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SIMOTICS XP 1MB1/5
系列低压隔爆电机
SIMOTICS XP 1MB1/5
Low-Voltage Flameproof Motor

siemens.com.cn/SIMOTICS_XP_1MB

概览

在许多工业和公共部门，爆炸危险一直存在，例如在化学工业、炼油厂、钻井平台、加油站、饲料制造和污水处理厂。

当爆炸性的气体、烟雾、雾气或尘埃与空气中的氧气以一定的易爆炸比例混合时，如果有接近于能够释放所谓最小点火能量的着火源，会存在爆炸的风险。

特别是在化学工业和石化工业中，当原油和天然气在运输时，或在采矿、碾磨（例如：谷物和固体颗粒）时，爆炸会造成严重的人员受伤和设备损坏。

为了保证在这些地区的安全性，大多数国家的立法者都根据国家和国际的标准，以法律和法规的形式制定和实施了适当的规定。

防爆设备的设计可以使正确使用这些设备时避免爆炸。

防爆设备可以根据不同类型的保护来设计。

使用现场必须根据爆炸危险发生的频率，由用户在主管当局的协助下，将其细分为指定区域。不同区域有对应的设备或装置类别。然后针对这些区域分析所需的保护类型，从而选择相应的设备（产品）类型。

Overview

In many industrial and public industries, explosion hazards are ever-present, e.g. the chemicals industry, refineries, on drilling platforms, gas stations, feed manufacturing and sewage treatment plants.

The risk of explosion is always present when gases, fumes, mist or dust are mixed with oxygen in the air in an explosive ratio close to sources of ignition that are able to release the so-called minimum ignition energy.

In the chemical and petrochemical industries in particular, when crude oil and natural gas are being transported, or in mining, milling (e.g. grain and granular solids), explosion can result in serious injury to persons and damage to equipment.

To ensure safety in these areas, legislators in most countries have implemented appropriate stipulations in the form of laws and regulations based on national and international standards.

Explosion-protected equipment is designed such that an explosion can be prevented when it is used properly.

The explosion-protected equipment can be designed in accordance with various types of protection.

The local conditions must be subdivided into specified zones by the user with the assistance of the responsible authorities in accordance with the frequency of occurrence of an explosion hazard. Device (equipment) categories are assigned to these zones. The zones are then subdivided into possible types of protection and therefore into possible equipment (product) types.

区域的分类

有爆炸风险的场所被划分为不同的区域。划分区域的标准取决于危险物质存在的时间以及发生危险的概率。各个区域分类的信息和规则遵循以下标准：

- GB3836.14，IEC/EN 60079-10-1 适用于气体环境
- GB 12476.3，IEC/EN 60079-10-2 适用于粉尘环境

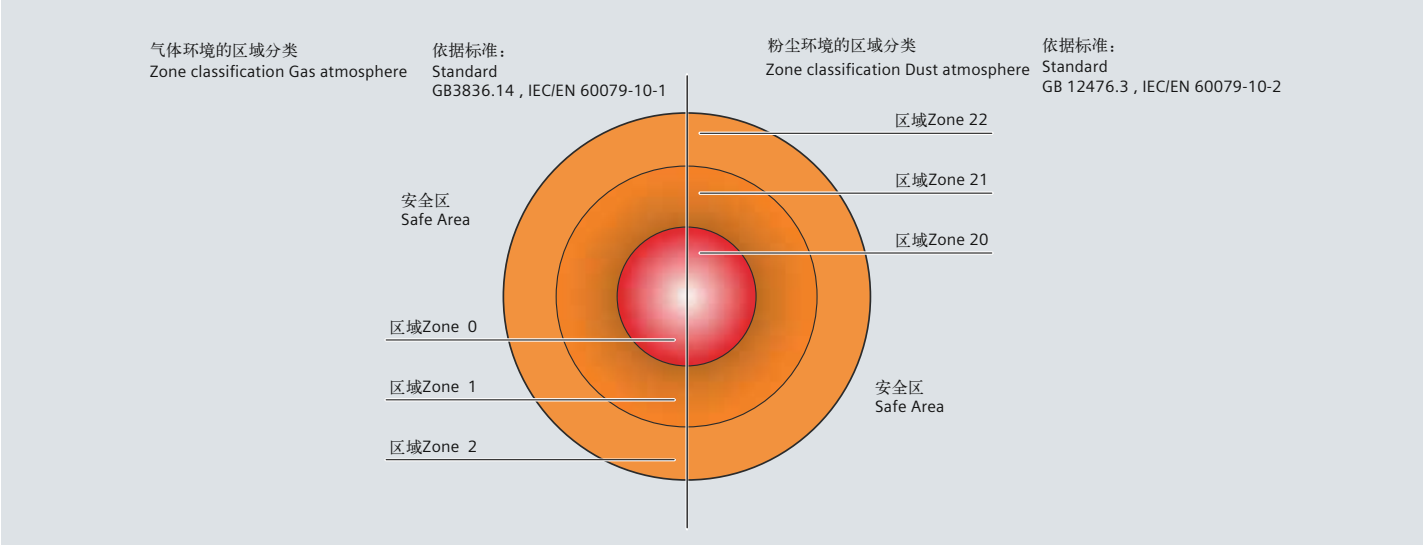
此外，在不同的爆炸分组和温度等级之间进行了分类，这些都包含在危险等级评估中。

Classification of zones

Areas subject to explosion hazard are divided into zones. Zoning is based on the presence time of explosive substances and probability of explosion. Information and specifications for classification of the zones are laid down in the following standards:

- GB3836.14, IEC/EN 60079-10-1 for gas atmospheres
- GB 12476.3, IEC/EN 60079-10-2 for dust atmospheres

Furthermore, a distinction is made between various explosion groups as well as temperature classes and these are included in the hazard assessment.



根据各区域的分类和存在的危险，所使用的设备必须满足最低防护要求。设备必须在符合要求的工况下使用，以避免点燃外部的爆炸性环境。

Depending on the particular zone and therefore the associated hazard, operating equipment must comply with defined minimum requirements regarding the type of protection. The different types of protection require corresponding measures to prevent ignition that should be implemented at the motor in order to prevent a surrounding explosive atmosphere from being ignited.

区域 Zone		区域定义的标准： Zone definition acc. to GB3836.14 & IEC/EN 60079-10-1 用于气体环境 for gas atmospheres GB 12476.3 & IEC/EN 60079-10-2 用于粉尘环境 for dust atmospheres	分配 保护类型 Assigned types of protection	分类根据 Category according to 2014/34/EU	设备保护等级根据 Equipment protection level acc. to GB3836.1 & IEC/EN 60079-0
气体 Gas [1) 2)]	粉尘 Dust [1) 2)]				
0	–	持续、长时间或频繁存在爆炸性气体环境的区域 An area in which there is an explosive gas atmosphere constantly, over a long period or frequently.	不允许低压电机 Low-voltage motors not permitted	1	Ga
1	–	在正常运行过程中，预计偶尔会出现爆炸性气体环境的 An area in which it is expected that an explosive gas atmosphere will occur occasionally during normal operation.	Ex e(GB) 或or Ex eb(IEC), Ex de, Ex d(GB) 或or Ex db(IEC)	2	Gb
2	–	在正常运行过程中，预计很少或只短暂出现爆炸性气体环境的区域 An area in which it is expected that an explosive gas atmosphere will occur only rarely and then only briefly during normal operation.	Ex nA(GB) 或 Ex ec(IEC)	3	Gc
–	20	持续、长时间或频繁存在由粉尘-空气混合物组成的爆炸性气体环境的区域 An area in which there is an explosive gas atmosphere comprising a dust-air mixture constantly, over a long period or frequently.	不允许低压电机 Low-voltage motors not permitted	1	Da
–	21	在正常运行的过程中，预计会偶尔存在由粉尘-空气混合物组成的爆炸性气体环境的区域 An area in which it is expected that an explosive gas atmosphere comprising a dust-air mixture will occur occasionally during normal operation.	Ex tb	2	Db
–	22	在正常运行的过程中，预计很少或只短暂在空气中形成一团易燃尘埃的爆炸性气体环境的区域 An area in which it is expected that an explosive gas atmosphere in the form of a cloud of flammable dust in air will occur only rarely and then only briefly during normal operation.	Ex tc [3)]	3	Dc

[1)] 电机用于
- 区域 1 也可以用于区域 2.
- 区域 21 也可以用于区域 22.

[2)] 若电机仅有气体防爆认证或粉尘防爆认证，不允许在混合环境中使用。混合环境：爆炸性的气体和粉尘同时在大气环境中存在。

[3)] Ex tc 电机不允许在含有导电粉尘的环境中运行。

[1)] Motors of
- Zone 1 can also be used in Zone 2.
- Zone 21 can also be used in Zone 22.

[2)] Motors which are certified for gas or dust protection must not be used in hybrid mixtures! Hybrid mixtures: when explosive gas and dust atmospheres occur simultaneously.

