

SIEMENS



Motors

Low-Voltage Motors SIMOTICS SD – 1LE5

355 - 1000 kW

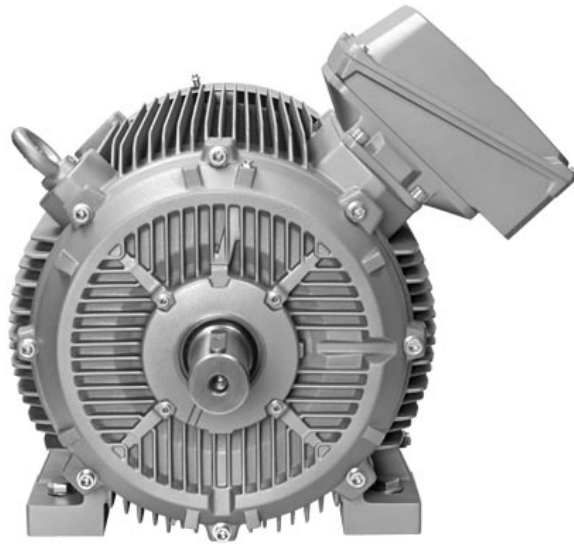
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Low-Voltage Motors SIMOTICS SD – 1LE5

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Catalog D 81.1 AO · 04/2018

For reasons of readability, the chapter Introduction generally refers to motors and does not mention the MLFB fuselage. In this catalogue Add-on D81.1 AO the term motors refers to SIMOTICS SD next generation, Series 1LE5 frame sizes 400 and 450.

Introduction

General Information regarding efficiency in accordance with International Efficiency, Guide to selection and ordering the motors, General technical specifications

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SIMOTICS SD Standard Motors next generation 1LE5

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The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with EN ISO 9001 Certified Registration No. DE-000357 QM) The certificate is recognized by all IQNet countries.



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Overview

Steps for drive selection

Step 1			Orientation and general technical information		
Technical requirements for the motor	Rated frequency and rated voltage	50/60 Hz 3 AC, 380 ... 690 V			
	Duty type	Standard duty (continuous duty S1 according to EN 60034-1)			
	Degree of protection	IP..			
	Rated speed	$n = \dots\dots\dots$ rpm			
	Rated power	$P = \dots\dots\dots$ kW			
	Rated torque	$M = P \cdot 9550/n = \dots\dots\dots$ Nm			
	Type of construction	IM..			
Step 2			Preselection in accordance with the application		
Determination of the installation conditions and definition of the application, if necessary	Ambient temperature	≤ 40 °C	> 40 °C		
	Installation altitude	≤ 1000 m	> 1000 m		
	Factors for derating	None	Determine the factor for derating (for reduction factor, see "Coolant temperature and installation altitude" on Page 1/11)		
Cross-reference to other motors	Motors for special requirements in explosion protection and applications or motors according to the NEMA standard.				
Step 3			Preliminary selection of the motor		
Determination of the range of possible motors	Select the frame size and therefore the possible motors on the basis of the following parameters: cooling method, degree of protection, rated power, rated speed and rated torque range. <u>Note:</u> The standard temperature range of the motors is from -20 to +40 °C.				

Layout of the selection and ordering tables and description of the columns of the table headers

Power, frame size, temperature class															Operating values at rated power					Article No., add. data	
Table header – Meaning																					
Prated, 50 Hz	Prated, 60 Hz	Prated, 60 Hz	Frame size	n _{rated} , 50 Hz	T _{rated} , 50 Hz	IE class	CC No. CC032A	η _{rated} , 50 Hz, 4/4	η _{rated} , 50 Hz, 3/4	η _{rated} , 50 Hz, 2/4	cosφ _{rated} , 50 Hz, 4/4	I _{rated} , 50 Hz, 400 V	T _{LR} /T _{rated}	I _{LR} /I _{rated}	T _B /T _{rated}	L _{pfA} , 50 Hz	L _{WA} , 50 Hz	Article No.	m IM B3	J	
kW	kW	hp	FS	rpm	Nm			%	%	%	A					dB (A)	dB (A)		kg	kgm ²	
Rated power at 50 Hz	Rated power at 60 Hz	Rated power at 60 Hz	Frame size	Rated speed at 50 Hz	Rated torque at 50 Hz	Efficiency class according to IEC 60034-30-1	CC No. CC032A	Efficiency at 50 Hz, 4/4-load	Efficiency at 50 Hz, 3/4-load	Efficiency at 50 Hz, 2/4-load	Power factor at 50 Hz, 4/4-load	Rated current at 400 V, 50 Hz	Locked-rotor torque at direct switch-on as a multiple of the rated torque	Locked-rotor current at direct switch-on as a multiple of the rated current	Breakdown torque on direct switch-on as a multiple of the rated torque	Measuring-surface sound pressure level at 50 Hz	Sound power level at 50 Hz	Article number	Weight for IM B3 type of construction, approx.	Moment of inertia	

Legend:

Primary key
Standard values for all motors
Specially for NEMA Energy Efficient MG1 motors, Table 12-11 or NEMA Premium Efficient MG1 motors, Table 12-12

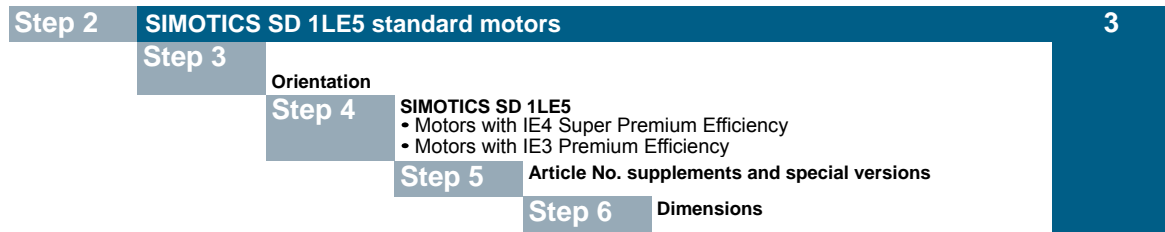
Note on pole-changing motors:

The operating values are specified here for the rated power for the two different pole numbers.

Step 4		Detailed selection of the motor in the selection and ordering data tables	
Determining the basic Article No. of the motor	Determine the motor Article No. according to the following parameters: rated power, rated speed, rated torque and rated current from the "Selection and ordering data" for the motors that have already been identified as possibilities.		
Step 5		Selection of the special versions or options	
Completing the motor Article No.	Determine special versions and the associated order codes (e.g. special voltages and types of construction, motor protection and degrees of protection, windings and insulation, colors and paint finish, mountings and mounting technology, etc.).		
Step 6		Additional information for motor selection	
Checking the required dimensions	The dimensions are specified in each catalog section under the heading of "Dimensions".		
Selection of the frequency converter, if required	For the Article No. of the converter and how to select it, see Catalogs D 11, D 18.1, D 21.3, D 31, and DA 51.2.		

Overview (continued)

Steps for drive selection in the catalog



1LE5 standard motors – next generation

Motor version	Efficiency class	Rated power at	Frame size – Motor type	Page
SIMOTICS SD Add cast-iron housing				
IEC	IE4 Super Premium Efficiency	355 ... 1000 kW	1LE5534	2/9
	IE3 Premium Efficiency	355 ... 1000 kW	1LE5533	2/11
SIMOTICS SD Pro cast-iron housing				
IEC	IE3 Premium Efficiency	335 ... 980 kW	1LE5583	2/13

Overview (continued)

To protect the drives against corrosion and external influences, high-quality paint systems are available in various colors.

Standard version	Additional identification code –Z with order code						
	S00	S01	S02	S03	S04	S05	S06
Paint finish, suitability of paint finish for climate group in accordance with IEC 60721-2-1							
Standard paint finish C2	Unpainted, but unfinished cast-iron surfaces are primed	Unpainted, motor primed	Special paint finish C3	Special paint finish system "sea air resistant" C4	Special paint finish system "offshore" C5	Interior paint finish, all bare internal components primed with rust inhibitor ¹⁾	Polyurethane-based top coat, standard version
Use							
Moderate (extended) for indoor and outdoor installation under a roof not directly exposed to weather conditions.	The motors can be supplied unpainted on request.	The motors can be supplied with just a primer coat on request.	Worldwide (global) for outdoor installation in direct sunlight and/or exposed to weather conditions.	Recommended for indoor or outdoor installation directly exposed to weather conditions, industrial climate with moderate SO ₂ exposure, VIK requirements, coastal ocean climate, but not offshore ocean climate, e.g. for crane drives and for the paper industry.	Recommended for outdoor installation directly exposed to weather conditions, industrial climate with moderate SO ₂ exposure and offshore ocean climate, e.g. for crane drives.	The motors can be supplied with internal paint finish on request. Recommended when there is a risk of heavy condensate formation.	Direct sunlight (ultraviolet light) can change the color of the paint. When color stability is a requirement, a polyurethane-based paint system is recommended for the top coat (RAL 7030). Other colors are available on request.
Test requirements according to EN ISO 12944-5 Corrosivity Category							
C2	–	–	C3	C4	C5	–	–
Total film thickness – nominal film thickness in μm ^{2) 3)}							
Motors in cast-iron version							
Water-b. 2K polyurethane	Resin primer	Water-b. 2K polyurethane primer	Water-b. 2K polyurethane	Water-b. 2K polyurethane	Water-b. 2K polyurethane	2K epoxy resin/ 2K polyurethane primer	Water-b. 2K polyurethane
120	60	120	180	240	320	60	Film thickness similar to S03/S04
Resistance							
			For corrosive atmospheres up to 1 % acid and alkali concentration or permanent dampness in sheltered rooms.	Chemical exposure up to 5 % acid and alkali concentration.	Chemical exposure up to 5 % acid and alkali concentration.		Sunlight
Temperature range							
Up to 120 °C for brief periods	–	–	Briefly up to 140 °C	–40 ... 140 °C	–40 ... 140 °C		
Up to 100 °C continuously			Continuously up to 120 °C				
Rel. air humidity at (temperature)							
60 % (40 °C)	–	–	100 % (40 °C)	75 % (50 °C)	75 % (60 °C)		

Table continues on the next page.

Colors and paint finish

Overview (continued)

Standard version	Additional identification code -Z with order code						
	S00	S01	S02	S03	S04	S05	S06
Suitability for recoating ⁷⁾							
Can be recoated within 1 week							
Pre-treatment of parts							
All parts cleaned and degreased, steel and cast-iron parts sandblasted							
Drying							
All layers oven-dried							
Top coat colors							
Standard version	RAL 7030 (stone gray)						
Available colors	Alternative standard and special RAL colors must be ordered with order code Y53 or Y56 and specification in plain text of the required RAL number (see tables for order codes Y53 and Y56 on the following page for selection of available RAL numbers/RAL colors). S06 is available only in standard RAL 7030						
Treatment of bare metal areas of shaft extensions and flanges							
Coated with anti-corrosion agent that repels water and palm sweat							

Note:

For transport, the bare parts are coated with anti-corrosion paint that will last for a limited length of time.

Increased corrosion protection for exterior components (H90)

The corrosion protection of the motor can be expanded with the H90 option for exterior components. In conjunction with options for special paints (S00-S06) or other materials such as bolts made of stainless steel (H07), the corrosion protection can be adapted to special ambient conditions.

When the H90 option is ordered, the motor is as follows:

- Surfaces not visible from outside are painted with the film thickness ordered (S01-S04)
- Bearing sealing with increased corrosion resistance
- Air inlet grille made of stainless steel
- For optional externally mounted components: cable installation in protective tubes with increased corrosion resistance

Depending on the level of salinity at the installation location, the following options may have to be ordered:

1. Location with high salinity or areas with almost continuous condensation (corrosivity category C5-M / C5-I)
 - H90 Increased corrosion protection for exterior components
 - R53 Undrilled removable entry plate
 - H07 Rust-resistant screws (externally)
 - S04 Special paint for use offshore
 - S05 Internal coating
2. Location with moderate salinity (corrosivity category C4)
 - H90 Increased corrosion protection for exterior components
 - H07 Rust-resistant screws (externally)
 - S03 Special paint finish sea air resistant
 - S05 Internal coating
3. Location with low salinity (corrosivity category C3):
 - H90 Increased corrosion protection for exterior components
 - H07 Rust-resistant screws (externally)
 - S02 Special paint finish C3
 - S05 Internal coating

1) Machined laminated rotor core, shaft, inner diameter of cast-iron housing, interior surfaces of cast-iron bearing plates.

2) Total film thickness:

- The specified film thickness represents average values for the external motor surfaces
- Unpainted or one layer of paint (60 µm) less beneath the fan cover
- The film thickness may differ at inaccessible locations (pockets/recesses or bases of ribs)

The film thickness specified for aluminum/cast-iron versions refers not only to motors, but also to components such as the bearing plate and housing. Motors in a mixed aluminum/cast-iron version are also available.

3) n.a.

4) n.a.

5) n.a.

6) n.a.

7) Primers, water-based 2K epoxy resin paints and polyurethane-based paints can be painted over with paints of the same kind if the motors are in the original packaging and are still covered by the warranty. A suitability test should be conducted before any recoating work is undertaken if the customer intends to use a coating of a different kind to overpaint the motor. Alternatively, a test in accordance with EN ISO 16927 "Determination of the overcoatability and recoatability of a coating" can be requested and ordered.

Introduction

General information

Colors and paint finish

Overview (continued)

*Finish in other standard RAL colors –
Order code Y53
(plain-text specification of the RAL number
required)*

RAL No.	Color name	RAL No.	Color name
3007	Black red	7000	Squirrel gray
5002	Ultramarine blue	7001	Silver gray
5007	Brilliant blue	7004	Signal gray
5009	Azure blue	7011	Iron gray
5010	Gentian blue	7016	Anthracite gray
5015	Sky blue	7022	Umbra gray
5017	Traffic blue	7031	Blue gray
5018	Turquoise blue	7032	Pebble gray
5019	Capri blue	7033	Cement gray
6011	Reseda green	7035	Light gray
6021	Pale green	9005	Jet black

The following weakly covering paints must be applied at least twice owing to their poor opacity. The standard finish for these colors is not possible and must be ordered with **S02**, **S03** or **S04**.

RAL No.	Color name
1002	Sand yellow
1013	Oyster white
1015	Light ivory
1019	Gray beige
2003	Pastel orange
2004	Pure orange
3000	Flame red
5012	Light blue
6019	Pastel green
9001	Cream white
9002	Gray white

*Paint finish in special RAL colors –
Order code Y56
(plain-text specification of the RAL number required)*

RAL No.	Color name	RAL No.	Color name
3004	Purple red	6034	Pastel turquoise
3011	Brown red	6034	Pastel turquoise
3015	Light pink	7005	Mouse gray
3020	Traffic red	7009	Green gray
4005	Blue lilac	7012	Basalt gray
5000	Violet blue	7015	Slate gray
5001	Green blue	7023	Concrete gray
5003	Sapphire blue	7036	Platinum gray
5005	Signal blue	7037	Dusty gray
5011	Steel blue	7038	Agate gray
5013	Cobalt blue	7039	Quartz gray
5014	Pigeon blue	7040	Window gray
5020	Ocean blue	7042	Traffic gray A
5021	Water blue	7044	Silk gray
5022	Night blue	7045	Telegray 1
5023	Distant blue	7046	Telegray 2
6000	Patina green	7047	Telegray 4
6001	Emerald green	8012	Red brown
6002	Leaf green	8025	Pale brown
6005	Moss green	8028	Terra brown
6009	Fir green	9003	Signal white
6010	Grass green	9004	Signal black
6016	Turquoise green	9006	White aluminum
6017	May green	9007	Gray aluminum
6018	Yellow green	9010	Pure white
6024	Traffic green	9011	Graphite black
6026	Opal green	9016	Traffic white
6029	Mint green	9017	Traffic black
6032	Signal green		

The following weakly covering paints must be applied at least twice owing to their poor opacity. The standard finish for these colors is not possible and must be ordered with **S02**, **S03** or **S04**.

RAL No.	Color name
1003	Signal yellow
1004	Golden yellow
1006	Maize yellow
1007	Daffodil yellow
1012	Lemon yellow
1014	Ivory
1018	Zinc yellow
1021	Rape yellow
1023	Traffic yellow
1028	Melon yellow
1032	Broom yellow
1033	Dahlia yellow
2008	Bright red orange
2009	Traffic orange
2010	Signal orange
3002	Carmine red
5024	Pastel blue
6027	Light green

Coating structure and colors not specified in the catalog are available on request.

Overview (continued)

EN 60034-1 specifies that, for all motors, the approximate total weight be indicated on the rating plate.

Supplementary data (maximum of 20 characters) can be indicated on the rating plate or additional rating plate and on the packaging label.
Order code **Y84**.

An additional rating plate for customer specifications is also possible, additional text: 9 lines of 40 characters each.
Order code **Y82**.

An additional rating plate with deviating rating plate data can also be ordered (only for ratings such as voltage, power, speed).
Order code **Y80**.

An "additional rating plate for voltage tolerance" can also be ordered.
Can be ordered for 400 VΔ/690 VY (voltage code "34").
Order code **B07**.

The number of rating plates and/or the material quality of the rating plate including additional rating plates can be ordered using order codes Y82, Y84 and Y80. Does not apply to order code B07, rotational direction arrows, PTC thermistor plates, other notices.

- Additional (rating) plate(s),
Order code **M10**.
- Plate(s) with resistance to scratches, heat, cold, and acid,
Order code **M11** (standard version).

In the standard version, the rating plate is available in international format or in German/English.
The language for the rating plate can be ordered by specifying in plain text. An overview of the languages that can be ordered is provided in the table below.

Overview of languages on the rating plate

Motor type	Frame size	Rating plate in	
		German (de)	English (en)
1LE5	400 ... 450	<input checked="" type="checkbox"/>	<input type="checkbox"/>

- Standard version
- Without additional charge

Other languages on request

SIEMENS 1LE5 NEMA CC 032A IIE3 H CE

Made in Germany D-90441 Nürnberg
3-Mot. 1AV3164A 1LE10231DA43AA0-Z E 1701/1410842 001 001

14 IEC/EN 60034 160L IMB3 IP55 Brake: 2LM8040-6NA10
15 94kg Th.Cl. 155(F) -20°C ≤ TAMB ≤ 45°C 2000M 230V AC 50/60Hz 1.25A
31 RINA Bearing UNIREX-N3 20g INTERVAL: 2000h TH.Cl. 155(F) 40Nm
16 DE 6209-2ZC3 20g
33 NE 6209-2ZC3 20g
34 Vibration B 60Hz: SF 1:1 CONT NEMA MG1 12-12 TEFC DES A 25.0 HP

V	Hz	A	kW	PF	NOM.EFF	rpm	IE-CL	CL
400 Δ	50	32.0	18.5	0.90	92.4	2955	IE3	M
690 Y	50	18.6	18.5	0.90	92.4	2955	IE3	M
460 Δ	60	32.0	21.3	0.91	91.7	3550	IE3	M
460 Δ	60	28.0	18.5	0.90	91.7	3550	IE3	N

KDNo. 12345678999111 MATNo. 12345678 Space Heater 230V G_D081_EN_00891

- Machine type: Three-phase low-voltage motor
- Article No.
- Factory serial number (Ident.-no., serial number)
- Type of construction
- Degree of protection
- Rated voltage [V] and winding connections
- Frequency [Hz]
- Rated current [A]
- Rated power [kW]
- Power factor (cos φ)
- Efficiency
- Rated speed [rpm]
- IE efficiency class
- Standards and specifications
- Weight of machine [kg]
- Temperature class
- Frame size
- Supplementary data (optional)
- Operating temperature range (only if it deviates from standard)
- Installation altitude (only when higher than 1000 m)
- Customer data (optional)
- Date of manufacture YYMM
- Half-key balancing
- Code letter "CL"
- Motor type number (MT)
- IEC standard series, power 50 Hz (P50/50 Hz) 400 Δ
- IEC standard series, power 50 Hz (P50/50 Hz) 690 Δ
- Equivalent power 60 Hz at the same utilization as IEC standard series 50 Hz
- IEC standard series power 60 Hz (P50/60 Hz)
- Manufacturer's address
- Marine certificates
- Optional information
- Bearing size
- Relubrication data optional

Overview (continued)

All motors in the SIMOTICS generation are equipped with innovative insulation systems, consisting of high-quality enamel wires and insulating sheet materials in conjunction with highly temperature-resistant impregnations.

