



**SIMOTICS 1LE8 低压大功率电机
SIMOTICS 1LE8 Low-voltage
Motors**

产品样本 2019.07



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总体介绍

SIMOTICS 1LE8 是基于 SIMOTICS SD 1LE5 全球设计平台，针对中国市场开发的适用于一般用途和严苛环境大负荷应用的新一代低压大功率电机；

SIMOTICS 1LE8 新一代低压大功率电动机的特点是可靠、功率大，通过设计优化，使电机结构非常紧凑且具有高功率密度。标准 IE3 效率，紧凑高效，坚固耐用。

SIMOTICS 1LE8 电动机技术特性

- 机座材料：灰铸铁；
- 标准颜色：石头灰（RAL7030）；
- 额定功率：132~500kW 50Hz；
- 达到 GB18613-2012 标准能效等级 2 级，且能满足 IEC 60034-30 标准中的 IE3 效率等级（50Hz）；
- 优化的紧凑结构设计，具有很高的功率密度；
- 标准安装结构类型（符合 IEC 60034-7 标准规定）：IM B3、IM V1、IM B35 等；
- 所有的电动机设计防护等级为 IP55（IEC 60034-5）且可达到 IP56、IP65 防护等级；

Overview

SIMOTICS 1LE8, based on SIMOTICS SD 1LE5 global design platform, is a new generation of low-voltage high-power motor suitable for general purpose and severe duty application and developed for the Chinese market.

SIMOTICS 1LE8 new generation low-voltage high-power motor is characterized by reliability and high power. Optimized design, the motor structure is very compact. 1LE8 with high energy efficiency (IE3), rugged design, compact dimensions/high power density.

Features of SIMOTICS 1LE8

- Frame material: grey cast iron;
- Standard color: stone grey (RAL 7030);
- Rated power output: 132~500kW at 50Hz;
- With efficiency grade 2. according to GB18613-2012 and efficiency class IE3 (50Hz) according to IEC 60034-30;
- Optimized compact style construction design, characterized by reliable and powerful performance;
- Standard mounting construction according to IEC 60034-7: IM B3, IM V1, IM B35 and etc;
- All motors are designed to IP55 degree of protection (IEC 60034-5) and optionally meet IP56, IP65 degree of protection;

- 标配再润滑装置；
- 可选择增强悬臂力设计；
- 电动机可选 PTC 或 PT100 热敏电阻或 KTY84-130 进行绕组保护；
- 接线盒标准位置处于机座顶端，进线孔处于右侧（从驱动端看），选项中接线盒位置和进线方向可变化；
- 绝缘系统按 155 (F) 温度等级设计，在额定输出和直接供电时按 130 (B) 温度等级使用；
- 电动机标准冷却方式为自扇冷却 IEC 60034-6 规定的 IC 411，可提供独立驱动风扇强制冷却；
- Re-greasing devices as standard;
- Reinforced bearings for increased cantilever forces as option;
- Winding protections with PTC, PT100 and KTY84-130 as option;
- Terminal box on top, and cable entry on right side (viewed from driven end). Variable location of connection boxes and cable entries as option;
- Insulation system is designed for Temperature class 155 (F). At rated output with line-fed operation, the motors can be used in temperature class 130 (B);
- Self ventilated motors with radial-flow fans (cooling method IC411 according to IEC 60034-6) as standard, forced air cool with external separately driven fans as option.

运行环境

- 防护等级 IP55 (IEC 60034-5)；
- 高度不超过海拔 1000 m (IEC 60034-1)；
- 允许的环境温度在 -20 °C ~ 40 °C (IEC 60034-1)；
- 所允许的相对湿度：
 - -20 °C ≤ T ≤ 20 °C: 100 %
 - 20 °C < T ≤ 30 °C: 95 %
 - 30 °C < T ≤ 40 °C: 55 %

对于更高的环境温度、以及（或者）高于海拔 1000 m 的地点，电动机的额定功率换算系数为 k_{HT} 。所允许的功率值 (P_{adm})：

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

Environmental

- Degrees of motor protection IP55 (IEC 60034-5);
- Altitude shall not exceed 1000m above sea-level (IEC 60034-1);
- Allowed air temperature between -20 °C and 40 °C (IEC 60034-1);
- Permitted relative humidity:
 - -20 °C ≤ T ≤ 20 °C: 100 %
 - 20 °C < T ≤ 30 °C: 95 %
 - 30 °C < T ≤ 40 °C: 55 %

For higher coolant temperatures and / or site altitudes higher than 1000 m above sea level, the specified motor output must be reduced by using the factor k_{HT} . The results in an admissible output (P_{adm}) of the motor:

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

海拔高度 Site altitude above sea level	对应海拔高度的环境温度 Site altitude above sea level Coolant temperature					
	< 30 °C	30 ~ 40 °C	45 °C	50 °C	55 °C	60 °C
1000 m	1.07	1.00	0.96	0.92	0.87	0.82
1500 m	1.04	0.97	0.93	0.89	0.84	0.79
2000 m	1.00	0.94	0.90	0.86	0.82	0.77
2500 m	0.96	0.90	0.86	0.83	0.78	0.74
3000 m	0.92	0.86	0.82	0.79	0.75	0.70
3500 m	0.88	0.82	0.79	0.75	0.71	0.67
4000 m	0.82	0.77	0.74	0.71	0.67	0.63

参考标准 Reference standards

名称 Title	中国国家标准 Chinese standard	IEC标准 IEC standard
《旋转电机 定额和性能》 Rotating electrical machines - Part 1: Rating and performance	GB/T 755	IEC 60034-1
《旋转电机(牵引电机除外)确定损耗和效率的试验方法》 Rotating electrical machines - Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)	GB/T 755.2	IEC 60034-2
《旋转电机结构型式、安装型式及接线盒位置的分类 (IM 代码)》 Rotating electrical machines; part 7: classification of types of constructions and mounting arrangements (IM code)	GB/T 997	IEC 60034-7
《三相异步电动机试验方法》 Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)	GB/T 1032	IEC 60034-2-1
《旋转电机 线端标志与旋转方向》 Rotating electrical machines - Part 8: Terminal markings and direction of rotation	GB/T 1971	IEC 60034-8
《旋转电机冷却方法》 Rotating electrical machines; part 6: methods of cooling (IC code)	GB/T 1993	IEC 60034-6
《电工电子产品环境试验 第2部分：试验方法 试验Db 交变湿热 (12h+12h循环)》 Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	GB/T 2423.4	IEC 60068-2-30
《旋转电机尺寸和输出功率等级 第1部分：机座号56 ~ 400和凸缘号55 ~ 1080》 Dimensions and output series for rotating electrical machines; part 1: frame numbers 56 to 400 and flange numbers 55 to 1080	GB/T 4772.1	IEC 60072-1
《旋转电机整体结构的防护等级 (IP代码) -分级》 Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code); Classification	GB/T 4942.1	IEC 60034-5
《轴中心高为56 mm及以上电机的机械振动 振动的测量、评定及限值》 Rotating electrical machines - Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher; Measurement, evaluation and limits of vibration severity	GB/T 10068	IEC 60034-14
《旋转电机噪声测定方法及限值 第1部分：旋转电机噪声测定方法》 Acoustics - Test code for the measurement of airborne noise emitted by rotating electrical machines	GB/T 10069.1	ISO 1680
《旋转电机噪声测定方法及限值 第3部分：噪声限值》 Rotating electrical machines - Part 9: Noise limits	GB/T 10069.3	IEC 60034-9
《中小型旋转电机通用安全要求》 General requirements for safety of small and medium size rotating electrical machines	GB/T 14711	
《中小型三相异步电动机能效限定值及能效等级》 Minimum allowable values of energy efficiency and energy efficiency grades for small and medium three-phase asynchronous motors	GB 18613	IEC 60034-30
《电气绝缘 耐热性和表示方法》 Electrical insulation - Thermal evaluation and designation	GB/T 11021	IEC 60085
《电工电子产品自然环境条件温度和湿度》 Classification of environmental conditions - Part 2-1: Environmental conditions appearing in nature - Temperature and humidity	GB/T 4797.1	IEC 60721-2-1
《标准电压》 IEC standard voltages	GB/T 156	IEC 60038
《旋转电机热保护》 Rotating electrical machines - Part 11: Thermal protection	GB/T 13002	IEC 60034-11
《单速三相笼型感应电动机起动性能》 Rotating electrical machines - Part 12: Starting performance of single-speed three-phase cage induction motors	GB/T 21210	IEC 60034-12
《旋转电机绝缘结构功能性评定 总则》 Rotating electrical machines -Functional evaluation of insulation systems -General guidelines	GB/T 17948.7	IEC 60034-18-1
《旋转电机电压型变频器供电的旋转电机无局部放电 (I型) 电气绝缘结构的鉴别和质量控制试验》 Rotating electrical machines - Part 18-41: Partial discharge free electrical insulation systems (Type I) used in rotating electrical machines fed from voltage converters - Qualification and quality control tests	GB/T 22720.1	IEC 60034-18-41
《旋转电机效率分级 (IE代码) 第1部分：电网供电的交流电动机》 Rotating electrical machines. Part 30-1. Efficiency classes of line operated AC motors (IE code)	GB/T 32891.1	IEC 60034-30-1
《电工电子产品应用环境条件第3部分：有气候防护场所固定使用》 Environmental conditions existing in the application of electric and electronic products - Section 3: Stationary use at weather-protected locations	GB/T 4798.3	IEC 60721-3-3

噪声

噪声值 (直接供电运行)

噪声值根据 DIN EN ISO 1680 标准在噪音室测得。表面声压级噪声 L_{pfa} 计算表示单位为 dB (A)。声压级噪声的空间平均值是在其测量面上测得的。测量面是距离电动机表面一立方米的地方。声功率级噪声用 L_{WA} 来表示，单位为 dB (A)。选型数据表中所给出的噪声值仅适用于全封闭自扇冷却 (冷却方式: IC411) 电动机在 50 Hz 电源供电空载运行时的情况，容差为 +3 dB。当在 60 Hz 电源下空载运行时，偏差值大约为 +4 dB。

Noise levels

Noise levels for mains-fed operation

The noise levels are measured in accordance with DIN EN ISO 1680 in a dead room. It is specified as the A-valued measuring-surface sound pressure level L_{pfa} in dB (A). This is the spatial mean value of the sound pressure levels measured on the measuring surface. The measuring surface is a cube 1 m away from the motor surface. The sound power level is also specified as L_{WA} in dB (A). The specified values in Technical data table are only valid for totally enclosed fan cooling (cooling method: IC411) motor with no load at 50 Hz with no load, and the tolerance is +3 dB. While motor operating 60 Hz with no load, the values are approximately +4 dB (A) higher.

振动

所有电动机转子都使用半键按照 A 级 (标准) 振动等级进行动态平衡。电动机在空载时测得振动速度有效值不超过下表中的 A 级所列值。

Vibration

1LE8 rotors are dynamically balanced to severity grade A using a half key.

Table below contains the effective vibration values for unloaded motors.

