



说明书
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SIMOTICS 1LE8 低压交流异步电动机

安装与维护手册

Installation and Maintenance Manual

[siemens.com.cn](https://www.siemens.com.cn)

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简介

1.1 应用范围

SIMOTICS 1LE8 系列标准电机的防护等级达到 IEC60034-5 标准中 IP55 防护等级的要求（见铭牌标注），适用于粉尘及潮湿的工作环境。

如果电机安装或储存于户外，有必要增加相应的防护装置，以避免受长期强烈的阳光曝晒、雨水的侵蚀、以及冰雪和灰尘对电机造成的影响。

相关使用环境条件如下：

- 海拔高度 $\leq 1000 \text{ m}$
- 环境温度 $+40 \text{ }^{\circ}\text{C}$
- 操作环境温度 $-20 \text{ }^{\circ}\text{C} \sim +40 \text{ }^{\circ}\text{C}$
- 相对湿度

环境温度	相对湿度
$-20 \text{ }^{\circ}\text{C} \leq T \leq 20 \text{ }^{\circ}\text{C}$	100 %
$20 \text{ }^{\circ}\text{C} < T \leq 30 \text{ }^{\circ}\text{C}$	95 %
$30 \text{ }^{\circ}\text{C} < T \leq 40 \text{ }^{\circ}\text{C}$	55 %

注：如果使用环境条件和以上不一样，请咨询西门子。

本系列 2 极，4 极，6 极，8 极电机符合 GB18613-2020《中小型三相异步电动机能效限定值及能效等级》标准，具体规格的能效标准对应如下：

1LE8003/1LE8033 是 3 级能效，具体能效可以参见铭牌。

1.2 冷却方式

自冷却方式（标准配置）：冷却方式 IC411，符合 IEC/EN 60034-6 标准要求。

SIMOTICS 1LE8 电机为全封闭自冷却（双向风扇）型式电机，在使用时确保电机具有足够的冷却风量。如果使用可选外部风扇，必须在安装风扇时确保合适的冷却风向。

强制冷却方式（选件）：冷却方式为 IC416，满足 IEC/EN 60034 标准要求。

电机冷却是通过一个独立的风扇（强制通风）而实现的。这种强制冷却不受机器运行状态的影响。

注意

- 1) 确保独立风扇气流通畅，且与周围环境气流方向一致；
- 2) 独立风扇须由一个独立电源模块供电，并且确保风扇的转向与其风扇罩上附带的转向标志指示的方向一致；
- 3) 独立风扇不能通过变频器驱动；
- 4) 电机启动前，先启动独立风扇，然后启动电机；电机停机时，先关闭电机电源，待电机停止运行后断开独立风扇驱动电源。

1.3 安装结构型式

电机铭牌上标出了其安装结构型式

警告

在运输过程中，电机须通过吊环或电机结构类型指定位置进行吊装搬运。

安装型式	IM B3 FS315~355	IM B6 ³⁾ FS315	IM B7 ³⁾ FS315	IM B8 ³⁾ FS315
示意图				
电机编号第14位号上对应的字母	A	T	U	V

安装型式	IM V5 ¹⁾ FS315	IM V6 ²⁾ FS315	IM V1 ¹⁾ FS315~355
示意图			
电机编号第14位号上对应的字母	C	D	G

安装型式	IM B35 FS315~355	IM V15 ¹⁾ FS315	IM V35 ²⁾ FS315
示意图			
电机编号第14位号上对应的字母	J	W	Y

注：

- 1) 室外使用时推荐使用护罩（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；
- 3) 不适用于1LE8033。

搬运及存储

在运输电机时，必须使用所有吊环来搬运。在搬运电机之前，请确保吊环安装正确且牢固，但切勿使用电机轴和风扇罩来搬运电机。另外，电机升降时必须注意避免摇摆和震动，以防造成轴承受损。

如果电机配有转子固定装置，则在运输电机时始终应使用该装置。在整个运输期间它都必须保持固定不能发生移动。如果客户已经加装了一些零件，例如联轴器或者带轮，则轴承在运输过程中有可能会损坏。在这种情况下需要客户自行准备转子固定装置。

建议所有的电机应该储存在干燥无尘的环境之下，并避免过多的震动。

电动机存放时不允许堆码。对于有包装箱的电机，按照包装箱上的标识操作。

2.1 室外存放

选择水平、不会摇晃且干燥的存放位置。如果按照存放要求是必要的，请在存放前修复损坏的包装。将电机、设备和包装箱放置在底架、大方木料或基座上，以防止地面湿气。防止电机陷入地下。

防潮用的盖布或防雨布不得与所存放物品的表面接触。放置间隔板垫，以确保足够的空气循环。

2.2 室内存放

应防止受极端天气的影响，储藏室应保持干燥、通风良好并且防尘、防冻、防撞、抗震。

2.3 金属裸露表面

考虑到运输已对裸露部分（如轴端、法兰表面、中心边缘）进行了临时的防腐处理（< 6 个月）。长期存放时，须采取适当的防腐措施。

！ 警告

如果电机没有采取任何保护措施而在室外使用或存放，会导致电机损坏。

- 避免电机受强烈阳光照射、雨雪、冰雹或灰尘的侵蚀。
 - 在户外或湿度大的环境中存储电机可能导致电机零部件生锈。
 - 必要时请咨询服务中心或者遵循户外使用电机的技术条件。
-

2.4 存放温度

允许的温度范围：-20 °C 到 +50 °C

允许的最大空气湿度：60 %

对于因环境温度而对运行状态或海拔有特殊规定的电机，其存放温度需要遵守其他条件。此时请参照电机铭牌上的环境温度和海拔的说明。

2.5 存放时间

每半年必须至少旋转一次电机轴，避免振蚀。长期存放会降低轴承的润滑使用寿命。

2.6 开放型轴承

- 存放超过 12 个月时，应对开放型轴承的润滑脂进行检查。
- 如果检查时发现润滑脂耗尽或受污染，必须立即更换润滑脂。冷凝水渗入会改变润滑脂粘稠度。

2.7 密封型轴承

- 密封型轴承存放超过 24 个月时，应更换驱动端和非驱动端轴承。

如果电机在灰尘及湿度较大环境下存储时间超过 2 年，电机的使用寿命将会降低。对于这种情况，必要时在电机安装和启动前，对其绝缘系统进行检测，从而保证其可以正常稳定的运行（相关参考值，见 3.5）。

电机加工表面（法兰表面，轴端表面等）已在工厂进行防腐蚀处理，但是在电机储存时仍需做必要的防腐措施。建议经常转动一下电机轴，使轴承润滑脂分布均匀，同时避免产生静态压痕。