The motors can be operated with SINAMICS G and SINAMICS S converters (controlled and uncontrolled infeed) while adhering to the admissible voltage peaks in accordance with the table below.

Continuous operation while fully utilizing the admissible voltage tolerances must be avoided and is not recommended in accordance with IEC 60034-1 2011 Chapter 7.3.

The preferred supply system configurations are TT systems and TN systems with neutral-point grounding. We do not recommend operation in corner-grounded TN systems because of the higher voltage load.

Operation on non-grounded IT systems is also possible. However, when a ground fault occurs, the insulation is excessively stressed. In the case of a ground fault, the process should be terminated as quickly as possible ($t < 2$ h), and the fault resolved.

For motors with protruding connection cables (order codes **R21**, **R23**, and **R24**), please inquire in the case of converter operation.

Impulse Voltage Insulation Class (IVIC) – category C (strong)

The insulation system of SIMOTICS motors significantly exceeds the requirements of stress category C (IVIC C = high stress). If voltage peaks higher than those specified according to IVIC C can occur, observe the data in the following table.

- For a line voltage (converter input voltage) up to max. 500 V and operation connected to a SINAMICS G/SINAMICS S converter with uncontrolled infeed (BLM, SLM), the relevant guidelines for the motor and converter configuration must be observed.
- For a line voltage (converter input voltage) up to max. 480 V and operation connected to a SINAMICS S converter with controlled infeed (ALM), the relevant guidelines for the motor and converter configuration must be observed.
- For line voltages (converter input voltages) higher than those stated above (max. 690 V), motors that are ordered for converter operation must have a suitable insulation system.
- For operation of a converter of another manufacturer, the permissible voltage peaks according to IEC 60034-18-41 in accordance with stress category C (see table below) must be observed, depending on the particular line voltage (converter input voltage) and the motor insulation system.

		Line voltage U_{rated}					
		400 V		480 V		500 V	
Standard		IVIC C	Siemens	IVIC C	Siemens	IVIC C	Siemens
$U_{\text{phase-to-ground}}$	$V_{pk/pk}$	1680	2200	2016	2200	2100	2200
$\hat{U}_{\text{phase-to-ground}}$	V_{pk}	840	1100	1008	1100	1050	1100
$U_{\text{phase-to-phase}}$	$V_{pk/pk}$	2360	3000	2832	3000	2950	3000
$\hat{U}_{\text{phase-to-phase}}$	V_{pk}	1180	1500	1416	1500	1475	1500

The following applies for the voltage rise time: $T_a > 0.3 \mu s$

The voltages according to EN 60034-18-41/IVIC C are specified as peak-to-peak values ($V_{pk/pk}$). For information, the conventional peak values (V_{pk}) are also stated.

Insulation systems for converter operation > 480 V/500 V

The SIMOTICS motors can be operated in their standard version on SINAMICS converters without an additional filter up to a maximum converter input voltage of 500 V 3 AC on uncontrolled infeeds (SINAMICS G/S/V, BLM/SLM) and up to 480 V 3 AC on controlled infeeds (SINAMICS S, ALM). The specific configuration guidelines for motors and converters must be observed.

For higher converter input voltages, > 480 V/500 V 3 AC, a special insulation system of the motor (PREMIUM) is required. This is available for converter motors, such as SIMOTICS GP/SD VSD10, SIMOTICS DP crane motors, SIMOTICS FD, and the converter-capable SIMOTICS SD Pro motors.

For IE3 standard motors as of frame size 225, the PREMIUM insulation system is available on request.

Bearing insulation/shaft grounding brushes for converter operation

To avoid damage to bearings caused by bearing currents, we recommend bearing insulation at the non-drive end (NDE) for frame size 225 and larger (order code **L51**).

For frame size 315 and larger, bearing insulation at the non-drive end (NDE) is always provided (order code **L51**).

When rotary encoders are used, it must be ensured that these do not bypass the bearing insulation. The rotary encoders in this catalog meet this requirement except for type 1XP8.

In most cases, NDE bearing insulation provides sufficient protection against damage to bearings due to bearing currents.

In rare cases, depending on the application and system, it may be necessary to take further measures on the converter or motor. On the motor side, bearing insulation is available on the non-drive end (NDE) (order code **L51**) and shaft grounding brushes (order code **L52**).

When NDE bearing insulation is used together with DE bearing insulation, the option "shaft grounding brush" must additionally be selected to keep the shaft at a defined potential. In this constellation, to avoid damage to the bearings of the driven machine due to bearing currents, it is also necessary to insulate the coupling between the motor and the driven machine.

The EMC guidelines must always be complied with when the drive system is installed.

Thermal utilization of the motor

When motors are operated on a converter, additional losses occur due to the harmonics in the motor currents, which, depending on the permissible winding temperature, can make it necessary to reduce the torque. For operation on SINAMICS converters, the permissible torque values can be obtained from the SIZER engineering tool.

For operation on SINAMICS converters with the power ratings specified in the catalog, the motors are used according to temperature class 155 (F), i.e. in this case neither a service factor > 1 nor an increased coolant temperature is possible (order codes **N02** and **N03** cannot be ordered).

Overview (continued)

DURIGNIT IR 2000 insulation

The DURIGNIT IR 2000 insulating system consists of high-quality enamel wires and insulating sheet materials in conjunction with temperature-resistant resin impregnation.

This ensures that these motors will have a high mechanical and electrical strength, high service value, and a long service life. The insulating system protects the winding to a large degree against aggressive gases, vapors, dust, oil, and increased air humidity. It can withstand the usual vibration stressing. The insulation is suitable up to an absolute air humidity of 30 g water per m³ of air. Moisture condensation should be prevented from forming on the winding.

For higher values, the **N30** and **N31** options are available – see page 1/10.

Please inquire about extreme applications.

Winding and insulation version with regard to temperature class

At rated power in line operation, the motors can be utilized in the following temperature class:

- For Simotics SD Add: temperature class 130 (B)
- For Simotics SD Pro: temperature class 155 (F)

Temperature class 155 (F), utilized acc. to 155 (F), with service factor (SF)

All motors with frame sizes 400 and 450 have a service factor of 1.05 at rated power in line operation.

Order code **N01**

Temperature class 155 (F), utilized acc. to 155 (F), for higher power

When utilized in line operation according to temperature class 155 (F), the rated power specified in the selection and ordering data can be increased by 5 %. In this case, the service factor is 1.0.

Order code **N02**

Temperature class 155 (F), utilized acc. to 155 (F), with increased coolant temperature

In line operation, with power as defined in the catalog, the coolant temperature is permitted to rise to 45 °C. In this case, the service factor is 1.0.

Order code **N03**

In the case of converter-fed operation at the power specified in the catalog, the motors are utilized according to temperature class 155 (F). Order codes **N02** and **N03** are not possible.

Temperature class 155 (F), utilized acc. to 130 (B), coolant temperature 45 °C, derating approx. 4 %

The Simotics SD Add motor series can be ordered according to temperature class 155 (F) for utilization according to temperature class 130 (B) and a maximum coolant temperature of 45 °C with derating of 4 %.

Order code **N05**

Temperature class 155 (F), utilized acc. to 130 (B), coolant temperature 50 °C, derating approx. 8 %

The Simotics SD Add motor series can be ordered according to temperature class 155 (F) for utilization according to temperature class 130 (B) and a maximum coolant temperature of 50 °C with derating of 8 %.

Order code **N06**

Temperature class 155 (F), utilized acc. to 130 (B), coolant temperature 55 °C, derating approx. 13 %

The Simotics SD Add motor series can be ordered according to temperature class 155 (F) for utilization according to temperature class 130 (B) and a maximum coolant temperature of 55 °C with derating of 13 %.

Order code **N07**

Temperature class 155 (F), utilized acc. to 130 (B), coolant temperature 60 °C, derating approx. 18 %

The Simotics SD Add motor series can be ordered according to temperature class 155 (F) for utilization according to temperature class 130 (B) and a maximum coolant temperature of 60 °C with derating of 18 %.

Order code **N08**

Temperature class 180 (H)

With the motor, utilization according to temperature class 180 (H) is permitted. The rated power is increased by 5 %.

Rating plate data for

- direct-on-line (DOL) operation: $P_{\text{rated}} \cdot 1.05 + SF 1.05$
- operation on converter (VSD): $P_{\text{rated}} \cdot 1.05$

Order code **N10**

Temperature class 180 (H) at rated power and max. CT 60 °C

Utilization according to temperature class 180 (H) at rated power and a maximum coolant temperature of 60 °C is possible on request for the motors.

Order code **N11**

Temperature class 155 (F) utilized acc. to 130 (B), with higher coolant temperature and/or installation altitude

The motors can be ordered according to temperature class 155 (F) for utilization according to temperature class 130 (B) with other customized requirements if they are specified in plain text in the order.

Order code **Y50**

Temperature class 155 (F), utilized acc. to 155 (F), other requirements

The motors can be ordered according to temperature class 155 (F) for utilization according to temperature class 155 (F) with other customized requirements if they are specified in plain text in the order.

Order code **Y52**

Temperature class 180 (H), utilized acc. to 155 (F)

The motors can be ordered according to temperature class 180 (H) for utilization according to temperature class 155 (F) with other customized requirements if they are specified in plain text in the order.

Order code **Y75**

Introduction

Electrical design

Windings and insulation

Overview (continued)

Increased air humidity/temperature with 30 to 60 g water per m³ of air

The motors are available in a version designed for increased air humidity in the range between 30 and 60 g water per m³ air as a function of the temperature, as shown in the table below. Order code **N30** (includes order code **H03**, closed condensation drain holes, **M11**, rating plate stainless steel version and **S02** standard/special paint finish for Performance Line cast-iron motors). Use of non-rusting bolts is recommended.

You must contact us if order code **N30** is to be combined with mountings (e.g. rotary pulse encoders or brakes).

Increased air humidity/temperature with over 60 to 100 g water per m³ of air

The motors are available in a version designed for increased air humidity of over 60 to 100 g water per m³ of air as a function of the temperature, as shown in the table below. This version contains condensation drain holes (closed), order code **N31** (includes order code **H03**, closed condensation drain holes, **M11**, rating plate stainless steel version and **S02** standard/special paint finish or **S03** "special paint sea air resistant" for Performance Line cast-iron motors). Use of non-rusting bolts is recommended.

You must contact us if order code **N31** is to be combined with mountings (e.g. rotary pulse encoders or brakes).

Absolute/relative conversion of air humidity

Relative humidity	Temperature							
	up to 20 °C	up to 30 °C	up to 40 °C	up to 50 °C	up to 60 °C	up to 70 °C	up to 80 °C	up to 90 °C
10 %	2	3	5	8	13	20	29	42
15 %	3	5	8	12	19	30	44	63
20 %	3	6	10	17	26	39	58	84
25 %	4	8	13	21	32	49	73	105
30 %	5	9	15	25	39	59	87	126
35 %	6	11	18	29	45	69	102	146
40 %	7	12	20	33	52	79	116	167
45 %	8	14	23	37	58	89	131	188
50 %	9	15	26	41	65	98	145	209
55 %	10	17	28	46	71	108	160	230
60 %	10	19	31	50	78	118	174	251
65 %	11	20	33	54	84	128	189	272
70 %	12	21	36	58	91	138	203	293
75 %	13	23	38	62	97	148	218	314
80 %	14	24	41	66	104	157	233	335
85 %	15	26	43	70	110	167	247	356
90 %	16	27	46	74	117	177	262	377
95 %	16	29	49	79	123	187	276	398
100 %	17	30	51	83	130	197	291	419

The values in the table with a blue background are covered by the standard version (up to < 30 g water per m³ of air).

The values in the table with a light gray background are covered by order code **N30** (30 to 60 g of water per m³ of air).

The values in the table with a dark gray background are covered by order code **N31** (60 to < 100 g of water per m³ of air).

Please contact us regarding requirements exceeding 100 g water per m³ of air.

Note:

- The coolant temperature and installation altitude can be found from page 1/11 onwards.
- The metal fan cover is available in combination with order code **F74** (not standard). The metal fan cover for cast-iron motors of the Performance Line (1LE16 frame sizes 315-355) and for 1LE5 frame sizes 400 and 450 always standard.
- In case of increased thermal stress, please combine with the order codes **N05** to **N08**.
- In conjunction with more stringent requirements for the paint finish or corrosion protection stress (offshore, sea air, etc.), the corresponding order codes **S02**, **S03**, **S04**, and potentially **H07**, must be combined.
- Order code **N31** requires additional specifications for the ambient temperature CT 50 °C to CT 90 °C.

Overview (continued)

The specified rated power is applicable for continuous duty in accordance with IEC 60034-1 at a frequency of 50 Hz, a coolant temperature (CT) or ambient temperature of 40 °C and an installation altitude (IA) up to 1000 m above sea level. The motors for ambient temperatures exceeding > 40 °C are equipped with various types of seal. Mountings such as brake, terminal box at NDE, type of construction IM V1, type of construction IM V3 can sometimes exceed utilization in accordance with temperature class 130 (B).

For higher coolant temperatures and/or installation altitudes greater than 1000 m above sea level, the specified motor power must be reduced using the factor k_{HT} .

Depending on the frame size of the motor or the number of poles, special windings may be added to the motors for the different operating conditions.

This results in an admissible motor power of:

$$P_{adm} = P_{rated} \cdot k_{HT}$$

If the admissible motor power is no longer adequate for the drive, it should be checked whether the motor with the next higher rated power fulfills the requirements.

Code	Description	Unit
P_{adm}	Admissible motor power	kW
P_{rated}	Rated power	kW
k_{HT}	Factor for abnormal coolant temperature and/or installation altitude	

The motors are designed for temperature class 155 (F) and utilized in temperature class 130 (B). Under non-standard operating conditions, if they are to be used in this class, the admissible power rating must be determined from the table below.

Reduction factor k_{HT} for different installation altitudes and/or coolant temperatures

Installation altitude above sea level m	Coolant temperature					
	< 30 °C	30 ... 40 °C	45 °C	50 °C	55 °C	60 °C
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

Coolant temperature and installation altitude are rounded to 5 °C and 500 m respectively.

For details of derating for utilization in temperature class 155 (F), see "DURIGNIT IR 2000 insulation system".

Motors for coolant temperatures other than 40 °C or installation altitudes higher than 1000 m above sea level for utilization in temperature class 130 (B) must always be ordered with the additional identification code "-Z" and plain text. In the case of extreme derating, the operating data for the motors, i.e. efficiency and power factor, will also be less favorable due to partial utilization.

The following special versions are possible for motors:

- Motors for coolant temperatures from -50 to +40 °C
Order code **D02**
- Motors for coolant temperatures from -40 to +40 °C
Order code **D03**
- Motors for coolant temperatures from -30 to +40 °C
Order code **D04**

When ordering with order codes **D03** or **D04** in combination with mountings, the respective technical specifications have to be observed and it is necessary to inquire.

For order codes for utilization according to temperature class 155 (F), see "DURIGNIT IR 2000 insulation system" under "Windings and insulation" on page 1/9.

Ambient temperature:

All motors can be used in the standard version at ambient temperatures between -20 and +40 °C. Exposure to direct sunlight can result in uncontrollable rises in motor temperature. To prevent this, appropriate shading measures, such as a sun canopy, are recommended.

Utilization according to temperature class 155 (F) up to 40 °C occurs with a service factor of 1.05, i.e. the motor can be continuously overloaded with 5 % of the rated power.

When motors are used in temperature class 130 (B) for higher ambient temperatures and/or installation altitudes, derating occurs in accordance with the Table "Reduction factor k_{HT} for different installation altitudes and/or coolant temperatures". For motors ex stock, the service factor is indicated on the rating plate.

For other temperatures, special measures are necessary. When brakes are to be mounted on motors intended for operation at temperatures below freezing, please contact your local Siemens office.

Overview (continued)

Anti-condensation heater

Supply voltage 230 V (1 AC)
Order code **Q02**

Supply voltage 115 V (1 AC)
Order code **Q03**

Supply voltage 400 V (1 AC)
Order code **Q06**

For motors with windings at risk of condensation due to the climatic conditions, e.g. inactive motors in humid atmospheres or motors that are subjected to widely fluctuating temperatures, anti-condensation heaters must be used.

An additional cable entry is provided for the connecting cable in the terminal box.

Motor series	Frame size	Cable entry
Cast-iron motors (SD)	400 ... 450	2 × M20 × 1.5

Anti-condensation heating must not be switched on during operation.

Frame size	Heat output of the anti-condensation heating		
	Supply voltage at		
	230 V	115 V (110 V)	400 V
	Order code Q02	Order code Q03	Order code Q06
	W	W	W
Motors 1LE5			
400 ... 450	240	240	370

Instead of an anti-condensation heater, another possibility is the connection of a voltage that is approximately 4 to 10 % of the rated motor voltage to stator terminals U1 and V1. 20 to 30 % of the motor rated current is normally sufficient to provide adequate heating.

Fans/separately driven fans

All motors with 4 or more poles have radial-flow fans in the standard version (with the exception of option **F90** – version "Forced-air cooled motors without external fan and fan cover") that cool regardless of the direction of rotation of the

Necessary minimum cooling air flow for forced-air cooled motors in standard duty

The cooling air flow specified in the selection table applies to continuous duty according to EN 60034-1 at a coolant temperature (CT) or ambient temperature of 40 °C respectively and an installation altitude (IA) up to 1000 m above sea level.

For the motors without an external fan and without

Frame size	Required cooling air flow for number of poles							
	2		4		6		8	
	IE3/IE4							
	50 Hz m³/min	60 Hz m³/min	50 Hz m³/min	60 Hz m³/min	50 Hz m³/min	60 Hz m³/min	50 Hz m³/min	60 Hz m³/min
400	1.2	1.4	1.3	1.6	1.7	2.0	1.3	1.6
450	1.5	1.8	1.6	2.2	1.5	1.8	1.2	1.4

motor (cooling method IC411 acc. to EN 60034-6). 1LE5 motors with 2 poles are cooled with axial fans specific to the direction of rotation. The air flow is forced from the non-drive-end (NDE) to the drive end (DE) in all motors.

Supply voltage of separately driven fan for motors:
The supply voltage tolerance of the separately driven fan is ±5 %. In confined spaces, it must be ensured that the minimum spacing is maintained between the fan cover and the wall. This also applies to adjacent parts, such as large handwheels and flywheels on the second shaft extension.

Clearance from wall/fan grilles

Size	mm
400	150
450	150

For version of the fan and the fan cover, see the table below.

Motor series	Frame size	Number of poles	Fan material	Fan cover material
1LE55	400 ... 450	4, 6, 8	Plastic	Metal
		2	Metal	

Metal external fan impeller

The standard fan impeller made of plastic can be replaced with a fan impeller made of metal. This version is available for the motors (with the exception of 1LE1 with option **F90** – version "Forced-air cooled motors without external fan and fan cover").

A metal external fan is already included for the low-noise version.

For 2-pole versions with frame sizes 400 and 450, the metal external fan impeller is made of aluminum.

Order code **F76**

Sheet metal fan cover

For motor series 1LE5 (with the exception of 1LE5 with option **F90** – version "Forced-air cooled motors without external fan and fan cover"), the sheet metal fan cover is provided as standard.

fan cover, order code **F90**, the motor is located in the air flow of the driven fan that must drive the minimum cooling air flow over the motor housing. The minimum air flow must pass closely over the housing (comparable to self-ventilation of the motor). Otherwise higher air flows are required to comply with admissible motor heating levels.

Overview (continued)

Terminal box position

The terminal box of the motor can be mounted in four different locations or positions (see from page 2/5). The position of the terminal box is coded using the 16th position of the motor Article No. When defining the position of the terminal box, please observe the following:

- Motors with feet must always be viewed looking onto the drive end with the shaft in the horizontal position. The feet are then always at "6 o'clock". This is especially important with construction types IM B6, IM B7, and IM B8, and also applies to combined construction types such as IM B35.
- Flange-mounting motors (e.g. IM B5) whose drive-end flange has a condensation drainage hole must always be viewed looking onto the drive end with the shaft in the horizontal position. The condensation drainage hole is then always at "6 o'clock".

