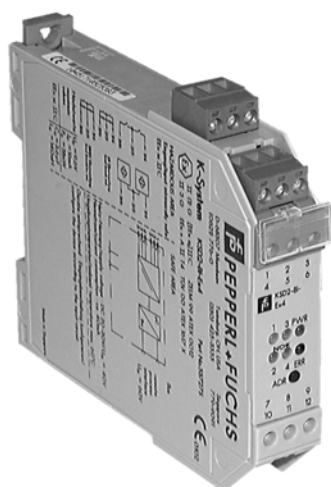


## Variants

KSD2 ... Ex ...	with 24 V DC power supply, intrinsically safe control circuit
KSD2 ...	with 24 V DC power supply, no explosion protection



Example: KSD2-BI-Ex4

## 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 the individual devices contain the electrical data stated in the EC-Type Examination Certificate and are a valid part of the instruction.
- RPI-system devices are not suitable for the isolation of signals in power engineering, unless this is specifically referred to in the respective data sheet.
- The respective statutory regulations and directives governing the application or intended use should be observed.
- Intrinsic safe circuits that were operated with circuits of other types of protection may not be used as intrinsic safe circuits afterwards.
- Circuits in type of protection "nL" that were operated with circuits of other types of protection (except intrinsic safe circuits) must not be used in type of protection "nL" afterwards

## Installation and commissioning in the safe area

Commissioning and installation must be carried out by specially trained qualified personnel only.

### Installation of the interface devices in the safe area

- The devices are constructed to satisfy the IP20 protection classification and must be protected accordingly from adverse environmental conditions such as water spray or dirt exceeding the pollution severity level 2.
- The devices must be installed outside the hazardous area!
- For devices with intrinsically safe circuits, the protected circuit (light blue identification on the device) can be located in the hazardous area. It is especially important to ensure that all non-intrinsically safe circuits are safely isolated.
- The installation of the intrinsically safe circuits is to be conducted in accordance with the relevant installation regulations.
- The respective peak values of the field device and the associated device with regard to explosion protection should be considered when connecting intrinsically safe field devices with the intrinsically safe circuits of RPI-system devices (demonstration of intrinsic safety). Here EN 60079-14/IEC60079-14 is to be observed.
- If more channels of one device are to be connected parallel it must be ensured that the parallel connection is made directly at the terminals. For the demonstration of intrinsic safety the maximum values of the parallel connection are to be regarded.
- When intrinsically safe circuits are used in areas made hazardous by dust (Ex zone "D") only appropriately certificated field devices must be used.
- The EC-Type Examination Certificates should be observed. It is especially important to observe the "special conditions" where these are contained in the certificates.

### Installation of the interface devices within zone 2 of the hazardous area

- Only devices with the manufacturer's declaration of conformity can be installed in zone 2.
- The individual data sheets indicate whether these conditions are met.
- The devices should be installed in a switch or junction box, which:
  - corresponds at least IP54 in accordance to EN 60529.
  - is confirm to the requirements of resistance to light and resistance to impact corresponding to EN 50014/IEC 60079-0.
  - is confirm to the requirements of thermal endurance corresponding to EN 60079-15.
  - must not cause ignition danger by electrostatic charge during intended use, maintenance and cleaning.
- For devices with intrinsically safe circuits, the protected circuit (light blue identification on the device) can be located in the hazardous area. It is especially important to ensure that all non-intrinsically safe circuits are safely isolated.
- The installation of the intrinsically safe circuits is to be conducted in accordance with the relevant installation regulations.
- The respective peak values of the field device and the associated device with regard to explosion protection should be considered when connecting intrinsically safe field devices with the intrinsically safe circuits of RPI-system devices (demonstration of intrinsic safety). Here EN 60079-14/IEC60079-14 is to be observed.
- If more channels of one device are to be connected parallel it must be ensured that the parallel connection is made directly at the terminals. For the demonstration of intrinsic safety the maximum values of the parallel connection are to be regarded.

- When intrinsically safe circuits are used in areas made hazardous by dust (Ex zone "D"), only appropriately certificated field devices must be used.
- The EC-Type Examination Certificates and 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.

**Repair and 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 on the device are also not allowed.

**Isolation coordinates for devices with Ex-certificate according to EN 50020** The devices are assessed for pollution degree 2 and overvoltage category II according to EN 50178.

**Isolation coordinates for installations for galvanic isolation according to EN 50178 and EN 61140** The devices of the RPI-system are installation devices respectively electronic equipment for the use in secluded electrical operating sites where only skilled personnel or electrically instructed personnel must have admission or access to. The devices are assessed for pollution degree 2 and overvoltage category II according to EN 50178.

