

Cast Iron Motors

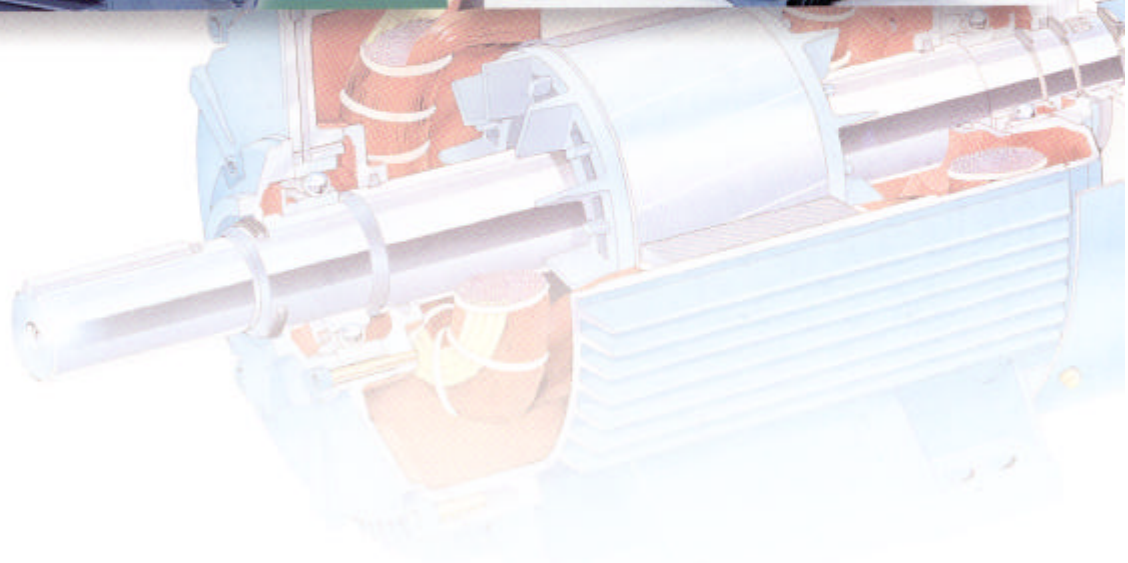
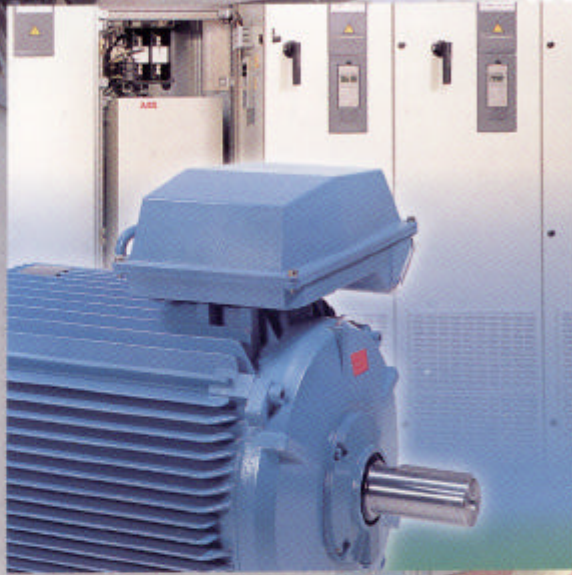


ABB Motors





The Leader in Motors

ABB Group is the world's leading electrical engineering company supplying expertise and products for electric power generation, transmission, and distribution as well as industrial and rail transportation markets. ABB supplies a full range of industrial electric motors, both AC and DC, LV and HV meeting the needs of most applications, with virtually any power rating.

Within the Group, ABB Motors is the world's leading manufacturer of low-voltage induction motors, having over 100 years experience and a presence in more than 140 countries. ABB Motors' broad understanding of customer applications enables it to work closely to solve individual problems or to supply custom-designed motors for any project - no matter how demanding.

For customers, this all represents a solid value and commitment revealed in the dependable quality of ABB Motors' products and in its unrivalled customer service and back up. The hallmarks of its products are efficiency, robustness and reliability, combined to represent the best value available. Customers the world over rely on ABB Motors as the most solid and reliable supplier of electric motors. But above all, ABB Motors values its customers.

The best value is also enhanced by ABB Motors' worldwide customer service network guaranteeing fast delivery, rapid response and local back-up, as well as by worldwide ABB Service network supporting the after sales service.

ABB Motors has manufacturing facilities in Denmark, Finland, Italy, Spain, Sweden, India and Mexico, and a joint venture in China. The comprehensive motor stocks at each of these sites are reinforced by large and versatile stocks at Central Stock Europe in Menden, Germany and Central Stock Asia in Singapore, and by numerous distribution stocks.

Totally enclosed squirrel cage three phase motors with cast iron frame Sizes 71 to 400, 0.25 to 710 kW

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ABB Motors reserves the right to change
the design, technical specification and
dimensions without prior notice.

Mechanical design

Stator

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

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

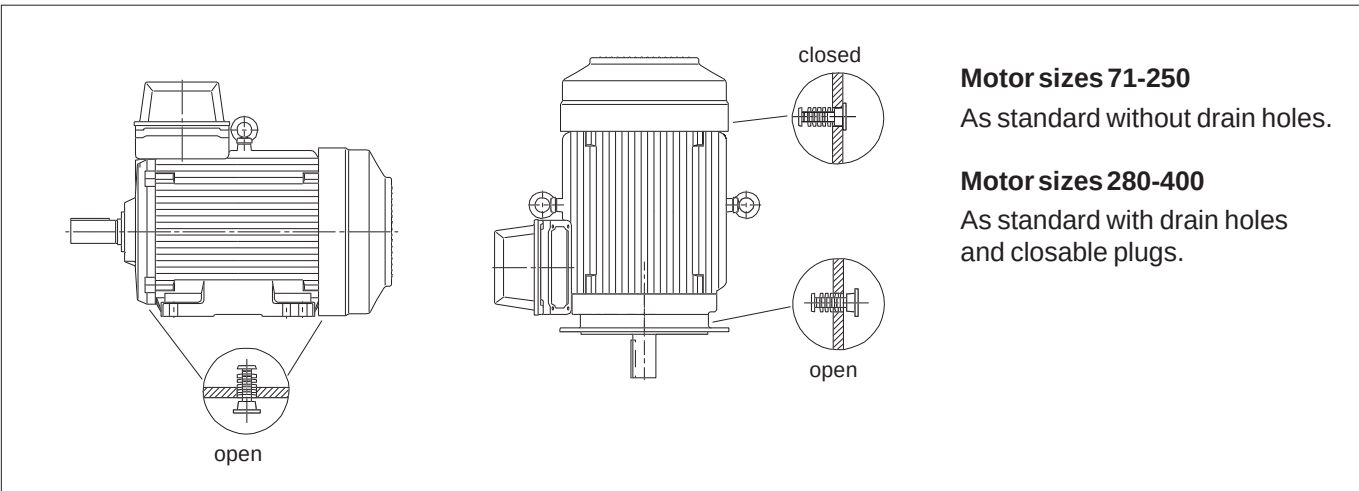
Drain holes

Motors 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 3031, is specified, on the basis of the method of motor mounting.

In the basic design, sizes 71 to 250 are supplied without drain holes, although these can be provided as option.

Motor sizes 280 to 400 are fitted with drain holes and closable plugs. The plugs are open on delivery. When mounting the motors, ensure that the drain holes face downwards.

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



Terminal box

Terminal boxes are mounted either on the top of the motor, or on either side of the motor, see ordering information on page 15 and the table below.

Motor size	Terminal box		
	on top	right side	left side
71	normal	—	—
80-132	normal	on request	on request
160-400	normal	on request	on request

The terminal box of motor sizes 71 to 250 can be turned 4x90° (as option in sizes 280 to 400) and in motor sizes 280 to 400 rotated 2x180°, to allow cable entry from either side of the motor.

Degree of protection of standard terminal box is IP 55.

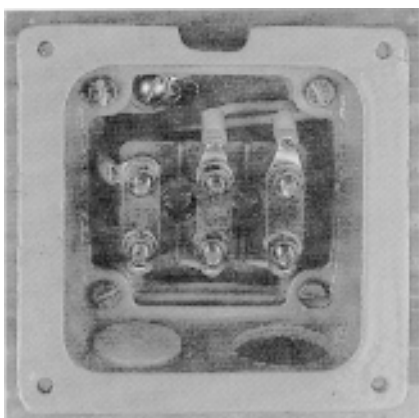
Motor sizes 71 to 250 are equipped with blank cover plates on delivery for connection flanges, but can be provided with cable glands as option.

In **motor sizes 280 to 400** the terminal box is equipped with cable glands or cable boxes as standard.

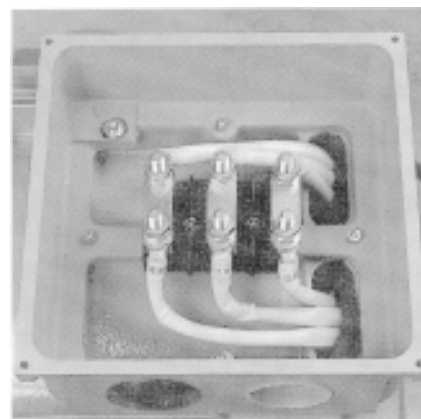
Terminations are suitable for Cu- and Al-cables (Al-cables on request for motor sizes 71 to 250). Cables are connected to the terminals by cable lugs which are not included with the motor.

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

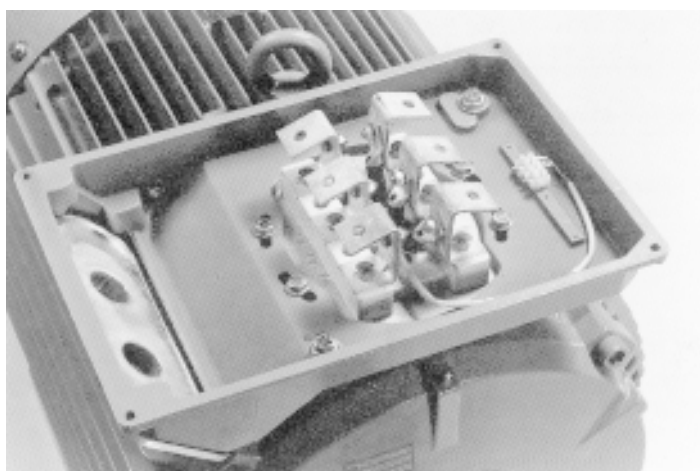
Please see variant codes on page 35 for options and dimension drawings of terminal boxes, pages 50-51.



Terminal box for motor sizes 71 to 132



Terminal box for motor sizes 160 to 250



Terminal box for motor sizes 280 to 400, provided either with a cable gland or a cable box.

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 and termination parts are supplied according to the following tables.

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

Motor sizes 71 to 250:

Voltage 220 - 690 V, 50 Hz

Motor size	Terminal box	Max. rated current A	Terminal bolt size 6 x	Max. connection Cu-cable area mm ²	Cable entry Pg size	Corresponding Pr size	Max. cable diameter mm
71	-	38	M4	6	2 x Pg 11	2 x Pr 18.6	13.5
80, 90	-	38	M4	6	2 x Pg 16	2 x Pr 22.5	16
100, 112	-	71	M5	16	2 x Pg 21	2 x Pr 28.3	20
132	-	71	M5	16	2 x Pg 21	2 x Pr 28.3	20
160	TB 20	94	M6	25	2 x Pg 29	2 x Pr 37	28
180	TB 20	94	M6	25	2 x Pg 29	2 x Pr 37	28
200	TB 30	117	M10	35	2 x Pg 36	2 x Pr 47	34
225	TB 40	146	M10	50	2 x Pg 36	2 x Pr 47	34
250	TB 40	180	M10	70	2 x Pg 42	2 x Pr 54	40

Motor sizes M2BA 280 to 400 with top-mounted terminal box:

Standard cable entries and cable boxes

Voltage 220-690 V, 50 Hz

Motor size	3000 r/min (2 poles)					1500 r/min (4 poles)					Voltage/freq. code
	Ter-minal box	Flange	Cable box	Cable entry	Terminal bolt size	Ter-minal box	Flange	Cable box	Cable entry	Terminal bolt size	
280 SM_	122/2	MKLL 22/42	–	2xPg42	M8	122/2	MKLL 22/42	–	2xPg42	M8	
315 SM_, ML_	142/1	MKLL 32/48	–	2xPg48	M10	142/1	MKLL 32/48	–	2xPg48	M10	
355 S	162/1	MPMM-ZL1	SK 172 1966	2xØ60	M12	162/1	MPMM-ZL1	SK 172 1966	2xØ60	M12	D
	142/2	–	SK 172 1966	2xØ60	M10	142/2	–	SK 172 1966	2xØ60	M10	E
355 SM_	162/1	MPMM-ZL1	SK 172 1966	2xØ60	M12	162/1	MPMM-ZL1	SK 172 1966	2xØ60	M12	
355 ML_	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	
400 M_	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	
400 LKA	162/2	MPMM-ZL1	LNPB 3328	2xØ80	M12	162/2	MPMM-ZL1	LNPB 3328	2xØ80	M12	D
	162/2	MPMM-ZL1	LNPB 3328	2xØ80	M12	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	E
400 LKB	162/2	MPMM-ZL1	LNPB 3328	2xØ80	M12	162/2	MPMM-ZL1	LNPB 3328	2xØ80	M12	
400 LKC	–	–	–	–	–	162/2	MPMM-ZL1	LNPB 3328	2xØ80	M12	

Motor size	1000 r/min (6 poles)					750 r/min (8 poles)					Voltage/freq. code
	Ter-minal box	Flange	Cable box	Cable entry	Terminal bolt size	Ter-minal box	Flange	Cable box	Cable entry	Terminal bolt size	
280 SMA, SMB	122/2	MKLL 22/36	–	2xPg36	M8	122/2	MKLL 22/36	–	2xPg36	M8	
280 SMC	122/2	MKLL 22/42	–	2xPg42	M8	122/2	MKLL 22/36	–	2xPg36	M8	
315 SM_	142/1	MKLL 32/42	–	2xPg42	M10	142/1	MKLL 32/42	–	2xPg42	M10	
315 ML_	142/1	MKLL 32/48	–	2xPg48	M10	142/1	MKLL 32/48	–	2xPg48	M10	
355 S	142/2	–	SK 172 1966	2xØ60	M10	142/2	–	SK 172 1966	2xØ60	M10	
355 SMA	142/2	–	SK 172 1966	2xØ60	M10	142/2	–	SK 172 1966	2xØ60	M10	
355 SMB	162/1	MPMM-ZL1	SK 172 1966	2xØ60	M12	–	–	–	–	–	D
355 SMB	142/2	–	SK 172 1966	2xØ60	M10	–	–	–	–	–	E
355 MLA	162/1	MPMM-ZL1	SK 172 1966	2xØ60	M12	142/2	–	SK 172 1966	2xØ60	M12	
355 MLC	162/1	MPMM-ZL1	SK 172 1966	2xØ60	M12	162/1	MPMM-ZL 1	SK 172 1966	2xØ60	M12	D
355 MLC	162/1	MPMM-ZL1	SK 172 1966	2xØ60	M12	142/2	–	SK 172 1966	2xØ60	M12	E
400 M	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	142/2	–	SK 172 1966	2xØ60	M12	D
	142/2	–	SK 172 1966	2xØ60	M10	142/2	–	SK 172 1966	2xØ60	M10	E
400 MA	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	162/1	MPMM-ZL 1	SK 172 1966	2xØ60	M12	D
	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	142/2	–	SK 172 1966	2xØ60	M12	E
400 MB	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	–	–	–	–	–	
400 LKA	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	162/1	MPMM-ZL 1	LNPB 3328	2xØ80	M12	
400 LKB	162/2	MPMM-ZL1	LNPB 3328	2xØ80	M12	162/1	MPMM-ZL 1	LNPB 3328	2xØ80	M12	D
	162/1	MPMM-ZL1	LNPB 3328	2xØ80	M12	162/1	MPMM-ZL 1	LNPB 3328	2xØ80	M12	E
400 LKC	162/2	MPMM-ZL1	LNPB 3328	2xØ80	M12	–	–	–	–	–	D
	162/1	MPMM-ZL1	LNPB 3328	2xØ80	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

The following examples explain the terminal box codings in the table above:

122/2	MKLL 22/42					- terminal box 122/2 - flange MKLL 22/42 - cable gland 2 x Pg 42
162/1	MPMM-ZL 1	SK 172 1966	2xØ60			- terminal box 162/1 - adaptor MPMM-ZL 1 - cable box SK 172 1966 - cable entry 2xØ60
162/5	MKPD 3425	LNPB 3328	2xØ80			- terminal box 162/5 - adaptor MKPD 3425 - cable box LNPB 3328 - cable entry 2xØ80

See drawings on the following page and on page 51.

Motor sizes 280 to 400 with side-mounted terminal box

Standard cable entries and cable boxes

Voltage 220-690 V, 50 Hz

Motor size	3000 r/min (2 poles)					1500 r/min (4 poles)					Voltage/freq. code
	Ter-minal box	Flange	Cable box	Cable entry	Terminal bolt size	Ter-minal box	Flange	Cable box	Cable entry	Terminal bolt size	
280 SM_	122/7	MKLL 22/42	–	2xPg42	M8	122/7	MKLL 22/42	–	2xPg42	M8	
315 SM_, ML_	142/5	MKLL 32/48	–	2xPg48	M10	142/5	MKLL 32/48	–	2xPg48	M10	
355 S	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	D
	142/10	~	SK 172 1966	2xØ60	M10	142/10	–	SK 172 1966	2xØ60	M10	E
355 SM_	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	
355 ML_	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	
400 M_	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	
400 LKA	162/8	MKPD 3425	LNPB 3328	2xØ80	M12	162/8	MKPD 3425	LNPB 3328	2xØ80	M12	D
	162/8	MKPD 3425	LNPB 3328	2xØ80	M12	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	E
400 LKB	162/8	MKPD 3425	LNPB 3328	2xØ80	M12	162/8	MKPD 3425	LNPB 3328	2xØ80	M12	
400 LKC	–	–	–	–	–	162/8	MKPD 3425	LNPB 3328	2xØ80	M12	

Motor size	1000 r/min (6 poles)					750 r/min (8 poles)					Voltage/freq. code
	Ter-minal box	Flange	Cable box	Cable entry	Terminal bolt size	Ter-minal box	Flange	Cable box	Cable entry	Terminal bolt size	
280 SMA, SMB	122/7	MKLL 22/36	–	2xPg36	M8	122/7	MKLL 22/36	–	2xPg36	M8	
280 SMC	122/7	MKLL 22/42	–	2xPg42	M8	122/7	MKLL 22/36	–	2xPg36	M8	
315 SM_	142/5	MKLL 32/42	–	2xPg42	M10	142/5	MKLL 32/42	–	2xPg42	M10	
315 ML_	142/5	MKLL 32/48	–	2xPg48	M10	142/5	MKLL 32/48	–	2xPg48	M10	
355 S	142/10	–	SK 172 1966	2xØ60	M10	142/10	–	SK 172 1966	2xØ60	M10	
355 SMA	142/10	–	SK 172 1966	2xØ60	M10	142/10	–	SK 172 1966	2xØ60	M10	
355 SMB	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	–	–	–	–	–	D
355 SMB	142/10	–	SK 172 1966	2xØ60	M10	–	–	–	–	–	E
355 MLA	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	142/10	–	SK 172 1966	2xØ60	M10	
355 MLC	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	D
355 MLC	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	142/10	–	SK 172 1966	2xØ60	M10	E
400 M	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	142/10	–	SK 172 1966	2xØ60	M10	D
	142/10	–	SK 172 1966	2xØ60	M10	142/10	–	SK 172 1966	2xØ60	M10	E
400 MA	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	162/5	MKPD 3425	SK 172 1966	2xØ60	M12	D
	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	142/10	–	SK 172 1966	2xØ60	M10	E
400 MB	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	–	–	–	–	–	
400 LKA	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	
400 LKB	162/8	MKPD 3425	LNPB 3328	2xØ80	M12	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	D
	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	E
400 LKC	162/8	MKPD 3425	LNPB 3328	2xØ80	M12	–	–	–	–	–	D
	162/5	MKPD 3425	LNPB 3328	2xØ80	M12	–	–	–	–	–	E

Motor sizes 280 to 400:

Voltage 220 - 690 V, 50 Hz

Alternatives for cable entries and cable boxes

In **motor sizes 280 to 400** the terminal box is equipped with cable glands or cable boxes as standard.

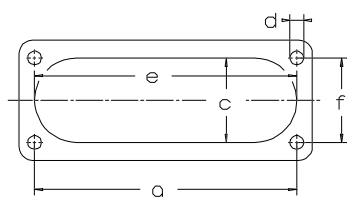
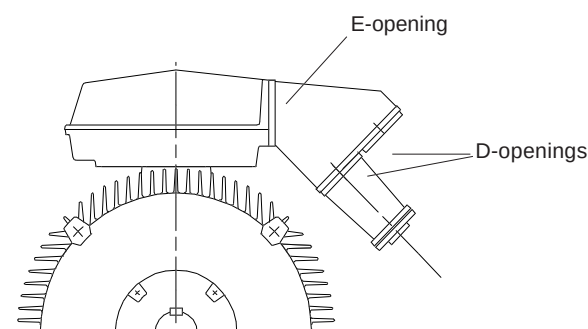
To enable the supply of suitable terminations for the motor, please state cable type, quantity and size when ordering.

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

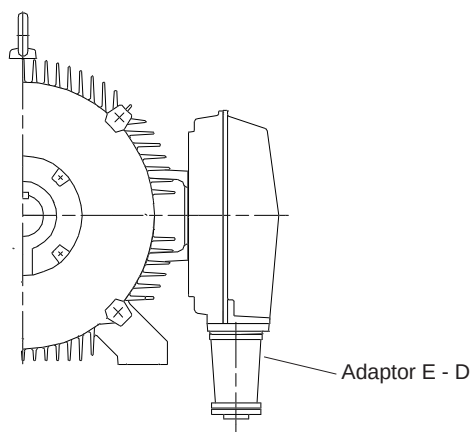
Motor size	Terminal box on top	Terminal box on side	Opening type	Max. rated current A (D/Y-conn.)	Max connection cable area mm ²	Cable gland diameter	Cable box diameter	Blank plate
280	122/2	122/7	C (FL 21)	363/210	2x150	2xPg29...42	1xØ36...52/Ø48...60	MKLN 20
315	142/1	142/5	D (FL33)	640/370	2x240	1xPg36...42 2xPg36...48	1xØ36...52/Ø48...60 2xØ48...60/Ø50...68 2xØ68...80	MKLN 30
355, 400	142/2	142/10	D (FL33)	640/370	2x240	1xPg36...42 2xPg36...48	1xØ36...52/Ø48...60 2xØ48...60/Ø50...68 2xØ68...80	MKLN 30
	162/1	162/5	E-D ¹⁾	950/550	4x240	2xPg36...48 1xPg36...42	1xØ36...52/Ø48...60 2xØ48...60/Ø50...68 2xØ68...80	
	162/2	162/8	E-D ¹⁾	1300/750	4x240	2xPg36...48 1xPg36...42	1xØ36...52/Ø48...60 2xØ48...60/Ø50...68 2xØ68...80	
	162/1	162/5	E-2D ¹⁾	950/550	4x240	2x2xPg36...48 2x1xPg36...42	2x1xØ36...52/Ø48...60 2x2xØ48...60/Ø50...68 2x2xØ68...80	
	162/2	162/8	E-2D ¹⁾	1300/750	4x240	2x2xPg36...48 2x1xPg36...42	2x1xØ36...52/Ø48...60 2x2xØ48...60/Ø50...68 2x2xØ68...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 on page 51.

Terminal box 162 with adapting flange MPMM-ZL 1:



Terminal box 162 with adapting flange MKPD 3425:



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.

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 on page 32.

Bearing types

Motor size	Number of poles	Standard design		Alternative designs
		Deep groove ball bearings		Roller bearings variant code 037
		D-end	N-end	D-end
71	2-6	6202 2RS C3	6202 2RS C3	—
80	2-6	6204 2RS C3	6204 2RS C3	—
90	2-6	6205 2RS C3	6205 2RS C3	—
100	2-6	6206 2RS C3	6206 2RS C3	—
112	2-6	6207 2RS C3	6207 2RS C3	—
132	2-6	6208 2RS C3	6208 2RS C3	—
160	2-12	6309-Z/C3	6309-Z/C3	NU 309 ¹⁾
180	2-12	6310-Z/C3	6310-Z/C3	NU 310 ¹⁾
200	2-12	6312-Z/C3 ²⁾	6312-Z/C3 ²⁾	NU 312 ¹⁾
225	2-12	6313-Z/C3 ²⁾	6313-Z/C3 ²⁾	NU 313 ¹⁾
250	2-12	6315-Z/C3 ²⁾	6315-Z/C3 ²⁾	NU 315 ¹⁾
280	2	6316/C4	6316/C4	¹⁾
	4-12	6316/C3	6316/C3	NU 316/C3 ¹⁾
315	2	6316/C4	6316/C4	¹⁾
	4-12	6319/C3	6316/C3	NU319/C3 ¹⁾
355	2	6319M/C4	6319M/C4	¹⁾
	4-12	6322/C3	6319/C3	NU 322/C3 ¹⁾
400	2	6319M/C4	6319M/C4	¹⁾
	4-12	6322/C3	6319/C3	NU 322/C3 ¹⁾

¹⁾ On request

²⁾ Motors also stocked with greasable bearings

Axially-locked bearings

The outer bearing ring at the D-end can be axially locked with an inner bearing cover; see table beside and variant code 042 on page 32. The inner ring is locked by tight tolerance to the shaft.

Motor size	Foot-mounted motors	Flange-mounted motors
71-132	On request	On request
160-180	On request	D-end
200-400	D-end	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, motor sizes 280 to 400 are provided with a warning sign.

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

Bearing seals

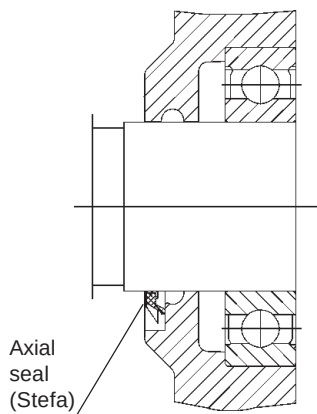
Motor sizes 71 to 132 are equipped with sealed bearings (2RS). M2BA motors, sizes 160 to 250 have, as standard, axial seals at D-end, sizes 280 to 400 at

both ends. The size and type of suitable seals are in accordance with the table below:

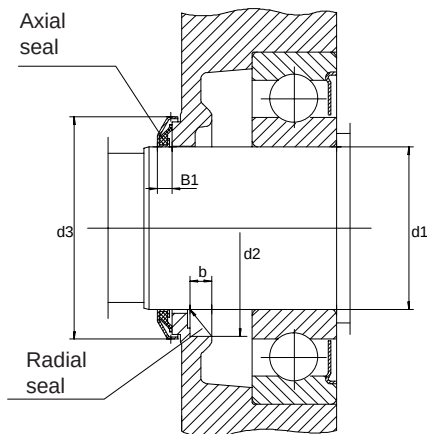
Motor size	Number of poles	d ₁	d ₂	d ₃	B ₁	b	Standard design		Alternative design Radial seal (DIN 3760) Variant code 072
							Axial seal	N-end	
160	2-12	45	62	63	4.5	8	9RB45	-	45x62x8
180	2-12	50	68	72	5.5	8	9RB50	-	50x68x8
200	2-12	60	80	82	5.5	8	9RB60	-	60x80x8
225	2-12	65	85	87	5.5	10	9RB65	-	65x85x10
250	2-12	75	95	97	5.5	10	9RB75	-	75x95x10
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 95	VS 95	95x120x12 ¹⁾
	4-12	110	140		15.5	12	VS 110	VS 95	110x140x12 ¹⁾
400	2	95	120		13.5	12	VS 95	VS 95	95x120x12 ¹⁾
	4-12	110	140		15.5	12	VS 110	VS 95	110x140x12 ¹⁾

¹⁾ Viton-seal

Motor sizes 71-132

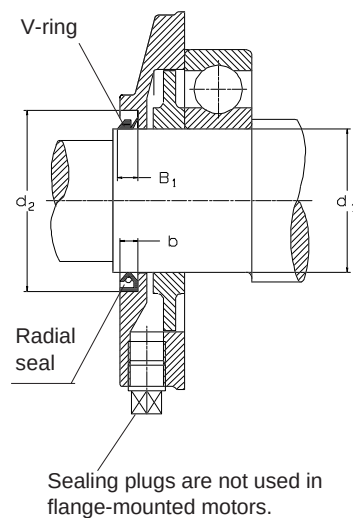


Motor sizes 160-250 ¹⁾



¹⁾ Motor sizes 200 to 250 also stocked with greasable bearings.

Motor sizes 280-400



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 M2BA 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

Lubrication

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

Standard versions of motors 71 to 250 are lubricated for life, with a lithium based, heat resistant grease. On request, motors sizes 160 to 250 can be provided with grease nipples in both bearings.

Motor sizes 200 to 250 are available from stock with either permanent greased or, as against variant codes, with regreasable bearings.

Motors sizes 280 to 400 have grease valve lubrication for lubrication in service. The lubrication intervals and grease quantity are stated in the maintenance instruction which comes with the motor.

Permissible loadings on the shaft end

The tables below give the permissible radial force in Newtons, assuming zero axial force. The values are based on normal conditions at 50 Hz and calculated bearing lives for motor sizes 71 to 132 of 20000 hours and for motor sizes 160 to 400 of 20000 and 40000 hours.

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

At 60 Hz the values must be reduced by 10 %. For two-speed motors, the values must be based on the higher speed.