The number of winding ends depends on the winding design. Three-phase motors are connected to the three phase conductors L1, L2 and L3 of a three-phase system. The rated voltage of the motor in the running connection must match the phase conductor voltages of the network.

When the three phases are operating in a time sequence and are connected to the terminals of the motor in alphabetical order U1, V1 and W1, clockwise rotation of the motor shaft is established as viewed onto the drive end. The direction of rotation of the motor can be changed to counterclockwise if two connecting leads are interchanged.

Labeled terminals are provided to connect the protective conductor. A PE terminal is provided in the terminal box for grounding.

External grounding terminal/external grounding is standard for 1LE5 motors with frame size 400 to 450.

A second external grounding connection can also be ordered. Order code **H70**

If a brake control system or thermal protection is installed, the connections will also be in the terminal box. The motors are suitable for direct connection to the line supply.

Design of the terminal box

The number of terminals and the size of the terminal box are designed for standard requirements.

For special requirements, or on customer request, the largest terminal box 1XB7750 can be supplied.

Larger terminal box:
Order code **R50**

When the terminal box is located on the left or right-hand side in conjunction with cable entry not aligned toward the housing feet, it must be noted that collisions between the motor connection cables and the foundations may occur. This must be taken into account during configuration.

If the necessary installation angle of the motor would cause machine components to collide with the terminal box, the terminal box can be moved from the drive end (DE) to the non-drive end (NDE). Dimensional drawings can be requested via the DT Configurator. Order code **H08**

Motor connection

Line feeder cables

The line feeder cables must be dimensioned acc. to DIN VDE 0298. The number of required feeder cables, if necessary in parallel, is defined by:

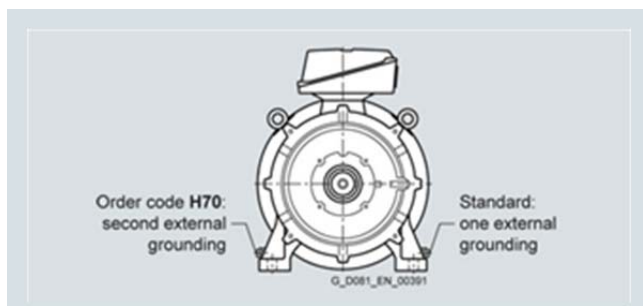
- The max. cable cross-section that can be connected
- The cable type
- Cable routing
- Ambient temperature and the corresponding admissible current in accordance with DIN VDE 0298

For motors with auxiliary terminals (e.g. 15th position of the Article No. letter B), additional cable entry holes are provided (M16 × 1.5 or M20 × 1.5 depending on frame size). For further details, see the data sheet function in the DT Configurator.

The terminal box is located on the housing and bolted in place. The terminal box can optionally be subsequently rotated.

Order code **R09**

You will find information on rotating the terminal box in the Operating Instructions.



Overview (continued)

Parallel feeders

Some motors must be fitted with parallel feeders due to the maximum permissible current per terminal. These motors are indicated in the selection and ordering data in the respective chapter.

The temperature rises in the terminal box must be taken into account when selecting the connection cable or individual connections.

These approximate temperature rises are as follows:

- Range of ambient temperature (T_{amb}) +50 K for motors with temperature class Th.Cl.155 (F).
- Range of ambient temperature (T_{amb}) +60 K for motors with temperature class Th.Cl.180 (F).
- Without any specifications in field 19 (T_{amb}) on the rating plate, T_{amb} is equal to 40 °C.

The terminal box can be rotated on the base of the motor housing such that the cable entry is located in the positions given below:

- Toward the drive end (DE) (rotation of terminal box through 90°, entry from DE) for flange motors (IM B5, IM B35, and IM V1) only possible with order code **H08!**
- Toward the fan end (NDE) (rotation of terminal box through 90°, entry from NDE)
Order code **R11**
- Opposite the standard position 0° (rotation of terminal box by 180°, entry opposite the standard position 0°)
Order code **R12**

The dimensions of the terminal box are listed in the section "Dimensions" on pages 2/32 and 2/33 in accordance with the frame size and the "Dimensional drawings".

If the position of the terminal box (right-hand side, left-hand side, or top) is changed, the position of the cable entry must be checked and, if necessary, ordered with the corresponding order codes (**R10**, **R11**, and **R12**).

Restrictions may result depending on the terminal box type, type of construction, terminal box position, and direction of cable entry. You will find more information on page 1/17.

Location of the cable entries with the corresponding order codes

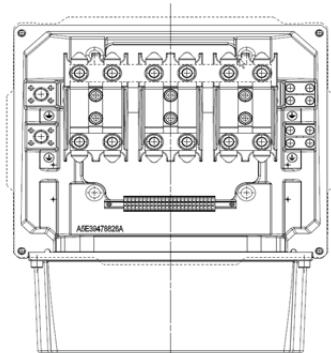
Motor	Frame size	Terminal box	Terminal box position											can be converted subsequently
			top left	top right	45° left	45° right	90° right	90° left	bottom	-90°	+90°	180°		
Type		Type	16th position of Article No. and with specification of order code, Article No. with -Z						Article No. with -Z Order code					
			0	1	2	3	5	6	9	R10 ²⁾	R11	R12		
1LE5	400	TB3R61	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	no ¹⁾	
	450	TB3R61	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	no ¹⁾	

¹⁾ Only possible with order code R09

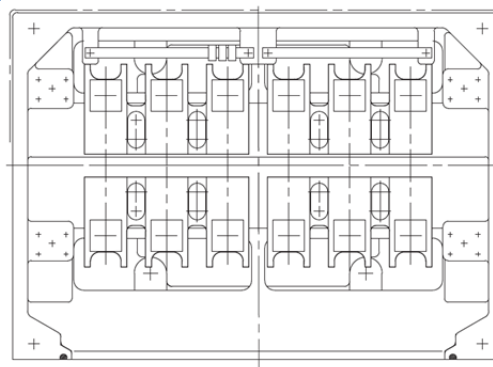
²⁾ Only possible for flange with order code H08

Overview (continued)

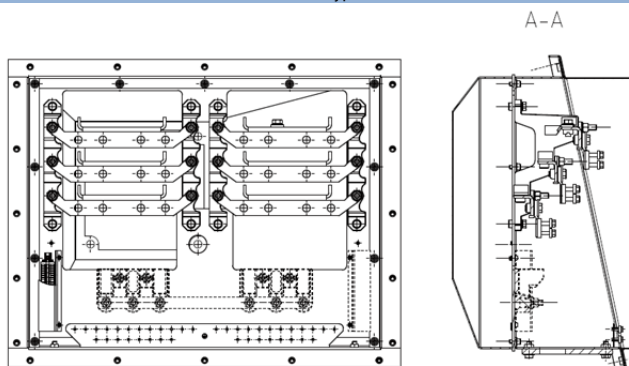
Terminal box type TB3R61



Terminal box type 1XB1631



Terminal box type 1XB7750



Technical specifications for terminal boxes for motors

Frame size	Terminal box ¹⁾	Number of terminals	Contact screw thread	Max. connectable cable mm ²	Outer cable diameter (sealing range) mm	Cable entry ²⁾
	Standard/larger (order code R50)					
400 ... 450	TB3R61/1XB7750	12	M16	240	56 ... 64.5	4 × M80 × 2
400 ... 450	1XB1631/1XB7750	12	M16	300	56 ... 64.5	4 × M80 × 2
400 ... 450	-/1XB7750	48	M12	300	41 ... 57	8 × M72 × 2

Terminal connection

The terminal board accommodates the terminals that are connected to the leads to the motor windings.

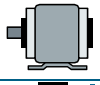

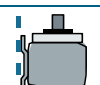
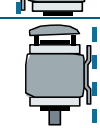
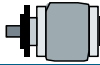

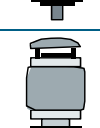
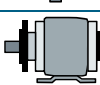
The terminals are designed so that the external (line) connections can be established with cable lugs, or optionally without cable lugs.
Order code **R19**.

1) For ordering spare parts and repair parts, in addition to the exact part designation, always specify the machine type and the serial number.

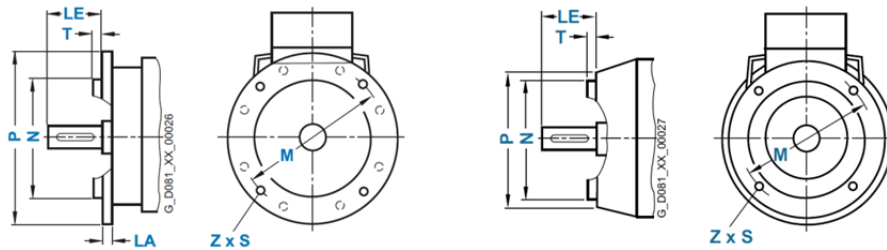
2) Designed for cable glands with O-ring.

Overview (continued)

Standard types of construction and special types of construction

Type of construction acc. to EN 60034-7		Frame size	Letter 14th digit of the Article No.	Additional order code –Z with order code
Without flange				
IM B3/IM 1001		400 to 450	A	–
IM V5/IM 1011 without protective cover		400 to 450 On request	C	–
IM V6/IM 1031		400 to 450 On request	D	–
IM V5/IM 1011 with protective cover		400 to 450 On request	C	+ H00 ¹⁾
With flange				
IM B5/IM 3001 with support foot		400 to 450	F	–
IM V1/IM 3011 without protective cover		400 to 450	G	–
IM V1/IM 3011 with protective cover		400 to 450	G	+ H00 ¹⁾
IM B35/IM 2001		400 to 450	J	

1) Standard cylindrical shaft extension (second shaft extension) **L05** is not possible.



In IEC 60072-2, the flange FF and, in DIN 42948, the flange A with through holes are assigned to frame sizes. The dimensions of the flanges conform to DIN 42948. Difference from IEC 60072-2: The dimension S is 28 mm in each case. See the assignment table below (Z = the number of retaining holes)

Frame size	Type of construction	Flange type	Flange with through holes (FF/A)		Dimension designation acc. to IEC									
			acc. to IEC 60072-2	acc. to DIN 42948	LA	LE	M	N	P	S	T	Z		
400 for 1LE5														
2-pole	IM B5, IM B35, IM V1	Flange	FF940	A 1000	28	170	940	880	1000	22	6	8		
4-pole														
6-pole														
8-pole														
450 for 1LE5														
2-pole	IM B5, IM B35, IM V1	Flange	FF1080	A 1150	30	170	1080	1000	1150	26	6	8		
4-pole														
6-pole														
8-pole														

Overview (continued)**Bearing lifetime (nominal lifetime)**

The nominal bearing lifetime is defined according to standardized calculation procedures (ISO 281) and is reached or even exceeded for 90 % of the bearings when the motors are operated in compliance with the data provided in the catalog.

Generally, the bearing lifetime is defined by the bearing size, the bearing load, the operating conditions, the speed and the grease lifetime. A bearing lifetime calculation is possible on request.

Bearing system

The bearing lifetime of motors with horizontal mounting is 40,000 hours if there is no additional axial loading at the coupling output and 20,000 hours when utilized according to the maximum admissible load. This assumes that the motor is operated at 50 Hz. The nominal bearing lifetime is reduced for converter operation at higher frequencies.

To achieve the calculated lifetime in continuous duty, for the admissible vibration values measured at the bearing plate, evaluation zones A and B specified in ISO 10816 are applicable. If higher vibration speeds will occur under the operating conditions, special measures will be necessary (please inquire).

Due to their physical characteristics, variable-speed motors have a different bearing lifetime under the same load conditions. This relationship is linear, i.e. if the frequency increases by 20 % from 50 Hz to 60 Hz, the lifetime decreases by 20 % from 20,000 to 16,000 hours under the load conditions specified in the catalog. If the frequency falls by 20 % from 50 Hz to 40 Hz, the lifetime rises by 20 % from 20,000 to 24,000 hours under the load conditions specified in the catalog.

It should be observed that, for types of construction IM V5 and IM V6, the belt tension is only permitted to be exerted parallel to the mounting plane or toward the mounting plane and the feet must be supported. Both feet must be secured for foot-mounting types of construction.

In the basic bearing system, the located bearing is situated at the drive end (DE) and the floating bearing is situated at the non-drive end (NDE).

The bearing system is axially preloaded with a spring element at the non-drive end (NDE) to ensure smooth running of the motor without play (see Fig. 1 in the diagrams of bearings on page 1/19).

If required, the located bearing can be fitted at the non-drive end (NDE).

Order code **L21**

For increased cantilever forces (e.g. belt drives), reinforced bearings can be used at the drive end (DE). The versions with cylindrical roller bearings are not axially preloaded and must always run under adequate radial loads (motors must not be operated on a test bed without additional radial loads). The located bearing is positioned at the non-drive end (NDE).

Order code **L22**

The 1LE5 motors can be supplied with reinforced bearings (size range 03) at both ends.

In this case, the bearing plates are made of cast iron.

Order code **L25**

A measuring nipple for SPM shock pulse measurement can be mounted to check bearing vibration. The motors have an M8 tapped hole for each bearing plate and a measuring nipple with a protective cap. If a second tapped hole is provided, it is fitted with a sealing cap.

Order code **Q01**

Bearing insulation

To prevent damage caused by bearing currents, insulated bearings are absolutely necessary for frame sizes 400 to 450 in converter operation.

- **L50** (bearing insulation DE)
- **L51** (bearing insulation NDE)
- **L50 + L51** (DE and NDE bearings insulated)
- Combination of order codes **L50** or **L51** or **L50 + L51** with **L22** (bearing version for increased cantilever forces)

It is up to the user in the case of DE bearing insulation (order code **L50**) + NDE bearing insulation (order code **L51**) to ensure grounding of the rotor.

The rotor grounding can be implemented either in the system via the coupled driven machine or in the motor via a grounding brush.

The grounding brush (order code **L52**) must always be provided when the driven machine is connected to the motor via an insulating coupling or an insulating belt output shaft.

Relubrication

For motors that can be regreased at defined regreasing intervals, the bearing lifetime can be extended and/or unfavorable factors such as temperature, mounting conditions, speed, bearing size, and mechanical load can be compensated.

For frame sizes 400 to 450, a regreasing device with a flat lubricating nipple DIN3404-AM10x1-5.8-A is standard.

For frame sizes 400 to 450, a regreasing device with a tapered lubricating nipple DIN71412-AM10x1-5.8 can be ordered.

Order code **L19**

In the case of motors equipped with regreasing device, information regarding regreasing intervals, quantity of grease, type of grease and any additional data is provided on the lubrication plate or rating plate. For regreasing intervals for the basic version, see the Table "Grease lifetime and regreasing intervals for horizontal installation".

Mechanical stress and grease service life

High speeds that exceed the rated speed with converter operation and the resulting increased vibrations alter the mechanical smooth running operation and the bearings are subject to increased mechanical stress. This reduces the grease lifetime and the bearing lifetime (please inquire where applicable).

The use of rigid couplings should be avoided as far as possible. For converter operation in particular, compliance with the mechanical limit speeds n_{max} at maximum supply frequency f_{max} is essential, see the following table "Mechanical limit speeds n_{max} at maximum supply frequency f_{max} ".

Overview (continued)

Mechanical limit speeds n_{max} at maximum supply frequency f_{max} (standard values) for motors – basic version

Frame size	Type	2-pole		4-pole		6-pole		8-pole	
		n_{max} rpm	f_{max} Hz	n_{max} rpm	f_{max} Hz	n_{max} rpm	f_{max} Hz	n_{max} rpm	f_{max} Hz
1LE5 – basic version									
1LE55.-									
400	4A... IM B3	3600	60	2200	74	2200	110	2200	147
450	4B... IM B3	3600 ²⁾	50	2100	70	2100	105	2100	140
400	4A... IM V1	3100	52	2100	70	2100	105	2100	140
450	4B... IM V1	-	-	1800	60	1800	90	1800	120

The specified limit speeds are applicable to motors without additional mountings, such as brakes or rotary encoders. In such applications, the characteristics of the respective mounting parts must be taken into account.

Grease lifetime and regreasing intervals for horizontal installation

Motor series	Frame size	No. of poles	
Regreasing¹⁾			
CT≤40 °C			
1LE5	400	2	4000 h
		4 ... 8	6000 h
	450	2	3000 h
		4 ... 8	6000 h

Bearing selection table for motors – basic version

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 can be read from the rating plate.

Bearing selection table for motors (basic version)

Frame size	No. of poles	Drive end DE bearing		Non-drive end NDE bearing		Fig. no. on page 1/19
		Horizontal and vertical type of constr.		Horizontal and vertical type of constr.		
1LE5						
400	2	6218 C3	7218 B + 6218 C3	6218 C3	6218 C3	Fig. 6 and Fig. 7
	4, 6, 8	6224 C3	7224 B + 6224 C3	6224 C3	6224 C3	Fig. 6 and Fig. 7
450	2	6220 C3	-	6220 C3	-	Fig. 6
	4, 6, 8	6226 C3	7226 B + 6226 C3	6226 C3	6226 C3	Fig. 6 and Fig. 7

Bearing selection table for motors (bearings reinforced at both ends – order code L25)

Frame size	No. of poles	Drive end DE bearing		Non-drive end NDE bearing		Fig. no. on page 1/19
		Horizontal and vertical type of constr.		Horizontal and vertical type of constr.		
1LE5						
400	2	O.R.	O.R.	O.R.	O.R.	Fig. 6 and Fig. 7
	4, 6, 8	6326 C3	O.R.	6326 C3	O.R.	Fig. 6 and Fig. 7
450	2	O.R.	-	O.R.	-	Fig. 6
	4, 6, 8	6326 C3	O.R.	6326 C3	O.R.	Fig. 6 and Fig. 7

- 1) If the coolant temperature is increased by 10 K, the grease lifetime and regreasing interval are halved.
- 2) Version only possible with steel bearing plates. Order on request with additional charge.

Overview (continued)

Diagrams of bearings

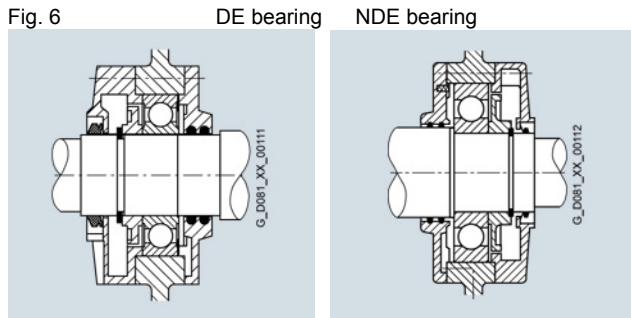


Fig. 6 DE bearing NDE bearing
Frame size 315 to 450,
2- to 8-pole, IM B3

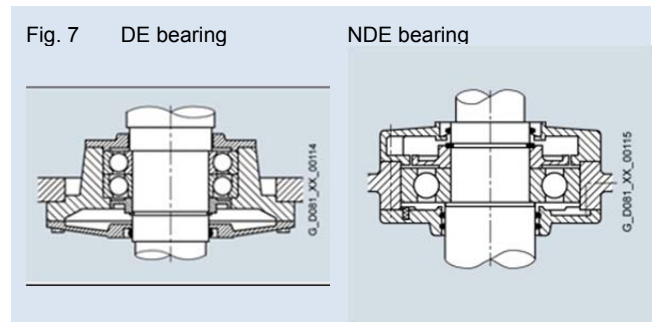
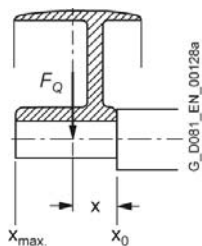


Fig. 7 DE bearing NDE bearing
Frame size 355 and 450,
2- to 8-pole, IM V1

Frame size 315 to 450
2- to 8-pole, IM V1

Admissible cantilever forces



In order to calculate the admissible cantilever forces for a radial load, the line of force (i.e. the centerline of the pulley) of the cantilever force F_Q (N) must be within the free shaft extension (dimension x).

Dimension x (mm) is the distance between the point of application of the force F_Q and the shaft shoulder. The dimension x_{max} corresponds to the length of the shaft extension.

