安装和操作说明书

（原版安装和操作说明书翻译文件）

BTS

非接触式热控开关装置

版本 14，2026-06-17
TCR3626011500ZH，防护等级 0：公然

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TCR3626011500ZH

本文档描述的是编辑结束时间截至 日的产品技术状态。

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1 应用，BTS 特性

非接触式热控开关装置（BTS）是 Voith 液力偶合器的监控系统。

- BTS 可以方便地监控液力偶合器的温度。
- **当温度过高时，会根据应用情况**
  - **向用户发出警告，**
  - **使驱动电机停机，**
  - **通过作功机械降低载荷。**
- 如果能够及时发现超温情况，就可避免偶合器中的工作液从熔断螺栓中流出。停机时间减少。
- 液力偶合器冷却后，BTS 自动复位。
- BTS 可以在**尺寸**大于 **206** 的 Voith 液力偶合器上使用。

⚠ 警告



爆炸危险

如果不使用绝缘开关放大器，会存在爆炸危险。

- 因为运算器的控制回路**非**本安隔爆，须在运算器和引发器之间放置相应的绝缘开关放大器！
- BTS 不允许在有爆炸危险的区域中，作为限制液力偶合器最高许可表面湿度的安全装置使用！

2 BTS 的功能

非接触式温度开关装置（BTS）由三个部件组成：

- **开关元件**
- 装有固定法兰的**引发器**
- **计算器**

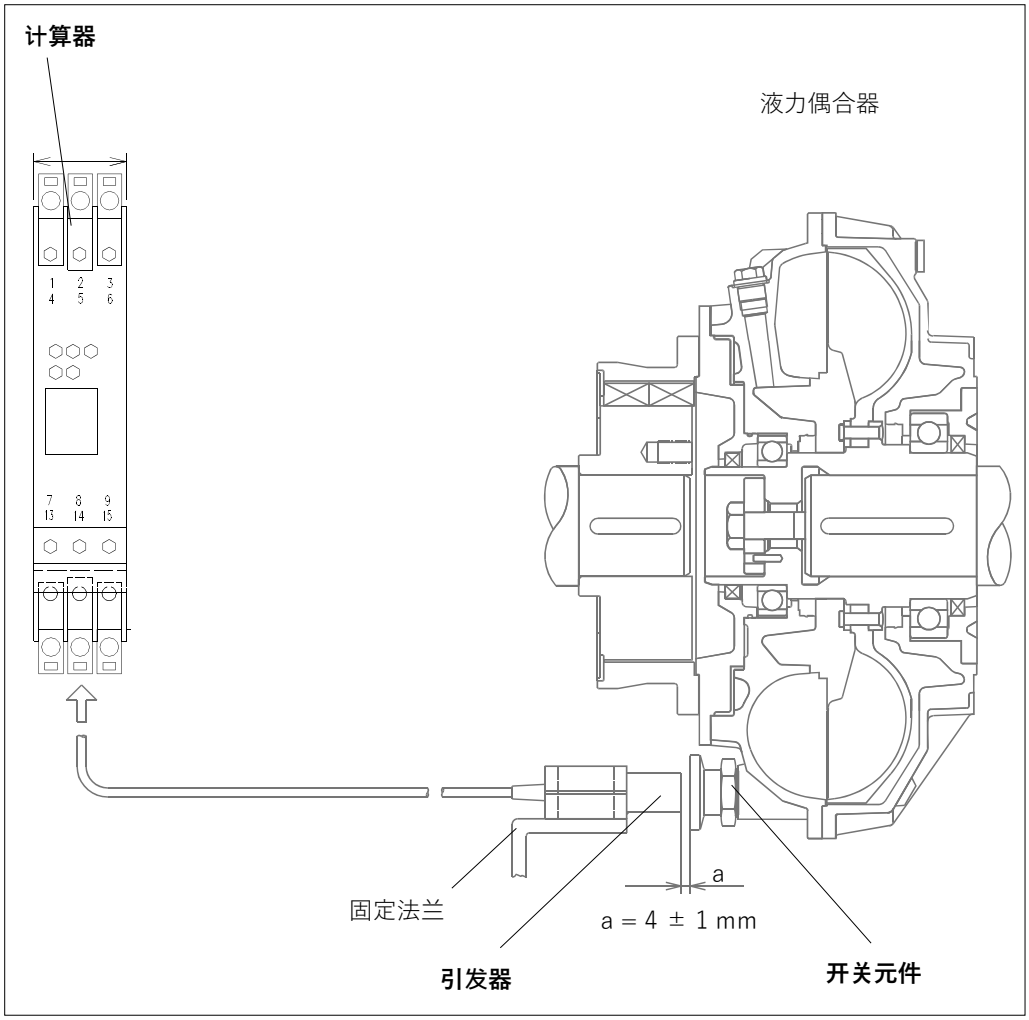


图 1

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在要求本安隔爆的控制回路时可以选择：

– **绝缘开关放大器**，双通道，用于最多 2 个引发器

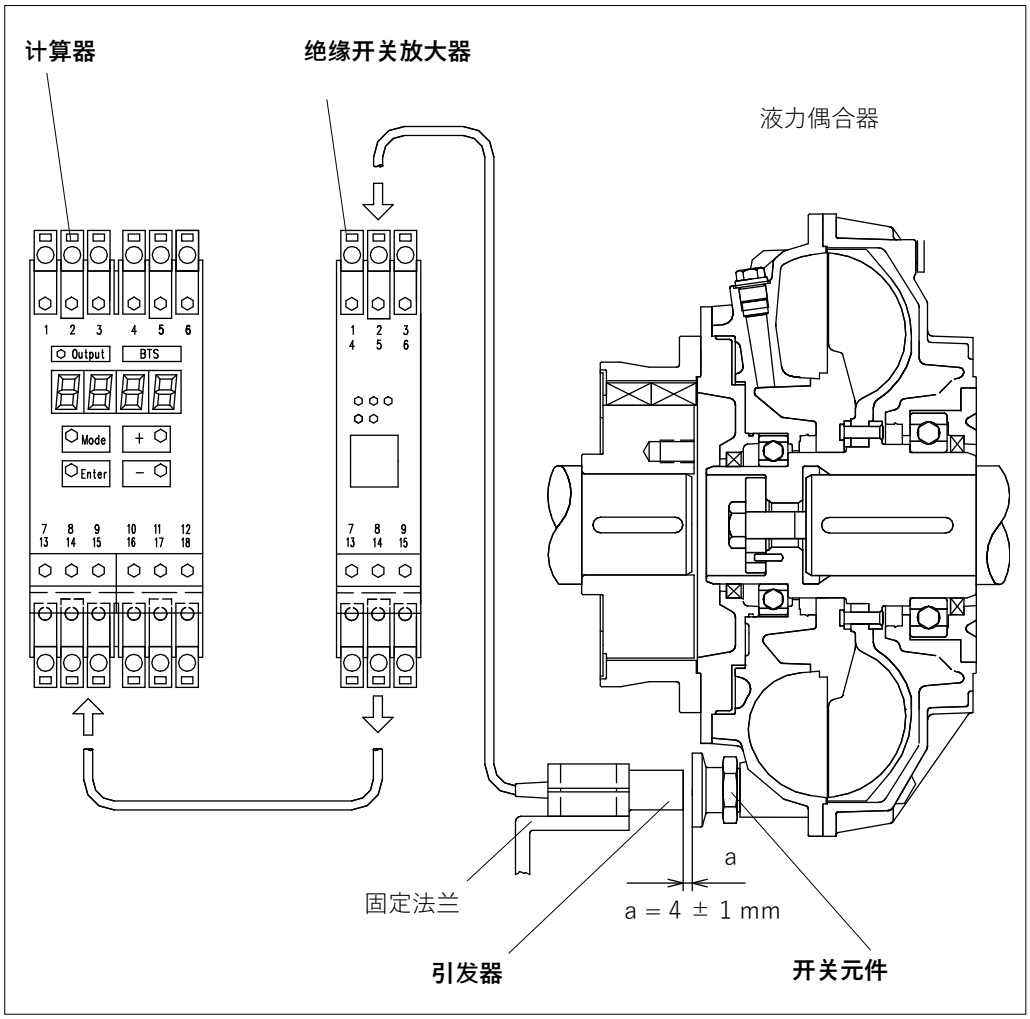


图 2

2.1 开关元件

开关元件是从动部件（简单电子设备）。它插在外轮或液力偶合器外壳中。这使得开关元件和液力偶合器内的工作液之间有了一个热接点。
在开关元件内集成了一个线圈和恒温开关。恒温开关的转换点与开关元件的反应温度相对应。

额定反应温度
à **第 3.1 章**

低于额定反应温度时，恒温开关闭合，接通线圈。高于额定反应温度时，恒温开关打开，断开电路。当温度降低时，恒温开关再次关闭电路。BTS 自动复位。

2.2 引发器

引发器是一种极化双线传感器。它依照感应传感器原理工作。
引发器内集成了一个电振荡器，可产生高频振荡。振荡器具有一个振荡电路，是决定频率的元件，由一个线圈和一个电容器组成。
振荡电路的线圈位于传感头内。电磁交变场通过此线圈离开传感头。

2.3 计算器

计算器是一个电子单元，用于记录电脉冲，计算脉冲之间的时间。
通过接通供电电压或外部触发信号开始进行计算。
计算开始后，必须在一段时间内（起动延时时间）中断脉冲的监测。
如果每单位时间的脉冲数降低到某个值以下，则具有转换接点的继电器将被释放。

2.4 绝缘开关放大器

绝缘开关放大器传输来自有爆炸危险区域的信号。
信号传感器可以是传感器或机械触点。
本安隔爆输入端与输出端和电源安全隔开。

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2.5 BTS 部件的相互作用

开关元件取代盲孔螺钉旋入液力偶合器中。带固定法兰的引发器平行于液力偶合器轴安装，并连接到计算器。

安装，位置
à **第 2 章**

如果开关元件在引发器头部的前面，则开关元件内的线圈与引发器内的线圈感应耦合。如果恒温开关关闭，则能量从引发器传递到开关元件。振荡衰减，且电流消耗量较低。

如果偶合器温度超过开关元件的反应温度，则恒温开关将切断开关元件中的电路。开关元件就不再使引发器中的振荡衰减。

计算器可识别因引发器电流消耗而导致的振荡衰减。

当开关元件在液力偶合器旋转情况下通过引发器时，开关元件持续在引发器上运转。衰减脉冲连续产生。计算器中的输出继电器被拾取。

当温度过高时，将不再发生这些衰减脉冲，也就是低于计算器上调整的极限频率。计算器发现丢失的脉冲，输出继电器被释放。

在起动液力偶合器时，计算器设置了一个起动延时时间。只要起动延时功能有效，输出继电器一直保持拾取。
在这个设定的时间过后，带开关元件的液力偶合器的转速应超过设置的极限频率。

极限频率
à **第 3.3.1 章**

⚠ 警告

人身伤害和物品损害的危险
在关闭以后，要保证控制装置不会自动重新起动。

- 关掉与液力偶合器安装在一起的设备，并固定开关，防止其被重新接通。
- 对于在液力偶合器和 BTS 上进行的所有工作，要确保驱动电机和工作机器已经停止运行，并且决不可能起动。
- 只有当液力偶合器的温度低于接通电机许可的最高许可温度时，才允许重新起动。

最高许可温度
à **液力偶合器操作说明书**

3 技术参数

3.1 开关元件

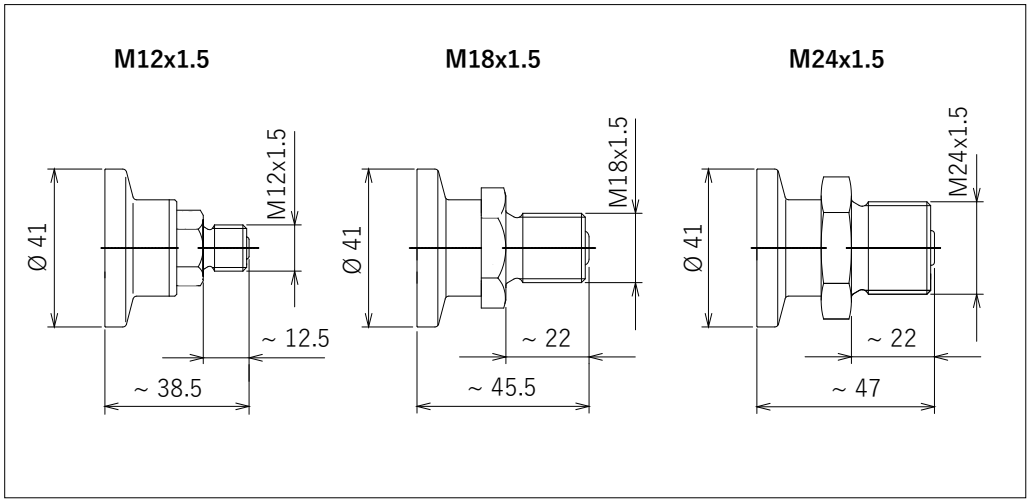


图 3

不同规格的液力偶合器有以下开关元件：

螺纹尺寸	M12x1.5	M18x1.5	M24x1.5
额定反应温度	125 ° C	85 / 90 / 100 / 110 /125 / 140 / 160 / 180 ° C	85 / 125 / 140 / 160 / 180 ° C
适用于偶合器尺寸	206 - 274	366 - 650	750 - 1330
反应温度公差	± 5 ° C		
复位温度	比反应温度低约 40 K		
扳手的开口尺寸	17	27	32
拧紧扭矩：	22 Nm	60 Nm	144 Nm
分类是 ⟨Ex⟩ II 2G/2D	Ui = 10 V	Ii = 50 mA	Pi = 50 mW
线圈区域内的工作温度	-40 ° C 至 +120 ° C		
恒温开关区域内的工作温度	至 90 ° C (T5)，至 125 ° C (T4)，至 190 ° C (T3)		

表 1

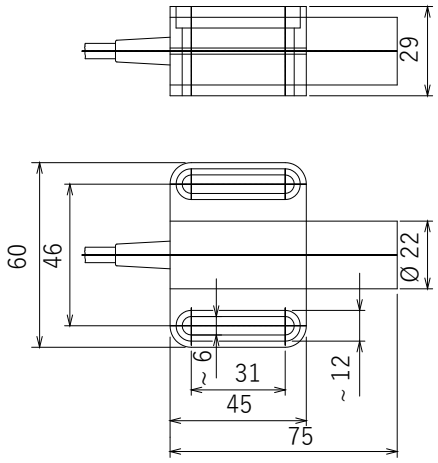


安全提示

- 外壳上标有开关元件的型号，包括：
  - Voith
  - 额定反应温度
  - 防爆标志 ⟨Ex⟩ II Ex i X
  - 序列号（示例：Voith 140 ° C ⟨Ex⟩ II Ex i X 234 5678）
- 设计偶合器时就决定了开关元件的额定反应温度。

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3.2 引发器、固定法兰



引发器与固定法兰一起显示

图 4

à 附录　　类型：　　NJ 10-22-N-E93-Y245590（2 m）
NJ 10-22-N-E93-Y246868（5 m）
NJ 10-22-N-E93-Y246869（10 m）

3.3 计算器和绝缘开关放大器

3.3.1 计算器

à 附录　　类型：　　KFU8-DW-1.D-Y209869

3.3.2 绝缘开关放大器 20…30 V DC

à 附录　　类型：　　KFD2-SOT3-Ex2

4 使用者提示

本手册会指导您安全、正确、经济地使用非接触式热控开关装置（BTS）。

只要遵守本手册中的相关说明，就可
- 增加设备的可靠性，并延长其使用寿命，
- 避免危险，
- 减少维修和停机时间。

本手册必须
- 始终放置在 BTS 工作现场，
- 供在设备上进行工作或运营设备的人员阅读及使用。

也可在这些必须遵守的操作说明书的附录中找到其他文件。

非接触式热控开关装置是按照目前的技术发展水平和批准的安全条例制造的。但在处理不当和未按规定使用时，可能对用户或第三人的身体和生命造成危险，或对设备和其他有形资产产生损害。

备件：
备件必须符合 Voith 规定的技术要求。要求使用原装备件。
非原装备件的安装及/或使用可能负面改变 BTS 的规定性能从而影响其安全性。
凡因使用非原装备件而造成的任何损失，Voith 概不承担责任。

维护时使用合适的车间设备。只有生产商或经过授权的专业工厂才能保证专业化的维修或修理。

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本说明书内容已经尽可能谨慎地完成编制。如果需要进一步的信息请联系：

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5 安全

5.1 安全提示

在操作说明书中，使用了带有如下所述名称和符号的安全提示。

5.1.1 安全提示的组成

⚠ 警示语
危险后果 危险源 • 危险防范

警示语
警示语将危险程度分为若干级别：

警示语	危险程度
⚠ 危险	死亡或者重伤（不可挽回的人身伤害）
⚠ 警告	可能会造成死亡或重伤
⚠ 小心	可能会造成轻伤或者中度伤害
提示	可能的物品损坏 – 产品 – 环境
安全提示	通用应用提示和有用信息，安全的操作和正确的安全措施