**Ambient conditions**

- Ambient temperature: see data sheet
- Storage temperature: -40 °C ... 85 °C (233 K ... 358 K)
- Humidity: max. 75 % rel. humidity without moisture condensation

## System description

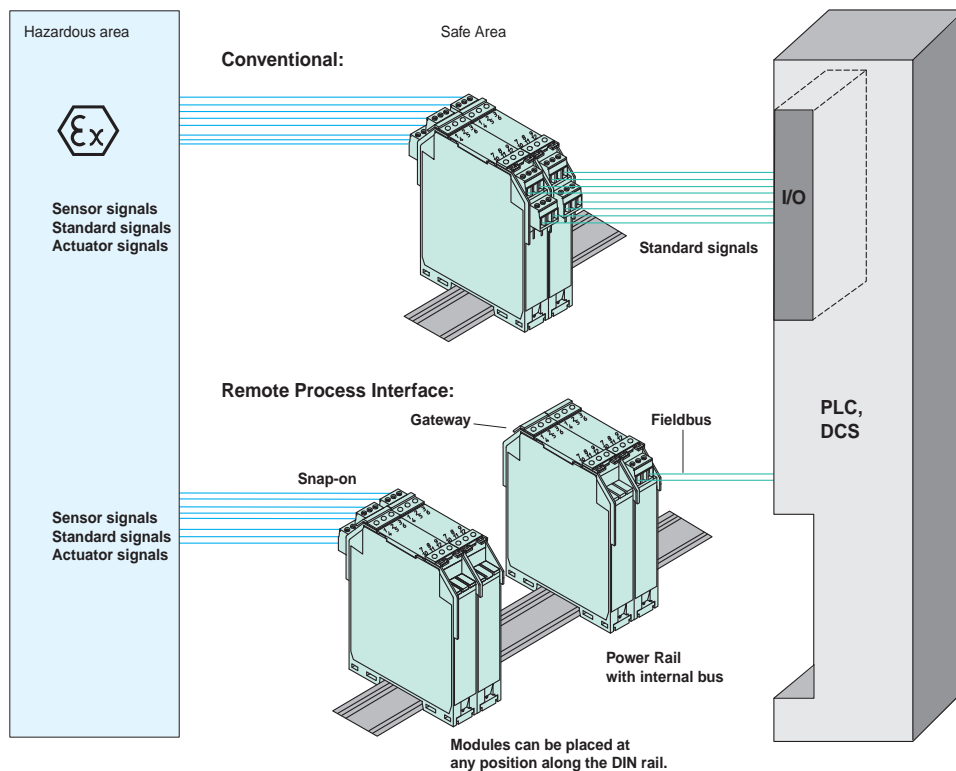
The remote process interface (RPI) from Pepperl+Fuchs is an interface system for conditioning conventional measurement, control, and regulator signals between sensors, actuators and field devices on one hand, and a process control system or a PLC on the other hand, whereby the connection to the control 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. 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 construction

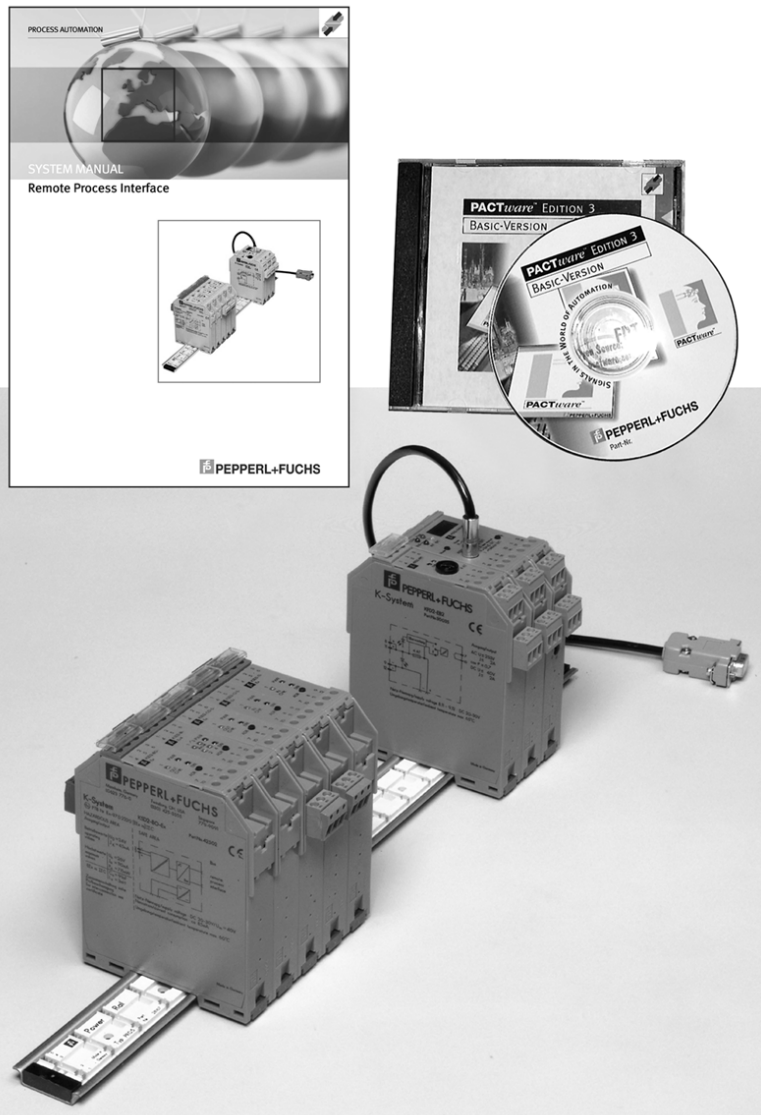


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## Components of the RPI-system