Total cantilever force $F_Q = c \cdot F_u$

The pre-tension factor c is a value gained from experience from the belt manufacturer. The following approximate value can be assumed:

- 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 of load and type of belt) $c = 2$ to 2.5 .

The circumferential force F_u (N) is calculated using the following equation

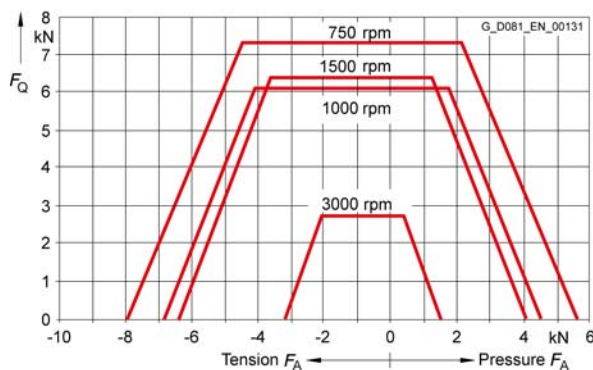
$$F_u = 2 \cdot 10^7 \frac{P}{n \cdot D}$$

- F_u circumferential force in N
- P rated motor power (transmitted power) in kW
- n rated motor speed in rpm
- D pulley diameter in mm

Permissible cantilever forces for the basic 50 Hz version

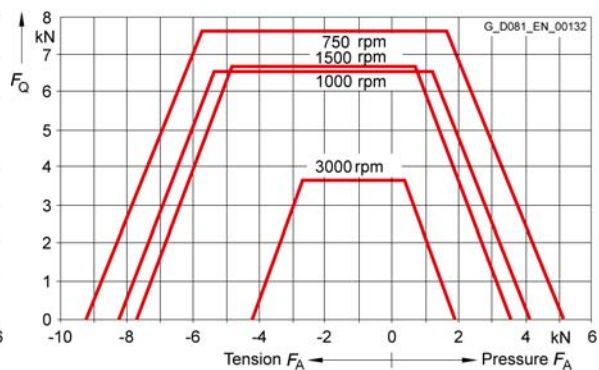
For the motors in horizontal type of construction, the maximum cantilever forces are specified with regard to the axial forces. See diagrams.

Frame size 400 – frame size IM B3



Cantilever force F_Q at $x = l$ (shaft extension) via axial force F_A at nominal bearing service life $L_{h10} = 20000$ h

Frame size 450 – frame size IM B3



Cantilever force F_Q at $x = l$ (shaft extension) via axial force F_A at nominal bearing service life $L_{h10} = 20000$ h

Permissible cantilever forces at 50 Hz – Bearings for increased cantilever forces – Order code L22

For all motors of frame size 400 and 450 in the horizontal and vertical type of construction on request. Please specify cantilever force and lever arm.

Overview (continued)

Admissible axial load

Motors in a vertical type of construction, basic version

For motors in vertical type of construction, the maximum cantilever forces are specified with regard to the axial forces, see page 1/20. The values shown do not assume a cantilever force on the shaft extension. The permissible loads are valid for operation at 50 Hz; please inquire for 60 Hz.

The calculation of the admissible axial load was based on the drive with generally available coupling. For suppliers, see the section "Accessories" in the respective section of the catalog.

Please inquire if the load direction alternates.

	2-pole 6-pole		4-pole 8-pole	
	Load downward downward N	upward upward N	downward downward N	upward upward N
1LE5				
403	8200 3200	11600 19200	5500 4100	15900 20400
405	7800 2600	12000 20000	5200 3300	16300 21200
407	7400 2300	12400 20900	4700 2400	17100 22100
453	6500 5200	13300 23300	7400 6200	20100 24600
455	6200 4800	13700 24300	7000 5300	20800 25500
457	5700 4100	14200 25400	6200 4300	21600 26600

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. Both of these results can only be achieved with converter operation. Please inquire about traction and vibratory operation.

The separately driven fan can be supplied already fitted, order code **F70**. There is no automatic adjustment of the voltage for the separately driven fan when ordering a "special voltage" for the motor. This must be specified in addition using the **Y81** option.

It can also be ordered separately and retrofitted. For selection information and article numbers, see the section "Accessories" (available soon). A rating plate listing all the important data is fitted to the separately driven fan. Please note the direction of rotation of the separately driven fan (axial-flow fan) when connecting it. Admissible coolant temperatures CT_{min} -25 °C, CT_{max} +40 °C, lower/higher coolant temperatures are available on request.

When the separately driven fan is mounted, the length of the motor increases by Δl.

The degree of protection of the motors with modular technology is IP55. Higher degrees of protection on request.

Technical specifications of forced ventilation (according to tolerances of EN 60034-1)

Frame size	Rated voltage range	Frequency	P _{max}	I _{max}
400	3 AC 200 to 240 Δ	50	2.2	2.00
2, 4, 6, 8-pole	3 AC 380 to 420 Y	50	2.2	1.15
	3 AC 440 to 480 Y	60	2.54	1.05
450	3 AC 200 to 240 Δ	50	4.0	14.0
2, 4, 6, 8-pole	3 AC 380 to 420 Y	50	4.0	8.0
	3 AC 440 to 480 Y	60	4.55	7.9

SIMOTICS SD standard motors next generation



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2/9	<u>Self-ventilated or forced-air cooled motors</u>
	SIMOTICS SD Add cast-iron series
	• 1LE5534
2/11	Motors with IE3 Premium Efficiency
2/11	<u>Self-ventilated or forced-air cooled motors</u>
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	• 1LE5534
	• 1LE5533
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	• 1LE5583

Overview



The SIMOTICS SD next generation is a new scalable generation of low-voltage motors. With their impressive performance and the additional versatility in their range of applications, this new motor series offers entry into a future-proof drive technology.

In addition to the future topics of digitalization and energy efficiency, this motor generation was developed with the focus on design optimization, which has resulted in a very compact motor design with a high power density. A standardized option range and the variable terminal box concept also enable flexible use of the motors in different system configurations and applications. The fact that the motors can run either on the line or on a converter is part of their versatility.

The following versions are available in the new 1LE5 motor series, differentiated by their performance features and functionality:

- **SIMOTICS SD Add**

The characteristic product feature of the SIMOTICS SD Add are the low starting currents. These not only meet industry-specific specifications, above all in process industries, but also have a positive impact on the operating quality (higher power system stability, lower thermal load, increased motor lifetime). Through the availability of country-specific certificates, these motors can be used in all the important global regions and markets.

- **SIMOTICS SD Pro**

The SIMOTICS SD Pro range is characterized by its extremely flexible concept, which makes it universally deployable in any plant, in any country in the world. Line and converter operation are generally possible up to 690 V; all important global, country and sector-specific certificates have been obtained. Moreover, combinations are available that further increase flexibility, depending on the frame size. For SIMOTICS SD Pro frame sizes 315 – 355, which are above all used in series business and are characterized by high starting and breakaway torques, this flexibility is manifested particularly through multi-voltage capability and efficiency stability irrespective of the line frequency 50 Hz/60 Hz. For SIMOTICS SD Pro in frame sizes 400 – 450, the starting currents are low. This version is focused more on project business and is primarily used in this power range for converter operation up to 690 V.

One decisive advantage of the motors of the SIMOTICS SD next generation series is the possibility of digital communication. This results in many advantages not just for engineering but throughout the product lifecycle.

SIMOTICS Digital Data App – Access to motor data at any time

The freely available SIMOTICS Digital Data App with frame sizes 315 and 355 already enables access to all motor-specific data and documents (electrical and mechanical data, dimensional drawings, operating instructions, spare part information, etc.) by reading in the data matrix codes present on every motor as standard. This increases transparency and makes commissioning and servicing easier.

SIMOTICS SD Next Generation – The first motors to have an interface with the digital world

The SIMOTICS SD next generation motors with frame sizes 315 and 355 will be the first low-voltage motors to support cloud-based condition data analysis via MindSphere and MindApp with SIMOTICS CONNECT in the near future. The motors are therefore ready for preventive maintenance and fast servicing, which further increases the availability and productivity of your system.

SIMOTICS SD standard motors next generation

Orientation

■ Benefits

- Rugged design in cast-iron housing increases reliability and availability.
- Compact dimensions/high power density enable use even in confined space conditions.
- High energy efficiency on the line (IE3, IE4) and on a converter (IES2) enable energy-saving operation.
- A standardized range of options and a variable terminal box concept increase flexible adaptation to the requirements of the application.
- Support of line and converter operation reduces variety.
- Provision of comprehensive CAD data simplifies the design and engineering phase.

Application

SIMOTICS SD next generation motors are ideal for use in a large number of standard applications, such as

- Pumps, fans, compressors
- Conveyors
- Winders
- Mixers
- Extruders
- Cranes

They are preferably used in industries such as

- Mining, cement
- Chemical
- Oil and gas
- Steel
- Water, waste water
- Heating, ventilation, and air-conditioning (HVAC)
- Pulp and paper
- Marine engineering

Technical specifications

Converter operation

The motors are suitable for line operation and optionally for converter operation (bearing insulation NDE, order code **L51**). The values specified in the selection tables apply to sinusoidal feeding.

Rated voltage

For the rated voltage, the tolerance according to EN 60034-1 always applies. A rated voltage range is not specified.

Motor protection

A motor protection function can be implemented using the I²t sensing circuit implemented in the converter software.

If required, more precise motor protection can be provided by direct temperature measurement using KTY84 sensors, Pt100/Pt1000 resistance thermometers or PTC thermistors in the motor winding. Some converters from Siemens determine the motor temperature using the resistance of the temperature sensor. They can be set to a required temperature for alarming and tripping.

Bearings

To avoid damage caused by bearing currents, the insulated bearing (L51) must be ordered.

When operating multiphase induction machines on a converter, an electrical bearing stress results from a capacitive induced voltage via the bearing lubricating film, depending on the principle being used. The physical cause of this is the common-mode voltage at the converter output that is inherent in the control method for a converter: the sum of the 3 phase voltages is – unlike in pure line operation – not equal to zero at every point in time. The high-frequency, pulsed common-mode voltage results in a residual current that forms a circuit back to the converter's DC link via the machine's internal capacitances, the machine housing and the grounding circuit. The machine's internal capacitances include the main insulation winding capacitance, the geometric capacitance between the rotor and stator, the lubricating film capacitance and the capacitance of any bearing insulation that may be present. The current flowing through the internal capacitances is proportional to the gradient, i.e. the voltage change of the common-mode voltage ($i(t) = C \cdot du/dt$).

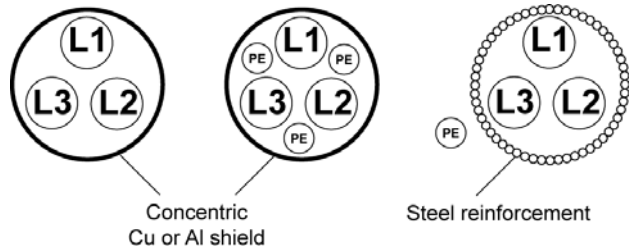
In order to apply currents to the motor that are as sinusoidal as possible (smooth running, oscillation torques, stray losses), a high clock frequency is required for the converter's output voltage. The related (very steep) switching edges of the converter output voltage (and also, therefore, of the common-mode voltage) cause correspondingly high capacitive currents and voltages on the machine's internal capacitances.

In the worst-case scenario, the capacitive voltage induced via the bearing can lead to random arcing through the bearing lubricating film, thus causing premature bearing aging or damage. (The current pulses caused by the puncture in the lubricating film are referred to as EDM (Electrostatic Discharge Machining) currents in the literature.)

This physical effect, which occurs sporadically, has mostly been observed in large motors. EMC-compliant installation of the drive system is a basic prerequisite for preventing premature bearing damage as a result of bearing currents.

The most important measures for reducing bearing damage.

- Insulated bearing at the non-drive end NDE (order code L51)
- Using cables with a symmetrical cable cross-section.

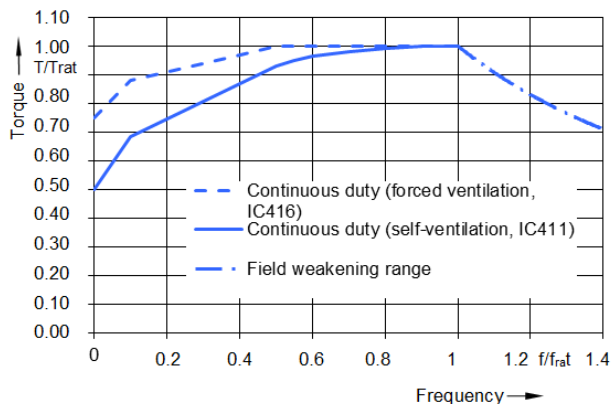


- Preference given to a line supply with isolated neutral point (IT system)
- Using grounding cables with low impedance over a wide frequency range (DC up to approximately 70 MHz): for example, braided copper ribbon cables, HF finely stranded wires
- Separate HF equipotential-bonding cable between motor housing and driven machine
- Separate HF equipotential-bonding cable between motor housing and converter PE busbar
- 360° HF contact of the cable shield at the motor housing and the converter PE busbar. This can be achieved using EMC screwed glands on the motor end and EMC shield clips at the converter, for example
- Using motor reactors at the converter
- Common-mode filters at the converter output

Thermal torque limits

In the case of self-ventilated motors, the thermally admissible load torques are reduced for continuous operation for speeds below the rated speed. This must be taken into account in those applications in particular that are not subjected to a load torque that is dependent on the square of the speed. Also in the case of forced-air cooled motors (order code F70), the maximum load torques are reduced slightly for high speed ranges.

When motors are operated at speeds above their rated speed (in the field-weakening range), the maximum load torque is also reduced.



SIMOTICS SD standard motors next generation

Orientation

Configuration

Terminal box positions

Standard DE, all positions optional, also at NDE; order code **H08**

Standard

rotated 180°

rotated 90°, cable entry DE

rotated 90°, cable entry NDE

1LE5...-..... ■

1LE5...-..... ■ -Z ■ ■ ■

1LE5...-..... ■ -Z ■ ■ ■

1LE5...-..... ■ -Z ■ ■ ■



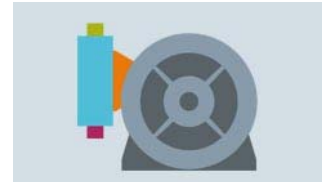
6 ¹⁾



6 R 1 2



6 R 1 0 ³⁾



6 R 1 1



2



2 R 1 2



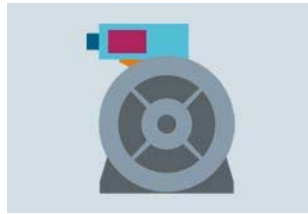
2 R 1 0 ³⁾



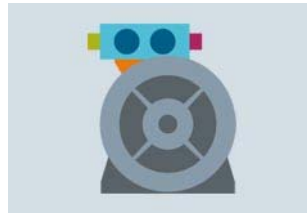
2 R 1 1



0 ^{2) 4)}



0 R 1 2 ⁴⁾



0 R 1 0 ^{3) 4)}



0 R 1 1 ⁴⁾



1 ⁴⁾



1 R 1 2 ^{2) 4)}



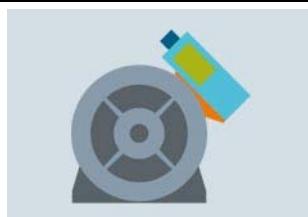
1 R 1 0 ^{3) 4)}



1 R 1 1 ⁴⁾



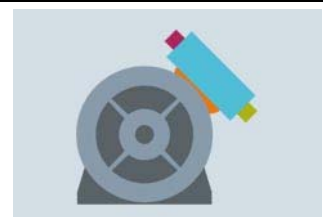
3



3 R 1 2



3 R 1 0 ³⁾



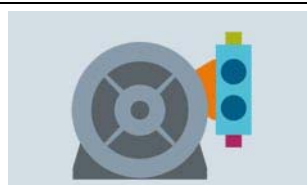
3 R 1 1



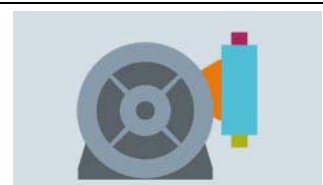
5 ¹⁾



5 R 1 2



5 R 1 0



5 R 1 1

For footnotes, see next page.

SIMOTICS SD standard motors next generation

Orientation

Configuration (continued)

Terminal box positions

Standard

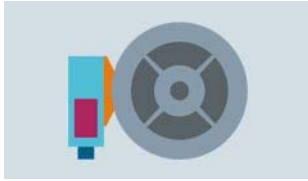
1LE5...-..... ■

rotated 180°

1LE5...-..... ■ -Z ■■■

1LE5...-..... ■ -Z ■■■

1LE5...-..... ■ -Z ■■■



Terminal box left 6



Terminal box right 9 R 6 R



Terminal box left 9 R 7 L



Terminal box right 9 R 7 R



Terminal box right 5



Terminal box left 9 R 5 L

Types of construction

IM B3 / IM B35 / IM V5 / IM V6



IM B5 / IM V1



Legend



Auxiliary terminal box 1 (3)⁵⁾

Auxiliary terminal box 2 (4)⁵⁾

Terminal box

Adapter

Cable entry

- 1) Note the bending radius of the connecting cables.
- 2) The motor must be raised using a crossbar.
- 3) Only possible for flange motors (IM B35, IM B5, IM V1) in conjunction with order code **H08**.
- 4) Not possible for motors with vertical shaft position (IM V1, IM V5, IM V6).
- 5) Mounting applies to auxiliary terminal box with order code **R62**. The auxiliary terminal boxes with order codes **R63** and **R65** are mounted on the housing. See the DT Configurator for details.

SIMOTICS SD standard motors next generation

Orientation

Technical specifications

Overview of technical specifications

This table lists the most important technical specifications. For more information and details, see catalog section 1 "Introduction".

Motor type	SIMOTICS SD 1LE5 IEC low-voltage motors
Connection types	Star/delta connection The connection type to be used can be established from the Article No. supplements for the required motor.
Number of poles	2, 4, 6, 8
Frame sizes	400 ... 450
Rated power	355 ... 1000 kW
Frequencies	50 Hz and 60 Hz
Versions	<ul style="list-style-type: none">• IE3 (Premium Efficiency)• IE4 (Super Premium Efficiency)
Marking	IEC 60034-30-1 IE3, IE4: 2, 4, 6 and 8-pole
Rated speed (synchronous speed)	750 ... 3600 rpm
Rated torque	1600 ... 8100 Nm
Insulation of the stator winding in accordance with EN 60034-1 (IEC 60034-1)	SD Add: Temperature class 155 (F), utilized to temperature class 130 (B) DURIGNIT IR 2000 insulation system SD Pro: Temperature class 155 (F), utilized to temperature class 155 (F) DURIGNIT IR 2000 insulation system
Degree of protection according to EN 60034-5 (IEC 60034-5)	IP55 as standard
Cooling according to EN 60034-6 (IEC 60034-6)	<ul style="list-style-type: none">• Self-ventilated (IC411)• Forced-air cooled motors w/o ext. fan/fan cover (IC418)• Forced-air cooled (IC416)
Permissible coolant temperature and installation altitude	-20 ... +40 °C as standard, installation altitude up to 1000 m above sea level. See "Coolant temperature and installation altitude" in Catalog Section 1 "Introduction".
Standard voltages according to EN 60038 (IEC 60038)	50 Hz: 400 V, 500 V, 690 V The voltage to be used can be found in the "Selection and ordering data" for the required motor.
Type of construction according to EN 60034-7 (IEC 60034-7)	<ul style="list-style-type: none">• Without flange: IM B3, IM V5 (on request), IM V6 (on request)• With flange: IM B5 with support foot, IM V1, IM B35
Paint finish Suitability of paint finish for climate group according to IEC 60721, Part 2-1	As standard: Color RAL 7030 stone gray See "Paint finish" in Catalog Section 1 "Introduction".
Vibration severity grade according to EN 60034-14 (IEC 60034-14)	Grade A (normal – without special vibration requirements) Optionally: Grade B (with special vibration requirements) See "Balance and vibration quantity" in Catalog Section 1 "Introduction".
Shaft extension according to DIN 748 (IEC 60072)	Balancing type: half-key balancing as standard See "Balance and vibration severity" in Catalog Section 1 "Introduction".
Sound pressure level according to EN ISO 1680 (tolerance +3 dB)	The sound pressure level is listed in the selection and ordering data for the required motor.
Weights	The weight is listed in the selection and ordering data for the required motor.
Modular mounting concept	Rotary pulse encoder, brake, separately driven fan or prepared for mountings
Consistent series concept	<ul style="list-style-type: none">• Terminal box obliquely partitioned and optionally rotatable through 4 x 90°• Bearings at DE and NDE are of identical design, reinforced bearings available as an option
Options	See Article No. supplements and special versions

More information

For more information, please get in touch with your Siemens contact in the Regions or use the DT Configurator.

