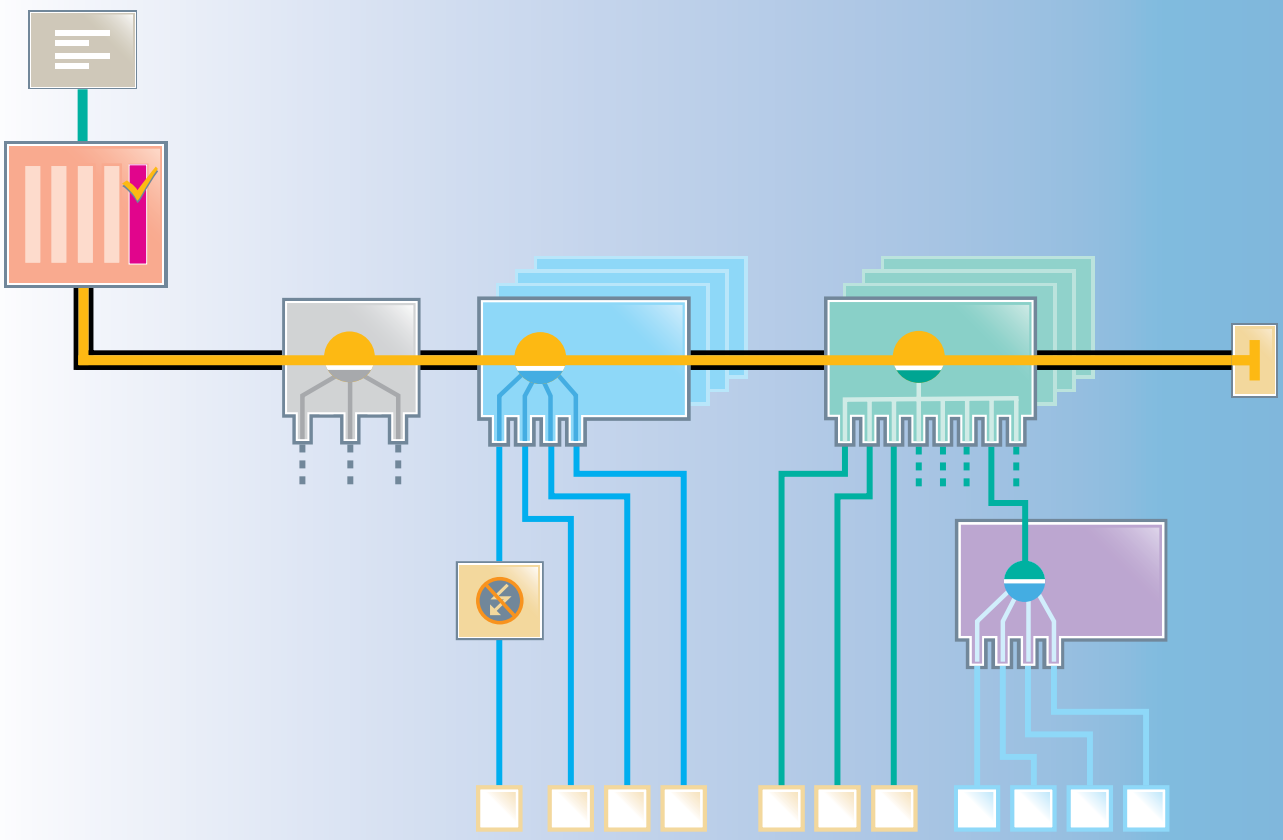
FieldConnex®

PROFIBUS®

PROFIBUS PA



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Introduction

FieldConnex® is the infrastructure and connection technology for fieldbus in process automation. It supports PROFIBUS PA based on IEC standard IEC 61158-2 and provides power and communication on the same cable. With quality components for your process automation system and demands in the field, our highly reliable and energy-efficient design enables you to easily design and implement segments that will keep running.

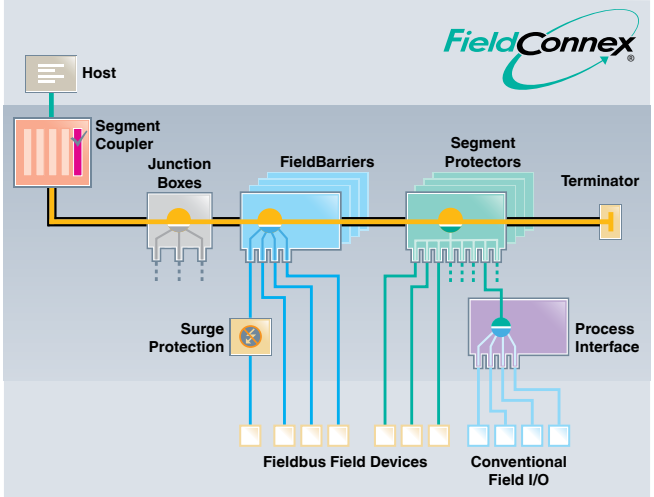


Figure 1 *System diagram: Schematic connections between all components of the fieldbus infrastructure.*

PROFIBUS PA is operated as a subnetwork to PROFIBUS DP. The Segment Coupler connects the two networks for data transmission and supplies power to the PROFIBUS PA segment.

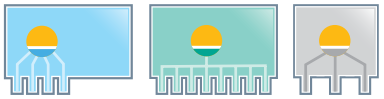
The color coding in the diagram above guides you through the process of selecting the right FieldConnex® components and options. Each chapter is clearly marked with the symbol for the component.

The following chapters describe all components – both hardware and software – that make up the FieldConnex® portfolio. This includes features, benefits, engineering concepts, and available options. Cross references to the "Technology" section, manuals, white papers, or other documents are provided for easy comprehension.

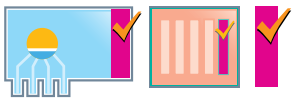
System Components

Diagrams show the context in which FieldConnex® components are applied in a segment. Symbols in the diagrams are defined for all product groups as follows:

Segment Couplers (orange) power the segment and provide the connection to PROFIBUS DP. Different versions and options suit all kinds of installations, starting from laboratory and test installations, to small-scale remote installations, up to large-scale process plants with 10 000 segments or more.



Device couplers (blue, green, or gray) provide the connection points for field instruments. They come in enclosures ready to install in the field and are customized with accessories to fit the solution. Pepperl+Fuchs provides pre-engineered and pre-wired cabinets and housing solutions for plug and play.



Physical layer diagnostics (magenta) monitor the fieldbus physical layer and signals. This approach simplifies all practical aspects on handling the fieldbus.

Process Interfaces (purple) connect simple analog or digital I/O devices to the fieldbus. The process interface collects status, process data, and diagnostics and transmits the information via fieldbus to the DCS.

Accessories (yellow) such as terminators and surge protectors complete the product line.

Physical Layer Diagnostics

The quality of the installation itself can be monitored economically with FieldConnex® Advanced Diagnostics. Operator and maintenance staff can keep the physical layer from the power supply, junction boxes, and all connections between the DCS and the instrument in clear view. The system notifies the user when changes in the physical layer become critical issues during the operation of the automation system.

At the core is the Advanced Diagnostic Module (ADM), which is the first of its kind to monitor fieldbus signals for their quality. The system includes a software interface that allows the worker to analyze the installation from the safety of the control room.

A built-in expert system interprets a large number of measurements reported by the ADM. It provides information about possible causes and suggests courses of corrective action in plain text. Faults and possible causes are already known ahead of time for well-planned and necessary trips to the field. This way, unnecessary trips are avoided.

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FieldConnex® Advanced Diagnostics reports alarms automatically to the DCS and plant asset management. This includes field-installed components with extra features to handle fault scenarios typical for fieldbus systems. This includes climate monitoring in the control cabinet, water ingress in junction boxes/instrument head, or wear of surge protectors. The alarm information reaches the DCS or maintenance station, traveling in parallel to normal fieldbus communication without requiring a fieldbus address or extra engineering.

FieldConnex® Advanced Diagnostics gives users the certainty that environmental conditions, manual intervention or any other potentially unknown cause will not harm the quality of the installation. This increases the overall availability so that fieldbus can be applied even in safety-critical applications.

Explosion Protection

FieldConnex® can be implemented in any hazardous area (Zones and Divisions) with a large selection of explosion protection concepts. The concepts are designed to meet the needs of modern-day process automation systems for ease of application, system availability, and live maintenance.

To learn more about explosion protection concepts, see the "Application Guideline" in the "Technology" section.

In order to meet the requirements of your plant, both the power supply and device coupler must support the chosen explosion protection concept of your plant. The following aspects have a major impact on choosing the right power supply and device coupler:

- Type of hazardous area
- Preferred explosion protection concept
- Maximum cable length and device count per segment

For a complete selection of FieldConnex® components, see the "Selection Guideline" for PROFIBUS PA.

High reliability and availability of all FieldConnex® system components result from our long-lasting expertise and the quality of our manufacturing. This is possible because of a highly integrated value chain, from product design, to production and quality control through delivery and implementation in your plant.

Enclosure and Cabinet Solutions

Aside from superior power supply components and field installation, Pepperl+Fuchs offers complete solutions built at our factories and ready for installation on site. Pre-engineered fieldbus junction boxes are made from a range of materials and include all components and accessories pre-wired and tested.

Our engineering departments assist with control cabinets built to order. Factory acceptance testing is available at our many facilities around the world. With premium fieldbus components and our value in engineering, we look to reduce your cost and time required on site for installation, testing, and plant startup.

PROFIBUS PA Segment Coupler

FieldConnex® Segment Couplers connect PROFIBUS DP to PROFIBUS PA and provide power to the instruments. They come in two versions: simplex "all-in-one" power supplies and modular Power Hubs with a motherboard as wiring interface. The Segment Coupler consists of a PROFIBUS DP/PA gateway and fieldbus power supplies. The gateway provides a transparent connection between PROFIBUS DP and PROFIBUS PA. Viewed from the PLC, all slaves appear as PROFIBUS DP slaves.

Details on the principle function of transparent coupling and Segment Couplers can be found below and in the "Technology" section.

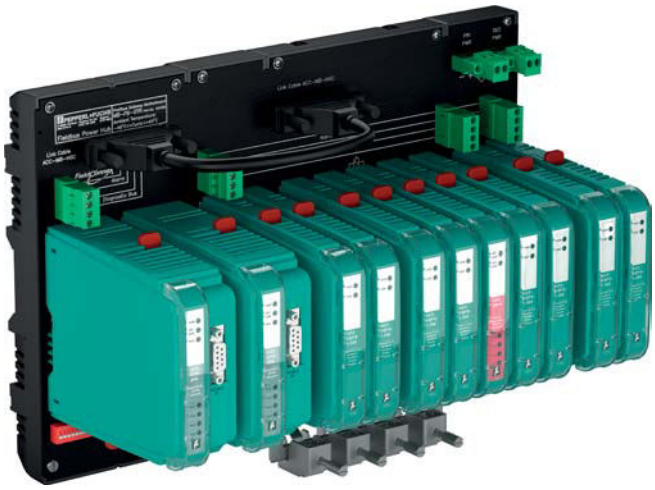

Figure 2 *The FieldConnex® PROFIBUS Power Hub Segment Coupler 3 (SK3) with optional simplex and redundant power supply and gateways. See Figure 2.*

Choices and options of the Power Hub are tailored to specific needs regarding plant availability, wiring, and diagnostics.

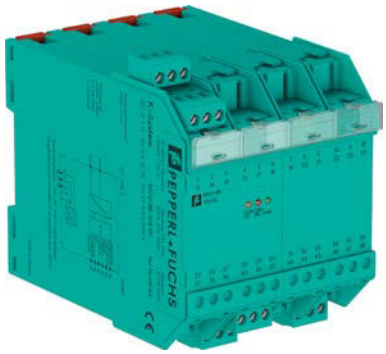

Figure 3 *The Segment Coupler (SK1) is the all-in-one solution and works well in smaller applications and laboratory environments.*

Detailed selection tables are located in the "Selection Guideline".

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Common Attributes

PROFIBUS Power Hub Gateway – Transparent Behavior

The gateway of the Segment Coupler provides a transparent connection so that all PA slaves appear to be connected to the PROFIBUS DP segment. This is true for all aspects of communication: Synchronous data exchange, field device configuration, and status information.

PROFIBUS Power Hub Gateways are equipped with a standard DB9 connector for easy connection to the DP segment.

Each segment comes with its own PA master. This allows for high speed on the PA side, as all segments operate independently and in parallel.

During idle time, the PA master detects the devices connected to it on the PA side. It also detects and sends alerts about abnormal conditions such as duplicate addressing.

When the DP master initiates communication, the gateway reads device data requested by the master and configures itself. It then assumes the communication role of all PA instruments connected to it.

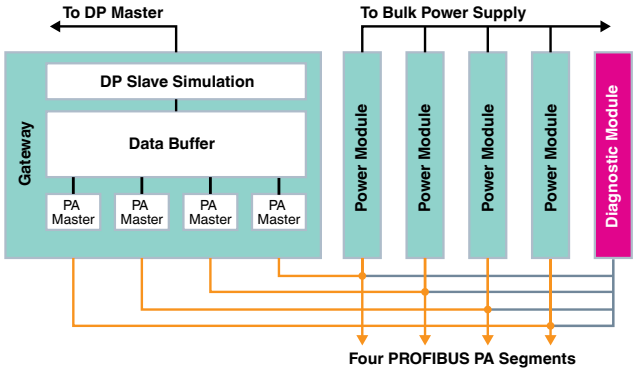

Figure 4 *Schematic diagram of FieldConnex® PROFIBUS Power Hub – each segment is equipped with its own PA master for high communication speed*

In the PLC or DCS system field instruments are configured and operated, based on their native GSD files.

Transparent behavior removes complexity in segment design, engineering, operation and maintenance – and the Segment Coupler remains configuration-free.

Heat Dissipation

FieldConnex® power supplies are designed for low heat dissipation. This contributes to a longer service life and, more importantly, to reduced heat dissipation, enabling a higher packing density in the control room cabinet. In most cases, heat dissipation rather than the actual cabinet floor space is the limiting factor in cabinet detail engineering.

The actual heat dissipation depends on layout and load conditions. To assist the decision-making process, selection tables indicate low heat dissipation as follows '-', '--', '---' where '---' stands for the lowest heat dissipation and the best performance.

DIN Rail Installation

All power supplies mount firmly on the DIN rail for easy installation in the cabinet.

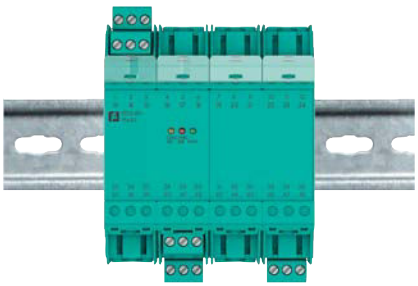

Figure 5 *Segment Coupler mounted on DIN rail.*

Figure 6 *DIN rail installation is standard for all FieldConnex® Segment Couplers.*

Supply and Conditioner

A selection of output voltages allows for designs for general purpose areas and hazardous areas. Additionally, fieldbus power is available in two forms:

1. Power Supply Modules provide galvanic isolation, impedance matching, and a choice of controlled output voltages.
2. Galvanic isolation provides many long-term benefits for communication stability and plant availability.

Where device couplers without galvanic isolation are applied, galvanic isolation of the power supply increases overall availability because communication behaves much more robustly towards unwanted conditions such as ground faults. Therefore, we recommend power supplies with galvanic isolation as state-of-the-art.

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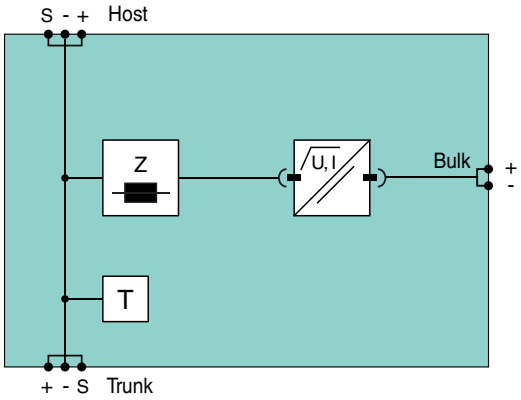

Figure 7 *Schematic diagram of fieldbus power supply. Galvanic isolation and controlled voltage output detail of MBHD-FB1-4**

Power Conditioner Modules provide impedance matching and short circuit limitation. The output voltage closely follows the bulk power voltage. Power Conditioners do not have galvanic isolation. They contain fewer electronic components and because of that have low heat dissipation. However, in modern-day plants, galvanic isolation is specified. Power Conditioners are purchased mostly as replacement.

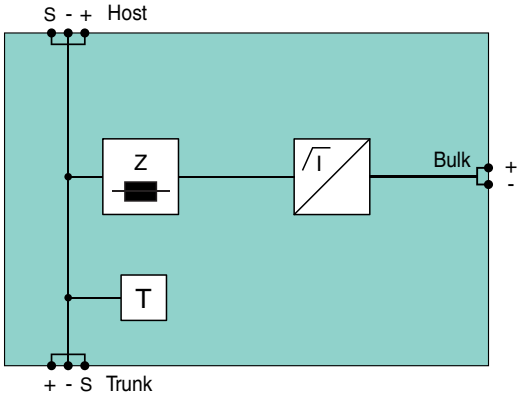

Figure 8 *Schematic diagram of fieldbus Power Conditioner: Without galvanic isolation, follows the bulk power voltage*

Applications for general purpose and safe areas with descriptions of explosion protection concepts are located in the "Application Guideline" of the "Technology" section.

Passive Impedance Matching

All FieldConnex® power supplies and Power Hubs feature passive impedance matching circuits. Passive components have a significantly lower heat dissipation compared to circuits using a series transistor.

Passive impedance matching is the only way to provide a perfectly balanced design. This contributes to a higher tolerance regarding grounding faults or module failures in redundant power supplies. A longer service life is guaranteed by using only resistors and inductances.

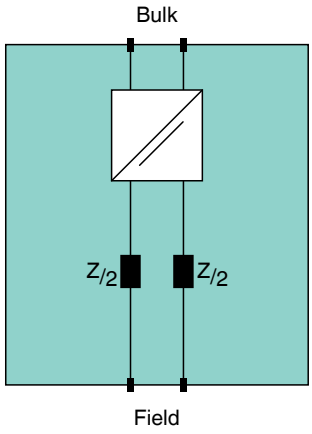

Figure 9 *Impedance matching with purely passive design*

For many of our products, we manufacture even the inductances. Thus we keep control over the quality of our manufacturing, components, and our circuit design.

Impedance Matching with CREST

Crosstalk and Resonance Suppression Technology (CREST) offers the best signal quality. In addition to the impedance matching circuits, filters ensure optimum signal quality. CREST provides additional impedance between segments in the case of ground faults on one or more segments, protecting the signal waveform from distortions.

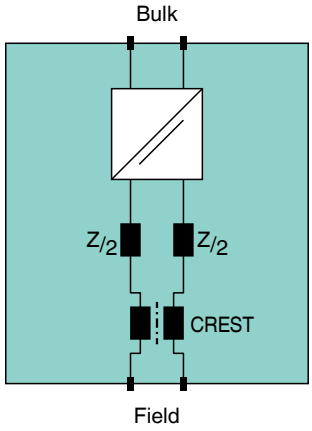

Figure 10 *CREST cancels noise and other disturbances through current compensated inductances.*

For a complete discussion of impedance matching and CREST, see the "Technology" section.

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Power Hub – Segment Coupler 3

The FieldConnex® PROFIBUS Power Hub is a modular fieldbus power supply. It is comprised of a motherboard that serves as a wiring interface and plug-in modules for the power supply and diagnostics. In order to meet the different demands regarding options, economics, and availability, we offer three different versions as described below. The following attributes characterize the PROFIBUS Power Hub:

Redundancy

Power Supply Modules hold all electronic components. For high availability, motherboards can host two Power Supply Modules per segment acting as redundant pairs. This enables:

- High segment availability
- Low number and cost of spares
- Low replacement cost through modularity

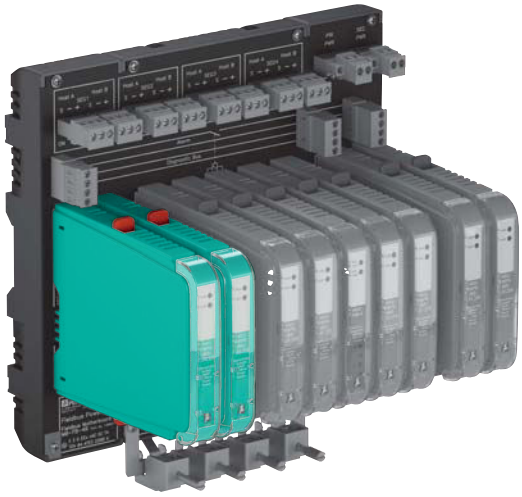

Figure 11 Each module feeds one segment. Two modules serve as redundancy pairs.

The connection to bulk power is redundant.

Figure 12 Redundant host connections (selected Power Hubs)

Module Mounting without Tools

All plug-in modules lock securely onto the motherboard via Quick Lok Bars. Installation and replacement of modules is fast and easy without tools.

FieldConnex® Power Hubs provide a socket for the Advanced Diagnostic Module (ADM) for four segments each.

Figure 13 Installation of power and diagnostic modules works without tools

Passive Motherboard

The motherboard is the wiring interface installed in the control room cabinet. It consists of passive components only for a long, uninterrupted service life. The impedance matching circuits are located in the motherboard.

Compared to electronic versions located in the power module, the impedance is always properly matched. This contributes to good signal quality and better communication reliability.

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Grounding Rail and Connectors with Retaining Screws

The motherboard can be fitted with a grounding rail for convenient and secure grounding of the cable shield. Typically, the shield is grounded centrally in the control room. Any type of grounding and shielding concept can be implemented.

Selected models feature plug-in connectors with retaining screws. The connection is long-lived and is designed to endure constant vibrations.

The fieldbus infrastructure does not require a SIL rating because the entire communication channel is already certified and approved for SIL 3 through the fieldbus protocol.

For a detailed discussion, see the "Technology" section.

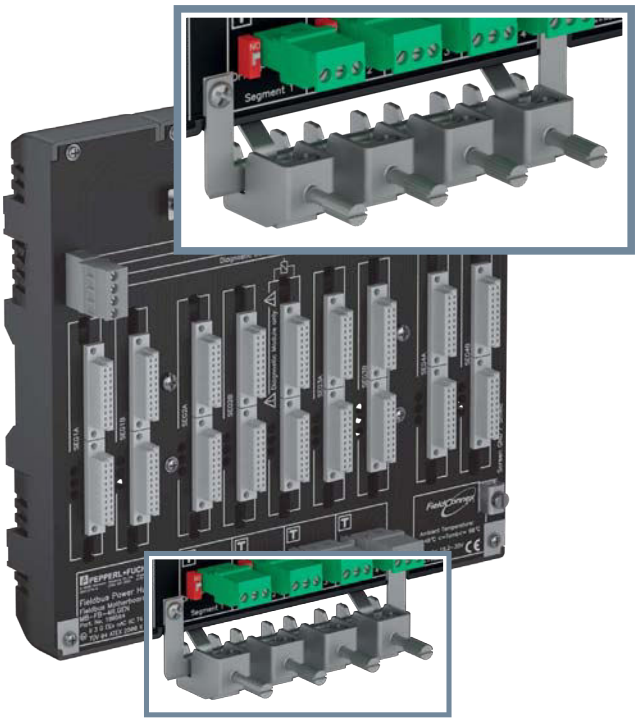

Figure 14 *Grounding rail installed on the motherboard. This simplifies installation and is one of the most popular options.*

Segment Coupler (SK1)

The Segment Coupler SK1 is an all-in-one simplex power supply and DP gateway. It provides power to one segment and connections to a DP master via terminals. The SK1 comes with an integrated terminator and can be powered via Power Rail. It is configuration-free and preferably applied in smaller applications or laboratory setups. The transmission speed on the DP side is constant 93.75 kBit/s.

Versions are available with high output for general purpose areas and the High-Power Trunk Concept, and with intrinsically safe outputs for a completely intrinsically safe installation according to FISCO or Entity explosion protection concepts.

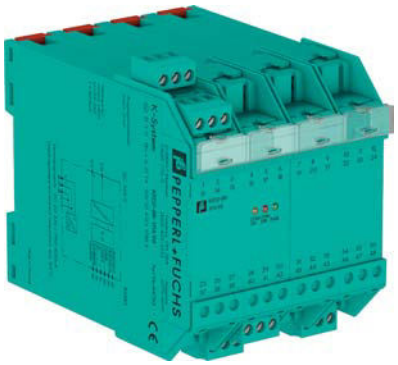

Figure 15 *Segment Coupler SK1: a compact single unit*

Current versions are only 20 mm wide and can be fitted on the DIN rail without requiring spacing for cooling purposes.

Type Codes	Types	Width (mm)	CREST	Terminators: Selectable/Fixed
KFD2-BR-Ex1.3PA.93	Supply			
KFD2-BR-1.PA.93	Supply			

Table 1 *Comparison of main attributes for Segment Coupler SK1*

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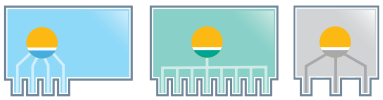
Installation and Distribution



Fieldbus installation components, in general referred to as device couplers, are wiring interfaces with an enclosure that can be fitted for different demands of degree of protection and mechanical methods of explosion protection.

FieldConnex® device couplers combined with FieldConnex® power supplies provide protection methods that meet the demands of general purpose and all explosion hazardous areas. They come in three basic types:

- **FieldBarrier:** Comprises short circuit current limitation, galvanic isolation, and intrinsically safe power limitation at the spur. For hazardous area Zone 1 and Div. 2 with instruments in Zone 0 ... 1 and Div. 1 … 2.
  The FieldBarrier is an innovation by Pepperl+Fuchs that has become a de facto standard for hazardous area applications requiring long cable lengths and high device counts. The FieldConnex® FieldBarrier has paved the way for fieldbus in process automation and has a very large installation base in the market.
- **Segment Protector:** With short circuit current limitation. The recommended and economical choice for installations in general purpose and hazardous areas Zone 1 … 2 and Div. 2.
- **Junction Box:** Simple, without short circuit current limitation. Is used when live access to a device is not critical, mainly for general-purpose applications or with intrinsically safe power supplies. Associated apparatus for hazardous areas Zone 1 … 2 and Div. 2.

Short circuit current limitation

Short circuit current limitation for each spur protects the segment from faults at a spur. In case of a short circuit condition, the segment remains in operation as the device coupler limits the current. We strongly recommend applying device couplers with short circuit current limitation.

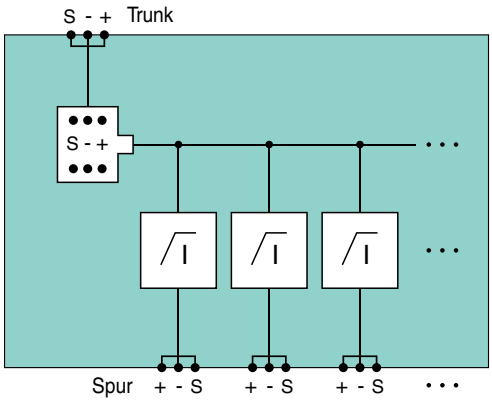


Figure 16 *Short circuit current limitation at the spur enables live work on a field instrument while protecting the remainder of the segment.*

FieldBarrier

Originally an innovation by Pepperl+Fuchs, the FieldConnex® FieldBarrier with galvanic isolation revolutionized the fieldbus industry. It is the fundamental building block of the High-Power Trunk Concept which is a de facto standard today allowing for long cable lengths and high device counts.

Typical Features

FieldBarriers comprise the following features:

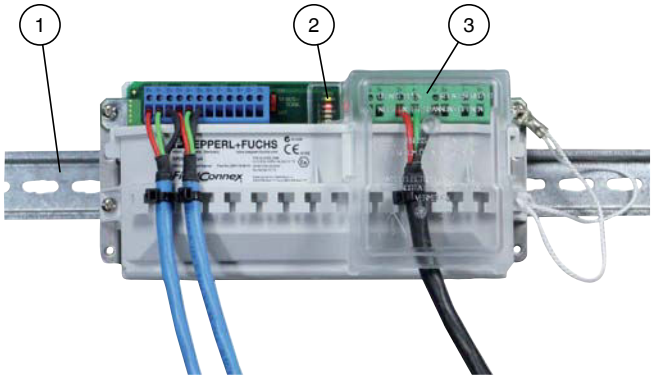


Figure 17 *FieldBarrier on a DIN rail.*

1. DIN rail installation: FieldBarriers are DIN rail mountable, typically without requiring tools.
2. LED indicators: LEDs provide indication for power and short circuit condition per spur. This supports installation and troubleshooting, and simplifies fault recognition.
3. Bus powering: The FieldBarrier draws the power required for indicators, power limitation, and short circuit current limitation from the fieldbus itself.

For a detailed discussion of explosion protection plans using FieldBarriers, see the "Application Guideline" in the "Technology" section.

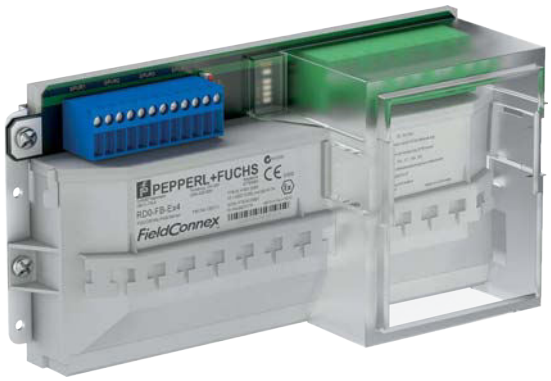


Figure 18 *FieldBarrier: The additional translucent cover prevents an unintended disconnection of the trunk. Spurs are intrinsically safe.*

The FieldBarrier acts as an intrinsically safe barrier between trunk and spurs with galvanic isolation. An important safety feature is the IP30 cover for the trunk connectors that protects against unintended opening of the trunk circuits.

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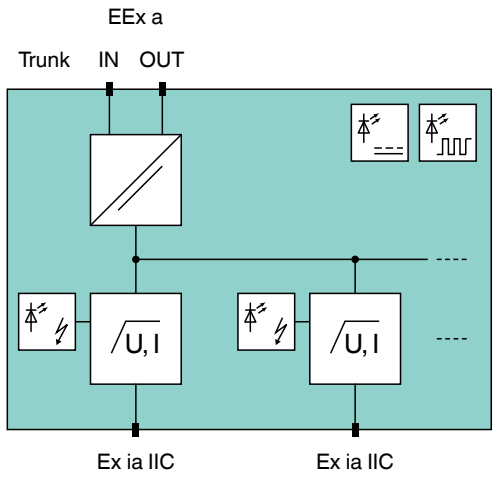

Figure 19 *FieldConnex® FieldBarrier: Galvanic isolation between trunk and spurs, short circuit limitation, and intrinsically safe explosion protection at each spur.*

The majority of devices installed in the hazardous area Zone 0/Class I, Div. 1 are connected to the fieldbus via a FieldConnex® FieldBarrier.

For enclosures with a degree of protection up to IP66 or equivalent Enclosure Type Rating, see "Fieldbus Junction Box Housing Solutions" in this section.

Segment Protectors

Segment Protectors are available for different applications. Their common attributes are short circuit current limitation and LED indicators.

Typical Features

Segment Protectors comprise the following features:

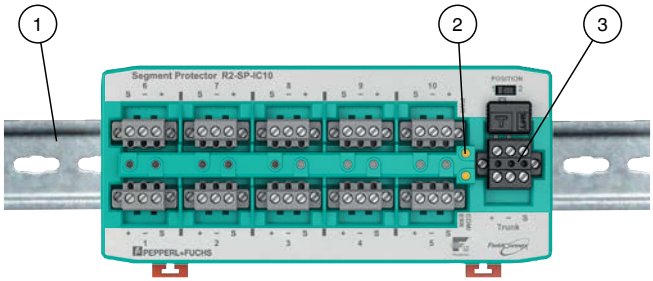

Figure 20 *Segment Protector on a DIN rail. Number of spurs can be selected from 4 ... 12.*

1. DIN rail installation: Segment Protectors are DIN rail mountable, typically without requiring tools.
2. LED indicators: LEDs provide indication for power, communication, and short circuit condition per spur. This supports installation and troubleshooting, and simplifies fault recognition.
3. Bus powering: The Segment Protector draws the power required for indicators, power limitation, and short circuit current limitation from the fieldbus itself.

R2-SP-N*:

Standard solution for the application in general purpose and Zone 2/Div. 2 areas. Supports latest standard for intrinsic safety 'Ex ic'. Comes with a choice 4 … 12 outputs.

R2-SP-IC*:

Segment Protector with progressive short circuit current limitation. It detects faults typical for fieldbus installations, such as contact bounce. It detects these faults and sends an alarm via Advanced Diagnostics to the maintenance station indicating the affected spur.

RM-SP*:

Modular solution for equipment in confined space such as skid-mounted applications. Also for Zone 2/Div. 2. Trunk module with two spurs can be expanded with modules of four spurs each.

R-SP-E12:

For explosion-proof/flameproof enclosure protection in Zone 1/Div. 2.

R3-SP-IBD12:

The DART version for Zone 1 with trunk and spurs intrinsically safe Ex ib IIC.

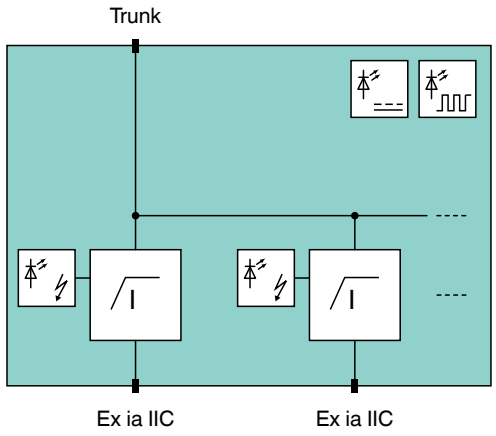

Figure 21 *FieldConnex® Segment Protector: Short circuit limitation and intrinsically safe explosion protection at each spur.*

For more details on DART Fieldbus, see "DART Fieldbus Components" as well as the "Application Guideline" in the "Technology" section, and the "Selection Guideline" for PROFIBUS PA.

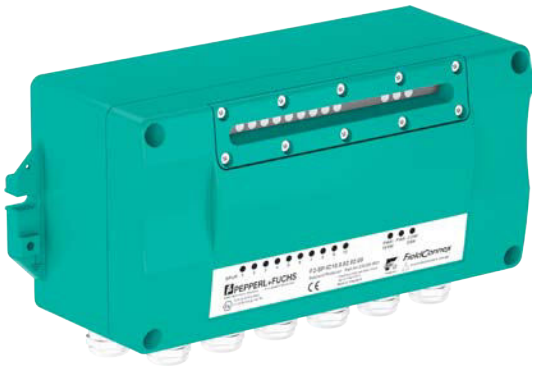

Figure 22 *Segment Protector in aluminum housing with LEDs visible from the outside*

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Receptacles for Test Connectors

Most Segment Protectors have a choice of trunk and spur connectors fitted with plugs or spring clamp terminal connections. More recent Segment Protectors feature removable terminals with retaining screws and test plug sockets.

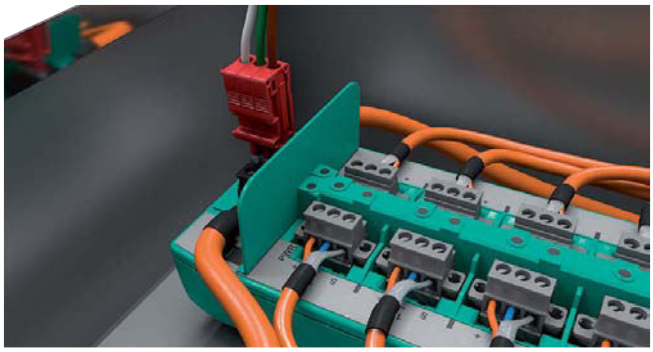

Figure 23 *R2 Segment Protector: LED indicators, short circuit current limitation at each spur, removable terminals with retaining screws, and sockets for test plugs.*

Trunk with T-Connector

Segment Protectors as of version R2-SP-N* feature a T-connector on the trunk line delivered with a terminator already in place. This is a simple, yet intuitive and reliable way of ensuring proper termination:

- When installed, the T-connector is attached to the trunk cable. The terminator is in place.
- When looping to the next Segment Protector in the same or another enclosure, the terminator has to be removed. The terminator on the next T-connector is already installed.

Even the Segment Protector itself can be exchanged without interfering with communication on the trunk.

Type	T-connector	Spring-Clamp Terminals	Plug-in Terminals	Plug-in Terminals with Retaining Screws	Explosion Protection	Installation in	Devices in
R2-SP-N*	X			X	Ex ic Ex nL	Zone 2 Div. 2	Zone 2 Div. 2
					Ex d	Zone 2	Zone 1
R2-SP-IC	X			X	Ex nAc	Zone 2 Div. 2	Zone 1 Div. 1
RM-SP*			X		Ex nL	Zone 2 Div. 2	Zone 2 Div. 2
R-SP-E12		X			Ex d	Zone 1	Zone 1
R3-SP-IBD12	X			X	Ex ib	Zone 1	Zone 1

Table 2 *Attributes and selection criteria of Segment Protectors*

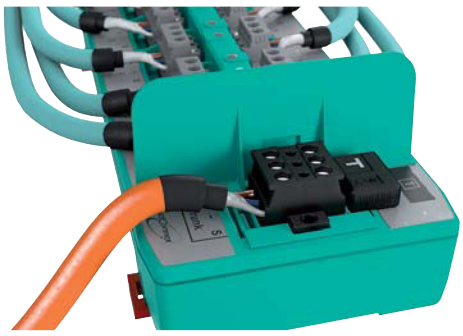

Figure 24 *The T-connector designed by Pepperl+Fuchs allows for easy and fault-free installation.*

With its innovative design, the R2-SP-N* Segment Protector series is the result of more than a decade's experience of using fieldbus technology for superior availability.

For enclosures with a degree of protection up to IP66 or equivalent Enclosure Type Rating, see "Fieldbus Junction Box Housing Solutions" in this section.

Junction Box

Simple junction boxes are used for connections in fieldbus installations where manual intervention is typically only required offline, e.g., while the plant is set into service mode.

Figure 25 *Simple junction box with IP67 for general purpose and intrinsically safe installation.*

FieldConnex® junction boxes F2-JB-* come with our declaration as associated apparatus for hazardous area Zone 1 (Div. 2). They can be operated together with intrinsically safe fieldbus power supplies.

Please see description of aluminum housings for more information.

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Fieldbus Junction Box Housing Solutions

Our wide range of FieldConnex® Fieldbus Junction Boxes are manufactured in-house to guarantee superior consistency and quality. Pre-engineered products are very popular due to the many choices and options. They accommodate practically all requirements from the process industry. The FieldConnex® Fieldbus Junction Boxes are pre-wired and host device couplers and accessories. They are ready to install on site, reducing installation cost and time.

For hazardous areas, the Fieldbus Junction Box comes with a certificate for Zones 1/2/21/22 and Class I, Div. 2.

For special requirements, our engineering department is prepared to build custom-tailored solutions according to your needs.

Stainless Steel

Our stainless steel enclosures are the sturdiest and most impact-resistant on the market today. They are an ideal choice for environments requiring frequent washing of the equipment. They offer fully watertight seals and are the perfect choice for highly corrosive areas where standard enclosures would not remain tight. Stainless steel enclosures are available with degree of protection rating IP67 and Type 6.

Figure 26 *Stainless steel enclosure with three FieldBarriers, a terminator, and pre-wired trunk connections.*

Polyester

Glass fiber reinforced polyester (GRP) Fieldbus Junction Boxes are the perfect choice where low weight or costs are required. They represent an ideal solution for most installations that require a degree of protection rating of up to IP66 and Type 4X.

Figure 27 *GRP enclosure with a pre-installed R2 Segment Protector*

Aluminum

The FieldConnex® F2* Fieldbus Junction Boxes are very compact, lightweight, and sturdy. For non-corrosive environments, aluminum enclosures are an even more economical choice. They are the best match for most installations that require degree of protection ratings IP67 and Type 4X.

Figure 28 *Very space-saving: FieldBarrier in an aluminum enclosure.*

See the respective datasheets for complete choices of cable glands and options available.

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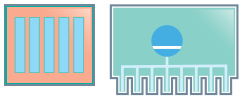
DART Fieldbus Components



FieldConnex® DART Fieldbus implements the intrinsically safe High-Power Trunk Concept. It provides the power to drive long segments and supplies a high number of field instruments. At the same time, the trunk remains intrinsically safe. DART Fieldbus consists of DART Power Hubs and DART Segment Protectors.

For a complete description of DART technology and operation, see the "Technology" section.

Components for DART Fieldbus are certified Ex ib IIC allowing installation in Zone 1 and gas group IIC. The Segment Coupler can reside in Zone 2.

The DART Power Hub is based on the FieldConnex® High-density Power Hub. It provides power to the segment and features connections to the control system. Due to the DART technology, the Power Hub detects a spark before it occurs and switches it off.

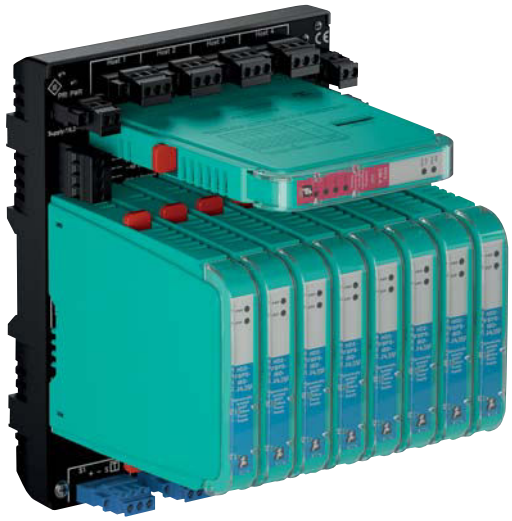


Figure 29 *DART Power Hub for PROFIBUS PA: redundant Power Supply Modules and intrinsically safe energy limitation.*

The DART Segment Protector (type R3-SP*) has a similar design as the R2-SP* Segment Protector and provides the same features.

