PROCESS AUTOMATION

Remote I/O Systeme

Remote Process Interface

Edition 2003

PEPPERL+FUCHS

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Contents

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Pepperl+Fuchs Documentation and Training

CD-ROM Catalogue

The Pepperl+Fuchs CD-ROM catalogue Process Automation includes the data sheets of the division Process Automation, level control and the instructional program of Pepperl+Fuchs. A product search can be initiated either by a search tree or by model number. In the Process Automation menu data sheets for signal converters of the Pepperl+Fuchs group can be accessed and in the level control menu, data sheets for level control can be found. In the Training menu the complete training and teachware program can be found.

Training Packages

Pepperl+Fuchs offers instructional cases and extended assembly kits for training on sensors and the AS-Interface.

Seminars

Other seminars offered by Pepperl+Fuchs:

Explosion protection through instrinsic safety
Level Control
Signal Conditioners for Process Automation

The seminars take place regularly at Pepperl+Fuchs, at the "Haus der Technik e.V." in Essen, Berlin and Munich, on various TÜV academies and preferably on site at the customer's.

Ex-i Video"Preventing Explosions with Intrinsic Safety"

In Part 1 "Introduction to explosion protection", this video explains the important implications of the ATEX Directives 94/9/EG and 1999/92/EG and provides an overview of all the important European specifications that translate these two ATEX directives. Among these are the European standards EN 1127-1 and EN 60079-10 (Zone definition and Zone divisions), and the Europe-wide applicable installation specification EN 60079-14.

In addition, the new device identification system is presented. Part 1 concludes with an overview of the ignition protection categories. (22 minutes duration)

In Part 2 "Explosion protection through intrinsic safety" the principle of intrinsic safety protection is explained and the important installation regulations that are necessary to maintain the intrinsic safety are clarified. The demonstration of intrinsic safety is treated on the basis of some examples. (17 minutes duration).

This instructional film, which is not manufacturer-biased, is also available on CD-ROM. The package includes an accompanying book in German, English, French, Spanish and Russian, in the standard PAL/NTSC format.

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Introduction to Explosion Protection through Intrinsic Safety

When introducing electrical equipment in a hazardous area, extensive regulations must be observed that are subdivided into European (EU) and national requirements. The European standards define the general specifications and the detailed guidelines for methods of protection against explosion. The national requirements primarily contain the installation criteria.

Electrical instruments for explosion groups I and II, as well as the T1 ... T6 temperature classifications, are grouped in DIN EN 50014 (see "Division of Hazards, Ignition Hazards due to Sparks and Hot Surfaces" in the following table). DIN EN 50020 presents categories, design and test specifications and type identification of intrinsically safe apparatus. Approvals for electrical instruments that are used in explosive environments are regulated by EG-Ex-Framework Guidelines 76/117/EWG and Guideline 94/9/EG.

The intrinsic safety method of explosion protection always relates to intrinsically safe circuitry that comprises an intrinsically safe apparatus, an appropriate electrical power source and the connecting cables. In intrinsically safe circuits, an explosive environment cannot be ignited by sparking or a thermal effect when operating normally under prescribed fault conditions. In an intrinsically safe circuit for categroy ia, 2 calculable faults (see definition EN 50020) must not cause an ignition and in category ib only 1 such fault is permissible. Limiting the power supply, total inductance and total capacitance within the intrinsically safe circuitry is the basic principle of the intrinsically safe explosion protection method.

The project manager or user has to compare the permissible internal limit values for intrinsically safe electrical apparatus with the permissible connection values of the associated electrical apparatus, in accordance with the following table:

Intrinsically safe apparatus + cable	Demonstration of intrinsic safety	Associated apparatus
U_i	$\geq$	U_0
I_i	$\geq$	I_0
P_i	$\geq$	P_0
$L_i + L_c$	$\leq$	L_0
$C_i + C_c$	$\leq$	C_0

These limit values are obtained from the prototype test certificate. The comparison of the limit values satisfies the requirements of DIN EN 60079-14 with regard to the demonstration of intrinsic safety. When installing complex intrinsically safe circuitry with more than one item of associated electrical apparatus, a calculated demonstration of intrinsic safety has to be carried out and this must then be referenced back to the explosion limit curves for DIN EN 50020 or to the tables that these curves represent.

In this case all the active associated electrical apparatus are combined in one complex associated electrical apparatus.

"Active" refers to any apparatus that can provide power to the intrinsically safe circuit under normal or malfunctioning operating conditions.

For the intrinsically safe connection terminals of this complex apparatus, the effective values for

the maximum output voltage U_0,

the maximum output current I_0,

the maximum output power P_0,

are calculated as follows, depending on the combined circuitry of the individual associated apparatus:

For parallel circuits:

I_0 from the sum of the individual currents,

U_0 from the maximum value of the individual voltages.

For series connection:

I_0 from the maximum value of the individual currents,

U_0 from the sum of the individual voltages.

The individual values are taken from the certificates of conformity.

The maximum output power is calculated from the following formula for assigned apparatus with linear current-voltage output characteristics:

$$P_0 = 1/4 * U_0 * I_0$$

Based on the calculated maximum value, the intrinsic safety has to be checked using the ignition limit curves. DIN EN 60079-14 references limitations (PTB report W39 is to be used for associated apparatus with non-linear current-voltage characteristics) and safety factors.

In addition to this demonstration of intrinsic safety, the integrity of the intrinsically safe circuitry must also be assured against the ingress of energy from other electrical power sources. If both requirements are fulfilled, a safe power limit within the circuitry will not be exceeded, even if there is an interruption, a short circuit or grounding of the circuitry (EN 60079-14). A detailed description of "Explosion protection through intrinsic safety" can be found in the handbook of the same name.

The previously valid national specifications will be replaced in the future by the following European standards:

EN 1127-1	Machine Safety/combustion and explosion protection (Zone 0; 1; 2 for gas and steam/ Zone 20; 21; 22 for dust)
EN 60079-10	Installation of electrical systems in potentially explosive areas (division into areas)
EN 60079-14	Installation of electrical systems in potentially explosive areas (installation specification)

The following table compares important general guidelines for explosion protection as applied in the European Union and North America.

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<table>
<tr><th></th><th>European Union</th><th>North America</th></tr>
<tr><td>Classification of hazards</td><td>Explosive mixture in
Group I: mines susceptible to fire-damp
Group II: other areas outside of mines</td><td>Explosive mixtures of air and
CLASS I: Gases and vapours
CLASS II: Dusts
CLASS III: Fibres</td></tr>
<tr><td>Ignition due to sparks</td><td>Grouping of ignition protection methods intrinsic safety/flame proof enclosure as well as ignition protection "u" according to minimum ignition current/maximum permitted gap with reference to the minimum ignition power of representative gases:
Group I Methane
Group IIA Propane
IIB Ethylene
IIC Hydrogen, Acetylene</td><td>Sub-division of the class according to ignition energy:
CLASS I Group A Acetylene
B Hydrogen
C Ethylene
D Methane
CLASS II Group E Metal dusts
F Coal dusts
G Grain dusts
CLASS III No grouping</td></tr>
<tr><td>Ignition hazards due to hot surfaces</td><td colspan="2">Division into temperature classes in accordance with IEC 60 079-8 for maximum surface temperatures with an ambient temperature of 40 °C, under fault conditions:
T1 ≤ 450 °C T2 ≤ 300 °C T3 ≤ 200 °C T4 ≤ 135 °C T5 ≤ 100 °C T6 ≤ 85 °C</td></tr>
<tr><td rowspan="3">Division of hazardous areas</td><td colspan="2">The following are subdivided according to the probability of the occurrence of a dangerous explosive atmosphere:</td></tr>
<tr><td>For gases, vapours, mists: (EN 1127-1)
Zone 0 constant or long term
Zone 1 occasionally
Zone 2 seldom and short term
For dusts: (EN 1127-1)
Zone 20 constant or long term or frequently
21 occasionally
22 short term or accumulation or layers of dust</td><td>for gases and dusts:
Division 1
Division 1
Division 2</td></tr>
<tr><td colspan="2">Note (see IEC 60 079-10): constant or long term corresponds to > 1000 h/year, occasionally corresponds to 10 ... 1000 h/year, seldom or short term corresp. to < 10h/year</td></tr>
<tr><td rowspan="2">Safety characteristics</td><td colspan="2">The characteristics of flammable gases and vapours as a basis for classification in respect of ignition energy and temperature/flashpoint are contained in:</td></tr>
<tr><td>Redeker, Nabert, Schön/intrinsic safety characteristics of flammable gases and vapours</td><td>NFPA 497 M
CSA No. C22-1</td></tr>
<tr><td>Approval authorities</td><td>PTB Physikalisch-Technische Bundesanstalt
DMT Deutsche Montan Technologie
BASEEFA British Approvals Service for Electrical Equipment in Flammable Atmospheres</td><td>UL Underwriters Laboratories, USA
FM Factory Mutual Research, USA
CSA Canadian Standards Association</td></tr>
<tr><td>Installation requirements</td><td>DIN EN 60079-14 (VDE 0165 Part 1) for explosive gas environments
DIN EN 50281-1-2 (VDE 0165 Part 2) for environments with flammable dust</td><td>NFPA 70 National Electrical Code Art. 500
NFPA 493 Standard for Intrinsically safe operations...</td></tr>
</table>

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System Description Remote Process Interface

The remote process interface (RPI) from Pepperl+Fuchs is an interface system for conditioning conventional measurement, control, and regulator signals between sensors, actuators and field devices on one hand, and a process control system or a PLC on the other hand, whereby the connection to the control system is made via a fieldbus interface. The signals are galvanically isolated using RPI. It is suitable for non-intrinsically safe and intrinsically safe signals within Zones 1 and 0. It can be used within a switching compartment in the safe area or in the field within explosion protection Zone 2.

Advantages

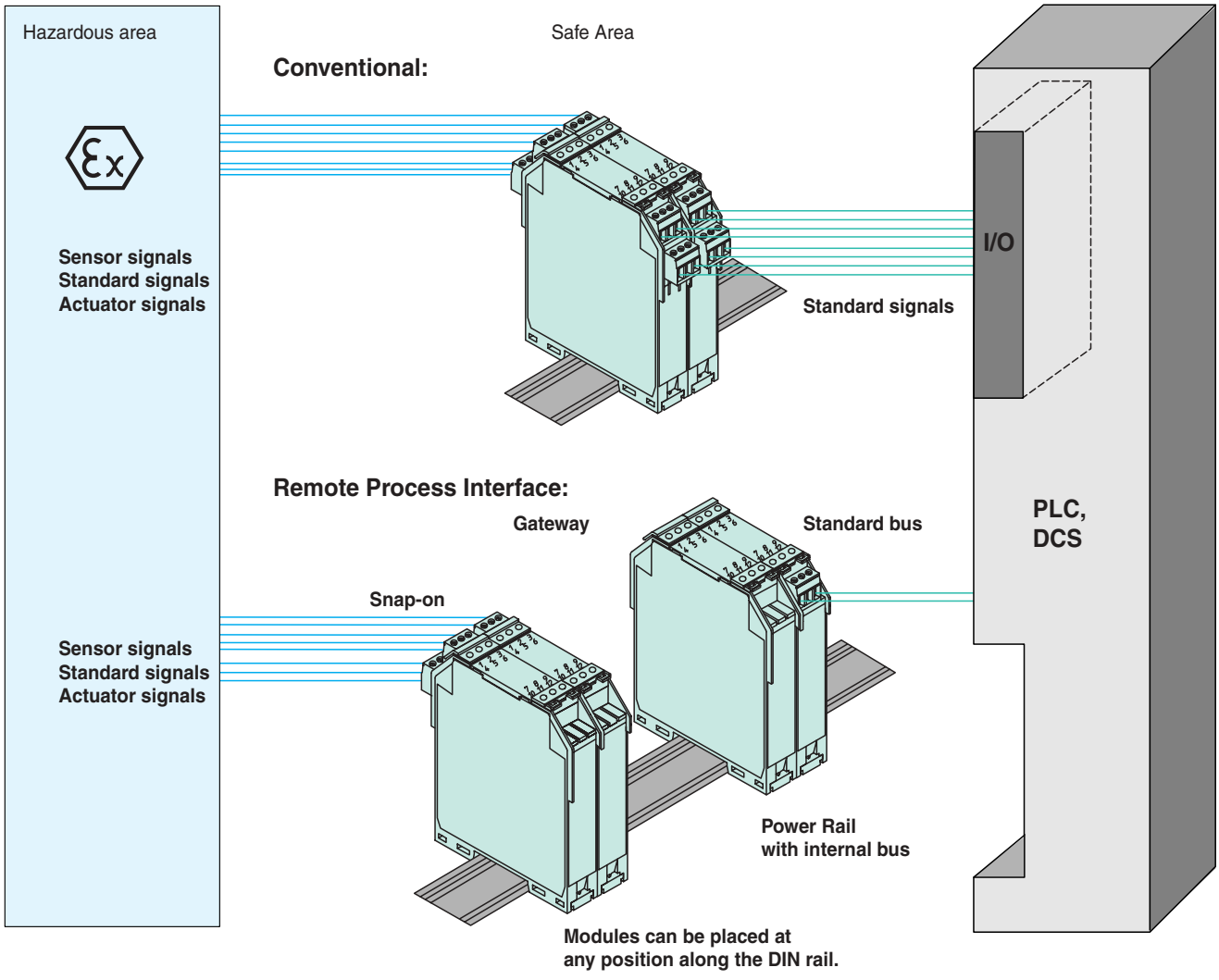
In using of the Pepperl+Fuchs Remote Process Interface (RPI) the investment cost for installation, planning and documentation are noticeably reduced. System accuracy is increased in comparison to conventional interface-systems. Due to the easy replacement of components and extensive system diagnosis system down time is decreased. This simplifies operation. Shunting the field circuit becomes unnecessary.

Areas of application

The signal currents for instrumentation and control and monitoring in production facilities often have to be preprocessed, before they are connected to the control system. This situation is to be found in many companies dealing with process automation, such as the chemical and petrochemical industries, on-shore and off-shore systems, pipelines etc. but also in factory automation in which explosive atmospheres can arise. In order to guarantee safety and proper function the signal circuits are arranged using intrinsic safety standards. In this method of ignition protection the signal conditioners are used as isolator modules, which are installed outside the hazardous area in the control room and which limit the electrical energy of the signal circuits in such a way as to prevent ignition also in the case of a fault. Pepperl+Fuchs has been the leading producer of such isolator modules for years. These secondary switching devices are available on Eurocards or in DIN-Rail housings (K-system). The remote process interface (RPI) from Pepperl+Fuchs is the consequence of the further development of rail mounted systems.

The Pepperl+Fuchs-Remote Process Interface is suited for use with process control systems, PLCs, as well as with PC based systems, e.g. SCADA systems.

Principle



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Mechanical Installation

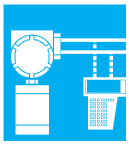
The installation of the Pepperl+Fuchs-Remote Process Interface is based on the systems characteristics:

1. within a switching compartment: in the switch cabinet, in a frame, on the wall.
2. in the field in a safe area: within an enclosure or junction box using IP54 or higher protection method.
3. in the field in hazardous areas: within zone 2 (in the USA: division 2) within an enclosure or junction box using IP54 or higher protection method.

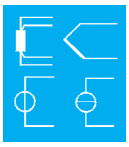
Field signals

In all three mounting styles the sensor/actuator signals can be provided in the intrinsically safe category EEx ia or EEx Ib.

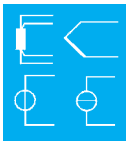
These sensor/actuator signals are commonly those signals used in process automation. Depending on the function the RPI devices have one to four channels for



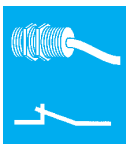
1. Analogue input 0/4 mA up to 20 mA with or without transmitter power, transfer of the HART protocol of the connected transmitter.



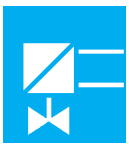
2. Analogue input for resistance thermometers, thermocouples, potentiometric recorders and mV-transmitters.



3. Analogue output 0/4 mA up to 20 mA, transfer of the HART protocol of the connected position controler.



4. Binary input for mechanical contacts and proximity switches to DIN EN 60947-5-6 (NAMUR sensors).



5. Binary output for solenoid valves.

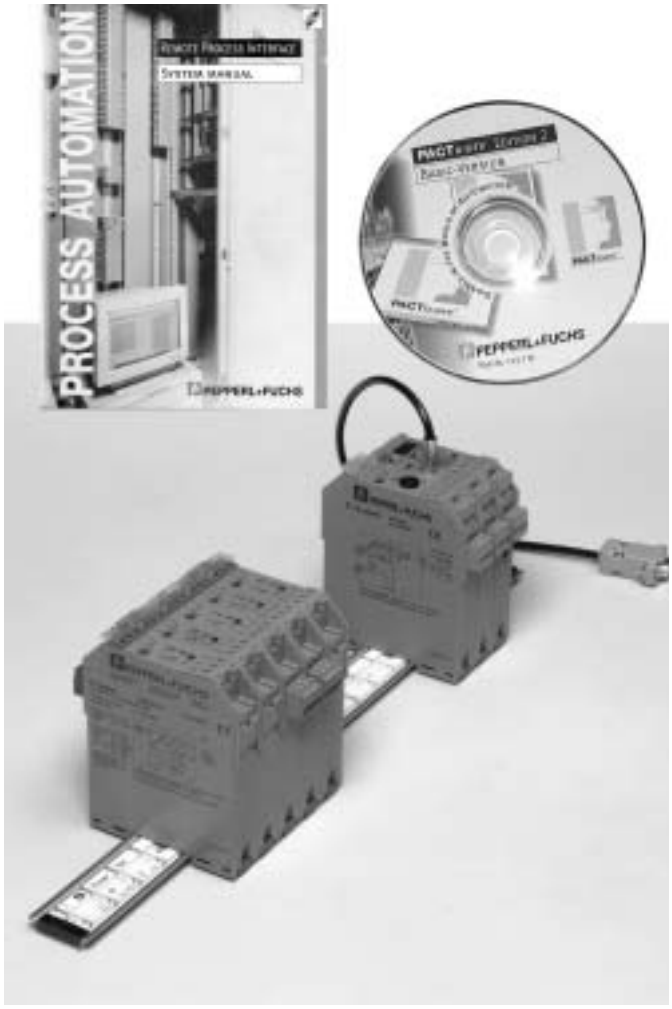
6. Binary output potential-free relay contact.

Components of the RPI System

Functional RPI system consists of:

1. DIN rail with Power Rail
   for mounting, voltage supply and internal bus connection.
2. Power feed module
   for coupling and monitoring the voltage supply. At 24 V DC power supply units are not necessary.
3. Gateway
   for connection to the external bus system.
4. Devices
   the function modules with intrinsically safe but also non-intrinsic safety field circuits.
5. Control display **PACT***ware*™ for
   - Planning,
   - Documentation,
   - Configuration,
   - Parameterisation,
   - Installation,
   - Commissioning,
   - monitoring,
   - diagnosis,

   of the complete system.
6. PC adapter
7. System manual



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Mounting

Components of the RPI System have removable device connectors with integrated self opening device terminals for leads with a diameter of up to 2.5 mm². These removable terminals simplify the installation of the enclosure greatly and allow the units to be swapped out during maintenance while the system is powered up.

As conventional systems RPI devices are simply snapped onto a rail, in which the Pepperl+Fuchs Power Rail used for powering the individual devices and for transferring signals is mounted. The mechanical structure allows the combined mounting of RPI modules and Pepperl+Fuchs K-system devices, and even third party components that can be rail mounted.

The rails can be mounted horizontally or vertically at any length. Thus RPI can be adapted to the characteristics of the system.

Space saving mounting systems are available, such as the KF module, which unites the cable trays, the individual lead connections, the rail and the Power Rail. Pepperl+Fuchs also offers suitable enclosures and switch cabinets.

All of the mounting spaces on the power rail are the same. Each device can be mounted at any site on the rail.

Voltage supply

RPI uses the 5-pin designs PR-05 or UPR-05 of the Power Rail, which is simply inserted in the DIN rail and mounted with it.

Power is supplied by means of two conductors on the power rail to the mounted devices. A contact is established to the power supply by simply snapping the component onto the DIN Rail. The need for wiring of one device to another in a "Daisy Chain" is eliminated. A power feed module provides the connnection between a DC 24 V supply and the power rail.

The RPI modules function in a voltage range of 20 V DC up to 30 V DC. Special power units are unnecessary. When higher power is required, the voltage supply via the Power Rail can be divided into individual segments, which are supplied separately.

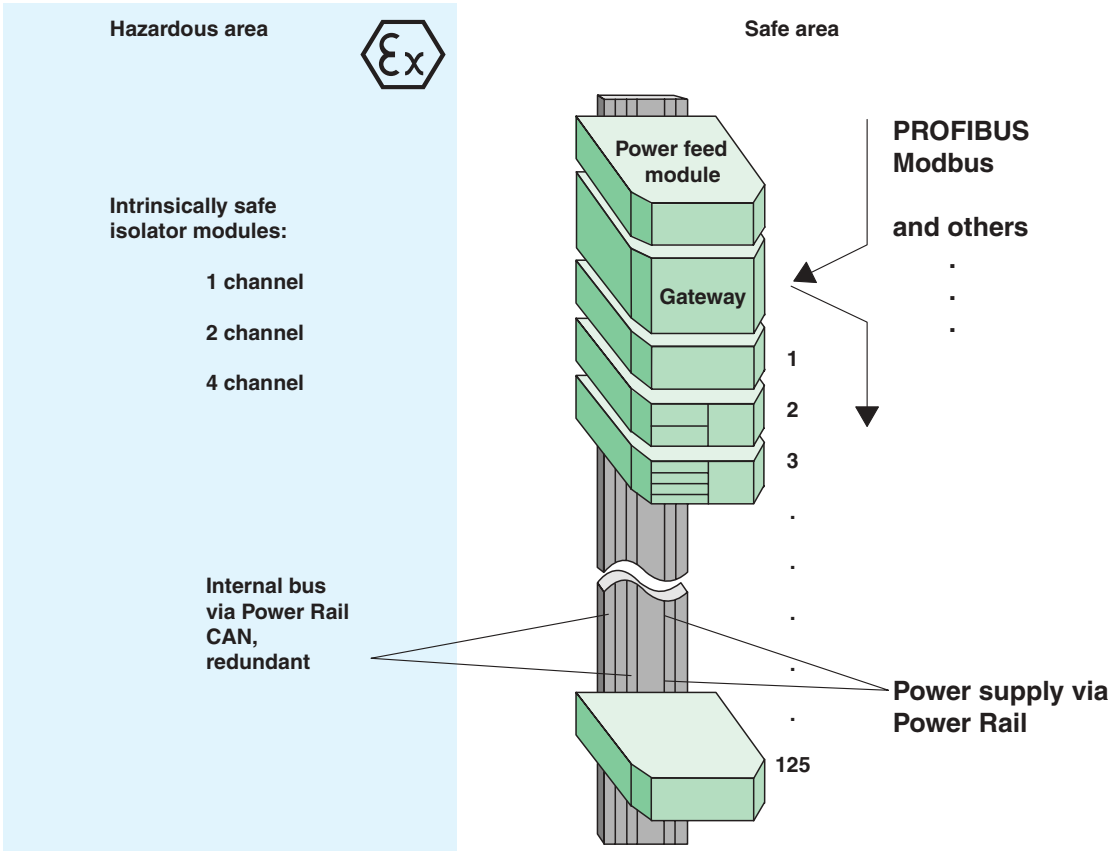
Bus systems

In addition to the conductors for power supply the Power Rail has three other conductors, across which the measurement signals are transmitted in digital form from the devices to a gateway and vice versa through an internal serial data bus. The communication control is taken over by the gateway. This gateway simultaneously provides the interface to an external standard bus, e.g. PROFIBUS DP, MODBUS etc., through which the signals are transmitted to the control system and vice versa. By selecting the gateway, the adaptation to the various bus systems (e.g. PROFIBUS or MODBUS), as well as to various process control systems is possible, including customer specific connections.

Number of channels

Up to a max. of 125 devices with up to 4 channels can be connected to a gateway, corresponding to a maximum of 500 channels. Multiple gateways can be coupled on the external bus to the control system, in order to form larger units. In practice this can be e.g. up to 125 gateways on PROFIBUS DP, providing e.g. 62.500 binary inputs. Nevertheless, channel numbers below 30 can also be attained by means of simple DIN rail mounting. RPI functions as a "modular slave" in PROFIBUS DP. This means that a RPI segment with up to 125 devices, thus maximum 500 channels, occupies only one PROFIBUS DP address.

Remote Process Interface with bus connection



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Cycle times

The internal CAN bus system of the RPI guarantees a time equidistant transfer of signals from and to the gateway. The cycle time is dependent on the function and number of devices on the gateway:

1	Device:	25 ms
125	devices with a binary input:	60 ms
125	devices with a binary output:	90 ms
125	devices with analogue input:	75 ms
125	devices with analogue output:	110 ms

The cycle time of the external bus depends on the the bus system used, the number of stations, the quantity of data that has to be transfered and baud rate. In most applications, the cycle time is within a range of hundred milliseconds or lower. For more information, please refer to RPI system manual and documentation for the bus master of the control system, the PLC or PCs.

Marshalling

All of the mounting spaces on the power rail are the same. Each device can be mounted at any site on the rail. Marshalling is therefore unnecessary, especially since there is no point-to-point wiring to the control system.

RPI Device Functions

Basic functions

RPI devices have an uncomparably higher range of functions than conventional interface modules:

- Selection switch markings (TAG-Nr.) can be stored in device
- Comments and notes can be stored
- Physical units are adjustable
- Lead monitoring
- 4 limit values in analogue devices
- Malfunction output status
- Status signals
- Diagnosis
- Simulation of the process signals and the diagnosis to the control system
- Simulation of the process signals to the field
- Clock function and time stamping for initial value detection in gateways

HART Protocol

HART compatible transmitters and position controlers are supported in many ways by RPI:

1. The 4 mA ... 20 mA signal is transmitted across the internal and external bus. The devices have additional, plug screw terminals in the safe area, to which the HART communication for monitoring and programming of the connected transmitters or position controlers is connected. Thus, a handheld communicator does not have to be connected to the intrinsically safe field conductors.
2. By means of a PC and the HART-Multiplexer Master KFD2-HMM-16 in association with the KSD2-HC HART control module and the KSD2-CI-S-Ex.H or KSD2-CI-S-H SMART transmitter power feed modules and the analogue SMART Output Repeaters KSD2-CO-S-Ex.H or KSD2-CO-S-H a subordinate HART communication level that is independent of the transfer of measured data via the fielbus, can be built up. Up to 250 field devices (sensors or actuators) can be addressed with this system via PC using current HARD configuration software, such as Cornerstone (Astec), AMS (Emerson) or **PACT***ware*™. The RS 485-interfaces of the HART-Multiplexer and of the RPI-Gateway can be networked. Then the RPI software **PACT***ware*™ and the HART software can be operated on the same PC. The subordinate HART communication level guarantees access to the field devices even if the external bus of the RPI system has failed. This finds particular application on PLCs and control systems, that do not support the HART protocol themselves.
3. The new gateway KSD2-GW2-PRO allows HART communication via the integrated RS 485-interface. This interface can be accessed by means of **PACT***ware*™. Thus, up to 250 HART field devices can be addressed without additional expenditure.
4. The 4 mA ... 20 mA signal is transfered together with the HART Protocol via the internal and external bus, PROFIBUS DP. This function is planned and will be used for process control systems, which support the HART protocol and in which the bus master can handle the HART message integrated into the protocol of the external bus.
   Another possibility is a PROFIBUS Master Class 2, integrated into the PC, which has access to the HART field device via the acyclic PROFIBUS DP V1 communication.

Configuration and Programming By Way of the Control System:

Every function of all devices and gateways can be initiated with the engineering console of a control system across the external bus, if the control system supports these functions.

Directly at the devices:

Some basic functions can be accessed directly the gateway and the devices without PC or control system.

From the PC by means of the Human Machine Interface:

The functions, configuration and parameters of all devices can be operated from the gateway and the PC. The function of an engineering console is achieved for the RPI with PLC systems. In addition to the connection for the external standard bus the gateway has a parameterisation interface for the temporary or permanent connection of a PC. Usually it is a RS 232 interface, which is supported by any PC. If gateways with RS 485 programming interfaces are used, then multiple gateways can be connected to a common service network. Thus the RPI devices of all gateways can be centrally operated from one single PC by means of a RPI user interface. This software runs under the operating systems Windows 98, Windows NT and Windows 2000 and follows the directive VDI/VDE 2187, which was developed by users in the chemical and automation industry. The directive also establishes the procedures for password protection and access rights as „Maintenance“ and „Specialist“. The language may be changed from German to English and vice versa. RPI systems can be planned, configured, programmed, documented, comissioned, diagnosed and modified by the RPI software online and offline, independent of the control system. The projection data of all RPI devices are stored to PC data carriers by means of the RPI user interface and can also be printed on paper as a hard copy.

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Electrical Safety

In relation to conventional systems the lower amount of wiring proportionally decreases the probability of wiring faults. All RPI devices and gateways are individually and internally short circuit protected. Group short circuit protection of the devices is performed by the fuse of the power feed module. Shorting of the fuse is indicated by LED and relay contact.

Availability

The Remote Process Interface devices are developed and produced by Pepperl+Fuchs according to high quality standards. Coupling to the process control system through bus systems increases overall system availablity. Signal processing in the control system is eliminated. Interferences at the bus cables are detected and the protocols are repeated. With the wide range of diagnostic capabilites of the RPI interferences can be categorised and corrected quickly or they can be prevented from occuring.

Configuration data are stored in the EEPROMs of the RPI device safe from power outages and wihout the use of backup batteries. In addition the data of all connected devices and the configuration data of the gateway are stored in the same way. The project data for the RPI are stored on the PC.

Redundancy of the voltage supply

The DC 24 V power supply for the RPI system can be arranged redundantly. Two voltage supplies can be connected over separate power feed modules. As a rule the two power supplies must be decoupled in order to prevent interaction between them. For this purpose, special power feed modules with integrated decoupling diodes are available.

Redundancy of the internal bus system

The mechanical properties of the internal bus system on the Power Rail is very durable. Nevertheless, the internal bus system has a serial redundant design. If the internal path fails due to breakage, short circuit between the conductors or due to a defective bus coupler, the system switches automatically from push-pull operation to phased operation. The bus signals are transferred over the remaining conductor, such that the negative potential of the supply voltage serves as a reference. This process is automatically indicated to the operator. The operator has time to correct the fault while the communication continues.

Redundancy of the external bus system and of the gateway

By installing a second gateway the external bus can also be constructed redundantly.

The following cases are possible:

1. Gateway-redundancy
2. Redundancy of the external bus to a single control system
3. Redundancy through two external busses and two control systems

Fault management

Effects of faults in the RPI system:

1. Faults are signalled.
2. Faults can be diagnosed in detail.
3. Predetermined signal values can be programmed, which are transferred to the process, in case communications are interrupted on the internal or external bus.
4. Predetermined signal values can be programmed which are transferred to the control system, in case a measurement signal has not been received from the field.
5. **The communication of the uninterrupted measurement circuit continues unaltered!**

Fault signalling and fault diagnosis is carried out

1. by means of LEDs on the devices and LCD at the gateway in a limited extent.
   In case of the new gateway, type GW2, a large text display is available.
2. via PC and RPI control software by diagnosis menus. Detailed diagnosis of faults associated with hardware, firm ware and communication of the devices and for each channel of the device separately lead breakage, short circuit, limit alarms, overrange and underrange.
3. with the control system by means of status signals to the same extent as in the case of b).
4. Also the correction of a fault is indicated on all three levels, a), b) and c).

The correction of faults is accomplished

- in case of device faults by simple replacement of defective devices. Adjustments, configurations or programming are not necessary The devices are fully pluggable and may be replaced during operation.
- during gateway faults by replacement of defective gateways. The configuration is loaded in the new gateway from the PC or from the control system. In operation with a redundant gateway the RPI continues to function unchanged.

Commissioning

The commissioning of the RPI is simplified in comparison with conventional systems:

1. Practically no wiring of the voltage supply and the control system. The time-consuming search for wiring faults is avoided.
2. RPI has full "plug-in" and "snap-on" features. All plug-in connection sites on the Power Rail are identical. All switch cabinets in a system can be similarly assembled. The devices do not have to be snapped on until they are put into operation. System changes are quickly accomplished.
3. A wide range of diagnostic tools are available which simplify the search for installation faults.

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Expansions

The Power Rail is designed for expansion by having adequate space for the placement of additonal units. Expensive pre-planning, pre-cabling and complex mechanics are avoided. Provided that it is permitted by the external bus system, expansions during operation can be made by snapping-on the units to the rail. At the gateway and on the control system, a signal indicates that an additional device has been added to the system. The new device can then be included in the RPI communication through a simple keystroke.

Special applications

Due to the high flexibility of RPI and its compatibility with the conventional Pepperl+Fuchs K-system special applications may also be realised. In emergency shut down systems (ESD systems) the input signal from the field should be a conventional 4 mA ... 20 mA safe area-signal and it should be digitally transmitted across the bus to the control system. Such tasks can be resolved by combining K-system and RPI system modules. The customer therefore obtains a compact and simple mechanical configuration. The K-system modules can be even mounted on the same DIN rail and supplied with power across the same Power Rail as RPI modules.

Training, Support

Questions concerning planning, installation, configuration, operation, safety, detection and correction of faults are answered by the RPI system manual. For the interconnection with control systems and PLCs a selection of application instructions is available .

The RPI software is self explanatory and has extensive help menus.

Pepperl+Fuchs offers classes and workshops on Remote Process Interface and related subjects. The classes may also be given at the customers location.

Pepperl+Fuchs has representatives in all parts of the world. They are willing to answer any questions that our customers might have. The "Network and Systems" group in Mannheim is at your disposal to answer special questions concerning RPI.

Cost Savings

The main feature of Pepperl+Fuchs' Remote Process Interface (RPI) is the transmission of measurement signals across serial bus systems, whereby the wiring between the RPI and control system as well as the I/O cards in the control system is no longer necessary.

Thanks to Power Rail an additional wiring for the power supply is no longer necessary. All plug-in stations are identical. The arrangement of the signals is controlled by software configuration. Marshalling is no longer required. In comparison to conventional systems, the cost for devices, terminals and cabling as well as for planning, documentation, assembly and connection are therefore clearly reduced. The easy snap-on features of the individual modules and the comprehensive software package simplifies the commissioning. By means of status and fault indications the maintenance is improved and the fault elimination accelerated.

The installation of the Pepperl+Fuchs Remote Process Interface results in noticeable savings in investment, planning, commissioning, operation and maintenance.

Tested Bus Couplers are available in large numbers. Please contact Pepperl+Fuchs

The description of the operating components and the error correction can be found in the system manual Remote Process Interface. The manual can be downloaded free of charge under www.pepperl-fuchs.com.

The following physical components can be set with the software:

InH2O	InHg	FtHO	mmHO	mmHg	psibar	mbar
g_SqCm	kg_SqCm	PA	kPA	toor	ATM	CuFt_min
USgal/Minute	Liter/Minute	ImpGal/Minute	m³/Hour	ft_s	mtr_s	gal_s
Mio.Gal/Day	Liters/Second	MilL_day	CuFt_s	CuFt_day	m³/Second	m³/Day
ImpGal/Hour	ImpGal/Day	°C	°F	°R	K	mV
Ohm	Hz	mA	gal	Liter	Imp. Gallons	m³
ft	Meters	Barrels	in	cm	mm	min
sec	hr	day	centi_stokes	cpoise	uMhol	Percent
v	pH	g	kg	t	lbs	ShTon LTon
Grams/Second	Grams/Minute	Grams/Hour	kg/Second	kg/Minute	kg/Hour	kg/Day
Tons/Minute	Tons/Hour	Tons/Day	lbs/Second	lbs/Minute	lbs/Hour	lb_day
ShTon_min	ShTon_hr	ShTon_day	LTon_hr	LTon_day	SGU	g_CuCm
kg_CuMtr	lb_gal	lb_CuFt	g_ml	kg_l	g_l	lb_CuIn
ShTon_CuYd	degTwad	degBrix	degBaum_hv	degBaum_lt	degAPI	Percent_sol_wt
Percent_sol_vol	degBall	proof_vol	proof_mass	bush	CuYd	CuFt
CuIn	mtr_hr	CuFt_hr	m³/Minute	Barrels/Second	Barrels/Minute	Barrels/Hour
Barrels/Day	USgal/Hour	ImpGal/Second	Liter/Hour	percent_StmQual	Ftin	CuFt_lb
pico_farads	Percent_plato	gallons_per_day	hecto_liter	mega_pascals	in_HO__degrees_C	mm_HO__degrees_C

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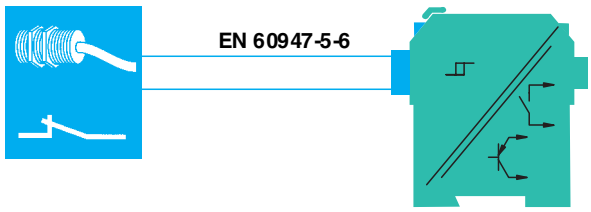
Function overview Remote Process Interface

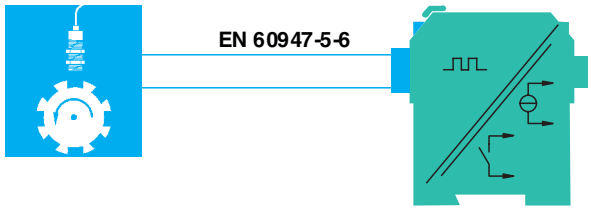
Overview

The following overview will help you to quickly find the appropriate product for your application.

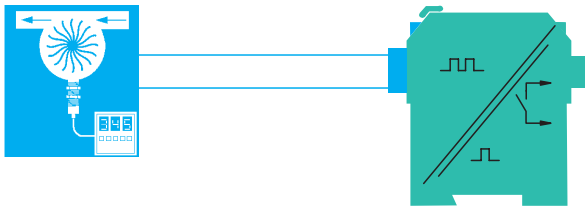
Sensors and switch contacts



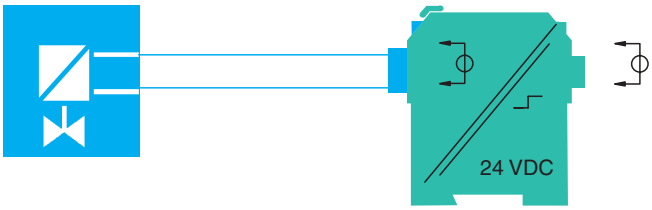
Rotational speed monitoring



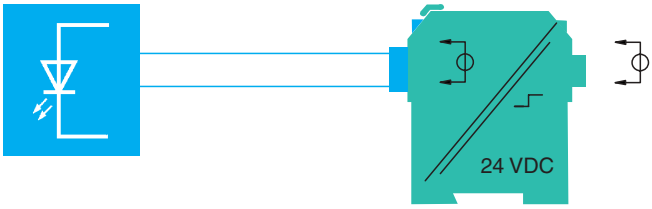
Flow monitoring



Valves



LEDs



Example	Page
Trip amplifier KSD2-BI-Ex4	page 38
Trip amplifier KSD2-BI-4 (only mechanical contacts)	page 42
Frequency converter KSD2-FI-Ex	page 46
Frequency converter KSD2-FI-Ex	page 46
Solenoid driver KSD2-BO-Ex	page 54
Solenoid driver KSD2-BO-Ex	page 54

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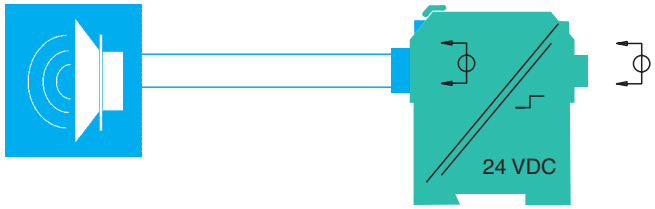
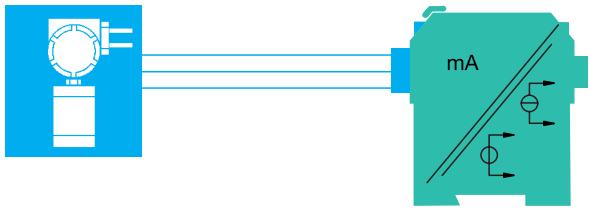
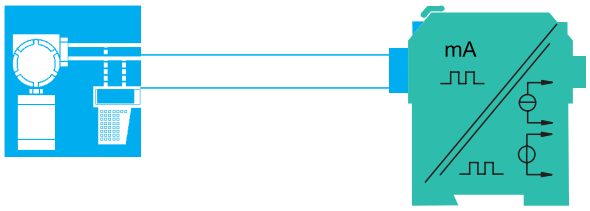
Audible alarms



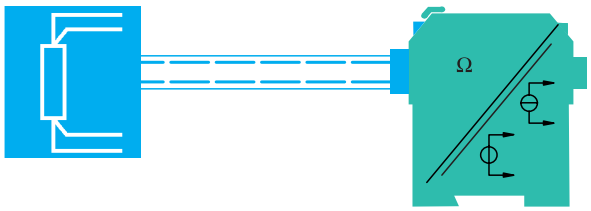
Transmitters



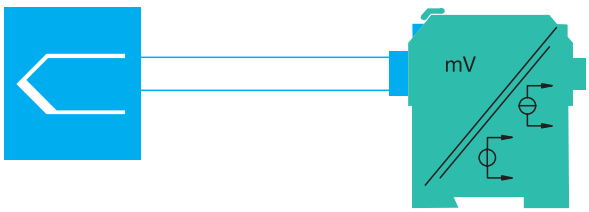
SMART transmitters



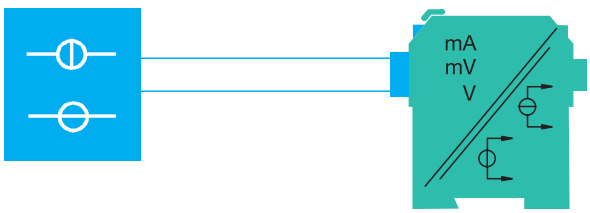
Pt 100



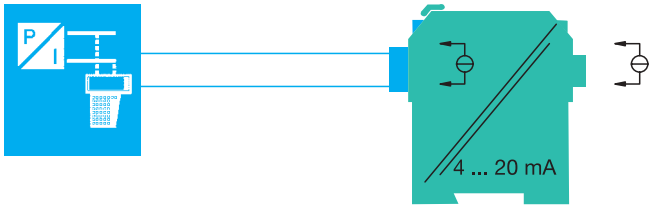
Thermocouples



Current and voltage sources



I/P Converters, Positioners, SMART capable



Solenoid driver KSD2-BO-Ex	page 54
Transmitter power supply KSD2-CI-S-Ex	page 62
SMART transmitter power feed module KSD2-CI-S-Ex	page 62
Universal temperature converter KSD2-TI-Ex	page 76
Universal temperature converter KSD2-TI-Ex	page 76
SMART-transmitter power supply KSD2-CI-S-Ex Voltage converter KSD2-MVI KSD2-VI	page 62 page 84 page 86
Analogue output repeater KSD2-CO-S-Ex	page 94

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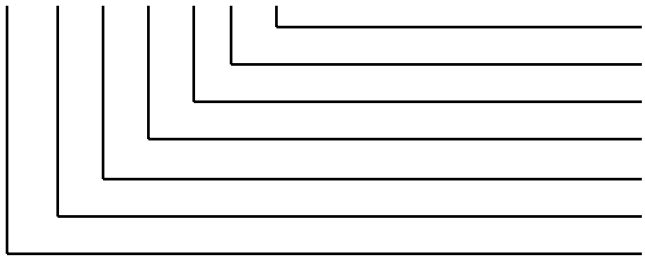
Type identification code

K __ __ __ - __ - Ex __ __



Pos. 7	Special function
Pos. 6	Number of channels, not applicable for single channel devices
	Ex-protection, not applicable to non-Ex devices
Pos. 5	Device function
Pos. 4	Level of power supply
Pos. 3	Type of power supply
Pos. 2	Construction

Position 1	K	=	K-system
Position 2	F	=	Housing height (115 mm) with removable terminals
	S	=	Remote Process Interface (RPI)
Position 3	D	=	DC power supply
Position 4	2	=	up to 24 V
Position 5	BI	=	Trip amplifier
	BO	=	Solenoid driver
	CI	=	Transmitter power supply
	CI-S	=	SMART-transmitter power supply
	CO	=	Output repeater
	CO-S	=	SMART Output Repeater
	EB.RPI	=	Power Rail-Power Feed Module for RPI
	EB.Rxx.RPI	=	Redundant Power Rail-Power Feed Module for RPI (xx = max. mechanical load, e.g. 2A = 2 Ampere)
	EB.MAR	=	Redundant Power Rail-Power Feed Module for the use of RPI on ships
	FI	=	Frequency converter
	GW	=	Gateway
	HC	=	HART control module
	MVI	=	Voltage converter
	RO	=	Relay module
	TI	=	Temperature converter
	VI	=	Voltage converter
Position 6	2 or 2.2	=	2 Channel
	4 or 4.2	=	4-channel
Position 7	CN	=	for ControlNet
	CN-485	=	for ControlNet with RS 485 program interface
	H	=	HART communication
	MOD	=	for MODBUS
	MOD-485	=	for MODBUS with RS 485 program interface
	MPL	=	for MODBUS plus
	MPL-485	=	for MODBUS plus with RS 485 program interface
	PRO	=	for PROFIBUS
	PRO-485	=	for PROFIBUS with RS 485 program interface

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System description

Intended use

- These devices are used in C&I technology for the galvanic isolation of C&I signals, such as 20 mA and 10 V unit signals, and also for the adaptation and/or standardisation of signals. Devices which have intrinsically safe control circuits are used to operate field devices within hazardous areas.
- The data sheets of individual devices contain the electrical data for the EC Declaration of conformity and must be considered as an essential component of the instruction manual.
- Laws and/or regulations governing the use or intended usage goal must be observed.
- Devices that have been operated in general electrical systems must no longer be used after that in electrical systems that are associated with areas exposed to the danger of explosion.

Commissioning and installation in connection with hazardous areas

(commissioning and installation must only be performed by competent professionals trained for this purpose.)

Installation of devices outside of hazardous areas

- The modules are constructed to satisfy protection class IP20 in accordance with EN 60529 and must accordingly be appropriately further protected in the case of adverse ambient conditions, such as water spraying or dirt in excess of pollution severity 2.
- The devices must be installed outside the hazardous area!
- Depending on the ignition protection class, intrinsically safe circuits of devices (light blue marking on the devices) may be placed in hazardous areas, in this case, particular care must be taken to ensure secure separation from all non-intrinsically safe circuits. The installation of the intrinsically safe circuits must be undertaken in accordance with the relevant installation regulations.
- For the connection of intrinsically safe field devices with the intrinsically safe circuits of associated apparatus of the RPI system the respective peak values of the field device and of the associated apparatus with regard to explosion protection have to be observed (proof of intrinsic safety). The document that must be observed here is EN 60079-14/IEC 60079-14. In the case of the Federal Republic of Germany the "National foreword" in DIN EN 60079-14/VDE 0165 Part 1 must be observed.
- When intrinsically safe circuits are used in areas made hazardous by dust (Ex-Zone "D") only appropriately certificated field devices must be used.
- The EU certificates of conformity or EU prototype test certificates must also be observed. It is especially important to observe the "Special Conditions" where these are contained in the certificates.

Installation of devices within Zone 2 of the hazardous area:

- Only devices with the relevant statement of conformity from an approved test centre or covered by the manufacturer's declaration of conformity can be installed in Zone 2.
- The individual data sheets indicate whether these conditions are met.
- The devices have to be installed in switch or junction boxes using IP54 or higher protection method in accordance with EN 60529.
- Depending on the ignition protection class, intrinsically safe circuits of devices (light blue marking on the devices) may be placed in hazardous areas, in this case, particular care must be taken to ensure secure separation from all non-intrinsically safe circuits.
- The installation of the intrinsically safe circuits must be undertaken in accordance with the relevant installation regulations.
- For the connection of intrinsically safe field devices with the intrinsically safe circuits of associated apparatus of the RPI system the respective peak values of the field device and of the associated apparatus with regard to explosion protection have to be observed (proof of intrinsic safety). The document that must be observed here is EN 60079-14/IEC 60079-14. In the case of the Federal Republic of Germany the "National foreword" in DIN EN 60079-14/VDE 0165 Part 1 must be observed.
- When intrinsically safe circuits are used in areas made hazardous by dust (Ex-Zone "D"), only appropriately certificated field devices must be used.
- The EU certificate of conformity, the EU prototype test certificate, the EU statement on conformity or the manufacturer's declaration of conformity should be observed. It is especially important to observe the "Special Conditions" where these are contained in the certificates.

Maintenance

The transfer characteristics of the devices remain stable, even over long periods of time, thus eliminating the need for regular adjustment. Maintenance is therefore not required.

Fault elimination

No changes can be made to devices which are operated in hazardous areas. Repairs to the device must only be undertaken by specialist authorised personnel who have been trained for the task.

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Construction type and mounting

The RPI system basically allows two different types of mounting:

1. Panel mounting
2. Mounting on a 35 mm standard DIN rail to DIN EN 50022.

Panel mounting is only recommended if a very small number of isolating modules are involved.

When mounting on the DIN rail, the units are simply snapped on. The expenditure on wiring for the power supply is significantly reduced by using Pepperl+Fuchs's "Power Rail" for the RPI-series.

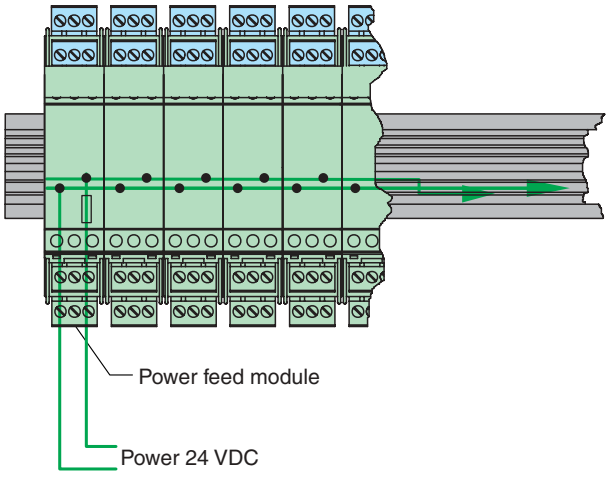
KS series with removable terminals.

The removable terminals simplify control cabinet construction and allow the units to be replaced while under power. **The screw-in self-opening apparatus terminals have a high-volume connection area for a wire cross-section of up to 2.5 mm².** The connectors are coded, so that it is not possible to make an incorrect connection. With the KF-CP coding profile, separately available connectors with test sockets or cage spring release terminals can be easily coded.

Wiring costs are very low when supplying power via the Power Rail. It is also possible to take advantage of a redundant power supply. A power failure is indicated via the power supply module signal contacts.

The power supply for the remote process interface is only possible using the power rail via a power supply module.