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 **PACTware™** (FDT) for
  - Planning,
  - Documentation,
  - Configuration,
  - Parameterisation,
  - Installation,
  - Commissioning,
  - Monitoring,
  - Diagnosis,of the complete system.
6. PC adapter
7. System manual

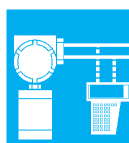


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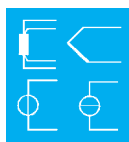
## Field signals

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

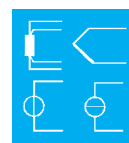
These sensor/actuator signals are commonly those signals used in process automation. Depending on the function the RPI devices have one to four channels for



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 controller.



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



5. Binary output for solenoid valves.



6. Binary output potential-free relay contact.

## Electrical connection

### Connection via removable terminals

The removable terminals simplify control cabinet construction and allow the units to be replaced while under power.

These screwed, self-opening terminals allow space for the connection of leads with core cross-sections of up to 2.5 mm<sup>2</sup>. The connectors are coded, so that it is not possible to make an incorrect connection.



Intrinsically safe field circuits are connected to the **blue** terminals. These may be conducted using DIN EN 60079-14-compliant leads into the hazardous area.

Non-intrinsically safe field circuits are connected to the **green** terminals.

With the KF-CP coding profile, separately available connectors with test sockets or cage spring release terminals can be easily coded.

## Mounting

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.

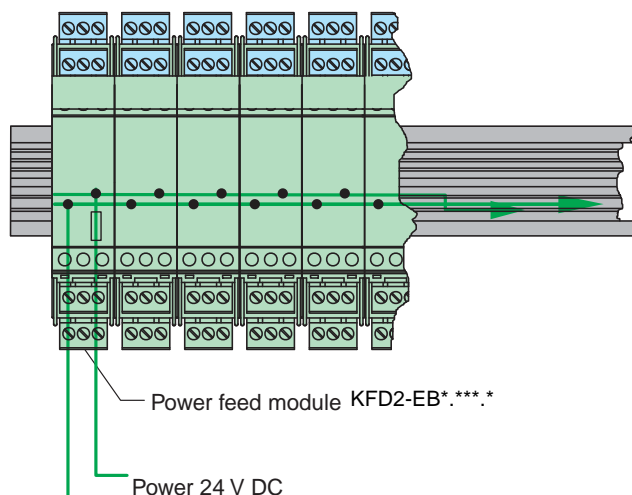
Basically, the RPI-series can be mounted in two ways:

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

Panel mounting is only recommended if a very small number of devices 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 devices of RPI-series.

### Power supply with Power Rail



Wiring costs are significantly lower when supplying power via the Power Rail. It is also possible to take advantage of collective error messages and 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.**

### Mounting with 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. The following versions of the Power Rail are available:

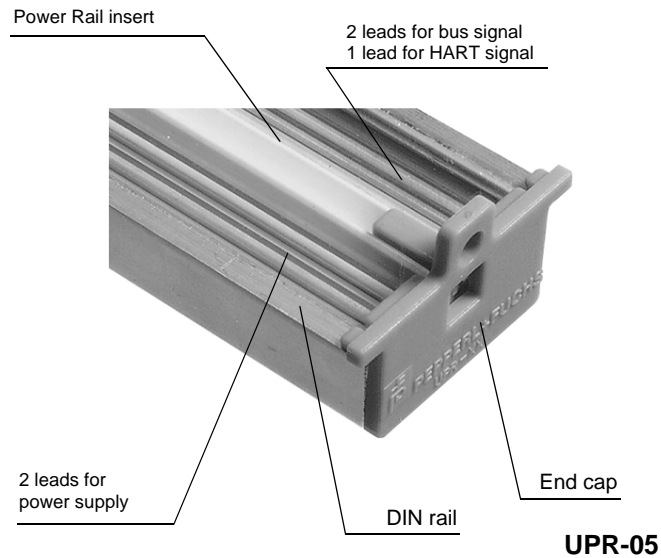
- Power Rail with DIN rail and cover with two leads for power supply, two leads for bus connections and one lead for HART signal (UPR-05)
- Power Rail with grid 4 cm (1.6 in) with two leads for power supply, two leads for bus connections and one lead for HART signal (PR-05)