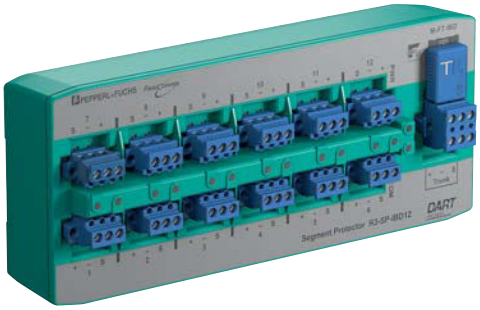


Figure 30 *DART Segment Protector –Short circuit protection and Zone 1 certified terminator.*

The segment retains its intrinsically safe rating when equipment is connected that is intrinsically safe (Ex ia), e.g., measurement tools. However, for DART to operate properly, only components listed in the certificate are permitted on the trunk.

Advanced Diagnostics

The fieldbus physical layer becomes a proactively manageable asset with the Advanced Diagnostic Module (ADM). The ADM automates commissioning and documentation, monitors the segment online, and identifies even gradually occurring faults in real time.

Advanced Diagnostics is designed to support three practical tasks or use cases: commissioning, monitoring, and troubleshooting.

Three use cases for Advanced Diagnostics are described in the "Technology" section.

Modules and Hardware

The FieldConnex® Advanced Diagnostic Module (ADM) for the FieldConnex® Power Hub system provides real-time monitoring and local data storage of physical layer values for up to four segments. It automatically triggers alarm messages and communicates with the operator and maintenance station, enabling access for commissioning, monitoring, and troubleshooting.

Passive input circuits leave the physical layer unchanged, providing true, exact measurements. The ADM detects gradual or sudden changes and helps trace even intermittent malfunctions. It can be configured to monitor each segment closely.

Three versions are available for different types of applications and use cases:

Figure 31 *Stationary ADM (HD2-DM-*) plugs into the FieldConnex® Power Hub. It monitors up to four segments online and in real time.*

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Advanced Diagnostic Module

The Advanced Diagnostic Module plugs into the FieldConnex® Power Hub. Full measurement capabilities for four segments make this module the best choice for providing highest plant availability and the lowest commissioning and maintenance costs.

Advanced Diagnostic Module with Relay Output

Advanced Diagnostic Module with relay output only. Working without a software interface, physical layer monitoring starts by plugging in the module without any extra engineering. Optionally, the user can set warning thresholds via DIP switches. The module reports unwanted conditions via voltage-free contact. In combination with the mobile ADM, this is an economical tool for commissioning and troubleshooting.

Basic Diagnostic Module

The Basic Diagnostic Module monitors the fieldbus Power Hub health status only and issues warnings via a voltage-free contact.

Additional options and applications are the stand-alone motherboard and the mobile version of the ADM:

Figure 32 Stationary ADM on stand-alone motherboard for retrofitting any segment.

Stand-alone Advanced Diagnostics

In combination with a stand-alone motherboard, the HD2-DM-A provides full function diagnostics. It can be wired to any segment in parallel to the existing power supply and includes remote software support via the Diagnostic Manager. This is the ultimate choice for retrofitting any existing fieldbus installation.

Figure 33 Mobile ADM DM-AM-KIT for the traveling fieldbus professional.

Mobile Advanced Diagnostic Module

The mobile ADM is made for the traveling fieldbus practitioners. This full-fledged tool supports all working procedures throughout the complete lifecycle of a segment. Featuring a USB connection for power and communication with any laptop, the mobile ADM is intended for work in the field. Connected to any 24 V power supply, it can even be left unattended while monitoring a troubled segment.

Integration into plant asset management or engineering stations can be accomplished in either of the following ways:

1. Integration via PROFIBUS DP: PROFIBUS Power Hub gateways can access the Advanced Diagnostic Module. The communication packages for the gateway and ADM include all drivers for easy setup with self-configuration. This is a very effective integration without requiring additional hardware.
2. Integration via Ethernet: An additional gateway provides full access to up to 62 stationary ADMs. It connects all ADMs to higher-level controls through Ethernet. Inside the control cabinet, a simple bus provides the bandwidth for physical layer diagnostic information. Thus, the bandwidth of the fieldbus itself remains untouched. This method is used when applying the Advanced Diagnostic Module to networks with Segment Coupler 2 (SK2) or without FieldConnex® power supplies.

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Figure 34 PROFIBUS Power Hub Gateway KT-MB-GT2AD to fieldbus diagnostic information

Optional inputs and outputs for analog and digital measurements and two high-power control outputs are designed for cabinet control. Even a humidity sensor is on board. The gateway can be configured as a local controller activating heaters, fans, or air-conditioning. Door contacts allow for alarming unauthorized access.

For a brief description of DCS integration, see below and the manual for full details.

Diagnostic Manager Software

The Diagnostic Manager, Professional Edition is the software program that displays the data of the ADM and runs the functions that make working with fieldbus quick and easy. The Diagnostic Manager automatically detects the diagnostic gateways and all Advanced Diagnostic Modules. The system is set up in minutes.

The Diagnostic Manager communicates simultaneously with all diagnostic modules. It runs on a PC in the safety of the control room. Multiple PCs running the Diagnostic Manager can access diagnostic information simultaneously, enabling a flexible distributed architecture.

Embedded in the Diagnostic Manager software is an expert system. This system learns and interprets the electrical values and behavior of each segment. A commissioning wizard documents a complete segment with only a few mouse clicks.

For fieldbus experts: The integrated oscilloscope triggers fieldbus-related events and stores up to ten consecutive shots. Working with fieldbus has never been easier.

A basic edition is available for free in the download section of www.pepperl-fuchs.com. It provides immediate access for reading and monitoring the physical layer for up to three ADMs simultaneously.

See the manual for full details on the Diagnostic Manager.

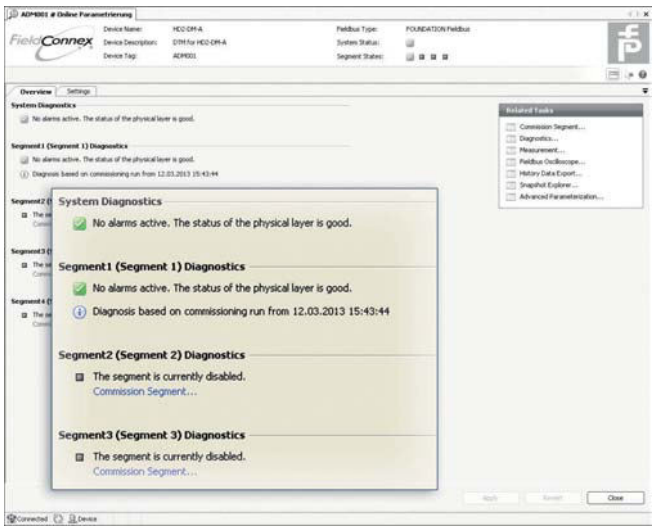

Figure 35 Summary views highlight enqueued tasks and issues with the fieldbus layer. They are easy to understand even for the installation and instrument professional with little fieldbus experience.

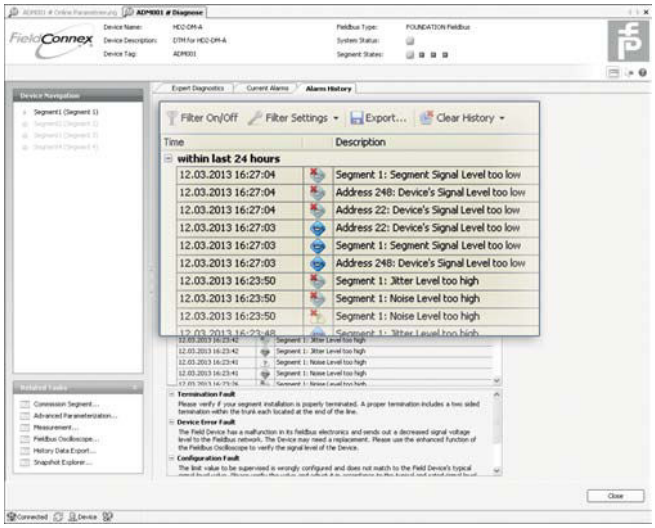

Figure 36 Alarm lists with time stamps and plain text messages provide insight into actual faults.

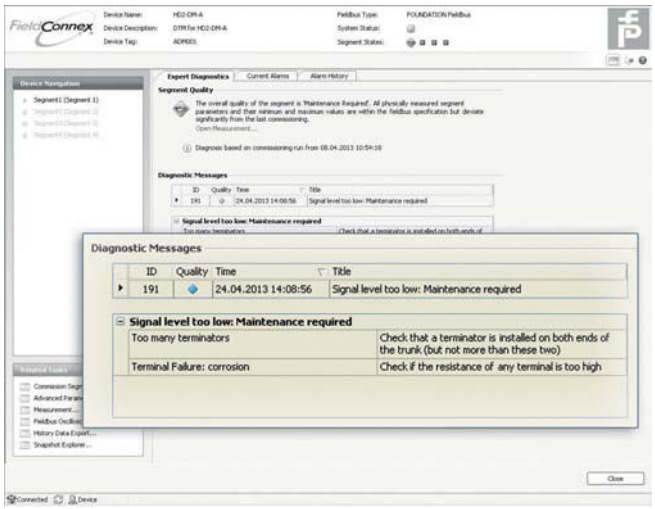

Figure 37 Clearly visible indicators guide the user. The expert system provides interpretation in easy-to-understand text.

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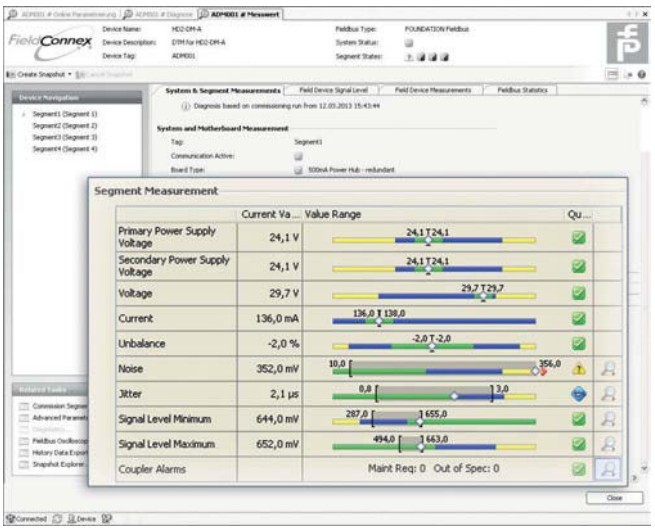

Figure 38 *Live monitoring with clearly delineated boundaries shows the physical layer health per segment and per instrument.*

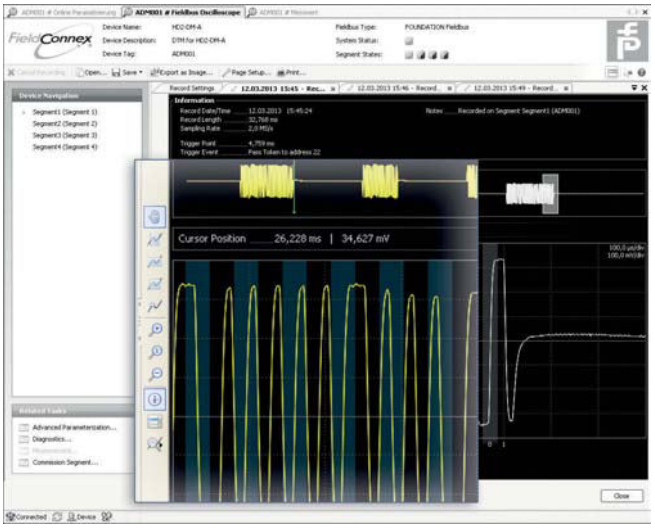

Figure 39 *A fieldbus oscilloscope shows the signal as it is. This often helps the fieldbus expert to draw additional conclusions.*

The Diagnostic Bus

With Segment Coupler 3 the easiest integration is via PROFIBUS DP and direct access through Segment Coupler 3. The diagnostic bus is internally wired connecting the Advanced Diagnostic Module directly to the PROFIBUS DP Gateway. See Figure 40. For all other power supplies or linking devices the diagnostic bus and Diagnostic Gateway is the proper choice.

FieldConnex® Advanced Diagnostics is equipped with a dedicated diagnostic bus. It provides the bandwidth for data transmission from the ADMs to the maintenance and operator station, without compromising the bandwidth of the respective segment. The diagnostic bus is the major prerequisite for any Advanced Diagnostics with value-added tools such as:

- Commissioning wizard
- Expert system
- Fieldbus oscilloscope
- Historian

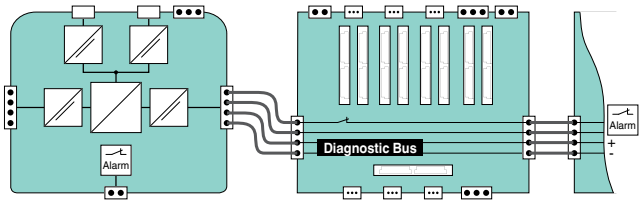

Figure 40 *A dedicated, automatically configured diagnostic bus takes care of transmitting data to and from the ADMs.*

In retrofit installations for any power supply or DP/PA coupler each cabinet is fitted with a diagnostic gateway (KT-MB-GT2AD*) that can connect two diagnostic busses and alarm lines for the voltage-free common alarm contact. From here, it is connected to the existing Ethernet backbone.

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Process Interfaces

The FieldConnex® process interface integrates simple conventional inputs and outputs into the DCS via fieldbus communication. On the fieldbus side, it acts as a transmitter. The output connections provide power for low-power valves and digital sensors with no additional wiring required. Multiple I/Os are connected to the DCS via one fieldbus address. Types of sensors include:

- Proximity switches
- On/off low-power valves
- Digital inputs

The process interface can be installed close to the sensors in Zone 1. The sensors themselves can be located in Zone 0. Integration into the DCS is automated via standard EDDL or FDT/DTM technology. This is a simple and standardized way to keep engineering costs to a minimum. Using process interfaces is a cost-effective solution to bring simple I/O signals into the DCS.

Choices of housing materials and types and custom built cabinets enable an optimum application within the topology of your plant.

Valve Coupler

The valve coupler connects up to four low-power solenoid valves and positioning sensors to the DCS via a single fieldbus address. A detailed list of compatible valves can be found online on the respective datasheets. The valve coupler allows for remote operation of the valve and monitoring with two end-position sensors.

In addition, the valve coupler provides the following functions:

- Measuring and storing actual values for break-away and runtime per valve
- Storing maximum and minimum values
- Conducting partial stroke tests in either valve position

It generates alarm messages for preset limit values, lead breakage, or short circuits on the cable. Information is immediately accessible and allows for proactive user intervention to avoid unwanted conditions such as stuck valves.

The valve coupler is certified as intrinsically safe for installation in Zone 1. Inputs and outputs can be located in Zone 0.

The two end position sensors per valve can be accessed via one cable. The respective inputs of the valve coupler can be used as an eight-channel DI block.

Selection Table

Type Code	Function	Inputs	Outputs	Terminals	Degree of protection	Installation in	I/O in
FD0-VC-Ex4.PA	Valve Coupler	8 DI	4 DO		IP65	Zone 1	Zone 0
FD0-BI-EX12.PA	Sensor Interface	12 DI	4 DO		IP65	Zone 1	Zone 0
F.VC0.P21.A04.*.*.***.***.*000	Valve Coupler Junction Box	8 DI	4 DO		IP66, NEMA 4X	Zone 1, Zone 21	Zone 0
F.VC0.S20.A04.*.*.***.***.*000	Valve Coupler Junction Box	8 DI	4 DO		IP66, NEMA 4X	Zone 1, Zone 21	Zone 0

Table 6 Type code selection table for process interfaces

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Pre-configured solutions such as the FieldConnex® pneumatic interface combine multiple valve couplers, solenoid and amplifier valves, and a FieldBarrier in one convenient and easy-to-install housing. The pneumatic interface controls up to 32 valves via one fieldbus cable and pressurized air. Contact your Pepperl+Fuchs representative for details.

Figure 41 *FieldConnex® process interfaces: Connect simple digital and analog I/O to the DCS via fieldbus.*

Sensor Interface

For the transmission of the status from up to 12 electrical contacts or intrinsically safe NAMUR sensors, the Sensor Interface is a solution with a very small foot print. The unit takes power from the segment and provides all information on one fieldbus address. It is certified intrinsically safe for installation in Zone 1.

Accessories

Accessories for FieldConnex® are terminators and surge protectors. They are available in two basic forms: IP20-proof DIN-rail-mountable and in an IP67-proof sturdy stainless steel housing.

Other products such as power supplies come with their own set of accessories (grounding rail, connector cables, …). For more information on these products, refer to the respective data sheets at www.pepperl-fuchs.com.

Diagnostic-Enabled Accessories

Diagnostic-enabled accessories such as selected surge protectors and enclosure leakage sensors communicate alarm information to the DCS. Depending on their mounting position, diagnostic-enabled accessories can communicate with the affected spur, field device, or device coupler.

Data is transmitted to the DCS in parallel to regular fieldbus communication utilizing the existing Advanced Diagnostics infrastructure. The accessories do not require a fieldbus address. Implementation is plug-and-play and additional engineering or planning is not required.

Surge Protectors

FieldConnex® surge protection modules protect field instruments, control systems, and the fieldbus infrastructure from damage through overvoltage and power surges. Possible causes for power surges are: lightning strikes, surges, or cross-talk from power cables. The surge protector drains the power surge to the earth potential. The surge protector consists of multiple gas discharge tubes (GDT) and is connected to the fieldbus lead, optionally with a shield and earth potential. During normal operation, the GDT constitutes an open circuit. In case of a power surge, the GDT short circuits briefly, eliminating the power surge to earth potential.

Terminal Mounting

These surge protectors fit on Power Hubs and device couplers. They sense the impact of each lightning strike. The surge protectors indicate need for replacement via Advanced Diagnostics, superseding the demand for recurring manual inspection. This feature is available with no engineering required. Retrofit on existing installations is possible without the diagnostics option.

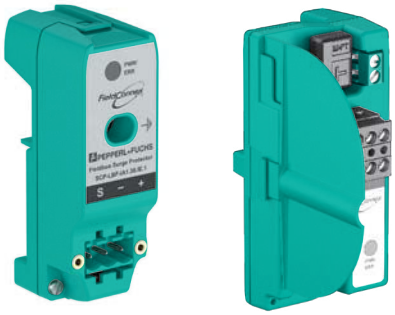

Figure 42 *Surge protectors for trunk and spur. Hook on Power Hub or Segment Protector without extra wiring.*

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Self Diagnostics for Surge Protector

Selected surge protectors monitor count and severity of overvoltage spikes endured over their lifetime. The results are then transmitted via Advanced Diagnostics to the maintenance station.

Replacement takes place only once the surge protector is worn out. This saves on replacement costs and otherwise necessary manual checks.

DIN Rail Mounting

FieldConnex® surge protectors enable the coordinated use in an EMC-oriented Lightning Protection Zones Concept in accordance with IEC 61312-1. They are in accordance with the fieldbus standard IEC 61158- 2 and are certified as intrinsically safe according to IEC 60079-11 including DART Fieldbus.

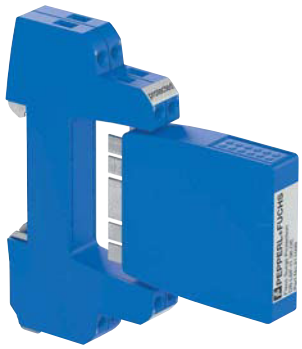

Figure 43 Surge protector for cabinet installation with click-to-latch plug-in design.

The surge protector for cabinet installation consists of a base and a plug-in unit. The base module is mounted on the DIN rail. It holds the plug-in module via an easy-to-operate locking mechanism. Firm contact increases the reliability of the unit and increases plant up-time. The base module comes in two versions, differing in the behavior upon removal of the plug-in module. Either the segment remains connected or it is disconnected.

The plug-in module contains the gas discharge tubes, and is available in two versions for different types of shielding and grounding:

1. Shield tied directly to earth. This module is applied where the central grounding point is located, typically in the cabinet. The module serves as the central grounding point for the segment. It is used in the field where multi-point grounding is applied.
2. Shield tied to earth via gas discharge tube (GDT). This version is used for field installation, where the shield has no direct connection to local earth. (that is, the shield is floating or capacitive grounding is used).

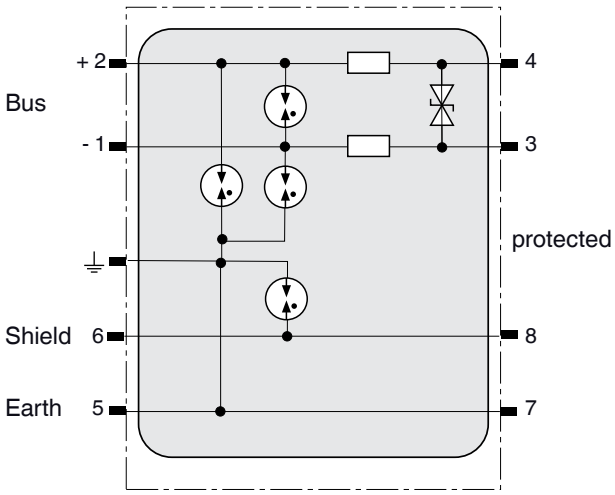

Figure 44 Typical schematic view of a surge protector with gas discharge tubes between +, -, shield, and earth.

The fieldbus planner decides which module fits the installation and maintenance requirements of the customer site best in each case.

Terminator

A fieldbus terminator is an electronic component with two basic functions:

1. It provides the impedance to suppress signal reflections.
2. It translates data signals that are transmitted as current change into a detectable voltage change as specified in the fieldbus standard IEC 61158-2.

One terminator is required at each end of the fieldbus trunk. FieldConnex® power supplies and device couplers carry integrated fieldbus terminators. If required, a separate "external" terminator can help to provide visibility to the installation and maintenance team, thus reducing the potential for human error.

Please see the description of Manchester bus-powered encoding in the "Technology" section for a thorough description.

FieldConnex® terminators feature a high-availability design by means of a resistor and multiple capacitors. Only a minor change in impedance results from the failure of a capacitor, leaving the basic function intact. This change in impedance is detected through online monitoring with the Advanced Diagnostic Module, allowing for corrective action before plant performance is jeopardized.

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Sturdy Housings for Terminators or Surge Protectors

For field installation, stainless steel housings with IP67 degree of protection feature a choice of threads.

FieldConnex® includes devices in sturdy IP67 housings designed for installation of terminators or surge protectors in hazardous areas. These units come with a choice of threads and offer explosion protection.

Figure 45 *Terminator or surge protector for field installation – the threading can be chosen.*

Enclosure Leakage Sensor

Small amounts of water or liquid chemicals can be damaging to fieldbus installation materials such as connectors and electronic components. The enclosure leakage sensor detects water ingress and signals the affected spur. Users get a water indicator inside an enclosure directly and without additional engineering – all included with Advanced Diagnostics.

The alarm information reaches the DCS or maintenance station, traveling in parallel to normal fieldbus communication without requiring a fieldbus address. Engineering is all done with the purchase of the component and installing it in parallel to the segment. Getting control of installation issues should always be this simple.

Figure 46 *Enclosure Leakage Sensor – small enough to fit into an instrument head.*

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Selection Tables

Surge Protectors	Explosion Protection	Connection Shield to Earth	Housing for Installation on	Degree of protection	Mount or Thread	Installation in
SCP-LBF-IA1.36.IE.1 [1]	Ex ia	Via GDT	Device coupler	IP20	No additional wiring	Zone 1 ... 2 Div. 1 ... 2
SCP-LBF-IA1.36.IE.0	Ex ia	Via GDT	Device coupler	IP20	No additional wiring	Zone 1 ... 2 Div. 1 ... 2
TCP-LBF-IA1.36.IE.1 [1]	Ex ia	Via GDT	Device coupler	IP20	No additional wiring	Zone 1 ... 2 Div. 1 ... 2
TCP-LBF-IA1.36.IE.0	Ex ia	Via GDT	Device coupler	IP20	No additional wiring	Zone 1 ... 2 Div. 1 ... 2
TPH-LBF-IA1.36.DE.1 [1]	Ex ia	Direct	Power Hub	IP20	No additional wiring	Zone 1 ... 2 Div. 1 ... 2
TPH-LBF-IA1.36.DE.0	Ex ia	Direct	Power Hub	IP20	No additional wiring	Zone 1 ... 2 Div. 1 ... 2
FS-LBF-D1.32	Ex d	None	Cable gland	IP67	M 20	Zone 1/Div. 2
FS-LBF-I1.32	Ex i	None	Cable gland	IP67	M 20	Zone 1/Div. 2
FN-LBF-D1.32	Ex d	None	Cable gland	IP67	½" NPT	Zone 1/Div. 2
FN-LBF-I1.32	Ex i	None	Cable gland	IP67	½" NPT	Zone 1/Div. 2

Table 3 Surge Protector selection table

[1] Requires device couplers with diagnostic function

Surge Protectors for DIN Rail installation	Explosion Protection for DIN Rail installation	Signal Connection	Connection Shield to Earth	Housing for Installation in	Degree of protection	Module Type (1 x base & 1 x plug in required)	Installation in
DB-LBF-I1	Ex i	Continuous		Cabinet	IP20	Base	Zone 1/Div. 2
DP-LBF-I1.36.DE			Direct			Plug-in	
DP-LBF-I.36.IE			Via GDT			Plug-in	
DB-LBF-I1.I	Ex i	Interrupted		Cabinet	IP20	Base	Zone 1/Div. 2
DP-LBF-I1.36.DE			Direct			Plug-in	
DP-LBF-I.36.IE			Via GDT			Plug-in	

Table 4 Surge Protector for DIN rail installation selection table
Continuous: Continuous fieldbus signal for uninterrupted operation during exchange of plug-in module
Interrupted: Interrupting the fieldbus signal. The segment is disconnected during exchange of the plug-in module.

Terminators	Explosion Protection	Housing for Installation on	Degree of protection	Mount or Thread	Installation in
KMD0-FT-Ex	Ex i	DIN Rail	IP67		Zone 1/Div. 2
FN-FT-Ex1.D.IEC	Ex d	Cable gland	IP67	½" NPT	Zone 1/Div. 2
FN-FT-Ex1.I.IEC	Ex i	Field	IP67	½" NPT	
FS-FT-Ex1.D.IEC	Ex d	Field	IP67	M 20	
FS-FT-Ex1.I.IEC	Ex i	Field	IP67	M 20	Zone 1/Div. 2
FP-FT-Ex1.D.IEC	Ex d	Field	IP67	PG 13.5	
FP-FT-Ex1.I.IEC	Ex i	Field	IP67	PG 13.5	Zone 1/Div. 2

Table 5 Terminator selection table

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Selection Guideline

This selection guideline takes you through the process of selecting all components of the fieldbus infrastructure, power supply, device coupler, and accessories that are right for your process automation system. It allows selection of system attributes in this order:

- Fieldbus system
- Explosion protection if required
- DCS system connection
- Product attributes

Selecting Your FieldConnex® Infrastructure

First, select and verify that the chosen concept for explosion protection is applicable in the hazardous area. See table below.

Second, select the appropriate power supply. There are simplex power supplies and modular power hubs. With power hubs, a power supply module must also be selected. Choices for FieldConnex® Advanced Diagnostics are not included in this part and are handled in separate planning steps. If you would like to apply FieldConnex® Advanced Diagnostics, it is sufficient at this point to select a Power Hub with socket for an advanced diagnostic module.

Decision criteria for a power supply are:

- DCS connections
- Redundancy
- Space requirements
- Attributes contributing to availability

Third, select the device coupler that is right for you. All FieldConnex® device couplers come fitted with housing, prewiring, and accessories. This section lists datasheets for enclosures in various protection ratings and materials.

Methods of Explosion Protection by Hazardous Area

Verify that the type of ignition protection is available for the hazardous area. The following table matches explosion protection applications with chapters from this selection guideline. Note that although other combinations are possible, the table contains only practical solutions.

Area in which the field devices are located	Intrinsically Safe Trunk and Spurs: Ex ia	High-Power Trunk with FieldBarrier: Spurs Ex ia	Trunk and Spurs Ex ib (DART)	High-Power Trunk with Mechanically Protected Trunk and Spurs Ex d/e	High-Power Trunk with Spurs Ex ic (FISCO)	High-Power Trunk with Spurs Ex ic (Entity)	High-Power Trunk with Spurs Ex nL/Non-Incendive Field Wiring	High-Power Trunk with Non-Incendive Spurs
General Purpose Area	■	■	■	■	■	■	■	■
Zone 2				■	■	■	■	■
Zone 1	■	■	■	■				
Zone 0	■	■						
Class I, Division 2				■	■	■	■	■
Class I, Division 1	■	■						
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General Selection Guidelines

Segment Couplers SK3 and SK1 are equipped with DB9 connectors for PROFIBUS DP. The Segment Coupler SK3 consists of two motherboards for power supplies and gateways respectively. It thus requires selection for both motherboards and plug-in modules. FieldConnex Advanced Diagnostics is always available as an option.

The exception is the compact Segment Coupler, which is provided as one complete kit with motherboard, power and gateway modules.

For more information, see: KT-MB-GTB-2PS or KT-MB-GTB-D-2PS. For Advanced Diagnostics the stand-alone version can be used if required.

Segment Coupler 1 is an all in one solution based on the K-System housing.

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Intrinsically Safe Trunk and Spurs: Ex ia

Power Hub Motherboard or SK1 Power Supply	N° of Segments	Redundant Power Supply	Slot for Advanced Diagnostics	PROFIBUS DP Speed	DP Speed Auto Adjust	CREST	Terminators: Selectable/Fixed	Grounding Bar Available
Segment Coupler 1								
KFD2-BR-Ex1.3PA.93	1			93.75 kBps			F	

Device Coupler	Enclosure Material	No. of Outputs	Output Protection Rating	Spur Short Circuit Protection	Installation in
F2-JB-I#.* (Aluminum Enclosure)	Aluminum	4, 6, 8	Ex ia		Zone 0...1

Wildcards (*) denote number of spurs or other options such as selections for cable glands and accessories. Please consult the respective data sheet for ordering details or ask your Pepperl+Fuchs sales engineer or representative for availability of your choices.

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High-Power Trunk with FieldBarrier: Spurs Ex ia

Select the Power Hub motherboard of the Segment Coupler 3 (SK3) with or without redundancy. In addition, a gateway motherboard and gateway modules are required, again available with and without redundancy.

Power Hub Motherboard for SK3 or SK 1 Power Supply	N° of Segments	Redundant Power Supply	Slot for Advanced Diagnostics	PROFIBUS DP Speed	DP Speed Auto Adjust	CREST	Terminators: Selectable/Fixed	Grounding Bar Available	HD2-FBCL-1.500	HD2-FBPS-1.25.360	HD2-FBPS-1.500
Universal Motherboards for Segment Coupler 3											
MB-FB-4R.GEN	4	■	■	45.45 kBps … 12 MBps	■	■	S	■	■	■	■
MB-FB-4.GEN	4		■		■	■	S	■	■	■	■
KT-MB-GTB-2PS (includes gateway module)	2				■		F			■	
Segment Coupler 1											
KFD2-BR-1.PA.93	1			93.75 kBps			F		—	—	—

For MB-FB* motherboards, the following components are required for the PROFIBUS DP to PA gateway:

Gateway Components of SK3	Description
MB-FB-GT	Motherboard for single gateway
MB-FB-GTR	Motherboard for two gateways in redundant configuration with redundant connection to DP master
HD2-GTR-4.PA	Gateway module

Device Coupler	Enclosure Material	No. of Outputs	Output Protection Rating	Spur Short Circuit Protection	Installation in
RD0-FB-Ex4.*	None[1]	4	Ex ia	■	Zone 1/Div. 2
F2D0-FB-Ex4.* (Enclosure)	Aluminum	4	Ex ia	■	Zone 1/Div. 2
F.FB0.S**.A**.1.0.***.***.****	Stainless Steel	4, 8, 12	Ex ia	■	Zone 1/Div. 2
F.FB0.P**.A**.1.0.***.***.****	GRP	4, 8, 12	Ex ia	■	Zone 1/Div. 2

Wildcards (*) denote number of spurs or other options such as selections for cable glands and accessories. Please consult the respective data sheet for ordering details or ask your Pepperl+Fuchs sales engineer or representative for availability of your choices.

[1] *Denotes wiring interface for DIN rail installation, IP20.*

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Trunk and Spurs Ex ib (DART)

Select the Power Hub motherboard of the Segment Coupler 3 (SK3) with or without redundancy. In addition, a gateway motherboard and gateway modules are required, again available with and without redundancy.

Power Hub Motherboard for SK3	N° of Segments	Redundant Power Supply	Slot for Advanced Diagnostics	Packing Density/Size	Power Dissipation per Segment	CREST	Terminators: Selectable/Fixed	Grounding Bar Available
High-density Motherboard and Power Supply for Segment Coupler 3								
KT-MB-FB-D-4R.GEN	4	■	■	++	-		F	■
KT-MB-GTB-D-2PS (includes gateway module)	2		■	+	-		F	

\+ ... +++ *Indicates reducedn space requirements.*
\- ... - - - *Indicates low to lowest heat dissipation. Lower is better for cabinet density.*

For KT-MB-FB-D-4R.GEN, the following components are required for the PROFIBUS DP to PA gateway:

Gateway Components of SK3	Description
MB-FB-GT	Motherboard for single gateway
MB-FB-GTR	Motherboard for two gateways in redundant configuration with redundant connection to DP master
HD2-GTR-4.PA	Gateway module

Only one device coupler fits this application:

Device Coupler	Enclosure Material	No. of Outputs	Output Protection Rating	Spur Short Circuit Protection	Installation in
R3-SP-IBD-N12 [1]	None	12	Ex ib	■	Zone 1

[1] *Pre-engineered and preconfigured enclosures available; contact your Pepperl+Fuchs representative for availability of your choices.*

Edition 912868 (US) / 220231 (EU) 05/2013

High-Power Trunk with Mechanically Protected Trunk and Spurs Ex d/e

Select the Power Hub motherboard of the Segment Coupler 3 (SK3) with or without redundancy. In addition, a gateway motherboard and gateway modules are required, again available with and without redundancy.

Power Hub Motherboard for SK3 or SK 1 Power Supply	N° of Segments	Redundant Power Supply	Slot for Advanced Diagnostics	PROFIBUS DP Speed	DP Speed Auto Adjust	CREST	Terminators: Selectable/Fixed	Grounding Bar Available	HD2-FBPS-1.25.360	HD2-FBPS-1.500
Universal Motherboards for Segment Coupler 3										
MB-FB-4R.GEN	4	■	■	45,45 kBps … 12 MBps	■	■	S	■	■	■
MB-FB-4.GEN	4		■		■	■	S	■	■	■
KT-MB-GTB-2PS (includes gateway module)	2				■		F		■	
Segment Coupler 1										
KFD2-BR-1.PA.93	1			93,75 kBps			F		—	—

For MB-FB* motherboards, the following components are required for the PROFIBUS DP to PA gateway:

Gateway Components of SK3	Description
MB-FB-GT	Motherboard for single gateway
MB-FB-GTR	Motherboard for two gateways in redundant configuration with redundant connection to DP master
HD2-GTR-4.PA	Gateway module

Device Coupler	Enclosure Material	No. of Outputs	Output Protection Rating	Spur Short Circuit Protection	Installation in
R-SP-E12	None[1]	12	—	■	Zone 1
F.SPE.S**.A**.1.0.***.***.****	Stainless Steel	12, 24	—	■	Zone 1
F.SPE.P**.A**.1.0.***.***.****	GRP	12, 24	—	■	Zone 1

Wildcards (*) denote number of spurs or other options such as selections for cable glands and accessories. Please consult the respective data sheet for ordering details or ask your Pepperl+Fuchs sales engineer or representative for availability of your choices.

[1] *Denotes wiring interface for DIN rail installation, IP20.*

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High-Power Trunk with Spurs Ex ic (FISCO)

Select the Power Hub motherboard of the Segment Coupler 3 (SK3) with or without redundancy. In addition, a gateway motherboard and gateway modules are required, again available with and without redundancy.

Special power modules are provided limiting the voltage U_o = 17.5 V.

Power Hub Motherboard for SK3	N° of Segments	Redundant Power Supply	Slot for Advanced Diagnostics	PROFIBUS DP Speed	DP Speed Auto Adjust	CREST	Terminators: Selectable/Fixed	Grounding Bar Available	HD2-FBPS-1.17.500
Universal Motherboards for Segment Coupler 3									
MB-FB-4R.GEN	4	■	■	45.45 kBps … 12 MBps	■	■	S	■	■
MB-FB-4.GEN	4		■		■	■	S	■	■

Components for PROFIBUS DP to PA gateway:

Gateway Components of SK3	Description
MB-FB-GT	Motherboard for single gateway
MB-FB-GTR	Motherboard for two gateways in redundant configuration with redundant
HD2-GTR-4.PA	Gateway module

Device Coupler	Enclosure Material	No. of Outputs	Output Protection Rating	Spur Short Circuit Protection	Installation in
R2-SP-N*	None[1]	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
F.SP4.S**.B**.1.0.***.***.***0	Stainless Steel	8…24	Ex ic	■	Zone 2/Div. 2
F.SP4.P**.B**.1.0.***.***.***0	GRP	8…24	Ex ic	■	Zone 2/Div. 2
SPJB-**-AL*.***	Aluminum	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
SPJB-**-CS*.***	Carbon Steel	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
SPJB-**-FB*.***	Fiberglass	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
SPJB-**-PCW.***	Polycarbonate	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
SPJB-**-SS*.***	Stainless Steel	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2

Wildcards (*) denote number of spurs or other options such as selections for cable glands and accessories. Please consult the respective data sheet for ordering details or ask your Pepperl+Fuchs sales engineer or representative for availability of your choices.

[1] *Denotes wiring interface for DIN rail installation, IP20.*

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High-Power Trunk with Spurs Ex ic (Entity)

Select the Power Hub motherboard of the Segment Coupler 3 (SK3) with or without redundancy. In addition, a gateway motherboard and gateway modules are required, again available with and without redundancy.

Special power modules are provided limiting the voltage U_o = 24 V.

Power Hub Motherboard for SK3	N° of Segments	Redundant Power Supply	Slot for Advanced Diagnostics	PROFIBUS DP Speed	DP Speed Auto Adjust	CREST	Terminators: Selectable/Fixed	Grounding Bar Available	HD2-FBPS-1.23.500
Universal Motherboards for Segment Coupler 3									
MB-FB-4R.GEN	4	■	■	45.45 kBps … 12 MBps	■	■	S	■	■
MB-FB-4.GEN	4		■		■	■	S	■	■

Components for PROFIBUS DP to PA gateway:

Gateway Components of SK3	Description
MB-FB-GT	Motherboard for single gateway
MB-FB-GTR	Motherboard for two gateways in redundant configuration with redundant connection to DP master
HD2-GTR-4.PA	Gateway module

Device Coupler	Enclosure Material	No. of Outputs	Output Protection Rating	Spur Short Circuit Protection	Installation in
R2-SP-N*	None[1]	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
F.SP4.S**.B**.1.0.***.***.***0	Stainless Steel	8…24	Ex ic	■	Zone 2/Div. 2
F.SP4.P**.B**.1.0.***.***.***0	GRP	8…24	Ex ic	■	Zone 2/Div. 2
SPJB-**-AL*.***	Aluminum	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
SPJB-**-CS*.***	Carbon Steel	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
SPJB-**-FB*.***	Fiberglass	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
SPJB-**-PCW.***	Polycarbonate	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2
SPJB-**-SS*.***	Stainless Steel	4, 6, 8, 10, 12	Ex ic	■	Zone 2/Div. 2

Wildcards (*) denote number of spurs or other options such as selections for cable glands and accessories. Please consult the respective data sheet for ordering details or ask your Pepperl+Fuchs sales engineer or representative for availability of your choices.

[1] *Denotes wiring interface for DIN rail installation, IP20.*

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High-Power Trunk with Spurs Ex nL/Non-Incendive Field Wiring

Select the Power Hub motherboard of the Segment Coupler 3 (SK3) with or without redundancy. In addition, a gateway motherboard and gateway modules are required, again available with and without redundancy.

Special power modules are provided limiting the voltage. Just match the voltage output to the respective input voltage of the field instrument.

Power Hub Motherboard for SK3	N° of Segments	Redundant Power Supply	Slot for Advanced Diagnostics	PROFIBUS DP Speed	DP Speed Auto Adjust	CREST	Terminators: Selectable/Fixed	Grounding Bar Available	HD2-FBPS-1.17.500	HD2-FBPS-1.23.500
Universal Motherboards for Segment Coupler 3										
MB-FB-4R.GEN	4	■	■	45.45 kBps … 12 MBps	■	■	S	■	■	■
MB-FB-4.GEN	4		■		■	■	S	■	■	■

Components for PROFIBUS DP to PA gateway:

Gateway Components of SK3	Description
MB-FB-GT	Motherboard for single gateway
MB-FB-GTR	Motherboard for two gateways in redundant configuration with redundant connection to DP master
HD2-GTR-4.PA	Gateway module

Device Coupler	Enclosure Material	No.of Outputs	Output Protection Rating	Spur Short Circuit Protection	Installation in
R2-SP-N*	None[1]	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
F.SP4.S**.B**.1.0.***.***.***0	Stainless Steel	8…24	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
F.SP4.P**.B**.1.0.***.***.***0	GRP	8…24	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-AL*.***	Aluminum	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-CS*.***	Carbon Steel	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-FB*.***	Fiberglass	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-PCW.***	Polycarbonate	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-SS*.***	Stainless Steel	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
F2-JBSC-* (Aluminum Enclosure)	Aluminum	4, 6, 8	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
RM-SPTM-N2 (Trunk Module)	None[1]	2	Ex nL	■	Zone 2/Div. 2
RM-SPEM-N4 (Extension Module)	None[1]	4	Ex nL	■	Zone 2/Div. 2

Wildcards (*) denote number of spurs or other options such as selections for cable glands and accessories. Please consult the respective data sheet for ordering details or ask your Pepperl+Fuchs sales engineer or representative for availability of your choices.