Power supply with Power Rail

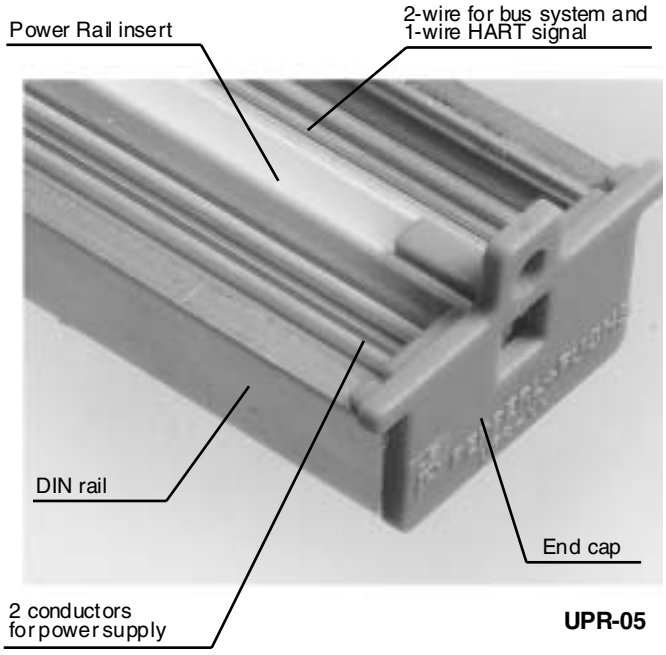


Power Rail

The universal power rail is an insert for the standard 35 mm DIN rail. Power is supplied by a 24 V DC power supply module via 2 heavy duty conductors.

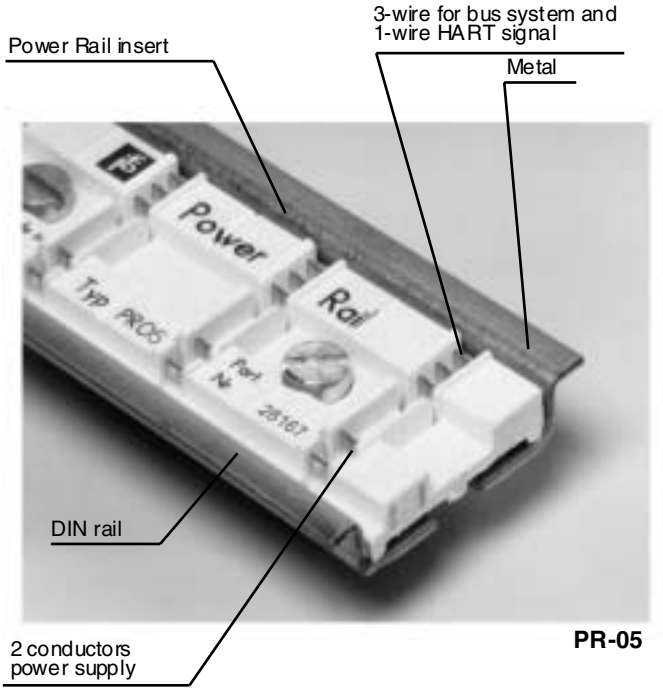
Two of three additional conductors serve for serial data transfer (UPR-05).

In contrast to the PR... the new UPR... does not have a mounting grid and should be used in new systems.



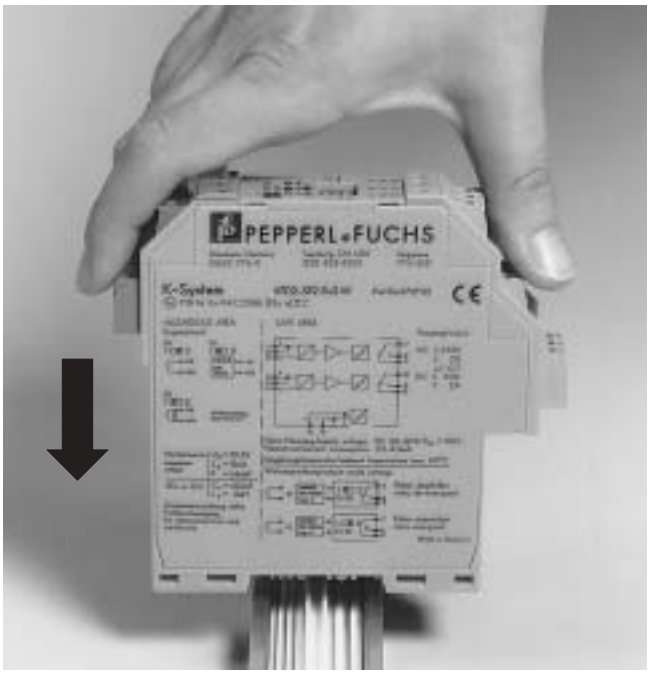
UPR-05

Standard devices with the type designation KS... have gold plated contacts that provide the connection to the Power Rail. By snapping onto the rail, the unit is supplied with power. Separate wiring for the power supply is not required. Furthermore, any available reserve spaces on the rail are automatically connected to the power supply for future expansion. Lead breakages and short circuits are also eliminated through the use of a robust power rail.



PR-05

As shown in the figure, the isolaton modules are snapped onto the power rail in a vertical downward movement.



CORRECT: Unit snapped on vertically.

INCORRECT: Unit snapped on at an angle

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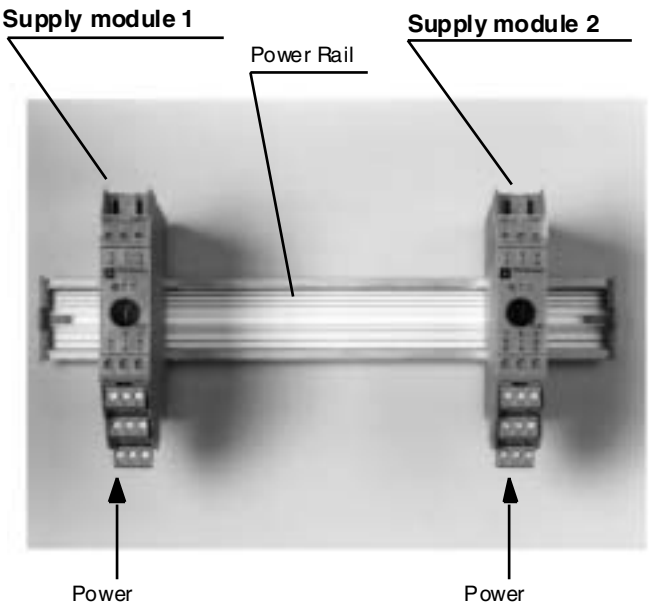
Power Feed Concepts for Power Rail

Redundant power supply

Power supply module KFD2-EB.R2A.RPI for redundant power supply of the Power Rail.



A redundant power supply to the Power Rail, with two supply modules, provides increased safety. If the fuse in one power supply module operates, the power supply is obtained via the second power supply module. Each power supply circuit is connected via its own Power Rail contact.

Electrical standards for the RPI system

Ex Signals/field circuit

- Transmitter power supply up to 17 V DC
- Current input max. 200 Ohm
- Pt100, in 2-, 3-, (4-) wire technology
- Resistance 0 Ohm ... 400 Ohm curve can be defined
- Thermocouple for each model, internal cold setting, external reference
- Current output min. 600 Ohm
- Binary input NAMUR DIN EN 60947-5-6
- Frequency input
- Binary output for Ex-i valves, short circuit protected (For details, see data sheet)
- Relay output

Mechanics of the Remote Process Interface

Mounting

Snap-on 35 mm standard DIN rail to DIN EN 50022. Can be mounted horizontally or vertically, side by side.

Housing material

Makrolon

Flammability classification

UL 94: V - 0

Connection options

removable connector with integrated self opening device terminals for leads of up to a max. of 1 x 2.5 mm^2

Miscellaneous

KS series: Coded connectors

Reference operating conditions for calibration

22.5 °C ± 2.5 °C

Ambient conditions

Climatic conditions

in accordance with DIN IEC 721, Class 3K3

Ambient temperature

see data sheet

Storage temperature

-40 °C ... 90 °C

Protection class in accordance with DIN 40050 IP20

Humidity

max. 75% rel. humidity, 95% for many modules

Safe area signals and control circuit

- 0/4 mA ... 20 mA signal level in accordance with NE43
- Current output min. 550 Ohm
- Current input max. 200 Ohm
- Binary input for mechanical contacts
- Voltage input
- Binary output (active, passive electronic output) 100 mA/30 V, short circuit protected
- Relay output 2 A, minimum load 1 mA/24 V
- Logic level 24 V in accordance with IEC 946
- Function isolation or safe isolation in accordance with EN 50 178 and NAMUR NE23 (For details, see data sheet)
- Frequency input

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Other standards for the RPI system

General

Isolator modules with and without explosion protection, mostly with EEx ia IIC, international approvals

EMC in accordance with NAMUR NE21 and EN 50081-2, EN 61326

LEDs satisfying NAMUR NE44

Switch-on pulse suppression

Supply voltage min. 20 V ... 30 V DC

DC: Power Rail

Man/machine interface software to VDE/VDI 2187

Binary inputs/outputs in accordance with NAMUR

The standards references for this interface have changed many times:

German standard (old): **DIN 19234**: Electrical distance sensors - DC interface for distance sensors and switch amplifiers; 1990-06

European standard (old): **EN 50227**: Low voltage switch gear and control gear - control devices and switching elements - proximity switches, DC interface for proximity sensors and switch amplifiers (NAMUR), 1996-10

German version (old): **DIN EN 50227**: Low voltage switchgear - control devices and switching elements - proximity switches, DC interface for proximity sensors and switch amplifiers (NAMUR), 1997, German nomenclature VDE 0660 Part 212

Current designation: DIN EN 60947-5-6: Low voltage switchgear - control devices and switching elements - proximity switches, DC interface for proximity sensors and switch amplifiers (NAMUR), 2000, German nomenclature. VDE 0660 Part 212

Current IEC designation: IEC 60947-5-6: Low voltage switchgear and controlgear - Part 5-6: Control circuit devices and switching elements - DC interface for proximity sensors and switching amplifiers (NAMUR), 1999

Insulation coordination for use of galvanic insulation in accordance with DIN EN 50178 and DIN/VDE 0106

The RPI devices are built-in devices and electronic apparatus for installing in closed electrical operating areas, to which only qualified electrical specialistes and technicians have access.

The devices are rated for use in pollution degree level 2 environments and overvoltage category II, in accordance with DIN EN 50178.

Insulation coordination for devices with Ex certification in accordance with EN 50020

The devices are rated for use in pollution degree level 2 environments in accordance with DIN EN 50178.

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Housing Types

Housing type A1

Height: 93 mm
(without K1 and K4 terminals)

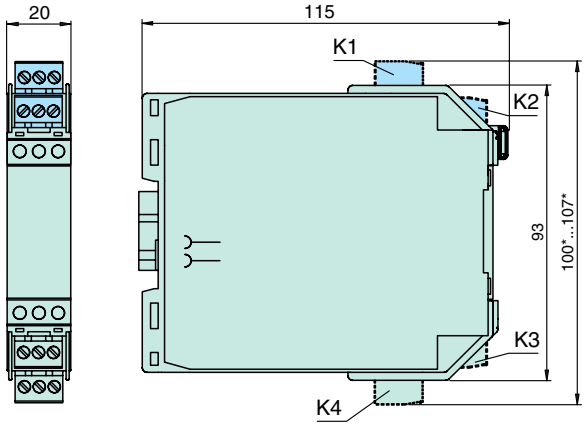
Housing type A3

Height: 100 mm
(without K4 terminal)

Housing type A4

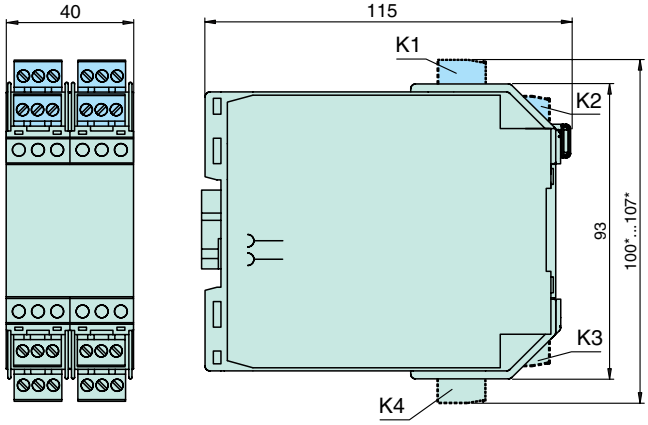
Height: 107 mm

*The unit is 102.5 ... 112 mm in height when using the KF-STP... connector

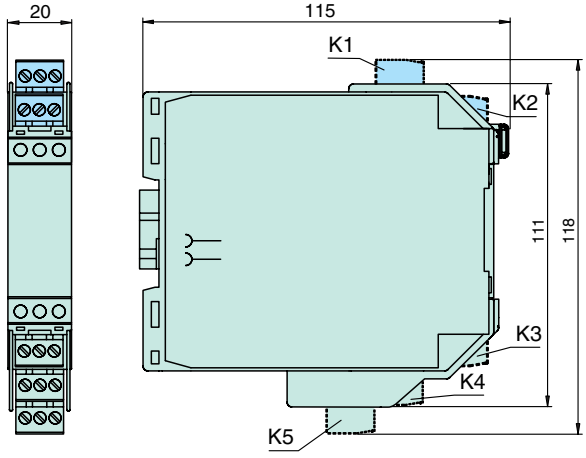


Housing type B2

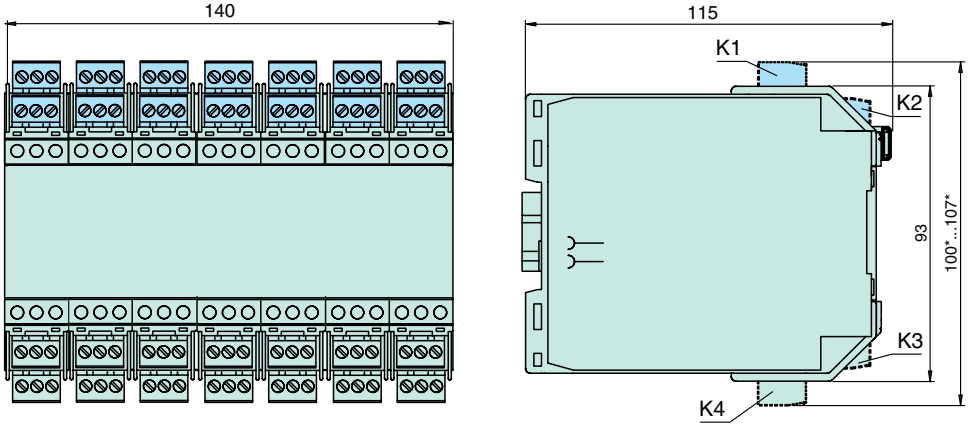
Height: 100 mm
(without K1 terminal)



Housing type C



Housing type G



The KF-mounting rail from Pepperl+Fuchs

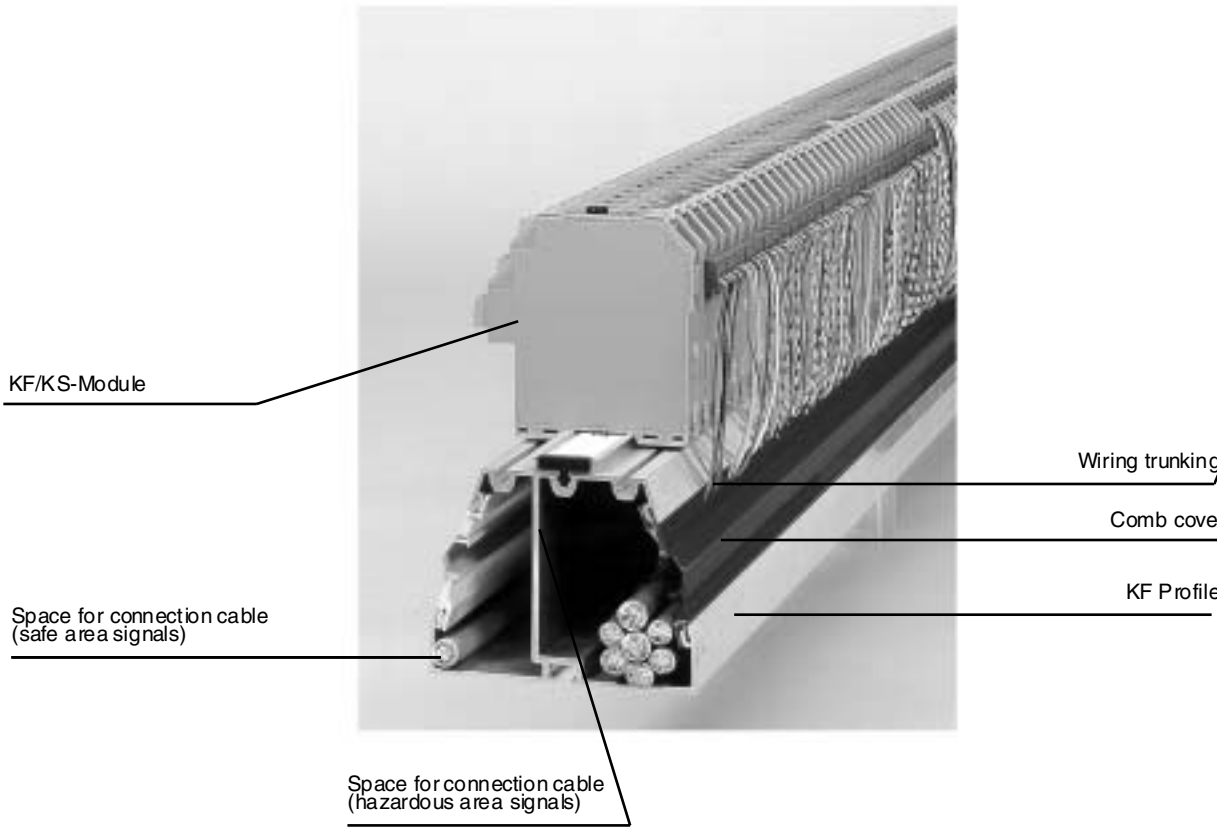
The KF mounting rail from Pepperl+Fuchs has an overall length of 1.8 m, and can be used to provide space-saving mounting for up to 90 KF module and accommodate the associated wiring. The system and field cables for Ex and non-Ex signals are easily installed in the integral cable ducts of the KF rail. Thus no additional cable guides are necessary.

The power supply to the individual modules is preferably provided via the power rail that can be integrated into the system. The power supply can in fact be achieved in two different ways:

1. If a 24 V DC supply is available, the supply to the modules can be by means of a KFD2-EB... power supply. It is also possible to build up various function groups and to supply these separately via power supply modules. If required, a redundant power supply to the KF modules can also be provided.
2. If a 230 V AC supply is available, the KFA... power supply module is used.

What advantages does the KF profile offer?

Very tight packing density in control cabinet assemblies, since the cable trunking is integrated in the mounting profile.



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Switch cabinet layout

Pepperl+Fuchs offers two different ways of laying out a control cabinet:

1. Marshalling and interface modules in one control cabinet. Short cable paths and a compact assembly highlight this configuration.
   The system oriented (ungrouped) signals are wired via field cables and terminal strips and from there they are marshalled directly on the KS modules. Thus, the KS modules are a copy of the I/O plane. The fieldbus cable, which is connected to the gateway of the RPI system, provides the connection to the higher level control system.

2. Marshalling and interface modules divided in two cabinets. The advantages: simplified installation of the field cables and the unified terminal structure (isolation between Ex and non-Ex). There is more space available in the marshalling cabinet for cabling. Special field cables (e.g. armoured cables with larger diameters) can be connected more easily to the terminal strips in the marshalling cabinet. An additional terminal strip is required per marshalled group for the interface cabinet. This means higher material and planning costs compared to layout 1 above.

Other concepts for structuring control cabinets to customer specific requirements can be obtained from our project management department.

Control cabinet without marshalling

Application instructions

Installation and service

The Remote Process Interface has been tested with a variety of common process control systems and PLCs.
In addition to the RPI system manual, Pepperl+Fuchs can provide appropriate instructions for the application of RPI in special connections to PLCs and control systems, which provide the user with the required detailed information for connecting RPI to the external bus and configuring the bus master.
On request, Pepperl+Fuchs will install, configure and program the RPI system in accordance with the customer's specifications and will take facilitate connection of the process control system or PLC.
In addition, Pepperl+Fuchs can supply complete systems, fully installed in control cabinets, to the standardised specification or to suit the requirements of the user.

Please ask us for a firm quotation.

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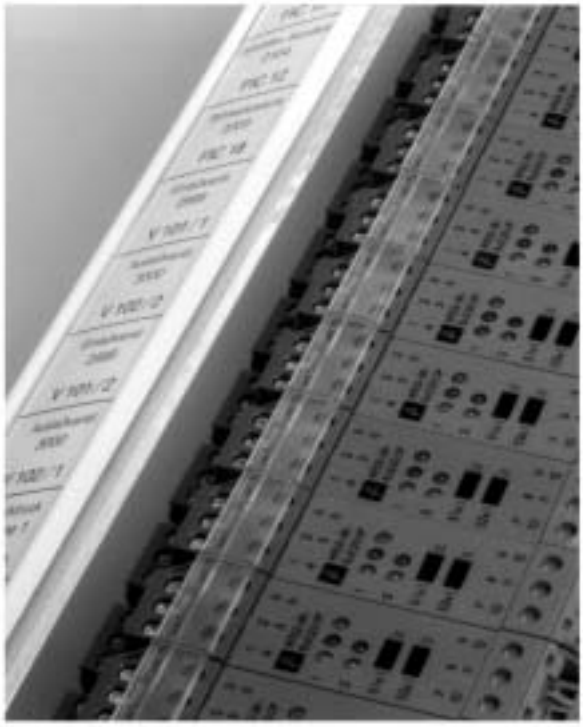
Accessories: Label carrier

(KFD0-LC1-XXX, KFD0-LC1-YYY)

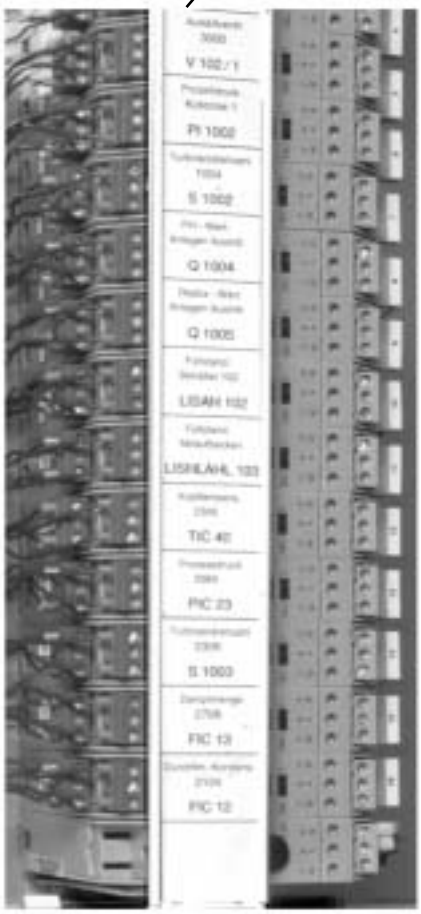
For additional labeling (position numbers, signal names etc.) of the KS modules in the switch cabinet. The labelling strips are 0.5 m or 1 m in length. A labelling surface area of 20 x 30 mm is available per KF module.

See section "Accessories and installation techniques" for more information (page 140).



Label holder

Label carrier



Label carrier

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Technical data

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Page

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Page

Analogue Output Repeaters 1-channel

Gateways

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Page

System accessories

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- 2-channel
- Input EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-BI-Ex2

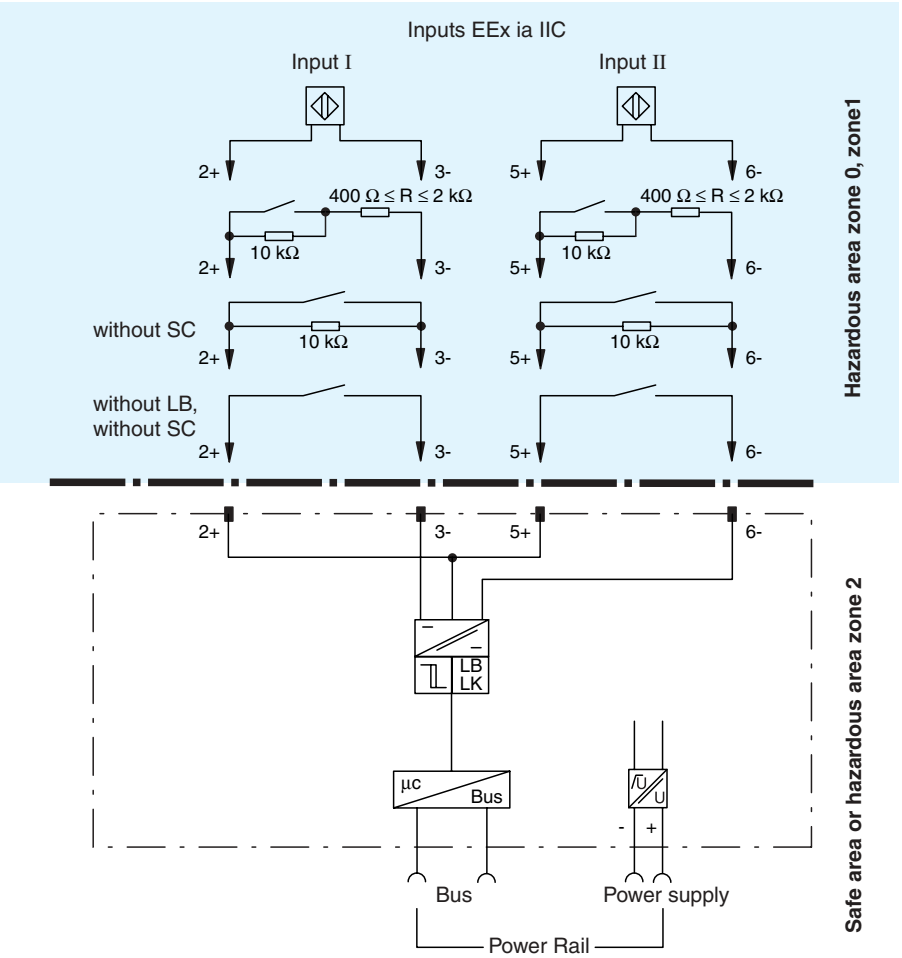
Function

The KSD2-BI-Ex2 transfers digital input signals from the hazardous area into the safe area across the Power Rail bus. Proximity sensors in accordance with DIN EN 60947-5-6 (NAMUR) or mechanical contacts may be used as alarms.
The inputs have a common positive reference and are galvanically isolated from the output and power per DIN EN 50020.

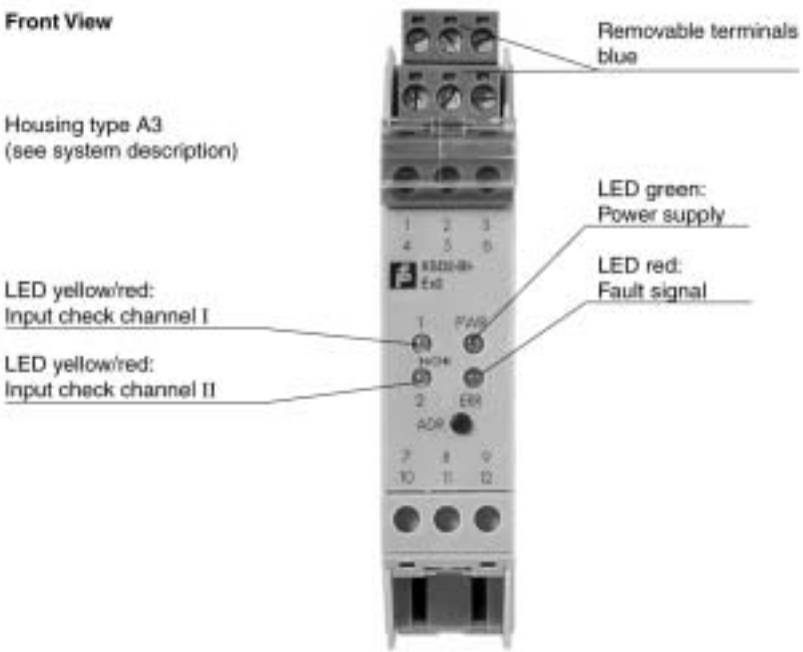
Application

The transfer of digital input signals from proximity switches or dry contacts from the hazardous area to the PLC or the DCS.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply			
Connection	Power Rail		
Rated voltage	20 ... 30 V DC		
Ripple	< 10 %		
Power consumption	1 W		
Input			
Connection	terminals 2+, 3-; 5+, 6-		
Rated values	acc. to DIN EN 60947-5-6 (NAMUR, DIN 19234)		
Switching point/Switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA		
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms		
Lead monitoring	breakage I < 0.1 mA ; short-circuit I > 6 mA		
Output			
Connection	Power Rail		
Interface	CAN protocol via Power Rail bus		
Transfer characteristics			
Switching frequency	≤ 10 Hz		
Electrical isolation			
Input/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Standard conformity			
Climatic conditions	acc. to DIN IEC 721		
Directive conformity			
Electromagnetic compatibility	standards		
Directive 89/336/EG	EN 61326, EN 50081-2, NE21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (253 .. 333 K)		
Mechanical specifications			
Protection degree	IP20		
Mass	approx. 100 g		
Data for application in conjunction with hazardous areas			
EC-Type Examination Certificate	ZELM 99 ATEX 0012 ; for additional certificates see www.pepperl-fuchs.com		
Group, category, type of protection	⟨Ex⟩ II (1) G [EEx ia] IIC		
Voltage U_0	9.6 V		
Current I_0	16 mA		
Power P_0	38 mW (linear characteristic)		
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4		
Electrical isolation			
Input/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Directive conformity	standards		
Directive 94/9 EU	EN 50014, EN 50020, EN 50021		
Entity parameter			
Certification number	J.I.0D4A5.AX		
FM control drawing	No. 116-0150		
Suitable for installation in division 2	yes		
Connection	terminals 1, 2, 3; 4, 5, 6		
Input I			
Current I_t	31.9 mA		
Voltage V_t	10.6 V		
Explosion group	A&B	C&E	D, F&G
Max. external capacitance C_a	2.62 µF	7.86 µF	20.96 µF
Max. external inductance L_a	33.75 mH	101.25 mH	270 mH
Safety parameter			
CSA control drawing	LR 36087-18		
Control drawing	No. 116-0149		
Connection	terminals 1, 2, 3; 4, 5, 6		
Input I			
Voltage V_{OC}	9.6 V		
Explosion group	A&B	C&E	D, F&G
Max. external capacitance C_a	3.5 µF	10.5 µF	28 µF
Max. external inductance L_a	33 mH	119 mH	285 mH

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Date of issue 2003-07-29

Notes

Software functions:

Adjustable by the **PACT*ware*™** human machine interface.

- Information on devices may be saved in PC memory

The following are separately adjustable for each channel:

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Input inversion
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Malfunction output status
  - downscale
  - upscale
  - Hold last value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

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- 4-channel
- Input EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-BI-Ex4

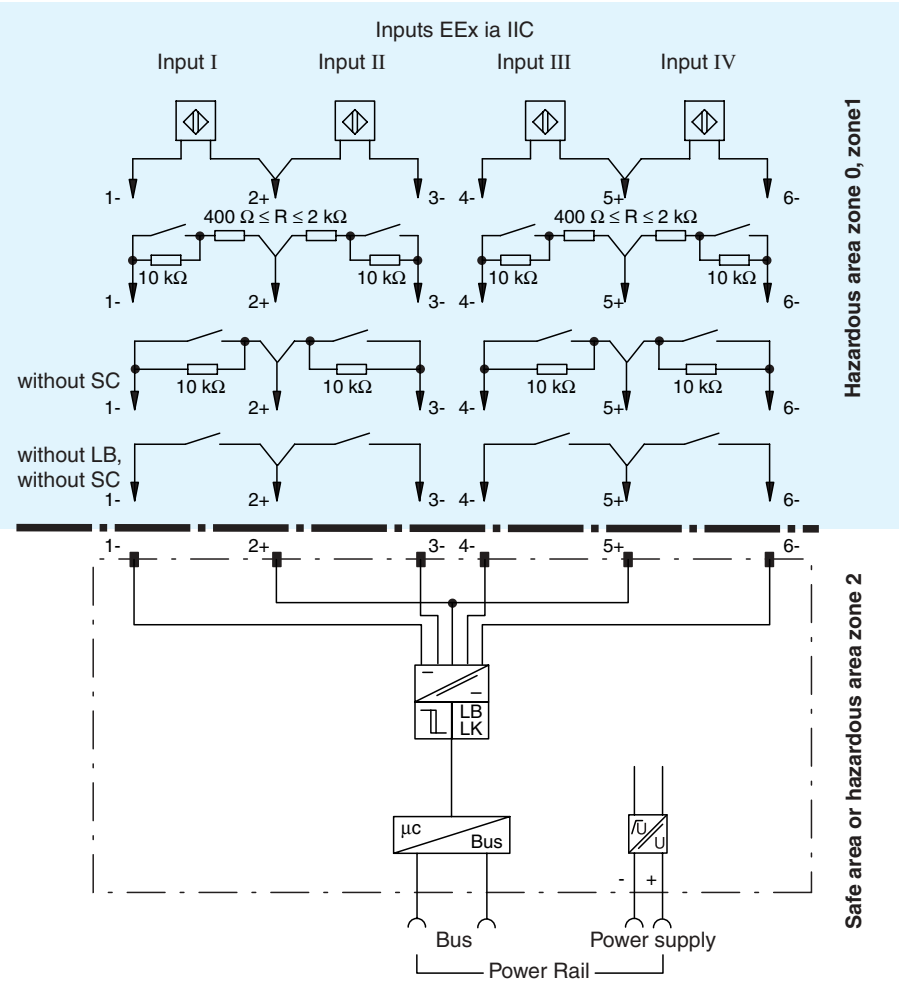
Function

The KSD2-BI-Ex4 transmits digital input signals from the hazardous area into the safe area across the Power Rail bus. Proximity sensors in accordance with DIN EN 60947-5-6 (NAMUR) or mechanical contacts may be used as alarms.
The inputs have a common positive reference and are galvanically isolated from the output and power per DIN EN 50020.

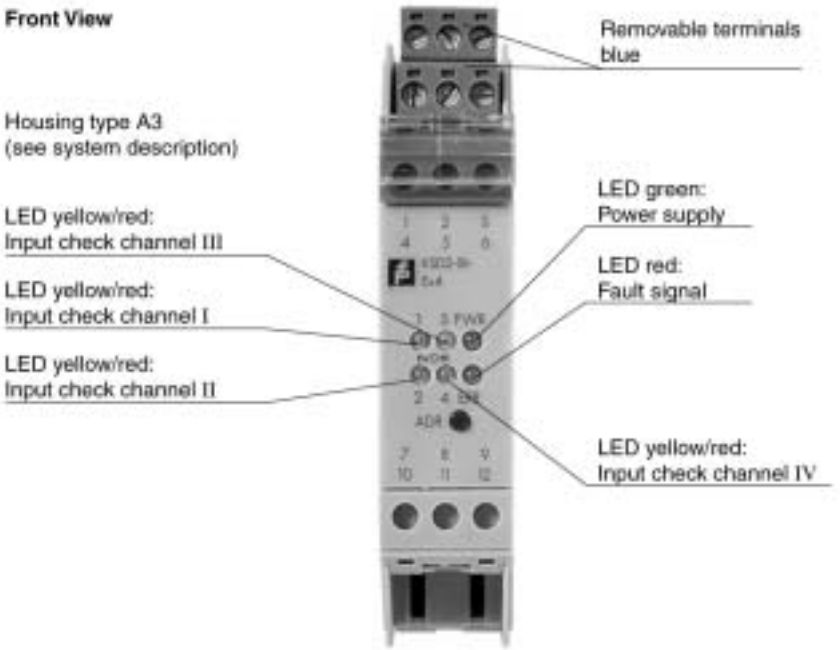
Application

The transfer of digital input signals from proximity switches or dry contacts from the hazardous area to the PLC or the DCS.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply				
Connection		Power Rail		
Rated voltage		20 ... 30 V DC		
Ripple		< 10 %		
Power loss		0.8 W		
Power consumption		1 W		
Input				
Connection		terminals 1-, 2+, 3-; 4-, 5+, 6-		
Rated values		acc. to DIN EN 60947-5-6 (NAMUR, DIN 19234)		
Switching point/Switching hysteresis		1.2 ... 2.1 mA / approx. 0.2 mA		
Pulse/Pause ratio		≥ 20 ms / ≥ 20 ms		
Lead monitoring		breakage I < 0.1 mA ; short-circuit I > 6 mA		
Output				
Connection		Power Rail		
Interface		CAN protocol via Power Rail bus		
Transfer characteristics				
Switching frequency		≤ 10 Hz		
Electrical isolation				
Input/Power supply, internal bus		safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Standard conformity				
Climatic conditions		acc. to DIN IEC 721		
Directive conformity				
Electromagnetic compatibility		standards		
Directive 89/336/EG		EN 61326, EN 50081-2, NE21		
Ambient conditions				
Ambient temperature		-20 ... 60 °C (253 ... 333 K)		
Mechanical specifications				
Protection degree		IP20		
Mass		approx. 100 g		
Data for application in conjunction with hazardous areas				
EC-Type Examination Certificate		ZELM 99 ATEX 0012 ; for additional certificates see www.pepperl-fuchs.com		
Group, category, type of protection		⟨Ex⟩ II (1) G [EEx ia] IIC		
Voltage	U_0	9.6 V		
Current	I_0	16 mA		
Power	P_0	38 mW (linear characteristic)		
Group, category, type of protection, Temperature classification		⟨Ex⟩ II 3 G EEx nA II T4		
Electrical isolation				
Input/Power supply, internal bus		safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Directive conformity		standards		
Directive 94/9 EU		EN 50014, EN 50020, EN 50021		
Entity parameter				
Certification number		J.I.0D4A5.AX		
FM control drawing		No. 116-0150		
Suitable for installation in division 2		yes		
Connection		terminals 1 , 2, 3; 4, 5, 6		
Input I				
Current	I_t	31.9 mA		
Voltage V_t		10.6 V		
Explosion group		A&B	C&E	D, F&G
Max. external capacitance C_a		2.62 µF	7.86 µF	20.96 µF
Max. external inductance L_a		33.75 mH	101.25 mH	270 mH
Safety parameter				
CSA control drawing		LR 36087-18		
Control drawing		No. 116-0149		
Connection		terminals 1 , 2, 3; 4, 5, 6		
Input I				
Voltage V_{OC}		9.6 V		
Current	I_{SC}	31.3 mA		
Explosion group		A&B	C&E	D, F&G
Max. external capacitance C_a		3.5 µF	10.5 µF	28 µF
Max. external inductance L_a		33 mH	119 mH	285 mH

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Date of issue 2003-07-29

Notes

Software functions:

Adjustable by the **PACT*ware*™** human machine interface.

- Information on devices may be saved in PC memory

The following are separately adjustable for each channel:

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Input inversion
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Malfunction output status
  - downscale
  - upscale
  - Hold last value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

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- 4-channel
- 24 V DC nominal supply voltage
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-BI-4

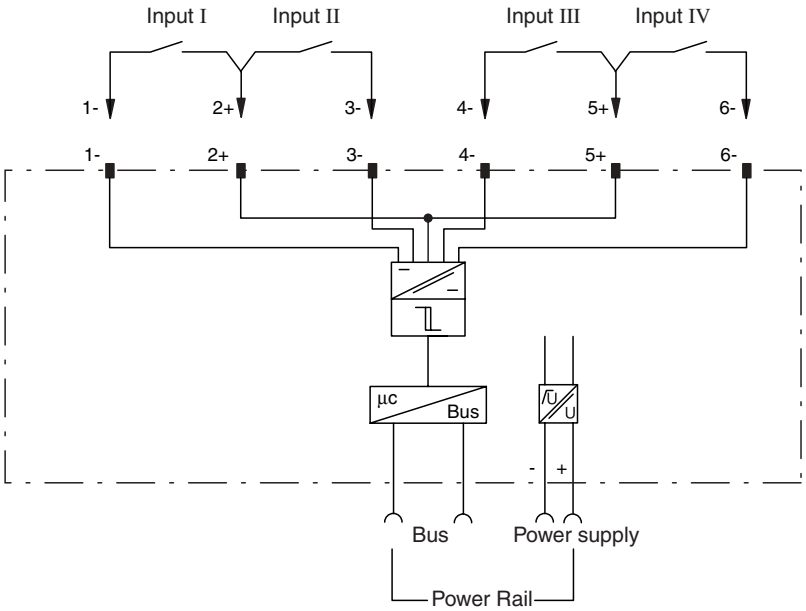
Function

The KSD2-BI-4 transmits digital input signals across the Power Rail bus. Dry contacts are used as the transmitters. The inputs have a common positive reference and are galvanically isolated from the output and power per DIN EN 61010.

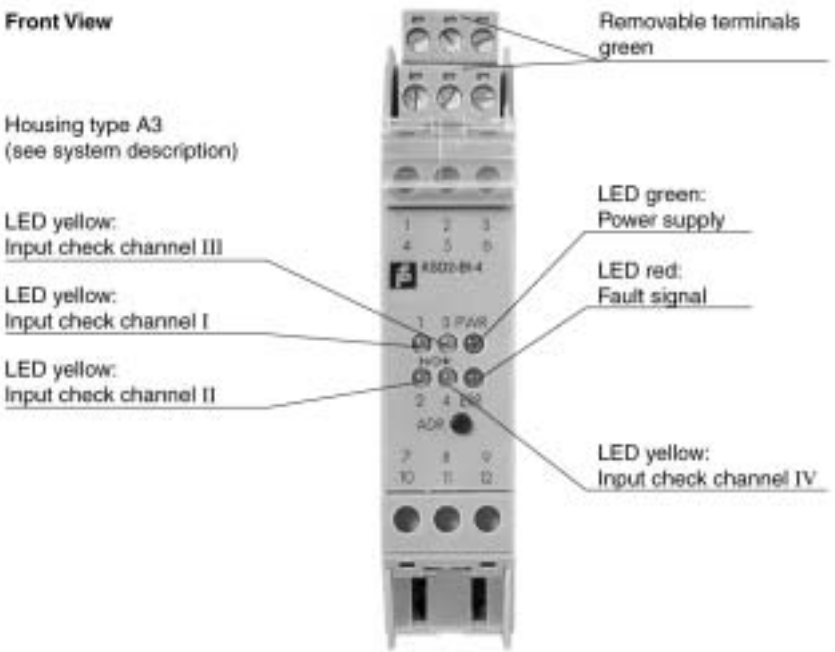
Application

The transfer of digital input signals from dry contacts to the PLC or the DCS.

Electrical Connection



Composition



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Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	1.2 W
Input	
Connection	terminals 1-, 2+, 3-; 4-, 5+, 6-
Open loop voltage	24 V
Short-circuit current	approx. 2 mA
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Switching frequency	≤ 10 Hz
Electrical isolation	
Input/Power supply, internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 300 V_{eff}
Standard conformity	
Coordination of insulation	acc. to DIN EN 50178
Electrical isolation	acc. to DIN EN 50178
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Software functions:

Adjustable by the **PACT***ware*™ human machine interface.

- Information on devices may be saved in PC memory

The following are separately adjustable for each channel:

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Input inversion
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 4-channel
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-BI-4.2

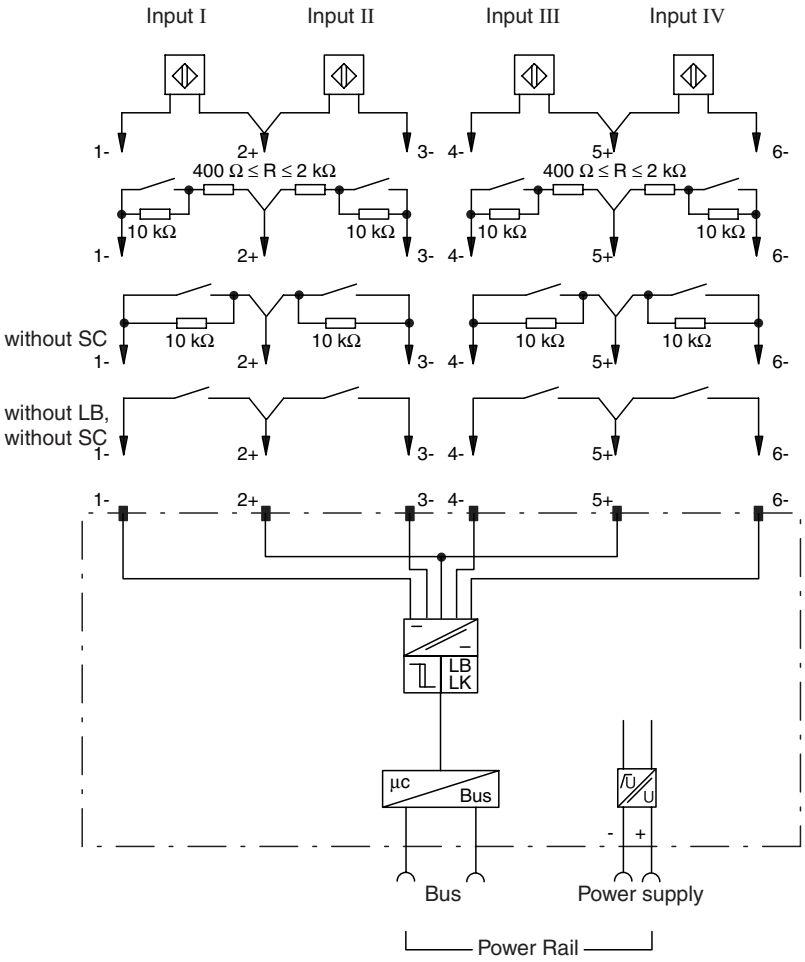
Function

The KSD2-BI-4.2 transmits digital input signals across the Power Rail Bus. Proximity sensors in accordance with DIN EN 60947-5-6 (NAMUR) or mechanical contacts may be used as alarms.
The inputs have a common positive reference and are galvanically isolated from the output and power per DIN EN 50178.

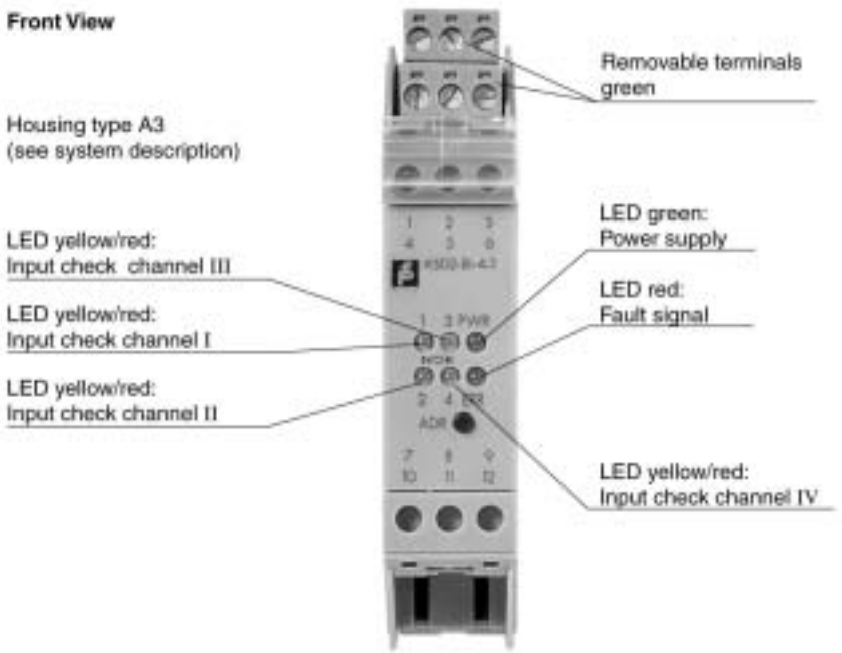
Application

The transfer of digital input signals of proximity sensors or dry contacts to the PLC or the DCS.

Electrical Connection



Composition



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Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	1 W
Input	
Connection	terminals 1-, 2+, 3-; 4-, 5+, 6-
Rated values	acc. to DIN EN 60947-5-6 (NAMUR, DIN 19234)
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms
Lead monitoring	Load I < 0.1 mA; Short-circuit I > 6 mA
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Switching frequency	≤ 10 Hz
Electrical isolation	
Output/Power supply, internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 300 V_{eff}
Standard conformity	
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Software functions:

Adjustable by the **PACT***ware*™ Human Machine Interface.