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

Permissible radial forces

Motor sizes 71 to 132

Motor size	Poles	Length of shaft extension E (mm)	Ball bearings	
			20000 hours X_0 (N)	X_{max} (N)
71	2	30	415	335
	4	30	415	335
	6	30	415	340
80 M_ AT	2	40	670	545
	4	40	890	725
	6	40	970	830
80 M_ BT	2	40	670	545
	4	40	890	725
	6	40	970	830
90 S	2	50	795	625
	4	50	995	780
	6	50	1135	880
90 L	2	50	780	635
	4	50	985	790
	6	50	1120	905

Motor size	Poles	Length of shaft extension E (mm)	Ball bearings	
			20000 hours X_0 (N)	X_{max} (N)
100	2	60	1090	875
	4	60	1360	1095
	6	60	1560	1250
112	2	60	1410	1120
	4	60	1735	1400
	6	60	2000	1620
132 S	2	80	1700	1330
	4	80	2130	1660
	6	80	2495	1935
132 M	2	80	1675	1345
	4	80	2130	1675
	6	80	2450	1960

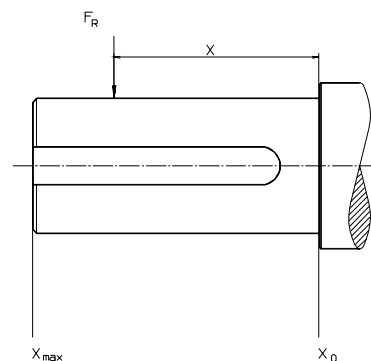
Motor sizes 160 to 400

Motor size	Poles	Length of shaft extension E (mm)	Ball bearings				Roller bearings			
			20000 hours		40000 hours		20000 hours		40000 hours	
			X ₀ (N)	X _{max} (N)	X ₀ (N)	X _{max} (N)	X ₀ (N)	X _{max} (N)	X ₀ (N)	X _{max} (N)
160	2	110	2980	2310	2350	1810	5530	4260	4370	3360
	4	110	3760	2900	2970	2290	6980	5380	5520	4250
	6	110	4290	3300	3390	2750	7980	6150	6310	4860
	8	110	4730	3660	3740	2880	8800	6780	6960	5360
180	2	110	3540	2880	2790	2260	6260	5080	4940	4010
	4	110	4390	3560	3440	2790	7830	6350	6160	5000
	6	110	5060	4110	3970	3220	9000	7300	7100	5750
	8	110	5590	4540	4390	3560	9940	8060	7830	6350
200 ML_	2	110	4510	3700	3530	2900	8520	7000	6710	5510
	4	110	5660	4650	4430	3640	10710	8800	8440	6930
	6	110	6470	5310	5050	4150	12250	10060	9640	7920
	8	110	7160	5880	5600	5880	13520	11100	10650	8750
225 SM_	2	110	4750	4010	3710	3130	9720	8200	7650	6450
	4	140	6310	5040	4920	3840	12900	10310	10150	8120
	6	140	7200	5760	5620	4500	14740	11800	11600	9280
	8	140	7970	6375	6230	4980	16270	13010	12820	10250
250 SM_	2	140	6100	4910	4750	3830	13600	10960	10710	8640
	4	140	7650	6170	5960	5450	17100	13800	13470	10870
	6	140	8700	7010	6760	5450	19520	15740	15360	12400
	8	140	9630	7760	7505	6050	21550	17380	16970	13690
280 SM_	2	140	7300	6200	5800	4900	20200	6600	16500	6600
	4	140	9200	7800	7300	6200	25000	12000	20300	12000
	6	140	10600	8900	8400	7100	28000	12000	23000	12000
	8	140	11600	9800	9200	7800	30700	12000	25000	12000
315 SM_	2	140	7300	6000	5800	4950	20200	6350	16500	6350
	4	170	11300	9400	9000	7500	32500	10700	26500	10700
	6	170	13000	10600	10300	8500	37000	10600	30000	10600
	8	170	14300	10400	11300	9400	40000	10400	32700	10400
315 ML_	2	140	7300	6000	5800	4950	20200	6000	16500	6000
	4	170	11300	9400	9000	7500	32500	18400	26500	18400
	6	170	13000	10800	10300	8500	37000	18400	30000	18400
	8	170	14300	12000	11300	9400	40000	18200	32700	18200
355 S_	2	140	9000	7900	6200	5300	26600	10100	21800	10100
	4	210	15200	12500	12000	9850	45000	22300	36700	22300
	6	210	17300	14200	13700	11300	51000	22300	41500	22300
	8	210	19000	15600	15200	12400	55500	22200	45200	22200
355 SM_	2	140	9000	7900	6100	5300	26700	8900	21800	8900
	4	210	15200	12500	12000	9850	45000	21400	36700	21300
	6	210	17300	14300	13700	11300	51000	21100	41500	21100
	8	210	19000	15700	15200	12400	55500	21700	45200	21700
355 ML_	2	140	9100	7100	6100	5400	26900	7100	21800	7100
	4	210	15200	12800	12000	10100	45500	19500	36700	19500
	6	210	17300	14600	13700	11500	51000	19000	41500	19000
	8	210	19300	16200	15200	12700	55500	19500	45200	19500
400 M_	2	140	9100	7100	6100	5400	26900	7100	21800	7100
	4	210	15200	12800	12000	10100	45500	19500	36700	19500
	6	210	17300	14600	13700	11500	51000	19000	41500	19000
	8	210	19300	16200	15200	12700	55500	19500	45200	19500
400 LK_	2	140	8900	3000	5700	3000	27000	3000	22000	3000
	4	210	15000	13000	11700	10100	46000	15000	37000	15000
	6	210	17200	13700	13600	11700	52000	13700	42000	13700
	8	210	19200	15000	15000	12900	55500	15000	46000	15000

If the radial force is applied between points X₀ and X_{max}, the permissible force F_R can be calculated from the following formula:

$$F_R = F_{X_0} - \frac{X}{E} (F_{X_0} - F_{X_{max}})$$

E = length of shaft extension in basic version



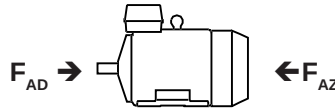
Permissible axial forces

The following tables give the permissible axial forces in Newton, assuming zero radial force. The values are based on normal conditions at 50 Hz with standard bearings and calculated bearing lives of 20000 and 40000 hours.

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

For two-speed motors, the values are to be based on the higher speed. The permissible loads of simultaneous radial and axial forces will be supplied on request. Given axial forces F_{AD} , assumes D-bearing locked by means of locking ring.

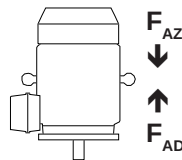
Mounting arrangement IM B3



Motor size	20000 hours								40000 hours							
	2-pole		4-pole		6-pole		8-pole		2-pole		4-pole		6-pole		8-pole	
	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N
71	270	270	350	350	440	440	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
80	400	400	510	510	590	590	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
90	450	450	560	560	640	640	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
100	620	620	780	780	890	890	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
112	810	810	1020	1020	1170	1170	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
132 S	980	980	1220	1220	1400	1400	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
132 M	980	980	1210	1210	1400	1400	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
160	2120	2120	2660	2660	3040	3040	3360	3360	1670	1670	2100	2100	2400	2400	2640	2640
180	2480	2480	3070	3070	3540	3540	3910	3910	1950	1950	2430	2430	2780	2780	3070	3070
200	3050	3050	3850	3850	4400	4400	4850	4850	2430	2430	3050	3050	3500	3500	3850	3850
225	3440	3440	4340	4340	4960	4960	5460	5460	2730	2730	3440	3440	3940	3940	4340	4340
250	4180	4180	5260	5260	6020	6020	6630	6630	3320	3320	4180	4180	4780	4780	5260	5260
280	7300	5300	8000	6000	9000	7000	10000	8000	5750	3750	6200	4200	6900	4900	7700	5700
315	7000	5000	9000	7000	10600	8600	11600	9600	5600	3600	6900	4900	7900	5900	8900	6900
355	10500	3500	13500	6500	15300	8300	16800	9800	8750	1750	10800	3800	12000	5000	13300	6300
400 M	10500	3500	13500	6500	15300	8300	16800	9800	8750	1750	10800	3800	12000	5000	13300	6300
400 LK	10100	3200	13000	6000	15000	8000	16500	9500	8350	1350	10200	3250	11800	4800	13000	6000

¹⁾ On request

Mounting arrangement IM V1



Motor size	20000 hours								40000 hours							
	2-pole		4-pole		6-pole		8-pole		2-pole		4-pole		6-pole		8-pole	
	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N	F_{AD} N	F_{AZ} N
71	290	260	380	330	460	420	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
80	430	390	540	490	620	560	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
90	480	420	610	520	700	600	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
100	680	580	880	740	990	840	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
112	890	760	1140	950	1280	1100	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
132 S	1100	910	1390	1120	1580	1300	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
132 M	1100	910	1430	1080	1680	1260	-	-	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾	-	-
160	2420	1820	3040	2280	3480	2600	3810	2920	1970	1370	2480	1720	2840	1960	3090	2200
180	2860	2100	3690	2450	4160	2920	4530	3290	2300	1570	3050	1810	3400	2160	3690	2450
200	3600	2500	4580	3120	5280	3530	5720	3980	2970	1870	3780	2320	4370	2620	4720	2980
225	4140	2740	5230	3440	6030	3900	6530	4400	3430	2030	4330	2550	5010	2870	5400	3270
250	5020	3330	6380	4150	7440	4610	8050	5210	4160	2470	5290	3060	6200	3360	6680	3840
280	8500	4300	9500	4600	11000	5500	12200	6600	6950	2700	7700	2800	8900	3350	9750	4200
315 SM	9000	3700	11600	5400	13500	6200	14500	7500	7450	2100	9450	3200	10900	3650	11900	4650
315 ML	9600	3400	12400	5000	14800	5600	16200	7000	8100	1850	10100	2850	12200	3150	13200	4150
355 S	14100	1600	18500	3800	21200	5000	23000	6800	12200	1) ¹⁾	15700	1000	18000	1750	19400	3100
355 SM	14900	800	19200	3100	22200	4100	24000	5800	13000	1) ¹⁾	16400	1) ¹⁾	18900	850	20300	2100
355 ML	15000	1) ¹⁾	19800	1700	23100	2500	25000	4300	13100	1) ¹⁾	17000	1) ¹⁾	19800	1) ¹⁾	21300	1) ¹⁾
400 M	15000	1) ¹⁾	19800	1700	23100	2500	25000	4300	13100	1) ¹⁾	17000	1) ¹⁾	19800	1) ¹⁾	21300	1) ¹⁾
400 LK	17300	1) ¹⁾	21800	1) ¹⁾	24300	1000	26200	2500	15400	1) ¹⁾	18900	1) ¹⁾	21100	1) ¹⁾	22500	1) ¹⁾

¹⁾ On request

Electrical design

Stator winding temperature sensors

Motors frame size 200-400 have as standard 3 PTC thermistors for 150°C connected in series in the stator winding. For other sizes see variant codes.

t_6 -times for setting motor protection devices

Setting of certain electronic motor protection devices requires knowledge of the t_6 time.

t_6 is defined as the acceptable time, from thermal considerations, for which a motor can withstand the locked rotor condition with a supply current equal to 6 times the rated value.

Note: the starting current of some smaller motor sizes with normal supply voltage is less than 6 times the rated value.

t_6 times in seconds

Motor size	2 poles	4 poles	6 poles	8 poles
71	16	14	16	-
80	14	12	14	-
90	12	12	14	-
100	10	10	12	-
112	15	12	13	11
132	16	12	13	13
160	15	12	12	18
180	15	12	13	18
200	17	12	12	20
225	14	16	20	18
250	15	20	16	18
280	12	15	14	12
315	12	15	13	10
355	12	16	15	24
400	12	16	15	24

Motors for other voltages

Motors wound for a given voltage at 50 Hz can also be used for other voltages. Efficiency, power factor and speed remain approximately the same.

Guaranteed values available on request.

ABB Motors reserves the right to change the design, technical specification and dimensions without prior notice.

Motor wound for	230V		400V		500V		690 V	
Connected to (50 Hz)	220V	230V	380V	415V	500V	550V	660V	690V
% of values at 400V, 50 Hz								
Output	100	100	100	100	100	100	100	100
I_N	182	174	105	98	80	75	61	58
I_S/I_N	90	100	90	106	100	119	90	100
T_S/T_N	90	100	90	106	100	119	90	100
T_{max}/T_N	90	100	90	106	100	119	90	100

Ordering information

Sample order

When placing an order, the motor type, size and product code must be specified. The product code of the motor is composed in accordance with the following examples.

Motor sizes 71 to 132

A	B	C	D,E,F
QU	100 L2 AT	GST 101 510	- ADC
		1 - 4 5 - 6 7 8 - 10 11 12 13 14	

- A Motor type
- B Motor size
- C Product code
- D Code for mounting arrangement
- E Voltage and frequency code
- F Generation code

Motor sizes 160 to 400

A	B	C	D,E,F
M2BA_	315 SMA	3GBA 312 210	- ADA
		1 - 4 5 - 6 7 8 - 10 11 12 13 14	

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

Positions 1 to 4

GST/ = Totally enclosed fan cooled squirrel cage
3GBA motor with cast iron frame

Positions 5 and 6

IEC-frame

07 = 71	11 = 112	20 = 200	31 = 315
08 = 80	13 = 132	22 = 225	35 = 355
09 = 90	16 = 160	25 = 250	40 = 400
10 = 100	18 = 180	28 = 280	

Position 7

Speed (Pole pairs)

1 = 2 poles	6 = 12 poles
2 = 4 poles	7 = > 12 poles
3 = 6 poles	8 = Two-speed motors for fan drive
4 = 8 poles	9 = Multi-speed motors, two-speed
5 = 10 poles	motors for constant torque

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
- C** = Flange-mounted, small flange (sizes 71 to 112)
- H** = Foot- and flange-mounted, terminal box top-mounted
- S** = Foot- and flange-mounted, terminal box RHS seen from D-end
- T** = Foot- and flange-mounted, terminal box LHS seen from D-end
- F** = Foot- and flange-mounted. Special flange.

Position 13

Voltage and frequency code

See appropriate pages with tables

Position 14

Generation code

A, B, C...

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

Please see pages 32-36.

Totally enclosed squirrel cage three phase motors, cast iron frame IP 55 IC 411

400 V 50 Hz

Output kW	Motortype	Product code	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			
						I _N A	I _s I _N	T _N Nm	T _s T _N	T _{max} T _N	
3000 r/min = 2 poles Basic design											
0.37 ²⁾	QU	71 M2 AT	GST 071 310-••C	2770	67.0	0.82	0.97	4.3	1.28	2.3	2.4
0.55 ²⁾		71 M2 BT	071 320-••C	2790	71.0	0.83	1.35	4.6	1.88	2.3	2.4
0.75 ³⁾		80 M2 AT	081 310-••C	2830	77.0	0.88	1.6	5.5	2.53	2.5	2.1
1.1 ³⁾		80 M2 BT	081 320-••C	2835	80.0	0.88	2.25	5.7	3.7	2.6	2.3
1.5 ⁴⁾		90 S2 AT	091 110-••C	2850	81.5	0.88	3.0	6.2	5.0	2.6	2.5
2.2 ⁴⁾		90 L2 AT	091 510-••C	2840	84.0	0.88	4.3	6.7	7.4	2.8	3.0
3 ⁴⁾		100 L2 AT	101 510-••C	2870	85.0	0.88	5.8	7.0	10	2.7	3.1
4 ⁴⁾		112 M2 AT	111 310-••C	2880	85.0	0.89	7.6	7.4	13	2.5	3.0
5.5 ⁴⁾		132 S2 AT	131 110-••C	2900	87.0	0.88	10.4	6.7	18	2.5	3.0
7.5 ⁴⁾		132 S2 BT	131 120-••C	2900	87.5	0.89	13.9	6.9	24.5	2.5	3.1
11	M2BA	160 MA	3GBA 161 310-••D	2930	91.2	0.88	20	6.3	36	1.9	2.5
15		160 M	161 300-••D	2920	91.7	0.90	26.5	6.6	49	2.3	2.5
18.5		160 L	161 500-••D	2920	92.4	0.91	32	7.3	60	2.6	2.7
22		180 M	181 300-••D	2930	92.8	0.89	38.5	7.2	71	2.5	2.7
30		200 MLA	201 410-••D	2955	93.2	0.88	53	7.3	97	2.4	3.1
37		200 MLB	201 420-••D	2950	93.6	0.89	64	7.3	120	2.5	3.2
45		225 SMB	221 220-••D	2960	93.9	0.88	79	7.3	145	2.5	2.8
55		250 SMA	251 210-••D	2970	94.4	0.89	95	7.5	177	2.0	3.0
75		280 SMA	281 210-••A	2977	94.9	0.88	131	7.5	241	2.3	3.3
90		280 SMB	281 220-••A	2975	95.1	0.90	152	7.6	289	2.3	3.1
110		315 SMA	311 210-••A	2982	95.1	0.86	194	7.6	352	2.0	3.0
132		315 SMB	311 220-••A	2982	95.4	0.88	228	7.4	423	2.2	3.0
160		315 SMC	311 230-••A	2981	96.1	0.89	269	7.5	513	2.3	3.0
200		315 MLA	311 410-••A	2978	96.3	0.90	334	7.8	641	2.6	3.0
250		355 S	351 100-••A	2980	96.1	0.92	410	6.6	801	1.3	3.0
315		355 SMA	351 210-••A	2978	96.6	0.92	510	7.7	1010	1.3	3.3
355 ¹⁾		355 SMB	351 220-••A	2975	96.4	0.92	580	7.1	1140	1.2	3.2
400		355 MLA	351 410-••A	2982	96.6	0.92	655	7.7	1281	1.6	3.3
450 ¹⁾		355 MLC	351 430-••A	2977	96.6	0.92	730	7.9	1444	1.2	3.2
400		400 M	401 300-••A	2982	96.6	0.92	655	7.7	1281	1.6	3.3
450 ¹⁾		400 MA	401 310-••A	2977	96.6	0.92	730	7.9	1444	1.2	3.2
500 ¹⁾		400 LKA	401 510-••A	2980	96.6	0.93	795	7.0	1602	0.8	2.8
560 ¹⁾		400 LKB	401 520-••A	2983	96.7	0.92	910	7.3	1793	0.7	3.4

3000 r/min = 2 poles High-output design

22 ¹⁾	M2BA	160 LB	3GBA 161 520-••D	2920	92.1	0.91	38	7.1	72	2.6	2.6
30 ¹⁾		180 LB	181 320-••D	2945	93.7	0.89	53	8.3	97	3.1	3.4
45		200 MLC	201 430-••D	2950	93.8	0.89	78	7.3	146	2.6	3.3
55		225 SMC	221 230-••D	2960	94.3	0.89	95	7.0	177	2.5	2.9
75		250 SMB	251 220-••D	2970	95.2	0.90	127	7.3	241	2.1	3.0
110		280 SMC	281 230-••A	2977	95.8	0.90	184	8.0	353	2.6	3.1

The two bullets in the product code indicate choice of mounting arrangement (page 15, pos 12), voltage and frequency (below).

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		

Insulation class F Temperature rise class B

380 V 50 Hz
415 V 50 Hz

Output kW	Motor type		Speed r/min	Effi- ciency %	Power factor cos φ	Current I _N A	Speed r/min	Effi- ciency %	Power factor cos φ	Current I _N A	Moment of inertia J = ¼ GD ² kgm ²	Weight kg	Sound pressure level L _p dB(A)
3000 r/min = 2 poles			Basic design										
0.37 ²⁾	QU	71 M2 AT	2730	64.5	0.84	1.04	2790	66.2	0.80	0.97	0.00031	11	57
0.55 ²⁾		71 M2 BT	2750	68.6	0.85	1.43	2810	70.3	0.81	1.34	0.0004	11	57
0.75 ³⁾		80 M2 AT	2795	74.8	0.90	1.69	2845	76.5	0.86	1.59	0.00097	17	58
1.1 ³⁾		80 M2 BT	2800	77.9	0.90	2.4	2850	79.6	0.86	2.25	0.0012	18	58
1.5 ⁴⁾	M2BA	90 S2 AT	2820	79.7	0.89	3.2	2865	81.2	0.87	2.95	0.0015	22	61
2.2 ⁴⁾		90 L2 AT	2810	82.3	0.89	4.55	2855	83.8	0.87	4.2	0.002	25	61
3 ⁴⁾		100 L2 AT	2845	83.5	0.89	6.1	2880	84.9	0.87	5.7	0.0044	34	65
4 ⁴⁾		112 M2 AT	2855	83.7	0.89	8.2	2890	85.0	0.89	7.4	0.0075	45	68
5.5 ⁴⁾		132 S2 AT	2880	85.9	0.88	11.1	2910	87.2	0.88	10	0.013	61	73
7.5 ⁴⁾		132 S2 BT	2880	86.5	0.89	14.8	2910	87.9	0.89	13.3	0.016	68	73
11		160 MA	2915	90.8	0.89	20.5	2935	91.3	0.86	19.4	0.039	105	70
15		160 M	2905	91.2	0.90	27.5	2925	92.0	0.89	25.5	0.047	118	70
18.5		160 L	2910	92.0	0.91	33.5	2930	92.6	0.90	31	0.054	133	70
22		180 M	2930	92.4	0.90	40.5	2945	93.0	0.88	37.5	0.077	178	72
30		200 MLA	2955	93.1	0.89	55	2960	93.3	0.86	52	0.15	250	74
37		200 MLB	2950	93.4	0.89	68	2955	93.7	0.87	63	0.18	270	74
45		225 SMB	2955	93.7	0.89	82	2965	93.9	0.87	77	0.26	335	74
55		250 SMA	2960	94.3	0.89	100	2970	94.5	0.88	92	0.49	420	75
75		280 SMA	2974	94.8	0.89	137	2980	94.8	0.87	127	0.8	590	77
90		280 SMB	2970	95.1	0.90	159	2978	95.1	0.89	147	0.9	630	77
110	1)	315 SMA	2980	95.1	0.87	202	2983	95.1	0.85	190	1.2	860	80
132		315 SMB	2980	95.4	0.89	238	2983	95.4	0.87	222	1.4	920	80
160		315 SMC	2979	96.1	0.90	282	2982	96.1	0.89	262	1.7	1010	80
200		315 MLA	2977	96.3	0.90	350	2981	96.4	0.90	321	2.1	1170	80
250		355 S	2978	96.0	0.92	430	2982	96.1	0.92	395	3.8	1550	83
315		355 SMA	2975	96.5	0.92	540	2980	96.6	0.92	490	4.8	1750	83
355		355 SMB	2973	96.4	0.92	610	2977	96.4	0.92	560	4.8	1750	83
400		355 MLA	2980	96.5	0.92	690	2983	96.6	0.91	635	6	2150	83
450	1)	355 MLC	2975	96.5	0.92	770	2979	96.6	0.92	705	6	2150	83
400	1)	400 M	2980	96.5	0.92	690	2983	96.6	0.91	635	6	2200	83
450		400 MA	2975	96.5	0.92	770	2979	96.6	0.92	705	6	2200	83
500		400 LKA	2977	96.5	0.93	840	2982	96.6	0.93	770	7.5	2850	85
560		400 LKB	2981	96.7	0.92	965	2984	96.8	0.91	885	8.5	2900	85

- ¹⁾ Temperature rise class F.
²⁾ Voltage code letters E, S only.
³⁾ Voltage code letters E, S only.
Motors with terminal box on top, code letter E on request.
⁴⁾ Voltage code letters D, E, S only.
Motors with terminal box on top, code letter E on request.

Further details or special designs on request.

Please note that the frequency converter application in critical conditions may require special rotor design within 355 and 400 frame motors. We therefore recommend a separate checking.

Totally enclosed squirrel cage three phase motors, cast iron frame IP 55 IC 411

400 V 50 Hz

Output kW	Motortype	Product code	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque				
						I _N A	$\frac{I_s}{I_N}$	T _N Nm	$\frac{T_s}{T_N}$	$\frac{T_{max}}{T_N}$		
1500 r/min = 4 poles												
Basic design												
0.25 ²⁾	QU	71 M4 AT	GST 072 310-••C	1390	66.0	0.74	0.74	3.5	1.72	2.0	2.3	
0.37 ²⁾		71 M4 BT	072 320-••C	1380	68.0	0.74	1.06	3.7	2.55	2.1	2.3	
0.55 ³⁾		80 M4 AT	082 310-••C	1420	75.0	0.77	1.37	4.7	3.7	2.5	2.2	
0.75 ³⁾		80 M4 BT	082 320-••C	1410	76.0	0.77	1.85	4.8	5.0	2.5	2.3	
1.1 ⁴⁾		90 S4 AT	092 110-••C	1410	78.5	0.77	2.65	4.8	7.45	2.2	2.3	
1.5 ⁴⁾		90 L4 AT	092 510-••C	1410	80.5	0.78	3.45	4.9	10.1	2.4	2.5	
2.2 ⁴⁾		100 L4 AT	102 510-••C	1425	82.5	0.84	4.6	5.6	14.7	2.6	2.8	
3 ⁴⁾		100 L4 BT	102 520-••C	1415	84.5	0.84	6.1	6.2	20.2	3.0	3.1	
4 ⁴⁾		112 M4 AT	112 310-••C	1435	85.5	0.84	8.0	6.7	26.6	2.8	3.2	
5.5 ⁴⁾		132 S4 AT	132 110-••C	1430	87.0	0.84	10.9	6.6	36.7	2.4	3.0	
7.5 ⁴⁾		132 M4 AT	132 310-••C	1430	88.5	0.86	14.2	6.9	50	2.7	3.1	
11		M2BA	160 M	3GBA 162 300-••D	1460	90.3	0.81	21.5	6.7	72	2.9	2.8
15			160 L	162 500-••D	1455	91.1	0.84	28.5	6.8	98	3.0	2.8
18.5	180 M		182 300-••D	1470	92.3	0.84	35	7.0	120	3.1	2.7	
22	180 L		182 500-••D	1470	92.4	0.83	41	7.0	143	2.9	2.8	
30		200 MLA	202 410-••D	1475	92.9	0.83	56	6.7	194	2.6	2.8	
37		225 SMA	222 210-••D	1480	93.6	0.84	68	6.6	239	2.4	2.5	
45		225 SMB	222 220-••D	1480	94.2	0.83	83	6.7	290	2.7	2.6	
55		250 SMA	252 210-••D	1480	94.6	0.86	98	7.5	355	2.3	2.8	
75		280 SMA	282 210-••A	1484	95.0	0.86	135	6.9	483	2.6	2.8	
90		280 SMB	282 220-••A	1483	95.2	0.87	158	7.2	580	2.6	2.7	
110		315 SMA	312 210-••A	1487	95.6	0.87	192	7.2	706	2.0	2.5	
132		315 SMB	312 220-••A	1487	95.8	0.87	232	7.1	848	2.3	2.7	
160		315 SMC	312 230-••A	1486	96.0	0.86	282	7.2	1028	2.4	2.9	
200		315 MLA	312 410-••A	1486	96.2	0.86	351	7.2	1285	2.5	2.9	
250		355 S	352 100-••A	1487	96.5	0.87	430	7.2	1606	2.3	2.7	
315		355 SMA	352 210-••A	1488	96.7	0.87	545	7.6	2022	2.5	2.9	
355		355 SMB	352 220-••A	1486	96.7	0.87	610	6.8	2281	2.2	2.6	
400		355 MLA	352 410-••A	1489	96.8	0.87	685	6.9	2565	1.6	2.8	
450		355 MLB	352 420-••A	1489	96.8	0.87	770	7.6	2886	1.5	3.0	
500		355 MLC	352 430-••A	1489	96.8	0.88	845	7.6	3207	1.3	2.9	
400		400 M	402 300-••A	1489	96.8	0.87	685	6.9	2565	1.6	2.8	
450		400 MA	402 310-••A	1489	96.8	0.87	770	7.6	2886	1.5	3.0	
500		400 MB	402 320-••A	1489	96.8	0.88	845	7.6	3207	1.3	2.9	
560		400 LKA	402 510-••A	1489	96.9	0.90	925	6.6	3591	1.1	2.6	
630		400 LKB	402 520-••A	1489	96.9	0.87	1080	6.9	4040	1.2	2.8	
710 ¹⁾		400 LKC	402 530-••A	1489	96.9	0.87	1220	6.8	4556	1.2	2.7	

1500 r/min = 4 poles High-output design

18.5 ¹⁾	M2BA	160 LB	3GBA 162 520-••D	1450	90.5	0.84	36	6.9	122	2.9	2.9
30 ¹⁾		180 LB	182 520-••D	1465	92.5	0.84	56	6.9	195	3.2	2.8
37		200 MLB	202 420-••D	1475	93.4	0.84	68	7.8	236	3.6	3.2
55		225 SMC	222 230-••D	1480	94.6	0.84	100	7.3	355	3.1	2.8
75		250 SMB	252 220-••D	1480	95.0	0.86	132	7.0	484	2.4	3.0
110		280 SMC	282 230-••A	1484	95.6	0.87	194	7.7	708	3.0	3.0

The two bullets in the product code indicate choice of mounting arrangement (page 15, pos 12), voltage and frequency (below).

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		

Insulation class F Temperature rise class B

380 V 50 Hz
415 V 50 Hz

	Output kW	Motor type	Speed r/min	Effi- ciency %	Power factor cos φ	Current I _N A	Speed r/min	Effi- ciency %	Power factor cos φ	Current I _N A	Moment of inertia J = ¼ GD ² kgm ²	Weight kg	Sound pressure level L _p dB(A)	
	1500 r/min = 4 poles			Basic design										
	0.25 ²⁾ 0.37 ²⁾	QU	71 M4 AT	1370	63.2	0.78	0.77	1400	63.0	0.71	0.78	0.0006	11	45
			71 M4 BT	1360	65.3	0.78	1.1	1390	65.3	0.71	1.11	0.00077	11	45
	0.55 ³⁾ 0.75 ³⁾		80 M4 AT	1400	72.4	0.81	1.42	1430	72.6	0.74	1.42	0.0018	17	46
			80 M4 BT	1390	73.5	0.80	1.94	1420	73.9	0.74	1.91	0.0021	18	46
	1.1 ⁴⁾ 1.5 ⁴⁾		90 S4 AT	1395	76.1	0.80	2.75	1415	76.7	0.75	2.65	0.0029	25	52
			90 L4 AT	1395	78.2	0.81	3.6	1415	79.0	0.76	3.5	0.0037	26	52
	2.2 ⁴⁾ 3 ⁴⁾		100 L4 AT	1410	80.3	0.86	4.85	1430	81.3	0.82	4.6	0.0075	34	53
			100 L4 BT	1400	82.4	0.86	6.4	1420	83.6	0.82	6.1	0.0098	35	53
	4 ⁴⁾		112 M4 AT	1420	83.5	0.86	8.5	1440	84.9	0.83	7.9	0.014	44	56
	5.5 ⁴⁾ 7.5 ⁴⁾		132 S4 AT	1415	85.1	0.85	11.6	1435	86.7	0.83	10.6	0.031	65	60
			132 M4 AT	1415	86.7	0.87	15.1	1435	88.4	0.85	13.9	0.04	79	60
	11 15		M2BA	160 M	1450	89.9	0.83	22.5	1465	90.5	0.79	21.5	0.066	115
		160 L		1445	90.6	0.84	30	1460	91.4	0.83	28	0.09	127	66
	18.5 22	180 M		1465	91.7	0.85	36	1470	92.2	0.83	34	0.161	175	66
		180 L		1465	92.1	0.85	42.5	1475	92.6	0.85	49	0.191	185	66
	30		200 MLA	1470	92.6	0.83	59	1475	93.0	0.83	54	0.29	255	66
	37 45		225 SMA	1475	93.4	0.84	72	1480	93.7	0.81	68	0.37	310	68
			225 SMB	1475	94.0	0.85	86	1480	94.2	0.81	82	0.42	330	68
	55		250 SMA	1475	94.3	0.86	103	1480	94.7	0.84	96	0.72	420	68
	75 90		280 SMA	1481	95.0	0.87	140	1485	95.0	0.84	131	1.25	590	68
			280 SMB	1481	95.2	0.88	165	1485	95.2	0.86	153	1.5	630	68
	110 132		315 SMA	1486	95.5	0.88	200	1488	95.6	0.86	189	2.3	870	70
	160 200 ¹⁾		315 SMB	1486	95.7	0.88	242	1488	95.8	0.86	227	2.6	925	70
			315 SMC	1485	95.9	0.87	294	1487	96.0	0.85	277	2.9	970	70
			315 MLA	1484	96.1	0.87	365	1487	96.3	0.85	342	3.5	1080	70
	250 315		355 S	1486	96.4	0.87	455	1488	96.5	0.86	420	6.5	1550	80
			355 SMA	1487	96.7	0.87	570	1489	96.7	0.86	525	8.2	1800	80
	355 400		355 SMB	1485	96.7	0.88	635	1487	96.7	0.86	595	8.2	1800	80
			355 MLA	1488	96.8	0.88	710	1490	96.8	0.86	670	10	2100	80
	450 500		355 MLB	1488	96.8	0.88	805	1490	96.8	0.86	750	10	2100	80
			355 MLC	1488	96.8	0.89	880	1490	96.8	0.87	830	10.5	2100	83
	400 450		400 M	1488	96.8	0.88	710	1490	96.8	0.86	670	10	2150	80
			400 MA	1488	96.8	0.88	805	1490	96.8	0.86	750	10	2150	80
	500 560		400 MB	1488	96.8	0.89	880	1490	96.8	0.87	830	10.5	2150	83
			400 LKA	1487	96.8	0.91	965	1490	96.9	0.90	890	14	3050	85
	630 710 ¹⁾		400 LKB	1488	96.8	0.88	1125	1490	96.9	0.87	1040	15	3150	85
			400 LKC	1487	96.8	0.88	1270	1490	96.9	0.86	1180	15	3150	85
	1500 r/min = 4 poles			High-output design										
	18.5 ¹⁾ 30 ¹⁾		M2BA	160 LB	1440	89.8	0.85	37	1450	90.8	0.83	34	0.101	135
		180 LB		1465	92.2	0.85	58	1470	92.7	0.82	55	0.225	203	66
	37 55		200 MLB	1475	93.3	0.85	71	1475	93.3	0.82	67	0.34	275	66
			225 SMC	1475	94.5	0.84	105	1480	94.6	0.82	99	0.49	355	68
	75 110		250 SMB	1475	94.5	0.87	139	1480	95.1	0.86	128	0.88	465	68
			280 SMC	1482	95.6	0.88	201	1486	95.7	0.86	189	1.85	690	68

¹⁾ Temperature rise class F.