振动等级 Vibration grade		机座号 Frame size (mm)	280 < FS ≤ 355
A	安装方式 Mounting	振动速度 (mm/s) Vibration velocity	
	自由悬置 Free suspension	2.8	
	刚性安装 Rigid mounting	2.3	
	自由悬置 Free suspension	1.8	
	刚性安装 Rigid mounting	1.5	
B			

铭牌信息 Nameplate



1 三相异步电动机	Three-phase low-voltage motor	14 IEC能效等级	IEC efficiency class
2 机座号	Frame size	15 二维码	Scan code
3 轴承	Bearing	16 IEC标准	IEC standard
4 润滑脂类型	Grease type	17 中国能效等级	China efficiency class
5 再润滑周期	Re-grease interval	18 平衡方式	Balance method
6 执行标准	Standards	19 中国国家标准	GB standard
7 额定电压	Rated voltage and Winding connections	20 产品序列号	Series number
8 频率	Frequency	21 热分级	Thermal class
9 额定功率	Rated output	22 加注润滑脂重量	Re-greasing quantity
10 额定电流	Rated current	23 电机重量	Motor weight
11 效率	Efficiency	24 订货号	Order No.
12 功率因数	Power factor	25 防护等级	Degree of protection
13 额定转速	Rated speed	26 安装结构形式	Type of construction

机械特性

接线盒

接线盒标准位置处于机座顶端，且自身可 $4 \times 90^\circ$ 旋转安装，从而使电缆可以从各个方向进入。315机座的接线盒有两个主进线孔，355机座的接线盒有三个主进线孔，所有进线孔采用螺塞密封。



标准接线盒

机座号 Frame Size	主接线端子数 No. of main terminal	主接线端子螺纹 Main terminal thread	主进线孔 Main cable entry	最大辅助端子数 ¹⁾ Max. auxiliary terminal	辅助电缆进线孔 ²⁾ Auxiliary cable entry
315	6	M12	2xM72x2	24	2xM20x1.5
355		M16	3xM72x2	24	2xM20x1.5

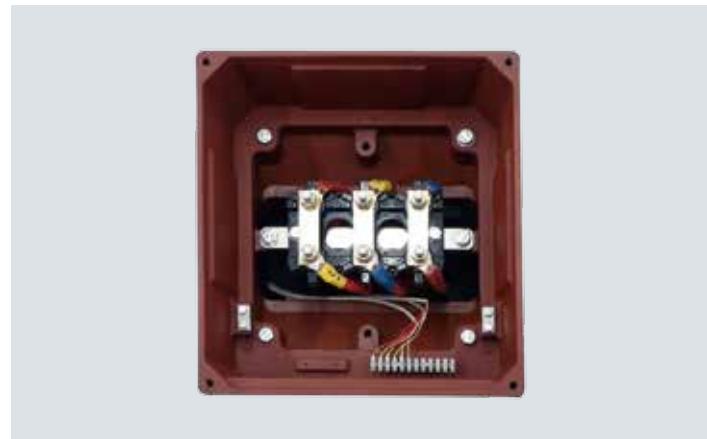
注：¹⁾ 当电机所需辅助接线端子数量超过24个时，应选用辅助接线盒（选件号L97）。辅助接线盒有2个M20x1.5的螺纹孔用于安装葛兰，这两个螺纹孔由闷盖密封

²⁾ 当电机配置了温度传感器、热敏电阻或防潮加热带时，接线盒上会带有2个辅助电缆进线孔

Mechanical design

Connection box

The connection box is located on the top of motor housing as standard, and can be rotated by $4 \times 90^\circ$ to allow for cable entry from each direction. The connection box of FS315 have 2 main cable entries, the connection box of FS355 have 3 main cable entries, all cable entries sealed by screwed plug.



Connection boxes technical data

¹⁾ If the number of auxiliary terminal is over 24, the auxiliary terminal box shall be selected (option code L97). Two M20x1.5 thread holes are provided for gland, and these two holes are sealed with plugs when motor delivered

²⁾ When equipped with temperature sensor, thermistor, resistance thermometer or anti-condensation heating, the junction box will have two auxiliary cable inlet holes

接线盒位置

接线盒除标准位置外，还可处于电动机机座的左上侧或右上侧。电动机接线盒位置可以在电动机订货号的第16位用数字表示出。

接线盒的位置是指从电动机驱动端来看的位置。

- 标配接线盒在顶部，电动机订货号的第16位数字为4；
- 接线盒在右上侧，电动机订货号的第16位数字为5；
- 接线盒在左上侧，电动机订货号的第16位数字为6。

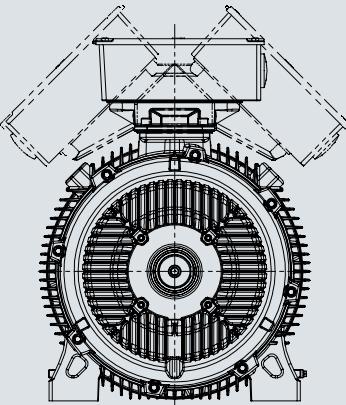
Location of the connection box

Besides standard position, the connection box also can be on the right or left of motor housing. The position of terminal box can be indicated on the 16th digit of motor order code.

The position of connection box is described by viewed from drive end (DE).

- On top (Standard), 16th position of Motor Order No. digit 4.
- On RHS, 16th position of Motor Order No. digit 5.
- On LHS, 16th position of Motor Order No. digit 6.

在顶部的（标配），电动机订货号的
第 16 位数字为 4
On top (Standard), 16th position of
Motor Order No. digit 4.



左上侧（选配），电动机订货号的
第 16 位数字为 6
On LHS, 16th position of Motor
Order No. digit 6.

右上侧（选配），电动机订货号的
第 16 位数字为 5
On RHS, 16th position of Motor
Order No. digit 5.

安装结构型式 Construction and mounting type

结构型式 Construction type	机座带底脚，端盖无法兰 With feet and without flange on the end-shield (DE)					
安装型式 Mounting type	IM B3 FS315~355	IM B6 FS315	IM B7 FS315	IM B8 FS315	IM V5 ¹⁾ FS315	IM V6 ²⁾ FS315
示意图 Diagram						
电机编号第14位号上对应的字母 Letter, position 14 th of Motor code	A	T	U	V	C	D

结构型式 Construction type	机座不带底脚，端盖有法兰 Without feet and with flange on the end-shield (DE)	机座带底脚，端盖有法兰 With feet and with flange on the end-shield (DE)		
安装型式 Mounting type	IM V1 ¹⁾ FS315~355	IM B35 FS315~355	IM V15 ¹⁾ FS315	IM V35 ²⁾ FS315
示意图 Diagram				
电机编号第14位号上对应的字母 Letter, position 14 th of Motor code	G	J	W	Y

¹⁾ 室外使用时推荐使用护罩（选件号H00）；

¹⁾ At outdoor application, the using of protective cover (option code H00) is recommended;

²⁾ 当户外安装时，推荐对电机轴采取防护措施，避免水直接喷射到电机轴上；

²⁾ At outdoor application the protection of shaft against jet-water is recommended;

冷却与通风

SIMOTICS 1LE8标配装有径流（离心）式冷却风扇，其冷却效能与电动机的旋转方向无关（冷却方法符合 IEC60034-6 标准的 IC411）。

对于某些应用，可以考虑配置独立驱动风扇，如：

- 电动机在低速运行时，推荐使用独立驱动风扇，从而使电动机得到有效利用；
- 电动机在明显高于额定同步转速的速度运行时，同样推荐选用独立驱动风扇，这样有助于降低电动机噪声。

独立驱动风扇的选件号为 F70。当安装独立驱动风扇时，电动机的长度将增加 ΔL 。

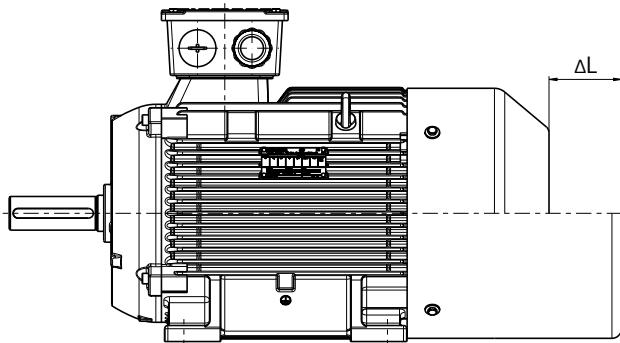
Cooling and ventilation

Standard motors are fitted with an radial flow fan for cooling in accordance with IEC 60034-6 cooling method.

For some special application, separately driven fan should be considered to be configurated.

- The use of a separately driven fan is recommended to increase motor utilization at low speed;
- When motor speed significantly higher than the synchronous speed, the separately fan is also recommended to be used. It can help reduce the motor noise.

The separately driven fan can be supplied already fitted, Option code F70. When the separately driven fan is mounted, the length of the motor increase by ΔL .



独立驱动风扇技术参数

对应电动机机座号 Motor frame size	电压 Voltage (V)	频率 Frequency (Hz)	功率 Rated output (W)	电流 Current (A)	转速 Speed (r/min)	ΔL (mm)
315	220Δ / 380Y	50	1100	4.33/2.5	1350	180
355	220Δ / 380Y	50	1100	4.33/2.5	1350	150

注：风扇可以在 210 ~ 240VD/360 ~ 420VY 50Hz 电源供电下运行，也可以在 220 ~ 260VD/380 ~ 480VY 60Hz 电源供电下运行。其他电源供电，须特殊询价。

Technical data for separately fan

Note: The fan can be running with supply 210 ~ 240VD/360 ~ 420VY 50Hz, and also 220 ~ 260VD/380 ~ 480VY 60Hz. Other voltage supply, possible on request.

轴承系统

SIMOTICS 1LE8系列电机标准配置深沟球轴承或角接触球轴承，这些轴承是可再润滑型的。

电机驱动端轴承浮动，非驱动端轴承固定。

标准配置的轴承可以承受一定的悬臂力，关于悬臂力参考第11页“电机轴允许的最大悬臂力”。当电机轴上需要承受的悬臂力较大时，可以考虑选择增强悬臂力的选项（选件号：L22），此时驱动端使用圆柱滚子轴承。

Bearing system

SIMOTICS 1LE8 series motors are supplied with the ball bearing or angular contact ball bearing as standard. These bearings are regreasable type.

The bearing at DE is floating, and NDE bearing is fixed.

The standard bearing can endure a maximum cantilever force, referred to page 11 - Permissible cantilever forces. If higher cantilever force on the shaft required, the increased cantilever bearing design (Option code: L22) should be considered, accordingly roller bearing used at DE.

轴承选配

Bearing Assignment

机座号 Frame size	极数 Number of poles	标准配置 Standard design				选项配置 Optional design	
		水平安装 Horizontal		竖直安装 Vertical		增强悬臂力的设计（选项代码L22） Increased cantilever force (option code L22)	
		驱动端轴承 DE bearing	非驱动端轴承 NDE bearing	驱动端轴承 DE bearing	非驱动端轴承 NDE bearing	驱动端轴承 DE bearing	非驱动端轴承 NDE bearing
315	2	6316 C4	6316 C4	6316 C4	7316 B	NU316	6316 C4
	4 to 8	6319 C4	6319 C4	6319 C4	7319 B	NU319	6319 C4
355	2	6317 C4	6317 C4	6317 C4	7317 B	NU317	6317 C4
	4 to 8	6320 C4	6320 C4	6320 C4	7320 B	NU320	6320 C4

注：当选择L51选项（非驱动端使用绝缘轴承）时，绝缘轴承的游隙为C3；

Note: When using insulated bearings for NDE, option code L51 , the clearance of the insulated bearings is C3.