表 2

危险后果
危险后果指的是危险的类型。

危险源
危险源被称作危险起因。

危险防范
危险防范描述防范危险的措施。

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5.1.2 安全标志定义

符号	定义
	爆炸危险 防爆符号标志提示可能存在危险，有爆炸危险的区域尤其值得注意。

表 3

5.2 按规定使用

- 非接触式热控开关装置（BTS）以非接触方式监控 Voith 液力偶合器的温度，专为工业应用而设计。如果用在其它场合，例如在未经同意的工作条件下使用，则是对非接触式热控开关装置的不当使用。
- 正确使用还包括遵守安装与操作说明书中的要求。
- 对于不按照规范使用所引起的损失厂家概不负责。其风险只能由用户承担。

5.3 不按规定使用

- 不遵守设计范围。
- 在高功率、高转速或者不协调的运行条件下，其他用途或超出范围的使用被视为不合规定。
- 不得使用第三方供应商的 BTS 或备件。

设计范围
à 操作说明书
液力偶合器

5.4 一般危险说明

对于在非接触式热控开关装置上进行的所有工作，请遵守事故预防地性规定规以及电气设备安装规则！

⚠ 警告



爆炸危险
在不遵守规定或未经许可变更时，存在爆炸危险。

- 在有爆炸危险的区域内使用热控开关装置，必须遵守在有爆炸危险区域内使用电气设备的地方性法规！不允许对包括连接电缆在内的潜在爆炸区域的电气设备进行修改。

在非接触式热控开关装置上进行操作时存在的危险：

危险

电击
在安装错误，接线错误的组件和松动的电路连接上，人们会受到电击和受重伤，甚至死亡。
安装错误或者接线错误的电子组件和松脱的电路连接会造成机器损坏。

- 电气专家应根据系统额定电压及最大消耗功率，完成与电网的正确联接。
- 线路电压必须与铭牌上的指示值一致。
- 电源端应配置相匹配的保险装置。

电击：

危险

静电载荷
静电可使人们受到电击。

- 设备安装，应由电力专家将液力偶合器安装在设备中。
- 机器和电力安装应有接地点。

在液力偶合器上进行操作：

⚠ 警告

受伤危险
在恒压式液力变矩器工作时，有割伤、挤伤及在零下温度时冻伤的危险。

- 请遵守液力偶合器的安装与操作说明书！
- 未配戴防护手套时，严禁碰触液力偶合器。
- 在液力偶合器冷却后，才可开始作业。
- 在液力偶合器上执行作业时，应确保光线充足、有足够的作业空间和通风良好。
- 关掉与液力偶合器安装在一起的设备，并固定开关，防止其被重新接通。
- 对于在液力偶合器上进行的所有工作，要确保发动机和工作机已经停止运行，并且决不可能起动。

噪声：

⚠ 警告

听力下降，持久听力损失
液力偶合器运行时产生噪声。如果声压等级达到 A 级，L_{PA}，$_{1m}$ 超过 80 dB(A) 可能导致听力损伤。

- 使用耳塞。

声压等级
ὰ 液力偶合器的操作说明书封面

喷液及排液：

⚠ 警告

喷出的热工作液可能导致失明的危险，烧伤危险
液力偶合器过热时易熔塞反应。工作液会从易熔塞中流出。
这仅可能在不按规定使用时发生。

- 在液力偶合器旁工作的人员须配戴护目镜。
- 请确保喷出的液体不会与人接触。
- 如果易熔塞喷液，立即关闭驱动装置。
- 液力偶合器旁的电控装置应考虑喷液保护。

不按规定使用
à 第 5.3 章

⚠ 警告

火灾危险
易熔塞反应后，喷出的油可能在热表面上点火从而引起火灾，同时亦释放出毒气和水蒸汽。

- 请确保喷出的热工作液不与机械零件、加热器、火星及明火接触。
- 易熔塞反应后，立即关闭驱动装置。
- 请注意安全数据页中的提示。

⚠ 小心

滑倒的危险
易熔塞溢出的铅和流出的工作液会造成滑倒的危险。

- 必要时，请提供足够大的收集槽。
- 直接分离流出的易熔液和工作液。
- 请注意安全数据页中的提示。

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5.5 其他危险

⚠ 警告

人身伤害和物品损害的危险
不正确的使用及运行会引起人员死亡、重伤或轻伤，并对财产及环境造成损害。
- 只允许合格的、经过培训和授权的人员对液力偶合器以及非接触式热控开关装置进行操作或检修。
- 请注意警告及安全提示。

5.6 在出现事故时的措施

安全提示

- 在出现事故时，请遵守当地的规定以及操作手册和运营商的安全措施。

5.7 运行提示

安全提示

- 如果液力偶合器在运行过程中出现异常，立即关掉驱动装置。

监测装置：

提示

财产损失
由于未准备就绪的监测装置造成液力偶合器的损坏。
- 检查现有的监测装置是否处于准备就绪状态。
- 立即维修出现故障的监测装置。
- 禁止桥接安全装置。

5.8 人员资质

仅允许具有资质、经过授权的专业人员执行相关作业，例如运输、入库、安装、电气接线、调试、运行、保养、维护及修理。

所谓有资质的专业人员，是指按照操作说明书熟悉运输、入库、安装、电气接线、调试、保养、维护和修理操作流程，并且具有相应资质的人员。通过培训和指导保证资质。

该人员须经过以下方面的培训、指导并得到授权以胜任如下要求：
- 按照专业规范并且根据相关安全标准运行、维护设备。
- 按照专业规范使用起重工具、吊装索具和起吊点。
- 按照专业规范处理废弃的介质与部件，例如润滑脂。
- 根据安全技术标准维护和使用安全装备。
- 预防事故，实施急救。

学徒人员仅可在具有资质的指定人员监督下对液力偶合器以及非接触式热控开关装置进行检修。

负责非接触式热控开关装置任何工作的人员必须：
- 可靠，
- 达到法律规定的最小年龄，
- 经过相关操作培训、指导，并且经过授权；
- 在有爆炸危险环境中使用时，要遵守 的规定。仅采用在有爆炸危险范围允许使用的工具。避免火花。



5.9 产品监督

我们的地址
à 第 2 页

即使发货以后，我们有法定义务对我们的产品进行监控。
因此，请与我们分享所有我们感兴趣的信息。例如：
- 运行数据变化。
- 在使用设备过程中获得的经验。
- 反复出现的问题。
- 在使用本安装与操作说明书过程中出现的问题。

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6 安装

⚠ 警告

受伤危险
在非接触式热控开关装置上作业时，请尤其注意 à 第 5 章（安全）！
- 请在开始安装前确保所有部件都没有电势。
- 易熔塞保护液力偶合器不会因过热而损坏。
  在使用 BTS 时也不允许用平头螺栓或具有其他额定反应温度的易熔塞代替易熔塞。
- 在没有易熔塞的情况下切勿操作液力偶合器！

6.1 交货状态

– 带密封环的开关元件，
– 带安装法兰的引发器和
– 计算器

通常作为散装部件与液力偶合器一起提供。

6.2 供货范围

如果之后将 BTS 安装到尺寸为 206 和 274 的液力偶合器上，请与 Voith 保持联系！

开关元件和易熔塞的标准组合：

额定反应温度		
开关元件	**易熔塞**	**色标**
160° C	180° C	蓝色
140° C	160° C	绿色
125° C	160° C	绿色
110° C	140° C	红色

表 4

开关元件与易熔塞的分配可随项目设计的不同而改变。同样可以获得不同的开关元件额定反应温度（85° C、90° C、100° C、110° C、125° C、140° C、160° C 和 180° C）（à 第 13 章）。

请与 Voith 联系
à 订单文件

6.3 安装 — 开关元件和引发器

⚠ 警告

爆炸危险
不遵守安装规定。

- 为避免任何损坏，应在液力偶合器安装后，充液前安装开关元件和引发器。
- 切勿损坏开关设备和连接导线。必须将所有导线放置在不受机械影响的地方。
- 不得对在易爆危险区域中使用的设备进行改动。
  不能对这些设备进行维修。
- 要避免对引发器产生冲击影响。只允许在无爆炸危险的环境中在机器上工作。
- 为防止产生静电，应按照 EN 60079-14 的要求敷设连接电缆，在运行过程中，决不能使它们发生磨损/摩擦。

- 将开关元件用密封圈取代盲孔螺钉旋入液力偶合器的外轮（项号 0300）或外壳（项号 0190） [1] 中。

外轮侧开关元件的排列 [2]：

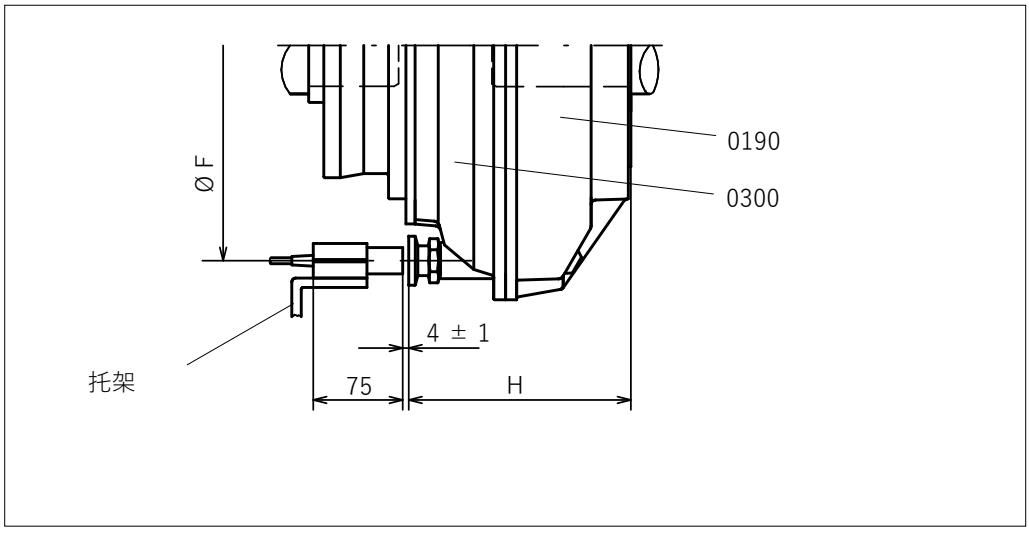


图 5

1) 在 DT 型液力偶合器中没有。
2) 对于 DT 型液力偶合器，也可在相对外轮侧进行安装。

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开关元件和引发器的安装尺寸：

	外轮侧	
液力偶合器型号	**节圆直径** **Ø F [mm]**	**距离** **~ H [mm]**
206 T	196 ± 1	111.5
206 DT	196 ± 1	151.5
274 T	268 ± 1	152
274 DT	268 ± 1	190
366 T	350 ± 1	193
422 T	396 ± 1	206
487 T	470 ± 1	228
562 T	548 ± 1	248
650 T	630 ± 1	289
750 T	729 ± 1	318
866 T	840 ± 1	356
866 DT	840 ± 1	600
1000 T	972 ± 1	369
1000 DT	972 ± 1	672
1150 T	1128 ± 1	458
1150 DT	1128 ± 1	783
1330 DT	1302 ± 1	912

表 5

不同排列方式的安装尺寸，请参见液力偶合器的装配图。

开关元件在外壳侧的排列（不适用 DT 或 T…S 型液力偶合器）：

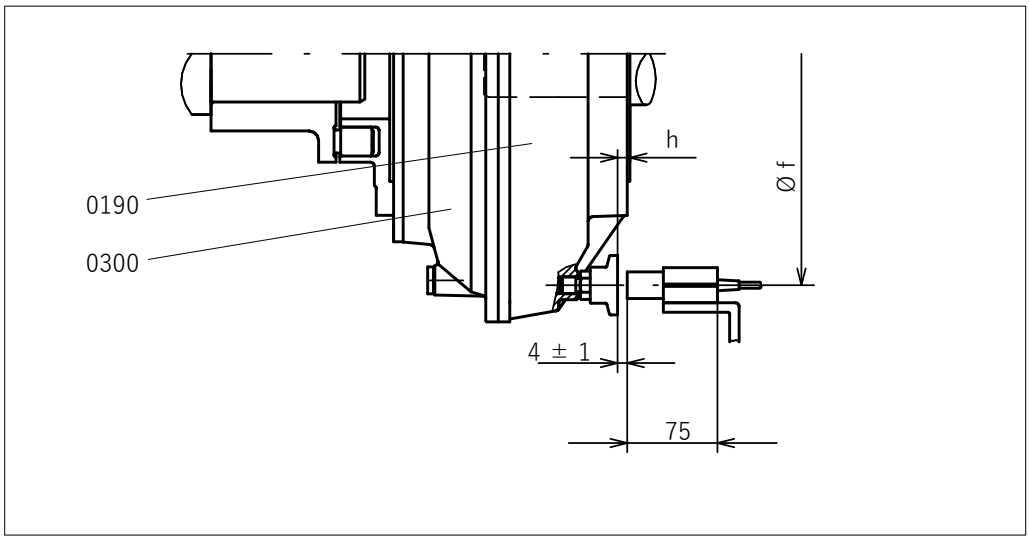


图 6

开关元件在外壳侧的排列（仅适用 T…S 型液力偶合器）：

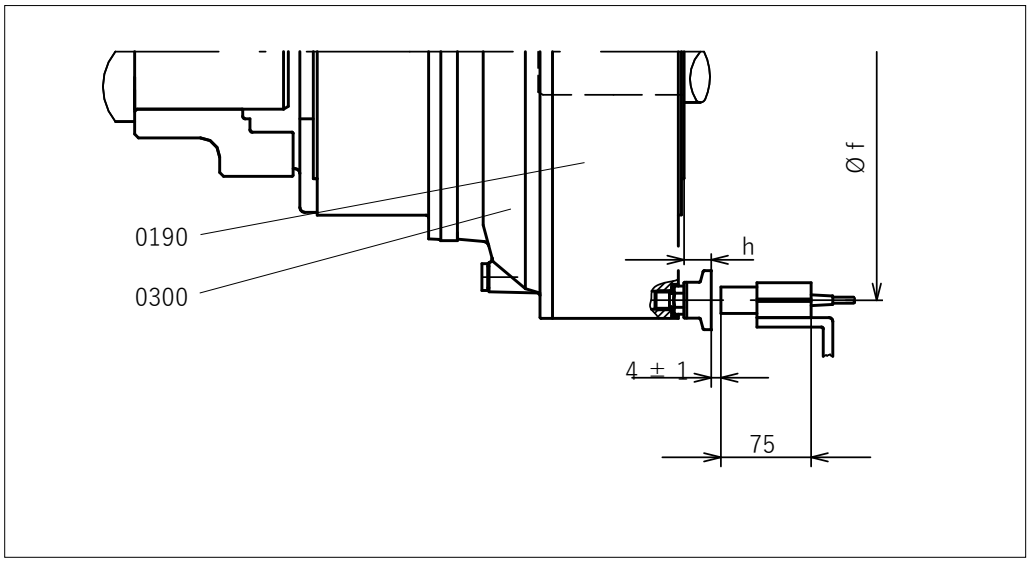


图 7

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开关元件和引发器的安装尺寸：

	外壳侧			
	不适用于 DT 或 T…S 型液力偶合器：		仅适用于 T…S 型液力偶合器：	
液力偶合器型号	节圆直径 Ø f [mm]	距离 ~ h [mm]	节圆直径 Ø f [mm]	距离 ~ h [mm]
206 T	200 ± 1	-16	-	-
274 T	264 ± 1	2.5	-	-
366 T	355 ± 1	16	-	-
422 T	398 ± 1	9	-	-
487 T	480 ± 1	29	-	-
562 T	556 ± 1	28.5	-	-
650 T	649 ± 1	51.5	-	-
750 T	742 ± 1	52.5	815 ± 1	25
866 T	862 ± 1	65	954 ± 1	25
1000 T	990 ± 1	54	1092 ± 1	25
1150 T	1140 ± 1	86	1250 ± 1	25

表 6

不同排列方式的安装尺寸，请参见液力偶合器的装配图。

提示

财产损失
不遵守安装规定。

- 确保托架足够稳定（不包括在 Voith 的供货范围内）！
- 避免任何振动，因为振动可能会产生错误信号！
- 观察引发器头周围的无金属区（15 mm）（à 原理草图如下）！