Contacts: www.siemens.com/automation/partner
DT Configurator: www.siemens.com/dt-configurator

You can find out about certain technologies through Siemens contact partners worldwide.

Wherever possible, you will find a local contact for:

- Technical support
- Spare parts/repairs
- Service
- Training
- Marketing & Sales
- Technical consultation/engineering

You start by selecting a:

- country
- product or
- sector

Selection and ordering data

The article number consists of a combination of digits and letters and is divided into three hyphenated blocks to provide a better overview, e.g. **1LE5534-4AB33-4AA2-Z**

H00

The first block (positions 1 to 7) identifies the motor type. The second block (positions 8 to 12) defines the motor frame size and length, the number of poles and in some cases the frequency/voltage. In the third block (positions 13 to 16), the frequency/voltage, type of construction and further design features are encoded.

For deviations in the second and third block from the catalog codes, either Z or 90 should be used as appropriate.

Ordering data:

- Complete Article No. and order code(s) or plain text
- If a quotation has been requested, please specify the quotation number in addition to the Article No.
- When ordering a complete motor as a spare part, please specify the factory serial no. for the previously supplied motor as well as the Article No.

Structure of the Article No.:	Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16
1st to 4th position: Digit, letter, letter, digit		1	L	E	5														
		• Self-ventilated by fan mounted on and driven by the rotor • Forced-air cooled by air flow from the fan to be driven with option extension F90																	
5th position: Digit						5													
6th to 7th position: 2 digits							3	3											
							8	3											
							3	4											
8th, 9th and 11th position: Digit, letter, digit										4	A			3					
															
											B			7					
10th position: Letter												A							
												B							
												C							
												D							
12th and 13th position: 2 digits														0		0			
																
														9		7			
14th position: Letter																	A		
																	...		
																	V		
15th position: Letter																		A	
																		...	
																		Z	
16th position: Digit																			
																			0
																			1
																			2
																			3
																			5
																			6
																			- Z

Ordering example

Selection criteria	Requirement	Structure of the Article No.
Motor type 1LE5	Standard motor with IE4 Premium Efficiency, self-ventilated, degree of protection IP55, cast-iron version	1LE5534-■■■■■■■■-■■■■■
Motor frame size / no. of poles / speed	400 / overall length 3 / 4-pole / 1500 rpm	1LE5534-4AB3■■■■■■
Rated power	560 kW	
Voltage and frequency	400 VΔ / 690 VY, 50 Hz	1LE5534-4AB33-4■■■■■
Type of construction with special version	IM V5 with protective cover ¹⁾	1LE5534-4AB33-4C■■■■-Z H00
Motor protection	1 or 3 PTC thermistors – for tripping (2 terminals)	1LE5534-4AB33-4CB■■■- Z H00
Terminal box position	Terminal box base left with terminal box 45°	1LE5534-4AB33-4CB2- Z H00

1) Standard without protective cover – the protective cover is defined with order code **H00** and must be ordered in addition to the Article No. with **-Z** and this order code.

SIMOTICS SD standard motors next generation

SIMOTICS SD Add motors

IE4 Super Premium Efficiency

Self-ventilated or forced-air cooled motors, cast-iron series 1LE5534

Selection and ordering data

Operating values at rated power														Cast-iron series 1LE5534 IE4 version acc. to IEC 60034-30-1 Article No.		m _{M B3} J		Torque class	
P _{rated} 50 Hz	Frame size	n _{rated}	T _{rated}	η _{rated} , 4/4	η _{rated} , 3/4	η _{rated} , 2/4	cos φ _{rated} , 4/4	I _{rated} Δ	T _{LR} /T _{rated}	I _{LR} /I _{rated}	T _B /T _{rated}	L _{pFA}	L _{WA}						
kW	FS	rpm	Nm	%	%	%		A											
• Cooling: Self-ventilated (IC411) • Efficiency: IE4 Super Premium Efficiency, service factor with sinusoidal feeding (SF) 1.05 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization with sinusoidal feeding in accordance with thermal class 130 (temperature class B) • Optionally suitable for converter operation with insulated bearing (L51) for U _{line} ≤480 V; U _{motor} ≤500 V; U _{DC} ≤720 V – IVIC C advanced insulation system																			
2-pole: 3000 rpm at 50 Hz																			
560 ³⁾	400	2988	1790	97.0	96.9	96.5	0.89	940	1.6	7.3	3.1	74	90	▲	1LE5 534-4AA3	■-■■■■■	2850	8.9	10
630 ³⁾	400	2988	2000	97.0	97.1	96.8	0.90	1040	1.6	7.3	3.0	74	90	▲	1LE5 534-4AA5	■-■■■■■	3000	9.8	10
710 ⁴⁾	400	2988	2250	97.1	97.2	96.9	0.90	680	1.7	7.3	2.9	74	90	▲	1LE5 534-4AA7	■-■■■■■	3200	10.8	10
800 ^{3) 4) 5)}	450	2990	2550	97.4	97.4	97.1	0.87	790	1.2	7.7	3.3	75	91	▲	1LE5 534-4BA3	■-■■■■■	4000	12.3	7
900 ^{3) 4) 5)}	450	2988	2900	97.4	97.5	97.4	0.89	870	1.2	7.2	3.0	75	91	▲	1LE5 534-4BA5	■-■■■■■	4250	13.5	7
1000 ^{3) 4) 5)}	450	2988	3200	97.4	97.6	97.6	0.90	950	1.2	7.0	2.7	75	91	▲	1LE5 534-4BA7	■-■■■■■	4450	14.7	7
4-pole: 1500 rpm at 50 Hz																			
560 ³⁾	400	1493	3600	96.9	97.0	96.6	0.86	970	2.2	7.5	3.1	72	88	▲	1LE5 534-4AB3	■-■■■■■	3050	14.9	13
630 ³⁾	400	1492	4050	96.8	96.9	96.6	0.87	1080	2.2	6.9	2.8	74	90	▲	1LE5 534-4AB5	■-■■■■■	3150	15.6	13
710 ⁴⁾	400	1492	4550	97.0	97.0	96.8	0.87	700	2.2	7.2	2.9	74	90	▲	1LE5 534-4AB7	■-■■■■■	3250	16.9	13
800 ⁴⁾	450	1492	5100	96.9	97.1	96.9	0.87	790	1.4	6.5	2.4	79	95	▲	1LE5 534-4BB3	■-■■■■■	4000	24.0	10
900 ⁴⁾	450	1492	5800	97.0	97.2	97.0	0.88	880	1.4	6.5	2.5	79	95	▲	1LE5 534-4BB5	■-■■■■■	4150	25.4	10
1000 ^{3) 4)}	450	1492	6400	97.1	97.2	97.1	0.88	980	1.5	6.8	2.6	79	95	▲	1LE5 534-4BB7	■-■■■■■	4350	28.0	10
6-pole: 1000 rpm at 50 Hz																			
450	400	994	4300	96.6	96.8	96.4	0.85	790	2.2	7.2	2.7	70	86	▲	1LE5 534-4AC3	■-■■■■■	3100	25.5	16
500	400	994	4800	96.7	96.8	96.5	0.85	880	2.3	7.3	2.8	70	86	▲	1LE5 534-4AC5	■-■■■■■	3250	27.4	16
560	400	994	5400	96.7	96.8	96.4	0.84	1000	2.4	7.5	2.9	70	86	▲	1LE5 534-4AC7	■-■■■■■	3300	28.6	16
630 ³⁾	450	995	6000	96.8	97.0	96.7	0.83	1130	2.0	7.0	2.8	72	88	▲	1LE5 534-4BC3	■-■■■■■	4050	38.6	13
710 ⁴⁾	450	994	6800	96.8	97.0	96.9	0.84	730	1.8	6.6	2.5	72	88	▲	1LE5 534-4BC5	■-■■■■■	4200	41.0	13
800 ⁴⁾	450	994	7700	96.8	97.0	96.8	0.84	820	1.8	6.6	2.4	74	90	▲	1LE5 534-4BC7	■-■■■■■	4300	43.3	13
8-pole: 750 rpm at 50 Hz																			
355	400	744	4550	95.8	96.1	95.8	0.80	670	2.0	6.5	2.6	64	80	▲	1LE5 534-4AD3	■-■■■■■	2850	21.9	13
400	400	744	5100	96.0	96.2	95.9	0.80	750	2.1	6.8	2.7	64	80	▲	1LE5 534-4AD5	■-■■■■■	3050	24.5	13
450	400	744	5800	96.0	96.3	96.0	0.80	850	2.1	6.8	2.7	64	80	▲	1LE5 534-4AD7	■-■■■■■	3250	27.5	13
500	450	745	6400	96.2	96.4	96.1	0.79	950	2.0	6.8	2.5	67	83	▲	1LE5 534-4BD3	■-■■■■■	3800	34.0	13
560	450	745	7200	96.3	96.5	96.1	0.79	1060	2.0	6.9	2.6	67	83	▲	1LE5 534-4BD5	■-■■■■■	4000	38.0	13
630	450	745	8100	96.4	96.6	96.3	0.80	1180	2.0	6.9	2.5	67	83	▲	1LE5 534-4BD7	■-■■■■■	4250	42.5	13
Voltages														Version		Order code(s)			
50 Hz	400 VΔ/690 VY		60 Hz	460 VΔ				Standard		3 4		-							
50 Hz	500 VΔ		60 Hz	575 VΔ				Without additional charge		4 0		-							
50 Hz	690 VΔ						Without additional charge		4 7		-								
For other voltages and more information, see from page 2/15																...			
Types of construction														Version		Order code(s)			
Without flange		IM B3 ²⁾						Standard		A		-							
With flange		IM B5 ²⁾						With additional charge		F		-							
For other types of construction and more information, see from page 2/16																...			
Motor protection														Version		Order code(s)			
Without								Standard		A		-							
PTC thermistor with 3 temperature sensors								With additional charge		B		-							
For other motor protection and more information, see from page 2/18																...			
Terminal box position														Version		Order code(s)			
Terminal box base left with terminal box 45°								Without additional charge		2		-							
Terminal box base right with terminal box 45°								Standard		3		-							
For other terminal box positions and more information, see from page 2/19																			
Special versions																Order code(s)			
Forced-air cooled motors w/o ext. fan/fan cover (IC418)								1LE5534-....		■-■■■■■		-Z F90+...+...+...							
Forced-air cooled (IC416)								1LE5534-....		■-■■■■■		-Z F70+...+...+...							
For options, see from page 2/20																1LE5534-.... ■-■■■■■ -Z ..+...+...+...			

1) n.a.
2) n.a.
3) Terminal box 1XB1631.

4) Standard version is 50 Hz / 690 V (voltage code 4-7) or 60 Hz / 575 V (voltage code 4-0).
5) n_{max}=3000 rpm. For higher speeds, the motor must have steel bearing plates. Order on request with additional charge.

SIMOTICS SD standard motors next generation

SIMOTICS SD Add motors

IE4 Super Premium Efficiency

Self-ventilated or forced-air cooled motors, cast-iron series 1LE5534

Selection and ordering data

Operating values at rated power														Cast-iron series 1LE5534 IE4 version acc. to IEC 60034-30-1 Article No.		m_{MB3}	J	Torque class
P_{rated} 60Hz	Frame size	n_{rated}	T_{rated}	$\eta_{rated, 4/4}$	$\eta_{rated, 3/4}$	$\eta_{rated, 2/4}$	$\cos\phi_{rated, 4/4}$	$I_{rated\Delta}$	T_{LR}/T_{rated}	I_{LR}/I_{rated}	T_B/T_{rated}	L_{ptA}	L_{WA}	▲ New	kg	kgm ²	CL	
kW	FS	rpm	Nm	%	%	%		A						▲ New	kg	kgm ²	CL	
• Cooling: Self-ventilated (IC411) • Efficiency: IE4 Super Premium Efficiency, service factor with sinusoidal feeding (SF) 1.05 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization with sinusoidal feeding in accordance with thermal class 130 (temperature class B) • Optionally suitable for converter operation with insulated bearing (L51) for $U_{line} \leq 480$ V; $U_{motor} \leq 500$ V; $U_{DC} \leq 720$ V – IVIC C advanced insulation system																		
2-pole: 3600 rpm at 60 Hz																		
616	3)	400	3588	1640	96.8	96.7	96.2	0.89	900	1.6	7.4	3.1	78	94	▲ 1LE5 534-4AA3	2850	8.9	10
693	3)	400	3588	1840	97.0	96.9	96.4	0.90	1000	1.6	7.4	3.0	78	94	▲ 1LE5 534-4AA5	3000	9.8	10
781	3) 4)	400	3590	2100	97.1	97.0	96.5	0.89	910	1.8	7.5	3.2	78	94	▲ 1LE5 534-4AA7	3200	10.8	10
920	3) 4) 5)	450	3590	2450	97.3	97.3	96.8	0.88	1080	1.1	7.6	3.2	79	95	▲ 1LE5 534-4BA3	4000	12.3	7
1040	3) 4) 5)	450	3588	2750	97.4	97.4	97.0	0.89	1200	1.2	7.2	3.0	79	95	▲ 1LE5 534-4BA5	4250	13.5	7
1120	3) 4) 5)	450	3586	3000	97.4	97.6	97.3	0.90	1280	1.2	6.9	2.6	79	95	▲ 1LE5 534-4BA7	4450	14.7	7
4-pole: 1800 rpm at 60 Hz																		
644	3)	400	1793	3450	96.9	96.9	96.4	0.87	960	2.1	7.5	3.0	76	92	▲ 1LE5 534-4AB3	3050	14.9	13
725	3)	400	1792	3850	96.8	96.8	96.4	0.87	1080	2.1	6.9	2.7	78	94	▲ 1LE5 534-4AB5	3150	15.6	13
817	4)	400	1791	4350	96.9	97.0	96.7	0.88	960	1.9	6.8	2.5	78	94	▲ 1LE5 534-4AB7	3250	16.9	13
920	3) 4)	450	1792	4900	96.9	97.0	96.6	0.87	1100	1.3	6.3	2.3	83	99	▲ 1LE5 534-4BB3	4000	24.0	10
1040	3) 4)	450	1793	5500	97.1	97.1	96.7	0.87	1240	1.4	6.8	2.6	83	99	▲ 1LE5 534-4BB5	4150	25.4	10
1150	3) 4)	450	1792	6100	97.1	97.2	96.9	0.88	1350	1.4	6.7	2.4	83	99	▲ 1LE5 534-4BB7	4350	28.0	10
6-pole: 1200 rpm at 60 Hz																		
518		400	1194	4150	96.7	96.8	96.4	0.86	780	2.1	7.3	2.6	73	89	▲ 1LE5 534-4AC3	3100	25.5	16
575		400	1194	4600	96.8	96.9	96.5	0.86	870	2.2	7.4	2.7	73	89	▲ 1LE5 534-4AC5	3250	27.4	16
644		400	1194	5200	96.8	96.8	96.4	0.85	980	2.3	7.6	2.8	73	89	▲ 1LE5 534-4AC7	3300	28.6	16
725	3)	450	1195	5800	96.9	97.0	96.7	0.84	1120	1.9	7.0	2.6	75	91	▲ 1LE5 534-4BC3	4050	38.6	13
817	4)	450	1194	6500	96.9	97.1	96.9	0.84	1010	1.7	6.6	2.3	75	91	▲ 1LE5 534-4BC5	4200	41.0	13
920	3) 4)	450	1194	7400	96.9	97.0	96.7	0.84	1130	1.8	6.6	2.4	77	93	▲ 1LE5 534-4BC7	4300	43.3	13
8-pole: 900 rpm at 60 Hz																		
408		400	894	4350	95.9	96.1	95.8	0.81	660	1.9	6.5	2.5	67	83	▲ 1LE5 534-4AD3	2850	21.9	13
460		400	894	4900	96.1	96.2	95.8	0.81	740	1.9	6.8	2.6	67	83	▲ 1LE5 534-4AD5	3050	24.5	13
518		400	894	5500	96.2	96.3	96.0	0.81	830	2.0	6.8	2.7	67	83	▲ 1LE5 534-4AD7	3250	27.5	13
575		450	895	6100	96.3	96.4	96.0	0.80	940	1.9	6.8	2.4	70	86	▲ 1LE5 534-4BD3	3800	34.0	13
644		450	895	6900	96.4	96.5	96.1	0.80	1050	1.9	6.9	2.5	70	86	▲ 1LE5 534-4BD5	4000	38.0	13
725		450	895	7700	96.5	96.6	96.3	0.81	1160	1.9	6.9	2.4	70	86	▲ 1LE5 534-4BD7	4250	42.5	13
Voltages														Version	Order code(s)			
50 Hz	400 VΔ/690 VY			60 Hz	460 VΔ			Standard		3	4	-						
50 Hz	500 VΔ			60 Hz	575 VΔ			Without additional charge		4	0	-						
50 Hz	690 VΔ							Without additional charge		4	7	-						
For other voltages and more information, see from page 2/15														...				
Types of construction														Version	Order code(s)			
Without flange		IM B3 ²⁾			Standard		A		-									
With flange		IM B5 ²⁾			With additional charge		F		-									
For other types of construction and more information, see from page 2/16														...				
Motor protection														Version	Order code(s)			
Without		Standard			A		-											
PTC thermistor with 3 temperature sensors		With additional charge			B		-											
For other motor protection and more information, see from page 2/18														...				
Terminal box position														Version	Order code(s)			
Terminal box base left with terminal box 45°		Without additional charge			2		-											
Terminal box base right with terminal box 45°		Standard			3		-											
For other terminal box positions and more information, see from page 2/19														...				
Special versions														Order code(s)				
Forced-air cooled motors w/o ext. fan/fan cover (IC418)										1LE5534-		-Z F90+ . . . + . . .						
Forced-air cooled (IC416)										1LE5534-		-Z F70+ . . . + . . .						
For options, see from page 2/20										1LE5534-		-Z . . . + . . . + . . .						

1) n.a.
2) n.a.
3) Terminal box 1XB1631.

4) Standard version is 50 Hz / 690 V (voltage code 4-7) or 60 Hz z / 575 V (voltage code 4-0).
5) Version only possible with steel bearing plates. Order on request with additional charge.