轴承寿命（标称寿命）

轴承的标称额定寿命可根据 ISO 281 标准规定的标准计算程序计算出来的。如果电动机在该样本中所规定条件下运行，90 % 甚至更高比例的轴承的运行时间可达到标称寿命。通常，轴承的使用寿命取决于轴承规格、轴承载荷、运行条件、转速以及润滑脂寿命。

当电动机水平安装，且不受轴向力的情况下，电动机的轴承寿命至少能够达到 40,000 小时。在承受最大容许载荷的情况下，其寿命也至少有 20,000 小时，这里所说的轴承寿命，指的都是电动机在 50 Hz 下正常运行的情况。

当电动机在非正常的条件下运行时，轴承的寿命会缩短。如下面几种情况：

- 当电动机的运行速度高于额定速度时，由于电动机的振动增大，使得轴承受额外的径向力和轴向力，导致其寿命减少；
- 当环境或设备等因素引起电动机振动加大时，同样轴承也会因此受到额外的径向力和轴向力，而导致其寿命减少；
- 当环境温度每升高 10 °C，润滑脂寿命以及再润滑时间缩短一半。

润滑脂寿命和再润滑周期（电动机水平安装）

机座号 Frame size	极数 Poles	再润滑周期 (小时) Re-greasing interval(40°C ¹⁾ (h)	加注油脂量 (克) Re-greasing quantity (g)
315	2	3000	30
	4	4000	40
	6, 8	6000	40
355	2	3000	30
	4	4000	60
	6, 8	6000	60

注：

¹⁾ 当环境温度每升高 10 °C，润滑脂寿命以及再润滑时间缩短一半。

Bearing lifetime (nominal lifetime)

The nominal bearing lifetime is defined according 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 provide in the catalog. Generally, the bearing lifetime is defined by the bearing size, the bearing load, the operating condition, the speed and the grease lifetime.

The bearing lifetime of motors with horizontal type of construction is at least 40,000 hours if there is no additional axial loading at the coupling output and at least 20,000 hours with the maximum admissible loads. This assumes that the motor is operated at 50Hz.

When the motor runs outside of normal conditions, the bearing life will be reduced, such as the following conditions.

- When 1LE8 motor runs beyond the rated speed, the increase of motor vibration will result in the extra radial and axial force on bearing. This will reduce the life of bearing;
- When the motor vibration increase due to the environment or other equipment, the bearing also will endure more radial and axial force. This also will reduce the life of bearing;
- If the coolant temperature is increased by 10 °C, the grease lifetime and regreasing interval is halved.

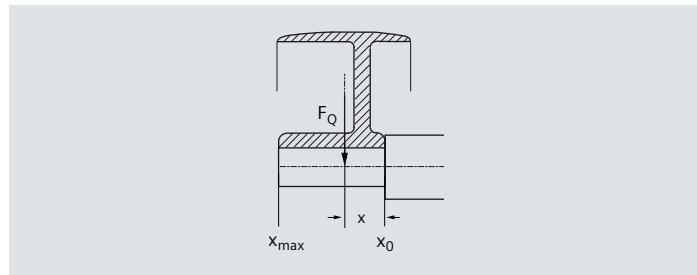
Grease life (Horizontal installation)

Note:

¹⁾ If the coolant temperature is increased by 10 K, the grease lifetime and regreasing interval are halved.

电动机轴驱动端允许的最大悬臂力

Permissible cantilever forces on DE shaft



为了计算径向负载的最大悬臂力，据轴肩处的悬臂力 F_Q (N) 必须位于轴伸端以内，(长度为 x)。长度 x [mm] 是距离轴肩的距离。长度最长为 x_{max} ，与轴伸长度相同。总的悬臂力 F_Q 使用以下公式计算。

$$F_Q = c \cdot F_U$$

预紧力系数 c 是从皮带制造商那得到的经验数值，下面的估算值可以应用。

- 对于一般扁平的皮带， $c = 2$;
- 对于 V 型皮带， $c = 2 \sim 2.5$;
- 对于特殊的皮带（取决于皮带类型和负载）， $c = 2 \sim 2.5$ 。

计算切向力 F_U (N) 使用下列公式：

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

F_U 切向力 (N)

P 额定功率 (kW)

n 额定转速

D 滑轮直径 (mm)

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 lie within the free shaft extension (dimension x). Dimension x [mm] is the distance between the point of application of force F_Q and the shaft shoulder. Dimension x_{max} . Corresponds to the length of the shaft extension. Total cantilever force is calculated using the following equation.

$$F_Q = c \cdot F_U$$

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 and load), $c = 2$ to 2.5.

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

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

F_U circumferential force in N

P rated motor power (transmitted power) in kW

n rated motor speed

D pulleys in mm.

假设电动机不受任何轴向力，下面的表格中列出了允许的径向悬臂力值（单位：牛顿）。

The table below contains the permissible Radial Force values in Newtons with the assumption of zero axial forces.

机座号 Frame size	极数 poles	最大悬臂力 Admissible cantilever force		水平安装时最大轴向力 Admissible axial force at horizontal mounting type	
		x_0 N	x_{max} N	轴向力为向外的拉力时 Tensile load (N)	轴向力为向内的推力时 Thrust load (N)
315	2	5100	4530	6260	3660
	4	7850	6810	9290	6490
	6	8220	7120	10150	6970
	8	9400	8150	11380	7900
355	2	4870	4370	6350	3170
	4	8110	7120	10000	6520
	6	8870	7790	11050	7870
	8	9910	8700	12030	8550

机座号 Frame size	极数 Number of poles	轴伸朝下竖直安装时最大轴向力 Admissible cantilever force at vertical mounting type when DE downward		轴伸朝上竖直安装时最大轴向力 Admissible cantilever force at vertical mounting type when DE upward	
		轴向力为向下的拉力时 Tensile load (N)	轴向力为向上的推力时 Thrust load (N)	轴向力为向上的拉力时 Tensile load (N)	轴向力为向下的推力时 Thrust load (N)
		2	13200	162	2762
315	4	20500	2043	5223	17300
	6	22100	3720	6900	19000
	8	24400	4006	7186	21200
	2	13400	853	3653	10600
355	4	24400	2894	6374	20900
	6	26600	5171	8651	23100
	8	29300	5509	8989	25800

电气特性

Electrical design

额定输出

SIMOTICS 1LE8电动机的额定功率是指电动机在S1连续运行的情况下（IEC 60034-1），此时周围环境温度为-20 °C ~ 40 °C，海拔高度不超过1000 m。

电压、频率

IEC 60034-1 将电压和频率的偏差分为A类（电压偏差±5%，频率偏差±2%）和B类（电压偏差±10%，频率偏差+3%/-5%）。电动机均能够在A类和B类提供额定转矩。在A类中，温度比正常运行下温度大约提升10 K。

Rated Output

SIMOTICS 1LE8 motors rated output powers means that the motor runs under continuous duty S1 (IEC 60034 - 1) operation when operated at ambient temperature from -20 °C to 40 °C and at altitudes of up to 1000 m over sea.

Voltage and Frequency

IEC 60034-1 differentiates between Category A (combination of voltage deviation ±5 % and frequency deviation ±2 %) and Category B (combination of voltage deviation ±10 % and frequency deviation +3 % / -5 %) for voltage and frequency fluctuations. The motors can supply their rated torque in both Category A and B. In Category A, the temperature rise is approximately 10 K higher than during normal operation.

标准 Standard 60034 - 1	类别 Category A	类别 Category B
电压偏差 Voltage deviation	±5 %	±10 %
频率偏差 Frequency deviation	±2 %	+3 % / -5 %

根据标准，不推荐电动机在B类情况下长时间运行
According to the standard, longer operation is not recommended for Category B.

电气数据公差

■ 效率 η

$P_{rated} \leq 150 \text{ kW}$: $-0.15 \times (1 - \eta)$

$P_{rated} > 150 \text{ kW}$: $-0.10 \times (1 - \eta)$

效率 η 为小于1的值

■ 功率因数: $(1 - \cos \phi) / 6$

最小绝对值: 0.02

最大绝对值: 0.07

■ 转差率: ±20% (电动机的偏差<1 kW ±30%时是允许的)

■ 堵转电流: +20%

■ 堵转转矩: -15% ~ +25%

■ 最大转矩: -10%

■ 转动惯量: ±10%

Tolerance for electrical data

■ Efficiency η at

$P_{rated} \leq 150 \text{ kW}$: $-0.15 \times (1 - \eta)$

$P_{rated} > 150 \text{ kW}$: $-0.10 \times (1 - \eta)$

With η being a decimal number

■ Power factor - $(1 - \cos \phi) / 6$

Minimum absolute value: 0.02

Maximum absolute value: 0.07

■ Slip ±20% (for motors < 1 kW ±30% is admissible)

■ Locked-rotor current +20%

■ Locked-rotor torque -15% to +25%

■ Breakdown torque -10%

■ Moment of inertia ±10%

过载倍数

根据 IEC60034 标准要求，SIMOTICS 1LE8 系列电动机能够在额定电压和频率下承受 1.5 倍的额定电流达 2 分钟。

Overload times

According to IEC60034, SIMOTICS 1LE8 series motors are designed to withstand overload capacity of 1.5 times rated current for 2 minutes at rated voltage and frequency.

绝缘系统

SIMOTICS 1LE8 电动机绝缘系统具有可靠性、耐用性好和寿命长、耐冲击能力强的特点。

SIMOTICS 1LE8 系列电动机标准设计温度等级为 155 (F)。当 1LE8 电动机直接供电，且输出额定功率时，其绝缘系统按 130 (B) 温度等级使用。

Insulation system

The insulation system of SIMOTICS 1LE8 results in high reliability, a long service life and high resistance to stress, for example, during starting or under overload conditions.

SIMOTICS 1LE8 series motors are designed for temperature class 155 (F). At rated output with line-fed operation, the motors can be used in temperature class 130 (B).

电动机保护

电动机过热保护

电动机热保护是指将温度保护传感器或温度检测传感器嵌入电动机定子绕组或其他适当的地方，从而使其不会因为过热而受到破坏。

不同的电动机热保护方式可以在 1LE8 电动机订货号的第 15 位采用不同的字母或者选件号来表示。下面是电动机的绕组保护和轴承保护的几种保护方式。

绕阻保护

■ PTC 热敏电阻温度保护

目前，最常用的电动机绕组过热保护方式是采用在电动机绕组中安装 PTC 热敏电阻进行保护。由于热敏电阻的热容量较低以及其在绕足间优良的热传导特性，绕组温度可被准确的监控。当达到极限温度时（标称跳闸温度），PTC 热敏电阻阻值会出现一个阶跃变化。这一变化被跳闸装置捕捉后，即可断开辅助回路。

PTC 热敏电阻本身不能耐受大电流和高电压。否则会导致半导体器件损坏。PTC 热敏电阻和跳闸装置的开关滞后效应小，因此可以实现快速重起。对于重载起动、起动频率高、负载变化大、环境温度高或电源波动大等应用场合，建议电动机使用该类保护。

Motor protection

Motor thermal overload protection

Motor thermal protection means to use of thermal protectors and thermal detectors incorporated into the stator windings or placed in other suitable positions in motor in order to protect them against serious damage due to thermal overloads.

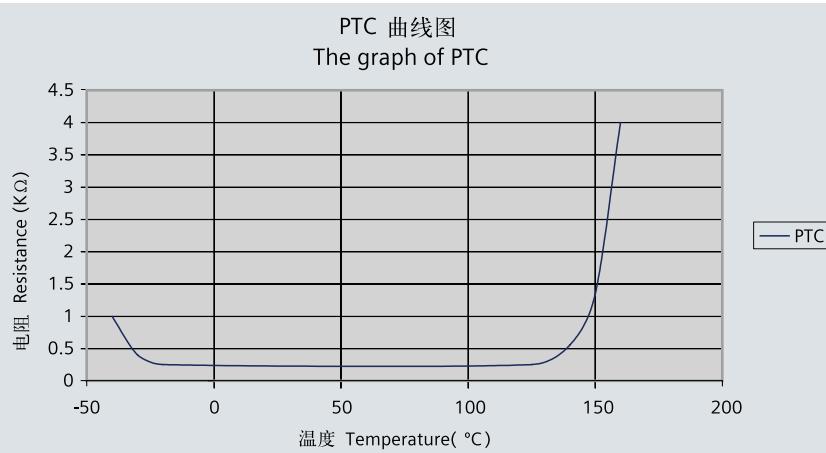
The order variants for motor protection are coded with letters in the 15th position of the Motor Order No., or ordered with Option code. Some protection method about winding protection and bearing protection are shown in the following.

