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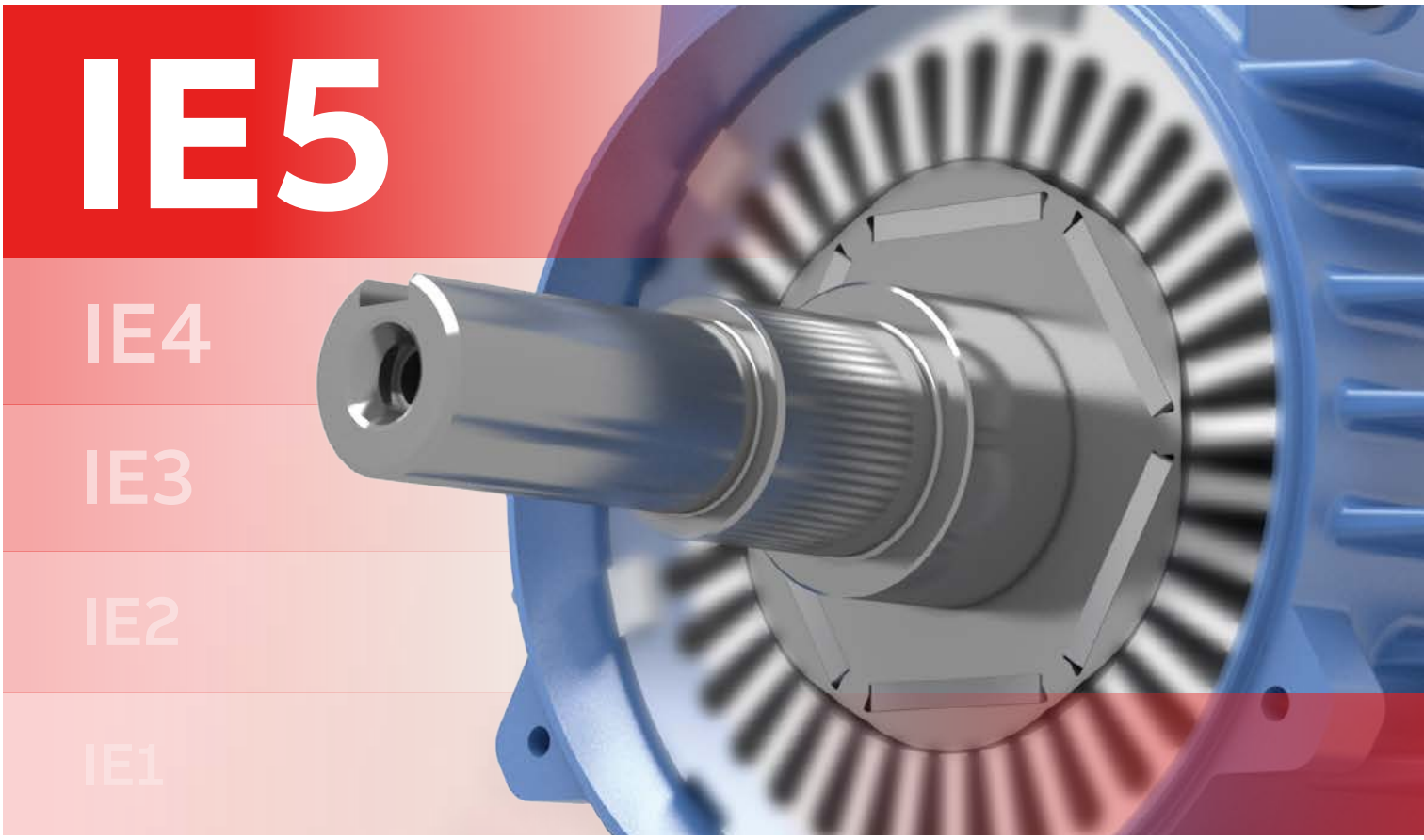
低压IE5超高效永磁同步电机
Low voltage IE5 Ultra Premium Permanent magnet motors



通过专业的设计及完整的产品组合，我们协同客户一起改善能源效率和生产力。

With expertise, and a comprehensive portfolio of products and life-cycle services, we help value-minded industrial customers their energy efficiency and productivity.

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IE5

ABB低压电机传承了ABB一贯的优良品质和快速的客户响应，生产的电机各项性能得到了大量客户和OEMs（原始设备制造商）的高度认可。此款电机可达到IE5超高效率。

ABB Low voltage motors are with ABB quality and support. These motors have the features appreciated by volume customers and serial OEMs. Motors achieve IE5 efficiency.

产品概述
General information

IE5

标准
ABB 电机采用全封闭三相永磁同步电机设计，其工艺符合IEC和EN国际标准。同时，可按要求提供符合其他国家规范的电机。

所有生产厂家均通过 ISO 9001 国际质量认证及 ISO 14000 环境标准，并符合所有适用的欧盟指令。

Standards
ABB motors are of the totally enclosed, three phase squirrel cage type, built to comply with international IEC and EN standards. Motors conforming to other national and international specifications are also available on request.

All production units are certified to ISO 9001 international quality standard as well ISO 14000 environmental standard and conform to all applicable EU Directives.

电气 Electrical	机械 Mecharical
IEC/EN 60034-1	IEC 60072
IEC/EN 60034-2-3	IEC/EN 60034-5
IEC/EN 60034-30	IEC/EN 60034-6
IEC/EN 60034-8	IEC/EN 60034-7
	IEC/EN 60034-8
	IEC 60034-14

产品简介
工业电机在世界发展的进程中扮演了举足轻重的角色，同时也消耗着超过全球45%的电力储备。随着世界环境问题的日趋严峻，全球各国陆续加入到了低碳环保这一伟大行动中。ABB做为全球电力行业的领导者，始终关切并以实际行动推出了此款IE5 M2BJX系列电机。

IE5 M2BJX系列产品是一款低压超高效三相永磁同步电动机。该系列电机通过ABB全球研发平台设计，率先面向中国市场。设计遵循IEC国际标准以及中国GB标准，效率达到IE5能效等级(IEC60034-30-2)。

此产品可广泛应用于绿色数据中心，印刷电路板设备，暖通空调，水处理，食品饮料，纺织、冶金等行业的风机、泵类等多类型负载。M2BJX的优异品质及服务为客户提供了增值空间，更高的产品灵活性可满足各类客户的不同应用需求。

Brief
Industrial motors play an important role in the development of the world and consume more than 45% of the world's electricity reserves. With the increasingly severe environmental problems in the world, countries around the world have joined the great action of low-carbon environmental protection. As a global leader in the power industry, ABB has been concerned and acted upon with the introduction of the IE5 M2BJX series motors.

M2BJX - Low voltage IE5 Ultra Premium permanent magnet motors are ABB high efficiency products. This series of motors are designed for Chinese market firstly. Product development is on ABB strong R&D platform. The design is in line with international IEC standards and China local GB standards. The efficiency level reaches IE5(IEC60034-30-2).

This product can be widely used in Green data center, Printed circuit board equipment, HVAC, water & waste water treatment, Food & Beverage, Textile, Metal and other industries with fan, pump and other types of load. The high quality and excellent service of M2BJX continuously make value for the customers. Higher product flexibilities lead to meet the different application requirements of our customers.