SIMOTICS SD standard motors next generation

SIMOTICS SD Add motors

IE3 Premium Efficiency

Self-ventilated or forced-air cooled motors, cast-iron series 1LE5533

Selection and ordering data																		
P _{rated} 50 Hz	Frame size	Operating values at rated power											Cast-iron series 1LE5533 IE3 version acc. to IEC 60034-30-1 Article No.	m _M B3	J	Torque class		
		n _{rated}	T _{rated}	η _{rated} , 4/4	η _{rated} , 3/4	η _{rated} , 2/4	cosφ _{rated} , 4/4	I _{rated} Δ	T _{LR} / T _{rated}	I _{LR} / I _{rated}	T _B / T _{rated}	L _{pFA}					L _{WA}	
kW	FS	rpm	Nm	%	%	%	A							▲ New	kg	kgm ²	CL	
• Cooling: Self-ventilated (IC411) • Efficiency: Premium Efficiency IE3, service factor with sinusoidal feeding (SF) 1.05 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization with sinusoidal feeding in accordance with thermal class 130 (temperature class B) • Optionally suitable for converter operation with insulated bearing (L51) for U _{line} ≤480 V; U _{motor} ≤500 V; U _{DC} ≤720 V – IVIC C advanced insulation system																		
2-pole: 3000 rpm at 50 Hz																		
560	3)	400	2986	1790	96.6	96.7	96.3	0.90	930	1.6	7.0	2.8	74	90	▲ 1LE5 533-4AA3	2850	8.9	10
630	3)	400	2986	2000	96.6	96.7	96.6	0.91	1030	1.6	7.0	2.8	74	90	▲ 1LE5 533-4AA5	3000	9.8	10
710	4)	400	2986	2250	96.8	96.9	96.7	0.91	670	1.7	7.0	2.8	74	90	▲ 1LE5 533-4AA7	3200	10.8	10
800	3) 4) 5)	450	2988	2550	97.0	97.0	96.6	0.88	780	1.1	7.5	3.1	75	91	▲ 1LE5 533-4BA3	4000	12.3	7
900	3) 4) 5)	450	2986	2900	97.0	97.1	96.9	0.90	860	1.1	7.0	2.8	75	91	▲ 1LE5 533-4BA5	4250	13.5	7
1000	3) 4) 5)	450	2984	3200	97.0	97.1	97.0	0.91	950	1.1	6.8	2.6	75	91	▲ 1LE5 533-4BA7	4450	14.7	7
4-pole: 1500 rpm at 50 Hz																		
560	3)	400	1492	3600	96.2	96.3	95.8	0.87	970	1.8	6.5	2.7	78	94	▲ 1LE5 533-4AB3	2800	12.8	13
630	3)	400	1492	4050	96.4	96.5	95.9	0.87	1080	1.9	6.8	2.7	78	94	▲ 1LE5 533-4AB5	3000	14.4	13
710	4)	400	1492	4550	96.5	96.6	96.2	0.88	700	1.9	6.8	2.7	78	94	▲ 1LE5 533-4AB7	3200	16.5	13
800	4)	450	1492	5100	96.5	96.6	96.1	0.88	790	1.6	7.0	2.6	81	97	▲ 1LE5 533-4BB3	3850	22.2	10
900	4)	450	1492	5800	96.6	96.7	96.2	0.87	900	1.5	7.0	2.6	81	97	▲ 1LE5 533-4BB5	4100	24.8	10
1000	3) 4)	450	1492	6400	96.6	96.7	96.3	0.89	970	1.7	7.0	2.6	81	97	▲ 1LE5 533-4BB7	4300	27.4	10
6-pole: 1000 rpm at 50 Hz																		
450	3)	400	992	4350	96.0	96.1	95.8	0.86	790	2.1	6.5	2.7	72	88	▲ 1LE5 533-4AC3	2900	22.0	13
500	3)	400	992	4800	96.0	96.1	95.8	0.86	870	2.2	6.5	2.7	72	88	▲ 1LE5 533-4AC5	3050	24.7	13
560	3)	400	992	5400	96.2	96.3	96.0	0.86	980	2.2	6.5	2.7	72	88	▲ 1LE5 533-4AC7	3250	27.8	13
630	3)	450	993	6100	96.3	96.4	96.2	0.85	1110	2.0	6.5	2.6	74	90	▲ 1LE5 533-4BC3	3800	34.4	13
710	4)	450	993	6800	96.3	96.4	96.4	0.85	730	2.0	6.5	2.5	74	90	▲ 1LE5 533-4BC5	4050	38.5	13
800	4)	450	993	7700	96.5	96.7	96.5	0.85	820	2.0	6.5	2.5	74	90	▲ 1LE5 533-4BC7	4300	43.1	13
8-pole: 750 rpm at 50 Hz																		
355	3)	400	742	4550	95.6	95.7	95.5	0.81	660	1.9	6.2	2.5	64	80	▲ 1LE5 533-4AD3	2850	21.9	13
400	3)	400	742	5100	95.7	95.8	95.5	0.81	740	2.0	6.5	2.6	64	80	▲ 1LE5 533-4AD5	3050	24.5	13
450	3)	400	742	5800	95.8	95.9	95.8	0.81	840	2.0	6.5	2.6	64	80	▲ 1LE5 533-4AD7	3250	27.5	13
500	3)	450	744	6400	95.9	96.0	95.7	0.80	940	1.9	6.5	2.4	67	83	▲ 1LE5 533-4BD3	3800	34.0	13
560	3)	450	744	7200	96.0	96.1	95.8	0.80	1050	1.9	6.5	2.4	67	83	▲ 1LE5 533-4BD5	4000	38.0	13
630	3)	450	744	8100	96.1	96.2	95.9	0.81	1170	1.9	6.5	2.4	67	83	▲ 1LE5 533-4BD7	4250	42.5	13
Voltages																		
50 Hz		400 VΔ/690 VY		60 Hz		460 VΔ		Version		Standard		3 4		Order code(s)		-		
50 Hz		500 VΔ		60 Hz		575 VΔ		Without additional charge		4 0		-		Order code(s)		-		
50 Hz		690 VΔ						Without additional charge		4 7		-		Order code(s)		-		
For other voltages and more information, see from page 2/15																		
Types of construction																		
Without flange		IM B3 ²⁾		Version		Standard		A		-		Order code(s)		-		-		
With flange		IM B5 ²⁾		With additional charge		F		-		-		Order code(s)		-		-		
For other types of construction and more information, see from page 2/16																		
Motor protection																		
Without		Version		Standard		A		-		-		Order code(s)		-		-		
PTC thermistor with 3 temperature sensors		With additional charge		B		-		-		-		Order code(s)		-		-		
For other motor protection and more information, see from page 2/18																		
Terminal box position																		
Terminal box base left with terminal box 45°		Without additional charge		2		-		Order code(s)		-		-		-		-		
Terminal box base right with terminal box 45°		Standard		3		-		Order code(s)		-		-		-		-		
For other terminal box positions and more information, see from page 2/19																		
Special versions																		
Forced-air cooled motors w/o ext. fan/fan cover (IC418)		1LE5533-....		-Z		F90+...+...+...		Order code(s)		-		-		-		-		
Forced-air cooled (IC416)		1LE5534-....		-Z		F70+...+...+...		Order code(s)		-		-		-		-		
		1LE5533-....		-Z		...+...+...+...		Order code(s)		-		-		-		-		

1) n.a.
 2) n.a.
 3) Terminal box 1XB1631.

4) Standard version is 50 Hz / 690 V (voltage code 4-7) or 60 Hz / 575 V (voltage code 4-0).
 5) n_{max}=3000 rpm. For higher speeds, the motor must have steel bearing plates. Order on request with additional charge.

SIMOTICS SD standard motors next generation

SIMOTICS SD Add motors

IE3 Premium Efficiency

Self-ventilated or forced-air cooled motors, cast-iron series 1LE5533

Selection and ordering data

P _{rated} 60Hz kW	Frame size FS	n _{rated} rpm	Operating values at rated power										Cast-iron series 1LE5533 IE3 version acc. to IEC 60034-30-1 Article No.	m _M B3 kg	J kgm ²	Torque class CL		
			T _{rated} Nm	η _{rated, 4/4} %	η _{rated, 3/4} %	η _{rated, 2/4} %	cosφ _{rated, 4/4}	I _{rated, Δ} A	T _{LR} / T _{rated}	I _{LR} / I _{rated}	T _B / T _{rated}	L _{ptA} dB(A)					L _{WA} dB(A)	
• Cooling: Self-ventilated (IC411) • Efficiency: Premium Efficiency IE3, service factor with sinusoidal feeding (SF) 1.05 • Insulation: Thermal class 155 (temperature class F), IP55 degree of protection, utilization with sinusoidal feeding in accordance with thermal class 130 (temperature class B) • Optionally suitable for converter operation with insulated bearing (L51) for U _{line} ≤480 V; U _{motor} ≤500 V; U _{DC} ≤720 V – IVIC C advanced insulation system																		
2-pole: 3600 rpm at 60 Hz																		
616	3)	400	3586	1640	96.5	96.4	95.8	0.90	890	1.6	7.2	2.8	78	94	▲ 1LE5 533-4AA3	2850	8.9	10
693	3)	400	3586	1850	96.5	96.5	96.2	0.91	990	1.6	7.1	2.8	78	94	▲ 1LE5 533-4AA5	3000	9.8	10
781	3) 4)	400	3588	2100	96.8	96.8	96.3	0.90	900	1.8	7.3	3.1	78	94	▲ 1LE5 533-4AA7	3200	10.8	10
920	3) 4) 5)	450	3588	2450	96.9	96.9	96.5	0.89	1070	1.0	7.5	3.0	79	95	▲ 1LE5 533-4BA3	4000	12.3	7
1040	3) 4) 5)	450	3586	2750	97.0	97.0	96.6	0.90	1200	1.1	7.0	2.8	79	95	▲ 1LE5 533-4BA5	4250	13.5	7
1120	3) 4) 5)	450	3584	3000	97.0	97.1	96.9	0.91	1270	1.1	6.8	2.5	79	95	▲ 1LE5 533-4BA7	4450	14.7	7
4-pole: 1800 rpm at 60 Hz																		
644	3)	400	1791	3450	96.2	96.3	95.5	0.88	950	1.7	6.4	2.5	82	98	▲ 1LE5 533-4AB3	2800	12.8	13
725	3)	400	1792	3850	96.4	96.3	95.7	0.88	1070	1.8	6.8	2.7	82	98	▲ 1LE5 533-4AB5	3000	14.4	13
817	4)	400	1792	4350	96.5	96.4	95.9	0.89	960	1.8	6.8	2.5	82	98	▲ 1LE5 533-4AB7	3200	16.5	13
920	3) 4)	450	1791	4900	96.3	96.3	95.8	0.89	1080	1.3	6.5	2.3	85	101	▲ 1LE5 533-4BB3	3850	22.2	10
1040	3) 4)	450	1791	5500	96.5	96.5	95.9	0.88	1230	1.4	6.8	2.5	85	101	▲ 1LE5 533-4BB5	4100	24.8	10
1150	3) 4)	450	1791	6100	96.6	96.6	96.1	0.90	1330	1.6	6.8	2.5	85	101	▲ 1LE5 533-4BB7	4300	27.4	10
6-pole: 1200 rpm at 60 Hz																		
518	3)	400	1193	4150	96.0	96.1	95.7	0.86	790	2.0	6.4	2.6	75	91	▲ 1LE5 533-4AC3	2900	22.0	13
575	3)	400	1193	4600	96.0	96.1	95.8	0.86	870	2.1	6.5	2.6	75	91	▲ 1LE5 533-4AC5	3050	24.7	13
644	3)	400	1193	5200	96.2	96.4	96.0	0.86	980	2.1	6.5	2.6	75	91	▲ 1LE5 533-4AC7	3250	27.8	13
725	3)	450	1194	5800	96.3	96.3	96.1	0.85	1110	1.9	6.4	2.4	77	93	▲ 1LE5 533-4BC3	3800	34.4	13
817	4)	450	1193	6500	96.3	96.4	96.4	0.85	1000	2.0	6.6	2.6	77	93	▲ 1LE5 533-4BC5	4050	38.5	13
920	3) 4)	450	1193	7400	96.5	96.7	96.4	0.85	1130	1.9	6.6	2.4	77	93	▲ 1LE5 533-4BC7	4300	43.1	13
8-pole: 900 rpm at 60 Hz																		
408	3)	400	892	4350	95.7	95.8	95.5	0.82	650	1.8	6.2	2.4	67	83	▲ 1LE5 533-4AD3	2850	21.9	13
460	3)	400	892	4900	95.8	95.9	95.6	0.82	730	1.9	6.5	2.5	67	83	▲ 1LE5 533-4AD5	3050	24.5	13
518	3)	400	892	5500	95.9	96.0	95.8	0.82	830	1.9	6.5	2.6	67	83	▲ 1LE5 533-4AD7	3250	27.5	13
575	3)	450	894	6100	96.0	96.1	95.7	0.81	930	1.8	6.5	2.3	70	86	▲ 1LE5 533-4BD3	3800	34.0	13
644	3)	450	894	6900	96.1	96.2	95.8	0.81	1040	1.8	6.5	2.4	70	86	▲ 1LE5 533-4BD5	4000	38.0	13
725	3)	450	894	7700	96.2	96.4	96.0	0.82	1150	1.8	6.5	2.4	70	86	▲ 1LE5 533-4BD7	4250	42.5	13
Voltages												Version		Order code(s)				
50 Hz	400 VΔ/690 VY	60 Hz	460 VΔ					Standard		3	4	-						
50 Hz	500 VΔ	60 Hz	575 VΔ					Without additional charge		4	0	-						
50 Hz	690 VΔ					Without additional charge		4	7	-								
For other voltages and more information, see from page 2/15														...				
Types of construction												Version		Order code(s)				
Without flange		IM B3 ²⁾						Standard		A	-							
With flange		IM B5 ²⁾						With additional charge		F	-							
For other types of construction and more information, see from page 2/16														...				
Motor protection												Version		Order code(s)				
Without						Standard		A	-									
PTC thermistor with 3 temperature sensors						With additional charge		B	-									
For other motor protection and more information, see from page 2/18														...				
Terminal box position												Version		Order code(s)				
Terminal box base left with terminal box 45°						Without additional charge		2	-									
Terminal box base right with terminal box 45°						Standard		3	-									
For other terminal box positions and more information, see from page 2/19																		
Special versions														Order code(s)				
Forced-air cooled motors w/o ext. fan/fan cover (IC418)												1LE5533-		■ ■ ■ ■ ■ -Z F90+ . . . + . . .				
Forced-air cooled (IC416)												1LE5534-		■ ■ ■ ■ ■ -Z F70+ . . . + . . .				
For options, see from page 2/20												1LE5533-		■ ■ ■ ■ ■ -Z . . + . . + . . + . .				

1) n.a.

2) n.a.

3) Terminal box 1XB1631.

4) Standard version is 50 Hz / 690 V (voltage code 4-7) or 60 Hz / 575 V (voltage code 4-0).

5) Version only possible with steel bearing plates. Order on request with additional charge.

Article No. supplements and special versions

Standard motors SIMOTICS SD next generation

Types of construction

Selection and ordering data

Operating values at rated power															Cast-iron series 1LE5583 IE3 version acc. to IEC 60034-30-1 Article No.		m _{MB3} J		Torque class
P _{rated} 60 Hz	Frame size	n _{rated}	T _{rated}	η _{rated} , 4/4	η _{rated} , 3/4	η _{rated} , 2/4	cosφ _{rated} , 4/4	I _{rated} Δ	T _{LR} / T _{rated}	I _{LR} / I _{rated}	T _B / T _{rated}	L _{ptA}	L _{WA}	▲ New	kg	kgm ²	CL		
kW	FS	rpm	Nm	%	%	%		A											
2-pole: 3600 rpm at 60 Hz																			
600	³⁾ 400	3588	1600	96.8	96.6	95.9	0.90	860	1.6	7.5	3.1	78	94	▲	1LE5 5 83-4AA3	2850	8.9	10	
670	³⁾ 400	3588	1780	96.9	96.8	96.2	0.91	950	1.6	7.4	3.1	78	94	▲	1LE5 5 83-4AA5	3000	9.8	10	
750	^{3) 4)} 400	3590	1990	97.0	96.9	96.4	0.90	860	1.8	7.5	3.2	78	94	▲	1LE5 5 83-4AA7	3200	10.8	10	
900	^{3) 4) 5)} 450	3590	2400	97.3	97.3	96.8	0.89	1040	1.1	7.7	3.2	79	95	▲	1LE5 5 83-4BA3	4000	12.3	7	
1005	^{3) 4) 5)} 450	3588	2650	97.3	97.4	97.1	0.91	1140	1.2	7.3	3.0	79	95	▲	1LE5 5 83-4BA5	4250	13.5	7	
1085	^{3) 4) 5)} 450	3586	2900	97.3	97.4	97.3	0.91	1230	1.2	7.0	2.7	79	95	▲	1LE5 5 83-4BA7	4450	14.7	7	
4-pole: 1800 rpm at 60 Hz																			
625	400	1791	3350	96.3	96.3	95.6	0.88	930	1.7	6.5	2.6	82	98	▲	1LE5 5 83-4AB3	2800	12.8	13	
710	400	1792	3800	96.6	96.5	95.9	0.88	1050	1.8	6.9	2.7	82	98	▲	1LE5 5 83-4AB5	3000	14.4	13	
795	⁴⁾ 400	1792	4250	96.7	96.7	96.2	0.89	930	1.9	7.0	2.6	82	98	▲	1LE5 5 83-4AB7	3200	16.5	13	
905	^{3) 4)} 450	1791	4850	96.5	96.4	95.7	0.89	1060	1.3	6.6	2.4	85	101	▲	1LE5 5 83-4BB3	3850	22.2	10	
1010	^{3) 4)} 450	1791	5400	96.7	96.6	95.9	0.88	1190	1.4	7.0	2.5	85	101	▲	1LE5 5 83-4BB5	4100	24.8	10	
1125	^{3) 4)} 450	1791	6000	96.8	96.7	96.2	0.90	1300	1.6	7.0	2.6	85	101	▲	1LE5 5 83-4BB7	4300	27.4	10	
6-pole: 1200 rpm at 60 Hz																			
500	400	1193	4000	96.2	96.3	95.8	0.85	770	2.0	6.6	2.7	75	91	▲	1LE5 5 83-4AC3	2900	22.0	13	
560	400	1193	4500	96.2	96.4	96.0	0.86	850	2.1	6.7	2.7	75	91	▲	1LE5 5 83-4AC5	3050	24.7	13	
625	400	1193	5000	96.4	96.5	96.1	0.86	950	2.1	6.7	2.6	75	91	▲	1LE5 5 83-4AC7	3250	27.8	13	
705	450	1194	5600	96.6	96.7	96.2	0.84	1090	2.0	6.5	2.5	77	93	▲	1LE5 5 83-4BC3	3800	34.4	13	
795	⁴⁾ 450	1193	6400	96.6	96.7	96.5	0.85	970	2.0	6.8	2.6	77	93	▲	1LE5 5 83-4BC5	4050	38.5	13	
895	⁴⁾ 450	1193	7200	96.8	96.9	96.6	0.85	1090	1.9	6.8	2.5	77	93	▲	1LE5 5 83-4BC7	4300	43.1	13	
8-pole: 900 rpm at 60 Hz																			
385	400	894	4100	95.9	96.0	95.5	0.81	620	1.9	6.9	2.5	67	83	▲	1LE5 5 83-4AD3	2850	21.9	13	
430	400	894	4600	96.0	96.1	95.6	0.81	690	2.0	7.3	2.7	67	83	▲	1LE5 5 83-4AD5	3050	24.5	13	
490	400	894	5200	96.2	96.2	95.8	0.81	790	2.0	7.1	2.7	67	83	▲	1LE5 5 83-4AD7	3250	27.5	13	
560	450	895	6000	96.3	96.4	95.9	0.80	910	1.9	7.0	2.5	70	86	▲	1LE5 5 83-4BD3	3800	34.0	13	
625	450	895	6700	96.3	96.4	96.0	0.80	1020	1.9	7.1	2.5	70	86	▲	1LE5 5 83-4BD5	4000	38.0	13	
690	450	895	7400	96.4	96.5	96.1	0.81	1110	1.9	7.2	2.5	70	86	▲	1LE5 5 83-4BD7	4250	42.5	13	
Voltages															Version		Order code(s)		
50 Hz	400 VΔ/690 VY			60 Hz	460 VΔ			Standard		3	4	-							
50 Hz	500 VΔ			60 Hz	575 VΔ			Without additional charge		4	0	-							
50 Hz	690 VΔ							Without additional charge		4	7	-							
For other voltages and more information, see from page 2/15																	...		
Types of construction															Version		Order code(s)		
Without flange		IM B3 ²⁾							Standard		A	-							
With flange		IM B5 ²⁾							With additional charge		F	-							
For other types of construction and more information, see from page 2/16																	...		
Motor protection															Version		Order code(s)		
Without									Standard		A	-							
PTC thermistor with 3 temperature sensors									With additional charge		B	-							
For other motor protection and more information, see from page 2/18																	...		
Terminal box position															Version		Order code(s)		
Terminal box base left with terminal box 45°									Without additional charge		2	-							
Terminal box base right with terminal box 45°									Standard		3	-							
For other terminal box positions and more information, see from page 2/19																	...		
Special versions																	Order code(s)		
Forced-air cooled motors w/o ext. fan/fan cover (IC418)									1LE5583-....		-Z F90+...+...+...								
Forced-air cooled (IC416)									1LE5534-....		-Z F70+...+...+...								
For options, see from page 2/20																	1LE5583-.... -Z ...+...+...+...		

