分析技术

取样气泵

P4.3, P4.83

安装及使用说明书

原版使用说明书

BC420010
05/2024

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen
Tel. +49 (0) 21 02 / 49 89-0, Fax: +49 (0) 21 02 / 49 89-20
E-Mail: analyse@buehler-technologies.com
Internet: www.buehler-technologies.com

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen
Tel. +49 (0) 21 02 / 49 89-0, Fax: +49 (0) 21 02 / 49 89-20
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。

文档信息
文档号..... BC420010
版本 05/2024

目录

1 导言

1.1 使用说明

样气泵被设计安装于工业应用中的气体分析系统中。

在一台带有双轴的电机上排列两只气泵，是实现带有两个独立气路的分析系统的具成本效益的解决方案。在需要快速响应时间的应用场合下，可通过联接两个气路增加P4. 83气泵的流量比率。

取样气泵专用于输送气体介质。它不适于液体。

请注意 产品描述 [> 页 4] 章节及 操作和控制 [> 页 11]章节中的详细说明，以及数据页中就特定预期用途、现有的材料组合及压力和温度限制作出的说明。

危险	**潜在爆炸性环境**
	应用于易爆区域中有爆炸危险 该设备**不**适用于易爆区域中。 禁止将**可燃**或爆炸性气体混合物输送通过设备。

安装于室外时，须提供足够的全天候保护，见 安放地要求 [> 页 8] 章节。

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：

42	xx	x	x	x	x	x	9	0	0	0	产品特征	
											基本型	
	80										P4. 3, 2 x 400 l/h	
	81										P4. 83, 2 x 800 l/h	
											电机电压	
		1									230 V 50/60 Hz; 1,4/1,2 A	
		2									115 V 50/60 Hz; 2,4/2,2 A	
											泵头位置	
			1								正常位置 垂直	
			2								已旋转180°	
											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 [2]	
					2						至160 ° C; PTFE/PEEK	
											螺纹连接（于230 V电压下）	
											PTFE泵体	**不锈钢泵体**
						9					DN 4/6（标准）	6 mm（标准）
						1					DN 6/8	8 mm
						2					3/8 “-1/4 “	3/8 “
						3					1/4 “-1/8 “	
						4					1/4″-1/6”	1/4″
											螺纹连接（于115 V电压下）	
											PTFE泵体	**不锈钢泵体**
						9					1/4 “-1/6 “（标准）	1/4 “ （标准）
						1					DN 6/8	8 mm
						2					3/8 “-1/4 “	3/8 “
						3					1/4 “-1/8 “	
						5					DN 4/6	6 mm
											安装附件	
							9				含安装支架和缓冲器	
											并联运行用连接套件	
								0			不带	
								1			软管道组PVDF/PTFE [3]	
								2			管道组1.4571/1.4401 [3]	

[1] 不适用于并联运行

[2] 对P4. 83不可能

[3] 仅对P4. 83可能

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 供货范围

P4. 3	P4. 83
2 x 带电机的样气泵	2 x 带电机的样气泵
4 x 橡胶金属缓冲块	4 x 橡胶金属缓冲块
1 x 安装支架	1 x 安装支架
产品文档	产品文档
	必要时1 x 连接套装（选件）

1.4 产品描述

取样气泵专用于输送气体介质。它不适于液体。

提请您注意本说明书的附件中就特定预期用途、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。

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（见目录要点 吊式泵头的转换 [> 页 9]）.

2 安全提示

2.1 重要提示

只有在下列条件完全满足时允许使用该设备：

- 于操作和安装说明书所述条件下，依铭牌并为规定的应用使用本产品。若擅自改动设备，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。
- 在数据表和说明书中给出的限值得以遵守，
- 监测设备/保护装置得以正确连接，
- 由比勒科技有限公司进行未于本说明书中描述的服务和维修，
- 使用原装备件。

本操作说明书是设备的一部分。制造商保留其在未事先申明的情况下修改性能、规格或设计的权利。请保管好本说明书，以供日后使用。

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。

警告提示标识

手册中将用到以下警示图标：

	常规性警告标志		常规性提示标志
	电压警告		请拔出电源插头
	吸入有毒气体危险警告		请使用呼吸保护器
	腐蚀性物质警告		请使用面部防护装置
	由爆炸导致的危险警告		请使用手套
	灼热表面警告		

2.2 通用风险提示

仅能由熟悉安全要求和风险的专业人员安装该设备。

请务必遵守安装地相关的安全法规和普遍适用的技术规则。请预防故障发生，避免人身伤害和财产损失。

设备操作员必须确保：

- 安全提示和操作说明书可供翻阅并予以遵守，
- 遵守国家有关事故预防条例，
- 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，
- 遵守有效的国家安装规定。

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

有毒和腐蚀性气体

样气有可能是有害的

a) 请在排放样气时选择不会对人身健康带来危害的区域。

b) 维护设备前，请关断气路连接并保证不会无意间被重新开启。

c) 在维护设备时注意自我保护，防止有毒、有腐蚀性气体对自身造成伤害。必要时，使用手套，防毒面具和防护面罩。

危险

潜在爆炸性环境

应用于易爆区域中有爆炸危险
该设备**不**适用于易爆区域中。
禁止将**可燃**或爆炸性气体混合物输送通过设备。

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

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。

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 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。

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 ° C (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	**小心擅伤或夹伤**
	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。

4.1 安放地要求

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。

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
- 积冰
- 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，请务必须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 组装

在安装板上安装P4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。

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。

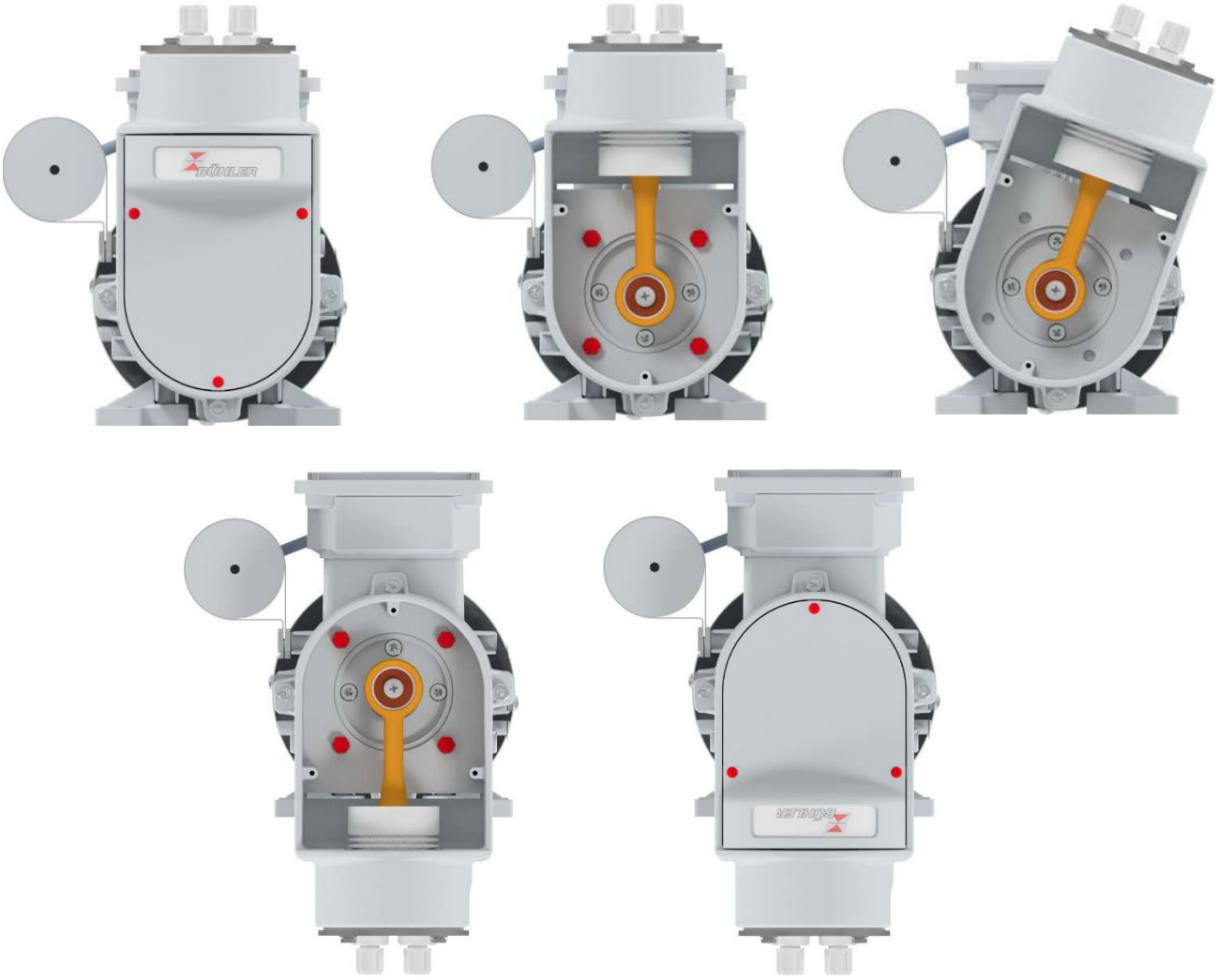
4.3.1 吊式泵头的转换

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 连接气管

泵在出厂时提供多种客户化管路连接方式。请对比铭牌上的订货号和“产品说明”中提及的订货方式。

避免混合连接，即避免将金属管路连接到塑料泵体上。如果个别应用场合，实在无法避免混合连接，安装金属接头到泵体时请非常小心，且连接管路不可对PTFE泵体产生应力作用。

