

**Increasing security.  
Saving space.  
Gaining flexibility.**

Signal conditioners for industrial applications



Your automation, our passion.

** PEPPERL+FUCHS**

# Interference-Free Signal Transmission

With many years of experience and an unmatched understanding of plant safety and process systems, Pepperl+Fuchs has engineered the SC-System. The new signal conditioners offer reliable process signals for your industrial application.

## Maximum signal integrity in processes

Signal conditioners ensure that communication between the field and control level remains free from interference, especially in large plants where signals can be distorted by interference caused by power mains or ground loops. Equalizing currents can occur in such loops if the grounding of high-performance devices is inadequate. Another factor is signal coupling from wireless communications equipment. The new SC-System prevents transmission and control errors through the use of galvanic isolation and provides a seamless and reliable process system – in heavy-production facilities such as those for steel and cement, in power plants, in the water/wastewater sector, and in the paper and food industry.

## Flexible use in a host of industries

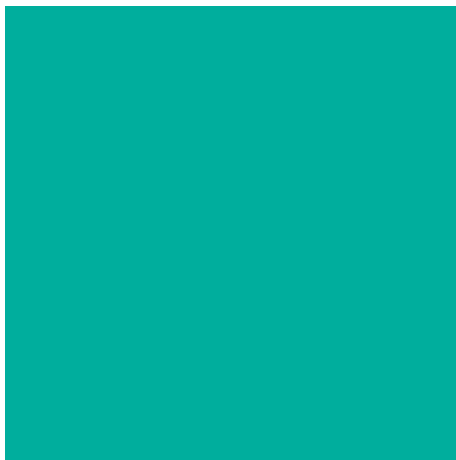
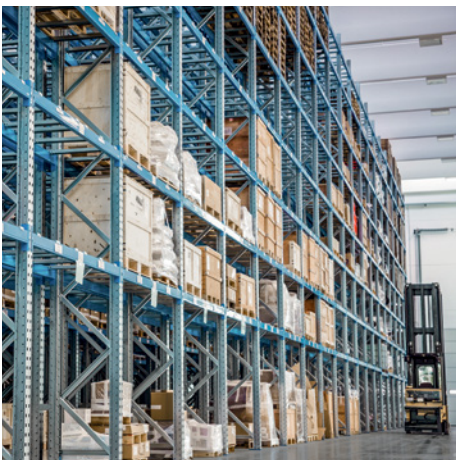
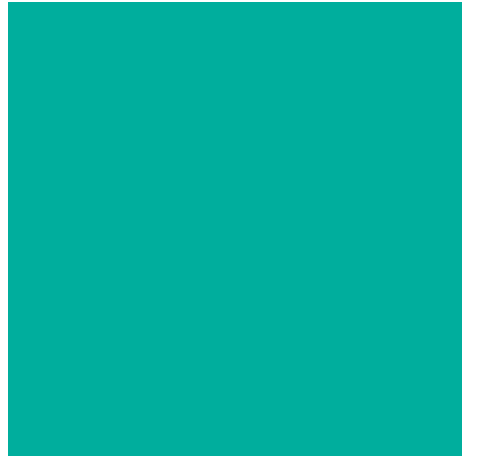
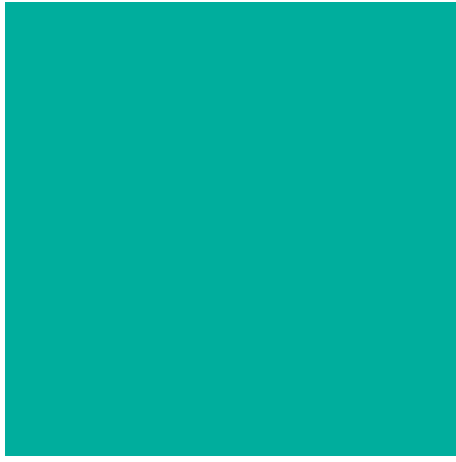
In most production facilities, there are processes and tasks in which analog measurements such as pressure, temperature, or fill level must be transmitted without any interference so that they can be processed at the control level. In these cases, signal conditioners provide a uniform signal standard, independent of the field devices used. Example applications include pumping fluids through piping, storing bulk goods, or mechanical and chemical treatment of substances.