1) n.a.
2) n.a.
3) Terminal box 1XB1631.

4) Standard version is 50 Hz / 690 V (voltage code 4-7) or 60 Hz / 575 V (voltage code 4-0).
5) Version only possible with steel bearing plates. Order on request with additional charge.

Article No. supplements and special versions

Standard motors SIMOTICS SD next generation

Voltages

Selection and ordering data

Voltages Cast-iron series 1LE55

Voltages	Artikel-Nr.-Ergänzung			P 50Hz ≤ 630 kW		P 50Hz > 630 kW		IEC	IE4 IE3
	Voltage code 12th and 13th position of the Article No.	Additional identi- fication code with order code and plain text if required		1LE5534 ADD	1LE5533 ADD	1LE5583 PRO			
1LE5									
Voltage at 50 Hz or 60 Hz									
50 Hz 400 VΔ/690 VY, 60 Hz 460 VΔ	3	4	–	□		O.R.			
50 Hz 500 VΔ	4	0		○		○			
60 Hz 575 VΔ				○		□ ²⁾			
50 Hz 690 VΔ	4	7	–	✓		□			
50 Hz 380 VΔ/660 VY, 60 Hz 440 VΔ	3	3	–	✓		O.R.			
50 Hz 415 VΔ, 60 Hz 480 VΔ	3	5	–	✓		O.R.			
50 Hz 600 VΔ, 60 Hz 690 VΔ	4	4	–	✓		✓			
50 Hz 660 VΔ	4	6	–	✓		✓ ²⁾			
Voltage at 60 Hz and required power									
440 VΔ; 60-Hz-Leistung	9	0	M1D	✓		O.R.			
460 VΔ; 60-Hz-Leistung	9	0	M1F	✓		O.R.			
575 VΔ; 60-Hz-Leistung	9	0	M1H	✓		✓ ²⁾			
400 VΔ/690 VY; 60-Hz-Leistung	9	0	M1J	O.R.		O.R.			
480 VΔ; 60-Hz-Leistung	9	0	M1L	✓		O.R.			
440 VΔ; 50-Hz-power	9	0	M2D	✓		O.R.			
460 VΔ; 50-Hz-power	9	0	M2F	✓		O.R.			
575 VΔ; 50-Hz-power	9	0	M2H	✓		✓ ²⁾			
400 VΔ/690 VY; 50-Hz-power	9	0	M2J	O.R.		O.R.			
480 VΔ; 50-Hz-power	9	0	M2L	✓		O.R.			
Non-standard voltage and/or frequencies									
Non-standard winding ¹⁾	9	0	M1Y	• and customer specifica- tions	✓		✓ ²⁾		

- Standard version
- ✓ With additional charge
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.

1) Plain text must be specified in the order: Voltage between 380 and 690 V (voltages outside this range are available on request), frequency, circuit, for 60 Hz additionally required rated power in kW.
2) 2-pole execution in shaft height 450 for 60 Hz operation on inquiry.







Article No. supplements and special versions

Standard motors SIMOTICS SD next generation

Types of construction

Selection and ordering data

Types of construction Cast-iron series 1LE55

Types of construction	Artikel-Nr.-Ergänzung		Frame size		IEC	IE4 IE3
	Type of construction letter 14th position of the Article No.	Article No. with additional identification code -Z	400	450		
1LE5.	■	..	400	450		
Without flange						
IM B3 1) 2)		A	-	□	□	
IM V6 2)		D	-	O.R.	O.R. 7)	
IM V5 without protective cover 2)		C	-	O.R.	O.R. 7)	
IM V5 with protective cover 2) 3) 4)		C	H00	O.R.	O.R. 7)	
With flange						
		Acc. to EN 50347				
		Acc. to DIN 42948				
IM B5 2) 5)		F	-	✓	✓	
IM V1 without protective cover 2)		G	-	✓	✓	
IM V1 with protective cover 2) 3) 4)		G	H00	✓	✓	
IM B35 ³⁾		J	-	✓	✓	

- Standard version
- ✓ With additional charge
- O.R. on request

- 1) The types of construction IM B6/7/8, IM V6, and IM V5 with/without protective cover are also possible as long as no stamping of these types of construction on the rating plate is required. As standard the type of construction IM B3 is then stamped on the rating plate. With type of construction IM V5 with protective cover, the protective cover has to be additionally ordered with order code H00. The protective cover is not stamped on the rating plate.
- 2) The type of construction is stamped on the rating plate. If mounted in a different position, the position must be specified to ensure that the condensation drainage holes are positioned correctly.
- 3) In combination with an encoder it is not necessary to order the protective cover (order code H00), as this is delivered as a protection for the encoder as standard. In this case the protective cover is standard design (without additional charge).
- 4) The "Standard cylindrical shaft extension (second shaft extension)" option (order code L05) is not possible.
- 5) The types of construction IM V3 and IM V1 with/without protective cover are also possible as long as no stamping of these types of construction on the rating plate is required. As standard the type of construction IM B5 is then stamped on the rating plate. With type of construction IM V1 with protective cover, the protective cover has to be additionally ordered with order code H00. The protective cover is not stamped on the rating plate.
- 6) For IM B5 design, additionally support the machine with a support foot on the NDE side. Support foot is not part of the scope of delivery. Support foot with appropriate rigidity must be sufficiently dimensioned. Support foot must be can carry totally motor weight.
- 7) Not possible for 2-pole motor 1LE55..-4BA.

Article No. supplements and special versions

Standard motors SIMOTICS SD next generation

Motor protection

Selection and ordering data

Motor protection

Cast-iron series 1LE55

Motor protection	Artikel-Nr.-Ergänzung		Frame size		IEC	IE4 IE3
	Motor protection letter 15th position of the Article No.	Additional identification code with order code and plain text if required	400	450		
			1LE5534 Add			
			1LE5533 Add			
			1LE5583 Pro			
1LE5			400	450		

Motor protection

Without	A	–	□	□
1 or 3 PTC thermistors – for tripping (2 terminals) ¹⁾	B	–	✓	✓
2 or 6 PTC thermistors – for warning and tripping (4 terminals) ¹⁾	C	–	✓	✓
1 temperature sensor KTY84-130 (2 terminals) ¹⁾	F	–	✓	✓
2 temperature sensors □ KTY84-130 (4 terminals) ¹⁾	G	–	✓	✓
3 Pt100 resistance thermometers – 2-wire input □ (6 terminals)	H	–	✓	✓
6 Pt100 resistance thermometers – 2-wire input (12 terminals)	J	–	✓	✓
1 Pt1000 resistance thermometer (2 terminals)	K	–	✓	✓
2 Pt1000 resistance thermometers (4 terminals)	L	–	✓	✓
1 Pt100 resistance thermometer – 2-wire input □ (2 terminals)	P	–	✓	✓
3 Pt100 resistance thermometers – 3-wire input □ (9 terminals)	Q	–	✓	✓
6 Pt100 resistance thermometers – 3-wire input (18 terminals)	R	–	✓	✓
3 bimetal sensors (NC contact) – for tripping □ (2 terminals) ¹⁾	Z	Q3A	✓	✓
6 bimetal sensors (NC contact) for warning and tripping (4 terminals) ¹⁾	Z	Q9A	✓	✓

- Standard version
- ✓ With additional charge

Note:

Options are available specifically for bearing protection – for order codes and descriptions, see from page 3/9.

1) Evaluation with appropriate tripping unit (see Catalog IC 10) is recommended.

Article No. supplements and special versions

Standard motors SIMOTICS SD next generation

Terminal box position

Selection and ordering data

Terminal box position Cast-iron series 1LE55

Terminal box position	Artikel-Nr.-Ergänzung		Frame size		IEC	IE4 IE3
	Terminal box position code 16th position of the Article No.	Additional identification code with order code and plain text if required	400	450		
			1LE5534 Add			
			1LE5533 Add			
			1LE5583 Pro			
1LE5... -			400	450		

Terminal box position

Terminal box position	0	1	2	3	5	6	9	9	9
Terminal box socket left-hand side with terminal box top ³⁾	✓	✓							
Terminal box socket right-hand side with terminal box top ³⁾	✓	✓							
Terminal box socket left with terminal box 45°	○	○							
Terminal box socket right with terminal box 45°	□	□							
Anschlusskasten seitlich rechts ¹⁾	✓	✓							
Anschlusskasten seitlich links ¹⁾	✓	✓							
Anschlusskasten seitlich links (socket bottom) ²⁾	✓	✓					R5L		
Anschlusskasten seitlich rechts (socket bottom) ²⁾	✓	✓					R6R		
Terminal box bottom left ²⁾	✓	✓					R7L		
Terminal box bottom right ²⁾	✓	✓					R7R		

- Standard version
- ✓ With additional charge
- Without additional charge

1) For types of construction with feet and flange-mounted with feet, cast feet are standard.
 2) Only possible in combination with type of construction IM B5.
 3) Not possible for motors with vertical drive shaft (IM V1, IM V5, IM V6).

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SIMOTICS SD standard motors next generation

Options

Selection and ordering data

Options

Cast-iron series 1LE55

Special versions	Additional identification code -Z with order code and plain text if required	Frame size		IEC	IE4 <hr/> IE3	
		1LE5534 Add	400			450
		1LE5533 Add				
		1LE5583 Pro				
1LE5		400	450			

Motor protection

1 or 3 PTC thermistors – for tripping (2 terminals) ¹⁾	Q11	✓	✓
2 or 6 PTC thermistors – for warning and tripping (4 terminals)	Q12	✓	✓
3 Heissleiter NTC - für Abschaltung (6 Klemmen)	Q21	O.R.	O.R.
1KTY84-130 temperature sensor (2 terminals) ¹⁾	Q23	✓	✓
2 KTY84-130 temperature sensors (4 terminals) ¹⁾	Q25	✓	✓
3 bimetal sensors (NC contacts) for tripping (2 terminals)	Q31	✓	✓
6 bimetal sensors (NC contacts) for warning and tripping (4)	Q32	✓	✓
3 bimetal sensors (NC contacts) for tripping (6 terminals)	Q33	✓	✓
6 bimetal sensors (NC contacts) for warning and tripping (12)	Q34	✓	✓
1Pt1000 resistance thermometer (2 terminals)	Q35	✓	✓
2 Pt1000 resistance thermometers (4 terminals)	Q36	✓	✓
6 Temperatursensor PT 1000 (12 Klemmen)	Q37	✓	✓
3 Pt100 resistance thermometers –2-wire input (6 terminals) ¹⁾	Q60	✓	✓
6 Pt100 resistance thermometers – 2-wire input (12 terminals) ¹⁾	Q61	✓	✓
1Pt100 resistance thermometer – 2-wire input (2 terminals)	Q62	✓	✓
3 Pt100 resistance thermometers – 3-wire input (9 terminals)	Q63	✓	✓
6 Pt100 resistance thermometers – 3-wire input (18 terminals)	Q64	✓	✓
2 Pt100 screw-in thermometers in basic configuration for bearings (2 terminals)	Q72	✓	✓
2 Pt100 screw-in thermometers, 3-wire input, for bearings (6)	Q78	✓	✓
2 Pt100 double screw-in thermometers, 3-wire input, for bearings (12 terminals)	Q79	✓	✓

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Standard motors SIMOTICS SD next generation

Options

Selection and ordering data

Options Cast-iron series 1LE55

Special versions	Additional identification code -Z with order code and plain text if required	Frame size		IEC	IE4 IE3	
		1LE5534 Add	400			450
		1LE5533 Add				
		1LE5583 Pro				
1LE5		400	450			

Motor connection and terminal box

External grounding	H04	<input type="checkbox"/>	<input type="checkbox"/>
Terminal box on NDE	H08	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Second external grounding	H70	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Subsequently rotatable main connection box	R09	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rotation of the terminal box through 90°, entry from DE ³⁸⁾	R10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rotation of the terminal box through 90°, entry from NDE	R11	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rotation of the terminal box through 180°	R12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
EMC cable gland, maximum configuration	R16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Metal cable gland, maximum configuration	R18	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Saddle terminal for connection without cable lug, accessories	R19	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3 cables protruding, 1,5 m long	R21	O.R.	O.R.
6 cables protruding, 1,5 m long	R23	O.R.	O.R.
6 cables protruding, 3 m long	R24	O.R.	O.R.
Larger terminal box ³⁹⁾	R50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Drilled removable entry plate	R52	<input type="checkbox"/>	<input type="checkbox"/>
Undrilled removable entry plate	R53	<input type="checkbox"/>	<input type="checkbox"/>
Cast-iron auxiliary terminal box (small)	R62	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Cast-iron auxiliary terminal box (big)	R63	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Stainless steel auxiliary terminal box (big)	R65	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Silicon-free version ³⁰⁾	R74	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Non-standard threaded through hole (NPT or G thread) ²⁾	Y61	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		• and customer specifications	

Windings and insulation

Temperature class 155 (F), utilized acc. to 155 (F), with service factor (SF) ³³⁾	N01	<input type="checkbox"/>	<input type="checkbox"/>
Temperature class 155 (F), utilized acc. to 155 (F), with increased power ³³⁾	N02	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Temperature class 155 (F), utilized acc. to 155 (F), with increased coolant temperature ³³⁾	N03	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Temperature class 155 (F), utilized acc. to 130 (B), coolant temperature 45 °C, derating approx. 4 % ⁴⁰⁾	N05	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Options

Cast-iron series 1LE55

Special versions	Additional identification code -Z with order code and plain text if required	Frame size		IEC	IE4 IE3
		1LE5534 Add			
		1LE5533 Add			
		1LE5583 Pro			
1LE5.		400	450		
Temperature class 155 (F), utilized acc. to 130 (B), coolant temperature 50 °C, derating approx. 8 % ⁴⁰⁾	N06	✓	✓		
Temperature class 155 (F), utilized acc. to 130 (B), coolant temperature 55 °C, derating approx. 13 % ⁴⁰⁾	N07	✓	✓		
Temperature class 155 (F), utilized acc. to 130 (B), coolant temperature 60 °C, derating approx. 18 % ⁴⁰⁾	N08	✓	✓		
Temperature class 180 (H) ⁴¹⁾	N10	✓	✓		
Temperature class 180 (H) at rated power and max. CT 60 °C ⁴⁾	N11	O.R.	O.R.		
Increased air humidity/temperature with 30 to 60	N30	✓	✓		
Increased air humidity/temperature with 60 to	N31	✓	✓		
Temperature class 155 (F), utilized acc. to 130 (B), with higher coolant temperature and/or installation altitude ³³⁾	Y50	• and spec. power, CT .. °C or IA ...m above sea level	✓	✓	
Temperature class 155 (F), utilized according to 155 (F), other requirements ⁴⁾³³⁾	Y52	• and spec. power, CT .. °C or IA ...m above sea level	✓	✓	
Temperature class 180 (H), utilized according to 155 (F) ³³⁾	Y75	• and spec. power, CT .. °C or IA ...m above sea level	O.R.	O.R.	
Colors and paint finish					
Standard paint finish C2 in RAL 7030 stone gray		□	□		
Unpainted (only cast-iron parts primed)	S00	○	○		
Unpainted, only primed	S01	✓	✓		
Special paint finish	S02	✓	✓		
Special paint finish sea air	S03	✓	✓		
Special paint finish for use	S04	✓	✓		
Internal coating	S05	✓	✓		
Top coat polyurethane ²⁷⁾	S06	□	□		

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Standard motors SIMOTICS SD next generation

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Selection and ordering data

Options Cast-iron series 1LE55

Special versions	Additional identification code -Z with order code and plain text if required	Frame size	IEC	IE4 IE3
1LE5		400 450		
Paint finish in other standard RAL colors: RAL 1002, 1013, 1015, 1019, 2003, 2004, 3000, 3007, 5007, 5009, 5010, 5012, 5015, 5017, 5018, 5019, 6011, 6019, 6021, 7000, 7001, 7004, 7011, 7016, 7022, 7031, 7032, 7033, 7035, 9001, 9002, 9005 (see Catalog Section 1 "Introduction")	Y53 • and <input type="checkbox"/> paint finish RAL...	✓ ✓		
Paint finish in special RAL colors: For RAL colors, see "Special paint finish in special RAL colors" (see Catalog Section 1 "Introduction")	Y56 • and <input type="checkbox"/> paint finish RAL...	✓ ✓		
Modular technology – Basic versions ⁵⁾				
Mounting of holding brake (standard assignment) ^{6) 25) 28) 30)}	F01	O.R.	O.R.	
Mounting of separately driven fan ³⁴⁾	F70	✓	✓	
Modular technology – Additional versions				
Brake supply voltage 230 V AC, 50/60 Hz	F11	O.R.	O.R.	
Brake supply voltage 400 V AC, 50/60 Hz	F12	O.R.	O.R.	
Special technology ⁵⁾				
Mounting of LL 861900 220 rotary pulse encoder ⁹⁾	G04	✓	✓	
Mounting of HOG 9 D 1024 I rotary pulse encoder ⁹⁾	G05	✓	✓	
Mounting of HOG 10 D 1024 I rotary pulse encoder ⁹⁾	G06	✓	✓	
Mounting of HOG 10 DN 1024 I rotary pulse encoder, terminal box moisture protection	G15	✓	✓	
Mounting of HOG 10 DN 1024 I rotary pulse encoder, terminal box dust protection ⁵⁾	G16	✓	✓	
Mounting of rotary pulse encoder HOG 10 DN 1024 I + FSL (integrated centrifugal switch, speed ... rpm), terminal box moisture protection	Y74 • and spec. speed <input type="checkbox"/> Rpm	O.R.	O.R.	
Mounting of rotary pulse encoder HOG 10 DN 1024 I + FSL, (integrated centrifugal switch, speed ... rpm), terminal box dust protection	Y76 • and spec. speed <input type="checkbox"/> Rpm	✓	✓	
Mounting of rotary pulse encoder HOG 10 DN 1024 I + ESL 93 (integrated electronic speed switch, speed ... rpm), terminal box dust protection	Y79 • and spec. speed <input type="checkbox"/> (max. 3) <input type="checkbox"/> Rpm	✓	✓	

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Options

Selection and ordering data

Options

Cast-iron series 1LE55

Special versions	Additional identification code -Z with order code and plain text if required	Frame size		IEC	IE4 ----- IE3
		1LE5534 Add			
		1LE5533 Add			
		1LE5583 Pro			
1LE5.		400	450		

Mechanical version and degrees of protection

Low-noise version for 2-pole motors with clockwise direction of rotation	F77	<input type="checkbox"/>	<input type="checkbox"/>
Low-noise version for 2-pole motors with counter-clockwise direction of rotation	F78	<input type="radio"/>	<input type="radio"/>
Prepared for mountings, center hole only	G40	<input type="checkbox"/>	<input type="checkbox"/>
Prepared for mountings with D16 shaft	G42	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Protective cover for encoder	G43	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Protective cover ^{7) 9) 11)}	H00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Condensation drainage holes	H03	<input type="checkbox"/>	<input type="checkbox"/>
Rust-resistant screws (externally)	H07	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IP65 degree of protection ¹³⁾	H20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IP56 degree of protection ¹⁴⁾	H22	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sealing ring made of fluororubber	H25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Extended corrosion protection of external components	H90	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Grounding brush for converter operation ³²⁾	L52	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Coolant temperature and installation altitude

Coolant temperature -50 to +40 °C ^{15) 35)}	D02	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Coolant temperature -40 to +40 °C ¹⁵⁾	D03	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Coolant temperature -30 to +40 °C ¹⁵⁾	D04	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Versions in accordance with standards and specifications

Electrical according to NEMA MG1-12 ¹⁷⁾	D30	<input type="checkbox"/>	<input type="checkbox"/>
Version according to UL with "Recognition Mark" ¹⁷⁾	D31	<input type="checkbox"/>	<input type="checkbox"/>
Canadian regulations (CSA) ¹⁶⁾	D40	<input type="checkbox"/>	<input type="checkbox"/>
TR CU product safety certificate EAC for Eurasian customs union	D47	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Bearings and lubrication

Regreasing device with M10 x 1 grease nipple according to DIN 71412-A	L19	<input type="radio"/>	<input type="radio"/>
Located bearing DE	L20	<input type="checkbox"/>	<input type="checkbox"/>
Located bearing NDE ³⁷⁾	L21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Bearing design for increased cantilever forces ^{28) 29)}	L22	O.R.	O.R.
Regreasing device	L23	<input type="checkbox"/>	<input type="checkbox"/>
Outlet for old grease	L30	O.R.	O.R.

