

# Electronics

## Analogue Signal Conditioning

Catalogue

## Electronics – Analogue Signal Conditioning

Product overview – Analogue Signal Conditioning

Intrinsically safe signal conditioners for hazardous area applications

Signal converters and monitoring components

Trip amplifier for monitoring AC/DC circuits

Signal converters and monitoring components in 6 mm width

Process monitoring

Indicators and configurable displays

Interface converter, AD/DA converter

Analogue Signal Conditioning Accessories

Fieldbus distributor

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## Appendix

Weidmüller Service

Technical appendix/Glossary

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Search according to type or order number, Addresses worldwide

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# Electronics – Analogue Signal Conditioning

## Intrinsically safe signal converters – ACT20X Page B.4



- Analogue and binary signal interfaces to Ex Zone 0 / Division 1
- FDT/DTM software configurable
- 2 channel modules in 22.5 mm housing

## Signal converters and monitoring components – ACT20P Page C.4



- Strain gauge transmitter for reading from load cells
- High levels of galvanic isolation and accuracy
- On-site calibration and TARE adjustment

## Signal converters and monitoring components – WAVE TTA Page C.10



- Signal converter and trip amplifier in a single device
- Flexible software configuration
- AC and DC wide-range power supply

## Signal converters and monitoring components – WAVE Page C.14



- A large selection of standard signal- and measurement isolators
- Simple to install and mounting on DIN-rails
- High level of galvanic isolation

## Trip amplifiers for monitoring – WAVE Page D.2



- Monitoring DC and AC currents and voltages
- Current/voltage ranges and switching points can be set manually.
- Pluggable units for monitoring current – on DIN rail base

## Signal converters and monitoring components, 6 mm – MICRO Page E.4



- Signal converters with galvanic isolation in slim design
- All-purpose 3-way isolator, supply isolator and temperature-measurement converter
- Easy to wire with MICROINTERFACE

## Signal converter and monitoring components, 6 mm – MCZ Page E.18



- Signal converter in terminal format
- Passive isolator, temperature/frequency converter and threshold monitoring
- Simple wiring with pluggable cross-connection channels

## Process monitoring – with display function Page F.4



- Monitoring for a variety of sensor types
- Two alarm channels with status displays
- Universally scalable, four-character LED display

## Process monitoring – with no display function Page F.24



- Monitoring for a variety of sensor types
- Two alarm channels with LED status displays
- Front-side setpoint adjustments

**LED displays with extended functionality**

Page G.4



- Large four-character LED display
- 1/8"-DIN-standard front-panel with IP65 protection
- Integrated signal converter and trip amplifier

**LCD displays**

Page G.20



- Large 3.5-character LCD display
- 1/8"-DIN-standard front-panel with IP65 protection
- Power supply via 4 – 20 mA current loop

**Interface converters**

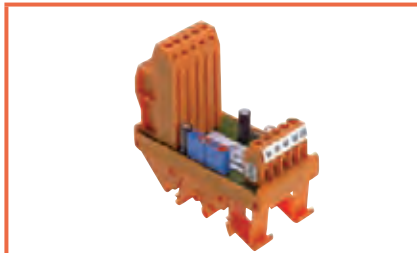
Page H.4



- RS232/ RS485/ TTY interface converter in WAVE housing
- RS-232 connection with SUB-D connector
- Bi-direction communication enabled

**AD/DA converter**

Page H.6



- 8-bit AD and DA converter
- Hold function for saving the current bit combination
- Mounting on DIN-rail

**Configuration adapter**

Page I.4



- USB interface adapter for configuring signal converters
- Compatible with ACT20X, WAVE TTA and ITX+ modules
- Simple installation with plug-in connector

**Calibration device**

Page I.6



- Measures and simulates voltage and current signals
- Adjustable continuous level and ramping functions
- Easy to adjust with buttons on front

**Markers and cross-connectors**

Page I.11



- Suitable MultiCard markers for all modules
- Pluggable cross-connectors for WAVE, MCZ and MICROSERIES

**Fieldbus distributor for the non-EX zone**

Page J.6



- Distributor for PROFIBUS-DP/-PA
- Optional surge protection and current limiting
- Versions with 1, 2, 4 and 8 connection for field devices

**Fieldbus distributor for the EX zone**

Page J.26



- Distributor for PROFIBUS-PA
- Versions with 1, 2, 4 and 8 connection for field devices
- External terminating resistor



# Product overview – Analogue Signal Conditioning

<b>Product overview – Analogue Signal Conditioning</b>	Introduction	A.2
	Quick select – Analogue Signal Conditioning	A.4

# Analogue Signal Conditioning questionnaire

## A

## Where...are analogue conditioners used?

In all types of electronic industrial and marine measurement and control systems – for example in processes such as power plants, steelworks, water and waste plant, oil and gas production and chemical processing. In fact, wherever temperature, pressure, level, flow, weight, speed etc is measured and controlled as part of a continuous or batch production process. Such measurement parameters – after being accurately produced – must not be degraded on their way from the field to the control room, despite external influences from the atmosphere and installation. Conversion or changes to these signals requires electronics of the highest quality, which can also withstand wide ambient temperature changes, electro-magnet interference, a vibrating environment, corrosive or hazardous atmospheres.

## What...functions do analogue conditioners provide?

One or more of the following:

- 1) Isolation of high level DC measurement and control signals. (Why do we need isolation? – see the notes that follow later in this brochure.)
- 2) Conversion of high level signals, such as 0...5 V input to 4...20 mA output
- 3) Amplify, linearise and transmit low level sensor inputs, such as millivolts from thermocouples, into high level DC outputs to enable transmission over distances 100 m or more.
- 4) Initiate status indications and alarms by creating relay contact closure outputs from analogue inputs.



**Why...do we need separate analogue module nowadays?  
Surely the control system (PLC or DCS) can perform the  
same functions?**

- 1) Sometimes this is true, but look at where the cabling from the field devices (transmitters, sensors, valves and actuators) needs to go. It will usually go not just straight to the control system. Many signals are also passed to local indicators and alarms, and each will need isolating from the others.
- 2) Often sensors - like thermocouples for temperature – need isolating, converting and linearising locally to a standardised high level signal (e.g. 4...20 mA) for long distance transmission – instead of running expensive compensation cable to the control system.
- 3) Where the control system has no isolated analogue inputs, a separate isolator will often be needed.
- 4) Where the control system cannot provide power for the sensor / transmitter and it is convenient to do this from an isolating module.
- 5) Where a high integrity, dedicated display is required, separate from the control system display, and the input needs splitting.
- 6) Where local linearisation is needed for a plant operator – for example where a liquid volume indicator is needed for filling a bulk storage tank, but the measurement is level (level to volume conversion depends on the shape of the tank).
- 7) Where the control system only takes 4...20 mA analogue inputs and the sensors provide other less common ranges, such as 0...20 mV, 2...10 V, 0...10 k $\Omega$ , 0...1mA, 4...12 kHz, 0...5 A AC etc
- 8) Where the control system needs to be protected from electrical noise pulses on its analogue inputs
- 9) Where expansion of the analogue inputs would mean an expensive new I/O board for the control system

**How...can I select the right product for my application?**

- 1) Weidmüller has a formidable range of analogue conditioners, covering most application requirements, and our range is expanding. We also have some useful tools for selection and configuration.
- 2) If you cannot find a suitable product for your application, it doesn't mean we don't have one! Tell us your requirement, and if we can't provide a solution from our current range of products, there may be a customized version that we could create for you.





# Quick select – Analogue Signal Conditioning

**A**
**Selection table**

Order No.	Product	Input									Miscellaneous	Sensor feed	Width
		Amount	0...20 mA	4...20 mA	0...10 V	0...5 V	TC	RTD	Frequency				
<b>Standard-signal isolator</b>													
8540180000	WAS5 CCC 0-20/0-20mA	1	X										17.5 mm
8540190000	WAZ5 CCC 0-20/0-20mA	1	X										17.5 mm
8540270000	WAS5 CVC 0-20mA/0-10V	1	X										17.5 mm
8540200000	WAS5 CCC 4-20/0-20MA	1		X									17.5 mm
8540250000	WAS5 CCC 0-20/4-20mA	1	X										17.5 mm
8540230000	WAS5 CVC 4-20mA/0-10V	1		X									17.5 mm
8447160000	WAS5 CCC HF 0-20/0-20MA	1	X										17.5 mm
8447170000	WAZ5 CCC HF 0-20/0-20MA	1	X										17.5 mm
8447250000	WAS5 CCC HF 4-20/0-20MA	1		X									17.5 mm
8447220000	WAS5 CVC HF 0-20/0-10V	1	X										17.5 mm
8447280000	WAS5 CVC HF 4-20/0-10V	1		X									17.5 mm
8444980000	WAS4 CCC DC 4-20/4-20MA	1		X									12.5 mm
8444990000	WAZ4 CCC DC 4-20/4-20MA	1		X									12.5 mm
8445010000	WAS4 CCC DC 4-20/0-20MA	1		X									12.5 mm
8445040000	WAS4 CVC DC 4-20/0-10V	1		X									12.5 mm
8445050000	WAZ4 CVC DC 4-20/0-10V	1		X									12.5 mm
8721150000	MAS RPS	1		X								X	6.1 mm
8721170000	MAS RPSH	1		X								X	6.1 mm
8540310000	WAS5 VCC 0-10V/0-20MA	1			X								17.5 mm
8540320000	WAZ5 VCC 0-10V/0-20MA	1			X								17.5 mm
8540290000	WAS5 VCC 0-10V/4-20MA	1			X								17.5 mm
8540300000	WAZ5 VCC 0-10V/4-20MA	1			X								17.5 mm
8540330000	WAS5 VVC 0-10V/0-10V	1			X								17.5 mm
8540340000	WAZ5 VVC 0-10V/0-10V	1			X								17.5 mm
8561610000	WAS5 VVC HF +/-10V/+10V	1								-10...+10 V			17.5 mm
8447310000	WAS5 VCC HF 0-10/0-20MA	1			X								17.5 mm
8447340000	WAS5 VCC HF 0-10/4-20MA	1			X								17.5 mm
8447370000	WAS5 VVC HF 0-10/0-10V	1			X								17.5 mm
8447380000	WAZ5 VVC HF 0-10/0-10V	1			X								17.5 mm
8411190000	MCZ CCC 0-20mA/0-20mA	1	X										6 mm
8444950000	WAS5 CCC LP 0-20/0-20mA	1	X										17.5 mm
8444960000	WAZ5 CCC LP 0-20/0-20mA	1	X										17.5 mm
8463580000	WAS5 CCC LP 0-20/0-20mA	2	X										17.5 mm
8463590000	WAZ5 CCC LP 0-20/0-20mA	2	X										17.5 mm
8543720000	WAS5 OLP	1	X	X	X	X							17.5 mm
8543730000	WAZ5 OLP	1	X	X	X	X							17.5 mm
7940024139	WAVEPak DC/DC	1	X		X							X	12.5 mm
8594810000	MAS DC/DC select	1	X	X	X								6.1 mm
8594840000	MAZ DC/DC select	1	X	X	X								6.1 mm
8757530000	MAS DC/DC select HI	1	X	X	X								6.1 mm
<b>Universal isolator</b>													
8560750000	WAZ4 PRO DC/DC	1	X	X	X					User adjustable: +/-20 mV...+/-200 V +/-0.1 mA...+/-200 mA			12.5 mm
8560740000	WAS4 PRO DC/DC	1	X	X	X								12.5 mm
7940010489	CLCAR	2								User adjustable: -24...24 mA -12...12 V			46 mm
7940010195	UCVAR	2								User adjustable: -55...55 mA -55...55 V			46 mm
<b>Standard-signal duplicator</b>													
8581160000	WAS5 CCC 2OLP	1		X									17.5 mm
8581170000	WAZ5 CCC 2OLP	1		X									17.5 mm

Amount	Output				Miscellaneous	Configuration	Auxiliary power	Rated voltage	Isolation	Connection system	Special characteristics	Page
	0...20 mA	4...20 mA	0...10 V	Relay								
1	X						24 V DC	300 V	3-way	S		C.22
1	X						24 V DC	300 V	3-way	Z		C.22
1			X				24 V DC	300 V	3-way	S		C.23
1	X						24 V DC	300 V	3-way	S		C.24
1		X					24 V DC	300 V	3-way	S		C.22
1			X				24 V DC	300 V	3-way	S		C.24
1	X						24 V DC	300 V	3-way	S	Limiting frequency > 15 kHz	C.18
1	X						24 V DC	300 V	3-way	Z	Limiting frequency > 15 kHz	C.18
1	X						24 V DC	300 V	3-way	S	Limiting frequency > 15 kHz	C.19
1			X				24 V DC	300 V	3-way	S	Limiting frequency > 15 kHz	C.18
1			X				24 V DC	300 V	3-way	S	Limiting frequency > 15 kHz	C.19
1		X					24 V DC	300 V	2-way	S	Output-side power supply	C.28
1		X					24 V DC	300 V	2-way	Z	Output-side power supply	C.28
1	X						24 V DC	300 V	2-way	S	Output-side power supply	C.28
1			X				24 V DC	300 V	2-way	S	Dual-side power supply	C.29
1			X				24 V DC	300 V	2-way	Z	Dual-side power supply	C.29
1		X					24 V DC	300 V	3-way	S		E.9
1		X					24 V DC	600 V	3-way	S	HART® transparent	E.8
1	X						24 V DC	300 V	3-way	S		C.25
1	X						24 V DC	300 V	3-way	Z		C.25
1		X					24 V DC	300 V	3-way	S		C.25
1		X					24 V DC	300 V	3-way	Z		C.25
1			X				24 V DC	300 V	3-way	S		C.26
1			X				24 V DC	300 V	3-way	Z		C.26
1					-10...+10 V		24 V DC	300 V	3-way	S	Limiting frequency > 15 kHz	C.21
1	X						24 V DC	300 V	3-way	S	Limiting frequency > 15 kHz	C.20
1		X					24 V DC	300 V	3-way	S	Limiting frequency > 15 kHz	C.20
1			X				24 V DC	300 V	3-way	S	Limiting frequency > 15 kHz	C.21
1			X				24 V DC	300 V	3-way	S	Limiting frequency > 15 kHz	C.21
1	X							100 V	2-way	Z	Passive isolator ILP	E.20
1	X							300 V	2-way	S	Passive isolator ILP	C.33
1	X							300 V	2-way	Z	Passive isolator ILP	C.33
2	X							300 V	2-way	S	Passive isolator ILP	C.33
2	X							300 V	2-way	Z	Passive isolator ILP	C.33
1		X				DIP switch		300 V	2-way	S	Passive isolator OLP	C.32
1		X				DIP switch		300 V	2-way	Z	Passive isolator OLP	C.32
1	X		X			Pluggable bridge	24 V DC	300 V	3-way	S		C.17
1	X	X	X			DIP switch	24 V DC	50 V	3-way	S		E.7
1	X	X	X			DIP switch	24 V DC	50 V	3-way	Z		E.7
1	X	X	X			DIP switch	24 V DC	300 V	3-way	S		E.6

1	X	X	X		Adjustable: 0/2...+/-10 V	DIP switch	22...230 V AC/DC	600 V	3-way	Z		C.16
1	X	X	X		0/1...+/-5 V 0...+/-20 mA	DIP switch	22...230 V AC/DC	600 V	3-way	S		C.16
3	X		X	X	With display	Button	24 V DC	300 V	3-way	S	With alarm output	F.10
3	X		X	X	With display	Button	24 V DC	300 V	3-way	S	With alarm output	F.6

2		X						300 V	2-way	S	Passive isolator OLP	C.30
2		X						300 V	2-way	Z	Passive isolator OLP	C.30

Connection system: S = screw / Z = tension clamp, ILP = Input Loop Powered, OLP = Output Loop Powered

# Quick select – Analogue Signal Conditioning

**A**
**Selection table**

Order No.	Product	Input									Miscellaneous	Sensor feed	Width
		Amount	0...20 mA	4...20 mA	0...10 V	0...5 V	TC	RTD	Frequency				
<b>Universal measuring transducer</b>													
8939670000	WAS6 TTA	1	X	X	X	X	X	X	X	X	User adjustable: -200...500 mV -20...50 V 2 Hz...100 kHz RTD, TC, Resistance, potentiometer	X	45 mm
8939680000	WAZ6 TTA	1	X	X	X	X	X	X	X	X		X	45 mm
8964310000	WAS6 TTA EX	1	X	X	X	X	X	X	X	X		X	45 mm
8964320000	WAZ6 TTA EX	1	X	X	X	X	X	X	X	X		X	45 mm
7940016563	ITX+ 4-20mA/4-20mA	1	X	X	X	X					User adjustable: -5...+10 V -100...+200 mV -10...+20 mA		12.5 mm
<b>Frequency measuring transducer</b>													
8581180000	WAS4 PRO Freq	1								X	2-, 3-wire PNP/NPN, Namur initiator, push-pull step		12.5 mm
8581190000	WAZ4 PRO Freq	1								X			12.5 mm
8461480000	MCZ CFC 0-20MA	1	X										6 mm
8461470000	MCZ VFC 0-10V	1			X								6 mm
7940015988	UPIIT	2									User adjustable: -55...55 mA -55...55 V		46 mm
7940010908	UPIIR	2									User adjustable: -55...55 mA -55...55 V		46 mm
<b>Strain gauge transmitter</b>													
1067250000	ACT20P-BRIDGE-S	1									Adjustable: +/-10 mV...+/- 50 mV		22.5 mm
<b>AC/DC measuring transducer</b>													
8581220000	WAS2 VMA V ac	1									Adjustable: 0...450 V AC		22.5 mm
8581230000	WAZ2 VMA V ac	1											22.5 mm
8528650000	WAS1 CMA LP 1/5/10A ac	1									Adjustable: 0...10 A AC		22.5 mm
8528660000	WAZ1 CMA LP 1/5/10A ac	1											22.5 mm
8523400000	WAS1 CMA 1/5/10A ac	1									Adjustable: 0...10 A AC		22.5 mm
8523410000	WAZ1 CMA 1/5/10A ac	1											22.5 mm
8526610000	WAS2 CMA 5/10A uc	1									Adjustable: 0...10 A AC/DC		22.5 mm
8526620000	WAZ2 CMA 5/10A uc	1											22.5 mm
8545830000	WAS2 CMA 20/25/30A uc	1									Adjustable: 0...30 A AC/DC		22.5 mm
8545840000	WAZ2 CMA 20/25/30A uc	1											22.5 mm
8513330000	WAS2 CMA 40/50/60A uc	1									Adjustable: 0...60 A AC/DC		22.5 mm
8526590000	WAZ2 CMA 40/50/60A uc	1											22.5 mm
7940010232	CNDAR	2									User adjustable: 0...20 mS 0...200 °C		46 mm
7940010184	UHZAR	1								X	User adjustable: 0...10 kHz 50 mV...250 V AC/DC		46 mm
<b>Temperature measuring transducer</b>													
8560720000	WAS5 PRO Thermo	1						X					17.5 mm
8560730000	WAZ5 PRO Thermo	1						X					17.5 mm
8432300000	WTS4 THERMO	1						X					12.5 mm
8432310000	WTZ4 THERMO	1						X					12.5 mm
8615240000	MAZ Thermo-J 0...700°C Output select	1						X					6.1 mm
8594830000	MAS Thermo-K 0...1000°C Output select	1						X					6.1 mm
8615210000	MAS Thermo-J 0...700°C Output select	1						X					6.1 mm
8594860000	MAZ Thermo-K 0...1000°C Output select	1						X					6.1 mm
8594820000	MAS PT100 0...100C	1							X				6.1 mm
8594850000	MAZ PT100 0...100C	1							X				6.1 mm
8560700000	WAS5 PRO RTD	1							X				17.5 mm
8560710000	WAZ5 PRO RTD	1							X				17.5 mm
8679490000	WAS5 PRO RTD 1000	1							X				17.5 mm

Amount	Output					Miscellaneous	Configuration	Auxiliary power	Rated voltage	Isolation	Connection system	Special characteristics	Page
	0...20 mA	4...20 mA	0...10 V	Relay									
3	X	X	X	X	X	1 analogue output, 2 relay outputs	Software	18...264 V AC/DC	300 V	3-way	S		C.12
3	X	X	X	X	300 V				3-way	Z		C.12	
3	X	X	X	X	300 V				3-way	S	With ATEX approval	C.13	
3	X	X	X	X	300 V				3-way	Z	With ATEX approval	C.13	
1		X				Software		300 V	2-way	S	Passive isolator OLP	C.15	
1	X	X	X			0...5 V	DIP switch	24 V DC	300 V	3-way	S		C.43
1	X	X	X			0...5 V	DIP switch	24 V DC	300 V	3-way	Z		C.43
1						Frequency: 0...1/ 4/ 8/ 16 kHz		24 V DC	100 V	2-way	Z	Frequency output	E.22
1						Frequency: 0...1/ 4/ 8/ 16 kHz		24 V DC	100 V	2-way	Z	Frequency output	E.22
1						Frequency-controlled relay output up to 25 Hz	Button	24 V DC	300 V	3-way	S		F.15
1						Frequency-controlled transistor output up to 999.9 Hz	Button	24 V DC	300 V	3-way	S	With alarm output	F.14
1	X		X					10...60 V DC	300 V	3-way	S		C.7
1	X	X					DIP switch	24 V DC	300 V	3-way	S		C.50
1	X	X					DIP switch	24 V DC	300 V	3-way	Z		C.50
1		X					DIP switch		300 V	2-way	S	Passive converter OLP	C.46
1		X					DIP switch		300 V	2-way	Z	Passive converter OLP	C.46
1	X	X					DIP switch	24 V DC	300 V	2-way	S	Output-side power supply	C.46
1	X	X					DIP switch	24 V DC	300 V	2-way	Z		C.46
1	X	X	X				DIP switch	24 V DC	300 V	2-way	S	Input-side power supply	C.44
1	X	X	X				DIP switch	24 V DC	300 V	2-way	Z		C.44
1	X	X	X				DIP switch	24 V DC	300 V	2-way	S	Input-side power supply	C.44
1	X	X	X				DIP switch	24 V DC	300 V	2-way	Z		C.44
1	X	X	X				DIP switch	24 V DC	300 V	2-way	S	Input-side power supply	C.45
1	X	X	X				DIP switch	24 V DC	300 V	2-way	Z		C.45
3	X		X	X		With display	Button	24 V DC	300 V	3-way	S	Conductivity measurement with alarm output	F.9
3	X		X	X		With display	Button	24 V DC	300 V	3-way	S	Frequency measurement with alarm output	F.11
1		X					DIP switch	24 V DC	300 V	3-way	S		C.40
1		X					DIP switch	24 V DC	300 V	3-way	Z		C.40
1	X	X	X				DIP switch	24 V DC			S		C.41
1	X	X	X				DIP switch	24 V DC			Z		C.41
1	X	X	X			0...5 V	DIP switch	24 V DC	100 V	2-way	Z		E.14
1	X	X	X			0...5 V	DIP switch	24 V DC	100 V	2-way	S		E.12
1	X	X	X			0...5 V	DIP switch	24 V DC	100 V	2-way	S		E.14
1	X	X	X			0...5 V	DIP switch	24 V DC	100 V	2-way	Z		E.12
1	X	X	X			0...5 V	DIP switch	24 V DC	100 V	2-way	S		E.10
1	X	X	X			0...5 V	DIP switch	24 V DC	100 V	2-way	Z		E.10
1	X	X	X				DIP switch	24 V DC	300 V	3-way	S		C.34
1	X	X	X				DIP switch	24 V DC	300 V	3-way	Z		C.34
1	X	X	X				DIP switch	24 V DC	300 V	3-way	S		C.34

Connection system: S = screw / Z = tension clamp, ILP = Input Loop Powered, OLP = Output Loop Powered

# Quick select – Analogue Signal Conditioning

A

## Selection table

Order No.	Product	Input							Miscellaneous	Sensor feed	Width
		Amount	0...20 mA	4...20 mA	0...10 V	0...5 V	TC	RTD			
<b>Temperature measuring transducer</b>											
8638950000	WAS5 PRO RTD Cu	1						X			17.5 mm
8432210000	WTS4 PT100/2 C 0/4-20mA	1						X			12.5 mm
8432220000	WTZ4 PT100/2 C 0/4-20mA	1						X			12.5 mm
8432150000	WTS4 PT100/3 C 0/4-20mA	1						X			12.5 mm
8432160000	WTZ4 PT100/3 C 0/4-20mA	1						X			12.5 mm
8432270000	WTS4 PT100/4 C 0/4-20mA	1						X			12.5 mm
8432280000	WTZ4 PT100/4 C 0/4-20mA	1						X			12.5 mm
8432219999	WTS4 PT100/2 C 0/4-20mA variabel	1						X			12.5 mm
8432229999	WTZ4 PT100/2 C 0/4-20mA variabel	1						X			12.5 mm
8432159999	WTS4 PT100/3 C 0/4-20mA variabel	1						X			12.5 mm
8432169999	WTZ4 PT100/3 C 0/4-20mA variabel	1						X			12.5 mm
8432279999	WTS4 PT100/4 C 0/4-20mA variabel	1						X			12.5 mm
8432289999	WTZ4 PT100/4 C 0/4-20mA variabel	1						X			12.5 mm
8432270011	WTS4 PT100/4 C 4-20mA 0...100C	1						X			12.5 mm
8432210011	WTS4 PT100/2 C 4-20mA 0...100C	1						X			12.5 mm
8432240000	WTS4 PT100/4 V 0-10V	1						X			12.5 mm
8432180000	WTS4 PT100/2 V 0-10V	1						X			12.5 mm
8432090000	WTS4 PT100/3 V 0-10V	1						X			12.5 mm
8432250000	WTZ4 PT100/4 V 0-10V	1						X			12.5 mm
8432190000	WTZ4 PT100/2 V 0-10V	1						X			12.5 mm
8432130000	WTZ4 PT100/3 V 0-10V	1						X			12.5 mm
8432249999	WTS4 PT100/4 V 0-10V variabel	1						X			12.5 mm
8432189999	WTS4 PT100/2 V 0-10V variabel	1						X			12.5 mm
8432099999	WTS4 PT100/3 V 0-10V variabel	1						X			12.5 mm
8432259999	WTZ4 PT100/4 V 0-10V variabel	1						X			12.5 mm
8432199999	WTZ4 PT100/2 V 0-10V variabel	1						X			12.5 mm
8432139999	WTZ4 PT100/3 V 0-10V variabel	1						X			12.5 mm
8432180001	WTS4 PT100/2 V 0-10V 0...100C	1						X			12.5 mm
8432090001	WTS4 PT100/3 V 0-10V 0...100C	1						X			12.5 mm
8432240001	WTS4 PT100/4 V 0-10V 0...100C	1						X			12.5 mm
8425720000	MCZ PT100/3 CLP 0...100C	1						X			6 mm
8483680000	MCZ PT100/3 CLP 0...120C	1						X			6 mm
8604420000	MCZ PT100/3 CLP 0...150C	1						X			6 mm
8473010000	MCZ PT100/3 CLP 0...200C	1						X			6 mm
8473020000	MCZ PT100/3 CLP 0...300C	1						X			6 mm
8473000000	MCZ PT100/3 CLP -50C...+150C	1						X			6 mm
8604430000	MCZ PT100/3 CLP -40C...100C	1						X			6 mm
7940012190	UTCAR	1						X			46 mm
7940010250	URTAR	1						X			46 mm
<b>Monitoring modules</b>											
8260280000	MCZ SC 0-10V	1			X						6 mm
8227350000	MCZ SC 0-20MA	1	X								6 mm
8543820000	WAS5 DC/Alarm	1	X	X	X						17.5 mm
8543880000	WAZ5 DC/Alarm	1	X	X	X						17.5 mm
8705640000	WAS5 VMR 1ph	1								Adjustable: 24...260 V AC/DC 1-phase reset input	17.5 mm
8705630000	WAS2 VMR 3ph	1								Adjustable: 80...250 V AC/DC 3-phase 200...400 V AC/DC 1-phase	22.5 mm
8516560000	WAS2 CMR 1/5/10A ac	1								0...10 A AC	22.5 mm
8516570000	WAZ2 CMR 1/5/10A ac	1								0...10 A AC	22.5 mm
8513340000	WAS2 CMR 20/40/60A ac	1								0...60 A AC	22.5 mm
8526600000	WAZ2 CMR 20/40/60A ac	1								0...60 A AC	22.5 mm

