安装和操作说明书

（原版安装和操作说明书翻译文件）

BTS-Ex

非接触式热控开关装置用于限制 Voith 液力偶合器的最高表面温度

版本 8，2021-6-15
3626-019600ex zh，防护等级 0：公然

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如果您有关于本产品的问题，请与 Voith 的客服部门联系并说明序列号（参见铭牌）

3626-019600ex zh

本文档描述的是编辑结束时间截至 2021 年 6 月 15 日的产品技术状态。

内容

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1 应用，BTS-Ex 特性

非接触式热控开关装置（BTS-Ex）是 Voith 液力偶合器的监控系统。

- BTS-Ex 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-Ex 自动复位。
- BTS-Ex 可以在**尺寸**大于 **366** 的 Voith 液力偶合器上使用。

1.1 在爆炸区域内作为安全装置使用

BTS-Ex 可以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温度的安全装置使用。达到了低要求率的点火保护等级 IPL1（SIL 1）。

⚠ 警告

爆炸危险
在超过许可的表面温度时，存在爆炸危险。
- 在超温时，必须在规定的时间内关闭驱动电机（à 液力偶合器操作说明书）

以下电子设备属于总体系统：

- 开关元件（安装在液力偶合器上）
- 计算开关元件的引发器
- 具有安全功能的计算器。

安全装置安装在上一级机器中/上。根据不同的 IP 保护等级可以确定用于清洁设备（灰尘沉淀）的时间。

开关元件和引发器允许用于以下方面：

- 爆炸组 IIA 和 IIB（引发器还有 IIC）中的区 2（气体爆炸，等级 3G，EPL Gc）
- 爆炸组 IIA、IIB 和 IIC 中的区 22（粉尘爆炸，等级 3D，EPL Dc）
- 爆炸组 IIA 和 IIB（引发器还有 IIC）中的区 1（气体爆炸，等级 2 G，EPL Gb）
- 爆炸组 IIA、IIB 和 IIC 中的区 21（粉尘爆炸，等级 2D，EPL Db）

⚠ 警告

爆炸危险
在不遵守使用条件时，存在爆炸危险。
- 该产品在爆炸组 IIIC 的粉尘爆炸区域中只能与有机粉尘一起使用。

计算器只允许在有爆炸危险区域内，安装在与环境要求相符的 IP 保护等级的外壳中，或具有自主许可的外壳中。

对表面温度的鉴定由环境条件决定，它在 T4…T3 之间： T4 意味着对于所有点火温度 > 135° C 的气体、蒸汽、雾，设备没有点火源。
在灰尘爆炸区中，参考温度 T***° C（范围在 85° C … 190° C 之间）在安全距离方面与燃烧温度有关。

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1.2 使用在爆炸区域中和作为安全装置在爆炸区中使用的特殊条件

设备只允许用于恰当并正确地使用。在违反上述规定时，会丧失担保权和生产商责任！

- 只有符合欧盟指令以及国家法定要求的配件才可以在爆炸性环境中使用。
- 该产品在爆炸组 IIIC 的粉尘爆炸区域中只能与有机粉尘一起使用。
- 一定要遵守本操作说明书中的特殊环境条件。
- 由运营商保证防闪电措施。

- 注意，在每个在该安全装置上运行的液力偶合器上，要使用所需的熔断螺栓。

à **液力偶合器操作说明书**

- 如果由该安全装置保证了许可的最高液力偶合器表面温度，则点火保护类型“由点火源监控防护”也适用于液力偶合器。
- 必须由 Voith Turbo 进行反应温度的设计。
- 每个元件的环境温度不允许超过相应的极限温度。
- 一定要排除由冰冻造成的机械损害。
- 在打开和关闭以后要重新安装塞子。
- 只允许在外壳和导管完整未受损的情况下运行安全装置。
- 在安装时必须确保符合 EMC 要求。
- 在安装时，一定要遵守使用国的安装规定，比如 EN 60079-14、EN 1127-1 和 EN 1127-2 标准。
- 需产生电势平衡。需根据应用国家的安装规程进行处理（例如 VDE 0100 部分 540，IEC 364-5-54）。
- 需避免静电充电。
- 为了确保导出静电充电，需考虑国家要求。
  - 不导电的零件在 IIB 中的表面不允许超出 100 cm²。
  - 不允许在带有电气腐蚀防护的设备中使用 BTS-Ex（除非在与制造商沟通后及采取特殊措施的情况下）。均衡电流不允许流经结构。
- 计算器适用于 2 级污染程序，根据 DIN EN 50178 测量。如果需要，要将开关元件和引发器保护起来，防止液体和/或污染物进行。这是由运行条件决定的，比如强灰尘或化学腐蚀性液体。
- 在温度低于 -20° C 时，要对引发器的安装进行机械保护。
- 在安装时要遵守开关元件与引发器间 3 mm 的最小距离（à 第 6.3 章）。
- 关闭后，必须先消除所有错误/触发，然后才能重新启动 BTS-Ex 或将其打开。
- 建议关闭链的监控设备和监控电路至少符合 PL c 根据 EN ISO 13849-1 或符合 SIL 1 根据 EN 61508 或 EN 62061 进行设计。
- 在已知的易爆环境中，不允许用暴力松开固定的零件（例如由于严寒或腐蚀）。必须避免结冰。
- 运营商必须根据防爆文件采取防护措施，例如防止外部撞击能量。
- 为了确保防爆，电气设备和额外安装的机械装置必须符合当地适用区域的要求，并由机器安装人员进行特别的检查。
- 允许在爆炸等级 IIC 中涂层/涂漆达到 0.2 mm 厚。在 IIB / I 中，厚度不允许超出 2 mm，必要时必须根据涂层/涂漆质量将厚度减少至例如 0.5 - 1 mm。运营商不允许涂漆。

1.3 一致性声明

见附录（参见欧盟一致性声明）

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2 BTS-Ex 的功能

非接触式温控开关装置（BTS-Ex）由三个部件组成：

- **开关元件**
- 装有固定法兰的**引发器**
- **计算器**

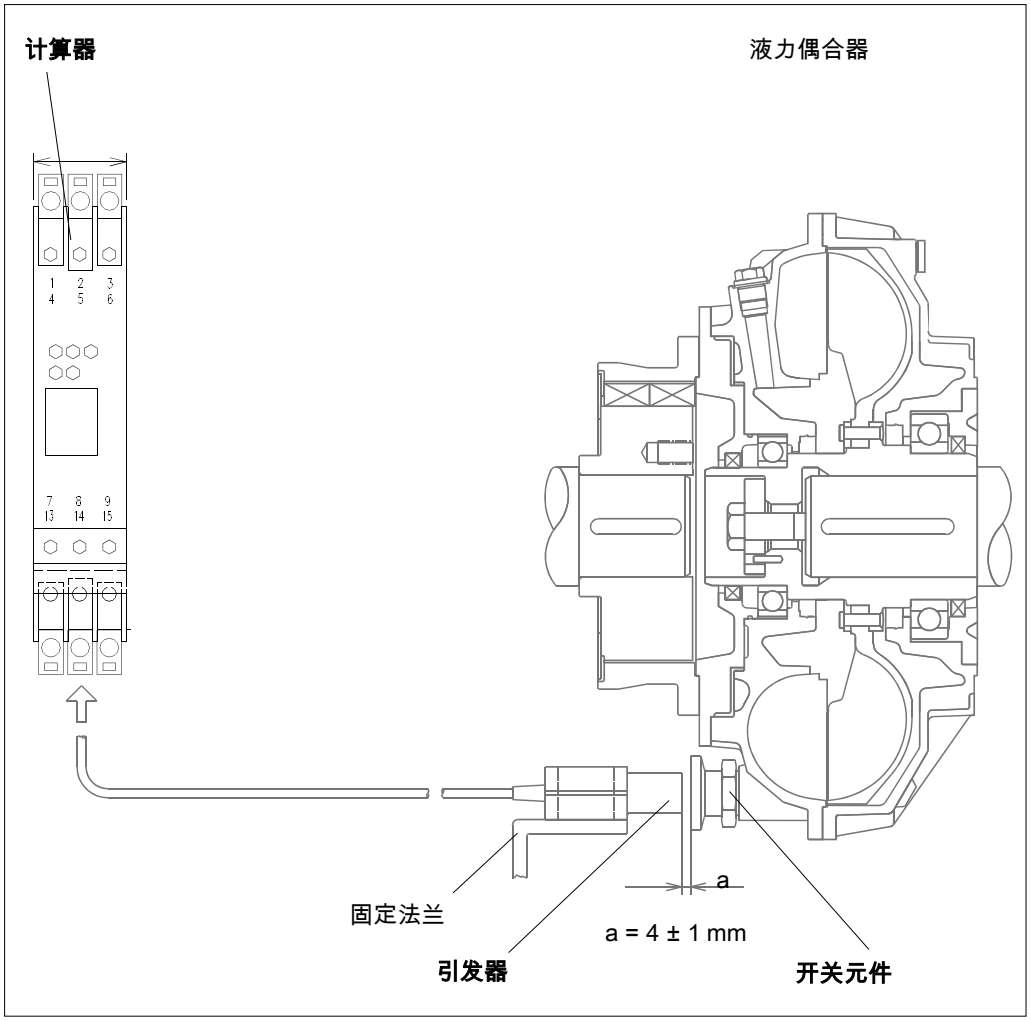

图 1

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-Ex 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（所属设备用本安隔爆电路保护爆炸区域）。
接通电源电压或利用一个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。

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2.4 BTS-Ex 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 6.3 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。

极限频率
à **第 3.3 章**

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。

⚠ 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-Ex 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。

⚠ 警告

爆炸危险
在不遵守最高许可温度时，存在爆炸危险。
- 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**

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3 技术参数

3.1 开关元件

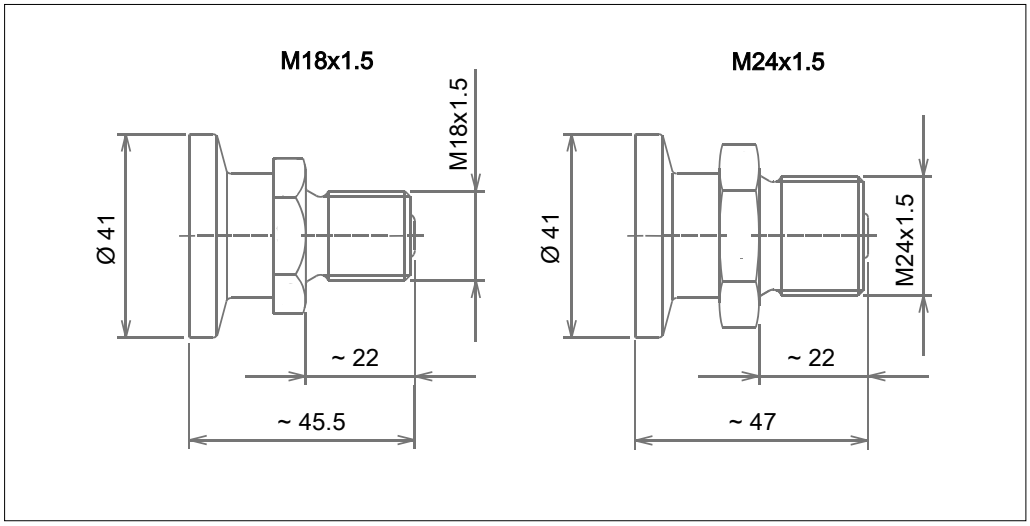


图 2

不同规格的液力偶合器有以下开关元件：

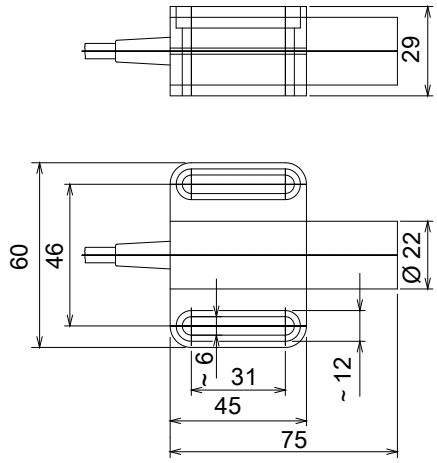
螺纹尺寸	M18x1.5	M24x1.5
额定反应温度	85 / 90 / 100 / 110 / 125 / 140 /160 / 180 ° C	85 / 125 / 140 / 160 / 180 ° C
适用于偶合器尺寸	366 - 650	750 - 1150
反应温度公差	± 5 ° C	
复位温度	比反应温度低约 40 K	
扳手的开口尺寸	27	32
拧紧扭矩：	60 Nm	144 Nm
分类是 Ex II 2GD	Ui = 10 V Ii = 50 mA Pi = 50 mW	
线圈区域内的工作温度	-40 ° C 至 +120 ° C	
恒温开关区域内的工作温度	至 90 ° 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 1234 5678）
- 设计偶合器时就决定了开关元件的额定反应温度。