[3)] Ex tc motors are not approved for operation in environments containing conductive dust.

应用

以下情况常常需要选用防爆电机，以防止爆炸对人造成严重伤害和对财产造成严重损失。

- 化工和石化行业
- 矿物油和天然气生产
- 煤气产业
- 煤气供应公司
- 加油站
- 焦化厂
- 磨粉厂 (例如：玉米，固体)
- 污水处理厂
- 木材加工(例如：木屑，树脂)
- 其他易受爆炸危害的行业

Application

The explosion-proof motors are often used in the following industries to prevent explosion hazards that result in serious injury to persons and severe damage to property.

- Chemical and petrochemical industry
- Production of mineral oil and gas
- Gas works
- Gas supply companies
- Petrol stations
- Coking plants
- Mills (e.g. corn, solids)
- Sewage treatment plants
- Wood processing (e.g. sawdust, tree resin)
- Other industries subject to explosion hazards

气体和蒸汽的隔爆等级 Flameproof class of gases and vapors

使用场所 Location	标准代号 Code of standard GB3836.1 / GB3836.2 / IEC60079-0 / IEC60079-1 隔爆等级 Flameproof class
矿用 For Mines	d Ⅰ
除煤矿以外的爆炸性气体环境 Explosive gas environment except mines	d Ⅱ A
	d Ⅱ B
	d Ⅱ C

按爆炸性混合物的自然温度 (°C) 分组 Temperature classes

电子设备的温度等级 Temperature class of electrical equipment	电子设备的最大表面温度 IMaximum surface temperature of electrical equipment	气体或蒸汽的点燃温度 Ignition temperature of gases or vapors
T1	450°C	> 450°C
T2	300°C	> 300°C
T3	200°C	> 200°C
T4	135°C	> 135°C
T5	100°C	> 100°C
T6	85°C	> 85°C

根据爆炸组别和温度等级对气体和蒸汽分类
Classification of gases and vapors into explosion groups and temperature classes

爆炸性 气体分组 explosion group	按爆炸性混合物的自然温度 (°C) 分组 Temperature classes					
	T1（450）	T2（300）	T3（200）	T4（135）	T5（100）	T6（85）
	材料名称 Material designation	材料名称 Material designation	材料名称 Material designation	材料名称 Material designation	材料名称 Material designation	材料名称 Material designation
IIA (MESG≥0.9mm)	丙酮 Acetone	醋酸戊醚 i-amyl acetate	汽油 Benzine	乙醛 Acetaldehyde		
	乙烷 Ethane	正丁烷 n-butane	汽油 Gasoline			
	乙酸乙酯 Ethyl acetate	正丁醇 n-butyl alcohol	特殊汽油 Special benzine			
	氯乙烷 Ethyl chloride	环己酮 Cyclohexanone	柴油燃料 Diesel fuel			
	氨 Ammonia	二氯乙烷 1.2- dichloroethane	民用燃油 Heating oils			
	苯 Benzene	乙酸酐 / 醋酸酐 Acetic acid anhydride	n-正己烷 n-hexane			
	醋酸 Acetic acid					
	一氧化碳 Carbon monoxide					
	甲烷 Methane					
	甲醇 Methanol					
	氯甲烷 Methyl chloride					
	萘 Naphthalene					
	苯酚 Phenol					
	丙烷 Propane					
	甲苯 Toluene					
IIB (0.5mm<MESG<0.9mm)	城市煤气（照明气） Town gas (illuminating gas)	乙醇 Ethyl alcohol	硫化氢 Hydrogen sulfide	乙基醚 Ethyl ether		
		乙烯 Ethylene				
		环氧乙烷 Ethylene oxide				
IIC (MESG≤0.5mm)	氢 Hydrogen	乙炔 Acetylene				二硫化碳 Carbon disulfide

MESG，GB 3836.11和IEC 60079-20-1中规定的最大试验安全间隙，是指在规定的条件下，壳内所有浓度的被试验气体或蒸气与空气的混合物点燃后，通过25 mm长的接合面均不能点燃壳外爆炸性气体混合物的外壳空腔两部分之间的最大间隙。

MESG值越小，意味着设备的防爆等级越高，对设备的要求越严苛。当设备可以满足在IIC气体组别下运行时，同时也满足IIA和IIB的要求。

MESG, maximum experimental safe gap (for an explosive mixture). It's maximum gap of a joint of 25 mm in width which prevents any transmission of an explosion during 10 tests made under the conditions specified in GB 3836.11 and IEC 60079-20-1.

The smaller the MESG value, the higher the explosion-proof level of the equipment, and the more stringent requirements for the equipment. If the equipment can run under the IIC gas group, it also meets the requirements of IIA and IIB.

SIMOTICS XP 1MB1/5电机隔爆标识说明
Explossion proof motor Marking of Flameproof Motors

防爆标识：ATEX 防爆标识
Marking for prevention of explosions: ATEX anti-explosion marking

设备类别 Equipment grouping ：
II类 = 用于非矿下环境的电气设备
Group II = Electrical equipment intended for use in places except mines

环境分区： 2 = 1区 3 = 2区	Zone code: 2 = Zone 1 3 = Zone 2
爆炸性环境： G = 爆炸性气体环境	Explosion atmosphere: G = Explosive gas atmosphere
防爆标识： IECEx和CNEX防爆标识	Marking for prevention of explosions: IECEx and CNEX anti-explosion marking
防爆类型： d = 由隔爆外壳保护的设备	Protection type: d = Protection by flameproof enclosures

爆炸性气体类别
II类 = 除煤矿瓦斯气体之外的其它爆炸性气体类别
（根据爆炸性气体的不同，又分为IIA、IIB、和IIC三类）
Explosion group:
Group II = Explosive gas atmosphere other than mines susceptible to firedamp (subdivided to IIA, IIB, and IIC according to different explosive gas)

II类电气设备最高表面温度分组 Maximum allowable surface temperature for Group II electrical equipment:

T1 = 450°C	T3 = 200°C	T5 = 100°C
T2 = 300°C	T4 = 135°C	T6 = 85°C

设备保护级别：
G = 气体防爆
Ga = “很高”的保护级别
Gb = “高”的保护级别
Gc = “一般”的保护级别
“很高” - 指在正常运行、出现预期的故障、或罕见故障时不会成为点燃源；
“高” - 指在正常运行、或出现预期故障时不会成为点燃源；
“一般” - 指在正常运行时不会成为点燃源，但可采取一些措施保证在点燃源预期经常出现的情况下不会形成有效点燃。
Protection level:
G = Explosive gas atmosphere
Ga = "very high" level of protection
Gb = "high" level of protection
Gc = "enhanced" level of protection
"very high" - not a source of ignition in normal operation, during expected malfunctions or during rare malfunctions;
"high" - not a source of ignition in normal operation or during expected malfunctions;
"enhanced" - not a source of ignition in normal operation and which may have some additional protection to ensure that it remains inactive as an ignition source in the case of regular expected occurrences.

注：
[1] 此部分标识遵循CE及ATEX标准。
[2] IEC最新标准IEC60079-0. 2017中防爆类型标识为db

Notes：
[1] This part of the identification follow the CE and ATEX standards.
[2] Protection type is db in IEC60079-0. 2017.

产品概述 Product overview

额定功率：0.55 ~ 400 kW
机座号：80 ~ 355
电压与频率：220/380V 50Hz
380/660V 50Hz，其他常用电压可选

冷却方式：IC411
隔爆标志：Ex d IIC T4 Gb
防护等级：IP55，IP56、IP65可选
绝缘系统：F级
注油装置：机座号280 ~ 355的电机标配，机座号160 ~ 250可选配
环境温度：-20°C ~ +40°C标配设计，温度上限可选至+60°C

Rated output：0.55 ~ 400 kW
Frame size：80 ~ 355
Voltage and Frequency：220/380V 50Hz
380/660V 50Hz, Other common voltage can be provide as option design
Cooling method：IC411
Frame-proof marking：Ex d IIC T4 Gb
Protect degree：IP55,IP56(Option) and IP65(Option)
Insulation class：F
Re-greasing device：FS 280 ~ 355 motor as standard , FS 160 ~ 250 motor as option design
Ambient temperature：-20°C ~ +40°C as standard, max. ambient temperature can be designed to +60°C as option

SIMOTICS XP 1MB1/5系列高效隔爆型全封闭、自扇冷三相异步电动机是西门子针对于全球市场开发的一款全新产品。该系列防爆电机完全符合IEC60079-0:2017 / IEC60079-1:2017以及GB3836.1-2010 / GB3836.2-2010等设计标准，防爆等级为 Ex d IIC T4 Gb且防爆性能通过CQST认证。其效率达到IEC 60034-30 IE3高效等级要求，符合GB18613-2012能效等级二级。

该系列产品结合西门子传承百年的设计技术，其生产设备采用先进的数控机床设备，基于西门子先进的绝缘结构设计以及制造工艺，采用优质的冷轧硅钢片以及经过严格质量检测与控制的高品质零部件，具有性能优良，使用安全可靠，安装灵活，维护方便，振动小，噪音低等特点。

SIMOTICS XP 1MB1/5系列高效隔爆型电动机可广泛应用于石油、化工及油气等危险领域和场所。电机的设计使得电机内部的爆炸不会波及外界环境，内部由爆炸产生的能量在被称作“隔爆腔”的空间内消散，使得这些能量不足以点燃外部的爆炸性环境。

SIMOTICS XP 1MB1/5 series flameproof motors in Siemens newly designed three-phase asynchronous for global market. It is totally enclosed fan cooling (TEFC) high efficiency motor. This series flameproof motor completely meet the standard of IEC60079-0:2017/IEC60079-1:2017 and GB3836.1-2010/GB3836.2-2010. The type of protection for this motor is Ex d IIC T4 Gb. And its efficiency fulfill efficiency grade IE3 of IEC 60034-30, and also Grade 2 efficiency of GB18613-2012.