所有工作都必须由熟练工人进行操作。电机做任何操作工作之前，确保电机与主线及辅助电源断开。并且确保电源不被意外开启。

3.1

安装

良好的基础与正确的安装是将来电机长期可靠运行的基本条件。基础不良或者安装不当，会造成异常的电机振动和噪音。

3.1.1 基础要求

电机安装的基础可以是金属底座，也可以是混凝土结构的平台，无论是何种结构基础都应有足够的强度与刚性支撑电机。

基础的设计可以参考 DIN4024。

支撑电机的基础表面必须是平面，常用电机支撑平面的平面度：

机座号 (FS)	平面度 (mm)
≤ 132	0.10
160	0.15
≥ 180	0.20

3.1.2 安装要求

由于机械部件制造公差及累积误差的存在，电机底脚安装平面与基础安装的接触平面之间，可能存在间隙。

安装时，应仔细用塞尺测量此间隙值。对于 >0.05mm 的间隙，应插入合适的填隙片。填隙片的尺寸根据实际的间隙值配做。



插入合适厚度的填隙片

3.1.3 电机安装完毕后必须将吊环拧紧。

当电机竖直安装且电机轴驱动端向下时，建议在非驱动端增加防护罩，从而可以避免水及其他外部物体进入风扇罩，从而影响电机散热。

3.1.4 当电机竖直安装且驱动端轴朝上安装，建议做必要的防护措施，以防止液体沿电机轴进入电机。

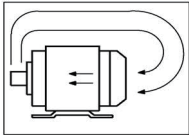
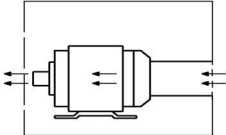
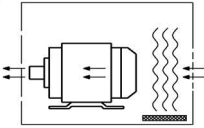
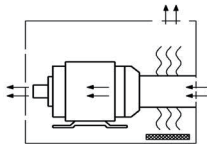
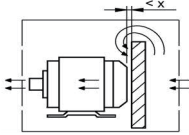
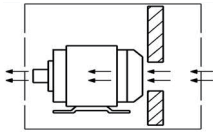
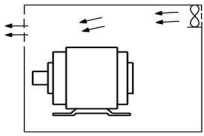
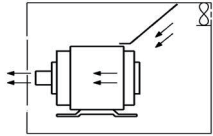
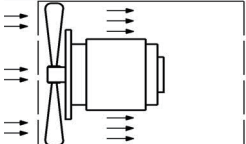
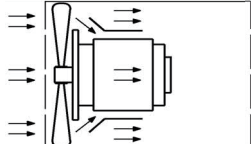
3.1.5 确保合理的冷却

警告

如果不注意以下几点说明，可能会造成财产损失、重伤或死亡。

- 切勿阻碍通风。
- 应防止临近机组的废气被直接吸入。
- 对进风口朝上的垂直安装电机，应防止异物和水从进风口进入。
- 对于轴端向上的电机，应防止液体沿轴端流入电机。

对于带有外部风扇的电机，请对电路进行设计以防止在外部风扇未运行时接通并运行主电机。

错误	正确
	
	
	
	
	

电机进风口与相邻模块的最小间距“X”尺寸见下表

机座号	X mm
315	110
355	140

3.2 接线盒

接线盒安装于电机顶部或侧面（左侧或右侧），可以作 $4 \times 90^\circ$ 方向旋转，便于电缆多角度引入。

3.3 动平衡与联结

为了确保安静、无振动的运行环境，对传动联结件（联轴器、滑轮、风扇、变速器等）须进行适当的轴向、径向校正。

1LE8 电机转子动平衡方式为半键平衡。动平衡方式在电机铭牌上有标注（H 表示半键平衡）。

注意

- 1) 为确保无振动运行，传动联结件的动平衡方式为半键平衡；
 - 2) 在调整传动联结件配合过程中，须考虑联结件与电机的温度环境；
 - 3) 当电机启动前没有联结任何传动件时，电机轴上的键必须移除。
-

3.4 电气连接



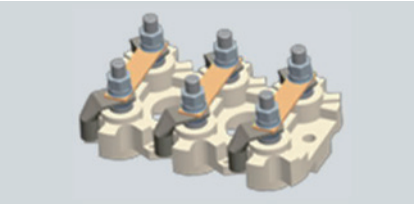
所有工作都必须由熟练工人进行操作。电机做任何操作工作之前，确保电机与主线及辅助电源断开。并且确保电源不被意外开启。

电机的接线盒内都有六个电源线接线端子和两个接地端子，电机的机壳上还有一个接地点。所有电机都适合双向转动（正转或者反转），并且通过调整其中两相电的顺序即可改变电机转向。

电源连接

本系列三相异步电动机线圈可连接成星形、三角形。
对于正确运行，允许电压偏差为 $\pm 5\%$ ，频率偏差为 $\pm 2\%$ 。

电缆连接示例



电机机壳外接地



关于接线端子的拧紧力矩，请参照表 1 中接线端子拧紧力矩。

表 1

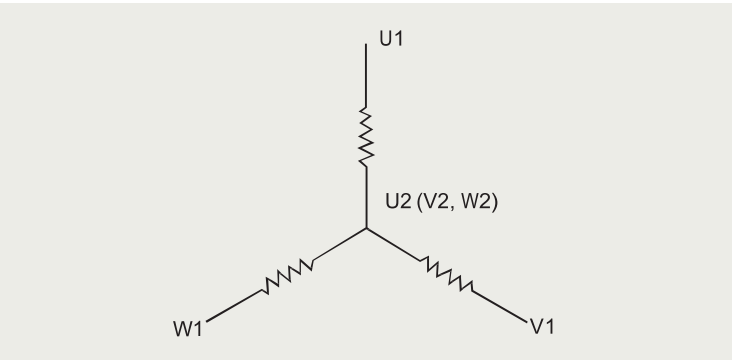
尺寸	M4	M5	M6	M8	M10	M12	M16
转距 (Nm)	1.2	2.5	4.0	8.0	13	20	40

注：拧紧力矩 (Nm，公差： $\pm 10\%$)



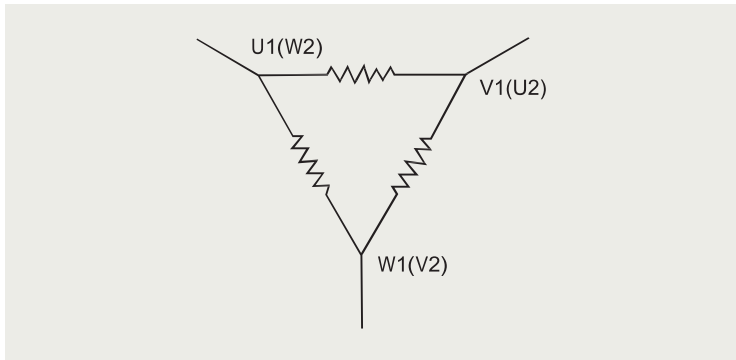
星形连接

星形连接是通过绕组接线端子 W2、U2 及 V2 相互连接，U1、V1、W1 端连接电源而实现，如下图所示



三角形连接

三角形连接是通过三相绕组的端子首尾依次相接而实现，如下图所示



注：若接线盒的辅助或主进线孔由葛兰密封，需要用标准的扳手来拧开。

绕组保护

电机有三种规格的温度传感器：（电机编号的第 15 位字母）

- 热敏电阻 PTC、测温电阻 PT100&PT1000—用于绕组测温时，报警温度建议设定为 145°C，跳闸温度建议设定为 155°C。
- 测温电阻 PT100 — 用于轴承测温时，报警温度建议设定为 95°C，跳闸温度建议设定为 105°C。对于 1LE8033 电机，可设定为 110°C。

注意

PTC 热敏电阻和 PT100 以及 PT1000 测温电阻都需要与外部控制单元进行联结。

当 PT100 测温电阻用于轴承温度监测时，报警和跳闸温度设定值与绕组测温的温度设定值不同。

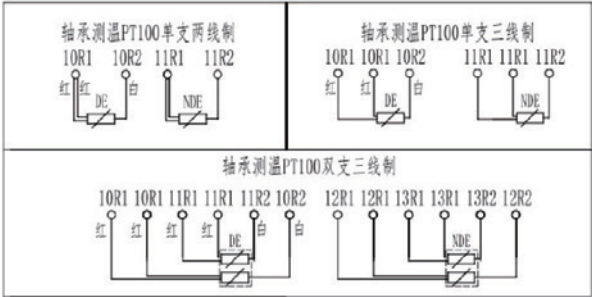
辅助接线端子

如电机配置 PTC，PT100，PT1000 和防潮加热带，其引线端标识如表 2 所示。

表 2 电机绕组保护

一组三芯串联的 PTC	第十五位为 B	2TP1
		2TP2
两组三芯串联的 PTC	第十五位为 C	1TP1
		1TP2
		2TP1
		2TP2
一个单支两线制 PT1000	第十五位为 K	1R1
		1R2
两个单支两线制 PT1000	第十五位为 L	1R1
		1R2
		2R1
		2R2
三个单支两线制 PT100	第十五位为 H	1R1
		1R2
		2R1
		2R2
		3R1
		3R2
六个单支两线制 PT100	第 15 位数为 J	1R1
		1R2
		2R1
		2R2
		3R1
		3R2
		4R1
		4R2
		5R1
		5R2
		6R1
		6R2
三个单支三线制 PT100	第 15 位数为 Q	1R1
		1R1
		1R2
		2R1
		2R1
		2R2
		3R1
		3R1
六个单支三线制 PT100	第 15 位数为 R	3R2
		1R1
		1R1
		1R2
		2R1
		2R1
		2R2
		3R1
		3R1
		3R2
		4R1
		4R1
		4R2

