.85	700	6.4	3850	1.2	2.7
450		**M2CA**	**400 LKA**	3GCA	403 510-••A	993	96.5	96.4	0.85	790	6.8	4327	1.3	2.8
500	[1]	**M2CA**	**400 LKB**	3GCA	403 520-••A	992	96.5	96.4	0.85	880	6.8	4813	1.3	2.8
1000 r/min = 6-poles						**400 V 50 Hz**					**High-output design**			
75		**M2CA**	**280 MB**	3GCA	283 320-••A	990	94.5	94.4	0.83	139	7.3	723	2.8	2.7
90		**M2CA**	**280 MC**	3GCA	283 330-••A	989	94.9	94.8	0.83	168	7.4	869	2.9	2.9
110		**M2CA**	**280 MD**	3GCA	283 340-••A	990	95.2	95.1	0.83	202	7.9	1061	3.1	3.0
750 r/min = 8-poles						**400 V 50 Hz**					**Basic design**			
37		**M2CA**	**280 SA**	3GCA	284 110-••A	741	93.4	93.1	0.78	74	7.3	477	1.8	3.1
45		**M2CA**	**280 SMA**	3GCA	284 210-••A	741	94.0	93.8	0.78	90	7.6	580	1.9	3.2
55		**M2CA**	**315 SA**	3GCA	314 110-••A	741	94.0	93.7	0.80	107	7.1	710	1.8	2.8
75		**M2CA**	**315 SMA**	3GCA	314 210-••A	740	94.5	94.2	0.81	142	7.1	968	1.8	2.8
90		**M2CA**	**315 MB**	3GCA	314 320-••A	740	94.7	94.5	0.82	169	7.3	1161	1.9	2.8
110	[2]	**M2CA**	**315 LA**	3GCA	314 510-••A	740	94.8	94.7	0.83	202	7.0	1420	1.9	2.7
110		**M2CA**	**355 SA**	3GCA	354 110-••A	742	94.6	94.0	0.80	215	5.6	1415	1.4	2.2
132		**M2CA**	**355 MA**	3GCA	354 310-••A	743	95.0	94.5	0.77	265	5.8	1696	1.5	2.3
160		**M2CA**	**355 MB**	3GCA	354 320-••A	742	95.2	94.8	0.79	310	6.4	2059	1.8	2.5
750 r/min = 8-poles						**400 V 50 Hz**					**High-output design**			
55		**M2CA**	**280 MB**	3GCA	284 320-••A	741	94.4	94.2	0.79	108	7.8	709	1.9	3.2

[1] Temperature rise acc. to class F.
[2] Temperature rise acc. to class F by 380 V.

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

General purpose steel 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 100%	Current I_N A	Speed r/min	Effi-ciency %	Power factor cos φ 100%	Current I_N A	Moment of inertia J = ¼ GD² 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**		
45		**M2CA**	**280 SA**	988	94.0	0.83	89	991	94.2	0.81	82	1.65	440	66
55		**M2CA**	**280 SMA**	988	94.3	0.84	106	991	94.4	0.82	99	2	475	66
75		**M2CA**	**315 SA**	991	94.8	0.82	146	993	94.9	0.77	143	2.9	630	72
90		**M2CA**	**315 SMA**	990	95.2	0.84	173	992	95.3	0.82	162	3.8	720	72
110		**M2CA**	**315 MB**	990	95.1	0.84	212	992	95.3	0.82	198	4.5	805	75
132		**M2CA**	**355 SA**	991	95.2	0.86	245	993	95.3	0.84	230	8.7	1200	75
132		**M2CA**	**315 LA**	988	95.3	0.84	252	991	95.5	0.83	234	5.4	910	75
160		**M2CA**	**355 SB**	991	95.8	0.86	295	993	95.9	0.84	275	10	1320	75
200		**M2CA**	**355 MA**	992	95.8	0.86	370	993	95.9	0.84	350	13	1550	75
250	1)	**M2CA**	**355 MB**	990	95.8	0.82	485	992	95.9	0.78	470	13	1550	75
315		**M2CA**	**355 LKD**	990	96.2	0.85	590	992	96.2	0.82	560	15	1900	82
355		**M2CA**	**400 MLA**	991	96.3	0.86	650	993	96.4	0.84	610	17	2400	82
400	1)	**M2CA**	**400 MLB**	991	96.3	0.86	730	992	96.4	0.84	680	17	2400	82
450		**M2CA**	**400 LKA**	992	96.5	0.86	825	993	96.5	0.83	790	19	2700	82
500	1)	**M2CA**	**400 LKB**	991	96.5	0.86	920	993	96.5	0.83	870	19	2700	82
1000 r/min = 6-poles				**380 V 50 Hz**				**415 V 50 Hz**				**High-output design**		
75		**M2CA**	**280 MB**	988	94.5	0.84	144	991	94.5	0.81	137	2.6	545	67
90		**M2CA**	**280 MC**	988	94.8	0.84	174	990	94.9	0.81	164	3.1	815	67
110		**M2CA**	**280 MD**	988	95.1	0.84	210	991	95.2	0.81	200	4.1	835	67
750 r/min = 8-poles				**380 V 50 Hz**				**415 V 50 Hz**				**Basic design**		
37		**M2CA**	**280 SA**	740	93.2	0.80	75	742	93.4	0.76	73	1.85	460	65
45		**M2CA**	**280 SMA**	740	93.8	0.80	92	742	94.0	0.75	90	2.2	500	65
55		**M2CA**	**315 SA**	740	93.9	0.82	108	742	94.0	0.78	105	2.9	630	70
75		**M2CA**	**315 SMA**	739	94.3	0.82	148	741	94.3	0.79	138	3.8	715	70
90		**M2CA**	**315 MB**	739	94.6	0.83	175	741	94.6	0.80	165	4.5	800	77
110	2)	**M2CA**	**315 LA**	738	94.7	0.84	213	740	94.8	0.81	198	5.4	900	77
110		**M2CA**	**355 SA**	740	94.5	0.80	220	742	94.7	0.79	205	8.7	1200	75
132		**M2CA**	**355 MA**	742	94.8	0.78	270	744	95.0	0.75	260	10	1350	75
160		**M2CA**	**355 MB**	741	95.1	0.80	320	743	95.2	0.78	300	13	1550	75
750 r/min = 8-poles				**380 V 50 Hz**				**415 V 50 Hz**				**High-output design**		
55		**M2CA**	**280 MB**	740	94.2	0.81	110	742	94.4	0.77	106	2.85	575	65

General purpose steel motors

Technical data for totally enclosed squirrel cage three phase motors, two-speed

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

Output kW	Motor type		Product code	Speed r/min	Effi-ciency %	Power factor cos φ	Current I_N A	Current $\frac{I_s}{I_N}$	Torque T_N Nm	Torque $\frac{T_s}{T_N}$	Torque $\frac{T_{max}}{T_N}$	Moment of inertia J = ¼ GD² kgm²	Weight kg
1500/1000 r/min = 4/6 poles				**400 V 50 Hz**								**Fan drive, two separate windings**	
60/18.5	**M2CA**	**280 SA**	3GCA 288 114-••A	1487/991	93.5/88.0	0.82/0.76	113/40	7.7/7.4	385/178	2.3/2.9	3.0/2.6	1.15	445
77/25	**M2CA**	**280 SMA**	3GCA 288 214-••A	1486/991	93.9/89.3	0.83/0.76	144/54	7.6/7.7	495/241	2.4/3.2	2.9/2.7	1.4	490
90/28	**M2CA**	**280 MB**	3GCA 288 324-••A	1485/991	94.2/89.8	0.86/0.78	161/58	7.4/7.7	579/270	2.3/3.2	2.7/2.8	1.7	550
110/32	**M2CA**	**315 SMA**	3GCA 318 214-••A	1489/992	95.2/91.2	0.85/0.78	199/67	6.6/6.5	706/308	1.9/2.8	2.6/2.9	2.3	730
125/37	**M2CA**	**315 MB**	3GCA 318 324-••A	1488/992	95.5/92.2	0.86/0.79	219/75	6.6/6.4	802/356	1.9/2.9	2.4/2.8	2.9	850
150/44	**M2CA**	**315 LA**	3GCA 318 514-••A	1488/991	95.7/92.6	0.87/0.79	260/88	6.6/6.4	963/424	1.9/3.0	2.4/2.7	3.5	970
180/55	**M2CA**	**355 MA**	3GCA 358 314-••A	1483/986	95.0/91.2	0.90/0.85	300/100	5.3/5.0	1159/532	1.1/1.3	2.3/2.2	6.5	1350
260/85	**M2CA**	**355 LA**	3GCA 358 514-••A	1487/988	95.7/92.0	0.90/0.85	435/155	7.7/5.9	1670/821	1.7/1.6	3.2/2.4	7.8	1550
1500/750 r/min = 4 - 8 poles				**400 V 50 Hz**								**Fan drive, Dahlander-connection**	
65/15	**M2CA**	**280 SA**	3GCA 288 119-••A	1484/743	93.2/90.0	0.84/0.63	121/38	7.5/5.3	418/193	2.7/2.8	2.9/2.3	1.15	445
80/20	**M2CA**	**280 SMA**	3GCA 288 219-••A	1486/743	93.8/91.5	0.83/0.63	150/50	8.5/5.4	514/257	3.3/2.9	3.4/2.6	1.4	490
90/23	**M2CA**	**280 MB**	3GCA 288 329-••A	1486/742	94.1/91.8	0.85/0.64	164/56	8.8/5.4	578/296	3.6/2.8	3.5/2.6	1.7	550
110/22	**M2CA**	**315 SMA**	3GCA 318 219-••A	1487/744	94.6/92.5	0.85/0.62	197/56	6.8/4.9	706/282	1.9/2.1	2.6/2.5	2.3	730
132/26	**M2CA**	**315 MB**	3GCA 318 329-••A	1486/746	94.9/93.0	0.86/0.64	235/65	6.8/4.8	848/334	2.0/2.0	2.6/2.4	2.9	850
160/32	**M2CA**	**315 LA**	3GCA 318 519-••A	1486/743	95.2/93.4	0.86/0.64	283/80	7.0/4.8	1028/411	2.1/2.1	2.7/2.5	3.5	970
200/40	**M2CA**	**355 MA**	3GCA 358 319-••A	1489/745	95.3/93.7	0.90/0.68	340/90	6.8/4.8	1282/512	1.4/1.3	2.8/2.5	6.5	1350
250/50	**M2CA**	**355 LA**	3GCA 358 519-••A	1490/745	95.5/94.0	0.87/0.64	435/120	7.5/5.1	1602/641	1.5/1.4	3.2/2.6	7.8	1550
1500/1000 r/min = 4/6 poles				**400 V 50 Hz**								**Constant torque, two separate windings**	
50/32	**M2CA**	**280 SA**	3GCA 289 114-••A	1486/987	92.0/90.5	0.84/0.78	94/65	6.9/6.2	321/310	2.0/2.5	2.6/2.2	1.15	445
60/40	**M2CA**	**280 SMA**	3GCA 289 214-••A	1486/987	92.6/91.8	0.85/0.78	111/82	7.1/6.6	386/387	2.1/2.8	2.7/2.3	1.4	490
70/47	**M2CA**	**280 MB**	3GCA 289 324-••A	1488/989	93.2/92.6	0.84/0.77	131/96	8.0/7.4	450/454	2.6/3.4	3.1/2.5	1.7	550
90/60	**M2CA**	**315 SMA**	3GCA 319 214-••A	1488/990	94.3/93.5	0.86/0.77	161/121	5.9/5.8	577/579	1.5/2.6	2.3/2.4	2.3	730
110/75	**M2CA**	**315 MB**	3GCA 319 324-••A	1490/989	94.9/93.9	0.86/0.79	195/147	6.8/5.6	705/724	1.9/2.7	2.6/2.3	2.9	850
132/90	**M2CA**	**315 LA**	3GCA 319 514-••A	1489/990	95.1/94.1	0.85/0.76	238/181	6.7/6.0	847/868	1.9/3.1	2.7/2.7	3.5	970
160/110	**M2CA**	**315 LB**	3GCA 319 524-••A	1491/990	95.3/94.5	0.85/0.79	287/213	7.2/5.8	1025/1061	2.1/2.8	2.7/2.3	3.9	1000
180/120	**M2CA**	**355 MA**	3GCA 359 314-••A	1488/990	95.0/94.3	0.89/0.80	305/230	7.2/7.3	1155/1157	1.4/2.0	3.1/3.1	6.5	1350
230/150	**M2CA**	**355 LA**	3GCA 359 514-••A	1489/990	95.3/94.5	0.89/0.82	395/280	7.7/6.9	1475/1447	1.5/2.0	3.2/2.9	7.8	1550
1500/750 r/min = 4 - 8 poles				**400 V 50 Hz**								**Constant torque, Dahlander-connection**	
50/32	**M2CA**	**280 SA**	3GCA 289 119-••A	1486/743	92.7/91.8	0.88/0.70	89/72	7.2/6.9	321/411	1.9/2.7	2.6/2.5	1.85	460
65/40	**M2CA**	**280 SMA**	3GCA 289 219-••A	1486/743	93.1/92.0	0.88/0.69	115/92	7.7/7.2	418/514	2.1/3.1	2.7/2.7	2.2	500
85/50	**M2CA**	**280 MB**	3GCA 289 329-••A	1487/743	93.8/92.8	0.88/0.68	149/115	8.5/7.7	546/643	2.5/3.4	2.9/2.9	2.85	575
100/65	**M2CA**	**315 SMA**	3GCA 319 219-••A	1487/742	94.2/93.8	0.89/0.74	174/137	6.5/6.3	642/836	1.5/2.1	2.6/2.5	4.1	755
120/75	**M2CA**	**315 MB**	3GCA 319 329-••A	1486/742	94.5/94.1	0.90/0.74	204/155	7.0/6.5	739/965	1.7/2.2	2.6/2.6	4.9	845
150/95	**M2CA**	**315 LA**	3GCA 319 519-••A	1486/742	94.7/94.2	0.89/0.72	262/204	7.2/6.5	964/1223	2.0/2.4	2.8/2.6	5.8	950
150/100	**M2CA**	**355 MA**	3GCA 359 319-••A	1487/741	94.7/94.3	0.90/0.72	255/210	5.6/4.4	963/1288	1.2/1.2	2.5/2.2	6.5	1350
180/130	**M2CA**	**355 LA**	3GCA 359 519-••A	1488/742	95.2/94.6	0.90/0.72	305/275	6.6/4.5	1155/1673	1.4/1.3	2.8/2.2	7.8	1550