[1] *Denotes wiring interface for DIN rail installation, IP20.*

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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High-Power Trunk with Non-Incendive Spurs

Select the Power Hub motherboard of the Segment Coupler 3 (SK3) with or without redundancy. In addition, a gateway motherboard and gateway modules are required, again available with and without redundancy.

All FieldConnex power supplies and power modules are applicable. The selection below shows reasonable choices.

Power Hub Motherboard for SK3 or SK 1 Power Supply	N° of Segments	Redundant Power Supply	Slot for Advanced Diagnostics	PROFIBUS DP Speed	DP Speed Auto Adjust	CREST	Terminators: Selectable/Fixed	Grounding Bar Available	HD2-FBCL-1.500	HD2-FBPS-1.25.360	HD2-FBPS-1.500
Universal Motherboards for Segment Coupler 3											
MB-FB-4R.GEN	4	■	■	45.45 kBps … 12 MBps	■	■	S	■	■	■	■
MB-FB-4.GEN	4		■		■	■	S	■	■	■	■
KT-MB-GTB-2PS (includes gateway module)	2				■		F			■	
Segment Coupler 1											
KFD2-BR-1.PA.93	1			93.75 kBps			F		—	—	—

For MB-FB* motherboards, the following components are required for the PROFIBUS DP to PA gateway:

Gateway Components of SK3	Description
MB-FB-GT	Motherboard for single gateway
MB-FB-GTR	Motherboard for two gateways in redundant configuration with redundant connection to DP master

Device Coupler	Enclosure Material	No. of Outputs	Output Protection Rating	Spur Short Circuit Protection	Installation in
R2-SP-N*	None[1]	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
F.SP4.S**.B**.1.0.***.***.***0	Stainless Steel	8…24	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
F.SP4.P**.B**.1.0.***.***.***0	GRP	8…24	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-AL*.***	Aluminum	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-CS*.***	Carbon Steel	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-FB*.***	Fiberglass	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-PCW.***	Polycarbonate	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
SPJB-**-SS*.***	Stainless Steel	4, 6, 8, 10, 12	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
F2-JBSC-* (Aluminum Enclosure)	Aluminum	4, 6, 8	Ex nL/Non-Incendive Field Wiring	■	Zone 2/Div. 2
RM-SPTM-N2 (Trunk Module)	None[1]	2	Ex nL	■	Zone 2/Div. 2
RM-SPEM-N4 (Extension Module)	None[1]	4	Ex nL	■	Zone 2/Div. 2

Wildcards (*) denote number of spurs or other options such as selections for cable glands and accessories. Please consult the respective data sheet for ordering details or ask your Pepperl+Fuchs sales engineer or representative for availability of your choices.

[1] *Denotes wiring interface for DIN rail installation, IP20.*

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Features

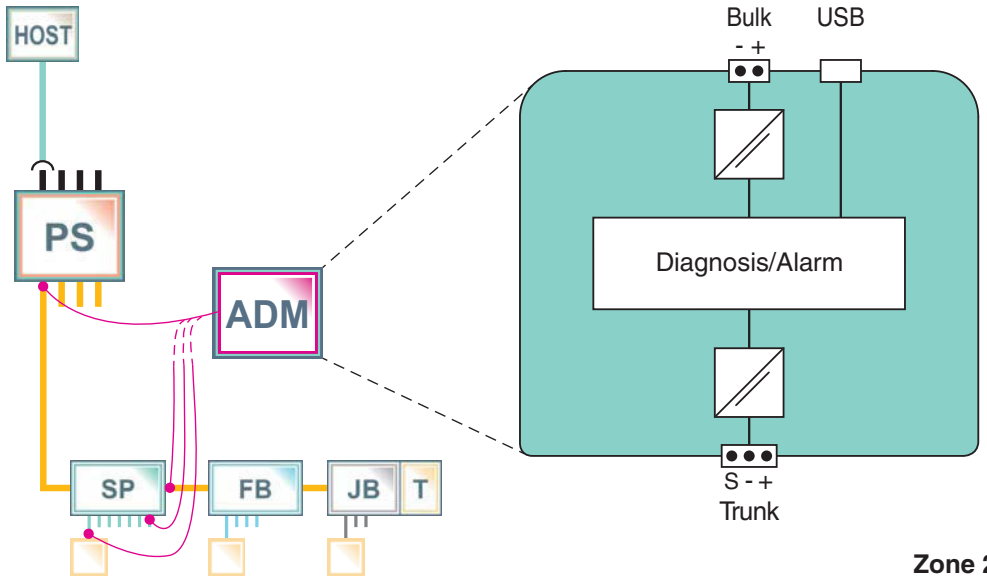
- **Comprehensive diagnostics for fieldbus physical layer**
- **Mobile kit for the fieldbus professional**
- **Precise measurements through passive circuits**
- **For commissioning and troubleshooting**
- **Installation in Zone 2/Class I, Div. 2**
- **Connection to energy limited fieldbus segments Ex nL permissible**
- **USB interface for PC connection and power supply**

Function

Designed for maintenance personnel and traveling fieldbus expert, the FieldConnex® Mobile Advanced Diagnostic Module (ADM) is a comprehensive measurement tool for single segments. It can be set up at any point on the segment. Its passive input circuits leave the physical layer untouched for exact data. The ADM detects gradual or sudden changes and helps trace even intermittent malfunctions.
The Mobile ADM primarily supports commissioning and troubleshooting. It is powered via USB 2.0 full-speed port and communicates with any laptop or desktop. In addition, a mounting bracket and connection for an external power supply enable the installation in a cabinet for continuous monitoring without USB connection.
The Diagnostic Manager is the software for display and operation from the safety of the control room. The Professional Edition provides powerful functions and wizards simplifying and automating work procedures: an embedded expert system, a data historian, and a built-in oscilloscope (see datasheet DTM-FC.AD*).

Assembly

Connection



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Technical data

Fieldbus interface	
Number of segments	1
Interface	
Interface type	USB: square type B socket
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Mechanical specifications	
Connection type	fieldbus: removable screw terminals with retaining screws external power: removable screw terminals with retaining screws USB: square type B socket
Core cross-section	2.5 mm^2
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 05 ATEX 2923 X
Group, category, type of protection, temperature class	Ⓔx II 3G Ex nA [nL] IIC T4
Directive conformity	
Directive 94/9/EC	IEC 60079-15:2003

Functional Overview

Fieldbus voltage The segment voltage is measured in a range of 0 V ... 35 V.

Unbalance detection A capacitive or resistive short between any fieldbus wire and shield is measured and given in a range between -100 % ... +100 %.
(-100% = short against - wire, +100% = short against +wire)

Termination Over- and Undertermination are detected and reported.

Communication level Node specific communication levels are measured in a range of 0 V ... 2.5 V.

Jitter Jitter is a measurement for the timing of each bit. Each component connected (power supply, field instrument, cable, ...) to the segment influences jitter. It is an excellent indicator for segment health. The jitter is either segment or device specific measured in a range of 0 µsec ... 8 µsec.

Signal polarity For each node the polarity of the signal modulation is given.

Noise measurement The noise is measured in a frequency range between 100 Hz ... 140 kHz. The noise measurement is node address specific to detect device specific noise emission.

Communication errors statistics Segment-specific error counters e.g. for CRC errors and framing errors are displayed.

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Features

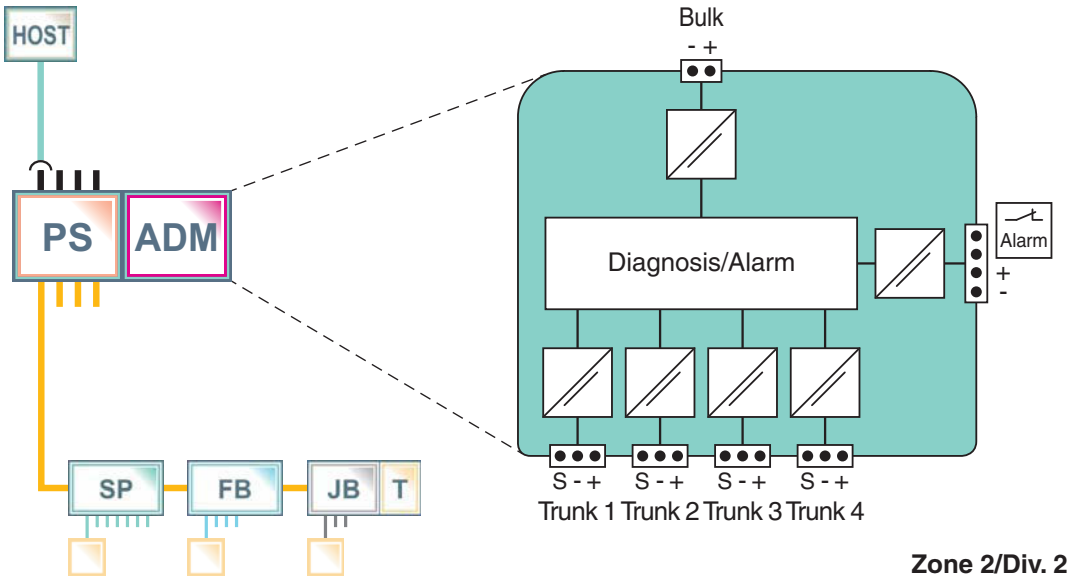
- **Comprehensive diagnostics for fieldbus physical layer and power supply**
- **Plug-in Module for the FieldConnex Power Hub**
- **Precise measurements through passive circuits**
- **For commissioning, online monitoring and troubleshooting**
- **Installation in Zone 2/Class I, Div. 2**
- **System state and fault indication via LEDs**
- **Display of data in the safety of the control room**
- **Automatic setup of diagnostic system**
- **Full software integration into DCS and PAM possible**

Function

Designed as a plug-in module for the FieldConnex® Power Hub, this Advanced Diagnostic Module (ADM) is a comprehensive measurement tool for the physical layer of up to four fieldbus segments. It's passive input circuits leave the physical layer untouched for exact data. The ADM detects gradual or sudden changes and helps trace even intermittent malfunctions.
The ADM supports commissioning, online monitoring and troubleshooting. It can be integrated tightly into the DCS and PAM via a separate diagnostic bus, making the fieldbus physical layer itself a managable asset. Configuration tools automate setup of the ADM and of selected DCS.
The Diagnostic Manager is the software for display and operation from the safety of the control room. The Professional Edition provides powerful functions and wizards simplifying and automating work procedures: Embedded expert system data historian and a built-in oscilloscope are included. (see datasheet DTM-FC.AD*).

Assembly

Connection



Zone 2/Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Fieldbus interface	
Number of segments	4
Indicators/operating means	
Fault signal	VFC alarm 1 A, 50 V DC, normally closed
Interface	
Interface type	diagnostic bus: RS 485
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	Motherboard specific
Core cross-section	Motherboard specific
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	Ⓔx II 3G EEx nA IIC T4
Directive conformity	
Directive 94/9/EC	EN 60079-15:2003
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4

Functional Overview

Expert system
Built-in expert system interprets behavior of each segment based on rules and gives pointed information in clear text. Precisely diagnosis causes and suggests remedies, which are easy to understand.

Supply input voltage
The supply voltage of the primary and secondary input is measured in a range of 0 V ... 40 V.

Segment power redundancy integrity
The health of the primary and backup fieldbus power supply is monitored. Mismatch of redundancy pairs is detected and causes an alarm.

Fieldbus voltage
The segment voltage is measured in a range of 0 V ... 35 V.

Fieldbus current
The current feed into a fieldbus segment is measured in a range of 0 A ... 1 A depending on the used power supply.

Unbalance detection
A capacitive or resistive short between any fieldbus wire and shield is measured and given in a range between -100% ... +100%.
(-100% = short against - wire, +100% = short against +wire)

Termination
Over- and Undertermination are detected and reported.

Signal level
Node specific signal levels are measured in a range of 0 V ... 2.5 V.

Jitter
Jitter is a measurement for the timing of each bit. Each component connected (power supply, field instrument, cable, ...) to the segment influences jitter. It is an excellent indicator for segment health. The jitter is either segment- or device-specifically measured in a range of 0 µsec ... 8 µsec.

Signal polarity
For each node the polarity of the signal modulation is given.

Noise measurement
Noise is measured in a frequency range between 100 Hz ... 140 kHz. Noise measurement is node-address-specific in order to detect device-specific noise.

Oscilloscope function
The built-in oscilloscope is a powerful tool for signal voltage behavior analysis. It allows for analysis of specific frames and occurring communication errors. Trigger conditions, as e. g. different frame types, CRC errors, framing errors are either node-address-specific or unspecific. The frame contents detected in the sampled period are analyzed and shown.

Live list generation
A list of all connected devices and additional status information is generated. The ADM detects initial connection of a device to a segment in operation. A message reminds the user to re-run the commissioning wizard.

Alarm management
For all measured values, either segment- or node-specific, alarm limits exist. In addition, warning limits can be defined. When these limits are violated, alarms are generated.

Edition 912868 (US) / 220231 (EU)05/2013

Features

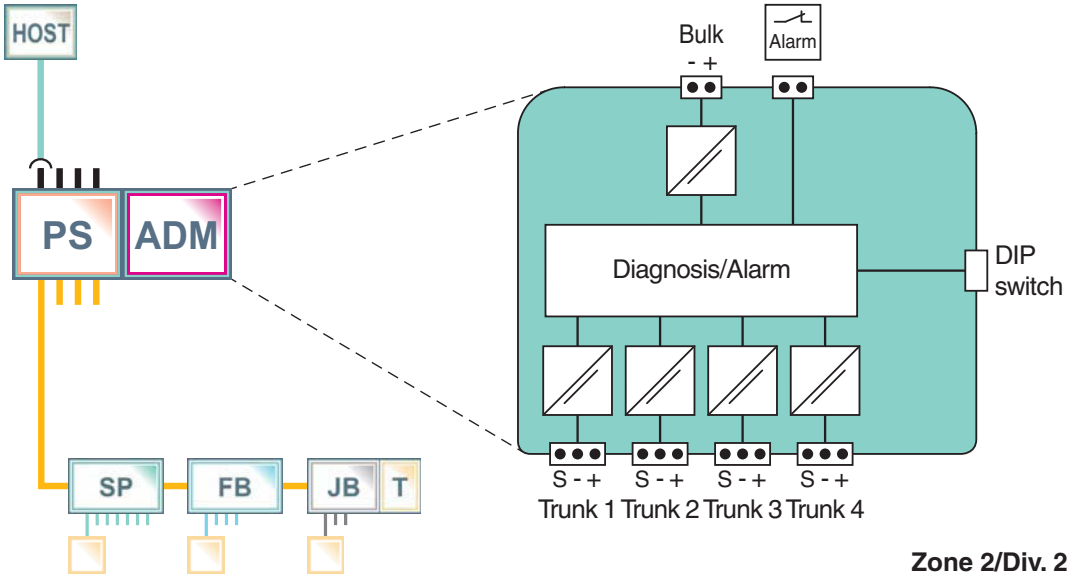
- **Diagnostics for fieldbus physical layer and power supply**
- **Plug-in Module for the FieldConnex Power Hub**
- **Plug and play - no engineering required**
- **For online monitoring**
- **Installation in Zone 2/Class I, Div. 2**
- **System state and fault indication via LEDs**
- **Alarm limits configurable via DIP switches**
- **Fault indication transmission by voltage free contact**

Function

Designed as a plug-in module for the FieldConnex® Power Hub, the Advanced Diagnostic Module (ADM) with relay output is a monitoring tool for the physical layer of up to four fieldbus segments. Passive input circuits leave the physical layer untouched, avoiding alteration of the signal.
The ADM indicates unwanted conditions via voltage-free contact. It provides physical layer diagnostics "plug-and-play", without additional engineering. If desired, the values for maintenance and out-of-specification limit ranges are configurable via DIP switches. LED signals indicate that a limit has been exceeded. For commissioning and troubleshooting, a comprehensive diagnostic module such as the FieldConnex(R) mobile ADM (see DM-AM-KIT) is recommended.

Assembly

Connection



Zone 2/Div. 2

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Technical data

Fieldbus interface	
Number of segments	4
Indicators/operating means	
Fault signal	VFC alarm 1 A, 50 V DC, normally closed
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	Ⓔx II 3G EEx nA II T4
Directive conformity	
Directive 94/9/EC	IEC 60079-15

Monitored Values Overview

For each value maintenance and out-of-specification limit ranges are configurable via DIP switches.

Jitter Jitter is a measurement for the timing of each bit. Each component connected (power supply, field instrument, cable, ...) to the segment influences jitter. It is an excellent indicator for segment health. The jitter is either segment- or device-specifically measured in a range of 1.6 µsec ... 4.8 µsec.

Signal Level The voltage level of the communication signal, node specific measurement.

Noise Unwanted disturbance. Often caused by overlay of a number of disturbances. Leads to signal deterioration.

Edition 912868 (US) / 220231 (EU)05/2013

Features

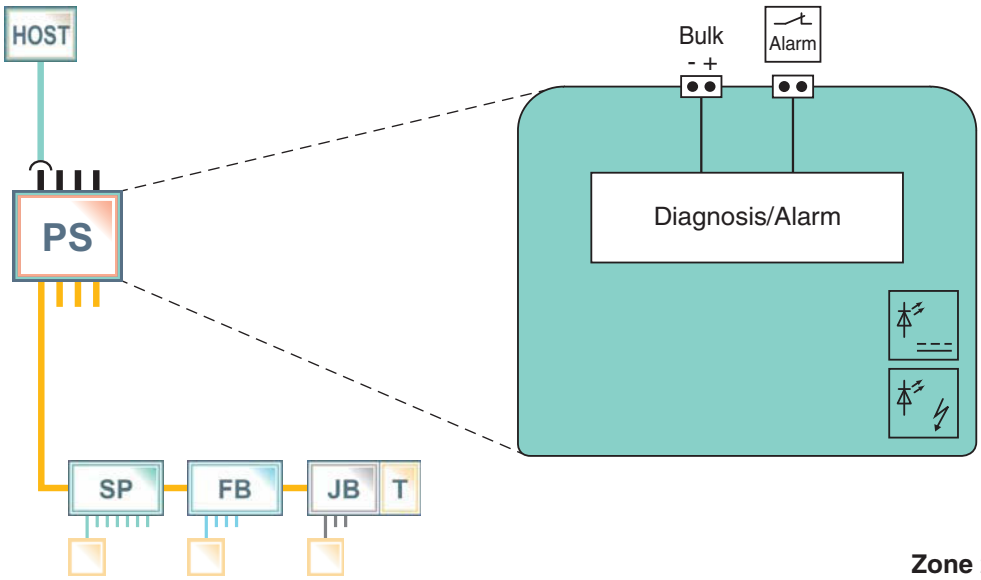
- **Basic monitoring for power supply output and health**
- **Plug-in Module for the FieldConnex Power Hub**
- **Plug and play - no engineering required**
- **For online monitoring**
- **Installation in Zone 2/Class I, Div. 2**
- **System state and fault indication via LEDs**

Function

Designed as a plug-in module for the FieldConnex® Power Hub, the Basic Diagnostic Module HD2-DM-B provides basic system diagnostics. It checks for proper operation of bulk power supplies and monitors the connected trunks for overload or short-circuit conditions. All Power Hub modules are checked for proper function. On redundant power modules it indicates missmatching pairs.
The module indicates a fault condition via voltage-free contact. It provides monitoring "plug-and-play" without additional engineering. LED signals indicate a fault for easy detection.

Assembly

Connection



Zone 2/Div. 2

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS PROTECTING YOUR PROCESS

Technical data

Indicators/operating means	
Fault signal	VFC alarm 1 A, 50 V DC, normally closed
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	Motherboard specific
Core cross-section	Motherboard specific
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	⟨Ex⟩ II 3G EEx nA C IIC T4
Directive conformity	
Directive 94/9/EC	EN 60079-15:2003
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nC IIC T4

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Features

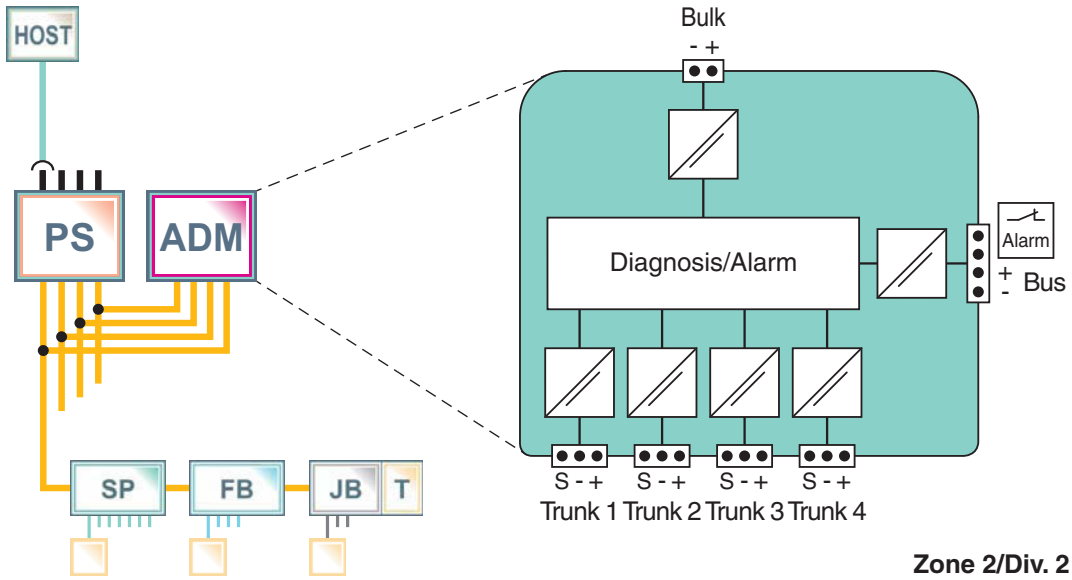
- **Comprehensive diagnostics for fieldbus physical layer**
- **Module and motherboard for retrofit of any installation**
- **Precise measurements through passive circuits**
- **For commissioning, online monitoring and troubleshooting**
- **Installation in Zone 2/Class I, Div. 2**
- **System state and fault indication via LEDs**
- **Display of data in the safety of the control room**
- **Full software integration into DCS and PAM possible**

Function

The kit of FieldConnex® Advanced Diagnostic Module (ADM) and motherboard is a comprehensive measurement tool for the physical layer for retrofitting of up to four fieldbus segments. Its passive input circuits leave the physical layer untouched for exact data. The ADM detects gradual or sudden changes and helps trace even intermittent malfunctions.
The ADM supports commissioning, online monitoring and troubleshooting. It can be integrated tightly into the DCS and PAM via a separate diagnostic bus, making the fieldbus physical layer itself a managable asset. Configuration tools automate setup of the ADM and of selected DCS.
The Diagnostic Manager is the software for display and operation from the safety of the control room. The Professional Edition provides powerful functions and wizards simplifying and automating work procedures: Embedded expert system data historian and a built-in oscilloscope are included. (see datasheet DTM-FC.AD*).

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Fieldbus interface	
Number of segments	4
Indicators/operating means	
Fault signal	VFC alarm 1 A, 50 V DC, normally closed
Interface	
Interface type	diagnostic bus: RS 485
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Mechanical specifications	
Connection type	screw terminals
Core cross-section	2.5 mm^2
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4

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Features

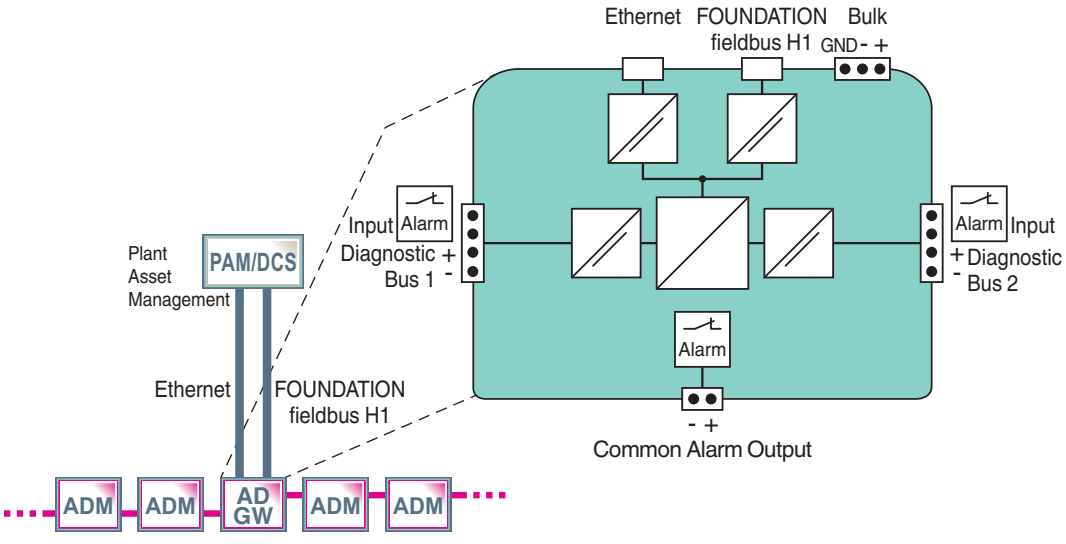
- **System integration kit for Advanced Diagnostics**
- **DCS integration via Diagnostic Manager or device DTM**
- **Simple automatic setup of Advanced Diagnostics**
- **Summary alarm handling**

Function

The FieldConnex® Diagnostic Gateway is the interface between stationary Advanced Diagnostic Modules (ADM) and the control system. It offers access to all ADM data in two ways: via Ethernet and the Diagnostic Manager software or via FOUNDATION Fieldbus H1 and DTM/EDD or both.
The gateway configures itself and automatically detects the ADMs. The Diagnostic Manager automatically finds gateways on the same subnet. The setup of the diagnostic bus and all connected modules is automatic. This significantly simplifies engineering of FieldConnex® Advanced Diagnostics.

Assembly

Connection



Zone 2/Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Ethernet Interface	
Port	100 BASE-TX
Protocol	TCP/IP and UDP/IP
Services	ICMP, DHCP, AutoIP, HTTP
Diagnostic Bus	
Number of Diagnostic Bus Channels	2
Cable length/Channel	30 m
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 73/23/EEC	EN 61010
Standard conformity	
Electrical isolation	IEC 62103
Electromagnetic compatibility	NE 21
Protection degree	IEC 60529
Climatic conditions	DIN IEC 721
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ethernet	IEEE 802.3
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3

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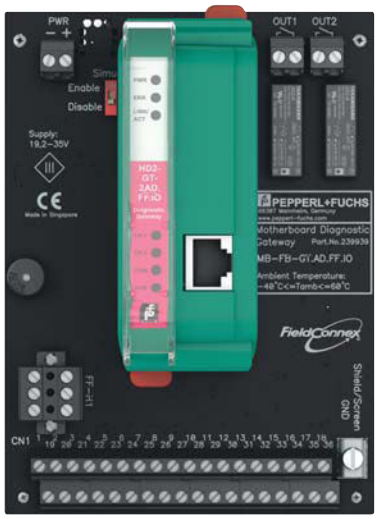
Features

- **System integration kit for Advanced Diagnostics**
- **DCS integration via Diagnostic Manager or device DTM**
- **Simple automatic setup of Advanced Diagnostics**
- **Alarm handling and integrated I/O for cabinet monitoring/control**

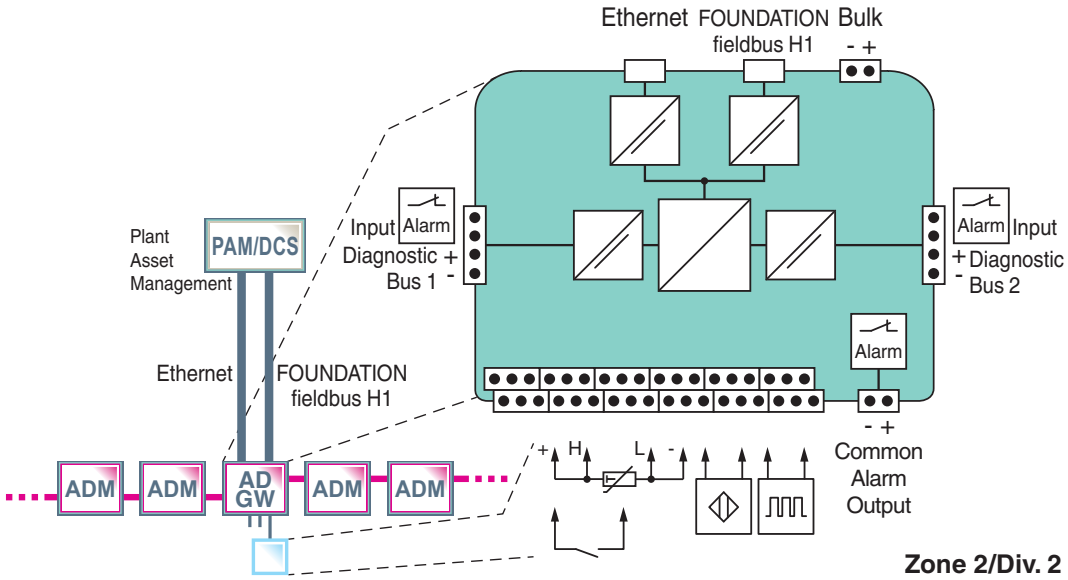
Function

The FieldConnex® Diagnostic Gateway is the interface between stationary Advanced Diagnostic Modules (ADM) and the control system. It offers access to all ADM data in two ways: via Ethernet and the Diagnostic Manager software or via FOUNDATION Fieldbus H1 and DTM/EDD or both.
The gateway configures itself and automatically detects the ADMs. The Diagnostic Manager automatically finds gateways on the same subnet. The setup of the diagnostic bus and all connected modules is automatic. This significantly simplifies engineering of FieldConnex® Advanced Diagnostics.
Inputs for frequency, temperature, humidity, and NAMUR sensors and 2 relay contacts allow control of the control cabinet. The cabinet and physical layer diagnostics become easy-to-manage plant assets.

Assembly



Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Ethernet Interface	
Port	100 BASE-TX
Protocol	TCP/IP and UDP/IP
Services	ICMP, DHCP, AutoIP, HTTP
Diagnostic Bus	
Number of Diagnostic Bus Channels	2
Cable length/Channel	30 m
Indicators/operating means	
Fault signal	buzzer on
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 73/23/EEC	EN 61010
Standard conformity	
Electrical isolation	IEC 62103
Electromagnetic compatibility	NE 21
Protection degree	IEC 60529
Climatic conditions	DIN IEC 721
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ethernet	IEEE 802.3
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3

Edition 912868 (US) / 220231 (EU)05/2013

Features

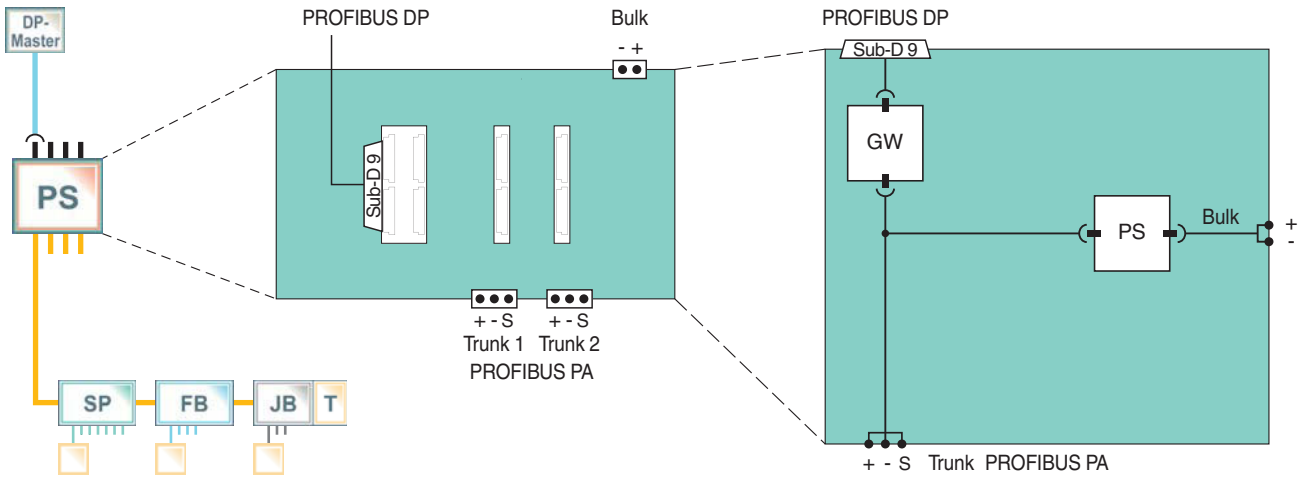
- **2 segments, simplex, individual modules per segment**
- **High-Power Trunk: Live work on devices in any hazardous area**
- **Connection to PROFIBUS DP**
- **Transparent, configuration free**
- **Optimized for size and quality, low heat dissipation**
- **Automatically adapts speed on DP - up to 12 Mbit/s**

Function

The FieldConnex® PROFIBUS Compact Power Hub is a modular fieldbus power supply. It consists of one motherboard, which is the mounting plate and wiring interface, two power modules - one per segment, and a gateway module for connection to PROFIBUS DP.
Communication is transparent between DP and PA: The gateway segment coupler makes each PA device appear as if it was connected to DP. This includes cyclic/acyclic data exchange and transmission speed. Segment design is clear and easy to understand without sub-networks; the gateway module itself is configuration free - all reducing engineering work.
Availability and a long service life is achieved through: only one passive impedance filter per segment, optimized design for low power dissipation, high-availability fieldbus termination and plug-in connectors with retaining screws.

Assembly

Connection



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Technical data

Supply	
Rated voltage	19.2 ... 35 V DC
Rated current	1.46 ... 0.77 A
Power loss	typ. 6.7 W
Fieldbus interface	
Number of segments	
Simplex	2
Rated voltage	25 ... 28 V
Rated current	360 ... 10 mA
Short-circuit current	typ. 400 mA
PROFIBUS DP	
Connection	9-pin Sub-D socket
Protocol	PROFIBUS DP/DP V1
Terminating resistor	100 Ω integrated
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 73/23/EEC	EN 50178 (identical to EN 62103)
Standard conformity	
Electrical isolation	IEC 62103
Electromagnetic compatibility	NE 21
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Mounting	DIN rail, system M36

Power module

		HD2-FBPS-1.25.360	
Power Output			
Voltage (V)		25 ... 28	
Current (mA)		360	
Limit U_0 (V)		-	
Device in ...	**Type of Protection**		**Required Installation Components**
Zone 0/Div. 1	Intrinsically safe Ex ia	■	FieldBarrier
Zone 1/Div. 1	Intrinsically safe Ex ia	■	FieldBarrier
Zone 1/Div. 1	Flameproof Ex d	■	Segment Protector R-SP-E12 or any Segment Protector installed in Zone 2
Safe Area	No specific type of protection	■	Segment Protector recommended

Edition 912868 (US) / 220231 (EU)05/2013

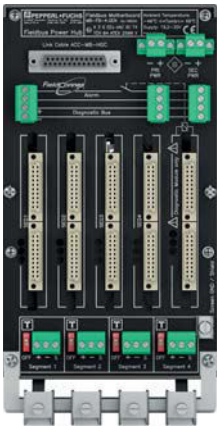
Features

- **4 segments, individual modules per segment**
- **Customizable for any host system**
- **High-Power Trunk: Live work on devices in any hazardous area**
- **Features for best signal quality, low heat dissipation**
- **Optional Advanced Diagnostics**
- **Passive impedance and CREST technology for high reliability**
- **Supports Ex ic/nL voltage limitation**
- **Installation in Zone 2/Div. 2**

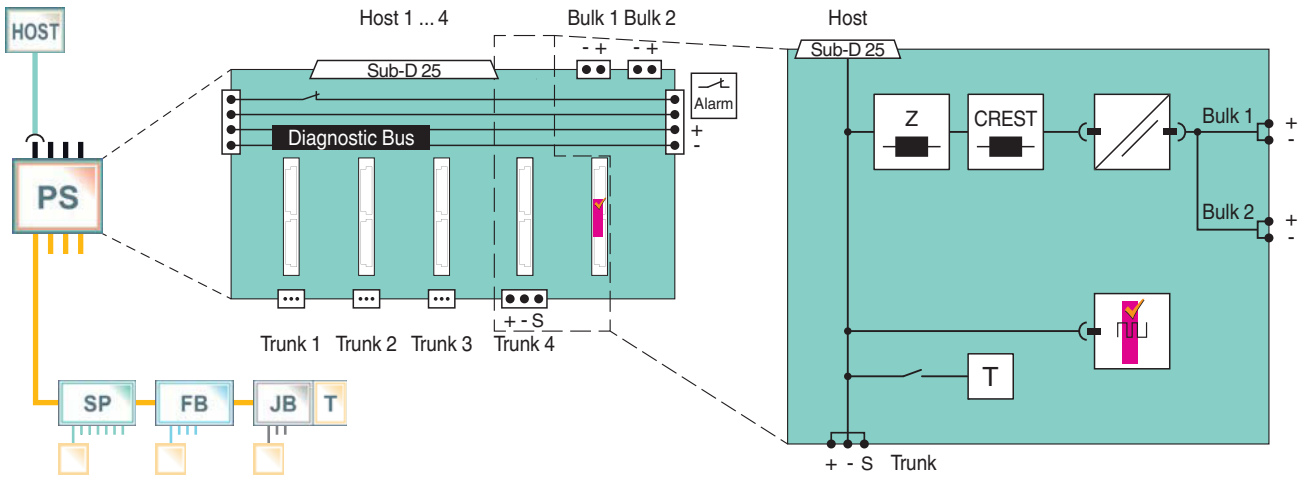
Function

The FieldConnex®Universal Power Hub is a modular fieldbus power supply, providing the most options for most reliable communication. It supports explosion protection e.g. the High-Power Trunk for longest cable run and highest device count. The Power Hub supports optional Advanced Diagnostics for fast fieldbus commissioning and online monitoring.
The motherboard is the wiring interface and mounting plate with a DB-25 connector for PROFIBUS PA gateway or customizable cable connections to any DCS. Sockets for individual power modules enable simple installation and can be replaced without tools. Certain motherboards enable power redundancy with seamless transfer. Pairs of modules feed each segment.
Availability and a long service life are achieved through: only one passive impedance filter per segment with CREST for superior signal transmission, optimized design for low power dissipation and high-availability fieldbus termination. Any mounting direction allows optimized and space-saving cabinet layout.

Assembly



Connection



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Technical data

Supply	
Connection	redundant
Rated voltage	19.2 ... 35 V SELV/PELV
Rated current	16 A
Fieldbus interface	
Number of segments	
Simplex	4
Terminating resistor	selectable 100 Ω
Indicators/operating means	
Fault signal	VFC alarm output via connectors
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	IEC 62103
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Mechanical specifications	
Connection type	screw terminals
Core cross-section	2.5 mm^2
Mounting	DIN mounting rail
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	Ⓔx II 3G EEx nA C IIC T4
Directive conformity	
Directive 94/9/EC	IEC 60079-15:2003

Compatible power modules

		HD2-FBPS-1.17.500	HD2-FBPS-1.23.500	HD2-FBPS-1.25.360	HD2-FBPS-1.500	HD2-FBCL-1.500	
Power Output							
Voltage (V)		15 ... 17	21 ... 23	25 ... 28	28 ... 30	-[1]	
Current (mA)		500	500	360	500	500	
Limit U_0 (V)		17.5	24	-	-	-	
Device in ...	**Type of Protection**						**Required Installation Components**
Zone 0/Div. 1	Intrinsically safe Ex ia			■	■	■	FieldBarrier
Zone 1/Div. 1	Intrinsically safe Ex ia			■	■	■	FieldBarrier
Zone 1/Div. 1	Flameproof Ex d			■	■	■	Segment Protector R-SP-E12 or any Segment Protector installed in Zone 2
Zone 2	Intrinsically safe Ex ic (FISCO)	■					Selected Segment Protectors
Zone 2	Intrinsically safe Ex ic (Entity)		■				Selected Segment Protectors
Div. 2	Non-incendive	■	■	■	■		Any Segment Protector; power module selection depends on voltage of field device
Safe Area	No specific type of protection			■	■	■	Segment Protector recommended

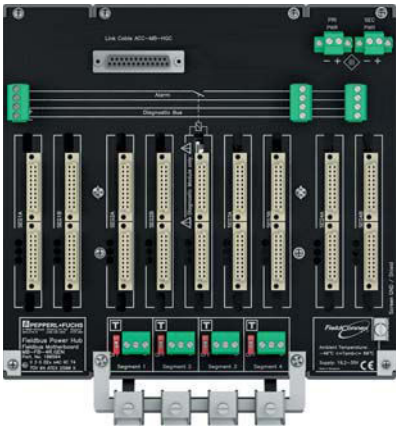
[1] follows bulk power supply

Edition 912868 (US) / 220231 (EU)05/2013

Features

- **4 segments, redundant, individual modules per segment**
- **Customizable for any host system**
- **High-Power Trunk: Live work on devices in any hazardous area**
- **Features for best signal quality, low heat dissipation**
- **Optional Advanced Diagnostics**
- **Passive impedance and CREST technology for high reliability**
- **Supports Ex ic/nL voltage limitation**
- **Installation in Zone 2/Div. 2**

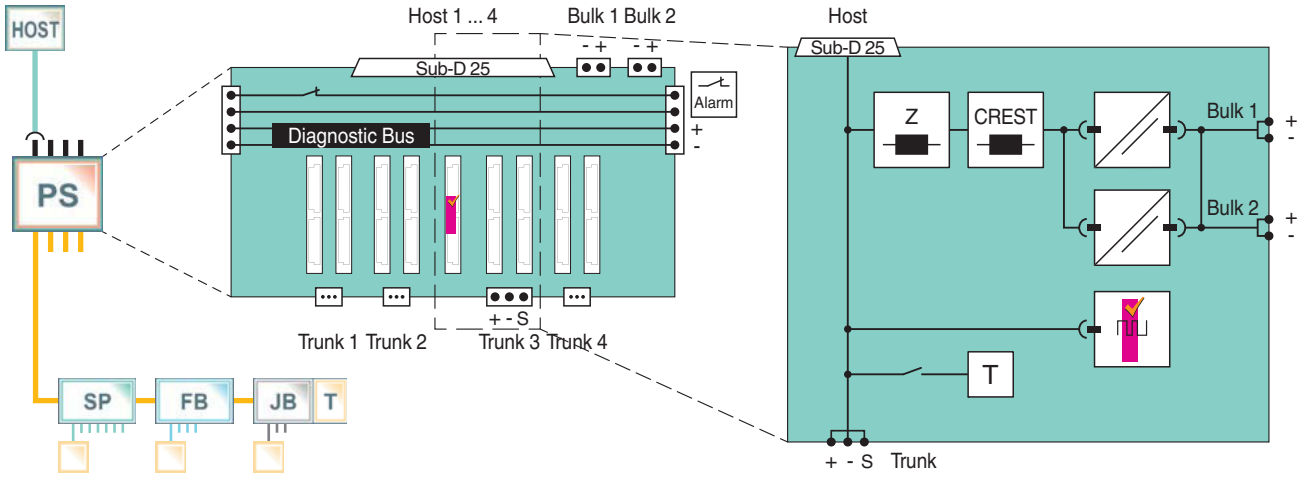
Assembly



Function

The FieldConnex®Universal Power Hub is a modular fieldbus power supply, providing the most options for most reliable communication. It supports explosion protection e.g. the High-Power Trunk for longest cable run and highest device count. The Power Hub supports optional Advanced Diagnostics for fast fieldbus commissioning and online monitoring.
The motherboard is the wiring interface and mounting plate with a DB-25 connector for PROFIBUS PA gateway or customizable cable connections to any DCS. Sockets for individual power modules enable simple installation and can be replaced without tools. Certain motherboards enable power redundancy with seamless transfer. Pairs of modules feed each segment.
Availability and a long service life are achieved through: only one passive impedance filter per segment with CREST for superior signal transmission, optimized design for low power dissipation and high-availability fieldbus termination. Any mounting direction allows optimized and space-saving cabinet layout.