六个单支三线制 PT100	15 位数为 R	5R1
		5R1
		5R2
		6R1
		6R1
		6R2



在温差比较大的环境中，电机停止一段时间将比较容易产生凝固水。因此，强烈建议在这种情况下为电机加选防潮加热带（选件号：Q04）。驱动端和非驱动端防潮加热带的辅助接线端子分别为 1HE1-1HE2，和 2HE1-2HE2。

警告

防潮加热带切勿在电机运转时加热。

3.5 检查绝缘电阻

在初次启动电机前或者经过长时间（6 个月）停机后，建议在开启电源启动之前对相位间的绝缘电阻进行测量。

警告

绝缘电阻测量完成后的短时间内，接线端子还可能带有一定的危险高电压，请勿直接触摸。

绝缘电阻

最小绝缘电阻：新电机或绕组维修后的电机对地电阻为 10 M Ω。临界电阻：临界电阻的计算方法为额定电压乘以系数，如额定电压 690 V 电机临界电阻可计算如下，临界电阻 = 0.69 kV × 0.5 M Ω /kV = 0.345 M Ω

测量方法

最小绝缘电阻的测量：绕组对地电阻的测量可以通过对绕组施加 500 V 直流电压来测量，绕组温度需保证在 $25\text{ }^{\circ}\text{C} \pm 15\text{ }^{\circ}\text{C}$ 。

临界电阻的测量：临界电阻的测量必须在电机运行温度的情况下对绕组施加 500 V 直流电压。

常见的绝缘电阻故障原因及处理方式主要有如下 2 种情况。

故障原因 1：可能是由于环境潮湿引起的。

处理措施 1：需要将绕组进行烘干处理。

故障原因 2：电机经过长时间运行后（电机处于热态状态），最小电阻值可降低。

处理措施 2：如果测量值低于临界电阻值，必须对电机进行更换或修改。

3.6 温度检测

温度是电机运行时的重要参考指标，得到电机各重要部位的实时温度，对掌握电机的运行状态、有效预防电机故障、保证电机可靠运行十分重要。

电机温度受冷却介质和环境温度的影响。对电机绕组温升的测量，通常是预埋测温元件（如 PT100），测温元件通过引出线连接控制系统，对电机进行测温，或者使用高精密的电阻法进行推算。如需测量电机机壳表面温度，应采用专门的仪器（如红外测温仪）进行测量，测量位置一般在电机吊环孔位置或电机中间位置。

警告

电机在运行时，其表面温度会逐渐上升，请勿用手直接触摸，以免烫伤。

3.7 变频器应用



在电机负载转矩不稳定时（如活塞式压缩机，负载），必然会导致非正弦电流，该电流的谐波会对系统造成影响，而产生过多干扰。

电磁兼容性

当变频器驱动电机时，电磁干扰的程度大小取决于变频器的类型（种类，IGBT 数量，干扰控制措施及制造商）、布线、距离以及应用需求。

在设计和应用阶段必须参考变频器制造商关于电磁兼容性的安装指导。



如果使用变频器驱动电机，转速超过电机额定转速时，必须考虑对电机的机械零部件及传动联结件的影响。

更多内容，请参考 IEC 60034-1。

噪声，温升和振动

电机在变频运行时，电机噪声、温升将会有所增加。

变频应用时，可能会由于转速高于额定转速，电机机械振动加大，从而使机械运转的平稳性发生变化。这样也会导致轴承和润滑脂的寿命降低。

在变频器上工作

以下章节只针对变频器应用。

电网类型

注意!

在三角形电路连接的TN电网上运行时的不对称的电压负载

在三角形电路连接的、带接地外导体的TN电网上运行时，电机绕组中会出现不对称的电压负载。这可能损坏绕组。

- 不要在带接地外导体的TN电网上运行电机。

注意!

在IT电网上运行时的接地

如果在TN电网上运行时出现接地，则绝缘层的负载会过大。这可能损坏绕组。

- 请尽可能在两小时内终止接地。
- 清除故障原因。
- 安装接地监控。

变频器输入电压

SIMOTICS电机的绝缘系统明显超出应力类型C (IVIC C=严酷) 的要求。如果出现高于IVIC C的电压峰值，请注意以下规定：

- 电源电压（变频器输入电压）低于480V并在SINAMICS G/SINAMICS S系列变频器上采用独立/受控电源运行时：请遵守电机及变频器选型指令。
- 电源电压（变频器输入电压）高于480V时，订购用于变频器运行的电机应配备相应的绝缘系统。
- 在第三方变频器上运行时：请遵循IEC 60034-18-41规定的应力类型C允许的电压峰值，与各自的电源电压（变频器输入电压）及电机绝缘系统相关。

注意!

连接电压过高会导致设备损坏

如果绝缘系统的连接电压过高，则会导致绝缘系统损坏。这可能导致电机完全报废。

- 请遵循上述指令要求的峰值电压。

降低轴承电流

采取下列措施可降低轴承电流：

- 确保接触面的面积较大。由于集肤效应，实心铜电缆不适合用于高频接地。

等电位电缆：

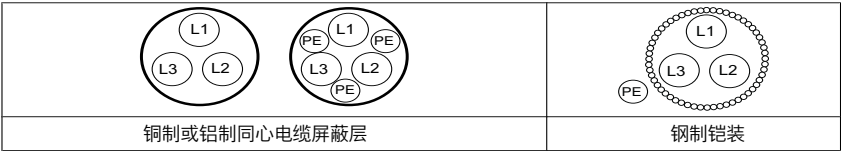
使用等电位电缆：

- 在电机和负载机械之间。
- 在电机和变频器之间。
- 在接线盒和电机外壳上的高频接地点之间。

电缆的选择和连接：

尽可能使用对称排列的屏蔽连接电缆。由尽可能多的单根导线构成的屏蔽网必须具有良好的导电性能。由铜线或铝线织成的屏蔽网较为合适。

- 屏蔽层在电机和变频器两侧都要接地。
- 屏蔽层要大面积搭接，以便更好地引导高频电流：
 - 在变频器一侧360°接触
 - 在电机一侧，在进线口使用EMC电缆密封套。
- 按上述方式搭接屏蔽层后，电机外壳和变频器之间便达到要求的等电位。此时无需使用一根单独的高频等电位电缆。



- 如果因为条件特殊无法实现屏蔽层接地或搭接不够充分,则无法达到要求的等电位。此时便需要使用一根单独的高频等电位电缆：
 - 在电机外壳和变频器的保护接地母排之间。
 - 在电机外壳和负载机械之间。
 - 单独的高频等电位电缆可以为扁平的编织铜带或高频绞线电缆。
 - 确保接触面的面积较大。

构建接地网络

必须全面看待由电机、变频器和负载机械构成的整体系统，才可以确实降低轴承电流。以下措施有助于降低轴承电流，以避免损坏：

- 在整个系统中安装性能良好的低阻抗网状接地系统。
- 在变频器输出端上使用共模滤波器（衰减铁芯）。西门子销售代表负载滤波器的选型设计。
- 使用输出滤波器来限制升压。输出滤波器可以减少输出电压中的谐波含量。

说明

变频器文档

变频器的使用不在本文档中说明。还需注意变频器的选型信息。

接地网络上的变频器操作

注意!