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

General purpose steel motors - Variant codes

Code [1]	Variant	Motor size 280	315	355	400
	Balancing				
052	Vibration acc. to Grade A (IEC 60034-14).	S	S	S	S
417	Vibration acc. to Grade B (IEC 60034-14).	P	P	P	P
423	Balanced without key.	P	P	P	P
424	Full key balancing.	P	P	P	P
	Bearings and lubrication				
036	Transport lock for bearings.	M	M	M	P
037	Roller bearing at D-end.	M	M	M	R
039	Cold resistant grease. For bearing temperatures -55 - +100°C.	NA	NA	NA	NA
040	Heat resistant grease (-25°... +150°C).	M	M	M	P
043	SPM-nipples.	M	M	M	P
058	Angular contact bearing at D-end, shaft force away from bearing.	P	P	P	P
060	Angular contact bearing at D-end, shaft force towards bearing.	P	P	P	P
107	Bearing mounted PT100 resistance elements.	P	P	P	P
420	Bearing mounted PTC thermistors.	P	P	P	P
796	Grease nipples JIS B 1575 PT 1/8 Type A. Stainless steel. Head type to be defined when ordering.	M	M	M	P
	Branch standard designs				
071	Cooling tower duty. Only motors with shaft extensions downwards.	NA	NA	NA	NA
142	”Manilla”-winding connection, (440 VD series, 220 VD parallel, 60 Hz).	P	P	R	R
178	Stainless steel/acid proof bolts.	P	P	P	P
209	Non-standard voltage or frequency (special winding).	P	P	P	P
425	Corrosion protected stator and rotor core.	P	P	P	P
	Cooling system				
044	Unidirectional fan, clockwise seen from D-end. Only 2-pole.	P	P	P	P
045	Unidirectional fan, counter clockwise seen from D-end. Only 2-pole.	P	P	P	P
068	Metal fan.	P	P	P	P
075	Cooling method IC 418 (without fan).	P	P	P	P
	Coupling				
035	Assembly of customer supplied coupling-half (finish bored and balanced).	P	P	P	P
	Dimension drawing				
141	Binding dimension drawing.	M	M	M	M
	Drain holes				
065	Plugged drain holes.	M	M	M	P
066	Modified drain hole position (for specified IM xxxx).	M	M	M	P
	Earthing bolt				
067	External earthing bolt.	M	M	M	P

[1] 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.
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Code [1]	Variant	Motor size 280	315	355	400
	Heating elements				
450	Heating element, 100-120 V.	M	M	M	P
451	Heating element, 200-240 V.	M	M	M	P
	Mounting arrangements				
009	IM 2001 foot/flange mounted, IEC flange, from IM 1001 (B35 from B3).	M	M	M	P
	Painting				
114	Special paint colour, standard grade.	M	M	M	P
179	Special paint specification.	P	P	P	P
	Protection				
005	Protective roof, vertical motor, shaft down.	M	M	M	P
072	Radial seal at D-end.	M	M	M	P
073	Sealed against oil at D-end.	NA	NA	NA	NA
158	Degree of protection IP 65. Dust proof version.	M	M	M	P
403	Degree of protection IP 56.	M	M	M	P
784	Gamma-seal at D-end.	NA	NA	NA	NA
	Rating & instruction plates				
002	Restamping voltage, frequency and output, continuous duty.	M	M	M	P
095	Restamping output (maintained voltage, frequency), intermittent duty.	M	M	M	P
135	Mounting of additional identification plate, stainless.	M	M	M	P
138	Mounting of additional identification plate, aluminum.	NA	NA	NA	NA
139	Additional identification plate delivered loose.	M	M	M	P
161	Additional rating plate delivered loose.	M	M	M	P
	Shaft & rotor				
069	Two shaft extensions as per basic catalogue. Standard shaft material.	P	P	P	P
070	One or two special shaft extensions, standard shaft material.	P	P	P	P
410	Stainless/acid-proof steel shaft (standard or non-standard design). One or two extensions.	P	P	P	P
	Standards and regulations				
010	Fulfilling CSA requirements.	P	P	P	P
011	Fulfilling CSA Energy Efficiency Verification (010 included).	NA	NA	NA	NA
	Stator winding temperature sensors				
121	Bimetal detectors, break type (NCC), (3 in series), 130°C, in stator winding.	M	M	M	P
122	Bimetal detectors, break type (NCC), (3 in series), 150°C, in stator winding.	M	M	M	P
123	Bimetal detectors, break type (NCC), (3 in series), 170°C, in stator winding.	M	M	M	P
125	Bimetal detectors, break type (NCC), (2x3 in series), 150°C, in stator winding.	M	M	M	P
127	Bimetal detectors, break type (NCC), (3 in series, 130°C & 3 in series, 150°C), in stator winding.	M	M	M	P
435	PTC - thermistors (3 in series), 130°C, in stator winding.	M	M	M	P
436	PTC - thermistors (3 in series), 150°C, in stator winding.	S	S	S	S
437	PTC - thermistors (3 in series), 170°C, in stator winding.	M	M	M	P
439	PTC - thermistors (2x3 in series), 150°C, in stator winding.	M	M	M	P

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Code [1]	Variant	Motor size 280	315	355	400
440	PTC - thermistors (3 in series, 110°C & 3 in series, 130°C), in stator winding.	NA	NA	NA	NA
441	PTC - thermistors (3 in series 130°C & 3 in series 150°C), in stator winding.	M	M	M	P
442	PTC - thermistors (3 in series 150°C & 3 in series 170°C), in stator winding.	M	M	M	P
446	PT100 resistance elements (2 per phase) in stator winding.	M	M	M	P
446	PT100 resistance elements (2 per phase) in stator winding.	M	M	M	P
	Terminal box				
015	Motor supplied in D-connection.	NA	NA	NA	NA
017	Motor supplied in Y-connection.	NA	NA	NA	NA
019	Larger than standard terminal box.	R	R	R	R
136	Extended cable connection, standard terminal box.	R	R	R	R
137	Extended cable connection, low terminal box.	P	P	R	R
157	Terminal box degree of protection IP 65.	M	M	M	P
187	Cable glands of non-standard design.	R	R	R	R
413	Extended cable connection, no terminal box.	P	P	P	P
414	Smaller than standard terminal box.	NA	NA	NA	NA
418	Separate terminal box for temperature detectors.	P	P	P	P
468	Cable entry from D-end.	P	P	P	P
469	Cable entry from N-end.	P	P	P	P
	Testing				
145	Type test report from catalogue motor, 400 V 50 Hz.	M	M	M	P
146	Type test with report for motor from specific delivery batch.	P	P	P	P
147	Type test with report for motor from specific delivery batch, customer witnessed.	P	P	P	P
148	Routine test report.	M	M	M	P
149	Testing according to separate test specification.	R	R	R	R
221	Type test and multi-point load test with report for motor from specific delivery batch.	R	R	R	R
222	Torque/speed curve, type test and multi-point load test with report for motor from specific delivery batch.	P	P	P	P
760	Vibration level test.	P	P	P	P
761	Vibration spectrum test.	P	P	P	P
762	Noise level test.	P	P	P	P
763	Noise spectrum test.	P	P	P	P
	Variable speed drives				
701	Insulated bearing at N-end. For fan and pump duty up to 500 V.	M	M	M	P
	Y/D-starting				
117	Terminals for Y/D start at both speeds (two speed windings).	P	P	R	R
118	Terminals for Y/D start at high speed (two speed windings).	P	P	R	R
119	Terminals for Y/D start at low speed (two speed windings).	P	P	R	R