This motor inherits Siemens hundred years design technology, the production equipment of this series adopt advanced CNC machine tools, based on Siemens advanced insulation structure design and manufacturing process, use high quality cold-rolled silicon steel sheets and high quality parts with strict quality control. This series products have excellent performance, safe and reliable to use, simple and flexible installation, easy to maintain, low vibration, low noise.

SIMOTICS XP 1MB1/5 series high-efficiency flameproof motors can be widely used in petroleum, chemical industry, oil and gas and other hazardous areas and places.These motors are designed such that an explosion within the housing cannot result in an explosion in the environment. The energy that is generated internally by an explosion is dissipated in the so-called “flameproof enclosure” so far that the energy is no longer sufficient for ignition outside the casing.

设计参考标准 Reference Standard

名称 Title	中国国家标准 Chinese standard	IEC标准 IEC standard
《爆炸性环境 第1部分：设备 通用要求》 Explosive atmospheres - Part 0: Equipment - General requirements	GB 3836.1	IEC 60079-0
《爆炸性环境 第2部分：由隔爆外壳"d"保护的设备》 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"	GB 3836.2	IEC 60079-1
《0CD3系列（IP55）隔爆型（Ex d IIC T4）三相异步电动机技术条件（机座号80～355）》 0CD3 series (IP55) flameproof (Ex d IIC T4) three-phase asynchronous motors - Technical specification (frame size 80 ~ 355)	Q/321081 KJA013	
《包装储运图示标志》 Packaging - Distribution packaging - Graphical symbols for handling and storage of packages	GB/T 191	ISO 780
《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
《交流低压电机散嵌绕组匝间绝缘 第1部分：试验方法》 Interturn insulation of random-wound winding for AC low-voltage electrical machines- Part 1: Test methods	GB/T 22719.1	
《交流低压电机散嵌绕组匝间绝缘 第2部分：试验限值》 Interturn insulation of random-wound winding for AC low-voltage electrical machines- Part 2: Test limits	GB/T 22719.2	
《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

噪声

噪声值

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。测量面是距离电机1米的测量包络面。声功率级噪声用 L_{WA} 来表示，单位为 dB（A）。噪音值见选型数据表，选型数据表中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，噪音容差为 +3 dB。当在 60 Hz 电源下空载运行时，噪音容差大约为 +4 dB。

Noise levels

Noise levels for mains-fed operation

The noise levels are measured in accordance with DIN EN ISO 1680 in a anechoic 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). Please find the noise value in technical data table, the specified values 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

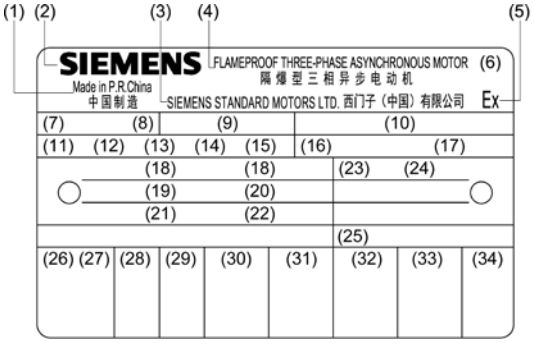
所有电动机转子都使用半键按照A级（标准）振动等级进行动态平衡。电动机在空载时测得振动速度有效值不超过下表中的 A 级所列值。电机还可选择B级振动等级设计。

Vibration

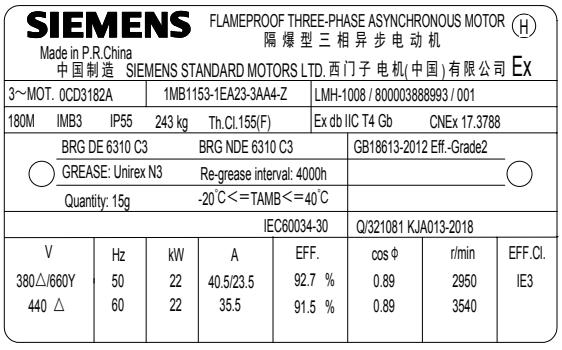
SIMOTICS XP 1MB1/5 rotors are dynamically balanced to severity grade A using a half key. Table below contains the effective vibration values for unloaded motors. Vibration grade B can be provided as option.

振动等级 Vibration grade	机座号 Frame size (mm)	56 ≤ FS ≤ 132	160 ≤ FS ≤ 280	280 < FS ≤ 355
A	安装方式 Mounting	Vibration velocity 振动速度（mm/s）	Vibration velocity 振动速度（mm/s）	Vibration velocity 振动速度（mm/s）
	自由悬置 Free suspension	1.6	2.2	2.8
	刚性安装 Rigid mounting	1.3	1.8	2.3
B	自由悬置 Free suspension	0.7	1.1	1.8
	刚性安装 Rigid mounting	–	0.9	1.5

铭牌信息 Nameplate



铭牌样例 Nameplate example



1	生产国家	Country of origin	
2	商标	Trademark (brand / company)	
3	生产厂	Manufacturer	
4	产品名称	Product name	
5	防爆标志	Mark of explosion protection	
6	键的类型	Key type	
7	电动机类别	Category of motor	
8	电动机型号	Motor type	
9	订货号	Order number	
10	生产序列号	Production series number	
11	机座号	Frame size	
12	安装结构型式	Mounting type	
13	IP防护等级	IP protection degree	
14	整机重量	Weight	
15	热等级	Thermal class	
16	防爆标识	Mark of explosion protection type	
17	防爆认证号	Ex certificate number	
18	轴承型号	Bearing type	
19	润滑脂型号	Bearing grease type	
20	再润滑周期	Re-grease interval	
21	加注油脂量	Re-grease quantity	
22	环境温度范围	Ambient temperature	
23	能效标准	Efficiency standard	
24	能效等级	China efficiency classification	
25	企业标准	Company standard	
26	额定电压	Rated voltage	
27	接线方式	Connection method	
28	额定频率	Rated frequency	
29	额定功率	Rated power	
30	额定电流	Rated current	
31	效率	Efficiency	
32	功率因数	Power factor	
33	额定转速	Rated speed	
34	能效等级	Efficiency classification according to IEC standard	

机械特性 Mechanical design

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 driven end-shield (DE)					
安装型式 Mounting type	IM B3 FS 80~355	IM B6 [3] FS 80~315	IM B7 [3)4)] FS80~315	IM B8 [6] FS80~250	IM V5 [1)3)5)] FS80~315	IM V6 [2)3)] FS 80~315
示意图 Diagram						
电机编号第14位号上对应的字母 Letter, position 14th 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 driven end-shield (DE)			机座带底脚，端盖有法兰 With feet and with flange on driven end-shield (DE)	
安装型式 Mounting type	IM B5 FS 80~315	IM V1 [1)] FS 80~355	IM V3 [2)] FS80~315	IM B35 FS80~355	IM V15 [1)3)5)] FS80~315
示意图 Diagram					
电机编号第14位号上对应的字母 Letter, position 14th of Motor code	F	G	H	J	W

结构型式 Construction type	机座不带底脚，端盖有标准小法兰 Without feet and with C-flange on driven end-shield (DE)			机座带底脚，端盖有标准小法兰 Without feet and with C-flange on driven end-shield (DE)
安装型式 Mounting type	IM B14 FS 80~160	IM V18 [1)] FS 80~160	IM V19 [2)] FS80~160	IM B34 FS 80~160
示意图 Diagram				
电机编号第14位号上对应的字母 Letter, position 14th of Motor code	K	M	L	N

[1)] 标配防雨罩，不能选用第二轴伸（选件号L05）。

[2)] 当户外使用时，建议采取防护措施，以避免水直接喷射到电机轴上。

[3)] 对于机座号315的电动机，订货前请咨询西门子。

[4)] 当接线盒位于机座顶部时，进线口默认朝向安装后会朝上，如需朝下，请选择选件代码R12。

[5)] 当接线盒位于机座左侧或右侧时，进线口默认朝向非驱动端，如需进线口朝其他方向，请选择选件代码R10，R11或R12。但须检查电机安装后是否有足够空间供电缆进线。

[6)] 不可同时选用再润滑装置（选件号L23）。

[1)] Protection cover provide as standard. The second shaft extension (option code L05) is not allowed.

