

Low-Voltage Motors

SIEMENS

Low-Voltage Motors

Catalogue M 11

2002/2003



Supersedes:
Catalogue M 11 · 2000

The products in this catalogue
are also included in the
CD-ROM catalogue CA 01
Order No.:
E86060-D4001-A100-B8

Contact your local Siemens representative
for further information

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*The products and sys-
tems described in this
catalogue are manu-
factured under applica-
tion of a quality manage-
ment system certified
by DQS in accordance
with DIN EN ISO 9001
(Certificate Registration
No. 000357 QM).
The DQS Certificate is
recognized in all EQ
Net countries.*

Introduction

Technical information

1LA and 1LG squirrel-cage motors

1MA squirrel-cage motors

Increased safety
EEx e II degree of protection

1MJ squirrel-cage motors

Flameproof enclosure
EEx de IIC degree of protection

Squirrel-cage motors

Sector solutions

Dimensions

Accessories and spare parts

Appendix

SIEMENS

Squirrel-cage motors

Introduction

Technology that demonstrates expertise

Whatever it is that you want to drive, motors from Siemens are sure to suit your drive system concept!

And should you ever experience a drive problem, whether small or large, we will work out the optimal solution with you.

The advantages of our motors:

- Optimum drive solutions for almost every sector
- Internationally recognized market leading technology
- The simple, rugged construction of the components guarantees an extremely long service life
- Certified quality "DIN EN ISO 9001"
- Worldwide operation thanks to compliance with national (DIN/VDE) and international standards (IEC/EN)
- Development and production with materials in accordance with the Siemens standard SN 36 350 for environmentally compatible products
- Environmentally friendly production technology
- Highly qualified engineering advice – locally – thanks to our global sales network
- Worldwide service
- High-speed logistics system
- 50,000 standard motors always in stock



Squirrel-cage motors

Introduction

**Low-voltage motors,
surface air cooled, IP 55 degree of protection**

■ The "modular installation concept" with rotary pulse encoder, separately driven fan and brake makes special designs superfluous. This mounting technology makes the 1LA standard motors, quick, easy and economical to use in any application. The "modular installation concept" reduces costs for installation, commissioning and stock keeping (for further details, see "Modular technology" in Section 2 "Technical information").

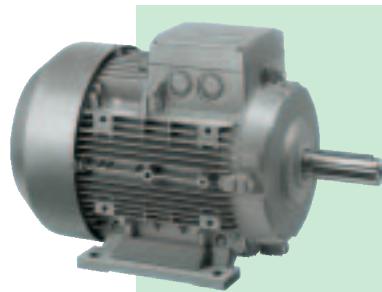


Basic version

Energy-saving motors
eff1, eff2, EPACT
pole-change

For converter-fed
operation

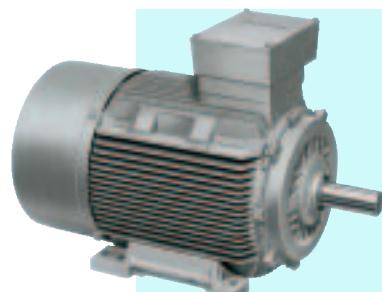
[1LA and 1LG, see Section 3](#)



Increased safety

EEx e II degree of
protection

[1MA see Section 4](#)



Flameproof enclosure

EEx de IIC degree of
protection

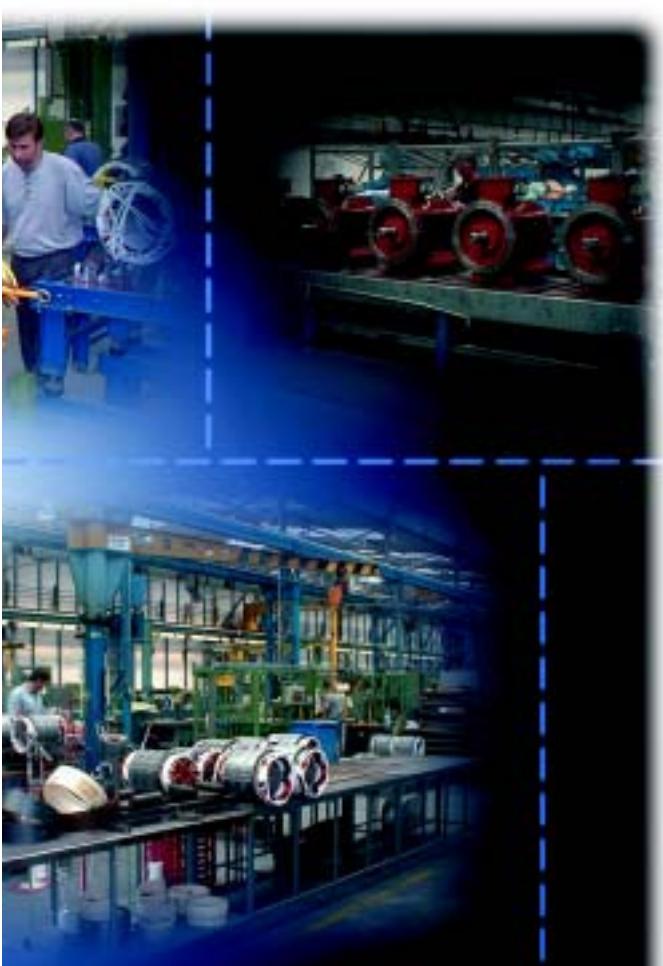
[1MJ see Section 5](#)

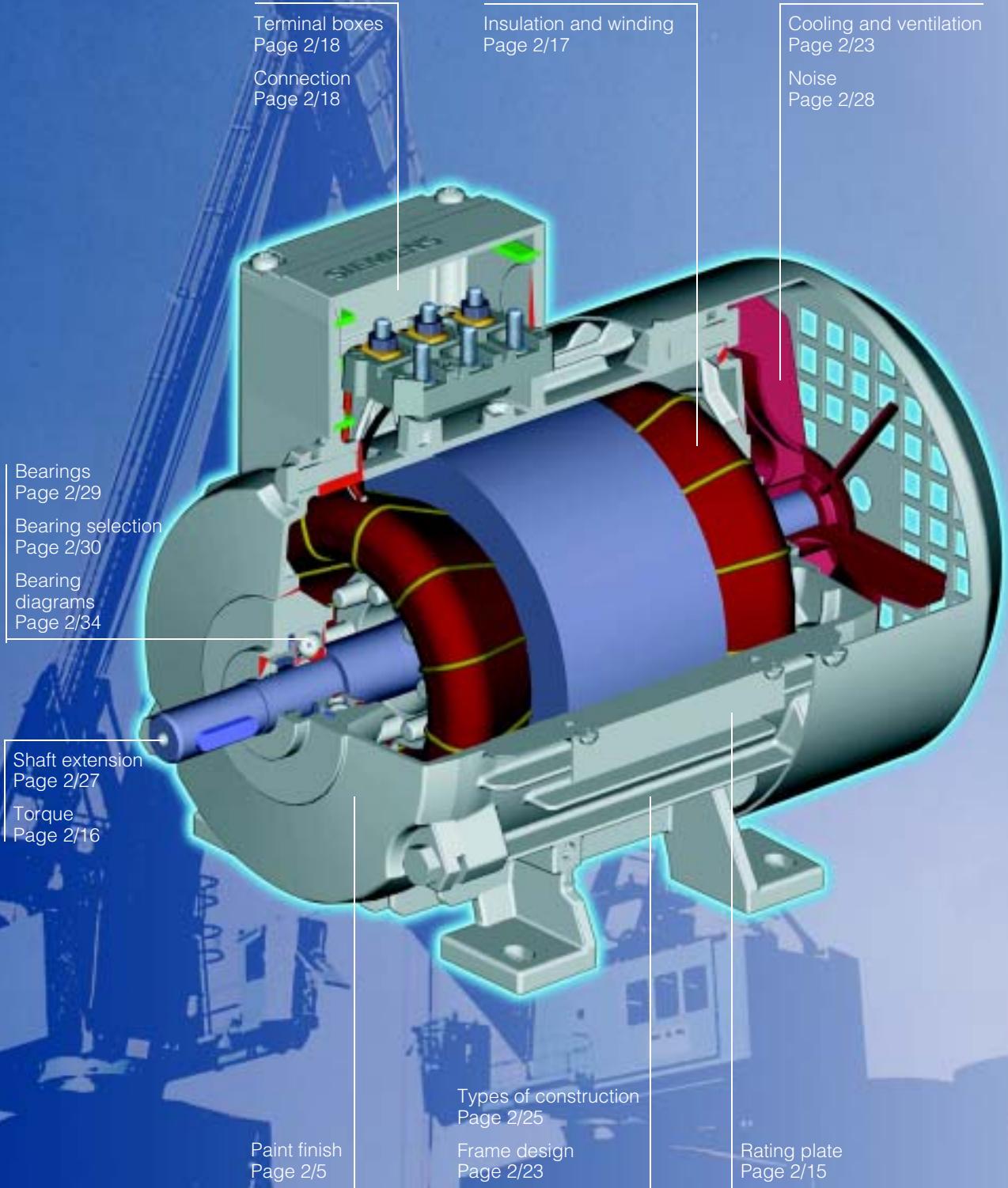


Sector solutions

Combustion gas motors, marine motors

[See Section 6](#)





Squirrel-cage motors

Technical information

2



2/2	General information
2/5	Order number
2/6	Paint finish and packaging
2/6	Project planning aids
2/7	Standards, specifications and tolerances
2/7	Applicable standards and specifications
2/7	National standards
2/7	Electrical tolerances
2/8	Energy-saving motors with European efficiency classification in accordance with EU/CEMEP
2/8	Motors for the U.S. market
2/9	Design and certification of explosion-proof motors in accordance with directive 94/9/EC (ATEX)
2/9	VIK design
2/10	Electrical design
2/13	Voltages, currents, and frequencies
2/16	Rated outputs and rating plates
2/17	Efficiency, power factor, and rated torque
2/18	Insulation, winding, motor protection, and standstill heating
2/18	Connection, switching, and terminal boxes
2/23	Mechanical design
2/23	Frame design
2/23	Degrees of protection
2/23	Cooling and ventilation
2/23	Coupling to gearboxes
2/24	Eyebolts
2/24	Speed and direction of rotation
2/25	Types of construction
2/27	Shaft extensions
2/27	Balance and vibration severity
2/28	Noise (direct on-line operation)
2/29	Bearings
2/36	Maximum cantilever forces
2/40	Maximum axial load
2/44	Converter-fed operation
2/44	Motor temperature detection
2/44	Insulation
2/44	Connection of the motors
2/44	Ventilation/ noise
2/44	Mechanical stress, grease life
2/44	Bearings
2/45	Mechanical limit speeds
2/46	Distributed drive systems
2/46	MICROMASTER® 411/COMBIMASTER® 411
2/47	ECOFAST®
2/47	MICROSTARTER
2/48	Modular technology
2/49	Pulse generator
2/50	Separately driven fan
2/56	Brakes
2/56	Dimensions and weight
2/58	Further mountings for 1LA/1LG motors

Squirrel-cage motors

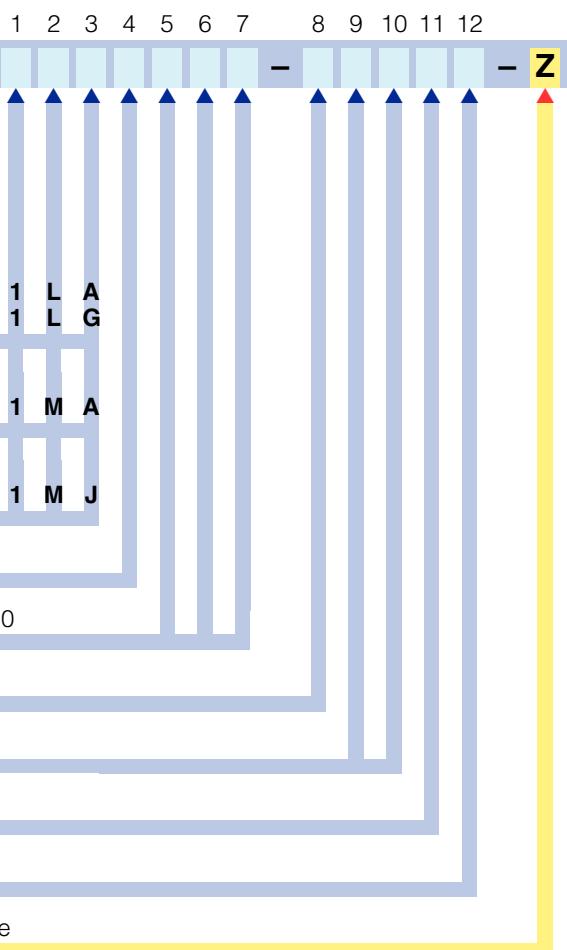
Technical information

Structure of order no.

Order number

1st to 3rd position (number, letter, letter)

Squirrel-cage motors Single-speed, pole-changing,
Totally enclosed, fan-cooled Aluminium and design
IP 55 degree of protection Improved efficiency eff2
 High efficiency eff1
 increased power rating, converter-fed
 operation



Ordering example

Three-phase AC motor IP 55

4-pole, 50 Hz, 45 kW,
 230 V Δ /400 V Y ,
 Type of construction IM V 5
 with
 canopy
 Special designs:
 ■ 3 PTC thermistors
 ■ Separately mounted fan

Order No.	1LA5223–4AA..
Voltage identifier	– 1
Design identifier	– 9
Special designs	–Z
■ Type of construction IM V 5 with canopy	M1F
■ 3 PTC thermistors	A11
■ Separately mounted fan	G17
In order, specify:	1LA5223–4AA19–Z M1F + A11 + G17

Order No.

Overview of "Special designs"

The Order Codes for the individual motors can be found in the "Selection and ordering data"

Order code	Special designs	For details see Page
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Windings and motor protection;

A10	Motor protection with PTC thermistors for converter-fed operation with three embedded temperature sensors for alarm in zones	2/17, 2/44
A11	Motor protection with PTC thermistors with three embedded temperature sensors for tripping	2/17, 2/18, 2/47
A12	Motor protection with PTC thermistors with six embedded temperature sensors for alarm and tripping	2/17
A15	Motor protection with PTC thermistors for converter-fed operation with three embedded temperature sensors for tripping	2/17
A16	Motor protection with PTC thermistors for converter-fed operation with six embedded temperature sensors for alarm and tripping	2/17
A23	Motor temperature detection with embedded temperature sensor KTY 84-130	2/44
A25	Motor temperature detection with embedded temperature sensors 2 x KTY 84-130	2/44
C11	Used as class F (up to CT 40 °C) with service factor	2/17, 2/44
C12	Used as class F (up to CT 40 °C) with increased power rating	2/17, 2/44
C13	Used as class F with increased coolant temperature	2/17, 2/44
Y52	Used as class F – other requirements	2/17

Paint finish

K23	Unpainted (only cast iron parts primed)	2/5
K24	Unpainted, only primed	2/5
K26	Special paintwork in RAL 7030 stone gray	2/5
K27	Special paintwork in RAL 6011 mignonette green	2/5
K28	Special paintwork in RAL 7031 bluish gray	2/5
L42	Special paintwork in RAL 7032 pebble gray	2/5
L43	Special paintwork in RAL 9005 jet black	2/5
M16	Special paintwork in RAL 1002 sand yellow	2/5
M17	Special paintwork in RAL 1013 pearl white	2/5
M18	Special paintwork in RAL 3000 flame red	2/5
M19	Special paintwork in RAL 6021 pale green	2/5
M20	Special paintwork in RAL 7001 silver gray	2/5
M21	Special paintwork in RAL 7035 light gray	2/5
M22	Special paintwork in RAL 9001 cream	2/5
M23	Special paintwork in RAL 9002 gray white	2/5
Y54	Special paintwork in other colors: RAL	2/5
Y53	Normal paint finish in other colors: RAL	2/5

Design for zones in accordance with ATEX

M34	Version for Zone 21 for mains-fed operation	2/9
M35	Version for Zone 22 for mains-fed operation	2/9
M38	Version for Zone 21 for converter-fed operation	2/9
M39	Version for Zone 22 for converter-fed operation	2/9
M72	Version for Zone 2 for mains-fed operation EEx nA II T3 acc. to EN 50 021, Ex nA II T3 acc. to IEC 60 079-15	2/9
M73	Version for Zone 2 for converter-fed operation EEx nA II T3 acc. to EN 50 021, Ex nA II T3 acc. to IEC 60 079-15	2/9

Order code	Special designs	For details see Page
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Distributed drive systems

G55	ECOFAST motor plug Han-Drive 10e for 230 VD/ 400 VY	2/46
H90	MICROSTARTER – direct on-line starter with DC 24 V control, metric M25 cable entries	2/47
H91	MICROSTARTER – direct on-line starter with DC 24 V control, with HAN Q8 plug connectors	2/47
H92	MICROSTARTER – direct on-line starter with AS-Interface connection, with metric M25 cable entries	2/47
H93	MICROSTARTER – direct on-line starter with AS-Interface connection, with HAN Q8 plug connectors (ECOFAST)	2/47
H94	MICROSTARTER – reversing starter with AS-Interface connection, with metric M25 cable entries	2/47
H95	MICROSTARTER – reversing starter with AS-Interface connection, with HAN Q8 plug connector (ECOFAST)	2/47

Shipping version – "Operation deck"

E11	Certified according to GL (German Lloyd) Germany, CT 45 °C, temperature class F used as F	6/2, 6/3
E21	Certified according to LRS (Lloyds Register of Shipping), Great Britain, CT 45 °C, temperature class F used as F	6/2, 6/3
E31	Certified according to BV (Bureau Veritas), France CT 45°C, temperature class F used as F	6/2, 6/3
E51	Certified according to DNV (Det Norske Veritas), Norway, CT 45°C, temperature class F used as F	6/2, 6/3

Modular technology

C00	Brake supply voltage 24 V DC	2/50, 2/54
C01	Brake supply voltage 400 V AC, 50 Hz	2/50, 2/54
G17	Mounting of separately driven fan	from 2/44, from 2/56
G26	Mounting of brake	from 2/50
H57	Mounting of 1XP8 001-1 (HTL) pulse generator	from 2/47, from 2/56
H58	Mounting of 1XP8 001-2 (TTL) pulse generator	2/47, 2/48, from 2/56
H61	Mounting of separately driven fan and 1XP8 001-1 pulse generator	from 2/47, from 2/56
H62	Mounting of brake and 1XP8 001-1 pulse generator	2/48, 2/51, from 2/56
H63	Mounting of brake and separately driven fan	2/49, 2/51, from 2/56
H64	Mounting of brake, separately driven fan, and 1XP8 001-1 pulse generator	2/48, from 2/56
K82	Manual brake release with lever	2/50, 2/51, 2/54

Further mountings

H70	Mounting of LL861 900 220 pulse generator	from 2/56
H71	Preparation and mounting for LL861 900 220 pulse generator to be provided	from 2/57
H72	Mounting for HOG 9 D 1024 I pulse generator	from 2/56
H73	Mounting for HOG 10 D 1024 I pulse generator	from 2/56
H74	Preparation and mounting for HOG 9 pulse generator to be provided	2/57, 2/59
H75	Preparation and mounting for HOG 10 pulse generator to be provided	2/57, 2/59
H78	Prepared for mounting for LL861 900 220 pulse generator	2/58
H79	Prepared for mounting HOG 9 D 1024 I pulse generator	2/59
H80	Prepared for mounting HOG 10 D 1024 I pulse generator	2/59

Squirrel-cage motors

Technical information

General information

2

Order No. (continued)

Overview of "Special designs" (continued)

The Order Codes for the individual motors can be found in the "Selection and ordering data"

Order code	Special designs	For details see Page	Order code	Special designs	For details see Page
H15	Prepared for mounting the MMI	2/44, 2/46	K38	Low-noise design for 2-pole motors with anticlockwise direction of rotation	2/9, 2/28
Converter installation					
D02	Coolant temperature – 50 °C to 40 °C	2/14, 2/15	K40	Regreasing device	from 2/29, 2/47
D03	Coolant temperature – 40 °C to 40 °C	2/14, 2/15	K45	Anti-condensation heater for 230 V	2/17
D04	Coolant temperature – 30 °C to 40 °C	2/14, 2/15	K46	Anti-condensation heater for 115 V	2/17
D30	Electrical in accordance with NEMA MG1-12	2/8, 2/47	K83	Rotation of terminal box by 90°, inserted from non-drive end	2/18 – 2/22
D31	Design according to UL with "Recognition Mark"	2/8, 2/47	K84	Rotation of terminal box by 90°, inserted from drive end	2/18 – 2/22
D40	Canadian regulations (CSA)	2/8, 2/47	K85	Rotation of terminal box by 180°	2/18 – 2/22
K01	Vibrational severity grade R	2/27, 2/47	K94	Locating bearing drive end	2/29 – 2/35, 2/47
K06	Two-part plate on terminal box	2/20	L04	Locating bearing non-drive end	2/29 – 2/35, 2/47
K09	Terminal box on RHS (view onto drive end)	2/24	L13	External earthing	2/18, 2/47
K10	Terminal box on LHS (view onto drive end)	2/19, 2/24	L27	Insulated bearing cartridge	2/44
K11	Terminal box on top, feet screwed on	2/24	L36	Sheet metal fan cover	–
K16	Second standard shaft-end	from 2/25, 2/47	L99	Wire-lattice pallet	2/5, 2/47
K17	Drive-end seal for flange-mounting motors	2/23, 2/47	M44	Earth brushes for converter-fed operation	–
K20	Bearings for increased cantilever forces	2/29, 2/31, from 2/37, 2/47	M46	Bolt-type screw terminal for cable connection, accessories pack (3 units)	–
K30	VIK design	2/9, 2/47	M47	Saddle terminals for connection without cable lug	–
K31	Extra rating plate and/or with additional data	2/15, 2/47	Y82	Extra rating plate	2/15, 2/47
K32	With two additional lifting rings for IM V 1 / IM V 3	2/25			
K36	Special bearing for drive end and non-drive end, bearing size 63	2/29 – 2/37	B00	Without S&C note. Customer's declaration of renouncement required	–
K37	Low-noise design for 2-pole motors with clockwise direction of rotation	2/9, 2/28	B01	Complete with one set of safety and commissioning notes per wire-lattice pallet	–
			B02	Factory test certificate 2.3 acc. to EN 10 204	6/3

Paint finish and packaging

Paint finish

Design	Suitability of paint finish for climate group in accordance with DIN IEC 60 721, Part 2 – 1		
Standard finish	Moderate (extended) for indoors and outdoors	Short per.: up to 120 °C Contin.: up to 100 °C	
Special finish	Worldwide (global) for outdoors Suitable for use in the tropics for 60% relative humidity at 40 °C	Short per.: up to 140 °C Contin.: up to 120 °C Also: For aggressive atmospheres up to 1 % acid and alkali concentration or permanent dampness in sheltered rooms	

■ The 1LA5, 1LA6, 1LA7, 1LA9 and 1MA7 as well as the 1MA6-/1MJ6 motors up to frame size 200 L are supplied with the special paint finish as standard.

All motors can be painted over with commercially available paints.

When no color is specified, all motors are painted in the color RAL 7030.

Packing weights and dimensions

Packing weights

For motors		for land transport			Type of construction IM B 5, IM V 1		
Size	Type	Size IM B 3	in cartons	on battens	in crates	in cartons	on battens
			tare	tare	tare	tare	tare
			kg	kg	kg	kg	kg
56 M	.... 050/053	0.65	–	–	0.65	–	–
63 M	.... 060/063	0.65	–	–	0.65	–	–
71 M	.... 070 073	0.65	–	–	0.65	–	–
80 M	.... 080 083	0.65	–	–	0.65	–	–
90 S	.... 090	0.65	–	–	0.65	–	–
90 L	.... 096/097	—	—	—	—	—	—
100 L	.... 106/107	1.3	–	–	1.3	–	–
112 M	.... 113	1.5	–	–	1.5	–	–
132 S	.... 130/131	4.7	–	–	5.2	–	–
132 M	.... 133/134	—	—	—	—	—	—
160 M	.... 163/164	4.8	–	–	5.7	–	–
160 L	.... 166	—	—	—	—	—	—
180 M	.... 183	13.0	–	–	13.4	–	–
180 L	.... 186	—	—	—	—	—	—
200 L	.... 206/207	13.5	–	–	13.5	–	–
225 S	.... 220	13.7	7	20	13.7	10	20
225 M	.... 223	—	—	—	—	—	—
250 M	.... 253	—	20	36	—	20	40
280 S	.... 280	—	20	36	—	20	40
280 M	.... 283	—	—	—	—	—	—
315 S	.... 310	—	20	38	—	20	45
315 M	.... 313	—	—	—	—	—	—
315 L	.... 316/317/318	—	22	40	—	22	—

Values for type 1MJ1/1MJ8 motors on request.

Packing weights and dimensions for 1LA8 and 1MA8 motors

For motors		Packing weights			
Size	Type	Land transport on battens		Sea transport in wooden cases	
		Type IM B 3	Type IM V 1	Type IM B 3	Type IM V 1
		tare	tare	tare	tare
		kg	kg	kg	kg
315	.... 315/317	30	55	270	310
355	.... 353/355/357	40	65	320	365
400	.... 403/405/407	45	75	390	445
450	.... 453/455/457	50	85	450	510
Maximum motor dimensions		Allowances for maximum motor dimensions (packing dimensions = motor dimensions + allowance)			
		Land transport on battens			
		Type IM B 3	Type IM V 1	Type IM B 3	Type IM V 1
		approx.	approx.	approx.	approx.
		mm	mm	mm	mm
Length		+250	+250	+250	+250
Width		+200	+300	+200	+200
Height		+200	+250	+500	+500

Squirrel-cage motors

Technical information

General information

2

Project planning aids

Electronic catalogue SD 01 (incl. SD configurator)



More than 100,000 products with approx. 5 mill. possible product variants from the drives technology sector are contained on one CD – the interactive catalogue **SD 01**. It contains low-voltage drives with fixed and variable speeds for all applications.

Energy-saving program

This energy-saving program has been developed so that the energy-saving potential can be utilized simply, quickly, and practically. The tool offers versatile user interfaces for calculating the individual energy-savings for Siemens energy-saving motors of the highest eff1 efficiency class. With this extraordinary tool it is even possible to plan entire plants with eff1 energy-saving motors for purposes of comparison.

The individual fields of application are as follows:

Case 1

Calculation of the energy-savings as well as the amortization time for the additional cost of the Siemens eff1 energy-saving motor as compared with the Siemens eff2 energy-saving motor.

In this case, the motor data for the Siemens energy-saving motors as well as their order numbers have already been stored. In addition, you are told how long it will take until the additional cost for an energy-saving motor will pay for itself.

Useful Internet links

Converters:

www.siemens.de/micromaster

Distributed drive technology:

www.siemens.de/combimaster

Geared motors:

www.siemens.de/gearedmotors

To make the selection of the suitable motor and/or converter from the diverse A&D SD range easier, the **SD configurator** has been developed which is integrated into the catalogue as a "selection aid".

The **SD configurator** makes it easier to find the right drive solution. In addition to the correct order number, it also supplies the corresponding documentation.

It can be used to display operating instructions, factory test certificates, and terminal box documents etc. as well as to generate data sheets, dimension drawings, and start-up calculations for the corresponding products.

It is also easy to assign a suitable converter to the selected motor.

The extensive help function does not only explain the program functions, but also contains extensive technical background material.

SD 01 Product range:

Low-voltage motors (energy-saving motors, explosion-proof motors) with corresponding documentations and dimension drawings, low-voltage converters of the MICRO-MASTER 4 product series and much more.

The SD 01 CD-ROM can be found in the inside cover of this catalogue.

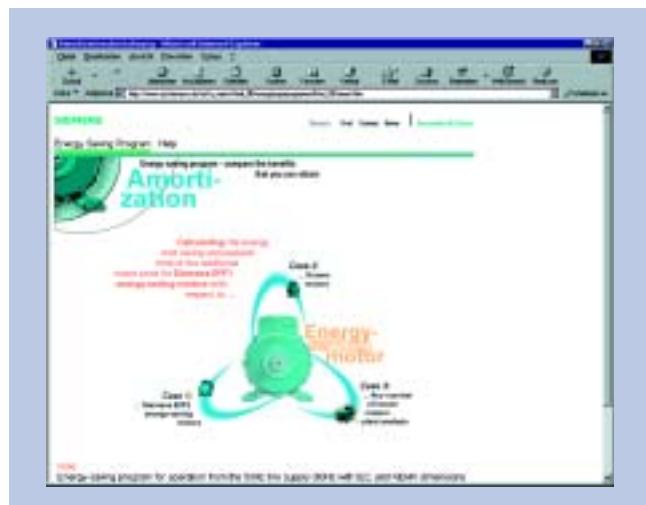
Additional copies can be obtained from the respective Siemens sales representative or ordered on the Internet under

www.siemens.de/automation/sd01

Under this address you can also find links to tips, tricks, and downloads for functional updates and documentation.

Order number for the SD 01 01/2003 English:

E86060-D5201-A100-A3-7600



Internet: www.siemens.de/energiesparprogramm

Order number of the CD-ROM 04/2002 German/English:
E80001-D40-P220-X-7400

Helpful products

ECOFAST:

www.siemens.de/ecofast

Helpful tools

Newsletter:

my.ad.siemens.de/myAnD/

Technical documentation for the following products

Motors:

www1.ad.siemens.de/sd_n_motor/html_00/bes00.htm

Standards, specifications, and tolerances

Applicable standards and specifications

The motors comply with various standards and regulations, especially with those in the table opposite.

Title	IEC	DIN/EN
General regulations for rotating electrical machines	IEC 60 034-1, IEC 60 085	DIN EN 60 034-1
AC induction motors for general use with standardized dimensions and power	IEC 60 072 only fixing dimensions	DIN EN 50 347
Restart characteristics, rotating electrical machines	IEC 60 034-12	DIN EN 60 034-12
Terminal markings and direction of rotation, rotating electrical machines	IEC 60 034-8	DIN EN 60 034-8
Designation for type of construction, installation and terminal box position	IEC 60 034-7	DIN EN 60 034-7
Entry to terminal box	–	DIN 42 925
Built-in thermal protection	IEC 60 034-11	–
Noise limits for rotating electrical machines	IEC 60 034-9	DIN EN 60 034-9
IEC standard voltages	IEC 60 038	DIN IEC 60 038
Cooling methods for rotating electrical machines	IEC 60 034-6	DIN EN 60 034-6
Mechanical vibrations, rotating electrical machines	IEC 60 034-14	DIN EN 60 034-14
Degrees of protection for rotating electrical machines	IEC 60 034-5	DIN EN 60 034-5
In addition, the following applies to EEx motors:		
General regulations	IEC 60 079-0	DIN EN 50 014
Explosion-proof enclosure "d"	IEC 60 079-1	DIN EN 50 018
Increased safety "e"	IEC 60 079-7	DIN EN 50 019
Type of protection "n" (non-sparking)	IEC 60 079-15	DIN EN 50 021

National standards

The motors comply with the applicable IEC or European standards listed above.

The European standards replace the national standards in the following European member states: Germany (VDE), France (NF C), Belgium (NBNC), Great Britain (BS), Italy (CEI), Netherlands (NEN), Sweden (SS), Switzerland (SEV) etc.

The motors also comply with various national standards. The following standards have been harmonized with IEC publication 60 034-1 or replaced by DIN EN 60 034-1, so that the motors can be operated at normal rated outputs.

For explosion-proof motors:

Since these motors comply with the European standards EN 50 014, EN 50 018, EN 50 019, and the 94/9/EC (ATEX) standard, all member states of the EU recognize the test certificates issued by the authorized test centers (PTB, DMT, etc.). The remaining members of the CENELEC also accept the certificates including Switzerland and the Czech Republic.

AS 1359	Australia (higher rated output assignment than stated in DIN EN 50347 for frame size 250 M or larger)
CSA C22.2, No. 100	Canada
IS 325 IS 4722	India
NEK – IEC 60 034-1	Norway

Electrical tolerances

The following tolerances are permitted according to DIN EN 60 034:

Motors which comply with DIN EN 60034-1 must have a voltage tolerance of $\pm 5\%$ / frequency tolerance $\pm 2\%$ (Design A).

The tolerance of $\pm 5\%$ according to DIN EN 60034-1 also applies to the rated voltage range. If utilized, the permitted limit temperature of the temperature class may be exceeded by 10 K

Efficiency at
 $P_N \leq 50 \text{ kW}$ – $0.15 \cdot (1 - \eta)$
 $P_N > 50 \text{ kW}$ – $0.1 \cdot (1 - \eta)$

with η being a decimal number.

$$\text{Power factor } -\frac{1-\cos\varphi}{6}$$

- Minimum absolute value: 0.02
- Maximum absolute value: 0.07

Slip $\pm 20\%^1)$

Locked-rotor current $+20\%$

Locked-rotor torque $-15\% \text{ to } +25\%$

Breakdown torque -10%

Moment of inertia $\pm 10\%$

For type 1MA motors:

Add 10 % to the certified values for the locked-rotor current.

1) For motors $< 1 \text{ kW}$ $\pm 30\%$ is permitted.

Squirrel-cage motors

Technical information

Standards, specifications, and tolerances

2

Energy-saving motors with European efficiency classification in accordance with EU/CEMEP¹⁾

Two and fourpole low-voltage motors in the power range of 1.1 to 90 kW are marked with the efficiency class (Improved Efficiency) or (High Efficiency)

in accordance with the EU/CEMEP agreement (EFF1) (EFF2)

So that the requirements of the efficiency classes (EFF1) and (EFF2) are fulfilled, the active parts of the motor have been optimized. The procedure for calculating

the efficiency is based on the loss-summation method according to IEC 60034-2.

Motors for the U.S. market

For motors which comply with U.S. regulations (NEMA, CSA, UL, etc.) it must always be checked whether the motors will be used in the U.S. or Canada and whether they are subject to state laws.

Minimum efficiencies required by law

In 1997, an act was passed in the USA to define minimum efficiencies for low-voltage three-phase motors (EPACT)²⁾. In Canada there is an act which is largely identical, although it is based on different verification methods. The efficiency of these motors is verified for the USA using IEEE 112, test method B, and for Canada using CSA-C390. Apart from a few exceptions, all low-voltage three-phase motors exported to the U.S. or Canada must comply with legal requirements on efficiency.

The act requires minimum efficiencies for 2, 4, and 6-pole motors with a voltage of 230 and 460V / 60 Hz in the power range of 1 to 200 HP (0.75 to 160 kW). Explosion-proof motors must also be included. 1LA9 and 1LG6 are also available in the design for zones 2, 21, and 22. According to EPACT, the following are excluded from the efficiency requirements, for example:

- Motors whose frame size output assignment does not correspond with the standard series according to NEMA MG1-12.
- Flange-mounting motors
- Asynchronous brake motors
- Converter-fed motors
- Motors with design letter C and higher

Further information on EPACT:
www.eren.doe.gov/

Particulars of the U.S. Energy Policy Act

The act lays down that the nominal efficiency at full load and a CC number (Compliance Certification) must be included on the rating plate. The CC number is issued by the U.S. Department of Energy (DOE). The following information is stamped on the rating plate of EPACT motors which must be marked by law: Nominal efficiency, design letter, code letter, CONT, CC no. CC 032A (Siemens) and NEMA MG1-12.

Special requirements for Canada: CSA – Energy Efficiency Verification

These motors fulfill the efficiency requirements laid down by the CSA standard C390. These motors are available as 1LA9 or 1LG6 and can be ordered with order code D40 and also include the CSA-E energy verification mark.



NEMA – Order Code D30

The motors with increased efficiency according to EPACT are designed to meet the NEMA MG1-12 electrical standard, and are marked accordingly. The mechanical design of all motors is compliant only to IEC, not to NEMA dimensions. For all motors, designs A, B, C, and D (torque characteristic according to NEMA or restart current limitation) means a special design for designs B, C, and D is necessary (on request). According to NEC-ANSI-C1,

all 1LA/1LG motors that match Division 2 can be implemented according to Division 2, Class I and II, Group A, B, and D. All other 1LA/1LG motors must be ordered with order code D30. Data on the rating plate: Rated voltage (voltage tolerance of ±10%), nominal efficiency, design letter, code letter, CONT and NEMA MG1-12.

UL Approval – Order Code D31

The motors based on the basic series 1LA/1LG are listed for up to 600 V by Underwriters Laboratories Inc. ("Recognition Mark" = R/C). The motors must be ordered with the code D31, voltage code "9" and the code for voltage and frequency³⁾. The "UL Recognition Mark" is included on the rating plate of the motor.



In addition, the motor is designed to meet the NEMA MG1-12 electrical standard. The following data is included on the rating plate: Rated voltage (voltage tolerance of ±10%), nominal efficiency, design letter, code letter, CONT, and NEMA MG1-12.

Required built-on or built-in components such as

Motor protection	A11
Heating element	K45, K46
Forced ventilation	G17
Brake	G26
Encoder	H57/H58, H70
Power connector	L44 to L49
Plug connector	G55
MICROSTARTER	H90 to H95

are listed by UL-R/C, CSA-C, and the US, or used by manufacturers in accordance with regulations. It may have to be decided whether the motor is suitable for the application.

The motors can be operated with a frequency converter – separate converter or built-on (1UA./H15) – at 50/60 Hz. Deviating frequency settings must be tested at final acceptance.

CSA Approval – Order Code D40

The motors based on the basic series 1LA/1LG are approved for up to 690 V in accordance with the Canadian regulations of the Canadian Standard Association (CSA). Built-on or built-in components which are used are listed by CSA or are used by the manufacturers in accordance with regulations. It may have to be decided whether the motor is suitable for the application.

The motors must be ordered with the code D40, voltage code "9" and the code for voltage and frequency. The CSA sign and the rated current (voltage tolerance of ±10%) are included on the rating plate.



When efficiency motors (1LA9, 1LG6) are ordered, they also include the CSA-E energy verification mark on the rating plate.



1) CEMEP = European Committee of Manufacturers of Electrical Machines and Power Electronics.

2) Energy Policy Act

3) According to UL, motor voltages up to 600 V are certified. For this reason, voltage code "6", for example, is omitted (400 VΔ/690 VY/50 Hz or 460 VΔ/60 Hz). Voltages 400 VΔ and 460 VΔ must be ordered as follows:

Voltage	Voltage code
400 VΔ /50 Hz or 460 VΔ /60 Hz (50 Hz rating)	9 with L1U
460 VΔ /60 Hz (50 Hz rating)	9 with L2T
460 VΔ /60 Hz (60 Hz rating)	9 with L2F

Standards, specifications, and tolerances

Design and certification of explosion-proof motors in accordance with directive 94/9/EC (ATEX)

Use of 1LA/1LG motors in hazardous areas (type of protection "n")¹⁾

(Zone 2) according to
EN 50021/IEC 60079-15

M72 System operation

M73 Converter-fed operation

The 1LA/1LG motors are suitable for use in hazardous areas of Zone 2 for temperature rises T1 to T3. The maximum surface temperature during service must be less than the temperature limit for the particular temperature rise.

The ventilation system must comply with DIN EN 50 014.

Use in accordance with class F on request.

The motors are fitted with an external earthing terminal.

The design of the terminal box is similar to EExe.

Vertical mounted motors with the shaft extension pointing downwards must be provided with a canopy.

Motors designed for type of protection "n" (Zone 2; Category 3 according to ATEX) bear a declaration of EC conformity which the manufacturer issues at his own discretion.

Ambient temperature -20 °C to +40 °C. Deviating temperatures on request.

The rating plate or the supplementary rating plate is stamped with:

(Ex) II 3G
EEx nA II T3 acc. to
EN 50021
Ex nA II T3 acc. to
IEC 60079-15.

The rating plates of the motors are not marked with a rated voltage range.

Converter-fed operation:

The standard requires that the motor and converter are tested as a unit. A request is therefore necessary.

When ordering 1LA8 motors it is necessary to specify in the E line whether a constant torque or pump and fan drive is required.

The 1LA and 1LG motors are fitted with PTC thermistor detectors. 1LG4 and 1LG6 motors are fitted with an additional PTC thermistor in the terminal box. For some motors, the speed limit must be reduced and metal fans used.

Zone 21 to IEC 61 241, EN 50 281 (ATEX)

M34 System operation

M38 Converter-fed operation

Zone 22 to IEC 61 241, EN 50 281 (ATEX)

M35 System operation

M39 Converter-fed operation

The 1LA/1LG motors are suitable for use in areas with danger of dust explosions if various precautions are taken. Surface temperatures may not exceed 125 °C during normal operation. The motor version for conducting dust, degree of protection IP 65, is designed for Zone 21; for non-conductive dust, degree of protection IP 55, for Zone 22.

The motors are fitted with an external earthing terminal and with an external metal fan.

The design of the terminal box for Zone 21 is similar to EExe.

Certificates:

- EC type test certificate (ATEX), issued by the DMT (Deutsche Montan- Technologie) test centre for Zone 21.
- Declaration of EC conformity for Zone 22.

Marking on the rating plate:

Zone 21: II 2D T125 °C

Zone 22: II 3D T125 °C

Pole-changing versions cannot be used for motors in Zones 2, 21, and 22.

Type of protection EEx de IIC explosion-proof enclosure "d"¹⁾

- All 1MJ motors are certified for the EEx de IIC type of protection.

1MJ6, size 71 M to 200 L, 1MJ1 and 1MJ8 with EC type test certificate according to directive 94/9/EC (ATEX)

1MJ6, size 225 M to 315 L with previous declaration of conformity (changeover to ATEX in February 2003)

The frames are designed to withstand internal explosion. An igniting flame to the outside is impossible. The frame temperature is less than the ignition temperature of the gases for temperature class T4.

Temperature class T6 on request.

- The PTB certificate of conformity, which is valid up to temperature class T4, covers the following deviations:

different coolant temperature (-20 °C to +60 °C), site altitude, frequency and rated duty type, pole-changing motors, fitting of temperature sensors and converter-fed operation with fitting of temperature sensors, design with explosion-proof terminal box, insulated bearing on non-drive end. Please inquire.

Markings on the rating plate:
 II 2G EEx de IIC or
 II 2G EEx d II C

EEx e II type of protection Increased safety "e"¹⁾

- The 1MA motors are certified for the EEx e II type of protection for temperature classes T1 to T3 and have an EC type test certificate in accordance with directive 94/9/EC (ATEX). Higher temperature classes are available to order.

With the exception of 2-pole motors with frame size 225 M or larger, all motors are standard designs i.e. the motors are suitable for T1/T2 or T3 and can be operated with the corresponding rated output. A new or supplementary certificate may be needed for non-standard designs (different frequency, output, coolant temperature, site altitude etc.) (please inquire). It is essential for the temperature class to be specified because if not, the standard design for T1/T2 and T3 will be certified (double certification fee).

Markings on the rating plate:
 II 2G EEx e

VIK design motors with external mountings (brake, pulse generator, separately driven fan, and standstill heating) do not comply with Zone 2 according to VDE 0165.

VIK design motors with metric screwed glands as cable entries are included in the scope of supply.

VIK design – Order code K30

Motors up to frame size 355 can be supplied in accordance with the "Technical Requirements" of VIK (Verband der Industriellen Energie- und Kraftwirtschaft).

Not possible for 1LA5 motors, 1LG4 motors are delivered. A low-noise design is additionally required for all 2-pole 1LG4, 1MJ6, and 1MA6 motors, frame sizes 315 S to 315 L, as well as for all 2-pole 1MJ8/1MJ motors

(Order Code **K37** or **K38**). 1LG4, 1LG6, and 1MJ6 motors are supplied with a special terminal box with a removable cable entry plate.

Take account of the rated-output assignment and the dimensions of 1LA8 motors. The terminal box of 1LA8 357 motors

(2 and 4-pole) cannot be rotated by 4 x 90°.

Vertically mounted motors with shaft extension pointing downwards must be provided with a canopy (type of construction code e.g. 9 (M1F), 4). Use as class B is specified. Frame sizes 400 and 450 are not available with the VIK design.

Converter-fed operation on request.

1) Ex-design motors (except for Zone 22) include certified metric glands in the scope of supply.

Squirrel-cage motors

Technical information

2

Electrical features

Voltages, currents, and frequencies

Standard voltages

EN 60034-1 differentiates between Category A (combination of voltage deviation $\pm 5\%$ and frequency deviation $\pm 2\%$) and Category B (combination of voltage deviation $\pm 10\%$ and frequency deviation $+3\%/-5\%$) for voltage and frequency fluctuations.

The motors can supply their rated torque in both Category A and Category B. In Category A, the temperature rise is approx. 10 K higher than during normal operation. According to the standard, longer operation is not recommended for Category B.

See page 2/15 for details of the rating plate inscriptions and examples. The selection and ordering data state the rated current at 400 V. DIN IEC 60 038 specifies a tolerance of $\pm 10\%$ for system voltages of 230 V, 400 V, and 690 V.

The rating plates of motors with voltage code 1 or 6 also include a rated current range in addition to the rated voltage (see table). The rated currents at 380 V and 420 V are listed in the table on page 2/12 and on the rating plate.

The tolerance laid down by DIN EN 60 034-1 applies to all converter-fed 1LA8 motors as well as to 1LA5, 1LA7, and 1LG6 motors with special 690 V insulation i.e. no rated voltage range is specified on the rating plate. For 1MA8 motors and 1LA and 1LG motors, type of protection "n" (Zone 2), no rated voltage range is specified either.

The maximum current is specified in the rated voltage range.

1MA motors:

For non-standard frequencies the t_E output values may differ from those stated in the selection tables; in this case, a new or supplementary certificate is needed. For Δ -connection, overload protection with phase-failure protection must be provided.

Standard voltages:

Voltages	Rated voltage range	Voltage code
1LA, 1LG, and 1MJ motors		
230 V Δ /400 V γ , 50 Hz	220 – 240 V Δ /380 – 420 V γ , 50 Hz	1
400 V Δ /690 V γ , 50 Hz	380 – 420 V Δ /660 – 725 V γ , 50 Hz	6
1LA and 1LG motors		
Second rating plate with 50 and 60 Hz data, frame sizes 56 to 315 M for 1LA9 and 1LG6 with output at 60 Hz additionally in HP		
460 V, 60 Hz	440 – 480 V, 60 Hz	1, 6
1MA motors		
230 V Δ /400 V γ , 50 Hz	218 – 242 V Δ /380 – 420 V γ , 50 Hz	1
400 V Δ /690 V γ , 50 Hz	380 – 420 V Δ /655 – 725 V γ , 50 Hz	6

Voltages, currents, and frequencies (continued)

Non-standard voltages and/or frequencies

The tolerance laid down by DIN EN 60 034-1 applies to all non-standard voltages.

Order Codes have been allocated for a number of non-standard voltages at 50 and 60 Hz.

(11th position of

Order No. = 9).

L1X	Standard winding
L1Y	Non-standard winding between 200 V and 690 V (other voltages to order)

When ordering state in plain plain text: Volatage, frequency, connection, and required rated output in kW.

This Order Code only determines the price.

Order Codes for other rated voltages:

Voltage at 50 Hz	Required output at 50 Hz	Order Code for 50 Hz (single- speed) ¹⁾	Frame sizes for motors							
			1LA5, 1LA7	1LA6, 1LA9	1LG4, 1LG6	1LA8	1MA6, 1MA7 ²⁾	1MA8	1MJ6	1MJ8, 1MJ1
220 VΔ /380 VY	50 Hz output	L1R	56 – 225	56 – 200	180 – 315M	–	63 – 315L	–	71 – 315	–
380 VΔ /660 VY	50 Hz output	L1L	56 – 225	56 – 200	180 – 315L	–	63 – 315L	315 – 355	71 – 315	–
415 VY	50 Hz output	L1C	56 – 225	56 – 200	180 – 315M	–	63 – 315L	315 – 355	71 – 315	–
415 VΔ	50 Hz output	L1D	56 – 225	56 – 200	180 – 315L	–	63 – 315L	315 – 355	71 – 315	–
400 VΔ (460 VΔ at 60 Hz)	50 Hz output	L1U	56 – 225	56 – 200	180 – 315L	–	–	–	–	–
60 Hz	60 Hz	60 Hz (single- speed)	1LA5, 1LA7	1LA6, 1LA9	1LG4, 1LG6	1LA8	1MA6, 1MA7 ²⁾	1MA8	1MJ6	1MJ8, 1MJ1
220 VΔ /380 VY	50 Hz output	L2A	56 – 225	56 – 200	180 – 315M	–	63 – 315L	–	71 – 315	–
220 VΔ /380 VY	60 Hz output	L2B	56 – 225	56 – 200	180 – 315M	–	–	–	71 – 280 S	315 – 450
380 VΔ /660 VY	50 Hz output	L2C	56 – 225	56 – 200	180 – 315L	315 – 450	63 – 315L	315 – 355	71 – 315	–
380 VΔ /660 VY	60 Hz output	L2D	56 – 225	56 – 200	180 – 315L	315 – 450	–	–	71 – 315	315 – 450
440 VY	50 Hz output	L2Q	56 – 225	56 – 200	180 – 315M	–	63 – 315L	–	71 – 315	–
440 VY	60 Hz output	L2W	56 – 225	56 – 200	180 – 315M	–	–	–	71 – 315	315 – 450
440 VΔ	50 Hz output	L2R	56 – 225	56 – 200	180 – 315L	315 – 450	63 – 315L	315 – 355	71 – 315	–
440 VΔ	60 Hz output	L2X	56 – 225	56 – 200	180 – 315L	315 – 450	–	–	71 – 315	315 – 450
460 VY	50 Hz output	L2S	56 – 225	56 – 200	180 – 315M	–	63 – 315L	–	71 – 315	–
460 VY	60 Hz output	L2E	56 – 225	56 – 200	180 – 315M	–	–	–	71 – 315	315 – 450
460 VΔ	50 Hz output	L2T	56 – 225	56 – 200	180 – 315L	315 – 450	63 – 315L	315 – 355	71 – 315	–
460 VΔ	60 Hz output	L2F	56 – 225	56 – 200	180 – 315L	315 – 450	–	–	71 – 315	315 – 450
575 VY	50 Hz output	L2U	56 – 225	56 – 200	180 – 315M	–	63 – 315L	–	71 – 315	–
575 VY	60 Hz output	L2L	56 – 225	56 – 200	180 – 315M	–	–	–	71 – 315	315 – 450
575 VΔ	50 Hz output	L2V	56 – 225	56 – 200	180 – 315L	315 – 450	63 – 315L	315 – 355	71 – 315	–
575 VΔ	60 Hz output	L2M	56 – 225	56 – 200	180 – 315L	315 – 450	–	–	71 – 315	315 – 450
60 Hz	60 Hz	60 Hz pole- changing	1LA5, 1LA7	1LA6, 1LA9	1LG4, 1LG6	1LA8	1MA6, 1MA7 ²⁾	1MA8	1MJ6	1MJ8, 1MJ1
220 V	50 Hz output	L4A	63 – 200	–	–	–	–	–	–	–
220 V	60 Hz output	L4B	63 – 200	–	–	–	–	–	–	–
380 V	50 Hz output	L4C	63 – 200	–	–	–	–	–	–	–
380 V	60 Hz output	L4D	63 – 200	–	–	–	–	–	–	–
440 V	50 Hz output	L4G	63 – 200	–	–	–	–	–	–	–
440 V	60 Hz output	L4E	63 – 200	–	–	–	–	–	–	–
460 V	50 Hz output	L4J	63 – 200	–	–	–	–	–	–	–
460 V	60 Hz output	L4H	63 – 200	–	–	–	–	–	–	–
575 V	50 Hz output	L4N	63 – 200	–	–	–	–	–	–	–
575 V	60 Hz output	L4M	63 – 200	–	–	–	–	–	–	–

1) The rating plate also includes a voltage range of + 5% for Order Codes **L1C**, **L1D**, **L1L** and **L1R**.

2) Requires special certificate.

Squirrel-cage motors

Technical information

Electrical features

Voltages, currents, and frequencies (continued)

Rated currents for the rated voltage range from 380 V to 420 V at 50 Hz

	Currents for voltage and number of poles							
	380 V 2-pole A	420 V 2-pole A	380 V 4-pole A	420 V 4-pole A	380 V 6-pole A	420 V 6-pole A	380 V 8-pole A	420 V 8-pole A
1LA7, 1LA5 motors								
1LA7 050	0.27	0.26	0.21	0.21	—	—	—	—
1LA7 053	0.33	0.32	0.30	0.31	—	—	—	—
1LA7 060	0.52	0.53	0.42	0.44	—	—	—	—
1LA7 063	0.68	0.70	0.56	0.57	0.48	0.5	—	—
1LA7 070	1.05	1.02	0.80	0.77	0.66	0.64	0.36	0.36
1LA7 073	1.38	1.41	1.07	1.06	0.80	0.80	0.51	0.52
1LA7 080	1.75	1.79	1.50	1.50	1.18	1.25	0.73	0.80
1LA7 083	2.45	2.50	1.90	1.92	1.62	1.66	1.01	1.10
1LA7 090	3.40	3.35	2.60	2.60	2.10	2.15	1.15	1.18
1LA7 096	4.70	4.65	3.50	3.50	3.0	2.95	1.63	1.60
1LA7 106	6.25	6.15	4.8	4.8	4.0	4.1	2.25	2.2
1LA7 107	—	—	6.5	6.8	—	—	3.0	3.0
1LA7 113	8.2	7.7	8.4	8.3	5.4	5.3	4.1	4.2
1LA7 130	10.6	10.4	11.4	11.9	7.3	7.5	5.9	6.0
1LA7 131	14.1	13.8	—	—	—	—	—	—
1LA7 133	—	—	15.4	15.5	9.5	9.7	7.9	7.9
1LA7 134	—	—	—	—	13.0	13.1	—	—
1LA7 163	21.0	20.5	22.3	21.5	17.5	17.3	9.9	10.6
1LA7 164	28.0	26.0	—	—	—	—	13.1	13.4
1LA7 166	34.0	32.0	29.5	28.5	24.8	24.7	17.6	18.4
1LA5 183	40	38	36	35	—	—	—	—
1LA5 186	—	—	42	41	31	29.5	26.5	23.5
1LA5 206	55	52	—	—	37	24.5	—	—
1LA5 207	67	64	57	54	44.5	41	34	31
1LA5 220	—	—	69	64	—	—	40	37
1LA5 223	81	76	84	78	59	54	47	43
1LA6, 1LG4 motors								
1LA6 106	6.25	6.15	4.8	4.8	4.0	4.1	2.25	2.2
1LA6 107	—	—	6.5	6.8	—	—	3.0	3.0
1LA6 113	8.2	7.7	8.4	8.3	5.4	5.3	4.1	4.2
1LA6 130	10.6	10.4	11.4	11.9	7.3	7.5	5.9	6.0
1LA6 131	14.1	13.8	—	—	—	—	—	—
1LA6 133	—	—	15.4	15.5	9.5	9.7	7.9	7.9
1LA6 134	—	—	—	—	13.0	13.1	—	—
1LA6 163	21.0	20.5	22.3	21.5	17.5	17.3	9.9	10.6
1LA6 164	28.0	26.0	—	—	—	—	13.1	13.4
1LA6 166	34.0	32.0	29.5	28.5	24.8	24.7	17.6	18.4
1LG4 183	41.5	40	36	35	—	—	—	—
1LG4 186	—	—	42.5	41.5	30.5	28.5	25.5	25
1LG4 188	56	54	59	60	38.5	37	34.5	34.5
1LG4 206	56	52	—	—	37	37	—	—
1LG4 207	82	63	57	55	45	42.5	33.5	32
1LG4 208	67	77	70	69	61	60	40.5	39
1LG4 220	—	—	72	65	—	—	40.5	36.5
1LG4 223	83	75	85	77	60	54	46.5	42
1LG4 228	100	90	104	94	73	66	64	58
1LG4 253	100	93	104	98	73	68	60	57
1LG4 258	134	128	138	134	87	81	73	69
1LG4 280	136	126	144	132	87	80	76	70
1LG4 283	162	150	168	156	106	97	92	84
1LG4 288	196	182	204	190	146	134	112	102
1LG4 310	198	188	205	194	142	136	110	104
1LG4 313	230	215	245	230	170	162	146	136
1LG4 316	280	255	295	275	205	190	174	164
1LG4 317	345	315	360	330	245	225	210	198
1LG4 318	430	390	450	425	295	275	250	240

Voltages, currents, and frequencies (continued)

Rated currents for the rated voltage range from 380 V to 420 V at 50 Hz (continued)

	Currents for voltage and number of poles							
	380 V 2-pole A	420 V A	380 V 4-pole A	420 V A	380 V 6-pole A	420 V A	380 V 8-pole A	420 V A
1LG6, 1LA8 motors								
1LG6 183	40.5	37.5	36	34.5	—	30.5	—	24.5
1LG6 186	—	—	42.5	40.5	—	29	—	23
1LG6 206	54	51	—	—	37	35.5	—	—
1LG6 207	66	62	56	54	44	40.5	32.5	30.5
1LG6 220	—	—	70	64	—	—	38	34.5
1LG6 223	81	73	84	76	59	53	45	41
1LG6 253	97	90	99	94	72	67	59	55
1LG6 280	134	124	138	128	85	79	75	69
1LG6 283	158	146	166	154	104	96	91	83
1LG6 310	192	174	200	184	142	134	106	100
1LG6 313	230	210	235	215	166	156	142	136
1LG6 316	275	250	285	265	205	190	170	158
1LG6 317	340	305	355	330	245	225	205	194
1LG6 318	—	—	—	—	290	275	250	230
1LA8 315	435	400	450	425	360	340	310	295
1LA8 317	540	495	560	530	450	420	385	365
1LA8 353	620	570	640	590	—	—	—	—
1LA8 355	690	630	720	680	570	530	480	455
1LA8 357	860	790	880	820	720	670	600	560
1LA8 403	950	880	990	930	810	760	680	640
1LA8 405	1080	990	1100	1040	890	840	760	720
1LA8 407	690 ¹⁾	640 ²⁾	710 ¹⁾	670 ²⁾	1000	940	850	810
1LA8 453	780 ¹⁾	730 ²⁾	810 ¹⁾	750 ²⁾	1160	1060	960	910
1LA8 455	880 ¹⁾	810 ²⁾	910 ¹⁾	860 ²⁾	740 ¹⁾	690 ²⁾	1080	1020
1LA8 457	970 ¹⁾	890 ²⁾	1000 ¹⁾	940 ²⁾	830 ¹⁾	770 ²⁾	1200	1140

The rating plates of 1MJ6 motors specify the maximum current in the voltage range in addition to the rated current.
This maximum is approx. 5% higher than the rated current.

Rated outputs and rating plates

Table of rated output at 60 Hz for single-speed motors

Motor type	Maximum output at 60 Hz for voltages between 220 V or 380 V and 725 V			
	2-pole kW	4-pole kW	6-pole kW	8-pole kW
1LA6, 1LA7, 1MJ6 motors				
1LA7 050	—	0.105	0.07	—
1LA7 053	—	0.14	0.105	—
1LA7 060	—	0.21	0.14	—
1LA7 063	—	0.29	0.21	0.1
1LA7 070	—	1MJ6 070	0.43	0.29
1LA7 073	—	1MJ6 073	0.63	0.43
1LA7 080	—	1MJ6 080	0.86	0.63
1LA7 083	—	1MJ6 083	1.3	0.86
1LA7 090	—	1MJ6 096	1.75	1.3
1LA7 096	—	1MJ6 097	2.55	1.75
1LA7 106	1LA6 106	1MJ6 106	3.45	2.55
1LA7 107	1LA6 107	1MJ6 107	—	3.45
1LA7 113	1LA6 113	1MJ6 113	4.6	4.6
1LA7 130	1LA6 130	1MJ6 130	6.3	6.3
1LA7 131	1LA6 131	1MJ6 131	8.6	—
1LA7 133	1LA6 133	1MJ6 133	—	8.6
1LA7 134	1LA6 134	1MJ6 134	—	6.3
1LA7 163	1LA6 163	1MJ6 163	12.6	12.6
1LA7 164	1LA6 164	1MJ6 164	17.3	—

Motor type	Maximum output at 60 Hz for voltages between 220 V or 380 V and 725 V			
	2-pole kW	4-pole kW	6-pole kW	8-pole kW
1LA6, 1LA7, 1MJ6 motors (continued)				
1LA7 166	1LA6 166	1MJ6 166	21.3	17.3
1LA5 183	1LG4 183	1MJ6 183	24.5	21.3
1LA5 186	1LG4 186	1MJ6 186	—	25.3
1LA4 188	—	—	33.5	22
1LA5 206	1LG4 206	1MJ6 206	33.5	—
1LA5 207	1LG4 207	1MJ6 207	41.5	34.5
1LG4 208	—	—	51	42.5
1LA5 220	1LG4 220	1MJ6 220	—	42.5
1LA5 223	1LG4 223	1MJ6 223	51	52
1LG4 228	—	—	62	63
1LG4 253	1MJ6 253	62	63	44.5
1LG4 258	—	84	86	54
1LG4 280	1MJ6 280	84	86	44.5
1LG4 283	1MJ6 283	101	104	54
1LG4 288	—	123	127	66
1LG4 310	1MJ6 310	123	127	66
1LG4 313	1MJ6 313	148	152	90
1LG4 316	—	180	184	108
1LG4 317	—	224	230	158
1LG4 318	—	280	288	158

Speed increases to approx. 120% in relation to 50 Hz motors.

1) Current at 660 V.

2) Current at 725 V.

Squirrel-cage motors

Technical information

Electrical features

2

Rated outputs and rating plates (continued)

Table of rated output at 60 Hz for single-speed motors (continued)

Motor type	Maximum output at 60 Hz for voltages between 220 V or 380 V and 725 V				Motor type	Maximum output at 60 Hz for voltages between 220 V or 380 V and 725 V			
	2-pole kW	4-pole kW	6-pole kW	8-pole kW		2-pole kW	4-pole kW	6-pole kW	8-pole kW
1LA8, 1MJ8, 1MJ1 motors									
1LA8 315 –	280	288	230	184	1MJ8 313	190	180	132	100
1LA8 317 –	353	362	288	230	1MJ8 314	–	–	145	120
1LA8 353 –	398	408	–	–	1MJ8 316	240	220	175	145
1LA8 355 –	448	460	362	288	1MJ8 353	280	250	225	180
1LA8 357 –	560	575	460	362	1MJ8 354	–	280	–	–
1LA8 403 –	616	644	518	408	1MJ8 356	350	315	280	225
1LA8 405 –	693	725	575	460	1MJ8 357	–	355	–	–
1LA8 407 –	781	817	644	518	1MJ1 353	available soon			
1LA8 453 –	–	920	725	575	1MJ1 355				
1LA8 455 –	–	1040	817	644	1MJ1 357				
1LA8 457 –	–	1150	920	725	1MJ1 403				
					1MJ1 405				
					1MJ1 407				
					1MJ1 453				
					1MJ1 455				
					1MJ1 457				
					1MJ1 458				

Rated outputs for 1MJ1 motors on request.

**Table of rated output at 60 Hz
for pole-change motors**

For 60 Hz, the rated output values can be increased using the correction factors in the table opposite.

The output is increased for each pole number separately i.e. for 6-/4-pole motors with frame sizes 180 to 315, 60 Hz, the 6-pole output can be increased by 20%, the 4-pole power by 15%.

Size	Number of poles	Correction factor for 60 Hz output for voltages between 220 V or 380 V and 725 V	
		56 to 160	180 to 315
56 to 160	2 to 8	1.15	
180 to 315	2	1.12	
	4	1.15	
	6 and 8	1.2	

Possible combinations of 2-pole motors

Frame size	Horizontal motor			Vertical motor		
	50 Hz with foot	60 Hz with foot	50 Hz with flange	60 Hz with flange	50 Hz	60 Hz
56 to 315 M	●	●	●	●	●	●
315 L	●	●	–	–	●	–
315	●	●	–	–	●	●
355 and 400	●	●	–	–	●	–
450	●	–	–	–	●	–

Coolant temperature and altitude above sea level

The rated output refers to continuous duty according to DIN EN 60 034-1 at a frequency of 50 Hz, a coolant temperature (CT) of 40 °C and a site altitude of up to 1000 m above sea level (ASL).

The motors are designed for class F and used in class B. If the actual operating conditions deviate from this class, the maximum output should be adjusted according to the following tables.

If explosion-proof motors are to be utilized at coolant temperatures that deviate from 40 °C and which have a site altitude greater than 1000 m above sea level the corresponding correction factors must be requested.

Order Codes **D02**, **D03** and **D04** only apply to motors 1LG4 and 1LG6.

Altitude above sea level ASL in m	Coolant temperature in °C					
	<30	30 – 40	45	50	55	60
1000	1.07	1.00	0.96	0.92	0.87	0.82
1500	1.04	0.97	0.93	0.89	0.84	0.79
2000	1.00	0.94	0.90	0.86	0.82	0.77
2500	0.96	0.90	0.86	0.83	0.78	0.74
3000	0.92	0.86	0.82	0.79	0.75	0.70
3500	0.88	0.82	0.79	0.75	0.71	0.67
4000	0.82	0.77	0.74	0.71	0.67	0.63

The coolant temperature and the altitude are rounded to the nearest 5 °C or 500 m.

Rated outputs and rating plates (continued)

Coolant temperature and altitude above sea level (continued)

Effective values, which must be stated when ordering, have been calculated for the following output ratings and coolant temperatures (CT) of 45 °C and 50 °C.

For changes in the output rating with class F utilization see "DURIGNIT IR 2000 insulation".

If utilized according to temperature class B, motors intended for coolant temperatures other than 40 °C or altitudes greater than 1000 m above sea level must always be ordered with the suffix "-Z" added to the Order No. and the requirement stated in plain text.

Additional derating of the output will result in a deterioration in performance due to the lower utilization factor of the motors.

Rated output kW	Maximum output at 50 Hz at CT 45 °C at CT 50 °C		
	kW	kW	kW
11	10.5	10	
15	14.5	13.8	
18.5	17.8	17	
22	21	20	
30	29	27.5	
37	35.5	34	
45	43	41.5	
55	53	51	
75	72	69	
90	86	83	
110	106	101	
132	127	122	
145	139	133	
160	153	147	
180	173	166	
200	192	184	
250	240	230	
280	269	258	
315	302	290	
355	340	325	
400	384	368	
560	432	414	
500	480	460	
450	538	515	
630	605	580	
710	682	653	
800	768	736	
900	864	828	
1000	960	920	

For Order Codes for class F utilization, see "DURIGNIT IR 2000 insulation".

For all motors:

The motors are intended to withstand 1.5 times the rated current for up to 2 minutes at rated voltage and frequency (DIN EN 60 034).

Ambient temperature

All motors with the standard design can be used at ambient temperatures of -20 °C to +40 °C.

Exceptions with Order Code C13:

Motor type	Size	Ambient temperature °C
1LA7	56M – 160L	-30 to +55
1LA6	100L – 160L	-30 to +55
1LG4	180M – 225M 250M – 315L	-30 to +55 -20 to +55
1LG6	180M – 225M 250M – 315L	-30 to +55 -20 to +55

Use as class F

- at 40 °C with service factor 1.1 or 1.15 for 1LG6/1LA9,
- above 40 °C in compliance with rated output.

When used as class B with higher ambient temperatures/greater site altitude, the power is reduced according to the table on Page 2/13 below.

Motors which are supplied directly have the service factor marked on the rating plate.

Special design measures are necessary for other ambient temperatures.

Inquiry is necessary if brakes are needed for subzero temperatures.

Rating plate

Motor type	Frame size	Rating plate								Double rating plate 50/60 Hz data for
		international	ge	ge/en	fr/sp	it	pt	ru	230/400 V and 460 V	
1LA5	all	■							■	■
1LA7	all	■							■	■
1LA9	all	■							■	■
1LA6	all	■							■	■
1LG4	all	■						▲	■	■
1LG6	all	■						▲	■	■
1LA8	all		■		●	●	●	●	▲	
1MA7	all	■		●	●	●	●	●	▲	
1MA6	all		■	●	●	●	●	●	▲	
1MA8	all		■	●	●	●	●	●	▲	
1MJ6	71 to 160	■		●	●	●	●	●	▲	
1MJ6	180 to 315		■	●	●	●	●	●	▲	
1MJ8	all		■	▲	▲	▲	▲	▲	▲	
1MJ1	all		■	▲	▲	▲	▲	▲	▲	

EN 60034-1 lays down that the approximate total weight for all motors from frame size 90 (from approx. 30 kg) is indicated on the rating plate.

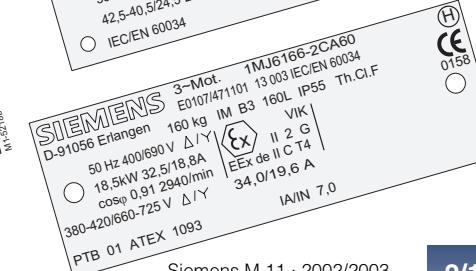
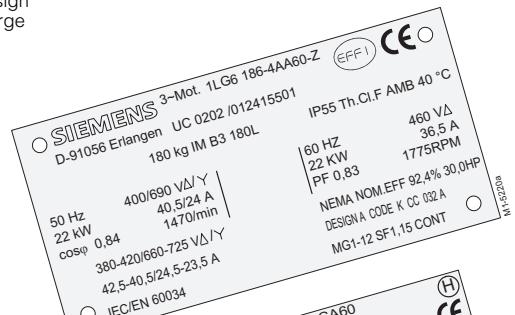
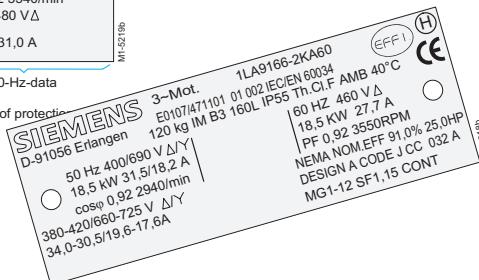
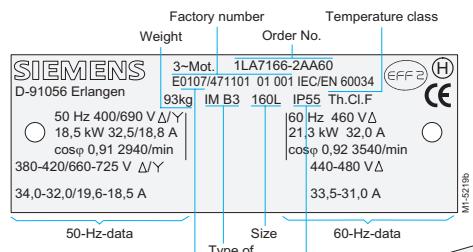
A second rating plate can be supplied loose for all motor, Order Code K31.

In addition, a supplementary plate with the order specifications is available, Order Code Y82.

Also for type 1MA motors:
With the exception of the 2-pole motors with frame size 225 M or larger, all motors are simultaneously suitable for T1/T2 and T3 (standard design). If the rated output for T1/T2 differs from that for T3, the data for both outputs is stated on separate rating plates.

- Standard design
- No extra charge
- ▲ Extra charge

Examples of rating plates



Squirrel-cage motors

Technical information

2

Electrical features

Efficiency, power factor, and rated torque

Efficiency and power factor

The efficiency η and power factor $\cos \varphi$ values for each rated output are listed in the selection tables in the individual sections of this catalogue.

For eff1 and eff2 motors, the $\frac{3}{4}$ load efficiency is also indicated.

The part-load values stated in the table opposite are averages; precise values can be provided on request.

Part-load efficiency % at 1/4 of full load				
	1/2	3/4	4/4	5/4
93	96	97	97	96.5
92	95	96	96	95.5
90	93.5	95	95	94.5
89	92.5	94	94	93.5
88	91.5	93	93	92.5
87	91	92	92	91.5
86	90	91	91	90
85	89	90	90	89
84	88	89	89	88
80	87	88	88	87
79	86	87	87	86
78	85	86	86	85
76	84	85	85	83.5
74	83	84	84	82.5
72	82	83	83	81.5
70	81	82	82	80.5
68	80	81	81	79.5
66	79	80	80	78.5
64	77	79.5	79	77.5
62	75.5	78.5	78	76.5
60	74	77.5	77	75
58	73	76	76	74
56	72	75	75	73
55	71	74	74	72
54	70	73	73	71
53	68	72	72	70
52	67	71	71	69
51	66	70	70	68
50	65	69	69	67
49	64	67.5	68	66
48	62	66.5	67	65
47	61	65	66	64
46	60	64	65	63
45	59	63	64	62
44	57	62	63	61
43	56	60.5	62	60.5
42	55	59.5	61	59.5
41	54	58.5	60	58.5

Part-load power factor at 1/4 of full load				
	1/2	3/4	4/4	5/4
0.70	0.86	0.90	0.92	0.92
0.65	0.85	0.89	0.91	0.91
0.63	0.83	0.88	0.90	0.90
0.61	0.80	0.86	0.89	0.89
0.57	0.78	0.85	0.88	0.88
0.53	0.76	0.84	0.87	0.87
0.51	0.75	0.83	0.86	0.86
0.49	0.73	0.81	0.85	0.86
0.47	0.71	0.80	0.84	0.85
0.45	0.69	0.79	0.83	0.84
0.43	0.67	0.77	0.82	0.83
0.41	0.66	0.76	0.81	0.82
0.40	0.65	0.75	0.80	0.81
0.38	0.63	0.74	0.79	0.80
0.36	0.61	0.72	0.78	0.80
0.34	0.59	0.71	0.77	0.79
0.32	0.58	0.70	0.76	0.78
0.30	0.56	0.69	0.75	0.78
0.29	0.55	0.68	0.74	0.77
0.28	0.54	0.67	0.73	0.77
0.27	0.52	0.63	0.72	0.76
0.26	0.50	0.62	0.71	0.76

Rated torque

The rated torque in Nm delivered at the motor shaft is

$$M = \frac{9.55 \cdot P \cdot 1000}{n}$$

P Rated output in kW
n Speed in rpm

If the voltage deviates from its nominal value within the allowed limits, the locked-rotor torque, the pull-up torque, and the breakdown torque vary with the approximate square of the value, while the locked-rotor current varies approximately linearly.

In the case of squirrel-cage motors, the locked-rotor torque and the breakdown torque are listed in the selection tables as multiples of the rated torque.

The normal practice is to start squirrel-cage motors directly on-line. The torque class indicates that with direct-on-line starting – even if there is -5% undervoltage – it is possible to start up the motor against a load torque of

up to
160% for CL 16
130% for CL 13
100% for CL 10
70% for CL 7
50% for CL 5
of the rated torque.

The individual torque characteristics can be found on the enclosed SD 01 CD-ROM. In addition, it is possible to perform calculations with the supplied start-up program.

For type 1MA motors

In the case of the standard design for T1/T2 and T3 and different rated outputs, the torque class specified for the higher output applies.

Insulation, winding, motor protection, and standstill heating

DURIGNIT Insulation® IR 2000

The DURIGNIT IR 2000 insulation system comprises high-grade enameled wires and insulating sheet materials combined with solvent-free impregnating resin.

The system ensures a high level of mechanical and electrical strength as well as good serviceability and a long motor life.

The insulation offers general protection for the windings against corrosive gases, vapors, dust, oil and increased humidity, and resists the normal stresses of vibration.

The insulation is suitable for an absolute humidity of up to 30 g water per m³. The windings must not become moist. Higher values on request!

■ The windings of the 1LA8 and 1MA8 motors are VPI-treated (vacuum-pressure-impregnation).

Please inquire about extreme applications.

All motors are designed for class F.
Utilization of motors for rated output and mains-fed operation for class B.

All 1LA motors can be stamped with the ratings in accordance with the selection tables and rated voltage range as well as with a service factor (SF) of 1.1 (for 1LA9 and 1LG6 SF= 1.15) and 1.05 for frame sizes 400 and 450. Order Code **C11**.

The service factor is already stamped on the rating plate of standard ex-stock motors and 1LA8 motors.

If the motor is used for class F, the rated output specified in the selection and ordering data can be increased by 10% (by 15% for 1LA9 and 1LG6 and by 5% for frame sizes 400 and 450). Order Code **C12**.

If the catalogue ratings are used, it is permissible to increase the temperature of the coolant to 55 °C (or to 50 °C for frame sizes 400 and 450). Order Code **C13**.

The service factor (SF) is not stamped on the rating plate for Order Codes **C12** and **C13**.

Restarting against residual field and opposite phase

All motors can be reclosed against 100% residual field after a system voltage failure.

Motor protection with PTC thermistor

The motors are usually protected by delayed terminal overload protection devices (either circuit-breakers for motor protection or overload relays).

This type of protection is current-sensitive and is particularly effective under locked-rotor conditions.

The motors can also be protected by means of semiconductor temperature sensors (thermistors) embedded in the winding and operating in conjunction with a tripping unit (thermistor motor protection) (Order Code **A11** or **A12**).

This type of protection is temperature-sensitive and prevents the motor windings from overheating, e.g. due to sharply fluctuating loads or frequent switching.

■ All 1LA8 and 1MA8 motors with the standard design are fitted with 6 PTC thermistors for alarm and tripping.

■ The response temperature of the PTC thermistors for the 1LA, 1MJ and 1LG motors corresponds to class F.

In order to achieve full thermal protection it is necessary to combine a thermally delayed overcurrent release and a PTC thermistor. Full motor protection implemented only with PTC thermistors on request.

 **For type 1MJ motors:**
Always use PTC thermistors if the duty is anything other than S1.

■ PTC thermistors are absolutely necessary if these motors are used for converter-fed operation. In this case, an additional thermistor is fitted in the terminal box for 1MJ6. Order Code **A15** or **A16**.

No additional anti-condensation heater can be integrated in designs with temperature sensors and frame sizes up to 200 L.

Thermistor protection takes the form of three PTC thermistors connected in series and embedded in the stator winding of the motor. The **3RN1** tripping unit which completes the system must be ordered separately – it is PTB certified. Further details about its mode of operation, circuitry, and price can be found in Catalogue NS K, Order No.: E86060-K1002-A101-A2-7600.

Pole-changing motors with two separate windings need twice the number of temperature sensors.

If an alarm signal is to be output prior to the motor being shut down, two groups of three temperature sensors will be needed. The alarm signal is usually output at 10 K below shutdown temperature.

Motor temperature detection with temperature sensor KTY84

See "Converter-fed operation" Page 2/44.

Anti-condensation heating

Supply voltage 115 V

Order Code **K45**

Supply voltage 230 V

Order Code **K46**

Anti-condensation heaters can be fitted to motors whose windings are exposed to a risk of condensation due to the ambient climate, e.g. stationary motors in a damp environment or motors subjected to considerable fluctuations in temperature.

An additional M16 x 1.5 or M20 x 1.5 cable entry fitting is provided in the terminal box for the power supply cable.

The anti-condensation heater must not be switched on while the motor is running.

An alternative to anti-condensation heaters (involving no extra cost) is to connect a voltage of around 4 to 10% of the motor rated voltage to stator terminals U1 and V1; 20 to 30% of the motor rated current provide an adequate heating effect (does not apply to 1MA6 motors, frame sizes 225 M to 315 L, 1LA8 and 1MA8).

 **For 1MJ6 motors:**

No built-in anti-condensation heater is available for 1MJ6 motors up to frame size 160 L when equipped with PTC thermistors.

For 1MA and 1LA motors with non-sparking design:

No built-in anti-condensation heater is available up to frame size 200 L.

For motors	Size	Heat output (W) for Order Code K45 (230 V)	Heat output (W) for Order Code K46 (115 V)
1LA5, 1LA6, 1LA7, 1LA9	56 to 80 90 to 112 132 to 200 225	25 50 100 78	25 50 100 78
1LG4, 1LG6, 1MJ6/1MA6	180 and 200 225 and 250 280 and 315	55 92 109/105	55 92 109/105
1LA8	all	200	183
1MA8	all	140	129
1MJ8	315 355	100 200	100 200
1MJ1	355 400 450	available soon	available soon
1LG4/1LG6 in (E)Ex nA	180 and 200 225 and 250 280 and 315	48 92 105	48 92 105

Squirrel-cage motors

Technical information

Electrical features

2

Connection, switching, and terminal boxes

The position of the terminal box always refers to as viewed from the drive end.

There are marked terminals for connecting the protective conductor.

On the outside of the motor housing is an earthing terminal (special design for 1LA5, 1LA6, and 1LA9 motors). Order Code **L13**.

The terminal boxes for motors with (E)Exn (Zone 2) type of protection and protection against dust explosions (Zone 21) deviate from the standard design.

For 1MJ motors:

The terminal box is in accordance with EEx e type of protection. The ends of the windings for motors up to frame size 160 are routed through a shared explosion-proof leadthrough into the terminal box; for frame size 180 and higher through single leadthroughs.

■ Motor connection

Mains conductors

The mains conductors must be dimensioned in accordance with DIN VDE 0298. The number of required – possibly parallel – feeders is determined by

- the maximum connectable conductor cross-section,

- the cable type,
- the laying arrangement
- the ambient temperature and
- the permissible current in accordance with DIN VDE 0298.

Parallel feeders

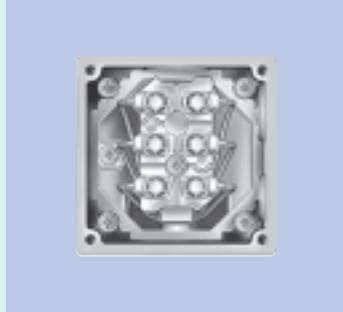
Some motors must be fitted with parallel feeders due to the maximum permissible current per terminal. These motors are marked in the selection tables. Two parallel feeders are used for motors with 1XB7 terminal boxes, with terminal box 1XB1 631 up to four feeders are possible.

Motors with a terminal box cover and auxiliary terminals (e.g. A11) also have a cable entry M16 x 1.5 or M20 x 1.5 with plug.

1LA7 and 1LA9, frame sizes 100 L to 160 L

The terminal box is integrated into the frame. On each side there are knock-out openings for boltings.

The bolting nuts for the boltings are included with the terminal box.



Type gk030



Type gk130, 230, 330



Type gk330 for 1LA5, 1LG4



Type gk 135, 235, 335



Type gk430



Type 1XB7 222, 322, gk431



Type gt 520, 620

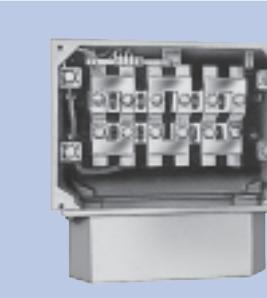


Type 1XB7 422, 522

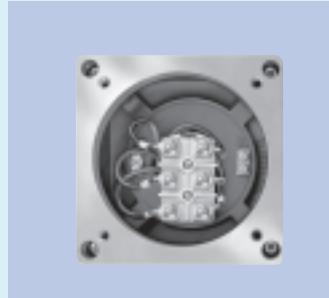


Type 1XB7 622

Connection, switching, and terminal boxes (continued)



Type 1XB1 631



Type gk465



Type 1XC1 270, 380



Type 1XC1 480, 580

Terminal boxes for 1LA and 1LG motors				
Motors	Size	Number of cable entries	Terminal box material	Feeder connection
1LA7, 1LA9	56 to 71	2 holes with plugs	Aluminium alloy	without cable lug or with cable lug
	80 to 90			
	100 to 160	2 holes 180° apart, 4 knock-out openings in cast-iron skin, sealed (2 left, 2 right), Terminal box is moulded		
1LA5, 1LA9	180 to 225	2 holes with plugs	Cast iron	Without cable lug
1LA6	100 to 160			
1LG4, 1LG6	180 to 225 250 to 315			
1LA8	315 and 355 ¹⁾ 400 and 450	4 holes, sealed	Cast iron	With cable lug

Terminal box position for 1LA and 1LG motors							
Motors	Size	Terminal box position			Rotation of terminal box		
		Top	Right-hand side or left-hand side	Retrofitting possi-ble	90°	180°	Retrofitting not possible ²⁾
1LA5, 1LA7, 1LA9	56 to 71	●	—	—	●	●	—
	80 to 90	●	●	—	●	●	—
	100 to 160	●	●	—	—	●	—
	180 to 225	●	●	—	●	●	—
1LA6	100 to 160	●	●	—	●	●	—
1LG4, 1LG6	180 to 315	●	●	— ⁴⁾	●	●	●
1LA8	315 and 355 357 (2 and 4-pole) ²⁾ 400 and 450	— ¹⁾ — ¹⁾ — ¹⁾	● ¹⁾ ● ¹⁾ ● ¹⁾	— ¹⁾ — ¹⁾ — ¹⁾	● ¹⁾ — ¹⁾ — ¹⁾	● ¹⁾ — ¹⁾ — ¹⁾	● ¹⁾ — ¹⁾ — ¹⁾

1) Rotated by 45°.

2) The position of the cable entry must be specified when ordering.

3) Terminal boxes in gray-cast design to order.

4) For option K10, the screwed on feet can be retrofitted.

Squirrel-cage motors

Technical information

2

Electrical features

Connection, switching, and terminal boxes (continued)

Terminal boxes for 1LA5, 1LA6, 1LA7, and 1LA9 motors							
Frame size	Type 1LA5 1LA7 1LA9	Type 1LA6	Number of terminals	Terminal screw thread	Max. conductor size mm ²	Sealing range in accordance with DIN 46319 mm	Cable entry ³⁾ Size
56	gk 030		6	M4	2.5	9 – 17	M25 x 1.5
63						4.5 – 10	M16 x 1.5
71							
80							
90							
100	gk 130	gk 135	6	M4	4	11 – 21	M32 x 1.5
112							
132	gk 230	gk 235	6	M4	6	11 – 21	M32 x 1.5
160	gk 330	gk 335	6	M5	16	19 – 28	M40 x 1.5
180							
200	gk 430		6	M6	25	27 – 35	M50 x 1.5
225	gk 431		6	M8	35	27 – 35	M50 x 1.5
Terminal boxes for 1LG4 and 1LG6 motors							
180	gk 330		6	M5	16	19 – 28	M40 x 1.5
200	gk 430		6	M6	25	27 – 35	M50 x 1.5
225	gk 431		6	M8	25 ●	27 – 35	M50 x 1.5
250	gt 520		6	M10	120	32 – 42	M63 x 1.5
280							40 – 50
315	gt 620		6	M12	240	40 – 48	M63 x 1.5
Terminal boxes for 1LA8 motors							
315	1XB7 622		6	M16	400	41 – 56	2 x M72 x 2/ 2 x M25 x 1.5
355 ¹⁾							
400	1XB1 631		12	M16	400	–	4 x Ø80/ 2 x M25 x 1.5
450							

● 35 mm² with cable lug

■ The terminal box list does not apply to pole-changing motors with three speeds.

Terminal boxes for 1MA6, 1MA7, 1MA8, and 1LA6/7/9 motors with (E)Ex n design				
Motors	Size	Number of cable entries	Terminal box material	Feeder connection
1MA7	63 to 90	2 holes incl. 1 certified bolting with sealing ring and 1 certified plug	Aluminium alloy	Without cable lug ⁴⁾ or with cable lug
	100 to 160	4 holes incl. 1 certified bolting with sealing ring and 3 certified plugs		
1MA6	100 to 160	2 holes incl. 1 certified bolting with sealing ring and 1 certified plug	Cast iron	
	180 to 225	2 holes incl. 2 certified boltings with sealing rings	Aluminium alloy	
1MA8	250 to 315		Cast iron	
	315 and 355			
	355 ⁵⁾)	4 holes, sealed		

1) The requirements specified for frame size 400 are valid for type 1LA8 357, 2 and 4-pole.

2) Split plate available at extra charge.

Order Code **K06**.

For standard design of terminal box 1XB1 631.

With strain relief for frame size 250 M or larger.

3) For 1LA6 motors, bolting nuts for boltings included.

4) The parts required for the connection without cable lugs are supplied in an accessories pack with the terminal box for all motors with frame size 225 or larger.

5) The requirements specified for frame size 400 are valid for type 1MA8/1LA8 357, 2 and 4-pole.

Connection, switching, and terminal boxes (continued)

Motors	Size	Terminal box position			Rotation of terminal box			Retrofitting not possible ²⁾
		Top	Right-hand side or left-hand side	Retrofitting possible	90°	180°		
1MA7 and 1LA7 in (E)Exn	63 to 71	●	—	—	●	●	—	
	80 to 90	●	●	—	●	●	—	
	100 to 160	●	●	●	—	● ³⁾	—	
1MA6 and 1LA6 in (E)Exn	100 to 160	●	●	●	●	●	—	
	180 to 225	●	●	—	●	●	—	
	250 to 315	●	●	—	●	●	●	
1MA8	315 and 355	—	● ¹⁾	—	●	●	●	
	357 (2 and 4-pole) ²⁾	—	● ¹⁾	—	—	—	—	
1MJ6	71 to 80	●	●	—	●	●	—	
	90 to 160	●	●	—	●	●	—	
	180 to 225	●	●	—	●	●	—	
	250 to 315	●	●	—	●	●	—	
1MJ8	315 to 355	●	●	—	●	●	—	
1MJ1	355 to 450	data available soon						

Terminal boxes for 1MA6, 1MA7, and 1LA6/7/9 motors in (E)Exn

Size	Type	Number of terminals	Terminal screw thread	Max. conductor size mm ²	Sealing range mm	Cable entry Size	Split plate Maximum outside cable diameter mm	
63	gk 130	6	M4	4	11 – 16	M25 x 1.5	—	
71					5 – 9	M16 x 1.5		
80								
90								
100					14 – 21	M32 x 1.5	—	
112								
132	gk 230	6	M4	6				
160	gk 330	6	M5	16	19 – 27	M40 x 1.5	—	
180	1XB7 222	6	M6	10	19 – 27	M40 x 1.5	—	
200	1XB7 322	6	M8	50	24 – 35	M50 x 1.5	—	
225								
250	1XB7 422	6	M10	120	32 – 42	M63 x 1.5	—	
280								
315	1XB7 522	6	M12	240	40 – 48	M63 x 1.5	—	
Terminal boxes for 1MA8 and 1LA8 motors in (E)ExnA								
315	1XB7 622	6	M16	400	41 – 56	2 x M72 x 2/ 2 x M25 x 1.5	40 – 70	
355⁴⁾	1XB1 631	12	M16	240	—	4 x Ø80/ 2 x M25 x 1.5	40 – 75	

Unused holes for 1MA motors must be sealed in accordance with EN 50 014.