连接管路时要注意，管路的出口入口要不受力，且留有足够距离（泵工作时会震动）。

单机模式

如果泵在单机模式中使用，连接气体通道至各泵头。输入端标记有**“In”**（进口），输出端标记有**“Out”**（出口）。注意气管接头是否密封。

并联模式（只限P4.83）

并联模式中，泵体通过连接套件结合。对此各泵头的输出端和输入端必须相互连接。输入端标记有**“In”**（进口），输出端标记有**“Out”**（出口）。气道连接至连接套件的相应T形件上。用于固定连接套件的锁紧螺母是泵的组成部分。

4.5 电气连接

警告	**危险的电压**
	仅能由训练有素的专业人员执行线路连接。

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。

须通过适当的过载保护（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±5 %，频率公差 ±1 %——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6-10 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：

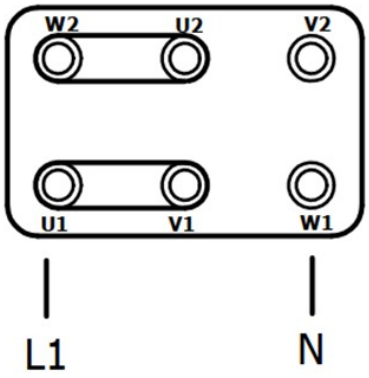
- 电动机接线盒内的接地螺栓。
- 安装支架上的接地螺栓。

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，并适当地拧紧螺钉。

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

禁止不合规操作设备！

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

有毒和腐蚀性气体

样气有可能是有害的

a) 请在排放样气时选择不会对人身健康带来危害的区域。

b) 维护设备前，请关断气路连接并保证不会无意间被重新开启。

c) 在维护设备时注意自我保护，防止有毒、有腐蚀性气体对自身造成伤害。必要时，使用手套，防毒面具和防护面罩。

5.1 开启测量气体泵

开启设备前，检查：

- 软管和电气接头不得损毁且要正确安装。
- 不得拆卸气体测量泵的任何部件（如盖子）。
- 测量气体泵的进气和出气口不得堵塞。
- 初压力小于0.5巴。
- 如果连续模式中低于150 l/h (P4.3时各泵头) 或 400 l/h (P4.83各泵头)节流，应有旁通阀。
- 遵守环境参数。
- 遵守铭牌数据。
- 电机的电压和频率与电网值一致。
- 电气连接固定拧紧并按照规定连接和设置监测装置！
- 进气口和散热面洁净。
- 保护措施已进行；接地！
- 电机正确固定。
- 连接盖闭合且导管孔正确密封。

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

测量气体泵设计只用于输送气态介质。不可用于液体。

测量气体泵应在无初压力的条件下运行。初压力不得大于0.5巴。气体出口不得堵塞。对于各泵头的流量，P4.3时至少50 l/h，P4.83泵时至少200 l/h。如果连续模式中低于150 l/h (P4.3) 或 400 l/h (P4.83)节流，必须通过旁通阀调节流量。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

在集成了旁通阀的泵上，可调节输出功率。转动阀时，不得使用强力，否则可能损坏阀！阀的旋转范围约为7圈。

6 维护

等待设备表面冷却后再进行维护工作。

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。

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

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

有毒和腐蚀性气体

样气有可能是有害的

a) 请在排放样气时选择不会对人身健康带来危害的区域。

b) 维护设备前，请关断气路连接并保证不会无意间被重新开启。

c) 在维护设备时注意自我保护，防止有毒、有腐蚀性气体对自身造成伤害。必要时，使用手套，防毒面具和防护面罩。

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

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。

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。有关如何更换零件的说明，请参见章节更换入口出口单向阀。

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。

运行约500小时后，应以3 Nm拧紧固定环的螺丝。

6.1 更换进气和排气阀

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。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：P4.3 = 1.7 bar; P4.83 = 3.5 bar
  低压：P4.3 = -0.65 bar; P4.83 = -0.75 bar
  流量：P4.3 = 400 l/h; P4.83 = 800 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）。

6.2 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）。
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：P4.3 = 1.7 bar; P4.83 = 3.5 bar
    低压：P4.3 = -0.65 bar; P4.83 = -0.75 bar
    流量:P4.3 = 400 l/h; P4.83 = 800 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）”。

6.3 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。
- 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。

7 服务和维修

若操作过程中发生错误，在此章节中，您可找到就故障诊断和消除的提示。
必须经由比勒授权人员进行设备维修。
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
有关我们的维护和调试个性化服务的更多信息，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：
Bühler Technologies GmbH
- Reparatur/Service -
Harkortstraße 29
40880 Ratingen
Deutschland
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 替换件

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坏

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。

故障	原因	补救
泵无法启动	– 供电线路断裂或未被正确连接	– 检查连接或保险丝和开关
	– 电机损坏	– 更换电机
泵不输送	– 阀损坏或被污染	– 小心地吹扫或更换阀门或参见 更换进气和排气阀 [> 页 13] 章节。
	– 已开启旁路阀	– 关闭旁路阀
	– 旁路阀的O型环损坏	– 委托比勒服务技术员维修或参见 更换旁路阀O圈（选配） [> 页 14]。
	– 波纹管破裂	– 委托比勒服务技术员维修或参见 更换波纹管和冲杆偏心轮组合 [> 页 13]。
泵运行时过响	– 曲轴驱动磨损	– 委托比勒服务技术员维修或参见 更换波纹管和冲杆偏心轮组合 [> 页 13]。
	– 电机轴承损坏	– 更换电机
保护装置触发	– 线圈和端子短路	– 测量绝缘电阻
	– 已超过启动时间	– 检查起动条件
功率不足	– 不密闭	– 重新拧紧缸盖螺栓，观察扭矩（见 维护 [> 页 12]一章）。
	– 波纹管破裂	– 委托比勒服务技术员维修或参见 更换波纹管和冲杆偏心轮组合 [> 页 13]。
	– 阀损坏或被污染	– 小心地吹扫或更换阀门或参见 更换进气和排气阀 [> 页 13] 章节。

表格 1: 故障处理

7.2 备件及附件

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：

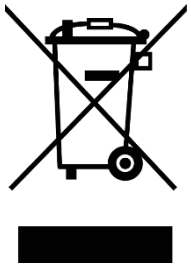
替换件		物品编号	在装配图42/025-Z02-01-2中的位置
P4. 3	波纹管	4200015	12a
	冲杆/偏心轮组合	4200075	10a, 11
	一套100 ° C阀门	4201002	2x 17a
	一套160 ° C阀门	4202002	2x 17b
	O型环旁路	9009115	21a
P4. 83	波纹管	4200071	12b
	冲杆/偏心轮组合	4200034	10c, 11
	一套160 ° C阀门	4202002	2x 17b
	O型环旁路	9009115	21a

表格 2: 备件及附件

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
WEEE
Harkortstr. 29
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