- Information on devices may be saved in PC memory

The following are separately adjustable for each channel:

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Input inversion
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Malfunction output status
  - downscale
  - upscale
  - Maintenance of the last accepted value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

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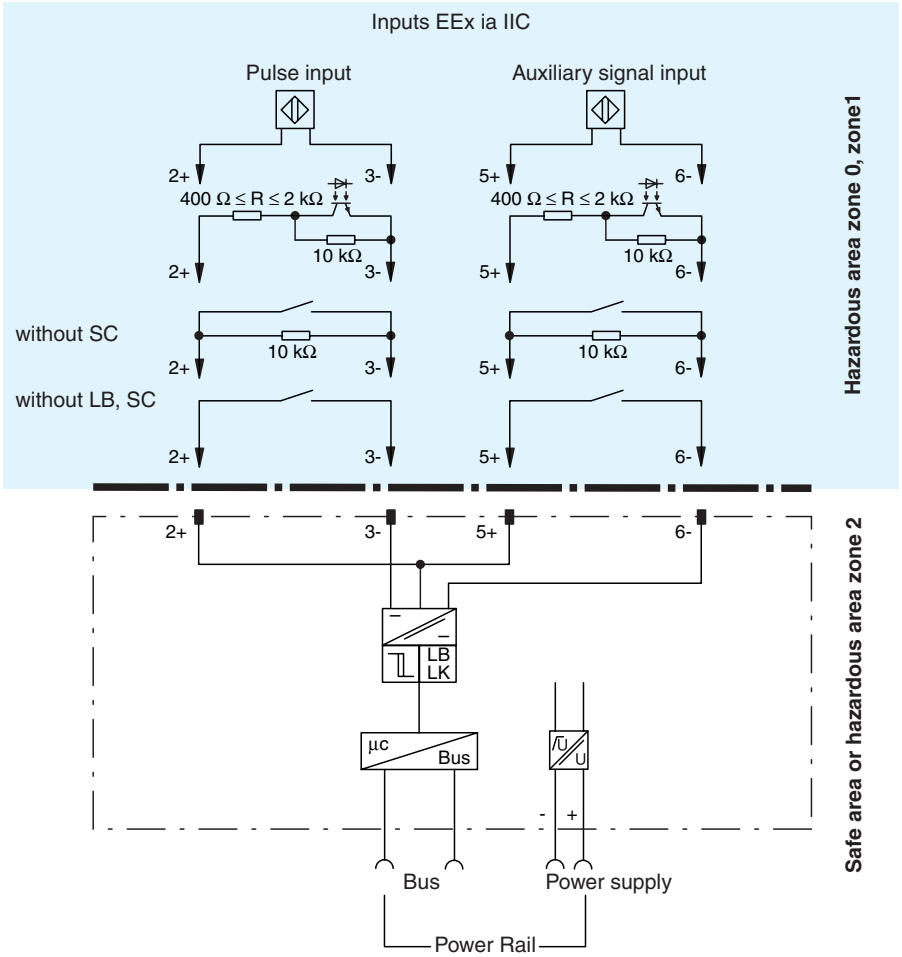
- 1-channel
- Input EEx ia IIC
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Frequency measurement, pulse-rate measurement, flow-rate measurement
- Rotation direction detection, flow direction detection
- Rotational speed monitoring
- Standstill monitoring
- Batch controller
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-FI-Ex

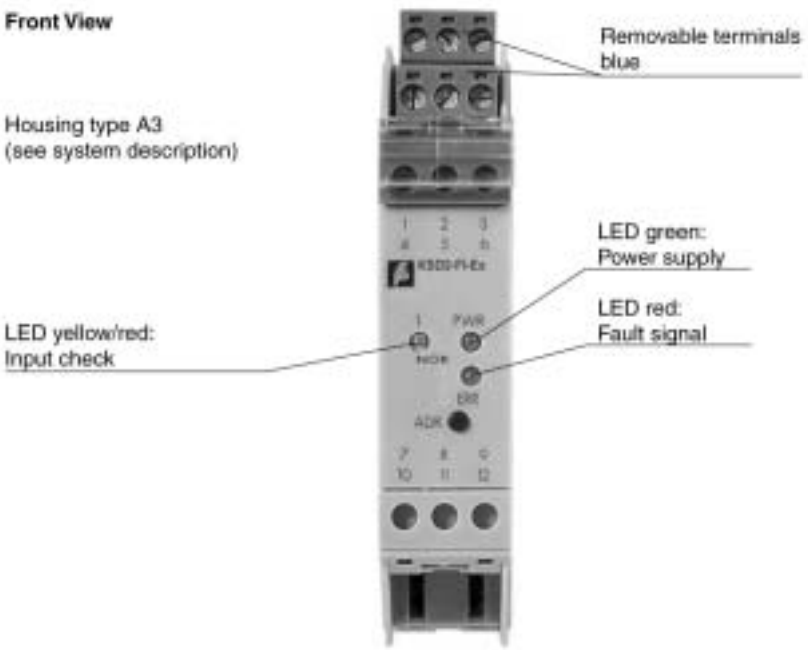
Function

The KSD2-FI-Ex transfers frequencies of digital input signals a cross the Power Rail bus from the hazardous ares into the safe area. Inputs for both channels can be DIN EN 60947-5-6 (NAMUR) proximity sensors, which register the rotation speed of flow switches. Optocouplers and mechanical contacts can also be linked to the module.
Depending on its configuration, the KSD2-FI-Ex can serve as a dual channel frequency meter, signal rate meter, a flow control gauge when using rotary encoders, a rotation direction indicator, rotation speed monitor, standstill monitor or a batch controller.
The KSD2-FI-Ex has a signal input and an additional auxiliary input which is only used for rotation and flow determination. Lead monitoring checks both the leads of the signal input and the auxiliary signal input. Lead monitoring and/or mode of operation is indicated by the yellow LED IN/CHK. Both inputs have a common reference (plus) and are galvanically isolated from the output and power per DIN EN 50020.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	1 W
Input	
Connection	terminals 2+, 3-; 5+, 6-
Rated values	acc. to DIN EN 60947-5-6 (NAMUR, DIN 19234)
Switching point/Switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Pulse/Pause ratio	40 ... 60 % of period at 1000 Hz; 10 ... 90 % of period at 250 Hz
Lead monitoring	breakage I < 0.1 mA ; short-circuit I > 6 mA
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Deviation	< 0.1 %
Switching frequency	0.3 ... 1500 If the maximum input frequency of 1500 Hz is exceeded, the signal value is undefined! No further messages.
Rotation direction detection	< 350 Hz Phase difference between pulse input signal and auxiliary pulse signal min. ± 700 µs (= ± 90 ° at 350 Hz)
Electrical isolation	
Input/Power supply, internal bus	safe electrical isolation acc. to EN 50020
Standard conformity	
Electromagnetic compatibility	acc. to EN 50081-2 / EN 50082-2, NAMUR NE 21
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE 21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
EC-Type Examination Certificate	ZELM 99 ATEX 0012 ; for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	⟨Ex⟩ II (1) G [EEx ia] IIC
Voltage U_0	9.6 V
Current I_0	16 mA
Power P_0	38 mW (linear characteristic)
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Electrical isolation	
Input/Power supply, internal bus	safe electrical isolation acc. to EN 50020
Directive conformity	standards
Directive 94/9 EU	EN 50014, EN 50020, EN 50021

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Application

Frequency measurement, signal rate measurement, flow measurement with rotary encoders, rotation direction monitoring, flow direction monitoring, rotation speed monitoring, standstill monitoring or batch controller.

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Notes

Software functions:
Adjustable by the **PACT***ware*™ human machine interface.
- Information on devices may be saved in PC memory
- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Physical units are adjustable
  - For a list see System Description RPI
- Lead monitoring selectable
- Collective lead monitoring for both signal input and auxiliary signal input
- Separate detection and indication of lead breakage and lead short circuit
- Malfunction output status
  - User defined
  - Maintenance of the last accepted signal value

- Simulation
  - of the measurement value
  - of the device diagnosis
  - of the process channel diagnosis
- The signal value is undefined when the maximum input frequency of 1500 Hz is exceeded! In this case, no further reports are displayed.

Frequency measurement, signal rate measurement, flow measurement, rotation speed monitoring
Only the signal input is evaluated.
- Conversion of the input frequency into various signal ranges, i. e. 0 l/s ... 20 l/s or 10 kg/min ... 500 kg/min
- 4 limit values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower warn level limit
  - Lower alarm level limit

Rotation direction monitoring, flow direction monitoring with flow control measurement, pulse rate measurement, flow control measurement, rotation direction monitoring
- Functions such as frequency measurement, however, the pulse input as well as the auxiliary signal input are evaluated. The frequency is determined by the signal input. In addition, the phase relationship of the input signal is checked at the auxiliary signal input for the determination of the rotation direction monitoring.
- The measurement signal is evaluated with the sign:
  - positive = forward, signal input is damped first, LED IN/CHK illuminates yellow
  - negative = backward, auxiliary signal input is damped first, LED IN/CHK is not illuminated

Batch controller
Only the signal input is evaluated.
- Conversion of the input frequency into various signal ranges, i. e. 0 ... 20 l/s or 10 ... 500 kg/min
- 4 limit values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower warn level limit
  - Lower alarm level limit
- 2 summary counters, resettable
- Batch Controller with pre-set warnings and pre-set alarm
- Entry of the pre-set alarm limit
- Entry of the pre-set warning limit
- Start of the counter process and deactivation of the alarm signals through the set command, as long as the shut-down values are not exceeded
- Activation of the alarm signals through stop command
- Reset of the counter process and activation of the alarm signals through the set command
- After activation of the alarm signals, input signals continue to be registered in the counter
- Entry of the shut-down values and the control commands from the control system via the external bus or via a PC with the RPI software **PACT***ware* connected to the parameterization interface of the gateway.

Batch controller with rotation direction monitoring, flow direction monitoring
Functions as in the case of batch controller, however the signal input as well as the auxiliary signal input are evaluated.
- The direction of the input signal is indicated:
  - positive = forward, signal input is damped first, LED IN/CH yellow, batch controller is incremented
  - negative = backward, auxiliary power input is damped first, LED/ IN/CHK is not illuminated, batch controller is decremented
- Negative counting is possible.

Standstill monitoring
- In all modes of operation, such as frequency measurement, rotation direction signalling and batch controller, a standstill monitoring can be acheived by setting the 4 limit values accordingly.

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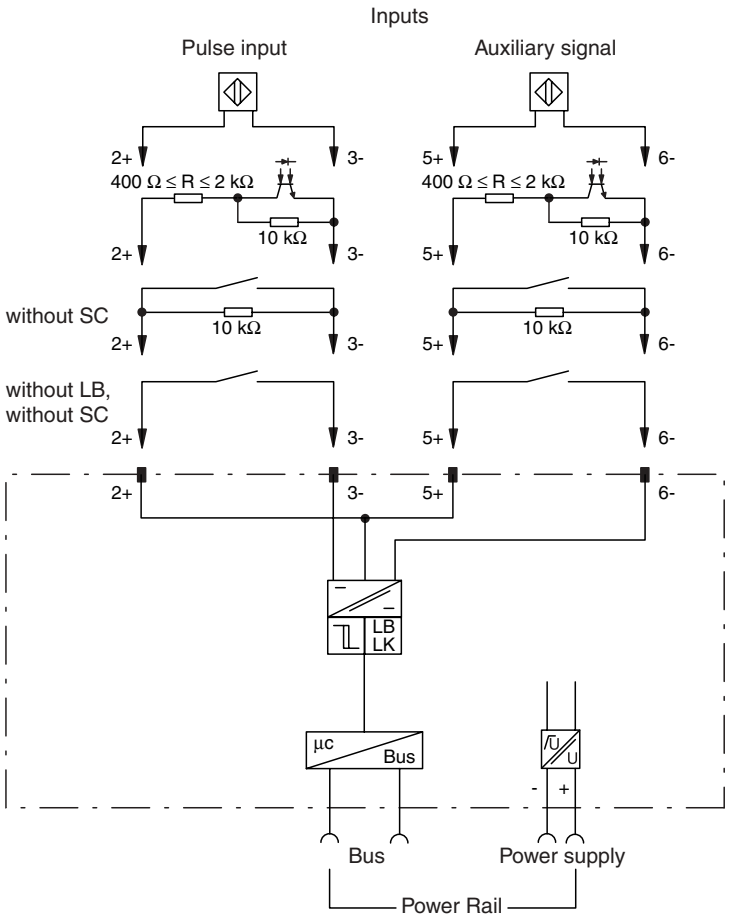
- 1-channel
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- 24 V DC rated operational voltage
- Frequency measurement, pulse-rate measurement, flow-rate measurement
- Rotation direction detection, flow direction detection
- Rotational speed monitoring
- Standstill monitoring
- Batch controller
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-FI

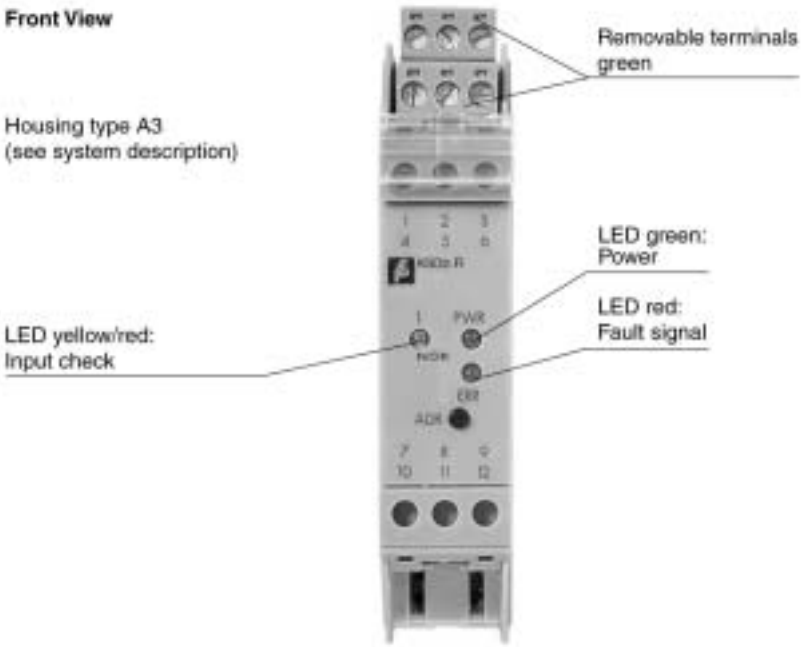
Function

The KSD2-FI transfers frequencies of digital input signals from the field to the control system via the Power Rail bus. Inputs for both channels can be DIN EN 60947-5-6 (NAMUR) proximity sensors, which register the rotation speed of flow switches. Optocouplers and mechanical contacts can also be linked to the module. The KSD2-FI is used for signal processing. Depending on its configuration, the device can serve as a frequency meter, pulse-rate meter, a flow meter when using rotary encoders, a rotation direction indicator, rotation speed monitor, standstill monitor or a batch controller.
The KSD2-FI has a signal input and an additional auxiliary signal input which is only used for rotation and flow direction indication. Lead monitoring checks both the leads of the signal input and the auxiliary signal input. Lead monitoring and/or mode of operation is indicated by the yellow LED IN/CHK.
Both inputs have a common positive reference (plus) and are galvanically isolated from the output and power supply.

Electrical Connection



Composition



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Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	1 W
Input	
Connection	terminals 2+, 3-; 5+, 6-
Rated values	acc. to DIN EN 60947-5-6 (NAMUR, DIN 19234)
Switching point/Switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Pulse/Pause ratio	40 ... 60 % of period at 1000 Hz; 10 ... 90 % of period at 250 Hz
Lead monitoring	Load I < 0.1 mA; Short-circuit I > 6 mA
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Deviation	< 0.1 %
Switching frequency	0.3 ... 1500 If the maximum input frequency of 1500 Hz is exceeded, the signal value is undefined! No further messages.
Rotation direction detection	< 350 Hz Phase difference between pulse input signal and auxiliary pulse signal min. ± 700 µs (= ± 90 ° at 350 Hz)
Electrical isolation	
Input/Power supply, internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 300 V_{eff}
Standard conformity	
Electromagnetic compatibility	acc. to EN 50081-2 / EN 50082-2, NAMUR NE 21
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE 21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Application

Frequency measurement, signal rate measurement, flow measurement with rotary encoders, rotation direction monitoring, flow direction monitoring, rotation speed monitoring, standstill monitoring or batch controller.

Notes

Software functions:

The software functions are adjustable by the **PACT***ware*™ Human Machine Interface.

- Information on devices may be saved in PC memory
- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Physical units are adjustable
  - List see "The RPI system"
- Lead monitoring selectable
- Collective lead monitoring for both signal input and auxiliary signal input
- Separate detection and indication of lead breakage and lead short circuit
- Malfunction output status
  - User defined
  - Maintenance of the last accepted signal value
- Simulation
  - of the measurement value of the device diagnosis
  - of the measurement value of the process channel device diagnosis

The signal value is undefined when the maximum input frequency of 1500 Hz is exceeded! In this case, no further reports are displayed.

Frequency measurement, signal rate measurement, flow measurement, rotation speed monitoring

Only the signal input is evaluated.

- Conversion of the input frequency into various signal ranges, i. e. 0 l/s ... 20 l/s or 10 kg/min ... 500 kg/min
- 4 limiting values: Upper and lower alarm level limit and warn level limit

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Rotation direction monitoring, flow direction monitoring with frequency measurement, signal rate measurement, flow measurement, rotation speed monitoring

- For functions such as frequency measurement both the pulse input as well as the auxiliary signal input are evaluated. The frequency is determined by the signal input. In addition, the phase relationship of the input signal is checked at the auxiliary signal input for the determination of the rotation direction monitoring.
- The measurement signal is evaluated with the sign:
  - positive = forward, signal input is damped first, LED IN/CHK illuminates yellow
  - negative = backward, auxiliary signal input is damped first, LED IN/CHK is not illuminated

Batch controller

Only the signal input is evaluated.

- Conversion of the input frequency into various signal ranges, i. e. 0 l/s ... 20 l/s or 10 kg/min ... 500 kg/min
- 4 limiting values:
  - Upper alarm level limit
  - Upper warn level limit
  - Lower alarm level limit
  - Lower warn level limit
- 2 summary counters, resettable
- Batch Controller with pre-set warnings and pre-set alarm
- Entry of the pre-set alarm limit
- Entry of the pre-set warning limit
- Start of the counter process and deactivation of the alarm signals through the set command, as long as the shut-down values are not exceeded.
- Activation of the alarm signals through stop command
- Reset of the counter process and activation of the alarm signals through the set command
- After activation of the alarm signals, input signals continue to be registered in the counter
- Entry of the shut-down values and the control commands from the control system via the external bus or via a PC with the RPI software **PACT***ware* connected to the parameterisation interface of the gateway.

Batch controller with rotation direction monitoring, flow direction monitoring

Functions as in the case of batch controller, however the signal input as well as the auxiliary signal input are evaluated.

- The direction of the input signal is indicated:
  - positive = forward, signal input is evaluated, LED IN/CH illuminates yellow, batch controller is incremented
  - negative = backward, auxiliary power input is damped first, LED/ IN/CHK is not illuminated, batch controller is decremented
- Negative counting is possible.

Standstill monitoring

- In all modes of operation, such as frequency measurement, rotation direction signalling and batch controller, a standstill monitoring can be acheived by setting the 4 limit values accordingly.

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- 1-channel
- Output EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-BO-Ex

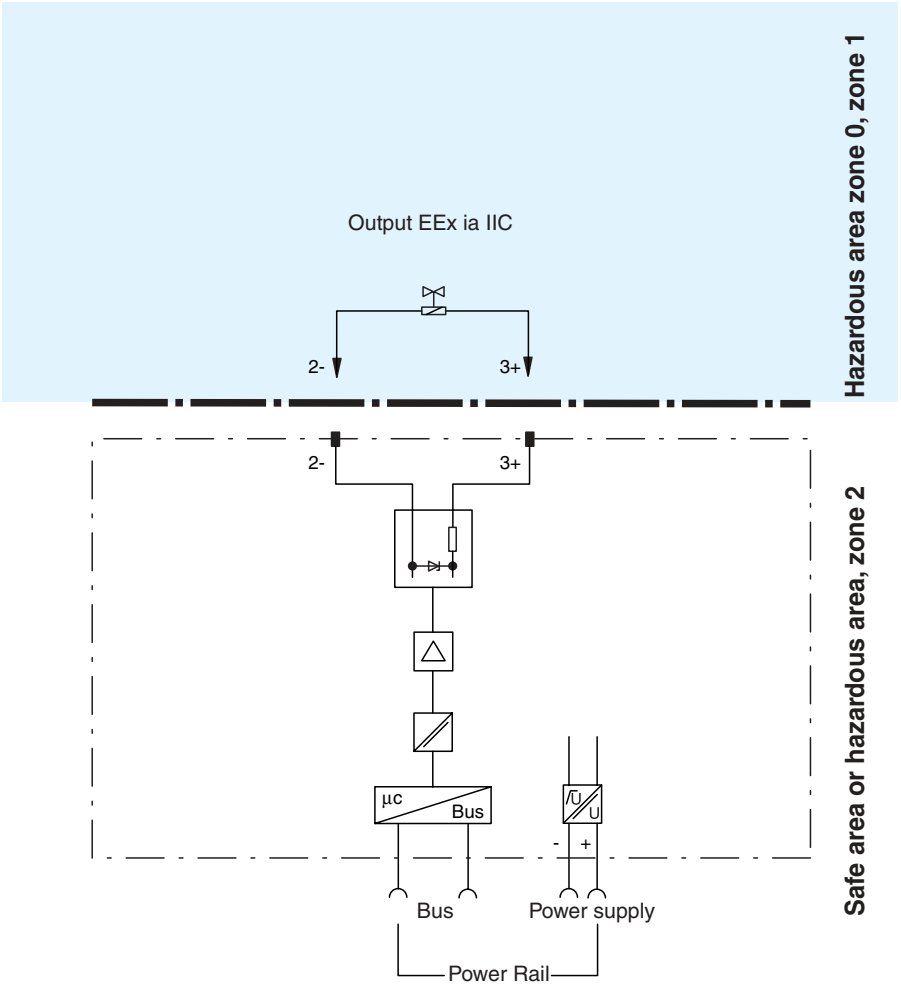
Function

The KSD2-BO-Ex supplies and switches the intrinsically safe solenoid valve in the hazardous area. Lead breakage or short circuiting of field circuits is indicated by a flashing red LED. The output is galvanically isolated from the input and the power supply.

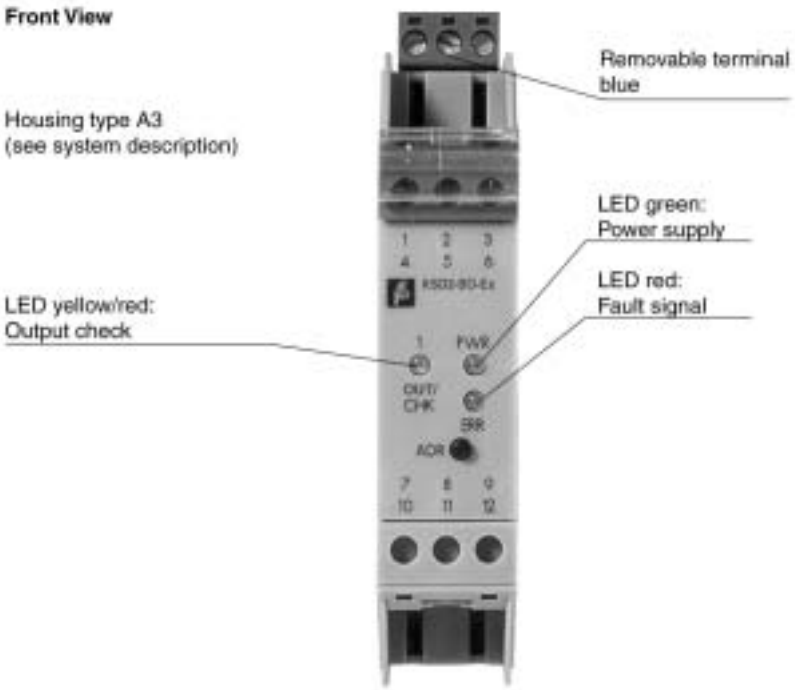
Application

Supply and control of a solenoid valve, an audible and optical alarm etc.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V
Ripple	< 10 %
Power loss	1.5 W
Power consumption	2 W
Input	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Output	
Limit	current: ≥ 45 mA voltage: 23.8 V at mA ; 12.5 V at 45 mA
Connection	terminals 2-, 3+
Switching frequency f	10 Hz
Lead monitoring	short-circuit message only when the output is activated R_B < 30 Ohm; lead breakage > 15 kOhm
Electrical isolation	
Output/Power supply, internal bus	safe electrical isolation acc. to EN 50020
Standard conformity	
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
EC-Type Examination Certificate	ZELM 00 ATEX 0030 ; for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	⟨Ex⟩ II (1) G D [EEx ia] IIC
Voltage U_0	26 V
Current I_0	110 mA
Power P_0	715 mW
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Supply	
Safety maximum voltage U_m	40 V DC
Electrical isolation	
Output/Power supply, internal bus	safe electrical isolation acc. to EN 50020
Directive conformity	standards
Directive 94/9 EU	EN 50014, EN 50020, EN 50021

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

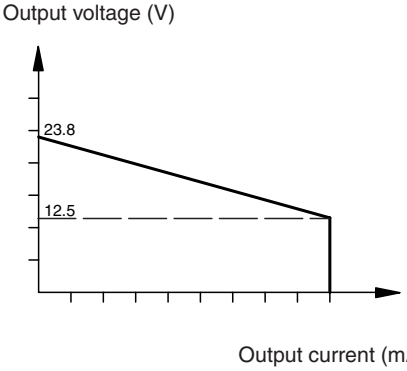
Notes

Software functions:

Adjustable by the **PACT***ware* Human Machine Interface.

- TAG numbers, 28 alphanumeric signs, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Output inversion
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Malfunction output status
  - Logic zero
  - Logic one
  - Hold last value
- Simulation
  - Of the output value
  - Of the device diagnosis
  - Of the process channel diagnosis

Output characteristic



Date of issue 2003-07-29

- 2-channel
- Output EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-BO-Ex2.2

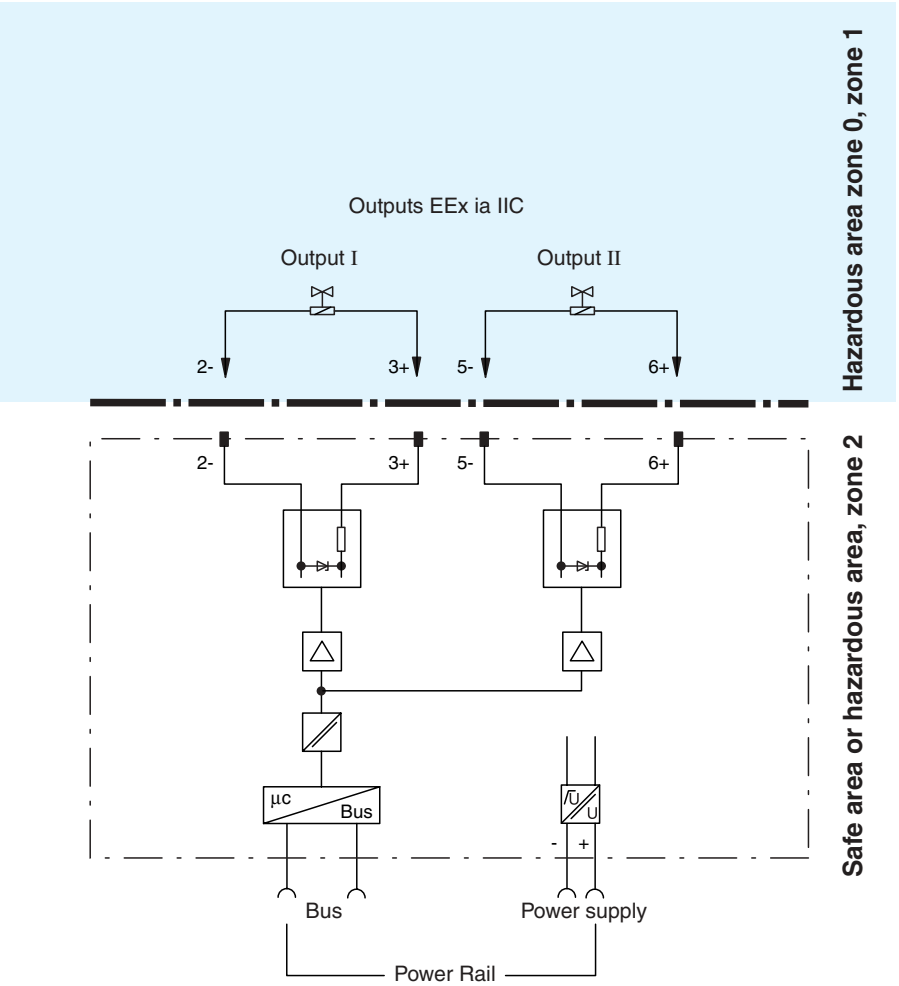
Function

The KSD2-BO-Ex2.2 supplies and switches the intrinsically safe solenoid valve in hazardous areas. Lead breakage or short circuiting of field circuits is indicated by a flashing red LED. The output is galvanically isolated from the input and the power supply.

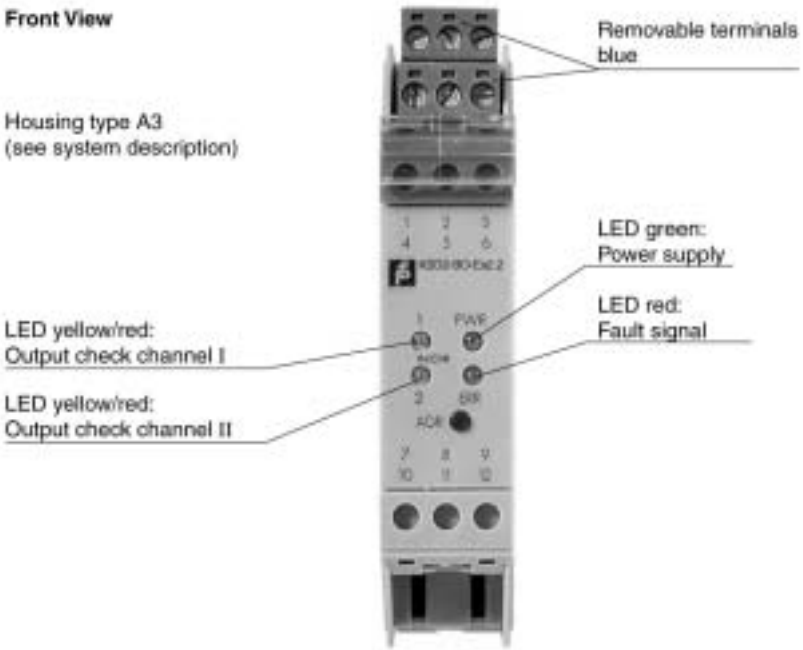
Application

Supply and control of two intrinsically safe solenoid valves, audible and optical alarms etc.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V
Ripple	< 10 %
Power loss	1.7 W
Power consumption	2.8 W
Input	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Output	
Limit	current I_e: ≥ 35 mA voltage: 23.8 V at 0 mA ; 15 V at 35 mA
Connection	output I: terminals 2-, 3+ output II: terminals 5-, 6+
Switching frequency f	10 Hz
Lead monitoring	short-circuit message only when the output is activated R_B < 30 Ohm; lead breakage > 15 kOhm
Electrical isolation	
Output/Power supply, internal bus	safe electrical isolation acc. to EN 50020
Standard conformity	
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
EC-Type Examination Certificate	ZELM 00 ATEX 0030 ; for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	⟨Ex⟩ II (1) G D [EEx ia] IIC
Voltage U_0	26 V
Current I_0	110 mA
Power P_0	715 mW
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Supply	
Safety maximum voltage U_m	40 V DC
Electrical isolation	
Output/Power supply, internal bus	safe electrical isolation acc. to EN 50020
Directive conformity	standards
Directive 94/9 EU	EN 50014, EN 50020, EN 50021

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

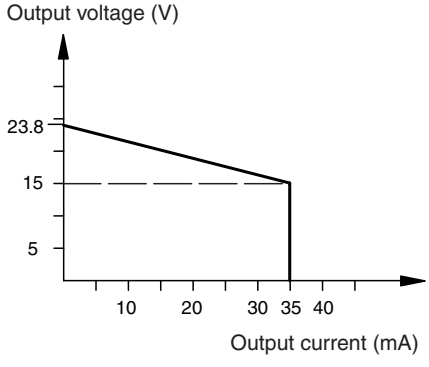
Notes

Software functions

Adjustable by the **PACT***ware* Human Machine Interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Output inversion
- Lead monitoring separately selectable for each channel
- Separate detection and indication of lead breakage and lead short circuit
- Malfunction output status
  - downscale
  - upscale
  - hold last valid value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Output characteristic



Date of issue 2003-07-29

- 2-channel
- Device installation permissible in zone 2
- Relay output suitable for controlling explosion-proof, encapsulated valves
- Relay output suitable for switching circuits in general
- Relay output also suitable for EEx ia IIC circuits
- Reliable electrical isolation of the relay contacts from each other and from the other circuits
- 24 V DC rated operational voltage
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-RO-Ex2

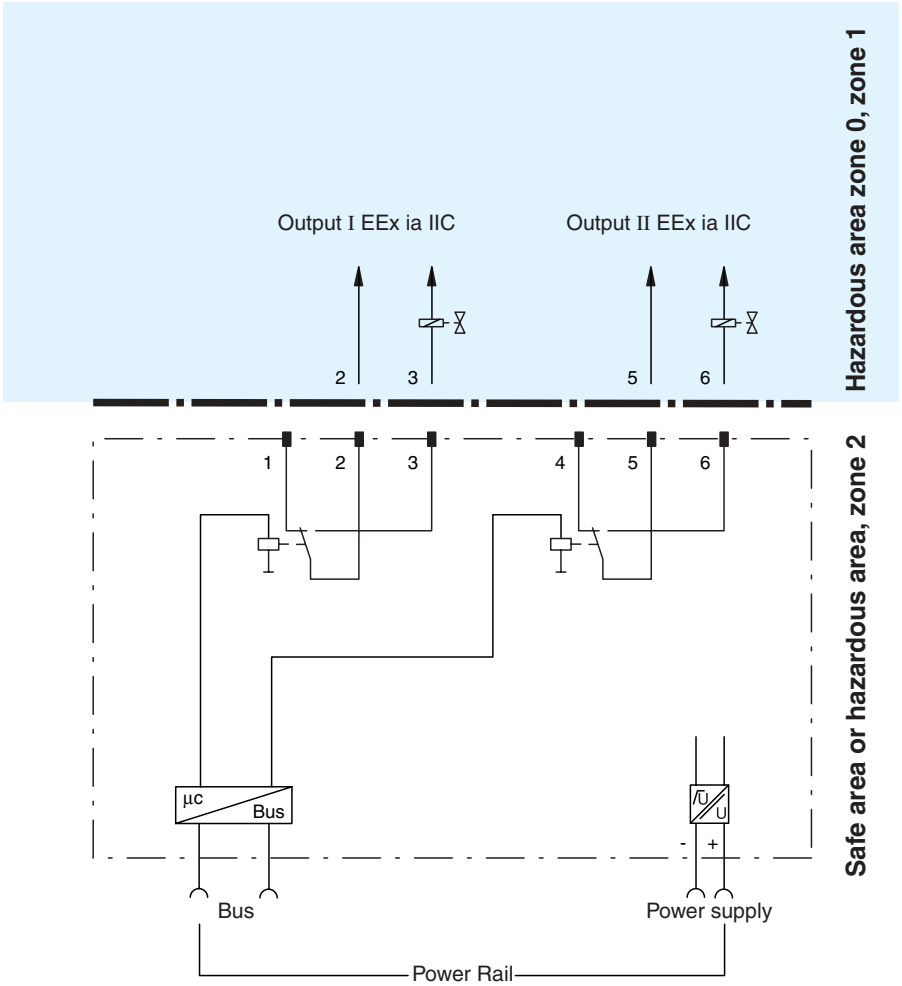
Function

The KSD2-RO-Ex2 allows for switching of 2 field devices. The change-over contacts are galvanically isolated from each other and from the circuit per EN 50020 and they are suited for controlling intrinsically safe or pressure resistant solenoid valves and alarms in the hazardous area.

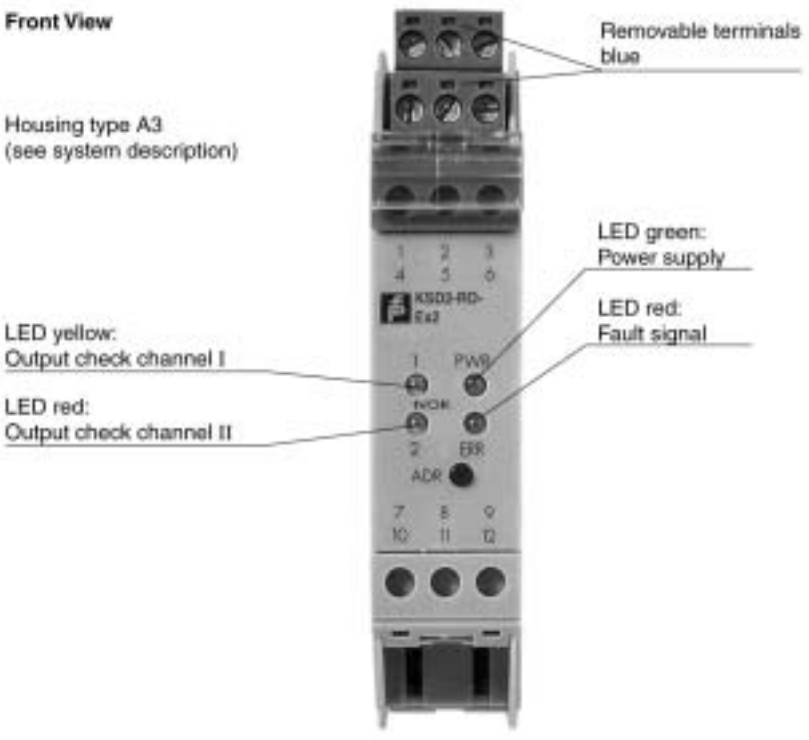
Application

Relay change-over contacts for controlling of non-intrinsically safe devices and valves and intrinsically safe solenoid valves, audible and optical alarms.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V
Ripple	< 10 %
Power consumption	1 W
Input	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Output	
Connection	output I: terminals 1, 2, 3 output II: terminals 4, 5, 6
Output I	terminals 1, 2, 3
Output II	terminals 4, 5, 6
Contact loading	use in hazardous area: 55 V use in safe area: 250 V AC / 1 A / cos φ > 0.7; 30 V DC / 2 A resistive load
Energised/De-energised delay	approx. 10 ms / approx. 10 ms
Mechanical life	10^6 switching cycles
Transfer characteristics	
Switching frequency	< 10 Hz
Electrical isolation	
Output I and II:	basic insulation according to DIN EN 50178, rated insulation voltage 253 V_{eff}
Output/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Standard conformity	
Coordination of insulation	acc. to DIN EN 50178
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
EC-Type Examination Certificate	PTB No. Ex-97.D.2138 ; for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	[EEx ia] IIC
Voltage U_i	55 V 40 V 37 V
Current I_i	0.8 A 1.5 A 2 A
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nAC IIC T4
Supply	
Safety maximum voltage U_m	253 V AC or 125 V DC
Electrical isolation	
Output/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Output I and II	safe electrical isolation acc. to EN 50020, voltage peak value 60 V
Directive conformity	standards
Directive 94/9 EU	EN 50014, EN 50020, EN 50021

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Software functions:

Adjustable by the **PACT***ware*™ human machine interface.

- Information on devices may be saved in PC memory

The following are separately adjustable for each channel:

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Output inversion
- Malfunction output status
  - Relay de-energised
  - Relay energised
  - Hold last value
- Simulation
  - of the output
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 2-channel
- Relay output suitable for controlling valves
- Relay output suitable for switching circuits in general
- Reliable electrical isolation of the relay contacts from each other and from the other circuits
- 24 V DC rated operational voltage
- Power Rail bus
- EMC acc. to NAMUR NE 21
- Spark absorbers 82Ω/22 nF

KSD2-RO-2

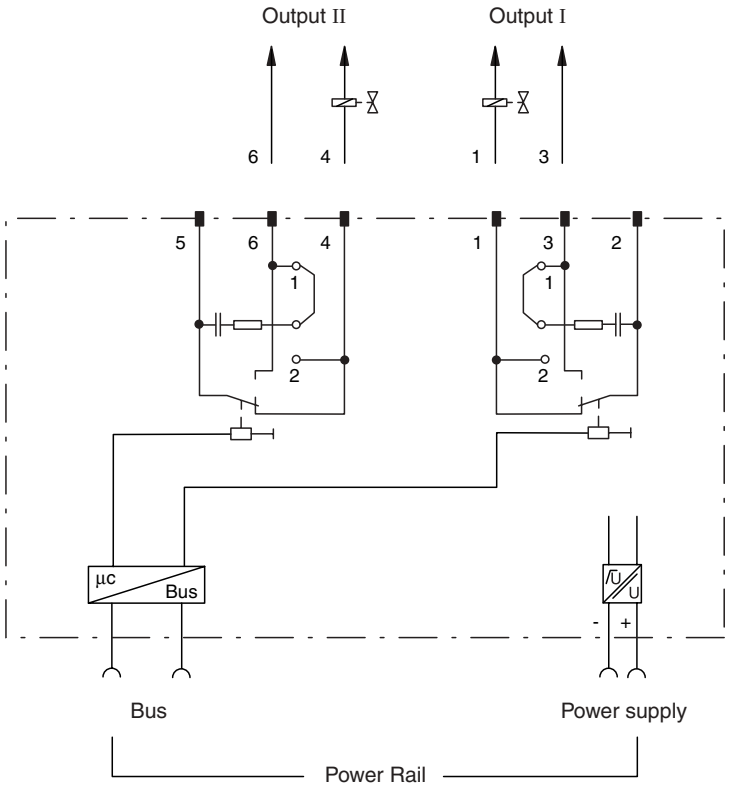
Function

The KSD2-RO-2 allows for switching of 2 field devices. The change-over contacts are galvanically isolated from each other and from the circuit per DIN EN 50178 and they are suited for controlling solenoid valves, contactors and alarms.

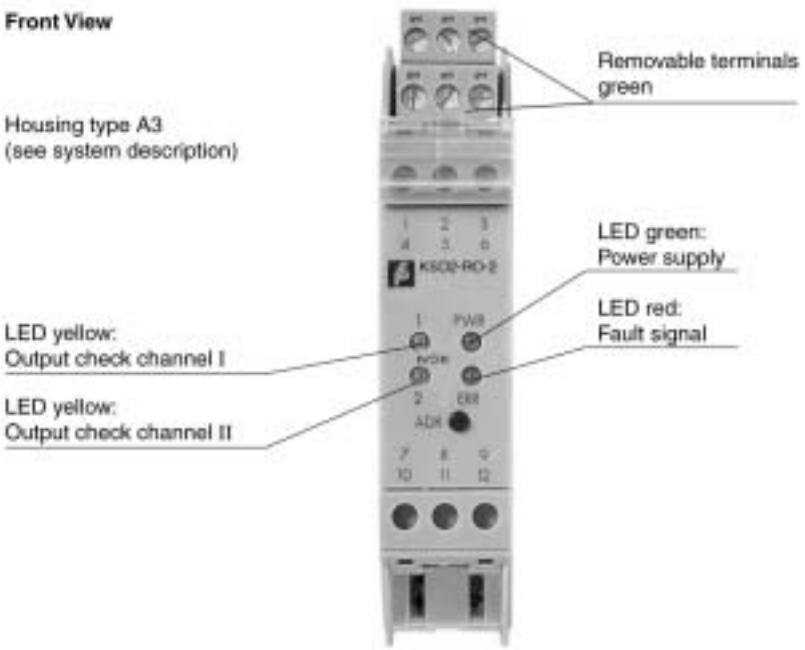
Application

Relay with changeover contacts for the control of non-intrinsically safe devices, contactors, valves as well as audible and optical alarms.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	1 W
Input	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Output	
Connection	output I: terminals 1, 2, 3 output II: terminals 4, 5, 6
Output I and II	signal, relay
Contact loading	250 V AC / 1 A / cos φ > 0.7; 30 V DC / 2 A resistive load
Mechanical life	10^6 switching cycles
Energised/De-energised delay	approx. 10 ms / approx. 10 ms
Spark absorber	82 Ω / 22 nF per channel, deactivateable or NO/NC switchable by means of Jumpers.
Transfer characteristics	
Switching frequency	< 10 Hz
Electrical isolation	
Output I and II:	basic insulation acc. to DIN EN 50178, rated insulation voltage 253 V_{eff} AC
Output/Power supply, internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 253 V_{eff}
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE 21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Software functions:

Adjustable by the **PACT***ware*™ Human Machine Interface.

- Information on devices may be saved in PC memory

The following are separately adjustable for each channel:

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Output inversion
- Malfunction output status
  - Relay de-energised
  - Relay energised
  - Hold last value
- Simulation
  - of the output
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 1-channel
- Input EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- 4 limit values
- Transfer of SMART signals into the hazardous area
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CI-S-Ex

Successor KSD2-CI-S-Ex.H

Function

The KSD2-CI-S is designed for the connection of 2- or 3-wire transmitters. It may also be used as a repeater for 0/4 mA ... 20 mA signals (current source). With a supply voltage > 20 V DC it is guaranteed that at least 14.7 V at 20 mA is available in the hazardous area. The circuit (terminal 3+, 1-) is monitored for lead faults.

2-wire transmitters are connected to terminals 2- and 3+. The input for the signal current is terminal 2.

2-wire transmitters with SMART-Communications are connected to terminals 3+ and 2-.

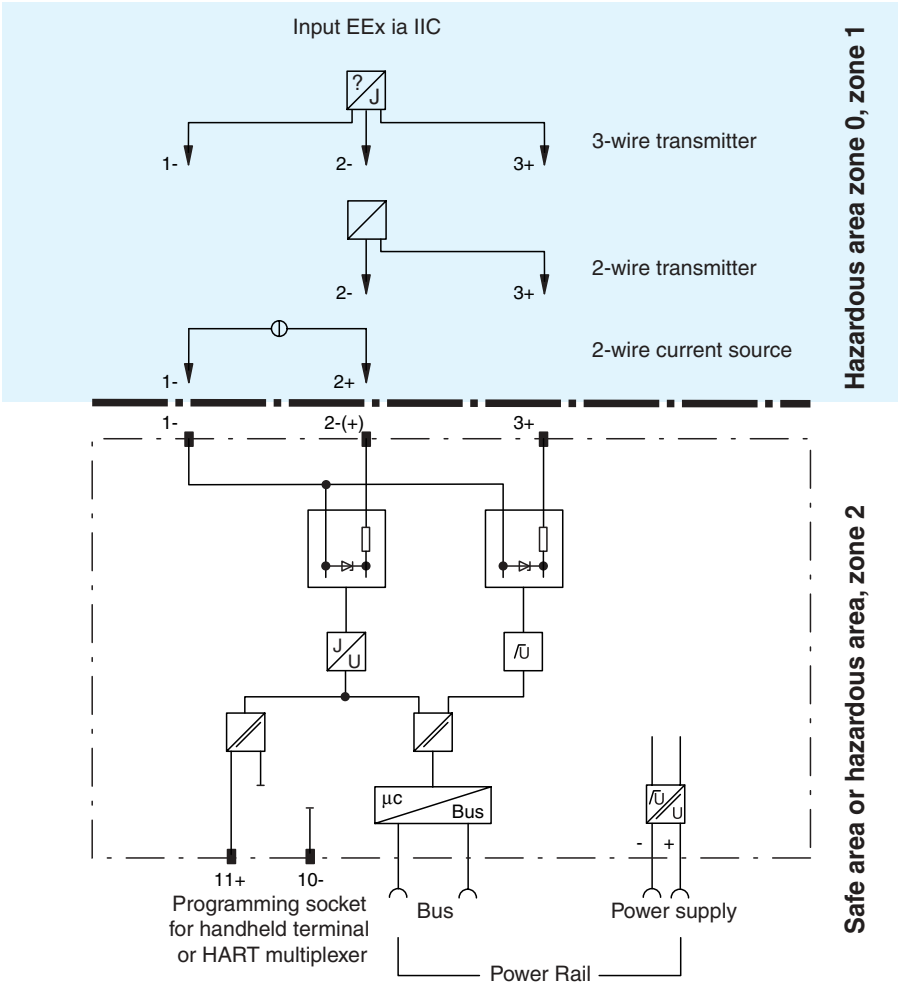
The KSD2-CI-S is delivered standard with the KF-STP-GN device connectors. These connectors are equipped with 2.3 mm jacks which may be used for connecting a SMART-Communicator.

The KFD2-HMM-16 or KFD0-HMS-16 HART multiplexers can be connected to terminals 11+ and 10-.

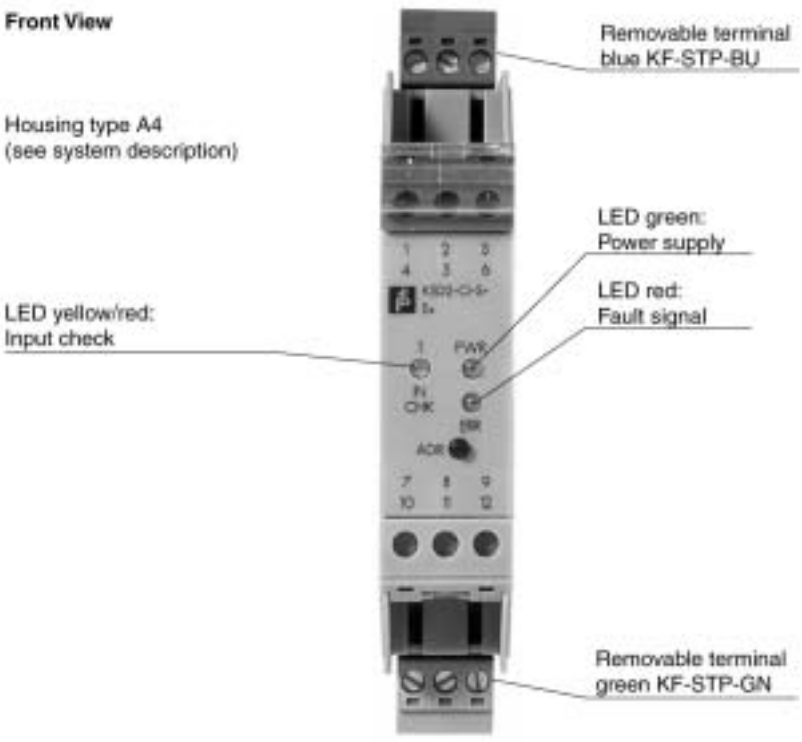
3-wire transmitters are connected to terminals 3+, 2- and 1-. The transmitter power is supplied through the terminals 3+ and 1-. The signal input is terminal 2.

Current sources which produce a signal in the range of 0/4 mA ... 20 mA are connected to terminals 2+ and 1-. Therefore, the current flows in the signal input and can be transmitted in the safe area.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply				
Connection		Power Rail		
Rated voltage		20 ... 30 V DC		
Ripple		< 10 %		
Power loss		1 W		
Power consumption		< 1.3 W		
Input				
Connection		terminals 1, 2, 3		
Input signal		0 ... 20 mA or 4 ... 20 mA		
Input resistance		approx. 105 Ω, terminals 1, 2		
Transmitter supply voltage		> 14.7 V at 20 mA		
Lead monitoring		breakage I ≤ 50 µA ; short-circuit I > 25 mA		
Output				
Connection		Power Rail		
Interface		CAN protocol via Power Rail bus		
Transfer characteristics				
Deviation		0.1 % of output signal range at 20 °C (293;K)		
Temperature		0.01 % / K of output signal range		
Electrical isolation				
Input/Power supply, internal bus		safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Standard conformity				
Climatic conditions		acc. to DIN IEC 721		
Directive conformity				
Electromagnetic compatibility		standards		
Directive 89/336/EG		EN 61326, EN 50081-2, NE21		
Ambient conditions				
Ambient temperature		-20 ... 60 °C (253 ... 333 K)		
Mechanical specifications				
Protection degree		IP20		
Mass		approx. 100 g		
Data for application in conjunction with hazardous areas				
EC-Type Examination Certificate		BAS99 ATEX 7182 ; for additional certificates see www.pepperl-fuchs.com		
Group, category, type of protection		⟨Ex⟩ II [1] G [EEx ia] IIC [T_{amb} = -20 °C to +60 °C)		
Equipment		terminals 3, 2, 1 and 3, 2	terminals 2, 1	
Voltage	U_0	25.4 V	3.6 V	
Current	I_0	93 mA	0 mA	
Power	P_0	570 mW	0 mW	
Group, category, type of protection, Temperature classification		⟨Ex⟩ II 3 G EEx nA II T4		
Electrical isolation				
Input/Power supply, internal bus		safe electrical isolation acc. to EN 50020, rated insulation voltage 300 V_{eff}		
Directive conformity		standards		
Directive 94/9 EU		EN 50014, EN 50020, EN 50021		
Entity parameter				
Certification number		J.I.2D0A6.AX		
FM control drawing		No. 116-0150		
Suitable for installation in division 2		yes		
Input I		terminals 2, 3		
Voltage V_{OC}		26.1 V		
Current	I_t	92 mA		
Explosion group		A&B	C&E	D, F&G
Max. external capacitance C_a		0.17 µF	0.5 µF	1.35 µF
Max. external inductance L_a		4.33 mH	17.3 mH	35.4 mH
Input II		terminals 2, 1		
Voltage V_{OC}		3.5 V		
Current	I_{SC}	0 mA		
Explosion group		A&B	C&E	D, F&G
Max. external capacitance C_a		1000 µF	3000 µF	8000 µF
Max. external inductance L_a		1000 mH	1000 mH	1000 mH
Input III		terminals 1, 2, 3		
Voltage V_t		26.1 V		
Current	I_t	96 mA		
Explosion group		A&B	C&E	D, F&G
Max. external capacitance C_a		0.17 µF	0.5 µF	1.35 µF
Max. external inductance L_a		3.97 mH	16 mH	35.2 mH
Safety parameter				
Control drawing		No. 116-0149		
Connection		terminals 1, 2, 3		

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Input I			
Voltage V_{OC}	25.4 V		
Current I_{SC}	93 mA		
Explosion group	A&B	C&E	D, F&G
Max. external capacitance C_a	0.18 µF	0.54 µF	1.44 µF
Max. external inductance L_a	4 mH	16.2 mH	32 mH

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Application

- The supply of power to 2- or 3-wire transmitters and the transfer of the measurement current
- Current signal repeater
- The supply of SMART transmitters in the hazardous area and the transfer of the analogue measurement current in the safe area. The interface allows a bidirectional communication between the transmitter and a handheld terminal or a HART multiplexer. These devices can be connected in the safe area. The bus transfers exclusively the digitised signal current.
- Suited for the following SMART-Systems: ABB, Chessel, Endress+Hauser, Emerson, Foxboro, Smar, Yokogawa

Notes

Software functions:

Adjustable by the **PACT***ware*™ human machine interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface"
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- 4 limit values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower alarm level limit
  - Lower warn level limit
  - Hysteresis adjustable
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the human machine interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Hold last value
- Simulation of the input value, of the device diagnosis and the process channel diagnosis

Date of issue 2003-07-29

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- 1-channel
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- 4 limit values
- Transfer of SMART signals
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CI-S

Successor KSD2-CI-S-H

Function

The KSD2-CI-S is designed for the connection of 2- or 3-wire transmitters. It may also be used as a repeater for 0/4 mA ... 20 mA signals (current source). With a supply voltage > 20 V DC it is guaranteed that a voltage of at least 14.7 V at 20 mA is available to the transmitter in the hazardous area. The circuit (terminal 3+, 1-) is monitored for lead faults.