1) Rotated by 45°.

2) The position of the cable entry must be specified when ordering.

3) For frame size 100 or larger.

4) The requirements specified for frame size 400 are valid for type 1MA8/1LA8 357, 2 and 4-pole.

Squirrel-cage motors

Technical information

Electrical features

2

Connection, switching, and terminal boxes (continued)

Terminal boxes (EEx e) for 1MJ6, 1MJ8, and 1MJ1 motors				
Motors	Size	Number of cable entries	Terminal box material	Feeder connection
1MJ6	71 and 80	2 holes incl. 1 certified bolting with sealing ring, 1 certified plug	Aluminium alloy BG 160 L gray-cast	Without cable lug or with cable lug ¹⁾
	90 to 160			
	180 to 225 250 to 315	2 holes incl. 2 certified boltings with sealing rings	Aluminium alloy Cast iron	
1MJ8	315 S/M	2 holes incl. 2 certified boltings		
	315L to 355	1 or 2 holes ²⁾		
1MJ1	355 to 450	available soon		

Terminal boxes (EEx e) for 1MJ6 motors						
Size	Type	Number of terminals	Terminal screw thread	Max. conductor size mm ²	Sealing range mm	Cable entry
71	gk 330	6	M4	4	11 – 16	M25 x 1.5
80						
90	gk 420	6	M4	6	11 – 16	M25 x 1.5
100					14 – 21	M32 x 1.5
112	gk 420	6	M4	6	14 – 21	M32 x 1.5
132						
160	gk 465 •		M5 •	16 •	19 – 27	M40 x 1.5
180	1XC1 270	6	M6	25	19 – 27	M40 x 1.5
200	1XC1 380	6	M8	50	24 – 35	M50 x 1.5
225						
250	1XC1 480	6	M10	120	32 – 42	M63 x 1.5
280						
315	1XC1 580	6	M12	240	40 – 48	M63 x 1.5
Terminal box (EEx e) for 1MJ8 motors						
315	without designation	6	M12	120 to 300	37 – 44 ²⁾	M75 x 1.5 ²⁾
355		6	M16		35 – 75 ²⁾	
Terminal box (EEx e) for 1MJ1 motors						
355	}	available soon				
400						
450						

• For frame size 160 L

■ Explosion-proof terminal boxes can be fitted (to order), except for frame sizes 180 and 200.

■ Unused holes for 1MJ motors must be sealed in accordance with EN 50 014.

1) The parts for the connection without cable lugs are supplied in an accessories pack with the terminal box for all 1MJ6 motors with frame size 225 M or larger.

2) Standard design from size 315 L with cable entry gland split lengthwise for 35 – 75 mm and strain relief.

Frame design

Some foot-mounting motors have two fixing holes at the non-drive end (see dimensions table).

There is a cast inscription near these fixing holes to differentiate between frame sizes.

Degrees of protection

All motors are designed for IP 55.

They are suitable for use in dusty or damp surroundings. The motors can be used in the tropics. Approx. value 60% relative humidity at CT 40 °C. Other requirements to order.

■ All motors which have a shaft extension pointing upwards must have a means (provided by the user) of preventing the ingress of liquids along the shaft.

In the case of flange-mounting motors with IM V 3 type of construction, the liquid level in the flange recess can be prevented from rising by means of drain holes (to order).

These are standard for 1MA6 and 1MJ6 motors with frame size 225 or larger and for all 1LG4 and 1LG6 motors.

It is recommended to use a design with canopy for types of construction which have a shaft extension pointing downwards, see "Types of construction" on Page 2/25 and 2/26.

1LG4, 1LG6, 1LA8, 1MA8 or 1MA6 motors with frame size 225 or larger come with condensation water holes sealed with plugs.

If the motors are operated or stored outdoors, a shielding or an additional cover is recommended, so as to avoid long-term effects when exposed to direct, intensive sunlight, rain, snow, ice or dust. If necessary, consult with Siemens about technical adjustments.

Cooling and ventilation

Standard motors with frame sizes 63 to 450 are fitted with a radial-flow fan which functions independently of the direction of rotation (cooling method IC 411 to DIN EN 60 034-6). The air is blown from the non-drive end to the drive end.

Motors with frame size 56 have no fan (IC 410).

■ Standard 2-pole 1LA8 (from frame size 355) and 1MA8 motors have an axial-flow fan for clockwise rotation. It is possible to convert the fan subsequently for anticlockwise rotation.

If the motor is installed in an area with a limited air supply, it is essential to ensure a minimum clearance between the fan cowl and the wall which is calculated by subtracting the length of the canopy from the length of the cowl (dimension LM – L).

Materials			
Type series	Size	Fan material ¹⁾	Fan cowl material ¹⁾
1LA5, 1LA7	63 to 225	Plastic	Corrosion-protected steel plate
1LA9	63 to 200		
1LA6	100 to 160		
1MA7	63 to 160		
1MA6	100 to 200		
1MJ6	71 to 200		
1LG4, 1LG6	180 to 315	Plastic	Glass-reinforced plastic
1MA6	225 to 315		
1MJ6	225 to 315		
1LA8	315 to 450		
1MA8	315 to 355		
1MJ8	315 to 355	Welded steel plate	Corrosion-protected steel plate
1MJ1	355 to 450	available soon	

Coupling to gearboxes

The flange-mounting motors can be fitted with a radial seal for coupling to gearboxes.

Order Code **K17**.

There must be adequate lubrication with grease, oil spray or oil mist (pressure oil is not allowed).

It is advisable to check the permitted bearing loads.

Please enquire about 1LA8 motors.

1) Designs for Zones 2, 21, and 22 sometimes make use of other materials.

Squirrel-cage motors

Technical information

Mechanical design

2

Eyebolts

The 1LA7, 1MA7 and 1LA5 horizontally mounted motors from frame size 100 L or larger have two cast eyebolts. Vertically mounted motors are additionally supplied with two repositionable eyebolts.

The 1LA6, 1MA6 horizontal foot-mounting motors are supplied with one eyebolt.

Frame sizes 100 to 160 are supplied with horizontal flange-mounting types with one eyebolt. One repositionable eyebolt is additionally supplied for vertically mounted motors. For frame sizes 180 M to 315 L, all flange-mounting types are supplied with two diagonal eyebolts. They can also be used for vertically mounted motors.

The horizontally mounted 1LG4 and 1LG6 motors are supplied with two diagonal eyebolts. The eyebolts of vertically mounted motors are repositionable.

All available type-specific eyebolts must be used for transport.

■ The 1MA6 and 1MJ6 motors with frame size 180 M or larger have one eyebolt with the standard IM B 3 type of construction, the IM B 5 type of construction has two eyebolts. If the motors are used with the IM V 1 type of construction, one of the eyebolts must be repositioned, whereby care must be taken to avoid stress perpendicular to the eyebolt.

The 1LA8 motors have one eyebolt for the IM B 3 type of construction and two eyebolts for the IM V 1 type of construction.

1MJ6 motors, frame size 100 L to 132 M have two eyebolts, frame sizes 160 M and 160 L one eyebolt.

Type series	Size	Frame material	Frame feet
1LA5, 1LA7, 1LA9	56 to 100 ²⁾ 112 to 225	Aluminium alloy Aluminium alloy	cast bolted
1MA7	63 to 100 ²⁾ 112 to 160	Aluminium alloy Aluminium alloy	cast bolted
1LG4, 1LG6	180 M to 315 M 315 L	Cast iron Cast iron	cast ³⁾ cast or bolted ⁴⁾
1LA6, 1MA6	100 to 200 225 to 315 M 315 L	Cast iron Cast iron Cast iron	bolted cast bolted
1MJ6	71 and 80 90 to 160 180 to 315	Cast iron Cast iron Cast iron	cast bolted bolted
1LA8	315 to 450	Cast iron	cast
1MA8	315 and 355	Cast iron	cast
1MJ8	315 to 355	Welded steel	welded
1MJ1	355 to 450	Available soon	

Speed and direction of rotation

The rated speed values apply to operation under rated conditions. The synchronous speed varies in direct proportion to the frequency of the power supply system.

The motors are suitable for operation in either direction of rotation.

Exceptions are the following 2-pole motors:

- 1MA8, 1LA8 from size 355
- 1LA8, 1MJ8, 1MJ6, 1MJ1, 1MA6, and 1LG4 in VIK design from size 315.

Connecting terminals U1, V1, W1 to phases L1, L2, L3 will result in clockwise rotation looking towards the drive end of the shaft. Anticlockwise rotation can be achieved by interchanging two of the phases (see also "Cooling and ventilation").

1) The plastic fan can be used for ambient temperatures up to 70 °C.

2) Frame size 100 with "side-mounted terminal box" has bolted feet.

3) Special design "bolted feet" for Order Codes K09, K10, K11.

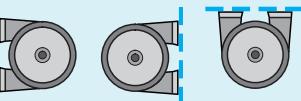
4) Basic design has cast feet, but if foot dimensions BB = 666 mm then bolted feet (see dimension drawing).

Squirrel-cage motors

Technical information

Mechanical design

2

Type of construction to DIN EN 60 034-7	Size	Code 12th position	Order Code
IM B 3		56 M to 450	0 ⁴⁾ -
IM B 6/IM 1051, IM B 7/IM 1061, IM B 8/IM 1071		56 M to 315 L	0 -
IM V 5/IM 1011 without canopy		56 M to 315 M 315 L	0 ^{9 1)} -
IM V 6/IM 1031		56 M to 315 M 315 L	0 ^{9 1)} -
IM V 5/IM 1011 with canopy		63 M to 315 L	9 ¹⁾⁷⁾ -
Flange			
IM B 5/IM 3001		56 M to 315 M	1 ²⁾ -
IM V 1/IM 3011 without canopy		56 M to 315 M 315 L to 450	1 ^{2)3) 8⁴⁾⁵⁾¹⁾} -
IM V 1/IM 3011 with canopy		63 M to 450	4 ¹⁾²⁾³⁾⁵⁾⁷⁾ -
IM V 3/IM 3031		56 M to 160 L 180 M to 315 M	1 ^{9 2)3)} -
IM B 35/IM 2001 ⁶⁾		56 M to 450	6 ⁴⁾ -

The flanges are assigned to the frame sizes as FF with through-holes in DIN EN 50 347.
A-flanges acc. to DIN 42 948 are still valid.

1) 60 Hz is available for 2-pole 1LG4 and 1LG6 motors with frame size 315 L on request.

2) The 1LG4/1LG6, 1MA6, and 1MJ6 motors with frame sizes between 225 S and 315 L are delivered with two bolted eyebolts (four eyebolts for 1LG6 318) ac-

cording to IM B 5, one of which may be repositioned acc. to IM V 1 or IM V 3. Care must be taken to avoid stress perpendicular to the eyebolt.

3) With frame sizes between 180 M and 225 M, the 1LA5 motors are available with two additional eye-

bolts; please state order suffix "Z" and Order Code **K32**.

4) Frame size 450, 2-pole, 60 Hz not available.

5) 60 Hz design is not available for 2-pole 1LA8 motors with frame size 355 or larger.

6) With 1LA8, the related flange diameter is greater than double the shaft height.

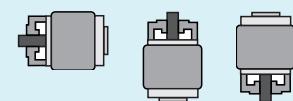
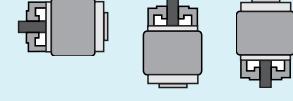
7) Second **K16** shaft extension not available.

Squirrel-cage motors

Technical information

2

Mechanical design

Type of construction to DIN EN 60 034-7	Size	Code 12th position	Order Code
Standard flange			
IM B 14/IM 3601, IM V 19/IM 3631, IM V 18/IM 3611 without canopy		56 M to 160 L	2
IM V 18/IM 3611 with canopy		63 M to 160 L	9 ¹⁾ M2A
IM B 34/IM 2101		56 M to 160 L	7
Custom flange			
IM B 14/IM 3601, IM V 19/IM 3631, IM V 18/IM 3611 without canopy		56 M to 160 L	3
IM V 18/IM 3611 with canopy		63 M to 160 L	9 ¹⁾ M2B
IM B 34/IM 2101		56 M to 160 L	9 M2C

The standard flanges are assigned to the frame sizes as FT with threaded holes in DIN EN 50 347.
C-flanges acc. to DIN 42 948 are still valid.

The custom flange was assigned as large flange in the previous DIN 42 677.

All types of construction within the following series have equal dimensions:

IM B 3, IM B 6, IM B 7, IM B 8, IM V 5, and IM V 6

IM B 5, IM V 1, and IM V 3

IM B 14, IM V 18, and IM V 19

The motors in the standard power range are available in the standard types of construction IM B 3, IM B 5 or IM B 14, and can be operated in mounting positions IM B 6, IM B 7, IM B 8, IM V 5, IM V 6, IM V 1, IM V 3 (up to frame size 160 L) or IM V 18 and IM V 19. Eyebolts are available for transport and installation in a horizontal position. In conjunction with the eyebolts, for the purpose of stabilizing the position when the motor is arranged vertically, additional lifting straps (DIN EN 1492-1) and/or clamping bands (DIN EN 12195-2) must be used. If mounting position IM V 1 is ordered, eyebolts are supplied for vertical mounting.

■ On the normal rating plate, therefore, they are marked with only the basic type of construction.

■ If foot-type motors larger than frame size 180 M are mounted to the wall, it is recommended that the motor feet are supported.

For all motors with the shaft end pointing down, the version "with canopy" is recommended;

see Section "Degrees of protection", Page 2/15.

 For explosion-proof motors:

For types of construction with shaft end pointing down, the version "with canopy" is mandatory.

Types of construction with shaft end pointing up must be suitably covered in order to avoid that small parts fall into the fan cowl.
(See also Section 17 DIN EN 50 014).

The cooling may not be impaired by the cover.

1) Second K16 shaft extension not available.

Shaft extensions

60° center hole to DIN 332, Part 2.

Drive-end shaft extension diameter mm	Thread mm
7 to 10	DR M3
Over 10 to 13	DR M4
Over 13 to 16	DR M5
Over 16 to 21	DR M6
Over 21 to 24	DR M8
Over 24 to 30	DR M10
Over 30 to 38	DR M12
Over 38 to 50	DR M16
Over 50 to 85	DR M20
Over 85 to 130	DS M24

The shaft extension at the non-drive end of frame sizes 100 L to 225 M has a M8 center hole, DR form, for mounting of the pulse generator 1XP8 001 or for fitting and extraction tools. The non-drive end of the 1LG4 and 1LG6 motors with the frame sizes 180 M to 315 L has a M16 center hole, DR form.

Second standard shaft extension.

Order Code **K16** (extra charge).

The second shaft extension can transmit the full rated output via a coupling drive output up to frame size 315 M (please enquire about reduced transmitted power for frame sizes larger than 315 L). The full rated output does not apply to 1LA motors, frame sizes 90 S to 112 M. These motors can only transmit the rated output of the next lower size.

Please also enquire about the transmitted power and maximum cantilever force if belt pulleys, chains or gear pinions are used on the second shaft extension.

A second shaft extension is not available if a pulse generator and/or separately driven fan is mounted. Please enquire if a brake is mounted.

■ Dimensions and tolerances for key ways and keys designed to DIN EN 50 347. The motors are always delivered with inserted key.

Balance and vibration severity

All the rotors are dynamically balanced with half keys to vibration severity grade N (standard). DIN EN 60 034-14 controls the vibration behavior of machines. This standard stipulates the "half key" type of balancing in line with DIN ISO 8821.

Vibration severity grade	Rated speed range rpm	Free suspension				Rigid installation $H > 400$
		$56 < H \leq 132$	$132 < H \leq 225$	$225 < H \leq 400$	$H > 400$	
N	600 to 3600	1.8	2.8	3.5	3.5	2.8
R	600 to 1800	0.71	1.12	1.8	2.8	1.8
	>1800 to 3600	1.12	1.8	2.8	2.8	1.8
S	600 to 1800	0.45	0.71	1.12	—	—
	>1800 to 3600	0.71	1.12	1.8	—	—

Remember that the measured values may deviate from the actual values by ±10%.

The type of balancing is marked on the drive-end shaft extension of the motor as follows:

F = Balancing with full key

H = Balancing with half key

N = Balancing without key

Motors up to frame size 80 have the type of balancing marked on the rating plate.

Full key balancing can be supplied if Order Code **L68** is specified (extra charge).

Precision-balanced motors can be supplied for meeting stricter specifications regarding the mechanical balance quality (extra charge).

Vibration severity grade R (reduced).

Order Code **K01**.

Vibration severity grade S (special) to order. (Not available with parallel roller bearing)

The values quoted here are applicable to freely suspended motors running uncoupled and at no load, as well as to rigidly installed 1LA8 motors, frame size 450.

For further details see Catalogue M 10.

■ Precision-balanced designs of pole-changing motors are available in accordance with DIN EN 60 034-14.

Squirrel-cage motors

Technical information

Mechanical design

2

Noise (direct on-line operation)

The noise levels are measured in accordance with DIN EN 21 680-1 in a dead room with rated power. L_{pfa} is specified in dB (A) as the A-weighted measuring-surface sound pressure level.

This value is the spatial mean value of the sound pressure levels measured on the test hemisphere. This test hemisphere is a cuboid at a distance of 1 m from the machine surface. In addition, the sound power level L_{WA} is specified in dB (A). The values are applicable at 50 Hz with a tolerance of +3 dB. They are approximately 4 dB (A) higher at 60 Hz.

Please enquire about the noise levels for pole-changing motors, motors with an increased power output or motors for converter-fed operation.

A-weighted measuring-surface sound pressure level and soundpower

Standard design

Type series	Size	Measuring-surface sound pressure level (L_{pfa})							
		2-pole		4-pole		6-pole		8-pole	
		L_{pfa} dB(A)	L_{WA} dB(A)	L_{pfa} dB(A)	L_{WA} dB(A)	L_{pfa} dB(A)	L_{WA} dB(A)	L_{pfa} dB(A)	L_{WA} dB(A)
1LA5,	56	41	52	42	53	38	49	—	—
1LA6,	63	49	60	42	53	39	50	—	—
1LA7,	71	52	63	44	55	39	50	36	47
1LA9,	80	56	67	47	58	40	51	41	52
1MA7,	90	60	72	48	60	43	55	41	53
1MA6,	100	62	74	53	65	47	59	45	57
1MJ6	112	63	75	53	65	52	64	49	61
	132	68	80	62	74	63	75	53	65
	160	70	82	66	78	66	78	63	75
	180	70	83	63	76	66	78	60	73
	200	71	84	65	78	66	78	58	71
	225	71	84	65	78	59	72	58	71
	250	75	89	65	79	60	74	57	71
	280	77	91	67	81	60	74	58	72
	315	79	93	69	83	63	77	62	76
1LG4	180	69	82	65	78	59	72	67	80
	200	73	86	66	79	59	72	57	70
	225	73	86	66	79	60	73	61	74
	250	75	88	67	80	61	74	55	68
	280	74	87	70	83	61	74	58	71
	315	79	92	70	83	65	78	64	77
1LG6	180	67	80	60	73	56	69	66	79
	200	71	84	62	75	59	72	66	79
	225	71	84	60	73	59	72	58	71
	250	71	84	65	78	60	73	57	70
	280	73	86	67	80	58	71	58	71
	315	76	89	68	81	61	74	64	77
1LG4 increased power	180	71	84	65	78	59	72	67	80
	200	73	86	66	79	61	74	57	70
	225	73	86	66	79	60	73	61	74
	250	75	88	67	80	61	74	55	68
	280	74	87	70	83	61	74	58	71
	315	—	—	—	—	65	78	64	77
1LA8	315	82	97	73	87	68	82	65	79
1MA8	315	75 ¹⁾	90 ¹⁾	73	87	68	82	—	—
1LA8, 1MA8	355	77 ¹⁾	92 ¹⁾	75	90	71	86	67	82
	400	79 ¹⁾	94 ¹⁾	78	93	73	88	69	84
	450	81 ¹⁾	96 ¹⁾	81	96	75	90	71	86
1MJ8	315	80	94	70	84	70	84	69	83
	355	82	97	73	88	75	90	73	88
1MJ1	355	Available soon							
	400	Available soon							
	450	Available soon							

In order to reduce noise levels, 2-pole motors with frame size 132 S or larger can be fitted with an axial-flow fan that is suitable for one direction of rotation only.

Clockwise rotation
Order Code **K37**

Anticlockwise rotation
Order Code **K38**

1) The standard motors have an axial-flow fan for clockwise rotation. Order Code **K37** is not needed. For anticlockwise rotation please state Order Code **K38**.

Low-noise design

Type series	Size	2-pole motors	
		L_{pfa} dB	L_{WA} dB
1LA5, 1LA6,	132	64	76
1LA7, 1MA7,	160	64	76
1MA6, 1MJ6	180	63	76
	200	63	76
	225	68	80
	250	70	82
	280	72	84
	315	74	86
1LG4, 1LG6	180	65	78
	200	70	83
	225	68	81
	250	70	83
	280	72	85
	315	74	87
1LA8	315	75	90
1MJ8	315	68	82
	355	69	84
1MJ1	355	Available soon	
	400	Available soon	
	450	Available soon	

The motors up to frame size 315 L are up to 80 mm longer than normal.
A second shaft extension and/or pulse generator mounting is not possible.

Bearings

Bearing life (nominal rated life)

The nominal bearing life is specified by standard calculation methods (DIN ISO 281) and is achieved or exceeded by 90 % of bearings when operated in accordance with catalogue specifications.

If the operating conditions are below average, a bearing life of 100000 (L_{10h}) hours can be achieved.

The bearing life essentially depends on the size of the bearing, the load, the operating conditions, the speed, and the lubrication interval.

Bearing system

The nominal bearing life of motors with horizontal type of construction is at least 40,000 hours if there is no additional axial loading at the output coupling; with the maximum permitted loads it is at least 20,000 hours provided the motor is operated at 50 Hz. The nominal bearing life is reduced for converter-fed operation with higher frequencies.

In the basic design of the bearings system, the floating bearing is at the drive end (DE) and the located bearing (axially fixed from frame size 160) at the non-drive end (NDE). The located bearings can also be fitted to the drive end (DE) on request, (Fig. 3 Page 2/34).

Order Code **K94**

The bearings system is axially pre-loaded with a spring which ensures that the motor runs smoothly and free of clearance.

This does not apply to designs with parallel roller bearings. The bearings of these motors must always be operated with sufficient radial force (do not operate motor in test bay without additional axial loading).

The motors of the 1LA6, 1LA7, 1LA9, and 1MA7 series up to and including frame size 132 are fitted with a floating bearings system (Fig. 1 Page 2/34).

An additional axially secured bearing at the non-drive end (NDE) with a retaining ring can be delivered up to frame size 132 on request (Fig. 2 Page 2/34).

Order Code **L04**

From frame size 160, all bearings are axially fixed (Fig. 2, 4 and 5, Page 2/34).

If high cantilever forces are exerted at the drive end, e.g. owing to a belt transmission, the motors can be fitted with strengthened bearings on request.

Order Code **K20**

The 1LG4/6 motors, frame sizes 180 to 250, can be delivered with strengthened deep-groove ball bearings on both sides (dimension series 03).

Order Code **K36**

See pages 2/32 and 2/33 for a selection of bearings for high cantilever forces; maximum loadings on Page 2/37.

Prelubricated

For prelubricated bearings, the grease life is tailored to the bearing life. However, the motor must be operated according to catalogue specifications.

Standard motors with a frame size of up to and including 250 are prelubricated.

Regreaseable

The bearing life of regreasable motors can be increased by observing specified relubrication intervals; this can also compensate for other factors such as temperatures, ingress of liquids, speed, bearing size, and mechanical load.

From frame size 280, the bearings can be regreased with a flat-type grease nipple M10 x 1 in accordance with DIN 3404.

Regreasable bearings can be fitted in motors with frame sizes 100 to 250.

Order Code **K40**

Type of lubrication	Size	Number of poles	Grease life up to CT 40 °C ¹⁾
Prelubricated	Up to 250	2	20 000 h
		4 to 8	40 000 h Relubrication interval
Regreasing	180 to 280	2	4000 h
		4 to 8	8000 h
	315	2	3000 h
		4 to 8	6000 h
	355 to 450	2 and 4	2000 h
		6 and 8	4000 h

1) If the temperature is increased by 10 K, the grease life reduces by half.

Squirrel-cage motors

Technical information

Mechanical design

2

Bearings (continued)

Selection of bearings for 1LA, 1LG, and 1MA motors, basic design

For motors Frame size	Type 1LA5 ... 1LA6 ... 1LA7 ... 1LA9 ... 1MA6 ... 1MA7 ...	Number of poles	Drive-end bearing	Non-drive end bearing	Fig. No. on pages
56 M	.... 05 .	all	6201 2ZC3	6201 2ZC3	Fig. 1
63 M	.... 06 .	all	6201 2ZC3	6201 2ZC3	
71 M	.... 07 .	all	6202 2ZC3	6202 2ZC3	
80 M	.... 08 .	all	6004 2ZC3	6004 2ZC3	
90 S/L	.... 09 .	all	6205 2ZC3	6004 2ZC3	
100 L	.... 10 .	all	6206 2ZC3 ¹⁾	6205 2ZC3 ¹⁾	
112 M	.... 113	all	6206 2ZC3 ¹⁾	6205 2ZC3 ¹⁾	
132 S/M	.... 13 .	all	6208 2ZC3 ¹⁾	6208 2ZC3 ¹⁾	
160 M/L	.... 16 .	all	6209 2ZC3 ¹⁾	6209 2ZC3 ¹⁾	Fig. 2
180 M/L	.... 18 .	all	6210 ZC3 ¹⁾	6210 ZC3 ¹⁾	Fig. 4
200 L	.... 20 .	all	6212 ZC3 ¹⁾	6212 ZC3 ¹⁾	
225 S/M	.... 22 .	all	6213 ZC3 ¹⁾	6212 ZC3 ¹⁾	
250 M	.... 253	all	6215 ZC3 ¹⁾	6215 ZC3 ¹⁾	
280 S	.... 28 .	2	6216 C3	6216 C3	
280 M	}	4 to 8	6317 C3	6317 C3	Fig. 5
315 S		2	6217 C3	6217 C3	
315 M	}	4 to 8	6319 C3	6319 C3	
315 L		2	6217 C3	6217 C3 ³⁾	7217 B ³⁾
		4 to 8	6319 C3	6319 C3	6319 C3
	1LG4 1LG6				
180 M/L	.... 18 .	all	6210 Z C3 ²⁾	6210 Z C3 ²⁾	Fig. 4
200 L	.... 20 .	all	6212 Z C3 ²⁾	6212 Z C3 ²⁾	
225 S	.... 22 .	all	6213 Z C3 ²⁾	6213 Z C3 ²⁾	
225 M					
250 M	.... 25 .	all	6215 Z C3 ²⁾	6215 Z C3 ²⁾	
280 S	.... 28 .	2	6217 C3	6217 C3	
280 M		4 to 8	6317 C3	6317 C3	
315 S	.... 310	2	6219 C3	6219 C3	
315 M	}	4 to 8	6319 C3	6319 C3	Fig. 5
315 L		2	6219 C3	6219 C3	
		4 to 8	6319 C3	6319 C3	7219 BEP
	1LA8 ... 1MA8 ...				Fig. 5
315	.... 31 .	2	NU 215 E + 6215 C3	6215 C3	7215 B
	4 to 8	NU 218 E + 6218 C3	6218 C3	7218 B	
355	.... 35 .	2	NU 217 E + 6217 C3	6217 C3 ³⁾	7217 B ³⁾
	4 to 8	NU 220 E + 6220 C3	6220 C3	7220 B	
400	1LA8 40 .	2	NU 217 E + 6217 C3	6217 C3 ³⁾	7217 B ³⁾
	4 to 8	NU 224 E + 6224 C3	6224 C3	7224 B	
450	1LA8 45 .	2	NU 219 E + 6219 C3 ³⁾	6219 C3 ³⁾	7218 B ³⁾
	4 to 8	NU 226 E + 6226 C3	6226 C3	7226 B	

The bearing selection tables are only intended for planning purposes. Authoritative information on the actual type of bearings fitted in motors already supplied

can be obtained from the factory by quoting the serial number or read off on the lubrication instruction plate of 1LA8 motors.

When deep-groove ball bearings with sideplates are used, the sideplate is on the inside. Fig. 3 (page 2/34) shows the non-standard design with a locating bearing at the drive

end for 1LA5, 1LA7, 1LA9, 1MA6, and 1MA7 motors.

1) Deep-groove bearings are used for regreasable designs (K40), (does not apply to 1LA6).

2) No deep-groove bearings are used for regreasable designs (K40).
3) Only at 50 Hz.

Bearings (continued)

Selection of bearings for 1MJ motors – basic design

For motors Frame size	Type	Number of poles	Drive-end bearing	Non-drive end bearing	Fig. No. on Page 2/35
Horizontal and vertical motors					
71 M	1MJ6 07 .	all	6202 ZC3	6202 ZC3	Fig. 8
80 M	1MJ6 08 .	all	6004 ZC3	6004 ZC3	
90 L	1MJ6 09 .	all	6205 C3	6205 C3	Fig. 9
100 L	1MJ6 10 .	all	6206 C3	6206 C3	
112 M	1MJ6 11 .	all	6306 C3	6306 C3	
132 S 132 M	1MJ6 13 .	all	6308 C3	6308 C3	Fig. 10
160 M 160 L	1MJ6 16 .	all	6309 C3	6309 C3	
180 M 180 L	1MJ6 18 .	all	6210 C3	6210 C3	Fig. 11
200 L	1MJ6 20 .	all	6212 C3	6212 C3	
225 S 225 M	1MJ6 22 .	all	6213 C3	6213 C3	
250 M	1MJ6 253	all	6215 C3	6215 C3	
280 S 280 M	1MJ6 28 .	all	NU 216	6216 C3	Fig. 12
315 S 315 M	1MJ6 31 .	2 4 to 8	NU 217 NU 218	6217 C3 6218 C3	
315	1MJ8 31 .	2 4 to 8	6316 C3 6320 C3	6316 C3 6320 C3	Fig. 13
355	1MJ8 35 .	2 4 to 8	6316 C3 6320 C3	6316 C3 6320 C3	6316 C3 6320 C3
355 400 450	1MJ1 35 1MJ1 40 1MJ1 45	available soon			

Squirrel-cage motors

Technical information

Mechanical design

2

Bearings (continued)

Selection of bearings for 1LA, 1MA, and 1MJ motors, bearings for high cantilever forces, Order Code K20

Please enquire about 1MJ8 and 1MJ1 motors

For motors Frame size	Type	Number of poles	Drive-end bearing	Non-drive end bearing
100	1LA5 . . .	all	6306 ZC3 ⁴⁾	6205 2ZC3 ⁶⁾
112	1LA6 . . .	all	6306 ZC3 ⁴⁾	6205 2ZC3 ⁶⁾
132	1LA7 . . .	all	6308 ZC3 ⁴⁾	6208 2ZC3 ⁶⁾
160	1LA9 . . .	all	6309 ZC3 ⁴⁾	6209 2ZC3 ⁶⁾
180	1MA6 . . .	all	6310 ZC3 (NU 210) ²⁾	6210 ZC3 ⁶⁾
200	1MA7 . . .	all	6312 ZC3 (NU 212) ²⁾	6212 ZC3 ⁶⁾
225	1MJ6 . . .	all	NU 213 E ³⁾ (6313 ZC3) ⁵⁾	6212 ZC3 ⁶⁾
250	1MA8 . . .	all	NU 215 E ³⁾	6215 ZC3 ⁶⁾
280	310	2	NU 216 E ³⁾	6216 C3
	313	4 to 8	NU 317 E ³⁾	6317 C3
315 S	316	2	NU 217 E ³⁾	6217 C3
315 M	317	4 to 8	NU 319 E ³⁾	6319 C3
315 L	318	2	NU 217 E ³⁾	6217 C3
		4 to 8	NU 319 E ³⁾	NU 319 E ¹⁾ 6319 C3 7217 B ¹⁾
	1LA8 . . .			
	1MA8 . . .			
315	31 . . .	4 to 8	NU 320 E	On request 6218 C3 On request
355	35 . . .	4 to 8	NU 322 E	On request 6220 C3 On request

Noise and vibration data on request.

An increased cantilever force is required for NU bearings as compared with standard bearings.

The bearing selection tables are only intended for planning purposes. Authoritative information on the actual type of bearings fitted in motors already supplied can be obtained

from the factory by quoting the serial number.

When deep-groove ball bearings with sideplates are used, the sideplate is on the inside. 1MJ8 motors for 60 Hz on request.

1) Only for 50 Hz.

2) Bracketed data for 1MJ6 motors.

3) Also deep-groove ball bearings of the dimension series 03 are possible (Order Code **K36**).

4) Does not apply to 1MJ6 motors.

5) Bracketed data for 1LA5.

6) Deep-groove bearings are used for regreasable designs (K40) (does not apply to 1LA6).

Bearings (continued)

Selection of bearings for 1LG4/6 motors, bearings for high cantilever forces, Order Code K20

For motors Frame size	Type 1LG4 ... 1LG6 ...	Number of poles	Drive-end bearing	Non-drive end bearing	Fig. No. on Page 2/34
180 M 180 L	.... 18 ..	all	NU210	6210 C3	Fig. 4
200 L	.... 20 ..	all	NU212	6212 C3	
225 S 225 M	.... 22 ..	all	NU213	6213 C3	
250 M	.... 25 ..	all	NU215	6215 C3	
280 S 280 M	.... 28 ..	2 4 to 8	NU217 NU317	6217 C3 6317 C3	Fig. 5
315 S 315 M	.... 310 } 313 }	2 4 to 8	NU219 NU319	6219 C3 6319 C3	
315 L	.... 316 } 317 } 318 }	2 4 to 8	NU219 NU319	6219 C3 6319 C3	

Bearings for 1LG4/6 motors, strengthened deep-groove ball bearings on both sides, Order Code K36

For motors Frame size	Type 1LG4 ... 1LG6 ...	Number of poles	Drive-end bearing	Non-drive end bearing	Fig. No. on Page 2/34
180 M 180 L	.... 18 ..	all	6310 Z C3 ¹⁾	6310 Z C3 ¹⁾	Fig. 4
200 L	.... 20 ..	all	6312 Z C3 ¹⁾	6312 Z C3 ¹⁾	
225 S 225 M	.... 22 ..	all	6313 Z C3 ¹⁾	6313 Z C3 ¹⁾	
250 M	.... 25 ..	all	6315 Z C3 ¹⁾	6315 Z C3 ¹⁾	

1) No deep-groove bearings are used
for regreasable designs (K40).

Squirrel-cage motors

Technical information

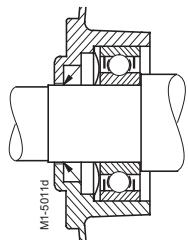
Mechanical design

2

Bearings (continued)

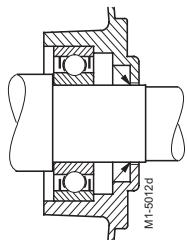
Bearing diagrams

Fig. 1 Drive-end bearing



M1-5011d

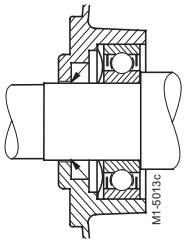
Non-drive end bearing



M1-5012d

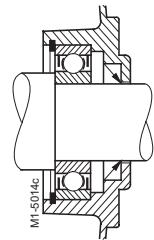
Fig. 2

Drive-end bearing



M1-5013c

Non-drive end bearing

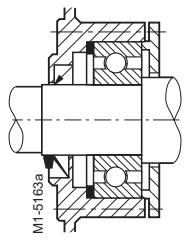


M1-5014c

Fig. 3 Drive-end bearing

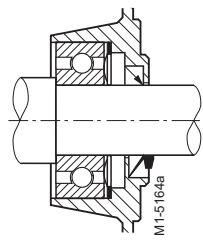
Non-drive end bearing

Locating bearings for 1LA7, 1LA9, 1MA7, frame sizes 56 to 160



M1-5163a

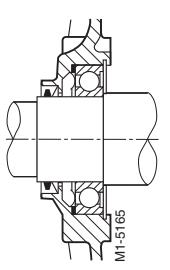
Non-drive end bearing



M1-5164a

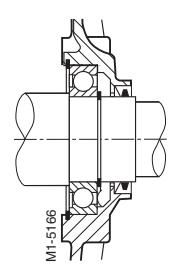
Fig. 4

Drive-end bearing



M1-5165

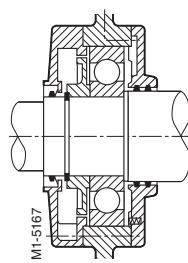
Non-drive end bearing



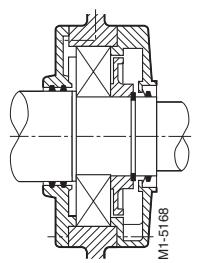
M1-5166

Fig. 5 Drive-end bearing

Non-drive end bearing



M1-5167



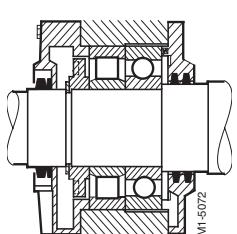
M1-5168

Frame sizes
280 S to 315 M, 2-pole
280 S to 315 L, 4- to 8-pole
315 L, 2-pole horizontal

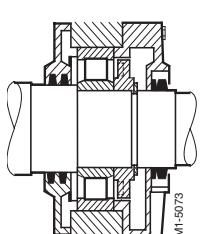
Non-drive end bearing:
Frame sizes
280 S to 315 L
Drive-end bearing:
Frame sizes
315 L, 2-pole vertical

Fig. 6 Drive-end bearing

Non-drive end bearing



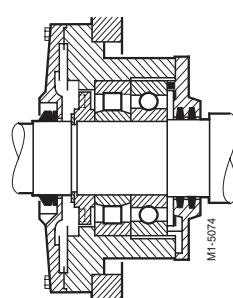
M1-5072



M1-5073

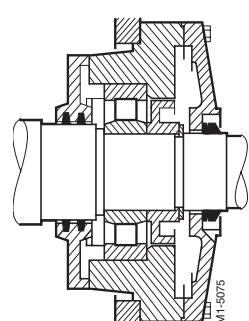
Frame sizes
315 to 400, 2- to 8-pole, IM B 3
450, 4- to 8-pole, IM B 3

Drive-end bearing



M1-5074

Non-drive end bearing

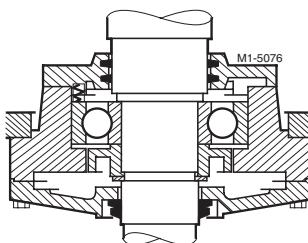


M1-5075

Bearings (continued)

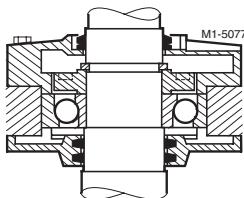
Bearing diagrams

Fig. 7 Drive-end bearing



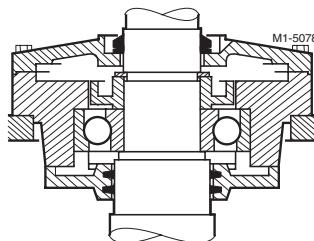
Frame sizes
315, 2- to 8-pole, IM V 1
355 and 450, 4- to 8-pole, 50 Hz, IM V 1

Non-drive end bearing



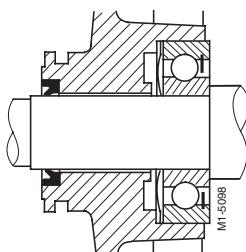
Frame sizes
315, 2- to 8-pole, IM V 1
355 and 450, 4- to 8-pole, 50 Hz, IM V 1
450, 4- to 8-pole, 50 Hz, IM V 1

Non-drive end bearing



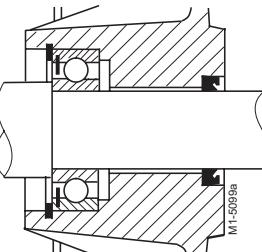
Frame sizes
450, 2-pole, 50 Hz, IM B 3

Fig. 8 Drive-end bearing



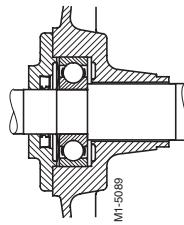
Frame sizes
315, 2- to 8-pole, IM V 1
355 and 450, 4- to 8-pole, 50 Hz, IM V 1

Non-drive end bearing



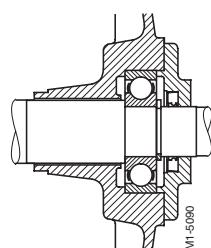
Frame sizes
315, 2- to 8-pole, IM V 1
355 and 450, 4- to 8-pole, 50 Hz, IM V 1

Fig. 9 Drive-end bearing



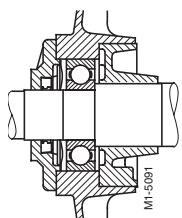
M1-5089

Non-drive end bearing



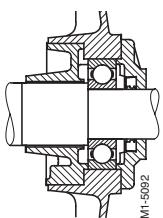
M1-5090

Fig. 10 Drive-end bearing



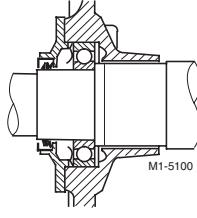
Frame sizes
315, 2- to 8-pole, IM V 1
355 and 450, 4- to 8-pole, 50 Hz, IM V 1

Non-drive end bearing



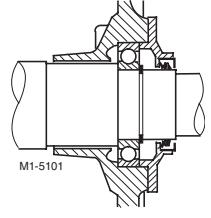
Frame sizes
315, 2- to 8-pole, IM V 1
355 and 450, 4- to 8-pole, 50 Hz, IM V 1

Fig. 11 Drive-end bearing



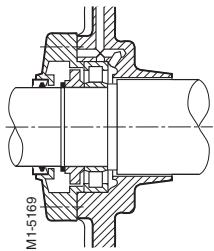
M1-5100

Non-drive end bearing



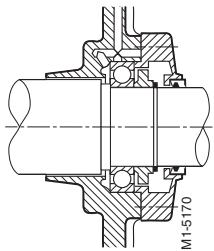
M1-5101

Fig. 12 Drive-end bearing



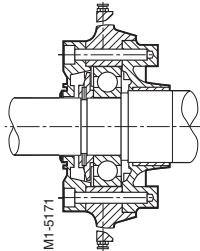
M1-5169

Non-drive end bearing



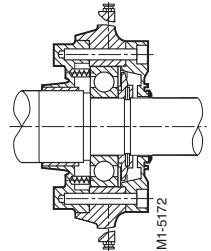
M1-5170

Fig. 13 Drive-end bearing



M1-5171

Non-drive end bearing



M1-5172

Drive-end and non-drive-end bearings
from frame size 315
Outer bearing seal
for frame size 400 and 450
with labyrinth gland

Squirrel-cage motors

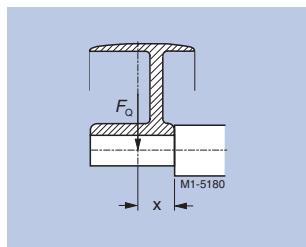
Technical information

Mechanical design

2

Maximum cantilever forces

Maximum cantilever forces, basic design



The values for the maximum cantilever force F_Q (N) with a radial load are based on the assumption that the line of force (i.e. the center line of the pulley) is still within the free shaft extension (dimension x).

Dimension x (mm) is the distance from the shoulder of the shaft to the line of action of the force F_Q . Dimension x_{max} is thus the length of the shaft extension.

Total cantilever force $F_Q = c \cdot F_u$

The pretensioning factor c is an empirical value determined by the belt manufacturer. It can be approximated as follows:

For normal flat leather belts with an idler pulley $c = 2$;
for V-belts $c = 2$ to 2.5;
for special synthetic belts (depending on the type and load) $c = 2$ to 2.5.

The peripheral force F_u (N) can be calculated from the following equation

$$F_u = 2 \cdot 10^7 \frac{P}{n \cdot D}$$

F_u Peripheral force in N

P Motor rated output (transmitted power) in kW

n Motor rated speed in rpm

D Belt pulley diameter in mm

Standard belt pulleys conforming to DIN 2211, Sheet 3.

The maximum cantilever forces for 60 Hz are approx. 80% of the 50 Hz values (please enquire).

Maximum cantilever forces for 50 Hz, basic version

Valid is: x_0 values refer to $x = 0$ and x_{max} values to $x = l$

For motors	Max. cantilever force at x_0			Max. cantilever force at x_{max}		
	No. of poles	Type	Type	No. of poles	Type	Type
	1LA5	1LG4	1MJ6	1LA5	1LG4	1MJ6
	1LA7	1LG6		1LA7	1LG6	
	1LA9	1LA6		1LA9	1LA6	
	1MA6			1MA6		
	1MA7			1MA7		
	N	N	N	N	N	N
56 M	2	270	—	—	240	—
	4	350	—	—	v305	—
	6	415	—	—	360	—
63 M	2	270	—	—	240	—
	4	350	—	—	305	—
	6	415	—	—	360	—
71 M	2	415	—	415	355	—
	4	530	—	530	450	—
	6	630	—	630	535	—
	8	690	—	—	585	—
80 M	2	485	—	485	400	—
	4	625	—	625	515	—
	6	735	—	735	605	—
	8	815	—	—	675	—
90 S	2	725	—	725	605	—
90 L	4	920	—	920	775	—
	6	1090	—	1090	910	—
	8	1230	—	1230	1030	—
100 L	2	1030	1100	1030	840	840
	4	1310	1450	1310	1060	1060
	6	1550	1650	1550	1250	1250
	8	1720	1820	1720	1400	1400
112 M	2	1010	1600	1680	830	1490
	4	1270	2100	1960	1040	1580
	6	1520	2400	2140	1240	1720
	8	1690	2650	2450	1380	1950
132 S	2	1490	2350	2250	1180	1820
132 M	4	1940	3000	2720	1530	2170
	6	2260	3500	3100	1780	2420
	8	2500	3800	3400	1980	2700
160 M	2	1540	2900	2800	1210	2250
160 L	4	2040	3700	3330	1590	2600
	6	2330	4250	3750	1820	2900
	8	2660	4700	3750	2080	2900
180 M	2	2000	1780	2000	1550	1410
180 L	4	2350	2240	2350	1950	1820
	6	2800	2550	2800	2250	2120
	8	3050	2860	3050	2500	2330
200 L	2	2550	2380	2550	2100	1930
	4	3350	3050	3350	2750	2530
	6	3900	3500	3900	3200	2930
	8	4150	3800	4150	3450	3210
225 S	2	3050	2820	3050	2550	2290
225 M	4	3750	3500	3750	2950	2760
	6	4550	4050	4550	3600	3240
	8	4850	4500	4850	3900	3500

Maximum cantilever forces for 50 Hz, basic version

Valid is: x_0 values refer to $x = 0$ and x_{max} values to $x = l$

For motors	Max. cantilever force at x_0			Max. cantilever force at x_{max}		
	Size	No. of poles	Type	No. of poles	Type	Type
			1LG4	1MA6	1MJ6	1LG4
			1LG6			1LG6
			N	N	N	N
250 M	2	3190	3650	3650	2530	2950
	4	4000	4400	4400	3350	3600
	6	4700	5350	5350	3900	4350
	8	5200	5700	5700	4400	4700
280 S	2	4000	3350	8100	3250	2800
280 M	4	8400	8400	7200	7000	7200
	6	9700	10000	8500	8100	9700
	8	10750	11000	9500	9000	9850
315 S	2	4750	3950	9000	3890	3350
315 M	4	9100	9900	13100	7300	8100
	6	10700	12100	15600	8700	9900
	8	11600	13300	16900	9600	10900
315 L	2	4000	3100	18400	3280	2700
	4	8400	8800	22500	7500	7450
	6	9700	11400	25200	9100	9600
	8	11100	12500	27700	10200	10500
			1LA8	1MJ8	1LA8	1MJ8
			1MA8	1MJ1 ¹⁾	1MA8	1MJ1 ¹⁾
315	2	8650	see diagrams		7600	see diagrams
	4	15400	Page 2/38		13200	Page 2/38
	6	17200			14700	
	8	19000			14300	
355	2	10600	see diagrams		9500	see diagrams
	4	21200	Page 2/38		18600	Page 2/38
	6	23400			18400	
	8	25700			16300	
400	2	9800	see diagrams		8700	see diagrams
	4	28400	Page 2/38		24300	Page 2/38
	6	31200			27000	
	8	34500			27600	
450	2	13500	see diagrams		12100	see diagrams
	4	29200	Page 2/38		25500	Page 2/38
	6	32500			31300	
	8	36100			31300	

1) Data for 1MJ1 available soon

Please note that in the case of the IM B 6, IM B 7, IM B 8, IM V 5, and IM V 6 types of construction, the belt tension is only allowed to act parallel to or towards the mounting plane and the feet must be braced. Both feet must be secured for foot-mounting construction. Refer to pages 2/37 to 2/39 if the cantilever forces are higher than those listed above.

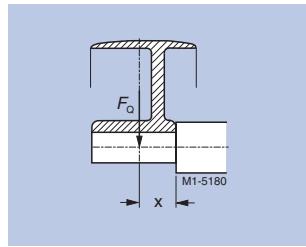
Maximum cantilever forces (continued)

Bearings for increased cantilever forces

Maximum cantilever forces for 50 Hz for type 1LA, 1MA, and 1MJ motors

Deep-groove bearings at drive-end (DE) – Order Code K20

For motors			Maximum cantilever force at F_Q	
Size	Type	Number of poles	at x_0	at $x_{max.}$
100	1LA5 . . .	2	1680	1490
		4	1960	1580
		6	2140	1720
		8	2450	1950
112	1LA6 . . .	2	1680	1490
		4	1960	1580
		6	2140	1720
		8	2450	1950
132	1LA7 . . .	2	2250	1820
		4	2720	2170
		6	3100	2420
		8	3400	2700
160	1LA9 . . .	2	2800	2250
		4	3330	2600
		6	3750	2900
		8	3750	2900
180	1MA6 . . .	2	3700	3000
		4	4450	3600
		6	5100	4150
		8	5550	4500
200	1MA7 . . .	2	5200	4300
		4	6450	5350
		6	7300	6100
		8	7900	6550



Maximum cantilever forces for 50 Hz for type 1LA, 1MA, and 1MJ motors

Parallel roller bearings at drive-end (DE) – Order Code K20

For motors			Maximum cantilever force at F_Q	
Size	Type	Number of poles	at x_0	at $x_{max.}$
225	1LA5 . . .	2	8100	6800
		4	9800	7800
		6	11200	8800
		8	12200	9700
250	1LA6 . . .	2	9600	7900
		4	11600	9600
		6	13200	10800
		8	14400	11800
280	1LA7 . . .	2	10000	8400
315 S	1MA6 . . .	2	12000	10200
315 M	1MA7 . . .	2	11800	10200
315 L	1MJ6 . . .	2	11800	10200
		317		(horizontal motors)

Please note that in the case of the IM B 6, IM B 7, IM B 8, IM V 5, and IM V 6 types of construction, the belt tension is only allowed to act parallel to or towards the mounting plane and the feet must be braced.

Maximum cantilever forces at 50 Hz for type 1LG motors

Parallel roller bearings at drive-end (DE) – Order Code K20

Valid is: x_0 values refer to $x = 0$ and $x_{max.}$ values to $x = l$

For motors			Maximum cantilever force at F_Q	
Size	Type	Number of poles	at x_0	at $x_{max.}$
180 M	1LG4 . . .	2	4550	3600
180 L	1LG6 . . .	4	5650	4050
		6	6350	4050
		8	6950	4050
200 L	1LG4 . . .	2	6600	5350
		4	8200	6850
		6	9300	6300
		8	10100	400
225 S	1LG4 . . .	2	7500	6250
225 M	1LG6 . . .	4	9150	7200
		6	10400	7400
		8	11300	7350
250 M	1LG4 . . .	2	9100	7300
		4	11300	9300
		6	12800	10500
		8	14100	10500
280 S	1LG4 . . .	2	11400	9350
280 M	1LG6 . . .	2	14700	12300
315 S	1LG4 . . .	2	14600	12700
315 M	1LG6 . . .	2	14600	12700
315 L	1LG4 . . .	2	14600	12700
		317		

Maximum cantilever forces at 50 Hz for type 1LG motors

Deep-groove bearings strengthened on both sides DE/NDE – Order Code K36

Valid is: x_0 values refer to $x = 0$ and $x_{max.}$ values to $x = l$

For motors			Maximum cantilever force at F_Q	
Size	Type	Number of poles	at x_0	at $x_{max.}$
180 M	1LG4 . . .	2	3280	2600
180 L	1LG6 . . .	4	4150	3430
		6	4750	3950
		8	5250	4050
200 L	1LG4 . . .	2	4350	3500
		4	5550	4550
		6	6350	5350
		8	7000	5900
225 S	1LG4 . . .	2	4850	3950
225 M	1LG6 . . .	4	6100	4850
		6	7050	5650
		8	7750	6150
250 M	1LG4 . . .	2	5800	4600
		4	7400	6050
		6	8500	7050
		8	9350	7850

Squirrel-cage motors

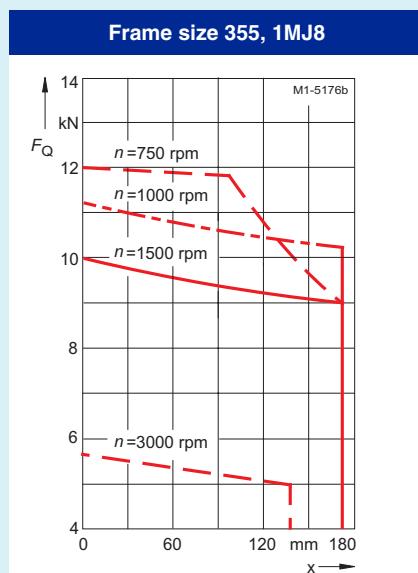
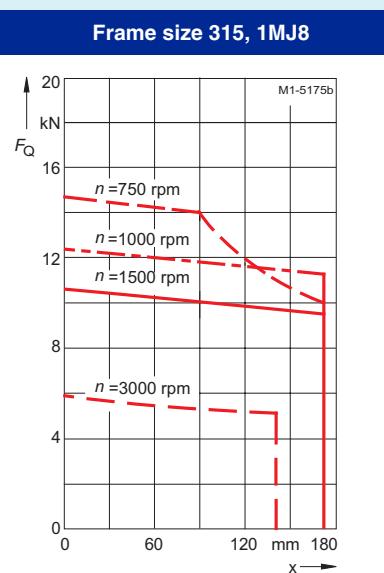
Technical information

Mechanical design

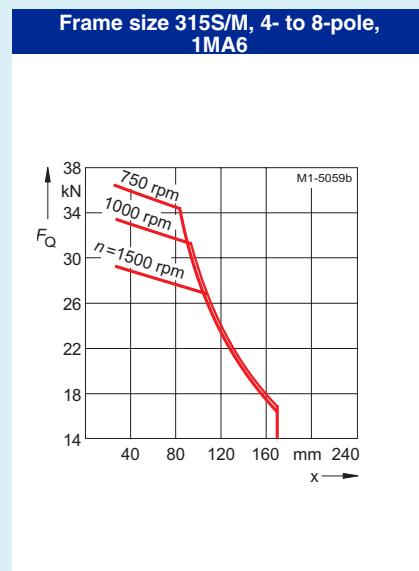
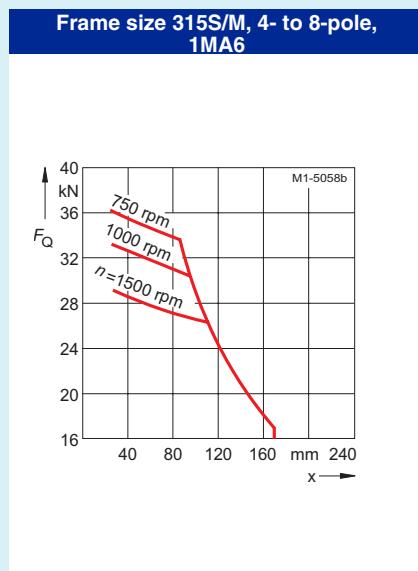
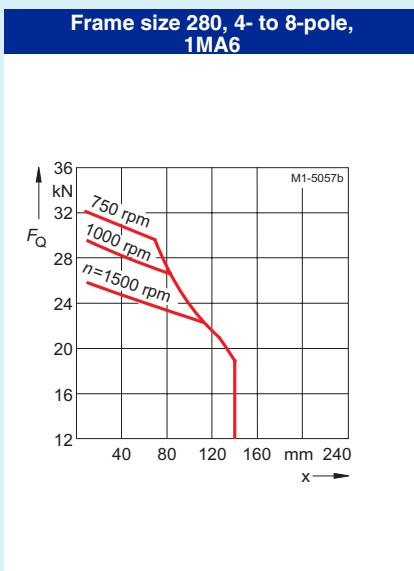
2

Maximum cantilever forces (continued)

Maximum cantilever forces at 50 Hz for type 1MJ8 motors, basic version



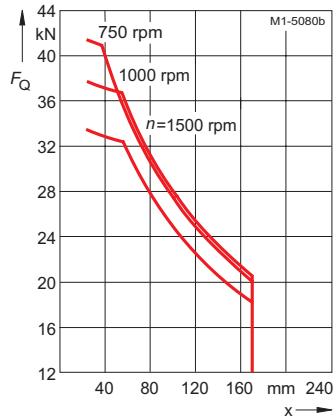
Maximum cantilever forces at 50 Hz for 1MA motors, bearings for high cantilever forces, Order Code K20



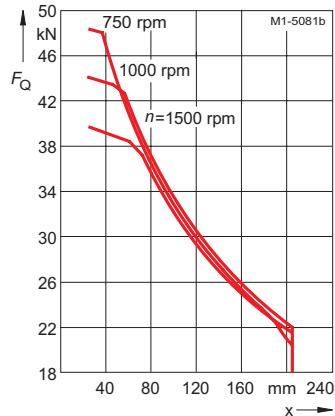
Maximum cantilever forces (continued)

Maximum cantilever forces at 50 Hz for 1LA, 1LG, and 1MA motors, bearings for high cantilever forces, Order Code K20 (continued)

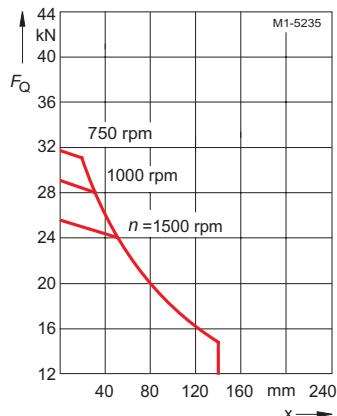
Frame size 315, 1LA8, 1MA8,
IM B 3 type of construction



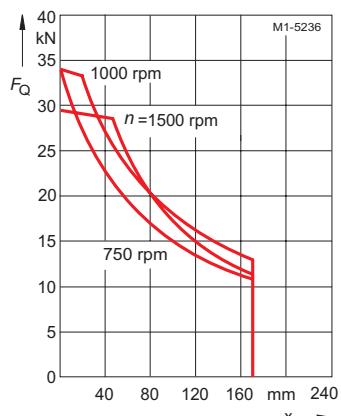
Frame size 355, 1LA8, 1MA8,
IM B 3 type of construction



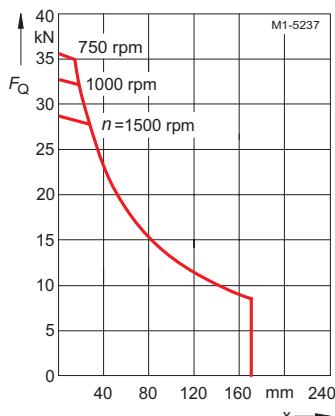
Frame size 280, 4- to 8-pole,
1LG4/1LG6



Frame size 315 L, 4- to 8-pole,
1LG4/1LG6



Frame size 315S/M, 4- to 8-pole,
1MA6



Squirrel-cage motors

Technical information

Mechanical design

2

Maximum axial load

Vertical 1LA, 1MA, and 1MJ motors

Frame size	With shaft extension															
	3000 rpm				1500 rpm				1000 rpm				750 rpm			
	downwards		upwards		downwards		upwards		downwards		upwards		downwards		upwards	
	Load down N	up N	Load down N	up N	Load down N	up N	Load down N	up N	Load down N	up N	Load down N	up N	Load down N	up N	Load down N	up N
56	80	245	230	95	80	330	310	95	80	410	390	95	—	—	—	—
63	80	245	230	95	80	330	310	95	80	410	390	95	—	—	—	—
71	105	365	335	130	90	380	440	130	90	590	550	130	90	700	660	130
80	110	425	360	160	100	540	480	165	100	650	590	165	100	760	700	165
90	110	440	360	180	100	680	580	190	100	920	820	190	100	1150	1050	190
100	140	700	550	280	130	990	820	285	130	1280	1110	285	130	1560	1390	285
112	140	710	550	300	130	1000	820	310	130	1290	1110	310	130	1570	1390	310
	(140)*	(1050)*	(800)*	(300)*	(130)*	(1350)*	(1100)*	(300)*	(130)*	(1720)*	(1500)*	(310)*	(130)*	(2000)*	(1850)*	(310)*
132	200	1200	950	470	180	1680	1200	470	180	1900	1600	470	190	2200	1900	440
	(1500)*	(1550)*	(1300)*	(470)*	(1500)*	(2100)*	(1600)*	(470)*	(280)*	(2400)*	(2100)*	(470)*	(290)*	(2800)*	(2400)*	(440)*
160	1500	1400	950	1900	1800	1300	2200	2200	1600	2700	2700	1950	2900			
	(2000)*	(1720)*	(1300)*	(2500)*	(2500)*	(2400)*	(1720)*	(2800)*	(2800)*	(2800)*	(2130)*	(3600)*	(3600)*	(2600)*	(3700)*	

Vertical 1LG motors, basic version

For motors		With shaft extension downwards								
Frame size	Type	3000 rpm		1500 rpm			1000 rpm		750 rpm	
		1LG4 ...	Load down	Load up	Load down	Load up	Load down	Load up	Load down	Load up
		1LG6 ...	N	N	N	N	N	N	N	N
180 M	.... 183	1140	1150	1500	1600	—	—	—	—	—
180 L	.... 186	—	—	1380	1630	1650	2000	2020	2250	
	.... 188	1140	1190	1390	1650	1640	2030	1880	2280	
200 L	.... 206	1610	1480	—	—	2420	2550	—	—	
	.... 207	1510	1530	2030	2100	2220	2610	2610	2970	
	.... 208	1510	1590	1990	2120	2210	2680	2600	3060	
225 S	.... 220	—	—	2110	2690	—	—	2830	3710	
225 M	.... 223	1540	1990	1920	2770	2260	3300	2620	3770	
	.... 228	1540	2070	1950	2840	2240	3430	2610	3880	
250 M	.... 253	1680	2760	2110	3740	2740	4350	3070	4920	
250 M	.... 258	1660	2870	2110	3960	2740	4520	3070	5160	
280 S	.... 280	390	4670	3190	8200	4510	9290	5510	10300	
280 M	.... 283	100	4780	2790	8340	4210	9450	5200	10400	
	.... 288	100	4950	2700	8570	4170	9600	5160	10600	
315 S	.... 310	840	6330	3380	10200	4760	11500	5860	12600	
315 M	.... 313	530	6490	2870	10500	4200	11800	5420	12900	
315 L	.... 316	8830	590	2450	11000	3680	12300	4800	13400	
	.... 317	8410	690	1800	11400	3100	12800	4410	13900	
	.... 318	8170	800	1620	12000	2690	13400	3820	14300	

Values shown without assuming
a cantilever force on the shaft
end.

* Bracketed values with frame sizes 112 to 160 apply to 1MJ6 motors.

Maximum axial load (continued)

Horizontal 1LA, 1MA, and 1MJ motors

Frame size	3000 rpm				1500 rpm				1000 rpm				750 rpm			
	Tensile load	Thrust load (N) with radial load at	without radial load	Tensile load	Thrust load (N) with radial load at	without radial load	Tensile load	Thrust load (N) with radial load at	without radial load	Tensile load	Thrust load (N) with radial load at	without radial load	Tensile load	Thrust load (N) with radial load at	without radial load	
	N	x_0	$x_{max.}$													
56	90	120	90	240	90	140	110	320	90	170	120	400	—	—	—	—
63	90	120	90	240	90	140	110	320	90	170	120	400	—	—	—	—
71	120	150	120	350	120	210	150	460	120	260	180	570	120	300	210	680
80	140	190	150	400	140	300	260	510	140	330	280	620	140	340	290	730
90	150	300	280	400	150	400	360	630	150	480	430	870	150	550	500	1100
100	220	450	350	630	220	600	500	910	220	650	550	1200	220	750	650	1480
112	220	450	350	630	220	600	500	910	220	650	550	1200	220	750	650	1480
	(220)*	(850)*	(700)*	(1050)*	(220)*	(1150)*	(1000)*	(1350)*	(220)*	(1300)*	(1150)*	(1720)*	(220)*	(1450)*	(1300)*	(2000)*
132	350	650	520	1200	350	850	700	1600	350	1020	890	1900	350	1150	1020	2200
	(350)*	(1000)*	(900)*	(1550)*	(350)*	(1250)*	(1150)*	(2100)*	(350)*	(1500)*	(1400)*	(2400)*	(350)*	(1750)*	(1650)*	(2800)*
160	1500	850	720	1500	1500	1050	920	1800	1500	1250	1120	2200	1500	1350	1220	2600
	(2100)*	(1280)*	(1100)*	(2100)*	(2100)*	(1680)*	(1700)*	(2350)*	(2100)*	(2050)*	(1920)*	(2900)*	(2100)*	(2400)*	(2200)*	(3300)*

Horizontal 1LG motors, basic version

Frame size	Type 1LG4 ... 1LG6 ...	3000 rpm				1500 rpm				1000 rpm				750 rpm			
		Loading direction		Loading direction		Loading direction		Loading direction		Loading direction		Loading direction		Loading direction			
		Tension	Thrust														
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
180 M	.... 183	1550	790	1950	1190	—	—	—	—	—	—	—	—	—	—	
180 L	.... 186	—	—	1890	1130	2220	1460	2470	1710	—	—	—	—	—	—	
	.... 188	1550	790	1900	1140	2220	1460	2460	1700	—	—	—	—	—	—	
200 L	.... 206	2150	990	—	—	3090	1940	—	—	—	—	—	—	—	—	
	.... 207	2130	970	2670	1520	3030	1880	3410	2260	—	—	—	—	—	—	
	.... 208	2130	970	2630	1480	3020	1870	3410	2250	—	—	—	—	—	—	
225 S	.... 220	—	—	2950	1920	—	—	3820	2790	—	—	—	—	—	—	
225 M	.... 223	2320	1290	2910	1880	3360	2330	3760	2740	—	—	—	—	—	—	
	.... 228	2320	1290	2910	1880	3350	2320	3760	2730	—	—	—	—	—	—	
250 M	.... 253	2510	1710	3150	2350	3750	2950	4180	3380	—	—	—	—	—	—	
250 M	.... 258	2510	1710	3140	2340	3750	2950	4170	3370	—	—	—	—	—	—	
280 S	.... 280	1790	3360	4970	6540	6180	7750	7170	8740	—	—	—	—	—	—	
280 M	.... 283	1720	3290	4860	6430	6110	7680	7090	8660	—	—	—	—	—	—	
	.... 288	1720	3290	4850	6420	6100	7670	7080	8650	—	—	—	—	—	—	
315 S	.... 310	2610	4180	5520	7520	6830	8830	7940	9940	—	—	—	—	—	—	
315 M	.... 313	2500	4070	5320	7320	6520	8520	7850	9850	—	—	—	—	—	—	
315 L	.... 316	2450	4020	5230	7230	6370	8370	7520	9520	—	—	—	—	—	—	
	.... 317	2320	3890	5050	7050	6110	8110	7350	9350	—	—	—	—	—	—	
	.... 318	2300	3870	4950	6950	5950	7950	7080	9080	—	—	—	—	—	—	

The maximum loads refer to 50 Hz; Please inquire about 60 Hz operation.

The figures for the maximum axial loads have been calculated assuming the maximum permitted cantilever forces.

Please ask for advice if the loading direction alternates (i.e. if the side from which the load is applied changes).

* Bracketed values with frame sizes 112 to 160 apply to 1MJ6 motors.

Squirrel-cage motors

Technical information

Mechanical design

2

Maximum axial load (continued)

Vertical 1LA, 1MA, and 1MJ motors

Frame size	Type	With shaft extension downwards																
		3000 rpm				1500 rpm				1000 rpm				750 rpm				
		Load down	Load up	Load down	Load up	Load down	Load up	Load down	Load up	Load down	Load up	Load down	Load up	Load down	Load up	Load down	Load up	
180 M	1LA5...	183	1150	1150	1900	1900	1400	1400	2350	2350	—	—	—	—	—	—	—	
180 L	186	—	—	—	—	1400	1400	2400	2400	1700	1700	2850	2850	2000	2000	3150	3150	
200 L	206	1650	1650	2750	2750	—	—	—	—	2550	2550	3950	3950	—	—	—	—	
	207	1550	1550	2800	2800	2000	2000	3350	3350	2400	2400	3950	3950	2800	2800	4500	4500	
225 S	220	—	—	—	—	2300	2300	3020	3020	—	—	—	—	3200	3200	4080	4080	
225 M	223	1890	1890	2190	2190	2180	2180	3060	3060	2700	2700	3500	3500	3040	3040	4120	4120	
250 M	253	1750	1750	2790	2790	2160	2160	3760	3760	2740	2740	4340	4340	2990	2990	4890	4890	
280 S	280	380	1150	4480	3850	3830	1350	8790	4950	5340	2350	10000	5650	6280	2850	11000	6250	
280 M	283	180	900	4580	3900	3550	1000	8910	5000	5000	2000	10100	5700	5930	2450	11100	6300	
315 S	310	210	900	5270	4500	3700	1700	10200	6400	5150	2300	11700	7050	6520	3400	13000	7950	
315 M	313	100	650	5350	4550	3330	1600	10400	6900	4740	2050	11700	7500	5801	2800	13000	8400	
315 L	316	9270	—	770	—	2330	—	10400	—	3650	—	11700	—	4630	—	13000	—	
	317	9270	—	840	—	1370	—	10800	—	2990	—	11600	—	3760	—	13000	—	
	318	9270	—	840	—	1370	—	10800	—	2990	—	11600	—	3760	—	13000	—	
	1LA8...	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
315	315	4300	1550	11100	2210	12500	2880	14300	3000	317	3790	1830	10600	2550	11800	3360	13600	3440
355	353	5320	1850	13100	3050	—	—	—	—	355	5000	2030	12700	3260	14100	4530	16300	4660
	357	4240	2480	11800	3760	12900	5410	15100	5530	357	4240	2480	11800	3760	12900	5410	15100	5530
400	403	3460	3130	15700	4140	17500	6140	20200	6380	405	2950	3430	15000	4580	16600	6720	16600	6960
	407	2500	3710	14300	5070	15700	7320	18500	7570	407	2500	3710	14300	5070	15700	7320	18500	7570
450	453	3560	3560	14400	6010	16300	8230	19300	8530	455	2900	3980	13600	6520	15400	8920	18300	9230
	457	2240	4440	12800	7110	14200	9790	17200	10100	457	2240	4440	12800	7110	14200	9790	17200	10100

Values shown without assuming a cantilever force on the shaft end.

The maximum loads refer to 50 Hz; Please inquire about 60 Hz operation.

The figures for the maximum axial loads have been calculated assuming that standard coupling types are used for the drive. See Section 8 for sources.

Please enquire about 1MJ8 and 1MJ1 motors.

Please ask for advice if the loading direction alternates.

Maximum axial load (continued)

Horizontal 1LA, 1MA, and 1MJ motors

For motors		3000 rpm		1500 rpm		1000 rpm		750 rpm	
Size	Type	Loading direction		Loading direction		Loading direction		Loading direction	
		Tension	Thrust	Tension	Thrust	Tension	Thrust	Tension	Thrust
		N	N	N	N	N	N	N	N
180 M	.... 183	1400	1400	1700	1700	—	—	—	—
180 L	.... 186	—	—	1700	1700	2050	2050	2400	2400
200 L	.... 206	2000	2000	—	—	3000	3000	—	—
	.... 207	1950	1950	2450	2450	2900	2900	3400	3400
225 S	.... 220	—	—	2980	1960	—	—	3880	2860
225 M	.... 223	2390	1370	2900	1880	3380	2360	3810	2790
250 M	.... 253	2450	1655	3070	2270	3620	2820	4000	3200
280 S	.... 280	1330 (3700)*	2900 (2100)*	5080 (4200)*	6740 (2600)*	6410 (5000)*	8070 (3400)*	7390 (5550)*	9050 (3950)*
280 M	.... 283	1200 (3600)*	2800 (2000)*	4990 (4000)*	6650 (2400)*	6260 (4800)*	7920 (3200)*	7220 (5350)*	8880 (3750)*
315 S	.... 310	1500 (3800)*	3160 (2200)*	5350 (4900)*	7450 (3300)*	6740 (5500)*	8810 (3900)*	8010 (6500)*	10110 (4900)*
315 M	.... 313	1400 (3650)*	3180 (2050)*	5260 (4900)*	7360 (3300)*	6560 (5450)*	8660 (3850)*	7690 (6250)*	9790 (4650)*
315 L	.... 316	1080	2740	4580	6680	5770	7870	6820	8920
	.... 317	940	2600	4170	6270	5410	7510	6410	8510
	.... 318	940	2600	4170	6270	5410	7510	6410	8510
1LA8 ... 1MA8 ...	N	N	N	N	N	N	N	N	N
315	.... 315	2640	2640	5190	5190	6190	6190	7030	7030
	.... 317	2640	2640	5190	5190	6190	6190	7030	7030
355	.... 353	3320	3320	6590	6590	—	—	—	—
	.... 355	3320	3320	6590	6590	7870	7870	8930	8930
	.... 357	3320	3320	6590	6590	7870	7870	8930	8930
400	.... 403	3320	3320	7810	7810	9340	9340	10600	10600
	.... 405	3320	3320	7810	7810	9340	9340	10600	10600
	.... 407	3320	3320	7810	7810	9340	9340	10600	10600
450	.... 453	4310	4310	8460	8460	10100	10100	11500	11500
	.... 455	4310	4310	8460	8460	10100	10100	11500	11500
	.... 457	4310	4310	8460	8460	10100	10100	11500	11500

The maximum loads refer to 50 Hz; Please inquire about 60 Hz operation.

The figures for the maximum axial loads have been calculated assuming that standard coupling types are used for the drive. See Section 8 for sources.

Please enquire about 1MJ8 and 1MJ1 motors.

Please ask for advice if the loading direction alternates.

* The values in brackets refer to 1MJ6 motors with frame sizes 280 S to 315 M.

Squirrel-cage motors

Technical information

Converter-fed operation

In general, all motors are suitable for converter-fed operation. Some motors require special measures.

The planning notes for drives with a constant or square-law counter-torque are contained in the following catalogues:

MICROMASTER:
Catalogue series DA 64 and
DA 51

SIMOVERT MASTERDRIVES:
Catalogue series DA 65

These catalogues also contain tables showing which squirrel-cage motors should be assigned to which SIMOVERT converter, depending on the load characteristic of the driven machine.

All data specified in Catalogue M 11 applies to 50 Hz supply systems.

Attention should be paid to the reduction factors for constant-torque drives, pump drives and compressor drives.

Motor temperature detection

KTY 84 temperature sensor:

Order Code:
A23 = 1 x KTY 84-130,
A25 = 2 x KTY 84-130

This sensor is a PTC thermistor. Its resistance varies as a function of the temperature in accordance with a defined curve.

Some Siemens converters calculate the motor temperature according to the resistance of the temperature sensor. They can be set to a user-definable temperature for alarms and tripping.

The 1LA8 motors are supplied without the standard PTC thermistor if Order Code **A23** is specified.

The temperature sensor is embedded in the motor winding overhang in the same way as a PTC thermistor. The evaluation is effected by the converter, for example.

The 3RS10 temperature monitoring device belonging to the protection device can be ordered separately for mains-fed operation. For further details see Catalogue NS K Order No. E86060-K1002-A101-A2-7600.

Motor protection

All standard 1LA and 1LG motors for Zones 2, 21, and 22 for converter-fed operation are already fitted with a PTC thermistor for tripping. It is also possible to order a PTC thermistor for alarm for converter-fed operation (Order Code **A10**).

Insulation

The insulation of 1LA and 1LG motors is such that they can operate unrestrictedly in converter-fed mode up to voltages of ≤ 500 V. The same applies to operation with pulse-controlled AC converters with voltage front times $t_s > 0.1 \mu\text{s}$ at the motor terminals.

Providing these conditions are met, all motors with voltage codes 1, 3, 5, and 6 can be operated in converter-fed mode, except for those with voltage ratings of > 500 V to 690 V, which are supplied with special insulation for operation with a pulse-controlled AC converter (SIMOVERT MASTERDRIVES, MM440 > 500 V – 600 V) but without a converter circuit (dU/dt filter or sine filter) (10th position of the Order No. = "M").

For operation with a converter at the outputs specified in the catalogue, the motors are utilized according to temperature class F. Order Codes **C11**, **C12** and **C13** are not possible.

Connection of the motors

In addition to the restrictions applying to mains-connected machines, the maximum permissible conductor cross-sections for the converter must also be kept in mind when the motors are connected.

Ventilation/noise

Increased fan noise may occur in self-ventilated motors at speeds higher than the rated speed.

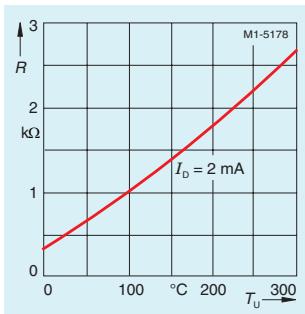
To increase motor utilization for low speeds, it is advisable to use separately ventilated motors such as 1LA5, 1LA7, 1LG4, and 1LG6 with Order Code **G17** or motor 1PQ8.

Mechanical stress, grease life

Due to the higher speeds beyond the rated speed value and the resulting increased vibration, the mechanical balance quality changes and the bearings are under greater mechanical stress. This reduces the grease life and the bearing life. (enquire if necessary).

Bearings

To avoid damage from bearing currents, insulated BS bearings are recommended for frame sizes 225 to 315 (Order Code **L27**). These are standard in 1LA8 motors for converter-fed operation on SIMOVERT MASTERDRIVES. (9th position of the Order No. = "P")



Mechanical limit speeds n_{max} for maximum supply frequency f_{max}

Motor	2-pole n_{max} , rpm	2-pole f_{max} , Hz	4-pole n_{max} , rpm	4-pole f_{max} , Hz	6-pole n_{max} , rpm	6-pole f_{max} , Hz	8-pole n_{max} , rpm	8-pole f_{max} , Hz
1LA7/1LA9 056	6000	100	4200	140	3600	180	3000	200
1LA7/1LA9 063	6000	100	4200	140	3600	180	3000	200
1LA7/1LA9 071	6000	100	4200	140	3600	180	3000	200
1LA7/1LA9 080	6000	100	4200	140	3600	180	3000	200
1LA7/1LA9 090	6000	100	4200	140	3600	180	3000	200
1LA6/1LA7/1LA9 10 .	6000	100	4200	140	3600	180	3000	200
1LA6/1LA7/1LA9 113	6000	100	4200	140	3600	180	3000	200
1LA6/1LA7/1LA9 13 .	5600	90	4200	140	3600	180	3000	200
1LA6/1LA7/1LA9 16 .	4800	80	4200	140	3600	180	3000	200
1LA5/1LA9 18 .	4600	75	4200 (3800)	140 (126)	3600	180	3000	200
1LA5/1LA9 20 .	4500	75	4200 (3800)	140 (126)	3600	180	3000	200
1LA5 22 .	4500	75	4500 (3800)	150 (126)	4400 (3400)	220 (170)	4400 (3400)	293 (226)
1LA8 31 .	3600	60	3000 (2650)	100 (88)	2950 (2350)	147 (117)	2950 (2350)	196 (156)
1LA8 35 .	3600/3100 ¹⁾	60/52 ¹⁾	2500 (2350)	83 (78)	2500 (2100)	125 (105)	2500 (2100)	166 (140)
1LA8 40 .	3600/3100 ¹⁾	60 52 ¹⁾	2200/(2100) 2100 ¹⁾	73/(70) 70 ¹⁾	2200/(1900) 2100 ¹⁾	110/(95) 105 ¹⁾	2200/(1900) 2100 ¹⁾	146/(126) 140 ¹⁾
1LA8 45 .	3000	50	2100/(1900) 1800 ¹⁾	70/(63) 60 ¹⁾	2100/(1700) 1800 ¹⁾	105/(85) 90 ¹⁾	2100/(1700) 1800 ¹⁾	140/ 120 ¹⁾
1LG4/1LG6 18 .	4600	76	4200 (3400)	140 (113)	3600 (3400)	180 (170)	3000	200
1LG4/1LG6 20 .	4500	75	4200 (3400)	140 (113)	3600 (3400)	180 (170)	3000	200
1LG4/1LG6 22 .	4500	75	4500 (3400)	150 (113)	4400 (3400)	220 (170)	4400 (3400)	293 (226)
1LG4/1LG6 25 .	3900	65	3700 (3400)	123 (113)	3700 (3000)	185 (150)	3700 (3000)	247 (200)
1LG4/1LG6 28 .	3600	60	3000	100	3000 (2800)	150 (140)	3000 (2800)	200 (187)
1LG4/1LG6 310	3600	60	2600	87	2600	130	2600	176
1LG4/1LG6 313	3600	60	2600	87	2600	130	2600	173
1LG4/1LG6 316	3600/ 3000 ¹⁾	60/ 50 ¹⁾	2600	87	2600 (2500)	130 (125)	2600 (2500)	173 (167)
1LG4/1LG6 317	2600	87	2600	87	2600 (2500)	130 (125)	2600 (2500)	173 (167)
1MJ6 07 .	6000	100	3000	100	2000	100	1500	100
1MJ6 08 .	6000	100	3000	100	2000	100	1500	100
1MJ6 09 .	6000	100	3000	100	2000	100	1500	100
1MJ6 10 .	5400	90	3000	100	2000	100	1500	100
1MJ6 11 .	5400	90	3000	100	2000	100	1500	100
1MJ6 13 .	4800	80	3000	100	2000	100	1500	100
1MJ6 16 .	4500	75	3000	100	2000	100	1500	100
1MJ6 18 .	5100	85	3000	100	2000	100	1500	100
1MJ6 20 .	5100	85	3000	100	2000	100	1500	100
1MJ6 22 .	4500	75	3800	126	3400	170	3400	226
1MJ6 25 .	3900	65	3700	123	3400	170	3400	226
1MJ6 28 .	3600	60	3000	100	3000	150	3000	200
1MJ6 31	3600/3000 ¹⁾	60/50 ¹⁾	2600	87	2600	130	2600	173

The values in brackets apply to motors used in hazardous areas.

1) For vertical mounting.

Squirrel-cage motors

Technical information

Distributed drive technology

2

MICROMASTER 411/COMBIMASTER 411

The new MICROMASTER 411/ COMBIMASTER 411 series is included in Catalogue DA 51.3 which contains the complete product range with ordering data, technical details, and explanations.

Fields of application

The MICROMASTER 411/ COMBIMASTER 411 is the ideal solution for distributed drive applications which require a high degree of protection. The devices have been designed for a broad range of drives from simple individual applications for pumps and fans up to multiple conveyor drives in networked control systems.

They are based on the universal MICROMASTER 420 converter series and distinguish themselves through customer-oriented performance and easy handling.

Design

The modular design makes it possible to select individual MICROMASTER 411/ COMBIMASTER 411 products including accessories, e.g. electromechanical brake controls or a PROFIBUS module.

Main characteristics

- Power range: 0.37 – 3.0 kW, 400 V, 3AC
- IP 66 degree of protection (MICROMASTER 411), natural ventilation

- Electrical isolation of electronics and connection terminals

- Parameter sets for fast commissioning and cost-saving.

- Modular construction with many accessories

- Operation without operator panel possible (if jumpers and/or control potentiometers are used)

- Integrated control potentiometer which can be accessed from the outside

Accessories (overview)

- Basic Operator Panel (BOP) for parameterizing a converter

- Clear text Advanced Operator Panel (AOP) for MICROMASTER 411/ COMBIMASTER 411 with multilingual display

- PROFIBUS module

- ASI module

- Devicenet module

- Brake resistance/electromechanical brake control combination module

- Electromechanical brake control module

- PC connecting set

- Assembly sets for fitting the operator panel

- PC commissioning programs

ECOFAST

ECOFAST is a system which makes extensive decentralization and modular design of installation elements possible

on the component level such as (MICROSTARTER, COMBIMASTER, MICROMASTER 411 and motor terminals, Order Code **G55**).

The main advantages of the ECOFAST motor terminal¹⁾ as compared with a terminal box are as follows:

- Fast assembly of I/O devices (e.g. motor starter) belonging to the ECOFAST system
- Reduction of assembly and repair times at end user
- No wiring errors due to connector technology
- Replacement of motor without affecting the electrics.

Further information can be found in the Catalogue NS K and in the converter catalogue "Distributed drive solutions CM411" – DA 51.3

The ECOFAST motor terminal can be supplied for the following motors:

- Frame sizes 56 M to 132 M
- Power range 0.06 kW to 5.5 kW (7.5 kW to order)
- Direct on-line-starting: Voltage code 1 for 230 V Δ / 400 V γ , 50 Hz
- Star-delta starting: Voltage code 9 with Order Code L1U 400 V Δ 50 Hz

Maximum permitted supply voltage at motor terminal: \leq 500 V

Ordering example

Motor data:

$P_2 = 5.5$ kW, 4-pole, eff1, star-delta starting for a supply voltage of 400 V/50 Hz

Order number:

**1LA9130-4KA90-Z
G55+L1U**

Further information under:
www.siemens.de/ecofast

Picture of the ECOFAST system



1) Not available for EX-motors.

MICROSTARTER

The new MICROSTARTER is a module for distributed drive technology. It can be used as a direct-on-line starter or reversing starter up to a motor output of 4 kW (motor frame size 63 M to 112 M).

A stable die-cast aluminium enclosure with IP 65 degree of protection is fitted instead of the motor terminal box. In addition to the control and evaluation electronics, it includes a direct-on-line or reversing contactor (depending on the version).

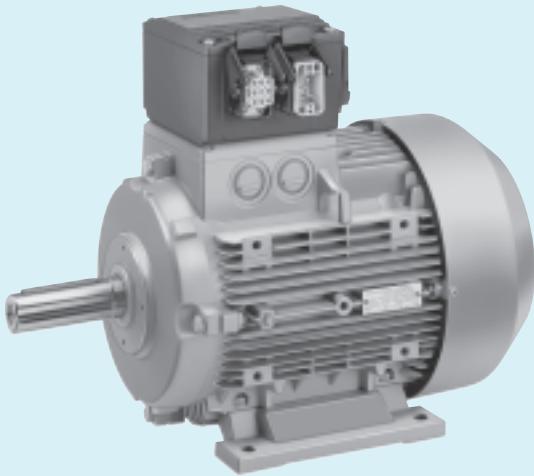
The MICROSTARTER is always equipped with a PTC thermistor detector (Order Code **A11**) and the corresponding electronic evaluation system. If the motor overheats, MICROSTARTER will automatically trip. This obviates the need for an external tripping unit for PTC thermistors.

If used as a standard slave on the AS-Interface, the MICROSTARTER has 4 inputs and 4 outputs. Two digital inputs with M12 sockets are available for receiving and evaluating signals close to the motor. An alternative to connecting the MICROSTARTER to the AS-Interface is to control it with an external DC 24 voltage.

