



## 取样气泵

P1. 3



## 安装及使用说明书

原版使用说明书





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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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# 1 引言

## 1.1 合规应用

型号为P1.3的样气泵被设计安装于工业应用中的气体分析系统中。

样气泵P1.3的完整的标记为：

<b>P1.3 Atex</b>	FM16ATEX0018X	II 3G Ex nA nC IIC T4...T3 Gc
	---	II 3/3G c IIC T3/T4 X (由比勒科技有限公司考察)
<b>P1.3 IECEX</b>	IECEX FMG 16.0012X	Ex nA nC IIC T4...T3 Gc
<b>P1.3 US/Canada</b>	Cl. I, Div. 2, Gps. A, B, C, D, T4...T3	

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“[技术规格](#) [ > 页 25]”中。可燃介质可被加热到高达此值。必须指出的是，原则上只可将可燃性气体加热其至各自燃点的80%。这两个值中较小的那个是最大介质温度。

若气流在波纹管/泵本体中导致危险的静电荷积聚（参见“[运行和操作](#) [ > 页 14]”章节），一般**禁止**采集气体介质。

在样气泵与其他依流程图位于样气泵气体出口处的系统元素（如冷却器、分析仪、过滤器、流量调节器等）间，须总是安装至少20 cm的软管或管道，以确保温度等级。

样气泵P1.3不适于液体。可于介于0 °C 至 50 °C的环境温度中使用该泵。不允许于室外安装及操作。

请注意就特定预期用途、现有的材料组合及压力和温度限制的说明。

## 1.2 适用标准

**FM US:** FM 3600:2011, FM 3611:2004, FM 3810:2005

**FM Canada:** CSA C22.2 No.213:2012, CSA C22.2 No.1010.1:2004

**Atex:** EN 60079-0:2012 + Nachtrag A11:2013, EN 60079-15:2010

**IECEX:** IEC 60079-0:2011, IEC 60079-15:2010

比勒科技有限公司将下列标准视为“内部生产控制”的一部分：

EN 13463-1:2009, EN 13463-5:2011

## 1.3 特别条件

### 1.3.1 一般条件

为了满足温度等级T4或T3的要求，就显得尤为重要，保证了P1.3E型泵的环境温度不超过50° C。

本产品的温度等级定义如下：

气体类型	最高介质温度	温度等级	
		在安装地	气路中
不可燃	50 ° C	T4	---
	70 ° C	T3	---
可燃	50 ° C	T4	T3

### 1.3.2 FM US/CANADA特别版

该装置必须被安装于一个需用工具启示的机壳中，它应按终端应用的规定足以改装、装配、距离和分离。

### 1.3.3 IECEX/ATEX特别版

运营者必须提供过压保护装置。这必须防止泵的过压>铭牌额定电压的140 %。

必须将泵安装在防护等级最低为IP54（IEC/ EN 60079-15）的外壳中。不得将壳体设计为无需工具即可打开，也必须满足IEC/EN 60079-0和IEC/EN 60079-15的要求。



## 1.4 物品编号结构

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	1	x	x	x	00	产品特征
										<b>基本型</b>
	30									P1.3 ATEX, IECEX, US/Canada
										<b>电机电压</b>
		1								230 V 50 Hz 0.48 A
		2								115 V 60 Hz 0.84 A
		3								12 V DC 1.55 A (应要求)
		4								24 V DC 0.8 A
										<b>泵头位置</b>
			1							正常位置 垂直
			2							已旋转180° *
										<b>泵头材料</b>
				1						PTFE
				2						VA (1.4571)
				3						带旁通阀的PVDF
				4						PVDF
										<b>阀材料</b>
					1					至70 ° C; PTFE/PVDF
										<b>螺纹连接（取决于泵体）</b>
						0				不带接头
						1				PVDF DN 4/6 *
						2				PVDF 1/4 “-1/6 “ *
						3				PVDF 1/4 “-1/8 “ *
						5				VA (1.4401) 6 mm **
						6				VA (1.4401) 1/4 “ **
										<b>安装附件</b>
							0			不带
							1			安装支架和减震套装
							2			仅减震套装
										<b>机壳</b>
								0		不带机壳
								1		包含3 m连接线的机壳

\* 仅在PTFE或PVDF泵体上。

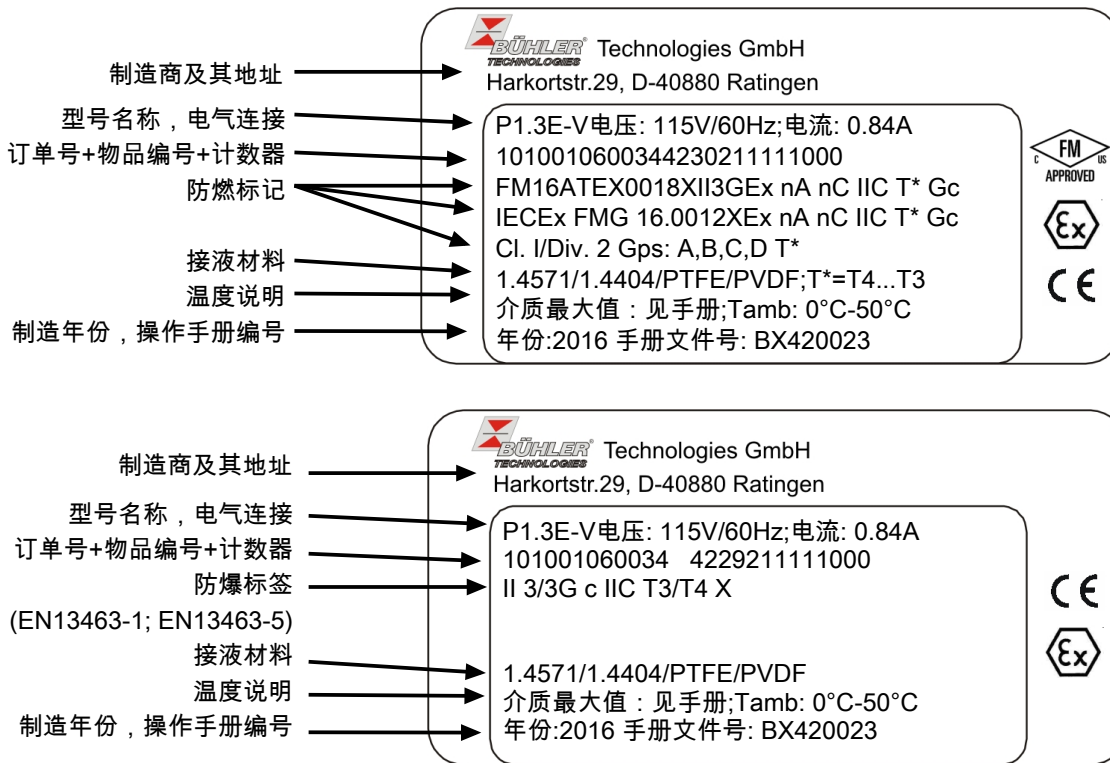
\*\* 仅在VA泵体上。

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。

## 1.5 铭牌

例如:



## 1.6 供货范围

- 1 x 取样泵带电机
- 1 x 产品说明文件
- 接头或安装附件 (选配项)

由于物流因素, 电路连接和/或选配附件, 例如接头和/或安装支架发货时并未组装好!

## 1.7 产品说明

取样气泵专用于输送气体介质。它不适用于液体。

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。

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“数据页”中。

### 提示



### 限制

样气泵P1.3可输送在正常运行时不会爆炸(从2区采样)的可燃性气体和非可燃性气体介质。若气流在波纹管/泵本体中导致危险的静电荷积聚(参见“运行”章节), 一般禁止从2区采集易气体介质。  
ATEX或IECEX版本适用于在II设备组, 3G类, 防爆组别IIC, 温度组别为T3...T4, 在多尘地区不得使用。  
美国/加拿大版本用于I类, 2区, A, B, C, D组。

如果使用时, 测量气体仍然潮湿, 可能会在导管内核泵体内形成冷凝物。这种情况下必须悬挂安装泵头(参见“悬挂泵头改装”项)。

### 提示



请勿在室外使用取样气泵!

## 2 安全提示

### 2.1 重要提示

#### 各种安全警告的定义

<b>危险</b>	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。
<b>警告</b>	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。
<b>注意</b>	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。
<b>提示</b>	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 常规性危险提示

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。这些均可在有效的协调标准，如 IEC 60079-14中找到。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。运输可燃气体时，存在爆炸危险。

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。

<b>危险</b>	<b>电压</b>	
	<p>有触电的危险</p> <p>a) 在进行所有作业时，断开设备电源。</p> <p>b) 确保设备不会意外地再次开启。</p> <p>c) 仅能由训练有素的人员打开设备。</p> <p>d) 注意电源电压是否正确。</p>	
<b>危险</b>	<b>有毒的刺激性气体会产生爆炸危险、中毒危险</b>	  
  	<p>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。</p> <p>a) 调试设备前，检查测量气体系统是否密封。</p> <p>b) 确保安全排出有害健康的气体。</p> <p>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。</p> <p>d) 维护时，防止有毒 / 刺激性的气体。穿戴相应的防护装备。</p>	
<b>危险</b>	<b>爆炸危险</b>	
	<p>不当使用情况下的气体泄漏引起的爆炸危险和生命危险。</p> <p>a) 请仅依本说明书中描述般使用设备。</p> <p>b) 请注意工艺条件。</p> <p>c) 检查管道的密封性。</p>	

**危险****绝热压缩（有爆炸危险）！**

因绝热压缩可能产生高的气体温度，须由用户进行检查。  
确保操作时遵守技术参数限制和使用条件，尤其是温度等级T4...T3下允许的介质温度。此外，该温度也随气体组成和环境温度而变化。必要时，操作者侧须以温度传感器监测，并须自动关闭气体泵。

**危险****因高温的爆炸危险**

设备的温度取决于介质温度。介质温度和泵的 **温度等级** 之间的关系被标于“数据页”中。  
请注意泵的温度等级T4...T3下允许的环境温度和介质温度。

**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。

**注意****倾斜风险**

设备的损坏  
确保设备在维护期间不被随意挪动或更改安装方式。

**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

气泵只能在原装箱或通过适当包装后才能运输。

需储存在有顶，干燥，防震，防尘的地方，温度需在-20° C 到40° C 之间。

**决不允许**将泵放置在室外保存。原则上，使用者必须考虑到防止设备遭到雷击的所有应用标准，否则可能会造成取样泵的损坏。

储存室内不得配备臭氧发生装置，例如荧光灯，汞弧灯，以及高电压设备。

## 4 安装和连接

### 注意



操作员需要使用正确的工具。

根据DIN EN 1127-1规定，操作员需要使用正确的工具。

### 4.1 安装地点要求

### 注意



对设备的损坏

防止设备受到粉尘，坠落物和外界冲击。

**雷击**

**决不允许。** 将泵放置在室外保存。原则上，使用者必须考虑到防止设备遭到雷击的所有应用标准，否则可能会造成取样泵的损坏。

### 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。

取样气泵P1.3是一个只允许于外壳中运行的内置式设备，该外壳（IP 54）能提供足够的保护，以免接触带电或运动的部件（风扇）。须防止水或污物侵入。

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。

电机的额定环境温度为0° C至+50° C，安装高度须≤海拔1000 m。

其他就安装地点的环境参数，请参阅操作和安装说明书末尾的“附录 [ > 页 25 ] ”章节。

### 4.2 安装

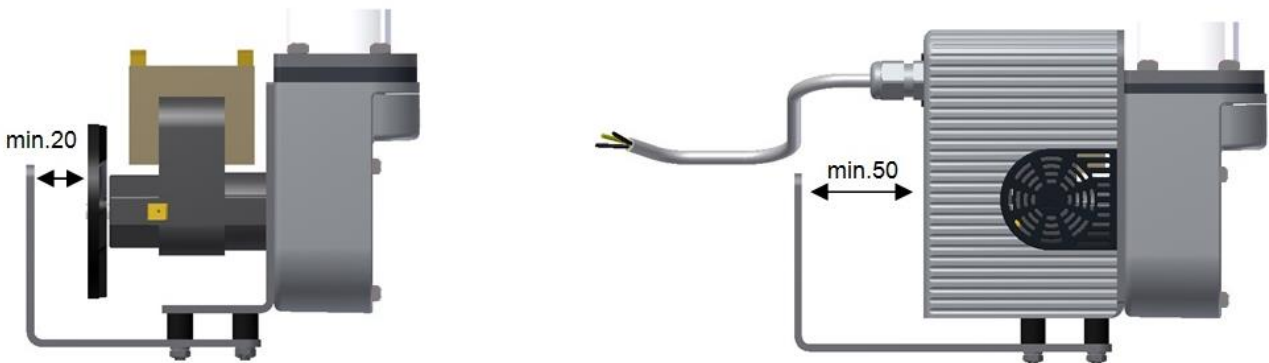
### 注意



对设备的损坏

防止设备受到粉尘，坠落物和外界冲击。

请使用合适的减震垫来安装泵，我们建议使用直径10mm，高度10mm，肖氏硬度70的减震垫。您也可以向我们订购。取样气泵四个基角处有四个M4螺纹孔用于安装减震垫。合适的减震垫、安装支架可以作为安装附件向我们单独采购。