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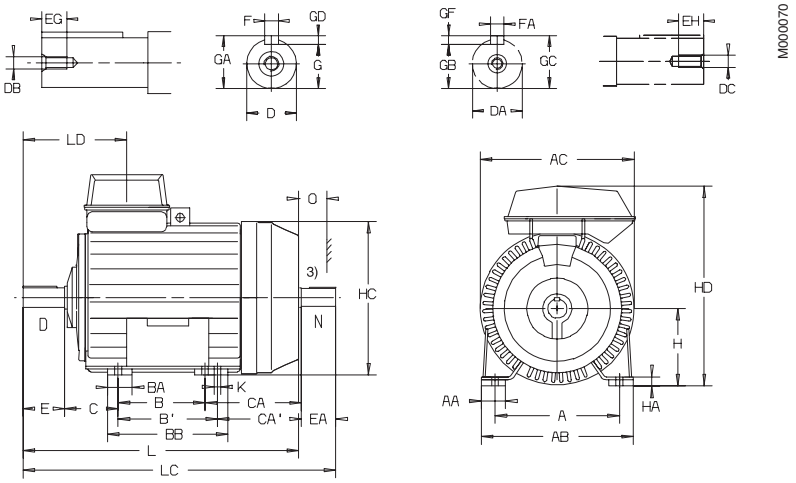
General purpose steel motors Sizes 280-315

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) – terminal box top mounted



Motor size	Poles 1)	A	AA	AB	AC	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH
280 SA	2	457	80	545	555	368	–	100	501	190	372	–	65	60	M20	M20	140	140	40	40
	4-8	457	80	545	555	368	–	100	450	190	302	–	75	65	M20	M20	140	140	40	40
280 SMA	2	457	80	545	555	368	419	100	501	190	372	321	65	60	M20	M20	140	140	40	40
	4-8	457	80	545	555	368	419	100	501	190	372	321	75	65	M20	M20	140	140	40	40
280 MB	2	457	80	545	555	419	–	100	501	190	381	–	65	60	M20	M20	140	140	40	40
	4-8	457	80	545	555	419	–	100	501	190	381	–	75	65	M20	M20	140	140	40	40
280 MC,MD	2	457	80	545	555	419	–	100	501	190	381	–	65	60	M20	M20	140	140	40	40
	4-8	457	80	545	555	419	–	100	501	190	381	–	75	65	M20	M20	140	140	40	40
315 SA	2	508	100	622	624	406	–	100	539	216	343	–	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	624	406	–	100	539	216	343	–	80	75	M20	M20	170	140	40	40
315 SMA	2	508	100	622	624	406	457	100	539	216	443	392	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	624	406	457	100	539	216	343	292	80	75	M20	M20	170	140	40	40
315 MB	2	508	100	622	624	457	–	100	539	216	392	–	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	624	457	–	100	539	216	392	–	80	75	M20	M20	170	140	40	40
315 LA	2	508	100	622	624	508	–	100	592	216	411	–	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	624	508	–	100	592	216	411	–	90	75	M24	M20	170	140	48	40
315 LB,LC	2	508	100	622	624	508	–	100	592	216	411	–	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	624	508	–	100	592	216	411	–	90	75	M24	M20	170	140	48	40

Motor size	Poles 1)	F	FA	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LC	LD	O
280 SA	2	18	18	58	69	53	64	11	11	280	32	558	730	24	1060	1210	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	730	24	990	1140	385	100
280 SMA	2	18	18	58	69	53	64	11	11	280	32	558	730	24	1060	1210	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	730	24	1060	1210	385	100
280 MB	2	18	18	58	69	53	64	11	11	280	32	558	730	24	1120	1270	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	730	24	1120	1270	385	100
280 MC	2	18	18	58	69	53	64	11	11	280	32	555	730	24	1255	1405	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	730	24	1255	1405	385	100
280 MD	2	18	18	58	69	53	64	11	11	280	32	558	730	24	1255	1405	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	730	24	1255	1405	385	100
315 SA	2	18	18	58	69	53	64	11	11	315	32	627	820	28	1095	1245	390	115
	4-8	22	20	71	85	67.5	79.5	14	12	315	32	627	820	28	1125	1275	420	115
315 SMA	2	18	18	58	69	53	64	11	11	315	32	627	820	28	1195	1345	390	115
	4-8	22	20	71	85	67.5	79.5	14	12	315	32	627	820	28	1125	1275	420	115
315 MB	2	18	18	58	69	53	64	11	11	315	32	627	820	28	1195	1345	390	115
	4-8	22	20	71	85	67.5	79.5	14	12	315	32	627	820	28	1225	1375	420	115
315 LA	2	18	18	58	69	53	64	11	11	315	32	627	820	28	1265	1415	390	115
	4-8	25	20	81	95	67.5	79.5	14	12	315	32	627	820	28	1295	1445	420	115
315 LB	2	18	18	58	69	53	64	11	11	315	32	627	820	28	1545	1695	390	115
	4-8	25	20	81	95	67.5	79.5	14	12	315	32	627	820	28	1575	1725	420	115
315 LC	2	18	18	58	69	53	64	11	11	315	32	627	848	28	1545	1695	390	115
	4	25	20	81	95	67.5	79.5	14	12	315	32	627	848	28	1575	1725	420	115

Tolerances:

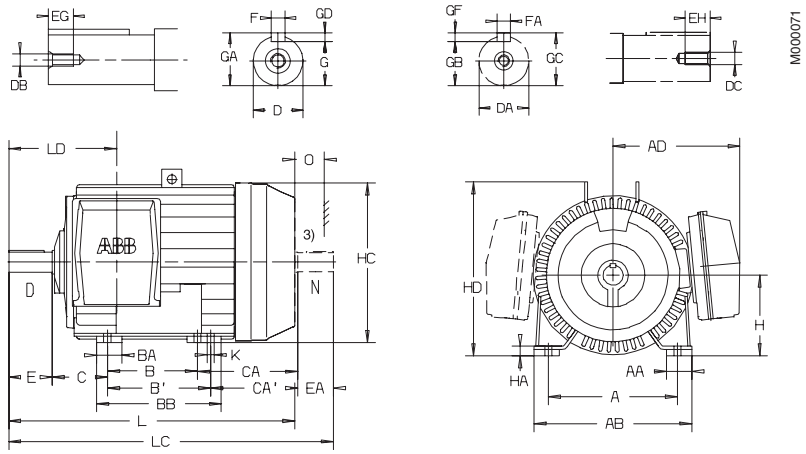
A, B	ISO js14	H	ISO 0, -1.0
D,DA	ISO m6		
F, FA	ISO h9		

1) Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
2) Cooling distance.
3) Second shaft end on request.

Above dimensions are 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) – terminal box side mounted



Motor size	Poles 1)	A	AA	AB	AD	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH
280 SA	2	457	80	545	448	368	–	100	501	190	372	–	65	60	M20	M20	140	140	40	40
	4-8	457	80	545	448	368	–	100	450	190	302	–	75	65	M20	M20	140	140	40	40
280 SMA	2	457	80	545	448	368	419	100	501	190	372	321	65	60	M20	M20	140	140	40	40
	4-8	457	80	545	448	368	419	100	501	190	372	321	75	65	M20	M20	140	140	40	40
280 MB	2	457	80	545	448	419	–	100	501	190	381	–	65	60	M20	M20	140	140	40	40
	4-8	457	80	545	448	419	–	100	501	190	381	–	75	65	M20	M20	140	140	40	40
280 MC,MD	2	457	80	545	448	419	–	100	501	190	381	–	65	60	M20	M20	140	140	40	40
	4-8	457	80	545	448	419	–	100	501	190	381	–	75	65	M20	M20	140	140	40	40
315 SA	2	508	100	622	502	406	–	100	539	216	343	–	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	502	406	–	100	539	216	343	–	80	75	M20	M20	170	140	40	40
315 SMA	2	508	100	622	502	406	457	100	539	216	443	392	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	502	406	457	100	539	216	343	292	80	75	M20	M20	170	140	40	40
315 MB	2	508	100	622	502	457	–	100	539	216	392	–	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	502	457	–	100	539	216	392	–	80	75	M20	M20	170	140	40	40
315 LA	2	508	100	622	502	508	–	100	592	216	411	–	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	502	508	–	100	592	216	411	–	90	75	M24	M20	170	140	48	40
315 LB,LC	2	508	100	622	502	508	–	100	592	216	411	–	65	60	M20	M20	140	140	40	40
	4-8	508	100	622	502	508	–	100	592	216	411	–	90	75	M24	M20	170	140	48	40

Motor size	Poles 1)	F	FA	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LC	LD	O
280 SA	2	18	18	58	69	53	64	11	11	280	32	558	620	24	1060	1210	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	620	24	990	1140	385	100
280 SMA	2	18	18	58	69	53	64	11	11	280	32	558	620	24	1060	1210	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	620	24	1060	1210	385	100
280 MB	2	18	18	58	69	53	64	11	11	280	32	558	620	24	1120	1270	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	620	24	1120	1270	385	100
280 MC	2	18	18	58	69	53	64	11	11	280	32	558	620	24	1255	1405	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	620	24	1255	1405	385	100
280 MD	2	18	18	58	69	53	64	11	11	280	32	558	620	24	1255	1405	385	100
	4-8	20	18	67.5	79.5	58	69	12	11	280	32	558	620	24	1255	1405	385	100
315 SA	2	18	18	58	69	53	64	11	11	315	32	627	685	28	1095	1245	390	115
	4-8	22	20	71	85	67.5	79.5	14	12	315	32	627	685	28	1125	1275	420	115
315 SMA	2	18	18	58	69	53	64	11	11	315	32	627	685	28	1195	1345	390	115
	4-8	22	20	71	85	67.5	79.5	14	12	315	32	627	685	28	1125	1275	420	115
315 MB	2	18	18	58	69	53	64	11	11	315	32	627	685	28	1195	1345	390	115
	4-8	22	20	71	85	67.5	79.5	14	12	315	32	627	685	28	1225	1375	420	115
315 LA	2	18	18	58	69	53	64	11	11	315	32	627	685	28	1265	1415	390	115
	4-8	25	20	81	95	67.5	79.5	14	12	315	32	627	685	28	1295	1445	420	115
315 LB,LC	2	18	18	58	69	53	64	11	11	315	32	627	685	28	1545	1695	390	115
	4-8	25	20	81	95	67.5	79.5	14	12	315	32	627	685	28	1575	1575	420	115

Tolerances:

A, B	ISO js14	H	ISO 0, -1.0
D,DA	ISO m6		
F, FA	ISO h9		

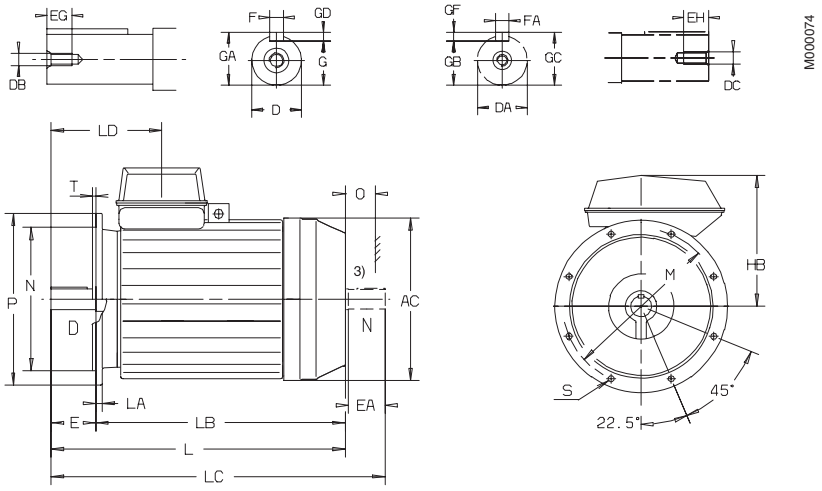
1) Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
2) Cooling distance.
3) Second shaft end on request.