The power supply is connected with a HAN Q8 plug-in connector in accordance with DESINA. In this way, the MICROSTARTER can be integrated into the ECOFAST system. The MICROSTARTER can also be ordered with a metric cable entry port, if required.

Because of its high degree of protection and compact design, the MICROSTARTER is especially suited for use with conveyor systems and in the food, beverages, and tobacco industries.

Example: 1LA7 motor with MICROSTARTER



Technical data

Rated output	up to 4 kW, Frame sizes 63 M to 112 M
Degree of protection	IP 65
Mounting position	any
Max. ambient temperature • during operation • during storage and transport	-20 °C to +40 °C -20 °C to +70 °C
Shock resistance	5 g/10 ms
Vibratory load	3 g
No-load switchover frequency	100 switchovers/h
Rated voltage	3 AC 50 Hz 380 V to 420 V ± 5% 3 AC 60 Hz 440 V to 480 V ± 5%
Overload protection	Motor thermistor analysis
Short-circuit protection for a power supply with • ECOFAST plug-in connector • metric cable entry port	Short-circuit protection with max. 40 A circuit-breaker max. 25 A Gl/gG (group fusing)
Power supply connection	ECOFAST (HAN Q8) or metric cable entry port (M25)
LED display (with AS-Interface connection)	AS-Interface, AUX, Power, STATE, Sensor1, Sensor2
Connection of external sensors (with AS-Interface connection)	2 via M 12 sockets
Minimum/maximum cross-sections of connections at contactor (for metric cable entries) Direct-on-line starter: • finely stranded with end sleeve • single-wire without end sleeve	2 x (0.75 to 1.5) mm ² or 1 x (0.75 to 2.5) mm ² 2 x (1 to 2.5) mm ² or 1 x 4 mm ²
Reversing starter: • finely stranded with end sleeve • single-wire without end sleeve	2 x (0.75 to 1.5) mm ² 2 x (1 to 1.5) mm ²
AS-Interface • Motor starter profile • Addressing • Connection for yellow and black trapezoidal-section cable • Total current input	7D via address jack with addressing unit via adapter plate with insulation piercing method ≤ 250 mA

Types

	Power supply connection	Dimensions (with view onto drive end) H x W x D mm	Weight kg	Order code
Direct-on-line starter with DC 24 V control	M25 HAN Q8	92 x 151 x 131 92 x 167 x 131	1.25 1.30	H90 H91
Direct-on-line starter with AS-Interface connection	M25 HAN Q8	92 x 151 x 154 92 x 167 x 154	1.35 1.40	H92 H93
Reversing starter with AS-Interface connection	M25 HAN Q8	92 x 151 x 154 92 x 167 x 154	1.50 1.55	H94 H95

The MICROSTARTER is fitted to three-phase AC motors with frame sizes 63 M to 112 M. The power supply connection (M25 or HAN Q8) is located on the right with view onto drive end.

When ordering please also state the corresponding Order Code in addition to the motor order number.

Options which can be combined with the MICROSTARTER (see "Special designs" Section 3):

Voltage code	"Modular technology"	"Mechanical versions"
1	H57 (from size 100) H58 (from size 100) G17 (from size 100) H61 (from size 100)	D30, D31, D40 K01, K16, K17 K20 (from size 100) K30, K31 K40 (from size 100) K94 L04, L13, L99 Y82

In addition, all "types of construction", "paint finishes", "Other mountings" and "Safety and

commissioning notes/certificates" can be combined.

Squirrel-cage motors

Technical information

Modular technology

The range of potential applications for the 1LA and 1LG motors can be broadened considerably in combination with the following built-on accessories (e.g. the motors can be used as brake motors).

- Pulse generator 1XP8 001, frame sizes 100 L to 315 L
- Separately driven fan, frame sizes 100 L to 315 L
- Brake, frame sizes 63 to 315 L

The brake must always be mounted in the factory for safety reasons. The pulse generator and/or the separately driven fan can also be retrofitted.

The degree of protection for motors with built-on accessories is IP 55. Higher degrees of protection on request.

Pulse generator 1XP8 001

The pulse generator can be supplied already mounted in an HTL version as 1XP8 001-1 (Order Code **H57**) or in a TTL version as 1XP8 001-2 (Order Code **H58**).

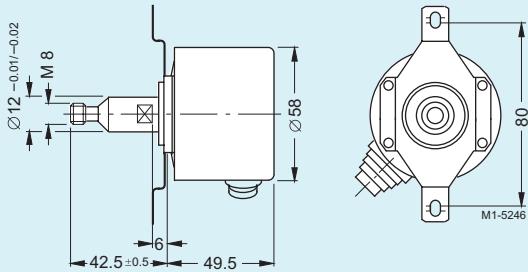
It can also be ordered and fitted separately, (Order No. **1XP8 001-1** or **1XP8 001-2**, part 8). All 1LA5, 1LA6, and 1LA7 motors with frame sizes 100 L to 225 M that are listed in the catalogue are prepared for fitting a pulse generator on the non-drive end (with M8 center hole, form DR). All 1LG4 and 1LG6 motors that are listed in the catalogue have a M16 center hole, form DR, on the non-drive end. The pulse generator can be fitted using a M16 adapter for M8.

The pulse generator can only be fitted on a standard non-drive end, i.e. a second shaft extension or a canopy can no longer be supplied.

Pulse generator 1XP8 001



Fixing dimensions for pulse generator 1XP8 001



Technical data of pulse generators

Supply voltage U_B	1XP8 001-1 (HTL version) +10 V to +30 V	1XP8 001-2 (TTL version) 5 V ±10%
Current input without load	200 mA	150 mA
Maximum load current per output	max. 100 mA	max. 20 mA
Pulses per revolution	1024	1024
Outputs	2 square-wave pulses A, B – 2 inverted square-wave pulses A, B Zero pulse and inverted zero pulse	
Pulse offset between the two outputs	$90^\circ \pm 20\%$	$90^\circ \pm 20\%$
Output amplitude	$U_{\text{High}} > U_B - 3.5 \text{ V}$ $U_{\text{Low}} < 3 \text{ V}$	$U_{\text{High}} > 2.5 \text{ V}$ $U_{\text{Low}} < 0.5 \text{ V}$
Minimum edge interval	$0.8 \mu\text{s}$ at 160 kHz	$0.45 \mu\text{s}$ at 300 kHz
Edge steepness (without load or cable)	$t_+, t_- \leq 200 \text{ ns}$	$t_+, t_- \leq 100 \text{ ns}$
Maximum frequency	160 kHz	300 kHz
Maximum speed	9000 rpm	12000 rpm
Temperature range	-20 °C to +80 °C	-20 °C to +100 °C
Degree of protection	IP 66	IP 66
Maximum radial cantilever force	60 N	60 N
Maximum axial force	40 N	40 N
Termination system	12-way plug (socket supplied)	
Certificates	CSA, UL	CSA, UL
Weight	0.3 kg	0.3 kg

Separately driven fan

The use of a separately driven fan is recommended to increase motor utilization at low speeds and to limit noise generation at speeds significantly higher than the synchronous speed. In both cases, this refers to converter-fed operation only. Please enquire about traction and vibratory operation.

The separately driven fan can be supplied already fitted. Order Code **G17**.

It can also be ordered and fitted separately (see Accessories, part 8, for selection information and order numbers).

The separately driven fan has a rating plate with all important data. Please note the fan's direction of rotation (axial fan) when connecting it. Coolant temperature CT_{max} , 50 °C, higher coolant temperatures on request.

Technical data of the separately driven fan

Frame size	Rated voltage range	Frequency	Rated speed	Rated output	Rated current
	V	Hz	rpm	kW	A
100 L	200 to 290 Δ	50	2680	0.062	0.24
	346 to 500 Y	50	2680	0.062	0.14
	200 to 290 Δ	60	3000	0.052	0.16
	346 to 500 Y	60	3000	0.052	0.09
112 M	200 to 290 Δ	50	2760	0.097	0.43
	346 to 500 Y	50	2760	0.097	0.25
	200 to 290 Δ	60	3120	0.098	0.29
	346 to 500 Y	60	3120	0.098	0.17
132 S/M	200 to 290 Δ	50	2690	0.164	0.59
	346 to 500 Y	50	2690	0.164	0.34
	200 to 290 Δ	60	2960	0.212	0.52
	346 to 500 Y	60	2960	0.212	0.30
160 M to 225 M ¹⁾	200 to 290 Δ	50	2690	0.269	0.95
	346 to 500 Y	50	2690	0.269	0.55
	200 to 290 Δ	60	2980	0.354	0.84
	346 to 500 Y	60	2980	0.354	0.48
250 M to 280 M	220 to 240 Δ	50	2720	0.450	1.15
	380 to 420 Y	50	2720	0.450	0.66
	440 to 480 Y	60	3320	0.520	1.05
315-2-pole	220 to 240 Δ	50	2750	0.650	1.64
	380 to 420 Y	50	2750	0.650	1.06
	440 to 480 Y	60	3365	0.750	1.60
315-4 . . . 8-pole	220 to 240 Δ	50	2720	0.450	1.15
	380 to 420 Y	50	2720	0.450	0.66
	440 to 480 Y	60	3320	0.520	1.05

Externally mounted separately driven fan

Version	For frame size	Number of poles	Order No. ²⁾
Separately driven fan incl. mounting parts	100	all	2CW2 185-8RF14-1AA0
	112	all	2CW2 210-8RF14-1AA1
	132	all	2CW2 250-8RF14-1AA2
	160	all	2CW2 300-8RF14-1AA3
	180	all	2CW2 300-8RF14-1AA4
	200	all	2CW2 300-8RF14-1AA5
	225	all	2CW2 300-8RF14-1AA6
	250	all	1PP9 063-2LA12-Z A11+K50
	280	all	1PP9 063-2LA12-Z A11+K50
	315	2	1PP9 070-2AA12-Z A11
	315	4 to 8	1PP9 063-2LA12-Z A11+K50
Separately driven fan and pulse generator incl. mounting parts	100	all	2CW2 185-8RF14-2AA0
	112	all	2CW2 210-8RF14-2AA1
	132	all	2CW2 250-8RF14-2AA2
	160	all	2CW2 300-8RF14-2AA3
	180	all	2CW2 300-8RF14-2AA4
	200	all	2CW2 300-8RF14-2AA5
	225	all	2CW2 300-8RF14-2AA6

1) For 1LG4 and 1LG6 motors with frame size 225 the values for frame sizes 250 M to 280 M apply.

2) The separately driven fan 2CW2 . . . includes a fan unit with fan impeller, the separately driven fan 1PP9 . . . only includes the fan motor.

Squirrel-cage motors

Technical information

Modular technology

2

Brakes

Spring-operated disk brakes are used. Two types of brake are used (depending on the motor). Standard brakes are for connection to 230 V and delivered with a rectifier and micro-circuit.

Order Code **G26**.

2LM8 spring-operated disk brake

This brake is fitted to 1LA5 and 1LA7 motors with frame sizes 63 to 225 and to 1LG motors with frame sizes 180 to 200 as standard.

Design and mode of operation

The brake takes the form of a single-disc brake with two friction faces.

The braking torque is generated by friction when pressure is applied by one or more compression springs to the de-energized brake. The brake is released electromagnetically.

When the motor brakes, the rotor – which can be axially shifted on the hub or the shaft – is pressed via the armature disk against the opp. frictional surfaces by means of the springs. When the brake is applied, there is an air gap S_{LU} between the armature disk and the solenoid component. The solenoid coil is energized with DC voltage in order to release the brake. The resulting magnetic force pulls the armature disk towards the solenoid comp. against the spring force. The spring force is then no longer applied to the rotor, so that the latter is able to rotate freely.

Voltage and frequency

The solenoid coils and the rectifier of the brakes are designed for connection to the following voltages:

1 AC 50 Hz 230 V \pm 10% or
1 AC 60 Hz 230 V \pm 10%.

It is not permissible to increase the brake voltage at 60 Hz!

The brake can also be supplied for other voltages. Brake connection voltage:

DC 24 V Order Code **C00**
2 AC 400 V Order Code **C01**
The Order Codes C00 and C01 must only be used in conjunction with Order Code G26.

Rating plate

The motors have a second rating plate with the brake data on the opposite side of the motor.

The 2LM8 brake is designed in IP 54 or IP 55 degree of protection.

Please enquire if the brake motors are used at subzero temperatures or in very humid environments (e.g. in a maritime climate) with long downtimes.

Connection

The main terminal box of the motor contains labeled terminals for connecting the brake.

The AC voltage for the excitation winding of the brake is connected to the two free terminals of the rectifier block. (~).

The brake can be released when the motor is stationary by separately energizing the solenoid. In this case, AC voltage must be connected to the terminals of the rectifier block. The brake remains released as long as this voltage is present.

The rectifiers are protected against overvoltages by means of varistors at the input and output.

The terminals of the brakes for 24 V DC voltage are connected to the DC voltage source directly.

Fast brake application

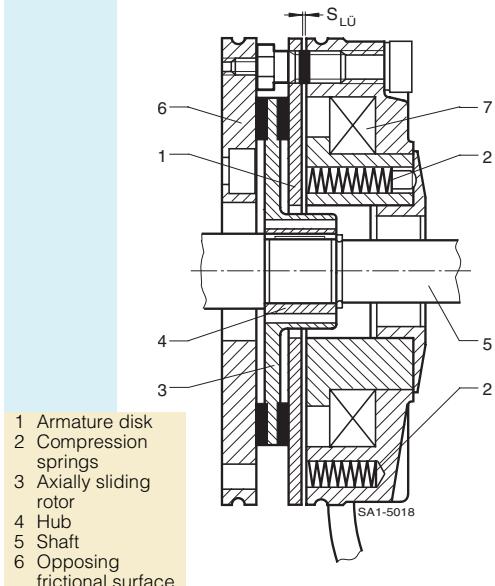
The brake is applied when it is isolated from the supply. The application time of the brake disk is delayed by the solenoid coil inductance (disconnected on the AC side). This involves a significant delay. For short brake application times, the brake must be disconnected on the DC side. For this purpose, the jumper between contact 1+ and contact 2+ must be removed and replaced by the contacts of an external switch (see. circuit diagrams).

Mechanical manual release

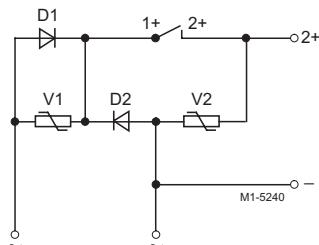
The brakes can be supplied with a mechanical manual release using an actuator lever. Order Code **K82**.

The length of the motor is increased by ΔL due to mounting the brake. For dimensions see Page 2/56.

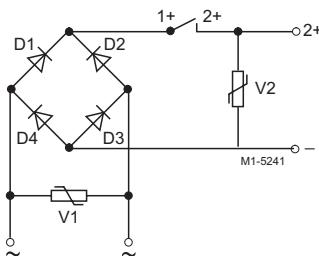
Design of the brake



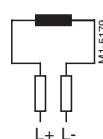
Half-wave rectifier 400 V AC



Rectifier bridge 230 V AC



Brake connection with 24 V DC voltage



Brakes(continued)

Performance of spring-operated brakes with standard excitation												Brake rating	
For mo- tors Frame size	Brake type	Rated brake torque at 100 rpm	Rated brake torque in relation to rated brake torque at 100 rpm in % for the following speeds			Voltage	Power input ¹⁾	Brake appli- cation time t_2 ²⁾	Brake release time	Brake mo- ment of inertia	Noise lev- el L_p with rated air gap	Lifetime of brake lining L	Air gap ad- justment re- quired af- ter braking energy L_N
			1500 rpm	3000 rpm	max. speed								
			Nm	%	%	V	A	ms	ms	kg m ²	dB(A)	Nm x 10 ⁶	Nm x 10 ⁶
63	2LM8 005-1NA10 2LM8 005-1NA60 2LM8 005-1NA80	5	87	80	65	AC 230 AC 400 DC 24	0.1 0.11 0.83	20	25	56	0.000013	77	105 16
71	2LM8 005-2NA10 2LM8 005-2NA60 2LM8 005-2NA80	5	87	80	65	AC 230 AC 400 DC 24	0.1 0.11 0.83	20	25	56	0.000013	77	105 16
80	2LM8 010-3NA10 2LM8 010-3NA60 2LM8 010-3NA80	10	85	78	65	AC 230 AC 400 DC 24	0.12 0.14 1.04	25	26	70	0.000045	75	270 29
90	2LM8 020-4NA10 2LM8 020-4NA60 2LM8 020-4NA80	20	83	76	66	AC 230 AC 400 DC 24	0.15 0.17 1.25	32	37	90	0.00016	75	740 79
100	2LM8 040-5NA10 2LM8 040-5NA60 2LM8 040-5NA80	40	81	74	66	AC 230 AC 400 DC 24	0.2 0.22 1.67	40	43	140	0.00036	80	1350 115
112	2LM8 060-6NA10 2LM8 060-6NA60 2LM8 060-6NA80	60	80	73	65	AC 230 AC 400 DC 24	0.25 0.28 2.1	53	60	210	0.00063	77	1600 215
132	2LM8 100-7NA10 2LM8 100-7NA60 2LM8 100-7NA80	100	79	72	65	AC 230 AC 400 DC 24	0.27 0.31 2.3	55	50	270	0.0015	77	2450 325
160	2LM8 260-8NA10 2LM8 260-8NA60 2LM8 260-8NA80	260	75	68	65	AC 230 AC 400 DC 24	0.5 0.47 4.2	100	165	340	0.0073	79	7300 935
180	2LM8 315-0NA10 2LM8 315-0NA60 2LM8 315-0NA80	315	75	68	65	AC 230 AC 400 DC 24	0.5 0.56 4.2	100	152	410	0.0073	79	5500 470
200, 225	2LM8 400-0NA10 2LM8 400-0NA60 2LM8 400-0NA80	400	73	68	65	AC 230 AC 400 DC 24	0.55 0.61 4.6	110	230	390	0.0200	93	9450 1260

1) For 400 V AC voltage and for 24 V DC, there may be an output deviation of +10% depending on the selected supply voltage.

2) The specified switching times are valid for switching on the DC side with a norm. release travel and with the coil already warm. They are average values which may vary among other things according to the rectifier type and the re-

lease travel. The brake application time for switching on the AC side, for example, is approx. 6 times longer than for switching on the DC side.

Squirrel-cage motors

Technical information

Modular technology

2

Brakes (continued)

Lifetime of the braking lining

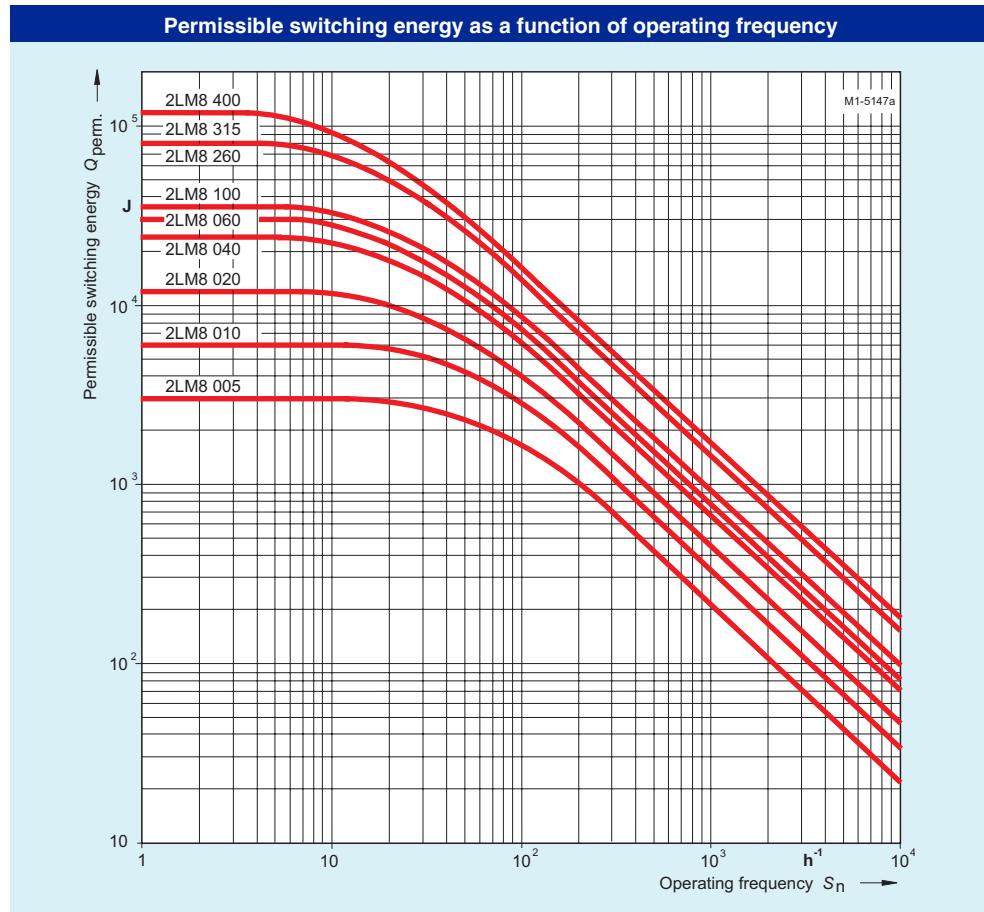
The braking energy L_N until the brake needs to be adjusted depends on various factors, and particularly on the masses that are braked, the operating speed, the operating frequency and thus the temperature on the friction faces. It is therefore not possible to specify a value for the friction energy until readjustment that is valid for all operating conditions.

The specific wear on the friction faces (volume of wear per unit of friction energy) is approximately 0.05 to 2 cm^3/kWh when the brake is used as a service brake.

Maximum speeds

Please refer to the table below for the maximum speeds at which an emergency stop is permissible. These speeds should be considered as recommended values and confirmed by testing under actual operating conditions.

The maximum permitted braking energy depends on the operating frequency and is shown for the various brakes on the graph opposite ("Permissible switching energy as a function of operating frequency"). Greater wear occurs during emergency braking.



For motors Frame size	Brake type	Max. rpm		Change in braking torque			Readjustment of air gap			
		Max. operating rpm if max. switching energy utilized	Max. no-load rpm with emergency stop function	Reduction per notch	Dim. "O ₁ "	Min. braking torque	Rated air gap S _{LüNenn}	Max. air gap S _{Lümax.}	Min. rotor thickness h _{min.}	
		rpm	Horizontal mounting rpm	Vertical mounting rpm	Nm	mm	Nm	mm	mm	
63	2LM8 005-1NA ..	3000	6000	6000	0.17	7.0	3.7	0.2	0.4	4.5
71	2LM8 005-2NA ..	3000	6000	6000	0.17	7.0	3.7	0.2	0.4	4.5
80	2LM8 010-3NA ..	3000	6000	6000	0.35	8.0	7.0	0.2	0.45	5.5
90	2LM8 020-4NA ..	3000	6000	6000	0.76	7.5	18.2	0.2	0.55	7.5
100	2LM8 040-5NA ..	3000	6000	6000	1.29	12.5	21.3	0.3	0.65	8.0
112	2LM8 060-6NA ..	3000	6000	6000	1.66	11.0	32.8	0.3	0.75	7.5
132	2LM8 100-7NA ..	3000	5300	5000	1.55	13.0	61.1	0.3	0.75	8.0
160	2LM8 260-8NA ..	1500	4400	3200	5.6	17.0	157.5	0.4	1.2	12.0
180	2LM8 315-0NA ..	1500	4400	3200	5.6	17.0	178.4	0.4	1.0	12.0
200, 225	2LM8 400-0NA ..	1500	3000	3000	6.15	21.0	248.7	0.5	1.5	15.5

Brakes (continued)

Changing the braking torque

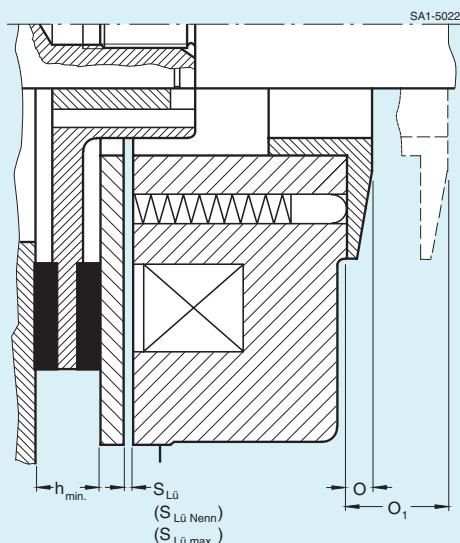
The brake is supplied with a preset torque. For 2LM8 brakes, it is possible to reduce this torque to the dimension o_1 by unscrewing the adjusting ring with a hook spanner.

The braking torque changes by the values shown in the above table for each notch of the adjusting ring.

Readjusting the air gap

Under normal operating conditions, the brake is practically maintenance-free. The air gap $s_{Lü}$ must be checked at regular intervals if the application requires a very large amount of friction energy, and readjusted to the rated gap $s_{Lü\text{Nenn}}$ at the latest when the maximum air gap $s_{Lü\text{max}}$ is reached.

Readjusting the air gap



KFB spring-operated brake

The KFB solenoid double-disk spring-operated brake is a safety brake which brakes the motor if the supply power is disconnected (power failure, emergency stop).

This brake is the standard brake for 1LG motors with frame sizes 225 to 315.

KFB brakes can be supplied with frame sizes 180 and 200 instead of 2LM8 standard brakes, if required. Special brake selections to order.

The KFB brake, IP 65 degree of protection, is mainly used for electric motors for moving devices, lifting gear, and cranes as well as for special industrial applications.

Design and mode of operation

When the brake current is switched on, an electromagnetic field develops which overcomes the spring force of the brake. The corresponding modules, including the motor shaft, can rotate freely. The brake is released. If the brake current is switched off or if there is a power failure, the electromagnetic field of the brake disappears. The mechanical braking energy is transferred to the motor shaft. The motor is braked.

Voltage and frequency

The standard design is for connection to 230 V/50 Hz $\pm 10\%$.

It is not permissible to increase the brake voltage at 60 Hz!

KFB brake



Squirrel-cage motors

Technical information

Modular technology

2

Brakes (continued)

The brake can also be supplied for other voltages.

Brake connection voltage:

24 V DC Order Code **C00**

2 Order Code **C01**

Order Codes **C00** and **C01** must only be used in conjunction with Order Code **G26**.

Rating plate

The motors have a second rating plate with the brake data on the opposite side of the motor.

Connection

The motors are fitted with an additional terminal box next to the main terminal box which is used for the brake connection.

Pintsch Bamag brakes are equipped with a standard rectifier bridge or half-wave rectifier. Special connections are not required. Optimal operating times are achieved without special circuitry.

Mechanical manual release

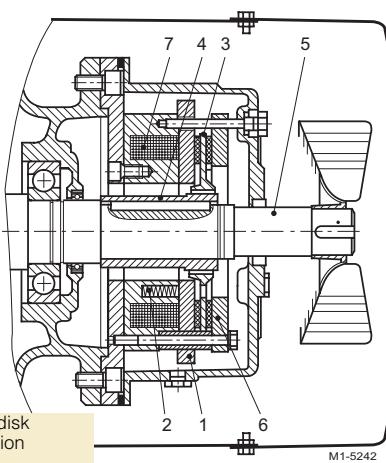
The brakes can be released manually with screws as standard. The brakes can be supplied with a mechanical manual release using an actuator lever. Order Code **K82**.

Other characteristics of the KFB brake

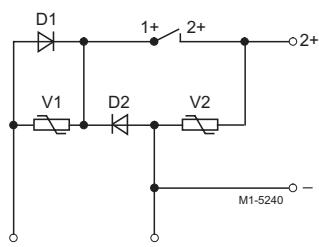
- High IP 65 degree of protection.
- Corrosion-resistant in seawater and in the tropics.
- This brake is a dynamic brake, not simply a holding brake. For this reason, there is less wear, especially in the case of emergency stops (commissioning).
- High wear reserves; repeated stepless air gap readjustment possible. This results in very long downtimes and low service and operating costs.

- The function and wear can be monitored with a microswitch and proximity switch. Microswitch on/off is standard for LG motors. An anti-condensation heating is optionally available.
- Fully functional brake for enclosure acceptance test. Visual inspection of brake possible during operation.
- The brake (air gap) can be adjusted in the workshop, for example, and mounted to the motor without further adjustments.
- The working parts can be replaced without great outlay. After the housing has been opened (three screws), it is easy to replace the friction lining carrier. It is not necessary to disassemble the entire brake.

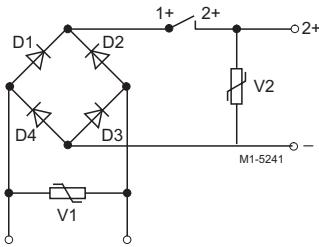
Design of the KFB brake



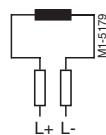
Half-wave rectifier 400 V AC



Rectifier bridge 230 V AC



Brake connection with 24 V DC voltage



Brakes (continued)

Overview of brake selections for 1LG motors

	For motor Frame size 180 ¹⁾	200 ¹⁾	225 ²⁾	250 ²⁾	280 ²⁾	315 ²⁾
Number of poles	2 to 8	2 to 8	2 to 8	2 to 8	4 to 8	4 to 8
Non-drive end bearing	6310C3	6312C3	6313C3	6215 C3	6317C3	6319C3
Flange bearing plate for non-drive end brake mounting	A300	A350	A350	A400	A450	A550
Max. diameter for second drive shaft	48k6	55m6	55m6	48 m6	65m6	70m6
Brake type	KFB 25	KFB 40	KFB 40	KFB 63	KFB 100	KFB 160
Braking torque	Nm	250	400	400	630	1000
n_{\max} – IM B 3	rpm	6000	5500	5500	4700	4000
n_{\max} – IM V 1	rpm	6000	5500	5500	4700	4000
Output at 110 V DC	W	158	196	196	220	307
Current at 230 V AC (207 V coil voltage) A		0.77	0.91	0.91	1	1.53
Current at 400 V AC (180 V coil voltage) A		0.8	1.18	1.18	1.25	1.8
Current at 110 V DC	A	1.44	1.78	1.78	2	2.79
Current at 24 V DC	A	5.21	6.92	9.62	8.17	12.2
Application time t_2	ms	70	80	80	110	125
Release time	ms	240	250	250	340	370
Brake moment of inertia	kg m ²	0.0048	0.0068	0.0068	0.0175	0.036
Lifetime of brake lining L	Nm · 10 ⁶					0.050
Air gap must be readjusted after braking energy L_N	Nm · 10 ⁶			available soon	available soon	

Configuration of brake mo- tors

Braking time

The time it takes the motor to come to a standstill comprises two components:

- a) The application time of the brake t_2
- b) The braking time t_{Br}

$$t_{Br} = \frac{J \cdot n_N}{9.55 \cdot (M_B \pm M_L)}$$

t_{Br} Braking time in s

J Total moment of inertia in m²

n_N Rated speed value of brake motor in rpm

M_B Rated braking torque in Nm

M_L Average load moment in Nm (supports M_L braking, so M_L is positive)

Overtravel rotations U

The overtravel rotations U of the brake motor can thus be calculated as follows:

$$U = \frac{n_N}{60} \left(t_2 + \frac{t_{Br}}{2} \right)$$

t_2 Application time of the brake in ms

Braking energy per braking operation Q_{zul}

The braking energy per braking operation in Nm consists of the energy of the moments of inertia to be braked Q_{kin} and the energy Q_L which is required to brake a load moment:

$$Q_{zul} = Q_{kin} + Q_L$$

- a) The energy of the moments of inertia in Nm

$$Q_{kin} = \frac{J \cdot n_N^2}{182.4}$$

n_N Rated speed value before braking in rpm

J Total moment of inertia in kg m²

- b) The braking energy in Nm against a load moment:

$$Q_L = \frac{\pm M_L \cdot n_N \cdot t_{Br}}{19.1}$$

M_L average load moment in Nm

M_L is positive if it is directed against braking

M_L is negative if it supports braking

Lifetime of the brake lining L and readjustment of the air gap

The brake lining becomes worn through friction which increases the air gap and the time it takes to brake at standard excitation. The braking torque remains almost constant throughout the entire lifetime of the brake lining.

When the brake lining is worn out, it can be easily replaced along with the armature disk.

In order to calculate the lifetime of the brake lining for circuit S_{\max} , it is necessary to divide the lifetime of the brake lining L in Nm by the braking energy Q_{zul} :

$$S_{\max} = \frac{L}{Q_{zul}}$$

The readjustment interval N for circuits can be calculated by dividing the braking energy L_N , which the brake must expend until the air gap needs readjusting with Q_{zul}

$$N = \frac{L_N}{Q_{zul}}$$

1) The standard brake for frame sizes 180 and 200 is brake 2LM8. KFB brake to order.

2) The standard brake for frame sizes 225 to 315 is the KFB brake.

Squirrel-cage motors

Technical information

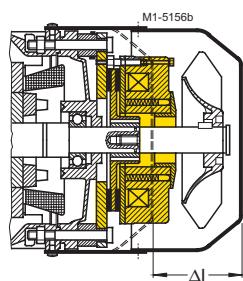
Modular technology

2

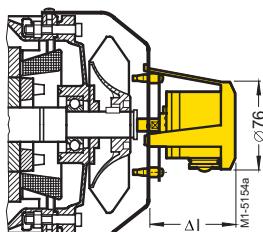
Dimensions and weight

Fixing dimensions 1LA5, 1LA6, 1LA7, 1LG4, and 1LG6

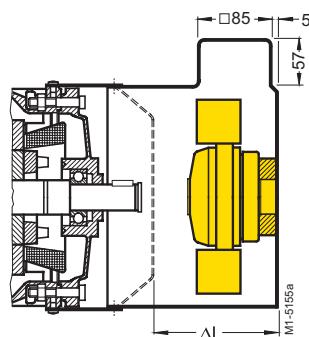
Brake,
Order Code G26



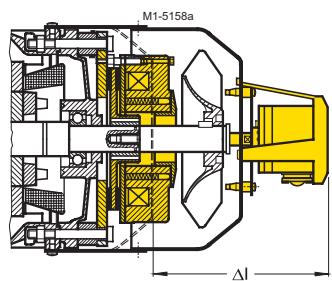
Pulse generator,
Order Codes H57, H58, H70, H72, H73



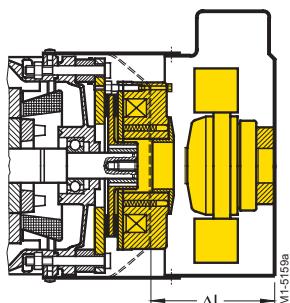
Separately driven fan,
Order Code G17



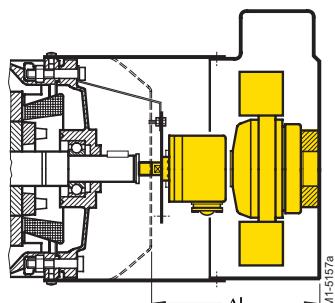
Brake and pulse generator,
Order Codes H62, H98



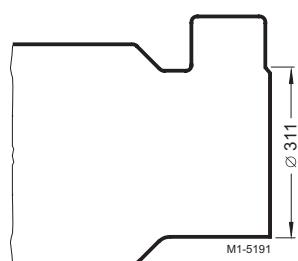
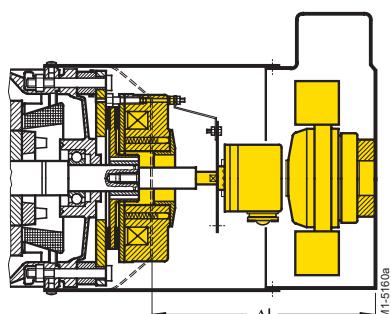
Brake and separately driven fan,
Order Code H63



Pulse generator and separately driven
fan, Order Codes H61, H97



Brake, pulse generator and separately driven fan,
Order Codes H64, H99



The fan attachment becomes narrower on the non-drive end of the motor housing with frame sizes 180 and 225 (with separately driven fan).

Dimensions and weights (continued)

For motor														
Frame size	Pulse generator	HOG9	HOG10	LL 861	Brake and separately driven fan (G17)	Extra weight for separately driven fan (H63)	Extra weight for brake and separately driven fan (G17)	Pulse generator and separately driven fan (H61, H97)	Brake, separately driven fan, and pulse generator (H64, H99)	Brake (G26)	Extra weight for brake (G26)	Brake and pulse generator (H62, H98)	Diameter of the cover	
	1XP8 (H57, H58)	(H72, H74)	(H73, H75)	(H70, H71)									mm	
	Δl [mm]	Δl [mm]	Δl [mm]	Δl [mm]	Δl [mm]	approx. kg	approx. kg	Δl [mm]	Δl [mm]	Δl [mm]	approx. kg	Δl [mm]	mm	
1LA6¹⁾, 1LA5, 1LA7										51	1	–	–	
63										51	1	–	–	
71										51	1	–	–	
80										54	2	–	–	
90										75	4	–	–	
100	78	89	133	101	124	124	4.0	10	209	209	78	6	156	202
112	78	89	133	101	137	137	4.5	12.5	212	212	87	8	165	227
132	78	89	133	101	155	155	5.5	17.5	225	225	106	12	184	226
160	78	89	133	101	200	200	7.0	33	250	250	129	26	207	320
180	78	89	133	101	242	242	10.0	37	242	242	137	27	215	358 (311)
200	78	89	133	101	245	245	11.0	52	245	245	142	41	220	398 (311)
225	78	89	133	101	245	245	11.0	52	245	245	142	41	220	398 (311)
1LG4, 1LG6														
180	63	72	116	86	233	233	10	32	233	233	125	22	188	356
200	63	72	116	86	237	237	11	43	237	237	137	32	200	396
225	63	72	116	86	235	799	22	85	425	519	239	63	302	439
250	63	72	116	86	235	785	25	108	425	505	225	83	288	489
280	63	72	116	86	235	787	28	146	425	507	227	118	290	539
315	63	72	116	86	247	825	36	291	437	545	265	255	328	604
1LA8														
315	89	133	101											
355	89	133	101											
400	89	133	101											
450	89	133	101											

1) No brake and HOG10 can be mounted to 1LA6.

Squirrel-cage motors

Technical information

Further mountings for 1LA/1LG motors

The "Further mountings" range includes pulse generators for frame sizes 100 L to 450 for motors 1LA5, 1LA6, 1LA7, 1LA8, and 1LG4/6. Please enquire about pulse generators for 1LA9 motors.

For 1LA motors, the Order Codes from the "Further mountings" range cannot be combined with Order Codes from the modular technology range.

For 1LG motors, the Order Codes **G17** (externally mounted separately driven fan), **G26** (externally mounted brake), and **H63** (externally mounted brake and separately driven fan) from the modular technology range can be combined with the pulse generators from the

"Further mountings" range.

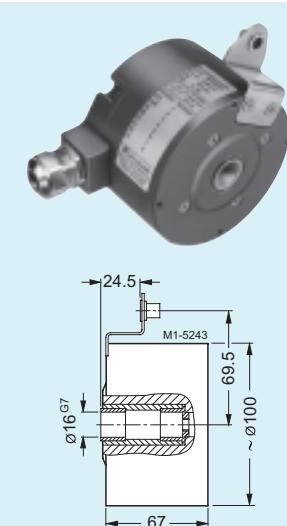
Pulse generator LL 861 900220

This generator is very robust and therefore suitable for service in harsh environments. It is shock-free and vibration-proof and is fitted with insulated bearings.

- The LL 861 900 220 pulse generator can be supplied already fitted. Order Code **H70**.
- The LL 861 900 220 pulse generator can be provided by the customer and installed by Siemens. Order Code **H71**.
- The LL 861 900 220 pulse generator can also be fitted separately. The motor must be prepared for this purpose. Order Code **H78** must be specified when ordering. The pulse generator is not part of the scope of supply. Parts required for assembly are also supplied.

The pulse generator with diagnostic system (ADS) can be supplied by Leine und Linde.

Manufacturer:
Leine und Linde (Germany)
GmbH
73430 Aalen
Spitalstr. 19
<http://www.leinelinde.de>



Technical data LL 861 900 220 (HTL version)

Supply voltage U_B	+9 V to +30 V
Current input without load	max. 80 mA
Maximum load current per output	40 mA
Pulses per revolution	1024
Outputs	6 short-circuit proof square wave pulses A, A', B, B', 0, 0'
Pulse offset between the two outputs	90° ± 25° el.
Output amplitude	$U_{\text{High}} > 20 \text{ V}$ $U_{\text{Low}} < 2.5 \text{ V}$
Pulse duty factor	1 : 1 ± 10%
Edge steepness	50 V/ μs (without load)
Maximum frequency	100 kHz with 350 m cable
Maximum speed	4000 rpm
Temperature range	-20 °C to +80 °C
Degree of protection	IP 65
Maximum radial cantilever force	300 N
Maximum axial force	100 N
Termination system	Terminals in generator Radial cable connection M20 x 1.5
Weight	approx. 1.3 kg

Further mountings for 1LA/1LG motors

Pulse generator HOG9 D 1024 I

The generator is fitted with insulated bearings.

- The HOG9 D 1024 I pulse generator can be supplied already fitted. Order Code **H72**.
- The HOG9 D 1024 I pulse generator can be provided by the customer and installed by Siemens. Order Code **H74**.

The HOG9 D 1024 I pulse generator can be fitted separately. The motor must be prepared for this purpose. Order Code **H79** must be specified in the order. The pulse generator is not part of the scope of supply. Parts required for assembly are also supplied.

Manufacturer:
Hübner Elektromaschinen AG
10967 Berlin
Planufer 92b
www.huebner-berlin.de



Technical data HOG9 D 1024 I (HTL version)

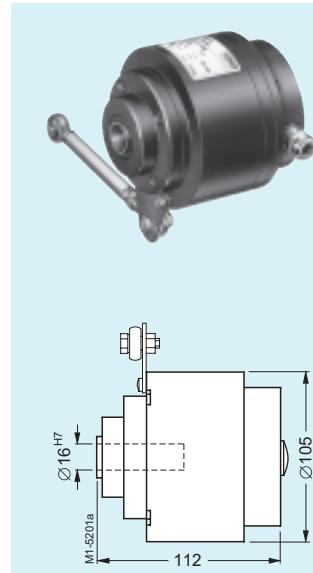
Supply voltage U_B	+9 V to +30 V
Current input without load	50 to 100 mA
Maximum load current per output	60 mA, 300 mA (max.)
Pulses per revolution	1024
Outputs	4 short-circuit proof square wave pulse A, B, and A', B'
Pulse offset between the two outputs	$90^\circ \pm 20\%$
Output amplitude	$U_{\text{High}} \geq U_B - 3.5 \text{ V}$ $U_{\text{Low}} \leq 1.5 \text{ V}$
Pulse duty factor	1 : 1 $\pm 20\%$
Edge steepness	10 V/ μs
Maximum frequency	120 kHz
Maximum speed	7000 rpm
Temperature range	-20 °C to +100 °C
Degree of protection	IP 56
Maximum radial cantilever force	150 N
Maximum axial force	100 N
Termination system	Radial right-angle plug (socket is part of the scope of supply)
Mech. design acc. to Hübner Ident. No.	73 522 B
Weight	Approx. 0.9 kg

Pulse generator HOG10 D 1024 I

This generator is very robust and therefore suitable for service in harsh environments. It is fitted with insulated bearings

- The HOG10 D 1024 I pulse generator can be supplied already fitted. Order Code **H73**.
- The pulse generator HOG10 D 1024 I can be provided by the customer and installed by Siemens. Order Code **H75**.
- The pulse generator HOG10 D 1024 I can be fitted separately. The motor must be prepared for this purpose. Order Code **H80** must be specified in the order. The pulse generator is not part of the scope of supply. Parts required for assembly are also supplied.

Manufacturer:
Hübner Elektromaschinen AG
10967 Berlin
Planufer 92b
www.huebner-berlin.de



Technical data HOG10 D 1024 I (HTL version)

Supply voltage U_B	+9 V to +30 V
Current input without load	approx. 100 mA
Maximum load current per output	60 mA, 300 mA (max.)
Pulses per revolution	1024
Outputs	4 short-circuit proof square wave pulse A, B, and A', B'
Pulse offset between the two outputs	$90^\circ \pm 20\%$
Output amplitude	$U_{\text{High}} \geq U_B - 3.5 \text{ V}$ $U_{\text{Low}} \leq 1.5 \text{ V}$
Pulse duty factor	1 : 1 $\pm 20\%$
Edge steepness	10 V/ μs
Maximum frequency	120 kHz
Maximum speed	7000 rpm
Temperature range	-20 °C to +100 °C
Degree of protection	IP 66
Maximum radial cantilever force	150 N
Maximum axial force	80 N
Termination system	Terminals, cable connection M16 x 1.5
Mech. design acc. to Hübner Ident. No.	74 055 B
Weight	Approx. 1.6 kg

Squirrel-cage motors

Technical information

Notes

2



Squirrel-cage motors 1LA and 1LG selection and ordering data

3

1LA5 to 1LA8, 1LG4 and 1LG6 motors

Frame sizes	56 to 450
Output range	0.06 to 1000 kW
Temperature class F	used as class B
Converter compatible	Voltage peak times $t_s > 0.1 \mu\text{s}$ at $U \leq 500 \text{ V}$

Stock types available for immediate delivery.
For types, see price list M 11.

Energy-saving motors according to CEMEP

Number of poles: 2 and 4
Output range 1.1 to 90 kW
Eff1 High Efficiency
Eff2 Improved Efficiency
Efficiency determined in accordance with IEC 60 034-2

Motor type identified on nameplate and packaging. $\frac{4}{4}$ and $\frac{3}{4}$ efficiency levels are documented. Licensed manufacturers only are permitted to apply identification. Optimization of these motor series has resulted in significant energy savings.

Energy-saving motors according to EPACT

Number of poles: 2, 4 and 6
Output range 1 to 200 HP
Minimum efficiency levels authorized under US law
Efficiency levels determined according to IEEE 112b

Nominal efficiency level and NEMA MG-1-12 are stamped on the rating plate.

Aluminium housing (0.06 to 53 kW)

Basic version

Energy-saving motor

3/2 • 1LA7, 1LA5 – 2-, 4-pole – 50 Hz,
“Improved Efficiency” eff2 acc. to CEMEP

3/3 • 1LA7, 1LA5 – 6-, 8-pole – 50 Hz

3/4 • 1LA9 – 2-, 4-pole – 50 Hz,
“High Efficiency” eff1 acc. to CEMEP

3/5 • 1LA9 – 6-pole – 50 Hz

Energy-saving motor acc. to EPACT

3/6 • 1LA9 – 2-, 4-, 6-pole – 60 Hz

With increased power

3/8 • 1LA9 – 2-, 4-pole – 50 Hz

Pole-change motors

3/9 • 1LA7, 1LA5 – 4-/2-, 8-/4-pole – 50 Hz,
pole-change

3/10 • 1LA7, 1LA5 – 4-/2-, 6-/4-, 8-/4-pole – 50 Hz,
pole-change for fan applications

3/11 • 1LA7, 1LA5 – 8-/6-/4-pole – 50 Hz, 3 speed
pole-change motors for fan applications

Cast iron housing (0.75 to 1000 kW)

Basic version

Energy-saving motor

3/12 • 1LA6, 1LG4, 1LA8 – 2-, 4-pole – 50 Hz,
“Improved Efficiency” eff2 acc. to CEMEP

3/14 • 1LA6, 1LG4, 1LA8 – 6-, 8-pole – 50 Hz

3/16 • 1LG6 – 2-, 4-pole – 50 Hz,
“High Efficiency” eff1 acc. to CEMEP

3/17 • 1LG6 – 6-, 8-pole – 50 Hz

Energy-saving motor acc. to EPACT

3/18 • 1LG6 – 2-, 4-, 6-pole – 60 Hz

With increased power

3/20 • 1LG4 – 2-, 4-, 6-, 8-pole – 50 Hz

Pole-change motors (available soon)

For operation with SIMOVERT® MASTERDRIVES

With standard insulation for $\leq 500 \text{ V}$

3/21 • 1LA8 – 2-, 4-, 6-, 8-pole – 50 Hz

With special insulation for 690 V

3/22 • 1LA7, 1LA5 – 2-, 4-, 6-pole – 50 Hz

3/23 • 1LG6, 1LA8 – 2-, 4-, 6-, 8-pole – 50 Hz

Special designs

3/25 • Windings and motor protection; Paint finish

3/26 • Version for hazardous areas, distributed
drive technology; marine version

3/27 • Modular installation; additional modules;
converter installation; Mechanical design

3/28 • Mechanical design; Notes on safety and
commissioning/certification

Squirrel-cage motors

1LA · Aluminium housing · Basic version

Selection and ordering data

Rated output kW	Size Order No. Order No.- supplements for voltage and size, see table below	Efficiency Class 	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated torque	Starting current multiple of the rated current	Stalling torque multiple of the rated torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx. kg
			Rated speed rpm	Efficiency η at 4/4- load %	Efficiency η at 3/4- load %	Power factor p.f.	Rated current at 400 V A	Rated torque Nm						
Energy-saving motor to CEMEP "Improved Efficiency" eff2, IP 55 degree of protection, temperature class F														
3000 rpm, 2-pole, 50 Hz														
0.09	56 M	1LA7 050-2AA ..	2830	63.0	62.0	0.81	0.26	0.30	2.0	3.7	2.3	16	0.00015	3
0.12		1LA7 053-2AA ..	2800	65.0	64.0	0.83	0.32	0.41	2.1	3.7	2.4	16	0.00015	3
0.18	63 M	1LA7 060-2AA ..	2820	63.0	62.0	0.82	0.50	0.61	2.0	3.7	2.2	16	0.00018	4
0.25		1LA7 063-2AA ..	2830	65.0	65.0	0.82	0.68	0.84	2.0	4.0	2.2	16	0.00022	4
0.37	71 M	1LA7 070-2AA ..	2740	66.0	65.0	0.82	1.00	1.3	2.3	3.5	2.3	16	0.00029	5
0.55		1LA7 073-2AA ..	2800	71.0	70.0	0.82	1.36	1.9	2.5	4.3	2.6	16	0.00041	6
0.75	80 M	1LA7 080-2AA ..	2855	73.0	72.0	0.86	1.73	2.5	2.3	5.6	2.4	16	0.00079	9
1.1		1LA7 083-2AA ..	2845	77.0	77.0	0.87	2.40	3.7	2.6	6.1	2.7	16	0.0010	11
1.5	90 S	1LA7 090-2AA ..	2860	79.0	80.0	0.85	3.25	5.0	2.4	5.5	2.7	16	0.0014	13
2.2	90 L	1LA7 096-2AA ..	2880	82.0	82.0	0.85	4.55	7.3	2.8	6.3	3.1	16	0.0018	16
3	100 L	1LA7 106-2AA ..	2890	84.0	84.0	0.85	6.10	9.9	2.8	6.8	3.0	16	0.0035	22
4	112 M	1LA7 113-2AA ..	2905	86.0	86.0	0.86	7.80	13	2.6	7.2	2.9	16	0.0059	29
5.5	132 S	1LA7 130-2AA ..	2925	86.5	86.5	0.89	10.3	18	2.0	5.9	2.8	16	0.015	39
7.5		1LA7 131-2AA ..	2930	88.0	88.0	0.89	13.8	24	2.3	6.9	3.0	16	0.019	48
11	160 M	1LA7 163-2AA ..	2940	89.5	89.5	0.88	20.0	36	2.1	6.5	2.9	16	0.034	68
15	160 M	1LA7 164-2AA ..	2940	90.0	90.2	0.90	26.5	49	2.2	6.6	3.0	16	0.043	77
18.5	160 L	1LA7 166-2AA ..	2940	91.0	91.2	0.91	32.5	60	2.4	7.0	3.1	16	0.051	86
22	180 M	1LA5 183-2AA ..	2940	91.7	91.7	0.88	39.0 ¹⁾	71	2.5	6.9	3.2	16	0.077	113
30	200 L	1LA5 206-2AA ..	2945	92.3	92.3	0.89	53.0	97	2.4	7.2	2.8	16	0.14	162
37		1LA5 207-2AA ..	2945	92.8	92.8	0.89	65.0 ¹⁾	120	2.4	7.7	2.8	16	0.16	182
45	225 M	1LA5 223-2AA ..	2960	93.6	93.6	0.89	78.0 ¹⁾	145	2.8	7.7	3.4	16	0.20	212
1500 rpm, 4-pole, 50 Hz														
0.06	56 M	1LA7 050-4AB ..	1350	56.0	55.0	0.77	0.20	0.42	1.9	2.6	1.9	13	0.00027	3
0.09		1LA7 053-4AB ..	1350	58.0	57.0	0.77	0.29	0.64	1.9	2.6	1.9	13	0.00027	3
0.12	63 M	1LA7 060-4AB ..	1350	55.0	54.0	0.75	0.42	0.85	1.9	2.8	2.0	13	0.00029	4
0.18		1LA7 063-4AB ..	1350	60.0	60.0	0.77	0.56	1.3	1.9	3.0	1.9	13	0.00037	4
0.25	71 M	1LA7 070-4AB ..	1350	60.0	60.0	0.79	0.76	1.8	1.9	3.0	1.9	13	0.00052	5
0.37		1LA7 073-4AB ..	1370	65.0	65.0	0.8	1.03	2.6	1.9	3.3	2.1	13	0.00077	6
0.55	80 M	1LA7 080-4AA ..	1395	67.0	67.0	0.82	1.45	3.8	2.2	3.9	2.2	16	0.0014	9
0.75		1LA7 083-4AA ..	1395	72.0	72.0	0.81	1.86	5.1	2.3	4.2	2.3	16	0.0017	10
1.1	90 S	1LA7 090-4AA ..	1415	77.0	77.0	0.81	2.55	7.4	2.3	4.6	2.4	16	0.0024	13
1.5	90 L	1LA7 096-4AA ..	1420	79.0	79.0	0.81	3.40	10	2.4	5.3	2.6	16	0.0033	16
2.2	100 L	1LA7 106-4AA ..	1420	82.0	82.5	0.82	4.70	15	2.5	5.6	2.8	16	0.0047	21
3		1LA7 107-4AA ..	1420	83.0	83.5	0.82	6.40	20	2.7	5.6	3.0	16	0.0055	24
4	112 M	1LA7 113-4AA ..	1440	85.0	85.5	0.83	8.20	27	2.7	6.0	3.0	16	0.012	31
5.5	132 S	1LA7 130-4AA ..	1455	86.0	86.0	0.81	11.4	36	2.5	6.3	3.1	16	0.018	41
7.5	132 M	1LA7 133-4AA ..	1455	87.0	87.5	0.82	15.2	49	2.7	6.7	3.2	16	0.023	49
11	160 M	1LA7 163-4AA ..	1460	88.5	89.0	0.84	21.5	72	2.2	6.2	2.7	16	0.043	73
15	160 L	1LA7 166-4AA ..	1460	90.0	90.2	0.84	28.5	98	2.6	6.5	3.0	16	0.055	85
18.5	180 M	1LA5 183-4AA ..	1460	90.5	90.5	0.83	35.0 ¹⁾	121	2.3	7.5	3.0	16	0.13	113
22	180 L	1LA5 186-4AA ..	1460	91.2	91.2	0.84	41.0 ¹⁾	144	2.3	7.5	3.0	16	0.15	123
30	200 L	1LA5 207-4AA ..	1465	91.8	91.8	0.86	55.0	196	2.6	7.0	3.2	16	0.24	160
37	225 S	1LA5 220-4AA ..	1470	92.9	92.9	0.87	66.0 ¹⁾	240	2.8	7.0	3.2	16	0.32	209
45	225 M	1LA5 223-4AA ..	1470	93.4	93.4	0.87	80.0 ¹⁾	292	2.8	7.7	3.3	16	0.36	235

Higher outputs under "1LA/1LG · Cast iron housing" on Pages 3/12 and 3/13.

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier					
	50 Hz			60 Hz			IM B 3			Price supplement		
	230 VΔ / 400 VΔ / 500 VY	400 VY	690 VY	500 VΔ	460 VY	460 VΔ	IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	
1LA7 050 to 1LA7 096												
1	6	3	—	1	6	0	1	1	4	2	3	6
1LA7 106 to 1LA7 166	1	6	3	5	1	6	0	1	1	4	2	3
1LA5 183 to 1LA5 223	1	6	3	5	1	6	0	1	1	4	—	6

Other voltage and/or frequency, voltage identifier "9".

Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

- 1) For connection to 230 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

For other designs, see "Technical information", "Designs".

Squirrel-cage motors

1LA · Aluminium housing · Basic version

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated torque	Starting current	Stalling torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx.
			Rated speed rpm	Efficiency η at 4/4-load %	Power factor p.f. 3/4-load %	Rated current at 400 V A	Rated torque at 400 V Nm							
Energy-saving motor, IP 55 degree of protection, temperature class F														
0.09	63 M	1LA7 063-6AB ..	850	45.0	41.5	0.66	0.44	1.0	1.8	2.0	1.9	13	0.00037	4
0.18	71 M	1LA7 070-6AA ..	835	56.0	51.5	0.75	0.62	2.1	2.1	2.3	1.9	16	0.00055	5
0.25		1LA7 073-6AA ..	830	61.0	59.3	0.76	0.78	2.9	2.2	2.7	2.0	16	0.00080	6
0.37	80 M	1LA7 080-6AA ..	920	62.0	60.5	0.72	1.20	3.8	1.9	3.1	2.1	16	0.0014	9
0.55		1LA7 083-6AA ..	910	67.0	66.5	0.74	1.60	5.8	2.1	3.4	2.2	16	0.0017	10
0.75	90 S	1LA7 090-6AA ..	915	69.0	69.0	0.76	2.05	7.8	2.2	3.7	2.2	16	0.0024	13
1.1	90 L	1LA7 096-6AA ..	915	72.0	72.0	0.77	2.85	11	2.3	3.8	2.3	16	0.0033	16
1.5	100 L	1LA7 106-6AA ..	925	74.0	74.0	0.75	3.90	15	2.3	4.0	2.3	16	0.0047	21
2.2	112 M	1LA7 113-6AA ..	940	78.0	78.5	0.78	5.20	22	2.2	4.6	2.5	16	0.0091	26
3	132 S	1LA7 130-6AA ..	950	79.0	79.5	0.76	7.20	30	1.9	4.2	2.2	16	0.015	38
4	132 M	1LA7 133-6AA ..	950	80.5	80.5	0.76	9.40	40	2.1	4.5	2.4	16	0.019	44
5.5	132 M	1LA7 134-6AA ..	950	83.0	83.0	0.76	12.8	55	2.3	5.0	2.6	16	0.025	52
7.5	160 M	1LA7 163-6AA ..	960	86.0	86.0	0.74	17.0	75	2.1	4.6	2.5	16	0.044	74
11	160 L	1LA7 166-6AA ..	960	87.5	87.5	0.74	24.5	109	2.3	4.8	2.6	16	0.063	95
15	180 L	1LA5 186-6AA ..	970	89.5	89.5	0.77	31.5	148	2.0	5.2	2.4	16	0.15	126
18.5	200 L	1LA5 206-6AA ..	975	90.2	90.2	0.77	38.5	181	2.7	5.5	2.8	16	0.24	164
22		1LA5 207-6AA ..	975	90.8	90.8	0.77	45.5	215	2.8	5.5	2.9	16	0.28	186
30	225 M	1LA5 223-6AA ..	978	91.8	91.8	0.77	61.0 ¹⁾	293	2.8	5.7	2.9	16	0.36	217
750 rpm, 8-pole, 50 Hz														
0.12	71 M	1LA7 070-8AB ..	630	53.0	54.5	0.68	0.36	1.4	1.9	2.2	1.7	13	0.00080	6
0.09		1LA7 073-8AB ..	645	53.0	49.5	0.64	0.51	1.8	2.2	2.2	2.0	13	0.00080	6
0.18	80 M	1LA7 080-8AB ..	675	51.0	49.5	0.68	0.75	2.5	1.7	2.3	1.9	13	0.0014	9
0.25		1LA7 083-8AB ..	685	55.0	50.5	0.64	1.03	3.5	2.0	2.6	2.2	13	0.0017	10
0.37	90 S	1LA7 090-8AB ..	675	63.0	62.0	0.75	1.13	5.2	1.6	2.9	1.8	13	0.0023	11
0.55	90 L	1LA7 096-8AB ..	675	66.0	65.0	0.76	1.58	7.8	1.7	3.0	1.9	13	0.0031	13
0.75	100 L	1LA7 106-8AB ..	680	66.0	65.0	0.76	2.15	11	1.6	3.0	1.9	13	0.0051	19
1.1		1LA7 107-8AB ..	680	72.0	72.0	0.76	2.90	15	1.8	3.3	2.1	13	0.0063	22
1.5	112 M	1LA7 113-8AB ..	705	74.0	74.0	0.76	3.90	20	1.8	3.7	2.1	13	0.013	24
2.2	132 S	1LA7 130-8AB ..	700	75.0	75.0	0.74	5.70	30	1.9	3.9	2.3	13	0.014	38
3	132 M	1LA7 133-8AB ..	700	77.0	77.5	0.74	7.60	41	2.1	4.1	2.4	13	0.019	44
4	160 M	1LA7 163-8AB ..	715	80.0	80.0	0.72	10.0	53	2.2	4.5	2.6	13	0.036	64
5.5	160 M	1LA7 164-8AB ..	710	83.5	83.5	0.73	13.0	74	2.3	4.7	2.7	13	0.046	74
7.5	160 L	1LA7 166-8AB ..	715	85.5	85.5	0.72	17.7	100	2.7	5.3	3.0	13	0.064	94
11	180 L	1LA5 186-8AB ..	725	87.0	87.0	0.75	24.5	145	2.0	5.0	2.2	13	0.21	128
15	200 L	1LA5 207-8AB ..	725	87.5	87.5	0.78	31.5	198	2.1	5.0	2.2	13	0.37	179
18.5	225 S	1LA5 220-8AB ..	725	89.2	89.2	0.79	38.0	244	2.1	4.5	2.2	13	0.37	187
22	225 M	1LA5 223-8AB ..	725	90.6	90.6	0.79	44.5	290	2.2	4.8	2.3	13	0.45	217

Higher outputs under "1LA/1LG · Cast iron housings" on Pages 3/14 and 3/15.

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier					
	50 Hz			60 Hz			IM B 3			Price supplement		
	230 VΔ / 400 VΔ / 500 VY	400 VΔ / 690 VY	(Outputs at 60 Hz see "Technical information")				IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35
1LA7 063 to 1LA7 096	1	6	3	—	1	6	0	1	1	4	2	3
1LA7 106 to 1LA7 166	1	6	3	5	1	6	0	1	1	4	2	3
1LA5 186 to 1LA5 223	1	6	3	5	1	6	0	1	1	4	—	6

Other voltage and/or frequency, voltage identifier "9".

Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

1) For connection to 230 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

For other designs, see "Technical information", "Designs".

Squirrel-cage motors

1LA · Aluminium housing · Basic version

Selection and ordering data

■ 50 Hz

The motors can also be used for 60 Hz according to EPACT, see Pages 3/6 and 3/7.

For further details, see "Technical information", "Motors for the US market".

3

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Effi- ciency Class	Rated speed rpm	Operating data at rated output				Starting torque For direct-on-line starting as multiple of the rated torque	Starting current at 400 V	Rated current at 400 V	Rated torque Nm	Stalling torque	Torque Class	Moment of inertia <i>J</i>	Weight approx. kg	Design IM B 3												
					Efficiency η at 4/4- load	Efficiency η at 3/4- load	Power factor p.f.	A																					
Energy-saving motor to CEMEP "High Efficiency" eff1, IP 55 degree of protection, temperature class F																	EFF I												
3000 rpm, 2-pole, 50 Hz																	EFF I												
0.09	56 M	1LA9 050-2KA ..		2830	68.0	68.0	0.79	0.24	0.30	2.9	4.5	3.0	16	0.00015	3														
0.12		1LA9 053-2KA ..		2830	69.0	69.0	0.81	0.31	0.40	2.6	4.3	2.8	16	0.00020	4														
0.18	63 M	1LA9 060-2KA ..		2840	70.0	70.0	0.78	0.48	0.61	2.5	4.8	3.1	16	0.00022	4														
0.25		1LA9 063-2KA ..		2830	70.0	70.0	0.82	0.63	0.84	2.3	4.9	2.5	16	0.00026	5														
0.37	71 M	1LA9 070-2KA ..		2840	74.0	74.0	0.77	0.94	1.2	3.1	6.5	3.1	16	0.00041	6														
0.55		1LA9 073-2KA ..		2835	75.0	75.0	0.75	1.42	1.9	3.0	6.3	2.9	16	0.00050	7														
0.75	80 M	1LA9 080-2KA ..		2870	80.0	80.0	0.84	1.65	2.5	3.5	8.3	3.2	16	0.0010	10														
1.1		1LA9 083-2KA ..	1	2860	84.0	84.0	0.89	2.15	3.7	3.2	7.0	3.2	16	0.0013	12														
1.5	90 S	1LA9 090-2KA ..	1	2890	85.0	85.0	0.87	2.95	5.0	3.5	7.0	3.5	16	0.0018	15														
2.2	90 L	1LA9 096-2KA ..	1	2890	86.5	86.5	0.87	4.25	7.3	3.5	7.0	3.5	16	0.0022	18														
3	100 L	1LA9 106-2KA ..	1	2890	87.0	87.0	0.88	5.70	9.9	3.1	7.0	3.2	16	0.0044	24														
4	112 M	1LA9 113-2KA ..	1	2905	88.5	88.5	0.89	7.40	13	2.6	7.0	3.2	16	0.0077	35														
5.5	132 S	1LA9 130-2KA ..	1	2930	89.5	89.5	0.90	9.90	18	2.4	7.0	3.2	16	0.019	43														
7.5		1LA9 131-2KA ..	1	2930	90.5	90.5	0.92	13.0	24	2.5	7.0	3.1	16	0.024	56														
11	160 M	1LA9 163-2KA ..	1	2945	91.0	91.0	0.90	19.4	36	2.3	7.0	3.1	16	0.044	73														
15	160 M	1LA9 164-2KA ..	1	2945	91.5	91.5	0.90	26.3	49	2.3	7.0	3.1	16	0.051	82														
18.5	160 L	1LA9 166-2KA ..	1	2940	92.3	92.5	0.92	31.5	60	2.3	7.0	3.1	16	0.065	102														
22	180 M	1LA9 183-2WA ..	1	2945	93.0	93.2	0.89	38.0 ¹⁾	71	2.5	7.2	3.3	16	0.090	131														
30	200 L	1LA9 206-2WA ..	1	2950	93.5	93.5	0.89	52.0	97	2.4	7.0	3.2	16	0.16	185														
37		1LA9 207-2WA ..	1	2950	94.0	94.1	0.89	64.0 ¹⁾	120	2.4	7.0	3.3	16	0.20	214														
1500 rpm, 4-pole, 50 Hz																	EFF I												
0.06	56 M	1LA9 050-4KA ..		1380	61.0	61.0	0.66	0.22	0.42	2.7	3.1	2.8	16	0.00027	3														
0.09		1LA9 053-4KA ..		1390	62.0	62.0	0.68	0.31	0.62	2.7	3.2	2.8	16	0.00035	4														
0.12	63 M	1LA9 060-4KA ..		1395	66.0	66.0	0.65	0.41	0.82	2.6	3.5	2.6	16	0.00037	4														
0.18		1LA9 063-4KA ..		1340	62.0	62.0	0.68	0.62	1.3	2.9	3.2	2.5	16	0.00045	5														
0.25	71 M	1LA9 070-4KA ..		1410	70.0	70.0	0.64	0.81	1.7	3.2	4.3	3.1	16	0.00076	6														
0.37		1LA9 073-4KA ..		1385	71.0	71.0	0.73	1.03	2.6	2.8	4.2	3.0	16	0.00095	7														
0.75	80 M	1LA9 080-4KA ..		1410	77.0	77.0	0.78	1.32	3.7	2.8	5.6	2.9	16	0.0017	10														
0.55		1LA9 083-4KA ..		1400	81.0	81.0	0.75	1.80	5.1	3.6	5.8	3.5	16	0.0024	12														
1.1	90 S	1LA9 090-4KA ..	1	1440	84.0	84.0	0.77	2.45	7.3	2.7	6.4	3.2	16	0.0033	15														
1.5	90 L	1LA9 096-4KA ..	1	1440	85.0	85.0	0.77	3.30	9.9	3.1	6.7	3.4	16	0.0040	18														
2.2	100 L	1LA9 106-4KA ..	1	1435	86.5	86.5	0.82	4.55	15	3.1	7.0	3.6	16	0.0062	25														
3		1LA9 107-4KA ..	1	1435	87.5	87.7	0.81	6.10	20	3.5	7.0	3.9	16	0.0077	30														
4	112 M	1LA9 113-4KA ..	1	1440	88.5	89.0	0.81	8.10	27	2.8	6.9	3.2	16	0.014	37														
5.5	132 S	1LA9 130-4KA ..	1	1455	89.5	89.5	0.84	10.6	36	2.9	7.0	3.6	16	0.023	45														
7.5	132 M	1LA9 133-4KA ..	1	1455	90.3	90.5	0.84	14.3	49	3.0	7.0	3.6	16	0.029	60														
11	160 M	1LA9 163-4KA ..	1	1460	91.5	92.0	0.85	20.5	72	2.7	6.9	3.2	16	0.055	81														
15	160 L	1LA9 166-4KA ..	1	1460	92.0	92.3	0.86	27.5	98	2.9	7.0	3.3	16	0.072	107														
18.5	180 M	1LA9 183-4WA ..	1	1465	92.5	93.0	0.84	34.5 ¹⁾	121	2.5	7.0	3.2	16	0.15	126														
22	180 L	1LA9 186-4WA ..	1	1465	93.0	93.4	0.84	40.5 ¹⁾	143	2.6	7.3	3.4	16	0.19	146														
30	200 L	1LA9 207-4WA ..	1	1465	93.5	94.0	0.87	53.0	196	2.6	7.0	3.2	16	0.32	199														

Higher outputs under "1LG · Cast iron housing" on Page 3/16.

Order No. supplements

See Page 3/5.

1) For connection to 230 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

Squirrel-cage motors

1LA · Aluminium housing · Basic version

Selection and ordering data

Rated output kW	Size mm	Order No. Order No. supplement for voltage and design, see table below	Effi- ciency Class 	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current at 400 V	Stalling torque at 400 V	Torque Class	Moment of inertia J	Weight Design IM B 3 approx. kg
				Rated speed rpm	Efficiency η at 4/4- load	Power factor p.f.	Rated current A	Rated torque Nm						
Energy-saving motor, IP 55 degree of protection, temperature class F														
0.75	90 S	1LA9 090-6KA ..	925	75.5	75.5	0.72	2.00	7.7	2.5	4.4	2.5	16	0.0033	16
1.1	90 L	1LA9 096-6KA ..	940	82.0	82.0	0.70	2.80	11	3.2	5.7	3.2	16	0.0050	19
1.5	100 L	1LA9 106-6KA ..	950	85.0	85.0	0.70	3.65	15	3.4	6.2	3.4	16	0.0065	25
2.2	112 M	1LA9 113-6KA ..	955	84.0	84.0	0.70	5.40	22	2.7	6.2	3.0	16	0.014	37
4	132 M	1LA9 133-6KA ..	950	84.0	84.0	0.81	8.50	40	2.5	6.3	2.7	16	0.025	49
5.5		1LA9 134-6KA ..	960	86.0	86.0	0.77	12.0	55	3.3	7.3	3.6	16	0.030	64
7.5	160 M	1LA9 163-6KA ..	965	88.0	88.0	0.72	17.1	74	2.2	5.5	2.5	16	0.063	98
11	160 L	1LA9 166-6KA ..	960	88.5	88.5	0.78	23.0	109	2.9	6.9	3.2	16	0.072	105
15	180 L	1LA9 186-6WA ..	970	91.0	91.0	0.75	31.5	148	2.0	6.5	2.5	16	0.19	144
18.5	200 L	1LA9 206-6WA ..	975	91.0	91.0	0.77	38.0	181	2.5	6.2	2.5	16	0.28	186
22		1LA9 207-6WA ..	975	91.5	91.5	0.77	45.0	215	2.5	6.2	2.5	16	0.36	217

Higher outputs under "1LG · Cast iron housing" on Page 3/17.

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier						
	50 Hz			60 Hz			IM B 3 Price supplement			IM B 5			
	230 VΔ / 400 VΔ / 500 VY	500 VΔ	460 VY	460 VΔ	400 VY	690 VY	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35		
1LA9 050 to 1LA9 096	1	6	3	—	1	6	0	1	1	4	2	3	6
1LA9 106 to 1LA9 166	1	6	3	5	1	6	0	1	1	4	2	3	6
1LA9 183 to 1LA9 207	1	6	3	5	1	6	0	1	1	4	—	—	6

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Designs", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

Squirrel-cage motors

1LA · Aluminium housing · Basic version

Selection and ordering data

■ 60 Hz

The motors can also be used for 50 Hz "High Efficiency" eff1, see Pages 3/4 and 3/5.

Rated output HP	Size Order No. supplement for voltage and design, see table below	Order No. supplement for voltage and design, see table below	Operating data at rated output				Starting torque For direct-on-line starting as multiple of the rated torque	Starting current multiple of the rated current	Stalling torque multiple of the rated torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx. kg								
			Rated speed rpm	Nominal efficiency %	Power factor p.f.	Rated current at 460 V A														
Energy-saving motor according to EPACT, IP 55 degree of protection, temperature class F																				
CC 032A																				
3600 rpm, 2-pole, 60 Hz																				
0.12	56 M	1LA9 050-2KA ..	3440	70.0	0.74	0.23	0.25	3.6	5.5	3.8	16	0.00015	3							
0.16		1LA9 053-2KA ..	3440	71.0	0.76	0.28	0.33	3.2	5.4	3.4	16	0.00020	4							
0.25	63 M	1LA9 060-2KA ..	3440	71.0	0.79	0.40	0.50	2.8	4.9	3.3	16	0.00022	4							
0.33		1LA9 063-2KA ..	3430	72.0	0.83	0.53	0.70	2.5	5.0	2.7	16	0.00026	5							
0.5	71 M	1LA9 070-2KA ..	3445	72.0	0.75	0.86	1.00	3.3	7.5	3.4	16	0.00041	6							
0.75		1LA9 073-2KA ..	3445	73.0	0.73	1.30	1.50	3.6	7.2	3.7	16	0.00050	7							
1 ●	80 M	1LA9 080-2KA ..	3485	75.5	0.82	1.52	2.05	4.4	9.6	4.4	16	0.0010	10							
1.5 ●		1LA9 083-2KA ..	3480	82.5	0.88	1.90	3.00	3.8	8.6	3.8	16	0.0013	12							
2 ●	90 S	1LA9 090-2KA ..	3510	84.0	0.86	2.60	4.10	4.1	8.6	4.1	16	0.0018	15							
3 ●	90 L	1LA9 096-2KA ..	3510	85.5	0.85	3.80	6.00	4.1	8.5	5.1	16	0.0022	18							
4	100 L	1LA9 106-2KA ..	3510	86.5	0.87	5.00	8.20	3.4	8.6	3.7	16	0.0044	24							
5	● 112 M	1LA9 113-2KA ..	3525	87.5	0.88	6.00	10	2.8	9.2	4.0	16	0.0077	35							
7.5 ●	132 S	1LA9 130-2KA ..	3540	88.5	0.90	8.70	15	2.7	8.5	3.8	16	0.019	43							
10 ●		1LA9 131-2KA ..	3540	89.5	0.92	11.4	20	2.8	8.3	3.7	16	0.024	56							
15 ●	160 M	1LA9 163-2KA ..	3555	90.2	0.90	17.0	30	2.5	8.5	3.7	16	0.043	73							
20 ●		1LA9 164-2KA ..	3555	90.2	0.90	23.2	40	2.5	8.5	3.7	16	0.051	82							
25 ●	160 L	1LA9 166-2KA ..	3550	91.0	0.92	27.7	50	2.4	8.5	3.5	16	0.062	102							
30 ●	180 M	1LA9 183-2WA ..	3545	91.0	0.86	35.5	59	2.6	8.6	3.5	16	0.093	131							
40 ●	200 L	1LA9 206-2WA ..	3555	91.7	0.88	46.5	81	2.5	8.4	3.6	16	0.16	185							
50 ●		1LA9 207-2WA ..	3555	92.4	0.88	57.0	100	2.7	8.4	3.7	16	0.2	214							
1800 rpm, 4-pole, 60 Hz																				
0.08	56 M	1LA9 050-4KA ..	1715	63.0	0.65	0.18	0.33	2.7	3.4	3.0	16	0.00027	3							
0.12		1LA9 053-4KA ..	1725	64.0	0.67	0.26	0.50	2.8	3.5	3.0	16	0.00035	4							
0.16	63 M	1LA9 060-4KA ..	1720	69.0	0.65	0.34	0.67	2.7	3.9	2.8	16	0.00037	4							
0.25		1LA9 063-4KA ..	1660	65.0	0.67	0.52	1.0	3.0	3.6	3.1	16	0.00045	5							
0.33	71 M	1LA9 070-4KA ..	1730	69.0	0.60	0.76	1.4	3.6	4.9	3.4	16	0.00076	6							
0.5		1LA9 073-4KA ..	1725	70.0	0.68	0.98	2.1	3.3	4.9	3.4	16	0.00096	7							
0.75	80 M	1LA9 080-4KA ..	1725	75.5	0.74	1.24	3.0	3.4	6.8	3.6	16	0.0017	10							
1 ●		1LA9 083-4KA ..	1720	82.5	0.72	1.59	4.2	4.0	7.3	3.9	16	0.0024	12							
1.5 ●	90 S	1LA9 090-4KA ..	1755	84.0	0.76	2.15	6.0	3.1	7.7	3.9	16	0.0032	15							
2 ●	90 L	1LA9 096-4KA ..	1755	84.0	0.76	2.95	8.2	3.6	8.1	4.2	16	0.0040	18							
3 ●	100 L	1LA9 106-4KA ..	1750	87.5	0.79	4.00	12	3.4	8.4	4.3	16	0.0061	25							
4 ●		1LA9 107-4KA ..	1750	87.5	0.79	5.50	17	3.8	8.7	4.6	16	0.0077	30							
5 ●	112 M	1LA9 113-4KA ..	1755	87.5	0.79	6.70	20	3.2	8.6	3.9	16	0.014	37							
7.5 ●	132 S	1LA9 130-4KA ..	1760	89.5	0.81	9.50	30	3.2	8.7	4.1	16	0.023	45							
10 ●	132 M	1LA9 133-4KA ..	1760	89.5	0.82	12.8	41	3.4	8.7	4.1	16	0.029	60							
15 ●	160 M	1LA9 163-4KA ..	1765	91.0	0.85	17.9	60	2.6	8.1	3.2	16	0.055	81							
20 ●	160 L	1LA9 166-4KA ..	1765	91.0	0.85	24.5	81	2.8	8.5	3.5	16	0.072	107							
25 ●	180 M	1LA9 183-4WA ..	1770	92.4	0.83	30.5	100	2.8	8.4	3.6	16	0.15	126							
30 ●	180 L	1LA9 186-4WA ..	1770	92.4	0.83	36.0	119	3.1	8.8	3.9	16	0.19	146							
40 ●	200 L	1LA9 207-4WA ..	1770	93.0	0.86	47.0	162	3.0	8.3	3.6	16	0.32	199							

Higher outputs under "1LG · Cast iron housing" on Page 3/18.

● With CC No. CC 032A

Order No. supplements

See Page 3/7.

Squirrel-cage motors

1LA · Aluminium housing · Basic version

Selection and ordering data

Rated output HP	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current	Stalling torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx. kg
			Rated speed rpm	Nominal efficiency %	Power factor p.f.	Rated current at 460 V A	Rated torque Nm						
Energy-saving motor according to EPACT, IP 55 degree of protection, temperature class F													
1200 rpm, 6-pole, 60 Hz													CC 032A
1 ● 1.5 ●	90 S 90 L	1LA9 090-6KA .. 1LA9 096-6KA ..	1140 1150	80.0 85.5	0.66 0.64	1.78 2.55	6.3 9.2	3.0 3.7	5.6 6.4	3.0 3.7	16 16	0.0035 0.0050	15 19
2	100 L	1LA9 106-6KA ..	1160	86.5	0.68	3.20	13	3.5	7.2	3.8	16	0.0065	25
3 ●	112 M	1LA9 113-6KA ..	1160	87.5	0.66	4.80	18	2.9	7.5	3.7	16	0.014	37
5 ● 7.5 ●	132 M 132 M	1LA9 133-6KA .. 1LA9 134-6KA ..	1160 1160	87.5 89.5	0.77 0.73	6.90 10.6	31 45	3.0 3.7	7.9 8.4	3.6 4.3	16 16	0.025 0.034	49 64
10 ● 15 ●	160 M 160 L	1LA9 163-6KA .. 1LA9 166-6KA ..	1165 1165	89.5 90.2	0.70 0.77	15.0 19.9	62 90	2.4 3.1	6.4 8.3	2.8 3.8	16 16	0.049 0.057	98 105
20 ●	180 L	1LA9 186-6WA ..	1175	90.2	0.75	28.0	122	2.2	7.2	2.8	16	0.19	144
25 ● 30 ●	200 L	1LA9 206-6WA .. 1LA9 207-6WA ..	1175 1175	91.7 91.7	0.75 0.75	34.0 40.0	150 179	2.8 2.8	7.1 7.2	2.8 2.8	16 16	0.28 0.36	186 217

Higher outputs under "1LG · Cast iron housing" on Page 3/19.

● With CC No. CC 032A

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier						
	50 Hz			60 Hz			IM B 3 Price supplement			IM B 5 IM V 1 IM V 1 IM B 14 IM B 14 IM B 35			
	230 VΔ / 400 VΔ / 500 VY	500 VΔ	460 VY	460 VΔ	400 VY	690 VY	Without protective cover	With protective cover	Without standard flange	With standard flange	With special flange		
1LA9 050 to 1LA9 096	1	6	3	—	1	6	0	1	1	4	2	3	6
1LA9 106 to 1LA9 166	1	6	3	5	1	6	0	1	1	4	2	3	6
1LA9 183 to 1LA9 207	1	6	3	5	1	6	0	1	1	4	—	—	6

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Designs", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

Squirrel-cage motors

1LA · Aluminium housing · With increased power

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current	Stalling torque	Torque Class	Moment of inertia J	Weight Design IM B 3								
			Rated speed rpm	Efficiency %	Power factor p.f.	Rated current at 400 V	Rated torque Nm														
IP 55 degree of protection, temperature class F, used as class F																					
3000 rpm, 2-pole, 50 Hz																					
0.20	56 M	1LA9 053-2LA ..	2830	69.0	0.82	0.50	0.67	2.1	4.5	2.3	16	0.00020	4								
0.33	63 M	1LA9 060-2LA ..	2775	68.0	0.80	0.88	1.1	2.3	4.4	2.2	16	0.00022	4								
0.45		1LA9 063-2LA ..	2720	68.0	0.84	1.15	1.6	2.2	4.2	2.3	16	0.00026	5								
0.65	71 M	1LA9 070-2LA ..	2720	72.0	0.83	1.57	2.3	2.4	4.5	2.5	16	0.00041	6								
0.94		1LA9 073-2LA ..	2735	73.0	0.82	2.30	3.3	2.5	4.8	2.4	16	0.00050	7								
1.45	80 M	1LA9 080-2LA ..	2820	76.0	0.83	3.30	4.9	3.1	6.7	3.1	16	0.0010	10								
1.75		1LA9 083-2LA ..	2840	77.0	0.82	4.00	5.9	3.7	7.4	3.5	16	0.0013	12								
2.9	90 S	1LA9 090-2LA ..	2825	81.0	0.82	6.30	9.8	3.2	6.5	3.0	16	0.0018	15								
3.8	90 L	1LA9 096-2LA ..	2810	81.0	0.85	7.90	13	3.1	6.5	2.7	16	0.0022	18								
4.4	100 L	1LA9 106-2LA ..	2880	82.0	0.83	9.30	15	3.0	7.8	3.2	16	0.0044	24								
6.5	112 M	1LA9 113-2LA ..	2900	85.0	0.83	13.3	21	3.0	8.6	3.8	16	0.0077	35								
8.5	132 S	1LA9 130-2LA ..	2895	84.0	0.87	16.8	28	1.9	6.7	2.2	16	0.019	43								
11		1LA9 131-2LA ..	2905	86.0	0.85	21.7	36	2.5	7.5	2.9	16	0.024	56								
17	160 M	1LA9 163-2LA ..	2910	87.0	0.85	33.0	56	2.1	6.3	2.5	16	0.044	73								
20	160 M	1LA9 164-2LA ..	2910	88.0	0.88	37.5	66	2.3	6.9	2.7	16	0.051	82								
24.5	160 L	1LA9 166-2LA ..	2920	89.0	0.87	45.5	80	2.8	8.2	3.3	16	0.065	102								
33	180 M	1LA9 183-2AA ..	2940	92.0	0.86	60.0	107	2.5	7.4	3.3	16	0.090	131								
44	200 L	1LA9 206-2AA ..	2945	92.0	0.86	80.0	143	2.4	7.8	3.2	16	0.16	185								
53		1LA9 207-2AA ..	2945	92.5	0.87	95.0	172	2.6	8.2	3.3	16	0.20	214								
1500 rpm, 4-pole, 50 Hz																					
0.14	56 M	1LA9 053-4LA ..	1385	62.0	0.74	0.44	0.97	2.3	3.5	2.2	16	0.00035	4								
0.21	63 M	1LA9 060-4LA ..	1335	60.0	0.77	0.66	1.5	2.1	2.9	2.1	16	0.00037	4								
0.29		1LA9 063-4LA ..	1330	60.0	0.71	0.98	2.1	2.3	2.9	2.3	16	0.00045	5								
0.45	71 M	1LA9 070-4LA ..	1340	64.0	0.71	1.50	3.2	2.3	3.4	2.3	16	0.00076	6								
0.60		1LA9 073-4LA ..	1340	70.0	0.75	1.65	4.3	2.3	3.6	2.3	16	0.00095	7								
0.90	80 M	1LA9 080-4LA ..	1340	70.0	0.81	2.30	6.4	2.3	4.1	2.4	16	0.0017	10								
1.25		1LA9 083-4LA ..	1340	70.0	0.83	3.10	8.9	2.7	4.5	2.4	16	0.0024	12								
1.8	90 S	1LA9 090-4LA ..	1380	77.0	0.86	3.90	12	2.4	5.1	2.4	16	0.0033	15								
2.5	90 L	1LA9 096-4LA ..	1390	76.0	0.81	5.90	17	2.5	5.1	2.3	16	0.0040	18								
4.0	100 L	1LA9 107-4LA ..	1410	77.0	0.81	9.20	27	2.7	6.0	3.0	16	0.0062	25								
5.5	112 M	1LA9 113-4LA ..	1440	82.0	0.80	12.1	36	3.0	6.8	3.0	16	0.014	37								
8.6	132 S	1LA9 130-4LA ..	1440	84.0	0.83	17.8	57	2.3	6.8	2.7	16	0.023	45								
11	132 M	1LA9 133-4LA ..	1450	85.0	0.83	22.5	72	2.8	7.4	3.1	16	0.029	60								
17	160 M	1LA9 163-4LA ..	1455	88.0	0.84	33.0	112	2.9	7.5	2.8	16	0.055	81								
22	160 L	1LA9 166-4LA ..	1455	88.0	0.82	44.0	144	3.1	8.3	3.4	16	0.072	107								
26	180 M	1LA9 183-4AA ..	1460	90.5	0.83	50.0	170	2.4	7.5	3.2	16	0.15	126								
32	180 L	1LA9 186-4AA ..	1465	91.3	0.84	60.0	209	2.5	7.9	3.4	16	0.19	146								
43	200 L	1LA9 207-4AA ..	1465	91.7	0.85	79.0	280	2.7	7.8	3.5	16	0.32	199								

Higher outputs under "1LG · Cast iron housing" on Page 3/20.

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier						
	50 Hz			60 Hz			IM B 3		Price supplement				
	230 VΔ / 400 VΔ / 500 VY	500 VA	460 VY	460 VΔ	400 VY / 690 VY		IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35	
1LA9 050 to 1LA9 096	1	6	3	—	1	6	0	1	1	4	2	3	6
1LA9 106 to 1LA9 166	1	6	3	5	1	6	0	1	1	4	2	3	6
1LA9 183 to 1LA9 207	1	6	3	5	1	6	0	1	1	4	—	—	6

Other voltage and/or frequency, voltage identifier "9". For other designs, see "Technical information", "Designs".

Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

Squirrel-cage motors

1LA · Aluminium housing · Pole-change motors

Selection and ordering data

Pole change motors

The torque classification for pole-changing motors only applies once the lowest speed

has been activated until the operating speed when it is

switched over to the next highest speed.

The motors can only be started direct-on-line.
For circuit diagrams, see Catalog M 10 and SD 01.

Rated output 1500 rpm kW	Size 3000 rpm kW	Order No. supplement for voltage and design, see table below	Operating data at rated output		Starting torque		Starting current		Stalling torque		Torque Class	Moment of inertia J	Weight approx. kg	Design IM B 3
			Rated speed rpm	Rated current at 400 V A	1500 rpm A	3000 rpm A	1500 rpm A	3000 rpm A	1500 rpm A	3000 rpm A				

Two speed pole-change, IP 55 degree of protection, temperature class F

1500/3000 rpm, 4/2-pole, 50 Hz, version with one winding in Dahlander circuit															
0.1	0.15	63 M	1LA7 060-0AA ..	1330/2650	0.41	0.51	1.8	1.8	2.7	2.9	1.8	1.8	10	0.00029	4
0.15	0.2		1LA7 063-0AA ..	1330/2700	0.51	0.58	2.0	2.0	3.0	3.3	2.0	2.0	10	0.00037	4
0.21	0.28	71 M	1LA7 070-0AA ..	1375/2700	0.70	1.1	1.6	1.6	3.0	3.1	1.8	1.8	10	0.00052	5
0.3	0.43		1LA7 073-0AA ..	1380/2770	0.89	1.3	1.8	1.8	3.7	3.8	2.0	2.0	10	0.00076	7
0.48	0.6	80 M	1LA7 080-0AA ..	1390/2810	1.25	1.6	1.7	1.7	3.9	4.0	2.0	2.0	10	0.0014	9
0.7	0.85		1LA7 083-0AA ..	1390/2810	1.75	2.1	1.8	1.8	4.3	4.3	2.1	2.1	10	0.0017	10
1.1	1.4	90 S	1LA7 090-0AA ..	1390/2810	2.70	3.6	1.6	1.8	4.2	4.3	1.9	2.0	13	0.0024	13
1.5	1.9	90 L	1LA7 096-0AA ..	1390/2860	3.40	4.5	1.9	1.9	4.9	5.3	2.0	2.1	13	0.0033	16
2	2.4	100 L	1LA7 106-0AA ..	1410/2870	4.25	5.5	1.8	1.8	5.0	5.5	2.0	2.1	13	0.0048	21
2.6	3.1		1LA7 107-0AA ..	1400/2850	5.50	7.6	2.3	2.4	5.6	5.6	2.4	2.4	13	0.0055	24
3.7	4.4	112 M	1LA7 113-0AA ..	1420/2885	8.00	10.5	2.0	2.2	5.6	5.8	2.2	2.3	13	0.011	31
4.7	5.9	132 S	1LA7 130-0AA ..	1450/2920	9.70	12.5	1.7	1.6	6.3	6.5	2.2	2.2	10	0.018	41
6.5	8	132 M	1LA7 133-0AA ..	1450/2930	13.6	16.7	2.0	2.1	6.9	7.5	2.5	2.6	10	0.023	50
9.3	11.5	160 M	1LA7 163-0AA ..	1455/2930	18.3	23.4	2.0	1.8	6.7	7.4	2.6	2.4	10	0.043	74
13	17	160 L	1LA7 166-0AA ..	1455/2930	25.6	32.0	2.5	2.8	7.6	8.5	3.0	3.0	10	0.060	92
15	18	180 M	1LA5 183-0AA ..	1470/2950	29.0	37.5	2.1	2.2	6.7	7.5	2.7	3.2	13	0.13	113
18	21.5	180 L	1LA5 186-0AA ..	1465/2950	34.5	42.0	2.0	2.2	6.4	7.3	2.6	3.1	13	0.15	123
26	31	200 L	1LA5 207-0AA ..	1465/2940	48.5	61.0	2.6	2.6	6.7	7.5	2.8	3.3	13	0.24	160
750 rpm	1500 rpm				750 rpm	1500 rpm									
750/1500 rpm, 8/4-pole, 50 Hz, version with one winding in Dahlander circuit															
0.35	0.5	90 S	1LA7 090-0AB ..	675/1365	1.19	1.41	1.3	1.3	2.5	3.2	1.6	1.6	10	0.0023	11
0.5	0.7	90 L	1LA7 096-0AB ..	675/1380	1.60	2.10	1.4	1.5	3.0	3.5	1.7	1.8	10	0.0031	13
0.7	1.1	100 L	1LA7 106-0AB ..	690/1380	2.10	3.25	1.7	1.6	3.3	3.5	2.0	1.9	10	0.0051	20
0.9	1.5		1LA7 107-0AB ..	680/1400	2.50	3.65	1.8	1.6	3.5	3.6	2.0	1.9	10	0.0063	22
1.4	1.9	112 M	1LA7 113-0AB ..	690/1410	4.00	5.20	1.4	1.5	3.6	4.4	1.7	1.8	10	0.013	25
1.8	3.6	132 S	1LA7 130-0AB ..	720/1430	6.30	7.20	2.0	1.3	4.3	5.4	2.3	1.8	10	0.018	41
2.5	5	132 M	1LA7 133-0AB ..	720/1430	8.20	10.0	2.0	1.3	4.3	5.4	2.3	1.8	10	0.023	49
3.5	7	160 M	1LA7 163-0AB ..	725/1450	11.7	13.9	2.0	1.4	4.0	5.4	2.3	1.8	10	0.043	73
5.6	11	160 L	1LA7 166-0AB ..	725/1450	18.5	21.5	2.2	1.7	4.2	5.9	2.4	2.0	10	0.060	91
11	18	180 L	1LA5 186-0AB ..	725/1455	27.0	35.0	1.9	2.0	5.2	6.2	2.2	2.2	13	0.21	123
17	27	200 L	1LA5 207-0AB ..	730/1465	40.5	50.5	2.4	2.3	5.4	6.6	2.5	2.5	13	0.37	160

Higher outputs available soon.

Order No. supplements

Motor type	Penultimate position: Voltage identifier				Final position: Design identifier						
	50 Hz, direct switch-on				IM B 3 Price supplement						
	230 V	400 V	500 V	690 V	IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35	
1LA7 060 to 1LA7 166	1	6	5	0	0	1	1	4	2	3	6
1LA5 183 to 1LA5 207	1	6	5	0	0	1	1	4	-	-	6

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

Squirrel-cage motors

1LA · Aluminium housing · Pole-change motors

Selection and ordering data

Rated output		Size	Order No. supplement for voltage and design, see table below	Operating data at rated output				Starting torque		Starting current		Stalling torque		Torque Class	Moment of inertia J	Weight Design IM B 3					
1500 rpm kW	3000 rpm kW			Rated speed rpm	Rated current at 400 V A	1500 rpm A	3000 rpm A	1500 rpm A	3000 rpm A	1500 rpm A	3000 rpm A	1500 rpm A	3000 rpm A								
Two speed pole-change for driving fans, IP 55 degree of protection, temperature class F																					
1500/3000 rpm, 4-2-pole, 50 Hz, version with one winding in Dahlander circuit																					
0.15	0.7	80 M	1LA7 080-0BA ..	1400/2745	0.39	1.76	1.8	1.6	3.8	4.0	2.0	2.0	10	0.0014	10						
0.25	0.95		1LA7 083-0BA ..	1385/2780	0.61	2.40	1.8	1.9	3.8	4.2	2.0	2.0	10	0.0017	11						
0.33	1.4	90 S	1LA7 090-0BA ..	1420/2835	0.76	3.50	1.9	1.8	4.5	4.3	2.1	2.0	10	0.0024	13						
0.5	2	90 L	1LA7 096-0BA ..	1420/2835	1.08	4.80	2.2	2.2	5.1	5.0	2.5	2.5	10	0.0033	16						
0.65	2.5	100 L	1LA7 106-0BA ..	1430/2865	1.44	5.40	1.7	2.2	5.0	5.5	2.3	2.3	10	0.0048	21						
0.8	3.1		1LA7 107-0BA ..	1425/2860	1.70	7.00	1.8	2.3	5.7	6.1	2.6	2.6	10	0.0055	24						
1.1	4.4	112 M	1LA7 113-0BA ..	1445/2885	2.50	10.7	2.1	2.2	6.2	6.2	2.4	2.4	10	0.011	31						
1.45	5.9	132 S	1LA7 130-0BA ..	1455/2920	3.00	12.8	2.0	2.1	6.8	6.5	2.8	2.8	10	0.018	41						
2	8	132 M	1LA7 133-0BA ..	1455/2930	4.00	16.0	1.9	2.1	7.6	7.5	2.6	2.6	10	0.023	50						
2.9	11.5	160 M	1LA7 163-0BA ..	1455/2930	5.70	22.0	1.8	1.8	6.9	7.4	2.5	2.4	10	0.043	74						
4.3	17	160 L	1LA7 166-0BA ..	1455/2930	8.40	31.0	1.9	2.2	7.1	8.5	2.5	2.6	10	0.060	92						
1000 rpm	1500 rpm				750 rpm	1500 rpm	750 rpm	1500 rpm	750 rpm	1500 rpm	750 rpm	1500 rpm									
1000/1500 rpm, 6-4-pole, 50 Hz, version with one winding in Dahlander circuit																					
0.12	0.4	80 M	1LA7 080-1BD ..	940/1430	0.51	1.38	1.7	1.7	2.8	4.0	1.8	2.0	10	0.0014	9						
0.18	0.55		1LA7 083-1BD ..	930/1420	0.73	1.62	1.5	1.7	2.5	4.0	1.8	2.0	10	0.0017	10						
0.29	0.8	90 S	1LA7 090-1BD ..	950/1430	1.07	2.10	1.5	1.5	3.4	4.3	2.0	2.0	10	0.0027	13						
0.38	1.1	90 L	1LA7 096-1BD ..	955/1430	1.33	2.65	1.8	1.8	3.8	4.9	2.3	2.3	10	0.0033	16						
0.6	1.7	100 L	1LA7 106-1BD ..	950/1410	1.75	3.80	1.8	1.8	4.2	5.2	2.2	2.2	10	0.0049	21						
0.75	2.1		1LA7 107-1BD ..	950/1420	2.30	4.55	1.6	1.9	3.9	5.2	2.0	2.2	10	0.0057	24						
0.9	3	112 M	1LA7 113-1BD ..	980/1450	3.00	6.70	2.0	2.1	4.5	6.1	2.5	2.5	10	0.012	31						
1.2	3.9	132 S	1LA7 130-1BD ..	975/1460	3.50	8.40	1.9	1.7	5.1	6.1	2.5	2.2	10	0.018	41						
1.7	5.4	132 M	1LA7 133-1BD ..	975/1460	4.55	11.4	2.1	1.9	5.1	6.6	2.6	2.5	10	0.023	49						
2.5	7.2	160 M	1LA7 163-1BD ..	980/1470	6.4	14.4	1.9	2.0	5.6	7.3	1.9	2.0	10	0.043	74						
3.7	12	160 L	1LA7 166-1BD ..	980/1470	9.3	23.3	1.9	2.4	5.7	8.1	2.3	3.0	10	0.060	92						
5.5	16	180 M	1LA5 183-1BD ..	965/1470	11.8	31.5	1.8	1.9	4.3	5.9	1.9	2.6	10	0.081	116						
6.5	19	180 L	1LA5 186-1BD ..	965/1460	13.8	36.5	1.8	1.9	4.3	5.6	2.1	2.6	10	0.094	123						
9.5	26	200 L	1LA5 207-1BD ..	980/1470	20.0	49.0	1.9	1.5	5.3	5.5	2.1	2.1	10	0.16	160						
750 rpm	1500 rpm				750 rpm	1500 rpm	750 rpm	1500 rpm	750 rpm	1500 rpm	750 rpm	1500 rpm									
750/1500 rpm, 8-4-pole, 50 Hz, version with one winding in Dahlander circuit																					
0.1	0.5	80 M	1LA7 080-0BB ..	680/1375	0.57	1.28	1.4	1.7	2.3	4.1	1.7	1.8	10	0.0014	9						
0.15	0.7		1LA7 083-0BB ..	685/1380	0.77	1.76	1.4	1.8	2.4	4.2	1.7	1.8	10	0.0017	10						
0.22	1	90 S	1LA7 090-0BB ..	695/1370	1.25	2.40	1.3	1.5	2.4	3.7	1.8	2.0	10	0.0024	13						
0.33	1.5	90 L	1LA7 096-0BB ..	700/1375	1.80	3.30	1.5	1.8	2.6	4.2	1.8	2.0	10	0.0033	16						
0.5	2	100 L	1LA7 106-0BB ..	710/1415	2.50	4.30	1.1	1.9	3.1	5.2	1.8	2.1	10	0.0047	21						
0.65	2.5		1LA7 107-0BB ..	700/1400	2.80	5.30	1.1	1.9	3.1	5.4	1.8	2.1	10	0.0054	24						
0.9	3.6	112 M	1LA7 113-0BB ..	720/1440	4.70	8.00	1.6	2.6	3.2	6.5	2.4	2.6	10	0.012	31						
1.1	4.7	132 S	1LA7 130-0BB ..	720/1455	3.30	10.3	2.0	2.3	4.3	6.4	2.5	2.9	10	0.018	41						
1.4	6.4	132 M	1LA7 133-0BB ..	720/1455	4.40	13.3	2.2	1.9	4.6	6.8	2.7	2.5	10	0.023	49						
2.2	9.5	160 M	1LA7 163-0BB ..	725/1465	6.50	19.7	1.7	2.0	4.1	7.0	2.0	2.6	10	0.043	73						
3.3	14	160 L	1LA7 166-0BB ..	730/1470	9.30	28.6	2.0	2.6	4.7	8.1	2.2	3.1	10	0.060	91						
4.5	16	180 M	1LA5 183-0BB ..	730/1470	13.6	32.3	1.4	2.3	3.8	7.0	2.1	2.9	10	0.13	113						
5	18.5	180 L	1LA5 186-0BB ..	730/1470	15.0	36.5	1.5	2.3	3.8	7.0	2.1	2.7	10	0.15	123						
7.5	28	200 L	1LA5 207-0BB ..	732/1470	20.5	52.0	1.9	2.5	4.3	7.1	2.2	2.5	10	0.24	160						

Higher outputs available soon.

Order No. supplements

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier						
	50 Hz, direct switch-on					IM B 3 Price supplement						
	230 V	400 V	500 V	690 V		IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35	
1LA7 080 to 1LA7 166	1	6	5	0		0	1	1	4	2	3	6
1LA5 183 to 1LA5 207	1	6	5	0		0	1	1	4	-	-	6

Other voltage and/or frequency, voltage identifier "9".
 Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

Squirrel-cage motors

1LA · Aluminium housing · Pole-change motors

Selection and ordering data

Rated output			Size	Order No.	Operating data at rated output						Starting torque			Starting current			Torque Classe	Moment of inertia J	Weight
750 rpm	1000 rpm	1500 rpm		Order No. supplement for voltage and design, see table below	Rated speeds rpm	Rated current at 400 V A	750 rpm A	1000 rpm A	1500 rpm A	750 rpm	1000 rpm	1500 rpm	750 rpm	1000 rpm	1500 rpm	KL	kg m ²	Design IM B 3 approx. kg	
3 Speed motors for driving fans, IP 55 degree of protection, temperature class F																			
750/1000/1500 rpm, 8-/6-/4-pole, 50 Hz, version with two windings, of which 750/1500 rpm in Dahlander circuit																			
0.15	0.22	0.7	90 S	1LA7 090-1BJ ..	705/960/1430	0.72	0.82	1.74	1.3	1.3	1.5	2.5	2.9	4.3	10	0.0028	12		
0.22	0.3	0.95	90 L	1LA7 096-1BJ ..	705/955/1435	1.06	1.13	2.30	1.3	1.3	1.4	2.5	3.1	4.0	10	0.0035	15		
0.37	0.55	1.5	100 L	1LA7 106-1BJ ..	700/955/1400	1.66	1.71	3.25	0.9	1.4	1.5	2.8	3.8	4.7	7	0.0048	20		
0.45	0.7	1.8		1LA7 107-1BJ ..	700/955/1400	1.85	2.15	3.90	0.9	1.4	1.7	2.8	3.8	4.7	7	0.0058	22		
0.6	0.85	2.4	112 M	1LA7 113-1BJ ..	715/970/1445	2.75	2.80	5.10	1.1	1.3	1.9	3.1	4.4	6.0	7	0.011	29		
0.75	1.1	3.1	132 S	1LA7 130-1BJ ..	730/980/1460	2.70	3.40	7.20	1.7	1.7	1.5	3.7	4.5	5.5	10	0.018	39		
1	1.5	4.4	132 M	1LA7 133-1BJ ..	730/980/1460	3.55	4.50	9.70	1.8	1.9	1.6	3.9	4.9	5.8	10	0.024	46		
1.6	2.2	6.6	160 M	1LA7 163-1BJ ..	730/980/1470	5.10	6.50	14.2	1.4	1.7	1.7	3.9	5.1	7.0	7	0.040	67		
2.4	3.5	10	160 L	1LA7 166-1BJ ..	730/980/1470	7.60	9.40	20.7	1.6	1.8	2.0	4.1	5.3	7.7	7	0.054	85		
3	4.5	13	180 M	1LA5 183-1BJ ..	730/980/1470	8.40	10.2	25.5	1.2	1.8	1.3	3.2	5.0	5.4	7	0.081	116		
3.7	5.5	16	180 L	1LA5 186-1BJ ..	725/975/1469	10.3	12.1	31.0	1.1	1.9	1.3	3.2	5.0	5.4	7	0.094	123		
5	8	22	200 L	1LA5 207-1BJ ..	730/975/1465	13.4	16.6	42.0	1.2	1.9	1.3	3.6	5.0	5.4	7	0.16	160		

Higher outputs available soon.

Order No. supplements

Motor type	Penultimate position: Voltage identifier				Final position: Design identifier							
	50 Hz, direct switch-on				IM B 3	Price supplement						
	230 V	400 V	500 V	690 V		IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35	
1LA7 090 to 1LA7 166	1	6	5	0	0	1	1	4	2	3	6	
1LA5 183 to 1LA5 207	1	6	5	0	0	1	1	4	-	-	6	

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Designs", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

Squirrel-cage motors

1LA/1LG · Cast iron housing · Basic version

Selection and ordering data

Rated output kW	Size Order No. Order No. supplement for voltage and design, see table below	Efficiency Class 	Operating data at rated output 4/4- load % rpm	Operating data at rated output Efficiency η at 4/4- load %			Rated current at 400 V A	Rated torque Nm	Starting torque For direct-on-line starting as multiple of the rated torque	Starting current multiple of the rated current	Stalling torque multiple of the rated torque	Torque Class KL	Moment of inertia J	Weight kg m ²	Design IM B 3 approx. kg
				100 L	112 M	132 S									
Energy-saving motor to CEMEP "Improved Efficiency" eff2, IP 55 degree of protection, temperature class F															
3	100 L	1LA6 106-2AA ..	2	2890	84.0	84.0	0.85	6.1	9.9	2.8	6.8	3.0	16	0.0035	34
4	112 M	1LG4 113-2AA ..	2	2905	86.0	86.0	0.86	7.8	13	2.6	7.2	2.9	16	0.0059	43
5.5	132 S	1LA6 130-2AA ..	2	2925	86.5	86.5	0.89	10.3	18	2.0	5.9	2.8	16	0.015	53
7.5		1LA6 131-2AA ..	2	2930	88.0	88.0	0.89	13.8	24	2.3	6.9	3.0	16	0.019	58
11	160 M	1LA6 163-2AA ..	2	2940	89.5	89.5	0.88	20.0	36	2.1	6.5	2.9	16	0.034	96
15	160 M	1LG4 164-2AA ..	2	2940	90.0	90.2	0.90	26.5	49	2.2	6.6	3.0	16	0.043	105
18.5	160 L	1LG4 166-2AA ..	2	2940	91.0	91.2	0.91	32.5	60	2.4	7.0	3.1	16	0.051	115
22	180 M	1LG4 183-2AA ..	2	2945	91.6	91.6	0.86	40.5	71	2.5	6.4	3.4	16	0.068	145
30	200 L	1LG4 206-2AA ..	2	2950	91.8	91.9	0.88	54.0	97	2.3	6.5	3.0	16	0.13	205
37		1LG4 207-2AA ..	2	2955	92.9	93.2	0.89	65.0	120	2.5	7.2	3.3	16	0.15	225
45	225 M	1LG4 223-2AA ..	2	2960	93.6	93.9	0.88	79.0	145	2.4	6.7	3.1	16	0.22	285
55	250 M	1LG4 253-2AB ..	2	2970	93.6	93.8	0.88	96.0	177	2.1	6.7	3.1	13	0.40	375
75	280 S	1LG4 280-2AB ..	2	2975	94.5	94.3	0.88	130	241	2.5	7.5	3.1	13	0.72	500
90	280 M	1LG4 283-2AB ..	2	2975	95.1	95.2	0.89	154	289	2.6	7.2	3.1	13	0.83	540
110	315 S	1LG4 310-2AB ..		2982	94.6	93.8	0.88	190	352	2.4	7.2	3.1	13	1.2	720
132	315 M	1LG4 313-2AB ..		2982	95.1	94.8	0.90	225	423	2.4	6.9	3.0	13	1.4	775
160	315 L	1LG4 316-2AB ..		2982	95.5	95.3	0.91	265	512	2.4	7.0	3.0	13	1.6	900
200	315 L	1LG4 317-2AB ..		2982	95.9	95.8	0.92	325	641	2.3	6.7	2.9	13	2.1	1015
250	315	1LA8 315-2AC ..		2979	96.2	96.2	0.90	415	801	1.8	7.0	2.8	10	2.7	1300
315		1LA8 317-2AC ..		2979	96.6	96.6	0.91	520	1010	1.8	7.0	2.8	10	3.3	1500
355	355	1LA8 353-2AC ..▲		2980	96.6	96.6	0.90	590	1140	1.7	6.5	2.5	10	4.8	1900
400		1LA8 355-2AC ..▲		2980	96.7	96.7	0.91	660	1280	1.7	6.5	2.5	10	5.3	2000
500		1LA8 357-2AC ..▲		2982	97.1	97.1	0.91	820	1600	1.8	6.5	2.6	10	6.4	2200
560	400	1LA8 403-2AC ..▲		2985	97.1	97.1	0.91	910	1790	1.6	7.0	2.8	10	8.6	2800
630		1LA8 405-2AC ..▲		2985	97.1	97.1	0.91	1020	2020	1.6	7.0	2.8	10	9.6	3000
710		1LA8 407-2AC ..▲		2985	97.3	97.3	0.91	670 ●	2270	1.7	7.0	2.8	10	11	3200
800	450	1LA8 453-2AE ..▲		2986	97.2	97.2	0.91	760 ●	2560	0.9	7.0	3.0	5	19	4000
900		1LA8 455-2AE ..▲		2986	97.3	97.3	0.92	840 ●	2880	0.9	7.0	2.8	5	21	4200
1000		1LA8 457-2AE ..▲		2986	97.4	97.4	0.93	920 ●	3200	0.9	7.0	2.7	5	23	4400

● Rated current at 690 V.

▲ With axial fan for clockwise rotation.

■ Also supplied for 400 VΔ (voltage identifier "9" and order code **L1Y**).

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier							
	50 Hz						60 Hz							
	230 VΔ / 400 VΔ / 500 VYY	400 VYY	690 VYY	230 VΔ / 400 VΔ / 500 VYY	460 VYY	460 VΔ	(Outputs at 60 Hz see "Technical information")	IM B 3	Price supplement	IM B 5	IM V 1	IM V 1	IM B 14	IM B 14	IM B 35
1LA6 106 to 1LA6 166	1	6	3	5	—	1	6	0	1	1	4	2	3	6
1LG4 183 to 1LG4 313	1	6	3	5	—	1	6	0	1	1	4	—	—	6
1LG4 316 to 1LG4 317	—	6	—	5	—	—	6	0	—	8	4	—	—	6
1LA8 315 to 1LA8 405	—	6	—	5	—	—	9 L2F	0	—	8	4	—	—	6
1LA8 407 to 1LA8 457	—	—	—	5	0	—	On request	0	—	8	4	—	—	6

Other voltage and/or frequency, voltage identifier "9".

Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For possible 2-pole motors, see "Technical information", "Outputs at 60 Hz".

For other designs, see "Technical information", "Designs".

Parallel supply cables required (see "Technical information", "Connections, circuits and terminal blocks")

Voltage	1LG4	1LA8
230 V	183 206 207 223 253 280 283 310 313 316 317	315 317 353 355 357 403 405 407 453 455 457
400 V		
500 V		
690 V		

Squirrel-cage motors

1LA/1LG · Cast iron housing · Basic version

Selection and ordering data

Rated output kW	Size Order No. Order No. supplement for voltage and design, see table below	Efficiency Class 	Operating data at rated output at 4/4- load % rpm	Operating data at rated output Efficiency η at 4/4- load % Power factor p.f.			Rated current at 400 V A	Rated torque 400 V Nm	Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx. kg	
				1500 rpm, 4-pole, 50 Hz	1400	1300									
2.2 3	100 L 100 L	1LA6 106-4AA .. 1LA6 107-4AA ..	2 2	1420 1420	82.0 83.0	82.5 83.5	0.82 0.82	4.7 6.4	15 20	2.5 2.7	5.6 5.6	2.8 3.0	16 16	0.0047 0.0055	33 36
4	112 M	1LA6 113-4AA ..	2	1440	85.0	85.5	0.83	8.2	27	2.7	6.0	3.0	16	0.012	45
5.5 7.5	132 S 132 M	1LA6 130-4AA .. 1LA6 133-4AA ..	2 2	1455 1455	86.0 87.0	86.0 87.5	0.81 0.82	11.4 15.2	36 49	2.5 2.7	6.3 6.7	3.1 3.2	16 16	0.018 0.023	55 62
11 15	160 M 160 L	1LA6 163-4AA .. 1LA6 166-4AA ..	2 2	1460 1460	88.5 90.0	89.0 90.2	0.84 0.84	21.5 28.5	72 98	2.2 2.6	6.2 6.5	2.7 3.0	16 16	0.043 0.055	100 114
18.5 22	180 M 180 L	1LG4 183-4AA .. 1LG4 186-4AA ..	2 2	1465 1465	90.4 91.0	90.8 91.5	0.84 0.84	35.0 41.5	121 143	2.4 2.5	6.7 6.9	3.1 3.2	16 16	0.10 0.12	140 155
30	200 L	1LG4 207-4AA ..	2	1465	91.6	92.0	0.85	56.0	196	2.5	6.7	3.4	16	0.19	205
37 45	225 S 225 M	1LG4 220-4AA .. 1LG4 223-4AA ..	2 2	1475 1475	92.2 93.1	92.6 93.6	0.85 0.86	68.0 81.0	240 291	2.5 2.7	6.7 7.2	3.1 3.2	16 16	0.37 0.45	265 300
55	250 M	1LG4 253-4AA ..	2	1480	93.5	93.8	0.85	100	355	2.4	6.1	2.8	16	0.69	390
75 90	280 S 280 M	1LG4 280-4AA .. 1LG4 283-4AA ..	2 2	1485 1485	94.2 94.6	94.1 94.6	0.85 0.86	136 160	482 579	2.5 2.5	7.1 7.4	3.0 3.0	16 16	1.2 1.4	535 580
110 132 160 200	315 S 315 M 315 L 315 L	1LG4 310-4AA .. 1LG4 313-4AA .. 1LG4 316-4AA .. 1LG4 317-4AA ..	2 2 2 2	1488 1488 1486 1486	94.6 95.2 95.7 95.9	94.6 95.2 95.8 96.2	0.85 0.85 0.86 0.88	198 235 280 340	706 847 1028 1285	2.5 2.7 2.7 2.6	6.4 6.8 6.8 6.5	2.8 2.9 2.8 2.8	16 16 16 16	1.9 2.3 2.9 3.5	730 810 955 1060
250 315	315	1LA8 315-4AB .. 1LA8 317-4AB ..	2 2	1488 1488	96.0 96.3	96.0 96.3	0.88 0.88	425 540	1600 2020	1.9 2.0	6.5 6.8	2.8 2.8	13 13	3.6	1300 1500
355 400 500	355	1LA8 353-4AB .. 1LA8 355-4AB .. 1LA8 357-4AB ..	2 2 2	1488 1488 1488	96.3 96.4 96.8	96.3 96.4 96.8	0.87 0.87 0.88	610 690 850	2280 2570 3210	2.1 2.1 2.1	6.5 6.5 6.5	2.6 2.6 2.4	13 13 13	6.1 6.8 8.5	1900 2000 2200
560 630 710	400	1LA8 403-4AB .. 1LA8 405-4AB .. 1LA8 407-4AB ..	2 2 2	1492 1492 1492	96.8 97.0 97.0	96.8 97.0 97.0	0.88 0.88 0.89	950 1060 690	3580 4030 4540	1.9 1.9 1.9	6.5 6.8 6.8	2.7 2.7 2.7	13 13 13	13 14 16	2800 3000 3200
800 900 1000	450	1LA8 453-4AC .. 1LA8 455-4AC .. 1LA8 457-4AC ..	2 2 2	1492 1492 1492	97.0 97.1 97.1	97.0 97.1 97.1	0.88 0.88 0.89	780 880 970	5120 5760 6400	1.6 1.6 1.7	7.0 7.0 7.0	2.6 2.6 2.6	10 10 10	23 26 28	4000 4200 4400

● Rated current at 690 V.

■ Also supplied for 400 VΔ (voltage identifier "9" and order code L1Y).

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier							
	50 Hz						60 Hz							
	230 VΔ / 400 VΔ / 500 VY 500 VΔ 690 VΔ 400 VY 690 VY						IM B 3 Price supplement IM B 5 IM V 1 With- out pro- tec- tive cover							
1LA6 106 to 1LA6 166	1	6	3	5	—	1	6	0	1	1	4	2	3	6
1LG4 183 to 1LG4 313	1	6	3	5	—	1	6	0	1	1	4	—	—	6
1LG4 316 to 1LG4 317	—	6	—	5	—	—	6	0	—	8	4	—	—	6
1LA8 315 to 1LA8 405	—	6	—	5	—	—	9 L2F	0	—	8	4	—	—	6
1LA8 407 to 1LA8 457	—	—	—	5	0	—	On request	0	—	8	4	—	—	6

Other voltage and/or frequency, voltage identifier "9".

Order codes are required for this purpose (see "Technical information", "Volts, currents and frequencies").

For other designs, see "Technical information", "Designs".

Parallel supply cables required (see "Technical information", "Connections, circuits and terminal blocks")

Voltage	1LG4								1LA8														
	183	186	207	220	223	253	280	283	310	313	316	317	315	317	353	355	357	403	405	407	453	455	457
230 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
400 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
500 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
690 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Squirrel-cage motors

1LA/1LG · Cast iron housing · Basic version

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque torque	Torque Class	Moment of inertia <i>J</i>	Weight Design IM B 3 approx. kg
			Rated speed rpm	Efficiency η at 4/4- load	Power factor p.f.	Rated current at 400 V	Rated torque Nm							
Energy-saving motor, IP 55 degree of protection, temperature class F														
1000 rpm, 6-pole, 50 Hz														
1.5	100 L	1LA6 106-6AA ..	925	74.0	74.0	0.75	3.9	15	2.3	4.0	2.3	16	0.0047	33
2.2	112 M	1LA6 113-6AA ..	940	78.0	78.5	0.78	5.2	22	2.2	4.6	2.5	16	0.0091	40
3	132 S	1LA6 130-6AA ..	950	79.0	79.5	0.76	7.2	30	1.9	4.2	2.2	16	0.015	50
4	132 M	1LA6 133-6AA ..	950	80.5	80.5	0.76	9.4	40	2.1	4.5	2.4	16	0.019	57
5.5	132 M	1LA6 134-6AA ..	950	83.0	83.0	0.76	12.8	55	2.3	5.0	2.6	16	0.025	66
7.5	160 M	1LA6 163-6AA ..	960	86.0	86.0	0.74	17.0	75	2.1	4.6	2.5	16	0.044	103
11	160 L	1LA6 166-6AA ..	960	87.5	87.5	0.74	24.5	109	2.3	4.8	2.6	16	0.063	122
15	180 L	1LG4 186-6AA ..	965	88.9	90.3	0.83	29.5	148	2.3	5.3	2.5	16	0.18	150
18.5	200 L	1LG4 206-6AA ..	975	89.8	90.2	0.81	36.5	181	2.5	5.6	2.5	16	0.24	195
22		1LG4 207-6AA ..	975	90.3	91.0	0.81	43.5	215	2.6	5.7	2.5	16	0.29	205
30	225 M	1LG4 223-6AA ..	978	91.8	92.8	0.83	57.0	293	2.7	5.6	2.5	16	0.49	280
37	250 M	1LG4 253-6AA ..	980	92.3	93.0	0.83	70.0	361	2.7	6.0	2.3	16	0.76	370
45	280 S	1LG4 280-6AA ..	985	92.4	93.1	0.85	83.0	436	2.4	6.1	2.4	16	1.12	475
55	280 M	1LG4 283-6AA ..	985	92.7	93.3	0.86	100	533	2.5	6.3	2.5	16	1.37	510
75	315 S	1LG4 310-6AA ..	988	93.5	93.7	0.84	138	725	2.5	6.5	2.8	16	2.1	685
90	315 M	1LG4 313-6AA ..	988	93.9	94.2	0.84	164	870	2.6	6.8	2.9	16	2.5	750
110	315 L	1LG4 316-6AA ..	988	94.3	94.6	0.86	196	1063	2.5	6.8	2.9	16	3.2	890
132	315 L	1LG4 317-6AA ..	988	94.8	95.0	0.86	235	1276	3.1	7.3	3.0	16	4.0	980
160	315 L	1LG4 318-6AA ..	988	95.0	95.1	0.86	285	1547	3.0	7.5	3.0	16	4.7	1180
200	315	1LA8 315-6AB ..	989	95.7	95.8	0.86	345	1930	2.0	6.3	2.5	13	6.0	1300
250		1LA8 317-6AB ..	989	95.9	98.0	0.86	430	2410	2.0	6.3	2.5	13	7.3	1500
315	355	1LA8 355-6AB ..	993	96.2	96.2	0.86	540	3030	2.2	6.5	2.8	13	13	2000
400		1LA8 357-6AB ..	993	96.5	96.5	0.86	690	3850	2.2	6.5	2.8	13	16	2200
450	400	1LA8 403-6AB ..	992	96.5	96.5	0.86	780	4330	2.2	6.5	2.8	13	21	2800
500		1LA8 405-6AB ..	992	96.5	96.5	0.86	860	4810	2.3	6.5	2.8	13	24	3000
560		1LA8 407-6AB ..	992	96.7	96.7	0.86	960	5390	2.3	6.5	2.8	13	27	3200
630	450	1LA8 453-6AB ..	993	96.8	96.8	0.86	1100	6060	2.0	6.5	2.6	13	35	4000
710		1LA8 455-6AB ..	993	96.8	96.8	0.86	710 •	6830	2.0	6.5	2.5	13	39	4200
800		1LA8 457-6AB ..	993	97.0	97.1	0.86	790 •	7690	2.0	6.5	2.5	13	44	4500

• Rated current at 690 V

■ Also supplied for 400 V Δ (voltage identifier "9" and order code **L1Y**).

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier							
	50 Hz						60 Hz							
230 V Δ / 400 V Δ / 500 V γ 500 V Δ 690 V Δ 400 V γ 690 V γ						460 V γ 460 V Δ (Outputs at 60 Hz see "Technical information")						IM B 3 Price supplement		
	IM B 5	IM V 1	IM V 1	IM B 14	IM B 14	IM B 35	IM B 5	IM V 1	IM V 1	IM B 14	IM B 14	IM B 35		
1LA6 106 to 1LA6 166	1	6	3	5	—	1	6	0	1	1	4	2	3	6
1LG4 183 to 1LG4 313	1	6	3	5	—	1	6	0	1	1	4	—	—	6
1LG4 316 to 1LG4 318	—	6	—	5	—	—	6	0	—	8	4	—	—	6
1LA8 315 to 1LA8 453	—	6	—	5	—	—	9 L2F	0	—	8	4	—	—	6
1LA8 455 to 1LA8 457	—	—	—	5	0	—	On request	0	—	8	4	—	—	6

Other voltage and/or frequency, voltage identifier "9". Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

Parallel supply cables required (see "Technical information", "Connections, circuits and terminal blocks")

Voltage	1LG4	1LA8									
230 V	186 206 207 223 253 280 283 310 313 316 317 318	315	317	355	357	403	405	407	453	455	457
400 V		■									
500 V											

Squirrel-cage motors

1LA/1LG · Cast iron housing · Basic version

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated torque	Starting current	Stalling torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx.
			Rated speed rpm	Efficiency η at 4/4-load %	Power factor p.f. 3/4-load %	Rated current at 400 V A	Rated torque at 400 V Nm							
Energy-saving motor, IP 55 degree of protection, temperature class F														
0.75	100 L	1LA6 106-8AB ..	680	66.0	65.0	0.76	2.15	11	1.6	3.0	1.9	13	0.0051	29
1.1		1LA6 107-8AB ..	680	72.0	72.0	0.76	2.90	15	1.8	3.3	2.1	13	0.0063	32
1.5	112 M	1LA6 113-8AB ..	705	74.0	74.0	0.76	3.90	20	1.8	3.7	2.1	13	0.013	39
2.2	132 S	1LA6 130-8AB ..	700	75.0	75.0	0.74	5.70	30	1.9	3.9	2.3	13	0.014	50
3	132 M	1LA6 133-8AB ..	700	77.0	77.5	0.74	7.60	41	2.1	4.1	2.4	13	0.019	57
4	160 M	1LA6 163-8AB ..	715	80.0	80.0	0.72	10.0	53	2.2	4.5	2.6	13	0.036	91
5.5	160 M	1LA6 164-8AB ..	710	83.5	83.5	0.73	13.0	74	2.3	4.7	2.7	13	0.046	102
7.5	160 L	1LA6 166-8AB ..	715	85.5	85.5	0.72	17.7	100	2.7	5.3	3.0	13	0.064	122
11	180 L	1LG4 186-8AB ..	725	87.5	88.3	0.73	25.0	145	1.7	4.2	2.1	13	0.17	150
15	200 L	1LG4 207-8AB ..	725	87.7	88.4	0.76	32.5	198	2.2	4.9	2.6	13	0.29	205
18.5	225 S	1LG4 220-8AB ..	730	89.4	90.4	0.78	38.5	242	2.3	5.5	2.7	13	0.48	270
22	225 M	1LG4 223-8AB ..	730	89.7	90.7	0.79	45.0	288	2.3	5.6	2.8	13	0.55	290
30	250 M	1LG4 253-8AB ..	730	91.4	92.2	0.81	58.0	392	2.3	5.5	2.6	13	0.84	385
37	280 S	1LG4 280-8AB ..	735	92.0	92.8	0.81	72.0	481	2.2	5.0	2.1	13	1.11	475
45	280 M	1LG4 283-8AB ..	735	92.4	93.3	0.81	87.0	585	2.2	5.1	2.1	13	1.35	515
55	315 S	1LG4 310-8AB ..	740	93.0	93.4	0.81	106	710	2.2	5.8	2.6	13	2.1	680
75	315 M	1LG4 313-8AB ..	738	93.3	94.0	0.83	140	971	2.2	5.7	2.6	13	2.5	745
90	315 L	1LG4 316-8AB ..	738	93.4	94.0	0.83	168	1165	2.2	5.8	2.7	13	3.1	865
110	315 L	1LG4 317-8AB ..	738	94.0	94.4	0.83	205	1423	2.4	6.1	2.8	13	3.9	1020
132	315 L	1LG4 318-8AB ..	738	94.2	94.6	0.83	245	1708	2.5	6.5	2.9	13	4.5	1100
160	315	1LA8 315-8AB ..	739	94.9	95.1	0.82	295	2070	2.1	6.0	2.3	13	6.0	1300
200		1LA8 317-8AB ..	739	95.2	95.6	0.82	370	2580	2.1	6.0	2.3	13	7.3	1500
250	355	1LA8 355-8AB ..	741	95.7	96.0	0.82	460	3220	2.1	6.1	2.4	13	13	2000
315		1LA8 357-8AB ..	741	96.0	96.0	0.82	580	4060	2.1	6.1	2.4	13	16	2200
355	400	1LA8 403-8AB ..	742	96.1	96.2	0.82	650	4570	2.0	6.5	2.6	13	21	2800
400		1LA8 405-8AB ..	742	96.2	96.4	0.82	730	5150	2.1	6.5	2.6	13	24	3000
450		1LA8 407-8AB ..	742	96.3	96.3	0.82	820	5790	2.1	6.5	2.6	13	27	3200
500	450	1LA8 453-8AB ..	744	96.4	96.4	0.81	920	6420	2.0	6.6	2.4	13	35	4000
560		1LA8 455-8AB ..	744	96.5	96.4	0.81	1040	7190	2.0	6.6	2.4	13	39	4200
630		1LA8 457-8AB ..	744	96.6	96.6	0.81	1160	8090	2.0	6.6	2.4	13	44	4500

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier							
	50 Hz						60 Hz							
	230 V Δ	400 V Δ	500 V Δ	690 V Δ	460 V γ	460 V Δ	IM B 3	Price supplement	IM B 5	IM V 1	IM V 1	IM B 14	IM B 14	
	400 V γ	690 V γ			(Outputs at 60 Hz see "Technical information")				With protective cover	Without protective cover	With protective cover	With standard flange	With special flange	
1LA6 106 to 1LA6 166	1	6	3	5	—	1	6	0	1	1	4	2	3	6
1LG4 183 to 1LG4 313	1	6	3	5	—	1	6	0	1	1	4	—	—	6
1LG4 316 to 1LG4 318	—	6	—	5	—	—	6	0	—	8	4	—	—	6
1LA8 315 to 1LA8 457	—	6	—	5	—	—	9 L2F	0	—	8	4	—	—	6

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Designs", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

Parallel supply cables required (see "Technical information", "Connections, circuits and terminal blocks")

Voltage	1LA8	315	317	355	357	403	405	407	453	455	457
400 V					■			■	■	■	■
500 V								■	■		

Squirrel-cage motors

1LG · Cast iron housing · Basic version

Selection and ordering data

■ 60 Hz

The motors can also be used for 60 Hz according to EPACT, see Pages 3/18 and 3/19.

For further details, see "Technical information", "Motors for the US market".

3

Rated output kW	Size Order No. Order No. supplement for voltage and design, see table below	Effi- ciency Class 	Operating data at rated output					Starting torque	Starting current	Stalling torque	Torque Class	Moment of inertia <i>J</i>	Weight Design IM B 3 ap- prox. kg	
			Rated speed rpm	Efficiency η at 4/4- load	Power factor p.f.	Rated current at 400 V A	Rated torque Nm							
Energy-saving motor to CEMEP "High Efficiency" eff1, IP 55 degree of protection, temperature class F														
													EFF I	
3000 rpm, 2-pole, 50 Hz														
22	180 M 1LG6 183-2AA ..	1	2955	94.1	94.5	0.88	38.5 ¹⁾	71	2.5	7.2	3.4	16	0.086	180
30	200 L 1LG6 206-2AA ..	1	2960	93.5	93.4	0.88	53.0 ¹⁾	97	2.4	7.0	3.3	16	0.15	225
37	1LG6 207-2AA ..	1	2960	94.1	94.0	0.89	64.0 ¹⁾	119	2.5	7.2	3.3	16	0.18	255
45	225 M 1LG6 223-2AA ..	1	2965	94.9	95.1	0.89	77.0 ¹⁾	145	2.5	7.3	3.2	16	0.27	330
55	250 M 1LG6 253-2AA ..	1	2975	95.3	95.3	0.90	93.0	177	2.4	6.8	3.0	16	0.47	420
75	280 S 1LG6 280-2AB ..	1	2975	95.2	95.2	0.89	128 ¹⁾	241	2.5	7.0	3.0	13	0.83	530
90	280 M 1LG6 283-2AB ..	1	2978	95.6	95.7	0.90	150 ¹⁾	289	2.6	7.6	3.1	13	1.0	615
110	315 S 1LG6 310-2AB ..		2982	95.8	95.7	0.91	182 ¹⁾	352	2.4	6.9	2.8	13	1.4	790
132	315 M 1LG6 313-2AB ..		2982	96.0	95.9	0.91	220 ¹⁾	423	2.6	7.1	2.9	13	1.6	915
160	315 L 1LG6 316-2AB ..		2982	96.4	96.4	0.92	260	512	2.5	7.1	2.9	13	2.1	1055
200	315 L 1LG6 317-2AB ..		2982	96.5	96.5	0.93	320	641	2.5	6.9	2.8	13	2.5	1245
1500 rpm, 4-pole, 50 Hz														
18.5	180 M 1LG6 183-4AA ..	1	1470	92.6	93.2	0.83	34.5 ¹⁾	120	2.5	6.4	3.0	16	0.12	155
22	180 L 1LG6 186-4AA ..	1	1470	93.2	93.5	0.84	40.5 ¹⁾	143	2.5	6.7	3.1	16	0.14	180
30	200 L 1LG6 207-4AA ..	1	1470	93.3	93.4	0.85	55.0 ¹⁾	195	2.6	6.7	3.3	16	0.23	225
37	225 S 1LG6 220-4AA ..	1	1480	94.0	94.4	0.85	67.0 ¹⁾	239	2.7	6.8	3.0	16	0.40	290
45	225 M 1LG6 223-4AA ..	1	1480	94.5	94.7	0.85	81.0 ¹⁾	290	2.8	6.9	3.0	16	0.49	330
55	250 M 1LG6 253-4AA ..	1	1485	95.1	95.3	0.87	96.0	354	2.6	7.5	3.0	16	0.86	460
75	280 S 1LG6 280-4AA ..	1	1485	95.1	95.2	0.87	130 ¹⁾	482	2.5	6.8	2.9	16	1.39	575
90	280 M 1LG6 283-4AA ..	1	1486	95.4	95.5	0.86	158 ¹⁾	578	2.7	7.5	3.1	16	1.71	675
110	315 S 1LG6 310-4AA ..		1488	95.9	96.0	0.87	190 ¹⁾	706	2.7	7.1	2.9	16	2.3	810
132	315 M 1LG6 313-4AA ..		1488	96.1	96.2	0.88	225 ¹⁾	847	2.7	7.3	2.9	16	2.9	965
160	315 L 1LG6 316-4AA ..		1490	96.3	96.4	0.88	275	1026	3.0	7.4	3.0	16	3.5	1105
200	315 L 1LG6 317-4AA ..		1490	96.4	96.5	0.88	340	1282	3.2	7.6	3.0	16	4.2	1305

Order No. supplements

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier						
	50 Hz					60 Hz						
	230 V Δ / 400 V Δ / 400 V ∇	400 V Δ / 690 V ∇	500 V Δ	500 V ∇	460 V Δ	460 V ∇	IM B 3	Price supplement	IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 35
1LG6 183 to 1LG6 313	1	6	3	5	1	6	0	1	1	4	6	
1LG6 316 to 1LG6 317	-	6	-	5	-	6	0	-	8	4	6	

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) For connection to 230 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

Squirrel-cage motors

1LG · Cast iron housing · Basic version

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated torque	Starting current	Stalling torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx.
			Rated speed rpm	Efficiency η at 4/4-load %	Power factor p.f. 3/4-load %	Rated current at 400 V A	Rated torque at 400 V Nm							
Energy-saving motor, IP 55 degree of protection, temperature class F														
1000 rpm, 6-pole, 50 Hz														
15	180 L	1LG6 186-6AA ..	975	90.9	91.7	0.81	29.5	147	2.4	5.5	2.5	16	0.20	175
18.5	200 L	1LG6 206-6AA ..	978	91.2	91.8	0.81	36.0	181	2.4	5.6	2.4	16	0.29	210
22		1LG6 207-6AA ..	978	91.9	92.5	0.82	42.0	215	2.4	5.6	2.4	16	0.36	240
30	225 M	1LG6 223-6AA ..	980	93.2	93.7	0.83	56.0 ¹⁾	292	2.8	6.5	2.9	16	0.63	325
37	250 M	1LG6 253-6AA ..	985	93.7	94.1	0.83	69.0	359	2.9	6.8	2.5	16	0.93	405
45	280 S	1LG6 280-6AA ..	988	94.4	94.6	0.85	81.0	435	3.0	6.8	2.7	16	1.37	520
55	280 M	1LG6 283-6AA ..	988	94.6	94.8	0.85	99.0	532	3.3	7.3	2.9	16	1.65	570
75	315 S	1LG6 310-6AA ..	990	95.0	95.0	0.83	138	723	2.8	7.3	3.0	16	2.5	760
90	315 M	1LG6 313-6AA ..	990	95.3	95.4	0.85	160	868	2.7	7.3	2.9	16	3.2	935
110	315 L	1LG6 316-6AA ..	990	95.6	95.7	0.85	196	1061	2.9	7.4	2.9	16	4.0	1010
132	315 L	1LG6 317-6AA ..	990	95.8	95.8	0.85	235	1273	3.1	7.8	3.1	16	4.7	1180
160	315 L	1LG6 318-6AA ..	990	95.8	95.9	0.86	280	1543	3.2	7.8	3.1	16	5.4	1245
750 rpm, 8-pole, 50 Hz														
11	180 L	1LG6 186-8AB ..	725	88.7	89.6	0.76	23.5	145	1.9	4.6	2.2	13	0.206	165
15	200 L	1LG6 207-8AB ..	725	89.3	89.8	0.80	30.5	198	2.3	5.3	2.6	13	0.367	235
18.5	225 S	1LG6 220-8AB ..	730	91.1	91.8	0.81	36.0	242	2.3	5.6	2.6	13	0.551	295
22	225 M	1LG6 223-8AB ..	730	91.6	92.1	0.81	43.0	288	2.4	5.8	2.8	13	0.658	335
30	250 M	1LG6 253-8AB ..	735	92.8	93.3	0.82	57.0	390	2.5	6.0	2.8	13	1.06	435
37	280 S	1LG6 280-8AB ..	738	93.1	93.3	0.81	71.0	479	2.3	5.7	2.3	13	1.35	510
45	280 M	1LG6 283-8AB ..	738	93.7	94.0	0.81	86.0	582	2.6	6.1	2.5	13	1.63	560
55	315 S	1LG6 310-8AB ..	740	94.3	94.4	0.82	102	710	2.5	6.3	2.9	13	2.5	750
75	315 M	1LG6 313-8AB ..	740	94.5	94.7	0.83	138	968	2.5	6.7	2.9	13	3.1	840
90	315 L	1LG6 316-8AB ..	740	94.7	95.1	0.84	164	1161	2.4	6.3	2.8	13	3.9	1005
110	315 L	1LG6 317-8AB ..	740	94.8	95.1	0.84	200	1420	2.4	6.4	2.6	13	4.5	1100
132	315 L	1LG6 318-8AB ..	740	94.9	95.2	0.84	240	1704	2.5	6.7	2.9	13	5.3	1270

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier						
	50 Hz			60 Hz			IM B 3	Price supplement			IM B 35		
	230 VΔ / 400 VY	400 VΔ / 690 VY	500 VY	500 VΔ	460 VY	460 VΔ		IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 35		
1LG6 186 to 1LG6 313	1	6	3	5	1	6	0	1	1	4	6		
1LG6 316 to 1LG6 318	—	6	—	5	—	6	0	—	8	4	6		

Other voltage and/or frequency, voltage identifier "9".

Order codes are required for this purpose (see "Technical information", "Designs", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) For connection to 230 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

Squirrel-cage motors

1LG · Cast iron housing · Basic version

Selection and ordering data

■ 60 Hz

The motors can also be used for 50 Hz "High Efficiency" eff1, see Pages 3/16 and 3/17.

For further details, see "Technical information", "Motors for the US market".

3

Rated output HP	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output				Starting torque For direct-on-line starting as multiple of the rated torque	Starting current multiple of the rated current	Stalling torque multiple of the rated torque	Torque Class	Moment of inertia <i>J</i>	Weight Design IM B 3 approx. kg	
			Rated speed rpm	Nominal efficiency η %	Power factor p.f.	Rated current at 460 V A							
Energy-saving motors according to EPACT, IP 55 degree of protection													
30 ●	180 M	3600 rpm, 2-pole, 60 Hz 1LG6 183-2AA ..	3560	93.6	0.88	34	60	2.7	7.9	3.7	16	0.086	180
40 ●	200 L	1LG6 206-2AA ..	3565	92.4	0.88	46	80	2.7	7.8	3.7	16	0.151	225
50 ●		1LG6 207-2AA ..	3565	92.4	0.89	57	100	2.8	7.8	3.7	16	0.182	255
60 ●	225 M	1LG6 223-2AA ..	3570	94.1	0.89	67	120	2.8	8.3	3.6	16	0.266	330
75 ●		1LG6 228-2AA ..¹⁾	3570	94.1	0.90	83	150	3.3	8.7	3.7	16	0.319	390
75 ●	250 M	1LG6 253-2AA ..	3578	93.6	0.89	84	149	2.7	7.5	3.2	16	0.466	420
100 ●		1LG6 258-2AA ..¹⁾	3580	94.1	0.89	112	199	2.8	8.4	3.5	16	0.565	470
100 ●	280 S	1LG6 280-2AB ..	3580	95.0	0.89	110	199	2.8	7.9	3.4	13	0.832	530
125 ●	280 M	1LG6 283-2AB ..	3580	95.0	0.90	136	249	2.9	8.3	3.4	13	1.00	615
150 ●		1LG6 288-2AA ..¹⁾	3580	95.0	0.90	164	299	3.1	8.5	3.6	16	1.160	660
150 ●	315 S	1LG6 310-2AB ..	3585	94.5	0.91	164	298	2.6	7.5	3.1	13	1.39	790
175 ●	315 M	1LG6 313-2AB ..	3586	95.0	0.91	190	348	3.0	8.3	3.3	13	1.62	915
200 ●	315 L	1LG6 316-2AB ..	3588	95.4	0.91	215	397	3.0	8.4	3.5	13	2.09	1055
250 ●	315 L	1LG6 317-2AB ..	3588	95.4	0.93	265	496	3.2	8.6	3.4	13	2.46	1245
300 ●	315 L	1LG6 318-2AA ..¹⁾	3591	95.4	0.92	320	595	4.1	10.0	3.9	16	2.74	1330
1800 rpm, 4-pole, 60 Hz													
25 ●	180 M	1LG6 183-4AA ..	1775	92.4	0.82	31	100	2.9	7.1	3.3	16	0.122	155
30 ●	180 L	1LG6 186-4AA ..	1775	92.4	0.83	36.5	121	2.8	7.4	3.4	16	0.144	180
40 ●	200 L	1LG6 207-4AA ..	1775	93.0	0.84	48	160	3.0	7.7	3.7	16	0.234	225
50 ●	225 S	1LG6 220-4AA ..	1785	93.6	0.84	60	200	3.1	7.5	3.4	16	0.398	290
60 ●	225 M	1LG6 223-4AA ..	1785	94.1	0.85	70	240	3.3	7.9	3.5	16	0.486	330
75 ●		1LG6 228-4AA ..¹⁾	1785	94.1	0.85	88	299	3.0	7.8	3.3	16	0.660	355
75 ●	250 M	1LG6 253-4AA ..	1790	94.5	0.86	86	298	2.9	8.2	3.4	16	0.856	460
100 ●		1LG6 258-4AA ..¹⁾	1788	94.5	0.86	116	398	3.0	8.1	3.3	16	0.990	495
100 ●	280 S	1LG6 280-4AA ..	1788	95.0	0.86	114	398	2.9	7.6	3.2	16	1.39	575
125 ●	280 M	1LG6 283-4AA ..	1790	95.0	0.86	144	497	3.0	8.2	3.4	16	1.71	675
150 ●		1LG6 288-4AA ..¹⁾	1788	95.0	0.86	172	598	3.1	8.4	3.5	16	1.88	710
150 ●	315 S	1LG6 310-4AA ..	1791	95.0	0.87	170	597	3.1	7.8	3.2	16	2.31	810
175 ●	315 M	1LG6 313-4AA ..	1791	95.4	0.87	198	696	3.2	8.4	3.3	16	2.88	965
200 ●	315 L	1LG6 316-4AA ..	1792	95.4	0.87	225	795	3.7	9.0	3.6	16	3.46	1105
250 ●	315 L	1LG6 317-4AA ..	1792	95.8	0.87	280	994	4.0	9.1	3.7	16	4.22	1305
300 ●	315 L	1LG6 318-4AA ..¹⁾	1792	95.8	0.87	335	1193	4.0	9.3	3.7	16	4.50	1345

● With CC No. CC 032A

Order No. supplements

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier					IM B 35
	50 Hz					60 Hz					
	230 V Δ / 400 V γ	400 V Δ / 690 V γ	500 V γ	500 V Δ	460 V γ	460 V Δ	IM B 3	Price supplement	IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover
1LG6 183 to 1LG6 313	1	6	3	5	1	6	0	1	1	4	6
1LG6 316 to 1LG6 318	–	6	–	5	–	6	0	–	8	4	6

Other voltage and/or frequency, voltage identifier "9". Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) Only 60 Hz data according to EPACT shown on the rating plate.

Squirrel-cage motors

1LG · Cast iron housing · Basic version

Selection and ordering data

Rated output HP	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current	Stalling torque	Torque Class	Moment of inertia <i>J</i>	Weight Design IM B 3 approx. kg
			Rated speed rpm	Nominal efficiency η	Power factor p.f.	Rated current at 460 V	Rated torque Nm						
Energy-saving motors according to EPACT, IP 55 degree of protection													
20 •	180 L	1LG6 186-6AA ..	1178	91.0	0.80	25.5	121	2.9	6.5	3.0	16	0.203	175
25 •	200 L	1LG6 206-6AA ..	1180	91.7	0.79	32	151	2.9	6.5	2.7	16	0.285	210
30 •		1LG6 207-6AA ..	1180	91.7	0.80	38.5	181	2.9	6.4	2.7	16	0.362	240
40 •	225 M	1LG6 223-6AA ..	1184	93.0	0.82	49	240	3.4	7.2	3.4	16	0.629	325
50 •		1LG6 228-6AA ..¹⁾	1184	93.0	0.83	61	301	3.2	7.6	3.4	16	0.760	355
50 •	250 M	1LG6 253-6AA ..	1186	93.0	0.82	61	300	3.4	7.4	2.9	16	0.934	405
60 •		1LG6 258-6AA ..¹⁾	1186	93.6	0.82	73	361	3.4	7.7	2.9	16	1.07	435
60 •	280 S	1LG6 280-6AA ..	1190	94.1	0.83	72	360	3.6	7.7	3.1	16	1.37	520
75 •	280 M	1LG6 283-6AA ..	1190	94.5	0.83	89	449	3.9	8.3	3.3	16	1.65	570
100 •		1LG6 288-6AA ..¹⁾	1190	94.5	0.84	118	599	4.0	8.4	3.3	16	1.94	615
100 •	315 S	1LG6 310-6AA ..	1191	94.5	0.82	120	598	3.3	8.4	3.4	16	2.50	760
125 •	315 M	1LG6 313-6AA ..	1191	94.5	0.84	148	747	3.0	7.9	3.1	16	3.20	935
150 •	315 L	1LG6 316-6AA ..	1192	95.0	0.84	176	897	3.3	8.5	3.3	16	4.02	1010
175 •	315 L	1LG6 317-6AA ..	1192	95.4	0.84	205	1046	3.8	8.9	3.6	16	4.71	1180
200 •	315 L	1LG6 318-6AA ..	1192	95.4	0.84	235	1195	4.0	9.4	4.0	16	5.39	1245

• With CC No. CC 032A

Order No. supplements

Motor type	Penultimate position: Voltage identifier						Final position: Design identifier					
	50 Hz			60 Hz			IM B 3	Price supplement				
	230 VΔ / 400 VY	400 VΔ / 690 VY	500 VY	500 VΔ	460 VY	460 VΔ		IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 35	
1LG6 186 to 1LG6 313	1	6	3	5	1	6	0	1	1	4	6	
1LG6 316 to 1LG6 318	–	6	–	5	–	6	0	–	8	4	6	

Other voltage and/or frequency, voltage identifier "9".

Order codes are required for this purpose (see "Technical information", "Designs", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) Only 60 Hz data according to EPACT shown on the rating plate.

Squirrel-cage motors

1LG · Cast iron housing · With increased power

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx.	
			Rated speed rpm	Efficiency η at 4/4- load %	Power factor p.f. 3/4- load %	Rated current at 400 V A	Rated torque Nm								
IP 55 degree of protection, temperature class F															
30	180 M	1LG4188-2AA ..	2950	92.8	92.9	0.86	54 ⁴⁾	97	2.4	7.1	3.4	16	0.086	175	
45	200 L	1LG4208-2AA ..	2955	93.6	93.7	0.89	78 ⁴⁾	145	2.5	6.9	3.2	16	0.18	255	
55	225 M	1LG4228-2AA ..	2960	94.8	95.0	0.89	94 ⁴⁾	177	2.6	7.3	3.2	16	0.27	335	
75	250 M	1LG4258-2AA ..	2970	94.5	94.5	0.88	130 ⁴⁾	241	2.4	7.1	3.1	16	0.48	420	
110	280 M	1LG4288-2AB ..	2975	95.5	95.6	0.90	184 ⁴⁾	353	2.5	7.0	3.0	13	1.00	630	
1500 rpm, 4-pole, 50 Hz															
30	180 L	1LG4188-4AA ..	1465	91.7	91.9	0.80	59 ⁴⁾	196	2.6	6.3	2.9	16	0.14	180	
37	200 L	1LG4208-4AA ..	1465	92.5	92.8	0.83	70 ⁴⁾	241	2.6	6.5	3.0	16	0.23	230	
55	225 M	1LG4228-4AA ..	1475	93.4	93.9	0.86	99 ⁴⁾	356	2.5	6.5	2.7	16	0.49	330	
75	250 M	1LG4258-4AA ..	1482	94.3	94.4	0.85	136 ⁴⁾	483	2.5	7.0	3.0	16	0.86	460	
110	280 M	1LG4288-4AA ..	1488	95.2	94.9	0.84	198 ⁴⁾	706	2.8	7.9	3.3	16	1.71	680	
1000 rpm, 6-pole, 50 Hz															
18.5	180 L	1LG4188-6AA ..	970	89.6	90.3	0.80	37.5 ⁴⁾	182	2.3	4.9	2.4	16	0.20	175	
30	200 L	1LG4208-6AA ..	975	90.9	91.3	0.80	60 ⁴⁾	294	2.6	5.8	2.6	16	0.36	245	
37	225 M	1LG4228-6AA ..	978	92.2	93.0	0.83	70 ⁴⁾	361	2.5	5.9	2.8	16	0.62	325	
45	250 M	1LG4258-6AA ..	982	93.3	93.8	0.83	84	438	2.7	6.3	2.3	16	0.93	405	
75	280 M	1LG4288-6AA ..	985	93.8	94.3	0.85	136 ⁴⁾	727	3.0	6.8	2.8	16	1.65	570	
750 rpm, 8-pole, 50 Hz															
15	180 L	1LG4188-8AB ..	720	87.8	88.5	0.73	34 ⁴⁾	199	2.0	4.5	2.4	13	0.21	165	
18.5	200 L	1LG4208-8AB ..	725	88.3	89.2	0.78	39	244	2.4	5.2	2.6	13	0.37	230	
30	225 M	1LG4228-8AB ..	730	90.4	91.2	0.79	61 ⁴⁾	392	2.6	5.6	2.8	13	0.66	340	
37	250 M	1LG4258-8AB ..	730	91.9	92.8	0.82	71	484	2.4	5.6	2.6	13	1.06	430	
55	280 M	1LG4288-8AB ..	735	92.9	93.7	0.81	106	715	2.4	5.6	2.3	13	1.63	565	

Order No. supplements

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier						
	50 Hz					60 Hz		IM B 3	Price supplement			
	230 V Δ / 400 V γ	400 V Δ / 690 V γ	500 V γ	500 V Δ	460 V γ	460 V Δ (Outputs at 60 Hz see "Technical information")	IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 35		
1LG4 188 to 1LG4 288	1	6	3	5	1	6	0	1	1	4	6	

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) Not possible for 2- and 4-pole motors from 1LA8 407 upwards and for 6-pole motors from 1LA8 455 upwards.

2) Only for 2- and 4-pole motors from 1LA8 407 upwards and for 6-pole motors from 1LA8 455 upwards.

3) Operation of motors with standard insulation is only possible with converter circuit (du/dt filter or sine filter).

4) For connection to 230 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

Squirrel-cage motors for use on SIMOVERT MASTERDRIVES

1LA · With standard insulation for $\leq 500 \text{ V}$

Selection and ordering data

Rated voltage

For motors connected to converters, the tolerance to DIN EN 60034-1 is generally applicable, a rated voltage

range is not usually specified (voltage identifiers 4, 5, 7 and 8).

1LA8 motors

It is important to note the following in the case of these motors:

The motors are designed with standard rotors and are suitable for mains and converter-fed operation. They are fitted with an insulated NDE bearing as standard.

For outputs from 900 kW upwards, operation on two parallel inverters without interphase transformers is possible, on request.

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current at 400 V	Stalling torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx.
			Rated speed rpm	Effi- ciency η	Power factor p.f.	Rated current at 400 V	Rated torque Nm						

IP 55 degree of protection, temperature class F, 2-, 4-, 6-, 8-pole, 50 Hz

3000 rpm, 2-pole, 50 Hz													
250	315	1LA8 315-2PC ..	2979	96.3	0.90	415	801	1.8	7.0	2.8	10	2.7	1300
315		1LA8 317-2PC ..	2979	96.7	0.91	520	1010	1.8	7.0	2.8	10	3.3	1500
355	355	1LA8 353-2PC ..	2980	96.6	0.90	590	1140	1.7	6.5	2.5	10	4.8	1900
400		1LA8 355-2PC ..	2980	96.7	0.91	660	1280	1.7	6.5	2.5	10	5.3	2000
500		1LA8 357-2PC ..	2982	97.1	0.91	820	1600	1.8	6.5	2.6	10	6.4	2200
560	400	1LA8 403-2PC ..	2985	97.1	0.91	910	1790	1.6	7.0	2.8	10	8.6	2800
630		1LA8 405-2PC ..	2985	97.1	0.91	1020	2020	1.6	7.0	2.8	10	9.6	3000
710		1LA8 407-2PC ..	2985	97.3	0.91	670 • ■	2270	1.7	7.0	2.8	10	11	3200
800	450	1LA8 453-2PE ..	2986	97.2	0.91	760 •	2560	0.9	7.0	3.0	5	19	4000
900		1LA8 455-2PE ..	2986	97.3	0.92	840 •	2880	0.9	7.0	2.8	5	21	4200
1000		1LA8 457-2PE ..	2986	97.4	0.93	920 •	3200	0.9	7.0	2.7	5	23	4400
1500 rpm, 4-pole, 50 Hz													
250	315	1LA8 315-4PB ..	1486	96.0	0.88	425	1600	1.9	6.5	2.8	13	3.6	1300
315		1LA8 317-4PB ..	1488	96.3	0.88	540	2020	2.0	6.8	2.8	13	4.4	1500
355	355	1LA8 353-4PB ..	1488	96.3	0.87	610	2280	2.1	6.5	2.6	13	6.1	1900
400		1LA8 355-4PB ..	1488	96.3	0.87	690	2570	2.1	6.5	2.6	13	6.8	2000
500		1LA8 357-4PB ..	1488	96.8	0.88	850	3210	2.1	6.5	2.4	13	8.5	2200
560	400	1LA8 403-4PB ..	1492	96.8	0.88	950	3580	1.9	6.5	2.7	13	13	2800
630		1LA8 405-4PB ..	1492	97.0	0.88	1060	4030	1.9	6.8	2.7	13	14	3000
710		1LA8 407-4PB ..	1492	97.0	0.89	690 • ■	4540	1.9	6.8	2.7	13	16	3200
800	450	1LA8 453-4PC ..	1492	97.0	0.88	780 • ■	5120	1.6	7.0	2.6	10	23	4000
900		1LA8 455-4PC ..	1492	97.1	0.88	880 • ■	5760	1.6	7.0	2.6	10	26	4200
1000		1LA8 457-4PC ..	1492	97.1	0.89	970 •	6400	1.7	7.0	2.6	10	28	4400
1000 rpm, 6-pole, 50 Hz													
200	315	1LA8 315-6PB ..	989	95.7	0.86	345	1930	2.0	6.3	2.5	13	6.0	1300
250		1LA8 317-6PB ..	989	95.9	0.86	430	2410	2.0	6.3	2.5	13	7.3	1500
315	355	1LA8 355-6PB ..	993	96.2	0.86	540	3040	2.2	6.5	2.8	13	13	2000
400		1LA8 357-6PB ..	993	96.5	0.86	690	3850	2.2	6.5	2.8	13	16	2200
450	400	1LA8 403-6PB ..	992	96.5	0.86	780	4330	2.2	6.5	2.8	13	21	2800
500		1LA8 405-6PB ..	992	96.5	0.86	860	4810	2.3	6.5	2.8	13	24	3000
560		1LA8 407-6PB ..	992	96.7	0.86	960	5390	2.3	6.5	2.8	13	27	3200
630	450	1LA8 453-6PB ..	993	96.8	0.86	1100	6060	2.0	6.5	2.6	13	35	4000
710		1LA8 455-6PB ..	993	96.8	0.86	710 • ■	6830	2.0	6.5	2.5	13	39	4200
800		1LA8 457-6PB ..	993	97.0	0.86	790 • ■	7690	2.0	6.5	2.5	13	44	4500
750 rpm, 8-pole, 50 Hz													
160	315	1LA8 315-8PB ..	739	94.9	0.82	295	2070	2.1	6.0	2.3	13	6.0	1300
200		1LA8 317-8PB ..	739	95.2	0.82	370	2580	2.1	6.0	2.3	13	7.3	1500
250	355	1LA8 355-8PB ..	741	95.7	0.82	460	3220	2.1	6.1	2.4	13	13	2000
315		1LA8 357-8PB ..	741	96.0	0.82	580	4060	2.1	6.1	2.4	13	16	2200
355	400	1LA8 403-8PB ..	742	96.1	0.82	650	4570	2.0	6.5	2.6	13	21	2800
400		1LA8 405-8PB ..	742	96.2	0.82	730	5150	2.1	6.5	2.6	13	24	3000
450		1LA8 407-8PB ..	742	96.3	0.82	820	5790	2.1	6.5	2.6	13	27	3200
500	450	1LA8 453-8PB ..	744	96.4	0.81	920	6420	2.0	6.6	2.4	13	35	4000
560		1LA8 455-8PB ..	744	96.5	0.81	1040	7190	2.0	6.6	2.4	13	39	4200
630		1LA8 457-8PB ..	744	96.6	0.81	1160	8090	2.0	6.6	2.4	13	44	4500

• Rated current at 690 V.

■ Also supplied for 400 VΔ (voltage identifier "9" and order code L1Y).

Order No. supplements

Motor type	Penultimate position: Voltage identifier				Final position: Design identifier			
	50 Hz (no rated voltage range)				IM B 3	Price supplement		
	400 VΔ	400 VΔ / 690 VY ³)	500 VΔ	690 VΔ ³)		IM V 1 Without protective cover	IM V 1 With protective cover	IM B 35
1LA8 315 to 1LA8 405	4	8	5	-	0	8	4	6
1LA8 407 to 1LA8 457	4 ¹)	8 ¹)	5 ⁵	7 ²)	0	8	4	6

For other designs, see "Technical information", "Designs".

For footnotes, see Page 3/20.

Squirrel-cage motors for use on SIMOVERT MASTERDRIVES

1LA · With standard insulation for 690 V

Selection and ordering data

Rated voltage

For motors connected to converters, the tolerance to DIN VDE 60034-1 is generally applicable, a rated voltage

range is not specified (voltage identifier 8).

1LA7, 1LA5 motors

It is important to note the following in the case of these motors:

In contrast to the standard version, for the windings and motor protection, options C11, C12, C13, Y52, A10, A23 and for the mechanical design options

D31, D40, K45, K46, H15 are not possible. Also, versions for Zone 2, 21 and 22 are not possible.

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current multiple of the rated current	Stalling torque multiple of the rated torque	Torque Class	Moment of inertia <i>J</i>	Weight kg m ²	Design IM B 3 approx.
			Rated speed rpm	Effi- ciency η	Power factor p.f.	Rated current at 690 V A	Rated torque Nm							

Aluminium housing, IP 55 degree of protection, temperature class F

3000 rpm, 2-pole, 50 Hz														
3	100 L	1LA7 106-2PM8.	2890	84.0	0.85	3.50	9.9	2.8	6.8	3.0	16	0.0035	21	
4	112 M	1LA7 113-2PM8.	2905	86.0	0.86	4.55	13	2.6	7.2	2.9	16	0.0059	27	
5.5	132 S	1LA7 130-2PM8.	2925	86.5	0.89	6.00	18	2.0	5.9	2.8	16	0.015	37	
7.5		1LA7 131-2PM8.	2930	88.0	0.89	8.00	24	2.3	6.9	3.0	16	0.019	42	
11	160 M	1LA7 163-2PM8.	2940	89.5	0.88	11.6	36	2.1	6.5	2.9	16	0.034	63	
15	160 M	1LA7 164-2PM8.	2940	90.0	0.90	15.4	49	2.2	6.6	3.0	16	0.043	72	
18.5	160 L	1LA7 166-2PM8.	2940	91.0	0.91	18.6	60	2.4	7.0	3.1	16	0.051	82	
22	180 M	1LA5 183-2PM8.	2940	91.7	0.88	23.0	71	2.5	6.9	3.2	16	0.077	113	
30	200 L	1LA5 206-2PM8.	2945	92.3	0.89	30.5	97	2.4	7.2	2.8	16	0.14	162	
37		1LA5 207-2PM8.	2945	92.8	0.89	37.7	120	2.4	7.7	2.8	16	0.16	182	
45	225 M	1LA5 223-2PM8.	2960	93.6	0.89	45.0	145	2.8	7.7	3.4	16	0.2	212	
1500 rpm, 4-pole, 50 Hz														
2.2	100 L	1LA7 106-4PM8.	1420	82.0	0.82	2.75	15	2.5	5.6	2.8	16	0.0047	20	
3		1LA7 107-4PM8.	1420	82.6	0.82	3.70	20	2.7	5.6	3.0	16	0.0055	23	
4	112 M	1LA7 113-4PM8.	1440	85.0	0.83	4.75	27	2.7	6.0	3.0	16	0.012	29	
5.5	132 S	1LA7 130-4PM8.	1455	86.0	0.81	6.60	36	2.5	6.3	3.1	16	0.018	39	
7.5	132 M	1LA7 133-4PM8.	1455	87.0	0.82	8.80	49	2.7	6.7	3.2	16	0.023	46	
11	160 M	1LA7 163-4PM8.	1460	88.5	0.84	12.4	72	2.2	6.2	2.7	16	0.043	67	
15	160 L	1LA7 166-4PM8.	1460	90.0	0.84	16.6	98	2.6	6.5	3.0	16	0.055	81	
18.5	180 M	1LA5 183-4PM8.	1460	90.5	0.83	20.5	121	2.3	7.5	3.0	16	0.13	113	
22	180 L	1LA5 186-4PM8.	1460	91.2	0.84	24.0	144	2.3	7.5	3.0	16	0.15	123	
30	200 L	1LA5 207-4PM8.	1465	91.8	0.86	32.0	196	2.6	7.0	3.2	16	0.24	160	
37	225 S	1LA5 220-4PM8.	1470	92.9	0.87	38.5	241	2.8	7.0	3.2	16	0.32	209	
45	225 M	1LA5 223-4PM8.	1470	93.4	0.87	46.5	293	2.8	7.7	3.3	16	0.36	235	
1000 rpm, 6-pole, 50 Hz														
1.5	100 L	1LA7 106-6PM8.	925	74.0	0.75	2.25	15	2.3	4.0	2.3	16	0.0047	20	
2.2	112 M	1LA7 113-6PM8.	940	78.0	0.78	3.05	22	2.2	4.6	2.5	16	0.0091	24	
3	132 S	1LA7 130-6PM8.	950	79.0	0.76	4.20	30	1.9	4.2	2.2	16	0.015	34	
4	132 M	1LA7 133-6PM8.	950	80.5	0.76	5.50	40	2.1	4.5	2.4	16	0.019	41	
5.5	132 M	1LA7 134-6PM8.	950	83.0	0.76	7.30	55	2.3	5.0	2.6	16	0.025	50	
7.5	160 M	1LA7 163-6PM8.	960	86.0	0.74	9.90	75	2.1	4.6	2.5	16	0.044	70	
11	160 L	1LA7 166-6PM8.	960	87.5	0.74	14.2	109	2.3	4.8	2.6	16	0.063	89	
15	180 L	1LA5 186-6PM8.	970	89.5	0.77	18.2	148	2.0	5.2	2.4	16	0.15	126	
18.5	200 L	1LA5 206-6PM8.	975	90.2	0.77	22.5	181	2.7	5.5	2.8	16	0.24	164	
22		1LA5 207-6PM8.	975	90.8	0.77	26.5	215	2.8	5.5	2.9	16	0.28	186	
30	225 M	1LA5 223-6PM8.	978	91.8	0.77	35.5	294	2.8	5.7	2.9	16	0.36	217	

Order No. supplements

Motor type	Final position: Design identifier					Price supplement	IM B 14	IM B 14	IM B 35
	IM B 3	IM B 5	IM V 1	IM V 1	With protective cover				
1LA7 106 to 1LA7 166	0	1	1	4	2	3	6		
1LA5 183 to 1LA5 223	0	1	1	4	—	—	6		

For other designs, see "Technical information", "Designs".

Squirrel-cage motors for use on SIMOVERT MASTERDRIVES

1LA/1LG · With standard insulation for 690 V

Selection and ordering data

Rated voltage

For motors connected to converters, the tolerance to DIN EN 60034-1 is generally applicable, a rated voltage

range is not specified (voltage identifier 7, 8).

1LG6 motors

It is important to note the following in the case of these motors:

In contrast to the standard version, for windings and motor protection, options C11, C12, C13, Y52, A10, and for versions for Zone 2, 21 and 22 options M34, M35, M38, M39, M72,

M73 and for the mechanical design options D30, D31, D40, K45, K46, H15 are not possible. Option K30 "VIK version" can be ordered on request.

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current multiple of the rated current	Stalling torque multiple of the rated torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx. kg
			Rated speed rpm	Effi- ciency η	Power factor p.f.	Rated current at 690 V A	Rated torque Nm						

Cast iron housing, IP 55 degree of protection, temperature class F

3000 rpm, 2-pole, 50 Hz													
22	180 M	1LG6 183-2PM8 .	2955	93.7	0.88	22.5	71	2.5	7.2	3.4	16	0.086	180
30	200 L	1LG6 206-2PM8 .	2960	93.1	0.89	30.5	97	2.4	7.0	3.3	16	0.15	225
37		1LG6 207-2PM8 .	2960	93.6	0.89	37	119	2.5	7.2	3.3	16	0.18	255
45	225 M	1LG6 223-2PM8 .	2965	94.4	0.89	45	145	2.5	7.3	3.2	16	0.27	330
55	250 M	1LG6 253-2PM8 .	2975	95.0	0.90	54	177	2.4	6.8	3.0	16	0.47	420
75	280 S	1LG6 280-2PM8 . ●	2975	95.0	0.89	74	241	2.5	7.0	3.0	13	0.83	530
90	280 M	1LG6 283-2PM8 . ●	2978	95.3	0.90	88	289	2.6	7.6	3.1	13	1.00	615
110	315 S	1LG6 310-2PM8 . ●	2982	95.5	0.91	106	352	2.4	6.9	2.8	13	1.39	790
132	315 M	1LG6 313-2PM8 . ●	2982	95.8	0.91	126	423	2.6	7.1	2.9	13	1.62	915
160	315 L	1LG6 316-2PM8 . ●	2982	96.2	0.92	152	512	2.5	7.1	2.9	13	2.1	1055
200		1LG6 317-2PM8 . ●	2982	96.2	0.93	188	641	2.5	6.9	2.8	13	2.5	1245
240	315	1LA8 315-2PM8 .	2978	96.1	0.90	230	770	1.8	7.0	3.0	10	2.7	1300
300		1LA8 317-2PM8 .	2978	96.5	0.91	285	962	1.9	7.0	3.0	10	3.3	1500
345	355	1LA8 353-2PM8 .	2981	96.4	0.90	335	1105	1.7	7.0	2.6	10	4.8	1900
390		1LA8 355-2PM8 .	2981	96.6	0.91	370	1249	1.7	6.7	2.6	10	5.3	2000
485		1LA8 357-2PM8 .	2982	97.0	0.91	460	1553	1.8	7.0	2.6	10	6.4	2200
545	400	1LA8 403-2PM8 .	2986	97.1	0.91	520	1743	1.5	7.0	3.0	10	8.6	2800
610		1LA8 405-2PM8 .	2986	97.1	0.92	570	1951	1.6	7.0	2.9	10	9.6	3000
680		1LA8 407-2PM7 .	2986	97.2	0.92	640	2175	1.7	7.0	3.0	10	11	3200
775	450	1LA8 453-2PM7 .	2987	97.2	0.92	730	2478	0.9	7.0	2.8	5	19	4000
875		1LA8 455-2PM7 .	2987	97.3	0.92	820	2798	0.9	7.0	2.8	5	21	4200
970		1LA8 457-2PM7 .	2987	97.4	0.93	900	3101	0.9	7.0	2.8	5	23	4400
1500 rpm, 4-pole, 50 Hz													
18.5	180 M	1LG6 183-4PM8 .	1470	92.1	0.83	20	120	2.5	6.4	3.0	16	0.12	155
22	180 L	1LG6 186-4PM8 .	1470	92.7	0.84	23.5	143	2.5	6.7	3.1	16	0.14	180
30	200 L	1LG6 207-4PM8 .	1470	92.7	0.85	32	195	2.6	6.7	3.3	16	0.23	225
37	225 S	1LG6 220-4PM8 .	1480	93.6	0.85	39	239	2.7	6.8	3.0	16	0.40	290
45	225 M	1LG6 223-4PM8 .	1480	94.1	0.85	47	290	2.8	6.9	3.0	16	0.49	330
55	250 M	1LG6 253-4PM8 .	1485	94.8	0.87	56	354	2.6	7.5	3.0	16	0.86	460
75	280 S	1LG6 280-4PM8 . ●	1485	94.7	0.87	76	482	2.5	6.8	2.9	16	1.39	575
90	280 M	1LG6 283-4PM8 . ●	1486	95.1	0.86	92	578	2.7	7.5	3.1	16	1.71	675
110	315 S	1LG6 310-4PM8 . ●	1488	95.6	0.87	110	706	2.7	7.1	2.9	16	2.3	810
132	315 M	1LG6 313-4PM8 . ●	1488	95.9	0.88	130	847	2.7	7.3	2.9	16	2.9	965
160	315 L	1LG6 316-4PM8 . ●	1490	96.1	0.88	158	1026	3.0	7.4	3.0	16	3.5	1105
200		1LG6 317-4PM8 . ●	1490	96.1	0.88	198	1282	3.2	7.6	3.0	16	4.2	1305
235	315	1LA8 315-4PM8 .	1485	95.8	0.87	235	1511	1.8	7.0	2.8	13	3.6	1300
290		1LA8 317-4PM8 .	1485	96.0	0.88	285	1865	1.8	7.0	2.8	13	4.4	1500
340	355	1LA8 353-4PM8 .	1488	96.0	0.87	340	2182	1.9	7.0	2.6	13	6.1	1900
385		1LA8 355-4PM8 .	1488	96.2	0.87	385	2471	2.0	7.0	2.6	13	6.8	2000
480		1LA8 357-4PM8 .	1488	96.5	0.87	480	3081	2.1	7.0	2.5	13	8.5	2200
545	400	1LA8 403-4PM8 .	1491	96.6	0.88	540	3491	1.9	7.0	2.6	13	13	2800
615		1LA8 405-4PM8 .	1491	96.8	0.88	600	3939	1.9	7.0	2.7	13	14	3000
690		1LA8 407-4PM7 .	1491	96.9	0.89	670	4420	1.9	7.0	2.6	13	16	3200
785	450	1LA8 453-4PM7 .	1492	96.8	0.88	770	5025	1.5	6.9	2.5	10	23	4000
880		1LA8 455-4PM7 .	1492	97.0	0.87	870	5633	1.6	7.0	2.6	10	26	4200
980		1LA8 457-4PM7 .	1492	97.1	0.89	950	6273	1.7	7.0	2.6	10	28	4400

● Insulated NDE bearing is recommended (order code L27)

Order No. supplements

Motor type	Final position: Design identifier		Price supplement IM V 1 Without protective cover	IM V 1 With protective cover	IM B 35
	IM B 3	IM B 5			
1LG6 183 to 1LG6 313	0	1	1	4	6
1LG6 316 to 1LG6 318	0	—	8	4	6
1LA8 315 to 1LA8 457	0	—	8	4	6

For other designs, see "Technical information", "Designs".

Squirrel-cage motors for use on SIMOVERT MASTERDRIVES

1LA/1LG · With standard insulation for 690 V

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx.								
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 690 V A	Rated torque Nm														
Cast iron housing, IP 55 degree of protection, temperature class F																					
1000 rpm, 6-pole, 50 Hz																					
15	180 L	1LG6 186-6PM8 .	975	90.0	0.81	17.2	147	2.4	5.5	2.5	16	0.20	175								
18.5	200 L	1LG6 206-6PM8 .	978	90.5	0.81	21	181	2.4	5.6	2.4	16	0.29	210								
22	200 L	1LG6 207-6PM8 .	978	91.4	0.82	24.5	215	2.4	5.6	2.4	16	0.36	240								
30	225 M	1LG6 223-6PM8 .	980	92.6	0.83	32.5	292	2.8	6.5	2.9	16	0.63	325								
37	250 M	1LG6 253-6PM8 .	985	93.1	0.83	40	359	2.9	6.8	2.5	16	0.93	405								
45	280 S	1LG6 280-6PM8 . ●	988	93.9	0.85	47	435	3.0	6.8	2.7	16	1.37	520								
55	280 M	1LG6 283-6PM8 . ●	988	93.9	0.85	58	532	3.3	7.3	2.9	16	1.65	570								
75	315 S	1LG6 310-6PM8 . ●	990	94.6	0.83	80	723	2.8	7.3	3.0	16	2.5	760								
90	315 M	1LG6 313-6PM8 . ●	990	94.9	0.85	93	868	2.7	7.3	2.9	16	3.2	935								
110	315 L	1LG6 316-6PM8 . ●	990	95.2	0.85	114	1061	2.9	7.4	2.9	16	4.0	1010								
132	1LG6 317-6PM8 . ●	990	95.4	0.85	136	1273	3.1	7.8	3.1	16	4.7	1180									
160	1LG6 318-6PM8 . ●	990	95.3	0.86	164	1543	3.2	7.8	3.1	16	5.4	1245									
190	315	1LA8 315-6PM8 .	990	95.5	0.85	196	1833	2.1	7.0	2.7	13	6.0	1300								
235		1LA8 317-6PM8 .	990	95.7	0.86	240	2267	2.2	7.0	2.7	13	7.3	1500								
300	355	1LA8 355-6PM8 .	992	96.2	0.86	305	2888	2.2	7.0	2.8	13	13	2000								
380		1LA8 357-6PM8 .	992	96.4	0.86	385	3658	2.3	7.0	2.9	13	16	2200								
435	400	1LA8 403-6PM8 .	993	96.4	0.85	445	4184	2.1	7.0	2.8	13	21	2800								
485		1LA8 405-6PM8 .	993	96.5	0.86	490	4664	2.1	7.0	2.8	13	24	3000								
545		1LA8 407-6PM8 .	993	96.6	0.86	550	5241	2.1	7.0	2.7	13	27	3200								
615	450	1LA8 453-6PM8 .	993	96.8	0.84	630	5915	2.0	7.0	2.7	13	35	4000								
690		1LA8 455-6PM7 .	993	96.8	0.85	700	6636	1.9	7.0	2.5	13	39	4200								
780		1LA8 457-6PM7 .	993	96.9	0.85	790	7502	2.0	7.0	2.6	13	44	4500								
750 rpm, 8-pole, 50 Hz																					
11	180 L	1LG6 186-8PM8 .	725	88.1	0.76	13.8	145	1.9	4.6	2.2	13	0.21	165								
15	200 L	1LG6 207-8PM8 .	725	88.2	0.80	17.8	198	2.3	5.3	2.6	13	0.37	235								
18.5	225 S	1LG6 220-8PM8 .	730	89.9	0.81	21.5	242	2.3	5.6	2.6	13	0.55	295								
22	225 M	1LG6 223-8PM8 .	730	90.6	0.81	25	288	2.4	5.8	2.8	13	0.66	335								
30	250 M	1LG6 253-8PM8 .	735	91.9	0.82	33.5	390	2.5	6.0	2.8	13	1.06	435								
37	280 S	1LG6 280-8PM8 . ●	738	92.6	0.81	41.5	479	2.3	5.7	2.3	13	1.35	510								
45	280 M	1LG6 283-8PM8 . ●	738	93.3	0.81	50	582	2.6	6.1	2.4	13	1.63	560								
55	315 S	1LG6 310-8PM8 . ●	740	93.8	0.82	60	710	2.5	6.3	2.9	13	2.5	750								
75	315 M	1LG6 313-8PM8 . ●	740	93.9	0.83	81	968	2.5	6.7	2.9	13	3.1	840								
90	315 L	1LG6 316-8PM8 . ●	740	94.2	0.84	95	1161	2.4	6.3	2.8	13	3.9	1005								
110	1LG6 317-8PM8 . ●	740	94.3	0.84	116	1420	2.4	6.4	2.6	13	4.5	1100									
132	1LG6 318-8PM8 . ●	740	94.4	0.84	140	1704	2.5	6.7	2.9	13	5.3	1270									
145	315	1LA8 315-8PM8 .	740	94.6	0.79	162	1871	2.2	6.4	2.5	13	6.0	1300								
180		1LA8 317-8PM8 .	740	94.9	0.80	198	2323	2.2	6.4	2.5	13	7.3	1500								
230	355	1LA8 355-8PM8 .	743	95.5	0.80	250	2956	2.1	6.8	2.4	13	13	2000								
290		1LA8 357-8PM8 .	743	95.7	0.81	315	3727	2.1	6.8	2.4	13	16	2200								
335	400	1LA8 403-8PM8 .	743	96.0	0.80	365	4306	1.9	6.6	2.6	13	21	2800								
375		1LA8 405-8PM8 .	743	96.1	0.80	410	4820	1.9	6.9	2.7	13	24	3000								
425		1LA8 407-8PM8 .	743	96.2	0.79	470	5463	1.9	6.8	2.7	13	27	3200								
485	450	1LA8 453-8PM8 .	745	96.5	0.78	540	6217	1.9	6.8	2.5	13	35	4000								
545		1LA8 455-8PM8 .	745	96.6	0.78	610	6986	2.0	6.8	2.5	13	39	4200								
600		1LA8 457-8PM8 .	745	96.7	0.79	660	7691	2.0	6.8	2.5	13	44	4500								

● Insulated NDE bearing is recommended (order code L27)

Order No. supplements

Motor type	Final position: Design identifier			Price supplement		
	IM B 3	IM B 5	IM V 1 Without protective cover	IM V 1 With protective cover	IM B 35	
1LG6 183 to 1LG6 313	0	1	1	4	6	
1LG6 316 to 1LG6 318	0	—	8	4	6	
1LA8 315 to 1LA8 457	0	—	8	4	6	

For other designs, see "Technical information", "Designs".