3.2 引发器、固定法兰



引发器与固定法兰一起显示

图 3

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）
NJ 10-22-N-E93-Y245590 (2 m, 新的防尘防爆标志)
NJ 10-22-N-E93-Y246868 (5 m, 新的防尘防爆标志)
NJ 10-22-N-E93-Y246869 (10 m, 新的防尘防爆标志)

3.3 计算器

à 附录　　类型：　KFD2-SR2-Ex2.W.SM

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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-Ex）。

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-Ex 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-Ex 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。

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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Voith 公司保留进行变更的权利。

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。

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-Ex**) 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

设计范围
à 操作说明书
液力偶合器

- 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-Ex 或备件。

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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：

声压等级
ὰ 液力偶合器的操作说明书封面

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。

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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。

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。

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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。

只能由具备能力资质的专业人员根据操作安全规定或类似的当地规定，在考虑电气额定值的条件下，在区 1（气体爆炸，类别 2G）和区 21（粉尘爆炸，类别 2D）的爆炸危险区域中使用 BTS-Ex。
务必注意铭牌上的说明。请注意操作说明书中的提示以及使用条件和各个设备字样/铭牌上的额外数据。

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 **EN 1127-1 附录 A** 和 **EN 1127-1 第 7 部分** 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。

5.10铭牌

铭牌适用于包括计算器、引发器和开关元件的整个组件，并附在计算器上。

	Voith Group | Division Industry | J.M. Voith SE & Co. KG Voithstraße 1, 74564 Crailsheim, 德国
BTS-Ex:	- 计算器 (Voith ID 201.03905210) - 引发器 - 开关元件
03 ATEX 0013 X	建造年份：2021
Ex II 3G Ex ic IIB T4/T3 Gc	SYST Ex II 2G Ex ib IIB T4/T3 Gb
Ex II 3D Ex ic IIIC T125° C/T180° C Dc	SYST Ex II 2D Ex ib IIIC T125° C/T180° C Db

图 4

铭牌上的标志有如下意义：

SYST： 整个安全装置的防爆标志
Ex： 防爆标志
II： 防爆组
2G、3G：气体设备类别
2D、3D：粉尘设备类别
Ex ib/ic：点火保护类型
T： 温度或温度等级
Gc、Gb： 气体设备防护等级
Dc、Db： 粉尘设备防护等级

安全提示

- 开关元件的温度等级(G)/最高表面温度(D)由液力偶合器的设计和运行条件决定。因此相关说明在液力偶合器的操作说明书中。

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-Ex 时也不允许用盲孔螺钉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！

只能在特定条件下，才允许在易爆区域进行安装和保养工作。注意以下提示：
- 需遵守本地安装条件。
- 只允许在无爆炸危险的环境中执行工作。
- 当工作环境中可能存在硫化氢、环氧乙烷、一氧化碳和/或爆炸组 IIC 的其它物质时，要采取额外的预防措施。因为这些物质所需的点火能量很低，在这种情况下只允许使用无火花的工具。

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

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

联系 Voith Turbo à 订单文件

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）。

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。

- 用液力偶合器外轮（项号 0300）中带密封环的开关元件更换盲孔螺钉。

外轮侧开关元件的排列 [1]：

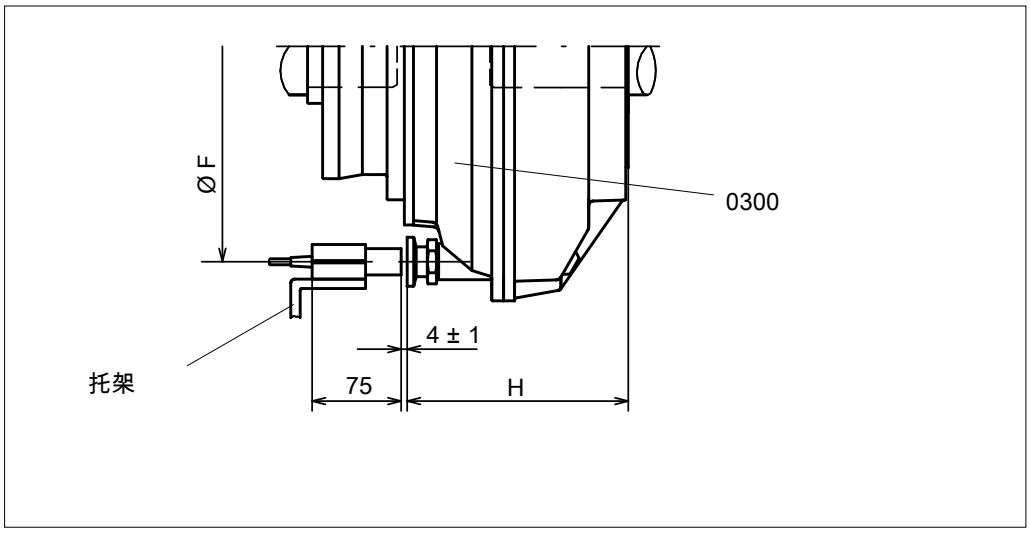

图 5

1) 对于 DT 型，也可在相对外轮侧进行安装。

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] T 偶合器**	**距离 ~ H [mm] DT 偶合器**
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 / 866DT	840 ± 1	356	600
1000 T / 1000 DT	972 ± 1	369	672
1150 T / 1150 DT	1128 ± 1	458	783

表 5

关于偏差要求的安装尺寸，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（不是 Voith 的供货范围）！
- 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）！

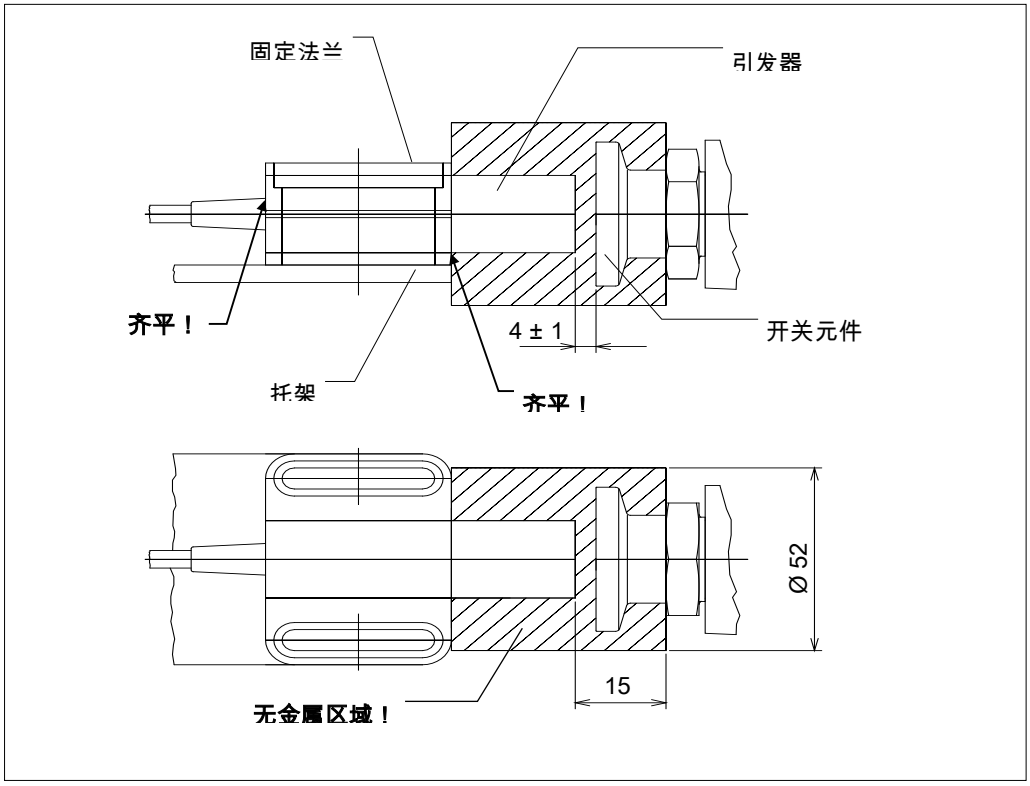

图 6

- 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

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-Ex 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。