保护接地 (PE) 导线电流可能导致损坏

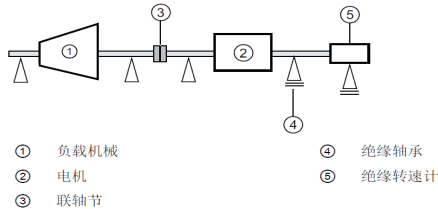
当电机在带有限流器、不带接地故障监控的变频器上运行时, 如果在输出侧存在接地故障, PE导线上可能会产生高达外部导线电流1.7倍的电流。考虑到上述情况, 不宜使用普通的额定多股芯线制成的PE导线以及普通接线盒的PE连接点, 结果可能导致财产损失。

- 使用合适尺寸的PE导线。
- 将PE导线连到电机外壳上的接线端子。

电机在变频器上工作时采用绝缘轴承

如果在低压变频器上运行电机, 则在非驱动端会安装一个绝缘轴承和一个带有绝缘支座的转速编码器 (选件)。

请遵循电机铭牌上有关轴承绝缘及允许的跨接的说明。



单轴驱动的示意图

注意!

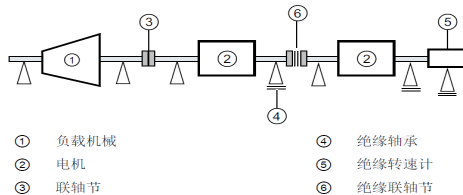
轴承损坏

不允许跨接轴承绝缘层。如有电流通过, 可能会对轴承造成损坏。

- 在后续的安装作业中, 如安装自动润滑系统或非绝缘型振荡接收器, 也必须确保轴承绝缘层不被跨接。
- 若有需要, 请联系西门子服务中心。

双轴驱动

如果希望串联两台电机, 即所谓的“双轴驱动”, 则需要在两台电机之间安装绝缘联轴节。



双轴驱动的示意图

注意!

轴承损坏

如果未在进行双轴驱动的两个电机之间使用绝缘联轴节, 则可能出现轴承电流。这可能会对两个电机的驱动端轴承造成损坏。

- 请使用绝缘联轴节连接电机。

维护



对电机进行维护操作前，电机必须对主电路以及相关的辅助电路隔离。

“5 项安全规则”（如在 DIN VDE 0105 中规定的）如下：

- 设备与电源隔离
- 采取有效措施防止再次连接
- 确认设备停止运行
- 确保电机正确接地
- 隔开相连的运动部分

以上所列的规则应一直保持到所有电机维修维护工作全面结束，并组装完成。

4.1 轴承寿命

在正常运行条件下，电机水平安装且不受任何轴向力的情况下，电机轴承寿命至少可达到 40.000 小时；在电机承受允许径向和轴向负荷时，电机轴承寿命至少可达 20.000 小时。这里所说的 20.000 或 40.000 小时指的是，电机在环境温度不超过 40 °C，按电机铭牌上标定的数据正常运转的情况下可达到的寿命。

注意！

- 1) 环境温度超过 40 °C 后，每升高 10 °C，润滑脂的寿命降低一半。
- 2) 电机在垂直安装、外界环境非常恶劣、受外部机械振动或处于湿度比较大的环境中运行的情况下，润滑油脂的寿命以及轴承的寿命将会缩短。
- 3) 长期的储存会降低轴承的寿命，电机在长期储存超过 24 个月时，驱动端和非驱动端的轴承需要重新注油。
- 4) 按要求的润滑时间间隔和加注油脂量进行定期注油。

警告

电机长期变频高速运转会将降低轴承和润滑脂的寿命。

4.2

润滑脂类型

润滑脂类型：UNIREX N3（Esso），合成润滑脂符合 DIN 51825-K3N 规定。

4.3

润滑脂寿命和再润滑周期

电机标准配置带注油装置，1LE8003系列再润滑周期及加注油脂量见下表。

机座号	极数	再润滑周期(小时)	加注油脂量（克）
315	2	3000	30
	4	4000	40
	6,8	6000	40
355	2	3000	30
	4	4000	60
	6,8	6000	60

1LE8033系列再润滑周期及加注油脂量见下表。

机座号	极数	再润滑周期(小时)	加注油脂量（克）
315	2	1500	30
	4	2000	40
	6,8	3000	40
355	2	1500	30
	4	2000	60
	6,8	3000	60

注意！

如果电机垂直安装、运行时存在较大振动、有负载突变的情况或者经常变向操作，应该在比更短的时间内更换润滑脂。

4.4

再润滑

警告

在电机运行过程中或停止状态进行注油时，必须遵守当地关于安全操作的相关规定！



添加润滑油脂时，注意不能加过多的润滑油脂，否则导致轴承温度过高。

添加润滑油脂过程中，切勿将灰尘或旧的润滑油脂进入轴承中。

注意!
在添加润滑脂之前，需要将注油孔中的旧润滑脂清理干净。对于废旧的润滑脂应妥善处理，以防污染环境。

建议在电机运行过程中保持工作温度时，进行添加润滑脂。
若在电机运行过程中不能添加润滑脂，推荐先注入少量润滑脂，然后旋转电机使润滑脂均匀分布，当电机停下后，将剩余的润滑脂再注入。
如果电机轴驱动端轴承或非驱动端轴承过热，建议检查轴承热损情况，如有必要，则需更换轴承或添加润滑脂。

注意!
如果过热，轴承脂颜色将会变暗。

4.5 轴承更换 — 装配与拆卸

当轴承寿命终了时，电动机运行的振动及噪声将明显增大，应更换轴承。

注意!
更换新轴承的规格型号应与旧轴承相符。

拆下电机的必要部分，用专业的工具将滚动轴承拉出。
在安装新的轴承之前，首先按照轴承生产商提供的相关说明对轴承进行预热，然后将轴承装入转子轴。轴承更换后，旧轴封（V 型环或油封）也必须更换。

警告
更换轴承时，严格禁止任何冲击和击打（例如用锤头等），以防损害轴承，造成过早损坏。



关于端盖或法兰盘上螺栓的拧紧力，请参照表 5 中螺栓的拧紧力矩大小及方向

尺寸	M4	M5	M6	M8	M10	M12	M16	M20
转矩 (Nm)	2	3.5	6	16	28	46	110	225

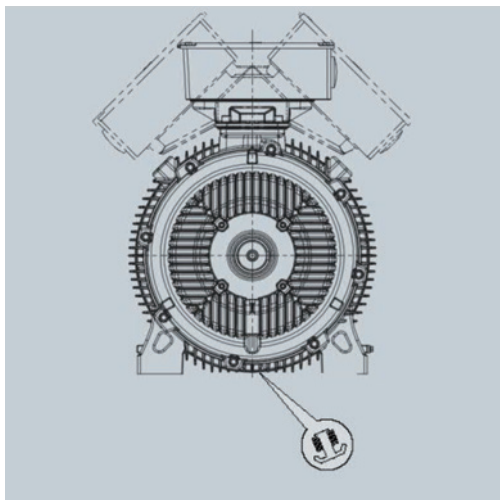
注：拧紧力矩（Nm，公差：± 10%）

4.6

排水孔

根据结构安装型式，可以考虑选用排水孔选项（选件号 H03）。

排水孔位于电机机座上，并且排水孔在出厂时预先安装好塑料塞。



预备检查

在电机第一次通电前，建议预先做以下几个方面的检查：

- 1) 确保螺栓拧紧，包括传动联结件上的螺栓；
- 2) 确保电机冷却风扇没有被卡住；
- 3) 若电机配有注油孔，确保轴承具有充分润滑油脂；
- 4) 确保电源以及接线方式与铭牌标出直接启动、软启动或变频器启动的数据一致。
- 5) 确保电机正确接地；
- 6) 若电机装配有热保护电阻或防潮加热带，确保这些器件的端子接线正确。

当电机接通电源后，确保检查电机的转向以及空气流通方向是否正确，以及电流、振动和噪声是否正常。

REACH 法规第 33 条的规定

该产品的一个或多个组成物品中含有高关注物质候选清单中的以下物质超过 0.1%：

- CAS 编号 7439-92-1，铅

基于现有信息，在规范化使用的条件下，包括废弃处理，该物质不会产生风险。

任何未经授权的改装、拆卸、及非西门子授权的维修等情形将可能导致无法获得保修资格。

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INTRODUCTION

1.1 Application scope

SIMOTICS 1LE8 series standard motors fulfill with protection degree IP55 according to IEC 60034-5, and can be used in a dusty and damp environment. A suitable canopy cover is recommended if the motors are installed outdoors with exposure to direct sunlight, rain, snow and ice.

