



取样气泵

P2. x ATEX

安装及使用说明书

原版使用说明书





Bühler Technologies GmbH, Harkortstr. 29, 40880 Ratingen
Tel. +49 (0) 21 02 / 49 89-0
Internet: www.buehler-technologies.com
E-Mail: analyse@buehler-technologies.com

使用设备之前，请仔细阅读说明书。请特别注意警告及安全提示。否则可能导致人身伤害与财产损失。比勒科技有限公司不为不正当使用或擅自修改设备承担责任。比勒科技有限公司不为不正当使用或擅自修改设备承担责任。

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文档信息

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1 引言

1.1 合规应用

型号为P2. x ATEX (-H2/-O2)的样气泵被设计安装于工业应用中的气体分析系统中，专用于输送气体介质。它不适用于液体。样气泵不适用于受天气影响的户外使用。

ATEX版本适用于在II设备组，2G类，防爆组别IIB+H2，温度组别为T3，某些版本为T4。严禁在粉尘区域或产生强静电的工艺附近使用本产品。

P2. x ATEX (-H2/-O2)样气泵的完整标记是：

P2. 2 ATEX (-H2/-O2), P2. 4 ATEX (-H2/-O2)

II 2 G Ex h IIB+H2 T3...T4 Gb X

P2. 72 ATEX (-H2/-O2), P2. 74 ATEX (-H2/-O2)

II 2 G Ex h IIB+H2 T3 Gb X

危险! 应用于易爆区域中有爆炸危险

样气泵不得在粉尘区域或指定爆炸性环境以外的危险区域使用。

根据此操作手册的规范，特别是技术数据中对温度参数的考虑，P2. x ATEX (-H2/-O2)样气泵可以输送不可燃和易燃的气体介质，这些气体介质在正常运行期间可能会爆炸。

输送高颗粒负载的爆炸性气体混合物会导致波纹管/泵体中产生危险的静电荷。在泵的进气口前，请安装一个带有合适滤芯的微粒过滤器。特别是对于P2. x ATEX-O2变体，我们建议过滤精度小于10 µm。

最高表面温度取决于介质和环境温度。介质温度、环境温度和泵的温度等级之间的关系被标于 [附录](#) [> 页 31]中。

为了便于在炎热环境中使用该泵，将P2. 4 ATEX/P2. 74 ATEX (-H2/-O2)型样气泵设计为泵头和驱动电机可分离，样气泵具有可拆分的过渡法兰，其中一半被安装在已加热的柜的内部，另一半被安装于外部，支承驱动电机。无需进一步适配工作即可对达30 mm的壁厚进行桥接。

在测量气体仍然潮湿的应用中，可能会导致在管道中和泵本体中形成冷凝水。如此情况下，须将泵头悬挂安装（见章节 悬挂泵体改装）。

样气泵P2. x ATEX-O2（商品货号： 42.....-O2）经过专门优化，与介质接触部件相关，适用于高氧气浓度环境。仅使用经BAM（联邦材料研究所）测试的材料。必须对组件进行特殊清洁，以尽量减少有机和无机污染物。在受控清洁度条件下生产产品，确保符合基于EIGA Doc 33/18的限值。

样气泵P2. x ATEX-H2（商品货号： 42.....-H2）通过扩展制造措施进行特殊改进，特别是为了避免氢气引起的部件损坏。此外，与介质接触的部件还要进行额外的光学检查，以去除任何残留的金属污染物，例如碎屑和颗粒。最后，进行批量化的密闭性检测。

提请您注意本说明书的 [附录](#) [> 页 31] 中就不同型号的特定预期用途、现有的材料组合及压力和温度限制作出的说明。此外，遵守铭牌上的说明和标记。

1.2 产品编码

设备出厂时可以提供不同的配置规格。您可以通过订货号确定所订购产品的具体配置规格。

在设备铭牌部分，您可以看到13位数字组成的产品编码。这些编码的每个数字（X）代表了泵的不同特征：

P2.2 ATEX, P2.4 ATEX

42	xx	x	x	x	x	x	9	0	0	0	产品特征
											基本型
	61										P2.2 ATEX 400 l/h（不带中间法兰直接运行）
	62										P2.4 ATEX 400 l/h（带中间法兰）
											电机电压
	7										230 V 50/60 Hz；0.78/0.86 A
	8										115 V 50/60 Hz；1.56/1.72 A
	9										380 – 420 V 50 Hz；0.46 A
	0										500 V 50 Hz；0.36 A
											泵头位置
		1									正常位置 垂直
		2									已旋转180° ¹⁾
											泵头材料
			1								PTFE
			2								不锈钢 1.4571
			3								带旁通阀的PTFE ¹⁾
			4								不锈钢 1.4571带旁通阀 ¹⁾
											阀材料
			1								至100 ° C；PTFE/PVDF ¹⁾
			2								至140 ° C；PTFE / PEEK
											螺纹连接（取决于泵体）
											PTFE泵体
											不锈钢泵体
			9								DN 4/6（标准）
			1								DN 6/8
			2								3/8 “-1/4 “
			3								1/4 “-1/8 “
			4								1/4 “-1/6 “
											安装附件
				9							含安装支架和缓冲器 ¹⁾

¹⁾ 对P2.4 ATEX不可能

P2.72 ATEX, P2.74 ATEX

42	xx	x	x	x	x	x	9	0	0	0	产品特征
											基本型
	65										P2.72 ATEX 700 1/h (不带中间法兰直接运行)
	66										P2.74 ATEX 700 1/h (带中间法兰)
											电机电压
		7									230 V 50/60 Hz; 0.78/0.86 A
		8									115 V 50/60 Hz; 1.56/1.72 A
		9									380 - 420 V 50 Hz; 0.46 A
		0									500 V 50 Hz; 0.36 A
											泵头位置
			1								正常位置 垂直
			2								已旋转180° ¹⁾
											泵头材料
				2							不锈钢 1.4571
				4							不锈钢 1.4571带旁通阀 ¹⁾
											阀材料
					2						至140 ° C; PTFE / PEEK
											螺纹接头
						9					6 mm (标准)
						1					8 mm
						2					3/8 “
						4					1/4 “
											安装附件
							9				含安装支架和缓冲器 ¹⁾

¹⁾ 对P2.74 ATEX不可能。

P2.2 ATEX-H2/-O2, P2.72 ATEX-H2/-O2, P2.4 ATEX-H2/-O2, P2.74 ATEX-H2/-O2

42	xx	x	x	x	2	x	9	0	0	0	x	产品特征
												基本型
61												P2.2 ATEX 400 1/h (不带中间法兰直接运行)
62												P2.4 ATEX 400 1/h (带中间法兰)
65												P2.72 ATEX 700 1/h (不带中间法兰直接运行)
66												P2.74 ATEX 700 1/h (带中间法兰)
												电机电压
7												230 V 50/60 Hz; 0.78/0.86 A
8												115 V 50/60 Hz; 1.56/1.72 A
												泵头位置
1												正常位置 垂直
2												已旋转180° ¹⁾
												泵头材料
2												不锈钢 1.4571
4												不锈钢 1.4571带旁通阀 ¹⁾²⁾
												阀材料
2												PTFE/PEEK ²⁾
												螺纹接头（取决于应用）
												适于-H₂（不锈钢）
0												N/A
9												6 mm
1												8 mm
4												1/4 “
												适于-O₂（不锈钢） ³⁾
												不带接头
												6 mm
												8 mm
												1/4 “
												安装附件
9												含安装支架和缓冲器 ¹⁾
												应用范围
												-H ₂ 针对高纯度氢气进行了优化
												-O ₂ 针对高纯度氧气进行了优化

¹⁾ 对P2.4 ATEX-H2/-O2和P2.74 ATEX-H2/-O2不可能。

²⁾ 对于O₂变量，经BAM测试的材料。

³⁾ 对于O₂变量，清洁过的螺旋接头被装在一个单独的袋子里。需要经BAM测试的PTFE密封胶带[见附件]。

如果对泵的型号有特殊说明，我们会在手册中做出标记。

请注意泵的使用限制（见选型表）。当订购备件或配件（例如单向阀）时请注意符合您泵的规格。

1.3 铭牌

例:

制造商及其地址	→	Bühler Technologies GmbH Harkortstr. 29 40880 Ratingen	
型号名称	→	P2.74 ATEX	
序列号, 产品编号	→	[ID number] [part number]	
供电电压	→	230V 50/60Hz; 0.78/0.86A	
IECEx证书号	→	IECEx IBE 24.0022 X	
防燃标记	→	II 2G Ex h IIB+H2 T3 ...T4 Gb X	
温度等级	→	T3: -20°C<Ta<+50°C; -20°C<Th<+100°C T4: -20°C<Ta<+50°C; -20°C<Th<+90°C	
EAC Ex批准文号	→	EAC Ex:RU C-DE.xxxx.xxxx	
接液材料	→	PTFE/PVDF/1.4571/1.4401/FFKM	
生产年份	→	[MM/YYYY]	
原版使用说明书的文件编号	→	 BX420002	

1.4 交货内容

P2. 2 ATEX/P2. 72 ATEX (-H2/-02)	P2. 4 ATEX/P2. 74 ATEX (-H2/-02)
1 x 带电机的样气泵	1 x 带中间法兰的泵头
4 x 橡胶金属缓冲块	1 x 电机
1 x 安装支架	1 x 连接法兰
产品文档	1 x 接头
	1 x 安装垫圈
	产品文档

2 安全提示

2.1 重要提示

仅当符合以下条件时，才允许使用设备：

- 于安装使用说明书中所述的条件下使用，依铭牌且为规定的用途使用本产品。未经授权修改设备时，比勒科技有限公司不承担任何责任，
- 遵守铭牌上的说明和标记，
- 遵循于数据页和说明书中规定的限值，
- 已正确连接了监控设备/保护装置，
- 未在本说明书中描述的维护和维修工作应由比勒科技有限公司进行，
- 使用原装备件。

本操作说明书是设备的一部分。制造商保留更改性能、规格或设计数据的权利，恕不另行通知。请保管好本说明书以备后用。

各种安全警告的定义

危险	提示有紧急危险情况的标识，如不可避免会引起重度身体损伤或者直接死亡。
警告	提示有中度风险的危险情况的标识，如不可避免可能会引起重度身体损伤或者死亡。
注意	提示有低风险的危险情况的标识，如不可避免可能会引起设备损伤或轻微至中度的身体损伤。
提示	提示设备或仪器重要信息的标识。

警示图标

手册中将用到以下警示图标：

	危险警告		挤压瘀伤警告
	高压危险警告		通用提示
	有毒气体吸入危险警告		请断开电源
	酸性和腐蚀性物质危险警告		请戴防毒面具
	易爆区域危险警告		请戴防护面具
	热表面警告		请戴防护手套

2.2 通用风险提示

只要遵守操作说明书的规范和运行参数，此产品不包含危险的火源。安装于一个完整系统中可能出现新的危害，气泵制造商不能对此加以任何影响。必要时，对欲加入此产品的整个系统进行一项风险评估。

在设计和构建整个系统时，必须遵守安装地相关的全国性安全条例和一般性的技术水准。对于潜在爆炸性环境中的设备和部件，这些标准包括EN (IEC) 60079和EN ISO 80079-36和-37系列标准。

在氧气浓度 > 21 vol % 的环境中使用设备和部件时，为防止可能发生的火灾危险，必须考虑到其他安全问题（如EIGA Doc 04）。将其他重要技术规定纳入安全概念。

必须遵照有关调试、运行、维护和废弃处理的其他国家法规。

请避免输送可燃气体时于您的系统中可能的放热反应，请勿于输送管线中使用催化物。可能导致危险的升温。为了便于化学安全性评估，于手册中列出了气泵的接液物料。

在波纹管泵中，绝热压缩属于物理工作原理。当非法超越运行参数时，不能排除危险的升温。

请避免这些危险情况。必要时，您应保护整个系统免受闪回风险。请遵循指示和适用的国家规定，预防故障发生，避免人身伤害和财产损失。

设备操作员必须确保：

- 仅能由熟悉安全要求和风险的专业人员安装该设备，
- 安全提示和操作说明书可供翻阅并予以遵守，
- 不得超过允许的数据并遵循适用条件，
- 使用保护装置和进行规定的维护工作，
- 弃置处理时，遵守法例条文。

维护和修理

进行维护和修理工作时，须注意以下几点：

- 必须由比勒授权的人员进行设备维修工作。
- 仅进行在操作和安装说明书中描述的改造、维护与安装工作。
- 仅使用原装备件。
- 请勿安装已损坏的或有缺陷的备件。如有必要，请在安装前进行目视检查，以检查备件是否有明显损坏。

在进行任何类型的维护工作时，必须遵守使用国家相关的操作规程和安全指令。

危险 	电压 有触电的危险 a) 在进行所有作业时，断开设备电源。 b) 确保设备不会意外地再次开启。 c) 仅能由训练有素的人员打开设备。 d) 注意电源电压是否正确。	
危险   	有毒的刺激性气体会产生爆炸危险、中毒危险 进行维护作业时，分别根据介质会逸出爆炸性或有毒的刺激性气体并导致爆炸危险或危害健康。 a) 调试设备前，检查测量气体系统是否密封。 b) 确保安全排出有害健康的气体。 c) 开始维护和维修作业前关闭气体供给并使用惰性气体或空气冲洗气路。防止气体供给装置意外拧开。 d) 维护时，防止有毒 / 刺激性的气体。穿戴相应的防护装备。	  
危险 	爆炸危险 不当使用情况下的气体泄漏引起的爆炸危险和生命危险。 a) 请仅依本说明书中描述般使用设备。 b) 请注意工艺条件。 c) 检查管道的密封性。	

危险**绝热压缩 (爆炸危险)!**

操作员应该事先考虑到绝热压缩会造成气体温度的升高。确保操作时遵守技术参数限制和环境条件限制（见选型表），考虑到温度级别T3和T4，时刻注意介质温度。必要时，操作员需要安装温度传感器来检测气体温度的变化，并且当温度超出防爆标准时应该自动关断泵电源。

危险**DANGER - 高温造成爆炸危险**

泵的温度取决于介质温度。介质温度和泵 **温度级别**的关系请参考选型样本。注意温度等级T3和T4，确定允许的最大环境温度和介质温度。

危险**扩散的输送介质**

爆炸危险！由于逸出易燃气体而形成爆炸性环境。

当使用高浓度的高扩散性输送介质，如氢气（H₂）等样气泵操作时，必须考虑到它们由于其设计而在技术上并非永久紧密。为了安全操作，必须遵守施工和操作的官方要求。除了定期进行泄漏检查外，还必须根据安装情况提供适当的技术措施，例如气体监测装置、技术通风等。

注意**热表面风险**

灼伤危险

如铭牌和操作条件所述，设备工作时壳体会产生超过50 °C的高温。根据安装现场条件，尽可能安置合适的警告提示。

注意**倾倒危险**

设备处的损害。

确保设备安全，防止翻倒、滑倒和坠落。

危险**放热反应会产生爆炸危险**

避免测量气体泵的输送管中和其它连接材质中（如管接头）存在加速反应的物质。根据各输送介质（如环氧乙烷），可以聚合介质。可以进行加热，其显示为火源。如果需要求助拥有丰富化学知识的专业部门进行解释。

3 运输及储存

只应在原包装或合适的替代包装中运输产品。

在不使用时，应对设备加以保护，防止其受潮受热。必须将其储存于-20° C至40° C（-4 ° F bis 104 ° F）下的封顶的、干燥且无尘的室内。必须确保无振动的环境（ $v_{eff} < 0.2 \text{ mm/s}$ ），以避免轴承损坏。

不得 将其存放于室外。原则上，用户方面须采用一切就防止因闪电冲击造成损害的相关标准。

特别是对于样气泵P2. x ATEX-02（货号：42.....-02），必须排除接液组件的任何污染。

存储区域中不得有任何能生产臭氧的装置，如日光灯、水银灯、高压电器。

较长期贮存或停机后，在再次运行前，须对绕组的绝缘电阻进行相对相和相对地的测量。绕组受潮会引起漏电流、电弧和破裂。绕组温度20 °（68 ° F）时，定子绕组的绝缘电阻必须至少为1.5 MΩ。若值较低时，须将绕组干燥。

应来回旋转电机轴，以确保轴承得以长期完全地润滑。为此，拧下支架盖（8）的三颗十字螺丝（9）并取下它。现在曲柄机构（10）变得可见。现在可以在此上旋转电机轴。

请在附录中的装配图42/025-Z02-01-2中找到项目编号的分配。

注意



小心撞伤或夹伤

夹伤手指

小心手指被夹入偏心轮和轴承之间。

4 安装和连接

安装前请检查设备是否有损坏。损坏的地方有可能是机壳或电源线等。绝对不可使用有明显损坏的设备。

危险



扩散的输送介质

爆炸危险！由于逸出易燃气体而形成爆炸性环境。

当使用高浓度的高扩散性输送介质，如氢气（H₂）等样气泵操作时，必须考虑到它们由于其设计而在技术上并非永久紧密。为了安全操作，必须遵守施工和操作的官方要求。除了定期进行泄漏检查外，还必须根据安装情况提供适当的技术措施，例如气体监测装置、技术通风等。

注意



使用适当的工具

根据 EN 1127-1 标准，操作者有义务负责妥善处理并选用合适的工具。

注意



清洁部件的污染

出于防火原因，在处理与介质接触的组件时，必须排除P2. x ATEX-02样气泵（商品货号：42.....-02）的油、油脂、灰尘、颗粒、棉绒、头发等污染。如有必要，请调整您的操作和组织措施，包括要使用的工作服、卫生法规等。如有必要，请将工作迁至合适、污垢较少的工作区域。



注意



设备的泄漏率

对于P2. x ATEX-H2样气泵（商品货号：42.....-H2），在出厂前测试泄漏率，以验证是否符合规定的限值。在松开或拧紧螺栓和/或管件后，这可能会偏离。如有必要，请重新检查。

4.1 现场安装需求

注意



设备处的损害

保护设备，特别是气体连接和气体管线免受灰尘、掉落物体和外部冲击。

闪电冲击

原则上，经营者方面须采用一切就防止因闪电冲击造成损害的相关标准，它可能导致设备损坏。

注意



避免振动和共振

操作员有义务在安装泵的时候避免泵产生振动或共振，以防止因此产生火花。

样气泵的结构和连接，以及拆除必须在安全区域内并在冷却状态下进行。

通风不得受阻，排出的空气，包括从相邻单元中，不得再次被吸入。

若不凭借比勒安装支架安装，须确保从电机到后壁有足够大的距离（至少40 mm）。

样气泵的安装高度须≤ 海拔1000 m。它们有各种版本，其具体技术规格可能彼此不同。因此，请始终遵守泵和电动机铭牌上的所有特定于设备的信息以及它们各自的限值——请参阅技术规格。

4.1.1 室外安装/户外安装

样气泵不专为室外安装或户外安装设计。操作和环境条件很大程度上决定了所需的必要保护类型和必要时的其他措施，如：

- 充足的全天候保护
- 调整维护间隔期（例如，清洁和更换易损件）

采取适当措施，并定期检查，以避免设备因下列因素受损：

- 腐蚀
- 阳光直射（温度峰值及因紫外线辐射受损）
- 因冷凝（例如，通过快速温度变化或停工时间）受潮
- 结冰
- 昆虫和微生物
- 其他动物如黄鼠狼等

即使在室外或户外安装时，请务必确保符合设备的所有运营边界参数。这些特别是：

- 最高或最低工作温度
- 防护等级

4.2 安装

注意



对设备的损坏

防止设备受到粉尘，坠落物和外界冲击。

P2.2 ATEX/P2.72 ATEX (-H2/-O2)

在安装板上安装P2.2 ATEX/P2.72 ATEX (-H2/-O2)时，请使用随附的安装支架，并仅使用随附的橡胶金属缓冲器。禁止在不带橡胶金属缓冲器的情况下运行。当泵安装在现有子结构上时，也应使用它们。有关安装支架和电机底座的孔图，请参考安装及使用说明书末尾的技术数据。

P2.4 ATEX/P2.74 ATEX (-H2/-O2)

欲组装P2.4 ATEX/P2.74 ATEX (-H2/-O2)样气泵，请参阅装配图 42/025-Z02-02-2。开始组装之前，必须检查样气泵的完整性。组装仍需要带螺母的长度合适的6 x M6螺钉。

对于所有类型的泵，泵头只能旋转0° 或180° 。

4.3 应对样气水分过量的特殊安装

对于一些应用中样气水分过量，可能会有冷凝液形成于气路或泵体中。这种情况下泵头必须倒装（泵头朝下）。

如果订货时并没有选择泵头朝下的配置，您仍然可以在现场轻松地更改泵头方向。

4.3.1 悬挂式泵头改造

注意



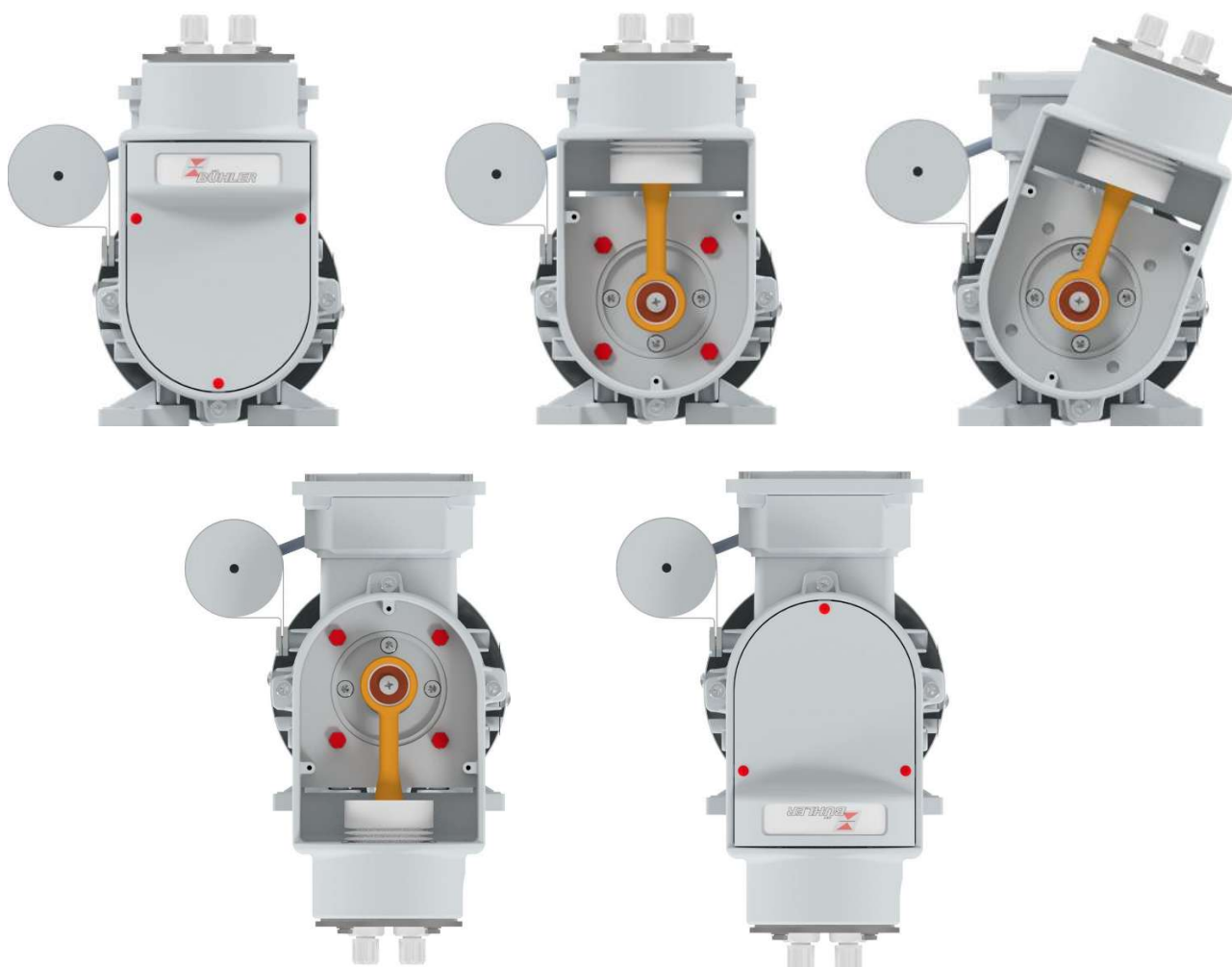
对设备的损坏

特别是当泵头朝下安装的泵，请确保没有粉尘或杂质颗粒通过通风口进入泵内。然而，泵的通风口不可以被直接盖住。如果无法做到以上几点，不可以按泵头朝下的方式安装气泵。

请使用附录中的装配图42/025-Z02-01-2以助您改装。

- 卸下三颗十字螺丝 (9) 并从泵支架 (5) 上取下支架盖 (8)。现在可以看到曲柄连杆机构 (10) 和电机法兰，或者根据泵的类型，中间法兰。
- 泵支架通过四个六角头螺钉 (7) 和弹簧垫圈 (6) 固定到法兰。请将螺钉完全拧下，同时紧握住泵支架，然后将支架沿法兰定心旋转180°。
- 以相反的顺序重新组装所有组件。请确保六角螺丝 (7) 3 Nm的扭矩。

不得将泵压头偏移90° 安装！



4.4 样气管路连接

泵上装有你所选的连接件（P2. x ATEX-02样气泵没有预装）。将铭牌上的商品货号与[导言](#) [> 页 2] 章节中的商品货号结构进行比较。

避免混合安装，即将管道安装于塑料体。若对某些应用不可避免，请将金属接头小心地，而不是强行地拧入PTFE泵体中。

请如此铺设管道，于输入和输出处留出足够距离的管道，以保持其弹性（泵振动）。

气泵上以“**In**”标注入口（输入）和以“**Out**”标注出口（输出）。确保气体管线连接紧密。

对于P2. x ATEX-02样气泵（项目编号：42.....-02），出厂时仅附有RT接头（锥形螺纹）作为单独提供的附件。必须安装经批准用于O₂应用的PTFE密封带（见[耗材和附件](#) [> 页 29]）。

4.4.1 监测气泵

提示



若遵循依维护计划的预防性维护措施，波纹管的破裂可仅被视为一种罕见的故障，但是也不能完全排除。

提示



波纹管破裂时，须立即关闭气泵！

提示



当输送易燃气体（即便高于“爆炸上限（UEL）”）或有毒气体时，工作中必须不断监测气泵。

危险



易爆! 有毒!

如果样气中含有易爆或有毒气体，在气泵波纹管破裂的情况下会发生气体泄露。请按上述方法监控气泵。如果在操作过程中出现任何不妥，请立即关闭气泵。

4.4.1.1 基本的监管措施

由于当波纹管中有**裂纹**时，环境空气将被吸入，气泵仍将产生压力，**须定期检查气泵的波纹管**。

此外，须使用合适的泵的输送率量计监测输送量，并以一合适的流量计确保气泵安全（视样气出口而定）。

更多关于[检查波纹管](#) [> 页 22] 的信息或维护间隔，请参见《安装与操作说明书》后部分的维护章节。

4.4.1.2 输送易燃和/或有毒气体时的监测措施

当输送易燃和/或有毒气体时，**时，额外地** 工作中必**不断**监测气泵。为此可以采取如下（1）或（2）。

1. 气体入口之前，泵的气体出口后，执行流量监测。气泵上游的吸气量/流量突然减少与气泵下游的流量保持不变或突然增加（气泵可能输送通过裂纹吸入的环境空气！）
2. 气体入口和流量监控上游监测负压，泵的气体出口后监测流量（见图）。气体入口前的负压突然下降，指示波纹管已经损坏。

在输送高于爆炸上限（UEL）的易燃气体时，我们建议同时在安装地点监测爆炸下限（LEL）。

在输送有毒气体时，我们建议在安装地点对MAK值进行监测（MAK：工作场所最大浓度）。

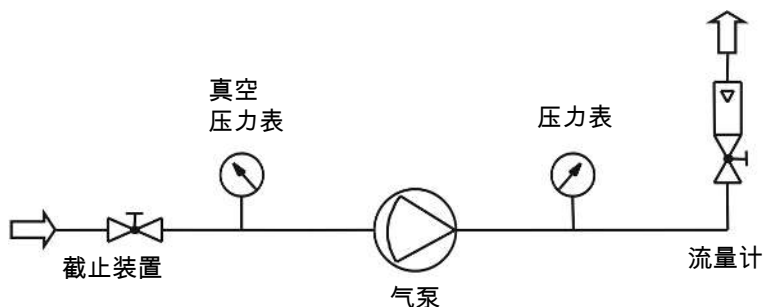


图1: 一个合适的监测流程图例

4.5 电气连接

警告



危险的电压

必须由合格的专业人员进行泵电机的电气连接。不正确的电气连接可能会导致致命的触电事故。

警告



不当的安装与调试

在爆炸性危险区域内对电气设备进行安装、布线和操作时，电机必须符合EN（IEC）60079-14标准的要求。同时请务必遵守相关的国家规定。

不当的电气连接可能会导致爆炸性危险区域发生爆炸。

因变频器运行的爆炸危险

仅允许使用允许的额定电压和电网频率来运行电动机。禁止使用变频器。

水泵电机采用变频器运行可能会导致不被允许的温度升高，从而在爆炸性危险区域引发爆炸危险。

注意



错误电压危险

错误的电压会毁坏设备。
正确的电压可以从铭牌上看到。

只能使用出厂时安装的发动机驱动设备。操作员不得更换设备或以另一台电机代替它。

须通过适当的过载保护（经认证的电机保护开关）对样气泵加以保护，以防其发热量超过允许值。

遵循安全开关设置的额定电流（见电机铭牌）。

为泵电机确保正确的电压和频率：对额定值电压公差 $\pm 5\%$ ，频率公差 $\pm 2\%$ ——取决于设计值。

根据相关接线图（见下方）正确连接样气泵。如果接线盒盖上有不同的接线图，则无论如何都要优先考虑。端子板上螺母的规定拧紧扭矩为1.5 Nm。

请确保足够多地消除连接电缆的应力。电缆接头的夹紧范围为6-12 mm。电缆密封套的规定拧紧扭矩为5 Nm。

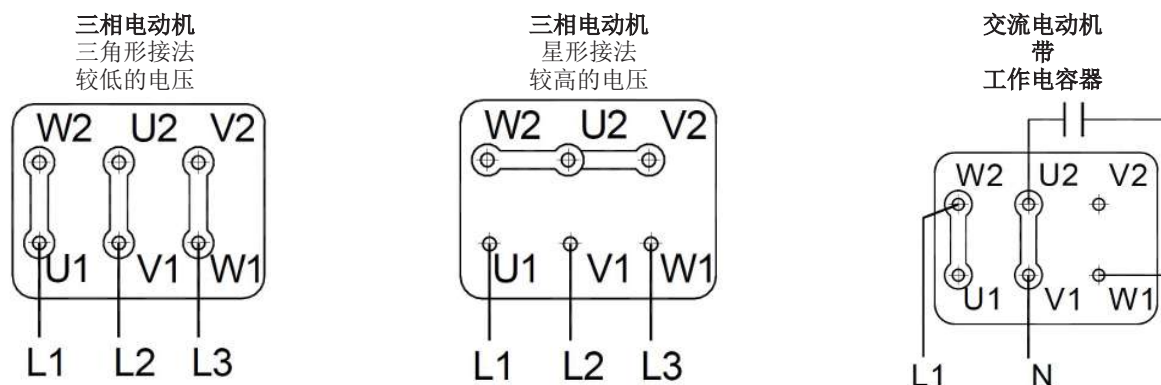
电源线及接地线的横截面必须与额定电流相适应。使用的电缆的横截面至少为1.5mm²。

必须按照官方规定将以下接地螺栓连接到本地的地线上：

- 电动机接线盒内的接地螺栓。
- 电机外壳上的外部接地螺栓。
- 安装支架上的接地螺栓。（可替代地，借助一电缆桥架将电机外壳的接地螺栓与位于外部的电机接地相连。）

补偿电流不得通过连接。

在接线盒中不得有异物、污物及湿气。应使用经批准用于该应用（可能是Atex，IECEX）的塞封闭不需要的电缆入口开口。为保证制造商指定的IP保护，在用盖子关闭接线盒时，请确保原始密封件正确就位，并用5 Nm的螺钉拧紧。必须遵循铭牌上的不同信息。现场的条件必须符合所有铭牌数据。



5 操作和控制

提示



禁止不合规操作或运行设备！

危险



有毒的刺激性气体会产生爆炸危险、中毒危险

进行维护作业时，分别根据介质会逸出爆炸性或有毒的刺激性气体并导致爆炸危险或危害健康。

- 调试设备前，检查测量气体系统是否密封。
- 确保安全排出有害健康的气体。
- 开始维护和维修作业前关闭气体供给并使用惰性气体或空气冲洗气路。防止气体供给装置意外拧开。
- 维护时，防止有毒 / 刺激性的气体。穿戴相应的防护装备。



危险



绝热压缩 (爆炸危险)!