- 安装计算器，如果需要，将隔离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：

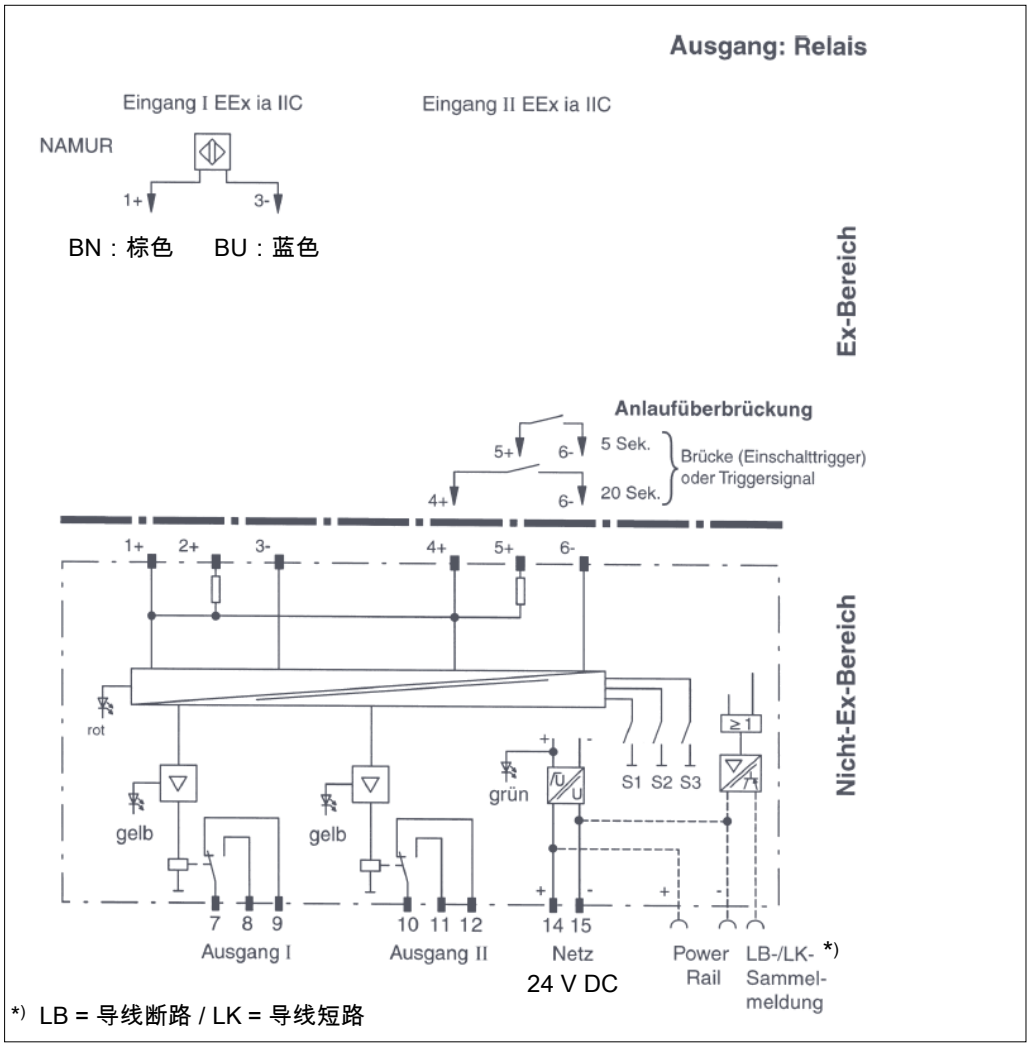

图 7

计算器
KFD2-SR2-Ex2.W.SM
à 第 15.5 章

端子分配： 计算器

端子编号	说明	数据
1+	输入 I	输入 I：Ex ia IIC BN 引发器
2+	输入 I	-
3-	输入 I	输入 I：Ex ia IIC BU 引发器
4+	输入 II	输入 II：Ex ia IIC 20 s 起动延时
5+	输入 II	- 5 s 起动延时
6-	输入 II	输入 II：Ex ia IIC COM 起动延时
7	输出 I	COM （常闭触点/常开触点）
8	输出 I	触点：常开触点 (NO)
9	输出 I	触点：静合 (NC)
10	输出 II	COM （常闭触点/常开触点）
11	输出 II	触点：常开触点 (NO)
12	输出 II	触点：静合 (NC)
13	-	-
14	电源	24 V DC +
15	电源	24 V DC -

表 6

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7 计算器的显示与设置

7.1 结构

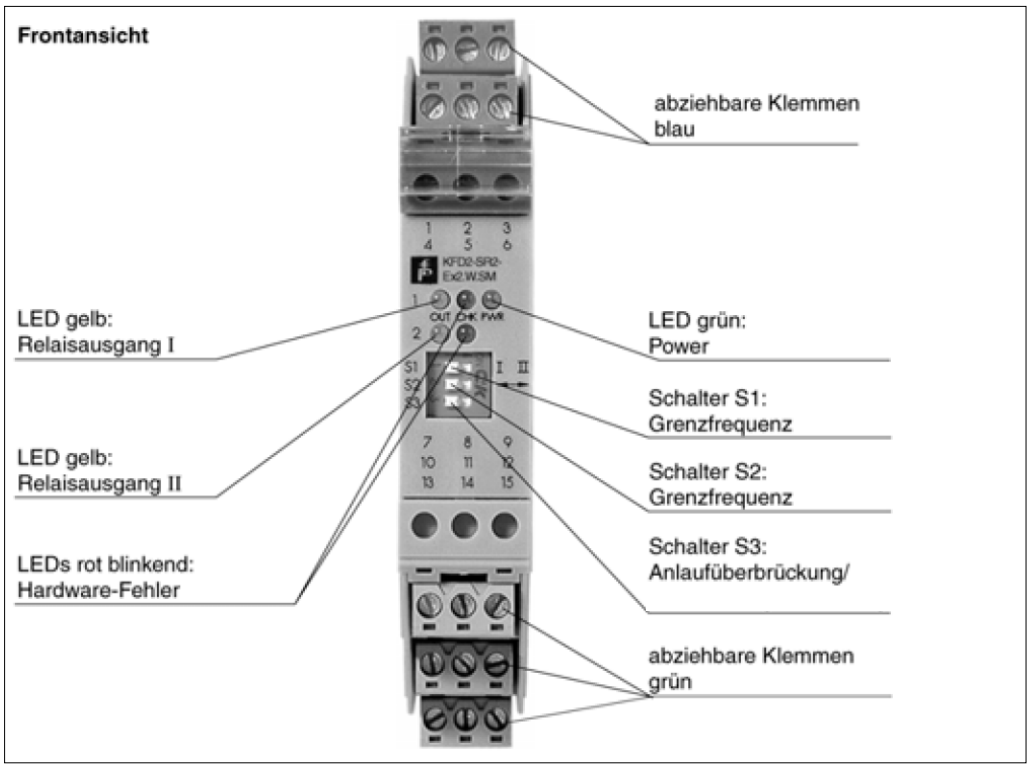

图 8

7.2 设置 DIP 开关 S1 和 S2 （极限频率）

DIP 开关要设置为 **S2 = I** 和 **S1 = II**：

极限频率	极限转速	滞后	开关 S2	开关 S1
0.1 Hz	6 min^{-1}	0.02 Hz	I	I
0.5 Hz	**30 min^{-1}**	**0.1 Hz**	**I**	**II**
2.0 Hz	120 min^{-1}	0.4 Hz	II	I
10.0 Hz	600 min^{-1}	2.0 Hz	II	II

表 7

在使用开关元件时极限转速为 **30 min^{-1}**。

7.3 DIP 开关 S3 的设置 （起动延时）

警告

爆炸危险
DIP 开关 S3 不允许设置为位置 II，因为否则不能保证安全装置的功能！
- 正确设置 DIP 开关 S3。
- 在调试过程中进行功能检查。

DIP 要设置为 **S3 = I**：

开关 S3	位置 I
功能	**带起动延时的计算器**
输入 I	脉冲输入 1 (NAMUR)： 必须连接原装 Voith 传感器。
输入 II	起动延时： 触点端子 4 + 6： 20 sec 触点端子 5 + 6： 5 sec [1)]
输出 I	MIN / 被动
输出 II	MIN / 主动

表 8

1) 标准设置，如果在 Voith 液力偶合器操作说明书的技术数据中没有其他说明。

7.4 设置起动延时时间

警告

爆炸危险
在起动延时时间内， 不记录液力偶合器的超温！
- 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。
- 在调试过程中进行功能检查。

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安全提示

- 起动延时时间从触发起动延时开始。
- 在起动延时时间过后，带开关元件的液力偶合器的转速必须明显超过设定的极限频率！
- 起动延时时间的工厂设定：5 s。

带起动延时的计算器 (S3 = I)
在低于 DIP 开关 S1 和 S2 设定的极限频率时，带起动延时的计算器会被动接通输出 I，主动接通输出 II（à 下面的原理草图）。

输入 I
监控导线断裂/短路情况。
必须连接原装 Voith 传感器。

输入 II
必须用于起动起动延时。在这里不监控导线断裂/短路情况。起动延时可以通过电桥（接通触发器）或一个外部触发器在 5 和 20 sec 间选择。

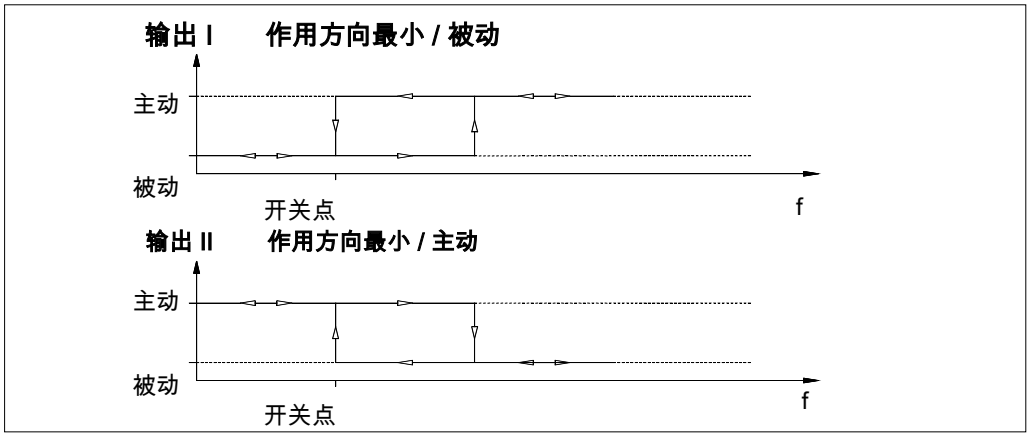

图 9

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。当起动延时功能有效时，检测到输出继电器，前面的 LED 亮。
- 起动延时时间过后，输出继电器释放，前面的 LED 熄灭。
- 必要时根据（à 第 7.3 章）设置起动延时时间。
- 在外部触发时，在计算器的起动延时端子间去除工厂安装的电桥。
- 正常起动带液力偶合器的 BTS-Ex。在起动延时时间过后，带开关元件的液力偶合器的转速必须明显超过设定的极限频率。如果没有超温，输出继电器会保持拉紧，前面的 LED 灯会亮起。
- 关闭带液力偶合器的驱动，使 BTS-Ex 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的转速低于设定的极限频率，输出继电器会释放，前面的 LED 灯熄灭。
- 可以进行正常运行。在出现故障时（à 第 11 章）。

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9 保养、维护

定义以下进行的保养工作（依据 IEC 60079-17）：

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。
- 不得对危险环境中运行的产品进行任何改变。
- 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！
- 只有符合欧盟指令以及国家法定要求的配件才可以在爆炸性环境中使用。
- 只允许在无爆炸危险的环境中进行包括拆卸机器在内的维护措施。
- 仅可使用爆炸性环境要求的原厂备件来更换部件，所使用的润滑剂与辅助材料也是如此。
- 要定期保养和清洁爆炸区域中的设备。时间间隔由运营商根据环境应力现场确定。
- 在保养和/或维护以后，要将所有去除的零件和提示重新安装到原始位置上。
- 维修后，必须验证等电位连接的功能。
- 除非制造商另有规定，否则必须遵守操作说明书中的保养间隔。

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！

保养计划：

期限	保养工作
每 500 个运行小时，最晚每 1 个月	检查设备是否有异常 （目视检查，灰尘沉淀）。
每 1 个月/6 个月使用合适的测量设备检查运行是否安静以及是否发热	目视检查（每月）， 仔细检查（每半年）
最晚在调试运行 3 个月以后，之后每年	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。

如果将释放系统用作安全、控制和调节装置，则必须至少每 12 个月检查一次。

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-Ex。
- 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-Ex。

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-Ex
请根据当地的规定清理 BTS-Ex。

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
绿色 LED 灯关闭。	在计算器上没有电源电压。	施加电源电压。	第 6.3 章
	计算器损坏。	更换计算器。	
黄色 LED 灯 1（上面的 LED 灯）显示错误。	DIP 开关的位置错误。	检查 DIP 开关的位置。	第 7.2 章 第 7.3 章
	引发器电级错误。	检查引发器接线。	第 6.3 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 6.3 章