Please refer to the following environmental application conditions.

- Installation Altitude $\leq 1000\text{m}$
- Ambient temperature $-20\text{ }^{\circ}\text{C} \sim +40\text{ }^{\circ}\text{C}$
- Relative humidity refer to following table

Ambient temperature	Relative Humidity
$-20\text{ }^{\circ}\text{C} \leq T \leq 20\text{ }^{\circ}\text{C}$	100 %
$20\text{ }^{\circ}\text{C} < T \leq 30\text{ }^{\circ}\text{C}$	95 %
$30\text{ }^{\circ}\text{C} < T \leq 40\text{ }^{\circ}\text{C}$	55 %

If the ambient conditions and site altitude is different from the above , please consult with Siemens.

1LE8 2P,4P,6P,8P series motors comply with GB18613-2020 《Minimum allowable values of energy efficiency and the energy efficiency grades for small and medium three-phase asynchronous motors》 , the efficiency standard and the value of energy efficiency are : 1LE8003/1LE8033 series motors are grade 3 , and the value of energy efficiency are shown on rating plate.

1.2 Cooling method

Self-ventilation (standard): Type of cooling IC411 in accordance with IEC / EN 60034-6 SIMOTICS 1LE8 motors are totally enclosed and self-ventilated (TEFC) by a bi-directional fan mounted on the NDE of the rotor shaft. Care must be taken to ensure adequate clearance for maximum air flow and cooling. If the optional external fan is used, the correct direction of air flow must be taken into consideration for proper cooling.

Forced ventilation (option): Type of cooling IC416 in accordance with IEC / EN 60034.

In this case the motor is cooled by a separately driven fan (forced ventilation), and it is not impacted by the status of the motor.

Notice!





- 1) Ensure the air flow of the separately driven fan smooth, and consistent with external air flow;
- 2) The separately driven fan is powered by an independent module. And it must be ensured that the rotation direction of the separately driven fan is consistent with the mark shown on fan cowl;
- 3) The separately driven fan cannot be powered through converter;
- 4) It must be ensured that the machine is not operated without starting the external fan, and stopped before external fan stop.




1.3 Types of construction/method of installation




The type of construction of the machine is stated on the rating plate.

Warning

During transport, machines may only be hoisted in a position corresponding to their basic type of construction.

Mounting type	IM B3 FS315~355	IM B6 ³⁾ FS315	IM B7 ³⁾ FS315	IM B8 ³⁾ FS315
Diagram				
Letter, position 14 th of Motor code	A	T	U	V

Mounting type	IM V5 ¹⁾ FS315	IM V6 ²⁾ FS315	IM V1 ¹⁾ FS315~355
Diagram			
Letter, position 14 th of Motor code	C	D	G

Mounting type	IM B35 FS315~355	IM V15 ¹⁾ FS315	IM V35 ²⁾ FS315
Diagram			
Letter, position 14 th of Motor code	J	W	Y

Note:

- 1) At outdoor application, the using of protective cover (option code H00) is recommended;
- 2) At outdoor application the protection of shaft again jet-water is recommended;
- 3) Not for 1LE8033.

HANDLING AND STORAGE

2

When lifting the motors, always use all the lifting eyes provided. Prior to lifting the motor make sure that the lifting eyes are installed correctly and tightened. Never lift a motor using the motor shaft and fan cowlings. In addition, care must be taken during lifting and lowering of the motor to avoid any shocks or vibrations which can result in bearing damages.

If the machine is fitted with a rotor shipping brace, this should always be used when transporting the machine. The rotor shipping brace must be attached during the transport. If the customer already has mounted parts, such as a coupling or belt pulley, the bearings can be damaged during transport. In this case, make sure that the customer uses a rotor shipping brace.

It is recommended that all motor be stored in a dry, dust free environment and free of excessive vibrations.

Do not stack motors during storage. For motors with packages, follow the instructions and markings on the package.

2.1 Storing outdoors

Choose a dry storage location which is safe from flooding and free from vibration. Repair any damage to the packaging before putting the equipment into storage if this is necessary to ensure proper storage conditions. In order to ensure protection against ground moisture, locate machines, equipment and crates on pallets, wooden beams or foundations. Prevent equipment from sinking into the ground. Do not impede air circulation under the stored items.

Covers or tarpaulins used to protect the equipment against the weather must not come into contact with the surfaces of the equipment. Use wooden spacer elements to ensure that air can circulate freely around the equipment.

2.2 Storing indoors

The storage rooms must provide protection against extreme weather conditions. They must be dry, free from dust, frost and vibration and well ventilated.

2.3 Bare metal surfaces

For transport, the bare surfaces (shaft ends, flange surfaces, centering edges) should be coated with an anti-corrosion agent which will last for a limited amount of time (<6 months). Apply suitable anticorrosion measures for longer storage times.

! Warning

The motor can be damaged if you use it or store it unprotected outdoors.

- Protect the motor against intensive solar radiation, rain, snow, ice and dust.
- Storing the motor outdoors or in a high humidity environment may cause the motor parts to rust.
- If required, contact the service center, or technically coordinate outdoors.

2.4 Storing temperature

Permissible temperature range: -20 °C to +50 °C

Maximum permissible air humidity: 60 %

For machines that have a special design regarding the ambient temperature in the operating state or the installation altitude, other conditions could apply regarding the storage temperature. In this case, refer to the machine rating plate for data on the ambient temperature and installation altitude.

2.5 Storing time

Turn the shaft once every year to avoid bearing brinelling. Prolonged storage periods reduce the useful life of the bearing grease (aging).

2.6 Opening bearing

- For open bearings, e.g., 1Z, check the status of the grease when stored for longer than 12 months.
- Replace the grease if it is identified that the grease has lost its lubricating properties or is polluted. The consistency of the grease will change if condensation is allowed to enter.

2.7 Closed bearings

- For closed bearings, replace the DE and NDE bearings after a storage time of 24 months.

After 2 years of storage, for sealed-type bearing, it is recommended to replace bearings; for the motor with re-greasing device, please replace bearing grease.

The service life of the motor can be considerably reduced if the storage period extends beyond 2 years in environments with high moisture and dirt. If necessary, the insulation resistance of the winding could be measured determine the health of the motor prior to installation and start-up, (see Section 3.5. for reference values).

Machined surfaces (flange, DE rotor shaft) are treated at the factory with an anti-corrosive agent to prevent rusting. However these surfaces should be retreated during storage as deemed necessary. It is recommended to rotate motor's shaft regularly to ensure grease distribution, and to prevent static impression on bearing rings.

INSTALLATION AND COMMISSIONING



All work must be carried out by a skilled worker. Before starting any work, be sure to isolate the machine from the main and auxiliary power supply as applicable. Mains must be secured against accidental switch on.

3.1 Installation

A fine foundation and exact installation is regarded as a basic requirement for coming long-time reliable working. Inappropriate foundation or installation may cause abnormal motor vibration and noise.

3.1.1 Foundation requirement

The foundation of installation can be a metal base or a platform of concrete structure, whatever structure the foundation has, the foundation must have enough strength and rigidity in order to support motors.

The design of foundation can refer to DIN 4024.

The supporting surface of the foundation must be flat, flatness of the supporting surfaces for conventional motors:

Frame size (FS)	Flatness (mm)
≤ 132	0.10
160	0.15
≥ 180	0.20

3.1.2 Installation requirement

Because of the manufacture tolerance and cumulate errors existing in mechanical parts, clearance may exist between the motor feet plane and the foundation support surface.

When install motors, the clearance size must be measured carefully by feeler gauge. For clearance which >0.05mm, shim with proper thickness should be inserted. The size of shim is according to the actual value of clearance.