**Please use the standard type UPR-05 for new systems.**

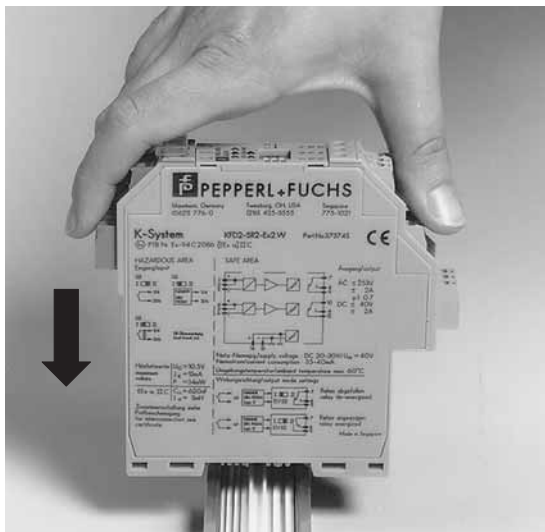
Standard devices with the type designations KS\*-... have gold plated contacts that provide the connection to the Power Rail. By snapping onto the rail, the unit is supplied with power. Separate wiring for the power supply is not required.

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.



As shown in the figure, the isolation modules are snapped onto the Power Rail in a vertical downward movement.



**CORRECT:** Unit snapped on vertically.



**INCORRECT:** Unit snapped on at an angle.

**Power supply via Power Rail** 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.

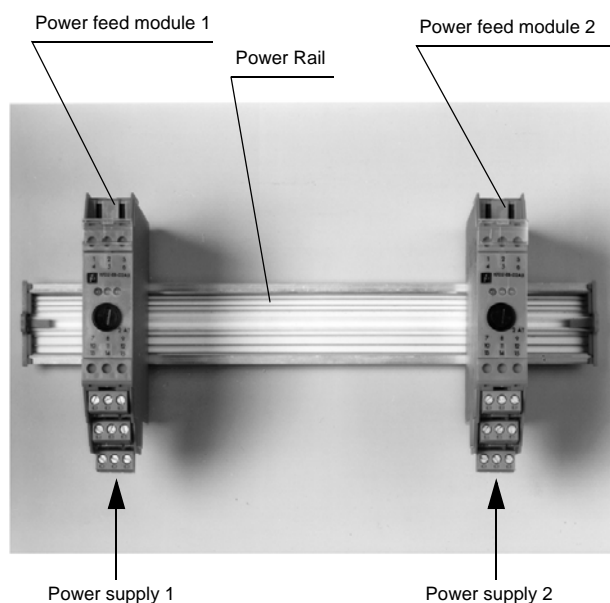
Power is supplied by means of two conductors on the Power Rail to the mounted devices. A contact is established to the power supply by simply snapping the component onto the DIN rail. The need for wiring of one device to another in a "daisy chain" is eliminated. A power feed module provides the connection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

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.

The error message output (relay contact) at the power feed module may only be connected to a SELV or a PELV system

**Redundant power supply via Power Rail** There is the following power supply concept for the redundant power supply via Power Rail.

KFD2-EB.R2A.RPI power supply module for redundant power supply.



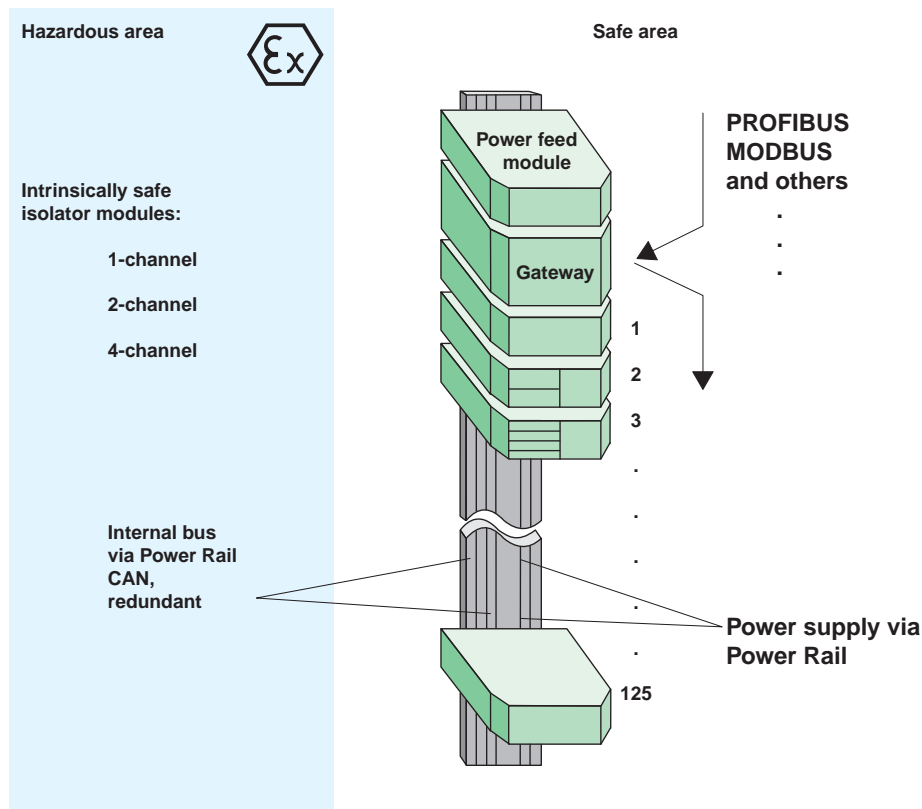
A redundant power supply to the Power Rail, with two supply modules, provides increased safety. If the fuse in one power supply module operates, the power supply is obtained via the second power supply module. Each power supply circuit is connected via its own Power Rail contact.