若安装样气泵，须始终确保从电机到后壁有足够大的距离（20 mm）。

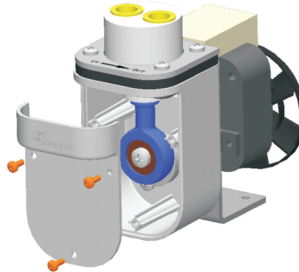
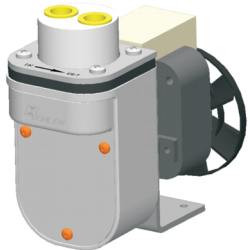
如果使用带外壳的样气（P1.3E型），则要求外壳与后壁之间的距离为50mm。这是连接电缆的最小允许弯曲半径的结果。

适用不同产品变体的特殊安装支架可作为附件提供。使用适当的安装支架，可以确保设备与后壁之间的正确距离。

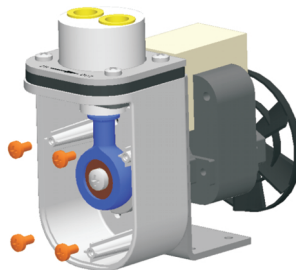
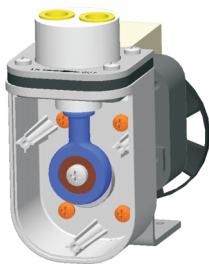
## 4.3 应对样气水分过量的特殊安装

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。

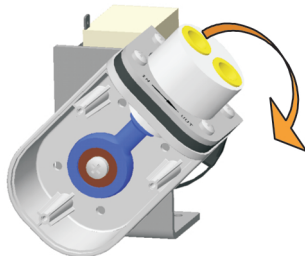
### 4.3.1 泵头朝下的改装



用梅花改锥（T10）将外壳上的3颗梅花螺丝（M3x8螺纹）取下。取下面壳。



拧下泵壳内4颗十字螺丝（M4x6螺纹）。



小心将泵头调转180度  
然后重新用3Nm扭力安装四颗十字螺丝并紧固。  
在紧固螺丝之前确保泵头处于四个基角中心。



最后重新用3颗梅花螺丝M3x8安装泵面板。



## 4.4 连接气体管线

在样气泵与其他依流程图位于样气泵气体出口处的系统元素（如冷却器、分析仪、过滤器、流量调节器等）间，须总是安装至少 20 cm 的软管或管道，以确保温度等级。

出厂时已以塑料塞将用于相应的接头的G1/4“ 螺纹孔堵塞，以防止污染。该接头通常不包括在发货范围内，但可作为附件另行购买，同时提供公制和英制规格。

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。

### 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流量计监测输送量，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）。

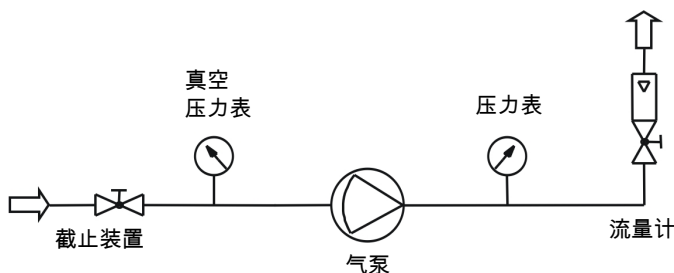


图1: 一个合适的监测流程图例

## 4.5 电气连接

### 危险



### 爆炸危险

在易燃或可燃环境中不得连接和断开电气连接。

### 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。

### 警告



机的配线 and 操作必须遵循当地有关在潜在易爆环境下线路配置的要求。例如EN60079-14。

### 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。

为样气泵装备了一个开关或断路器（根据IEC60947-1和IEC60947-3标准）。须将其布置成不易被用户触及。须将开关标记为设备用的切断装置。该开关一定不能接入到电源线中或中断地线。此外，还须将样气泵与带电部件全极断开。

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（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。带BLDC电机的样气泵已经在电机电子系统中集成了一个过热保护装置。

安全开关设置用额定电流（230V=0.48 A，115 V=0.84 A，24 V DC=0.8 A，12 V DC = 1.55 A）。

为泵电机确保正确的电压 **和** 频率（电压公差±5%，频率公差±2%）。

P1.3型号的泵(115 V/230 V)的电气连接借助6.3 mm规格的扁插头。

P1.3型号(12 V DC/24 V DC)和P1.3E型号(所有电压)的样气泵标配一根3米长的电缆。



须将地线连接至电机的接地扁插头上。对于型号为P1.3E (115 V/230 V) 的设备，须将地线连接至连接电缆的黄/绿线（见P1.3泵的电气连接图）。

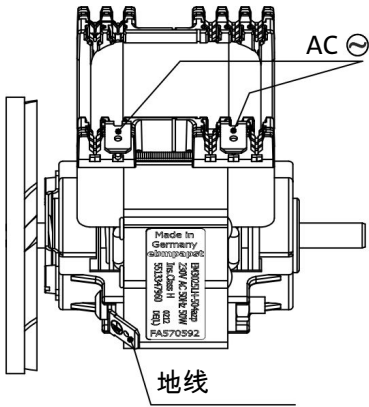
电源线及接地线的横截面必须与额定电流相适应。

请为电气连接，尤其为接地使用一根横截面至少为0.75 mm<sup>2</sup> 的电缆。

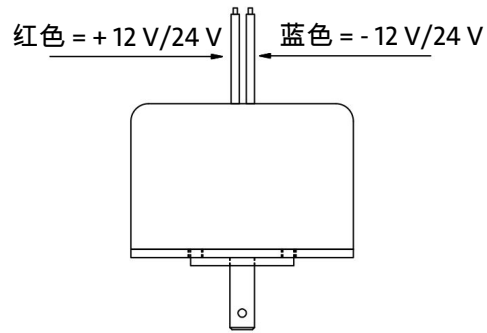
必须遵循铭牌上的不同信息。现场的条件必须符合所有铭牌数据。

必须采用适当的措施防止带电部件接触人体和/或异物介入。

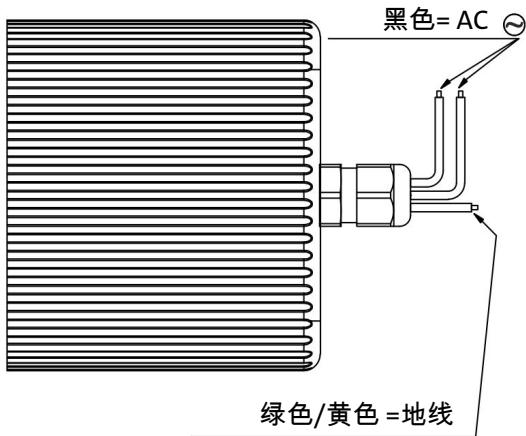
P1.3 115 V/230 V



P1.3 12 V/24 V



P1.3E 115 V/230 V



P1.3E 12 V/24 V

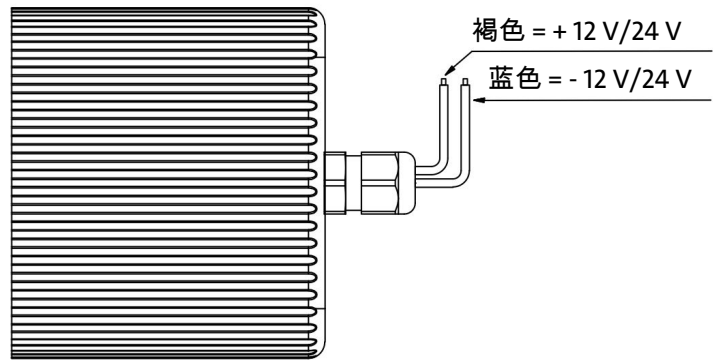


图2: P1.3泵电气连接

## 5 运行和操作

### 提示



禁止不合规操作设备！

### 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。

- 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



#### 绝热压缩（有爆炸危险）！

因绝热压缩可能产生高的气体温度，须由用户进行检查。确保操作时遵守技术参数限制和使用条件，尤其是温度等级T4...T3下允许的介质温度。此外，该温度也随气体组成和环境温度而变化。必要时，操作者侧须以温度传感器监测，并须自动关闭气体泵。

### 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。若气流在波纹管/泵本体中导致易燃静电荷积聚（波纹管/泵体中的投射面 $\sim 9 \text{ cm}^2$ ），**禁止**以泵P1.3 / P1.3E采集易爆气体介质（最大来自2区）。

### 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 $50^\circ \text{C}$ 的高温。根据安装现场条件，尽可能安置合适的警告提示。

## 5.1 开启气泵

### 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 $0.3 \text{ bar}$ 。
- 当连续运行时且流量低于 $150 \text{ l/h}$ ，旁路可用。
- 环境参数得以遵循。
- 铭牌数据得以遵循。
- 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。
- 在外壳盖的通风孔未被盖住或污染，而是自由畅通。
- 是否执行了保护措施；接地！
- 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，温度监控）。

### 启动泵后注意：

- 没有不正常的噪音和振动。
- 流量不会过高或过低，如果流量不稳定，表明波纹管有破损。

## 5.2 操作取样气泵

### 注意



### 活动部分有可能造成人身伤害

设备有可能受到坠落物和外界冲击以至损坏。注意任何情况下不要触及泵的活动部分。不允许泵不带泵面壳或带破损的面壳工作！

取样气泵设计用于输送气态介质，不适用于输送液态介质。

气泵的不得带压工作。系统压力高于0.3bar时不可以使用气泵。气体排空气路不可以被关闭。泵的流量不得小于50 l/h（150 l/h，系统压力 0.3 bar）。如果想要永久地把P1.1泵的流量降低到150 l/h，需要使用外部旁路阀。

### 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5圈。

## 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。

### 提示



在进行维护工作时，请使用附件中的备件示意图。

### 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。



### 注意



#### 倾斜风险

设备的损坏  
确保设备在维护期间不被随意挪动或更改安装方式。

### 注意



#### 气体泄露

在拆卸气泵时，气泵不能处于加压状态。

### 注意



#### 操作员需要使用正确的工具。

根据DIN EN 1127-1规定，操作员需要使用正确的工具。

### 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



#### 不正确地更换部件会有爆炸危险

更换部件时应格外小心，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。

**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。

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“更换吸排气阀”章节）。  
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。