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Supply	
Connection	redundant
Rated voltage	19.2 ... 35 V SELV/PELV
Rated current	16 A
Fieldbus interface	
Number of segments	
Redundant	4
Terminating resistor	selectable 100 Ω
Indicators/operating means	
Fault signal	VFC alarm output via connectors
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	IEC 62103
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Mechanical specifications	
Connection type	screw terminals
Core cross-section	2.5 mm²
Mounting	DIN mounting rail
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	⟨Ex⟩ II 3G EEx nA C IIC T4
Directive conformity	
Directive 94/9/EC	IEC 60079-15:2003

Compatible power modules

		HD2-FBPS-1.17.500	HD2-FBPS-1.23.500	HD2-FBPS-1.25.360	HD2-FBPS-1.500	HD2-FBCL-1.500	
Power Output							
Voltage (V)		15 ... 17	21 ... 23	25 ... 28	28 ... 30	-[1]	
Current (mA)		500	500	360	500	500	
Limit U_0 (V)		17.5	24	-	-	-	
Device in ...	**Type of Protection**						**Required Installation Components**
Zone 0/Div. 1	Intrinsically safe Ex ia			■	■	■	FieldBarrier
Zone 1/Div. 1	Intrinsically safe Ex ia			■	■	■	FieldBarrier
Zone 1/Div. 1	Flameproof Ex d			■	■	■	Segment Protector R-SP-E12 or any Segment Protector installed in Zone 2
Zone 2	Intrinsically safe Ex ic (FISCO)	■					Selected Segment Protectors
Zone 2	Intrinsically safe Ex ic (Entity)		■				Selected Segment Protectors
Div. 2	Non-incendive	■	■	■	■		Any Segment Protector; power module selection depends on voltage of field device
Safe Area	No specific type of protection			■	■	■	Segment Protector recommended

[1] follows bulk power supply

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Features

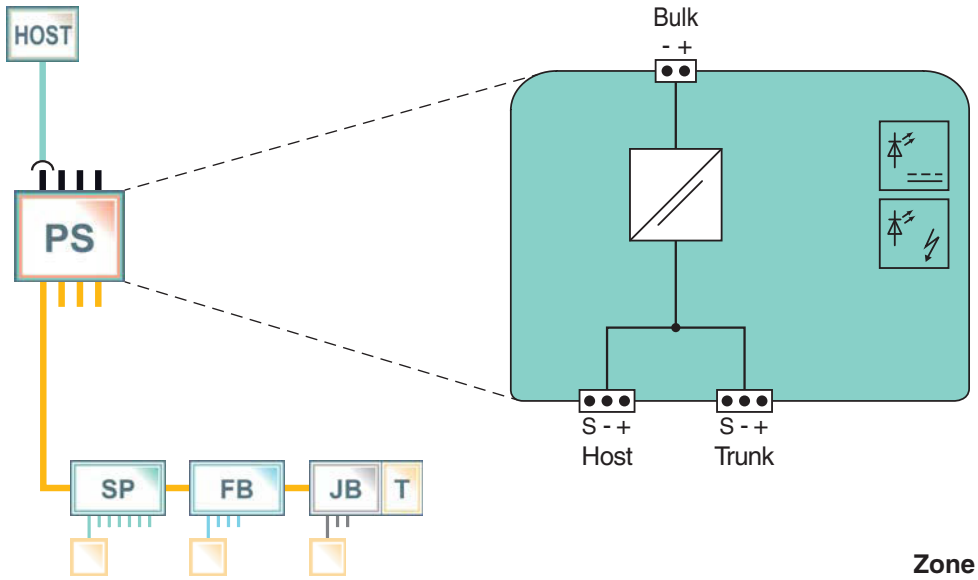
- **Output: 15 ... 17 V/500 mA**
- **Voltage limitation for FISCO ic, Entity ic, also FNICO and Ex nL**
- **With galvanic isolation**
- **Installation in Zone 2/Class I, Div. 2**
- **High efficiency, low heat dissipation for high packing density**
- **Hot swappable in redundant configuration**
- **Module exchange without tools during operation**

Function

This Power Supply Module is a system component for the FieldConnex® Power Hub and can be plugged into the motherboard. It adapts current and voltage for the supply of fieldbus segments and field devices.
The combination of this power supply, selected motherboards and R2 Segment Protectors provide outputs certified for explosion protection Ex ic according to FISCO or Entity. Reliability of communication is enhanced through galvanic isolation between segment and bulk power supply. Two LEDs indicate power and status. In redundant configuration two modules are connected in parallel via simple circuits ensuring seamless operation.

Assembly

Connection



Zone 2/Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Supply	
Rated voltage	19.2 ... 35 V DC
Rated current	520 ... 290 mA
Power loss	typ. 1.3 W
Fieldbus interface	
Rated voltage	15 ... 17 V
Rated current	500 ... 10 mA
Short-circuit current	550 mA
Terminating impedance	Motherboard specific
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	Motherboard specific
Core cross-section	Motherboard specific
Mounting	motherboard mounting
Data for application in connection with Ex-areas	
Outputs	
Voltage U_o	17.5 V
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	Ⓔx II 3 G Ex nA II T4
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-11:2007, EN 60079-15:2006
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4
Certificates and approvals	
Marine approval	DNV A-10798

Edition 912868 (US) / 220231 (EU)05/2013

Features

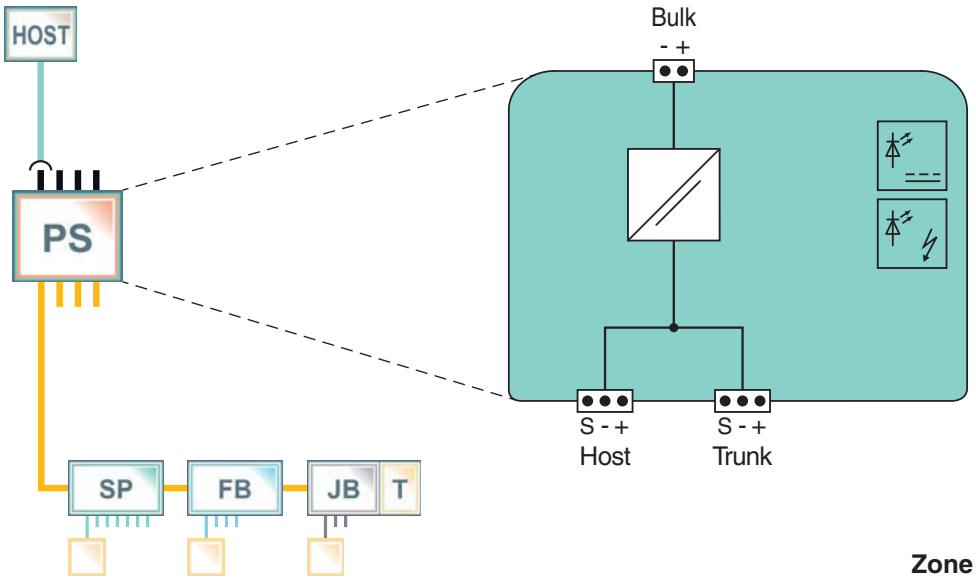
- **Output: 21 ... 23 V/500 mA**
- **Voltage limitation for Entity ic and Ex nL**
- **With galvanic isolation**
- **Installation in Zone 2/Class I, Div. 2**
- **High efficiency, low heat dissipation for high packing density**
- **Hot swappable in redundant configuration**
- **Module exchange without tools during operation**

Function

This Power Supply Module is a system component for the FieldConnex® Power Hub and can be plugged into the motherboard. It adapts current and voltage for the supply of fieldbus segments and field devices.
The combination of this power supply, selected motherboards and R2 Segment Protector provide outputs certified for explosion protection Entity Ex ic and Entity Ex nL.
Reliability of communication is enhanced through galvanic isolation between segment and bulk power supply. Two LEDs indicate power and status. In redundant configuration two modules are connected in parallel via simple circuits ensuring seamless operation.

Assembly

Connection



Zone 2/Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Supply	
Rated voltage	19.2 ... 35 V DC
Rated current	700 ... 390 mA
Power loss	typ. 1.5 W
Fieldbus interface	
Rated voltage	21 ... 23 V
Rated current	500 ... 10 mA
Short-circuit current	550 mA
Terminating impedance	Motherboard specific
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	Motherboard specific
Core cross-section	Motherboard specific
Mounting	motherboard mounting
Data for application in connection with Ex-areas	
Outputs	
Voltage U_o	24 V
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	Ⓔx II 3 G Ex nA II T4
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-11:2007, EN 60079-15:2006
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4
Certificates and approvals	
Marine approval	DNV A-10798

Edition 912868 (US) / 220231 (EU)05/2013

Features

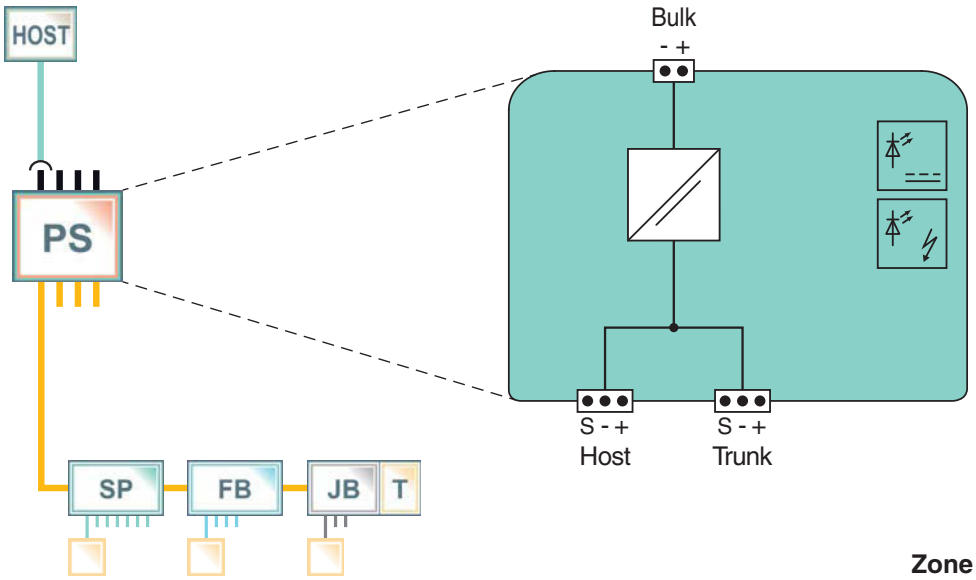
- **Output: 28 ... 30 V/500 mA**
- **High-Power Trunk for high device count and long cable runs**
- **With galvanic isolation**
- **Installation in Zone 2/Class I, Div. 2**
- **High efficiency, low heat dissipation for high packing density**
- **Hot swappable in redundant configuration**
- **Module exchange without tools during operation**

Function

This Power Supply Module is a system component for the FieldConnex® Power Hub and can be plugged into the motherboard. It adapts current and voltage for the supply of fieldbus segments and field devices.
This power supply features the highest output power and allows for maximum cable lengths and highest number of devices in hazardous areas with the High-Power Trunk concept.
Reliability of communication is enhanced through galvanic isolation between segment and bulk power supply. Two LEDs indicate power and status. In redundant configuration two modules are connected in parallel via simple circuits ensuring seamless operation.

Assembly

Connection



Zone 2/Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Supply	
Rated voltage	19.2 ... 35 V DC
Rated current	910 ... 490 mA
Power loss	typ. 1.8 W
Fieldbus interface	
Rated voltage	28 ... 30 V
Rated current	500 ... 10 mA
Short-circuit current	550 mA
Terminating impedance	Motherboard specific
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	Motherboard specific
Core cross-section	Motherboard specific
Mounting	motherboard mounting
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	Ⓔx II 3 G Ex nA II T4
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-11:2007, EN 60079-15:2006
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4
Certificates and approvals	
Marine approval	DNV A-10798

Edition 912868 (US) / 220231 (EU)05/2013

Features

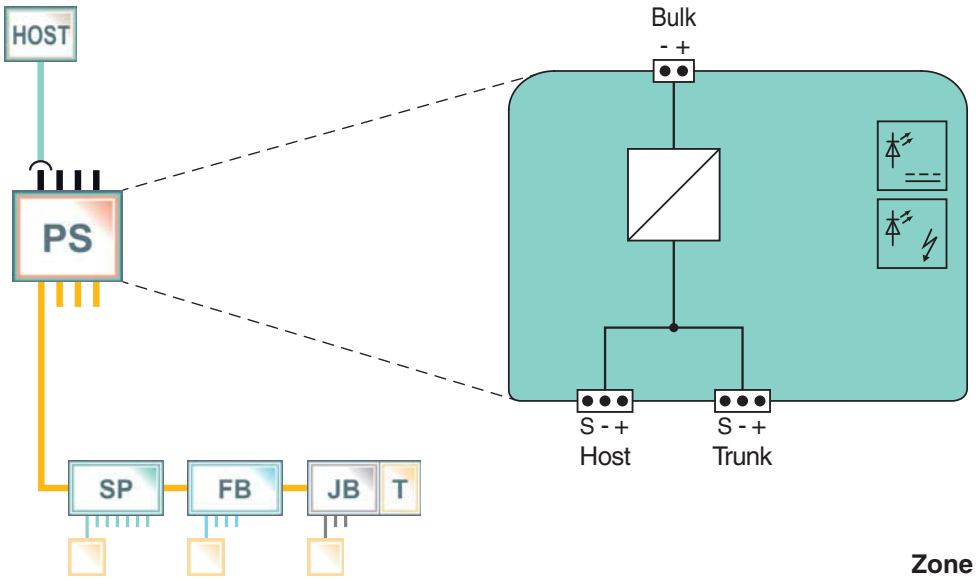
- **Output: bulk power voltage 500 mA**
- **High-Power Trunk for high device count and long cable runs**
- **Without galvanic isolation**
- **Installation in Zone 2/Class I, Div. 2**
- **Very low heat dissipation**
- **Hot swappable in redundant configuration**
- **Module exchange without tools during operation**

Function

The Power Conditioner Module is a system component for the FieldConnex® Power Hub and can be plugged into any universal motherboard (Type code: MB-FB*). It adapts the current for the supply of fieldbus segments and field devices. The power conditioner limits the current and provides the voltage levels from the bulk power to the network without galvanic isolation. It has the smallest number of components for a very long service life. It provides short-circuit limitation towards the segment and the host interfaces. Two LEDs indicate power and status. In redundant configuration two modules are connected in parallel via simple circuits ensuring seamless operation.

Assembly

Connection



Zone 2/Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Supply	
Rated voltage	19.2 ... 32 V DC
Power loss	max. 0.8 W
Fieldbus interface	
Rated voltage	supply voltage minus ≤ 2.5 V at full load
Rated current	0 ... 500 mA
Short-circuit current	600 mA
Host-rated current	0 ... 40 mA
Host short-circuit current	0 ... 55 mA
Terminating impedance	Motherboard specific
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Mechanical specifications	
Connection type	Motherboard specific
Core cross-section	Motherboard specific
Mounting	motherboard mounting
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	⟨Ex⟩ II 3G EEx nA II T4
Directive conformity	
Directive 94/9/EC	EN 60079-15:2003
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4

Edition 912868 (US) / 220231 (EU)05/2013

Features

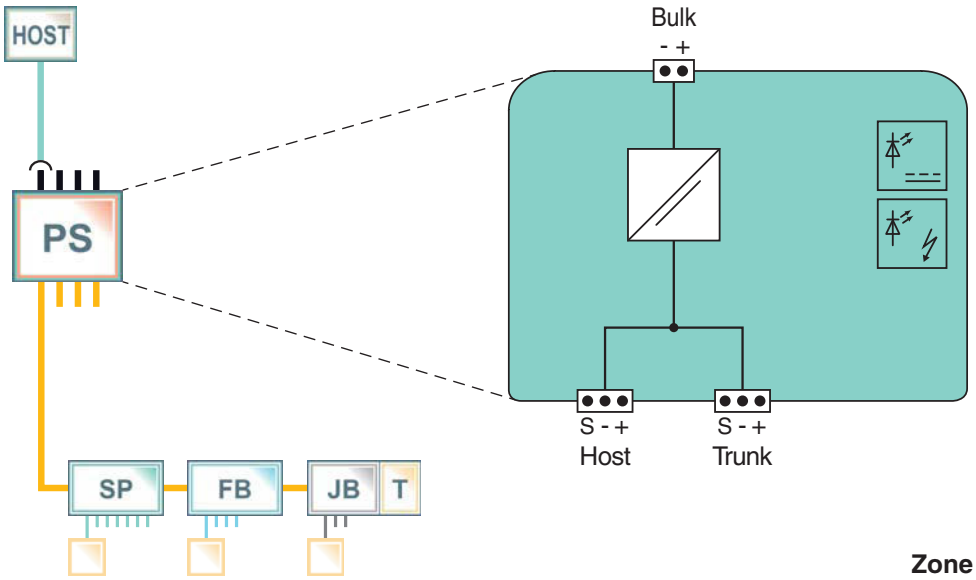
- **Output: 25 ... 28 V/360 mA**
- **Universal power supply for most applications**
- **With galvanic isolation**
- **Installation in Zone 2/Class I, Div. 2**
- **High efficiency, low heat dissipation for high packing density**
- **Hot swappable in redundant configuration**
- **Module exchange without tools during operation**

Function

This Power Supply Module is a system component for the FieldConnex® Power Hub and can be plugged into the motherboard. It adapts current and voltage for the supply of fieldbus segments and field devices.
This power supply satisfies the needs of most fieldbus applications with regards to cable lengths and number of devices.
Reliability of communication is enhanced through galvanic isolation between segment and bulk power supply. Two LEDs indicate power and status. In redundant configuration two modules are connected in parallel via simple circuits ensuring seamless operation.

Assembly

Connection



Zone 2/Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical data

Supply	
Rated voltage	19.2 ... 35 V DC
Rated current	670 ... 360 mA
Power loss	typ. 2 W
Fieldbus interface	
Rated voltage	25 ... 28 V
Rated current	360 ... 10 mA
Short-circuit current	typ. 400 mA
Terminating impedance	Motherboard specific
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	Motherboard specific
Core cross-section	Motherboard specific
Mounting	motherboard mounting
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 06 ATEX 553229 X
Group, category, type of protection, temperature class	Ⓔx II 3 G Ex nA II T4
Directive conformity	
Directive 94/9/EC	EN 60079-15:2005, EN 60079-0:2004
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4
Certificates and approvals	
Marine approval	DNV A-10798

Edition 912868 (US) / 220231 (EU)05/2013

Features

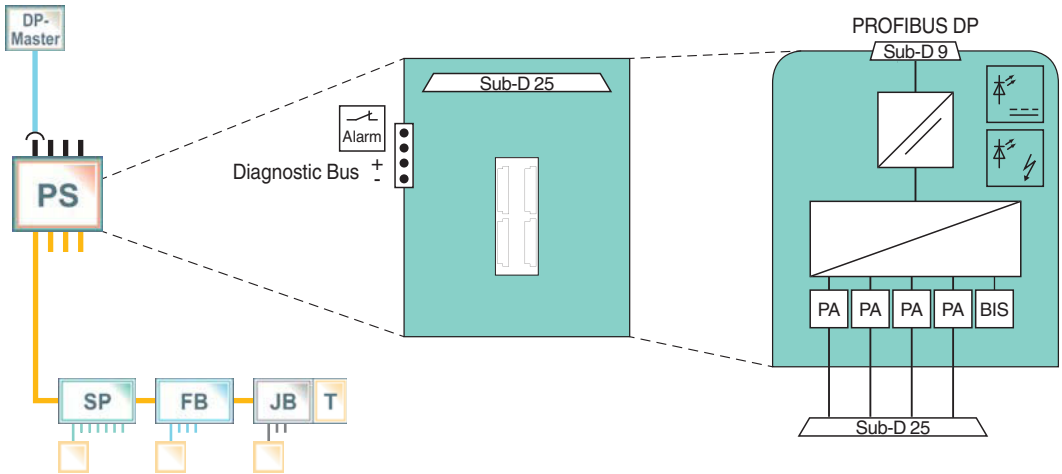
- **For one PROFIBUS Gateway Module**
- **Connection to PROFIBUS DP**
- **Part of Segment Coupler 3**

Function

The PROFIBUS Gateway Motherboard is a system component of the FieldConnex® PROFIBUS Universal Power Hub system. Gateway, power supply and respective motherboards combined are named PROFIBUS Segment Coupler 3 (SK3).
The motherboard is the mounting plate and wiring interface for one PROFIBUS Gateway Module. It connects to any *.GEN Power Supply Motherboard via system cable (included). Communication is transparent between DP and PA: The gateway segment coupler makes each PA device appear as if it was connected to DP. This includes cyclic/acyclic data exchange and transmission speed. Segment design is clear and easy to understand without sub-networks; the gateway module itself is configuration free - all reducing engineering work.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Supply	
Rated voltage	19.2 ... 35 V SELV/PELV
Rated current	2 ... 3 A
Indicators/operating means	
Fault signal	VFC alarm output via connectors
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	IEC 62103
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Mechanical specifications	
Mounting	DIN mounting rail
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	Ⓔx II 3G EEx nA IIC T4
Directive conformity	
Directive 94/9/EC	IEC 60079-15:2003
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4

PROFIBUS Power Hub Gateway Module

Type code	Description
HD2-GTR-4PA	PROFIBUS DP/PA Gateway Module

Edition 912868 (US) / 220231 (EU)05/2013

Features

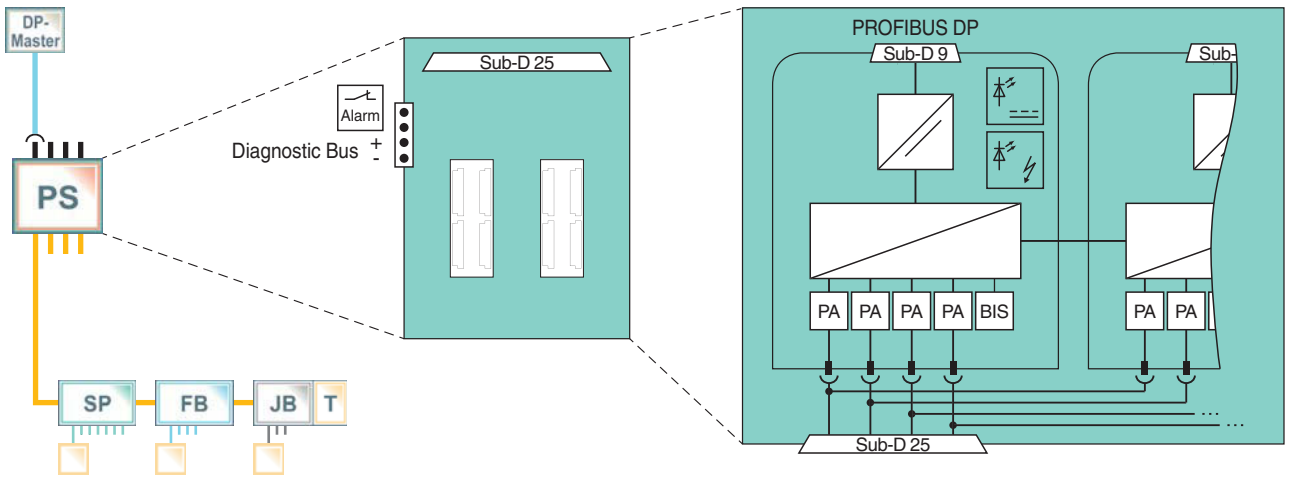
- **For two PROFIBUS Gateway Modules**
- **Redundant configuration**
- **Connection to PROFIBUS DP**
- **Part of Segment Coupler 3**

Function

The PROFIBUS Gateway Motherboard is a system component of the FieldConnex® PROFIBUS Universal Power Hub system. Gateway, power supply and respective motherboards combined are named PROFIBUS Segment Coupler 3 (SK3).
The motherboard is the mounting plate and wiring interface for two PROFIBUS Gateway Modules. It connects to any *.GEN Power Supply Motherboard via system cable (included). Communication is transparent between DP and PA: The gateway segment coupler makes each PA device appear as if it was connected to DP. This includes cyclic/acyclic data exchange and transmission speed. Segment design is clear and easy to understand without sub-networks; the gateway module itself is configuration free - all reducing engineering work.
Gateway modules operate in redundant configuration with handshaking between each communication. During redundancy transfer between modules communication is seamless for DP-Master und field devices ensuring continued operation. Gateways indicate their internal status via voltage-free contact and via diagnostic telegram on PROFIBUS DP.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Supply	
Rated voltage	19.2 ... 35 V SELV/PELV
Rated current	2 ... 3 A
Indicators/operating means	
Fault signal	VFC alarm output via connectors
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	IEC 62103
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Mechanical specifications	
Mounting	DIN mounting rail
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	Ⓔx II 3G EEx nA IIC T4
Directive conformity	
Directive 94/9/EC	IEC 60079-15:2003
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4

PROFIBUS Power Hub Gateway Module

Type code	Description
HD2-GTR-4PA	PROFIBUS DP/PA Gateway Module

Edition 912868 (US) / 220231 (EU)05/2013

Features

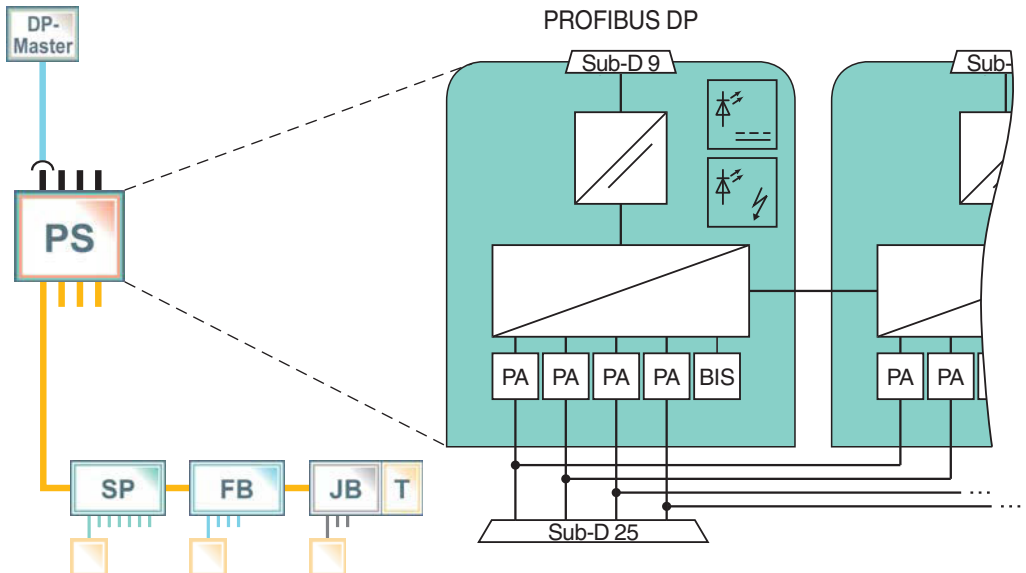
- **PROFIBUS DP V1/For 4 segments PA**
- **Connects PA transparently to PROFIBUS DP**
- **Optional redundant configuration**
- **Installation in Zone 2/Class I, Div. 2**
- **Up to 12 Mbit/s, auto adapting**
- **For redundant and non-redundant masters**
- **Supports Flying Redundancy (FR)**
- **Cyclic/acyclic data exchange**

Function

The fieldbus gateway is a system component of the FieldConnex® PROFIBUS Power Hub (Segment Coupler 3/SK3) and plugs into the gateway motherboard. It transparently connects PROFIBUS DP with up to four PROFIBUS PA segments. It operates in conjunction with power supply modules connected to a separate motherboard (*.GEN).
Transparent coupling means that each PA slave is directly addressed and configured from the PROFIBUS DP master. The gateway itself is configuration free. A DTM enables setup of communication and offers several status and diagnostic functionalities.
Used in connection with the corresponding motherboard, two gateways provide redundant coupling. The HD2-GTR-4PA supports PROFIBUS Flying Redundancy (FR) and all non-redundant master.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Supply	
Rated voltage	19.2 ... 35 V DC
Rated current	160 ... 90 mA
Power loss	3 W
Fieldbus interface	
PROFIBUS DP	
Connection	9-pin Sub-D socket
Protocol	PROFIBUS DP V1
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 73/23/EEC	EN 50178 (identical to EN 62103)
Standard conformity	
Electrical isolation	IEC 62103
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Mounting	motherboard mounting
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 04 ATEX 2500 X
Group, category, type of protection, temperature class	Ⓔx II 3G EEx nA II T4
Directive conformity	
Directive 94/9/EC	EN 60079-15:2003
International approvals	
FM approval	CoC 3024816, CoC 3024816C
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, AEx/Ex nA IIC T4

Edition 912868 (US) / 220231 (EU)05/2013

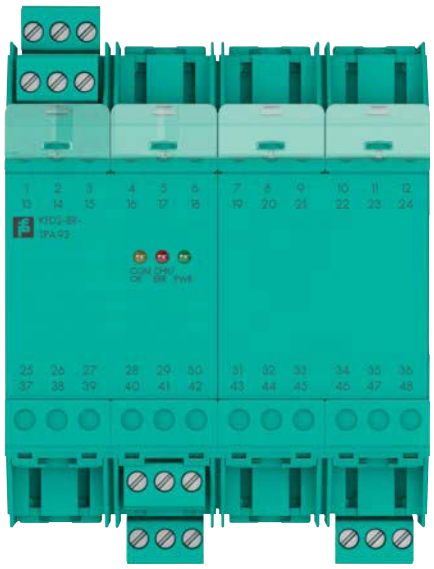
Features

- **Output: 24 ... 26 V/400 mA**
- **Connects PA transparently to PROFIBUS DP**
- **Intrinsically safe, Ex ia (FISCO or Entity)**
- **Installation in Zone 2/Class I, Div. 2**
- **Fixed, high-availability terminator**
- **For all non-redundant masters**
- **Cyclic/acyclic data exchange**

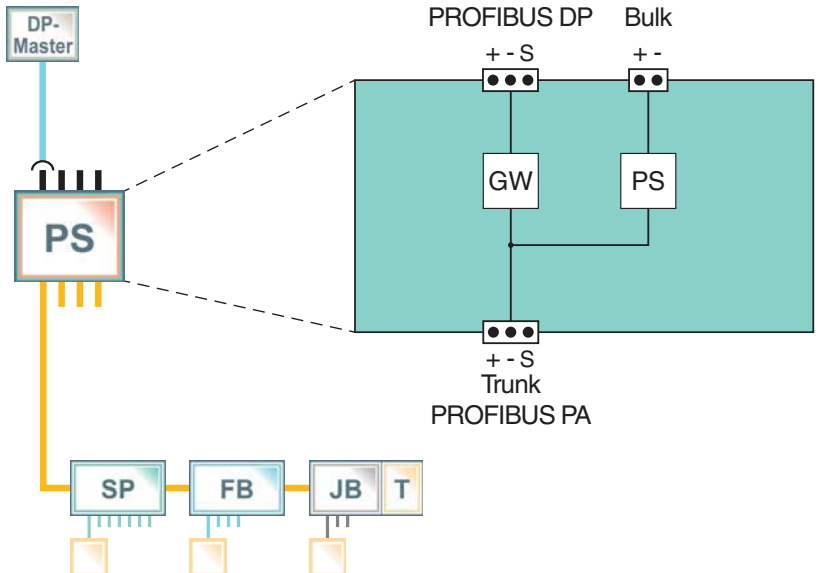
Function

This "Segment Coupler 1" or SK1 is an all-in-one gateway and fieldbus power supply for connecting PROFIBUS PA to PROFIBUS DP transparently. It powers a single PROFIBUS PA segment adapting current and voltage. Power output is designed for long cable lengths and device counts suiting the needs of most fieldbus applications. Fieldbus couplers provide explosion protection for live work at the spur where needed.
Transparent coupling means that each PA slave is directly addressed and configured from the PROFIBUS DP master. The gateway itself is configuration free. A DTM enables setup of communication and offers several status and diagnostic functionalities.
SK1 supports any DP master at a fixed transmission speed of 93.75 kbps.

Assembly



Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

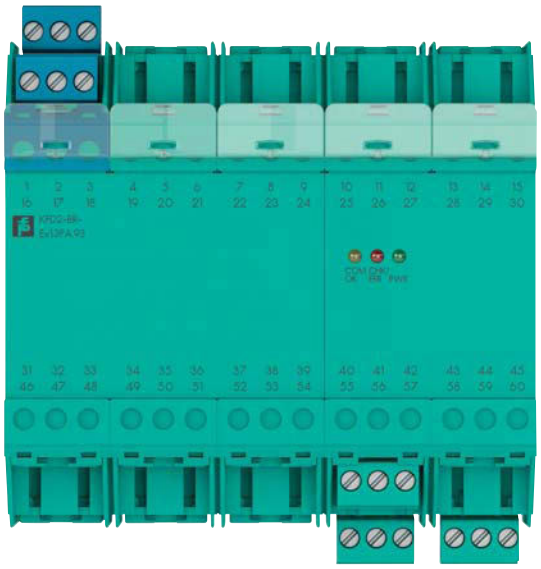
Supply	
Connection	Power Rail or terminals 47 (L+), 48 (L-)
Rated voltage	20 ... 35 V DC
Ripple	≤ 10 %
Rated current	790 mA ... 400 mA
Fieldbus interface	
PROFIBUS PA	
Connection	terminals 3, 15+; 2, 14-
Rated voltage	24 ... 26 V
Rated current	≤ 400 mA
Terminating impedance	100 Ω, integrated
PROFIBUS DP	PROFIBUS with RS 485 transmission technique
Connection	terminals 28 RxD/TxD-P, 29 RxD/TxD-N, 30 shield/FE, 40 DGND, 41 CNTR-P, 42 VP
Baud rate	93.75 kBit/s
Terminating impedance	with rotary switch (S1) switchable: 1 = on; 0 = off
Directive conformity	
Electromagnetic compatibility	
Directive 89/336/EEC	EN 61326, EN 50081-2
Standard conformity	
Electrical isolation	EN 50178
Electromagnetic compatibility	NAMUR NE 21
Protection degree	IEC/EN 60529
Climatic conditions	DIN IEC 721
Mechanical specifications	
Connection type	Terminals
Core cross-section	up to 2.5 mm^2
Mounting	DIN rail mounting
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 01 ATEX 1788X
Group, category, type of protection, temperature class	⟨Ex⟩ 3G EEx nA II T4
Directive conformity	
Directive 94/9/EC	EN 50021:1999

Edition 912868 (US) / 220231 (EU)05/2013

Features

- **Output: 12.6 ... 13.4 V/100 mA**
- **Connects PA transparently to PROFIBUS DP**
- **High-Power Trunk for high device count and long cable runs**
- **Installation in Zone 2/Class I, Div. 2**
- **Fixed, high-availability terminator**
- **For all non-redundant masters**
- **Cyclic/acyclic data exchange**

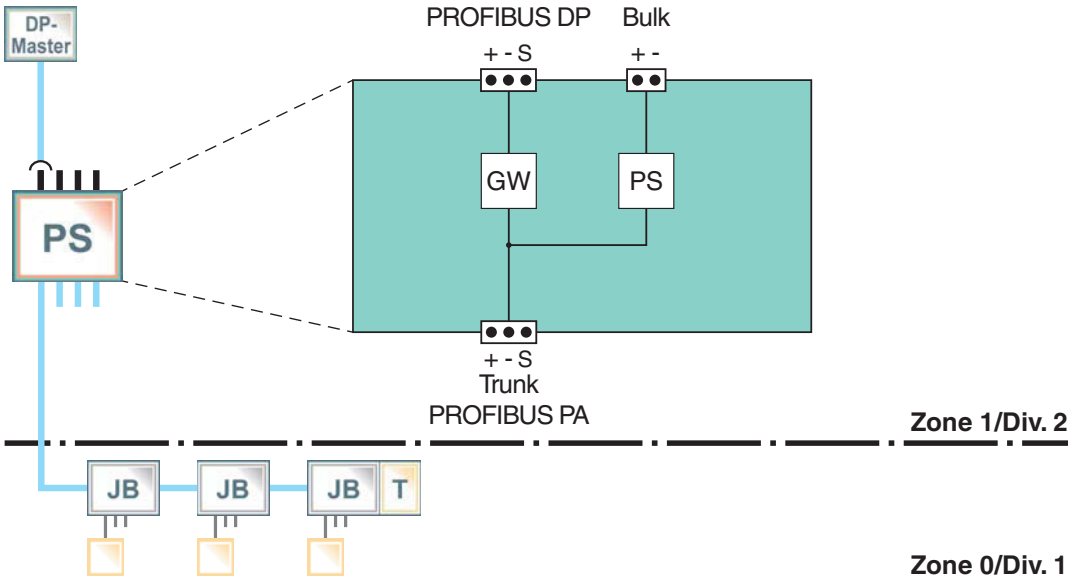
Assembly



Function

This "Segment Coupler 1" or SK1 is an all-in-one gateway and fieldbus power supply for connecting PROFIBUS PA to PROFIBUS DP transparently. It powers a single PROFIBUS PA segment adapting current and voltage.
The output is rated intrinsically safe Ex ia IIC according to FISCO and Entity. The complete segment can be installed intrinsically safe.
Transparent coupling means that each PA slave is directly addressed and configured from the PROFIBUS DP master. The gateway itself is configuration free. A DTM enables setup of communication and offers several status and diagnostic functionalities.
SK1 supports any DP master at a fixed transmission speed of 93.75 kbps.

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS PROTECTING YOUR PROCESS

Technical data

Supply	
Connection	Power Rail or terminals 59+, 60-, 58 FE
Rated voltage	20 ... 35 V DC
Ripple	≤ 10 %
Rated current	190 mA ... 430 mA
Fieldbus interface	
PROFIBUS PA	
Connection	terminals 3, 18+; 2, 17-
Rated voltage	12.6 ... 13.4 V
Rated current	≤ 100 mA
Terminating impedance	100 Ω, integrated
PROFIBUS DP	PROFIBUS with RS 485 transmission technique
Connection	Terminals 40 RxD/TxD-P, 41 RxD/TxD-N, 42 screen/FE, 55 DGND, 56 CNTR-P, 57 VP
Baud rate	93.75 kBit/s
Terminating impedance	with rotary switch (S1) switchable: 1 = on; 0 = off
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	EN 50178
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Climatic conditions	IEC 60721
Mechanical specifications	
Connection type	Terminals
Core cross-section	up to 2.5 mm^2
Mounting	DIN rail mounting
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 99 ATEX 2142, for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection, temperature class	⟨Ex⟩ II (1)GD [EEx ia] IIC
Supply	
Maximum safe voltage U_m	253 V AC/125 V DC (Attention! U_m is no rated voltage.)
PROFIBUS PA	
Voltage U_o	15 V
Current I_o	207.2 mA
Power P_o	1.93 W
Maximum safe voltage U_m	60 V
Statement of conformity	TÜV 00 ATEX 1531 X, observe statement of conformity
Group, category, type of protection, temperature class	⟨Ex⟩ II 3G EEx nA II T4
Directive conformity	
Directive 94/9/EC	EN 50014:1997 EN 50020:1994

Edition 912868 (US) / 220231 (EU)05/2013

Features

- **Adjustable output 15 ... 30 V/max.1 A**
- **8 hours operation at 500 mA without recharging**
- **IP 54 - Rain and splash proof**
- **Rugged housing for outdoor use**
- **Low battery and overload indication**
- **Output current meter**
- **Selectable terminators for creating any type of termination**
- **All in one - no additional components required**

Function

Validation of device communication and fieldbus installation testing can be done even when the line voltage or DCS system is not available. This allows on-site personnel to verify the quality of the installation at early stages.