[2)] When used outdoors, please take some protection measures to prevent water from spraying on the shaft.

[3)] For FS315, please consult with Siemens before ordering.

[4)] When terminal box is mounted on the top of the motor, the cable inlet will toward to top after installation, if need toward to down, please select option code R12.

[5)] When terminal box is mounted on the left or right side of the motor, the cable entry will be toward to non-driven end as default, if the cable entry is requested toward to other direction, separate option code (option code R10, R11 or R12) should be configured. Please ensure enough space of cable connection.

[6)] Re-greasing device (option code L23) can not be configured.

轴承系统

SIMOTICS XP 1MB1/5系列电动机标准配置深沟球轴承，这些轴承是密封的或可再润滑型的，轴承设计满足防爆要求。电动机标准设计驱动端轴承固定，非驱动端轴承浮动。

标准配置的轴承可以承受一定的悬臂力，关于悬臂力可以参见第14页“轴伸上所允许的载荷”部分。当电动机轴端承受的悬臂力较大时，可以考虑选择增强悬臂力的轴承设计（选件号：L22）。

FS80 ~ 250 范围电动机标配不带再润滑装置，但可选择配置再润滑装置（选件号：L23）。FS280 ~ 355 范围的电动机，并标配再润滑装置。

下表列出了标准配置下的轴承型号。

Bearing Assignment

SIMOTICS XP 1MB1/5 series motor are supplied with ball bearing as standard, these bearings are either sealed or regreasable type. Bearing design meets the requirements of explosion protection. Floating bearing at DE, and fixed bearing at NDE assembled as standard configuration.

The standard bearing can endure a maximum cantilever force, referred to page 14 - Permissible forces on shaft extension. If higher cantilever force on the shaft required, the increased cantilever bearing design (Option code: L22) should be considered.

As standard, FS80 ~ 250 motors are not with regreasing device, but re-greasing device (Option code: L23) can be configured. FS280 ~ 355 motors with regreasable bearing and regreasing device is configured as standard.

The following table lists the standard bearing configuration.

轴承选配

Bearing Assignment

机座号 Frame size	极数 Pole	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
80	2 ~ 6	6204-2Z C3	6204-2Z C3	6204-2Z C3	6204-2Z C3	-	-
90	2 ~ 6	6205-2Z C3	6205-2Z C3	6205-2Z C3	6205-2Z C3	-	-
100	2 ~ 6	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3	-	-
112	2 ~ 6	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3	-	-
132	2 ~ 8	6308-2Z C3	6308-2Z C3	6308-2Z C3	6308-2Z C3	-	-
160	2 ~ 8	6309 C3	6309 C3	6309 C3	6309 C3	NU309	6309 C3
180	2 ~ 8	6310 C3	6310 C3	6310 C3	6310 C3	NU310	6310 C3
200	2 ~ 8	6312 C3	6312 C3	6312 C3	6312 C3	NU312	6312 C3
225	2 ~ 8	6313 C3	6313 C3	6313 C3	6313 C3	NU313	6313 C3
250	2 ~ 8	6315 C3	6315 C3	6315 C3	6315 C3	NU315	6315 C3
280	2	6315 C3	6315 C3	6315 C3	6315 C3	NU315	6315 C3
	4 ~ 8	6317 C3	6317 C3	6317 C3	6317 C3	NU317	6317 C3
315	2	6316 C3	6316 C3	6319 C3	6319 C3	NU316	6316 C3
	4 ~ 8	6319 C3	6319 C3	6319 C3	6319 C3	NU319	6319 C3
355	2	6317 C4	6317 C4	6320 C4	6320 C4	NU317	6317 C4
	4 ~ 8	6320 C4	6320 C4	6320 C4	6320 C4	NU320	6320 C4

润滑脂寿命和再润滑周期

对于不可再润滑的轴承，其润滑脂寿命与轴承寿命相当。

Grease life and re-greasing interval

For permanent lubrication, the bearing grease lifetime is matched to the bearing lifetime.

润滑脂寿命和再润滑周期（电动机水平安装）

Grease lifetime and re-grease interval (Horizontal installation)

使用持久润滑型轴承时 Using permanent lubrication bearing		
机座号 Frame size	极数 Poles	润滑脂寿命 Grease lifetime up to CT 40°C [1]
80 ~ 250	2-8	20000 或 (or) 40000 [2]

[1] 标准的最高环境温度为40°C，对于持久润滑型轴承，环境温度每升高10°C，润滑脂寿命缩短一半。

[2] 40000小时适用于电动机水平安装，环境温度25°C下，且轴不受额外轴向力的工作情况。

[1] Maximum ambient temperature is 40°C under standard conditions. For permanent lubrication bearings, grease lifetime will be halved for each 10K ambient temperature rising.

[2] The 40000h grease lifetime is suited for horizontal mounting motors without additional axial force and ambient temperature not exceed 25°C.

使用可再润滑型轴承时 Using re-greasable bearing				
机座号 Frame size	极数 Poles	轴承 Bearing	润滑周期 Interval (小时 / h)	
			标准环境温度及N05/N06 Standard include e.g. N05/N06	更高的环境温度如N07/N08 Hot ambient e.g. N07/N08
160	2P	6309 C3 NU309	4000	2000
	4~8P		8000	4000
180	2P	6310 C3 NU310	4000	2000
	4~8P		8000	4000
200	2P	6312 C3 NU312	4000	2000
	4~8P		8000	4000
225	2P	6313 C3 NU313	4000	2000
	4~8P		8000	4000
250	2P	6315 C3 NU315	4000	2000
	4~8P		8000	4000
280	2P	6315 C3 NU315	4000	2000
	4P	6317 C3 NU317	6000	3000
	6~8P		8000	4000
315	2P	6316 C3 NU316	3000	1500
	4P	6319 C3 NU319	4000	2000
	6~8P		6000	3000
355	2P	6317 C3 NU317	3000	1500
	4P	6320 C4 NU320	4000	2000
	6~8P		6000	3000

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：

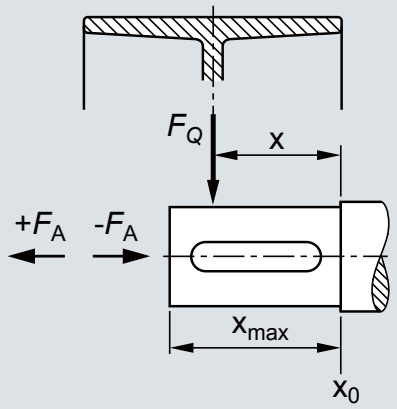
- 当电动机的运行速度高于额定速度时，由于电动机的振动增大，使得轴承受到额外的径向力和轴向力，导致其寿命减少；
- 当环境或设备等因素引起电动机振动加大时，同样轴承也会因此受到额外的径向力和轴向力，而导致其寿命减少；

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

- When 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;

轴伸上所允许的载荷

Admissible forces on shaft extension



F_Q = 悬臂力 Cantilever force (N)
FA = 轴向力 Axial force (N)
x = 载荷施加的位置与轴肩的距离 Distance between point of force and shoulder of shaft (mm)
l = 轴伸的长度 Length of shaft extension (mm)

以下表格中所列出的数值是指允许施加在轴伸上的载荷，并且是基于轴承寿命 L10h = 20000 小时 计算的。

施加的载荷不可超过所允许的值，从而确保在隔爆间隙内轴的挠度不会超出允许的范围。

表中数值适用于50Hz的使用条件。当在60Hz条件下使用时，须将表中的载荷数值减小6%，以达到同样的使用寿命。

The allowed loads on the drive-end shaft extensions are assigned in the following tables, and these values are based on a calculated bearing service life of L10h = 20000 h.

The specified cantilever forces must not be exceeded to ensure compliance with the maximum admissible shaft bending in the flameproof joint.

The values in these tables are applicable for 50 Hz application. When using at 60 Hz, the allowed loads must be reduced by 6% in order to achieve the same lifetime.