Amount	Output					Miscellaneous	Configuration	Auxiliary power	Rated voltage	Isolation	Connection system	Special characteristics	Page
	0...20 mA	4...20 mA	0...10 V	Relay									
1	X	X	X				DIP switch	24 V DC	300 V	3-way	S		C.36
1	X	X					Potentiometer	24 V DC			S		C.39
1	X	X					Potentiometer	24 V DC			Z		C.39
1	X	X					Potentiometer	24 V DC			S		C.38
1	X	X					Potentiometer	24 V DC			Z		C.38
1	X	X					Potentiometer	24 V DC			S		C.37
1	X	X					Potentiometer	24 V DC			Z		C.37
1	X	X					Potentiometer	24 V DC			S		C.39
1	X	X					Potentiometer	24 V DC			Z		C.39
1	X	X						24 V DC			S	Special adjustment	C.38
1	X	X						24 V DC			Z	Special adjustment	C.38
1	X	X						24 V DC			S	Special adjustment	C.37
1	X	X						24 V DC			Z	Special adjustment	C.37
1	X	X						24 V DC			S	Calibrated to 0...100 °C	C.37
1	X	X						24 V DC			S	Calibrated to 0...100 °C	C.39
1			X				Potentiometer	24 V DC			S		C.37
1			X				Potentiometer	24 V DC			S		C.39
1			X				Potentiometer	24 V DC			S		C.38
1			X				Potentiometer	24 V DC			Z		C.37
1			X				Potentiometer	24 V DC			Z		C.39
1			X				Potentiometer	24 V DC			Z		C.38
1			X					24 V DC			S	Special adjustment	C.37
1			X					24 V DC			S	Special adjustment	C.39
1			X					24 V DC			S	Special adjustment	C.38
1			X					24 V DC			Z	Special adjustment	C.37
1			X					24 V DC			Z	Special adjustment	C.37
1			X					24 V DC			Z	Special adjustment	C.39
1			X					24 V DC			Z	Special adjustment	C.38
1			X					24 V DC			S	Calibrated to 0...100 °C	C.39
1			X					24 V DC			S	Calibrated to 0...100 °C	C.38
1			X					24 V DC			S	Calibrated to 0...100 °C	C.37
1		X									Z	Passive converter OLP	E.21
1		X									Z	Passive converter OLP	E.21
1		X									Z	Passive converter OLP	E.21
1		X									Z	Passive converter OLP	E.21
1		X									Z	Passive converter OLP	E.21
1		X									Z	Passive converter OLP	E.21
3	X		X	X		With display	Button	24 V DC	300 V	3-way	S	Temperature measurement with alarm output	F.7
3	X		X	X		With display	Button	24 V DC	300 V	3-way	S	Temperature measurement with alarm output	F.8
2				X				24 V DC			Z		E.23
2				X				24 V DC			Z		E.23
2				X			DIP switch	24 V DC	300 V	3-way	S	Adjustable switching thresholds	D.4
2				X			DIP switch	24 V DC	300 V	3-way	Z	Adjustable switching thresholds	D.4
1				X		CO contact	DIP switch		300 V	3-way	S	Adjustable switching thresholds. Versorgung aus dem Messkreis	D.6
1				X		Monitoring of low and surge voltages	DIP switch		600 V	2-way	S	Adjustable switching thresholds, supply from the measurement circuit	D.7
1				X			DIP switch	24 V DC	300 V	2-way	S	Adjustable switching thresholds	D.5
1				X			DIP switch	24 V DC	300 V	2-way	Z	Adjustable switching thresholds	D.5
1				X			DIP switch	24 V DC	300 V	2-way	S	Adjustable switching thresholds	D.5
1				X			DIP switch	24 V DC	300 V	2-way	Z	Adjustable switching thresholds	D.5

Connection system: S = screw / Z = tension clamp, ILP = Input Loop Powered, OLP = Output Loop Powered

# Quick select – Analogue Signal Conditioning

**A**
**Selection table**

Order No.	Product	Input									Miscellaneous	Sensor feed	Width
		Amount	0...20 mA	4...20 mA	0...10 V	0...5 V	TC	RTD	Frequency				
<b>Monitoring modules</b>													
7940017848	DPADMV 0-10mV	1									0...10 mV		46 mm
7940017849	DPADMV 0-100mV	1									0...100 mV		46 mm
7940011718	DPADCV 0-10V	1			X								46 mm
7940012970	DPADCV 1-5V	1									1...5 V		46 mm
7940017847	DPAAVX 0-125Vac	1									0...250 V AC		46 mm
7940016144	DPAMAS 4-20mA	2		X									46 mm
7940011294	DPADMA 4-20mA	1		X									46 mm
7940017853	DPATCX K/0-1000C	1					X						46 mm
7940014212	DPARTD 0-50C	1						X					46 mm
7940014900	DPARTD 0-100C	1						X					46 mm
7940017852	DPARTD 0-200C	1						X					46 mm
7940017919	DPADRT 200Ohm20-400hm	2									Two resistors R1 and R2 in 2-wire configuration with R1 > R2		46 mm
7940017917	DPARES 0-1KOhm	1									2-wire resistance		46 mm
7940017850	DPAPOT 1KOhm/0-100%	1									3-wire partial-voltage meter or measuring wire		46 mm
7940017851	DPAPOT 10KOhm/0-100%	1									3-wire partial-voltage meter or measuring wire		46 mm
7940010174	UCVR	2									User adjustable: -55...55 mA -55...55 V		46 mm
7940014450	XFAR										User adjustable: -22...22 mA -11...11 V		46 mm
7760000017	UTCR	1					X						46 mm
7940011087	URTR	1						X					46 mm
7940015213	UHZR	1							X		User adjustable: 0...10 kHz 50 mV...250 V AC/DC		46 mm
7940017921	CNDR	2									Adjustable conductivity: 0...20 mS 0...200 °C		46 mm

Amount	Output				Miscellaneous	Configuration	Auxiliary power	Rated voltage	Isolation	Connection system	Special characteristics	Page
	0...20 mA	4...20 mA	0...10 V	Relay								
2				X	CO contact		24 V DC	300 V	3-way	S	Voltage monitoring	F.27
2				X	CO contact		24 V DC	300 V	3-way	S	Voltage monitoring	F.27
2				X	CO contact		24 V DC	300 V	3-way	S	Voltage monitoring	F.28
2				X	CO contact		24 V DC	300 V	3-way	S	Voltage monitoring	F.28
2				X	CO contact		24 V DC	300 V	3-way	S	Voltage monitoring	F.29
2				X	CO contact		24 V DC	300 V	3-way	S	Monitoring of residual current	F.34
2				X	CO contact		24 V DC	300 V	3-way	S	Current monitoring	F.26
2				X	CO contact		24 V DC	300 V	3-way	S	Temperature monitoring	F.31
2				X	CO contact		24 V DC	300 V	3-way	S	Temperature monitoring	F.30
2				X	CO contact		24 V DC	300 V	3-way	S	Temperature monitoring	F.30
2				X	CO contact		24 V DC	300 V	3-way	S	Temperature monitoring	F.30
2				X	CO contact		24 V DC	300 V	3-way	S	Resistance monitoring Residual current measuring	F.35
2				X	CO contact		24 V DC	300 V	3-way	S	Resistance monitoring	F.33
2				X	CO contact		24 V DC	300 V	3-way	S	Position monitoring	F.32
2				X	CO contact		24 V DC	300 V	3-way	S	Position monitoring	F.32
2				X	CO contact	Button	24 V DC	300 V	3-way	S		F.18
2				X	CO contact	Button	24 V DC	300 V	3-way	S		F.22
2				X	CO contact	Button	24 V DC	300 V	3-way	S		F.19
2				X	CO contact	Button	24 V DC	300 V	3-way	S		F.20
2				X	CO contact	Button	24 V DC	300 V	3-way	S		F.23
2	X		X	X	CO contact	Button	24 V DC	300 V	3-way	S		F.21

Connection system: **S** = screw / **Z** = tension clamp, **ILP** = Input Loop Powered, **OLP** = Output Loop Powered





# Intrinsically safe signal conditioners for hazardous area applications

<b>Intrinsically safe signal conditioners for hazardous area applications</b>	Intrinsically safe signal conditioners for hazardous area applications – Overview	B.2
	ACT20X – Overview	B.4
	ACT20X	B.6

# Intrinsically safe signal conditioners for hazardous area applications

## ACT20X signal converters

The ACT20X is a completely new line of signal converter products for the Ex zone. These compact modules require only 11 mm per channel and take up very little space in the electrical cabinet. Weidmüller has specially designed the ACT20X line for process automation applications in Ex and non-Ex zones. The sixteen different variants can process all standard input signals (such as 2-wire, HART®, NAMUR, RTD, thermocouple or DC) from the Ex zone 0. They can also handle digital or analogue signals from Ex-zone field devices to the controller. The integrated relay output issues and alert in the event of a malfunction; this makes troubleshooting easier and reduces facility down times. The WI-Manager configuration software is based on FDT (Field Device Tool) technology. The software allows you to configure all ACT20X products with your PC so that they can be custom-fit to a wide variety of process applications. Weidmüller provides a device type manager (DTM) for the ACT20X modules that can be used in any FDT-based frame. The DTMs allow you to configure different devices quickly and accurately. They also enable you to analyze measurements and diagnostics data. The DTM can also be used to clearly identify the connected device. The FDT frame application „WI Manager“ and the device-specific DTMs are available from Weidmüller free of charge. The ACT20X modules can be used in a temperature range from –20 °C to +60 °C without limitations. The modules can be installed in the safe zone or in the hazardous area of Zone 2. All modules have 3-way isolation and are optionally available with a 2-channel design.

The ACT20Xs always deliver a pure, interference-free signal thanks to their accuracy, temperature stability and high insulation strength. They can easily be used around the globe since they already have all the necessary international approvals, including ATEX, ICEEX, GOST and FM.

## Features

- Analogue and binary signal interface to Zone 0/Div.1 for explosion-risk inputs and outputs
- The approvals include usage in Zone 0 (IECEX, ATEX), Class 1, Division 1 and 2 (FM).
- All standard input signals (such as 2-wire, HART®, NAMUR, RTD, thermocouple or DC) from the Ex Zone 0.
- High-quality 3-way isolation
- Two-channel option – this minimizes the installation costs and reduces the space required within the electrical cabinet
- HART® transparent analogue signals
- Integrated alarm contact
- Ambient temperature: –20 to +60 °C
- All modules can be configured with WI-Manager FDT/DTM software



**ACT20X: an overview of the six basic module types**



**ACT20X-HDI-SDO**

NAMUR isolating switching amplifier



**ACT20X-SDI-HDO**

Solenoid driver



**ACT20X-HAI-SAO**

Current supply isolator,  
HART® Transparent



**ACT20X-SAI-HAO**

Current output isolator,  
HART® Transparent



**ACT20X-HTI-SAO**

Temperature transducer



**ACT20X-HUI-SAO**

Universal signal converter

# ACT20X – Universal, intrinsically safe signal conditioners for hazardous area applications

**PC-configurable conditioners family for hazardous areas in the new Weidmüller electronics housing for installation in safe or hazardous areas of Zone 2**

The ACT20X products fulfil the strict standards of the hazardous area industries and process signals from various Ex zones (Zones 0, 1, 2) for the control system.

ACT20X can be used universally. On the input side, the ACT20X can process HART® input signals, DC, RTD, thermocouple or

NAMUR signals from the Ex area. On the output side, field devices in the Ex area are controlled via the ACT20X with analogue or digital signals. All ACT20X products are characterised by insulation, accuracy and high temperature stability.

The 2-channel versions with width of 22.5 mm are available with either transistor or relay output. Due to this high component density, the space requirements and installation costs are reduced accordingly.





### Configuration via FDT

All modules can be quickly and conveniently configured with manufacturer-independent FDT/DTM software.



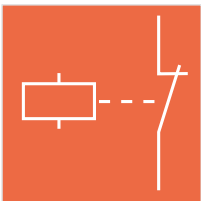
### Worldwide application

Fulfills the strict standards and requirements of the process industry. Can be used worldwide due to international and local approvals ATEX, IECEx, CULUS, FM, GOST and DNV.



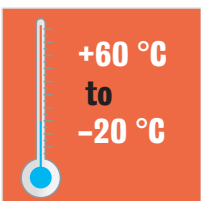
### Intelligent connection system

Pluggable, coded, with release lever. The release lever simplifies maintenance and allows the disconnection without damaging the cables.



### Alarm function

No laborious troubleshooting. Alarm function integrated for cable or sensor errors. In case of failures, a diagnostic signal is sent to the control system.



### Robust

Wide ambient temperature range from -20 °C ... +60 °C.

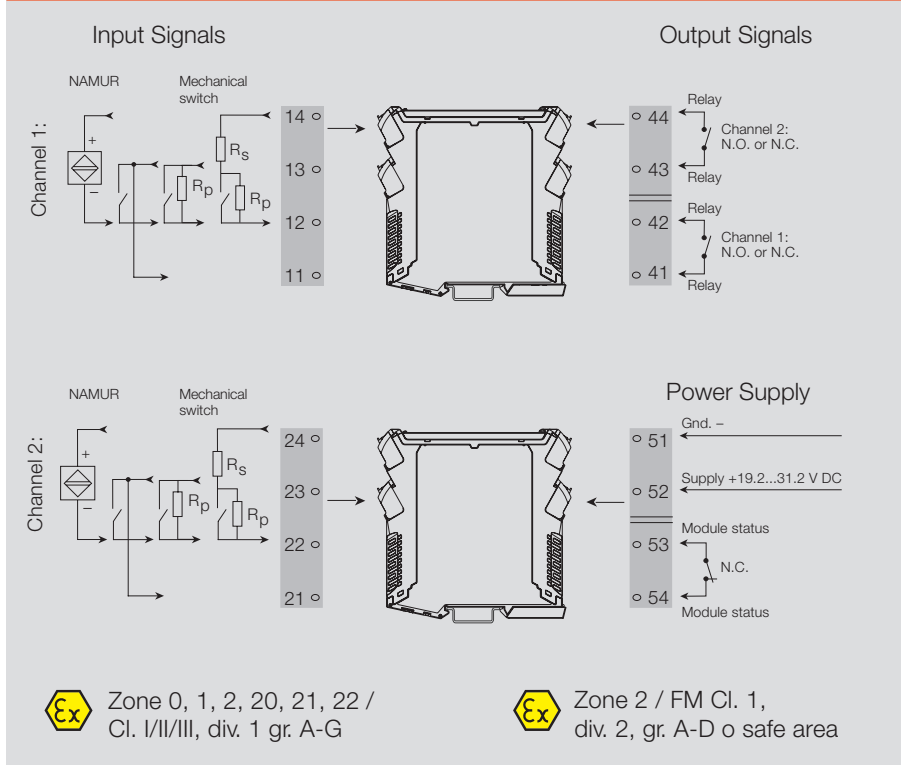
**ACT20X**

**NAMUR isolating switching amplifier: with relay output**

The ACT20X-HDI-SDO-RNO (NC) isolating switching amplifier is a specialized signal isolating converter for Namur sensor signals or for simple switching signals from the Ex Zone 0. A single relay, available optionally as NC or NO, provides the output signal in the safe zone. Single-channel or double-channel versions are also available.

**B**

**Connection diagram: ACT20X HDI-SDO-RNC**

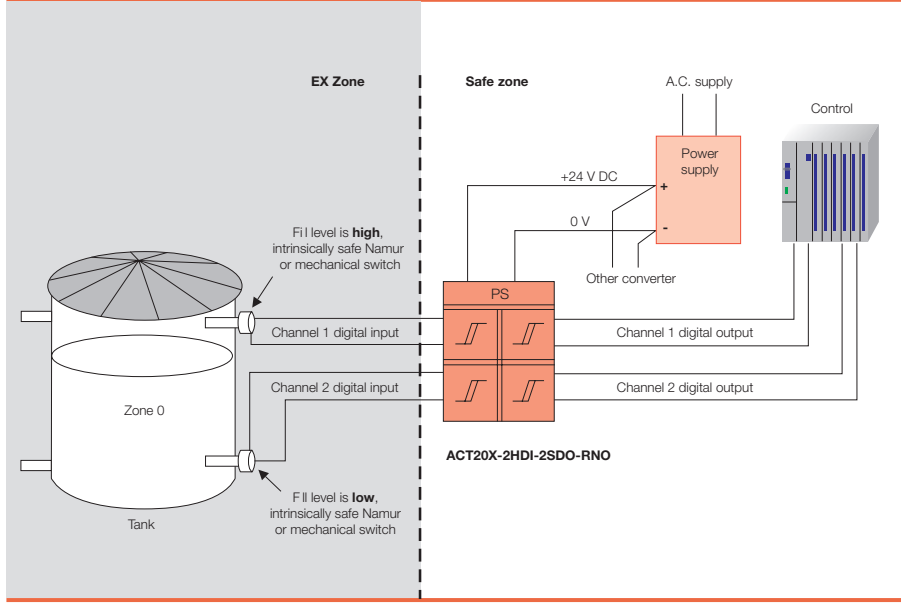


**Ex label**

<b>ATEX</b>
II 3 G Ex nA nC IIC T4
II (1) G [Ex ia] IIC/II B/IIA
II (1) D [Ex iaD]
<b>IECEX</b>
Ex nA nC IIC T4 Gc
[Ex ia Ga] IIC/II B/IIA
[Ex ia Da] IIIC
<b>FM</b>
Installation in CL I DIV2 GP A-D T4
Protects Ex circuits, in compliance with
Cl. I-III ABT 1/2 GP A-G or
Cl. I Zn2 AEx/Ex nA nC [ia] IIC T4.

**Note**

**Application: monitoring of fill level with the ACT20X HDI-SDO-RNO (relay output)**

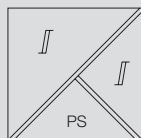


## NAMUR isolating switching amplifier

- Converts intrinsically safe digital signals (NAMUR / switching contact) from EX Zone 0 into digital output signals (relay output) for the safe zone
- PC configuration with FDT/DTM software, download at [www.weidmuller.com](http://www.weidmuller.com)
- Relay output for error alarm
- 1 or 2 channels in one module

## ACT20X-HDI-SDO-RNO-S / RNC-S ACT20X-2HDI-2SDO-RNO-S / RNC-S

With relay output



### Technical data

Input	
Sensor	NAMUR sensor, according to EN60947, Switch with or without RS, RP
Sensor supply	8 V DC / 8 mA
Resistance	RP = 750 Ω / RS = 15kΩ
Input frequency	0...5 kHz
Pulse duration	> 0.1 ms
Input resistance	1 kΩ
Triggerlevel low / Triggerlevel high	< 1.2 mA /
Output signal in case of wire break	< 0.1 mA, > 6.5 mA (in case of wire break)
Output	
Type	Relay, 1 or 2 NO / NC (potential-free)
Rated switching voltage	≤ 250 V AC / 30 V DC (safe area) ≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 2 A AC/DC (safe area, Zone 2 area)
Power rating	≤ 500 VA / 60 W (safe area) ≤ 16 VA / 32 W (Zone 2)
Alarm output	
Type	Relay, 1 NO (voltage-free)
Nominal switching voltage	≤ 125 V AC / 110 V DC (safe area) ≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area) ≤ 16 VA / 32 W (Zone 2)
General data	
Supply voltage	19...31.2 V DC
NAMUR supply	8 V DC / 8 mA
Power consumption	≤ 3 W (2 channels)
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
Approvals	
Approvals	cULus; CE; ATEX; IECEX; FM
Insulation coordination	
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
Data for Ex applications (ATEX)	
Voltage U <sub>0</sub>	10.6 V DC
Current I <sub>0</sub>	12 mA DC
Power P <sub>0</sub>	32 W
Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup> 2.5 / 0.5 / 2.5
Length x width x height	mm 119.2 / 22.5 / 113.6
Screw connection	
	2.5 / 0.5 / 2.5
	119.2 / 22.5 / 113.6
Note	

### Ordering data

Type	Qty.	Order No.
<b>1-channel version, NO</b>		
ACT20X-HDI-SDO-RNO-S	1	8965340000
<b>1-channel version, NC</b>		
ACT20X-HDI-SDO-RNC-S	1	8965350000
<b>2-channel version, NO</b>		
ACT20X-2HDI-2SDO-RNO-S	1	8965370000
<b>2-channel version, NC</b>		
ACT20X-2HDI-2SDO-RNC-S	1	8965380000
CBX200 USB configuration interface - 8978580000		



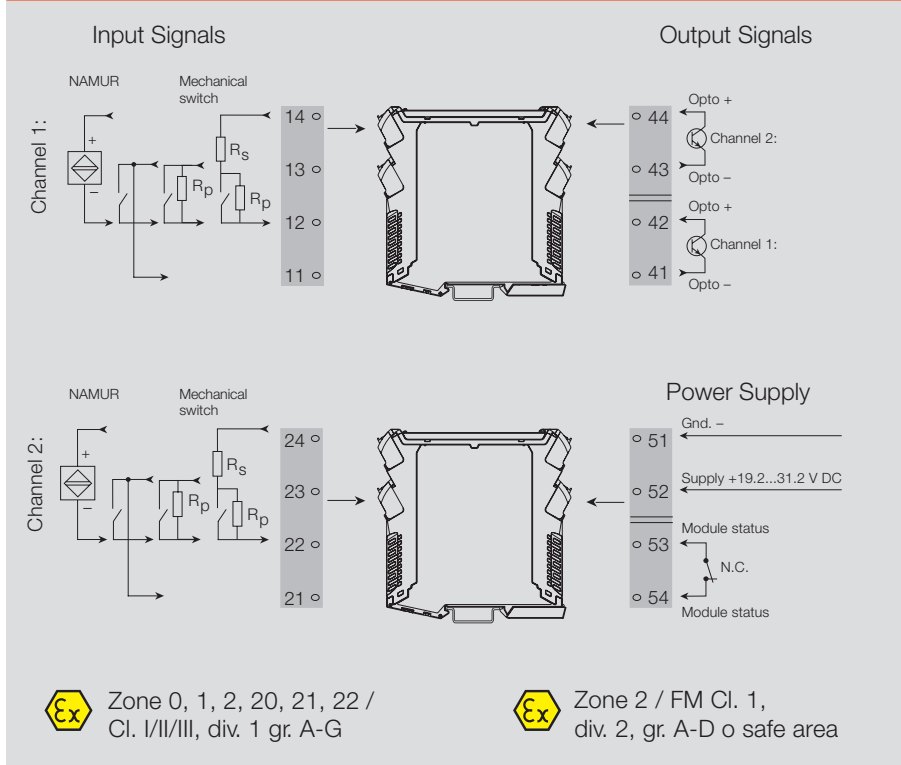
**ACT20X**

**NAMUR isolating switching amplifier: with NPN transistor output**

The ACT20X-HDI-SDO isolating switching amplifier is a specialized signal isolating converter for Namur sensor signals or for simple switching signals from the Ex Zone 0. A plus-switching (NPN) transistor provides the output signal in the safe zone. Single-channel or double-channel versions are also available.

**B**

**Connection diagram: ACT20X HDI-SDO**

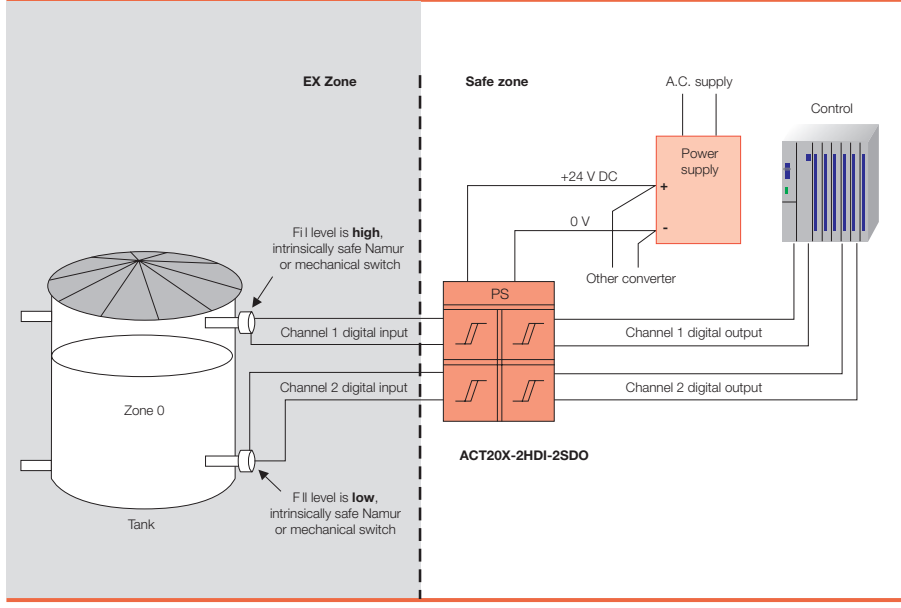


**Ex label**

<b>ATEX</b>
II 3 G Ex nA nC IIC T4
II (1) G [Ex ia] IIC/II B/IIA
II (1) D [Ex iaD]
<b>IECEX</b>
Ex nA nC IIC T4 Gc
[Ex ia Ga] IIC/II B/IIA
[Ex ia Da] IIIC
<b>FM</b>
Installation in CL I DIV2 GP A-D T4
Protects Ex circuits, in compliance with
Cl. I-III ABT 1/2 GP A-G or
Cl. I Zn2 AEx/Ex nA nC [ia] IIC T4.

**Note**

**Application: monitoring the fill level with isolating switching amplifier**

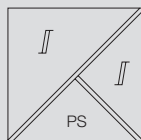


## NAMUR isolating switching amplifier

- Converts intrinsically safe digital signals (NAMUR / switching contact) from EX Zone 0 into digital output signals (transistor output) for the safe zone
- PC configuration with FDT/DTM software, download at [www.weidmuller.com](http://www.weidmuller.com)
- Relay output for error alarm
- 1 or 2 channels in one module

## ACT20X-HDI-SDO-S / 2HDI-2SDO-S

with transistor output



### Technical data

Input	
Sensor	NAMUR sensor, according to EN60947, Switch with or without RS, RP
Sensor supply	8 V DC / 8 mA
Resistance	RP = 750 Ω / RS = 15kΩ
Input frequency	0...5 kHz
Pulse duration	> 0.1 ms
Input resistance	1 kΩ
Triggerlevel low / Triggerlevel high	< 1.2 mA / > 2.1 mA
Output signal in case of wire break	< 0.1 mA, > 6.5 mA (in case of wire break)
Output	
Type	NPN transistor output
Switching frequency	5 kHz
Pulse duration	60 μs
Rated switching voltage	≤ 30 V DC
Power rating	≤ 80 mA / ≤ 2.4 W
Voltage drop at max. load	< 2.5 V DC
Alarm output	
Type	Relay, 1 NO (voltage-free)
Nominal switching voltage	≤ 125 V AC / 110 V DC (safe area)
	≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area)
	≤ 16 VA / 32 W (Zone 2)
General data	
Supply voltage	19...31.2 V DC
NAMUR supply	8 V DC / 8 mA
Power consumption	≤ 3 W (2 channels)
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
Approvals	
Approvals	cULus; CE; ATEX; IECEX; FM
Insulation coordination	
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
Data for Ex applications (ATEX)	
Voltage U <sub>0</sub>	10.6 V DC
Current I <sub>0</sub>	12 mA DC
Power P <sub>0</sub>	32 W
Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup> 2.5 / 0.5 / 2.5
Length x width x height	mm 119.2 / 22.5 / 113.6
Note	
Screw connection	

### Ordering data

Type	Qty.	Order No.
<b>1-channel version</b>		
ACT20X-HDI-SDO-S	1	8965360000
<b>2-channel version</b>		
ACT20X-2HDI-2SDO-S	1	8965390000

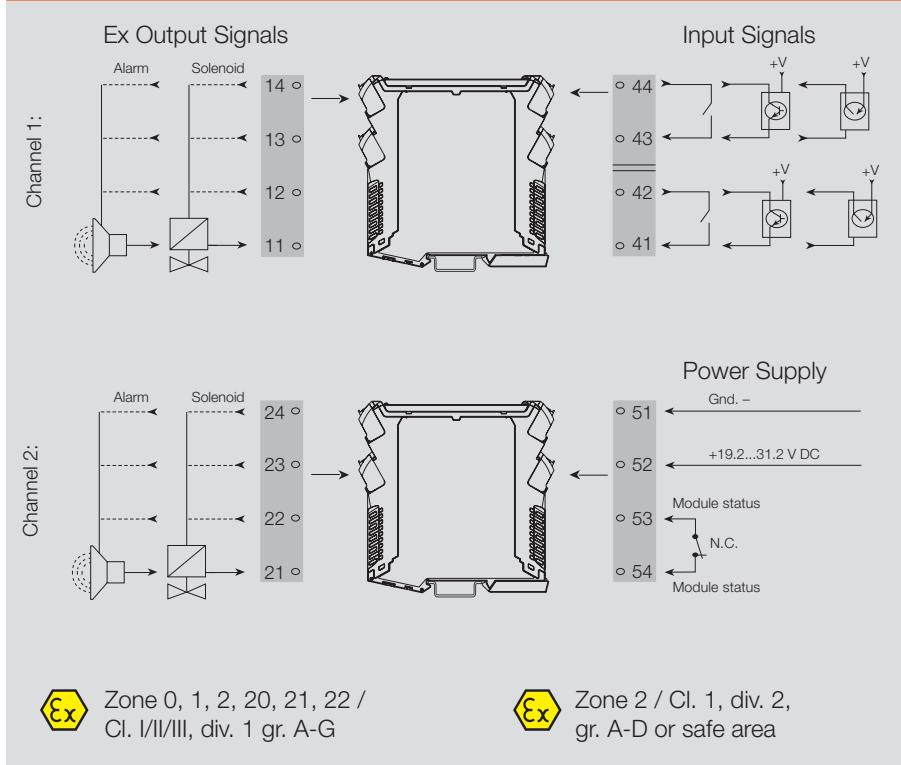
CBX200 USB configuration interface - 8978580000

**ACT20X**

**Solenoid driver for ignition protection IIC, 35 mA**

The ACT20X-SDI-HDO solenoid driver has an input in the safe zone and an output in the Ex zone 0. This driver is suitable for switching solenoid valves or alarm transmitters. It is optionally available in a single-channel or double-channel version.