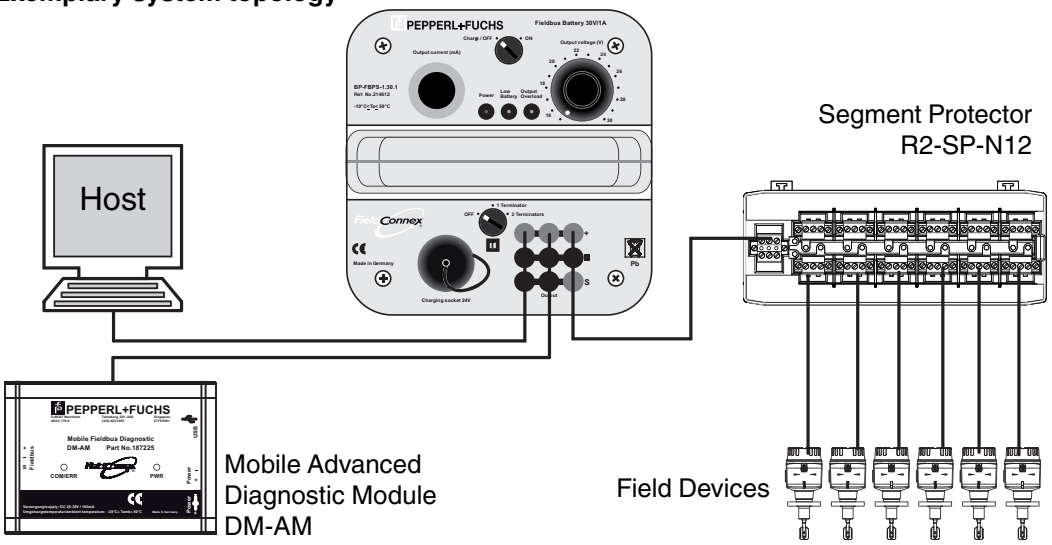
The fieldbus battery features a rugged housing for indoor/outdoor use during commissioning of fieldbus segments. The battery includes a fieldbus power conditioner. Its output voltage is adjustable to match the value of the later used fieldbus power supply. A battery charger is included.

The fieldbus battery complements the FieldConnex Mobile Advanced Diagnostic Module or any other equipment available for testing any fieldbus installation.

Assembly

Connection

Exemplary system topology



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Supply	
Battery charger	110 ... 240 V AC, 50/60 Hz
Charging voltage	24 V DC
Connections	
Battery charger	DC Round socket
Fieldbus interface	
Rated voltage	15 ... 30 V DC, adjustable
Rated current	1 A
Host-side	banana socket 4 mm
Terminating resistor	2x 100 Ω on/off switchable via rotary switch
Diagnostic link	banana socket 4 mm
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Accumulator	
Capacitance	7200 mAh
Charging time	8 ... 16 h

Edition 912868 (US) / 220231 (EU)05/2013

Features

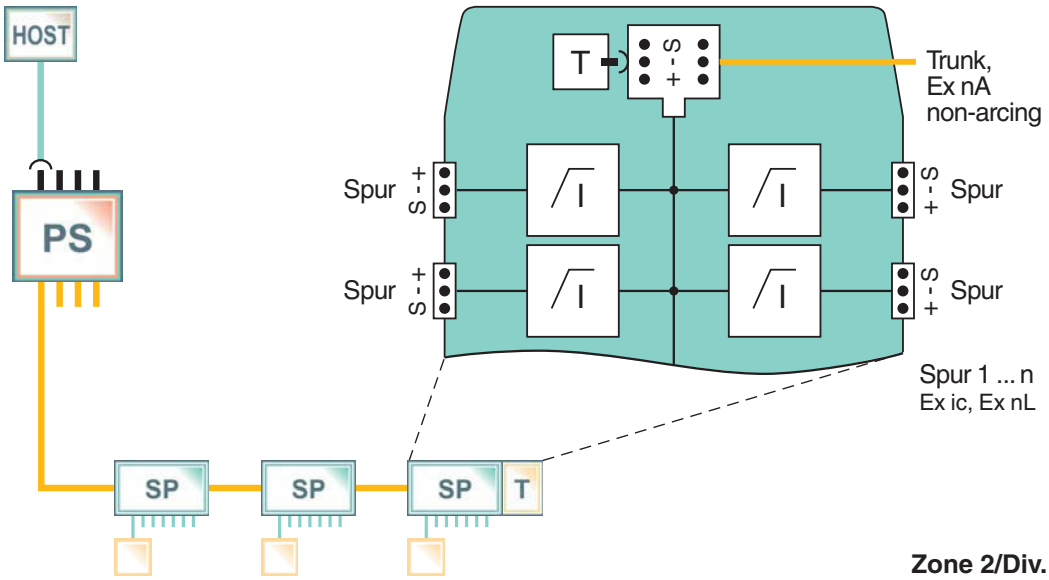
- **4 ... 12 outputs Ex ic, Ex nL (FISCO or Entity) or non-incendive (Div 2)**
- **Short-circuit protection per output**
- **Segment Protector in Zone 2/Div. 2**
- **Instruments in Zone 2/Div. 2**
- **Power, Com, and Error LEDs**
- **T-connector for easy installation and maintenance**
- **Test points for easy troubleshooting**

Function

The R2 Segment Protector, a fieldbus coupler for DIN-rail installation, connects 4 ... 12 instruments to the segment with intrinsic safety (Ex ic), energy limitation (Ex nL) and short circuit protection at each spur. This ensures proper operation of the segment during faults or hot work at the spur.
The T-connector at the trunk allows for exchange of a Segment Protector with no effect on the remaining segment. The terminator is mounted at the 'T' and removed for network extensions always ensuring proper termination.
All plugs feature retaining screws. LEDs and test access points simplify troubleshooting and help to decrease repair time. Any grounding and shielding concept is possible based on FieldConnex enclosure solutions.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical data

Fieldbus interface	
Main cable (Trunk)	
Rated voltage	9 ... 31 V DC
Rated current	≤ 4.5 A
Outputs	
Rated voltage	≤ 31 V
Rated current	≤ 43 mA
Short-circuit current	max. 58 mA
Quiescent current	≤ 8 mA (R2-SP-N4), ≤ 8 mA (R2-SP-N6), ≤ 8 mA (R2-SP-N8), ≤ 10 mA (R2-SP-N10), ≤ 10 mA (R2-SP-N12)
Voltage drop main cable/outputs	≤ 1.3 V
Voltage drop trunk In/Out	0 V
Terminating resistor	external type M-FT 100 Ω +/- 10 %
Surge protection	Trunk overvoltage protection if voltage exceeds typ. 39 V, max. 41 V
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	removable screw terminals with retaining screws
Core cross-section	≤ 2.5 mm^2/AWG 12-24
Housing material	Polycarbonate
Housing width	77 mm
Housing height	93 mm (R2-SP-N4), 121 mm (R2-SP-N6), 148 mm (R2-SP-N8), 177 mm (R2-SP-N10), 205 mm (R2-SP-N12)
Housing depth	42 mm
Protection degree	IP20
Mass	130 g (R2-SP-N4), 180 g (R2-SP-N6), 230 g (R2-SP-N8), 280 g (R2-SP-N10), 330 g (R2-SP-N12)
Mounting	DIN rail mounting
Data for application in connection with Ex-areas	
Main cable (Trunk)	
Rated current	see Statement of Conformity
Outputs	
Voltage U_o	24 V for IIC gas group, defined by trunk voltage 32 V for IIB gas group
Current I_o	65 mA for IIC and IIB gas groups
Inductance L_o	0.25 mH for IIC and IIB gas groups
Capacitance C_o	60 nF for IIC and IIB gas groups
Statement of conformity	TÜV 11 ATEX 081151 X
Group, category, type of protection, temperature class	⟨Ex⟩ II 3G Ex nA [nL] [ic] IIC T4
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-11:2007, EN 60079-15:2005, EN 60079-27:2008
International approvals	
FM approval	CoC 3027877, CoC 3027877C
Control drawing	No. 116-0280
Approved for	Class I, Division 2, Groups A, B, C, D, T4/Class I, Zone 2, Ex nA [nL] IIC T4
UL approval	E106378
Approved for	Class I, Division 2, Groups A, B, C, D
IECEx approval	IECEx 11.0011 X
Approved for	⟨Ex⟩ Ex nA [nL] [ic] IIC T4
Certificates and approvals	
Marine approval	DNV A-10798

912868 (US) / 220231 (EU)05/2013
Edition

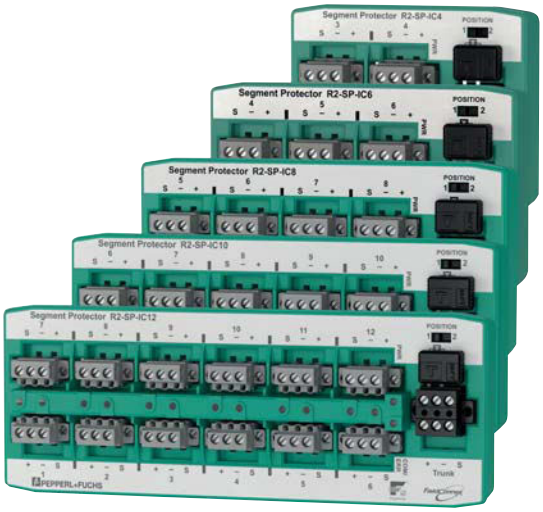
Features

- **4 ... 12 outputs Ex ic (FISCO or Entity) or non-incendive (Div 2)**
- **Advanced fault isolation at the spur**
- **Segment Protector in Zone 2/Div. 2**
- **Instruments in Zone 2/Div. 2 or Zone 1/Div. 1**
- **Advanced Diagnostics at the spur**
- **Power, Com, Diagnostics, and Error LEDs**
- **T-connector for easy installation and maintenance**
- **Test points for easy troubleshooting**

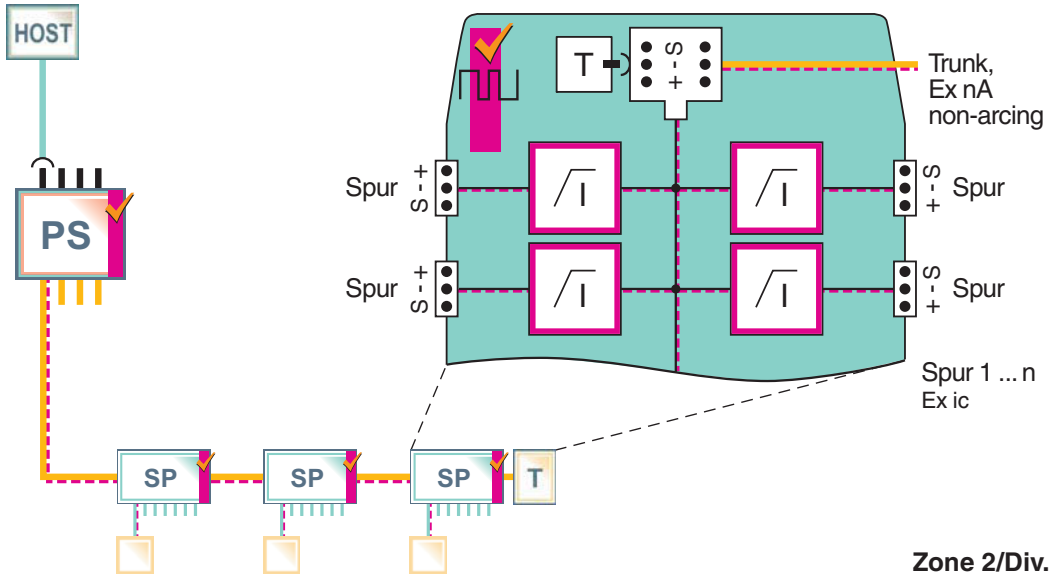
Function

The R2 Segment Protector with integrated diagnostics, a fieldbus coupler for DIN rail installation, connects 4 ... 12 instruments to the segment with intrinsic safety (Ex ic). Short-circuit, jabber, and bounce protection isolates most fault condition types from the segment. The short-circuit limit is adjustable for maximum load with Ex ic for gas groups IIB and IIC.
The T-connector at the trunk allows for exchange of a Segment Protector with no effect on the remaining segment. The terminator is mounted at the 'T' and removed for network extensions ensuring proper termination.
Segment Protectors with integrated diagnostics offer physical layer diagnostics at the spur. They are the basis for optional surge protectors with wear indication and enclosure leakage sensors all monitoring the quality of the installation for best availability.

Assembly



Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Fieldbus interface	
Main cable (Trunk)	
Rated voltage	9 ... 31 V DC 10.5 V DC minimum input voltage acc. to FF-846
Rated current	≤ 4.5 A
Outputs	
Rated voltage	≤ 31 V
Rated current	≤ 32 mA switch 1, position 1 ≤ 43 mA switch 1, position 2
Short-circuit current	46 mA switch 1, position 1 65 mA switch 1, position 2
Quiescent current	≤ 15 mA (R2-SP-IC4), ≤ 17 mA (R2-SP-IC6), ≤ 17 mA (R2-SP-IC8), ≤ 19 mA (R2-SP-IC10), ≤ 19 mA (R2-SP-IC12)
Voltage drop main cable/outputs	≤ 1.2 V
Voltage drop trunk In/Out	0 V
Terminating resistor	external type M-FT 100 Ω +/- 10 %
Surge protection	Trunk overvoltage protection if voltage exceeds typ. 39 V, max. 41 V
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Climatic conditions	IEC 60721
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	removable screw terminals with retaining screws
Core cross-section	≤ 2.5 mm²/AWG 12-24
Housing material	Polycarbonate
Housing width	77 mm
Housing height	93 mm (R2-SP-IC4), 121 mm (R2-SP-IC6), 148 mm (R2-SP-IC8), 177 mm (R2-SP-IC10), 205 mm (R2-SP-IC12)
Housing depth	42 mm
Protection degree	IP20
Mass	130 g (R2-SP-IC4), 180 g (R2-SP-IC6), 230 g (R2-SP-IC8), 280 g (R2-SP-IC10), 330 g (R2-SP-IC12)
Mounting	DIN rail mounting
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	TÜV 12 ATEX 098651 X
Group, category, type of protection, temperature class	Ⓔx II 3 G Ex nAc [ic] IIC T4
Supply	
Maximum safe voltage U_m	35 V
Outputs	
Voltage U_o	32 V
Current I_o	46 mA switch 1, position 1 65 mA switch 1, position 2
Inductance L_o	0.25 mH switch 1, position 1 0.125 mH switch 1, position 2
Capacitance C_o	60 nF
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2012, EN 60079-15:2010
International approvals	
IECEx approval	IECEx TUN 12.0015 X
Approved for	Ⓔx Ex nAc [ic] IIC T4
Certificates and approvals	
Marine approval	pending

912868 (US) / 220231 (EU)05/2013
Edition

Features

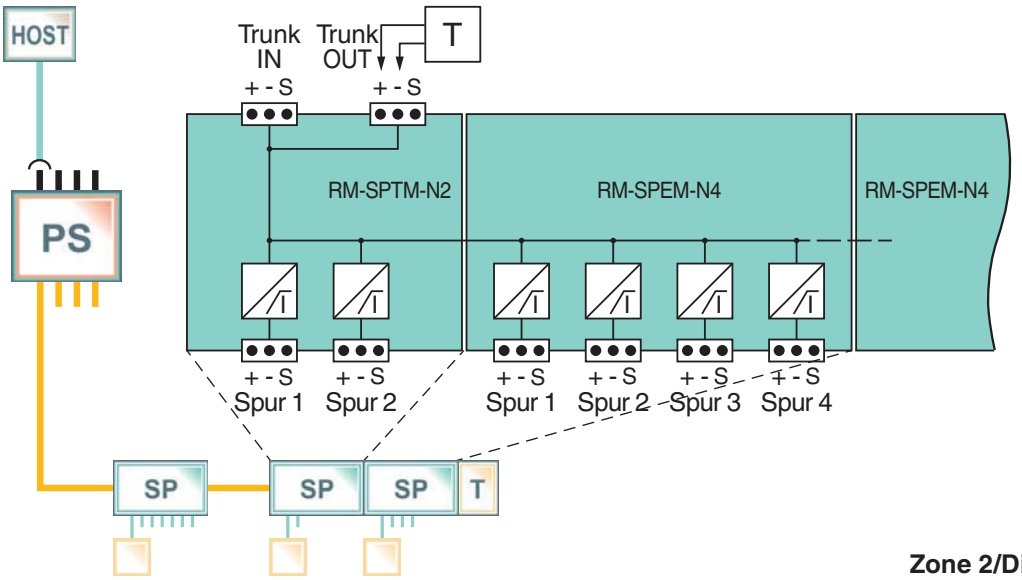
- **2 outputs Ex nL, expandable to up to 26 with short-circuit protection**
- **High-Power Trunk for high device count and long cable runs**
- **Segment Protector in Zone 2/Div. 2**
- **Instruments in Zone 2/Div. 2**
- **Power, Com, and Error LEDs**
- **Integrated overvoltage protection**

Function

The modular Segment Protector, a fieldbus coupler for DIN rail, connects instruments to the fieldbus segment. It features the most compact design and easily expandability for skid-mount applications.
The trunk module connects the Segment Protector to the segment. Expansion modules snap side-by-side interconnected via a system plug. The high-availability terminator is mounted at the output. As it is removed for network extensions proper termination is always ensured. Short-circuit protection ensures proper operation of the segment in case of faults or hot work. Integrated LEDs simplfy troubleshooting and help decrease repair time.
All connectors are plug-in type with receptacles for measuring tools, such as the mobile ADM. This leaves the wiring undisturbed. Any grounding and shielding concept is possible with FieldConnex enclosure solutions.

Assembly

Connection



Zone 2/Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical data

Fieldbus interface	
Main cable (Trunk)	
Rated voltage	9 ... 31 V DC
Rated current	≤ 4.5 A
Outputs	
Rated voltage	≤ 31 V
Rated current	≤ 43 mA
Short-circuit current	max. 58 mA
Inherent current consumption	7 mA (RM-SPTM-N2), 3.5 mA (RM-SPEM-N4), total current consumption = 7 mA + n * 3.5 mA with n = number of Extension Modules RM-SPEM-N4
Voltage drop main cable/outputs	≤ 1.3 V
Terminating resistor	100 Ω external
Surge protection	Trunk overvoltage protection if voltage exceeds typ. 39 V, max. 41 V
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	screw terminals, removable
Core cross-section	≤ 2.5 mm^2/AWG 12-24
Housing material	Polyamide PA 66
Housing width	17.5 mm per device
Housing height	94 mm
Housing depth	54 mm
Protection degree	IP20
Mass	75 g per device
Mounting	DIN rail mounting
Data for application in connection with Ex-areas	
Main cable (Trunk)	
Rated current	see Statement of Conformity
Outputs	
Voltage U_o	24 V for IIC gas group, defined by trunk voltage 32 V for IIB gas group
Current I_o	65 mA for IIC and IIB gas groups
Inductance L_o	0.25 mH for IIC and IIB gas groups
Capacitance C_o	60 nF for IIC and IIB gas groups
Statement of conformity	TÜV 11 ATEX 081152 X
Group, category, type of protection, temperature class	⟨Ex⟩ II 3G Ex nA [nL] IIC T4
Directive conformity	
Directive 94/9/EC	EN 60079-15:2005, EN 60079-0:2006
International approvals	
UL approval	E106378
Approved for	Class I, Division 2, Groups A, B, C, D
Certificates and approvals	
Marine approval	DNV A-10798

Edition 912868 (US) / 220231 (EU)05/2013

Features

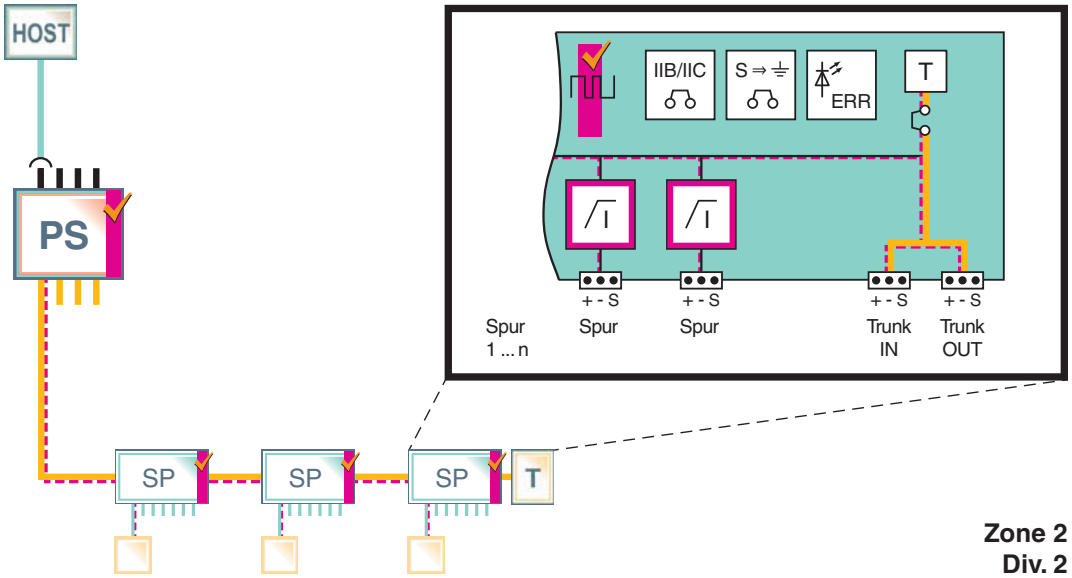
- **4 ... 10 outputs Ex ic (FISCO or Entity) or non-incendive (Div 2)**
- **Advanced fault isolation at the spur**
- **Segment Protector in Zone 2/Div. 2**
- **Instruments in Zone 2/Div. 2 or Zone 1/Div. 1**
- **Advanced Diagnostics at the spur**
- **Power, Com, Terminator, Diagnostics, and Error LEDs**

Function

The F2 Segment Protector with integrated diagnostics, a device coupler in aluminum housing, connects 4 ... 10 instruments to the segment with intrinsic safety (Ex ic). Pre-engineering options are: cable glands in various materials; a choice of fixed or plug-in terminals with screw or spring-clamp connections. Short circuit, jabber, and bounce protection isolate most fault condition types from the segment.
The short circuit current limitation is adjustable for maximum load with Ex ic for gas groups IIB and IIC. The shield can be connected hard-to-ground or floating. A terminator with LED indication is selectable via jumper.
Short circuit protection ensures proper operation of the segment in case of unwanted faults at the spur. Work on devices always requires a hot work permit. The integrated fieldbus terminator features a high-availability design and can be chosen via a jumper

Assembly

Connection



Zone 2
Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Fieldbus interface	
Main cable (Trunk)	
Rated voltage	9 ... 31 V DC, 10.5 V DC minimum input voltage acc. to FF-846
Rated current	≤ 4.5 A
Outputs	
Rated voltage	≤ 31 V
Rated current	≤ 32 mA jumper 1, position 2 ≤ 43 mA jumper 1, position 1
Short-circuit current	46 mA jumper 1, position 2 65 mA jumper 1, position 1
Quiescent current	≤ 15 mA (F2-SP-IC04), ≤ 17 mA (F2-SP-IC06), ≤ 17 mA (F2-SP-IC08), ≤ 19 mA (F2-SP-IC10)
Voltage drop main cable/outputs	≤ 1.2 V
Voltage drop trunk In/Out	0 V
Terminating resistor	selectable via Jumper 100 Ω +/- 10 %
Surge protection	trunk, spurs overvoltage protected if voltage exceeds typ. 39 V, max. 41 V
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Climatic conditions	IEC 60721
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	removable screw terminal, removable spring terminal, screw terminal
Core cross-section	≤ 2.5 mm^2/AWG 12-24
Cable entry	cable gland, plug connection, and stopping plug options
Cable diameter	6 ... 13 mm (cable glands plastic), 7 ... 12 mm (cable glands nickel plated brass), 8.5 ... 13 mm (cable glands stainless steel), 8.5 ... 16 mm outside, 6 ... 12 mm inside, 0 ... 1.25 mm armor (cable glands nickel plated brass/stainless steel for armored cable)
Housing material	ALSI12 (Cu) DIN1725 (Si 1.2 %), anodized
Housing width	120 mm (stopping plug plastic/stainless steel), 140 mm (cable glands plastic/nickel plated brass/stainless steel), 160 mm (cable glands nickel plated brass/stainless steel for armored cable), 135 mm (plug connection M12 nickel plated brass/stainless steel)
Housing height	258 mm
Housing depth	93 mm
Protection degree	IP66
Mass	max 2.6 kg, depending on model
Mounting	panel mounting
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	pending
Group, category, type of protection, temperature class	Ⓔx II 3 G Ex nAc [ic] IIC T4
Supply	
Maximum safe voltage U_m	35 V
Outputs	
Voltage U_o	32 V
Current I_o	46 mA jumper 1, position 2 65 mA jumper 1, position 1
Inductance L_o	0.25 mH jumper 1, position 1 0.125 mH jumper 1, position 2
Capacitance C_o	60 nF
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2012, EN 60079-15:2010
International approvals	
IECEx approval	pending
Approved for	pending
Certificates and approvals	
Marine approval	pending

Edition 912868 (US) / 220231 (EU)05/2013

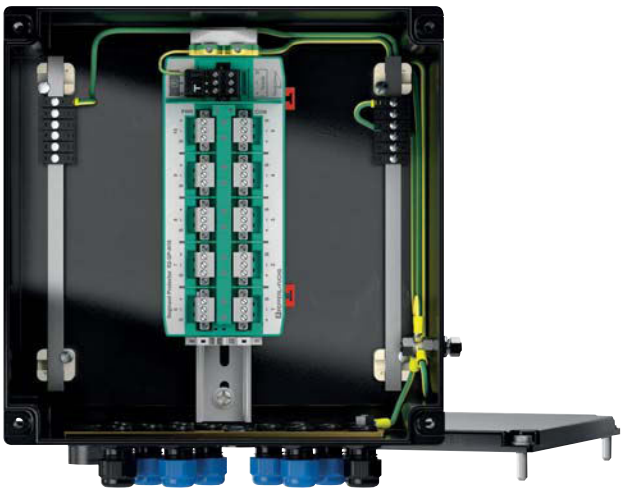
Features

- 4 ... 12 outputs Ex ic, Ex nL (FISCO or Entity)
- Glass fiber reinforced polyester, impact resistant, IP66
- Configurable cable entries for trunk and spurs
- International approvals
- Installation in Zone 2

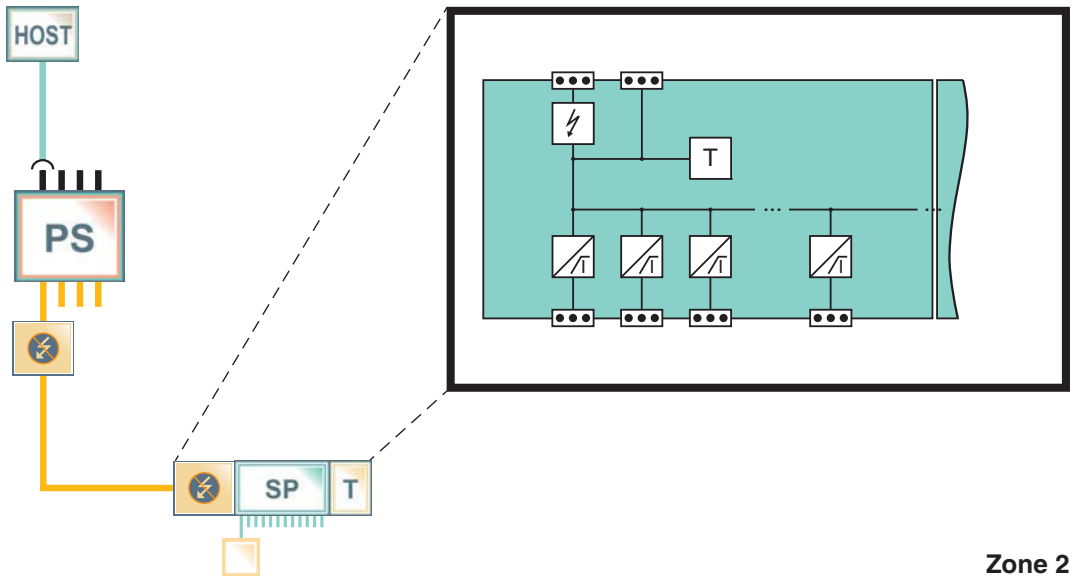
Function

This Segment Protector Junction Box is a device coupler with FieldConnex® Segment Protectors for Zone 2. Devices can be located in Zone 2. The number of outputs and size can be selected.
Glass fiber reinforced polyester provides corrosion resistance and is light weight. The surface resistance avoids electrostatic charge.
Trunk and spur entries can be selected individually from a range of cable glands and stopping plugs. A breather is included by default. Tag plate, grounding bar, surge protection for the trunk, and bus termination are available as options.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly



Connection



Zone 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

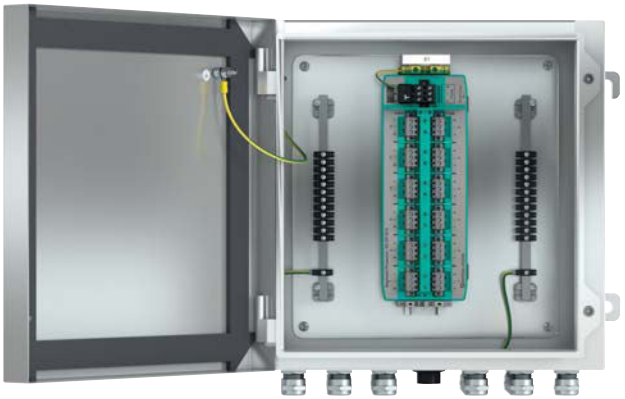
General specifications	
Installed components	Segment Protector R2-SP-N** For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Impact resistance	EN 60079-0
Mechanical specifications	
Enclosure cover	detachable cover with retaining screws
Protection degree	IP66
Cable entry	cable gland and stopping plug options
Material	
Housing	polyester, impact resistant, glass fiber reinforced
Surface	black molded finish (RAL 9005)
Surface resistance	< 10^9 Ω
Water absorption	< 6 %
Seal	silicon, one piece
Grounding plate	brass
Material thickness	grounding plate: 3 mm
Dimensions	(W x H x D) 271 x 271 x 136 mm (1 x R2-SP-N**) 544 x 271 x 136 mm (2 x R2-SP-N**)
Mounting	thru-holes Ø6.5 mm
Grounding	grounding bolt M6, Stainless steel
Data for application in connection with Ex-areas	
Statement of conformity	PF 08 CERT 1278 (assembled Junction Box), for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	⟨Ex⟩ II 3G Ex nA [nL] [ic] IIC T4
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 600079-14:2003, EN 60079-15:2005, EN 60079-11:2007
International approvals	
IECEx approval	IECEx PTB 09.0016, suitable Junction Box on request

Edition 912868 (US) / 220231 (EU)05/2013

Features

- 4 ... 12 outputs Ex ic, Ex nL (FISCO or Entity)
- Stainless steel, electropolished, IP66
- Configurable cable entries for trunk and spurs
- International approvals
- Installation in Zone 2

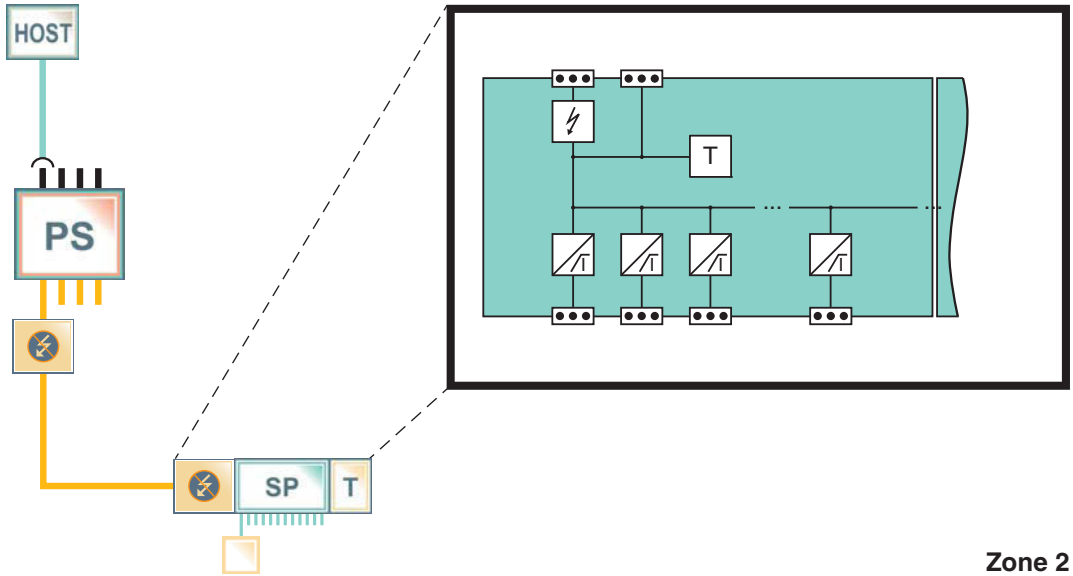
Assembly



Function

This Segment Protector Junction Box is a device coupler with FieldConnex® Segment Protectors for Zone 2. Devices can be located in Zone 2. The number of outputs and size can be selected.
Electropolished stainless steel 316L provides high corrosion and impact resistance at a very wide temperature range. The integrated rain channel prevents standing water from damaging the one-piece seal.
Trunk and spur entries can be selected individually from a range of cable glands and stopping plugs. A breather is included by default. Tag plate, grounding bar, surge protection for the trunk, and bus termination are available as options.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Connection



Zone 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	Segment Protector R2-SP-N** For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Impact resistance	EN 60079-0
Mechanical specifications	
Enclosure cover	detachable hinged door with captive retaining screws
Protection degree	IP66
Cable entry	cable gland and stopping plug options
Material	
Housing	Stainless steel 1.4404/AISI 316L
Surface	electropolished
Seal	Neoprene, fire-resistant, one piece
Material thickness	enclosure body, enclosure cover, mounting plate: 1.5 mm gland plate: 3.0 mm
Dimensions	(W x H x D) 306 x 306 x 165 mm (1 x R2-SP-N**) 380 x 380 x 175 mm (2 x R2-SP-N**)
Mounting	thru-holes Ø10 mm
Grounding	grounding bolt M10, brass
Data for application in connection with Ex-areas	
Statement of conformity	PF 08 CERT 1278 (assembled Junction Box), for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	Ⓔx II 3G Ex nA [nL] [ic] II C T4
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 600079-14:2003, EN 60079-15:2005, EN 60079-11:2007
International approvals	
IECEx approval	IECEx PTB 09.0016, suitable Junction Box on request

Edition 912868 (US) / 220231 (EU)05/2013

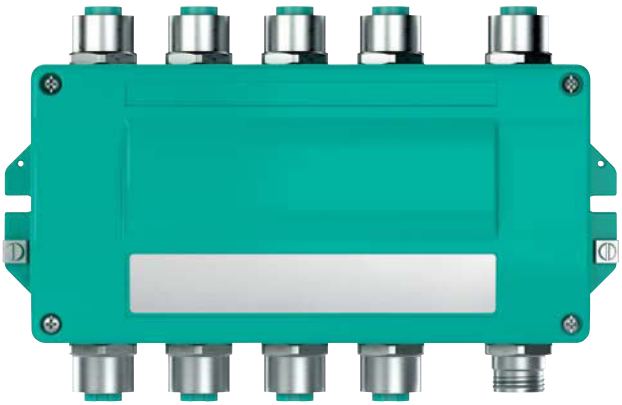
Features

- **Intrinsically safe (Ex ic)/non-incendive outputs**
- **Anodized aluminum, IP67**
- **Configurable cable entries for trunk and spurs**
- **Packaged solution**
- **Installation in Class I, Division 2**

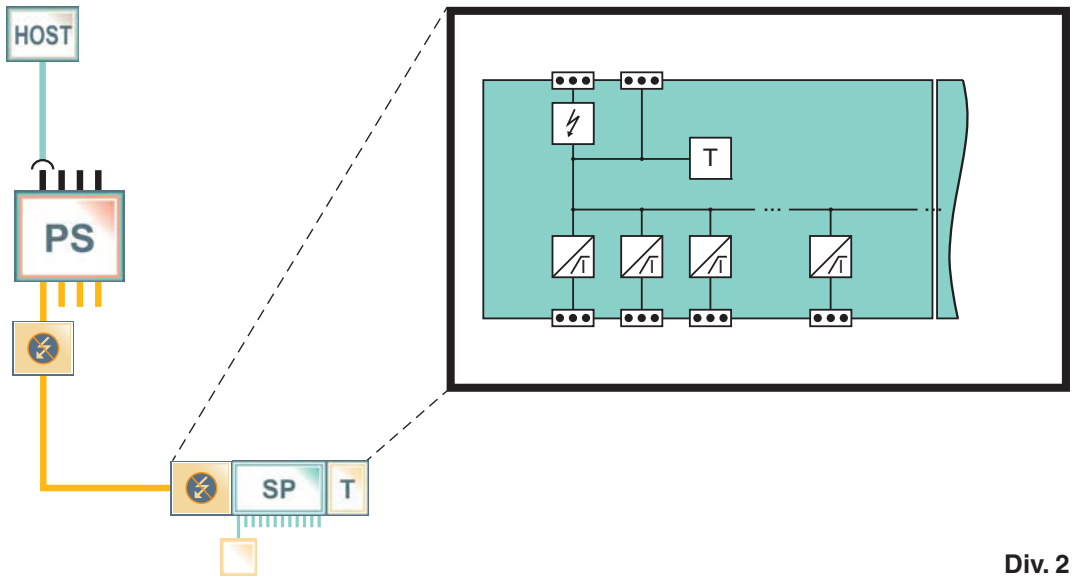
Function

This Segment Protector Junction Box is a device coupler with FieldConnex® Segment Protectors for Zone 2/Div 2. Devices can be located in Zone 2/Div 2. The number of outputs and size can be selected.
Anodized aluminum provides corrosion resistance also to salt and impact resistance with lower weight compared to stainless steel. The compact housing offers convenient mounting flanges with external grounding lug.
Trunk and spur entries can be selected individually from a range of cable glands and quick disconnects.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly



Connection



Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	Segment Protector R2-SP-N** For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Mechanical specifications	
Enclosure cover	detachable cover with retaining screws
Protection degree	IP67
Cable entry	cable gland and stopping plug options
Material	
Housing	aluminum
Surface	epoxy polyester paint
Seal	Polyurethane (PUR), one piece
Material thickness	enclosure body: 4 mm enclosure cover: 3 mm
Dimensions	(W x H x D) 114 x 258 x 84 mm
Mounting	panel mount with M6 slots
Grounding	grounding bolt on enclosure body and enclosure cover

Edition 912868 (US) / 220231 (EU)05/2013

Features

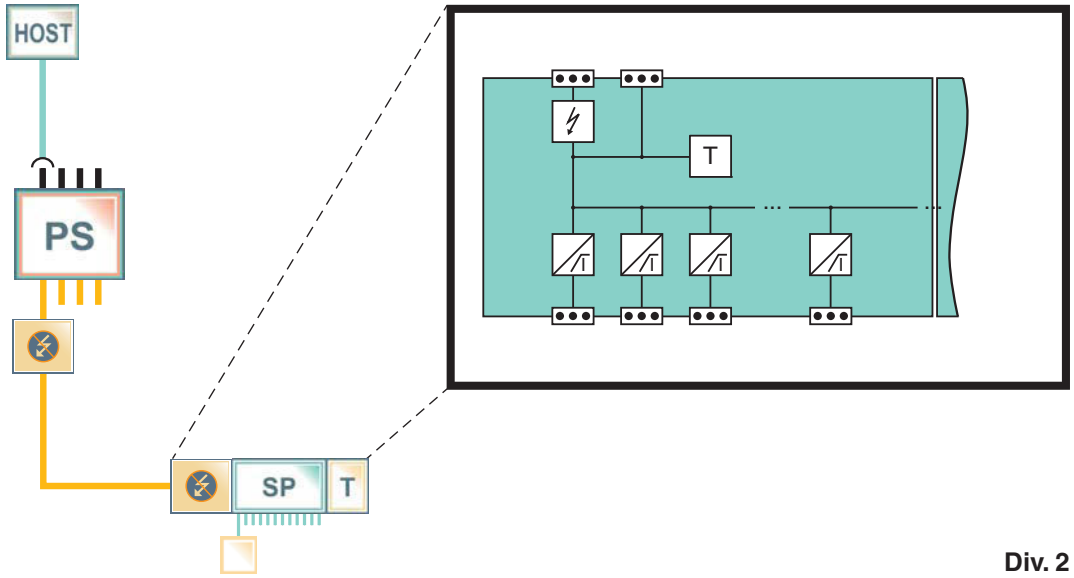
- **Intrinsically safe (Ex ic)/non-incendive outputs**
- **Carbon steel, NEMA 4**
- **Configurable cable entries for trunk and spurs**
- **Packaged solution**
- **Installation in Class I, Division 2**

Function

This Segment Protector Junction Box is a device coupler with FieldConnex® Segment Protectors for Zone 2/Div 2. Devices can be located in Zone 2/Div 2. The number of outputs and size can be selected.
Painted carbon steel provides good corrosion resistance. The optional window makes it easy to see the coupler's LEDs.
Trunk and spur entries can be selected individually from a range of cable glands and quick disconnects.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly

Connection



Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	Segment Protector R2-SP-N** For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Mechanical specifications	
Enclosure cover	hinged door with cam lock
Protection degree	IP66, NEMA 4, NEMA 4X, NEMA 12
Cable entry	cable gland and stopping plug options
Material	
Housing	Steel
Surface	gray paint
Seal	oil-resistant, one piece
Material thickness	enclosure body, enclosure cover: 1.6 mm window: 6 mm
Dimensions	(W x H x D) 203 x 254 x 102 mm window size: 197 x 95 mm
Mounting	thru-holes Ø6.4 mm
Grounding	grounding bolt on enclosure body and enclosure cover

Edition 912868 (US) / 220231 (EU)05/2013

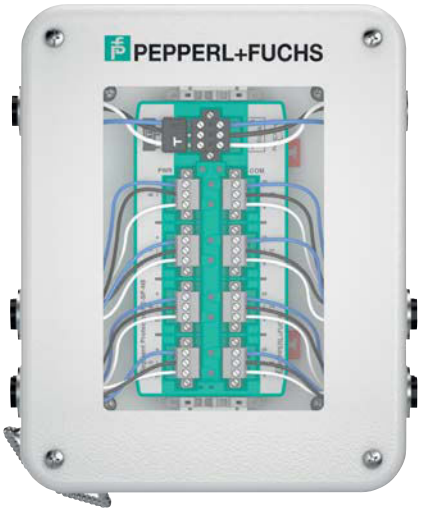
Features

- **Intrinsically safe (Ex ic)/non-incendive outputs**
- **Glass fiber reinforced polyester, NEMA 4x**
- **Configurable cable entries for trunk and spurs**
- **Packaged solution**
- **Installation in Class I, Division 2**

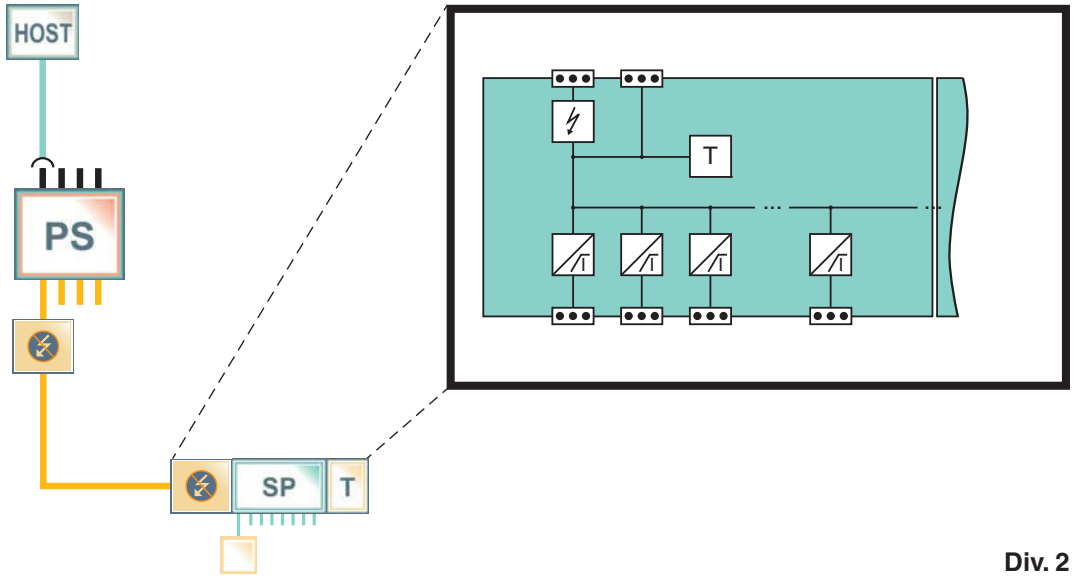
Function

This Segment Protector Junction Box is a device coupler with FieldConnex® Segment Protectors for Zone 2/Div 2. Devices can be located in Zone 2/Div 2. The number of outputs and size can be selected.
Glass fiber reinforced polyester provides corrosion resistance and is light weight. The surface resistance avoids electrostatic charge.
Trunk and spur entries can be selected individually from a range of cable glands and quick disconnects.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly



Connection



Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	Segment Protector R2-SP-N** For technical data on installed electronic component see data sheet.
Mechanical specifications	
Enclosure cover	detachable cover with stainless steel safety chain
Protection degree	NEMA 6P, NEMA 12
Cable entry	cable gland and stopping plug options
Material	
Housing	polyester, impact resistant, glass fiber reinforced
Seal	Polyurethane (PUR), one piece
Material thickness	enclosure body: 4 mm enclosure cover: 3 mm
Dimensions	(W x H x D) 191 x 244 x 121 mm
Mounting	Flanged mounting Ø8 mm holes

Edition 912868 (US) / 220231 (EU)05/2013

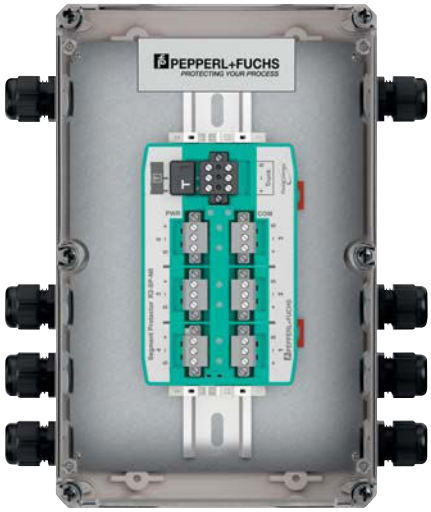
Features

- **Intrinsically safe (Ex ic)/non-incendive outputs**
- **Impact resistant polycarbonate, NEMA 4x**
- **Configurable cable entries for trunk and spurs**
- **Packaged solution**
- **Installation in Class I, Division 2**

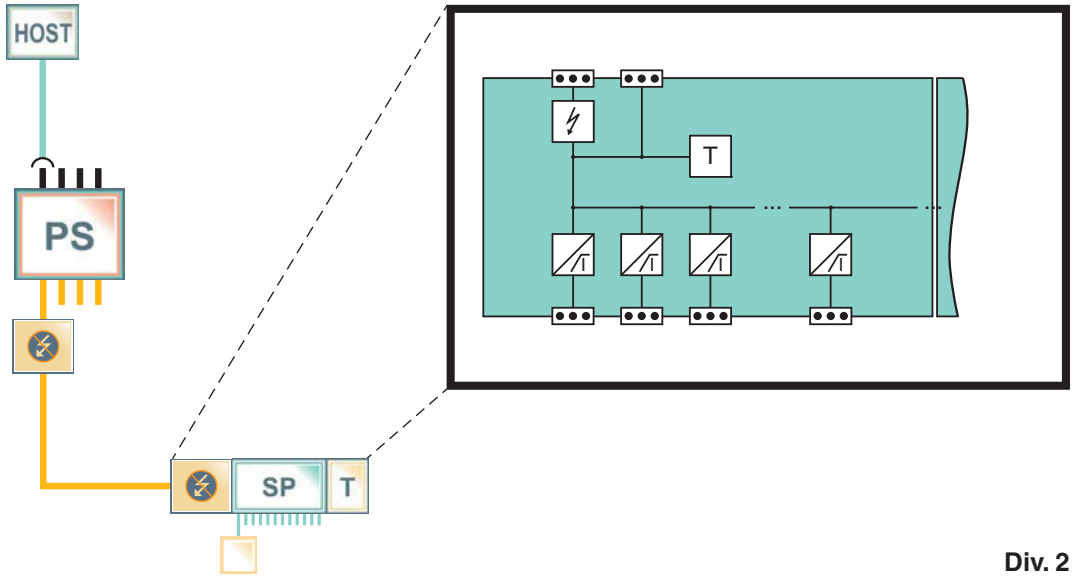
Function

This Segment Protector Junction Box is a device coupler with FieldConnex® Segment Protectors for Zone 2/Div 2. Devices can be located in Zone 2/Div 2. The number of outputs and size can be selected.
Impact-resistant polycarbonate provides corrosion resistance. It is light weight and easy to modify. The clear cover makes it easy to see the coupler's LEDs.
Trunk and spur entries can be selected individually from a range of cable glands and quick disconnects.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly



Connection



Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	Segment Protector R2-SP-N** For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Mechanical specifications	
Enclosure cover	detachable cover with retaining screws
Protection degree	IP67, NEMA 4, NEMA 4X, NEMA 6, NEMA 12, NEMA 13
Cable entry	cable gland and stopping plug options
Material	
Housing	polycarbonate, impact resistant
Seal	Polyurethane (PUR), one piece
Material thickness	enclosure body: 4 mm enclosure cover: 3 mm
Dimensions	(W x H x D) 160 x 240 x 90 mm
Mounting	holes Ø4.5 mm

Edition 912868 (US) / 220231 (EU)05/2013

Features

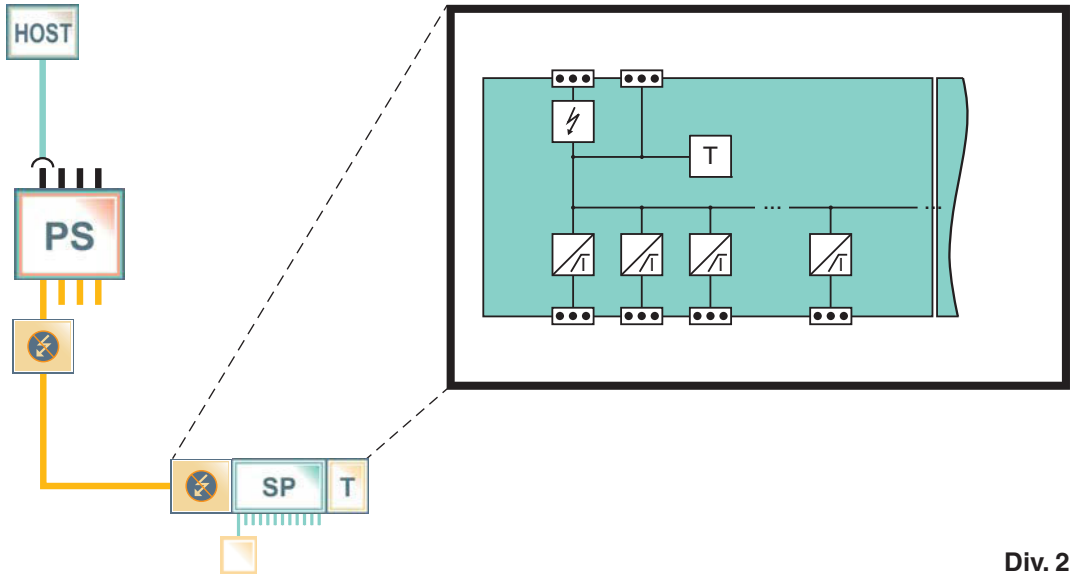
- **Intrinsically safe (Ex ic)/non-incendive outputs**
- **Stainless steel, brushed NEMA 4x**
- **Configurable cable entries for trunk and spurs**
- **Packaged solution**
- **Installation in Class I, Division 2**

Function

This Segment Protector Junction Box is a device coupler with FieldConnex® Segment Protectors for Zone 2/Div 2. Devices can be located in Zone 2/Div 2. The number of outputs and size can be selected.
Electropolished stainless steel 316L provides high corrosion and impact resistance at a very wide temperature range. The flanged collar around the door prevents standing water from damaging the one-piece seal. The optional window makes it easy to see the coupler's LEDs.
Trunk and spur entries can be selected individually from a range of cable glands and quick disconnects.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly

Connection



Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	Segment Protector R2-SP-N** For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Mechanical specifications	
Enclosure cover	hinged door with cam lock
Protection degree	IP66, NEMA 4, NEMA 4X, NEMA 12
Cable entry	cable gland and stopping plug options
Material	
Housing	Stainless steel 1.4404/AISI 316L
Surface	brushed finish
Seal	oil-resistant, one piece
Material thickness	enclosure body, enclosure cover: 1.6 mm window: 6 mm
Dimensions	(W x H x D) 203 x 254 x 102 mm window size: 197 x 95 mm
Mounting	thru-holes Ø6.4 mm
Grounding	grounding bolt on enclosure body and enclosure cover

Edition 912868 (US) / 220231 (EU)05/2013

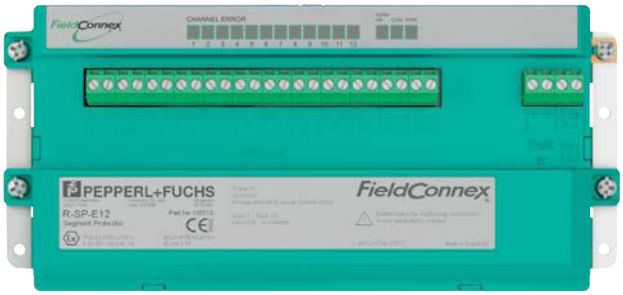
Features

- **12 increased safety outputs (Ex e)**
- **Segment Protector in Zone 1/Div. 2**
- **Instruments in Zone 1/Div. 1**
- **Short-circuit protection per output**
- **High power on trunk and spurs**

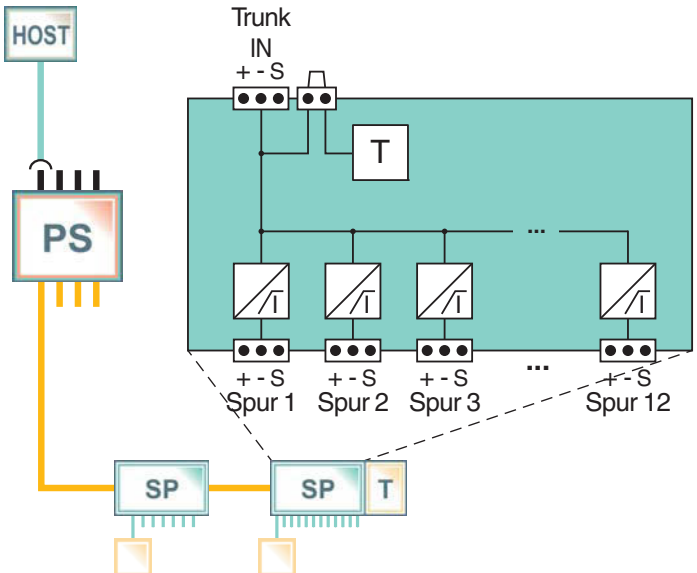
Function

The R-SP-E12 Segment Protector is a fieldbus coupler that connects instruments to the fieldbus segment.
Flameproof (Ex d) field devices are connected to the trunk line via one output each. Trunk and spurs are certified increased safety (Ex e).
Short-circuit protection ensures proper operation of the segment in case of unwanted faults at the spur. Work on devices always requires a hot work permit. The integrated fieldbus terminator features high-availability design and is selectable.
Connectors are fixed screw terminals. Any grounding and shielding concept is possible based on FieldConnex enclosure solutions.
Customizable housings host one or more Segment Protectors for different output counts.

Assembly



Connection



Zone 1/Div. 2

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Fieldbus interface	
Main cable (Trunk)	
Rated voltage	9 ... 32 V DC
Outputs	
Rated voltage	≤ 32 V
Rated current	≤ 40 mA
Short-circuit current	max. 50 mA
Self current consumption	≤ 9 mA
Voltage drop main cable/outputs	≤ 1.3 V
Terminating impedance	100 Ω integrated
Terminating resistor	selectable 100 Ω integrated
Surge protection	trunk, spurs overvoltage protected if voltage exceeds typ. 39 V, max. 41 V
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Mechanical specifications	
Connection type	screw fixing
Core cross-section	≤ 2.5 mm^2/AWG 12-24
Housing material	Polycarbonate
Housing width	216 mm
Housing height	100 mm
Housing depth	50 mm
Protection degree	IP20
Mass	800 g
Mounting	DIN rail mounting
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 04 ATEX 2100 X
Group, category, type of protection, temperature class	Ⓔx II 2G EEx mb e IIC T4
Maximum values	
Rated voltage	≤ 35 V
Prospective short-circuit current	100 A
Directive conformity	
Directive 94/9/EC	EN 50014:1997+A1+A2, EN 50019:2000, EN 60079-18:2004
International approvals	
IECEx approval	IECEx PTB 05.0010X
Approved for	Ex me II T4

Edition 912868 (US) / 220231 (EU)05/2013

Features

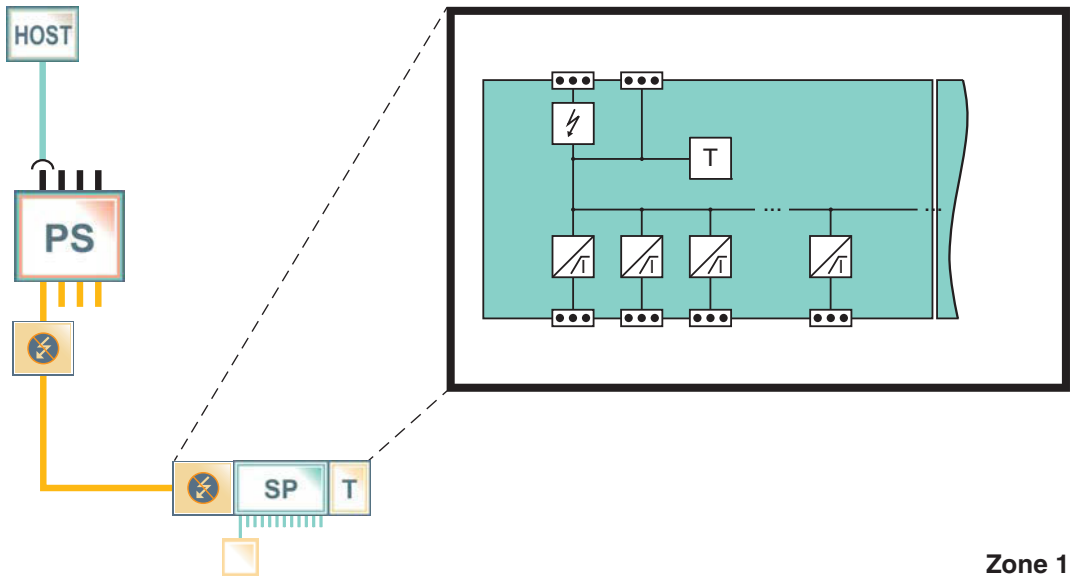
- **Connection of Ex d certified devices**
- **Glass fiber reinforced polyester, impact resistant, IP66**
- **Configurable cable entries for trunk and spurs**
- **International approvals**
- **Installation in Zone 1**

Function

This Segment Protector Junction Box is a device coupler with FieldConnex® Segment Protectors for Zone 1. Devices can be located in Zone 1. The number of outputs and size can be selected.
Glass fiber reinforced polyester provides corrosion resistance and is light weight. The surface resistance avoids electrostatic charge.
Trunk and spur entries can be selected individually from a range of cable glands and stopping plugs. A breather is included by default. Tag plate, grounding bar, surge protection for the trunk, and bus termination are available as options.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly

Connection



Zone 1

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	Segment Protector R-SP-E12 For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Impact resistance	EN 60079-0
Mechanical specifications	
Enclosure cover	detachable cover with retaining screws
Protection degree	IP66
Cable entry	cable gland and stopping plug options
Material	
Housing	polyester, impact resistant, glass fiber reinforced
Surface	black molded finish (RAL 9005)
Surface resistance	< 10^9 Ω
Water absorption	< 6 %
Seal	silicon, one piece
Grounding plate	brass
Material thickness	grounding plate: 3 mm
Dimensions	(W x H x D) 271 x 271 x 136 mm (1 x R2-SP-E12) 544 x 271 x 136 mm (2 x R2-SP-E12)
Mounting	thru-holes Ø6.5 mm
Grounding	grounding bolt M6, Stainless steel
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 07 ATEX 1061 (assembled Junction Box), for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	Ⓔx II 2G Ex e mb IIC T4 (F.SPE.S**.A**.1.0.***.***.**00) Ⓔx II 2G Ex d e mb IIC T4 (F.SPE.S**.A**.1.0.***.***.***T) Ⓔx II 2G Ex d e mb IIC T4 (F.SPE.S**.A**.1.0.***.***.**3*)
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 600079-14:2003
International approvals	
IECEx approval	IECEx PTB 07.0036, suitable Junction Box on request
INMETRO	2008EC02CP015, suitable Junction Box on request

Edition 912868 (US) / 220231 (EU)05/2013

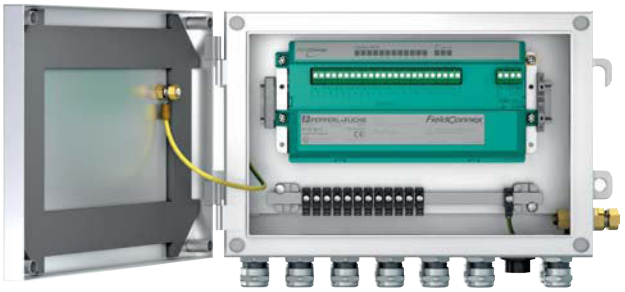
Features

- **Connection of Ex d certified devices**
- **Stainless steel, electropolished, IP66**
- **Configurable cable entries for trunk and spurs**
- **International approvals**
- **Installation in Zone 1**

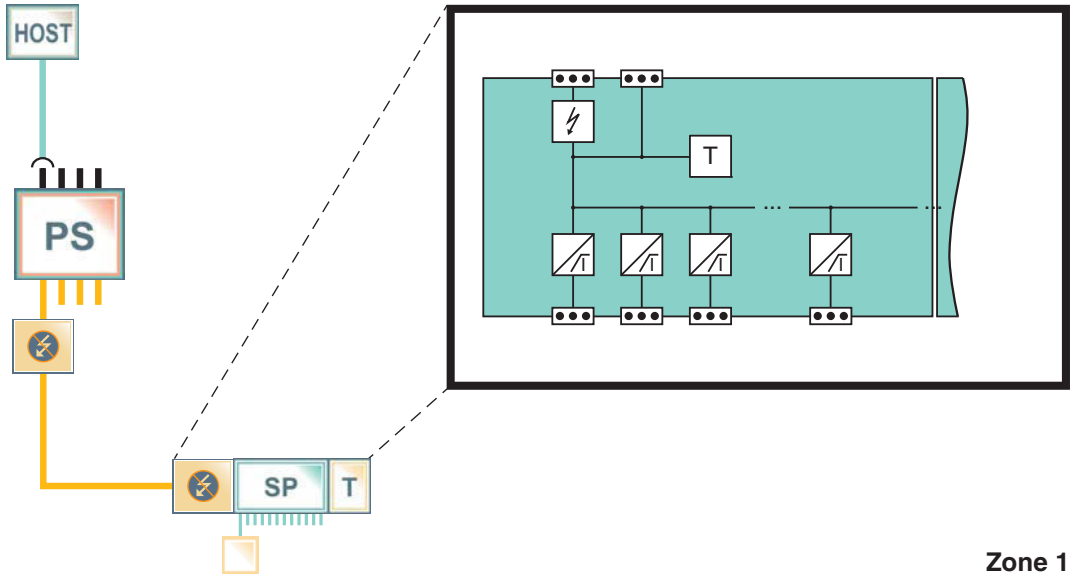
Function

This Segment Protector Junction Box is a device coupler with FieldConnex® Segment Protectors for Zone 1. Devices can be located in Zone 1. The number of outputs and size can be selected.
Electropolished stainless steel 316L provides high corrosion and impact resistance at a very wide temperature range.
Trunk and spur entries can be selected individually from a wide range of cable glands and stopping plugs. A breather is included by default. Tag plate, grounding bar, surge protection for the trunk are available as options.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly



Connection



Zone 1

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	Segment Protector R-SP-E12 For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Impact resistance	EN 60079-0
Mechanical specifications	
Enclosure cover	detachable hinged door with captive retaining screws
Protection degree	IP66
Cable entry	cable gland and stopping plug options
Material	
Housing	Stainless steel 1.4404/AISI 316L
Surface	electropolished
Seal	Neoprene, fire-resistant, one piece
Material thickness	enclosure body, enclosure cover, mounting plate: 1.5 mm gland plate: 3.0 mm
Dimensions	(W x H x D) 300 x 200 x 120 mm (1 x R-SP-E12) 480 x 400 x 175 mm (2 x R-SP-E12)
Mounting	thru-holes Ø10 mm
Grounding	grounding bolt M10, brass
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 07 ATEX 1061 (assembled Junction Box), for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	Ⓔx II 2G Ex e mb IIC T4 (F.SPE.S**.A**.1.0.***.***.**00) Ⓔx II 2G Ex d e mb IIC T4 (F.SPE.S**.A**.1.0.***.***.***T) Ⓔx II 2G Ex d e mb IIC T4 (F.SPE.S**.A**.1.0.***.***.**3*)
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 600079-14:2003
International approvals	
IECEx approval	IECEx PTB 07.0036, suitable Junction Box on request
INMETRO	2008EC02CP015, suitable Junction Box on request

Edition 912868 (US) / 220231 (EU)05/2013

Features

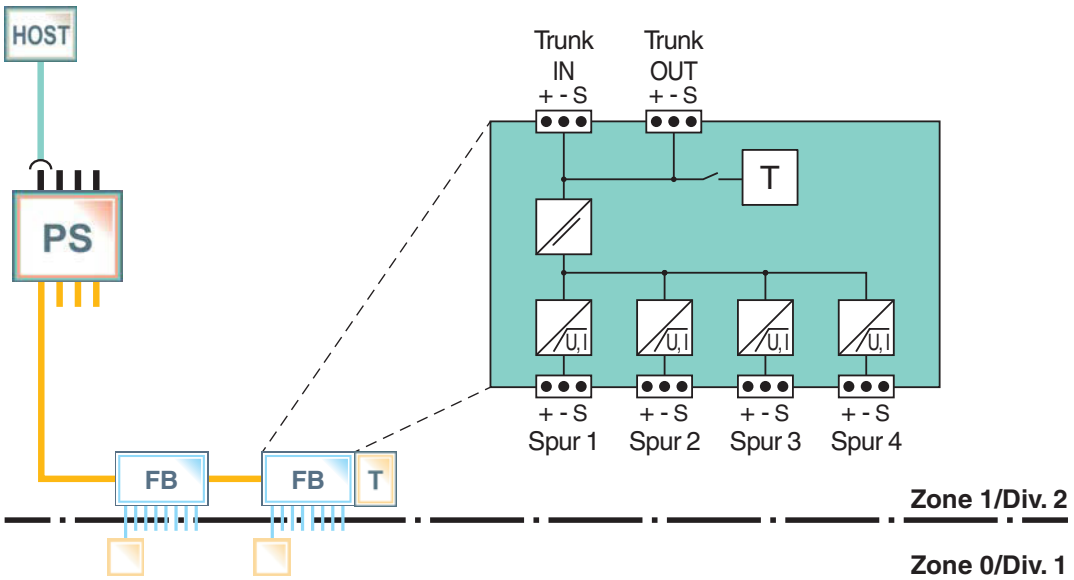
- 4 outputs Ex ia IIC
- FieldBarrier in Zone 1/Div. 2
- Instruments in Zone 0...1/Div. 1
- Short-circuit protection per output
- Power, Com, and Error LEDs
- Supports FISCO and Entity
- Integrated cable tie-downs
- Supports all grounding methods

Function

The FieldBarrier, a fieldbus coupler for DIN rail installation, connects four instruments with intrinsic safety (Ex ia/Ex ib) and short-circuit protection at each output. This ensures proper operation of the segment during faults or hot work at the spur.
High power on the trunk enables maximum cable lengths and device count in any hazardous area. The integrated fieldbus terminator features high-availability design and is selectable. Output terminals with a choice of fixed or spring clamp terminals connect one device each. LEDs simplify troubleshooting and help decrease repair time. Any grounding and shielding concept is possible based on FieldConnex enclosure solutions.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
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Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS PROTECTING YOUR PROCESS

Technical data

Fieldbus interface	
Main cable (Trunk)	
Connection	input (Trunk IN): terminals 3+, 4-, 5s output (Trunk OUT): terminals 7-, 8+, 6s
Rated voltage	32 ... 16 V DC
Rated current	31 mA ... 26 mA (without load) 77 mA ... 115 mA (at 20 mA load per input) 120 mA ... 209 mA (at 40 mA load per input) 135 mA ... 241 mA (short-circuit on all outputs)
Outputs	
Rated voltage	10 ... 13 V
Rated current	≤ 43 mA
Short-circuit current	50 mA
Terminating impedance	100 Ω switchable
Electrical isolation	
Main wire/outputs	isolation is not affected by interference according to EN 50020, voltage peak value 375 V
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC/EN 60529
Climatic conditions	DIN IEC 721
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	fixed terminals, plug-in terminals
Core cross-section	up to 2.5 mm^2
Housing material	Polycarbonate
Housing width	100 mm
Housing height	217 mm
Housing depth	74 mm
Protection degree	IP20
Mass	1050 g
Mounting	mounting on DIN rail in cabinet
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 02 ATEX 2086
Group, category, type of protection, temperature class	⟨Ex⟩ II 2(1G/D) G EEx me [ia] IIC T4
Main cable (Trunk)	
Maximum safe voltage U_m	253 V AC
Outputs	in accordance to IEC 60079-27
Voltage U_o	15.75 V
Current I_o	248 mA
Power P_o	975 mW
Declaration of conformity	PF 08 CERT 0579 Valid for F2 housing solution without plug connectors
Group, category, type of protection, temperature class	⟨Ex⟩ II 3 D Ex tD A22 IP54 T135 °C (non-conductive dust)
Directive conformity	
Directive 94/9/EC	EN 50014:1997+A1+A2, EN 61241-0:2007, EN 61241-1:2007, EN 50020:1994,EN 50019:2000, EN 50028:1987
International approvals	
FM approval	CoC 3015728
Control drawing	No. 116-0226
Approved for	Class I, Division 2, Groups A, B, C, D/Class I, Zone 2, AEx nA [ia] IIC T4
CSA approval	CoC 1592754
Control drawing	116-0266
Approved for	Class I, Division 2, Groups A, B, C, D/Class I, Zone 2, Ex nA [ia] IIC T4
IECEx approval	IECEx PTB 03.0003
Approved for	Ex me [ia] IIC T4
Certificates and approvals	
Marine approval	DNV A-10798

Edition 912868 (US) / 220231 (EU)05/2013

Features

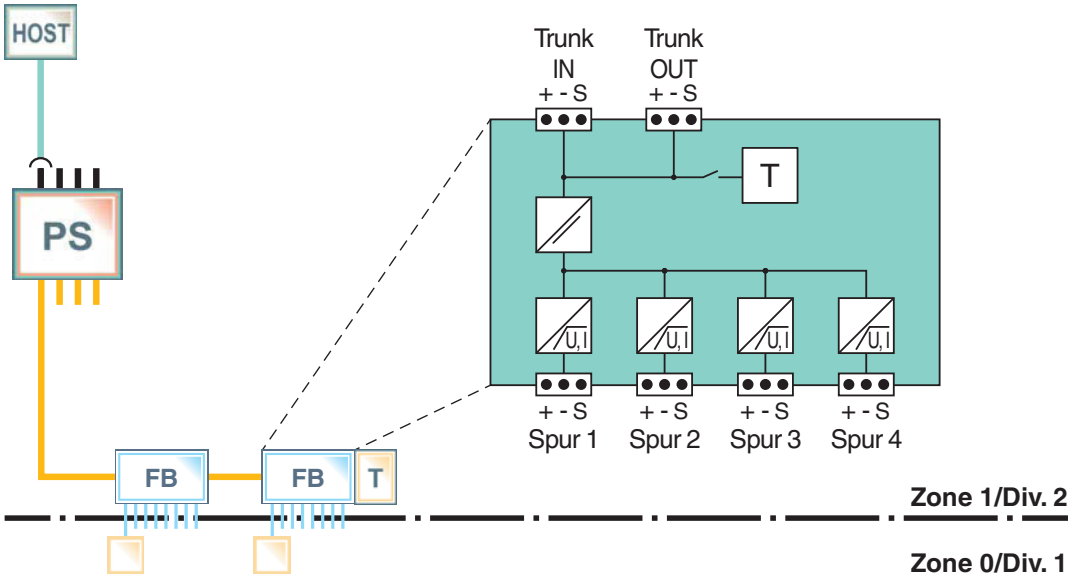
- 4 outputs Ex ia IIC
- FieldBarrier in Zone 1/Div. 2
- Instruments in Zone 0...1/Div. 1
- Short-circuit protection per output
- Power, Com, and Error LEDs
- Supports FISCO and Entity
- Integrated cable tie-downs

Assembly

Function

The FieldBarrier, a fieldbus coupler in an aluminum housing, connects four instruments with intrinsic safety (Ex ia/Ex ib) and short-circuit protection at each output. This ensures proper operation of the segment during faults or hot work at the spur. The housing (Type F2) is made of sturdy cast aluminum for installation in rough environments.
High power on the trunk enables maximum cable lengths and device count in any hazardous area. The integrated fieldbus terminator features high-availability design and is selectable. Output terminals with a choice of fixed or spring clamp terminals connect one device each. LEDs simplify troubleshooting and help decrease repair time. Hard and capacitive grounding and shielding concepts are selectable via jumper.

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Fieldbus interface	
Main cable (Trunk)	
Conformity	
Protection degree	EN 60529
Mechanical specifications	
Enclosure cover	detachable cover with retaining screws
Protection degree	IP67
Cable entry	cable gland and stopping plug options
Material	
Housing	ALSI12 (Cu) DIN1725 (Si 1.2 %), anodized
Surface	painted green
Seal	silicon, one piece
Housing width	140 mm (cable glands plastic/nickel plated brass/stainless steel), 160 mm (cable glands nickel plated brass for armored cable), 135 mm (plug connection M12 nickel plated brass/stainless steel, plug connection 7/8" stainless steel)
Housing height	258 mm
Housing depth	84 mm
Mass	3350 g
Mounting	thru-holes Ø6.5 mm
Grounding	M5 threading for grounding bolt
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 02 ATEX 2086
Group, category, type of protection, temperature class	Ⓔx II 2(1G/D) G EEx me [ia] IIC T4
Declaration of conformity	PF 08 CERT 0579 Valid for F2 housing solution without plug connectors
Group, category, type of protection, temperature class	Ⓔx II 3 D Ex tD A22 IP54 T135 °C (non-conductive dust)
Directive conformity	
Directive 94/9/EC	EN 50014:1997+A1+A2, EN 61241-0:2007, EN 61241-1:2007, EN 50020:1994,EN 50019:2000, EN 50028:1987
International approvals	
FM approval	CoC 3015728
Control drawing	No. 116-0226
Approved for	Class I, Division 2, Groups A, B, C, D/Class I, Zone 2, AEx nA [ia] IIC T4
CSA approval	CoC 1592754
Control drawing	116-0266
Approved for	Class I, Division 2, Groups A, B, C, D/Class I, Zone 2, Ex nA [ia] IIC T4
IECEx approval	IECEx PTB 03.0003
Approved for	Ex me [ia] IIC T4
Certificates and approvals	
Marine approval	DNV A-10798

Edition 912868 (US) / 220231 (EU)05/2013

Features

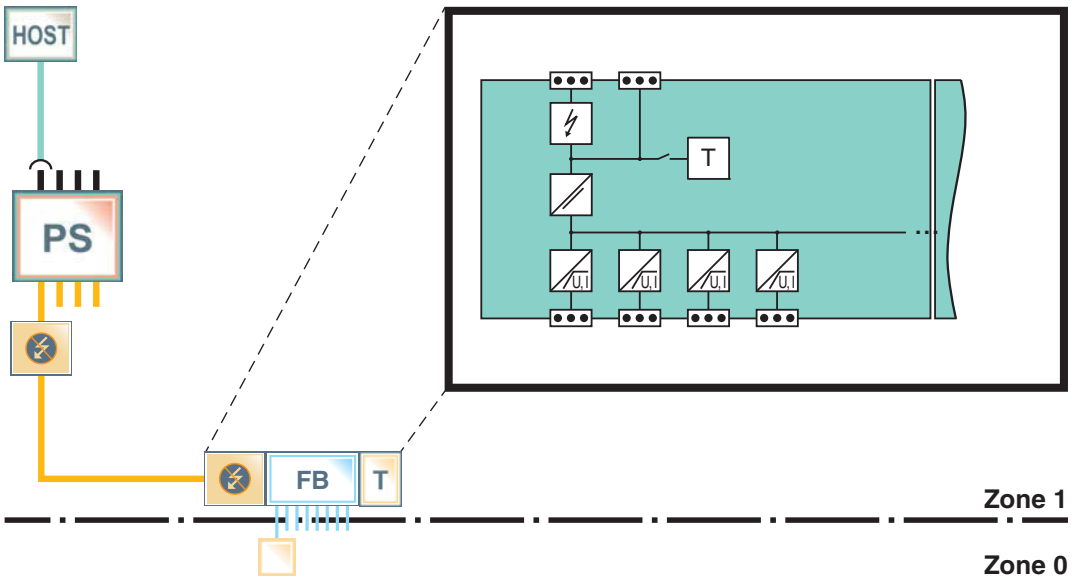
- **4, 8 or 12 outputs Ex ia**
- **Impact resistance enclosure, IP66**
- **Configurable cable entries for trunk and spurs**
- **Packaged certified solution**
- **Installation in Zone 1**

Assembly

Function

This Junction Box is a device coupler with FieldConnex® FieldBarriers for Zone 1. Devices can be located in Zone 0. The number of outputs and size can be selected.
Glass fiber reinforced polyester provides corrosion resistance and is light weight. The surface resistance avoids electrostatic charge.
Trunk and spur entries can be selected individually from a range of cable glands and stopping plugs. A breather is included by default. Tag plate, grounding bar, surge protection for the trunk, and bus termination are available as options.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	FieldBarrier RD0-FB-Ex4.COM For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Impact resistance	EN 60079-0
Mechanical specifications	
Enclosure cover	detachable cover with retaining screws
Protection degree	IP66
Cable entry	cable gland and stopping plug options
Material	
Housing	polyester, impact resistant, glass fiber reinforced
Surface	black molded finish (RAL 9005)
Surface resistance	< 10^9 Ω
Water absorption	< 6 %
Seal	silicon, one piece
Grounding plate	brass
Material thickness	grounding plate: 3 mm
Dimensions	(W x H x D) 271 x 271 x 136 mm (1 x RD0-FB-Ex4.COM) 544 x 271 x 136 mm (2 x RD0-FB-Ex4.COM) 544 x 544 x 136 mm (3 x RD0-FB-Ex4.COM)
Mounting	thru-holes Ø6.5 mm
Grounding	grounding bolt M6, Stainless steel
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 07 ATEX 1061 (assembled Junction Box), for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	Ⓔx II 2(1)G Ex e mb [ia] IIC T4 (F.FB0.***.A**.1.0.***.***.**00) Ⓔx II 2(1)G Ex d e mb [ia] IIC T4 (F.FB0.***.A**.1.0.***.***.***1) Ⓔx II 2(1)G Ex d e mb [ia] IIC T4 (F.FB0.***.A**.1.0.***.***.**3*)
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 600079-14:2003
International approvals	
IECEx approval	IECEx PTB 07.0036, suitable Junction Box on request
INMETRO	2008EC02CP015, suitable Junction Box on request

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Features

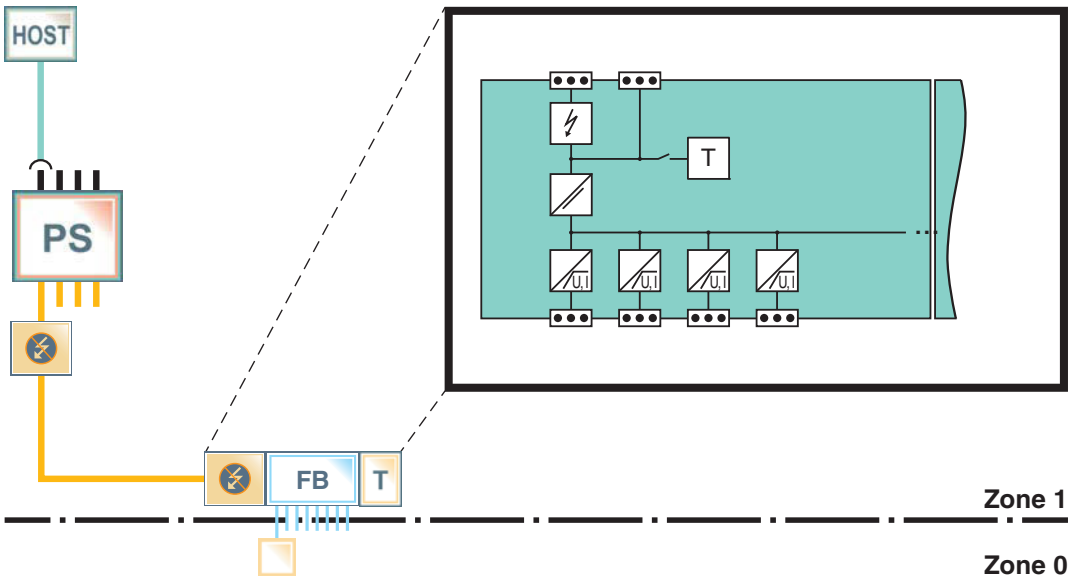
- **4, 8 or 12 outputs Ex ia**
- **Electropolished enclosure, IP66**
- **Configurable cable entries for trunk and spurs**
- **Packaged certified solution**
- **Installation in Zone 1**

Function

This Junction Box is a device coupler with FieldConnex® FieldBarriers for Zone 1. Devices can be located in Zone 0. The number of outputs and size can be selected. Electropolished stainless steel 316L provides high corrosion and impact resistance at a very wide temperature range. Trunk and spur entries can be selected individually from a range of cable glands and stopping plugs. A breather is included by default. Tag plate, grounding bar, surge protection for the trunk, and bus termination are available as options. This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

General specifications	
Installed components	FieldBarrier RD0-FB-Ex4.COM For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Impact resistance	EN 60079-0
Mechanical specifications	
Enclosure cover	detachable hinged door with captive retaining screws
Protection degree	IP66
Cable entry	cable gland and stopping plug options
Material	
Housing	Stainless steel 1.4404/AISI 316L
Surface	electropolished
Seal	Neoprene, fire-resistant, one piece
Material thickness	enclosure body, enclosure cover, mounting plate: 1.5 mm gland plate: 3.0 mm
Dimensions	(W x H x D) 300 x 200 x 120 mm (1 x RD0-FB-Ex4.COM) 380 x 380 x 175 mm (2 x RD0-FB-Ex4.COM) 480 x 400 x 175 mm (3 x RD0-FB-Ex4.COM)
Mounting	thru-holes Ø10 mm
Grounding	grounding bolt M10, brass
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 07 ATEX 1061 (assembled Junction Box), for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	Ⓔx II 2(1)G Ex e mb [ia] IIC T4 (F.FB0.***.A**.1.0.***.***.**00) Ⓔx II 2(1)G Ex d e mb [ia] IIC T4 (F.FB0.***.A**.1.0.***.***.***1) Ⓔx II 2(1)G Ex d e mb [ia] IIC T4 (F.FB0.***.A**.1.0.***.***.**3*)
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 600079-14:2003
International approvals	
IECEx approval	IECEx PTB 07.0036, suitable Junction Box on request
INMETRO	2008EC02CP015, suitable Junction Box on request

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Features

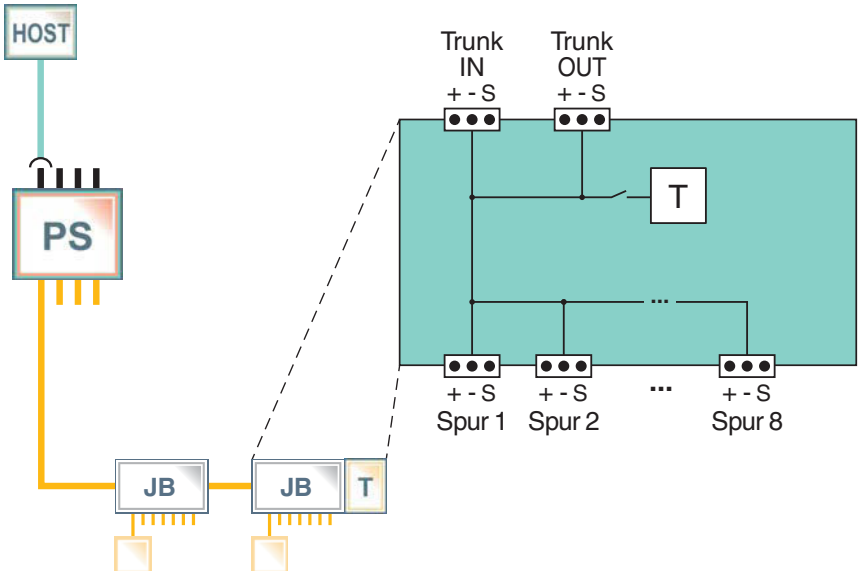
- **4 ... 8 outputs Ex ia, ib**
- **Installation in Zone 0/Div. 1**
- **Instruments in Zone 0...1/Div. 1**
- **Trunk and spurs intrinsically safe**
- **Supports FISCO and Entity**

Function

The Fieldbus Junction Box is a passive device coupler that connects instruments to intrinsically safe segments. The housing (Type F2) is made of sturdy aluminum for installation in rough environments Zone 1/Div. 2.
As an associated apparatus, the junction box is permitted for trunk and spur connections that are rated intrinsically safe (Ex ia, Ex ib) for instruments located in Zone 0 ... 1/Div. 2.
A choice of fixed screw terminals or plug-in spring clamp connectors is available. Hard and capacitive grounding concepts are selectable via jumper.