Winding protection

■ PTC thermistors protection

The most comprehensive protection against thermal overloading of the motor is provided by PTC thermistors (thermistor motor protection) installed in the motor winding. The temperature of the winding can be accurately monitored thanks to its low heating capacity and the excellent heat contact with the winding. When a limit temperature is reached (nominal tripping temperature), the resistance of PTC thermistors will have a step change. This is evaluated by a tripping unit and can be used to open auxiliary circuits.

The PTC thermistors themselves cannot be subjected to high currents and voltages. This would result in destruction of the semiconductor. The switching hysteresis of the PTC thermistor and tripping unit is low, which supports fast restarting of the drive. Motors with this type of protection are recommended for heavy duty starting, switching duty, extreme changes in load, high ambient temperatures or fluctuating supply systems.



两种 PTC 热敏电阻温度保护

- 电动机绕组带一组三芯串联的 PTC 热敏电阻用于跳闸，跳闸温度为 155 °C，电动机订货号第 15 位字母为“B”，需 2 个辅助接线端子。
- 电动机绕组带两组三芯串联的 PTC 热敏电阻，其中一组用于在电动机跳闸前报警，一组用于跳闸，报警温度为 145 °C，跳闸温度为 155 °C，电动机订货号第 15 位字母为“C”，需 4 个辅助接线端子。

2 alternatives of PTC protection

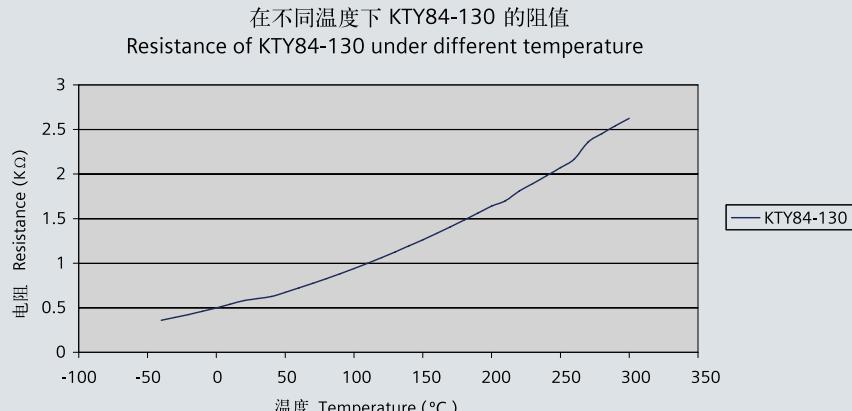
- Motor winding is protected with PTC thermistors with 3 embedded temperature sensors for tripping. Connection be done through 2 auxiliary terminals in the connection box. 15th position of Motor Order No. letter B.
- Motor winding is protected with two sets of three temperature sensors, one set is for warning, another set for tripping. The warning temperature is 145 °C, and tripping temperature is 155 °C. Connection be done through 4 auxiliary terminals in the connection box. 15th position of Motor Order No. letter C.

■ KTY84-130 温度传感器温度保护

当 SIMOTICS 1LE8 电动机变频应用时，推荐使用 KTY84-30 温度传感器进行绕组保护。KTY84-130 温度传感器特性曲线如下所示。

■ KTY84-130 temperature sensor protection

When SIMOTICS 1LE8 with converter fed operation, KTY84-30 is recommended to be configured for winding protection. The following chart show the characteristic of KTY84-30.



KTY 84-130 温度传感器的特性曲线 KTY84-130 sensor characteristics curve

一些西门子变频器可以通过温度传感器的电阻来确定电动机的温度，从而设定电动机报警和跳闸的温度。

SIMOTICS 1LE8 电动机绕组带一个 KTY 84-130 温度传感器，电动机订货号第 15 位字母为 “F”，需 2 个辅助接线端子。

电动机绕组带两个KTY 84-130温度传感器，订货号第15位字母为 “G”，需用4个辅助接线端子。

Some converters from Siemens determine the motor temperature using the resistance of the temperature sensor. They can be set to a required temperature for alarm and tripping.

SIMOTICS 1LE8 Motor winding with embedded temperature detector sensor KTY 84-130. Two auxiliary terminals are provided in the connection box. 15th position of Motor Order No. letter F.

The motor winding with 2 embedded sensors KTY84-130, four auxiliary terminals are provided in the connection box, 15th position of Motor Order No. letter G.

■ PT100 热敏电阻温度保护

PT100 热敏电阻是一种精确高、灵敏度高的传感器，其线性温度阻值优于其他电阻式传感器，性能稳定、可靠性高，其特性曲线如下。

四种 PT100 热敏电阻温度保护

- 电动机绕组带 3 个 2 线制 PT100 测温元件，电动机订货号第 15 位字母为 “H”，需 6 个辅助接线端子。
- 电动机绕组带 6 个 2 线制 PT100 测温元件，电动机订货号第 15 位字母为 “J”，需 12 个辅助接线端子。
- 电动机绕组带3个3线制PT100测温元件，电动机订货号第15位字母为 “Q”，需9个辅助接线端子。
- 电动机绕组带6个3线制PT100测温元件，电动机订货号第15位字母为 “R”，需18个辅助接线端子。

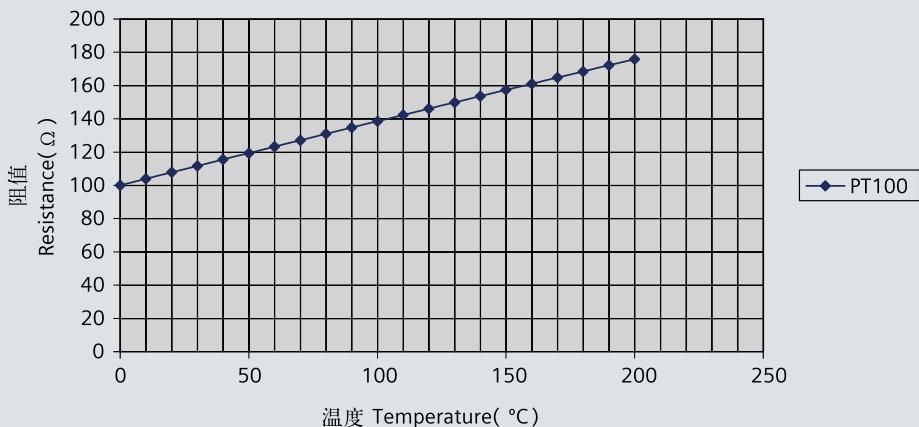
■ PT100 resistance thermometers protection

PT100 thermometers are a high precision, high sensitivity, better linear temperature resistance, more stable performance, and high reliability sensor, whose characteristics are as following.

4 alternatives of PT100

- Installation of 3 PT100 resistance thermometers. Connection be done through 6 auxiliary terminals in the connection box. 15th position of Motor Order No. letter H.
- Installation of 6 PT100 resistance thermometers. Connection be done through 12 auxiliary terminals in the connection box. 15th position of Motor Order No. letter J.
- Installation of 3 PT100 resistance thermometers in 3-wire connection, through 9 auxiliary terminals in the connection box. 15th position of Motor Order No. letter Q.
- Installation of 6 PT100 resistance thermometers in 3-wire connection, through 18 auxiliary terminals in the connection box. 15th position of Motor Order No. letter R.

在不同温度下 PT100 的阻值
Resistance of PT100 under different temperature



轴承保护

SIMOTICS 1LE8 电动机轴承标配不带任何保护。对于某些苛刻的应用，推荐对轴承采取保护措施。轴承保护是通过在电动机驱动端和非驱动端的轴承端盖拧入温度传感器来进行保护。温度传感器的引接线引入电动机主接线盒内。

电机驱动端和非驱动端轴承位置各安装1个热电阻传感器，其中：

安装单支两线制热电阻传感器，选项代码为Q72，需4个辅助接线端子；

安装单支三线制热电阻传感器，选项代码为Q78，需6个辅助接线端子；

安装双支三线制热电阻传感器，选项代码为Q79，需12个辅助接线端子。

防潮加热保护

当电动机处于较为恶劣的环境时，比如湿度非常大或者昼夜温差比较大，电动机的绕组很可能出现凝露的现象，这样会带来电动机烧毁的风险。对于这种情况，建议选用防潮加热带对电机进行保护（选件号：Q04），电机驱动端和非驱动端的绕组将各配一防潮加热带，需4个辅助接线端子。

电动机防潮加热带必须在电动机工作过程中处于不工作状态；当电动机停机时，防潮加热带必须启动工作，为绕组加热。防潮加热带的电气参数如下表所示。

防潮加热带电气参数

Bearing protection

SIMOTICS 1LE8 motors bearing has no protection as standard. For some severe application, such as high load, high coolant temperature and etc., the bearing is recommended to be protected. The bearing is protected through thermometers screwed into the bearing plates of motor driven end (DE) and non-drive-end (NDE). The wires are routed through the main connection box.

The resistance thermometer is installed at each position of DE and NDE bearing, where:

1 PT100 resistance thermometer - 2-wire input (4 terminals), option code Q72;

1 PT100 resistance thermometer - 3-wire input (6 terminals), option code Q78;

2 PT100 resistance thermometer - 3-wire input (12 terminals), option code Q79.

Anti-condensation heater

Motors whose windings are 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 can be equipped with anti-condensation heaters (Option code: Q04), 2 auxiliary terminals in connection box are needed.”

Anti-condensation heaters must be switched off during operation. When motor shut down, the heaters must be switched on.

Electrical data of Anti-condensation heater

机座号 Frame size	功率 Power (W)	电压 Voltage
315	100	220 V
355	100	220 V

变频应用

SIMOTICS 1LE8 电动机适于变转速、恒转速的各种应用，如风机、泵、压缩机等。

当变频器驱动电动机时，电磁干扰的程度大小取决于变频器的类型（种类，IGBT 数量，干扰控制措施及制造商）、布线、距离以及应用需求。在设计和应用阶段必须参考变频器制造商关于电磁兼容性的安装指导。

当 SIMOTICS 1LE8 电动机变频应用（变频器供电），且输出额定功率时，电动机的使用温度等级为 155 (F)。为了避免杂散电流对电动机轴承的损坏，推荐使用绝缘轴承。请向西门子咨询关于绝缘轴承的详细信息。

变频器驱动运行

SIMOTICS 1LE8 电动机的标准绝缘系统设计要求，能够保证其在变频器供电电压不超过 460 V 时正常运行。

SIMOTICS 1LE8 电动机带有特定的负载时能够使用变频器驱动，其特定的负载扭矩如以下图表所示：

Converter fed application

SIMOTICS 1LE8 motors are suitable for pumps, fans, compressors, and mechanical machine applications where variable or constant speed is required.