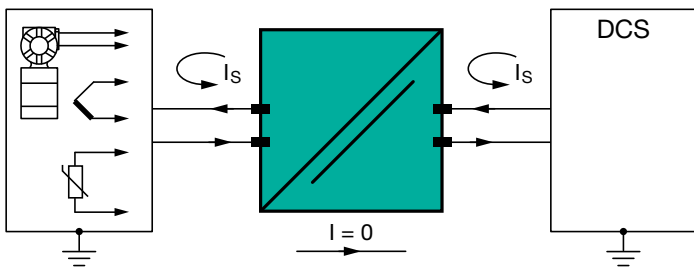
## Precise temperature measurement safeguards production

In general, process steps run optimally only at a stable reaction temperature and must not be dependent on external conditions. In addition, a quick and accurate temperature measurement influences the service life of machines and plants. Signal conditioners for the conversion of measured values from thermocouples or resistance thermometers can be found in rotary kilns for cement manufacturing or the thermal preparation of wood chips in paper manufacturing.

## Protecting the environment

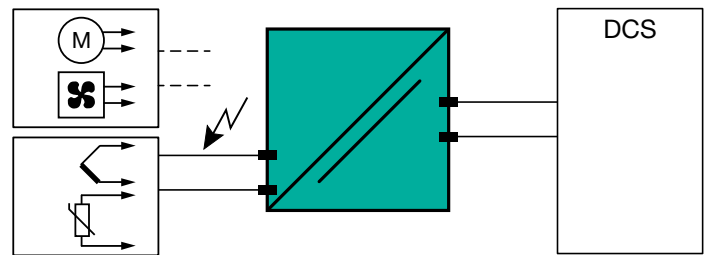
Signal conditioners are used for precise measurement and conversion of incoming sensor signals when measuring fill levels. For example, the fill level in the lime slurry container for flue gas desulfurization in a furnace must be continually monitored to eliminate any environmental hazards. If the level is too high, an overflow may occur and pollute the groundwater. If the level is too low, the flue gas escapes from the chimney without being cleaned.





### Secure communication in the plant

The central feature of a signal conditioner is galvanic isolation. This prevents transmission and control errors caused by equalizing currents in ground loops. Ground loops can interrupt communication between field and control levels to such an extent that safe monitoring and control of processes are no longer guaranteed. Input filters are integrated to provide protection against common mode noise caused by electrical drives with frequency converters. These input filters prevent faults from reaching the control system and distorting the measuring signals.



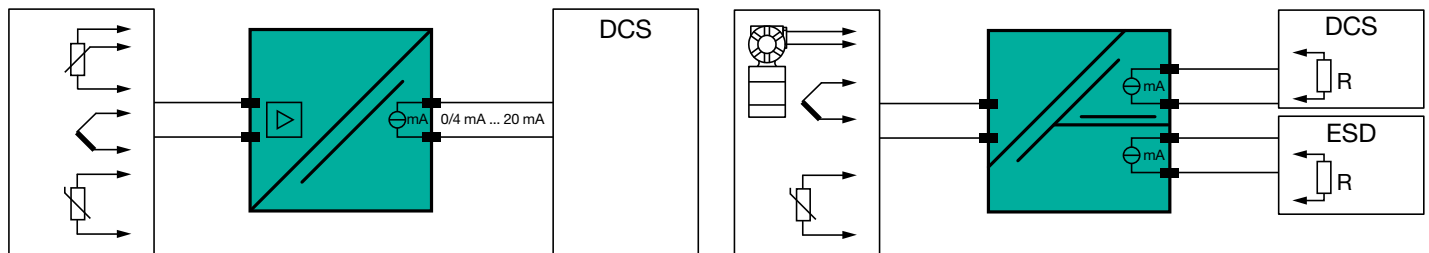
### Protection against short circuits and surges

The analog signal conditioners from Pepperl+Fuchs offer protection against short circuits for each individual current circuit. In the event of a line fault, the relevant output on the control side is switched to a safe state. This protects other devices against faults in a channel on the field side. All other channels and connected measuring devices are not affected by the fault and remain operational.