## 6.1 维护计划

部件	工作时间范围	待执行的工作	执行人
泵体螺丝	500 小时后	以3 Nm的力重新拧紧螺丝	客户
整台泵	每隔500 小时	检查软管接头、保护和控制装置、功能是否正常、是否污损、是否密封。 损毁时更换或由Bühler技术部门维修。	客户
整台泵	每隔 8000小时或污染严重时	清洁整台泵 ，参见“泵托架清洁”。	客户
整台泵	制造日期6年后	更换整台泵	客户
阀门	每隔8000小时或压力下降时	检查阀门并根据需要更换， 参见章节“更换进口和出口阀门”。	客户
波纹管	每隔4000 小时或6 个月	，通过关上吸入管检查。损毁时维修， “参见检查波纹管”。	客户
波纹管	2 年后	更换波纹管， “参见更换波纹管”。	客户

## 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。

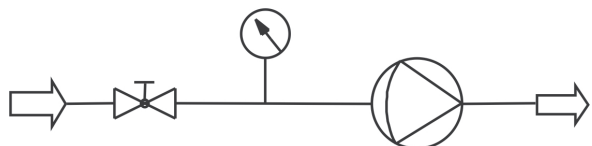
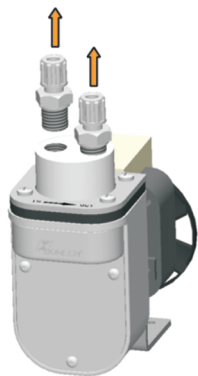


图3: 检查波纹管

## 6.3 更换入口出口单向阀



首先拧开旋入式接头。

用一个宽大的一字螺丝刀向外旋转入口或出口单向阀。

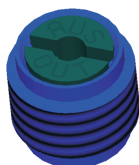
**注意:**对于带旁通阀的泵体PVDF和PVDF，气体入口和出口处装有PTFE垫片。您的备用阀门中同样也有这些。插入新垫片之前，请取出旧的。

入口或出口单向阀是同一的。其安装位置决定了功能。如在图中可见，阀的一侧为蓝色，另一侧为黑色。此外，以“EIN”或“IN”标注阀入口和以“AUS”或“OUT”标注阀出口。

入口单向阀



出口单向阀

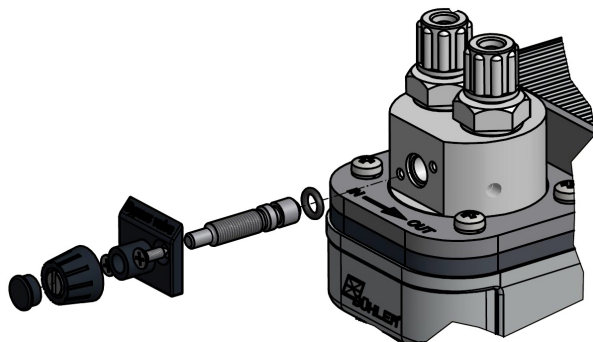


若欲组装气泵，请按相反顺序执行上述步骤。拧紧入口和出口单向阀时，务必遵循规定的旋入扭矩，最大为1 Nm。**注意!** 较强拧紧阀将导致泵本体的永久变形，可能更进一步导致更换泵。

安装旋入式接头时，请注意连接的严密性。

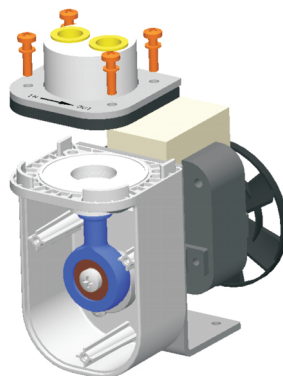
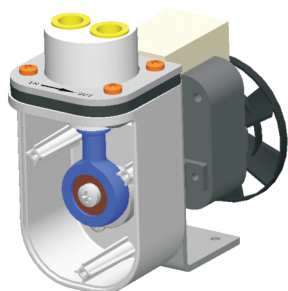
## 6.4 更换旁通阀的O型环（可选）

- 松开阀板上的两颗螺丝，并将整个单元拉出来。
- 以合适的O型环润滑脂（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，并拧紧螺丝。





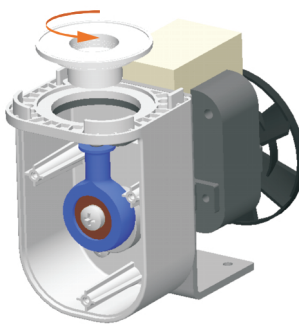
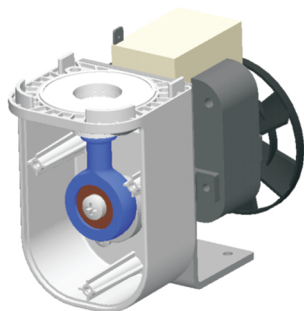
## 6.5 更换泵内部部件



先取下泵的面壳，见章节 泵头朝下的改装。

松开4颗 M4x18 大圆头螺钉，提起泵头，安装压环和胶垫。

## 6.6 更换波纹管



抓住波纹管的底部，也就是转动曲柄的上部，逆时针方向将其旋下。注意不要拆下任何其他垫片。

在重新安装波纹管之前，确保波纹管完好无损。

反序用手拧紧波纹管。

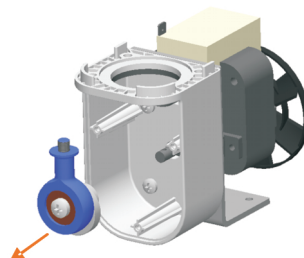
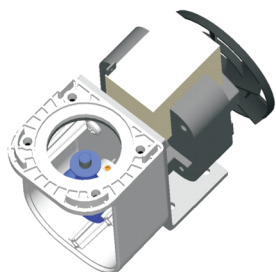
## 6.7 更换曲柄齿轮

### 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。



曲柄机构由带有滚珠轴承的曲柄和偏心轮组成。

拆除波纹管后，请用尺寸1.5的内六角扳手(或如果螺丝有Torx传动装置，则为Tx6)卸下偏心轮 M3中的螺纹杆。

现可从电机轴上取下曲轴机构。

安装替换部件前，请清洁电机轴，去除锈迹并用无树脂油润滑。

请以一滴中等强度的螺纹锁再次插入螺纹杆。在拧入螺纹杆时，请务必确保其位于轴的锁定孔中。在与孔接触后，再多拧90°，直到拧紧螺纹销钉。

## 6.8 组装取样气泵

如果取样气泵被拆卸，反序安装即可。请确保波纹管与泵头接触面清洁且没有被刮伤（即使很小的凹槽也可以导致泄漏）。首先用1Nm扭力装上4个M4x18大头螺钉，然后利用3Nm力将其紧固。

**注意!** 仅使用一次3Nm的扭力上紧螺丝。波纹管和PTFE泵头因为材质关系非常脆弱并保证了气体的高流动性。

检查取样气泵是否安装牢固，运转正常。

## 6.9 清洁泵支架

### 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。

- 拆下在外壳盖上的三个螺丝，并取出壳盖（参见“改造悬挂的泵体”章节）。
- 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）。
- 重新装上外壳盖，并拧紧在外壳盖上的三个螺丝。

## 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

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

- 维修/服务 -

Harkortstraße 29

40880 Ratingen

Deutschland

请将填写并签署好的 RMA 一去污声明附入包装。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

- 关闭设备并断开设备与总电源的连接。
- 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。



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	- 检查接头，保险丝和开关
泵无法送气	- 单向阀损坏	- 用气体冲刷阀，或更换新阀
	- 旁路阀被开启	- 关闭旁路阀
	- 波纹管破裂	- 更换波纹管
泵产生噪音	- 曲轴齿轮磨损	- 更换曲轴齿轮
供气量不足	- 泄漏	- 用合适的扭力重新紧固泵头螺丝，（见章节 组装取样气泵）。
	- 波纹管破裂	- 如果需要，检查并更换波纹管
	- 单向阀损坏	- 用气体冲刷阀，或更换新阀

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：

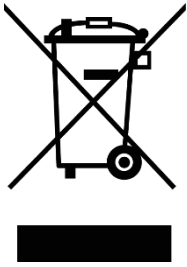
备件	订货号	备件图中的位置 42/018-Z03-01-2
波纹管	42 28 00 3	18
耐温 70 ° C 的单向阀组	42 28 06 6	2 x 23/26
曲轴齿轮备件组合	42 28 06 5	28
安装支架	42 28 06 0	6, 7, 8, 9, 10
带电机外壳型泵的安装支架	42 28 06 7	43a
减震垫带螺丝和锁紧垫片	42 28 06 1	43b
安装支架和减震套件	42 28 06 2	39, 40, 41, 42
用于带电机外壳型泵的安装支架和减震套件	42 28 06 3	39, 40, 41, 42, 43a

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 化学抗腐蚀性表

泵的湿材料可以在铭牌上找到。

方程式	物质名称	浓度	Teflon® PTFE	PCTFE	PEEK	PVDF	FFKM	Viton® FPM	V4A
CH <sub>3</sub> COCH <sub>3</sub>	Acetone丙酮		1/1	1/3	1/1	3/4	1/1	4/4	1/1
C <sub>6</sub> H <sub>6</sub>	Benzene苯		1/1	1/3	1/1	1/3	1/1	3/3	1/1
Cl <sub>2</sub>	Chlorine氯	10 % wet	1/1	0/0	4/4	2/2	1/1	3/0	4/4
Cl <sub>2</sub>	Chlorine氯	97 %	1/0	1/3	4/4	1/1	1/0	1/1	1/1
C <sub>2</sub> H <sub>6</sub>	Ethane乙烷		1/0	0/0	1/0	2/0	1/0	1/0	2/0
C <sub>2</sub> H <sub>5</sub> OH	Ethanol乙醇	50 %	1/1	1/3	1/1	1/1	1/1	2/2	1/0
C <sub>2</sub> H <sub>4</sub>	Ethene乙烯		1/0	0/0	0/0	1/0	1/0	1/0	1/0
C <sub>6</sub> H <sub>5</sub> C <sub>2</sub> H <sub>5</sub>	Ethylbenzene乙苯		1/0	0/0	0/0	1/1	1/0	2/0	1/0
HF	Hydrofluoric acid氢氟酸		1/0	0/0	0/0	2/2	2/0	4/0	3/4
CO <sub>2</sub>	Carbon dioxide二氧化碳		1/1	0/0	1/0	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 <sub>4</sub>	Methane甲烷	高纯	1/1	0/0	1/1	1/0	1/0	1/1	1/1
CH <sub>3</sub> OH	Methanol甲醇		1/1	1/1	1/1	1/1	1/1	3/4	1/1
CH <sub>2</sub> Cl <sub>2</sub>	Methylene chloride二氯甲烷		1/0	2/0	1/0	1/0	1/0	3/0	1/1
H <sub>3</sub> PO <sub>4</sub>	Phosphoric acid磷酸	1-5 %	1/1	1/1	1/1	1/1	1/1	1/1	1/1
H <sub>3</sub> PO <sub>4</sub>	Phosphoric acid磷酸	30 %	1/1	1/1	1/1	1/1	1/1	1/1	1/1
C <sub>3</sub> H <sub>8</sub>	Propane丙烷	气态	1/1	0/0	1/0	1/1	1/0	1/0	1/0
C <sub>3</sub> H <sub>6</sub> O	Propenoxide氧化丙烯		1/0	0/0	0/0	2/4	2/0	4/0	1/0
HNO <sub>3</sub>	Nitric acid硝酸	1-10 %	1/1	1/0	1/1	1/1	1/0	1/1	1/1
HNO <sub>3</sub>	Nitric acid硝酸	50 %	1/1	1/0	3/3	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	2/4
HCl	Hydrochloric acid盐酸	35 %	1/1	1/1	1/0	1/1	1/1	1/2	2/4
O <sub>2</sub>	Oxygen氧气		1/1	0/0	1/0	1/1	1/1	1/2	1/1
SF <sub>6</sub>	Sulfur hexafluoride六氟化硫		1/0	0/0	1/0	0/0	1/0	2/0	0/0
H <sub>2</sub> SO <sub>4</sub>	Sulfuric acid硫酸	1-6 %	1/1	1/1	2/2	1/1	1/1	1/1	1/2
H <sub>2</sub> S	Hydrosulphide硫化氢		1/1	1/1	0/0	1/1	1/1	4/4	1/1
N <sub>2</sub>	Nitrogen氮气		1/1	0/0	1/0	1/1	1/0	1/1	1/0
C <sub>6</sub> H <sub>5</sub> C <sub>2</sub> H <sub>3</sub>	Styrene苯乙烯		1/1	0/0	1/0	1/0	1/0	3/0	1/0
C <sub>6</sub> H <sub>5</sub> CH <sub>3</sub>	Toluene (Methylbenzene) 甲苯		1/1	0/0	1/0	1/1	1/1	3/3	1/1
H <sub>2</sub> O	Water水		1/1	0/0	1/1	1/1	1/1	1/1	1/1