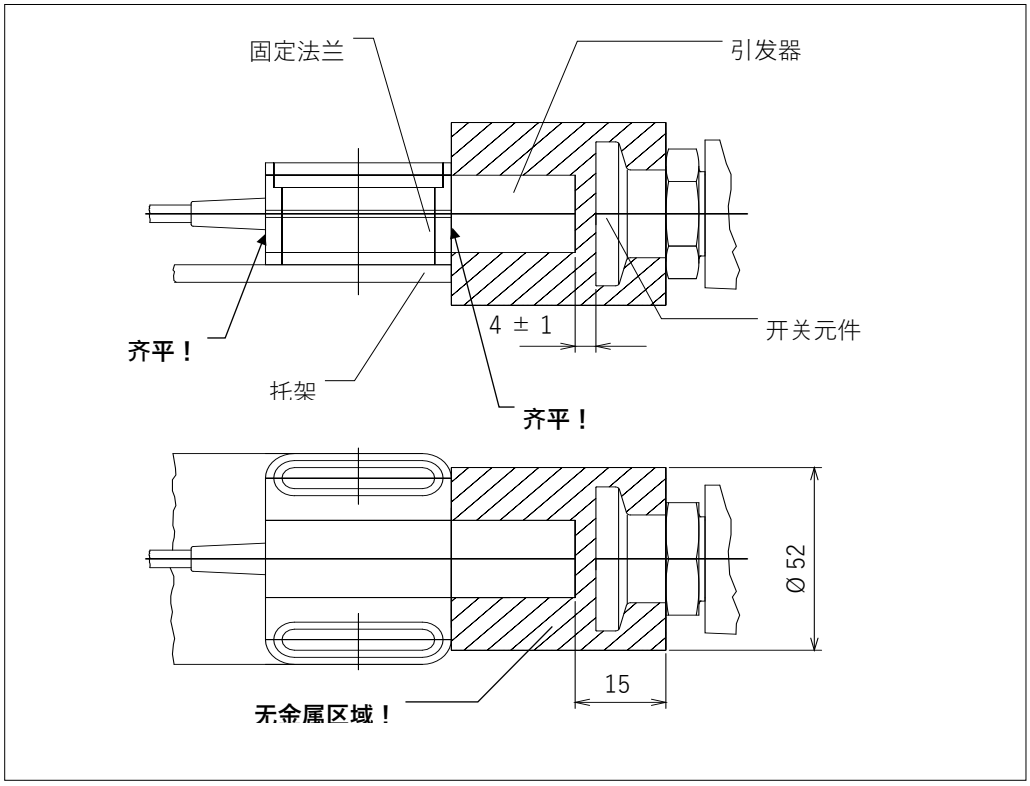


图 8

- 将带固定法兰的引发器安装到开关元件的节圆直径，以及与液力偶合器轴平行的托架上。
- 引发器末端安装在与固定法兰齐平的位置处。固定法兰的前面与托架齐平。
- 将引发器头部和开关元件之间的距离设成 **4 ± 1 mm**！

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6.4 安装、连接 – 计算器、绝缘开关放大器

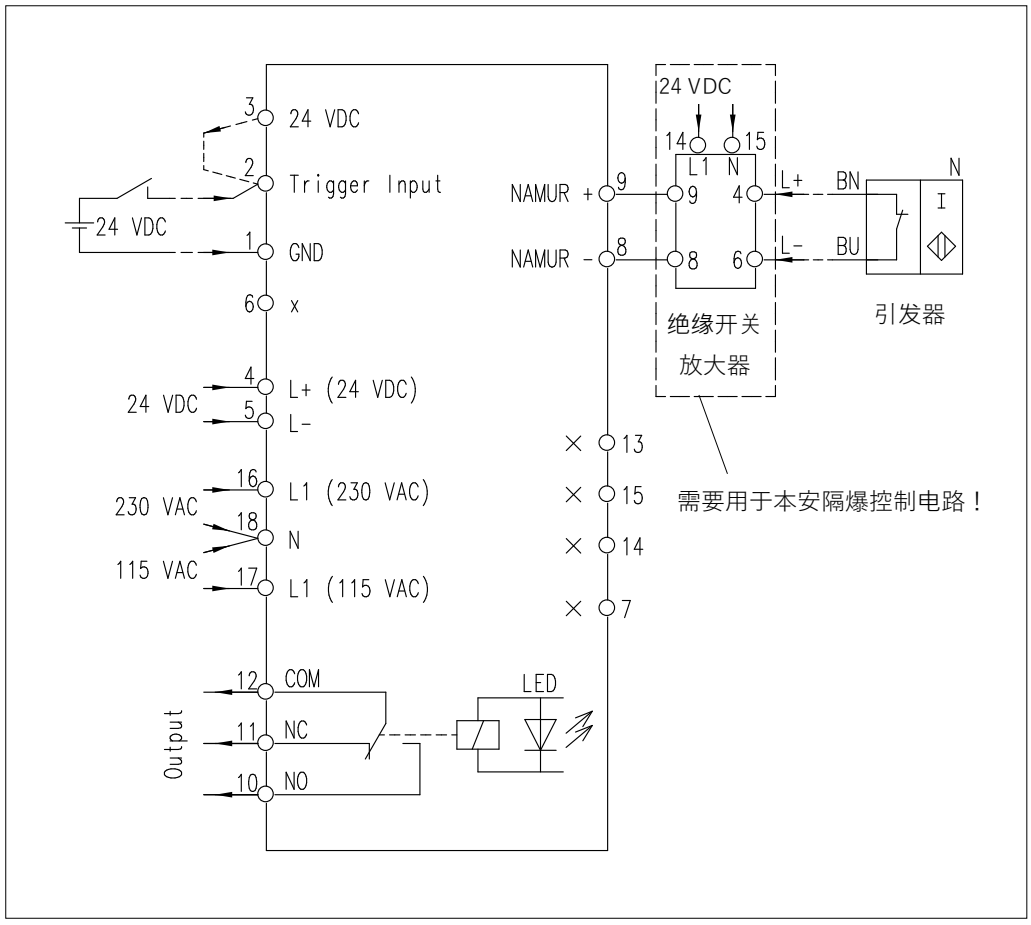
提示

财产损失
因不恰当地连接电子部件或不符合安装说明而损坏设备。

- BTS 的接线不在供货范围内！
- 当引发器和计算器之间的距离较大时，我们建议使用屏蔽电缆以便进行延伸。
- 引发器和计算器之间延伸电缆的总电阻要小于 100 Ω。

- 将计算器（必要时也将绝缘开关放大器）安装在适当的控制柜内，并按照接线图进行连接。

接线图：



计算器
KFU8-DW-1.D-Y209869
à 第 14.4 章

图 9

端子分配： 计算器

端子编号	说明
1	用于触发器输入端的 GND
2	启动延时触发器输入端， +24 DC
3	触发器输入端电源。 在通过接通电源电压触发时，在端子 3 和 2 之前设置电桥（交货状态）。
4	电源电压，+24 V DC
5	电源电压，GND
6	不连接！
7	不连接！
8	NAMUR 输入端，L-
9	NAMUR 输入端，L+
10	输出继电器，常开触点，NO
11	输出继电器，常闭触点，NC
12	输出继电器，方根，COM
13	不连接！
14	不连接！
15	不连接！
16	电源电压，230 V AC，L1
17	电源电压，115 V AC，L1
18	电源电压， N

表 7

⚠ 警告

爆炸危险
在不遵守防爆条件时，存在爆炸危险。
- 计算器的控制电路非本安隔爆！
- 在要求本安隔爆控制电路时，要在计算器和引发器之间接通恰当的绝缘开关放大器！



端子分配：绝缘开关放大器

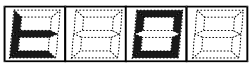
端子编号	说明
1+	NAMUR 输入端 1，L+
2+	不连接！
3–	NAMUR 输入端 1，L–
4+	NAMUR 输入端 2，L+
5+	不连接！
6–	NAMUR 输入端 2，L–
7	输出端 1 +
8	输出端 1/2 –
9	输出端 2 +
14+	电源电压
15–	24 VDC

表 8

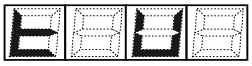
7 计算器的显示与设置

7.1 显示 – 计算器

运行模式：



- 温度正常
- 正常运行状态



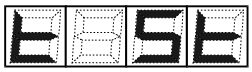
- 超温
- 开关元件的转速 < 60 min^{-1}



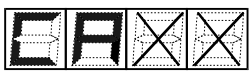
- 激活起动延时
- 无温度监控！

图 10

设置模式



- 设置起动延时时间



- 软件版本号

图 11

7.2 设置 – 计算器

- 必要时设置起动延时时间，出厂设置：10 s！
  根据（下面的原理草图）通过正面的按键进行设置。

⚠ 警告

人身伤害和物品损害的危险
在起动延时时间内， 不记录液力偶合器的超温！
- 只允许合格的、经过培训和授权的人员对液力偶合器进行操作或检修。
- 请注意警告及安全提示。

安全提示

- 起动延时时间从触发起动延时开始。
- 起动延时时间过后，带开关元件的液力偶合器的速度必须明显超过 60 min^{-1}！
- 起动延时时间的工厂设定：10 s。

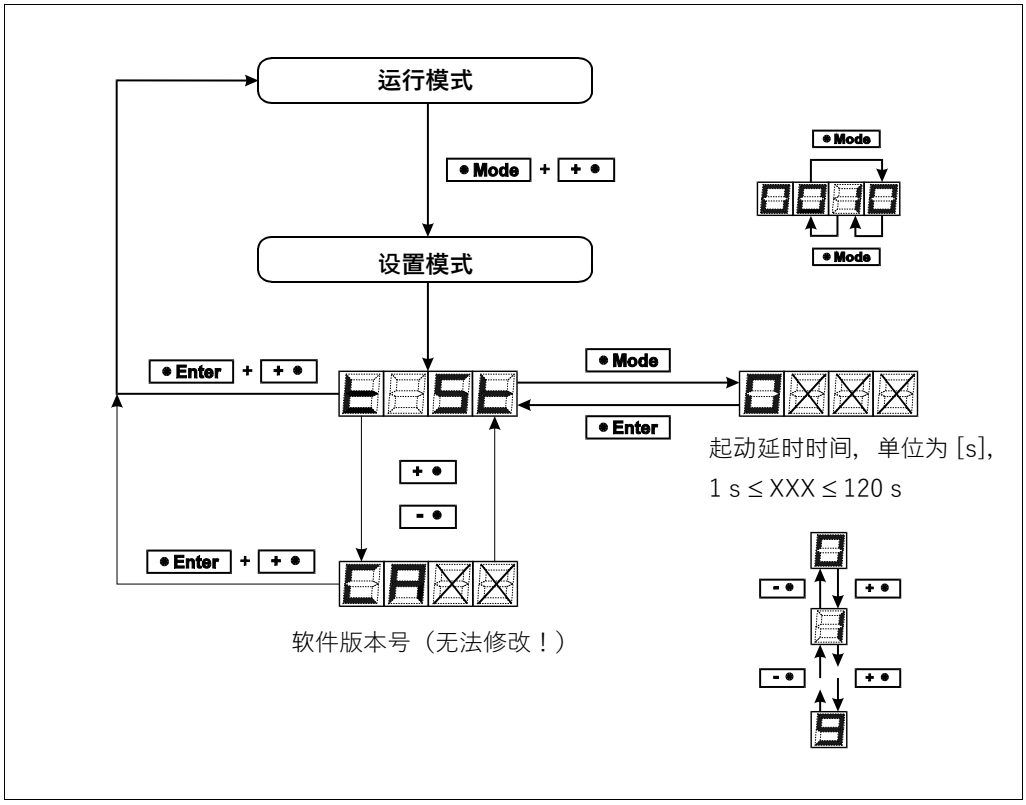


图 12

8 调试

⚠ 警告

受伤危险
在非接触式热控开关装置上作业时，请尤其注意 à 第 5 章（安全）！
- 调试运行不当可能会造成人身伤害、
  财产损失及破坏环境！
- 只允许专业人员实施调试运行，特别是液力偶合器的首次起动！
- 请防止设备未经授权起动！

- 根据**接线图**检查布线（à 第 6.4 章）。
  要特别注意电源电压的布线是否正确！
- 首先给计算器加上电源电压，不起动液力偶合器。在激活起动延时时，设备显示 8888。
  输出继电器已拧紧，前面的 LED 灯亮起。
- 在起动延时时间结束之后，设备显示 8888。
  输出继电器落下，前面的 LED 熄灭。
- 必要时根据 à 第 7.2 章设置起动延时时间。
- 在外部触发时，去除出厂安装的端子 2 和 3 之间的电桥。
- 正常起动带液力偶合器的 BTS。起动延时时间过后，带开关元件的液力偶合器的转速必须明显超过 **60 min^{-1}**。如果不存在低温，计算器显示 8888。输出继电器保持拧紧，前面的 LED 灯亮起。
- 关闭带液力偶合器的驱动，使 BTS 保持在运行准备就绪的状态中。如果带开关元件的液力偶合器转速超过 **60 min^{-1}**，计算器会显示 8888。输出继电器落下，前面的 LED 熄灭。
- 可以进行正常运行。在出现故障时，à 第 10 章。

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9 保养、维护

保养和维护： 使目标保持一种状态，或者重新恢复该状态，从而与相关标准要求相符，保证了执行所需的功能的一系列活动的组合。

检查： 仔细调查对象的一种活动，目标是对目标的状态给出可靠的说法，不需要拆卸，或在必要时部分拆卸，并通过措施比如测量进行补充。

目视检查：目视检查是指一种不使用接触装置或工具能确定可见缺陷的检查，比如缺少螺栓。

近距离检查： 一种除了包括目视检查以外，通过使用接触装置，比如移动楼梯（如果需要）和工具识别螺栓松落等错误。为了进行复检，通常不需要打开外壳或关闭设备的电压。

细节检查： 一种除了包括近距离检查以外，必须需要打开外壳，如果需要时通过使用工具和检测装置识别出连线松落等错误的检查。

⚠ 警告

受伤危险
在非接触式热控开关装置上作业时，请尤其注意 à 第 5 章（安全）！
- 注意始终保持液力偶合器旁通畅无阻！

- 只允许有资质且经授权的专业人员进行维护以及保养工作！通过指导和培训液力偶合器保证质量。
- 维护和保养不当会导致死亡、重伤或轻伤而且会造成财产损失或破坏环境。

资质
à 第 5.8 章

- 关掉与液力偶合器安装在一起的设备，并固定开关，防止其被重新接通。
- 对于在液力偶合器上进行的所有工作，要确保驱动电机和工作机已经停止运行，并且决不可能起动！
- 只允许使用原装备件更换部件。

完成维护和保养工作后，立即安装所有安全罩及安全装置并检查设备性能。检查功能是否正常！

维护计划：

期限	保养工作
每 1000 个运行小时，最晚每 6 个月	检查设备是否有异常 （目视检查，灰尘沉淀）。
最晚在起动 6 个月以后， 之后每 2 年	检查电子设备的完整性（细节检查）。
在有污染物时	清洁（à 第 9.1 章）。

表 9

报告模板
à 液力偶合器操作说明书

- 根据报告进行保养工作及常规检查工作。
- 记录保养工作。

防爆液力偶合器须进行如下附加的保养工作：



保养间隔	保养工作
在有污染物或堵塞时： 要定期清洁爆炸区域中的设备。周期由运营商根据环境应力现场确定，比如在灰尘沉淀大于或约为 0.2...0.5 mm 时。	清洁（à 第 9.1 章）。

表 10

⚠ 警告

爆炸危险
不符合规定的保养工作会产生爆炸危险。
为确保根据防爆规定运行，请依照保养计划完成作业。
- 立即清除设备上堆积的易燃灰尘。

9.1 外部清洁

提示

财产损失
因不恰当的外部清洗损坏 BTS。
- 请注意清洁剂与 BTS 塑料外壳以及电缆接线橡胶密封垫的兼容性！
- 请不要使用高压清洁设备！
- 小心处理密封垫。避免高压水枪以及压缩空气。

- 根据需要使用溶脂性溶剂清洁 BTS。

10 废弃处理

废弃处理包装
根据当地的规定将包装进行废弃处理。

工作液的废弃处理
废弃处理工作液时，请恪守相应的法律法规及制造商或供应商的规定。

清理 BTS
请根据当地的规定清理 BTS。

参考下表中废弃处理使用的材料和原料的特殊提示：

	废物种类		
材料	**再利用**	**剩余垃圾**	**特殊垃圾**
金属	X	–	–
电缆	X	–	–
密封件	–	X	–
塑料	x [1)]	(x)	–
设备	–	–	x [1), 2)]
包装	X	–	–

表 11

1) 如可能
2) 按照安全规章和生产规定清理

11 故障 – 解决措施、故障查找

⚠ 警告

受伤危险
在非接触式热控开关装置上作业时，请尤其注意 à 第 5 章（安全）！

⚠ 警告



爆炸危险
不得对危险环境中运行的设备进行任何改变。
- 不允许维修；要进行更换。

下表可用来迅速查找故障或问题原因，并根据需要，采取相应措施。

运行故障	可能的原因	补救	参见
计算器不显示。	在计算器上没有电源电压。	施加电源电压。	第 6.4 章
	计算器损坏。	更换计算器。	
通电后无法触发起动延时。	去除了计算器上端子 3 和 2 之间的电桥。	插入电桥。	第 6.4 章
外部信号无法触发起动延时。	未去除计算器上端子 3 和 2 之间的电桥。	去除电桥。	第 6.4 章
	外部触发信号过短。	至少在起动延时时间内提供触发信号。	