**B Connection diagram: ACT20X SDI-HDO**

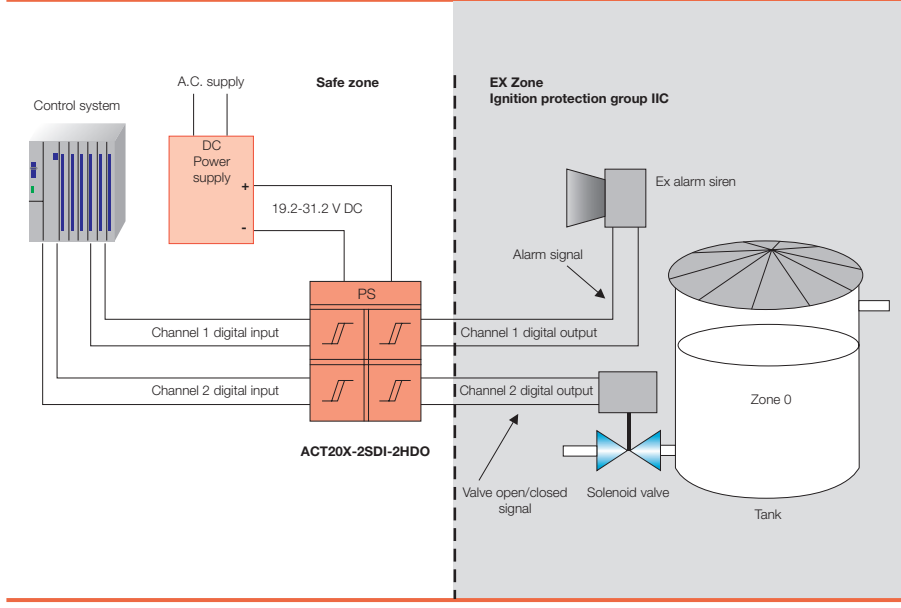


**Ex label**

<b>ATEX</b>
II 3 G Ex nA nC IIC T4
II (1) G [Ex ia] IIC/IIA
II (1) D [Ex iaD]
<b>IECEx</b>
Ex nA nC IIC T4 Gc
[Ex ia Ga] IIC/IIA
[Ex ia Da] IIIC
<b>FM</b>
Installation in CL I DIV2 GP A-D T4
Protects Ex circuits, in compliance with
Cl. I-III ABT 1/2 GP A-G or
Cl. I Zn2 AEx/Ex nA nC [ia] IIC T4.

**Note**

**Application: Inflow control in Ex zone with ignition protection group IIC**



**Output data: Solenoid driver**

**for ignition protection group IIC (< 35 mA)**

Connection terminal			
Channel 1	U without load	U with load	I max
11-12	Min. 24 V	Min. 12.5 V	35 mA
11-13	Min. 24 V	Min. 13.5 V	35 mA
11-14	Min. 24 V	Min. 14.5 V	35 mA

**Note**

**for ignition protection group IIC (< 35 mA)**

Connection terminal			
Channel 2	U without load	U with load	I max
21-22	Min. 24 V	Min. 12.5 V	35 mA
21-23	Min. 24 V	Min. 13.5 V	35 mA
21-24	Min. 24 V	Min. 14.5 V	35 mA

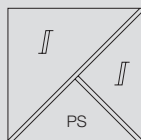
**Note**

### Solenoid driver

- The solenoid driver controls intrinsically safe valves, LEDs, acoustic alarms, etc.
- PC configuration with FDT/DTM software, download at [www.weidmueller.com](http://www.weidmueller.com)
- Output current is limited to 35 mA for gas group IIC
- 1 or 2 channels in one module
- Relay output for error alarm

### ACT20X-SDI-HDO / 2SDI-2HDO

For gas group IIC 35 mA



### Technical data

Input	
Type	NPN, PNP switching signal
Input voltage	≤ 28 V DC
Input resistance, voltage	3.5 kΩ
Triggerlevel low	≤ 2.0 V DC (NPN), ≤ 8.0 V DC (PNP)
Triggerlevel high	≥ 4.0 V DC (NPN), ≥ 10V DC (PNP)
Alarm output	
Type	Relay, 1 NO (voltage-free)
Nominal switching voltage	≤ 125 V AC / 110 V DC (safe area) ≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area) ≤ 16 VA / 32 W (Zone 2)
General data	
Supply voltage	19...31.2 V DC
Power consumption	≤ 3 W (2 channels)
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
Approvals	
Approvals	cULus; CE; ATEX; IECEX; FM
Insulation coordination	
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
Data for Ex applications (ATEX)	
Voltage U <sub>0</sub>	28 V DC
Current I <sub>0</sub>	≤ 135 mA
Power P <sub>0</sub>	≤ 0.95 W

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
	2.5 / 0.5 / 2.5
	119.2 / 22.5 / 113.6

### Ordering data

Type	Qty.	Order No.
<b>1-channel version</b>		
ACT20X-SDI-HDO-L-S	1	8965400000
<b>2-channel version</b>		
ACT20X-2SDI-2HDO-S	1	8965420000

CBX200 USB configuration interface - 8978580000

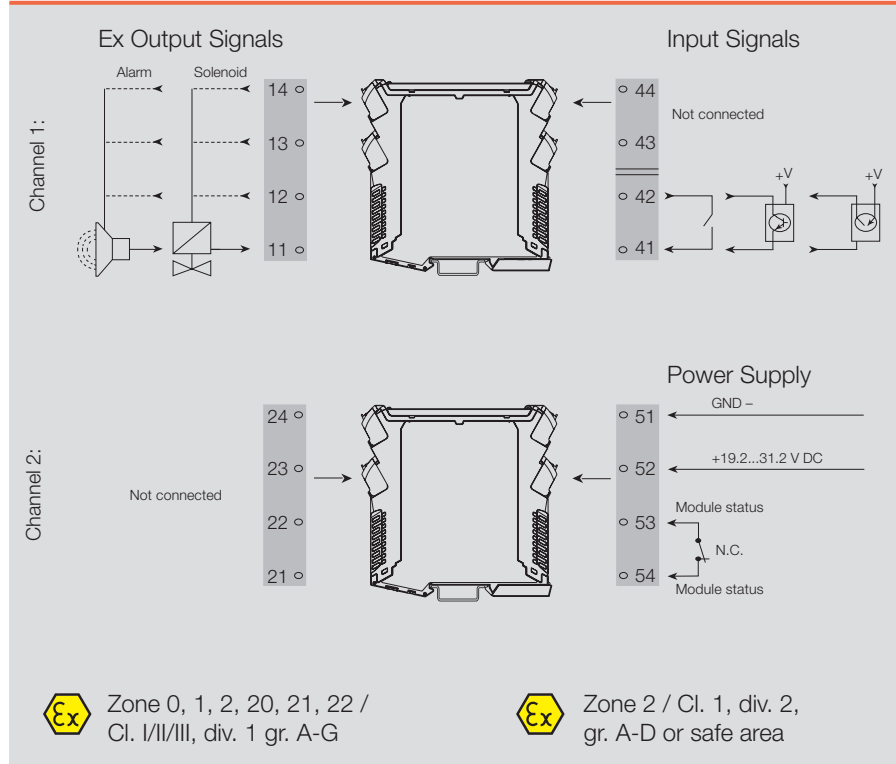
## ACT20X

### Solenoid driver for ignition protection group IIB, <60 mA

The ACT20X-SDI-HDO solenoid driver has an input in the safe zone and an output in the Ex zone 0. This driver is suitable for switching solenoid valves or alarm transmitters.

## B

### Connection diagram: ACT20X-SDI-HDO, for ignition protection group IIB, <60 mA

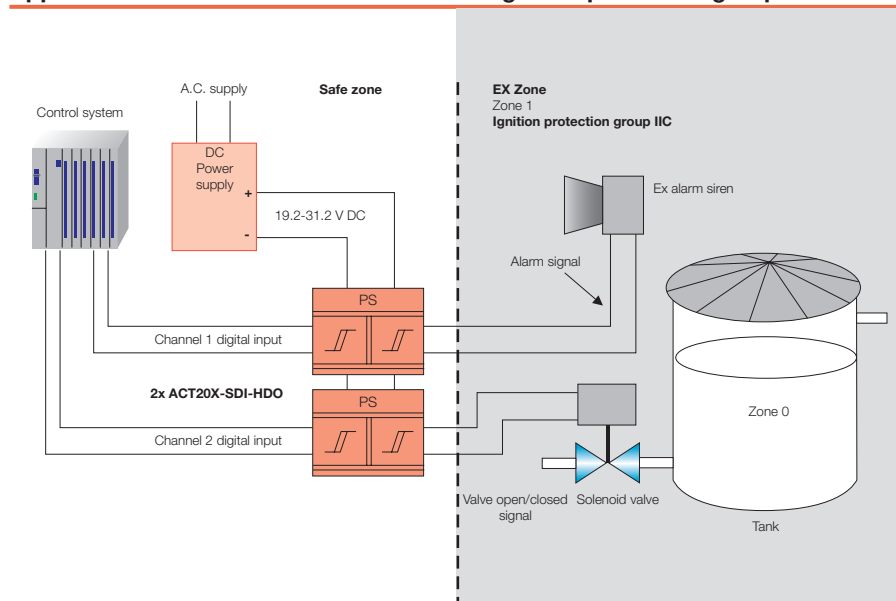


### Ex label

<b>ATEX</b>
II 3 G Ex nA nC IIC T4
II (1) G [Ex ia] IIC/IIA
II (1) D [Ex iaD]
<b>IECEX</b>
Ex nA nC IIC T4 Gc
[Ex ia Ga] IIC/IIA
[Ex ia Da] IIIC
<b>FM</b>
Installation in CL I DIV2 GP A-D T4
Protects Ex circuits, in compliance with
Cl. I-III ABT 1/2 GP A-G or
Cl. I Zn2 AEx/Ex nA nC [ia] IIC T4.

**Note**

### Application: Inflow control in Ex zone with ignition protection group IIB



### Output data: Solenoid driver for ignition protection group IIC (< 60 mA)

Connection terminal			
Channel 1	U without load	U with load	I max
11-12	Min. 24 V	Min. 9 V Min. 11.5 V	60 mA 50 mA
11-13	Min. 24 V	Min. 12.5 V Min. 10 V	60 mA 50 mA
11-14	Min. 24 V	Min. 11 V Min. 13 V	60 mA 50 mA

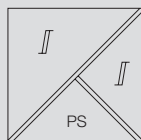
**Note**

### Solenoid driver

- The solenoid driver controls intrinsically safe valves, LEDs, acoustic alarms, etc.
- PC configuration with FDT/DTM software, download at [www.weidmueller.com](http://www.weidmueller.com)
- Output current is limited to 60 mA for gas group IIB
- Relay output for error alarm

### ACT20X-SDI-HDO-H-S

For gas group IIB < 60 mA



### Technical data

Input	
Type	NPN, PNP switching signal
Input voltage	≤ 28 V DC
Input resistance, voltage	3.5 kΩ
Triggerlevel low	≤ 2.0 V DC (NPN), ≤ 8.0 V DC (PNP)
Triggerlevel high	≥ 4.0 V DC (NPN), ≥ 10V DC (PNP)
Alarm output	
Type	Relay, 1 NO (voltage-free)
Nominal switching voltage	≤ 125 V AC / 110 V DC (safe area)
	≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area)
	≤ 16 VA / 32 W (Zone 2)
General data	
Supply voltage	19...31.2 V DC
Power consumption	≤ 3 W (2 channels)
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
Approvals	
Approvals	cULus; CE; ATEX; IECEX; FM
Insulation coordination	
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
Data for Ex applications (ATEX)	
Voltage U <sub>0</sub>	28 V DC
Current I <sub>0</sub>	≤ 110 mA
Power P <sub>0</sub>	≤ 0.77 W

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
	2.5 / 0.5 / 2.5
	119.2 / 22.5 / 113.6

### Ordering data

Type	Qty.	Order No.
<b>1-channel version</b>		
ACT20X-SDI-HDO-H-S	1	8965410000

CBX200 USB configuration interface - 8978580000

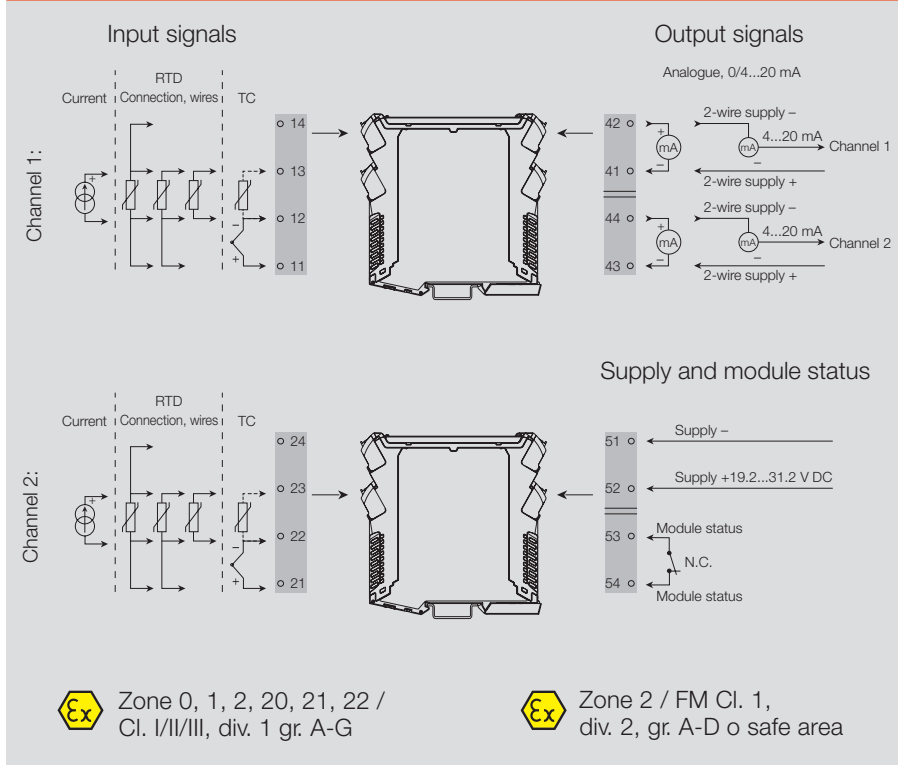
**ACT20X**

**Temperature transducer**

The ACT20X-HTI-SAO temperature transducer processes temperature signals from PT100 sensors and thermocouples originating in the Ex zone. A current signal (mA) can also be connected as the input signal. The input circuit is designed for intrinsically safe signals from the Ex zone 0. Analogue signals are available for the output-side safe zone. It is optionally available in a single-channel or double-channel version.

**B**

**Connection diagram: ACT20X-HTI-SAO temperature transducer**

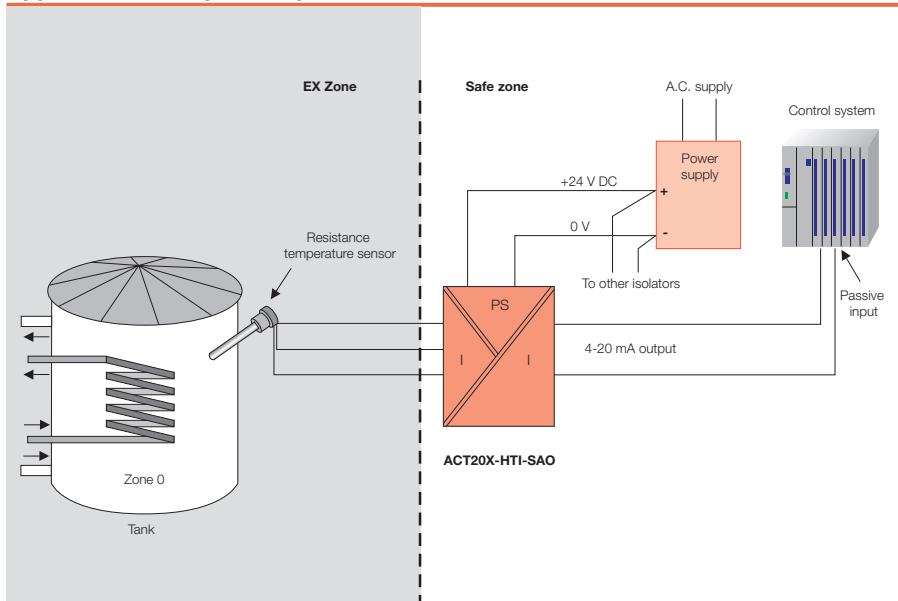


**Ex label**

<b>ATEX</b>
II 3 G Ex nA nC IIC T4
II (1) G [Ex ia] IIC/II B/IIA
II (1) D [Ex iaD]
<b>IECEX</b>
Ex nA nC IIC T4 Gc
[Ex ia Ga] IIC/II B/IIA
[Ex ia Da] IIIC
<b>FM</b>
Installation in CL I DIV2 GP A-D T4
Protects Ex circuits, in compliance with
Cl. I-III ABT 1/2 GP A-G or
Cl. I Zn2 AEx/Ex nA nC [ia] IIC T4.

**Note**

**Application example: temperature measurements in the Ex zone**



**Accuracy / temperature coefficients**

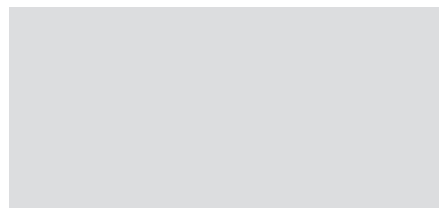
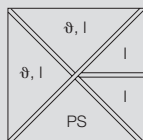
**ACT20X-HTI-SAO**

Input	Accuracy	Temperature coefficient
Input mA	$\leq \pm 4 \mu\text{A}$	$\leq \pm 4 \mu\text{A} / ^\circ\text{C}$
<b>Input RTD</b>		
PT100	$\leq \pm 0.2 ^\circ\text{C}$	$\leq \pm 0.02 ^\circ\text{C} / ^\circ\text{C}$
Ni100	$\leq \pm 0.3 ^\circ\text{C}$	$\leq \pm 0.03 ^\circ\text{C} / ^\circ\text{C}$
<b>Input TC</b>		
Type B	$\leq \pm 4.5 ^\circ\text{C}$	$\leq \pm 0.45 ^\circ\text{C} / ^\circ\text{C}$
Type E, J, K, L, N, T, U	$\leq \pm 1 ^\circ\text{C}$	$\leq \pm 0.1 ^\circ\text{C} / ^\circ\text{C}$
Type R, S, W3, W5, LR	$\leq \pm 2 ^\circ\text{C}$	$\leq \pm 0.2 ^\circ\text{C} / ^\circ\text{C}$
<b>Note</b>		

### Temperature transducer

- Converts intrinsically safe RTD, thermocouple and mA signals into analogue signals for the safe zone.
- PC configuration with FDT/DTM software, download at [www.weidmueller.com](http://www.weidmueller.com)
- Relay output for error alarm
- 1 or 2 channels in one module

### ACT20X-HTI-SAO-S / 2HTI-2SAO-S



### Technical data

Input	
Type	RTD, TC, DC (mA)
Sensor supply	3.8...26 V DC
Temperature input range	Configurable
Line resistance in measuring circuit	≤ 50 Ω
Input current	0(4)...20 mA
Input resistance, current	20 Ω + PTC 50 Ω
Output	
Output current	0(4)...20 mA / 20...4 mA (configurable)
Output signal limit	3.8...20.5 mA / 0...20.5 mA (dependent on range)
load impedance current	≤ 600 Ω
Influence of load resistance	≤ 0.01% of span / 100 Ω
Current loop output	
Output current	4...20 mA
Load resistance	(U <sub>0</sub> - 3.5) / 0.023 A
Influence of load resistance	≤ 0.01% of span / 100 Ω
2-wire supply	3.5...26 V DC
Alarm output	
Type	Relay, 1 NO (voltage-free)
Nominal switching voltage	≤ 125 V AC / 110 V DC (safe area) ≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area) ≤ 16 VA / 32 W (Zone 2)
General data	
Supply voltage	19...31.2 V DC
Power consumption	≤ 3 W (2 channels)
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
Approvals	
Approvals	cULus; CE; ATEX; IECEX; FM
Insulation coordination	
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
Data for Ex applications (ATEX)	
Voltage U <sub>0</sub>	8.7 V DC
Current I <sub>0</sub>	18.4 mA
Power P <sub>0</sub>	40 mW
Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
Clamping range (nominal / min. / max.)	2.5 / 0.5 / 2.5
Length x width x height	119.2 / 22.5 / 113.6

Type	Temperature-range	Accuracy
<b>Metal PTC</b>		
Pt100	-200...850 °C	± (0.15 + 0.02 x T) Class A ± (0.30 °C + 0.005 x T) Class B
Pt500	-200...850 °C	
Pt1000	-200...850 °C	
Ni50		± (0.4 + 0.007 x T) ± (0.4 + 0.028 x T)
Ni100	-60...0 °C	
Ni120	0...180 °C	
Ni1000		
<b>TC-Type according to IEC60584-1</b>		
B	50...250 °C	± 25 K
	250...500 °C	± 10 K
	500...1820 °C	± 6 K
E	-200...-150 °C	± 4 K
	-150...1000 °C	± 3 K
J	-200...-150 °C	± 4 K
	-150...1200 °C	± 3 K
K	-200...-150 °C	± 5 K
	-150...1200 °C	± 3 K
	1200...1372 °C	± 4 K
N	-200...-150 °C	± 6 K
	-150...1300 °C	± 3 K
R	-50...200 °C	± 10 K
	200...1780 °C	± 6 K
S	-50...200 °C	± 10 K
	200...1780 °C	± 6 K
T	-200...-150 °C	± 5 K
	-150...400 °C	± 3 K
<b>according to DIN43710</b>		
U	0...600 °C	± 3 °C
L	0...900 °C	± 3 °C

### Ordering data

Type	Qty.	Order No.
<b>1-channel version</b>		
ACT20X-HTI-SAO-S	1	8965470000
<b>2-channel version</b>		
ACT20X-2HTI-2SAO-S	1	8965480000

CBX200 USB configuration interface - 8978580000



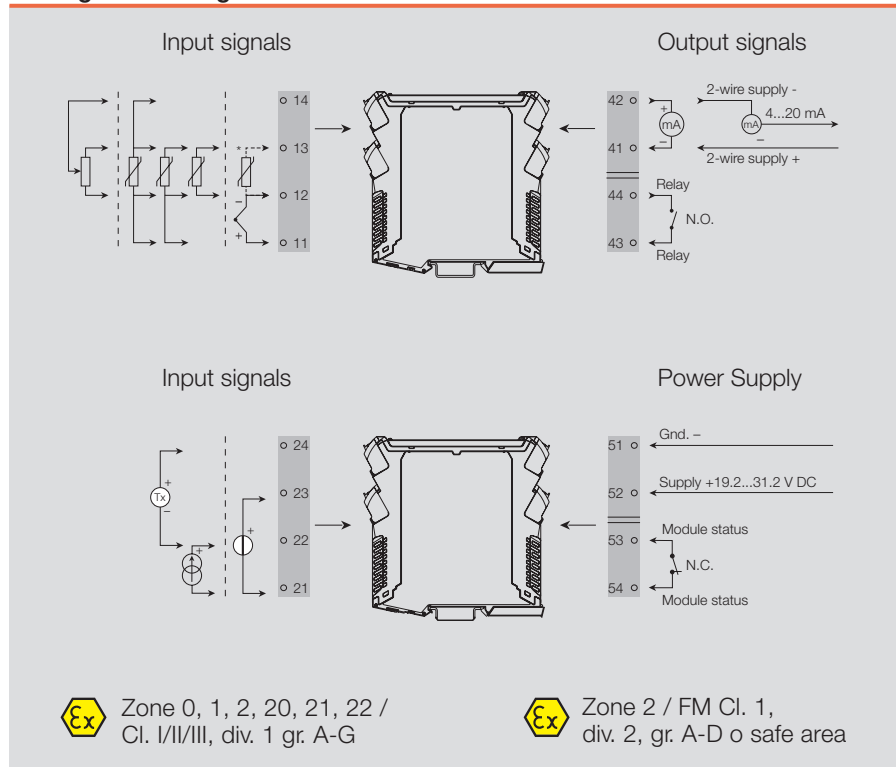
## ACT20X

### Universal signal converter

The ACT20X-HUI-SAO universal signal converter is a configurable temperature and signal converter. This component processes temperature signals from PT100 sensors and thermocouples as well as DC voltage and current signals (mA) from the Ex zone. On the output side, analogue signals are provided for the safe zone. This component also has a relay output that can be used for configuring the switching threshold.

## B

### Connection diagram: the ACT20X-HUI-SAO universal measurement and signal isolating converter

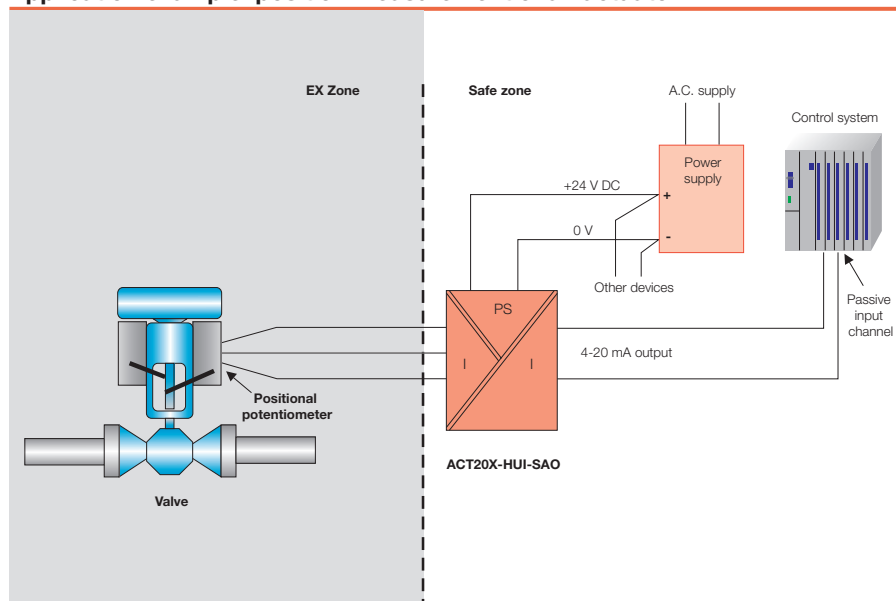


### Ex label

<b>ATEX</b>
II 3 G Ex nA nC IIC T4
II (1) G [Ex ia] IIC/II B/IIA
II (1) D [Ex iaD]
<b>IEEx</b>
Ex nA nC IIC T4 Gc
[Ex ia Ga] IIC/II B/IIA
[Ex ia Da] IIIC
<b>FM</b>
Installation in CL I DIV2 GP A-D T4
Protects Ex circuits, in compliance with
Cl. I-III ABT 1/2 GP A-G or
Cl. I Zn2 AEx/Ex nA nC [ia] IIC T4.