表格 3: 化学抗腐蚀性表

0 - 完全抗腐蚀

1 - 几乎完全抗腐蚀

2 - 部分抗腐蚀

3 - 不抗腐蚀

4 - 无数据

每种介质给出两个数值，左边数值为零上20 度时值，右侧数字表示零上50 度时值。

### 重要提示

题为“塑料的耐化学性”“塑料材质的属性”的表单根据各个原材料生产者提供的信息而编译。数值完全符合实验室对原材料所做的测试。这些原材料所制成的塑料部件时常受到一些无法在实验室提供的模拟环境的影响（如，温度，压力，材料内部应力，化学物质，设计特点等）。因此表单中的数字仅作为参考值。如果无法确定您的工况对材质的影响，我们建议针对现场条件做实验。以上数值不可作为法律索赔依据，我们不对以上数字负任何法律责任。产品的化学和机械性能不足以评估其是否完全适用，如要特别考虑到易燃液体（爆炸保护）的立法。

要获得其他对物质的防腐蚀性，请另外询问我们。

## 10 操作日志 ( 复印模板 )

维护日期	设备号	运行时间	备注	签名

# 11 附录

## 11.1 技术规格

### 技术规格

额定电压/电流消耗:	230 V 50 Hz, 0.48 A 115 V 60 Hz, 0.84 A 12 V DC, 1.55 A 24 V DC, 0.8 A
防护等级OEM/外壳 & 12 V/24 V:	IP 00/IP 20
重量 (不计附件):	约1.3 kg (12 V/24 V 约0.8 kg)
介质温度:	见 温度等级
环境温度:	0 ° C 至 50 ° C
标称输送量:	280 l/h
接液材料	PTFE, PVDF, 1.4571, 1.4401, 氟橡胶
取决于配置:	

气体管道将通过旋入式转接头连接 (G1/4螺纹)。相应的管接头及安装支架和减振器可作为选件订购。

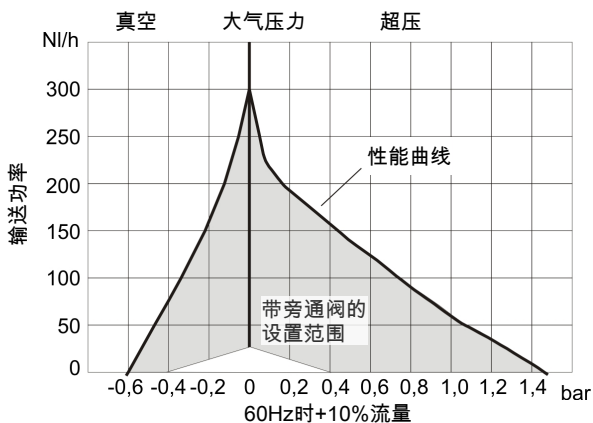
## 11.2 温度等级

气体类型	最高介质温度	温度等级	
		在安装地	气路中
不可燃	50 ° C	T4	---
	70 ° C	T3	---
可燃	50 ° C	T4	T3

## 11.3 防燃标记

Pl. 3 Atex	FM16ATEX0018X	II 3G Ex nA nC IIC T4...T3 Gc
	---	II 3/3G c IIC T3/T4 X (由比勒科技有限公司考察)
Pl. 3 IECEX	IECEX FMG 16.0012X	Ex nA nC IIC T4...T3 Gc
Pl. 3 US/Canada	Cl. I, Div. 2, Gps. A, B, C, D, T4...T3	

## 11.4 性能曲线

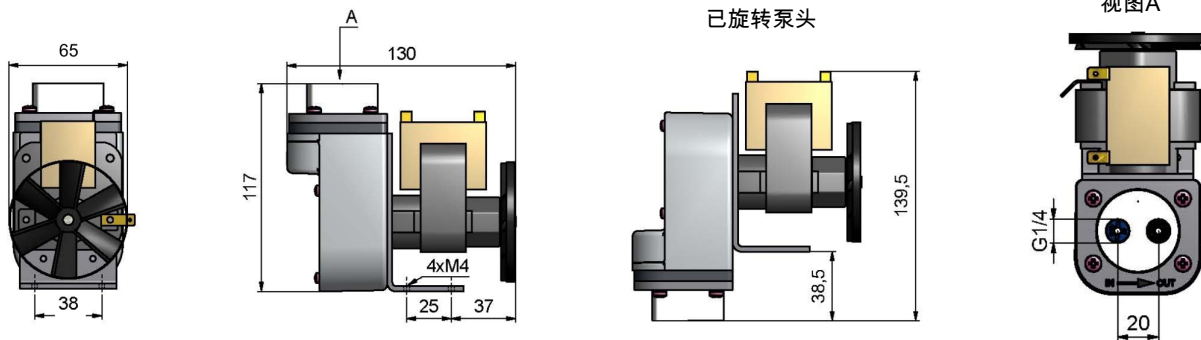


**提示:** 关于压力和流率, 请必须遵守操作说明书 (编号 420023) 第5章中的注意事项!

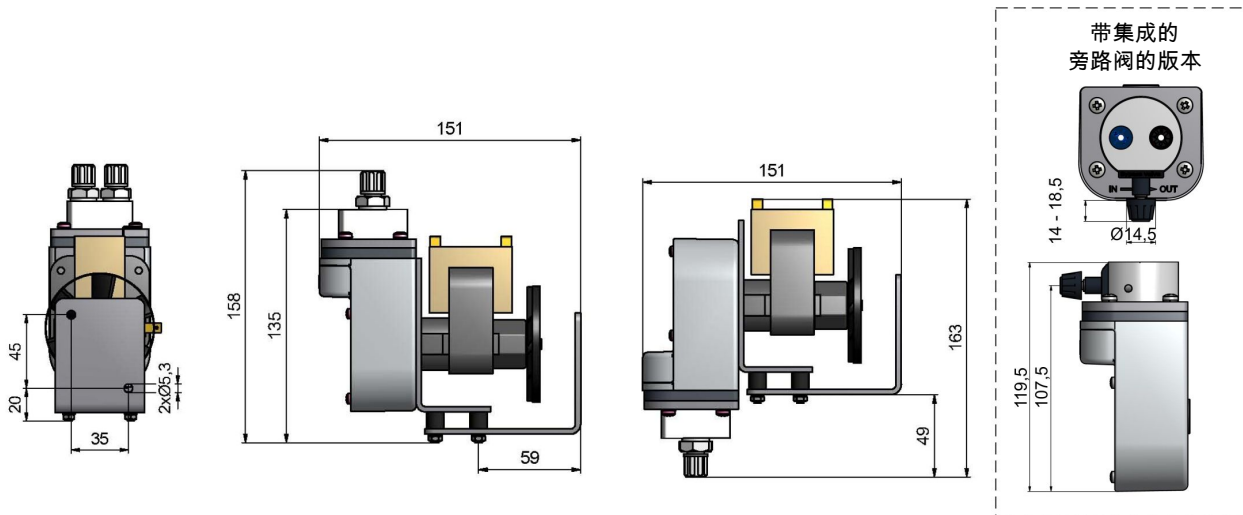
## 11.5 尺寸P1.3 (115V或230V)

P1.3样气泵的电气连接经由扁插座实现。

不带附件:

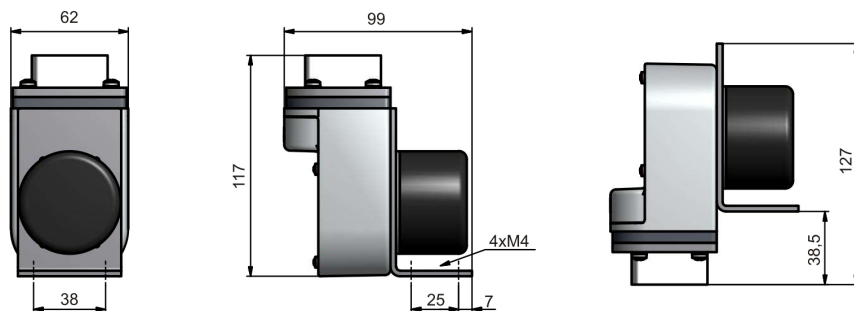


带附件:



## 11.6 P1.3尺寸 (24 V DC / 12 V DC)

为了连接P1.3 (24 V DC / 12 V DC) 样气泵, 标配有一根3m长的连接电缆以供使用。

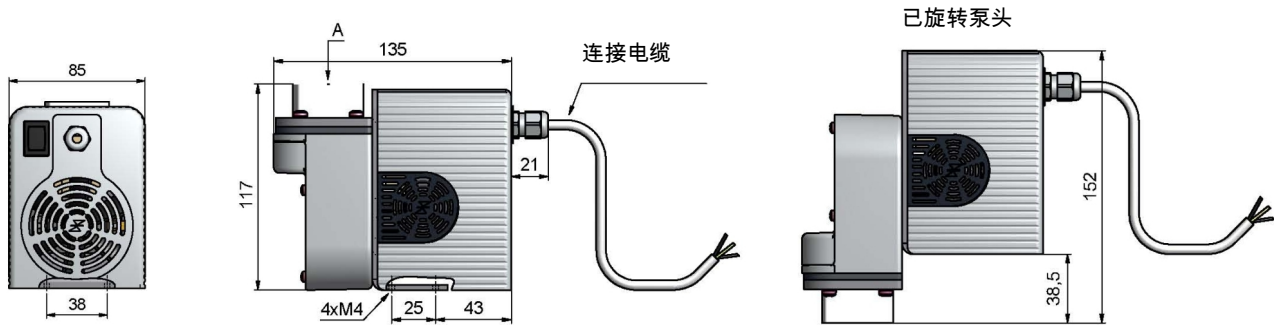




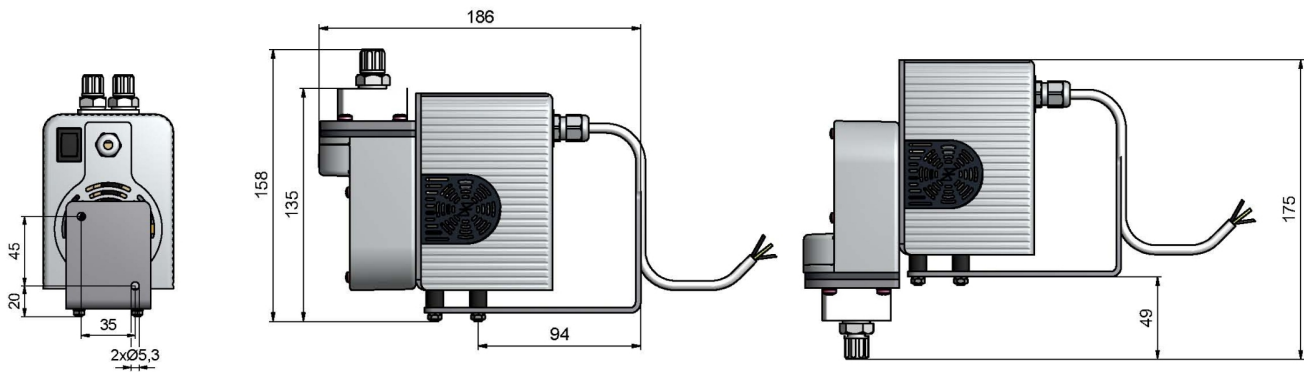
## 11.7 P1.3E尺寸 (所有电压)