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

General purpose steel motors Sizes 280-315

Dimension drawings

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



3

Motor size	Poles 1)	AC	D	DA	DB	DC	E	EA	EG	EH	F	FA	G	GA	GB	GC
280 SA	2	555	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64
	4-8	555	75	65	M20	M20	140	140	40	40	20	18	67.5	79.5	58	69
280 SMA	2	555	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64
	4-8	555	75	65	M20	M20	140	140	40	40	20	18	67.5	79.5	58	69
280 MB	2	555	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64
	4-8	555	75	65	M20	M20	140	140	40	40	20	18	67.5	79.5	58	69
280 MC,MD	2	555	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64
	4-8	555	75	65	M20	M20	140	140	40	40	20	18	67.5	79.5	58	69
315 SA	2	624	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64
	4-8	624	80	75	M20	M20	170	140	40	40	22	20	71	85	67.5	79.5
315 SMA	2	624	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64
	4-8	624	80	75	M20	M20	170	140	40	40	22	20	71	85	67.5	79.5
315 MB	2	624	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64
	4-8	624	80	75	M20	M20	170	140	40	40	22	20	71	85	67.5	79.5
315 LA	2	624	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64
	4-8	624	90	75	M24	M20	170	140	48	40	25	20	81	95	67.5	79.5
315 LB,LC	2	624	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64
	4-8	624	90	75	M24	M20	170	140	48	40	25	20	81	95	67.5	79.5

Motor size	Poles 1)	GD	GF	HB	L	LA	LB	LC	LD	M	N	O 2)	P	S	T
280 SA	2	11	11	450	1060	22	920	1210	385	500	450	100	550	18	5
	4-8	12	11	450	990	22	850	1140	385	500	450	100	550	18	5
280 SMA	2	11	11	450	1060	22	920	1210	385	500	450	100	550	18	5
	4-8	12	11	450	1060	22	920	1210	385	500	450	100	550	18	5
280 MB	2	11	11	450	1120	22	980	1270	385	500	450	100	550	18	5
	4-8	12	11	450	1120	22	980	1270	385	500	450	100	550	18	5
280 MC	2	11	11	450	1255	22	980	1405	385	500	450	100	550	18	5
	4-8	12	11	450	1255	22	980	1405	385	500	450	100	550	18	5
280 MD	2	11	11	450	1255	22	980	1405	385	500	450	100	550	18	5
	4-8	12	11	450	1255	22	980	1405	385	500	450	100	550	18	5
315 SA	2	11	11	505	1095	25	955	1245	390	600	550	115	660	23	6
	4-8	14	12	505	1125	25	955	1275	420	600	550	115	660	23	6
315 SMA	2	11	11	505	1195	25	1055	1345	390	600	550	115	660	23	6
	4-8	14	12	505	1125	25	955	1275	420	600	550	115	660	23	6
315 MB	2	11	11	505	1195	25	1055	1345	390	600	550	115	660	23	6
	4-8	14	12	505	1225	25	1055	1375	420	600	550	115	660	23	6
315 LA	2	11	11	505	1265	25	1125	1415	390	600	550	115	660	23	6
	4-8	14	12	505	1295	25	1125	1445	420	600	550	115	660	23	6
315 LB	2	11	11	505	1545	25	1125	1415	390	600	550	115	660	23	6
	4-8	14	12	505	1575	25	1405	1725	420	600	550	115	660	23	6
315 LC	2	11	11	505	1545	25	1125	1415	390	600	550	115	660	23	6
	4-8	14	12	526	1575	25	1405	1725	420	600	550	115	660	23	6

Tolerances:

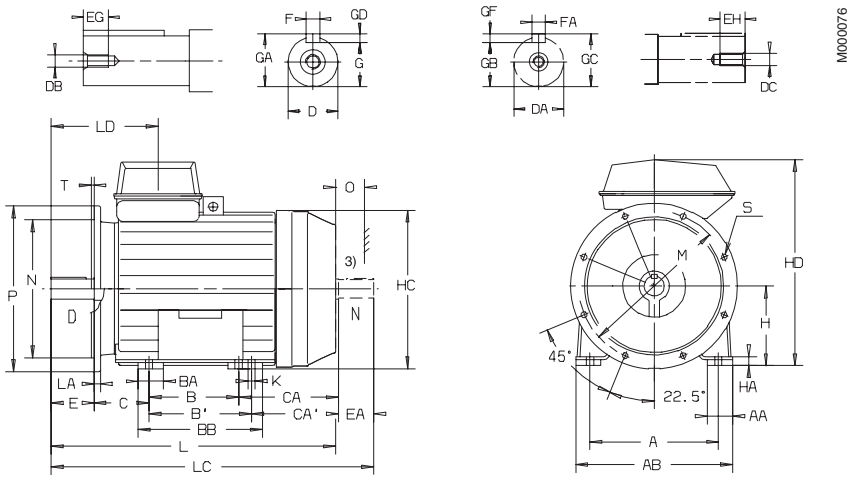
D,DA	ISO m6
F, FA	ISO h9
N	ISO j6

1) Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
2) Cooling distance.
3) Second shaft end on request.

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

Dimension drawings

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



Motor size	Poles 1)	A	AA	AB	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH	F	FA
280 SA	2	457	80	545	368	–	100	501	190	372	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	457	80	545	368	–	100	501	190	302	–	75	65	M20	M20	140	140	40	40	20	18
280 SMA	2	457	80	545	368	419	100	501	190	372	321	65	60	M20	M20	140	140	40	40	18	18
	4-8	457	80	545	368	419	100	501	190	372	321	75	65	M20	M20	140	140	40	40	20	18
280 MB	2	457	80	545	419	–	100	501	190	381	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	457	80	545	419	–	100	501	190	381	–	75	65	M20	M20	140	140	40	40	20	18
280 MC,MD	2	457	80	545	419	–	100	501	190	381	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	457	80	545	419	–	100	501	190	381	–	75	65	M20	M20	140	140	40	40	20	18
315 SA	2	508	100	622	406	–	100	539	216	343	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	406	–	100	539	216	343	–	80	75	M20	M20	170	140	40	40	22	20
315 SMA	2	508	100	622	406	457	100	539	216	443	392	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	406	457	100	539	216	343	292	80	75	M20	M20	170	140	40	40	22	20
315 MB	2	508	100	622	457	–	100	539	216	392	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	457	–	100	539	216	392	–	80	75	M20	M20	170	140	40	40	22	20
315 LA	2	508	100	622	508	–	100	592	216	411	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	508	–	100	592	216	411	–	90	75	M24	M20	170	140	48	40	25	20
315 LB,LC	2	508	100	622	508	–	100	592	216	411	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	508	–	100	592	216	411	–	90	75	M24	M20	170	140	48	40	25	20

Motor size	Poles 1)	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LC	LD	M	N	O 2)	P	S	T
280 SA	2	58	69	53	64	11	11	280	32	558	730	24	1060	1210	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	730	24	990	1140	385	500	450	100	550	18	5
280 SMA	2	58	69	53	64	11	11	280	32	558	730	24	1060	1210	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	730	24	1060	1210	385	500	450	100	550	18	5
280 MB	2	58	69	53	64	11	11	280	32	558	730	24	1120	1270	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	730	24	1120	1270	385	500	450	100	550	18	5
280 MC	2	58	69	53	64	11	11	280	32	558	730	24	1255	1405	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	730	24	1225	1405	385	500	450	100	550	18	5
280 MD	2	58	69	53	64	11	11	280	32	558	730	24	1255	1405	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	730	24	1255	1405	385	500	450	100	550	18	5
315 SA	2	58	69	53	64	11	11	315	32	627	820	28	1095	1245	390	600	550	115	660	23	6
	4-8	71	85	67.5	79.5	14	12	315	32	627	820	28	1125	1275	420	600	550	115	660	23	6
315 SMA	2	58	69	53	64	11	11	315	32	627	820	28	1195	1345	390	600	550	115	660	23	6
	4-8	71	85	67.5	79.5	14	12	315	32	627	820	28	1125	1275	420	600	550	115	660	23	6
315 MB	2	58	69	53	64	11	11	315	32	627	820	28	1195	1345	390	600	550	115	660	23	6
	4-8	71	85	67.5	79.5	14	12	315	32	627	820	28	1225	1375	420	600	550	115	660	23	6
315 LA	2	58	69	53	64	11	11	315	32	627	820	28	1265	1415	390	600	550	115	660	23	6
	4-8	81	95	67.5	79.5	14	12	315	32	627	820	28	1295	1445	420	600	550	115	660	23	6
315 LB	2	58	69	53	64	11	11	315	32	627	820	28	1545	1695	390	600	550	115	660	23	6
	4-8	81	95	67.5	79.5	14	12	315	32	627	820	28	1575	1725	420	600	550	115	660	23	6
315 LC	2	58	69	53	64	11	11	315	32	627	848	28	1545	1695	390	600	550	115	660	23	6
	4	81	95	67.5	79.5	14	12	315	32	627	848	28	1575	1725	420	600	550	115	660	23	6

Tolerances:

A, B	ISO js14	H	ISO 0, -1.0
D,DA	ISO m6	N	ISO j6
F, FA	ISO h9		

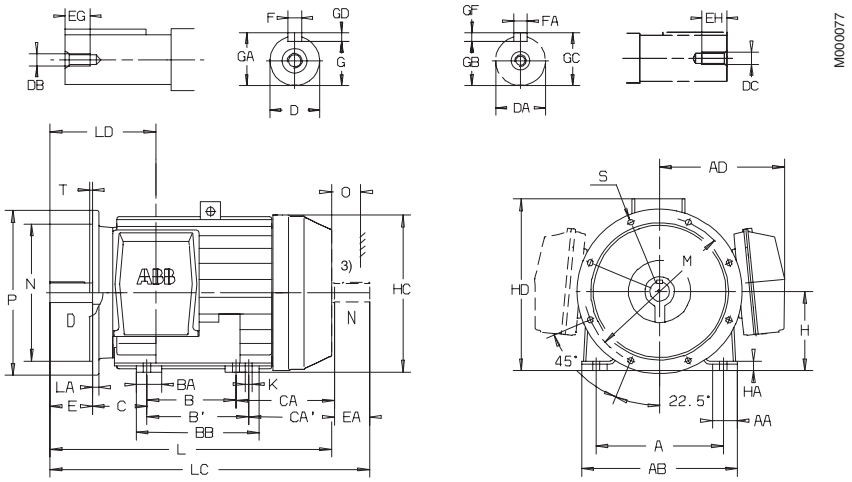
1) Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
2) Cooling distance.
3) Second shaft end on request.