运行故障	可能的 原因	补救	参见
计算器上的显示：  在断开和重新接通之后重新出现显示。	电子装置故障。 计算器损坏。	断开并重新接通电源电压。 更换计算器。	
在起动延时时间结束之后，始终显示超温（），尽管不存在超温。	起动延时时间选择得过短。	起动延时时间过后，带开关元件的液力偶合器的转速必须明显超过 60 min^{-1}。相应地提高起动延时时间。	
	引发器电级错误。	检查引发器接线。	第 6.4 章
	引发器头与开关元件间的距离过大。	将距离设置为 4 ± 1 mm。	第 6.4 章
	引发器损坏。	检查引发器，需要时更换。	
	开关元件损坏。	检查开关元件，如果需要，进行 更换。	
在起动延时时间结束之后，偶尔显示超温（），尽管不存在超温。	引发器头与开关元件间的距离过大。	将距离设置为 4 ± 1 mm。	第 6.4 章
	引发器的托架不够稳定。通过振动可能出现错误信号。	将托架足够稳定地进行设置。	第 6.4 章
当起动延时功能激活时，工作液从易熔塞泄漏。	起动延时时间选择得太长。	设一个较短的起动延时时间，这样，当起动延时时间过后，带开关元件的液力偶合器的速度将会明显超过 60 min^{-1}	
起动延时时间过后，工作液从熔断螺栓泄漏，BTS 不显示超温。	开关元件和熔断螺栓的额定反应温度不匹配。	请与 Voith 联系。	第 12 章
	开关元件损坏。	检查开关元件，如果需要，进行 更换。	
如果发生了本表中未列出的故障，请向 Voith 咨询（à 第 12 章）。			

表 12

为更加准确地确定故障原因，可按相应顺序采取以下措施：

测量	结果	可能的故障查找
在计算器上施加电源电压。 测量 NAMUR 输入端 （端子 9 和 8）上的无载电压和短路电流。	与以下额定值有明显偏差： – 无载电压： 8.2 V DC – 短路电流：6.5 mA	计算器损坏。
将引发器与计算器相连接。 测量未衰减的引 发器的电流消耗量。	电流消耗 > 6.0 mA 或 < 2.1 mA	引发器损坏。
将引发器与计算器相连接。 测量已衰减的引 发器的电流消耗量。 **提示：** 可以通过比如直接放在引发器前面的金属板使引发器振荡衰减。	电流消耗 > 1.2 mA 或 < 0.1 mA	引发器损坏。
正确安装后，在开关元件和液力偶合器不过热情况下，使引发器振荡衰减。	电流消耗 > 1.2 mA 和 < 6.0 mA	开关元件损坏。

表 13

12 咨询、安装和备件订购

如需

- 查询
- 委任装配工
- 订购备件
- 调试时

我们需要：

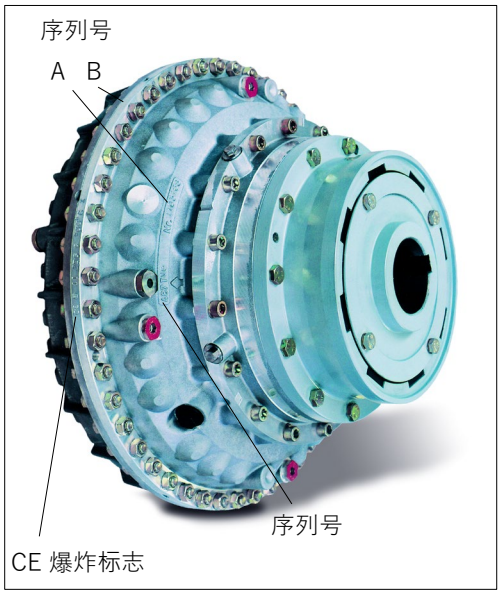


图 13

我们需要**序列号**和采用了 BTS 的液力偶合器的**型号名称**。

à 液力偶合器的序列号及型号名称可在液力偶合器的外轮/轴瓦 (A) 或者在液力偶合器的外缘 (B) 上找到。
à 序列号为数字钢印。
à 如果液力偶合器防爆，在液力偶合器的外围 可以找到 CE-Ex 认证防爆标记。

如果需要预约**服务工程师**、进行**调试**或**维修**，我们额外需要
- 偶合器安装地点，
- 联系人及地址，
- 问题的详细描述。

联系
à 第 2 页

如果要**订购备件**，我们还需要
- 备件供货的发运地址。

13 备件信息

提示

不得擅自进行改动或改造！
不得使用其它制造商的设备或设施进行改造！
未征得 Voith 公司的书面批准就擅自更改或改动会使保修无效！将丧失一般索赔权！

- 只有生产商才能保证专业化的维修！

13.1开关元件

BTS 开关元件					密封圈
用于液力偶合器尺寸	**螺纹尺寸**	**额定反应温度**	**开关元件型号**	**材料号**	**材料号**
206 - 274	M12x1.5	125° C	Voith 125 ° C	TCR.10498440	TCR.03658012
366 - 650	M18x1.5	85 ° C	Voith 85 ° C	TCR.10672470	TCR.03658018
		90 ° C	Voith 90 ° C	TCR.10642650	
		110° C	Voith 110 ° C	TCR.10642630	
		125° C	Voith 125 ° C	TCR.10499540	
		140° C	Voith 140 ° C	TCR.10499550	
		160° C	Voith 160 ° C	TCR.10499560	
		180° C	Voith 180 ° C	TCR.10499570	
750 - 1330	M24x1.5	85 ° C	Voith 85 ° C	TCR.11973940	TCR.03658024
		125° C	Voith 125 ° C	TCR.10488230	
		140° C	Voith 140 ° C	TCR.10653470	
		160° C	Voith 160 ° C	TCR.10633550	
		180° C	Voith 180 ° C	TCR.10488220	

表 14

13.2 引发器、固定法兰

引发器的型号	材料号
NJ 10-22-N-E93-Y245590 （2 m）	201.04312710
NJ 10-22-N-E93-Y246868 （5 m）	201.04312810
NJ 10-22-N-E93-Y246869 （10 m）	201.04312910
固定法兰 BF22	TCR.03668170

表 15

13.3 计算器

计算器的型号	材料号
KFU8-DW-1.D-Y209869	201.01630810

表 16

13.4 绝缘开关放大器

绝缘开关放大器型号	材料号
KFD2-SOT3-Ex2	201.04495110

表 17

14 附录

14.1引发器 NJ 10-22-N-E93-Y245590 (2 m)

Voith 材料号: 201.04312710

操作说明书	Pepperl+Fuchs
技术参数	Pepperl+Fuchs
一致性声明	Pepperl+Fuchs
制造商声明	Pepperl+Fuchs

Instruction Manual

1. Marking

Inductive sensor
NJ10-22-N-E93-Y245590
ATEX marking
⟨Ex⟩ II 2G Ex ia IIC T6...T1 Gb
⟨Ex⟩ II 1D Ex ia IIIC T_{200}135°C Da
IECEx marking
Ex ia IIC T6...T1 Gb
Ex ia IIIC T_{200}135°C Da
Ex ia I Mb

Pepperl+Fuchs Group
Lilienthalstraße 200, 68307 Mannheim, Germany
Internet: www.pepperl-fuchs.com

2. Validity

Specific processes and instructions in this instruction manual require special provisions to guarantee the safety of the operating personnel.

3. Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the device. The trained and qualified personnel must have read and understood the instruction manual.

4. Reference to Further Documentation

Observe laws, standards, and directives applicable to the intended use and the operating location. Observe Directive 1999/92/EC in relation to hazardous areas.

The corresponding datasheets, manuals, declarations of conformity, EU-type examination certificates, certificates, and control drawings if applicable (see datasheet) are an integral part of this document. You can find this information under www.pepperl-fuchs.com.

For specific device information, scan the QR code on the device or enter the serial number in the serial number search at www.pepperl-fuchs.com

Due to constant revisions, documentation is subject to permanent change. Please refer only to the most up-to-date version, which can be found under www.pepperl-fuchs.com.

5. Intended Use

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

Technical data provided in the datasheet may be partly restrained by the information given in this instruction manual.

Use the device only within the specified ambient and operating conditions.

The device is an electrical apparatus for hazardous areas.

The certificate applies only to the use of apparatus under atmospheric conditions.

If you use the device outside atmospheric conditions, consider that the permissible safety parameters should be reduced.

The device can be used in hazardous areas containing gas, vapor, and mist.

The device can be used in hazardous areas containing combustible dust.

The device can be used in underground parts of mines as well as those parts of surface installations of such mines containing firedamp and/or combustible dust.

5.1. Requirements for Equipment Protection Level Gb

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

5.2. Requirements for Equipment Protection Level Da

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

5.3. Requirements for Equipment Protection Level Mb

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

6. Improper Use

Protection of the personnel and the plant is not ensured if the device is not used according to its intended use.

7. Mounting and Installation

Observe the installation instructions according to IEC/EN 60079-14.

Safety-relevant markings are found on the nameplate of the device or the nameplate supplied.

Attach the nameplate supplied in the immediate vicinity of the device. Attach the nameplate so that it is legible and indelible. Take the ambient conditions into account.

Do not mount a damaged or polluted device.

Mount the device so that it complies with the specified degree of protection according to IEC/EN 60529.

If you use the device in environments subject to adverse conditions, you must protect the device accordingly.

Do not remove the warning markings.

7.1. Requirements for Usage as Intrinsically Safe Apparatus

When connecting intrinsically safe devices with intrinsically safe circuits of associated apparatus, observe the maximum peak values with regard to explosion protection (verification of intrinsic safety). Observe the standards IEC/EN 60079-14 or IEC/EN 60079-25.

The type of protection is determined by the connected intrinsically safe circuit.

7.2. Specific Conditions of Use

Mount the device so that it complies with the specified degree of protection according to IEC/EN 60529.

7.2.1. Requirements in Relation to Electrostatics

Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1.

Do not mount the supplied nameplate in areas that can be electrostatically charged.

You can reduce the electrostatic hazards by minimizing the generation of static electricity. For example, you have the following options to minimize the generation of static electricity:

- Control the environmental humidity.
- Protect the device from direct airflow.
- Ensure a continuous drain off of the electrostatic charges.

7.2.1.1. Requirements for Equipment Protection Level Da

Avoid electrostatic charges which could result in electrostatic discharges while installing, operating, or maintaining the device.

7.2.2. Requirements to Mechanics

7.2.2.1. Requirements for Usage as Intrinsically Safe Apparatus

Protect the device from impact effects by mounting in a surrounding enclosure if it is used in the temperature range between the minimum permissible ambient temperature and -20 °C.

Mount the device with at least a degree of protection of IP20 according to IEC/EN 60529.

8. Operation, Maintenance, Repair

Observe the specific conditions of use.

Safety-relevant markings are found on the nameplate of the device or the nameplate supplied.

Do not use a damaged or polluted device.

Do not repair, modify, or manipulate the device.

Modifications are permitted only if approved in this instruction manual and in the device-related documentation.

If there is a defect, always replace the device with an original device.

Do not remove the warning markings.

8.1. Requirements for Usage as Intrinsically Safe Apparatus

Only operate the device with intrinsically safe circuits according to IEC/EN 60079-11.

The type of protection is determined by the connected intrinsically safe circuit.

8.2. Requirements for Equipment Protection Level Gb

Observe the temperature table for the corresponding equipment protection level in the certificate.

Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

8.3. Requirements for Equipment Protection Level Da

Observe the temperature table for the corresponding equipment protection level in the certificate.

Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

8.4. Requirements for Equipment Protection Level Mb

Observe the temperature table for the corresponding equipment protection level in the certificate.

Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

9. Delivery, Transport, Disposal

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Keep the original packaging. Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

The device, built-in components, packaging, and any batteries contained within must be disposed in compliance with the applicable laws and guidelines of the respective country.

10. National Ex approvals

EAC-EX:	TC RU C-DE.AA87.B.00394

11. Safety-Relevant Technical Data

11.1. Equipment protection level Gb

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NJ10-22-N...
ATEX certificate	PTB 00 ATEX 2048 X
ATEX marking	Ex II 2G Ex ia IIC T6...T1 Gb
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia IIC T6...T1 Gb
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 130 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. U_i = 16 V, I_i = 25 mA, P_i = 34 mW T6: 73 °C T5: 88 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW T6: 69 °C T5: 84 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW T6: 51 °C T5: 66 °C T4: 80 °C T3: 80 °C T2: 80 °C T1: 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW T6: 39 °C T5: 54 °C T4: 61 °C T3: 61 °C T2: 61 °C T1: 61 °C

11.2. Equipment protection level Da

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NJ10-22-N...
ATEX certificate	PTB 00 ATEX 2048 X
ATEX marking	Ex II 1D Ex ia IIIC T_{200}135°C Da
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia IIIC T_{200}135°C Da
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 130 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. U_i = 16 V, I_i = 25 mA, P_i = 34 mW 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW 62 °C

11.3. Equipment protection level Mb

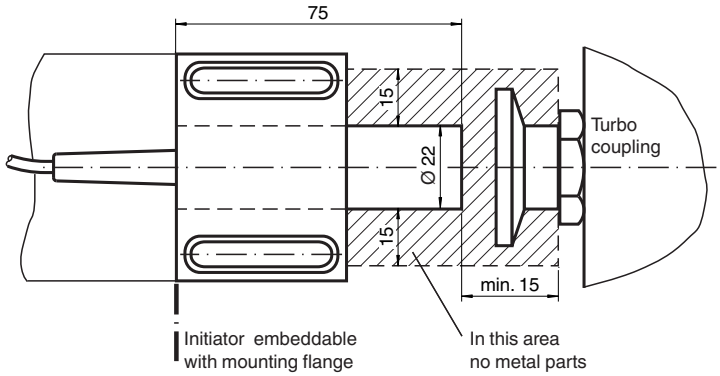
Type of protection	Intrinsic safety
Certificates	
Appropriate type	NJ10-22-N...
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia I Mb

IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 130 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. U_i = 16 V, I_i = 25 mA, P_i = 34 mW 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW 61 °C

Inductive sensor
NJ10-22-N-E93-Y245590

■ Comfort series

Dimensions



Technical Data

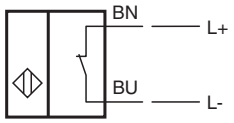
General specifications		
Switching function		Normally closed (NC)
Output type		NAMUR
Rated operating distance	s_n	10 mm
Installation		non-flush
Assured operating distance	s_a	0 ... 10 mm
Output type		2-wire
Nominal ratings		
Nominal voltage	U_o	8.2 V (R_i approx. 1 kΩ)
Switching frequency	f	0 ... 1000 Hz
Hysteresis	H	typ. 5 %
Current consumption		
Measuring plate not detected		min. 3 mA
Measuring plate detected		≤ 1 mA
Functional safety related parameters		
$MTTF_d$		3602 a
Mission Time (T_M)		20 a
Diagnostic Coverage (DC)		0 %
Compliance with standards and directives		
Standard conformity		
NAMUR		EN 60947-5-6:2000 IEC 60947-5-6:1999

Release date: 2021-06-21 Date of issue: 2021-06-21 Filename: 70133281_eng.pdf

Technical Data

Standards		EN 60947-5-2:2007 EN 60947-5-2/A1:2012 IEC 60947-5-2:2007 IEC 60947-5-2 AMD 1:2012
Approvals and certificates		
IECEx approval		
Equipment protection level Gb		IECEx PTB 11.0037X
Equipment protection level Da		IECEx PTB 11.0037X
Equipment protection level Mb		IECEx PTB 11.0037X
ATEX approval		
Equipment protection level Gb		PTB 00 ATEX 2048 X
Equipment protection level Da		PTB 00 ATEX 2048 X
EAC conformity		TR CU 012/2011
UL approval		cULus Listed, General Purpose
Ambient conditions		
Ambient temperature		-40 ... 100 °C (-40 ... 212 °F) Also observe the maximum permissible ambient temperature stated in the data for application in connection with hazardous areas. Keep to the lower of the two values.
Mechanical specifications		
Connection type		cable
Housing material		PBT
Sensing face		PBT
Degree of protection		IP68
Cable		
Cable diameter		6 mm ± 0.2 mm
Bending radius		> 10 x cable diameter
Material		silicone
Core cross-section		0.75 mm^2
Length	L	2 m
General information		
Use in the hazardous area		see instruction manuals

Connection



Release date: 2021-06-21 Date of issue: 2021-06-21 Filename: 70133281_eng.pdf

EU-Declaration of conformity

EU-Konformitätserklärung

en/de

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No. / *Nr.*: DOC-5073
Date / *Datum*: 2021-07-21

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PEPPERL+FUCHS

Declaration of conformity / *Konformitätserklärung*

We, Pepperl+Fuchs SE declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.