为了连接P1.3E样气泵，标配有一根3m长的连接电缆以供使用。

不带附件：

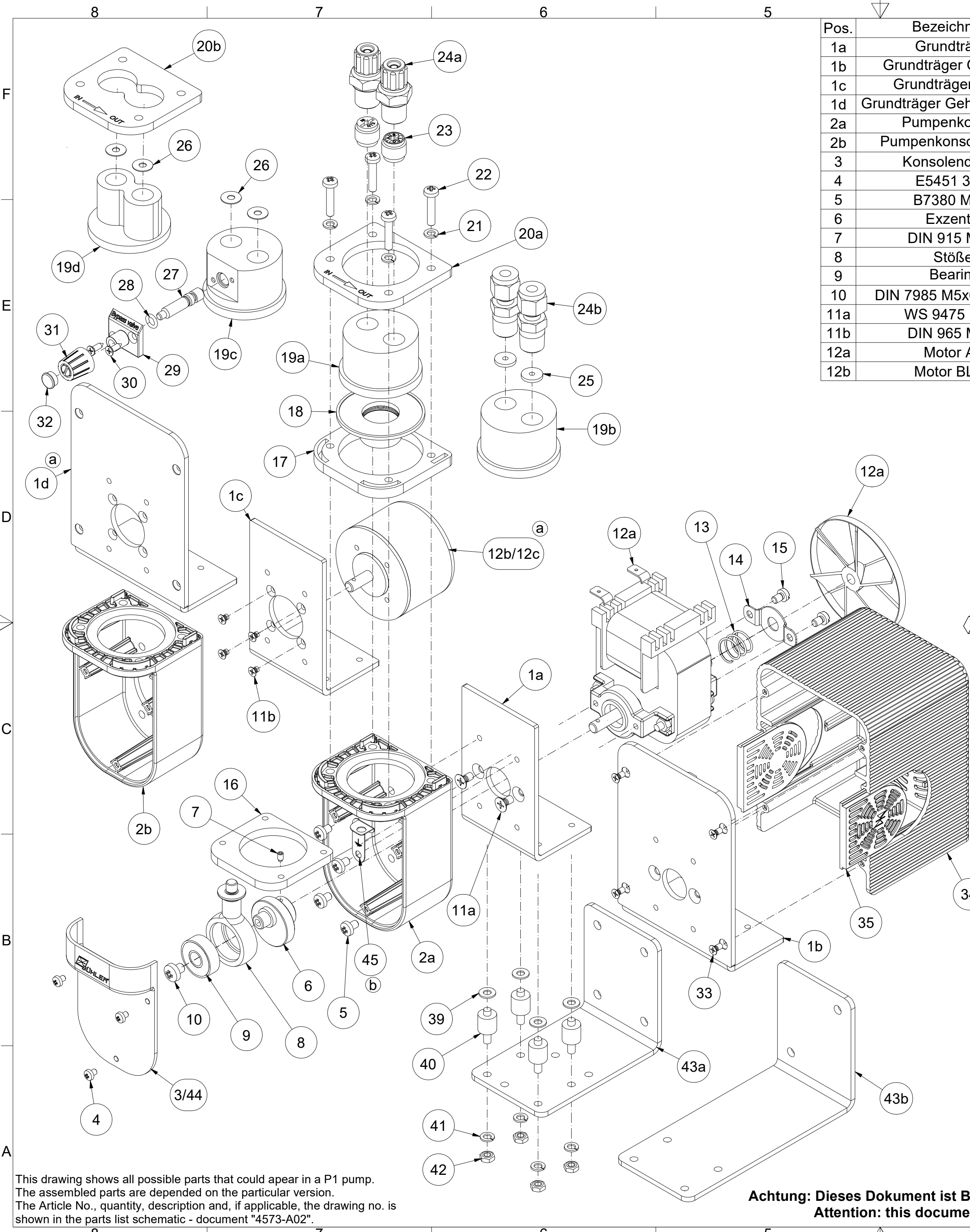


带附件：

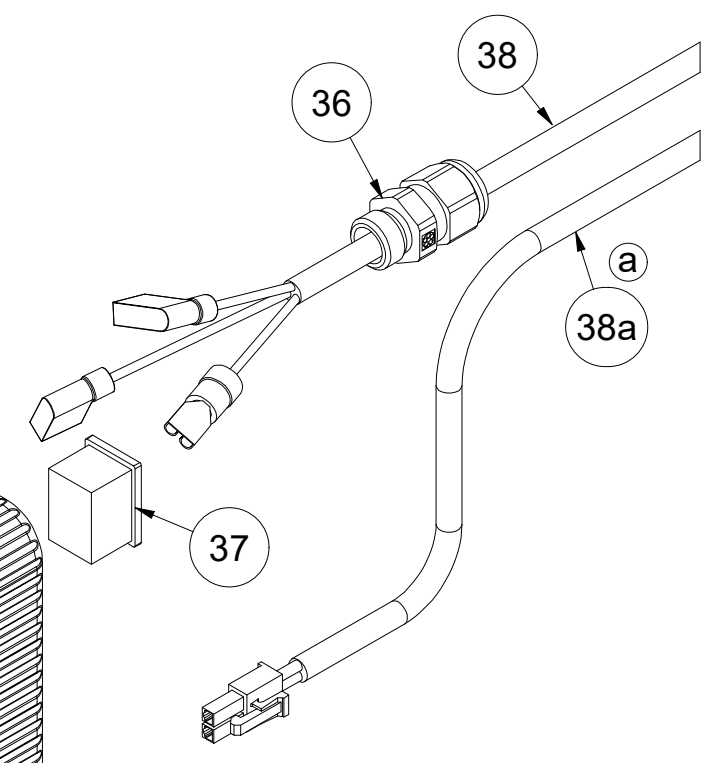


## 12 随附文档

- 替换件和装配图: 42/018-Z03-01-2
- 认证: FM16Atex0018X; IECEX FMG16; FM16CA0191X; FM16US0414X
- 符合性声明: KX420013
- RMA -去污声明



Pos.	Bezeichnung	Description	Pos.	Bezeichnung	Description
1a	Grundträger	base angel	12c	Motor BLDC mit Stecker	motor bldc with plug
1b	Grundträger Gehäuse	base angel enclosure	13	Feder	spring
1c	Grundträger BLDC	base angel bldc	14	Erdungsblech	protective ground sheet
1d	Grundträger Gehäuse BLDC	base angel enclosure bldc	15	DIN 85 M4x6	DIN 85 M4x6
2a	Pumpenkonsole	pump console	16	Gegenring	counter ring
2b	Pumpenkonsole BLDC	pump console bldc	17	Abdeckung	cover
3	Konsolendeckel	cover	18	Faltenbalg	bellow
4	E5451 30x8	E5451 30x8	19a	Pumpenkörper PTFE	pump head PTFE
5	B7380 M4x6	B7380 M4x6	19b	Pumpenkörper VA	pump head SS
6	Exzenter	Eccentric	19c	Pumpenkörper PVDF Bypass	pump head PVDF bypass
7	DIN 915 M3x5	DIN 915 M3x5	19d	Pumpenkörper PVDF	pump head PVDF
8	Stößel	Plunger	20a	Befestigungsring	mounting ring
9	Bearing	Kugellager	20b	Befestigungsring nur PVDF Körper	mounting ring only PVDF head
10	DIN 7985 M5x6 or M5x8	DIN 7985 M5x6 or M5x8	21	DIN 127 B4,1 oder DIN 6796	DIN 127 B4,1 or DIN 6796
11a	WS 9475 M4x8	WS 9475 M4x8	22	B7380 M4x20	B7380 M4x20
11b	DIN 965 M3x6	DIN 965 M3x6	23	Ein- Auslassventil	In- Outletvalve
12a	Motor AC	motor AC	24a	Verschraubung PVDF	Fitting PVDF
12b	Motor BLDC	motor bldc	24b	Verschraubung VA	Fitting SS
			25	Verdränger	displacer
			26	Dichtscheibe	valve sealing
			27	Spindel	spindle
			28	O-Ring	o-ring
			29	Ventilplatte	valve plate
			30	DIN 7982 2,9x9,5	DIN 7982 2,9x9,5
			31	Drehknopf	knob
			32	Abdeckung	cover
			33	E5454 30x8	E5454 30x8
			34	Gehäuseteil 1	enclosure part 1
			35	Gehäuseteil 2	enclosure part 2
			36	Kabelverschraubung	cable gland
			37	Blindstopfen	dummy plug
			38	Anschlusskabel	connection cable
			38a	Anschlusskabel BLDC	connection cable bldc
			39	DIN 125 A4,3	DIN 125 A4,3
			40	Gummi Puffer	vibration damper
			41	DIN 127 B4,1 oder DIN 6796	DIN 127 B4,1 or DIN 6796
			42	DIN 934 M4	DIN 934 M4
			43a	Montagekonsole	Mounting console
			43b	Montagekonsole Gehäuse	Mounting console enclosure
			44	Konsolendeckel mit Lüftungsschlitzen	Cover with ventilation slots
			45	Potentialausgleichsblech	Equipotential bonding sheet



Ersatzteile / Spare parts			
Bezeichnung	Description	Artikel Nr. / Article no.	Pos.Nr. / Pos. no.
Kurbeltrieb	crank assembly	4228065	6/7/8/9/10
Faltenbalg	bellow	4228003	18
Ventil 70°C (1 Stück)	Valve 70°C (1 piece)	4228006	23
Ventil 70°C (2 Stück)	Valve 70°C (2 Stück)	4228066	23/26
O-Ring	O-ring	9009398	28
Montagekonsole	Mounting console	4228060	43a
Montagekonsole Gehäuse	Mounting console enclosure	4228067	43b
Pufferset	Damper set	4228061	39/40/41/42
Montagekonsole & Pufferset	Mounting console & damper set	4228062	39/40/41/42/43a
Montagekonsole & Pufferset	Mounting console & damper set	4228063	39/40/41/42/43b

This drawing shows all possible parts that could appear in a P1 pump. The assembled parts are depended on the particular version. The Article No., quantity, description and, if applicable, the drawing no. is shown in the parts list schematic - document "4573-A02".

**Achtung: Dieses Dokument ist Bestandteil der FM-Zulassung**  
**Attention: this document is part of the FM-Approval**

Alle Kanten gratfrei	Alle Rechte vorbehalten	Maße ohne Toleranzangabe nach ISO 2768-mK	Maßstab: 1:1,6	Masse:
✓ = √ RøH		Datum: 13.10.2015	Werkstoff:	
✗ = √ Rz 63		Name: Sundergeld	Benennung: Exploded view of the P1.x Pumps	
✓ = √ Rz 16		Gepr.	ZeichnungsNr.: 42/018-Z03-01-2B	
✓ = √ Rz 6,3			Art.Nr.: 42...	
✓ = √ Rz 4			Arbeitsanweisung:	





# 1 TYPE EXAMINATION CERTIFICATE

2 Equipment or Protective systems intended for use in Potentially  
Explosive Atmospheres - Directive 94/9/EC

3 Type Examination Certificate No: FM16ATEX0018X

4 Equipment or protective system:  
(Type Reference and Name) P1.3 Sample Gas Pumps

5 Name of Applicant: Bühler Technologies GmbH

6 Address of Applicant: Harkortstraße 29  
40880, Ratingen, Germany

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Ltd. 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 to the Directive.