Interfering signals can interrupt a signal path if there is an isolation problem in mains-connected devices. In this case, the signal conditioner's galvanic isolation prevents high voltages from being transferred into the measuring circuit. This protects personnel and equipment from dangerously high voltages.

# High Signal Quality and a Wide Range of Application Options

Signal conditioners use galvanic isolation to provide seamless communication between field and control levels, and protect personnel and equipment from dangerously high voltages.



## Conversion to standard signals

Field devices often supply signals of different standards that simply cannot be processed at the control level. Even if field devices supply standard signals, these signals cannot always be processed because small PLCs in particular are available for just a few types of signals. The signal conditioner's signal conversion function converts analog signals into highly-standardized 0/4 mA...20 mA or 0 V...10 V signals. This ensures not only fault-free communication between the field device and the control level, but also means that expensive non-standard input cards for the controller are no longer necessary.

## Signal splitting – multiple use of signals

Sensor signals are used not only to control processes, but are also often required in emergency shutdown systems and data recording systems. Signal conditioners with a splitting function transmit the measured signal via parallel, galvanically isolated outputs on the control side. This ensures reliable forwarding of the signal if faults occur and avoids the disadvantages of serial wiring.

## Problem-free combination of sources and sinks

The SC-System's signal conditioners ensure that a measuring channel still operates if current sinks on the field side are combined with current sinks on the control side.