Note

### Application example: position measurement of an actuator



### Accuracy / temperature coefficients

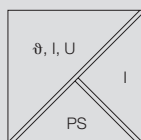
#### ACT20X-HUI-SAO

Input	Accuracy	Temperature coefficient
Input mA	$\leq \pm 4 \mu\text{A}$	$\leq \pm 4 \mu\text{A} / ^\circ\text{C}$
Input Volt	$\leq \pm 20 \mu\text{V}$	$\leq \pm 2 \mu\text{V} / ^\circ\text{C}$
<b>Input RTD</b>		
Pt100	$\leq \pm 0.2 ^\circ\text{C}$	$\leq \pm 0.02 ^\circ\text{C} / ^\circ\text{C}$
Ni100	$\leq \pm 0.3 ^\circ\text{C}$	$\leq \pm 0.03 ^\circ\text{C} / ^\circ\text{C}$
<b>Input TC</b>		
Type B	$\leq \pm 4.5 ^\circ\text{C}$	$\leq \pm 0.45 ^\circ\text{C} / ^\circ\text{C}$
Type E, J, K, L, N, T, U	$\leq \pm 1 ^\circ\text{C}$	$\leq \pm 0.1 ^\circ\text{C} / ^\circ\text{C}$
Type R, S, W3, W5, LR	$\leq \pm 2 ^\circ\text{C}$	$\leq \pm 0.2 ^\circ\text{C} / ^\circ\text{C}$
<b>Note</b>		

## Universal signal converter

- Universal isolator for intrinsically safe RTD, thermocouple, resistor, potentiometer and DC signals (mA, V)
- PC configuration with FDT/DTM software, download at [www.weidmueller.com](http://www.weidmueller.com)
- Digital relay output adjustable as threshold switch
- Relay output for error alarm

## ACT20X-HUI-SAO-S



### Technical data

Input	
Type	RTD, TC, DC (mA, V)
Sensor supply	28...16.5 V DC/0...20 mA
Temperature input range	Configurable
Line resistance in measuring circuit	≤ 50 Ω
Input current	0(4)...20 mA
Input voltage	0...12 V DC, configurable: 0..1 / 0.2...1 / 0...5 / 0...10 and 2...10 V DC
Input resistance, voltage/current	>10 MΩ / 20 Ω + PTC 50 Ω
Output analogue	
Output current	0...23 mA, configurable: 0...20 / 4...20 / 20...0 / 20...4 mA
Output signal limit load impedance current	3.8...20.5 mA / 0...20.5 mA (dependent on range)
Influence of load resistance	≤ 600 Ω
Current loop output	
Output current	4...20 mA
Load resistance	(U <sub>0</sub> - 3.5) / 0.023 A
Influence of load resistance	≤ 0.01% of span / 100 Ω
2-wire supply	≤ 26 V DC
Output digital	
Type	Relay, 1 NO
Function	Configurable switching thresholds
Nominal switching voltage	≤ 250 V AC / 30 V DC (safe area)
	≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 2 A AC/DC (safe area, Zone 2 area)
Power rating	≤ 500 VA / 60 W (safe area)
	≤ 16 VA / 32 W (Zone 2)
Alarm output	
Type	Relay, 1 NO (voltage-free)
Nominal switching voltage	≤ 125 V AC / 110 V DC (safe area)
	≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area)
	≤ 16 VA / 32 W (Zone 2)
General data	
Supply voltage	19...31.2 V DC
Power consumption	≤ 3.5 W
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
Approvals	
Approvals	cULus; CE; ATEX; IECEX; FM
Insulation coordination	
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
Data for Ex applications (ATEX)	
Voltage U <sub>0</sub>	8.7 V DC
Current I <sub>0</sub>	18.4 mA
Power P <sub>0</sub>	40 mW
Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup> 2.5 / 0.5 / 2.5
Length x width x height	mm 119.2 / 22.5 / 113.6
Note	
	<b>Screw connection</b>

Type	Temperature-range	Accuracy
<b>Metal PTC</b>		
Pt100	-200...850 °C	± (0.15 + 0.02 x T) Class A
Pt500	-200...850 °C	± (0.30 °C + 0.005 x T) Class B
Pt1000	-200...850 °C	
Ni50		
Ni100	-60...0 °C	± (0.4 + 0.007 x T)
Ni120	0...180 °C	± (0.4 + 0.028 x T)
Ni1000		
<b>TC-Type according to IEC60584-1</b>		
B	50...250 °C	± 25 K
	250...500 °C	± 10 K
	500...1820 °C	± 6 K
E	-200...-150 °C	± 4 K
	-150...1000 °C	± 3 K
J	-200...-150 °C	± 4 K
	-150...1200 °C	± 3 K
K	-200...-150 °C	± 5 K
	-150...1200 °C	± 3 K
	1200...1372 °C	± 4 K
N	-200...-150 °C	± 6 K
	-150...1300 °C	± 3 K
R	-50...200 °C	± 10 K
	200...1780 °C	± 6 K
S	-50...200 °C	± 10 K
	200...1780 °C	± 6 K
T	-200...-150 °C	± 5 K
	-150...400 °C	± 3 K
<b>according to DIN43710</b>		
U	0...600 °C	± 3 °C
L	0...900 °C	± 3 °C

### Ordering data

Type	Qty.	Order No.
<b>1-channel version</b>		
ACT20X-HUI-SAO-S	1	8965490000

CBX200 USB configuration interface - 8978580000

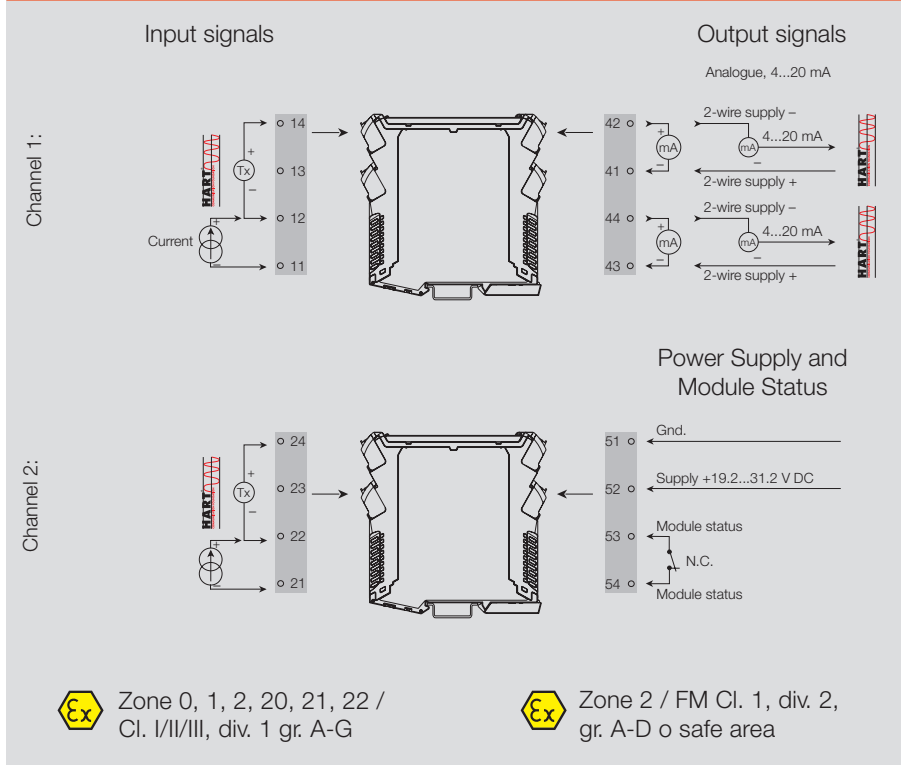
**ACT20X**

**Current supply isolator, HART® Transparent**

The ACT20X-HAI-SAO current supply isolator is a HART® protocol, transparent signal isolator for analogue input signals from the Ex zone 0. It provides an analogue signal for the safe zone on the output side. It is optionally available in a single-channel or double-channel version.

**B**

**Connection diagram: ACT20X-HAI-SAO current supply isolator**

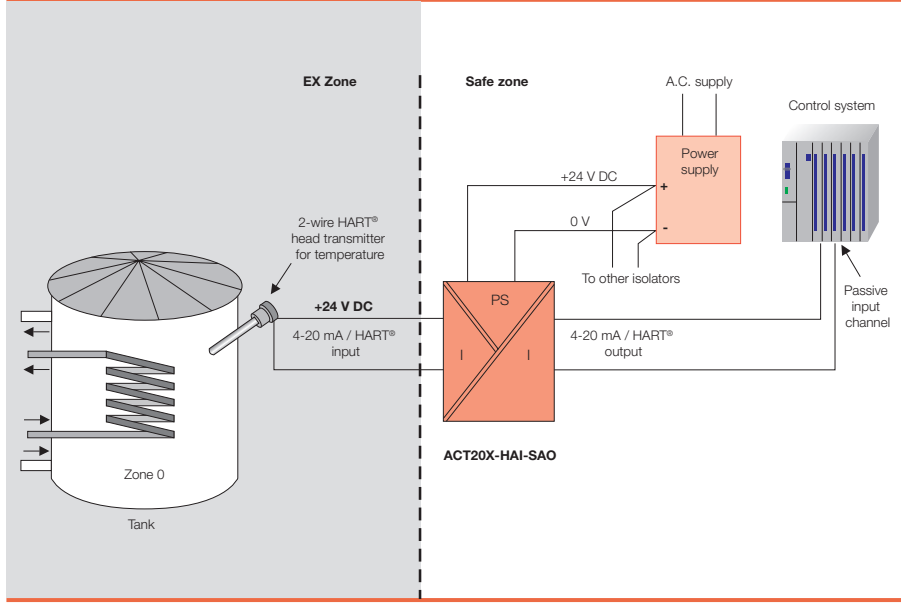


**Ex label**

<b>ATEX</b>
II 3 G Ex nA nC IIC T4
II (1) G [Ex ia] IIC/II B/IIA
II (1) D [Ex iaD]
<b>IECEX</b>
Ex nA nC IIC T4 Gc
[Ex ia Ga] IIC/II B/IIA
[Ex ia Da] IIIC
<b>FM</b>
Installation in CL I DIV2 GP A-D T4
Protects Ex circuits, in compliance with
Cl. I-III ABT 1/2 GP A-G or
Cl. I Zn2 AEx/Ex nA nC [ia] IIC T4.

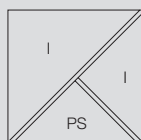
**Note**

**Application example: measuring temperature with a head transmitter, signal transmission with HART®**



## Current supply isolator

- Converts analogue signals from the Ex Zone 0 into analogue output signals for the safe zone.
- Active and passive current inputs
- HART® Transparent
- PC configuration with FDT/DTM software, download at [www.weidmuller.com](http://www.weidmuller.com)
- Relay output for error alarm
- 2-channel module can also be used as signal splitter



## Technical data

Input	
Input current	4...20 mA
Sensor supply	> 15 V DC at 20 mA
Residual ripple (current loop)	< 7.5 mV <sub>eff</sub>
Output analogue	
Output current	4...20 mA
Output signal limit	< 28 mA
load impedance current	≤ 600 Ω
2-wire supply	≤ 26 V DC
Accuracy	< 0.1% span
Temperature coefficient	< 0.1% vom Span/°C (T <sub>0</sub> )
Step response time	≤ 5 ms
Cut-off frequency (-3 dB)	0.5...2.5 kHz @ 3.5...23 mA bi-directional HART® signal
Alarm output	
Type	Relay, 1 NO (voltage-free)
Nominal switching voltage	≤ 125 V AC / 110 V DC (safe area)
	≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area)
	≤ 16 VA / 32 W (Zone 2)
General data	
Supply voltage	19...31.2 V DC
Power consumption	≤ 3 W (2 channels)
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
Approvals	
Approvals	cULus; CE; ATEX; IECEX; FM
Insulation coordination	
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
Data for Ex applications (ATEX)	
Voltage U <sub>0</sub>	28 V DC
Current I <sub>0</sub>	93 mA
Power P <sub>0</sub>	< 650 mW

## ACT20X-HAI-SAO-S / 2HAI-2SAO-S

## Preliminary product data!

Input current	4...20 mA
Sensor supply	> 15 V DC at 20 mA
Residual ripple (current loop)	< 7.5 mV <sub>eff</sub>
Output current	4...20 mA
Output signal limit	< 28 mA
load impedance current	≤ 600 Ω
2-wire supply	≤ 26 V DC
Accuracy	< 0.1% span
Temperature coefficient	< 0.1% vom Span/°C (T <sub>0</sub> )
Step response time	≤ 5 ms
Cut-off frequency (-3 dB)	0.5...2.5 kHz @ 3.5...23 mA bi-directional HART® signal
Relay, 1 NO (voltage-free)	≤ 125 V AC / 110 V DC (safe area)
	≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area)
	≤ 16 VA / 32 W (Zone 2)
Supply voltage	19...31.2 V DC
Power consumption	≤ 3 W (2 channels)
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
Approvals	cULus; CE; ATEX; IECEX; FM
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
Voltage U <sub>0</sub>	28 V DC
Current I <sub>0</sub>	93 mA
Power P <sub>0</sub>	< 650 mW

## Ordering data

Type	Qty.	Order No.
<b>1-channel version</b>		
ACT20X-HAI-SAO-S	1	8965430000
<b>2-channel version</b>		
ACT20X-2HAI-2SAO-S	1	8965440000

CBX200 USB configuration interface - 8978580000

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
	2.5 / 0.5 / 2.5
	119.2 / 22.5 / 113.6

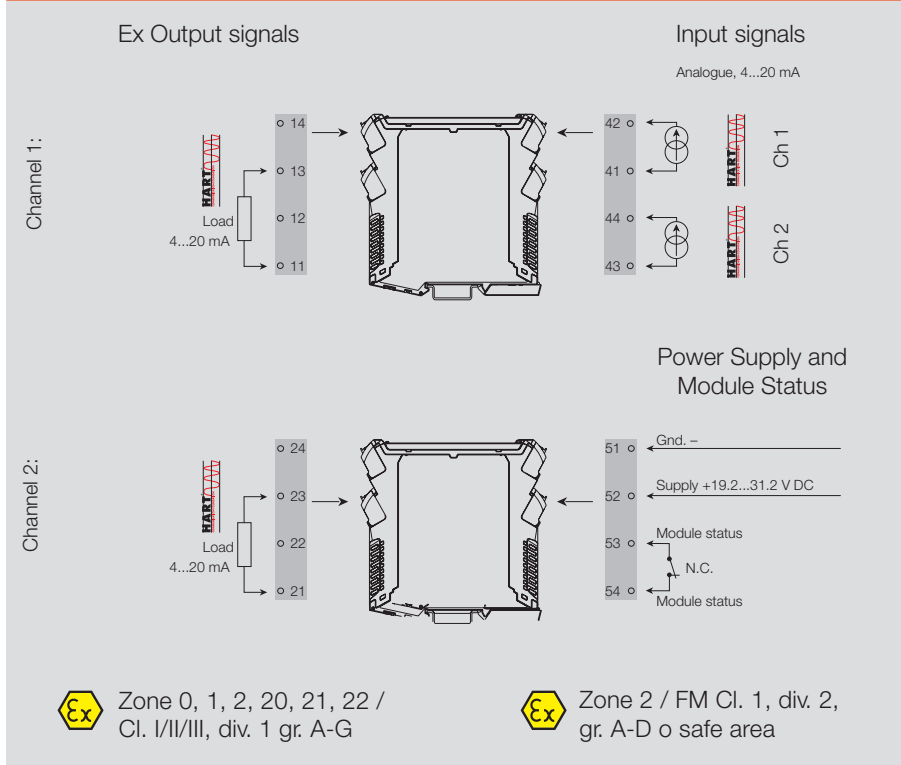
**ACT20X**

**Current output isolator, HART® Transparent**

The ACT20X-SAI-HAO current output isolator is designed so that the HART® protocol transparent. The input is designed for the safe zone and the output is designed for the Ex zone up to Zone 0. It is optionally available in a single-channel or double-channel version.

**B**

**Connection diagram:**

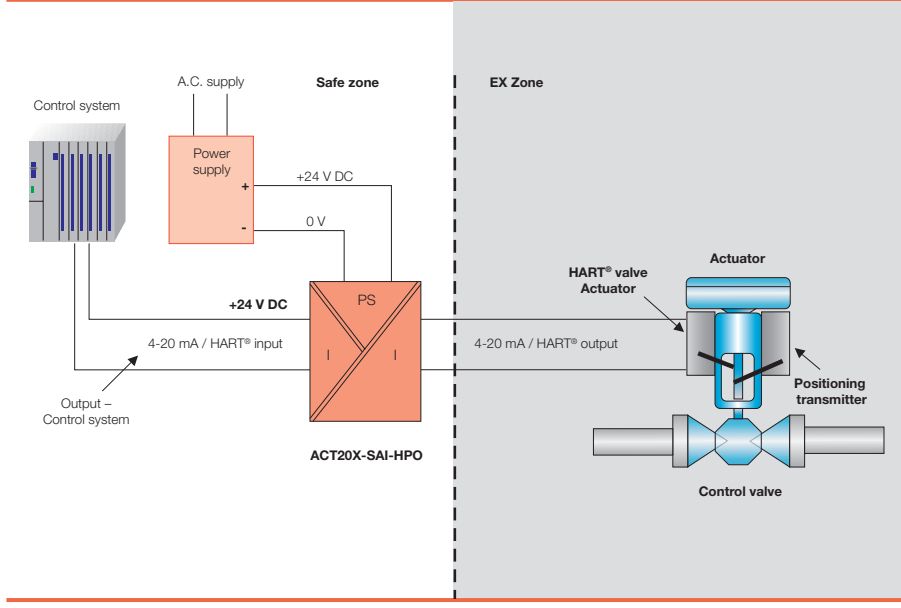


**Ex label**

<b>ATEX</b>
II 3 G Ex nA nC IIC T4
II (1) G [Ex ia] IIC/II B/IIA
II (1) D [Ex iaD]
<b>IECEX</b>
Ex nA nC IIC T4 Gc
[Ex ia Ga] IIC/II B/IIA
[Ex ia Da] IIIC
<b>FM</b>
Installation in CL I DIV2 GP A-D T4
Protects Ex circuits, in compliance with
Cl. I-III ABT 1/2 GP A-G or
Cl. I Zn2 AEx/Ex nA nC [ia] IIC

**Note**

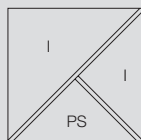
**Application example: controlling an actuator in the Ex zone.**



## Current output isolator

- For controlling field devices located in hazardous areas
- HART® Transparent
- Relay output for error alarm
- PC configuration with FDT/DTM software, download at [www.weidmuller.com](http://www.weidmuller.com)
- 1 or 2 channels in one module

## ACT20X-SAI-HAO-S / 2SAI-2HAO-S



### Technical data

<b>Input</b>	
Input current	4...20 mA
Voltage drop	< 2 V
<b>Output analogue</b>	
Output current	4...20 mA
Output signal limit	< 28 mA
load impedance current	≤ 600 Ω
2-wire supply	> 14,5 V @ 20 mA
Residual ripple (current loop)	< 7,5 mV <sub>eff</sub>
Accuracy	< 0.1% span
Temperature coefficient	< 0.1% vom Span/°C (T <sub>1</sub> )
Step response time	≤ 5 ms
Cut-off frequency (-3 dB)	0.5...2.5 kHz @ 3.5...23 mA bi-directional HART® signal
<b>Alarm output</b>	
Type	Relay, 1 NO (voltage-free)
Nominal switching voltage	≤ 125 V AC / 110 V DC (safe area)
	≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area)
	≤ 16 VA / 32 W (Zone 2)
<b>General data</b>	
Supply voltage	19...31.2 V DC
Power consumption	≤ 3 W (2 channels)
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
<b>Approvals</b>	
Approvals	cULus; CE; ATEX; IECEX; FM
<b>Insulation coordination</b>	
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
<b>Data for Ex applications (ATEX)</b>	
Voltage U <sub>0</sub>	28 V DC
Current I <sub>0</sub>	93 mA
Power P <sub>0</sub>	< 650 mW

### Preliminary product data!

Input current	4...20 mA
Voltage drop	< 2 V
Output current	4...20 mA
Output signal limit	< 28 mA
load impedance current	≤ 600 Ω
2-wire supply	> 14,5 V @ 20 mA
Residual ripple (current loop)	< 7,5 mV <sub>eff</sub>
Accuracy	< 0.1% span
Temperature coefficient	< 0.1% vom Span/°C (T <sub>1</sub> )
Step response time	≤ 5 ms
Cut-off frequency (-3 dB)	0.5...2.5 kHz @ 3.5...23 mA bi-directional HART® signal
Type	Relay, 1 NO (voltage-free)
Nominal switching voltage	≤ 125 V AC / 110 V DC (safe area)
	≤ 32 V AC / 32 V DC (Zone 2)
Continuous current	≤ 0.5 A AC / 1 A DC (safe area, Zone 2)
Power rating	≤ 62.5 V AC / 32 W (safe area)
	≤ 16 VA / 32 W (Zone 2)
Supply voltage	19...31.2 V DC
Power consumption	≤ 3 W (2 channels)
Tightening torque, min. / Tightening torque, max.	0.4 Nm / 0.6 Nm
Ambient temperature / Storage temperature	-20 °C...+60 °C / -20 °C...+85 °C
Approvals	cULus; CE; ATEX; IECEX; FM
Insulation voltage	2.6 kV (input / output)
Rated voltage	300 V
EMC standards	DIN EN 61326
Voltage U <sub>0</sub>	28 V DC
Current I <sub>0</sub>	93 mA
Power P <sub>0</sub>	< 650 mW

### Ordering data

Type	Qty.	Order No.
<b>1-channel version</b>		
ACT20X-SAI-HAO-S	1	8965450000
<b>2-channel version</b>		
ACT20X-2SAI-2HAO-S	1	8965460000

CBX200 USB configuration interface - 8978580000

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm

Screw connection	
	2.5 / 0.5 / 2.5
	119.2 / 22.5 / 113.6



# Signal converters and monitoring components

## Signal converters and monitoring components

An overview of universal signal converters and monitoring components	C.2
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ACT20P – Strain gauge transmitter	C.6
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WAVESERIES – Universal signal converter and trip amplifier, configurable	C.10
WAVESERIES – Universal signal converter, output loop powered	C.14
WAVESERIES – DC/DC 3-way isolator	C.16
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# Signal converters and monitoring components

## Analogue signal converters and monitoring components in IP20 housings can be attached to mounting rails

This product line includes: passive and active isolation amplifiers for analogue current and voltage signals; measurement isolators for measuring temperatures, resistances, frequencies, AC/DC currents and voltages; and universally-configurable signal isolating converters with integrated threshold monitoring.

Our wide range of products covers all the functions for isolating, converting and monitoring analogue signals. Thus these products can be used in practically all industrial measurement applications to safeguard the basic functionality between field signals and post-processing systems. A comprehensive line of accessories is also available for the analogue signal converter product line. These include pluggable cross-connectors, markers, and configuration adapters for the software-programmable products.

## Features

- Can handle a variety of measurements
- Standard analogue signals on the output side
- Universally configurable
- Stand-alone, pluggable connection mechanism – screw or tension clamp
- Tool-free installation
- Quick initial commissioning – with interchangeable electronic
- Minimal wiring effort – with pluggable ZQV 2,5N cross-connector
- Excellent functionality
- Clear type designations makes selecting easy
- High level galvanic isolation





**ACT20P**

Strain gauge transmitter



**WAVESERIES**

Universal signal converter and  
trip amplifier, configurable

# ACT20P Strain gauge transmitter for reading load cells

The ACT20P Bridge converts strain gauge measurement signals to standard analogue signals.

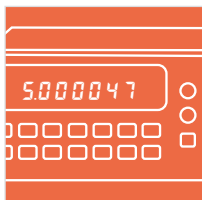
The ACT20P family offers the customer precise and functional signal converters in a compact design. The ACT20P bridge is the first product from this new line of signal converters.

Load cells, or so-called force transducers, are used for weighing all types of industrial products. Most of these are made of a metallic spring bellow. The spring deformations are recorded by a strain gauge and converted into a mV signal. The ACT20P Bridge reads these signals and converts them to a standard signal 0(4) – 20 mA or 0 – 10 V. This secure separation also protects against counterfeit signals. A control signal at the tare input can be used to set the empty weight.

### Features

- Adjust to load cells using the push button
- Easy tare calibration using the integrated control input
- Intelligent pluggable connection method
- The release lever simplifies maintenance and enables the connection to be unplugged without any wire damage.
- Integrated captive coding with the unique „auto-set“ function





### Exact measurement

The input with 6-conductor connection and very high accuracy (0.05 % of the measurement range) enables precise signal processing.



### Conversion

Conversion of the bridge voltage in standardised analogue signals.



### Tare calibration

Simple calibration of the empty (tare) weight can be done on-site by using the button under the front plate or with an external connection via a PLC output.



### On-site calibration

Simple and reliable calibration on-site. The ACT20P Bridge is adjusted to the different load cells by means of a push button behind the hinged panel.



### Protection

Protection against noise from the field. The 3-way isolation separates the input, the voltage supply and the output with 5.7 kV isolation voltage.



### ACT20P Bridge

Strain gauge transmitter for reading load cells

# ACT20P – Strain gauge transmitter for reading from load cells

## ACT20P bridge – Strain gauge transmitter for reading from load cells

### General

The ACT20P Bridge is a DIN rail mounted, signal conditioner for industrial measuring bridges. It provides a precise excitation voltage for the bridge, and converts the input measurement to an isolated current/voltage signal. Strain gauge transmitter are used for various measurements like weight, force, tension, pressure, torque, and deflection.

### Bridge excitation supply

Voltage sense connections are provided so that the excitation voltage can be measured at the bridge. Known as 'remote sensing' this method compensates for cabling and contact resistance errors. It is recommended for all new installations or where an upgrade is possible. Remote sensing wiring requires three twisted pairs.

### TARE adjustment

The installed strain gauge is normally subjected to an initial load independent of the measurement taken. The TARE connection allows you to correct for this initial loading by operating a switch. Alternatively there is a button on the front of the unit (under the front cover) that performs the same function. Press for two seconds to correct for the initial load (the 'CAL HI' LED will light for one second).

### Gauge factor

Every strain gauge has a 'gauge factor' which gives the output voltage at full-scale for a one volt excitation voltage (given in mV/V). You multiply this by the bridge excitation voltage to get the output voltage when the gauge is fully loaded. For example, a load cell with 10V excitation and 2mV/V gauge factor will give 20mV when fully loaded. The meaning of a 20mV output depends on the type of the strain gauge. If it was designed to measure 0-1000Kg then 20mV indicates a 1000Kg load.

### Setup

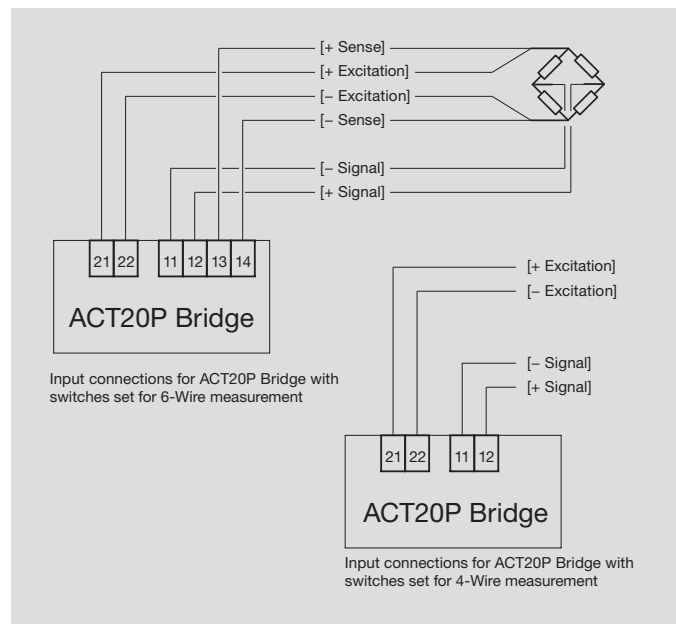
The ACT20P Bridge has internal switch settings that determine the excitation voltage (5V or 10V) and Input range limits. Select the appropriate settings from the table below. Once you have set the DIP switches, you simply calibrate the unit to the input and output range for your application.

### Calibration

There are three options for calibrating the ACT20P Bridge:

- Bench calibrate using a bridge simulator (if you know the gauge factor)
- Calibrate on-site by loading the actual installed strain gauge
- Bench calibrates using a mV source (if you know the gauge factor).

For more information please read the manual from the web page: [www.weidmueller.com](http://www.weidmueller.com)

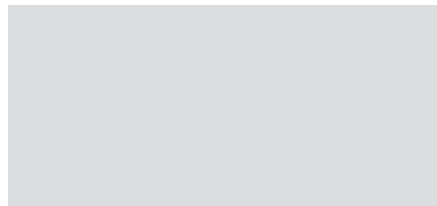
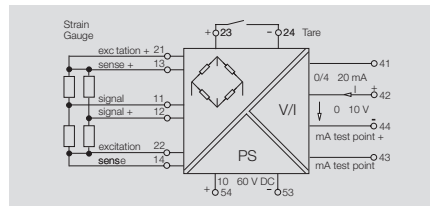


**Configurable**

Strain gauge transmitter for reading from load cells

- 3-way isolation
- Supply for measuring bridges up to 4 x 350 Ω
- Simple calibration of the tare weight using external switch or PLC input
- Input and output ranges adjustable via DIP switch

**ACT20P-BRIDGE-S**



**Technical data**

Input	
Type	Resistance measuring bridge
Bridge sensitivity	1.0 mV / V to 5.0 mV / V
Input measurement range	± 10 mV / ± 20 mV / ± 30 mV / ± 50 mV (adjustable)
Input resistance	> 1 MΩ
Sensor supply	120 mA @ 10 V (= 4 x 350 Ω bridge resistors)
Bridge supply voltage	5 V or 10 V
Output	
Type	Voltage and current output (configurable)
Output voltage / Output current	0 ...11 V (adjustable) / 0...22 mA (adjustable)
Load impedance, voltage/current	600 Ω / 1 kΩ
General data	
Supply voltage	10...60 V DC
Power consumption	3 W @ 24 V DC
Linearity	Typically ± 0.05% of signal range
Repeat accuracy	± 0.05% of signal range
Humidity	10...90 % (no condensation)
Temperature coefficient	typ. 0.005 % / °C
Long-term drift	0.1 % / 10,000 h
Step response time	< 400 ms (10...90 %)
Ambient temperature / Storage temperature	-40 °C...+70 °C / -40 °C...+85 °C
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 61326
Rated voltage	300 V <sub>eff</sub>
Impulse withstand voltage	4 kV (1.2/50 μs)
Pollution severity	2
Overvoltage category	III
Insulation voltage	5.7 kV (input / output, input / supply)

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	
Screw connection	
2.5 / 0.5 / 2.5	
119.2 / 22.5 / 113.6	
Note	

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
2.5 / 0.5 / 2.5	
119.2 / 22.5 / 113.6	
Note	

**Ordering data**

Screw connection
------------------

Type	Qty.	Order No.
ACT20P-BRIDGE-S	1	1067250000

Note	

Note	

**Accessories**

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**Front panel DIP Switch settings**

Switch	Action if On	Action if Off
1	10 V Excitation	5 V Excitation
2	mA Output	Voltage Output
3	10 mV Span	Turn off for other ranges
4	20 mV Span	
5	30 mV Span	
6	50 mV Span	
7	4-wire Measurement	6-wire Measurement
8		

**Connections**

Terminal	Signal	
11	Signal -	Input signal
12	Signal +	
13	Sense +	Bridge Excitation Voltage
14	Sense -	
21	Excitation +	External Tare switch
22	Excitation -	
23	Tare +	External Tare switch
24	Tare -	
41	mA Output -	Output signal
42	Output +	
43	mA Test Point -	
44	Voltage Output -	Output signal
44	mA Test Point +	
54	+	Power Supply
53	-	

# WAVESERIES – signal converters and monitoring components

## Isolation, conversion and monitoring of analogue signals – enclosed in a rail-mounted WAVEBOX housing

WAVESERIES products are well suited for users seeking an analogue signal conversion solution. Weidmüller’s WAVESERIES integrates a wide variety of functions into a compact, space-saving design. This product line covers a broad range of products suitable for many different analogue signal conditioning applications.