2-wire transmitters are connected to terminals 2- and 3+. The input for the signal current is terminal 2.

2-wire transmitters with SMART-Communications are connected to terminals 3+ and 2-.

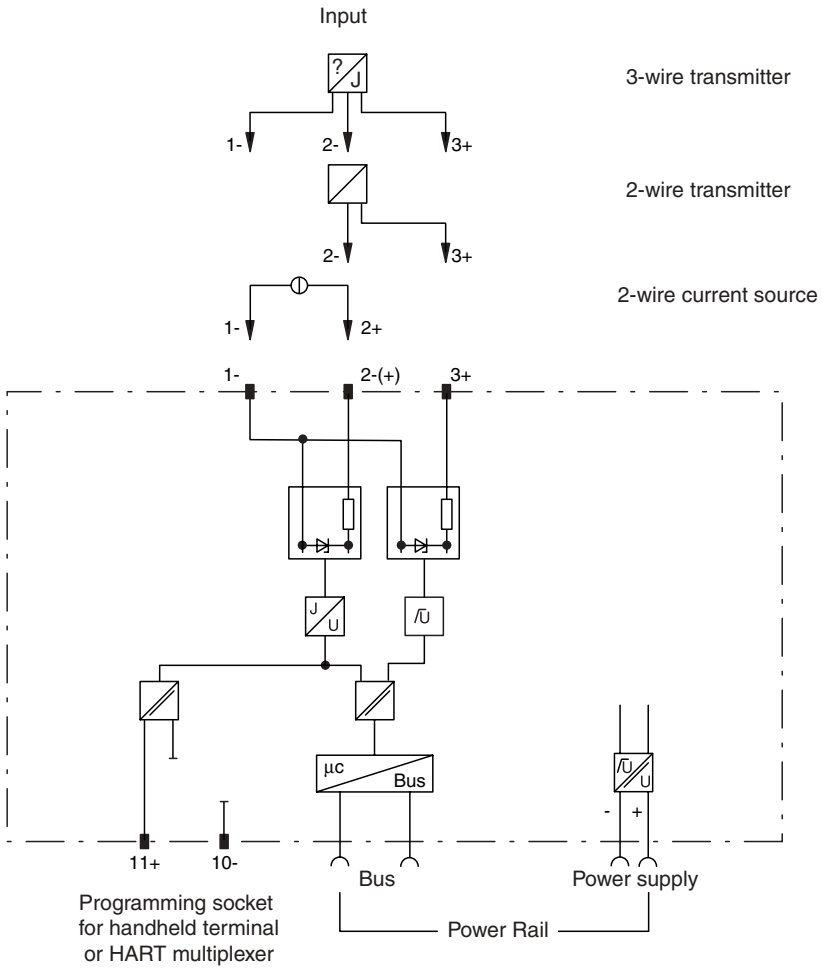
The KSD2-CI-S is delivered standard with the KF-STP-GN device connectors. These connectors are equipped with 2.3 mm jacks which may be used for connecting a SMART-Communicator.

The KFD2-HMM-16 or KFD0-HMS-16 HART Mulitplexers can be connected to terminals 11+ and 10-.

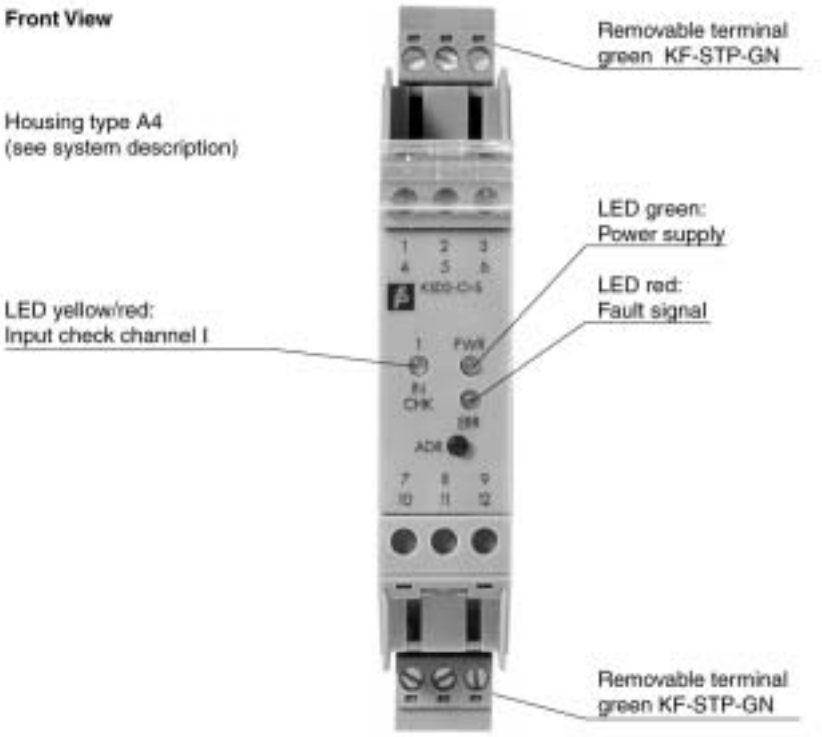
3-wire transmitters are connected to terminals 3+, 2- and 1-. The transmitter power is supplied through the terminals 3+ and 1-. The signal input is terminal 2.

Current sources which produce a signal in the range of 0/4 mA ... 20 mA are connected to terminals 2+ and 1-. Therefore, the current flows in the signal input and can be transmitted to the safe area.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 .. 30 V DC
Ripple	< 10 %
Power consumption	< 1.3 W
Input	
Connection	terminals 1, 2, 3
Input signal	0 ... 20 mA or 4 .. 20 mA
Input resistance	approx. 105 Ω , terminals 1, 2
Transmitter supply voltage	> 14.7 V at 20 mA
Lead monitoring	Load I ≤ 50 µA; Short-circuit I > 25 mA
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Deviation	0.1 % of output signal range at 20 °C (293;K)
Temperature	0.01 % /K of output signal range
Electrical isolation	
Input/Power supply, internal bus	basic insulation acc. to DIN EN 50178, voltage peak value 375 V
Standard conformity	
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE 21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Application

- The supply of power to 2- or 3-wire transmitters and the transfer of the measurement current
- Current signal repeater
- The supply of SMART transmitters and transfer of the analogue measurement current. The interface allows a bidirectional communication between the transmitter and a handheld terminal or a HART multiplexer. The bus transfers exclusively the digitised signal current.
- Suited for the following SMART-Systems:

ABB	Chessel	Endress+Hauser	Emerson
Foxboro	Smar	Yokogawa	

Notes

Software functions

Adjustable by the **PACT***ware*™ Human Machine Interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface"
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- 4 limit values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower alarm level limit
  - Lower warn level limit
  - Hysteresis adjustable
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the Human Machine Interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Maintenance of the last accepted measurement value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 1-channel
- Input EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- 4 limit values
- Transfer of HART signals from the Power Rail bus or handheld terminal to the hazardous area
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CI-S-Ex.H

replaces type KSD2-CI-S-Ex

Function

The KSD2-CI-S-Ex.H is designed for the connection of 2- or 3-wire transmitters. It may also be used as a repeater for 0/4 mA ... 20 mA signals (current source). With a supply voltage > 20 V DC it is guaranteed that at least 14.7 V at 20 mA is available in the hazardous area. The circuit (terminal 3+, 1-) is monitored for lead faults.

2-wire transmitters are connected to terminals 2- and 3+. The input for the signal current is terminal 2.

2-wire transmitters with HART communication are connected to terminals 3+ and 2- .

The KSD2-CI-S-Ex.H is delivered standard with the KF-STP-... device connectors, which are equipped with 2.3 mm jacks which may be used for connecting a HART communicator.

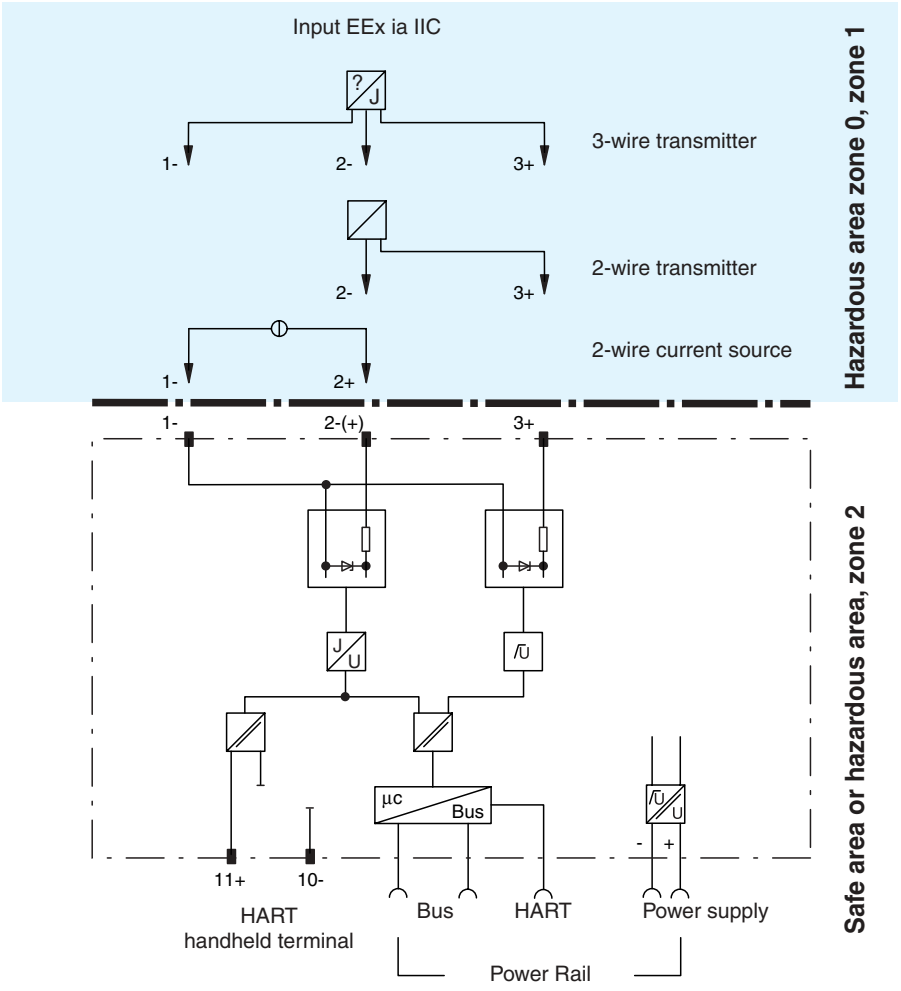
A handheld terminal can be connected to terminals 11+ und 10- . The device supports also the HART communication via the Power Rail bus.

3-wire transmitters are connected to terminals 3+, 2- and 1-. The transmitter power is supplied through the terminals 3+ and 1-. The signal input is terminal 2.

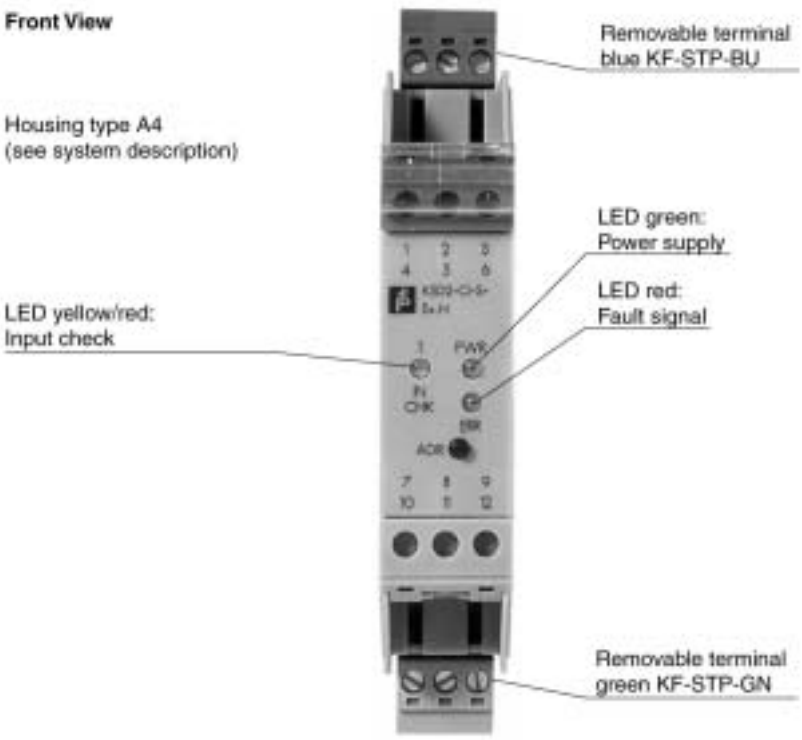
Current sources which produce a signal in the range of 0/4 mA ... 20 mA are connected to terminals 2+ and 1-.

Therefore, the current flows in the signal input and can be transmitted in the safe area.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply			
Connection		Power Rail	
Rated voltage		20 .. 30 V DC	
Ripple		< 10 %	
Power consumption		< 1.3 W	
Input			
Connection		terminals 1, 2, 3	
Input signal		0 ... 20 mA or 4 .. 20 mA	
Input resistance		approx. 105 Ω , terminals 1, 2	
Transmitter supply voltage		> 14.7 V at 20 mA	
Lead monitoring		breakage I ≤ 50 µA ; short-circuit I > 25 mA	
Output			
Connection		Power Rail	
Interface		CAN protocol via Power Rail bus	
Transfer characteristics			
Deviation		0.1 % of the input signal range at 20 °C (293 K)	
Temperature		0.01 %/K of the input signal range	
Electrical isolation			
Input/Power supply, internal bus		safe electrical isolation acc. to EN 50020, voltage peak value 375 V	
Standard conformity			
Climatic conditions		acc. to DIN IEC 721	
Directive conformity			
Electromagnetic compatibility		standards	
Directive 89/336/EG		EN 61326, EN 50081-2, NE 21	
Ambient conditions			
Ambient temperature		-20 ... 60 °C (253 ... 333 K)	
Mechanical specifications			
Protection degree		IP20	
Mass		approx. 100 g	
Data for application in conjunction with hazardous areas			
EC-Type Examination Certificate		BAS 99 ATEX 7182 ; for additional certificates see www.pepperl-fuchs.com	
Group, category, type of protection		⟨Ex⟩ II [1] G [EEx ia] IIC [T_{amb} = -20 °C to + 60 °C)	
Equipment		terminals 3, 2, 1 and 3, 2	terminals 2, 1
Voltage	U_0	25.4 V	3.6 V
Current	I_0	93 mA	0 mA
Power	P_0	570 mW	0 mW
Group, category, type of protection, Temperature classification		⟨Ex⟩ II 3 G EEx nA II T4	
Electrical isolation			
Input/Power supply, internal bus		safe electrical isolation acc. to EN 50020, voltage peak value 375 V	
Directive conformity		standards	
Directive 94/9 EU		EN 50014, EN 50020, EN 50021	

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Application

- Tth supply of power to 2- or 3-wire transmitters and the transfer of the measurement current
- Current signal repeater
- Supply of HART transmitters in the hazardous areas and transfer of the analogue measurement current into the safe area. The interface allows a bidirectional communication between the transmitter and the handheld terminal. The device can be connected in the safe area. The bus transfers the digital value of the signal current to the HART communication.

Notes

Software functions:

Adjustable by the **PACT*ware*™** Human Machine Interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - For a list see System Description RPI
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- 4 limiting values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower alarm level limit
  - Lower warn level limit
- Hysteresis adjustable
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the Human Machine Interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Hold last value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 1-channel
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- 4 limit values
- Transfer of HART signals via the Power Rail bus or from handheld terminal
- Power Rail bus
- EMC acc. to NAMUR NE 21

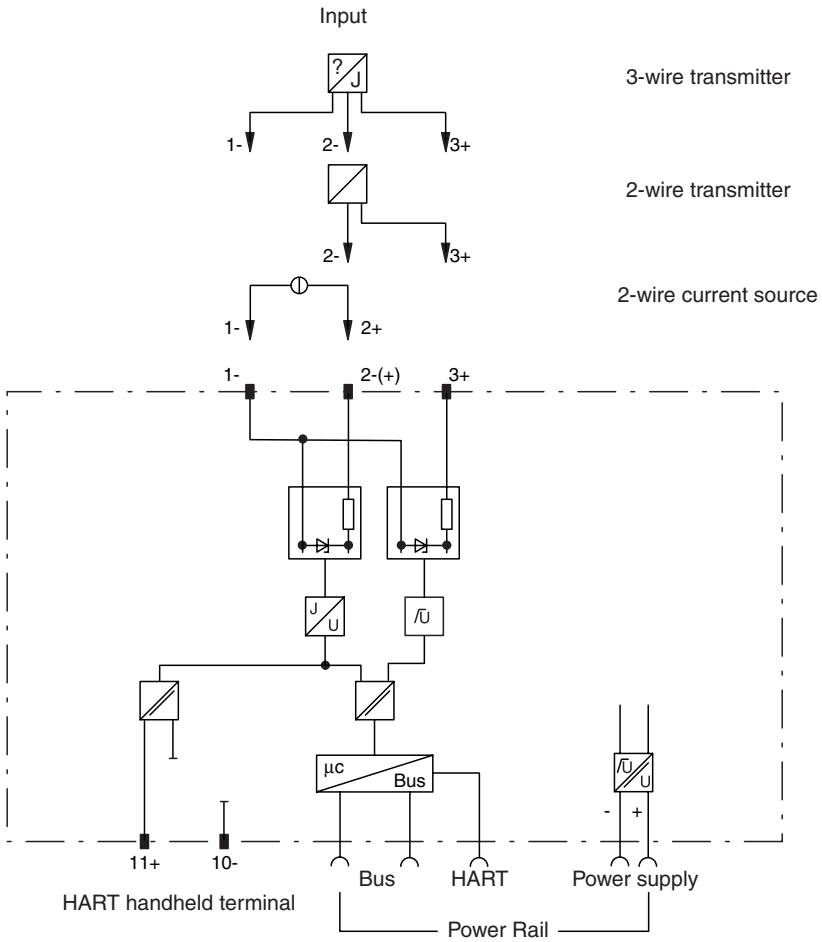
KSD2-CI-S-H

replaces type KSD2-CI-S

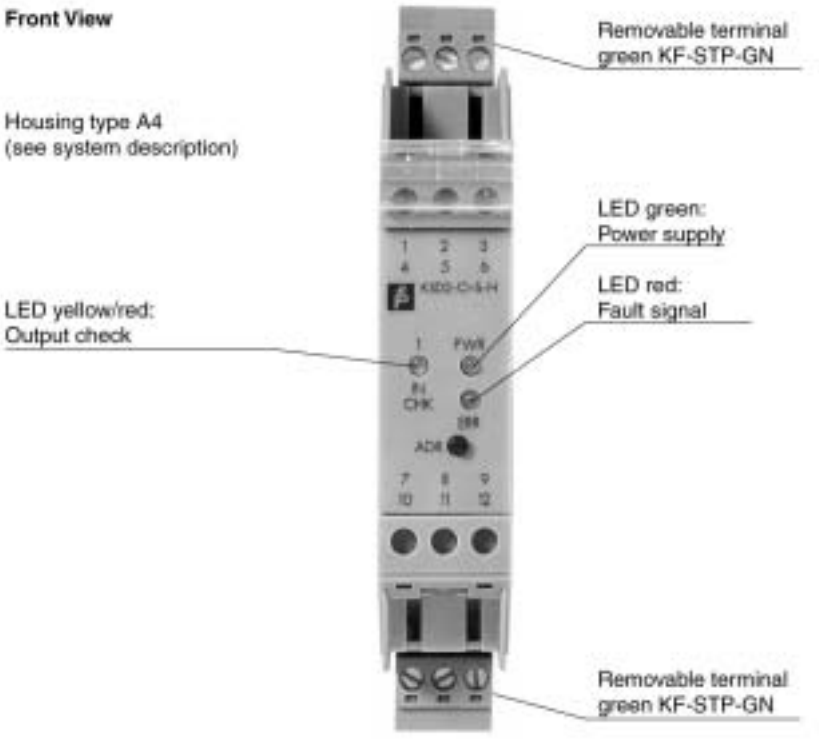
Function

The KSD2-CI-S-H is designed for the connection of 2- or 3-wire transmitters. It may also be used as a repeater for 0/4 mA ... 20 mA signals (current source). With a supply voltage > 20 V DC it is guaranteed that a voltage of at least 14.7 V at 20 mA is available to the transmitter in the hazardous area.
The circuit (terminal 3+, 1-) is monitored for lead faults.
2-wire transmitters are connected to terminals 2- and 3+. The input for the signal current is terminal 2.
2-wire transmitters with HART communication are connected to terminals 3+ and 2- .
The KSD2-CI-S-H is delivered with the connectors KF-STP-GN. The 2.3 mm jacks are integrated in this connector for use with HART Communicators.
A handheld terminal can be connected to the terminals 11+ and 10- . The device supports also the HART communication via the Power Rail bus.
3-wire transmitters are connected to terminals 3+, 2- and 1-.
The transmitter power is supplied through the terminals 3+ and 1-. The signal input is terminal 2.
Current sources which produce a signal in the range of 0/4 mA ... 20 mA are connected to terminals 2+ and 1-.
Therefore, the current flows in the signal input and can be transmitted to the safe area.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	< 1.3 W
Input	
Connection	terminals 1, 2, 3
Input signal	0 ... 20 mA or 4 ... 20 mA
Input resistance	approx. 105 Ω, terminals 1, 2
Transmitter supply voltage	> 14.7 V at 20 mA
Lead monitoring	Load I ≤ 50 µA; Short-circuit I > 25 mA
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Deviation	0.1 % of the input signal range at 20 °C (293 K)
Temperature	0.01 %/K of the input signal range
Electrical isolation	
Input/Power supply, internal bus	basic insulation acc. to DIN EN 50178, voltage peak value 375 V
Standard conformity	
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Application

- The supply of power to 2 or 3 wire transmitters and the transfer of the measurement current
- Current signal repeater
- Supply of HART transmitters and the transfer of the analogue measurement current. The interface allows a bidirectional communication between the transmitter and the handheld terminal. The bus transfers the digital value of the signal current to the HART communication.

Notes

Software functions

Adjustable by the **PACT*ware*™** Human Machine Interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see " System Description Remote Process Interface"
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- 4 limiting values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower alarm level limit
  - Lower warn level limit
  - Hysteresis adjustable
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the Human Machine Interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Maintenance of the last accepted measurement value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 2-channel
- Input EEx ia IIC
- 24 V DC nominal supply voltage
- 4 limit values per channel
- Device installation permissible in zone 2
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CI-Ex2

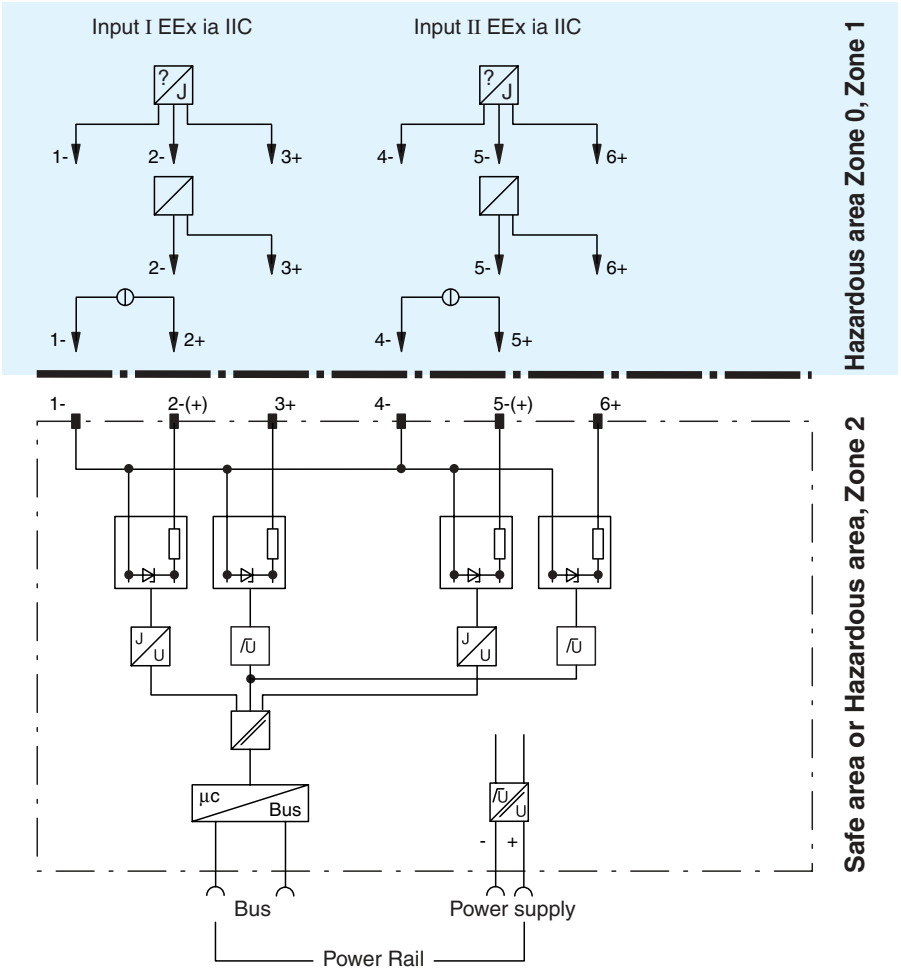
Function

The KSD2-CI-Ex2 is designed for the connection of 2- or 3-wire transmitters. It may also be used as a repeater for 0/4 mA ... 20 mA signals (current source). With a supply voltage > 20 V DC it is guaranteed that at least 15 V is available to the transmitter in the hazardous area at a current of 20 mA. The supply circuits (terminal 3+, 1- or 6+, 4-) are monitored for lead faults.
The two inputs are galvanically connected and have a commom negative potential. They are galvanically isolated from the Bus and the power supply.
2-wire transmitters are connected to terminals 2- and 3+ or 5- and 6+. The input for the signal current is terminal 2 or 5.
3-wire transmitters are connected to terminals 3+, 2- and 1- or 6+, 5- and 4-. The transmitter power is supplied through terminals 3+ and 1- or 6+ and 4-. The signal input is terminal 2 or 5.
Current sources which produce a signal in the range of 0/4 mA ... 20 mA, are connected to terminals 2+ and 1- or 5+ and 4-. Therefore, the current flows in the signal input and can be transferred to the safe area.

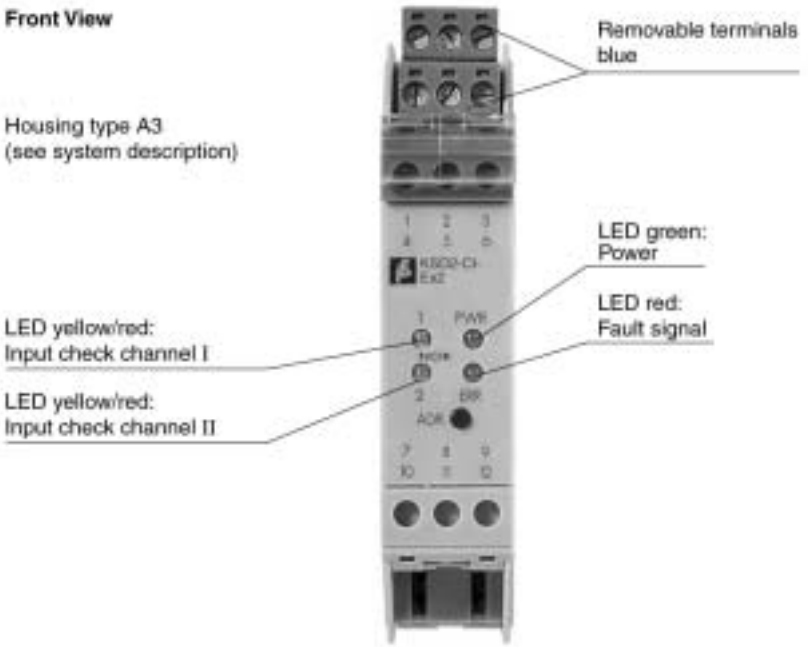
Application

- The supply of power to the 2- or 3-wire transmitters installed in the hazardous area and the transfer of the measurement current to the safe area
- Current signal repeaters

Electrical Connection



Composition



Date of issue 2003-07-29

Supply					
Connection	Power Rail				
Rated voltage	20 ... 30 V				
Ripple	< 10 %				
Power consumption	< 1.9 W				
Input					
Connection	terminals 1 , 2, 3; 4, 5, 6				
Input signal	0/4 ... 20 mA				
Available voltage	> 15 V at 20 mA				
Lead monitoring	breakage I ≤ 2 mA ; short-circuit U < 4 V				
Output					
Connection	Power Rail				
Interface	CAN protocol via Power Rail bus				
Transfer characteristics					
Deviation	0.1 % of output signal range at 20 °C (293;K)				
Temperature	0.01 % / K of output signal range				
Electrical isolation					
Input/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V				
Standard conformity					
Climatic conditions	acc. to DIN IEC 721				
Directive conformity					
Electromagnetic compatibility	standards				
Directive 89/336/EG	EN 61326, EN 50081-2, NE21				
Ambient conditions					
Ambient temperature	-20 ... 60 °C (253 ... 333 K)				
Mechanical specifications					
Protection degree	IP20				
Mass	approx. 100 g				
Data for application in conjunction with hazardous areas					
EC-Type Examination Certificate	PTB 00 ATEX 2010; for additional certificates see www.pepperl-fuchs.com				
Group, category, type of protection	⟨Ex⟩ II (1) G [EEx ia] IIC				
Equipment	terminals 1 , 2, 3 or 4, 5, 6	terminals 1, 2 or 4, 5			
Voltage U_0	25.2 V			3.5 V	
Current I_0	93 mA			0.7 mA	
Power P_0	585 mW			0.6 mW	
Type of protection [EEx ib]	linear characteristic				
Explosion group	IIB	IIC		IIB	IIC
External capacitance	815 nF	105 nF	≥ 249 nF	≥ 99 nF see prototype test certificate	
External inductance	16.8 mH	4.5 mH		9.8 mH	1.8 mH
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4				
Electrical isolation					
Input/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V				
Directive conformity	standards				
Directive 94/9 EU	EN 50014, EN 50020, EN 50021				

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Software functions

Adjustable by the **PACT***ware*™ Human Machine Interface.
- Information on devices may be saved in PC memory

The following are separately adjustable for each channel:
- Selection switch markings (TAG-No.), 28 alphanumeric markings, can be programmed into device
- Commentary, may be saved in PC memory
- Physical characteristics are adjustable
  - List see "System Description Remote Process Interface"
- Lead monitoring optional
- Separate detection and indication of lead breakage and lead short circuit
- 4 limit values
  - upper alarm limit
  - upper warning limit
  - lower warning limit
  - lower alarm limit
  - hysteresis adjustable
- Start value and end value of the measurement range
  - for determination of the overflow and underflow range
  - for the configuration of the analogue value indicator of the control display
- Signalling of having exceeded or fallen short of the measurement range
- Determining the behaviour in the case of an error
  - Signal value optional
  - Start value of the measurement range
  - End value of the measurement range
  - Maintenance of the last accepted measurement value
- Simulation
  - of the output value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 2-channel
- 24 V DC rated operational voltage
- 4 limit values per channel
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CI-2

Function

The KSD2-CI-2 is suited for the connection of 2- and 3--wire transmitters. It may also be used as a repeater for 0/4 mA ... 20 mA signals (current source). With a rated operational voltage of > 20 V DC it is guaranteed that for a transmitter with a current conduction of 20 mA at least 15 V is available. The circuit (terminals, 1- or+, 4–) is monitored of lead fault. The two inputs are galvanically connected and have a common negative potential.

2-wire transmitters are connected to terminals 2- and 3+ or 5- and 6+. The input for the signal current is terminal 2 or 5.

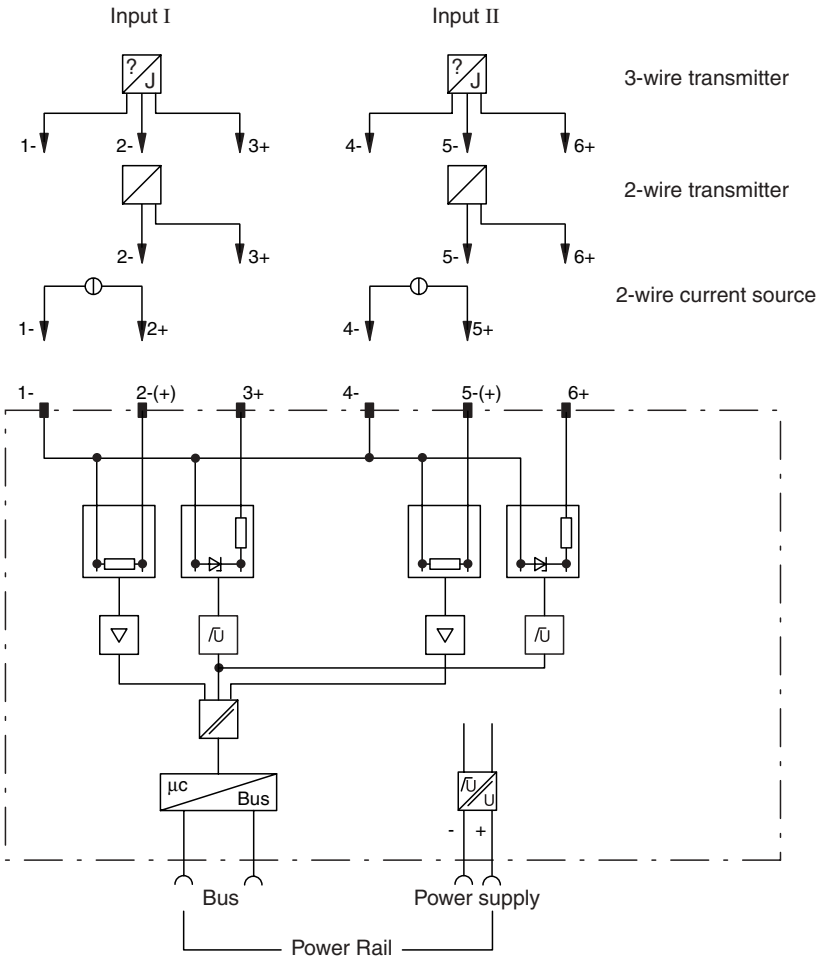
3-wire transmitters are connected to terminals 3+, 2- and 1- or 6+, 5- and 4-. The transmitter power is supplied through terminals 3+ and 1- or 6+ and 4-. The signal input is terminal 2 or terminal 5.

Current sources which generate a signal in the range of 0/4 mA ... 20 mA, are connected to terminals 2+ and 1- or 5+ and 1-. Thus the current flows into the signal input and is transmitted to the output.

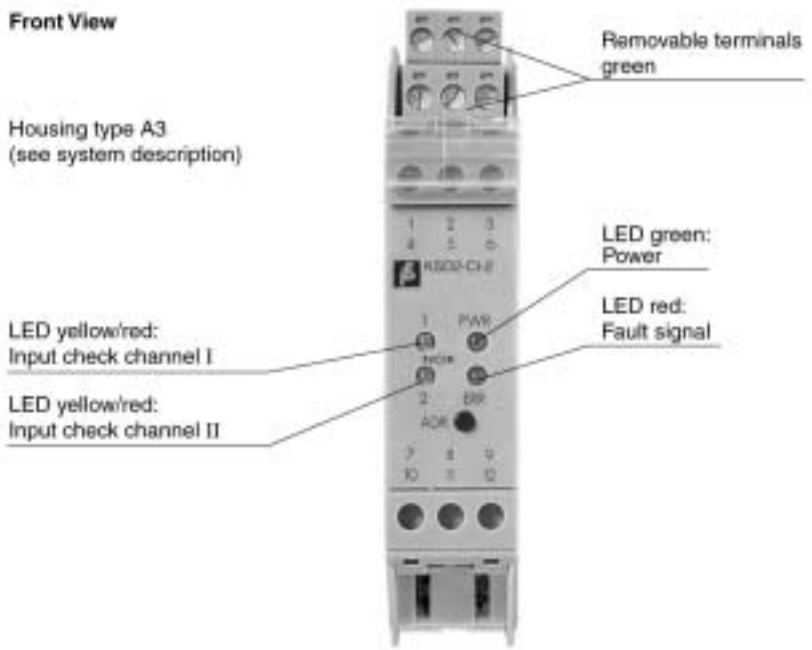
Application

- The supply of power to 2- or 3-wire transmitters and the transfer of the measurement current
- Current signal repeater

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	< 1.9 W
Input	
Connection	terminals 1, 2, 3; 4, 5, 6
Input signal	0/4 ... 20 mA
Available voltage	> 15 V at 20 mA
Lead monitoring	Load I ≤ 2 mA; Short-circuit U < 4 V
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Deviation	0.1 % of output signal range at 20 °C (293;K)
Temperature	0.01 % / K of output signal range
Electrical isolation	
Input/Power supply, internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 300 V_{eff}
Standard conformity	
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Software functions

Adjustable by the **PACT***ware*™ Human Machine Interface.

- Information on devices may be saved in PC memory

The following are separately adjustable for each channel:

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface"
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- 4 limit values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower warn level limit
  - Lower alarm level limit
- Hysteresis adjustable
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the Human Machine Interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Maintenance of the last accepted measurement value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

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- 1-channel
- Input EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Connection of resistance thermometers Pt100 or Ni100 in 2-, 3- or 4-wire connection
- Connection of thermocouples, type B, E, J, K, L, N, R, S or T
- Cold junction compensation
- Connection of other resistive sensors, mV sources or thermocouples possible. Linearisation adjustable via software
- 4 limit values
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-TI-Ex

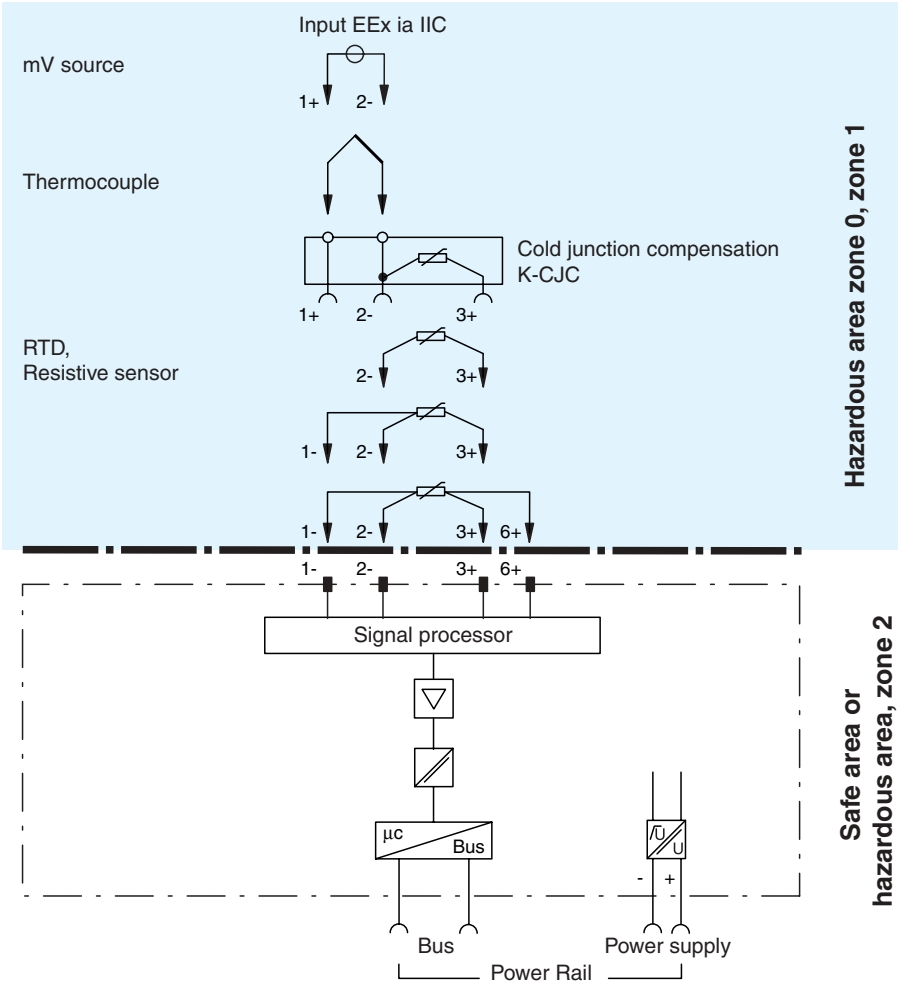
Function

The KSD2-TI-Ex is designed for the connection of RTDs and thermocouples. The input signal of the temperature sensor is linearised.
The configuration may be over the internal Power Rail bus. A red flashing LED and a signal through the bus indicates burnout detection.
RTDs can be connected in 2-, 3- or 4-wire mode.
Internal cold junction compensation can be selected for thermocouples. For this purpose, a RTD is integrated in the K-CJC terminal block (available as an accessory). Cold junction compensation is also possible externally.
All parameters and configurations are transferred over the internal Power Rail bus.

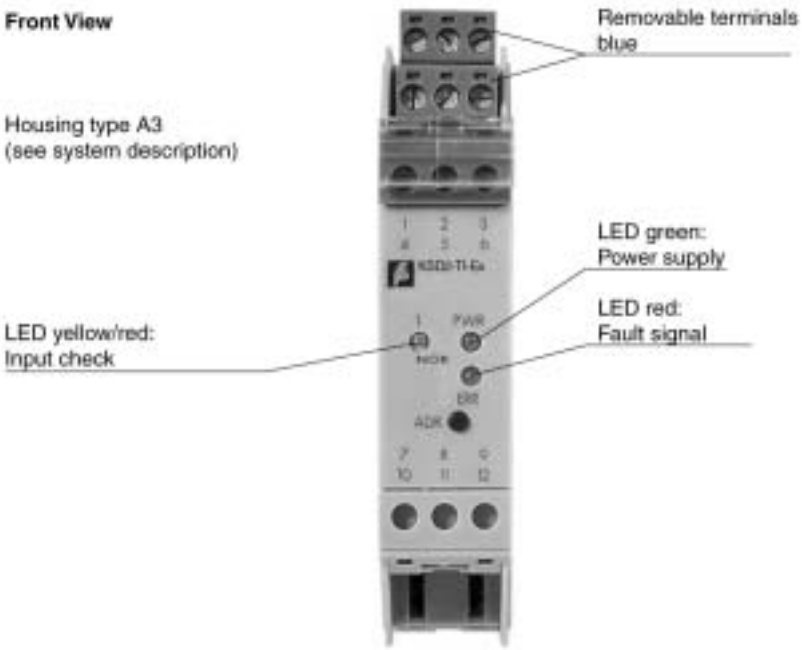
Application

- Temperature measurement are performed by resistance temperature sensors or thermocouples.
- Detection of position through low Ohmic potentiometric repeater.
- Detection of mV signals.

Electrical Connection



Composition



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Supply			
Connection	Power Rail		
Rated voltage	20 ... 30 V DC		
Ripple	< 10 %		
Power consumption	< 1.5 W		
Input			
Connection	terminals 1, 2, 3, 6 suitable for Pt100, Ni100, other resistive sensors, thermocouples type B, E, J, K, L, N, R, S, T and mV sources		
Lead resistance	per lead ≤ 50 Ω		
Current for sensor burnout detection	approx. 48 nA		
Measuring current	approx. 400 µA with resistance measuring sensor		
Lead monitoring	resistive sensors, Pt100, Ni100: lead breakage and short-circuit detection for all leads:(4-leads: lead breakage at terminal 3 is detected as short-circuit); threshold for short-circuit detection ≤ 10 Ω mV sources, thermocouples: lead breakage detection; sensor burnout and short-circuit detection for cold junction compensation K-CJC		
Output			
Connection	Power Rail		
Interface	CAN protocol via Power Rail bus		
Transfer characteristics			
Deviation			
Pt100, Ni100	2- and 3-wire: ± 0.4 K 4-wire: ± 0.35 K		
Thermocouples, except type B	± 1 K, ± 0.5 K deviation on the cold junction compensation in addition		
Thermocouple B	± 1 K in the range > 600 °C ± 3 K in the remaining area ± 0.5 K deviation of the cold junction compensation in addition		
Resistance type sensor, mV sensor	± 0,1 % of output signal range		
Error: Temperature			
Pt100, Ni100	± (0.0015 % of the measured value in K + 0.006 % of the measurement range)/K		
Thermocouples	± (0.2 K + 0.004 % of the measured value in °C + 0.006 % of the measurement range)/K		
Resistance type sensor, mV sensor	± 0.01 % of measuring range / K		
Influence of the power supply	± 0.1 % of the measurement range		
Electrical isolation			
Input/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Directive conformity			
Electromagnetic compatibility	standards		
Directive 89/336/EG	EN 61326, EN 50081-2, NE21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (253 ... 333 K)		
Mechanical specifications			
Protection degree	IP20		
Mass	approx. 100 g		
Data for application in conjunction with hazardous areas			
EC-Type Examination Certificate	BAS99 ATEX 7187 ; for additional certificates see www.pepperl-fuchs.com		
Group, category, type of protection	⟨Ex⟩ II [1] G D [EEx ia] IIC (T_{amb} = -20 °C to +60 °C)		
Voltage U_0	11 V		
Current I_0	33 mA		
Power P_0	90 mW		
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4		
Electrical isolation			
Input/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Directive conformity	standards		
Directive 94/9 EU	EN 50014, EN 50020, EN 50021		
Entity parameter			
Certification number	3000845		
Suitable for installation in division 2	yes		
Connection	terminals 1, 3; 2, 6		
Safety parameter			
CSA control drawing	LR 36087-18		
Control drawing	No. 116-0149		
Input I			
Voltage V_{OC}	10.5 V		
Current I_{SC}	32 mA		
Explosion group	A&B	C&E	D, F&G
Max. external capacitance C_a	2.7 µF	8.1 µF	21.6 µF
Max. external inductance L_a	33 mH	119 mH	285 mH

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Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Sensor type	in accordance with the standard	Measurement range	
		Start	End
Resistance type		0 Ohm	500 Ohm
(resistance-linear or freely linearisable)			
Pt100	IEC 751/Juli 95	-200 °C	+850 °C
Ni100	DIN 43760/	-60 °C	+220 °C
mV-source		-0.2 V	+2 V
(voltage-linear or freely linearisable)			
Thermocouples			+1300 °C
K	IEC 584-1/Okt. 96	-100 °C	+400 °C
T	IEC 584-1/Okt. 96	-200 °C	+1000 °C
E	IEC 584-1/Okt. 96	-100 °C	+1200 °C
J	IEC 584-1/Okt. 96	-200 °C	+1300 °C
N	IEC 584-1/Okt. 96	-100 °C	+1600 °C
R	IEC 584-1/Okt. 96	0 °C	+1600 °C
S	IEC 584-1/Okt. 96	-22 °C	+900 °C
L	DIN 43710	-200 °C	+1800 °C
B	IEC 584-1/Okt. 96	+100 °C	

Software functions:

Adjustable by the **PACT*ware*™** human machine interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - Input for potentiometric recorder: °C, °F, K, Ohm, none
  - Input for thermocouple and mV-source: °C, °F, K, mV, none
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- 4 limit values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower alarm level limit
  - Lower warn level limit
  - Hysteresis adjustable
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the human machine interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Hold last value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Accessories

Cold junction compensation K-CJC-BU for thermocouples, pluggable

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- 1-channel
- 24 V DC rated operational voltage
- Connection of resistance thermometers Pt100 or Ni100 in 2-, 3- or 4-wire connection
- Connection of thermocouples, type B, E, J, K, L, N, R, S or T
- Cold junction compensation
- Connection of other resistive sensors, mV sources or thermocouples possible. Linearisation adjustable via software
- 4 limit values
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-TI

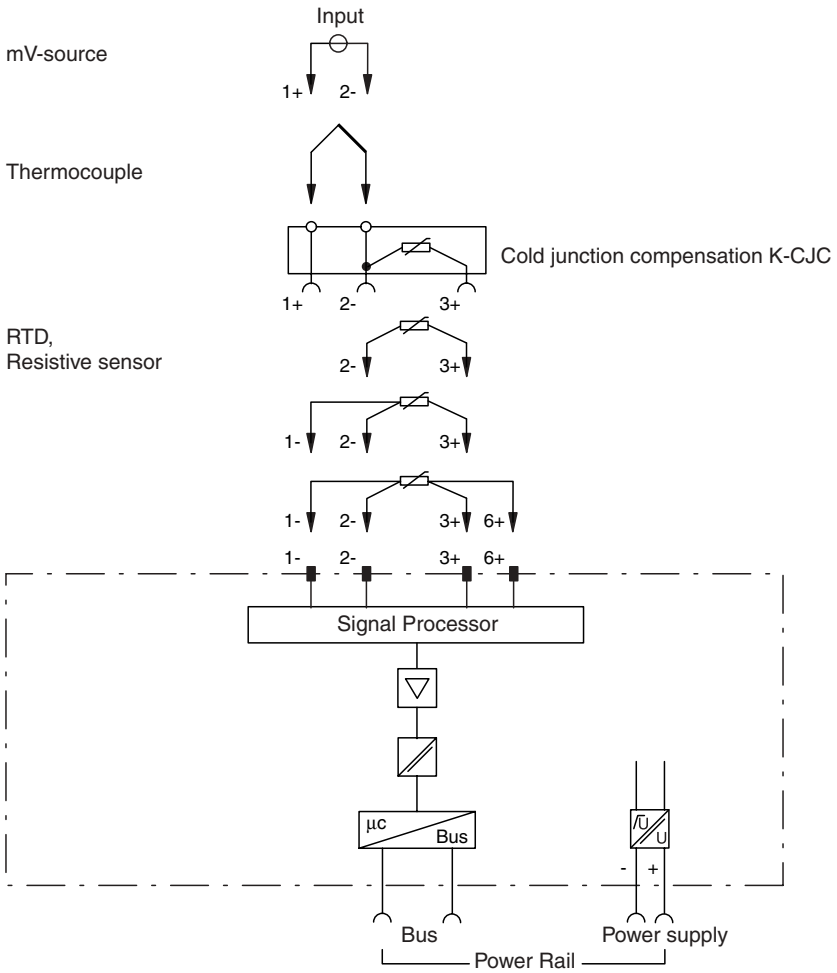
Function

The KSD2-TI is designed for the connection of RTDs and thermocouples. The input signal of the temperature sensor is linearised.
The configuration may be over the internal Power Rail Bus. A red flashing LED and a signal through the Bus indicates burnout detection.
RTDs can be connected in 2-, 3- or 4-wire mode.
Internal cold junction compensation can be selected for thermocouples. For this purpose, a RTD is integrated in the K-CJC terminal block (available as an accessory). Cold junction compensation is also possible externally.
All parameters and configurations are transferred over the internal Power Rail Bus.