*Die Pepperl+Fuchs SE erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten **Produkte** den genannten **Europäischen Richtlinien** und **Normen** entsprechen.*

Products / *Produkte*

Product / *Produkt*	Item number	Description / *Beschreibung*
NJ2-12GK-N-Y40110	70133235	Inductive sensor
NJ2-12GK-N-10M-Y89552	70133232	Inductive sensor
NJ2-12GK-N-25M	70133233	Inductive sensor
NJ2-12GK-N-5M	70133234	Inductive sensor
NJ2-12GM-N-Y08766	70133239	Inductive sensor
NJ2-12GM-N-Y10638	70133240	Inductive sensor
NJ2-14GM-N-C50	70133255	Inductive sensor
NJ2-14GM-N-V1-Y19784	70133256	Inductive sensor
NJ2,5-14GM-N-V1-Y21146	70133054	Inductive sensor
NJ25-50-N	70133327	Inductive sensor
NJ10-30GK-N-5M	70133311	Inductive sensor
NJ25-50-N-15M	70133328	Inductive sensor
NJ15-30GKK-N	70133073	Inductive sensor
NJ25-50-N-5M	70133329	Inductive sensor
NJ15-30GK-N	70133317	Inductive sensor
NJ15-30GK-N-Y08943	70133320	Inductive sensor
NJ15-30GK-N-10M	70133074	Inductive sensor
NJ15-30GK-N-20M	70133318	Inductive sensor
NJ15-30GK-N-30M	70133319	Inductive sensor
NJ20-40-N	70133323	Inductive sensor
NJ2-11-N-G-Y102883	70133198	Inductive sensor
NJ2-11-N-G-910	70133196	Inductive sensor
NJ10-22-N	70133280	Inductive sensor
NJ10-22-N-E93-Y245590	70133281	Inductive sensor
NJ10-22-N-E93-Y246868	70133282	Inductive sensor
NJ10-22-N-E93-Y246869	70133283	Inductive sensor
NJ10-22-N-G	70133284	Inductive sensor
NJ10-22-N-G-5M	70133285	Inductive sensor
NJ10-30GKK-N	70133308	Inductive sensor
NJ10-30GK-N	70133309	Inductive sensor
NJ10-30GK-N-15M	70133310	Inductive sensor
NJ2-11-N-Y14235	70133202	Inductive sensor
NJ2-12GK-N	70133049	Inductive sensor

Directives and Standards / *Richtlinien und Normen*

EU-Directive *EU-Richtlinie*	Standards *Normen*
ATEX 2014/34/EU (L96/309-356)	EN 60079-11:2012-01 EN IEC 60079-0:2018-07
EMC 2014/30/EU (L96/79-106)	EN 60947-5-2/A1:2012-11 EN 60947-5-2:2007-12 EN 60947-5-6:2000-01 EN IEC 60947-5-2:2020-03
RoHS 2011/65/EU (L174/88-110)	EN IEC 63000:2018-12

Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE 0102

Signatures / *Unterschriften*

Mannheim, 2021-07-21

i.V. Ulrich Ehrenfried
Head of Innovation Unit Electromagnetic Sensors

i.V. Tobias Dittmer
Global Product Manager

ANNEX ATEX

Notified Body QM-System / Notifizierte Stelle des QM-Systems
Physikalisch Technische Bundesanstalt (0102)
Bundesallee 100
38116 Braunschweig
Germany

Marking and Certificates / *Kennzeichnung und Zertifikate*

Marking *Kennzeichnung*	Certificate *Zertifikat*	Issuer ID *Aussteller ID*
Ex II 1 D Ex II 2 G	PTB 00 ATEX 2048 X	0102

Key for Issuer ID / *Schlüssel zur Aussteller ID*

ID	Issuer / *Aussteller*
0102	Physikalisch Technische Bundesanstalt Bundesallee 100 38116 Braunschweig Germany

PEPPERL+FUCHS Your automation, our passion.

Pepperl+Fuchs SE • 68307 Mannheim • Germany

Customer: DE164472
J.M. Voith SE & Co. KG | VTA

Mannheim, November 24, 2023

We, Pepperl+Fuchs SE at 68307 Mannheim hereby declare that the listed product/s have been produced conform to the Regulation (EC) No 1907/2006 (REACH). Used SVHC according Article 33 of the regulation are noted.

Manufacturer Declaration

Item/s		
Item Number	Item Description	*Your Item No*
SCIP No.		
SVHC		
70133281	NJ10-22-N-E93-Y245590	
1a8b87c8-f50d-4cf1-b772-699892f52066		
-4,4'-isopropylidenediphenol (Bisphenol A), EC 201-245-8, CAS 80-05-7		
-Lead (Pb) EC 231-100-4, CAS 7439-92-1		

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Department Global Compliance
24.11.2023 Mannheim

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Lilienthalstraße 200 • 68307 Mannheim • Germany • Phone: +49 621 776-0 • Fax: +49 621 776-1000 • www.pepperl-fuchs.com • info@de.pepperl-fuchs.com
Board Members: Dr.-Ing. Gunther Kegel (Chairman), Werner Guthier (Deputy Chairman), Lutz Liebers, Reiner Müller, Florian Ochs
Chairwoman of the Supervisory Board: Monika Mueller-Michael • Registration Court: AG Mannheim HRB 737016 • VAT reg. no.: DE 143877372
Bank Account: Commerzbank AG • IBAN: DE89670800500685472200 • BIC: DRESDEFF670 • Deutsche Bank AG • IBAN: DE73670700100553270000 • BIC: DEUTDESMXXX

14.2引发器 NJ 10-22-N-E93-Y246868 (5 m)

Voith 材料号: 201.04312810

操作说明书	Pepperl+Fuchs
技术参数	Pepperl+Fuchs
一致性声明	Pepperl+Fuchs
制造商声明	Pepperl+Fuchs

Instruction Manual

1. Marking

Inductive sensor
NJ10-22-N-E93-Y246868
ATEX marking
⟨Ex⟩ II 2G Ex ia IIC T6...T1 Gb
⟨Ex⟩ II 1D Ex ia IIIC T_{200}135°C Da
IECEx marking
Ex ia IIC T6...T1 Gb
Ex ia IIIC T_{200}135°C Da
Ex ia I Mb

Pepperl+Fuchs Group
Lilienthalstraße 200, 68307 Mannheim, Germany
Internet: www.pepperl-fuchs.com

2. Validity

Specific processes and instructions in this instruction manual require special provisions to guarantee the safety of the operating personnel.

3. Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the device. The trained and qualified personnel must have read and understood the instruction manual.

4. Reference to Further Documentation

Observe laws, standards, and directives applicable to the intended use and the operating location. Observe Directive 1999/92/EC in relation to hazardous areas.

The corresponding datasheets, manuals, declarations of conformity, EU-type examination certificates, certificates, and control drawings if applicable (see datasheet) are an integral part of this document. You can find this information under www.pepperl-fuchs.com.

For specific device information, scan the QR code on the device or enter the serial number in the serial number search at www.pepperl-fuchs.com

Due to constant revisions, documentation is subject to permanent change. Please refer only to the most up-to-date version, which can be found under www.pepperl-fuchs.com.

5. Intended Use

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

Technical data provided in the datasheet may be partly restrained by the information given in this instruction manual.

Use the device only within the specified ambient and operating conditions.

The device is an electrical apparatus for hazardous areas.

The certificate applies only to the use of apparatus under atmospheric conditions.

If you use the device outside atmospheric conditions, consider that the permissible safety parameters should be reduced.

The device can be used in hazardous areas containing gas, vapor, and mist.

The device can be used in hazardous areas containing combustible dust.

The device can be used in underground parts of mines as well as those parts of surface installations of such mines containing firedamp and/or combustible dust.

5.1. Requirements for Equipment Protection Level Gb

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

5.2. Requirements for Equipment Protection Level Da

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

5.3. Requirements for Equipment Protection Level Mb

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

6. Improper Use

Protection of the personnel and the plant is not ensured if the device is not used according to its intended use.

7. Mounting and Installation

Observe the installation instructions according to IEC/EN 60079-14.

Safety-relevant markings are found on the nameplate of the device or the nameplate supplied.

Attach the nameplate supplied in the immediate vicinity of the device. Attach the nameplate so that it is legible and indelible. Take the ambient conditions into account.

Do not mount a damaged or polluted device.

Mount the device so that it complies with the specified degree of protection according to IEC/EN 60529.

If you use the device in environments subject to adverse conditions, you must protect the device accordingly.

Do not remove the warning markings.

7.1. Requirements for Usage as Intrinsically Safe Apparatus

When connecting intrinsically safe devices with intrinsically safe circuits of associated apparatus, observe the maximum peak values with regard to explosion protection (verification of intrinsic safety). Observe the standards IEC/EN 60079-14 or IEC/EN 60079-25.

The type of protection is determined by the connected intrinsically safe circuit.

7.2. Specific Conditions of Use

Mount the device so that it complies with the specified degree of protection according to IEC/EN 60529.

7.2.1. Requirements in Relation to Electrostatics

Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1.

Do not mount the supplied nameplate in areas that can be electrostatically charged.

You can reduce the electrostatic hazards by minimizing the generation of static electricity. For example, you have the following options to minimize the generation of static electricity:

- Control the environmental humidity.
- Protect the device from direct airflow.
- Ensure a continuous drain off of the electrostatic charges.

7.2.1.1. Requirements for Equipment Protection Level Da

Avoid electrostatic charges which could result in electrostatic discharges while installing, operating, or maintaining the device.

7.2.2. Requirements to Mechanics

7.2.2.1. Requirements for Usage as Intrinsically Safe Apparatus

Protect the device from impact effects by mounting in a surrounding enclosure if it is used in the temperature range between the minimum permissible ambient temperature and -20 °C.

Mount the device with at least a degree of protection of IP20 according to IEC/EN 60529.

8. Operation, Maintenance, Repair

Observe the specific conditions of use.

Safety-relevant markings are found on the nameplate of the device or the nameplate supplied.

Do not use a damaged or polluted device.

Do not repair, modify, or manipulate the device.

Modifications are permitted only if approved in this instruction manual and in the device-related documentation.

If there is a defect, always replace the device with an original device.

Do not remove the warning markings.

8.1. Requirements for Usage as Intrinsically Safe Apparatus

Only operate the device with intrinsically safe circuits according to IEC/EN 60079-11.

The type of protection is determined by the connected intrinsically safe circuit.

8.2. Requirements for Equipment Protection Level Gb

Observe the temperature table for the corresponding equipment protection level in the certificate.

Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

8.3. Requirements for Equipment Protection Level Da

Observe the temperature table for the corresponding equipment protection level in the certificate.

Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

8.4. Requirements for Equipment Protection Level Mb

Observe the temperature table for the corresponding equipment protection level in the certificate.

Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

9. Delivery, Transport, Disposal

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Keep the original packaging. Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

The device, built-in components, packaging, and any batteries contained within must be disposed in compliance with the applicable laws and guidelines of the respective country.

10. National Ex approvals

EAC-EX:	TC RU C-DE.AA87.B.00394

11. Safety-Relevant Technical Data

11.1. Equipment protection level Gb

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NJ10-22-N...
ATEX certificate	PTB 00 ATEX 2048 X
ATEX marking	Ex II 2G Ex ia IIC T6...T1 Gb
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia IIC T6...T1 Gb
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 130 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. U_i = 16 V, I_i = 25 mA, P_i = 34 mW T6: 73 °C T5: 88 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW T6: 69 °C T5: 84 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW T6: 51 °C T5: 66 °C T4: 80 °C T3: 80 °C T2: 80 °C T1: 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW T6: 39 °C T5: 54 °C T4: 61 °C T3: 61 °C T2: 61 °C T1: 61 °C

11.2. Equipment protection level Da

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NJ10-22-N...
ATEX certificate	PTB 00 ATEX 2048 X
ATEX marking	Ex II 1D Ex ia IIIC T_{200}135°C Da
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia IIIC T_{200}135°C Da
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 130 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. U_i = 16 V, I_i = 25 mA, P_i = 34 mW 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW 62 °C

11.3. Equipment protection level Mb

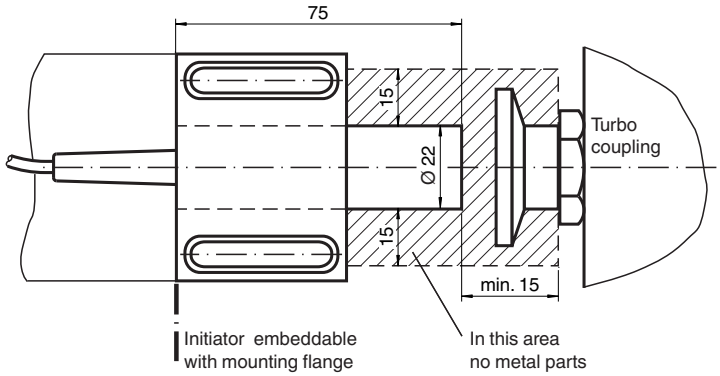
Type of protection	Intrinsic safety
Certificates	
Appropriate type	NJ10-22-N...
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia I Mb

IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 130 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. U_i = 16 V, I_i = 25 mA, P_i = 34 mW 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW 61 °C

Inductive sensor
NJ10-22-N-E93-Y246868

■ Comfort series

Dimensions



Technical Data

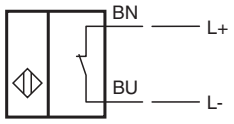
General specifications		
Switching function		Normally closed (NC)
Output type		NAMUR
Rated operating distance	s_n	10 mm
Installation		non-flush
Assured operating distance	s_a	0 ... 10 mm
Output type		2-wire
Nominal ratings		
Nominal voltage	U_o	8.2 V (R_i approx. 1 kΩ)
Switching frequency	f	0 ... 1000 Hz
Hysteresis	H	typ. 5 %
Current consumption		
Measuring plate not detected		min. 3 mA
Measuring plate detected		≤ 1 mA
Functional safety related parameters		
$MTTF_d$		3602 a
Mission Time (T_M)		20 a
Diagnostic Coverage (DC)		0 %
Compliance with standards and directives		
Standard conformity		
NAMUR		EN 60947-5-6:2000 IEC 60947-5-6:1999

Release date: 2021-06-21 Date of issue: 2021-06-21 Filename: 70133282_eng.pdf

Technical Data

Standards		EN 60947-5-2:2007 EN 60947-5-2/A1:2012 IEC 60947-5-2:2007 IEC 60947-5-2 AMD 1:2012
Approvals and certificates		
IECEx approval		
Equipment protection level Gb		IECEx PTB 11.0037X
Equipment protection level Da		IECEx PTB 11.0037X
Equipment protection level Mb		IECEx PTB 11.0037X
ATEX approval		
Equipment protection level Gb		PTB 00 ATEX 2048 X
Equipment protection level Da		PTB 00 ATEX 2048 X
EAC conformity		TR CU 012/2011
UL approval		cULus Listed, General Purpose
Ambient conditions		
Ambient temperature		-40 ... 100 °C (-40 ... 212 °F) Also observe the maximum permissible ambient temperature stated in the data for application in connection with hazardous areas. Keep to the lower of the two values.
Mechanical specifications		
Connection type		cable
Housing material		PBT
Sensing face		PBT
Degree of protection		IP68
Cable		
Cable diameter		6 mm ± 0.2 mm
Bending radius		> 10 x cable diameter
Material		silicone
Core cross-section		0.75 mm^2
Length	L	5 m
General information		
Use in the hazardous area		see instruction manuals

Connection



Release date: 2021-06-21 Date of issue: 2021-06-21 Filename: 70133282_eng.pdf

EU-Declaration of conformity

EU-Konformitätserklärung

en/de

Pepperl+Fuchs SE
Lilienthalstraße 200
68307 Mannheim
Germany
Phone +49 621 776-0
Fax +49 621 776-1000

No. / *Nr.*: DOC-5073
Date / *Datum*: 2021-07-21

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PEPPERL+FUCHS

Declaration of conformity / *Konformitätserklärung*

We, Pepperl+Fuchs SE declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.

*Die Pepperl+Fuchs SE erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten **Produkte** den genannten **Europäischen Richtlinien** und **Normen** entsprechen.*

Products / *Produkte*

Product / *Produkt*	Item number	Description / *Beschreibung*
NJ2-12GK-N-Y40110	70133235	Inductive sensor
NJ2-12GK-N-10M-Y89552	70133232	Inductive sensor
NJ2-12GK-N-25M	70133233	Inductive sensor
NJ2-12GK-N-5M	70133234	Inductive sensor
NJ2-12GM-N-Y08766	70133239	Inductive sensor
NJ2-12GM-N-Y10638	70133240	Inductive sensor
NJ2-14GM-N-C50	70133255	Inductive sensor
NJ2-14GM-N-V1-Y19784	70133256	Inductive sensor
NJ2,5-14GM-N-V1-Y21146	70133054	Inductive sensor
NJ25-50-N	70133327	Inductive sensor
NJ10-30GK-N-5M	70133311	Inductive sensor
NJ25-50-N-15M	70133328	Inductive sensor
NJ15-30GKK-N	70133073	Inductive sensor
NJ25-50-N-5M	70133329	Inductive sensor
NJ15-30GK-N	70133317	Inductive sensor
NJ15-30GK-N-Y08943	70133320	Inductive sensor
NJ15-30GK-N-10M	70133074	Inductive sensor
NJ15-30GK-N-20M	70133318	Inductive sensor
NJ15-30GK-N-30M	70133319	Inductive sensor
NJ20-40-N	70133323	Inductive sensor
NJ2-11-N-G-Y102883	70133198	Inductive sensor
NJ2-11-N-G-910	70133196	Inductive sensor
NJ10-22-N	70133280	Inductive sensor
NJ10-22-N-E93-Y245590	70133281	Inductive sensor
NJ10-22-N-E93-Y246868	70133282	Inductive sensor
NJ10-22-N-E93-Y246869	70133283	Inductive sensor
NJ10-22-N-G	70133284	Inductive sensor
NJ10-22-N-G-5M	70133285	Inductive sensor
NJ10-30GKK-N	70133308	Inductive sensor
NJ10-30GK-N	70133309	Inductive sensor
NJ10-30GK-N-15M	70133310	Inductive sensor
NJ2-11-N-Y14235	70133202	Inductive sensor
NJ2-12GK-N	70133049	Inductive sensor

Directives and Standards / *Richtlinien und Normen*

EU-Directive *EU-Richtlinie*	Standards *Normen*
ATEX 2014/34/EU (L96/309-356)	EN 60079-11:2012-01 EN IEC 60079-0:2018-07
EMC 2014/30/EU (L96/79-106)	EN 60947-5-2/A1:2012-11 EN 60947-5-2:2007-12 EN 60947-5-6:2000-01 EN IEC 60947-5-2:2020-03
RoHS 2011/65/EU (L174/88-110)	EN IEC 63000:2018-12

Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE 0102

Signatures / *Unterschriften*

Mannheim, 2021-07-21

i.V. Ulrich Ehrenfried
Head of Innovation Unit Electromagnetic Sensors

i.V. Tobias Dittmer
Global Product Manager

ANNEX ATEX

Notified Body QM-System / Notifizierte Stelle des QM-Systems
Physikalisch Technische Bundesanstalt (0102)
Bundesallee 100
38116 Braunschweig
Germany

Marking and Certificates / *Kennzeichnung und Zertifikate*

Marking *Kennzeichnung*	Certificate *Zertifikat*	Issuer ID *Aussteller ID*
Ex II 1 D Ex II 2 G	PTB 00 ATEX 2048 X	0102

Key for Issuer ID / *Schlüssel zur Aussteller ID*

ID	Issuer / *Aussteller*
0102	Physikalisch Technische Bundesanstalt Bundesallee 100 38116 Braunschweig Germany

PEPPERL+FUCHS Your automation, our passion.