## System construction

**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.

### Bus connection



**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. 62500 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.

**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 bus system used, the number of stations, the quantity of data that has to be transferred 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 incomparably higher range of functions than conventional interface modules:

- Selection switch markings (TAG number) 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 controllers 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 controllers is connected. Thus, a hand-held 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 fieldbus, can be built up.

Up to 250 field devices (sensors or actuators) can be addressed with this system via PC using current HART configuration software, such as AMS (Emerson) or **PACT<sub>ware</sub>**<sup>TM</sup> (FDT). The RS 485 interfaces of the HART multiplexer and of the RPI gateway can be networked. Then the RPI software **PACT<sub>ware</sub>**<sup>TM</sup> (FDT) 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<sub>ware</sub>**<sup>TM</sup> (FDT). Thus, up to 250 HART field devices can be addressed without additional expenditure.

4. The 4 mA ... 20 mA signal is transferred 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 from the gateway and the devices without PC or control system.

### From the PC by means of the human machine interface

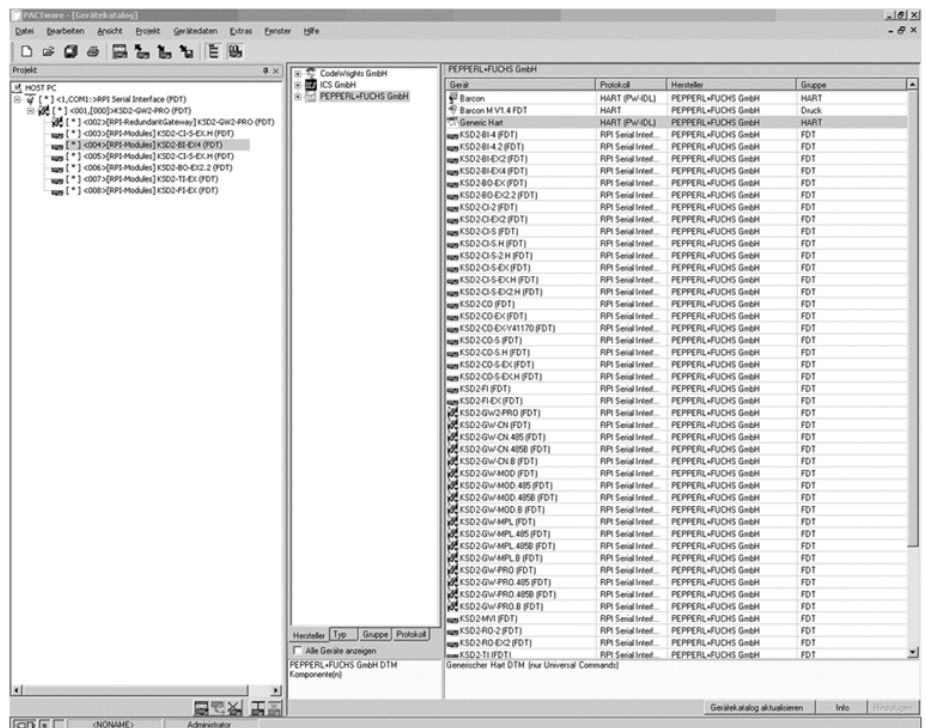
The functions, configuration and parameters of all devices can be operated from the gateway and the PC. The function of an engineering console is achieved for the RPI with PLC systems.

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 **PACTware™** (FDT).

This software runs under the operating systems Windows NT, Windows 2000 and Windows XP 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 is selectable. RPI-systems can be planned, configured, programmed, documented, commissioned, diagnosed and modified by the RPI software on-line and off-line, independent of the control system.

The projection data of all RPI devices are stored via **PACTware™** (FDT) to PC data carriers and can also be printed on paper as a hard copy.



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
Ω	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_Culn
ShTon_CuYd	degTwad	degBrix	degBaum_hv	degBaum_lt	degAPI	Percent_sol_wt
Percent_sol_vol	degBall	proof_vol	proof_mass	bush	CuYd	CuFt
Culn	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

**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 availability. 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 capabilities of the RPI interferences can be categorised and corrected quickly or they can be prevented from occurring.