允许的径向载荷F_Q Admissible cantilever radial force F_Q

允许的数值：X_0的值用于 X = 0 的位置，$X_{0.5}$的值用于 X = 0.5l 的位置，X_{max}的值用于 X = l 的位置（l = 轴伸长度） Valid are: x_0 values for x = 0, $x_{0,5}$ for x = 0,5 - l, and x_{max} values for x = l (l = shaft extension)												
机座号 Frame size	x_0 转速 speed				$x_{0,5}$ 转速 speed				x_{max} 转速 speed			
	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]
080	0.57	0.70	0.80	0.81	0.53	0.57	0.58	0.56	0.42	0.43	0.43	0.42
090	0.52	0.66	0.85	0.94	0.48	0.66	0.69	0.70	0.44	0.49	0.51	0.52
100	1.34	1.62	1.69	1.55	1.11	1.11	1.12	1.03	0.83	0.82	0.83	0.76
112	1.30	1.63	1.80	1.82	1.15	1.30	1.19	1.20	0.86	0.97	0.88	0.89
132	1.98	2.46	2.81	3.05	1.79	1.83	1.88	2.00	1.42	1.29	1.33	1.42
160	2.77	3.43	3.70	4.30	2.51	2.85	3.29	2.57	1.95	1.94	2.23	1.75
180	3.07	3.78	4.38	4.86	2.80	3.44	3.99	4.43	2.57	2.88	2.94	3.70
200	3.96	5.01	5.63	6.19	3.64	4.61	5.17	5.69	3.36	4.26	4.39	5.25
225	4.50	5.59	6.26	7.23	4.17	5.09	5.69	6.58	3.89	4.66	5.22	4.77
250	5.43	6.72	7.65	8.72	4.93	6.10	6.95	7.92	4.51	5.58	6.36	6.25
280	4.69	7.43	8.94	8.86	4.33	6.85	8.24	8.17	4.00	6.33	7.07	6.79
315 S/M	5.48	8.30	9.28	9.21	5.21	7.36	6.91	5.70	4.79	5.53	4.78	4.12
315 L	4.05	5.35	6.83	8.60	3.80	4.92	5.80	5.35	3.58	4.03	4.21	3.88
355	3.90	3.93	请咨询西门子 Values on request		3.70	3.57	请咨询西门子 Values on request		3.52	2.61	请咨询西门子 Values on request	

当径向载荷为零时所允许的轴向载荷 Admissible axial force

机座号 Frame size	水平安装 Horizontal shaft				竖直安装 - 轴伸端朝上 Vertical shaft - Shaft extension at top 安装结构型式 Mounting types：IM V3, IM V6, IM V14, IM V19, IM V36							
	轴向力 +FA Axial force +FA				轴向力向上 Force acting upwards				轴向力向下 Force acting downwards			
	转速 speed				转速 speed				转速 speed			
	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]
080	0.32	0.50	0.64	0.73	0.35	0.54	0.69	0.78	0.83	1.00	1.13	1.22
090	0.33	0.52	0.69	0.79	0.38	0.59	0.76	0.86	0.86	1.05	1.21	1.31
100	0.89	1.25	1.62	1.92	1.00	1.38	1.74	2.02	1.66	2.01	2.40	2.70
112	0.88	1.30	1.62	1.88	0.98	1.43	1.76	2.03	1.68	2.07	2.38	2.62
132	1.31	1.88	2.34	2.72	1.48	2.10	2.58	2.97	2.41	2.93	3.37	3.74
160	2.01	2.81	3.32	3.90	2.31	3.17	3.82	4.32	2.81	3.56	3.93	4.59
180	2.24	3.08	3.78	4.37	2.62	3.58	4.31	5.01	2.98	3.70	4.37	4.85
200	2.76	3.89	4.70	5.43	3.38	4.54	5.46	6.30	3.85	4.94	5.65	6.26
225	3.12	4.35	5.24	6.24	3.95	5.43	6.46	7.28	4.24	5.23	5.97	7.15
250	3.79	5.29	6.43	7.58	4.82	6.61	7.84	8.83	5.14	6.35	7.40	8.71
280	3.67	5.84	7.30	7.27	5.21	7.98	9.21	9.18	4.51	6.51	8.19	8.16
315 S/M	4.13	7.00	7.73	8.74	7.26	10.35	11.85	13.06	4.70	7.65	8.29	9.50
315 L	4.03	6.07	7.34	8.29	8.45	10.93	13.04	14.12	4.77	6.09	6.88	7.74
355	4.98	7.67	请咨询西门子 Values on request		12.60	15.17	请咨询西门子 Values on request		5.16	6.21	请咨询西门子 Values on request	

当径向载荷为零时所允许的轴向载荷 Admissible axial force

机座号 Frame size	水平安装 Horizontal shaft				竖直安装 - 轴伸端朝下 Vertical shaft - Shaft extension at bottom 安装结构型式 Mounting types：IM V1, IM V5, IM V10, IM V15, IM V18							
	轴向力 -FA Axial force -FA				轴向力向上 Force acting upwards				轴向力向下 Force acting downwards			
	转速 speed				转速 speed				转速 speed			
	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]
080	0.86	1.04	1.18	1.27	0.89	1.08	1.23	1.32	0.29	0.46	0.59	0.68
090	0.92	1.12	1.28	1.38	0.98	1.18	1.35	1.45	0.27	0.45	0.61	0.72
100	1.78	2.14	2.51	2.80	1.89	2.27	2.63	2.91	0.77	1.12	1.51	1.81
112	1.77	2.19	2.51	2.77	1.86	2.32	2.64	2.92	0.79	1.18	1.49	1.73
132	2.58	3.15	3.61	3.99	2.75	3.37	3.85	4.24	1.14	1.66	2.10	2.47
160	3.12	3.92	4.43	5.01	3.42	4.27	4.92	5.43	1.71	2.46	2.82	3.48
180	3.36	4.20	4.90	5.49	3.74	4.70	5.43	6.13	1.86	2.58	3.25	3.73
200	4.46	5.59	6.40	7.13	5.08	6.25	7.16	8.01	2.14	3.24	3.94	4.56
225	5.07	6.30	7.19	8.19	5.90	7.38	8.41	9.23	2.29	3.28	4.02	5.20
250	6.17	7.67	8.81	9.96	7.20	8.99	10.22	11.21	2.76	3.97	5.02	6.33
280	6.05	8.64	10.10	10.07	7.59	10.78	12.01	11.98	2.13	3.71	5.39	5.36
315 S/M	6.73	10.18	10.91	11.92	9.86	13.53	15.03	16.24	2.10	4.47	5.11	6.32
315 L	6.63	9.25	10.52	11.47	11.05	14.11	16.22	17.30	2.17	2.91	3.70	4.56
355	7.78	11.15	请咨询西门子 Values on request		15.40	18.65	请咨询西门子 Values on request		2.36	2.73	请咨询西门子 Values on request	

在存在径向力[1)]的条件下允许的额外的轴向力 Additional axial force

机座号 Frame size	水平安装 Horizontal shaft				竖直安装 - 轴伸端朝上 Vertical shaft - Shaft extension at top 安装结构型式 Mounting types：IM V3, IM V6, IM V14, IM V19, IM V36							
	轴向力 +FA Axial force +FA				轴向力向上 Force acting upwards				轴向力向下 Force acting downwards			
	转速 speed				转速 speed				转速 speed			
	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]
080	0.05	0.15	0.22	0.27	0.08	0.19	0.27	0.32	0.55	0.65	0.72	0.76
090	0.08	0.16	0.24	0.30	0.14	0.23	0.32	0.36	0.61	0.68	0.76	0.82
100	0.26	0.48	0.74	1.16	0.37	0.60	0.86	1.27	1.03	1.24	1.51	1.94
112	0.26	0.51	0.67	0.90	0.35	0.63	0.81	1.05	1.05	1.27	1.43	1.64
132	0.38	0.69	0.93	1.13	0.55	0.91	1.17	1.38	1.48	1.74	1.96	2.15
160	0.78	1.21	1.52	1.79	1.08	1.57	2.02	2.21	1.58	1.96	2.13	2.48
180	0.90	1.35	1.70	2.02	1.28	1.85	2.23	2.66	1.64	1.97	2.29	2.50
200	1.04	1.63	2.06	2.43	1.66	2.28	2.82	3.30	2.13	2.68	3.01	3.26
225	1.19	1.86	2.35	2.77	2.02	2.94	3.57	3.81	2.31	2.74	3.08	3.68
250	1.43	2.25	2.84	3.35	2.46	3.57	4.25	4.60	2.78	3.31	3.81	4.48
280	1.65	2.55	3.22	3.22	3.19	4.69	5.13	5.13	2.49	3.22	4.11	4.11
315 S/M	1.73	3.02	3.49	3.55	5.56	6.38	7.34	7.34	3.00	3.68	3.78	3.78
315 L	1.73	2.77	3.49	3.98	6.68	8.52	9.94	10.16	3.00	3.68	3.78	3.78
355	2.73	4.29	请咨询西门子 Values on request		10.84	13.44	请咨询西门子 Values on request		3.40	4.48	请咨询西门子 Values on request	

[1)] 此处的径向力指第15页"允许的径向载荷FQ"表中数值

[1)] The radial force means data of "Admissible cantilever radial force FQ" in page 15.