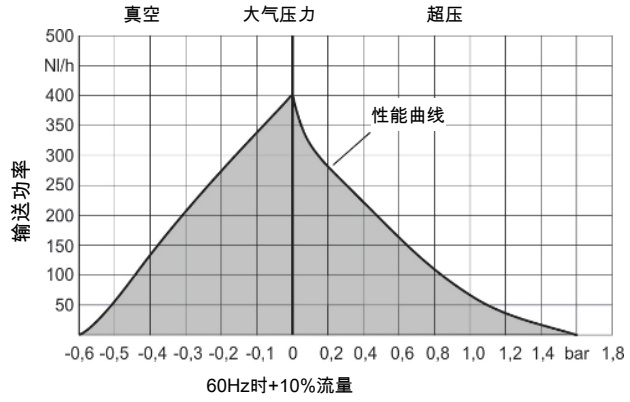
9.1 技术规格

P4. 3/P4. 83技术规格

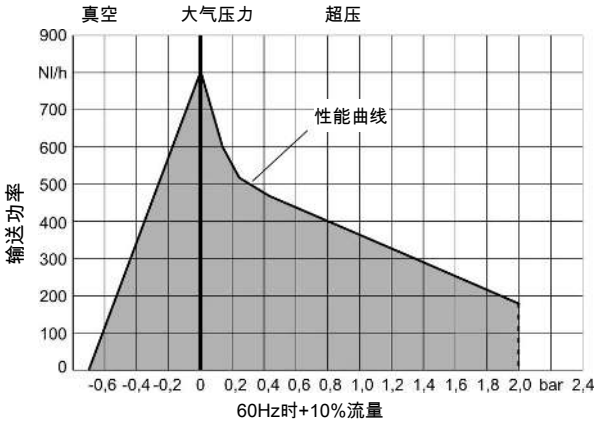
额定电压:	见订购提示
额定电流:	见订购提示
防护等级:	电气 IP55 机械 IP20
重量:	约12.5 kg
死容积:	2 x 8.5 ml
FM C-US (仅115V) FM认证号:	3038101/3038101C
环境温度:	最高 60 ° C
介质温度:	PTFE/PVDF阀最高100 ° C PTFE/PEEK阀最高160 ° C
润湿部件的材料取决于泵的类型:	PTFE / PVDF （带100 ° C 阀门的标准泵） + PEEK （带160 ° C 阀门的标准泵） + 氟橡胶（带100 ° C 阀门和旁路阀的标准泵） + PCTFE, 氟橡胶 （带160 ° C 阀门和旁路阀的标准泵） + 1.4571 （VA泵体） + 1.4401, 氟橡胶（VA管接头） + 氟橡胶 (带旁通阀的VA泵体)

9.2 性能曲线

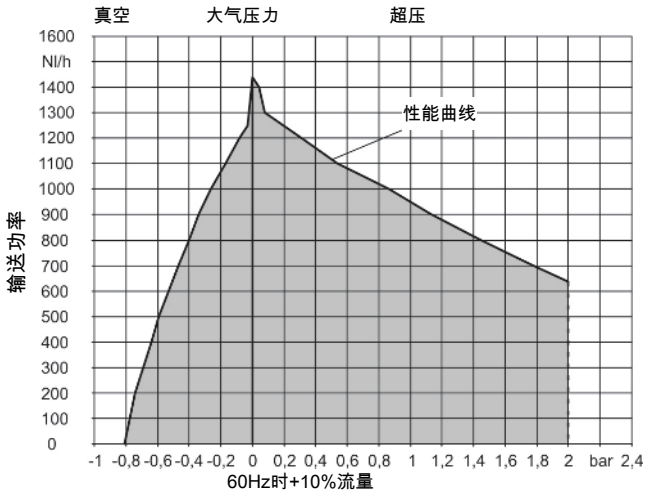
P4. 3 (每台)



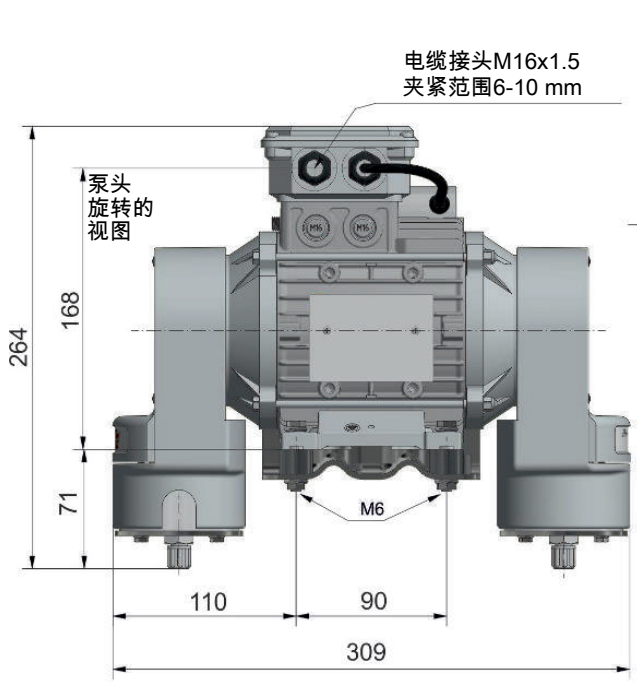
P4. 83 (每台)

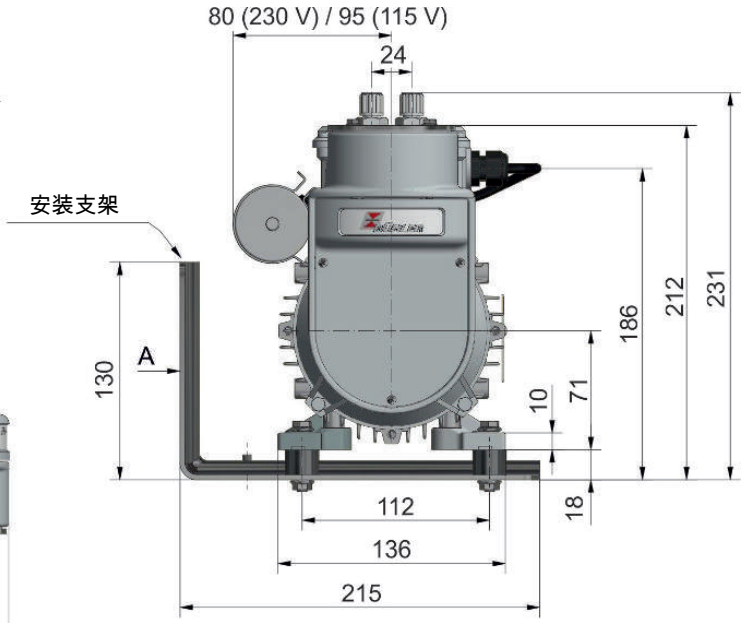


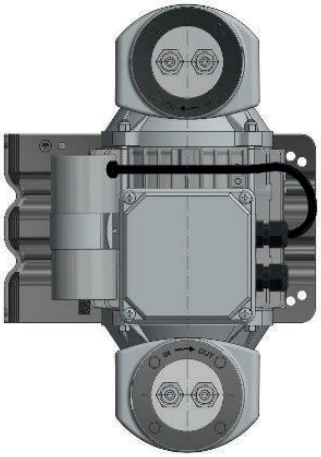
P4. 83 (并联)

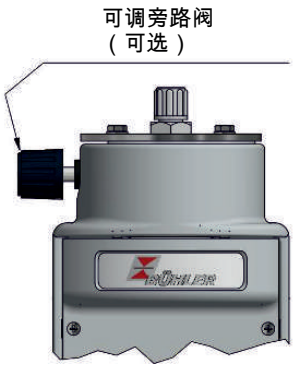


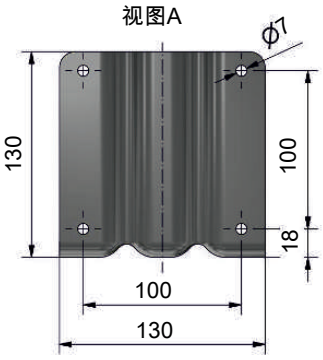
9.3 尺寸







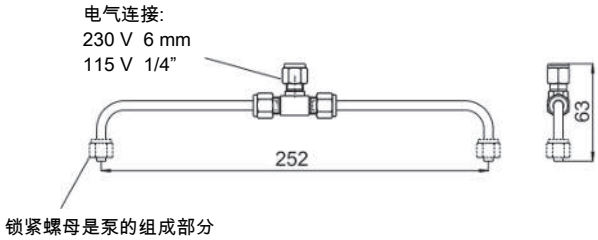




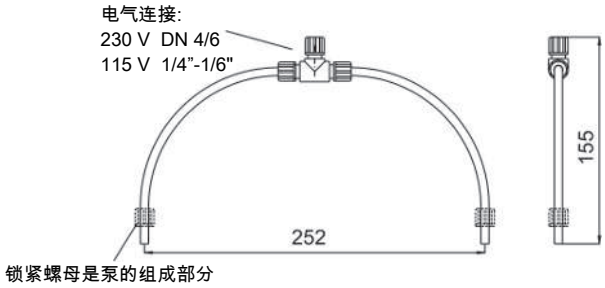
安装说明:
1) 应水平安装泵
2) 安装过程中，根据需要旋转泵头。当输送含有冷凝水成份的气体时, 应与阀一同向下安装泵头。