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

General purpose steel motors Sizes 280-315

Dimension drawings

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



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Motor size	Poles 1)	A	AA	AB	AD	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH	F	FA
280 SA	2	457	80	545	448	368	–	100	501	190	372	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	457	80	545	448	368	–	100	501	190	302	–	75	65	M20	M20	140	140	40	40	20	18
280 SMA	2	457	80	545	448	368	419	100	501	190	372	321	65	60	M20	M20	140	140	40	40	18	18
	4-8	457	80	545	448	368	419	100	501	190	372	321	75	65	M20	M20	140	140	40	40	20	18
280 MB	2	457	80	545	448	419	–	100	501	190	381	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	457	80	545	448	419	–	100	501	190	381	–	75	65	M20	M20	140	140	40	40	20	18
280 MC,MD	2	457	80	545	448	419	–	100	501	190	381	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	457	80	545	448	419	–	100	501	190	381	–	75	65	M20	M20	140	140	40	40	20	18
315 SA	2	508	100	622	502	406	–	100	539	216	343	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	502	406	–	100	539	216	343	–	80	75	M20	M20	170	140	40	40	22	20
315 SMA	2	508	100	622	502	406	457	100	539	216	443	392	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	502	406	457	100	539	216	343	292	80	75	M20	M20	170	140	40	40	22	20
315 MB	2	508	100	622	502	457	–	100	539	216	392	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	502	457	–	100	539	216	392	–	80	75	M20	M20	170	140	40	40	22	20
315 LA	2	508	100	622	502	508	–	100	592	216	411	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	502	508	–	100	592	216	411	–	90	75	M24	M20	170	140	48	40	25	20
315 LB,LC	2	508	100	622	502	508	–	100	592	216	411	–	65	60	M20	M20	140	140	40	40	18	18
	4-8	508	100	622	502	508	–	100	592	216	411	–	90	75	M24	M20	170	140	48	40	25	20

Motor size	Poles 1)	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LC	LD	M	N	O 2)	P	S	T
280 SA	2	58	69	53	64	11	11	280	32	558	620	24	1060	1210	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	620	24	990	1140	385	500	450	100	550	18	5
280 SMA	2	58	69	53	64	11	11	280	32	558	620	24	1060	1210	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	620	24	1060	1210	385	500	450	100	550	18	5
280 MB	2	58	69	53	64	11	11	280	32	558	620	24	1120	1270	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	620	24	1120	1270	385	500	450	100	550	18	5
280 MC	2	58	69	53	64	11	11	280	32	558	620	24	1255	1405	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	620	24	1255	1405	385	500	450	100	550	18	5
280 MD	2	58	69	53	64	11	11	280	32	558	620	24	1255	1405	385	500	450	100	550	18	5
	4-8	67.5	79.5	58	69	12	11	280	32	558	620	24	1255	1405	385	500	450	100	550	18	5
315 SA	2	58	69	53	64	11	11	315	32	627	685	28	1095	1245	390	600	550	115	660	23	6
	4-8	71	85	67.5	79.5	14	12	315	32	627	685	28	1125	1275	420	600	550	115	660	23	6
315 SMA	2	58	69	53	64	11	11	315	32	627	685	28	1195	1345	390	600	550	115	660	23	6
	4-8	71	85	67.5	79.5	14	12	315	32	627	685	28	1125	1275	420	600	550	115	660	23	6
315 MB	2	58	69	53	64	11	11	315	32	627	685	28	1195	1345	390	600	550	115	660	23	6
	4-8	71	85	67.5	79.5	14	12	315	32	627	685	28	1225	1375	420	600	550	115	660	23	6
315 LA	2	58	69	53	64	11	11	315	32	627	685	28	1265	1415	390	600	550	115	660	23	6
	4-8	81	95	67.5	79.5	14	12	315	32	627	685	28	1295	1445	420	600	550	115	660	23	6
315 LB,LC	2	58	69	53	64	11	11	315	32	627	685	28	1545	1695	390	600	550	115	660	23	6
	4-8	81	95	67.5	79.5	14	12	315	32	627	685	28	1575	1725	420	600	550	115	660	23	6

Tolerances:

A, B	ISO js14	H	ISO 0, -1.0
D,DA	ISO m6	N	ISO j6
F, FA	ISO h9		

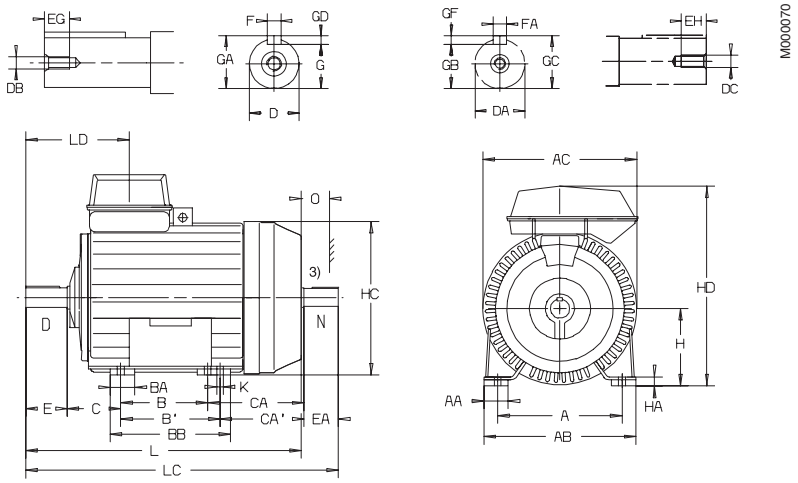
1) Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
2) Cooling distance.
3) Second shaft end on request.

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

General purpose steel motors Sizes 355-400

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) – terminal box top mounted



Motor size	Poles 1)	A	AA	AB	AC	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH
355 SA,SB	2	610	110	714	720	500	–	100	584	254	416	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	720	500	–	100	584	254	416	–	100	90	M24	M20	210	170	48	48
355 MA	2	610	110	714	720	560	–	100	644	254	416	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	720	560	–	100	644	254	416	–	100	90	M24	M24	210	170	48	48
355 MB	2	610	110	714	720	560	–	100	644	254	416	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	720	560	–	100	644	254	416	–	100	90	M24	M24	210	170	48	48
355 LA	2	610	110	714	720	630	–	100	714	254	426	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	720	630	–	100	714	254	426	–	100	90	M24	M24	210	170	48	48
355 LB	2	610	110	714	720	630	–	100	714	254	426	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	720	630	–	100	714	254	426	–	100	90	M24	M24	210	170	48	48
355 LKD	4-8	610	110	714	720	630	710	100	802	254	583	503	100	90	M24	M24	210	170	48	48
400 MLA	2	686	140	820	810	630	710	140	850	280	583	503	70	70	M20	M20	140	140	40	40
	4-8	686	140	820	810	630	710	140	850	280	583	503	100	90	M24	M24	210	170	48	48
400 MLB	2	686	140	820	810	630	710	140	850	280	583	503	70	70	M20	M20	140	140	40	40
	4-8	686	140	820	810	630	710	140	850	280	583	503	100	90	M24	M24	210	170	48	48
400 LKA	2	686	140	820	810	710	800	140	935	280	643	553	80	75	M20	M20	170	140	40	40
	4-8	686	140	820	810	710	800	140	935	280	643	553	100	90	M24	M24	210	170	48	48
400 LKB	2	686	140	820	810	710	800	140	935	280	643	553	80	75	M20	M20	170	140	40	40
	4-8	686	140	820	810	710	800	140	935	280	643	553	100	90	M24	M24	210	170	48	48

Motor size	Poles 1)	F	FA	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LC	LD	O 2)
355 SA,SB	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1310	1460	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	920	28	1380	1560	462	130
355 MA	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1370	1520	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	920	28	1440	1620	462	130
355 MB	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1370	1520	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	920	28	1440	1620	462	130
355 LA	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1450	1600	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	920	28	1520	1700	462	130
355 LB	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1450	1600	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	920	28	1520	1700	462	130
355 LKD	4-8	28	25	90	106	91	95	16	14	355	36	715	920	28	1660	1847	462	130
400 MLA	2	20	20	62.5	74.5	62.5	74.5	12	12	400	45	805	1003	35	1616	1773	408	150
	4-8	28	25	90	106	81	95	16	14	400	45	805	1003	35	1686	1873	478	150
400 MLB	2	20	20	62.5	74.5	62.5	74.5	12	12	400	45	805	1003	35	1616	1773	408	150
	4-8	28	25	90	106	81	95	16	14	400	45	805	1003	35	1686	1873	478	150
400 LKA	2	22	20	71	85	67.5	79.5	14	12	400	45	805	1003	35	1786	1943	438	150
	4-8	28	25	90	106	81	95	16	14	400	45	805	1003	35	1826	2013	478	150
400 LKB	2	22	20	71	85	67.5	79.5	14	12	400	45	805	1003	35	1786	1943	438	150
	4-8	28	25	90	106	81	95	16	14	400	45	805	1003	35	1826	2013	478	150

Tolerances:

A, B	ISO js14	H	ISO 0, -1.0
D,DA	ISO m6		
F, FA	ISO h9		

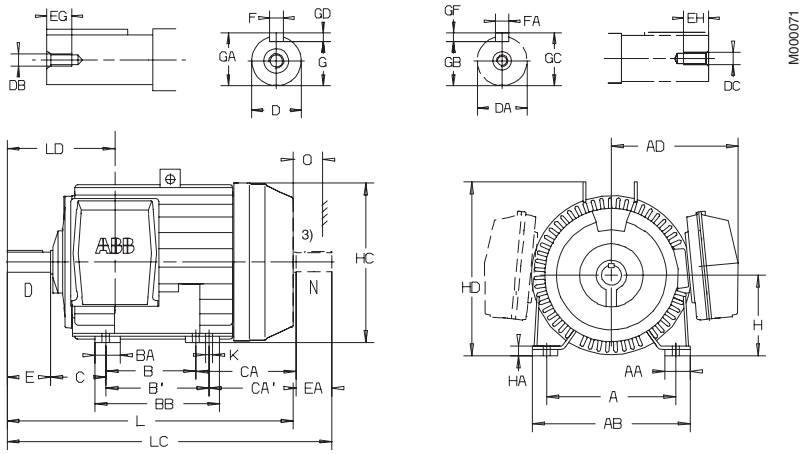
1) Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
2) Cooling distance.
3) Second shaft end on request.