Selection and ordering data

Additional order suffix -Z with order code	Special designs	Motor type – Size					
		Aluminium			Cast iron		
		1LA7	1LA5	1LA9	1LA6	1LG4/1LG6	1LA8

Windings and motor protection

C11	Used as class F (up to KT 40 °C) with service factor	56 – 160 ⁴⁾	180 – 225 ⁴⁾	56 – 200 ³⁾	100 – 160	180 – 315 ⁴⁾	315 – 450
C12	Used as class F (up to KT 40 °C) With increased power ¹⁾	56 – 160 ⁴⁾	180 – 225 ⁴⁾	56 – 200 ³⁾	100 – 160	180 – 315 ⁴⁾	315 – 450
C13	Used as class F With increased cooling air temperature	56 – 160 ⁴⁾	180 – 225 ⁴⁾	56 – 200 ³⁾	100 – 160	180 – 315 ⁴⁾	315 – 450
Y52 • and output KT.. °C or AH... m above sl	Used as class F – other requirements	56 – 160 ⁴⁾	180 – 225 ⁴⁾	56 – 200	100 – 160	180 – 315 ⁴⁾	315 – 450
A10	PTC thermistor version for alarm on converter-fed operation in Zones 2, 21, 22 ²⁾	56 – 160 ⁴⁾	–	56 – 200	100 – 160	180 – 315 ⁴⁾	–
A11	Motor protection by means of PTC thermistor with 3 embedded temperature sensors for tripping ²⁾	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	–
A12	Motor protection by means of PTC thermistor with 6 embedded temp. sensors for alarm and tripping ²⁾	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	Standard design
A23	Motor temperature sensing with embedded KTY 84-130 temperature sensors ²⁾	56 – 160 ⁴⁾	180 – 225 ⁴⁾	56 – 200	100 – 160	180 – 315	315 – 450
A25	Motor temperature sensing with 2 embedded KTY 84-130 temperature sensors ²⁾	–	–	–	–	180 – 315	–

Paint finish

	Standard paintwork in RAL 7030 stone grey					Standard version	
K26	Special paintwork in RAL 7030 stone grey	Standard version (without order code)				180 – 315	315 – 450
M16	Special paintwork in RAL 1002 sand yellow	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
M17	Special paintwork in RAL 1013 pearl white						
M18	Special paintwork in RAL 3000 flame red						
K27	Special paintwork in RAL 6011 mignonette green						
M19	Special paintwork in RAL 6021 pale green						
M20	Special paintwork in RAL 7001 silver grey						
K28	Special paintwork in RAL 7031 bluish grey						
L42	Special paintwork in RAL 7032 pebble grey						
M21	Special paintwork in RAL 7035 light grey						
M22	Special paintwork in RAL 9001 cream						
M23	Special paintwork in RAL 9002 grey white						
L43	Special paintwork in RAL 9005 jet black						
Y54 • And special paintwork RAL....	Special paintwork in other colors: RAL 1015, 1019, 2003, 2004, 3007, 5007, 5009, 5010, 5012, 5015, 5017, 5018, 5019, 6019, 7000, 7004, 7011, 7016, 7022, 7033	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
Y53 • And special paintwork RAL....	Standard paintwork in other colors	–	–	–	–	180 – 315	315 – 450
K23	Unpainted (only cast iron parts primed)	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
K24	Unpainted, only primed	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	–

• Additional plain text required.

1) The rating plate only shows the 50 Hz data.

2) For appropriate tripping unit, see Catalog NS K.
In the case of pole-change motors with separate windings, twice the number of temperature sensors is required. When used in areas subject to explosion hazards, a certified tripping unit is necessary.

3) Not possible for the version with increased power.

4) Not possible for motors with special insulation for 690 V.

RAL No.	Name of color	RAL No.	Name of color
1015	Light ivory	5017	Traffic blue
1019	Grey beige	5018	Turquoise blue
2003	Pastel orange	5019	Capri blue
2004	Pure orange	6019	Pastel green
3007	Wine red	7000	Squirrel grey
5007	Black blue	7004	Signal grey
5009	Azure blue	7011	Iron grey
5010	Gentian blue	7016	Anthracite grey
5012	Light blue	7022	Umbra grey
5015	Sky blue	7033	Cement grey

Squirrel-cage motors

1LA/1LG · Special designs

Selection and ordering data

Additional order suffix -Z with order code	Special designs	Motor type – Size					
		Aluminium		Cast iron			
		1LA7	1LA5	1LA9	1LA6	1LG4/1LG6	1LA8
Version for zones according to ATEX¹⁾							
M72²⁾	Version for Zone 2 for mains-fed operation EEx nA II T3 acc. to EN 50 021, Ex nA II T3 acc. to IEC 60 079-15	63 – 160	–	63 – 160 ⁴⁾	100 – 160	180 – 315 ⁴⁾	315 – 450
M73²⁾⁽³⁾⁽⁵⁾	Version for Zone 2 for converter-fed operation EEx nA II T3 acc. to EN 50 021, Ex nA II T3 acc. to IEC 60 079-15	63 – 160	–	63 – 160 ⁴⁾	100 – 160	180 – 315 ⁴⁾	315 – 450
M34⁶⁾	Version for Zone 21 for mains-fed operation	56 – 160	180 – 225	56 – 200 ⁴⁾	100 – 160	180 – 315 ⁴⁾	–
M38⁵⁾⁽⁶⁾	Version for Zone 21 for converter-fed operation	56 – 160	180 – 225	56 – 200 ⁴⁾	100 – 160	180 – 315 ⁴⁾	–
M35⁷⁾	Version for Zone 22 for mains-fed operation	56 – 160	180 – 225	56 – 200 ⁴⁾	100 – 160	180 – 315 ⁴⁾	–
M39⁵⁾⁽⁷⁾	Version for Zone 22 for converter-fed operation	56 – 160	180 – 225	56 – 200 ⁴⁾	100 – 160	180 – 315 ⁴⁾	–
Distributed drive systems							
G55¹⁰⁾	ECOFAST motor plug Han-Drive 10e for 230 VΔ /400 VY	56 – 132	–	56 – 132 ¹¹⁾	–	–	–
H90⁸⁾	MICROSTARTER direct-on-line starter with 24 V DC activation, with M25 metric cable entry	63 – 112	–	–	–	–	–
H91⁸⁾	MICROSTARTER direct-on-line starter with 24 V DC activation, with HAN Q8 plug connectors	63 – 112	–	–	–	–	–
H92⁸⁾	MICROSTARTER direct-on-line starter with AS-Interface connection, with M25 metric cable entry	63 – 112	–	–	–	–	–
H93⁸⁾	MICROSTARTER direct-on-line starter with AS-Interfaceconnection, with HAN Q8 plug connectors (ECOFAST)	63 – 112	–	–	–	–	–
H94⁸⁾	MICROSTARTER reversing starter with AS-Interface connection, with M25 metric cable entry	63 – 112	–	–	–	–	–
H95⁸⁾	MICROSTARTER reversing starter with AS-Interface connection, with HAN Q8 plug connectors (ECOFAST)	63 – 112	–	–	–	–	–
Marine version – “Operation below deck”⁹⁾⁽¹²⁾⁽¹⁴⁾							
E11	Certified according to GL (Germanischer Lloyd), Germany, KT 45 °C, temperature class F used as F	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450 ¹³⁾
E21	Certified according to LRS (Lloyds Register of Shipping), Great Britain, KT 45 °C, temperature class F used as F	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450 ¹³⁾
E31	Certified according to BV (Bureau Veritas), France, KT 45 °C, temperature class F used as F	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450 ¹³⁾
E51	Certified according to DNV (Det Norske Veritas), Norway, KT 45 °C, temperature class F used as F	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450 ¹³⁾

1) Modular installation and additional modules not possible;
Anti-condensation heater not possible up to size 200L. The versions for the Zones are not possible for motors with special insulation for 690 V.

2) The motors have no rated voltage range.

3) To comply with the standard, the motor and converter must be tested as a unit. For 1LA8 motors, please specify constant torque drive or pump/compressor drive.

4) Not possible for the version with increased power.

5) PTC thermistors for temperature class B are included with this option.

6) Version for conductive dust particles, IP 65 degree of protection.

7) Version only for non-conductive dust particles, IP 55 degree of protection.

8) The MICROSTARTER always contains one PTC thermistor with temperature sensors (option A11) and the associated evaluation electronics. It is possible for pole-changing motors with two separate windings and motors other than 1LA7 to be used, on request.

9) Factory test certificate 2.3 in accordance with EN 10204 is supplied. Individual acceptance test must be specified in plain text on ordering if required (price supplement).

10) Not possible for pole-changing motors.

11) Not possible for 1LA9 BG 132 motors with increased power.

12) Derating may be necessary in the case of (E) Exn (Zone 2) motors and 1LA9 motors with increased power.

13) The 1LA8 motors do not have a prototype test certificate (individual acceptance test required).

14) Utilization of temperature class F according to B can cause derating.

Selection and ordering data

Additional order suffix -Z with order code	Special designs	Motor type – Size					
		Aluminium			Cast iron		
		1LA7	1LA5	1LA9	1LA6	1LG6/1PP6	1LA8
Modular assembly¹⁾							
H57 ²⁾	Externally mounted 1XP8 001-1 rotary pulse encoder (HTL)	100 – 160	180 – 225	–	100 – 160	180 – 315	–
H58 ²⁾	Externally mounted 1XP8 001-2 rotary pulse encoder (TTL)	100 – 160	180 – 225	–	100 – 160	180 – 315	–
G17 ²⁾	Externally mounted separately-driven fan	100 – 160	180 – 225	–	100 – 160	180 – 315 ⁴⁾	–
H61 ²⁾	Externally mounted separately driven fan and 1XP8 001-1 rotary pulse encoder	100 – 160	180 – 225	–	100 – 160	180 – 315	–
G26 ²⁾	Externally mounted brake	63 – 160	180 – 225	–	–	180 – 315 ⁴⁾	–
H62 ²⁾	Externally mounted brake and 1XP8 001-1 rotary pulse encoder	100 – 160	180 – 225	–	–	180 – 315	–
H63 ²⁾	Externally mounted brake and separately driven fan	100 – 160	180 – 225	–	–	180 – 315 ⁴⁾	–
H64 ²⁾	Externally mounted brake, separately driven fan and 1XP8 001-1 rotary pulse encoder	100 – 160	180 – 225	–	–	180 – 315	–
K82	Manual brake release with lever	63 – 160	180 – 225	–	–	180 – 315	–
C00	Brake supply voltage 24 V DC	63 – 160	180 – 225	–	–	180 – 315	–
C01	Brake supply voltage 400 V AC, 50 Hz	63 – 160	180 – 225	–	–	180 – 315	–
Additional externally mounted units¹⁾⁴⁾							
H70	Externally mounted LL861 900 220 rotary pulse encoder	100 – 160	180 – 225	–	100 – 160	180 – 315	315 – 450
H71	Pre-assembly and mounting of LL861 900 220 rotary pulse encoder, which is to supply	100 – 160	180 – 225	–	100 – 160	180 – 315	315 – 450
H78	Prepared for mounting of LL861 900 220 rotary pulse encoder	100 – 160	180 – 225	–	100 – 160	180 – 315	315 – 450
H72	Mounting of HOG 9 D 1024 I rotary pulse encoder	100 – 160	180 – 225	–	100 – 160	180 – 315	315 – 450
H74	Pre-assembly and mounting of HOG 9 rotary pulse encoder, which is to supply	100 – 160	180 – 225	–	100 – 160	180 – 315	315 – 450
H79	Prepared for mounting HOG 9 D 1024 I rotary pulse encoder	100 – 160	180 – 225	–	100 – 160	180 – 315	315 – 450
H73	Mounting of HOG 10 D 1024 I rotary pulse encoder	100 – 160	180 – 225	–	–	180 – 315	315 – 450
H75	Pre-assembly and mounting of HOG 10 rotary pulse encoder, which is to supply	100 – 160	180 – 225	–	–	180 – 315	315 – 450
H80	Prepared for mounting HOG 10 D 1024 I rotary pulse encoder	100 – 160	180 – 225	–	–	180 – 315	315 – 450
Converter installation							
H15 ³⁾	Prepared for mounting the MMI	56 – 132	–	–	–	–	–
Mechanical design							
K06	Two-part plate on terminal block	–	–	–	–	200 – 315 ⁵⁾	315 – 355. for 400 and 450 standard version
K09	Terminal box on RHS (view onto drive end)	80 – 160	180 – 225	80 – 200	100 – 160	180 – 315	Standard version
K10	Terminal box on LHS (view onto drive end)	80 – 160	180 – 225	80 – 200	100 – 160	180 – 315	315 – 450
K11	Terminal box on top, feet screwed on	–	–	–	–	180 – 315	–
K83	Rotation of terminal box by 90°, inserted from drive end	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
K84	Rotation of terminal box by 90°, inserted from non-drive end	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
K85	Rotation of terminal box by 180°	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
M46	Bolt-type screw terminal for cable connection, accessories pack (3 units)	–	–	–	–	250 – 315 ⁵⁾	–
M47	Saddle terminals for cable lug free connection	–	–	–	–	250 – 315 ⁶⁾	–
D02	Cooling air temperature – 50 °C to 40 °C	–	–	–	–	180 – 315	–
D03	Cooling air temperature – 40 °C to 40 °C	–	–	–	–	180 – 315	–

1) Second shaft end not possible. Further externally mounted units are not possible in combination with the modular assembly system.

2) Order codes cannot be combined.

3) Converter mounting is possible in accordance with the COMBIMASTER spectrum for motors with 230 VΔ / 400 VY voltages. For further details, see Catalogs DA 51.3 and DA 64. Not possible for motors with special insulation for 690 V.

4) For 1LG4/1LG6 motors, G17, G26 and H63 can also be combined with all rotary pulse encoders under "Additional externally mounted units".

5) Not possible for design for zones and VIK.

6) Standard for design for zones and VIK.

Squirrel-cage motors

1LA/1LG · Special designs

Selection and ordering data

Additional order suffix -Z with order code	Special designs	Motor type – Size					
		Aluminium		Cast iron			
		1LA7	1LA5	1LA9	1LA6	1LG4/1LG6	1LA8
Mechanical design (continued)							
D04	Cooling air temperature – 30 °C to 40 °C	–	–	–	–	180 – 315	–
D30	Electrical acc. to NEMA MG1-12 ¹⁰⁾	56 – 160	180 – 225	56 – 200 ¹¹⁾	100 – 160	180 – 315 ¹¹⁾	–
D31	Designed to UL with "Recognition Mark" ¹⁾	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	–
D40	Canadian standards (CSA) ²⁾ ¹⁰⁾	56 – 160	180 – 200	56 – 200	100 – 160	180 – 315	315 – 450
		With voltage identifier 9 and order code for voltage and frequency					
K01	Vibrational severity grade R	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 400
		For pole-changing motors on request					
K16	Second standard shaft end ³⁾	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
K17	Radial sealing ring on drive end with flange types ⁴⁾	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	–
K20	Bearing for increased cantilever forces ⁵⁾	100 – 160	180 – 225	100 – 200	100 – 160	180 – 315	315 – 355
K36	Special bearing for drive end and non drive end, bearing size 63	–	–	–	–	180 – 250, 280 – 315 ⁶⁾ standard type	–
K40	Regreasing device	100 – 160	180 – 225	100 – 200 ⁷⁾	100 – 160	180 – 250, standard version from 280 upwards	–
L04	Located bearing non drive end	56 – 132, 160 standard version	–	56 – 132	100 – 132, 160 standard version	–	–
K94	Located bearing drive end	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	–
L27	Insulated bearing cartridge	–	–	–	–	225 – 315	Standard for operation with SIMOVERT MASTER-DRIVES
M44	Earth brushes for converter-fed operation	–	–	–	–	280 – 315	–
L13	External earthing	56 – 160	180 – 225	56 – 200	100 – 160	Standard version	
K30	VIK design ⁸⁾	56 – 160	–	56 – 160	100 – 160	180 – 315 ⁹⁾	315 – 355
K31	Extra rating plate, loose	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
K32	With two additional lifting rings for IM V 1 / IM V 3	–	180 – 225	–	–	–	–
Y82 • And order codes	Extra rating plate and/or with additional data	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
K37	Low noise version for 2-pole motors with clockwise rotation ⁶⁾	132 – 160	180 – 225	180 – 200	132 – 160	180 – 315	315, for 355 – 450 standard version
K38	Low noise version for 2-pole motors with anti-clockwise rotation ⁶⁾	132 – 160	180 – 225	180 – 200	132 – 160	180 – 315	315 – 450
K45	Anti-condensation heater for 230 V ¹⁰⁾ ¹²⁾	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
K46	Anti-condensation heater for 115 V ¹⁰⁾ ¹²⁾	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	315 – 450
L36	Sheet metal fan cover	–	–	–	–	180 – 315	–
L99	Wire-lattice pallet	56 – 160	180	56 – 180	–	–	–

Notes on safety and commissioning/certification

B00	Without notes on safety and commissioning Notice of renouncement is required from the customer	56 – 160	180 – 225	56 – 200	–	–	–
B01	Complete with one set of safety and commissioning notes per wire-lattice pallet	56 – 160	180	56 – 180	–	–	–
B02	Factory test certificate 2.3 acc. to EN 10 204	56 – 160	180 – 225	56 – 200	100 – 160	180 – 315	Standard version

• Additional plain text required.

1) Possible up to 600 V.

2) The rated voltage is shown on the rating plate. Separately driven fan and brake are not CSA certified.

3) For motors from size 315 of a vertical design, if a version with a second shaft end is required, please enquire. Not possible for version with protective cover.

4) Not possible for type IM V3.

5) Not possible for:
2-pole 1LG4/1LG6 motors of size 315L in vertical design;
2-pole 1LA8 motors, sizes 315 to 355;
1LA8 motors in vertical design. Vibrational severity grade R on request.

6) For 2-pole motors 1LG4/1LG6 sizes 280 and 315 not possible.

7) Not possible for 1LA9 134–6.

8) Modular installation and additional modules not possible. Anti-condensation heater not possible up to size 200L.

For 2-pole motors 1LG4/1LG6 size 315, additional low noise version is required, order code K37 or K38. For 1LA8 motors, note power and dimensions. For 2- and 4-pole motors 1LA8 357, the terminal block cannot be rotated by 4 x 90°.

For motors with special insulation for 690 V, on request.

9) Not possible for 2-pole 1LG4/1LG6 motors, size 315L, vertical designs; Vibrational severity grade R on request.

10) Not possible for motors with special insulation for 690 V.

11) For designs in EPACT or UL standard version (no order code required).

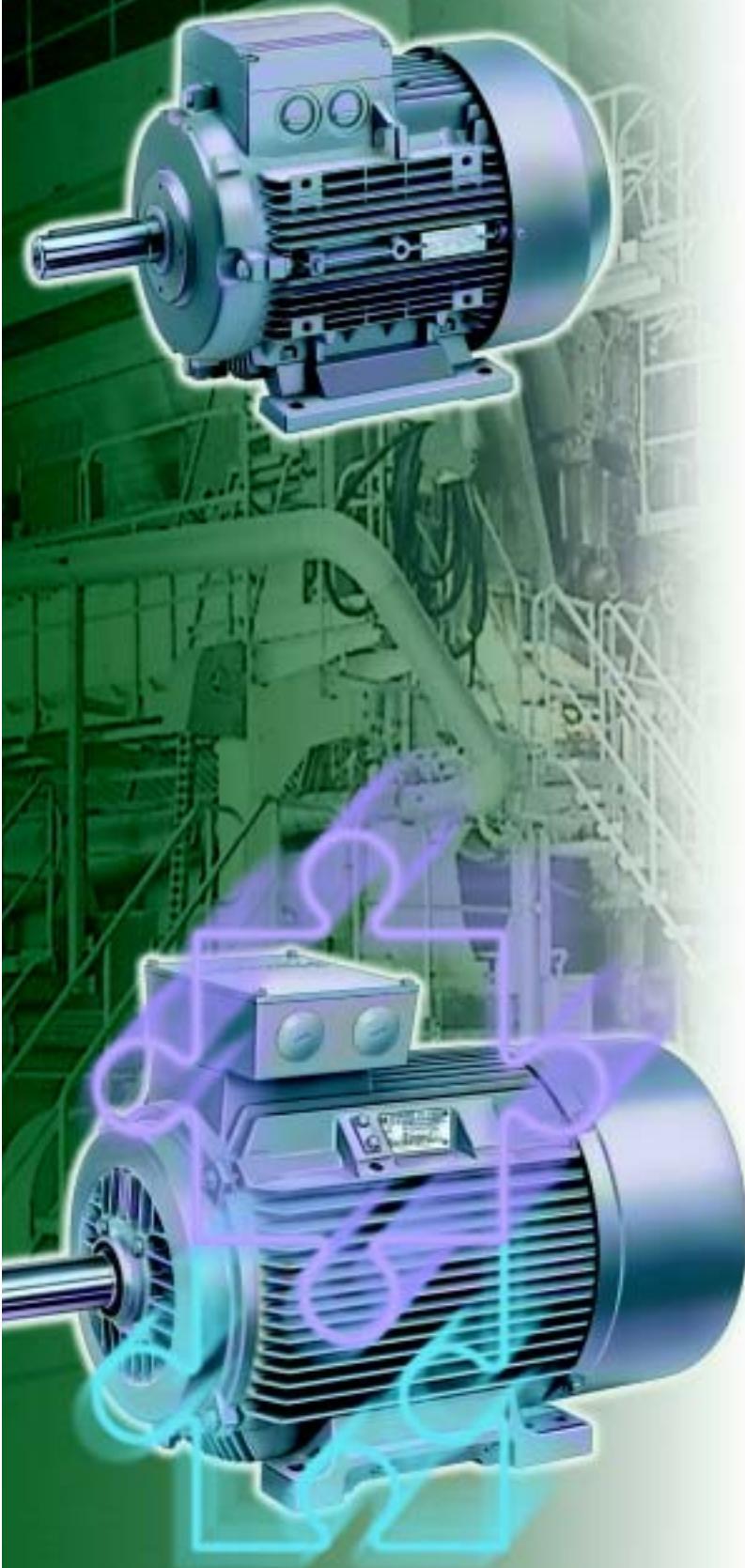
12) For 1LA motors in "non sparking" version, built-in anti-condensation heater is not possible up to size 200L.

Squirrel-cage motors

1MA · increased safety

EEx e II degree of protection

Selection and ordering data



4/2

Aluminium housing

- 2-, 4-, 6-pole – 50 Hz

4/3
4/4
4/5

Cast iron housing

- 2-pole – 50 Hz
- 4-pole – 50 Hz
- 6-pole – 50 Hz

4/6
4/6
4/7
4/7
4/7

Special designs

- Windings and motor protection
- Paint finish
- Mechanical design
- Certification
- Marine version

4

1MA motors Increased safety

Frame size	63 to 355
Output range	0.12 to 400 kW
Temp. class	T1 to T3
Temp. class F	Utilization acc. to B

For special versions (other frequencies, outputs, cooling air temperatures, installation altitudes, etc.), certification costs may be incurred.
For motor types that have not yet been acceptance tested by the PTB, changes may arise in the technical specifications.

Squirrel-cage motors

1MA · EEx e II degree of protection · Aluminium housing

Selection and ordering data

Rated output kW	Temper- ature classes	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated torque	Start- ing current For the rated current torque	Stalling torque Multiple of the rated torque	t_E time For temper- ature classes	Torque Class	Moment of inertia J	Weight approx. kg											
				Rated speed rpm	Effi- ciency $\eta^1)$	Power factor p.f.	Rated current at 380 V to 420 V	Rated torque Nm	T1 s																		
Temperature classes T1 to T3, IP 55 degree of protection, temperature class F																											
ATEX																											
3000 rpm, 2-pole, 50 Hz																											
0.18	T1-T3	63 M	1MA7 060-2BA ..	2810	66	0.74	0.55	0.61	2.3	4.4	2.3	30	27	16	0.00018	4											
0.25	T1-T3		1MA7 063-2BA ..	2800	68	0.85	0.70	0.85	2.2	4.4	2.3	19	16	16	0.00023	4											
0.37	T1-T3	71 M	1MA7 070-2BA ..	2825	73	0.80	0.93	1.3	2.3	5.6	3.0	28	25	16	0.00035	6											
0.55	T1-T3		1MA7 073-2BA ..	2785	72	0.84	1.4	1.9	3	5.2	2.6	18	13	16	0.00045	7											
0.75	T1-T3	80 M	1MA7 080-2BA ..	2845	73	0.85	1.81	2.5	2.5	6.2	2.7	13	11	16	0.00085	9											
1.1	T1-T3		1MA7 083-2BA ..	2855	79	0.85	2.5	3.7	2.8	6.4	3	12	10	16	0.0011	11											
1.3	T1-T3	90 S	1MA7 090-2BA ..	2850	78	0.88	2.9	4.4	2.6	6.2	2.8	12	11	16	0.0015	13											
1.85	T1-T3	90 L	1MA7 096-2BA ..	2860	81	0.88	3.95	6.2	2.8	7.2	2.8	9	8	16	0.002	16											
2.5	T1-T3	100 L	1MA7 106-2BA ..	2865	82	0.87	5.3	8.3	2.6	7.4	2.8	9	8	16	0.0038	21											
3.3	T1-T3	112 M	1MA7 113-2BB ..	2875	84	0.89	6.7	11	2.1	6.6	2.3	10	9	13	0.0055	27											
4.6	T1-T3	132 S	1MA7 130-2BB ..	2895	84	0.89	9.3	15	1.9	6.1	2.5	11	11	13	0.016	38											
5.5	T3		1MA7 131-2BB .. ²⁾	2920	85	0.89	10.7	18	2.2	7.8	2.7	12	11	13	0.021	44											
6.5	T1,T2			2890	85	0.91	12.6	21	1.9	6.6	2.3	10	7	13	0.021	44											
7.5	T3	160 M	1MA7 163-2BB .. ²⁾	2940	86	0.85	15.3	24	2.2	7.6	3.1	18	17	13	0.034	67											
9.5	T1,T2			2910	86	0.88	18.6	31	1.7	6.1	2.4	15	—	13	0.034	67											
10	T3	160 M	1MA7 164-2BB .. ²⁾	2925	87	0.91	19.1	33	2.1	7.4	2.9	18	8	13	0.04	72											
13	●	T1,T2		2885	87	0.92	24.5	43	1.6	5.7	2.2	16	—	13	0.04	72											
12.5	T3	160 L	1MA7 166-2BB .. ²⁾	2940	89	0.93	23.0	41	2.3	7.6	3	21	9	13	0.052	82											
16	●	T1,T2		2910	87	0.93	30.0	53	1.8	5.8	2.3	15	—	13	0.052	82											
1500 rpm, 4-pole, 50 Hz																											
0.12	T1-T3	63 M	1MA7 060-4BB ..	1375	55	0.66	0.52	0.83	1.9	2.6	1.9	35	30	13	0.0003	4											
0.18	T1-T3		1MA7 063-4BB ..	1330	57	0.75	0.62	1.3	1.9	2.7	1.9	30	25	13	0.0004	4											
0.25	T1-T3	71 M	1MA7 070-4BB ..	1310	60	0.77	0.80	1.8	1.9	3.1	1.9	50	40	13	0.0006	6											
0.37	T3		1MA7 073-4BB ..	1355	67	0.74	1.10	2.6	1.9	3.7	2.1	35	29	13	0.00083	7											
0.55	T1-T3	80 M	1MA7 080-4BA ..	1390	73	0.73	1.59	3.8	2.4	4.6	2.5	24	21	16	0.0015	9											
0.75	T1-T3		1MA7 083-4BA ..	1395	73	0.75	2.05	5.1	2.6	4.8	2.6	19	16	16	0.0018	11											
1	T1-T3	90 S	1MA7 090-4BA ..	1420	77	0.78	2.5	6.7	2.2	5.4	2.5	16	14	16	0.0028	13											
1.35	T1-T3	90 L	1MA7 096-4BA ..	1415	78	0.82	3.1	9.1	2.3	5.9	2.5	15	13	16	0.0035	16											
2	T1-T3	100 L	1MA7 106-4BA ..	1420	80	0.82	4.5	14	2.5	6.4	2.7	13	11	16	0.0048	20											
2.5	T1-T3		1MA7 107-4BA ..	1415	81	0.83	5.5	17	2.6	6.4	2.7	12	10	16	0.0058	23											
3.6	T1-T3	112 M	1MA7 113-4BA ..	1435	85	0.83	7.5	24	2.6	7.2	2.9	10	9	16	0.011	29											
5	T1-T3	132 S	1MA7 130-4BA ..	1445	86	0.82	10.4	33	2.7	6.6	3.2	10	9	16	0.021	42											
6.8	T1-T3	132 M	1MA7 133-4BA ..	1460	87	0.82	14.0	44	3	7.7	3.6	10	9	16	0.027	61											
10	T1-T3	160 M	1MA7 163-4BB ..	1455	88	0.87	19.7	66	2.3	6.5	2.7	17	10	13	0.052	67											
13.5	T1-T3	160 L	1MA7 166-4BB ..	1465	89	0.84	27	88	2.4	6.9	3	18	9	13	0.057	107											
1000 rpm, 6-pole, 50 Hz																											
0.25	T1-T3	71 M	1MA7 073-6BA ..	850	63	0.72	0.81	2.8	2.2	3	2.1	130	70	16	0.0009	7											
0.37	T1-T3	80 M	1MA7 080-6BA ..	920	68	0.7	1.14	3.6	2.3	3.6	2.4	60	55	16	0.0015	9											
0.55	T1-T3		1MA7 083-6BA ..	930	69	0.67	1.75	5.6	2.4	4	2.4	30	27	16	0.0025	13											
0.65	T1-T3	90 S	1MA7 090-6BA ..	915	70	0.75	1.8	6.8	2.3	3.9	2.4	35	30	16	0.0028	14											
0.95	T1-T3	90 L	1MA7 096-6BA ..	910	72	0.75	2.6	9.9	2.3	4.1	2.4	22	19	16	0.0038	16											
1.3	T1-T3	100 L	1MA7 106-6BA ..	935	77	0.73	3.35	13	2.4	4.8	2.5	26	26	16	0.0063	20											
1.9	T1-T3	112 M	1MA7 113-6BB ..	940	79	0.76	4.7	19	2.3	5	2.5	19	16	13	0.011	24											
2.6	T1-T3	132 S	1MA7 130-6BB ..	945	79	0.75	6.5	26	1.8	4.4	2.4	21	18	13	0.015	36											
3.5	T1-T3	132 M	1MA7 133-6BB ..	955	81	0.72	9.0	35	2.3	5.1	2.8	16	13	13	0.019	41											
4.8	T1-T3	132 M	1MA7 134-6BB ..	950	83	0.76	11.4	48	2.4	5.6	2.8	13	11	13	0.025	50											
6.6	T1-T3	160 M	1MA7 163-6BB ..	960	85	0.75	14.9	65	2.7	6.4	3.1	18	9	13	0.041	70											
9.7	T1-T3	160 L	1MA7 166-6BB ..	965	88	0.76	21.0	96	2.8	7.7	2.2	15	8	13	0.055	105											

● Used as class F.

Order No. supplements

Motor type	Penultimate position: Voltage identifier				Final position: Design identifier					IM B 3	Price supplement	IM B 5	IM V 1	IM B 14	IM B 14	IM B 35
	50 Hz		230 VΔ / 400 VΔ / 400 VY		500 VY		500 VΔ				With protective cover	With standard flange	With special flange			
1MA7 060 to 1MA7 096	1	6 ⁴⁾	3 ⁵⁾	—	0	1	4	2	3	6						
1MA7 106 to 1MA7 166	1	6	3	5	0	1	4	2	3	6						

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Designs", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs". For footnotes, see Page 4/3.

Squirrel-cage motors

1MA · EEx e II degree of protection · Cast iron housing

Selection and ordering data

Rated output kW	Temper- ature classes	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current For temperature classes	Stalling torque at 380 V to 420 V	t_E time For temper- ature classes	Torque Class	Moment of inertia J	Weight approx. kg	
				Rated speed rpm	Effi- ciency η ¹⁾	Power factor p.f.	Rated current at 380 V to 420 V	Rated torque Nm								
Temperature classes T1 to T3, IP 55 degree of protection, temperature class F																
2.5	T1-T3	100 L	1MA6 106-2BA ..	2865	82	0.86	5.3	8.3	2.6	7.4	2.8	9	8	16	0.0038	34
3.3	T1-T3	112 M	1MA6 113-2BB ..	2875	84	0.89	6.7	11	2.1	6.6	2.3	10	9	13	0.0055	43
4.6	T1-T3	132 S	1MA6 130-2BB ..	2895	84	0.88	9.3	15	1.9	6.1	2.5	11	11	13	0.016	53
5.5	T3	132 S	1MA6 131-2BB ..²⁾	2920	85	0.89	10.7	18	2.2	7.8	2.7	12	11	13	0.021	58
6.5	T1,T2	132 S		2890	85	0.91	12.6	21	1.9	6.6	2.3	10	7	13	0.021	58
7.5	T3	160 M	1MA6 163-2BB ..²⁾	2940	86	0.85	15.3	24	2.2	7.6	3.1	8	17	13	0.034	96
9.5	T1,T2	160 M		2910	86	0.88	18.6	31	1.7	6.1	2.4	15	—	13	0.034	96
10	T3	160 M	1MA6 164-2BB ..²⁾	2925	87	0.91	19.1	33	2.1	7.4	2.9	18	8	13	0.04	105
13●	T1,T2	160 M		2885	87	0.92	24.5	43	1.6	5.7	2.2	16	—	13	0.04	105
12.5	T3	160 L	1MA6 166-2BB ..²⁾	2940	89	0.93	23.0	41	2.3	7.5	3.0	23	9	13	0.052	115
16●	T1,T2	160 L		2910	87	0.93	30.0	53	1.8	5.8	2.3	5	—	13	0.052	115
15	T3	180 M	1MA6 183-2BC ..	2955	92	0.87	29	49	2	6.9	3.3	30	14	10	0.077	170
19	T1,T2			2935	91.1	0.88	36.5	62	1.6	5.5	2.6	24	—	10		
20	T3	200 L	1MA6 206-2BC ..	2960	91.2	0.86	39	64	1.9	6	2.9	35	14	10	0.14	245
25	T1,T2			2950	90.6	0.87	49	81	1.5	4.8	2.3	28	—	10		
24	T3		1MA6 207-2BC ..	2965	92	0.87	46	77	2	6.4	3	35	10	10	0.16	246
31	T1,T2			2950	91.4	0.88	60	100	1.5	4.9	2.3	26	—	10		
28	T3	225 M	1MA6 223-2BC ..	2970	93.6	0.9	51	90	1.8	6.4	2.7	30	13	10	0.24	310
38	T1,T2		1MA6 223-2AC ..	2970	93.9	0.89	69 ³⁾	122	1.8	7	2.7	16	—	10		
36	T3	250 M	1MA6 253-2BC ..	2975	93.5	0.91	64	116	1.5	6.6	2.7	30	11	10	0.45	415
47	T1,T2		1MA6 253-2AC ..	2975	93.9	0.9	85	151	1.5	6.5	2.7	18	—	10		
64	T3	280 S	1MA6 280-2BD ..	2983	94.5	0.9	84	150	1.5	7.1	2.9	30	23	7	0.79	570
58	T1,T2	280 S	1MA6 280-2AD ..	2980	94.3	0.89	115	205	1.5	7.8	2.9	19	—	7		
76	T3	280 M	1MA6 283-2BD ..	2982	94.7	0.91	104	186	1.5	7.2	2.8	27	11	7	0.92	610
68	T1,T2		1MA6 283-2AD ..	2978	94.8	0.9	134	244	1.5	7.5	2.8	15	—	7		
95	T3	315 S	1MA6 310-2BD ..	2985	94	0.91	120	218	1.4	7.1	2.8	50	21	7	1.3	790
80	T1,T2	315 S	1MA6 310-2AD ..	2985	94.6	0.9	169	304	1.5	7.3	2.9	30	—	7		
112	T3	315 M	1MA6 313-2BD ..	2985	94.8	0.91	142	256	1.6	7	2.8	40	19	7	1.5	850
100	T1,T2		1MA6 313-2AD ..	2985	94.8	0.91	198 ³⁾	358	1.4	7.5	2.7	21	—	7		
135	T3	315 L	1MA6 316-2BD ..	2984	94.9	0.92	174	320	1.4	6.8	2.7	40	11	7	1.8	990
125	T1,T2		1MA6 316-2AD ..	2984	95.2	0.91	234	432	1.6	7.4	2.9	17	—	7		
165	T3		1MA6 317-2BD ..	2985	95.5	0.91	214	400	1.5	7.3	2.5	30	7	7	2.3	1100
150	T1,T2		1MA6 317-2AD ..	2986	95.7	0.91	280	528	1.8	9.3	2.9	7	—	7		
200	T3	315	1MA8 315-2BD ..[▲]	2982	95.3	0.91	260	480	1.1	6.5	2.6	13	—	7	2.7	1300
190	T1,T2		1MA8 315-2AD ..[▲]	2980	96.2	0.92	345	640	1	5.8	2.5	23	—	7		
255	T3		1MA8 317-2BD ..[▲]	2985	96.5	0.92	325	608	1.2	6.4	2.7	10	7	3.3	1500	
220	T1,T2		1MA8 317-2AD ..[▲]	2982	96.7	0.92	435	816	1.2	6.9	2.8	12	—	7		
300	T3	355	1MA8 353-2BE ..[▲]	2982	96.3	0.91	375	704	0.9	6	2.5	9	5	4.8	1900	
250	T1,T2		1MA8 353-2AE ..[▲]	2982	96.6	0.91	520	960	1	6.4	2.7	14	—	5		
335	T3		1MA8 355-2BE ..[▲]	2985	96.5	0.92	430	800	1	6.4	2.6	8	5	5.3	2000	
300	T1,T2		1MA8 355-2AE ..[▲]	2985	96.8	0.9	590 ⁶⁾	1070	1	6.8	2.7	12	5	6.4	2200	
400	T3		1MA8 357-2BE ..[▲]	2985	96.8	0.92	510	960	1	6.4	2.6	8	5	6.4		
1MA8 315 to 1MA8 357				2982	96.9	0.92	680	1280	1	6.3	2.5	10	5	6		

● Utilization in accordance with temperature class F — ■ VIK is not possible. ▲ With axial fan for clockwise rotation.

Order No. supplements

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier					
	50 Hz	230 V Δ / 400 V Δ / 400 V γ	500 V γ	500 V Δ	IM B 3	Price supplement	IM B 5	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35
1MA6 106 to 1MA6 166	1	6	3	5	0	1	4	2	3	6	
1MA6 183 to 1MA6 313	1	6	3	5	0	1	4	—	—	6	
1MA6 316 to 1MA6 317	—	6	3	5	0	—	4	—	—	6	
1MA8 315 to 1MA8 357	—	6⁷⁾	On request	On request	0	—	4	—	—	6	

Other voltage and/or frequency, voltage identifier "9". Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

- 1) With reference to 75 °C.
- 2) For voltage identifier "9", separate versions for T1, T2 and T3. For order code A11, only possible for one power output in each case.

- 3) For connection to 230 V, parallel supply cables are required.
- 4) For 1MA7 06 motors, 690 V γ version is not possible.

- 5) For 1MA7 060-4, 500 V γ version is not possible.

- 6) For connection to 400/500 V, parallel supply cables are required (see "Technical information",

- "Connections, circuits and terminal blocks").

- 7) Rated voltage range for 1MA8 on request.

Squirrel-cage motors

1MA · EEx e II degree of protection · Cast iron housing

Selection and ordering data

Rated output kW	Temper- ature classes	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque current	t_E time For tem- perature classes	Torque Class	Moment of inertia J	Weight approx. kg	
				Rated speed rpm	Effi- ciency $\eta^1)$	Power factor p.f.	Rated current at 380 V to 420 V	Rated torque Nm								
Temperature classes T1 to T3, IP 55 degree of protection, temperature class F																
2	T1-T3	100 L	1MA6 106-4BA ..	1420	80	0.81	4.5	14	2.5	6.4	2.7	13	11	16	0.0048	33
2.5	T1-T3	100 L	1MA6 107-4BA ..	1415	81	0.83	5.5	17	2.6	6.4	2.7	12	10	16	0.0058	36
3.6	T1-T3	112 M	1MA6 113-4BA ..	1435	85	0.83	7.5	24	2.6	7.2	2.9	10	9	16	0.011	45
5	T1-T3	132 S	1MA6 130-4BA ..	1445	86	0.82	10.4	33	2.7	6.6	3.2	10	9	16	0.021	55
6.8	T1-T3	132 M	1MA6 133-4BA ..	1465	87	0.82	14.0	44	3.0	7.6	3.6	11	9	16	0.027	62
10	T1-T3	160 M	1MA6 163-4BB ..	1455	88	0.87	19.7	66	2.3	6.5	2.7	17	10	13	0.052	100
13.5	T1-T3	160 L	1MA6 166-4BB ..	1465	89	0.84	27	88	2.4	6.8	3.0	18	9	13	0.057	114
15	T3	180 M	1MA6 183-4BC ..	1465	90.7	0.80	31	97	1.8	6.1	2.9	18	11	10	0.13	165
17	T1,T2	180 M		1460	90.0	0.82	35.5	111	1.6	5.3	2.4	13		10		
17.5	T3	180 L	1MA6 186-4BC ..	1475	91.6	0.80	36	114	1.8	6.4	3	16	11	10	0.15	177
20	T1,T2	180 L		1465	90.6	0.82	41 ²⁾	130	1.6	5.6	2.6	13		10		
24	T3	200 L	1MA6 207-4BC ..	1475	92.1	0.79	47	155	2.1	7.1	3	14	6	10	0.24	240
27	T1,T2			1470	91.6	0.81	53	175	1.8	6.3	2.6	12		10		
30	T3	225 S	1MA6 220-4BC ..	1481	93.3	0.83	59	193	1.6	6.7	2.7	13	13	10	0.44	300
33	T1,T2	225 S		1480	93.1	0.84	64 ²⁾	213	1.4	6.2	2.5	11		10		
36	T3	225 M	1MA6 223-4BC ..	1484	93.8	0.84	70 ²⁾	232	1.7	6.9	2.8	12	12	10	0.52	330
40	T1,T2	225 M		1480	93.6	0.85	77 ²⁾	258	1.5	6.2	2.5	10		10		
44	T3	250 M	1MA6 253-4BC ..	1485	94	0.85	83	283	1.7	7.3	2.5	18	11	10	0.79	435
50	T1,T2			1485	93.8	0.86	94	322	1.5	6.4	2.1	15		10		
58	T3	280 S	1MA6 280-4BC ..	1488	94.6	0.84	111	372	1.7	6.3	2.5	30	7	10	1.4	610
68	T1,T2	280 S		1485	94.5	0.85	131	437	1.5	5.3	2.1	23		10		
70	T3	280 M	1MA6 283-4BC ..	1488	94.8	0.85	130	449	1.7	7	2.5	26	6	10	1.6	660
80	T1,T2	280 M		1485	94.8	0.87	150 ²⁾	514	1.5	6	2.2	20		10		
84	T3	315 S	1MA6 310-4BD ..	1492	95.4	0.84	158	538	1.7	7.7	2.8	28	8	7	2.2	830
100	T1,T2	315 S		1490	95.3	0.85	188	641	1.4	6.5	2.4	24		7		
100	T3	315 M	1MA6 313-4BD ..	1492	95.8	0.85	185	640	1.6	7.2	2.5	29	7	7	2.7	910
115	T3	315 L	1MA6 316-4BD ..	1490	95.6	0.86	214	740	1.7	7.5	2.5	28	5	7	3.2	1060
135	T1,T2			1488	95.5	0.87	248	868	1.4	6.4	2.1	21		7		
135	T3		1MA6 317-4BD ..	1492	95.8	0.86	245	868	1.7	7.8	2.8	26	7	7	4.2	1200
165	T1,T2			1485	95.8	0.87	305	1061	1.5	6.3	2.3	17		7		
170	T3	315	1MA8 315-4BD ..	1490	96.2	0.86	310	1090	1.3	6.4	2.7	8	7	3.6	1300	
200	T1,T2			1486	95.7	0.85	365	1290	1.1	5.4	2.3	21		7		
215	T3		1MA8 317-4BD ..	1490	96.5	0.87	390	1380	1.4	6.9	2.7	7	7	4.4	1500	
245	T1,T2			1486	96.4	0.88	440	1570	1.2	6.0	2.4	19		7		
240	T3	355	1MA8 353-4BE ..	1490	96.5	0.88	430	1540	0.9	6.3	2.5	8	5	6.1	1900	
275	T1,T2			1488	96.4	0.89	485 ³⁾	1760	0.8	5.5	2.2	21		5		
275	T3		1MA8 355-4BE ..	1490	96.7	0.88	490 ³⁾	1760	0.9	7.1	2.6	7	5	6.8	2000	
315	T1,T2			1488	96.6	0.88	560 ³⁾	2020	0.8	6.2	2.3	22		5		
350	T3		1MA8 357-4BE ..	1490	96.9	0.88	620	2240	1	7.6	2.6	5	5	8.5	2200	
400	T1,T2			1488	96.8	0.89	710	2570	0.9	6.7	2.3	15	5	5		

■ VIK is not possible.

Order No. supplements

Motor type	Penultimate position: Voltage identifier				Final position: Design identifier										
	50 Hz		IM B 3		Price supplement		IM B 5		IM V 1 With protective cover		IM B 14 With standard flange		IM B 14 With special flange		IM B 35
230 VΔ / 400 VY	400 VΔ / 690 VY	500 VY	500 VΔ												
For Δ -connection, overload protection with phase-failure protection must be provided.															
1MA6 106 to 1MA6 166	1	6	3	5	0	1	4	2	3	6					
1MA6 183 to 1MA6 313	1	6	3	5	0	1	4	—	—	—					6
1MA6 316 to 1MA6 317	—	6	3	5	0	—	4	—	—	—					6
1MA8 315 to 1MA8 357	—	6 ⁴⁾	3	On request	0	—	4	—	—	—					6

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Designs", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) With reference to 75 °C.

2) For connection to 230 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

3) For connection to 400 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

4) Rated voltage range for 1MA8 on request.

Squirrel-cage motors

1MA · EEx e II degree of protection · Cast iron housing

Selection and ordering data

Rated output kW	Tem- pera- ture classes	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated current torque	Start- ing current For tem- perature classes	Stalling torque current torque	t_E time For tem- perature classes	Torque Class	Moment of inertia J	Weight approx. kg											
				Rated speed rpm	Effi- ciency $\eta^1)$	Power factor	p.f.	Rated current at 380 V to 420 V	Rated torque Nm																		
Temperature classes T1 to T3, IP 55 degree of protection, temperature class F																											
ATEX																											
1000 rpm, 6-pole, 50 Hz																											
1.3	T1-T3	100 L	1MA6 106-6BA ..	935	77	0.73	3.35	13	2.4	4.8	2.5	26	26	16	0.0063	33											
1.9	T1-T3	112 M	1MA6 113-6BB ..	940	79	0.76	4.7	19	2.3	5.0	2.5	19	16	13	0.011	40											
2.6	T1-T3	132 S	1MA6 130-6BB ..	945	79	0.75	6.5	26	1.8	4.4	2.4	21	18	13	0.015	50											
3.5	T1-T3	132 M	1MA6 133-6BB ..	955	81	0.72	8.9	35	2.3	5.1	2.8	16	13	13	0.019	57											
4.8	T1-T3	132 M	1MA6 134-6BB ..	950	83	0.76	11.4	48	2.4	5.6	2.8	13	11	13	0.025	66											
6.6	T1-T3	160 M	1MA6 163-6BB ..	960	85	0.76	14.9	65	2.7	6.5	3.1	18	9	13	0.041	103											
9.7	T1-T3	160 L	1MA6 166-6BB ..	965	88	0.76	21.0	96	2.8	7.7	2.2	15	8	13	0.055	122											
13.2	T1-T3	180 L	1MA6 186-6BC ..	975	89.6	0.78	28.5	129	1.6	5.4	2.5	22	18	10	0.20	177											
16.5	T1-T3	200 L	1MA6 206-6BC ..	980	90.5	0.81	34.5	161	1.7	5.4	2.6	23	19	10	0.29	220											
20	T1-T3	200 L	1MA6 207-6BC ..	980	90.8	0.82	41	195	1.7	5.6	2.6	22	17	10	0.33	235											
27	T1-T3	225 M	1MA6 223-6BC ..	975	92.5	0.82	54	263	1.6	5.6	2.5	15	15	10	0.57	305											
33	T1-T3	250 M	1MA6 253-6BC ..	985	93	0.83	66	320	1.6	5.3	2.4	16	16	10	0.89	410											
40	T1-T3	280 S	1MA6 280-6BC ..	990	93.3	0.85	77	386	1.5	6.2	2.6	13	13	10	1.3	540											
46	T3	280 M	1MA6 283-6BC ..	988	93.5	0.86	86	445	1.6	6.5	2.5	12	10	10	1.5	580											
50	T1,T2	280 M		987	93.3	0.86	96	484	1.5	5.8	2.3	14	10														
64	T3	315 S	1MA6 310-6BC ..	991	94.3	0.84	124	617	1.7	6.2	2.5	14	10	10	2.4	770											
68	T1,T2	315 S		990	94.2	0.85	131	656	1.6	5.9	2.3	22	10														
76	T3	315 M	1MA6 313-6BC ..	991	94.6	0.84	146	732	1.7	6.4	2.5	8	10	10	2.9	830											
82	T1,T2	315 M		990	94.5	0.84	158	791	1.6	5.9	2.3	18	10														
92	T3	315 L	1MA6 316-6BC ..	991	95	0.85	172	887	1.7	6.5	2.5	9	10	10	3.5	970											
98	T1,T2	315 S		990	94.8	0.85	185	945	1.6	6.1	2.3	20	10														
110	T3		1MA6 317-6BC ..	991	95.2	0.84	210	1060	1.7	6.8	2.5	6 ■ 10	10		4.3	1060											
120	T1,T2			990	95	0.85	230	1160	1.6	6.2	2.3	16	10														
125	T3		1MA6 318-6BC ..	991	95.2	0.86	220 ●	1210	1.6	7	2.5	6 ■ 10	10		4.9	1100											
135	T1,T2			990	95	0.86	240 ●	1300	1.5	6.5	2.3	17	10														
160	T3	315	1MA8 315-6BD ..	991	95.7	0.86	290	1540	1.3	6.8	2.6	9	7	7	6.0	1300											
175	T1,T2			990	95.6	0.88	315	1690	1.2	6.3	2.4	24	7														
200	T3		1MA8 317-6BD ..	991	96.1	0.87	360	1930	1.4	6.4	2.7	7	7	7	7.3	1500											
215	T1,T2			990	96	0.88	380	2070	1.3	6	2.5	25	7														
250	T3	355	1MA8 355-6BD ..	994	96.4	0.86	455	2400	1.3	6	2.5	7	7	13	1900												
275	T1,T2			993	96.2	0.86	495 ²⁾	2640	1.2	5.8	2.3	25	7														
315	T3		1MA8 357-6BD ..	995	96.6	0.86	570 ²⁾	3020	1.4	7.2	2.6	5 ■ 7	7	16	2200												
340	T1,T2			994	96.5	0.86	610 ²⁾	3270	1.3	6.7	2.4	15	7														

● Certified for 400 V rated voltage only.

■ VIK is not possible.

Order No. supplements

Motor type	Penultimate position: Voltage identifier				Final position: Design identifier				
	IM B 3				Price supplement				
	50 Hz	230 VΔ / 400 VY	500 VY	500 VΔ	IM B 5	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35
For Δ -connection, overload protection with phase-failure protection must be provided.									
1MA6 106 to 1MA6 166	1	6	3	5	0	1	4	2	3
1MA6 183 to 1MA6 313	1	6	3	5	0	1	4	—	6
1MA6 316 to 1MA6 317	—	6	3	5	0	—	4	—	6
1MA8 315 to 1MA8 357	—	6 ³⁾	3	On request	0	—	4	—	6

Other voltage and/or frequency, voltage identifier "9". Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) With reference to 75 °C.

2) For connection to 400 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

3) Rated voltage range for 1MA8 on request.

Squirrel-cage motors

1MA · EEx e II degree of protection

Order codes for special versions

Additional order suffix -Z with order code	Special designs	Motor type – Size		
		Aluminium housing 1MA7	Cast iron housing 1MA6	1MA8

Windings and motor protection:

Y52 • Used as class F and output KT.. °C or AH... m above sea level	63 – 160 Please enquire. Certification costs may be incurred.	100 – 315 Please enquire. Certification costs may be incurred.	–
A11 Motor protection by means of PTC thermistor with 3 embedded temperature sensors for tripping ¹⁾	63 – 160	100 – 315 ²⁾	–
A12 Motor protection by means of PTC thermistor with 6 embedded temperature sensors for alarm and tripping ¹⁾	63 – 160	100 – 315 ²⁾	Standard design

4

Paint finish

Standard paintwork in RAL 7030 stone grey	–	225 – 315 standard design	Standard design
K26 Special paintwork in RAL 7030 stone grey	Standard design (without order code)	225 – 315, standard design for 100 to 200 (without order code)	315 – 355
M16 Special paintwork in RAL 1002 sand yellow	63 – 160	100 – 200 For 225 – 315 with order code Y54 and special paintwork RAL ...	315 – 355 With order code Y54 and special paintwork RAL ...
M17 Special paintwork in RAL 1013 pearl white			
M18 Special paintwork in RAL 3000 flame red			
K27 Special paintwork in RAL 6011 mignonette green			
M19 Special paintwork in RAL 6021 pale green			
M20 Special paintwork in RAL 7001 silver grey			
K28 Special paintwork in RAL 7031 bluish grey			
L42 Special paintwork in RAL 7032 pebble grey			
M21 Special paintwork in RAL 7035 light grey			
M22 Special paintwork in RAL 9001 cream			
M23 Special paintwork in RAL 9002 grey white			
L43 Special paintwork in RAL 9005 jet black			
Y54 • Special paintwork in other colors: RAL 1015, 1019, 2003, 2004, 3007, 5007, 5009, 5010, 5012, 5015, 5017, 5018, 5019, 6019, 7000, 7004, 7011, 7016, 7022, 7033 And standard paintwork RAL....	63 – 160	100 – 315	315 – 355
Y53 • Standard paintwork in other colors: And standard paintwork RAL....	–	225 – 315	315 – 355
K23 Unpainted (only cast iron parts primed)	63 – 160	100 – 315	315 – 355
K24 Unpainted, only primed	63 – 160	100 – 200	–

• Additional plain text required.

1) For appropriate certified 3RN1
tripping unit, see Catalog NS K.

2) Not permitted as sole protection from
size 180 upwards; motor protection
contactor required.

RAL No.	Name of color	RAL No.	Name of color
1015	Light ivory	5017	Traffic blue
1019	Grey beige	5018	Turquoise blue
2003	Pastel orange	5019	Capri blue
2004	Pure orange	6019	Pastel green
3007	Wine red	7000	Squirrel grey
5007	Black blue	7004	Signal grey
5009	Azure blue	7011	Iron grey
5010	Gentian blue	7016	Anthracite grey
5012	Light blue	7022	Umbra grey
5015	Sky blue	7033	Cement grey

Squirrel-cage motors

1MA · EEx e II degree of protection

Order codes for special versions

Additional order suffix -Z with order code	Special designs	Motor type – Size		
		Aluminium housing 1MA7	Cast iron housing 1MA6	1MA8

Mechanical design:

K06	Two-part plate on terminal block	–	225 – 315	– for 1MA8 357, 2- and 4-pole, standard version
K09	Terminal box on LHS (view onto drive end)	80 – 160	100 – 315	Standard design
K10	Terminal box on RHS (view onto drive end)	80 – 160	100 – 315	315 – 355
K83	Rotation of terminal box by 90°, inserted from non-drive end	63 – 160	100 – 315	315 – 355
K84	Rotation of terminal box by 90°, inserted from drive end	63 – 160	100 – 315	315 – 355
K85	Rotation of terminal box by 180°	63 – 160	100 – 315	315 – 355
K01	Vibrational severity grade R	63 – 160	100 – 315	315 – 355
K16	Second standard shaft end ¹⁾	63 – 160	100 – 315	315 – 355
K17	Radial sealing ring on drive end with flange types ²⁾	63 – 160	100 – 315	–
K20	Bearing for increased cantilever forces ³⁾	100 – 160	100 – 315	315 – 355
K40	Regreasing device	100 – 160	100 – 250, standard version from 280 upwards	
L04	Locating bearing non drive end	63 – 132, 160 standard version	100 – 132, 160 standard version	–
K94	Locating bearing drive end	63 – 160	100 – 200	–
K30	VIK design ⁴⁾	63 – 160	100 – 315	315 – 355
K31	Extra rating plate, loose	63 – 160	100 – 315	315 – 355
Y82 • And order codes	Extra rating plate and/or with additional data	63 – 160	100 – 315	315 – 355
K37	Low noise version for 2-pole motors with clockwise rotation ⁵⁾	132 – 160	132 – 315	Standard design
K38	Low noise version for 2-pole motors with anti-clockwise rotation ⁵⁾	132 – 160	132 – 315	315 – 355
K45	Anti-condensation heater for 230 V	–	225 – 315	315 – 355
K46	Anti-condensation heater for 115 V	–	225 – 315	315 – 355
L99	Wire-lattice pallet	63 – 160	100 – 180	–

Certification

B02	Factory test certificate 2.3 acc. to EN 10 204	63 – 160	100 – 315	–
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Marine version – “Operation below deck”^{6) 7)}

E11	Certified according to GL (Germanischer Lloyd) Germany, KT 45 °C, Temperature class F used as F	63 – 160	100 – 315	–
E21	Certified according to LRS (Lloyd's Register of Shipping) Great Britain, KT 45 °C, Temperature class F used as F	63 – 160	100 – 315	–
E31	Certified according to BV (Bureau Veritas) France, KT 45 °C, Temperature class F used as F	63 – 160	100 – 315	–
E51	Certified according to DNV (Det Norske Veritas) Norway, KT 45 °C, Temperature class F used as F	63 – 160	100 – 315	–

● Additional plain text required.

1) Motors of size 180 M in vertical designs for version with second shaft end are available on request.
Low noise version (2-pole) not possible from size 132 S to 315 L. Not possible for version with protective cover.

2) Not possible for size IM V 3, only for 4-pole to 6-pole motors for size 180 M upwards.

3) Not possible for:
2-pole 1MA6 motors,
size 315 L, vertical designs;
2-pole 1MA8 motors
and 1MA8 motors,
vertical designs.

Vibrational severity grade R
On request for 1MA6 motors
from size 225 M upwards.

4) For sizes 315 S to 315 L,
low noise version also required.
For 1MA8 motors, note power and dimensions.
For 2- and 4-pole motors 1MA8 357, the terminal block cannot be rotated by 4 × 90°.

5) 1MA6/1MA7 motors are up to 80 mm longer than normal.
Second shaft end not possible.

6) Factory test certificate 2.3 in accordance with EN 10204 is supplied. Individual acceptance test must be specified in plain text on ordering if required (price supplement).

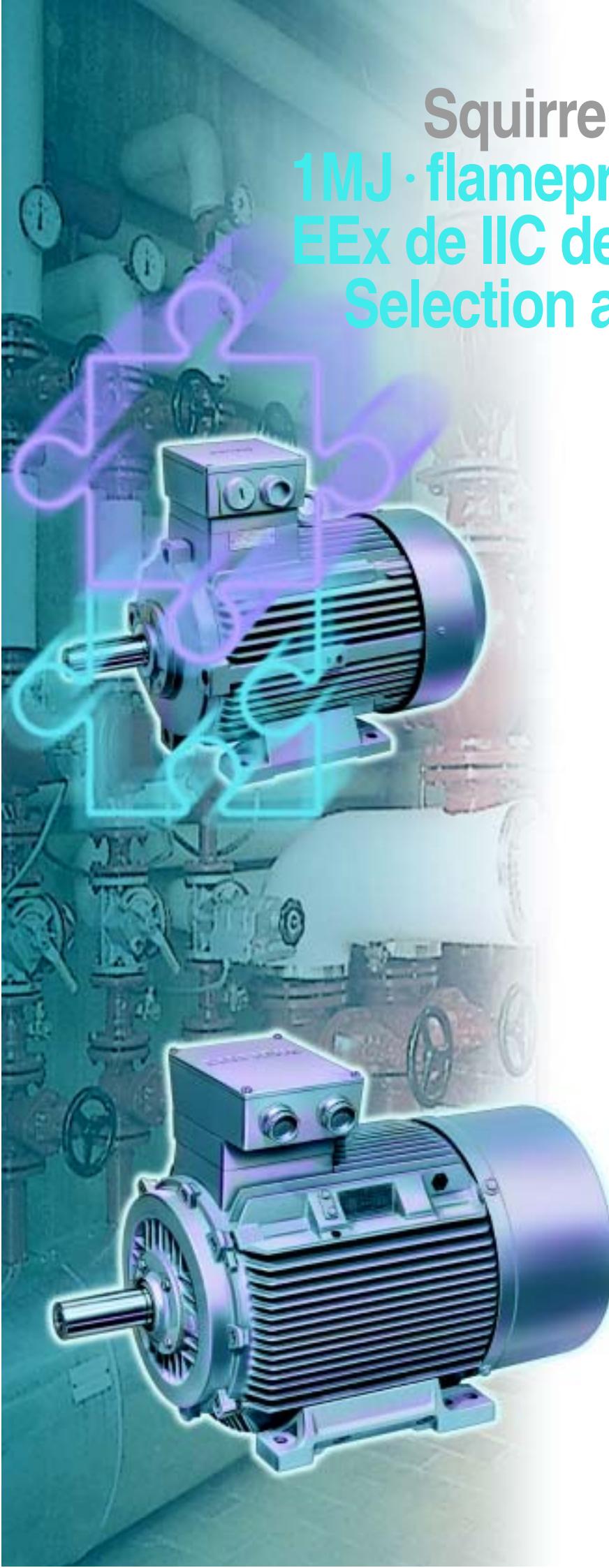
7) For 1MA motors of class F used as class B, derating may be necessary.

Squirrel-cage motors

1MA · EEx e II degree of protection

Notes

4



Squirrel-cage motors

1MJ · flameproof enclosure

EEx de IIC degree of protection

Selection and ordering data

5/2

- 2-pole – 50 Hz

5/3

- 4-pole – 50 Hz

5/4

- 6-pole – 50 Hz

5/5

- 8-pole – 50 Hz

5/6

- Motor protection

5/6

- Paint finish

5/7

- Mechanical design

5/7

- Certification

5/7

- Marine version

Special designs

5

- Motor protection

- Paint finish

- Mechanical design

- Certification

- Marine version

1MJ motors Flameproof enclosure

Frame size	71 to 450
Output range	0.25 to 900 kW
Temp. class	T1 to T4
Temp. class F	Utilization acc. to B
Converter compatible	$t_s > 0.1 \mu\text{s}$ at $U \leq 500 \text{ V}$
Voltage peak times	

The motors comply with the highest explosion group IIC.

Squirrel-cage motors

1MJ · EEx de IIC degree of protection

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx. kg	
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 400 V A	Rated torque Nm								
Temperature classes T1 to T4, IP 55 degree of protection, temperature class F ATEX⁴⁾															
0.37	71 M	1MJ6 070-2CA ..	2750	67	0.81	0.98	1.3	2.3	4.3	2.3	16	0.00035	19		
0.55		1MJ6 073-2CA ..	2790	71	0.81	1.38	1.9	2.5	5.3	2.6	16	0.00045	20		
0.75	80 M	1MJ6 080-2CA ..	2840	72	0.86	1.75	2.5	2.4	6.3	2.3	16	0.00085	24		
1.1		1MJ6 083-2CA ..	2835	74	0.87	2.45	3.7	2.6	6.3	2.3	16	0.0011	26		
1.5	90 L	1MJ6 096-2CA ..	2850	78	0.84	3.3	5.0	2.5	6.7	2.5	16	0.0015	32		
2.2		1MJ6 097-2CA ..	2860	80	0.86	4.6	7.4	2.8	7.1	2.8	16	0.0020	35		
3	100 L	1MJ6 106-2CA ..	2885	82	0.85	6.2	9.9	2.8	7.7	3.0	16	0.0038	44		
4	112 M	1MJ6 113-2CA ..	2895	84	0.88	7.8	13	2.4	7.6	2.8	16	0.0055	57		
5.5	132 S	1MJ6 130-2CA ..	2925	85	0.89	10.5	18	2.0	5.9	2.6	16	0.015	75		
7.5		1MJ6 131-2CA ..	2930	87	0.89	14	24	2.3	6.9	2.6	16	0.019	82		
11	160 M	1MJ6 163-2CA ..	2940	88	0.88	20.5	36	2.1	6.5	2.6	16	0.034	123		
15	160 M	1MJ6 164-2CA ..	2940	89	0.91	26.5	49	2.2	6.6	3.1	16	0.043	134		
18.5	160 L	1MJ6 166-2CA ..	2940	91	0.91	32.5	60	2.4	7.0	3.3	16	0.051	161		
22	180 M	1MJ6 183-2CA ..	2940	92	0.88	39	71	2.5	6.9	3.2	16	0.077	175		
30	200 L	1MJ6 206-2CA ..	2940	92.3	0.89	53	97	2.4	6.5	2.8	16	0.14	250		
37		1MJ6 207-2CA ..	2945	92.8	0.90	64	120	2.4	7.7	2.8	16	0.16	266		
45	225 M	1MJ6 223-2CB ..	2955	93.9	0.90	77 ¹⁾	145	2.3	6.9	2.7	13	0.24	335		
55	250 M	1MJ6 253-2CB ..	2965	94.0	0.91	93	177	2.1	6.9	2.8	13	0.45	445		
75	280 S	1MJ6 280-2CC ..	2975	94.7	0.90	128	241	1.9	7.0	2.7	10	0.79	600		
90	280 M	1MJ6 283-2CC ..	2975	95.1	0.91	150 ¹⁾	289	2.0	7.0	2.7	10	0.92	640		
110	315 S	1MJ6 310-2CC ..	2980	94.8	0.90	186	353	1.8	7.0	2.8	10	1.3	840		
132	315 M	1MJ6 313-2CC ..	2980	95.1	0.90	225 ¹⁾	423	1.9	7.0	2.8	10	1.5	900		
160	315 M	1MJ8 313-2AB ..	2980	95.7	0.88	280	513	2.2	6.9	2.5	13	2.3	1100		
200		1MJ8 316-2AB ..	2980	96.2	0.89	335	641	2.3	6.9	2.6	13	2.8	1200		
250	355	1MJ8 353-2AC ..	2980	96.2	0.89	423 ²⁾	801	2.1	6.7	2.6	10	3.5	1700		
315		1MJ8 356-2AC ..	2980	96.6	0.89	530 ²⁾	1009	2.1	6.7	2.6	10	4.2	2000		
355	355	1MJ1 355-2AD ..	2978	96.5	0.91	580	1138	1.0	6.4	2.7	7	4.3	2400		
400		1MJ1 357-2AD ..	2978	96.6	0.91	655	1282	0.95	6.1	2.6	7	4.3	2400		
450	400	1MJ1 403-2AE ..	2984	96.7	0.90	745	1440	0.8	6.2	2.8	5	6.0	2800		
500		1MJ1 405-2AE ..	2982	96.8	0.91	820	1601	0.8	5.9	2.55	5	7.0	3000		
560		1MJ1 407-2AE ..	2983	97.0	0.91	915	1792	0.85	6.2	2.7	5	7.0	3000		
630	450	1MJ1 453-2AE ..	2986	96.9	0.91	600 ●	2014	0.75	6.2	2.7	5	11.0	4000		
710		1MJ1 455-2AE ..	2986	97.0	0.91	670 ●	2270	0.8	6.3	2.8	5	11.0	4000		
800		1MJ1 457-2AE ..	2986	97.1	0.91	760 ●	2557	0.8	6.3	2.8	5	13.0	4200		
900		1MJ1 458-2AE ..	2985	97.2	0.91	850 ●	2879	0.85	6.4	2.7	5	13.0	4200		

● Rated current at 690 V.

Order No. supplements

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier						
	50 Hz		IM B 3		IM B 5		IM V 1		IM B 14		IM B 14	
	230 VΔ / 400 VY		400 VΔ		400 VΔ / 690 VY		500 VY		500 VΔ		Price supplement	IM B 35
1MJ6 070 to 1MJ6 097	1	—	6	3	—	0	1	4	2	3³⁾	6	
1MJ6 106 to 1MJ6 166	1	—	6	3	5	0	1	4	—	—	6	
1MJ6 183 to 1MJ6 207	1	—	6	3	5	0	1	4	—	—	6	
1MJ6 223 to 1MJ6 313	—	4	6	3	5	0	1	4	—	—	6	
1MJ8 313 to 1MJ8 316	—	—	6	3	5	0	1	4	—	—	6	
1MJ8 353 to 1MJ8 356	—	—	6	3	5	0	1	4	—	—	6	
1MJ1 355 to 1MJ1 458	—	—	6	3	5	0	—	4	—	—	6	

Other voltage and/or frequency, voltage identifier "9".

Order codes are required for this purpose
(see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) For connection to 400 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

2) The motors have two terminal blocks.

3) Only up to 1MJ6 083.

4) For 1MJ6 22 to 1MJ6 31 available from 01.02.03.

Squirrel-cage motors

1MJ · EEx de IIC degree of protection

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Rated torque	Starting torque For direct-on-line starting as multiple of the rated torque	Starting current multiple of the rated current	Stalling torque multiple of the rated torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx. kg
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 400 V A	Nm							

Temperature classes T1 to T4, IP 55 degree of protection, temperature class F

ATEX⁵⁾

1500 rpm, 4-pole, 50 Hz														
0.25	71 M	1MJ6 070-4CB ..	1325	60	0.77	0.78	1.8	1.8	3.2	1.8	13	0.0006	20	
0.37		1MJ6 073-4CB ..	1375	64	0.74	1.13	2.5	2	3.6	2	13	0.0008	21	
0.55	80 M	1MJ6 080-4CA ..	1395	71	0.79	1.42	3.7	2.3	4.7	2.4	16	0.0015	24	
0.75		1MJ6 083-4CA ..	1395	73	0.79	1.88	5.1	2.5	5	2.6	16	0.0018	26	
1.1	90 L	1MJ6 096-4CA ..	1410	73	0.81	2.7	7.5	2.1	4.9	2.5	16	0.0028	32	
1.5		1MJ6 097-4CA ..	1420	77	0.8	3.5	10	2.2	5.8	2.6	16	0.0035	35	
2.2	100 L	1MJ6 106-4CA ..	1420	78	0.8	5.1	15	2.2	6	2.6	16	0.0048	44	
3		1MJ6 107-4CA ..	1415	80	0.82	6.6	20	2.7	6.4	3	16	0.0058	47	
4	112 M	1MJ6 113-4CA ..	1435	83	0.82	8.5	27	2.8	7.2	3	16	0.011	58	
5.5	132 S	1MJ6 130-4CA ..	1450	86	0.83	11.1	36	2.4	6.9	3.3	16	0.018	76	
7.5	132 M	1MJ6 133-4CA ..	1450	86	0.84	15	49	2.7	7.7	3.3	16	0.024	85	
11	160 M	1MJ6 163-4CA ..	1455	87	0.85	21.5	72	2.4	6.6	2.9	16	0.040	128	
15	160 L	1MJ6 166-4CA ..	1455	89	0.85	28.5	98	2.8	7.4	3.2	16	0.052	158	
18.5	180 M	1MJ6 183-4CA ..	1460	90.5	0.84	35	121	2.3	7.1	3	16	0.13	175	
22	180 L	1MJ6 186-4CA ..	1460	91.2	0.85	41	144	2.3	7.1	3	16	0.15	189	
30	200 L	1MJ6 207-4CA ..	1465	91.8	0.86	55	196	2.6	7.4	3.2	16	0.24	247	
37	225 S	1MJ6 220-4CA ..	1475	93	0.86	67 ¹⁾	240	2.5	7	3.1	16	0.44	325	
45	225 M	1MJ6 223-4CA ..	1475	93.4	0.87	80 ¹⁾	292	2.6	7	3.2	16	0.52	355	
55	250 M	1MJ6 253-4CA ..	1480	94	0.87	97	355	2.6	6.7	2.5	16	0.79	465	
75	280 S	1MJ6 280-4CA ..	1485	94.7	0.86	132	482	2.5	6.7	2.7	16	1.4	630	
90	280 M	1MJ6 283-4CA ..	1485	95	0.86	160 ¹⁾	579	2.5	6.8	2.8	16	1.6	680	
110	315 S	1MJ6 310-4CA ..	1486	94.8	0.86	194	707	2.5	6.7	2.7	16	2.2	870	
132	315 M	1MJ6 313-4CA ..	1486	95.5	0.86	232 ¹⁾	848	2.7	7.2	3	16	2.7	950	
160	315 M	1MJ8 313-4AC ..	1485	95.6	0.86	285	1029	2.4	6.8	2.5	13	3.3	1120	
200	315 L	1MJ8 316-4AB ..	1485	95.7	0.85	355	1286	2.5	6.9	2.4	13	4.0	1200	
225	355	1MJ8 353-4AC ..	1485	96.2	0.85	400	1447	2.1	6.6	2.3	13	5.5	1800	
250		1MJ8 354-4AD ..	1490	96.5	0.86	435 ²⁾	1602	1.2	6.5	2.4	7	6	1800	
280		1MJ8 356-4AC ..	1485	96.3	0.85	495 ²⁾	1801	2.1	6.6	2.3	13	6.5	2100	
315		1MJ8 357-4AD ..	1490	96.6	0.87	540 ²⁾	2019	1.2	6.5	2.4	7	7	2100	
355	355	1MJ1 353-4AD ..	1491	96.6	0.86	620	2272	1.05	6.1	2.4	7	7.5	2500	
400		1MJ1 355-4AD ..	1491	96.7	0.86	695	2560	1.05	6.0	2.35	7	9.0	2700	
450		1MJ1 357-4AD ..	1491	96.8	0.86	785	2880	1.1	6.2	2.4	7	9.0	2700	
500	400	1MJ1 403-4AD ..	1492	96.8	0.87	855 ¹⁾	3200	1.1	6.2	2.6	7	13	3100	
560		1MJ1 405-4AD ..	1492	96.9	0.88	950 ¹⁾	3583	1.1	6.2	2.55	7	15	3300	
630		1MJ1 407-4AD ..	1492	97.0	0.88	1070 ^{1) 2) 4)}	4031	1.1	6.3	2.6	7	15	3300	
710	450	1MJ1 453-4AD ..	1493	97.0	0.89	1190 ^{1) 2) 4)}	4540	0.95	6.3	2.5	7	24.5	4300	
800		1MJ1 455-4AD ..	1493	97.1	0.88	1355 ^{1) 2) 4)}	5114	1.0	6.6	2.6	7	24.5	4300	
900		1MJ1 457-4AD ..	1493	97.2	0.88	880 ●	5755	1.05	6.6	2.5	7	29.0	4800	

● Rated current at 690 V.

Order No. supplements

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier					
	50 Hz	230 VΔ / 400 VΔ	400 VΔ / 690 VY	500 VΔ / 500 VY	500 VΔ	IM B 3	Price supplement	IM B 5	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35
1MJ6 070 to 1MJ6 097	1	—	6	3	—	0	1	4	2	3 ³⁾	6
1MJ6 106 to 1MJ6 166	1	—	6	3	5	0	1	4	—	—	6
1MJ6 183 to 1MJ6 207	1	—	6	3	5	0	1	4	—	—	6
1MJ6 220 to 1MJ6 313	—	4	6	3	5	0	1	4	—	—	6
1MJ8 313 to 1MJ8 316	—	—	6	3	5	0	1	4	—	—	6
1MJ8 353 to 1MJ8 357	—	—	6	3	5	0	—	4	—	—	6
1MJ1 353 to 1MJ1 457	—	—	6	3	5	0	—	4	—	—	6

Other voltage and/or frequency, voltage identifier "9".

Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) For connection to 400 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

2) The motors have two terminal blocks.

3) Only up to 1MJ6 083.

4) For connection to 500 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

5) For 1MJ6 22 to 1MJ6 31 available from 01.02.03.

Squirrel-cage motors

1MJ · EEx de IIC degree of protection

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque torque	Torque Class	Moment of inertia J	Weight Design approx. kg
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 400 V A	Rated torque Nm				KL	kg m ²	
Temperature classes T1 to T4, IP 55 degree of protection, temperature class F													
0.25	71 M	1MJ6 073-6CA ..	870	63	0.7	0.82	2.7	2.2	3.1	2.2	16	0.0009	16
0.37	80 M	1MJ6 080-6CA ..	910	64	0.71	1.18	3.9	1.9	3.3	2	16	0.0015	35
0.55		1MJ6 083-6CA ..	900	64	0.74	1.67	5.8	2	3.5	2.1	16	0.0018	23
0.75	90 L	1MJ6 096-6CA ..	910	69	0.76	2.1	8.0	2.2	3.9	2.3	16	0.0028	32
1.1		1MJ6 097-6CA ..	905	72	0.75	2.95	12	2.4	4.3	2.4	16	0.0035	32
1.5	100 L	1MJ6 106-6CA ..	930	75	0.73	4.0	15	2.3	4.5	2.5	16	0.0063	39
2.2	112 M	1MJ6 113-6CA ..	945	76	0.76	5.5	22	2.2	4.8	2.5	16	0.011	52
3	132 S	1MJ6 130-6CA ..	945	78	0.75	7.4	30	2	4.8	2.2	16	0.015	78
4	132 M	1MJ6 133-6CA ..	945	79	0.76	9.6	40	2	5	2.4	16	0.019	85
5.5	132 M	1MJ6 134-6CA ..	950	83	0.76	12.6	55	2.2	5.4	2.5	16	0.025	92
7.5	160 M	1MJ6 163-6CA ..	960	86	0.72	17.5	75	2.1	5.1	2.5	16	0.041	134
11	160 L	1MJ6 166-6CA ..	960	87	0.74	24.5	109	2.3	5.5	2.5	16	0.049	167
15	180 L	1MJ6 186-6CA ..	970	89	0.83	29.5	148	2.6	6.3	2.4	16	0.20	190
18.5	200 L	1MJ6 206-6CA ..	975	90.2	0.82	36	181	2.6	6.3	2.3	16	0.29	240
22		1MJ6 207-6CA ..	975	90.8	0.83	42.5	215	2.5	5.7	2.3	16	0.33	255
30	225 M	1MJ6 223-6CA ..	978	92	0.84	56 ¹⁾	293	2.6	5.7	2.2	16	0.57	330
37	250 M	1MJ6 253-6CA ..	980	92.4	0.84	69	361	2.6	6	2.1	16	0.89	440
45	280 S	1MJ6 280-6CA ..	982	93	0.86	81	438	2.4	6	2.3	16	1.3	560
55	280 M	1MJ6 283-6CA ..	984	93.6	0.86	99	534	2.5	6.2	2.4	16	1.5	600
75	315 S	1MJ6 310-6CA ..	988	93.8	0.85	136	725	2.4	6.2	2.5	16	2.4	810
90	315 M	1MJ6 313-6CA ..	988	94.2	0.85	162	870	2.4	6.2	2.5	16	2.9	870
110	315 M	1MJ8 313-6AC ..	990	95.3	0.86	195	1061	2.1	6.8	2.3	10	4.8	1150
132	315 M	1MJ8 314-6AC ..	990	95.4	0.87	228	1273	2.1	6.6	2.3	10	4.8	1150
160	315 L	1MJ8 316-6AC ..	990	95.5	0.87	275	1543	2.1	6.6	2.3	10	6.0	1250
200	355	1MJ8 353-6AD ..	990	95.6	0.86	350	1929	1.1	6.5	2.2	7	8	1900
250		1MJ8 356-6AD ..	990	95.8	0.85	440	2412	1.1	6.5	2.2	7	9	2200
280	355	1MJ1 353-6AD ..	993	96.3	0.84	500	2693	1.05	5.8	2.4	7	10.5	2500
315		1MJ1 355-6AD ..	993	96.4	0.84	560	3029	1.0	5.7	2.35	7	12.5	2700
355		1MJ1 357-6AD ..	993	96.5	0.85	630	3415	1.0	5.6	2.3	7	12.5	2700
400	400	1MJ1 403-6AD ..	994	96.5	0.84	715	3844	1.0	5.6	2.3	7	18	3200
450		1MJ1 405-6AD ..	994	96.6	0.84	800 ¹⁾	4323	1.0	5.5	2.25	7	21.5	3500
500		1MJ1 407-6AD ..	994	96.7	0.84	890 ¹⁾	4805	1.05	5.7	2.3	7	21.5	3500
560	450	1MJ1 453-6AD ..	995	96.9	0.85	980 ¹⁾ ²⁾	5374	0.95	5.8	2.3	7	34.0	4600
630		1MJ1 455-6AD ..	995	97.0	0.85	1105 ¹⁾ ²⁾ ⁴⁾	6046	0.95	5.7	2.3	7	34.0	4600
710		1MJ1 457-6AD ..	995	97.1	0.85	1240 ¹⁾ ²⁾ ⁴⁾	6813	0.95	5.7	2.25	7	40.0	4900
780		1MJ1 458-6AD ..	995	97.2	0.85	790 ●	7486	1.0	6.0	2.4	7	40.0	4900

● Rated current at 690 V.

Order No. supplements

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier							
	50 Hz		IM B 3		Price supplement		IM B 5		IM V 1 With protective cover		IM B 14 With standard flange		IM B 14 With special flange
230 VΔ / 400 VY	400 VΔ	400 VΔ / 690 VY	500 VY	500 VΔ									
1MJ6 073 to 1MJ6 097	1	—	6	3	—	0	1	4	2	3 ³⁾	6		
1MJ6 106 to 1MJ6 166	1	—	6	3	5	0	1	4	—	—	6		
1MJ6 186 to 1MJ6 207	1	—	6	3	5	0	1	4	—	—	6		
1MJ6 223 to 1MJ6 313	—	4	6	3	5	0	1	4	—	—	6		
1MJ8 313 to 1MJ8 316	—	—	6	3	5	0	1	4	—	—	6		
1MJ8 353 to 1MJ8 356	—	—	6	3	5	0	—	4	—	—	6		
1MJ1 353 to 1MJ1 458	—	—	6	3	5	0	—	4	—	—	6		

Other voltage and/or frequency, voltage identifier “9”.

Order codes are required for this purpose (see “Technical information”, “Voltages, currents and frequencies”).

For other designs, see “Technical information”, “Designs”.

1) For connection to 400 V, parallel supply cables are required (see “Technical information”, “Connections, circuits and terminal blocks”).

2) The motors have two terminal blocks.
3) Only up to 1MJ6 083.

4) For connection to 500 V, parallel supply cables are required (see “Technical information”, “Connections, circuits and terminal blocks”).

5) For 1MJ6 22 to 1MJ6 31 available from 01.02.03.