IE5 低压永磁同步电机特点

通过对客户需求的深入挖掘，ABB 结合多年来在低压永磁电机领域积累的丰富研发、生产经验，在本地研发的低压永磁同步电机中包含诸多亮点：

高效节能

- ABB 的永磁方案可达到 IE5 超高效能效，节电效果非常明显，甚至可以通过节省电费来抵扣采购成本。
- 高功率因数，降低系统成本。

更小更轻

- 与同扭矩输出的异步电机相比，体积可缩小 1~3 个机座号，重量轻约 40~60% 左右（以目前量产型号为例），为客户节约更多空间。
- 减少客户的物料号，简化客户的采购流程。

高效区间广

- 永磁同步电机的效率和功率因数在各个负载点均有优势，在满载时比 IE3 异步电机效率大约高 6-8%，在轻载时优势更为明显，搭配变频器整个系统的节能可最大提升至原先的 60%。

精准控制

- 转子和定子同步转速，能够对转速和转矩进行精准控制，比如高精度机床。

IE5 low voltage Permanent magnet motor features

High efficiency and energy saving

- ABB's permanent magnet solution achieves IE5 Ultra Premium high efficiency performance, the effect of saving electricity is very obvious, and can even offset the procurement costs by electricity saving.
- High power factor, reduce system cost.

Smaller and lighter

- Compared with the asynchronous motor with the same torque output, the volume can be reduced by 1~3 frame sizes, the weight could be 40~60% lighter which can save more space for customers.(the data comes from actual customer applications)
- Reduce customer's material number, simplify customer's purchasing process.

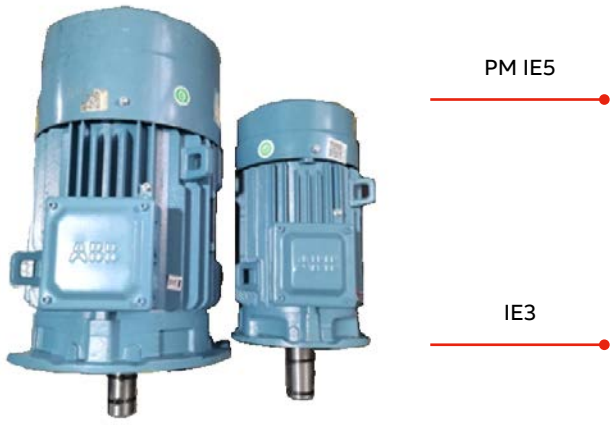
Wide high efficiency and power factor range

- PM motor has wide high efficiency and power factor range. 6-8% efficiency higher than IE3 induction motor at rated power. Energy saving could up to 60% at low speed compared with induction motor when operating with converter.

Precise control

- Synchronous rotor and stator speed, accurate control of speed and torque system which could be used for high-precision machine tools.

IE5 永磁电机和 IE3 异步电机体积和重量对比



PM Motor compact size

中心高
Frame size
H90

▼ 3 个机座

重量
Weight
32kg

▼ ~55%

中心高
Frame size
H132

重量
Weight
72kg

成熟案例

功率 Power	转速 Speed	IE3 异步机中心高 IE3 FS	永磁中心高 PM FS
1.5	3000	90	71
2.2	3000	90	71
1.5	1500	90	80
3	3000	100	80
4	3000	112	90
5.5	3000	132	90
7.5	3000	132	90
2.2	1500	100	90

Cases

功率 Power	转速 Speed	IE3 异步机中心高 IE3 FS	永磁中心高 PM FS
3	1500	100	90
4	1500	112	90
1.5	1000	100	90
2.2	1000	112	90
3	1000	132	90
90	2900	280	200
110	1125	280	280（长度缩短 25%）

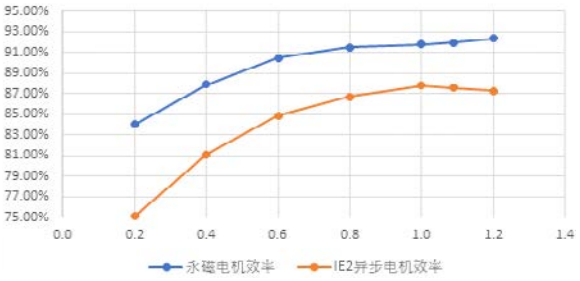
产品概述
General information

IE5

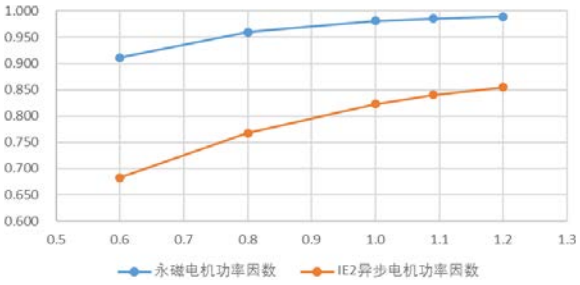
对比异步电机，永磁同步电机在低频段拥有更高的效率及功率因数。

Compared with induction motor, PM motor with high efficiency and power factor even during low speed application.

不同负载下电机效率变化曲线图
Efficiency case



不同负载下电机功率因数变化曲线图
Power factor case



针对一台年工作时长 8000 小时的 7.5kW 3000rpm 变频运用电机

IE5

效率
Efficiency
92.3%

电能消耗
Energy consumed
65005 kWh

▲ **~8%**

▼ **~8%**

IE3

效率
Efficiency
88.6%

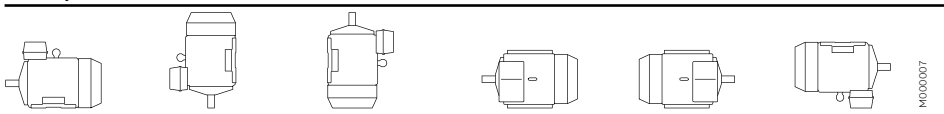
电能消耗
Energy consumed
67720 kWh

For example, 7.5kW 3000rpm VSD case with 8000 working hours per year

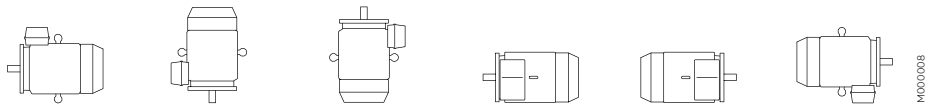
年节约电能 power saving：2715kWh
年节约电费 electricity saving：2308RMB
投资回报周期 pay back：约 1 年
年减排二氧化碳 Carbon dioxide reduction：1925kg

产品概述 - 安装结构形式
General information - Mounting arrangements

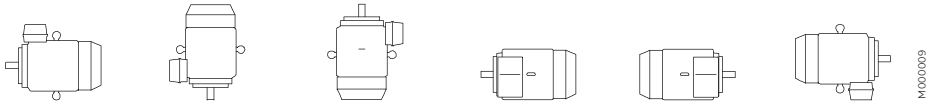
底脚安装型电机
Foot-mounted motor

代码 I/ 代码 II Code I / code II						产品代码位置 12 Product code pos. 12
						A = 底脚安装型，接线盒在顶部 foot-mounted, term.box top
IM B3	IM V5	IM V6	IM B6	IM B7	IM B8	
IM 1001	IM 1011	IM 1031	IM 1051	IM 1061	IM 1071	