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Options Cast-iron series 1LE55

Special versions	Additional identification code -Z with order code and plain text if required	Frame size	IEC	IE4 IE3
		1LE5534 Add		
		1LE5533 Add		
		1LE5583 Pro		
1LE5.		400		450
Increased maximal speed	L37	O.R.		O.R.
Bearing insulation DE ^{31) 32)}	L50	✓		✓
Bearing insulation NDE ³²⁾	L51	✓		✓
Measuring nipple for SPM shock pulse measurement for bearing inspection	Q01	✓		✓
Balance and vibration quantity				
Vibration quantity level A		<input type="checkbox"/>		<input type="checkbox"/>
Vibration quantity level B ¹⁸⁾	L00	✓		✓
Half-key balancing		<input type="checkbox"/>		<input type="checkbox"/>
Balancing without feather key, feather key is supplied	L01	✓		✓
Full-key balancing	L02	✓		✓
Shaft and rotor				
Shaft extension with standard dimensions, without feather	L04	✓		✓
Standard cylindrical shaft extension (second shaft end) NDE acc. to EN 50347	L05	✓		✓
Concentricity of shaft extension in accordance with DIN 42955 Tolerance R	L07	✓		✓
Concentricity of shaft extension, coaxiality, and linear movement in accordance with DIN 42955 Tolerance R for flange-mounting motors	L08	✓		✓
Non-standard cylindrical shaft extension, DE ¹⁹⁾	Y58 • and customer specifications	✓		✓
Non-standard cylindrical shaft extension, NDE ¹⁹⁾	Y59 • and customer specifications	✓		✓
Special shaft steel as requested by customer	Y60 • and customer specifications	O.R.		O.R.
Heating and ventilation				
Sheet metal fan cover	F74	<input type="checkbox"/>		<input type="checkbox"/>
Metal external fan	F76	✓		✓
Without external fan and without fan cover	F90	✓		✓
Anti-condensation heating for 230 V (2 terminals)	Q02	✓		✓
Anti-condensation heating for 115 V (2 terminals)	Q03	✓		✓

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Options

Cast-iron series 1LE55

Special versions	Additional identification code -Z with order code and plain text if required	Frame size		IEC	IE4 IE3	
		1LE5534 Add	400			450
		1LE5533 Add				
		1LE5583 Pro				
1LE5.		400	450			
Anti-condensation heating for 400 V (2 terminals)	Q06	✓	✓			
Separately driven fan with non-standard voltage and/or frequency	Y81 • and customer specifications	✓	✓			
Rating plate and additional rating plates						
Additional rating plate for voltage tolerance ²⁰⁾	B07	✓	✓			
Second rating plate, loose	M10	✓	✓			
Rating plate, stainless steel	M11	☐	☐			
Additional rating plate with deviating rating plate data	Y80 • and customer specifications	✓	✓			
Additional rating plate with customer specifications	Y82 • and customer specifications	✓	✓			
Additional information on rating plate and on package label (max. 20 characters)	Y84 • and customer specifications	✓	✓			
Extension of the liability for defects						
Extension of the liability for defects period by 12 months to a total of 24 months (2 years) from delivery ²¹⁾	Q80	✓	✓			
Extension of the liability for defects by 18 months to a total of 30 months (2.5 years) from delivery ²¹⁾	Q81	✓	✓			
Extension of the liability for defects period by 24 months to a total of 36 months (3 years) from delivery ²¹⁾	Q82	✓	✓			
Extension of the liability for defects by 30 months to a total of 42 months (3.5 years) from delivery ²¹⁾	Q83	✓	✓			
Extension of the liability for defects by 36 months to a total of 48 months (4 years) from delivery ²¹⁾	Q84	✓	✓			
Extension of the liability for defects by 42 months to a total of 60 months (5 years) from delivery ²¹⁾	Q85	✓	✓			
Packaging, safety notes, documentation, and test certificates						
Acceptance test certificate 3.1 in accordance with EN 10204 ²¹⁾	B02	✓	✓			
Printed German/English operating instructions enclosed ²²⁾	B04	✓	✓			
Equivalent circuit diagram	B51	✓	✓			

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Options

Cast-iron series 1LE55

Special versions	Additional identification code -Z with order code and plain text if required	Frame size		IEC	IE4 IE3
		400	450		
1LE5.					
Starting curve (torque-speed and current-speed curve)	B52	✓	✓		
Document - Electrical data sheet	B60	✓	✓		
Document - Order dimensional drawing	B61	✓	✓		
Standard test (routine test) with acceptance	B65	✓	✓		
Temperature rise test without acceptance	B67	✓	✓		
Temperature rise test with acceptance	B68	✓	✓		
Type test with heat run for vertical motors, without acceptance	B80	✓	✓		
Type test with heat run for vertical motors, with acceptance	B81	✓	✓		
Type test with heat run for horizontal motors, without acceptance	B82	✓	✓		
Type test with heat run for horizontal motors, with acceptance	B83	✓	✓		
Documentation Package "Basic"	B90	✓	✓		
Documentation Package "Advanced"	B91	✓	✓		
Documentation Package "Projects"	B92	✓	✓		

- Standard version
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- R. Possible on request

- 1) Evaluation with appropriate tripping unit (see Catalog IC 10) is recommended.
- 2) Parallel Whitworth threaded pipe DIN ISO 228 (DIN 259) BSPP (British Standard Pipe Parallel) threaded pipe for connections not sealed in the thread (cylindrical), external = G.
- 3) The grease lifetime specified in Catalog Section 1 "Introduction" refers to CT 40 °C. If the coolant temperature is increased by 10 K, the grease lifetime and regreasing interval are halved.
- 4) Not possible for 1LE5 motors with increased power rating.
- 5) A second shaft extension is not possible in shaft height 315 - 355. Please inquire for mounted brakes.
- 6) For order codes F11, and F12, the brake supply voltage must be specified or ordered.
- 7) The protective cover is omitted at the factory when a rotary pulse encoder is combined with a separately driven fan, because in this case the rotary pulse encoder is installed under the fan cover.
- 8) n.a.
- 9) The LL and HOG rotary pulse encoders are fitted with a protective cover as standard. The protective cover is omitted at the factory when a rotary pulse encoder is combined with a separately driven fan, because in this case the rotary pulse encoder is installed under the fan cover (order code G43).
- 10) Option (encoder mounting) is only possible for motors with a mounted separately driven fan or for naturally cooled motors (without a forceventilated fan). This option can be used in combination with brakes of type KFB and SFB! This option cannot be used in combination with brakes of type 2LM8.
- 11) Protective cover air inlet at vertical type of construction.
- 12) Not possible for type of construction IM V3.
- 13) n.a.
- 14) Not possible in combination with brake 2LM8 – order code F01.
- 15) In connection with mountings, the respective technical specifications must be observed, for SH 315 and 355 please inquire before ordering.
- 16) The rated voltage is indicated on the rating plate without voltage range. Order code D40 does not authorize importing into Canada.
- 17) Possible up to 600 V max. The rated voltage is indicated on the rating plate without voltage range. Order codes D30 and D31 do not authorize importing into USA and Mexico.

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Options

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Special versions	Additional identification code -Z with order code and plain text if required	Frame size	IEC	IE4
	1LE5534 Add	400		IE4
	1LE5533 Add	450		IE3
	1LE5583 Pro			
1LE5.		400		450

- 18) n.a.
- 19) When motors are ordered that have a longer or shorter shaft extension than normal, the required position and length of the feather keyway must be specified in a sketch. It must be ensured that only feather keys in accordance with EN 50347, Form A are used. The feather keyway is positioned centrally on the shaft extension. The length is defined by the manufacturer in accordance with the appropriate standard. Not valid for:
Conical shafts, non-standard threaded journals, non-standard shaft tolerances, friction welded journals, extremely "thin" shafts, special geometry dimensions (e.g. square journals), hollow shafts. Valid for nonstandard shaft extensions DE or NDE. The feather key is always supplied.
For order codes Y58, Y59, and L05 the following applies:
- Dimensions D and DA ≤ inner diameter of roller bearing (see dimension tables under "Dimensions")
- Dimensions E and EA ≤ 2 × length E (normal) of the shaft extension.
- 20) Can be ordered for 400 VΔ/690 VY (voltage code "34").
- 21) The delivery time for the factory test certificate may differ from the delivery time for the motor.
- 22) The Operating Instructions (compact) are available in PDF format for all official EU languages at <http://support.automation.siemens.com/WW/view/en/40761976>.
- 23) n.a.
- 24) Not possible in combination with order codes Q72 and Q78.
- 25) Not possible in combination with order codes N05, N06, N07, N08, and N11.
- 26) In combining order codes F01 and F12, the rectifier for the brake will be supplied separately as a single part.
- 27) Order code S06 cannot be combined with order codes S00 and S01. It can be combined with Y53 on request.
- 28) A minimum cantilever force Fmin of 0.5·Fmax is required for NU bearings (cylindrical roller bearings) in contrast to ball bearings. Cylindrical roller bearings are not suitable for coupling output or for brief periods of no-load operation without cantilever force.
- 29) Admissible cantilever forces with reinforced bearings for shaft height 400 - 450 on request. Please indicate cantilever force and lever arm.
- 30) UL- / CSA-approval not applicable for Shaft height 400 - 450.
- 31) For insulated bearing DE and not insulated bearing NDE motor coupling must be insulated.
- 32) Grounding brush (L52) is mandatory at insulated bearing DE and NDE if there is no grounding for drive train available. Otherwise it should not be used..
- 33) Only possible with motors for mains-fed operation.
- 34) Separately driven fan motor is carried out with voltage code 3-4 (400 V / 50 Hz; 460 V / 60 Hz).
- 35) Type of protection is changing to IP54 for shaft height 400 - 450.
- 36) Not possible for 2-pole motors and shaft height 400 - 450.
- 37) Not possible at vertical type of construction for shaft height 400 - 450..
- 38) Only possible in combination with option H08 for motors with flange (IM B5, IM B35, IM V1).
- 39) Restrictions are possible when terminal box mounted.
- 40) Only possible in combination for SIMOTICS SD Add motors (6th position of the Article No.: 3).
- 41) Increased power by 5 % compared to temperature class 155 (F).

Dimensions

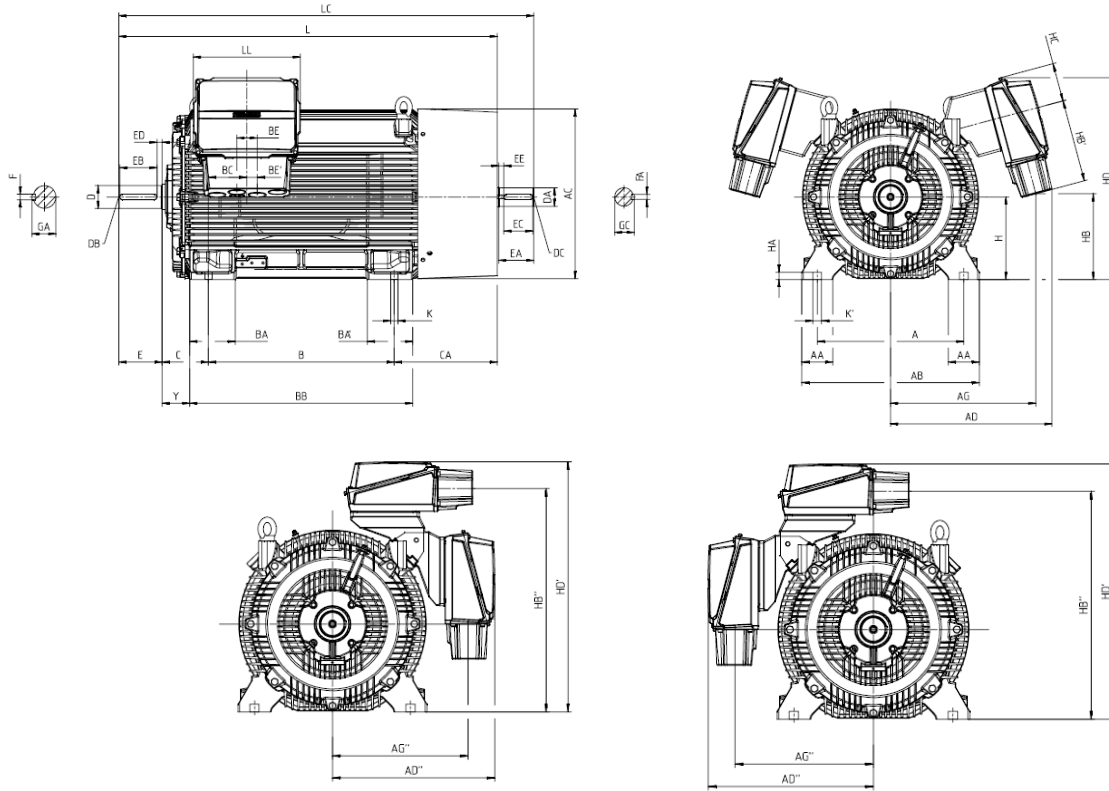
Standard motors SIMOTICS SD next generation

Cast-iron series

Dimension drawings

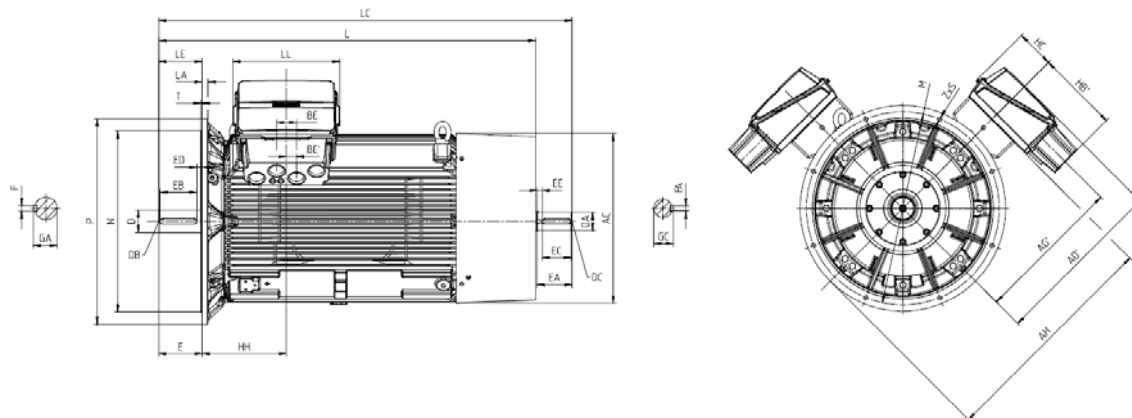
Type of construction IM B3

For flange dimension, see page 1/16 (Z = the number of retaining holes)



Type of construction IM B5 and IM V1

For flange dimension, see page 1/16 (Z = the number of retaining holes)



Dimensions

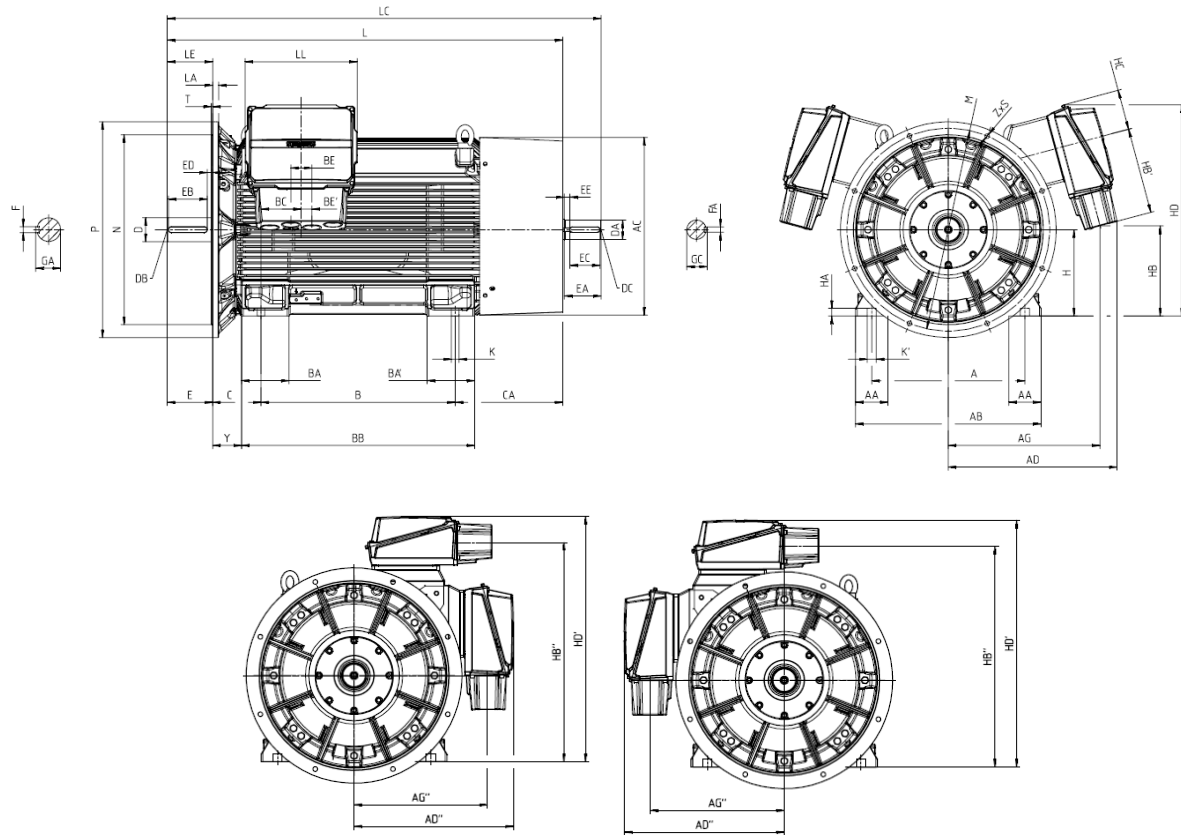
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Cast-iron series

Dimension drawings

Type of construction IM B5 and IM V1

For flange dimension, see page 1/16 (Z = the number of retaining holes)



For motor	Dimension designation acc.to IEC																												
Frame size	Motor type	No. of poles	A	AA	AB	AC	AD	AD'	AD''	AG	AG'	AG''	AH	B	B'	B''	BA	BA'	BB	BC	BE	BE'	C	CA	CA'	CA''	H	HA	HB
400	4AA	2	710	150	860	880	785	845	740	705	720	620	1110	900	-	-	220	220	1080	186	87.5	43.5	224	501	-	-	400	35	420
	4AB	4																											
	4AC	6																											
	4AD	8																											
450	4BA	2	800	180	980	970	820	895	775	740	770	655	1235	1000	-	-	260	260	1220	170	87.5	43.5	250	535	-	-	450	42	505
	4BB	4																											
	4BC	6																											
	4BD	8																											

For motor	Dimension designation acc.to IEC											DE shaft extension				NDE shaft extension												
Frame size	Motor type	No. of poles	HB'	HB''	HC	HD	HD'	HH	Y	K	K'	L	LC ¹⁾	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
400	4AA	2	400	1020	190	980	1140	410	134	35	42	1795	1940	519	80	M20	170	140	25	22	85	70	M20	140	125	10	20	74.5
	4AB	4										1835	2010		110	M24	210	180		28	116	90	M24	170	140	25	25	95
	4AC	6																										
	4AD	8																										
450	4BA	2	400	1105	190	1065	1225	420	140	42	50	1955	2100	519	90	M24	170	140	25	25	95	75	M20	140	125	10	20	79.5
	4BB	4										1995	2210		120		210	180		32	127	100	M24	210	180	25	28	106
	4BC	6																										
	4BD	8																										

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