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

General purpose steel motors Sizes 355-400

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) – terminal box side mounted



Motor size	Poles 1)	A	AA	AB	AD	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH
355 SA,SB	2	610	110	714	570	500	–	100	584	254	416	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	570	500	–	100	584	254	416	–	100	90	M24	M20	210	170	48	48
355 MA	2	610	110	714	570	560	–	100	644	254	416	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	570	560	–	100	644	254	416	–	100	90	M24	M24	210	170	48	48
355 MB	2	610	110	714	570	560	–	100	644	254	416	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	570	560	–	100	644	254	416	–	100	90	M24	M24	210	170	48	48
355 LA	2	610	110	714	570	630	–	100	714	254	426	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	570	630	–	100	714	254	426	–	100	90	M24	M24	210	170	48	48
355 LB	2	610	110	714	570	630	–	100	714	254	426	–	70	70	M20	M20	140	140	40	40
	4-8	610	110	714	570	630	–	100	714	254	426	–	100	90	M24	M24	210	170	48	48
355 LKD	4-6	610	110	714	570	630	710	100	802	254	583	503	100	90	M24	M24	210	170	48	48
400 MLA	2	686	140	820	603	630	710	140	850	280	583	503	70	70	M20	M20	140	140	40	40
	4-6	686	140	820	603	630	710	140	850	280	583	503	100	90	M24	M24	210	170	48	48
400 MLB	2	686	140	820	603	630	710	140	850	280	583	503	70	70	M20	M20	140	140	40	40
	4-6	686	140	820	603	630	710	140	850	280	583	503	100	90	M24	M24	210	170	48	48
400 LKA	2	686	140	820	603	710	800	140	935	280	643	553	80	75	M20	M20	170	140	40	40
	4-6	686	140	820	603	710	800	140	935	280	643	553	100	90	M24	M24	210	170	48	48
400 LKB	2	686	140	820	603	710	800	140	935	280	643	553	80	75	M20	M20	170	140	40	40
	4-6	686	140	820	603	710	800	140	935	280	643	553	100	90	M24	M24	210	170	48	48

Motor size	Poles 1)	F	FA	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LC	LD	O 2)
355 SA,SB	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1310	1460	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	768	28	1380	1560	462	130
355 MA	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1370	1520	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	768	28	1440	1620	462	130
355 MB	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1370	1520	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	768	28	1440	1620	462	130
355 LA	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1450	1600	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	768	28	1520	1700	462	130
355 LB	2	20	20	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1450	1600	392	130
	4-8	28	25	90	106	81	95	16	14	355	36	715	768	28	1520	1700	462	130
355 LKD	4-8	28	25	90	106	91	95	16	14	355	36	715	768	28	1660	1847	462	130
400 MLA	2	20	20	62.5	74.5	62.5	74.5	12	12	400	45	805	900	35	1616	1773	408	150
	4-6	28	25	90	106	81	95	16	14	400	45	805	900	35	1686	1873	478	150
400 MLB	2	20	20	62.5	74.5	62.5	74.5	12	12	400	45	805	900	35	1616	1773	408	150
	4-6	28	25	90	106	81	95	16	14	400	45	805	900	35	1686	1873	478	150
400 LKA	2	22	20	71	85	67.5	79.5	14	12	400	45	805	900	35	1786	1943	438	150
	4-6	28	25	90	106	81	95	16	14	400	45	805	900	35	1826	2013	478	150
400 LKB	2	22	20	71	85	67.5	79.5	14	12	400	45	805	900	35	1786	1943	438	150
	4-6	28	25	90	106	81	95	16	14	400	45	805	900	35	1826	2013	478	150

Tolerances:

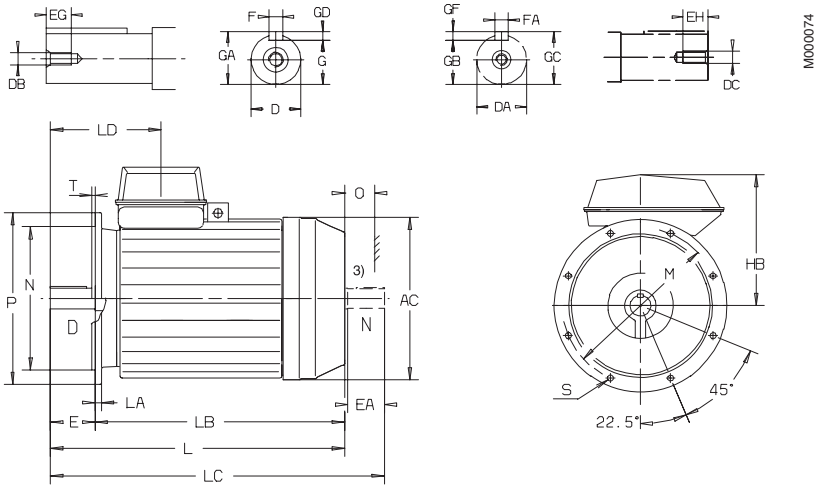
A, B	ISO js14	H	ISO 0, -1.0
D,DA	ISO m6		
F, FA	ISO h9		

1) Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
2) Cooling distance.
3) Second shaft end on request.

Above dimensions are 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), V1 (IM 3011), V3 (IM 3031) and IM B14 (IM 3601), V18 (IM 3611), V19 (IM 3631)



Motor size	Poles 1)	AC	D	DA	DB	DC	E	EA	EG	EH	F	FA	G	GA	GB	GC
355 SA,SB	2	720	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5
	4-8	720	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95
355 MA	2	720	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5
	4-8	720	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95
355 MB	2	720	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5
	4-8	720	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95
355 LA	2	720	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5
	4-8	720	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95
355 LB	2	720	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5
	4-8	720	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95
355 LKD	4-6	720	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95
400 MLA	2	810	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5
	4-6	810	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95
400 MLB	2	810	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5
	4-6	810	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95
400 LKA	2	810	80	75	M20	M20	170	140	40	40	22	20	71	85	67.5	79.5
	4-6	810	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95
400 LKB	2	810	80	75	M20	M20	170	140	40	40	22	20	71	85	67.5	79.5
	4-6	810	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95

Motor size	Poles 1)	GD	GF	HB	L	LA	LB	LC	LD	M	N	O 2)	P	S	T
355 SA,SB	2	12	12	565	1310	25	1170	1460	392	740	680	130	800	23	6
	4-8	16	14	565	1380	25	1170	1560	462	740	680	130	800	23	6
355 MA	2	12	12	565	1370	25	1230	1520	392	740	680	130	800	23	6
	4-8	16	14	565	1440	25	1230	1620	462	740	680	130	800	23	6
355 MB	2	12	12	565	1370	25	1230	1520	392	740	680	130	800	23	6
	4-8	16	14	565	1440	25	1230	1620	462	740	680	130	800	23	6
355 LA	2	12	12	565	1450	25	1310	1600	392	740	680	130	800	23	6
	4-8	16	14	565	1520	25	1310	1700	462	740	680	130	800	23	6
355 LB	2	12	12	565	1450	25	1310	1600	392	740	680	130	800	23	6
	4-8	16	14	565	1520	25	1310	1700	462	740	680	130	800	23	6
355 LKD	4-6	16	14	565	1660	25	1450	1847	462	740	680	130	800	23	6
400 MLA	2	12	12	603	1616	25	1476	1773	408	740	680	150	800	23	6
	4-6	16	14	603	1686	25	1476	1873	478	740	680	150	800	23	6
400 MLB	2	12	12	603	1616	25	1476	1773	408	740	680	150	800	23	6
	4-6	16	14	603	1686	25	1476	1873	478	740	680	150	800	23	6
400 LKA	2	14	12	603	1786	25	1616	1943	438	740	680	150	800	23	6
	4-6	16	14	603	1826	25	1616	2013	478	740	680	150	800	23	6
400 LKB	2	14	12	603	1786	25	1616	1943	438	740	680	150	800	23	6
	4-6	16	14	603	1826	25	1616	2013	478	740	680	150	800	23	6

Tolerances:

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

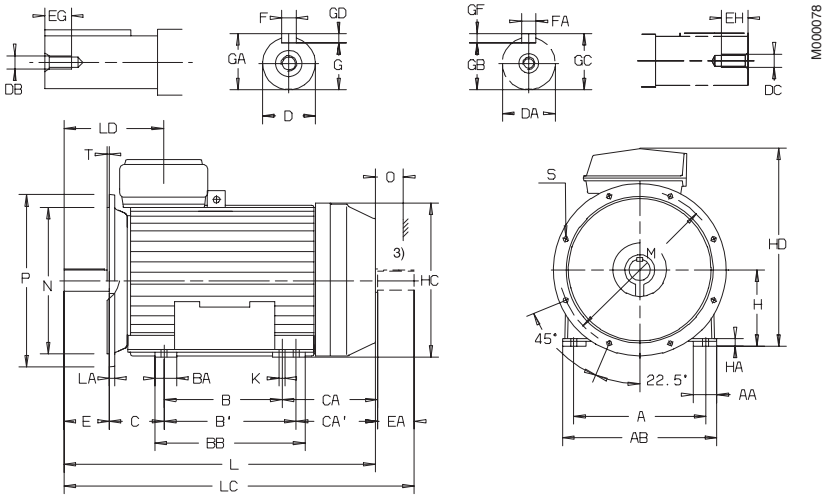
1) Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
2) Cooling distance.
3) Second shaft end on request.

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

General purpose steel motors Sizes 355-400

Dimension drawings

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



Motor size	Poles [1]	A	AA	AB	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH	F	FA
355 SA,SB	2	610	110	714	500	–	100	584	254	426	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	500	–	100	584	254	426	–	100	90	M24	M20	210	170	48	48	28	25
355 MA	2	610	110	714	560	–	100	644	254	426	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	560	–	100	644	254	426	–	100	90	M24	M24	210	170	48	48	28	25
355 MB	2	610	110	714	560	–	100	644	254	426	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	560	–	100	644	254	426	–	100	90	M24	M24	210	170	48	48	28	25
355 LA	2	610	110	714	630	–	100	714	254	436	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	630	–	100	714	254	436	–	100	90	M24	M24	210	170	48	48	28	25
355 LB	2	610	110	714	630	–	100	714	254	436	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	630	–	100	714	254	436	–	100	90	M24	M24	210	170	48	48	28	25
355 LKD	4-6	610	110	714	630	710	100	802	254	583	503	100	90	M24	M24	210	170	48	48	28	25
400 MLA	2	686	140	820	630	710	140	850	280	583	503	70	70	M20	M20	140	140	40	40	20	20
	4-6	686	140	820	630	710	140	850	280	583	503	100	90	M24	M24	210	170	48	48	28	25
400 MLB	2	686	140	820	630	710	140	850	280	583	503	70	70	M20	M20	140	140	40	40	20	20
	4-6	686	140	820	630	710	140	850	280	583	503	100	90	M24	M24	210	170	48	48	28	25
400 LKA	2	686	140	820	710	800	140	935	280	643	553	80	75	M20	M20	170	140	40	40	22	20
	4-6	686	140	820	710	800	140	935	280	643	553	100	90	M24	M24	210	170	48	48	28	25
400 LKB	2	686	140	820	710	800	140	935	280	643	553	80	75	M20	M20	170	140	40	40	22	20
	4-6	686	140	820	710	800	140	935	280	643	553	100	90	M24	M24	210	170	48	48	28	25