运行故障	可能的原因	补救	参见
黄色 LED 灯 1（上面的 LED 灯）显示错误。	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 6.3 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。	
	继电器输出 I 有缺陷。	检查继电器输出 I。	
黄色 LED 2（下面的 LED 灯）显示错误。	继电器输出 II 有缺陷。	检查继电器输出 II。	
红色 LED 灯闪亮。	硬件错误。	检查设备。	
当起动延时功能激活时，工作液从易熔塞泄漏。	起动延时时间设定得太长。	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-Ex 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 Turbo 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 Turbo 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 1 和 3）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： 8.0 V DC - 短路电流：8.0 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：

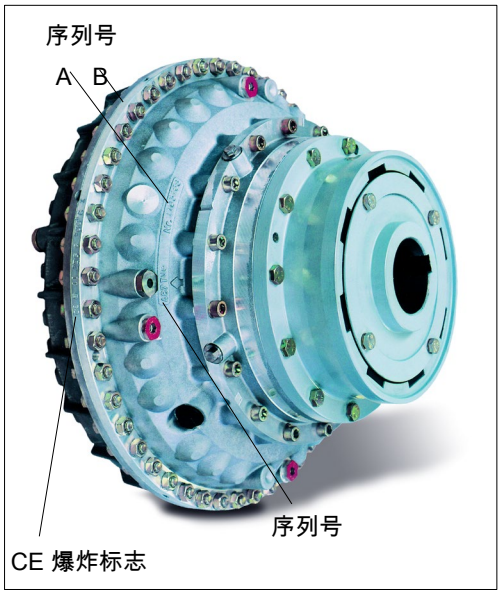


图 10

我们需要 BTS-Ex 的液力偶合器的**序列号**和**型号**。

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。

安装和操作说明书 / 版本 8 / 3626-019600ex
zh / 防护等级 0: 公然 / 2021-6-15

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-Ex 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**
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 - 1150	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）	201.02171810
NJ 10-22-N-E93-Y246868 （5 m）	201.02171910
NJ 10-22-N-E93-Y246869 （10 m）	201.02172010
NJ 10-22-N-E93-Y245590 （2 m，新的防尘防爆标志）	201.04312710
NJ 10-22-N-E93-Y246868 （5 m，新的防尘防爆标志）	201.04312810
NJ 10-22-N-E93-Y246869 （10 m，新的防尘防爆标志）	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
KFD2-SR2-Ex2.W.SM	TCR.11975610
KFD2-SR2-Ex2.W.SM（新的防爆标志）	201.03905210

表 16

14 附录

14.1欧盟一致性声明

一致性声明 Voith

原文翻译

欧盟一致性声明

我们，

J.M. Voith SE & Co. KG
Voithstraße 1
74564 Crailsheim

声明，一致性声明由我们全权负责发布，并且属于以下组件：

名称：用于限制 Voith 液力偶合器最高表面温度的非接触式热控开关装置

型号： BTS-Ex

生产数量： 1t. 供货文件

组件包含：

1. 开关元件

标记示例： Voith 140 ° C II Ex i X 1234 5678

1. 表面	2. 表面	3. 表面	4. 表面	5. 表面	6. 表面
A	B	C	D	E	F
Voith	140° C	II Ex i X		1234	5678
Voith	140° C	II	Ex i X	1234	5678

A （1. 冲压表面） = Voith
B （2. 冲压表面） = 额定反应温度： 85° C 90° C 100° C 110° C
125° C 140° C 160° C 180° C
C （3. 冲压表面） = 防爆标志： II Ex i X
D （4. 冲压表面） = 防爆标志：保留
E （5. 冲压表面） = 序列号（1 到 4 位数字）
F （6. 冲压表面） = 序列号（5 到 8 位数字）

2. 引发器

NJ 10-22-N-E93-Y245590
NJ 10-22-N-E93-Y246868
NJ 10-22-N-E93-Y246869

3. 计算器

Pepperl + Fuchs KFD2-SR2-Ex2.W.SM

上述声明对象满足欧盟相关统一规范的要求：

ATEX 指令 2014/34/EU
EMC 指令 2014/30/EU

以下统一标准（或其部分）已被使用：

- EN IEC 60079-0: 2018
- EN 60079-11: 2012
- EN 60079-25: 2010
- EN ISO 80079-36:2016
- EN ISO 80079-37:2016
- EN ISO/IEC 80079-38:2016

其他适用标准和技术规范：

- TRGS 727: 2016

根据制造商的液力偶合器的 2014/34/EU 指令第 1 条第 1 款 b) 项的要求，该组件可用作安全、控制和调节装置。

发布此一致性声明的唯一责任由制造商承担。

技术文件授权代表

J.M. Voith SE & Co. KG
Bernhard Ludas 先生
Voithstraße 1
74564 Crailsheim

可要求提交专门的技术文件。

代表 J.M. Voith SE & Co. KG 签名：

Satyavolu, Ravi Krishna
Digitally signed by Satyavolu, Ravi Krishna
Date: 2021.09.13 17:36:13 +02'00'

Crailsheim	2021-9-13	Ravi Krishna Satyavolu (Vice President CCE HDC)
位置	**日期**	**姓名，职位，签名**

14.2引发器 NJ 10-22-N-E93-Y245590 (2 m)

Voith 材料号: 201.02171810

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

Instruction Manual

1. Marking

Inductive sensor NJ10-22-N-E93-Y245590
Equipment protection level: Gb ATEX certificate: PTB 00 ATEX 2048 X ATEX marking: Ⓔx II 2G Ex ia IIC T6…T1 Gb IECEx certificate: IECEx PTB 11.0037X IECEx marking: Ex ib IIC T6
Equipment protection level: Da ATEX certificate: PTB 00 ATEX 2048 X ATEX marking: Ⓔx II 1D Ex ia IIIC T135°C Da
Equipment protection level: Mb IECEx certificate: IECEx PTB 11.0037X IECEx marking: Ex ia I

Pepperl+Fuchs GmbH Lilienthalstraße 200, 68307 Mannheim, Germany

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.

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 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.

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.

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.

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

7.2. Special Conditions

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.

7.2.1.1. Requirements for Equipment Protection Level Da

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

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

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 special conditions.

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.

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.

Disposing of device, packaging, and possibly contained batteries must be in compliance with the applicable laws and guidelines of the respective country.

0102

Model Number

NJ10-22-N-E93-Y245590

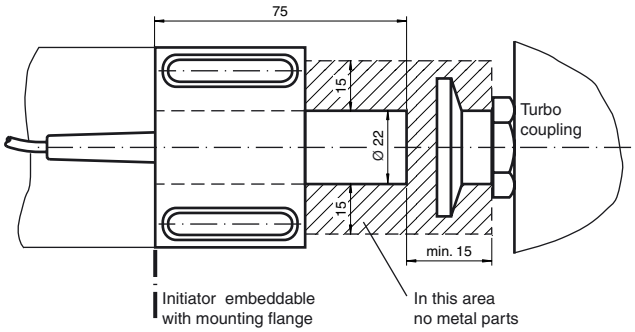
Features

- **Comfort series**
- **10 mm non-flush**

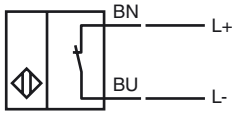
Technical Data

General specifications		
Rated operating distance	s_n	10 mm
Installation		non-flush
Output polarity		NAMUR
Assured operating distance	s_a	0 ... 10 mm
Output type		2-wire
Nominal ratings		
Nominal voltage	U_o	8 V
Switching frequency	f	0 ... 1000 Hz
Hysteresis	H	typ. 5 %
Current consumption		
Measuring plate not detected		≥ 3 mA
Measuring plate detected		≤ 1 mA
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 silicone , 2 m
Core cross-section		0.75 mm²
Housing material		PBT
Sensing face		PBT
Degree of protection		IP68
Cable		
Bending radius		> 10 x cable diameter
General information		
Use in the hazardous area		see instruction manuals
Compliance with standards and directives		
Standard conformity		
NAMUR		EN 60947-5-6:2000 IEC 60947-5-6:1999
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		
EAC conformity		TR CU 012/2011
UL approval		cULus Listed, General Purpose

Dimensions



Electrical Connection



Release date: 2017-12-13 09:46 Date of issue: 2017-12-13 245590_eng.xml

Data for application in connection with hazardous areas		
Equipment protection level		Gb , Da , Mb
Equipment protection level Gb		
Type of protection		intrinsic safety
CE marking		CE 0102
Certificates		
Appropriate type		NJ 10-22-N...
ATEX certificate		PTB 00 ATEX 2048 X
ATEX marking		Ex II 2G Ex ia IIC T6…T1 Gb
Standards		EN 60079-0:2012+A11:2013 , EN 60079-11:2012
IECEx certificate		IECEx PTB 11.0037X
IECEx marking		Ex ib IIC T6
Standards		IEC 60079-0:2004 , IEC 60079-11:2006
Effective internal inductivity	C_i	≤ 130 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature T_{amb}		Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at U_i = 16 V , I_i = 25 mA , P_i = 34 mW , T6 : 73 °C (163.4 °F) T5 : 88 °C (190.4 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at U_i = 16 V , I_i = 25 mA , P_i = 64 mW , T6 : 69 °C (156.2 °F) T5 : 84 °C (183.2 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at U_i = 16 V , I_i = 52 mA , P_i = 169 mW , T6 : 51 °C (123.8 °F) T5 : 66 °C (150.8 °F) T4 : 80 °C (176 °F) T3 : 80 °C (176 °F) T2 : 80 °C (176 °F) T1 : 80 °C (176 °F) at U_i = 16 V , I_i = 76 mA , P_i = 242 mW , T6 : 39 °C (102.2 °F) T5 : 54 °C (129.2 °F) T4 : 61 °C (141.8 °F) T3 : 61 °C (141.8 °F) T2 : 61 °C (141.8 °F) T1 : 61 °C (141.8 °F)
Equipment protection level Da		
Type of protection		intrinsic safety
CE marking		CE 0102
Certificates		
Appropriate type		NJ 10-22-N...
ATEX certificate		PTB 00 ATEX 2048 X
ATEX marking		Ex II 1D Ex ia IIIC T135°C Da
Standards		EN 60079-0:2012+A11:2013 , EN 60079-11:2012
Effective internal inductivity	C_i	≤ 130 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature T_{amb}		Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at U_i = 16 V , I_i = 25 mA , P_i = 34 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 25 mA , P_i = 64 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 52 mA , P_i = 169 mW : 80 °C (176 °F) at U_i = 16 V , I_i = 76 mA , P_i = 242 mW : 61 °C (141.8 °F)
Equipment protection level Mb		
Type of protection		intrinsic safety
Certificates		
Appropriate type		NJ 10-22-N...
IECEx certificate		IECEx PTB 11.0037X
IECEx marking		Ex ia I
Standards		IEC 60079-0:2004 , IEC 60079-11:2006
Effective internal inductivity	C_i	≤ 130 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 µH A cable length of 10 m is considered.

