

INNOMOTICS



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Innomotics Moves!

Low Voltage Motors XP Dust Explosion-proof
1MB8014 系列低压粉尘防爆电机

INNOMOTICS



2023年7月1日，茵梦达（Innomotics）作为独立运营的实体在德国成立。茵梦达（Innomotics）隶属于西门子集团，由西门子股份公司（Siemens AG）100% 控股。

茵梦达将覆盖此前西门子大型传动应用事业部、西门子数字化工业集团低压电机事业部，以及西门子法律上独立运营的 Sykatec 公司和 Weiss 主轴公司的相关业务。茵梦达在全球拥有约 15,000 名员工，作为电机和大型传动领域的开拓者，其致力于挖掘增长潜力，以确保公司在未来市场上取得成功。

电机和大型传动系统是茵梦达的核心业务和专业领域。

茵梦达在中国的运营公司包括：

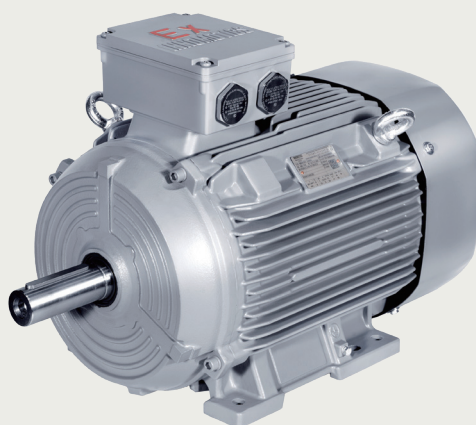
- 西门子电机（中国）有限公司
- 西门子（上海）电气传动设备有限公司
- 西门子（天津）传动设备有限责任公司
- 西门子（数控）南京有限公司天津分公司



西门子电机（中国）有限公司于 2006 年 3 月 1 日正式运营，自 2009 年由西门子（中国）有限公司 100% 控股。

西门子电机（中国）有限公司致力于研发和生产符合 IEC 标准的茵梦达品牌、西门子品牌的三相异步电动机，以及按中国标准设计的贝得品牌系列三相异步电动机。电机产品供应国内、国际市场。

公司拥有员工约 2000 余人，占地面积 13.4 万平方米，年产电机约 100 万台，为茵梦达在华最大的低压、高效电机研发和生产基地。



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概览 Overview

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、粮食加工、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。

In many industrial and public industries, explosion hazards are ever-present, e.g. the chemicals industry, refineries, on drilling platforms, gas stations, food processing, 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：

- GB 3836.14, IEC/EN 60079-10-1 适用于气体环境
- GB/T 3836.35, IEC/EN 60079-10-2 适用于粉尘环境

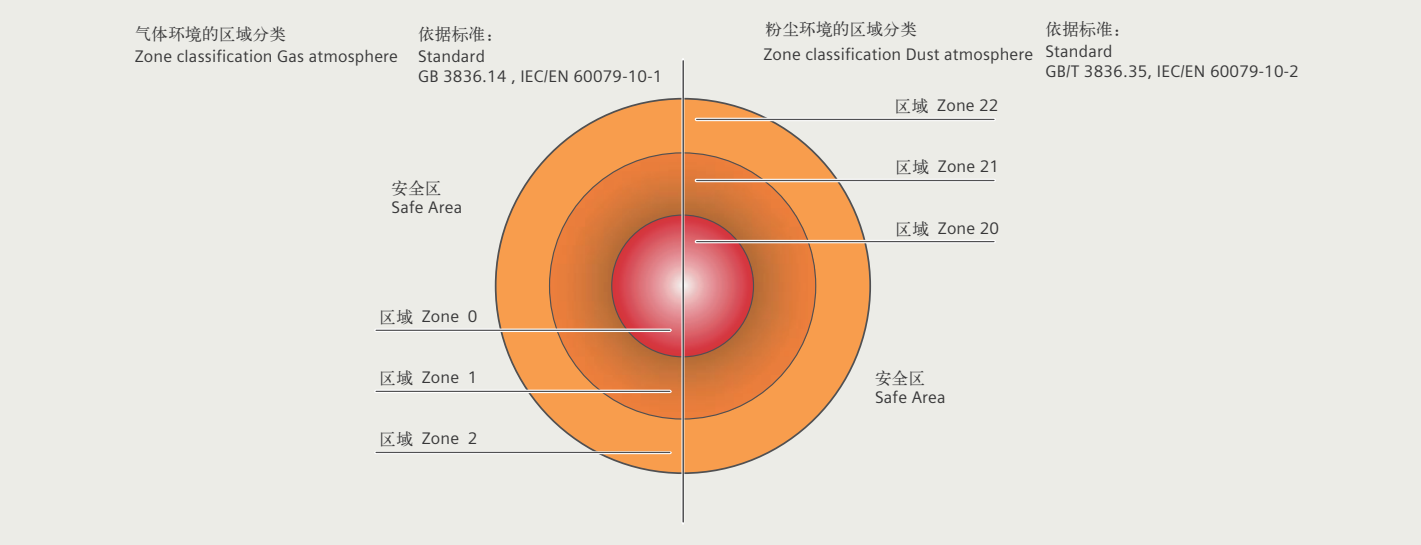
此外，在不同的爆炸分組和温度等级之间进行了分类，这些都包含在危险等级评估中。

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:

- GB 3836.14, IEC/EN 60079-10-1 for gas atmospheres
- GB/T 3836.35, 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 GB 3836.14 & IEC/EN 60079-10-1 用于气体环境 for gas atmospheres GB/T 3836.35 & 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 GB/T 3836.1 & 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.	不允许低压电机使用 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区域 An area in which it is expected that an explosive gas atmosphere will occur occasionally during normal operation.	Ex eb, Ex db eb, Ex db	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 ec	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.	不允许低压电机使用 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