操作员应该事先考虑到绝热压缩会造成气体温度的升高。确保操作时遵守技术参数限制和环境条件限制（见选型表），考虑到温度级别T3和T4，时刻注意介质温度。必要时，操作员需要安装温度传感器来检测气体温度的变化，并且当温度超出防爆标准时应该自动关断泵电源。

危险



危险的静电负荷 (爆炸危险)

在输送例如非常干燥及含有微粒的气体时，可能在波纹管/泵体中积聚易燃的静电负荷。在泵的进气口前，请安装一个带有合适滤芯的微粒过滤器。特别是对于P2. x ATEX-02变体，我们建议过滤精度小于10 μm。

注意



热表面风险

灼伤危险

如铭牌和操作条件所述，设备工作时壳体会产生超过50 °C的高温。根据安装现场条件，尽可能安置合适的警告提示。

危险



扩散的输送介质

爆炸危险！由于逸出易燃气体而形成爆炸性环境。

当使用高浓度的高扩散性输送介质，如氢气（H₂）等样气泵操作时，必须考虑到它们由于其设计而在技术上并非永久紧密。为了安全操作，必须遵守施工和操作的官方要求。除了定期进行泄漏检查外，还必须根据安装情况提供适当的技术措施，例如气体监测装置、技术通风等。

5.1 开启测量气体泵

开启设备前，请检查：

- 软管和电气连接未被损坏，并已被正确安装。
- 气泵上无任何部分被拆卸（如顶盖）。
- 气泵的出入口未被锁定。
- 入口压力低于0.5 bar(g)。
- 当连续运行时且流量低于150 l/h (P2. x ATEX (-H2/-O2)) 或400 l/h (P2. 7x ATEX (-H2/-O2))，旁路可用。
- 环境参数得以遵循。
- 注意铭牌说明！
- 电机的电压和频率是否与电源值一致。
- 电气连接是否被妥善拧紧和监控设备是否已被正确连接和调整。
- 进气口孔和冷却表面是否干净。
- 是否执行了保护措施；接地！
- 泵是否被正确固定。
- 接线盒盖是否闭合，电缆进线口是否被妥善密封。
- 联轴器的弹性齿圈（仅P2.4 ATEX/P2.74 ATEX (-H2/-O2)）是否安装正确且未损坏。
- 取决于运行，必要的保护和监测设备已到位并发挥作用（取决于泵的类型，例如电动机保护开关，压力表，阻火器，温度监测）。
- 根据操作员规范，样气泵具有足够的气密性。如有必要，拖动4个3 Nm的螺栓。

开启设备前，请检查：

- 无异常噪音或振动。
- 流量未增大或减小。这可表明该波纹管已受损。

5.2 运行测量气体泵

取样气泵专用于输送气体介质。它不适于液体。

样气泵应在不带预压的情况下运行。不允许预压超过0.5 bar。不得堵塞气体出口。P2. x ATEX (-H2/-O2)的流量须至少达50 l/h，P2. 7x ATEX (-H2/-O2)泵的流量须至少达200 l/h。在持续运行时，若P2. x ATEX (-H2/-O2)节流至150 l/h以下，P2. 7x ATEX (-H2/-O2)泵节流至400 l/h以下，须通过一个旁路控制流量。在这种情况下，应选择带旁通阀的版本。

提示



极端节流会降低波纹管的寿命

泵配有集成旁通阀时，可设置输出功率。转动阀门时不得施加较大的力，因为否则会损毁阀门！阀的转动范围约为7圈。

提示：阅读并遵守维护计划！

6 维护

须在安全区域中及冷却的状态下维护设备。特别是仅能于安全区域中用压缩空气清洗。

进行维护工作时，须注意以下几点：

- 仅能由熟悉安全要求和风险的专业人员维护设备。
- 请您仅执行于本操作和安装说明书中描述的维护。
- 进行保养工作时，请遵循所有相关的安全和管制信息。
- 请仅使用原厂备件。

对于样气泵P2.x ATEX-O2 (商品货号：42.....-O2)，在进行维护工作时，对避免污染有特殊要求：

- 仅使用清洁且未被损坏的工具。我们建议使用不起毛的清洁布进行清洁，最好预先浸泡在异丙醇和软化水的混合物中，以实现无残留的脱脂。
- 仅使用清洁的原厂备件（参见章节 [替换件](#) [> 页 29] 和 [耗材和附件](#) [> 页 29] ）。
- 请勿使用原包装损坏的部件。
- 仅当压缩空气至少符合ISO 8573-1:2010的2级时，才被允许使用。

提示



在进行维护工作时，请使用附件中的装配图。

危险



电压

有触电的危险

- 在进行所有作业时，断开设备电源。
- 确保设备不会意外地再次开启。
- 仅能由训练有素的人员打开设备。
- 注意电源电压是否正确。



危险



有毒的刺激性气体会产生爆炸危险、中毒危险

进行维护作业时，分别根据介质会逸出爆炸性或有毒的刺激性气体并导致爆炸危险或危害健康。

- 调试设备前，检查测量气体系统是否密封。
- 确保安全排出有害健康的气体。
- 开始维护和维修作业前关闭气体供给并使用惰性气体或空气冲洗气路。防止气体供给装置意外拧开。
- 维护时，防止有毒 / 刺激性的气体。穿戴相应的防护装备。



危险**使用适当的工具**

根据 EN 1127-1 标准，操作者有义务负责妥善处理并选用合适的工具。

使用于易爆性危险区域

易燃气体和灰尘可能被点燃或爆炸。请避免以下危害源：

静电（产生火花）

仅使用湿布清洁由塑料和标贴制成的机壳组件。

产生火花

请保护好设备，免其受到撞击。

若流程中存在因火焰穿透的爆炸危险，请安装一个阻火器。

点燃粉尘层

如果设备在多尘环境中使用，请定期清除所有组件上的粉尘层。同时去除不易触及处的粉尘层（参见“清洁”章节）。

保持涂层的防护作用

为了避免因外部撞击而产生潜在的点燃风险，表面防护层的保护作用不得因磨损或腐蚀性介质而受到损害，且必须始终保持完好。

严禁修补或重新喷涂此保护层！

请勿使用边缘锋利或尖锐的工具。

**危险****不正确地更换部件会有爆炸危险**

更换部件时应该格外小心，不正确地更换部件可能造成爆炸。

如果您感觉对任何操作细节有疑问，请确保部件更换由生产商完成。

**危险****扩散的输送介质**

爆炸危险！由于逸出易燃气体而形成爆炸性环境。

当使用高浓度的高扩散性输送介质，如氢气（H₂）等样气泵操作时，必须考虑到它们由于其设计而在技术上并非永久紧密。为了安全操作，必须遵守施工和操作的官方要求。除了定期进行泄漏检查外，还必须根据安装情况提供适当的技术措施，例如气体监测装置、技术通风等。

**注意****热表面风险**

灼伤危险

如铭牌和操作条件所述，设备工作时壳体产生超过50 °C的高温。

根据安装现场条件，尽可能安置合适的警告提示。

**注意****倾倒危险**

设备处的损害。

确保设备安全，防止翻倒、滑倒和坠落。

**注意****气体泄露**

在拆卸气泵时，气泵不能处于加压状态。

**注意****清洁部件的污染**

出于防火原因，在处理与介质接触的组件时，必须排除P2. x ATEX-02样气泵（商品货号：42.....-02）的油、油脂、灰尘、颗粒、棉绒、头发等污染。如有必要，请调整您的操作和组织措施，包括要使用的工作服、卫生法规等。如有必要，请将工作迁至合适、污垢较少的工作区域。



取决于待输送样气质量，也许需要不时更换入口和出口单向阀（见章节 [更换入口出口单向阀](#) [> 页 24]）。
若阀，尤其是在短暂运行之后，受到严重污染，您应该于泵的上游装备一个粒子过滤器。这将显著延长使用寿命。
根据操作条件，以适当的时间间隔（参见 [维护周期](#) [> 页 21]）

- 检查连接室和端子的清洁度或加以清洁。
 - 检查电气连接是否紧密。
 - 清洁电动机的冷却气道。
 - 对弹性体链齿进行间隙测试和目视检查。
- 必须保护吸气口和冷却表面不受堵塞和污染。

6.1 维护周期

元件	间隔	待执行的工作	执行人
泵体的螺丝	500 h后	以3 Nm拧紧螺丝	客户
整个泵	每500 h	检查软管连接、保护和控制装置，功能是否正常，有无污染，密闭性。 如有损坏，加以更换或由比勒技术公司人员修复。	客户
整个泵	每8000 h或污染情况严重时	清洁整个泵，参见 清洁泵壳体 [> 页 24]。	客户
阀	每8000 h或当压力下降时	检查阀，必要时加以更换，参见 更换入口出口单向阀 [> 页 24]。	客户
波纹管	每4000 h或 6个月	通过关闭吸入管检查。如遇损伤，参见 检查波纹管 [> 页 22] + 更换波纹管和连杆偏心组合。	客户
整个泵	每43800 h或5年	由比勒公司检查 产品编号参见 43800小时返厂检测时需要的订货号 [> 页 26]。	售后技术员/ 比勒技术
联轴器 (P2. 4 ATEX/P2. 74 ATEX (-H2/-O2))	在2000 h或3个月， 此后每4000 h或 6个月	首次检查弹性联轴器，参见 联轴器的检查及更换。	客户

还请遵守电机制造商的保养提示。 制造商文档位于随附的文档中。

关于用于O₂应用的样气泵的重要信息

P2. x ATEX-02（产品编号：42. -02）：

当比勒服务技术人员在现场进行维护工作时，尽管采取了所有预防措施（手套、清洁工具等）并尽了最大的努力，但就纯度而言，仍无法保证产品与工厂制造的O₂设备相对应。除了我们无法评估的个别环境条件外，我们无法评估要服务的产品的实际状况。为了获得全面保修，所有与介质接触的部件都必须在比勒技术有限公司工厂规定的制造条件下进行更换。

6.2 检查波纹管

提示



若遵循依维护计划的预防性维护措施，波纹管的破裂可仅被视为一种罕见的故障，但是也不能完全排除。

提示



波纹管破裂时，须立即关闭气泵！

提示



当输送易燃气体（即便高于“爆炸上限（UEL）”）或有毒气体时，工作中必须不断监测气泵。

危险



易爆！有毒！

如果样气中含有易爆或有毒气体，在气泵波纹管破裂的情况下会发生气体泄露。请按上述方法监控气泵。如果在操作过程中出现任何不妥，请立即关闭气泵。

由于当波纹管中有**裂纹时**，环境空气将被吸入，气泵仍将产生压力，**须定期检查气泵的波纹管**。

为此，请您于样气入口上游连接一个合适的截断装置和一个合适的真空压力表（见图）。若在工作中，吸气管被关闭后，仍不能产生负压，表明波纹管已破损并须予以更换。

保养周期参见[维护周期](#) [> 页 21]。

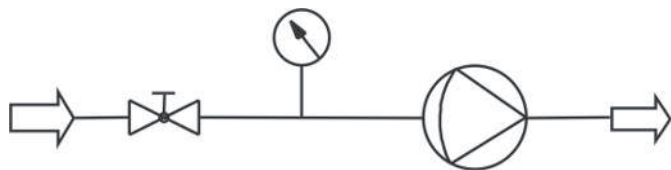


图 2: 检查波纹管

6.3 更换波纹管和冲杆偏心轮组合

提示



更换连杆偏心组合的限制

不可单独更换偏心件，连杆或轴承。只能同时更换出厂时就已经组装好的连杆偏心组合。

请使用附录中的装配图42/025-Z02-01-2以助您完成维护。

1. 卸下三颗十字螺丝（9）并从泵支架（5）上取下支架盖（8）。
2. 将气泵上的灰尘和其他污染物除去。用干净的湿布擦去顽固污垢（不使用溶剂型清洁产品）。请务必遵守 [清洁](#) [> 页 24] 一章中的所有提示。
3. 卸下泵体（13）上方的4个六角螺钉（16）和张紧垫圈（15）。PTFE泵体还内置有锁紧环（14），以提供更好的表面压力。
4. 小心地将泵体向上拉出泵支架。确保波纹管（12）不致过度拉伸。如果泵体卡在波纹管上，请尝试小心转动以使其松动。
5. 将波纹管保持在冲杆（10）的正上方，然后逆时针拧开。如果仅更改波纹管，则可直接跳至第14点继续。
6. 拆下4个六角螺栓（7）和弹簧垫圈（6）并从法兰上拆下泵支架。
7. 从曲柄连杆机构（10）的偏心轮上松开并卸下螺纹销钉（11）。它具有一内六角形（SW 2）或Torx驱动器（TX 8）槽。请使用合适的工具。
8. 现在，小心地将曲柄连杆机构从轴上撬开。最好使用2个大的平头螺丝刀。
9. 清洁轴，必要时清除轴上的残留物，如摩擦腐蚀等。
检查配合尺寸11k6。
10. 重新组装前，请使用不含树脂的油将轴浸湿。
11. 将新的曲柄连杆机构插到轴上并将螺纹销钉的止动孔与轴上的相应孔对齐。请避免使用冲击工具，因为这可能会损坏滚珠轴承。
12. 请用一中等强度的螺丝锁固胶（连续工作温度不低于150 °C）插入螺纹销钉，并用1.5 Nm的扭矩将其拧紧。请务必确保螺纹销钉的锥形端已正确居于轴孔中。
13. 现在请将泵支架重新引到曲柄连杆机构上，将其向上对齐或旋转180°，然后再次用六角螺钉（7）和弹簧垫圈（6）固定——拧紧扭矩3 Nm。
14. 检查密封面和波纹管的折痕是否损坏和污染。
15. 请从上方将波纹管穿过泵支架并顺时针用手将其旋转到曲柄连杆机构的冲杆上。
16. 清洁泵体并检查密封面是否损坏。
17. 将泵体放在波纹管上并将其相对于进气口和出气口转到所需的位置。原则上，与泵体的安装方向无关。但是，请确保锁紧环或泵体上的标记与所安装的阀门及其功能相匹配。入口单向阀与出口单向阀无区别。其安装位置决定了功能。此外，以“EIN”或“IN”标注阀入口和以“AUS”或“OUT”标注阀出口。
18. 再次用4个六角螺栓（16）和张紧垫圈（15）紧固泵体，对于PTFE泵体，用锁紧环紧固，首先以1 Nm，然后以3 Nm的交叉拧紧螺钉。
19. 最后，用3颗十字螺丝重新安装支架盖。
20. 检查样气泵的密封性。
21. 执行试验运转。至少必须达到以下值：
超压：P2.2 ATEX/P2.4 ATEX (-H2/-O2) = 1.7 bar; P2.72 ATEX/P2.74 ATEX (-H2/-O2) = 1.8 bar
低压：P2.2 ATEX/P2.4 ATEX (-H2/-O2) = -0.65 bar; P2.72 ATEX/P2.74 ATEX (-H2/-O2) = -0.6 bar
流量：P2.2 ATEX/P2.4 ATEX (-H2/-O2) = 400 l/h; P2.72 ATEX/P2.74 ATEX (-H2/-O2) = 700 l/h

请将保养工作连同测试值填入样气泵的“操作日志（复印模板）”。

6.4 更换旁路阀O圈（选配）

请使用附录中的装配图42/025-Z02-01-2以助您完成维护。

- 松开两个螺钉（24）并小心地将整个单元，包括阀板（23），主轴（22）和旋钮（26）上的O型环（21），从泵体（13）中拉出。对于VA泵体，请使用SW13开口扳手顺时针拧松主轴支架（25），然后拆下整个单元。
- 请从主轴上拆下旧的O型环。
- 以合适的O型环润滑脂（连续工作温度最低215 °C，如Fluoronox S90/2）浸湿新的O型环，并连接到主轴。样气泵 P2. x ATEX-O2（产品编号：42.....-O2）只用于适用于氧气应用的润滑剂（例如Krytox NRT 8908）。
- 小心地将整个单元旋回泵体，并再次拧紧螺丝及主轴支架。
- 检查样气泵的密封性。

6.5 更换入口出口单向阀

请使用附录中的装配图42/025-Z02-01-2以助您完成维护

- 请从泵体（13）上卸下螺纹接头（18）。
- 用一个宽大的一字螺丝刀向外旋转阀（17）。在泵体为不锈钢的情况下，所谓的挤压器（20）也位于阀的下方。这些用于减少死体积，并且必须安装在这些泵体内。
- 将新阀拧入泵体，并以最大1 Nm的扭矩拧紧。注意阀的正确安装方向。允许气体入口温度最高为100 °C的阀为黑色/红色，最高温度为160 °C的阀为灰色/橙色。P2. x ATEX-02样气泵的阀门未被染色。
- 红色或橙色的一面对应于气体入口，黑色或灰色的一面对应于气体出口。阀在气体入口标记为“EIN”和“IN”，在气体出口标记为“AUS”和“OUT”。从上方观察泵体时看到的字母决定了阀门的功能。
- 最后，将螺纹接头重新安装到泵体中。请更换不锈钢螺纹接头，必要时更换损坏的密封环（19）。
- 检查样气泵的密封性。
- 执行试验运转。至少必须达到以下值：
超压：P2.2 ATEX/P2.4 ATEX (-H2/-O2) = 1.7 bar；P2.72 ATEX/P2.74 ATEX (-H2/-O2) = 1.8 bar
低压：P2.2 ATEX/P2.4 ATEX (-H2/-O2) = -0.65 bar；P2.72 ATEX/P2.74 ATEX (-H2/-O2) = -0.6 bar
流量：P2.2 ATEX/P2.4 ATEX (-H2/-O2) = 400 l/h；P2.72 ATEX/P2.74 ATEX (-H2/-O2) = 700 l/h

请将保养工作连同测试值填入样气泵的“操作日志（复印模板）”。

6.6 清洁

6.6.1 清洁泵壳体

危险



静电充电（产生火心）

塑料质地部件只能用干净湿布清洁。

粉尘燃烧！

如果取样如果设备使用在多尘环境下，请务必定期清理灰尘。同时设备缝隙里的灰尘也必须清理干净。

保护涂层的保护作用

为避免潜在引燃危险，必须保证任何情况下防护涂层不被磨损或腐蚀！

禁止补漆或重新喷涂！

不可以使用尖锐的工具。

- 欲清洁泵支架的内部，请从支架盖（8）上拧下三颗十字螺丝（9）并取下它。
- 现在可将泵支架内部的灰尘和其他污染物除去。用干净的湿布擦去顽固污垢。请勿使用含有溶剂的清洁产品。
- 现在重新装上支架盖，并拧紧三个螺丝。

请在附录中的装配图42/025-Z02-01-2中找到项目编号的分配。

6.6.2 清洁电机

取决于泵的运转情况，必须定期进行以下工作：

- 检查连接空间和端子的清洁度。
- 检查电气连接是否紧密。
- 清洁冷却风路。
- 检查电机是否自由、低振动运行及噪音生成。若您发现任何异常，请联系我们的客服。

必须保护冷却表面和吸气口不受堵塞和污染。

6.7 联轴器的检查及更换

提示



联轴器的维护限制

只可直接更换韧性联轴器
拆卸、重装和更换联轴器的工作只能由德国比勒科技有限公司完成。六角螺钉被定位胶漆标记过，油漆不可以被损坏。

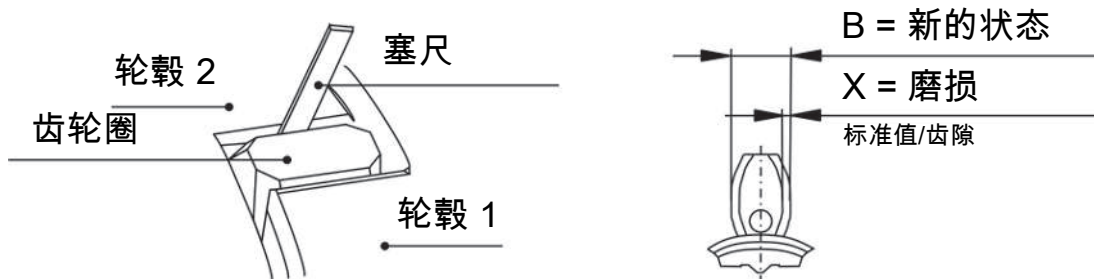


图 3: 联轴器 气泵

请使用附录中的装配图42/025-Z02-02-2以助您完成维护。

我们使用的联轴器（对于P2.4 ATEX/P2.74 ATEX（-H2/-02）型）是无间隙联轴器！

检查联轴器凸轮（28a/28b）和齿轮圈（28c）之间的间隙。一旦产生间隔，无论检查间隔如何，都必须立即更换齿轮圈。

为此，通过卸下六角螺钉（32）和垫圈（31），将单元泵头和中间法兰（X/28）与其余部分分开。卸下磨损的齿轮圈并去除联接法兰和中间法兰上的灰尘和其他杂质。用干净的湿布擦去顽固污垢（不使用溶剂型清洁产品）。

在电机侧的轮毂上安装一新的齿轮圈。可以通过在弹性体上稍加润滑脂或上油来减小装配力。为此仅使用不含添加剂的矿物油基油脂。

现在，将泵头单元和中间法兰重新插入联接法兰中，并再次用六角螺钉和垫圈将其紧固。可以通过联接法兰上的检查孔检查组装是否正确。

执行试验运转并随后在泵的操作日志（复印模板）中填入维护工作。

6.8 43800小时返厂检测时需要的订货号

订购检验时，请输入相应的商品货号。

用于检查的商品货号的结构与泵的商品货号相同。根据泵的装备，必须选择商品货号。

x将由相应的设备变体取代。其他装备特征不被考虑在内，在商品货号中用0表示。

对于样气泵P2. x ATEX-02（货号：42.....-02），不打算使用以下商品货号预订检查。请联系我们获取个性化报价。

用于检查P2. 2 ATEX, P2. 2 ATEX-H2泵的产品编号

4261	X	0	0	X	XX	
	7					230 V 50/60 Hz
	8					115 V 50/60 Hz
	9					380 - 420 V/50 Hz
	0					500 V/50 Hz
				1		100 ° C 阀
				2		140 ° C 阀
					00	-
					H2	带密闭性检测

用于检查P2. 4 ATEX, P2. 4 ATEX-H2泵的产品编号

4262	X	0	0	0	XX	
	7					230 V 50/60 Hz
	8					115 V 50/60 Hz
	9					380 - 420 V/50 Hz
	0					500 V/50 Hz
					00	-
					H2	带密闭性检测

用于检查P2. 72 ATEX, P2. 72 ATEX-H2泵的产品编号

4265	X	0	0	2	XX	
	7					230 V 50/60 Hz
	8					115 V 50/60 Hz
	9					380 - 420 V/50 Hz
	0					500 V/50 Hz
					00	-
					H2	带密闭性检测

用于检查P2. 74 ATEX, P2. 74 ATEX-H2泵的产品编号

4266	X	0	0	0	XX	
	7					230 V 50/60 Hz
	8					115 V 50/60 Hz
	9					380 - 420 V/50 Hz
	0					500 V/50 Hz
					00	-
					H2	带密闭性检测

例如：P2.2-Atex 泵，230V 50/60Hz供电，泵头接口朝下，PTFE材质泵体，140° C / 284° F单向阀

泵的订货号： 4261 7112 99 000（此号码可以在泵的铭牌上找到，参考章节产品编码产品编码和铭牌[铭牌](#) [> 页 6]）。

返厂检测时需要的订货号： 4261 1002 00

7 服务和维修

若操作过程中发生错误，在此章节中，必要时您可找到就故障诊断和消除的提示或者请联系我们的服务。

必须由比勒授权的人员进行设备维修工作。

若您有任何疑问，请联系我们的客服：

电话：+49-(0) 2102-498955 或您当地的销售代表。

关于我们个性化的维修、改造和调试服务的更多信息，请访问 <https://www.buehler-technologies.com/service>。

若在消除故障并接通电源后仍不能正常工作，须由制造商检查该设备。为此，请以合适的包装将设备发送至：

比勒科技有限公司 - BZL
Halle A1 - Aircompark
Halskestr. 24
40880 拉廷根
德国

请将填写并签署好的RMA去污声明附入包装。否则您的维修委托将不予处理。该表格位于本手册的附录中，但也可通过e-mail另行索取：

service@buehler-technologies.com

7.1 故障处理

注意



注意由设备破损带来的潜在危险

避免人身伤害或财产损失

- a) 关闭设备并断开设备与总电源的连接。
- b) 尽快对设备进行维修。设备在未排除故障之前不可以重新上电开机。



注意



热表面风险

灼伤危险

如铭牌和操作条件所述，设备工作时壳体产生超过50 °C的高温。
根据安装现场条件，尽可能安置合适的警告提示。

问题 / 故障	可能原因	解决方案
泵无法启动	– 供电问题或安装不正确 – 电机损坏	– 检查接头，保险丝和开关 – 返回德国比勒科技有限公司更换电机
泵无法送气	– 单向阀损坏 – 旁路阀被开启 – 旁路阀O圈损坏 – 波纹管破裂 – 联轴器被破坏 – 联轴器垫片破裂/磨损	– 用气体冲刷阀，或更换新阀，参考“更换入口出口单向阀更换入口出口单向阀 [> 页 24] 。 – 关闭旁路阀 – 送至 Bühler 服务处更换或参考“更换旁路阀O圈”自行更换 – 送至 Bühler 服务处更换或参考“更换波纹管和连杆偏心组合更换波纹管和连杆偏心组合自行更换。 – 送至 Bühler 服务处更换 – 送至 Bühler 服务处更换或参考“更换联轴器垫片联轴器的检查及更换自行更换。
泵产生噪音	– 曲轴齿轮磨损 – 联轴垫片磨损 – 联轴器耦合轮松了 – 电机轴承故障	– 送至 Bühler 服务处更换或参考“更换波纹管和连杆偏心组合更换波纹管和连杆偏心组合自行更换。 – 送至 Bühler 服务处更换或参考“更换联轴器垫片联轴器的检查及更换自行更换。 – 送至 Bühler 服务处更换 – 送至 Bühler 服务处更换
联轴器垫片过早磨损	– 可能由于臭氧或与其类似组分与造成联轴器垫片物理特性改变。	– 确保臭氧或与其类似组分远离联轴器垫片，联轴器垫片物理性质不被改变。
保护开关激活	– 线圈或端子短路 – 启动时间过长	– 检查绝缘电阻 – 检查启动条件
供气量不足	– 泄漏 – 波纹管破裂 – 单向阀损坏	– 参考“维护维护章节，重新紧固泵头螺丝。 – 送至 Bühler 服务处更换或参考“更换波纹管和连杆偏心组合更换波纹管和连杆偏心组合自行更换。 – 用气体冲刷阀，或更换新阀，参考“更换入口出口单向阀更换入口出口单向阀 [> 页 24] 。

表格 1: 故障处理

更换配件请参考章节“维护,,维护“。

7.2 替换件

订购零配件时请注意设备型号和序列号。

附件及设备的升级见参数表或产品目录表。

建议随泵同时订购以下备件：

气泵	替换件	商品货号	在装配图 42/025-Z02-01-2 & 42/025-Z02-02-2中的位置
P2. 2 ATEX	波纹管	4200015	12a
P2. 2 ATEX-H2	冲杆/偏心轮组合	4200075	10a, 11
P2. 4 ATEX	联轴器用齿轮圈	4220011	28c
P2. 4 ATEX-H2	一套100 ° C阀门	4201002	2x 17a
	一套160 ° C阀门	4202002	2x 17b
	O型环 旁通阀（氟橡胶）	9009115	21a
P2. 72 ATEX	波纹管	4200071	12b
P2. 72 ATEX-H2	冲杆/偏心轮组合	4200097	10b, 11
P2. 74 ATEX	联轴器用齿轮圈	4220011	28c
P2. 74 ATEX-H2	一套160 ° C阀门	4202002	2x 17b
	O型环 旁通阀（氟橡胶）	9009115	21a

样气泵P2.x ATEX-O2专用的替换件（产品编号：42.....-O2）：

气泵	替换件	商品货号	在装配图 42/025-Z02-01-2 & 42/025-Z02-02-2中的位置
P2. 2 ATEX-O2/	波纹管	4200015-O2	12a
P2. 4 ATEX-O2	冲杆/偏心轮组合	4200075	10a, 11
	联轴器用齿轮圈	4220011	28c
	阀 PTFE/PEEK（1件）	4202014-O2	2x 17b
	O型环 旁通阀（氟橡胶）	9009458-O2	21a
P2. 72 ATEX-O2/	波纹管	4200071-O2	12b
P2. 74 ATEX-O2	冲杆/偏心轮组合	4200097	10b, 11
	联轴器用齿轮圈	4220011	28c
	阀 PTFE/PEEK（1件）	4202014-O2	2x 17b
	O型环 旁通阀（氟橡胶）	9009458-O2	21a

7.2.1 耗材和附件

商品货号	名称
9022325	经BAM认证的PTFE密封带（4.5米一卷）

8 报废

在废弃处理产品时，必须遵守适用的国家法律法规。请以对健康和环境不产生危害为原则进行废弃处理。

对于Bühler Technologies GmbH的产品，被划掉的带轮垃圾桶的符号指向欧盟（EU）内电气和电子产品的特殊废弃处理说明。



被划掉的垃圾桶的符号表示标有它的电器电子产品必须与生活垃圾分开处理。必须作为废弃的电气和电子设备妥善处理它们。

Bühler Technologies GmbH很乐意废弃处理带有此标签的设备。为此，请将设备寄送到以下地址。

我们在法律上有义务保护我们的员工免受受污染设备造成的危险。因此，我们恳请您理解，只有在设备不含任何刺激性、腐蚀性或其他对健康或环境有害的物料的情况下，我们才能废弃处理您的旧设备。对于每个废弃的电气和电子设备，必须填写“RMA——去污表格和声明”表格，它可在我们的网站上找到。填妥的表格必须贴于包装外部的明显位置。

如需退回废弃电气和电子设备，请使用以下地址：

Bühler Technologies GmbH - BZL
WEEE
Halle A1 - Aircompark
Halskestr. 24
40880 Ratingen
Germany

另请注意数据保护规则，您自己有责任确保您退回的旧设备上没有个人数据。因此，请确保在归还之前从旧设备中删除您的个人数据。

9 附录

9.1 技术规格P2.2 ATEX/P2.4 ATEX

额定电压:	见订购提示
标记:	II 2 G Ex h IIB+H2 T3...T4 Gb X
IECEX证书号:	IECEX IBE 24.0022X
防护等级:	电气 IP65 机械 IP20
死容积:	8.5 ml
重量:	约7.5 kg (P2.2 ATEX) 约8.5 kg (P2.4 ATEX)
接液材料 取决于配置:	PTFE, PVDF (带100 °C 阀门的标准泵) + PEEK (带140 °C 阀门的标准泵) + FKM (带100 °C 阀门和旁路阀的标准泵) + PCTFE, FKM (带140 °C 阀门和旁路阀的标准泵) + 1.4571 (VA泵体) + 1.4401, FKM (VA管接头) + FKM (带旁通阀的VA泵体)

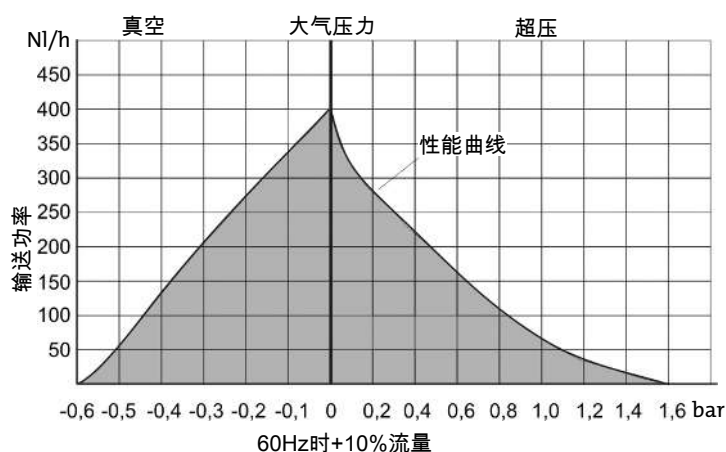
下表描述了样气泵的温度特性及其允许运行的极限值。温度等级既适用于安装区域（区段）内的气体，也适用于气路中的爆炸性输送介质：

温度等级	电机环境温度	泵头环境温度	P2.2 ATEX		P2.4 ATEX	
			介质温度 ¹⁾		泵头环境温度 ¹⁾	介质温度 ¹⁾
			不带旁通阀	带旁通阀		
T3	-20 °C...50 °C	最高50 °C	最高140 °C	最高135 °C ²⁾	最高100 °C	最高140 °C
T4			最高90 °C	最高85 °C	最高90 °C	最高90 °C

¹⁾ 由于工厂安装的塑料螺纹接头的最高连续工作温度，对于不带旁通阀的泵，这些型号的最大允许介质和环境温度限制为 ≤ 80 °C，对于带旁通阀的泵，最大允许介质和环境温度限制为 ≤ 75 °C。

²⁾ 在介质温度 > 85 °C 时，仅允许在不锈钢版本中使用旁通阀进行操作。

性能曲线400l/h



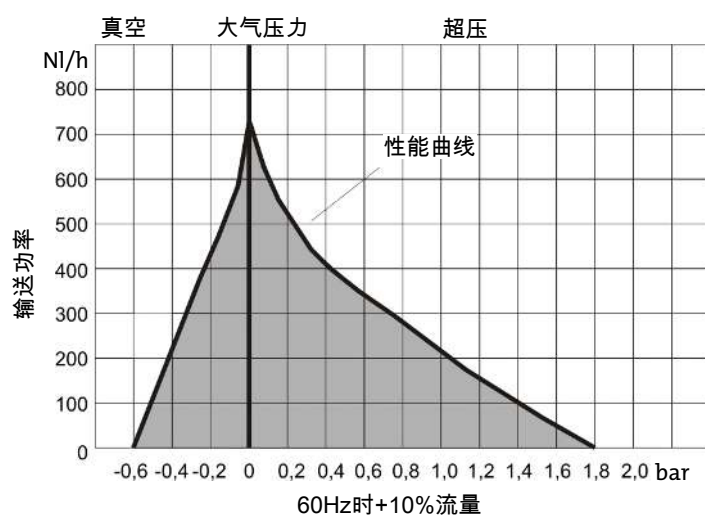
9.2 技术规格P2.72 ATEX/P2.74 ATEX

额定电压:	见订购提示
标记:	II 2 G Ex h IIB+H2 T3 Gb X
IECEX证书号:	IECEX IBE 24.0022X
防护等级:	电气 IP65 机械 IP20
死容积:	8.5 ml
重量:	约7.5 kg (P2.72 ATEX) 约8.5 kg (P2.74 ATEX)
接液部件:	PTFE, PEEK, 1.4571 (所有型号的构件) + FKM (旁通阀) + 1.4401, FKM (VA管接头)

下表描述了样气泵的温度特性及其允许运行的极限值。温度等级既适用于安装区域（区段）内的气体，也适用于气路中的爆炸性输送介质：

温度等级	电机环境温度	P2.72 ATEX			P2.74 ATEX	
		泵头环境温度	介质温度		泵头环境温度	介质温度
			不带旁通阀	带旁通阀		
T3	-20 ° C...50 ° C	最高50 ° C	最高115 ° C	最高105 ° C	最高100 ° C	最高115 ° C

性能曲线700l/h



9.3 技术规格P2.x ATEX-H2/-O2

额定电压:	见订购提示
标记:	P2. 2 ATEX-H2/-O2, P2. 4 ATEX-H2/-O2 II 2 G Ex h IIB+H2 T3...T4 Gb X P2. 72 ATEX-H2/-O2, P2. 74 ATEX-H2/-O2 II 2 G Ex h IIB+H2 T3 Gb X
IECEX证书号:	IECEX IBE 24.0022X
防护等级:	电气 IP65 机械 IP20
死容积:	8.5 ml
重量:	约7.5 kg (P2. 2 ATEX-H2/-O2, P2. 72 ATEX-H2/-O2) 约8.5 kg (P2. 4 ATEX-H2/-O2, P2. 74 ATEX-H2/-O2)
接液材料 取决于配置:	PTFE, PEEK, 1.4571 (所有型号的构件) + FKM (旁通阀) + 1.4401, FKM (VA管接头, 用于H ₂ 变体) + 1.4401 (用于O ₂ 变体的 VA RT 管件, 需要经过BAM测试的PTFE密封胶带 [见附件])