Configuration data are stored in the EEPROMs of the RPI device safe from power outages and without 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 24 V DC power supply for the RPI-system can be arranged redundantly (see section "Redundant power supply via Power Rail")

**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 buses 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 2.
4. Also the correction of a fault is indicated on all three levels, see 1., 2., and 3.

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.

**Expansions**

The Power Rail is designed for expansion by having adequate space for the placement of additional 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 are 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.

**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](http://www.pepperl-fuchs.com).

## Technical data

### Electrical data

- Safe area signals and control circuit**
- 0/4 mA ... 20 mA signal level acc. to NE43
  - Current output HART compatible (min. 550  $\Omega$ )
  - Current input HART compatible
  - Binary input for mechanical contacts
  - Voltage input
  - Frequency 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 acc. to IEC 60946
  - Function isolation or safe isolation acc. to EN 50178 and NAMUR NE23
- For details, see data sheet.

- Ex-signals and field circuit**
- Transmitter power supply up to 17 V DC
  - Current input HART compatible
  - Pt100, in 2-, 3-, (4-)wire technology
  - Resistor 0  $\Omega$  ... 400  $\Omega$  with freely definable characteristic
  - Thermocouples of all types, internal cold junction, external reference
  - Current output HART compatible
  - Binary input NAMUR EN 60947-5-6
  - Frequency input
  - Binary output for Ex-i valves, short circuit protected
  - Relay output
- For details, see data sheet.

### Mechanical data

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

**Housing material** Polycarbonate (PC)

**Protection degree** IP20 acc. to EN 60529

**Connection** removable connector with integrated self opening device terminals for leads of up to a max. of 1 x 2.5 mm<sup>2</sup>

### Ambient conditions

**Ambient temperature** see data sheet

**Storage temperature** -40 °C ... 85 °C (233 K ... 358 K)

**Reference conditions for adjustment** 22.5 °C  $\pm$  2.5 °C (295.5 K  $\pm$  2.5 K)

**Relative humidity** max. 95 % no moisture condensation

**Vibration resistance** acc. to EN 60068-2-6, 10 Hz ... 150 Hz, 1 g, high crossover frequency

**Shock resistance** acc. to EN 60068-2-27, 15 g, 11 ms, half-sine

## Compliance with standards and directives

- General**
- RPI modules with and without explosion protection, mostly with Ex ia IIC, international approvals
  - EMC acc. to NAMUR NE21 and EN 61326
  - LEDs acc. to NAMUR NE44
  - Software acc. to NAMUR NE53
  - Switch-on pulse suppression
  - Supply voltage min. 20 V DC ... 30 V DC via Power Rail or supply terminals (SELV or PELV)
  - Safety devices acc. to VDE 0660 T.209, AK acc. to DIN 19250

### 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 switch gear - 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 switch gear - 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 switch gear and control gear - part 5-6: Control circuit devices and switching elements - DC interface for proximity sensors and switching amplifiers (NAMUR), 1999

### Isolation coordinates for devices with Ex-certificate according to EN 50020

The devices are assessed for pollution degree 2 and overvoltage category II according to EN 50178.

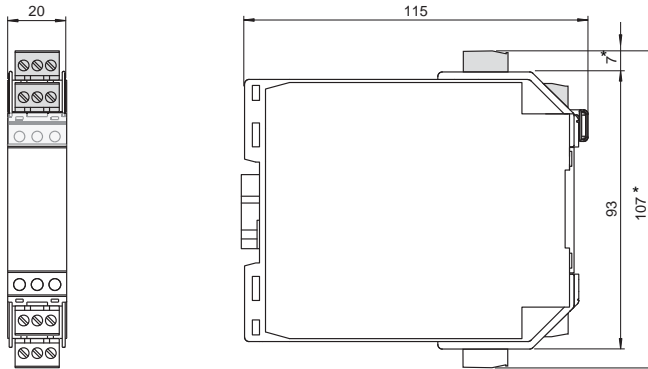
### Isolation coordinates for installations for galvanic isolation according to EN 50178 and EN 61140

The devices of the RPI-systems are installation devices respectively electronic equipment for the use in secluded electrical operating sites were only skilled personnel or electrically instructed personnel must have admission or access to.

The devices are assessed for pollution degree 2 and overvoltage category II according to EN 50178.

### Housing types

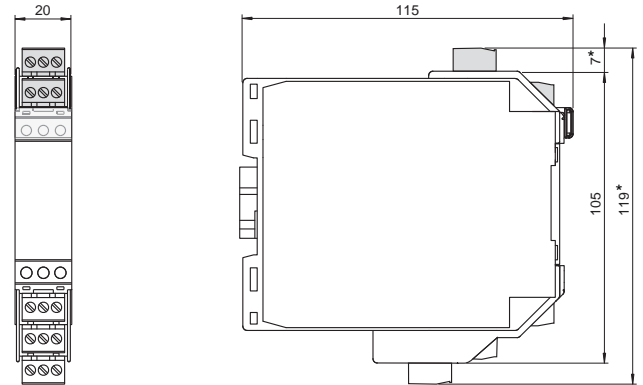
#### Housing type B1



Width 20 mm (0.8 in)  
Number of terminals max. 4

\* When using the KF-STP-\*\* connector  
the device is 112 mm (4.4 in) max. in height.