²⁾ Voltage code letters E, S only.

³⁾ Voltage code letters E, S only.

Motors with terminal box on top, code letter E on request.

⁴⁾ Voltage code letters D, E, S only.

Motors with terminal box on top, code letter E on request.

Further details or special designs on request.

Please note that the frequency converter application in critical conditions may require special rotor design within 355 and 400 frame motors. We therefore recommend a separate checking.

Totally enclosed squirrel cage three phase motors, cast iron frame IP 55 IC 411

400 V 50 Hz

Output kW	Motortype	Product code	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			
						I _N A	I _s I _N	T _N Nm	T _s T _N	T _{max} T _N	
1000 r/min = 6 poles Basic design											
0.18 ²⁾	QU	71 M6 AT	GST 073 310-••C	850	49.0	0.60	0.88	3.0	2.0	1.9	2.0
0.25 ²⁾		71 M6 BT	073 320-••C	860	53.0	0.61	1.12	3.2	2.8	2.2	2.4
0.37 ³⁾		80 M6 AT	083 310-••C	925	68.0	0.67	1.17	3.2	3.82	1.7	2.2
0.55 ³⁾		80 M6 BT	083 320-••C	930	70.0	0.67	1.69	3.6	5.65	1.7	2.2
0.75 ⁴⁾	M2BA	90 S6 AT	093 110-••C	935	74.0	0.71	2.05	4.3	7.65	2.1	2.5
1.1 ⁴⁾		90 L6 AT	093 510-••C	920	75.0	0.75	2.8	4.1	11.5	2.0	2.3
1.5 ⁴⁾		100 L6 AT	103 510-••C	950	79.0	0.72	3.8	5.0	15	2.3	2.7
2.2 ⁴⁾		112 M6 AT	113 310-••C	950	83.0	0.76	5.0	5.7	22	2.2	2.7
3 ⁴⁾		132 S6 AT	133 110-••C	955	84.5	0.79	6.5	6.2	30	2.2	3.0
4 ⁴⁾		132 M6 AT	133 310-••C	955	85.0	0.77	8.8	6.5	40	2.6	3.3
5.5 ⁴⁾		132 M6 BT	133 320-••C	955	87.0	0.80	11.4	6.9	55	2.6	3.1
7.5		160 M	3GBA 163 300-••D	970	89.3	0.79	15.4	6.7	74	2.0	2.8
11		160 L	163 500-••D	970	89.8	0.78	23	7.1	109	2.2	2.9
15		180 L	183 500-••D	970	90.8	0.78	31	7.0	148	2.1	3.0
18.5		200 MLA	203 410-••D	985	91.1	0.81	36	7.0	179	2.5	2.7
22		200 MLB	203 420-••D	980	91.7	0.81	43	7.2	214	2.5	2.7
30		225 SMB	223 220-••D	985	92.8	0.83	56	6.6	291	2.5	2.7
37		250 SMA	253 210-••D	985	93.7	0.83	69	7.3	359	2.8	2.8
45		280 SMA	283 210-••A	990	94.5	0.84	82	6.7	434	2.5	2.4
55		280 SMB	283 220-••A	990	94.7	0.84	101	7.0	531	2.7	2.6
75	315 SMA	313 210-••A	992	95.0	0.82	141	7.4	722	2.4	2.8	
90	315 SMB	313 220-••A	992	95.5	0.84	163	7.5	866	2.4	2.8	
110	315 SMC	313 230-••A	991	95.6	0.83	202	7.4	1060	2.5	2.9	
132	315 MLA	313 410-••A	991	95.8	0.83	240	7.5	1272	2.7	3.0	
160	355 S	353 100-••A	992	95.9	0.85	280	6.8	1540	1.8	2.7	
200	355 SMA	353 210-••A	992	95.9	0.85	355	7.1	1925	2.0	2.7	
250	355 SMB	353 220-••A	992	96.0	0.84	450	7.5	2407	2.2	2.8	
315	355 MLA	353 410-••A	991	96.2	0.84	565	7.3	3036	2.0	3.0	
355	355 MLC	353 430-••A	991	96.4	0.84	635	7.6	3421	1.5	3.0	
250	400 M	403 300-••A	992	96.0	0.84	450	7.5	2407	2.2	2.8	
315	400 MA	403 310-••A	991	96.2	0.84	565	7.3	3036	2.0	3.0	
355	400 MB	403 320-••A	991	96.4	0.84	635	7.6	3421	1.5	3.0	
400	400 LKA	403 510-••A	992	96.5	0.85	700	6.4	3851	1.2	2.7	
450	400 LKB	403 520-••A	993	96.5	0.85	790	6.8	4328	1.3	2.8	
500	400 LKC	403 530-••A	992	96.5	0.85	880	6.8	4813	1.3	2.8	

1000 r/min = 6 poles High-output design

15 ¹⁾	M2BA	160 LB	3GBA 163 510-••D	960	89.1	0.77	29.5	7.6	139	2.7	3.1
18.5 ¹⁾		180 LB	183 510-••D	965	90.6	0.79	37.5	6.2	183	2.0	2.6
30		200 MLC	203 430-••D	980	91.7	0.81	56	7.5	292	3.3	3.0
37		225 SMC	223 230-••D	985	93.2	0.83	69	7.7	359	3.1	3.0
45	M2BA	250 SMB	253 220-••D	985	94.1	0.84	82	7.3	436	2.8	2.8
75		280 SMC	283 230-••A	990	95.2	0.84	137	7.3	723	2.9	2.8

The two bullets in the product code indicate choice of mounting arrangement (page 15, pos 12), voltage and frequency (below).

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		

Insulation class F Temperature rise class B

		380 V 50 Hz						415 V 50 Hz						
Output kW	Motor type	Speed r/min	Effi- ciency %	Power factor cos φ	Current I _N A	Speed r/min	Effi- ciency %	Power factor cos φ	Current I _N A	Moment of inertia J = ¼ GD ² kgm ²	Weight kg	Sound pressure level L _p dB(A)		
1000 r/min = 6 poles			Basic design											
0.18 ²⁾	QU	71 M6 AT	835	47.0	0.64	0.91	865	47.0	0.59	0.9	0.0006	11	47	
0.25 ²⁾		71 M6 BT	845	51.1	0.65	1.14	875	51.2	0.60	1.13	0.00082	11	47	
0.37 ³⁾		80 M6 AT	910	66.2	0.71	1.2	940	66.5	0.66	1.17	0.0019	17	48	
0.55 ³⁾		80 M6 BT	915	68.3	0.71	1.72	945	68.8	0.66	1.69	0.0024	18	48	
0.75 ⁴⁾	M2BA	90 S6 AT	920	72.4	0.74	2.1	945	73.0	0.70	2.05	0.0039	21	48	
1.1 ⁴⁾		90 L6 AT	905	73.5	0.78	2.9	930	74.2	0.74	2.8	0.0049	24	48	
1.5 ⁴⁾		100 L6 AT	940	77.6	0.75	3.9	960	78.4	0.71	3.75	0.011	35	51	
2.2 ⁴⁾		112 M6 AT	940	81.7	0.79	5.2	955	82.6	0.74	5	0.017	44	54	
3 ⁴⁾		132 S6 AT	945	83.3	0.81	6.8	960	84.3	0.77	6.4	0.038	71	59	
4 ⁴⁾		132 M6 AT	945	83.9	0.79	9.2	960	85.0	0.75	8.7	0.049	78	59	
5.5 ⁴⁾		132 M6 BT	945	86.0	0.82	11.8	960	87.2	0.78	11.2	0.065	80	59	
7.5		160 M	960	88.7	0.80	16.1	970	89.6	0.77	15.1	0.088	115	66	
11		160 L	960	89.4	0.80	23.5	970	90.0	0.76	22.4	0.106	135	66	
15		180 L	970	90.9	0.79	32	975	91.1	0.74	31	0.207	177	68	
18.5		200 MLA	980	90.8	0.81	38	985	91.1	0.78	36	0.37	245	73	
22		200 MLB	980	91.6	0.81	45	985	91.8	0.79	42	0.43	260	73	
30		225 SMB	985	92.6	0.83	59	985	92.9	0.82	55	0.64	320	67	
37		250 SMA	985	93.5	0.84	72	990	93.8	0.81	67	1.16	415	68	
45		280 SMA	988	94.2	0.85	87	991	94.4	0.83	81	1.85	570	66	
55		280 SMB	988	94.6	0.85	105	991	94.8	0.83	99	2.2	610	66	
75	315 SMA	991	94.9	0.84	145	993	95.0	0.79	140	3.2	820	68		
90	315 SMB	991	95.4	0.85	169	993	95.5	0.82	160	4.1	910	68		
110	315 SMC	990	95.5	0.84	211	992	95.6	0.82	197	4.9	980	68		
132	315 MLA	990	95.7	0.84	250	992	95.8	0.82	236	5.8	1100	68		
160	355 S	991	95.8	0.86	295	993	95.9	0.84	275	10.4	1550	75		
200	355 SMA	991	95.8	0.86	370	993	95.9	0.83	350	12.5	1800	75		
250	355 SMB	991	96.0	0.85	470	993	96.1	0.82	445	12.5	1800	75		
315	355 MLA	990	96.2	0.85	590	992	96.2	0.82	560	14.6	2100	75		
355	355 MLC	990	96.3	0.86	655	992	96.4	0.82	630	15.8	2100	78		
250	400 M	991	96.0	0.85	470	993	96.1	0.82	445	12.5	2000	75		
315	400 MA	990	96.2	0.85	590	992	96.2	0.82	560	14.6	2150	75		
355	400 MB	990	96.3	0.86	655	992	96.4	0.82	630	15.8	2150	78		
400	400 LKA	991	96.3	0.86	730	992	96.4	0.84	680	16.5	2800	80		
450	400 LKB	992	96.5	0.86	825	993	96.5	0.83	790	19	3050	80		
500	400 LKC	991	96.5	0.86	920	993	96.5	0.83	870	19	3050	80		
1000 r/min = 6 poles			High-output design											
14.5 ¹⁾	M2BA	160 LB	955	88.7	0.79	30.5	965	89.2	0.75	29.2	0.127	148	66	
17.5 ¹⁾		180 LB	965	90.0	0.81	39	965	90.8	0.78	36.5	0.221	185	68	
30		200 MLC	980	91.5	0.83	57	985	91.9	0.83	53	0.49	275	73	
37		225 SMC	980	93.0	0.83	72	985	93.2	0.81	68	0.75	345	67	
45		250 SMB	985	93.8	0.86	85	985	94.2	0.83	80	1.49	460	68	
75		280 SMC	988	95.2	0.85	143	991	95.3	0.83	132	2.85	690	66	

¹⁾ Temperature rise class F.

²⁾ Voltage code letters E, S only.

³⁾ Voltage code lettersn E, S only.

Motors with terminal box on top, code letter E on request.

⁴⁾ Voltage code letters D, E, S only.

Motors with terminal box on top, code letter E on request.

Further details or special designs on request.

Please note that the frequency converter application in critical conditions may require special rotor design within 355 and 400 frame motors. We therefore recommend a separate checking.

Totally enclosed squirrel cage three phase motors, cast iron frame IP 55 IC 411

400 V 50 Hz

Output kW	Motortype	Product code	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			
						I _N A	I _s I _N	T _N Nm	T _s T _N	T _{max} T _N	
750 r/min = 8 poles Basic design											
4	M2BA	160 MA	3GBA 164 310-••D	715	84.1	0.69	10	5.2	54	2.1	2.4
5.5		160 M	164 300-••D	710	84.7	0.70	13.4	5.4	74	2.4	2.6
7.5		160 L	164 500-••D	715	86.3	0.70	18.1	5.4	100	2.4	2.8
11		180 L	184 500-••D	720	88.7	0.76	23.5	5.9	146	2.4	2.6
15		200 MLA	204 410-••D	740	91.1	0.82	29	7.4	194	1.8	3.0
18.5		225 SMA	224 210-••D	730	91.1	0.79	37	6.2	242	1.9	2.7
22		225 SMB	224 220-••D	730	91.5	0.77	45	6.0	288	1.9	2.7
30		250 SMA	254 210-••D	735	92.8	0.79	59	6.9	390	1.9	2.9
37		280 SMA	284 210-••A	741	93.4	0.78	74	7.3	477	1.8	3.1
45		280 SMB	284 220-••A	741	94.0	0.78	90	7.6	580	1.9	3.2
55		315 SMA	314 210-••A	740	94.3	0.81	104	7.1	710	1.6	2.7
75		315 SMB	314 220-••A	740	94.8	0.82	140	7.1	968	1.7	2.7
90		315 SMC	314 230-••A	740	95.1	0.82	167	7.4	1161	1.8	2.7
110		315 MLA	314 410-••A	740	95.2	0.83	202	7.3	1420	1.8	2.7
132		355 S	354 100-••A	742	95.0	0.80	250	5.8	1699	1.5	2.3
160		355 SMA	354 210-••A	742	95.2	0.80	305	6.3	2059	1.7	2.4
200		355 MLA	354 410-••A	743	95.5	0.77	395	6.6	2571	1.8	2.7
250		355 MLC	354 430-••A	744	95.7	0.80	470	6.6	3209	1.5	3.0
200		400 M	404 300-••A	743	95.5	0.77	395	6.6	2571	1.8	2.7
250		400 MA	404 310-••A	744	95.7	0.80	470	6.6	3209	1.5	3.0
315		400 LKA	404 510-••A	744	96.0	0.79	605	6.3	4043	1.4	2.6
355		400 LKB	404 520-••A	744	96.2	0.79	680	6.6	4557	1.5	2.7

750 r/min = 8 poles High-output design

8.5 ¹⁾	M2BA	160 LB	3GBA 164 520-••D	700	83.5	0.70	21	5.1	115	2.4	2.5
15 ¹⁾		180 LB	184 520-••D	720	88.0	0.76	32.5	6.0	199	2.5	2.6
18.5		200 MLB	204 420-••D	745	91.4	0.81	36	6.7	237	1.7	2.8
30		225 SMC	224 230-••D	735	91.8	0.79	60	7.2	390	2.1	3.3
37		250 SMB	254 220-••D	735	93.2	0.81	71	7.2	481	2.0	2.9
55		280 SMC	284 230-••A	741	94.4	0.79	108	7.8	709	1.9	3.2

The two bullets in the product code indicate choice of mounting arrangement (page 15, pos 12), voltage and frequency (below).

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	Other rated voltage, connection or frequency, max. 690 V	
220-240 VΔ 50 Hz 380-420 VY 50 Hz 440-480 VY 60 Hz	660 VΔ 50 Hz	690 VΔ 50 Hz			

Insulation class F
Temperature rise class B

380 V 50 Hz							415 V 50 Hz						
Output kW	Motor type	Speed r/min	Effi- ciency %	Power factor cos φ	Current I _N A		Speed r/min	Effi- ciency %	Power factor cos φ	Current I _N A	Moment of inertia J = ¼ GD ² kgm ²	Weight kg	Sound pressure level L _p dB(A)
750 r/min = 8 poles		Basic design											
4	M2BA 160 MA	710	83.8	0.71	10.2		720	84.5	0.66	9.9	0.071	100	73
5.5		705	84.0	0.72	13.8		715	85.0	0.68	13.3	0.09	113	73
7.5		710	85.7	0.72	18.6		715	86.6	0.68	17.8	0.121	126	73
11		715	88.2	0.77	24.5		720	89.0	0.75	23	0.223	177	65
15	200 MLA	735	91.0	0.83	30		740	91.2	0.79	29	0.45	250	71
18.5	225 SMA	730	91.0	0.79	39		735	91.3	0.76	36	0.61	305	73
22	225 SMB	730	91.4	0.81	45		735	91.5	0.76	44	0.68	320	73
30	250 SMA	735	92.6	0.81	61		740	92.9	0.77	58	1.25	415	68
37	280 SMA	740	93.2	0.80	75		742	93.4	0.76	73	1.85	570	65
45	280 SMB	740	93.8	0.80	92		742	94.0	0.75	90	2.2	610	65
55	315 SMA	739	94.2	0.83	108		741	94.4	0.80	102	3.2	820	62
75	315 SMB	739	94.6	0.84	146		741	94.9	0.81	137	4.1	910	62
90	315 SMC	739	94.9	0.84	173		741	95.1	0.81	164	4.9	980	64
110	315 MLA	739	95.0	0.84	209		741	95.3	0.82	196	5.8	1100	72
132	355 S	741	94.8	0.81	260		743	95.0	0.79	245	10.4	1550	75
160	355 SMA	741	95.1	0.81	315		743	95.2	0.79	295	12.5	1800	75
200	355 MLA	742	95.5	0.79	410		744	95.5	0.75	390	14.6	2100	75
250	355 MLC	743	95.7	0.82	485		744	95.7	0.78	470	15.8	2100	75
200	400 M	742	95.5	0.79	410		744	95.5	0.75	390	14.6	2150	75
250	400 MA	743	95.7	0.82	485		744	95.7	0.78	470	15.8	2150	75
315	400 LKA	743	96.0	0.81	615		744	96.0	0.78	590	16.5	2800	80
355	400 LKB	743	96.2	0.81	690		744	96.2	0.77	675	19	3050	80
750 r/min = 8 poles		High-output design											
8.5 ¹⁾	M2BA 160 LB	695	81.7	0.73	21.5		705	83.8	0.68	21	0.13	128	73
13.5 ¹⁾		715	87.6	0.78	33.5		720	88.3	0.74	32	0.239	185	65
18.5	200 MLB	735	91.2	0.83	37		735	91.6	0.79	35	0.54	275	70
30	225 SMC	730	91.7	0.80	62		735	91.9	0.77	61	0.8	345	73
37	250 SMB	735	92.5	0.82	74		735	93.2	0.81	71	1.52	460	68
55	280 SMC	740	94.2	0.81	110		742	94.4	0.77	106	2.85	690	62

¹⁾ Temperature rise class F.

Further details or special designs on request.

Please note that the frequency converter application in critical conditions may require special rotor design within 355 and 400 frame motors. We therefore recommend a separate checking.

Data for motor sizes 71 to 132 on request.

**Totally enclosed squirrel cage
three phase motors, cast iron frame
IP 55 IC 411**

**Insulation class F
Temperature rise class B**

400 V 50 Hz

Output kW	Motor type M2BA	Product code 3GBA	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			Moment of inertia J = ¼ GD ² kgm ²	Weight kg		
						I _N	I _s	T _N	T _s	T _{max}				
						A	I _N	Nm	T _N	T _N				
600 r/min = 10 poles													Basic design	
3	160 MA	165 310-••D	560	79.2	0.61	8.95	4.8	51	1.6	2.1	0.071	100		
4	160 M	165 300-••D	560	79.5	0.60	12.1	4.8	68	1.7	2.1	0.09	113		
5.5	160 L	165 500-••D	565	81.6	0.60	16.2	5.0	93	1.7	2.2	0.121	126		
7.5	180 L	185 500-••D	575	85.1	0.65	19.6	5.6	124	1.5	2.0	0.223	177		
11	200 MLA	205 410-••D	585	86.3	0.66	28	5.8	179	1.2	1.8	0.45	250		
15	200 MLB	205 420-••D	585	86.4	0.68	37	5.9	245	1.2	1.8	0.53	275		
18.5	225 SMB	225 220-••D	585	87.5	0.65	47	5.9	302	1.2	1.8	0.68	320		
22	225 SMC	225 230-••D	585	87.8	0.66	55	5.8	359	1.2	1.8	0.79	345		
30	250 SMB	255 220-••D	590	89.4	0.61	79	5.3	485	1.0	1.6	1.51	460		
37	280 SMB	285 220-••A	593	92.8	0.73	80	6.1	596	1.4	2.8	2.2	610		
45	280 SMC	285 230-••A	592	93.2	0.76	93	6.2	726	1.4	2.8	2.85	690		
55	315 SMB	315 220-••A	594	94.4	0.78	108	6.7	884	1.6	2.7	4.1	910		
75	315 SMC	315 230-••A	593	94.3	0.78	149	6.4	1208	1.6	2.6	4.9	980		
90	315 MLA	315 410-••A	593	94.5	0.78	177	6.6	1449	1.7	2.7	5.8	1100		
110	355 S	355 100-••A	595	94.5	0.77	218	6.3	1765	1.3	2.7	10.4	1550		
132	355 SMA	355 210-••A	595	94.7	0.79	255	6.4	2118	1.2	2.6	12.5	1800		
160	355 MLA	355 410-••A	595	94.9	0.77	316	6.6	2568	1.3	2.7	14.6	2100		
160	400 M	405 300-••A	595	94.9	0.77	316	6.6	2568	1.3	2.7	14.6	2150		
200	400 LKA	405 510-••A	595	95.2	0.79	380	6.3	3210	1.3	2.6	16.5	2800		
250	400 LKB	405 520-••A	595	95.5	0.79	480	6.1	4012	1.3	2.6	19	3050		

500 r/min = 12 poles Basic design												
7.5	200 MLA	206 410-••D	485	83.5	0.62	21	5.3	148	1.8	2.3	0.45	250
11	225 SMB	226 220-••D	485	86.2	0.60	31	5.1	216	1.5	2.1	0.68	320
15	250 SMC	226 230-••D	485	86.5	0.60	42	4.8	295	1.4	2.1	0.8	345
18.5	250 SMB	256 220-••D	485	89.0	0.63	48	5.5	364	1.6	2.2	1.52	460
30	280 SMB	286 220-••A	493	91.8	0.60	78	6.0	581	2.0	3.1	2.2	610
37	280 SMC	286 230-••A	493	92.1	0.61	96	6.3	717	2.1	3.2	2.85	690
45	315 SMB	316 220-••A	494	93.4	0.76	92	6.5	870	1.6	2.6	4.1	910
55	315 SMC	316 230-••A	493	93.6	0.77	112	6.5	1065	1.6	2.6	4.9	980
75	315 MLA	316 410-••A	493	93.8	0.77	153	6.2	1453	1.6	2.5	5.8	1100
90	355 S	356 100-••A	494	93.5	0.72	193	5.8	1740	1.3	2.2	10.4	1550
110	355 SMA	356 210-••A	494	94.0	0.74	228	5.9	2126	1.3	2.2	12.5	1800
132	355 MLA	356 410-••A	494	94.1	0.75	270	5.9	2552	1.3	2.2	14.6	2100
132	400 M	406 300-••A	494	94.1	0.75	270	5.9	2552	1.3	2.2	14.6	2150
160	400 LKA	406 510-••A	494	94.2	0.76	320	5.9	3093	1.3	2.2	16.5	2800
200	400 LKB	406 520-••A	494	94.5	0.74	410	5.8	3866	1.3	2.3	19	3050

Further details or special designs on request.

Please note that the frequency converter application in critical conditions may require special rotor design within 355 and 400 frame motors. We therefore recommend a separate checking.

Data for smaller frame sizes and other voltages on request.

The two bullets in the product code indicate choice of mounting arrangement (page 15, pos 12), voltage and frequency (below).

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		

**Totally enclosed squirrel cage
three phase motors, cast iron frame
two-speed motors, IP 55 IC 411**

**Insulation class F
Temperature rise class F**

400 V 50 Hz

Output kW	Motor type M2BA	Product code 3GBA	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			Moment of inertia J = ¼ GD² kgm²	Weight kg
						I _N A	I _s I _N	T _N Nm	T _s T _N	T _{max} T _N		
3000/1500 r/min = 2/4 poles						Fan drive, two separate windings						
13/1.9	160 LA	168 511--D	2940/1470	88.5/79.5	0.92/0.79	23.0/4.4	7.8/6.4	42/12	2.1/2.1	3.0/2.5	0.054	133
17.5/2.5	160 L	168 501--D	2925/1475	89.0/81.0	0.92/0.77	31.0/5.8	7.1/6.7	57/16	2.0/2.5	2.6/2.9	0.057	140
20/2.8	180 M	188 301--D	2930/1465	89.0/77.0	0.90/0.77	36.0/6.9	6.4/5.8	65/18	2.1/1.9	2.4/2.0	0.094	194
25/3.6	180 MB	188 321--D	2940/1465	90.0/78.0	0.88/0.78	46.0/8.6	7.5/7.3	81/24	2.6/1.9	2.9/1.9	0.108	200
30/4.1	200 MLA	208 411--D	2945/1480	91.5/85.0	0.89/0.72	54/10	8.0/7.1	97/26	2.2/2.7	2.8/2.8	0.15	250
38/5.5	200 MLB	208 421--D	2945/1480	92.5/86.5	0.91/0.74	67/13	7.7/6.8	123/35	2.2/2.6	2.6/2.6	0.19	270
43/6	225 SMB	228 221--D	2950/1475	92.5/86.5	0.90/0.78	75/13	7.1/5.8	139/39	2.3/2.7	2.4/2.0	0.26	335
50/7	225 SMC	228 231--D	2955/1480	93.0/87.5	0.91/0.78	86/15	7.3/6.1	162/45	2.4/2.9	2.4/2.1	0.29	355
70/10	250 SMB	258 221--D	2965/1485	94.0/89.5	0.90/0.76	119/22	9.3/7.1	225/64	2.3/2.5	3.1/2.3	0.57	465
84/12	280 SMB	288 221--A	2978/1492	94.6/91.0	0.88/0.75	146/26	8.0/7.2	269/77	2.2/3.0	3.0/2.9	0.9	630
100/15	280 SMC	288 231--A	2973/1492	94.8/91.5	0.91/0.76	169/32	6.8/7.2	321/96	1.8/3.1	2.5/2.8	1.15	690
125/18	315 SMB	318 221--A	2975/1490	95.0/91.5	0.89/0.76	216/38	6.5/6.6	401/115	1.7/2.7	2.6/3.0	1.4	920
150/22	315 SMC	318 231--A	2974/1487	95.3/91.9	0.90/0.79	253/44	6.5/5.8	482/141	1.8/2.3	2.5/2.6	1.7	1010
190/27	315 MLA	318 411--A	2980/1487	95.8/92.5	0.90/0.79	320/54	8.0/5.6	609/173	2.8/2.5	3.1/2.6	2.1	1170
200/25	355 S	358 101--A	2977/1491	95.0/91.0	0.89/0.78	340/50	6.6/7.0	642/160	1.3/1.4	2.9/3.1	3	1550
250/32	355 SMA	358 211--A	2972/1491	95.0/92.0	0.91/0.78	420/65	6.6/7.0	803/205	1.2/1.5	3.1/3.7	3.5	1750
315/40	355 MLA	358 411--A	2986/1493	95.8/93.4	0.89/0.74	535/84	8.8/8.3	1007/256	1.8/2.2	3.7/3.8	4.4	2150
315/40	400 M	408 301--A	2986/1493	95.8/93.4	0.89/0.74	535/84	8.8/8.3	1007/256	1.8/2.2	3.7/3.8	4.4	2200
1)	400 LKA	408 511--A	1)									
3000/1500 r/min = 2 - 4 poles						Fan drive, Dahlander-connection						
10/2	160 MA	168 318--D	2910/1465	85.0/83.5	0.89/0.73	19.0/4.8	5.9/6.1	30/43	1.5/2.4	2.3/2.8	0.039	118
16/3.2	160 LA	168 518--D	2915/1465	87.5/86.5	0.92/0.76	28.5/7.0	6.6/6.3	52/21	1.8/2.5	2.4/2.8	0.054	133
19.5/4.5	160 L	168 508--D	2930/1465	89.0/88.0	0.89/0.77	36/9.7	7.6/6.4	64/29	2.3/2.5	2.9/2.8	0.057	140
21.5/4.7	180 M	188 308--D	2935/1465	90.0/88.0	0.91/0.77	38/10	7.0/5.3	70/28	2.1/2.1	2.6/2.3	0.094	194
26/5.2	180 MB	188 328--D	2940/1470	90.5/89.5	0.89/0.75	47/11	6.9/5.8	85/34	2.3/2.4	2.6/2.4	0.108	200
32/8	200 MLA	208 418--D	2940/1465	90.0/89.0	0.89/0.85	58/16	7.1/6.2	104/52	2.0/2.0	2.5/2.2	0.28	255
39/10	200 MLB	208 428--D	2950/1475	91.5/91.0	0.89/0.85	69/19	7.4/6.2	126/65	2.0/2.0	2.6/2.3	0.34	275
42/11	200 MLC	208 438--D	2950/1470	92.5/91.0	0.89/0.77	75/23	7.7/5.6	136/71	2.2/2.1	3.0/2.5	0.19	280
45/13	225 SMB	228 228--D	2955/1475	93.0/91.5	0.92/0.82	76/25	7.4/5.3	145/84	2.0/2.0	2.6/2.1	0.27	335
55/15	225 SMC	228 238--D	2955/1475	93.5/92.5	0.91/0.82	94/29	7.3/5.4	178/97	2.0/2.0	2.6/2.2	0.3	355
75/25	250 SMB	258 228--D	2965/1475	94.5/93.0	0.92/0.82	125/48	8.9/5.5	241/162	2.3/2.0	3.1/2.2	0.36	465
90/30	280 SMB	288 228--A	2965/1484	93.8/93.8	0.91/0.86	153/54	7.3/5.8	290/193	1.4/1.7	3.0/2.2	1.5	630
105/33	280 SMC	288 238--A	2970/1485	94.0/94.0	0.91/0.86	179/60	7.9/6.0	338/212	1.7/1.7	3.0/2.2	1.85	690
125/35	315 SMB	318 228--A	2970/1484	95.0/94.5	0.88/0.76	218/70	6.6/5.2	402/225	1.3/1.6	2.6/2.5	1.4	920
175/45	315 MLA	318 418--A	2971/1484	95.5/95.0	0.89/0.77	300/90	7.2/5.5	562/290	1.7/1.8	2.7/2.5	2.1	1170
190/45	355 S	358 108--A	2987/1491	95.0/94.0	0.84/0.74	345/95	8.2/6.0	607/288	1.7/1.6	2.7/2.4	3.4	1550
200/50	355 SMA	358 218--A	2987/1491	95.0/94.5	0.84/0.76	360/100	7.7/6.6	639/320	1.9/1.9	2.9/2.7	4.2	1750
1)	355 MLA	358 418--A	1)									
1)	400 M	408 308--A	1)									
1)	400 LKA	408 518--A	1)									

The two bullets in the product code indicate choice of mounting arrangement (page 15, pos 12.), voltage and frequency (below).