常见可燃性粉尘特性

Characteristics of common flammable dust

粉尘种类 Type of dust	粉尘名称 Type of dust	高温表面堆积粉尘层 (5mm) 的引燃温度 (°C) Ignition temperature of dust layer (5mm) at high temperature surface (5mm) (°C)	粉尘云的引燃温度 (°C) Ignition temperature of dust cloud (°C)	爆炸下限 浓度 (g/m³) Lowest concentration of explosion (g/m³)	粉尘平均 粒径 (μ m) Average particle size of dust (μ m)	危险 性质 Dangerous nature	粉尘 等级 Dust grade
金属 Metal	铝 (表面处理) Aluminum (surface treatment)	320	590	37~50	10~15	导 CONDUCTIVE	III C
	铝 (含脂) Aluminum (containing fat)	230	400	37~50	10~20	导 CONDUCTIVE	III C
	铁 Iron	240	430	153~204	100~150	导 CONDUCTIVE	III C
	镁 magnesium	340	470	44~59	5~10	导 CONDUCTIVE	III C
	红磷 Phosphorus	305	360	48~64	30~50	非 NON-CONDUCTIVE	III B
	炭黑 Carbon	535	〉 600	36~45	10~20	导 CONDUCTIVE	III C
	钛 Titanium	290	375	-	-		III C
	锌 Zinc	430	530	212~284	10~15	导 CONDUCTIVE	III C
	电石 Calcium carbide	325	555	-	〈200	非 NON-CONDUCTIVE	III B
	钙硅铝合金 (8% 钙, 30% 硅, 55% 铝) Calcium silicon aluminum alloy (8% calcium, 30% silicon, 55% aluminum)	290	465	-	-	导 CONDUCTIVE	III C
	硅铁合金 (45% 硅) Ferrosilicon alloy (45% silicon)	〉 450	640	-	-	导 CONDUCTIVE	III C
	黄铁矿 Pyrite	445	555	-	〈90	导 CONDUCTIVE	III C
化学 药品 Chemical medicine	锆石 Zircon	305	360	92~123	5~10	导 CONDUCTIVE	III C
	硬脂酸锌 Zinc stearate	熔融 Melting	315	-	8~15	非 NON-CONDUCTIVE	III B
	萘 Naphthalene	熔融 Melting	575	28~38	30~100	非 NON-CONDUCTIVE	III B
	蒽 Anthracene	熔融升华 Melting sublimation	505	29~39	40~50	非 NON-CONDUCTIVE	III B
	己二酸 Adipic acid	熔融 Melting	580	65~90	-	非 NON-CONDUCTIVE	III B
	苯二 (甲) 酸 Benzene 2 (a) acid	熔融 Melting	650	61~83	80~100	非 NON-CONDUCTIVE	III B
	无水苯二 (甲) 酸 (粗制品) Anhydrous benzene 2 (a) acid (crude)	熔融 Melting	605	52~71	-	非 NON-CONDUCTIVE	III B
	苯二甲酸腈 Benzoate	熔融 Melting	〉 700	37~50	-	非 NON-CONDUCTIVE	III B
	无水马来酸 (粗制品) Anhydrous maleic acid (crude))	熔融 Melting	500	82~113	-	非 NON-CONDUCTIVE	III B
	醋酸钠酯 Sodium acetate	熔融 Melting	520	51~70	5~8	非 NON-CONDUCTIVE	III B
	结晶紫 Crystal violet	熔融 Melting	475	46~70	15~30	非 NON-CONDUCTIVE	III B
	四硝基咔唑 Four nitro carbazole	熔融 Melting	395	92~123	-	非 NON-CONDUCTIVE	III B
	二硝基甲酚 Two nitrocresol	熔融 Melting	340	-	40~60	非 NON-CONDUCTIVE	III B
	阿司匹林 Aspirin	熔融 Melting	405	31~41	60	非 NON-CONDUCTIVE	III B
	肥皂粉 Soap powder	熔融 Melting	575	-	80~100	非 NON-CONDUCTIVE	III B
	青色燃料 Green fuel	350	465	-	300~500	非 NON-CONDUCTIVE	III B
合成 树脂 Synthetic resin	萘酚燃料 Naphthol fuel	395	415	133~184	-	非 NON-CONDUCTIVE	III B
	聚乙烯 Polyethylene	熔融 Melting	410	26~35	30~50	非 NON-CONDUCTIVE	III B
	聚丙烯 Polypropylene	熔融 Melting	430	25~35	-	非 NON-CONDUCTIVE	III B
	聚苯乙烯 Polystyrene	熔融 Melting	475	27~37	40~60	非 NON-CONDUCTIVE	III B
	苯乙烯 (70%) 与丁二烯 (30%) 粉状聚合物 Styrene (70%) and butadiene (30%) powdery polymerization	熔融 Melting	420	27~37	-	非 NON-CONDUCTIVE	III B
	聚乙烯醇 Polyvinyl alcohol	熔融 Melting	450	42~55	5~10	非 NON-CONDUCTIVE	III B
	聚丙烯腈 Polyacrylonitrile	熔融炭化 Melting carbonization	505	35~55	5~7	非 NON-CONDUCTIVE	III B
	聚氨酯 (类) Polyurethane (class)	熔融 Melting	425	46~63	50~100	非 NON-CONDUCTIVE	III B
	聚乙烯四肽 Polythene four peptide	熔融 Melting	480	52~71	〈200	非 NON-CONDUCTIVE	III B
	聚乙烯氮戊环酮 Polyvinyl amyl ketone	熔融 Melting	465	42~58	10~15	非 NON-CONDUCTIVE	III B
	聚氯乙烯 Polyvinyl chloride (PVC)	熔融炭化 Melting carbonization	595	63~86	4~5	非 NON-CONDUCTIVE	III B
	氯乙烯 (70%) 与苯乙烯 (30%) 粉状聚合物 Chloroethylene (70%) and styrene (30%) powdery polymerization	熔融炭化 Melting carbonization	520	44~60	30~40	非 NON-CONDUCTIVE	III B
	酚醛树脂 (酚醛清漆) Phenolic resin (phenolic varnish)	熔融炭化 Melting carbonization	520	36~40	10~20	非 NON-CONDUCTIVE	III B
	有机玻璃粉 Organic glass powder	熔融炭化 Melting carbonization	485	-	-	非 NON-CONDUCTIVE	III B

粉尘种类 Type of dust	粉尘名称 Type of dust	高温表面堆积粉尘层 (5mm) 的引燃温度 (°C) Ignition temperature of dust layer (5mm) at high temperature surface (5mm) (°C)	粉尘云的引 燃温度 (°C) Ignition temperature of dust cloud (°C)	爆炸下限 浓度 (g/m³) Lowest concentration of explosion (g/m³)	粉尘平均 粒径 (μ m) Average particle size of dust (μ m)	危险 性质 Dangerous nature	粉尘 等级 Dust grade
天然 树脂 Natural resin	骨胶（虫胶） Bone glue (shellac)	沸腾 Boiling	475	-	20~50	非 NON-CONDUCTIVE	III B
	硬质橡胶 Hard rubber	沸腾 Boiling	360	36~49	20~30	非 NON-CONDUCTIVE	III B
	软质橡胶 Soft rubber	沸腾 Boiling	425	-	80~100	非 NON-CONDUCTIVE	III B
	天然树脂 Natural resin	熔融 Melting	370	38~52	20~30	非 NON-CONDUCTIVE	III B
	蛄钋树脂 Mantis palladium resin	熔融 Melting	330	30~41	20~50	非 NON-CONDUCTIVE	III B
沥青 蜡类 Asphalt waxes	松香 Rosin	熔融 Melting	325	-	50~80	非 NON-CONDUCTIVE	III B
	硬蜡 Hard wax	熔融 Melting	400	26~36	80~50	非 NON-CONDUCTIVE	III B
	绕组沥青 Winding asphalt	熔融 Melting	620	-	50~80	非 NON-CONDUCTIVE	III B
农产品 Agricultural products	硬沥青 Hard asphalt	熔融 Melting	620	-	50~150	非 NON-CONDUCTIVE	III B
	烧焦油沥青 Charred asphalt	熔融 Melting	580	-	-	非 NON-CONDUCTIVE	III B
	裸麦粉 Rye flour	325	415	67~93	30~50	非 NON-CONDUCTIVE	III B
	裸麦谷物粉（未处理） Rye grain flour (untreated)	305	430	-	50~100	非 NON-CONDUCTIVE	III B
	裸麦筛落粉（粉碎品） Rye powder (crushed)	305	415	-	30~40	非 NON-CONDUCTIVE	III B
	小麦粉 Wheat flour	炭化 Carbonization	410	-	20~40	非 NON-CONDUCTIVE	III B
	小麦谷物粉 Wheat grain powder	290	420	-	15~30	非 NON-CONDUCTIVE	III B
	小麦筛落粉（粉碎品）	290	410	-	3~5	非 NON-CONDUCTIVE	III B
	Wheat sifting powder (comminuted product)	290	410	-	3~5	非 NON-CONDUCTIVE	III B
	乌麦、大麦、谷物粉 Rye, barley and cereal flour	270	440	-	50~150	非 NON-CONDUCTIVE	III B
	筛米糠 Sieve rice bran	270	420	-	50~150	非 NON-CONDUCTIVE	III B
	玉米淀粉 Corn starch	炭化 Carbonization	410	-	2~30	非 NON-CONDUCTIVE	III B
	马铃薯粉 Potato powder	炭化 Carbonization	430	-	60~80	非 NON-CONDUCTIVE	III B
	布丁粉 Pudding powder	炭化 Carbonization	395	-	10~20	非 NON-CONDUCTIVE	III B
纤维 鱼粉 Fiber fish meal	糊精粉 Dextrin powder	400	71~99	20~30	非 NON-CONDUCTIVE	III B	
	砂糖粉 Sugar powder	熔融 Melting	360	77~107	20~40	非 NON-CONDUCTIVE	III B
	乳糖 lactose	熔融 Melting	450	83~115	-	非 NON-CONDUCTIVE	III B
	可可子粉（脱脂品） Cocoa seed powder (nonfat)	245	460	-	30~40	非 NON-CONDUCTIVE	III B
	咖啡粉（精致品） Coffee powder (delicacy)	收缩	600	-	40~80	非 NON-CONDUCTIVE	III B
	啤酒麦芽粉 Beer malt powder	285	405	-	100~500	非 NON-CONDUCTIVE	III B
	紫苜蓿 Purple alfalfa	280	480	-	200~500	非 NON-CONDUCTIVE	III B
	亚麻粕粉 Flax meal powder	285	470	-	-	非 NON-CONDUCTIVE	III B
	菜种渣粉 Dish of slag powder	炭化	465	-	400~500	非 NON-CONDUCTIVE	III B
	鱼粉 Fish meal	炭化	485	-	80~100	非 NON-CONDUCTIVE	III B
	烟草纤维 Tobacco fiber	290	485	-	50~100	非 NON-CONDUCTIVE	III A
	木棉纤维 Kapok fiber	385	-	-	-	非 NON-CONDUCTIVE	III A
	人造短纤维 Artificial short fiber	305	-	-	-	非 NON-CONDUCTIVE	III A
	亚硫酸盐纤维 Sulfite fiber	380	-	-	-	非 NON-CONDUCTIVE	III A
	木质纤维 Wood fiber	250	445	-	40~80	非 NON-CONDUCTIVE	III A
	纸纤维 Paper fiber	360	-	-	-	非 NON-CONDUCTIVE	III A
	椰子粉 Coconut powder	280	450	-	100~200	非 NON-CONDUCTIVE	III B
	软木粉 Cork powder	325	460	44~59	30~40	非 NON-CONDUCTIVE	III B
	针叶树（松）粉 Coniferous tree (pine) powder	325	440	-	70~150	非 NON-CONDUCTIVE	III B
燃料 Fuel	硬木（丁钠橡胶）粉 Hard wood (sodium rubber) powder	315	420	-	70~100	非 NON-CONDUCTIVE	III B
	泥煤粉（堆积） Coal dust (packing)	260	450	-	60~90	导 CONDUCTIVE	III C
	褐粉煤（生褐粉） Lignite (raw brown powder)	260	450	49~68	2~3	非 NON-CONDUCTIVE	III B
	褐煤粉 Brown pulverized coal	230	185	-	3~7	导 CONDUCTIVE	III C
	有烟煤粉 Smoke pulverized coal	235	595	41~57	5~11	导 CONDUCTIVE	III C
	瓦斯煤粉 Pulverized coal gas	225	580	35~48	5~10	导 CONDUCTIVE	III C
	焦炭用煤粉 Pulverized coal for coke	280	610	33~45	5~10	导 CONDUCTIVE	III C
	贫煤粉 Coal powder	285	680	34~45	5~7	导 CONDUCTIVE	III C
	无烟煤粉 Smokeless pulverized coal	〉 430	〉 600	-	100~130	导 CONDUCTIVE	III C
	木炭粉（硬质） Charcoal powder (hard)	340	595	39~52	1~2	导 CONDUCTIVE	III C
	泥煤焦炭粉 Peat coke powder	360	615	40~54	1~2	导 CONDUCTIVE	III C
	褐煤焦炭粉 Lignite coke powder	235	-	-	4~5	导 CONDUCTIVE	III C
	煤焦炭粉 Coal coke powder	430	〉 750	37~50	4~5	导 CONDUCTIVE	III C