Assembly

Connection



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Technical data

Fieldbus interface	
Main cable (Trunk)	
Connection	input (Trunk IN): terminals 1+, 2-, 3s output (Trunk OUT): terminals 4+, 5-, 6s
Rated voltage	≤ 35 V DC
Rated current	3 A DC at 70 °C, reduction 0.1A/K
Outputs	
Rated voltage	see main cable
Rated current	see main cable
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NAMUR NE 21
Protection degree	IEC/EN 60529
Climatic conditions	DIN IEC 721
Mechanical specifications	
Connection type	Terminals
Core cross-section	up to 2.5 mm^2
Housing	258 mm x 114 mm x 84 mm (without cable glands)
Protection degree	IP67
Mass	1800 g
Mounting	panel mounting

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Features

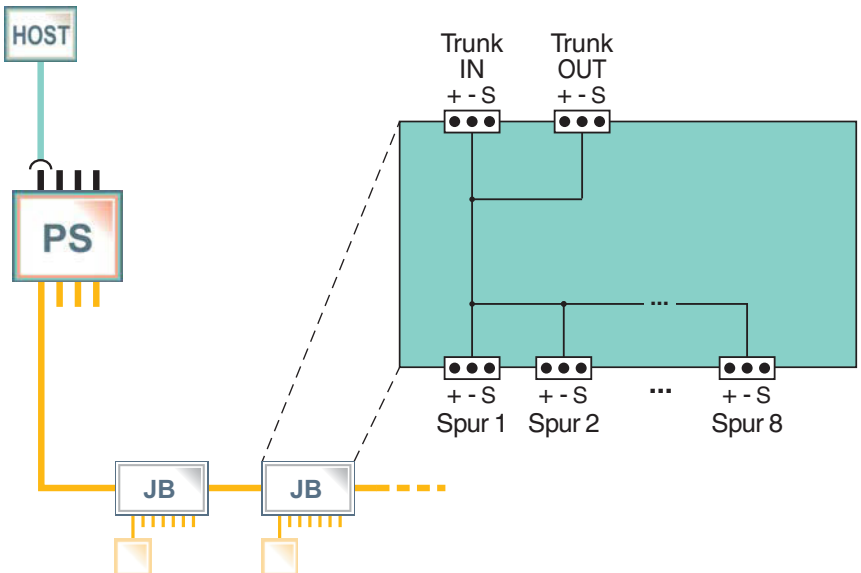
- **4 ... 8 outputs Ex ia, ib**
- **Installation in Zone 0/Div. 1**
- **Instruments in Zone 0...1/Div. 1**
- **Trunk and spurs intrinsically safe**
- **Supports FISCO and Entity**

Function

The Fieldbus Junction Box is a passive device coupler that connects instruments to intrinsically safe segments. The housing (Type F2) is made of sturdy aluminum for installation in rough environments Zone 1/Div. 2.
As an associated apparatus, the junction box is permitted for trunk and spur connections that are rated intrinsically safe (Ex ia, Ex ib) for instruments located in Zone 0 ... 1/Div. 2.
A choice of fixed screw terminals or plug-in spring clamp connectors is available. Hard and capacitive grounding concepts are selectable via jumper.

Assembly

Connection



Zone 0

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Technical data

Fieldbus interface		
Main cable (Trunk)		
Connection		input (Trunk IN): terminals 1+, 2-, 3s output (Trunk OUT): terminals 4+, 5-, 6s
Rated voltage		≤ 35 V DC
Rated current		3 A DC
Outputs		
Rated voltage		see main cable
Rated current		see main cable
Directive conformity		
Electromagnetic compatibility		
Directive 2004/108/EC		EN 61326-1:2006
Standard conformity		
Electromagnetic compatibility		NAMUR NE 21, EN 61326
Protection degree		IEC/EN 60529
Climatic conditions		DIN IEC 721
Mechanical specifications		
Connection type		
Main cable (Trunk)		Terminals
Core cross-section		up to 2.5 mm^2
Cable diameter		
Main cable (Trunk)		5 ... 10 mm
Housing		258 mm x 114 mm x 84 mm (without cable glands)
Protection degree		IP67
Mass		1800 g
Mounting		panel mounting
Data for application in connection with Ex-areas		
Main cable (Trunk)		only for connection to intrinsically safe fieldbus circuits
Maximum values		
Voltage	U_i	≤ 35 V
Current	I_i	≤ 3 A
Directive conformity		standards
Directive 94/9/EC		EN 50014, EN 50020, EN 50284

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Features

- **2 segments, simplex, individual modules per segment**
- **Output: 22 ... 24 V/360 mA, Ex ib IIC**
- **DART for intrinsically safe, high-power segments**
- **Connection to PROFIBUS DP**
- **Transparent, configuration free**
- **Optimized for size and quality, low heat dissipation**
- **Passive impedance for high reliability**

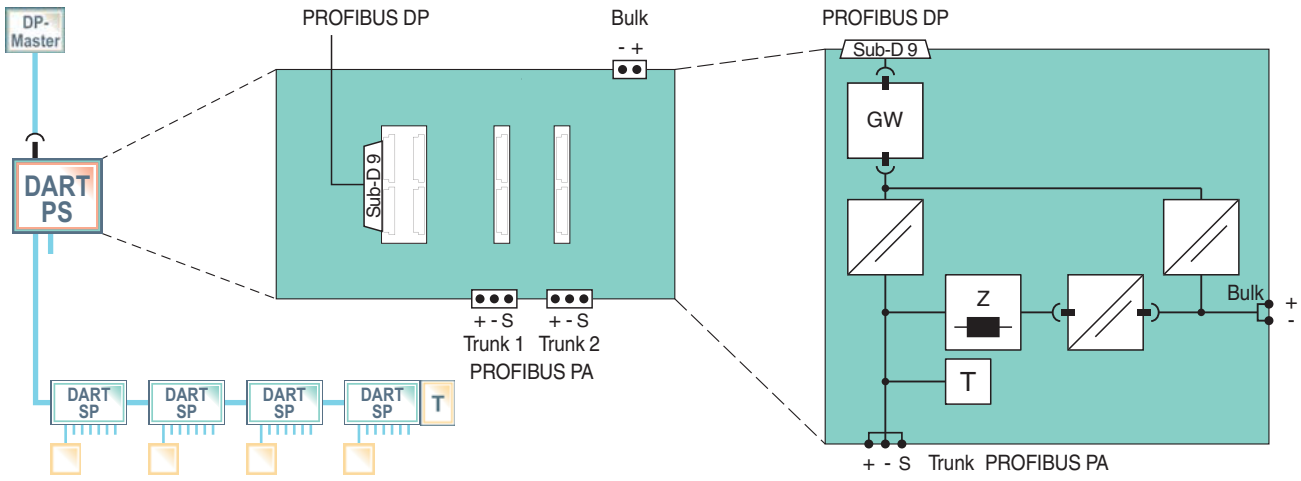
Function

The FieldConnex® DART PROFIBUS Compact Power Hub is a modular fieldbus power supply. It consists of one motherboard, which is the mounting plate and wiring interface, two power modules - one per segment, and a gateway module for connection to PROFIBUS DP.
DART (Dynamic Arc Recognition and Termination) enables the intrinsically safe High-Power Trunk Concept for a completely intrinsically safe segment certified acc. to IEC 60079-11.
This Power Hub kit is ready to install. Sockets for all modules enable simple installation and replacement without tools.
Three-port isolation between segment, bulk power and host enhances system reliability.
Communication is transparent between DP and PA: The gateway segment coupler makes each PA device appear as if it was connected to DP. This includes cyclic/acyclic data exchange and transmission speed. Segment design is clear and easy to understand without sub-networks; the gateway module itself is configuration free - all reducing engineering work.
Availability and a long service life is achieved through: only one passive impedance filter per segment, optimized design for low power dissipation, high-availability fieldbus termination and plug-in connectors with retaining screws.

Assembly

DART FIELDBUS

Connection



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Technical data

Supply	
Rated voltage	19.2 ... 35 V SELV/PELV
Rated current	1330 ... 745 mA
Fieldbus interface	
Number of segments	
Simplex	2
Rated voltage	20.8 ... 22.3 V
Rated current	360 ... 10 mA
Short-circuit current	413 mA
PROFIBUS DP	
Connection	9-pin Sub-D socket
Protocol	PROFIBUS DP/DP V1
Terminating resistor	100 Ω, integrated
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 73/23/EEC	EN 50178 (identical to EN 62103)
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	plug with screw flange
Core cross-section	2.5 mm^2
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 10 ATEX 2034, PTB 10 ATEX 2020 X, PTB 11 ATEX 2010 X
Group, category, type of protection, temperature class	Ⓔx II 2 G Ex ib IIC T4, Ⓔx II (2) D [Ex ib] IIIC, Ⓔx II 3(2) G Ex nAc [ib] IIC T4
Supply	
Maximum safe voltage U_m	35 V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 60079-15:2006, EN 60079-25:2010, EN 61241-11:2006
International approvals	
IECEx approval	pending
Approved for	[Ex ib] IIC [Ex ib] IIIC Ex nAc II T4
Certificates and approvals	
Marine approval	pending

Power module

		HD2-FBPS-IBD-1.24.360	
Power Output			
Voltage (V)		20.8 ... 22.3	
Current (mA)		360	
Device in ...	**Type of Protection**		**Required Installation Components**
Zone 1	Intrinsically safe Ex ib	■	Segment Protector R3-SP-IBD12

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Features

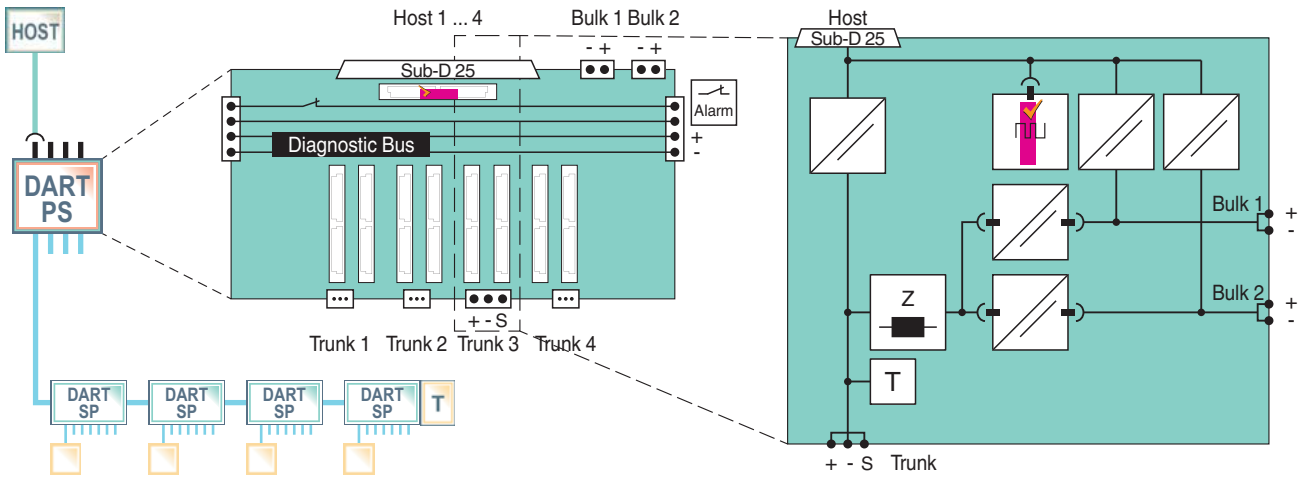
- **4 segments, load-sharing redundancy**
- **Output: 22 ... 24 V/360 mA, Ex ib IIC**
- **DART for intrinsically safe, high-power segments**
- **Redundant connection to PROFIBUS DP**
- **Customizable for any host system**
- **Individual modules per segment**
- **Optimized for size and quality, low heat dissipation**
- **Passive impedance for high reliability**
- **Installation in Zone 2**

Function

The FieldConnex® DART High-density Power Hub is a modular fieldbus power supply for four segments. It supports optional Advanced Diagnostics for fast fieldbus commissioning and online monitoring. The kit comprises one motherboard and eight power supply modules (2 modules per segment).
DART (Dynamic Arc Recognition and Termination) enables the intrinsically safe High-Power Trunk Concept for a completely intrinsically safe segment certified acc. to IEC 60079-11.
A Sub-D 25-pin connector with fieldbus power hooks up to the Segment Coupler for direct PROFIBUS DP connection. Through designed custom cables this power hub is easily adaptable to any FF-control system. Sockets for all modules enable simple installation and replacement without tools. Power redundancy is load-sharing with either module supplying half of load current. Three-port isolation between segment, bulk power and host enhances system reliability. Availability and a long service life is achieved through: only one passive impedance filter per segment, optimized design for low power dissipation, high-availability fieldbus termination and plug-in connectors with retaining screws.

Assembly

Connection



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Technical data

Supply	
Connection	redundant
Rated voltage	19.2 ... 35 V SELV/PELV
Rated current	3230 ... 1820 mA
Fieldbus interface	
Number of segments	
Redundant	4
Rated voltage	20.8 ... 22.3 V
Rated current	360 ... 10 mA
Short-circuit current	413 mA
Host-side	25-pin Sub-D socket
Host-rated voltage	10.1 ... 11 V
Host-rated current	... 40 mA
Host short-circuit current	... 50 mA
Terminating resistor	100 Ω, integrated
Indicators/operating means	
Fault signal	VFC alarm output via connectors
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	plug with screw flange
Core cross-section	2.5 mm^2
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 10 ATEX 2034, PTB 10 ATEX 2020 X, PTB 11 ATEX 2010 X
Group, category, type of protection, temperature class	⟨Ex⟩ II 2 G Ex ib IIC T4, ⟨Ex⟩ II (2) D [Ex ib] IIIC, ⟨Ex⟩ II 3(2) G Ex nAc [ib] IIC T4
Supply	
Maximum safe voltage U_m	35 V
Host interface	
Maximum safe voltage U_m	35 V
Alarm output	
Maximum safe voltage U_m	35 V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 60079-15:2006, EN 60079-25:2010, EN 61241-11:2006
International approvals	
IECEx approval	pending
Approved for	[Ex ib] IIC [Ex ib] IIIC Ex nAc II T4
Certificates and approvals	
Marine approval	pending

Power module

		HD2-FBPS-IBD-1.24.360	
Power Output			
Voltage (V)		20.8 ... 22.3	
Current (mA)		360	
Device in ...	**Type of Protection**		**Required Installation Components**
Zone 1	Intrinsically safe Ex ib	■	Segment Protector R3-SP-IBD12

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Edition

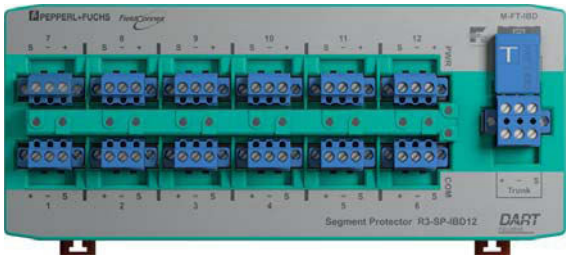
Features

- **12 outputs Ex ib IIC**
- **Segment Protector in Zone 1**
- **Instruments in Zone 1**
- **Short-circuit protection per output**
- **Power, Com, and Error LEDs**
- **T-connector for easy installation and maintenance**
- **Test points for easy troubleshooting**

Function

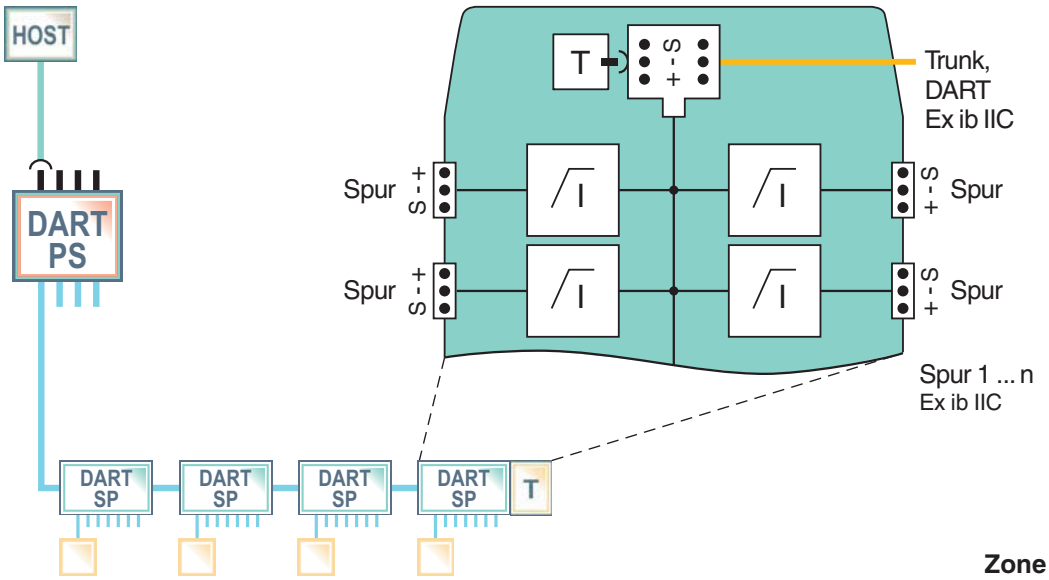
The DART Segment Protector, a fieldbus coupler for DIN-rail installation, provides outputs for up to 12 intrinsically safe instruments (Ex ib IIC) to an intrinsically safe High-Power Trunk. It is equipped with short-circuit protection. This ensures proper operation of the segment during faults or hot work at the spur.
The T-connector at the trunk allows for exchange of a Segment Protector without effect on the remaining segment. The high-availability terminator is mounted at the 'T'. As it is removed for network extensions proper termination is always ensured.
All plugs feature retaining screws. LEDs and test access points simplfy troubleshooting and help to decrease repair time. Any grounding and shielding concept is possible based on FieldConnex enclosure solutions.

Assembly



DART FIELDBUS

Connection



Zone 1

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Technical data

Fieldbus interface	
Main cable (Trunk)	
Rated voltage	14.5 ... 24 V DC
Rated current	≤ 4.5 A
Outputs	
Number of outputs	12
Number of devices per output	1
Rated voltage	≥ 10.5 V, ≤ 24 V
Rated current	≤ 34 mA
Short-circuit current	max. 47 mA
Self current consumption	typical 20 mA, ≤ 25 mA
Voltage drop main cable/outputs	≤ 4 V
Voltage drop trunk In/Out	0 V
Terminating resistor	external type M-FT-IBD 100 Ω +/- 10 %
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	removable screw terminals with retaining screws
Core cross-section	≤ 2.5 mm²/AWG 12-24
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 10 ATEX 2034, PTB 10 ATEX 2018X
Group, category, type of protection, temperature class	Ⓔx II 2G Ex ib IIC T4, Ⓔx II (2)D [Ex ib] IIIC
Main cable (Trunk)	for connection to the DART Fieldbus System acc. to System Certificate PTB 10 ATEX 2034
Outputs	Entity
Voltage U_o	23 V
Current I_o	47 mA
Power P_o	1.08 W
Inductance L_o	gas group IIC 170 µH gas group IIB 1 mH
Capacitance C_o	gas group IIC 60 nF gas group IIB 470 nF
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 61241-11:2006
International approvals	
IECEx approval	pending
Approved for	Ex ib IIC T4 [Ex ib] IIIC
Certificates and approvals	
Marine approval	pending

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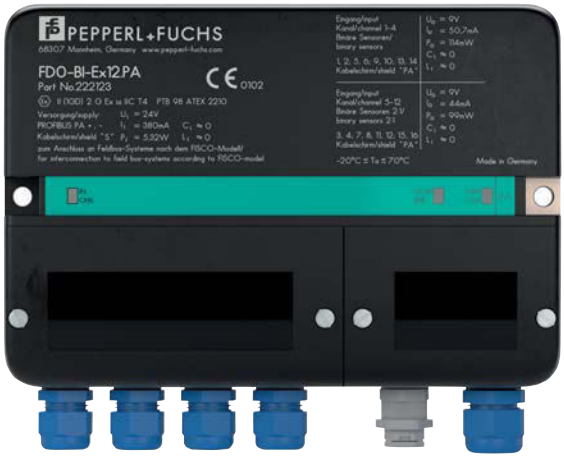
Features

- **For 12 intrinsically safe binary inputs**
- **Installation in Zone 1 and Zone 2**
- **Sensors in Zone 0**
- **Connection to fieldbus acc. to FISCO or Entity**
- **Galvanic separation between bus and sensors**
- **EMC acc. to NAMUR NE 21**

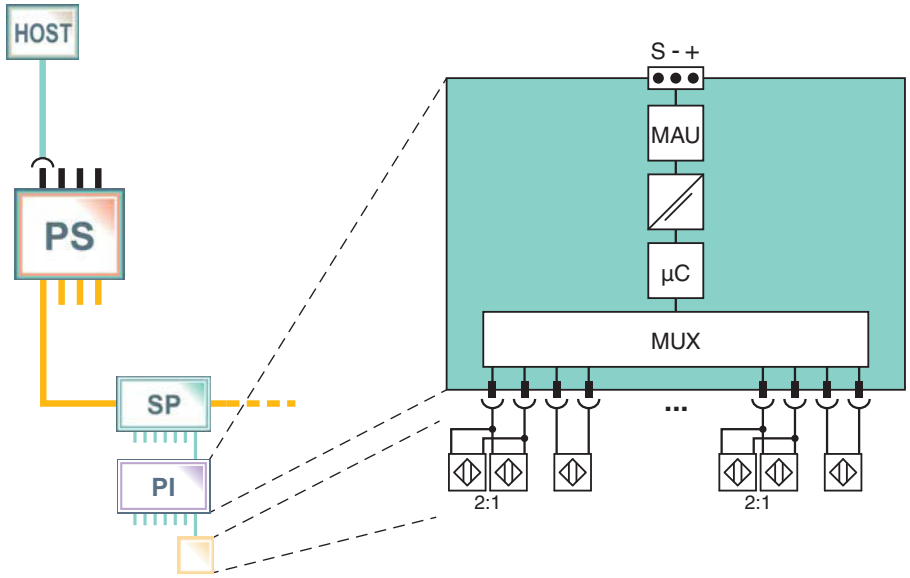
Function

The binary input (BI) for outside installation connects up to twelve digital inputs to the DCS via fieldbus. It is installed close to the sensors in the hazardous area. Inputs include intrinsically safe NAMUR sensors or mechanical contacts. The BI communicates all data, configuration, and alarms via one fieldbus address to the DCS. System integration is possible through GSD files. Fieldbus powers the sensors and the binary interface itself, additional power or wiring is not required.
Four inputs are connected directly, eight inputs are connected via 2:1 technology. See the list with compatible sensors online. The binary input monitors the sensors for proper function.

Assembly



Connection



Zone 1

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Technical data

Fieldbus interface	
PROFIBUS PA	
Connection	Connection +, -
Rated voltage	9 ... 32 V
Rated current	≤ 23 mA
Baud rate	31.25 kBit/s
Protocol	PROFIBUS DP V1
Field circuit	
Inputs	
Sensor supply voltage	4, for binary sensors: 5.5 V 8, for binary sensors: 5 V
Sensor supply current	4, for binary sensors: 4.5 mA 8, for binary sensors: ≤ 5 mA
Max. cycle time	for binary 4 sensors, 4 x 1 s = 4 s for 8 binary sensors, 8 x 12.5 ms = 100 ms
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	EN 60079-11
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC/EN 60529
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Core cross-section	Bus cable:Ø 5 mm ... 10 mm cable sensors: Ø 4 mm ... 8 mm
Housing	187 mm x 129 mm x 46 mm
Protection degree	IP65
Installation position	Cable glands downwards
Mass	approx. 290 g
Mounting	panel mounting
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 98 ATEX 2210
Group, category, type of protection, temperature class	Ⓔx II 2G (1) Ex ia [ia Ga] IIC T4 Gb, Ⓔx II (1D) [Ex ia Da] IIIC, Ⓔx II 3G Ex ic IIC T4 Gc, Ⓔx II (3D) [Ex ic Dc] IIIC
Field-side	
Voltage U_o	9 V
Current I_o	44 mA
Power P_o	99 mW
PROFIBUS PA	
Voltage U_i	24 V
Current I_i	380 mA
Power P_i	5.32 W
Rated voltage	9 ... 32 V
Rated current	23 mA
FDE (Fault Disconnect Equipment)	6.7 mA
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2012
International approvals	
IECEx approval	IECEx TUN 04.0002
Approved for	Ex ia [ia Ga] IIC T4 Gb, [Ex ia Da] IIIC, Ex ic IIC T4 Gc, [Ex ic Dc] IIIC

Edition 912868 (US) / 220231 (EU)05/2013

Features

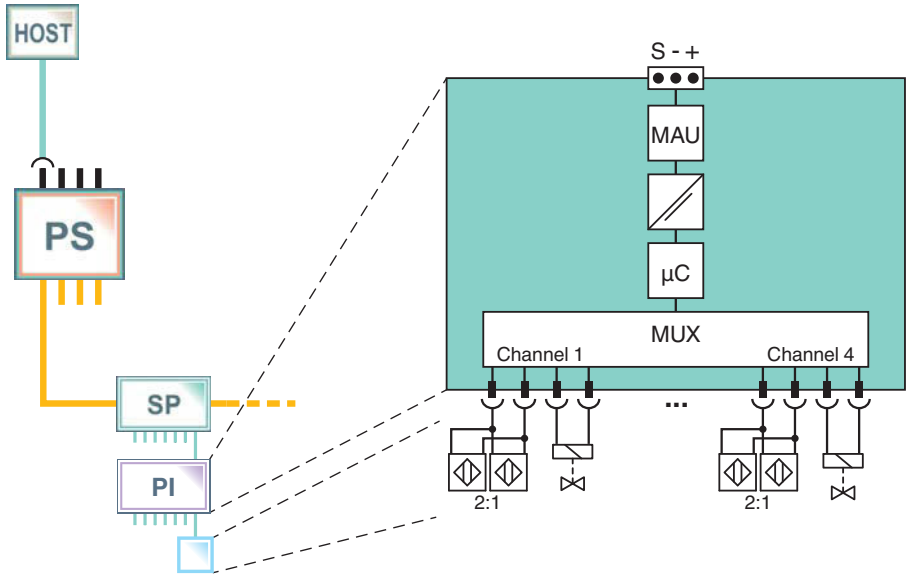
- For four intrinsically safe valves with position sensors
- Installation in Zone 1 and Zone 2
- Valves in Zone 0
- Connection to fieldbus acc. to FISCO or Entity
- DCS integration with FDT/DTM technology
- Monitors lead breakage and short circuits
- Valve monitoring and diagnostics integrated
- Conducts partial stroke testing
- Conforms to PROFIBUS PA profile

Function

The valve coupler (VC) for PROFIBUS PA connects up to four intrinsically safe low-power valves to the DCS via fieldbus. It is installed pre-wired in a field enclosure or directly outside close to the valves in the hazardous area. The VC drives four low-power auxiliary valves and gathers positioning information via pairs of inductive proximity switches.
The VC communicates all data, configuration, and alarms via one fieldbus address to the DCS. It supports DCS integration through GSD file and FDT/DTM technology. Fieldbus powers the actors, sensors and the valve coupler itself, additional power or wiring is not required.
The VC supports the PROFIBUS PA profile for easy integration with summary diagnostics according to NAMUR recommendations. It detects lead breakage and short circuit conditions. It monitors and reports runtime and breakaway time during each operation and can conduct partial stroke tests.

Assembly

Connection



Zone 1

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Fieldbus interface	
PROFIBUS PA	
Connection	Connection +, -
Rated voltage	9 ... 32 V
Rated current	≤ 23 mA
Baud rate	31.25 kBit/s
Protocol	IEC 61158-2
Field circuit	
Inputs	
Sensor supply voltage	5 V
Sensor supply current	5 mA
Max. cycle time	≤ 160 ms
Outputs	
Output voltage	6.4 ... 7.9 V
Output rated operating current	1.5 mA
Holding current	1 mA
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	EN 60079-11
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC/EN 60529
Ambient conditions	
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Core cross-section	Bus cable: Ø 5 mm ... 10 mm Cable sensors/valve: Ø 4 mm ... 8 mm
Housing	187 mm x 129 mm x 46 mm
Protection degree	IP65
Installation position	Cable glands downwards
Mass	approx. 290 g
Mounting	panel mounting
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 98 ATEX 2210
Group, category, type of protection, temperature class	Ⓔx II 2G (1) Ex ia [ia Ga] IIC T4 Gb, Ⓔx II (1D) [Ex ia Da] IIIC, Ⓔx II 3G Ex ic IIC T4 Gc, Ⓔx II (3D) [Ex ic Dc] IIIC
PROFIBUS PA	
Voltage U_i	24 V
Current I_i	380 mA
Power P_i	5.32 W
Rated voltage	9 ... 32 V
Rated current	23 mA
FDE (Fault Disconnect Equipment)	6.7 mA
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2012
International approvals	
IECEx approval	IECEx TUN 04.0002
Approved for	Ex ia [ia Ga] IIC T4 Gb, [Ex ia Da] IIIC, Ex ic IIC T4 Gc, [Ex ic Dc] IIIC

Edition 912868 (US) / 220231 (EU)05/2013

Features

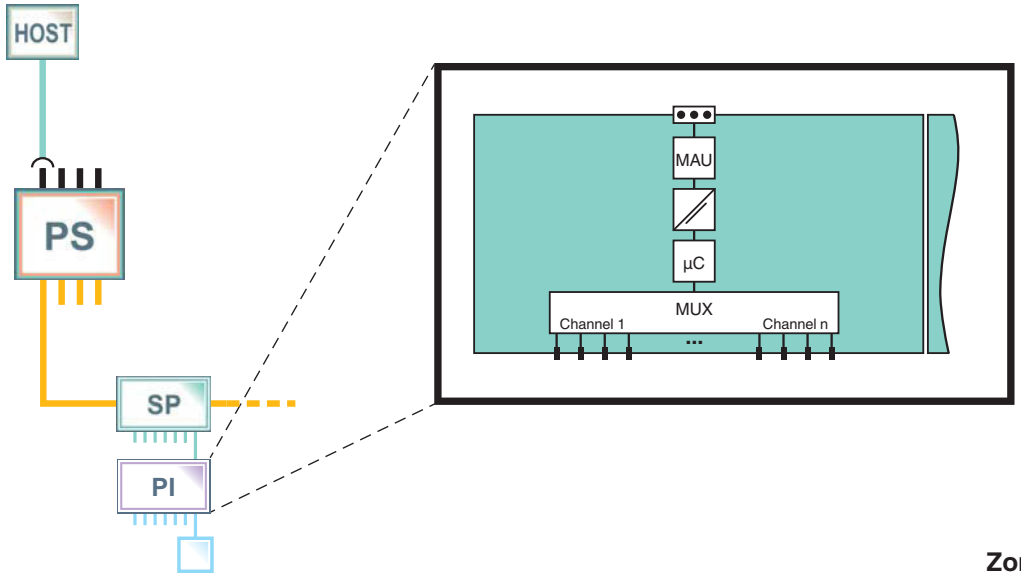
- **4 valve control and 8 position feedback signals**
- **Glass fiber reinforced polyester, impact resistant, IP66**
- **Configurable cable entries for bus lines and field signal lines**
- **International approvals**
- **Installation in Zone 1**

Function

This Fieldbus Junction Box holds valve couplers for connection to low-power solenoid valves. The fieldbus junction box can be installed in Zone 1, sensors in Zone 0. Four valves including two end position sensors can be connected.
Glass fiber reinforced polyester provides corrosion resistance and is light weight. The surface resistance avoids electrostatic charge.
Bus and field signal line entries can be chosen individually from a range of cable glands and stopping plugs. A breather is included by default. A tag plate is available as option.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly

Connection



Zone 1

Edition 912868 (US) / 220231 (EU)05/2013

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
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Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS PROTECTING YOUR PROCESS

Technical data

General specifications	
Installed components	Valve Coupler FD0-VC-Ex4.** For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Impact resistance	EN 60079-0
Mechanical specifications	
Enclosure cover	detachable cover with retaining screws
Protection degree	IP66
Material	
Housing	polyester, impact resistant, glass fiber reinforced
Surface	black molded finish (RAL 9005)
Surface resistance	$< 10^9\ \Omega$
Water absorption	< 6 %
Seal	silicon, one piece
Grounding plate	brass
Material thickness	grounding plate: 3 mm
Dimensions	(W x H x D) 271 x 544 x 136 mm (1 x FD0-VC-Ex4.**)
Mounting	thru-holes Ø6.5 mm
Grounding	grounding bolt M6, Stainless steel
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 07 ATEX 1061 (assembled Junction Box), for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	⟨Ex⟩ II 2(1)G Ex ia IIC T4
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 600079-14:2003
International approvals	
IECEx approval	IECEx PTB 07.0036, suitable Junction Box on request
INMETRO	2008EC02CP015, suitable Junction Box on request

Edition 912868 (US) / 220231 (EU)05/2013

Features

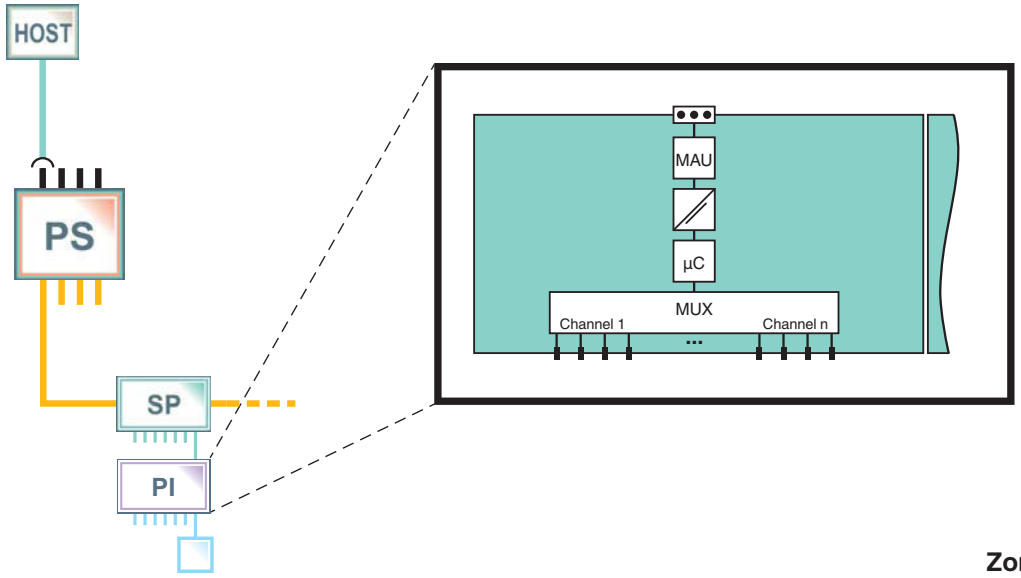
- **4 valve control and 8 position feedback signals**
- **Stainless steel, electropolished, IP66**
- **Configurable cable entries for bus lines and field signal lines**
- **International approvals**
- **Installation in Zone 1**

Function

This Fieldbus Junction Box holds valve couplers for connection to low-power solenoid valves. The fieldbus junction box can be installed in Zone 1, sensors in Zone 0. Four valves including two end position sensors can be connected.
Electropolished stainless steel 316L provides high corrosion and impact resistance at a very wide temperature range. The integrated rain channel prevents standing water from damaging the one-piece seal.
Bus and field signal line entries can be chosen individually from a range of cable glands and stopping plugs. A breather is included by default. A tag plate is available as option.
This junction box is available pre-wired, with all accessories, for fast ordering, delivery, site installation, and commissioning.

Assembly

Connection



Zone 1

Edition 912868 (US) / 220231 (EU)05/2013

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS PROTECTING YOUR PROCESS

Technical data

General specifications	
Installed components	Valve Coupler FD0-VC-Ex4.** For technical data on installed electronic component see data sheet.
Conformity	
Protection degree	EN 60529
Impact resistance	EN 60079-0
Mechanical specifications	
Enclosure cover	detachable hinged door with captive retaining screws
Protection degree	IP66
Material	
Housing	Stainless steel 1.4404/AISI 316L
Surface	electropolished
Seal	Neoprene, fire-resistant, one piece
Material thickness	enclosure body, enclosure cover, mounting plate: 1.5 mm gland plate: 3.0 mm
Dimensions	(W x H x D) 380 x 380 x 175 mm (1 x FD0-VC-Ex4.**)
Mounting	thru-holes Ø10 mm
Grounding	grounding bolt M10, brass
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 07 ATEX 1061 (assembled Junction Box), for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	Ⓔx II 2(1)G Ex ia IIC T4
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 600079-14:2003
International approvals	
IECEx approval	IECEx PTB 07.0036, suitable Junction Box on request
INMETRO	2008EC02CP015, suitable Junction Box on request

Edition 912868 (US) / 220231 (EU)05/2013

Features

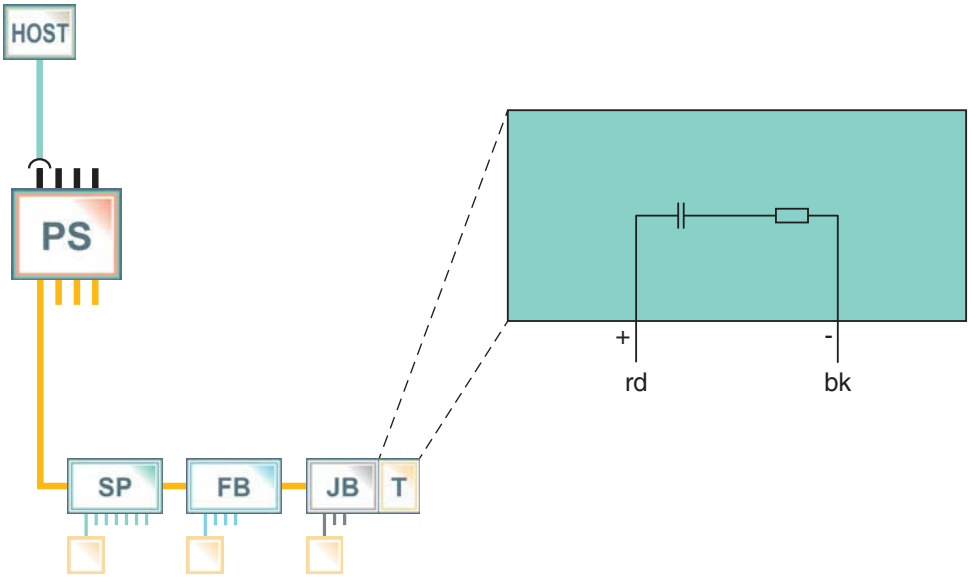
- **Terminator in stainless steel housing**
- **Flameproof enclosure (Ex d) protection**
- **Installation on open cable gland**
- **Choice of threads 20 mm, Pg 13.5 mm or 1/2" NPT**

Function

F*-FT-Ex1.D.IEC are terminators for fieldbus and provide capacitance and resistance to terminate a fieldbus segment according to IEC 61158-2. Explosion protection is flameproof 'Ex d' for installation in Zone 1…2. A solid metal housing enables installation in rough environments. Housings are selectable with 20 mm ISO, PG 13.5 mm or ½" NPT connecting threads for easy installation on outdoor junction boxes or field instruments.
For increased availability the terminator features four capacitors in a network. If one capacitor should fail the basic functionality remains intact. This is detectable with the FieldConnex® Advanced Diagnostic Module allowing timely maintenance.
Fieldbus terminators are required at each end of the trunk line. They eliminate signal reflections at the end of the cable and convert the fieldbus signal transmitted as a current into a voltage, which is detectable by all devices.