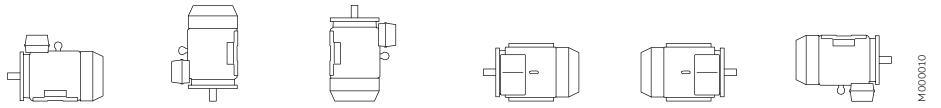
凸缘安装型电机，大凸缘
Flange-mounted motor, large flange

代码 I/ 代码 II Code I / code II						产品代码位置 12 Product code pos. 12
						B = 凸缘安装型，大凸缘 flange mounted, large flange
IM B5	IM V1	IM V3	*)	*)	*)	
IM 3001	IM 3011	IM 3031	IM 3051	IM 3061	IM 3071	

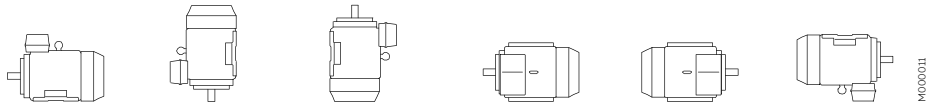
凸缘安装型电机，小凸缘
Flange-mounted motor, small flange

代码 I/ 代码 II Code I / code II						变量代码 Variant code
						047 = B5 派生出 B14 B14 from B5
IM B14	IM V18	IM V19	*)	*)	*)	
IM 3601	IM 3611	IM 3631	IM 3651	IM 3661	IM 3671	

底脚和凸缘安装型电机，大凸缘
Foot- and flange-mounted motor with feet, large flange

代码 I/ 代码 II Code I / code II						变量代码 Variant code
						009 = B3 派生出 B35 B35 from B3
IM B35	IM V15	IM V35	*)	*)	*)	
IM 2001	IM 2011	IM 2031	IM 2051	IM 2061	IM 2071	

底脚和凸缘安装型电机，小凸缘
Foot- and flange-mounted motor with feet, small flange

代码 I/ 代码 II Code I / code II						变量代码 Variant code
						008 = B3 派生出 B34 B34 from B3
IM B34	IM V17					
IM 2101	IM 2111	IM 2131	IM 2151	IM 2161	IM 2171	

*) Not Stated in IEC 60034-7.
IEC 60034-7 无规定

产品概述 - 防护等级：IP 代码 / IK 代码
General information - Degrees of protection: IP code/IK code

按旋转电机外壳提供的防护等级分类符合

• 对于 IP 代码，适用 IEC 60034-5 或 EN 60529
• 对于 IK 代码，适用 EN 50102

IP 防护
防止人员接触（或接近）带电部件，以及机壳内的运转部件。同时避免外界固体异物侵入机器内，保护机器，避免进水防止受到有害影响。

IK 代码
机壳保护电机不受外部机械冲击不利影响的程度分级。

Classification of degrees of protection provided by enclosures of rotating machines refers to:

• Standard IEC 60034-5 or EN 60529 for IP code
• Standard EN 50102 for IK code

IP protection
Protection of persons against getting in contact with (or approaching) live parts and against contact with moving parts inside the enclosure. Also protection of the machine against ingress of solid foreign objects. Protection of machines against the harmful effects due to the ingress of water.

IK code
Classification of degrees of protection provided by enclosure for motors against external mechanical impacts.

IP 代码说明
Explanation of the IP code

特征字母 Ingress protection	对人和机壳内电机部件的保护程度 Degree of protection to persons and to parts of the motors inside the enclosure	机壳防止机器进水，遭受有害影响的防水程度 Degree of protection provided by the enclosure with respect to harmful effects due to ingress of water
IP	5	5
	1	2

IK 代码说明
Explanation of the IK code

国际机械保护 International mechanical protection	特征组 Characteristic group
IK	08
	1

位置1 Position 1
2：防止大于 12mm 的固体进入机壳 Motors protected against solid objects greater than 12 mm
4：防止大于 1mm 的固体进入机壳 Motors protected against solid objects greater than 1 mm
5：防尘保护电机 Dust-protected motors
6：隔尘电机 Dust-tight motors

位置2 Position 2
3：使电机被溅水后不受损害 Motors protected against spraying water
4：使电机被淋水后不受损害 Motors protected against splashing water
5：使电机被喷水后不受损害 Motors protected against water jets
6：使电机遭大浪后不受损害 Motors protected against heavy seas

位置1 Position 1	
IK代码和冲击能量之间的关系： Relation between IK code and impact energy:	
IK代码 IK code	冲击能量焦耳 Impact energy/Joule
0:	不按照EN 50102提供保护 Not protected according to EN 50102
01:	0.15
02:	0.2
03:	0.35
04:	0.5
05:	0.7
06:	1
07:	2
08:	5 (ABB 标准) 5 (ABB Standard)
09:	10
10:	20

订购信息
Ordering information

IE5

订购时，请按照示例在订单中说明以下最小数据。电机产品代码根据以下示例编写。

When placing an order, please state the following minimum data in the order, as in the example. The product code of the motor is composed in accordance with the following example.

示例	
电机型号	M2BJX 71MLA 6
极数	6
安装方式（IM 代码）	IM B3 (IM1001)
额定输出	1.5kW
产品代码	3GBJ073417-ASC
附加代码（如需）	

Example	
Motor type	M2BJX 71MLA 6
Pole number	6
Mounting arrangement (IM-code)	IM B3 (IM1001)
Rated output	1.5kW
Product code	3GBJ073417-ASC
Variant codes if needed	

产品代码说明
Explanation of the product code

电机型号 Motor type	电机尺寸 Motor size	产品代码 Product code	安装方式代码，电压及频率代码，产品族代码 Mounting arrangement, voltage and frequency code, generation codes	变量代码 Variant codes
M2BJX	**71MLA**	**3GBJ 073 417 - ASC**		**002, etc**
		1 2 3 4 5 6 7 8 9 10 11 12 13 14		

位置 1-4			
3GBJ = 全封闭铸铁机座永磁电机			
位置 5-6			
IEC 机座			
07 = 71	08 = 80	09 = 90	10 = 100
位置 7 极对数			
3=6 极 4=8 极			
位置 8 - 9 序列号			
位置 10 转速			
位置 11 -(破折号)			
位置 12 安装方式			
A = 底脚安装型电机 B = 凸缘安装型电机带通孔的大凸缘。			
位置 13 电压			
S 380 VY			
位置 14 产品族代码			

Positions 1 to 4			
3GBJ = Totally enclosed PM motor with cast iron frame			
Positions 5 to 6			
IEC size			
07 = 71	08 = 80	09 = 90	10 = 100
Positions 7 Speed (pole pairs)			
3=6 poles 4=8 poles			
Positions 8 to 9 Serial number			
Positions 10 Speed			
Positions 11 -(dash)			
Position 12 Mounting arrangement			
A = Foot-mounted motor B = Flange-mounted motor. Large flange with clearance holes.			
Position 13 Voltage			
S 380 VY			
Position 14 Generation code			

铭牌
Rating plates

IE5

铭牌以表格形式提供365V的转速、电流、效率的参数。

注：365V是电网电压经变频器压降后输出到电机定子侧的电压。

The rating plates are in table form giving values for speed, current and efficiency at 365V.