注：

- III A 级为可燃性飞絮；
- III B 级为非导电性粉尘；
- III C 级为导电性粉尘。

Note:

- III A grade is Combustible flyings;
- III B grade is non-conductive dust;
- III C grade is conductive dust.

产品概述 Product Overview

	额定功率：7.5 ~ 22 kW	Rated output: 7.5 ~ 22 kW
	机座号：160 ~ 200	Frame size: 160 ~ 200
	极数：6	Pole: 6
	电压与频率：支持多种电压与频率	Voltage and Frequency: Support multiple voltage and frequency
	冷却方式：IC411	Cooling method: IC411
	隔爆标志：Ex tb IIIC T130℃ Db	Frame-proof marking: Ex tb IIIC T130℃ Db
	防护等级：IP65	Protect degree: IP65
	绝缘系统：F级	Insulation class: F
	环境温度：-20℃ ~ +40℃	Ambient temperature: -20℃ ~ +40℃
	海拔高度：不超过1000米	Site altitude above sea level: Not exceed 1000m

茵梦达 1MB8014 系列粉尘防爆型三相异步电动机是全封闭、自扇冷高效电动机，该系列产品效率满足 GB18613-2020 能效等级 2 级标准要求。

粉尘防爆电机可用于粮食或饲料加工、木材加工、面粉加工或储存，以及金属、化学药品、合成树脂、农产品、各种纤维、燃料等等可燃性粉尘场所。具体粉尘种类见“粉尘特性举例”，但该电机不适用于瓦斯和/或可燃性粉尘引起危险的煤矿井下以及煤矿地面装置用电气设备，也不适用于不需要大气中的氧即可燃烧的炸药粉尘或自燃物质（如磷粉）。

茵梦达粉尘防爆电动机防爆性能符合 GB/T 3836.1-2021《爆炸性环境第 1 部分：设备 通用要求》和 GB/T 3836.31-2021《爆炸性环境第 31 部分：由防粉尘点燃外壳“t”保护的设备的规定，适用爆炸性粉尘环境的 21 区，22 区。

Innomotics 1MB8014 series dust explosion-proof three-phase asynchronous motor is totally enclosed, self-fan cooled super premium efficiency motor. The products meet the requirements of the GB18613-2020 efficiency of energy efficiency grade 2.

Dust explosion-proof motor can be used for food or forage machine, wood machine, flour machine or storage, as well metal, chemicals, synthetic resin, agricultural products and all kinds of combustible dust places such as fiber, fuel and so on. Detailed types of dust refer to "dust characteristics example,"but this series motors are not suitable for gas or underground coal mine with combustible dust and coal mine ground device with electrical equipment, also can't be used in place with explosive dust and spontaneous combustion substances (e.g. phosphorus powder) but can burn without oxygen from the atmosphere.

Innomotics dust explosion-proof motor's performance fulfill GB/T 3836.1-2021《Explosive atmospheres-Part I: Equipment General requirements》and GB/T 3836.31-2021《Explosive atmospheres-Part 31: Equipment dust ignition protection by enclosure "t"》，suitable for explosive dust environment Zone 21 or zone 22.

设计参考标准

Reference Standard

名称 Title	中国国家标准 Chinese standard	IEC标准 IEC standard
《可燃性粉尘环境用电气设备 第 1 部分：通用要求》 Electrical apparatus for use in the presence of combustible dust - Part 1: General requirements	GB/T 3836.1	IEC 61241-0
《可燃性粉尘环境用电气设备 第 3 部分：存在或可能存在可燃性粉尘的场所分类》 Electrical apparatus for use in the presence of combustible dust - Part3: Classification of areas where combustible dusts are or may be present	GB/T 3836.35	IEC 60079-10-2
《可燃性粉尘环境用电气设备 第 5 部分：外壳保护型“tD”》 Electrical apparatus for use in the presence of combustible dust Part5: Protection by enclosures “tD”	GB/T 3836.31	IEC 61241-1
1MB8014 系列粉尘防爆型三相异步电动机技术条件（机座号 160 ~ 200） 1MB8014 series dust explosion proof three-phase asynchronous motors - Technical specification (frame size 160 ~ 200)	Q/321081 KJA019	
《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

运行环境

- 防护等级 IP65（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 IP65 (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:

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

对于不同高度和（或）不同环境温度的功率换算系数 k_{HT} Factor k_{HT} for different site altitudes and / or coolant temperature						
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

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。

振动等级 Vibration Grade	机座号 Frame size (mm)	56 ≤ FS ≤ 132		FS > 132	
	安装方式 Mounting	位移 displacement/ (μm)	速度 Vibration velocity/(mm/s)	位移 displacement/ (μm)	速度 Vibration velocity/(mm/s)
A	自由悬置 Free suspension	45	2.8	45	2.8
	刚性安装 Rigid mounting	-	-	37	2.3 2.8 ¹⁾
B	自由悬置 Free suspension	18	1.1	29	1.8
	刚性安装 Rigid mounting	-	-	24	1.5 1.8 ¹⁾