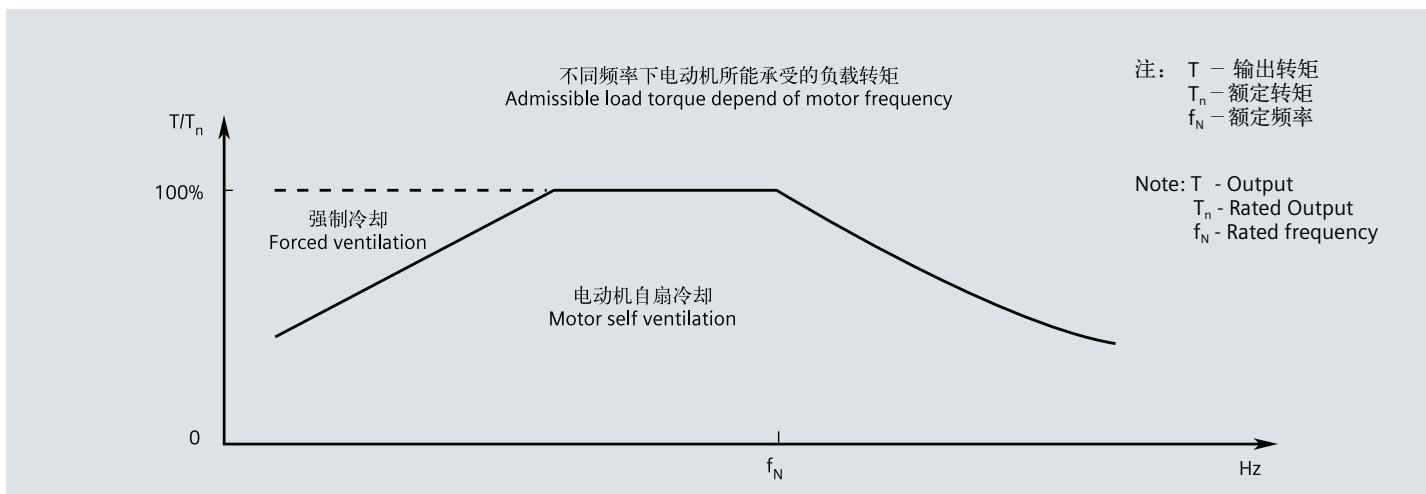
In application where the motor is driven by a converter, the degree of electrical interference depends on the type of converter used (type, number of IGBTs, interference suppression measures, and manufacturer), cabling, distance and application requirements. The installation guidelines of the converter manufacturer with regards to electromagnetic compatibility must be considered at all times during the design and implementation phases.

At rated output with converter fed operation, the motors will be used in temperature class 155 (F). To prevent damage as a result of bearing currents, insulated bearings are recommended to be assembled for frame size 250 and above. Please inquire Siemens about the detailed information of insulated bearing.

Converter-fed operation

The standard insulation of the SIMOTICS 1LE8 motors is designed such that operation is possible on the converter at mains voltage up to 460 V.

SIMOTICS 1LE8 motors are capable for converter-fed operation with certain characteristics load, of which the load torque characteristics is referred in the following diagram:



当负载转矩在允许的转矩范围内时，电动机能够自扇冷却；当负载转矩超过所允许的转矩时，电动机需要强迫冷却。

在电动机运行速度超过额定转速时，噪声和振动值将增加，并且轴承的寿命将缩短。需要注意再润滑周期和润滑脂的寿命。

变频运行时当频率超过 60 Hz 时，必需按照特定的限值进行动平衡。

By usage with admissible torque and below, the motor can be operated with self cooling; by usage over the admissible torque line, the motor with forced ventilation is needed.

At operating speeds above rated speed the noise and vibration levels increase and the bearing life time reduce. Attention should be paid to the re-greasing intervals and the grease service life.

For converter-fed operation with frequencies greater than 60 Hz special balancing is required for compliance with the specified limit values.

SIMOTICS 1LE8 电动机所允许的最大安全转速如下表

The allowed maximum safe operating speed of SIMOTICS 1LE8 motors shows the diagram

机座号 Frame Size	2 极 2 pole		4 极 4 pole		6 极 6 pole		8 极 8 pole	
	最高转速 Max. rpm	最大频率 fmax						
315	3600	60	2300	77	1800	90	1400	93
355	3600	60	2300	77	1800	90	1400	93

电压承受值

绕组绝缘的电介质应力决定于：

- 电压峰值，上升时间以及变频器产生的脉冲频率；
- 变频器与电动机连接电缆的特性和长度；
- 绕组结构和其他系统参数，尤其是绝缘系统中不同绕组的对地电压（代表了绝缘系统的电介质应力）。

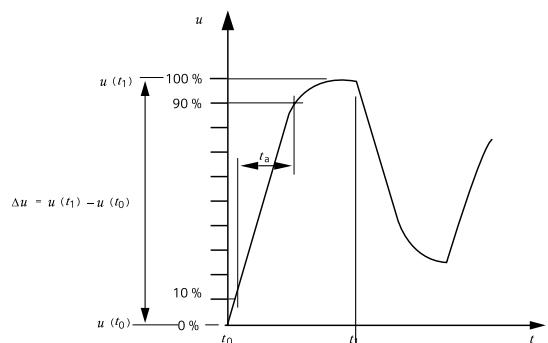
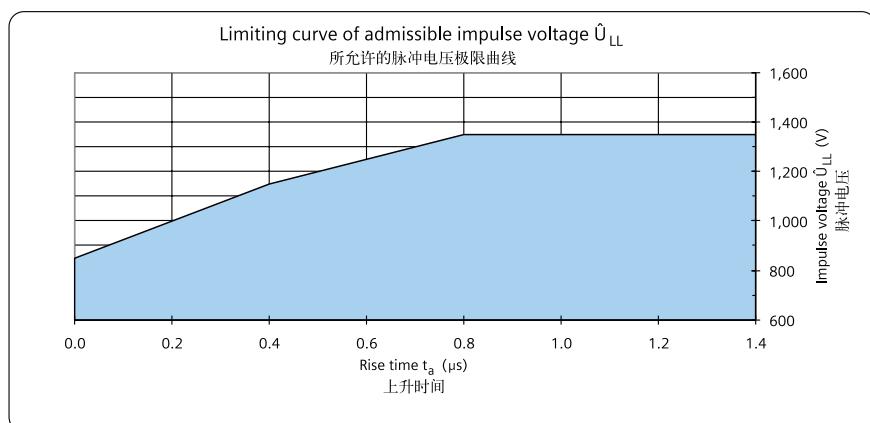
图表所示为 SIMOTICS 1LE8 电动机标准绝缘能承受电压的峰值和上升时间：

Voltage withstand levels

The dielectric stress of the winding insulation is determined by:

- the peak voltage, rise time and frequency of the impulses produced by the converter.
- the characteristics and the length of the connection leads between the converter and motor.
- the winding construction and other system parameters, especially the voltages between the different parts of the winding and the ground represent dielectric stress at the insulation system.

The standard insulation of the SIMOTICS 1LE8 motors is designed to withstand voltage peak and rise time which is showed in the diagram:



数值参照 IEC 60034-17, GB/T 20161-2008 标准。

The values refer to standard IEC 60034-17 and GB/T 20161-2008.

有限变频应用数据

Limited VSD application data

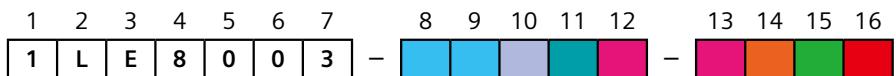
电机额定电压 Rated voltage	允许的电压峰值 Permitted voltage peaks		升压时间&最大压差 Rise time & Max dU
≤690 V DOL	$U_{PG} = 2200 \text{ V}_{pp}$	$U_{pp} = 3000 \text{ V}_{pp}$	0.1μs Max. dU=900V
≤480 V Inverter			0.2μs Max. dU=1050V 0.4μs Max. dU=1260V

注：表格中峰值电压为峰峰值电压

Note: Voltages specified are peak-peak values (Vpk/pk)

订货号 Order No.

订货号 Order No.



电机系列 Motor family

1LE8003系列三相异步电动机

1LE8003 series three-phase asynchronous motor

机座号 Frame size

3A = 315 3B = 355

极数 Pole

A = 2 B = 4 C = 6 D = 8

铁芯长度编号 Code of stator length

电压、连接方式和频率编号 Code of voltage, connections and frequency

3-3 = 50Hz 380V Δ / 660V Y

3-4 = 50Hz 400V Δ / 690V Y

3-5 = 50Hz 415V Δ

0-4 = 50Hz 400V Δ

9-0 = 特殊电压和频率 Special voltage & frequency

结构和安装方式编号 Code of construction and mounting type

A = IM B3 T = IM B6 U = IM B7 V = IM B8 J = IM B35

G = IM V1 C = IM V5 D = IM V6 W = IM V15 Y = IM V35

绕组保护编号 Code of winding protection

A = 无绕组保护 Without winding protection

B = 一组三芯串联的PTC热敏电阻用于跳闸 3 PTC thermistors for tripping

C = 两组三芯串联的PTC热敏电阻用于报警和跳闸 6 PTC thermistors for alarm and tripping

F = 一个KTY84温度传感器 Motor temperature detection with one embedded temperature sensor KTY84

G = 两个KTY84温度传感器 Motor temperature detection with two embedded temperature sensor KTY84

H = 一组三个PT100温度传感器 3 PT100 resistance thermometers

J = 两组三个PT100温度传感器 6 PT100 resistance thermometers

Q = 一组三个三线式PT100温度传感器 3 PT100 resistance thermometers in 3-wire connection

R = 两组三个三线式PT100温度传感器 6 PT100 resistance thermometers in 3-wire connection

接线盒位置编号 (从驱动端看) Code of terminal box position (view from drive end)

4 = 顶置 On top 5 = 右上侧 On right hand side 6 = 左上侧 On left hand side

选型技术数据表 Technical data table

机座号 Frame Size	订货号 MLFB	额定 功率 Rated Output	额定转速 Rated Speed 50Hz	额定转速 Rated Speed 60Hz	效率 Efficiency at (50HZ) 4/4 load	效率 Efficiency at (50HZ) 3/4 load	效率 Efficiency at (60HZ) 4/4 load	功率因数 Power factor at (50Hz) 4/4 load	功率因数 Power factor at (60Hz) 4/4 load
		kW	rpm	%	%	%	%	—	—
		3000rpm 2-pole							
		380VD/660VY 50Hz							
315	1LE8003-3AA33-3□□□	220	2982	3578.4	95.8	95.86	95.8	0.9	0.91
315	1LE8003-3AA63-3□□□	250	2978	3573.6	95.8	95.86	95.8	0.9	0.91
315	1LE8003-3AA83-3□□□	280	2982	3578.4	95.8	95.86	95.8	0.9	0.91
315	1LE8003-3AA73-3□□□	315	2980	3576	95.8	95.86	95.8	0.91	0.91
355	1LE8003-3BA33-3□□□	355	2986	3583.2	95.8	95.71	95.8	0.89	0.89
355	1LE8003-3BA43-3□□□	400	2982	3578.4	95.8	95.71	95.8	0.89	0.89
355	1LE8003-3BA73-3□□□	450	2990	3588	95.8	95.71	95.8	0.89	0.89
355	1LE8003-3BA53-3□□□	500	2988	3585.6	95.8	95.71	95.8	0.89	0.89
		1500rpm 4-pole							
		380VD/660VY 50Hz							
315	1LE8003-3AB33-3□□□	220	1491	1789.2	96	96.16	96.2	0.85	0.85
315	1LE8003-3AB63-3□□□	250	1490	1788	96	96.16	96.2	0.85	0.85
315	1LE8003-3AB83-3□□□	280	1490	1788	96	96.16	96.2	0.85	0.85
315	1LE8003-3AB73-3□□□	315	1490	1788	96	96.16	96.2	0.85	0.85
355	1LE8003-3BB33-3□□□	355	1491	1789.2	96	96.28	96.2	0.85	0.85
355	1LE8003-3BB43-3□□□	400	1491	1789.2	96	96.28	96.2	0.86	0.86
355	1LE8003-3BB73-3□□□	450	1491	1789.2	96	96.28	96.2	0.86	0.86
355	1LE8003-3BB53-3□□□	500 ¹⁾	1490	1788	96	96.28	96.2	0.87	0.87
		1000rpm 6-pole							
		380VD/660VY 50Hz							
315	1LE8003-3AC63-3□□□	160	991	1189.2	95.8	96.11	95.8	0.85	0.85
315	1LE8003-3AC13-3□□□	185	991	1189.2	95.8	96.11	95.8	0.85	0.85
315	1LE8003-3AC73-3□□□	200	990	1188	95.8	96.11	95.8	0.85	0.85
315	1LE8003-3AC33-3□□□	220	991	1189.2	95.8	96.11	95.8	0.85	0.85
315	1LE8003-3AC83-3□□□	250	990	1188	95.8	96.11	95.8	0.85	0.85
355	1LE8003-3BC83-3□□□	280	993	1191.6	95.8	95.92	95.8	0.85	0.85
355	1LE8003-3BC23-3□□□	315	993	1191.6	95.8	95.92	95.8	0.85	0.85
355	1LE8003-3BC33-3□□□	355	993	1191.6	95.8	95.92	95.8	0.85	0.85
355	1LE8003-3BC43-3□□□	400 ¹⁾	993	1191.6	95.8	95.92	95.8	0.85	0.85
		750rpm 8-pole							
		380VD/660VY 50Hz							
315	1LE8003-3AD63-3□□□	132	740	888	94	94.4	94.5	0.8	0.8
315	1LE8003-3AD73-3□□□	160	740	888	94.3	94.7	94.5	0.8	0.8
315	1LE8003-3AD13-3□□□	185	741	889.2	94.5	94.9	95	0.8	0.8
315	1LE8003-3AD83-3□□□	200	740	888	94.6	95	95	0.8	0.8
355	1LE8003-3BD73-3□□□	220	745	894	94.6	95.01	95	0.81	0.81
355	1LE8003-3BD13-3□□□	250	743	891.6	94.6	95.01	95	0.81	0.81
355	1LE8003-3BD83-3□□□	280	744	892.8	94.6	95.01	95	0.81	0.81
355	1LE8003-3BD23-3□□□	315	743	891.6	94.6	95.01	95	0.81	0.81