# Minimal Space Requirements, Maximum Flexibility



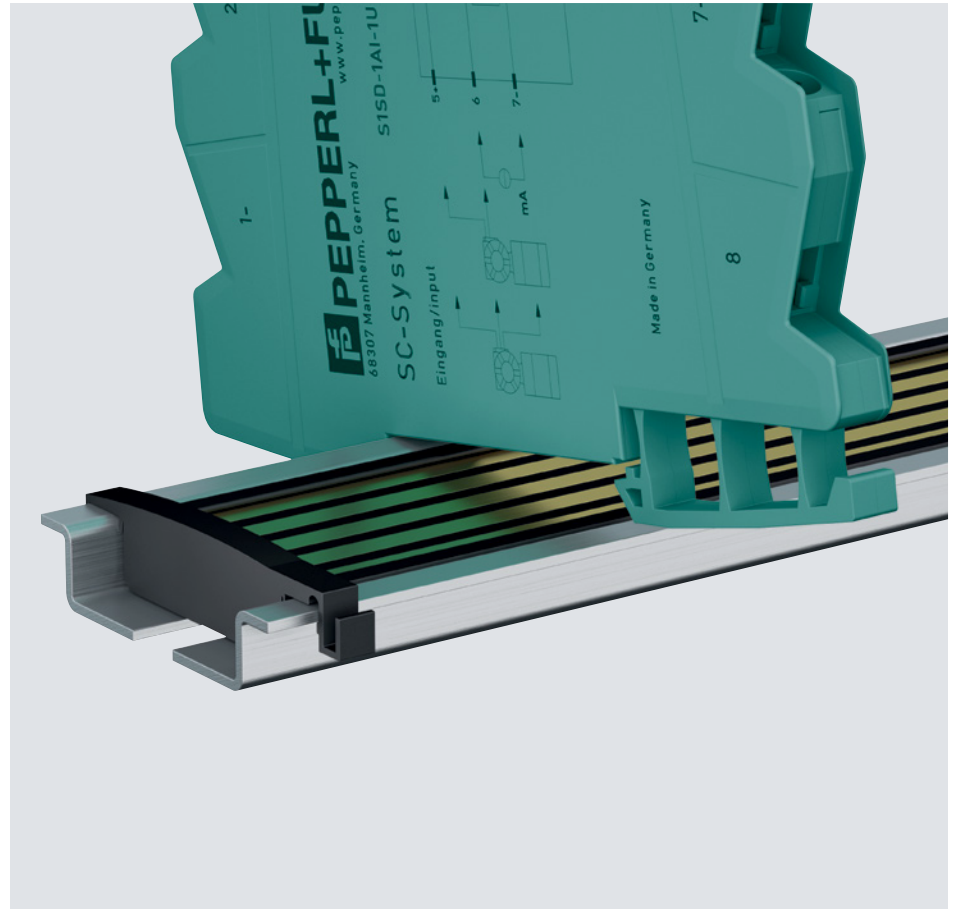
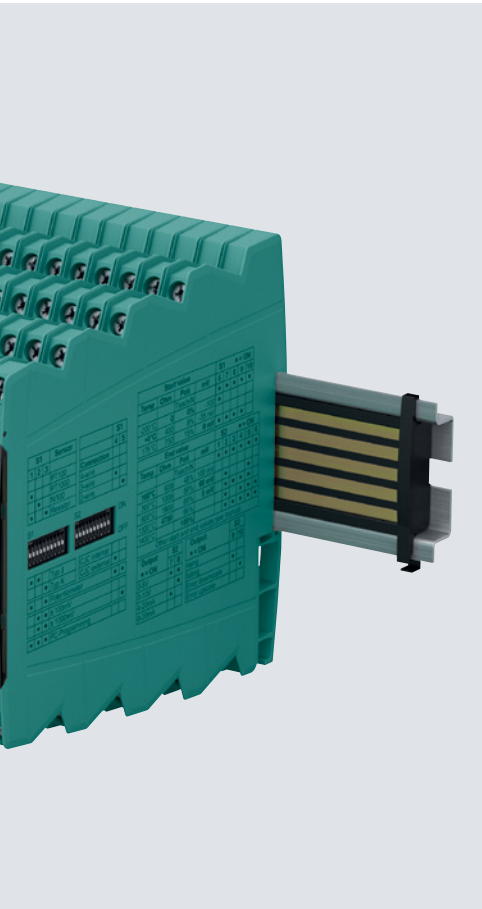
High-quality isolation, an extended temperature range, and an extremely compact design: The SC-System from Pepperl+Fuchs boasts a unique combination of powerful features.

## High-quality isolation for optimum protection

Signal conditioners principally serve to prevent hazardous voltages from being transferred to the control side. The SC-System from Pepperl+Fuchs is characterized by its exceptionally high-quality isolation of 3 kV test voltage and 300 V working voltage. The device therefore takes into account the increased demand for immunity in day-to-day operations and guarantees optimum protection for people and equipment.

## Extended temperature range for maximum flexibility

Featuring a low-power design with low power dissipation, the SC-System can be used at ambient temperatures of -25 °C to +70 °C. This extended temperature range is precisely customized to customer requirements, enabling maximum flexibility in any application. As the components of the SC-System are designed for such a high load, their service life is increased and costs are saved – even if the components are used at less extreme temperatures.



### Compact design reduces required space to a minimum

The SC-System also features an extremely compact housing design. At just 97 mm high and 6 mm wide, the slim modules are among the most compact on the market. The low height of the user-friendly components ensures that they can fit between narrow-seated cable ducts, saving valuable space in the switch cabinet.

### Mechanical stability for trouble-free operation

Signal conditioners may be subjected to considerable loads during operation. If used in the vicinity of apparatus such as piston engines or breakers, signal conditioners need to be able to withstand high levels of vibration. The high mechanical stability of the SC-System ensures that the plant operates without any problems.