9.4 P4.83并联运行用管道组/ 软管道组尺寸

管道组

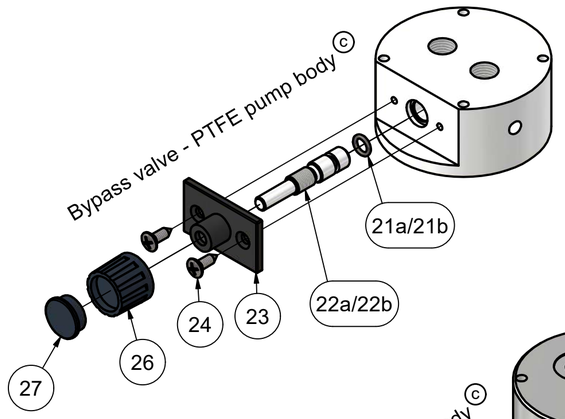


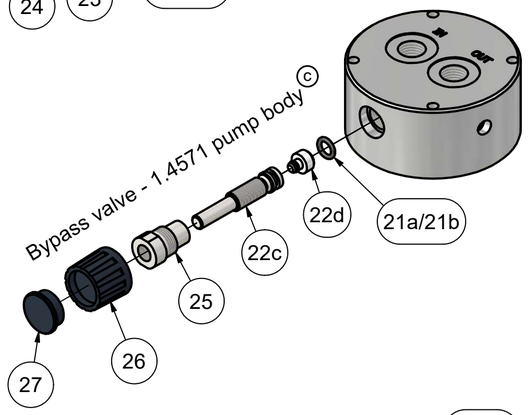
软管道组

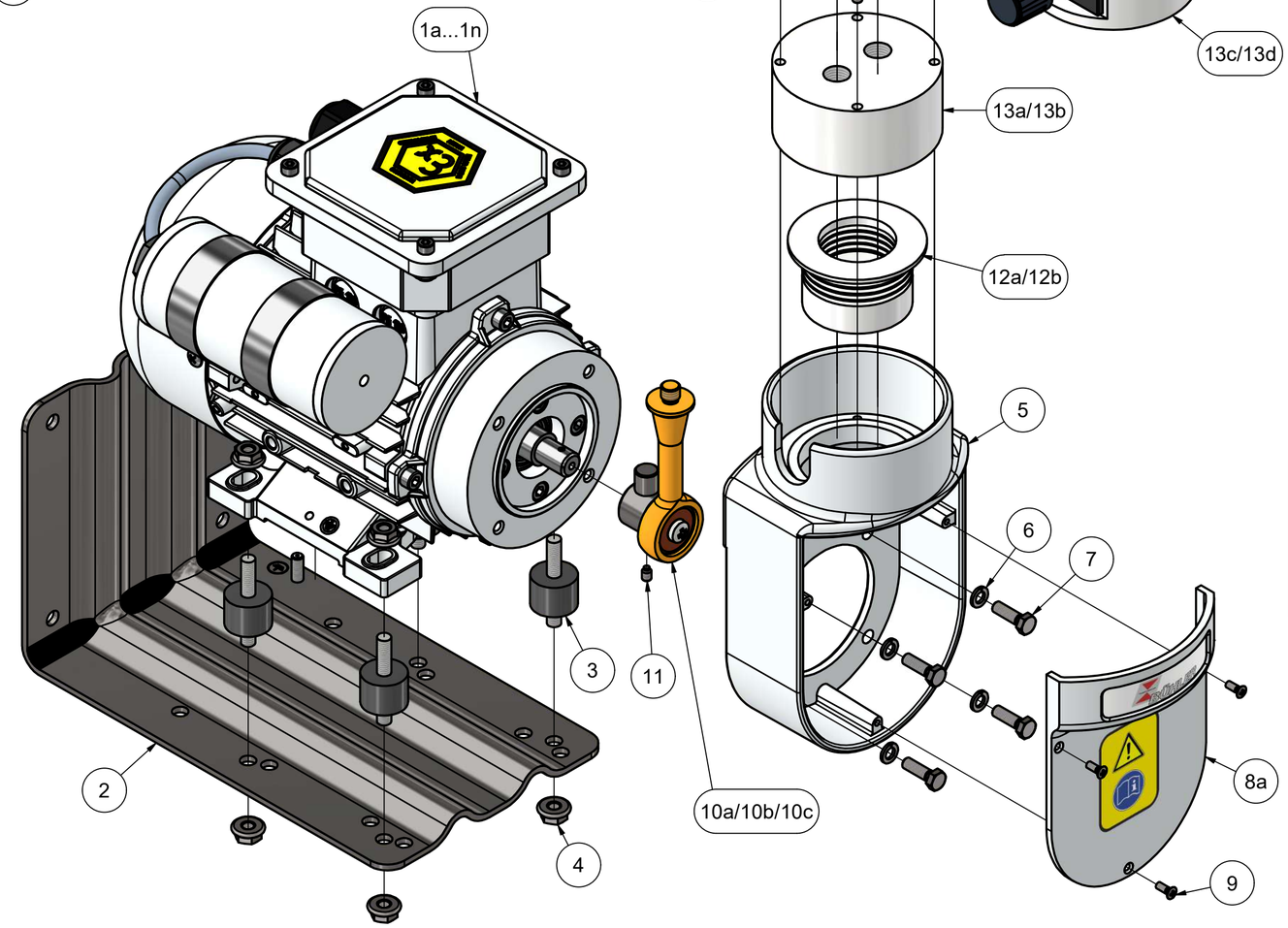


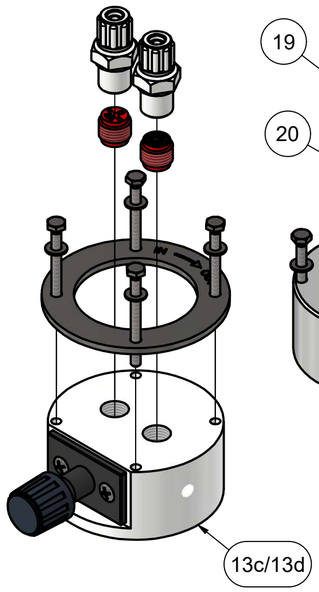
10 附录

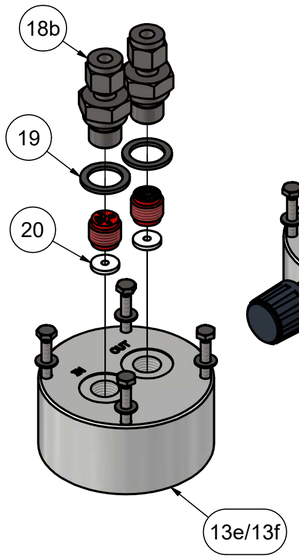
- 图纸: 42/025-Z02-01-2, 42/025-Z02-03-2
- 符合性声明: KX 42 0002
- 操作手册: 电动机
- 认证: FM21NUS0010, FM21NCA0007
- RMA -去污声明

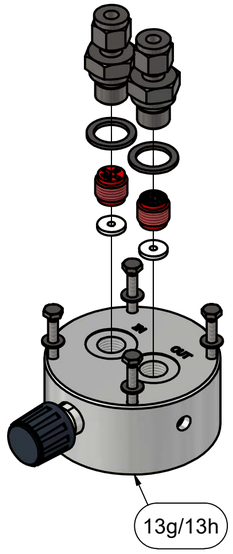


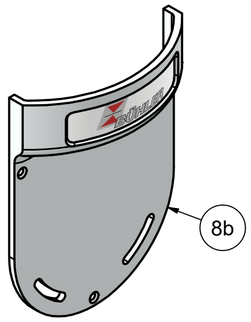












Die Pumpentypen P2.4, P2.84, P2.4C, P2.4 Atex/Amex, P2.74 Atex und P2.84 Amex sind mit einem Zwischenflansch zwischen Motor und Pumpe ausgestattet. Beachten Sie hierzu zusätzlich die spezifische Explosions- und Montagezeichnung 42/025-Z02-02-2.

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:		
							Datum:	Name:	Benennung:		(b)
√ = √ Ro1						Bearb.	03.02.2021	Sundergeld	Montagezeichnung - Assembly drawing - P2.3, P2.83, P2.4, P2.84, P4.3, P4.83, P2.3C, P2.4C, P2.2 Atex / Amex, P2.4 Atex / Amex, P2.72 Atex, P2.74 Atex, P2.82 Amex, P2.84 Amex		
√ = √ Rz 63						Gepr.	27.05.2024				
√ = √ Rz 16		c	Übersetzung	24.05.24	Sun	BÜHLER Technologies GmbH 40880 Ratingen			ZeichnungsNr.: 42/025-Z02-01-2C		
√ = √ Rz 4		b	Bezeichn.	16.09.21	Sun				Art.Nr.: ---		
		a	Motor Nr	15.06.21	Sun	Ers.für:			Arbeitsanweisung:		
		Zust.	And.	Datum	Name						

Zeichnungsnummer/Drawing no. 42/025-Z02-03-2 | Rev.C | Date: 24.05.2024 | Autor: Sundergeld
Änderung: C = Übersetzungskorrektur => pump "head">"body"| Geprüft am: 27.05.2024 **| Prüfer:** Breitenmann

Legende und spezifische Zuordnung der Positionsnummern aus den Montagezeichnungen
Legend and specific assignment for the item numbers of the assembly drawings

42/025-Z02-01-2 & 42/025-Z02-02-2

Pos. No.	Description	Beschreibung	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	Kupplungsnabe	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 den wesentlichen Anforderungen der Richtlinie

2006/42/EG

(MRL)

in ihrer aktuellen Fassung entsprechen.