下表描述了样气泵的温度特性及其允许运行的极限值。温度等级既适用于安装区域（区段）内的气体，也适用于气路中的爆炸性输送介质：

P2.x ATEX-H2变体的温度参数

		P2. 2 ATEX-H2		P2. 4 ATEX-H2	
温度等级	电机环境温度	泵头环境温度	介质温度	泵头环境温度	介质温度
			不带旁通阀		
T3	-20 °C...50 °C	最高50 °C	最高140 °C	最高100 °C	最高140 °C
T4			最高90 °C	最高90 °C	最高90 °C

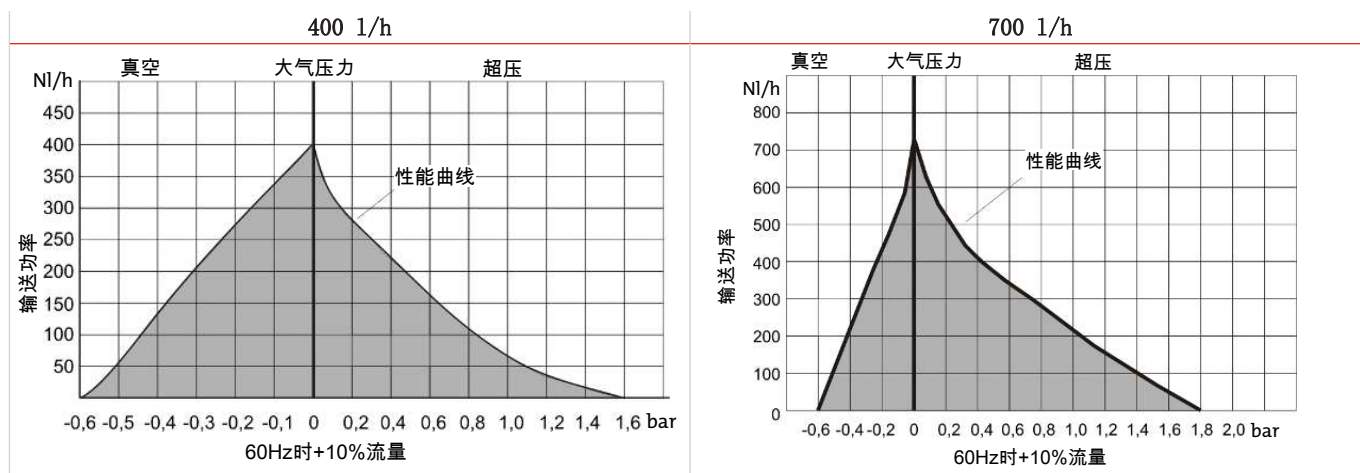
		P2. 72 ATEX-H2		P2. 74 ATEX-H2	
温度等级	电机环境温度	泵头环境温度	介质温度	泵头环境温度	介质温度
			不带旁通阀		
T3	-20 °C...50 °C	最高50 °C	最高115 °C	最高100 °C	最高115 °C
			带旁通阀		
			最高105 °C		

P2.x ATEX-O2变体的温度参数

		P2. 2 ATEX-O2		P2. 4 ATEX-O2	
温度等级	电机环境温度	泵头环境温度	介质温度	泵头环境温度	介质温度
T3	-20 °C...50 °C	最高50 °C	最高75 °C	最高75 °C	最高75 °C
T4					

		P2. 72 ATEX-O2 / P2. 74 ATEX-O2	
温度等级	电机环境温度	泵头环境温度	介质温度
T3	-20 °C...45 °C	最高45 °C	最高45 °C

性能曲线



9.4 就电机的重要提示

在易爆区域中的电机需要配备保护装置！

电机保护开关可能会有一些特定的环境要求，这些要求可能与基础设备的规定有所不同。请综合考虑环境温度、区域划分（防爆区域等级）、爆炸组别以及温度等级。请始终将所有组件的操作说明和数据表中的所有技术信息作为安全考虑的一部分。

将电机保护开关安装于易爆区域外

电机电压	电流整定范围（过载脱扣器）	产品编号
7 = 230 V 50/60 Hz	0.7 - 1 A	9132020041
8 = 115 V 50/60 Hz	1.4 - 2 A	9132020057
9 = 380-420 V 50 Hz	0.45 - 0.63 A	9132020055
0 = 500 V 50 Hz	0.35 - 0.5 A	9132020071

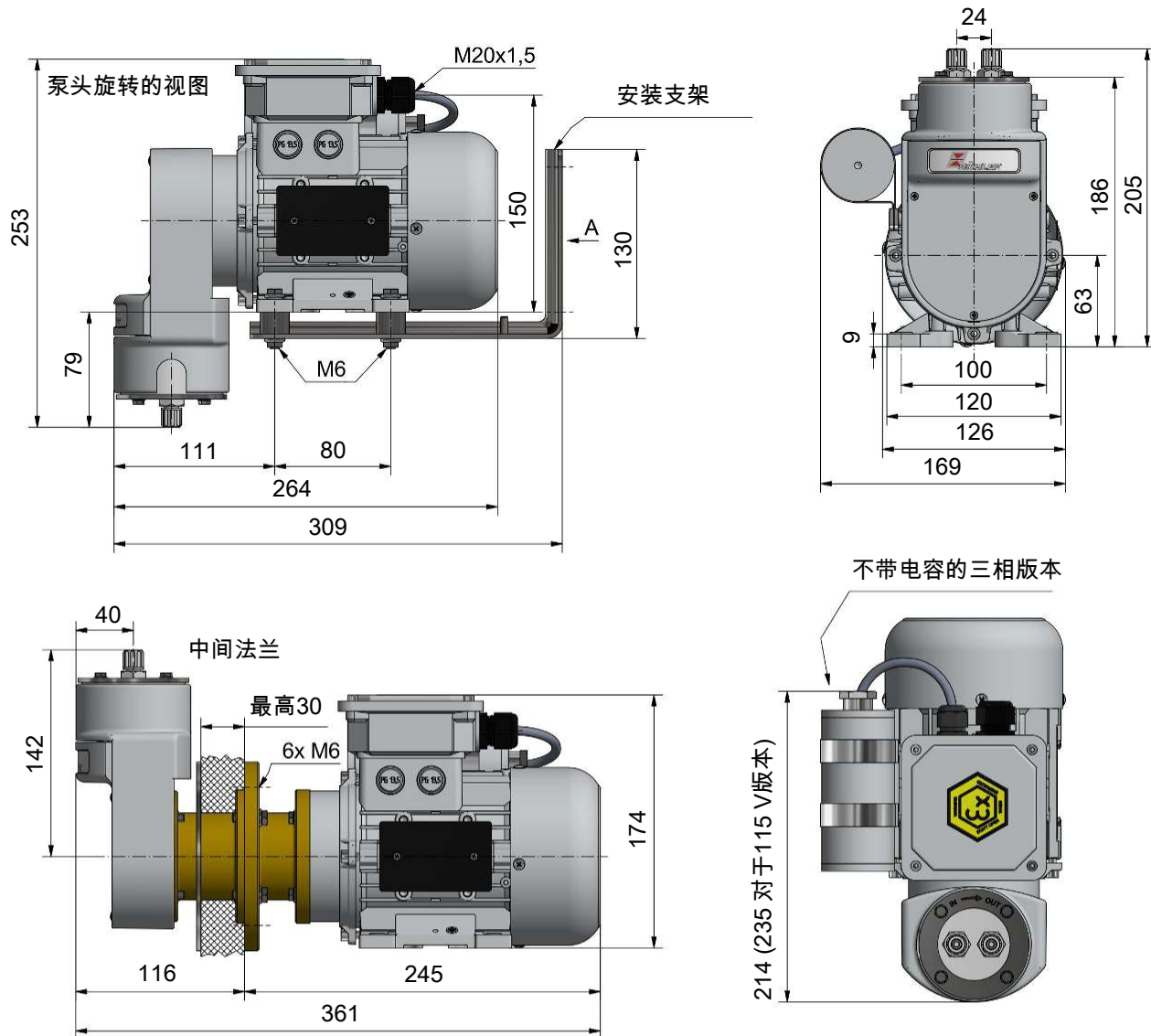
将电机保护开关安装于易爆区域1或2区（仅Atex）

电机电压	电流整定范围（过载脱扣器）	产品编号
7 = 230 V 50/60 Hz	0.63 - 1 A	9132020036
8 = 115 V 50/60 Hz	1.6 - 2.5 A	9132020033
9 = 380-420 V 50 Hz	0.4 - 0.63 A	9132020073
0 = 500 V 50 Hz	0.25 - 0.4 A	9132020074

9.5 P2.x ATEX尺寸

P2.2 ATEX, P2.72 ATEX - 标准版本

P2.4 ATEX, P2.74 ATEX - 带中间法兰版本



用于带中间法兰的泵的墙面安装图



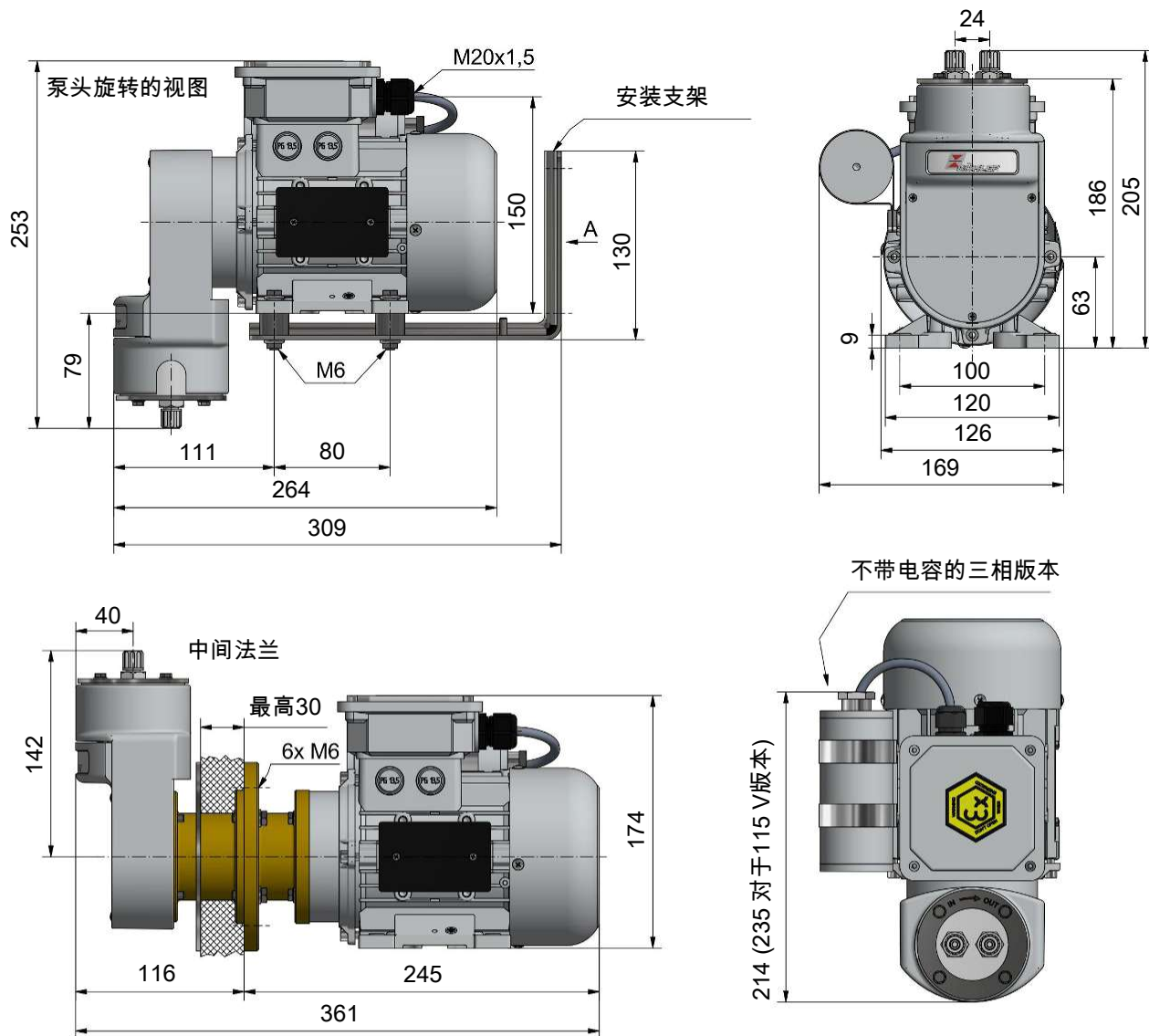
安装说明:

- 1) 应水平安装泵
- 2) 安装过程中, 根据需要旋转泵头。当输送含有冷凝水份的气体时, 应与阀一同向下安装泵头。

9.6 P2.x ATEX-H2/-O2尺寸

P2.2 ATEX-H2/-O2, P2.72 ATEX-H2/-O2 - 标准版本

P2.4 ATEX-H2/-O2, P2.74 ATEX-H2/-O2 - 带中间法兰的版本



用于带中间法兰的泵的墙面安装图



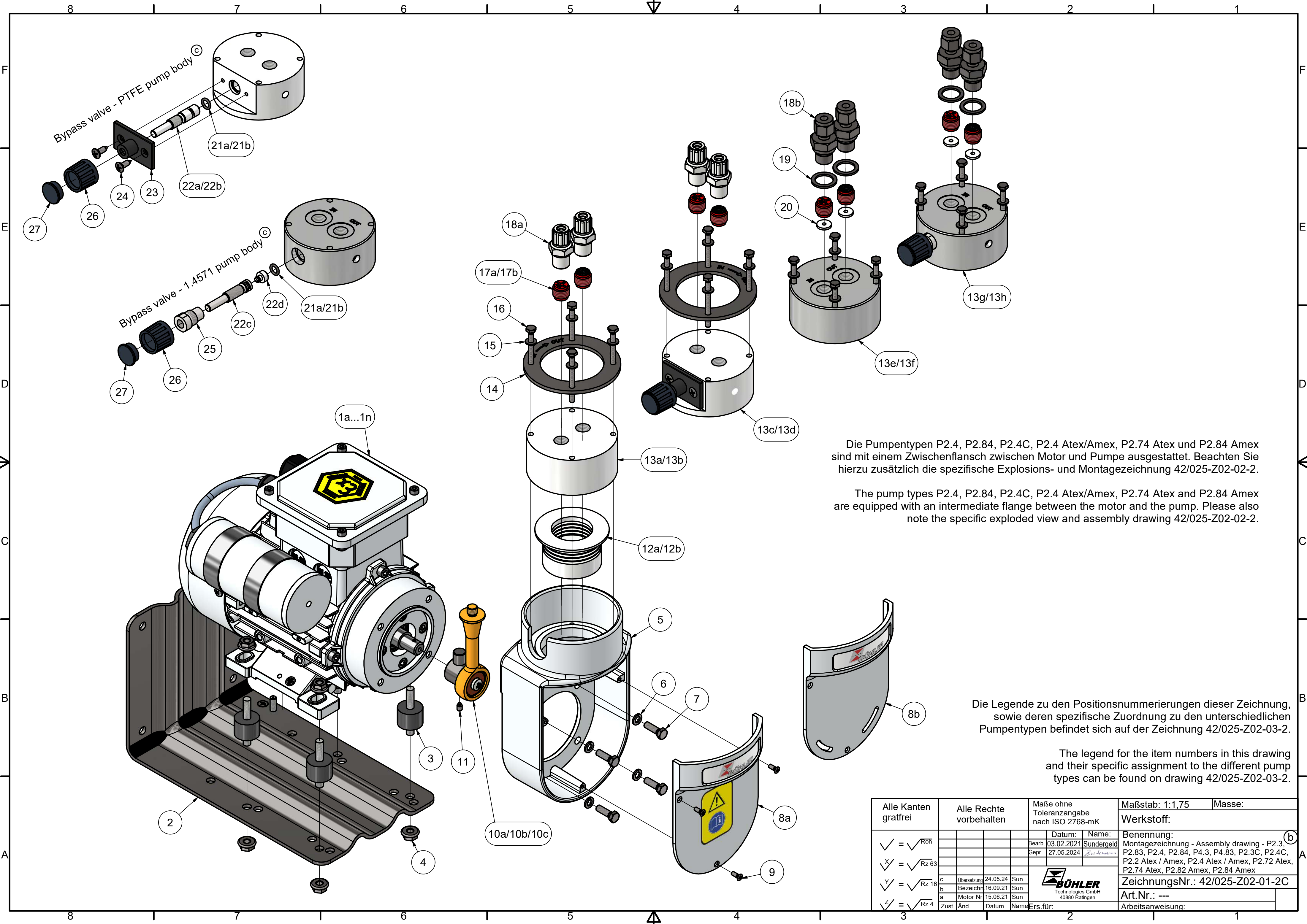
安装说明:

- 1) 应水平安装泵
- 2) 安装过程中, 根据需要旋转泵头。当输送含有冷凝水成份的气体时, 应与阀一同向下安装泵头。

9.7 操作日志 (复印模板)

10 附录

- 图纸: 42/025-Z02-01-2, 42/025-Z02-02-2; 42/025-Z02-03-2
- 符合性声明: KX420010
- 02声明: B#420025
- 操作说明书: 电动机
- 认证: 电动机制造商符合性声明
EPT 17 ATEX 2588 X
IECEX EUT 14.0001X
- 化学抗腐蚀性表
- RMA 去污声明



Die Pumpentypen P2.4, P2.84, P2.4C, P2.4 Atex/Amex, P2.74 Atex und P2.84 Amex sind mit einem Zwischenflansch zwischen Motor und Pumpe ausgestattet. Beachten Sie hierzu zusätzlich die spezifische Explosions- und Montagezeichnung 42/025-Z02-02-2.

The pump types P2.4, P2.84, P2.4C, P2.4 Atex/Amex, P2.74 Atex and P2.84 Amex are equipped with an intermediate flange between the motor and the pump. Please also note the specific exploded view and assembly drawing 42/025-Z02-02-2.

Die Legende zu den Positionsnummerierungen dieser Zeichnung, sowie deren spezifische Zuordnung zu den unterschiedlichen Pumpentypen befindet sich auf der Zeichnung 42/025-Z02-03-2.

The legend for the item numbers in this drawing and their specific assignment to the different pump types can be found on drawing 42/025-Z02-03-2.

Alle Kanten gratfrei		Alle Rechte vorbehalten		Maße ohne Toleranzangabe nach ISO 2768-mK		Maßstab: 1:1,75		Masse:	
						Werkstoff:			
✓ = √R0f					Datum:	Name:			
					Bearb.	03.02.2021	Sundergeld		
✓x = √Rz 63					Gepr.	27.05.2024	<i>Bitte nicht unterschreiben</i>		
✓y = √Rz 16	c	Übersetzung	24.05.24	Sun	 BÜHLER Technologies GmbH 40880 Ratingen				
	b	Bezeichnung	16.09.21	Sun					
✓z = √Rz 4	a	Motor Nr	15.06.21	Sun	ZeichnungsNr.: 42/025-Z02-01-2C				
	Zust.	Änd.	Datum	Name	Ers. für:		Arbeitsanweisung:		

Zeichnungsnummer/Drawing no. 42/025-Z02-03-2 Rev.D Date: 10.01.2025 Autor: Sundergeld			Legende und spezifische Zuordnung der Positionsnummern aus den Montagezeichnungen 42/025-Z02-01-2 & 42/025-Z02-02-2															
Änderung: D = Übersetzung vertauscht => Beschreibung/Description Geprüft am:13.01.2025 Prüfer: <i>B. W. G. G.</i>			Legend and specific assignment for the item numbers of the assembly drawings															
Pos. No.	Beschreibung	Description	P2.3	P2.83	P2.4	P2.84	P4.3	P4.83	P2.3C	P2.4C	P2.2 Atex	P2.2 Amex	P2.4 Atex	P2.4 Amex	P2.72 Atex	P2.74 Atex	P2.82 Amex	P2.84 Amex
1a	Motor 230V 50/60Hz	Motor 230V 50/60Hz	X	X	X	X	---	---	X	X	---	---	---	---	---	---	---	---
1b	Motor 115V 50/60Hz	Motor 115V 50/60Hz	X	X	X	X	---	---	X	X	---	---	---	---	---	---	---	---
1c	Motor 230/400V 50/60Hz	Motor 230/400V 50/60Hz	X	X	X		---	---	X	X	---	---	---	---	---	---	---	---
1d	Motor 230V 50/60Hz with two shaft ends	Motor 230V 50/60Hz mit 2 Wellenenden	---	---	---	---	X	X	---	---	---	---	---	---	---	---	---	---
1e	Motor 115V 50/60Hz with two shaft ends	Motor 115V 50/60Hz mit 2 Wellenenden	---	---	---	---	X	X	---	---	---	---	---	---	---	---	---	---
1f	Motor 230V 50/60Hz Atex, IECEX	Motor 230V 50/60Hz Atex, IECEX	---	---	---	---	---	---	---	---	X	---	X	---	X	X	---	---
1g	Motor 115V 50/60Hz Atex, IECEX	Motor 115V 50/60Hz Atex, IECEX	---	---	---	---	---	---	---	---	X	---	X	---	X	X	---	---
1h	Motor 380-420V 50Hz Atex, IECEX	Motor 380-420V 50Hz Atex, IECEX	---	---	---	---	---	---	---	---	X	---	X	---	X	X	---	---
1i	Motor 500V 50Hz Atex, IECEX	Motor 500V 50Hz Atex, IECEX	---	---	---	---	---	---	---	---	X	---	X	---	X	X	---	---
1j	Motor 230V 50/60Hz Cl.I, Div.2	Motor 230V 50/60Hz Cl.I, Div.2	---	---	---	---	---	---	---	---		X	---	X	---	---	X	X
1k	Motor 115V 50/60Hz Cl.I, Div.2	Motor 115V 50/60Hz Cl.I, Div.2	---	---	---	---	---	---	---	---		X	---	X	---	---	X	X
2	Montagekonsole	Mounting bracket	X	X	---	---	X	X	X	---	X	X	---	---	X	---	X	---
3	Gummi-Metall-Puffer	Shock absorber	X	X	---	---	X	X	X	---	X	X	---	---	X	---	X	---
4	Mutter DIN 6923 - M6	Nut DIN 6923 - M6	X	X	---	---	X	X	X	---	X	X	---	---	X	---	X	---
5	Pumpenkonsole	Pump housing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	Federring DIN 127 B5,1	Spring washer DIN 127 B5,1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	Schraube DIN 933 M5x16	Screw DIN 933 M5x16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8a	Konsolendeckel - standard	Cover - standard	X	X	X	X	X	X	---	---	X	X	X	X	X	X	X	X
8b	Konsolendeckel mit Schlitzen	Cover with slots	---	---	---	---	---	---	X	X	---	---	---	---	---	---	---	---
9	Schraube DIN 966 M3x8	Screw DIN 966 M3x8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10a	Kurbeltrieb für 400l/h Pumpen (Stößel gold)	Crank drive for 400l/h pumps (plunger gold)	X	---	X	---	X	---	X	X	X	X	X	X	---	---	---	---
10b	Kurbeltrieb für 700l/h Pumpen (Stößel grün)	Crank drive for 700l/h pumps (plunger green)	---	---	---	---	---	---	---	---	---	---	---	---	X	X	---	---
10c	Kurbeltrieb für 800l/h Pumpen (Stößel schwarz)	Crank drive for 800l/h pumps (plunger black)	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
11	Schraube DIN 915 M4x6 oder ISO 4028 M4X6 TX 8	Screw DIN 915 M4x6 or ISO 4028 M4X6 TX 8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12a	Faltenbalg für 400l/h Pumpen (4 Falten)	Below for 400l/h pumps (4 folds)	X	---	X	---	X	---	X	X	X	X	X	X	---	---	---	---
12b	Faltenbalg für 700l/h und 800l/h Pumpen (8 Falten)	Below for 700l/h and 800l/h pumps (8 folds)	---	X	---	X	---	X	---	---	---	---	---	---	X	X	X	X
13a	Pumpenkörper - PTFE für 400l/h Pumpen	Pump body - PTFE for 400l/h pumps	X	---	X	---	X	---	X	X	X	X	X	X	---	---	---	---
13b	Pumpenkörper - PTFE für 800l/h Pumpen	Pump body - PTFE for 800l/h pumps	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
13c	Pumpenkörper - PTFE mit Bypassventil für 400l/h Pumpen	Pump body - PTFE with bypass valve for 400l/h pumps	X	---	X	---	X	---	X	X	X	X	X	X	---	---	---	---
13d	Pumpenkörper - PTFE mit Bypassventil 800l/h Pumpen	Pump body - PTFE with bypass valve for 800l/h pumps	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
13e	Pumpenkörper - 1.4571 für 400l/h und 700l/h Pumpen	Pump body - 1.4571 for 400l/h and 700l/h pumps	X	---	X	---	X	---	X	X	X	X	X	X	X	X	---	---
13f	Pumpenkörper - 1.4571 für 800l/h Pumpen	Pump body - 1.4571 for 800l/h pumps	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
13g	Pumpenkörper - 1.4571 mit Bypassventil für 400l/h und 700l/h Pumpen	Pump body - 1.4571 with bypass valve for 400l/h and 700l/h pumps	X	---	X	---	X	---	X	X	X	X	X	X	X	X	---	---
13h	Pumpenkörper - 1.4571 mit Bypassventil für 800l/h Pumpen	Pump body - 1.4571 with bypass valve for 800l/h pumps	---	X	---	X	---	X	---	---	---	---	---	---	---	---	X	X
14	Montagering - nur für PTFE Pumpenkörper	Mounting ring - only for pump bodys made of PTFE	X	X	X	X	X	X	X	X	X	X	X	X	---	---	X	X
15	Spannscheibe DIN 6796 d=4	Clamping washer DIN 6796 d=4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	Schraube DIN 933 M4x45	Screw DIN 933 M4x45	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17a	Ventil - geeignet bis zu 100°C Gaseingangstemperatur	Valve - suitable up to 100°C gas inlet temperature	X	---	---	---	X	---	X	---	X	X	---	---	---	---	---	---
17b	Ventil - geeignet bis zu 160°C Gaseingangstemperatur	Valve - suitable up to 160°C gas inlet temperature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18a	Kunststoff Einschraubverschraubung - diverse Typen - siehe Pumpendatenblätter	Plastic fitting - various types - see pump data sheets	X	X	X	X	X	X	X	X	X	X	X	X	---	---	X	X
18b	Edelstahl Rohrverschraubung - diverse Typen - siehe Pumpendatenblätter	Stainless steel fitting - various types - see pump data sheets	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
19	Dichtring - nur für Edelstahl Pumpenkörper	Sealing ring - only for pump bodys made of 1.4571	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20	Verdränger - nur für Edelstahl Pumpenkörper	Displacer - only for pump bodys made of 1.4571	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21a	O-Ring - FKM	O-Ring made of FKM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21b	O-Ring - FFKM	O-Ring made of FFKM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22a	Spindel für Bypassventil - geeignet bis zu 100°C Gaseingangstemperatur	Spindle for PTFE bypass valve - suitable up to 100°C gas inlet temperature	X	---	---	---	X	---	X	---	X	X	---	---	---	---	---	---
22b	Spindel für Bypassventil - geeignet bis zu 160°C Gaseingangstemperatur	Spindle for PTFE bypass valve - suitable up to 160°C gas inlet temperature	---	X	X	X	---	X	---	X	---	---	X	X	X	X	X	X
22c	Spindel für Edelstahl Bypassventil	Spindle for 1.4571 bypass valve	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22d	Spindelspitze	Spindle tip	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	Montageplatte Bypassventil	Mounting plate bypass valve	X	X	X	X	X	X	X	X	X	X	X	X	---	---	X	X
24	Schraube DIN 7982 4,2x13	Screw DIN 7982 4,2x13	X	X	X	X	X	X	X	X	X	X	X	X	---	---	X	X
25	Spindelaufnahme	Spindle holder	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	Drehknopf	Knob	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
27	Deckel	Cover	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28	Zwischenflansch	Intermediate flange	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
28a/28b	Kupplungsnahe	Coupling hub	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
28c	Kupplungsstern	Spider	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
29	Kupplungsflansch	Coupling flange	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
30	Montagering	Mounting ring	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
31	Schraube DIN 933 M6x20	Screw DIN 933 M6x20	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
32	Unterlegscheibe DIN 125 A6,4	Washer DIN 125 A6,4	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
33	Unterlegscheibe DIN 125 A5,3	Washer DIN 125 A5,3	---	---	X	X	---	---	---	X	---	---	X	X	---	X	---	X
34	Schraube DIN 933 M5x20	Screw DIN 933 M5x20	---	---	X	X			---	X	---	---	X	X	---	X	---	X
X	Kompletter Pumpenkopf - diverse Kombinationsmöglichkeiten	Complete pump head - various combinations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

EG-/EU-Konformitätserklärung EC/EU Declaration of Conformity



Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte „Geräte“ im Sinne der Richtlinie **2014/34/EU (ATEX)** in ihrer aktuellen Fassung sind.
*Bühler Technologies GmbH hereby declares that the following products are "equipment" according to Directive **2014/34/EU (ATEX)** in its current version.*

Die technischen Unterlagen dieses Produkts sind gemäß Anhang VIII der Richtlinie 2014/34/EU bei der notifizierten Stelle IBExU Institut für Sicherheitstechnik GmbH, Kennnummer 0637, hinterlegt.
The technical documentation for this product is filed with the notified body IBExU Institut für Sicherheitstechnik GmbH, identification number 0637, in accordance with Annex VIII of Directive 2014/34/EU.

Die Produkte sind Maschinen im Sinne der Richtlinie **2006/42/EG (MRL)** Artikel 2 a) und erfüllen alle einschlägigen Anforderungen.
*The products are machines according to Directive **2006/42/EC (MD)** Article 2 (a) and fulfill all relevant requirements.*

Folgende Richtlinien wurden berücksichtigt:
The following directives were taken into account:

2011/65/EU (RoHS)

Produkt/product: Messgaspumpen / *Sample gas pumps*
Typen/types: **P2.2 ATEX, P2.4 ATEX, P2.72 ATEX, P2.74 ATEX (-H2/-O2)**

Die Produkte werden entsprechend der derzeit gültigen ATEX-Richtlinie innerhalb der internen Fertigungskontrolle folgendermaßen gekennzeichnet:
The products are marked according to the currently valid ATEX directive during internal control of production:

P2.2 ATEX, P2.4 ATEX (-H2/-O2)
II 2 G Ex h IIB+H2 T3...T4 Gb X
P2.72 ATEX, P2.74 ATEX (-H2/-O2)
II 2 G Ex h IIB+H2 T3 Gb X

Zur Beurteilung der Konformität gemäß ATEX-Richtlinie wurden folgende harmonisierte Normen herangezogen:
For the assessment of conformity according to the ATEX directive, the following harmonised standards were applied:

EN ISO 80079-36:2016 **EN 809:1998+A1:2009 + AC:2010**
EN ISO 80079-37:2016

Zusätzlich wurden berücksichtigt:
The following standards were also applied:

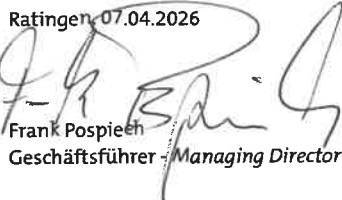
EN ISO 12100:2010

CE-Erklärung Zulieferer: Orange1 Electric Motors S.P.A.
CE-Declaration supplier: Via Mantova 93
43122 Parma Italy
Eingeschaltete Benannte Stelle: Eurofins Produkt Testing Italy S.r.l.
Engaged Notified Body: Nummer 0477
Nr. der Konformitätsbescheinigung: EPT 17 ATEX 2588 X
No. of Certificate:

Die Vorschriften zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten und die Änderung 2015/863 wurden berücksichtigt.
The product is in conformity with the restriction of the use of certain hazardous substances in electrical and electronic equipment and the amending through the directive 2015/863 was regarded.

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
The manufacturer bears sole responsibility for this Declaration of Conformity.

Ratingen, 07.04.2026


Frank Pospiech
Geschäftsführer - Managing Director



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx IBE 24.0022X	Page 1 of 6	<u>Certificate history:</u> Issue 0 (2025-04-04)
Status:	Current	Issue No: 1	
Date of Issue:	2026-01-05		
Applicant:	Bühler Technologies GmbH Harkortstrasse 29 40880 Ratingen Germany		
Equipment:	sample gas pump		
Optional accessory:			
Type of Protection:	Non-electrical "h"		
Marking:	used abbreviation: T_m ...medium temperature, T_a ...ambient (motor) temperature, T_h ...pump head temperature, w ...with, w/o ... without		
	P2.2 ATEX / P2.2 ATEX-H2 with bypass: Ex h IIB+H ₂ T3...T4 Gb X (T3) $-20^{\circ}\text{C} \leq T_m \leq +135^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_{a,h} \leq +50^{\circ}\text{C}$ (T4) $-20^{\circ}\text{C} \leq T_m \leq +85^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_{a,h} \leq +50^{\circ}\text{C}$		
	P2.2 ATEX / P2.2 ATEX-H2 / P2.4 ATEX / P2.4 ATEX-H2 without bypass: Ex h IIB+H ₂ T3...T4 Gb X (T3) $-20^{\circ}\text{C} \leq T_m \leq +140^{\circ}\text{C}$, w/o coupling: $-20^{\circ}\text{C} \leq T_{a,h} \leq +50^{\circ}\text{C}$, w. coupling: $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_h \leq +100^{\circ}\text{C}$ (T4) $-20^{\circ}\text{C} \leq T_m \leq +90^{\circ}\text{C}$, w/o coupling: $-20^{\circ}\text{C} \leq T_{a,h} \leq +50^{\circ}\text{C}$, w. coupling: $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_h \leq +90^{\circ}\text{C}$		
	P2.2 ATEX-O2 with/without bypass, P2.4 ATEX-O2 without bypass: Ex h IIB+H ₂ T3...T4 Gb X (T3,T4) $-20^{\circ}\text{C} \leq T_m \leq +75^{\circ}\text{C}$, w/o coupling: $-20^{\circ}\text{C} \leq T_{a,h} \leq +50^{\circ}\text{C}$, w. coupling: $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_h \leq +75^{\circ}\text{C}$		
	P2.72 ATEX / P2.72 ATEX-H2 with bypass: Ex h IIB+H ₂ T3 Gb X (T3) $-20^{\circ}\text{C} \leq T_m \leq +105^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_{a,h} \leq +50^{\circ}\text{C}$		
	P2.72 ATEX / P2.72 ATEX-H2 / P2.74 ATEX / P2.74 ATEX-H2 without bypass: Ex h IIB+H ₂ T3 Gb X (T3) $-20^{\circ}\text{C} \leq T_m \leq +115^{\circ}\text{C}$, w/o coupling: $-20^{\circ}\text{C} \leq T_{a,h} \leq +50^{\circ}\text{C}$, w. coupling: $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_h \leq +100^{\circ}\text{C}$		
	P2.72 ATEX-O2 with/without bypass, P2.74 ATEX-O2 without bypass: Ex h IIB+H ₂ T3 Gb X (T3) $-20^{\circ}\text{C} \leq T_{m,a,h} \leq +45^{\circ}\text{C}$		
Approved for issue on behalf of the IECEx Certification Body:	Kai Willamowski		
Position:	Head of department Certification Body		
Signature: (for printed version)			
Date: (for printed version)			

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.