Release date: 2017-12-13 09:46 Date of issue: 2017-12-13 245590_eng.xml

Maximum permissible ambient temperature T_{amb}	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at U_i = 16 V , I_i = 25 mA , P_i = 34 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 25 mA , P_i = 64 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 52 mA , P_i = 169 mW : 80 °C (176 °F) at U_i = 16 V , I_i = 76 mA , P_i = 242 mW : 61 °C (141.8 °F)

Release date: 2017-12-13 09:46 Date of issue: 2017-12-13 245590_eng.xml

EU-Declaration of conformity

EU-Konformitätserklärung

en/de

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

No. / *Nr.*: DOC-3331
Date / *Datum*: 2017-01-26

PEPPERL+FUCHS

Declaration of conformity / *Konformitätserklärung*

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

*Die Pepperl+Fuchs GmbH 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*
NJ10-22-N-E93-Y245590	245590	Inductive sensor

Directives and Standards / *Richtlinien und Normen*

EU-Directive *EU-Richtlinie*	**Standards** *Normen*
ATEX 2014/34/EU (L96/309-356)	EN 60079-0/A11:2013-11 EN 60079-0:2012-08 EN 60079-11:2012-01
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

Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE 0102

Signatures / *Unterschriften*

Mannheim, 2017-01-26

ppa. Wolfgang Helm
Director Business Unit 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

14.3引发器 NJ 10-22-N-E93-Y246868 (5 m)

Voith 材料号: 201.02171910

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

Instruction Manual

1. Marking

Inductive sensor NJ10-22-N-E93-Y246868
Equipment protection level: Gb ATEX certificate: PTB 00 ATEX 2048 X ATEX marking: Ex II 2G Ex ia IIC T6…T1 Gb IECEx certificate: IECEx PTB 11.0037X IECEx marking: Ex ib IIC T6
Equipment protection level: Da ATEX certificate: PTB 00 ATEX 2048 X ATEX marking: Ex II 1D Ex ia IIIC T135°C Da
Equipment protection level: Mb IECEx certificate: IECEx PTB 11.0037X IECEx marking: Ex ia I

Pepperl+Fuchs GmbH Lilienthalstraße 200, 68307 Mannheim, Germany

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.

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 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.

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.

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.

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

7.2. Special Conditions

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.

7.2.1.1. Requirements for Equipment Protection Level Da

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

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

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 special conditions.

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.

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.

Disposing of device, packaging, and possibly contained batteries must be in compliance with the applicable laws and guidelines of the respective country.

0102

Model Number

NJ10-22-N-E93-Y246868

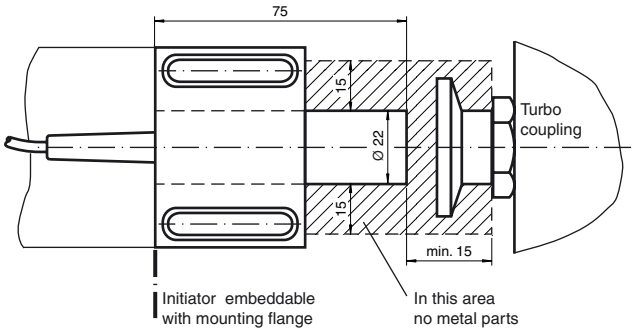
Features

- **Comfort series**
- **10 mm non-flush**

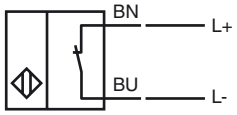
Technical Data

General specifications		
Rated operating distance	s_n	10 mm
Installation		non-flush
Output polarity		NAMUR
Assured operating distance	s_a	0 ... 10 mm
Output type		2-wire
Nominal ratings		
Nominal voltage	U_o	8 V
Switching frequency	f	0 ... 1000 Hz
Hysteresis	H	typ. 5 %
Current consumption		
Measuring plate not detected		≥ 3 mA
Measuring plate detected		≤ 1 mA
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 silicone , 5 m
Core cross-section		0.75 mm²
Housing material		PBT
Sensing face		PBT
Degree of protection		IP68
Cable		
Bending radius		> 10 x cable diameter
General information		
Use in the hazardous area		see instruction manuals
Compliance with standards and directives		
Standard conformity		
NAMUR		EN 60947-5-6:2000 IEC 60947-5-6:1999
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		
EAC conformity		TR CU 012/2011
UL approval		cULus Listed, General Purpose

Dimensions



Electrical Connection



Release date: 2017-12-13 09:46 Date of issue: 2017-12-13 246868_eng.xml

Data for application in connection with hazardous areas		
Equipment protection level		Gb , Da , Mb
Equipment protection level Gb		
Type of protection		intrinsic safety
CE marking		CE 0102
Certificates		
Appropriate type		NJ 10-22-N...
ATEX certificate		PTB 00 ATEX 2048 X
ATEX marking		Ex II 2G Ex ia IIC T6…T1 Gb
Standards		EN 60079-0:2012+A11:2013 , EN 60079-11:2012
IECEx certificate		IECEx PTB 11.0037X
IECEx marking		Ex ib IIC T6
Standards		IEC 60079-0:2004 , IEC 60079-11:2006
Effective internal inductivity	C_i	≤ 130 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature T_{amb}		Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at U_i = 16 V , I_i = 25 mA , P_i = 34 mW , T6 : 73 °C (163.4 °F) T5 : 88 °C (190.4 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at U_i = 16 V , I_i = 25 mA , P_i = 64 mW , T6 : 69 °C (156.2 °F) T5 : 84 °C (183.2 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at U_i = 16 V , I_i = 52 mA , P_i = 169 mW , T6 : 51 °C (123.8 °F) T5 : 66 °C (150.8 °F) T4 : 80 °C (176 °F) T3 : 80 °C (176 °F) T2 : 80 °C (176 °F) T1 : 80 °C (176 °F) at U_i = 16 V , I_i = 76 mA , P_i = 242 mW , T6 : 39 °C (102.2 °F) T5 : 54 °C (129.2 °F) T4 : 61 °C (141.8 °F) T3 : 61 °C (141.8 °F) T2 : 61 °C (141.8 °F) T1 : 61 °C (141.8 °F)
Equipment protection level Da		
Type of protection		intrinsic safety
CE marking		CE 0102
Certificates		
Appropriate type		NJ 10-22-N...
ATEX certificate		PTB 00 ATEX 2048 X
ATEX marking		Ex II 1D Ex ia IIIC T135°C Da
Standards		EN 60079-0:2012+A11:2013 , EN 60079-11:2012
Effective internal inductivity	C_i	≤ 130 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature T_{amb}		Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at U_i = 16 V , I_i = 25 mA , P_i = 34 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 25 mA , P_i = 64 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 52 mA , P_i = 169 mW : 80 °C (176 °F) at U_i = 16 V , I_i = 76 mA , P_i = 242 mW : 61 °C (141.8 °F)
Equipment protection level Mb		
Type of protection		intrinsic safety
Certificates		
Appropriate type		NJ 10-22-N...
IECEx certificate		IECEx PTB 11.0037X
IECEx marking		Ex ia I
Standards		IEC 60079-0:2004 , IEC 60079-11:2006
Effective internal inductivity	C_i	≤ 130 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 µH A cable length of 10 m is considered.

Release date: 2017-12-13 09:46 Date of issue: 2017-12-13 246868_eng.xml

Maximum permissible ambient temperature T_{amb}	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at U_i = 16 V , I_i = 25 mA , P_i = 34 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 25 mA , P_i = 64 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 52 mA , P_i = 169 mW : 80 °C (176 °F) at U_i = 16 V , I_i = 76 mA , P_i = 242 mW : 61 °C (141.8 °F)

Release date: 2017-12-13 09:46 Date of issue: 2017-12-13 246868_eng.xml

EU-Declaration of conformity

EU-Konformitätserklärung

en/de

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

No. / *Nr.*: DOC-3336
Date / *Datum*: 2017-01-26

PEPPERL+FUCHS

Declaration of conformity / *Konformitätserklärung*

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

*Die Pepperl+Fuchs GmbH 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*
NJ10-22-N-E93-Y246868	246868	Inductive sensor

Directives and Standards / *Richtlinien und Normen*

EU-Directive *EU-Richtlinie*	**Standards** *Normen*
ATEX 2014/34/EU (L96/309-356)	EN 60079-0/A11:2013-11 EN 60079-0:2012-08 EN 60079-11:2012-01
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

Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE 0102

Signatures / *Unterschriften*

Mannheim, 2017-01-26

ppa. Wolfgang Helm
Director Business Unit 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

14.4引发器 NJ 10-22-N-E93-Y246869 (10 m)

Voith 材料号: 201.02172010

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

Instruction Manual

1. Marking

Inductive sensor NJ10-22-N-E93-Y246869
Equipment protection level: Gb ATEX certificate: PTB 00 ATEX 2048 X ATEX marking: Ex II 2G Ex ia IIC T6…T1 Gb IECEx certificate: IECEx PTB 11.0037X IECEx marking: Ex ib IIC T6
Equipment protection level: Da ATEX certificate: PTB 00 ATEX 2048 X ATEX marking: Ex II 1D Ex ia IIIC T135°C Da
Equipment protection level: Mb IECEx certificate: IECEx PTB 11.0037X IECEx marking: Ex ia I

Pepperl+Fuchs GmbH Lilienthalstraße 200, 68307 Mannheim, Germany

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.

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 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.

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.

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.

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

7.2. Special Conditions

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.

7.2.1.1. Requirements for Equipment Protection Level Da

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

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

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 special conditions.

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.

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.

Disposing of device, packaging, and possibly contained batteries must be in compliance with the applicable laws and guidelines of the respective country.

0102

Model Number

NJ10-22-N-E93-Y246869

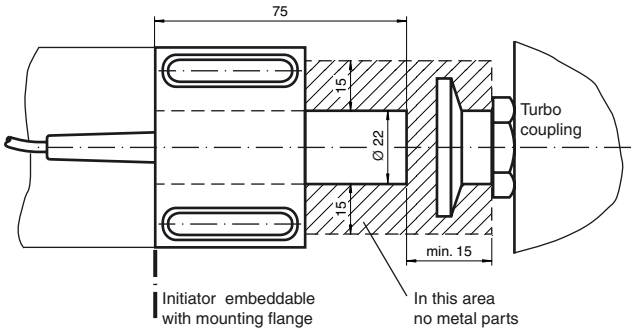
Features

- **Comfort series**
- **10 mm non-flush**

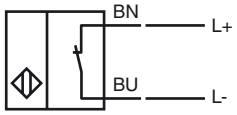
Technical Data

General specifications		
Rated operating distance	s_n	10 mm
Installation		non-flush
Output polarity		NAMUR
Assured operating distance	s_a	0 ... 10 mm
Output type		2-wire
Nominal ratings		
Nominal voltage	U_o	8 V
Switching frequency	f	0 ... 1000 Hz
Hysteresis	H	typ. 5 %
Current consumption		
Measuring plate not detected		≥ 3 mA
Measuring plate detected		≤ 1 mA
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 silicone , 10 m
Core cross-section		0.75 mm²
Housing material		PBT
Sensing face		PBT
Degree of protection		IP68
Cable		
Bending radius		> 10 x cable diameter
General information		
Use in the hazardous area		see instruction manuals
Compliance with standards and directives		
Standard conformity		
NAMUR		EN 60947-5-6:2000 IEC 60947-5-6:1999
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		
EAC conformity		TR CU 012/2011
UL approval		cULus Listed, General Purpose