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

A	B	D	E	H	S
220 V 50 Hz	380 V 50 Hz	380-400 V 50 Hz 440-480 V 60 Hz	500 V 50 Hz 575 V 60 Hz	400-415 V 50 Hz 460-480 V 60 Hz	220-230 V 50 Hz

**Totally enclosed squirrel cage
three phase motors, cast iron frame
two-speed motors, IP 55 IC 411**

**Insulation class F
Temperature rise class F**

400 V 50 Hz

Output kW	Motor type M2BA	Product code 3GBA	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			Moment of inertia J = ¼ GD² kgm²	Weight kg
						I _N A	I _s I _N	T _N Nm	T _s T _N	T _{max} T _N		
1500/1000 r/min = 4/6 poles						Fan drive, two separate windings						
10.5/3.5 14.5/4.5	160 M 160 L	168 304-••D 168 504-••D	1460/965 1460/970	87.0/75.5 88.5/77.0	0.84/0.78 0.85/0.76	21/8.6 28/11.0	6.4/4.1 6.9/4.6	69/35 95/44	2.0/1.3 2.2/1.5	2.5/1.7 2.6/1.9	0.089 0.119	127 148
16/5 20/6.5	180 M 180 L	188 304-••D 188 504-••D	1470/980 1470/980	89.0/78.0 90.0/79.5	0.83/0.73 0.83/0.74	31/12.5 39/16.0	6.3/4.6 7.2/5.0	104/49 130/63	1.9/1.5 2.4/1.8	2.5/2.0 2.7/2.0	0.176 0.224	194 207
23/7.2 30/9	200 MLA 200 MLB	208 414-••D 208 424-••D	1475/985 1470/985	89.5/84.0 90.0/83.5	0.88/0.87 0.90/0.89	43/15 54/18	7.7/7.8 7.7/7.9	149/70 195/87	1.6/1.9 1.6/1.7	2.8/2.9 2.7/2.5	0.44 0.53	250 275
34/11 42/14	225 SMB 225 SMC	228 224-••D 228 234-••D	1470/985 1475/985	91.0/85.0 91.5/89.0	0.91/0.89 0.89/0.89	60/21 75/27	7.7/6.7 8.4/6.8	221/107 272/136	1.5/1.3 1.7/1.4	2.7/2.3 3.0/2.3	0.67 0.78	320 345
63/18.5	250 SMB	258 224-••D	1475/985	93.5/87.0	0.89/0.79	110/40	7.5/7.3	408/179	2.4/3.0	2.7/2.6	0.89	465
85/27 100/30	280 SMB 280 SMC	288 224-••A 288 234-••A	1483/990 1485/990	94.1/90.2 94.7/90.0	0.85/0.75 0.86/0.79	154/58 180/61	6.2/6.6 7.8/7.5	547/260 643/289	2.2/2.9 2.5/3.1	2.5/2.8 2.9/2.7	1.5 1.85	630 690
120/36 145/43 180/54	315 SMB 315 SMC 315 MLA	318 224-••A 318 234-••A 318 414-••A	1485/989 1486/990 1483/990	95.0/91.2 95.0/92.0 95.5/92.0	0.85/0.78 0.85/0.78 0.86/0.78	212/74 256/88 323/110	6.2/5.8 6.2/6.0 6.0/6.2	771/347 932/415 1159/521	1.8/2.3 1.8/2.6 1.9/2.8	2.3/2.5 2.3/2.6 2.6/2.6	2.6 2.9 3.5	925 970 1080
160/55 240/85	355 S 355 SMA 355 MLA	358 104-••A 358 214-••A 358 414-••A	1483/986 1487/988	95.0/91.5 95.5/93.0	0.89/0.83 0.89/0.84	275/105 410/160	6.0/5.2 7.7/6.6	1030/533 1541/821	1.3/1.4 1.4/1.6	2.8/2.3 3.1/2.7	6.5 8.2	1550 1800
¹⁾ ¹⁾	400 M 400 LKA	408 304-••A 408 514-••A	¹⁾ ¹⁾									
1500/750 r/min = 4/8 poles						Fan drive, two separate windings						
9/1.3 13/1.8	160 M 160 L	168 302-••D 168 502-••D	1460/735 1455/735	87.0/60.0 88.0/64.0	0.84/0.53 0.85/0.53	18/5.9 26/8.2	6.6/4.0 6.0/4.1	59/17 89/26	2.0/2.2 1.9/2.2	2.5/2.7 2.3/2.6	0.089 0.119	127 148
16/2.3 19/2.7	180 M 180 L	188 302-••D 188 502-••D	1475/740 1475/740	88.5/64.0 89.5/68.0	0.82/0.53 0.83/0.54	32/9.7 37/10.5	6.8/4.1 7.5/7.2	104/30 123/35	2.2/2.2 2.6/2.6	2.7/2.6 2.9/2.6	0.176 0.224	194 207
26/3.3 30/3.8	200 MLA 200 MLB	208 412-••D 208 422-••D	1475/740 1470/740	91.0/73.0 91.5/75.5	0.85/0.59 0.86/0.59	49/11.0 55/12.5	6.9/4.6 6.7/4.6	168/46 195/49	2.1/2.2 2.1/2.2	2.5/2.3 2.4/2.2	0.28 0.34	255 275
38/5.2 46/7	225 SMB 225 SMC	228 222-••D 228 232-••D	1480/740 1480/740	91.5/80.5 92.5/82.0	0.84/0.63 0.86/0.66	72/15 85/19	7.3/5.2 7.7/4.9	245/67 297/90	2.1/2.3 2.3/2.1	2.6/2.3 2.7/2.1	0.41 0.49	330 355
63/10	250 SMB	258 222-••D	1475/740	93.5/83.0	0.89/0.65	110/27	7.5/6.0	408/129	2.4/3.0	2.7/2.7	0.89	465
85/12 100/15	280 SMB 280 SMC	288 222-••A 288 232-••A	1483/744 1485/744	94.1/85.5 94.7/86.5	0.85/0.62 0.86/0.60	154/33 180/42	6.2/5.3 7.8/5.6	547/154 643/193	2.2/2.4 2.5/2.7	2.5/2.4 2.9/2.5	1.5 1.85	630 690
120/16 145/19 180/23	315 SMB 315 SMC 315 MLA	318 222-••A 318 232-••A 318 412-••A	1485/740 1486/741 1483/741	95.0/85.0 95.0/87.0 95.5/87.2	0.85/0.73 0.85/0.71 0.86/0.70	212/38 256/45 323/55	6.2/4.0 6.2/4.5 6.0/4.5	771/206 932/245 1159/296	1.8/1.7 1.8/2.1 1.9/2.3	2.3/2.1 2.3/2.3 2.6/2.6	2.6 2.9 3.5	925 970 1080
180/30 230/40 300/55	355 S 355 SMA 355 MLA	358 102-••A 358 212-••A 358 412-••A	1486/746 1486/746 1489/743	94.0/91.0 95.0/92.0 95.6/92.7	0.87/0.63 0.88/0.63 0.89/0.69	320/76 400/100 510/125	7.8/6.1 8.0/6.0 8.5/6.6	1157/384 1478/512 1924/707	1.6/2.0 1.6/2.2 1.7/1.8	3.1/2.8 3.2/2.9 3.4/2.8	6.5 8.2 10	1550 1800 2100
300/55 ¹⁾	400 M 400 LKA	408 302-••A 408 512-••A	1489/743 ¹⁾	95.6/92.7	0.89/0.69	510/125	8.5/6.6	1924/707	1.7/1.8	3.4/2.8	10	2150

The two bullets in the product code indicate choice of mounting arrangement (page 15, pos 12), voltage and frequency (below).

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

A	B	D	E	H	S
220 V 50 Hz	380 V 50 Hz	380-400 V 50 Hz 440-480 V 60 Hz	500 V 50 Hz 575 V 60 Hz	400-415 V 50 Hz 460-480 V 60 Hz	220-230 V 50 Hz

**Totally enclosed squirrel cage
three phase motors, cast iron frame
two-speed motors, IP 55 IC 411**

**Insulation class F
Temperature rise class F**

400 V 50 Hz

Output kW	Motor type M2BA	Product code 3GBA	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			Moment of inertia J = ¼ GD² kgm²	Weight kg
						I _N A	I _s I _N	T _N Nm	T _s T _N	T _{max} T _N		
1500/750 r/min = 4 - 8 poles						Fan drive, Dahlander-connection						
10.5/2.2	160 M	168 309-••D	1460/735	87.5/79.0	0.84/0.54	21/7.4	6.9/3.7	69/29	2.2/1.5	2.7/2.3	0.089	127
15.5/2.7	160 L	168 509-••D	1460/735	88.5/79.5	0.85/0.51	30/9.5	6.9/3.9	101/35	2.2/1.7	2.6/2.6	0.119	148
17/3.4	180 M	188 309-••D	1470/730	88.5/78.0	0.85/0.56	33/11	5.8/4.3	111/44	1.7/1.2	2.3/1.9	0.176	194
22/4.4	180 L	188 509-••D	1475/735	89.5/79.0	0.83/0.53	43/15	6.7/3.9	143/57	2.0/1.7	2.6/2.3	0.224	207
29/6.5	200 MLA	208 419-••D	1470/730	90.5/86.0	0.86/0.64	54/17	6.9/4.2	188/81	2.2/1.9	2.4/1.9	0.28	255
33/8	200 MLB	208 429-••D	1475/730	91.5/86.5	0.86/0.64	61/21	7.8/4.2	214/105	2.6/1.9	2.6/1.8	0.34	275
42/10	225 SMB	228 229-••D	1480/740	92.0/89.5	0.86/0.64	85/27	7.8/5.0	271/129	2.5/2.2	3.0/2.3	0.49	335
50/11	225 SMC	228 239-••D	1465/735	92.5/89.5	0.87/0.65	91/28	7.3/4.7	324/143	2.3/2.0	2.5/2.0	0.49	355
60/15	250 SMB	258 229-••D	1475/735	93.0/90.0	0.86/0.70	104/34	7.9/4.7	388/195	2.6/2.1	2.7/2.0	0.89	465
80/18.5	280 SMB	288 229-••A	1485/742	94.0/91.5	0.85/0.64	144/46	8.3/5.3	514/238	3.1/2.8	3.1/2.3	1.5	630
90/20	280 SMC	288 239-••A	1485/742	94.4/92.0	0.87/0.64	159/49	8.5/5.3	579/257	3.3/2.9	3.1/2.3	1.85	690
125/28	315 SMB	318 229-••A	1488/744	95.2/92.7	0.85/0.60	225/72	7.3/4.7	802/359	2.4/2.1	2.9/2.3	2.6	925
160/37	315 MLA	318 419-••A	1486/741	94.7/93.2	0.86/0.64	285/90	6.8/4.3	1028/477	2.3/1.8	2.8/2.2	3.5	1080
155/38	355 S	358 109-••A	1492/746	94.5/93.5	0.87/0.76	275/77	8.5/7.1	992/486	1.7/1.5	3.5/3.1	6.5	1550
175/44	355 SMA	358 219-••A	1492/746	95.0/94.0	0.87/0.76	305/90	8.6/7.2	1120/563	1.8/1.5	3.7/3.2	8.2	1800
¹⁾	355 MLA	358 419-••A	¹⁾									
¹⁾	400 M	408 309-••A	¹⁾									
¹⁾	400 LKA	408 519-••A	¹⁾									
1000/750 r/min = 6/8 poles						Fan drive, two separate windings						
	160 M	On request										
	160 L	On request										
	180 M	On request										
	180 L	On request										
17/7.5	200 MLB	208 426-••D	985/740	88.0/81.5	0.85/0.77	33/17	7.1/6.4	165/97	2.2/2.2	2.5/2.5	0.42	260
20/9	200 MLC	208 436-••D	985/740	88.5/82.5	0.84/0.74	39/21	7.6/7.0	194/116	2.4/2.6	2.7/2.9	0.48	275
26/12	225 SMB	228 226-••D	985/740	89.5/84.5	0.85/0.76	49/27	7.4/7.1	252/155	2.2/2.4	2.5/2.7	0.63	320
32/14	225 SMC	228 236-••D	985/740	90.5/85.5	0.83/0.76	62/31	7.0/7.2	310/180	2.4/2.5	2.4/2.5	0.74	345
43/15	250 SMB	258 226-••D	990/745	91.0/86.0	0.84/0.75	81/34	7.3/7.4	415/198	2.2/2.7	2.5/2.8	1.41	460
53/20	280 SMB	288 226-••A	989/744	93.3/87.5	0.84/0.73	99/45	6.4/7.3	512/257	2.2/3.0	2.4/2.6	2.2	610
70/26	280 SMC	288 236-••A	991/744	94.0/89.5	0.82/0.74	132/57	7.9/7.6	675/334	2.7/3.2	2.8/2.7	2.85	690
84/36	315 SMB	318 226-••A	991/744	94.0/90.4	0.82/0.73	160/79	6.9/6.8	809/462	2.0/2.6	2.6/2.9	4.1	910
103/44	315 SMC	318 236-••A	992/743	94.3/91.5	0.82/0.75	195/94	7.7/6.8	992/566	2.3/2.6	2.8/2.7	4.9	980
123/52	315 MLA	318 416-••A	991/741	94.5/91.0	0.83/0.75	229/112	7.5/6.9	1184/667	2.3/2.7	2.8/2.7	5.8	1100
115/55	355 S	358 106-••A	991/744	94.5/92.5	0.85/0.77	210/115	7.1/7.8	1108/706	1.6/2.5	3.0/3.3	8.5	1550
165/70	355 SMA	358 216-••A	986/743	95.0/92.5	0.86/0.77	295/145	5.7/8.0	1598/900	1.4/2.6	2.5/3.4	10.5	1800
225/95	355 MLA	358 416-••A	992/745	95.2/93.3	0.85/0.75	400/200	7.4/7.9	2166/1218	1.8/2.4	3.1/3.2	12.6	2100
225/95	400 M	408 306-••A	992/745	95.2/93.3	0.85/0.75	400/200	7.4/7.9	2166/1218	1.8/2.4	3.1/3.2	12.6	2100
¹⁾	400 LKA	408 516-••A	¹⁾									

¹⁾ On request

Please note that the frequency converter application in critical conditions may require special rotor design within 355 and 400 frame motors. We therefore recommend a separate checking.

Data for motor sizes 71 to 132 on request.

**Totally enclosed squirrel cage
three phase motors, cast iron frame
two-speed motors, IP 55 IC 411**

**Insulation class F
Temperature rise class F**

400 V 50 Hz

Output kW	Motor type M2BA	Product code 3GBA	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			Moment of inertia J = ¼ GD ² kgm ²	Weight kg
						I _N A	I _s I _N	T _N Nm	T _s T _N	T _{max} T _N		
3000/1500 r/min = 2/4 poles						Constant torque, two separate windings						
12/6 15/7.5	160 LA 160 L	169 511-••D 169 501-••D	2835/1460 2940/1460	87.5/84.5 88.5/84.5	0.92/0.80 0.93/0.78	22/13.0 27/16.5	7.7/6.0 7.9/6.0	39/39 49/49	2.1/2.3 2.2/2.4	2.8/2.4 2.9/2.4	0.054 0.057	133 140
18/9	180 MB	189 321-••D	2945/1460	89.0/84.0	0.90/0.77	32/20	7.7/5.2	58/59	2.5/2.3	2.8/2.1	0.108	200
23/12 30/16	200 MLA 200 MLB	209 411-••D 209 421-••D	2960/1475 2960/1475	90.0/89.0 91.0/90.0	0.89/0.85 0.90/0.87	42/23 53/30	7.8/7.4 8.2/7.3	74/77 97/104	1.7/2.2 1.8/2.2	2.8/2.5 2.9/2.5	0.28 0.34	255 275
36/18 40/20	225 SMB 225 SMC	229 221-••D 229 231-••D	2960/1480 2960/1475	91.5/91.5 92.0/91.5	0.91/0.76 0.91/0.79	63/38 69/41	8.0/7.2 8.5/6.5	116/116 129/129	2.5/3.8 2.8/3.3	2.7/2.5 2.8/2.2	0.26 0.29	335 355
50/25	250 SMB	259 221-••D	2965/1485	93.0/93.0	0.91/0.76	86/52	8.9/8.5	161/161	2.1/3.5	2.9/2.9	0.57	465
65/33 82/41	280 SMB 280 SMC	289 221-••A 289 231-••A	2978/1487 2978/1478	93.5/93.2 94.2/93.8	0.90/0.77 0.91/0.78	111/67 140/81	7.3/6.9 7.7/7.1	208/212 263/263	1.8/2.8 2.0/3.0	2.7/2.6 2.9/2.6	0.9 1.15	630 690
100/50 125/63 155/78	315 SMB 315 SMC 315 MLA	319 221-••A 319 231-••A 319 411-••A	2980/1488 2978/1488 2977/1487	94.3/94.3 94.7/94.6 94.9/94.9	0.89/0.75 0.90/0.76 0.90/0.77	173/102 212/128 262/155	7.3/6.5 6.8/6.5 6.4/6.2	320/321 401/404 497/501	1.9/3.0 1.9/3.1 1.8/3.2	3.1/2.7 2.8/2.8 2.6/2.6	1.4 1.7 2.1	920 1010 1170
160/80 200/100 1) 1)	355 S 355 SMA 355 MLA 400 M 400 LKA	359 101-••A 359 211-••A 359 411-••A 409 301-••A 409 511-••A	2985/1491 2977/1493 1) 1)	94.8/94.8 95.0/94.5 1) 1)	0.90/0.77 0.91/0.76	270/160 335/200	7.1/6.5 7.7/7.7	512/512 642/640	1.3/1.9 1.3/1.9	3.1/2.9 3.4/3.6	3 3.5	1550 1750
3000/1500 r/min = 2 - 4 poles						Constant torque, Dahlander-connection						
9/6.5 12.5/9 15/10.5	160 MA 160 LA 160 L	169 318-••D 169 518-••D 169 508-••D	2885/1440 2890/1440 2900/1445	83.0/82.0 85.5/85.5 87.0/86.0	0.92/0.74 0.93/0.80 0.93/0.77	17.1/15.6 22.5/19 27/23	4.6/4.3 5.2/4.6 5.8/4.9	40/43 41/60 49/69	1.3/1.7 1.4/1.8 1.6/2.1	1.9/1.9 1.9/1.9 2.1/2.1	0.039 0.054 0.057	118 133 140
18/12 24/17	180 M 180 MB	189 308-••D 189 328-••D	2940/1455 2945/1455	89.0/89.0 90.0/90.0	0.88/0.79 0.89/0.80	33/25 43/34	6.8/5.3 7.4/5.2	59/79 78/111	2.1/2.4 2.4/2.4	2.6/2.2 2.8/2.1	0.094 0.108	194 200
32/24 39/29	200 MLA 200 MLB	209 418-••D 209 428-••D	2940/1470 2950/1470	89.0/90.5 90.5/91.0	0.89/0.86 0.84/0.86	58/45 75/53	6.8/5.9 6.8/7.0	104/156 126/188	1.8/2.1 1.7/2.2	2.4/2.1 2.6/2.4	0.28 0.34	255 275
42/32 50/40	225 SMB 225 SMC	229 228-••D 229 238-••D	2955/1475 2960/1475	92.5/93.0 92.5/93.0	0.92/0.88 0.84/0.87	71/57 94/71	7.1/6.5 7.4/7.1	136/207 161/259	1.5/1.9 1.8/2.0	2.5/2.3 2.8/2.5	0.49 0.49	330 355
68/50	250 SMB	259 228-••D	2940/1475	93.0/93.5	0.93/0.88	113/87	6.6/6.9	220/324	1.5/2.1	2.4/2.5	0.89	465
90/65 105/75	280 SMB 280 SMC	289 228-••A 289 238-••A	2965/1486 2970/1487	93.8/94.8 94.0/94.9	0.91/0.85 0.91/0.86	153/116 179/134	7.3/8.7 7.9/8.7	290/418 338/482	1.4/2.6 1.7/2.5	3.0/3.3 3.0/3.3	1.5 1.85	630 690
125/85 175/120	315 SMB 315 MLA	319 228-••A 319 418-••A	2971/1485 2971/1485	95.0/95.0 95.5/95.5	0.88/0.73 0.89/0.76	218/178 300/240	6.6/6.3 7.2/6.5	402/546 562/772	1.3/2.5 1.7/2.7	2.6/2.5 2.7/2.7	1.4 2.1	920 1170
170/125 180/150 1) 1)	355 S 355 SMA 355 MLA 400 M 400 LKA	359 108-••A 359 218-••A 359 418-••A 409 308-••A 409 518-••A	2980/1486 2983/1487 1) 1)	95.0/94.5 95.0/95.5 1) 1)	0.91/0.74 0.92/0.79	285/260 300/290	7.7/5.5 8.0/5.8	545/803 576/963	1.2/1.3 1.2/1.2	3.4/3.0 3.4/2.8	3.4 4.2	1550 1750

The two bullets in the product code indicate choice of mounting arrangement (page 15, pos 12), voltage and frequency (below).

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

A	B	D	E	H	S
220 V 50 Hz	380 V 50 Hz	380-400 V 50 Hz 440-480 V 60 Hz	500 V 50 Hz 575 V 60 Hz	400-415 V 50 Hz 460-480 V 60 Hz	220-230 V 50 Hz

**Totally enclosed squirrel cage
three phase motors, cast iron frame
two-speed motors, IP 55 IC 411**

**Insulation class F
Temperature rise class F**

400 V 50 Hz

Output kW	Motor type M2BA	Product code 3GBA	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			Moment of inertia J = ¼ GD ² kgm ²	Weight kg
						I _N A	I _s I _N	T _N Nm	T _s T _N	T _{max} T _N		
1500/1000 r/min = 4/6 poles						Constant torque, two separate windings						
7.5/5.5	160 M	169 304---D	1465/965	85.5/80.5	0.83/0.77	15.5/13.0	7.1/4.7	49/54	2.1/1.8	2.7/1.9	0.089	127
11.5/8.5	160 L	169 504---D	1465/965	86.5/82.5	0.84/0.76	23/19.5	7.0/4.9	75/84	2.1/1.8	2.8/2.0	0.119	148
13/8	180 M	189 304---D	1475/975	88.0/82.5	0.82/0.75	26/19.0	6.5/4.3	84/78	1.9/1.4	2.6/1.8	0.176	194
15/10	180 L	189 504---D	1475/975	88.5/84.0	0.83/0.74	30/23	7.1/4.4	97/98	2.3/1.5	2.7/1.9	0.224	207
18/12	200 MLA	209 414---D	1475/985	88.5/86.0	0.91/0.86	33/24	7.6/7.8	117/116	2.1/2.6	2.5/2.6	0.42	260
22/14.7	200 MLB	209 424---D	1480/985	89.5/86.5	0.89/0.87	40/29	8.2/7.6	142/143	2.4/2.6	2.8/2.5	0.48	275
25/16.7	200 MLC	209 434---D	1475/980	89.0/85.5	0.87/0.88	47/32	7.7/6.7	162/162	2.3/2.3	2.6/2.2	0.48	275
32/21	225 SMB	229 224---D	1480/985	90.0/89.5	0.88/0.86	58/40	8.6/8.0	206/204	2.3/2.4	2.8/2.7	0.63	320
36/24	225 SMC	229 234---D	1480/985	90.5/90.0	0.88/0.87	66/45	8.4/7.4	232/233	2.2/2.2	2.8/2.5	0.74	345
50/32	250 SMB	259 224---D	1475/985	92.5/90.5	0.89/0.80	89/65	7.5/7.1	324/310	2.3/3.1	2.6/2.6	0.89	465
65/43	280 SMB	289 224---A	1485/988	93.0/92.0	0.86/0.77	117/86	6.5/6.7	418/417	2.0/2.9	2.4/2.3	1.5	630
76/50	280 SMC	289 234---A	1486/989	93.7/92.6	0.86/0.77	136/101	7.2/7.4	488/483	2.3/3.4	2.7/2.5	1.85	690
90/60	315 SMB	319 224---A	1490/991	94.3/93.7	0.84/0.75	167/124	7.3/6.7	577/578	2.0/2.9	3.0/2.7	2.6	925
110/75	315 SMC	319 234---A	1490/992	94.5/94.0	0.85/0.74	200/158	7.4/6.9	705/722	2.0/3.1	2.7/2.9	2.9	970
140/95	315 MLA	319 414---A	1489/990	95.0/94.2	0.85/0.77	253/191	6.9/5.7	898/916	2.0/2.6	2.7/2.3	3.5	1080
135/90	355 S	359 104---A	1486/991	94.0/93.5	0.88/0.80	235/175	6.9/7.4	868/867	1.4/1.9	3.0/3.2	6.5	1550
200/130	355 SMA	359 214---A	1490/991	95.0/94.5	0.87/0.79	350/255	8.5/7.8	1282/1253	1.5/2.0	3.7/3.3	8.2	1800
¹⁾	355 MLA	359 414---A	¹⁾									
¹⁾	400 M	409 304---A	¹⁾									
¹⁾	400 LKA	409 514---A	¹⁾									

1500/750 r/min = 4/8 poles						Constant torque, two separate windings						
5.5/2.7	160 M	169 302---D	1465/730	85.0/71.0	0.83/0.57	11.5/9.6	6.8/4.0	36/35	2.1/2.0	2.6/2.3	0.089	127
9/4.5	160 L	169 502---D	1465/730	86.5/73.5	0.83/0.56	18/16	7.0/4.1	59/59	2.1/2.1	2.7/2.5	0.119	148
14/7	180 L	189 502---D	1475/735	88.0/76.0	0.83/0.56	28/24	7.7/4.2	91/91	2.6/2.3	2.9/2.3	0.225	207
18.5/9.4	200 MLA	209 412---D	1475/730	89.5/82.5	0.85/0.65	35/26	7.3/4.3	120/123	2.2/1.9	2.5/1.8	0.28	255
22/11	200 MLB	209 422---D	1480/735	90.5/83.0	0.84/0.60	42/32	8.4/4.7	142/143	2.6/2.4	2.9/2.2	0.34	275
28/14	225 SMB	229 222---D	1480/735	90.0/85.5	0.85/0.61	53/39	7.7/4.9	181/182	2.1/2.4	2.7/2.2	0.41	330
34/17	225 SMC	229 232---D	1480/735	92.0/87.0	0.86/0.66	63/43	7.9/4.8	219/221	2.2/2.2	2.7/2.0	0.49	355
50/25	250 SMB	259 222---D	1480/740	92.5/88.0	0.87/0.60	90/68	8.6/6.0	323/323	2.6/3.5	3.0/2.9	0.89	465
60/30	280 SMB	289 222---A	1486/742	93.0/90.0	0.88/0.61	106/79	7.4/6.2	386/386	1.9/3.4	2.6/2.5	1.5	630
74/37	280 SMC	289 232---A	1486/740	93.5/90.9	0.88/0.68	131/86	7.8/6.0	476/477	2.2/2.9	2.8/2.2	1.85	690
95/48	315 SMB	319 222---A	1489/741	94.3/91.5	0.84/0.65	172/114	6.8/4.5	609/619	1.9/2.4	2.6/2.1	2.6	925
115/58	315 SMC	319 232---A	1489/742	94.6/92.1	0.83/0.63	214/144	6.7/4.3	738/746	1.9/2.4	2.6/2.1	2.9	970
140/70	315 MLA	319 412---A	1488/741	94.0/92.5	0.85/0.64	255/170	6.6/4.5	898/902	1.9/2.4	2.5/2.1	3.5	1080
160/80	355 S	359 102---A	1488/741	94.5/93.0	0.87/0.72	280/175	8.1/5.3	1027/1031	1.5/1.4	3.4/2.3	6.5	1550
180/90	355 SMA	359 212---A	1488/743	95.0/94.0	0.87/0.73	315/190	8.3/5.4	1155/1156	1.6/1.5	3.5/2.6	8.2	1800
250/125	355 MLA	359 412---A	1489/741	95.3/94.0	0.87/0.72	435/270	8.8/5.6	1603/1611	1.8/1.6	3.7/2.5	10	2100
250/125	400 M	409 302---A	1489/741	95.3/94.0	0.87/0.72	435/270	8.8/5.6	1603/1611	1.8/1.6	3.7/2.5	10	2150
¹⁾	400 LKA	409 512---A	¹⁾									

¹⁾ On request

Please note that the frequency converter application in critical conditions may require special rotor design within 355 and 400 frame motors. We therefore recommend a separate checking.

Data for motor sizes 71 to 132 on request.