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

3057155 dated 11<sup>th</sup> April 2016

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0:2012 +A11:2013 and EN 60079-15:2010

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:



II 3 G Ex nA nC IIC T4...T3 Gc Ta = 0°C to +50°C



cn=Mick Gower, o=FM Approvals,  
ou,  
email=mick.gower@fmapprovals.  
com, c=GB  
2016.04.15 14:20:47 +01'00'

**Mick Gower**  
Certification Manager, FM Approvals Ltd.

Issue date: 15<sup>th</sup> April 2016

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: [atex@fmapprovals.com](mailto:atex@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

# SCHEDULE

to Type Examination Certificate No. FM16ATEX0018X

## 13 Description of Equipment or Protective System:

The P1 sample gas pumps carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components, the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps are available with or without a cover over the electronics and motor. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor. The P1.3 sample gas pump is for hazardous locations and the P1.1 sample gas pump is for the US and Canada general purpose non-hazardous locations.

Model Code Structure:

4230abc1def00. P1.3 Sample Gas Pump.

a = Motor voltage: 1, 2, 3 or 4.

b = Pump head position: 1 or 2.

c = Pump head material: 1, 2, 3 or 4.

d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.

e = Mounting accessories: 0, 1 or 2.

f = Housing: 0 or 1

## 14 Special Conditions for Safe Use:

1. The installer shall provide transient over-voltage protection of the supply connections at a voltage not to exceed 140% of the voltage rating of the pump.
2. The apparatus shall be mounted in an enclosure providing a minimum degree of protection of IP54 in accordance with EN 60079-15, and shall be installed within a tool-secured enclosure which meets the requirements of EN 60079-0 and EN 60079-15.
3. To maintain a T4 to T3 temperature class care shall be taken to ensure the enclosure temperature does not exceed 50°C.
4. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class
Non-flammable	70°C	T4
Flammable	50°C	T4
Flammable	70°C	T3

## 15 Essential Health and Safety Requirements:

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

## 16 Test and Assessment Procedure and Conditions:

This Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Ltd's ATEX Certification Scheme.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**



# SCHEDULE

to Type Examination Certificate No. FM16ATEX0018X

17 **Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by FM Approvals Ltd.

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
15 <sup>th</sup> April 2016	Original Issue.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

# 1 TYPE EXAMINATION CERTIFICATE



2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **Type Examination Certificate No:** FM16ATEX0018X

4 **Equipment or protective system:** P1.3 Sample Gas Pumps  
(Type Reference and Name)

5 **Name of Applicant:** Bühler Technologies GmbH

6 **Address of Applicant:** Harkortstraße 29  
40880, Ratingen, Germany

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Ltd. 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 to the Directive.

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

3057155 dated 11<sup>th</sup> April 2016

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0:2012 +A11:2013 and EN 60079-15:2010

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:



II 3 G Ex nA nC IIC T4...T3 Gc Ta = 0°C to +50°C



cn=Mick Gower, o=FM Approvals,  
ou,  
email=mick.gower@fmapprovals.  
com, c=GB  
2016.12.15 11:08:04 Z

**Mick Gower**  
Certification Manager, FM Approvals Ltd.

Issue date: 15<sup>th</sup> December 2016

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: [atex@fmapprovals.com](mailto:atex@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

F ATEX 029 (Apr/16)

Page 1 of 3

# SCHEDULE

to Type Examination Certificate No. FM16ATEX0018X

## 13 Description of Equipment or Protective System:

The P1 sample gas pumps carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components, the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps are available with or without a cover over the electronics and motor. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor.

Model Code Structure:

4230abc1def00. P1.3 Sample Gas Pump.

a = Motor voltage: 1, 2, 3 or 4.

b = Pump head position: 1 or 2.

c = Pump head material: 1, 2, 3 or 4.

d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.

e = Mounting accessories: 0, 1 or 2.

f = Housing: 0 or 1

## 14 Specific Conditions of Use:

1. The installer shall provide transient over-voltage protection of the supply connections at a voltage not to exceed 140% of the voltage rating of the pump.
2. The apparatus shall be mounted in an enclosure providing a minimum degree of protection of IP54 in accordance with EN 60079-15, and shall be installed within a tool-secured enclosure which meets the requirements of EN 60079-0 and EN 60079-15.
3. To maintain a T4 to T3 temperature class care shall be taken to ensure the ambient temperature does not exceed 50°C.
4. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class	
		at installation site	in gas path
Non-Flammable	50°C	T4	--
Non-Flammable	70°C	T3	--
Flammable	50°C	T4	T3

## 15 Essential Health and Safety Requirements:

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

FM Approvals Ltd, 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS

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# SCHEDULE

to Type Examination Certificate No. FM16ATEX0018X

**16 Test and Assessment Procedure and Conditions:**

This Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Ltd's ATEX Certification Scheme.

**17 Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by FM Approvals Ltd.

**18 Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
15 <sup>th</sup> April 2016	Original Issue.
15 <sup>th</sup> December 2016	<u>Supplement 1:</u> Report Reference: – RR207245 dated 9 <sup>th</sup> December 2016 Description of the Change: Temperature Class Table in Specific Conditions of Use and documentation update.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: [atex@fmapprovals.com](mailto:atex@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)



# 1 TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **Type Examination Certificate No: FM16ATEX0018X**

4 **Equipment or protective system: P1.3 Sample Gas Pumps (Type Reference and Name)**

5 **Name of Applicant: Bühler Technologies GmbH**

6 **Address of Applicant: Harkortstraße 29 40880, Ratingen, Germany**

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Europe Ltd. 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 to the Directive.

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

3057155 dated 11<sup>th</sup> April 2016

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0:2012+A11:2013 and EN 60079-15:2010

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:



II 3 G Ex nA nC IIC T4...T3 Gc Ta = 0°C to +50°C

  
Digitally signed by  
Damien Mc Ardle  
DN: cn=Damien Mc Ardle,  
o=FM Approvals, ou=FM  
Approvals Europe Ltd,  
email=damien.mcardle@f  
mapprovals.com, c=IE  
Date: 2019.04.12 13:28:30  
+01'00'

**Damien Mc Ardle**  
**Certification Manager, FM Approvals Europe Ltd.**

Issue date: 12<sup>th</sup> April 2019

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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T: +353 (0) 1761 4200 E-mail: [atex@fmapprovals.com](mailto:atex@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

# SCHEDULE

to Type Examination Certificate No. FM16ATEX0018X

## 13 Description of Equipment or Protective System:

The P1 sample gas pumps carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components, the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps are available with or without a cover over the electronics and motor. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor.

Model Code Structure:

4230abc1def00. P1.3 Sample Gas Pump.

a = Motor voltage: 1, 2, 3 or 4.

b = Pump head position: 1 or 2.

c = Pump head material: 1, 2, 3 or 4.

d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.

e = Mounting accessories: 0, 1 or 2.

f = Housing: 0 or 1

## 14 Specific Conditions of Use:

1. The installer shall provide transient over-voltage protection of the supply connections at a voltage not to exceed 140% of the voltage rating of the pump.
2. The apparatus shall be mounted in an enclosure providing a minimum degree of protection of IP54 in accordance with EN 60079-15, and shall be installed within a tool-secured enclosure which meets the requirements of EN 60079-0 and EN 60079-15.
3. To maintain a T4 to T3 temperature class care shall be taken to ensure the ambient temperature does not exceed 50°C.
4. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class	
		at installation site	in gas path
Non-Flammable	50°C	T4	---
Non-Flammable	70°C	T3	---
Flammable	50°C	T4	T3

## 15 Essential Health and Safety Requirements:

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

# SCHEDULE

to Type Examination Certificate No. FM16ATEX0018X

**16 Test and Assessment Procedure and Conditions:**

This Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

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This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX Certification Scheme.

**17 Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by FM Approvals Europe Ltd.

**18 Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
15 <sup>th</sup> April 2016	Original Issue.
15 <sup>th</sup> December 2016	<u>Supplement 1:</u> Report Reference: – RR207245 dated 09 <sup>th</sup> December 2016 Description of the Change: Temperature Class Table in Specific Conditions of Use and documentation update.
12 <sup>th</sup> April 2019	<u>Supplement 2:</u> Description of the Change: Certificate transferred from FM Approvals Ltd., notified body no. 1725, to FM Approvals Europe Ltd., notified body no. 2809.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**





# 1 TYPE EXAMINATION CERTIFICATE

2 Equipment or Protective systems intended for use in Potentially  
Explosive Atmospheres - Directive 2014/34/EU

3 Type Examination Certificate No: FM16ATEX0018X

4 Equipment or protective system:  
(Type Reference and Name) P1.3 Sample Gas Pumps

5 Name of Applicant: Bühler Technologies GmbH

6 Address of Applicant: Harkortstraße 29  
40880, Ratingen, Germany

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Europe Ltd. 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 to the Directive.

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

3057155 dated 11<sup>th</sup> April 2016

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0:2012+A11:2013 and EN 60079-15:2010

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:



II 3 G Ex nA nC IIC T4...T3 Gc Ta = 0°C to +50°C

 Digitally signed by  
Richard Zammitt  
DN: cn=Richard  
Zammitt, o, ou=FM  
Approvals Europe  
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email=richard.zammitt@  
fmapprovals.com, c=IE

**Richard Zammitt**  
Certification Manager, FM Approvals Europe Ltd.

Issue date: 07<sup>th</sup> April 2020

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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T: +353 (0) 1761 4200 E-mail: [atex@fmapprovals.com](mailto:atex@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

# SCHEDULE

to Type Examination Certificate No. FM16ATEX0018X

## 13 Description of Equipment or Protective System:

The P1 sample gas pumps carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components, the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor.

Model Code Structure:

4230abc1def00. P1.3 Sample Gas Pump.

a = Motor voltage: 1, 2, 3 or 4.

b = Pump head position: 1 or 2.

c = Pump head material: 1, 2, 3 or 4.

d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.

e = Mounting accessories: 0, 1 or 2.

f = Housing: 0 or 1

## 14 Specific Conditions of Use:

1. The installer shall provide transient over-voltage protection of the supply connections at a voltage not to exceed 140% of the voltage rating of the pump.
2. The apparatus shall be mounted in an enclosure providing a minimum degree of protection of IP54 in accordance with EN 60079-15, and shall be installed within a tool-secured enclosure which meets the requirements of EN 60079-0 and EN 60079-15.
3. To maintain a T4 to T3 temperature class care shall be taken to ensure the ambient temperature does not exceed 50°C.
4. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class	
		at installation site	in gas path
Non-Flammable	50°C	T4	---
Non-Flammable	70°C	T3	---
Flammable	50°C	T4	T3

## 15 Essential Health and Safety Requirements:

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

# SCHEDULE

to Type Examination Certificate No. FM16ATEX0018X

## 16 Test and Assessment Procedure and Conditions:

This Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

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## 17 Schedule Drawings

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by FM Approvals Europe Ltd.