Pepperl+Fuchs SE • 68307 Mannheim • Germany

Customer: DE164472
J.M. Voith SE & Co. KG | VTA

Mannheim, November 24, 2023

We, Pepperl+Fuchs SE at 68307 Mannheim hereby declare that the listed product/s have been produced conform to the Regulation (EC) No 1907/2006 (REACH). Used SVHC according Article 33 of the regulation are noted.

Manufacturer Declaration

Item/s		
Item Number	Item Description	*Your Item No*
SCIP No.		
SVHC		
70133282	NJ10-22-N-E93-Y246868	
2cf50ea3-9289-4d6e-87b2-1e566cbb10ed		
-4,4'-isopropylidenediphenol (Bisphenol A), EC 201-245-8, CAS 80-05-7		
-Lead (Pb) EC 231-100-4, CAS 7439-92-1		

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Department Global Compliance
24.11.2023 Mannheim

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Lilienthalstraße 200 • 68307 Mannheim • Germany • Phone: +49 621 776-0 • Fax: +49 621 776-1000 • www.pepperl-fuchs.com • info@de.pepperl-fuchs.com
Board Members: Dr.-Ing. Gunther Kegel (Chairman), Werner Guthier (Deputy Chairman), Lutz Liebers, Reiner Müller, Florian Ochs
Chairwoman of the Supervisory Board: Monika Mueller-Michael • Registration Court: AG Mannheim HRB 737016 • VAT reg. no.: DE 143877372
Bank Account: Commerzbank AG • IBAN: DE89670800500685472200 • BIC: DRESDEFF670 • Deutsche Bank AG • IBAN: DE73670700100553270000 • BIC: DEUTDESMXXX

14.3引发器 NJ 10-22-N-E93-Y246869 (10 m)

Voith 材料号: 201.04312910

操作说明书	Pepperl+Fuchs
技术参数	Pepperl+Fuchs
一致性声明	Pepperl+Fuchs
制造商声明	Pepperl+Fuchs

Instruction Manual

1. Marking

Inductive sensor
NJ10-22-N-E93-Y246869
ATEX marking
⟨Ex⟩ II 2G Ex ia IIC T6...T1 Gb
⟨Ex⟩ II 1D Ex ia IIIC T_{200}135°C Da
IECEx marking
Ex ia IIC T6...T1 Gb
Ex ia IIIC T_{200}135°C Da
Ex ia I Mb

Pepperl+Fuchs Group
Lilienthalstraße 200, 68307 Mannheim, Germany
Internet: www.pepperl-fuchs.com

2. Validity

Specific processes and instructions in this instruction manual require special provisions to guarantee the safety of the operating personnel.

3. Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the device. The trained and qualified personnel must have read and understood the instruction manual.

4. Reference to Further Documentation

Observe laws, standards, and directives applicable to the intended use and the operating location. Observe Directive 1999/92/EC in relation to hazardous areas.

The corresponding datasheets, manuals, declarations of conformity, EU-type examination certificates, certificates, and control drawings if applicable (see datasheet) are an integral part of this document. You can find this information under www.pepperl-fuchs.com.

For specific device information, scan the QR code on the device or enter the serial number in the serial number search at www.pepperl-fuchs.com

Due to constant revisions, documentation is subject to permanent change. Please refer only to the most up-to-date version, which can be found under www.pepperl-fuchs.com.

5. Intended Use

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

Technical data provided in the datasheet may be partly restrained by the information given in this instruction manual.

Use the device only within the specified ambient and operating conditions.

The device is an electrical apparatus for hazardous areas.

The certificate applies only to the use of apparatus under atmospheric conditions.

If you use the device outside atmospheric conditions, consider that the permissible safety parameters should be reduced.

The device can be used in hazardous areas containing gas, vapor, and mist.

The device can be used in hazardous areas containing combustible dust.

The device can be used in underground parts of mines as well as those parts of surface installations of such mines containing firedamp and/or combustible dust.

5.1. Requirements for Equipment Protection Level Gb

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

5.2. Requirements for Equipment Protection Level Da

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

5.3. Requirements for Equipment Protection Level Mb

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

6. Improper Use

Protection of the personnel and the plant is not ensured if the device is not used according to its intended use.

7. Mounting and Installation

Observe the installation instructions according to IEC/EN 60079-14.

Safety-relevant markings are found on the nameplate of the device or the nameplate supplied.

Attach the nameplate supplied in the immediate vicinity of the device. Attach the nameplate so that it is legible and indelible. Take the ambient conditions into account.

Do not mount a damaged or polluted device.

Mount the device so that it complies with the specified degree of protection according to IEC/EN 60529.

If you use the device in environments subject to adverse conditions, you must protect the device accordingly.

Do not remove the warning markings.

7.1. Requirements for Usage as Intrinsically Safe Apparatus

When connecting intrinsically safe devices with intrinsically safe circuits of associated apparatus, observe the maximum peak values with regard to explosion protection (verification of intrinsic safety). Observe the standards IEC/EN 60079-14 or IEC/EN 60079-25.

The type of protection is determined by the connected intrinsically safe circuit.

7.2. Specific Conditions of Use

Mount the device so that it complies with the specified degree of protection according to IEC/EN 60529.

7.2.1. Requirements in Relation to Electrostatics

Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1.

Do not mount the supplied nameplate in areas that can be electrostatically charged.

You can reduce the electrostatic hazards by minimizing the generation of static electricity. For example, you have the following options to minimize the generation of static electricity:

- Control the environmental humidity.
- Protect the device from direct airflow.
- Ensure a continuous drain off of the electrostatic charges.

7.2.1.1. Requirements for Equipment Protection Level Da

Avoid electrostatic charges which could result in electrostatic discharges while installing, operating, or maintaining the device.

7.2.2. Requirements to Mechanics

7.2.2.1. Requirements for Usage as Intrinsically Safe Apparatus

Protect the device from impact effects by mounting in a surrounding enclosure if it is used in the temperature range between the minimum permissible ambient temperature and -20 °C.

Mount the device with at least a degree of protection of IP20 according to IEC/EN 60529.

8. Operation, Maintenance, Repair

Observe the specific conditions of use.

Safety-relevant markings are found on the nameplate of the device or the nameplate supplied.

Do not use a damaged or polluted device.

Do not repair, modify, or manipulate the device.

Modifications are permitted only if approved in this instruction manual and in the device-related documentation.

If there is a defect, always replace the device with an original device.

Do not remove the warning markings.

8.1. Requirements for Usage as Intrinsically Safe Apparatus

Only operate the device with intrinsically safe circuits according to IEC/EN 60079-11.

The type of protection is determined by the connected intrinsically safe circuit.

8.2. Requirements for Equipment Protection Level Gb

Observe the temperature table for the corresponding equipment protection level in the certificate.

Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

8.3. Requirements for Equipment Protection Level Da

Observe the temperature table for the corresponding equipment protection level in the certificate.

Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

8.4. Requirements for Equipment Protection Level Mb

Observe the temperature table for the corresponding equipment protection level in the certificate.

Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

9. Delivery, Transport, Disposal

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Keep the original packaging. Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

The device, built-in components, packaging, and any batteries contained within must be disposed in compliance with the applicable laws and guidelines of the respective country.

10. National Ex approvals

EAC-EX:	TC RU C-DE.AA87.B.00394

11. Safety-Relevant Technical Data

11.1. Equipment protection level Gb

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NJ10-22-N...
ATEX certificate	PTB 00 ATEX 2048 X
ATEX marking	Ex II 2G Ex ia IIC T6...T1 Gb
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia IIC T6...T1 Gb
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 130 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. U_i = 16 V, I_i = 25 mA, P_i = 34 mW T6: 73 °C T5: 88 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW T6: 69 °C T5: 84 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW T6: 51 °C T5: 66 °C T4: 80 °C T3: 80 °C T2: 80 °C T1: 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW T6: 39 °C T5: 54 °C T4: 61 °C T3: 61 °C T2: 61 °C T1: 61 °C

11.2. Equipment protection level Da

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NJ10-22-N...
ATEX certificate	PTB 00 ATEX 2048 X
ATEX marking	Ex II 1D Ex ia IIIC T_{200}135°C Da
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia IIIC T_{200}135°C Da
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 130 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. U_i = 16 V, I_i = 25 mA, P_i = 34 mW 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW 62 °C

11.3. Equipment protection level Mb

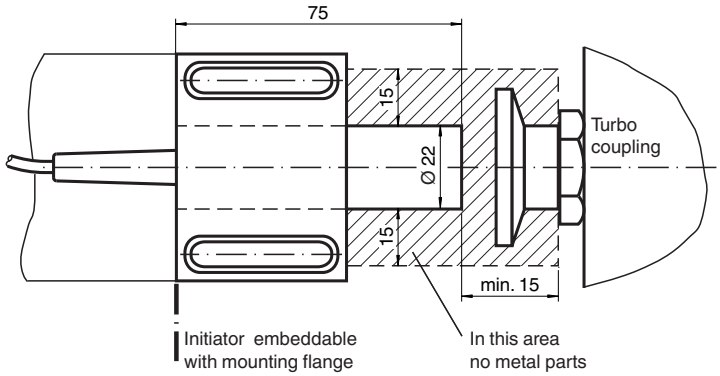
Type of protection	Intrinsic safety
Certificates	
Appropriate type	NJ10-22-N...
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia I Mb

IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 130 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. U_i = 16 V, I_i = 25 mA, P_i = 34 mW 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW 61 °C

Inductive sensor
NJ10-22-N-E93-Y246869

■ Comfort series

Dimensions



Technical Data

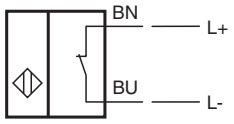
General specifications		
Switching function		Normally closed (NC)
Output type		NAMUR
Rated operating distance	s_n	10 mm
Installation		non-flush
Assured operating distance	s_a	0 ... 10 mm
Output type		2-wire
Nominal ratings		
Nominal voltage	U_o	8.2 V (R_i approx. 1 kΩ)
Switching frequency	f	0 ... 1000 Hz
Hysteresis	H	typ. 5 %
Current consumption		
Measuring plate not detected		min. 3 mA
Measuring plate detected		≤ 1 mA
Functional safety related parameters		
$MTTF_d$		3602 a
Mission Time (T_M)		20 a
Diagnostic Coverage (DC)		0 %
Compliance with standards and directives		
Standard conformity		
NAMUR		EN 60947-5-6:2000 IEC 60947-5-6:1999

Release date: 2021-06-21 Date of issue: 2021-06-21 Filename: 70133283_eng.pdf

Technical Data

Standards		EN 60947-5-2:2007 EN 60947-5-2/A1:2012 IEC 60947-5-2:2007 IEC 60947-5-2 AMD 1:2012
Approvals and certificates		
IECEx approval		
Equipment protection level Gb		IECEx PTB 11.0037X
Equipment protection level Da		IECEx PTB 11.0037X
Equipment protection level Mb		IECEx PTB 11.0037X
ATEX approval		
Equipment protection level Gb		PTB 00 ATEX 2048 X
Equipment protection level Da		PTB 00 ATEX 2048 X
EAC conformity		TR CU 012/2011
UL approval		cULus Listed, General Purpose
Ambient conditions		
Ambient temperature		-40 ... 100 °C (-40 ... 212 °F) Also observe the maximum permissible ambient temperature stated in the data for application in connection with hazardous areas. Keep to the lower of the two values.
Mechanical specifications		
Connection type		cable
Housing material		PBT
Sensing face		PBT
Degree of protection		IP68
Cable		
Cable diameter		6 mm ± 0.2 mm
Bending radius		> 10 x cable diameter
Material		silicone
Core cross-section		0.75 mm^2
Length	L	10 m
General information		
Use in the hazardous area		see instruction manuals

Connection



Release date: 2021-06-21 Date of issue: 2021-06-21 Filename: 70133283_eng.pdf

EU-Declaration of conformity

EU-Konformitätserklärung

en/de

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No. / *Nr.*: DOC-5073
Date / *Datum*: 2021-07-21

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PEPPERL+FUCHS

Declaration of conformity / *Konformitätserklärung*

We, Pepperl+Fuchs SE declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.

*Die Pepperl+Fuchs SE erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten **Produkte** den genannten **Europäischen Richtlinien** und **Normen** entsprechen.*

Products / *Produkte*

Product / *Produkt*	Item number	Description / *Beschreibung*
NJ2-12GK-N-Y40110	70133235	Inductive sensor
NJ2-12GK-N-10M-Y89552	70133232	Inductive sensor
NJ2-12GK-N-25M	70133233	Inductive sensor
NJ2-12GK-N-5M	70133234	Inductive sensor
NJ2-12GM-N-Y08766	70133239	Inductive sensor
NJ2-12GM-N-Y10638	70133240	Inductive sensor
NJ2-14GM-N-C50	70133255	Inductive sensor
NJ2-14GM-N-V1-Y19784	70133256	Inductive sensor
NJ2,5-14GM-N-V1-Y21146	70133054	Inductive sensor
NJ25-50-N	70133327	Inductive sensor
NJ10-30GK-N-5M	70133311	Inductive sensor
NJ25-50-N-15M	70133328	Inductive sensor
NJ15-30GKK-N	70133073	Inductive sensor
NJ25-50-N-5M	70133329	Inductive sensor
NJ15-30GK-N	70133317	Inductive sensor
NJ15-30GK-N-Y08943	70133320	Inductive sensor
NJ15-30GK-N-10M	70133074	Inductive sensor
NJ15-30GK-N-20M	70133318	Inductive sensor
NJ15-30GK-N-30M	70133319	Inductive sensor
NJ20-40-N	70133323	Inductive sensor
NJ2-11-N-G-Y102883	70133198	Inductive sensor
NJ2-11-N-G-910	70133196	Inductive sensor
NJ10-22-N	70133280	Inductive sensor
NJ10-22-N-E93-Y245590	70133281	Inductive sensor
NJ10-22-N-E93-Y246868	70133282	Inductive sensor
NJ10-22-N-E93-Y246869	70133283	Inductive sensor
NJ10-22-N-G	70133284	Inductive sensor
NJ10-22-N-G-5M	70133285	Inductive sensor
NJ10-30GKK-N	70133308	Inductive sensor
NJ10-30GK-N	70133309	Inductive sensor
NJ10-30GK-N-15M	70133310	Inductive sensor
NJ2-11-N-Y14235	70133202	Inductive sensor
NJ2-12GK-N	70133049	Inductive sensor

Directives and Standards / *Richtlinien und Normen*

EU-Directive *EU-Richtlinie*	Standards *Normen*
ATEX 2014/34/EU (L96/309-356)	EN 60079-11:2012-01 EN IEC 60079-0:2018-07
EMC 2014/30/EU (L96/79-106)	EN 60947-5-2/A1:2012-11 EN 60947-5-2:2007-12 EN 60947-5-6:2000-01 EN IEC 60947-5-2:2020-03
RoHS 2011/65/EU (L174/88-110)	EN IEC 63000:2018-12

Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE 0102

Signatures / *Unterschriften*

Mannheim, 2021-07-21

i.V. Ulrich Ehrenfried
Head of Innovation Unit Electromagnetic Sensors

i.V. Tobias Dittmer
Global Product Manager

ANNEX ATEX

Notified Body QM-System / Notifizierte Stelle des QM-Systems
Physikalisch Technische Bundesanstalt (0102)
Bundesallee 100
38116 Braunschweig
Germany

Marking and Certificates / *Kennzeichnung und Zertifikate*

Marking *Kennzeichnung*	Certificate *Zertifikat*	Issuer ID *Aussteller ID*
Ex II 1 D Ex II 2 G	PTB 00 ATEX 2048 X	0102

Key for Issuer ID / *Schlüssel zur Aussteller ID*

ID	Issuer / *Aussteller*
0102	Physikalisch Technische Bundesanstalt Bundesallee 100 38116 Braunschweig Germany

PEPPERL+FUCHS Your automation, our passion.