### Convenient supply and error reporting

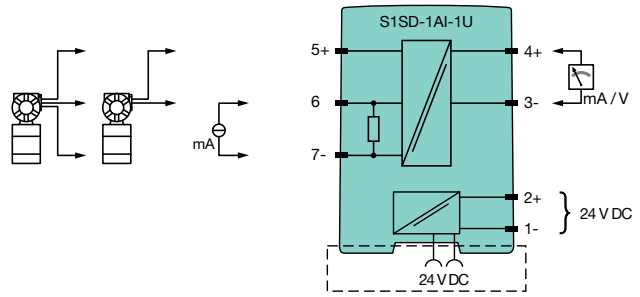
The power bus is an insert part for DIN mounting rails. It provides conductors for the supply of interface modules via supply modules, and for collective error messages. As an alternative to supplying power via terminals for larger applications, the power bus makes it possible to supply energy centrally and reduces the need for individual wiring. The power bus fits into any standard DIN mounting rail and is ideal for retrofitting.

# Transmitter Power Supplies

## Transmitter power supply S1SD-1AI-1U

Transfers signals from measuring transmitters and active current sources.

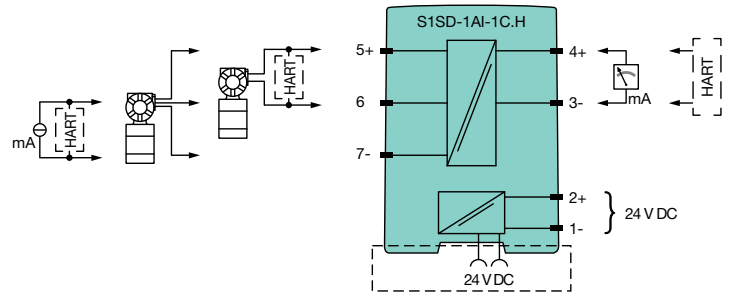
- Input for 2-wire transmitters, 3-wire transmitters, and active sources
- Current and voltage output
- Configuration via DIP switch



## SMART transmitter power supply S1SD-1AI-1C.H

Enables SMART communication between transmitters and control systems.

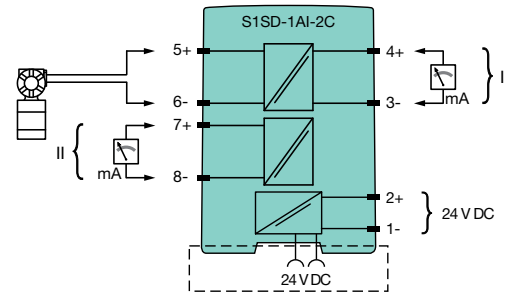
- Input for 2-wire transmitters, 3-wire transmitters, and active sources
- SMART transfer
- Current output (active)



## Transmitter power supply/splitter S1SD-1AI-2C

Transfers current signals from the field to the control system using two galvanically isolated active current outputs.

- Input for 2-wire transmitters
- Dual current output (active)

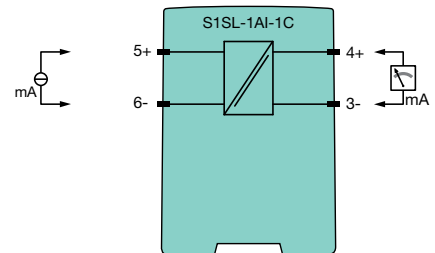


# Passive Isolators

## Passive isolator S1SL-1AI-1C

Transfers current signals from the field to the control system.

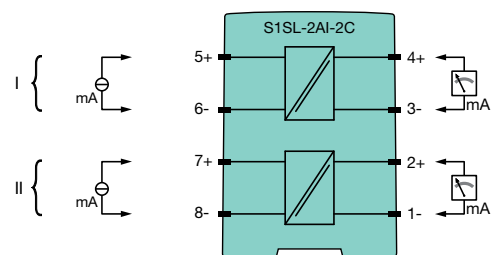
- Loop powered on the field side
- 1-channel design
- Current output (active)



## Passive isolator S1SL-2AI-2C

Transfers current signals from the field to the control system.