**Totally enclosed squirrel cage
three phase motors, cast iron frame
two-speed motors, IP 55 IC 411**

**Insulation class F
Temperature rise class F**

400 V 50 Hz

Output kW	Motor type M2BA	Product code 3GBA	Speed r/min	Effi- ciency %	Power factor cos φ	Current		Torque			Moment of inertia J = ¼ GD² kgm²	Weight kg
						I _N A	I _s I _N	T _N Nm	T _s T _N	T _{max} T _N		
1500/750 r/min = 4 - 8 poles						Constant torque, Dahlander-connection						
8/4.5	160 M	169 309••D	1440/730	84.5/79.5	0.86/0.60	16/13.5	4.5/3.4	53/59	1.3/1.4	1.8/1.9	0.089	127
12/7	160 L	169 509••D	1445/730	86.5/81.0	0.87/0.59	23/21	5.0/3.5	79/92	1.5/1.4	1.9/1.9	0.119	148
16/8	180 L	189 509••D	1460/730	88.0/78.5	0.86/0.53	31/28	1.9/3.4	105/104	1.4/1.6	1.9/2.1	0.224	207
22/13	200 MLA	209 419••D	1475/735	87.5/86.0	0.81/0.69	45/32	6.5/5.9	142/169	2.0/2.5	2.6/2.7	0.36	245
25/15	200 MLB	209 429••D	1475/735	89.0/86.0	0.86/0.67	47/38	7.6/6.0	162/195	2.2/2.6	2.7/2.7	0.42	260
29/17	200 MLC	209 439••D	1475/735	90.0/88.0	0.91/0.75	52/38	7.2/6.1	188/221	2.2/2.6	2.4/2.4	0.48	275
35/21	225 SMB	229 229••D	1475/735	90.0/89.0	0.90/0.74	63/47	6.7/5.8	227/273	1.7/2.1	2.2/2.3	0.63	320
42/25	225 SMC	229 239••D	1475/735	91.0/89.5	0.91/0.75	74/54	6.8/5.9	272/325	1.8/2.1	2.2/2.2	0.74	345
55/33	250 SMB	259 229••D	1480/740	92.0/90.5	0.90/0.75	97/71	7.3/6.4	355/426	2.1/2.5	2.5/2.5	1.5	460
65/40	280 SMB	289 229••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	610
85/50	280 SMC	289 239••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	690
95/65	315 SMB	319 229••A	1487/743	94.1/93.8	0.88/0.73	168/140	7.9/6.4	610/835	2.1/2.5	2.8/2.4	4.1	910
150/95	315 MLA	319 419••A	1486/742	94.8/94.4	0.90/0.76	255/193	8.0/6.8	964/1223	1.8/2.0	3.1/2.8	5.8	1100
150/90	355 S	359 109••A	1491/741	94.0/93.0	0.89/0.73	260/195	7.1/3.8	960/1160	1.3/1.1	2.5/2.1	6.5	1550
180/130	355 SMA	359 219••A	1487/741	95.0/94.0	0.88/0.72	310/280	7.0/4.6	1156/1675	1.6/1.4	2.8/2.3	8.2	1800
210/160	355 MLA	359 419••A	1489/742	95.3/94.5	0.89/0.70	360/355	8.5/5.5	1347/2059	2.0/1.4	3.5/2.8	10	2100
210/160 ¹⁾	400 M	409 309••A	1489/742	95.3/94.5	0.89/0.70	360/355	8.5/5.5	1347/2059	2.0/1.4	3.5/2.8	10	2150
	400 LKA	409 519••A	¹⁾									
1000/750 r/min = 6/8 poles						Constant torque, two separate windings						
	160 M	On request										
	160 L	On request										
	180 M	On request										
	180 L	On request										
16/12	200 MLB	209 426••D	985/740	86.5/82.5	0.85/0.73	31/29	7.0/6.3	155/155	2.1/2.4	2.4/2.6	0.42	260
18/13.5	200 MLC	209 436••D	985/740	87.5/83.5	0.83/0.72	36/32	7.9/6.6	174/174	2.5/2.6	2.8/2.8	0.48	275
23/17	225 SMB	229 226••D	985/740	89.0/85.5	0.84/0.78	46/37	7.9/6.3	222/220	2.3/2.2	2.7/2.3	0.63	320
28/20	225 SMC	229 236••D	985/740	89.0/86.5	0.86/0.77	57/43	7.1/6.5	272/259	2.0/2.3	2.4/2.4	0.74	345
37/27	250 SMB	259 226••D	990/740	90.0/87.5	0.83/0.75	71/59	7.8/6.7	357/348	2.3/2.5	2.7/2.5	1.41	460
47/35	280 SMB	289 226••A	990/743	92.2/90.7	0.83/0.70	89/80	6.6/7.2	453/450	2.1/3.3	2.5/2.6	2.2	610
60/45	280 SMC	289 236••A	992/742	93.0/91.6	0.82/0.76	114/93	7.7/6.5	578/579	2.4/2.7	2.8/2.2	2.85	690
72/54	315 SMB	319 226••A	993/744	93.3/92.7	0.82/0.74	137/115	7.1/7.0	692/693	1.9/2.8	2.8/2.7	4.1	910
88/66	315 SMC	319 236••A	992/742	93.3/92.5	0.83/0.75	165/139	7.0/7.2	847/849	1.8/2.4	2.5/2.3	4.9	980
106/80	315 MLA	319 416••A	992/740	93.7/92.9	0.82/0.78	202/162	7.9/6.0	1020/1032	2.3/2.2	3.0/2.5	5.8	1100
110/83	355 S	359 106••A	991/741	94.0/93.0	0.85/0.80	200/160	6.6/6.5	1060/1070	1.5/1.8	3.0/2.6	8.5	1550
135/100	355 SMA	359 216••A	991/741	94.5/93.5	0.86/0.81	240/190	6.4/6.1	1301/1289	1.4/1.8	2.8/2.5	10.5	1800
180/135	355 MLA	359 416••A	993/742	94.6/94.5	0.82/0.80	340/260	7.8/5.9	1731/1738	1.8/1.8	3.4/2.5	12.6	2100
180/135 ¹⁾	400 M	409 306••A	993/742	94.6/94.5	0.82/0.80	340/260	7.8/5.9	1731/1738	1.8/1.8	3.4/2.5	12.6	2150
	400 LKA	409 516••A	¹⁾									

¹⁾ On request

Please note that the frequency converter application in critical conditions may require special rotor design within 355 and 400 frame motors. We therefore recommend a separate checking.

Data for motor sizes 71 to 132 on request.

The two bullets in the product code indicate choice of mounting arrangement (page 15, pos 12.), voltage and frequency (below). .

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

A	B	D	E	H	S
220 V 50 Hz	380 V 50 Hz	380-400 V 50 Hz 440-480 V 60 Hz	500 V 50 Hz 575 V 60 Hz	400-415 V 50 Hz 460-480 V 60 Hz	220-230 V 50 Hz

Rating plates

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

Motor sizes QU 71 to 132

ABB Motors			CE
Type	QU 100 L4 AT	IEC 34-1	
3~ Mot	GS 2229936 B	cos φ 0.84	
	2.2 kW 50 Hz 1425 r/min	2.6 kW 60 Hz 1720 r/min	
220-240/380-420 Δ/Y V		250-280/440-480 Δ/Y V	
8.5 / 4.9		8.8 / 5.1	
I.Cl. F	IP 55	GST102510ASC	

For motor sizes 160 to 400 the rating plate is in table form giving values for speed, current and power factor for six voltages.

Motor sizes M2BA 160 to 400

ABB Motors							CE	
3 ~ motor		M2BA 315 SMB 4 B3						
IEC 315 S/M 80								
S1				No 3291111 7711 SM				
				Ins.cl. F			IP 55	
V	Hz	kW	r/min	A	cos φ	I _A /I _N	t _E /s	
690 Y	50	132	1487	163	0.86			
400 D	50	132	1487	232	0.86			
660 Y	50	132	1485	169	0.87			
380 D	50	132	1485	240	0.88			
415 D	50	132	1488	225	0.86			
440 D	60	150	1785	238	0.88			
Cat. no		3GBA 312 220 - ADA						
6319/C3				6316/C3			925 kg	
IEC 34-1								

Variant Codes

Code ¹⁾	Variant	Motor size				
		QU 71-132	M2BA 160-180	200-250	280-315	355-400
	Balancing					
052	Balancing to grade R (ISO 2373).	L	T	T	T	T
417	Balancing to grade S (ISO 2373).	L	T	T	T	T
424	Full key balancing.	T	T	T	T	T
426	Half key balancing.	S	S	S	S	S
	Bearings and lubrication					
036	Transport lock for bearings.	L	L	L	L	L
037	Roller bearing at D-end.	–	L	L	L	L
039	Cold resistant grease. For bearing temperatures -55 - +100°C.	L	L	L	L	L
040	Heat resistant grease. For bearing temperatures -25 - +150°C.	L	L	L	L	L
041	Bearings regreasable via grease nipples.	–	L	L	S	S
042	Internal bearing cover, locked D-end. Standard for sizes 160-180, flange-mounted.	R	L	S	S	S
043	SPM nipples.	L	L	L	L	S
057	2RS bearings at both ends. Grease for bearing temperatures -20 - +110°C.	S	R	R	–	–
058	Angular contact ball bearing at D-end, shaft force away from bearing.	R	R	R	L	L
059	Angular contact ball bearing at N-end, shaft force towards bearing.	R	R	R	T	T
060	Angular contact bearing at D-end, shaft force towards bearing.	R	R	R	L	L
061	Angular contact bearing at N-end, shaft force away from bearing.	R	R	R	T	T
107	Bearing mounted PT100 resistance elements.	–	T	T	T	T
108	Continuous bearing monitoring (SPM system 32).	R	R	R	T	T
420	Bearing mounted PTC thermistors.	–	R	R	T	T
	Brakes					
412	Built-on brake.	–	T	T	T	T
	Branch standard designs					
071	Cooling tower duty. Only motors with shaft extensions downwards.	R	R	R	T	T
142	"Manilla" winding connection. (440 VΔ series, 220 VΔ parallel, 60 Hz).	T	T	T	T	T
415	Smoke venting design (short time duty in high ambient temperature).	R	T	T	T	T
170	Smoke venting specification 200°C, 2 hours.	R	T	T	T	T
171	Smoke venting specification 300°C, 0.5 hour.	R	T	T	T	T
172	Smoke venting specification 300°C, 1 hour.	R	T	T	T	T
178	Stainless steel/acid proof bolts.	L	T	T	T	T
209	Non-standard voltage or frequency (special winding).	R	T	T	T	T
416	High speed design.	R	R	R	T	T
419	Textile industry design.	L	R	R	R	R
425	Corrosion protected stator and rotor core.	L	T	T	T	T
432	Copper bar rotor.	–	–	–	T	T
785	Reinforced tropicalisation.	L	T	T	S	S

¹⁾ Certain variant codes cannot be used simultaneously.

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the number per order may be limited.
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Code 1)	Variant	Motor size				
		QU 71-132	M2BA 160-180	200-250	280-315	355-400
Cooling system						
044	Unidirectional fan, clockwise seen from D-end.	—	—	—	R	R
045	Unidirectional fan, counter clockwise seen from D-end.	—	—	—	R	R
054	Special fan for noise reduction.	—	—	—	L	L
068	Metal fan. Mandatory for ambient temperatures ≥ 60°C.	L	L	L	L	L
490	Plastic fan with metal hub.	—	—	—	L	S
075	Cooling method IC 418 (without fan).	L	T	T	T	T
183	Separate motor cooling (fan axial, N-end).	—	T	T	T	T
422	Separate motor cooling (fan top or side, N-end).	—	—	—	T	T
Coupling						
035	Assembly of customer supplied coupling-half (finish bored and balanced).	L	L	L	L	L
Dimension drawing						
141	Binding dimension drawing.	L	L	L	L	L
Drain holes						
065	Plugged drain holes.	L	—	—	L	L
066	Modified drain hole position (for specified IM xxxx).	L	T	T	L	L
076	Draining holes with plugs.	L	L	L	S	S
Earthing bolt						
067	External earthing bolt.	L	L	L	S	S
Hazardous environments See catalogue “Motors for Hazardous Environments EEx d, EEx de, EEx e, Ex nA, BA/Ex-motors GB 98-03”, for details.						
Heating elements						
450	Heating element, 100-120 V.	L	T	T	T	T
451	Heating element, 200-240 V.	L	T	T	L	L
High Performance Motors See catalogue “High Performance Motors, BA/High Performance GB 98-01” for details.						
Insulation system						
014	Winding insulation class H.	T	T	T	T	T
405	Special winding insulation for frequency converter supply, rated supply > 500 V.	—	T	T	T	T
406	Winding for supply > 690 ≤ 1000 V.	T	T	T	T	T
Marine Motors See catalogue “Marine Motors, BA/Marine GB 98-05” for details.						
Mounting arrangements						
008	IM 2101 foot/flange mounted, IEC flange, from IM 1001 (B34 from B3).	L	—	—	—	—
009	IM 2001 foot/flange mounted, IEC flange, from IM 1001 (B35 from B3).	L	L	L	L	L
047	IM 3601 flange mounted, IEC flange, from IM 3001 (B14 from B5).	L	—	—	—	—
048	IM 3001 flange mounted, IEC flange, from IM 3601 (B5 from B14).	L	—	—	—	—
078	IM 3601 flange mounted, DIN C flange.	L	—	—	—	—
090	IM 2101 foot/flange mounted, DIN C flange, from IM 1001 (B34 from B3).	L	—	—	—	—
091	IM 2001 foot/flange mounted, DIN A flange, from IM 1001 (B35 from B3).	L	—	—	—	—
Noise reduction						
055	Noise reducing cover	R	R	R	T	T
Painting						
114	Special paint colour, standard grade.	L	L	L	L	L
179	Special paint specification.	R	R	R	R	R

¹⁾ Certain variant codes cannot be used simultaneously.

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Code 1)	Variant	Motor size				
		QU 71-132	M2BA 160-180	200-250	280-315	355-400
	Protection					
072	Radial seal at D-end.	L	T	T	L	L
073	Sealed against oil at D-end.	L	R	R	R	R
211	Weather protected, IPWxx.	L	R	R	R	R
005	Protective roof, vertical motor, shaft down. See dimension drawing page 54.	L	L	L	L	L
401	Protective roof, horizontal motor.	L	T	T	T	T
403	Degree of protection IP 56.	L	T	T	L	L
404	Degree of protection IP 56, without fan.	L	T	T	T	T
	Rating & instruction plates					
002	Restamping voltage, frequency and output, continuous duty.	L	L	L	L	L
003	Individual serial number.	S	S	S	S	S
013	Restamping to output for class F temperature rise. Applies to variants with temperature rise to class B as standard.	L	L	L	L	L
095	Restamping output (maintained voltage, frequency), intermittent duty.	L	L	L	L	L
098	Stainless rating plate.	S	S	S	S	S
138	Mounting of additional identification plate.	L	L	L	L	L
150	Instruction plates and maintenance instructions in non-standard language.	R	R	R	R	R
161	Additional rating plate delivered loose.	L	L	L	L	L
	Shaft & rotor					
069	Two shaft extensions as per basic catalogue. Standard shaft material.	R	T	T	T	T
070	One or two special shaft extensions, standard shaft material.	R	R	R	T	T
155	Cylindrical shaft extension, D-end, without key-way.	L	T	T	T	T
156	Cylindrical shaft extension, N-end, without key-way.	L	T	T	T	T
164	Shaft extension with closed key-way.	T	S	S	T	T
165	Shaft extension with open key-way.	S	T	T	S	S
410	Stainless/acid-proof steel shaft (standard or non-standard design). One or two extensions.	R	R	R	T	T
427	Shaft extension complies with Australian Standards (AS).	R	R	R	T	T
	Standards and regulations					
010	Fulfilling CSA requirements.	R	R	R	T	T
011	Fulfilling CSA Energy Efficiency Verification (code 010 included).	R	R	R	T	T
421	VIK-design (Verband der Industriellen Energie- und Kraftwirtschaft e.V.).	L	T	T	T	T
773	EEMUA No 132 1988 design.	R	R	R	T	T
774	Design according to NORSOK (North Sea Territorial Waters).	R	R	R	T	T
775	Design according to SHELL DEP 33.66.05.31 design.	R	R	R	T	T
787	UIC design (Union of Chemical Industries).	L	R	R	T	T
	Stator winding temperature sensors					
	Breaking capacity for bimetal detector:					
	<u>Sizes 71-100:</u>					
	2 A at 380 V ac					
	5 A at 240 V ac					
	2.5 A at 24 V dc					
	<u>Sizes 112-250</u>					
	4 A at 250 V ac					
	3 A at 60 V dc					
	<u>Sizes 280-400</u>					
	24 A at 250 V ac					

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Code 1)	Variant	Motor size				
		QU 71-132	M2BA 160-180	200-250	280-315	355-400
121	Bimetal detectors, break type (NCC), (3 in series), 130°C, in stator winding.	R	L	L	L	L
122	Bimetal detectors, break type (NCC), (3 in series), 150°C, in stator winding.	R	L	L	L	L
123	Bimetal detectors, break type (NCC), (3 in series), 170°C, in stator winding.	R	L	L	L	L
125	Bimetal detectors, break type (NCC), (2x3 in series), 150°C, in stator winding.	R	L	L	L	L
127	Bimetal detectors, break type (NCC), (3 in series, 130°C and 3 in series, 150°C), in stator winding.	R	L	L	L	L
435	PTC - thermistors (3 in series), 130°C, in stator winding. Two speed motors, only for new manufacture.	L	L	L	L	L
436	PTC - thermistors (3 in series), 150°C, in stator winding. Two speed motors, only for new manufacture.	S	L	S	S	S
437	PTC - thermistors (3 in series), 170°C, in stator winding. Two speed motors, only for new manufacture.	L	L	L	L	L
439	PTC - thermistors (2x3 in series), 150°C, in stator winding. Two speed motors, only for new manufacture.	L	L	L	L	L
441	PTC - thermistors (3 in series, 130°C and 3 in series, 150°C, in stator winding. Two speed motors, only for new manufacture.	L	L	L	L	L
442	PTC - thermistors (3 in series, 150°C and 3 in series, 170°C, in stator winding. Two speed motors, only for new manufacture.	L	L	L	L	L
445	PT100 (1 per phase) in stator winding.	L	T	T	L	L
446	PT100 (2 per phase) in stator winding.	L	T	T	L	L
Terminal box						
015	Δ connection in terminal box (reconnection from Y).	L	L	L	L	L
017	Y connection in terminal box (reconnection from Δ).	L	L	L	L	L
019	Larger than standard terminal box.	R	T	T	R	R
137	Extended cable connection, low terminal box.	R	T	T	T	R
157	Terminal box degree of protection IP 65.	L	T	T	L	L
230	One standard cable gland or cable box.	L	L	L	S	S
402	Terminal box adapted for AI cables.	R	T	T	S	S
409	Large terminal box with two terminal blocks.	R	R	R	T	T
413	Extended cable connection, no terminal box.	R	R	R	T	T
414	Smaller than standard terminal box.	–	R	R	R	R
418	Separate terminal box for temperature detectors.	L	T	T	L	L
466	Terminal box at N-end.	R	R	R	R	R
467	Lower than standard terminal box and rubber extended cable.	R	T	T	R	R
468	Non-standard cable entry direction (please state direction).	L	L	L	L	L
469	Axial cable entry direction, terminal box 4x90° turnable.	L	L	L	T	T
Testing						
140	Test confirmation.	L	L	L	–	–
145	Type test report from test of identical motor.	L	L	L	L	L
146	Type test with report for motor from specific delivery batch.	L	L	L	L	L
147	Type test with report for motor from specific delivery batch, customer witnessed.	L	L	L	L	L
148	Routine test report.	L	L	L	L	L
149	Testing according to separate test specification.	L	L	L	L	L
153	Reduced test for classification society.	L	L	L	L	L

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Code 1)	Variant	Motor size				
		QU 71-132	M2BA 160-180	200-250	280-315	355-400
760	Vibration level test.	L	L	L	L	L
761	Vibration spectrum test.	R	R	R	L	L
762	Noise level test.	L	L	L	L	L
763	Noise spectrum test.	L	L	L	L	L
764	Complete test with ABB frequency converter.	R	R	R	L	L
Variable speed drives						
405	Special winding insulation for frequency converter supply, rated supply > 500 V.	–	T	T	T	T
701	Insulated bearing at N-end	–	R	R	L	L
704	EMC cable termination	–	R	R	L	L
Cooling system						
183	Separate motor cooling (fan axial, N-end).	–	T	T	T	T
422	Separate motor cooling (fan top or side, N-end).	–	–	–	T	T
Mounting of tacho						
182	Pulse sensor mounted as specified (Leine & Linde equivalent, hollow-shaft type).	R	T	T	T	T
470	Prepared for hollow shaft pulse tacho (L&L equivalent).	–	T	T	T	T
479	Mounting of other types of tachos with shaft extension.	–	T	T	T	T
Separate motor cooling & tacho						
474	Separate motor cooling and prepared for hollow shaft pulse tacho (L&L equivalent).	–	T	T	T	T
428	Separate motor cooling (fan top, N-end) and Leine & Linde, type 510 006361, pulse tacho.	–	–	–	T	T
429	Separate motor cooling (fan top, N-end) and Leine & Linde, type 186 90010, hollow shaft pulse tacho.	–	–	–	T	T
430	Separate motor cooling (fan top, N-end) and DC tacho, shaft extension type.	–	–	–	T	T
475	Separate motor cooling (fan axial, N-end) and 512 hollow shaft pulse tacho (L&L equivalent).	–	T	T	T	T
476	Separate motor cooling (fan axial, N-end) and 1024 hollow shaft pulse tacho (L&L equivalent).	–	T	T	T	T
477	Separate motor cooling (fan axial, N-end) and 2048 hollow shaft pulse tacho (L&L equivalent).	–	T	T	T	T
Tacho						
062	Tachogenerator.	R	T	T	T	T
471	512 hollow shaft pulse tacho (L&L equivalent).	–	T	T	T	T
472	1024 hollow shaft pulse tacho (L&L equivalent).	–	T	T	T	T
473	2048 hollow shaft pulse tacho (L&L equivalent).	–	T	T	T	T
Y/D-starting						
117	Terminals for Y/D start at both speeds (two speed windings).	L	T	T	T	T
118	Terminals for Y/D start at high speed (two speed windings).	L	T	T	T	T
119	Terminals for Y/D start at low speed (two speed windings).	L	T	T	T	T

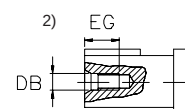
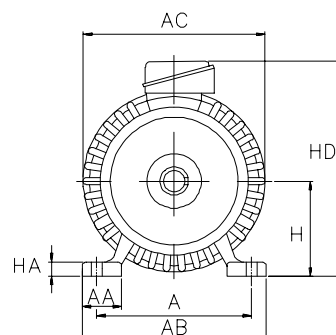
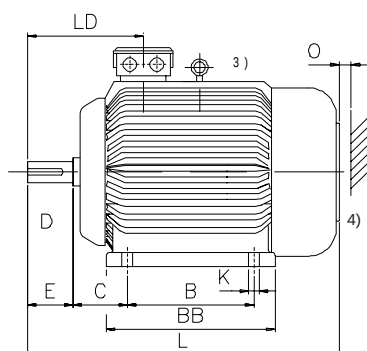
¹⁾ Certain variant codes cannot be used simultaneously.

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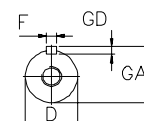
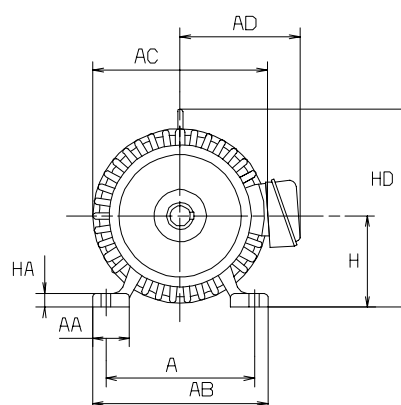
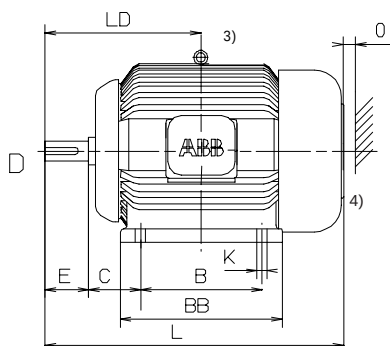
Foot-mounted; IM B3 (IM1001), IM B6 (IM1051), IM B7 (IM1061),
IM B8 (IM1071), IM V5 (IM1011), IM V6 (IM1031)

Cast iron motors

Terminal box top-mounted



Terminal box side-mounted ⁵⁾



Type QU	Poles	A	AA	AB	AC	AD	B	BB	C	D ¹⁾	DB	E	EG
		b	n	f	g		a	e	w1	d	d6	l	
71 M	2-6	112	30	145	137	—	90	110	45	14	M5	30	12.5
80 M	2-6	125	35	160	160	145	100	135	50	19	M6	40	16
90 S	2-6	140	35	175	175	150	100	140	56	24	M8	50	19
90 L	2-6	140	35	175	175	150	125	165	56	24	M8	50	19
100 L	2-6	160	40	200	205	175	140	180	63	28	M10	60	22
112 M	2-6	190	50	235	224	180	140	185	70	28	M10	60	22
132 S	2-6	216	55	270	264	200	140	205	89	38	M12	80	28
132 M	2-6	216	55	270	264	200	178	243	89	38	M12	80	28

Type QU	Poles	F	GA	GD	H	HA	HD top-m. p	HD side-m. p	K	L	LD top-m.	LD side-m.	O ⁶⁾
		u	t		h	c			s	k			
71 M	2-6	5	16	5	71	10	190	—	7	250	101	—	15
80 M	2-6	6	21.5	6	80	12	220	162	10	282	116	140	20
90 S	2-6	8	27	7	90	12	235	185	10	310	128	156	25
90 L	2-6	8	27	7	90	12	235	185	10	335	128	168.5	25
100 L	2-6	8	31	7	100	12	270	240	12	380	138	193	25
112 M	2-6	8	31	7	112	15	290	260	12	395	144	200	25
132 S	2-6	10	41	8	132	18	330	300	12	462	172	239	25
132 M	2-6	10	41	8	132	18	330	300	12	500	172	258	25

¹⁾ Tolerances:
D ISO j6 (QU 71)
ISO k6 (QU 80-132)
keys acc. DIN 6885, sheet 1

²⁾ In the shaft end the motors have a centre hole with protective sinking and thread acc. to DIN 332, sheet 2.
³⁾ Motors from frame size 100 with lifting eye bolts.
⁴⁾ Second shaft end on request.
⁵⁾ Frame size 71 only with top-mounted terminal box.
⁶⁾ Cooling distance.

Dimensions: capital letters acc. to IEC 72, small letters acc. to DIN 42673.

Dimensions for terminal boxes on page 50, for protection roofs on page 54.

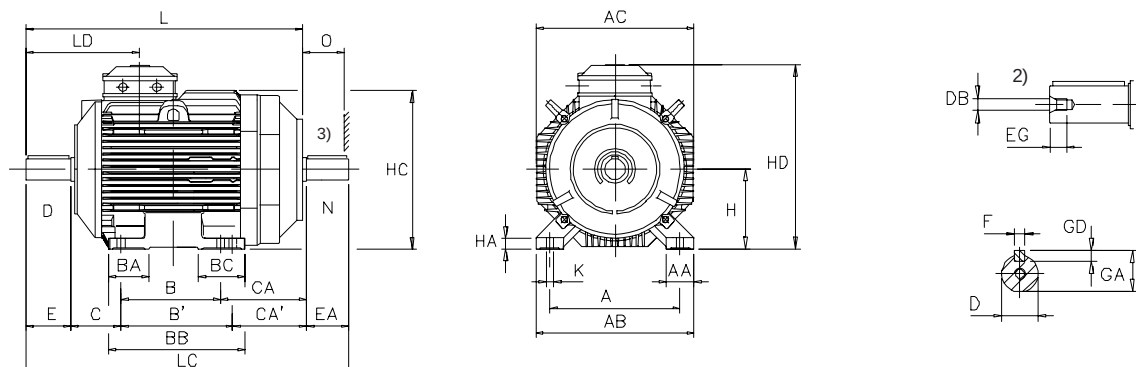
Dimension drawing

M2BA 160 - 250

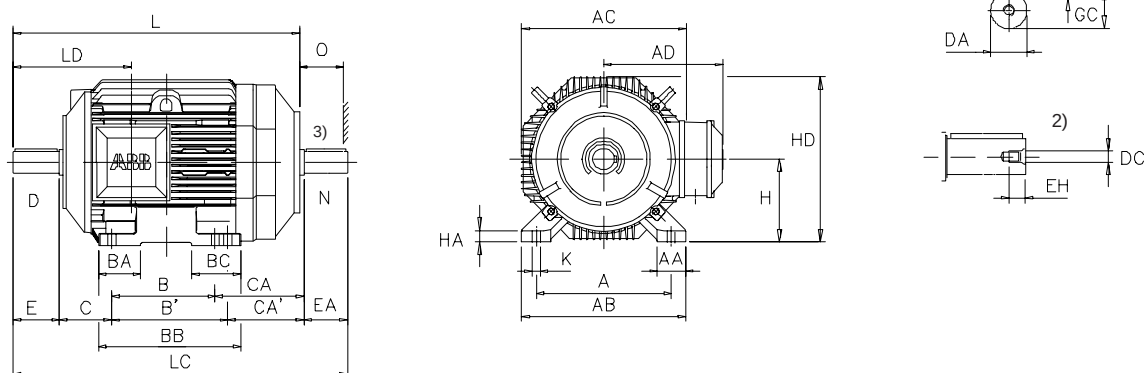
Foot-mounted; IM B3 (IM1001), IM B6 (IM1051), IM B7 (IM1061),
IM B8 (IM1071), IM V5 (IM1011), IM V6 (IM1031)

Cast iron motors

Terminal box top-mounted



Terminal box side-mounted



Type M2BA	Poles	A	AA	AB	AC	AD	B	B'	BA	BB	BC	C	CA	CA'	D ¹⁾	DA ¹⁾	DB	DC	E	EA
		b	n	f	g		a		m	e		w1	w2		d	d1	d6	d7	l	l1
160 M ₋	2-8	254	70	320	320	250	210	-	80	260	80	108	188	-	42	42	M16	M16	110	110
160 L	2-8	254	70	320	320	250	254	-	80	304	100	108	204	-	42	42	M16	M16	110	110
180 M,L	2-8	279	70	350	350	264	241	279	85	350	120	121	246	208	48	48	M16	M16	110	110
200 ML ₋	2-8	318	73	386	386	294	267	305	100	363	100	133	266	228	55	55	M20	M20	110	110
225 SM ₋	2	356	80	436	436	327	286	311	100	373	100	149	285	260	55	55	M20	M20	110	110
	4-8	356	80	436	436	327	286	311	100	373	100	149	285	260	60	60	M20	M20	140	140
250 SM ₋	2	406	86	494	494	350	311	349	126	432	126	168	271	233	60	60	M20	M20	140	140
	4-8	406	86	494	494	350	311	349	126	432	126	168	271	233	65	65	M20	M20	140	140

Type M2BA	Poles	EG	EH	F	FA	GA	GC	GD	GF	H ¹⁾	HA	HC	HD top-m. p	HD side-m. p	K	L	LC	LD	O ⁴⁾
				u	u1	t	t1			h	c			s	k	k1			
160 M ₋	2-8	36	36	12	12	45	45	8	8	160	22	320	410	320	14.5	611	726	261	40
160 L	2-8	36	36	12	12	45	45	8	8	160	22	320	410	320	14.5	671	786	261	40
180 M,L	2-8	36	36	14	14	51.5	51.5	9	9	180	28	355	444	355	14.5	714	828	253	40
200 ML ₋	2-8	42	42	16	16	59	59	10	10	200	30	393	494	393	18.5	773	886	296	40
225 SM ₋	2	42	42	16	16	59	59	10	10	225	32	443	552	443	18.5	825	940	324	40
	4-8	42	42	18	18	64	64	11	11	225	32	443	552	443	18.5	855	1000	354	40
250 SM ₋	2	42	42	18	18	64	64	11	11	250	35	497	600	497	24	885	1030	354	40
	4-8	42	42	18	18	69	69	11	11	250	35	497	600	497	24	885	1030	354	40

¹⁾ Tolerances:

D, DA ISO k6 < Ø 50mm

ISO m6 > Ø 50mm

keys acc. to DIN 6885, sheet 1
H ISO 0, -0.5

²⁾ In the shaft end the motors have a centre hole with protective sinking and thread to DIN 332 sheet 2.

³⁾ Second shaft end on request.

⁴⁾ Cooling distance.

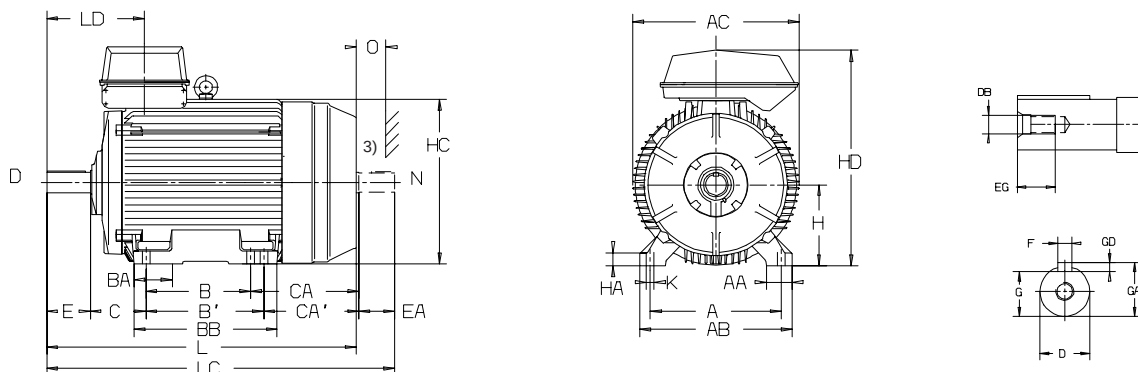
Dimensions: capital letters acc. to IEC 72
small letters acc. to DIN 42673.

Dimensions for terminal boxes on page 50,
for protection roofs on page 54.