铭牌信息 Nameplate

(1)	(2)	(3)	(4)	(5)(6)
INNMOTICS Made in P.R.China 中国制造 DUST EXPLOSION PROOF THREE-PHASE ASYNCHRONOUS MOTOR 粉尘防爆型三相异步电动机 Siemens Standard Motors Ltd. 西门子电机(中国)有限公司 Ex				
(7)	(8)	(8)	(9)	
(10)	(11)	(12)	(13)	(14)
(15)	(16)	(17)	(18)	
(19)	(20)	(21)	(22)	(23)
(24)	(25)	(26)	(27)	(28)
(29)	(30)	(31)	(32)	

1	生产国家	Product country
2	商标	Company logo
3	生产工厂	Manufacturer
4	产品名称	Product name
5	防爆标志	Mark of explosion proof
6	键的类型	Feature-key type
7	电动机类别	Category of motor
8	订货号	Order number
9	生产序列号	Production series number
10	机座号	Frame size
11	安装结构型式	Mounting type
12	IP 防护等级	IP protection level
13	整机重量	Weight
14	热等级	Thermal level
15	防爆标识	Mark of explosion protection type
16	防爆认证号	Ex certificate number

注：
¹⁾ 该值为 GB/T 10068-2020 中定义的轴中心高 FS > 132 mm 的两极电机，当两倍电网频率占主导时的振动速度限值。

Vibration

The 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.

铭牌示例 Nameplate

INNOMOTICS Made in P.R.China 中国製造				DUST EXPLOSION PROOF THREE-PHASE ASYNCHRONOUS MOTOR 粉尘防爆型三相异步电动机 Siemens Standard Motors Ltd. 西门子电机(中国)有限公司				Ex Ⓜ	
TYPE 1MB8014-2AC4		3-3AA4-Z		LMH-2308 / 800003888993 / 001					
200L IMB3 IP65		254 kg		Th.Cl.155(F)		Ex tb IIIC T130°C Db		CNEEx19.4888X	
BRG DE 6212 C3		BRG NDE 6212 C3		IEC60034-30				⊕	
Grease: Unirex N3		Quantity: 20g		GB18613-2020					
Re-grease interval: 8000h				Eff.-Grade2					
Q/321081 KJA019-2023									
V	Hz	kW	A	EFF.(%)	cosφ	r/min	EFF.Cl.		
380V△/660VY	50	18.5	37.5/21.5	93.4	0.80	988	IE4		
440 V△	60	22	39.0	93.0	0.80	1184			

17	轴承型号	Bearing type
18	IEC 能效标准	IEC Efficiency standard
19	润滑脂型号	Bearing grease type
20	加注油脂量	Re-grease quantity
21	中国能效标准	China efficiency standard
22	再润滑周期	Re-grease interval
23	中国能效等级	China efficiency classification
24	企业标准	Standards
25	额定电压和接线方式	Rated voltage and Winding connections
26	额定频率	Frequency
27	额定功率	Rated power
28	额定电流	Rated current
29	效率	Efficiency
30	功率因数	Power factor
31	额定转速	Rated speed
32	能效等级	Efficiency level
33	二维码	QR code

Note：
¹⁾ The level are vibration velocity limit when the twice line frequency vibration level is dominant defined by GB/T 10068-2020, for 2p motors that frame size bigger than 132mm.

防爆标志 Ex-Mark

	Ex	tb	IIIC	T130℃	Db
防爆标识 Marking for prevention of explosions					
防爆类型 Protection type: tb = 外壳保护型 Protection by enclosures					
粉尘组别 Explosion Group IIIC = 导电性粉尘 IIIC = Conductive dust					
最高表面温度 Maximum surface temperature					
设备保护等级 Equipment protection level Db = 高保护级别 Db = Protection level 'High'					

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 FS160 ~ 200	IM B6 FS160 ~ 200	IM B7 FS160 ~ 200	IM B8 FS160 ~ 200	IM V5 ¹⁾ FS160 ~ 200	IM V6 ²⁾ FS160 ~ 200
示意图 Diagram						
电动机订货号第 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 B5 FS160 ~ 200	IM V1 ¹⁾ FS160 ~ 200	IM V3 ²⁾ FS160 ~ 200	IM B35 FS160 ~ 200	IM V15 ¹⁾ FS160 ~ 200	IM V35 ²⁾ FS160 ~ 200
示意图 Diagram						
电动机订货号第 14 位号上 对应的字母 Letter, position 14 th of Motor code	F	G	H	J	W	Y

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 the end-shield (DE)			机座带底脚，端盖有标准小法兰 With feet and with C-flange on the end-shield (DE)	
安装型式 Mounting type	IM B14 FS160	IM V18 ¹⁾ FS160	IM V19 ²⁾ FS160	IM B34 FS160	
示意图 Diagram					
电动机订货号第 14 位号上 对应的字母 Letter, position 14 th of Motor code	K	M	L	N	

注：
¹⁾ 室外使用时推荐使用防雨罩（选件号 H00）；
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。

Notes:
¹⁾ At outdoor application, the using of protective cover (option code H00) is recommended;
²⁾ At out door application the protection of shaft again jet-water is recommended.

轴承选型

1MB8014 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。

FS160 的电动机驱动端与非驱动端轴承浮动；FS180 ~ 200 电动机驱动端轴承浮动，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，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）。

FS160 ~ 200 范围电动机标配不带再润滑装置，可选择配置再润滑装置（选件号：L23）。

机座号 Frame size	极数 Number of poles	标准配置 Standard design		选项配置 Optional design	
		水平/竖直安装 Horizontal / Vertical mounting		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
160	6	6309 2Z C3	6309 2Z C3	NU309	6309 2Z C3
180	6	6310 2Z C3	6310 2Z C3	NU310	6310 2Z C3
200	6	6312 2Z C3	6312 2Z C3	NU312	6312 2Z C3

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。但是，这只能是在电机严格按照本样本中规定的技术数据运行。

对于以规定间隔再润滑的电机，轴承寿命可以延长，从而补偿不利因素，诸如温度、安装条件、转速、轴承规格和机械载荷造成的影响。

润滑脂寿命和再润滑周期（电动机水平安装） Grease life (Horizontal installation)

机座号 Frame size	极数 Poles	润滑脂寿命 Grease lifetime up to CT 40 °C ¹⁾
持久润滑型轴承的润滑脂 Grease for permanent lubrication bearing		
160 ~ 200	6	20000 或 (or) 40000 ²⁾
可再润滑型轴承的润滑脂 Grease for regreaseable bearing		
160 ~ 200	6	8000 小时 (h)

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；
²⁾ 40000 小时适用于电动机水平安装，且轴不受额外的轴向力影响。

Bearing Assignment

1MB8014 series motors are supplied with the ball bearing as standard. These bearings are either of the sealed or regreaseable type.

For FS160, the floating bearings are assembled; for FS180 ~ 200, floating bearing at DE, and fixed bearing at NDE assembled.

The standard bearing can endure a maximum cantilever force, the increased cantilever bearing design (Option code: L22) should be considered.

For FS160 ~ 200 standard design, the motors are without regreasing device. the regreasing device can be configured optionally (Option code L23).

Grease life and re-greasing interval

For permanent lubrication, the bearing grease lifetime is matched to the bearing lifetime. This can, however, only be achieved if the motor is operated in accordance with the catalog specifications.

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

Note:
¹⁾ If the coolant temperature is increased by 10 K, the grease lifetime and regreasing interval are halved;
²⁾ 40000 h apply to horizontally installed motors with coupling output without additional axial loads.

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；
- 当环境温度每升高 10℃，润滑脂寿命以及再润滑时间缩短一半。

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;
- If the coolant temperature is increased by 10 °C, the grease lifetime and regreasing interval is halved.