365V is the input voltage at motor side after voltage drop from convertor.

铭牌示例

ABB Shanghai Motors Co. Ltd
Shanghai 200245 P.R of China

IEC 60034-1 IE5

3 ~ PERMANENT MAGNET MOTOR					IMB5/IM3001	2022
M2BJX 90LA 6						
503251371005					EMF: 365V	IVIC:C/C
No.3G1C21470000165401					Ins.cl. F	IP 55
V	Hz	kW	r/min	A	Eff.	Duty
365 Y	150	5.5	3000	9.4	94.0%	S9

Product code 3GBJ093047-BSC
NETWORK VOLTAGE: 380-480V IE5 - IEC TS 60034-30-2
Nmax 3000r/min
6208-2Z/C3 6305-2Z/C3 27 kg

说明：
铭牌图片仅供格式参考，最终数据以实际铭牌为准。

Rating Plate sample

ABB Shanghai Motors Co. Ltd
Shanghai 200245 P.R of China

IEC 60034-1 IE5

3 ~ PERMANENT MAGNET MOTOR					IMB5/IM3001	2022
M2BJX 90LA 6						
503251371005					EMF: 365V	IVIC:C/C
No.3G1C21470000165401					Ins.cl. F	IP 55
V	Hz	kW	r/min	A	Eff.	Duty
365 Y	150	5.5	3000	9.4	94.0%	S9

Product code 3GBJ093047-BSC
NETWORK VOLTAGE: 380-480V IE5 - IEC TS 60034-30-2
Nmax 3000r/min
6208-2Z/C3 6305-2Z/C3 27 kg

Remark:
The format of the rating plate is for reference only. The final figure will be subject to the actual rating plate.

电气特性
Electrical design

绝缘系统
ABB 采用 F 级绝缘材料，B 级温升设计。

F 级绝缘系统 B 级温升的采用，使 ABB 产品可获得 25°C的安全裕度。这使电机在短时间内过载使用，或在较高环境温度和海拔，或在高电压和频率容差下使用成为可能。这一设计同样可用于延长绝缘寿命。例如，温度降低 10K，绝缘寿命延长。

B 级绝缘（130°C）
• 额定环境温度 40°C
• 最大允许温升 80K
• 热点温升裕度 10K

F 级绝缘（155°C）
• 额定环境温度 40°C
• 最大允许温升 105K
• 热点温升裕度 10K

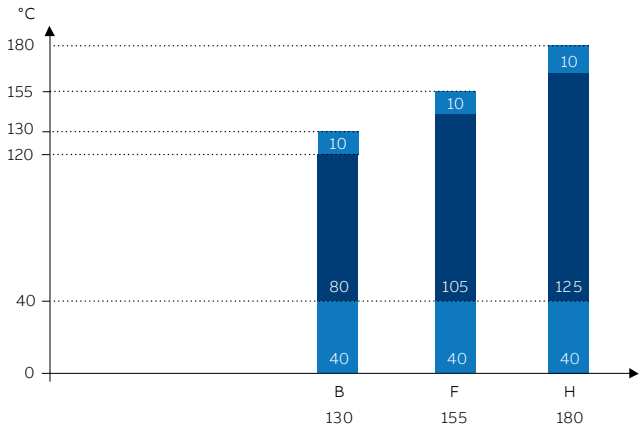
H 级绝缘（180°C）
• 额定环境温度 40°C
• 最大允许温升 125K
• 热点温升裕度 10K

Insulation
ABB uses class F insulation, which with temperature rise B, is the common requirement among industry today. The use of class F insulation with class B temperature rise gives ABB products a 25 °C safety margin. This can be used to increase the loading for limited periods, to operate at higher ambient temperatures or altitudes, or with greater voltage and frequency tolerances. It can also be used to extend insulation life. For instance, a 10 K temperature reduction will extend the insulation life.

Thermal class 130 (B)
• Nominal ambient temperature 40 °C
• Max permissible temperature rise 80K
• Hot spot temperature margin 10K

Thermal class 155 (F)
• Nominal ambient temperature 40 °C
• Max permissible temperature rise 105K
• Hot spot temperature margin 10K

Thermal class 180 (H)
• Nominal ambient temperature 40 °C
• Max permissible temperature rise 125K
• Hot spot temperature margin 10K



各绝缘等级的安全裕度
Safety margins per thermal class

电气特性
Electrical design

运行环境

根据 IEC 60034-1 规定，容差是指测试值与铭牌 (或样本) 标称值之间的最大允许偏差。测试结果基于按照 IEC 60034-2-1, IEC 60034-9, IEC 60034-12 所规定的测试。

Environmental

In accordance with IEC 60034-1, tolerance is the maximum allowed deviation between the test result and the declared value on the rating plate (or in the catalog). Test results are based on test procedures in accordance with IEC 60034-2-1, IEC 60034-9, and IEC 60034-12.

电气数据容差

Tolerance for electricel data

	效率 Efficiency	功率因数 * Power factor	最大转矩 Breakdown torque T_b / T_N	转动惯量 Moment of inertia	噪声等级 Noise level
PN (kW) ≤ 150	-15 %(1-η)	-1/6 (1-cos φ)	-10 % of the value	± 10 % of the value	+3 dB(A)
PN (kW) > 150	-10 %(1-η)				

* 功率因数容差最小绝对值：0.02，最大绝对值：0.07。
* Power factor minimum absolute value 0.02, maximum absolute value 0.07.

环境温度及海拔高度

标准电机设计的最大环境温度为 40°C，最高海拔为 1000m。如果当电机在较高的环境温度或海拔下运行，输出功率相应降低。详情请咨询 ABB。

Ambient temperatures and high altitudes

Normal motors are designed for operation at a maximum ambient temperature of 40°C and at a maximum altitude of 1000 meters above sea level. If a motor is operated at higher ambient temperatures or altitude, it should be derated. Detailed information, please contact your ABB sales office.

对于不同高度和（或）不同环境温度的功率换算系数 kHT

Factor kHT for different site altitudes and / or coolant temperature

海拔高度 Site altitude above see level	对应海拔高度的环境温度 Site altitude above see 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

机械设计
Mechanical design

机座
包括底脚在内的电机机座是铸铁制成的。整体式铸铁底脚能够实现稳固的安装及降低振动。可提供底脚安装型、凸缘安装型及二者结合的电机。

排水孔
如果在非常湿润或潮湿的环境下，特别是在断续负载下操作电机，则应设置排水孔。根据电机安装方法，指定相应的 IM 标号，如 IM 3031。

机座号为 71 到 90 的电机安装了排水孔及闭合塞。孔塞在出厂时打开。安装电机时，确保排水孔朝下。

垂直安装时，上塞必须完全闭合。在灰尘过多的环境中，两个塞都应闭合。

安装方式不同于底脚安装型 IM B3 时，请在订购时使用变量代码 066。

请参阅“排水孔”标题下的变量代码 066。

Motor frame
The motor frame is made of cast iron, and the standard design includes cast iron feet. Integrated cast iron feet provide rigid mounting, and lower vibration. Motors can be supplied for foot mounting, flange mounting, and combinations of these.