Certificate issued by:

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg
Germany





IECEx Certificate of Conformity

Certificate No.: **IECEx IBE 24.0022X**

Page 2 of 6

Date of issue: 2026-01-05

Issue No: 1

Manufacturer: **Bühler Technologies GmbH**
Harkortstrasse 29
40880 Ratingen
Germany

Manufacturing
locations: **Bühler Technologies GmbH**
Harkortstrasse 29
40880 Ratingen
Germany

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition: 7.0

ISO 80079-36:2016 Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic methods and requirements
Edition: 1.0

ISO 80079-37:2016 Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non electrical type of protection constructional safety "c", control of ignition source "b", liquid immersion "k"
Edition: 1.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

DE/IBE/ExTR24.0028/01

Quality Assessment Report:

DE/BVS/QAR16.0002/08



IECEx Certificate of Conformity

Certificate No.: **IECEx IBE 24.0022X**

Page 3 of 6

Date of issue: 2026-01-05

Issue No: 1

EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

with/without bypass:

P2.2 ATEX, P2.2 ATEX-H2, P2.2 ATEX-O2, P2.72 ATEX, P2.72 ATEX-H2, P2.72 ATEX-O2

without bypass:

P2.4 ATEX, P2.4 ATEX-H2, P2.4 ATEX-O2, P2.74 ATEX, P2.74 ATEX-H2, P2.74 ATEX-O2

SPECIFIC CONDITIONS OF USE: YES as shown below:

- 1.) *The pumps may only be used under observance of the installation conditions with integration into the equipotential bonding and by ensuring the maintenance work according to the operating instructions. Explicit attention must be paid to deposits. After an ignition inside the equipment, all parts exposed to flames must be checked.*
- 2.) *The pumps may only be used if their materials are resistant to mechanical and/or chemical effects and corrosion under the respective operating conditions so that the explosion protection is always maintained.*
- 3.) *At a medium temperature of > 85 °C, operation with a bypass valve is only permitted in the stainless steel version.*
- 4.) *The plastic screw-in fittings (PVDF) installed by Bühler factory have a maximum continuous operating temperature of 140 °C. The compression processes inside the pump cause additional temperature increases. The pump types P2.2 ATEX (with/without bypass) and P2.4 ATEX (without bypass) are therefore restricted in the maximum permissible ambient / pump head / medium temperatures using PVDF screw-in-fittings, see Table 5 in section "Equipment continued" under the point technical data..*
- 5.) *The following boundary values have to be complied. The temperature of the entering sample gas (medium temperature) inside the gas pump and the ambient and pump head temperature outside the gas pump must not exceed the given temperatures in Table 1 to Table 4 in section "Equipment continued" under the point technical data.*
- 6.) *The attachments and accessories used on pumps must fulfil the requirements in accordance with IECEx with respect to equipment group and category. They must be suitable for use in potentially explosive atmospheres of the respective explosion group and temperature class.*
- 7.) *The equipment is designed exclusively for pumping gas. If the gases and vapours flowing through the pump contain particles or condensate the pump head has to be mounted with pump head pointing downward (pump head rotatable, see manual). It must be ensured that no foreign bodies can get through the pump inlet.*
- 8.) *The gases and vapours flowing through the pump must not cause exothermic reactions.*
- 9.) *A maximum drive shaft speed of 1700 rpm for pump types P2.x/2.7x must not be exceeded. The correct voltage and frequency for the motor must be observed.*
- 10.) *Safety of screwed connections against unscrewing and loosening must be ensured by appropriate measures such as maintenance of tightening torques as specified in the operating instructions of the sample gas pumps, use of protection elements or sticking in with appropriate adhesives.*
- 11.) *Opening of the pumps is only allowed at standstill and after clearance measurement so that no explosive atmosphere is present.*
- 12.) *To avoid electrostatic charging on non-dissipative materials (e. g. externally attached labels made of non-dissipative plastics, insulating paint on outer surfaces of the pumps), cleaning work must not be carried out with dry cloths. In addition, processes that generate intensive electrostatic charging must not be operated in the vicinity of the sample gas pumps.*
- 13.) *The additional requirements from the respective operating instructions for the devices and operating equipment attached to the pump must be observed and applied. In addition to the speed or frequency range of the motor, the minimum and maximum speed of the pumps according to the operating instructions must be observed.*



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Certificate No.: **IECEX IBE 24.0022X**

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Issue No: 1

Equipment (continued):

The sample gas pump is a combination of a non-electrical bellows pump with an electrical drive (covered by its own certificate). The sample gas pump is intended for installation in gas analysis systems for industrial applications to transport gaseous media only. It is not suitable for liquids.

If the specifications of the pump is observed, in particular the temperature parameters in the technical data, the sample gas pump can convey non-flammable and also flammable gaseous media, which can occasionally be explosive in normal operation.

The pump head and the drive motor on the P2.4 ATEX/P2.74 ATEX sample gas pump are isolated for use in hot applications. The sample gas pump has a split adapter which can be mounted with one half inside a heated cabinet while the other half mounted on the outside supports the drive motor. In doing so, wall thicknesses of up to 30 mm can be bridged without additional modifications.

There are two types of special pumps: P2.x/P2.7x ATEX-O2 and P2.x/P2.7x ATEX-H2. The pumps are optimised with regard to parts in contact with O₂/H₂ by special tested material and cleaning of the components.

The applied materials are:

- pump console/console cover cast aluminium 226-D (P2.x/P2.7x (Atex O2/H2))
- plunger AlMgSi0.5 or AlMgSi1 with anodic coating
- bellows PTFE
- pump body stainless steel 1.4571 or PTFE
- screw-in connectors (connector, sealing) PVDF or stainless steel 1.4401 with FKM (viton)
- valve material (diaphragm, housing, inlet) PTFE, PVDF or PEEK
- bypass spindle material (spindle, sealing) PVDF & FKM or PCTFE & FKM or PTFE & 1.4571 & FKM or PVDF & FFKM or PCTFE & FFKM or PTFE & 1.4571 & FFKM

Technical data:

Table 1: P2.x ATEX, P2.x ATEX-H2

	with bypass	without bypass	
	P2.2	P2.2	P2.4 (with coupling)
Maximum drive shaft speed	1700 rpm		
Ambient temperature	-20 °C to 50 °C		
Pump head temperature	T3: Max. 50 °C T4: Max. 50 °C	T3: Max. 50 °C T4: Max. 50 °C	T3: Max. 100 °C T4: Max. 90 °C
Medium temperature	T3: Max. 135 °C T4: Max. 85 °C	T3: Max. 140 °C T4: Max. 90 °C	T3: Max. 140 °C T4: Max. 90 °C
Nominal output	400 l/h		
Weight	Approx. 7.5 kg	Approx. 7.5 kg	Approx. 8.5 kg

Table 2: P2.x ATEX-O2

	with bypass	without bypass	
	P2.2	P2.2	P2.4 (with coupling)
Maximum drive shaft speed	1700 rpm		
Ambient temperature	-20 °C to 50 °C		
Pump head temperature	T3: Max. 50 °C T4: Max. 50 °C	T3: Max. 50 °C T4: Max. 50 °C	T3: Max. 75 °C T4: Max. 75 °C
Medium temperature	T3: Max. 75 °C T4: Max. 75 °C	T3: Max. 75 °C T4: Max. 75 °C	T3: Max. 75 °C T4: Max. 75 °C
Nominal output	400 l/h		
Weight	Approx. 7.5 kg	Approx. 7.5 kg	Approx. 8.5 kg



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Date of issue: 2026-01-05

Issue No: 1

Table 3: P2.7x ATEX, P2.7x ATEX-H2

	with bypass	without bypass	
	P2.72	P2.72	P2.74 (with coupling)
Maximum drive shaft speed	1700 rpm		
Ambient temperature	-20 °C to 50 °C		
Pump head temperature	T3: Max. 50 °C	T3: Max. 50 °C	T3: Max. 100 °C
Medium temperature	T3: Max. 105 °C	T3: Max. 115 °C	T3: Max. 115 °C
Nominal output	700 l/h		
Weight	Approx. 7.5 kg	Approx. 7.5 kg	Approx. 8.5 kg

Table 4: P2.7x ATEX-O2

	with bypass	without bypass	
	P2.72	P2.72	P2.74 (with coupling)
Maximum drive shaft speed	1700 rpm		
Ambient temperature	-20 °C to 45 °C		
Pump head temperature	T3: Max. 45 °C	T3: Max. 45 °C	T3: Max. 45 °C
Medium temperature	T3: Max. 45 °C	T3: Max. 45 °C	T3: Max. 45 °C
Nominal output	700 l/h		
Weight	Approx. 7.5 kg	Approx. 7.5 kg	Approx. 8.5 kg

The pump types P2.2 ATEX (with/without bypass) and P2.4 ATEX (without bypass) with plastic screw-in fittings (PVDF) are further restricted in the maximum permissible ambient / pump head / medium temperatures using PVDF screw-in-fittings.

Table 5: restrictions due to plastic screw fittings (PVDF)

pump				permissible temperatures (°C)		
No.	bypass	coupling	PVDF screw-in-fittings	ambient	pump head	medium
P2.2 ATEX	no	no	limited	-20 ... 50	max. 50	max. 80
P2.2 ATEX	yes	no	limited	-20 ... 50	max. 50	max. 75
P2.4 ATEX	no	yes	limited	-20 ... 50	max. 80	max. 80

The product is a non-electrical equipment with attached separately certified electrical and non-electrical equipment. In accordance with the options provided by OD 280, this certification covers just the non-electrical equipment. Correct selection of the attached equipment is assessed in the IHA.

Following potential ignition hazards were identified on the product:

1. hot surfaces
2. mechanically generated sparks
3. electrical sources
4. static electricity
5. adiabatic compression / shock waves (only inside the gas pump)
6. exothermic reactions

Following protective measures were applied to minimize the ignition hazards:

1. limitation of medium and ambient temperature
2. measurements to determine maximum temperature from adiabatic compression with different types of pumps (P2.x, P2.7x) and pump configurations (with/without bypass)
3. correct selection of materials
4. correct selection of electric products for intended use in explosive atmospheres
5. operating instructions for the user



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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

Compared to version 1, the pump designation has been adjusted and additional pump details have been added. Specification and correction of marking, supplement in IHA



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: **IECEx IBE 24.0022X** Page 1 of 5 [Certificate history:](#)

Status: **Current** Issue No: 0

Date of Issue: 2025-04-04

Applicant: **Bühler Technologies GmbH**
Harkortstrasse 29
40880 Ratingen
Germany

Equipment: **sample gas pump**

Optional accessory:

Type of Protection: **Non-electrical "h"**

Marking: used abbreviation: T_a ...ambient (motor) temperature, T_m ...medium temperature, T_h ...pump head temperature

P2.2 ATEX / P2.2 ATEX-H2 with bypass: Ex h IIB+H₂ T3...T4 Gb/Gb X
(T3) $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_m \leq +135^{\circ}\text{C}$
(T4) $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_m \leq +85^{\circ}\text{C}$

P2.2 ATEX / P2.2 ATEX-H2 / P2.4 ATEX / P2.4 ATEX-H2 without bypass: Ex h IIB+H₂ T3...T4 Gb/Gb X
(T3) $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_m \leq +140^{\circ}\text{C}$, additional with coupling: $-20^{\circ}\text{C} \leq T_h \leq +100^{\circ}\text{C}$
(T4) $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_m \leq +90^{\circ}\text{C}$, additional with coupling: $-20^{\circ}\text{C} \leq T_h \leq +90^{\circ}\text{C}$

P2.2 ATEX-O2 with/without bypass, P2.4 ATEX-O2 without bypass: Ex h IIB+H₂ T3...T4 Gb/Gb X
(T3) $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_m \leq +75^{\circ}\text{C}$, additional with coupling: $-20^{\circ}\text{C} \leq T_h \leq +75^{\circ}\text{C}$
(T4) $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_m \leq +75^{\circ}\text{C}$, additional with coupling: $-20^{\circ}\text{C} \leq T_h \leq +75^{\circ}\text{C}$

P2.72 ATEX / P2.72 ATEX-H2 with bypass: Ex h IIB+H₂ T3 Gb/Gb X
(T3) $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_m \leq +105^{\circ}\text{C}$

P2.72 ATEX / P2.72 ATEX-H2 / P2.74 ATEX / P2.74 ATEX-H2 without bypass: Ex h IIB+H₂ T3 Gb/Gb X
(T3) $-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_m \leq +115^{\circ}\text{C}$, additional with coupling: $-20^{\circ}\text{C} \leq T_h \leq +100^{\circ}\text{C}$

P2.72 ATEX-O2 with/without bypass, P2.74 ATEX-O2 without bypass: Ex h IIB+H₂ T3 Gb/Gb X
(T3) $-20^{\circ}\text{C} \leq T_a \leq +45^{\circ}\text{C}$, $-20^{\circ}\text{C} \leq T_m \leq +45^{\circ}\text{C}$, additional with coupling: $-20^{\circ}\text{C} \leq T_h \leq +45^{\circ}\text{C}$

Approved for issue on behalf of the IECEx
Certification Body: **Kai Willamowski**

Position: **Head of department Certification Body**

Signature:
(for printed version)

Date:
(for printed version)

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.



Certificate issued by:

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg
Germany





IECEx Certificate of Conformity

Certificate No.: **IECEx IBE 24.0022X**

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Date of issue: 2025-04-04

Issue No: 0

Manufacturer: **Bühler Technologies GmbH**
Harkortstrasse 29
40880 Ratingen
Germany

Manufacturing
locations: **Bühler Technologies GmbH**
Harkortstrasse 29
40880 Ratingen
Germany

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition: 7.0

ISO 80079-36:2016 Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic methods and requirements
Edition: 1.0

ISO 80079-37:2016 Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non electrical type of protection constructional safety "c", control of ignition source "b", liquid immersion "k"
Edition: 1.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

DE/IBE/ExTR24.0028/00

Quality Assessment Report:

DE/BVS/QAR16.0002/08



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Certificate No.: **IECEx IBE 24.0022X**

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Date of issue: 2025-04-04

Issue No: 0

EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

with/without bypass:

P2.2 ATEX, P2.2 ATEX-H2, P2.2 ATEX-O2, P2.72 ATEX, P2.72 ATEX-H2, P2.72 ATEX-O2

without bypass:

P2.4ATEX, P2.4ATEX-H2, P2.4 ATEX-O2, P2.74 ATEX, P2.74 ATEX-H2, P2.74 ATEX-O2

SPECIFIC CONDITIONS OF USE: YES as shown below:

- 1.) *The pumps may only be used under observance of the installation conditions with integration into the equipotential bonding and by ensuring the maintenance work according to the operating instructions. Explicit attention must be paid to deposits. After an ignition inside the equipment, all parts exposed to flames must be checked.*
- 2.) *The pumps may only be used if their materials are resistant to mechanical and/or chemical effects and corrosion under the respective operating conditions so that the explosion protection is always maintained.*
- 3.) *At a medium temperature of > 85 °C, operation with a bypass valve is only permitted in the stainless steel version.*
- 4.) *The plastic screw-in fittings (PVDF) installed by Bühler factory have a maximum continuous operating temperature of 140 °C. The compression processes inside the pump cause additional temperature increases. The pump types P2.2 ATEX (with/without bypass) and P2.4 ATEX (without bypass) are therefore restricted in the maximum permissible ambient / pump head / medium temperatures using PVDF screw-in-fittings, see Table 5 in section "Equipment continued" under the point technical data.*
- 5.) *The following boundary values have to be complied. The temperature of the entering sample gas (medium temperature) inside the gas pump and the ambient and pump head temperature outside the gas pump must not exceed the given temperatures in Table 1 to Table 4 in section "Equipment continued" under the point technical data.*
- 6.) *The attachments and accessories used on pumps must fulfil the requirements in accordance with Directive 2014/34/EU with respect to equipment group and category. They must be suitable for use in potentially explosive atmospheres of the respective explosion group and temperature class.*
- 7.) *The equipment is designed exclusively for pumping gas. If the gases and vapours flowing through the pump contain particles or condensate the pump head has to be mounted with pump head pointing downward (pump head rotatable, see manual). It must be ensured that no foreign bodies can get through the pump inlet.*
- 8.) *The gases and vapours flowing through the pump must not cause exothermic reactions.*
- 9.) *A maximum drive shaft speed of 1700 rpm for pump types P2.xATEX/2.7xATEX must not be exceeded. The correct voltage and frequency for the motor must be observed.*
- 10.) *Safety of screwed connections against unscrewing and loosening must be ensured by appropriate measures such as maintenance of tightening torques as specified in the operating instructions of the sample gas pumps, use of protection elements or sticking in with appropriate adhesives.*
- 11.) *Opening of the pumps is only allowed at standstill and after clearance measurement so that no explosive atmosphere is present.*
- 12.) *To avoid electrostatic charging on non-dissipative materials and painted outer surfaces of the pumps and externally attached labels made of non-dissipative plastics, cleaning work must not be carried out with dry cloths. In addition, processes that generate intensive electrostatic charging must not be operated in the vicinity of the sample gas pumps.*
- 13.) *In case the motors are supplied by inverter, they shall be provided with protectors inside the windings (normally PTC thermistors), capable of assuring the respect of temperature class limits. Such devices shall be connected to a control device able to cut off power to the motor in case of reaching of the limit temperature. In addition to the speed or frequency range of the motor, the minimum and maximum speed of the pumps according to the operating instructions must be observed.*



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Certificate No.: **IECEx IBE 24.0022X**

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Date of issue: 2025-04-04

Issue No: 0

Equipment (continued):

The sample gas pump is a combination of a non-electrical bellows pump with an electrical drive (covered by its own certificate). The sample gas pump is intended for installation in gas analysis systems for industrial applications to transport gaseous media only. It is not suitable for liquids.

If the specifications of the pump is observed, in particular the temperature parameters in the technical data, the sample gas pump can convey non-flammable and also flammable gaseous media, which can occasionally be explosive in normal operation.

The pump head and the drive motor on the P2.4 ATEX/P2.74 ATEX sample gas pump are isolated for use in hot applications. The sample gas pump has a split adapter which can be mounted with one half inside a heated cabinet while the other half mounted on the outside supports the drive motor. In doing so, wall thicknesses of up to 30 mm can be bridged without additional modifications.

There are two types of special pumps: (P2.x/P2.7x) ATEX-O2 and (P2.x/P2.7x) ATEX-H2. The pumps are optimised with regard to parts in contact with O₂/H₂ by special tested material and cleaning of the components.

The applied materials are:

- pump console/console cover cast aluminium 226-D (P2.x/2.7x ATEX(-O₂/H₂))
- plunger AlMgSi0.5 or AlMgSi1 with anodic coating
- bellows PTFE
- pump body stainless steel 1.4571 or PTFE
- screw-in connectors (connector, sealing) PVDF or stainless steel 1.4401 with FKM (viton)
- valve material (diaphragm, housing, inlet) PTFE, PVDF or PEEK
- bypass spindle material (spindle, sealing) PVDF & FKM or PCTFE & FKM or PTFE & 1.4571 & FKM or PVDF & FFKM or PCTFE & FFKM or PTFE & 1.4571 & FFKM

Technical data:

Table 1: P2.x ATEX, P2.x ATEX-H2

	with bypass	without bypass	
	P2.2	P2.2	P2.4 (with coupling)
Maximum drive shaft speed	1700 rpm		
Ambient temperature	-20 °C to 50 °C		
Pump head temperature	T3: Max. 50 °C T4: Max. 50 °C	T3: Max. 50 °C T4: Max. 50 °C	T3: Max. 100 °C T4: Max. 90 °C
Medium temperature	T3: Max. 135 °C T4: Max. 85 °C	T3: Max. 140 °C T4: Max. 90 °C	T3: Max. 140 °C T4: Max. 90 °C
Nominal output	400 l/h		
Weight	Approx. 7.5 kg	Approx. 7.5 kg	Approx. 8.5 kg

Table 2: P2.x ATEX-O2

	with bypass	without bypass	
	P2.2	P2.2	P2.4 (with coupling)
Maximum drive shaft speed	1700 rpm		
Ambient temperature	-20 °C to 50 °C		
Pump head temperature	T3: Max. 50 °C T4: Max. 50 °C	T3: Max. 50 °C T4: Max. 50 °C	T3: Max. 75 °C T4: Max. 75 °C
Medium temperature	T3: Max. 75 °C T4: Max. 75 °C	T3: Max. 75 °C T4: Max. 75 °C	T3: Max. 75 °C T4: Max. 75 °C
Nominal output	400 l/h		
Weight	Approx. 7.5 kg	Approx. 7.5 kg	Approx. 8.5 kg



IECEx Certificate of Conformity

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Date of issue: 2025-04-04

Issue No: 0

Table 3: P2.7x ATEX, P2.7x ATEX-H2

	with bypass	without bypass	
	P2.72	P2.72	P2.74 (with coupling)
Maximum drive shaft speed	1700 rpm		
Ambient temperature	-20 °C to 50 °C		
Pump head temperature	T3: Max. 50 °C	T3: Max. 50 °C	T3: Max. 100 °C
Medium temperature	T3: Max. 105 °C	T3: Max. 115 °C	T3: Max. 115 °C
Nominal output	700 l/h		
Weight	Approx. 7.5 kg	Approx. 7.5 kg	Approx. 8.5 kg

Table 4: P2.7x ATEX-O2

	with bypass	without bypass	
	P2.72	P2.72	P2.74 (with coupling)
Maximum drive shaft speed	1700 rpm		
Ambient temperature	-20 °C to 45 °C		
Pump head temperature	T3: Max. 45 °C	T3: Max. 45 °C	T3: Max. 45 °C
Medium temperature	T3: Max. 45 °C	T3: Max. 45 °C	T3: Max. 45 °C
Nominal output	700 l/h		
Weight	Approx. 7.5 kg	Approx. 7.5 kg	Approx. 8.5 kg

The pump types P2.2 ATEX (with/without bypass) and P2.4 ATEX (without bypass) with plastic screw-in fittings (PVDF) are further restricted in the maximum permissible ambient / pump head / medium temperatures using PVDF screw-in-fittings.

Table 5: restrictions due to plastic screw fittings (PVDF)

pump				permissible temperatures (°C)		
No.	bypass	coupling	PVDF screw-in-fittings	ambient	pump head	medium
P2.2 ATEX	no	no	limited	-20 ... 50	max. 50	max. 80
P2.2 ATEX	yes	no	limited	-20 ... 50	max. 50	max. 75
P2.4 ATEX	no	yes	limited	-20 ... 50	max. 80	max. 80

The product is a non-electrical equipment with attached separately certified electrical and non-electrical equipment. In accordance with the options provided by OD 280, this certification covers just the non-electrical equipment. Correct selection of the attached equipment is assessed in the IHA.

Following potential ignition hazards were identified on the product:

1. hot surfaces
2. mechanically generated sparks
3. electrical sources
4. static electricity
5. adiabatic compression / shock waves (only inside the gas pump)
6. exothermic reactions

Following protective measures were applied to minimize the ignition hazards:

1. limitation of medium and ambient temperature
2. measurements to determine maximum temperature from adiabatic compression with different types of pumps (P2.x, P2.7x) and pump configurations (with/without bypass)
3. correct selection of materials
4. correct selection of electric products for intended use in explosive atmospheres
5. operating instructions for the user

O2-Erklärung *O2 Declaration*

**Messgaspumpen für den Einsatz mit
hochreinem Sauerstoff optimiert**

*Sample Gas Pumps optimised for use with
high-purity oxygen*

Applikationen mit Sauerstoff: Partikel-, Öl- und Fettfreiheit

Mit dieser Erklärung bestätigen wir, dass alle medienberührenden Flächen der nachfolgenden Produkte in Anlehnung an die Vorgaben der EIGA Doc 33/18 und des VDA-Band 19 gereinigt und gefertigt sind.

Applications with oxygen: free of particles, oil and grease

With this declaration, we confirm that all surfaces of the following products that come into contact with media have been cleaned and manufactured in accordance with the specifications of EIGA Doc 33/18 and VDA Volume 19.

Produkt / Products	Messgaspumpen / Sample Gas Pumps
Typen / Types:	P2.x ATEX-O2 P2.x AMEX-O2 P1.3-O2
Art-Nr. / Item no.:	42-O2

Ratingen, den 25.04.2024

Bühler Technologies GmbH



Sample gas pumps optimized for use with high-purity oxygen

Applications with oxygen: Free from particles, oil and grease



For use with high-purity oxygen, the product requires special cleaning to ensure that it is free from oil and grease, as oxygen is a strong oxidising agent. Under unfavourable conditions, oxygen can cause spontaneous combustion of organic substances such as particles, oils and fats, and generally promotes the combustion of substances. Oils and fats can even react explosively on contact with oxygen. We use special cleaning and production processes to ensure the safe use of our products with high-purity oxygen and avoid the above-mentioned undesirable reactions.

With this declaration, we confirm that all surfaces of the following products that come into contact with media have been cleaned and manufactured in accordance with the requirements of EIGA Doc 33/18 and VDA Volume 19.

Product:	Sample gas pumps
Models:	P2.x ATEX-O2 P2.x AMEX-O2 P1.3-O2
Item no.:	42-O2

For the "O2" measuring gas pumps, only materials that have been tested by the Federal Institute for Materials Research and Testing (BAM) for oxygen applications, taking into account the relevant application parameters, are used for the components in contact with the medium.

All components in contact with the medium undergo a special cleaning process to reliably remove impurities (such as oil, grease and particles). This process is documented by a comprehensive delivery specification to the service provider and compliance with the limit values is verified with regular analyses by an independent, accredited laboratory.

The contamination limits of the surfaces in contact with media are defined as follows (as in EIGA Doc 33/18 Cleaning of Equipment for oxygen service):

	Contamination limits
Non-volatile organic or inorganic impurities:	$\leq 220 \text{ mg/m}^2$ for non-volatile impurities
Particles:	$\leq 22 \text{ particles/m}^2$ between 500 μm and 1000 μm

The "O2" measuring gas pumps are manufactured in a structurally separated clean room in accordance with VDA Volume 19.

Compliance with the production and assembly specifications is documented by the trained specialist by means of a test report. After cleaning, the sample gas pumps are packed in airtight and dustproof packaging and clearly labeled "Cleaned for oxygen service. Do not open until ready for use".

All described cleaning properties are lost if the product comes into contact with oily or greasy media or is otherwise contaminated from the outside.





1. INFORMAZIONI GENERALI DI SICUREZZA

EX Queste istruzioni di sicurezza si riferiscono all'installazione, utilizzo e manutenzione dei motori serie O-M utilizzabili in aree potenzialmente esplosive per la presenza di GAS e POLVERI combustibili. Le informazioni riportate sono ad uso di personale qualificato. Fatta eccezione per l'apertura della scatola morsettiera, l'apertura di ogni altra parte cancella le condizioni di garanzia dei motori.

Riportiamo qui sotto le differenti marcature e le zone (ATEX) di utilizzo dei differenti motori:

GAS	II 2G Ex db IIC T3 Gb T.amb -40°C , +60°C	Zone 1, 2
	II 2G Ex db IIC T4 Gb T.amb -40°C , +60°C	
	II 2G Ex db IIC T5 Gb T.amb -40°C , +40°C	
	II 2G Ex db eb IIC T3 Gb T.amb -40°C , +60°C	
	II 2G Ex db eb IIC T4 Gb T.amb -40°C , +60°C	
POLVERI	II 2G Ex db eb IIC T5 Gb T.amb -40°C , 40°C	Zone 21, 22
	II 2D Ex tb IIIC T125°C T.amb -40°C , +60°C (spessore max layer 5mm)	

I motori sono conformi con I Requisiti Essenziali di Salute e Sicurezza per le zone potenzialmente esplosive riportati nelle normative Europee:

IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-7, IEC/EN60079-31

! Le macchine elettriche rotanti presentano parti sotto tensione o in movimento e parti molto calde. Il trasporto, il collegamento per la messa in funzione e la manutenzione devono essere eseguiti da personale qualificato e responsabile (vedere IEC 364). Interventi inadeguati possono causare danni a persone e cose.

! Controllare attentamente i dati indicati sulla targa prima della messa in funzione del motore. I motori in bassa tensione sono considerati come componenti da installare in altre macchine ai sensi della Direttiva Comunitaria sulle macchine 2006/42/EC. La messa in funzione è proibita fino ad avvenuto accertamento della conformità finale a tale direttiva.

Le macchine elettriche rotanti alimentate da rete sono conformi alle norme EN 61000-6-1,2,3,4 riguardanti fenomeni di compatibilità elettromagnetica - Direttiva 2004/108/CE e non sono necessari particolari accorgimenti di schermatura. Nel caso di funzionamento intermittente, gli eventuali disturbi generati dai dispositivi di inserzione devono essere limitati mediante adeguati cablaggi.

! I lavori sulla macchina elettrica devono avvenire a macchina ferma e scollegata dalla rete (compresi gli equipaggiamenti ausiliari). Se sono presenti protezioni elettriche, eliminare ogni possibilità di avviamento improvviso attenendosi alle specifiche raccomandazioni sull'impiego delle varie apparecchiature.

2. TRASPORTO, IMMAGAZZINAMENTO

! Al ricevimento della fornitura accertarsi che non sussistano danni imputabili al trasporto e nell'eventualità darne comunicazione immediata, contestandoli allo spedizioniere ed astenendosi dalla messa in funzione.

Quando sono forniti con il motore, serrare saldamente i golfari a vite; poiché essi servono per il sollevamento del solo motore, non si devono sollevare macchine o accessori aggiuntivi ad esso accoppiati.

Se necessario, fare ricorso a mezzi di trasporto adeguati e sufficientemente dimensionati. Se sul motore sono presenti due golfari utilizzare sempre entrambi per il sollevamento. Se i motori vengono immagazzinati accertarsi che l'ambiente sia asciutto, senza polvere ed esente da vibrazioni (v eff. <0,2 mm/s) al fine di evitare danneggiamenti ai cuscinetti. Prima della messa in funzione misurare la resistenza di isolamento. Se si misurano valori di resistenza <1,5MΩ□□essicare l'avvolgimento. Per la procedura di essiccazione rivolgersi direttamente al nostro ufficio tecnico.

3. INSTALLAZIONE

! L'installazione deve essere conforme alle regole riportate nella norma IEC/EN 60079-14 o con le normative nazionali (edizione in vigore).

Prima di iniziare l'installazione in atmosfera esplosiva, l'installatore deve assicurarsi che il motore sia idoneo all'utilizzo nella rea classificata tenendo in considerazione le differenti sostanze infiammabili presenti (verificare la marcatura riportata sul motore prima di installarlo).

Il motore verrà installato solo da personale qualificato con conoscenza riguardante l'installazione di apparecchiature elettriche per atmosfere esplosive e ciò si può procedere solo nel caso in cui sia il motore sia la macchina applicata sia perfettamente fermi, non alimentati elettricamente ed assicurati contro partenze improvvise.

La targa motore riporta tutti i dati quali tensione, potenza e tutti gli altri dati elettrici e meccanici, inoltre sulla targa sono riportate tutte le informazioni di sicurezza (tipo di protezione, classe di temperatura, temperatura ambiente etc.).

ATTENZIONE: NON APRIRE IN PRESENZA DI ATMOSFERA ESPLOSIVA

Gli organi di accoppiamento devono essere equilibrati con mezza chavetta su mandrino liscio. Giunti e pulegge devono essere montati mediante apparecchiature apposite al fine di non danneggiare i cuscinetti del motore. Dopo il montaggio controllare che gli organi di accoppiamento siano ben fissi sull'estremità albero e spinti contro l'arresto. Se il mozzo dell'organo di accoppiamento fosse più corto dell'estremità d'albero la differenza dovrà essere compensata mediante bussola distanziatrice. Pulegge troppo piccole o troppo larghe compromettono il buon funzionamento dei cuscinetti.

I motori devono essere installati in posizione tale che l'aria di raffreddamento possa entrare ed uscire facilmente. La ventilazione non deve essere impedita e l'aria di scarico, anche di gruppi adiacenti, non deve essere aspirata dalla ventola. Evitare di avere fonti di calore tali da influenzare la temperatura sia dell'aria sia del motore.

In caso di installazione all'aperto proteggere il motore con opportuni accorgimenti dall'irraggiamento solare e dalle intemperie. In caso di posizione verticale con albero in basso usare copriventola con tettuccio parapigioggia. Si consiglia di proteggere il motore con dispositivi salvamotore, limitatori elettronici di coppia qualora il motore non sia dotato di termistori.

Nel caso di ambienti con forti escursioni termiche ed ove si preveda la formazione di condensa, Orange1 EM potrà dotare il motore di apposite scaldiglie anticondensa.

Invece di utilizzare riscaldatori anticondensa, è possibile alimentare il motore sui pin U1-V1 con una tensione del 4-10% della tensione di fase nominale del motore; il 20-30% della corrente nominale è sufficiente per riscaldare il motore.