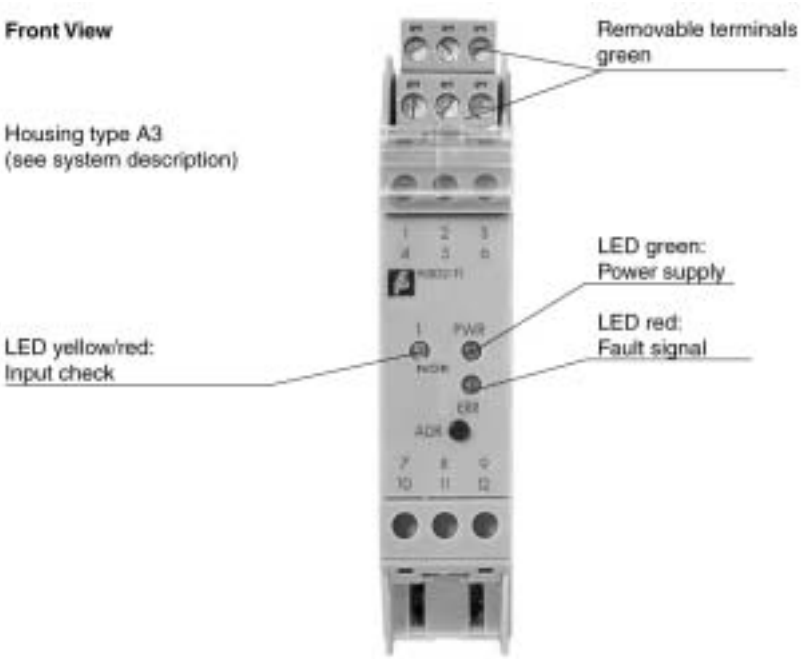
Application

- Temperature measurement are performed by resistance temperature sensors or thermocouples.
- Detection of position through low Ohmic potentiometric repeater.
- Detection of mV signals.

Electrical Connection



Composition



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Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	< 1.5 W
Input	
Connection	terminals 1, 2, 3, 6 suitable for Pt100, Ni100, other resistive sensors, thermocouples type B, E, J, K, L, N, R, S, T and mV sources
Lead resistance	≤ 50 Ω per lead
Current for sensor burnout detection	approx. 48 nA
Measuring current	approx. 400 µA with resistance measuring sensor
Lead monitoring	resistive sensors, Pt100, Ni100: lead breakage and short-circuit detection for all leads:(4-leads: lead breakage at terminal 3 is detected as short-circuit); threshold for short-circuit detection ≤ 10 Ω mV sources, thermocouples: lead breakage detection; sensor burnout and short-circuit detection for cold junction compensation K-CJC
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Deviation	
Pt100, Ni100	2- and 3-wire: ± 0.4 K 4-wire: ± 0.35 K
Thermocouples, except type B	± 1 K , ± 0.5 K deviation on the cold junction compensation in addition
Thermocouple B	± 1 K in the range > 600 °C ± 3 K in the remaining area ± 0.5 K deviation of the cold junction compensation in addition
Resistance type sensor, mV sensor	± 0.1 % of the measurement range
Error: Temperature	
Pt100, Ni100	± (0.0015 % of the measured value in K + 0.006 % of the measurement range)/K
Thermocouples	± (0.2 K + 0.004 % of the measured value in °C + 0.006 % of the measurement range)/K
Resistance type sensor, mV sensor	± 0.01 % of measuring range / K
Influence of the power supply	± 0.1 % of the measurement range
Electrical isolation	
Input/Power supply, internal bus	basic insulation acc. to DIN EN 50178, voltage peak value 375 V
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

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Notes

Sensor type	in accordance with the standard	Measurement range	
		Start	End
Resistance type sensor		0 Ohm	500 Ohm
(resistance-linear or freely linearisable)			
Pt100	IEC 751/July 95	-200 °C	+850 °C
Ni100	DIN 43760/	-60 °C	+220 °C
mV-source		-0.2 V	+2 V
(voltage-linear or freely linearisable)			
Thermocouples			
K	IEC 584-1/Oct. 96	-100 °C	+1300 °C
T	IEC 584-1/Oct. 96	-200 °C	+400 °C
E	IEC 584-1/Oct. 96	-100 °C	+1000 °C
J	IEC 584-1/Oct. 96	-200 °C	+1200 °C
N	IEC 584-1/Oct. 96	-100 °C	+1300 °C
R	IEC 584-1/Oct. 96	0 °C	+1600 °C
S	IEC 584-1/Oct. 96	-22 °C	+1600 °C
L	DIN 43710	-200 °C	+900 °C
B	IEC 584-1/Oct. 96	+100 °C	+1800 °C

Software functions:
Adjustable by the **PACT***ware*™ Human Machine Interface.
- TAG numbers, 28 alphanumeric signs, can be stored in device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - Input for resistance type sensor: °C, °F, K, ohm, none
  - Input for thermocouple, mV source: °C, °F, K, mV, none
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- 4 limit values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower alarm level limit
  - Lower warn level limit
  - Hysteresis adjustable
- Lower scale value and upper scale value of the measurement range
  - For the determination of the overflow and underflow range
  - For the configuration of the analogue monitor of the Human Machine Interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Hold last value
- Simulation
  - Of the input value
  - Of the device diagnosis
  - Of the process channel diagnosis

Accessories
Cold junction compensation K-CJC-GN for thermocouples, pluggable

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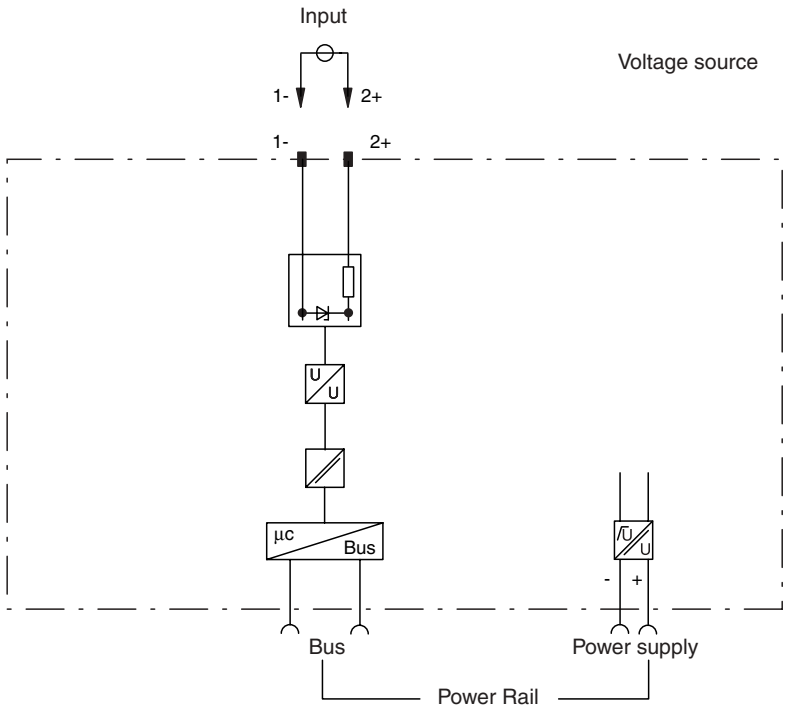
- 1-channel
- 4 limit values
- Power Rail bus
- EMC acc. to NAMUR NE 21
- Connection of low resistant sources

KSD2-MVI

Function

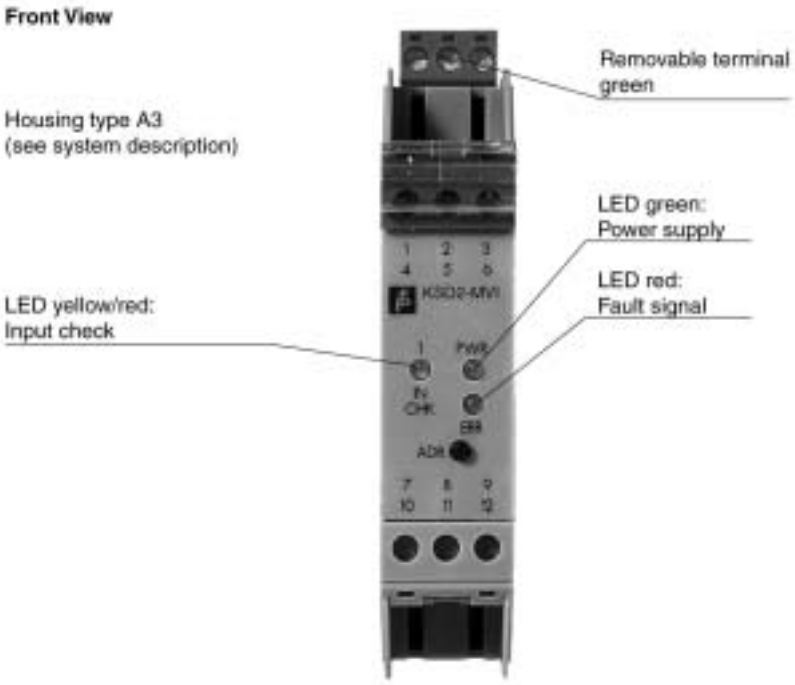
The KSD2-MVI is suitable for the connection of analogue input signals with a voltage range 0 mV ... 50 mV.
The measurement value is transferred in digital form to the control system or to the memory programmable control system.
The 4 limit values can also be set with the PC-programming software.

Electrical Connection



Composition

Front View



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Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	< 1 W
Input	
Connection	terminals 2, 1
Input signal	0 ... 50 mV
Input resistance	1 kΩ ... 2 kΩ
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Deviation	0.5 % input signal range at 20 °C (293 K)
Temperature	0.05 %/K of input signal range
Electrical isolation	
Input/Power supply, internal bus	basic insulation according to DIN EN 50178, rated insulation voltage 300 V_{eff}
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Application

- Converter for analogue input voltages

Notes

Software functions:
Adjustable by the PACT*ware* Human Machine Interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface"
- 4 limit values
  - Upper alarm level limit
  - Upper warn level limit
  - Lower alarm level limit
  - Lower warn level limit
  - Hysteresis adjustable
- Lower scale value and upper scale value of the measurement range
  - for the determination the overflow and underflow range
  - for the configuration of the analogue monitor of the Human Machine Interface
- Overrange and underrange alarm
- Malfunction output status
  - User definded
  - Min.
  - Max.
  - Hold last value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

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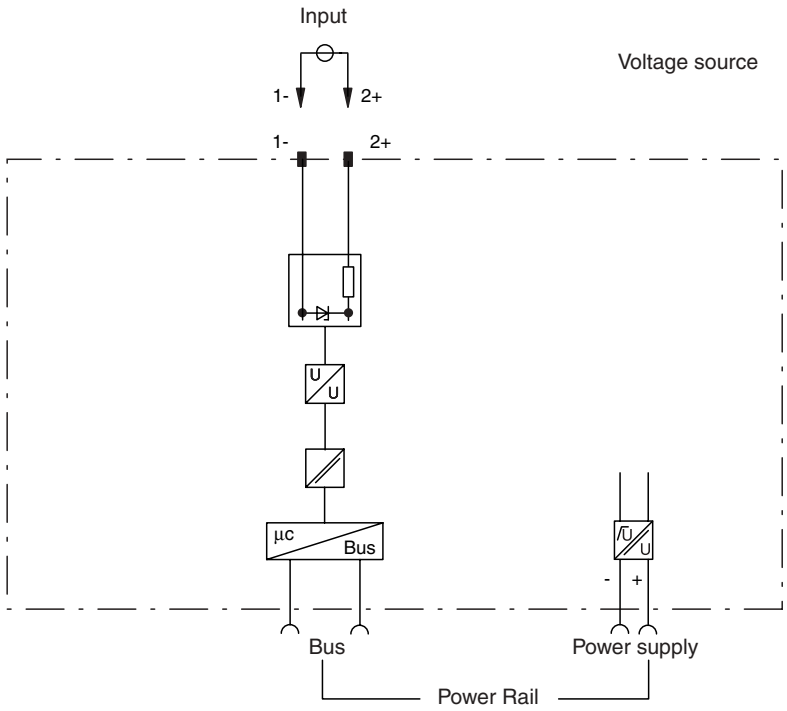
- 1-channel
- 24 V DC nominal supply voltage
- Lead monitoring
- 4 limit values
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-VI

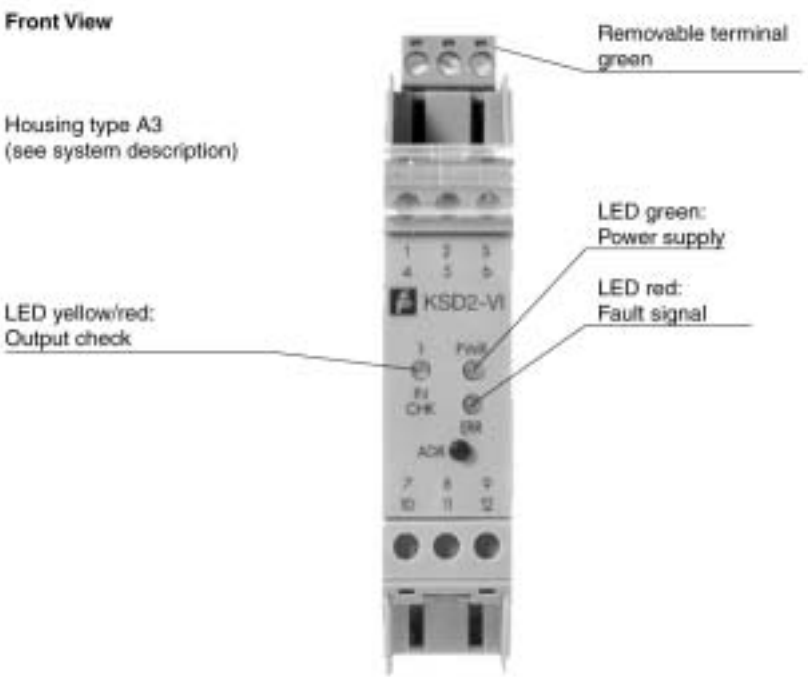
Function

The KSD2-VI is suitable for connecting analog input signals with a voltage range 0/2 V ... 10 V.
The measurement value is transferred in digital form to the control system or to the memory programmable control system.
Lead monitoring can be turned off with the PC-programming software.
The 4 limit values can also be set with the PC-programming software.

Electrical Connection



Composition



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Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	< 1 W
Input	
Connection	terminals 2, 1
Lead monitoring	Load U < 0,025 V; Short-circuit U < 0.025 V
Input signal	0 ... 10 V or 2 ... 10 V
Input resistance	≥ 100 kΩ
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Transfer characteristics	
Deviation	0.5 % input signal range at 20 °C (293 K)
Temperature	0.01 %/K of the input signal range
Electrical isolation	
Input/Power supply, internal bus	basic insulation according to DIN EN 50178, rated insulation voltage 300 V_{eff}
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Application

- Converter for analogue input voltages

Notes

Software functions

Can be set with the control display **PACT***ware*™.

- Selection switch markings (TAG-No.), 28 alphanumeric markings, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical characteristics are adjustable
  - List see "System Description Remote Process Interface"
- Lead monitoring selectable
- 4 limit values
  - Upper alarm limit
  - Upper warning limit
  - Lower alarm limit
  - Lower warning limit
  - Adjustable hysteresis
- Start value and end value of the measurement range
  - to determine the overflow and underflow range
  - for configuring analogue value display in the graphical user interface
- Signalling of having exceeded or fallen short of the measurement range.
- Determining the behaviour in the case of an error
  - Signal value optional
  - Start value of the measurement range
  - End value of the measurement range
  - Maintenance of the last accepted measurement value
- Simulation
  - of the output value
  - of the device diagnosis
  - of the process channel diagnosis

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- 1-channel
- Output EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- 4 limit values
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CO-Ex

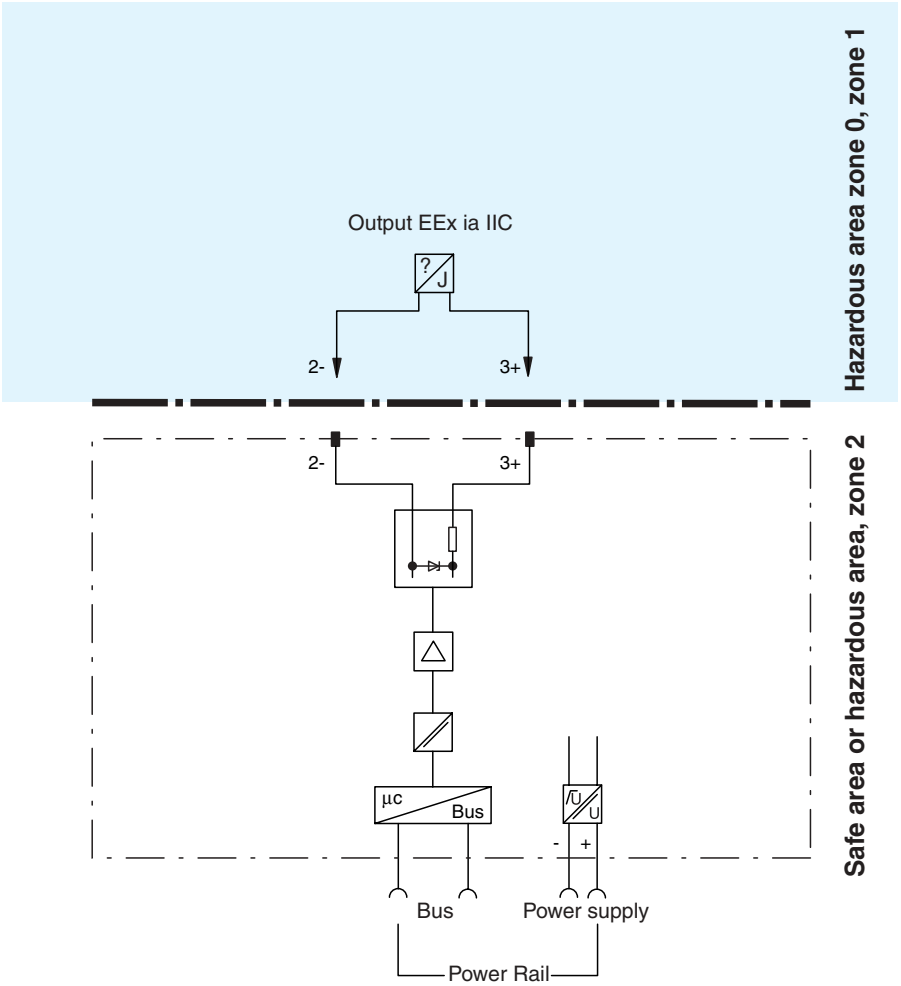
Function

The KSD2-CO-Ex transmits a 0/4 mA ... 20 mA current signal to the hazardous area. Loads between 30 Ohms ... 750 Ohms can be connected.
The output is galvanically isolated from the bus and power supply.
The output field circuit is monitored for lead breakage and short circuit conditions.

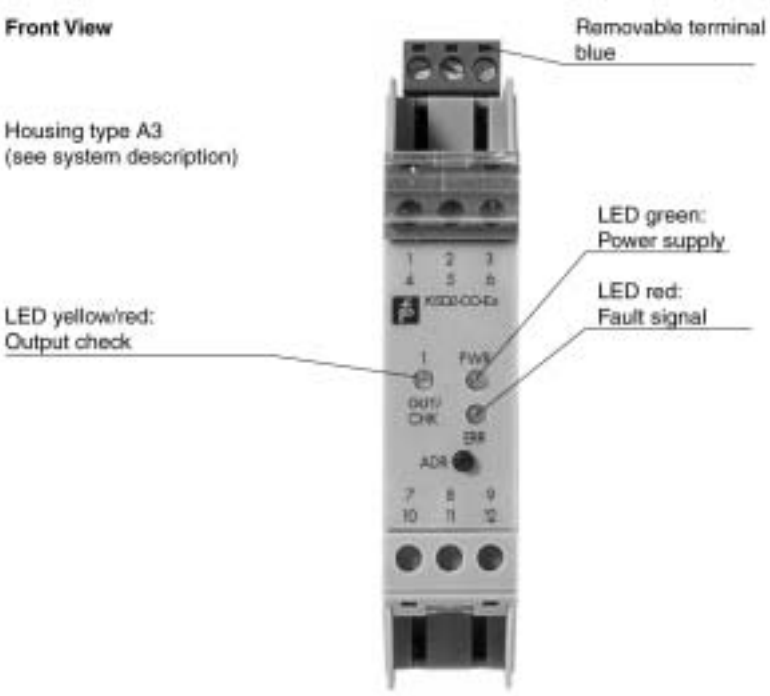
Application

The control of pneumatic positioners (I/P-converter) and intrinsically safe solenoid valves.

Electrical Connection



Composition



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Supply				
Connection		Power Rail		
Rated voltage		20 ... 30 V		
Ripple		< 10 %		
Power consumption		1.3 W		
Input				
Connection		Power Rail		
Interface		CAN protocol via Power Rail bus		
Output				
Connection		terminals 2, 3		
Current		0/4 ... 20 mA		
Load		30 ... 750 Ω		
Residual ripple		≤ 0.25 %		
Lead monitoring		possible for $I_{nominal} \geq 1$ mA breakage, load > 820 Ohm; short-circuit, load < 30 Ohm		
Transfer characteristics				
Deviation		0.1 % of output signal range at 20 °C (293 K)		
Temperature		0.01 % / K of output signal range		
Electrical isolation				
Output/Power supply, internal bus		safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Directive conformity				
Electromagnetic compatibility		standards		
Directive 89/336/EG		EN 61326, EN 50081-2, NE21		
Ambient conditions				
Ambient temperature		-20 ... 60 °C (253 ... 333 K)		
Mechanical specifications				
Protection degree		IP20		
Mass		approx. 100 g		
Data for application in conjunction with hazardous areas				
EC-Type Examination Certificate		ZELM 99 ATEX 0013 ; for additional certificates see www.pepperl-fuchs.com		
Group, category, type of protection		⟨Ex⟩ II (1) G [EEx ia] IIC		
Voltage	U_0	24.2 V		
Current	I_0	91 mA		
Power	P_0	547 mW (linear characteristic)		
Group, category, type of protection, Temperature classification		⟨Ex⟩ II 3 G EEx nA II T4		
Electrical isolation				
Output/Power supply, internal bus		safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Directive conformity		standards		
Directive 94/9 EU		EN 50014, EN 50020, EN 50021		
Entity parameter				
Certification number		J.I.0D2A4.AX		
FM control drawing		No. 116-0150		
Suitable for installation in division 2		yes		
Connection		terminals 2, 3		
Input I				
Voltage V_{OC}		24.8 V		
Current	I_t	92 mA		
Explosion group		A&B	C&E	D, F&G
Max. external capacitance C_a		0.19 µF	0.57 µF	1.54 µF
Max. external inductance L_a		4.3 mH	17.2 mH	35.2 mH
Safety parameter				
CSA control drawing		LR 36087-18		
Control drawing		No. 116-0149		
Connection		terminals 2, 3		
Input I				
Safety parameter		24.2 V / 270 Ohm		
Voltage V_{OC}		24.2 V		
Current	I_{SC}	91 mA		
Explosion group		A&B	C&E	D, F&G
Max. external capacitance C_a		0.2 µF	0.6 µF	1.6 µF
Max. external inductance L_a		4 mH	16.2 mH	32 mH

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Date of issue 2003-07-29

Notes

Software functions:

Adjustable by the **PACT***ware***™** human machine interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface".
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the human machine interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Hold last value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

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- 1-channel
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- 4 limit values
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CO

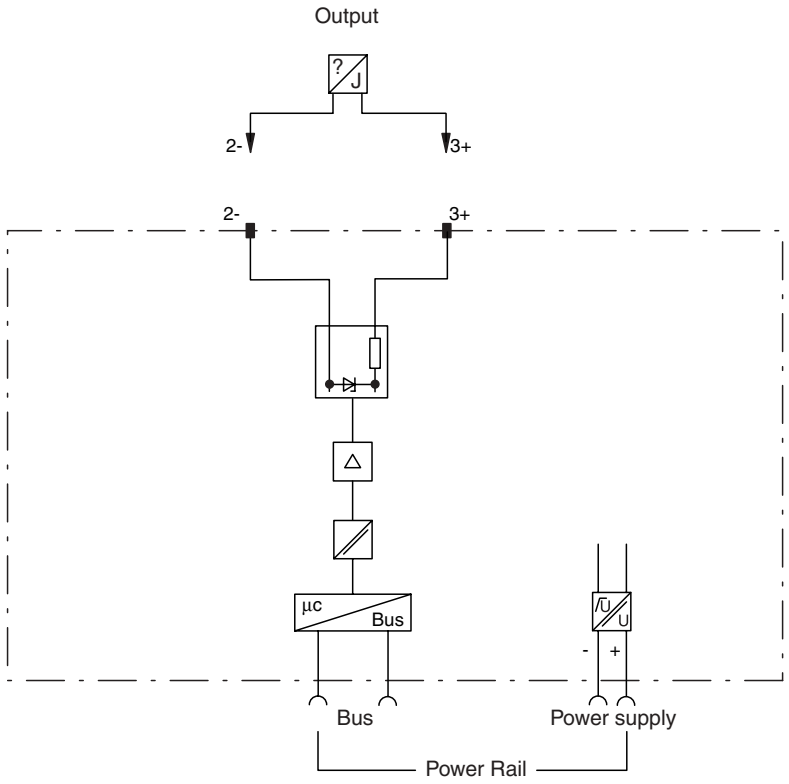
Function

The KSD2-CO transmits a 0/4 mA ... 20 mA current signal. Loads between 30 Ohms ... 750 Ohms can be connected. The output is galvanically isolated from the bus and power supply. The output field circuit is monitored for lead breakage and short circuit conditions.

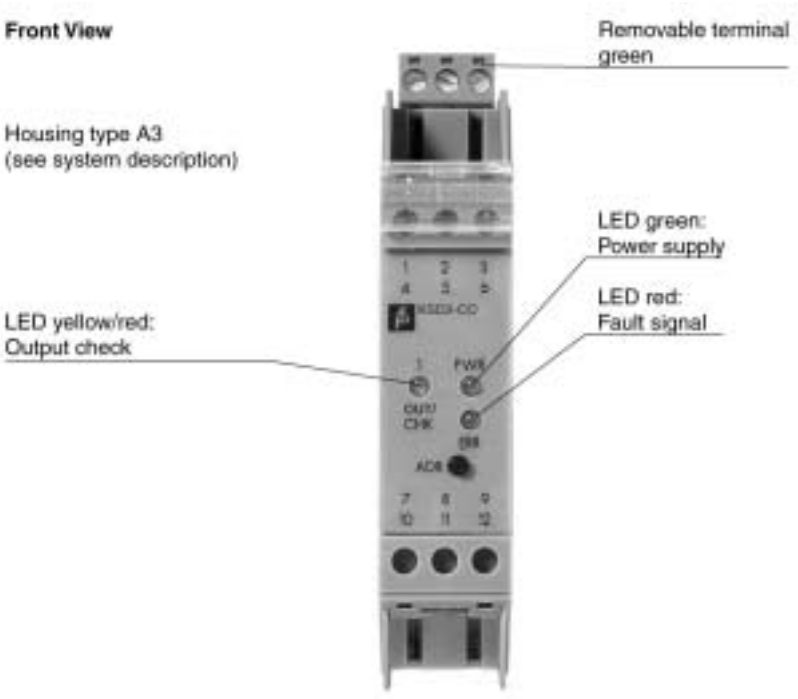
Application

The control of pneumatic positioners (I/P converters) and solenoid drivers.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	1.3 W
Input	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Output	
Connection	terminals 2, 3
Current	0/4 ... 20 mA
Load	30 ... 750 Ω
Residual ripple	≤ 0.25 %
Lead monitoring	possible for $I_{nominal} \geq 1$ mA breakage I < 3.6 mA; short-circuit, load < 30 Ohm
Transfer characteristics	
Deviation	0.1 % of output signal range at 20 °C (293;K)
Temperature	0.01 % / K of output signal range
Electrical isolation	
Output/Power supply, internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 300 V_{eff}
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Software functions

Adjustable by the **PACT***ware*™ Human Machine Interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface".
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the Human Machine Interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Maintenance of the last accepted measurement value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 1-channel
- Output EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- 4 limit values
- Transmission of HART signals into the hazardous area
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CO-S-Ex

Successor KSD2-CO-S-Ex.H

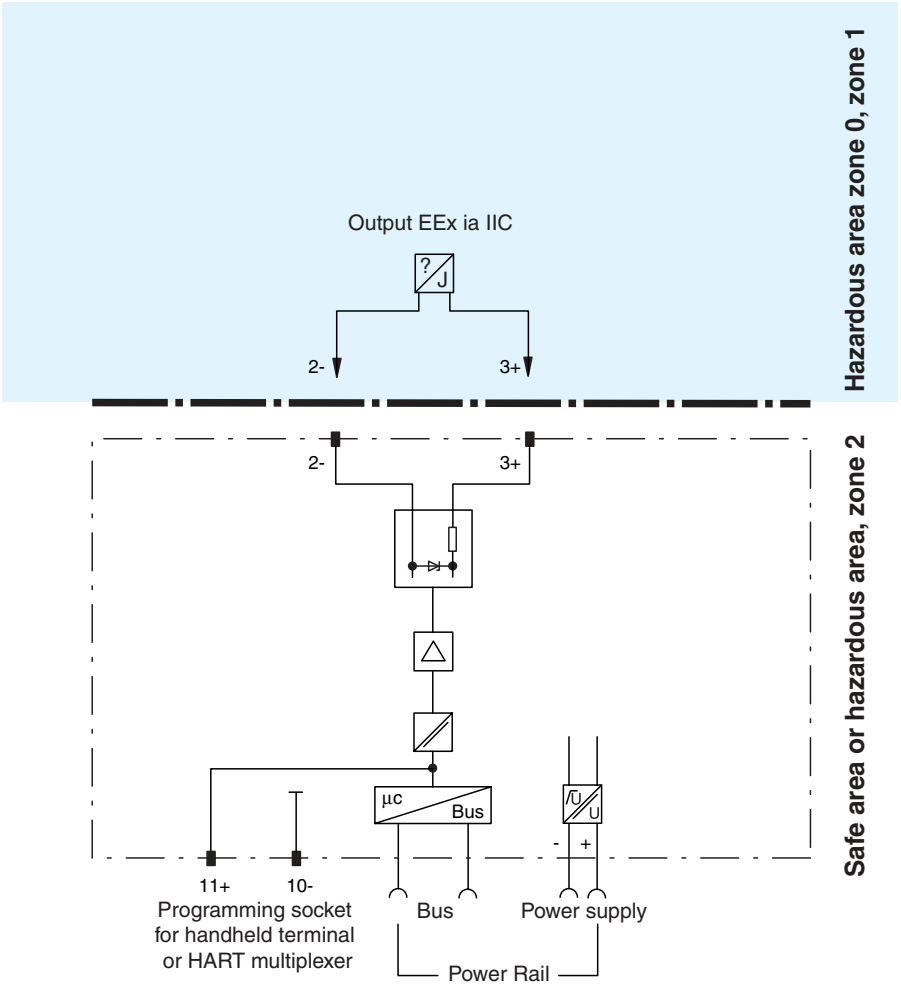
Function

The KSD2-CO-S-Ex transmits a 0/4 mA ... 20 mA current signal into the hazardous area. Loads between 30 Ohms ... 750 Ohms can be connected.
The output is galvanically isolated from the bus and power supply.
The output field circuit is monitored for lead breakage and short circuit conditions.
The device allows for monitoring and programming of positioners, which support the HART Protocol.
The KSD2-CO-S-Ex is delivered standard with the KF-STP-... device connectors. The 2.3 mm jacks are integrated in this connector for use with HART Communicators. The KFD2-HMM-16 or KFD0-HMS-16 HART multiplexers can be connected to terminals 11+ and 10-.

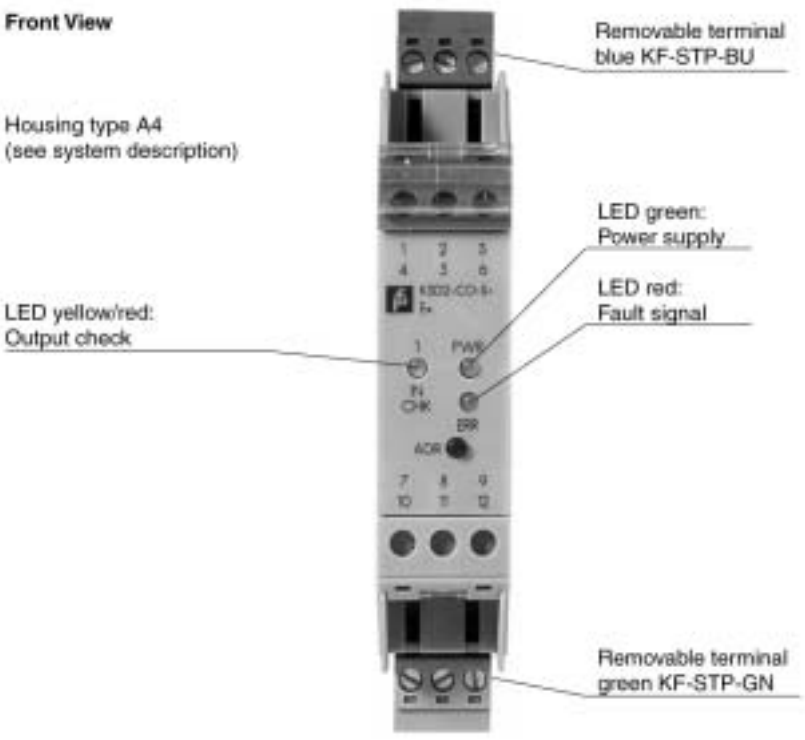
Application

The control of intrinsically safe solenoid valves and positioners. The interface allows a bidirectional communication between the position controler and a handheld terminal or a HART multiplexer.
These devices can be connected in the safe area. The bus transfers the digital control signal exclusively.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply				
Connection		Power Rail		
Rated voltage		20 ... 30 V		
Ripple		< 10 %		
Power consumption		1.3 W		
Input				
Connection		Power Rail		
Interface		CAN protocol via Power Rail bus		
Output				
Connection		terminals 2, 3		
Current		0/4 ... 20 mA		
Load		30 ... 750 Ω		
Residual ripple		≤ 0.25 %		
Lead monitoring		possible for $I_{nominal}$ ≥ 1 mA breakage I < 3.6 mA; short-circuit, load < 30 Ohm		
Transfer characteristics				
Deviation		0.1 % of output signal range at 20 °C (293;K)		
Temperature		0.01 % / K of output signal range		
Electrical isolation				
Output/Power supply, internal bus		safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Directive conformity				
Electromagnetic compatibility		standards		
Directive 89/336/EG		EN 61326, EN 50081-2, NE21		
Ambient conditions				
Ambient temperature		-20 ... 60 °C (253 ... 333 K)		
Mechanical specifications				
Protection degree		IP20		
Mass		approx. 100 g		
Data for application in conjunction with hazardous areas				
EC-Type Examination Certificate		ZELM 99 ATEX 0013 ; for additional certificates see www.pepperl-fuchs.com		
Group, category, type of protection		⟨Ex⟩ II (1) G [EEx ia] IIC		
Voltage	U_0	24.2 V		
Current	I_0	91 mA		
Power	P_0	547 mW (linear characteristic)		
Group, category, type of protection, Temperature classification		⟨Ex⟩ II 3 G EEx nA II T4		
Electrical isolation				
Output/Power supply, internal bus		safe electrical isolation acc. to EN 50020, voltage peak value 375 V		
Directive conformity		standards		
Directive 94/9 EU		EN 50014, EN 50020, EN 50021		
Entity parameter				
Certification number		J.I.0D2A4.AX		
FM control drawing		No. 116-0150		
Suitable for installation in division 2		yes		
Connection		terminals 2, 3		
Input I				
Voltage V_{OC}		24.8 V		
Current	I_t	92 mA		
Explosion group		A&B	C&E	D, F&G
Max. external capacitance C_a		0.19 µF	0.57 µF	1.54 µF
Max. external inductance L_a		4.3 mH	17.2 mH	35.2 mH
Safety parameter				
CSA control drawing		LR 36087-18		
Control drawing		No. 116-0149		
Connection		terminals 2, 3		
Input I				
Safety parameter		24.2 V / 270 Ohm		
Voltage V_{OC}		24.2 V		
Current	I_{SC}	91 mA		
Explosion group		A&B	C&E	D, F&G
Max. external capacitance C_a		0.2 µF	0.6 µF	1.6 µF
Max. external inductance L_a		4 mH	16.2 mH	32 mH

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Date of issue 2003-07-29

Notes

Software functions:

Adjustable by the **PACT***ware***™** human machine interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface".
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the human machine interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Hold last value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

Date of issue 2003-07-29

- 1-channel
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- 4 limit values
- Transfer of HART signals via the Power Rail bus or from handheld terminal
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CO-S

Successor KSD2-CO-S-H

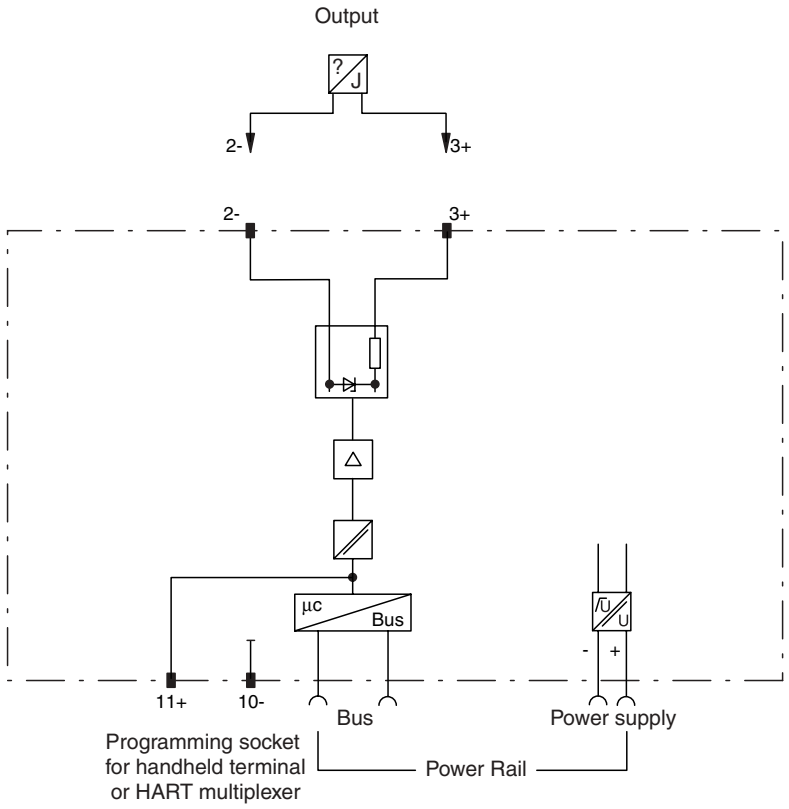
Function

Der KSD2-CO-S transmits a 0/4 mA ... 20 mA current signal. Loads between 30 Ohms ... 750 Ohms can be connected. The output is galvanically isolated from the bus and power supply. The output field circuit is monitored for lead breakage and short circuit conditions. The device allows for monitoring and programming of positioners, which support the HART Protocol.
The KSD2-CO-S is delivered standard with the KF-STP-GN device connectors. The 2.3 mm jacks are integrated in this connector for use with HART Communicators. The KFD2-HMM-16 or KFD0-HMS-16 HART multiplexers can be connected to terminals 11+ and 10-.

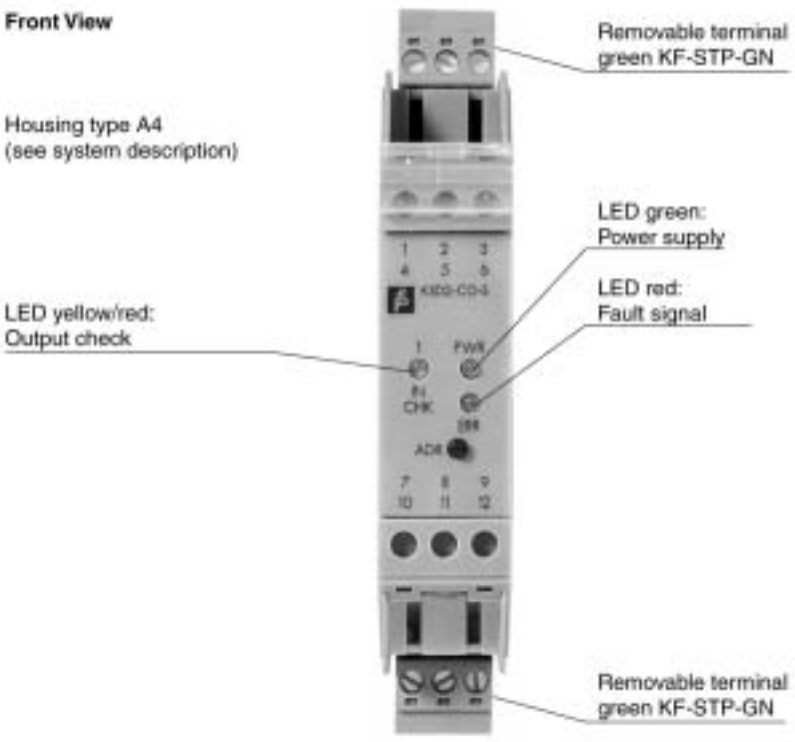
Application

The control of solenoid drivers and positioners. The interface allows a bidirectional communication between the position controler and a handheld terminal or a HART- multiplexer. The Bus transfers the digital control signal exclusively.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	1.3 W
Input	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Output	
Connection	terminals 2, 3
Current	0/4 ... 20 mA
Load	30 ... 750 Ω
Residual ripple	≤ 0.25 %
Lead monitoring	possible for $I_{nominal} \geq 1$ mA breakage I < 3.6 mA; short-circuit, load < 30 Ohm
Transfer characteristics	
Deviation	0.1 % of output signal range at 20 °C (293;K)
Temperature	0.01 % / K of output signal range
Electrical isolation	
Output/Power supply, internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 300 V_{eff}
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Software functions

Adjustable by the **PACT***ware*™ Human Machine Interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface".
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the Human Machine Interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Maintenance of the last accepted measurement value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 1-channel
- Output EEx ia IIC
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Transfer of HART signals from the Power Rail bus or handheld terminal to the hazardous area
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CO-S-Ex.H

replaces type KSD2-CO-S-Ex

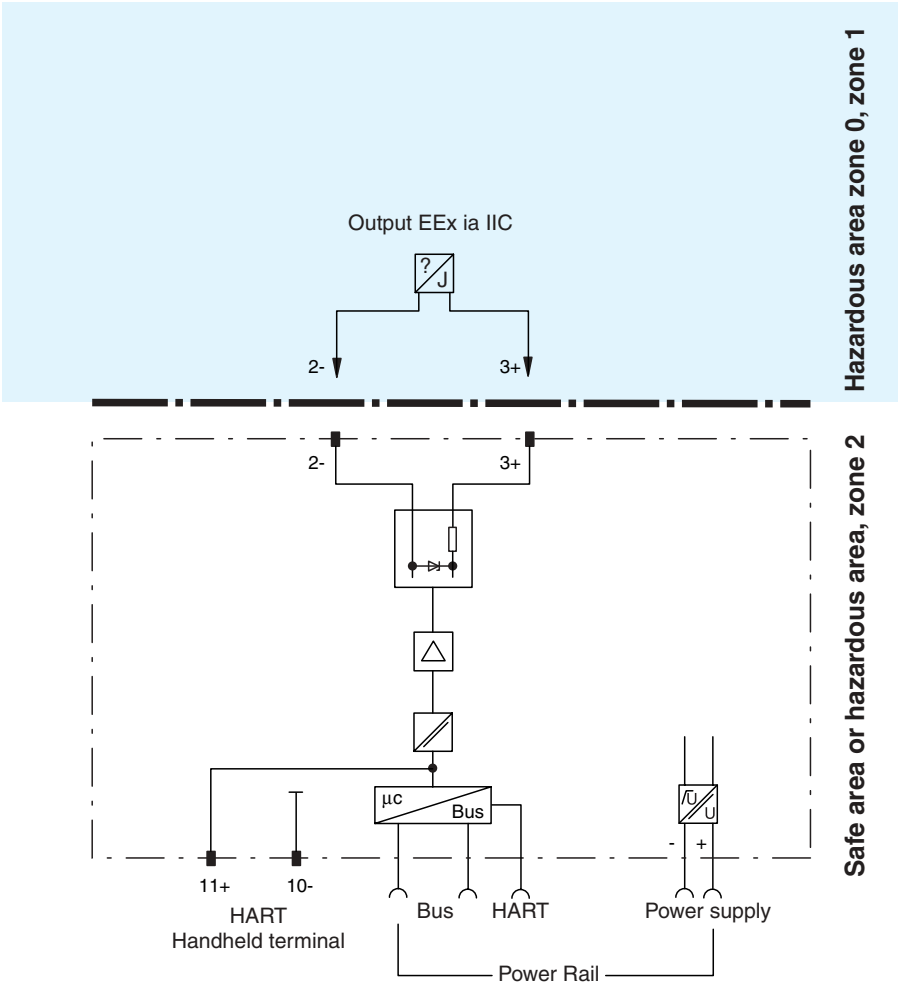
Function

The KSD2-CO-S-Ex.H transfers a 0/4 mA ... 20 mA current signal into the hazardous area. Loads between 30 Ohms ... 750 Ohms can be connected. The output is galvanically isolated from the bus and power supply.
The output field circuit is monitored for lead breakage and short circuit conditions.
The device allows for monitoring and programming of positioners, which support the HART Protocol.
The KSD2-CO-S-Ex.H is delivered standard with the connectors KF-STP-... . The 2.3 mm jacks are integrated in this connector for use with HART Communicators. A handheld terminal can be connected to the terminals 11+ and 10- . The device supports also the HART communication via the Power Rail bus.

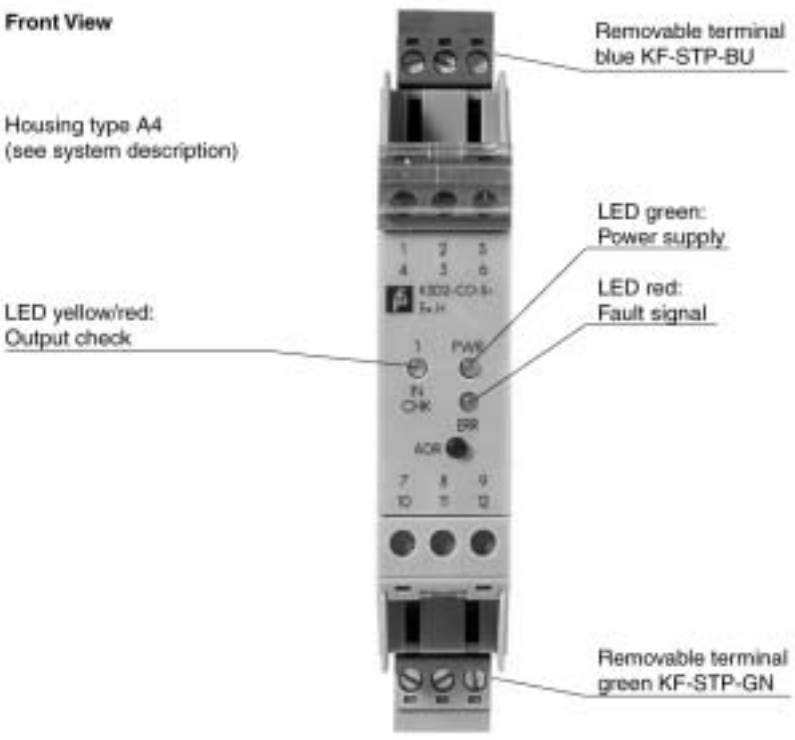
Application

The control of intrinsically safe solenoid valves and positioners. The interface allows a bidirectional communication between the position controler and the handheld terminal. The device can be connected in the safe area. The bus transfers the digital value of the control signal to the HART communication.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V
Ripple	< 10 %
Power consumption	1.3 W
Input	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Output	
Connection	terminals 2, 3
Current	0/4 ... 20 mA
Load	30 ... 750 Ω
Residual ripple	≤ 0.25 %
Lead monitoring	possible for $I_{nominal} \geq 1$ mA breakage I < 3.6 mA; short-circuit, load < 30 Ohm
Transfer characteristics	
Deviation	0.1 % of output signal range at 20 °C (293;K)
Temperature	0.01 % / K of output signal range
Electrical isolation	
Output/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Standard conformity	
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
EC-Type Examination Certificate	ZELM 99 ATEX 0013 ; for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	⟨Ex⟩ II (1) G [EEx ia] IIC
Voltage U_0	24.2 V
Current I_0	91 mA
Power P_0	547 mW (linear characteristic)
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Electrical isolation	
Output/Power supply, internal bus	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Directive conformity	standards
Directive 94/9 EU	EN 50014, EN 50020, EN 50021

Supplementary information

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Notes

Software functions:

Adjustable by the **PACT***ware*™ human machine interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface".
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the human machine interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Hold last value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

Date of issue 2003-07-29

- 1-channel
- 24 V DC rated operational voltage
- Lead breakage (LB) monitoring and short-circuit (SC) monitoring
- Transfer of HART signals via the Power Rail bus or from handheld terminal
- Power Rail bus
- EMC acc. to NAMUR NE 21

KSD2-CO-S-H

replaces type KSD2-CO-S

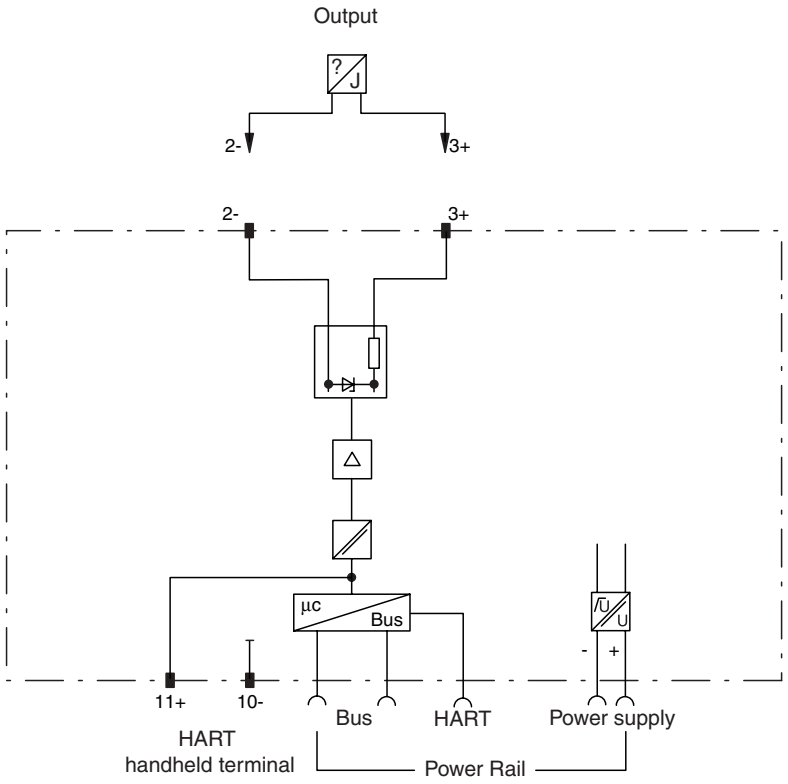
Function

The KSD2-CO-S-H transfers a 0/4 mA ... 20 mA current signal. Loads between 30 Ohms ... 750 Ohms can be connected. The output is galvanically isolated from the bus and power supply. The output field circuit is monitored for lead breakage and short circuit conditions. The device allows for monitoring and programming of positioners, which support the HART Protocol.
The KSD2-CO-S-H is delivered with the connectors KF-STP-GN. The 2.3 mm jacks are integrated in this connector for use with HART Communicators. A handheld terminal can be connected to the terminals 11+ and 10- .. The device supports additionally the HART communication via the Power Rail bus.