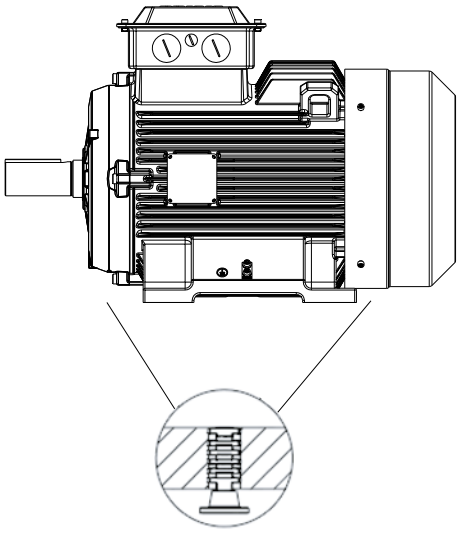
Drain holes
Motors that will be operated in very humid or wet environments, and especially under intermittent duty, should be provided with drain holes. The IM designation, such as IM 3031, determines the intended mounting arrangement for the motor.

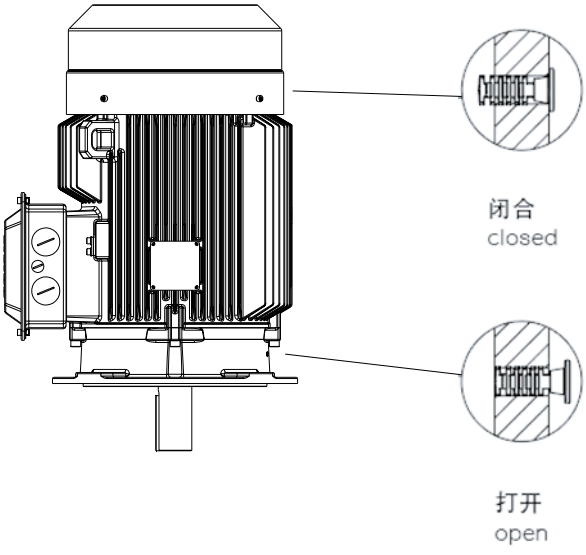
Motor sizes 71 - 90 are fitted with drain holes and closable plugs. The plugs are open on delivery. When mounting the motors, ensure that the drain holes face downwards.

In the case of vertical mounting, the upper plug must be hammered home completely. In very dusty environments, both plugs should be hammered home.

When mounting arrangement differs from foot mounted IM B3, mention variant code 066 when ordering.

See variant codes 066 under the heading “Drain holes”.





机座号 71-90
标准情况下配备排水孔及闭合塞

As standard, motor sizes 71 - 90 are delivered with drain holes and closable plugs.

机械设计
Mechanical design

轴承
电机通常安装以下单列深沟球轴承。

标准及可选设计

机座号	极数	标准设计	
		深沟球轴承	
		D 端	N 端
71	6	6205-2Z/C3	6302-2Z/C3
80	6	6206-2Z/C3	6303-2Z/C3
90	6	6208-2Z/C3	6305-2Z/C3

说明：
电机铭牌上显示轴承型号及描述方式仅供客户更换、维修轴承作参考，不代表轴承品牌，具体的轴承品牌以公司实际使用的为准。

轴向锁定轴承
所有电机在 D 端标配轴向锁定轴承。

轴密封件
每规格电机的密封尺寸和类型符合下表：

Bearings
General performance motors are normally fitted with single-row deep-groove ball bearings, as shown in the table below.

Standard and alternative designs

Motor size	Number of poles	Standard design	
		Deep groove ball bearings	
		D-end	N-end
71	6	6205-2Z/C3	6302-2Z/C3
80	6	6206-2Z/C3	6303-2Z/C3
90	6	6208-2Z/C3	6305-2Z/C3

Remark:
The bearing type and description on rating plate do not represent the bearing brand, instead it is a technical consideration that can help the owner to make replacement and set up a maintenance program. The brand is subject to the bearing installed.

Axially-locked bearings
All motors are equipped as standard with an axially locked bearing. General at D-end.

Bearing seals
This table presents the standard sizes and types of bearing seals per motor size.

机座号 Motor size	极数 Number of Poles	标准设计 Standard design		可选设计 Optional design	
		轴向密封件 Axial seal		D 端伽玛密封 Gamma seal at D-end	D 端径向密封 Radial seal at D-end
		D 端 D-end	N 端 N-end	变量代码 784 Variant codes 784	变量代码 072 Variant codes 072
71	6	V-25A	V-14A	25 x 40 x 4	25 x 42 x7
80	6	V-30A	V-16A	30 x 47 x 4.5	30 x 52 x7
90	6	V-40A	V-25A	40 x 57 x 4.5	40 x 62 x7

机械设计
Mechanical design

轴承寿命

根据 ISO 281，轴承的正常寿命 L_{10h} 定义为在特定条件下 90% 的相同轴承在一系列测试中所达到或超过的运行小时数。50% 的轴承至少达到这一数字的五倍。

润滑

装有封闭式轴承的电机

机座号为 71-90 的电机采用封闭式轴承。封闭式轴承中装有优质的润滑脂。铭牌上印有轴承型号。

以下数值可作为轴承使用寿命指导值，具体寿命取决于应用和负载情况：

皮带轮直径

所需轴承寿命确定后，最小允许皮带轮直径可使用 F_R 计算，如下所示：

$$D = \frac{1.9 \cdot 10^7 \cdot K \cdot P}{n \cdot F_R}$$

其中：	
D：	带轮直径，单位（mm）
P：	功率要求，kW
n：	电机转速，r/min
K：	皮带张力因数，取决于皮带类型和负载类型。 V 形皮带通用值为 2.5。
F_R：	允许径向力

Bearing life

The nominal life L_{10h} of a bearing is defined according to ISO 281 as the number of operating hours achieved or exceeded by 90% of identical bearings in a large test series under specified conditions. 50% of bearings achieve at least five times this lifetime.

Lubrication

Motors with bearings greased for life

Motors in frame sizes 71-90 are equipped with bearings greased for life. Bearings are lubricated with high-quality grease. Bearing types are stated on the rating plate.