Pepperl+Fuchs SE • 68307 Mannheim • Germany

Customer: DE164472
J.M. Voith SE & Co. KG | VTA

Mannheim, November 24, 2023

We, Pepperl+Fuchs SE at 68307 Mannheim hereby declare that the listed product/s have been produced conform to the Regulation (EC) No 1907/2006 (REACH). Used SVHC according Article 33 of the regulation are noted.

Manufacturer Declaration

Item/s		
Item Number	Item Description	*Your Item No*
SCIP No.		
SVHC		
70133283	NJ10-22-N-E93-Y246869	
313df958-fb94-4948-91b4-843538f6e738		
-4,4'-isopropylidenediphenol (Bisphenol A), EC 201-245-8, CAS 80-05-7		
-Lead (Pb) EC 231-100-4, CAS 7439-92-1		

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Department Global Compliance
24.11.2023 Mannheim

Pepperl+Fuchs SE
Lilienthalstraße 200 • 68307 Mannheim • Germany • Phone: +49 621 776-0 • Fax: +49 621 776-1000 • www.pepperl-fuchs.com • info@de.pepperl-fuchs.com
Board Members: Dr.-Ing. Gunther Kegel (Chairman), Werner Guthier (Deputy Chairman), Lutz Liebers, Reiner Müller, Florian Ochs
Chairwoman of the Supervisory Board: Monika Mueller-Michael • Registration Court: AG Mannheim HRB 737016 • VAT reg. no.: DE 143877372
Bank Account: Commerzbank AG • IBAN: DE89670800500685472200 • BIC: DRESDEFF670 • Deutsche Bank AG • IBAN: DE73670700100553270000 • BIC: DEUTDESMXXX

14.4计算器 KFU8-DW-1.D-Y209869

Voith 材料号: 201.01630810

技术参数	Pepperl+Fuchs
一致性声明	Pepperl+Fuchs
制造商声明	Pepperl+Fuchs



Rotation Speed Monitor

KFU8-DW-1.D-Y209869

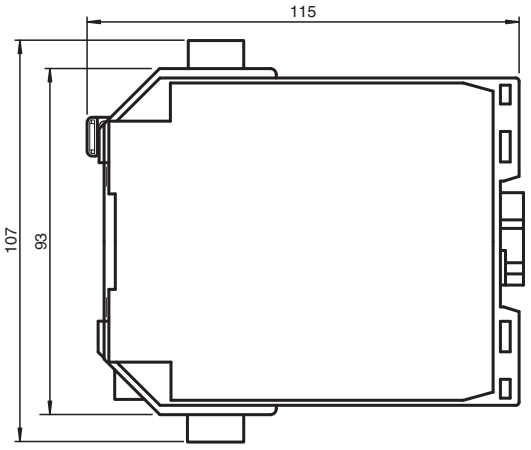
- Rotational speed monitoring up to 10 kHz
- 1 pre-select value with relay output and LED indicator
- Multi-range power pack
- NAMUR sensors connectable
- Adjustable start-up override
- Menu driven operation via 4 front keys
- Period measurement

Evaluation unit

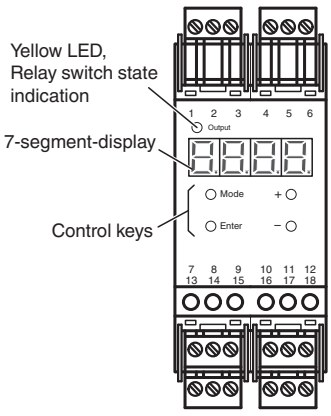
Function

The speed monitor is a device used to indicate and monitor periodic signals (frequencies and rotational speeds) which occur in almost all areas of automation and process engineering.
The input signals are evaluated in accordance with the cycle method. That is, by measuring the duration of a period and then converting it with a very fast micro controller to a frequency or rotational speed.
The speed monitor can be supplied with 115 V AC, 230 V AC or by a 24 V DC supply and when connected to an alternating voltage it provides a 24 V DC source to supply the signal sensor.

Dimensions



Indicators/operating means



Technical Data

General specifications	
Pre-selection	single
Functional safety related parameters	
$MTTF_d$	100 a

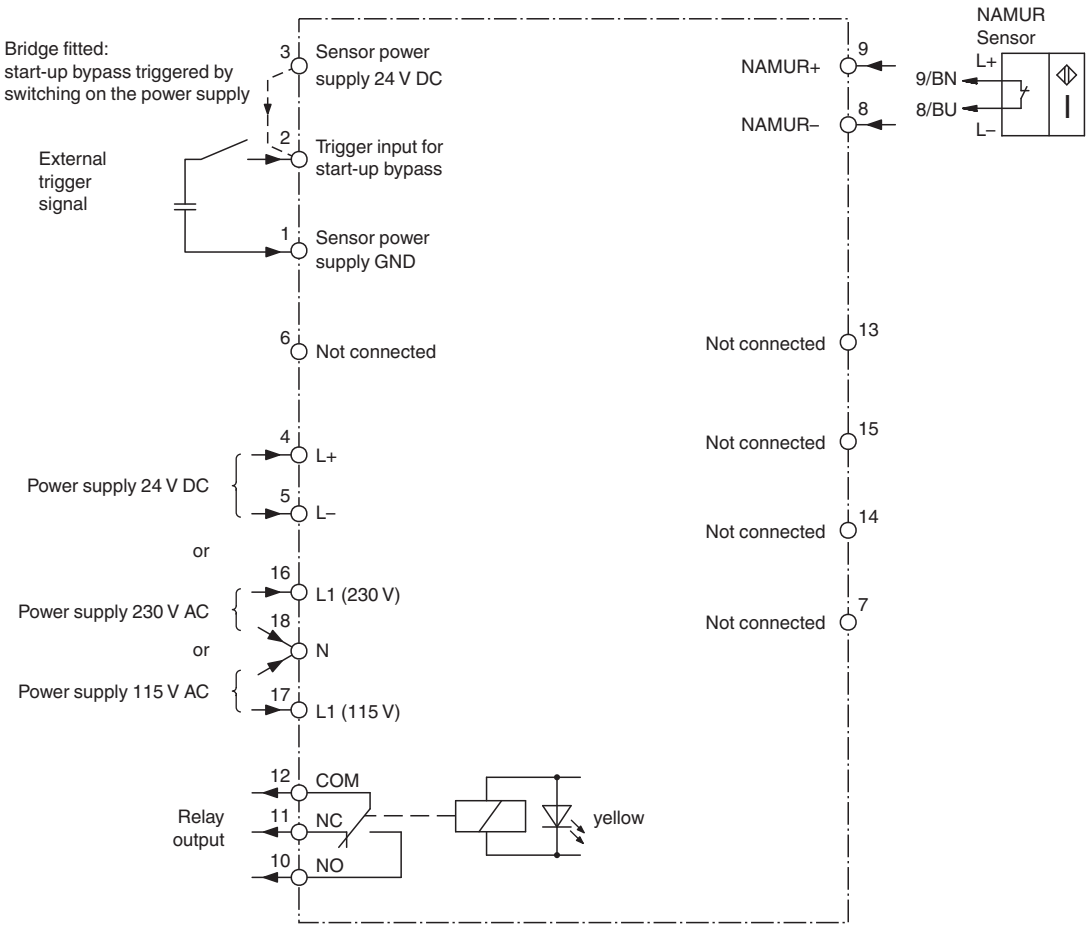
Release date: 2025-05-20 Date of issue: 2025-05-20 Filename: 209869_eng.pdf

Technical Data

Supply		
Rated voltage	U_r	200 ... 230 V AC ; 100 … 130 V AC; 50/60 Hz 20 VDC ... 30 VDC
Fusing		external fusing 4 A
Power consumption		AC: < 5 VA DC: < 5 W
Input		
Control input		NAMUR: 1,2 mA ≤ x ≤ 2,1 mA (terminal 8, 9), max. 8.2 V and 6.5 mA, impedance 1.2 kOhm
Trigger input		12 V (terminal 2), max. 30 V, impedance 2.8 kOhm
Pulse duration		20 µs
Input 1		
Switching point		1.2 ... 2.1 mA Switching hysteresis approx. 0.2 mA
Input frequency		0.002 ... 10000 Hz, pulse length/duration: ≥ 20µs
Impedance		1.2 kΩ
Input 3		
Start-up override		Triggering by external signal 16 ... 30 V or Place jumper between terminals 2/3 or by switching on supply voltage (terminal 2 and terminal 3 permanently bridged)
Hold-up time		1 ... 9999 s (External trigger signal)
Output		
Relay		1 changeover contact
Sensor supply		24 V DC ± 10 %, 30 mA , short-circuit protected
Contact loading		250 V AC/2 A/ cos φ ≥ 0.7 40 V DC/2 A
Delay times		
Time delay before availability		≤ 400 ms
Start-up override		1 ... 9999 s
Relay		≤ 20 ms
Transfer characteristics		
Measuring error		0 ... 10 kHz: ≤ ±0.1% Display: ±1 digit
Standard conformity		
Electromagnetic compatibility		acc. to EN 50081-2 / EN 50082-2
Ambient conditions		
Ambient temperature		-25 ... 40 °C (-13 ... 104 °F)
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
Relative humidity		max. 80 %, not condensing
Altitude		0 ... 2000 m
Operating conditions		The device has only to be used in an indoor area.
Mechanical specifications		
Connection assembly		**Caution:** Please be aware that the device may only be connected to a switchable power supply. The switch or circuit breaker must be easy to reach and identified as the separator for the device.
Degree of protection		IP20
Connection		coded, removable terminals , max. core cross section 0.34 ... 2.5 mm^2
Construction type		modular terminal housing in Makrolon, System KF For use in the switch cabinet/switch cabinet module
Mounting		snap-on to 35 mm standard rail or screw fixing
Life span		30 x 10^6 switching cycles

Release date: 2025-05-20 Date of issue: 2025-05-20 Filename: 209869_eng.pdf

Connection



Release date: 2025-05-20 Date of issue: 2025-05-20 Filename: 209869_eng.pdf

EU-Declaration of conformity

en/de

EU-Konformitätserklärung

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No. / *Nr.*: DOC-1838C
Date / *Datum*: 2022-03-30

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PEPPERL+FUCHS

Declaration of conformity / *Konformitätserklärung*

We, Pepperl+Fuchs SE declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.

*Die Pepperl+Fuchs SE erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten **Produkte** den genannten **Europäischen Richtlinien** und **Normen** entsprechen.*

Products / *Produkte*

Product / *Produkt*	**Item number**	**Description** / *Beschreibung*
KFU8-FSSP-1.D	181191	Frequency voltage current converter
KFU8-FSSP-1.D-Y180599	180599	Frequency voltage current converter
KFU8-DW-1.D	190149	Overspeed/underspeed Monitor
KFU8-DW-1.D-Y209869	209869	Overspeed/underspeed Monitor

Directives and Standards / *Richtlinien und Normen*

EU-Directive *EU-Richtlinie*	**Standards** *Normen*
2014/30/EU (EMC)	EN 61326-1:2013
2014/35/EU (LV)	EN 61010-1:2010 + A1:2019
2011/65/EU (RoHS)	EN IEC 63000:2018

Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE

Signatures / *Unterschriften*

Mannheim, 2022-03-30

i.V. Sebastian Stöber
Director Business Unit SYSTEMS

i.V. Wolfram Warnecke
Approval Engineer

UK-Declaration of conformity

en

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No: DOC-6863
Date: 2022-09-30

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PEPPERL+FUCHS

Declaration of conformity

We, Pepperl+Fuchs SE declare under our sole responsibility that the **products** listed below are in conformity with the listed **UK Regulations** as indicated below and amended by **UK SI 2019 No. 696**, and **standards**.

Products

Product	Item number	Description
KFU8-DW-1.D	190149	Speed monitor
KFU8-DW-1.D-Y209869	209869	Speed monitor
KFU8-FSSP-1.D	181191	Frequency converter
KFU8-FSSP-1.D-Y180599	180599	Frequency converter I/U

Regulations and Standards

UK Regulation	Standards
UK SI 2012 No. 3032 (RoHS)	EN IEC 63000:2018
UK SI 2016 No. 1091 (EMC)	EN 61326-1:2013
UK SI 2016 No. 1101 (LV)	EN 61010-1:2010 + A1:2019

Affixed UKCA Marking

UK CA

Signatures

Mannheim, 2022-09-30

i.V. Sebastian Stöber
Vice President Business Unit Systems

i.V. Simon Wagner
Product Manager

PEPPERL+FUCHS Your automation, our passion.

Pepperl+Fuchs SE • 68307 Mannheim • Germany

Customer: DE164472
J.M. Voith SE & Co. KG | VTA

Mannheim, November 24, 2023

We, Pepperl+Fuchs SE at 68307 Mannheim hereby declare that the listed product/s have been produced conform to the Regulation (EC) No 1907/2006 (REACH). Used SVHC according Article 33 of the regulation are noted.

Manufacturer Declaration

Item/s		
Item Number	Item Description	*Your Item No*
SCIP No.		
SVHC		
209869	KFU8-DW-1.D-Y209869	
b43d1487-49d9-4a5a-8d64-90c032f9250e		
-Lead (Pb) EC 231-100-4, CAS 7439-92-1		

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Department Global Compliance
24.11.2023 Mannheim

Pepperl+Fuchs SE
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Board Members: Dr.-Ing. Gunther Kegel (Chairman), Werner Guthier (Deputy Chairman), Lutz Liebers, Reiner Müller, Florian Ochs
Chairwoman of the Supervisory Board: Monika Mueller-Michael • Registration Court: AG Mannheim HRB 737016 • VAT reg. no.: DE 143877372
Bank Account: Commerzbank AG • IBAN: DE89670800500685472200 • BIC: DRESDEFF670 • Deutsche Bank AG • IBAN: DE73670700100553270000 • BIC: DEUTDESMXXX

14.5绝缘开关放大器 KFD2-SOT3-Ex2

Voith 材料号: 201.04495110

操作说明书	Pepperl+Fuchs
技术参数	Pepperl+Fuchs
一致性声明	Pepperl+Fuchs
制造商声明	Pepperl+Fuchs

Instruction Manual

1. Marking

Switch amplifier KFD2-SOT3-Ex1.LB, KFD2-SOT3-Ex1.LB.IO, KFD2-SOT3-Ex2, KFD2-SOT3-Ex2.IO, KFD2-SOT3-Ex2.IO-Y1
ATEX certificate: EXA 16 ATEX 0016 X ATEX marking: ⟨Ex⟩ II 3(1)G Ex nA [ia Ga] IIC T4 Gc ⟨Ex⟩ II (1)D [Ex ia Da] IIIC ⟨Ex⟩ I (M1) [Ex ia Ma] I
IECEx certificate: IECEx EXA 16.0009X IECEx marking: Ex nA [ia Ga] IIC T4 Gc , [Ex ia Da] IIIC , [Ex ia Ma] I
North America Certifcates: E106378 (UL) Class I, Division 2, Groups A-D, T4 Class I, Zone 2, Group IIC T4 Associated apparatus with intrinsically safe circuits for: Class I, Division 1, Groups A-D; Class II, Division 1, Groups E-G; Class III [AEx ia Ga] IIC, [AEx ia Da] IIIC, [Ex ia Ga] IIC, [Ex ia Da] IIIC

Pepperl+Fuchs Group Lilienthalstraße 200, 68307 Mannheim, Germany
Internet: www.pepperl-fuchs.com

2. Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the device. The trained and qualified personnel must have read and understood the instruction manual.

Prior to using the product make yourself familiar with it. Read the instruction manual carefully.

3. Reference to Further Documentation

Observe laws, standards, and directives applicable to the intended use and the operating location.

For mining applications, observe laws, standards, and directives applicable to the operating location.

The corresponding datasheets, manuals, declarations of conformity, EU-type examination certificates, certificates, and control drawings if applicable supplement this document. You can find this information under www.pepperl-fuchs.com.

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at www.pepperl-fuchs.com.

If you use the device in safety-related applications, observe the requirements for functional safety. You can find these requirements in the functional safety documentation under www.pepperl-fuchs.com.

4. Intended Use

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

The device is used in control and instrumentation technology (C&I technology) for the galvanic isolation of signals such as 20 mA and 10 V standard signals or alternatively for adapting or standardizing signals. The device has intrinsically safe circuits that are used for operating intrinsically safe field devices in hazardous areas.

The device transfers digital signals (NAMUR sensors/mechanical contacts) from the explosion-hazardous area to the non-explosion-hazardous area.

Use the device only within the specified ambient and operating conditions.

Only use the device stationary.

The device is an associated apparatus according to IEC/EN 60079-11.

The device is an electrical apparatus for hazardous areas of Zone 2.

If you use the device in safety-related applications, observe the information for safety function and safe state.

5. Improper Use

Protection of the personnel and the plant is not ensured if the device is not used according to its intended use.

6. Mounting and Installation

Do not mount a damaged or polluted device.