在存在径向力[1] 的条件下允许的额外的轴向力 Additional axial force

机座号 Frame size	水平安装 Horizontal shaft				竖直安装 - 轴伸端朝下 Vertical shaft - Shaft extension at bottom 安装结构型式 Mounting types：IM V1, IM V5, IM V10, IM V15, IM V18							
	轴向力 -FA Axial force -FA				轴向力向上 Force acting upwards				轴向力向下 Force acting downwards			
	转速 speed				转速 speed				转速 speed			
	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]
080	0.59	0.69	0.76	0.81	0.62	0.73	0.81	0.86	0.01	0.11	0.18	0.22
090	0.67	0.75	0.84	0.89	0.73	0.82	0.91	0.96	0.02	0.09	0.17	0.23
100	1.15	1.36	1.63	2.05	1.26	1.49	1.74	2.16	0.14	0.35	0.63	1.06
112	1.14	1.40	1.56	1.79	1.24	1.52	1.69	1.94	0.16	0.38	0.54	0.75
132	1.65	1.96	2.20	2.40	1.82	2.18	2.44	2.65	0.21	0.47	0.69	0.88
160	1.89	2.32	2.63	2.90	2.19	2.67	3.12	3.32	0.48	0.86	1.02	1.37
180	2.02	2.47	2.82	3.14	2.40	2.97	3.35	3.78	0.52	0.85	1.17	1.38
200	2.74	3.33	3.76	4.13	3.36	3.99	4.52	5.01	0.42	0.98	1.30	1.56
225	3.14	3.81	4.30	4.72	3.97	4.89	5.52	5.76	0.36	0.79	1.13	1.73
250	3.81	4.63	5.22	5.73	4.84	5.95	6.63	6.98	0.40	0.93	1.43	2.10
280	4.03	5.35	6.02	6.02	5.57	7.49	7.93	7.93	0.11	0.42	1.31	1.31
315 S/M	4.33	6.20	6.67	6.73	8.16	9.56	10.52	10.52	0.40	0.50	0.60	0.60
315 L	4.33	5.95	6.67	7.16	9.28	11.70	13.12	13.34	0.40	0.50	0.60	0.60
355	5.53	7.77	请咨询西门子 Values on request		13.64	16.92	请咨询西门子 Values on request		0.60	1.00	请咨询西门子 Values on request	

[1] 此处的径向力指第15页"允许的径向载荷FQ"表中数值

[1] The radial force means data of "Admissible cantilever radial force FQ" in page 15.

当需要电机轴伸承受更大的径向载荷时，可以选择在驱动端使用滚子轴承（选件号L22）。此时非驱动端的轴承将固定。

施加的载荷不可超过所允许的值，从而确保在隔爆间隙内轴的挠度不会超出允许的范围。

表中数值适用于50Hz的使用条件。当在60Hz条件下使用时，须将表中的载荷数值减小6%，以达到同样的使用寿命。

If higher radial loads are needed, roller bearing at DE side (option code L22) can be selected. In this case, the NDE bearing will be located bearing.

The specified cantilever forces must not be exceeded to ensure compliance with the maximum admissible shaft bending in the flameproof joint.

The values in these tables are applicable for 50 Hz application. When using at 60 Hz, the allowed loads must be reduced by 6% in order to achieve the same lifetime.

当选用L22选项时，允许的径向载荷F_Q Admissible cantilever radial force F_Q when using option L22

允许的数值：X_0的值用于 X = 0 的位置，$X_{0.5}$的值用于 X = 0.5l 的位置，X_{max}的值用于 X = l 的位置（l = 轴伸长度） Valid are: x_0 values for x = 0, $x_{0,5}$ for x = 0,5 - l, and x_{max} values for x = l (l = shaft extension)												
机座号 Frame size	x_0 转速 speed				$x_{0,5}$ 转速 speed				x_{max} 转速 speed			
	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]
160	5.38	5.34	6.15	4.82	2.87	2.85	3.29	2.57	1.95	1.94	2.23	1.75
180	8.15	8.10	7.93	9.95	4.37	4.34	4.44	5.57	2.98	2.96	3.03	3.81
200	11.03	11.41	11.01	13.45	6.14	6.35	6.13	7.49	4.24	4.39	4.23	5.18
225	14.99	14.64	16.11	14.01	8.53	6.73	8.20	7.13	5.94	4.98	5.48	4.77
250	18.19	19.21	18.71	17.34	9.95	10.51	10.24	9.49	6.83	7.22	7.03	6.51
280	16.48	18.07	16.80	16.14	9.64	10.48	9.74	9.35	6.71	7.27	6.75	6.49
315 S/M	21.25	12.97	12.10	10.59	12.93	6.87	6.45	5.97	9.27	4.98	4.81	4.17
315 L	15.96	10.30	10.74	9.92	9.82	5.56	5.80	5.35	7.13	4.03	4.21	3.88
355	18.70	请咨询西门子 Values on request			11.40	请咨询西门子 Values on request			8.20	请咨询西门子 Values on request		

当选用L22选项时，在存在径向力[1)]的条件下允许的额外的轴向力 Additional axial force when using option L22

机座号 Frame size	水平安装 Horizontal shaft				竖直安装 Vertical shaft							
	轴向力 ±FA Axial force ±FA				轴向力向上 Force acting upwards				轴向力向下 Force acting downwards			
	转速 speed				转速 speed				转速 speed			
	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]	3000 rpm [KN]	1500 rpm [KN]	1000 rpm [KN]	750 rpm [KN]
160	2.09	2.81	3.23	3.84	2.39	3.17	3.73	4.26	1.79	2.46	2.73	3.42
180	2.40	3.26	3.88	4.41	2.78	3.76	4.41	5.05	2.02	2.76	3.35	3.77
200	3.53	4.72	5.60	6.33	4.15	5.37	6.36	7.20	2.91	4.07	4.84	5.46
225	3.40	4.66	5.47	7.15	4.23	5.74	6.69	8.19	2.57	3.59	4.25	6.11
250	4.50	6.09	7.29	8.51	5.53	7.41	8.70	9.76	3.47	4.77	5.88	7.26
280	3.98	6.43	7.77	8.83	5.52	8.57	9.68	10.74	2.44	4.30	5.86	6.92
315 S/M	3.77	7.19	8.61	9.71	6.35	10.13	11.98	13.08	1.19	4.25	5.24	6.34
315 L	4.11	7.16	8.40	9.35	7.25	11.17	13.07	14.13	0.97	3.15	3.73	4.57
355	5.39	请咨询西门子 Values on request			10.51	请咨询西门子 Values on request			0.27	请咨询西门子 Values on request		

[1)] 此处的径向力指上表"允许的径向载荷FQ（NU轴承）"表中数值

[1)] The radial force means data of "Admissible cantilever radial force FQ (reinforced bearing)" above.

接线盒

接线盒标准位置位于机座顶端，且自身可4x90°C旋转，从而使电缆可以从各个方向进入。当选择进线口朝向电机驱动端时，须留意电机安装环境前方是否留有足够空间供电缆走线。标准接线盒使用喇叭口型进线斗，机座号80~225的电机有一个进线斗，机座号250~355的电机有两个进线斗。

Connection box

The connection box is located on the top of motor housing as standard, and can be rotated by 4 × 90° to allow for cable entry from each direction. When selecting the entrance to the motor drive end, please notice whether there is enough space in front of the installation for the cable line. For the standard connection box with hoop gland, the motor of FS 80~225 has one hoop gland, and the motor of FS250~355 has two.

根据需求，SIMOTICS XP 1MB1/5系列隔爆电机还可提供格兰进线的接线盒（选件号：X98），另外还可以配置带有辅助接线盒的格兰进线接线盒（选件号：L97），这里辅助接线盒可以满足电机配置较多热保护时从而需要较多辅助接线端子的情况，这些端子可以通过这个辅助接线盒单独接线。

Besides standard connection box, another type of connection box with cable gland (option code: X98) can be configured for SIMOTICS XP 1MB1/5 series motors. And connection box with auxiliary terminal box (option code: L97) also can be configured, this type of connection box can be used for separate connection of more thermal protectors selected.

标准配置接线盒
Standard connection box

X98接线盒（可选）
Connection box of option code X98

L97接线盒（可选）
Connection box of option code L97

标准接线盒 Standard main terminal box

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	主接线端子允许的线缆尺寸范围（mm^2）[2] Main terminal's permissible cable cross section (mm^2)	主进线孔数量 No. of main cable entry	接线斗直径 Hoop gland dia. (mm)	进线电缆直径可选尺寸 Cable diameter can be selected (mm) min.~ max.	最大辅助端子数 [1] Max. auxiliary terminal	辅助电缆进线孔[3] Auxiliary cable entry
80	6	M4	6 ~ 35	1	42	13 ~ 14 19 ~ 20 24 ~ 25	6	1 x M20 x 1.5
90								
100		M4		1			8	
112								
132								
160		M5	6 ~ 70	1	58	13 ~ 14 19 ~ 20 25 ~ 26 30 ~ 31 34 ~ 35	12	
180								
200		M6	16 ~ 70	1	72	19 ~ 20 25 ~ 26 31 ~ 32 37 ~ 38 41 ~ 42	12	
225								
250		M10	16 ~120	2			12	
280								
315		M16	50 ~185	2	90		12	
355		M20	50 ~ 300					

注：

[1] 每个辅助接线端子所能适配的电缆接头不超过 2.5 mm^2。

[2] 请根据进线电缆直径可选尺寸选择电缆，并保证所选电缆允许的电缆直径处于此列数据范围内。

[3] 对于FS160-355，如需两个辅助电缆进线孔，请选择X98接线盒。

Notes:

[1] The adaptable diameter to each auxiliary terminal can not exceed 2.5mm^2.