接线盒技术参数 Connection boxes technical data

机座号 Frame Size	主接线端子数 No. of main terminal	接线螺钉螺纹 Main terminal thread	引接线最大截面积(mm) Max. connectable cross-section	外接电缆直径 Cable diameter (mm) max. ~ min.	进线孔尺寸 Cable entry size	最多容纳辅助端子数 Max. auxiliary terminal
160	6	M5	16	22~32	M40x1.5+M40x1.5	14
180						
200		M6	25	32~38	M50x1.5+M50x1.5	14

辅助端子进线孔尺寸 Cable entry size	允许外接电缆直径范围 (mm) Allowed outer cable diameter range (mm)	允许电缆的芯数范围 Allowed core number range of cable	引接线(导体)标称截面积(mm²) Nominal section area of connection (conductor)(mm²)
M16 x 1.5	8-11	2-7	1 mm²
M20 x 1.5	11-14.3	8-10	1 mm²
M25 x 1.5	13-20.2	12-27	1 mm²

注意：

1. 电力电缆建议使用 YJV（GB/17206）交联聚乙烯绝缘及聚氯乙烯护套 3+1 铜芯电缆；
2. 弱电信号控制电缆建议使用 KVV（GB/T9330）聚氯乙烯绝缘聚乙烯护套铜芯截面 1 mm² 的多芯控制电缆；
3. 加热带线路为强电信号控制，请使用 KVV 铜芯截面 2 x 1mm² 的控制电缆单独进线；
4. 如果使用电缆直径不在防爆葛兰线径范围内，电机将失去防爆性能；
5. 如果需要使用铠装葛兰需特殊询价。

Note：

1. Power cables are recommended to use YJV (GB/17206) crosslinked polyethylene insulation and PVC sheath 3+1 copper core cable;
2. The control cable of weak current signal is recommended to use KVV (GB/T9330) polyvinyl chloride insulated sheath copper core section 1 mm² multi-core control cable;
3. The heating line is a strong signal control, please use the KVV copper core section 2 x 1mm² control cable to enter the line alone;
4. If the cable diameter is not in the range of explosion protection, the electric motor will lose the explosion-proof property;
5. If you need to use an armored gland, please make a special inquiry.

电气特性

额定输出

茵梦达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。

标准 60034 - 1 Standard 60034 - 1	类别 A 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
Prated ≤ 150 kW: - 0.15 x (1 - η)
Prated > 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 %

Electrical design

Rated Output

Innomotics 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.

Tolerance for electrical data

- Efficiency η at
Prated ≤ 150 kW: - 0.15 x (1 - η)
Prated > 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 %

绝缘系统

1MB8014 系列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。

1MB8014 系列电动机标准设计温度等级为 155℃（F）。当 1MB8014 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。

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。

绕组保护

■ 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组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。

Insulation system

The insulation system of 1MB8014 series results in high reliability, a long service life and high resistance to stress, for example, during starting or under overload conditions.

1MB8014 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).

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.

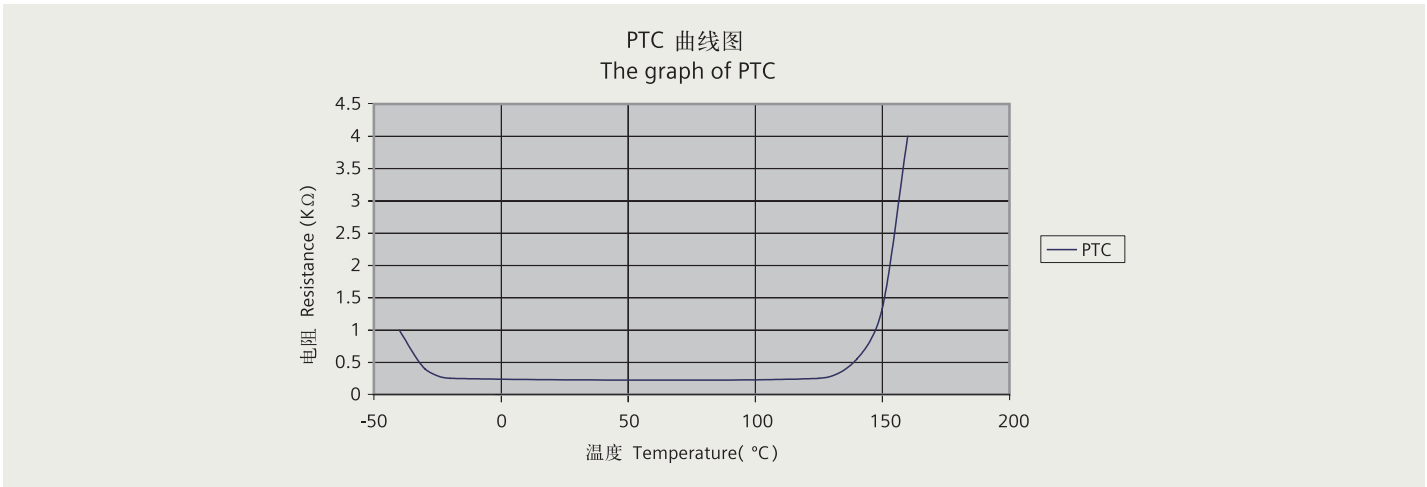
The order variants for motor protection are coded with letters in the 15th position of the Motor Order No., or ordered with Option code. Some protection method about winding protection and bearing protection are shown in the following.

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。

■ 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。

两种 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。

2 alternatives of PTC protection

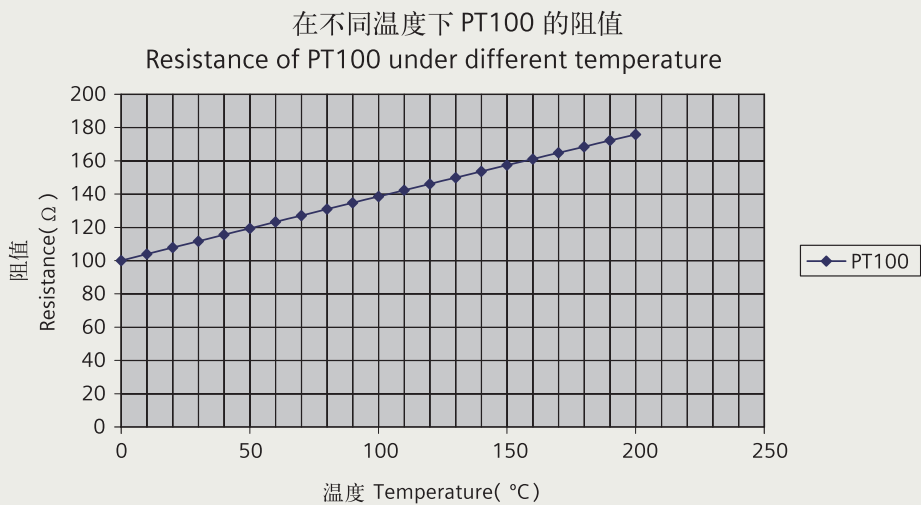
- Motor winding is protected with PTC thermistors with 3 embedded temperature sensors for tripping. Connection be done through 2 auxiliary terminals in the connection box. 15th position of Motor Order No. letter B.
- Motor winding is protected with two sets of three temperature sensors, one set is for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

2 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.



轴承保护

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。

电动机轴承装两个 PT100 测温元件，选件号为 Q72，需 4 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（选件号：Q04）进行保护，需2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 Power (W)	电压 Vlotage
160	40	220 V
180 ~ 200	50	220 V

Bearing protection

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.

Installation of 2 PT100 screwed-in resistance thermometers for motor bearings, Option code: Q72. Connection be done through 4 auxiliary terminals in the connection box.