! Controllare il senso di rotazione a motore non accoppiato facendo attenzione di assicurare la linguetta al fine di evitarne un distacco violento durante la rotazione. Se il senso di rotazione non è quello voluto, togliere tensione e quando il motore si sarà fermato:

- nel caso di motore trifase scambiare tra loro due delle tre fasi
- nel caso di motore monofase scambiare tra loro i cavetti dell'avvolgimento ausiliario

Entrate cavo

! A seconda del tipo di protezione del motore gli ingressi cavo dovranno essere certificate in conformità con le normative riportate in tabella ed avere l'intervallo di temperatura ambiente del motore medesimo:

Tipo di protezione della scatola morsetti	Tipo di protezione del passacavo	Temperatura operativa
Ex eb tb	Ex eb tb	-40°C , +100°C
Ex db tb	Ex db tb	-40°C , +100°C

Le sezioni dei cavi ammissibili a seconda del tipo di filettatura sono i seguenti:

Filetto pressacavo	Grandezza Motore	Diametro cavi (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20X1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25X1.5	132	12,5-20,5
M32X1.5	160-180	17-26

I pressacavi e/o tappi di chiusura, se non forniti con il motore dovranno essere con filetto come da tabella sopra.

I passacavi montati sulla scatola morsetti devono essere coperti da un certificato ATEX e IECEx in accordo con il tipo di protezione della scatola morsetti (Ex db e/o Ex db eb e/o Ex tb).

Devono avere un grado di protezione minimo di IP66 in accordo con EN/IEC 60529 e EN/IEC 60079-0; la temperatura di esercizio del passacavo deve essere inclusa nel campo di temperatura ambiente definito sulla targa, dalla minima temperatura fino alla massima temperatura riportata +25°C.

I passacavi devono essere completamente avvitati al corpo della custodia con una coppia di serraggio di 5Nm.

La connessione elettrica deve essere realizzata utilizzando cavi che hanno una temperatura di esercizio della guaina almeno uguale alla massima temperatura ambiente indicata sulla targa +25°C e una temperatura dell'isolante del conduttore almeno uguale alla massima temperatura ambiente indicata sulla targa +35°C.

I pressacavi dell'alloggiamento del condensatore e i pressacavi dei cavi del motore all'interno delle custodie Ex sono installati in fabbrica. Non è consentito svitare o modificare l'installazione di fabbrica.

Essendo piedi applicabili al corpo motore è possibile montarli in 3 diverse posizioni in modo da avere la scatola sulla parte superiore del motore oppure sui lati destro o sinistro.

Allo stesso tempo la scatola morsettiera può essere montata con l'uscita cavo posizionata dove necessario (ripristinare in tal caso le guarnizioni).

Questa operazione deve essere effettuata prima della connessione rimuovendo il coperchio, svitando le viti che fissano la scatola al motore e riavvitandole nel rispetto della coppia di serraggio (vedi la tabella con le coppie di serraggio). Avvitare completamente rispettando le coppie di serraggio consultando la tabella COPPIE DI SERRAGGIO

4. COLLEGAMENTO ALLA RETE ELETTRICA

EX Solo personale qualificato è autorizzato al collegamento del motore alla rete elettrica.

Il collegamento alla rete di alimentazione deve essere effettuato tramite ingressi cavo forniti con il motore o tramite altri ingressi cavo purché certificate in accordo con le normative europee come riportato sopra, in conformità alla Direttiva ATEX 2014/34/UE e approvati IECEx.

Nel caso di motore completo di cavo, la parte libera del cavo dovrà essere collegata in zona sicura oppure all'interno di una custodia Ex avente modo di protezione idoneo all'atmosfera esplosiva circostante.

! Fare sempre riferimento ai dati stampati sulla targa di tensione e frequenza per assicurarsi un corretto accoppiamento alla rete di alimentazione. Tolleranze di ±5% sulla tensione e ±1% sulla frequenza (la X sul numero del certificato). Per motori con classe di temperatura T3 e T4 è possibile avere ±10% sulla tensione I diagrammi di collegamento vengono normalmente forniti con il motore o sono stampati nella scatola morsettiera. Qualora mancassero, fare riferimento a quelli forniti nel presente manuale.

Assicurarsi che, nel caso di avviamento stella/triangolo, il passaggio da stella a triangolo sia eseguito solo quando la corrente di avviamento sia diminuita al valore corrispondente a quello di stella: ciò è importante per evitare il rischio di sovraccarichi non ammessi.

La scelta del cavo deve essere adeguata alla potenza del motore ed al tipo di impianto in cui è installato.

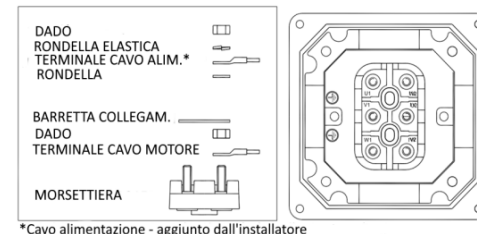
Il motore deve essere protetto da un dispositivo di protezione, che nel caso di guasto tolga alimentazione prima che la temperatura superficiale superi il valore di innesco dell'atmosfera circostante.

EX I motori con scatola Ex d sono dotati di una morsettiera standard.

TABELLA COPPIE DI SERRAGGIO

Filettatura	M4	M5	M6	M8
Copie di serraggio (Nm)	1,5	2	3	6

Le connessioni di potenza devono essere realizzate come in figura. I collegamenti devono essere sufficientemente stretti in modo da evitare ogni tipo di allentamento in accordo con la tabella COPPIE DI SERRAGGIO .



IMPORTANTE: Motori con scatola morsetti Ex eb: RIPOSIZIONARE LA GUARNIZIONE NELLA CORRETTA POSIZIONE PRIMA DI RICHIEDERE LA SCATOLA E RIAVVITARE COMPLETAMENTE LE VITI

Collegamento di terra

⚠ In aggiunta al collegamento di terra effettuato all'interno della scatola morsettiera, un altro collegamento esterno deve essere effettuato sul corpo motore. Se i conduttori di linea hanno sezione S il conduttore di terra sarà:

Conduttore di terra	Conduttori di linea
= S	$S \leq 16 \text{ mm}^2$
16	$16 \text{ mm}^2 < S \leq 35 \text{ mm}^2$
$\geq 0,5 S$	$S > 35 \text{ mm}^2$

Protezione termica

⚠ Il motore deve essere protetto tramite un dispositivo di sgancio che, in caso di guasto, tolga tensione al motore in modo da evitare che la temperatura superficiale delle parti a contatto con l'atmosfera esplosiva non raggiunga il valore di innesco.

Motori Alimentati tramite inverter

⚠ Nel caso in cui i motori vengano alimentati tramite inverter (VFD) , essi devono essere provvisti di protettori termici (normalmente PTC), all'interno degli avvolgimenti, in grado di garantire i limiti della classe di temperatura.

Tali dispositivi di controllo della temperatura devono essere a loro volta collegati a dispositivi di sgancio dell'alimentazione del motore nel caso di raggiungimento della temperatura. Le caratteristiche operative consentite in questa modalità sono riportate sulla targa dati o su un'etichetta aggiuntiva. I filtri di uscita devono essere installati in base alla lunghezza del cavo sul lato motore del VFD. La scelta del filtro e la lunghezza massima del cavo dipendono dalle istruzioni e dai dati forniti dal produttore del VFD. Per prevenire le correnti vaganti circolanti, si raccomanda di adottare opportuni accorgimenti sull'alimentazione che permettano di ridurne sensibilmente la causa. A tal fine, contattare il fornitore VFD locale.

Scaldiglie

⚠ Le scaldiglie non devono essere alimentate in alcun caso quando il motore è sotto tensione. I cavi di collegamento dovranno essere adeguati ad una potenza di 25W con tensione di alimentazione con range 110V-240V (±10%).

Carichi ammissibili

Supponendo una durata di 20.000h per motori 2P e 40.000h per motori 4/6/8P:

	Taglia Motore	Cuscinetti	Max carico radiale in L/2	Max carico assiale Spinta	Max carico assiale Tiro
	63	6202	365	230	120
	71	6202	450	280	160
	80	6204	590	370	220
	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

Servizi ammissibili

S1: servizio continuo, il motore raggiunge la temperatura di equilibrio termico.

S2: servizio intermittente: periodo funzionamento carico costante di durata tale da non raggiungere l'equilibrio termico seguito da periodo di riposo fino al raggiungimento della temperatura ambiente (del fluido scambiatore).

S3: servizio intermittente: sequenza di cicli di funzionamento identici comprendenti un periodo di funzionamento a carico seguito da un periodo di riposo; il ciclo è tale che la corrente di avviamento non influenza la sovratemperatura in maniera significativa.

S9: servizio in cui carico e velocità variano in modo non periodico. Tipico del motore funzionante tramite inverter in cui all'interno degli avvolgimenti devono essere montate protezioni termiche adeguate (vedi sopra).

Motori Servoventilati (IC416)

Nel caso di motori aventi ventilazione forzata (IC416) il motore principale dovrà essere alimentato solo quando la ventilazione ausiliaria è funzionante.

5. MARCATURA

CE (*)		Marcatura di conformità alle direttive Europee
Ex (*)		Marcatura per le protezioni contro le esplosioni
II (*)		Motori per impianti di superficie (diversi dalle miniere)
2 (*)		Categoria 2: livello di protezione elevato
GAS	G (*)	Atmosfera esplosiva per la presenza di gas vapori o nebbie infiammabili
	Ex db	Motore e scatola antideflagranti
	Ex dbeb	Motore antideflagrante, scatola a sicurezza aumentata
	IIC	Gruppo del Gas, idoneo anche per IIB e IIA
	T3, T4, T5	Classe di temperatura
POLVERE	D (*)	Atmosfera esplosiva per la presenza di polveri combustibili
	Ex tb IIC	Custodie tb idonee per zona 21 (cat. 2D)
	T125°C	Max temperatura superficiale
T.amb		Temperatura ambiente
AB xx yyy		AB : laboratorio che rilascia il certificato CE di tipo xx : anno di rilascio del certificato yyy : numero del certificate CE di tipo
ZZZZ (*)		Numero dell'O.N. che rilascia la Notifica della Garanzia di Qualità dei Prodotti
(*) Solo per marcatura ATEX		

6. MANUTENZIONE E RIPARAZIONI

⚠ ⚠ La MANUTENZIONE sarà effettuata solo da personale qualificato in accordo con la normative EN 60079-17 o norme nazionali (ultima edizione in vigore).

Il personale qualificato deve avere conoscenza riguardante l'installazione di apparecchiature elettriche per atmosfere potenzialmente esplosive.

Ogni 3000 h di servizio verificare e ripristinare, se necessario il grasso sulle tenute radiali (ad esempio i V-ring) Periodicamente (in funzione dell'ambiente e del tipo di impiego) verificare:

- pulizia del motore (olio, POLVERE, sporco e residui di lavorazioni) e che non sia ostruito il passaggio dell'aria di raffreddamento.
- corretto fissaggio e connessione dei collegamenti elettrici
- il livello di vibrazione del motore (veff<3,5 mm/s per Pn<15KW veff<4,5 mm/s per Pn>15KW) il livello di rumore e nel caso questo si presenti anormale verificare il fissaggio motore, l'equilibratura della macchina accoppiata o l'esigenza di sostituzione dei cuscinetti.

⚠ Le RIPARAZIONI devono essere fatte in accordo con la normative IEC/EN 60079-19.

Tali riparazioni possono essere effettuate solo sotto il controllo e l'autorizzazione di Orange1 EM oppure da parte di un'officina certificata.

Nel caso in cui la riparazione venga realizzata da parte di un'officina autorizzata, questa deve rispettare le caratteristiche originali del motore ed utilizzare solo parti di ricambio originali.

Inoltre sarà loro dovere mettere sul motore una targa aggiuntiva con un simbolo che identifichi la riparazione, il nome dell'azienda, la certificazione, numero e data della riparazione effettuata.

Nulla riguardante il modo di protezione può essere modificato. Nel caso in cui tali regole non vengano rispettate il motore perderà tutte le sue caratteristiche di certificato.

I GIUNTI NON POSSONO ESSERE RIPARATI

7. COMPONENTI MODULARI

I motori sono completamente modulari. Piedi e flange possono essere montati senza alterare la certificazione ATEX, essendo esterni e non facendo parte del tipo di protezione Ex. Nella tabella sottostante mostriamo le viti da utilizzare per il montaggio dei diversi componenti modulari.

Taglia Motore	Flange	Piedi	Coperchio scatola morsetti
63-71	M5x16	M6x16	M5x14
80-90	M6x20	M6x20	M5x14
100	M8x20	M8x30 DADO M8	M5x14
112	M8x20	M8x35 DADO M8	M5x14
132	M10x20	M10X50 DADO M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
Viti classe 8.8			

8.DATA DI PRODUZIONE

La data di produzione viene riportata sulla targa del motore indicando Mese ed Anno di fabbricazione : MM-AA



1. GENERAL SAFETY INFORMATION

⚠ These safety instructions refer to the installation, utilization and maintenance of motors O-M series to be used in potentially explosive areas with presence of combustible GAS and/or DUST. The information of these instructions are only for qualified personnel. Except for the opening of terminal cover, any other opening cancels the warranty conditions of the motors.

Here below you can see the different markings of the motors and the different zones where they can be used:

GAS	II 2G Ex db IIC T3 Gb T.amb -40°C , +60°C II 2G Ex db IIC T4 Gb T.amb -40°C , +60°C II 2G Ex db IIC T5 Gb T.amb -40°C , +40°C II 2G Ex db eb IIC T3 Gb T.amb -40°C , +60°C II 2G Ex db eb IIC T4 Gb T.amb -40°C , +60°C II 2G Ex db eb IIC T5 Gb T.amb -40°C , +40°C	Zones 1, 2
DUST	II 2D Ex tb IIC T125°C T.amb -40°C , +60°C (maximum thickness of dust layer 5mm)	Zones 21, 22

The motors comply with the Essential Health and Safety Requirements for potentially explosive atmospheres provided by European Standards:

IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-7,
IEC/EN 60079-31

⚠ Electric rotating machines present dangers from live and rotating parts, and probably very hot surfaces. All work on them including transportation, connection, commissioning and maintenance must be by qualified and responsible specialists (IEC 364 must be observed). Inadequate work can lead to severe damage to persons and property.

⚠ It is imperative to observe the data printed on the nameplate before operating the motor. Low voltage motors are components to be installed into machines in accordance with Directive 2006/42/EC. Commissioning is not allowed until the conformity of the end product with this directive has been established. These asynchronous motors comply the EMC (2014/30/EU) Directive and no particular shielding is necessary when connected to a pure sinewave voltage supply.

⚠ Before working on the motor, ensure it has stopped and is disconnected from the power supply (including auxiliary equipment). If there is any form of automatic starting, automatic resetting, relays or remote starting, avoid any possibility of unexpected re-starting, paying attention to specific recommendations on equipment application.

2. TRANSPORT, STORAGE

⚠ On receipt verify that the motor has not been damaged during transport and in this case avoid any installation and communicate immediately to the transport service.

Eyebolts, when provided with the motor, must be tightened properly as they are suitable only for lifting the motor, no additional loads are allowed to be attached. If necessary use sufficiently dimensioned devices as a means of transport. Do not use any projection of the motor body to hang the motor for transport purposes.

If two eyebolts are present on the motor use both for lifting. Store low voltage motors in a dry, dust free and low vibration (v eff <0.2 mm/s) area to prevent bearing damage. Before commissioning, the insulation resistance must be measured. In case of values < 1,5 MΩ the winding must be dried. Contact our technical department directly for information on the drying procedure.

3. INSTALLATION

⚠ Installation must comply with the rules of the standard IEC/EN 60079-14 or with the national standards (edition into effect).

Before the installation in an explosive atmosphere, the installer must ensure that the motor is suitable for the classified area in consideration of the different inflammable substances present in the installation area (**please verify the marking on the motor plate before installation**).

The motor must be installed only by qualified people with knowledge about electrical apparatus for explosive gas atmospheres and electrical installations in hazardous areas and has to be done with the motor and driven machine at standstill, electrically dead and locked against restart.

The rating on the nameplate corresponds to voltage and frequency of the power supply and all other electrical and mechanical data, as well as the safety data regarding the motor (protection type, temperature class, ambient temperature etc.).

WARNING: DO NOT OPEN IN PRESENCE OF EXPLOSIVE ATMOSPHERE

. The coupling components must also be balanced with a half key on a smooth mandrel. Coupling belts and pulleys must be assembled by suitable tools to protect the bearings.

After assembly check that the coupling components are well fixed on the shaft end; they must be properly pushed against the shaft shoulder. Where the hub of the coupling gear is shorter than the shaft end, compensate the difference by use of a bush spacer.

Too large or too small pulleys can impair the shaft bearing life; similarly excessive belt tension can cause low bearing life or shaft breakage.

The motors must be installed in a proper position so that cooling air can go in and out easily. The ventilation must not be hindered and the outgoing air - also from adjacent units - must not be directly sucked in again. To keep a good cooling of the motor, there must be a minimum distance of 40mm between the fan cover and another element capable to reduce the air aspiration of the ventilation. Avoid heat sources near the motor that might affect the temperatures both of cooling air and of the motor.

In case of outdoor installation protect the motor from solar radiation and extremes of weather. In case of vertical mounting with shaft down use fan cover with rain roof. It is advisable to protect the motor with such as overcurrent devices and torque limiters where it is not protected by winding temperature transducers connected to appropriate switchgear.

In case of environments with wide thermal excursions and when can be preview the presence of moisture, Orange1 EM will equip the motor with heaters.

Instead of use anti-condensation heaters, is possible to supply the motor on pins U1-V1 with a voltage 4-10% of the rated motor phase-voltage; 20-30% of the rated current is enough to heat the motor.

⚠ Check the direction of rotation with the motor not coupled fastening the shaft key to avoid its violent ejection during rotation.

If the direction of rotation is not as desired, disconnect the motor and wait until the motor is completely stopped:

- in case of three phase motors interchange two phases at the terminals.
- in case of single phase motors refer to the diagram supplied with the motor

Cable entries

⚠ Depending on the type of protection of the motor the cable entries shall comply with the standards written in the table and having the range of temperature of the motor itself:

Type of protection of the terminal box	Type of protection of the cable gland	Operative Temp.
Ex eb tb	Ex eb tb	-40°C , +100°C
Ex db tb	Ex db tb	-40°C , +100°C

The cable diameter for each size of cable gland are like below:

Cable gland thread	Motor size	Range of cable diameter (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20x1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25x1.5	132	12,5-20,5
M32x1.5	160-180	17-26

Cable glands and plugs if not supplied with the motor shall be like above.

The cable gland mounted on the terminal box shall be covered by a valid ATEX and IECEx certificate according to the type of protection of the terminal compartment (Ex db and or Ex eb and or Ex tb). It shall have a minimum protection degree IP66 according to EN/IEC 60529 and EN/IEC 60079-0; the operating temperature of the cable gland shall be included in the temperature range defined by the minimum ambient temperature reported on the Ex Label of the motor and the maximum ambient temperature + 25°C.

The cable glands shall be completely screwed to the motor with a tightening torque of 5Nm

- The field wiring shall be carried out using cables having an overall sheath operating temperature at least equal to the maximum ambient temperature of the motor +25°C and conductor insulation temperature at least equal to the maximum ambient temperature of the motor +35°C.

Capacitor housing cable glands and motor wires cable glands inside Ex enclosures are factory installed. It is not allowed to unscrew or modify the factory installation.

As the feet can be mounted on the frame it is possible to fix them in 3 different positions so to have the possibility to have the terminal box on the top or on the right and left sides of the motor.

At the same time the terminal box can be mounted on the motor so to have the cable entries where it is necessary. So the cable entries can be in the four different positions. This operation has to be done before connection, removing the box cover, unscrewing the 4 screws that fix the box to the motor. Screw completely in respect of the tightening torque of TIGHTENING TORQUE TABLE

4. CONNECTION TO THE POWER SUPPLY

⚠ Only qualified people are allowed to connect the motor to the power supply. The connection to the electric supply must be done by through the cable entry supplied with the motor or through another type of cable entry certified in accordance with the European Standards showed above in compliance with Directive 2014/34/EU and IECEx approved.

In case of motor complete with cable, the free end of the cable should be connected in a safe zone or inside an Ex enclosure with a type of protection suitable for the explosive atmosphere.

⚠ Always refer to the data printed on the nameplate for voltage and frequency to ensure the motor is appropriate for the mains supply.

If not specified it is possible to assume tolerances of ±5% on voltage and ±1% on frequency indicated on the nameplate (X on the certificate number).

For motor with temperature class T3 and T4 is possible to have ±10% on voltage. The connection diagrams are normally supplied together with the motor or are printed in the terminal box. If they are missing please refer to this manual or contact directly to our technical office.

Check and make sure that, in the case of star /delta start, the switching from star to delta can only be executed after the starting current of the star step has fallen; this is important because of the risk of not allowed operational loads.

The cable size choice must be suitable to the motor ratings and the plant type.

The motors shall be protected by a tripping device, which in case of breakdown could cut off the power supply before the surface temperature exceeds the ignition temperature of the explosive atmosphere.

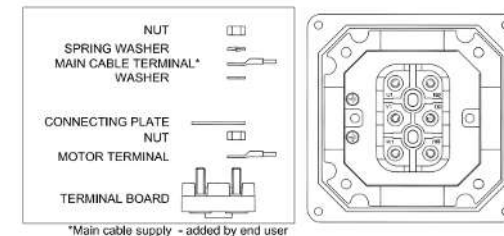
⚠ The motors with increased safety terminal box ("eb") are built with a special terminal board with improved insulation and distances.

⚠ The Ex d motors have a normal terminal board.

TIGHTENING TORQUE TABLE

Thread	M4	M5	M6	M8
Tightening Torque (Nm)	1,5	2	3	6

The power connection shall be made as in the picture. The nuts shall have to be tightened according to TIGHTENING TORQUE TABLE to avoid any loosening.



IMPORTANT: Motors with Ex eb terminal box REPLACE THE GASKET (SEAL) IN THE RIGHT POSITION BEFORE CLOSING THE TERMINAL BOX AND SCREW COMPLETELY ALL THE SCREWS.

Earth connection

⚠ In addition to the earth screw terminal fitted inside the terminal box, another external one must be on the motor frame. If the line conductors have a section S the earth connections have to be:

Earth conductor	Line conductors
= S	S ≤ 16 mm ²
16	16 mm ² < S ≤ 35 mm ²
≥ 0,5 S	S > 35 mm ²

Connection of auxiliary cables ("e" terminal box)

⚠ If the motor is provided with terminal board with auxiliary pins the connection of thermal protection and/or heaters can be made in such pins.

If the motor is provided with just a terminal board having just the 6 mains pins the connection of thermal protection and heaters have to be made by welding the wires of auxiliary devices with the wires of the cable and insulate using a heat-shrink sheath.

Protection

⚠ The motor must be protected by a tripping device that in case of breakdown, cut off the supply of the motor so that the surface temperature of the parts in contact with the explosive atmosphere doesn't reach the ignition temperature.

Motors for inverter duty

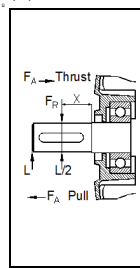
⚠ In case the motors are supplied by inverter, they shall be provided with protectors inside the windings (normally PTC thermistors), capable of assuring the respect of temperature class limits. Such devices shall be connected to a control device able to cut off power to the motor in case of reaching of the limit temperature. The permissible operating characteristics in this mode are stated on the nameplate or an additional label. Output filters must be installed based upon the length of the cable on the motor side of the VFD. Filter selection and the maximum cable length depend on the instructions and data provided by the VFD manufacturer. To prevent stray circulating currents, it is recommended to use appropriate measures on the power supply that allow to significantly reduce the triggering cause. For this purpose contact your local VFD supplier.

Heaters

⚠ The heaters shall be supplied only when the motor is not under power. The cables have to be adequate for a power of 25W with supply that can be from 110V up to 240V (±10%).

Permissible load

Assuming a life-span of 20.000h for 2P motors and 40.000h for 4,6,8P motors:

	Motor size	Bearing	*Max radial load in L/2	*Max axial load Thrust	*Max axial load Pull
	63	6202	365	230	120
	71	6202	450	280	160
	80	6204	590	370	220
	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

* Values in [N]

Allowed duty services

S1: Continuous duty the motor works at a constant load until thermal equilibrium is reached.

S2: Intermittent duty: Once started, the motor works at a constant load for a limited period and thermal equilibrium is not reached. Motor will be started a second time then when its temperature has decreased to room temperature.

S3: Intermittent duty: A sequence of identical duty cycles, made up with a time of operation at constant load and a time at rest. When at rest, the motor is not fed. Starting current does not significantly influence temperature rise.

S9: Load and speed vary periodically within the permissible operating range. Frequent overloading may occur. Typical of motors supplied by inverter.

Motors with forced ventilation (IC416)

In case of motors with forced ventilation, the main motor can be supplied only when the auxiliary ventilation is already working.

5. MARKING

	(*) Marking of conformity to the European Directives
	(*) Specific marking of explosion protection
II (*)	Motor for surface plants (different from mines)
2 (*)	Category 2: high level of protection
GAS	G (*) explosive atmosphere due to presence of combustible gas vapour or mist
	Ex db Flameproof motor and terminal box
	Ex dbeb Flameproof motor, increased safety terminal box
	IIC Gas group, suitable for IIB and IIA
	T3, T4, T5 Temperature class
DUST	D (*) explosive atmosphere due to presence of combustible dust
	Ex tb IIC tb enclosures suitable for zone 21 (cat. 2D)
	T125 °C Max surface temperature
T.amb Ambient temperature	
AB xx yyy AB : laboratory which issues the CE type certificate xx : year of issue of certificate yyy : number of CE type certificate	
ZZZZ (*) Notified Body that gives the Product Quality Assurance Notification	
(*) Only for ATEX marking	

6. MAINTENANCE AND REPAIR

⚠ **⚠** **Ex** MAINTENANCE shall be performed only by qualified people in accordance with the standard IEC/EN 60079-17 or national standards (last edition). Qualified people must have knowledge about electrical apparatus for explosive atmospheres and electrical installations in hazardous areas.

- Every 3000 hours of service verify and restore, if necessary, the grease on the radial seals (for example V-rings).

Periodically (depending on the environment and duty) verify:

- motor cleanliness (oil, DUST, dirt and machining residuals absence) and free passage of cooling air
- correct tightening of electrical connections, of fastening screws
- free motor running with low vibration ($v_{eff} < 3,5 \text{ mm/s}$ for $P_n < 15 \text{ KW}$ $v_{eff} < 4,5 \text{ mm/s}$ for $P_n > 15 \text{ KW}$) and absence of anomalous noises; where there is high vibration and/or noise verify the motor fastenings, machine balancing and that the bearings are in good condition.
- The bearings must be inspected once per 3000h operation.

⚠ **Ex** REPAIRS shall be made in accordance with the rules as defined in EN 60079-19 standard. These repairs can only be done under the control and authorization of Orange1 EM or by certified repair workshop. When the repair is made by a certified repair workshop, they must respect all the original characteristic of the motor and use only original spare parts. Furthermore they have to place an additional nameplate on the motor with written a symbol to identify the , company name and certification, repair operation number and date. Nothing regarding the type of protection can be modified. In case all these rules are not respected, the motor loses all its characteristic of certification.

FLAMEPROOF JOINTS CANNOT BE REPAIRED

7. MODULAR COMPONENTS

The motors are completely modular. Feet and flanges can be mounted without affecting the ATEX certificate, as they are external and are not part of the type of protection. In the table here below we show you the screws to be used to mount the different modular components.

Motor Size	Flange	Feet	Terminal box Cover
63-71	M5x16	M6x16	M5x14
80-90	M6x20	M6x20	M5x14
100	M8x20	M8x30 DADO M8	M5x14
112	M8x20	M8x35 NUT M8	M5x14
132	M10x20	M10x50 NUT M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + NUT M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + NUT M10	M6X20
Screws class 8.8			

8. MANUFACTURING DATE

The manufacturing date is shown on the motor nameplate indicating Month and year of manufacture: MM-YY



1. ALLGEMEINE SICHERHEITSHINWEISE

⚠ Diese Anleitung betrifft die Installation, den Betrieb und die Wartung der Motoren der O-M Serie zum Einsatz in explosionsgefährdeten Bereichen durch GAS und/oder STÄUBE.

Die Informationen zu dieser Anleitung sind nur für entsprechend qualifiziertes Personal bestimmt. Alle Eingriffe die über das Öffnen des Klemmkastens hinaus gehen, haben ein Erlöschen der Motorgarantie zur Folge! Nachfolgend die Motorkennzeichnungen, welche für die entsprechenden Zonen maßgeblich sind.

GAS	II 2G Ex db IIC T3 Gb T.amb –40°C , +60°C II 2G Ex db IIC T4 Gb T.amb –40°C , +60°C II 2G Ex db IIC T5 Gb T.amb –40°C , +40°C II 2G Ex db eb IIC T3 Gb T.amb –40°C , +60°C II 2G Ex db eb IIC T4 Gb T.amb –40°C , +60°C II 2G Ex db eb IIC T5 Gb T.amb –40°C , +40°C	Zones 1, 2
	II 2D Ex tb IIC T125°C T.amb –40°C , +60°C (maximale Dicke der Staubschicht 5mm)	Zones 21, 22
STAUB		

Für diese Motoren gelten die Gesundheit- und Sicherheitsbestimmungen für explosionsfähige Atmosphäre nach Europeanorm:

IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-7, IEC/EN60079-31

⚠ Elektrisch drehende Maschinen stellen durch Spannung, drehende Teile und evt. erhitzte Oberflächen eine Gefahr dar. Alle Arbeiten daran, einschließlich Transport, Anschluss, Inbetriebnahme und Wartung hat durch qualifiziertes Fachpersonal zu erfolgen (unter Beachtung der IEC 364). Unsachgemäße Arbeiten können zu ernststen Personen- und Sachschäden führen.

⚠ Die auf dem Leistungsschild vermerkten Daten müssen unbedingt beachtet werden. Niederspannungsmotoren sind Komponenten zum Einbau in Maschinen gemäß Bestimmung 2006/42/EC. Die Inbetriebnahme darf erst dann erfolgen, wenn die Konformität des Endprodukts mit diesen Bestimmungen sicher gestellt wurde. Diese Asynchronmotoren entsprechen der EMC Bestimmung(2014/30/UE) und bedürfen keiner besonderen Abschirmung beim Anschluss an eine reine Sinuswellen-Spannungsversorgung. Die gesamte Inbetriebnahme darf erst erfolgen, nachdem diese Bestimmungen für das komplette Endprodukt umgesetzt worden sind.

⚠ Vor Arbeiten an dem Motor vergewissern Sie sich, dass sich dieser nicht mehr dreht und auch die Stromversorgung abgestellt ist. (dies gilt auch für Zusatzeinrichtungen!). Jegliche Art von automatischem Start sowie automatischem Relais- oder ferngesteuertem Start der Anlage ist vorher zu überprüfen

und auszuschalten um einen versehentlichen Anlauf zu verhindern

2. TRANSPORT UND LAGERUNG

⚠ Nach Erhalt ist der Motor auf eventuelle Transportschäden zu untersuchen und gegebenenfalls der Spediteur davon zu unterrichten - der Motor darf dann auf keinen Fall eingebaut werden.

Wenn vorgesehen, müssen die Hebeösen sorgfältig am Motor befestigt werden und dürfen nur die Last des Motors tragen. Eine zusätzliche Belastung ist nicht gestattet und muss gegebenenfalls gesondert gesichert werden. Verwenden Sie zu Transportzwecken nie irgendwelche Vorsprünge des Motorgehäuses. Wurden zwei Hebeösen mitgeliefert sind diese auch zu benutzen.

Lagern Sie Niederspannungsmotoren in trockener, staub- und vibrationsfreier Umgebung (v eff<0,2mm/s) um Lagerschäden zu vermeiden. Vor Inbetriebnahme messen Sie den Isolationswiderstand. Bei Werten < 1,5 MΩ muss die Wicklung getrocknet werden. Setzen Sie sich direkt mit unserer Technikabteilung in Verbindung um Informationen über die Vorgehensweise zu erhalten.

3. INSTALLATION

⚠ Die Installation erfolgt gemäß den Bestimmungen nach EN 60079-14 oder nach nationalen Standards (neuester Stand). Vor dem Einbau in einen explosionsgefährdeten Bereich ist sicher zu stellen, dass der Motor auch für diesen Einsatz entsprechend der Klassifizierung der auftretenden Stoffe denen er ausgesetzt sein wird, ausgelegt ist (**prüfen Sie vor der Installation die Kennzeichnung auf dem Leistungsschild!**)

Der Einbau darf nur durch Fachpersonal mit fundierten Kenntnissen zu elektrischen Geräten in explosionsgefährdeten Bereichen und deren elektrischen Installation in diesem Bereich erfolgen. Hierbei ist der Motor / die Anlage außer Betrieb, die Stromversorgung abgeschaltet und ein versehentlicher Neustart ausgeschlossen. Alle Angaben auf dem Leistungsschild entsprechen der Spannung und Frequenz des Netzanschlusses und allen anderen darauf vermerkten elektrischen und mechanischen Daten, sowie den Sicherheitsangaben zum Motor (Schutzart, Temperaturklasse, Umgebungstemperatur etc.).

WARNUNG: NICHT ÖFFNEN BEI EXPLOSIONGEFÄHRDETEN

Die Anschlussteile sind ebenso mit einer halben Passfeder auf einem glatten Dorn auszuwuchten. Antriebsriemen und Riemenscheiben werden mit einem geeigneten Werkzeug montiert um die Lager zu schützen. Nach dem Zusammenbau überprüfen Sie den festen Sitz der Bauteile. Sie müssen sorgfältig gegen die Wellenschulter geschoben werden. Ist die Kupplungsnahe kürzer als das Wellenende wird der Unterschied mit einem Zwischenstück ausgeglichen. Zu große oder zu kleine Riemenscheiben können die Lebensdauer der Wellenlager beeinträchtigen; desgleichen reduziert eine zu hohe Riemenspannung die Lebensdauer des Lagers oder verursacht einen Bruch der Welle. Der Motor wird so eingebaut, dass eine ungehinderte Luftzirkulation gewährleistet ist und die abgeführte Wärme, auch die benachbarter Geräte, nicht wieder als Kühlluft angesaugt wird. Zur Kühlung des Motors ist ein Mindestabstand von 40 mm von der Lüfterhaube zu anderen Teilen, welche den Luftstrom zum Lüfter beeinträchtigen könnten, einzuhalten. Vermeiden Sie Wärmequellen in der Nähe des Motors, welche sowohl den Motor als auch die zur Kühlung benötigte Luft erhitzen könnten.