The following values can be used as a guide for bearing lifetime, depending on application and load conditions:

Pulley diameter

When the desired bearing life has been determined, the minimum permissible pulley diameter can be calculated with F_R as follows:

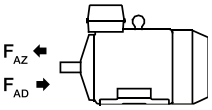
$$D = \frac{1.9 \cdot 10^7 \cdot K \cdot P}{n \cdot F_R}$$

Where:	
D：	Pulley diameter, mm
P：	Power requirement, kW
n：	Motor speed, r/min
K：	Belt tension factor, dependent on belt type and type of duty A common value of V-belts is 2.5
F_R：	Permissible radial force

机械设计
Mechanical design

轴上允许负载
允许轴向力
表中提供了环境温度为25℃时，正常条件下，径向力为零时的轴伸允许轴向力（N）。分别对轴承寿命满足20000和40000小时进行计算。

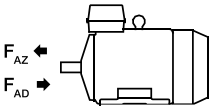
可根据需求同时提供径向和轴向力的允许载荷。对于轴向力 F_{AD}，假设 D 轴承锁定。



安装方式 IM B3

Permissible loading on the shaft
Permissible axial forces
The following tables present permissible axial forces on the shaft in Newton's, assuming zero radial force, a 25 °C ambient temperature, and normal conditions. The values are given for a calculated bearing life of 20 000 and 40 000 hours per motor size.

Permissible loads of simultaneous radial and axial forces can be supplied on request. For axial force F_{AD}, it is assumed that the D-bearing is locked with a locking ring.



Mounting arrangement IM B3

机座号 Motor size	转速 Speed (r/min)	轴伸长度 Length of shaft extension E (mm)	深沟球轴承 Basic design with deep groove ball bearings 20,000 小时 20,000 h F_{AD} (N)	 F_{AZ}(N)	40,000 小时 40,000 h F_{AD} (N)	 F_{AZ}(N)
71	3000	50	830	470	670	310
80	1500	60	1400	1000	1090	690
80	3000	60	1090	690	870	470
90SL	1000	80	2380	1820	1830	1270
90SL	1500	80	2030	1470	1600	1040
90SL	3000	80	1600	1040	1270	710
90L	1000	80	2380	1820	1830	1270
90L	1500	80	2030	1470	1600	1040
90L	3000	80	1600	1040	1270	710

允许径向力

表中提供了环境温度为 25°C时，正常条件下，轴向力为零时的轴伸允许径向力（N）。分别对轴承寿命满足20,000小时和40,000小时进行计算。

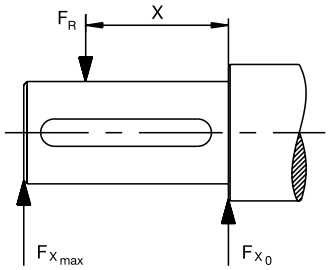
电机为底座安装型 IM B3，并且含横向力。在某些情况下，轴的强度影响允许负载力。

需提供同时存在径向力和轴向力的允许负载值，请联系 ABB。

如果径向力作用于点 X_0 和 X_{max} 之间，则允许负载力 F_R 可以通过以下公式计算：

$$F_R = F_{X_0} - \frac{X}{E}(F_{X_0} - F_{X_{max}})$$

E : 基本型号中的轴伸长度



Permissible radial forces

The following table gives the permissible radial forces on shaft in Newton, assuming zero axial force, ambient temperature of 25°C , and normal conditions. The values are given for calculated bearing life of 20,000 and 40,000 hours per motor size.

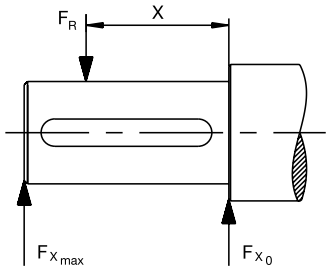
These calculated values further assume mounting position IM B3 (foot-mounted), with force directed sideways. In some cases, the strength of the shaft affects permissible forces.

Permissible loads of simultaneous radial and axial forces can be supplied on request.

If the radial force is applied between points X_0 and X_{max}, the permissible force F_R can be calculated with the following formula:

$$F_R = F_{X_0} - \frac{X}{E}(F_{X_0} - F_{X_{max}})$$

E : Length of the shaft extension in the standard version



机座号 Motor size	转速 Speed (r/min)	轴伸长度 Length of shaft extension E (mm)	深沟球轴承 Basic design with deep groove ball bearings 20,000 小时 20,000 h F_{X0} (N)	 F_{Xmax}(N)	40,000 小时 40,000 h F_{X0} (N)	 F_{Xmax}(N)
71	3000	50	810	640	640	510
80	1500	60	1420	1100	1120	870
80	3000	60	1120	870	890	690
90SL	1000	80	2420	1800	1920	1430
90SL	1500	80	2110	1570	1670	1250
90SL	3000	80	1670	1250	1330	990
90L	1000	80	2450	1890	1950	1500
90L	1500	80	2140	1650	1700	1310
90L	3000	80	1700	1310	1350	1040

机械设计
Mechanical design

标准接线盒交付
标准接线盒的防护等级为IP55。标准情况下，接线盒安装在电机D端顶部。机座号71-90 的电机，采用一体式接线盒，因此接线盒无法转动，如需实现接线盒电缆入口2x180°转向，可使用变量代码（VC022).

如果未另行规定，则采用标准交付。

注意：对于侧面安装的电机，请联系ABB！

Standard terminal box
The degree of protection for the standard terminal box is IP 55. By default, terminal boxes are mounted on top of the motor at D-end. In motor sizes 71-90, the terminal box is integrated in motor frame, turning is not possible in the standard motor, but 2x180° turning is available as an option (variant code 022).

Standard delivery if no other information is provided.

Note: For side-mounted motors, contact your ABB sales office.

机座号 Motor size	极数 Pole number	螺纹孔 Threaded holes	电缆外径 mm Cable outer diameter mm	单芯横截面 平方毫米/相 Single core cross-section mm²/phase	端子螺栓尺寸 6x terminal bolt size 6x
71	2-8	2xM16x1.5	Ø5-9	2.5	M4
80-90	2-8	2xM25x1.5	Ø11-16	4	M4

电机接地 Earthing	机座接地 Earthing on frame	主接线盒接地 Earthing in main terminal box
71-90	M5	M5

表面处理
ABB 低压电机标准喷漆系统符合 ISO/ EN 12944:2 的腐蚀类别 C3M（相当于中等耐腐蚀性及耐用性）。

标准色为Munsell蓝8B 4.5/3.25。其它颜色，请用变量代码114进行订购。

机械振动
ABB标准电机满足IEC60034-14 标准中的 A 级振动。

Surface treatment
ABB's standard surface treatment is corrosivity category C3, durability range M (which equal to medium corrosivity and medium durability) based on the ISO 12944 standard.

The standard ABB paint color for motors is Munsell blue 8B 4.5/3.25. Other colors are also available, see variant code 114

Vibration
ABB motor meets the requirements of class A vibration based on IEC60034-14 standard.