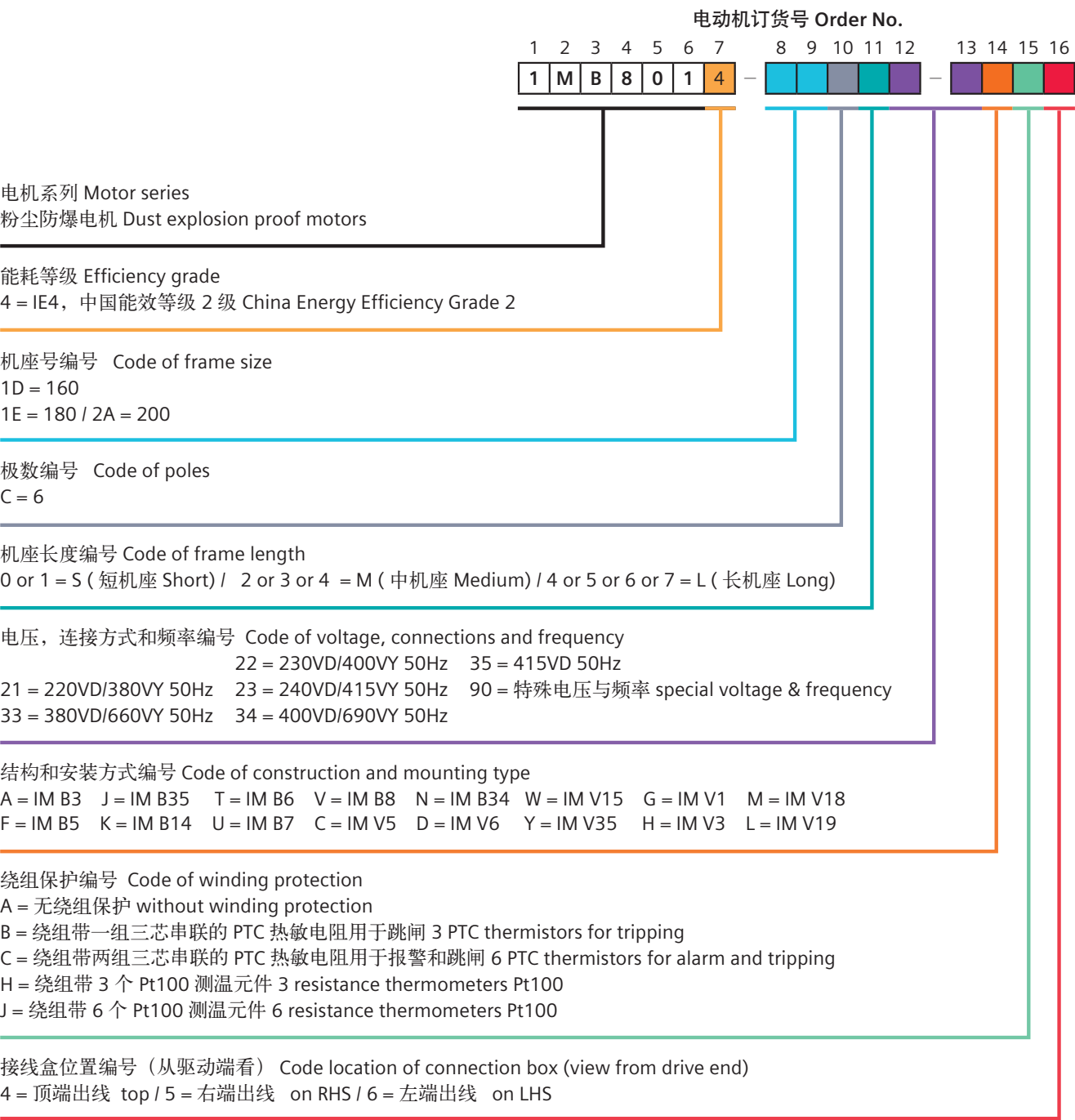
Anti-condensation heater

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

MLFB 介绍



选型技术数据表 Technical data table

中国能效等级 2 级，IE4

机座号 Frame Size	额定功率 Rated Output	额定功率 (60Hz) Rated output (60Hz)	型号 OrderNo.	额定转速 Rated Speed	效率—参照 GB18613-2020, 即 IEC 60034-30 Efficiency is in accordance with GB18613-2020, IEC 60034-30			
					效率 Efficiency at ww (50HZ) 4/4 load	效率 Efficiency at (50HZ) 3/4 load	功率因数 Power factor	额定电流 Rated current
	kW	kW		r/m	%	%		A
1000rpm 6 极 6 pole 380VD/660VY								
160M	7.5	8.6	1MB8014-1DC23-3 □□□	984	91.3	91.6	0.76	16.4
160L	11	12.6	1MB8014-1DC43-3 □□□	985	92.3	92.4	0.77	23.5
180L	15	18	1MB8014-1EC43-3 □□□	986	92.9	93.4	0.8	30.5
200L	18.5	22	1MB8014-2AC43-3 □□□	988	93.4	93.8	0.8	37.5
200L	22	26.5	1MB8014-2AC53-3 □□□	988	93.7	94.2	0.81	44

注：
¹⁾ 当电动机在 50Hz 电源供电空载运行时，噪音容差为 +3dB。当在 60Hz 电源下空载运行时，噪音容差为 +4dB。

Note:
¹⁾ Noise value is only applicable to the direct power supply and the condition of no-load operation. If the motor in 50Hz power supply, the tolerance is +3dB. If the motor in 60Hz power supply, the tolerance is +4dB.

	额定转矩 Rated torque	起动电流 Starting Current	起动转矩 Starting torque	最大转矩 Max torque	转动惯量 Moment of inertia(J)	噪音 ¹⁾ Noise LpfA	重量 Weight IMB3
	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			kgm²	dB(A)	Kg
1000rpm 6 极 6 pole 380VD/660VY							
	72.8	7.5	3	3	0.1501	56/69	137
	107	8	3.6	3.3	0.2007	56/69	168
	145	7.6	2.7	3	0.3095	57/70	205
	179	8	2.5	3	0.555	59/72	256
	213	8	2.8	3	0.638	59/72	277

选件 Options

选件号 Option Code	描述 Description	应用范围 Frame size scope
电压和频率 Voltage and Frequency		
1MB8014- □□□□ 2-1 □□□	220VD / 380VY 50Hz; 440VY 60Hz (60Hz output 60Hz 输出)	FS160-200
1MB8014- □□□□ 3-3 □□□	380VD / 660VY 50Hz; 440VD 60Hz (60Hz output 60Hz 输出)	FS160-200
1MB8014- □□□□ 2-2 □□□	230VD / 400VY 50Hz; 460VY 60Hz (60Hz output 60Hz 输出)	FS160-200
1MB8014- □□□□ 3-4 □□□	400VD / 690VY 50Hz; 460VD 60Hz (60Hz output 60Hz 输出)	FS160-200
1MB8014- □□□□ 2-3 □□□	240VD / 415VY 50Hz; 480VY 60Hz (60Hz ouput 60Hz 输出)	FS160-200
1MB8014- □□□□ 3-5 □□□	415VD 50Hz; 480VD 60Hz (60Hz output 60Hz 输出)	FS160-200
M1C	440VY 60Hz (60Hz output 60Hz 输出)	FS160-200
M1D	440VD 60Hz (60Hz output 60Hz 输出)	FS160-200
M1E	460VY 60Hz (60Hz output 60Hz 输出)	FS160-200
M1F	460VD 60Hz (60Hz output 60Hz 输出)	FS160-200
M2C	440VY 60Hz (50Hz output 50Hz 输出)	FS160-200
M2D	440VD 60Hz (50Hz output 50Hz 输出)	FS160-200
M2E	460VY 60Hz (50Hz output 50Hz 输出)	FS160-200
M2F	460VD 60Hz (50Hz output 50Hz 输出)	FS160-200
绕组保护 Winding protection		
1MB8014- □□□□□ - □□ A □	无绕组保护 Without winding protection	FS160-200
1MB8014- □□□□□ - □□ B □	三个 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 3 embedded temperature sensors for tripping, need 2 terminals	FS160-200
1MB8014- □□□□□ - □□ C □	六个 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 6 embedded temperature sensors for alarm and tripping, need 4 terminals	FS160-200
1MB8014- □□□□□ - □□ H □	三个 PT100 传感器监测绕组温度, 需用 6 个辅助端子 Installation of 3 PT100 resistance thermometers in stator winding, need 6 terminals	FS160-200
1MB8014- □□□□□ - □□ J □	六个 PT100 传感器监测绕组温度, 需用 12 个辅助端子 Installation of 6 PT100 resistance thermometers in stator winding, need 12 terminals	FS160-200
N10	H 级绝缘系统 (180 °C) 180 °C (H) class insulation system	FS160-200
Q04	220V 防潮加热带 Anti-condensation heaters for 220V	FS160-200
接线盒 Connection box		
R10 ¹⁾	接线盒旋转 90 度, 出线口朝驱动端 Rotation of terminal box by 90° , entry from DE	FS160-200
R11	接线盒旋转 90 度, 出线口朝非驱动端 Rotation of terminal box by 90° , entry from NDE	FS160-200
R12	接线盒旋转 180 度 Rotation of terminal box by 180°	FS160-200
R15	配备一个金属葛兰和一个金属闷盖 1 metal cable glands+1 metal cover	FS160-200