- Passive isolation amplifier for standard analogue signals
- Active isolation amplifier for standard analogue signals with 2-way or 3-way isolation
- Measurement isolating converters for recording temperatures (RTD sensors/ thermocouples), resistances, frequencies, AC/DC currents up to 60 A, and AC voltages up to 450 V.
- Measuring transducer for measuring AC currents up to 500 A
- Measurement converters for different input signals, with universal configuration (possible with DIP switch or software)
- Measurement converters with threshold monitoring, universal configuration possible with software

### Service

No tools are required when removing the PCB from the housing. Simply push in the locking clips on the head piece and then pull out the upper section along with the connections and the PCB.

### Saves time

The ZQV 2,5N cross-connector can be used to connect the housing together in order to bridge the power supply between the modules.

### Security

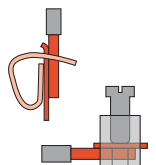
You must ensure the presence of „protective separation“ in accordance with EN50178. The WAVESERIES product are able to fulfil these requirements completely.

### Flexibility

The BLZ/ BLZF pluggable screw and tension-clamp connections offer you the best flexibility. Coding elements can be used (without loss of poles) to make sure that the wrong plug cannot be inserted.

### Protection

The WAVEBOX housing is made from recyclable plastics. It is available in widths of 12.5, 17.5, 22 or 45 mm. Practically no tools are required during installation. All requirements and EMC are met. The integrated ventilation slits ensure that sufficient heat dissipation takes place.





**WAVE TTA / ITXPlus**

Universal signal converter and trip amplifier, configurable



**PRO DC/DC**

DC/DC 3-way isolator, configurable



**WAS / WAZ 5...C DC**

DC/DC 3-way isolator



**WAS / WAZ4...C DC**

DC/DC 2-way isolator with supply on output side



**WAS / WAZ5 OLP/ CCC LP**

DC/DC passive isolator output/input loop powered



**PRO RTD**

RTD signal isolating converters, configurable



**WAS / WAZ4 PT100**

RTD signal converters for 2-, 3- and 4-wire connections



**PRO Thermo**

Thermocouple signal isolator, configurable



**Thermo select**

Thermocouple signal converters, configurable



**PRO Frequency**

Frequency signal isolator converter, configurable



**WAS / WAZ CMA**

Current monitoring up to 60 A AC/DC, configurable



**CMA**

Current measurement converter up to 500 A



**WAS / WAZ VMA AC**

Voltage monitoring up to 450 V AC



## WAVE TTA – one module fits all ...

In the case of signal processing this is a big benefit. The maintenance engineer who hasn't got the right spare isolator or transmitter, and has to run part of the plant on manual control for a day or two before the replacement arrives understands this. It wastes his time and money. So Weidmüller have designed a signal processor with unique flexibility.

In one module the Wave TTA is an intelligent signal

- Isolator
- Convertor
- Transmitter
- Lineariser
- Trip-amplifier

The new Wave TTA is a „universal“ Transmitter Trip-Amplifier. It is part of Weidmüller's well-established WAVESERIES family of analogue signal conditioners, which are widely used in process and factory automation applications.

The TTA is unique. It has a combination of high performance and exceptional configurability. Designed for process industry applications, the TTA will work accurately and stably over a wide ambient temperature range, and over a wide supply voltage range, and with most types of sensor inputs. For 2 wire current transmitters 24 V DC power is provided. Alternatively the TTA can be a passive input for the current source.

Most commonly used temperature sensors and DC inputs are accepted, and the TTA also allows the user to define his own characteristic, so special sensor types and linearisation can easily be accommodated.

To help simplify installation and loop commissioning, test terminals are provided to permit input and output signal checks without removing cabling.

For linearised and/or isolated analogue outputs, the user has a choice of standard or rangeable DC milliamps and voltage ranges. These can be set as either direct or reverse acting. The user can also select upscale or downscale output in the event of a sensor break or an open circuit in the input.

The TTA provides 2 independently settable changeover-relay outputs, for use as high and low level alarms or control points.

Configuring the versatile TTA to change input and output parameters is simple, and performed from a computer via an interface (CBX200 USB).

Powering the TTA is flexible too. When the auxiliary supply is anything between 18 and 264 V (AC or DC), one module can take it.

Physically, the TTA comes in a black WAVESERIES housing with a flammability class V0 acc. UL 94, for mounting on TS35 DIN rail. Pluggable connectors, allow screw or tension clamp wiring. A screwdriver-releasable front flap gives access to the configuration interface socket.



**Universal input signals**

- Temperature signals (such as RTDs),  
One module integrates thermocouples and potentiometers, frequency transmitter, DC voltage signals and DC current signals.

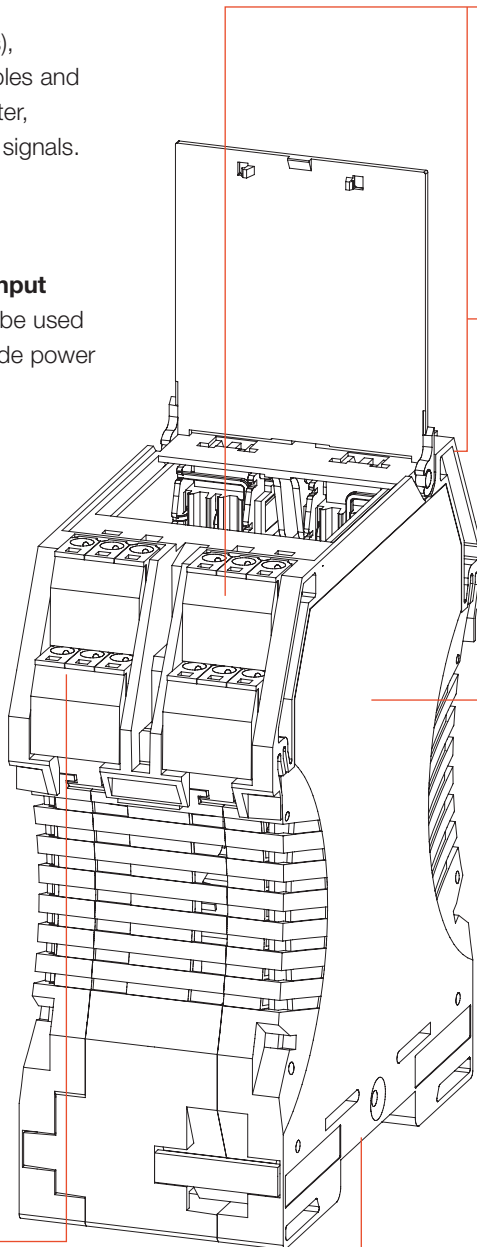
**Current source or loop powered input**

- For DC current inputs the TTA can be used with either a passive input, or provide power for a two-wire transmitter.

**Wide AC/DC power input (18-264 V AC/DC)**

**User-definable characterisation**

- If none of the standard input linearisation options suit the sensor, a special curve can easily be created.



**Inputs & outputs configurable via computer**

- The range of configurability of the TTA is remarkable – and made easy using TTA SET software, in conjunction with the CBX200 USB interface.

**Both analogue and relay outputs**

- In one module the TTA integrates adjustable alarm or control outputs from mechanical relays, as well as it's proportional analogue output.

**Wide ambient temperature range (-40 to 70 °C)**

- Mounting the TTA outside in the field is no problem. It's ambient temperature range means it can also be field enclosure mounted.

**High accuracy and temperature stability**

- The Wave TTA offers performance minimizes losses for data acquisition systems, with it's output accuracy typically < 0,1 %, and temperature stability < 0,01 %/K

**Milliamp signal testing without removing cables**

- The current and voltage inputs can be tested using a supplemental test contact without loosening the existing wiring.

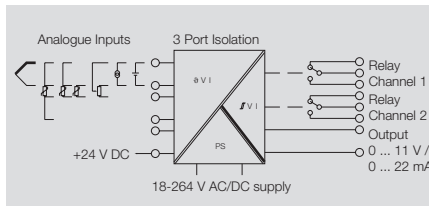
UL Class I Div.2 and ATEX Zone 2 approvals

# WAVESERIES – Universal signal converter and trip amplifier, configurable

## WAVE TTA

- Inputs and outputs can be configured by PC with TTA-SET, download at [www.weidmueller.com](http://www.weidmueller.com)
- Universal input signals
- Loop-powered or passive input
- Pluggable connection terminals

## WAS6 TTA / WAZ6 TTA

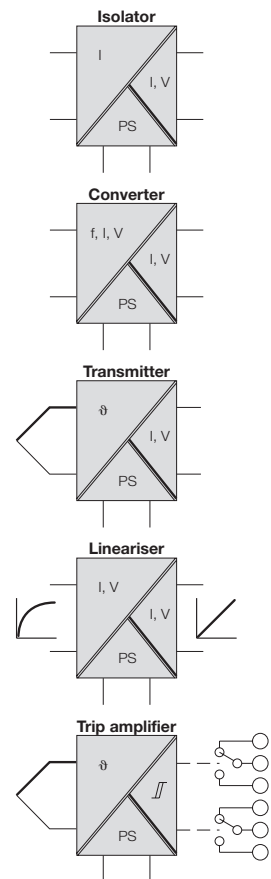


### Technical data

<b>Input</b>	
Sensor	
Potentiometer	
Resistance	
Input frequency	
Input voltage	
Input current	
Sensor supply	
<b>Output analogue</b>	
Output voltage	
Output current	
Load impedance, voltage/current	
Signal output	
Transmit function	
<b>Output digital</b>	
Type	
Switching voltage AC, max. / DC, max.	
Continuous current	
<b>General data</b>	
Supply voltage	
Power consumption	
Accuracy	
Temperature coefficient	
Ambient temperature / Storage temperature	
Step response time	
Humidity	
Approvals	
<b>Insulation coordination</b>	
Standards	
EMC standards	
Rated voltage	
Impulse withstand voltage	
Pollution severity	
Oversvoltage category	
Clearance & creepage distances	
Insulation voltage	
<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

Thermocouples: B, E, J, K, L, N, R, S, T (IEC 60584), PT100, PT1000, (EN 60571) Ni100, Ni1000, (JIS1604), Cu10, Cu25, Cu50, Cu100 (DIN 43760) 2-/3-/4-wire	
100 Ω...100 kΩ	
10 Ω...5 kΩ	
2 Hz...100 kHz	
-200...500 mV (min. 4 mV span), -20...50 V DC (min. 0.5 V span)	
-20...50mA (min. span 0.4 mA)	
24 V DC / 22 mA	
Adjustable between -10...+10 V (min. span of 2.5 V)	
Adjustable between 0...20 mA (min. span of 5 mA)	
> 10 kΩ @ 0...10 V / > 20 kΩ @ -10...+10 V / < 700 Ω	
direct or inverted	
Linear, x <sup>1/2</sup> , x <sup>3/2</sup> , x <sup>5/2</sup> or user-defined curve (101 points)	
2 x 1 CO contact (hard gold-plated)	
250 V / 30 V	
3 A AC / 2 A DC	
18...264 V AC/DC	
< 3.5 W	
< 0.1 % span (DC, RTD); 0.2 % span (or 1 °C) + Cj failure	
< 0.1 % / K (DC, RTD); < 0.1 % FSR / K + Cj error 0.07 °C/K (thermocouples)	
-40 °C...+70 °C / -40 °C...+85 °C	
50 ms...1 sec (RTD, mV inputs), 110 ms...1 sec (V, mA inputs)	
5...95 %, no condensation	
cULus; GL; CE	
EN 50178 (secure separation)	
EN 55011, EN 61000-6	
300 V	
6 kV	
2	
III	
≥ 5.5 mm (1 mm <small>Input/output</small> )	
2.5 kV	
<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	2.5 / 0.5 / 2.5
100 / 45 / 112.4	100 / 45 / 112.4

### Typical functions



### Ordering data

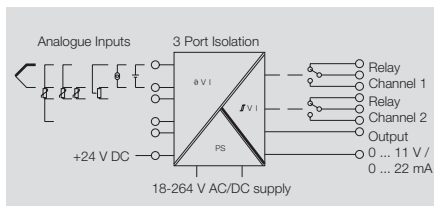
Type	Qty.	Order No.
<b>Screw connection</b>		
WAS6 TTA	1	8939670000
<b>Tension clamp connection</b>		
WAZ6 TTA	1	8939680000

CBX200 USB configuration interface - 8978580000

WAVE TTA EX

- Inputs and outputs can be configured by PC with TTA-SET, download at [www.weidmueller.com](http://www.weidmueller.com)
- Universal input signals
- Loop-powered or passive input
- Pluggable connection terminals
- ATEX 3 G Ex nA IIC T4
- UL Class I, Div. 2

WAS6 TTA EX / WAZ6 TTA EX

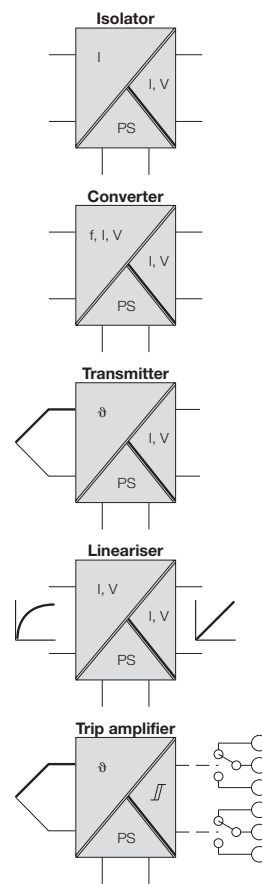


Technical data

<b>Input</b>	
Sensor	
Potentiometer	
Resistance	
Input frequency	
Input voltage	
Input current	
Sensor supply	
<b>Output analogue</b>	
Output voltage	
Output current	
Load impedance, voltage/current	
Signal output	
Transmit function	
<b>Output digital</b>	
Type	
Switching voltage AC, max. / DC, max.	
Continuous current	
<b>General data</b>	
Supply voltage	
Power consumption	
Accuracy	
Temperature coefficient	
Ambient temperature / Storage temperature	
Step response time	
Humidity	
Approvals	
<b>Insulation coordination</b>	
Standards	
EMC standards	
Rated voltage	
Impulse withstand voltage	
Pollution severity	
Overvoltage category	
Clearance & creepage distances	
Insulation voltage	
<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

Thermocouples: B, E, J, K, L, N, R, S, T (IEC 60584), PT100, PT1000, (EN 60571) Ni100, Ni1000, (JIS1604), Cu10, Cu25, Cu50, Cu100 (DIN 43760) 2-/3-/4-wire	
100 Ω...100 kΩ	
10 Ω...5 kΩ	
2 Hz...100 kHz	
-200...500 mV (min. 4 mV span), -20...50 V DC (min. 0.5 V span)	
-20...50mA (min. span 0.4 mA)	
24 V DC / 22 mA	
Adjustable between -10...+10 V (min. span of 2.5 V)	
Adjustable between 0...20 mA (min. span of 5 mA)	
> 10 kΩ @ 0...10 V / > 20 kΩ @ -10...+10 V / < 700 Ω	
direct or inverted	
Linear, x <sup>1/2</sup> , x <sup>3/2</sup> , x <sup>5/2</sup> or user-defined curve (101 points)	
2 x 1 CO contact (hard gold-plated)	
250 V / 30 V	
2 A AC/DC	
24...240 V AC/DC; 24...36 V AC / 24...50 V DC (ATEX Zone 2)	
< 3.5 W	
< 0.1 % span (DC, RTD); 0.2 % span (or 1 °C) + CJ failure	
< 0.1 % / K (DC, RTD); < 0.1 % FSR / K + CJ error 0.07 °C/K (thermocouples)	
-40 °C...+70 °C / -40 °C...+85 °C	
50 ms...1 sec (RTD, mV inputs), 110 ms...1 sec (V, mA inputs)	
5...95 %, no condensation	
cULus; GL; cULusEX; ATEX; CE	
EN 50178 (secure separation)	
EN 55011, EN 61000-6	
300 V	
6 kV	
2	
III	
≥ 5.5 mm (1 mm Input/output)	
2.5 kV	
<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	2.5 / 0.5 / 2.5
100 / 45 / 112.4	100 / 45 / 112.4

Typical functions



Ordering data

Type	Qty.	Order No.
<b>Screw connection</b>		
WAS6 TTA EX	1	8964310000
<b>Tension clamp connection</b>		
WAZ6 TTA EX	1	8964320000

CBX200 USB configuration interface - 8978580000

# ITXPlus

## Universal, loop powered signal isolating converter

The ITXPlus is a compact signal isolating converter that is loop-powered, programmable and electrically isolated. On the input side, you can connect DC-current/voltage signals, 2-, 3-, or 4-wire PT100s, and thermocouples. The ITXPlus measures, filters and separates the input signals. It converts them into a proportional signal from 4 to 20 mA. The ITXPlus is supplied using a 4 to 20 mA current loop on the output side. For linear temperature measurements, you can connect all standard types of thermocouples and resistance temperature detectors (RTDs). The ITXPlus can also process signals from any non-linear resistance setpoint device, such as the NTC, PTC, or log. potentiometer. The appropriate characteristic is programmed in a configurable table containing up to 101 measured values.

Furthermore, the ITXPlus can be connected to resistors, potentiometers and sensors which operate in the mV/mA range. The internal program also features many square-root, linear and x3/2-/x5/2-transfer functions. Other characteristic curves which have not been pre-programmed can be entered directly using a PC. In this way you can reproduce any sensor's characteristic curve.

The T-Set software can be used for configuration or for showing measurement trends. The CBX100 interface connects the ITXPlus with the PC. It implements complete electrical isolation between the serial port and the signal converter.

### Technical data

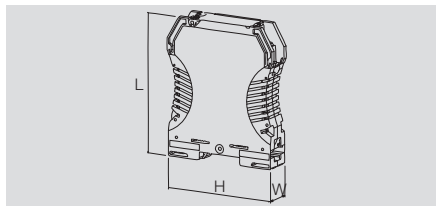
Inputs		
Type		
Thermocouple inputs	Type	Standard
	B	
	C	
	E	IEC584
	J	
	K	
	L	DIN 43710
	N	
	R	IEC584
	S	
	T	
	W3, W5	ASTM E98890
	User-defined Input	
	Cold-junction compensation	
Wire-break recognition		
mA		
Volt		
mV		
2, 3, 4-wire RTD	Type	Standard
	PT 100	DIN 43710
	PT 100	JIS
	PT 200	DIN 43710
	PT 200	JIS
	NI 120	DIN 43710
	CU 100	DIN 43710
	Cable resistance	
	Sensor current	
	Influence of cable resistance sensor (3/4 wire)	
Resistance		
Accuracy		
Type	Range	
E,J,K,L,N,T,U	< 500 °C	
	> 500 °C	
B, C, R, S, W3, W5		
mV, V, mA		
PT100/RTD	All	
Resistance		

Thermocouple, PT100/RTD, mA, volt, mV, resistance		
Lower limit	Upper limit	Min. range
400 °C	1828 °C	200 °C
0 °C	2000 °C	
-100 °C	1000 °C	
-100 °C	1200 °C	50 °C
-180 °C	1372 °C	
-100 °C	900 °C	
-180 °C	1300 °C	100 °C
-50 °C	1760 °C	
-50 °C	1760 °C	200 °C
-200 °C	400 °C	50 °C
0 °C	2300 °C	200 °C
2-101 values		
± 1.0 °C		
yes		
- 10 mA to + 20 mA to 40 Ω input resistance (min. range 1 mA)		
- 5 V to + 10 V to 2 M Ω input resistance (min. range 0,5 V)		
- 100 mV to + 200 mV to 2 M Ω input resistance (min range 4 mV)		
Lower limit	Upper limit	Min. range
-200 °C	850 °C	
-200 °C	630 °C	
-200 °C	850 °C	50 °C
-200 °C	630 °C	
-80 °C	320 °C	
-100 °C	260 °C	100 °C
5 Ω max.		
0.1 mA		
< 0.002 Ω per Ω wire resistance		
0 to 10 k Ω (min. range 10 Ω)		
Temperature coefficient		Accuracy
± 0.02 °C per C° ambient temperature		≤ ± 1.0 °C
± 0.01 % of end value per °C ambient temperature		
± 0.02 °C per C° ambient temperature		≤ ± 2.0 °C
		≤ ± 0.1 % of end value
		≤ ± 0.5 °C
		≤ ± 0.1 % of end value

**ITXPlus**

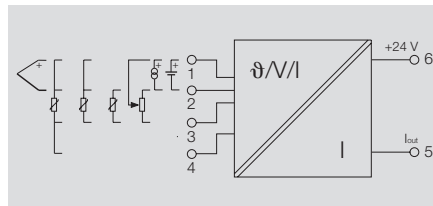
Universal signal isolator/converter with 2-wire technology

- Current, voltage and temperature inputs (RTD, TC)
- Supply via output loop (Output loop-powered)
- PC-programmable with T-SET, download at [www.weidmueller.com](http://www.weidmueller.com)
- Pluggable connection terminals



**ITXPlus**

Programmable with T-SET



**Technical data**

Input	
Type	Type, thermocouple
Input current	
Input voltage	
Input resistance, voltage/current	
Output	
Type	
Output current	
load impedance current	
General data	
Supply voltage	
Humidity	
Temperature coefficient	
Ambient temperature / Storage temperature	
Long-term drift	
Step response time	
Insulation coordination	
Impulse withstand voltage	
Rated voltage	
Insulation voltage	
EMC standards	
Approvals	

Universal signal isolator / signal amplifier, thermocouple, RTD B / C / E / J / K / L / N / R / S / T / W3 / W5 - 200...+ 2300 °C depending on thermocouple -10...+20 mA (min. span 1 mA) -5...+10 V / -100...+200 mV (min. span 0.5 V / 4 mV) 2 MΩ / 40 Ω	
Current output 4...20 mA typ. 700 Ω @ 24 V DC	
10...40 V DC, loop powered 10...90 % (no condensation) typ. 0.02 % / °C -10 °C...+70 °C / -20 °C...+70 °C 0.1 % / 10.000 h Typ. 200 ms (10...90%)	
4 kV (1.2/50 μs) 300 V <sub>eff</sub> 2 kV input / output DIN EN 61326 cULus; CE	

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
1.5 / 0.5 / 2.5	
92.4 / 12.5 / 112.4	

**Ordering data**

Universal input
-----------------

Type	Qty.	Order No.
ITX+ 4-20mA/4-20mA	1	7940016563

Note
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**Accessories**

CBX100 USB configuration interface - 7940025031 Refer to Accessories for markers
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**Connections**

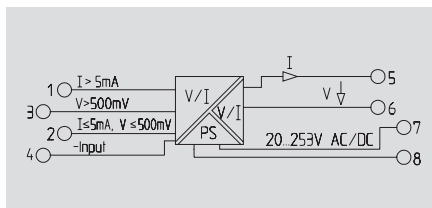
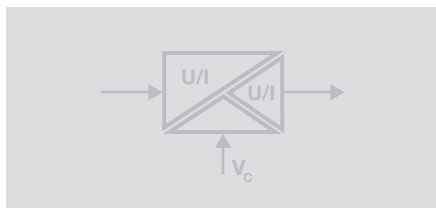
Terminal	Signal	
5	Loop -ve	Supply voltage
6	Loop +ve	
1	Signal + Power supply Sensor	Thermocouple
2	Signal + Power supply Storage (only for programming)	
1	A-Sense	4-wire PT100/RTD (or resistance)
3	A	
2	B	
4	B-Sense	3-wire PT100/RTD (or resistance)
1	A-Sense	
3	A	
2	B	2-wire PT100/RTD (or resistance)
3	A	
2	B	Voltage (mV or V)
1	Signal +	
2	Signal -	Current (mA)
1	Signal +	
2	Signal -	
3	A	Potentiometer
1	Wiper	
2	B	

WAVESERIES - DC/DC 3-way isolator

Configurable

- Universally adjustable via DIP switch
- WAVETOOL software offers configuration help, download at [www.weidmueller.com](http://www.weidmueller.com)
- Power supply 20...230 V AC/DC
- Minimal power loss
- Adjustable transmission frequency

PRO DC/DC



Switch position/setting options

Input	Switch							
	S1				S2			
Input range	1	2	3	4	1	2	3	4
0 ... ±60 mV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0 ... ±100 mV	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±150 mV	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±300 mV	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±500 mV	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±1 V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±5 V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±10 V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±100 V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... + ~0.3 mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±1 mA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±5 mA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±10 mA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±20 mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±50 mA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4 ... ±20 mA*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

\*Offset conversion not calibrated

Switch S2		4
calibratet ranges		<input checked="" type="checkbox"/>
Span-pot. activated: input x 0.33 ... x 3.30		<input type="checkbox"/>

Output	Switch				
	S1			S3	
Output range	5	6	7	1	2
0 ... ±10 V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2 ... 10 V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±5 V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1 ... 5 V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0 ... ±20 V	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 ... 20 mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Offset (in % of output voltage)	S1			S2
	8	9	10	5
0 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
-100 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
-50 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
+50 %	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
+100 %	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Zero pot. activated: additional ±25 %

Switch S3		3
Bandwidth 10 kHz		<input type="checkbox"/>
Bandwidth 10 Hz		<input checked="" type="checkbox"/>

Set range can be documented on side of housing.