Insert a shim with proper thickness

3.1.3 Lifting eyes are screwed in place and must be tightened. If the motor is installed vertically with the DE shaft facing downwards, a protective canopy is recommended to cover the fan cowling. This canopy is necessary to prevent the ingress of water and foreign objects that may inhibit proper fan operation.

3.1.4 If the DE shaft is facing upwards, a protective canopy and / or suitable protective measures are recommended to be taken to prevent liquids from entering the motor windings via the shaft.

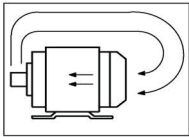
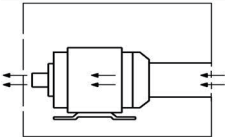
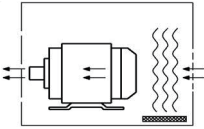
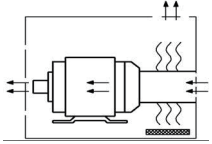
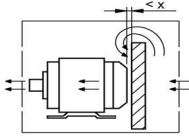
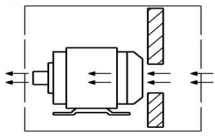
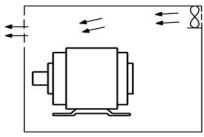
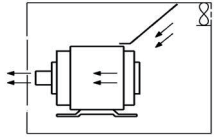
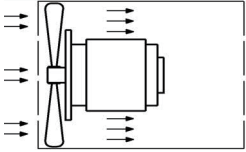
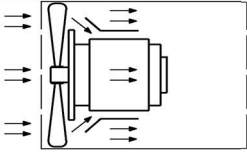
3.1.5 Ensure cooling

Warning

Death, severe injury or material damage can occur if you do not carefully observe the following points.

- Do not obstruct ventilation.
 - Prevent the air expelled by neighboring equipment from being immediately sucked in again.
 - For machines with a vertical type construction with air entry from above, prevent the ingress of foreign bodies and water in the air entry openings.
 - If the shaft extension is facing upwards, liquid must be prevented from entering by moving along the shaft.
-

For motors equipped with separately driven fan, please make design to ensure the motor cannot be started when the fan is not running.

Wrong	Correct
	
	
	
	
	

The minimum distance between motor fan cover and adjacent object "X" is shown below:

Frame size	X mm
315	110
355	140

3.2 Terminal box

Terminal box is either top or side mounted (LHS or RHS) on the motor and can be rotated 4 times by 90° thus allowing for multiple cable entry possibilities.

3.3 Balancing and coupling of transmission elements

To ensure a quiet and vibration free operation, proper axial and radial alignment of a balanced transmission element (coupling, pulleys, fans, gear box, etc.) is essential.

As standard, the 1LE8 rotors are dynamically balanced using a half feather key as indicated on the ratings name plate (H = Half Key).

Notice!

- 1) The transmission and coupling elements are required to be half-key balanced to ensure a vibration free operation.
 - 2) Coupling and motor temperature considerations must be taken into account during alignment of the transmission.
 - 3) Key must be removed from the motor shaft prior to starting if no transmission is coupled.
-

3.4 Electrical connection



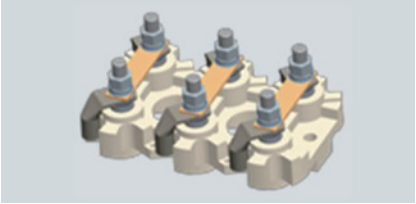
All work must be carried out by skilled worker. Before starting any work, be sure to isolate the machine from the main and auxiliary power supply as applicable. Mains must be secured against accidental switch on.

There are six power terminals and two earthing positions located in the terminal box. There is an additional earthing point located on the base of the frame. All motors are suitable for bi - directional rotation (CW or CCW). Rotation direction can be changed by exchanging any two phases.

Mains Power Connection

Windings of standard three-phase single speed motors can be connected either in star or delta connection. Voltage and frequency deviations of $\pm 5\%$ VAC and $\pm 2\%$ Hz respectively of the rated voltage and frequency values are acceptable for proper operation.

Cable Connection Examples



External Earthing



Please refer to Table 1 for tightening torque and direction for electrical terminal lugs.

Table 1

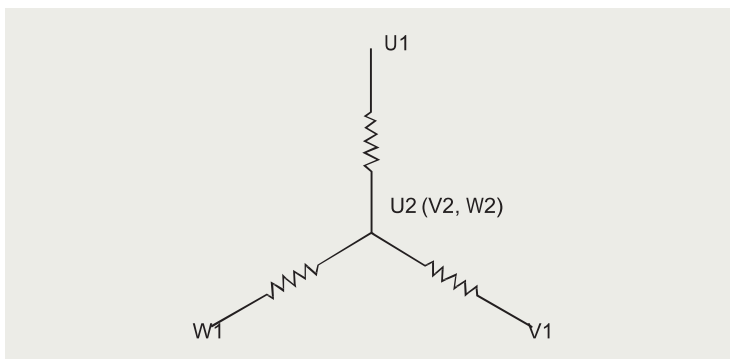
Size	M4	M5	M6	M8	M10	M12	M16
Torque (Nm)	1.2	2.5	4.0	8.0	13	20	40

Note: Tightening Torque (Nm, Tolerance: $\pm 10\%$)



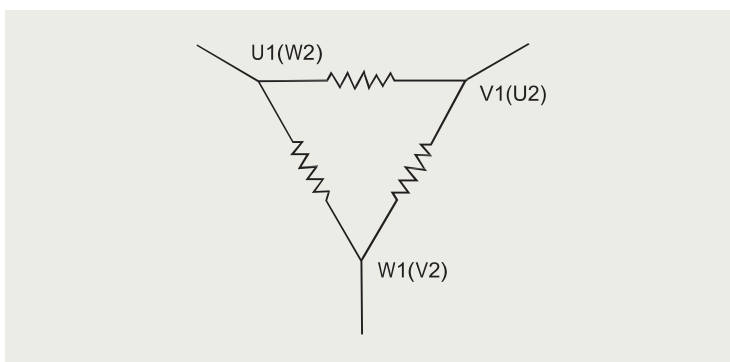
Star connection

A star connection is obtained by connecting W2, U2, V2 terminals to each other and the U1, V1, W1 terminals to the mains.



Delta connection

A delta connection is obtained by connecting the end of a phase to the beginning of the next phase.



Note:

If the auxiliary or mains cable entries on the terminal box is sealed with gland plugs, a flat (standard) screw driver is required for removal.

Winding Protection

Motors have three types of electrical protection sensors:

- PTC, PT100 & PT1000 - used for monitoring temperature of stator windings, advise temperature alarming 145°C or tripping function 155°C.
- PT100 - used for monitoring temperature of bearing, advise temperature alarming 95°C or tripping function 105°C. For 1LE8033 motors tripping function temperature set to 110°C.

Notice!

The PTC, PT100 and PT1000 require connection to an external control unit.

When PT100s are used for bearing temperature monitoring, the alarming and tripping values are independent of those of the winding's.

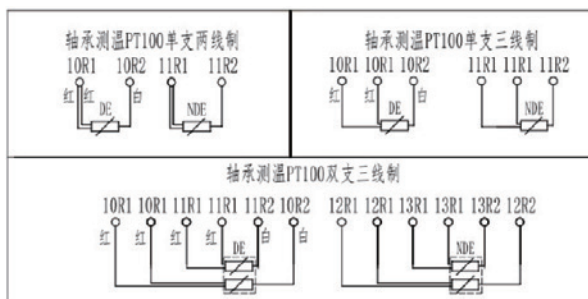
Auxillary terminal Connection

If the motors are configured with winding protection PTC, PT100, PT1000 and space heating, the auxiliary terminal connection is shown in Table 2.