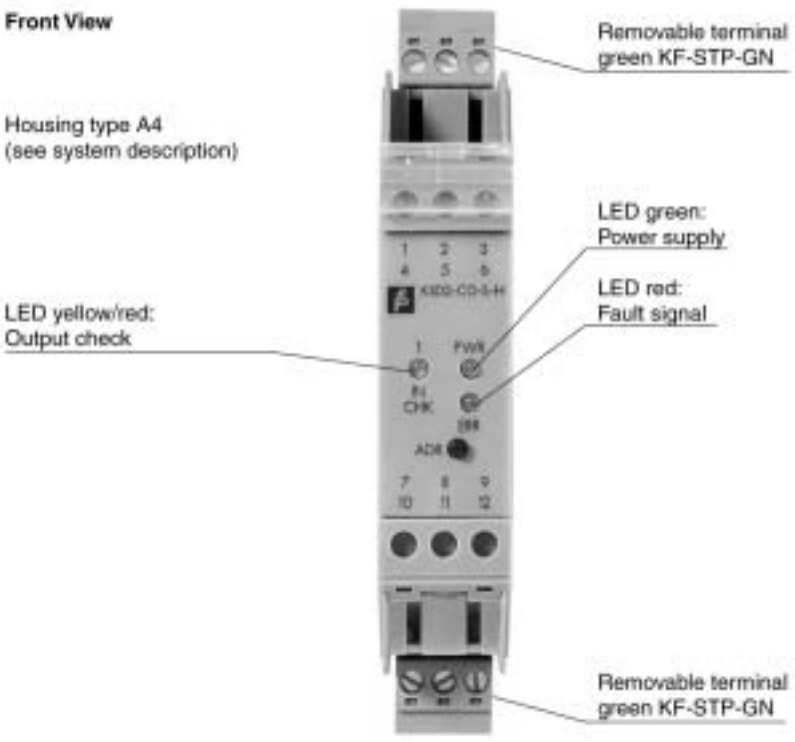
Application

The control of solenoid drivers and positioners. The interface allows a bidirectional communication between the position controler and the handheld terminal. The bus transfers the digital value of the control current and the HART communication.

Electrical Connection



Composition



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	1.3 W
Input	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Output	
Connection	terminals 2, 3
Current	0/4 ... 20 mA
Load	30 ... 750 Ω
Residual ripple	≤ 0.25 %
Lead monitoring	possible for $I_{nominal} \geq 1$ mA breakage I < 3.6 mA; short-circuit, load < 30 Ohm
Transfer characteristics	
Deviation	0.1 % of output signal range at 20 °C (293;K)
Temperature	0.01 % / K of output signal range
Electrical isolation	
Output/Power supply, internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 300 V_{eff}
Standard conformity	
Climatic conditions	acc. to DIN IEC 721
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Software functions

Adjustable by the **PACT***ware*™ Human Machine Interface.

- Tag numbers, 28 alphanumeric characters, can be programmed into device
- Commentary, may be saved in PC memory
- Information on devices may be saved in PC memory
- Physical units are adjustable
  - List see "System Description Remote Process Interface".
- Lead monitoring selectable
- Separate detection and indication of lead breakage and lead short circuit
- Lower scale value and upper scale value of the measurement range
  - for the determination of the overflow and underflow range
  - for the configuration of the analogue monitor of the Human Machine Interface
- Overrange and underrange alarm
- Malfunction output status
  - User defined
  - Min.
  - Max.
  - Maintenance of the last accepted measurement value
- Simulation
  - of the input value
  - of the device diagnosis
  - of the process channel diagnosis

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- Connects the Remote Process Interface to the control system/PLC/PC via PROFIBUS
- Couples the internal CAN bus to the external PROFIBUS
- Device installation permissible in zone 2
- Master function for the internal CAN bus
- External bus: PROFIBUS DP
- External baud rate up to 1.5 MBd
- Separate RS 232 connection on front side for system configuration, also directed to terminals for creating a subordinate monitoring system
- 24 V DC rated operational voltage
- Redundant gateway possible
- EMC acc. to NAMUR NE 21

KSD2-GW-PRO

Successor KSD2-GW2-PRO

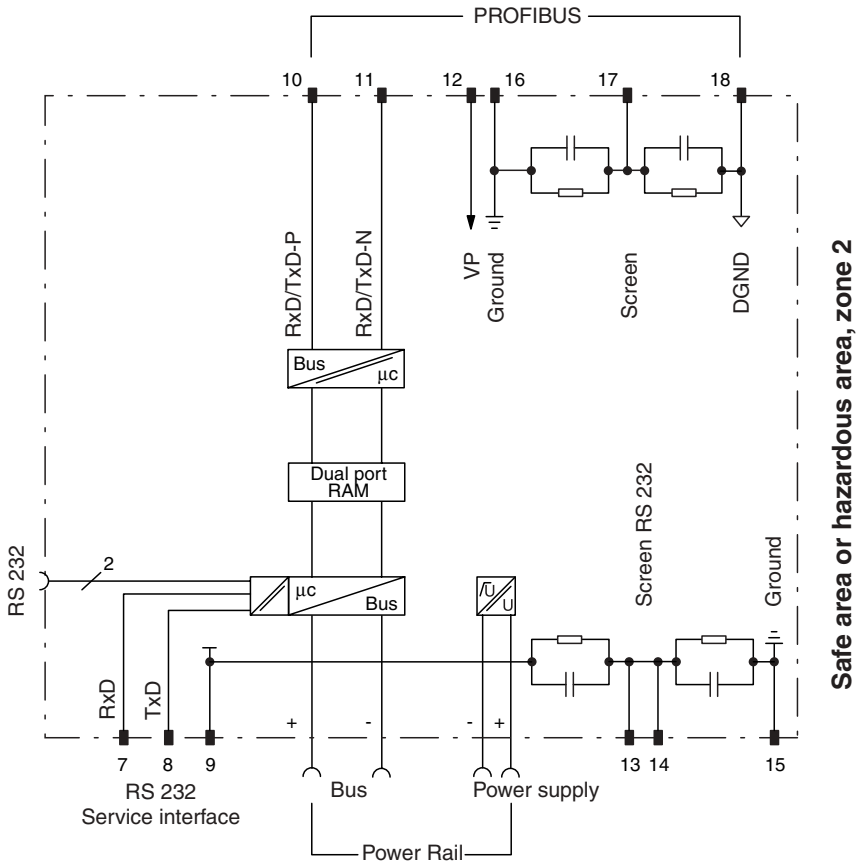
Function

The KSD2-GW-PRO translates the protocols of the internal CAN Bus into the PROFIBUS DP protocols of the external bus system and vice versa. Up to 125 devices can be connected to a gateway via the Power Rail.

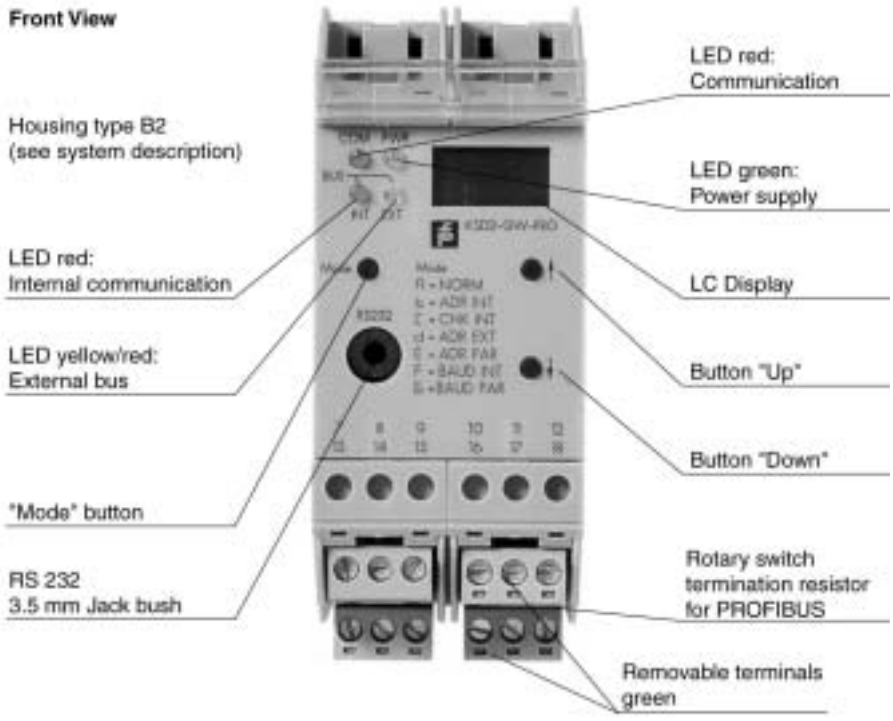
Application

Connection of the RPI with the control system/PLC/PC via PROFIBUS. Configuration interface for the RPI devices.

Electrical Connection



Composition



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Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	2.8 W
Internal bus	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus with up to 125 units
Cycle time	1 device 25 ms 125 devices with discrete input 60 ms 125 devices with discrete output 90 ms 125 devices with analogue input 75 ms 125 devices with analogue output 110 ms
External bus	
Connection	terminals 10, 11, 12; 16, 17, 18
Interface	PROFIBUS acc. to DIN EN 50170/2
Service interface	
Connection	terminals 7, 8, 9 and jack bush
Interface	RS 232
Redundancy	
Option	through the use of a second gateway
Electrical isolation	
Internal/External bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Internal bus/Power supply	not available
External bus/Power supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/external bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021
Entity parameter	
Certification number	3000845
FM control drawing	No. 116-0150
Suitable for installation in division 2	yes
Safety parameter	
CSA control drawing	LR 36087-21
Control drawing	No. 116-0149

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Operation

The configuration, parameterisation, addressing, operation and fault detection are performed by PC and human machine interface via RS 232-interface (see RPI system manual). Limited operation without a PC is possible with the control elements of the gateway and the devices.

Operating components

Jacks for the connection of a PC across K-ADP2 adapter for the configuration and parameterisation of the system. The PC may alternatively be connected to the plug-in screw terminals 7, 8, 9 in case, e. g. that a PC-based separate monitor level is to be installed. The jack on the front panel and the screw terminals 7, 8, 9 may not be used simultaneously.

Date of issue 2003-07-29

- Connects the Remote Process Interface to the control system/PLC/PC via PROFIBUS
- Couples the internal CAN bus to the external PROFIBUS
- Device installation permissible in zone 2
- Master function for the internal CAN bus
- External bus: PROFIBUS DP
- External baud rate up to 1.5 MBd
- Separate service connection independent from the DCS or PLC through RS 485 interface in addition to PROFIBUS connection.
- 24 V DC rated operational voltage
- Redundant gateway possible
- EMC acc. to NAMUR NE 21

KSD2-GW-PRO.485

Successor KSD2-GW2-PRO

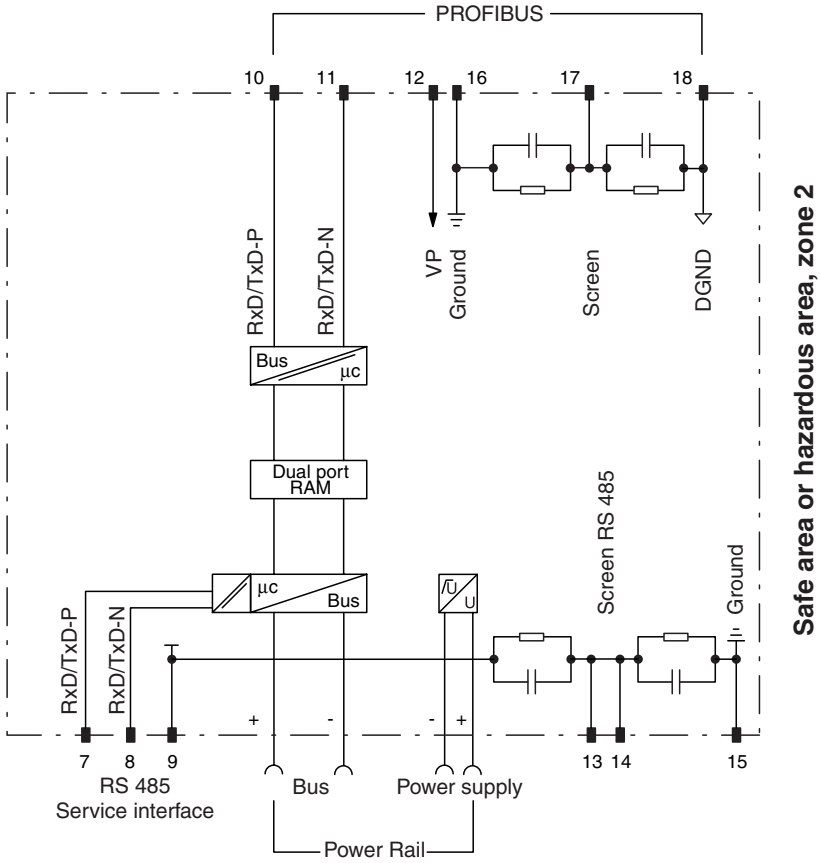
Function

The KSD2-GW-PRO.485 translates the protocols of the internal CAN bus into the PROFIBUS DP protocols of the external bus system and vice versa. Up to 125 devices can be connected to a gateway via the Power Rail.
The gateways of multiple RPI segments can be continuously networked with one of the control system's or PLC's independent service levels over the RS 485 program interface in addition to the PROFIBUS connection. The operator has access independent of the control system, to the configuration data and parameters of all connected gateways and RPI devices by means of a PC and the RPI control display.

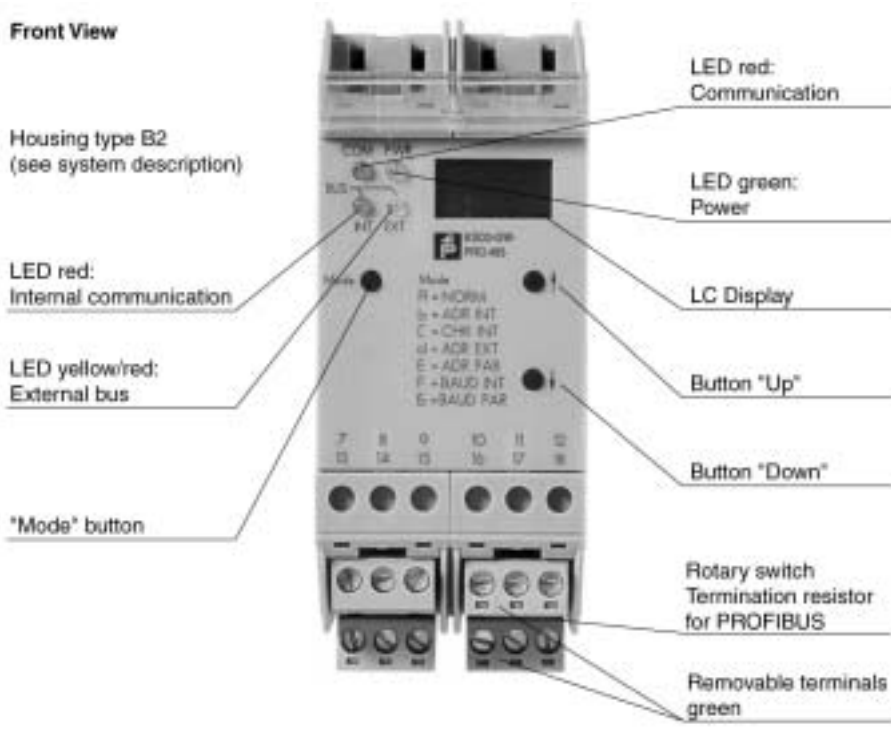
Application

Connection of the RPI with the control system/PLC/PC via PROFIBUS.
Configuration interface for the RPI devices.

Electrical Connection



Composition



Date of issue 2003-07-29

Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	2.8 W
Internal bus	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus with up to 125 units
Cycle time	1 device 25 ms 125 devices with discrete input 60 ms 125 devices with discrete output 90 ms 125 devices with analogue input 75 ms 125 devices with analogue output 110 ms
External bus	
Connection	terminals 10, 11, 12; 16, 17, 18
Interface	PROFIBUS acc. to DIN EN 50170/2
Service interface	
Connection	terminals 7, 8, 9
Interface	RS 485
Redundancy	
Option	through the use of a second gateway
Electrical isolation	
Internal/External bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Internal bus/Power supply	not available
External bus/Power supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/external bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	Ⓔx II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021
Entity parameter	
Certification number	3000845
FM control drawing	No. 116-0150
Suitable for installation in division 2	yes
Safety parameter	
CSA control drawing	LR 36087-21
Control drawing	No. 116-0149

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Operation

The configuration, parameterisation, addressing, operation and fault detection are performed by PC and human machine interface via RS 485 interface (see RPI system manual). Limited operation without a PC is possible with the control elements of the gateway and the devices.

Operating components

Connection of a PC for the configuration and parameterisation of the system via K-ADP4 adapter to the plug-in screw terminals 7, 8, 9.

Date of issue 2003-07-29

- Connects the Remote Process Interface by means of PROFIBUS with DCS/PLC/PC
- External Baudrate up to 1.5 MBd
- Installation permissible in zone 2
- Supports acyclic tasks in acc. with PROFIBUS DP V1
- So configuration and parameterisation by means of PROFIBUS possible
- Configuration and parameterisation by means of FDT-conforming control display for use with RPI-DTM, e. g. **PACT***ware*
- Integrated HART-Multiplexer
- HART communication by means of PROFIBUS DP V1 or integrated RS 485-interface
- Compatible to **PACT***ware*, AMS a. o.
- DC 24 V supply voltage
- Gateway redundancy possible
- EMC acc. to NAMUR NE 21
- 24 V DC rated operational voltage

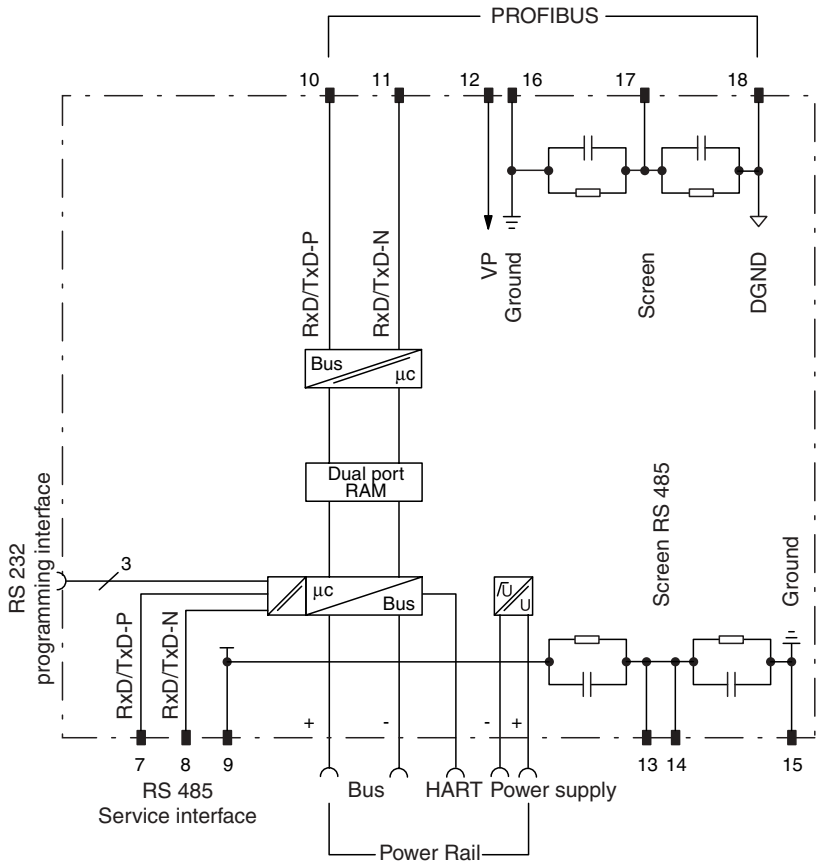
KSD2-GW2-PRO

replaces models
KSD2-GW-PRO,
KSD2-GW-PRO.B,
KSD2-GW-PRO.485,
KSD2-GW-PRO.485B

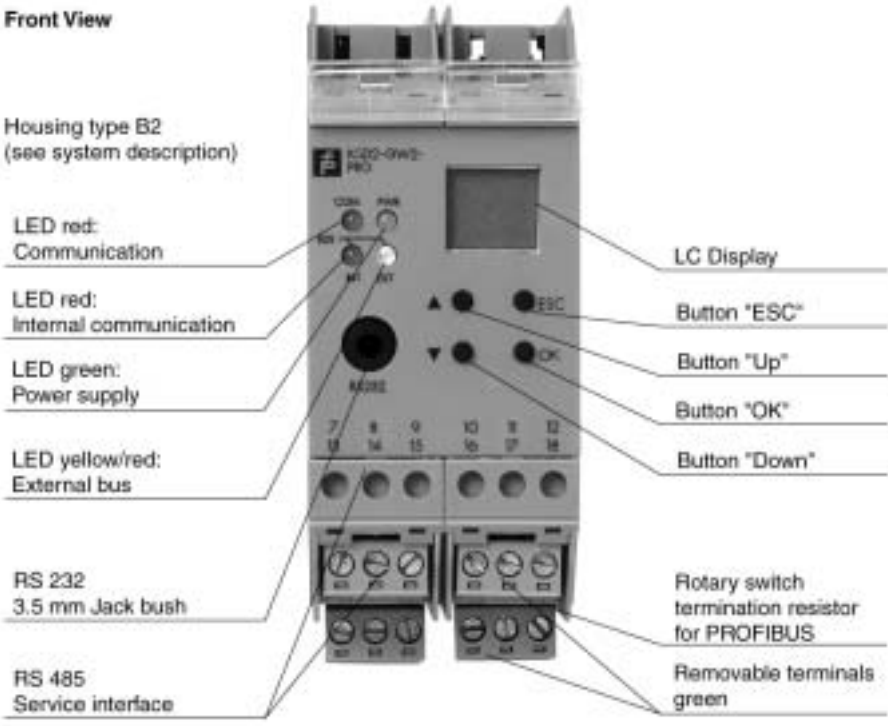
Application

Connection of the RPI with the control system/PLC/PC over PROFIBUS. Configuration interface for the RPI devices. HART communication with field devices connected to RPI devices by means of an integrated HART multiplexer system or with an external PROFIBUS DP V1.

Electrical Connection



Composition



Date of issue 2003-07-29

Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	2.8 W
Internal bus	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus with up to 125 units
Cycle time	1 device 25 ms 125 devices with discrete input 60 ms 125 devices with discrete output 90 ms 125 devices with analogue input 75 ms 125 devices with analogue output 110 ms
External bus	
Connection	terminals 10, 11, 12; 16, 17, 18
Interface	PROFIBUS acc. to EN 50 170
Service interface	
Connection	RS 422-Interface: terminals 7+, 8-, 9 screen RS 232-Interface: Ø3.5 mm jack bush
Redundancy	
Option	through the use of a second gateway
Electrical isolation	
Internal/External bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Internal bus/Power supply	not available
External bus/Power supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/external bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021
Entity parameter	
Certification number	3000845
FM control drawing	No. 116-0150
Suitable for installation in division 2	yes
Safety parameter	
CSA control drawing	LR 36087-21
Control drawing	No. 116-0149

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Date of issue 2003-07-29

Notes

Operating principle

The KSD2-GW2-PRO is the interface between the external PROFIBUS DP V1 and the RPI-internal CAN bus. As many as 125 RPI modules can be managed and connected over the Power Rail.
The configuration and parameterisation of the system can be performed either with the PROFIBUS DP V1, the RS 485 or the RS 232 service interface.
The configuration and parameterisation can be performed by any FDT-compliant user interface, for example **PACT***ware*™, as long as RPI-DTM has been integrated.
Configuration or parameterisation by means of K-SK1 is not possible.
HART telegrams are received by the Gateway through the integrated RS 485 service interface, and are forwarded on to the corresponding RPI modules (KSD2-CI-S-H, KSD2-CI-S-Ex.H, KSD2-CO-S-H and KSD2-CO-S-Ex.H). The HART multiplexers integrated for this purpose can manage as many as 250 intelligent field devices. HART communication works bidirectionally.
HART communication can also be performed by means of an FDT-compliant HART configuration software package such as **PACT***ware*™, or AMS. A prerequisite is integration of an appropriate HART DTM.

Operation

Configuration, parameterisation, address assignment, commissioning and troubleshooting are performed by PC and user interface with an RS 232 or RS 485 interface or with a PROFIBUS DP V1 (see RPI system manual). Limited operation without a PC is possible with the control elements of the Gateway and the devices.

Operating components

Socket for connecting a PC with K-ADP2 adapter for configuration and parameterisation of the system with an RS 232 interface. In addition, the PC can also be connected to plug-in screw terminals 7, 8, 9 if you want to install a separate PC-based monitoring level with the RS 485 interface. The front-side jack bush and screw terminals 7, 8, 9 can be used at the same time.

Date of issue 2003-07-29

Date of issue 2003-07-29

- Connects the Remote Process Interface to the control system/PLC/PC via Modbus
- Couples the internal CAN bus to the external Modbus
- Device installation permissible in zone 2
- Master function for the internal CAN bus
- External bus: Modbus profile RTU (Remote Terminal Unit)
- External baud rate up to 57.6 KBd
- Standard interface RS 485
- Separate RS 232 connection on front side for system configuration, also directed to terminals for creating a subordinate monitoring system
- 24 V DC rated operational voltage
- Redundant gateway possible
- EMC acc. to NAMUR NE 21

KSD2-GW-MOD

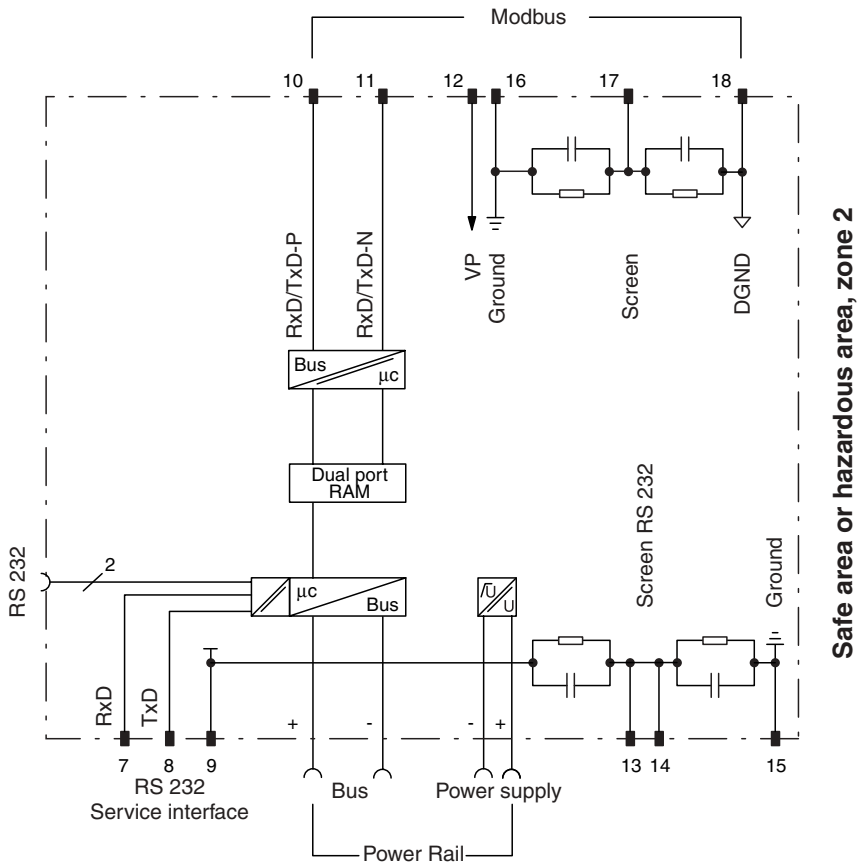
Function

The KSD2-GW-MOD translates the protocols of the internal CAN Bus into the Modbus-RTU protocols of the external bus system and vice versa. Up to 125 devices can be connected to a gateway via the Power Rail.

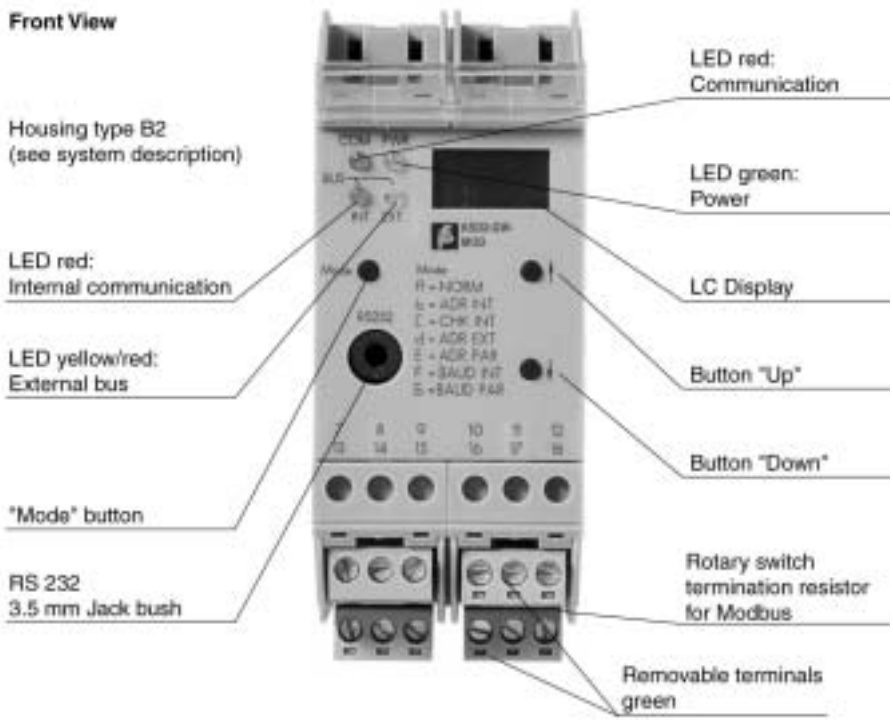
Application

Connection of the RPI with the control system/PLC/PC via Modbus.
Configuration interface for the RPI devices.

Electrical Connection



Composition



Date of issue 2003-07-29

Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	2.4 W
Internal bus	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus with up to 125 units
Cycle time	1 device 25 ms 125 devices with discrete input 60 ms 125 devices with discrete output 90 ms 125 devices with analogue input 75 ms 125 devices with analogue output 110 ms
External bus	
Connection	terminals 10, 11, 12; 16, 17, 18
Interface	Modbus profile RTU, RS 485
Service interface	
Connection	terminals 7, 8, 9 and jack bush
Interface	RS 232
Redundancy	
Option	through the use of a second gateway
Electrical isolation	
Internal/External bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Internal bus/Power supply	not available
External bus/Power supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/external bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	Ⓔx II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021
Entity parameter	
Certification number	3000845
FM control drawing	No. 116-0150
Suitable for installation in division 2	yes
Safety parameter	
CSA control drawing	LR 36087-21
Control drawing	No. 116-0149

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Operation

The configuration, parameterisation, addressaing, operation and fault detection are performed by PC and human machine interface via RS 232-interface (see RPI system manual). Limited operation without a PC is possible with the control elements of the Gateway and the devices.

Operating components

Jacks for the connection of a PC across K-ADP2 adapter for the configuration and parameterisation of the system. The PC may alternatively be connected to the plug-in screw terminals 7, 8, 9 in case, e. g. that a PC-based separate monitor level is to be installed. The jack on the front panel and the screw terminals 7, 8, 9 may not be used simultaneously.

Date of issue 2003-07-29

- Connects the Remote Process Interface to the control system/PLC/PC via Modbus
- Couples the internal CAN bus to the external Modbus
- Device installation permissible in zone 2
- Master function for the internal CAN bus
- External bus: Modbus profile RTU (Remote Terminal Unit)
- External baud rate up to 57.6 KBd
- Standard interface RS 485
- Separate service connection independent from DCS or PLC via RS 485 interface in addition to Modbus connection
- 24 V DC rated operational voltage
- Redundant gateway possible
- EMC acc. to NAMUR NE 21

KSD2-GW-MOD.485

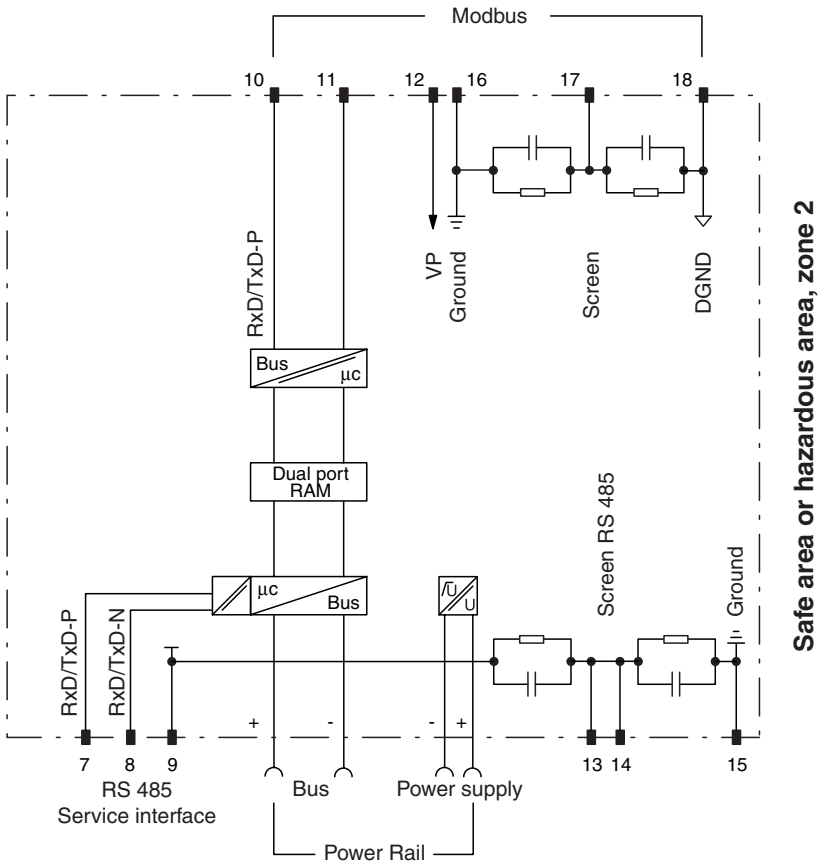
Function

The KSD2-GW-MOD.485 translates the protocols of the internal CAN bus into the Modbus-RTU protocols of the external bus systems and vice versa. Up to 125 devices can be connected to a gateway via the Power Rail.
The gateways of multiple RPI segments can be continuously networked with one of the control system's or PLC's independent service levels over the RS 485 program interface in addition to the Modbus connection. The operator has access independent of the control system, to the configuration data and parameters of all connected gateways and RPI devices by means of a PC and the RPI human machine interface.

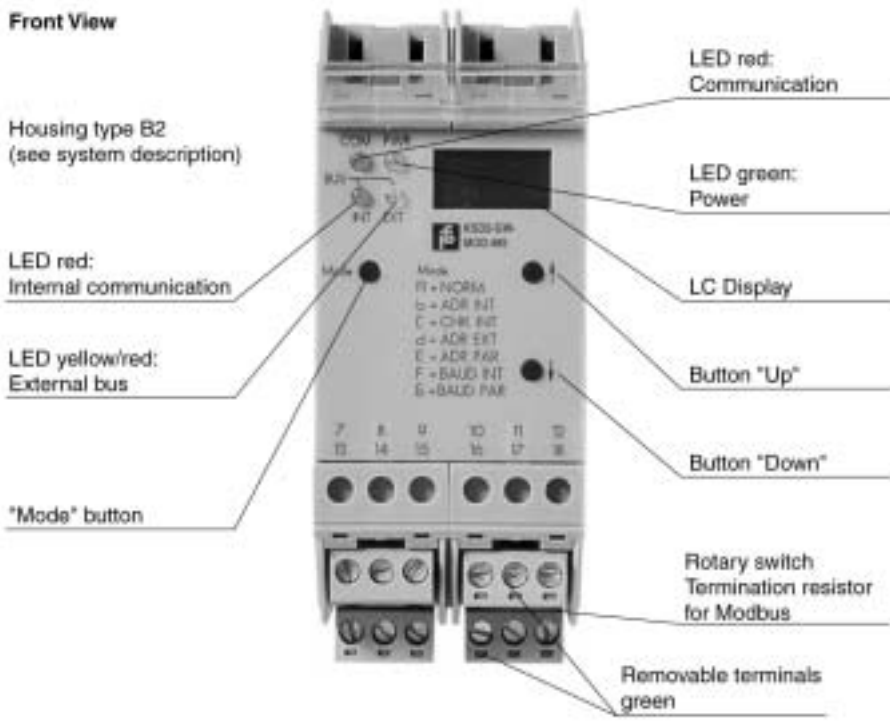
Application

Connection of the RPI with the control system/PLC/PC via Modbus.
Configuration interface for the RPI devices.

Electrical Connection



Composition



Date of issue 2003-07-29

Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	2.4 W
Internal bus	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus with up to 125 units
Cycle time	1 device 25 ms 125 devices with discrete input 60 ms 125 devices with discrete output 90 ms 125 devices with analogue input 75 ms 125 devices with analogue output 110 ms
External bus	
Connection	terminals 10, 11, 12; 16, 17, 18
Interface	Modbus profile RTU, RS 485
Service interface	
Connection	terminals 7, 8, 9
Interface	RS 485
Redundancy	
Option	through the use of a second gateway
Electrical isolation	
Internal/External bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Internal bus/Power supply	not available
External bus/Power supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/external bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021
Entity parameter	
Certification number	3000845
FM control drawing	No. 116-0150
Suitable for installation in division 2	yes
Safety parameter	
CSA control drawing	LR 36087-21
Control drawing	No. 116-0149

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Operation

The configuration, parameterisation, addressing, operation and fault detection are performed by PC and human machine interface via RS 485 interface (see RPI system manual). Limited operation without a PC is possible with the control elements of the gateway and the devices.

Operating components

Connection of a PC for the configuration and parameterisation of the system via K-ADP4 adapter to the plug-in screw terminals 7, 8, 9.

Date of issue 2003-07-29

- Connects the Remote Process Interface to the control system/PLC/PC via ControlNet
- Couples the internal CAN bus to the external ControlNet
- Device installation permissible in zone 2
- Master function for the internal CAN bus
- External bus: ControlNet
- External baud rate 5 MBd
- Separate RS 232 connection on front side for system configuration, also directed to terminals for creating a subordinate monitoring system
- 24 V DC rated operational voltage
- External bus is always media-redundant
- Redundant gateway possible
- EMC acc. to NAMUR NE 21

KSD2-GW-CN

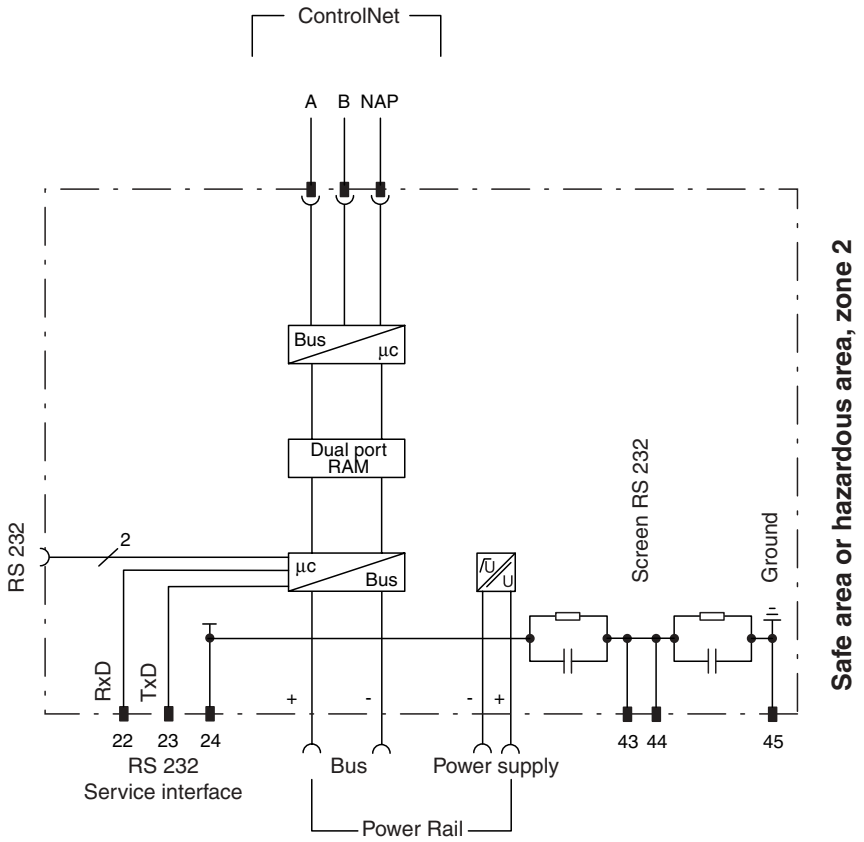
Function

The KSD2-GW-CN translates the protocols of the internal CAN-Bus into the ControlNet protocols of the external bus system and vice versa. Up to 125 devices can be connected to a Gateway via the Power Rail.

Application

Connection of the RPI with the control system/PLC/PC via ControlNet. Configuration interface for the RPI devices.

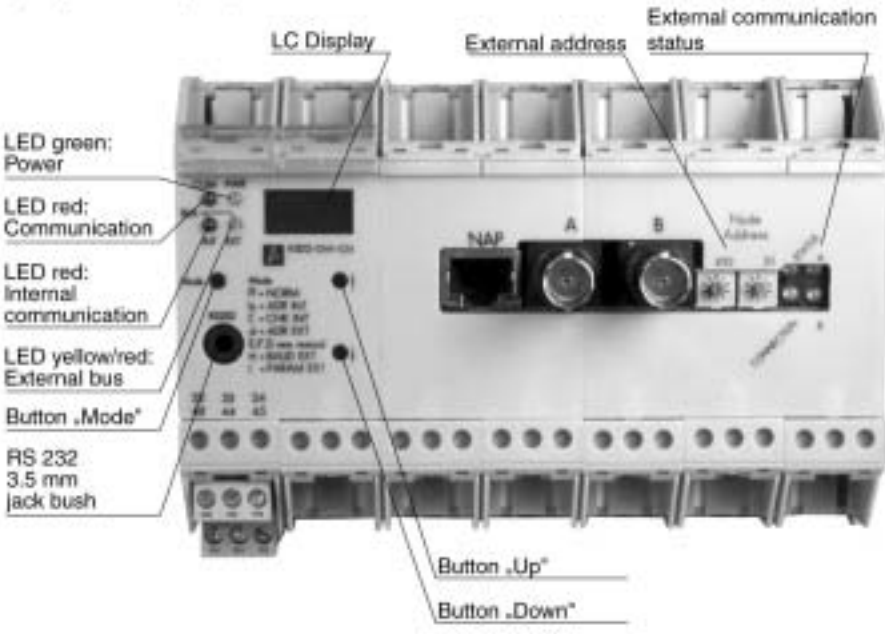
Electrical Connection



Composition

Front View

Housing type G
(see system description)



Date of issue 2003-07-29

Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	3.6 W
Internal bus	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Cycle time	1 device 25 ms 125 devices with discrete input 60 ms 125 devices with discrete output 90 ms 125 devices with analogue input 75 ms 125 devices with analogue output 110 ms
External bus	
Connection	BNC A, B NAP
Interface	ControlNet
Service interface	
Connection	terminals 22, 23, 24 and jack bush
Interface	RS 232
Redundancy	
Option	through the use of a second gateway
Electrical isolation	
Internal/External bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Internal bus/Power supply	not available
External bus/Power supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/external bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 .. 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 520 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021
Entity parameter	
Certification number	3000845
FM control drawing	No. 116-0150
Suitable for installation in division 2	yes
Safety parameter	
CSA control drawing	LR 36087-21
Control drawing	No. 116-0149

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Operation

The configuration, parameterisation, addressing, operation and fault detection is performed by means of PC and the Human Machine Interface via the RS 232 interface. Limited operation without a PC is possible with the control elements of the Gateway and the devices.

Operating components

Jacks for the connection of a PC across K-ADP2 adapter for the configuration and parameterisation of the system. The PC may alternatively be connected to plug-in screw terminals 22, 23, 24, in case , e. g. that a PC-based separate monitor level is to be installed. The jack on the front panel and the screw terminals 22, 23, 24 may not be used simultaneously.

Date of issue 2003-07-29

- Connects the Remote Process Interface to the control system/PLC/PC via ControlNet
- Couples the internal CAN bus to the external ControlNet
- Device installation permissible in zone 2
- Master function for the internal CAN bus
- External bus: ControlNet
- External baud rate 5 MBd
- Separate service connection independent from the DCS or PLC through RS 485 interface in addition to ControlNet connection
- 24 V DC rated operational voltage
- External bus is always media-redundant
- Redundant gateway possible
- EMC acc. to NAMUR NE 21

KSD2-GW-CN.485

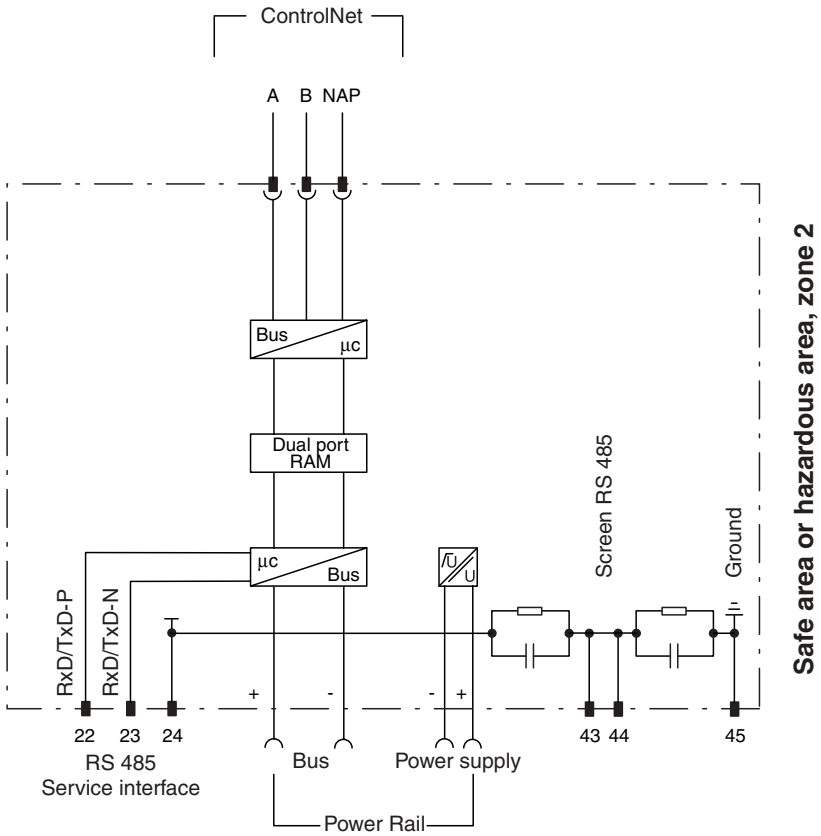
Function

The KSD2-GW-CN.485 translates the protocols of the internal CAN bus into the ControlNet protocols of the external bus system and vice versa. Up to 125 devices can be connected to a Gateway via the Power Rail.
The gateways of multiple RPI segments can be continuously networked with one of the control system's or PLC's independent service levels over the separate RS 485 program interface in addition to the ControlNet connection. The operator has access independent of the control system, to the configuration data and parameters of all connected gateways and RPI devices by means of a PC and the RPI Human Machine Interface.

Application

Connection of the RPI with the control system/PLC/PC via ControlNet.
Configuration interface for the RPI devices.