■ = on  
□ = off

Technical data

Input	
Input voltage / Input current	
Input resistance, voltage/current	
Output	
Output voltage / Output current	
Load impedance, voltage/current	
Cut-off frequency (-3 dB)	
Offset current / Offset voltage	
Adjustment range, zero point	
Adjustment range, amplification	
Displacement	
General data	
Supply voltage	
Power consumption	
Accuracy	
Temperature coefficient	
Ambient temperature	
Storage temperature	
Approvals	
Insulation coordination	
Standards	
EMC standards	
Rated voltage	
Impulse withstand voltage	
Insulation voltage input or output/supply	
Overvoltage category	
Pollution severity	

± 20 mV...± 200 V / ± 0.1mA...± 100 mA
Approx. 1 MΩ / < 5 mA; approx. 100 Ω; > 5 mA: approx. 5 Ω
0...±10 V / 0...±20 mA
≥ 1 kΩ / ≤ 600 Ω
> 10 kHz / < 10 Hz
20 μA / 10 mV
± 25 % of the measuring span of selected output range
0.33...3.30 x end value of selected output range
-100%, -50%, 0%, 50%, 100% of measuring span
22...230 V AC/DC +10 %
ca. 1 W
< 0.1 % of end value, + Offset
≤ 60 ppm/K of final value
-10 °C...+70 °C
-40 °C...+85 °C
cULus; GL; CE
EN 50178
DIN EN 61326, EN 61000-2-6
600 V
5 kV, 1.2/50 μs (IEC 255-4)
4 kV <sub>eff</sub>
III
2

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4
Note	

Ordering data

Screw connection	
Tension clamp connection	
Note	

Type	Qty.	Order No.
WAS4 PRO DC/DC	1	8560740000
WAZ4 PRO DC/DC	1	8560750000
Note		

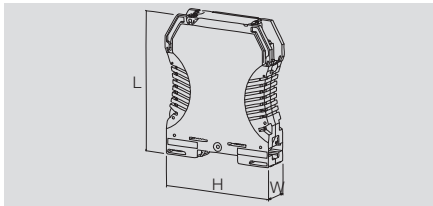
Accessories

Markers – refer to Accessories	
Note	

**Configurable**

Configurable signal isolators/converters in 4-wire technology

- External sensor supply
- Supply of 12 - 60 V DC
- Current or voltage input can be configured with DIP switch
- Input or output scaling
- Direct or reverse output signal

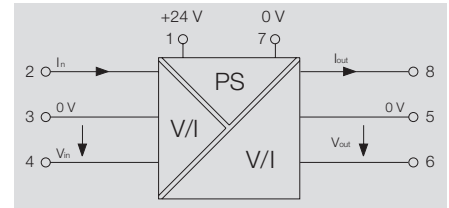


**WAVEPak**

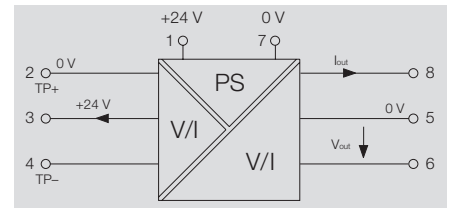
**3-way isolator**



**Wiring possibility A (input passive)**



**Wiring possibility B (input active)**



**Technical data**

Input	
Type	Current or voltage output configurable with jumper
Input signal	0...22 mA or 0...10 V
Sensor supply	20 mA @ 24 V DC output
Input resistance, voltage/current	> 1 MΩ / 100 Ω
Resolution	3.5 μA / 1.76 mV per bit
Output	
Type	Current of voltage output, configured with jumper
Output current / Output voltage	0...22 mA / 0...10 V
load impedance current	≤ 1 kΩ
load impedance voltage	≥ 500 kΩ
General data	
Supply voltage	12...60 V DC
Power consumption	2.5 W @ 24 V DC
Linearity	< ± 0.1 % (typically ± 0.05 %)
Humidity	10...90 % (no condensation)
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Temperature coefficient	≤ 0.05 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	< 220 ms (10...90 %)
Approvals	cULus; CE
Insulation coordination	
Impulse withstand voltage	4 kV (1.2/50 μs)
EMC standards	DIN EN 61326
Insulation voltage	2 kV input / output / power supply
Rated voltage	300 V <sub>eff</sub>
Overtoltage category	III
Pollution severity	2

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	
Screw connection	
1.5 / 0.5 / 2.5	
92.4 / 12.5 / 112.4	
Type	
WAVEPak DC/DC	
Qty.	Order No.
1	7940024139

**Connections**

Terminal	Signal	
1	Signal +	Supply voltage
7	Signal -	
4	Signal +	Voltage input
3	Signal -	
2	Signal +	Current input
3	Signal -	
3	Signal +	Loop Powered Input
2	Signal -	
6	Signal +	Voltage output
5	Signal -	
8	Signal +	Current output
5	Signal -	

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

**Ordering data**

Universal converter
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Note	

**Accessories**

Markers – refer to Accessories
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## WAVESERIES - DC/DC 3-way isolator

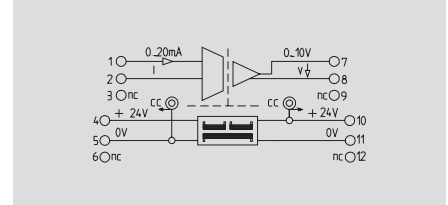
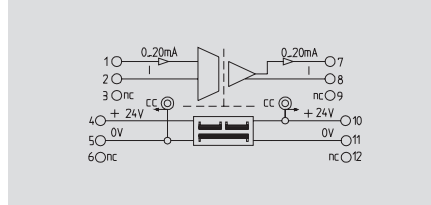
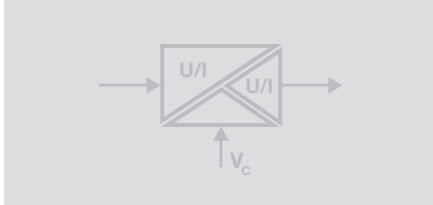
### 20 kHz limiting frequency

- Signal conversion
- Galvanic isolation between input / output signals and power supply
- Power supply can be cross-connected using plug-in jumpers.

### 0 (4)...20 mA/0 (4)...20 mA



### 0...20 mA / 0...10 V



### Technical data

<b>Input</b>	
Input voltage / Input current	/ 0(4)...20 mA
Input resistance, voltage/current	/ 50 Ω
<b>Output</b>	
Output voltage / Output current	/ 0(4)...20 mA
Load impedance, voltage/current	/ ≤ 500 Ω
Cut-off frequency (-3 dB)	≥ 15 kHz (typ. 20 kHz)
<b>General data</b>	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.5 W @ I <sub>OUT</sub> = 20 mA
Accuracy	< 0.2 % of end value
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	≤ 40 μs (typ. 30 μs)
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CSA; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage	1.2 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

<b>Input</b>	
Input voltage / Input current	/ 0...20 mA
Input resistance, voltage/current	/ 50 Ω
<b>Output</b>	
Output voltage / Output current	0...10 V /
Load impedance, voltage/current	≥ 2 kΩ /
Cut-off frequency (-3 dB)	≥ 15 kHz (typ. 20 kHz)
<b>General data</b>	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.3 W @ I <sub>OUT</sub> = 5 mA
Accuracy	< 0.2 % of end value
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	≤ 40 μs (typ. 30 μs)
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CSA; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage	1.2 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	
<b>Ordering data</b>	
Screw connection	
Tension clamp connection	
<b>Note</b>	
<b>Accessories</b>	

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

### Ordering data

Screw connection	
Tension clamp connection	

### Note

### Accessories

<b>Screw connection</b>		<b>Tension clamp connection</b>	
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5	92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4

Type	Qty.	Order No.
WAS5 CCC HF 0-20/0-20MA	1	8447160000
WAZ5 CCC HF 0-20/0-20MA	1	8447170000

Cross-connector for power supplies and markers – refer to Accessories

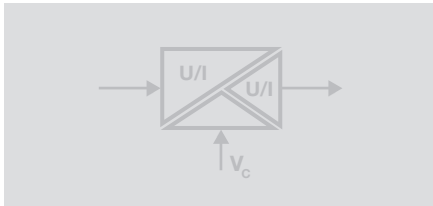
<b>Screw connection</b>	
2.5 / 0.5 / 2.5	
92.4 / 17.5 / 112.4	

Type	Qty.	Order No.
WAS5 CVC HF 0-20/0-10V	1	8447220000

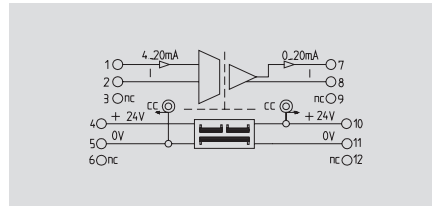
Cross-connector for power supplies and markers – refer to Accessories

20 kHz limiting frequency

- Signal conversion
- Galvanic isolation between input / output signals and power supply
- Power supply can be cross-connected using plug-in jumpers.



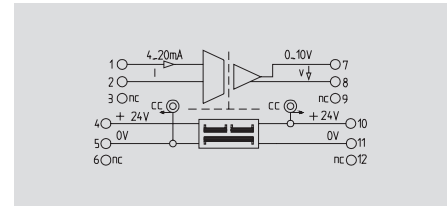
4...20 mA / 0...20 mA



4...20 mA / 0...10 V



UL Class I, Div. 2



Technical data

<b>Input</b>	
Input voltage / Input current	/ 4...20 mA
Input resistance, voltage/current	/ 50 Ω
<b>Output</b>	
Output voltage / Output current	/ 0...20 mA
Load impedance, voltage/current	/ ≤ 500 Ω
Cut-off frequency (-3 dB)	≥ 15 kHz (typ. 20 kHz)
<b>General data</b>	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.5 W @ I <sub>OUT</sub> = 20 mA
Accuracy	< 0.2 % of end value
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	≤ 40 μs (typ. 30 μs)
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CSA; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage	1.2 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

		/ 4...20 mA
		/ 50 Ω
		/ 0...20 mA
		/ ≤ 500 Ω
		≥ 15 kHz (typ. 20 kHz)
		24 V DC ± 25 %
		< 1.5 W @ I <sub>OUT</sub> = 20 mA
		< 0.2 % of end value
		≤ 250 ppm/K of final value
		≤ 40 μs (typ. 30 μs)
		0 °C...+55 °C
		-20 °C...+85 °C
		cULus; CSA; CE
		EN 50178
		EN 55011, EN 61000-6
		300 V
		4 kV
		1.2 kV <sub>eff</sub> / 5 s
		III
		2
		≥ 3 mm

		/ 4...20 mA
		/ 50 Ω
		0...10 V /
		≥ 2 kΩ / ≤ 600 Ω
		≥ 15 kHz (typ. 20 kHz)
		24 V DC ± 25 %
		< 1.3 W @ I <sub>OUT</sub> = 5 mA
		< 0.2 % of end value
		≤ 250 ppm/K of final value
		≤ 40 μs (typ. 30 μs)
		0 °C...+55 °C
		-20 °C...+85 °C
		cULus; CSA; cULusEX; CE
		EN 50178
		EN 55011, EN 61000-6
		300 V
		4 kV
		1.2 kV <sub>eff</sub> / 5 s
		III
		2
		≥ 3 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	
	2.5 / 0.5 / 2.5
	92.4 / 17.5 / 112.4
<b>Note</b>	

<b>Screw connection</b>	
	2.5 / 0.5 / 2.5
	92.4 / 17.5 / 112.4
<b>Note</b>	

Ordering data

	Screw connection
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Type	Qty.	Order No.
WAS5 CCC HF 4-20/0-20MA	1	8447250000

Type	Qty.	Order No.
WAS5 CVC HF 4-20/0-10V	1	8447280000

<b>Note</b>	
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Accessories

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	Cross-connector for power supplies and markers – refer to Accessories
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	Cross-connector for power supplies and markers – refer to Accessories
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## WAVESERIES - DC/DC 3-way isolator

### 20 kHz limiting frequency

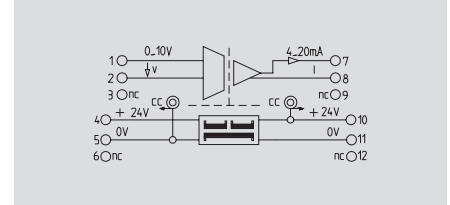
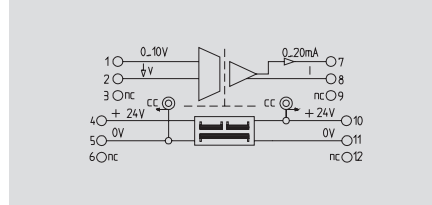
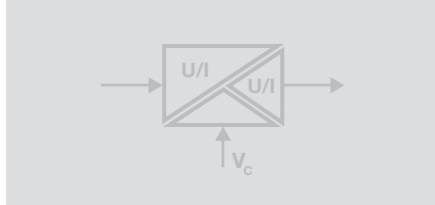
- Signal conversion
- Galvanic isolation between input / output signals and power supply
- Power supply can be cross-connected using plug-in jumpers.

### 0...10 V / 0...20 mA



### 0...10 V / 4...20 mA

UL Class I, Div. 2



### Technical data

<b>Input</b>	
Input voltage / Input current	0...10 V /
Input resistance, voltage/current	500 kΩ /
<b>Output</b>	
Output voltage / Output current	/ 0...20 mA
Load impedance, voltage/current	/ ≤ 500 Ω
Cut-off frequency (-3 dB)	≥ 15 kHz (typ. 20 kHz)
<b>General data</b>	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.5 W @ I <sub>OUT</sub> = 20 mA
Accuracy	± 0.2 % of final value
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	≤ 40 μs (typ. 30 μs)
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CSA; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage	1.2 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

	0...10 V /
	500 kΩ /
	/ 0...20 mA
	/ ≤ 500 Ω
	≥ 15 kHz (typ. 20 kHz)
	24 V DC ± 25 %
	< 1.5 W @ I <sub>OUT</sub> = 20 mA
	± 0.2 % of final value
	≤ 250 ppm/K of final value
	≤ 40 μs (typ. 30 μs)
	0 °C...+55 °C
	-20 °C...+85 °C
	cULus; CSA; CE
	EN 50178
	EN 55011, EN 61000-6
	300 V
	4 kV
	1.2 kV <sub>eff</sub> / 5 s
	III
	2
	≥ 3 mm

	0...10 V /
	500 kΩ /
	/ 4...20 mA
	/ ≤ 500 Ω
	≥ 15 kHz (typ. 20 kHz)
	24 V DC ± 25 %
	< 1.5 W @ I <sub>OUT</sub> = 20 mA
	± 0.2 % of final value
	≤ 250 ppm/K of final value
	≤ 40 μs (typ. 30 μs)
	0 °C...+55 °C
	-20 °C...+85 °C
	cULus; CSA; cULusEX; CE
	EN 50178
	EN 55011, EN 61000-6
	300 V
	4 kV
	1.2 kV <sub>eff</sub> / 5 s
	III
	2
	≥ 3 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	
	2.5 / 0.5 / 2.5
	92.4 / 17.5 / 112.4
<b>Note</b>	

<b>Screw connection</b>	
	2.5 / 0.5 / 2.5
	92.4 / 17.5 / 112.4
<b>Note</b>	

### Ordering data

	Screw connection
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Type	Qty.	Order No.
WAS5 VCC HF 0-10/0-20MA	1	8447310000

Type	Qty.	Order No.
WAS5 VCC HF 0-10/4-20MA	1	8447340000

<b>Note</b>	
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### Accessories

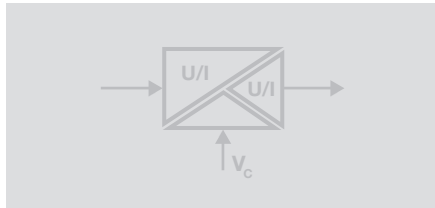
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Cross-connector for power supplies and markers – refer to Accessories	
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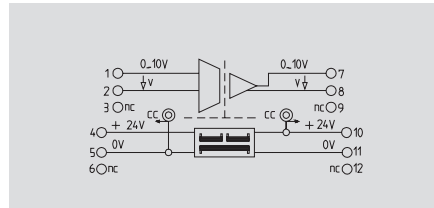
Cross-connector for power supplies and markers – refer to Accessories	
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20 kHz limiting frequency

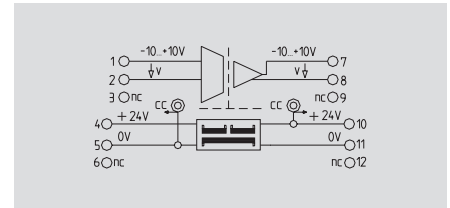
- Signal conversion
- Galvanic isolation between input / output signals and power supply
- Power supply can be cross-connected using plug-in jumpers.



0...10 V / 0...10 V



-10 V...+10 V / -10 V...+10 V



Technical data

<b>Input</b>	Input voltage / Input current Input resistance, voltage/current
<b>Output</b>	Output voltage / Output current Load impedance, voltage/current Cut-off frequency (-3 dB)
<b>General data</b>	Supply voltage Power consumption Accuracy Temperature coefficient Step response time Ambient temperature Storage temperature Approvals
<b>Insulation coordination</b>	Standards EMC standards Rated voltage Impulse withstand voltage Insulation voltage Overvoltage category Pollution severity Clearance & creepage distances

Input	0...10 V / 500 kΩ /
Output	0...10 V / ≥ 2 kΩ / ≥ 15 kHz (typ. 20 kHz)
General data	24 V DC ± 25 % < 1.3 W @ I <sub>OUT</sub> = 5 mA ± 0.2 % of final value ≤ 250 ppm/K of final value ≤ 40 μs (typ. 30 μs) 0 °C...+55 °C -20 °C...+85 °C cULus; CSA; CE
Insulation coordination	EN 50178 EN 55011, EN 61000-6 300 V 4 kV 1.2 kV <sub>eff</sub> / 5 s III 2 ≥ 3 mm

Input	-10...+10 V / 500 kΩ /
Output	-10...+10 V / ≥ 2 kΩ / ≥ 15 kHz (typ. 20 kHz)
General data	24 V DC ± 25 % < 1.3 W @ I <sub>OUT</sub> = 5 mA ± 0.2 % of measuring range ≤ 250 ppm/K of measuring range ≤ 40 μs (typ. 30 μs) 0 °C...+55 °C -20 °C...+85 °C cULus; CE
Insulation coordination	EN 50178 EN 55011, EN 61000-6 300 V 4 kV 1.2 kV <sub>eff</sub> / 5 s III 2 ≥ 3 mm

<b>Dimensions</b>	Clamping range (nominal / min. / max.) mm <sup>2</sup> Length x width x height mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4

<b>Screw connection</b>
2.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4

Ordering data

Screw connection
Tension clamp connection

Type	Qty.	Order No.
WAS5 VVC HF 0-10/0-10V	1	8447370000
WAZ5 VVC HF 0-10/0-10V	1	8447380000

Type	Qty.	Order No.
WAS5 VVC HF +-10V/+-10V	1	8561610000

<b>Note</b>
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Accessories

Cross-connector for power supplies and markers – refer to Accessories
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Cross-connector for power supplies and markers – refer to Accessories
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Cross-connector for power supplies and markers – refer to Accessories
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## WAVESERIES - DC/DC 3-way isolator

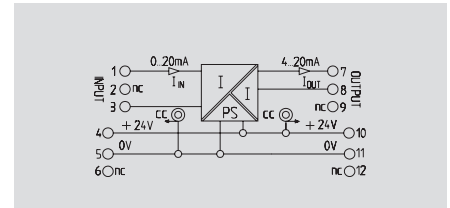
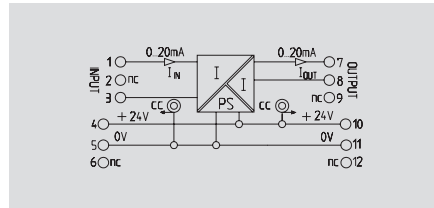
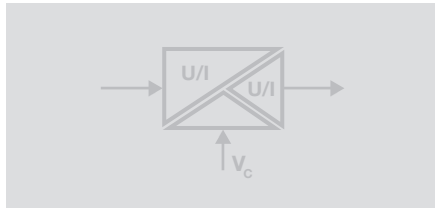
### 10 Hz limiting frequency

- Signal conversion
- Galvanic isolation between input / output signals and power supply
- Power supply can be cross-connected using plug-in jumpers.

### 0...(4) 20 mA / 0...(4) 20 mA



### 0...20 mA / 4...20 mA



### Technical data

<b>Input</b>	Input voltage / Input current
<b>Output</b>	Output voltage / Output current Load impedance, voltage/current Cut-off frequency (-3 dB)
<b>General data</b>	Supply voltage Power consumption Accuracy Temperature coefficient Step response time Ambient temperature Storage temperature Approvals
<b>Insulation coordination</b>	Standards EMC standards Rated voltage Impulse withstand voltage Insulation voltage Overvoltage category Pollution severity Clearance & creepage distances

Input	/ 0(4)...20 mA
Output	/ 0(4)...20 mA / ≤ 600 Ω
General data	10 Hz 24 V DC ± 25 % < 1.5 W @ I <sub>OUT</sub> = 20 mA 0.2 % ± 250 ppm/K ≤ 45 ms 0 °C...+55 °C -20 °C...+85 °C cULus; CE
Insulation coordination	EN 50178 EN 55011, EN 61000-6 300 V 4 kV 2 kV <sub>eff</sub> / 5 s III 2 ≥ 3 mm

Input	/ 0...20 mA
Output	/ 4...20 mA / ≤ 600 Ω
General data	10 Hz 24 V DC ± 25 % < 1.5 W @ I <sub>OUT</sub> = 20 mA 0.2 % ± 250 ppm/K ≤ 45 ms 0 °C...+55 °C -20 °C...+85 °C cULus; CE
Insulation coordination	EN 50178 EN 55011, EN 61000-6 300 V 4 kV 2 kV <sub>eff</sub> / 5 s III 2 ≥ 3 mm

<b>Dimensions</b>	Clamping range (nominal / min. / max.)	mm <sup>2</sup>
	Length x width x height	
<b>Note</b>		

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4

<b>Screw connection</b>
2.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4

### Ordering data

	Screw connection
	Tension clamp connection
<b>Note</b>	

Type	Qty.	Order No.
WAS5 CCC 0-20/0-20mA	1	8540180000
WAZ5 CCC 0-20/0-20mA	1	8540190000

Type	Qty.	Order No.
WAS5 CCC 0-20/4-20mA	1	8540250000

### Accessories

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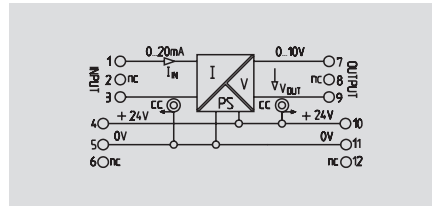
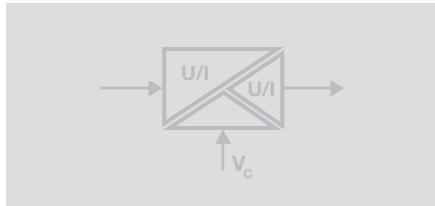
Cross-connector for power supplies and markers – refer to Accessories
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Cross-connector for power supplies and markers – refer to Accessories
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### 10 Hz limiting frequency

- Signal conversion
- Galvanic isolation between input / output signals and power supply
- Power supply can be cross-connected using plug-in jumpers.

### 0...20 mA / 0...10 V



### Technical data

<b>Input</b>	Input voltage / Input current
<b>Output</b>	Output voltage / Output current Load impedance, voltage/current Cut-off frequency (-3 dB)
<b>General data</b>	Supply voltage Power consumption Accuracy Temperature coefficient Step response time Ambient temperature Storage temperature Approvals
<b>Insulation coordination</b>	Standards EMC standards Rated voltage Impulse withstand voltage Insulation voltage Overvoltage category Pollution severity Clearance & creepage distances

	/ 0...20 mA
	0...10 V /
	≥ 1 kΩ /
	10 Hz
	24 V DC ± 25 %
	< 1.3 W @ I <sub>OUT</sub> = 5 mA
	0.2 %
	± 250 ppm/K
	≤ 45 ms
	0 °C...+55 °C
	-20 °C...+85 °C
	cULus; CE
	EN 50178
	EN 55011, EN 61000-6
	300 V
	4 kV
	2 kV <sub>eff</sub> / 5 s
	III
	2
	≥ 3 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	
<b>Note</b>	

<b>Screw connection</b>	
	2.5 / 0.5 / 2.5
	92.4 / 17.5 / 112.4
<b>Note</b>	

### Ordering data

	Screw connection
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Type	Qty.	Order No.
WAS5 CVC 0-20mA/0-10V	1	8540270000

<b>Note</b>	
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### Accessories

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	Cross-connector for power supplies and markers – refer to Accessories
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## WAVESERIES - DC/DC 3-way isolator

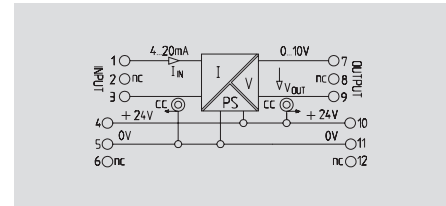
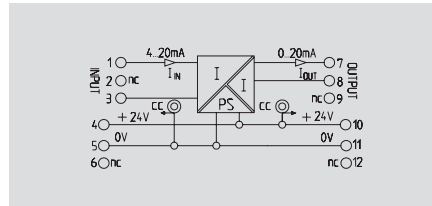
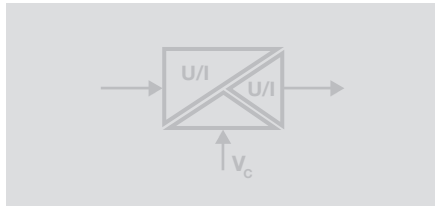
### 10 Hz limiting frequency

- Signal conversion
- Galvanic isolation between input / output signals and power supply
- Power supply can be cross-connected using plug-in jumpers.

### 4...20 mA / 0...20 mA



### 4...20 mA / 0...10 V



### Technical data

<b>Input</b>	Input voltage / Input current
<b>Output</b>	Output voltage / Output current Load impedance, voltage/current Cut-off frequency (-3 dB)
<b>General data</b>	Supply voltage Power consumption Current-carrying capacity of cross-connect. Accuracy Temperature coefficient Step response time Ambient temperature Storage temperature Approvals
<b>Insulation coordination</b>	Standards EMC standards Rated voltage Impulse withstand voltage Insulation voltage Overvoltage category Pollution severity Clearance & creepage distances

Input	/ 4...20 mA
Output	/ 0...20 mA / ≤ 600 Ω
General data	10 Hz
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.5 W @ I <sub>OUT</sub> = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Accuracy	0.2 %
Temperature coefficient	± 250 ppm/K
Step response time	≤ 45 ms
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage	2 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

Input	/ 4...20 mA
Output	0...10 V / ≥ 1 kΩ /
General data	10 Hz
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.3 W @ I <sub>OUT</sub> = 5 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Accuracy	0.2 %
Temperature coefficient	± 250 ppm/K
Step response time	≤ 45 ms
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage	2 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

<b>Dimensions</b>	Clamping range (nominal / min. / max.)	mm <sup>2</sup>
	Length x width x height	mm
<b>Note</b>		

<b>Screw connection</b>	2.5 / 0.5 / 2.5
	92.4 / 17.5 / 112.4
<b>Note</b>	

<b>Screw connection</b>	2.5 / 0.5 / 2.5
	92.4 / 17.5 / 112.4
<b>Note</b>	

### Ordering data

	Screw connection
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Type	Qty.	Order No.
WAS5 CCC 4-20/0-20MA	1	8540200000

Type	Qty.	Order No.
WAS5 CVC 4-20mA/0-10V	1	8540230000

<b>Note</b>	
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<b>Note</b>	
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<b>Note</b>	
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### Accessories

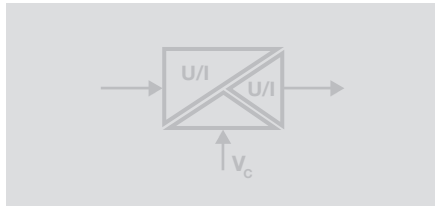
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Cross-connector for power supplies and markers – refer to Accessories
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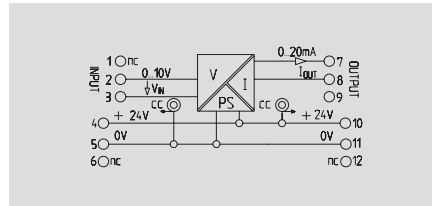
Cross-connector for power supplies and markers – refer to Accessories
---

10 Hz limiting frequency

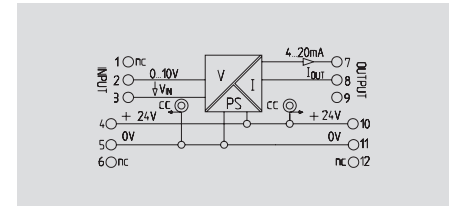
- Signal conversion
- Galvanic isolation between input / output signals and power supply
- Power supply can be cross-connected using plug-in jumpers.



0...10 V / 0...20 mA



0...10 V / 4...20 mA



Technical data

<b>Input</b>	Input voltage / Input current
<b>Output</b>	Output voltage / Output current Load impedance, voltage/current Cut-off frequency (-3 dB)
<b>General data</b>	Supply voltage Power consumption Accuracy Temperature coefficient Step response time Ambient temperature Storage temperature Approvals
<b>Insulation coordination</b>	Standards EMC standards Rated voltage Impulse withstand voltage Insulation voltage Overvoltage category Pollution severity Clearance & creepage distances

Input	0...10 V /
Output	/ 0...20 mA / ≤ 600 Ω
General data	10 Hz 24 V DC ± 25 % < 1.5 W @ I <sub>OUT</sub> = 20 mA 0.2 % ± 250 ppm/K ≤ 45 ms 0 °C...+55 °C -20 °C...+85 °C cULus; CE
Insulation coordination	EN 50178 EN 55011, EN 61000-6 300 V 4 kV 2 kV <sub>eff</sub> / 5 s III 2 ≥ 3 mm

Input	0...10 V /
Output	/ 4...20 mA / ≤ 600 Ω
General data	10 Hz 24 V DC ± 25 % < 1.5 W @ I <sub>OUT</sub> = 20 mA 0.2 % ± 250 ppm/K ≤ 45 ms 0 °C...+55 °C -20 °C...+85 °C cULus; CE
Insulation coordination	EN 50178 EN 55011, EN 61000-6 300 V 4 kV 2 kV <sub>eff</sub> / 5 s III 2 ≥ 3 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4
<b>Note</b>	

Ordering data

	Screw connection
	Tension clamp connection

Type	Qty.	Order No.
WAS5 VCC 0-10V/0-20MA	1	8540310000
WAZ5 VCC 0-10V/0-20MA	1	8540320000

Type	Qty.	Order No.
WAS5 VCC 0-10V/4-20MA	1	8540290000
WAZ5 VCC 0-10V/4-20MA	1	8540300000

<b>Note</b>	
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Accessories

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Cross-connector for power supplies and markers – refer to Accessories
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Cross-connector for power supplies and markers – refer to Accessories
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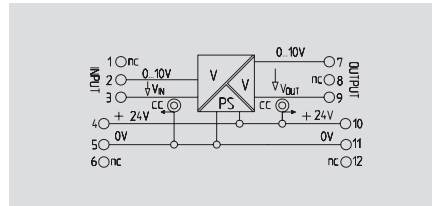
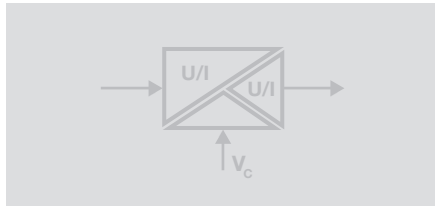


## WAVESERIES - DC/DC 3-way isolator

### 10 Hz limiting frequency

- Signal conversion
- Galvanic isolation between input / output signals and power supply
- Power supply can be cross-connected using plug-in jumpers.