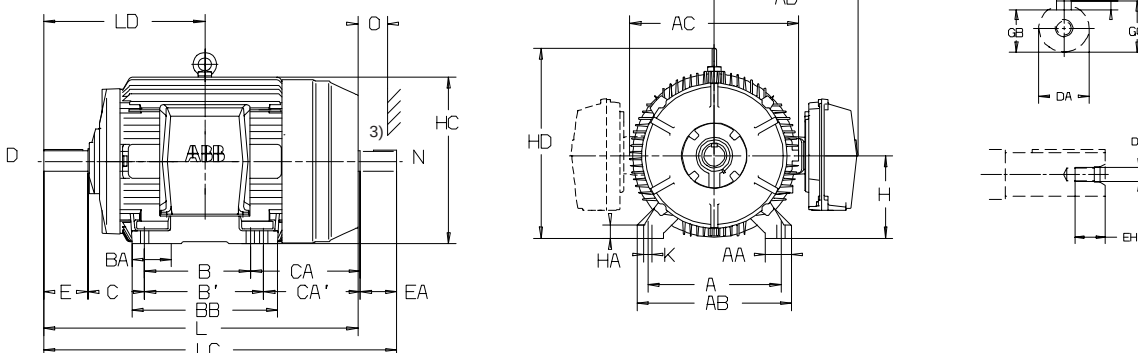
Foot-mounted; IM B3 (IM1001), IM B6 (IM1051), IM B7 (IM1061),
IM B8 (IM1071), IM V5 (IM1011), IM V6 (IM1031)

Cast iron motors

Terminal box top-mounted



Terminal box side-mounted



Type M2BA	Poles	A	AA	AB	AC	AD	B	B'	BA	BB	C	CA	CA'	D ¹⁾	DA ¹⁾	DB	DC	E	EA	EG	EH
	²⁾	b	n	f	g		a		m	e	w1	w2		d	d1	d6	d7	l	l1		
280 SM	2	457	85	530	572	487	368	419	146	506	190	400	349	65	60	M20	M20	140	140	40	40
	4-12	457	85	530	572	487	368	419	146	506	190	400	349	75	65	M20	M20	140	140	40	40
315 SM	2	508	100	590	645	549	406	457	163	556	216	420	369	65	60	M20	M20	140	140	40	40
	4-12	508	100	590	645	549	406	457	163	556	216	420	369	80	75	M20	M20	170	140	40	40
315 ML	2	508	100	590	645	549	457	508	163	607	216	420	369	65	60	M20	M20	140	140	40	40
	4-12	508	100	590	645	549	457	508	163	607	216	420	369	90	75	M24	M20	170	140	48	40

Type M2BA	Poles	F	FA	G	GA	GB	GC	GD	GF	H ¹⁾	HA	HC	HD	HD	K	L	LC	LD	LD	O
	²⁾	u	u1		t		t1			h	c		top-m. p	side-m. p	s	k	k1	top-m.	side-m.	⁴⁾
280 SM	2	18	18	58	69	53	64	11	11	280	40	566	745	660	24	1088	1238	332	540	100
	4-12	20	18	67.5	79.5	58	69	12	11	280	40	566	745	660	24	1088	1238	332	540	100
315 SM	2	18	18	58	69	53	64	11	11	315	50	638	840	732	30	1173	1322	351	584	115
	4-12	22	20	71	85	67.5	79.5	14	12	315	50	638	840	732	30	1203	1352	381	614	115
315 ML	2	18	18	58	69	53	64	11	11	315	50	638	840	732	30	1224	1373	351	609	115
	4-12	25	20	81	95	67.5	79.5	14	12	315	50	638	840	732	30	1254	1403	381	639	115

¹⁾ Tolerances:
D, DA ISO m6
H ISO 0, - 1.0

²⁾ Dimensions for 2-pole motors also valid for
2/4- and 2-4 -pole two-speed motors.

³⁾ Second shaft end on request.

⁴⁾ Cooling distance.

Dimensions: capital letters acc. to IEC 72,
small letters acc. to DIN 42673.

Dimensions for terminal boxes on page 51,
for protection roofs on page 54.

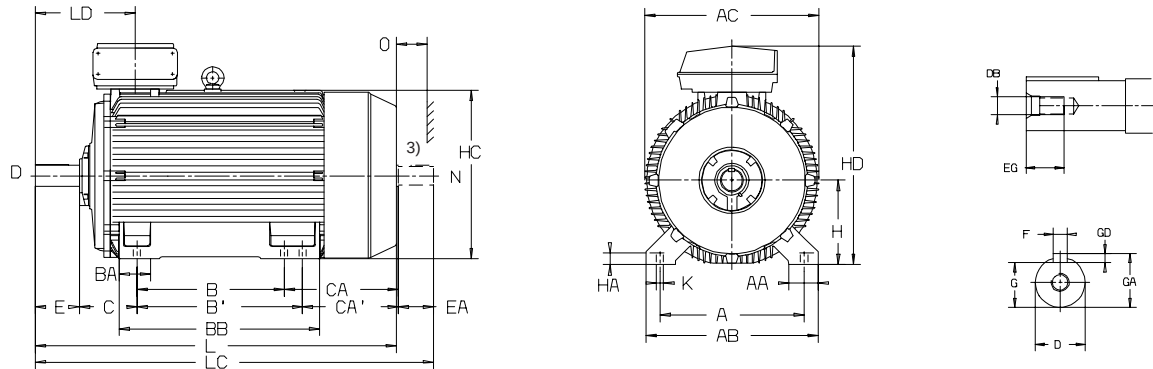
Dimension drawing

M2BA 355 - 400

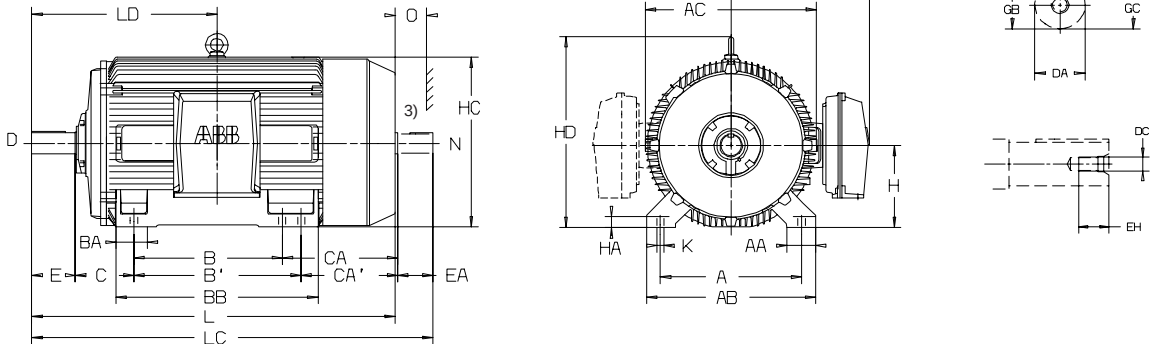
Foot-mounted; IM B3 (IM1001), IM B6 (IM1051), IM B7 (IM1061),
IM B8 (IM1071), IM V5 (IM1011), IM V6 (IM1031)

Cast iron motors

Terminal box top-mounted



Terminal box side-mounted



Type M2BA	Poles	A	AA	AB	AC	AD	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH
	²⁾	b	n	f	g		a		m	e	w1	w2		d	d1	d6	d7	l	l1		
355 S _—	2	610	120	700	740	627	500	—	161	662	254	460	—	70	70	M20	M20	140	140	40	40
	4-12	610	120	700	740	627	500	—	161	662	254	460	—	100	90	M24	M24	210	170	48	48
355 SM _—	2	610	120	700	740	627	500	560	161	722	254	512	452	70	70	M20	M20	140	140	40	40
	4-12	610	120	700	740	627	500	560	161	722	254	512	452	100	90	M24	M24	210	170	48	48
355 ML _—	2	610	120	700	740	627	560	630	161	792	254	557	487	70	70	M20	M20	140	140	40	40
	4-12	610	120	700	740	627	560	630	161	792	254	557	487	100	90	M24	M24	210	170	48	48
400 M _—	2	686	120	775	746	627	630	—	130	737	280	461	—	70	70	M20	M20	140	140	40	40
	4-12	686	120	775	746	627	630	—	130	737	280	461	—	100	90	M24	M24	210	170	48	48
400 LK _—	2	686	140	820	824	667	710	800	170	967	280	558	468	80	75	M20	M20	170	140	40	40
	4-12	686	140	820	824	667	710	800	170	967	280	558	468	100	90	M24	M24	210	170	48	48

Type M2BA	Poles	F	FA	G	GA	GB	GC	GD	GF	H	HA	HC	HD	HD	K	L	LC	LD	LD	O
	²⁾	u	u1		t		t1			¹⁾ h	c		top-m. p	side-m. p	s	k	k1	top-m.	side-m.	⁴⁾
355 S _—	2	20	20	62.5	74.5	62.5	74.5	12	12	355	55	725	955	838	35	1344	1494	397	652	130
	4-12	28	25	90	106	81	95	16	14	355	55	725	955	838	35	1414	1594	467	722	130
355 SM _—	2	20	20	62.5	74.5	62.5	74.5	12	12	355	55	725	955	838	35	1396	1546	397	678	130
	4-12	28	25	90	106	81	95	16	14	355	55	725	955	838	35	1466	1646	467	748	130
355 ML _—	2	20	20	62.5	74.5	62.5	74.5	12	12	355	55	725	955	838	35	1501	1651	397	730	130
	4-12	28	25	90	106	81	95	16	14	355	55	725	955	838	35	1571	1751	467	800	130
400 M _—	2	20	20	62.5	74.5	62.5	74.5	12	12	400	60	773	1005	886	35	1501	1651	397	730	130
	4-12	28	25	90	106	81	95	16	14	400	60	773	1005	886	35	1571	1751	467	800	130
400 LK _—	2	22	20	71	85	67.5	79.5	14	12	400	55	812	1040	945	35	1708	1858	432	819	150
	4-12	28	25	90	106	81	95	16	14	400	55	812	1040	945	35	1748	1928	502	889	150

¹⁾ Tolerances:
D, DA ISO m6
H ISO 0, - 1.0

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

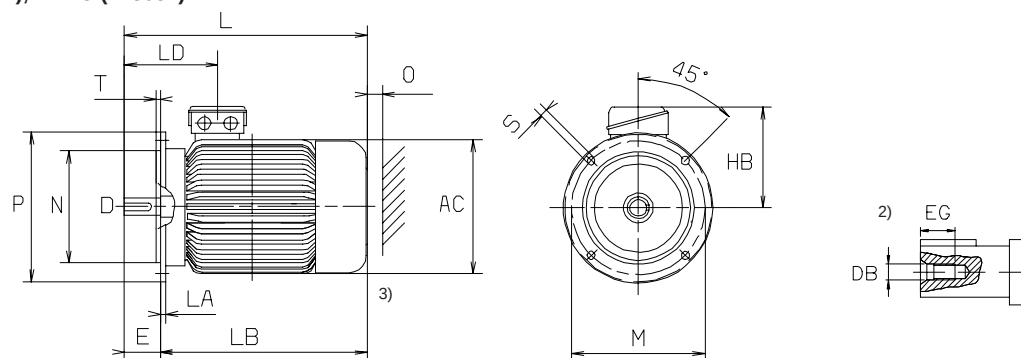
Dimensions: capital letters acc. to IEC 72,
small letters acc. to DIN 42673.

Dimensions for terminal boxes on page 51,
for protection roofs on page 54.

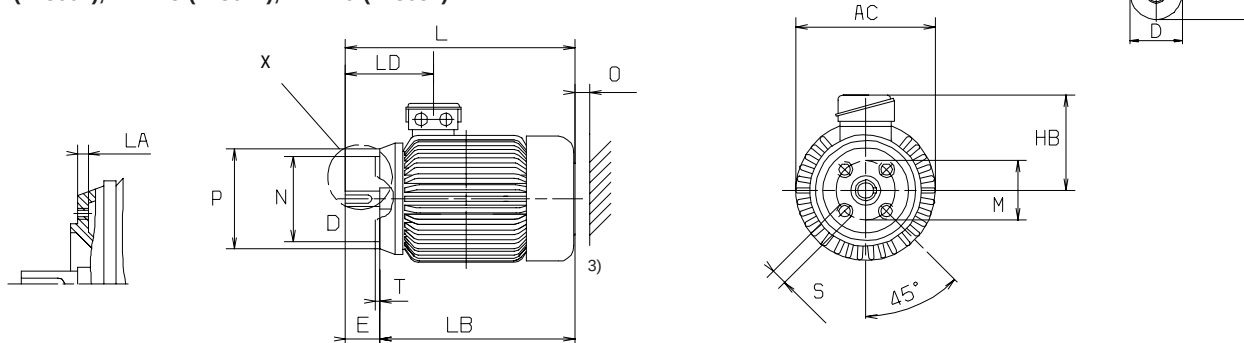
Flange-mounted; IM B5 (IM3001), IM V1 (IM3011), IM V3 (IM3031)
and IM B14 (IM3601, IM V18 (IM3611), IM V19 (IM3631)

Cast iron motors

Flange-mounted motor, large flange
IM B5 (IM3001), IM V1 (IM3011), IM V3 (IM3031)



Flange-mounted motor, small flange
IM B14 (IM3601), IM V18 (IM3611), IM V19 (IM3631)



Type QU	Poles	AC	D ¹⁾	DB	E	EG	F	GA	GD	HB	L	LD	O ⁴⁾
		g	d	d6	l		u	t			k		
71 M	2-6	137	14	M5	30	12.5	5	16	5	115	254	101	15

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

Type QU	Flange size	LA	LB	M	N ¹⁾	P	S	T
	c1			e1	b1	a1	s1	f1
71 M	C60	9	220	130	110	160	10	3.5

IM B14 (IM3601), IM V18 (IM3611), IM V19 (IM3631)

Type QU	Flange size	LA	LB	M	N ¹⁾	P	S	T
	c1			e1	b1	a1	s1	f1
71 M	C105 C140	8 10	224 224	85 115	70 95	105 140	M6 M8	2.5 3.5

¹⁾ Tolerances:
D ISO j6
keys acc. to DIN 6885, sheet 1
N ISO j6

²⁾ In the shaft end the motors have a centre hole with protective sinking and thread acc. to DIN 332 sheet 2.
³⁾ Second shaft end on request.
⁴⁾ Cooling distance.

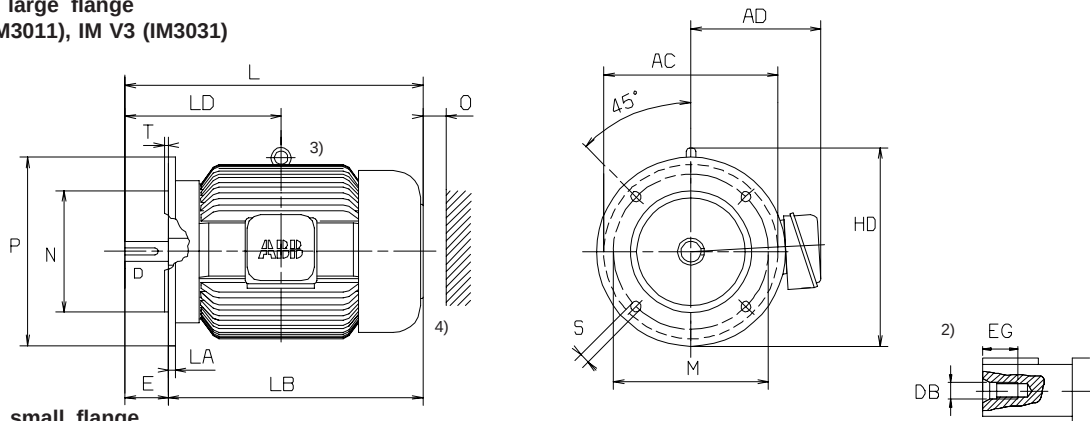
Dimensions: capital letters acc. to IEC 72, small letters acc. to DIN 42673.

Dimensions for terminal boxes page 50, for protection roofs page 54.

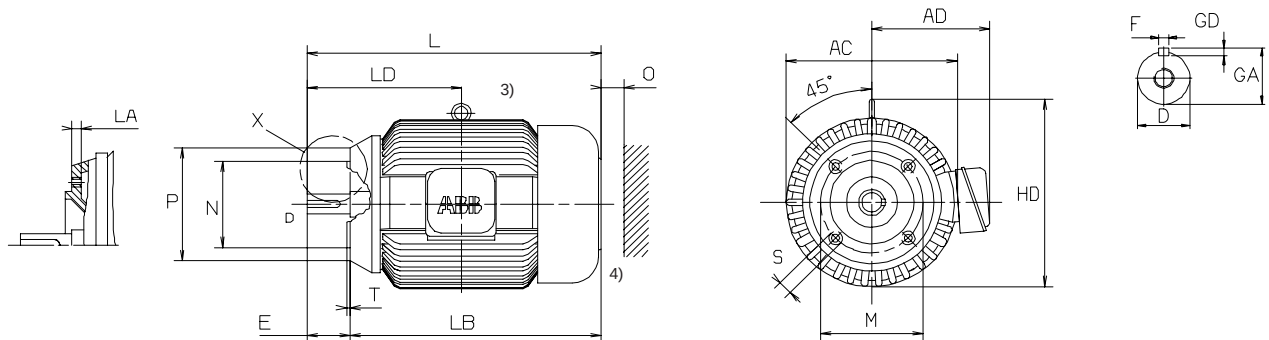
Flange-mounted; IM B5 (IM3001), IM V1 (IM3011), IM V3 (IM3031)
and IM B14 (IM3601, IM V18 (IM3611), IM V19 (IM3631))

Cast iron motors

Flange-mounted motor, large flange
IM B5 (IM3001), IM V1 (IM3011), IM V3 (IM3031)



Flange-mounted motor, small flange
IM B14 (IM3601), IM V18 (IM3611), IM V19 (IM3631)



Type QU	Poles	AC	AD	D ¹⁾	DB	E	EG	F	GA	GD	L	LB	LD	O ⁵⁾
		g		d	d6	l		u	t		k			
80 M	2-6	160	145	19	M6	40	16	6	21.5	6	290	250	140	20
90 S	2-6	180	150	24	M8	50	19	8	27	7	320	270	156	25
90 L	2-6	180	150	24	M8	50	19	8	27	7	345	295	168.5	25
100 L	2-6	205	175	28	M10	60	22	8	31	7	280	320	193	25
112 M	2-6	224	180	28	M10	60	22	8	31	7	395	335	200	25
132 S	2-6	264	200	38	M12	80	28	10	41	8	462	382	239	25
132 M	2-6	264	200	38	M12	80	28	10	41	8	500	420	258	25

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

Type QU	Flange size	HD	LA	M	N ¹⁾	P	S	T
	p		c1	e1	b1	a1	s1	f1
80 M	C200	200	10	165	130	200	12	3.5
90 S	C200	200	10	165	130	200	12	3.5
90 L	C200	200	10	165	130	200	12	3.5
100 L	C250	262	11	215	180	250	15	4
112 M	C250	272	11	215	180	250	15	4
132 S	C300	318	12	265	230	300	15	4
132 M	C300	318	12	265	230	300	15	4

IM B14 (IM3601), IM V18 (IM3611), IM V19 (IM3631)

Type QU	Flange size	HD	LA	M	N ¹⁾	P	S	T
	p		c1	e1	b1	a1	s1	f1
80 M	C120	172	8	100	80	120	M6	3
	C160	172	10	130	110	160	M8	3.5
90 S	C140	185	10	115	95	140	M8	3
	C160	185	10	130	110	160	M8	3.5
90 L	C140	185	10	115	95	140	M8	3
	C160	185	10	130	110	160	M8	3.5
100 L	C160	250	10	130	110	160	M8	3.5
	C200	250	12	165	130	200	M10	3.5
112 M	C160	272	10	130	110	160	M8	3.5
	C200	272	12	165	130	200	M10	3.5

¹⁾ Tolerances:
D ISO j6
keys acc. to DIN 6885, sheet 1
N ISO j6

²⁾ In the shaft end the motors have a centre hole with protective sinking and thread acc. to DIN 332 sheet 2.
³⁾ Motors from frame size 100 with lifting eye bolts.
⁴⁾ Second shaft end on request.
⁵⁾ Cooling distance.

Dimensions: capital letters acc. to IEC72, small letters acc. to DIN 42673.

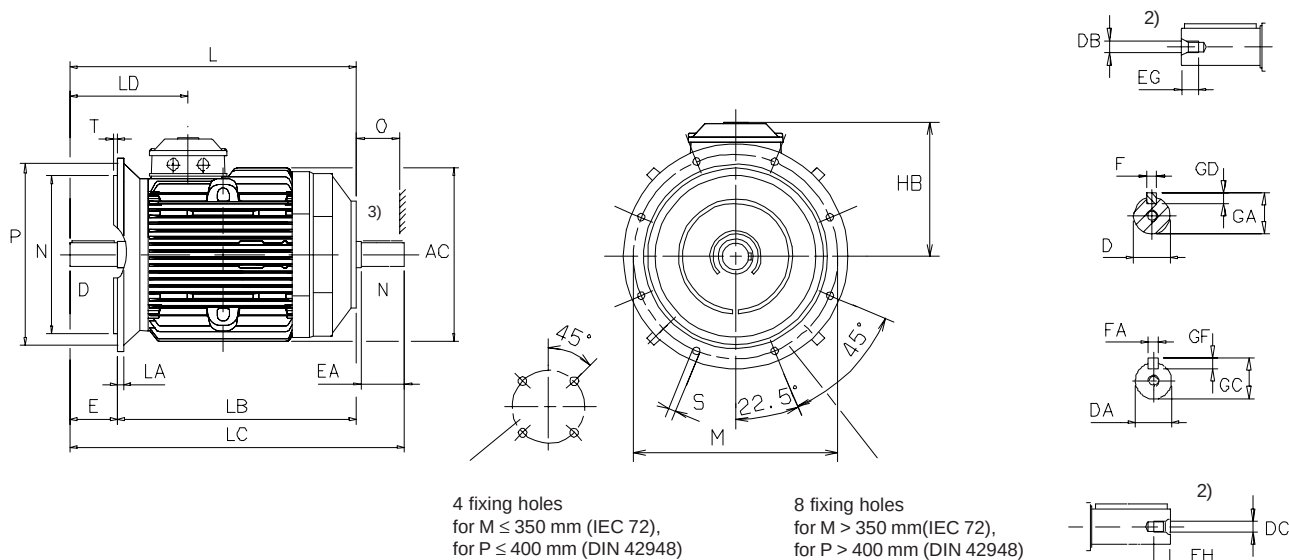
Dimensions for terminal boxes page 50, for protection roofs page 54.

Dimension drawing

M2BA 160 - 250

Flange-mounted;
IM B5 (IM3001), IM V1 (IM3011), IM V3 (IM3031)

Cast iron motors



Type M2BA	Poles	AC	D ¹⁾	DA ¹⁾	DB	DC	E	EA	EG	EH	F	FA	GA	GC
		g	d	d1	d6	d7	l	l1			u	u1	t	t1
160 M_	2-8	320	42	42	M16	M16	110	110	36	36	12	12	45	45
160 L	2-8	320	42	42	M16	M16	110	110	36	36	12	12	45	45
180 M,L	2-8	350	48	48	M16	M16	110	110	36	36	14	14	51.5	51.5
200 ML_	2-8	386	55	55	M20	M20	110	110	42	42	16	16	59	59
225 SM_	2	436	55	55	M20	M20	110	110	42	42	16	16	59	59
	4-8	436	60	60	M20	M20	140	140	42	42	18	18	64	64
250 SM_	2	494	60	60	M20	M20	140	140	42	42	18	18	64	64
	4-8	494	65	65	M20	M20	140	140	42	42	18	18	69	69

Type M2BA	Poles	GD	GF	HB	L	LA	LB	LC	LD	M	N ¹⁾	O ⁴⁾	P	S	T
					k	c1		k1		e1	b1		a1	s1	f1
160 M_	2-8	8	8	250	611	13	501	726	261	300	250	40	350	18.5	5
160 L	2-8	8	8	250	671	13	561	786	261	300	250	40	350	18.5	5
180 M,L	2-8	9	9	264	714	13	604	828	253	300	250	40	350	18.5	5
200 ML_	2-8	10	10	294	773	15	663	886	296	350	300	40	400	18.5	5
225 SM_	2	10	10	327	825	16	715	940	324	400	350	40	450	18.5	5
	4-8	11	11	327	855	16	715	1000	354	400	350	40	450	18.5	5
250 SM_	2	11	11	350	885	18	745	1030	354	500	450	40	550	18.5	5
	4-8	11	11	350	885	18	745	1030	354	500	450	40	550	18.5	5

¹⁾ Tolerances:

D, DA ISO k6 < Ø 50mm
ISO m6 > Ø 50mm
keys acc. to DIN 6885, sheet 1
N ISO j6

²⁾ In the shaft end the motors have a centre hole with protective sinking and thread to DIN 332 sheet 2.

³⁾ Second shaft end on request.

⁴⁾ Cooling distance.

Dimensions: capital letters acc. to IEC 72
small letters acc. to DIN 42673.

Dimensions for terminal boxes on page 50,
for protection roofs on page 54.

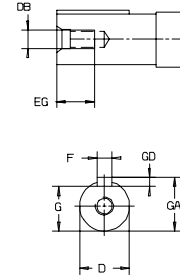
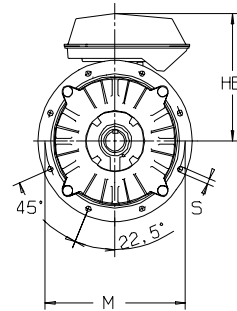
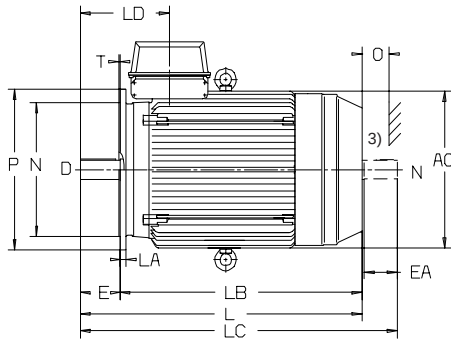
Dimension drawing

M2BA 280 - 400

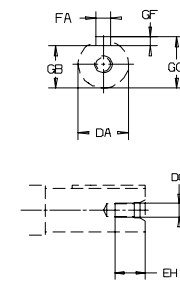
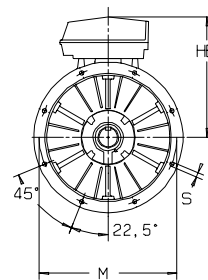
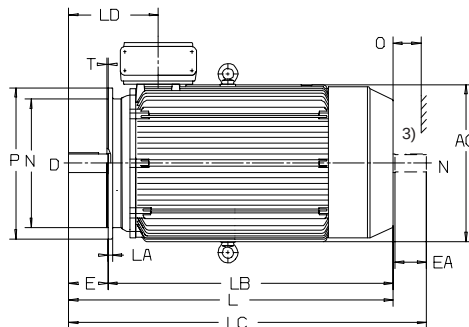
Flange-mounted;
IM B5 (IM3001), IM V1 (IM3011), IM V3 (IM3031)

Cast iron motors

M2BA 280-315



M2BA 355-400



Type M2BA	Poles	AC	D ¹⁾	DA ¹⁾	DB	DC	E	EA	EG	EH	F	FA	G	GA	GB	GC	GD	GF
	²⁾	g	d	d1	d6	d7	l	l1			u	u1		t		t1		
280 SM_	2	572	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64	11	11
	4-12	572	75	65	M20	M20	140	140	40	40	20	18	67.5	79.5	58	69	12	11
315 SM_	2	645	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64	11	11
	4-12	645	80	75	M20	M20	170	140	40	40	22	20	71	85	67.5	79.5	14	12
315 ML_	2	645	65	60	M20	M20	140	140	40	40	18	18	58	69	53	64	11	11
	4-12	645	90	75	M24	M20	170	140	48	40	25	20	81	95	67.5	79.5	14	12
355 S_	2	746	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5	12	12
	4-12	746	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95	16	14
355 SM_	2	746	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5	12	12
	4-12	746	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95	16	14
355 ML_	2	746	70	70	M20	M20	140	140	40	40	20	20	62.5	74.5	62.5	74.5	12	12
	4-12	746	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95	16	14
400 LK_	2	824	80	75	M20	M20	170	140	40	40	22	20	71	85	67.5	79.5	14	12
	4-12	824	100	90	M24	M24	210	170	48	48	28	25	90	106	81	95	16	14

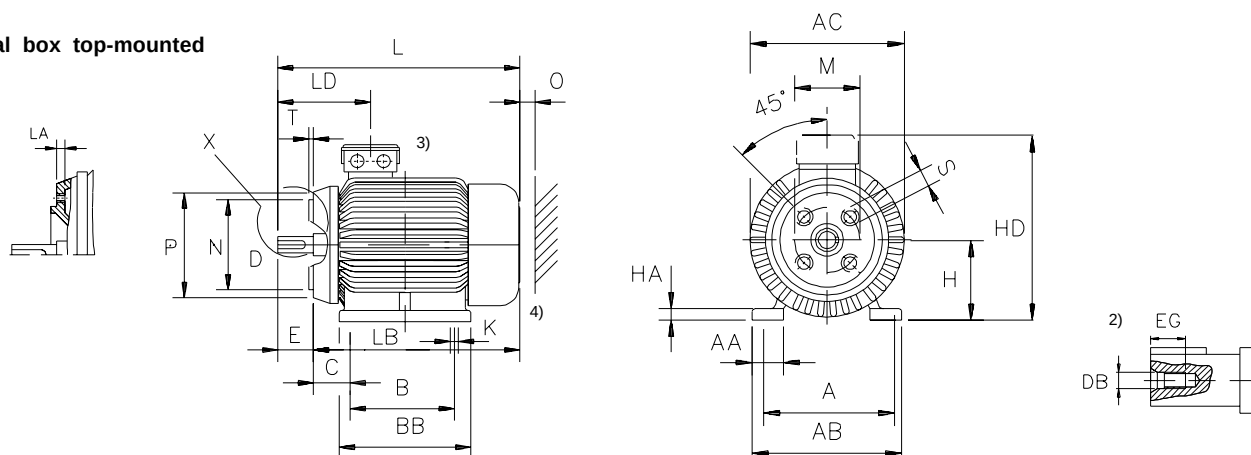
Type M2BA	Poles	HB	L	LA	LB	LC	LD	M	N ¹⁾	O ⁴⁾	P	S	T
	²⁾		k	c1		k1		e	b1		a1	s1	f1
280 SM_	2	465	1088	22	938	1238	332	500	450	100	550	18	5
	4-12	465	1088	22	938	1238	332	500	450	100	550	18	5
315 SM_	2	525	1173	25	1033	1322	351	600	550	115	660	23	6
	4-12	525	1203	25	1033	1352	381	600	550	115	660	23	6
315 ML_	2	525	1224	25	1084	1373	351	600	550	115	660	23	6
	4-12	525	1254	25	1084	1403	381	600	550	115	660	23	6
355 S_	2	600	1344	25	1204	1494	397	740	680	130	800	23	6
	4-12	600	1414	25	1204	1594	467	740	680	130	800	23	6
355 SM_	2	600	1396	25	1256	1546	397	740	680	130	800	23	6
	4-12	600	1466	25	1256	1646	467	740	680	130	800	23	6
355 ML_	2	600	1501	25	1361	1651	397	740	680	130	800	23	6
	4-12	600	1571	25	1361	1751	467	740	680	130	800	23	6
400 LK_	2	640	1678	25	1538	1828	432	740	680	150	800	23	6
	4-12	640	1748	25	1538	1928	505	740	680	150	800	23	6

¹⁾ Tolerances:
D, DA ISO m6
N ISO j6 (280 SM_)
ISO js6 (315_) ²⁾ Dimensions for 2-pole motors also valid for 2/4- and 2-4 -pole two-speed motors.
³⁾ Second shaft end on request.
⁴⁾ Cooling distance.