Herewith declares Bühler Technologies GmbH that the following products correspond to the essential requirements of Directive

2006/42/EC

(MD)

in its actual version.

Die Produkte sind Maschinen nach Artikel 2 a).

The products are machines according to article 2 (a).

Produkt / *products*: Messgaspumpen / *Sample gas pumps*
Typ / *type*: P4.3, P4.83

Das Betriebsmittel ist für den Einbau in Gasanalysesystemen bestimmt und für das Fördern von ausschließlich gasförmigen Medien vorgesehen
The equipment is designed for installation in gas analyser systems and is designed to transport only gaseous media.

Das oben beschriebene Produkt der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:
The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

EN 809:1998+A1:2009 + AC:2010

EN 60204-1:2018

Zusätzlich wurden berücksichtigt:
In addition, the following standards have been used:
EN ISO 12100:2010

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
This declaration of conformity is issued under the sole responsibility of the manufacturer.

Dokumentationsverantwortlicher für diese Konformitätserklärung ist Herr Stefan Eschweiler mit Anschrift am Firmensitz.
The person authorised to compile the technical file is Mr. Stefan Eschweiler located at the company's address.

Ratingen, den 15.09.2022

Stefan Eschweiler
Geschäftsführer – *Managing Director*

Frank Pospiech
Geschäftsführer – *Managing Director*

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen,
Tel. +49 (0) 21 02 / 49 89-0, Fax. +49 (0) 21 02 / 49 89-20
Internet: www.buehler-technologies.com

UK Declaration of Conformity

The manufacturer Bühler Technologies GmbH declares, under the sole responsibility, that the product complies with the requirements of the following UK legislation:

Machinery Safety Regulations 2008

Products: Sample gas pumps
Types: P4.3
P4.83

The equipment is designed for installation in gas analyser systems and is designed to transport only gaseous media.

The object of the declaration described above is in conformity with the relevant designated standards:

EN 809:1998+A1:2009 + AC:2010

EN 60204-1:2018

In addition, the following standards have been used:

EN ISO 12100:2010

Ratingen in Germany, 01.11.2022

Stefan Eschweiler
Managing Director

Frank Pospiech
Managing Director

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen,
Tel. +49 (0) 21 02 / 49 89-0, Fax. +49 (0) 21 02 / 49 89-20
Internet: www.buehler-technologies.com

Istruzioni di servizio

Prescrizioni sulla sicurezza uso e manutenzione del prodotto

Via Achille Grandi, 23 47030, San Mauro Pascoli (FC)
www.orange1.eu

Indicazioni sulle misure di sicurezza ed istruzioni per i motori trifase e i motori monofase

I simboli di seguito riportati servono da riferimento alle misure di sicurezza ed alle istruzioni supplementari contenute nelle presenti istruzioni di servizio.

Istruzioni speciali di sicurezza e garanzia

Pericolo

Attenersi strettamente alle misure di sicurezza ed alle istruzioni supplementari contenute nelle presenti istruzioni di servizio per la salvaguardia di persone e cose.

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.

Tutti i lavori di collegamento devono essere eseguiti da personale qualificato.

UTILIZZO PRESCRITTO E CONDIZIONI DI FUNZIONAMENTO

I motori a bassa tensione sono destinati a impianti industriali e sono conformi alle norme armonizzate EN 60034/IEC34. Se non espressamente previsto è vietato l'utilizzo in zone classificate per pericolo di esplosione ed incendio.
I motori sono adatti a temperature ambiente che vanno da -20°C a +40°C ed a luoghi con altitudine fino a 1000 m. s.l.m.

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 50081 e EN 50082 riguardanti fenomeni di compatibilità elettromagnetica - Direttiva 2004/108/EC 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.

Nei motori monofase il condensatore può rimanere caricato tenendo temporaneamente in tensione i morsetti anche a motore fermo.

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 <1,5M□ essiccare l'avvolgimento. Per la procedura di essiccazione rivolgersi direttamente al nostro ufficio tecnico.

INSTALLAZIONE

Tutte le operazioni di allacciamento elettrico devono essere eseguite da personale qualificato con motore fermo disinserito e nell'impossibilità di essere riavviato.
Il rotore è equilibrato dinamicamente con mezza chiavetta. Gli organi di accoppiamento devono essere equilibrati con mezza chiavetta 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 riaspirata 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. 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, il motore deve essere dotato di apposite scaldiglie anticondensa, fori di scolo sono da praticarsi nella posizione più idonea a seconda della posizione di installazione.

Nel caso di installazione di motori con flangia B14, assicurarsi che la lunghezza dei bulloni di fissaggio sia adeguata con il loro diametro e la profondità del foro: viti troppo lunghe possono causare danni all'avvolgimento del motore. Quando i fori sono fornito chiusi con viti e guarnizioni o-ring, ripristinare le guarnizioni in fase di accoppiamento.

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 delletre fasi

nel caso di motore monofase scambiare tra loro icavetti dell'avvolgimento ausiliario

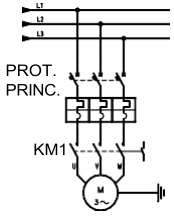
L'allacciamento elettrico deve essere eseguito in modo sicuro e permanente: utilizzare adeguati capicorda.

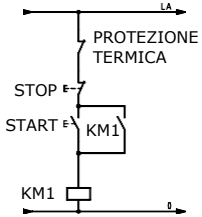
Le parti metalliche del motore che normalmente non sono sotto tensione devono essere francamente collegate a terra mediante un cavo di sezione adeguata di colore giallo-verde, utilizzando l'apposito morsetto contrassegnato all'interno della scatola morsettiera.
Nella scatola morsettiera non devono essere presenti corpi estranei, sporcizia ed umidità. Chiudere gli imbocchi dei cavi qualora restino inutilizzati ed usare adeguati passacavi qualora non siano stati forniti con il motore. Controllare cheil diametro del cavo sia compatibile con il pressacavo fornito od utilizzato.
Richiudere sempre il coperchio della scatola morsettiera per non alterare il grado di protezione previsto.

COLLEGAMENTO

Il collegamento elettrico deve sempre essere eseguito da personale qualificato in accordo con le vigenti norme IEE , EN 60204 ed eventuali prescrizioni locali.

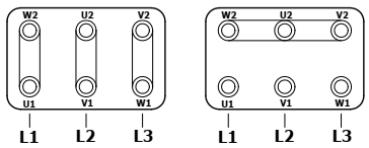
Fare sempre riferimento ai dati stampati sulla targa di tensione e frequenza per assicurarsi un corretto accoppiamento alla rete di alimentazione. Se non specificato si possono assumere tolleranze di ±5% sulla tensione e ±1% sulla frequenza indicati in targa.
I diagrammi di collegamento vengono normalmente 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.
Nel caso in cui il motore sia provvisto di protettore termico, collegare i cavi del protettore ad un contatto ausiliario del contattore sulla linea di alimentazione.



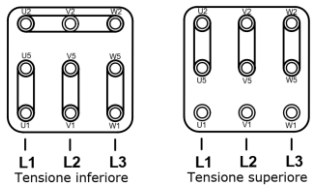


FUNZIONAMENTO:
Una volta avviato il motore a pieno carico controllare che parta e giri silenziosamente, e che non si verifichino vibrazioni eccessive o forti rumori anomali.
Per un primo esame di un eventuale anomalia fare riferimento alla tabella in calce.