### 0...10 V / 0...10 V



### Technical data

<b>Input</b>	
Input voltage / Input current	0...10 V /
<b>Output</b>	
Output voltage / Output current	0...10 V /
Load impedance, voltage/current	≥ 1 kΩ /
Cut-off frequency (-3 dB)	10 Hz
<b>General data</b>	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.3 W @ I <sub>OUT</sub> = 5 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Accuracy	0.2 %
Temperature coefficient	± 250 ppm/K
Step response time	≤ 45 ms
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage input or output/supply	2 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

	0...10 V /
	0...10 V /
	≥ 1 kΩ /
	10 Hz
	24 V DC ± 25 %
	< 1.3 W @ I <sub>OUT</sub> = 5 mA
	≤ 2 A
	0.2 %
	± 250 ppm/K
	≤ 45 ms
	0 °C...+55 °C
	-20 °C...+85 °C
	cULus; CE
	EN 50178
	EN 55011, EN 61000-6
	300 V
	4 kV
	2 kV <sub>eff</sub> / 5 s
	III
	2
	≥ 3 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4

### Ordering data

	Screw connection
	Tension clamp connection

Type	Qty.	Order No.
WAS5 VVC 0-10V/0-10V	1	8540330000
WAZ5 VVC 0-10V/0-10V	1	8540340000

<b>Note</b>	
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### Accessories

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Cross-connector for power supplies and markers – refer to Accessories



## WAVESERIES - DC/DC 2-way isolator

### Supply on outside

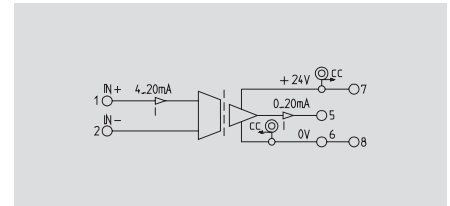
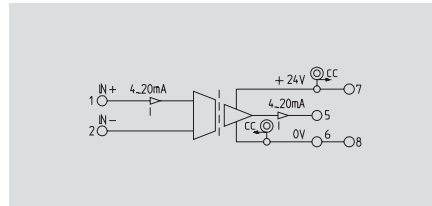
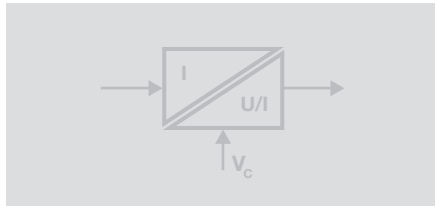
- Signal conversion
- Galvanic isolation between input and output signals
- Power supply can be cross-connected using plug-in jumpers.

### 4...20 mA / 4...20 mA

UL Class I, Div. 2



### 4...20 mA / 0...20 mA



### Technical data

<b>Input</b>
Input voltage / Input current
<b>Output</b>
Output voltage / Output current
Load impedance, voltage/current
Cut-off frequency (-3 dB)
<b>General data</b>
Supply voltage
Current consumption
Current-carrying capacity of cross-connect.
Accuracy
Temperature coefficient
Step response time
Ambient temperature
Storage temperature
Approvals
<b>Insulation coordination</b>
Standards
EMC standards
Rated voltage
Impulse withstand voltage
Insulation voltage
Overvoltage category
Pollution severity
Clearance & creepage distances

/ 4...20 mA (current loop)
/ 4...20 mA
/ ≤ 500 Ω
≥ 15 Hz (typ. 20 Hz)
24 V DC ± 20 %
< 32 mA @ I <sub>OUT</sub> = 20 mA
≤ 2 A
± 0.2 % of final value
≤ 250 ppm/K of final value
≤ 30 ms (typ. 20 ms)
0 °C...+55 °C
-20 °C...+85 °C
cULus; CSA; cULusEX; CE
EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV <sub>eff</sub> / 5 s
III
2
≥ 3 mm

/ 4...20 mA (current loop)
/ 0...20 mA
/ ≤ 500 Ω
≥ 15 Hz (typ. 20 Hz)
24 V DC ± 20 %
< 32 mA @ I <sub>OUT</sub> = 20 mA
≤ 2 A
± 0.2 % of final value
≤ 250 ppm/K of final value
≤ 30 ms (typ. 20 ms)
0 °C...+55 °C
-20 °C...+85 °C
cULus; CSA; CE
EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV <sub>eff</sub> / 5 s
III
2
≥ 3 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

<b>Screw connection</b>
2.5 / 0.5 / 2.5
92.4 / 12.5 / 112.4

### Ordering data

	Screw connection
	Tension clamp connection

Type	Qty.	Order No.
WAS4 CCC DC 4-20/4-20MA	1	8444980000
WAZ4 CCC DC 4-20/4-20MA	1	8444990000

Type	Qty.	Order No.
WAS4 CCC DC 4-20/0-20MA	1	8445010000

<b>Note</b>
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### Accessories

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Cross-connector for power supplies and markers – refer to Accessories

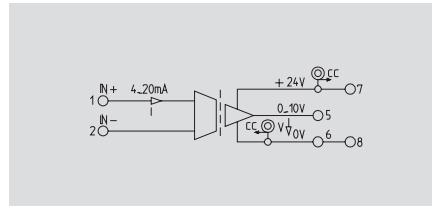
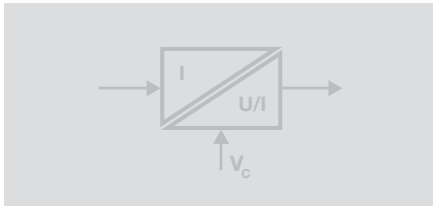
Cross-connector for power supplies and markers – refer to Accessories

### Supply on outside

- Signal conversion
- Galvanic isolation between input and output signals
- Power supply can be cross-connected using plug-in jumpers.

### 4...20 mA / 0...10 V

UL Class I, Div. 2



### Technical data

<b>Input</b>	
Input voltage / Input current	/ 4...20 mA (current loop)
<b>Output</b>	
Output voltage / Output current	0...10 V /
Load impedance, voltage/current	≥ 1 kΩ /
Cut-off frequency (-3 dB)	≥ 15 Hz (typ. 20 Hz)
<b>General data</b>	
Supply voltage	24 V DC ± 20 %
Current consumption	< 20 mA @ I <sub>out</sub> = 10 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Accuracy	± 0.2 % of final value
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	≤ 30 ms (typ. 20 ms)
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CSA; cULusEX; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage	1.2 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

	/ 4...20 mA (current loop)
	0...10 V /
	≥ 1 kΩ /
	≥ 15 Hz (typ. 20 Hz)
	24 V DC ± 20 %
	< 20 mA @ I <sub>out</sub> = 10 mA
	≤ 2 A
	± 0.2 % of final value
	≤ 250 ppm/K of final value
	≤ 30 ms (typ. 20 ms)
	0 °C...+55 °C
	-20 °C...+85 °C
	cULus; CSA; cULusEX; CE
	EN 50178
	EN 55011, EN 61000-6
	300 V
	4 kV
	1.2 kV <sub>eff</sub> / 5 s
	III
	2
	≥ 3 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

### Ordering data

	Screw connection
	Tension clamp connection

Type	Qty.	Order No.
WAS4 CVC DC 4-20/0-10V	1	8445040000
WAZ4 CVC DC 4-20/0-10V	1	8445050000

<b>Note</b>	
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### Accessories

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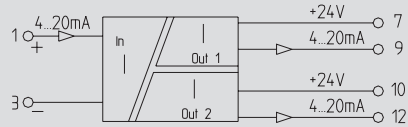
	Cross-connector for power supplies and markers – refer to Accessories
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WAVESERIES - DC/DC passive isolator

Signal multiplier  
Loop powered

- Galvanic isolation
- Input and output current loop feed
- Very low power consumption
- No calibration necessary

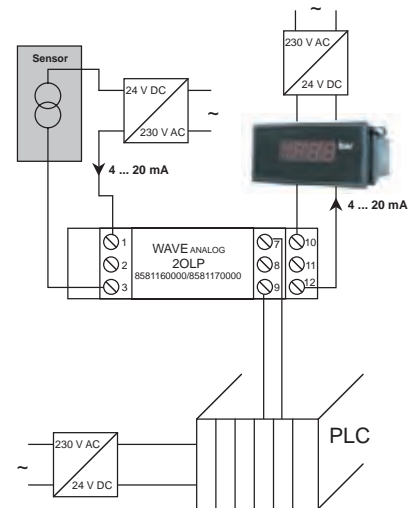
20LP



Technical data

<b>Input</b>	
Input current	4...20 mA (current loop)
Voltage drop	3.8 V
<b>Output</b>	
Output current	2 x 4...20 mA (current loop)
Output signal limit	Approx. 31 mA
Load impedance, voltage/current	$/ R_L = (U_{gr} - 12 V) / 20 \text{ mA}$ z.B. 600 $\Omega$ at 24 V
Cut-off frequency (-3 dB)	30 Hz
<b>General data</b>	
Supply voltage	min. 12 V DC/ max. 30 V DC
Accuracy	typ. 0.1 %; max. 0.2 %
Temperature coefficient	$\leq 150 \text{ ppm/K}$
Step response time	< 20 ms
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage input or output/supply	4 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	$\geq 5.5 \text{ mm}$

Example of application



<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4

Ordering data

	Screw connection
	Tension clamp connection

Type	Qty.	Order No.
WAS5 CCC 20LP	1	8581160000
WAZ5 CCC 20LP	1	8581170000

<b>Note</b>	
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Accessories

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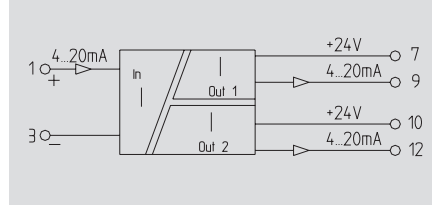
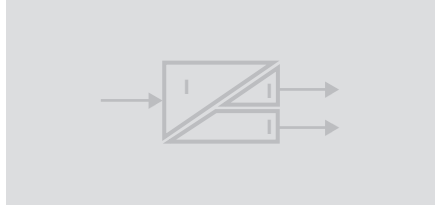
Markers – refer to Accessories.

**Signal multiplier**

**Loop powered**

- Galvanic isolation
- Input and output current loop feed
- Very low power consumption
- No calibration necessary
- ATEX II 3 G Ex nA IIC T4
- UL Class I, Div. 2

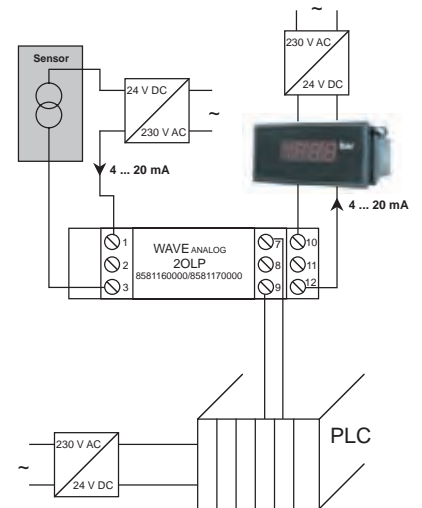
**20LP**



**Technical data**

<b>Input</b>	
Input current	4...20 mA (current loop)
Voltage drop	3.8 V
<b>Output</b>	
Output current	2 x 4...20 mA (current loop)
Output signal limit	Approx. 31 mA
Load impedance, voltage/current	$/ R_L = (U_{0} - 12 \text{ V}) / 20 \text{ mA}$ z.B. $600 \Omega$ at 24 V
Cut-off frequency (-3 dB)	30 Hz
<b>General data</b>	
Supply voltage	min. 12 V DC/ max. 30 V DC
Accuracy	typ. 0.1 %; max. 0.2 %
Temperature coefficient	$\leq 150 \text{ ppm/K}$
Step response time	< 20 ms
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE; cULusEX; ATEX
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage input or output/supply	4 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	$\geq 5.5 \text{ mm}$

**Example of application**



<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4

**Ordering data**

Screw connection
Tension clamp connection

Type	Qty.	Order No.
WAS5 CCC 20LP EX	1	8975640000
WAZ5 CCC 20LP EX	1	8975650000

<b>Note</b>
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**Accessories**

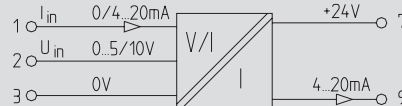
Markers – refer to Accessories.

# WAVESERIES - DC/DC passive isolator

## Output-current loop-powered

- Galvanic isolation
- Very low power consumption
- Input range selected via DIP switch
- No calibration necessary

## OLP



### Technical data

Input	
Input voltage	0...(5)10 V
Input resistance, voltage/current	0...5V: 210 kΩ; 0...10V: 430 kΩ / 51 Ω
Input current	0(4)...20 mA
Rated current	40 mA
Output	
Output current	Current loop
Output signal limit	Approx. 31 mA
Load impedance, voltage/current	$R_L = (U_s - 12 V) / 20 \text{ mA}$ z.B. 600 Ω at 24 V
Cut-off frequency (-3 dB)	10 Hz/ 100 Hz switchable
General data	
Supply voltage	min. 12 V DC/ max. 30 V DC
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Default setting	0...20mA, 10 Hz
Accuracy	0.2% of measuring range final value
Temperature coefficient	≤ 150 ppm/K
Step response time	< 10 Hz: 80 ms; 100 Hz: 50 ms
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Insulation voltage	4 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 5.5 mm

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

### Ordering data

Screw connection	WAS5 OLP
Tension clamp connection	WAZ5 OLP

### Note

### Accessories

Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4

Type	Qty.	Order No.
WAS5 OLP	1	8543720000
WAZ5 OLP	1	8543730000

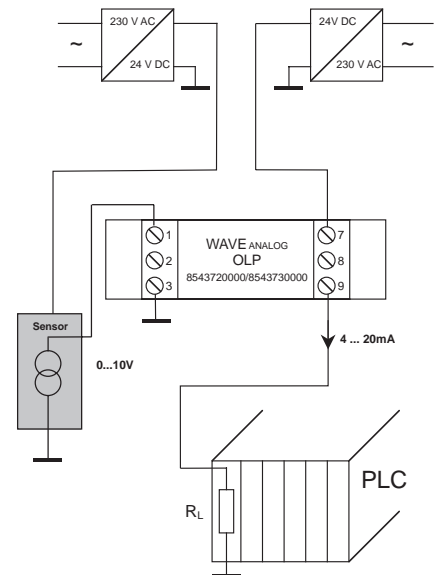
Markers – refer to Accessories.

### Setting options/switch position

Input	SW 1			
	1	2	3	4
0 ... 20 mA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 ... 20 mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0 ... 5 V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
0 ... 10 V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transmission frequency				
10 Hz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
100 Hz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

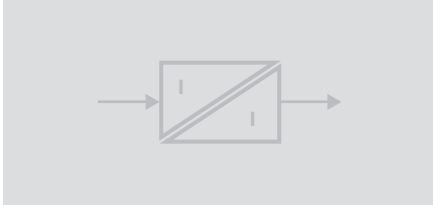
■ = on  
□ = off

### Example of application



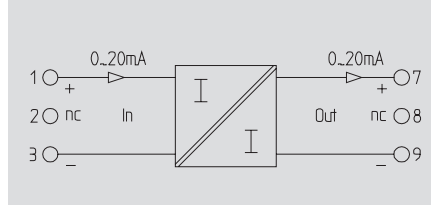
**Input current loop feed**

- Reliable isolation
- Very low power consumption
- UL Class I, Div. 2



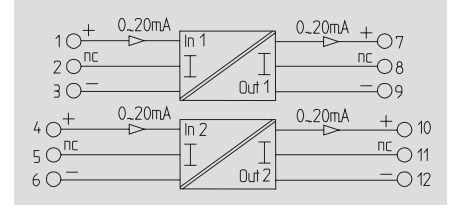
**CCC LP**

(1-channel)



**CCC LP**

(2-channel)



**Technical data**

Input	
Input voltage / Input current	/ 0(4)...20 mA current loop
Pick-up current	< 100 µA
Voltage drop	Approx. 3 V at $R_L = 0 \Omega$ ; approx. 13 V at $R_L = 500 \Omega$ ; ( $I_N = 20$ mA)
Output	
Output voltage / Output current	/ 0(4)...20 mA
Load impedance, voltage/current	/ $\leq 500 \Omega$
General data	
Ambient temperature	-25 °C...+70 °C
Storage temperature	-40 °C...+80 °C
Accuracy	< 0.1 % of end value
Temperature coefficient	$\leq 50$ ppm/K of final value
Approvals	cULus; CSA; cULusEX; GL; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV <sub>eff</sub> / 1 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	$\geq 5.5$ mm

Input	
Input voltage / Input current	/ 0(4)...20 mA current loop
Pick-up current	< 100 µA
Voltage drop	Approx. 3 V at $R_L = 0 \Omega$ ; approx. 13 V at $R_L = 500 \Omega$ ; ( $I_N = 20$ mA)
Output	
Output voltage / Output current	/ 0(4)...20 mA
Load impedance, voltage/current	/ $\leq 500 \Omega$
General data	
Ambient temperature	-25 °C...+70 °C
Storage temperature	-40 °C...+80 °C
Accuracy	< 0.1 % of end value
Temperature coefficient	$\leq 50$ ppm/K of final value
Approvals	cULus; CSA; cULusEX; GL; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV <sub>eff</sub> / 1 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	$\geq 5.5$ mm

Input	
Input voltage / Input current	/ 0(4)...20 mA current loop
Pick-up current	< 100 µA
Voltage drop	Approx. 3 V at $R_L = 0 \Omega$ ; approx. 13 V at $R_L = 500 \Omega$ ; ( $I_N = 20$ mA)
Output	
Output voltage / Output current	/ 0(4)...20 mA
Load impedance, voltage/current	/ $\leq 500 \Omega$
General data	
Ambient temperature	-25 °C...+70 °C
Storage temperature	-40 °C...+80 °C
Accuracy	< 0.1 % of end value
Temperature coefficient	$\leq 50$ ppm/K of final value
Approvals	cULus; CSA; cULusEX; GL; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV <sub>eff</sub> / 1 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	$\geq 5.5$ mm

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4
Note	

Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4
Note	

**Ordering data**

Screw connection	WAS5 CCC LP 0-20/0-20mA	1	8444950000
Tension clamp connection	WAZ5 CCC LP 0-20/0-20mA	1	8444960000

Type	Qty.	Order No.
WAS5 CCC LP 0-20/0-20mA	1	8444950000
WAZ5 CCC LP 0-20/0-20mA	1	8444960000

Type	Qty.	Order No.
WAS5 CCC LP 0-20/0-20mA	1	8463580000
WAZ5 CCC LP 0-20/0-20mA	1	8463590000

Note
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Note
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Note
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**Accessories**

Markers – refer to Accessories.
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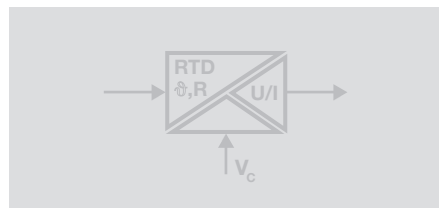
Markers – refer to Accessories.
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Markers – refer to Accessories.
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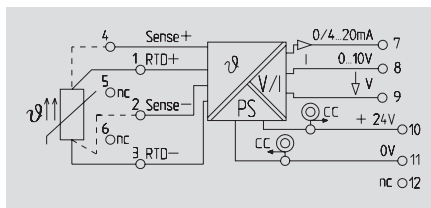
**RTD signal isolator/converter**

- Universally adjustable via DIP switch
- 3-way isolation
- Linearisation
- Power supply can be cross-connected using plug-in jumpers.
- WAVETOOL software offers configuration help, download at [www.weidmueller.com](http://www.weidmueller.com)

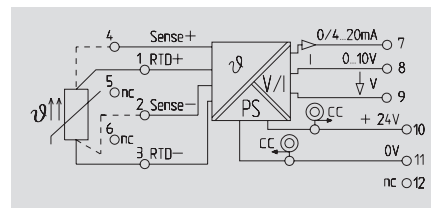


**PRO RTD**

UL Class I, Div. 2



**PRO RTD 1000**



**Technical data**

**Input**

Sensor

Temperature input range

**Output**

Output current / Output voltage

Offset current / Offset voltage

Load impedance, voltage/current

Wire break detection

Fine adjustment

Status indicator

**General data**

Supply voltage

Power consumption

Step response time

Ambient temperature

Storage temperature

Approvals

**Insulation coordination**

Standards

EMC standards

Rated voltage

Impulse withstand voltage

Insulation voltage

Overvoltage category

Pollution severity

Clearance & creepage distances

PT100/2-/3-/4-wire, Ni100/2-/3-/4-wire, potentiometer: min. 0-100 Ω, max. 0-100 kΩ, resistance: 0-450 Ω configurable

0(4)...20 mA / 0...10 V

max. 100 μA / max. 0.05 V

≥ 1 kΩ / ≤ 600 Ω

LED flashing (output value: > 20 mA, >10 V)

≥ ± 5 %, Version 1 and later: ≥ 12.5 % / potentiometer:

12.5%...25%

Module active: LED on/ wire breakage: LED flashing/

Error: LED off

24 V DC ± 25 %

830...880...980mW at I<sub>OUT</sub> = 20 mA

fast/slow: 2-/3-/4-conductor: 1.2 s/2.2 s; potentiometer: 0.5

s/1.1 s

0 °C...+55 °C

-20 °C...+85 °C

cULus; cULusEX; GL; CE

DIN 43760, EN 50178, EN 60751, IEC 751

EN 55011, EN 61000-6

300 V

4 kV

2 kV<sub>eff</sub> / 5 s

III

2

≥ 3 mm

Ni1000/2-/3-/4-wire, Potentiometer: min. 0-1kΩ, max. 0-100kΩ, PT1000/2-/3-/4-wire, Resistance: 0-4.5kΩ configurable

0(4)...20 mA / 0...10 V

max. 100 μA / max. 0.05 V

≥ 1 kΩ / ≤ 600 Ω

LED flashing (output value: > 20 mA, >10 V)

± 12.5 % of FSR; potentiometer: ± 12.5 % ... ± 25 %

Module active: LED on/ wire breakage: LED flashing/

Error: LED off

24 V DC ± 25 %

830...880...980mW at I<sub>OUT</sub> = 20 mA

Fast/slow:2-/3-/4-conductor: 1.2s/2.3s; potentiometer:

0.5s/1.2s

0 °C...+55 °C

-20 °C...+85 °C

cULus; GL; CE

DIN 43760, EN 50178, EN 60751, IEC 751

EN 55011, EN 61000-6

300 V

4 kV

2 kV<sub>eff</sub> / 5 s

III

2

≥ 3 mm

**Dimensions**

Clamping range (nominal / min. / max.) mm<sup>2</sup>

Length x width x height mm

**Note**

**Screw connection**

2.5 / 0.5 / 2.5

92.4 / 17.5 / 112.4

**Tension clamp connection**

1.5 / 0.5 / 2.5

92.4 / 17.5 / 112.4

**Screw connection**

2.5 / 0.5 / 2.5

92.4 / 17.5 / 112.4

**Ordering data**

Screw connection

Tension clamp connection

Type Qty. Order No.

WAS5 PRO RTD 1 8560700000

WAZ5 PRO RTD 1 8560710000

Type Qty. Order No.

WAS5 PRO RTD 1000 1 8679490000

**Note**

**Accessories**

Cross-connector for power supplies and markers – refer to Accessories

Cross-connector for power supplies and markers – refer to Accessories

PRO RTD

Switch positions/setting options

Selection of input			Switch 1		
Input			1	2	3
PT100	2-conductor		■	■	■
PT100	3-conductor		□	■	■
PT100	4-conductor		■	□	■
R	2-conductor		□	□	■
Ni100	2-conductor		■	■	□
Ni100	3-conductor		□	■	□
Ni100	4-conductor		■	□	□
Potentiometer			□	□	□

■ = on  
□ = off

PRO RTD 1000

Switch positions/setting options

Selection of input			Switch 1		
Input			1	2	3
PT1000	2-conductor		■	■	■
PT1000	3-conductor		□	■	■
PT1000	4-conductor		■	□	■
R	2-conductor		□	□	■
Ni1000	2-conductor		■	■	□
Ni1000	3-conductor		□	■	□
Ni1000	4-conductor		■	□	□
Potentiometer			□	□	□

■ = on  
□ = off

Selection of minimum input size			Switch 1			
$\vartheta_{min}$	$R_{min}$	Poti <sub>min</sub>	4	5	6	7
0 °C	0 Ω	0 %	■	■	■	■
-10 °C	10 Ω	10 %	■	■	■	□
-20 °C	20 Ω	20 %	■	■	□	■
-25 °C	20 Ω	25 %	■	■	□	□
-30 °C	30 Ω	30 %	■	□	■	■
-40 °C	40 Ω	40 %	■	□	■	□
-50 °C	50 Ω	50 %	■	□	□	■
-60 °C	60 Ω	60 %	■	□	□	□
-70 °C	70 Ω	70 %	□	■	■	■
-80 °C	80 Ω	80 %	□	■	■	□
-90 °C	90 Ω		□	■	□	■
-100 °C	100 Ω		□	■	□	□
-150 °C	150 Ω		□	□	■	■
-200 °C	200 Ω		□	□	■	□
Special range			□	□	□	■

Selection of minimum input size			Switch 1			
$\vartheta_{min}$	$R_{min}$	Poti <sub>min</sub>	4	5	6	7
0 °C	0 Ω	0 %	■	■	■	■
-10 °C	100 Ω	10 %	■	■	■	□
-20 °C	200 Ω	20 %	■	■	□	■
-25 °C	200 Ω	25 %	■	■	□	□
-30 °C	300 Ω	30 %	■	□	■	■
-40 °C	400 Ω	40 %	■	□	■	□
-50 °C	500 Ω	50 %	■	□	□	■
-60 °C	600 Ω	60 %	■	□	□	□
-70 °C	700 Ω	70 %	□	■	■	■
-80 °C	800 Ω	80 %	□	■	■	□
-90 °C	900 Ω		□	■	□	■
-100 °C	1000 Ω		□	■	□	□
-150 °C	1500 Ω		□	□	■	■
-200 °C	2000 Ω		□	□	■	□
Special range			□	□	□	■

Choice of measuring range			Switch 2				
T	R	Poti	1	2	3	4	5
40 K	20 Ω	20 %	■	■	■	■	■
50 K	25 Ω	25 %	■	■	■	■	□
60 K	30 Ω	30 %	■	■	■	□	■
70 K	35 Ω	35 %	■	■	■	□	□
80 K	40 Ω	40 %	■	■	□	■	■
90 K	45 Ω	45 %	■	■	□	■	□
100 K	50 Ω	50 %	■	■	□	□	■
110 K	55 Ω	55 %	■	■	□	□	□
120 K	60 Ω	60 %	■	□	■	■	■
125 K	62.5 Ω	62.5 %	■	□	■	■	□
130 K	65 Ω	65 %	■	□	■	□	■
140 K	70 Ω	70 %	■	□	■	□	□
150 K	75 Ω	75 %	■	□	□	■	■
160 K	80 Ω	80 %	■	□	□	■	□
170 K	85 Ω	85 %	■	□	□	□	■
180 K	90 Ω	90 %	■	□	□	□	□
190 K	95 Ω	95 %	□	■	■	■	■
200 K	100 Ω	100 %	□	■	■	■	□
250 K	125 Ω	---	□	■	■	□	■
300 K	150 Ω	---	□	■	■	□	□
350 K	175 Ω	---	□	■	□	■	■
400 K	200 Ω	---	□	■	□	■	□
450 K	225 Ω	---	□	■	□	□	■
500 K	250 Ω	---	□	■	■	□	□
550 K	275 Ω	---	□	□	■	■	■
600 K	300 Ω	---	□	□	■	■	□
650 K	325 Ω	---	□	□	■	□	■
700 K	350 Ω	---	□	□	■	□	□
750 K	375 Ω	---	□	□	□	■	■
800 K	400 Ω	---	□	□	□	■	□
850 K	425 Ω	---	□	□	□	□	■
900 K	450 Ω	---	□	□	□	□	□