永磁电机配合ABB变频驱动
PM motors with ABB variable speed drives

客户现场的持续高性能和高效率是每家客户都关心并期望的事。ABB的变频驱动器在设计的初期就为大家考虑到了这一点。ABB拥有超过40年的设计服务经验并可以提供整个生命周期内的各种服务事项。

ABB驱动配备了最先进的电机控制系统，帮助您优化整个生产流程，提高能源效率和产品质量，用更少的运营成本产出更多的产品，并减少您的停机时间和维护频次。所有ABB驱动都是基于更加便利的选择、订购、安装和使用来设计，我们提供集成的安全特性，让您有更多的时间专注于更重要的事情及您的业务。

我们的产品组合包括中低压交直流驱动器，功率从几千瓦到数兆瓦，可用于基本上每一个行业和应用的所有类型电机，使用环境从水处理设备到洁净的电器柜，从恶劣的煤矿和海上平台到食品及饮料生产。如此宽的产品范围可以让您选择最合适的驱动解决方案，提供最强的可靠性和效率来满足每一个客户的需要。

详情请咨询ABB或访问官网
https://new.abb.com/drives

Being able to rely on the continuous high performance and efficiency of your operations is something you want to take for granted. ABB variable frequency drives are made with all this in mind, established upon more than 40 years of experience and backed by a broad range of life cycle services.

ABB drives help you to optimize your processes and systems with state-of-the-art motor control technology, resulting in increased energy efficiency, better product quality, and reduced operating costs with higher output, less downtime, and reduced need for maintenance. All ABB drives are designed for easy selection, ordering, installation and use, and they offer integrated safety features, giving you more time to focus on what matters for you and your business.

Our portfolio offers low-voltage AC and DC drives, medium-voltage AC drives, and motion control drives spanning the fractional-kilowatt to multimegawatt power level. There is a drive available for essentially every industry and application and for all types of motors, in environments ranging from water utility facilities to clean electrical rooms, and to harsh coal mines and windy offshore platforms to food and beverage production. This wide product range allows you to select the best-fitting drive solution, providing maximum reliability and efficiency for every need.

Consult ABB to find the drive that matches your business needs the best or visit our web page
https://new.abb.com/drives

技术数据
Technical data

IE5

IP55 - IC411 - 绝缘等级F，温升等级B
IE5效率等级数据根据 IEC 60034-30-2：2016
IP 55 - IC 411 - Insulation class F, temperature rise class B
IE5 efficiency class according to IEC 60034-30-2; 2016

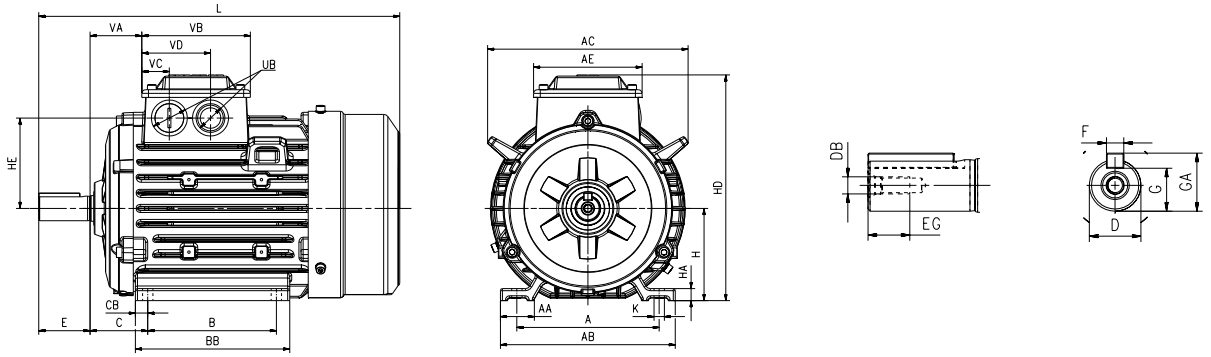
输出 Output	电机型号 Motor type	产品代码 Product code	转速 Speed	效率 Efficiency			功率因数 Power factor			电流 Current	转矩 Torque	转动惯量 Moment of inertia	重量 Weight	声压等级 Sound pressure level,
kW			r/min	满载 load 100%	3/4 负载 load 75%	1/2 负载 load 50%	100% cosΦ	75%	50%	I_N A	T_N Nm	J=1/4 GD^2kgm^2	kg	L_{PA} dB
3000 r/min			**365 V 150Hz**						**CENELEC- 设计 design**					
1.5	M2BJX 71MLA 6	3GBJ073417-•SC	3000	90.9	90.8	90.8	0.96	0.95	0.95	2.72	4.8	0.00090	12	61
2.2	M2BJX 71MLB 6	3GBJ073427-•SC	3000	91.8	91.2	90.6	0.96	0.96	0.97	3.95	7.0	0.00126	13	60
3	M2BJX 80MB 6	3GBJ083327-•SC	3000	92.6	92.5	91.5	0.98	0.97	0.97	5.23	9.6	0.00230	19	70
4	M2BJX 90SLA 6	3GBJ093017-•SC	3000	93.3	92.7	92.2	0.97	0.96	0.97	6.99	12.7	0.00451	24	62
5.5	M2BJX 90SLD 6	3GBJ093047-•SC	3000	94.0	93.3	92.4	0.98	0.96	0.95	9.44	17.5	0.00554	26	69
7.5	M2BJX 90LB 6	3GBJ093527-•SC	3000	94.5	92.8	91.2	0.97	0.97	0.97	12.9	23.9	0.00724	32	68
1500 r/min			**365V 75Hz**						**CENELEC- 设计 design**					
1.5	M2BJX 80MA 6	3GBJ083313-•SC	1500	89.1	89.0	88.8	0.97	0.99	0.99	2.75	9.6	0.00230	19	58
2.2	M2BJX 90SLC 6	3GBJ093033-•SC	1500	90.2	90.1	89.8	0.98	0.97	0.97	3.94	14.0	0.00484	25	61
3	M2BJX 90SLE 6	3GBJ093053-•SC	1500	91.1	90.0	89.0	0.98	0.97	0.98	5.32	19.1	0.00621	27	59
4	M2BJX 90LC 6	3GBJ093533-•SC	1500	91.8	91.7	91.5	0.97	0.97	0.97	7.11	25.5	0.00797	33	70
1000 r/min			**365V 50Hz**						**CENELEC- 设计 design**					
1.5	M2BJX 90SLB 6	3GBJ093022-•SC	1000	89.9	89.3	89.1	0.97	0.96	0.96	2.72	14.3	0.00484	25	58
2.2	M2BJX 90LA 6	3GBJ093512-•SC	1000	90.9	90.8	90.7	0.95	0.95	0.95	4.03	21.0	0.00664	28	60
3	M2BJX 90LD 6	3GBJ093542-•SC	1000	91.8	91.6	91.2	0.96	0.96	0.96	5.38	28.7	0.00831	34	59

产品代码中的一个圆点表示可选的安装方式代码（见订购信息一页）。

The one bullet in the product code indicate choice of mounting arrangements code (see ordering information page).