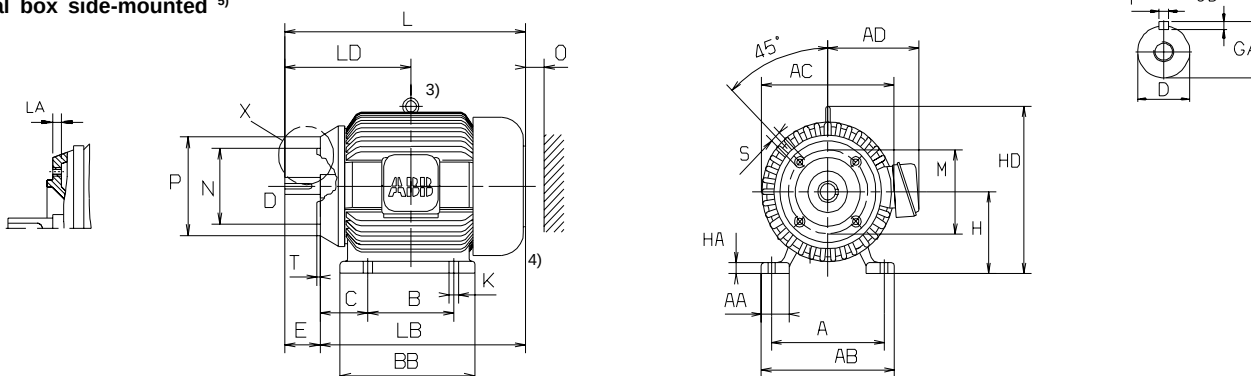
Dimensions: capital letters acc. to IEC 72,
small letters acc. to DIN 42673.

Dimensions for terminal boxes page 51,
for protection roof page 54.

Terminal box top-mounted



Terminal box side-mounted ⁵⁾



Type QU	Poles	A	AA	AB	AC	AD	B	BB	C	D ¹⁾	DB	E	EG	F	GA	GD
		b	n	f	g		a	e	w1	d	d6	l		u	t	
71 M	2-6	112	30	145	137	—	90	110	45	14	M5	30	12.5	5	16	5
80 M	2-6	125	35	160	160	145	100	135	50	19	M6	40	16	6	21.5	6
90 S	2-6	140	35	175	180	150	100	140	56	24	M8	50	19	8	27	7
90 L	2-6	140	35	175	180	150	125	165	56	24	M8	50	19	8	27	7
100 L	2-6	160	40	200	205	175	140	180	63	28	M10	60	22	8	31	7
112 M	2-6	190	50	240	224	180	140	190	70	28	M10	60	22	8	31	7

Type QU	Flange size	H	HA	HD top-m.	HD side-m.	K	L	LA	LB	LD top-m.	LD side-m.	M	N ¹⁾	O ⁹⁾	P	S	T
		h	c	p	p	s	k	c1				e1	b1		a1	s1	f1
71 M	C105 C140	71	10	190	—	7	250	8 10	224	101	—	85 115	70 95	15	105 140	M6 M8	2.5 3.5
80 M	C120 C160	80	12	220	172	10	290	8 10	250	116	140	100 130	80 110	20	120 120	M6 M8	3 3.5
90 S	C140 C160	90	12	235	185	10	320	10 10	270	128	156	115 130	95 110	25	140 160	M8 M8	3 3.5
90 L	C140 C160	90	12	235	185	10	345	10 10	295	128	168.5	115 130	95 110	25	140 160	M8 M8	3 3.5
100 L	C160 C200	100	14	270	250	12	380	10 12	320	138	193	130 165	110 130	25	160 200	M8 M10	3.5 3.5
112 M	C160 C200	112	15	290	272	12	395	10 12	335	144	200	130 165	110 130	25	160 200	M8 M10	3.5 3.5

¹⁾ Tolerances:
D ISO j6 (QU 71)
ISO k6 (QU 80-112)
keys acc. to DIN 6885, sheet 1
N ISO j6

²⁾ In the shaft end the motors have a centre hole with protective sinking and thread acc. to DIN 332 sheet 2.

³⁾ Motors from frame size 100 with lifting eye bolts.

⁴⁾ Second shaft end on request.

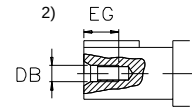
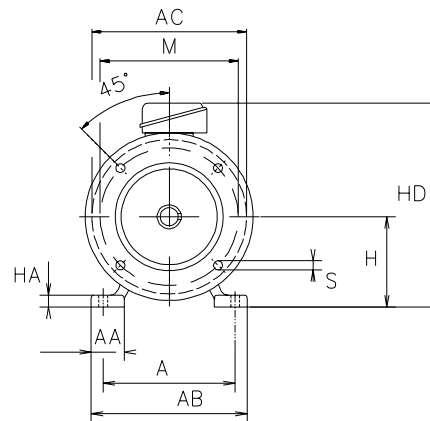
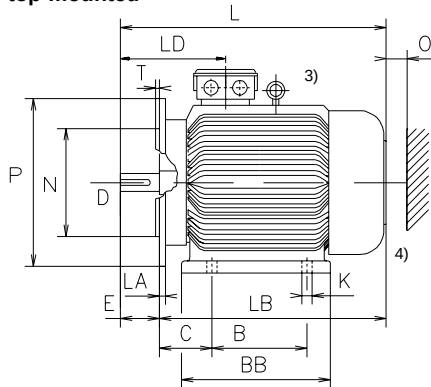
⁵⁾ Frame size 71 only with top-mounted terminal box.

⁹⁾ Cooling distance.

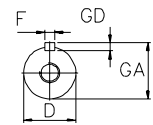
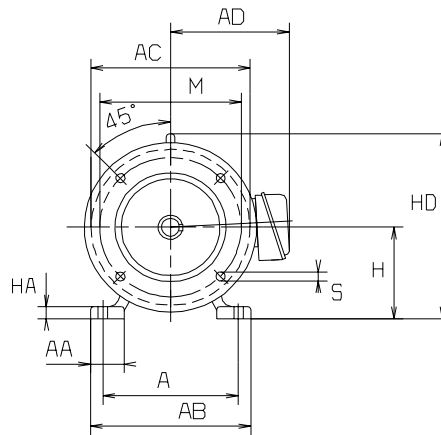
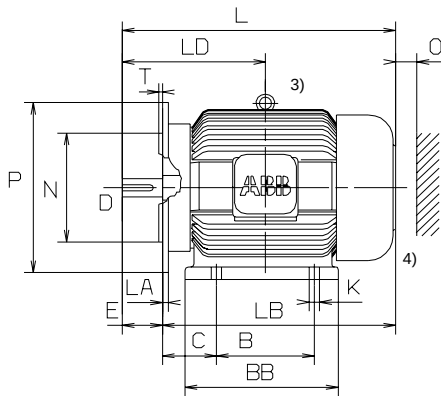
Dimensions: capital letters acc. to IEC 72, small letters acc. to DIN 42673.

Dimensions for terminal boxes page 50, for protection roof page 54.

Terminal box top-mounted



Terminal box side-mounted ⁵⁾



Type QU	Poles	A	AA	AB	AC	AD	B	BB	C	D ¹⁾	DB	E	EG	F	GA	GD
		b	n	f	g		a	e	w1	d	d6	l		u	t	
71 M	2-6	112	30	145	137	—	90	110	45	14	M5	30	12.5	5	16	5
80 M	2-6	125	35	160	160	145	100	135	50	19	M6	40	16	6	21.5	6
90 S	2-6	140	35	175	175	150	100	140	56	24	M8	50	19	8	27	7
90 L	2-6	140	35	175	175	150	125	165	56	24	M8	50	19	8	27	7
100 L	2-6	160	40	200	205	175	140	180	63	28	M10	60	22	8	31	7
112 M	2-6	190	50	235	224	180	140	185	70	28	M10	60	22	8	31	7
132 S	2-6	216	55	270	264	200	140	205	89	38	M12	80	28	10	41	8
132 M	2-6	216	55	270	264	200	178	243	89	38	M12	80	28	10	41	8

Type QU	Poles	H	HA	HD top-m.	HD side-m.	K	L	LA	LB	LD top-m.	LD side-m.	M	N ¹⁾	O ⁹⁾	P	S	T
		h	c	p	p	s	k	c1				e1	b1		a1	s1	f1
71 M	2-6	71	10	190	—	7	250	9	220	101	—	130	110	15	160	10	3.5
80 M	2-6	80	12	220	180	10	282	10	250	116	140	165	130	20	200	12	3.5
90 S	2-6	90	12	235	190	10	310	10	270	128	156	165	130	25	200	12	3.5
90 L	2-6	90	12	235	190	10	335	10	295	128	168.5	165	130	25	200	12	3.5
100 L	2-6	100	14	270	237	12	380	11	320	138	193	215	180	25	250	15	4
112 M	2-6	112	15	290	260	12	395	11	335	144	200	215	180	25	250	15	4
132 S	2-6	132	18	330	300	12	462	12	382	172	239	265	230	25	300	15	4
132 M	2-6	132	18	330	300	12	500	12	420	172	258	265	230	25	300	15	4

¹⁾ Tolerances:

D ISO k6 (QU 71)
ISO j6 (80-132)
keys acc. to DIN 6885, sheet 1
N ISO j6

²⁾ In the shaft end the motors have a centre hole with protective sinking and thread acc. to DIN 332 sheet 2.

³⁾ Motors from frame size 100 with lifting eye bolts.

⁴⁾ Second shaft end on request.

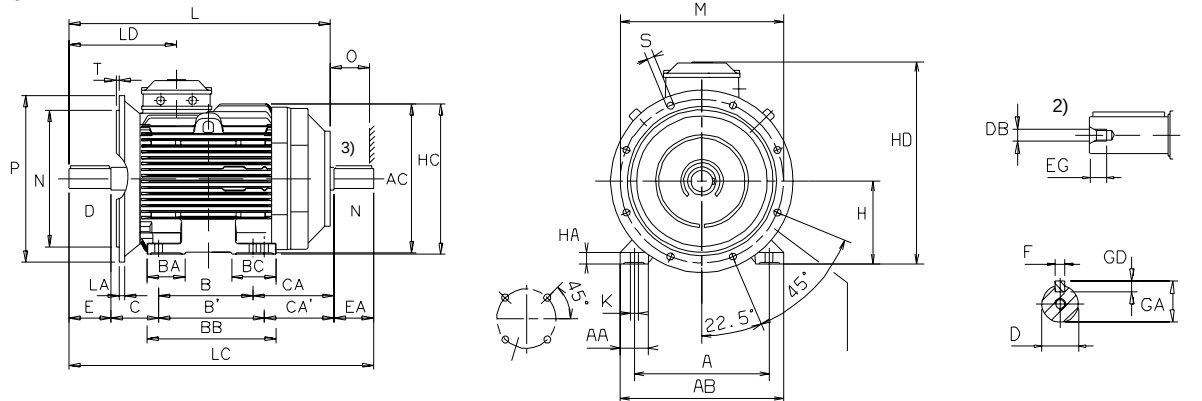
⁵⁾ Frame size 71 only with top-mounted terminal box.

⁹⁾ Cooling distance.

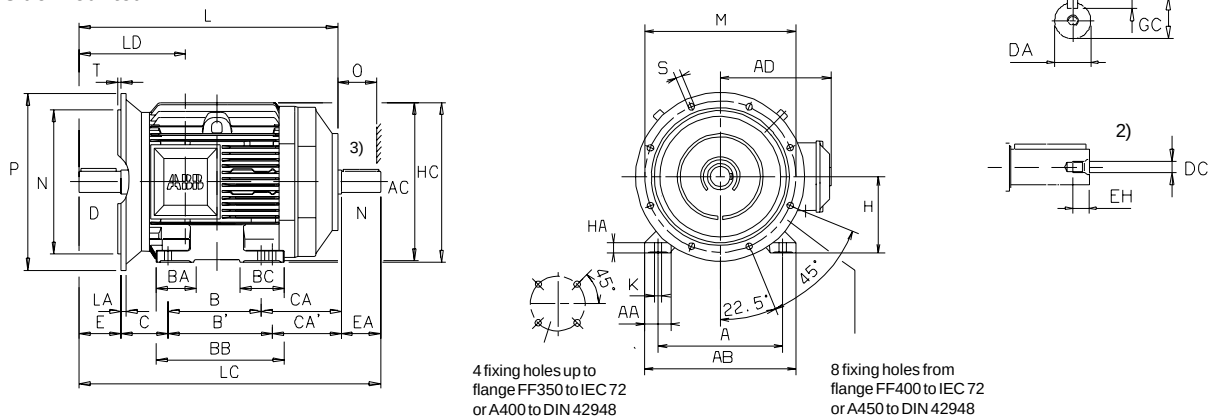
Dimensions: capital letters acc. to IEC 72, small letters acc. to DIN 42673.

Dimensions for terminal boxes page 50, for protection roof page 54.

Terminal box top-mounted



Terminal box side-mounted



Type M2BA	Poles	A	AA	AB	AC	AD	B	B'	BA	BB	BC	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH
		b	n	f	g		a		m	e		w1	w2		d	d1	d6	d7	l	l1		
160 M	2-8	254	70	320	320	250	210	—	80	260	80	108	188	—	42	42	M16	M16	110	110	36	36
160 L	2-8	254	70	320	320	250	254	—	80	304	100	108	204	—	42	42	M16	M16	110	110	36	36
180 M,L	2-8	279	70	350	350	264	241	279	85	350	120	121	246	208	48	48	M16	M16	110	110	36	36
200 ML	2-8	318	73	386	386	294	267	305	100	363	100	133	266	228	55	55	M20	M20	110	110	42	42
225 SM	2	356	80	436	436	327	286	311	100	373	100	149	285	260	55	55	M20	M20	110	110	42	42
	4-8	356	80	436	436	327	286	311	100	373	100	149	285	260	60	60	M20	M20	140	140	42	42
250 SM	2	406	86	494	494	350	311	349	126	432	126	168	271	233	60	60	M20	M20	140	140	42	42
	4-8	406	86	494	494	350	311	349	126	432	126	168	271	233	65	65	M20	M20	140	140	42	42

Type M2BA	Poles	F	FA	GA	GC	GD	GF	H	HA	HC	HD	K	L	LA	LC	LD	M	N	O	P	S	T
		u	u1	t	t1			h	c		p	s	k	c1	k1		e1	b1		a1	s1	f1
160 M	2-8	12	12	45	45	8	8	160	22	320	410	14.5	611	13	726	261	300	250	40	350	18.5	5
160 L	2-8	12	12	45	45	8	8	160	22	320	410	14.5	671	13	786	261	300	250	40	350	18.5	5
180 M,L	2-8	14	14	51.5	51.5	9	9	180	28	355	444	14.5	714	13	828	253	300	250	40	350	18.5	5
200 ML	2-8	16	16	59	59	10	10	200	30	393	494	18.5	773	15	886	296	350	300	40	400	18.5	5
225 SM	2	16	16	59	59	10	10	225	32	443	552	18.5	825	16	940	324	400	350	40	450	18.5	5
	4-8	18	18	64	64	11	11	225	32	443	552	18.5	855	16	1000	354	400	350	40	450	18.5	5
250 SM	2	18	18	64	64	11	11	250	35	497	600	24	885	18	1030	354	500	450	40	550	18.5	5
	4-8	18	18	69	69	11	11	250	35	497	600	24	885	18	1030	354	500	450	40	550	18.5	5

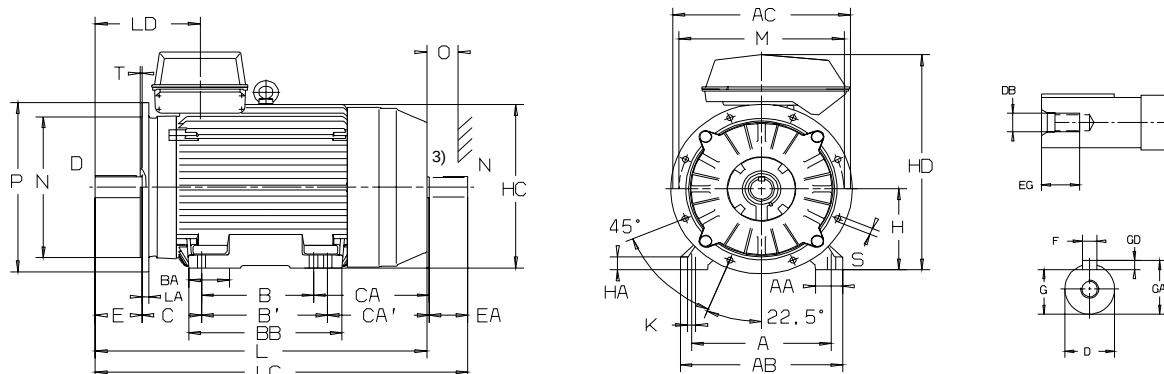
1) Tolerances:
D ISO k6 < Ø 50 mm
ISO m6 > Ø 50 mm
keys acc. to DIN 6885, sheet 1
H ISO 0, -0.5
N ISO j6

2) In the shaft end the motors have a centre hole with protective sinking and thread acc. to DIN 332 sheet 2.
3) Second shaft end on request.
4) Cooling distance

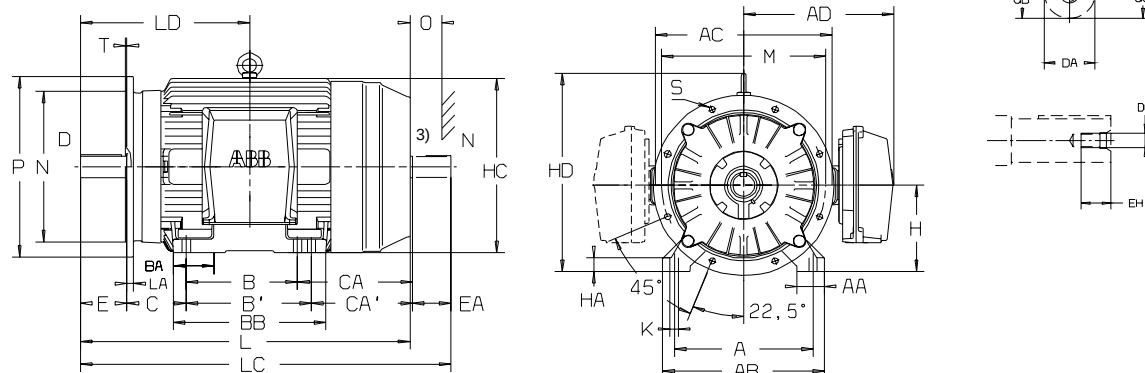
Dimensions: capital letters acc. to IEC 72, small letters acc. to DIN 42673.

Dimensions for terminal boxes page 50, for protection roof page 54.

Terminal box top-mounted



Terminal box side-mounted



Type M2BA	Poles	A	AA	AB	AC	AD	B	B '	BA	BB	C	CA	CA '	D	DA	DB	DC	E	EA	EG	EH	F	FA	G
	²⁾	b	n	f	g		a		m	e	w1	w2		¹⁾ d	¹⁾ d1	d6	d7	l	l1		¹⁾ u	¹⁾ u1		
280 SM	2	457	85	530	572	487	368	419	146	506	190	400	349	65	60	M20	M20	140	140	40	40	18	18	58
	4-12	457	85	530	572	487	368	419	146	506	190	400	349	75	65	M20	M20	140	140	40	40	20	18	67.5
315 SM	2	508	100	590	645	549	406	457	163	556	216	420	369	65	60	M20	M20	140	140	40	40	18	18	58
	4-12	508	100	590	645	549	406	457	163	556	216	420	369	80	75	M20	M20	170	140	40	40	22	20	71
315 ML	2	508	100	590	645	549	457	508	163	607	216	420	369	65	60	M20	M20	140	140	40	40	18	18	58
	4-12	508	100	590	645	549	457	508	163	607	216	420	369	90	75	M24	M20	170	140	48	40	25	20	84

Type M2BA	Poles	GA	GB	GC	GD	GF	H	HA	HC	HD	HD	K	L	LA	LC	LD	LD	M	N	P	S	T	O
	²⁾	t		t1			¹⁾ h	c		top-m.	side-m.	s	k	c1	k1	top-m.	side-m.	e1	¹⁾ b1	a1	s1	f1	⁴⁾
280 SM	2	69	53	64	11	11	280	40	566	745	660	24	1088	22	1238	332	540	500	450	550	18	5	100
	4-12	79.5	58	69	12	11	280	40	566	745	660	24	1088	22	1238	332	540	500	450	550	18	5	100
315 SM	2	69	53	64	11	11	315	50	638	840	732	30	1173	25	1322	351	584	600	550	660	23	6	115
	4-12	85	67.5	79.5	14	12	315	50	638	840	732	30	1203	25	1352	381	614	600	550	660	23	6	115
315 ML	2	69	53	64	11	11	315	50	638	840	732	30	1224	25	1373	351	609	600	550	660	23	6	115
	4-12	95	67.5	79.5	14	12	315	50	638	840	732	30	1254	25	1403	381	639	600	550	660	23	6	115

¹⁾ Tolerances:
D,DA ISO m6
F ISO h9
H ISO 0, -1.0
N ISO j6 (280 SM)
ISO js6 (315)

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

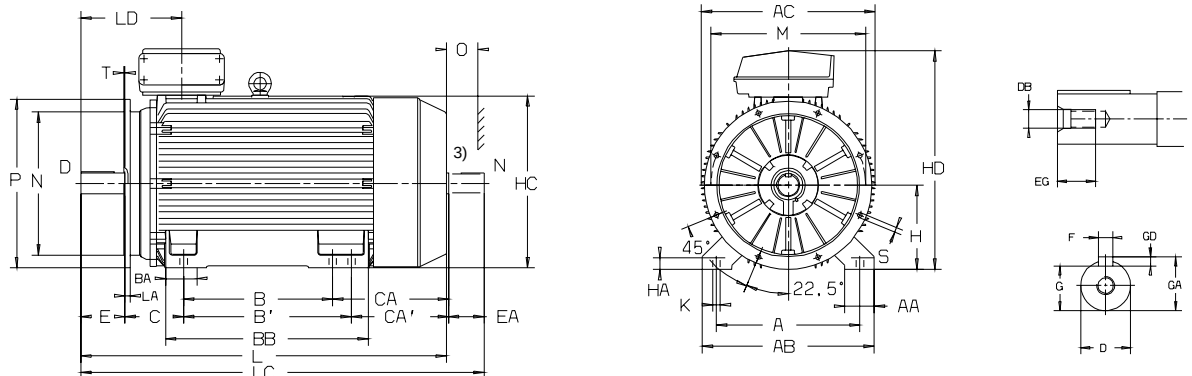
Dimensions: capital letters acc. to IEC 72, small letters acc. to DIN 42673.

Dimensions for terminal boxes page 51, for protection roof page 54.

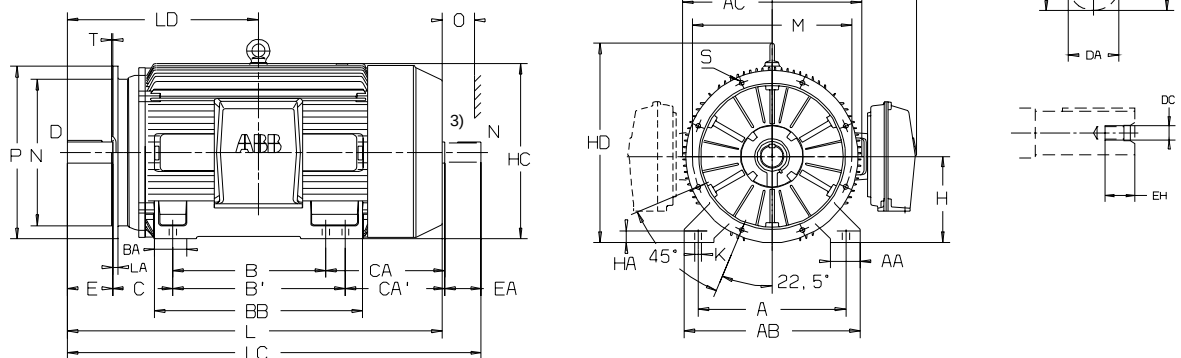
Foot- and flange-mounted
IM B35 (IM2001), IM V15 (IM2011), IM V36 (IM2031)

Cast iron motors

Terminal box top-mounted



Terminal box side-mounted



Type M2BA	Poles	A	AA	AB	AC	AD	B	B'	BA	BB	C	CA	CA'	D	DA	DB	DC	E	EA	EG	EH	F	FA	G
	²⁾	b	n	f	g	a	m	e	w1	w2	d	d1	d6	d7	l	l1	u	u1						
355 S ₁	2	610	120	700	740	627	500	—	161	662	254	460	—	70	70	M20	M20	140	140	40	40	20	20	62.5
	4-12	610	120	700	740	627	500	—	161	662	254	460	—	100	90	M24	M24	210	170	48	48	28	25	90
355 SM ₁	2	610	120	700	740	627	500	560	161	722	254	512	452	70	70	M20	M20	140	140	40	40	20	20	62.5
	4-12	610	120	700	740	627	500	560	161	722	254	512	452	100	90	M24	M24	210	170	48	48	28	25	90
355 ML ₁	2	610	120	700	740	627	560	630	161	792	254	557	487	70	70	M20	M20	140	140	40	40	20	20	62.5
	4-12	610	120	700	740	627	560	630	161	792	254	557	487	100	90	M24	M24	210	170	48	48	28	25	90
400 M ₁	2	686	120	775	746	627	630	—	130	737	280	461	—	70	70	M20	M20	140	140	40	40	20	20	62.5
	4-12	686	120	775	746	627	630	—	130	737	280	461	—	100	90	M24	M24	210	170	48	48	28	25	90
400 LK ₁	2	686	140	820	824	667	710	800	170	967	280	558	468	80	75	M20	M20	170	140	40	40	22	20	71
	4-12	686	140	820	824	667	710	800	170	967	280	558	468	100	90	M24	M24	210	170	48	48	28	25	90

Type M2BA	Poles	GA	GB	GC	GD	GF	H	HA	HC	HD	HD	K	L	LA	LC	LD	LD	M	N	P	S	T	O
	²⁾	t	t1				¹⁾ h	c		top-m. p	side-m. p	s	k	c1	k1	top-m.	side-m.	e1	¹⁾ b1	a1	s1	f1	⁴⁾
355 S ₁	2	74.5	62.5	74.5	12	12	355	55	725	955	838	35	1344	25	1494	397	645	740	680	130	800	236	
	4-12	106	81	95	16	14	355	55	725	955	838	35	1414	25	1594	467	715	740	680	130	800	23	6
355 SM ₁	2	74.5	62.5	74.5	12	12	355	55	725	955	838	35	1396	25	1546	397	670	740	680	130	800	23	6
	4-12	106	81	95	16	14	355	55	725	955	838	35	1466	25	1646	467	740	740	680	130	800	23	6
355 ML ₁	2	74.5	62.5	74.5	12	12	355	55	725	955	838	35	1501	25	1651	397	723	740	680	130	800	23	6
	4-12	106	81	95	16	14	355	55	725	955	838	35	1571	25	1751	467	793	740	680	130	800	23	6
400 M ₁	2	74.5	62.5	74.5	12	12	400	60	773	1005	886	35	1501	25	1651	397	723	740	680	130	800	23	6
	4-12	106	81	95	16	14	400	60	773	1005	886	35	1571	25	1751	467	793	740	680	130	800	23	6
400 LK ₁	2	85	67.5	79.5	14	12	400	55	812	1040	945	35	1708	25	1858	432	795	740	680	150	800	23	6
	4-12	106	81	95	16	14	400	55	812	1040	945	35	1748	25	1928	502	865	740	680	150	800	23	6

¹⁾ Tolerances:
D, DA ISO m6
F ISO h9
H ISO 0, -1.0
N ISO js6

²⁾ Dimensions for 2-pole motors also valid for 2/4- and 2-4 -pole two-speed motors.

³⁾ Second shaft end on request.

⁴⁾ Cooling distance.

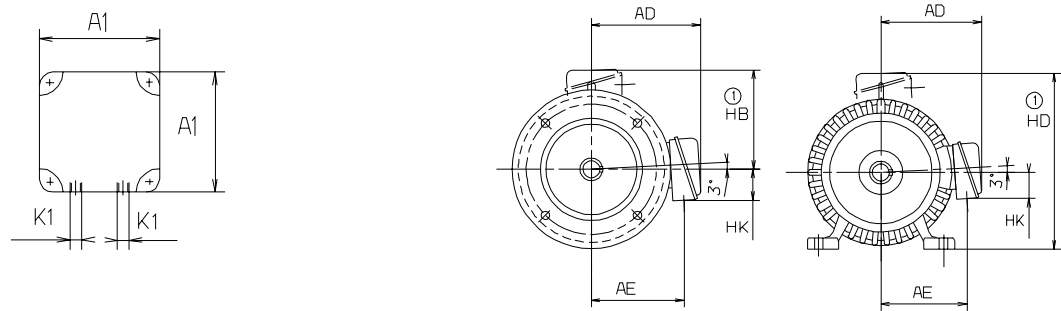
Dimensions: capital letters acc. to IEC 72, small letters acc. to DIN 42673.

Dimensions for terminal boxes page 51, for protection roof page 54.

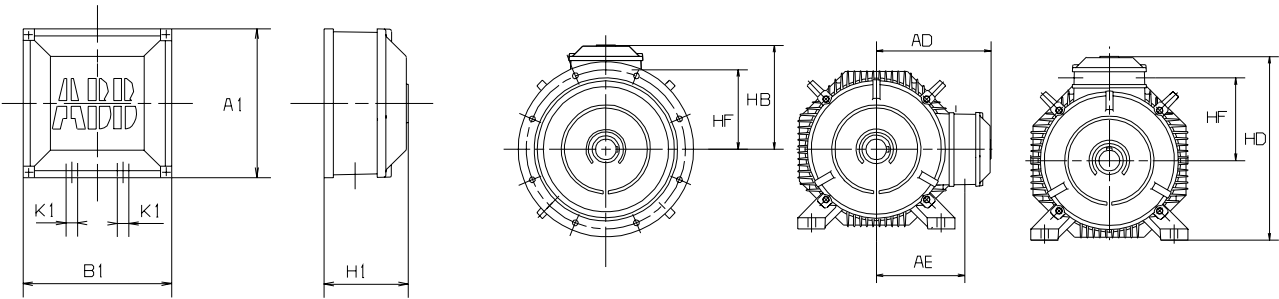
Terminal box in standard design
with 6 terminals

Cast iron motors

Motor sizes QU 71 to 132:



Motor sizes M2BA 160 to 250:



Motor size	Poles	Terminal box dimensions			Motor dimensions							Thread K1
		A1	B1	H1	AD	AE	HB	HD	HF	HK side-m.	HK top-m.	
71 ¹⁾	2-6	120	110		—	—	115	190	—	—	59	2xPg11
80	2-6	120	110		145	110	137	220	—	54	59	2xPg16
90	2-6	120	110		150	117	145	235	—	53	59	2xPg16
100	2-6	135	120		175	134	166	270	—	65	72	2xPg21
112	2-6	135	120		180	140	176	290	—	65	72	2xPg21
132	2-6	135	120		200	160	196	330	—	65	72	2xPg21
160	2-8	192	192	104	250	185	250	410	185	—		2xPg29
180	2-8	192	192	104	264	199	264	444	199	—		2xPg29
200	2-8	240	240	118	294	218	294	494	218	—		2xPg36
225	2-8	276	276	129	327	247	327	552	247	—		2xPg36
250	2-8	276	276	129	350	270	350	600	270	—		2xPg42

¹⁾ QU 71 only with top-mounted terminal box.