Table 2 Motor winding protection

One set of PTC	15th digit is B	2TP1
		2TP2
Two set of PTC	15th digit is C	1TP1
		1TP2
		2TP1
		2TP2
One PT1000 sensor	15th digit is K	1R1
		1R2
Two PT1000 sensor	15th digit is L	1R1
		1R2
		2R1
		2R2
Three bi-wire PT100	15th digit is H	1R1
		1R2
		2R1
		2R2
		3R1
		3R2

Six bi-wire PT100	15th digit is J	1R1
		1R2
		2R1
		2R2
		3R1
		3R2
		4R1
		4R2
		5R1
		5R2
		6R1
		6R2
		1R1
		1R1
Three tri-wire PT100	15th digit is Q	1R2
		2R1
		2R1
		2R2
		3R1
		3R1
		3R2
		1R1
Six tri-wire PT100	15th digit is R	1R1
		1R1
		1R2
		2R1
		2R1
		2R2
		3R1
		3R1
		3R2
		4R1
		4R1
		4R2
Six tri-wire PT100	15th digit is R	5R1
		5R1
		5R2
		6R1
		6R1
		6R2



Motors which are exposed to a wide temperature fluctuation environment are susceptible to condensation formation, hence it is strongly recommended to add a anti-condensation heater (option code : Q04).The terminals for DE and NDE heaters are 1HE1-1HE2, and 2HE1-1HE2.

Warning

The space heater must never be energized during motor operation.

3.5

Insulation resistance inspection

After extended periods of storage or standstill (6 months or longer), it is recommended to measure the insulation resistance between phases and phase to ground prior to applying power at start-up.

Warning

During and shortly after the resistance measurement, the motor terminals are hazardous with a residual voltage charge. Avoid touching the terminals.

Insulation resistance

The minimum insulation resistance between new, cleaned or repaired windings with reference to ground is 10 M Ω .

The critical insulation resistance (Recruit) is calculated by multiplying the rated voltage, e.g. 0.69 kV AC, with the constant factor (0.5M Ω / kV):

$$\text{Recruit} = 0.69 \text{ kV} \times 0.5 \text{ M } \Omega / \text{kV} = 0.345 \text{ M } \Omega$$

Measurement

The minimum insulation resistance between the windings and ground measurement is taken at 500 V DC and at a winding temperature of 25 °C \pm 15 °C.

The measurement of the critical insulation resistance: it should be measured with 500 V DC with the winding at operating temperature.

Normal failure and corrective measures on insulation resistance

Cause: Might be due to high humidity.

Correction: Windings must be dried.

Cause: After extended periods of operation, the minimum insulation resistance may decrease.

However as long as the measured value is not less than the Recruit values the motor will continue to operate.

Correction: If the measured value is less than the Recruit value then the motor must be replaced or repaired.

3.6

Temperature measurement

Temperature is an important reference index of motor running, the important parts for motor realtime temperature, the operation state, effective prevention of master motor fault, to ensure reliable operation is very important.

The motor temperature is influenced by cooling medium and environmental temperature.

Measurement of motor winding temperature rise, usually embedded temperature measuring device (such as PT100), temperature measuring element through the lead wire connection control system, the motor temperature, or using the high precision of resistance method is founded. For measuring surface temperature of motor, should use special instruments such as infrared thermometer to measure, measure position generally in the middle position of the motor or eyebolt position.

Warning

When Motor is running, the surface temperature will gradually rise, Please do not directly touch by hand, in order to avoid scald.

3.7

Drive Application



In applications when motor torque is variable (piston-type compressor, load for example), the inevitable result is a non-sinusoidal motor current, whose harmonics can lead to excessive system perturbation or excessive electromagnetic interference.

Electromagnetic compatibility

In application where the motor is driven by a drive, the degree of electrical interference depends on the type of used drive (type, number of IGBTs, interference suppression measures, and manufacturer), cabling, distance and application requirements.

The installation guidelines of the drive manufacturer with regards to electromagnetic compatibility must be considered at all times during the design and implementation phases.



If the motor is driven by a drive and the operating speed exceeds synchronous speed then considerations must be given to the mechanical components and transmission coupling.

Please refer to IEC 60034-1 for further details.

Noise, Temperature and Vibration

When motor are used with converter fed operation, the noise and temperature rise will be a little worse than standard motor with rated speed.

Due to increased speeds above the rated speed, vibration of motor will increase. Therefore the mechanical smooth running is changed, and lifetime of grease and bearing will be reduced.

Converter Application

The following sections are only for frequency converters applications.

Instructions

Grid type

Attention!

Asymmetric voltage load when operating on a TN grid connected by triangular circuits

When operating on a TN grid connected by triangular circuits with grounded external conductors, asymmetric voltage loads will occur in the motor windings. This may damage the windings.

- Do not run a motor on a TN grid with a grounded external conductor.
-

Attention!

Grounding when operating on the IT grid

If the grounding occurs during operation on the TN power grid, the load of the insulation layer will be too large. This may damage winding.

- Stop grounding within two hours if possible.
 - Clear the causes of faults.
 - Install grounding monitoring.
-

Inverter input voltage

The insulation system of SIMOTICS motor obviously exceeds the requirement of stress type C (IVIC C= harsh). If a voltage peak higher than IVIC C occurs, please note the following:

- when the power supply voltage (inverter input voltage) is lower than 480V and the SINAMICS G/SINAMICS S series inverter runs with independent or controlled power supply, follow the instructions for selecting the motor and inverter.

- when the supply voltage (inverter input voltage) is higher than 480V, the ordered electrical components for the inverter operation will be equipped with insulation systems.
- Running on third-party frequency converters: The allowable peak voltage for stress type C specified in IEC 60034-18-41 depends on the respective supply voltage (inverter input voltage) and the motor insulation system.

Attention!

Excessively high connection voltage may damage the device

If the connection voltage of the insulation system is too high, the insulation system may be damaged. This can lead to complete motor obsolescence.

- Follow the above instructions for peak voltage requirements.
-

Reduce bearing current

The bearing current can be reduced by taking the following measures:

- Ensure that the contact surface area is large. Solid copper cables are not suitable for high frequency grounding due to skin effect.

Equal potential cable:

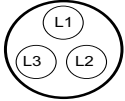
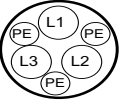
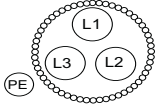
Use isopotential cable:

- Between the motor and the load machine.
- Between the motor and the frequency converter.
- Between the junction box and the high-frequency ground points on the motor housing.

Cable selection and connection:

Use a symmetrical arrangement of shielded connection cables whenever possible. A shield network consisting of as many single wires as possible must be electrically conductive. A screen made of copper or aluminum wire is more suitable.

- The shield layer must be grounded on both sides of the motor and frequency converter.
- The shielding layer should be overlapped over a large area to better guide the high-frequency current:
 - Contact 360° on one side of the frequency converter
 - On the motor side, use an EMC cable sealing sleeve on the cable inlet.
- When the shield is overlapped in the above way, the required equipotential between the motor housing and the frequency converter is achieved. There is no need to use a separate high-frequency isopotential cable.

 	
Concentric cable shield of copper or aluminum	steel armor

- If the shield grounding cannot be achieved or the lap is insufficient due to special conditions, the required equipotential cannot be achieved. In this case, a separate high-frequency isopotential cable is required:
 - Between the motor housing and the protection grounding bus of the frequency converter.
 - Between the motor housing and the load machinery.
 - Individual high frequency isopotential cable can be flat braided copper tape or high frequency stranded cable.
 - Ensure that the contact surface has a large area.

Building a grounding Network

Only by comprehensively looking at the overall system composed of motors, frequency converters and load machinery can the bearing current be really reduced. The following measures help to reduce bearing current to avoid damage:

- Install a low-impedance mesh grounding system with good performance throughout the system.
- Use common-mode filters (attenuating cores) at the output of the frequency converter. Siemens sales representative load filter selection design.
- Limit the boost using the output filter. The output filter can reduce harmonics in the output voltage.

Instructions

Frequency converter document

The use of frequency converters is not described in this document. Attention should also be paid to the selection of inverter information.

Converter operation on the ground network

Attention!

Protection Ground (PE) wire current may cause damage

When the motor is running on a frequency converter with a finite current generator and no ground fault monitoring, a current up to 1.7 times the external wire current may be generated on the PE wire if there is a ground fault on the output side.