外形图及外形尺寸 机座号 71-90
Dimension drawings Frame size 71-90

底脚安装型电机 IM1001, B3
Foot-mounted motor IM1001, B3



电机尺寸 Motor size		A	AA	AB	AC	AE	B	B'	BB	C	CB	D-tol.	DB	E	EG
M2BJX	71ML	112	30	136	147	96	90	-	135	45	10	24	M8	50	19
	80M	125	33	154	161	106	100	-	125	50	12.5	28	M10	60	22
	90SL	140	33	170	195	106	100	125	150	56	12	38	M12	80	28
	90L	140	33	170	195	106	125	-	185	56	12	38	M12	80	28

电机尺寸 Motor size		F	G	GA	H	HA	HE	HD	K	L	UB	VA	VB	VC	VD
M2BJX	71ML	8	20	28	71	9	65	175	7	307	M16x1.5	40	96	32	64
	80M	8	24	32	80	12	72	192	10	332	M25x1.5	43	106	33	73
	90SL	10	33	43	90	12	88	217	10	385	M25x1.5	50	106	33	73
	90L	10	33	43	90	12	88	217	10	420	M25x1.5	50	106	33	73

公差 Tolerance	
A, B	± 0.8
D	ISO j6 ≤ ϕ28 mm
	ISO k6 ≤ ϕ38 mm
F	ISO h9
H	+0, -0.5
N	ISO j6
C	± 0.8

上表给出了主要尺寸（单位：mm）
如需图纸详情，请访问我们的网页
www.abb.com/motors&generators 或联系 ABB。

Above table gives the main dimensions in mm.
For detailed drawings please see our web-pages
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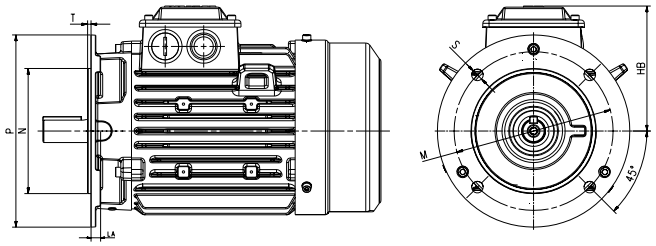
外形图及外形尺寸 Dimension drawings

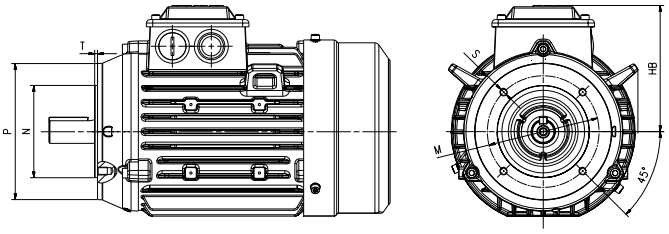
机座号 71-90 Frame size 71-90

凸缘安装型电机 IM3001, B5
Flange-mounted motor IM3001, B5



电机尺寸 Motor size		HB	LA	M	N	P	S	T
M2BJX	71ML	104	9	130	110	160	10	3.5
	80M	112	10	165	130	200	12	3.5
	90SL	127	10	165	130	200	12	3.5
	90L	127	10	165	130	200	12	3.5

小凸缘安装型电机 IM3601, B14
Small flange-mounted motor IM3601, B14



电机尺寸 Motor size		M	N	P	S	T
M2BJX	71ML	85	70	105	M6	2.5
	80M	100	80	120	M6	3
	90SL	115	95	140	M8	3
	90L	115	95	140	M8	3

公差 Tolerance	
A, B	± 0.8
D	ISO j6 ≤ ϕ28 mm
	ISO k6 ≤ ϕ38 mm
F	ISO h9
H	+0, -0.5
N	ISO j6
C	± 0.8

上表给出了主要尺寸（单位：mm）
如需图纸详情，请访问我们的网页
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Above table gives the main dimensions in mm.
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变量代码 IE5
Variant codes

变量代码 Variant code	描 述 Description	M2BJX 71	80	90
管理 Management				
530	正常质保期延长 2 年 Two-year extension on standard warranty	●	●	●
865	延长一年质保 One-year extension on standard warranty	●	●	●
行业标准设计 Branch standard designs				
178	不锈钢 / 耐酸螺栓 Stainless steel / acid proof bolts	●	●	●
加热元件 Heating elements				
451	加热带 , 200-240V Heating element, 200 - 240V	●	●	●
安装方式 Mounting arrangements				
008	IM 2101 底脚 / 法兰安装 ,IEC 法兰 , 由 IM 1001 派生 (B3 派生出 B34) IM 2101 foot/flange mounted, IEC flange, from IM 1001 (B34 from B3)	●	●	●
009	IM 2001 底脚 / 法兰安装 ,IEC 法兰 , 由 IM 1001 派生 (B3 派生出 B35) IM 2001 foot/flange mounted, IEC flange, from IM 1001 (B35 from B3)	●	●	●
047	IM 3601 法兰安装 ,IEC 法兰 , 由 IM 3001 派生 (B5 派生出 B14) IM 3601 flange mounted, IEC flange, from IM 3001 (B14 from B5)	●	●	●
066	非标安装方式 (请指定 IM xxxx) (除 B3(1001),B5(3001), B14 (3601), IM B35 (2001) & IM B34 (2101)) 外的其它安装型式须在定单中注明) Modified for specified mounting position differing from IM B3 (1001), IM B5 (3001), B14 (3601), IM B35 (2001), IM B34 (2101)	●	●	●
绝缘系统 Insualtion system				
014	H 级绝缘绕组 Winding insulation class H	●	●	●
喷漆 Painting				
114	特殊油漆颜色， 标准等级 Special paint color, standard grade	●	●	●
防护 Protection				
005	防护罩 , 立式电机 , 轴伸向下 Protective roof	●	●	●
072	D 端径向密封 . 不适用于 280,315 的 2 极电机 Radial seal at D-end. Not possible for 2-pole , 280 and 315 frames	●	●	●
403	防护等级 IP56 Degree of protection IP56	●	●	●
铭牌和指示牌 Rating & instruction plates				
002	重敲铭牌电压、频率、输出、连续工作制 Restamping voltage, frequency and output, continuous duty	●	●	●
轴和转子 Shaft and rotor				
070	D 端特殊轴伸 , 标准材料 Special shaft extension at D-End, standard shaft material	●	●	●
标准和规范 Standards and regulations				
538	CE 标识 CE mark	O	O	O
定子绕组温度传感器 Stator winding temperature sensors				
436	定子绕组安装 PTC- 热敏电阻 (3 个串联),150 ° C PTC - thermistors (3 in series), 150 ° C, in stator winding	●	●	●

O 标配 | ● 可选 | - 不适用
O = Included as standard | ● = Available as option | - = Not applicable

变量代码
Variant codes

IE5

变量代码 Variant code	描 述 Description	M2BJX 71	80	90
轴承与润滑 Bearings and Lubrication				
057	两端 2RS 轴承 2RS bearings at both ends	●	●	●
622	铸铁轴承内盖 (低窜动) Inner bearing cover of cast iron	-	●	●
测试 Testing				
148	出厂试验报告 outine test report	●	●	●
接线盒 Terminal box				
022	电缆进线孔在左侧 (从 D 端看) Cable entry LHS (seen from D-end)	●	●	●
冷却系统 Cooling system				
183	独立电机冷却 (轴流风扇 ,N 端) Separate motor cooling (fan axial, N-end)	●	●	●

O 标配 | ● 可选 | - 不适用
O = Included as standard | ● = Available as option | - = Not applicable

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