注:

¹⁾ 绝缘系统按 155 (F) 温度等级设计，在额定输出和直接供电时按 155 (F) 温度等级使用；

铸铁壳系列电机, Cast Iron Motors
IE3, 中国能效等级2级

	额定电流 Rated current at 380V 50Hz	额定电流 Rated current at 660V 50Hz	额定电流 Rated current at 440V 60Hz	额定转矩 Rated torque	起动电流 Starting Current	起动转矩 Starting torqueStarting torque	最大转矩 Max torque	重量 Weight IMB3	转动惯量 Moment of inertia(J)	噪声 Noise LpfA	噪声 Noise LWA			
	A	A	A	Nm	直接起动对额定转矩(电流)的倍数 For direct-on-line starting as multiple of the rated			kg	kgm ²	dB(A)	dB(A)			
3000rpm 2-pole														
380VD/660VY 50Hz														
	390	225	330	705	7.8	2.8	3.5	1380	2.9	81	96			
	440	255	375	802	7.8	2.8	3.5	1500	3.4	81	96			
	495	285	420	897	8	3.2	3.5	1520	3.4	81	96			
	550	315	475	1009	8	3.2	3.5	1590	3.8	81	96			
	630	365	550	1135	7.5	2.2	2.6	2020	5.5	86	101			
	710	410	620	1281	7	2	2.4	2200	6.1	86	101			
	800	460	690	1437	8.5	2.8	3.2	2270	6.5	86	101			
	890	510	770	1598	8.5	2.8	3.2	2300	6.5	86	101			
1500rpm 4-pole														
380VD/660VY 50Hz														
	410	235	355	1409	7	2.2	2.4	1480	5.1	73	88			
	465	270	400	1602	7	2.2	2.4	1530	5.5	73	88			
	520	300	450	1795	7	2.2	2.4	1610	6.0	73	88			
	590	340	510	2019	7	2.2	2.4	1650	6.2	73	88			
	660	380	570	2274	8.5	2.7	2.8	1960	7.2	81	96			
	740	425	630	2562	8.5	2.7	2.8	2070	8.0	81	96			
	830	475	710	2882	8.5	2.7	2.8	2290	9.4	81	96			
	910	520	780	3205	8	2.4	2.8	2290	9.4	81	96			
1000rpm 6-pole														
380VD/660VY 50Hz														
	300	172	260	1542	7.8	2.3	2.4	1370	6.5	68	83			
	345	199	300	1783	7.8	2.3	2.4	1470	7.2	68	83			
	375	215	320	1929	7.8	2.3	2.4	1540	7.8	68	83			
	410	235	355	2120	7.8	2.3	2.4	1660	9.1	68	83			
	465	270	405	2412	7.8	2.3	2.4	1700	9.3	68	83			
	520	300	450	2693	8.0	2	2.3	2150	14.3	78	93			
	590	340	510	3029	8.0	2	2.3	2180	14.3	78	93			
	660	380	570	3414	8.0	2	2.3	2270	15.3	78	93			
	750	430	640	3847	8	2.5	2.5	2270	15.3	78	93			
750rpm 8-pole														
380VD/660VY 50Hz														
	265	154	230	1704	7	2.3	2.5	1320	5.9	72	87			
	320	186	280	2065	7	2.3	2.5	1480	7.4	72	87			
	370	215	320	2384	7	2.3	2.5	1680	9.3	72	87			
	400	230	345	2581	7	2.3	2.5	1690	9.3	72	87			
	435	250	375	2820	7.5	2.6	3	2140	14.2	73	88			
	495	285	425	3213	7.5	2.6	3	2160	14.2	73	88			
	560	320	475	3594	7.5	2.6	3	2230	15.2	73	88			
	620	360	540	4049	7.5	2.6	3	2250	15.2	73	88			

Note:

¹⁾ Insulation system is designed for temperature class 155 (F). At rated output with line-fed operation, the motors can be utilized according to 155 (F).

选件 Options

电动机订货号 Motor order code	选件号 Option Code ¹⁾	描述 Description	应用范围 Application Scope
电压与频率 Voltages and frequency			
1LE8003-□□□□3-3□□□	-	380VD / 660VY 50 Hz ²⁾	FS315-355
1LE8003-□□□□3-4□□□	-	400VD / 690VY 50 Hz	FS315-355
1LE8003-□□□□0-4□□□	-	400VD 50 Hz	FS315-355
1LE8003-□□□□3-5□□□	-	415VD 50 Hz	FS315-355
1LE8003-□□□□9-0□□□	M2H	575 VD, 50Hz功率输出 50 Hz output	FS315-355
1LE8003-□□□□9-0□□□	M2B	380VD/660VY 60Hz (50Hz功率输出 50Hz output)	FS315-355
1LE8003-□□□□9-0□□□	M2D	440VD 60Hz (50Hz功率输出 50Hz output)	FS315-355
1LE8003-□□□□9-0□□□	M2F	460VD 60Hz (50Hz功率输出 50Hz output)	FS315-355
绕组保护和轴承保护 Winding protection and bearing protection			
1LE8003-□□□□□-□□G□	G (15 th digit)	两组KTY84-130温度传感器 2 temperature sensor KTY 84-130 (4 Terminals)	FS315-355
1LE8003-□□□□□-□□Q□	Q (15 th digit)	绕组带3个单支三线制PT100测温元件，需用9个辅助接线端子 3 PT100 resistance thermometers in stator winding, 3-wire circuit	FS315-355
1LE8003-□□□□□-□□R□	R (15 th digit)	绕组带6个单支三线制PT100测温元件，需用18个辅助接线端子 6 PT100 resistance thermometers in stator winding, 3-wire circuit	FS315-355
1LE8003-□□□□□-□□A□	A (15 th digit)	无绕组保护 Without motor protection	FS315-355
1LE8003-□□□□□-□□B□	B (15 th digit)	绕组带一组三芯串联的 PTC 热敏电阻用于跳闸，需用2个辅助接线端子 Motor protection with PTC thermistors with three embedded temperature sensors for tripping	FS315-355
1LE8003-□□□□□-□□C□	C (15 th digit)	绕组带两组三芯串联的 PTC 热敏电阻用于报警和跳闸，需用4个辅助接线端子 Motor protection with PTC thermistors with six embedded temperature sensors for alarm & tripping	FS315-355
1LE8003-□□□□□-□□F□	F (15 th digit)	带KTY84-130温度传感器 Motor temperature detection with embedded temperature sensor KTY84-130	FS315-355

¹⁾ 订货时，电动机订货号需带“-Z”，然后再附带上选件号；

¹⁾ When ordering, need supplement "-Z" after order number. Add option code after that.

²⁾ 无需附加费用；

²⁾ Without additional charge.

电动机订货号 Motor order code	选件号 Option Code ¹⁾	描述 Description	应用范围 Application Scope
1LE8003-□□□□□-□□H□	H (15 th digit)	绕组带3个单支两线制PT100测温元件，需用6个辅助接线端子 Installation of three PT100 resistance thermometers	FS315-355
1LE8003-□□□□□-□□J□	J (15 th digit)	绕组带6个单支两线制PT100测温元件，需用12个辅助接线端子 Installation of six PT100 resistance thermometers	FS315-355
-	Q72	前后轴承各带1个单支两线制PT100测温元件，需用4个辅助接线端子 1 PT100 resistance thermometer - 2-wire input (4 terminals) , at each position of DE and NDE bearing	FS315-355
-	Q78	前后轴承各带1个单支三线制PT100测温元件，需用6个辅助接线端子 1 PT100 resistance thermometer - 3-wire input (6 terminals) ,at each position of DE and NDE bearing	FS315-355
-	Q79	前后轴承各带1个双支三线制PT100测温元件，需用12个辅助接线端子 2 PT100 resistance thermometers - 3-wire input (12 terminals) , at each position of DE and NDE bearing	FS315-355
电动机接线盒 Motor connection box			
1LE8003-□□□□□-□□□4	4 (16 th digit) ²⁾	接线盒在顶端 Connection box on top 进线孔在右侧（从驱动端看）（标准电动机） cable entry on right (view from DE) (Standard version)	FS315-355
1LE8003-□□□□□-□□□5	5 (16 th digit)	接线盒在右边（从驱动端看） Connection box on RHS (view from DE)	FS315-355
1LE8003-□□□□□-□□□6	6 (16 th digit)	接线盒在左边（从驱动端看） Connection box on LHS (view from DE)	FS315-355
-	R15	带一个金属葛兰 One metal cable gland	FS315-355
-	R10 ³⁾	接线盒顺时针旋转 90° Clockwise rotate the connection box through 90°	FS315-355
-	R11 ³⁾	接线盒逆时针旋转 90° Counter-clockwise rotate the connection box through 90°	FS315-355
-	R12 ³⁾	接线盒直接旋转 180° Rotation of the connection box through 180°	FS315-355
-	L97	辅助接线盒 Auxiliary terminal box	FS315-355

¹⁾ 订货时，电动机订货号需带“-Z”，然后再附带上选件号；

¹⁾ When ordering, need supplement "-Z" after order number. Add option code after that.

²⁾ 无需附加费用；

²⁾ Without additional charge.

³⁾ 接线盒旋转方向为从接线盒盖正上方观察时的方向；

³⁾ The direction of rotation of the terminal box is viewed directly above the terminal box cover.