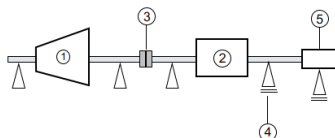
In view of the above, it is not advisable to use PE wires made of ordinary rated multi-core wires and PE connection points of ordinary junction boxes, which may result in property damage.

- Use PE wires of appropriate size.
- Connect the PE wire to the wiring terminals on the motor housing.

Insulated bearings for motor works on the frequency converter

If the motor is run on a low-voltage frequency converter, an insulated bearing and a speed encoder with an insulated support (optional) are installed at the non-driven end.

Follow the instructions on the motor nameplate for bearing insulation and allowed bonding.



①load machinery ②Motor ③Coupling ④Insulated bearing ⑤Insulated tachometer

Schematic diagram of a single-axis drive

Attention!

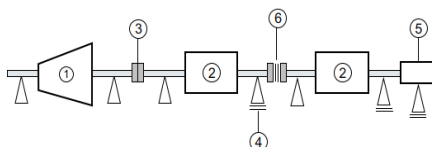
Bearing damage

Bonding bearing insulation is not allowed. If there is current through, it may cause damage to the bearing.

- It is also necessary to ensure that the bearing insulation is not cleaved during subsequent installations such as automatic lubrication systems or non-insulated oscillation receivers.
- Contact Siemens Service Center if necessary.

Biaxial drive

If you want two motors in series, known as a "two-shaft drive," you need to install insulated couplings between the two motors.



①load machinery ②Motor ③Coupling ④Insulated bearing ⑤Insulated tachometer
⑥Insulated Coupling

Schematic diagram of the double shaft drive

Attention!

Bearing damage

Bearing currents may occur if insulated couplings are not used between the two motors that are being driven with two shafts. This may cause damage to the driving end bearings of both motors.

- Connect the motor with insulated couplings.
-



Before starting any service and maintenance work on the motor the motor must be properly isolated from the mains and auxiliary power.

The usual "5 safety rules" (as set forth in DIN VDE 0105) are:

- Isolate the equipment
- Take effective measures to prevent reconnection
- Verify equipment is dead
- Ensure Earthing correctly
- Cover or fence off adjacent live parts

These precautions listed above should remain in force until all maintenance work is finished and the motor has been fully assembled.

4.1

Bearing lifetime

The average bearing lifetime for motors with sealed or open bearing at the DE & NDE varies between 20.000 and 40.000 hours for horizontal mounted motors without additional axial loading.

This 20.000 or 40.000 hours of operation applies to 2, 4, 6, 8 pole motors when operated at an ambient 40°C based on rating plate data.

Notice !

- 1) For every 10K temperature rise above 40°C, the grease lifetime is reduced.
- 2) Extended storage periods, excessive vibrations and high humidity levels will reduce the useful life of the DE & NDE bearing and bearing grease.
- 3) Long time storage will reduce bearing grease lifetime. If motor has in storage for over 24 months, it is recommended to replace bearing grease.
- 4) Bearings must be re-greased according to required intervals and re-greasing quantity.

Warning

Operating a motor above synchronous speeds for extended periods of time will reduce the bearing grease lifetime.

4.2

Grease type

Type of grease: UNIREX N3 (Esso); Conforms to DIN 51825-K3N.

4.3

Grease lifetime and regreasing intervals

The standard motors are equipped with re-greasing device. 1LE8003 series please refer to regreasing intervals and grease quantity as following table.

Frame Size	Poles	Re-greasing Interval (h)	Re-greasing quantity (g)
315	2	3000	30
	4	4000	40
	6,8	6000	40
355	2	3000	30
	4	4000	60
	6,8	6000	60

1LE8033 series please refer to re-greasing intervals and grease quality as following table.

Frame Size	Poles	Re-greasing Interval (h)	Re-greasing quantity (g)
315	2	1500	30
	4	2000	40
	6,8	3000	40
355	2	1500	30
	4	2000	60
	6,8	3000	60

Exception !

In applications where the motor is installed vertically or operating with heavy vibration, sudden load changes, frequent reversing operation, etc., the grease should be changed at considerably more frequent intervals than the operating hours stated above.

Warning

All local safety regulations must be considered when re-greasing the motor in operation or at a standstill.



Care must be taken not to over grease the bearings as this can result in increased bearing temperatures.

Dust and old grease must be prevented from entering the motor bearings during the re-greasing cycles.

Notice !

The re-greasing nipple should be cleaned of old grease and dust prior to attaching the regreasing device. For the waste grease should be properly handled to prevent environmental pollution.

It is recommended that the DE and NDE bearings should be re-greased while the motor is in operating and at operating temperature.

If it is not possible to re-grease the motor during operation, then it recommended that a partial amount of the grease is injected and then the motor energized and rotated for a few revolutions to allow for grease dispersion. After coming to a complete stop the remaining grease should be added.

If a DE or NDE bearing have experienced overheating, it is recommended that the bearing should be inspected for heat damage and replaced or re-greased as necessary.

Notice !

Bearing grease will appear dark in color if overheating was experienced.

4.5 Bearing replacement – assembly and disassembly

As bearings near the end of their useful lifespan, the vibration and noise levels of the motor will increase considerably. Then the bearing must be replaced.

Notice !

Worn or damaged bearings must be replaced with an equivalent bearing matching the original specifications.

When replacing the bearing, dismantle the necessary parts and use a suitable bearing extraction tool to remove the damaged or worn bearing.

Before installing the new bearing, pre-heat the bearing as per the manufacture instruction prior to pressing it onto the rotor shaft. Shaft sealing rings (V Ring or Oil Seal) must be replaced with new ones after bearing replacement.

Warning

Any impacts or hits (such as with a hammer etc.) is strictly forbidden as this will damage the bearing and result in premature failure.

Please refer to tightening torques for the end flange bolts.



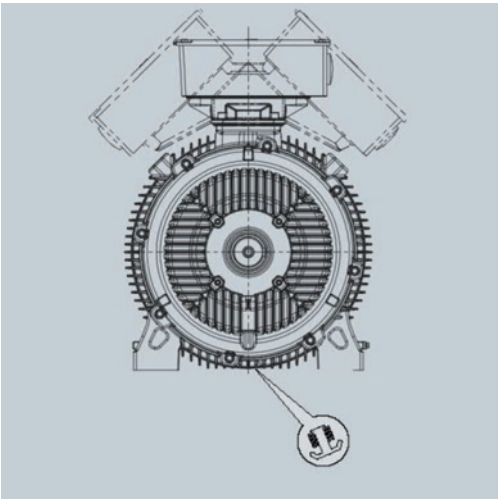
Size	M4	M5	M6	M8	M10	M12	M16	M20
Torque(Nm)	2	3.5	6	16	28	46	110	225

Note: Tightening Torque (Nm, Tolerance: $\pm 10\%$)

4.6 Condensation drain plug

Based on the motor's construction and mounting type, please consider to select the drainage hole option(option code H03).

Drainage hole is on motor's frame, and it is closed by a plastic piug when delivered.



Preliminary Inspection

Before applying power to the motor for the first time, it is recommended to check:

- 1) All retaining bolts are tightened including transmission coupling and alignment
- 2) Motor cooling fan unobstructed
- 3) Bearings are adequately regreased
- 4) Mains supply voltage and connection method match is according to rating plate.
Operation of DOL, Soft start and VSD are set according to parameters on rating plate.
- 5) Proper connection of earthing (grounding)
- 6) Connections of sensors' and heaters' terminals, if have.

After motor is powered on, check motor's rotation and air flow, Check whether the current , vibration, and noise is normal.

Information according to Article 33 of the REACH regulation

The product contains one or several subproducts in which the following substance – belonging to the “list of candidates” – exists in a concentration exceeding 0.1 percent by weight.

- CAS No. 7439-92-1, lead

Based on the currently available information, we assume that this substance does not represent any risk when correctly used, including its disposal.

Unauthorized modifications, disassembling, or repairing may make warranty invalid.

如有变动，恕不事先通知
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