Bei der Aufstellung im Freien ist der Motor vor direkter Sonneneinstrahlung und Wetterextremen zu schützen. Ist die Wicklung des Motors nicht mit einem an einer entsprechenden Schaltanlage angeschlossenen Temperaturmesswandler ausgestattet, ist es ratsam den

Motor gegen Überstrom und mit einen Drehmomentbegrenzer zu schützen.

Bei einer Umgebung mit starken Temperaturschwankungen oder hoher Luft-feuchtigkeit, kann Orange1 EM den Motor mit einer Stillstandheizung ausstatten. Dichtungen und Schrauben sind so ausgelegt, dass die IP Klassifizierung gewährleistet ist. Anstelle der Verwendung von Antikondensationsheizungen ist es möglich, den Motor an den Stiften U1-V1 mit einer Spannung von 4-10% der Nenn-Motorphasenspannung zu versorgen; 20-30% des Nennstroms reichen aus, um den Motor zu erwärmen.

⚠ Überprüfen Sie die Drehrichtung des Motors ohne montierte Wellenpassfeder um eine spätere Beschädigung zu vermeiden.

Sollte der Motor nicht die gewünschte Drehrichtung haben schalten Sie den Motor aus und warten bis zu dessen vollständigem Stillstand.

- Bei einem 3-ph Motor tauschen Sie 2 Phasen an der Klemme.
- bei einem 1-ph Motor folgen Sie dem mitgelieferten Diagramm

⚠ Kabeleingänge

Je nach Schutzart des Motors sollen die Kabeleingänge den in nachfolgender Tabelle festgelegten Normen und dem Temperaturbereich des Motors entsprechen.

Schutzart des Klemmkasten	Schutzart der Kabelverschraubung	Betriebstemp.
Ex eb tb	Ex eb tb	–40 °C , +100 °C
Ex db tb	Ex db tb	–40 °C , +100 °C

Der Kabeldurchmesser für jede Größe der Kabelverschraubung ist wie folgt:

Kabelverschraubung Gewinde	Motor Größe	Kabeldurchmesser (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20X1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25X1.5	132	12.5-20.5
M32X1.5	160-180	17-26

Kabelverschraubungen und Stecker, wenn sie nicht mit dem Motor geliefert werden, müssen wie oben ausgeführt sein. Die am Anschlusskasten montierte Kabelverschraubung muss gemäß der Schutzart des Anschlusses (Ex db und/oder Ex eb und/oder Ex tb) durch ein gültiges ATEX- und IECEx-Zertifikat abgedeckt sein. Sie muss mindestens die Schutzart IP66 aufweisen nach EN/IEC 60529 und EN/IEC 60079-0 zertifiziert sein. Die Betriebstemperatur der Kabelverschraubung muss innerhalb des Temperaturbereiches liegen, der durch die auf dem Ex-Etikett des Motors angegebene minimale Umgebungstemperatur und die maximale Umgebungstemperatur + 25 °C definiert ist. **Die Kabelverschraubungen sind gut an den Motor festzuschrauben mit einem Anzugsdrehmoment von 5 Nm.**

- Die Feldverdrahtung muss mit Kabeln durchgeführt werden, deren Gesamtmantel-Betriebstemperatur mindestens gleich der maximalen Umgebungstemperatur des Motors +25 °C und die Leiterisolationstemperatur mindestens gleich der maximalen Umgebungstemperatur des Motors +35 °C sein. Kondensatorgehäuse-Kabelverschraubungen und Motorkabelverschraubungen in Ex-Gehäusen werden werkseitig installiert. Die werkseitige Installation darf nicht abgeschraubt oder verändert werden! Da die Füße am Motor Gehäuse montiert werden, ist es möglich, sie in 3 verschiedenen Positionen zu befestigen, um die Möglichkeit zu haben, den Klemmenkasten auf der Oberseite oder auf der rechten bzw. linken Seite des Motors anzubringen. Gleichzeitig kann der Klemmenkasten am Motor unterschiedlich ausgerichtet werden, um die Kabeleinführungen dort zu haben, wo es notwendig ist. So

können die Kabeleinführungen in den vier verschiedenen Richtungen positioniert werden. Dieser Vorgang muss vor dem Anschluss durchgeführt werden, indem der Klemmkastendeckel entfernt wird und die 4 Schrauben gelöst werden, mit denen der Kasten am Motor befestigt ist. Schrauben Sie vollständig unter Beachtung des Anzugsdrehmoments der ANZUGSMOMENT-TABELLE diese wieder fest.

4. ANSCHLUSS AN DIE STROMVERSORGUNG

Der Motor darf nur von Fachpersonal an die Stromversorgung angeschlossen werden.

Der Anschluss an die Stromversorgung erfolgt über den mitgelieferten Kabeleingang oder einen entsprechenden Eingang nach o.g. Liste, gemäß den Richtlinien zu 2014/34/EU.

Wird der Motor mit Kabel geliefert, erfolgt der Anschluss in einem sichern Bereich oder in einem extra dafür ausgelegtem explosionsgeschützten Gehäuse.

⚠ Prüfen Sie immer die Daten zur Spannung und Frequenz um sicher zu stellen, dass der Motor auch wirklich für diese Stromversorgung ausgelegt ist. Wenn nicht anders angegeben, ist eine Toleranz von ±5% bei der Spannung und ± 1 % bei der Frequenz zu den gestempelten Daten zulässig (das X auf der Zertifikatsnummer). Bei Motoren der Temperaturklassen T3 und T4 ist eine Spannungsabweichung von ±10 % möglich. Die Anschlussdiagramme werden entweder zusammen mit dem Motor geliefert oder sind im Klemmkasten aufgedruckt. Sollten diese doch einmal fehlen, folgen Sie dem Diagramm in diesem Handbuch oder wenden sich an unsere Technikabteilung.

Überprüfen und stellen Sie sicher, dass bei einer Stern/Dreieckschaltung der Wechsel von Stern zu Dreieck nur dann stattfinden kann, nachdem der Anlaufstrom der Sternschaltung gefallen ist. Dies ist notwendig um eine nicht zulässige Betriebslast zu vermeiden.

Die Auswahl der Kabelstärke erfolgt nach den Vorgaben von Motor und Anlage.

Die Motoren müssen mit einem Auslöser geschützt werden, damit im Falle einer Störung die Stromzufuhr unterbrochen wird, bevor die Oberflächentemperatur die zulässige Entzündungstemperatur innerhalb der explosionsgeschützten Umgebung überschreitet

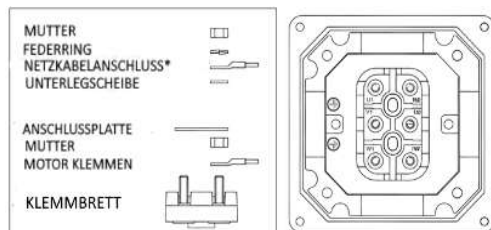
⚠ Die Ex e Motoren – erhöhte Sicherheit verfügen über spezielle Klemmkästen mit besserer Isolation und Zwischenräumen.

⚠ Die Ex d Motoren haben ein normales Klemmenbrett. Der Stromanschluss erfolgt nach Anschlussplan. Die Muttern sind entsprechend fest anzuziehen um ein Lockern auszuschließen.

ANZUGSMOMENTTABELLE

Gewinde	M4	M5	M6	M8
Anzugsmoment (Nm)	1,5	2	3	6

Der Stromanschluss erfolgt wie auf dem Bild. Die Muttern müssen gemäß der ANZUGSMOMENTTABELLE angezogen werden, um ein Lockern zu verhindern.



*Vom Benutzer hinzugefügtes Netzkabel

WICHTIG: Motoren mit Klemmkasten Ex eb: Achten Sie auf den korrekten Sitz der Dichtung am Klemmkasten und ziehen Sie sorgfältig sämtliche Schrauben an.

Erdung

⚠ Zusätzlich zum Schutzleiteranschluss innerhalb des Klemmkastens muss ein entsprechender weiterer Erdungsanschluss außen am Motorgehäuse angebracht werden.

Bei einem Schnitt S bei der Schleifleitung ist das Erdungskabel wie folgt auszuführen:

Schutzleitung	Schleifleitung
$\approx S$	$S \leq 16 \text{ mm}^2$
16	$16 \text{ mm}^2 < S \leq 35 \text{ mm}^2$
$\geq 0,5 S$	$S > 35 \text{ mm}^2$

Anschluss zusätzlicher Kabel (Exe Klemmkasten):

⚠ Besitzt der Motor zusätzliche Kontakte auf dem Klemmbrett, kann dort ein Thermoschutz und/oder eine Stillstandheizung angeschlossen werden.

Sollte das Klemmbrett nur über 6 Kontakte verfügen, erfolgt der Anschluss des Thermoschutzes und der Stillstandheizung indem man deren Drähte mit den Kabeldrähten verlötet und einer geschrumpften Schlauchhülle isoliert.

Thermoschutz

⚠ Die Motoren müssen mit einem Auslöser geschützt werden, damit im Falle einer Störung die Stromzufuhr unterbrochen wird. Dadurch wird verhindert, dass die Flächen innerhalb der explosionsgefährdeten Umgebung die zulässige Oberflächentemperatur nicht erreicht.

Motoren für Umrichterbetrieb.

⚠ Wird der Motor mit einem Umrichter (VFD) betrieben ist die Wicklung mit PTCs auszustatten um die angegebene Temperaturklasse zu gewährleisten. Diese Wärmeschalter sind an eine entsprechende Kontrollschaltung anzuschließen um den Motor bei Erreichung des Temperaturlimits abzuschalten.

Die zulässigen Betriebseigenschaften in diesem Modus sind auf dem Typenschild oder einem zusätzlichen Aufkleber angegeben. Ausgangsfilter müssen basierend auf der Länge des Kabels auf der Motorseite des VFD installiert werden. Die Filterauswahl und die maximale Kabellänge hängen von den Anweisungen und Daten des VFD-Herstellers ab. Um umlaufende Ströme / Peaks zu vermeiden, wird empfohlen, geeignete Maßnahmen an der Stromversorgung zu treffen, die es ermöglichen, die Auslöseursache deutlich zu reduzieren. Wenden Sie sich zu diesem Zweck an Ihren VFD-Händler vor Ort.

Stillstandheizung

⚠ Diese Heizung ist nur bei ausgeschaltetem Motor in Betrieb.

Zulässige Belastung:

Bei einer angenommenen Lebenszeit von 20.000 h bei 2-Pol Motoren und 40.000 für 4,6,8-Pol Motoren.

	BG	Lager	*Max radial Last in L/2	*Max axial Last Schub	*Max axial Last Druck
$F_A \rightarrow \text{Druck}$	63	6202	365	230	120
$F_B \rightarrow X$	71	6202	450	280	160
$L/2$	80	6204	590	370	220
$\leftarrow F_A \text{ Zug}$	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

*Maßeinheit IN [N]

Erlaubte Zolldienste

S1: Dauerbetrieb Der Motor arbeitet mit konstanter Last, bis das thermische Gleichgewicht erreicht ist.

S2: Aussetzbetrieb: Nach dem Start arbeitet der Motor für eine begrenzte Zeit mit konstanter Last und das thermische Gleichgewicht wird nicht erreicht. Der Motor wird dann ein zweites Mal gestartet, wenn seine Temperatur auf Raumtemperatur abgesunken ist.

S3: Aussetzbetrieb: Eine Abfolge identischer Lastspiele, die sich aus einer Betriebszeit bei konstanter Belastung und einer Ruhezeit zusammensetzt. Im Ruhezustand wird der Motor nicht gespeist. Der Anlaufstrom hat keinen wesentlichen Einfluss auf den Temperaturanstieg.

S9: Last und Drehzahl ändern sich periodisch innerhalb des zulässigen Betriebsbereichs. Es kann zu häufigen Überlastungen kommen. Typisch für Motoren, die vom Umrichter versorgt werden.

Servolüftete Motoren (IC416)

Bei Motoren mit Fremdbelüftung (IC416) muss der Hauptmotor nur bei Betrieb der Zusatzlüftung eingeschaltet sein.

5. KENNZEICHNUNGEN

CE (*)		Konformität zu Europäischen Direktiven
Ex (*)		Kennzeichen für Explosionsschutz
II (*)		Motor für oberirdische Anlagen (kein Bergbau)
2 (*)		Kategorie 2: hoher Schutzgrad
Gas	G (*)	Explosionsfähige Atmosphäre durch Dampf oder Nebel
	Ex db	Explosionsschutz. Motor und Klemmkasten
	Ex dbeb	Explosionsschutz. Motor und Klemmkasten, erhöhte Sicherheit
	IIC	Gasgruppe, auch geeignet für IIB und IIA
	T3, T4, T5	Temperaturklasse
Staub	D (*)	Explosionsfähige Atmosphäre durch brennbare Stäube
	Ex tb IIC	Gehäuse tD Verfahren A für Zone 21 (Kat. 2D)
	T125°C	maximale Oberflächentemperatur
T.amb		Umgebungstemperaturbereich
AB xx ATEX yyy		AB : Zertifizierungsstelle für CE Type xx : Jahr der Zertifizierung yyy : Zertifizierungsnummer
ZZZZ (*)		Prüfstelle für Baumusterprüfbescheinigung
		(*) Nur für ATEX-Kennzeichnung

6. WARTUNG UND REPARATUR

⚠ **WARTUNG:** Darf nur von entsprechend qualifiziertem Personal unter Beachtung der aktuellen europäischen Standards und IEC/EN 60079-17 Bestimmungen ausgeführt werden. Dieses Personal muss über spezielles Wissen für die Installation elektrischer Betriebsmittel in explosionsgefährdeter Umgebung verfügen.

- Alle 3000 Betriebsstunden ist das Fett an den radialen Dichtungen (V-Ringe) zu überprüfen und gegebenenfalls nachzuschmieren.

Je nach Einsatz und Umgebung sind regelmäßig folgende Wartungen auszuführen:

- Motor säubern (von STAUB, ÖL und Maschinenablagerungen) und die Durchgänge zur Kühlung freihalten

- korrekten Sitz der elektrischen Anschlüsse und aller Befestigungen prüfen.

- auf einen freien, vibrationsarmen Motorlauf

(v eff < 3,5 mm/s für Pn < 15 kW)

(v eff < 4,5 mm/s für Pn > 15 kW)

überprüfen und auf außergewöhnliche Laufgeräusche achten.

Sollten o.g. Probleme auftreten, sind die Motorbefestigungen, die Maschinenwucht oder der Zustand der Lager zu kontrollieren.

⚠ **REPARATUREN:** sind gemäß den Bestimmungen nach IEC/EN 60079-19 Standards durchzuführen.

Diese Reparaturen können nur unter der Kontrolle und mit der Genehmigung von Orange1 EM oder einer entsprechend zertifizierten Werkstatt ausgeführt werden.

Wird die Reparatur von einer solchen Werkstatt ausgeführt, hat diese alle ursprünglichen Eigenschaften des Motors zu beachten. Es dürfen nur originale Ersatzteile verwendet werden. Darüber hinaus ist ein zusätzliches Schild am Motor anzubringen, welches das Reparatursymbol **R** aufweist, sowie den Firmennamen, und deren Zertifizierung, die Reparatur-Vorgangsnummer und das Datum.

An der Schutzart dürfen keine Veränderungen vorgenommen werden!

Sollten diese Vorschriften nicht eingehalten werden, verliert der Motor sämtliche Zertifizierungskriterien.

VERBINDUNGEN KÖNNEN NICHT REPARIERT WERDEN 7. MODULARE KOMponenten

Diese Motoren sind komplett modular, das heißt Füße und Flansche können vom Kunden selbst montiert werden ohne dabei gegen das ATEX Zertifikat zu verstoßen, da es sich hier um außen liegende Teile handelt, welche nicht die Schutzart betreffen. Nachfolgende Tabelle zeigt die zu verwendenden Schraubengrößen um die verschiedenen Teile zu befestigen.

BG	Flansche	Füße	Klemmkasten-deckel
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	M5x14
100	M8x20	M8x30 NUSS M8	M5x14
112	M8x20	M8x35 NUSS M8	M5x14
132	M10x20	M10x50 NUSS M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + NUSS M10	M6x20
180	n.3 M10x95 n.1 M10x70	M10x70 + NUSS M10	M6x20
Schraubengüte 8.8			

8. HERSTELLUNGSDATUM

Das Herstellungsdatum ist auf dem Typenschild des Motors angegeben

Angabe von Herstellungsmonat und -jahr: MM-JJ



1. INFORMACIÓN DE SEGURIDAD GENERAL

⚠ Estas instrucciones de seguridad se refieren a la instalación, utilización y mantenimiento de los motores de la serie OM para ser utilizado en zonas con peligro de explosión con presencia de gas y / o polvo combustible. La información de estas instrucciones son sólo para personal cualificado. A excepción de la apertura de la tapa del terminal, cualquier otra apertura anula las condiciones de garantía de los motores.

A continuación se pueden ver los diferentes marcados de los motores y las diferentes zonas en las que se pueden utilizar:

GAS	II 2G Ex db IIC T3 Gb	T.amb -40°C , +60°C	Zones 1, 2
	II 2G Ex db IIC T4 Gb	T.amb -40°C , +60°C	
	II 2G Ex db IIC T5 Gb	T.amb -40°C , +40°C	
	II 2G Ex db eb IIC T3 Gb	T.amb -40°C , +60°C	
	II 2G Ex db eb IIC T4 Gb	T.amb -40°C , +60°C	
	II 2G Ex db eb IIC T5 Gb	T.amb -40°C , +40°C	
POLVO	II 2D Ex tb IIIC T125°C	T.amb -40°C , +60°C	Zones 21, 22
	(espesor máximo de la capa de polvo de 5 mm)		

Los motores cumplen con los requisitos de seguridad para atmósferas potencialmente explosivas proporcionadas por las normas europeas:

IEC/EN 60079-0, EN 60079-1, EN 60079-7, EN60079-31

⚠ Las máquinas rotativas eléctricas pueden presentar un peligro por abrasión debido a las altas temperaturas de su superficie así como un peligro físico debido a las partes móviles. Todos los trabajos en las mismas, incluyendo el transporte, conexión, puesta en servicio y mantenimiento, deben realizarse por personal cualificado (Acorde con el IEC 364). Una manipulación inadecuada puede conducir a graves daños a personas y/o equipos.

⚠ Es imprescindible revisar y comprobar los datos impresos en la placa de identificación antes de hacer funcionar el motor. Los motores de baja tensión cumplen con la Directiva 2006/42/EC. La puesta en marcha no está permitida hasta conformidad del producto final con dicha directiva. Los motores asíncronos cumplen la Directiva EMC(2014/30/UE) por lo que no es necesaria ninguna protección especial en caso de conectarse a una fuente de tensión sinusoidal pura.

⚠ Antes de trabajar en el motor, asegúrese de que se ha detenido y está desconectado de la fuente de alimentación (incluyendo equipos auxiliares). Si hay instalado cualquier forma de arranque automático, relés o arranque remoto, evite toda posibilidad de arranque inesperado, prestando atención a las recomendaciones específicas sobre la aplicación del equipo.

2. TRANSPORTE, ALMACENAMIENTO

⚠ A la recepción, verifique que el motor no ha sido dañado durante el transporte. En caso de daños en el motor debe evitarse la instalación y debe comunicarse la incidencia de inmediato al servicio de transporte. Los cáncamos, deben estar bien apretados al suministrarse del motor, ya que sirven para elevar el mismo, y no debe haber cargas adicionales en el momento de la fijación. Utilice si es necesario dispositivos que ayuden a su transporte. No utilice otras partes del motor que no sean los cáncamos para colgarlo con la finalidad de transportarlo. En caso de que hayan 2 cáncamos, use ambos para un transporte óptimo. Almacene los motores en un lugar seco, libre de polvo y sin vibraciones ($v_{eff} < 0.2 \text{ mm/s}$) para evitar daños en los rodamientos. Antes de la puesta en marcha, se debe comprobar la resistencia de aislamiento. En caso de que la resistencia dé valores de $< 1.5 \text{ M}\Omega$ el bobinado debe secarse. Póngase en contacto con nuestro departamento técnico directamente para obtener información sobre el procedimiento de secado.

3. INSTALACIÓN

⚠ La instalación del motor debe cumplir con la norma EN 60079-14 o bien las normas nacionales en vigor donde vaya a ser instalado. Antes de la instalación en un entorno explosivo, el instalador debe asegurarse de que el motor es el adecuado para el área clasificada teniendo en consideración las diferentes sustancias inflamables presentes en el área de la instalación (**por favor, compruebe la placa de características antes de la instalación**). El motor debe ser instalado exclusivamente por personal cualificado con conocimientos sobre aparatos eléctricos para atmósferas de gas explosivos e instalaciones eléctricas en áreas peligrosas y tiene que hacerse con el motor y la máquina accionada parada, desconectada y protegida contra re-arranque.

El marcado de la placa de características se corresponde al voltaje y frecuencia de la fuente de alimentación y todos los demás datos eléctricos y mecánicos, así como los datos de seguridad en relación con el motor (tipo de protección, clase de temperatura, temperatura ambiente, etc).

ADVERTENCIA: NO ABRIR EN PRESENCIA DE ATMÓSFERA EXPLOSIVA

Los componentes de acoplamiento deben ser también equilibrados con una media chaveta en una superficie completamente plana. Las correas y poleas de acoplamiento deben ser montadas con las herramientas adecuadas para proteger los cojinetes. Después del montaje compruebe que los enganches están bien fijados en el extremo del eje; deben estar debidamente sujetos al mismo. Cuando el engranaje de la rueda dentada de acoplamiento es más corto que el extremo del eje, se debe compensar la diferencia mediante el uso de un casquillo distanciador. Poleas demasiado grandes o demasiado pequeñas pueden perjudicar la vida de los rodamientos y del eje; Tener una tensión excesiva en la correa puede acortar la vida del rodamiento e incluso puede provocar la rotura del eje. Los motores deben instalarse en una posición adecuada para que el aire de refrigeración pueda entrar y salir fácilmente. La ventilación no debe obstaculizarse y el aire de salida - también de agregados - no puede ser insertarse directamente de nuevo. Para mantener una buena refrigeración del motor, debe haber una distancia mínima de 40 mm entre la tapa del ventilador y cualquier elemento capaz de reducir la aspiración de aire de la ventilación. Evitar fuentes de calor cerca del motor que podrían afectar a las temperaturas del aire de enfriamiento y del motor. En caso de instalación al aire libre proteger el motor de la radiación solar y las inclemencias del tiempo. En caso de montaje vertical con el eje hacia abajo, utilice la tapa del

ventilador con protector de lluvia (sombbrero). Es aconsejable proteger el motor con dispositivos contra sobretensión como limitadores de par allá donde no hayan protecciones térmicas o interruptores de protección. En caso de ambientes con constantes cambios ambientales o con previsión de presencia de humedad, Orange1 EM equipará el motor con resistencias de caldeo. En lugar de usar resistencias de caldeo, es posible suministrar el motor a los pines U1-V1 con un voltaje del 4-10% del voltaje nominal de fase del motor; 20-30% de la corriente nominal es suficiente para calentar el motor.

⚠ Compruebe el sentido de giro con el motor no acoplado, sujetando el eje para evitar una expulsión violenta durante la rotación. Si el sentido de giro no es el deseado, desconecte el motor y espere hasta que el motor se detenga por completo: - en caso de motores trifásicos debe intercambiar dos fases en los terminales. - en caso de motores monofásicos consulte el diagrama suministrado con el motor.

Entrada de cable

⚠ Dependiendo del tipo de protección del motor, las entradas de los cables deberán cumplir con las normas escritas en la siguiente tabla y con el mismo rango de temperatura del motor:

Tipo de protección de la tapa del terminal	Tipo de protección de Prensaestopas	Temperatura de funcionamiento
Ex eb tb	Ex eb tb	-40°C , +100°C
Ex db tb	Ex db tb	-40°C , +100°C

El diámetro del cable para cada tamaño de prensaestopas es el siguiente:

Prensaestopas hilo	Tamaño del Motor	Diámetro del cable (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20X1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25X1.5	132	12.5-20.5
M32X1.5	160-180	17-26

Los prensaestopas y los tapones, si no se suministran con el motor, deben ser como se indica arriba. El prensaestopas montado en la caja de bornes deberá estar cubierto por un certificado ATEX e IECEx válido según el tipo de protección de la caja de bornes (Ex db y/o Ex eb y/o Ex tb), deberá tener un grado de protección mínimo IP66 según normativa EN/IEC 60529 y EN/IEC 60079-0; la temperatura de funcionamiento del prensaestopas debe estar incluida en el rango de temperatura definido por la temperatura ambiente mínima indicada en la etiqueta Ex del motor y la temperatura ambiente máxima + 25 °C.

Los prensaestopas se atornillarán completamente al motor con un par de apriete de 5Nm

El cableado debe realizarse con cables que tengan una temperatura de funcionamiento de la cubierta al menos igual a la temperatura ambiente máxima del motor +25 °C y una temperatura de aislamiento del conductor al menos igual a la temperatura ambiente máxima del motor +35 °C. Los prensaestopas del cable de la carcasa del condensador y los prensaestopas de los cables del motor dentro de la carcasa Ex se instalan en fábrica. No está permitido desatornillar ni modificar la instalación de fábrica. Como las patas son desmontables es posible fijarlas en 3 posiciones diferentes para tener la posibilidad de tener la caja de bornes en la parte superior o en los lados derecho e izquierdo del motor. Al mismo tiempo la caja de bornes se puede montar directamente en el motor para tener las entradas de cables que sea necesario. Así que las entradas de los cables pueden estar en las cuatro posiciones diferentes. Esta operación se tiene que hacer antes de la conexión. Para quitar la cubierta de la caja de bornes, debe desatornillarse

los 4 tornillos que fijan la caja al motor y para colocarla de nuevo se debe enroscar por completo teniendo en cuenta el par de apriete (ver la tabla de los pares de apriete). Atornillar completamente respetando el par de apriete de la TABLA DE PARES DE APRIETE

4.CONEXIÓN A LA RED ELÉCTRICA

⚠ La conexión a la red eléctrica debe hacerse sólo por personal debidamente cualificado por medio de la entrada del cable suministrado con el motor o bien por medio de otro tipo de entrada de cables certificada, de conformidad con las normas europeas mostradas anteriormente en cumplimiento con la Directiva 2014/34/EU. En caso de motor con cable ya instalado, el extremo libre del cable debe estar conectado en una zona de seguridad o en el interior de un recinto, con un tipo de protección adecuado para el ambiente explosivo. Consulte siempre los datos de tensión y frecuencia impresos en la placa para asegurar que el motor esta adecuado a la alimentación de red. Si no se especifica, se puede suponer una tolerancia de $\pm 5\%$ de la tensión y de $\pm 1\%$ en la frecuencia indicada en la placa de características (X en el número de certificado). Para motores con clase de temperatura T3 y T4 es posible tener $\pm 10\%$ en el voltaje. Los diagramas de conexión se suministran normalmente junto con el motor o se imprimen en la caja de bornes. Si faltan, por favor consulte este manual o póngase en contacto directamente con nuestra oficina técnica. Compruebe y asegúrese de que, en el caso de arranque estrella / triángulo, el paso de estrella a triángulo solo puede ser ejecutado después de que el paso del arranque estrella haya finalizado; este punto importante ya que puede haber un riesgo de cargas no permitidas.

El tamaño de cable debe ser adecuado a las características del motor y del tipo de planta. Los motores deberán estar protegidos por un dispositivo de disparo, que en caso de avería debe cortar el suministro de energía antes de que la temperatura de la superficie sea superior a la temperatura de ignición de la atmósfera explosiva.

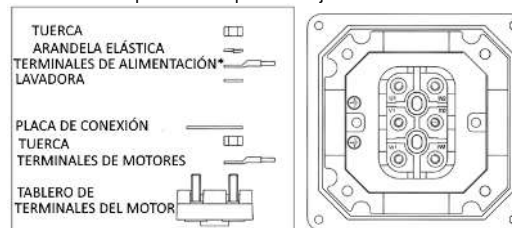
⚠ Los motores con caja de bornes de seguridad aumentada ("eb") se fabrican con una tarjeta de terminales especial y con un mejor aislamiento y mayor distancia.

⚠ Los motores Ex d tienen una tarjeta de terminales estándar. La conexión de alimentación se hará como en la imagen. Las tuercas tendrán que apretarse lo suficiente para evitar un afloje futuro.

TABLA DE PARES DE APRIETE

Rosca	M4	M5	M6	M8
Par de apriete (Nm)	1,5	2	3	6

La conexión de alimentación se realizará como en la imagen. Las tuercas deberán apretarse según la TABLA DE PARES DE APRIETE para evitar que se aflojen.



*Cable de motor - agregado por el instalador

IMPORTANTE: Motores con caja de bornes Ex eb, SÍTUE LA JUNTA (SEAL) EN LA POSICIÓN CORRECTA ANTES

DE CERRAR LA CAJA DE BORNES Y DESTORNILLAR TOTALMENTE TODOS LOS TORNILLOS. CONEXIÓN A TIERRA

Además del tornillo de la terminal de tierra instalado en el interior de la caja de bornes, debe haber otro terminal externo en la carcasa del motor. Si los conductores de la línea tienen una sección S las conexiones a tierra tiene que ser::

Conductor de tierra	Conductores de línea
= S	$S \leq 16 \text{ mm}^2$
16	$16 \text{ mm}^2 < S \leq 35 \text{ mm}^2$
$\geq 0,5 \text{ S}$	$S > 35 \text{ mm}^2$

Conexión de cables auxiliares (Caja de terminales “e”)

Si el motor está provisto de caja de bornes auxiliares, la conexión de protecciones térmicas y / o resistencias de caldeo se puede hacer en las mismas borneras. Si el motor está provisto de una caja de bornes que tiene sólo las 6 principales borneras, la conexión de la protección térmica y calentadores, tiene que ser realizada mediante soldadura de los alambres de los dispositivos auxiliares con los hilos del cable, y aislar usando una funda termorretráctil.

Protección

El motor debe estar protegido por un dispositivo de disparo que, en caso de avería, corte la alimentación del motor de manera que la temperatura de la superficie de las partes en contacto con la atmósfera explosiva no alcance la temperatura de ignición.

Acondicionamiento para convertidor

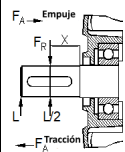
En caso de que los motores vayan a trabajar con convertidor de frecuencia (VFD) , deberán estar provistos de protectores en los bobinados (normalmente termistores PTC), capaces de asegurar su funcionamiento dentro de los límites de las clases de temperatura. Dichos dispositivos deberán estar conectados a un dispositivo de control capaz de cortar el suministro de energía al motor en caso de llegar de la temperatura límite. Las características de funcionamiento admisibles en este modo se indican en la placa de características o en una etiqueta adicional. Los filtros de salida deben instalarse según la longitud del cable en el lado del motor del VFD. La selección del filtro y la longitud máxima del cable dependen de las instrucciones y los datos proporcionados por el fabricante del VFD. Para evitar corrientes de circulación parásitas, se recomienda utilizar medidas adecuadas en la fuente de alimentación que permitan reducir significativamente la causa de activación. Para ello, póngase en contacto con su proveedor local de VFD.

Resistencias de caldeo

Las resistencias de caldeo funcionan únicamente cuando el motor está en marcha o conectado a la red.

Carga permitida

Suponiendo una vida útil de 20.000h para motores 2P y 40.000h para motores 4,6,8 P:

	Tamaño del Motor	Rodamientos	*Max radial carga in L/2	*Max axial carga (Empuje)	*Max axial Carga (tracción)
	63	6202	365	230	120
	71	6202	450	280	160
	80	6204	590	370	220
	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

*unidad de medida in [N]

Servicios permitidos

S1: trabajo continuo, el motor funciona a una carga constante hasta que se alcanza el equilibrio térmico.
S2: Servicio intermitente: una vez encendido, el motor trabaja a una carga constante durante un período limitado y no se alcanza el equilibrio térmico. El motor se iniciará una segunda vez, luego cuando su temperatura haya disminuido a temperatura ambiente.
S3: servicio intermitente: secuencia de ciclos de trabajo idénticos, compuesta por un tiempo de funcionamiento a carga constante y un tiempo de reposo. Cuando está en reposo, el motor no se alimenta. La corriente de arranque no influye significativamente en el aumento de la temperatura.
S9: la carga y la velocidad varían periódicamente dentro del rango de funcionamiento permitido. Sobrecarga frecuente puede ocurrir. Típico de los motores suministrados por el inversor (ver arriba).

Motores con ventilación forzada (IC416)

En el caso de motores con ventilación forzada, el motor principal solo se puede suministrar cuando la ventilación auxiliar ya está funcionando.

5. MARCADO

CE (*)		Marcado de conformidad con las directivas Europeas
Ex (*)		Marcado específico de protección contra explosiones
II (*)		Motor para plantas en superficie (no para minas)
2 (*)		Categoría 2: Alto nivel de protección
GAS	G (+)	Atmosfera explosiva, por la presencia de vapor de gas combustible o vaho
	Ex db	Motor y caja de bornes antideflagrante
	Ex dbeb	Motor y caja de bornes antideflagrante de seguridad aumentada.
	IIIC	Grupo gas, incluye las zonas IIB and IIA
	T3, T4, T5	Clase de temperatura
DUST	D (*)	Atmosfera explosiva, debido a la presencia de polvo combustible
	Ex tb IIIC	Aptos para zona 21 (cat. 2D)
	T125°C	Max temperatura superficial
T.amb		Temperatura ambiente
AB xx ATEX yyy		AB : laboratorio que emite certificado de tipo CE xx : año de expedición del certificado yyy : numero de tipo de certificado CE
zzzz (*)		Organismo certificador, que notifica la garantía de calidad producto.
		(*) Solo para marcado ATEX

6. MANTENIMIENTO Y REPARACIÓN

EL MANTENIMIENTO debe ser realizado únicamente por personal cualificado de acuerdo con la norma EN 60079-17 o bien las normas nacionales donde esté instalado el motor. El personal cualificado deben tener conocimiento sobre aparatos eléctricos en atmósferas explosivas e instalaciones eléctricas en áreas peligrosas.
- Cada 3000 horas de servicio verificar y restablecer, si es necesario, la grasa en las juntas radiales (por ejemplo, los anillos en V). Periódicamente (en función del entorno y el deber) verificar:
- Limpieza del motor (aceite, polvo, suciedad y residuos) y el libre paso de aire de refrigeración
- El correcto ajuste de los tornillos de fijación de las conexiones eléctricas.
- Niveles de vibración admitidos (v ef <3,5 mm / s para Pn <15KW v ef <4,5 mm / s para Pn> 15KW) y ausencia de ruidos anómalos; en caso un alto nivel de vibraciones y / o ruido

verificar la fijaciones de motor y que el equilibrio de la máquina y los rodamientos estén en buenas condiciones.