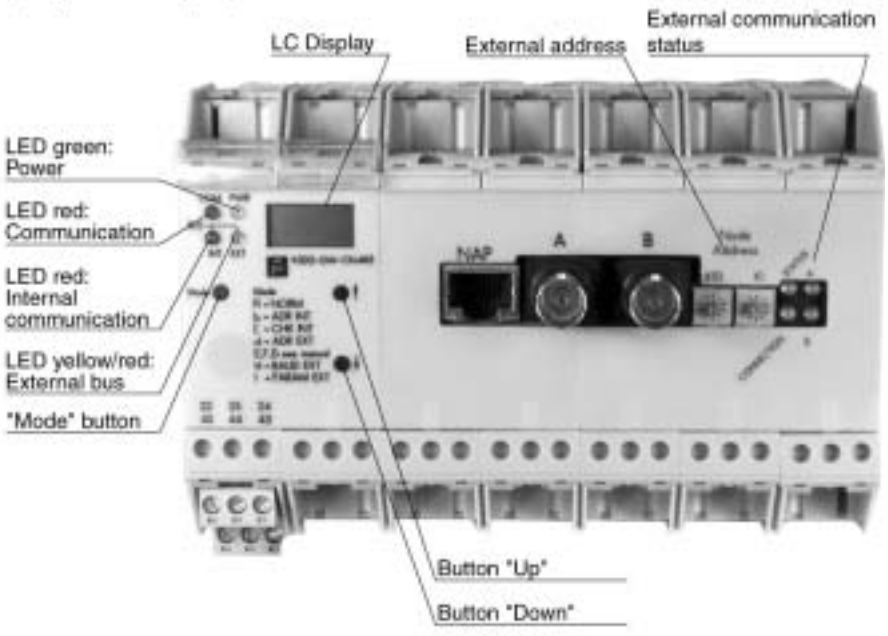
Electrical Connection



Composition

Front View

Housing type G
(see system description)



Date of issue 2003-07-29

Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	3.6 W
Internal bus	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Cycle time	1 device 25 ms 125 devices with discrete input 60 ms 125 devices with discrete output 90 ms 125 devices with analogue input 75 ms 125 devices with analogue output 110 ms
External bus	
Connection	BNC A, B NAP
Interface	ControlNet
Service interface	
Connection	terminals 22, 23, 24
Interface	RS 485
Redundancy	
Option	through the use of a second gateway
Electrical isolation	
Internal/External bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Internal bus/Power supply	not available
External bus/Power supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/external bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 .. 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 520 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021
Entity parameter	
Certification number	3000845
FM control drawing	No. 116-0150
Suitable for installation in division 2	yes
Safety parameter	
CSA control drawing	LR 36087-21
Control drawing	No. 116-0149

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Operation

The configuration, parameterisation, addressing, operation and fault detection is performed by means of PC and the Human Machine Interface via the RS 485 interface. Limited operation without a PC is possible with the control elements of the Gateway and the devices.

Operating components

Connection of a PC for the configuration and parameterisation of the system via K-ADP4 adapter to the plug-in screw terminals 22, 23, 24.

Date of issue 2003-07-29

- Connects the Remote Process Interface to the control system/PLC/PC via Modbus Plus
- Couples the internal CAN bus to the external Modbus Plus
- Device installation permissible in zone 2
- Master function for the internal CAN bus
- External bus: Modbus Plus
- External baud rate 1 MBd
- Standard interface RS 485
- Separate RS 232 connection on front side for system configuration, also directed to terminals for creating a subordinate monitoring system
- 24 V DC rated operational voltage
- Redundant gateway possible
- EMC acc. to NAMUR NE 21

KSD2-GW-MPL

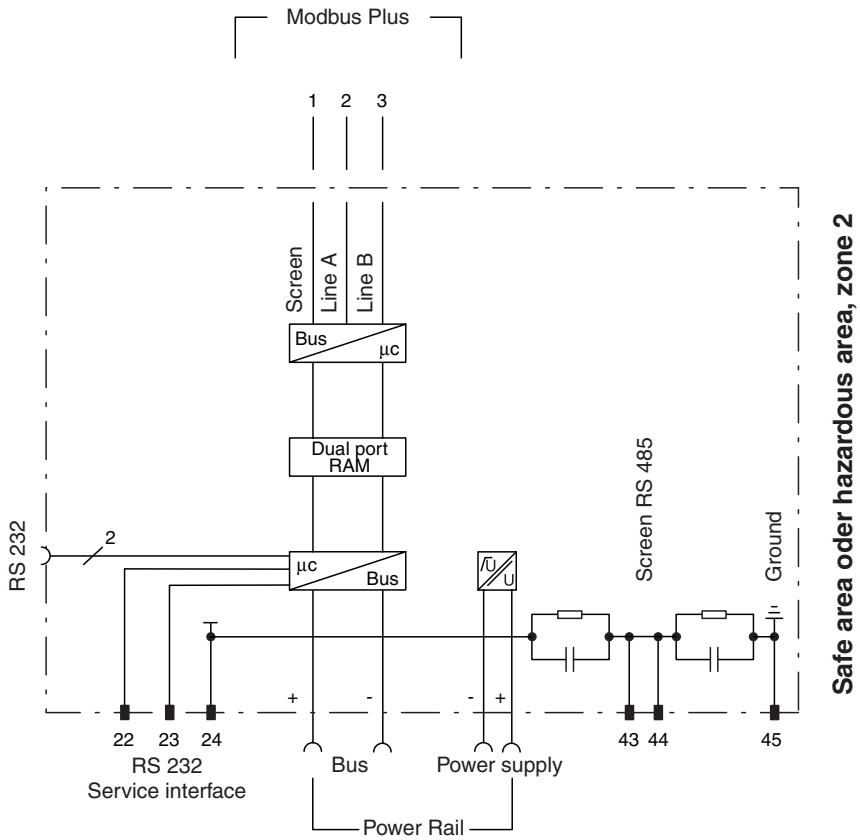
Function

The KSD2-GW-MPL translates the protocols of the internal CAN bus into the Modbus Plus protocols of the external Bus system and vice versa. Up to 125 devices can be connected to a Gateway via the Power Rail.

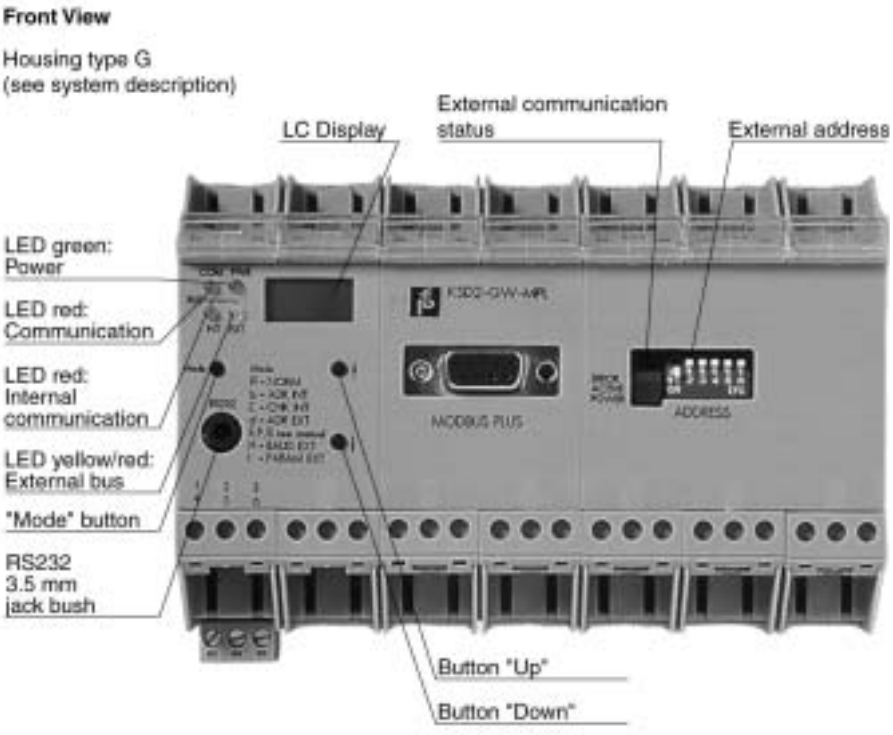
Application

Connection of the RPI with control system/PLC/PC via Modbus Plus.
Configuration interface for the RPI devices.

Electrical Connection



Composition



Date of issue 2003-07-29

Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	4.8 W
Internal bus	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus with up to 125 units
Cycle time	1 device 25 ms 125 devices with discrete input 60 ms 125 devices with discrete output 90 ms 125 devices with analogue input 75 ms 125 devices with analogue output 110 ms
External bus	
Connection	9-pin sub-D socket
Interface	Modbus Plus, RS 485 interface
Service interface	
Connection	terminals 22, 23, 24 and jack bush
Interface	RS 232
Redundancy	
Option	through the use of a second gateway
Electrical isolation	
Internal/External bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Internal bus/Power supply	not available
External bus/Power supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/external bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 505 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	Ⓔx II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021
Entity parameter	
Certification number	3000845
FM control drawing	No. 116-0150
Suitable for installation in division 2	yes
Safety parameter	
CSA control drawing	LR 36087-21
Control drawing	No. 116-0149

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Operation

The configuration, parametrisation, addressing, operation and fault detection is performed by means of PC and Human Machine Interface **PACT***ware* via the RS 232 interface. Limited operation without a PC is possible with the control elements of the Gateway and the devices.

Operating components

Jacks for the connection of a PC across K-ADP2 adapter for the configuration and parameterisation of the system. The PC may alternatively be connected to plug-in screw terminals 22, 23, 24, in case , e. g. that a PC-based separate monitor level is to be installed. The jack on the front panel and the screw terminals 22, 23, 24 may not be used simultaneously.

Date of issue 2003-07-29

- Connects the Remote Process Interface to the control system/PLC/PC via Modbus Plus
- Couples the internal CAN bus to the external Modbus Plus
- Device installation permissible in zone 2
- Master function for the internal CAN bus
- External bus: Modbus Plus
- External baud rate 1 MBd
- Standard interface RS 485
- Separate service connection independent from the DCS or PLC through RS 485 interface in addition to Modbus Plus connection
- 24 V DC rated operational voltage
- Redundant gateway possible
- EMC acc. to NAMUR NE 21

KSD2-GW-MPL.485

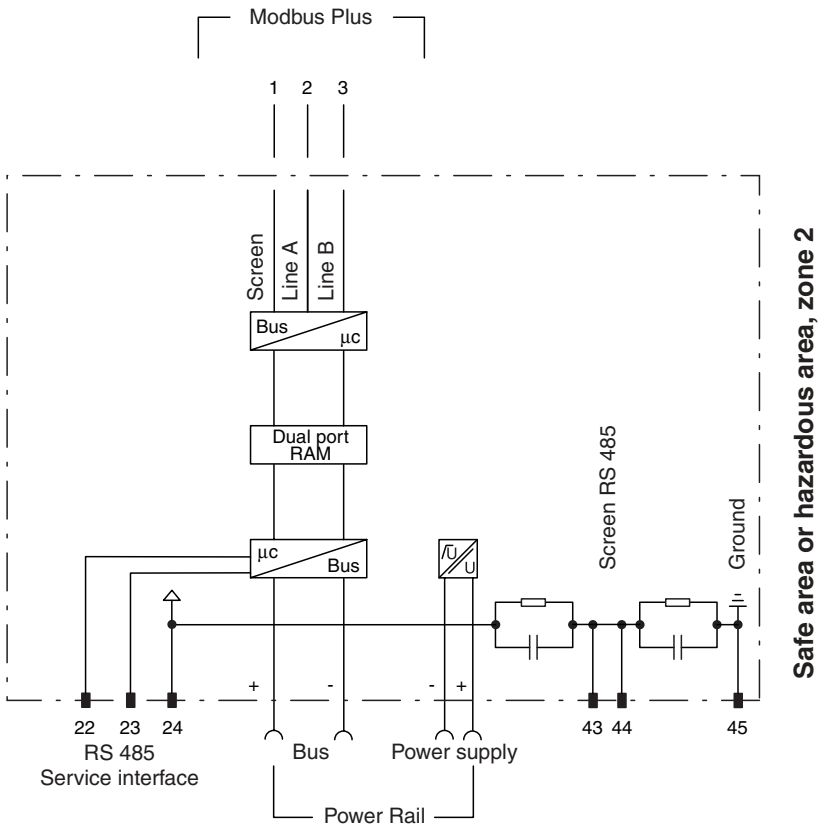
Function

The KSD2-GW-MPL.485 translates the protocols of the internal CAN Bus into the Modbus-plus-protocols of the external Bus system and vice versa. Up to 125 devices can be connected to a Gateway via the Power Rail.
The gateways of multiple RPI segments can be continuously networked with one of the control systems's or PLC's independent service levels using the RS 485 parameter interface in addition to the Modbus Plus connection. The operator has access independent of the control system, to the configuration data and parameters of all connected gateways and RPI devices by means of a PC and the RPI Human Machine Interface.

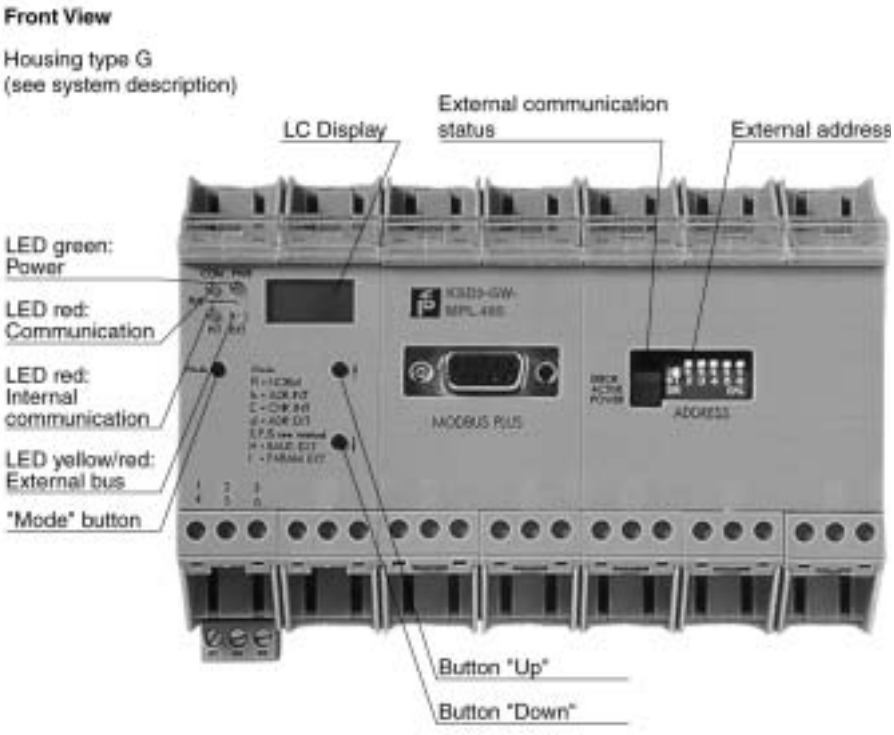
Application

Connection of the RPI with control system/PLC/PC via Modbus Plus. Configuration interface for the RPI devices.

Electrical Connection



Composition



Date of issue 2003-07-29

Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	4.8 W
Internal bus	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus with up to 125 units
Cycle time	1 device 25 ms 125 devices with discrete input 60 ms 125 devices with discrete output 90 ms 125 devices with analogue input 75 ms 125 devices with analogue output 110 ms
External bus	
Connection	9-pin sub-D socket
Interface	Modbus Plus, RS 485 interface
Service interface	
Connection	terminals 22, 23, 24
Interface	RS 485
Redundancy	
Option	through the use of a second gateway
Electrical isolation	
Internal/External bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Internal bus/Power supply	not available
External bus/Power supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/internal bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/external bus	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Service interface/supply	basic insulation acc. to DIN EN 50178, rated insulation voltage 50 V_{eff} AC
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 505 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	Ⓔx II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021
Entity parameter	
Certification number	3000845
FM control drawing	No. 116-0150
Suitable for installation in division 2	yes
Safety parameter	
CSA control drawing	LR 36087-21
Control drawing	No. 116-0149

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Notes

Operation

The configuration, parameterisation, addressing, operation and fault detection is performed by means of PC and Human Machine Interface via the RS 485 interface. Limited operation without a PC is possible with the control elements of the gateway and the devices.

Operating components

Connection of a PC for the configuration and parameterisation of the system via K-ADP4 adapter to the plug-in screw terminals 22, 23, 24.

Date of issue 2003-07-29

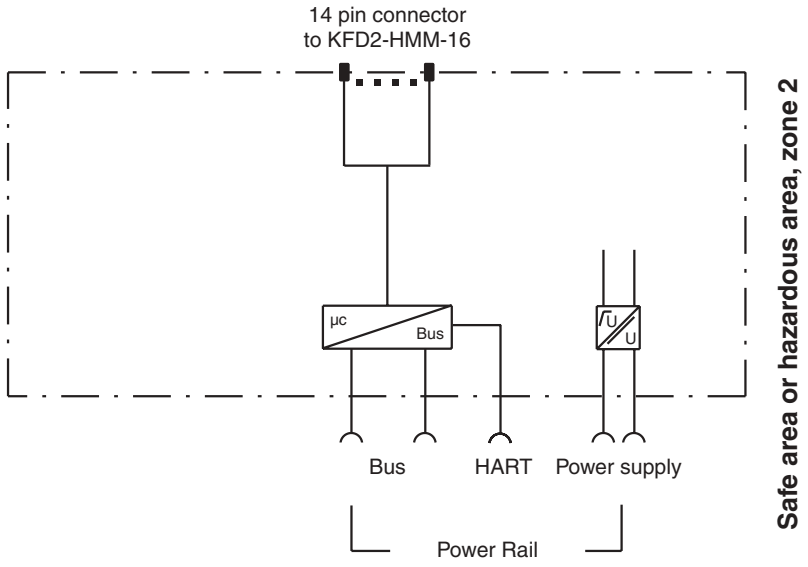
- Control of the HART communication with up to 250 field devices
- Coupling of the KFD2-HMM-16 HART multiplexer to the RPI without complex wiring
- Device installation permissible in zone 2
- 24 V DC rated operational voltage
- Power Rail bus
- 14-core ribbon cable for connection of the KFD2-HMM-16 HART multiplexer
- EMC acc. to NAMUR NE 21

KSD2-HC

Function

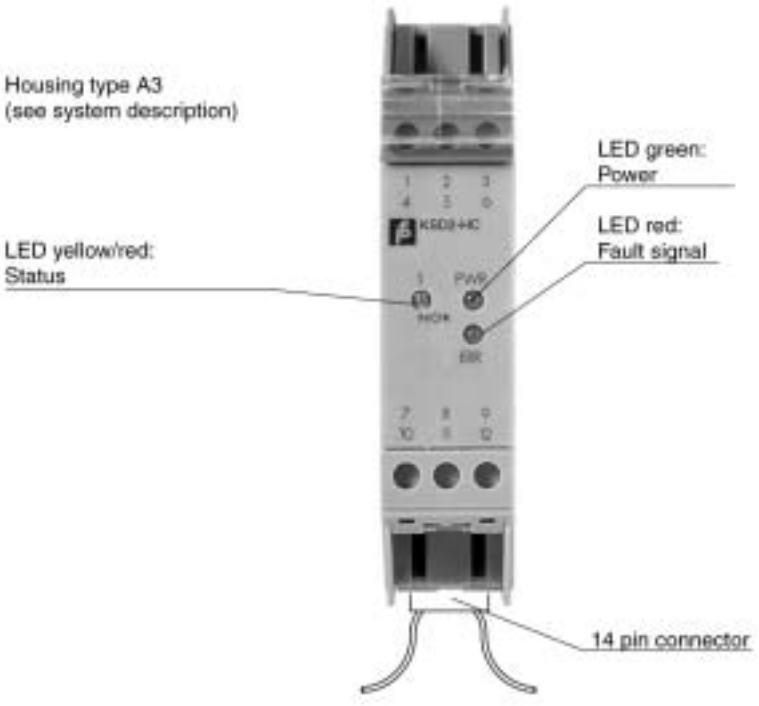
Field devices, sensors and actuators are often configured, parameterised and monitored via HART communication. With the HART control module KSD2-HC and the HART multiplexer KFD2-HMM-16 the RPI is completed by a HART communication level that is independent from the measurement data transfer via the field bus.
The HART control module KSD2-HC is snapped on the rail with the Power Rail of the RPI system, next to it the HART multiplexer KFD2-HMM-16. It is connected with the HART control module by means of the 14-pin ribbon cable without further wiring. Only the HART multiplexer master is used. By this system one gets HART access to up to 250 field devices with HART communication, which are connected to the HART transmitter supply isolators KSD2-CI-S-Ex.H or KSD2-CI-S-H and the analogue HART output drivers/repeaters KSD2-CO-S-Ex.H or KSD2-CO-S-H of the RPI system.
The access is accomplished via RS 485 interface of the HART multiplexer by means of PC and software such as Cornerstone (Astec), AMS (Emerson), or **PACT***ware* (see datasheet HART multiplexer). The RS 485 interfaces of the HART multiplexer and of the RPI gateway can be networked. Then, the RPI software K-SK1 or **PACT***ware* and the HART software can be run with the same PC.

Electrical Connection



Composition

Front View



Date of issue 2003-07-29

Supply	
Connection	Power Rail
Rated voltage	20 ... 30 V DC
Ripple	< 10 %
Power consumption	1.2 W
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Input	
Connection	14-pin ribbon cable from the KFD2-HMM-16 master
Output	
Connection	Power Rail
Interface	CAN protocol via Power Rail bus
Standard conformity	
Climatic conditions	acc. to DIN IEC 721
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 .. 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nA II T4
Directive conformity	standards
Directive 94/9 EU	EN 50021

Supplementary information

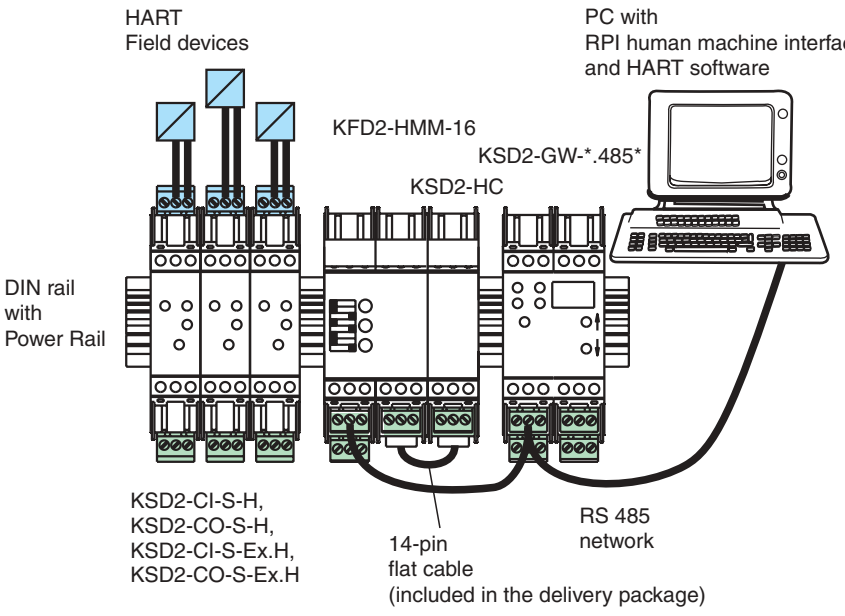
EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. This information can be found under www.pepperl-fuchs.com

Application

HART communication level for RPI

Notes

Software functions
The device does not need any parameterisation.
K-system modules with collective error signals via Power Rail cannot be operated on the same Power Rail segment with the HART communication.



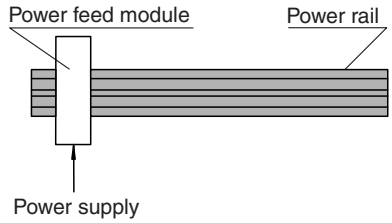
Date of issue 2003-07-29

- 24 V DC rated operational voltage
- Device installation permissible in zone 2
- Supply current ≤ 4 A
- Fault signal output with adjustable mode of operation
- Bus access via terminals
- EMC acc. to NAMUR NE 21

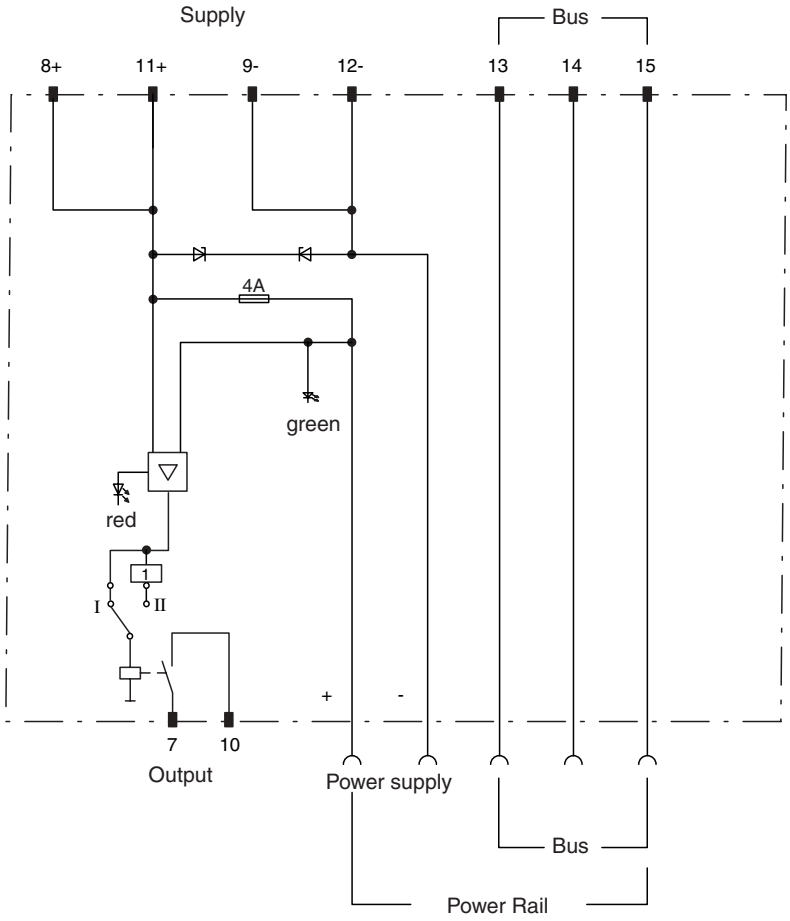
KFD2-EB.RPI

Function

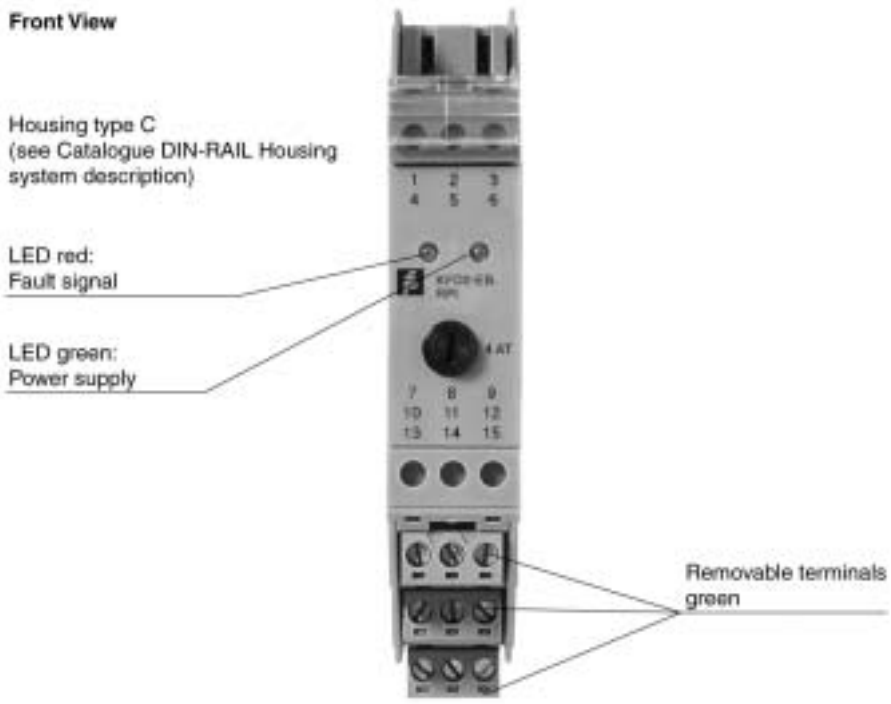
The power feed module KFD2-EB.RPI supplies the Power Rail with a voltage of 24 V DC and a 4 A maximum current. The application of the supply voltage is indicated on the front panel by means of a green LED (POWER ON).
In a fault condition, the relays switch open and the fault is indicated by means of a red LED on the front panel. The mode of operation can be adjusted with a plug-in jumper.
The dual designed power feed terminals have the ability to loop the supply (up to a max. of 10 A).
On the KFD2-EB2.RPI, the 3 poles of the Power Rails for the bus connection are separately arranged on terminals 13, 14 and 15.
The breakdown diode connected between terminals 8+, 11+ and 9-, 12- provides transient overvoltage protection per IEC 801-5.



Electrical Connection



Composition

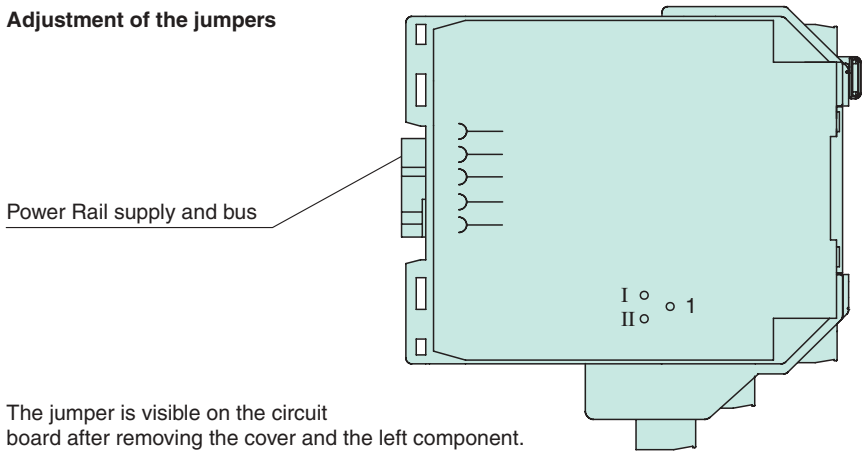


Date of issue 2003-07-29

Supply	
Connection	terminals 11+, 12- terminals 8+, 9-
Rated voltage	20 ... 30 V DC , the max. rated operational voltage of the devices plugged onto the Power Rail must not be exceeded.
Output	
Power Rail feed	output current: ≤ 4 A
Fault signal	relay output: NO
Contact loading	24 V AC; 1 A / 24 V DC; 1 A
Energised/De-energised delay	approx. 20 ms / approx. 20 ms
Ambient conditions	
Ambient temperature	-25 ... 60 °C (248 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nAC IIC T4

Notes

Adjustment of the jumpers



The jumper is visible on the circuit board after removing the cover and the left component.

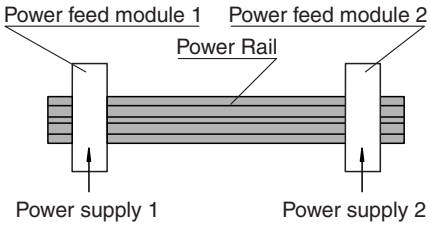
Date of issue 2003-07-29

- 24 V DC rated operational voltage
- Device installation permissible in zone 2
- Supply current ≤ 2 A
- Bus access via terminals
- Redundant supply
- Fault signal output with adjustable mode of operation
- EMC acc. to NAMUR NE 21

KFD2-EB.R2A.RPI

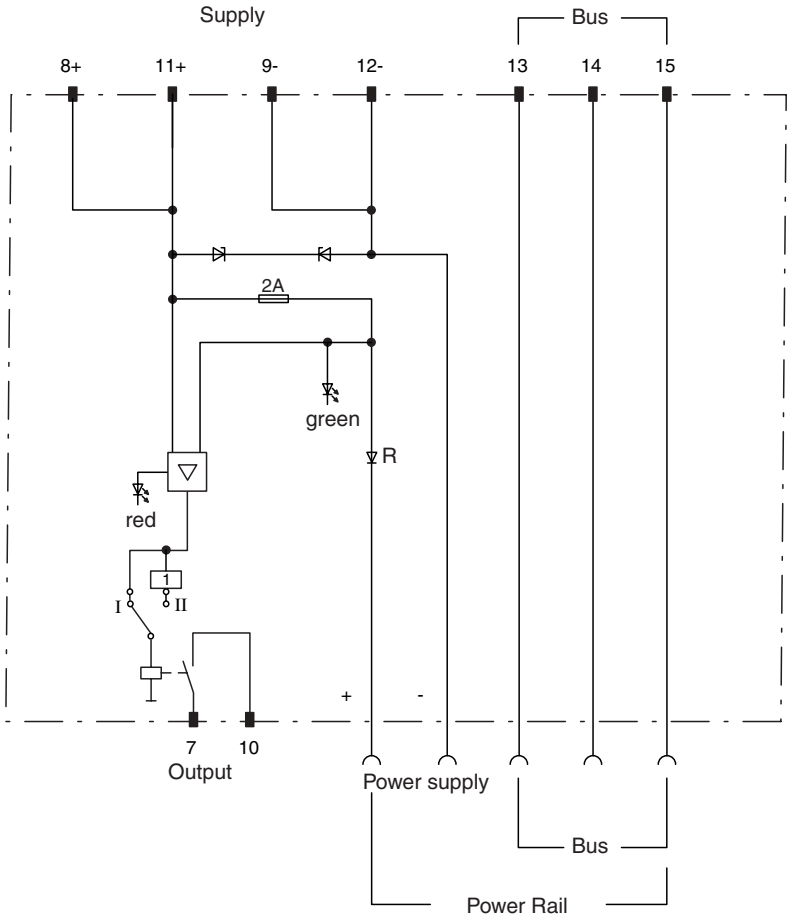
Function

The power feed module KFD2-EB.R2A.RPI supplies the Power Rail with a voltage of 24 V DC and a maximum current of 2 A. The application of the supply voltages is indicated on the front panel by means of a green LED (POWER ON). The integrated fault evaluation detects shorts.
In a fault condition, the relays switch closed and the fault is indicated by means of a red LED on the front panel. The mode of operation can be adjusted with a plug-in jumper. The dual designed power feed terminals have the ability to loop the supply (up to a max. of 10 A). The 3 poles of the Power Rails for the bus connection are separately arranged on terminals 13, 14 and 15. The breakdown LED connected between terminals 8+, 11+ and 9-, 12- provides transient overvoltage protection per IEC 801-5.

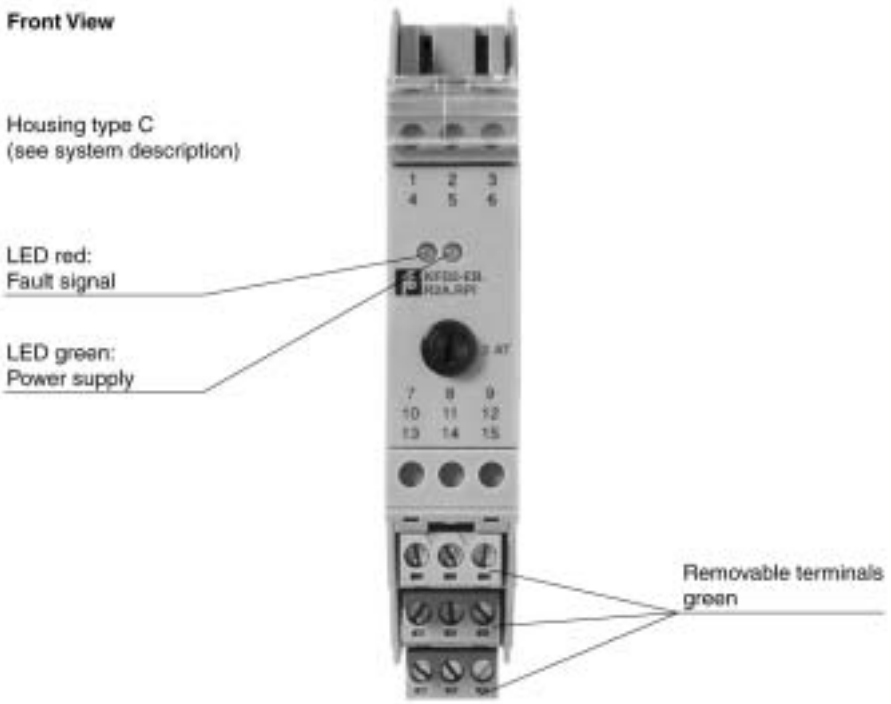


Two power feed modules can be used on a Power Rail as a redundant supply through the Reverse Diode "R".

Electrical Connection



Composition

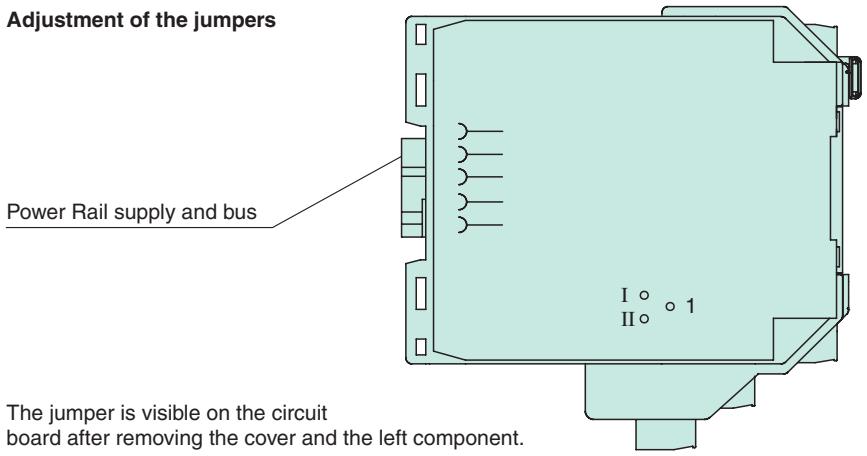


Date of issue 2003-07-29

Supply	
Connection	terminals 11+, 12- terminals 8+, 9-
Rated voltage	20 ... 30 V DC , the max. rated operational voltage of the devices plugged onto the Power Rail must not be exceeded.
Output	
Power Rail feed	output current: ≤ 2 A
Fault signal	relay output: NO
Contact loading	24 V AC; 1 A / 24 V DC; 1 A
Energised/De-energised delay	approx. 20 ms / approx. 20 ms
Ambient conditions	
Ambient temperature	-25 ... 60 °C (248 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g
Data for application in conjunction with hazardous areas	
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nAC IIC T4

Notes

Adjustment of the jumpers



The jumper is visible on the circuit board after removing the cover and the left component.

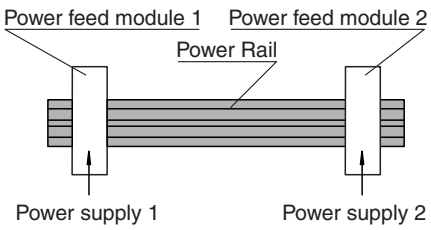
Date of issue 2003-07-29

- 24 V DC rated operational voltage
- Supply current ≤ 2 A
- Bus access via terminals
- Redundant supply
- Fault signal output with adjustable mode of operation
- EMC acc. to NAMUR NE 21
- For applications on ships

KFD2-EB.MAR.RPI

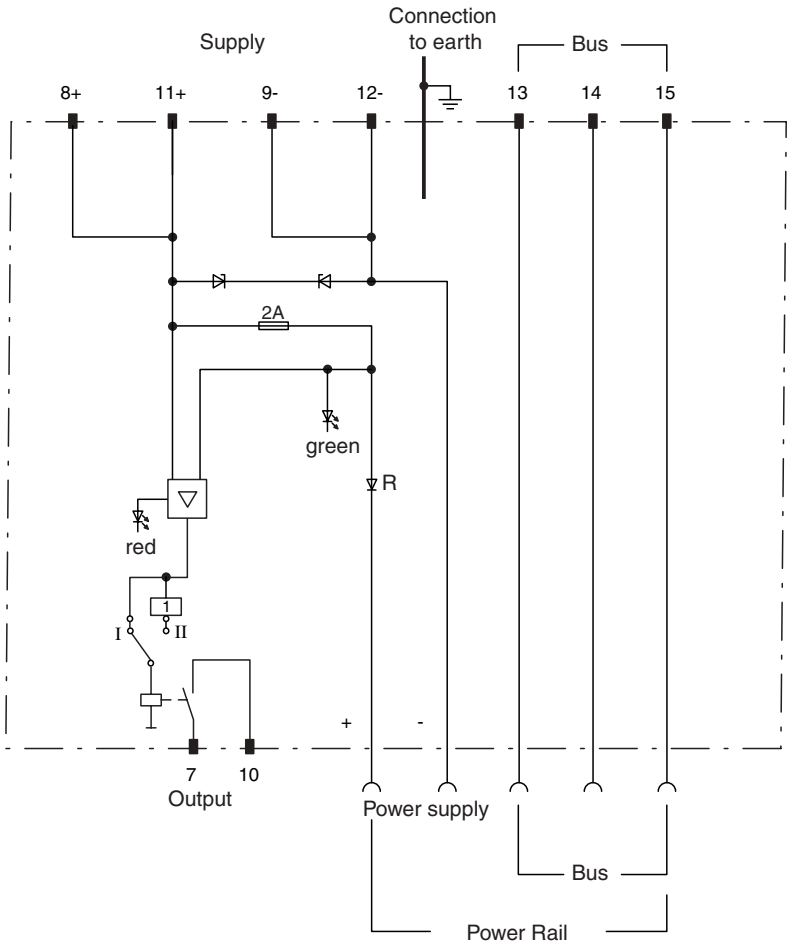
Function

The power feed module KFD2-EB.MAR.RPI is especially designed for the use on ships. It supplies the Power Rail with a voltage of 24 V DC and a maximum current of 2 A. The application of the supply voltages is indicated on the front panel by means of a green LED (POWER ON). The integrated fault evaluation detects shorts.
In a fault condition, the relays switch closed and the fault is indicated by means of a red LED on the front panel. The mode of operation can be adjusted with a plug-in jumper. The dual designed power feed terminals have the ability to loop the supply (up to a max. of 10 A). The 3 poles of the Power Rails for the bus connection are separately arranged on terminals 13, 14 and 15. The breakdown LED connected between terminals 8+, 11+ and 9-, 12- provides transient overvoltage protection per IEC 801-5.

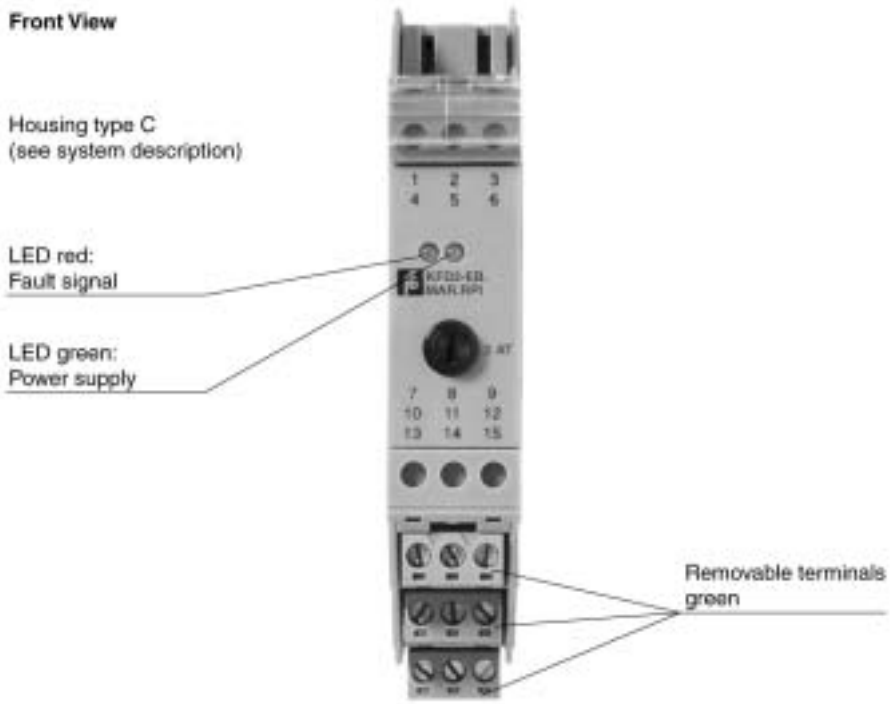


Two power feed modules can be used on a Power Rail as a redundant supply through the Reverse Diode "R".

Electrical Connection



Composition

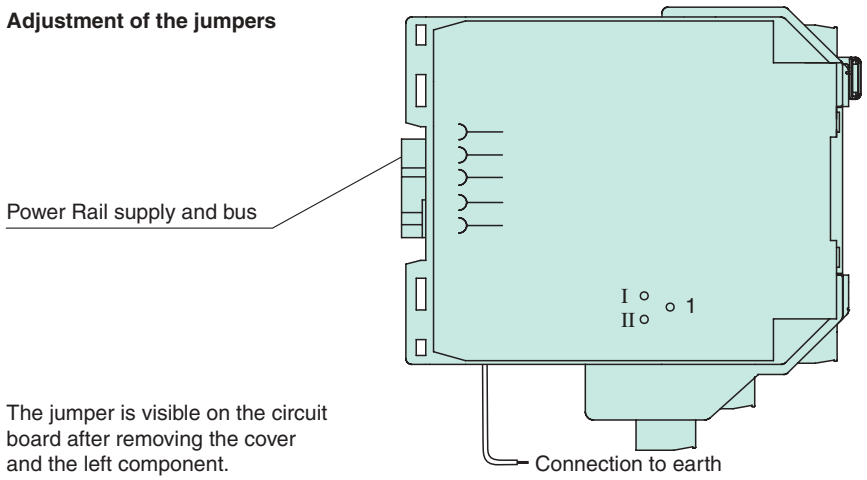


Date of issue 2003-07-29

Supply	
Connection	terminals 11+, 12- terminals 8+, 9- grounding cable
Rated voltage	20 ... 30 V DC , the max. rated operational voltage of the devices plugged onto the Power Rail must not be exceeded.
Output	
Power Rail feed	output current: ≤ 2 A
Fault signal	relay output: NO
Contact loading	24 V AC; 1 A / 24 V DC; 1 A
Energised/De-energised delay	approx. 20 ms / approx. 20 ms
Ambient conditions	
Ambient temperature	-5 ... 60 °C (268 ... 333 K)
Mechanical specifications	
Protection degree	IP20
Mass	approx. 100 g

Notes

Adjustment of the jumpers



Accessories and Installation Techniques

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Page

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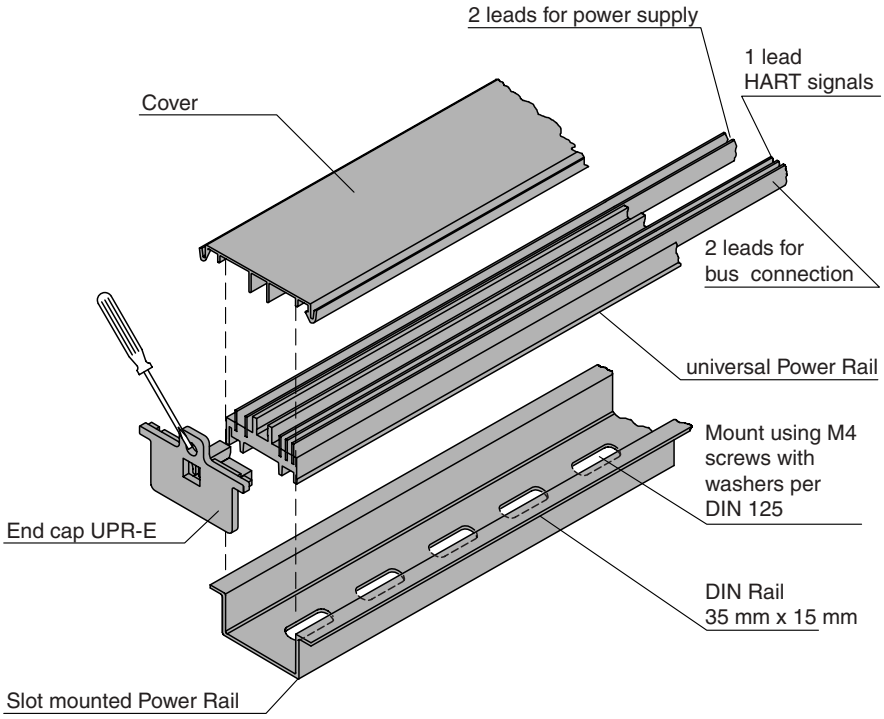
Universal Power Rail

- Nominal current 4 A
- Standard length 2 m, may be cut



UPR-05

- with 2 conductors for power supply, 2 conductors for bus connections and one conductor for HART signal transmission.

Please use this standard type for new systems.

The universal Power Rail is a plastic insert that has been specifically designed to seat into the DIN rail. Devices that can be mounted on a standard rail in accordance with DIN EN 50 022, can be easily mounted on the DIN rail.

The Power Rail has 2 conductors for supplying the modules, 1 conductor for HART-signal transfer and 2 conductors for bus connections. These 2 conductors are used on Remote Process Interface, for the internal bus system, for the transfer of digital information. The devices of the Remote Process Interface are supplied with power via the 2 conductors on the Power Rail. Gold plated contacts are provided to ensure secure electrical contact.

The UPR-05 is not segmented. Modules of any width can be mounted on these rails. This ensures that it will be possible to mount future component designs on the same rail. The TS35 Type 12 end terminal is used as a termination when the devices are mounted vertically.

The cover serves as a means of mechanical and electrical protection for exposed conductors. It is possible to remove the installed Power Rail from the DIN rail using the UPR-E end cap.

The universal Power Rail, the cover and the DIN rail are delivered in a standard length of 2 m and can be cut with a saw to any required length.

Delivery package UPR-05:

Universal Power Rail, DIN Rail made of aluminium, cover plate, 2 end caps UPR-E. The UPR-E end caps can be ordered separately (in packs of 10).

UPR-E

End Cap for UPR-05 (see graphic)
in packs of 10

Date of issue 2003-07-25

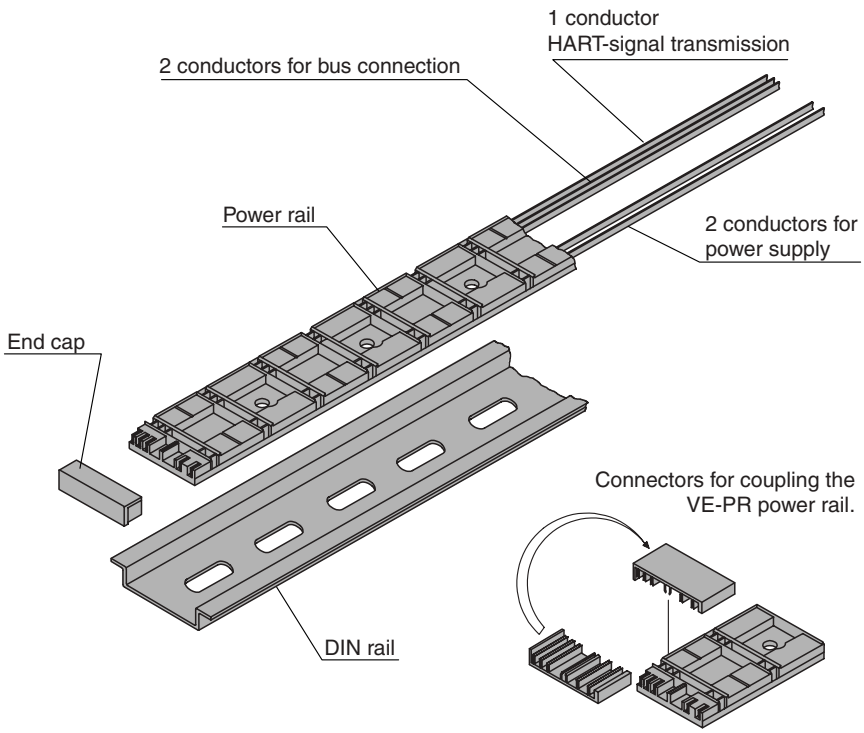
Power Rail

- Nominal current 4 A
- Easy to install
- can be extended in 50 cm steps
- can be shortened in 4 cm steps
- The end caps supplied provide insulation

PR-05

- with 2 conductors for power supply, 2 conductors for bus connections and one conductor for HART signal transmission

For newer systems please use model UPR-05.