选件 Options

电动机订货号 Motor order code	选件号 Option Code ¹⁾	描述 Description	应用范围 Application Scope
绕组与绝缘 Windings and insulation			
—	N01 ⁴⁾	耐热等级155(F), 按照155(F)使用, 服务系数1.15 Temperature class 155 (F), used according to 155 (F), with service factor (SF1.15)	FS315-355
—	N10	耐热等级180(H) Temperature class 180(H)	FS315-355
—	Q04	绕组带 220 V 防潮加热带 Anti-condensation heating for 220 V	FS315-355
轴承 bearing			
—	L51 ⁵⁾	非驱动端使用绝缘轴承 Bearing insulation NDE	FS315-355
—	L80	使用SKF轴承 SKF Bearing	FS315-355
—	L20	驱动端轴承固定 Fixed bearing on DE side	FS315-355
—	L22 ⁵⁾	增强悬臂力轴承设计 Bearing design for increased cantilever forces	FS315-355
—	Q01	驱动端预留SPM测量接头 Measuring nipple for SPM shock pulse at DE measurement for bearing inspection	FS315-355
平衡 Balance and Vibration quantity			
—	L00	B 级振动等级 Vibration quantity level B	FS315-355

¹⁾ 订货时, 电动机订货号需带“-Z”, 然后再附带上选件号;

¹⁾ When ordering, need supplement "-Z" after order number. Add option code after that.

⁴⁾ 不适用于500kW-4P(3BB5)和400kW-6P(3BC4)两个规格;

⁴⁾ Not applicable for 500kW-4P(3BB5) and 400kW-6P(3BC4).

⁵⁾ 仅可用于电机水平安装时;

⁵⁾ Only applicable for horizontal mounting motor.

电动机订货号 Motor order code	选件号 Option Code ¹⁾	描述 Description	应用范围 Application Scope
机械设计和防护等级 Mechanical design and degrees of protection			
—	H20	防护等级IP65 IP65 degree of protection	FS315-355
—	H22	防护等级IP56 (非高海拔) IP56 degree of protection (non-high altitude)	FS315-355
—	H70	第二接地 Second external grounding	FS315-355
—	L05 ⁶⁾	第二标准轴伸 Second standard shaft extension	FS315-355
—	H00 ⁷⁾	防雨罩 Motor with protective cover	FS315-355
—	H03	冷凝水排放孔 Condensation drainage holes	FS315-355
—	F70 ⁸⁾	独立风机 Mounting of separately driven fan	FS315-355
—	F90 ⁹⁾	风机电机 (不带风扇和风罩, 非驱动端轴孔封闭) Fan motor (Without fan and fan cover, NDE closed)	FS315-355
—	X05	用于使用LL861900220编码器 Prepared for of LL861900220 encoder	FS315-355
—	G04	安装LL861900220编码器 Mounting of LL861900220 rotary pulse encoder	FS315-355
—	X50	安装欧姆龙编码器(E6B2-C)和独立风机 Mounting of Omron rotary pulse encoder (E6B2-C) and separately driven fan	FS315-355
—	W74	安装欧姆龙编码器(E6B2-CWZ1X)和独立风机。 Mounting of Omron encoder (E6B2-CWZ1X) and separated driven fan	FS315-355

¹⁾ 订货时, 电动机订货号需带“-Z”, 然后再附带上选件号;

¹⁾ When ordering, need supplement "-Z" after order number. Add option code after that.

⁶⁾ 带防雨罩或独立驱动风扇的电机不能选此选件, 第二标准轴伸尺寸与驱动端不一致, 详见外形尺寸图;

⁶⁾ Not possible in combination with canopy or separately driven fan. The second standard shaft extension dimension is not same with DE shaft.

⁷⁾ 不可与选件L05并用;

⁷⁾ Not possible in combination with Option code L05.

⁸⁾ 当安装独立风机时, 电机长度会增加。具体增加尺寸和风机技术参数见第9页。500kW-4P (3BB5) 和400kW-6P (3BC4) 两个规格不能选此选件;

⁸⁾ When the separately driven fan is mounted, the length of the motor increase by ΔL. For an explanation of the additional dimension and technical data see from page 9. Not applicable for 500kW-4P(3BB5) and 400kW-6P(3BC4).

⁹⁾ 电机非驱动端无风扇和风罩, 电机长度会因此缩短。用户应当采取适当的冷却措施, 没有或错误的冷却措施都将缩短电机的使用寿命, 甚至会损坏电机。

⁹⁾ Without fan and fan cover, the length of the motor is decrease. The correct motor cooling is in responsibility of customer. Missing or wrong cooling reduce the life time or damaged the motor.

选件 Options

电动机订货号 Motor order code	选件号 Option Code ¹⁾	描述 Description	应用范围 Application Scope
颜色和喷漆 Colors and Paint finish			
—	S01	不喷漆, 只带底漆 Unpainted, only primed	FS315-355
—	X84	RAL 9005 外观漆 Standard finish in RAL 9005	FS315-355
—	X86	RAL 5015 外观漆 Standard finish in RAL 5015	FS315-355
—	X80	RAL 7035 外观漆 Standard finish in RAL 7035	FS315-355
—	X90	RAL 9010 外观漆 Standard finish in RAL 9010	FS315-355
—	S80	RAL 7032 外观漆 Standard finish in RAL 7032	FS315-355
—	S81	RAL 9006 外观漆 Standard finish in RAL 9006	FS315-355
—	W88	适用于防腐蚀环境TH、W、F1、WF1和海洋气候环境 Design for TH, W, F1, WF1 and Sea air resistant	FS315-355
测试证书 Test certificates			
—	B02	出厂检验报告3.1, 按照EN10204标准 Acceptance test certificate 3.1 in accordance with EN 10204	FS315-355
环境温度 Coolant temperature			
—	D03	环境温度-40 °C ~ 40 °C Ambient temperature - 40 °C to 40 °C	FS315-355
—	N05	绝缘等级155 (F), 按照130 (B) 使用, 环境温度45°C时, 降低功率约4% Temperature class 155 (F), utilized acc. To 130 (B), collant temperature 45 °C, derating approx 4%	FS315-355
—	N06	绝缘等级155 (F), 按照130 (B) 使用, 环境温度50 °C时, 降低功率约8% Temperature class 155 (F), utilized acc. To 130 (B), collant temperature 50 °C, derating 8%	FS315-355

¹⁾ 订货时, 电动机订货号需带“-Z”, 然后再附带上选件号;

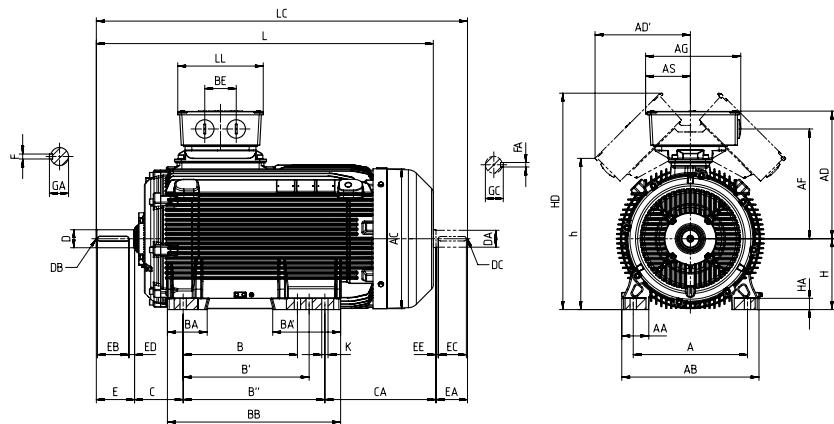
¹⁾ When ordering, need supplement "-Z" after order number. Add option code after that.

外形尺寸 Dimension drawings

SIMOTICS 1LE8系列电机

机座号315-355 Frame size 315-355

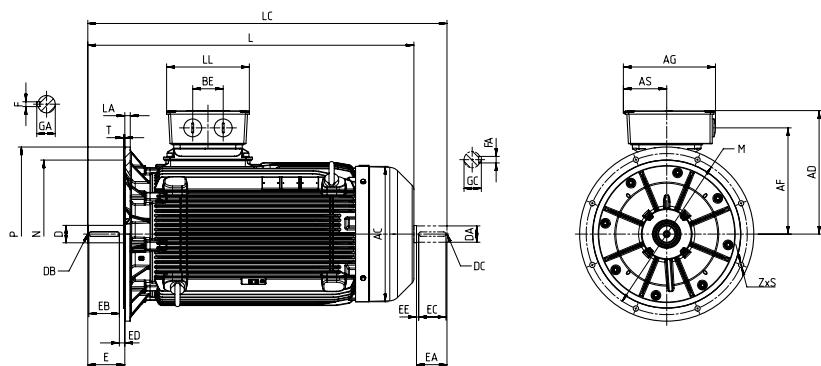
IM B3安装结构方式 Type of constructions IM B3



SIMOTICS 1LE8系列电机

机座号315-355 Frame size 315-355

IM B5安装结构方式 Type of constructions IM B5



机座号 Frame size	型号 Type	极数 Poles	尺寸及公差 Dimension and tolerance																CA
			A	AA	AB	AC	AD ¹⁾	AD' ¹⁾	AF	AG	AS	B	B'	B''	BA	BA'	BB	BE	
315	3AA	2P	508	120	610	622	570	430	488	423	199	508	560	630	177	302	770	140	216
	3AB, 3AC, 3AD	4~8P	508	120	610	622	570	430	488	423	199	508	560	630	177	302	770	140	216
355	3BA	2P	610	150	780	699	625	510	538	505	196	630	710	800	195	322	998	2x130 ²⁾	254
	3BA, 3BB, 3BC	4~8P	610	150	780	699	625	510	538	505	196	630	710	800	195	322	998	2x130 ²⁾	254

¹⁾该尺寸为整机外形尺寸，为圆整后的数值。

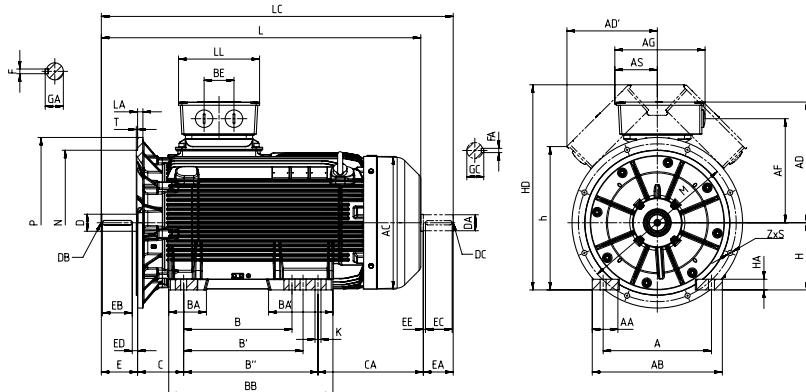
²⁾机座号355电机接线盒有三个进线孔，相邻两孔间距130mm。

外形尺寸 Dimension drawings

SIMOTICS 1LE8系列电机

机座号315-355 Frame size 315-355

IM B35安装结构方式 Type of constructions IM B35



机座号 Frame size	型号 Type	极数 Poles	尺寸及公差 Dimension and tolerance									
			D		DB	E		EB		ED	F	
			基本尺寸 Dimension	极限偏差 Tolerance		基本尺寸 Dimension	极限偏差 Tolerance	基本尺寸 Dimension	极限偏差 Tolerance		基本尺寸 Dimension	极限偏差 Tolerance
315	3AA	2P	Φ65	m6 +0.030 +0.011	M20x42	140	0 -0.4	125	+0.5 0	10	18 0	-0.043
	3AB, 3AC, 3AD	4~8P	Φ80	m6 +0.030 +0.011	M20x42	170	0 -0.4	140	+0.5 0	25	22 0	-0.052
355	3BA	2P	Φ75	m6 +0.030 +0.011	M20x42	140	0 -0.4	125	+0.5 0	10	20 0	-0.052
	3BA, 3BB, 3BC	4~8P	Φ95	m6 +0.035 +0.013	M24x50	170	0 -0.4	140	+0.5 0	25	25 0	-0.052