Motor size	Poles [1]	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LC	LD	M	N	O [2]	P	S	T
355 SA,SB	2	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1310	1460	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	920	28	1380	1560	462	740	680	130	800	23	6
355 MA	2	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1370	1520	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	920	28	1440	1620	462	740	680	130	800	23	6
355 MB	2	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1370	1520	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	920	28	1440	1620	462	740	680	130	800	23	6
355 LA	2	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1450	1600	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	920	28	1520	1700	462	740	680	130	800	23	6
355 LB	2	62.5	74.5	62.5	74.5	12	12	355	36	715	920	28	1450	1600	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	920	28	1520	1700	462	740	680	130	800	23	6
355 LKD	4-6	90	106	91	95	16	14	355	36	715	920	28	1660	1847	462	740	680	130	800	23	6
400 MLA	2	62.5	74.5	62.5	74.5	12	12	400	45	805	1003	35	1616	1773	408	740	680	150	800	23	6
	4-6	90	106	81	95	16	14	400	45	805	1003	35	1686	1873	478	740	680	150	800	23	6
400 MLB	2	62.5	74.5	62.5	74.5	12	12	400	45	805	1003	35	1616	1773	408	740	680	150	800	23	6
	4-6	90	106	81	95	16	14	400	45	805	1003	35	1686	1873	478	740	680	150	800	23	6
400 LKA	2	71	85	67.5	79.5	14	12	400	45	805	1003	35	1786	1943	438	740	680	150	800	23	6
	4-6	90	106	81	95	16	14	400	45	805	1003	35	1826	2013	478	740	680	150	800	23	6
400 LKB	2	71	85	67.5	79.5	14	12	400	45	805	1003	35	1786	1943	438	740	680	150	800	23	6
	4-6	90	106	81	95	16	14	400	45	805	1003	35	1826	2013	478	740	680	150	800	23	6

Tolerances:

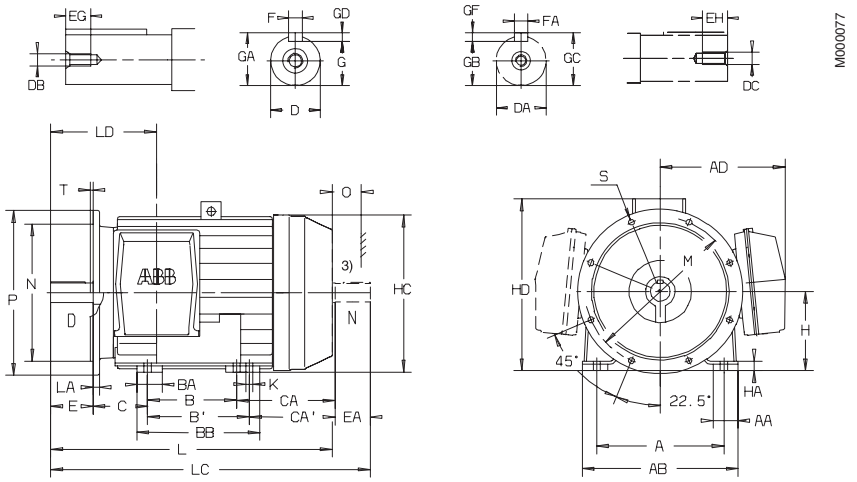
A, B	ISO js14	H	ISO 0, -1.0
D,DA	ISO m6	N	ISO j6
F, FA	ISO h9		

[1] Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
[2] Cooling distance.
[3] Second shaft end on request.

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

Dimension drawings

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



Motor size	Poles [1]	A	AA	AB	AD	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH	F	FA
355 SA,SB	2	610	110	714	570	500	–	100	584	254	416	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	570	500	–	100	584	254	416	–	100	90	M24	M20	210	170	48	48	28	25
355 MA	2	610	110	714	570	560	–	100	644	254	416	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	570	560	–	100	644	254	416	–	100	90	M24	M24	210	170	48	48	28	25
355 MB	2	610	110	714	570	560	–	100	644	254	416	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	570	560	–	100	644	254	416	–	100	90	M24	M24	210	170	48	48	28	25
355 LA	2	610	110	714	570	630	–	100	765	254	426	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	570	630	–	100	765	254	426	–	100	90	M24	M24	210	170	48	48	28	25
355 LB	2	610	110	714	570	630	–	100	765	254	426	–	70	70	M20	M20	140	140	40	40	20	20
	4-8	610	110	714	570	630	–	100	765	254	426	–	100	90	M24	M24	210	170	48	48	28	25
355 LKD	4-6	610	110	714	570	630	710	100	802	254	583	503	100	90	M24	M24	210	170	48	48	28	25
400 MLA	2	686	140	820	603	630	710	140	850	280	583	503	70	70	M20	M20	140	140	40	40	20	20
	4-6	686	140	820	603	630	710	140	850	280	583	503	100	90	M24	M24	210	170	48	48	28	25
400 MLB	2	686	140	820	603	630	710	140	850	280	583	503	70	70	M20	M20	140	140	40	40	20	20
	4-6	686	140	820	603	630	710	140	850	280	583	503	100	90	M24	M24	210	170	48	48	28	25
400 LKA	2	686	140	820	603	710	800	140	935	280	643	553	80	75	M20	M20	170	140	40	40	22	20
	4-6	686	140	820	603	710	800	140	935	280	643	553	100	90	M24	M24	210	170	48	48	28	25
400 LKB	2	686	140	820	603	710	800	140	935	280	643	553	80	75	M20	M20	170	140	40	40	22	20
	4-6	686	140	820	603	710	800	140	935	280	643	553	100	90	M24	M24	210	170	48	48	28	25

Motor size	Poles [1]	G	GA	GB	GC	GD	GF	H	HA	HC	HD	K	L	LC	LD	M	N	O [2]	P	S	T
355 SA,SB	2	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1310	1460	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	768	28	1380	1560	462	740	680	130	800	23	6
355 MA	2	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1370	1520	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	768	28	1440	1620	462	740	680	130	800	23	6
355 MB	2	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1370	1520	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	768	28	1440	1620	462	740	680	130	800	23	6
355 LA	2	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1450	1600	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	768	28	1520	1700	462	740	680	130	800	23	6
355 LB	2	62.5	74.5	62.5	74.5	12	12	355	36	715	768	28	1450	1600	392	740	680	130	800	23	6
	4-8	90	106	81	95	16	14	355	36	715	768	28	1520	1700	462	740	680	130	800	23	6
355 LKD	4-6	90	106	91	95	16	14	355	36	715	768	28	1660	1847	462	740	680	130	800	23	6
400 MLA	2	62.5	74.5	62.5	74.5	12	12	400	45	805	900	35	1616	1773	408	740	680	150	800	23	6
	4-6	90	106	81	95	16	14	400	45	805	900	35	1686	1873	478	740	680	150	800	23	6
400 MLB	2	62.5	74.5	62.5	74.5	12	12	400	45	805	900	35	1616	1773	408	740	680	150	800	23	6
	4-6	90	106	81	95	16	14	400	45	805	900	35	1686	1873	478	740	680	150	800	23	6
400 LKA	2	71	85	67.5	79.5	14	12	400	45	805	900	35	1786	1943	438	740	680	150	800	23	6
	4-6	90	106	81	95	16	14	400	45	805	900	35	1826	2013	478	740	680	150	800	23	6
400 LKB	2	71	85	67.5	79.5	14	12	400	45	805	900	35	1786	1943	438	740	680	150	800	23	6
	4-6	90	106	81	95	16	14	400	45	805	900	35	1826	2013	478	740	680	150	800	23	6

Tolerances:

A, B	ISO js14	H	ISO 0, -1.0
D,DA	ISO m6	N	ISO j6
F, FA	ISO h9		

[1] Dimensions for 4-pole motors also valid for 4/6- and 4-8 -pole two-speed motors.
[2] Cooling distance.
[3] Second shaft end on request.

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

Dimension drawings

Terminal box in standard design with 6 terminals

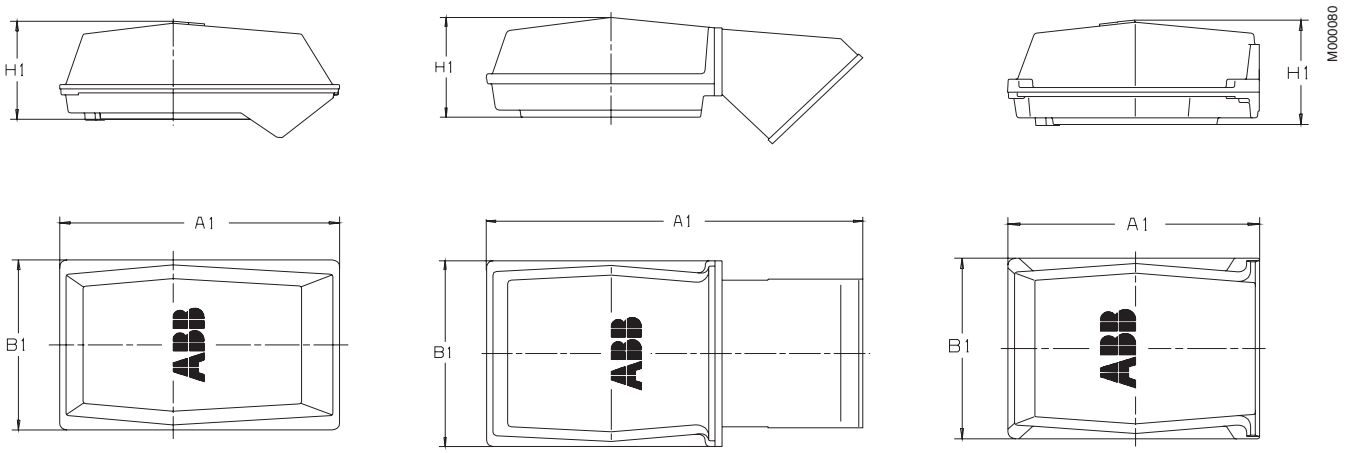
Top-mounted terminal box:

122/4
142/4

162/4, 162/9 +
adapter

Side-mounted terminal box:

122/5
142/6
162/7, 162/10



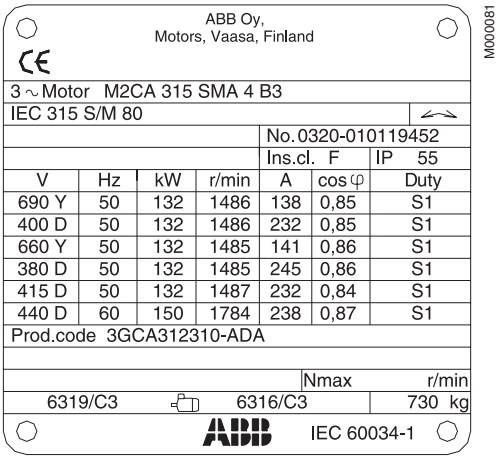
Terminal box type	**Motor size**	A1	B1	H1
Top-mounted terminal box:				
122/4	**280**	455	280	177
142/4	**315 - 400M**	536	349	197
162/4 + adapter	**355 - 400**	787	410	226
Side-mounted terminal box:				
122/5	**280**	383	280	180
142/6	**315 - 400M**	426	347	201
162/7	**355 - 400**	508	412	226

Further details on terminal boxes on previous pages.