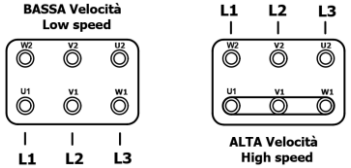
TRIFASE 1 VELOCITÀ 2-4-6-8 POLI (6 fili)



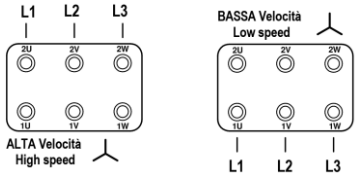
TRIFASE 1 VELOCITÀ 2-4-6-8 POLI (9 fili)



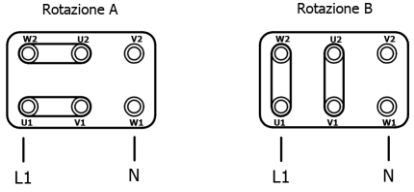
TRIFASE DOPPIA VELOCITÀ 1 AVVOLGIMENTO (DAHLANDER)



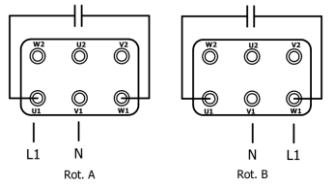
TRIFASE DOPPIA VELOCITÀ AVVOLGIMENTI SEPARATI



MONOFASE 4 FILI



MONOFASE 3 FILI



MANUTENZIONE:
All'occorrenza e periodicamente (in funzione dell'ambiente e del servizio) verificare e ripristinare se necessario:
- la pulizia del motore (assenza di oli, sporcizia, residui di lavorazione) ed il libero passaggio dell'aria di ventilazione
- il corretto serraggio delle connessioni elettriche, degli organi di accoppiamento e fissaggio meccanico del motore
- le condizioni delle tenute statiche e rotanti

il livello di vibrazione del motore (v eff<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.

ANOMALIA			Possibili cause	Rimedio
Cuscinetto troppo caldo	Cuscinetto rumoroso	Motore gira irregolarmente		
■			Cinghia troppo tesa	Diminuire la tensione della cinghia
■		■	Il giunto trasmette sforzi al motore	Riallineare il motore o il giunto
■			Temperatura aria raffreddamento >40°C (104 °F)	Ristabilire temperatura raffreddamento
■	■	■	Motore non montato correttamente	Controllare la forma costruttiva
		■	Sbilanciamento causato dalla puleggia o giunto	Controllare la bilanciatura
		■	Fissaggio labile del motore	Controllare il fissaggio
Se I rimedi sopra descritti non sono sufficienti, vi consigliamo di sostituire I cuscinetti				

ANOMALIA				Possibili cause	Rimedio
Non parte	Troppo caldo	Diminuzione velocità	Intervento protezioni		
■		■		Coppia resistente troppo alta	Controllare il motore e la coppia di carico
■		■		Tensione alimentazione troppo bassa	Verificare rete di alimentazione
■		■	■	Interruzione di una fase	Verificare rete di alimentazione
■	■	■	■	Errato collegamento	Verificare con schema
	■	■	■	Sovraccarico	Controllare dati di targa
	■		■	Frequenza di inserzioni troppo elevata	Controllare il tipo di servizio indicato in targa
	■			Ventilazione insufficiente	Controllare i canali di ventilazione
			■	Corto circuito nell'avvolgimento o nella scatola morsettiera	Verificare resistenza isolamento
			■	Eccessiva durata dell'avviamento	Verificare condizioni di avviamento

ORANGE1 ELECTRIC MOTORS

Service instructions

Safety prescriptions

Product use and maintenance

Via Achille Grandi, 23 47030, San Mauro Pascoli (FC)
PROTEZIONE

Indications on safety prescriptions and special instructions for three phase and single phase motors

These symbols will draw your attention to the safety measures and additional instructions given in these Operating Instructions.

Special instructions regarding safety and warran nger

For reasons of protection of persons and objects s y follow the safety measures and additional instructions given in these Operating Instructions.

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.

All work on electrical connections to the motors must be performedonly by qualified personnel.

SPECIFIED USE AND WORKING CONDITIONS

These low voltage motors are only intended for use in industrial plants and are in accordance with the relevant sections of EN 60034/IEC34.Their use in hazardous areas is prohibited, unless explicitly indicated.
The motors are suitable for ambient temperatures from -20°C (68°F) to +40°C (104°F) and altitudes <= 1000m above sea level.

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 with EN 50081 and EN 50082 standards on electromagnetic compatibility for the EMC (2004/108/EC) 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.

In single phase motors, capacitors can remain temporarily charged resulting in live terminals even after the motor has stopped. Discharge all the capacitors and ground every terminal before touching any connection.

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 M□ the winding must be dried. Contact our technical department directly for information on the drying procedure.

INSTALLATION

All work must only be done by qualified personnel with the low voltage motor and driven machine at standstill, electrically dead and locked against restart.
The rotor has been balanced dynamically with a half key fitted. 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.
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.
It is advisable to protect the motor with such as over-current 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, the motor must be equipped with heaters, drain holes must be positioned in places dependent on the installation configuration.

In case of installation of motors with face flange B14, make sure that the fixing screws are of a proper length compared to the tapped diameter: too long screws could damage the motor winding. In case of motor provided with screws and o-ring seals, such seals shall be replaced in the right position during the assembling.

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

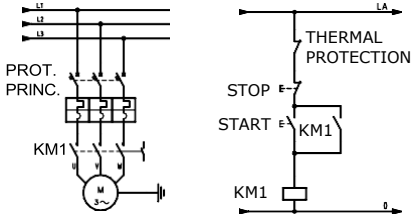
Connection must be made in such a way that a durably safe, electrical connection is maintained : adequate cable and associated equipment must be used.

Metallic parts that are normally not energized must be connected to earth by means of green-yellow cable of a proper section using the earth terminal inside the terminal box.
The terminal box must be free of foreign bodies, dirt and humidity. Open cablegland holes must be sealed.
Use appropriate cable glands if these are not included with the motor. Check ifthe cable diameter is compatible with the cable gland installed.
Always close the terminal box cover in order not to invalidate the protectionclass of the motor.

CONNECTION

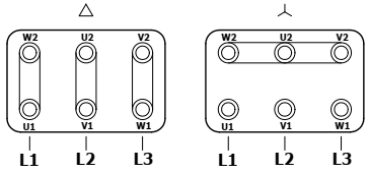
The electrical connection must be done by qualified personnel in accordance with appropriate regulations such as IEE, EN 60204 and local prescriptions.

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.
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 permitted operational loads.
In case the motor is provided with thermal protector connect the thermal protector cables to a auxiliary contact following the drawing:

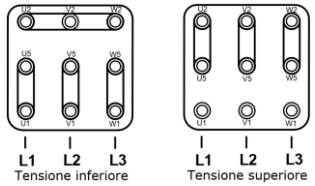


OPERATION:
Once the motor is running at full load check if the motor starts freely and runs smoothly and ensure excessive vibrations and high noise are absent.
For a first check following a failure please refer to the table below.

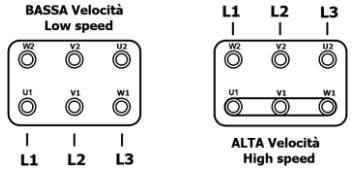
SINGLE SPEED 3-ph 2-4-6-8 POLES (6 wires)



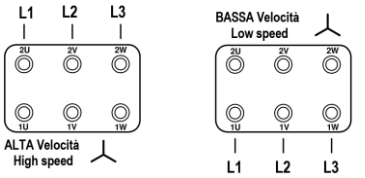
SINGLE SPEED 3-ph 2-4-6-8 POLES (9 wires)



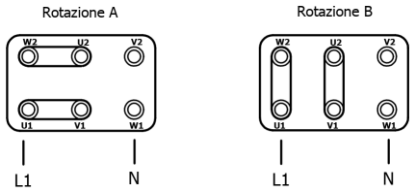
DOUBLE SPEED 3-ph SINGLE WINDING (DAHLANDER)



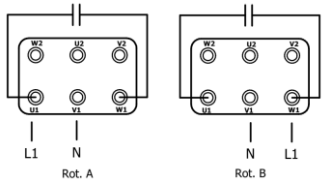
DOUBLE SPEED 3-ph SEPARATE WINDINGS



SINGLE PHASE 4 WIRES



SINGLE PHASE 3 WIRES



MAINTENANCE:
If necessary and periodically (depending on the environment and duty) verify and maintain as necessary to ensure:
- motor cleanliness (oil, 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<3,5mm/s for Pn<15KW v eff<4,5 mm/s for Pn>15KW) 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.