选件号 Option Code	描述 Description	应用范围 Frame size scope
轴承 Bearing		
Q72	轴承带 2 个单支双线圈 PT100 测温元件，需用 4 个辅助接线端子 Installation of 2 single 2 wires PT100 resistance thermometers for bearings, need 4 terminals	FS160-200
L80	SKF 轴承 SKF bearings	FS160-200
L22	增强悬臂力轴承设计 Bearing design for increased cantilever forces	FS160-200
L23	再润滑装置 Re-greasing device	FS160-200
L20	驱动端轴承固定 Located bearing at DE	FS160
Q01	驱动端预留 SPM 测量接头 Measuring nipples at DE for SPM shock pulse sensors for bearing inspection	FS160-200
平衡 Balance		
L00	B 级振动等级 Vibration quantity level B	FS160-200
机械防护 Mechanical design and protection grade		
H00 ²⁾	电动机带防雨罩 Motor with protective cover	FS160-200
H70	第二外部接地 2nd External grounding	FS160-200
L72	第二标准轴伸 2nd standard shaft extension	FS160-200
铭牌和测试报告 Nameplate and Testing Certificate		
B02	出厂检验报告 Acceptance test certificate 3.1 in accordance with EN 10204	FS160-200
油漆 Paint finish		
S01	不喷漆，只带底漆 Unpainted, only primed	FS160-200
W88	适用于 TH, W, F1, WF1 以及海洋性气候环境用电机 Design for TH, W, F1, WF1 and sea-air resistance	FS160-200

¹⁾ 选择此项时需留意安装环境，请确认进线孔前方有足够的空间用于接入电缆；

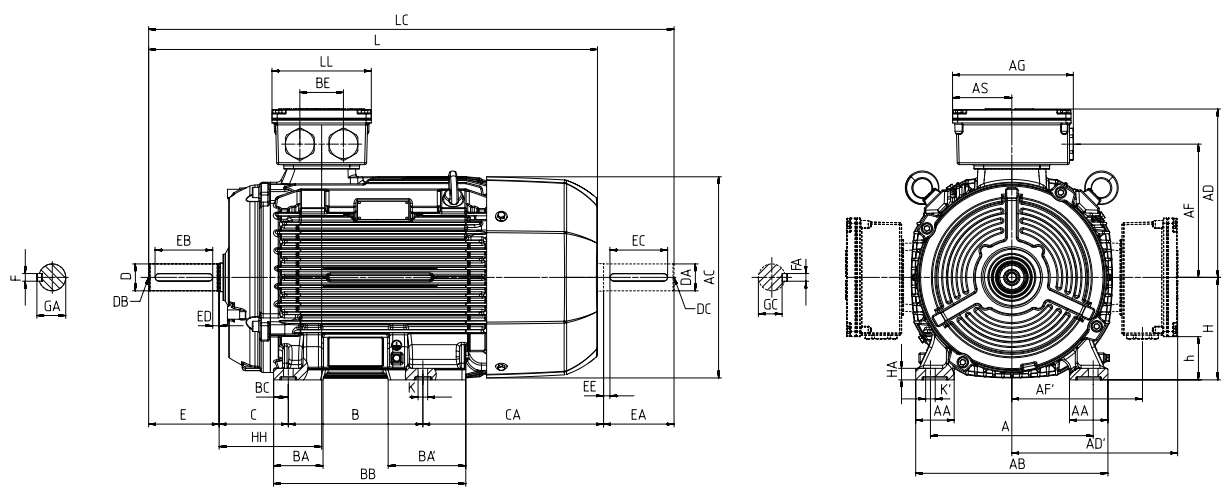
²⁾ 仅适用于 IMV1、IMV5、IMV15、IMV18 安装结构型式。

¹⁾ When ordering this option, please take care about the installation location that whether there is enough space for cable inserting;

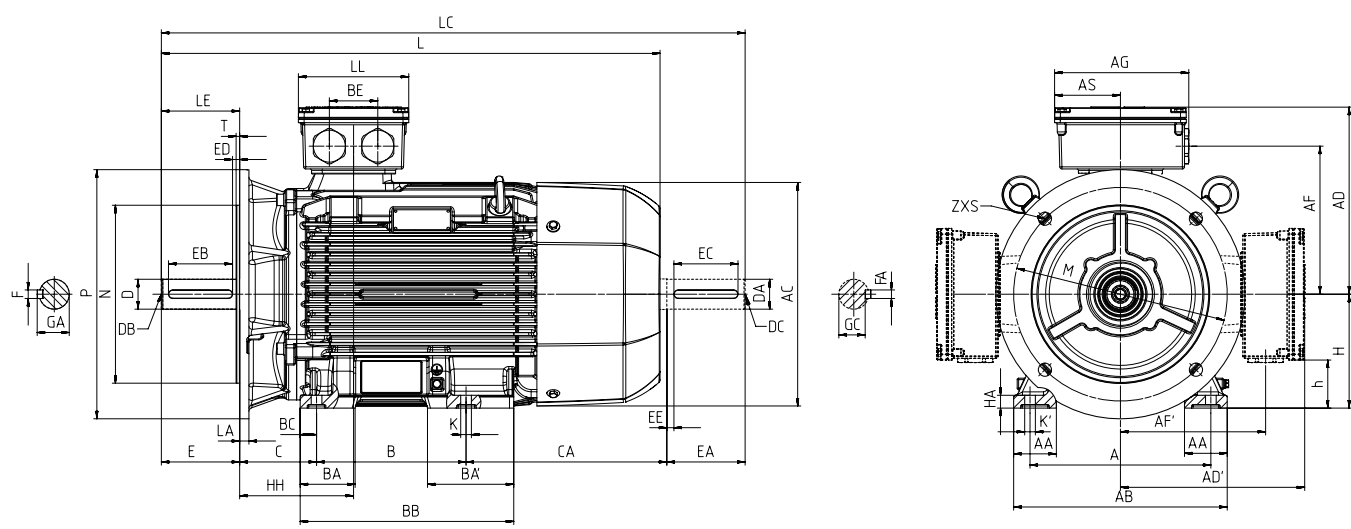
²⁾ It is applicable only for IMV1, IMV5, IMV15 and IMV18.