## 18 Certificate History

Details of the supplements to this certificate are described below:

Date	Description
15 <sup>th</sup> April 2016	Original Issue.
15 <sup>th</sup> December 2016	<u>Supplement 1:</u> Report Reference: – RR207245 dated 09 <sup>th</sup> December 2016. Description of the Change: Temperature Class Table in Specific Conditions of Use and documentation update.
12 <sup>th</sup> April 2019	<u>Supplement 2:</u> Description of the Change: Certificate transferred from FM Approvals Ltd., notified body no. 1725, to FM Approvals Europe Ltd., notified body no. 2809.
07 <sup>th</sup> April 2020	<u>Supplement 3:</u> Report Reference: – PR455937 dated 02 <sup>nd</sup> April 2020. Description of the Change: Add option for gas pump cover DC motors.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**



# 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](http://www.iecex.com)

Certificate No.: **IECEx FMG 16.0012X** Page 1 of 3 [Certificate history:](#)  
Status: **Current** Issue No: 0  
Date of Issue: 2016-04-11  
Applicant: **Bühler Technologies GmbH**  
Harkortstraße 29  
40880 Ratingen  
**Germany**  
Equipment: **P1 Sample Gas Pumps**  
Optional accessory:  
Type of Protection: **Type 'n'**  
Marking: **Ex nA nC IIC T4 Gc**

Approved for issue on behalf of the IECEx  
Certification Body:

**James E. Marquedant**

Position:

**Manager, Electrical Systems**

Signature:  
(for printed version)

Date:  
(for printed version)

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Certificate issued by:

**FM Approvals LLC**  
1151 Boston-Providence Turnpike  
Norwood, MA 02062  
**United States of America**







# IECEx Certificate of Conformity

Certificate No.: **IECEx FMG 16.0012X**

Page 2 of 3

Date of issue: 2016-04-11

Issue No: 0

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

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 60079-0:2011](#) Explosive atmospheres - Part 0: General requirements  
Edition:6.0

[IEC 60079-15:2010](#) Explosive atmospheres - Part 15: Equipment protection by type of protection "n"  
Edition:4

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:

[US/FMG/ExTR16.0013/00](#)

Quality Assessment Report:

[DE/BVS/QAR16.0002/00](#)



# IECEx Certificate of Conformity

Certificate No.: **IECEx FMG 16.0012X**

Page 3 of 3

Date of issue: 2016-04-11

Issue No: 0

## EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The P1 sample gas pump carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps are available with or without a cover over the electronics and motor. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor.

## SPECIFIC CONDITIONS OF USE: YES as shown below:

1. The installer shall provide transient over-voltage protection of the supply connections at a voltage not to exceed 140% of the voltage rating of the pump.
2. The pump shall be mounted in an enclosure providing a minimum degree of protection of IP54 in accordance with IEC/EN 60079-15, and shall be installed within a tool-secured enclosure which meets the requirements of IEC/EN 60079-0 and IEC/EN 60079-15.
3. The apparatus is to be installed in a tool-secured enclosure in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
4. Temperature codes are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Code
Non-flammable	70°C	T4
Flammable	50°C	T4
Flammable	70°C	T3



# 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](http://www.iecex.com)

Certificate No.: **IECEx FMG 16.0012X** Page 1 of 4 [Certificate history:](#)  
Issue 0 (2016-04-11)

Status: **Current** Issue No: 1

Date of Issue: 2016-12-09

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

Equipment: **P1 Sample Gas Pumps**

Optional accessory:

Type of Protection: **Type 'n'**

Marking: **Ex nA nC IIC T4 Gc**

Approved for issue on behalf of the IECEx  
Certification Body:

**James E. Marquedant**

Position:

**Manager, Electrical Systems**

Signature:  
(for printed version)

Date:  
(for printed version)

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# IECEx Certificate of Conformity

Certificate No.: **IECEx FMG 16.0012X**

Page 2 of 4

Date of issue: 2016-12-09

Issue No: 1

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

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 60079-0:2011](#) Explosive atmospheres - Part 0: General requirements  
Edition:6.0

[IEC 60079-15:2010](#) Explosive atmospheres - Part 15: Equipment protection by type of protection "n"  
Edition:4

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 Reports:

[US/FMG/ExTR16.0013/00](#)

[US/FMG/ExTR16.0013/01](#)

Quality Assessment Reports:

[DE/BVS/QAR16.0002/00](#)

[DE/BVS/QAR16.0002/01](#)



# IECEx Certificate of Conformity

Certificate No.: **IECEx FMG 16.0012X**

Page 3 of 4

Date of issue: 2016-12-09

Issue No: 1

## EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The P1 sample gas pump carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps are available with or without a cover over the electronics and motor. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor.

## SPECIFIC CONDITIONS OF USE: YES as shown below:

1. The installer shall provide transient over-voltage protection of the supply connections at a voltage not to exceed 140% of the voltage rating of the pump.
2. The pump shall be mounted in an enclosure providing a minimum degree of protection of IP54 in accordance with IEC/EN 60079-15, and shall be installed within a tool-secured enclosure which meets the requirements of IEC/EN 60079-0 and IEC/EN 60079-15.
3. The apparatus is to be installed in a tool-secured enclosure in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
4. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class	
		at installation site	in gas path
Non-Flammable	50°C	T4	---
Non-Flammable	70°C	T3	---
Flammable	50°C	T4	T3



# IECEx Certificate of Conformity

Certificate No.: **IECEx FMG 16.0012X**

Page 4 of 4

Date of issue: 2016-12-09

Issue No: 1

**DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)**

In the certificate, under Specific Conditions of Use, Reformatting and changes to the Temperature Class Table for maximum gas temperature and Temperature class values. Several drawings were updated for this change . The Name Plate drawing was updated for a non-IECEx related change.



# 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](http://www.iecex.com)

Certificate No.: **IECEx FMG 16.0012X** Page 1 of 4 Certificate history:  
Status: **Current** Issue No: 2 [Issue 1 \(2016-12-09\)](#)  
[Issue 0 \(2016-04-11\)](#)  
Date of Issue: 2020-04-02  
Applicant: **Bühler Technologies GmbH**  
Harkortstraße 29  
40880 Ratingen  
Germany  
Equipment: **P1.3 Sample Gas Pumps**  
Optional accessory:  
Type of Protection: **Type 'n'**  
Marking: **Ex nA nC IIC T4 Gc**

Approved for issue on behalf of the IECEx  
Certification Body:

**J. E. Marquedant**

Position:

**VP, Manager - Electrical Systems**

Signature:  
(for printed version)

Date:  
(for printed version)

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# IECEx Certificate of Conformity

Certificate No.: **IECEx FMG 16.0012X**

Page 2 of 4

Date of issue: 2020-04-02

Issue No: 2

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

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 60079-0:2011](#) Explosive atmospheres - Part 0: General requirements  
Edition:6.0

[IEC 60079-15:2010](#) Explosive atmospheres - Part 15: Equipment protection by type of protection "n"  
Edition:4

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 Reports:

[US/FMG/ExTR16.0013/00](#)

[US/FMG/ExTR16.0013/01](#)

[US/FMG/ExTR16.0013/02](#)

Quality Assessment Report:

[DE/BVS/QAR16.0002/03](#)





# IECEx Certificate of Conformity

Certificate No.: **IECEx FMG 16.0012X**

Page 3 of 4

Date of issue: 2020-04-02

Issue No: 2

## EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The P1.3 sample gas pump carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1.3 consists of the main components the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1.3 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor.

## SPECIFIC CONDITIONS OF USE: YES as shown below:

1. The installer shall provide transient over-voltage protection of the supply connections at a voltage not to exceed 140% of the voltage rating of the pump.
2. The pump shall be mounted in an enclosure providing a minimum degree of protection of IP54 in accordance with IEC/EN 60079-15, and shall be installed within a tool-secured enclosure which meets the requirements of IEC/EN 60079-0 and IEC/EN 60079-15.
3. To maintain a T4 to T3 temperature class care shall be taken to ensure the enclosure temperature does not exceed 50°C.
4. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class	
		at installation site	in gas path
Non-Flammable	50°C	T4	---
Non-Flammable	70°C	T3	---
Flammable	50°C	T4	T3



# IECEx Certificate of Conformity

Certificate No.: **IECEx FMG 16.0012X**

Page 4 of 4

Date of issue: 2020-04-02

Issue No: 2

**DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)**  
Addition of gas sample covers to the DC 12VDC and 24VDC motors



Member of the FM Global Group

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T: 781 762 4300 F: 781-762-9375 www.fmapprovals.com

# CERTIFICATE OF COMPLIANCE

## HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS

This certificate is issued for the following equipment:

**4230abc1def00. P1.3 Sample Gas Pump.**

NI/I/2/ABCD/T4...T3 Ta = 0°C to +50°C;

a = Motor voltage: 1, 2, 3 or 4.

b = Pump head position: 1 or 2.

c = Pump head material: 1, 2, 3 or 4.

d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.

e = Mounting accessories: 0, 1 or 2.

f = Housing: 0 or 1.

**Special Conditions of Use:**

1. The apparatus is to be installed in a tool-secured enclosure in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
2. To maintain a T4 to T3 temperature class care shall be taken to ensure the enclosure temperature does not exceed 50°C.
3. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class
Non-flammable	70°C	T4
Flammable	50°C	T4
Flammable	70°C	T3

**Equipment Ratings:**

Nonincendive for use in Class I, Division 2, Groups A, B, C and D, Temperature Class T4...T3 hazardous locations.

FM Approved for:  
Bühler Technologies GmbH  
Ratingen, Germany



# CERTIFICATE OF CONFORMITY



1. **HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**
2. **Certificate No:** FM16CA0191X
3. **Equipment:** P1.3 Sample Gas Pumps  
**(Type Reference and Name)**
4. **Name of Listing Company:** Bühler Technologies GmbH
5. **Address of Listing Company:** Harkortstraße 29  
40880, Ratingen, Germany
6. The examination and test results are recorded in confidential report number:  
  
3057155 dated 11<sup>th</sup> April 2016
7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:  
  
CSA-C22.2 No. 213:2012, CAN/CSA-C22.2 No. 61010-1:2004
8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. 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.
10. **Equipment Ratings:**  
  
Nonicendive for use in Class I, Division 2, Groups A, B, C and D, Temperature Class T4...T3 hazardous locations.

**Certificate issued by:**

J.E. Marquedant  
Manager, Electrical Systems

9 December 2016

Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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](mailto:information@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

# SCHEDULE



Canadian Certificate Of Conformity No: FM16CA0191X

11. The marking of the equipment shall include:

Class I Division 2, Groups A, B, C, D; T4...T3 Ta = 0°C to +50°C

12. **Description of Equipment:**

The P1 sample gas pumps carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components, the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps are available with or without a cover over the electronics and motor. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor. The P1.3 sample gas pump is for hazardous locations and the P1.1 sample gas pump is for the US and Canada general purpose non-hazardous locations.

Model Code Structure:

4230abc1def00. P1.3 Sample Gas Pump.

a = Motor voltage: 1, 2, 3 or 4.

b = Pump head position: 1 or 2.

c = Pump head material: 1, 2, 3 or 4.

d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.

e = Mounting accessories: 0, 1 or 2.

f = Housing: 0 or 1

13. **Specific Conditions of Use:**

1. The apparatus is to be installed in a tool-secured enclosure in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
2. To maintain a T4 to T3 temperature class care shall be taken to ensure the ambient temperature does not exceed 50°C.
3. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class	
		at installation site	in gas path
Non-Flammable	50°C	T4	---
Non-Flammable	70°C	T3	---
Flammable	50°C	T4	T3

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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# SCHEDULE



Canadian Certificate Of Conformity No: FM16CA0191X

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

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

**15. Schedule Drawings**

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

**16. Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
11 <sup>th</sup> April 2016	Original Issue.
9 <sup>th</sup> December 2016	<b>Supplement 1:</b> Report Reference: – RR207245 dated 9 <sup>th</sup> December 2016 Description of the Change: In the certificate, under Specific Conditions of Use, Reformatting and changes to the Temperature Class Table for maximum gas temperature and Temperature class values. Several drawings were updated for this change. The Name Plate drawing was updated to correct the nonincendive marking.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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# CERTIFICATE OF CONFORMITY



1. **HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**
2. **Certificate No:** FM16CA0191X
3. **Equipment:** P1.3 Sample Gas Pumps  
**(Type Reference and Name)**
4. **Name of Listing Company:** Bühler Technologies GmbH
5. **Address of Listing Company:** Harkortstraße 29  
40880, Ratingen, Germany
6. The examination and test results are recorded in confidential report number:  
  
3057155 dated 11<sup>th</sup> April 2016
7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:  
  
CSA-C22.2 No. 213:2012, CAN/CSA-C22.2 No. 61010-1:2004
8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. 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.
10. **Equipment Ratings:**  
  
Nonincendive for use in Class I, Division 2, Groups A, B, C and D, Temperature Class T4...T3 hazardous locations.