Squirrel-cage motors

1MJ · EEx de IIC degree of protection

Selection and ordering data

Rated output kW	Size	Order No. Order No. supplement for voltage and design, see table below	Operating data at rated output						Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque torque	Torque Class	Moment of inertia J	Weight Design IM B 3 approx. kg
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 400 V A	Rated torque Nm							
Temperature classes T1 to T4, IP 55 degree of protection, temperature class F														
0.37	90 L	1MJ6 096-8CB ..	655	61	0.76	1.16	5.3	1.4	2.8	1.7	13	0.0025	28	
0.55		1MJ6 097-8CB ..	655	65	0.76	1.62	7.9	1.5	2.9	1.7	13	0.0035	30	
0.75	100 L	1MJ6 106-8CB ..	665	65	0.77	2.15	11	1.6	3.5	1.8	13	0.0053	40	
1.1		1MJ6 107-8CB ..	685	74	0.74	2.9	16	1.8	3.9	2	13	0.0070	48	
1.5	112 M	1MJ6 113-8CB ..	700	74	0.73	4.0	21	1.8	4.4	2	13	0.013	52	
2.2	132 S	1MJ6 130-8CB ..	695	74	0.72	6.0	30	1.7	4.2	2.1	13	0.014	78	
3	132 M	1MJ6 133-8CB ..	700	76	0.72	7.9	40	1.9	4.4	2.2	13	0.019	85	
4	160 M	1MJ6 163-8CB ..	715	81	0.72	9.9	54	2.1	4.8	2.3	13	0.035	119	
5.5	160 M	1MJ6 164-8CB ..	710	83	0.72	13.3	74	2.3	5.1	2.5	13	0.043	134	
7.5	160 L	1MJ6 166-8CB ..	715	84	0.72	17.9	100	2.6	5.8	2.8	13	0.062	159	
11	180 L	1MJ6 186-8CB ..	725	87	0.7	26	145	2	5	2.2	13	0.21	191	
15	200 L	1MJ6 207-8CB ..	725	87.5	0.78	32	198	2.1	5	2.2	13	0.37	263	
18.5	225 S	1MJ6 220-8CB ..	725	88.6	0.8	37.5	244	2.1	5	2.2	13	0.58	325	
22	225 M	1MJ6 223-8CB ..	725	90.1	0.81	43.5	290	2.1	5	2.2	13	0.66	350	
30	250 M	1MJ6 253-8CB ..	730	91.6	0.81	58	392	2.1	5	2.1	13	1.1	465	
37	280 S	1MJ6 280-8CB ..	732	92.7	0.82	70	483	2.2	5.5	2.2	13	1.4	570	
45	280 M	1MJ6 283-8CB ..	734	92.8	0.83	84	585	2.2	5.5	2.2	13	1.6	620	
55	315 S	1MJ6 310-8CB ..	738	93.1	0.82	104	712	2.2	6	2.4	13	2.3	780	
75	315 M	1MJ6 313-8CB ..	738	93.6	0.82	140	970	2.3	6.2	2.5	13	3.0	890	
90	315 M	1MJ8 313-8AB ..	740	94.4	0.79	175	1161	1.7	6.1	2	10	4.8	1150	
110	315 M	1MJ8 314-8AB ..	740	94.4	0.79	210	1420	1.7	6.1	2	10	4.8	1150	
132	315 L	1MJ8 316-8AB ..	740	94.4	0.8	255	1704	1.8	6.1	2	10	6.0	1250	
160	355	1MJ8 353-8AD ..	740	95.1	0.83	292	2065	1.3	5.3	2.2	7	12	1900	
200		1MJ8 356-8AD ..	740	95.4	0.83	365	2581	1.3	5.3	2.2	7	14.7	2250	
250	355	1MJ1 355-8AD ..	743	95.9	0.83	455	3213	1.1	5.4	2.25	7	12.5	2700	
280		1MJ1 357-8AD ..	743	96.0	0.82	515	3597	1.15	5.4	2.3	7	12.5	2700	
315	400	1MJ1 403-8AD ..	744	96.1	0.82	580	4043	1.0	5.4	2.35	7	17.5	3200	
355		1MJ1 405-8AD ..	744	96.2	0.82	645	4557	1.0	5.3	2.3	7	21.0	3500	
400		1MJ1 407-8AD ..	744	96.3	0.82	735	5136	0.95	5.2	2.25	7	21.0	3500	
450	450	1MJ1 453-8AE ..	745	96.6	0.84	800 ¹⁾	5769	0.85	5.3	2.25	5	35.5	4600	
500		1MJ1 455-8AE ..	745	96.7	0.83	900 ¹⁾	6411	0.85	5.2	2.2	5	35.5	4600	
560		1MJ1 457-8AE ..	745	96.7	0.84	1000 ^{1) 2) 4)}	7178	0.85	5.4	2.25	5	42.0	4900	
630		1MJ1 458-8AE ..	745	96.8	0.83	1130 ^{1) 2) 4)}	8075	0.9	5.3	2.25	5	42.0	4900	

5

Order No. supplements

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier					
	50 Hz	230 VΔ / 400 VΔ	400 VΔ / 690 VY	500 VY	500 VΔ	IM B 3	Price supplement				
						IM B 5	IM V 1 With protective cover	IM B 14 With standard flange	IM B 14 With special flange	IM B 35	
1MJ6 096 and 1MJ6 097	1	—	6	3	—	0	1	4	2	3³⁾	6
1MJ6 106 to 1MJ6 166	1	—	6	3	5	0	1	4	—	—	6
1MJ6 186 to 1MJ6 207	1	—	6	3	5	0	1	4	—	—	6
1MJ6 220 to 1MJ6 313	—	4	6	3	5	0	1	4	—	—	6
1MJ8 313 to 1MJ8 316	—	—	6	3	5	0	1	4	—	—	6
1MJ8 353 to 1MJ8 356	—	—	6	3	5	0	—	4	—	—	6
1MJ1 355 to 1MJ1 458	—	—	6	3	5	0	—	4	—	—	6

Other voltage and/or frequency, voltage identifier "9".
Order codes are required for this purpose (see "Technical information", "Voltages, currents and frequencies").

For other designs, see "Technical information", "Designs".

1) For connection to 400 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

2) The motors have two terminal blocks.
3) Only up to 1MJ6 083.

4) For connection to 500 V, parallel supply cables are required (see "Technical information", "Connections, circuits and terminal blocks").

5) For 1MJ6 22 to 1MJ6 31 available from 01.02.03.

Squirrel-cage motors

1MJ · EEx de IIC degree of protection

Order codes for special designs

Additional order suffix -Z with order code	Special designs	Motor type – Size		
		1MJ6	1MJ8	1MJ1
Motor protection				
A11	Motor protection with PTC thermistor and 3 embedded temperature sensors for tripping ¹⁾	71 – 315 ●	315 – 355	355 – 450
A12	Motor protection with PTC thermistor and 6 embedded temperature sensors for alarm and tripping ¹⁾	71 – 315 ▲	315 – 355 ▲	355 – 450 ▲
A15	Motor protection with PTC thermistor for converter-fed operation with 3 embedded temperature sensors for tripping ¹⁾	71 – 315 ●	315 – 355	355 – 450
A16	Motor protection with PTC thermistor for converter-fed operation with 6 embedded temperature sensors for alarm and tripping ¹⁾	71 – 315 ▲	315 – 355 ▲	355 – 450 ▲

● Anti-condensation heating (order codes K45, K46) up to size 160 L not available additionally.

▲ Anti-condensation heating (order codes K45, K46) not available additionally. Exception: 1MJ6 31.

Paint finish

K26	Special paintwork in RAL 7030 stone grey	225 – 315, standard design for 71 – 200 (without order code)	315 – 355	355 – 450
M16	Special paintwork in RAL 1002 sand yellow	71 – 200, For 225 – 315 with order code	315 – 355	355 – 450
M17	Special paintwork in RAL 1013 pearl white	Y54 and special paintwork RAL . . .	With order code Y54 and special paintwork RAL . . .	
M18	Special paintwork in RAL 3000 flame red			
K27	Special paintwork in RAL 6011 mignonette green			
M19	Special paintwork in RAL 6021 pale green			
M20	Special paintwork in RAL 7001 silver grey			
K28	Special paintwork in RAL 7031 bluish grey			
L42	Special paintwork in RAL 7032 pebble grey			
M21	Special paintwork in RAL 7035 light grey			
M22	Special paintwork in RAL 9001 cream			
M23	Special paintwork in RAL 9002 grey white			
L43	Special paintwork in RAL 9005 jet black			
Y54 ● And special paintwork RAL....	Special paintwork in other colors: RAL 1015, 1019, 2003, 2004, 3007, 5007, 5009, 5010, 5012, 5015, 5017, 5018, 5019, 6019, 7000, 7004, 7011, 7016, 7022, 7033	71 – 315	315 – 355	355 – 450
Y53 ● And standard paintwork RAL....	Standard paintwork in other colours	225 – 315	315 – 355	355 – 450
K23	Unpainted (only cast iron parts primed)	71 – 315	315 – 355	355 – 450
K24	Unpainted, only primed	71 – 200	–	–

● Additional plain text required.

1) For appropriate certified 3RN1 tripping unit, see Catalog NS K.

RAL No.	Name of colour	RAL No.	Name of colour
1015	Light ivory	5017	Traffic blue
1019	Grey beige	5018	Turquoise blue
2003	Pastel orange	5019	Capri blue
2004	Pure orange	6019	Pastel green
3007	Wine red	7000	Squirrel grey
5007	Black blue	7004	Signal grey
5009	Azure blue	7011	Iron grey
5010	Gentian blue	7016	Anthracite grey
5012	Light blue	7022	Umbra grey
5015	Sky blue	7033	Cement grey

Order codes for special designs

Additional order suffix -Z with order code	Special designs	Motor type – Size		
		1MJ6	1MJ8	1MJ1
Mechanical design				
K09	Terminal box on RHS (view onto drive end)	90 – 315	315 – 355	355 – 450
K10	Terminal box on LHS (view onto drive end)	90 – 315	315 – 355	355 – 450
K83	Rotation of terminal box by 90°, inserted from non-drive end	71 – 315	315 – 355	355 – 450
K84	Rotation of terminal box by 90°, inserted from non-drive end	71 – 315	315 – 355	355 – 450
K85	Rotation of terminal box by 180°	71 – 315	315 – 355	355 – 450
K01	Vibrational severity grade R	71 – 315	315 – 355	355 – 450
K16	Second standard shaft end ¹⁾	71 – 315	315 – 355	355 – 450
K17	Radial sealing ring on drive end with flange types ²⁾	71 – 315	315 – 355	355 – 450
K20	Bearings for increased cantilever forces	180 – 250 Vibrational severity grade R on request.	–	–
K40	Regreasing device	180 – 250, standard version from 280 upwards	Standard design	Standard design
K30	VIK version ³⁾	71 – 315	315 – 355	355
K31	Extra rating plate, loose	71 – 315	315 – 355	355 – 450
Y82 •	Extra rating plate	71 – 315	315 – 355	355 – 450
And order codes				
K37	Low noise version for 2-pole motors with clockwise rotation ⁴⁾	132 – 315	315 – 355	355 – 450
K38	Low noise version for 2-pole motors with anti-clockwise rotation ⁴⁾	132 – 315	315 – 355	355 – 450
K45	Anti-condensation heater for 230 V	71 – 315 • ▲	315 – 355 ▲	355 – 450 ▲
K46	Anti-condensation heater for 115 V	71 – 315 • ▲	315 – 355 ▲	355 – 450 ▲
L99	Wire-lattice pallet	71 – 160	–	–

- PTC thermistor (order codes A11, A15) up to size 160 L not available additionally.

▲ 6 PTC thermistors (order codes A12, A16) not available additionally.
Exception: 1MJ6 31.

5

Certification

B02	Factory test certificate 2.3 acc. to EN 10 204	71 – 200	–	–
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Marine version – “Operation below deck”^{5) 6)}

E11	Certified according to GL (Germanischer Lloyd) Germany, KT 45 °C, Temperature class F used as F	71 – 315	–	–
E21	Certified according to LRS (Lloyd's Register of Shipping) Great Britain, KT 45 °C, Temperature class F used as F	71 – 315	–	–
E31	Certified according to BV (Bureau Veritas) France, KT 45 °C, Temperature class F used as F	71 – 315	–	–
E51	Certified according to DNV (Det Norske Veritas) Norway, KT 45 °C, Temperature class F used as F	71 – 315	–	–

- Additional plain text required.

1) For 1MJ6 and vertical designs from BG 180 M upwards available on request, low-noise version (2-pole) not possible. Version with protective cover not possible.

2) Not possible for size IM V 3, only for 4-pole to 8-pole motors for size 180 M upwards.

3) For 2-pole motors from size 315 S upwards, additional low-noise version is required. Order code K37 or K38.

4) The motors are up to 80 mm longer than normal. Second shaft end not possible.

5) Factory test certificate 2.3 in accordance with EN 10 204 is supplied. Individual acceptance test must be specified in plain text on ordering if required (price supplement).

6) For 1MJ motors of class F used as class B, derating may be necessary.

Squirrel-cage motors

1MJ · EEx de IIC degree of protection

Notes

5

Squirrel-cage motors

Sector solutions

Selection and ordering data



Marine motors	
<i>Overview</i>	
6/2	Standards and specifications
6/2	Mechanical design
6/3	Certificates
Smoke extraction motors	
<i>Overview</i>	
6/4	Low-voltage motors for use in smoke and heat extraction machinery
6/4	Technical design
Selection and ordering data	
<u>Temperature/time classes F200 and F300</u>	
6/7	• Forced-air cooled squirrel-cage motors 1PP7, 1PP5, 1PP6, 2-pole, 4-pole, sizes 80 to 315
6/8	• Forced-air cooled squirrel-cage motors 1PP7, 1PP5, 1PP6, 6-pole, sizes 80 to 315
6/9	• Self-cooled squirrel-cage motors 1LA7, 1LA5, 1LG6, 2-pole, 4-pole, sizes 80 to 315
6/10	• Self-cooled squirrel-cage motors 1LA7, 1LA5, 1LG6, 6-pole, sizes 80 to 315
<u>Temperature-time class F400</u>	
6/11	• Forced-air cooled squirrel-cage motors 1PP6 2-pole, 4-pole, sizes 100 to 315
6/12	• Forced-air cooled squirrel-cage motors 1PP6 6-pole sizes 100 to 315
6/13	• Self-cooled squirrel-cage motors 1LA6, 1LG6, 2-pole, 4-pole, sizes 100 to 315
6/14	• Self-cooled squirrel-cage motors 1LA6, 1LG6, 6-pole, sizes 100 to 315
Order codes for special designs	
6/15	• Windings and motor protection
6/15	• Paint finish
6/15	• Mechanical design
6/15	• Notes on safety and commissioning/certification
6/15	• Additional suffixes

Squirrel-cage motors

Sector solutions · Marine motors

Overview

Low-voltage motors in the marine version can be used as auxiliary drives below deck on ships and in the offshore industry. The thermal utilization of the motors is matched to the generally higher ambient temperatures on board ship. If the application demands compliance with additional regulations, e.g. protection against explosion hazards, the appropriate motor series must be chosen – ADD from previous sections of this catalogue.

The classification authorities categorize the auxiliary drives on board ships into "essential services" and "non-essential services". Acceptance testing by a representative of the relevant classification authority is required for motors used in essential auxiliary drives, depending on their output.

In special cases, in addition to the acceptance test, supervision of construction may also be required. Supervision of construction involves monitoring of the separate manufacturing stages of a motor by an inspector from the classification authority.

The charges of the classification authority incurred for acceptance testing or acceptance testing with supervision of construction will be invoiced separately.

Approved motor series types with aluminium (Alu) and cast iron (C iron) housings to the IP55 and IP56 (non-heavy sea) degrees of protection in accordance with Sections 3, 4 and 5.²⁾

Motors	Sizes																Output range ¹⁾		
	56	63	71	80	90	100	112	132	160	180	200	225	250	280	315	355	400	450	kW
1LA7/1PP7	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	0.06 – 18.5
1LA5/1PP5																			11 – 45
1LA9/1PP9	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	0.06 – 53
1LA6						C iron	C iron	C iron	C iron										0.75 – 18.5
1LG4/1PP4						C iron	C iron	11 – 200											
1LG6/1PP6						C iron	C iron	11 – 200											
1LA8/1PQ8³⁾																			C iron C iron C iron C iron 160 – 1000
1MA7	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	Alu	0.12 – 16
1MA6						C iron	C iron	1.3 – 165											
1MJ6						C iron	C iron	0.25 – 132											

Standards and specifications

Due to the particular climatic conditions, marine motors also comply with the IEC 92-301 standard (electrical installation on board ship) in addition to the regulations for standard motors. In addition, the motors are manufactured and type approved in accordance with the regulations of the following marine classification authorities:

BV Bureau Veritas (France)
GL Germanischer Lloyd (Germany)
LRS Lloyds Register of Shipping (Great Britain)
DNV Det Norske Veritas (Norway)

Furthermore, the motors can be produced in accordance with the regulations of the following classification authorities (however without a type approval certificate):

ABS American Bureau of Shipping (USA)
RINA Registro Italiano Navale (Italy)
CCS Chinese Classification Authority (China), only applicable to 1LA8/1PQ8

Regulations of the individual classification authorities:

IEC/EN / classification authority	Coolant temperature KT °C	Temperature-rise limit for temperature class F K	Acceptance testing for drives for essential services above ⁴⁾ kW	Supervision of construction for drives for essential services kW	Order code for type approved motors of temperature class F utilization to F ⁵⁾
IEC/EN 60034-1	40	105	–	–	–
GL	45	100	≥ 50	–	E11
LRS	45	95	≥ 100	≥ 100	E21
BV	45	100	≥ 50	–	E31
DNV	45	95	≥ 300	–	E51
ABS	50	95	≥ 100	≥ 100	–
RINA	45	95	≥ 50	–	–
CCS	45	95	≥ 50	–	–

1) Output data with reference to 50 Hz mains operation at KT 45 °C in temperature class F, used as F.

2) Derating may be necessary in the case of 1MA and 1MJ motors, (E) Exn (Zone 2) motors and 1LA9 motors with increased power.

3) The 1LA8 and 1PQ8 motors do not have a type approval certificate (individual acceptance test required).

4) Individual acceptance tests are not required below the specified outputs.

5) Utilization of temperature class F according to B can cause derating.

Mechanical versions

In general, all marine motors have an external earthing terminal. The rating plate features the relevant marine classification authority complete with the associated cooling air temperature. In addition, a factory test certificate 2.3 to EN 10 204 is supplied that includes the certificate number of the marine classification authority.

Standard version to IP55 degree of protection, optionally IP56 (non-heavy sea) can be ordered with order code **K52**.

Motors can be supplied, depending on the motor series, in corrosion-resistant aluminium housing and in rugged cast iron version. The motors with an aluminium housing in the flange version have a rugged cast iron flange.

Increased cooling air temperature

The motors in temperature class F have a thermal reserve. Derating may be necessary with cooling air temperatures higher than KT45° C (price supplement). When ordering, specify Order No. with **-Z** and plain text. The permissible output power can be determined using the following table.

	Cooling air temperature KT °C	45	50	55	60
Reduction factor	1.00	0.96	0.92	0.87	

Higher efficiency

The efficiency of marine motors is similar to that of energy-saving motors. This ensures energy-saving operation on board ship.

Windings and motor protection

For coil and bearing monitoring, the motors can be equipped with PTC thermistors, temperature sensors and resistance thermometers. Motors can be equipped with anti-condensation heating if winding are to be exposed to condensation.

Paint finish

The special paint finish range for the "worldwide" climate group according to DIN IEC 60 721-2-1 offers high corrosion protection and is especially suitable for installation of motors in a corrosive sea atmosphere or in rooms that are constantly damp. Special paint finish is standard for all 1LA5, 1LA6, 1LA7, 1LA9, 1MA7 motors as well as 1MA6/1MJ6 up to size 200L.

Special paint finish can be ordered for 1LG4/6 and 1MA6 in sizes 225S – 315M depending on the RAL colour shade as an option.

Ordering example

Squirrel-cage motor IP 55, 1500 rpm, 55 kW, efficiency class EFF1, 400VΔ /690 VY, 50 Hz, IM B3 type, marine version essential drive with acceptance test and certificate from Germanischer Lloyd, cooling-air temperature 45 °C, special paint finish RAL 5007

In order, specify:

1LG6 253-4AA60-Z
E11+Y54

Plain text (E-line):
GL-individual acceptance test,
special paint finish RAL 5007

Certificates



Squirrel-cage motors

Sector solutions · Smoke extraction motors

Overview

Low-voltage motors for use in smoke and heat extraction machinery to EN 12 101-3

The new low-voltage motors with squirrel-cage rotors for use in smoke and heat extraction machinery in accordance with EN 12 101-3 are mainly designed for driving Smoke Extraction fans, so they are also known as smoke extraction motors. They are mainly used in buildings that demand smoke monitoring due to their shape and design. Some typical application examples are tunnels, single and multi-storey shopping centres, industrial buildings and warehouses, building complexes and atriums, theatres, enclosed car parks and stairways.

The dual function motors function in

- operation under normal conditions as a fan motor.
- fault operation (at high ambient temperatures, specified minimum operating times) to keep access and escape routes smoke-free, to aid fire fighting by creating a smoke-free layer, to delay and/or prevent spread of a fire, to protect devices and equipment, to reduce the heat stress of components during a fire, and to reduce secondary fire damage due to thermal decomposition products and hot gases.

Temperature/time classification to EN 12 101-3

- **F200** or 200 °C for 120 min
- **F300** or 300 °C for 60 min
- **F400** or 400 °C for 120 min

Testing and test certification

The smoke extraction motor series listed in the selection tables have been tested by the "Research and test laboratory of the Department of Climate Control and Building Services of the Technical University of Munich" in accordance with EN 12 101-3.

F200/F300 was generally tested at 300 °C for 120 min.

The relevant test certificates were issued.

Supervised construction approvals for smoke extraction units – Certification procedure

- Use of smoke extraction motors in smoke extraction fans with existing supervised construction approval in accordance with EN 12 101-3.

1. Application by the fan manufacturer to the DIBT (Deutsches Institut für Bau-technik – German Institute for Building Installation Systems) in Berlin for installing the motors tested to EN 12 101-3 in an already existing approval for the smoke extraction fans.

2. DIBT requests an expert opinion concerning the suitability of the tested motors from the fan testing authority.

3. DIBT includes the motors in the supervised construction approvals after receiving a satisfactory expert opinion.

Initial approval of smoke extraction units

In this case, complete assemblies (motor + fan) must be tested at an approved test center (e.g. TU Munich) before submission of an application for the supervised construction approval to the DIBT.

Technical design

Motor series

The smoke extraction motors based on basic series 1LA and 1LG

- Basic series 1PP.; forced-air cooled, version without internal fan, located in air flow of the driven fan
- Sub-series 1LA. or 1LG.; self-cooled, version with internal fan (metal)

The motors are manufactured with cast iron or aluminium housings in accordance with their fire protection classes.

Standards and specifications

Also applicable:

Permanently installed fire fighting equipment EN 12 101-3: Equipment for controlling smoke and heat flow, Part 3, Specification for smoke and heat extraction units.

Voltage and frequency

Rated voltages according to IEC 60034-1

230 V Δ 50 Hz

400 V Δ 50 Hz and 400 VY 50 Hz

500 V Δ 50 Hz and 500 VY 50 Hz

690 VY 50 Hz

Abnormal voltages and 60 Hz, on request.

Labelling

- Rating plate
For the listed rated voltages with 50 Hz performance data.
- Fault plate showing:
Number and year of issue of the European standard, temperature/time class, minimum operating time.

All labels, corrosion resistant, second set of labels loose.

Rated output, operating mode, number of poles

The rated output applies for continuous operation (normal operation) to IEC 60034-1, at a frequency of 50 Hz, cooling air temperature up to 40 °C, installation height up to 1000 m above sea level. For a higher cooling air temperature and installation altitude, derating is required (for reduction factors, see "Technical information").

Fault operation:

In contrast to normal operation, there is fault operation to EN 12 101-3.

At the end of the fault time, the motor may be inoperable. De-installation of the motor followed by an overhaul or replacement with a new motor is therefore mandatory.

Any "thermal motor protection" implemented must be deactivated in the event of a fault.

No. of poles: 2, 4 and 6; more poles and pole-change, on request.

Insulation arrangement

Special insulation arrangements, matched to the respective temperature/time classes. Maximum thermal utilization according to temperature class F.

Insulation of the smoke extraction motors is designed to permit operation with a converter at voltages \leq 500 V without restrictions. This also applies for operation with a PWM converter with Voltage peak times $t_s > 0.1 \mu s$ at the motor terminals.

Converter-fed operation is not permitted in the event of emergency situation.

Technical design (continued)

Water drain holes

Always provided; but sealed in accordance with IP55 degree of protection.

Bearing plates

All bearing plates are cast iron.

Connection method

Protruding non-metallic sheathed cable, without terminal block, with cover plate or funnel cap. Cable length is dependent on the axle height.

Sizes 80 to 112: 0.5 m

Sizes 132 to 225: 1.5 m

Sizes 250 to 315: 3.0 m

Special designs of connecting cables, on request.

Position of the connecting cable

- Sizes 80 to 160:
 - On the top at NDE as standard. Optionally left or right on the NDE (for foot-mounted type with screw mounted feet).
- Sizes 180 to 315:
 - Flange foot-mounted types: On the top at NDE as standard. Optionally left or right at NDE.
 - All foot-mounted types: On the top at DE as standard with connecting cable looped through in the direction of NDE. Optionally left or right on the DE with connecting cables looped through in the direction of NDE (for foot-mounted types with screw-mounted feet).

Earthing by means of protruding cable

Minimum necessary cooling air quantities during normal operation

1LA7/1PP7 motors, sizes 80 to 160; 1LA5/1PP5, sizes 180 to 225; 1LA6/1PP6, sizes 100 to 160

Size	Air flow required in m ³ /min for number of poles		
	2	4	6
80	1.74	0.90	0.60
90	3.12	1.56	1.08
100	3.96	1.86	1.26
112	4.98	3.0	1.98
132	8.04	5.04	3.36
160	12.90	9.54	6.36
180	10.98	10.98	7.267
200	15.12	13.02	8.58
225	12.12	13.02	8.58

In the motor version without an integral fan (1PP5, 6, 7), the motor lies in the air flow of the driven fan which must

drive the minimum cooling air quantity over the motor housing.

Bearing, grease

Special bearing arrangements matched to the respective temperature class.

In accordance with fire protection classes F200/F300, F400, and the individual sizes, grooved ball bearing Series of 62 or 63 clearance.

Fixed bearing at DE.

Nominal bearing service life L_{10h} (fan drive) at least 20000 hours at maximum permitted rated load.

Motors in sizes 80 to 250 are usually permanently greased.

Paint finish

The motors are given a two-part paint finish as standard (world-wide) in the color shade RAL 7030.

1LG6/1PP6 motors, sizes 180 to 315:

Size	Air flow required in m ³ /min for number of poles		
	2	4	6
180	12.0	13.0	8.5
200	20.5	17.0	11.0
225	20.5	18.5	12.5
250	25.5	22.5	17.0
280	24.5	28.0	21.5
315	47.0	36.0	26.5

With larger quantities of cooling air, the operating temperature of the motor can be reduced.

Squirrel-cage motors

Sector solutions · Smoke extraction motors

Overview

Technical design (continued)

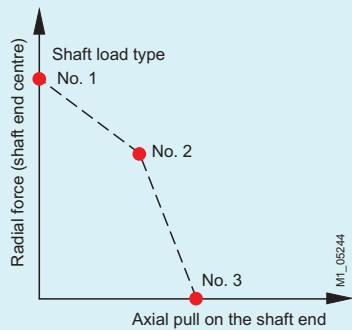
Permissible load on the shaft end

Permissible load in the axial and radial direction, the data is valid except sizes 280 and 315 for any number of poles.

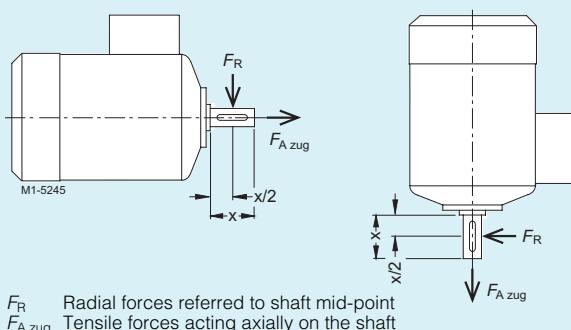
Higher loading with appropriate bearings have not been tested.

Size	No. of poles	DE bearing	Type of loading on the shaft	Shaft horizontally		Shaft vertically downwards	
				No.	F_R N	F_A pull N	F_R N
80	2 – 8	6004	1 Radial force	400	0	360	0
			2 Radial force + axial pull	150	130	40	170
			3 Axial pull	0	215	0	200
90	2 – 8	6205	1 Radial force	650	0	590	0
			2 Radial force + axial pull	250	205	100	260
			3 Axial pull	0	343	0	310
100	2 – 8	6206	1 Radial force	890	0	820	0
			2 Radial force + axial pull	400	265	300	265
			3 Axial pull	0	490	0	430
112	2 – 8	6206	1 Radial force	870	0	760	0
			2 Radial force + axial pull	400	250	250	260
			3 Axial pull	0	480	0	405
132	2 – 8	6208	1 Radial force	1070	0	810	0
			2 Radial force + axial pull	450	315	250	300
			3 Axial pull	0	580	0	450
160	2 – 8	6209	1 Radial force	1440	0	1210	0
			2 Radial force + axial pull	700	450	500	335
			3 Axial pull	0	825	0	620
180	2 – 8	6210	1 Radial force	1540	0	1020	0
			2 Radial force + axial pull	770	430	550	220
			3 Axial pull	0	815	0	455
200	2 – 8	6212	1 Radial force	2050	0	1450	0
			2 Radial force + axial pull	1200	770	500	460
			3 Axial pull	0	1350	0	720
225	2 – 8	6213	1 Radial force	2460	0	1910	0
			2 Radial force + axial pull	1370	900	500	660
			3 Axial pull	0	1560	0	920
250	2 – 8	6215	1 Radial force	2770	0	1490	0
			2 Radial force + axial pull	1400	840	500	460
			3 Axial pull	0	1500	0	710
280	2 – 8	6217	1 Radial force	3180	0	3000	0
			2 Radial force + axial pull	1700	1820	600	1085
			3 Axial pull	0	2630	0	1380
315	2 – 8	6219	1 Radial force	3470	0		
			2 Radial force + axial pull	1750	2200	On request	On request
			3 Axial pull	0	3000		

Load types



Forces on shaft end



Squirrel-cage motors

Sector solutions · Smoke extraction motors

Selection and ordering data

Rated output kW	Size	Order No. Order No.- supplements for voltage and size, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque	Torque Class	Moment of inertia J	Weight kg m ²	Size IM B 3 approx.
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 400 V A	Rated torque Nm							

Forced-air cooled motors 1PP7, 1PP5 (aluminium housing) and 1PP6 (cast iron housing)
IP 55 degree of protection, type of cooling IC 411, temperature/time classes F200 and F300

EN 12 101-3

3000 rpm, 2-pole, 50 Hz													
0.75 1.1	80 M	1PP7 080-2TA.. 1PP7 083-2TA..	2855 2845	73.0 77.0	0.86 0.87	1.73 2.40	2.5 3.7	2.3 2.6	5.6 6.1	2.4 2.7	16 16	0.00085 0.0011	9.8 11.5
1.5 2.2	90 S 90 L	1PP7 090-2TA.. 1PP7 096-2TA..	2860 2880	79.0 82.0	0.85 0.85	3.25 4.55	5.0 7.3	2.4 2.8	5.5 6.3	2.7 3.1	16 16	0.0015 0.002	14.6 17.4
3	100 L	1PP7 106-2TA..	2890	84.0	0.85	6.1	9.9	2.8	6.8	3.0	16	0.0038	23
4	112 M	1PP7 113-2TA..	2905	86.0	0.86	7.8	13	2.6	7.2	2.9	16	0.0055	31
5.5 7.5	132 S	1PP7 130-2TA.. 1PP7 131-2TA..	2925 2930	86.5 88.0	0.89 0.89	10.3 13.8	18 24	2.0 2.3	5.9 6.9	2.8 3.0	16 16	0.016 0.021	44 52
11 15 18.5	160 M 160 L	1PP7 163-2TA.. 1PP7 164-2TA.. 1PP7 166-2TA..	2940 2940 2940	89.5 90.0 91.0	0.88 0.90 0.91	20 26.5 32.5	36 49 60	2.1 2.2 2.4	6.5 6.6 7.0	2.9 3.0 3.1	16 16 16	0.034 0.04 0.052	71 82 95
22	180 M	1PP5 183-2TA..	2940	91.7	0.88	39	71	2.5	6.9	3.2	16	0.077	119
30 37	200 L 200 L	1PP5 206-2TA.. 1PP5 207-2TA..	2945 2945	92.3 92.8	0.89 0.89	53 65	97 120	2.4 2.4	7.2 7.7	2.8 2.8	16 16	0.14 0.16	171 194
45	225 M	1PP5 223-2TA..	2960	93.6	0.89	78	145	2.8	7.7	3.4	16	0.2	229
55	250 M	1PP6 253-2TB..	2975	95.1	0.90	94	177	2.5	7.4	3.3	13	0.466	405
75 90	280 S 280 M	1PP6 280-2TB.. 1PP6 283-2TB..	2975 2975	95.3 95.6	0.91 0.90	126 152	241 289	2.6 3.0	7.5 7.5	2.9 3.0	13 13	0.832 1.00	510 595
110 132 160 200	315 S 315 M 315 L 315 L	1PP6 310-2TB.. 1PP6 313-2TB.. 1PP6 316-2TB.. 1PP6 317-2TB..	2985 2984 2984 2984	95.9 96.1 96.3 96.4	0.90 0.91 0.93 0.93	186 220 260 325	352 422 512 640	2.6 2.7 2.8 2.5	7.5 7.4 7.5 7.0	3.2 3.0 3.1 2.8	13 13 13 13	1.39 1.62 2.09 2.46	770 895 1035 1225
1500 rpm, 4-pole, 50 Hz													
0.55 0.75	80 M	1PP7 080-4TA.. 1PP7 083-4TA..	1395 1395	67.0 72.0	0.82 0.81	1.45 1.86	3.7 5.1	2.2 2.3	3.9 4.2	2.2 2.3	16 16	0.0015 0.0018	9.6 11
1.1 1.5	90 S 90 L	1PP7 090-4TA.. 1PP7 096-4TA..	1415 1420	77.0 79.0	0.81 0.81	2.55 3.4	7.4 10	2.3 2.4	4.6 5.3	2.4 2.6	16 16	0.0028 0.0035	14 17.3
2.2 3	100 L	1PP7 106-4TA.. 1PP7 107-4TA..	1420 1420	82.0 83.0	0.82 0.82	4.7 6.4	15 20	2.5 2.7	5.6 5.6	2.8 3.0	16 16	0.0048 0.0058	23 26
4	112 M	1PP7 113-4TA..	1440	85.0	0.83	8.2	27	2.7	6.0	3.0	16	0.011	33
5.5 7.5	132 S 132 M	1PP7 130-4TA.. 1PP7 133-4TA..	1455 1455	86.0 87.5	0.81 0.82	11.4 15.2	36 49	2.5 2.7	6.3 6.7	3.1 3.2	16 16	0.018 0.024	46 52
11 15	160 M 160 L	1PP7 163-4TA.. 1PP7 166-4TA..	1460 1460	88.5 90.0	0.84 0.84	21.5 28.5	72 98	2.2 2.6	6.2 6.5	2.7 3.0	16 16	0.04 0.052	70 95
18.5 22	180 M 180 L	1PP5 183-4TA.. 1PP5 186-4TA..	1460 1460	90.5 91.2	0.83 0.84	35 41	121 144	2.3 2.3	7.5 7.5	3.0 3.0	16 16	0.13 0.15	116 130
30	200 L	1PP5 207-4TA..	1465	91.8	0.86	55	196	2.6	7.0	3.2	16	0.24	176
37	225 S	1PP5 220-4TA..	1470	92.9	0.87	66	241	2.8	7.0	3.2	16	0.32	221
45	225 M	1PP5 223-4TA..	1470	93.4	0.87	80	293	2.8	7.7	3.3	16	0.36	247
55	250 M	1PP6 253-4TA..	1485	94.9	0.86	97	354	2.9	7.5	3.3	16	0.856	445
75 90	280 S 280 M	1PP6 280-4TA.. 1PP6 283-4TA..	1486 1485	95.0 94.9	0.87 0.88	132 156	482 579	2.6 2.5	7.3 7.3	2.8 2.8	16 16	1.39 1.71	555 655
110 132 160 200	315 S 315 M 315 L 315 L	1PP6 310-4TA.. 1PP6 313-4TA.. 1PP6 316-4TA.. 1PP6 317-4TA..	1488 1488 1488 1488	95.3 95.5 95.9 95.7	0.87 0.87 0.87 0.88	192 230 275 345	706 847 1027 1284	2.6 2.7 2.9 3.2	6.9 7.0 7.4 7.3	2.8 2.7 2.9 3.1	16 16 16 16	2.31 2.88 3.46 4.22	790 945 1085 1285

Forced-air cooled (surface cooled) motors without external fan and fan cover; the motors are located in the air flow of the driven fan and are adequately cooled during operation under normal conditions.

Order No. supplement

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier			
	50 Hz		IM B 3		IM B 5	Price supplement		IM V1 without protective cover	IM B 35
	230 VΔ / 400 VY	400 VΔ / 690 VY	500 VY	500 VΔ		1	1		
1PP7 080 to 1PP7 096	1	6	3	—	0	1	1	6	
1PP7 106 to 1PP7 166	1	6	3	5	0	1	1	6	
1PP5 183 to 1PP5 223	1	6	3	5	0	1	1	6	
1PP6 253 to 1PP6 313	1	6	3	5	0	1	1	6	
1PP6 316 to 1PP6 318	—	6	—	5	0	1 ¹⁾	8	6	

1) Additional radial supports must be provided.

For other designs, see "Technical information", "Designs".

Squirrel-cage motors

Sector solutions · Smoke extraction motors

Selection and ordering data

Rated output kW	Size	Order No. Order No.- supplements for voltage and size, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque torque	Torque Class	Moment of inertia <i>J</i>	Weight Size IM B 3 approx.
			Rated speed rpm	Efficiency η	Power factor p.f.	Rated current at 400 V	Rated torque Nm						

Forced-air cooled motors 1PP7, 1PP5 (aluminium housing) and 1PP6 (cast iron housing)
IP 55 degree of protection, type of cooling IC 411, temperature/time classes F200 and F300

EN 12 101-3

1000 rpm, 6-pole, 50 Hz													
0.37	80 M	1PP7 080-6TA..	920	62.0	0.72	1.20	3.9	1.9	3.1	2.1	16	0.0015	9.6
0.55		1PP7 083-6TA..	910	67.0	0.74	1.60	5.8	2.1	3.4	2.2	16	0.0018	11
0.75	90 S	1PP7 090-6TA..	915	69.0	0.76	2.1	7.8	2.2	3.7	2.2	16	0.0028	14.2
1.1	90 L	1PP7 096-6TA..	915	72.0	0.77	2.9	11.5	2.3	3.8	2.3	16	0.0035	17.4
1.5	100 L	1PP7 106-6TA..	925	74.0	0.75	3.9	15	2.3	4	2.3	16	0.0063	25
2.2	112 M	1PP7 113-6TA..	940	78.0	0.78	5.2	22	2.2	4.6	2.5	16	0.011	29
3	132 S	1PP7 130-6TA..	950	79.0	0.76	7.2	30	1.9	4.2	2.2	16	0.015	44
4	132 M	1PP7 133-6TA..	950	80.5	0.76	9.4	40	2.1	4.5	2.4	16	0.019	49
5.5		1PP7 134-6TA..	950	83.0	0.76	12.8	55	2.3	5	2.6	16	0.025	57
7.5	160 M	1PP7 163-6TA..	960	86.0	0.74	17	75	2.1	4.6	2.5	16	0.041	78
11	160 L	1PP7 166-6TA..	960	87.5	0.74	24.5	109	2.3	4.8	2.6	16	0.049	104
15	180 L	1PP5 186-6TA..	970	89.5	0.77	31.5	148	2.0	5.2	2.4	16	0.15	130
18.5	200 L	1PP5 206-6TA..	975	90.2	0.77	38.5	181	2.7	5.5	2.8	16	0.24	176
22		1PP5 207-6TA..	975	90.8	0.77	45.5	215	2.8	5.5	2.9	16	0.28	196
30	225 M	1PP5 223-6TA..	978	91.8	0.77	61	294	2.8	5.7	2.9	16	0.36	237
37	250 M	1PP6 253-6TA..	984	92.6	0.84	69	359	2.7	6.4	2.4	16	0.934	390
45	280 S	1PP6 280-6TA..	986	92.8	0.86	81	436	2.5	6.6	2.5	16	1.37	500
55	280 M	1PP6 283-6TA..	986	92.7	0.87	99	533	2.5	6.5	2.5	16	1.65	550
75	315 S	1PP6 310-6TA..	990	93.9	0.85	136	723	2.7	7.0	2.9	16	2.50	740
90	315 M	1PP6 313-6TA..	990	94.3	0.86	160	868	2.7	7.3	3.0	16	3.20	915
110	315 L	1PP6 316-6TA..	990	94.7	0.87	192	1061	2.6	7.4	3.0	16	4.02	990
132	315 L	1PP6 317-6TA..	988	94.8	0.87	230	1276	3.0	7.2	2.8	16	4.71	1160
160	315 L	1PP6 318-6TA..	990	95.0	0.86	285	1543	3.1	7.5	3.0	16	5.39	1225

Forced-air cooled (surface cooled) motors without external fan and fan cover; the motors are located in the air flow of the driven fan and are adequately cooled during operation under normal conditions.

Order No. supplement

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier				
	50 Hz					IM B 3	Price supplement			IM B 35
	230 V Δ / 400 V Δ	400 V Δ / 690 V Δ	500 V γ	500 V Δ	IM B 5		IM V1 without protective cover			
1PP7 080 to 1PP7 096	1	6	3	—	0	1	1	1	6	
1PP7 106 to 1PP7 166	1	6	3	5	0	1	1	1	6	
1PP5 183 to 1PP5 223	1	6	3	5	0	1	1	1	6	
1PP6 253 to 1PP6 313	1	6	3	5	0	1	1	1	6	
1PP6 316 to 1PP6 318	—	6	—	5	0	1 ¹⁾	8	8	6	

For other designs, see "Technical information", "Designs".

1) Additional radial supports must be provided.

Squirrel-cage motors

Sector solutions · Smoke extraction motors

Selection and ordering data

Rated output kW	Size	Order No. Order No.- supplements for voltage and size, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current multiple of the rated current	Stalling torque multiple of the rated torque	Torque Class	Moment of inertia <i>J</i>	Weight kg m ²	Size IM B 3 approx.
			Rated speed rpm	Efficiency η	Power factor p.f.	Rated current at 400 V	Rated torque Nm							

Self-cooled motors 1LA7, 1LA5 (aluminium housing) and 1LG6 (cast iron housing)
IP 55 degree of protection, type of cooling IC 411, temperature/time classes F200 and F300

EN 12 101-3

3000 rpm, 2-pole, 50 Hz													
0.75	80 M	1LA7 080-2TA..	2855	73.0	0.86	1.73	2.5	2.3	5.6	2.4	16	0.00085	10.2
1.1		1LA7 083-2TA..	2845	77.0	0.87	2.40	3.7	2.6	6.1	2.7	16	0.0011	11.9
1.5	90 S	1LA7 090-2TA..	2860	79.0	0.85	3.25	5.0	2.4	5.5	2.7	16	0.0015	15.2
2.2	90 L	1LA7 096-2TA..	2880	82.0	0.85	4.55	7.3	2.8	6.3	3.1	16	0.002	18
3	100 L	1LA7 106-2TA..	2890	84.0	0.85	6.1	9.9	2.8	6.8	3.0	16	0.0038	24
4	112 M	1LA7 113-2TA..	2905	86.0	0.86	7.8	13	2.6	7.2	2.9	16	0.0055	32
5.5	132 S	1LA7 130-2TA..	2925	86.5	0.89	10.3	18	2.0	5.9	2.8	16	0.016	45
7.5		1LA7 131-2TA..	2930	88.0	0.89	13.8	24	2.3	6.9	3.0	16	0.021	53
11	160 M	1LA7 163-2TA..	2940	89.5	0.88	20	36	2.1	6.5	2.9	16	0.034	74
15		1LA7 164-2TA..	2940	90.0	0.90	26.5	49	2.2	6.6	3.0	16	0.04	85
18.5	160 L	1LA7 166-2TA..	2940	91.0	0.91	32.5	60	2.4	7.0	3.1	16	0.052	98
22	180 M	1LA5 183-2TA..	2940	91.7	0.88	39	71	2.5	6.9	3.2	16	0.077	125
30	200 L	1LA5 206-2TA..	2945	92.3	0.89	53	97	2.4	7.2	2.8	16	0.14	179
37		1LA5 207-2TA..	2945	92.8	0.89	65	120	2.4	7.7	2.8	16	0.16	202
45	225 M	1LA5 223-2TA..	2960	93.6	0.89	78	145	2.8	7.7	3.4	16	0.2	238
55	250 M	1LG6 253-2TB..	2975	94.2	0.90	94	177	2.5	7.4	3.3	13	0.466	420
75	280 S	1LG6 280-2TB..	2975	94.8	0.91	126	241	2.6	7.5	2.9	13	0.832	530
90		1LG6 283-2TB..	2975	95.2	0.90	152	289	3.0	7.5	3.0	13	1.00	615
110	315 S	1LG6 310-2TB..	2985	95.0	0.90	186	352	2.6	7.5	3.2	13	1.39	790
132	315 M	1LG6 313-2TB..	2984	95.3	0.91	220	422	2.7	7.4	3.0	13	1.62	915
160	315 L	1LG6 316-2TB..	2984	95.7	0.93	260	512	2.8	7.5	3.1	13	2.09	1055
200	315 L	1LG6 317-2TB..	2984	95.9	0.93	325	640	2.5	7.0	2.8	13	2.46	1245
1500 rpm, 4-pole, 50 Hz													
0.55	80 M	1LA7 080-4TA..	1395	67.0	0.82	1.45	3.7	2.2	3.9	2.2	16	0.0015	10
0.75		1LA7 083-4TA..	1395	72.0	0.81	1.86	5.1	2.3	4.2	2.3	16	0.0018	11.4
1.1	90 S	1LA7 090-4TA..	1415	77.0	0.81	2.55	7.4	2.3	4.6	2.4	16	0.0028	14.6
1.5	90 L	1LA7 096-4TA..	1420	79.0	0.81	3.4	10	2.4	5.3	2.6	16	0.0035	17.9
2.2	100 L	1LA7 106-4TA..	1420	82.0	0.82	4.7	15	2.5	5.6	2.8	16	0.0048	24
3		1LA7 107-4TA..	1420	83.0	0.82	6.4	20	2.7	5.6	3.0	16	0.0058	27
4	112 M	1LA7 113-4TA..	1440	85.0	0.83	8.2	27	2.7	6.0	3.0	16	0.011	34
5.5	132 S	1LA7 130-4TA..	1455	86.0	0.81	11.4	36	2.5	6.3	3.1	16	0.018	47
7.5		1LA7 133-4TA..	1455	87.5	0.82	15.2	49	2.7	6.7	3.2	16	0.024	53
11	160 M	1LA7 163-4TA..	1460	88.5	0.84	21.5	72	2.2	6.2	2.7	16	0.04	73
15		1LA7 166-4TA..	1460	90.0	0.84	28.5	98	2.6	6.5	3.0	16	0.052	98
18.5	180 M	1LA5 183-4TA..	1460	90.5	0.83	35	121	2.3	7.5	3.0	16	0.13	125
22		1LA5 186-4TA..	1460	91.2	0.84	41	144	2.3	7.5	3.0	16	0.15	139
30	200 L	1LA5 207-4TA..	1465	91.8	0.86	55	196	2.6	7.0	3.2	16	0.24	187
37		1LA5 220-4TA..	1470	92.9	0.87	66	241	2.8	7.0	3.2	16	0.32	233
45	225 S	1LA5 223-4TA..	1470	93.4	0.87	80	293	2.8	7.7	3.3	16	0.36	259
55		1LG6 253-4TA..	1485	94.7	0.86	97	354	2.9	7.5	3.3	16	0.856	460
75	280 S	1LG6 280-4TA..	1486	94.6	0.87	132	482	2.6	7.3	2.8	16	1.39	575
90		1LG6 283-4TA..	1485	94.6	0.88	156	579	2.5	7.3	2.8	16	1.71	675
110	315 S	1LG6 310-4TA..	1488	95.0	0.87	192	706	2.6	6.9	2.8	16	2.31	810
132		1LG6 313-4TA..	1488	95.3	0.87	230	847	2.7	7.0	2.7	16	2.88	965
160	315 L	1LG6 316-4TA..	1488	95.7	0.87	275	1027	2.9	7.4	2.9	16	3.46	1105
200		1LG6 317-4TA..	1488	95.5	0.88	345	1284	3.2	7.3	3.1	16	4.22	1305

Surface-cooled motors with external fan and fan cover.

Order No. supplement

Motor type	Penultimate position: Voltage identifier				Final position: Design identifier			
	50 Hz				IM B 3			
	230 VΔ / 400 VY	400 VΔ / 690 VY	500 VY	500 VΔ		IM B 5	Price supplement	IM B 35
1LA7 080 to 1LA7 096	1	6	3	—	0	1	1	6
1LA7 106 to 1LA7 166	1	6	3	5	0	1	1	6
1LA5 183 to 1LA5 223	1	6	3	5	0	1	1	6
1LG6 253 to 1LG6 313	1	6	3	5	0	1	1	6
1LG6 316 to 1LG6 318	—	6	—	5	0	1 ¹	8	6

1) Additional radial supports must be provided.

For other designs, see "Technical information", "Designs".

Squirrel-cage motors

Sector solutions · Smoke extraction motors

Selection and ordering data

Rated output kW	Size	Order No. Order No.- supplements for voltage and size, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque torque	Torque Class	Moment of inertia J	Weight Size IM B 3 approx.
			Rated speed rpm	Effi- ciency η	Power factor p.f.	Rated current at 400 V	Rated torque Nm						

Self-cooled motors 1LA7, 1LA5 (aluminium housing) and 1LG6 (cast iron housing)
IP 55 degree of protection, type of cooling IC 411, temperature/time classes F200 and F300

EN 12 101-3

1000 rpm, 6-pole, 50 Hz													
0.37	80 M	1LA7 080-6TA..	920	62.0	0.72	1.20	3.9	1.9	3.1	2.1	16	0.0015	9.5
0.55		1LA7 083-6TA..	910	67.0	0.74	1.60	5.8	2.1	3.4	2.2	16	0.0018	11.4
0.75	90 S	1LA7 090-6TA..	915	69.0	0.76	2.1	7.8	2.2	3.7	2.2	16	0.0028	14.8
1.1	90 L	1LA7 096-6TA..	915	72.0	0.77	2.9	11.5	2.3	3.8	2.3	16	0.0035	18
1.5	100 L	1LA7 106-6TA..	925	74.0	0.75	3.9	15	2.3	4	2.3	16	0.0063	26
2.2	112 M	1LA7 113-6TA..	940	78.0	0.78	5.2	22	2.2	4.6	2.5	16	0.011	30
3	132 S	1LA7 130-6TA..	950	79.0	0.76	7.2	30	1.9	4.2	2.2	16	0.015	45
4	132 M	1LA7 133-6TA..	950	80.5	0.76	9.4	40	2.1	4.5	2.4	16	0.019	50
5.5		1LA7 134-6TA..	950	83.0	0.76	12.8	55	2.3	5	2.6	16	0.025	58
7.5	160 M	1LA7 163-6TA..	960	86.0	0.74	17	75	2.1	4.6	2.5	16	0.041	81
11	160 L	1LA7 166-6TA..	960	87.5	0.74	24.5	109	2.3	4.8	2.6	16	0.049	107
15	180 L	1LA5 186-6TA..	970	89.5	0.77	31.5	148	2.0	5.2	2.4	16	0.15	139
18.5	200 L	1LA5 206-6TA..	975	90.2	0.77	38.5	181	2.7	5.5	2.8	16	0.24	187
22		1LA5 207-6TA..	975	90.8	0.77	45.5	215	2.8	5.5	2.9	16	0.28	207
30	225 M	1LA5 223-6TA..	978	91.8	0.77	61	294	2.8	5.7	2.9	16	0.36	249
37	250 M	1LG6 253-6TA..	984	92.4	0.84	69	359	2.7	6.4	2.4	16	0.934	405
45	280 S	1LG6 280-6TA..	986	92.7	0.86	81	436	2.5	6.6	2.5	16	1.37	520
55	280 M	1LG6 283-6TA..	986	92.6	0.87	99	533	2.5	6.5	2.5	16	1.65	570
75	315 S	1LG6 310-6TA..	990	93.8	0.85	136	723	2.7	7.0	2.9	16	2.50	760
90	315 M	1LG6 313-6TA..	990	94.2	0.86	160	868	2.7	7.3	3.0	16	3.20	935
110	315 L	1LG6 316-6TA..	990	94.6	0.87	192	1061	2.6	7.4	3.0	16	4.02	1010
132	315 L	1LG6 317-6TA..	988	94.7	0.87	230	1276	3.0	7.2	2.8	16	4.71	1180
160	315 L	1LG6 318-6TA..	990	94.9	0.86	285	1543	3.1	7.5	3.0	16	5.39	1245

Surface-cooled motors with external fan and fan cover.

Order No. supplement

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier				
	50 Hz					IM B 3 Price supplement				
	230 VΔ / 400 VY	400 VΔ / 690 VY	500 VY	500 VA		IM B 5	IM V1 without protective cover	IM B 35		
1LA7 080 to 1LA7 096	1	6	3	—		0	1	1	6	
1LA7 106 to 1LA7 166	1	6	3	5		0	1	1	6	
1LA5 183 to 1LA5 223	1	6	3	5		0	1	1	6	
1LG6 253 to 1LG6 313	1	6	3	5		0	1	1	6	
1LG6 316 to 1LG6 318	—	6	—	5		0	1 ¹⁾	8	6	

For other designs, see "Technical information", "Designs".

1) Additional radial supports must be provided.

Squirrel-cage motors

Sector solutions · Smoke extraction motors

Selection and ordering data

Rated output kW	Size	Order No. Order No.- supplements for voltage and size, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current as multiple of the rated current	Stalling torque	Torque Class	Moment of inertia J	Weight kg m ²	Size IM B 3 approx.
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 400 V A	Rated torque Nm							
Forced-air cooled motors 1PP6 (cast iron housing) IP 55 degree of protection, cooling type IC 411, temperature/time class F400														
3	100 L	1PP6 106-2UA.. 2875	79.0	0.85	6.5	10	2.5	6.2	2.8	16	0.0038	31		
4	112 M	1PP6 113-2UA.. 2900	82.0	0.85	8.7	13	2.5	6.8	2.9	16	0.0055	40		
5.5	132 S	1PP6 130-2UA.. 2920	84.0	0.89	10.8	18	1.9	5.7	2.7	16	0.016	49		
7.5		1PP6 131-2UA.. 2930	85.0	0.89	14.5	24	2.0	6.5	2.8	16	0.021	54		
11	160 M	1PP6 163-2UA.. 2930	87.0	0.85	21	36	1.8	6.4	2.7	16	0.034	91		
15	160 M	1PP6 164-2UA.. 2930	88.0	0.89	27.5	49	2.0	6.5	2.80	16	0.04	99		
18.5	160 L	1PP6 166-2UA.. 2930	89.0	0.90	34	60	2.0	7.0	2.70	16	0.052	109		
22	180 M	1PP6 183-2UA.. 2955	93.1	0.88	39	71	2.4	7.0	3.2	16	0.086	175		
30	200 L	1PP6 206-2UA.. 2955	92.8	0.88	53	97	2.3	6.7	3.1	16	0.151	215		
37	200 L	1PP6 207-2UA.. 2958	93.0	0.89	65	119	2.4	7.1	3.2	16	0.182	245		
45	225 M	1PP6 223-2UA.. 2962	95.0	0.89	77	145	2.4	7.1	3.1	16	0.266	320		
55	250 M	1PP6 253-2UA.. 2972	94.9	0.90	94	177	2.3	6.7	2.9	16	0.466	405		
75	280 S	1PP6 280-2UB.. 2975	94.9	0.89	128	241	2.4	6.8	2.9	13	0.832	510		
90	280 M	1PP6 283-2UB.. 2976	95.2	0.90	152	289	2.5	7.4	3.0	13	1.00	595		
110	315 S	1PP6 310-2UB.. 2982	95.3	0.91	184	352	2.4	6.8	2.7	13	1.39	770		
132	315 M	1PP6 313-2UB.. 2980	95.7	0.91	220	423	2.5	6.9	2.8	13	1.62	895		
160	315 L	1PP6 316-2UB.. 2982	96.0	0.92	265	512	2.4	7.1	2.8	13	2.09	1035		
190	315 L	1PP6 317-2UB.. 2982	96.3	0.93	325	608	2.6	7.2	2.9	13	2.46	1225		
1500 rpm, 4-pole, 50 Hz														
2.2	100 L	1PP6 106-4UA.. 1410	79.0	0.75	5.6	15	2.3	5.0	2.5	16	0.0048	31		
3		1PP6 107-4UA.. 1410	79.0	0.80	7.1	20	2.5	5.0	2.6	16	0.0058	34		
4	112 M	1PP6 113-4UA.. 1440	82.0	0.75	9.5	27	2.7	5.7	3.0	16	0.011	42		
5.5	132 S	1PP6 130-4UA.. 1455	81.0	0.80	12.8	36	2.5	6.3	3.0	16	0.018	51		
7.5	132 M	1PP6 133-4UA.. 1455	82.0	0.80	16.5	49	2.7	6.7	3.1	16	0.024	58		
11	160 M	1PP6 163-4UA.. 1460	85.0	0.80	24	72	2.2	6.2	2.7	16	0.04	95		
15	160 L	1PP6 166-4UA.. 1460	86.0	0.80	33.3	98	2.6	6.5	3.0	16	0.052	108		
18.5	180 M	1PP6 183-4UA.. 1470	91.2	0.84	35	120	2.4	6.1	2.8	16	0.122	150		
22	180 L	1PP6 186-4UA.. 1472	92.1	0.85	40.5	143	2.4	6.4	2.9	16	0.144	175		
30	200 L	1PP6 207-4UA.. 1470	92.6	0.86	55	195	2.4	6.4	3.1	16	0.234	215		
37	225 S	1PP6 220-4UA.. 1480	92.9	0.86	67	239	2.6	6.5	2.8	16	0.398	280		
45	225 M	1PP6 223-4UA.. 1480	93.6	0.86	81	290	2.7	6.6	2.9	16	0.486	320		
55	250 M	1PP6 253-4UA.. 1485	94.5	0.87	97	354	2.5	7.4	2.9	16	0.856	445		
75	280 S	1PP6 280-4UA.. 1484	94.6	0.87	132	483	2.4	6.7	2.8	16	1.39	554		
90	280 M	1PP6 283-4UA.. 1486	95.1	0.86	160	578	2.6	7.3	3.0	16	1.71	655		
110	315 S	1PP6 310-4UA.. 1488	95.3	0.87	192	706	2.7	7.0	2.8	16	2.31	790		
132	315 M	1PP6 313-4UA.. 1488	95.6	0.88	225	847	2.6	7.1	2.8	16	2.88	945		
160	315 L	1PP6 316-4UA.. 1490	95.8	0.88	275	1025	2.9	7.2	2.9	16	3.46	1085		
200	315 L	1PP6 317-4UA.. 1488	95.9	0.88	345	1284	3.1	7.5	2.9	16	4.22	1285		

Forced-air cooled (surface cooled) motors without external fan and fan cover; the motors are located in the air flow of the driven fan and are adequately cooled during operation under normal conditions.

Order No. supplement

Motor type	Penultimate position: Voltage identifier				Final position: Design identifier			
	50 Hz				IM B 3	Price supplement		
	230 VΔ / 400 VY	400 VΔ / 690 VY	500 VY	500 VΔ	IM B 5	IM V1 without protective cover	IM B 35	
1PP6 106 to 1PP6 313	1	6	3	5	0	1	1	6
1PP6 316 to 1PP6 318	—	6	—	5	0	1	8	6

For other designs, see "Technical information", "Designs".

1) Additional radial supports must be provided.

Squirrel-cage motors

Sector solutions · Smoke extraction motors

Selection and ordering data

Rated output kW	Size	Order No. Order No.- supplements for voltage and size, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque torque	Torque Class	Moment of inertia J	Weight Size IM B 3 approx.	
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 400 V A	Rated torque Nm							
Forced-air cooled motors 1PP6 (cast iron housing) IP 55 degree of protection, cooling type IC 411, temperature/time class F400														EN 12 101-3
1.5	100 L	1PP6 106-6UA.. 925	72.0	0.70	4.50	15	2.3	4.0	2.3	16	0.0063	31		
2.2	112 M	1PP6 113-6UA.. 940	75.0	0.74	5.70	22	2.1	4.4	2.3	16	0.011	42		
3	132 S	1PP6 130-6UA.. 950	77.0	0.75	7.8	30	1.6	4.1	1.7	16	0.015	52		
4	132 M	1PP6 133-6UA.. 950	80.0	0.76	10	40	1.7	4.6	2.1	16	0.019	62		
5.5	132 M	1PP6 134-6UA.. 950	81.0	0.76	14	55	2.0	5.0	2.3	16	0.025	72		
7.5	160 M	1PP6 163-6UA.. 960	82.0	0.74	20	75	2.0	5.0	2.4	16	0.041	107		
11	160 L	1PP6 166-6UA.. 960	84.0	0.74	27.5	109	2.0	5.0	2.5	16	0.049	129		
15	180 L	1PP6 186-6UA.. 974	88.9	0.82	30	147	2.2	5.2	2.3	16	0.203	170		
18.5	200 L	1PP6 206-6UA.. 975	89.8	0.82	36.5	181	2.2	5.3	2.3	16	0.285	200		
22	200 L	1PP6 207-6UA.. 975	90.8	0.83	42.5	215	2.2	5.4	2.3	16	0.362	230		
30	225 M	1PP6 223-6UA.. 980	92.3	0.84	56	292	2.7	6.3	2.8	16	0.629	315		
37	250 M	1PP6 253-6UA.. 984	93.0	0.84	69	359	2.8	6.5	2.4	16	0.934	390		
45	280 S	1PP6 280-6UA.. 986	92.6	0.86	82	436	2.8	6.3	2.5	16	1.37	500		
55	280 M	1PP6 283-6UA.. 986	93.1	0.86	99	533	3.1	6.8	2.7	16	1.65	550		
75	315 S	1PP6 310-6UA.. 990	94.0	0.84	138	723	2.7	7.0	2.9	16	2.50	740		
90	315 M	1PP6 313-6UA.. 988	94.5	0.85	162	870	2.6	7.1	2.8	16	2.50	915		
110	315 L	1PP6 316-6UA.. 988	94.7	0.85	198	1063	2.8	7.2	2.8	16	2.50	990		
132	315 L	1PP6 317-6UA.. 990	95.1	0.85	235	1273	3.0	7.5	3.0	16	2.50	1160		
160	315 L	1PP6 318-6UA.. 988	95.1	0.86	285	1546	3.1	7.5	3.0	16	2.50	1225		

Forced-air cooled (surface cooled) motors without external fan and fan cover; the motors are located in the air flow of the driven fan and are adequately cooled during operation under normal conditions.

Order No. supplement

Motor type	Penultimate position: Voltage identifier 50 Hz					Final position: Design identifier				
	230 VΔ / 400 VΔ	400 VΔ / 690 VY	500 VY	500 VΔ	IM B 3	Price supplement		IM B 5	IM V1 without protective cover	IM B 35
1PP6 106 to 1PP6 313 1PP6 316 to 1PP6 318	1 —	6 6	3 —	5 5	0 0	1 1 ¹⁾	1 8	1 8	6 6	

For other designs, see "Technical information", "Designs".

1) Additional radial supports must be provided.

Squirrel-cage motors

Sector solutions · Smoke extraction motors

Selection and ordering data

Rated output kW	Size	Order No. Order No.- supplements for voltage and size, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current multiple of the rated current	Stalling torque multiple of the rated torque	Torque Class	Moment of inertia J	Weight kg m ²	Size IM B 3 approx.
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 400 V A	Rated torque Nm							
Self cooled motors 1LA6, 1LG6 (cast iron housing) IP 55 degree of protection, cooling type IC 411, temperature/time class F400														
3	100 L	1LA6 106-2UA.. 2875	79.0	0.85	6.5	10	2.5	6.2	2.8	16	0.0038	32		
4	112 M	1LA6 113-2UA.. 2900	82.0	0.85	8.7	13	2.5	6.8	2.9	16	0.0055	41		
5.5	132 S	1LA6 130-2UA.. 2920	84.0	0.89	10.8	18	1.9	5.7	2.7	16	0.016	51		
7.5		1LA6 131-2UA.. 2930	85.0	0.89	14.5	24	2.0	6.5	2.8	16	0.021	56		
11	160 M	1LA6 163-2UA.. 2930	87.0	0.85	21	36	1.8	6.4	2.7	16	0.034	93		
15	160 M	1LA6 164-2UA.. 2930	88.0	0.89	27.5	49	2.0	6.5	2.80	16	0.04	102		
18.5	160 L	1LA6 166-2UA.. 2930	89.0	0.90	34	60	2.0	7.0	2.70	16	0.05	112		
22	180 M	1LG6 183-2UA.. 2955	92.6	0.88	39	71	2.4	7.0	3.2	16	0.086	180		
30	200 L	1LG6 206-2UA.. 2955	92.2	0.88	53	97	2.3	6.7	3.1	16	0.151	225		
37	200 L	1LG6 207-2UA.. 2958	92.5	0.89	65	119	2.4	7.1	3.2	16	0.182	255		
45	225 M	1LG6 223-2UA.. 2962	94.6	0.89	77	145	2.4	7.1	3.1	16	0.266	330		
55	250 M	1LG6 253-2UA.. 2972	94.3	0.90	94	177	2.3	6.7	2.9	16	0.466	420		
75	280 S	1LG6 280-2UB.. 2975	94.5	0.89	128	241	2.4	6.8	2.9	13	0.832	530		
90	280 M	1LG6 283-2UB.. 2976	94.9	0.90	152	289	2.5	7.4	3.0	13	1.00	615		
110	315 S	1LG6 310-2UB.. 2982	94.7	0.91	184	352	2.4	6.8	2.7	13	1.39	790		
132	315 M	1LG6 313-2UB.. 2980	95.2	0.91	220	423	2.5	6.9	2.8	13	1.62	915		
160	315 L	1LG6 316-2UB.. 2982	95.6	0.92	265	512	2.4	7.1	2.8	13	2.09	1055		
190	315 L	1LG6 317-2UB.. 2982	95.9	0.93	325	608	2.6	7.2	2.9	13	2.46	1245		
1500 rpm, 4-pole, 50 Hz														
2.2	100 L	1LA6 106-4UA.. 1410	79.0	0.75	5.6	15	2.3	5.0	2.5	16	0.0048	32		
3		1LA6 107-4UA.. 1410	79.0	0.80	7.1	20	2.5	5.0	2.6	16	0.0058	34		
4	112 M	1LA6 113-4UA.. 1440	82.0	0.75	9.5	27	2.7	5.7	3.0	16	0.011	43		
5.5	132 S	1LA6 130-4UA.. 1455	81.0	0.80	12.8	36	2.5	6.3	3.0	16	0.018	53		
7.5	132 M	1LA6 133-4UA.. 1455	82.0	0.80	16.5	49	2.7	6.7	3.1	16	0.024	60		
11	160 M	1LA6 163-4UA.. 1460	85.0	0.80	24	72	2.2	6.2	2.7	16	0.04	97		
15	160 L	1LA6 166-4UA.. 1460	86.0	0.80	33.3	98	2.6	6.5	3.0	16	0.052	110		
18.5	180 M	1LG6 183-4UA.. 1470	90.7	0.84	35	120	2.4	6.1	2.8	16	0.122	155		
22	180 L	1LG6 186-4UA.. 1472	91.7	0.85	40.5	143	2.4	6.4	2.9	16	0.144	180		
30	200 L	1LG6 207-4UA.. 1470	92.2	0.86	55	195	2.4	6.4	3.1	16	0.234	225		
37	225 S	1LG6 220-4UA.. 1480	92.6	0.86	67	239	2.6	6.5	2.8	16	0.398	290		
45	225 M	1LG6 223-4UA.. 1480	93.3	0.86	81	290	2.7	6.6	2.9	16	0.486	330		
55	250 M	1LG6 253-4UA.. 1485	94.2	0.87	97	354	2.5	7.4	2.9	16	0.856	460		
75	280 S	1LG6 280-4UA.. 1484	94.2	0.87	132	483	2.4	6.7	2.8	16	1.39	574		
90	280 M	1LG6 283-4UA.. 1486	94.7	0.86	160	578	2.6	7.3	3.0	16	1.71	675		
110	315 S	1LG6 310-4UA.. 1488	95.0	0.87	192	706	2.7	7.0	2.8	16	2.31	810		
132	315 M	1LG6 313-4UA.. 1488	95.3	0.88	225	847	2.6	7.1	2.8	16	2.88	965		
160	315 L	1LG6 316-4UA.. 1490	95.6	0.88	275	1025	2.9	7.2	2.9	16	3.46	1105		
200	315 L	1LG6 317-4UA.. 1488	95.7	0.88	345	1284	3.1	7.5	2.9	16	4.22	1305		

Surface-cooled motors with integral fan and fan cover.

Order No. supplement

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier			
	50 Hz					IM B 3	Price supplement		
	230 VΔ / 400 VΔ / 400 VY	500 VY	500 VΔ	460 VY		IM B 5	IM V1 without protective cover	IM B 35	
1LA6 106 to 1LG6 313	1	6	3	5	0	1	1	6	
1LG6 316 to 1LG6 318	—	6	—	5	0	1 ¹⁾	8	6	

For other designs, see "Technical information", "Designs".

1) Additional radial supports must be provided.

Squirrel-cage motors

Sector solutions · Smoke extraction motors

Selection and ordering data

Rated output kW	Size	Order No. Order No.- supplements for voltage and size, see table below	Operating data at rated output					Starting torque For direct-on-line starting as multiple of the rated torque	Starting current current	Stalling torque torque	Torque Class	Moment of inertia J	Weight Size IM B 3 approx.
			Rated speed rpm	Efficiency η %	Power factor p.f.	Rated current at 400 V A	Rated torque Nm						

Self cooled motors 1LA6, 1LG6 (cast iron housing)
IP 55 degree of protection, cooling type IC 411, temperature/time class F400

EN 12 101-3

1000 rpm, 6-pole, 50 Hz													
1.5	100 L	1LA6 106-6UA..	925	72.0	0.70	4.50	15	2.3	4.0	2.3	16	0.0063	32
2.2	112 M	1LA6 113-6UA..	940	75.0	0.74	5.70	22	2.1	4.4	2.3	16	0.011	43
3	132 S	1LA6 130-6UA..	950	77.0	0.75	7.8	30	1.6	4.1	1.7	16	0.015	54
4	132 M	1LA6 133-6UA..	950	80.0	0.76	10	40	1.7	4.6	2.1	16	0.019	63
5.5	132 M	1LA6 134-6UA..	950	81.0	0.76	14	55	2.0	5.0	2.3	16	0.025	74
7.5	160 M	1LA6 163-6UA..	960	82.0	0.74	20	75	2.0	5.0	2.4	16	0.041	110
11	160 L	1LA6 166-6UA..	960	84.0	0.74	27.5	109	2.0	5.0	2.5	16	0.049	132
15	180 L	1LG6 186-6UA..	974	88.7	0.82	30	147	2.2	5.2	2.3	16	0.203	175
18.5	200 L	1LG6 206-6UA..	975	89.4	0.82	36.5	181	2.2	5.3	2.3	16	0.285	210
22	200 L	1LG6 207-6UA..	975	90.5	0.83	42.5	215	2.2	5.4	2.3	16	0.362	240
30	225 M	1LG6 223-6UA..	980	92.2	0.84	56	292	2.7	6.3	2.8	16	0.629	325
37	250 M	1LG6 253-6UA..	984	92.6	0.84	69	359	2.8	6.5	2.4	16	0.934	405
45	280 S	1LG6 280-6UA..	986	92.3	0.86	82	436	2.8	6.3	2.5	16	1.37	520
55	280 M	1LG6 283-6UA..	986	92.8	0.86	99	533	3.1	6.8	2.7	16	1.65	570
75	315 S	1LG6 310-6UA..	990	93.7	0.84	138	723	2.7	7.0	2.9	16	2.50	760
90	315 M	1LG6 313-6UA..	988	94.2	0.85	162	870	2.6	7.1	2.8	16	3.20	935
110	315 L	1LG6 316-6UA..	988	94.5	0.85	198	1063	2.8	7.2	2.8	16	4.02	1010
132	315 L	1LG6 317-6UA..	990	94.9	0.85	235	1273	3.0	7.5	3.0	16	4.71	1180
160	315 L	1LG6 318-6UA..	988	94.9	0.86	285	1546	3.1	7.5	3.0	16	5.39	1245

Surface-cooled motors with external fan and fan cover.

Order No. supplement

Motor type	Penultimate position: Voltage identifier					Final position: Design identifier			
	50 Hz					IM B 3	Price supplement		
	230 VΔ / 400 VY	400 VΔ / 690 VY	500 VYY	500 VΔ	IM B 5		IM V1 without protective cover	IM B 35	
1LA6 106 to 1LG6 313	1	6	3	5	0	1	1	6	
1LG6 316 to 1LG6 318	—	6	—	5	0	1¹⁾	8	6	

For other designs, see "Technical information", "Designs".

1) Additional radial supports must be provided.

Squirrel-cage motors

Sector solutions · Smoke extraction motors

Order codes for special designs

Additional order suffix -Z with order code	Special designs	Motor type – Size						
		1PP7	1PP5	1PP6	1LA7	1LA5	1LG6	1LA6
Windings and motor protection								
A11	Motor protection by means of PTC thermistor with 3 built-in temperature sensors for shutdown ¹⁾	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
A12	Motor protection by means of PTC thermistor with 6 built-in temperature sensors for warning and shutdown ¹⁾	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
A23	Motor temperature sensing with built-in KTY 84-130 temperature sensors ¹⁾	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
Paint finish								
Special paintwork in RAL 7030 stone grey		Standard design (without order code)						
M16	RAL 1002 sand yellow	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
M17	RAL 1013 pearl white							
M18	RAL 3000 flame red							
K27	RAL 6011 mignonette green							
M19	RAL 6021 pale green							
M20	RAL 7001 silver grey							
K28	RAL 7031 bluish grey							
L42	RAL 7032 pebble grey							
M21	RAL 7035 light grey							
M22	RAL 9001 cream white							
M23	RAL 9002 grey white							
L43	RAL 9005 jet black							
Y54 • And special paintwork RAL.....	Special paintwork in other colors: RAL 1015, 1019, 2003, 2004, 3007, 5007, 5009, 5010, 5012, 5015, 5017, 5018, 5019, 6019, 7000, 7004, 7011, 7016, 7022, 7033	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
K23	Unpainted (only cast iron parts primed)	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
K24	Unpainted, only primed	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
Mechanical design								
K40	Regreasing device	100 – 160	180 – 225	100 – 315	100 – 160	180 – 225	180 – 315	100 – 160
L13	External earthing	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
K31	Extra rating plate, loose	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
Y82 • And order code	Extra rating plate	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
K45	Anti-condensation heater for 230 V	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
K46	Anti-condensation heater for 115 V	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
L99	Wire-lattice pallet	80 – 160	180	100 – 180	80 – 150	180	180	100 – 160
Safety and commissioning notes/certification								
B02	Factory test certificate 2.3 acc. to EN 10 204 (routine test)	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
Additional suffixes								
A60	Installation of 3 PT 100 G resistance thermometers	–	225	225 – 315	–	225	225 – 315	–
A61	Installation of 6 PT 100 G resistance thermometers	–	225	225 – 315	–	225	225 – 315	–
G50	Measuring nipples for SPM shock pulse measurement for bearing monitoring	–	180 – 225	180 – 315	–	180 – 225	180 – 315	–
K50	IP65 degree of protection	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
L03	Vibration-proof version	80 – 160	180 – 225	100 – 160	80 – 160	180 – 225	–	100 – 160
L51	Protruding cable end – right side	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
L52	Protruding cable end – left side	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160
L68	Full-key balancing	80 – 160	180 – 225	100 – 315	80 – 160	180 – 225	180 – 315	100 – 160

• Additional plain text required.

1) For appropriate control unit,
see Catalog NS K.

Squirrel-cage motors

Sector solutions

Notes

6

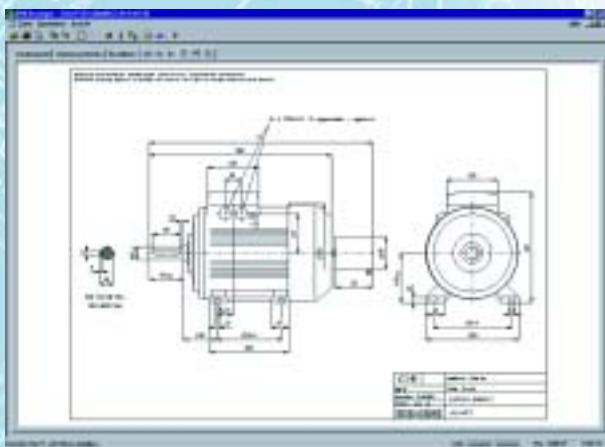
Squirrel-cage motors

Dimensions

Dimension sheet generator:

(part of the SD Configurator)

The SD Configurator contains a dimension drawing for each motor in this catalogue. Provided that a complete Order No. is entered or parameterized with or without an order code, a dimension drawing can be called up under the "Documentation" tab.



These dimension drawings can be presented and printed in various different views and windows.

The corresponding dimension drawings can be exported, saved and processed in DXF format (interchange/import format for CAD systems) or as bitmap graphics.

The SD Configurator is integrated as a selection guide in the electronic catalogue SD 01 which can be found on the inside front cover of this catalogue (for further information, see "Technical information", "Project planning aids").

Further copies can be requested from the responsible Siemens Sales Representative or ordered on the Internet at

<http://www.siemens.de/automation/sd01>

At this address, you will also find links to Tips and Tricks, and downloads for updating the functions or content.

Order number for SD 01 01/2003 (English)
E86060-D5201-A100-A3-7600

7/2

1LA7, 1MA7 · Frame sizes 56 M to 160 L

1LA5 · Frame sizes 180 M to 225 M

7/4

1LA9 · Frame sizes 56 to 200 L

7/6

1LA6, 1MA6 · Frame sizes 100 L to 160 L

7/8

1MA6 · Frame sizes 180 M to 315 L

7/10

1LG4 · Frame sizes 180 M to 315 L

7/12

1LG6 · Frame sizes 180 M to 315 L

7/14

1LA8, 1MA8 · Frame sizes 315 to 450

7/16

1MJ6 · Frame sizes 71 M to 160 L

7/18

1MJ6 · Frame sizes 180 M to 315 M

7/20

1MJ8 · Frame sizes 315 M to 355

Flange dimensions

Dimensions for smoke extraction motors and 1MJ1 motors on request

Notes on the dimensions

■ Dimension drawings according to DIN EN 50 347 and IEC 60 072.

Fits

The shaft extensions specified in the dimension tables (DIN 748) and centering spigot diameters (DIN 42 948) are machined with the following fits:

Dimensions-designation	ISO fit DIN ISO 286-2
D, DA	to 30 j6 over 30 to 50 k6 over 50 m6
N	to 250 j6 over 250 h6
F, FA	h9

The drilled holes of couplings and belt pulleys should have an ISO fit of at least H7.

Dimensional tolerances

For the following dimensions, the permissible deviations are given below:

Dimension-symbol	Dimension	Permitted deviation
A, B	to 250 over 250 to 500 over 500 to 750 over 750 to 1000 over 1000	± 0.75 ± 1.0 ± 1.5 ± 2.0 ± 2.5
M	to 200 over 200 to 500 over 500	± 0.25 ± 0.5 ± 1.0
H	to 250 over 250	- 0.5 - 1.0 - 0.5
E, EA		

Keyways and featherkeys

(dimensions GA, GC, F and FA) are made in compliance with DIN 6885 Part 1.

■ All dimension data is specified in mm.

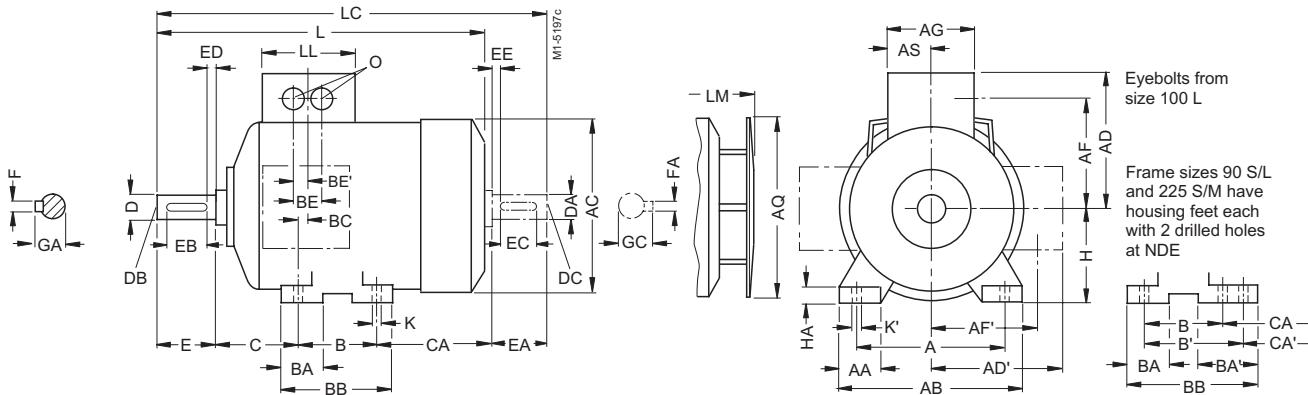
Squirrel-cage motors

Dimensions

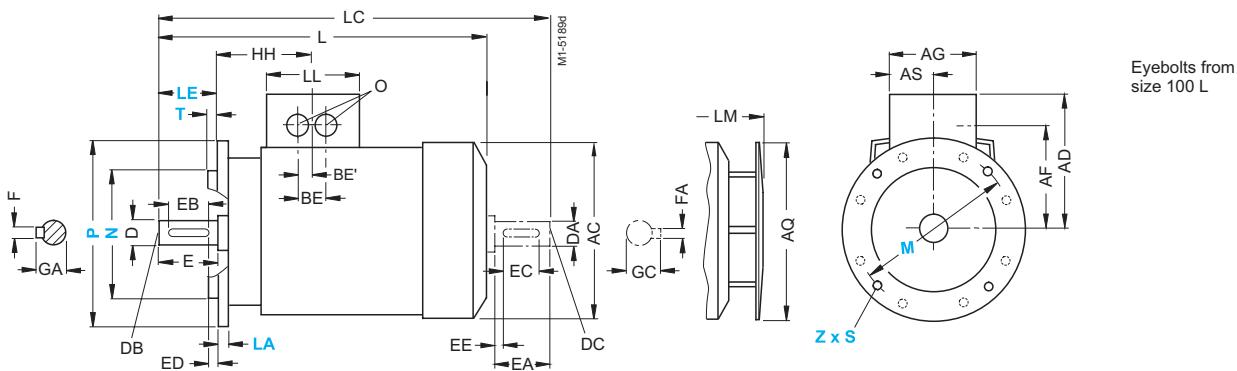
1LA7, 1MA7 · Frame sizes 56 M to 160 L

1LA5 · Frame sizes 180 M to 225 M

IM B 3



IM B 5 and IM V 1 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



Frame size	Type 1LA7 ... 1MA7 ...	No. of poles	Dimension drawing according to IEC																					
			A	AA	AB	AC ¹⁾	AD	AD'	AF	AF'	AG	AQ	AS	B	B'	BA	BA'	BB	BC	BE	BE'	C	CA	CA'
56 M	1LA7 050 • 2 to 4 1LA7 053 •		90	25	110	116	101	101	78	78	74	-	37	71	-	28	-	87	34	32	18	36	53	-
63 M	... 060 ... 063	2 to 6	100	27	120	124	101	101	78	78	74	124	37	80	-	28	-	96	30 (52.5)	32	18 (16)	40	66	-
71 M	... 070 ... 073	2 to 8	112	27	132	145	111	111	88	88	74	124	37	90	-	27	-	106	18 (41.5)	32	18 (16)	45	83	-
80 M	... 080 ... 083	2 to 8	125	30.5	150	163	120	120	97	97	75	124	37.5	100	-	32	-	118	14 (36)	32	18 (16)	50	94 134 ⁴⁾	-
90 S	... 090	2 to 8	140	30.5	165	180	128	128	105	105	75	170	37.5	100*	125	33	54	143	23 (46)	32	18 (16)	56	143	118
90 L	... 096	2 to 8	140	30.5	165	180	128	128	105	105	75	170	37.5	100	125*	33	54	143	23 (46)	32	18 (16)	56	143	118
100 L	... 106 ... 107	2 to 8 4 and 8	160	42	196	203	135	163	78	123	120	170	60	140	-	47	-	176	39	42	21	63	125	-
112 M	... 113	2 to 8	190	46	226	227	148	176	91	136	120	170	60	140	-	47	-	176	32	42	21	70	141	-
132 S	... 130 ... 131 ... 132 ... 134	2 to 8 2 4 to 8 6	216	53	256	267	167	194	107	154	140	250	70	140	-	49	-	180	39	42	21	89	162.5	-
132 M	... 133 ... 134	4 to 8 6	216	53	256	267	167	194	107	154	140	250	70	178	-	49	-	218	39	42	21	89	124.5 162.5 ⁵⁾	-
160 M	... 163 ... 164 ... 165	2 to 8 2 and 8 2 to 8	254	60	300	320	197	226	127	183	165	250	82.5	210	-	57	-	256	52.5	54	27	108	183	-
160 L	... 166	2 to 8	254	60	300	320	197	226	127	183	165	250	82.5	254	-	57	-	300	52.5	54	27	108	139 179 ⁶⁾	-
180 M	1LA5 183	2 and 4	279	69.5	339	363	258	258	216	216	152	340	71	241	-	50	-	287	38	54	27	121	259	-
180 L	1LA5 186	4 to 8	279	69.5	339	363	258	258	216	216	152	340	71	279	-	50	-	325	38	54	27	121	221	-
200 L	1LA5 206 1LA5 207	2 and 6 2 to 8	318	83	388	402	305	305	252	252	260	340	96	305	-	58.5	-	355	45	85	42.5	133	239	-
225 S	1LA5 220	4 and 8	356	103	426	402	305	305	252	252	260	340	96	286*	311	58	83	361	36	85	42.5	149	248.5	-
225 M	1LA5 223	2 4 to 8	356	103	426	402	305	305	252	252	260	340	96	286	311*	58	83	361	36	85	42.5	149	223.5	-

■ The dimensions in brackets apply to 1MA7.

■ For 1LA in pole-change version (6 or 9 terminals), the dimensions of the basic version apply.

* This dimension is assigned in DIN EN 50347 to the frame size listed.

● The motors of frame size 56 M are non-ventilated.

1) Measured across the screw heads.

2) With a cast-on terminal housing, 4 knockout openings are provided for metric threads.

3) In a low-noise version, the dimension L is 8 mm greater and the dimension LM is 11.5 mm greater.

4) For 1MA7 083-6.

5) For 1MA7 133-4.

6) For 1MA7 166-4 and 1MA7 166-6.