Dimensions



Electrical Connection



Release date: 2017-12-13 09:46 Date of issue: 2017-12-13 246869_eng.xml

Data for application in connection with hazardous areas		
Equipment protection level		Gb , Da , Mb
Equipment protection level Gb		
Type of protection		intrinsic safety
CE marking		CE 0102
Certificates		
Appropriate type		NJ 10-22-N...
ATEX certificate		PTB 00 ATEX 2048 X
ATEX marking		Ex II 2G Ex ia IIC T6…T1 Gb
Standards		EN 60079-0:2012+A11:2013 , EN 60079-11:2012
IECEx certificate		IECEx PTB 11.0037X
IECEx marking		Ex ib IIC T6
Standards		IEC 60079-0:2004 , IEC 60079-11:2006
Effective internal inductivity	C_i	≤ 130 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature T_{amb}		Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at U_i = 16 V , I_i = 25 mA , P_i = 34 mW , T6 : 73 °C (163.4 °F) T5 : 88 °C (190.4 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at U_i = 16 V , I_i = 25 mA , P_i = 64 mW , T6 : 69 °C (156.2 °F) T5 : 84 °C (183.2 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at U_i = 16 V , I_i = 52 mA , P_i = 169 mW , T6 : 51 °C (123.8 °F) T5 : 66 °C (150.8 °F) T4 : 80 °C (176 °F) T3 : 80 °C (176 °F) T2 : 80 °C (176 °F) T1 : 80 °C (176 °F) at U_i = 16 V , I_i = 76 mA , P_i = 242 mW , T6 : 39 °C (102.2 °F) T5 : 54 °C (129.2 °F) T4 : 61 °C (141.8 °F) T3 : 61 °C (141.8 °F) T2 : 61 °C (141.8 °F) T1 : 61 °C (141.8 °F)
Equipment protection level Da		
Type of protection		intrinsic safety
CE marking		CE 0102
Certificates		
Appropriate type		NJ 10-22-N...
ATEX certificate		PTB 00 ATEX 2048 X
ATEX marking		Ex II 1D Ex ia IIIC T135°C Da
Standards		EN 60079-0:2012+A11:2013 , EN 60079-11:2012
Effective internal inductivity	C_i	≤ 130 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 µH A cable length of 10 m is considered.
Maximum permissible ambient temperature T_{amb}		Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at U_i = 16 V , I_i = 25 mA , P_i = 34 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 25 mA , P_i = 64 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 52 mA , P_i = 169 mW : 80 °C (176 °F) at U_i = 16 V , I_i = 76 mA , P_i = 242 mW : 61 °C (141.8 °F)
Equipment protection level Mb		
Type of protection		intrinsic safety
Certificates		
Appropriate type		NJ 10-22-N...
IECEx certificate		IECEx PTB 11.0037X
IECEx marking		Ex ia I
Standards		IEC 60079-0:2004 , IEC 60079-11:2006
Effective internal inductivity	C_i	≤ 130 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 100 µH A cable length of 10 m is considered.

Release date: 2017-12-13 09:46 Date of issue: 2017-12-13 246869_eng.xml

Maximum permissible ambient temperature T_{amb}	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. at U_i = 16 V , I_i = 25 mA , P_i = 34 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 25 mA , P_i = 64 mW : 100 °C (212 °F) at U_i = 16 V , I_i = 52 mA , P_i = 169 mW : 80 °C (176 °F) at U_i = 16 V , I_i = 76 mA , P_i = 242 mW : 61 °C (141.8 °F)

Release date: 2017-12-13 09:46 Date of issue: 2017-12-13 246869_eng.xml

EU-Declaration of conformity

EU-Konformitätserklärung

en/de

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No. / *Nr.*: DOC-3335
Date / *Datum*: 2017-01-26

PEPPERL+FUCHS

Declaration of conformity / *Konformitätserklärung*

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

*Die Pepperl+Fuchs GmbH 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*
NJ10-22-N-E93-Y246869	246869	Inductive sensor

Directives and Standards / *Richtlinien und Normen*

EU-Directive *EU-Richtlinie*	**Standards** *Normen*
ATEX 2014/34/EU (L96/309-356)	EN 60079-0/A11:2013-11 EN 60079-0:2012-08 EN 60079-11:2012-01
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

Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE 0102

Signatures / *Unterschriften*

Mannheim, 2017-01-26

ppa. Wolfgang Helm
Director Business Unit 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

14.5引发器 NJ 10-22-N-E93-Y245590（2 m，新的防尘防爆标志）

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

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

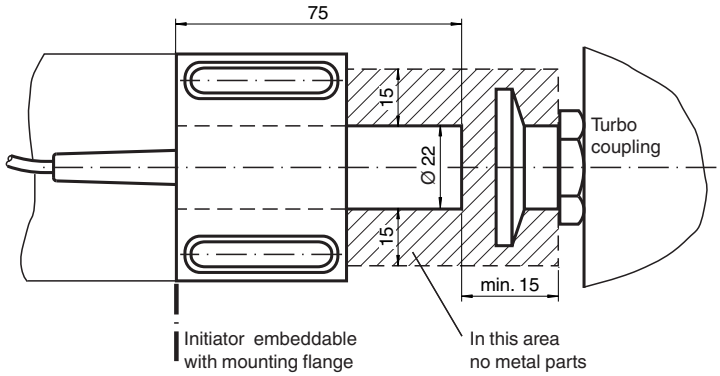
Type of protection	Intrinsic safety
Certificates	
Appropriate type	NJ10-22-N...
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia I Mb

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

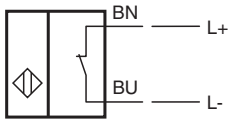
General specifications		
Switching function		Normally closed (NC)
Output type		NAMUR
Rated operating distance	s_n	10 mm
Installation		non-flush
Assured operating distance	s_a	0 ... 10 mm
Output type		2-wire
Nominal ratings		
Nominal voltage	U_o	8.2 V (R_i approx. 1 kΩ)
Switching frequency	f	0 ... 1000 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

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

14.6引发器 NJ 10-22-N-E93-Y246868（5 m，新的防尘防爆标志）

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

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

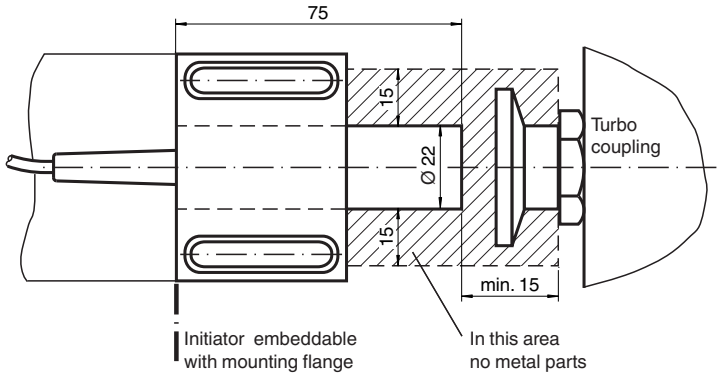
Type of protection	Intrinsic safety
Certificates	
Appropriate type	NJ10-22-N...
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia I Mb

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

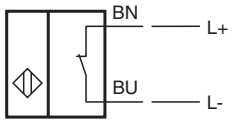
General specifications		
Switching function		Normally closed (NC)
Output type		NAMUR
Rated operating distance	s_n	10 mm
Installation		non-flush
Assured operating distance	s_a	0 ... 10 mm
Output type		2-wire
Nominal ratings		
Nominal voltage	U_o	8.2 V (R_i approx. 1 kΩ)
Switching frequency	f	0 ... 1000 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



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Products / *Produkte*

Product / *Produkt*	**Item number**	**Description** / *Beschreibung*
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NJ2-12GK-N-10M-Y89552	70133232	Inductive sensor
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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
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NJ10-22-N-G	70133284	Inductive sensor
NJ10-22-N-G-5M	70133285	Inductive sensor
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NJ10-30GK-N-15M	70133310	Inductive sensor
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Directives and Standards / *Richtlinien und Normen*

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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

14.7引发器 NJ 10-22-N-E93-Y246869（10 m，新的防尘防爆标志）

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

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

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2. Validity

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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

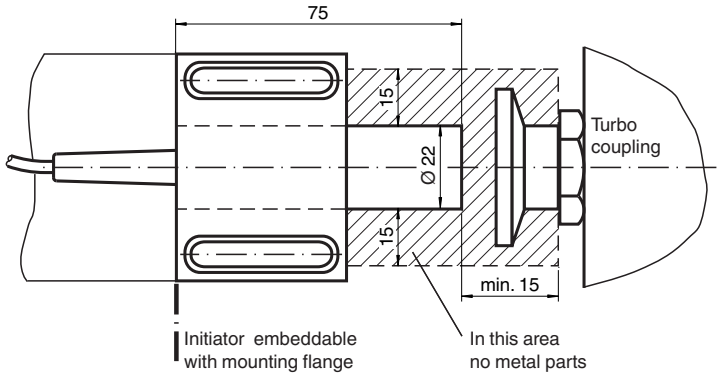
Type of protection	Intrinsic safety
Certificates	
Appropriate type	NJ10-22-N...
IECEx certificate	IECEx PTB 11.0037X
IECEx marking	Ex ia I Mb

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

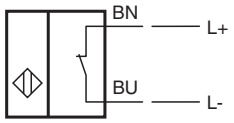
General specifications		
Switching function		Normally closed (NC)
Output type		NAMUR
Rated operating distance	s_n	10 mm
Installation		non-flush
Assured operating distance	s_a	0 ... 10 mm
Output type		2-wire
Nominal ratings		
Nominal voltage	U_o	8.2 V (R_i approx. 1 kΩ)
Switching frequency	f	0 ... 1000 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

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

14.8计算器 KFD2-SR2-Ex2.W.SM

操作说明书	Pepperl+Fuchs
技术参数	Pepperl+Fuchs
一致性声明	Pepperl+Fuchs
安全性说明	Pepperl+Fuchs

安装和操作说明书 / 版本 8 / 3626-019600ex
zh / 防护等级 0: 公然 / 2021-6-15

Instruction Manual

Marking

K-System, Isolated barriers for Zone 2
Device identification
Model number
ATEX approval
Group, category, type of protection, temperature classification

table 1

The exact designation of the device can be found on the name plate on the device side.

Pepperl+Fuchs GmbH Lilienthalstrasse 200, 68307 Mannheim, Germany

table 2

Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.
Mounting, installation, commissioning, operation, maintenance and dismounting of the device may only be carried out by appropriate trained and qualified personnel. The instruction manual must be read and understood.
Prior to using the device you should make yourself familiar with the device and carefully read the instruction manual.

Reference to Further Documentation

Observe laws, standards, and directives applicable to the intended use and the operating location.
The corresponding datasheets, declarations of conformity, EC-type-examination certificates, certificates and control drawings if applicable supplement this document. You can find this information under www.pepperl-fuchs.com.

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.
Use the device only within the specified ambient conditions.
The device is designed for mounting on a 35 mm DIN mounting rail according to EN 60715.
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.

Improper Use

Protection of the personnel and the plant is not ensured if the device is not being used according to its intended use.
The device is not suitable for isolating signals in power installations unless this is noted separately in the corresponding datasheet.

Mounting and Installation

Do not mount a damaged or polluted device.
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 an 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.
All circuits connected to the device must comply with the overvoltage category II (or better) according to IEC/EN 60664-1.
Only use power supplies that provide protection against electric shock (e. g. SELV or PELV) for the connection to power feed modules.
Observe the installation instructions according to IEC/EN 60079-14.

Requirements for Cables and Connection Lines

Observe the following points when installing cables and connection lines:
Observe the permissible core cross-section of the conductor.
If you use 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.
If the rated voltage is greater than 50 V AC, proceed as follows:
1. Switch off the voltage.
2. Connect the terminal blocks or disconnect the terminal blocks.