- Loop powered on the field side
- 2-channel design
- Current output (active)



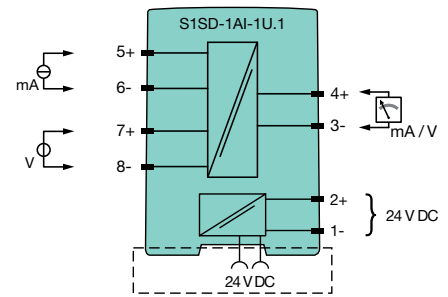


# Isolating Amplifiers

## Isolating amplifier for standard signals S1SD-1AI-1U.1

Transfers standard signals to the control system.

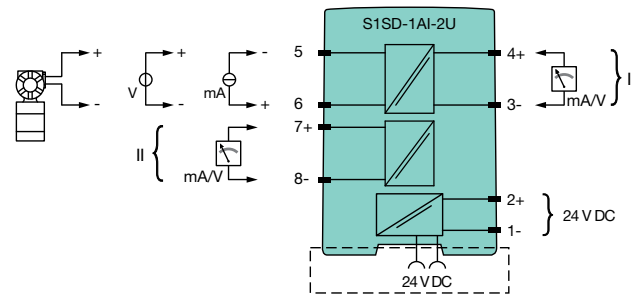
- Input for standard signals (current and voltage)
- Current and voltage output
- Configuration via DIP switch



## Isolating amplifier/splitter S1SD-1AI-2U

Transfers standard signals to the control system using two galvanically isolated outputs (splitter).

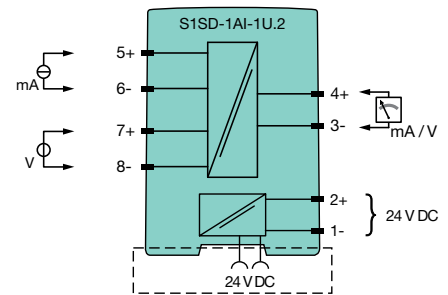
- Input for standard signals (current and voltage) and transmitter power supply
- Dual current and voltage output
- Configuration via DIP switch



## Isolating amplifier for bipolar signals S1SD-1AI-1U.2

Transfers and converts bipolar signals.

- Input for bipolar standard signals
- Bipolar current and voltage output
- Configuration via DIP switch

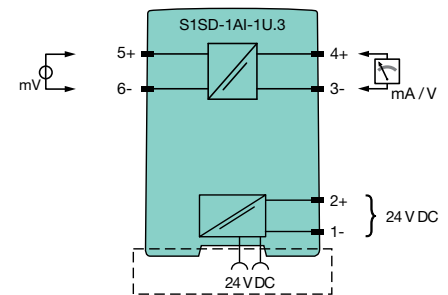


# Signal Converters

## mV signal converter S1SD-1AI-1U.3

Signal converter for fast bipolar mV signals (shunt measurement).

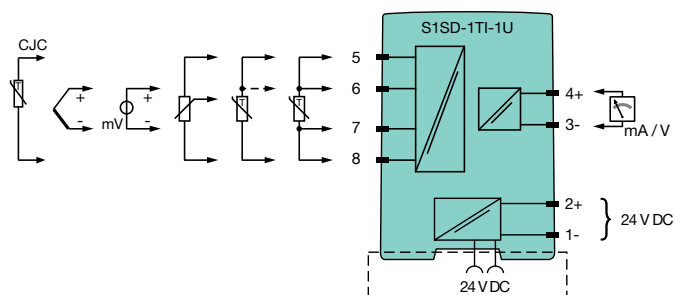
- Input for bipolar mV signals
- Bipolar current and voltage output
- Configuration via DIP switch



## Temperature converter S1SD-1TI-1U

Universal signal converter for temperature sensors, resistors, and potentiometers.