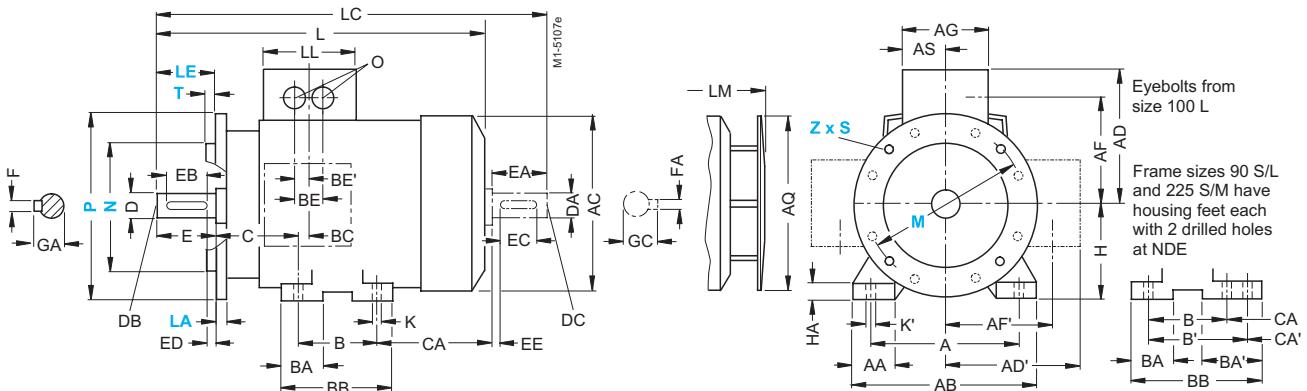
Squirrel-cage motors

Dimensions

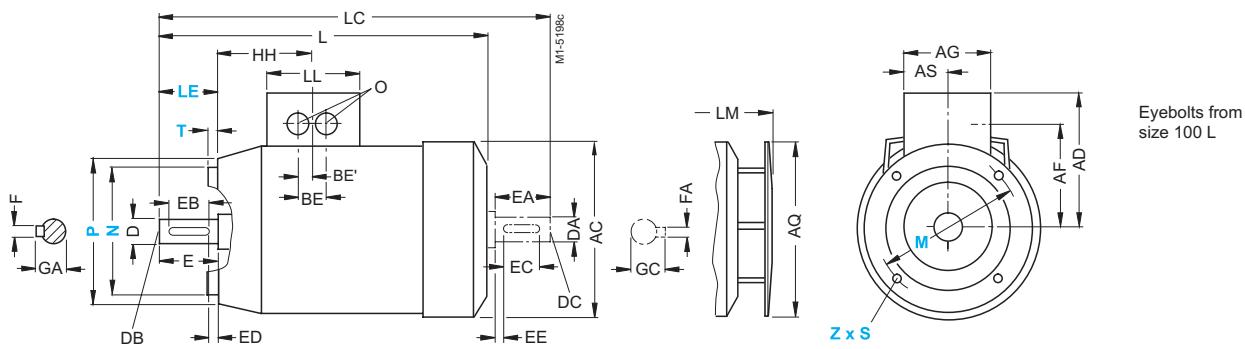
1LA7, 1MA7 · Frame sizes 56 M to 160 L

1LA5 · Frame sizes 180 M to 225 M

IM B 35 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



IM B 14 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



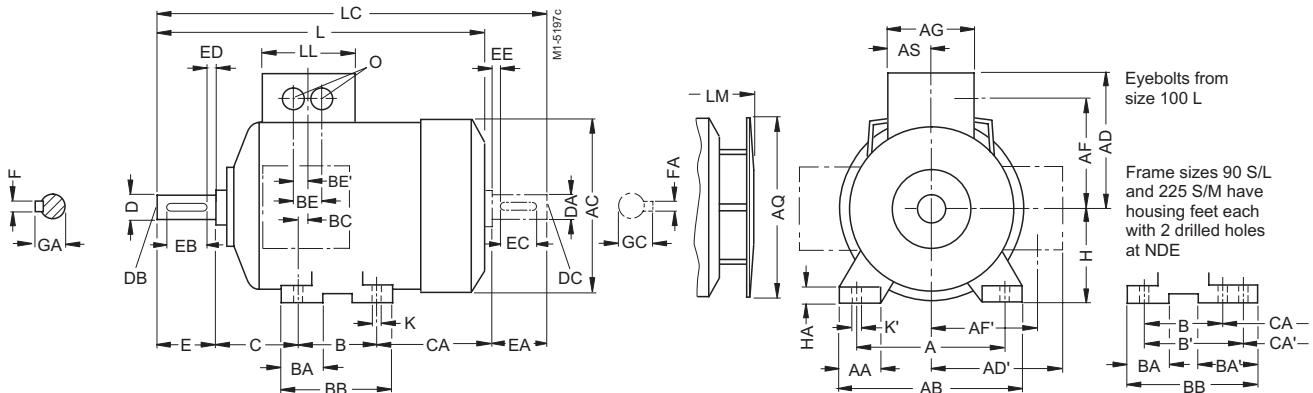
H	HA	HH	K	K'	L	LC	LL	LM	O	Drive-end shaft extension					Non-drive-end shaft extension								
										D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
56	6	69.5	5.8	9	169	200	74	—	1x M16 x 1.5 1x M25 x 1.5	9	M3	20	14	3	3	10.2	9	M3	20	14	3	3	10.2
63	7	69.5 (92.5)	7	10	202.5	232	74 (120)	231.5	1x M16 x 1.5 1x M25 x 1.5	11	M4	23	16	3.5	4	12.5	11	M4	23	16	3.5	4	12.5
71	7	63.5 (86.5)	7	10	240	278	74 (120)	268	1x M16 x 1.5 1x M25 x 1.5	14	M5	30	22	4	5	16	14	M5	30	22	4	5	16
80	8	63.5 (86)	9.5	13.5	273.5 308.5 ⁴⁾	324	75 (120)	299.5 334.5 ⁴⁾	1x M16 x 1.5 1x M25 x 1.5	19	M6	40	32	4	6	21.5	19	M6	40	32	4	6	21.5
90	10	79 (101.5)	10	14	331	389	75 (120)	382.5	1x M16 x 1.5 1x M25 x 1.5	24	M8	50	40	5	8	27	19	M6	40	32	4	6	21.5
100	12	102	12	16	372	438	120	423.5	2x M32 x 1.5 ²⁾	28	M10	60	50	5	8	31	24	M8	50	40	5	8	27
112	12	102	12	16	393	461	120	444.5	2x M32 x 1.5 ²⁾	28	M10	60	50	5	8	31	24	M8	50	40	5	8	27
132	15	128	12	16	452.5 ³⁾	551.5	140	505 ³⁾	2x M32 x 1.5 ²⁾	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
132	15	128	12	16	452.5 ³⁾ 490.5 ⁵⁾	551.5 589.5 ⁵⁾	140	505 ³⁾ 543 ⁵⁾	2x M32 x 1.5 ²⁾	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160	18	160.5	15	19	588	721	165	640.5	2x M40 x 1.5 ²⁾	42	M16	110	90	10	12	45	42	M16	110	90	10	12	45
160	18	160.5	15	19	588 628 ⁶⁾	721 761 ⁶⁾	165	640.5 680.5 ⁶⁾	2x M32 x 1.5 ²⁾	42	M16	110	90	10	12	45	42	M16	110	90	10	12	45
180	18	159	15	19	712	841	132	793.5	2x M40 x 1.5	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
180	18	159	15	19	712	841	132	793.5	2x M32 x 1.5	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
200	24	178	19	25	768.5	897	192	850	2x M50 x 1.5	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
225	24	184.5	19	25	806	933.5	192	887.5	2x M40 x 1.5	60	M20	140	125	7.5	18	64	55	M20	110	100	5	16	59
225	24	184.5	19	25	776	903.5	192	857.5	2x M50 x 1.5	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
					806	933.5		887.5		60	M20	140	125	7.5	18	64							

Squirrel-cage motors

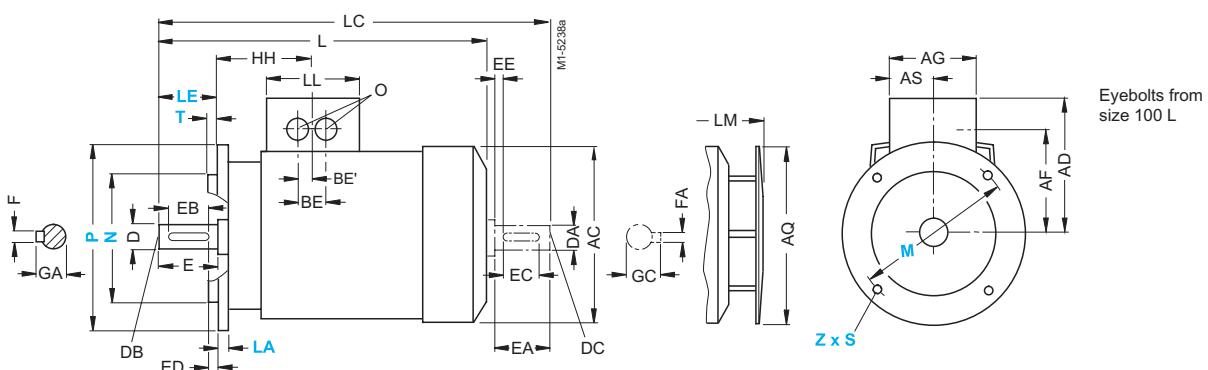
Dimensions

1LA9 · Frame sizes 56 M to 200 L

IM B 3



IM B 5 and IM V 1 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



Frame size	Type 1LA9 ...	No. of poles	Dimension drawing according to IEC																						
			A	AA	AB	AC ¹⁾	AD'	AD	AF	AF'	AG	AQ	AS	B	B'	BA	BA'	BB	BC	BE	BE'	C	CA	CA'	
56 M	050 ●	2 and 4	90	25	110	116	101	101	78	78	74	—	37	71	—	28	—	87	34	32	18	36	53	—	
	053 ●										37														
63 M	060	2 and 4	100	27	120	124	101	101	78	78	74	124	37	80	—	28	—	96	30	32	18	40	66	—	
	063										37													92	
71 M	070	2 and 4	112	30.5	132	145	111	111	88	88	74	124	37	90	—	27	—	106	18	32	18	45	83	—	
	073										37														
80 M	080	2 and 4	125	30.5	150	163	120	120	97	97	75	124	37.5	100	—	32	—	118	14	32	18	50	94	—	
	083										100													134	
90 S	090	2 to 6	140	30.5	165	180	128	128	105	105	75	170	37.5	100*	125	33	54	143	23	32	18	56	143	118	
90 L	096-6K	2 to 6													125*										
	096																								
100 L	106	2 to 6	160	42	196	203	135	163	78	123	120	170	60	140	—	47	—	176	39	42	21	63	160	—	
	107	4																						195 ⁵⁾	
112 M	113	2 to 6	190	46	226	227	148	176	91	136	120	170	60	140	—	47	—	176	32	42	21	70	179	—	
132 S	130	2 and 4	216	53	256	267	167	194	107	154	140	250	70	140	—	49	—	180	39	42	21	89	162.5	—	
	131	2																						200.5	
132 M	133	6	216	53	256	267	167	194	107	154	140	250	70	178	—	49	—	218	39	42	21	89	124.5	—	
	133	4																						162.5	
	134	6																							
160 M	163	2 to 6	254	60	300	320	197	226	127	183	165	250	82.5	210	—	57	—	256	52.5	54	27	108	183	—	
	164	2																							
160 L	166	2 to 6	254	60	300	320	197	226	127	183	165	250	82.5	254	—	57	—	300	52.5	54	27	108	179	—	
180 M	183	2 and 4	279	69.5	339	363	258	258	216	216	152	340	71	241	—	50	—	287	38	54	27	121	259	—	
180 L	186	4 and 6	279	69.5	339	363	258	258	216	216	152	340	71	279	—	50	—	325	38	54	27	121	221	—	
200 L	206	2 and 6	318	83	388	402	305	252	252	260	340	96	305	—	58.5	—	355	45	85	42.5	133	239	—		
	207	2 to 6																							

* This dimension is assigned in DIN EN 50347 to the frame size listed.

1) Measured across the screw heads.

3) For 1LA9 096-6KA.

4) For 1LA9 096-2 and 1LA9 096-4.

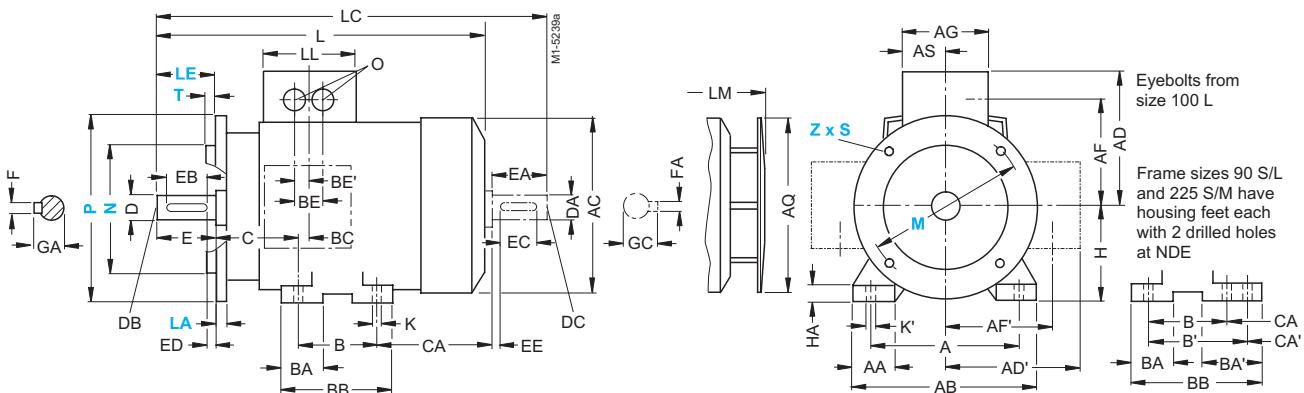
5) For 1LA9 107-4KA.

Squirrel-cage motors

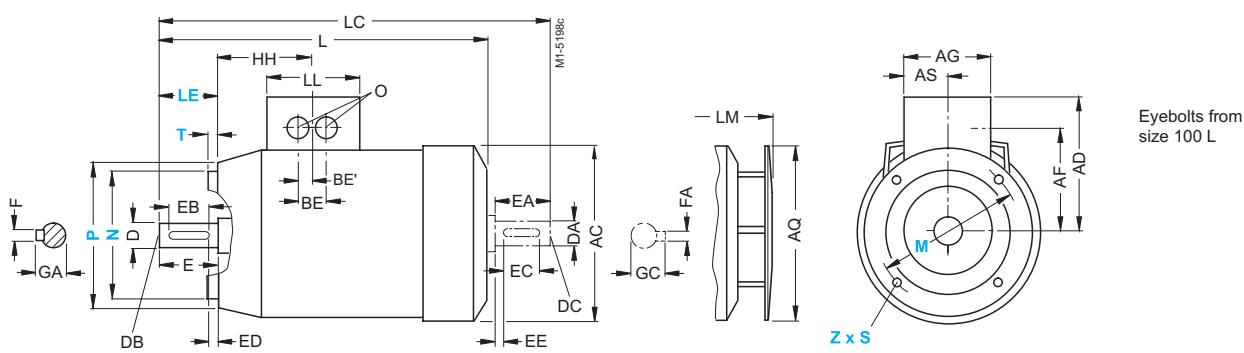
Dimensions

1LA9 · Frame sizes 56 M to 200 L

IM B 35 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



IM B 14 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



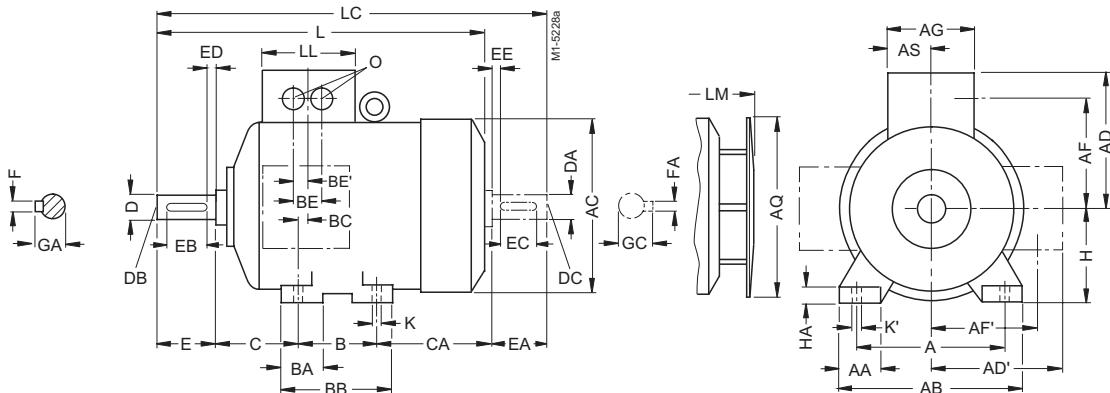
H	HA	HH	K	K'	L	LC	LL	LM	O	Drive-end shaft extension					Non-drive-end shaft extension								
										D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
56	6	69.5	5.8	9	169	200	74	—	1x M16 x 1.5 1x M25 x 1.5	9	M3	20	14	3	3	10.2	9	M3	20	14	3	3	10.2
63	7	69.5	7	10	202.5 228.5	232 258	74	231.5 257.5	1x M16 x 1.5 1x M25 x 1.5	11	M4	23	16	3.5	4	12.5	11	M4	23	16	3.5	4	12.5
71	7	63.5	7	10	240	278	74	268	1x M16 x 1.5 1x M25 x 1.5	14	M5	30	22	4	5	16	14	M5	30	22	4	5	16
80	8	63.5	9.5	13.5	273.5 308.5	324 364	75	299.5 334.5	1x M16 x 1.5 1x M25 x 1.5	19	M6	40	32	4	6	21.5	19	M6	40	32	4	6	21.5
90	10	79	10	14	331 376 ³⁾ 358 ⁴⁾	389 434 ³⁾ 414 ⁴⁾	75	382.5 427.5 ³⁾ 409.5 ⁴⁾	1x M16 x 1.5 1x M25 x 1.5	24	M8	50	40	5	8	27	19	M6	40	32	4	6	21.5
100	12	102	12	16	407 442 ⁵⁾ 508 ⁵⁾	473 493 ⁵⁾	120	458.5	2x M32 x 1.5 ²⁾	28	M10	60	50	5	8	31	24	M8	50	40	5	8	27
112	12	102	12	16	431	499	120	482.5	2x M32 x 1.5 ²⁾	28	M10	60	50	5	8	31	24	M8	50	40	5	8	27
132	15	128	12	16	452.5 490.5	551.5 589.5	140	505 543	2x M32 x 1.5 ²⁾	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
132	15	128	12	16	452.5 490.5	551.5 589.5	140	505 543	2x M32 x 1.5 ²⁾	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160	18	160.5	15	19	588	721	165	640.5	2x M40 x 1.5 ²⁾	42	M16	110	90	10	12	45	42	M16	110	90	10	12	45
160	18	160.5	15	19	628	761	165	680.5	2x M40 x 1.5 ²⁾	42	M16	110	90	10	12	45	42	M16	110	90	10	12	45
180	18	159	15	19	712	841	132	793.5	2x M40 x 1.5	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
180	18	159	15	19	712	841	132	793.5	2x M40 x 1.5	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
200	24	178	19	25	768.5	897	192	850	2x M50 x 1.5	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59

Squirrel-cage motors

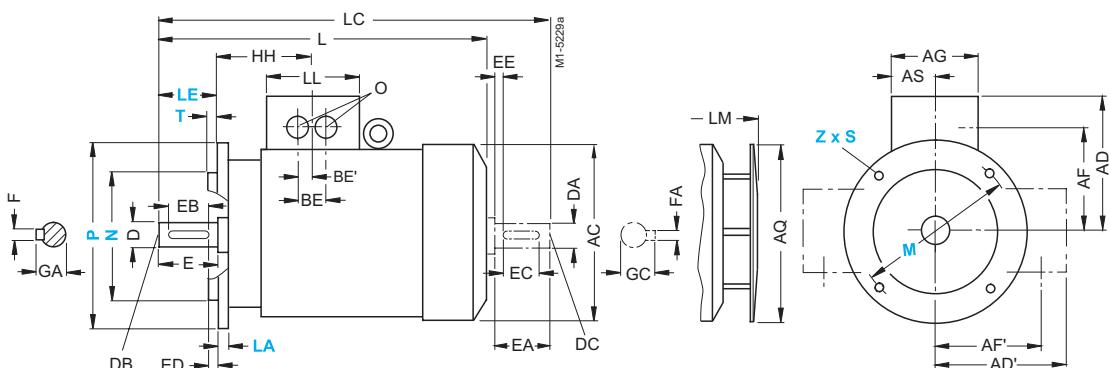
Dimensions

1LA6, 1MA6 · Frame sizes 100 L to 160 L

IM B 3



IM B 5 and IM V 1 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



Size	Type 1LA6 ... 1MA6 ...	No. of poles	Dimension drawing according to IEC																				
			A	AA	AB	AC ¹⁾	AD	AD'	AF	AF'	AG	AQ	AS	B	BA	BB	BC	BE	BE'	C	CA	H	HA
100 L	106	2 to 8	160	40	196	201	164	164	124	124	121	170	60.5	140	46	180	42	42	21	63	125	100	12
	107	4 and 8																					
112 M	113	2 to 8	190	42.5	226	225.5	178	178	138	138	121	170	60.5	140	46	180	34	42	21	70	141	112	15
132 S	130	2 to 8	216	50	256	265	194	194	154	154	141	250	70.5	140	47	180	42	42	21	89	162.5	132	17
	131	2																					
132 M	133	4 to 8	216	50	256	265	194	194	154	154	141	250	70.5	178	49	218	42	42	21	89	124.5	132	17
	134	6																					
160 M	163	2 to 8	254	60	300	320	226	226	183	183	166	250	83	210	63	256	52	54	27	108	183	160	18
	164	2 and 8																					
160 L	166	2 to 8	254	60	300	320	226	226	183	183	166	250	83	254	63	300	52	54	27	108	139	160	18

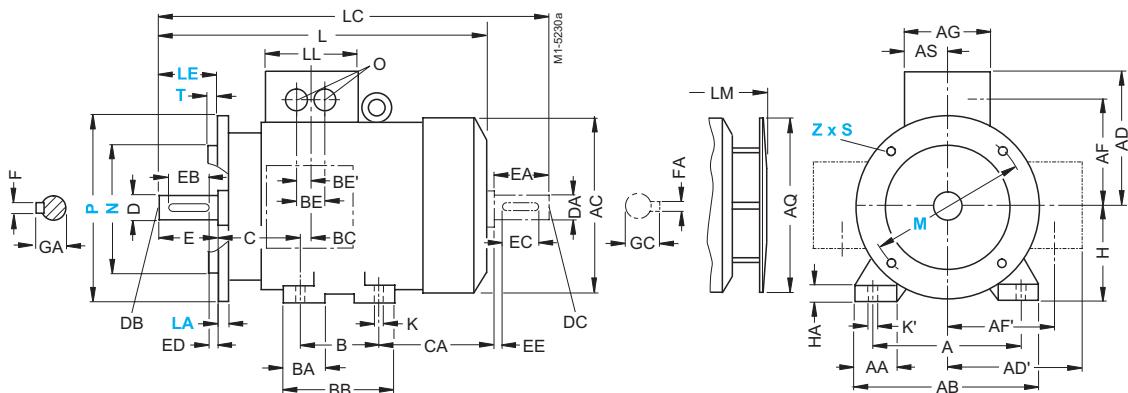
1) Measured across the screw heads.

Squirrel-cage motors

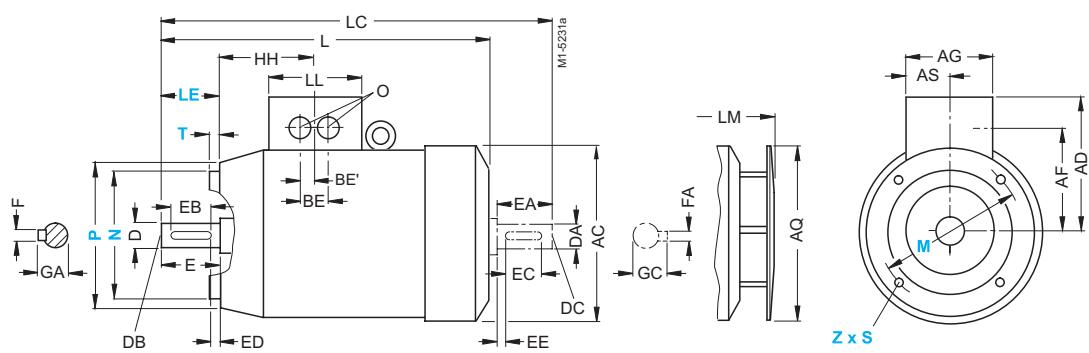
Dimensions

1LA6, 1MA6 · Frame sizes 100 L to 160 L

IM B 35 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



IM B 14 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



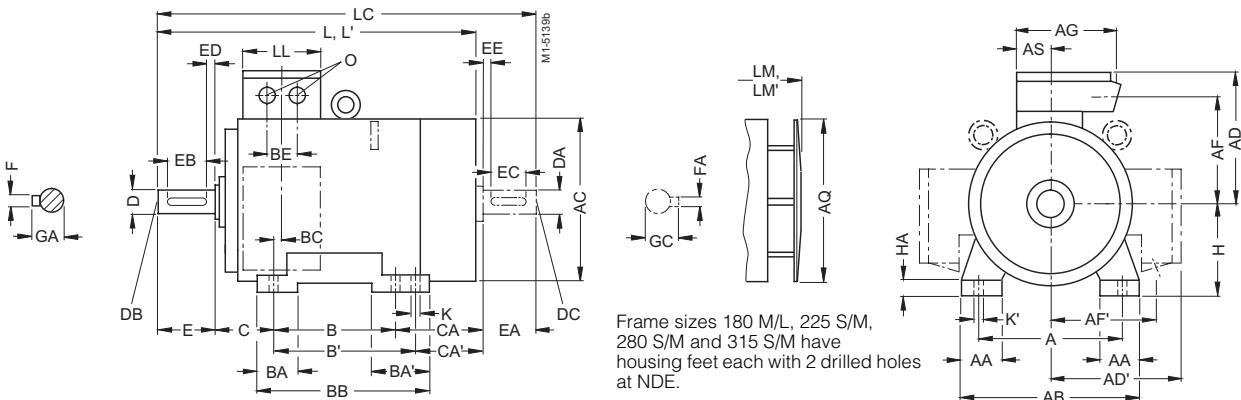
HH	K	K'	L	LC	LL	LM	O	Drive-end shaft extension						Non-drive-end shaft extension							
								D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
104.5	12	16	372	438	121	423.5	2x M32 x 1.5	28	M10	60	50	5	8	31	24	M8	50	40	5	8	27
104.5	12	16	393	461	121	444.5	2x M32 x 1.5	28	M10	60	50	5	8	31	24	M8	50	40	5	8	27
130.5	12	16	435.5	551.5	141	506	2x M32 x 1.5	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
130.5	12	16	435.5	551.5	141	506	2x M32 x 1.5	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160	14.5	18	588	721	166	640.5	2x M40 x 1.5	42	M16	110	90	10	12	45	42	M16	110	90	10	12	45
160	14.5	18	588	721	166	640.5	2x M40 x 1.5	42	M16	110	90	10	12	45	42	M16	110	90	10	12	45

Squirrel-cage motors

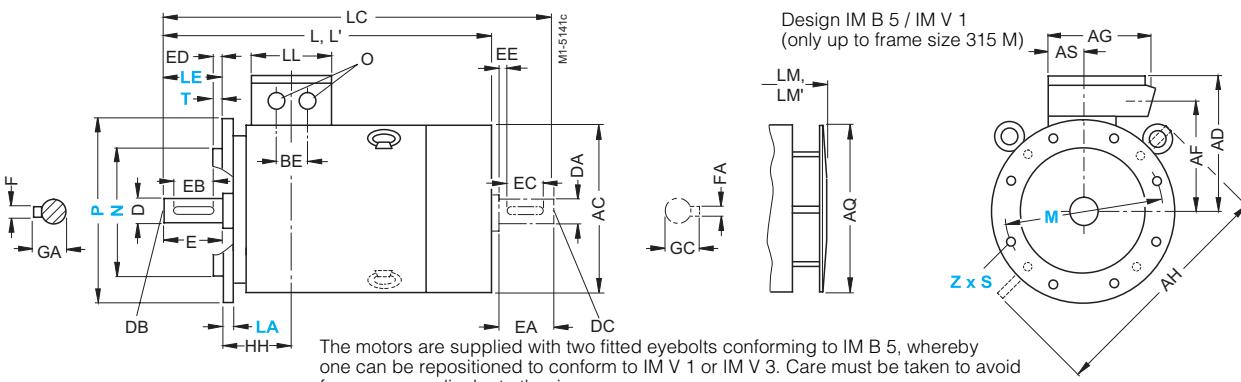
Dimensions

1MA6 · Frame sizes 180 M to 315 L

IM B 3



IM B 5 and IM V 1 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



Frame size	Type 1MA6 ...	No. of poles	Dimension drawing according to IEC																					
			A	AA	AB	AC ¹⁾	AD	AD'	AF	AF'	AG	AH	AQ	AS	B	B'	BA	BA'	BB	BC	BE	C	CA	CA'
180 M	183	2	279	65	344	375	274	274	227	227	220	470	340	82	241*	279	70	108	319	35	75	121	259	-
		4																						
180 L	186	4 to 8	279	65	344	375	274	274	227	227	220	470	340	82	241	279*	70	108	319	35	75	121	-	221
200 L	206	2	318	80	398	402	308	308	248	248	262	530	340	99	305	-	85	85	355	42	85	133	239	-
	207	2	318	80	398	402	308	308	248	248	262	530	340	99	305	-	85	85	355	42	85	133	239	-
	4 to 8																							
225 S	220	4 and 8	356	80	436	442	339	339	269	269	264	580	425	100	286*	311	85	110	361	25	85	149	269	-
225 M	223	2	356	80	436	442	339	339	269	269	264	580	425	100	286	311*	85	110	361	25	85	149	-	244
	4 to 8																							
250 M	253	2	406	100	506	505	427	427	333	333	338	645	470	120	349	-	100	100	409	39	95	168	283	-
	4 to 8																							
280 S	280	2	457	100	557	555	452	452	358	358	338	700	525	120	368*	419	100	151	471	30	95	190	317	-
	4 to 8																							
280 M	283	2	457	100	557	555	452	452	358	358	338	700	525	120	368	419*	100	151	471	30	95	190	-	266
	4 to 8																							
315 S	310	2	508	120	628	620	515	515	395	395	405	805	590	134	406*	457	125	171	527	32	90	216	358	-
	4 to 8																							
315 M	313	2	508	120	628	620	515	515	395	395	405	805	590	134	406	457*	125	171	527	32	90	216	-	307
	4 to 8																							
315 L	316	2	508	120	628	620	515	515	395	395	405	805	590	134	508	-	120	120	578	32	90	216	396	-
	317	2																						
	4 to 8																							
	318	6 and 8																						

■ Dimensions for 9-terminal box on request.

* This dimension is assigned in DIN EN 50347 to the frame size listed.

1) Measured across the screw heads.

2) For version with low-noise fan.

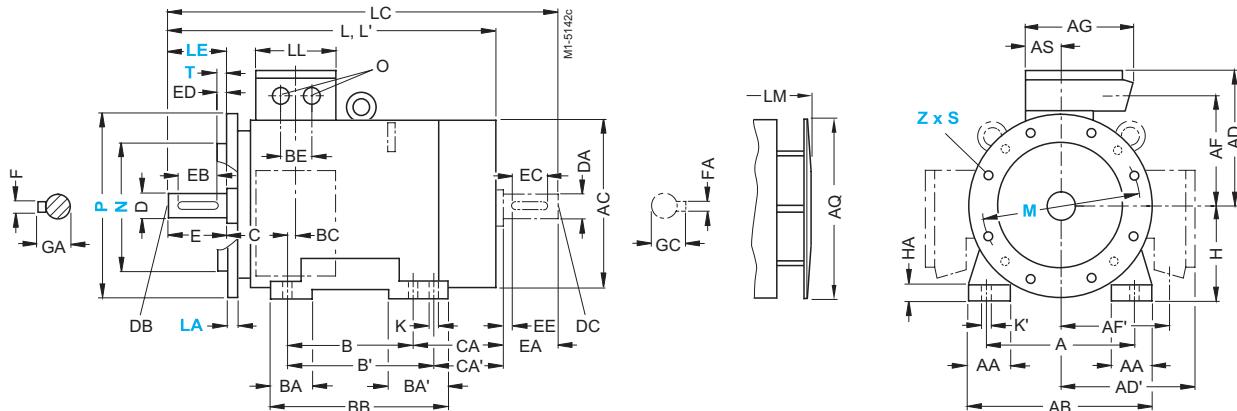
3) In the low-noise version, a second shaft end and/or top-mounted sensor is not possible.

Squirrel-cage motors

Dimensions

1MA6 · Frame sizes 180 M to 315 L

IM B 35 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



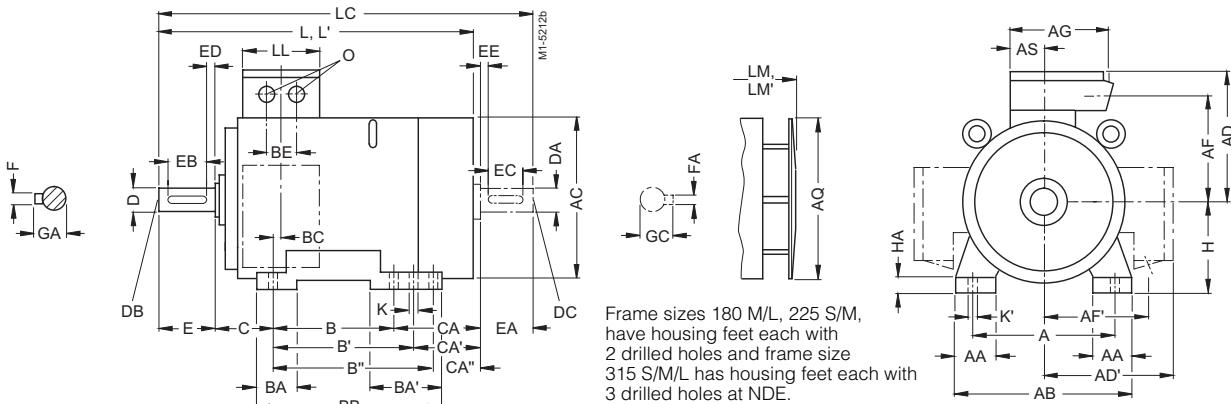
H	HA	HH	K	K'	L	L ²)	LC ³)	LL	LM	LM ²)	O	Drive-end shaft extension						Non-drive-end shaft extension								
												D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC	
180	26	156	15	20	715	770	841	164	796.5	885	2x M40 x 1.5	48	M 16	110	100	5	14	51.5	48	M 16	110	100	5	14	51.5	
180	26	156	15	20	715	—	841	164	796.5	—	2x M40 x 1.5	48	M 16	110	100	5	14	51.5	48	M 16	110	100	5	14	51.5	
200	34	175	19	25	727	825	897	197	808.5	910	2x M50 x 1.5	55	M 20	110	100	5	16	59	48	M 16	110	100	5	14	51.5	
200	34	175	19	25	727	825	897	197	808.5	910	2x M50 x 1.5	55	M 20	110	100	5	16	59	48	M 16	110	100	5	14	51.5	
225	34	174	19	25	839	—	954	200	935	—	2x M50 x 1.5	60	M 20	140	125	10	18	64	55	M 20	110	100	10	16	59	
225	34	174	19	25	839	809	855	924	200	909	2x M50 x 1.5	55	M 20	110	100	5	16	59	48	M 16	110	100	5	14	51.5	
225	34	174	19	25	839	—	954	935	—	60	140	125	10	18	64	55	M 20	100	10	16	59	55	M 20	110		
250	42	207	24	30	935	1010	1050	234	1035	1110	2x M63 x 1.5	60	M 20	140	125	10	18	64	55	M 20	110	100	5	16	59	
250	42	207	24	30	935	—	1080	—	1035	—	65	1110	2x M63 x 1.5	60	65	140	125	10	18	64	69	60	140	125	18	64
280	42	220	24	30	1010	1080	1155	234	1120	1230	2x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
280	42	220	24	30	1010	1080	1155	234	1120	1230	2x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
315	52	248	28	35	1114	1185	1260	266	1224	1295	2x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
315	52	248	28	35	1114	—	1290	1254	—	80	170	140	22	85	70	20	74.5	70	22	85	70	20	74.5	70		
315	52	248	28	35	1114	1185	1260	266	1224	1295	2x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
315	52	248	28	35	1114	—	1290	1254	—	80	170	140	22	85	70	20	74.5	70	22	85	70	20	74.5	70		
315	52	248	28	35	1254	1325	1400	266	1364	1435	2x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
315	52	248	28	35	1284	—	1430	1394	—	80	170	140	22	85	70	20	74.5	70	22	85	70	20	74.5	70		
315	52	248	28	35	1284	—	1430	1394	—	80	170	140	22	85	70	20	74.5	70	22	85	70	20	74.5	70		

Squirrel-cage motors

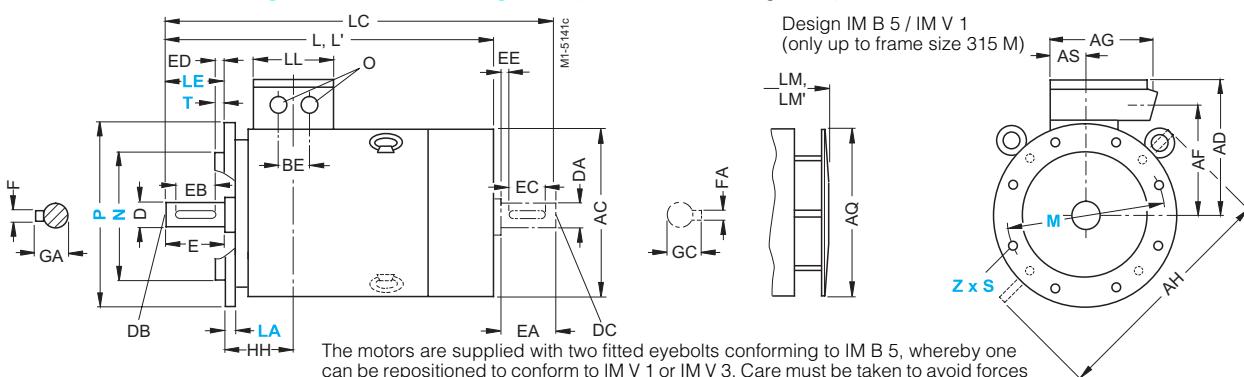
Dimensions

1LG4 · Frame sizes 180 M to 315 L

IM B 3



IM B 5 and IM V 1 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



For motor		Dimension drawing according to IEC																							
Frame size	Type 1LG4 ...	No. of poles	A	AA	AB	AC ¹⁾	AD	AD'	AF	AF'	AG	AH	AQ	AS	B	B'	B''	BA	BA'	BB	BC	BE	C	CA	CA'
180 M	183	2 and 4	279	65	340	364	262	262	220	220	152	452	340	71	241*	279	-	50	91	328	36	54	121	202	164
180 L	186	4 to 8	279	65	340	364	262	262	220	220	152	452	340	71	241	279*	-	50	91	328	36	54	121	202	164
	188	2	279	65	340	364	262	262	220	220	152	452	340	71	241	279*	-	50	91	328	36	54	121	253	215
200 L	206	2 and 6	318	70	380	402	300	300	247	247	260	486	340	96	305	-	-	60	60	355	63	85	133	177	-
	207	2 to 8	318	70	380	402	300	300	247	247	260	486	340	96	305	-	-	60	60	355	63	85	133	177	-
	208	2 and 6 4 and 8	318	70	380	402	300	300	247	247	260	486	340	96	305	-	-	60	60	355	63	85	133	234	-
																								177	
225 S	220	4 and 8	356	80	436	445	325	325	272	272	260	556	425	96	286*	311	-	85	110	361	47	85	149	218	193
225 M	223	2	356	80	436	445	325	325	272	272	260	556	425	96	286	311*	-	85	110	361	47	85	149	218	193
	228	4 to 8	356	80	436	445	325	325	272	272	260	556	425	96	286	311*	-	85	110	361	47	85	149	278	253
250 M	253	2	406	100	490	495	392	392	310	310	300	620	470	117	349	-	-	100	100	409	69	110	168	235	-
	258	4 to 8	406	100	490	495	392	392	310	310	300	620	470	117	349	-	-	100	100	409	69	110	168	235	-
		4	406	100	490	495	392	392	310	310	300	620	470	117	349	-	-	100	100	409	69	110	168	305	235
280 S	280	2	457	100	540	555	432	432	348	348	300	672	525	118	368*	419	-	100	151	479	62	110	190	267	216
280 M	283	4 to 8	457	100	540	555	432	432	348	348	300	672	525	118	368	419*	-	100	151	479	62	110	190	267	216
	288	2	457	100	540	555	432	432	348	348	300	672	525	118	368	419*	-	100	151	479	62	110	190	377	326
	6 and 8																							267	216
315 S	310	2	508	120	610	610	500	500	400	400	380	780	590	154	406*	457	-	125	176	527	69	110	216	315	264
	310	4 to 8	508	120	610	610	500	500	400	400	380	780	590	154	406	457*	-	125	176	527	69	110	216	315	264
315 M	313	2	508	120	610	610	500	500	400	400	380	780	590	154	406	457*	-	125	176	527	69	110	216	315	264
	313	4 to 8	508	120	610	610	500	500	400	400	380	780	590	154	457	508*	-	125	176	578	69	110	216	424	373
315 L	316/317 2		508	120	610	610	500	500	400	400	380	780	590	154	457	508*	155	250	666	69	110	216	615	564	
	316/317 4 to 8																								
	318	8																							
	318	6	508	120	610	610	500	500	400	400	380	780	590	154	406	457	508*	155	250	666	69	110	216	615	564

* This dimension is assigned in DIN EN 50347 to the frame size listed.

1) Measured across the screw heads.

2) In version with low-noise fan for 2-pole motors.

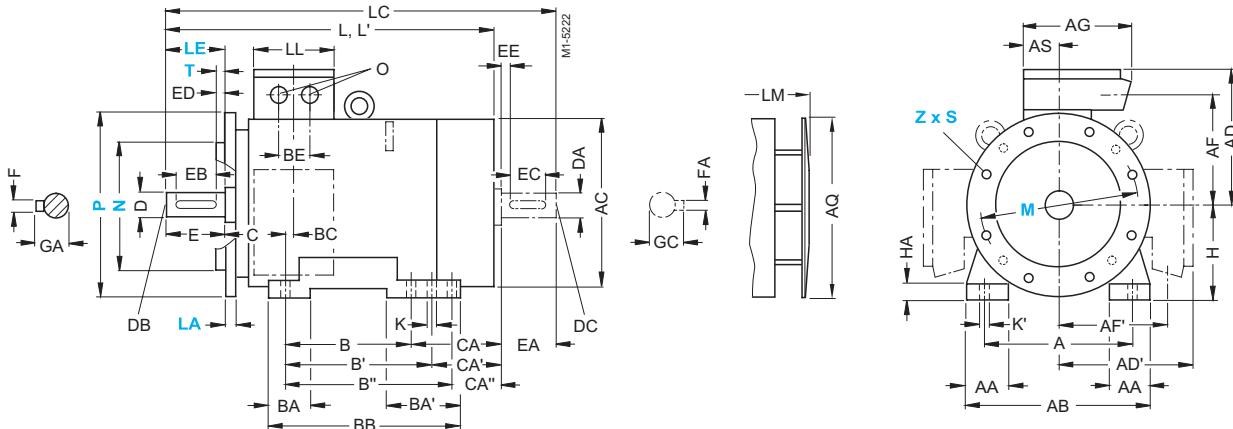
3) In the low-noise version, a second shaft end and/or top-mounted sensor is not possible.

Squirrel-cage motors

Dimensions

1LG4 · Frame sizes 180 M to 315 L

IM B 35 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



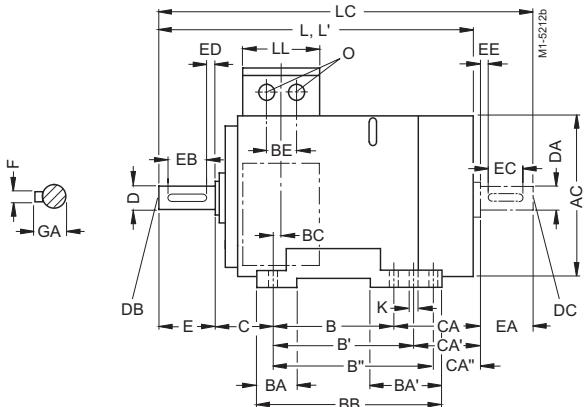
CA''	H	HA	HH	K	K'	L	L ⁽²⁾	LC ³⁾	LL	LM	LM ⁽²⁾	O	Drive-end shaft extension					Non-drive-end shaft extension								
													D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
180	20	157	15	19		670	670	784	132	760	760	2 x M40 x 1.5	48	M 16	110	100	5	14	51.5	48	M 16	110	100	5	14	51.5
180	20	157	15	19		670		784	132	760		2 x M40 x 1.5	48	M 16	110	100	5	14	51.5	48	M 16	110	100	5	14	51.5
180	20	157	15	19		720	720	835	132	810	810	2 x M40 x 1.5	48	M 16	110	100	5	14	51.5	48	M 16	110	100	5	14	51.5
200	25	196	19	25		720	754	835	192	810	844	2 x M50 x 1.5	55	M 20	110	100	5	16	59	55	M 20	110	100	5	16	59
200	25	196	19	25		720	754	835	192	810	844	2 x M50 x 1.5	55	M 20	110	100	5	16	59	55	M 20	110	100	5	16	59
200	25	196	19	25		777	811	892	192	867	901	2 x M50 x 1.5	55	M 20	110	100	5	16	59	55	M 20	110	100	5	16	59
225	34	196	19	25		790		903	192	890		2 x M50 x 1.5	60	M 20	140	125	10	18	64	55	M 20	110	100	5	16	59
225	34	196	19	25		760	794	873	192	860	894	2 x M50 x 1.5	55	M 20	110	100	5	16	59	48	M 16	110	100	5	14	51.5
225	34	196	19	25		820	854	933	192	920	954	2 x M50 x 1.5	55	M 20	110	100	5	16	59	48	M 16	110	100	5	14	51.5
225	34	196	19	25		850		963	950																	
250	40	237	24	30		890	927	1002	236	990	1027	2 x M63 x 1.5	60	M 20	140	125	10	18	64	55	M 20	110	100	5	16	59
250	40	237	24	30		890	927	1002	236	990	1027	2 x M63 x 1.5	60	M 20	140	125	10	18	64	55	M 20	110	100	5	16	59
250	40	237	24	30		960	1102	1032		990	1027	2 x M63 x 1.5	60	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
250	40	237	24	30		960	1102	1060		990	1027	2 x M63 x 1.5	60	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
280	40	252	24	30		960	998	1105	236	1070	1108	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
280	40	252	24	30		960	998	1105	236	1070	1108	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
280	40	252	24	30		1070	1108	1215	236	1180	1218	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
						960		1105		1070																
315	50	285	28	35		1072	1142	1217	307	1182	1252	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
315	50	285	28	35		1072	1142	1217	307	1182	1252	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
315	50	285	28	35		1232	1302	1377	307	1342	1412	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
						1262	1407	1372																		
513	315	30	285	28	35	1402		1547	307	1512		2 x M63 x 1.5	80	M 20	170	140	10	22	85	70	M 20	140	125	10	20	74.5

Squirrel-cage motors

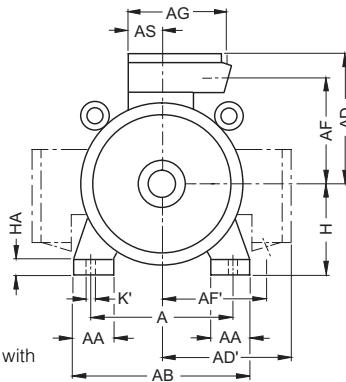
Dimensions

1LG6 . Frame sizes 180 M to 315 L

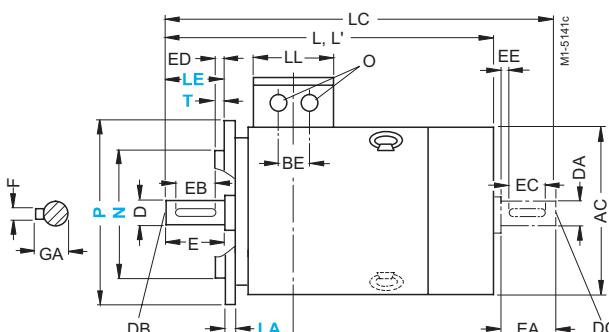
IM B 3



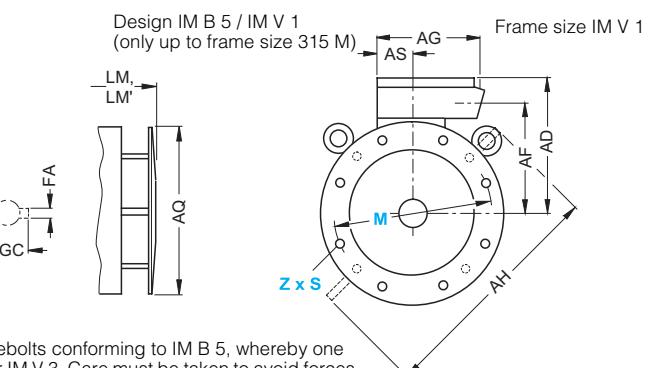
Frame sizes 180 M/L, 225 S/M,
have housing feet each with
2 drilled holes and frame size
315 S/M/L has housing feet each with
3 drilled holes at NDE.



IM B 5 and IM V 1 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



The motors are supplied with two fitted eyebolts conforming to IM B 5, whereby one can be repositioned to conform to IM V 1 or IM V 3. Care must be taken to avoid forces perpendicular to the ring.

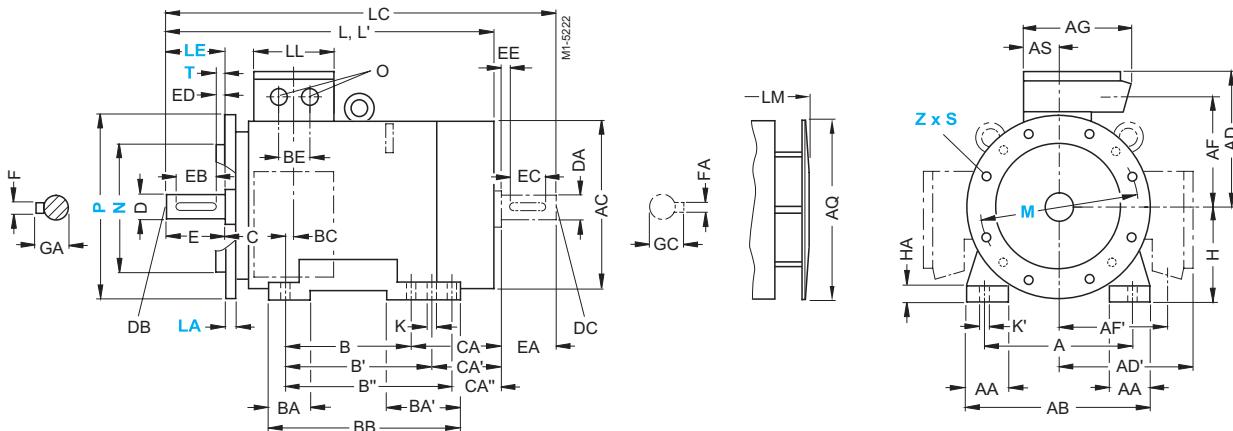


- * This dimension is assigned in DIN EN 50347 to the frame size listed

1) Measured across the screw heads

3) In the low-noise version, a second shaft end and/or top-mounted sensor is not possible.

IM B 35 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



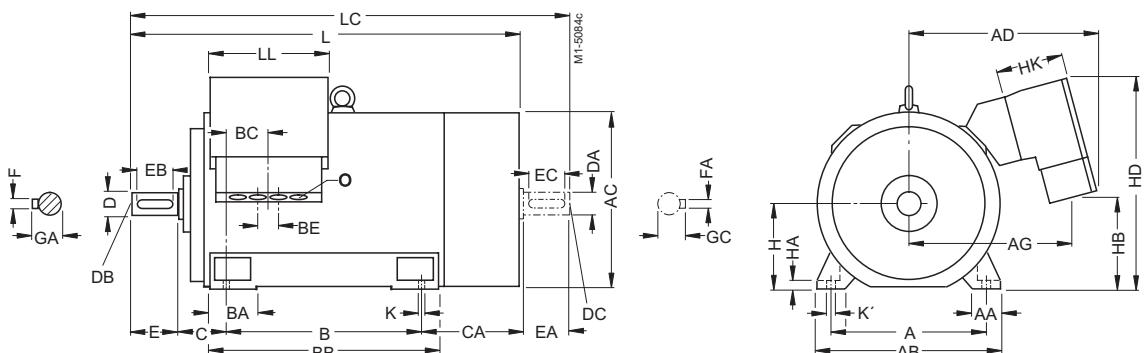
CA''	H	HA	HH	K	K'	L	L ²)	LC ³)	LL	LM	LM ²)	O	Drive-end shaft extension					Non-drive-end shaft extension						
													D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
180	20	157	15	19	720	835	132	810	2 x M40 x 1.5	48	M 16	110	100	5	14	51.5	48	M 16	110	100	5	14	51.5	
		670			720	784	132	810	2 x M40 x 1.5	48	M 16	110	100	5	14	51.5	48	M 16	110	100	5	14	51.5	
200	25	196	19	25	720	835	192	810	2 x M50 x 1.5	55	M 20	110	100	5	16	59	55	M 20	110	100	5	16	59	
200	25	196	19	25	777	892	192	867	2 x M50 x 1.5	55	M 20	110	100	5	16	59	55	M 20	110	100	5	16	59	
		720			835	810																		
225	34	196	19	25	790	903	192	890	2 x M50 x 1.5	60	M 20	140	125	10	18	64	55	M 20	110	100	5	16	59	
225	34	196	19	25	820	933	192	920	2 x M50 x 1.5	55	M 20	110	100	5	16	59	48	M 16	110	100	5	14	51.5	
		850			963	950			60	M 20	140	125	10	18	64	55	M 20	110	100	5	16	59		
250	40	237	24	30	890	1002	236	990	2 x M63 x 1.5	60	M 20	140	125	10	18	64	55	M 20	110	100	5	16	59	
		960			1102	1060			65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64		
		890			1032	990			65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64		
280	40	252	24	30	960	1105	236	1070	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
		75			1215	236	1180		75	M 20	140	125	10	20	79.5	65	M 20	140	125	10	18	64		
		960			1105	1070			75	M 20	140	125	10	20	79.5	65	M 20	140	125	10	18	69		
315	50	285	28	35	1072	1217	307	1182	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
		1102			1247	1212			80	M 20	170	140	10	22	85	70	M 20	140	125	10	20	74.5		
315	50	285	28	35	1102	1247	307	1212	2 x M63 x 1.5	80	M 20	170	140	10	22	85	70	M 20	140	125	10	20	74.5	
315	50	285	28	35	1232	1377	307	1342	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
		1262			1407	1372			80	M 20	170	140	10	22	85	70	M 20	140	125	10	20	74.5		
315	50	285	28	35	1232	1377	307	1342	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
		1262			1407	1372			80	M 20	170	140	10	22	85	70	M 20	140	125	10	20	74.5		
513	315	30	285	28	35	1372	1517	307	1482	2 x M63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
		1402			1547	1512			80	M 20	170	140	10	22	85	70	M 20	140	125	10	20	74.5		
		80																						

Squirrel-cage motors

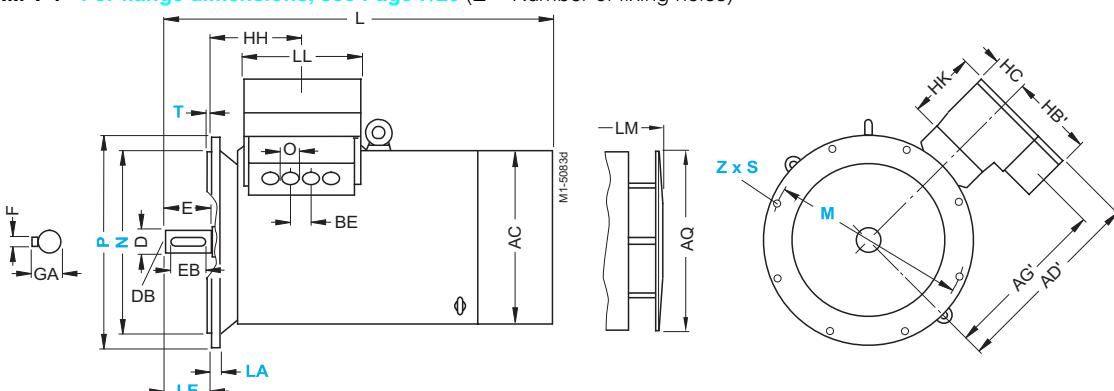
Dimensions

1LA8, 1MA8 · Frame sizes 315 to 450

IM B 3



IM V 1 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



Frame size	Type 1LA8 . . . 1MA8 . . .	No. of poles	Dimension drawing according to IEC																	
			A	AA	AB	AC ¹⁾	AD	AD'	AG	AG'	AQ	B	BA	BB	BC	BE	C	CA	H	HA
315	. . . 315	2	560	120	680	710	680	690	560	560	670	630	180	780	195	135	180	435	315	28
	. . . 317	4 to 8															180			
	. . . 31 . . .	4 to 8 ²⁾																		
355	. . . 353	2	630	150	780	790	710	730	585	600	750	800	220	980	185	135	200	470	355	35
	. . . 355	4 to 8															200	200		
	. . . 357																			
	. . . 35 . . .	4 to 8 ²⁾																(100)		
400	1LA8 403	2	710	150	860	880	875	930	775	795	850	900	220	1080	186	100	224	506	400	35
	1LA8 405	4 to 8																		
	1LA8 407																			
450	1LA8 453	2 ³⁾	800	180	980	970	910	980	810	845	950	1000	260	1220	170	100	250	540	450	42
	1LA8 455	4 to 8																		
	1LA8 457																			

■ The dimensions in brackets apply to 1LA8 357, 2-pole and 4-pole.

1) Measured across the screw heads (not in the flattened area of the fan cowl).

2) With bearing for increased lateral forces.

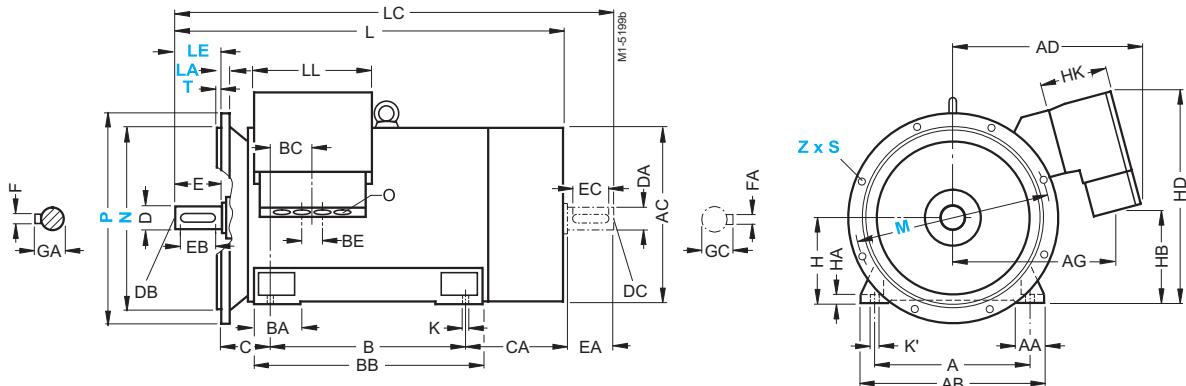
3) Only for 50 Hz.

Squirrel-cage motors

Dimensions

1LA8, 1MA8 · Frame sizes 315 to 450

IM B 35 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



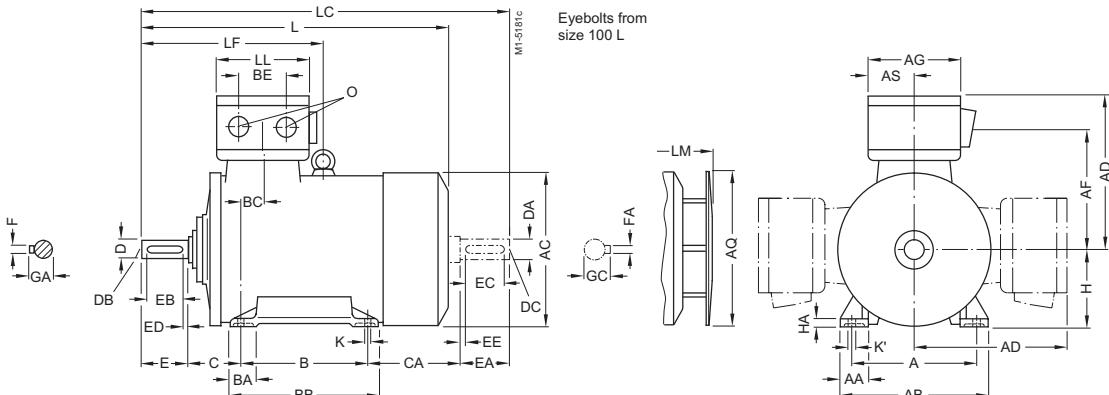
HB	HB'	HD	HK	K	K'	L	LC	LL	LM	O	Drive-end shaft extension					Non-drive-end shaft extension						
											D	DB	E	EB	F	GA	DA	DC	EA	EC	FA	GC
330	285	835	229	26	33	1370	1495	330	1500	M 72 x 2	65	M 20	140	125	18	69	50	M 16	110	100	14	53.5
						1400	1555		1530		85	M 20	170	140	22	90	70	M 20	140	125	20	74.5
						1420	1575				95	M 24	170	140	25	100	70	M 20	140	125	20	74.5
400	285	905	229	33	40	1595	1750	330	1735	M 72 x 2	75	M 20	140	125	20	79.5	60	M 20	140	125	18	64
(360)	(400)	(945)	(320)			1625	1810		1765	(550)	95	M 24	170	140	25	100	80	M 20	170	140	22	85
						1690	1874			(Ø 80)	100	M 24	210	180	28	106	80	M 20	170	140	22	85
440	400	1025	320	33	40	1785	1940	550	1395	Ø 80	80	M 20	170	140	22	85	70	M 20	140	125	20	74.5
						1825	2010		1975		110	M 24	210	180	28	116	90	M 24	170	140	25	95
525	400	1110	320	39	47	1945	2100	550	2105	Ø 80	90	M 24	170	140	25	95	75	M 20	140	125	20	79.5
						1985	2210		2145		120		210	180	32	127	100	M 24	210	180	28	106

Squirrel-cage motors

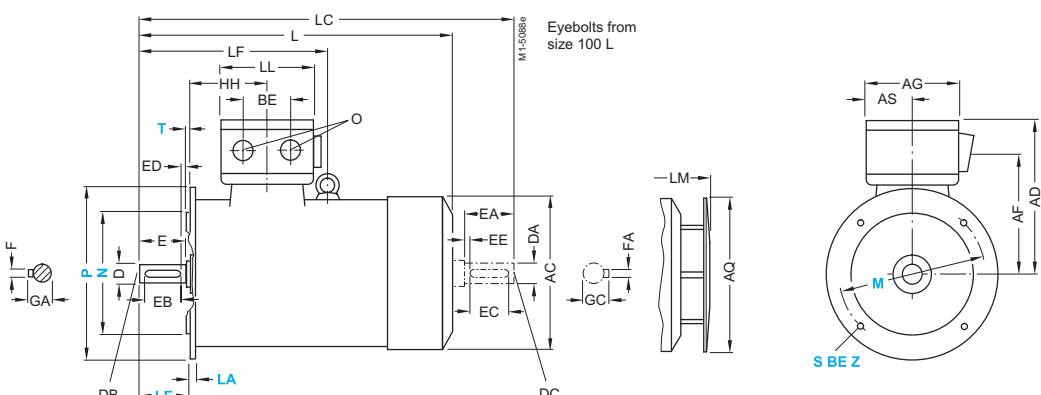
Dimensions

1MJ6 . Frame sizes 71 M to 160 L

IM B 3



IM B5 and IM V1 : For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



For motor			Dimension drawing according to IEC																					
Frame size	Type 1MJ6 ...	No. of poles	A	AA	AB	AC ¹⁾	AD	AF	AG	AQ	AS	B	BA	BB	BC	BE	C	CA	H	HA	HH	K	K'	L
71 M	....070	2 and 4	112	34	140	148.5	201 ²⁾	162	152	124	71	90	30	110	58	54	45	144	71	8	103	7	10	299
	....073	2 to 6																						
80 M	....080	2 to 6	125	36	160	165.5	209 ²⁾	170	152	125	71	100	35	125	44	54	50	156	80	10	93.5	9.5	13.5	336
	....083	2 to 6																						
90 L	....096	2 to 8	140	37	168	183	218	177	162	170	81	125	35	156	54	54	56	177	90	13	109.5	10	14	383
	....097	2 to 8																						
100 L	....106	2 to 8	160	45	196	202.5	223	182	162	170	81	140	45	176	50	54	63	185	100	14	112.5	12	16	426
	....107	4 and 8																						
112 M	....113	2 to 8	190	50	226	228.5	238	197	162	170	81	140	45	176	52	54	70	180	112	15	121.5	12	16	428
132 S	....130	2 to 8	216	53	256	267.5	258	217	162	250	81	140	49	180	55	54	89	228	132	17	144	12	16	515
	....131	2																						
132 M	....133	4 to 8	216	53	256	267.5	258	217	162	250	81	178	49	218	55	54	89	190	132	17	144	12	16	515
	....134	6																						
160 M	....163	2 to 8	254	60	300	323	280	239	162	250	81	210	57	256	40	54	108	238	160	20	148	15	19	641
	....164	2 and 8																						
160 L	....166	2 to 8	254	60	300	323	314	246	216	250	95	254	57	300	40	96	108	194	160	20	148	15	19	641

- 1) Measured across the screw heads.

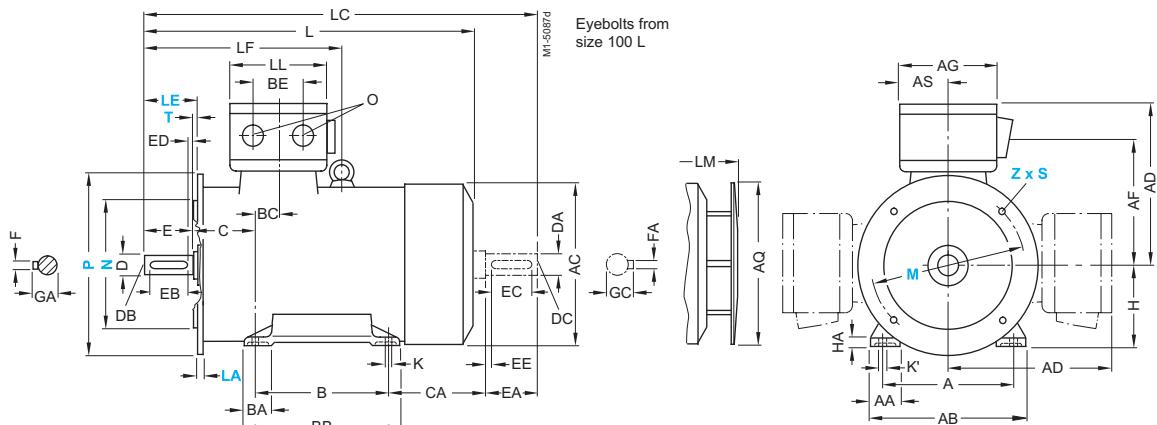
2) K09 and K10 from frame size 90 upwards.

Squirrel-cage motors

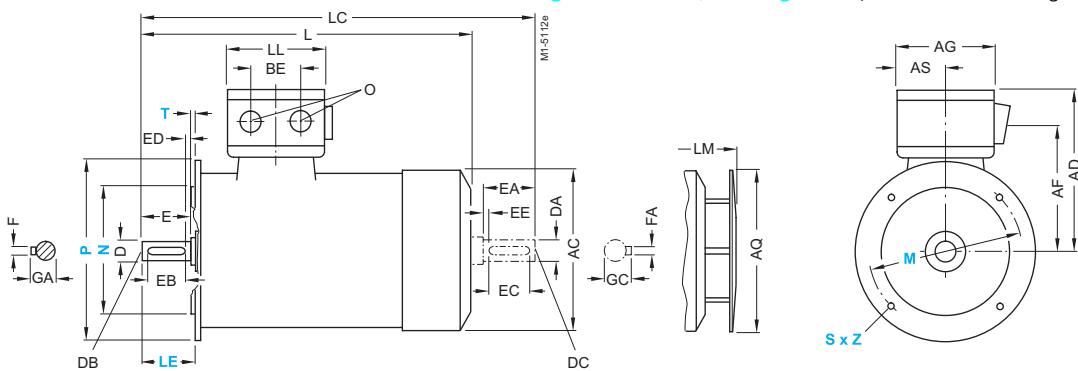
Dimensions

1MJ6 · Frame sizes 71 M to 160 L

IM B 35 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



IM B 14 – For 1MJ6 frame sizes 71 M to 90 L · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



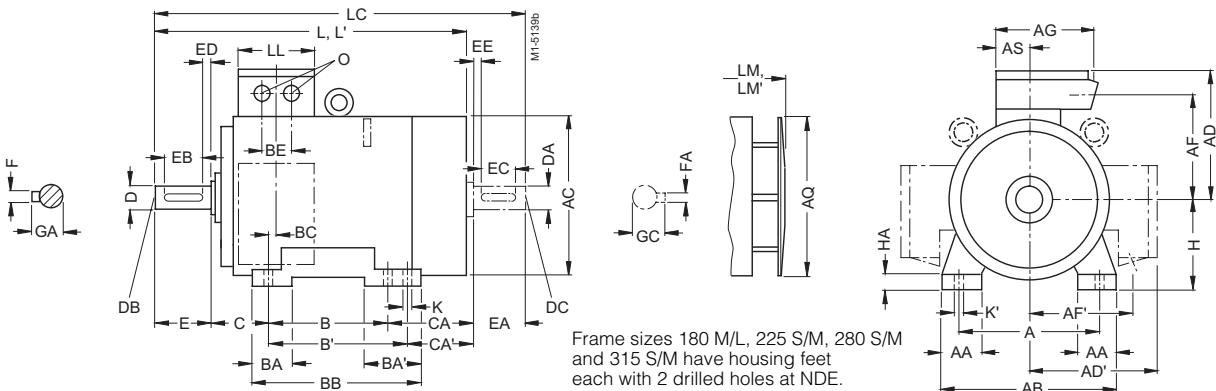
LC	LF	LL	LM	O	Drive-end shaft extension							Non-drive-end shaft extension						
					D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
339	–	132	327	2 x M25 x 1.5	14	M 5	30	22	4	5	16	14	M 5	30	22	4	5	16
386	–	132	362	2 x M25 x 1.5	19	M 6	40	32	4	6	21.5	19	M 6	40	32	4	6	21.5
458	–	162	434.5	2 x M25 x 1.5	24	M 8	50	40	5	8	27	24	M 8	50	40	5	8	27
508	–	162	477.5	2x M32 x 1.5	28	M 10	60	50	5	8	31	28	M 10	60	50	5	8	31
510	–	162	479.5	2x M32 x 1.5	28	M 10	60	50	5	8	31	28	M 10	60	50	5	8	31
617	–	162	567.5	2x M32 x 1.5	38	M 12	80	70	5	10	41	38	M 12	80	70	5	10	41
617	–	162	567.5	2x M32 x 1.5	38	M 12	80	70	5	10	41	38	M 12	80	70	5	10	41
776	383	162	693.5	2 x M40 x 1.5	42	M 16	110	90	10	12	45	42	M 16	110	90	10	12	45
776	383	190	693.5	2 x M40 x 1.5	42	M 16	110	90	10	12	45	42	M 16	110	90	10	12	45

Squirrel-cage motors

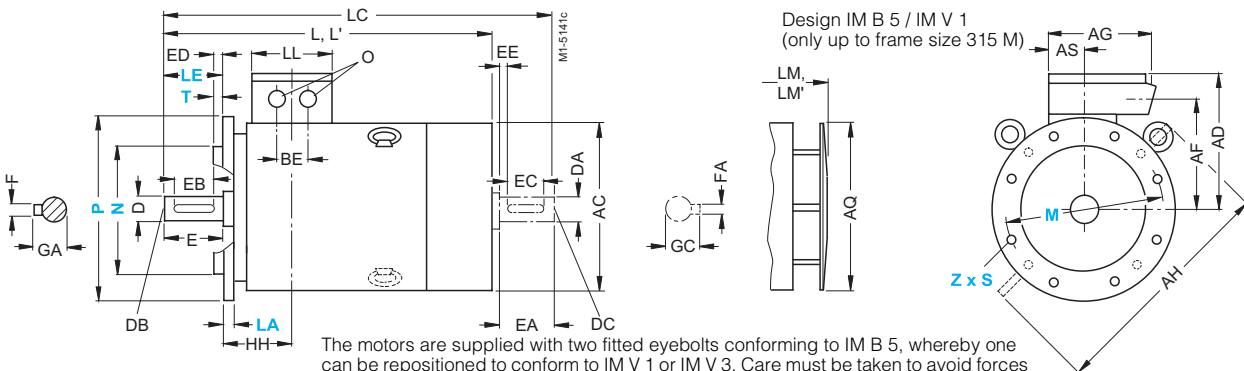
Dimensions

**1MJ6 · Frame sizes 180 M to 315 M,
1MJ8 · Frame sizes 315 M to 355**

IM B 3



IM B 5 and IM V 1 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



For motor		Frame size	Type	No. of poles	Dimension drawing according to IEC																						
A	AA	AB	AC ¹⁾	AD	AD'	AE	AE'	AE''	AF	AF'	AG	AH	AQ	AS	B	B'	BA	BA'	BB	BC	BE	C	CA				
180 M	1MJ6 183	2 and 4		279	65	344	375	306	306	—	—	—	259	259	220	470	340	82	241*	279	70	108	319	35	75	121	259
180 L	1MJ6 186	4 to 8		279	65	344	375	306	306	—	—	—	259	259	220	470	340	82	241	279*	70	108	319	35	75	121	—
200 L	1MJ6 206	2		318	80	398	415	349	349	—	—	—	289	289	262	530	340	98.5	305	—	85	85	355	42	85	133	239
	1MJ6 207	6		318	80	398	415	349	349	—	—	—	289	289	262	530	340	98.5	305	—	85	85	355	42	85	133	239
	1MJ6 207	2		318	80	398	415	349	349	—	—	—	289	289	262	530	340	98.5	305	—	85	85	355	42	85	133	239
	1MJ6 207	4 to 8		318	80	398	415	349	349	—	—	—	289	289	262	530	340	98.5	305	—	85	85	355	42	85	133	239
225 S	1MJ6 220	4 and 8		356	80	436	442	377	377	—	—	—	315	315	262	580	425	100	286*	311	85	110	361	25	90	149	269
225 M	1MJ6 223	2		356	80	436	442	377	377	—	—	—	315	315	262	580	425	100	286	311*	85	110	361	25	90	149	—
	1MJ6 223	4 to 8		356	80	436	442	377	377	—	—	—	315	315	262	580	425	100	286	311*	85	110	361	25	90	149	—
250 M	1MJ6 253	2		406	100	506	505	466	466	—	—	—	353	353	336	645	470	120	349	—	100	100	409	39	95	168	283
	1MJ6 253	4 to 8		406	100	506	505	466	466	—	—	—	353	353	336	645	470	120	349	—	100	100	409	39	95	168	283
280 S	1MJ6 280	2		457	100	557	555	491	491	—	—	—	395	395	336	700	525	120	368*	419	100	151	479	30	95	190	317
	1MJ6 280	4 to 8		457	100	557	555	491	491	—	—	—	395	395	336	700	525	120	368	419*	100	151	479	30	95	190	—
280 M	1MJ6 283	2		457	100	557	555	491	491	—	—	—	395	395	336	700	525	120	368	419*	100	151	479	30	95	190	—
	1MJ6 283	4 to 8		457	100	557	555	491	491	—	—	—	395	395	336	700	525	120	368	419*	100	151	479	30	95	190	—
315 S	1MJ6 310	2		508	120	628	620	558	558	—	—	—	448	448	410	805	590	135	406*	457	125	171	527	32	90	216	358
	1MJ6 310	4 to 8		508	120	628	620	558	558	—	—	—	448	448	410	805	590	135	406	457*	125	171	527	32	90	216	—
315 M	1MJ6 313	2		508	120	628	620	558	558	—	—	—	448	448	410	805	590	135	406	457*	125	171	527	32	90	216	—
	1MJ6 313	4 to 8		508	120	628	620	558	558	—	—	—	448	448	410	805	590	135	406	457*	125	171	527	32	90	216	—
315 M	1MJ8 313	2		508	120	630	622	—	—	—	—	—	494	—	—	—	—	—	457	—	130	130	570	—	—	216	—
	1MJ8 313	4 to 8		508	120	630	622	—	—	—	—	—	494	—	—	—	—	—	457	—	130	130	570	—	—	216	—
315 L	1MJ8 316	2		508	120	630	622	—	—	—	—	—	494	—	—	—	—	—	508	—	130	130	621	—	—	216	—
	1MJ8 316	4 to 8		508	120	630	622	—	—	—	—	—	494	—	—	—	—	—	508	—	130	130	621	—	—	216	—
355 M	1MJ8 353	2		610	120	700	698	—	—	520	740	710	—	—	480	—	—	—	560	—	150	150	650	—	—	254	—
	1MJ8 353	4 to 8		610	120	700	698	—	—	520	740	710	—	—	480	—	—	—	560	—	150	150	650	—	—	254	—
355 L	1MJ8 356	2		610	120	700	698	—	—	520	740	710	—	—	480	—	—	—	630	—	150	150	720	—	—	254	—
	1MJ8 356	4 to 8		610	120	700	698	—	—	520	740	710	—	—	480	—	—	—	630	—	150	150	720	—	—	254	—
355 M	1MJ8 357	4		610	120	700	698	—	—	520	740	710	—	—	480	—	—	—	630	—	150	150	720	—	—	254	—

* This dimension is assigned in DIN EN 50347 to the frame size listed.

1) Measured across the screw heads.

3) In the low-noise version, a second shaft end is not possible.

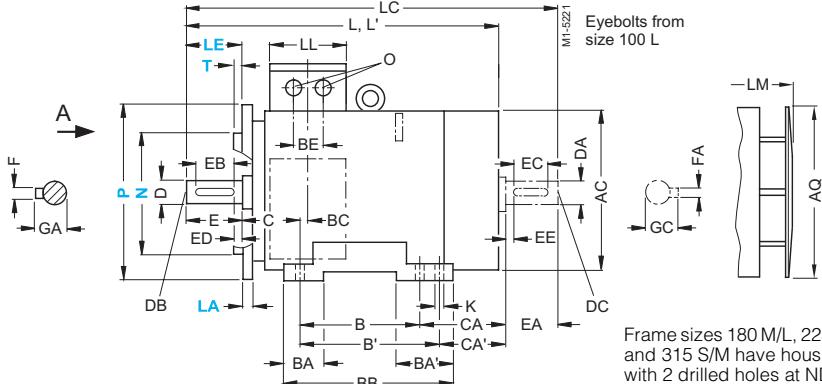
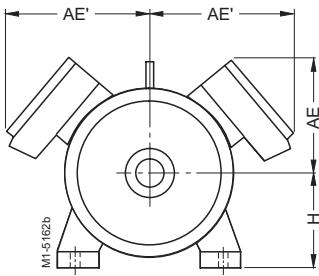
2) For version with low-noise fan.

Squirrel-cage motors

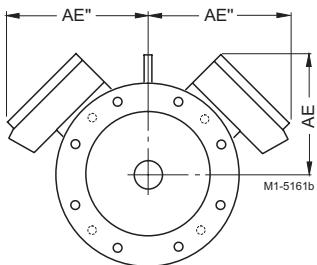
Dimensions

**1MJ6 · Frame sizes 180 M to 315 M,
1MJ8 · Frame sizes 315 M to 355**

IM B 35 · For flange dimensions, see Page 7/20 (Z = Number of fixing holes)



Frame sizes 180 M/L, 225 S/M, 280 S/M and 315 S/M have housing feet each with 2 drilled holes at NDE.

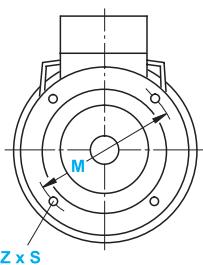
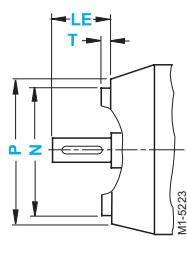
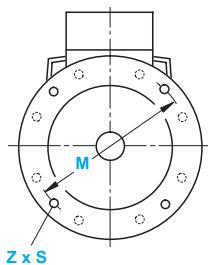
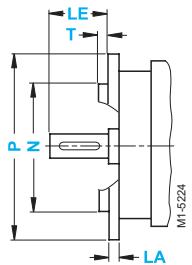


CA'	H	HH	HA	K	K'	L	L ⁽²⁾	LC ³⁾	LL	LM	LM ⁽²⁾	O	Drive-end shaft extension					Non-drive-end shaft extension									
													D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC	
-	180	156	26	15	20	715	770	841	164	796.5	885	2 x M 40 x 1.5	48	M 16	110	100	5	14	51.5	48	M 16	110	100	5	14	51.5	
221	180	156	26	15	20	715	-	841	164	796.5	-	2 x M 40 x 1.5	48	M 16	110	100	5	14	51.5	48	M 16	110	100	5	14	51.5	
-	200	175	34	19	25	771.5	825	897	197	853	910	2 x M 50 x 1.5	55	M 20	110	100	5	16	59	48	M 16	110	100	5	14	51.5	
-	200	175	34	19	25	771.5	825	897	197	853	910	2 x M 50 x 1.5	55	M 20	110	100	5	16	59	48	M 16	110	100	5	14	51.5	
-	225	174	34	19	25	839	-	954	197	939	-	2 x M 50 x 1.5	60	M 20	140	125	10	18	64	55	M 20	110	100	5	16	59	
244	225	174	34	19	25	809	855	924	197	909	955	2 x M 50 x 1.5	55	M 20	110	100	5	16	59	48	M 16	110	100	5	14	51.5	
-	225	174	34	19	25	839	-	954	939	-	-	60	140	125	10	18	64	55	M 20	110	100	5	16	59			
-	250	207	42	24	30	930	1010	1050	234	1035	1110	2 x M 63 x 1.5	60	M 20	140	125	10	18	64	55	M 20	110	100	5	16	59	
-	280	220	42	24	30	1010	1080	1155	234	1120	1230	2 x M 63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
-	280	220	42	24	30	1010	-	1080	1155	234	1120	1230	2 x M 63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64
-	315	248	56	28	35	1114	1185	1260	266	1224	1295	2 x M 63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
307	315	248	56	28	35	1114	1185	1260	266	1224	1295	2 x M 63 x 1.5	65	M 20	140	125	10	18	69	60	M 20	140	125	10	18	64	
-	315	-	30	28	28	1241	-	1440	-	1404	-	2 x M 63 x 1.5	65	M 20	140	125	18	69	65	M 20	140	125	18	69	-		
-	315	-	30	28	28	1343	-	1563	-	1455	-	2 x M 63 x 1.5	80	M 20	170	140	22	85	80	M 20	170	140	22	85	-		
-	315	-	30	28	28	1343	-	1563	-	1455	-	2 x M 63 x 1.5	80	M 20	170	140	22	85	80	M 20	170	140	22	85	-		
-	315	-	30	28	28	1351	-	1550	-	1514	-	35 - 75	65	M 20	140	125	18	69	65	M 20	140	125	18	69	-		
-	315	-	30	28	28	1453	-	1673	-	1565	-	35 - 75	80	M 20	170	140	22	85	80	M 20	170	140	22	85	-		
-	355	-	30	28	28	1650	-	1850	-	-	-	35 - 75	75	M 20	140	125	20	79.5	75	M 20	140	125	20	79.5	-		
-	355	-	30	28	28	1680	-	1910	-	-	-	35 - 75	90	M 24	170	140	25	95	90	M 24	170	140	25	95	-		
-	355	-	30	28	28	1680	-	1910	-	-	-	35 - 75	90	M 24	170	140	25	95	90	M 24	170	140	25	95	-		
-	355	-	30	28	28	1780	-	1980	-	-	-	35 - 75	75	M 20	140	125	20	79.5	75	M 20	140	125	20	79.5	-		
-	355	-	30	28	28	1810	-	2040	-	-	-	35 - 75	90	M 24	170	140	25	95	90	M 24	170	140	25	95	-		
-	355	-	30	28	28	1810	-	2040	-	-	-	35 - 75	90	M 24	170	140	25	95	90	M 24	170	140	25	95	-		

Squirrel-cage motors

Dimensions

Flange dimensions



In DIN EN 50347, flange FF with clearance holes and flange FT with tapped holes are assigned to the frame sizes.

The DIN 42948 standard with flanges A and C remains valid. See the assignment table below.
(Z = Number of fixing holes)

Frame size	Design, flange type	Flange with clearance holes (FF/A) tapped holes (FT/C) acc. to DIN EN 50 237	acc. to DIN 42 948	Dimension drawing according to IEC							
				LA	LE	M	N	P	S	T	Z
1LA5, 1LA6, 1LA7, 1LA9, 1LG4, 1LG6, 1MA6, 1MA7 and 1MJ6 motors											
56	IM B 5 flange	FF 100	A120	8	20	100	80	120	7	3	4
	IM B 14 standard flange	FT 65	C 80	—	20	65	50	80	M 5	2.5	4
	IM B 14 special flange	FT 85	C 105	—	20	85	70	105	M 6	2.5	4
63	IM B 5 flange	FF 115	A140	8	23	115	95	140	10	3	4
	IM B 14 standard flange	FT 75	C 90	—	23	75	60	90	M 5	2.5	4
	IM B 14 special flange	FT 100	C 120	—	23	100	80	120	M 6	3	4
71	IM B 5 flange	FF 130	A160	9	30	130	110	160	10	3.5	4
	IM B 14 standard flange	FT 85	C 105	—	30	85	70	105	M 6	2.5	4
	IM B 14 special flange	FT 115	C 140	—	30	115	95	140	M 8	3	4
80	IM B 5 flange	FF 165	A200	10	40	165	130	200	12	3.5	4
	IM B 14 standard flange	FT 100	C 120	—	40	100	80	120	M 6	3	4
	IM B 14 special flange	FT 130	C 160	—	40	130	110	160	M 8	3.5	4
90	IM B 5 flange	FF 165	A200	10	50	165	130	200	12	3.5	4
	IM B 14 standard flange	FT 115	C 140	—	50	115	95	140	M 8	3	4
	IM B 14 special flange	FT 130	C 160	—	50	130	110	160	M 8	3.5	4
100	IM B 5 flange	FF 215	A250	11	60	215	180	250	14.5	4	4
	IM B 14 standard flange	FT 130	C 160	—	60	130	110	160	M 8	3.5	4
	IM B 14 special flange	FT 165	C 200	—	60	165	130	200	M 10	3.5	4
112	IM B 5 flange	FF 215	A250	11	60	215	180	250	14.5	4	4
	IM B 14 standard flange	FT 130	C 160	—	60	130	110	160	M 8	3.5	4
	IM B 14 special flange	FT 165	C 200	—	60	165	130	200	M 10	3.5	4
132	IM B 5 flange	FF 265	A300	12	80	265	230	300	14.5	4	4
	IM B 14 standard flange	FT 165	C 200	—	80	165	130	200	M 10	3.5	4
	IM B 14 special flange	FT 215	C 250	—	80	215	180	250	M 12	4	4
160	IM B 5 flange	FF 300	A350	13	110	300	250	350	18.5	5	4
	IM B 14 standard flange	FT 215	C 250	—	110	215	180	250	M 10	4	4
	IM B 14 special flange	FT 250	C 300	—	110	265	230	300	M 12	4	4
180	IM B 5 flange	FF 300	A350	13	110	300	250	350	18.5	5	4
200	IM B 5 flange	FF 350	A400	15	110	350	300	400	18.5	5	4
225 2-pole 4-pole to 8-pole	IM B 5 flange	FF 400	A450	16	110	400	350	450	18.5	5	8
250	IM B 5 flange	FF 500	A550	18	140	600	550	660	22	6	8
280	IM B 5 flange	FF 500	A550	18	140	600	550	660	22	6	8
315 2-pole 4-pole to 8-pole	IM B 5 flange	FF 600	A660	22	140	600	550	660	22	6	8
1LA8, 1MA8 and 1MJ8 motors											
315 2-pole 4-pole to 8-pole	IM B 5 flange	—	—	25	140	740	680	800	22	6	8
355 2-pole 4-pole to 8-pole	IM B 5 flange	—	—	25	140	840	780	900	22	6	8
400 2-pole 4-pole to 8-pole	IM B 5 flange	—	—	28	170	940	880	1000	22	6	8
450 2-pole 4-pole to 8-pole	IM B 5 flange	—	—	30	170	1080	1000	1150	26	6	8

Squirrel-cage motors

Accessories and repair parts

Repair parts

- Siemens supply commitment for replacement motors and repair parts for the following periods after delivery of the motor:
 - Up to 5 years In the event of total motor failure Siemens will supply a fully compatible motor in terms of mounting dimensions and functions (possibly from a different Series).
 - Up to 5 years Repair parts can be supplied.
 - Up to 10 years Siemens provides information and, if necessary, documentation for repair parts.
- When ordering repair parts, the following data is required:
 - Part designation and number
 - Order No. and Serial No. of the motor
- Ordering example for a fan cowl 1LA7, frame size 160 M, 4-pole:
Fan cowl No. 7.40,
1LA7 163-4AA60, works No. J783298901018
- See Section 2 for bearing selection tables.
- Repair parts for 1MJ6, 1MJ8, 1MJ1, 1ME8, 1ML8 and 1LG8 motors and smoke extraction motors, on request.
- No obligation exists to supply repair parts of standard parts.
- Support – Hotline

In Germany
Tel.: 01 80/5 05 04 48

For telephone numbers in other countries, visit the following page on the Internet
[http://www.siemens.com/automation/
service&support](http://www.siemens.com/automation/service&support)

8/2

Accessories

Repair parts

- 1LA5 · Frame sizes 180 M to 225 M
- 1LA7 and 1MA7 · Frame sizes 56 M to 90 L
- 1LA6/7 and 1MA6/7 · Frame sizes 100 L to 160 L
- 1LA6 and 1MA6 · Frame sizes 180 M to 200 L
- 1LA6 and 1MA6 · Frame sizes 225 M to 315 L
- 1LA8 and 1MA8 · Frame sizes 315 to 450
- 1LG4 and 1LG6 · Frame sizes 180 M to 250 M
- 1LG4 and 1LG6 · Frame sizes 280 S to 315 L

Squirrel-cage motors

Accessories

Modular technology, slide rails, foundation blocks, tapered pins, couplings, encoder mounting

Modular technology

The components of the modular installation concept can be ordered as accessories. The brake is not permitted to be retrofitted due to its relevance for safety.

Cables for pulse generators can be ordered according to Catalogue DA 65.11.