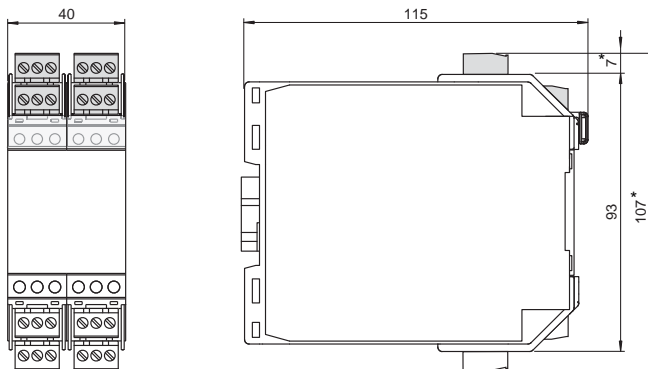
#### Housing type B2



Width 20 mm (0.8 in)  
Number of terminals max. 5

\* When using the KF-STP-\*\* connector  
the device is 124 mm (4.9 in) max. in height.

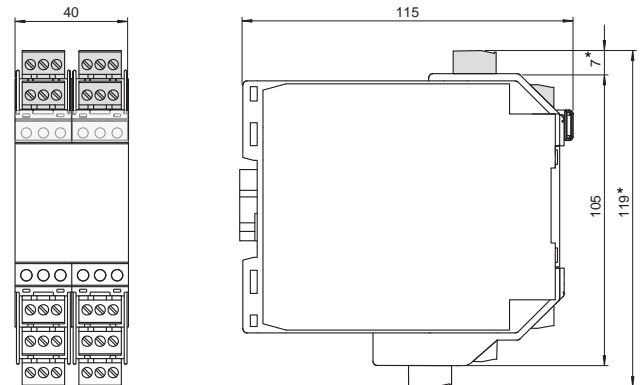
#### Housing type C1



Width 40 mm (1.6 in)  
Number of terminals max. 8

\* When using the KF-STP-\*\* connector  
the device is 112 mm (4.4 in) max. in height.

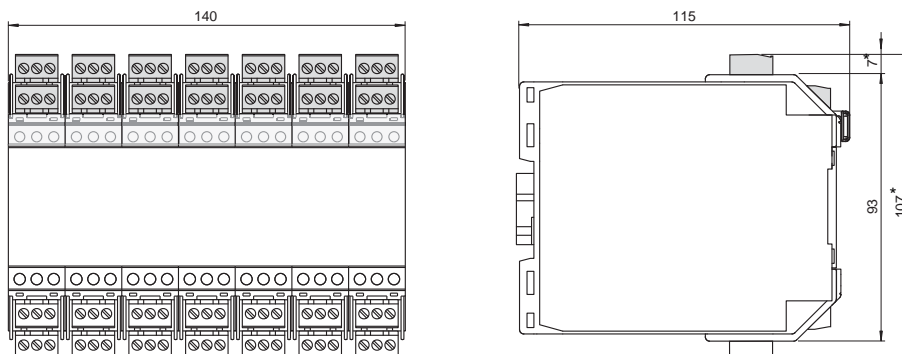
#### Housing type C2



Width 40 mm (1.6 in)  
Number of terminals max. 5

\* When using the KF-STP-\*\* connector  
the device is 124 mm (4.9 in) max. in height.

#### Housing type G

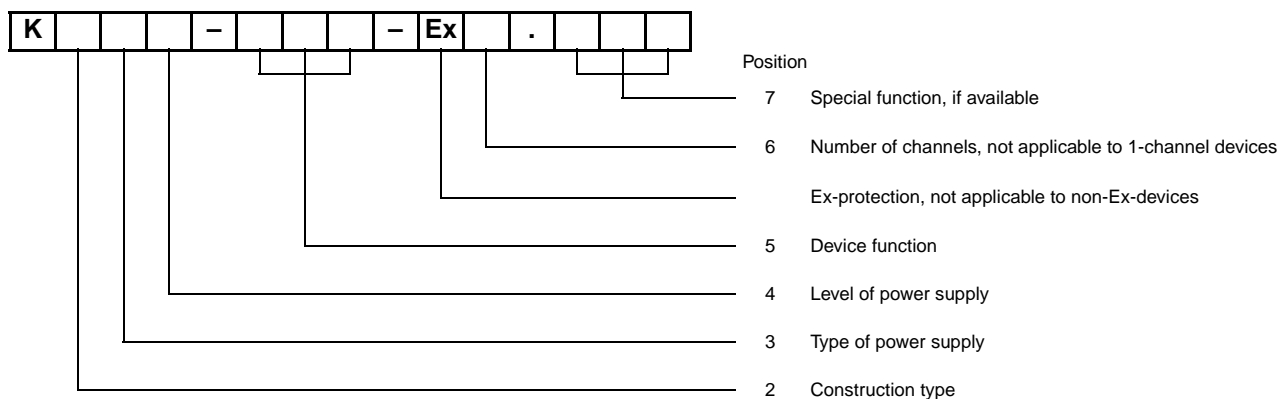


Width 40 mm (1.6 in)  
Number of terminals max. 28

\* When using the KF-STP-\*\* connector  
the device is 112 mm (4.4 in) max. in height.