Terminal box in standard design with 6 terminals

Cast iron motors

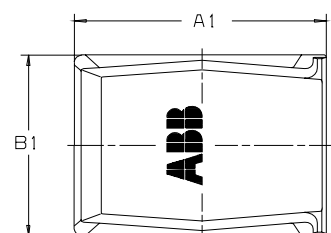
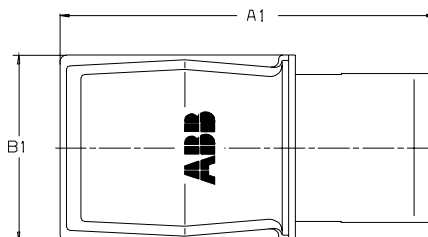
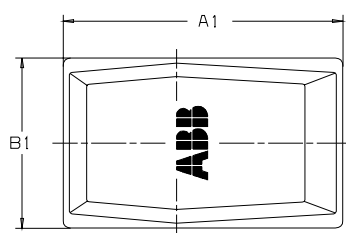
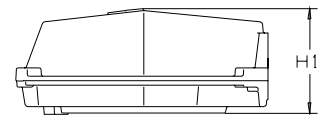
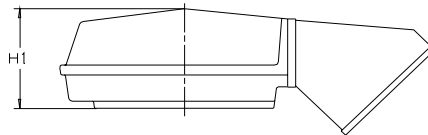
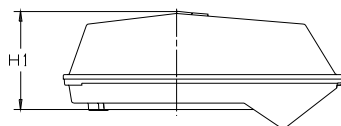
Top-mounted terminal box:

122/2
142/1, 142/2

162/1, 162/2 +
adaptor MPMM-ZL1

Side-mounted terminal box:

122/7
142/5, 142/10
162/5, 162/8



Terminal box type	Motor size	A1	B1	H1
Top-mounted terminal box:				
122/2	280	455	280	177
142/1, 142/2	315 - 400M	536	349	197
162/1, 162/2 + Adapter MPMM-ZL1	355 - 400	787	410	226
Side-mounted terminal box:				
122/7	280	383	280	180
142/5, 142/10	315 - 400M	426	347	201
162/5, 162/8	355 - 400	508	412	226

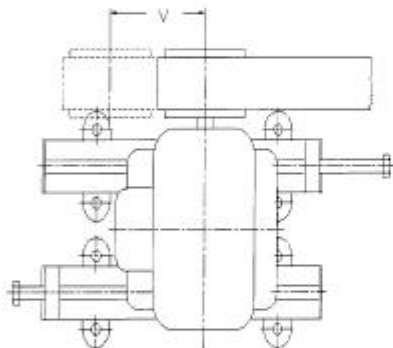
Further details on terminal boxes on pages 4-8.

For motor dimensions please see dimension drawings on earlier pages.

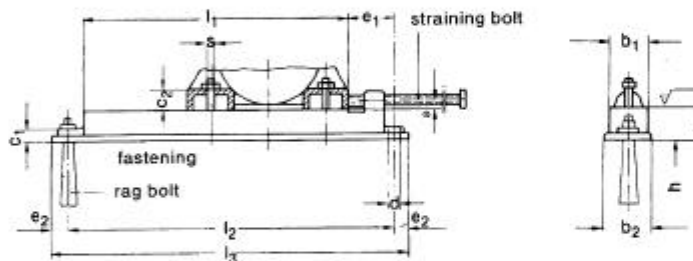
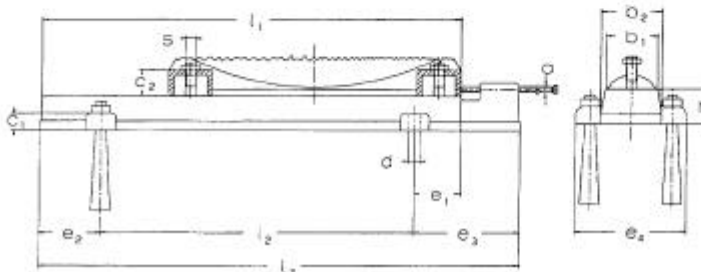
Slide rails acc. to DIN 42923

Cast iron motors

Dimensions in mm



Slide and supporting surfaces machined; complete with straining and fastening bolts.

Fig. 1 - For sliding length $l_1 = 265$ to 500 mmFig. 2 - For sliding length $l_1 = 630$ to 800 mm

Sliding length l_1	Associated motor frame size	Displacement v min.	Weight per set ca kg
265	80	70	3.5
	90	55	
315	80	115	5.0
	90	100	
355	100	105	6.5
400	112	120	8.5
	132	90	
500	160	130	15.5
	180	90	
630	200	230	28
	225	180	
800	250	290	40

Designation of a slide rail having a sliding length of $l_1 = 500$ mm, complete with straining and fastening bolts:

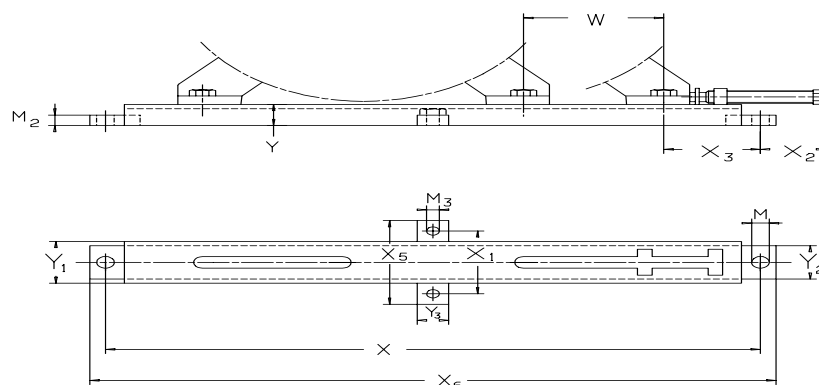
Slide rails 500 DIN 42 923 GMN 408 553 RS

Sliding length l_1	a	b_1	b_2	c_1 max	d	e_1	e_2	e_3	e_4	h	l_2	l_3	Bending moment min. Mb N mm	Motor fastening bolt thread s	Straining	Used rag bolt		Assoc. Motor size	Product- nummer GSA	
													max. c_2	acc. to DIN 561 Type	acc. to DIN 529 St. Typ					
265 315	6 8	40 45	50 55	18 18	10 12	45 55	15 20	- -	- -	35 35	325 390	355 430	80 000 100 000	M8 M8	20 20	BM 10x120 BM 12x160	2 2	M 8x100Mu M10x100Mu	80-90 80-90	9408 553 R1000 9408 553 R2000
355 400	8 8	50 55	65 70	23 25	12 15	55 65	20 25	- -	- -	40 45	430 480	470 530	200 000 400 000	M10 M10	22 30	BM 12x160 BM 12x160	2 2	M10x100Mu M12x125Mu	100 112-132	9408 553 R3000 9408 553 R4000
500 630	12 12	70 85	85 100	30 35	19 19	80 80	30 80	- 160	- 130	55 65	610 470	670 710	700 000 1 000 000	M12 M16	35 50	BM 20x240 BM 20x240	2 4	M16x160Mu M16x160Mu	160-180 200-225	9408 553 R5000 9408 553 R6000
800	16	100	120	35	28	100	100	200	165	75	600	900	2 500 000	M20	55	BM 24x300	4	M24x250Mu	250	9408 553 R7000

Slide rail material: GG-20 (gray cast iron) to DIN 1691.
Anchoring bolts and nuts are not supplied by us.

If the total displacement v is resorted to in case of slide rails 630 or 800, a transition piece (e.g. of hardwood) is to be inserted between motor and straining bolt.

Slide rails

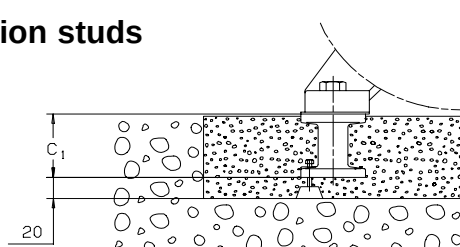


Type	Motor size	M	M ₂	M ₃	W _{max}	X	X ₁	X ₂ max	X ₃ min	X ₅	X ₆	Y	Y ₁	Y ₂	Y ₃	Weight/ rail kg
ZHKJ 50	280	28	25	20	135	850	150	125	135	200	900	50	100	80	50	14.5
ZHKJ 63	315	28	25	20	220	1040	150	125	150	200	1090	50	100	80	50	17.5
ZHKJ 71 ¹⁾	355	33	30	20	275	1260	190	145	185	240	1320	60	140	120	50	31
ZHKJ 71 ¹⁾	400	33	30	20	180	1260	190	140	200	240	1320	60	140	120	50	31

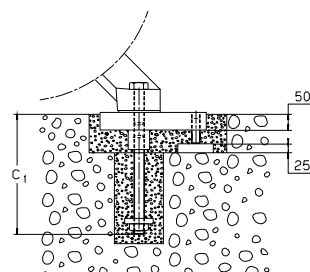
¹⁾ When mounting on a ceiling or on a wall please contact the manufacturer.

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 tightening down, be supported in a suitable manner.

Foundation studs



ZBYH 161...241



ZBHE 301

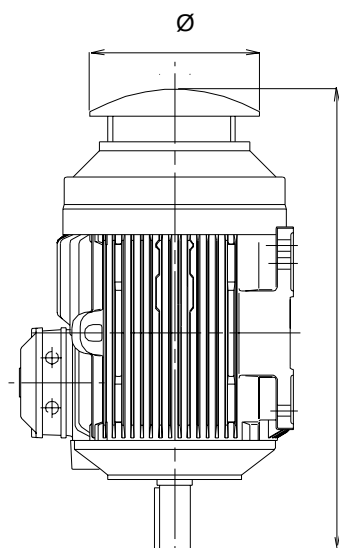
Foundation stud type	Fixing screw	Motor size	Main dimensions		C1	D1	E1	Weight kg
			A1	B1				
ZBYH 161	M16 x 60/60 Y	200, 225	65	65	70	M16	35	1.8
ZBYH 201	M20 x 70/70 Y	250, 280	100	100	95	M20	35	3.4
ZBYH 241	M24 x 90/90 Y	315, 355	130	130	135	M24	45	7
ZBHE 301	M30 x 100/100 Y	400	300	200	385	M30	65	30

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

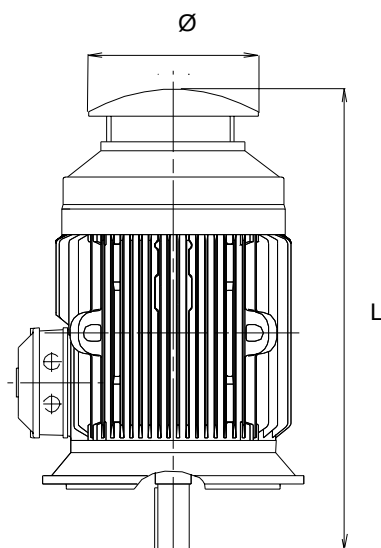
Protective roof, variant code 005

Cast iron motors

Motor size 71 to 250

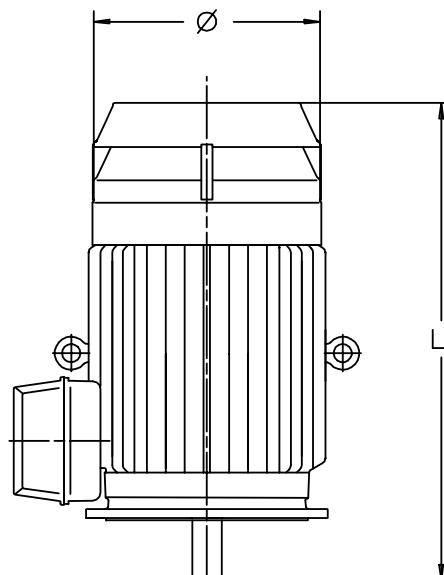


Mounting arrangement
IM V15 with
protective roof



Mounting arrangement
IM V1 (IM V18) with
protective roof

Motor size 280 to 400



Motor size	Poles	Ø	L	Motor size	Poles	Ø	L
71 M	2-6	140	275	280 SM_	2 4-12	555 555	1190 1190
80 M	2-6	155	320	315 SM_	2 4-12	624 624	1290 1320
90 S	2-6	175	345	315 ML_	2 4-12	624 624	1341 1371
90 L	2-6	175	370	355 S_	2 4-12	720 720	1476 1546
100 L	2-6	195	410	355 SM_	2 4-12	720 720	1528 1598
112 M	2-6	220	425	355 ML_	2 4-12	720 720	1633 1703
132 S	2-6	260	490	400 L_	2 4-12	810 810	1860 1900
132 M	2-6	260	530				
160 M	2-8	310	683				
160 L	2-8	310	743				
180 M,L	2-8	310	783				
200 ML_	2-8	310	845				
225 SM_	2 4-8	310 310	898 928				
250 SM_	2-8	310	958				

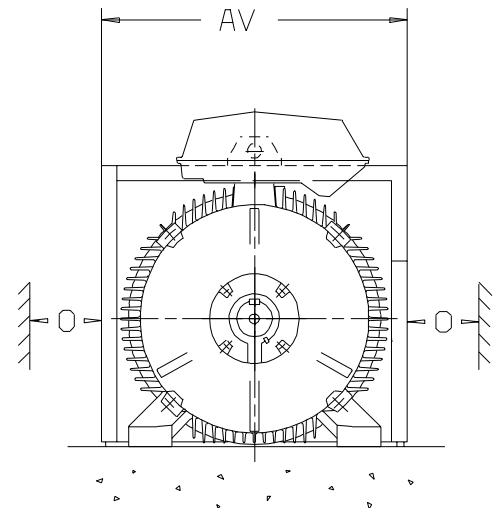
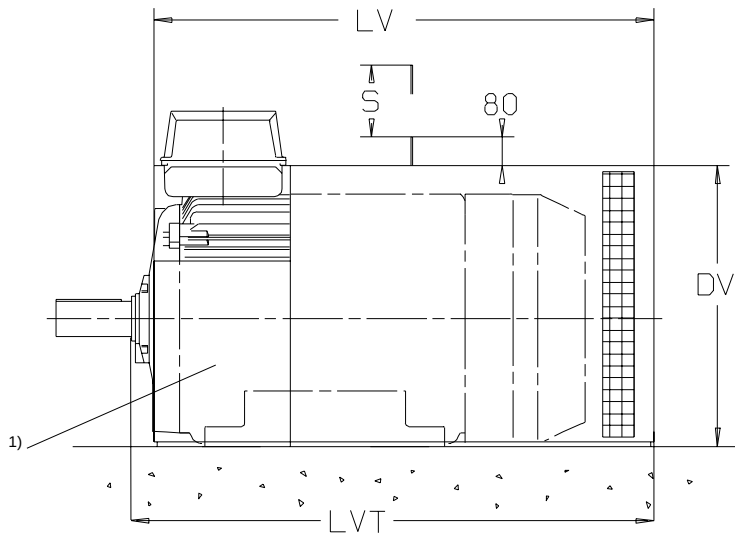
Silencer

Cast iron motors

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 for foot-mounted motors

Silencers for flange-mounted motors on request.



Motor size	AV	LV	LVT	DV	O ²⁾	S ³⁾	Weight kg
280 SM_	676	987	1090	618	50	745	40
315 SM_	749	1066	1190	690	60	840	60
315 ML_	749	1143	1241	690	60	840	66
355 S_	844	1242	1376	777	65	955	70
355 SM_	844	1294	1428	777	65	955	73
355 ML_	844	1399	1533	777	65	955	75
400 M_	869	1399	1533	825	65	1005	80
400 LK_	928	1574	1730	864	75	1040	100

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.

²⁾ Clearance for motor cooling.

³⁾ Clearance for removal of silencer.

Note: Dimensions of silencers for smaller frame sizes on request.

Cast iron motors in brief, basic design

Motor size		71	80	90	100	112	132	160	180
Stator	Material	Cast iron GG 20/GRS 200							
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G, RAL 5014							
	Paint thickness	Two-pack PUR-paint, thickness ≥ 60 μm						Two-pack epoxy paint,thickness ≥ 70μm	
Bearing end shields	Material	Cast iron GG 15/GRS 150							
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G, RAL 5014							
	Paint thickness	Two-pack PUR-paint, thickness ≥ 60 μm						Two-pack epoxy paint,thickn. ≥ 70μm	
Bearings	D-end = N-end	6202 2RS C3	6204 2RS C3	6205 2RS C3	6206 2RS C3	6207 2RS C3	6208 2RS C3	6309 Z/C3	6310- Z/C3
Axially-locked bearings	Inner bearing cover	On request						As standard, locked at D-end	
Bearing seal		2RS-integral seals						Axial seal as standard, radial seal on request	
Lubrication		Greased for life. Regreasing nipples optional in sizes 160 to 180							
SPM-nipples		—						Optional	
Rating plate	Material	Stainless steel 0.80 Cr 18 Ni9						Stainless steel, SS-EN 10088, 0.5mm	
Terminal box	Frame material Cover material Cover screws material	Cast iron GG 15/GRS 150 Cast iron GG 15/GRS 150 Steel 5G, coated with zinc and yellow cromated							
Connections	Cable entries	2xPg11	2xPg16	2xPg16	2xPg21	2xPg21	2xPg21	2xPg29	2xPg29
	Terminals	6 terminals for connection with cable lugs (not included)							
Fan	Material	Reinforced glass fiber							
Fan cover	Material Paint colour shade	Steel Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G, RAL 5014							
	Paint thickness	Two-pack PUR-paint, thickness ≥ 60 μm						Two-pack epoxy polyester paint, thickness ≥ 50 μm	
Stator winding	Material Insulation	Copper Insulation class F							
	Winding protection	On request							
Rotor winding	Material	Pressure die-cast aluminium							
Balancing method		Half key balancing as standard							
Key ways		Open key way						Closed key-way	
Heating elements	On request	25 W	25 W	25 W	25 W	25 W	25 W	25 W	25 W
Drain holes		Optional							
Enclosure		IP 55, higher protection on request							
Cooling method		IC 411							

Cast iron motors in brief, basic design

Motor size		200	225	250	280	315	355	400
Stator	Material	Cast iron GG 15/GRS 150			Cast iron GG 20/GRS 200			
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G, RAL 5014						
	Paint thickness	Two-pack epoxy paint, thickness ≥ 70 µm						
Bearing end shields	Material	Cast iron GG 15/GRS 150			Cast iron GG 20/GRS 200, except flange-mounted sizes 355-400 Spheroidal graphit GGG40/GRP400			
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G, RAL 5014						
	Paint thickness	Two-pack epoxy paint, thickness ≥ 70 µm						
Bearings	D-end 2-pole 4-12 -pole	6312-Z/C3	6313-Z/C3	6315-Z/C3	6316-C4 6316-C3	6316-C4 6319-C3	6319M/C4 6322-C3	6319M/C4 6322-C3
	N-end 2-pole 4-12 -pole	6312-Z/C3	6313-Z/C3	6315-Z/C3	6316-C4 6316-C3	6316-C4 6316-C3	6319M/C4 6319-C3	6319M/C4 6319-C3
Axially-locked bearings	Inner bearing cover	As standard, locked at D-end						
Bearing seals		Axial seal as standard, radial seal on request			V-ring as standard, radial seal on request			
Lubrication		Greased for life or regreasable bearings			Regreasable bearings, regreasing nipples, M10x1			
SPM-nipples		Optional					As standard	
Rating plate	Material	Stainless steel, SS-EN 10088, thickness 0.5 mm			Acid proof stainless steel AISI 316 thickness 0.6 mm			
Terminal box	Frame material Cover material Cover screws material	Cast iron GG 15/GRS 150 Cast iron GG 15/GRS 150 Steel 5G, coated with zinc and yellow cromated						
Connections	Cable-entries 2-, 4-pole 6-pole	2xPg36	2xPg36	2xPg42	2xPg42 2xPg36	2xPg48 2xPg42	2xØ60/80 2xØ60	2xØ80 2xØ60/80
	Terminals	6 terminals for connection with cable lugs (not included)						
Fan	Material	Reinforced glass fiber			Reinforced glass fiber, aluminium or polypropylene with metal hub			
Fan cover	Material	Steel						
	Paint colour shade	Blue, Munsell 8B 4.5/3.25 / NCS 4822 B05G, RAL 5014						
	Paint thickness	Two-pack epoxypolyesterpaint, thickness ≥ 50 µm			Two-pack epoxypolyesterpaint, thickness ≥ 80 µm			
Stator winding	Material	Copper						
	Insulation	Insulation class F						
	Winding protection	3 pcs thermistors as standard						
Rotor winding	Material	Pressure die-cast aluminium			Pressure die-cast aluminium or copper			
Balancing method		Half key balancing as standard						
Key way		Closed key way			Open key way			
Heating elements	On request	25 W	50 W	50 W	50 W	2x50 W	2x65 W	2x65 W
Drain holes		Optional			As standard, open on delivery			
Enclosure		IP 55, higher protection on request						
Cooling method		IC 411						

ABB Motors product range

Motor type/application	IEC frame sizes	Output
Three-phase motors, IP 55	56 - 400	0.18 - 710 kW
Ex nA motors	63 - 400	0.18 - 630 kW
EEx e motors	63 - 400	0.18 - 390 kW
EEx d/EEx de motors	80 - 400	0.55 - 630 kW
Marine motors	63 - 400	0.18 - 630 kW
IP 23 S open drip proof motors	250 - 400	75 - 800 kW
Single-phase motors	63 - 100	0.15 - 2.2 kW
Brake motors	71 - 400	0.25 - 710 kW
Integral motors	80 - 132	0.75 - 7.5 kW

Basic alternatives

- aluminium, steel and cast iron frames available
- LV motors up to 1000 V
- standard versions of all types kept in stock
- larger LV and HV motors can also be supplied
- motors according to NEMA-standard

Special types/alternatives

- special variable speed AC drives
- high speed motor, over 3000 r/min
- motor adjusted with a holding brake
- traction motors
- generators for wind mills
- roller tables and mines
- water cooled motors
- slip-ring motors
- motors with vertical hollow shaft
- smoke venting design
- stator/rotor units

Catalogues and brochures for these motors are available from:

ABB Motors
Business Area Marketing Communications
P.O.Box 633
FIN-65101 Vaasa
tel. +358 10 22 4000
fax +358 10 22 43575
www.abb.com/motors

Energy efficient, totally enclosed squirrel cage three phase motor

Type M2CA 280 M, 90 kW, IP 55, IC 411 1484 r/min, weight 630 kg

Terminal box

The spacious terminal box makes the motor quick and easy to connect. The terminal box can be rotated so that cables can be connected from the right or the left.

Bearing seal, D-end

Axial seal on the shaft protects the drive-end bearing from dirt and moisture. The inner bearing cover has a felt seal. Degree of protection according to class IP 56 is available as a modification.

Bearings

All motors have as standard high quality ball bearings.

Insulation

High-grade insulation and generous electrical dimensioning give the motor a high overload capacity.

Rotor winding

Aluminium rotor winding, pressure die-cast in the rotor slots.

Lubrication

Motor sizes 71 to 250 are fitted as standard with permanently greased bearing. Motor sizes 280 to 400 have regreasing nipples.

Bearing seal, N-end

A V-ring on the shaft or a labyrinth seal protects the bearing at the non-drive end from dirt and moisture. The inner bearing cover has a felt seal.

Energy saving

Generous electrical dimensioning gives the motor high efficiency.

Low noise level

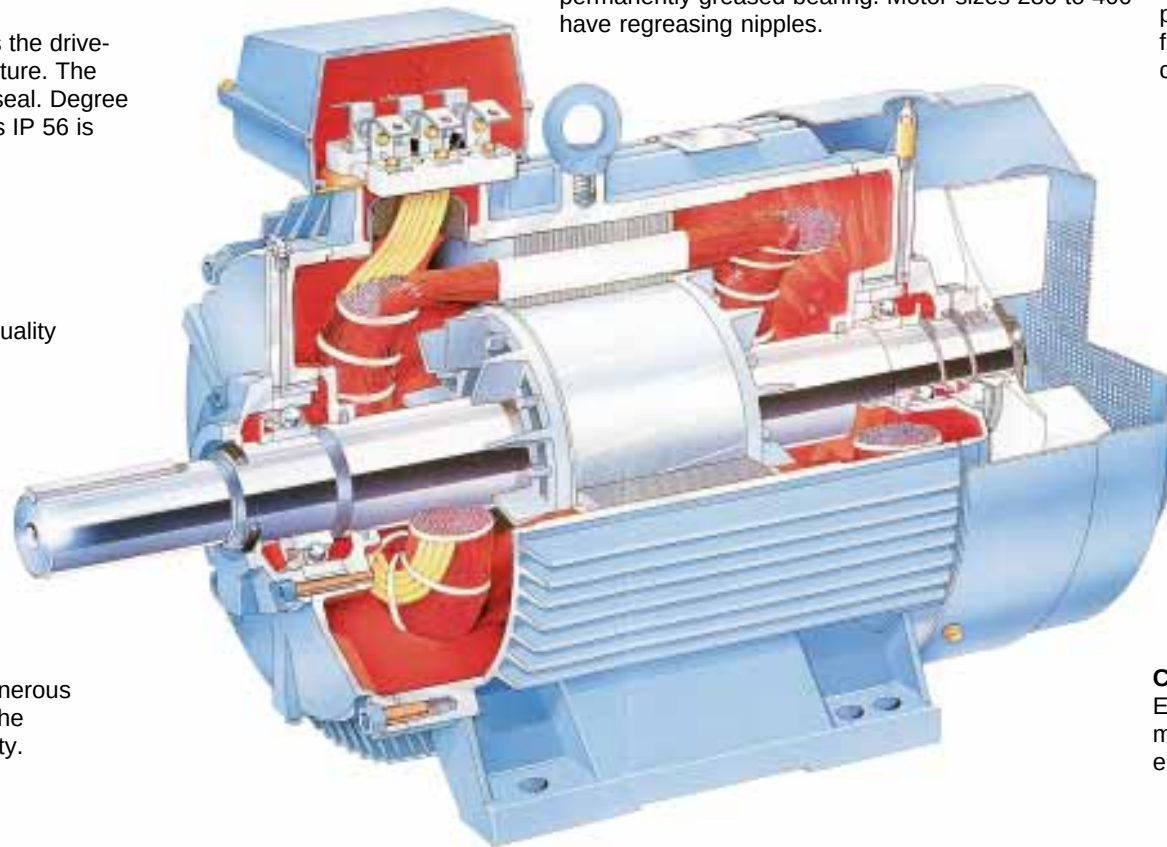
The high efficiency of the motor means that a smaller, quieter fan can be used.

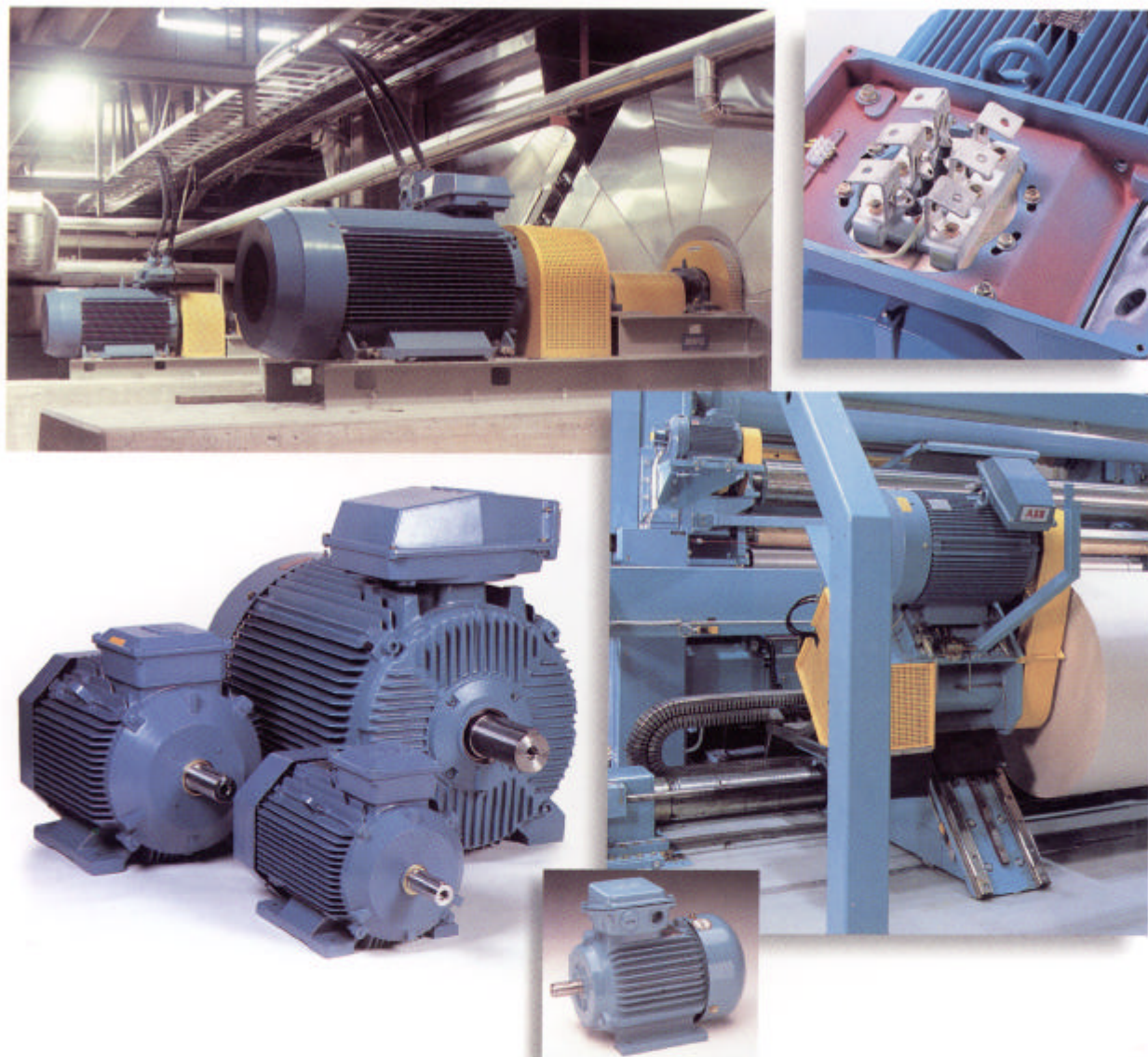
Corrosion protection

Effective, robust corrosion protection means that the motor can be used in all environments.

Stator frame

The stator is made of cast iron, including feet, bearing housing and terminal box. This makes the motor mechanically very strong and robust. Integrally cast feet allow a very rigid mounting and minimal vibration.





Cast Iron Motors

This product catalogue contains electrical and mechanical data on the cast iron motor range available from ABB Motors. It can be used in conjunction with the catalogue BA/Basic Motor Technology GB which contains basic technical information about standard motors.

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Catalogue BA/M2BA GB 98-09