Design	For motor Frame size	Order No.	Weight kg
Pulse generator	HTL version	1XP8 001-1	0.3
	TTL version	1XP8 001-2	0.3
Separately driven fan	100	2CW2 185-8RF14-1AA0	3.9
incl. mounting parts	112	2CW2 210-8RF14-1AA1	4.4
	132	2CW2 250-8RF14-1AA2	5.7
	160	2CW2 300-8RF14-1AA3	7.2
	180	2CW2 300-8RF14-1AA4	9.6
	200	2CW2 300-8RF14-1AA5	10.7
	225	2CW2 300-8RF14-1AA6	10.7
Separately driven fan and pulse generator 1XP8 001-1	100	2CW2 185-8RF14-2AA0	4.2
incl. mounting parts	112	2CW2 210-8RF14-2AA1	4.7
	132	2CW2 250-8RF14-2AA2	6.0
	160	2CW2 300-8RF14-2AA3	7.5
	180	2CW2 300-8RF14-2AA4	9.9
	200	2CW2 300-8RF14-2AA5	11.0
	225	2CW2 300-8RF14-2AA6	11.0

Slide rails with fixing bolts and tensioning screws to DIN 42 923

Slide rails are an easy and convenient means of adjusting the belt tension of a machine in the absence of an idler pulley. They are secured to the foundation with rag bolts or foundation blocks.

The assignment of slide rails to motor frame sizes is stated in DIN 42 923.

No standard slide rails are available for motors of frame sizes 355 to 450 (please inquire).

Sources include:
Lütgert & Co. GmbH
PO Box 42 51
D-33276 Gütersloh
Tel. +49 52 41-74 07-0
Fax +49 52 41-74 07-90
www.luetgert-antriebe.de
e-mail:
luetgert-antriebe@t-online.de

Foundation blocks to DIN 799

Foundation blocks are recessed into concrete foundations and grouted with cement. They have a number of uses, e.g. for fixing medium-sized machines, slide rails, pedestal bearings and base frames. After the fixing bolts have been removed, a machine can be shifted as required without having to lift it.

During initial installation, the foundation blocks, which are pinned and bolted to the machine (without shims), are not grouted until the latter has been properly aligned. The machine is first set down 2 to 3 mm lower than its first final position. The difference between the shaft heights is compensated by means of shims during the final assembly. The taper pins enable the machine to be repositioned accurately without having to realign it whenever it is removed and replaced.

Sources include:
Lütgert & Co. GmbH
PO Box 42 51
D-33276 Gütersloh
Tel. +49 52 41-74 07-0
Fax +49 52 41-74 07-90
www.luetgert-antriebe.de
e-mail:
luetgert-antriebe@t-online.de

Taper pins to DIN 258 with threaded ends and constant taper lengths

The purpose of taper pins is to ensure that parts which are frequently disassembled are aligned accurately. The hole for the taper pin is reamed so that, when the pin is inserted by hand, there is still about 3 to 4 mm of the taper projecting above the hole rim.

The pin is driven in fully with a hammer.

The pin is extracted by tightening a nut down on its threaded end.

Standard taper pins are available from normal commercial sources.

Sources include:
Otto Roth GmbH & Co. KG
Bäumleinsberg 54
91233 Neukirchen am Sand
Tel. +49 91 23-94 00 10
Fax +49 91 23-94 00 15

Couplings

In the majority of applications, the motor is connected to the drive by means of a flexible coupling.

Sources include:
KTR Kupplungstechnik GmbH
Rodder Damm 170
48432 Rheine
Tel. +49 59 71-7 98-0
Fax +49 59 71-7 98-6 98
www.ktr.de

Encoder mounting

On delivery or mounted by the customer.

Options: H74, H79, H75, H80
Hübner Elektromaschinen AG
10967 Berlin
Planufer 92b
Tel. +49 30-6 90 03-0
Fax +49 30-6 90 03-1 04
www.huebner-berlin.de

Options H71, H78
Leine & Linde (Deutschland) GmbH
73430 Aalen
Spitalstr. 19
Tel. +49 73 61-96 16 36
Fax +49 73 61-96 16 35
www.leinelinde.de

Squirrel-cage motors

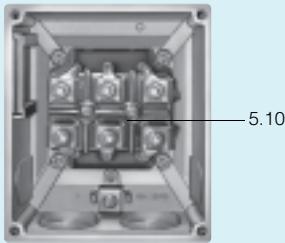
Repair parts

1LA5 squirrel-cage motors
Frame sizes 180 M to 225 M

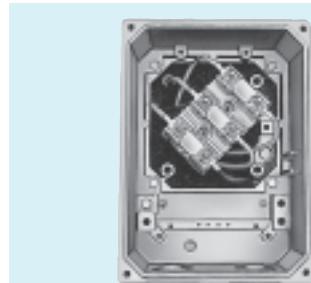
Selection and ordering data

For motor	
Frame size	Type
180 M	1LA5 183
180 L	1LA5 186
200 L	1LA5 206 1LA5 207
225 M	1LA5 220 1LA5 223

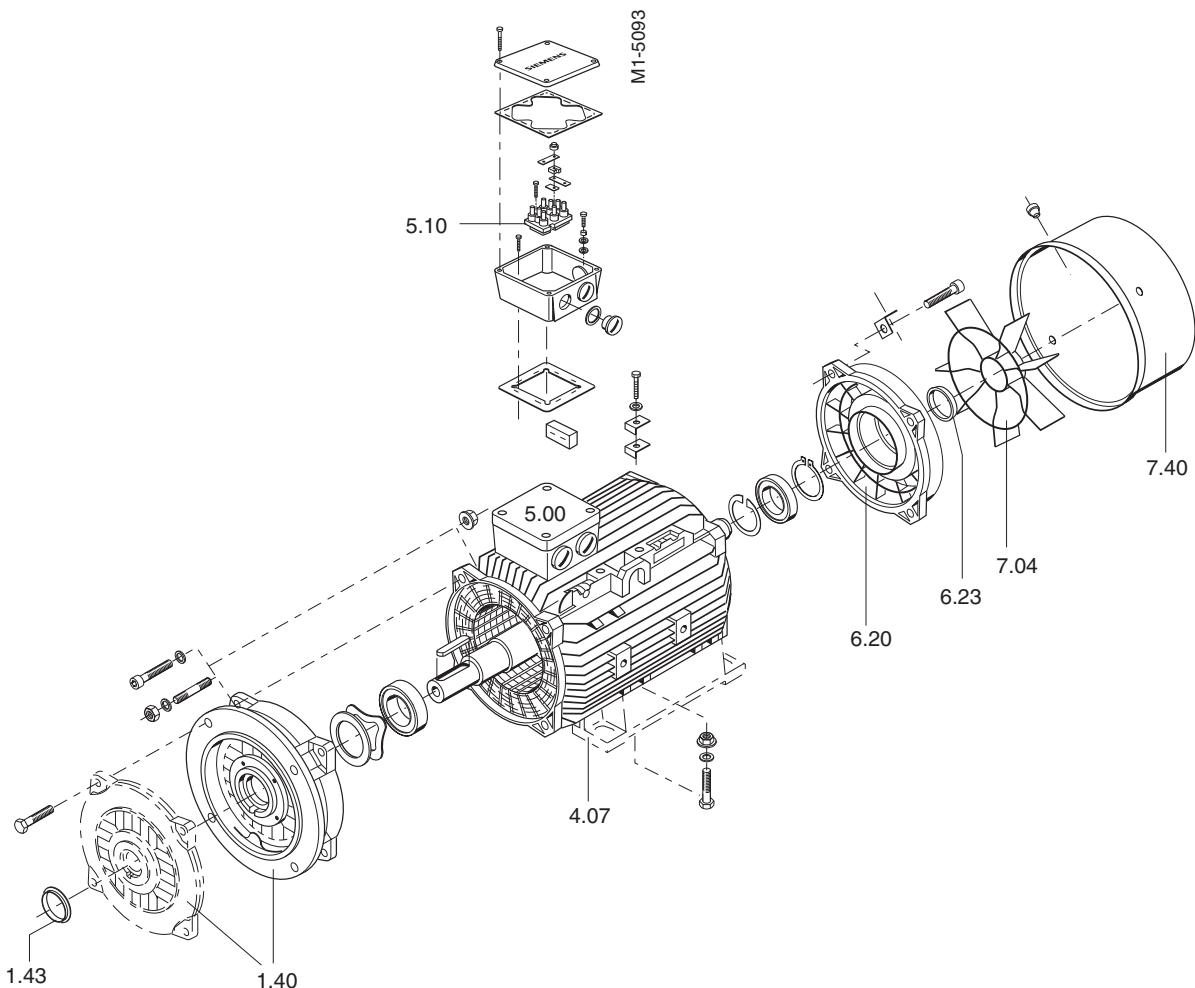
Motor (operating instructions 610.42348/21)	
Part No.	Designation
1.40	Bearing shield at drive end
1.43/6.23	V ring
4.07	Housing feet (2 units)
5.00	Terminal box, complete with terminal board
5.10	Terminal board
6.20	Bearing shield at non-drive end
7.04	External fan
7.40	Fan cowl



Terminal box gk 330



Terminal box gk 430



Squirrel-cage motors

Repair parts

1LA7 and 1MA7 squirrel-cage motors Frame sizes 56 to 90

Selection and ordering data

For motor	Frame size	Type	1LA7 . . . , 1MA7 . . .
	56 M	. . . 050	
		. . . 053	
	63 M	. . . 060	
		. . . 063	
	71 M	. . . 070	
		. . . 073	
	80 M	. . . 080	
		. . . 083	
	90 S	. . . 090	
	90 L	. . . 096	

Motor (op. instructions 5.61070000.10.000)

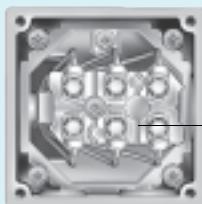
Part No.	Designation
1.40	Bearing shield at drive end
1.43/6.23	Shaft seal
4.07	Housing feet (2 units)
5.00	Terminal box, complete with terminal board
5.10	Terminal board
6.20	Bearing shield at non-drive end
7.04	External fan
7.40	Fan cowl

5.10 Terminal board

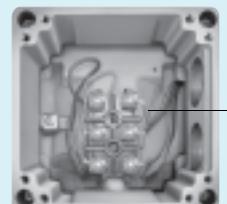
For motor	Type	Order No.
1LA7 05 . . . to 1LA7 09 . . .		1LY7 113
1MA7 06 . . . to 1MA7 09 . . .		1LY7 116

7.04 External fan

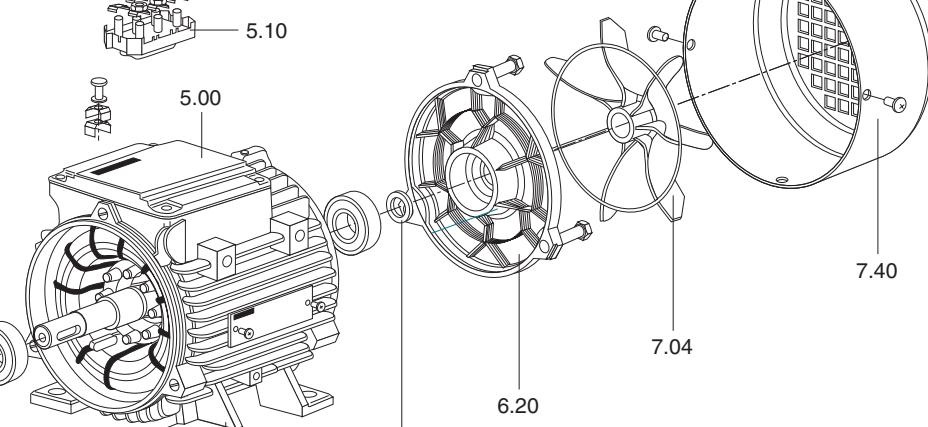
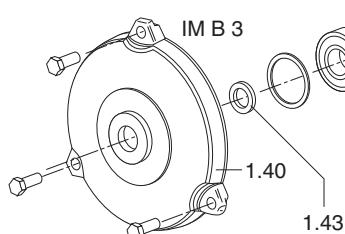
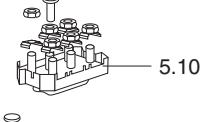
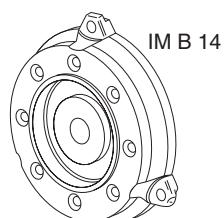
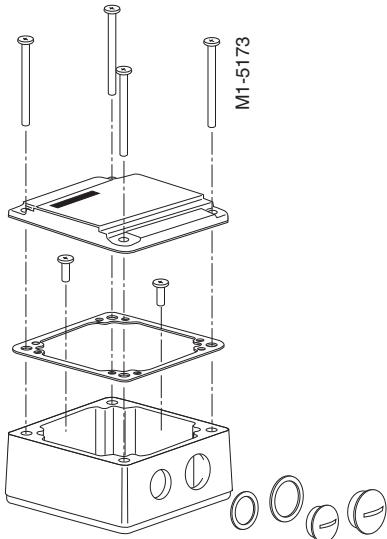
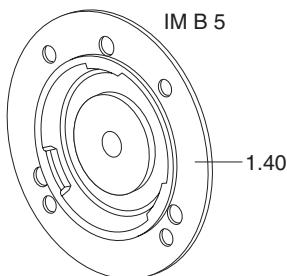
For motor	Frame size	Type	Order No.	Thermo-plastic	Metal
1LA7 . . . , 1MA7 . . .	63	. . . 06 . . .	1LY7 001	1LY7 201	
	71	. . . 07 . . .	1LY7 002	1LY7 202	
	80	. . . 08 . . .	1LY7 003	1LY7 203	
	90	. . . 09 . . .	1LY7 025	1LY7 225	



Terminal box gk 030 for 1LA7 motors



Terminal box gk 130 for 1MA7 motors



Squirrel-cage motors

Repair parts

1LA6/1LA7/1MA6/1MA7 squirrel-cage motors
Sizes 100 L to 160 L

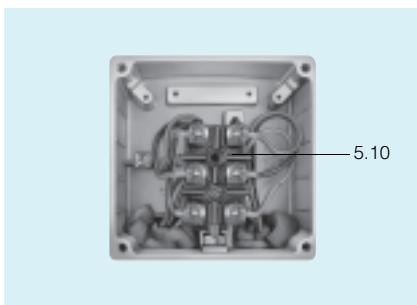
Selection and ordering data

For motor	Type
Frame size	1LA7 . . . , 1MA7 . . .
100 L	.... 106
112 M	.... 113
132 S	.... 130 131
160 M	.... 163 164
160 L	.... 166

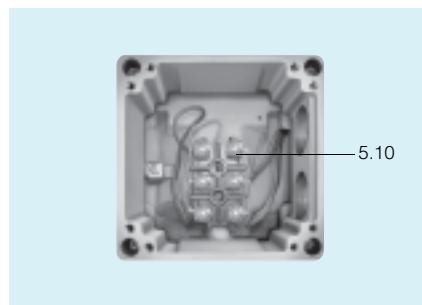
Motor (op. instructions 5.61070000.10.000)

Part No.	Designation
1.40	Bearing shield at drive end
1.43/6.23	Shaft seal
4.07	Housing feet (2 units)
5.00	Terminal box cover*, complete with terminal board
5.10	Terminal board
5.90	Terminal box on right or left side (order codes K09 or K10 respectively)
6.20	Bearing shield at non-drive end
7.04	External fan
7.40	Fan cowl

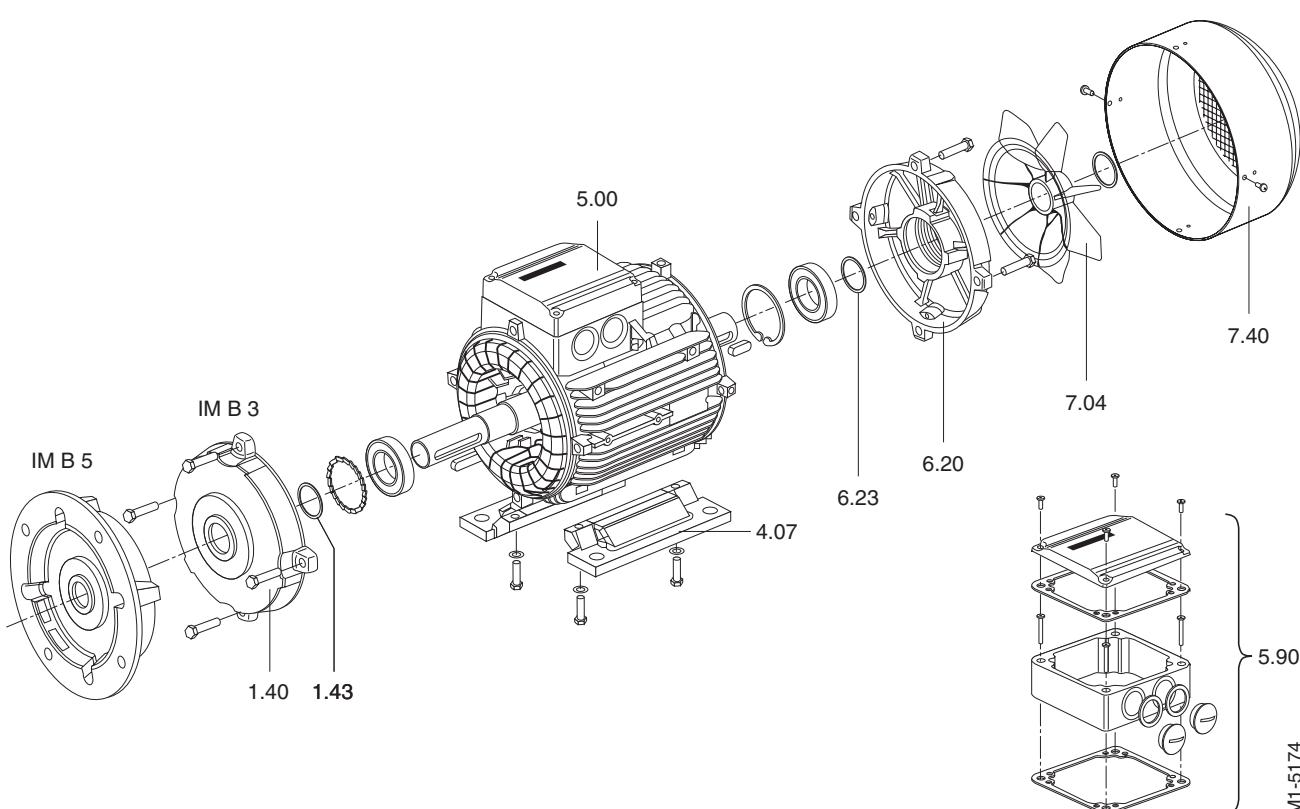
* Terminal box is cast-on



Terminal box gk 330 (1LA7)



Terminal box gk 335 (1LA6)



Squirrel-cage motors

Repair parts

1LA6 and 1MA6 squirrel-cage motors Frame sizes 180 M to 200 L

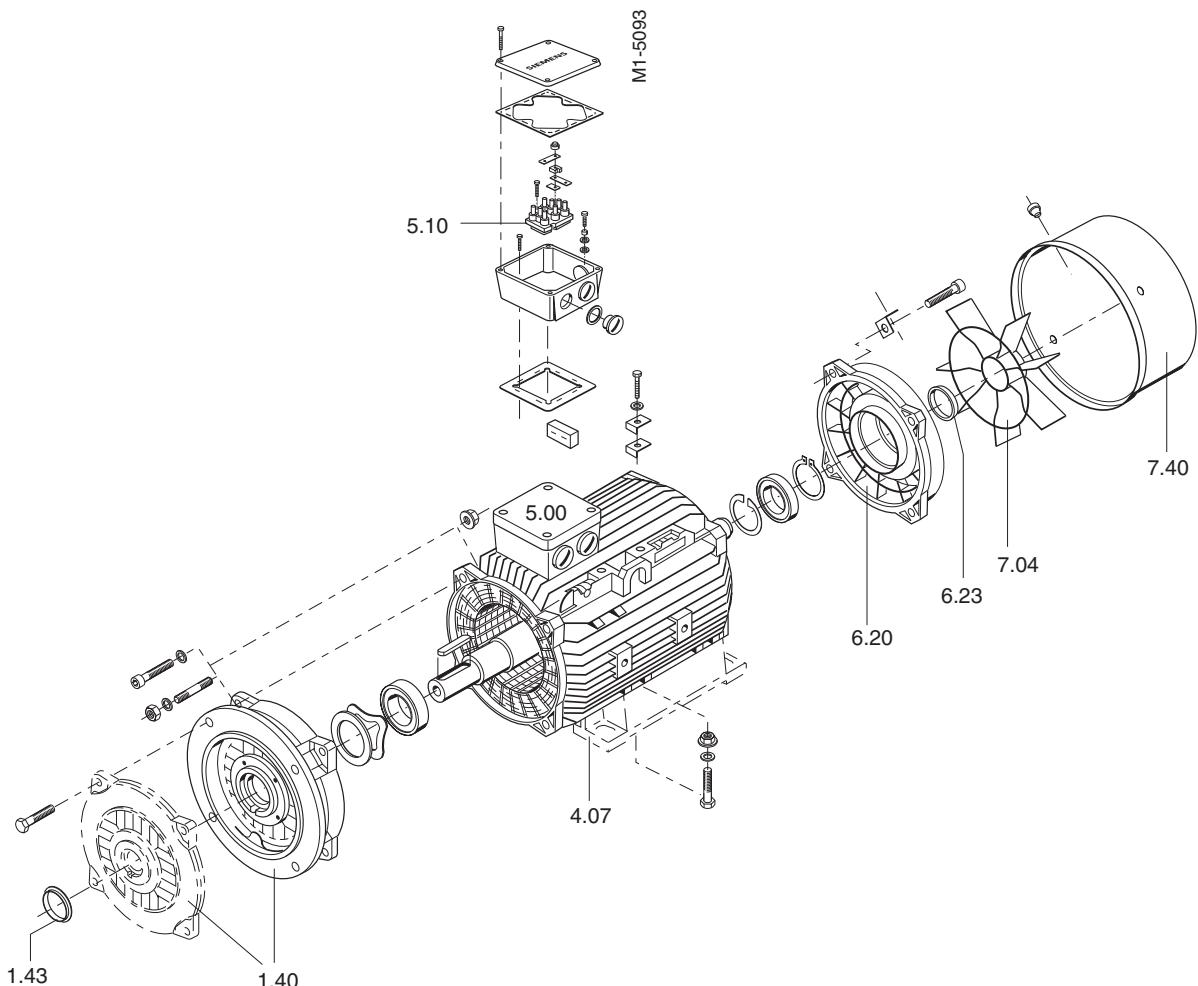
Selection and ordering data

For motor	
Frame size	Type
	1LA6 . . . , 1MA6 . . .
180 M	. . . 183
180 L	. . . 186
200 L	. . . 206 . . . 207

Motor (operating instructions 610.43106/21)	
Part No.	Designation
1.40	Bearing shield at drive end
1.43/6.23	V ring
4.07	Housing feet (2 units)
5.00	Terminal box, complete with terminal board
5.10	Terminal board
6.20	Bearing shield at non-drive end
7.04	External fan
7.40	Fan cowl



Terminal box 1XB7 222/322



Squirrel-cage motors

Repair parts

1LA6 and 1MA6 squirrel-cage motors
Frame sizes 225 M to 315 L

Selection and ordering data

For motor	Type
Frame size	1LA6 . . . , 1MA6 . . .
225 M	220
225 M	223
250 M	253
280 S	280
280 M	283
315 S	310
315 M	313
315 L	316 317 318

Motor (operating instructions NMA 2748 DE)

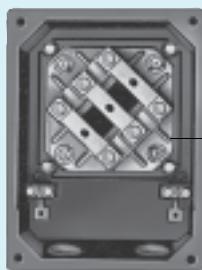
Part No.	Designation
5.00	Bearing shield at drive end
5.10	Flange bearing shield
6.00	Bearing shield at non-drive end
8.00	Rotor complete with external fan and rolling-contact bearing
10.10	Housing feet (2 units)
11.00	External fan
12.01	Fan cowl
12.70	Protective cover
20.00	Terminal box, complete with terminals

Bearing (operating instructions NMA 2924)

Part No.	Designation
4.20	Outer bearing cap on drive end
4.60	Inner bearing cap on drive end
3.20	Outer bearing cap on non-drive end
3.60	Inner bearing cap on non-drive end
3.10/4.10	V ring

1XB7 terminal box for frame sizes 225 M to 400 L (operating instructions NMA 2923)

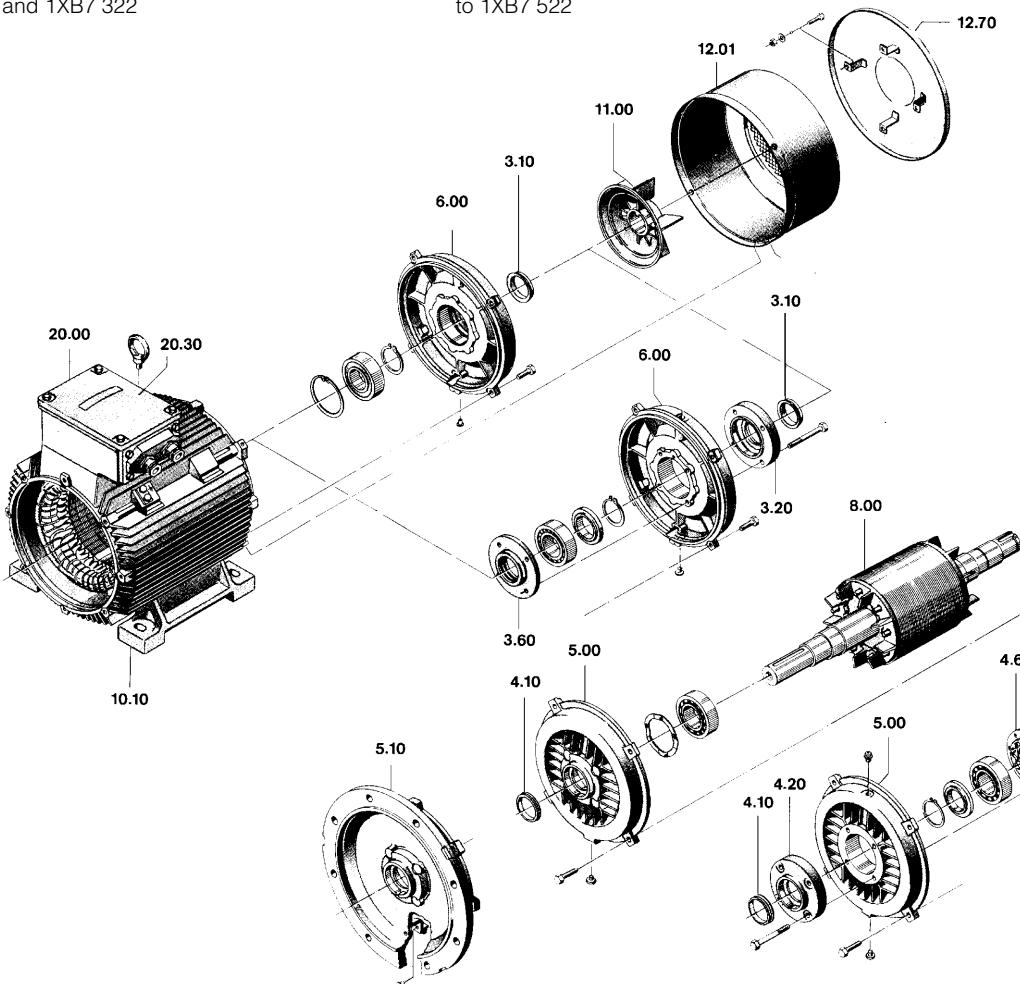
Part No.	Designation
20.30	Terminal box cover
21.40	Insulating plate (terminal board) without terminals



Terminal box 1XB7 222
and 1XB7 322



Terminal box 1XB7 422
to 1XB7 522



Squirrel-cage motors

Repair parts

1LA8 and 1MA8 squirrel-cage motors Frame sizes 315 to 450

Selection and ordering data

For motor

Frame size	Type
315	1LA8 ... , 1MA8 ...
	.... 315
	.... 317
355	.... 353
	.... 355
	.... 357
400	.... 403
	.... 405
	.... 407
450	.... 453
	.... 455
	.... 457

Motor (operating instructions NMA 3420 DE)

Part No.	Designation
5.00	Bearing shield at drive end
5.10	Flange bearing shield
6.00	Bearing shield at non-drive end
7.07	Integral fan
8.00	Rotor complete with external fan and rolling-contact bearing
11.04	External fan, unidirectional
11.05	External fan, bidirectional
12.01	Fan cowl
12.70	Protective cover
20.00	Terminal box, complete with terminals

Bearing (operating instructions NMA 2934, 2935, 2936 DE)

Part No.	Designation
3.20	Outer bearing cap on drive end
3.60	Inner bearing cap on drive end
4.20	Outer bearing cap on non-drive end
4.60	Inner bearing cap on non-drive end
3.10/4.10	V ring

1XB7 terminal box for frame sizes 315 and 355 (operating instructions NMA 2923 DE)

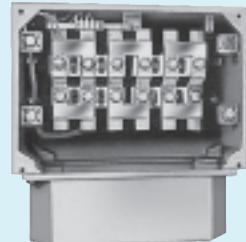
Part No.	Designation
20.30	Terminal box cover
21.40	Insulating plate (terminal board) without terminals

1XB1 terminal box for frame sizes 400 and 450 (operating instructions NMA 2937 DE)

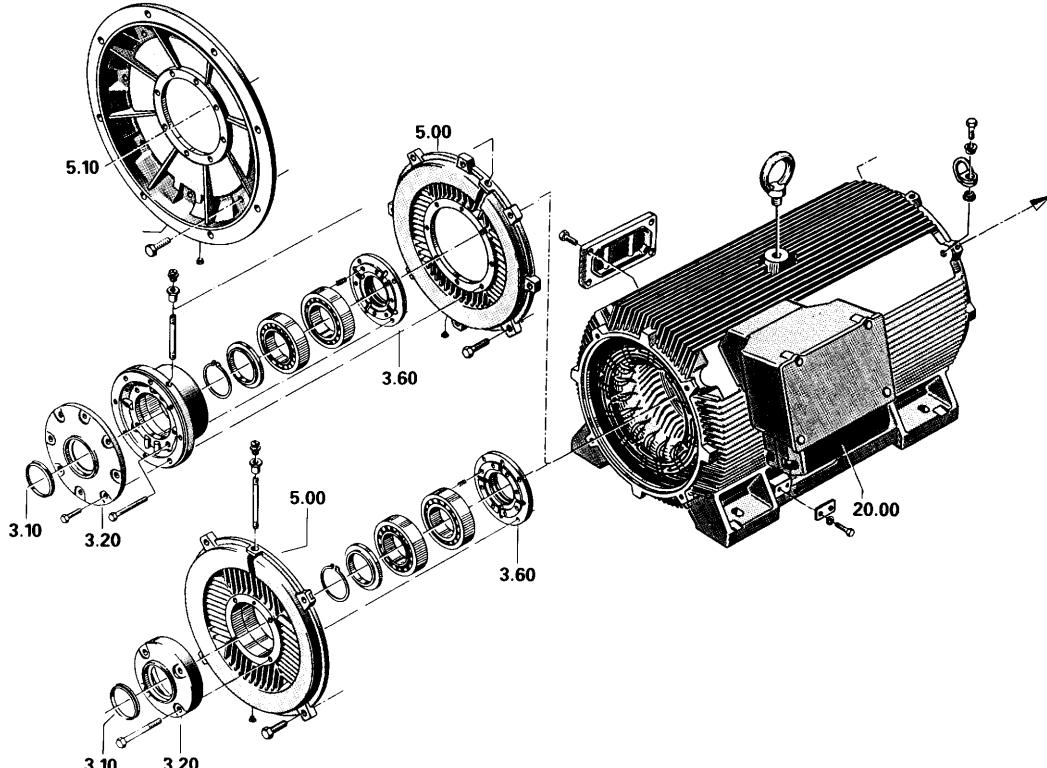
Part No.	Designation
20.00	Terminal box, complete
20.30	Terminal box cover
	Terminal post insulator



Terminal box 1XB7 622



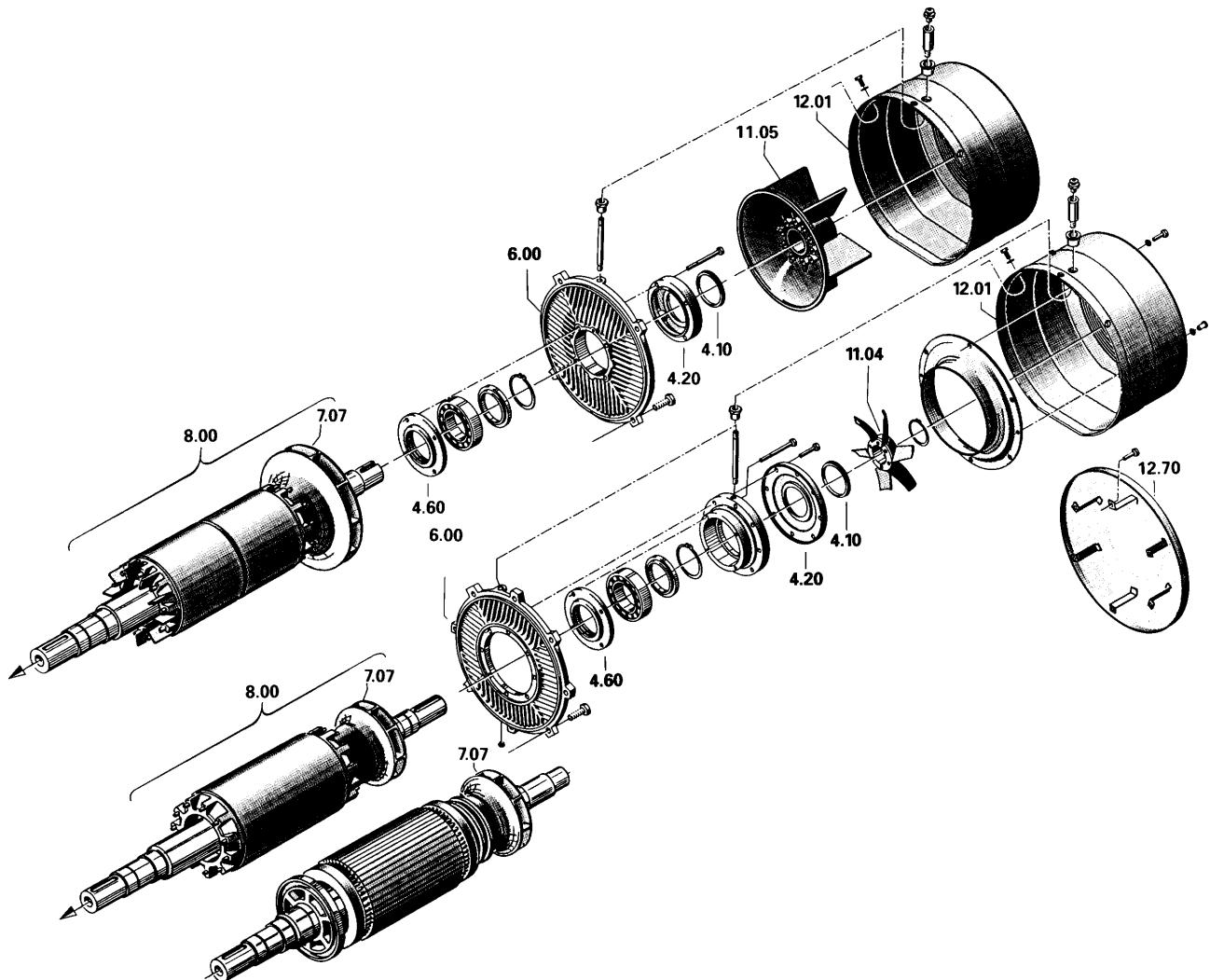
Terminal box 1XB1 631



Squirrel-cage motors

Repair parts

1LA8 and 1MA8 squirrel-cage motors
Frame sizes 315 to 450



Squirrel-cage motors

Repair parts

1LG4, 1LG6 squirrel-cage motors Frame sizes 180 M to 250 M

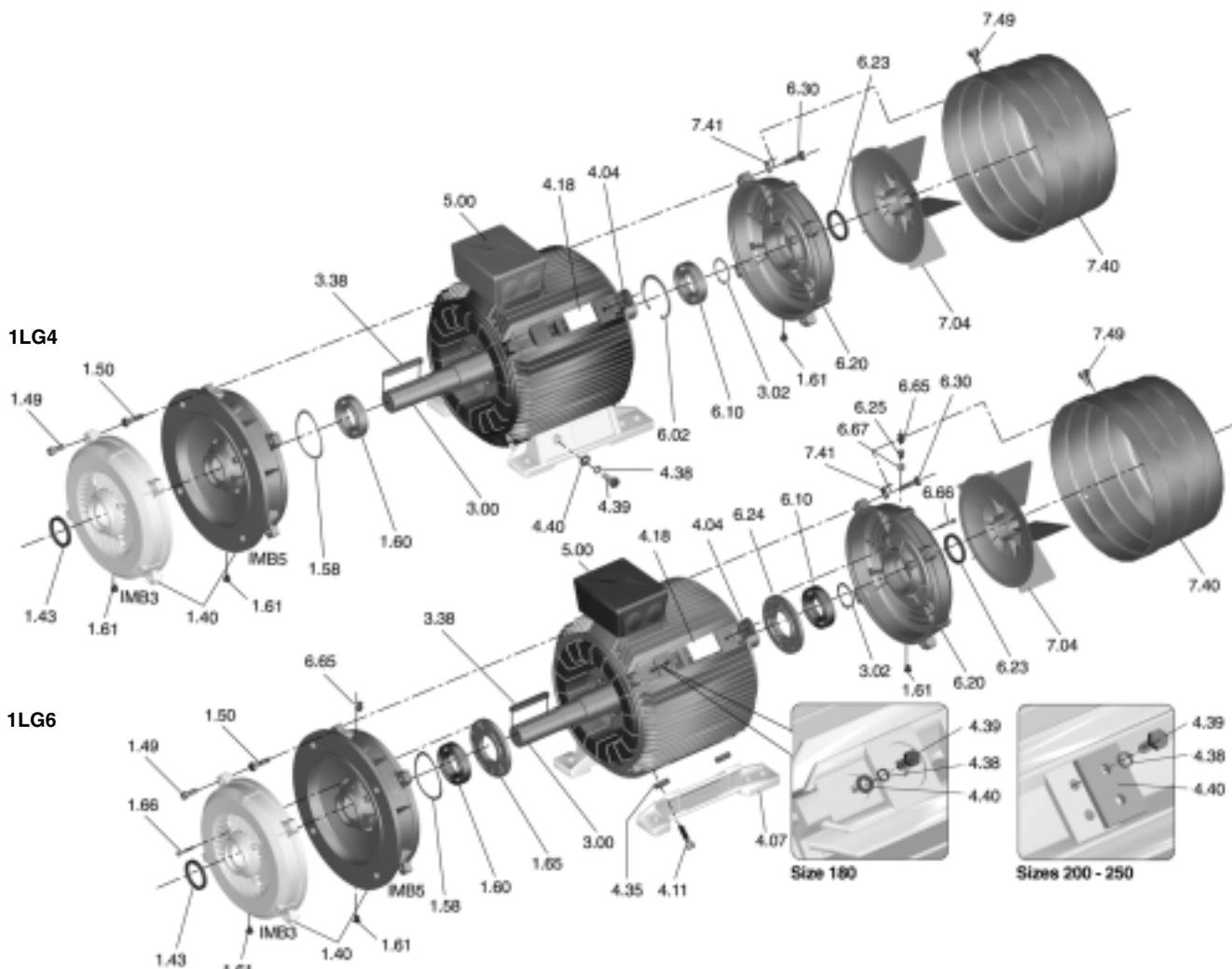
Selection and ordering data

For motor	Type
Frame size	1LG4 . . . , 1LG6 . . .
180 M	183
180 L	186
	188
200 L	206
	207
	208
225 S	220
225 M	223
	228
250 M	253
	258

Mounting and removal tackle is not supplied for rolling contact bearings, fans and drive components!

Motor (op. instructions 35037000000057)

Part No.	Designation	Part No.	Designation
1.00	Drive-end bearing	5.52	Terminal link
1.40	Bearing shield	5.70	Terminal clamp
1.43	Shaft seal	5.71	Outer bearing cap
1.58	Spring lock washer	5.72	Spun washer
1.60	Rolling contact bearing	5.83	Gasket
1.61	Sealing plugs	5.84	Terminal box cover
1.65	Bearing cap	5.89	Screw
1.67	Outer bearing cap	5.94	Screw
1.68	Spun washer	5.95	Terminal
1.69	Compression spring	5.96	Mounting rail
3.00	Rotor, complete	5.97	Brace, complete
4.00	Stator, complete	5.99	Contact plate
4.07	Housing feet (size 180 – right, left)	6.00	Bearing, non-drive end
4.18	Rating plate	6.10	Rolling contact bearing
4.35	Washer	6.20	Bearing shield
4.40	Washer	6.23	Shaft seal
4.41	Earthing strap	6.24	Bearing cap
5.00	Terminal box, complete	6.65	Grease nipple
5.03	Seal (size 200, string seal)	6.66	Rubber socket
5.10	Terminal board, complete	6.67	Lubrication pipe
5.33	Non-rotating washer	7.00	Ventilation, complete
5.34	Terminal clamp	7.04	Fan
5.35	Grommets	7.40	Fan cowl
5.44	Terminal box, top section	7.41	Bracket
5.51	Nut	7.49	Screw

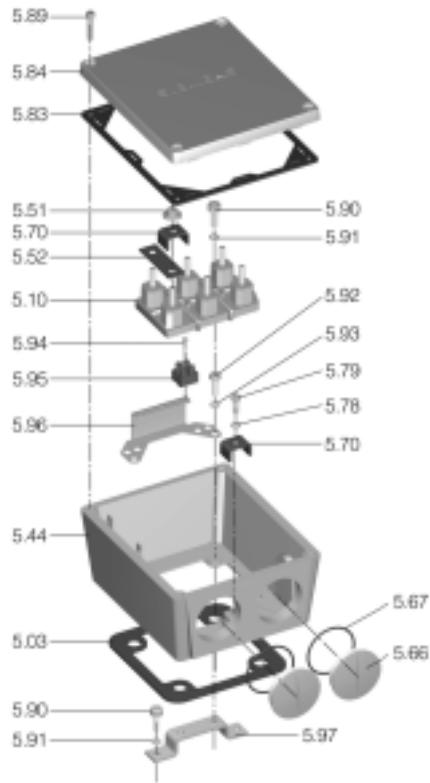


Squirrel-cage motors

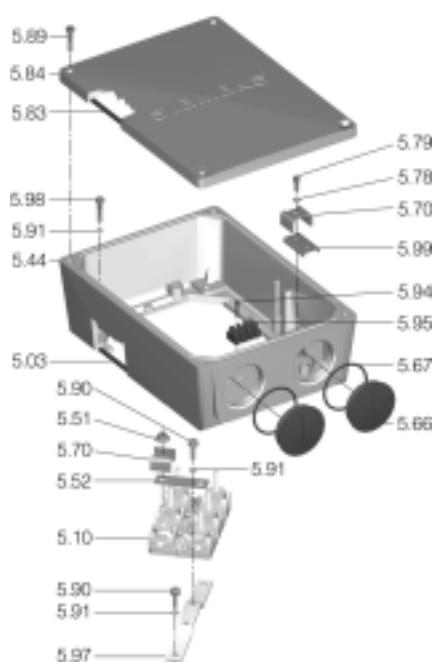
Repair parts

**1LG4, 1LG6 squirrel-cage motors
Frame sizes 180 M to 250 M**

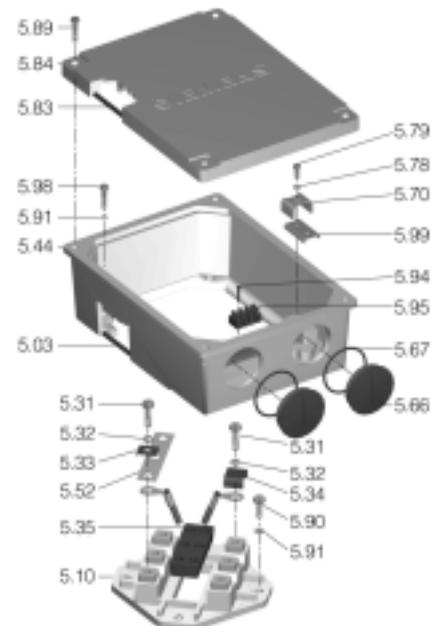
gk 330



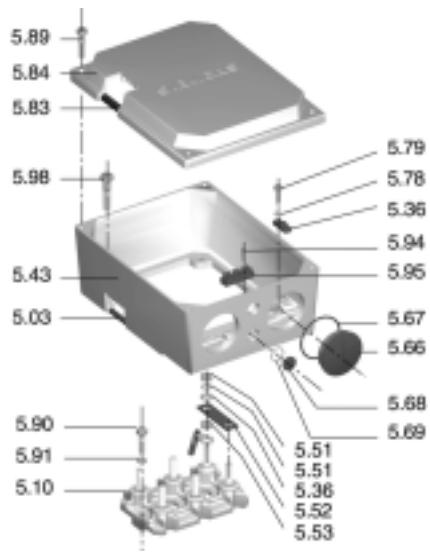
gk 430



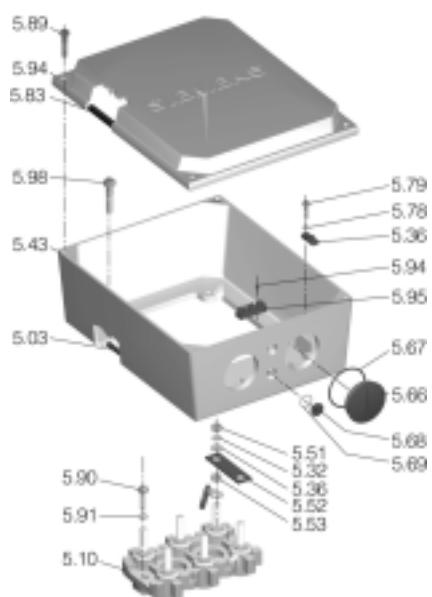
gk 431



gt 520



gt 620



Squirrel-cage motors

Repair parts

1LG4, 1LG6 squirrel-cage motors
Frame sizes 280 S to 315 L

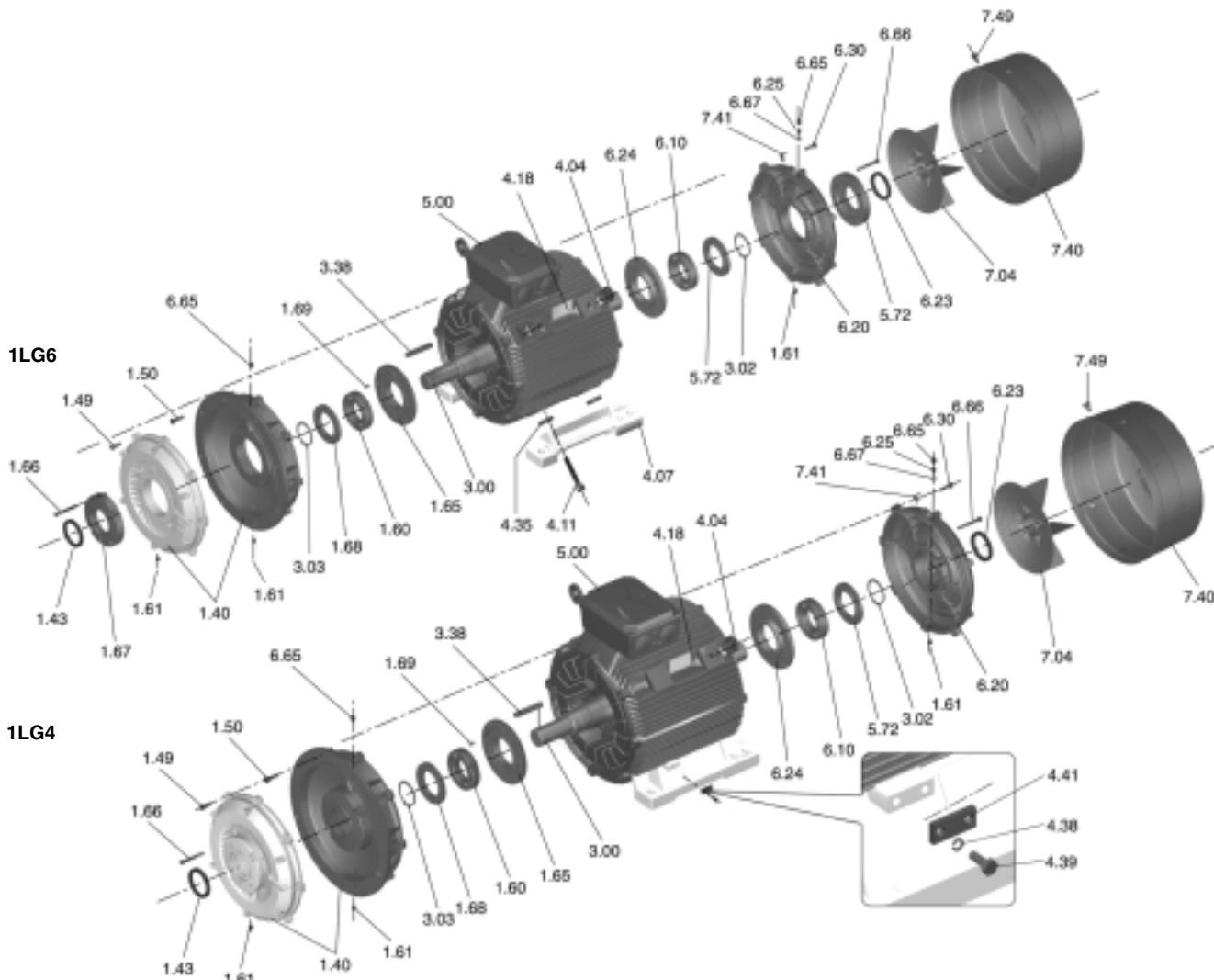
Selection and ordering data

For motor	Type
Frame size	1LG4 . . . , 1LG6 . . .
280 S	280
280 M	283
	288
315 S	310
315 M	313
315 L	316
	317
	318

Mounting and removal tackle is not supplied for rolling contact bearings, fans and drive components!

Motor (op. instructions 35037000000057)

Part No.	Designation	Part No.	Designation
1.00	Drive-end bearing	5.52	Terminal link
1.40	Bearing shield	5.70	Terminal clamp
1.43	Shaft seal	5.71	Outer bearing cap
1.58	Spring lock washer	5.72	Spun washer
1.60	Rolling contact bearing	5.83	Gasket
1.61	Sealing plugs	5.84	Terminal box cover
1.65	Bearing cap	5.89	Screw
1.67	Outer bearing cap	5.94	Screw
1.68	Spun washer	5.95	Terminal
1.69	Compression spring	5.96	Mounting rail
3.00	Rotor, complete	5.97	Brace, complete
4.00	Stator, complete	5.99	Contact plate
4.07	Housing feet (size 180 – right, left)	6.00	Bearing, non-drive end
4.18	Rating plate	6.10	Rolling contact bearing
4.35	Washer	6.20	Bearing shield
4.40	Washer	6.23	Shaft seal
4.41	Earthing strap	6.24	Bearing cap
5.00	Terminal box, complete	6.65	Grease nipple
5.03	Seal (size 200, string seal)	6.66	Rubber socket
5.10	Terminal board, complete	6.67	Lubrication pipe
5.33	Non-rotating washer	7.00	Ventilation, complete
5.34	Terminal clamp	7.04	Fan
5.35	Grommets	7.40	Fan cowl
5.44	Terminal box, top section	7.41	Bracket
5.51	Nut	7.49	Screw

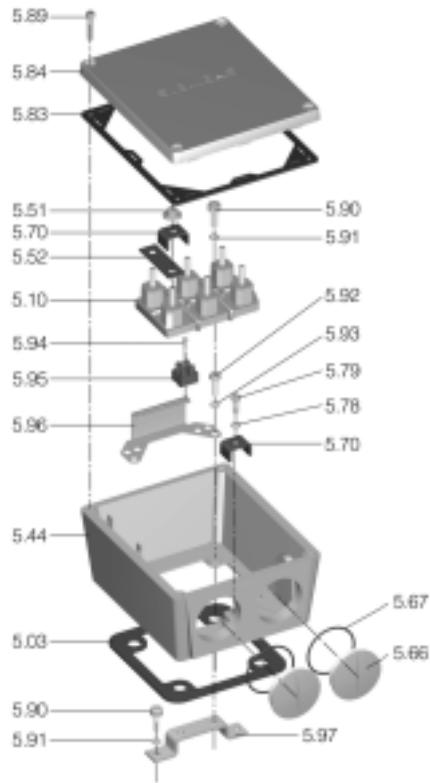


Squirrel-cage motors

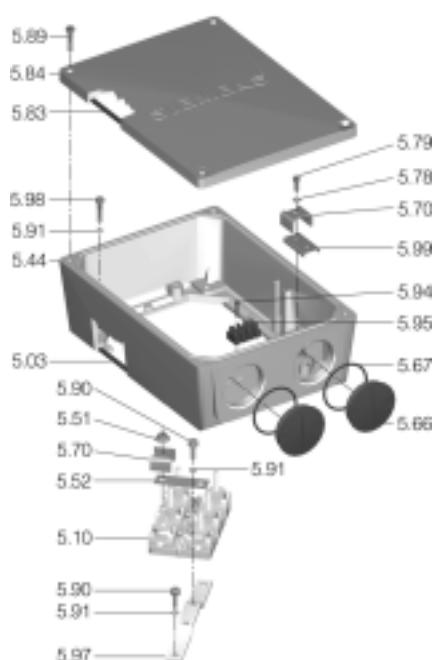
Repair parts

1LG4, 1LG6 squirrel-cage motors
Frame sizes 280 S to 315 L

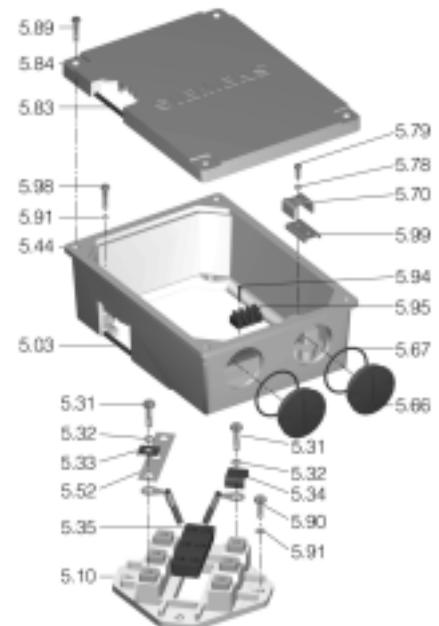
gk 330



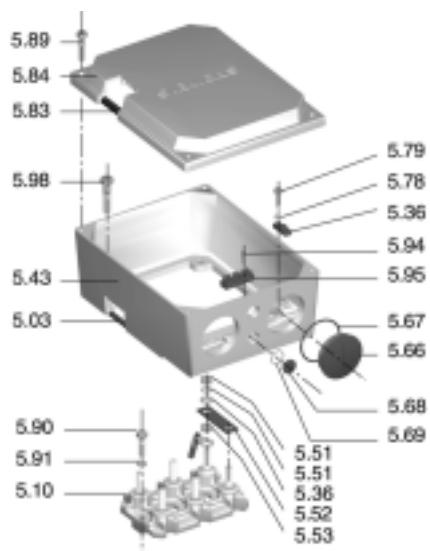
gk 430



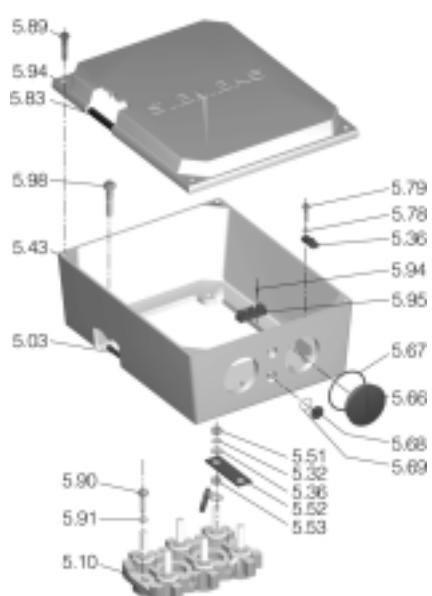
gk 431



gt 520



gt 620



Squirrel-cage motors

Repair parts

Notes

8

Squirrel-cage motors

Appendix

Environment, resources and recycling

Siemens AG has committed itself to protecting the environment and conserving valuable natural resources. This applies both to production and to the products we sell. As early as the development phase, the possible impact of future products and systems on the environment is taken into consideration. Our aim is to prevent environmental pollution or, at least, reduce it to a minimum and in doing so, look beyond existing regulations and legislation. The most important activities in the protection of the environment are:

- We are constantly endeavoring to minimize the environmental impact of our products as well as their consumption of energy and resources over and above the statutory environmental protection regulations.
- We take every possible step to prevent damage to the environment.
- The environmental impact is assessed and considered at the earliest possible stage of product and process planning.
- Our optimized environmental management strategy ensures that our environmental policy is effectively implemented. The technical and administrative procedures required for this purpose are reviewed at regular intervals and continuously updated.
- Environmental awareness is expected of all our employees. It is a permanent management task to consolidate and promote responsibility for the environment at all levels.
- We encourage our contract partners to act in accordance with the same environmental principles as ourselves. We cooperate with the responsible public authorities.
- We inform interested members of the public about the consequences of our corporate policies for the environment as well as our achievements to the benefit of the environment.
- All documentation is printed on chlorine-free bleached paper.

A/2	Overview of MICROMASTER 410/420/ 430/440
A/3	Overview of MICROMASTER 411/ COMBIMASTER 411/geared motors
A/4	Overview of customized motors
A/5	Siemens companies and representatives worldwide
Service & Support	
A/6	Information and ordering on the Internet and on CD-ROM
A/7	Our services for every phase of your project
A/8	Customer support
A/9	Subject index
A/11	Order number index
A/14	Conditions of sale and delivery Export regulations

A

Squirrel-cage motors

Appendix

Overview of MICROMASTER 410/420/430/440

The MICROMASTER inverters from Siemens ideally complement the motors. The table gives an overview of the features of these inverters. The

complete product spectrum with ordering data, technical details and designs is included in Catalogue DA 51.2.

You will find up-to-date information about AC inverters on the Internet at

<http://www.siemens.com/micromaster>

Main features	MICROMASTER 410 “Price-conscious” For variable speeds with 3-phase motors on single-phase supply systems, e.g. for pumps, fans, advertising panels, cabinets, gate drives and dispensing machines	MICROMASTER 420 “Universal” For 3-phase supply systems as well as optional fieldbus interfacing, e.g. in conveyor belts, material conveyors, pumps, fans and machine tools	MICROMASTER 430 “Optimized for pumps and fans” With optimized operator panel (manual/automatic changeover) adapted software functions and optimum power utilization	MICROMASTER 440 “Comprehensive” With finely tuned vector control (with and without sensor feedback) for numerous applications in sectors such as conveyor systems, textiles, elevators, hoisting gear and mechanical engineering
Output range	0.12 kW to 0.75 kW	0.12 kW to 11 kW	7.5 kW to 90 kW	0.12 kW to 250 kW
Voltage ranges	1-ph AC 100 V to 120 V 1-ph AC 200 V to 240 V	1-ph AC 200 V to 240 V 3-ph AC 200 V to 240 V 3-ph AC 380 V to 480 V	3-ph AC 380 V to 480 V	1-ph AC 200 V to 240 V 3-ph AC 200 V to 240 V 3-ph AC 380 V to 480 V 3-ph AC 500 V to 600 V
Closed-loop control	<i>U/f</i> characteristic Multipoint characteristic (parameterizable <i>U/f</i> characteristic) FCC (flux current control)	<i>U/f</i> characteristic Multipoint characteristic (parameterizable <i>U/f</i> characteristic) FCC (flux current control)	<i>U/f</i> characteristic Multipoint characteristic (parameterizable <i>U/f</i> characteristic) FCC (flux current control)	<i>U/f</i> characteristic Multipoint characteristic (parameterizable <i>U/f</i> characteristic) FCC (flux current control) Vector Control
Process control	–	Internal PI controller	Internal PI controller (auto tuning)	Internal PI controller (auto tuning)
Inputs	3 digital inputs 1 analog input	3 digital inputs 1 analog input	6 digital inputs 2 analog inputs 1 PTC/KTY input	6 digital inputs 2 analog inputs 1 PTC/KTY input
Outputs	1 relay output	1 analog output 1 relay output	2 analog outputs 3 relay outputs	2 analog outputs 3 relay outputs
Automation link	The PLC partner for LOGO®! and SIMATIC® S7-200	The ideal partner for your automation tasks, for SIMATIC S7-200 as well as for SIMATIC S7-300/400 (TIA) and SIMOTION®	The ideal partner for your automation tasks, for SIMATIC S7-200 as well as for SIMATIC S7-300/400 (TIA) and SIMOTION	The ideal partner for your automation tasks, for SIMATIC S7-200 as well as for SIMATIC S7-300/400 (TIA) and SIMOTION
Other features	Natural ventilation (no fan) Terminals are in the same locations as for conventional switching elements (e.g. contactors)	BICO technique	Energy-saving mode Load torque monitoring (detects dry running of pumps) Motor staging	3 selectable drive data sets Integral brake chopper (up to 75 kW) Torque control



Squirrel-cage motors

Appendix

Overview of MICROMASTER 411/ COMBIMASTER 411/geared motors

MICROMASTER 411/COMBIMASTER 411 inverters and geared motors from Siemens are available for decentralized implementation with the motors. The table gives an overview of the features of these

products. The complete product spectrum with ordering data, technical details and explanations can be found in Catalogues DA 51.3 MICROMASTER – COMBIMASTER,

M 15 geared motors and M 15.1 helical gear motors. You will find up-to-date information on MICROMASTER 411/COMBIMASTER 411 and geared motors on the Internet at

<http://www.siemens.com/combimaster>
<http://www.siemens.com/gearedmotors>

	MICROMASTER 411	COMBIMASTER 411	Geared motors			
Main features	“Decentralized” For a wide range of drives – simple stand-alone applications from pumps and fans through to multiple conveyor drives in networked control systems.		Helical gearbox	Flat gearbox	Right angle gearbox	Spur wheel wormshaft gearbox
Output range	0.37 kW to 3 kW		0.09 kW to 7.5 kW		0.12 kW to 7.5 kW	
Voltage ranges	3-ph AC 380 V to 480 V		230/400 V Δ/Y; 500 V Y; 400/690 V Δ/Y			
Housing/ frame sizes	CS B CS C	71 – 100 90/100	63 – 132			
Types of construction	–		IM B 3 IM B 5 IM V 1 (without protective cover) IM V 1 (with protective cover) IM B 14 (with standard flange) IM B 14 (with special flange) IM B 35		Foot-mounted type Flange-mounted type Universal type	
Degree of protection	IP 66	IP 55	IP 55 (IP 65, IP 56)			
Other technical features	U/f characteristic Multipoint characteristic (parameterizable U/f characteristic) FCC (flux current control) Internal PI controller 3 digital inputs 1 analog input 1 relay output Compound braking for controlled rapid braking		Housing from permanent-mold casting Torque 80 – 550 Nm	Aluminium housing Torque 130 – 660 Nm	Aluminium or cast-iron housing Torque 120 – 800 Nm	Aluminium or cast-iron housing Torque 70 – 1400 Nm



A

Squirrel-cage motors

Appendix

Overview of customized motors

In addition to the products offered in the catalogue, our range of motors also includes “customized motors”.

This means that we develop individual drive solutions for your special requirements, type them if necessary, and supply them in accordance with your logistical requirements.

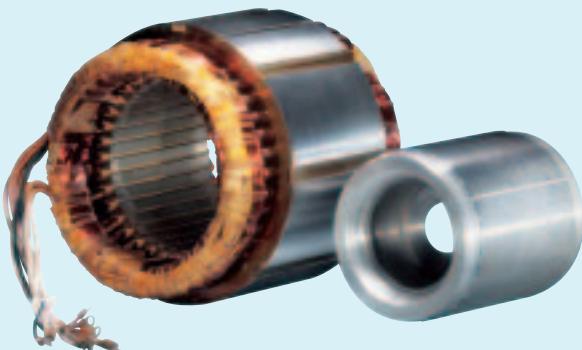
Our representatives worldwide can, of course, also be contacted in this regard (see Page A/5).

Please request a quotation.

In the following text, we have listed some of the “customized solutions” already implemented:

- High-quality motors for textile machines and compressors
- Motors with increased power/weight ratios
- Liquid-cooled motors
- Synchronous generators for spare-current sources
- Motors for wood machining plant
- Integral motors for cooling motors/compressors (refrigerator-proof)
- Roller motors for unsmooth running (e.g. rolling mill drive)
- Pump motors with special shafts / special materials
- Single-phase motors for industrial use
- Hoisting gear motors

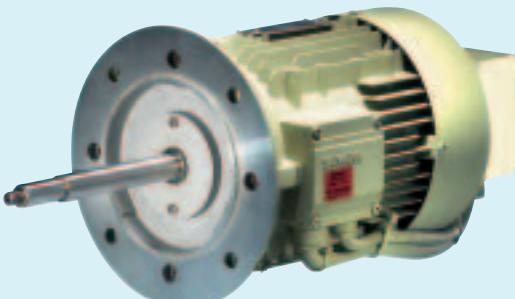
Integral motors for refrigeration



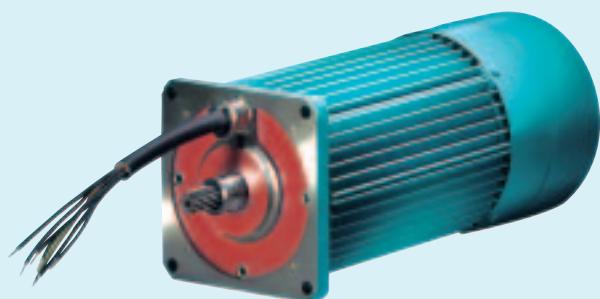
Roller motors for unsmooth running



Pump motor with special shafts / special materials



Lifting gear motor



Squirrel-cage motors

Appendix

Siemens companies and representatives worldwide

The screenshot shows the Siemens Automation and Drives website. The main menu includes "Home", "Storage", "Print", "Search", "Previous", "Next", and "Logout". The left sidebar has sections for "Automation and Drives", "Process & Equipment", "Services", and "Support". The right sidebar features a "Standorte" section with links to "The A&D Group", "Components", "Coating", "Jobs & Careers", and "Locations". Below this are links to "Spare Parts", "Country Directories", "Corporate Direct", "Automotive", "Electrical Engineering", "Plastics", "Metals", "Glass", and "Rubber". The central content area displays various product categories like "Industrial Automation Systems", "Drives", "Process Automation", "Industrial Software", "Communication", "Industrial Measurement", "Process Analytics", "Intelligent Reference Systems", "Software", and "Services". Each category has a list of sub-links.

The Siemens Automation and Drives Group (A&D) has built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

At the address

<http://www.siemens.com/automation>

you will find everything you need to know about products, systems and services.

The link "**Countries**" is available on the right.

This can be selected to navigate to the Internet sites of Siemens companies and representatives worldwide.

By switching the language to German and selecting the link "**Standorte**", you will also find details of the Siemens sales departments in Germany.

Here you will find addresses, telephone numbers, sketch maps and other helpful information.

In the footer of every A&D Internet page, you can select the following link

Kontakt

or

Contact

to obtain support specifically for the currently selected page (e.g. contact partners).

A

Squirrel-cage motors

Appendix · Service & Support

Information and ordering on the Internet and on CD-ROM

A&D in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

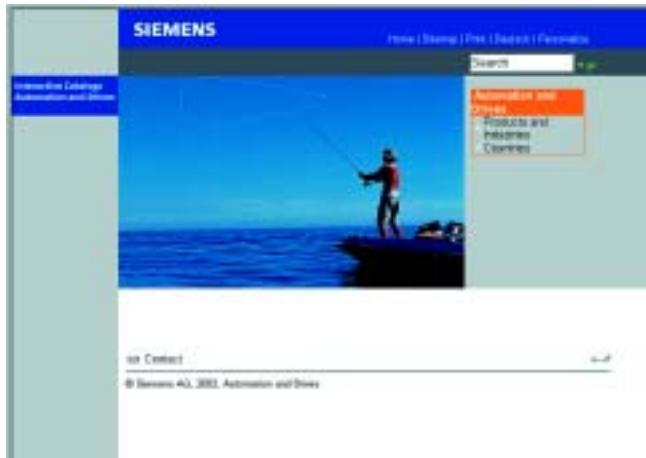
The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

<http://www.siemens.com/automation>

you will find everything you need to know about products, systems and services.

Product Selection Using the Interactive Catalogs



Detailed information together with convenient interactive functions:
The interactive catalogs CA 01 and ET 01 cover more than 80,000 products and thus provide a full summary of the Siemens Automation and Drives product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalogs can be found in the Internet under

<http://www.siemens.com/automation/ca01>

or on CD-ROM.

Automation and Drives, CA 01
Order No.:
E86060-D4001-A110-B6-7600

Electrical installation technology, ET 01
Order No.:
E86060-D8200-A107-A2-7600

Easy Shopping with the A&D Mall



The A&D Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the A&D Mall on the Internet under:

<http://www.siemens.com/automation/mall>

Our services for every phase of your project



In the face of harsh competition you need optimum conditions to keep ahead all the time: A strong starting position. A sophisticated strategy and team for the necessary support – in every phase. Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

In every phase: from planning and startup to maintenance and upgrading.

Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

Online Support



The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

<http://www.siemens.com/automation/service&support>

Technical Consulting



Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution.¹⁾

Service On Site



With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.

In Germany
Tel.: 0180 50 50 444²⁾

Optimization and Upgrading



To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading.¹⁾

Technical Support



Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

Tel.: +49 (0)180 50 50 222

Fax: +49 (0)180 50 50 223

E-mail:

adsupport@siemens.com

Configuration and Software Engineering



Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.¹⁾

Repairs and Spare Parts



In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.

In Germany
Tel.: 0180 50 50 448²⁾

1) Get in touch with the sales contact in your region for questions about these services. Our Helpline (tel.:

+49 (0) 180 50 50 111) will also put you through to the right contact or just visit our Internet site.

2) For country-specific telephone numbers go to our Internet site at:

<http://www.siemens.com/automation/service&support>

Squirrel-cage motors

Appendix · Service & Support

Customer support



Knowledge Base on CD-ROM



For locations without online connections to the Internet there are excerpts of the free part of the information sources available on CD-ROM (Service & Support Knowledge Base). This CD-ROM contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service and Technical Support.

The CD-ROM also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The CD-ROM will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on CD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base CD** from your Siemens contact.

Order no.

6ZB5310-0EP30-0BA2

Orders via the Internet
(with Automation Value Card or credit card) at:

<http://www.siemens.com/automation/service&support>

in the Shop domain.

Automation Value Card



Small card – great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase high-quality Support Tools in our Online Shop, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Automation Value Card order numbers

Credits	Order no.
200	6ES7 997-0BA00-0XA0
500	6ES7 997-0BB00-0XA0
1000	6ES7 997-0BC00-0XA0
10000	6ES7 997-0BG00-0XA0

Detailed information on the services offered is available on our Internet site at:

<http://www.siemens.com/automation/service&support>

Service & Support à la Card:

Examples

Technical Support

"Priority"	Priority processing for urgent cases
"24 h"	Availability round the clock
"Extended"	Technical consulting for complex questions

Support Tools in the Support Shop

"System Utilities"	Tools that can be used directly for configuration, analysis and testing
"Applications"	Complete topic solutions including ready-tested software
"Functions & Samples"	Adaptable blocks for accelerating your developments

A

Subject index

	Page		Page
A			
A&D in the WWW	A/6	Efficiency	2/16
A&D Mall	A/6	Electrical design	2/10 to 2/22
Abnormal frequencies	2/11	Electronic Catalogue SD 01	2nd Inside cover, 2/6
Abnormal voltages	2/11	Encoder mounting	8/2
Accessories	Section 8	Energy Efficiency Verification	2/8
Aluminium housing	3/2 to 3/11, 4/2	Energy Policy Act	2/8
Appendix	Section A	Energy-saving motors with	
Approvals	6/4	European efficiency classification	
Automation Value Card	A/8	to EU/CEMEP	2/8
Axial loads	2/40 to 2/43	Energy-saving motors	3/2 to 3/6, 3/12 to 3/17
B		Energy-saving range	2/6
Balance	2/27	Environment	A/1
Bearing diagrams	2/34 to 2/35	EPACT	3/6, 3/18
Bearing selection	2/30 to 2/33	Ex zones	3/26
Bearing service life	2/29	Explosion-proof enclosure "d"	2/9
Bearing shields	6/5	Explosion-proof enclosure	Section 5
Bearing system	2/30	Export regulations	A/16
Bearings for increased cantilever forces	2/37	External mountings for	
Bearings	2/29 to 2/35, 2/44, 6/5	1LA/1LG motors	2/58 to 2/59
Brakes	2/50 to 2/55	External mountings	3/27
C		Eyebolts	2/24
Cable entry	2/9	F	
Cantilever forces	2/36 to 2/39	F200	6/7 to 6/10
Cast iron housings	3/12 to 3/20, 4/3 to 4/5	F300	6/7 to 6/10
CEMEP	3/2, 3/5, 3/12, 3/16	F400	6/11 to 6/14
Certificates	6/3	Forced-air cooled motors	6/7, 6/8, 6/11, 6/12
Certification procedure	6/4	Foundation blocks	8/2
Certification	4/7, 5/7, 6/15	Frame design	2/23
Circuit	2/18 to 2/22	Frequencies	2/10 up to 2/12
Classification societies	6/2	Frequency	6/4
COMBIMASTER 411	2/46, A/3	Further external mountings for	
Companies worldwide	A/5	1LA/1LG motors	2/58 to 2/59
Conditions of sale and delivery	A/16	G	
Configuration of brake motors	2/55	Geared motors	A/3
Connection method	6/5	General information	2/2 to 2/6
Connection of motors	2/44	Grease life	2/44
Connection	2/18 to 2/22	H	
Converter mounting	3/27	Hazardous areas	2/9
Converter-fed operation	2/44	Heat extraction machinery	6/4
Coolant temperature	2/14, 2/15	High efficiency	3/5, 3/17
Cooling	2/23	Higher efficiency	6/3
Coupling to gearboxes	2/23	I	
Couplings	8/2	Improved efficiency	3/2, 3/12, 3/13
CSA approval	2/8	Increased cooling air temperature	6/3
Currents	2/10 to 2/12	Increased output	3/8, 3/20
Customized motors	A/4	Increased safety "e"	2/9
D		Increased safety	Section 4
Degree of protection "n"	2/9	Installation altitude	2/14, 2/15
Degree of protection EEx de IIC	2/9, Section 5	Insulation arrangement	6/4
Degree of protection EEx e II	2/9, Section 4	Insulation	2/17, 2/44
Degrees of protection	2/23	Interactive catalogues	A/6
Design and certification of explosion-proof motors in accordance with directive 94/9/EC (ATEX)	2/9	Internet links	2/6
Designs	2/3, 2/4	Introduction	1/2, 1/3
Dimension sheet generator	7/1	K	
Dimensions	2/56, 2/57, Section 7	Knowledge base on CD-ROM	A/8
Direction of rotation	2/24	L	
Distributed drive systems	2/46 to 2/47, 3/26	Lubricants	6/5
Double pole-change	3/9, 3/10	M	
Driving fans	3/10, 3/11	Marine motors	6/2, 6/3
E		Marine version	3/26, 4/7, 5/7
ECOFAST	2/46	Maximum axial loading	2/40 to 2/43
EEx de IIC	Section 5	Maximum cantilever forces	2/36 to 2/39
EEx e II	Section 4	Maximum load on the shaft end	6/6
eff1	3/5, 3/17	Mechanical design	2/23 to 2/43, 3/27, 4/7, 5/7,
eff2	3/2, 3/12, 3/13	Mechanical limit speeds	6/15, 6/2 2/45

Squirrel-cage motors

Appendix

Subject index

	Page		Page
Mechanical stress	2/44	S	2nd inside cover, 2/6
Mechanical stress	2/44	SD 01	2nd inside cover, 2/6
MICROMASTER 411	2/46	SD Configurator	Section 6
MICROMASTER	A/2, A/3	Sector solutions	Sections 3, 4, 5, 6
MICROSTARTER	2/47	Selection data	6/9, 6/10, 6/13, 6/14
Minimum air quantities	6/5	Self-cooled motors	2/49
Minimum efficiency levels	2/8	Separately driven fan	A/7
Modular technology	2/48 to 2/57, 3/27, 8/2	Service & Support	A/7
Motor protection	2/17, 3/25, 4/6, 5/6, 6/15, 6/3	Service locally	A/7
Motor series	6/4	Shaft extensions	2/27
Motor temperature detection	2/17, 2/44	SIMOVERT MASTERDRIVES	3/21 to 3/24
Motors for the U.S. market	2/8	Slide rails and tensioning screws	8/2
N		Smoke extraction machinery	6/4
National standards	2/7	Smoke extraction motors	6/4 to 6/15
NEMA	2/8	Software engineering	A/7
Noise for direct on-line operation	2/28	Spare parts	A/7, Section 8
Noise generation	2/44	Special designs	2/3, 2/4, 3/25 to 3/28, 4/6 to 4/7
Notes on commissioning	3/28, 6/15	Speed limits	5/6 to 5/7, 6/15
Notes on safety	3/28, 6/15	Speed	2/45
Notes on the dimensions	7/1	Spring-operated brake	2/24
Number of poles	6/4	Squirrel-cage motors 1LA, 1LG	Section 3
O		Squirrel-cage motors 1MA	Section 4
Online Support	A/7	Squirrel-cage motors 1MJ	Section 5
Operating mode	6/4	Standard voltages	2/10
Operation with		Standards and specifications	2/7
SIMOVERT MASTERDRIVES	3/21 to 3/24	Standards	2/7 to 2/9, 6/2, 6/4
Optimization	A/7	Standstill heating	2/17
Ordering data		Supervised construction approvals	6/4
Order No.	2/2	T	
Output tables	2/13, 2/14	Tapered pins	8/2
Outputs	2/13 to 2/15	Technical Consulting	A/7
Overview of "Special designs"	2/3, 2/4	Technical design	6/4
P		Technical information	Section 2
Packaging dimensions	2/5	Technical Support	A/7
Packaging weights	2/5	Temperature sensor	2/17
Packaging	2/5	Temperature/time class F300	6/7 to 6/10
Paint finish	2/5, 3/25, 4/6, 5/6, 6/15, 6/3, 6/5	Temperature/time class F400	6/11 to 6/14
Pole-change	3/9 to 3/11	Temperature/time classe F200	6/7 to 6/10
Power factor	2/16	Terminal boxes	2/18 to 2/22
Prelubrication	2/29	Tolerances for electrical data	2/7
Project engineering	A/7	Tolerances	2/7 to 2/9
Project planning aids	2/6	Trade marks	2nd inside cover
Pulse generator 14XP8 001	2/48	Triple pole-change	3/11
Pulse generator HOG10 D 1024 I	2/59	Types of construction	2/25 to 2/26
Pulse generator HOG9 D 1024 I	2/59		
Pulse generator LL 861 900220	2/58	U	
R		UL approval	2/8
Rated currents	2/12 to 2/13	Upgrading	A/7
Rated output	6/4	Use in smoke and heat, extraction	
Rated torque	2/16	machinery	6/4
Rating plates	2/15	Useful Internet links	2/6
Recycling	A/1		
Regulations	2/7 to 2/9, 6/2, 6/4	V	
Repair	A/7	Ventilation	2/23, 2/44
Representatives worldwide	A/5	Vibration severity	2/27
Resources	A/1	VIK design	2/9
Restarting	2/17	Voltage	6/4
		Voltages	2/10 to 2/12
W			
Water drain holes		Water drain holes	6/5
Weights		Weights	2/57
Winding protection		Winding protection	6/3
Windings		Windings	2/17, 3/25, 4/6, 6/15

Squirrel-cage motors

Appendix

Order number index

<i>Order No.</i>	<i>Page</i>	<i>Order No.</i>	<i>Page</i>
1LA5			
1LA5 18.	3/2, 3/3, 3/9, 3/10, 3/11, 3/22, 6/9, 6/10	1LG6 28.	3/16, 3/17, 3/18, 3/19, 3/23, 3/24, 6/9, 6/10, 6/13, 6/14
1LA5 20.	3/2, 3/3, 3/9, 3/10, 3/11, 3/22, 6/9, 6/10	1LG6 31.	3/16, 3/17, 3/18, 3/19, 3/23, 3/24, 6/9, 6/10, 6/13, 6/14
1LA5 22.	3/2, 3/3, 3/22, 6/9, 6/10		
1LA6		1MA6	
1LA6 10.	3/12, 3/13, 3/14, 3/15, 6/13, 6/14	1MA6 10.	4/3, 4/4, 4/5
1LA6 11.	3/12, 3/13, 3/14, 3/15, 6/13, 6/14	1MA6 11.	4/3, 4/4, 4/5
1LA6 13.	3/12, 3/13, 3/14, 3/15, 6/13, 6/14	1MA6 13.	4/3, 4/4, 4/5
1LA6 16.	3/12, 3/13, 3/14, 3/15, 6/13, 6/14	1MA6 16.	4/3, 4/4, 4/5
		1MA6 18.	4/3, 4/4, 4/5
		1MA6 20.	4/3, 4/4, 4/5
		1MA6 22.	4/3, 4/4, 4/5
		1MA6 25.	4/3, 4/4, 4/5
		1MA6 28.	4/3, 4/4, 4/5
		1MA6 31.	4/3, 4/4, 4/5
1LA7		1MA7	
1LA7 05.	3/2	1MA7 06.	4/2
1LA7 06.	3/2, 3/3, 3/9	1MA7 07.	4/2
1LA7 07.	3/2, 3/3, 3/9	1MA7 08.	4/2
1LA7 08.	3/2, 3/3, 3/9, 3/10, 6/9, 6/10	1MA7 09.	4/2
1LA7 09.	3/2, 3/3, 3/9, 3/10, 3/11, 6/9, 6/10	1MA7 10.	4/2
1LA7 10.	3/2, 3/3, 3/9, 3/10, 3/11, 3/22, 6/9, 6/10	1MA7 11.	4/2
1LA7 11.	3/2, 3/3, 3/9, 3/10, 3/11, 3/22, 6/9, 6/10	1MA7 13.	4/2
1LA7 13.	3/2, 3/3, 3/9, 3/10, 3/11, 3/22, 6/9, 6/10	1MA7 16.	4/2
1LA7 16.	3/2, 3/3, 3/9, 3/10, 3/11, 3/22, 6/9, 6/10		
1LA8		1MA8	
1LA8 31.	3/12, 3/13, 3/14, 3/15	1MA8 31.	4/3, 4/4, 4/5
1LA8 31.	3/21, 3/23, 3/24	1MA8 35.	4/3, 4/4, 4/5
1LA8 35.	3/12, 3/13, 3/14, 3/15		
1LA8 35.	3/21, 3/23, 3/24	1MJ1	
1LA8 40.	3/12, 3/13, 3/14, 3/15	1MJ1 35.	5/2, 5/3, 5/4, 5/5
1LA8 40.	3/21, 3/23, 3/24	1MJ1 40.	5/2, 5/3, 5/4, 5/5
1LA8 45.	3/12, 3/13, 3/14, 3/15	1MJ1 45.	5/2, 5/3, 5/4, 5/5
1LA8 45.	3/21, 3/23, 3/24	1MJ6	
		1MJ6 07.	5/2, 5/3, 5/4
		1MJ6 08.	5/2, 5/3, 5/4
		1MJ6 09.	5/2, 5/3, 5/4, 5/5
		1MJ6 10.	5/2, 5/3, 5/4, 5/5
		1MJ6 11.	5/2, 5/3, 5/4, 5/5
		1MJ6 13.	5/2, 5/3, 5/4, 5/5
		1MJ6 16.	5/2, 5/3, 5/4, 5/5
		1MJ6 18.	5/2, 5/3, 5/4, 5/5
		1MJ6 20.	5/2, 5/3, 5/4, 5/5
		1MJ6 22.	5/2, 5/3, 5/4, 5/5
		1MJ6 25.	5/2, 5/3, 5/4, 5/5
		1MJ6 28.	5/2, 5/3, 5/4, 5/5
		1MJ6 31.	5/2, 5/3, 5/4, 5/5
1LA9		1MJ8	
1LA9 05.	3/4, 3/6, 3/8	1MJ8 31.	5/2, 5/3, 5/4, 5/5
1LA9 06.	3/4, 3/6, 3/8	1MJ8 35.	5/2, 5/3, 5/4, 5/5
1LA9 07.	3/4, 3/6, 3/8		
1LA9 08.	3/4, 3/6, 3/8	1PP5	
1LA9 09.	3/4, 3/5, 3/6, 3/7, 3/8	1PP5 18.	6/7, 6/8
1LA9 10.	3/4, 3/5, 3/6, 3/7, 3/8	1PP5 20.	6/7, 6/8
1LA9 11.	3/4, 3/5, 3/6, 3/7, 3/8	1PP5 22.	6/7, 6/8
1LA9 13.	3/4, 3/5, 3/6, 3/7, 3/8		
1LA9 16.	3/4, 3/5, 3/6, 3/7, 3/8	1PP6	
1LA9 18.	3/4, 3/5, 3/6, 3/7, 3/8	1PP6 10.	6/11, 6/12
1LA9 20.	3/4, 3/5, 3/6, 3/7, 3/8	1PP6 11.	6/11, 6/12
		1PP6 13.	6/11, 6/12
		1PP6 16.	6/11, 6/12
		1PP6 18.	6/11, 6/12
		1PP6 20.	6/11, 6/12
		1PP6 22.	6/11, 6/12
		1PP6 25.	6/7, 6/8, 6/11, 6/12
		1PP6 28.	6/7, 6/8, 6/11, 6/12
		1PP6 31.	6/7, 6/8, 6/11, 6/12
1LG4			
1LG4 18.	3/12, 3/13, 3/14, 3/15, 3/20		
1LG4 20.	3/12, 3/13, 3/14, 3/15, 3/20		
1LG4 22.	3/12, 3/13, 3/14, 3/15, 3/20		
1LG4 25.	3/12, 3/13, 3/14, 3/15, 3/20		
1LG4 28.	3/12, 3/13, 3/14, 3/15, 3/20		
1LG4 31.	3/12, 3/13, 3/14, 3/15		
1LG6			
1LG6 18.	3/16, 3/17, 3/18, 3/19, 3/23, 3/24, 6/13, 6/14		
1LG6 20.	3/16, 3/17, 3/18, 3/19, 3/23, 3/24, 6/13, 6/14		
1LG6 22.	3/16, 3/17, 3/18, 3/19, 3/23, 3/24, 6/13, 6/14		
1LG6 25.	3/16, 3/17, 3/18, 3/19, 3/23, 3/24, 6/9, 6/10, 6/13, 6/14		

Squirrel-cage motors

Appendix

Order number index

Order No. *Page*

1PP7

1PP7 08.	6/7, 6/8
1PP7 09.	6/7, 6/8
1PP7 10.	6/7, 6/8
1PP7 11.	6/7, 6/8
1PP7 13.	6/7, 6/8
1PP7 16.	6/7, 6/8

A

Squirrel-cage motors

Appendix

Notes

A

Squirrel-cage motors

Appendix

Conditions of sale and delivery Export regulations

Terms and Conditions of Sale and Delivery

in the Federal Republic of Germany

By using this catalog you can acquire hardware and software products described therein from the Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside the Federal Republic of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity.

for customers based in the Federal Republic of Germany

The General Terms of Payment as well as the General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry shall apply.

For software products, the General License Conditions for Software Products for Automation and Drives for Customers with Seat or registered Office in Germany shall apply.

for customers with a seat or registered office outside the Federal Republic of Germany

The General Terms of Payment as well as the General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany shall apply.

For software products, the General License Conditions for Software Products for Automation and Drives for Customers with Seat or registered Office outside of Germany shall apply.

General

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices.

It shall be debited separately at the respective rate according to the applicable legal regulations.

In addition to the prices of products which include silver and/or copper, surcharges may be calculated if the respective limits of the notes are exceeded.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

The dimensions are in mm. Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages,
– especially with regard to data, dimensions and weights given –
these are subject to change without prior notice.

Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA0
(for customers based in the Federal Republic of Germany)
- 6ZB5310-0KS53-0BA0
(for customers based outside of the Federal Republic of Germany)

or download them from the Internet:

www.siemens.com/automation/mall
(A&D Mall Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the <u>German Export List</u> . Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "AL not equal to N" are subject to a European or German export authorization when being exported out of the EU.
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