Assembly

Connection



Zone 1

Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC/EN 60529
Ambient conditions	
Ambient temperature	-50 ... 85 °C (-58 ... 185 °F)
Storage temperature	-50 ... 85 °C (-58 ... 185 °F)
Mechanical specifications	
Core cross-section	0.75 mm^2
Housing	77 mm x 22 mm
Protection degree	IP67
Mass	100 g
Mounting	20 mm ISO thread PG13.5 thread 1/2 NPT thread
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	DMT 01 ATEX 104 X
Group, category, type of protection, temperature class	Ⓔx II 2G EEx d IIC T6
Temperature class	T6 for ambient temperature ≤ 60 °C T5 for ambient temperature ≤ 75 °C T4 for ambient temperature ≤ 85 °C
Maximum values	
Rated voltage	< 253 V AC/125 V DC
Operating values	
Rated voltage	≤ 32 V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-1:2007, EN 60079-26:2007
International approvals	
IECEx approval	IECEx BVS 10.0022X
Approved for	Ex d IIC T6 Gb

Edition 912868 (US) / 220231 (EU)05/2013

Features

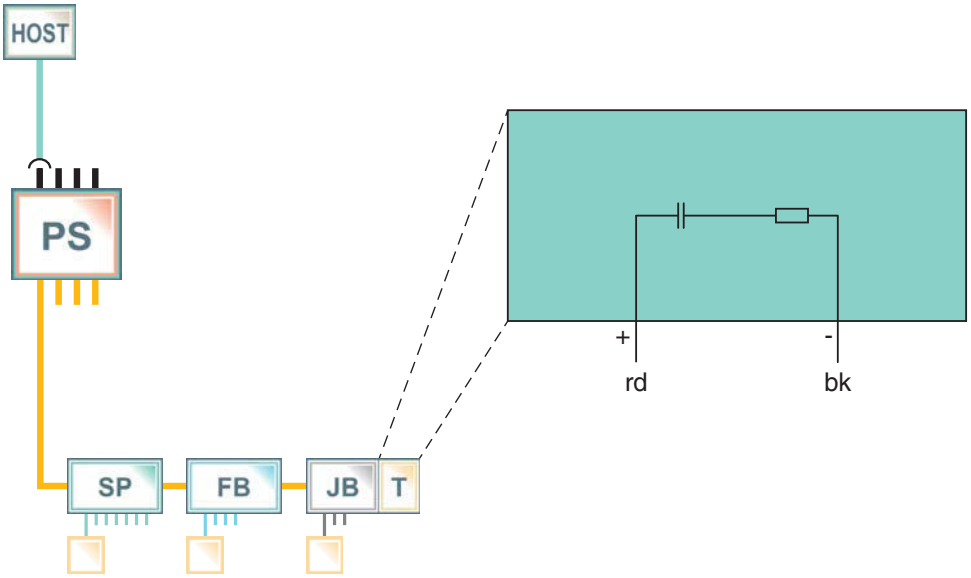
- **Terminator in stainless steel housing**
- **Intrinsically safe, FISCO or Entity**
- **Installation on open cable gland**
- **Choice of threads 20 mm, Pg 13.5 mm or 1/2" NPT**

Function

F*-FT-Ex1.I.IEC are terminators and provide capacitance and resistance to terminate a fieldbus segment according to IEC 61158-2. Explosion protection is intrinsically safe 'Ex ia' for installation in Zone 0...2. A solid metal housing enables installation in rough environments. Housings are selectable with 20 mm ISO, PG 13.5 mm or ½" NPT connecting threads for easy installation on outdoor junction boxes or field instruments.
For increased availability the terminator features four capacitors in a network. If one capacitor should fail the basic functionality remains intact. This is detectable with the FieldConnex® Advanced Diagnostic Module allowing timely maintenance.
Fieldbus terminators are required at each end of the trunk line. They eliminate signal reflections at the end of the cable and convert the fieldbus signal transmitted as a current into a voltage, which is detectable by all devices.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC/EN 60529
Ambient conditions	
Ambient temperature	-50 ... 85 °C (-58 ... 185 °F)
Storage temperature	-50 ... 85 °C (-58 ... 185 °F)
Mechanical specifications	
Core cross-section	0.75 mm^2
Housing	77 mm x 22 mm
Protection degree	IP67
Mass	100 g
Mounting	20 mm ISO thread PG13.5 thread 1/2 NPT thread
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	DMT 01 ATEX 104 X
Group, category, type of protection, temperature class	Ⓔx II 1G EEx ia IIC T6
Temperature class	T6 for ambient temperature ≤ 60 °C T5 for ambient temperature ≤ 75 °C T4 for ambient temperature ≤ 85 °C
Maximum values	
Voltage U_i	≤ 30 V
Operating values	
Rated voltage	≤ 30 V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-11:2007, EN 60079-26:2007, IEC 60079-27:2008
International approvals	
IECEx approval	IECEx BVS 10.0022X
Approved for	Ex ia IIC T6 Ga

Edition 912868 (US) / 220231 (EU)05/2013

Features

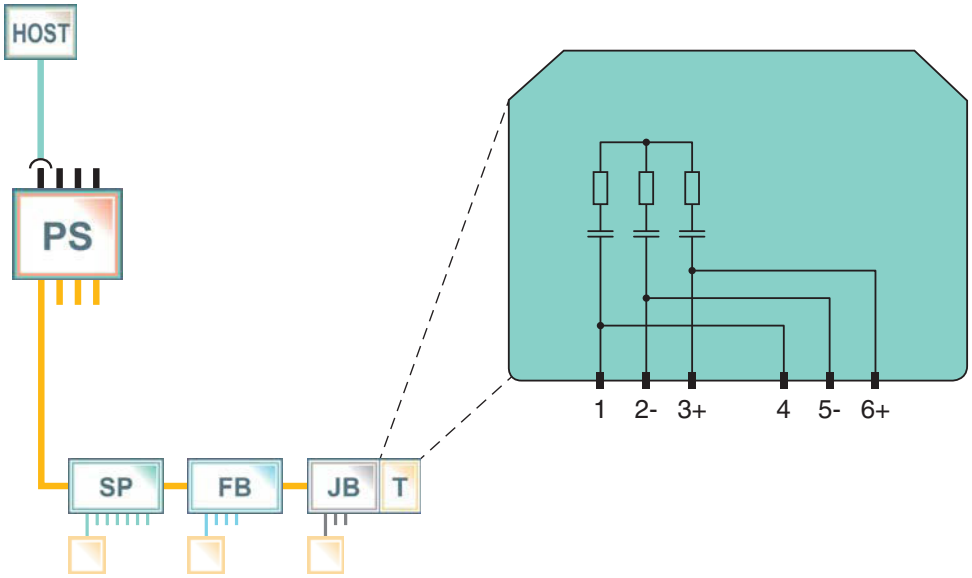
- **Terminator in IP 20 housing**
- **Intrinsically safe, FISCO or Entity**
- **Installation on DIN rail in cabinet or field junction box**

Function

The KMD0-FT-Ex is a terminator for fieldbus and provides capacitance and resistance to terminate a fieldbus segment according to IEC 61158-2. Explosion protection is intrinsically safe 'Ex ia' for installation in Zone 0...2. The housing is IP 20 for simple installation on the DIN rail for easy installation in control room cabinets or inside outdoor junction boxes.
For increased availability the terminator features four capacitors in a network. If one capacitor should fail the basic functionality remains intact. This is detectable with the FieldConnex® Advanced Diagnostic Module allowing timely maintenance.
Fieldbus terminators are required at each end of the trunk line. They eliminate signal reflections at the end of the cable and convert the fieldbus signal transmitted as a current into a voltage, which is detectable by all devices.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Directive conformity		
Electromagnetic compatibility		
Directive 2004/108/EC		EN 61326-1:2006
Standard conformity		
Electromagnetic compatibility		NE 21:2006
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
Relative humidity		75 %
Mechanical specifications		
Core cross-section		2.5 mm^2
Housing width		20 mm
Protection degree		IP20
Mass		approx. 60 g
Data for application in connection with Ex-areas		
EC-Type Examination Certificate		PTB 98 ATEX 2157
Group, category, type of protection, temperature class		⟨Ex⟩ II 2G EEx ia IIC T4
Voltage	U_i	24 V
Current	I_i	280 mA
Power	P_i	1.93 W
Directive conformity		
Directive 94/9/EC		EN 50014:1997 EN 50020:1994

Edition 912868 (US) / 220231 (EU)05/2013

Features

- **Series voltage reducing module**
- **Removable terminals**
- **Polarity reversal protected**
- **Installation in cabinet on DIN mounting rail**

Function

Pepperl+Fuchs Segment Protectors feature a safety switch off for explosion protection at typically 31.5 V.

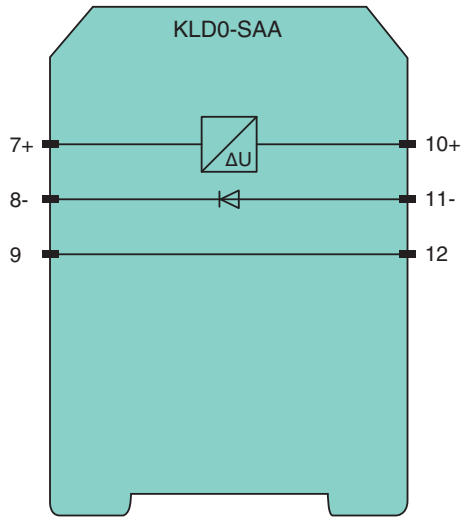
In rare cases the tolerances in other manufacturers' power modules in combination with very short cable lengths with little or no voltage drop lead to a switch off of the Segment Protector.

The KLD0-SAA is used to limit the voltage to uncritical values.

The KLD0-SAA is installed in close proximity to the power supply within the control cabinet.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	< 75 %
Mechanical specifications	
Connection type	Terminals
Core cross-section	up to 2.5 mm^2
Housing	20 mm x 115 mm x 107 mm
Protection degree	IP20
Mass	approx. 100 g
Mounting	DIN rail mounting

Edition 912868 (US) / 220231 (EU)05/2013

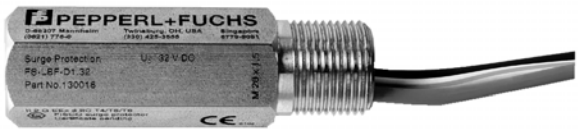
Features

- **Surge Protector in stainless steel housing**
- **Flameproof enclosure (Ex d) protection**
- **Surge protection for '+' and '-' fieldbus lead**
- **Choice of threads 20 mm or 1/2" NPT**

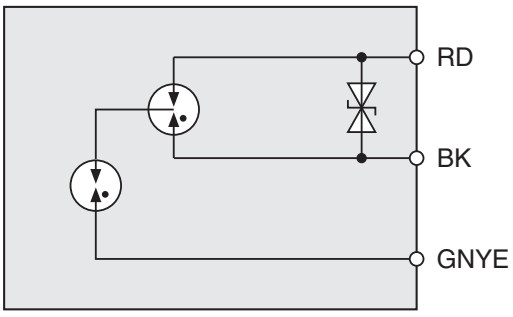
Function

F*-LBF-D1.32 are surge protection devices for fieldbus installations. They direct power surges to earth via gas discharge tubes protecting field devices and control units from voltage surges and lightning strikes. They are in accordance with the fieldbus standard IEC 61158-2 and certified Ex d (flameproof enclosure) for Zone 1.
FieldConnex® surge protectors for field installation allow the coordinated use in a lightning protection zone concept in accordance with IEC 61312-1. Housings are selectable with 20 mm ISO or ½" NPT connecting threads for easy installation on outdoor junction boxes.

Assembly



Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Electrical specifications	
Rated voltage	32 V
Surge Current (8/20) I_n	
per line	10 kA
total	10 kA
Max. surge current (8/20) I_{max}	10 kA
Voltage Protection Level at max. rated current	
Line/Line	58 V
Line/Earth	1700 V
Voltage Protection Level at 1 kV/µsec	
Line/Line	50 V
Line/Earth	1.2 kV
Reaction time t_A	
Line/Line	≤ 1 ns
Line/Earth	≤ 100 ns
Capacitance	
Line/Line	25 pF
Line/Earth	15 pF
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC/EN 60529
Surge protection	IEC 61643-21
Ambient conditions	
Ambient temperature	-50 ... 80 °C (-58 ... 176 °F)
Storage temperature	-50 ... 85 °C (-58 ... 185 °F)
Mechanical specifications	
Core cross-section	1.3 mm^2
Housing material	Stainless steel 1.4401 (AISI 316) surface all over polished
Protection degree	IP00/IP67 if correctly installed
Mass	160 g
Mounting	screw mounting
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	KEMA 04 ATEX 2318 X
Group, category, type of protection, temperature class	Ⓔx II 2G Ex d IIC T5/T6
Temperature class	T6 for ambient temperature ≤ 70 °C T5 for ambient temperature ≤ 80 °C
Maximum values	
Rated voltage	32 V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-1:2007
International approvals	
IECEx approval	IECEx KEM 09.0067X
Approved for	Ex d IIC T5/T6 Gb

Edition 912868 (US) / 220231 (EU)05/2013

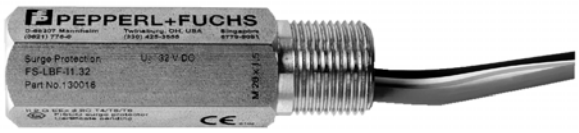
Features

- **Surge Protector in stainless steel housing**
- **Intrinsically safe, FISCO or Entity**
- **Surge protection for '+' and '-' fieldbus lead**
- **Choice of threads 20 mm or 1/2" NPT**

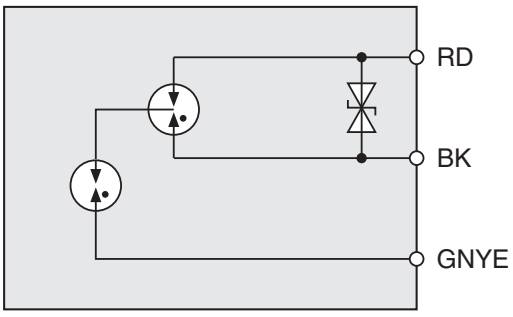
Function

F*-LBF-I1.32 are surge protection devices for fieldbus installations. They direct power surges to earth via gas discharge tubes protecting field devices and control units from voltage surges and lightning strikes. They are in accordance with the fieldbus standard IEC 61158-2 and certified intrinsically safe Ex ia for Zone 1, FISCO and Entity. FieldConnex® surge protectors for field installation allow the coordinated use in a lightning protection zone concept in accordance with IEC 61312-1. Housings are selectable with 20 mm ISO or ½" NPT connecting threads for easy installation on outdoor junction boxes.

Assembly



Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Electrical specifications	
Rated voltage	32 V
Rated current	550 mA
Surge Current (8/20) I_n	
per line	10 kA
total	10 kA
Max. surge current (8/20) I_{max}	10 kA
Voltage Protection Level at max. rated current	
Line/Line	58 V
Line/Earth	1700 V
Voltage Protection Level at 1 kV/µsec	
Line/Line	50 V
Line/Earth	1.2 kV
Reaction time t_A	
Line/Line	≤ 1 ns
Line/Earth	≤ 100 ns
Capacitance	
Line/Line	25 pF
Line/Earth	15 pF
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC/EN 60529
Surge protection	IEC 61643-21
Ambient conditions	
Ambient temperature	-50 ... 80 °C (-58 ... 176 °F)
Storage temperature	-50 ... 85 °C (-58 ... 185 °F)
Mechanical specifications	
Core cross-section	1.3 mm^2
Housing material	Stainless steel 1.4401 (AISI 316) surface all over polished
Protection degree	IP00/IP67 if correctly installed
Mass	160 g
Mounting	screw mounting
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	KEMA 04 ATEX 1317 X
Group, category, type of protection, temperature class	⟨Ex⟩ II 2(1)G Ex ia IIC T5/T6
Temperature class	T6 for ambient temperature ≤ 70 °C T5 for ambient temperature ≤ 80 °C
Voltage U_i	Entity 30 V, FISCO 17.5 V
Current I_i	Entity 550 mA, FISCO 380 mA
Power P_i	Entity 3 W, FISCO 5.32 W
Internal capacitance C_i	negligible 0 nF
Internal inductance L_i	negligible 0 µH
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-11:2007, EN 60079-26:2007, EN 60079-27:2008
International approvals	
IECEx approval	IECEx KEM 09.0081X
Approved for	Ex ia [ia Ga] IIC T5/T6 Gb

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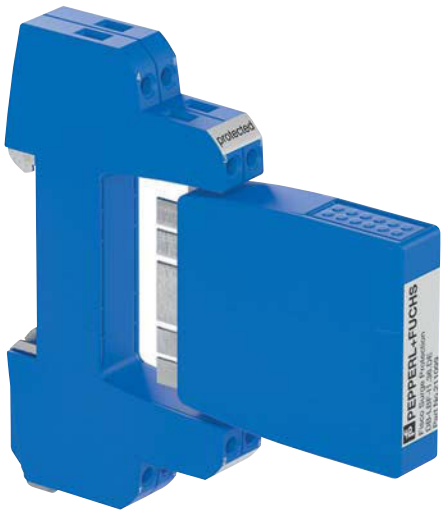
Features

- **Modular: protection module easy to replace**
- **Intrinsically safe (Ex ia), FISCO, Entity, DART Fieldbus, or general-purpose**
- **Protection module replaceable, interrupting or non-interrupting**
- **Grounding of shield direct or via gas-discharge tube**
- **Compact and space-saving design**
- **Installation on DIN rail in cabinet or field junction box**

Function

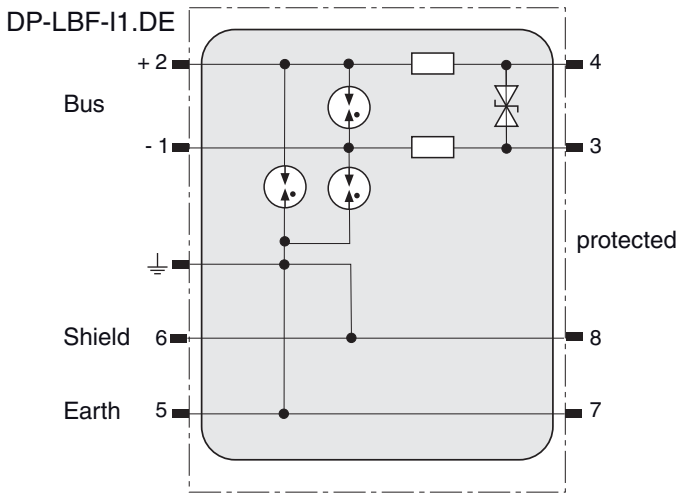
The modular surge protector for fieldbus consists of a base (DB …), and plug-in module (DP-LBF-I1.36*) and is in acc. with IEC 61158-2. It directs power surges to earth via gas discharge tubes protecting field devices. It is certified intrinsically safe for circuits in hazardous area Zone 0 … 2/Div. 1 … 2 and DART Fieldbus. The surge protector is installed in Zone 1 … 2 or Div. 1 … 2. Choices support all concepts: interrupting/non-interrupting module exchange and direct/indirect grounding of the shield. The plug-in module can be exchanged without tools. They support coordinated use in a lightning protection zone concept in acc. with IEC 61312-1. Installation in cabinet or junction box requires a minimum amount of wiring.

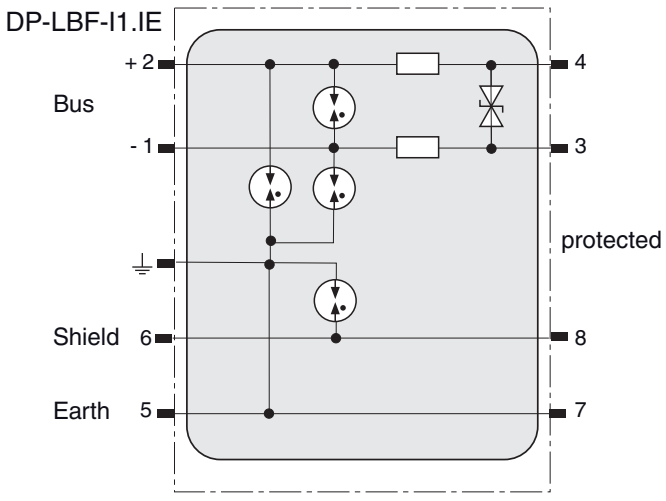
Assembly



DART FIELDBUS

Connection





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Technical data

Electrical specifications	
Rated voltage	33 V
Rated current	500 mA
Voltage Protection Level U_p	
Line/Line	≤ 58 V category C1/C2 8/20µsec, ≤ 50 V category C3 1kV/µsec ≤ 51 V category B2 10/700µsec, ≤ 55 V category D1 10/350µsec
Line/Earth	≤ 1400 V category C1/C2 8/20µsec, ≤ 1100 V category C1/C2 1kV/µsec ≤ 1000 V category B2 10/700µsec, ≤ 1300 V category D1 10/350µsec
Screen/Shield directly grounded	≤ 25 V category C1/C2 8/20µsec, ≤ 20 V category D1 10/350µsec
Screen/Shield indirectly grounded (via GDT)	≤ 700 V category C1/C2 8/20µsec, ≤ 600 V category C3 1kV/µsec ≤ 500 V category B2 10/700µsec, ≤ 600 V category D1 10/350µsec
Reaction time t_A	
Line/Line	≤ 1 ns
Line/Earth	≤ 100 ns
Screen/Shield-Earth	≤ 100 ns
Overstressed fault mode	acc. IEC 61643-21 line inoperable mode 3 lines 1 and 2 at 15,5kA (8/20µsec) lines 3 and 4 at 30kA (8/20µsec)
Series resistance in line	1 Ω +/- 5 %
Impulse durability	
Per line	1 kA category D1 10/350µsec, 5 kA category C1/C2 8/20µsec
Screen/Shield directly grounded	5 kA category D1 10/350µsec
Screen/Shield indirectly grounded (via GDT)	4 kA category D1 10/350µsec, 10 kA category C1/C2 8/20µsec
AC durability	1 A, 50 Hz, 1 s category A2
Capacitance	
Line/Line	800 pF
Line/Earth	16 pF
Standard conformity	
Protection degree	IEC 60529
Climatic conditions	IEC 60721
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Surge protection	IEC 61643-21
Ambient conditions	
Ambient temperature	-50 ... 80 °C (-58 ... 176 °F)
Storage temperature	-50 ... 85 °C (-58 ... 185 °F)
Relative humidity	≤ 95 % non-condensing
Shock resistance	15 g 11 ms
Vibration resistance	1 g, 10 ... 150 Hz
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	KEMA 09 ATEX 0191 X
Group, category, type of protection, temperature class	Ⓔx II 2(1)G Ex ia IIC T4/T5/T6
Voltage U_i	30 V
Current I_i	500 mA
Internal capacitance C_i	negligible 0 nF
Internal inductance L_i	negligible 0 µH
Statement of conformity	KEMA 09 ATEX 0190 X
Group, category, type of protection, temperature class	Ⓔx II 3G Ex ic IIC T4/T5/T6, Ⓔx II 3G Ex nA II T4/T5/T6
Voltage U_i	33 V
Current I_i	500 mA
Internal capacitance C_i	negligible 0 nF
Ambient conditions	
Ambient temperature	-50 ... 80 °C (-58 ... 176 °F) T4, -50 ... 75 °C (-58 ... 167 °F) T5, -50 ... 50 °C (-58 ... 122 °F) T6
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-11:2007, EN 60079-15:2005, EN 60079-26:2007, EN 60079-27:2008
International approvals	
CSA approval	CSA 2437472
Control drawing	116-0361
IECEx approval	IECEx KEM 09.0088X
Approved for	Ex ia [ia Ga] IIC T4/T5/T6 Gb, Ex ic IIC T4/T5/T6 Gc, Ex nA IIC T4/T5/T6 Gc

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Features

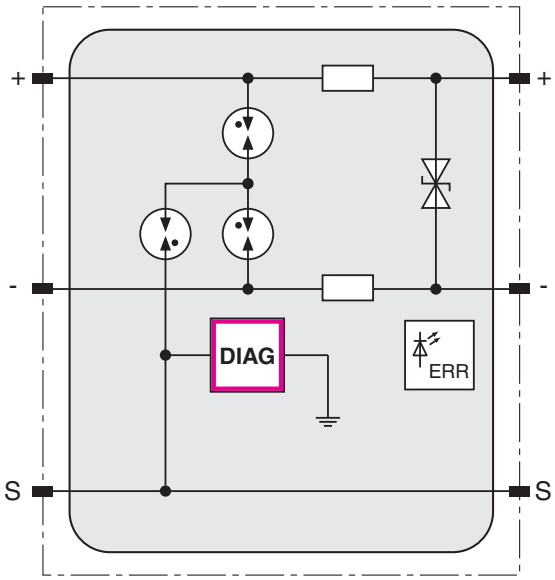
- **Pluggable, mounts between Power Hub and trunk cable**
- **Intrinsically safe (Ex ia), FISCO, Entity, DART Fieldbus, or general-purpose**
- **Optional diagnostics for wear**
- **Grounding of shield direct**
- **Indication via LED and Advanced Diagnostics**

Function

This fieldbus surge protector is in acc. with IEC 61158-2 and mounts on the trunk connector of FieldConnex® High-Density and Compact Power Hubs protecting them. It directs power surges to earth via gas discharge tubes. It is certified intrinsically safe for circuits in hazardous areas up to Zone 0/Div. 1 and DART Fieldbus. The surge protector is installed in Zone 1 … 2 or Div. 1 … 2.
Self-diagnostics (option) continuously monitor wear caused by surges. The end of the useful life is indicated via LED and in the control room via FieldConnex® Advanced Diagnostics for exchange.
Installation on the trunk connector is without additional wiring even as retrofit. A single grounding bar connects surge protectors mounted side by side to a common grounding point.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Electrical specifications	
Rated voltage	36 V
Rated current	600 mA
Voltage Protection Level U_p	
Line/Line	≤ 50 V category B2 10/700µsec, 25 A ≤ 52 V category C1 8/20µsec, 300 A ≤ 55 V category C2 8/20µsec, 5 kA ≤ 46 V category C3 1kV/µsec, 10 A
Line/Earth	≤ 1060 V category B2 10/700µsec, 50 A per line ≤ 800 V category C1 8/20µsec, 300 A per line ≤ 1450 V category C2 8/20µsec, 5 kA per line ≤ 1300 V category C3 1kV/µsec, 50 A per line ≤ 1080 V category D1 10/350µsec, 500 A per line
Reaction time t_A	
Line/Line	≤ 1 ns
Line/Earth	≤ 100 ns
Overstressed fault mode	acc. IEC 61643-21 line inoperable mode 3
Series resistance in line	2 Ω +/- 5 %
Impulse durability	
Per line	5 kA category C2 8/20µsec
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NAMUR NE 21
Protection degree	IEC 60529
Climatic conditions	IEC 60721
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Surge protection	IEC 61643-21
Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	≤ 95 % non-condensing
Shock resistance	15 g 11 ms
Vibration resistance	1 g, 10 ... 150 Hz
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	SIRA 12 ATEX 2128X
Group, category, type of protection, temperature class	⟨Ex⟩ II 1G Ex ia IIC T4
Voltage U_i	24 V
Current I_i	500 mA
Internal capacitance C_i	2 nF
Internal inductance L_i	0.1 µH
Statement of conformity	SIRA 12 ATEX 4176X
Group, category, type of protection, temperature class	⟨Ex⟩ II 3G Ex nAc IIC T4, ⟨Ex⟩ II 3G Ex ic IIC T4
Voltage U_i	33 V
Current I_i	600 mA
Internal capacitance C_i	2 nF
Directive conformity	
Directive 94/9/EC	EN 60079-0:2012, EN 60079-11:2012, EN 60079-15:2010, EN 60079-26:2007
International approvals	
IECEx approval	IECEx SIR 12.0051X
Approved for	Ex ia IIC T4

Edition 912868 (US) / 220231 (EU)05/2013

Features

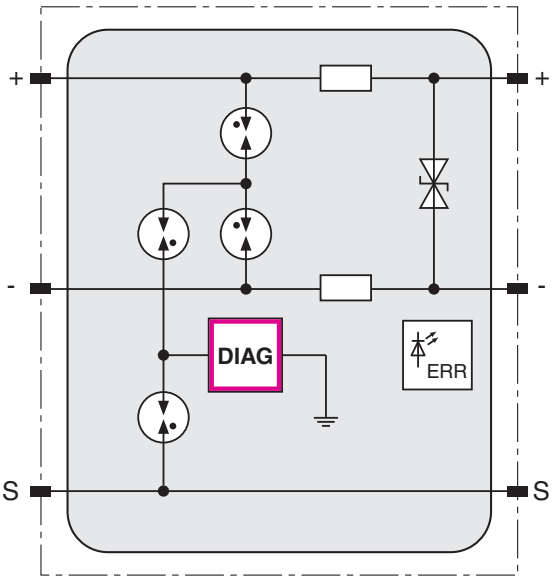
- **Pluggable, mounts between device coupler and trunk cable**
- **Intrinsically safe (Ex ia), FISCO, Entity, DART Fieldbus, or general-purpose**
- **Optional diagnostics for wear**
- **Grounding of shield via gas-discharge tube**
- **Indication via LED and Advanced Diagnostics**

Function

This fieldbus surge protector is in acc. with IEC 61158-2 and mounts on the trunk connector of FieldConnex® device couplers protecting them. It directs power surges to earth via gas discharge tubes. It is certified intrinsically safe for circuits in hazardous areas up to Zone 0/Div. 1 and DART Fieldbus. The surge protector is installed in Zone 1 … 2 or Div. 1 … 2. Self-diagnostics (option) continuously monitor wear caused by surges. The end of the useful life is indicated via LED and in the control room via FieldConnex® Advanced Diagnostics for exchange.
Installation on the trunk connector is without additional wiring even as retrofit.

Assembly

Connection



Edition 912868 (US) / 220231 (EU)05/2013

Technical data

Electrical specifications	
Rated voltage	36 V
Rated current	600 mA
Voltage Protection Level U_p	
Line/Line	≤ 50 V category B2 10/700µsec, 25 A ≤ 50 V category C1 8/20µsec, 300 A ≤ 55 V category C2 8/20µsec, 5 kA ≤ 46 V category C3 1kV/µsec, 10 A
Line/Earth	≤ 1060 V category B2 10/700µsec, 50 A per line ≤ 800 V category C1 8/20µsec, 300 A per line ≤ 1.5 kV category C2 8/20µsec, 5 kA per line ≤ 1.3 kV category C3 1kV/µsec, 50 A per line ≤ 1080 V category D1 10/350µsec, 500 A per line
Screen/Shield indirectly grounded (via GDT)	≤ 500 V category B2 10/700µsec, 100 A ≤ 600 V category C1 8/20µsec, 500 A ≤ 720 V category C2 8/20µsec, 10 kA ≤ 550 V category C3 1kV/µsec, 100 A ≤ 570 V category D1 10/350µsec, 1 kA
Reaction time t_A	
Line/Line	≤ 1 ns
Line/Earth	≤ 100 ns
Screen/Shield-Earth	≤ 100 ns
Overstressed fault mode	acc. IEC 61643-21 line inoperable mode 3
Series resistance in line	2 Ω +/- 5 %
Impulse durability	
Per line	5 kA category C2 8/20µsec
Screen/Shield indirectly grounded (via GDT)	1 kA category D1 10/350µsec 10 kA category C2 8/20µsec
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NAMUR NE 21
Protection degree	IEC 60529
Climatic conditions	IEC 60721
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Surge protection	IEC 61643-21
Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	≤ 95 % non-condensing
Shock resistance	15 g 11 ms
Vibration resistance	1 g, 10 ... 150 Hz
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	SIRA 12 ATEX 2128X
Group, category, type of protection, temperature class	Ⓔx II 1G Ex ia IIC T4
Voltage U_i	24 V
Current I_i	500 mA
Internal capacitance C_i	2 nF
Internal inductance L_i	0.1 µH
Statement of conformity	SIRA 12 ATEX 4176X
Group, category, type of protection, temperature class	Ⓔx II 3G Ex nAc IIC T4, Ⓔx II 3G Ex ic IIC T4
Voltage U_i	33 V
Current I_i	600 mA
Internal capacitance C_i	2 nF
Directive conformity	
Directive 94/9/EC	EN 60079-0:2012, EN 60079-11:2012, EN 60079-15:2010, EN 60079-26:2007
International approvals	
IECEx approval	IECEx SIR 12.0051X
Approved for	Ex ia IIC T4

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Features

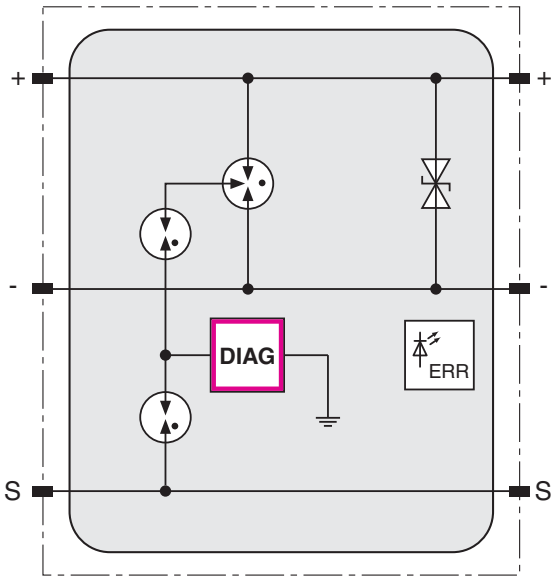
- **Pluggable, mounts between device coupler and spur cable**
- **Intrinsically safe (Ex ia), FISCO, Entity, DART Fieldbus, or general-purpose**
- **Optional diagnostics for wear**
- **Grounding of shield via gas-discharge tube**
- **Indication via LED and Advanced Diagnostics**

Function

This fieldbus surge protector is in acc. with IEC 61158-2 and mounts on the spur connector of FieldConnex® device couplers protecting them. It directs power surges to earth via gas discharge tubes. It is certified intrinsically safe for circuits in hazardous areas up to Zone 0/Div. 1 and DART Fieldbus. The surge protector is installed in Zone 1 … 2 or Div. 1 … 2. Self-diagnostics (option) continuously monitor wear caused by surges. The end of the useful life is indicated via LED and in the control room via FieldConnex® Advanced Diagnostics for exchange.
Installation on the spur connector is without additional wiring even as retrofit. A single grounding bar connects surge protectors mounted side by side to a common grounding point.

Assembly

Connection



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Technical data

Electrical specifications	
Rated voltage	36 V
Rated current	250 mA
Voltage Protection Level U_p	
Line/Line	≤ 50 V category B2 10/700µsec, 25 A ≤ 53 V category C1 8/20µsec, 150 A ≤ 55 V category C2 8/20µsec, 150 A ≤ 46 V category C3 1kV/µsec, 10 A
Line/Earth	≤ 980 V category B2 10/700µsec, 50 A per line ≤ 800 V category C1 8/20µsec, 50 A per line ≤ 1450 V category C2 8/20µsec, 5 kA per line ≤ 1200 V category C3 1kV/µsec, 50 A per line ≤ 980 V category D1 10/350µsec, 500 A per line
Screen/Shield indirectly grounded (via GDT)	≤ 500 V category B2 10/700µsec, 100 A ≤ 600 V category C1 8/20µsec, 500 A ≤ 700 V category C2 8/20µsec, 10 kA ≤ 550 V category C3 1kV/µsec, 100 A ≤ 570 V category D1 10/350µsec, 1 kA
Reaction time t_A	
Line/Line	≤ 1 ns
Line/Earth	≤ 100 ns
Screen/Shield-Earth	≤ 100 ns
Overstressed fault mode	acc. IEC 61643-21 line inoperable mode 2
Impulse durability	
Per line	5 kA category C2 8/20µsec
Screen/Shield indirectly grounded (via GDT)	1 kA category D1 10/350µsec 10 kA category C2 8/20µsec
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NAMUR NE 21
Protection degree	IEC 60529
Climatic conditions	IEC 60721
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Surge protection	IEC 61643-21
Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	≤ 95 % non-condensing
Shock resistance	15 g 11 ms
Vibration resistance	1 g, 10 ... 150 Hz
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	SIRA 12 ATEX 2128X
Group, category, type of protection, temperature class	⟨Ex⟩ II 1G Ex ia IIC T4
Voltage U_i	24 V
Current I_i	500 mA
Internal capacitance C_i	2 nF
Internal inductance L_i	0.1 µH
Statement of conformity	SIRA 12 ATEX 4176X
Group, category, type of protection, temperature class	⟨Ex⟩ II 3G Ex nAc IIC T4, ⟨Ex⟩ II 3G Ex ic IIC T4
Voltage U_i	33 V
Current I_i	600 mA
Internal capacitance C_i	2 nF
Directive conformity	
Directive 94/9/EC	EN 60079-0:2012, EN 60079-11:2012, EN 60079-15:2010, EN 60079-26:2007
International approvals	
IECEx approval	IECEx SIR 12.0051X
Approved for	Ex ia IIC T4

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Features

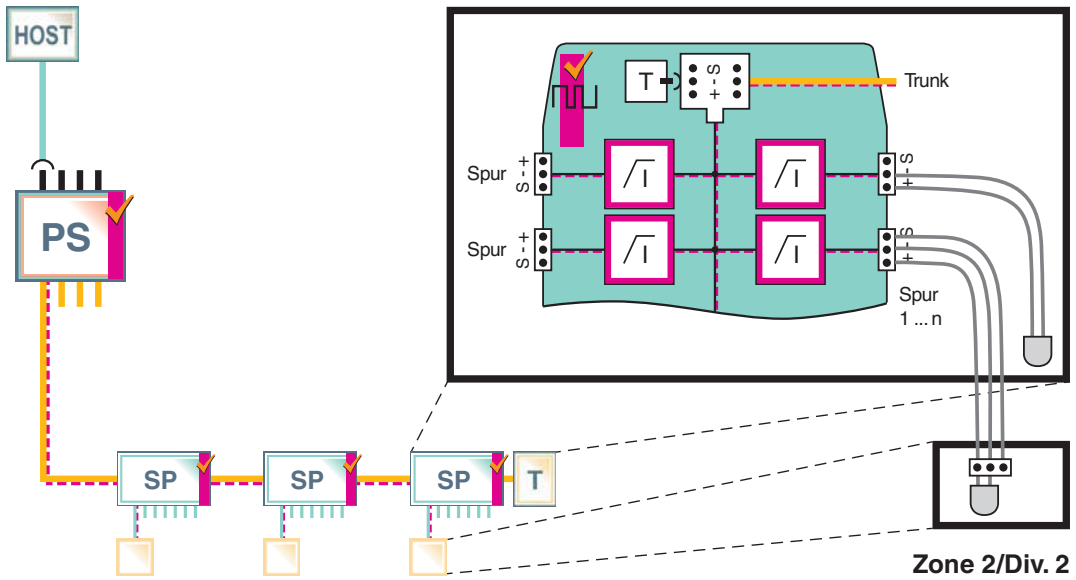
- **Indication via LED and Advanced Diagnostics**
- **Intrinsically safe, FISCO or Entity**
- **For instrument or device coupler**
- **Fits inside terminal compartment**

Function

The enclosure leakage sensor senses water ingress in field device housings or junction boxes. It fits into the enclosure and sends alarms via the fieldbus network. It is certified intrinsically safe Ex ia for installation in Zone 0.
The alarm is indicated via LED and in the control room via FieldConnex® Advanced Diagnostics. Corrective actions can thus prevent effects from becoming irreversible or avoid conditions adverse to plant performance.
The ELS-1 connects in parallel to field instruments, trunk or spur connectors of compatible device coupler.

Assembly

Connection



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Technical data

Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Climatic conditions	IEC 60721
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Ambient temperature	-40 ... 80 °C (-40 ... 176 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	100 %
Shock resistance	15 g 11 ms
Vibration resistance	1 g, 10 ... 150 Hz
Mechanical specifications	
Connection type	two strands, length 180 mm with cable ferrules, PVC insulation
Core cross-section	0.25 mm^2
Housing material	Polycarbonate
Protection degree	Electronic component IP67 connection IP00
Mass	10 g
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	SIRA 12 ATEX 2129X
Group, category, type of protection, temperature class	Ⓔx II 1G Ex ia IIC T4
Voltage U_i	24 V
Internal capacitance C_i	negligible 0 nF
Internal inductance L_i	negligible 0 µH
Statement of conformity	SIRA 12 ATEX 4154X
Group, category, type of protection, temperature class	Ⓔx II 3G Ex nAc IIC T4, Ⓔx II 3G Ex ic IIC T4
Voltage U_i	33 V
Internal capacitance C_i	negligible 0 nF
Directive conformity	
Directive 94/9/EC	IEC 60079-0:2011, EN 60079-11:2012, EN 60079-15:2010, EN 60079-26:2007
International approvals	
IECEx approval	IECEx SIR 12.0052X
Approved for	Ex ia IIC T4, Ex ic IIC T4, Ex nAc IIC T4

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