FAULT			Possible causes	Remedy
Bearing too hot	Bearing noise	Motor runs unevenly		
■			Pulley tension too high	Reduce pulley tension
■		■	Coupling forces are pulling or pushing	Realign motor, correct coupling
■			Coolant temperature above 40°C (104°F)	Adjust temperatureof cooling air
■	■	■	Motor incorrectly mounted	Correct the motor mounting
		■	Unbalance caused by pulley or coupling	Balance finely
		■	Motor fastening insecure	Improve fastening
If the remedies described here are insufficient, we recommend replacement of the bearings				

FAULT				Possible causes	Remedy
Doesn't start	Too hot	Speed reduction	Protective devices intervention		
■		■		Resisting torque is too high	Reduce the load torque
■		■		Mains voltage too low	Increase mains voltage
■		■	■	Phase interruption	Check mains supply
■	■	■	■	Wrong connection	Check with the wiring diagram
	■	■	■	Overload	compare data on rating plate with measurements
	■		■	Switching frequency too high	Observe rated duty type
	■			Insufficient ventilation	Check ventilation passages
			■	Short circuit of winding or terminal board	Measure insulation resistance
			■	Starting time exceeded	Reduce load torque/load inertia

FM Approvals
1151 Boston Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: **781 762 4300** F: 781-762-9375 www.fmapprovals.com

CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

P2.2 AMEX (P/N 4271XXXX99), P2.4 AMEX (P/N 4272XXXX99), P2.5 AMEX (P/N 4278XXXX99), P2.82 AMEX (P/N 4273XXXX99) and P2.84 AMEX (P/N4274XXXX99) Rated 115V/230V AC, 50/60Hz, 1.7A/0.89A. Sample Gas Pumps.
NI / I / 2 / BCD / T3, T4 Ta = -20 °C to +50 °C
x = denote power supply, position of pump head, material of pump head and material of valves.

For ordinary locations:

P2.3 (P/N 4256XXXX99), P2.4 (P/N 4257XXXX99), P2.5 (P/N 4258XXXX99), P2.83 (P/N4263XXXX99), P2.84 (P/N 4264XXXX99) Rated 115VAC, 50/60Hz, 1.7A and P4.3 (P/N 4280XXXXX99), P4.83 (P/N 4281XXXX99) Rated 115VAC, 50/60Hz, 1.7A . Sample Gas Pumps.
x = denote power supply, position of pump head, material of pump head, material of valves and accessories (only P4.XX)

Equipment Ratings:

Nonincendive electric apparatus for use in Class I, II, Division 2, Groups A, B, C & D indoor hazardous (Classified) locations and for use in ordinary Locations

FM Approved for:

Bühler Technologies GmbH
Ratingen D-40880 Germany

FM Approvals

Member of the FM Global Group

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3600	1998
Class 3611	2004
Class 3810	2005

Original Project ID: 3038101 Approval Granted: May 24, 2010

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date

FM Approvals LLC

J. E. Marquedant
Group Manager, Electrical

24 May 2010
Date

FM Approvals
Member of the FM Global Group

FM Approvals
1151 Boston Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: **781 762 4300** F: 781-762-9375 www.fmapprovals.com

CERTIFICATE OF COMPLIANCE

ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

P2.3 (P/N 4256XXXX99), P2.4 (P/N 4257XXXX99), P2.5 (P/N 4258XXXX99), P2.83 (P/N4263XXXX99), P2.84 (P/N 4264XXXX99) Rated 115VAC, 50/60Hz, 1.7A and P4.3 (P/N 4280XXXXX99), P4.83 (P/N 4281XXXX99) Rated 115VAC, 50/60Hz, 1.7A . Sample Gas Pumps.
x = denote power supply, position of pump head, material of pump head, material of valves and accessories (only P4.XX)

Equipment Ratings:

Industrial electrical equipment meeting basic electrical, mechanical and fire protection requirements.

FM Approved for:

Bühler Technologies GmbH
Ratingen D-40880 Germany

FM Approvals®

Member of the FM Global Group

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3600	2011
Class 3611	2004
Class 3810	2005

Original Project ID: 3038101 Approval Granted: 24 May 2010

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
120709	July 24, 2012		

FM Approvals LLC

J. E. Marquedant
Group Manager, Electrical

24 July 2012
Date

CERTIFICATE OF CONFORMITY

1. **ELECTRICAL EQUIPMENT PER US REQUIREMENTS**

2. **Certificate No:** **FM21NUS0010**

3. **Equipment:**
   (Type Reference and Name) **Model P2.3, P2.4, P2.83, P2.84, P4.3 and P4.83 Sample Gas Pumps**

4. **Name of Listing Company:** **Bühler Technologies GmbH**

5. **Address of Listing Company:** **Harkortstrasse 29**
   Ratingen
   D-40880
   Germany

6. The examination and test results are recorded in confidential report number:

   3038101 dated 24th May 2010

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   FM Class 3810:2005

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

24 September 2021
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to US Certificate of Conformity No: FM21NUS0010

8. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

9. **Equipment Ratings:**

The P2.3, P2.4, P2.83 and P2.84 pumps (models 4256*****9*00, 4257*****9*00, 4263*****9*00 and 4264*****9*00) operate at 115 Vac, at a current of 1.5 to 1.6 A, or 2.3 to 2.78 A, depending upon motor utilized. The P4.3 and P4.83 pumps (models 4280*****9*00 and 4281*****9*00) operate at 115 Vac, at a current of 2.55 to 2.8 A. The pumps are rated for an ambient temperature range of -20°C to +60°C.

10. **Description of Equipment:**

General – The sample pumps move sample gases from stacks to an analyzer. A sample pump consists of a motor and a pump head, which can be split by an intermediate flange with variable versions.

Construction – The sample pumps are of painted metal construction. The motors for the pumps provide a terminal box fitted with an M16x1.5 cable gland suitable for use with a 6 to 10 mm diameter cable.

Model types – Approved model number variants are as defined below.

42aabcdef9g00. Sample Gas Pumps, where:

aa = Base model: 56, 57, 63, 64, 80, 81
(where 56 = P2.3, 57 = P2.4, 63 = P2.83, 64 = P2.84, 80 = P4.3, 81 = P4.83)
b = Motor voltage: 2
c = Pump head position: 1, 2
d = Pump head material: 1, 2, 3, 4
e = Valve material: 1, 2
f = Screw-in connections: 9, 1, 2, 3, 5
g = Connection kit for parallel operation: 0, 1, 2

11. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

12. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

13. **Certificate History**

Details of the supplements to this certificate are described below:

SCHEDULE

to US Certificate of Conformity No: FM21NUS0010

Date	Description
24th May 2010	Original Issue.
24th July 2012	Supplement 1: Report Reference: 120709 dated 24th July 2012 Description of the Change: Create separate certificate for ordinary location certificate. Refer to FM21US0082X certificate history for changes to hazardous location pump variants under revision 120709.
24th September 2021	Supplement 2: Report Reference: RR228650 dated 24th September 2021. Description of the Change: Re-create certificate in new format. Reformat model number scheme in Certificate and Approval Guide listing. Remove erroneous references to FM Class 3600 and FM Class 3611 from certificate. Refer to FM21US0082X certificate history for changes to hazardous location pump variants under RR228650.

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

CERTIFICATE OF CONFORMITY

1. **ELECTRICAL EQUIPMENT PER US REQUIREMENTS**

2. **Certificate No:** **FM21NUS0010**

3. **Equipment:**
   (Type Reference and Name) **Model P2.3, P2.4, P2.83, P2.84, P4.3 and P4.83 Sample Gas Pumps**

4. **Name of Listing Company:** **Bühler Technologies GmbH**

5. **Address of Listing Company:** **Harkortstrasse 29**
   Ratingen
   D-40880
   Germany

6. The examination and test results are recorded in confidential report number:

   3038101 dated 24th May 2010

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   FM Class 3810:2005

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

2 December 2021
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to US Certificate of Conformity No: FM21NUS0010

8. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

9. **Equipment Ratings:**

The P2.3, P2.4, P2.83 and P2.84 pumps (models 4256*****9*00, 4257*****9*00, 4263*****9*00 and 4264*****9*00) operate at 115 Vac, at a current of 1.5 to 1.6 A, or 2.3 to 2.78 A, depending upon motor utilized. The P4.3 and P4.83 pumps (models 4280*****9*00 and 4281*****9*00) operate at 115 Vac, at a current of 2.55 to 2.8 A, or 2.8 to 3.4 A, depending upon motor utilized. The pumps are rated for an ambient temperature range of -20°C to +60°C.

10. **Description of Equipment:**

General – The sample pumps move sample gases from stacks to an analyzer. A sample pump consists of a motor and a pump head, which can be split by an intermediate flange with variable versions.

Construction – The sample pumps are of painted metal construction. The motors for the pumps provide a terminal box fitted with an M16x1.5 cable gland suitable for use with a 6 to 10 mm diameter cable.

Model types – Approved model number variants are as defined below.