The device is designed for mounting on a 35 mm DIN mounting rail according to EN 60715.

Mount the device in a way that the device is protected against mechanical hazard. Mount the device in a surrounding enclosure for example.

Do not mount the device in the dust hazardous area.

The device fulfills a degree of protection IP20 according to IEC/EN 60529.

The device must be installed and operated only in a controlled environment that ensures a pollution degree 2 (or better) according to IEC/EN 60664-1.

If used in areas with higher pollution degree, the device needs to be protected accordingly.

The device must be installed and operated only in an environment of overvoltage category II (or better) according to IEC/EN 60664-1.

Only connect supplies that provide protection against electric shock to power feed modules (e. g. SELV or PELV).

Observe the installation instructions according to IEC/EN 60079-14.

If you are using the Power Rail, supply the Power Rail only via the corresponding power feed modules or power supplies. Do not supply the Power Rail via isolators.

If you install the device in safety-related applications, observe the requirements for functional safety.

Requirements for Cables and Connection Lines

Observe the permissible core cross section of the conductor.

When using stranded conductors, crimp wire end ferrules on the conductor ends.

Use only one conductor per terminal.

When installing the conductors the insulation must reach up to the terminal.

Observe the tightening torque of the terminal screws.

Requirements for Usage as Associated Apparatus

If circuits with type of protection Ex i are operated with non-intrinsically safe circuits, they must no longer be used as circuits with type of protection Ex i.

Keep the separation distances between all non-intrinsically safe circuits and intrinsically safe circuits according to IEC/EN 60079-14.

Observe the compliance of the separation distances between two adjacent intrinsically safe circuits according to IEC/EN 60079-14.

Observe the respective peak values of the field device and the associated apparatus with regard to explosion protection when connecting intrinsically safe field devices with intrinsically safe circuits of associated apparatus (verification of intrinsic safety). Also observe IEC/EN 60079-14 and IEC/EN 60079-25.

If more channels of one device are connected in parallel, ensure the parallel connection is made directly at the terminals of the device. When verifying the intrinsic safety, observe the maximum values for the parallel connection.

Requirements for Equipment Protection Level Gc

The device must be installed and operated only in surrounding enclosures that

- comply with the requirements for surrounding enclosures according to IEC/EN 60079-0,
- are rated with the degree of protection IP54 according to IEC/EN 60529.

Connection or disconnection of energized non-intrinsically safe circuits is only permitted in the absence of a potentially explosive atmosphere.

7. Operation, Maintenance, Repair

If you operate the device in safety-related applications, observe the requirements for functional safety. In case of operating in low demand mode, plan appropriate intervals for the proof test.

Do not use a damaged or polluted device.

Do not repair, modify, or manipulate the device.

If there is a defect, always replace the device with an original device.

Requirements for Equipment Protection Level Gc

Connection or disconnection of energized non-intrinsically safe circuits is only permitted in the absence of a potentially explosive atmosphere.

Only use operating elements in the absence of a potentially explosive atmosphere.

8. Delivery, Transport, Disposal

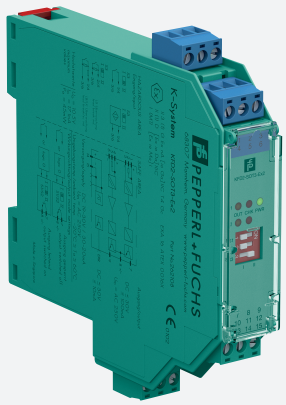
Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

The device, built-in components, packaging, and any batteries contained within must be disposed in compliance with the applicable laws and guidelines of the respective country.



Switch Amplifier

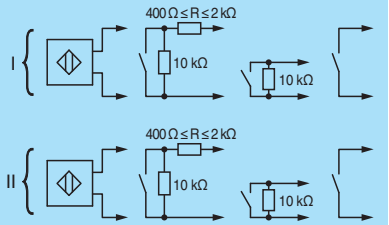
KFD2-SOT3-Ex2

- 2-channel isolated barrier
- 24 V DC supply (Power Rail)
- Dry contact or NAMUR inputs
- 2 passive transistor outputs
- Reversible mode of operation
- Line fault detection (LFD)
- Up to SIL 2 (SC 3) acc. to IEC/EN 61508

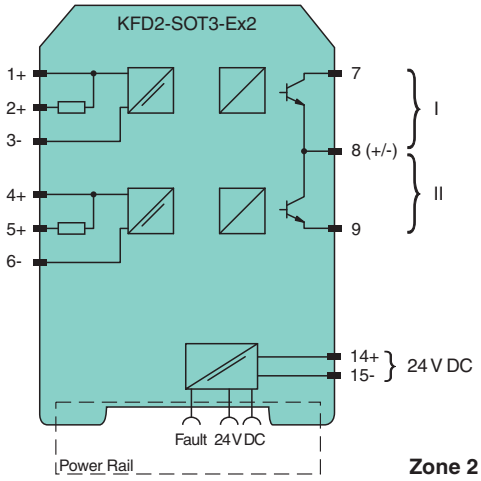
Function

This isolated barrier is used for intrinsic safety applications.
The device transfers digital signals (NAMUR sensors or dry contacts) from a hazardous area to a safe area.
Each input controls a passive transistor output.
Via switches the mode of operation can be reversed and the line fault detection can be switched off.
A fault is signalized by LEDs acc. to NAMUR NE44 and a separate collective error message output.

Connection



Zone 0, 1, 2



Zone 2

Technical Data

General specifications		
Signal type		Digital Input
Functional safety related parameters		
Safety Integrity Level (SIL)		SIL 2
Systematic capability (SC)		SC 3
Supply		
Connection		Power Rail or terminals 14+, 15-
Rated voltage	U_r	19 ... 30 V DC
Ripple		≤ 10 %
Rated current	I_r	30 ... 20 mA
Power dissipation		≤ 1.1 W including maximum power dissipation in the output

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Technical Data

Input		
Connection side		field side
Connection		terminals 1+, 2+, 3-; 4+, 5+, 6-
Rated values		acc. to EN 60947-5-6 (NAMUR), see manual for electrical data
Open circuit voltage/short-circuit current		approx. 10 V DC / approx. 8 mA
Switching point/switching hysteresis		1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection		breakage I ≤ 0.1 mA , short-circuit I ≥ 6.5 mA
Pulse/Pause ratio		min. 100 µs / min. 100 µs
Output		
Connection side		control side
Connection		output I: terminals 7, 8 ; output II: terminals 8, 9
Rated voltage	U_r	30 V DC
Rated current	I_r	100 mA , short-circuit protected
Response time		≤ 200 µs
Signal level		1-signal: (external voltage) - 3 V max. for 100 mA 0-signal: blocked output (off-state current ≤ 10 µA)
Output I		signal ; Transistor
Output II		signal ; Transistor
Collective error message		Power Rail
Transfer characteristics		
Switching frequency		≤ 5 kHz
Galvanic isolation		
Input/Output		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Input/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Output/power supply		basic insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Indicators/settings		
Display elements		LEDs
Control elements		DIP switch
Configuration		via DIP switches
Labeling		space for labeling at the front
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 (industrial locations)
Conformity		
Electromagnetic compatibility		NE 21:2012 , EN 61326-3-2:2008
Degree of protection		IEC 60529:2001
Input		EN 60947-5-6:2000
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications		
Degree of protection		IP20
Connection		screw terminals
Mass		approx. 150 g
Dimensions		20 x 119 x 115 mm (0.8 x 4.7 x 4.5 inch) (W x H x D) , housing type B2
Mounting		on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with hazardous areas		
EU-type examination certificate		EXA 16 ATEX 0016 X
Marking		⟨Ex⟩ II 3(1)G Ex nA [ia Ga] IIC T4 Gc ⟨Ex⟩ II (1)D [Ex ia Da] IIIC ⟨Ex⟩ I (M1) [Ex ia Ma] I
Input		Ex ia
Voltage	U_o	10.5 V
Current	I_o	17.1 mA
Power	P_o	45 mW (linear characteristic)

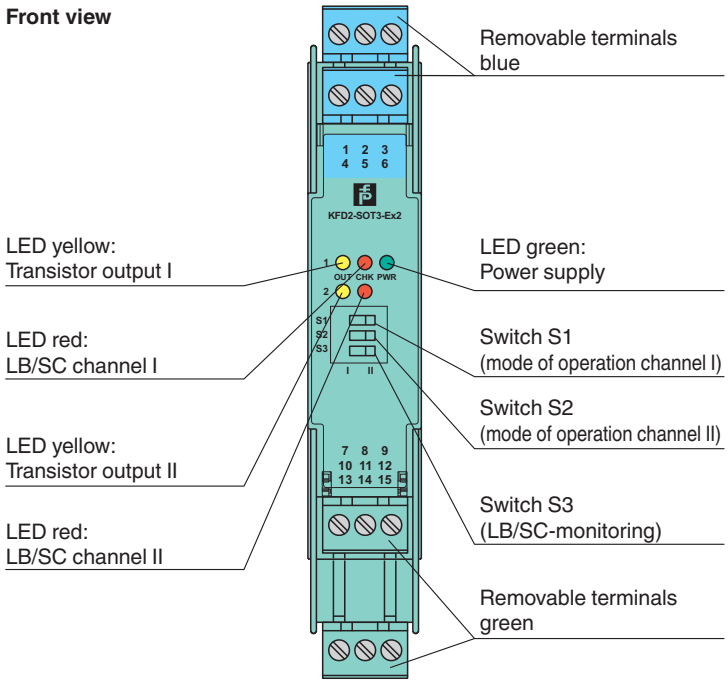
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Technical Data

Supply		
Maximum safe voltage	U_m	253 V AC (Attention! U_m is no rated voltage.)
Output		
Maximum safe voltage	U_m	253 V AC (Attention! The rated voltage can be lower.)
Galvanic isolation		
Input/Output		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Input/power supply		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Directive conformity		
Directive 2014/34/EU		EN IEC 60079-0:2018+AC:2020 , EN 60079-11:2012 , EN 60079-15:2010
International approvals		
UL approval		E106378
Control drawing		116-0424 (cULus)
IECEx approval		
IECEx certificate		IECEx EXA 16.0009X
IECEx marking		Ex nA [ia Ga] IIC T4 Gc , [Ex ia Da] IIIC , [Ex ia Ma] I
General information		
Supplementary information		Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.

Assembly

Front view



Matching System Components

	**KFD2-EB2**	Power Feed Module
	**UPR-03**	Universal Power Rail with end caps and cover, 3 conductors, length: 2 m
	**UPR-03-M**	Universal Power Rail with end caps and cover, 3 conductors, length: 1,6 m

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Matching System Components

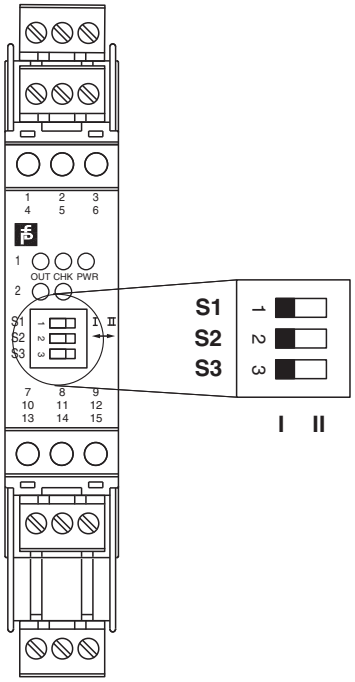
	**UPR-03-S**	Universal Power Rail with end caps and cover, 3 conductors, length: 0.8 m
	**K-DUCT-BU**	Profile rail, wiring comb field side, blue
	**K-DUCT-BU-UPR-03**	Profile rail with UPR-03- * insert, 3 conductors, wiring comb field side, blue

Accessories

	**F-NR3-Ex1**	NAMUR Resistor Network
	**KF-ST-5GN**	Terminal block for KF modules, 3-pin screw terminal, green
	**KF-ST-5BU**	Terminal block for KF modules, 3-pin screw terminal, blue
	**KF-CP**	Red coding pins, packaging unit: 20 x 6

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Configuration



Switch position

S	Function		Position
1	Mode of operation output I active	with high input current	I
		with low input current	II
2	Mode of operation output II active	with high input current	I
		with low input current	II
3	Line fault detection	ON	I
		OFF	II

Operating states

Control circuit	Input signal
Initiator high impedance/contact opened	low input current
Initiator low impedance/contact closed	high input current
Lead breakage, lead short circuit	Line fault

Factory setting: switch 1, 2 and 3 in position I

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EU-Declaration of conformity

en/de

EU-Konformitätserklärung

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No. / *Nr.*: DOC-2637A
Date / *Datum*: 2021-02-10

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PEPPERL+FUCHS

Declaration of conformity / *Konformitätserklärung*

We, Pepperl+Fuchs SE declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.

*Die Pepperl+Fuchs SE erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten **Produkte** den genannten **Europäischen Richtlinien** und **Normen** entsprechen.*

Products / *Produkte*

Product / *Produkt*	**Item number**	**Description** / *Beschreibung*
KFD2-SOT3-EX1.LB	262106	Switch amplifier
KFD2-SOT3-EX1.LB.IO	264211	Switch amplifier
KFD2-SOT3-EX2	262108	Switch amplifier
KFD2-SOT3-EX2.IO	264212	Switch amplifier
KFD2-SOT3-EX2.IO-Y1	264348	Switch amplifier

Directives and Standards / *Richtlinien und Normen*

EU-Directive *EU-Richtlinie*	**Standards** *Normen*
ATEX 2014/34/EU (L96/309-356)	EN 60079-11:2012-01 EN 60079-15:2010-05 EN IEC 60079-0/AC:2020-02 EN IEC 60079-0:2018-07
EMC 2014/30/EU (L96/79-106)	EN 61326-1:2013-01
RoHS 2011/65/EU (L174/88-110)	EN IEC 63000:2018-12

Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE 0102

Signatures / *Unterschriften*

Mannheim, 2021-02-10

ppa. Michael Kessler
Executive Vice President Components & Technology

i.V. Udo Körner
Continuation Manager Value Engineering

ANNEX EMC

The products listed above fulfill the immunity test requirements for equipment intended for use in industrial locations.

Die oben gelisteten Produkte erfüllen die Störfestigkeits-Prüfanforderungen an Betriebsmittel, die zum Gebrauch in industriellen Bereichen vorgesehen sind.

ANNEX ATEX

Notified Body QM-System / Notifizierte Stelle des QM-Systems
Physikalisch Technische Bundesanstalt (0102)
Bundesallee 100
38116 Braunschweig
Germany

Marking and Certificates / ***Kennzeichnung und Zertifikate***

Marking *Kennzeichnung*	Certificate *Zertifikat*	Issuer ID *Aussteller ID*
Ex I (M1) Ex II (1) D Ex II 3 (1) G	EXA 16 ATEX 0016 X	2829

Key for Issuer ID / ***Schlüssel zur Aussteller ID***

ID	**Issuer** / *Aussteller*
2829	Fiditas d.o.o. Karlovačka cesta 197 10250 Zagreb-Lučko Croatia

Pepperl+Fuchs SE declares that the products are only affected by minor or formal changes with respect to the new edition of the standards. These changes are not relevant for compliance with the essential health and safety requirements. The products still comply with the ATEX Directive. This declaration is also valid if the marking and the certificates of the listed devices correspond to previous editions of standards.

Die Pepperl+Fuchs SE erklärt hiermit, dass die Produkte nur von kleineren oder formalen Änderungen in Bezug auf die neue Ausgabe der Normen betroffen sind. Diese Änderungen sind nicht relevant für die Konformität mit den wesentlichen Gesundheits- und Sicherheitsanforderungen. Die Produkte erfüllen nach wie vor die ATEX-Richtlinie. Diese Erklärung gilt auch, wenn die Kennzeichnung und die Zertifikate der aufgeführten Geräte vorangegangenen Normenständen entsprechen.

PEPPERL+FUCHS Your automation, our passion.

Pepperl+Fuchs SE • 68307 Mannheim • Germany

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Mannheim, November 24, 2023

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Manufacturer Declaration

Item/s		
Item Number	Item Description	*Your Item No*
SCIP No.		
SVHC		
262108	KFD2-SOT3-EX2	
669ec995-b42b-42c9-9cbb-a45b1e9c858a		
-Hexahydromethylphthalic anhydride including cis- and trans stereo isomeric forms and all possible combinations of the isomers EC 247-094-1, CAS 25550-51-0,EC 243-072-0,CAS 19438-60-9, EC 256-356-4, CAS 48122-14-1, EC 260-566-1,CAS 57110-29-9		
-Diboron trioxide, EC 215-125-8 CAS 1303-86-2		
-4,4'-isopropylidenediphenol (Bisphenol A), EC 201-245-8, CAS 80-05-7		
-Lead (Pb) EC 231-100-4, CAS 7439-92-1		

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Department Global Compliance
24.11.2023 Mannheim

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Board Members: Dr.-Ing. Gunther Kegel (Chairman), Werner Guthier (Deputy Chairman), Lutz Liebers, Reiner Müller, Florian Ochs
Chairwoman of the Supervisory Board: Monika Mueller-Michael • Registration Court: AG Mannheim HRB 737016 • VAT reg. no.: DE 143877372
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