For motor dimensions please see dimension drawings on earlier pages.

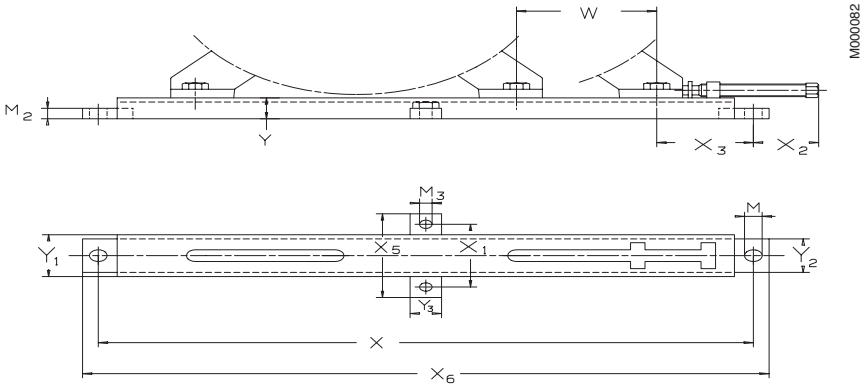
Rating plate

The rating plate is in table form giving values for speed, current and power factor for six voltages.



Accessories

Slide rails for motor sizes 280-400

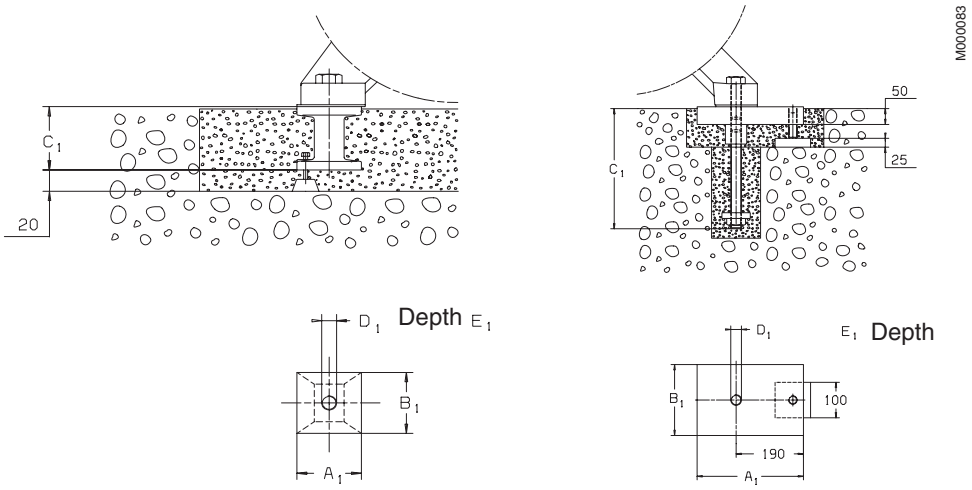


Type	Motor size	M	M_2	M_3	W_{max}	X	X_1	X_2 max	X_3 min	X_5	X_6	Y	Y_1	Y_2	Y_3	Weight/ rail kg
ZHKJ 50	**280**	28	25	20	135	850	150	125	135	200	900	50	100	80	50	14.5
ZHKJ 63	**315**	28	25	20	220	1040	150	125	150	200	1090	50	100	80	50	17.5
ZHKJ 71 [1]	**355**	33	30	20	275	1260	190	145	185	240	1320	60	140	120	50	31
ZHKJ 71 [1]	**400**	33	30	20	180	1260	190	140	200	240	1320	60	140	120	50	31

[1] When mounting on a ceiling or on a wall please contact the manufacturer.

Each set includes two complete slide rails including screw for mounting the motor on the rails. Screws for mounting the rails on the foundation are not included. Slide rails are supplied with unmachined lower surfaces and should, prior to tightenng down, be supported in a suitable manner.

Foundation studs for motor sizes 280-400



ZBYH 161...241 **ZBHE 301**

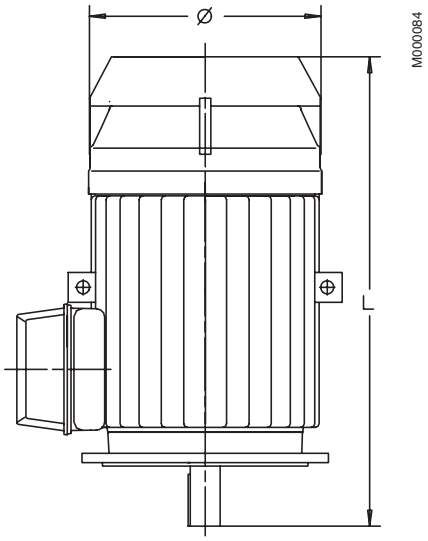
Foundation stud type	Fixing screw	Motor size	Main dimensions A1	B1	C1	D1	E1	Weight kg
ZBYH 201	M20 x 70/70 Y	**280**	100	100	95	M20	35	3.4
ZBYH 241	M24 x 90/90 Y	**315, 355**	130	130	135	M24	45	7
ZBHE 301	M30 x 100/100 Y	**400**	300	200	385	M30	65	30

Each set of foundation studs includes 4 studs, fixing screw for the motor, adjusting screw with foundation plate.

Accessories

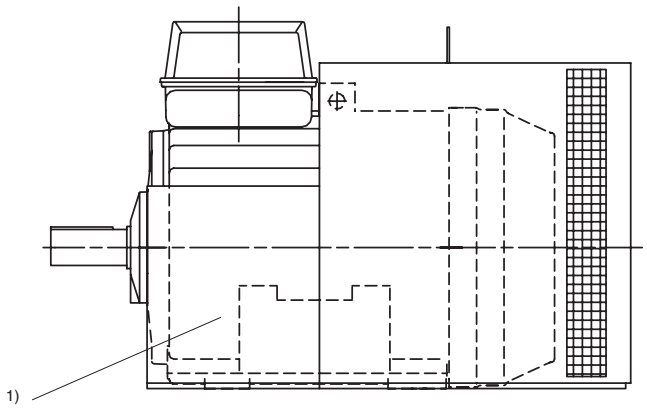
Protective roof (variant code 005)

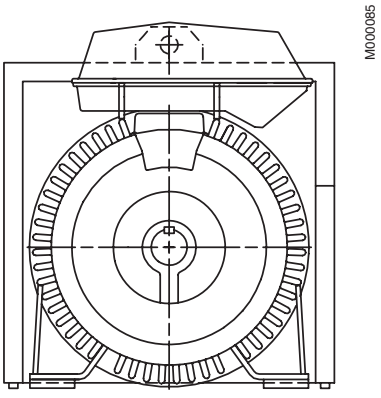
Motor size	Poles	Ø	L
280 S_	2	555	1160
	4-12	555	1090
280 SM_	2	555	1160
	4-12	555	1160
280 M_	2	555	1220
	4-12	555	1220
315 S_	2	624	1210
	4-12	624	1240
315 SM_	2	624	1310
	4-12	624	1240
315 M_	2	624	1310
	4-12	624	1340
315 L_	2	624	1380
	4-12	624	1410
355 S_	2	720	1440
	4-12	720	1510
355 M_	2	720	1500
	4-12	720	1570
355 L_	2	720	1580
	4-12	720	1650
355 LK_	4-12	720	1790
400 ML_	2	810	1796
	4-12	810	1836
400 LK_	2	810	1936
	4-12	810	1976



Mounting arrangement IM V1
with protective roof

Silencer for motor sizes 280-400





Both foot-mounted and flange-mounted motors can be fitted with a silencer to reduce the noise level by about 10 dB(A). The silencer is painted blue and is made of 2 mm steel sheet. The sound absorbing material is 40 mm thick polyurethane foam. On the underside there is a rubber strip to seal against the floor. The silencer fits loosely over the motor.

Dimensions of silencers on request.

[1] If connections to the motor or control gear require it, an opening can be made in the extension of the silencer or it can be removed.

General purpose steel motors in brief, basic design

Motor frame size			280	315	355	400
Stator	Material Paint colour shade Paint thickness		Profile-pressed sheet steel Blue, Munsell 8B 4.5/3.25 (NCS 4822-B05G) / RAL 5014 Two-pack epoxy paint, thickness ≥ 70 µm			
Bearing end shields	Material Paint colour shade Paint thickness		Cast iron EN-GJL-200 or spheroidal graphit EN-GJS-400 Blue, Munsell 8B 4.5/3.25 (NCS 4822-B05G) / RAL 5014 Two-pack epoxy paint, thickness ≥ 70 µm			
Bearings	D-end	2-pole 4-12 poles	6316/C4 6316/C3	6316/C4 6319/C3	6316M/C4 6322/C3	6317M/C4 6322/C3
	N-end	2-pole 4-12 poles	6316/C4 6316/C3	6316/C4 6316/C3	6316M/C4 6319/C3	6317M/C4 6319/C3
Axially-locked bearings	Inner bearing cover		As standard, locked at D-end			
Bearing seal			V-ring as standard, radial seal on request			
Lubrication			Regreasing nipples, M10x1 Grease for bearing temperatures -30°C to +120°C			
SPM-nipples			On request			
Rating plate			Acid proof stainless steel AISI 316, thickness 0.6 mm, with individual serial number			
Terminal box	Frame material Cover material Cover screw material		Cast iron EN-GJL-150 Cast iron EN-GJL-150 Steel 5G, coated with sinc and yellow cromated			
Connections	Cable entries	2-4 pole 6-8 pole	2 x M63 2 x M63	2 x M63 2 x M63	2 x Ø60/80 2 x Ø60	2 x Ø80 2 x Ø60/80
	Terminals		6 terminals for connection with cable lugs (not included)			
Fan	Material		Reinforced glassfiber laminate, aluminium or polypropylene with metal hub			
Fan cover	Material Paint colour shade Paint thickness		Sheet steel Blue, Munsell 8B 4.5/3.25 (NCS 4822-B05G) / RAL 5014 Two-pack epoxy polyester paint, thickness ≥ 80 µm			
Stator winding	Material Insulation		Copper Insulation class F; temperature rise class B unless otherwise stated.			
	Winding protection		PTC-thermistors 150°C, 3 in series, as standard			
Rotor winding	Material		Pressure die-cast aluminium			
Balancing method			Half key balancing as standard			
Key ways			Open key way			
Heating elements	On request		50 W	1 x 65 W	2 x 65 W	2 x 65 W
Drain holes			As standard, open on delivery			
Enclosure			IP 55, higher protection on request			
Cooling method			IC 411			

Notes:

Notes:

ABB Motors' total product offer

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M000328

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Marine motors
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– Steel motors
– Cast iron motors
– Open drip proof motors

Other applications
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– High speed motors
– Wind turbine generators
– Smoke venting motors
– Water cooled motors
– Motors for roller table drives

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