[2] Please choose the cable entry diameter according to the cable diameter can be selected column. And ensure the allowed cable entry diameter is within the range in this column.

[3] For FS160-355, if two auxiliary cable entry is needed, please select X98 connection box.

选项 - 配备闷盖的接线盒（选项代码X98） Option - Main terminal box with plug (option code X98)

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	主接线端子允许的线缆尺寸范围（mm^2）[2] Main terminal's permissible cable cross section (mm^2)	主进线孔 Main cable entry	最大辅助端子数[1] Max. auxiliary terminal	辅助进线孔 Auxiliary cable entry
80	6	M4	6 ~ 35	1xM16x1.5+1xM25x1.5	6	1xM20x1.5
90						
100		M4		2xM32x1.5	8	
112						
132						
160		M5	6 ~ 70	2xM40x1.5	12	2xM20x1.5
180						
200		M6	16 ~ 70	2xM50x1.5	12	
225						
250		M10	16 ~ 120	2xM63x1.5	12	
280						
315		M16	50 ~ 185	2xM80x2	12	
355		M20	50 ~ 300			

选项 - 带辅助接线盒的接线盒（选项代码L97）

Option - Main terminal box together with auxiliary terminal box design (option code L97)

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	主接线端子允许的线缆尺寸范围（mm^2）[2] Main terminal's permissible cable cross section (mm^2)	主进线孔 Main cable entry	最大辅助端子数[1] Max. auxiliary terminal	辅助进线孔 Auxiliary cable entry
160	6	M5	6~70	2xM40x1.5	26	2xM20x1.5
180						
200		M6	16~70	2xM50x1.5		
225						
250		M10	16~120	2xM63x1.5	32	
280						
315		M16	50~185	2xM80x2		
355		M20	50~300			

注：

[1] 每个辅助接线端子所能适配的电缆接头不超过 2.5 mm^2。

[2] 请根据主进线孔尺寸选择格兰，并保证所选格兰允许的电缆直径处于此列数据范围内。

Notes:

[1] The adaptable diameter to each auxiliary terminal can not exceed 2.5mm^2.

[2] Please choose the cable gland according to the dimension in main cable entry column. And ensure the allowed cable entry diameter is within the range in this column.

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侧或右侧，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。

- 标配接线盒在顶部，电动机订货号的第 16 位数字为 4，进线口默认朝向机座右侧；
- 接线盒在右边，电动机订货号的第 16 位数字为 5，进线口默认朝向非驱动端；
- 接线盒在左边，电动机订货号的第 16 位数字为 6，进线口默认朝向非驱动端。

接线盒的位置是指从电动机驱动端来看的位置。

Location of the connection box

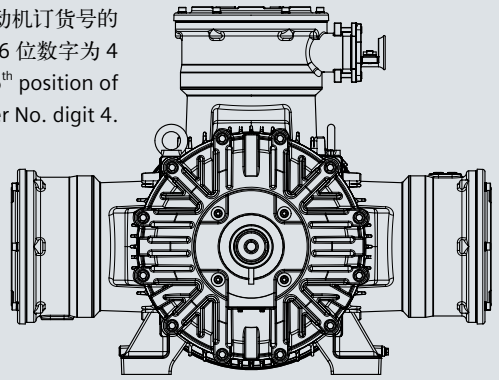
Besides standard position, the connection box also can be on the right or left of motor housing. The position of terminal box is indicated on the 16th digit of motor order code.

- On top (Standard), 16th digit of Motor Order No. digit 4, the cable inlet will toward the right of frame as default.
- On RHS, 16th digit of Motor Order No. digit 5, the cable inlet will toward non-drive side as default.
- On LHS, 16th digit of Motor Order No. digit 6, the cable inlet will toward non-drive side as default.

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

当接线盒位于机座左侧或右侧时，进线口默认朝向非驱动端，如需进线口朝其他方向，请选择选件代码R10，R11或R12。但须检查电机安装后是否有足够空间供电缆进线。

When terminal box is mounted on the left or right side of the motor, the cable entry will be toward to non-driven end as default, if the cable entry is requested toward to other direction, separate option code (option code R10, R11 or R12) should be configured. Please ensure enough space of cable connection.



接线盒的进线孔

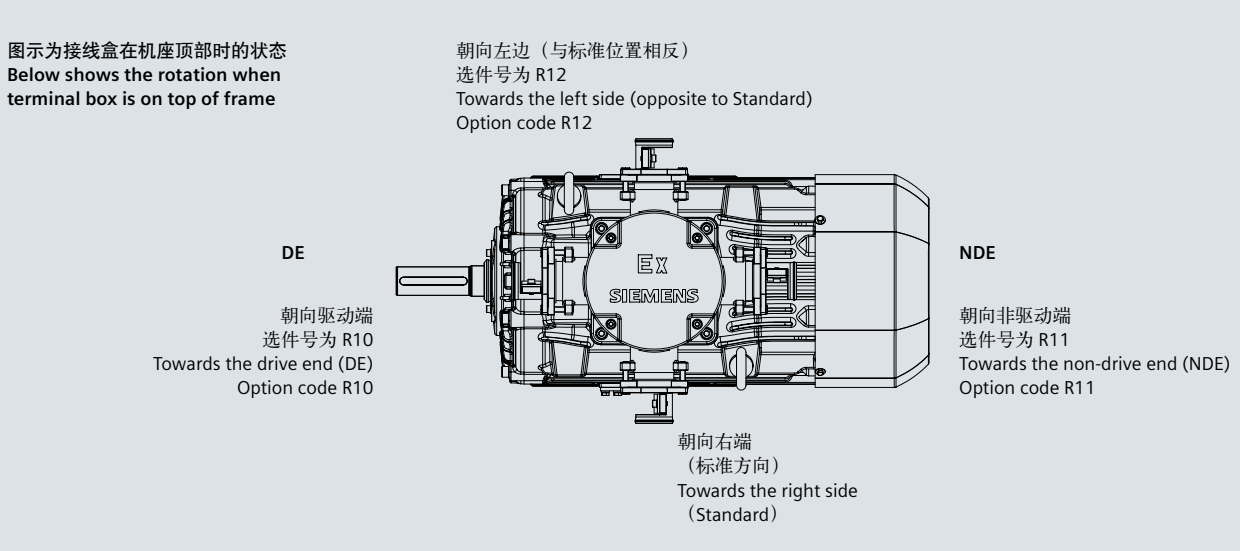
除非另作规定，否则对于接线盒在机座顶部的电机，进线孔默认朝向右侧（从电机驱动端看）。可通过选项来旋转接线盒，改变进线孔方向。旋转的方向为从接线盒正上方俯视时的方向。

- 接线盒顺时针旋转 90°，选件号为 R10。
- 接线盒逆时针旋转 90°，选件号为 R11。
- 接线盒旋转 180°，选件号为 R12。

Cable entry on connection box

Unless stated, otherwise for the motor with the connection box at the top, the cable entry is at right side (viewed from motor driven side) by default. Terminal box can be rotated by using options to change the direction of cable entry. The rotation direction defines by viewing from the top of terminal box. .

- Rotating the connection box by clockwise 90°, Option code R10.
- Rotating the connection box by counter-clockwise 90° , Option code R11.
- Rotating connection box by 180°，Option code R12.



如果接线盒的位置改变时（如右侧或左侧），必须检查进线孔的位置是否方便进线。必须检查电机安装后是否有足够空间供电缆进线。具体尺寸参考36页外形尺寸。必要时，可以同时订购其它选件（R10，R11 和 R12）。

If the position of the connection box (connection box RHS or LHS) is changed, the position of the cable entry must be checked. It is necessary to check whether there is enough space for cable entry. The specific dimensions refer to outline dimensions in page 36. If necessary, it can be ordered with the corresponding order codes (R10, R11 and R12).

电气特性

额定输出

SIMOTICS XP 1MB1/5 电动机的额定功率是指电动机在连续运行的情况下 S1（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。

Electrical design

Rated Output

SIMOTICS XP 1MB1/5 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
  $P_{rated} \leq 150$ kW: - 0.15 x (1 – η)
  $P_{rated} > 150$ kW: - 0.10 x (1 – η)
  效率 η 为小于 1 的值
- 功率因数：(1 – cos φ) / 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 %

过载倍数

根据 IEC60034 标准要求，SIMOTICS XP 1MB1/5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。

Tolerance for electrical data

- Efficiency η at
  $P_{rated} \leq 150$ kW: - 0.15 x (1 – η)
  $P_{rated} > 150$ kW: - 0.10 x (1 – η)
  With η being a decimal number
- Power factor - (1 – cos φ) / 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 %

Overload times

According to IEC60034, SIMOTICS XP 1MB1/5 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 XP 1MB1/5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 XP 1MB1/5系列电动机标准设计温度等级为 155（F）。当 SIMOTICS XP 1MB1/5电动机电网直接供电，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 XP 1MB1/5 results in high reliability, a long service life and high resistance to stress, for example, during starting or under overload conditions.