42aabcdef9g00. Sample Gas Pumps, where:

aa = Base model: 56, 57, 63, 64, 80, 81
(where 56 = P2.3, 57 = P2.4, 63 = P2.83, 64 = P2.84, 80 = P4.3, 81 = P4.83)
b = Motor voltage: 2
c = Pump head position: 1, 2
d = Pump head material: 1, 2, 3, 4
e = Valve material: 1, 2
f = Screw-in connections: 9, 1, 2, 3, 5
g = Connection kit for parallel operation: 0, 1, 2

11. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

12. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

13. **Certificate History**

Details of the supplements to this certificate are described below:

SCHEDULE

to US Certificate of Conformity No: FM21NUS0010

Date	Description
24th May 2010	Original Issue.
24th July 2012	Supplement 1: Report Reference: 120709 dated 24th July 2012. Description of the Change: Create separate certificate for ordinary location certificate. Refer to FM21US0082X certificate history for changes to hazardous location pump variants under revision 120709.
24th September 2021	Supplement 2: Report Reference: RR228650 dated 24th September 2021. Description of the Change: Re-create certificate in new format. Reformat model number scheme in Certificate and Approval Guide listing. Remove erroneous references to FM Class 3600 and FM Class 3611 from certificate. Refer to FM21US0082X certificate history for changes to hazardous location pump variants under RR228650.
2nd December 2021	Supplement 3: Report Reference: RR230190 dated 2nd December 2021. Description of the Change: Addition of alternate motor supplier/type, impacting equipment ratings field of certificate.

FM Approvals
Member of the FM Global Group

FM Approvals
1151 Boston Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: **781 762 4300** F: 781-762-9375 www.fmapprovals.com

CERTIFICATE OF COMPLIANCE

ELECTRICAL EQUIPMENT
PER CANADIAN REQUIREMENTS

This certificate is issued for the following equipment:

P2.3 (P/N 4256XXXX99), P2.4 (P/N 4257XXXX99), P2.5 (P/N 4258XXXX99), P2.83 (P/N4263XXXX99), P2.84 (P/N 4264XXXX99) Rated 115VAC, 50/60Hz, 1.7A and P4.3 (P/N 4280XXXXX99), P4.83 (P/N 4281XXXX99) Rated 115VAC, 50/60Hz, 1.7A . Sample Gas Pumps.
x = denote power supply, position of pump head, material of pump head, material of valves and accessories (only P4.XX)

Equipment Ratings:

Industrial electrical equipment meeting basic electrical, mechanical and fire protection requirements.

FM Approved for:

Bühler Technologies GmbH
Ratingen D-40880 Germany

FM Approvals®

Member of the FM Global Group

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

CSA C22.2 61010-1, 2004 Re-affirmed 2009

Original Project ID: 3038101

Canadian Project ID: 3038101C

Approval Granted: July 24, 2012

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date

FM Approvals LLC

J. E. Marquedant

J. E. Marquedant
Group Manager, Electrical

24 July 2012
Date

CERTIFICATE OF CONFORMITY

1. **ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**

2. **Certificate No:** **FM21NCA0007**

3. **Equipment:**
   (Type Reference and Name) **Model P2.3, P2.4, P2.83, P2.84, P4.3 and P4.83 Sample Gas Pumps**

4. **Name of Listing Company:** **Bühler Technologies GmbH**

5. **Address of Listing Company:** **Harkortstrasse 29**
   Ratingen
   D-40880
   Germany

6. The examination and test results are recorded in confidential report number:

   3038101C_Rev120709 dated 24th July 2012

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   CAN/CSA-C22.2 No. 61010-1:R2009

8. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

24 September 2021
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to Canadian Certificate of Conformity No: FM21NCA0007

9. Equipment Ratings:

The P2.3, P2.4, P2.83 and P2.84 pumps (models 4256*****9*00, 4257*****9*00, 4263*****9*00 and 4264*****9*00) operate at 115 Vac, at a current of 1.5 to 1.6 A, or 2.3 to 2.78 A, depending upon motor utilized. The P4.3 and P4.83 pumps (models 4280*****9*00 and 4281*****9*00) operate at 115 Vac, at a current of 2.55 to 2.8 A. The pumps are rated for an ambient temperature range of -20°C to +60°C.

10. **Description of Equipment:**

General – The sample pumps move sample gases from stacks to an analyzer. A sample pump consists of a motor and a pump head, which can be split by an intermediate flange with variable versions.

Construction – The sample pumps are of painted metal construction. The motors for the pumps provide a terminal box fitted with an M16x1.5 cable gland suitable for use with a 6 to 10 mm diameter cable.

Model types – Approved model number variants are as defined below.

42aabcdef9g00. Sample Gas Pumps, where:
aa = Base model: 56, 57, 63, 64, 80, 81
(where 56 = P2.3, 57 = P2.4, 63 = P2.83, 64 = P2.84, 80 = P4.3, 81 = P4.83)
b = Motor voltage: 2
c = Pump head position: 1, 2
d = Pump head material: 1, 2, 3, 4
e = Valve material: 1, 2
f = Screw-in connections: 9, 1, 2, 3, 5
g = Connection kit for parallel operation: 0, 1, 2

11. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals Canadian Certification Requirements.

12. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

13. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
24th July 2012	Original Issue.

SCHEDULE

to Canadian Certificate of Conformity No: FM21NCA0007

Date	Description
24th September 2021	Supplement 1: Report Reference: RR228650 dated 24th September 2021. Description of the Change: Re-create certificate in new format. Reformat model number scheme in Certificate and Approval Guide listing. Refer to FM21CA0055X certificate history for changes to hazardous location pump variants under RR228650.

CERTIFICATE OF CONFORMITY

1. **ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**

2. **Certificate No:** **FM21NCA0007**

3. **Equipment:**
   (Type Reference and Name) **Model P2.3, P2.4, P2.83, P2.84, P4.3 and P4.83 Sample Gas Pumps**

4. **Name of Listing Company:** **Bühler Technologies GmbH**

5. **Address of Listing Company:** **Harkortstrasse 29**
   Ratingen
   D-40880
   Germany

6. The examination and test results are recorded in confidential report number:

   3038101C_Rev120709 dated 24th July 2012

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   CAN/CSA-C22.2 No. 61010-1:R2009

8. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

2 December 2021
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

SCHEDULE

to Canadian Certificate of Conformity No: FM21NCA0007

9. **Equipment Ratings:**

The P2.3, P2.4, P2.83 and P2.84 pumps (models 4256*****9*00, 4257*****9*00, 4263*****9*00 and 4264*****9*00) operate at 115 Vac, at a current of 1.5 to 1.6 A, or 2.3 to 2.78 A, depending upon motor utilized. The P4.3 and P4.83 pumps (models 4280*****9*00 and 4281*****9*00) operate at 115 Vac, at a current of 2.55 to 2.8 A, or 2.8 to 3.4 A, depending upon motor utilized. The pumps are rated for an ambient temperature range of -20°C to +60°C.

10. **Description of Equipment:**

General – The sample pumps move sample gases from stacks to an analyzer. A sample pump consists of a motor and a pump head, which can be split by an intermediate flange with variable versions.

Construction – The sample pumps are of painted metal construction. The motors for the pumps provide a terminal box fitted with an M16x1.5 cable gland suitable for use with a 6 to 10 mm diameter cable.

Model types – Approved model number variants are as defined below.

42aabcdef9g00. Sample Gas Pumps, where:

aa = Base model: 56, 57, 63, 64, 80, 81
(where 56 = P2.3, 57 = P2.4, 63 = P2.83, 64 = P2.84, 80 = P4.3, 81 = P4.83)
b = Motor voltage: 2
c = Pump head position: 1, 2
d = Pump head material: 1, 2, 3, 4
e = Valve material: 1, 2
f = Screw-in connections: 9, 1, 2, 3, 5
g = Connection kit for parallel operation: 0, 1, 2

11. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals Canadian Certification Requirements.

12. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

13. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
24th July 2012	Original Issue.

SCHEDULE

to Canadian Certificate of Conformity No: FM21NCA0007

Date	Description
24th September 2021	Supplement 1: Report Reference: RR228650 dated 24th September 2021. Description of the Change: Re-create certificate in new format. Reformat model number scheme in Certificate and Approval Guide listing. Refer to FM21CA0055X certificate history for changes to hazardous location pump variants under RR228650.
2nd December 2021	Supplement 2: Report Reference: RR230190 dated 2nd December 2021. Description of the Change: Addition of alternate motor supplier/type, impacting equipment ratings field of certificate.

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: information@fmapprovals.com www.fmapprovals.com

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

Ansprechpartner/ 联系人

Name/ 姓名

Abt./ 部门

Tel./ 电话

E-Mail

Gerät/ 设备

Anzahl/ 数量

Auftragsnr./ 订单号码

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

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, Lebensgefahr/ 有毒的, 致命危险	☐ gesundheitsgefährdend/ 危害健康的	☐ gesundheitsschädlich/ 对人体有害的	☐ umweltgefährdend/ 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者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

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen
Tel. +49 (0) 21 02 / 49 89-0, Fax: +49 (0) 21 02 / 49 89-20
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.

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。

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，请使用备件的包装或自选一符合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。

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen
Tel. +49 (0) 21 02 / 49 89-0, Fax: +49 (0) 21 02 / 49 89-20
E-Mail: service@buehler-technologies.com
Internet: www.buehler-technologies.com