EX LAS REPARACIONES se harán de acuerdo con las normas definidas en el estándar EN 60079-19..

Estas reparaciones sólo pueden realizarse bajo el control y autorización de Orange1 EM o bien en un taller de reparaciones certificado. Cuando la reparación se realice en un taller de reparaciones certificado, deben respetarse todas las características originales del motor y utilizar sólo recambios originales. Además se debe colocar una placa de identificación adicional en el motor con el símbolo escrito para identificar la reparación. Debe mostrarse en dicha placa el nombre de la empresa, certificación, número de operación de reparación y fecha. No puede modificarse nada en relación con el tipo de protección. En caso de que no se respeten estas normas, el motor pierde toda su característica de certificación.

LAS JUNTAS NO SE PUEDEN REPARAR

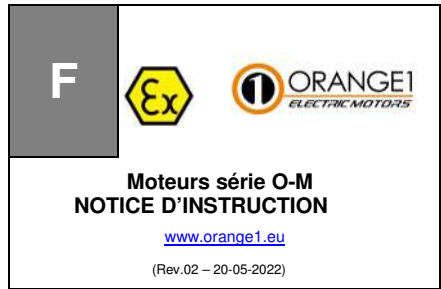
7. COMPONENTES MODULARES

Los motores son completamente modulares. Las patas y las bridas pueden montarse sin afectar el certificado ATEX, ya que son externos y no son parte del tipo de protección. En la tabla de a continuación te mostramos los tornillos que deben utilizarse para montar los diferentes componentes modulares.

Tamaño del Motor	Bridas	Pies/Patas	Cubierta caja de terminales
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	M5x14
100	M8x20	M8x30 TUERCA M8	M5x14
112	M8x20	M8x35 TUERCA M8	M5x14
132	M10x20	M10X50 TUERCA M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
Calidad de tornillo 8.8			

8. FECHA DE PRODUCCIÓN

La fecha de producción se muestra en la placa del motor indicando Mes y Año de fabricación: MM-AA



1. GENERALITES

⚠ Ces instructions de sécurité se réfèrent à l'installation, l'utilisation, le transport et à la maintenance des moteurs série O-M pour une utilisation dans les atmosphères potentiellement explosives en présence de gaz et / ou de poussières. Les informations de ces instructions sont uniquement destinées à du personnel qualifié. Les instructions sont généralement délivrées à un personnel qualifié, en responsabilité d'utiliser des machines dans les atmosphères potentiellement explosives. A l'exception de l'ouverture du couvercle de la boîte à bornes, toute ouverture d'un autre élément, annule les conditions de garantie concernant ces moteurs. Ci-dessous sont listés les différents marquages des moteurs ainsi que les zones dans lesquelles ils peuvent être utilisés.

GAZ	II 2G Ex db IIC T3 Gb T.amb -40°C , +60°C II 2G Ex db IIC T4 Gb T.amb -40°C , +60°C II 2G Ex db IIC T5 Gb T.amb -40°C , +40°C II 2G Ex db eb IIC T3 Gb T.amb -40°C , +60°C II 2G Ex db eb IIC T4 Gb T.amb -40°C , +60°C II 2G Ex db eb IIC T5 Gb T.amb -40°C , +40°C	Zones 1, 2
	II 2D Ex tb IIIC T125°C T.amb -40°C , +60°C (épaisseur maximale de la couche de poussière 5mm)	Zones 21, 22

Ces moteurs sont conformes aux Exigences Essentielles de sécurité et de santé pour les atmosphères potentiellement explosives selon les normes européennes :

IEC/EN 60079-0, EC/EN 60079-1, IEC/EN 60079-7, IEC/EN60079-31

⚠ Les machines tournantes représentent un danger lorsqu'elles sont en rotation et peuvent provoquer également des brûlures en raison de la température très élevée de la surface extérieure. Toute intervention sur ces moteurs tels que branchement, connexion, maintenance, mise en service, ne peuvent être effectués que par des personnes qualifiées (IEC 364 doit être appliquée). Un travail mal réalisé peut provoquer des dommages aux personnes et aux biens environnants.

⚠ Il est impératif avant de branchement de lire avec précaution la plaque signalétique fixée sur le moteur. Les moteurs basse tension sont des composants devant être incorporés à des machines selon la directive 2006/42/EC. La mise en service n'est pas autorisée jusqu'à ce que la conformité de la machine avec cette directive ne soit établie.

Ces moteurs asynchrones sont en conformités avec la directive EMC 2014/30/UE et aucune protection particulière n'est requise lorsqu'ils sont connectés a un signal sinusoïdale pur.

⚠ Avant toute intervention sur le moteur, soyez certain qu'il soit arrêté et débranché du secteur d'alimentation (ainsi que les équipements auxiliaires éventuels). En cas de démarreurs, de re-démarreurs automatiques, relais ou télécommande, faire attention aux recommandations spécifiques de ces équipements.

2. TRANSPORT ET STOCKAGE

⚠ Lors de la réception de ces moteurs, vérifier si aucune avarie n'est survenue lors du transport . Si tel est le fait, ne pas mettre en service et contacter immédiatement votre transporteur.

Les anneaux de levage, lorsqu'ils sont fournis avec le moteur, doivent être correctement fixés, ou en vérifier la fixation, car ils ne sont prévus et calculés que pour lever le moteur seul, et aucune charge additionnelle n'est autorisée. Si nécessaire utiliser des éléments plus appropriés au transport ou déplacements. Ne jamais utiliser d'autres éléments du moteur pour le lever ou le transporter. Si deux anneaux de levage sont montés ou fournis avec le moteur, utiliser les deux anneaux en même temps pour le lever. Stocker les moteurs dans un local sec, propre, sans poussières, abrité des intempéries dans une température ambiante comprise entre 5°C et 40°C, avec un taux d'humidité relative < à 50%. Afin de ne pas endommager les roulements, durant leur stockage, les moteurs ne devront pas être exposés à des vibrations (v eff < 0,2mm/s). Avant la mise en service, la résistance d'isolement devra être mesurée. Dans le cas ou la valeur de la résistance serait < 1,5 M.Ω , les bobinages devront être séchés. Contactez immédiatement notre service technique afin de connaître la procédure à suivre.

3. INSTALLATION

⚠ ⚠ L'installation doit être effectuée conformément aux normes EN 60079-14 ou aux normes nationales en vigueur (dernière édition). Avant l'installation dans une atmosphère explosive, l'installateur devra vérifier que le moteur est adapté à la classification de la zone et aux caractéristiques des différentes substances inflammables, gaz ou poussières, présentent dans la zone ou le moteur sera installé. Il est impératif de vérifier le marquage sur la plaque signalétique avant l'installation.

Le moteur doit être installé uniquement par du personnel qualifié qui a la connaissance des risques dus aux courants électriques et aux caractéristiques chimiques et physiques des gaz et poussières combustibles dans les environnements dangereux. Il devra également savoir quoi faire en cas d'arrêt du moteur, de la machine, afin d'éviter un redémarrage intempestif.

Les indications portées sur la plaque signalétique correspondent aux voltages et fréquences de l'alimentation et autres données électriques et mécaniques, ainsi que les indications de sécurité concernant le moteur (type de protection, classe de température, température ambiante etc...).

ATTENTION : NE PAS OUVRIR EN PRESENCE D'ATMOSPHERE EXPLOSIVE

Les accouplements ou autres éléments montés sur les arbres moteurs devront être équilibrés. Tous montages sur l'arbre moteur, accouplements, poulies, moyeux etc... devront être effectués avec des outillages appropriés pour ne pas endommager les roulements du moteur.

Après montage de ces éléments, vérifier qu'ils soient bien fixés sur le bout d'arbre et notamment qu'ils soient en appui contre l'épaulement. Dans le cas contraire compenser l'espace par des rondelles ou par une entretoise.

Les poulies trop grandes ou trop petites peuvent nuire à la durée de vie des roulements à billes. De même une tension trop importante des courroies provoquent les mêmes problèmes et également provoquer une déformation ou une rupture de l'arbre.

Les moteurs doivent être installés dans de bonnes conditions mécaniques et aérauliques nécessaire à un bon échange thermique. La ventilation doit être libre de toute gêne pour faciliter l'entrée et la sortie d'air de toute part , et ne doit pas être perturbée par des éléments voisins contradictoires. Afin de ne pas perturber la ventilation, une distance de 40mm minimum doit être respectée entre l'arrière du capot de ventilation et un élément susceptible de nuire a l'aspiration de l'air, nécessaire au refroidissement du moteur. Eviter également des éléments chauds à proximité du moteur qui pourraient affecter les températures du refroidissement ainsi que celle du moteur lui même.

En cas d'installation à l'extérieur, il est impératif de protéger le moteur des rayons solaires ainsi que des intempéries pluie et neige (la neige neutralisant la ventilation). Il est obligatoire d'utiliser en cas de montage vertical arbre en bas, un toit ou un parapluie pour protéger l'entrée d'air du ventilateur contre des éléments étrangers extérieurs .

Il est préférable de protéger le moteur par un disjoncteur ou un limiteur de couple lorsqu'il n'est pas protégé par une sonde thermométrique dans les bobinage connectée à un relais approprié.

Dans le cas d'un environnement très humide et / ou de moisissure, Orange1 EM peut équiper les moteurs de réchauffeurs.

Ces réchauffeurs ne doivent pas être connectés lorsque le moteur fonctionne.

Au lieu d'utiliser des réchauffeurs anti-condensation, il est possible d'alimenter le moteur sur les broches U1-V1 avec une tension de 4 à 10% de la tension de phase nominale du moteur; 20-30% du courant nominal est suffisant pour chauffer le moteur.

⚠ Vérifier le sens de rotation avant de coupler le moteur. Pou cela, avant de brancher le moteur, retirer ou maintenir par un adhésif la clavette afin d'éviter son éjection lors de la rotation.

Si le sens de rotation n'est pas celui requit, débrancher le moteur du secteur et modifier le sens selon:

- Moteur triphasé, intervertir 2 phases sur la plaquette à bornes
- Moteur monophasé, suivre le schéma de branchement fourni avec le moteur.

Les schémas de branchement sont fournis avec le moteur ou imprimés dans la boîte à borne. En cas d'oubli ou de perte, se référer à ce manuel ou nous contacter

Entrées de câbles

⚠ En fonction du type de protection du moteur, les entrées de câbles, presse étoupe ou autres raccordements, devront être impérativement conformes aux normes en vigueur selon le tableau ci-dessous et devront aussi correspondre à la gamme de température du moteur.

Type de protection de la boîte à bornes	Type de protection du. presse-étoupe	Tempeatura operativa
Ex eb tb	Ex eb tb	-40°C , +100°C
Ex db tb	Ex db tb	-40°C , +100°C

Filetage de presse-étoupe	Taille du moteur	Diamètre du câble (mm)
M16x1.5	56-63-71-80-90-100-112	6-12
M20X1.5	56-63-71-80-90-100-112	6-12 / 9-16
M25X1.5	132	12,5-20,5
M32X1.5	160-180	17-26

Les presse-étoupes et les fiches, s'ils ne sont pas fournis avec le moteur, doivent être comme ci-dessus. Le presse-étoupe monté sur la boîte à bornes doit être couvert par un certificat ATEX et IECEx valide selon le type de protection du compartiment de raccordement (Ex db et ou Ex eb et ou Ex tb), Il doit avoir un degré de protection minimum IP66 selon selon EN/CEI 60529 et EN/CEI 60079-0 ; la température de fonctionnement du presse-étoupe doit être comprise dans la plage de température définie par la température ambiante minimale indiquée sur l'étiquette Ex du moteur et la température ambiante maximale + 25 °C.

Les presse étoupe ou tout autre raccordements, devront être vissés à fond sur les entrées de câbles de la boîte à bornes du moteur : 5Nm couple de serrage

- Le câblage de terrain doit être effectué en utilisant des câbles ayant une température globale de fonctionnement de la gaine au moins égale à la température ambiante maximale du moteur +25°C et une température d'isolation du conducteur au moins égale à la température ambiante maximale du moteur +35°C .

Les presse-étoupes du boîtier du condensateur et les presse-étoupes des câbles du moteur à l'intérieur des boîtiers Ex sont installés en usine. Il est interdit de dévisser ou de modifier l'installation d'usine.

Les moteurs sont conçus avec des pattes rapportées pouvant être montées dans différentes positions sur la carcasse du moteur afin de positionner la boîte à bornes sur le dessus ou à droite ou à gauche.

De même les entrées de câbles de la boîte à bornes peuvent être orientés dans 4 positions différentes. Pour cela , avant câblage, et après avoir enlevé le couvercle de la boîte à bornes, desserrer les 4 vis à l'intérieur de la boîte à bornes et tourner la boîte dans la position requise. Resserrer les 4 vis à fond en appliquant le couple de serrage selon le tableau « couple de serrage » ci-après, et refermer le couvercle de la boîte à bornes après connexion : 5Nm couple de serrage.

4. RACCORDEMENT AUX CIRCUITS ELECTRIQUES

⚠ ⚠ Seulement les personnes qualifiées peuvent effectuer cette opération. Vérifier la mesure de résistance d'isolement.

Ce raccordement, doit être réalisé soit par l'intermédiaire du ou des presse étoupe fournis avec le moteur , soit par un presse étoupe ou autre dispositif possédant obligatoirement une certification en accord avec la directive ATEX 2014/34/EU.

Dans le cas où le moteur serait fourni avec une sortie de fils ou câbles, les fils volants devront être connectés directement dans une zone non dangereuse, si la longueur du câble d'origine le permet, ou à l'intérieur d'une boîte EX correspondant à la protection requise de la zone ou elle sera installée.

⚠ Toujours se rapporter à la plaque signalétique du moteur pour vérifier les tensions et fréquences, afin qu'elles correspondent avec l'alimentation à réaliser. Si rien n'est spécifié, la tolérance de voltage admise est +/- 5% et de 1% pour la fréquence par rapport aux indications écrites sur la plaque (le X sur le numéro du certificat). Pour les moteurs des classes de température T3 et T4 il est possible d'avoir ±10% sur la tension. Il est important afin d'éviter les risques de surcharge ampère-métriques non autorisée dans le cas d'un démarrage Y / D, de vérifier et d'être certain que la connexion se réalise après que la période de démarrage soit terminée.

Le calibrage des câbles d'alimentation doit correspondre dimensionnellement aux intensités indiquées sur la plaque signalétique.

Les moteurs doivent être protégés par un disjoncteur pouvant en cas de surcharge couper l'alimentation afin que la température de surface du moteur ne dépasse pas la température maximale d'inflammabilité des gaz ou poussières dans l'atmosphère environnante.

⚠ Les moteurs construits avec des boîte à bornes « eb » (Exdb eb) sont équipés de plaquettes à bornes à isolation renforcée et possèdent des distances augmentées entre les contacts.

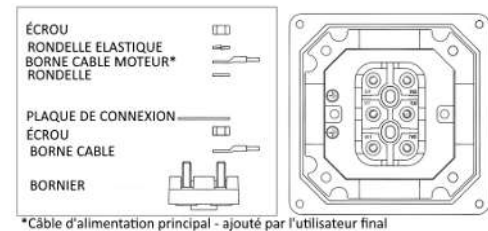
⚠ Les moteurs Exd sont équipés d' une plaquette à bornes standard.

TABLEAU DES COUPLES DE SERRAGE

Visserie	M4	M5	M6	M8
Couple de serrage (Nm)	1,5	2	3	6

La visserie de connexion de la plaquette à bornes doit être montée selon le schéma ci-dessous:

Les écrous doivent être serrés conformément au TABLEAU DES COUPLES DE SERRAGE pour éviter tout desserrage.



IMPORTANT : Pour les moteurs équipés de boîte à bornes Ex eb, et pour le respect d'une bonne étanchéité, bien replacer le joint avant de refermer le couvercle de boîte à bornes et bien resserrer toutes les vis.

Mise à la terre:

⚠ En plus du dispositif de mise à la terre à l'intérieur de la boîte à bornes, le moteur est équipé d'une borne de terre extérieure. Ces bornes doivent être connectées selon:

Câble de terre	Câble d'alimentation
= S	S ≤ 16 mm ²
16	16 mm ² < S ≤ 35 mm ²
≥ 0,5 S	S > 35 mm ²

Connexions des auxiliaires dans une boîte à bornes « eb », pour moteurs Exdb eb.

⚠ Si le moteur est équipé d'une plaquette à bornes incluant des bornes pour brancher des sondes thermiques ou réchauffeurs, les utiliser à ces fins. Dans le cas contraire, ces auxiliaires devront être soudés aux câbles, et isolés en utilisant un fourreau ou gaine rétractable en le chauffant.

Protection

⚠ Le moteur doit être protégé par un disjoncteur thermique ou ampère-métrique permettant en cas de surcharge ou blocage de couper l'alimentation afin d'éviter une surchauffe pouvant dépasser la température d'inflammabilité permise dans la zone où il est installé.

Moteurs alimentés par l'intermédiaire d'un variateur de fréquence.

⚠ Il est obligatoire dans ce cas que les bobinages des moteurs soient équipés de sondes thermiques (les sondes PTC étant les plus utilisées).Celles-ci ont pour fonction de contrôler la classe de température à respecter de la zone. Ces sondes doivent être connectées à un relais qui coupera l'alimentation du moteur dans le cas de températures excessives.

Les caractéristiques de fonctionnement autorisées dans ce mode sont indiquées sur la plaque signalétique ou sur une étiquette supplémentaire. Les filtres de sortie doivent être installés en fonction de la longueur du câble côté moteur du variateur de fréquence (VFD). La sélection du filtre et la longueur maximale du câble dépendent des instructions et des données fournies par le fabricant du VFD. Pour éviter les courants de circulation vagabonds, il est recommandé d'utiliser des mesures appropriées sur l'alimentation électrique qui permettent de réduire considérablement la cause de déclenchement. Pour cela, contactez votre fournisseur VFD local.

Résistance de chauffage

⚠ Les résistances ne doivent en aucun cas être alimentées lorsque le moteur est sous tension. Les câbles de raccordement doivent être adaptés à une puissance de 25W avec une tension d'alimentation d'une intervalle de 110V-240V (± 10%).

Charges axiales et radiales maximum admises

Dans l'esprit d'assurer une durée de vie de 20 000 heures pour les moteurs 2 pôles et de 40 000 heures pour les moteurs 4,6,8 pôles, il est recommandé de ne pas dépasser les valeurs suivantes:

	Ht D'axe	Roulements	*Charges radiales maxi à L/2	*Charges axiales maxi (poussée)	*Charges radiales maxi (tirée)
	63	6202	365	230	120
	71	6202	450	280	160
	80	6204	590	370	220
	90	6205	645	400	230
	100	6206	920	560	350
	112	6306	1280	700	480
	132	6308	1345	770	590
	160	6309	2465	1401	714
	180	6310	3000	1498	615

Services autorisés

S1 : Service continu le moteur fonctionne à charge constante jusqu'à ce que l'équilibre thermique soit atteint.
S2 : Service intermittent : Une fois démarré, le moteur fonctionne à charge constante pendant une durée limitée et l'équilibre thermique n'est pas atteint. Le moteur sera redémarré une deuxième fois lorsque sa température sera descendue à la température ambiante.

S3 : Service intermittent : Suite de cycles de service identiques, constitués d'un temps de fonctionnement à charge constante et d'un temps de repos. Au repos, le moteur n'est pas alimenté. Le courant de démarrage n'influence pas significativement l'échauffement.

S9 : La charge et la vitesse varient périodiquement dans la plage de fonctionnement autorisée. Une surcharge fréquente peut se produire. Typique des moteurs alimentés par variateur de fréquence.

Moteurs servo-ventilés (IC416)

Dans le cas de moteurs à ventilation forcée (IC416), le moteur principal ne doit être alimenté que lorsque la ventilation auxiliaire fonctionne.

5. MARQUAGE

CE (*)	Marquage de conformité des Normes Européennes
Ex (*)	Marquage spécifique des matériels de protection contre l'explosion
II (*)	Zone de surface (différents des mines zone I)
2 (*)	Category 2: high level of protection
G (*)	Atmosphère explosive due à la présence de gaz et /ou vapeur
Ex db	Moteur antidéflagrant ainsi que la boîte à bornes
Ex dbeb	Moteur antidéflagrant avec la boîte à bornes à sécurité augmentée «e»
IIC	Groupe de gaz , valable également pour IIB et IIA
T3, T4, T5	Classes de températures
D (*)	Atmosphère explosive due à la présence de poussières explosives
Ex tb IIC	tD Enceinte, méthode A pour zone 21(catégorie2D)
T125°C	température de surface maximale
T.amb	la température ambiante
AB xx ATEX yyy	AB: Nom du laboratoire ayant délivré le certificat CE de type xx: Année du certificat yyy: Numéro du certificat
ZZZZ (*)	Numéro de référence déterminant la notification de l'Assurance Qualité du produit.
(*) Uniquement pour le marquage ATEX	

6. MAINTENANCE ET REPARATION

⚠ ⚠ ⚠ La maintenance doit être effectuée uniquement par du personnel qualifié en accord avec les normes EN60079-17 ou avec les normes nationales, dernière édition en vigueur.Le personnel qualifié doit avoir la parfaite connaissance de l' installation des appareils électriques dans les atmosphères explosives. Périodiquement, en relation avec l'environnement et le service , vérifiez:

-Toutes les 3000 heures, compléter si nécessaire la graisse sur les joints d'arbres.

-La présence de poussières ou huiles sur la surface du moteur et la nettoyer régulièrement pour éviter les dépôts.

-S'assurer que le passage d'air du ventilateur et capot ne soit pas gênés ou obstrués.

-Que les vis principales, les connections et presse étoupe ne soient pas desserrés.

-Que le moteur tourne librement, sans vibrations anormales (v eff < 3,5mm/s pour Pn < 15kw) et sans bruits excessifs. Dans le cas de vibrations et / ou bruits, vérifier les fixations du moteur, équilibrage (des équipements montés) et que les roulements soient en bon état.

⚠ Les réparations doivent être effectuées en relation avec les règles et Normes définies selon EN60079-19. Les réparations ne peuvent être réalisées que sous le contrôle et l'autorisation de Orange1 EM, ou par un établissement agréé et certifié. Lorsqu'un établissement certifié effectue la réparation, celle-ci doit être réalisée en respectant strictement les caractéristiques du moteur et en utilisant uniquement des pièces d'origine . Après cette intervention, une plaque signalétique supplémentaire doit être fixée sur le moteur avec le symbole d'identification de l'établissement étant intervenu , son numéro de certification, le numéro et la date d'intervention.

Aucun élément d'origine concernant la protection du moteur ne peut être modifié.

Dans le cas d'une modification par rapport à l'origine ou du non respect évoqué ci-dessus, le moteur perdra sa certification d'origine.

LES JOINTS NE PEUVENT PAS ÊTRE RÉPARÉS 7. COMPOSANTS MODULAIRES

Ces moteurs sont construits dans un esprit de modularité. Pattes et brides peuvent être montées ou démontées sans pour autant affecter la certification ATEX du moteur lui-même. Ces opérations étant hors de l'enceinte antidéflagrante.

Dans le tableau ci-dessous, sont répertoriées les vis nécessaires aux montages de ces différents éléments.

Ht D'axe	Brides	Pattes	Couvercle BâB
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	M5x14
100	M8x20	M8x30 / ECROU M8	M5x14
112	M8x20	M8x35 / ECROU M8	M5x14
132	M10x20	M10X50 MUT M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
Vis qualité 8.8			

8. DATE DE FABRICATION

La date de fabrication est indiquée sur la plaque signalétique du moteur indiquant le mois et l'année de fabrication : MM-AA

Dichiarazione UE di Conformità / UE Declaration of Conformity / Déclaration UE de Conformité UE Konformitätserklärung / Declaration UE de Conformidad

I motori elettrici asincroni / Electric asynchronous motors / Les moteurs électriques asynchrone
Elektrische asynchron motoren typ / Los motores electricos asincronos del tipo

Serie O-M

Che riportano una delle marcature

Bearing one of the marks / Marques / Kennzeichnung / **Que llevan una de los marcados**

EU Type Examination certificate (according to Annex III of the ATEX Directive 2014/34/EU)				EPT 17 ATEX 2588 X
CE	0477	Ex	II 2G Ex db IIC T5... T3 Gb	
CE	0477	Ex	II 2GD Ex db IIC T5... T3 Gb Ex tb IIIC T125°C Db	
CE	0477	Ex	II 2G Ex db eb IIC T5... T3 Gb	
CE	0477	Ex	II 2GD Ex db eb IIC T5... T3 Gb Ex tb IIIC T125°C Db	

Sono dichiarati conformi sotto l'esclusiva responsabilità del costruttore/ They are declared compliant under the sole responsibility of the manufacturer / Ils sont déclarés conformes sous la seule responsabilité du fabricant / Sie werden unter der alleinigen Verantwortung des Herstellers als konform erklärt./Se declaran conformes bajo la exclusiva responsabilidad del fabricante.

ORANGE 1 ELECTRIC MOTORS S.P.A.

in accordo alle seguenti Direttive CE/in compliance with the EC Directives/selon les Directives CE suivantes
in Übereinstimmung mit den folgenden EG-Richtlinien/de acuerdo con las siguientes Directivas EC

2014/34/UE
2014/30/UE
2006/42/EC
2015/863 / EU
(EU) 2019/1781

(ATEX)
(EMC)
(Machinery)
(RoHS III)
(Ecodesign Requirements)

e in conformità alle seguenti Norme/ and comply with the following Standards / et enconfrmité avec les Normes
und entsprechen den folgenden Standard / y conform a las sigulentes Normas

EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-31:2014, EN 60079-7:2015+A1:2018
EN 60034-1,2,5,6,7,9,12,14, IEC60072-1,

NOTA/ NOTE/ BEMERKUNG/ NOTAS

(Directive 2006/42/EC Direttiva Macchine, Machinery Directive, Directive Machine, Maschinen-Richtlinie, Directiva Maquinaria)

I motori in oggetto sono considerati componenti, in accordo con la direttiva macchine. Il motore non deve essere messo in servizio
finché la macchina stessa su cui è montato non venga dichiarata conforme alla direttiva macchine.

Above motors considered as components, comply with the directive machine. The motor must not be incorporated in service until the machine
itself has not been declared in conformity with the machinery directive.

Les moteurs ci-dessus considérés comme composants sont conformes à la directive machine. Le moteur ne peut être incorporé
et mis en service avant que la machine dans laquelle il est incorporé ne soit déclarée conforme à la directive machine.

Für die korrekte installation der oben genannten Motore sowie der entsprechenden komponenten, die in ihrer Bauart mit den zu dieser
Bescheinigung aufgeführten Vorschriften übereinstimmen, ist der Mashinenherstelle/Maschinenbetreiber verantwortlich. Die Motoren
entsprechen den Vorschriften nur, solange die Anlage, in der sie eingebaut wurden, in übereinstimmung mit den geltenden Maschinen-
richtlinien und Vorschriften errichtet wurde.

Los motores en objecto, por tratarse de componentes, cumplen las normas de la directiva si la instalacion està correctamente controlada por el
constructor de la máquina. El motor no debe entrar en servicio hasta que la máquina en que ha sido incorporado disponga de la declaration de
la directive maquinaria

Product Quality Assurance Notification Number (according to Annex IV of the ATEX Directive 2014/34/EU): EPT 21 ATEX 4234 Q
Notified by Eurofins Product Testing Italy S.r.l. – Notified Body n.0477 - Via Courgné 21 - 10156 Torino Italy

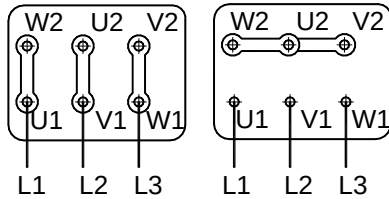


28/06/2021

Armando Donazzan
Legale Rappresentante

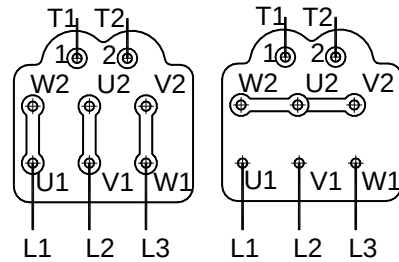
Schemi di collegamento / Wiring diagrams

Trifase 1 Velocità 2-4-6-8 poli (6 fili) – Three-phase 1 speed 2-4-6-8 poles (6 wires)



(D) Collegamento delta
Tensione inferiore
Delta connection
lower voltage

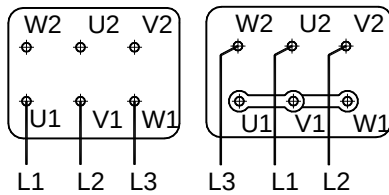
(Y) Collegamento stella
Tensione superiore
Star connection
higher voltage



(D) Collegamento delta
Tensione inferiore
Delta connection
lower voltage

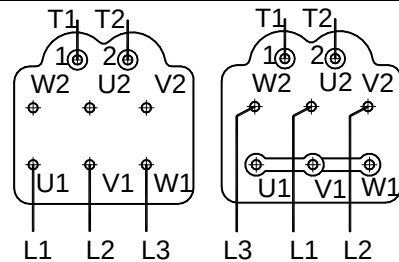
(Y) Collegamento stella
Tensione superiore
Star connection
higher voltage

Trifase doppia velocità 1 avvolgimento – Three-phase double speed 1 winding



Bassa velocità – Low speed

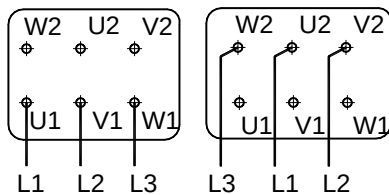
Alta velocità – high speed



Bassa velocità – Low speed

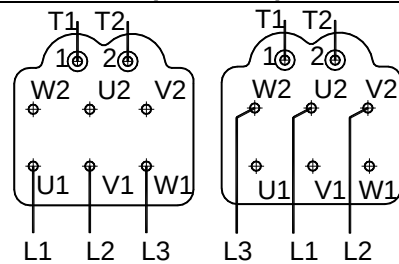
Alta velocità – high speed

Trifase doppia velocità 2 avvolgimenti separati – Three-phase double speed 2 separate windings



Bassa velocità – Low speed

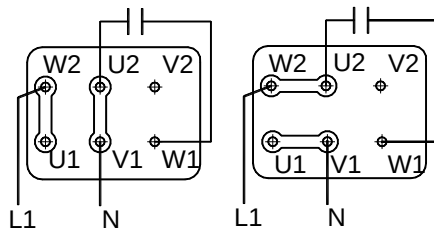
Alta velocità – high speed



Bassa velocità – Low speed

Alta velocità – high speed

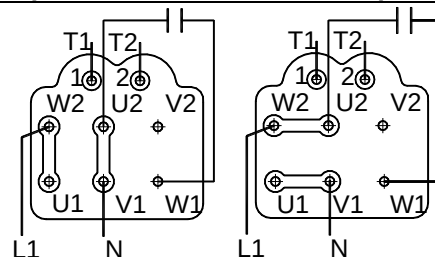
Monofase 4 fili – Single-phase 4 wires



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation

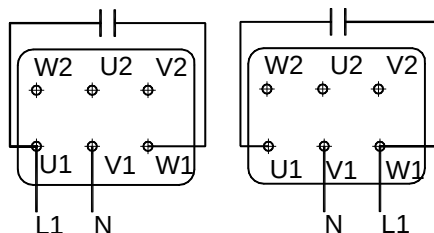
Monofase 4 fili con protezione termica Single-phase 4 wires with thermal protection



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation

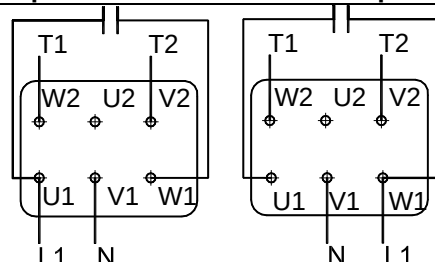
Monofase 3 fili – Single-phase 3 wires



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation

Monofase 3 fili con protezione termica Single-phase 3 wires with thermal protection



Rotazione oraria
Clockwise rotation

Rotazione antioraria
Counter clockwise rotation



[1]

EU-TYPE EXAMINATION CERTIFICATE

[2] **Equipment intended for use in potentially explosive atmospheres Directive 2014/34/EU – Annex III**

[3] Certificate Number: **EPT 17 ATEX 2588 X** **issue 5**

[4] Equipment: **Electric motor
O-M**

[5] Manufacturer: **ORANGE1 ELECTRIC MOTORS S.p.A**

[6] Address: **Via Mantova, 93 – 43122 Parma - Italy**

[7] This equipment and its accepted variations are specified in the annex to this Certificate.

[8] Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/34/EU of the European Parliament and of the Council of 26th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II of the Directive. The examination and test results are recorded in the confidential Report N°EPT.24.REL.01/2313114

[9] Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the following harmonized standards:

EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-7:2015+A1:2018, EN 60079-31:2014

[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.

Further requirements of the Directive 2014/34/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.

[12] The equipment shall include the sign  and the following strings:

II 2G
Ex db IIC T5 ... T3 Gb or
II 2G
Ex db eb IIC T5 ... T3 Gb or
-40°C ≤ Tamb ≤ +60°C
II 2GD
Ex db IIC T5 ... T3 Gb
Ex tb IIIC T125°C Db
II 2GD
Ex db eb IIC T5 ... T3 Gb
Ex tb IIIC T125°C Db

Relationships between ambient temperature range and temperature limits are reported in the equipment description

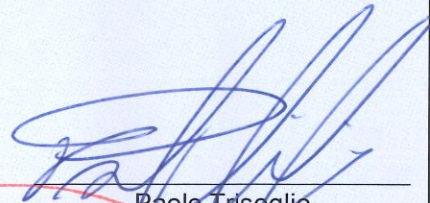
Applicable when flameproof terminal compartment is used

Applicable when increased safety terminal compartment is used

Place and date of issue:

(DD-MM-YYYY)

Torino, 19-03-2024

Dionisio Bucchieri
Directive Responsible

Paolo Trisoglio
Managing Director


PRD N° 119B
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CP-ATEX-MOD-26-00



This Certificate has 8 pages and it is reproducible only in its entirety. Conditions of validity are reported below.