SIMOTICS XP 1MB1/5 series motors are designed for temperature class 155 (F). At rated output with line-fed operation, the motors are 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.

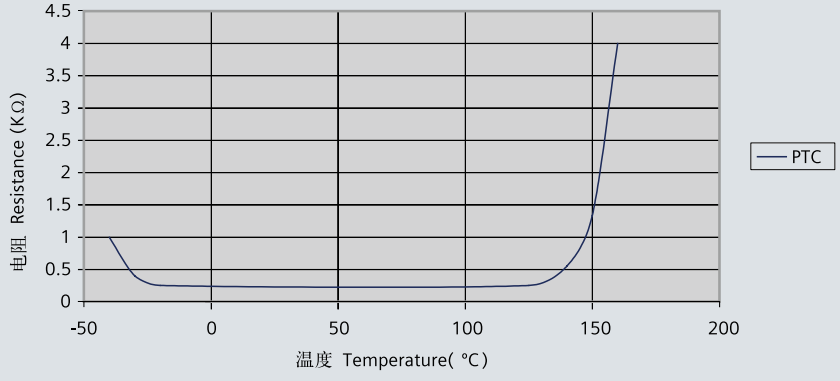
Winding protection

■ **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 lowheating 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.

PTC 曲线图
The graph of PTC



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。

■ PT100 热敏电阻传感器温度保护

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热敏电阻保护选项：

- 绕组中带三个单支二线制PT100测温元件，电机的铭牌编号15位数为H，选项代码为Q60（适用于FS100～355），需6个辅助接线端子。
- 绕组中带六个单支二线制PT100测温元件，电机的铭牌编号15位数为J，选项代码为Q61（适用于FS180～355），需12个辅助接线端子。
- 绕组中带三个单支三线制PT100测温元件，电机的铭牌编号15位数为Q，选项代码为Q63（适用于FS160～355），需9个辅助接线端子。
- 绕组中带六个单支三线制PT100测温元件，电机的铭牌编号15位数为R，选项代码为Q64（适用于FS180～355），需18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.

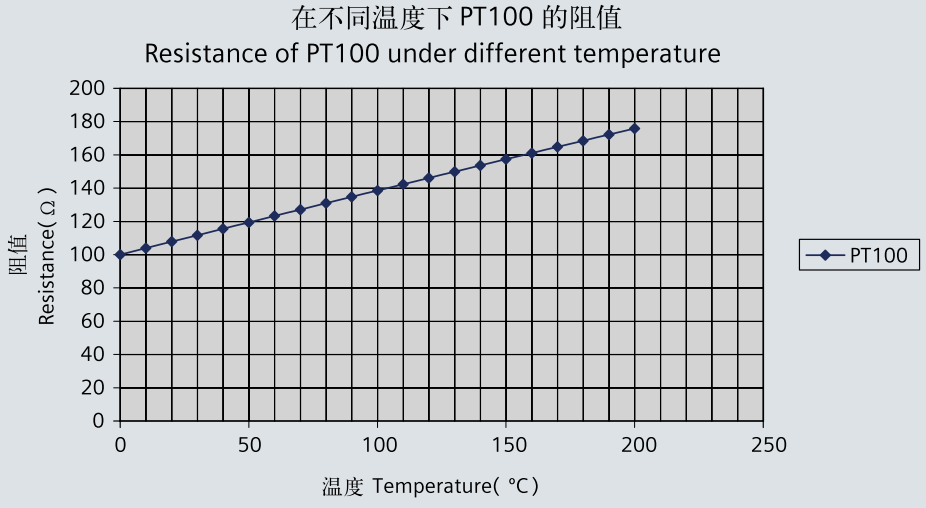
- Motor winding is protected with two sets of three temperature sensors, one set is for warning, another set for tripping. The warning temperature is 145 °C, and tripping temperature is 155 °C. Connection be done through 4 auxiliary terminals in the connection box. 15th position of Motor Order No. letter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

■ 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 single 2 wires PT100 resistance thermometers. Connection be done through 6 auxiliary terminals in the connection box. 15th position of Motor Order No. letter H. Option code is Q60(FS100~355).
- Installation of 6 single 2 wires PT100 resistance thermometers. Connection be done through 12 auxiliary terminals in the connection box. 15th position of Motor Order No. letter J.Option code is Q61(FS180~355).
- Installation of 3 single 3 wires PT100 resistance thermometers. Connection be done through 9 auxiliary terminals in the connection box. 15th position of Motor Order No. letter Q. Option code is Q63(FS160~355).
- Installation of 6 single 3 wires PT100 resistance thermometers. Connection be done through 18 auxiliary terminals in the connection box. 15th position of Motor Order No. letter R.Option code is Q64(FS180~355).



■ PT1000热敏电阻传感器温度保护

PT1000热敏电阻可对电机绕组温度进行更精确地监测，有两种选项方案可供选择：

- 绕组中带一个单支两线制PT1000测温元件，电机的铭牌编号15位数为K，选项代码为Q35（适用于FS80～355），需2个辅助接线端子。
- 绕组中带两个单支两线制PT1000测温元件，电机的铭牌编号15位数为L，选项代码为Q36（适用于FS80～355），需4个辅助接线端子。

轴承保护

SIMOTICS XP 1MB1/5电动机轴承标配不带轴承测温装置。对于某些苛刻的应用，推荐对轴承采取高温保护措施。轴承温度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、监控温度来进行保护。温度传感器的引接线引入电动机主接线盒内。

- 前后端轴承各装一个单支双线制PT100测温元件，选项代码为Q72，共需使用4个辅助接线端子。
- 前后端轴承各装一个单支三线制PT100测温元件，选项代码为Q78，共需使用6个辅助接线端子。
- 前后端轴承各装一个双支三线制PT100测温元件，选项代码为Q79，共需使用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，建议对电动机绕组配置防潮加热带进行保护。

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。根据所需电压的不同，两种防潮加带的选项可供选择：

- 绕组中安装220V防潮加热带，电机的选项代码为Q04
- 绕组中安装230V防潮加热带，电机的选项代码为Q02。

这两种选项均需使用两个辅助接线端子。防潮加热带的电气参数如下表所示。

防潮加热带电气参数

机座号 Frame size	功率和电压 Power (W) & voltage (V)	
	Q04	Q02
80 ~ 90	20 W / 220 V	20 W / 230 V
100 ~ 112	30 W / 220 V	30 W / 230 V
132 ~ 160	40 W / 220 V	40 W / 230 V
180 ~ 200	50 W / 220 V	50 W / 230 V
225 ~ 280	60 W / 220 V	60 W / 230 V
315	80 W / 220 V	80 W / 230 V
355	100 W / 220 V	110 W / 230 V

■ PT1000 resistance thermometers protection

The PT1000 thermistor can monitor the temperature of the motor winding more accurately. 2 alternatives of PT1000

- Installation of 1 single 2 wires PT1000 resistance thermometers. Connection be done through 2 auxiliary terminals in the connection box. 15th position of Motor Order No. letter K. Option code is Q35(FS80~355).
- Installation of 2 single 2 wires PT1000 resistance thermometers. Connection be done through 4 auxiliary terminals in the connection box. 15th position of Motor Order No. letter L. Option code is Q36(FS80~355).

Bearing protection

SIMOTICS XP 1MB1/5 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.

- Equipped with one single 2-wires PT100 thermometer in each side bearings, and the option code is Q72, which totally requires 4 auxiliary terminals for both sides.
- Equipped with one single 3-wires PT100 thermometer in each side bearings, and the option code is Q78, which totally requires 6 auxiliary terminals for both sides.
- Equipped with one double 3-wires PT100 thermometer in each side bearings, and the option code is Q79, which totally requires 12 auxiliary terminals for both sides.

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.

Anti-condensation heaters must be switched off during operation. When motor shut down, the heaters must be switched on. 2 alternatives of anti-condensation heaters:

- Installed in the windings,220V. The motor's option code is Q04.
- Installed in the windings,230V. The motor's option code is Q02.

These two options are required to use two auxiliary terminals. The electrical parameters of anti-condensation heaters are shown in the following table.

Electrical data of Anti-condensation heater

Frame size	Q04	Q02
80 ~ 90	20 W / 220 V	20 W / 230 V
100 ~ 112	30 W / 220 V	30 W / 230 V
132 ~ 160	40 W / 220 V	40 W / 230 V
180 ~ 200	50 W / 220 V	50 W / 230 V
225 ~ 280	60 W / 220 V	60 W / 230 V
315	80 W / 220 V	80 W / 230 V
355	100 W / 220 V	110 W / 230 V