- Input for resistance thermometers, thermocouples, PTC thermistors, potentiometers, and mV signals
- Current and voltage output
- Configuration via DIP switch or software



# Accessories

## Power bus set

**POWERBUS-SETL5.250** (Height 7.5 mm)

**POWERBUS-SETH5.250** (Height 15.0 mm)

Power bus set for low and high DIN mounting rails.

- Bus + bus carrier
- End caps
- Length: 250 mm



## Cover

**POWERBUS-COV.250**

Cover for empty slots on the power bus in the DIN mounting rail.

- For high and low DIN mounting rails
- Packaging unit: 5 items
- Length: 250 mm



## End caps

**POWERBUS-CAP**

Used to securely attach the power bus to the DIN mounting rail and to protect the ends of the bus.

- Packaging unit:  
5 left + 5 right end caps

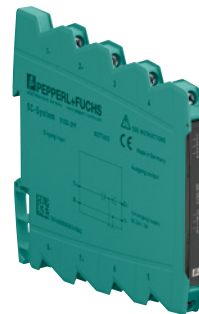


## Infeed module

**S1SD-2PF**

For supplying power to the power bus.

- Redundant power supply via decoupling diodes
- Current up to 3 A
- LED display
- Power supply for up to 75 modules



## Adapter with USB interface

**S-ADP-USB**

Programming device for parameterization using PC software.

- Potential-free USB interface cable
- Used with SC-System devices
- Configurable via PC
- Possible to supply devices with power via the USB interface



# Features Overview

	Transmitter power supply S1SD-1AI-1U	SMART Transmitter power supply S1SD-1AI-1C.H	Transmitter power supply/splitter S1SD-1AI-2C	Passive isolator S1SL-1AI-1C	Passive isolator S1SL-2AI-2C	Isolating amplifier S1SD-1AI-1U.1	Isolating amplifier/splitter S1SD-1AI-2U	Isolating amplifier S1SD-1AI-1U.2	mV signal converter S1SD-1AI-1U.3	Universal temperature converter S1SD-1TI-1U
Number of channels	1	1	1	1	2	1	1	1	1	1
<b>Field side</b>										
2-wire transmitter	■	■	■				■			
3-wire transmitter	■	■								
0/4 mA ... 20 mA (source)	■	■		■	2	■	■	■		
± 10 mA; ± 20 mA								■		
± 5 V; ± 10 V								■		
0/1 ... 5 V								■		
0/2 ... 10 V						■	■	■		
± 60 mV									■	
± 100 mV									■	■
± 150 mV, ± 250 mV, ± 300 mV, ± 500 mV									■	
± 1000 mV									■	■
RTD										■
TC										■
PTC										■
Potentiometer/resistor										■
<b>Control side</b>										
0/2 ... 10 V	■					■	■	■		■
0/4 mA ... 20 mA (source)	■	■	■	■	2	■	■	■	■	■
± 10 mA; ± 20 mA								■	■	
± 5 V; ± 10 V								■	■	
<b>Additional functions</b>										
HART		■								
Splitter			■				■			
Front potentiometers for fine adjustment								■		
<b>Supply voltage</b>										
24 V DC + power bus	■	■	■			■	■	■	■	■
Loop powered				■	■					
<b>Parameterization</b>										
DIP switch	■					■	■		■	■
PC software										■
<b>Certifications</b>										
UL Listed, Class I, Div. 2	■	■	■	■	■	■	■	■	■	■
CE	■	■	■	■	■	■	■	■	■	■

# Your automation, our passion.

## Explosion Protection

- Intrinsically Safe Barriers
- Signal Conditioners
- Fieldbus Infrastructure
- Remote I/O Systems
- HART Interface Solutions
- Wireless Solutions
- Level Measurement
- Purge and Pressurization Systems
- Industrial Monitors and HMI Solutions
- Electrical Explosion Protection Equipment
- Solutions for Explosion Protection

## Industrial Sensors

- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- AS-Interface
- Identification Systems
- Logic Control Units

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