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## Type code/model number



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	=	Isolated switch 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.R**.RPI	=	Redundant Power Rail power feed module for RPI (* = 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	=	Universal 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 service interface
	ETH.MOD	=	for MODBUS via Ethernet
	ETH.MOD.485	=	for MODBUS via Ethernet with RS 485 service interface
	H	=	HART communication
	MOD	=	for MODBUS
	MOD.485	=	for MODBUS with RS 485 service interface
	MPL	=	for MODBUS Plus
	MPL.485	=	for MODBUS Plus with RS 485 service interface
	PRO	=	for PROFIBUS
	PRO.485	=	for PROFIBUS with RS 485 service interface



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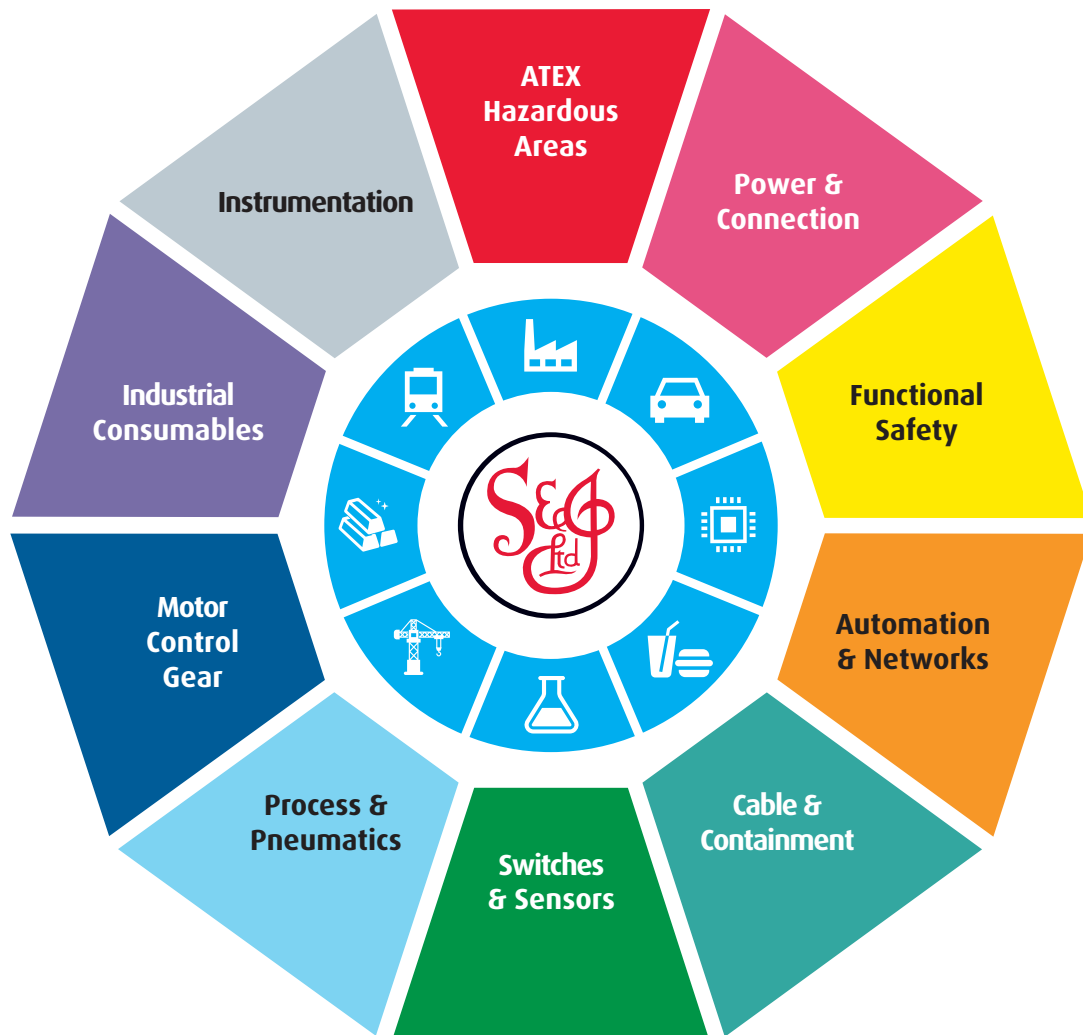
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