外形尺寸 Dimension drawings

IM B3 安装结构型式 IM B3 construction type

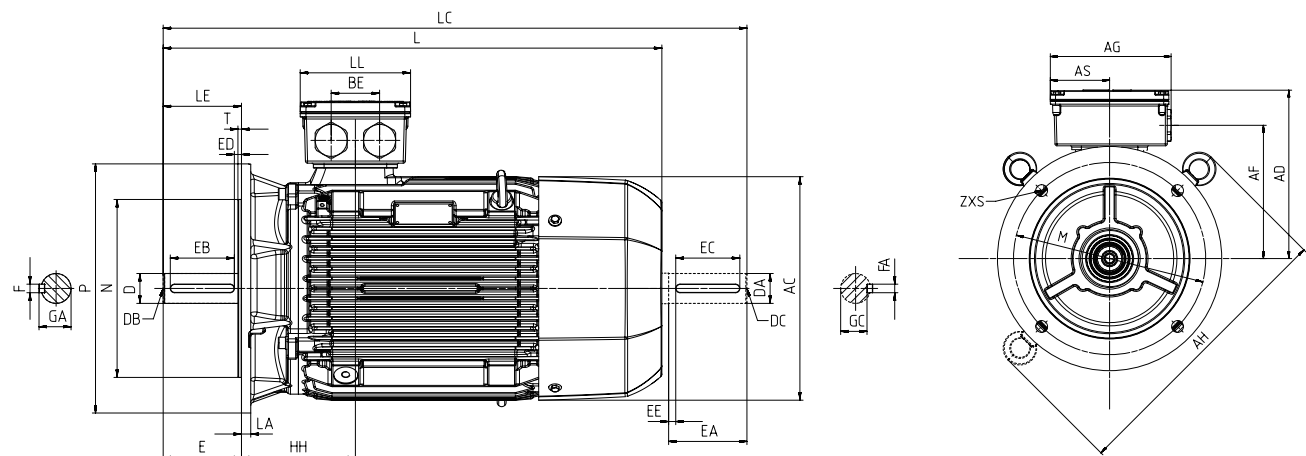


IM B35 安装结构型式 IM B35 construction type

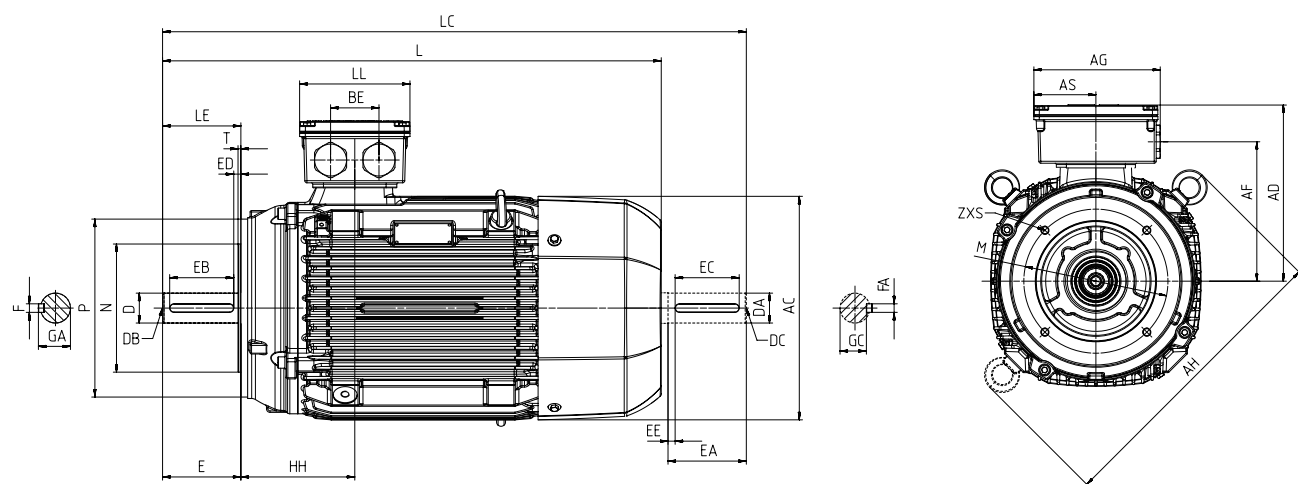


机座号 Frame size	订货号 MLFB 1MB0013	极数 Poles	尺寸及公差 /mm Dimension and toleranc												
			A	B	C		D		E		F		GA	H	
					基本尺寸 Dimension	极限偏差 Tolerance	基本尺寸 Dimension	极限偏差 Tolerance	基本尺寸 Dimension	极限偏差 Tolerance	基本尺寸 Dimension	极限偏差 Tolerance		基本尺寸 Dimension	极限偏差 Tolerance
160M	1DC2	6	254	210	108	± 3.0	42	+ 0.018 + 0.002	110	± 0.43	12	0 － 0.043	45	160	0 － 0.5
160L	1DC4	6	254	254	108	± 3.0	42	+ 0.018 + 0.002	110	± 0.43	12	0 － 0.043	45	160	0 － 0.5
180L	1EC4	6	279	279	121	± 3.0	48	+ 0.018 + 0.002	110	± 0.43	14	0 － 0.043	51.5	180	0 － 0.5
200L	2AC4, 2AC5	6	318	305	133	± 3.0	55	+ 0.030 + 0.011	110	± 0.43	16	0 － 0.043	59	200	0 － 0.5

IM B5 安装结构型式 IM B5 construction type



IM B14 安装结构型式 Type of construction IM B14

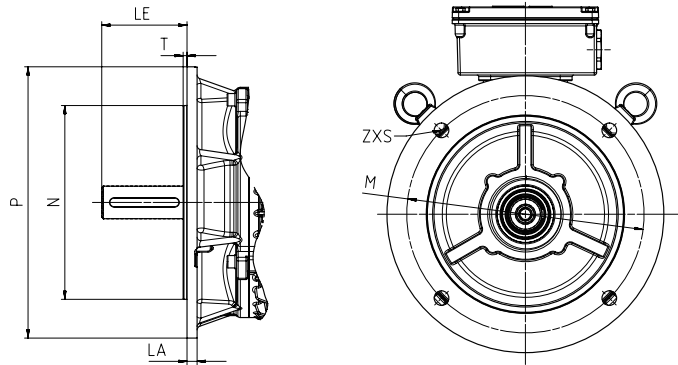


尺寸及公差 /mm Dimension and toleranc																							
	K/K'		AB	AC	AD/ AD'	L	AA	BA	BA'	BB	BC	AF/ AF'	AG	AS	BE	HA	LL	DB	EB		ED	HH	R
	基本尺寸 Dimension	极限偏差 Tolerance																	基本尺寸 Dimension	极限偏差 Tolerance			
	15	+ 0.43 0	330	314	265	670	60	77	77	256	23	208	190	92.5	68	18	155	M16x36	90	+ 0.50 0	10	160	0
	15	+ 0.43 0	330	314	265	705	60	77	121	300	23	208	190	92.5	68	18	155	M16x36	90	+ 0.50 0	10	160	0
	15	+ 0.43 0	339	354	290	775	60	91	129	328	24.5	232	190	92.5	68	20	155	M16x36	100	+ 0.50 0	5	166	0
	19	+ 0.52 0	378	493	325	825	70	100	100	355	25	259	245	103.5	85	25	213	M20x42	100	+ 0.50 0	5	207	0

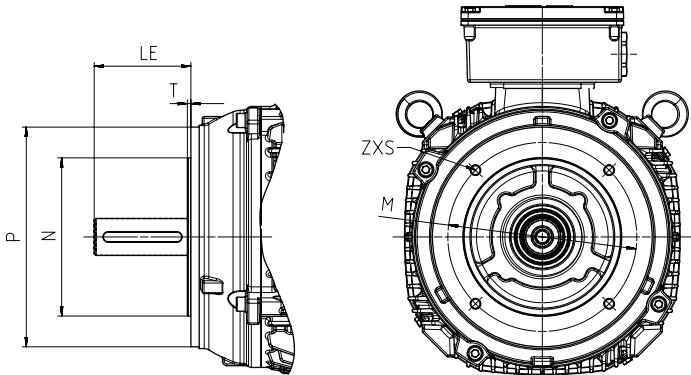
外形尺寸 Dimension drawings

法兰尺寸 Flange dimension

IM B5、IM B35、IM V1、IM V3 安装结构型式
Type of construction IM B5, IM B35, IM V1, IM V3



IM B14、IM V18、IM V19 安装结构型式
Type of construction IM B14, IM V18, IM V19



机座号 Frame size	安装结构形式 Type of construction	法兰带通孔（FF/A） / 带内螺纹孔（FT/C） Flange with through holes (FF/A) / tapped holes (FT/C)	尺寸图依据 IEC 标准 Dimension designation according to IEC standards							
		按照 DIN EN 50347 标准 According to DIN EN 50347	LA ¹⁾	LE	M	N	P ²⁾	S	T	Z
160	IM B5, IM B35, IM V1, IM V3	FF300	13	110	300	250	350	18.5	5	4
	IM B14, IM V18, IM V19	FT215	-	110	215	180	250	M12	4	4
180	IM B5, IM B35, IM V1, IM V3	FF300	13	110	300	250	350	18.5	5	4
200	IM B5, IM B35, IM V1, IM V3	FF350	15	110	350	300	400	18.5	5	4

¹⁾ 法兰厚度 LA 尺寸是指法兰安装孔处的厚度；
²⁾ 请注意，IM B35 安装方式全圆法兰外圆可能会低于机座底脚。

¹⁾ Flange LA size refers to the thickness at the flange mounting hole;
²⁾ Please note, the outer circle dimension maybe lower than the base foot in IM B35.

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