机座号 Frame size	型号 Type	极数 Poles	尺寸及公差 Dimension and tolerance									
			DA		DC	EA		EC		EE	FA	
			基本尺寸 Dimension	极限偏差 Tolerance		基本尺寸 Dimension	极限偏差 Tolerance	基本尺寸 Dimension	极限偏差 Tolerance		基本尺寸 Dimension	极限偏差 Tolerance
315	3AA	2P	Φ65	m6 +0.030 +0.011	M20x42	140	0 -0.4	125	+0.5 0	10	18 0	-0.043
	3AB, 3AC, 3AD	4~8P	Φ75	m6 +0.030 +0.011	M20x42	140	0 -0.4	125	+0.5 0	10	20 0	-0.052
355	3BA	2P	Φ65	m6 +0.030 +0.011	M20x42	140	0 -0.4	125	+0.5 0	10	18 0	-0.043
	3BA, 3BB, 3BC	4~8P	Φ80	m6 +0.030 +0.011	M20x42	170	0 -0.4	140	+0.5 0	25	22 0	-0.052

机座号 Frame size	型号 Type	极数 Poles	尺寸及公差 Dimension and tolerance										
			GC	H		HA	HD ¹⁾	h ¹⁾	K		L ¹⁾	LC	LL
				基本尺寸 Dimension	极限偏差 Tolerance				基本尺寸 Dimension	极限偏差 Tolerance			
315	3AA	2P	69	315	0 -1	50	965	675	Φ28	H14 +0.52	1475	1620	380
	3AB, 3AC, 3AD	4~8P	79.5	315	0 -1	50	965	675	Φ28	H14 +0.52	1505	1650	380
355	3BA	2P	69	355	0 -1	49	1045	700	Φ28	H14 +0.52	1600	1749	423
	3BA, 3BB, 3BC	4~8P	85	355	0 -1	35	1045	700	Φ28	H14 +0.52	1630	1809	423

¹⁾ 该尺寸为整机外形尺寸，为圆整后的数值。

²⁾ 机座号355电机接线盒有三个进线孔，相邻两孔间距130mm。

外形尺寸 Dimension drawings

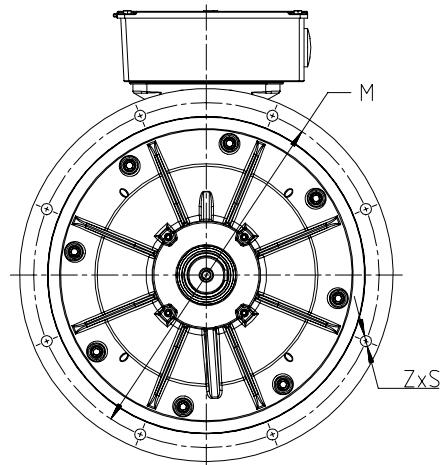
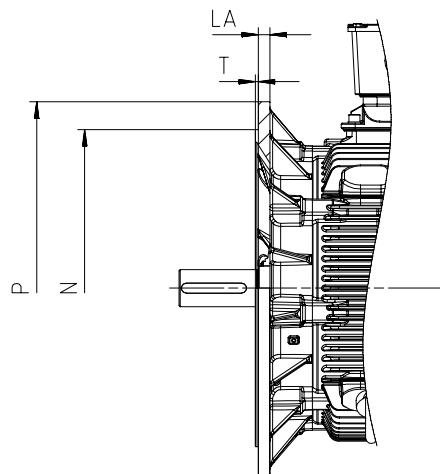
法兰尺寸 Flange dimension

IM V1、IM B35、IM V15、IM V35 安装结构型式

Type of construction IM V1、IM B35、IM V15、IM V35

IM V1、IM B35、IM V15、IM V35 安装结构型式

Type of construction IM V1、IM B35、IM V15、IM V35



机座号 Frame size	型号 Type	极数 Poles	法兰带通孔 Flange with holes FF/A	法兰尺寸及公差 Flange dimension and tolerance								
				DIN / EN 50347	P	N		LA	T		M	ZxS
						基本尺寸 Dimension	极限偏差 Tolerance		基本尺寸 Dimension	极限偏差 Tolerance		
315	3AA	2P	FF740	Φ800	Φ680	js6	+0.025 -0.025	25	6	h12 0 -0.12	Φ740	8xΦ24
315	3AB, 3AC, 3AD	4~8P	FF740	Φ800	Φ680	js6	+0.025 -0.025	25	6	h12 0 -0.12	Φ740	8xΦ24
355	3BA	2P	FF740	Φ800	Φ680	js6	+0.025 -0.025	25	6	h12 0 -0.12	Φ740	8xΦ24
355	3BA, 3BB, 3BC	4~8P	FF740	Φ800	Φ680	js6	+0.025 -0.025	25	6	h12 0 -0.12	Φ740	8xΦ24

认证 Certificates



北方区

北京
北京市朝阳区望京中环南路7号
电话: 400 616 2020

包头
内蒙古自治区包头市昆区钢铁大街74号
财富中心1905室
电话: (0472) 520 8828

济南
山东省济南市舜耕路28号
舜耕山庄商务会所5层
电话: (0531) 8266 6088

青岛
山东省青岛市香港中路76号
颐中假日酒店4楼
电话: (0532) 8573 5888

烟台
山东省烟台市南大街9号
金都大厦16层1606室
电话: (0535) 212 1880

淄博
山东省淄博市张店区中心路177号
淄博饭店7层
电话: (0533) 218 7877

潍坊
山东省潍坊市奎文区四平路31号
鸢飞大酒店2408房间
电话: (0536) 822 1866

济宁
山东省济宁市市中区太白东路55号
万达写字楼1306室
电话: (0537) 3316 6887

天津
天津市和平区南京路189号
津汇广场写字楼1401室
电话: (022) 8319 1666

唐山
河北省唐山市建设北路99号
火炬大厦1308室
电话: (0315) 317 9450/51

石家庄
河北省石家庄市中山东路303号
世贸广场酒店1309号
电话: (0311) 8669 5100

太原
山西省太原市府西街69号
国际贸易中心西塔16层1609B-1610室
电话: (0351) 868 9048

呼和浩特
内蒙古呼和浩特市乌兰察布西路
内蒙古饭店10层1022室
电话: (0471) 620 4133

东北区

沈阳
沈阳市沈河区青年大街1号市
府恒隆广场41层
电话: (024) 8251 8111

大连
辽宁省大连市高新区
七贤岭广贤路117号
电话: (0411) 8369 9760

长春
吉林省长春市亚泰大街3218号
通钢国际大厦22层
电话: (0431) 8898 1100

哈尔滨
黑龙江省哈尔滨市南岗区红军街15号
奥威斯发展大厦30层A座
电话: (0451) 5300 9933

华西区

成都
四川省成都市高新区拓新东街81号
天府软件园C6栋12楼
电话: (028) 6238 7888

重庆
重庆市渝中区邹容路68号
大都会商厦18层1807-1811
电话: (023) 6382 8919

贵阳
贵州省贵阳市南明区花果园后街
彭家湾E7栋(国际金融街1号)
14号楼01802室
电话: (0851) 8551 0310

昆明
云南昆明市北京路155号
红塔大厦1204室
电话: (0871) 6315 8080

西安
西安市高新区锦业一路11号
西安国家服务外包示范基地一区D座3层
电话: (029) 8831 9898

乌鲁木齐
新疆乌鲁木齐市五一路160号
新疆鸿福大酒店贵宾楼918室
电话: (0991) 582 1122

银川
银川市北京东路123号
太阳神大酒店A区1507房间
电话: (0951) 786 9866

兰州
甘肃省兰州市东岗西路589号
锦江阳光酒店2206室
电话: (0931) 888 5151

华东区

上海
上海杨浦区大连路500号
西门子上海中心
电话: 400 616 2020

杭州
浙江省杭州市西湖区杭大路15号
嘉华国际商务中心1505室
电话: (0571) 8765 2999

宁波
浙江省宁波市江东区沧海路1926号
上东国际2号楼2511室
电话: (0574) 8785 5377

绍兴
浙江省绍兴市解放北路
玛格丽特商业中心西区2幢
玛格丽特酒店10层1020室
电话: (0575) 8820 1306

温州
浙江省温州市车站大道577号
财富中心1506室
电话: (0577) 8606 7091

南京
江苏省南京市中山路228号
地铁大厦17层
电话: (025) 8456 0550

扬州
江苏省扬州市邗江区博物馆路547号
德馨大厦1508室
电话: (0514) 8789 4566

扬中
江苏省扬中市前进北路52号
扬中宾馆明珠楼318室
电话: (0511) 8832 7566

徐州
江苏省徐州市泉山区科技大道
科大佳源713室
电话: (0516) 8370 8388

苏州
江苏省苏州市新加坡工业园苏华路2号
国际大厦11层17-19单元
电话: (0512) 6288 8191

无锡
江苏省无锡市县前东街1号
金陵大酒店2401-2402室
电话: (0510) 8273 6868

南通
江苏省南通市崇川区桃园路8号
中南世纪城17栋1104室
电话: (0513) 8102 9880

福州
福建省福州市晋安区王庄街道长乐中路3号
福晟国际中心21层
电话: (0591) 8750 0888

厦门
福建省厦门市厦禾路189号
银行中心21层2111-2112室
电话: (0592) 268 5508

常州

江苏省常州市关河东路38号
九洲寰宇大厦911室
电话: (0519) 8989 5801

盐城
江苏省盐城市盐都区
华邦国际东厦A区2008室
电话: (0515) 8836 2680

昆山
江苏省昆山市前进东路389号
台协大厦1502室
电话: (0512) 55118321

华南区

广州
广东省广州市天河路208号
天河城侧粤海天河城大厦8-10层
电话: (020) 3718 2222

佛山
广东省佛山市南海区灯湖东路1号
友邦金融中心2座33楼J单元
电话: (0757) 8232 6710

珠海
广东省珠海市香洲区梅华西路166号
西藏大厦1303A室
电话: (0756) 335 6135

南宁
广西南宁市金湖路63号
金源现代城9层935室
电话: (0771) 552 0700

深圳
广东省深圳市南山区华侨城
汉唐大厦9楼
电话: (0755) 2693 5188

东莞
广东省东莞市南城区宏远路1号
宏远大厦1510室
电话: (0769) 2240 9881

汕头
广东省汕头市金砂路96号
金海湾大酒店19楼1920室
电话: (0754) 8848 1196

海口
海南省海口市滨海大道69号
宝华海景大酒店803房
电话: (0898) 6678 8038

福州
福州市晋安区王庄街道长乐中路3号
福晟国际中心21层
电话: (0591) 8750 0888

厦门
福建省厦门市厦禾路189号
银行中心21层2111-2112室
电话: (0592) 268 5508

华中区

武汉
湖北省武汉市武昌区中南路99号
武汉保利大厦21楼2102室
电话: (027) 8548 6688

合肥
安徽省合肥市濉溪路278号
财富广场首座27层2701-2702室
电话: (0551) 6568 1299

宜昌
湖北省宜昌市东山大道95号
清江大厦2011室
电话: (0717) 631 9033

长沙
湖南省长沙市天心区湘江中路二段36号
华远国际中心24楼2416室
电话: (0731) 8446 7770

南昌
江西省南昌市北京西路88号
江信国际大厦14楼1403/1405室
电话: (0791) 8630 4866

郑州
河南省郑州市中原区中原中路220号
裕达国贸中心写字楼2506房间
电话: (0371) 6771 9110

洛阳
河南省洛阳市涧西区西苑路6号
友谊宾馆516室
电话: (0379) 6468 3519

技术培训
北京: (010) 6476 8958
上海: (021) 6281 5933
广州: (020) 3718 2012
武汉: (027) 8773 6238/8773 6248-601
沈阳: (024) 8251 8220
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技术支持与服务热线
电话: 400 810 4288
(010) 6471 9990
E-mail: 4008104288.cn@siemens.com
Web: www.4008104288.com.cn
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