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.
Intrinsically safe circuits of associated apparatus can be led into hazardous areas. Observe the compliance of the separation distances to all non-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 maximum values of the device, when connecting the device to 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.
If no L_o and C_o values are specified for the simultaneous appearance of lumped inductances and capacitances, the following rule applies.

- The specified value for L_o and C_o is used if one of the following conditions applies:
  - The circuit has distributed inductances and capacitances only, e. g., in cables and connection lines.
  - The total value of L_i (excluding cable) of the circuit is < 1 % of the specified L_o value.
  - The total value of C_i (excluding cable) of the circuit is < 1 % of the specified C_o value.
- A maximum of 50 % of the specified value for L_o and C_o is used if the following condition applies:
  The total value of L_i (excluding cable) of the circuit is ≥ 1 % of the specified L_o value.
  The total value of C_i (excluding cable) of the circuit is ≥ 1 % of the specified C_o value.
  The reduced capacitance for gas groups I, IIA and IIB must not exceed the value of 1 µF (including cable).
  The reduced capacitance for gas group IIC must not exceed the value of 600 nF (including cable).

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.
Provide a transient protection. Ensure that the peak value of the transient protection does not exceed 140 % of the rated voltage.
Place warning label "Warning – Do not remove or replace fuse when energized!" visibly on the housing.

Operation, Maintenance, Repair

The devices must not be repaired, changed or manipulated. If there is a defect, the product must always be replaced with an original device.
If the rated voltage is greater than 50 V AC, proceed as follows:
1. Switch off the voltage.
2. Connect the terminal blocks or disconnect the terminal blocks.

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.
Only use the programming socket in the absence of a potentially explosive atmosphere.
Only change the replaceable fuse, when the device is de-energized.

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 (see datasheet) must be considered.
Disposing of device, packaging, and possibly contained batteries must be in compliance with the applicable laws and guidelines of the respective country.

Features

- 2-channel isolated barrier
- 24 V DC supply (Power Rail)
- Dry contact or NAMUR inputs
- Selectable frequency trip values
- 2 relay contact outputs
- Start-up override
- Selectable mode of operation
- Line fault detection (LFD)
- Up to SIL 2 acc. to IEC 61508

Function

This isolated barrier is used for intrinsic safety applications. It is a zero speed/standstill monitor that accepts input frequency pulses and triggers an output when the frequency drops below a selected value.

Two startup override values are available. This unit can also be used to determine rotation direction.

During an error condition, relays revert to their de-energized state and LEDs indicate the fault according to NAMUR NE44.

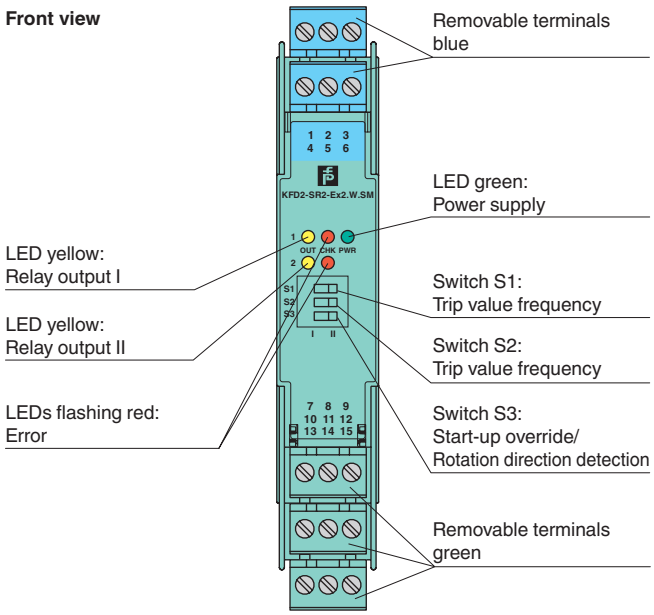
The available diagnostic LEDs show rotation detection, limit trip indicator, power on, and hardware error indication.

The unit is easily programmed via switches mounted on the front of the unit.

A unique collective error messaging feature is available when used with the Power Rail system.

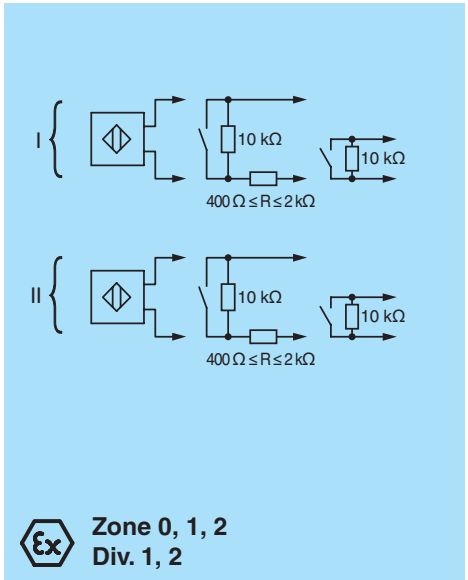
For additional information, refer to www.pepperl-fuchs.com.

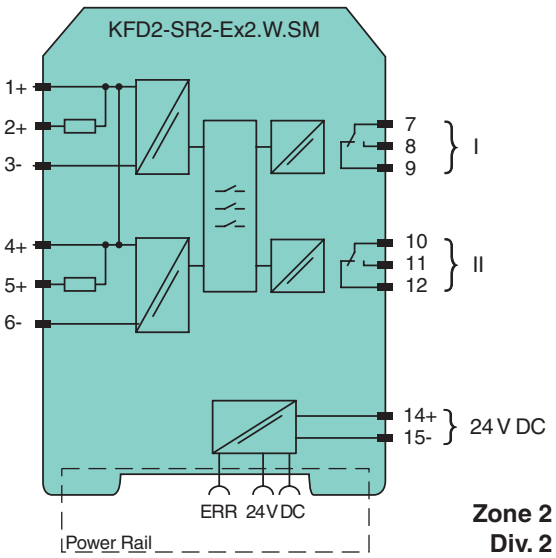
Assembly



SIL 2

Connection





Release date 2016-09-13 11:47 Date of issue 2016-09-13 132964_eng.xml

General specifications		
Signal type		Digital Input
Programming		via DIP switch and programmable
Supply		
Connection		Power Rail or terminals 14+, 15-
Rated voltage	U_n	20 ... 30 V DC
Power consumption		≤ 1.5 W
Input		
Connection		Input I: terminals 1+, 2+, 3- ; Input II: terminals 4+, 5+, 6-
Rated values		acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current		approx. 8 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 mA
Control input		sensor power supply approx. 8.2 V, impedance 1.2 kΩ
Pulse duration		> 200 µs for standstill monitoring, > 250 µs for rotation direction detecion
Output		
Connection		output I: terminals 7, 8, 9 ; output II: terminals 10, 11, 12
Relay		2 changeover contacts
Contact loading		253 V AC/2 A/cos ϕ > 0.7; 126.5 V AC/4 A/cos ϕ > 0.7; 40 V DC/2 A resistive load
Minimum switch current		2 mA / 24 V DC
Energized/De-energized delay		approx. 20 ms / approx. 20 ms
Mechanical life		10^7 switching cycles
Trip value	f_{max}	for standstill monitoring: 0.1 Hz; 0.5 Hz; 2 Hz; 10 Hz adjustable via DIP switch (S1 and S2)
Transfer characteristics		
Accuracy		5 % (S3 = I), 30 % (S3 = II)
Start-up override		5 seconds or 20 seconds, programmable
Frequency range		≤ 2 kHz
Rotation direction detection		90° phase difference between pulse input signal 1 and 2, overlapping ≥ 125 µs
Electrical 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		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Output/Output		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 (industrial locations)
Low voltage		
Directive 2014/35/EU		EN 61010-1:2010
Conformity		
Electromagnetic compatibility		NE 21:2006
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
Mass		approx. 150 g
Dimensions		20 x 119 x 115 mm (0.8 x 4.7 x 4.5 inch) , housing type B2
Mounting		on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with hazardous areas		
EC-Type Examination Certificate		PTB 00 ATEX 2080
Group, category, type of protection		⟨Ex⟩ II (1)G [Ex ia Ga] IIC ⟨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	13 mA
Power	P_o	34 mW (linear characteristic)
Supply		
Maximum safe voltage	U_m	253 V AC / 125 V DC (Attention! U_m is no rated voltage.)
Output		

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Contact loading	253 V AC/2 A/cos ϕ > 0.7; 126.5 V AC/4 A/cos ϕ > 0.7; 40 V DC/2 A resistive load
Maximum safe voltage U_m	253 V AC (Attention! The rated voltage can be lower.)
Error message output	
Maximum safe voltage U_m	40 V DC (Attention! U_m is no rated voltage.)
Statement of conformity	TÜV 99 ATEX 1493 X
Group, category, type of protection, temperature class	Ⓔx II 3G Ex nA nC IIC T4
Output	
Contact loading	50 V AC/4 A/cos ϕ > 0.7; 40 V DC/2 A resistive load
Electrical 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 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-15:2010
International approvals	
FM approval	
Control drawing	116-0035
CSA approval	
Control drawing	116-0047
IECEx approval	IECEx PTB 11.0034
Approved for	[Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I
General information	
Supplementary information	EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see www.pepperl-fuchs.com.

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Operating principle

The function of standstill monitor with start-up override (S3 = I) or standstill monitor with rotation direction monitoring (S3 = II) can be selected by means of DIP switches.

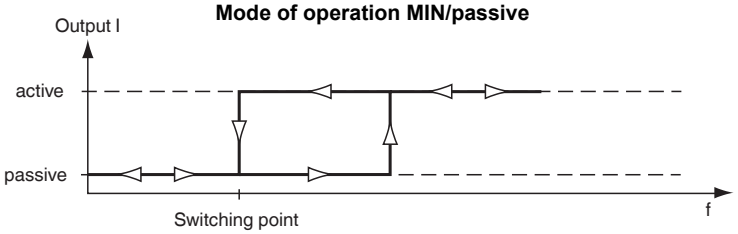
S3:	I	II
Function:	Standstill monitor with start-up override	Standstill monitor with rotation direction monitoring
Input I:	Pulse input 1: NAMUR contacts (bounce-free)	Pulse input 1: NAMUR contacts (bounce-free)
Input II:	Start-up override: contact terminal 4 + 6: 20 seconds contact terminal 5 + 6: 5 seconds	Pulse input 2: NAMUR contacts (bounce-free)
Output I:	MIN/passive	MIN/passive
Output II:	MIN/active	Direction of rotation/error

Standstill monitor with start-up override (S3 = I)

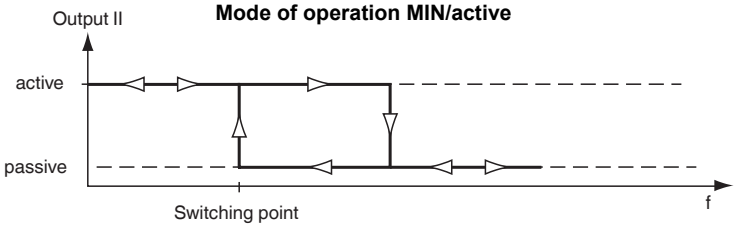
If the frequency falls below the trip value set with the DIP switches S1 and S2, the standstill monitor with start-up override switches the output I to passive and the output II to active. Input I is used to monitor the frequency of rising current edges. Signal transmitters can be sensors in accordance with EN 60947-5-6 (NAMUR) or contacts. Input I is monitored for lead breakage/short-circuiting. A start-up override can be initiated via input II. The duration of the start-up override can be selected between 5 and 20 seconds by means of a bridge (starting trigger) or an external trigger signal. During the start-up override time the outputs assume the "no standstill" state. In this case there is no lead breakage/short-circuit monitoring at input II.