**Certificate issued by:**

  
\_\_\_\_\_  
J.E. Marquedant  
VP, Manager - Electrical Systems

2 April 2020  
\_\_\_\_\_  
Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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](mailto:information@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)



# SCHEDULE



Canadian Certificate Of Conformity No: FM16CA0191X

11. The marking of the equipment shall include:

Class I Division 2, Groups A, B, C, D; T4...T3 Ta = 0°C to +50°C

12. **Description of Equipment:**

The P1 sample gas pumps carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components, the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor. The P1.3 sample gas pump is for hazardous locations and the P1.1 sample gas pump is for the US and Canada general purpose non-hazardous locations.

Model Code Structure:

- 4230abc1def00. P1.3 Sample Gas Pump.
- a = Motor voltage: 1, 2, 3 or 4.
- b = Pump head position: 1 or 2.
- c = Pump head material: 1, 2, 3 or 4.
- d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.
- e = Mounting accessories: 0, 1 or 2.
- f = Housing: 0 or 1

13. **Specific Conditions of Use:**

1. The apparatus is to be installed in a tool-secured enclosure in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
2. To maintain a T4 to T3 temperature class care shall be taken to ensure the ambient temperature does not exceed 50°C.
3. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class	
		at installation site	in gas path
Non-Flammable	50°C	T4	---
Non-Flammable	70°C	T3	---
Flammable	50°C	T4	T3

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

# SCHEDULE



Canadian Certificate Of Conformity No: FM16CA0191X

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

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

**15. Schedule Drawings**

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

**16. Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
11 <sup>th</sup> April 2016	Original Issue.
9 <sup>th</sup> December 2016	<u>Supplement 1:</u> Report Reference: – RR207245 dated 9 <sup>th</sup> December 2016. Description of the Change: In the certificate, under Specific Conditions of Use, Reformatting and changes to the Temperature Class Table for maximum gas temperature and Temperature class values. Several drawings were updated for this change. The Name Plate drawing was updated to correct the nonincendive marking.
2 <sup>nd</sup> April 2020	<u>Supplement 2:</u> Report Reference: – PR455937 dated 2 <sup>nd</sup> April 2020. Description of the Change: Add option for gas pump cover DC motors.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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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:

### 4230abc1def00. P1.3 Sample Gas Pump.

NI/I/2/ABCD/T4...T3 Ta = 0°C to +50°C;

a = Motor voltage: 1, 2, 3 or 4.

b = Pump head position: 1 or 2.

c = Pump head material: 1, 2, 3 or 4.

d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.

e = Mounting accessories: 0, 1 or 2.

f = Housing: 0 or 1.

#### Special Conditions of Use:

1. The apparatus is to be installed in a tool-secured enclosure in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
2. To maintain a T4 to T3 temperature class care shall be taken to ensure the enclosure temperature does not exceed 50°C.
3. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class
Non-flammable	70°C	T4
Flammable	50°C	T4
Flammable	70°C	T3

#### Equipment Ratings:

Nonincendive for use in Class I, Division 2, Groups A, B, C and D, Temperature Class T4...T3 hazardous (Classified) locations.

#### FM Approved for:

Bühler Technologies GmbH  
Ratingen, Germany



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: 3057155

Approval Granted: April 11, 2016

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
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FM Approvals LLC

J.E. Marquedant  
Manager, Electrical Systems

11 April 2016


Date

# CERTIFICATE OF CONFORMITY



1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** FM16US0414X
3. **Equipment:** P1.3 Sample Gas Pumps  
**(Type Reference and Name)**
4. **Name of Listing Company:** Bühler Technologies GmbH
5. **Address of Listing Company:** Harkortstraße 29  
40880, Ratingen, Germany
6. The examination and test results are recorded in confidential report number:  
  
3057155 dated 11<sup>th</sup> April 2016
7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:  
  
FM Class 3600:2011, FM Class 3611:2004, FM Class 3810:2005
8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. 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.
10. **Equipment Ratings:**  
  
Nonincendive for use in Class I, Division 2, Groups A, B, C and D, Temperature Class T4...T3 hazardous (Classified) locations

**Certificate issued by:**

  
\_\_\_\_\_  
J.E. Marquedant  
Manager, Electrical Systems

9 December 2016  
\_\_\_\_\_  
Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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](mailto:information@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)



# SCHEDULE

US Certificate Of Conformity No: FM16US0414X

11. The marking of the equipment shall include:

Class I Division 2, Groups A, B, C, D; T4...T3 Ta = 0°C to +50°C

12. **Description of Equipment:**

The P1 sample gas pumps carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components, the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps are available with or without a cover over the electronics and motor. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor. The P1.3 sample gas pump is for hazardous locations.

Model Code Structure:

4230abc1def00. P1.3 Sample Gas Pump.

a = Motor voltage: 1, 2, 3 or 4.

b = Pump head position: 1 or 2.

c = Pump head material: 1, 2, 3 or 4.

d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.

e = Mounting accessories: 0, 1 or 2.

f = Housing: 0 or 1

13. **Specific Conditions of Use:**

1. The apparatus is to be installed in a tool-secured enclosure in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
2. To maintain a T4 to T3 temperature class care shall be taken to ensure the ambient temperature does not exceed 50°C.
3. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class	
		at installation site	in gas path
Non-Flammable	50°C	T4	---
Non-Flammable	70°C	T3	---
Flammable	50°C	T4	T3

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T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: [information@fmaprovals.com](mailto:information@fmaprovals.com) [www.fmaprovals.com](http://www.fmaprovals.com)

# SCHEDULE



US Certificate Of Conformity No: FM16US0414X

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

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

**15. Schedule Drawings**

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

**16. Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
11 <sup>th</sup> April 2016	Original Issue.
9 <sup>th</sup> December 2016	<b>Supplement 1:</b> Report Reference: – RR207245 dated 9 <sup>th</sup> December 2016 Description of the Change: In the certificate, under Specific Conditions of Use, Reformatting and changes to the Temperature Class Table for maximum gas temperature and Temperature class values. Several drawings were updated for this change. The Name Plate drawing was updated to correct the nonincendive marking.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**



# CERTIFICATE OF CONFORMITY



1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** FM16US0414X
3. **Equipment:** P1.3 Sample Gas Pumps  
**(Type Reference and Name)**
4. **Name of Listing Company:** Bühler Technologies GmbH
5. **Address of Listing Company:** Harkortstraße 29  
40880, Ratingen, Germany
6. The examination and test results are recorded in confidential report number:  
  
3057155 dated 11<sup>th</sup> April 2016
7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:  
  
FM Class 3600:2011, FM Class 3611:2004, FM Class 3810:2005
8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. 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.
10. **Equipment Ratings:**  
  
Noncendive for use in Class I, Division 2, Groups A, B, C and D, Temperature Class T4...T3 hazardous (Classified) locations

## Certificate issued by:

J.E. Marquedant  
VP, Manager - Electrical Systems

2 April 2020

Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

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# SCHEDULE



US Certificate Of Conformity No: FM16US0414X

11. The marking of the equipment shall include:

Class I Division 2, Groups A, B, C, D; T4...T3 Ta = 0°C to +50°C

12. **Description of Equipment:**

The P1 sample gas pumps carry gases from various processes to analyzers. The gas circuit typically has additional analysis components such as sample gas probe, filter, flow meter, cooler, etc. The sample gas pump P1 consists of the main components, the pump head and motor. An eccentric converts the rotation of the motor into an up and down motion using a connecting rod, thus producing the pump mechanism. Inside the so-called pump body, above the bellows, which facilitates the pump motion, are inlet and outlet valves. The user connects the gas circuits to the sample gas pump through screw-in connections.

The P1 sample gas pumps are available as 12Vdc, 24Vdc, 115Vac, 60Hz or 230Vac, 50Hz. The 115Vac and 230Vac sample gas pumps have internal self resetting thermal protection built into the motor. The P1.3 sample gas pump is for hazardous locations.

Model Code Structure:

- 4230abc1def00. P1.3 Sample Gas Pump.
- a = Motor voltage: 1, 2, 3 or 4.
- b = Pump head position: 1 or 2.
- c = Pump head material: 1, 2, 3 or 4.
- d = Screw-in connections / pipe fitting: 0, 1, 2, 3, 5 or 6.
- e = Mounting accessories: 0, 1 or 2.
- f = Housing: 0 or 1

13. **Specific Conditions of Use:**

1. The apparatus is to be installed in a tool-secured enclosure in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
2. To maintain a T4 to T3 temperature class care shall be taken to ensure the ambient temperature does not exceed 50°C.
3. Temperature class are defined by the following table:

Type of Gas used in Pump	Maximum Gas Temperature	Temperature Class	
		at installation site	in gas path
Non-Flammable	50°C	T4	---
Non-Flammable	70°C	T3	---
Flammable	50°C	T4	T3

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

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: [information@fmaprovals.com](mailto:information@fmaprovals.com) [www.fmaprovals.com](http://www.fmaprovals.com)

# SCHEDULE



US Certificate Of Conformity No: FM16US0414X

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

15. **Schedule Drawings**

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

16. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
11 <sup>th</sup> April 2016	Original Issue.
9 <sup>th</sup> December 2016	<u>Supplement 1:</u> Report Reference: – RR207245 dated 9 <sup>th</sup> December 2016. Description of the Change: In the certificate, under Specific Conditions of Use, Reformatting and changes to the Temperature Class Table for maximum gas temperature and Temperature class values. Several drawings were updated for this change. The Name Plate drawing was updated to correct the nonincendive marking.
2 <sup>nd</sup> April 2020	<u>Supplement 2:</u> Report Reference: – PR455937 dated 2 <sup>nd</sup> April 2020. Description of the Change: Add option for gas pump cover DC motors.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: [information@fmaprovals.com](mailto:information@fmaprovals.com) [www.fmaprovals.com](http://www.fmaprovals.com)

## EU-Konformitätserklärung EU-declaration of conformity



Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte „Geräte“ im Sinne der Richtlinie

Herewith declares Bühler Technologies GmbH that the following products are "equipment" according to Directive

**2014/34/EU  
(ATEX)**

In ihrer aktuellen Fassung sind.

in its actual version.

Folgende Richtlinien wurden berücksichtigt:

The following directives were regarded:

**2014/35/EU (NSR/LVD)  
2014/30/EU (EMV/EMC)**

**Produkt / products:** Messgaspumpe / Sample gas pump  
**Typ / type:** P1.3

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:



**II 3/3 G Ex h IIC T3/T4 Gc X**

Kennzeichnung unter Berücksichtigung des nicht-elektrischen Explosionsschutzes  
Marking, taking into account non-electrical explosion protection



**II 3 G Ex nA nC IIC T4...T3 Gc**

Kennzeichnung unter Berücksichtigung des elektrischen Explosionsschutzes  
Marking, taking into account electrical explosion protection

Zur Beurteilung der Konformität gemäß ATEX-Richtlinie wurden folgende harmonisierte Normen herangezogen:  
For the assessment of conformity according to the ATEX directive the following standards have been used:

**EN 60079-0:2012 + A11:2013**

**EN 60079-15:2010**

**EN ISO 80079-36:2016**

Der Hersteller hat die Übereinstimmung des Gerätes mit aktuelleren Normenausgaben als in der Baumusterprüfbescheinigung aufgeführt geprüft und die Konformität festgestellt:

The manufacturer has checked the compliance of the device with more current standards than those listed in the type examination certificate and has established conformity:

**EN IEC 60079-0:2018**

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 25.02.2021

Stefan Eschweiler  
Geschäftsführer – Managing Director

Frank Pospiech  
Geschäftsführer – Managing Director



# 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

### 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



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



### 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.

### Vermeiden von Änderungen und Beschädigungen bei der Analyse

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 statischen Entladungen

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.

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