The Power Rail is a simple plastic insert for the standard rail in accordance with DIN EN 50022. It solves all of the power supply wiring problems involved when mounting terminal blocks.

A wide range of RPI modules is available, supplied with power by simply snapping them onto the Power Rail. The supply of power to the 2 Power Rail conductors is achieved either by means of a power supply module, or via the terminal strip of a mother board.

By comparison, the interface module power supply connections are only suitable for the supply of the individual modules. They are not suitable for the supply of the Power Rail or to further conduct the Power Rail voltage.

On the PR-05 Power Rail two poles for the bus connection of the RPI modules and one conductor for HART signal transmission are available.

The standard length of the rail is 500 mm. It has to be cut at the identified positions at a distance of 40 mm to meet any individual requirements. Gold plated contacts are provided to ensure secure electrical contact.

VE-PR

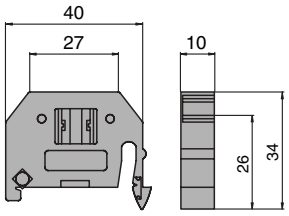
Connection element for PR-05 (see graphic)

End terminal TS35 Type 12

The TS35 Type 12 end terminals are used as terminations when KF or KH devices are mounted on the DIN rail in accordance with DIN EN 50 022.

This component is not supplied by Pepperl+Fuchs.

Supplier: Wago



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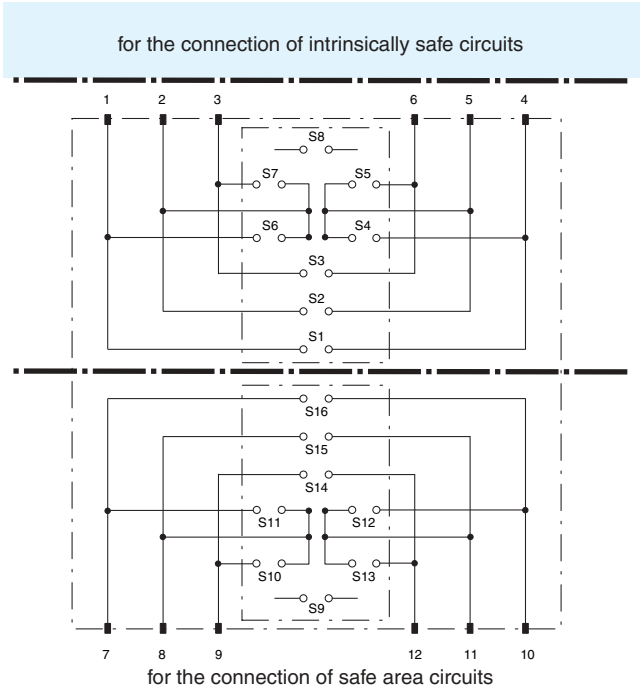
Dummy KFD0-LGH

The KFD0-LGH is a module for use in laying cables. It improves accessibility and compactness within a control cabinet.

By means of solder bridges, optional DIP-switches, different configurations are possible.

Intrinsically safe circuits of up to 40 V can be connected to terminals 1, 2 and 3 or 4, 5 and 6. Terminals 1 to 6 are linked.

Safe area circuits up to 50 V can be connected to terminals 7, 8 and 9 or 10, 11 and 12.

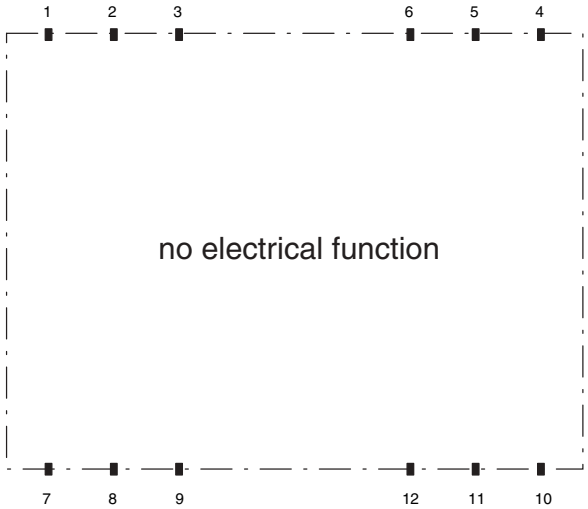


Dummy KFD0-LGH-Y34868

The KFD0-LGH-Y34868 is a module, which is used for covering unused connections (expansion sites). Thus the free connectors of the cable tree can be mechanically fixed, clearly and easily.

Intrinsically safe circuits of up to 40 V can be connected to terminals 1, 2 and 3 or 4, 5 and 6. Terminals 1 to 6 are linked.

Safe area circuits up to 50 V can be connected to terminals 7, 8 and 9 or 10, 11 and 12.



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KF-STP-**

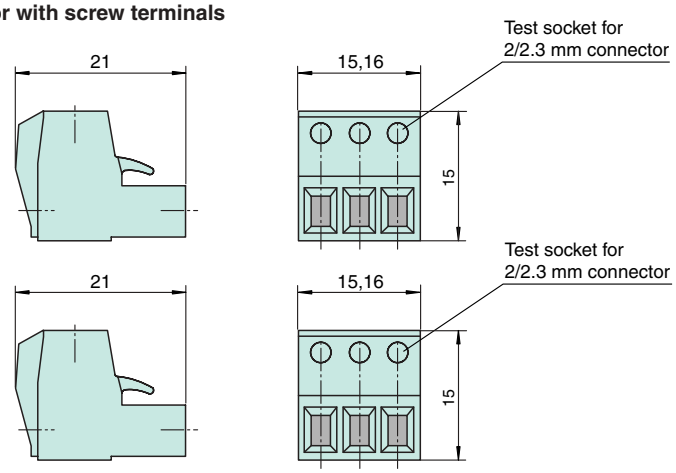
SMART transmitter/repeater units and the isolated transformers are supplied as standard with the KF-STP- terminal connectors. Handheld terminals can be connected to the integrated test jacks. The connections can be made in the hazardous area or in the safe area by means of 2/2.3 mm standard test jacks. Only certified devices should be connected in the hazardous area.

If test sockets are required on other KF modules, then these device connectors can be used.

Order code:

KF-STP-BU (blue)
KF-STP-GN (green)

Device connector with screw terminals



KF-FKC-**

If required, K-system devices can be converted to have screwless terminals with spring retention.

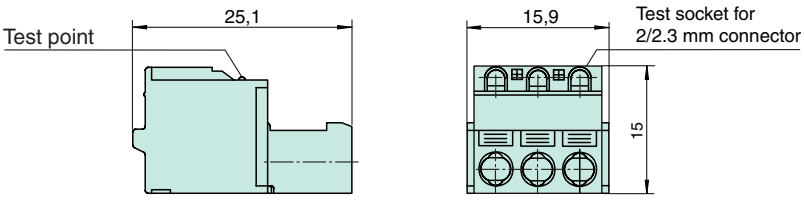
Order code:

KF-FKC-3G2B (3St. green, 2 St. blue)*
KF-FKC-5B (5 St. blue)*
KF-FKC-5G (5 St. green)*
* units per package

Note:

Each set contains the items required for coding.

Device connectors with cage tension spring terminals



Note:

The removable terminals KF-STP-* , KF-FKC-* guarantee protection from direct contact by means of a strong insulation. This applies to rated insulation voltage in the case of maximum overvoltage in accordance with Overvoltage Category III of EN 50178 (1500 V AC).

The voltage is to be switched off in case of rated insulation voltages greater than 50 V AC before connecting or disconnecting the device connectors.

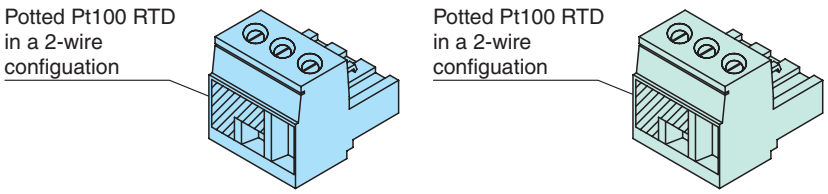
K-CJC-*

Removable terminals with integrated thermometers for cold junction compensation for thermocouples

Order code:

K-CJC-BU (blue)
K-CJC-GN (green)

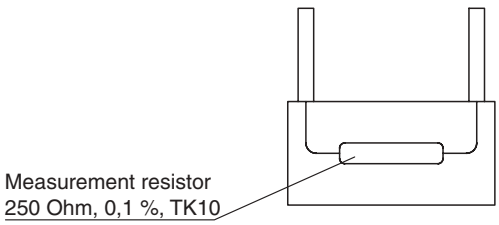
Device connectors with sensors



K-250R0%1

The resistance is compatible for KF screw terminals and is connected with the connection lead.

- Conversion of 4 mA ... 20 mA/ 1 V ... 5 V
- Series resistor for HART/SMART power loops



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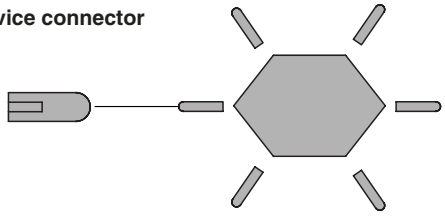
KF-CP

KF connectors can be coded with an encoder pin. This is accomplished by inserting the encoder pin into the slot of the connector.

in packs of: 100 x 6 pieces

Coding profile for device connector



BMKL 18x8

Self-adhesive labels made of polyester in 18 x 8 mm format are also suitable for labelling documentation carriers.

BMKL 18x8 with 288 pieces per DIN A4 sheet suitable for commercially available laser printers or pens.

Supplier: Phoenix Contact

You will find a text mask in the form of a Word file on our Internet page at:

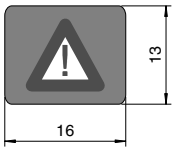
www.pepperl-fuchs.com/pa/service/downloads/textmaske

KF-SEAL

Adhesive foil

- destructive, removable Scotchmark sticker 3812, white, matt
- rectangular shape 16 mm x 13 mm
- for securing front-side programming switches and sockets as well as potentiometers suitable for K system

Packing size: sheet similar to DIN A4 with approx. 150 pieces of adhesive sticker



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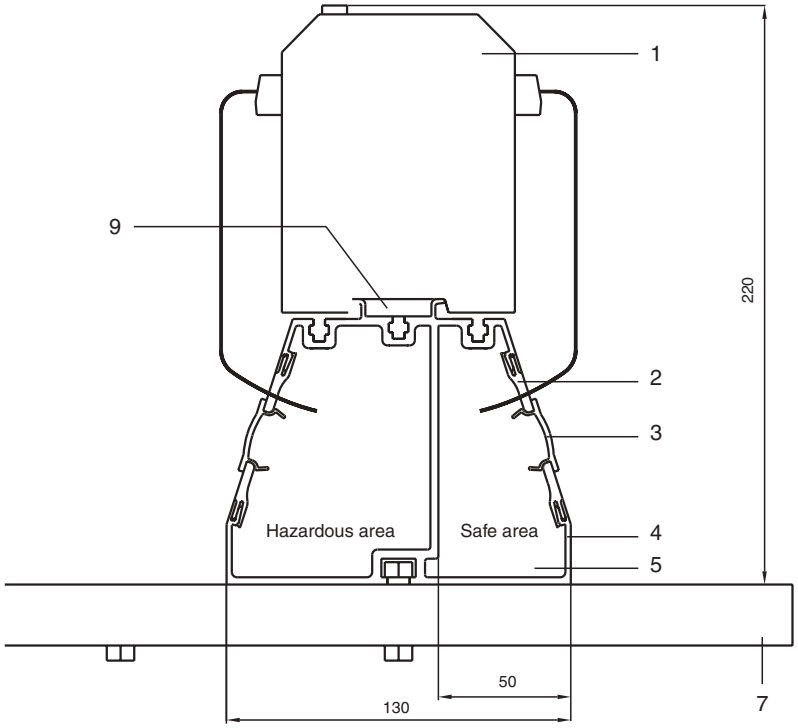
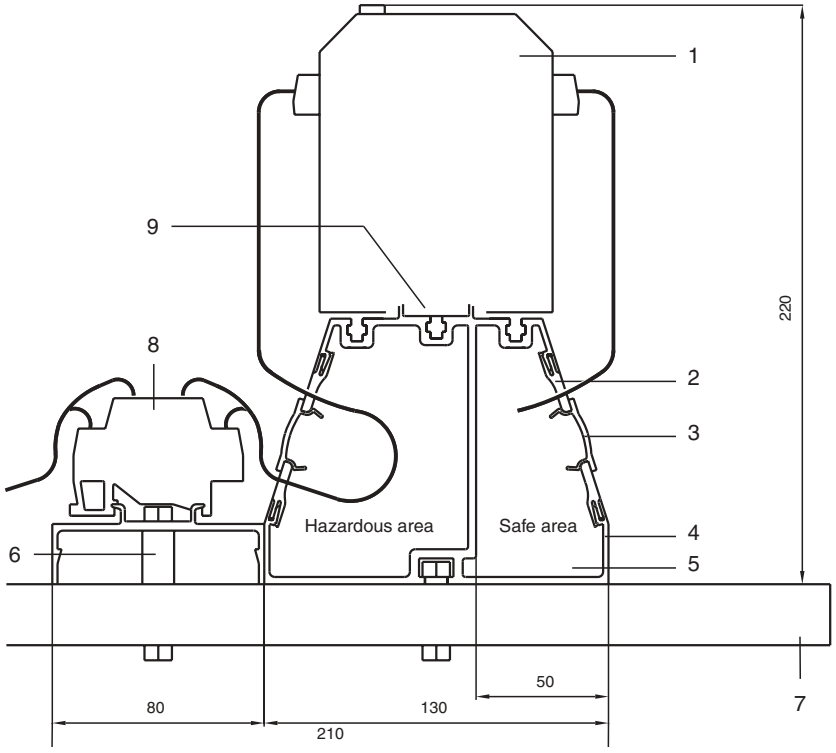
KF Profile without Shunting Bridge



1) KS module
2) Wiring comb for direct wiring to the KS modules
3) Comb cap
4) KF module
5) Space for connection cable: field cable for the hazardous and safe areas
7) Mounting plate
9) Power Rail

KF Profile with Shunting Bridge



1) KS module
2) Wiring comb for direct wiring to the KS-modules
3) Comb cap
4) KF module
5) Space for connection cable: field cable for the hazardous and safe areas
6) Spacer bolts for mounting in cabinets
7) Mounting plate
8) Terminal
9) Power Rail

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1) Label field
2) Holder

Length up to 500 mm:

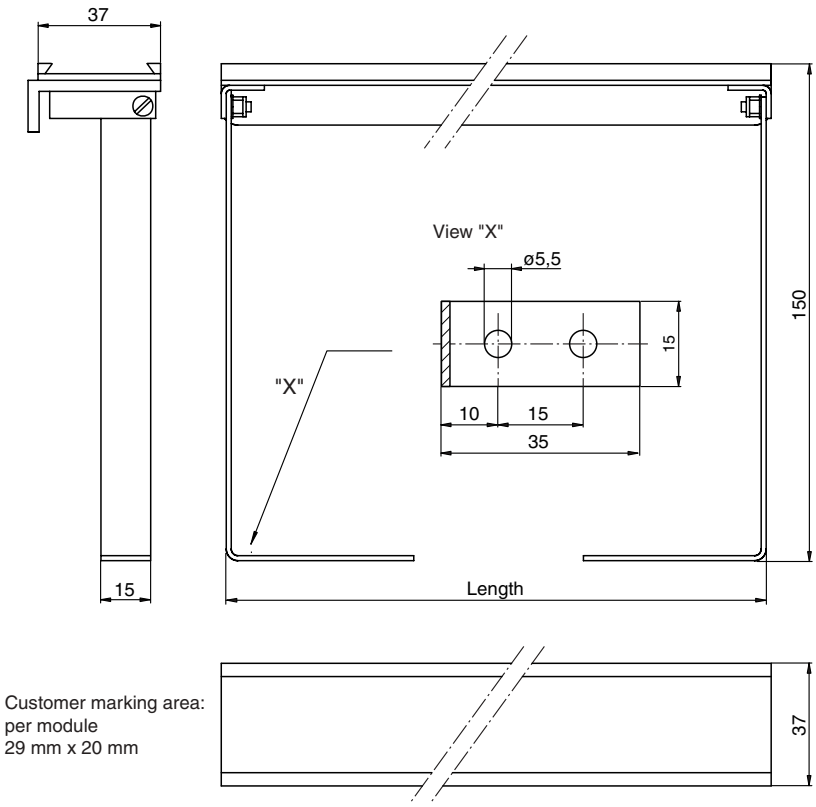
KFD0-LC1-XXX

Length 510 mm ... 1000 mm:

KFD0-LC1-YYY

Universal label holder for the K-system.
The mounting is carried out on the KF module, by means of the claw clamp (accessory). It can also be attached to a mounting plate using an M4 screw. Various lengths are available as standard, up to 1000 mm (see table).

Special lengths can be ordered:
Please always state length required!



Label carrier

Length	Part. No.	Type designation	Remarks
up to 500 mm	108878	KFD0-LC1-XXX-Y108878	(*) customer-specific (XXX = length in cm)
510 mm ... 1000 mm	108879	KFD0-LC1-YYY-Y108879	(*) customer-specific (YYY = length in cm)

(*) Please state when ordering. Delivery: 2 to 4 weeks.

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Instruction manual

These instructions are only valid in connection with the corresponding data sheets

Marking

The initiator simulator IS01 is marked as follows.

Pepperl+Fuchs	D 68307 Mannheim
CE-marking	CE 0106
Type	IS01
Number and year of manufacture	see test badge
Identification to avoid explosions	II 1 G EEx ia IIB T4
Electrical parameters	U_i = 16 V DC
	I_i = 55 mA
	P_i = 245 mW
	C_i = 125 nF
	L_i = 0 mH
Ambient temperature:	T_U ≤ +50 °C

Intended use

- The initiator simulator IS01 is used in the measuring and control technique for the simulation of switching function and lead short circuit at devices, which contain intrinsically safe circuits. The initiator simulator IS01 can be operated within hazardous areas.
- The data sheet of the initiator simulator IS01 contains the electrical data of the EC-prototype test certificate and is an essential component of the instruction manual.
- Laws and/or regulations governing the use or intended usage goal must be observed.
- Initiator simulators IS01, which have been operated in general electrical systems, must not be used in electrical systems, that are in connection with hazardous areas, afterwards.

Commissioning for use in explosive atmospheres

(Commissioning must only be performed by particularly trained specialists)

- The initiator simulator IS01 is designed in the IP20 protection class in accordance with EN 60529 and must be appropriately protected against adverse environmental conditions such as splashed water or dirt beyond accumulation level 2.
- The initiator simulator IS01 is an intrinsically safe electrical apparatus and can be operated within hazardous areas, in zone 0, zone 1 and zone 2. The initiator simulator IS01 must only be connected to intrinsically safe circuits. The maximum permissible values of the initiator simulators IS01 have to be observed.
- A legible copy of the EC-Type Examination Certificate DMT 02 ATEX E 008 is an essential component of this instruction manual. The electrical data of section 15 of the prototype test certificate have to be observed.

Maintenance

The function of the initiator simulator IS01 is stable, even over long periods, thus eliminating the need for regular adjustment. Maintenance is therefore not required.

Fault elimination

No changes can be made to devices which are operated in hazardous areas. Repairs to the device must only be undertaken by specialist authorised personnel who have been trained for the task.

The initiator simulator IS01 is rated for the use in pollution degree 2, in accordance with EN 50178.

Ambient conditions

Ambient temperature see datasheet

Humidity max. 75 % relative humidity without condensation

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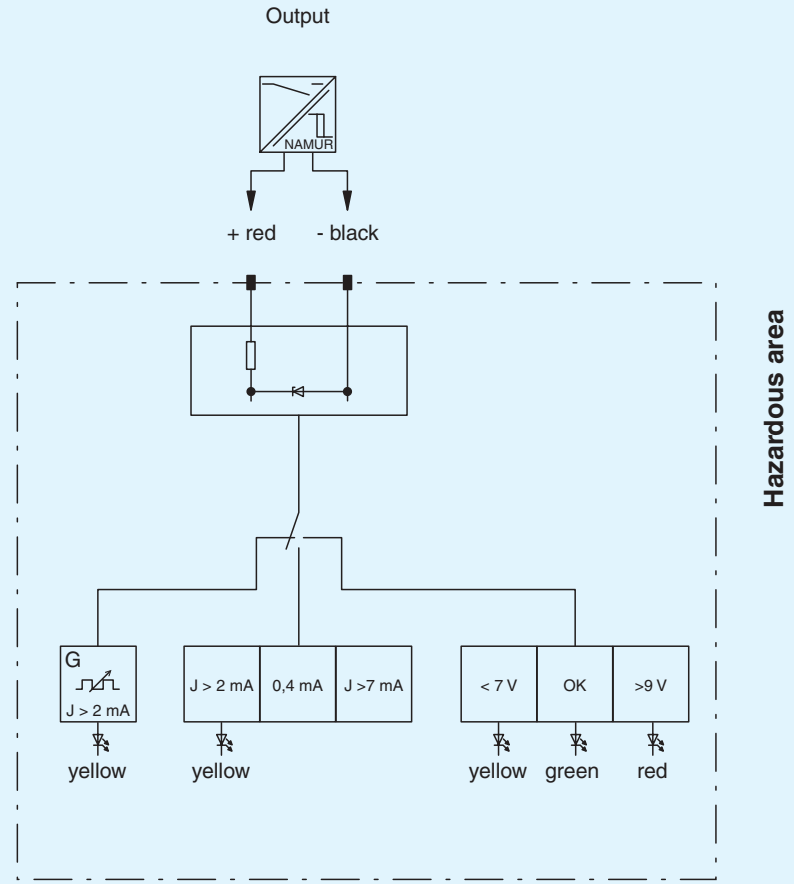
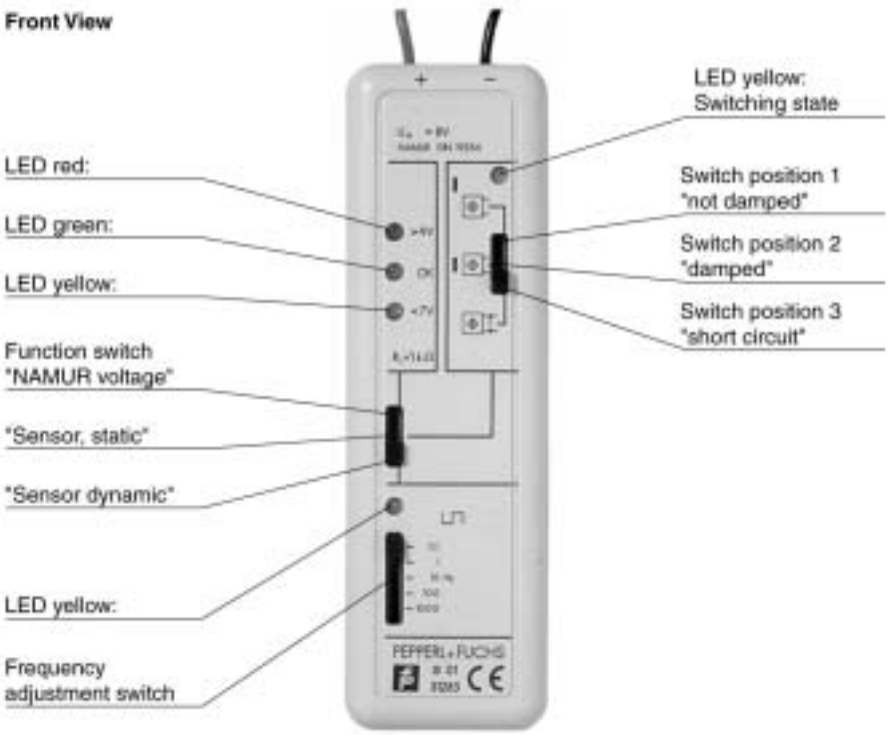
- Intrinsically safe EEx ia IIB T4
- Test device for isolated switch amplifier and other devices connected in series to the NAMUR input
- Display of the correct voltage of NAMUR input
- Simulation of switching function and line short-circuit
- Quartz-precision square-wave generator for testing rotational speed controllers and frequency-current converters
- No batteries necessary, always ready for operation

IS01

Electrical Connection



Composition



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Supply	
Input voltage	8 V DC (R_i approx. 1 kOhm); ≤ 30 V DC
Directive conformity	
Electromagnetic compatibility	standards
Directive 89/336/EG	EN 61326, EN 50081-2, NE21
Output	
Rated values	acc. to IEC 60947-5-6 (NAMUR, DIN 19234), see system description for electrical data
Ambient conditions	
Ambient temperature	0 ... 50 °C (273 ... 323 K)
Storage temperature	-25 ... 70 °C (248 ... 343 K)
Mechanical specifications	
Protection degree	IP00, according to EN 60529
Mass	70.5 g
Construction type	ABS - handheld housing, grey
Data for application in conjunction with hazardous areas	
EC-Type Examination Certificate	DMT 02 ATEX E 008 , for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 1G EEx ia IIB T4 [circuit(s) in zone 0/1/2]
Voltage U_i	16 V DC
Current I_i	55 mA
Power P_i	245 mW
Type of protection [EEx ia]	
Internal capacitance (EEx ia)	125 nF
Internal inductance (EEx ia)	0 mH
Directive conformity	
Directive 94/9 EU	EN 50014, EN 50020

Notes

Operation:

The simulator is used instead of a sensor and is connected to an input to DIN EN 60947-5-6 NAMUR.
Three different test functions may be selected using the function switch.

Switch position "NAMUR voltage"

The voltage of the control circuit can be tested according to DIN EN 60947-5-6 NAMUR. In this case the initiator simulator has an internal resistance of 1 kOhm.

Function switch position "sensor static"

- Switch position 1 control circuit J > 2,1 mA (Initiator not damped)
- Switch position 2 control circuit J about 0,4 mA (Initiator damped)
- Switch position 3 control circuit J > 7,0 mA (Lead short circuit)

Function switch position "sensor dynamic"

A quartz controlled rectangular wave controller produces a signal with a duty ratio of 50 % : 50 %.
The frequency can be adjusted from 0.1 Hz up to 1 kHz using the slide switch.

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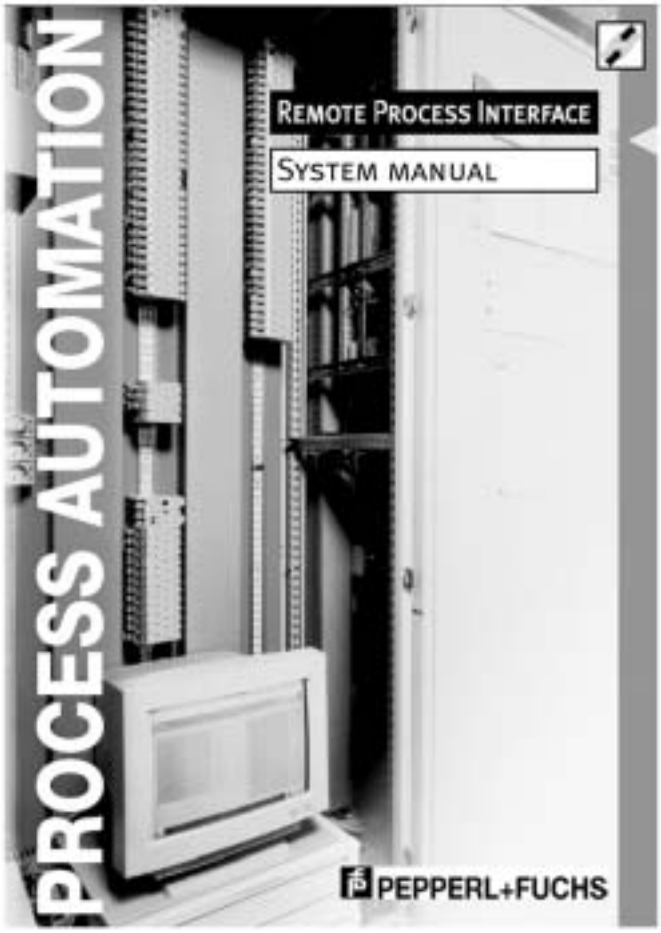
RPI system manual

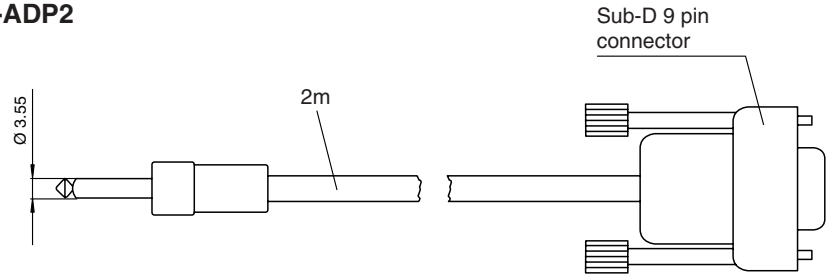
Can be downloaded (free of charge):
http://www.pepperl-fuchs.com



Adaptor K-ADP2

Adaptor for gateways with RS 232 service interface.

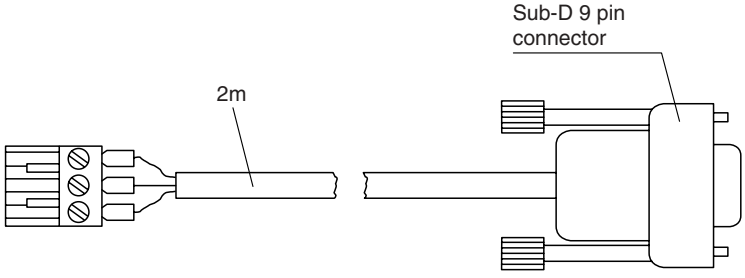
K-ADP2



Adaptor K-ADP4

Adaptor for gateways with RS 485 service interface.

K-ADP4



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PACT*ware*™ Edition 2

Manufacturer and fieldbus independent configuration tool with FDT interface (**F**ield **D**evice **T**ool)

- Based on FDT technology
- Device Type Manager (DTMs) available for all Pepperl+Fuchs devices and systems
- Commissioning, configuration and parameter assignment independent of the process control system
- Communication DTMs available for serial interfaces and fieldbus systems
- Maintenance, diagnostics and error correction
- Suited for PCs running Windows 98, Windows NT, Windows 2000 and Windows XP
- In accordance with VDI/VDE 2187

Hardware requirements

PC with Pentium II 200_MHz processor and at least 64_MByte user memory.

Operating system

Windows 98, Windows NT4.0 from Service Pack 4, Windows 2000 and Windows XP.

Languages

German, English and French can be selected

Licencing

The packages point-to-point Interface Technology, point-to-bus Remote I/O, point-to-bus HART and Level can be downloaded separately or altogether (http://www.pepperl-fuchs.com/pa/accessories/pactware/main.html) in a **BASIC version** without the functions printing and storage.

The **BASIC version** can also be obtained on CD-ROM from Pepperl+Fuchs.

The release of the functions printing and storage requires a licence number. The licences with the functionality quoted in the table (page 146) can be ordered at Pepperl+Fuchs.

Schematic representation of the system configuration

Graphic representation of all communication and device DTMs in the tree structure. In case of online operation colour code for identification of defective units and simulation operation. Multiple windows can be open simultaneously. It is therefore possible to view the set device parameters, to monitor the measurement value and to display the device diagnostic simultaneously.

System planning, application processing

Generation of a configuration by means of a graphical application processing menu. Editing of available projects. Selection switch markings for each channel. Offline configuration, saving of project data to hard disk or disk. Automatic comparison of the project plan to the actual available system when establishing connections on the device and parameter levels.

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PACT*ware* BASIC version	
Model	**Functionality**
PW2-BASIC	all available DTMs of the Pepperl+Fuchs K and E devices, HART-Multiplexer, Remote I/O systems RPI and IS-RPI and level control devices. Reduced functionality: no printing, no storing
Licences	
PW2-P.LEVEL	Professional Level licence for all available DTMs of the Pepperl+Fuchs level control devices
PW2-P.RIO100	Professional RIO100 licence for the connection of 100 measurement circuits to the Pepperl+Fuchs Remote I/O systems RPI and IS-RPI including HART-Multiplexer.
PW2-P.RIO500	Professional RIO500 licence for the connection of 500 measurement circuits to the Pepperl+Fuchs Remote I/O systems RPI and IS-RPI including HART-Multiplexer.
PW2-ENTERPRISE	Enterprise licence for all available DTMs of the Pepperl+Fuchs K and E devices, HART-Multiplexer, Remote I/O systems RPI and IS-RPI and level control devices. Unlimited number of devices, measurement circuits and systems within a project can be operated.

Device parameterisation

Access to all device parameters via a serial interface, via HART communication or via acyclic fieldbus communication.

Indication of measured value

Online monitoring of arbitrary process values

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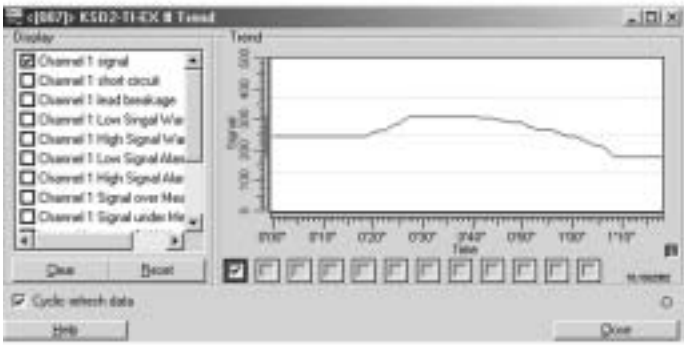
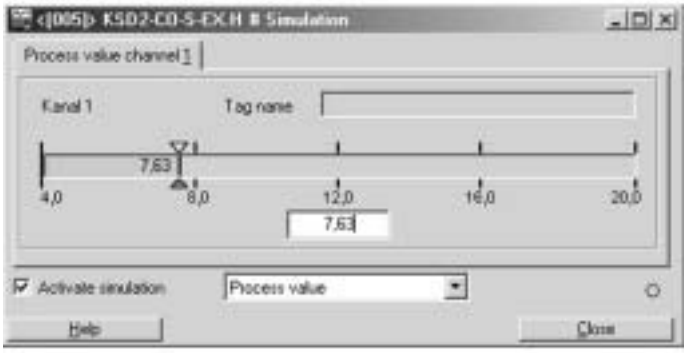
Trend indication

Indication of trends of arbitrary process values



Simulation

Simulation of all measured variables and diagnostic data



Diagnosis

All diagnostic information is accessible via **PACT***ware*™

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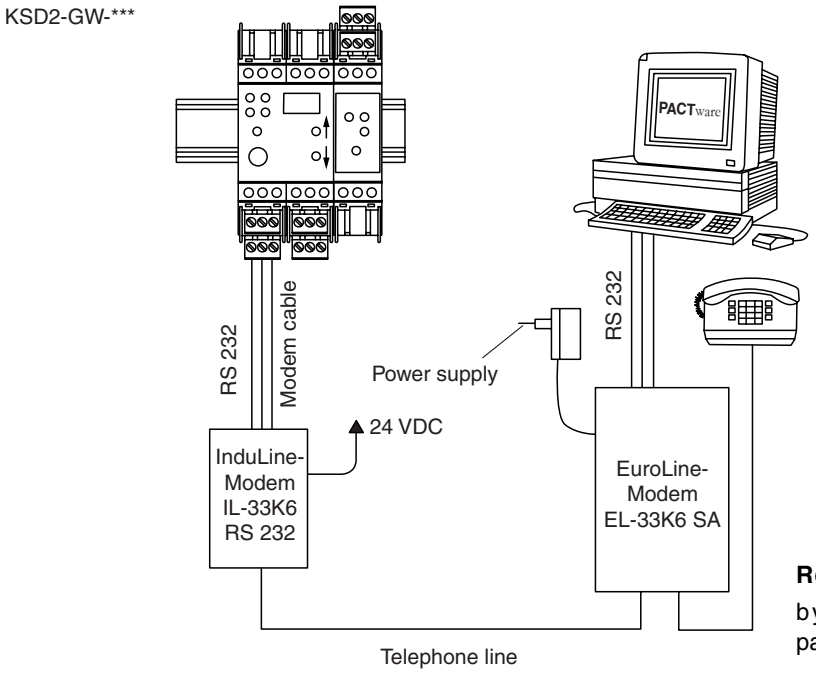
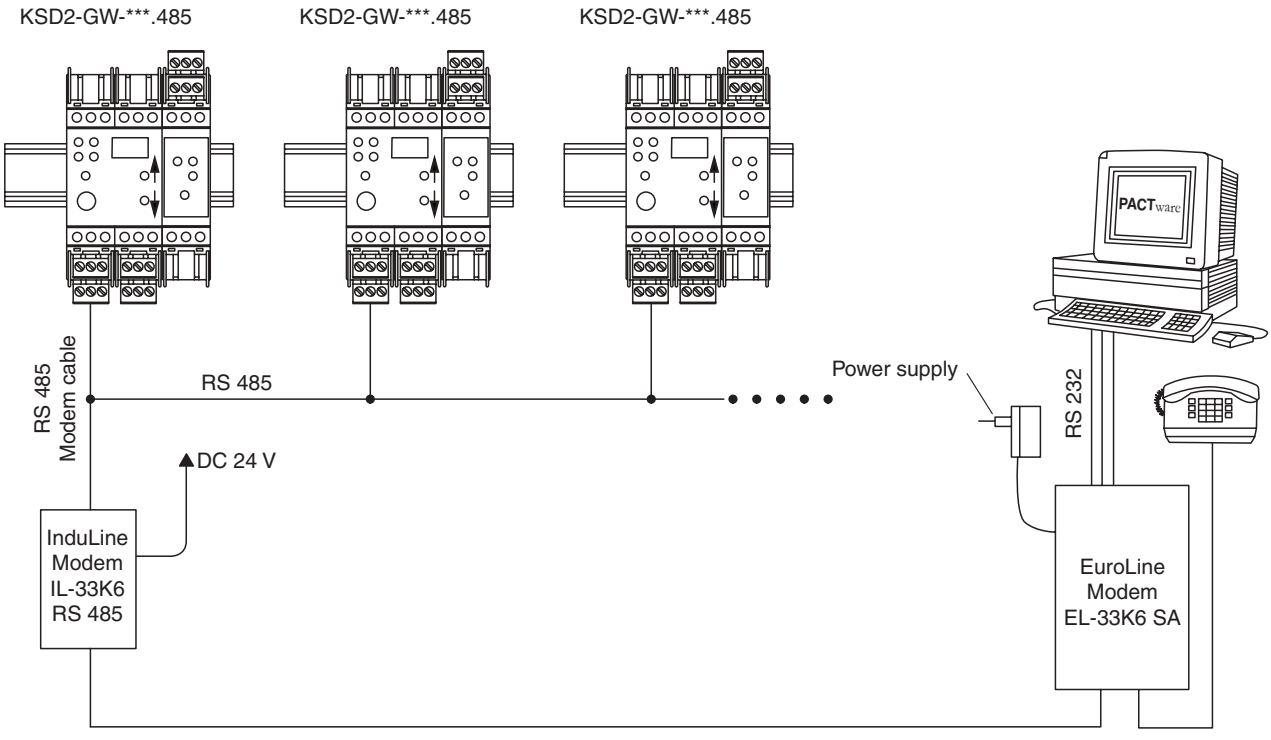
InduLine/EuroLine Modem

InduLine/EuroLine modems are used for remote monitoring and remote configuration of the RPI. The Gateway parameter data are transmitted from their parameterisation interfaces, via the modem/telephone network, to the remote PC with the RPI user (i.e. man/machine) interface K-SK1 installed on it and vice versa. In the case of gateways with an RS 232 parmeterisation interface there is thereby a point-to-point connection. By using gateways with RS 485 parameterisation interfaces several RPI segments can be controlled simultaneously.



Remote parameterisation on a RPI segment
by means of modem coupling via the RS 232 parameterisation interface



Remote parameterisation on several RPI segments
by means of modem coupling via the RS 232 parameterisation interface

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RS 232 modem cable	**signal**	**gateway connection**	**PIN Sub-D-plug**
	RxD	terminal 7	3
	TxD	terminal 8	2
	GND	terminal 9	7
RS 485 modem cable	**signal**	**gateway connection**	**PIN Sub-D-plug**
	RxD/TxD-P	terminal 7	3
	RxD/TxD-N	terminal 8	8
	GND	terminal 9	1

Commissioning

1. Connect InduLine modem to PC (**PACT***ware*™).
2. Call menu level "Options/Initialise modem".
   "Dialog COM-Port" appears on the screen.
   Select baudrate and modem type (InduLine ...).
   O.K. Return.
   The modem is initialised with the appropriate parameters.
3. Disconnect the InduLine modem from the PC.
   Connect the InduLine modem to the Gateway.
4. Connect Euroline Modem to PC (**PACT***ware*™).
5. Call menu level "Options/Initialise modem".
   "Dialog COM-Port" appears on the screen.
   Select Modem Type (EuroLine ...).
6. Mark COM Port in the project tree.
   Select menu level "Device data/COM-Port settings".
   Select baudrate.
   Insert x against "Make connection via Modem".

Types of modem

InduLine-Modem IL-33K6/RS232
InduLine-Modem IL-33K6/RS485
Euroline Modem EL-33K6 SA

Modem reference source

Allied Data Technologie GmbH
Rheinstraße 7, 41836 Hückelhoven
Tel.:+49 (0)2433 - 938350
Fax.:+49(0)24 33 - 938246
e-mail: bme.sales@t-online.de

Approvals

European approvals

Type designation	ATEX zone 0/1	ATEX zone 2	CENELEC	TÜV	SEV	FTZU	KDB	BKI	ISZWE (VNIIVE)
	Europe	Germany	Europe	Germany	Switzerland	Czchech Rep.	Poland	Hungary	Ukraine
KFD2-EB-MAR.RPI	-	-	-	-	-	-	-	-	-
KFD2-EB.R2A.RPI	-	TÜV 98 ATEX 1618 X	-	-	-	-	-	-	-
KFD2-EB.RPI	-	TÜV 98 ATEX 1618 X	-	-	-	-	-	-	-
KSD2-BI-4	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-BI-4.2	-	-	-	-	-	-	-	-	-
KSD2-BI-Ex2	ZELM 99 ATEX 0012	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-BI-Ex4	ZELM 99 ATEX 0012	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-BO-Ex	ZELM 00 ATEX 0030	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-BO-Ex2.2	ZELM 00 ATEX 0030	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-CI-2	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-CI-S	-	-	-	-	-	-	-	-	-
KSD2-CI-S-Ex	BAS 99 ATEX 7182	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-CI-S-Ex.H	BAS 99 ATEX 7182	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-CI-S-H	-	-	-	-	-	-	-	-	-
KSD2-CO	-	-	-	-	-	-	-	-	-
KSD2-CO-Ex	ZELM 99 ATEX 0013	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-CO-S	-	-	-	-	-	-	-	-	-
KSD2-CO-S-Ex	ZELM 99 ATEX 0013	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-CO-S-Ex.H	ZELM 99 ATEX 0013	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-CO-S-H	-	-	-	-	-	-	-	-	-
KSD2-FI	-	-	-	-	-	-	-	-	-
KSD2-FI-Ex	ZELM 99 ATEX 0012	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-GW-CN	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-GW-CN.485	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-GW-MOD	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-

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European approvals

Type designation	ATEX zone 0/1	ATEX zone 2	CENELEC	TÜV	SEV	FTZU	KDB	BKI	ISZWE (VNIIVE)
	Europe	Germany	Europe	Germany	Switzerland	Czchech Rep.	Poland	Hungary	Ukraine
KSD2-GW-MOD.485	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-GW-MPL	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-GW-MPL.485	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-GW-PRO	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-GW2-PRO	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-GW-PRO.485	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-HC	-	TÜV 00 ATEX 1617 X	-	-	-	-	-	-	-
KSD2-MVI	-		-	-	-	-	-	-	-
KSD2-RO-2	-	TÜV 00 ATEX 1618 X	-	-	-	-	-	-	-
KSD2-RO-Ex2	-	TÜV 00 ATEX 1618 X	97.D.2138	-	-	-	-	-	-
KSD2-TI	-	-	-	-	-	-	-	-	-
KSD2-TI-Ex	BAS 99 ATEX 7187	TÜV 00 ATEX 1617 X	-	-	A.Nr.96.110869.01	J03569	-	-	-
KSD2-VI	-		-	-	-	-	-	-	-
IS01	DMT 02 ATEX E 008	-	-	-	-	-	-	-	-

Non-european approvals

Type designation	FM	UL	CSA	CEPEL	SA	MDA	QMD	NSW	NEPSI	TIIS	KISCO	KROS
	USA	USA	Canada	Brazil	Australia	Australia	Australia	Australia	China	Japan	Korea	Korea
KFD2-EB-MAR.RPI	-	-	-	-	-	-	-	-	-	-	-	-
KFD2-EB.R2A.RPI	yes	-	yes	-	-	-	-	-	-	-	-	-
KFD2-EB2.RPI	yes	-	yes	-	-	-	-	-	-	-	-	-
KSD2-BI-4	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-BI-4.2	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-BI-Ex2	yes	-	yes	-	-	-	-	-	-	-	-	-
KSD2-BI-Ex4	yes	-	yes	-	-	-	-	-	-	-	-	-
KSD2-BO-Ex	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-BO-Ex2.2	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-CI-2	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-CI-S	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-CI-S-Ex	yes	-	-	-	-	-	-	-	GYJ97136	-	-	-
KSD2-CI-S-Ex.H	yes	-	-	-	-	-	-	-	-	-	-	-
KSD2-CI-S-H	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-CO	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-CO-Ex	yes	-	yes	-	-	-	-	-	-	-	-	-
KSD2-CO-S	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-CO-S-Ex	yes	-	yes	-	-	-	-	-	-	-	-	-
KSD2-CO-S-Ex-H	yes	-	yes	-	-	-	-	-	-	-	-	-
KSD2-CO-S-H	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-FI	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-FI-Ex	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-GW-CN	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-GW-CN.485	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-GW-MOD	-	-	yes	-	-	-	-	-	-	-	-	-
KSD2-GW-MOD.485	-	-	yes	-	-	-	-	-	-	-	-	-

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Non-european approvals

Type designation	FM	UL	CSA	CEPEL	SA	MDA	QMD	NSW	NEPSI	TIS	KISCO	KROS
	USA	USA	Canada	Brazil	Australia	Australia	Australia	Australia	China	Japan	Korea	Korea
KSD2-GW-MPL	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-GW-MPL.485	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-GW-PRO	-	-	yes	-	-	-	-	-	-	-	-	-
KSD2-GW2-PRO	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-GW-PRO.485	-	-	yes	-	-	-	-	-	-	-	-	-
KSD2-HC	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-MVI	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-RO-2	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-RO-Ex2	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-TI	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-TI-Ex	-	-	-	-	-	-	-	-	-	-	-	-
KSD2-VI	-	-	-	-	-	-	-	-	-	-	-	-
IS01	-	-	-	-	-	-	-	-	-	-	-	-

Glossary

The manufacturer certifies that the product meets the fundamental safety requirements under EC regulations by the application of a registration number to this product.

The following apply to Pepperl+Fuchs products:

Regulations:

73/23/EWG	Low Voltage Directive
89/336/EWG	EMC Directive
89/392/EWG	Machine Directive
94/9/EG	Devices and Safety Systems for Hazardous Areas

Definition of Contamination Level 2 per EN 50178

Under normal circumstances, only non-conductive contamination occurs. Occasionally however, short-term conductance may be expected through condensation when the device is not being operated. This applies to the immediate surrounding conditions of the electronic device.

Insulation Coordination

The assignment of the insulation characteristics of an apparatus in accordance with:

1. The expected over voltages,
2. The characteristic values of the overvoltage precautions,
3. The expected surrounding conditions,
4. The protective measures against contamination.

Overvoltage Category

The assignment of an electrical apparatus in accordance with the expected over voltage.

Table:

The assignment of rated operating voltages to the rated surge voltages

Rated operating voltage (V) for alternating voltage systems in accordance with DIN IEC 38	Rated surge voltages in V for overvoltage category			
	I	II	III	IV
230/400/277/480[1)]	1500	2500	4000	6000
400/690	2500	4000	6000	8000
1000	4000	6000	8000	12000

[1)] Rated operating voltage of 500 V is set.

Maximum Output Power (P_O)

The highest electrical power in an intrinsically safe circuit that can be received from the electronic device.

Maximum Output Voltage (U_O)

The highest output voltage (AC or DC peak value) in an intrinsically safe circuit which can occur, under open circuit conditions, at the connection components of the electronic device with each applied voltage up to the maximum voltage and including U_m and U_i

Observation: When more than one voltage is applied, the maximum output voltage is the only one to appear of the unfavorable combination of applied voltages.

Maximum External Inductance (L_O)

The highest inductive value in an intrinsically safe circuit which can be connected to the terminal blocks of the device without affecting the intrinsic safety.

Maximum External Capacitance (C_O)

The highest capacitance value in an intrinsically safe circuit which can be connected to the terminal blocks of the device without affecting the intrinsic safety.

Maximum Input Voltage (U_O)

The highest voltage (AC or DC peak values) which may be applied to the terminal blocks of the intrinsically safe device without affecting the intrinsic safety.

Maximum Internal Inductance (L_O)

Effective replacement inductance at the device terminal blocks for the internal inductances.

Maximum Internal Capacitance (C_i)

Effective replacement capacitance at the device's terminal blocks for the internal capacitances.

Maximum Output Current (I_O)

The highest current (AC or DC current peak values) in an intrinsically safe circuit which may be received from the device's terminal blocks.

Maximum Effective Value of AC or Maximum DC (U_m)

The highest voltage which can be applied to the non-intrinsically safe terminal blocks of the device without affecting the overall intrinsic safety.

Observation: The U_m value may vary between the different groups of terminal blocks.

Maximum Input Current (I_O)

The highest current (AC or DC current peak value), which can be supplied across the terminal blocks to the circuit without affecting the intrinsic safety.

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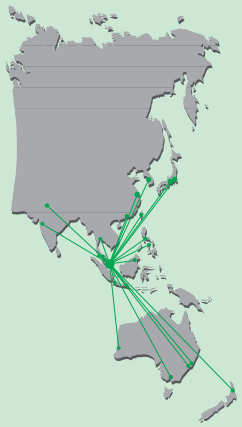

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