Trip value	Hysteresis	Switch S2	Switch S1
0.1 Hz	**0.02 Hz**	**I**	**I**
0.5 Hz	**0.1 Hz**	**I**	**II**
2 Hz	**0.4 Hz**	**II**	**I**
10 Hz	**2 Hz**	**II**	**II**

Mode of operation MIN/passive



Mode of operation MIN/active



Release date 2016-09-13 11:47 Date of issue 2016-09-13 132964_eng.xml

EU-Declaration of conformity

en/de

EU-Konformitätserklärung

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No. / *Nr.*: DOC-0170B
Date / *Datum*: 2016-03-31

PEPPERL+FUCHS

Declaration of conformity / *Konformitätserklärung*

We, Pepperl+Fuchs GmbH declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.
*Die Pepperl+Fuchs GmbH 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-SR2-Ex1.W	132958 203343	Switch Amplifier
KFD2-SR2-Ex1.W.LB	132959	Switch Amplifier
KFD2-SR2-Ex2.W	132960	Switch Amplifier
KFD2-SR2-Ex2.W.SM	132964	Standstill and Rotational Direction Monitor

Directives and Standards / *Richtlinien und Normen*

EU-Directive *EU-Richtlinie*	Standards *Normen*
2004/108/EC (EMC) valid until 2016-04-19 (L390/24-37) **2014/30/EU (EMC)** valid from 2016-04-20 (L96/79-106)	EN 61326-1:2013 (industrial locations)
94/9/EC (ATEX) valid until 2016-04-19 (L100/1-29) **2014/34/EU (ATEX)** valid from 2016-04-20 (L96/309-356)	EN 60079-0:2012+A11:2013 EN 60079-11:2012 EN 60079-15:2010
2006/95/EC (LV) valid until 2016-04-19 (L374/10-19) **2014/35/EU (LV)** valid from 2016-04-20 (L96/357-374)	EN 61010-1:2010

Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE 0102

Signatures / *Unterschriften*

Mannheim, 2016-03-31

ppa. Michael Kessler
Vice President Business Unit
Components and Technology

i.V. Friedrich Füß
Manager
Interface Technology

ANNEX ATEX

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

We, Pepperl+Fuchs GmbH declare that the products are only affected by minor or formal changes in respect to the new edition of the standards. These changes are not relevant for compliance with the EHSRs and consequently the products still comply with the ATEX Directive.
Die Pepperl+Fuchs GmbH 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 EHSRs, weshalb die Produkte nach wie vor die ATEX-Richtlinie erfüllen.

The EC-Type-Examination and the marking of the equipment was performed in accordance with the following standards:
Die EG-Baumusterprüfung und die Kennzeichnung des Betriebsmittels wurden nach den folgenden Normen durchgeführt:
EN 60079-0:2012
EN 60079-11:2012

The marking as category 3 G apparatus is issued in acc. with the following standards:
Die Kennzeichnung als Kategorie 3 G Betriebsmittels ist nach den folgenden Normen durchgeführt:
EN 60079-0:2006
EN 60079-15:2005

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

Products / ***Produkte***	**KFD2-SR2-Ex1.W KFD2-SR2-Ex1.W.LB KFD2-SR2-Ex2.W**	
Marking *Kennzeichnung*	Certificate *Zertifikat*	Issuer ID *Aussteller ID*
Ex II (1) G Ex II (1) D Ex I (M1)	PTB 00 ATEX 2080	0102
Ex II (3) G	PF08 CERT 0803	PF
Ex II 3 G	TÜV 99 ATEX 1493 X	TÜV

Products / ***Produkte***	**KFD2-SR2-Ex2.W.SM**	
Marking *Kennzeichnung*	Certificate *Zertifikat*	Issuer ID *Aussteller ID*
Ex II (1) G Ex II (1) D Ex I (M1)	PTB 00 ATEX 2080	0102
Ex II 3 G	TÜV 99 ATEX 1493 X	TÜV

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

ID	Issuer / *Aussteller*
0102	Physikalisch Technische Bundesanstalt Bundesallee 100 38116 Braunschweig Germany
TÜV	TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen Germany
PF	Pepperl + Fuchs GmbH Lilienthalstraße 200 68307 Mannheim Germany

1 Function description

The standstill monitor KFD2-SR2-**.W.SM can be operated with the function of a standstill monitor with start-up override or as a standstill monitor with direction of rotation signalling. The function is selected using DIP switch 3.

The limit values for standstill detection can be selected using DIP switches 1 and 2 (for details see data sheet).

The device is equipped with 2 inputs and has a maximum input frequency of 2000 Hz

- The current firmware version is 2v0.
- The current hardware version is 1v0.

Function start-up override

The input pulses at input 1 are used for the standstill monitoring. The input is monitored for lead faults (LB – lead breakage/SC – short-circuit) (for Ex version).

Input 2 is used to trigger the start-up override. Two time intervals are available (5 s and 20 s). In this case the device reverts to the "no standstill" condition for the duration of the start-up override. No lead monitoring takes place in this condition.

Function direction of rotation signal

In this case both inputs are used for the standstill monitoring. If one of the two channels fails, then the remaining functional input is used for the standstill monitoring. In addition, a direction of rotation is determined via the sequence of the input signals of the two overlapping input signals. This direction of rotation is output via relay 2. Both inputs are monitored for lead faults (in the Ex version).

Behaviour in the event of a fault

- Monitoring for lead faults (in the Ex version)
- Continuous monitoring of the device for internal memory faults

On the occurrence of a fault, both relays revert to the safe condition, the red LEDs signal the fault and a collective error is output via the Power Rail (Ex devices only).

2 Use of the KFD2-SR2-**2.W.SM in the context of SIL2 applications

Make sure, that in the critical condition of the application the relays have dropped out (are passive). Then, in the case of power failure (dropped out relay) a safety "GO state" (relay pulled in) cannot occur.

This behaviour shall be tested before commissioning the system.

Example 1

The protective screen of a rotating shaft should remain locked until the shaft is at a standstill. The safety-critical condition is the rotating shaft (risk of injury). For this reason the locking of the protective screen should be achieved by means of a dropped out (passive) relay. The relay does not pull in (become active) until the shaft has stopped (safety GO state). This device function is only achieved with "standstill monitoring with start-up override" (S3 = I) and control of the protective screen with relay 2.

Example 2

The cooling of a critical process by means of a fan/coolant pump is to be monitored. The safety-critical state is the standstill of the fan/pump (overheating). For this reason the triggering of an alarm is achieved by means of a dropped out (passive) relay. As long as the fan or the pump is running (safety GO state) the relay is pulled in (active). This device function can be achieved with "standstill monitoring with start-up override" (S3 = I) and "standstill monitoring with direction of rotation signal" (S3 = II) with relay 1.

Further information on boundary and ambient conditions is provided in the associated data sheet.

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3 Safety and installation instructions

The standstill monitor KFD2-SR2-**2.W.SM must only be operated by trained specialist personnel and in accordance with the data sheet.

The protection of the operating personnel and of the plant is only guaranteed when these devices are used for their intended application. Any other operation than that described in the data sheet and the safety instructions places the safety and function of the devices and connected systems in question.

In the event that faults cannot be eliminated, the devices should be switched off and protected against inadvertent restart. The devices must only be repaired by the manufacturer Pepperl+Fuchs. Interventions within the devices and modifications to them are dangerous and are therefore not permissible. Such actions will render any claims against the warranty null and void and will also negate the approval in accordance with SIL2.

Malfunctioning of the devices should be reported to the manufacturer Pepperl+Fuchs.

The standstill monitors are constructed to protection class IP21 and must accordingly be protected against adverse ambient conditions (water, small foreign bodies, etc.).

4 Failure rates

The failure rates and related characteristics are given in section 6 and the FMEDA. The mean probability of failure PFD is given in section 5.

The standstill monitor KFD2-SR2-**2.W.SM is categorised for the Safety Integrity Level SIL2. In the assessment of a complete system in which the standstill monitor is to be used, the failure rate of the complete loop must be considered.

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5 Product life and maintenance

Product life is limited by the following parameters:

- Mechanical life of the relay of at least 2.5 x 10^5 operating cycles at maximum permissible load (500 VA) in accordance with the data sheet.

  At a contact loading of approx. 50 mW the life is approx. 5 x 10^6 operating cycles.
- Life of the flash memory: approx. 12 years
- Life of the Elko: approx. 15 years

For devices, which are used in the "Low Demand Mode", the appraisal has to be made in the context of the maintenance of the total system, but after 5 years at the latest.

PFD for devices with lead breakage detection after 5 years: **5.62E-4**

PFD for devices without lead breakage detection after 5 years: **5.81E-4**

For the detection of random faults, which have been categorised by the FMEDA as "undetected dangerous", the following tests are to be carried out during the maintenance intervals:

- Application of a frequency smaller than 10 % of the set limit frequency -> the relay must switch in accordance with the data in the data sheet.
- Application of a frequency greater than 10 % of the set limit frequency + associated hysteresis -> relay must switch in accordance with the data in the data sheet.
- When examining the switching states of the relay, a check has to be made in the dropped out condition to check whether the normally closed contact (NC) has a low resistance and the normally open contact (NO) has a high resistance (welding of the contacts).
- When examining the switching states of the relay, a check has to be made in the pulled in condition to check whether the normally closed contact (NC) has a high resistance (welding of the contacts) and the normally open contact (NO) has a low resistance (only necessary in the sense that it is available).

By means of these tests 95 % of all faults that have been categorised as "undetected dangerous" can be detected.

An early fault detection is not included in the functionality of the KFD2-SR2-**2.W.SM.

Recalibration is not necessary.

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6 Validation

The validation of the SIL2 capability of the standstill monitor KFD2-SR2-**2.W.SM took place in the context of an assessment with EXIDA. The appropriate documents are available on the Internet or directly from Pepperl+Fuchs.

The value 0 has been taken as the hardware fault tolerance in accordance with Table B in EN 61508-2 (7.4.3.1.3).

The failure rates used are based on the "Basic Failure Rates" from the Siemens Standard SN29500.

In addition, the following assumptions have been made:

- Failure rates are constant, wear has not been taken into account.
- Fault propagations are not relevant.
- After a "Safe Failure" the repair time is 8 hours.
- The "Low Demand Mode" has been assumed.
- The failure rates of external power supplies have not been accounted for.
- Connected sensors have not been accounted for in the failure rates.
- Output 1 has been considered to be the safety-relevant output.
- Either the classification MIL-HNBK-217F or IEC 645-1 class C (max. temperature corresponds to the manufacturer's data) with an average ambient temperature of 40°C can be taken as the ambient condition.
- The test time, within which the logic control unit must react to a "Dangerous Detected" failures, is one hour.

The following SFF and failure rates have been determined for the standstill monitor KFD2-SR2-**2.W.SM:

With lead fault detection

λ_{sd} = 11 FIT

λ_{su} = 248 FIT

λ_{dd} = 90 FIT

λ_{du} = 26 FIT

SFF = 91.25 %

DC_S = 4.25 %

DC_D = 77.59 %

Without lead fault detection

λ_{sd} = 9 FIT

λ_{su} = 247 FIT

λ_{dd} = 90 FIT

λ_{du} = 27 FIT

SFF = 90.91 %

DC_S = 3.52 %

DC_D = 76.92 %

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