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ANNEX
EU-TYPE EXAMINATION CERTIFICATE
N. EPT 17 ATEX 2588 X issue 5

[15] Equipment description

The motors are made of aluminium and have separate parts: motor enclosure, terminal box for supply and capacitor enclosure (optional). The motors are suitable for group IIC and group IIIC. The motor enclosure has types of protection "Ex d" and "Ex t";

The terminal box can have types of protection "Ex d" and "Ex t" or "Ex e" and "Ex t"; in addition, the connection between the motor wires and supply cable can be made in a box without terminals by the use of splicing or head to head connectors

The capacitor enclosure has types of protection "Ex d" and "Ex t";

All the parts of the flameproof enclosures have flameproof joints independent from each other.

The motors can be equipped with auxiliary devices (heaters, thermal protectors).

The anti-condensation heater can be activated only when the motor is not powered.

In case of single phase motors the capacitors have to be placed in the appropriate enclosure or in safe area.

Electrical characteristics

The equipment can be supplied by mains or inverter:

Mains Supply

Maximum rated voltage: 850 V

Maximum rated power: 30 kW

Rated frequency: 50/60 Hz

Insulation class: F or H

Duty: S1, S2, S3, S9

Poles: 2, 4, 6, 8, 2/4, 4/8, 4/6, 6/8

Degree of protection: IP65 (For version with Ex db eb flat box execution)
IP66 (Other versions)

Inverter supply

Frequency range: 5-100 Hz

Possibility of supply through inverter exclusively with the use of thermal protectors applied on the windings.

Such protectors may be either PTO and PTC and they shall be connected to an appropriate and reliable control device.

Activation temperature related to the temperature class:

- 90°C for temperature class T5;
- 130°C for temperature class T4;
- 150°C for temperature class T3.

Ambient temperature: $-40 \div +40$ °C (or $+60$ °C for T3, T4 class of temperature)

Temperature classes and Maximum surface temperature:

T5, T4, T3, T125°C as a function of the ambient temperature and of the electrical characteristics (as indicated in the technical note).



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Ventilation

The motors can be ventilated and not ventilated (with half power in respect to the ventilated corresponding motors so to maintain a T3 temperature class with ambient temperature of 60°C or T4 temperature class with ambient temperature of 40°C).

Ventilation can be made by fan, who is fitted directly on the shaft, or by using an auxiliary motor. The auxiliary motor belongs to O-M series. It will be a two poles 63 motor (for shaft height from 80 to 132) or a two poles 71 motor (for shaft height from 160 to 180).

Impellers for Ex db motors, which have a peripheral speed below 50 m/s, are made of plastic material.

Impellers for Ex tb or Ex db tb or Ex db motors (which have a peripheral speed above 50 m/s) are made of plastic dissipative material or metallic material.

The degree of protection (IP) of ventilation openings are:

- IP 20 on the air inlet side
- IP 10 on the air outlet side

Summary of possible marking strings and allowed ambient temperature range

Ordinary terminal box

Ex db IIC T4 Gb	Ex tb IIIC T125°C	Tamb -40°C + 60°C
Ex db eb IIC T4 Gb	Ex tb IIIC T125°C	Tamb -40°C + 60°C
Ex db IIC T5 Gb	Ex tb IIIC T125°C	Tamb -40°C + 40°C
Ex db eb IIC T5 Gb	Ex tb IIIC T125°C	Tamb -40°C + 40°C

Cable connection by means of flat box

Three phases motors

Ex db eb IIC T3 Gb	Ex tb IIIC T125°C	Tamb -40°C + 60°C
Ex db eb IIC T4 Gb	Ex tb IIIC T125°C	Tamb -40°C + 50°C

Single phase motors from frame size 56 up to frame 100:

Ex db eb IIC T3 Gb	Ex tb IIIC T125°C	Tamb -40°C + 50°C
--------------------	-------------------	-------------------

Cable entries

The cable entries integrated in motor body, terminal box (motor side), capacitor box are part of this certification.

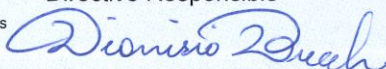
All the other cable entries devices used on the enclosures are already properly ATEX certified.

The accessories used for cable entries and for unused holes must be covered by a separate ATEX certification according to the applicable standards EN 60079-0, EN 60079-1, EN 60079-7 and EN 60079-31.



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ANNEX

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Identification

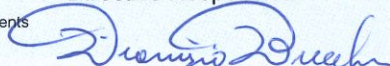
The three-phase and single-phase asynchronous motors, Series O-M (IE1 Range), are identified by a code as follows

Motor Type Identification				OD	063	A	4
Motor Type							
Single phase motors Efficiency IE1							
MD	1ph Ex db or Ex tb (ATEX Marking)	ME	1ph Ex db eb or Ex db eb tb (ATEX Marking)				
MX	P<0.12Kw 1ph Ex db or Ex db tb (ATEX + IECEX Marking)	MY	P<0.12Kw 1ph Ex db eb or Ex db eb tb (ATEX + IECEX Marking)				
	P>= 0.12Kw 1ph Ex db or Ex db tb (IECEX Marking only)		P>= 0.12Kw 1ph Ex db eb or Ex db eb tb (IECEX Marking only)				
Three phase motors Efficiency IE1							
OD	3ph Ex db or Ex tb (ATEX Marking)	OE	3ph Ex db eb or Ex db eb tb (ATEX Marking)				
OX	P<0.12 kW all speeds P>= 0.12 kW double speed 3ph Ex db or Ex db tb (ATEX + IECEX Marking)	OY	P<0.12 kW all speeds P>= 0.12 kW double speed 3ph Ex db eb or Ex db eb tb (ATEX + IECEX Marking)				
	P>= 0.12 kW single speed 3ph Ex db or Ex db tb (IECEX Marking only)		P>= 0.12 kW single speed 3ph Ex db eb or Ex db eb tb (IECEX Marking only)				
Shaft Height							
56, 63, 71, 80, 90, 100, 112, 132, 160, 180							
Main stator dimensions (depending on motor power)							
A,B		56, 63, 71, 80					
S,L		90, 132, 160, 180					
K,M		100, 132, 160, 180					
Poles number							
2, 4, 6	Single phase motors 1 speed						
2, 4, 6, 8	Three phase motors 1 speed						
3, 5, 7, 9	3ph double speed 2/4, 4/8, 4/6, 6/8 poles Constant Torque						
C, D, E, F	3ph double speed 2/4, 4/8, 4/6, 6/8 poles Quadratic Torque						



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ANNEX **EU-TYPE EXAMINATION CERTIFICATE** **N. EPT 17 ATEX 2588 X issue 5**

The three-phase and single phase asynchronous motors, Series O (IE2-IE3 Range), are identified by a code as follows:

Motor Type Identification				OH	063	A	4
Motor Type							
Three phase and single phase motors Efficiency IE2 – IE3							
MH	1-Phase Ex db or Ex db tb (Atex marking)	MK	1-Phase Ex db eb or Ex db eb tb (Atex marking)				
OH	3 –Phase Ex db or Ex db Ex tb (ATEX Marking)	OK	Ex db Ex eb or Ex db Ex eb Ex tb (ATEX Marking)				
MZ	1-Phase Ex db or Ex db tb (Atex + IECEX marking)	MJ	1-Phase Ex db eb or Ex db tb (ATEX + IECEX marking)				
OZ	Ex db or Ex db Ex tb (ATEX + IECEX Marking)	OJ	Ex db Ex eb or Ex db Ex eb Ex tb (ATEX + IECEX Marking)				
Shaft Height							
56, 63, 71, 80, 90, 100, 112, 132, 160, 180							
Main housing Frame S M L Main stator dimensions (depending on motor power) A B C D E S Z							
Poles number							
2, 4, 6, 8	Three phase motors 1 speed						
2, 4	Single phase motors 1 speed						

Warning label

“Flameproof joints cannot be repaired”

“Use screws quality ≥ 8.8 ”

“Potential electrostatic charging hazard – Do not rub the surface – Clean only with a damp cloth”

Note: this warning is included only in case of painting with thickness greater than 0.2mm

“Do not open in presence of explosive atmosphere”

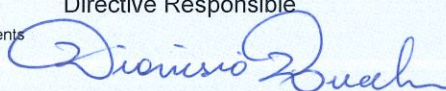
“Refer to instruction for cable and cable gland selection”

“Do not open when energized”



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ANNEX

EU-TYPE EXAMINATION CERTIFICATE

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Routine tests

According to clause 7.1 of EN 60079-7 standard, each motor having increased safety "Ex eb" terminal box shall be submitted to the dielectric strength test (carried out in accordance with clause 6.1). The test shall be deemed to have passed if no breakdown or arcing occurs applying a test voltage equals to $(1000 + 2U)$ V.r.m.s. for at least 1 minute, where U is the rated voltage of the motor.

The test can be alternatively carried out at 1.2 times the test voltage for a period of at least 100 ms.

The test voltage shall be applied between each galvanically isolated connection included in the terminal box.

[16] Assessment Report n° EPT.24.REL.01/2313114

This EU-Type Examination Certificate is released after the positive result of the conformity assessment of the Council Directive 2014/34/EU and to harmonized technical standards listed in this certificate performed by the Notified Body Eurofins Product Testing Italy S.r.l., and reported in the Assessment Report above cited.

[17] Special condition for a safe use

Supply voltage must be within:

- $\pm 5\%$ of the nominal value for temperature class T5;
- $\pm 10\%$ of the nominal value for temperature class T3 or T4.
- Flameproof joints are not intended to be repaired.
- The anti-condensation heater can be activated only when the motor is not powered.

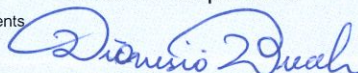
Essential Health and Safety Requirements

[18] Assured by compliance with harmonized standards.



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ANNEX
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[19] Descriptive documents

The equipment object of this Certificate are described by the following documents that are scheduled documents and therefore they cannot be modified without the explicit authorization of the Notified Body.

Type of document	Document identification	Rev.	Date
*Technical note (four attachments included)	Technical note asynchronous motors series O - M sizes 56-180	4	21-11-2023
Sealing rings drawings	Schema gommini	-	19-02-2021
Gland nuts drawings	Schema premistoppa	-	23-02-2021
Washer drawings	Schema rondelle	-	23-02-2021
Safety, installing maintenance instructions (non- flat box motor)	Motors series O-M - Safety, installing maintenance instructions	01	28-06-2021
Safety, installing maintenance instructions (flat box and not flat box motors)	Motors series O-M - Safety, installing maintenance instructions	02	20-05-2022

* New or revised document

[20] Terms and conditions

The product liability rests with the Manufacturer, his representative or, in the absence of a representative, with the importer, in accordance with the General Product Safety Directive 2001/95/EC.

The following conditions may render this certificate invalid:

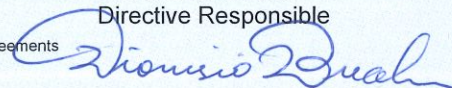
- changes in the design or construction of the product;
- changes or amendments to the Directive;
- changes or amendments in the standards which form the basis for documenting compliance with the essential requirements of the 2014/34/EU Directive.



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[21] History

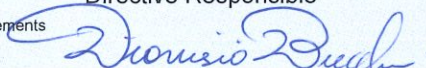
Issue	Description	Date
0	First emission, replacement of the EC-TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350 and its supplements n. 1 and 2.	06-02-2017
1	Constructive change and changing of manufacturer's references	08-02-2019
2	- Inclusion of the high efficiency IE2-IE3 versions (with and without extension ring) - Verification of compliance according to the latest standard editions EN IEC 60079-0:2018 and EN 60079-7:2015+A1:2018	29-06-2021
3	Inclusion of "flat box" version for single phase motors sizes from 56 to 100 and for three phase motors sizes from 56 to 132 (models 132M D2, 71M Z6, 132M E6 are excluded)	15-07-2022
4	The high efficiency version (IE2) for single phase motors has been included in the scope of the certificate	21-12-2022
5	The marking plate of IE1 motors version has been updated. The protection degree has been increased from IP 65 to IP 66, excluding Ex db eb flat box execution that remain IP 65.	19-03-2024



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End of Certificate



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx EUT 14.0001X	Page 1 of 6	<u>Certificate history:</u>
Status:	Current	Issue No: 8	Issue 7 (2024-05-08)
Date of Issue:	2026-02-17		Issue 6 (2023-12-04)
Applicant:	ORANGE1 ELECTRIC MOTORS S.p.A. Via Mantova, 93 43122 Parma Italy		Issue 5 (2022-12-21)
Equipment:	Series O-M three-phase and single-phase asynchronous squirrel cage rotor motors, supplied by mains or inverter		
Optional accessory:	Terminal box and Capacitor box		
Type of Protection:	Flameproof enclosures "d"; Dust ignition protection by enclosure "t"; Increased safety "e"		
Marking:	Ex db IIC T5 or T4 or T3 Gb <i>or</i> Ex db IIC T5 or T4 or T3 Gb, and Ex tb IIIC T125°C Db <i>or</i> Ex db eb IIC T5 or T4 or T3 Gb <i>or</i> Ex db eb IIC T5 or T4 or T3 Gb, and Ex tb IIIC T125°C Db -40 °C ≤ Ta ≤ +60 °C Relationships between ambient temperature range and temperature classes are reported in the attachment of this certificate.		

Approved for issue on behalf of the IECEx
Certification Body:

Dionisio Bucchieri

Position:

Head of IECEx Certification Body

Signature:
(for printed version)

Date:
(for printed version)

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.



Certificate issued by:

Eurofins Product Testing Italy S.r.l.
Via Cuorgnè
n.21 - 10156 Torino
Italy





IECEx Certificate of Conformity

Certificate No.: **IECEx EUT 14.0001X**

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Date of issue: 2026-02-17

Issue No: 8

Manufacturer: **ORANGE1 ELECTRIC MOTORS S.p.A.**
Via Mantova, 93
43122 Parma
Italy

Manufacturing
locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

[IEC 60079-0:2017](#) Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

[IEC 60079-1:2014](#) Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
Edition:7.0

[IEC 60079-31:2013](#) Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
Edition:2

[IEC 60079-7:2017](#) Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
Edition:5.1

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

[IT/EUT/ExTR14.0001/08](#)

Quality Assessment Report:

[IT/EUT/QAR14.0001/12](#)



IECEx Certificate of Conformity

Certificate No.: **IECEx EUT 14.0001X**

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Date of issue: 2026-02-17

Issue No: 8

EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The motors are made of aluminium alloy and have separate parts: motor enclosure always Ex db protected, terminal box that can be protected by Ex db or Ex eb methods as specified in identification section and a capacitor enclosure Ex db protected, only for single-phase versions. These motors are suitable for gas group IIC.

In addition, when the marking for dust group IIIC is present, all parts of motors are also compliant with Ex tb type of protection.

As alternative to the Ex eb standard terminal box the connection between the motor wires and supply cable can be made in a box without terminals by the use of splicing or head to head connectors and a permanently connected cable.

All the parts of the flameproof enclosures have flameproof joints independent from each other.

The motors can be equipped with auxiliary devices (heaters, thermal protectors).

The anti-condensation heater can be activated only when the motor is not powered.

Electrical characteristics

The equipment can be supplied by mains or inverter:

Mains Supply

Maximum rated voltage: 850 V

Maximum rated power: 30 kW

Rated frequency: 50/60 Hz

Insulation class: F or H

Duty: S1, S2, S3, S9

Poles: 2, 4, 6, 8, 2/4, 4/8, 4/6, 6/8

Degree of protection: IP65 (For version with Ex db eb flat box execution)

IP66 (Other versions)

SPECIFIC CONDITIONS OF USE: YES as shown below:

- Supply voltage must be within:
 - $\pm 5\%$ of the nominal value for temperature class T5;
 - $\pm 10\%$ of the nominal value for temperature class T3 or T4.

- Flameproof joints are not intended to be repaired.

The anti-condensation heater can be energized only when the motor is not powered.

- Motors supplied with converters, with forced ventilation types TEFV and air-over ventilated types TEAO shall be installed only with a safety device able to disconnect the supply system when the embedded thermal sensors inside the windings detect the temperature value specified in the safety instruction, related to the temperature class indicated in the marking plate.
- The motor version MB, MC, MS, MP, MA, ML, OB, OC, OS and OP (identified as TEAO) shall be installed only with an auxiliary air ventilation source that is able to assure a minimum air speed value close to the motor fins equal or higher than the value specified in the ventilation section of this certificate and in the safety instruction.



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Equipment (continued):

Inverter supply

Frequency range: 5-100 Hz

Possibility of supply through inverter exclusively with the use of thermal protectors applied on the windings.

Such protectors may be either PTO and PTC and they shall be connected to an appropriate and reliable control device.

Activation temperature related to the temperature class:

- 90 °C for temperature class T5;
- 130 °C for temperature class T4;
- 150 °C for temperature class T3.

Ambient temperature. $-40 \div +40$ °C (or +60°C for T3, T4 class of temperature)

Temperature classes and Maximum surface temperature:

T5, T4, T3, T125°C as a function of the ambient temperature and of the electrical characteristics.

Ventilation

The motors can be totally enclosed fan cooled (TEFC, IC 411), totally enclosed air over/airtight (TEAO, IC 418) or totally enclosed forced ventilated (TEFV, IC 416).

Ventilation can be made by fan, that is fitted directly on the shaft (TEFC), by auxiliary air cooling system (TEAO), or by using an auxiliary motor (TEFV).

The only auxiliary motors permitted for TEFV version are O-M series flat-box types with Ex db eb type of protection, two poles size 63 motors (for shaft height from 80 to 132) or a two poles size 71 motors (for shaft height from 160 to 180).

For TEAO application the permitted motor sizes and the minimum air speeds that shall be assured on the motor surface is indicated the safety instruction and detailed below:

Minimum value of air speed [m/s]

Frame size	2 poles	4 poles
56	18	9
63	18	9
71	21	11
80	27	14
90S	32	16
90L	32	16



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Summary of possible marking strings and allowed ambient temperature range

Ordinary terminal box

Ex db IIC T4 Gb	or	Ex db IIC T4 Gb Ex tb IIIC T125 °C Db	Tamb -40 °C + 60 °C
Ex db eb IIC T4 Gb	or	Ex db eb IIC T4 Gb Ex tb IIIC T125 °C Db	Tamb -40 °C + 60 °C
Ex db IIC T5 Gb	or	Ex db IIC T5 Gb Ex tb IIIC T125 °C Db	Tamb -40 °C + 40 °C
Ex db eb IIC T5 Gb	or	Ex db eb IIC T5 Gb Ex tb IIIC T125 °C Db	Tamb -40 °C + 40 °C

Cable connection by means of flat box

Three phases motors:

Ex db eb IIC T3 Gb	or	Ex db eb IIC T3 Gb Ex tb IIIC T125 °C Db	Tamb -40 °C + 60 °C
Ex db eb IIC T4 Gb	or	Ex db eb IIC T4 Gb Ex tb IIIC T125 °C Db	Tamb -40 °C + 50 °C

Single phase motors from frame size 56 up to frame 100:

Ex db eb IIC T3 Gb	or	Ex db eb IIC T4 Gb Ex tb IIIC T125 °C Db	Tamb -40 °C + 50 °C
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Cable entries

The cable entry integrated in the capacitor box is part of this certification.

All the other cable entries devices used on the enclosures are already properly IECEx certified.

The accessories used for cable entries and for unused holes must be covered by a separate IECEx certification according to the applicable standards IEC 60079-0, IEC 60079-1, IEC 60079-7 and IEC 60079-31.

Warning label

“FLAMEPROOF JOINTS CANNOT BE REPAIRED”

“USE SCREWS QUALITY ≥ 8.8 ”

“POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS”

Note: this warning is included only in case of painting with thickness greater than 0.2 mm

“DO NOT OPEN IN PRESENCE OF EXPLOSIVE ATMOSPHERE”

“REFER TO INSTRUCTION FOR CABLE AND CABLE GLAND SELECTION”

“DO NOT OPEN WHEN ENERGIZED”

Routine tests

According to clause 7.1 of IEC 60079-7 standard, each motor having increased safety “Ex eb” terminal box shall be submitted to the dielectric strength test (carried out in accordance with clause 6.1). The test shall be deemed to have passed if no breakdown or arcing occurs applying a test voltage equals to $(1000 + 2U)$ V.r.m.s. for at least 1 minute, where U is the rated voltage of the motor.

The test can be alternatively carried out at 1.2 times the test voltage for a period of at least 100 ms.

The test voltage shall be applied between each galvanically isolated connection included in the terminal box.



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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

The range of cable glands installed at the factory on the various types of motors has been expanded, and some typing errors have been corrected.

Annex:

[EPT.26.REL.02-2513113_1.pdf](#)

化学抗腐蚀性表

分析技术

公式	介质	浓度	特氟龙® PTFE	PCTFE	PEEK	PVDF	FEP	FFKM	氟橡胶® V4A FPM	玻璃
CH ₃ COCH ₃	Acetone丙酮		1/1	1/3	1/1	3/4	(1)	1/1	4/4	1/1
C ₆ H ₆	Benzol苯		1/1	1/3	1/1	1/3	1/1	1/1	3/3	1/1
Cl ₂	Chlorine氯	10 %潮湿	1/1	0/0	4/4	2/2	1/1	1/1	3/0	4/4
Cl ₂	Chlorine氯	97 %	1/0	1/3	4/4	1/1	1/1	1/0	1/1	1/1
C ₂ H ₆	Ethane乙烷		1/0	0/0	1/0	2/0	–	1/0	1/0	2/0
C ₂ H ₅ OH	Ethanol乙醇	50 %	1/1	1/3	1/1	1/1	1/1	1/1	2/2	1/0
C ₂ H ₄	Ethylene乙烯		1/0	0/0	0/0	1/0	1/1	1/0	1/0	1/0
C ₂ H ₂	Ethyne乙炔		1/0	0/0	0/0	1/0	1/1	1/0	2/0	1/0
C ₆ H ₅ C ₂ H ₅	Ethylbenzene乙苯		1/0	0/0	0/0	1/1	1/1	1/0	2/0	1/0
HF	Hydrofluoric acid氟化氢		1/0	0/0	0/0	2/2	(1)	2/0	4/0	3/4
CO ₂	Carbon dioxide二氧化碳		1/1	0/0	1/0	1/1	(1)	1/0	1/1	1/1
CO	Carbon monoxide一氧化碳		1/0	0/0	1/1	1/1	–	1/0	1/0	1/1
CH ₄	Methane甲烷	技术纯	1/1	0/0	1/1	1/0	1/1	1/0	1/1	1/1
CH ₃ OH	Methanol甲醇		1/1	1/1	1/1	1/1	1/1	1/1	3/4	1/1
CH ₂ Cl ₂	Methylene chloride二氯甲烷		1/0	2/0	1/0	1/0	1/1	1/0	3/0	1/1
H ₃ PO ₄	Phosphoric acid磷酸	1-5 %	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
H ₃ PO ₄	Phosphoric acid磷酸	30 %	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
C ₃ H ₈	Propane丙烷	气态	1/1	0/0	1/0	1/1	1/1	1/0	1/0	1/0
C ₃ H ₆ O	Propylene oxide丙烯腈		1/0	0/0	0/0	2/4	1/1	2/0	4/0	1/0
HNO ₃	Nitric acid硝酸	1-10 %	1/1	1/0	1/1	1/1	1/1	1/0	1/1	1/1
HNO ₃	Nitric acid硝酸	50 %	1/1	1/0	3/3	1/1	1/1	1/0	1/0	1/2
HCl	Hydrochloric acid盐酸	1-5 %	1/1	1/1	1/0	1/1	1/1	1/1	1/1	2/4
HCl	Hydrochloric acid盐酸	35 %	1/1	1/1	1/0	1/1	1/1	1/1	1/2	2/4
O ₂	Oxygen氧气		1/1	0/0	1/0	1/1	1/1	1/1	1/2	1/1
SF ₆	Sulphur hexafluoride六氟化硫		1/0	0/0	1/0	0/0	0/0	1/0	2/0	0/0
H ₂ SO ₄	Sulfuric acid硫酸	1-6 %	1/1	1/1	2/2	1/1	1/1	1/1	1/1	1/2
H ₂ S	Hydrogen sulphide硫化氢		1/1	1/1	0/0	1/1	1/0	1/1	4/4	1/1
N ₂	Nitrogen氮气		1/1	0/0	1/0	1/1	1/1	1/0	1/1	1/0
C ₆ H ₅ C ₂ H ₃	Styrene苯乙烯		1/1	0/0	1/0	1/0	1/0	1/0	3/0	1/0
C ₆ H ₅ CH ₃	Toluol (methylbenzene) 甲苯 (甲基苯)		1/1	0/0	1/0	1/1	1/1	1/1	3/3	1/1
H ₂ O	Water水		1/1	0/0	1/1	1/1	1/1	1/1	1/1	1/1
H ₂	Hydrogen氢气		1/0	1/0	1/0	1/0	(1)	1/0	1/0	1/0

0 – 无说明/不能判断

1 – 极好的耐抗性/适用

2 – 好的耐抗性/适用

3 – 有限制适用

4 – 不适用

() – 估计值

每种介质须说明2个值。左侧数字=+20° C时的值，右侧数字=+50° C时的值。

来源: Bürkle GmbH: 化学耐受性列表, <https://www.buerkle.de> [访问时间: 2026年2月12日]。



RMA-Formular und Erklärung über Dekontaminierung

RMA-去污表格和声明



RMA-Nr./ 商品退货 授权号码

Die RMA-Nr. bekommen Sie von Ihrem Ansprechpartner im Vertrieb oder Service. Bei Rücksendung eines Altgeräts zur Entsorgung tragen Sie bitte in das Feld der RMA-Nr. "WEEE" ein./ 从销售或服务处的联系人那里可获得商品退货授权 (RMA) 号码。当寄还旧设备以废弃处理时, 请于RMA号码栏中输入"WEEE"。

Zu diesem Rücksendeschein gehört eine Dekontaminierungserklärung. Die gesetzlichen Vorschriften schreiben vor, dass Sie uns diese Dekontaminierungserklärung ausgefüllt und unterschrieben zurücksenden müssen. Bitte füllen Sie auch diese im Sinne der Gesundheit unserer Mitarbeiter vollständig aus./ 请将退货单, 去污声明和货运单一同装在透明套中, 粘在包装外。否则您的维修委托将不予处理。

Firma/ 公司

Firma/ 公司

Straße/ 街道

PLZ, Ort/ 邮政编码, 地点

Land/ 国家

Gerät/ 设备

Anzahl/ 数量

Auftragsnr./ 订单号码

Ansprechpartner/ 联系人

Name/ 姓名

Abt./ 部门

Tel./ 电话

E-Mail

Serien-Nr./ 序列号

Artikel-Nr./ 商品编号

Grund der Rücksendung/ 寄回原因

- ☐ Kalibrierung/ 校准 ☐ Modifikation/ 修改
☐ Reklamation/ 投诉 ☐ Reparatur/ 修复
☐ Elektroaltgerät/ 废旧电子设备 (WEEE)
☐ andere/ 其他的

bitte spezifizieren/ 请注明

Handelt es sich bei dem Gerät um ein sogenanntes Bühler O2-Ready Produkt (Artikelnummer endet mit „-O2“)?/ 设备是否是所谓的比勒 O2-Ready 产品 (物品编号以“-O2”结尾) ?

- ☐ Nein/ 否 ☐ Ja/ 是

Ist das Gerät möglicherweise kontaminiert?/ 设备是否具有污染性 ?

- ☐ Nein, da das Gerät nicht mit gesundheitsgefährdenden Stoffen betrieben wurde./ 否, 因为该设备已被正确清洁和消毒。
☐ Nein, da das Gerät ordnungsgemäß gereinigt und dekontaminiert wurde./ 否, 因为未以有损健康的物质运行该设备。
☐ Ja, kontaminiert mit:/ 是, 污染物为:



☐
explosiv/
易爆的



☐
entzündlich/
易燃的



☐
brandfördernd/
助燃的



☐
komprimierte
Gase/
压缩气体



☐
ätzend/
腐蚀性的



☐
giftig, Lebensge-
fahr/
有毒的, 致命危险



☐
gesundheitsge-
fährdend/
危害健康的



☐
gesund-
heitsschädlich/
对人体有害的



☐
umweltge-
fährdend/
对环境有害的

Bitte Sicherheitsdatenblatt beilegen!/ 请附上《安全数据表》!

Das Gerät wurde gespült mit:/ 该设备已被冲洗:

Diese Erklärung wurde korrekt und vollständig ausgefüllt und von einer dazu befugten Person unterschrieben. Der Versand der (dekontaminierten) Geräte und Komponenten erfolgt gemäß den gesetzlichen Bestimmungen.

按法律规定寄回 (已去污的) 设备和组件

Falls die Ware nicht gereinigt, also kontaminiert bei uns eintrifft, muss die Firma Bühler sich vorbehalten, diese durch einen externen Dienstleister reinigen zu lassen und Ihnen dies in Rechnung zu stellen.

如果产品没有被清洁, 即我们收到时受了污染, 比勒公司保留委托一外部的服务提供商清理的权利并向您收取费用。

Firmenstempel/ 公司印章

Datum/ 日期

rechtsverbindliche Unterschrift/ 具法律约束力的签名

DC000011

10/2025

Bühler Technologies GmbH, Harkortstr. 29, 40880 Ratingen

Tel. +49 (0) 21 02 / 49 89-0

E-Mail: service@buehler-technologies.com

Internet: www.buehler-technologies.com



Vermeiden von Veränderung und Beschädigung der einzusendenden Baugruppe

Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies GmbH. Um eine aussagekräftige Analyse zu gewährleisten muss die Ware möglichst unverändert untersucht werden. Es dürfen keine Veränderungen oder weitere Beschädigungen auftreten, die Ursachen verdecken oder eine Analyse unmöglich machen.

Vermeidung von Kontaminationen bei Produkten für hochreine Sauerstoffapplikationen (O2-Ready)

Handelt es sich bei dem Gerät um ein sogenanntes Bühler O2-Ready Produkt (Artikelnummer endet mit „-O2“), so ist dafür zu sorgen, dass es vom Ausbau des Artikels bis zur Anlieferung bei Firma Bühler zu keiner Kontamination medienberührender Teile kommt. Verschließen Sie Öffnungen und verpacken Sie das Gerät in ein luftdichtes Behältnis. Kennzeichnen Sie die Ware deutlich, insbesondere durch Angabe der vollständigen Artikelnummer (.....-O2) auf der ersten Seite dieses Formulars. Hierdurch wird sichergestellt, dass es auch unsererseits zu keiner unnötigen Kontamination kommt.

Umgang mit elektrostatisch sensiblen Baugruppen

Bei elektronischen Baugruppen kann es sich um elektrostatisch sensible Baugruppen handeln. Es ist darauf zu achten, diese Baugruppen ESD-gerecht zu behandeln. Nach Möglichkeit sollten die Baugruppen an einem ESD-gerechten Arbeitsplatz getauscht werden. Ist dies nicht möglich sollten ESD-gerechte Maßnahmen beim Austausch getroffen werden. Der Transport darf nur in ESD-gerechten Behältnissen durchgeführt werden. Die Verpackung der Baugruppen muss ESD-konform sein. Verwenden Sie nach Möglichkeit die Verpackung des Ersatzteils oder wählen Sie selber eine ESD-gerechte Verpackung.

Einbau von Ersatzteilen

Beachten Sie beim Einbau des Ersatzteils die gleichen Vorgaben wie oben beschrieben. Achten Sie auf die ordnungsgemäße Montage des Bauteils und aller Komponenten. Versetzen Sie vor der Inbetriebnahme die Verkabelung wieder in den ursprünglichen Zustand. Fragen Sie im Zweifel beim Hersteller nach weiteren Informationen.

Einsenden von Elektroaltgeräten zur Entsorgung

Wollen Sie ein von Bühler Technologies GmbH stammendes Elektroprodukt zur fachgerechten Entsorgung einsenden, dann tragen Sie bitte in das Feld der RMA-Nr. „WEEE“ ein. Legen Sie dem Altgerät die vollständig ausgefüllte Dekontaminierungserklärung für den Transport von außen sichtbar bei. Weitere Informationen zur Entsorgung von Elektroaltgeräten finden Sie auf der Webseite unseres Unternehmens.

避免修改和损坏要寄送的组件

对有缺陷的组件的分析是比勒科技有限公司的质量保证的一个重要组成部分。为了确保分析有说服力，必须尽可能地保持原样来检查产品。不能发生任何改变或进一步的损害，这样可能会掩盖原因或阻碍分析。

避免高纯度氧气应用产品受到污染 (O2-Ready)

如果设备是所谓的比勒O2-Ready产品（物品编号以“-O2”结尾），则必须确保从物品取出到交付给比勒的整个过程中，与介质接触的部件不会受到污染。密封所有开口，并将设备装入密闭容器中。清楚标明货物，特别是在本表第一页注明完整的物品编号(.....-O2)。这可以确保我们也不会造成不必要的污染。

处理静电敏感组件

若有电子组件，则可能是静电敏感组件。必须注意以符合ESD标准的方式处理这些组件。如果可能，应在符合ESD标准的工作场所更换组件。如果不可能，在更换过程中应采取符合ESD标准的措施。只能在符合ESD标准的容器中运输。组件的封装必须符合ESD标准。如果可能，请使用备件包装或自选一符合ESD标准的包装。

安装替换件

在安装备件时，请遵守上述说明。确保配件和所有组件的正确组装。调试前将电缆移回原来状态。如有疑问，请询问制造商了解更多信息。

将废旧电子设备寄送废弃处理

如果您想寄送来自Bühler Technologies GmbH的电子产品以进行妥善废弃处理，请于RMA号码栏中输入“WEEE”。将完整填写的去污声明附于废旧设备上，以便运输时从外部即可见。有关废弃电气和电子设备废弃处理的更多信息，请访问我司的网站。