Choice of measuring range			Switch 2				
T	R	Poti	1	2	3	4	5
40 K	200 Ω	20 %	■	■	■	■	■
50 K	250 Ω	25 %	■	■	■	■	□
60 K	300 Ω	30 %	■	■	■	□	■
70 K	350 Ω	35 %	■	■	■	□	□
80 K	400 Ω	40 %	■	■	□	■	■
90 K	450 Ω	45 %	■	■	□	■	□
100 K	500 Ω	50 %	■	■	□	□	■
110 K	550 Ω	55 %	■	■	□	□	□
120 K	600 Ω	60 %	■	□	■	■	■
125 K	625 Ω	62.50 %	■	□	■	■	□
130 K	650 Ω	65 %	■	□	■	□	■
140 K	700 Ω	70 %	■	□	■	□	□
150 K	750 Ω	75 %	■	□	□	■	■
160 K	800 Ω	80 %	■	□	□	■	□
170 K	850 Ω	85 %	■	□	□	□	■
180 K	900 Ω	90 %	■	□	□	□	□
190 K	950 Ω	95 %	□	■	■	■	■
200 K	1000 Ω	100 %	□	■	■	■	□
250 K	1250 Ω	---	□	■	■	□	■
300 K	1500 Ω	---	□	■	■	□	□
350 K	1750 Ω	---	□	■	□	■	■
400 K	2000 Ω	---	□	■	□	■	□
450 K	2250 Ω	---	□	■	□	□	■
500 K	2500 Ω	---	□	■	■	□	□
550 K	2750 Ω	---	□	□	■	■	■
600 K	3000 Ω	---	□	□	■	■	□
650 K	3250 Ω	---	□	□	■	□	■
700 K	3500 Ω	---	□	□	■	□	□
750 K	3750 Ω	---	□	□	□	■	■
800 K	4000 Ω	---	□	□	□	■	□
850 K	4250 Ω	---	□	□	□	□	■
900 K	4500 Ω	---	□	□	□	□	□

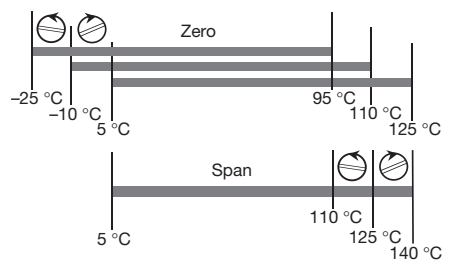
Selection of output		Switch 2		witching on the manual adjustment	
Output		6	7	manual adjustment	S. 1
0...10 V		■	□		8
0...5 V		■	■	off	□
0...20 mA		□	□	on	■
4...20 mA		□	■		

Selection of the step response		S. 2
step response		8
slow		■
fast		□

Accuracy, slow/fast step response	
PT 100, Ni100: 0.3 % of measuring range	0.8 %
Measuring range: < 100 K / 0.3 K / 0.8 K	
Potentiometer: 0.2 % of final value / 0.3 %	
Resistance: 0.2 % of final value / 0.3 %	

Temperature coefficient	
Measuring range ≥ 200 K	≤ 200 ppm / °C
100 K ≤ Measuring range < 200 K	≤ 250 ppm / °C
40 K ≤ Measuring range < 100 K	≤ 400 ppm / °C

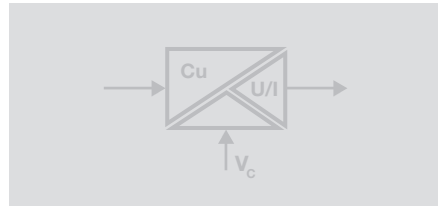
Examples for setting zero and range	
<b>Temperature setting:</b>	
Output	4 ... 20 mA
DIP switch	-10 °C ... +110 °C
Range	75 ... 110 °C
Range	120 °C
Range adjustment	± 12.5 %



**WAVEtool setting aid**  
 The service tool is used for fast, uncomplicated configuration of WAVEANALOG PRO.  
 Download from the internet:  
<http://www.weidmueller.com>

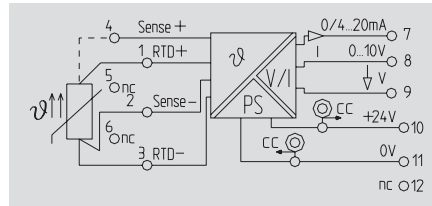
RTD signal isolator/converter

- Universally adjustable via DIP switch
- 3-way isolation
- Linearisation
- Power supply can be cross-connected using plug-in jumpers.
- WAVETOOL software offers configuration help, download at [www.weidmueller.com](http://www.weidmueller.com)



PRO RTD Cu

UL Class I, Div.2



Technical data

Input

Sensor  
Temperature input range

Output

Output current / Output voltage  
Offset current / Offset voltage  
Load impedance, voltage/current  
Wire break detection  
Fine adjustment  
Status indicator

General data

Supply voltage  
Power consumption  
Step response time  
Ambient temperature  
Storage temperature  
Approvals

Insulation coordination

Standards  
EMC standards  
Rated voltage  
Impulse withstand voltage  
Insulation voltage  
Overvoltage category  
Pollution severity  
Clearance & creepage distances

3-/4-wired, Cu 10, Cu 25, Cu 50, Cu 100

Adjustable from -200...+260°C

0(4)...20 mA / 0...10 V

max. 100 µA / max. 0.05 V

≥ 1 kΩ / ≤ 600 Ω

LED flashing (output value: > 20 mA, >10 V)

± 12.5% of FSR

Module active: LED on/ wire breakage: LED flashing/

Error: LED off

24 V DC ± 25 %

880...980...1030mW at I<sub>OUT</sub> = 20 mA

Fast: 1.2 s/ slow: 2.2 s

0 °C...+55 °C

-20 °C...+85 °C

cULus; cULusEX; CE

EN 50178

EN 55011, EN 61000-6

300 V

4 kV

2 kV<sub>eff</sub> / 5 s

III

2

≥ 3 mm

Dimensions

Clamping range (nominal / min. / max.) mm<sup>2</sup>  
Length x width x height mm

Note

Ordering data

Screw connection

Note

Accessories

Screw connection

2.5 / 0.5 / 2.5  
92.4 / 17.5 / 112.4

Type Qty. Order No.

WAS5 PRO RTD Cu 1 8638950000

Note

Cross-connector for power supplies and markers – refer to Accessories

Selection of connection	Switch 1		Selection of sensor	
	1	2	Type	Switch 1 2 3
3-wire	■	■	Cu 10	■ ■
4-wire	□	□	Cu 25	■ □
			Cu 50	□ ■
			Cu 100	□ □

Selection of minimum input values	Switch 1			
	4	5	6	7
0 min				
- 0 °C	■	■	■	■
-10 °C	■	■	■	□
-20 °C	■	■	□	■
-25 °C	■	■	□	□
-30 °C	■	□	■	■
-40 °C	■	□	■	□
-50 °C	■	□	□	■
-60 °C	■	□	□	□
-70 °C	□	■	■	■
-80 °C	□	■	■	□
-90 °C	□	■	□	■
-100 °C	□	■	□	□
-150 °C	□	□	■	■
-200 °C	□	□	■	□
special range	□	□	□	□

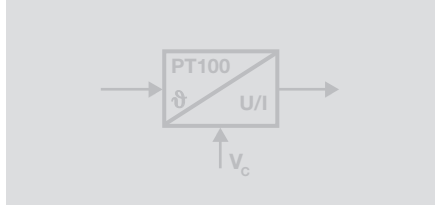
Selection of the measurement range	Switch 2				
	Span	1	2	3	4
40 K	■	■	■	■	■
50 K	■	■	■	■	□
60 K	■	■	■	□	■
70 K	■	■	■	□	□
80 K	■	■	□	■	■
90 K	■	■	□	■	□
100 K	■	■	□	□	■
110 K	■	■	□	□	□
120 K	■	□	■	■	■
125 K	■	□	■	■	□
130 K	■	□	■	□	■
140 K	■	□	■	□	□
150 K	■	□	□	■	■
160 K	■	□	□	■	□
170 K	■	□	□	□	■
180 K	■	□	□	□	□
190 K	□	■	■	■	■
200 K	□	■	■	■	□
210 K	□	■	■	□	■
220 K	□	■	■	□	□
230 K	□	■	□	■	■
240 K	□	■	□	■	□
250 K	□	■	□	□	■
260 K	□	■	□	□	□
270 K	□	□	■	■	■
280 K	□	□	■	■	□
290 K	□	□	■	□	■
300 K	□	□	■	□	□
350 K	□	□	□	■	■
400 K	□	□	□	■	□
450 K	□	□	□	□	■
460 K	□	□	□	□	□

Selection of Output	Switch 2		Switching on the manual fine adjustment		
	Output	6	7	man. adj.	Switch 1 8
0...10 V	■	□	man. adj.	8	□
0...20 mA	□	□	off		□
4...20 mA	□	■	on		■

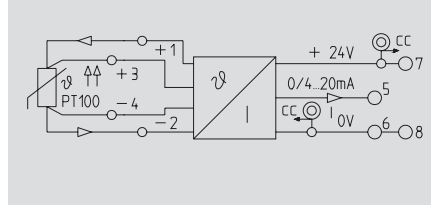
Selection of step set time	Switch 2	
	Time of step response	8
slow	■	■ = on
fast	□	□ = off

**RTD, 4-wire converter**

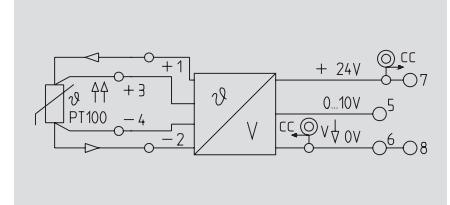
- 2-, 3- and 4-conductor system
- Adjustable temperature range  
-200°C...+800°C
- Adjustable output range
- Power supply can be cross-connected using plug-in jumpers.
- No galvanic isolation between input and output circuits



**PT100 / 4 0 (4)...20 mA**



**PT100 / 4 0...10 V**



**Technical data**

<b>Input</b>
Sensor
Sensor supply
<b>Output</b>
Output voltage / Output current
Load impedance, voltage/current
<b>General data</b>
Supply voltage / Current consumption
Ambient temperature / Storage temperature
Accuracy
Approvals
Standards
EMC standards

PT100 / 2-/3-/4-wire
1.45 mA
0(4)...20 mA
≤ 500 Ω
24 V DC ± 20 % /
0 °C...+55 °C / -20 °C...+85 °C
100K ≤ MB < 600K: 0.1 %; MB ≥ 600K: 0.2 %; of measuring range
cULus; CSA; CE
EN 50178, EN 60751, IEC751
EN 55011, EN 61000-6

PT100 / 2-/3-/4-wire
1.45 mA
0...10 V /
≥ 1 kΩ /
24 V DC ± 20 % /
0 °C...+55 °C / -20 °C...+85 °C
100K ≤ MB < 600K: 0.1 %; MB ≥ 600K: 0.2 %; of measuring range
cULus; CSA; CE
EN 50178, EN 60751, IEC751
EN 55011, EN 61000-6

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
0.5 / 2.5	0.5 / 2.5
92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

<b>Screw connection</b>	<b>Tension clamp connection</b>
0.5 / 2.5	0.5 / 2.5
92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

**Ordering data**

Adjustable from -200...+800°C	Screw connection
Adjustable from -200...+800°C	Tension clamp connection
Special adjustment	Screw connection
Special adjustment	Tension clamp connection
0...100 °C	Screw connection

<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
WTS4 PT100/4 C 0/4-20mA	1	8432270000
WTZ4 PT100/4 C 0/4-20mA	1	8432280000
WTS4 PT100/4 C 0/4-20mA variabel	1	8432279999
WTZ4 PT100/4 C 0/4-20mA variabel	1	8432289999
WTS4 PT100/4 C 4-20mA 0...100C	1	8432270011

<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
WTS4 PT100/4 V 0-10V	1	8432240000
WTZ4 PT100/4 V 0-10V	1	8432250000
WTS4 PT100/4 V 0-10V variabel	1	8432249999
WTZ4 PT100/4 V 0-10V variabel	1	8432259999
WTS4 PT100/4 V 0-10V 0...100C	1	8432240001

**Note**

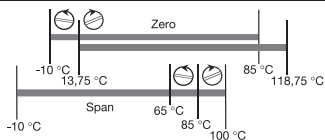
Cross-connectors for power supplies and markers - refer to WAVESERIES accessories

Specify temperature range for special calibrations.

**Applications**

**Example for Zero and Span**

<b>Temperature adjustment:</b>	
Tmin	-10 °C
Span	75...110 °C
<b>Span</b>	95 °C
<b>Adjustment of Span</b>	+ 25 %



<b>Temperature coefficient</b>	
Measurement range	≥ 200 K ≤ 200 ppm / °C (typ. 80 ppm / °C)
100K ≤ Measurement range < 200 K	≤ 225 ppm / °C (typ. 90 ppm / °C)
40K ≤ Measurement range < 100 K	≤ 450 ppm / °C (typ. 180 ppm / °C)

- Aids**
- Voltage supply 24 Vdc, 50 mA
  - Simulator for PT 100 or precision-resistance-decade
  - Ampere-/voltmeter which can be calibrated to an accuracy of >0.1% of the end value.

**Switch position/setting options**

<b>Tmin</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>Span</b>	<b>4</b>	<b>5</b>	<b>6</b>
0 °C	■	■	■	40 ... 50 °C	■	■	■
-10 °C	■	■	□	50 ... 75 °C	■	■	□
-20 °C	■	□	■	75 ... 110 °C	■	■	■
-40 °C	■	□	□	110 ... 165 °C	□	□	□
-60 °C	□	■	■	165 ... 245 °C	□	■	■
-80 °C	□	■	□	245 ... 360 °C	□	□	□
-100 °C	□	□	■	360 ... 540 °C	□	■	■
-200 °C	□	□	□	540 ... 800 °C	□	□	□
<b>Output 1)</b>	<b>7</b>			<b>PT 100</b>	<b>8</b>	<b>9</b>	<b>10</b>
0 ... 20 mA	□			2 - wire	■	■	■
4 ... 20 mA	■			3 - wire	□	□	□
				4 - wire	□	□	□

1) only modules with current output

■ = on  
□ = off

# WAVESERIES - PT100/RTD - signal converter

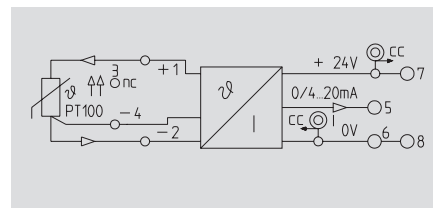
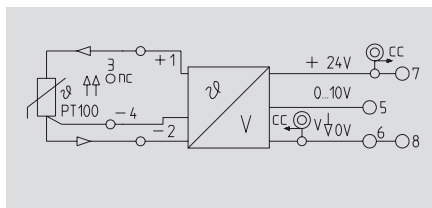
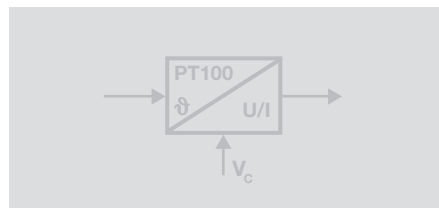
## RTD, 3-wire converter

- 3-conductor system
- Adjustable temperature range  
-200°C...+800°C
- Adjustable output range
- Power supply can be cross-connected using plug-in jumpers.
- No galvanic isolation between input and output circuits

## PT100 / 3 0...10 V



## PT100 / 3 0 (4)...20 mA



### Technical data

Input	
Sensor	PT100/3-wire
Sensor supply	1.45 mA
Output	
Output voltage / Output current	0...10 V /
Load impedance, voltage/current	≥ 1 kΩ /
General data	
Supply voltage / Current consumption	24 V DC ± 20 % /
Ambient temperature / Storage temperature	0 °C...+55 °C / -20 °C...+85 °C
Accuracy	± 0.5 % of measuring range
Approvals	cULus; CSA; CE
Standards	EN 50178, EN 60751, IEC751
EMC standards	EN 55011, EN 61000-6

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5	92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5	92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5	92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5	92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

### Ordering data

Adjustable from -200...+800°C	Screw connection
Adjustable from -200...+800°C	Tension clamp connection
Special adjustment	Screw connection
Special adjustment	Tension clamp connection
0...100 °C	Screw connection

Type	Qty.	Order No.
WTS4 PT100/3 V 0-10V	1	8432090000
WTZ4 PT100/3 V 0-10V	1	8432130000
WTS4 PT100/3 V 0-10V variabel	1	8432099999
WTZ4 PT100/3 V 0-10V variabel	1	8432139999
WTS4 PT100/3 V 0-10V 0...100C	1	8432090001

Type	Qty.	Order No.
WTS4 PT100/3 C 0/4-20mA	1	8432150000
WTZ4 PT100/3 C 0/4-20mA	1	8432160000
WTS4 PT100/3 C 0/4-20mA variabel	1	8432159999
WTZ4 PT100/3 C 0/4-20mA variabel	1	8432169999

**Note**

Specify temperature range for special calibrations.

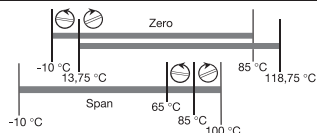
Cross-connectors for power supplies and markers - refer to WAVESERIES accessories

### Applications

#### Example for Zero and Span

#### Temperature adjustment:

Tmin	-10 °C
Span	75...110 °C
Span	95 °C
Adjustment of Span	+ 25 %



#### Temperature coefficient

Measurement range ≥ 200 K ≤ 200 ppm / °C (typ. 80 ppm / °C)  
 100K ≤ Measurement range < 200K ≤ 250 ppm / °C (typ. 100 ppm / °C)  
 40K ≤ Measurement range < 100K ≤ 500 ppm / °C (typ. 200 ppm / °C)

#### Aids

- Voltage supply 24 Vdc, 50 mA
- Simulator for PT 100 or precision-resistance-decade
- Ampere-/voltmeter which can be calibrated to an accuracy of >0.1% of the end value.

#### Switch position/setting options

Tmin	1	2	3	Span	4	5	6
0 °C	■	■	■	40 ... 50 °C	■	■	■
-10 °C	■	■	■	50 ... 75 °C	■	■	■
-20 °C	■	■	■	75 ... 110 °C	■	■	■
-40 °C	■	■	■	110 ... 165 °C	■	■	■
-60 °C	■	■	■	165 ... 245 °C	■	■	■
-80 °C	■	■	■	245 ... 360 °C	■	■	■
-100 °C	■	■	■	360 ... 540 °C	■	■	■
-200 °C	■	■	■	540 ... 800 °C	■	■	■

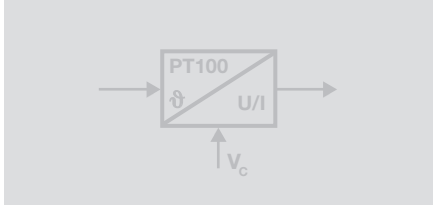
Output 1)	Range	7	PT 100	8	9	10
0 ... 20 mA	■	■	2 - wire	■	■	■
4 ... 20 mA	■	■	3 - wire	■	■	■
			4 - wire	■	■	■

1) only modules with current output

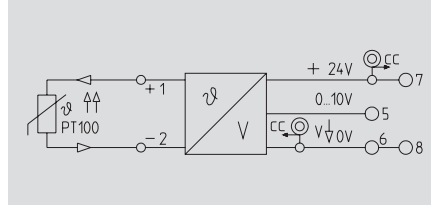
■ = on  
□ = off

**RTD, 2-wire converter**

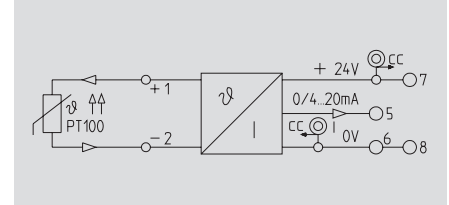
- 2-conductor system
- Adjustable temperature range  
-200°C...+800°C
- Adjustable output range
- Power supply can be cross-connected using plug-in jumpers.
- No galvanic isolation between input and output circuits



**PT100 / 2 0...10 V**



**PT100/2 0 (4)...20 mA**



**Technical data**

<b>Input</b>
Sensor
Sensor supply
<b>Output</b>
Output voltage / Output current
Load impedance, voltage/current
<b>General data</b>
Supply voltage / Current consumption
Ambient temperature / Storage temperature
Accuracy
Approvals
Standards
EMC standards

PT100/2-wire
1.45 mA
0...10 V /
≥ 1 kΩ /
24 V DC ± 20 % / < 38 mA @ I <sub>OUT</sub> = 20 mA
0 °C...+55 °C / -20 °C...+85 °C
± 0.5 % of measuring range
cULus; CSA; CE
EN 50178, EN 60751, IEC751
EN 55011, EN 61000-6

PT100/2-wire
1.45 mA
/ 0(4)...20 mA
/ ≤ 500 Ω
24 V DC ± 20 % / < 48 mA @ I <sub>OUT</sub> = 20 mA
0 °C...+55 °C / -20 °C...+85 °C
± 0.5 % of measuring range
cULus; CSA; CE
EN 50178, EN 60751, IEC751
EN 55011, EN 61000-6

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

**Ordering data**

Adjustable from -200...+800°C	Screw connection
Adjustable from -200...+800°C	Tension clamp connection
Special adjustment	Screw connection
Special adjustment	Tension clamp connection
0...100 °C	Screw connection

Type	Qty.	Order No.
WTS4 PT100/2 V 0-10V	1	8432180000
WTZ4 PT100/2 V 0-10V	1	8432190000
WTS4 PT100/2 V 0-10V variabel	1	8432189999
WTZ4 PT100/2 V 0-10V variabel	1	8432199999
WTS4 PT100/2 V 0-10V 0...100C	1	8432180001

Type	Qty.	Order No.
WTS4 PT100/2 C 0/4-20mA	1	8432210000
WTZ4 PT100/2 C 0/4-20mA	1	8432220000
WTS4 PT100/2 C 0/4-20mA variabel	1	8432219999
WTZ4 PT100/2 C 0/4-20mA variabel	1	8432229999
WTS4 PT100/2 C 4-20mA 0...100C	1	8432210011

**Note**

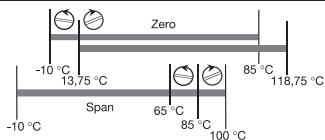
Specify temperature range for special calibrations.

Cross-connectors for power supplies and markers - refer to WAVESERIES accessories

**Applications**

**Example for Zero and Span**

<b>Temperature adjustment:</b>	
Tmin	-10 °C
Span	75...110 °C
<b>Span</b>	
Adjustment of Span	+ 25 %



**Temperature coefficient**

Measurement range ≥ 200 K ≤ 200 ppm / °C (typ. 80 ppm / °C)  
 100K ≤ Measurement range < 200K ≤ 250 ppm / °C (typ. 100 ppm / °C)  
 40K ≤ Measurement range < 100K ≤ 500 ppm / °C (typ. 200 ppm / °C)

**Aids**

- Voltage supply 24 Vdc, 50 mA
- Simulator for PT 100 or precision-resistance-decade
- Ampere-voltmeter which can be calibrated to an accuracy of >0.1% of the end value.

**Switch position/setting options**

Tmin	1	2	3	Span	4	5	6
0 °C	■	■	■	40 ... 50 °C	■	■	■
-10 °C	■	■	□	50 ... 75 °C	■	■	□
-20 °C	■	□	■	75 ... 110 °C	■	■	■
-40 °C	■	□	□	110 ... 165 °C	■	□	□
-60 °C	□	■	■	165 ... 245 °C	□	■	■
-80 °C	□	■	□	245 ... 360 °C	□	■	□
-100 °C	□	□	■	360 ... 540 °C	□	□	■
-200 °C	□	□	□	540 ... 800 °C	□	□	□

Output 1)		PT 100		
Range	7	8	9	10
0 ... 20 mA	□	2 - wire	■	■
4 ... 20 mA	■	3 - wire	■	■
		4 - wire	□	□

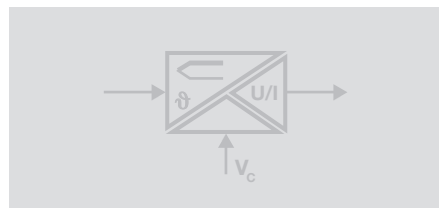
1) only modules with current output

■ = on  
□ = off

Thermo converter type:

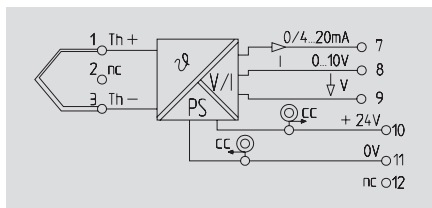
K,J,T,E,N,R,S,B

- 3-way isolation
- Internal cold-junction compensation
- Power supply can be cross-connected using plug-in jumpers.
- Suitable for insulated and uninsulated thermocouples
- WAVETOOL software offers configuration help, download at www.weidmueller.com



PRO Thermo

UL Class I, Div. 2



Select of thermocoupler				Selection of minimum temperature								
Typ	SW1			Δ <sub>min</sub>	SW1							
K	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
J	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-10°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-20°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-30°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-40°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-50°C	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-100°C	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-150°C	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				-200°C	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				+50°C	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				+100°C	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				+150°C	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				+200°C	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				+250°C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				500°C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				Special range	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technical data

Input

Sensor  
Temperature input range

Output

Output voltage / Output current  
Load impedance, voltage/current  
Offset current / Offset voltage  
Line resistance in measuring circuit  
Wire break detection  
Fine adjustment  
Status indicator

General data

Supply voltage  
Power consumption  
Step response time  
Current-carrying capacity of cross-connect.  
Ambient temperature  
Storage temperature  
Default setting  
Approvals

Insulation coordination

Standards  
EMC standards  
Rated voltage  
Impulse withstand voltage  
Insulation voltage  
Overvoltage category  
Pollution severity  
Clearance & creepage distances

Dimensions

Clamping range (nominal / min. / max.) mm<sup>2</sup>  
Length x width x height mm

Note

Ordering data

Screw connection  
Tension clamp connection

Note

Accessories

Thermo element (IEC 584) type: K,J,T,E,N,R,S,B

-200...+1820 °C

Output

0...10 V / 0(4)...20 mA  
≥ 1 kΩ / ≤ 600 Ω  
max. 100 μA / max. 0.05 V  
50 Ω  
LED flashing (output value: > 20 mA, >10 V)  
± 5% (switchable)  
Module active: LED on/ wire breakage: LED flashing/  
Error: LED off

Supply voltage

24 V DC ± 25 %  
800...850...950 mW at I<sub>out</sub> = 20 mA  
Without filter: max. 1.4 s; with filter: max. 7.5 s

Current-carrying capacity of cross-connect.

≤ 2 A  
0 °C...+55 °C  
-20 °C...+85 °C

Type K; 0...1000°C; 4...20mA; filter: off; man. calibration: off  
cULus; cULusEX; GL; CE

Standards

EN 50178, EN 60584, IEC 584  
EN 55011, EN 61000-6  
300  
4 kV  
2 kV<sub>eff</sub> / 5 s  
III  
2  
≥ 3 mm

Screw connection

2.5 / 0.5 / 2.5

Tension clamp connection

1.5 / 0.5 / 2.5  
92.4 / 17.5 / 112.4

Type

Qty. Order No.  
WAS5 PRO Thermo 1 8560720000  
WAZ5 PRO Thermo 1 8560730000

Note

Cross-connector for power supplies and markers – refer to Accessories

Selection of temperature span

Span	SW2					Selection of output	
100°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Output	SW2
150°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0...10V	<input checked="" type="checkbox"/>
200°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0...20mA	<input type="checkbox"/>
250°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4...20mA	<input type="checkbox"/>
300°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
350°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
400°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
450°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
500°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
550°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
600°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
650°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
700°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
750°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
800°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
850°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
900°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
950°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1000°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1050°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1100°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1150°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1200°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1250°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1300°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1350°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1400°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1450°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1500°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1600°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1700°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
1800°C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

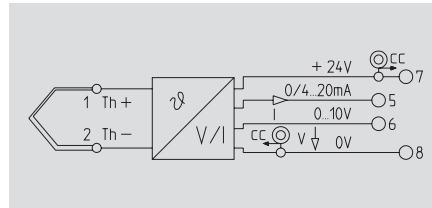
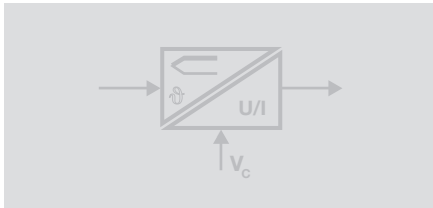
Temperature coefficient

K -200°C...-150°C	± (5K + 0,1% of set range)
-150°C...1200°C	± (3K + 0,1% of set range)
1200°C...1372°C	± (4K + 0,1% of set range)
J -200°C...-150°C	± (4K + 0,1% of set range)
-150°C...1200°C	± (3K + 0,1% of set range)
T -200°C...-150°C	± (5K + 0,1% of set range)
-150°C...400°C	± (3K + 0,1% of set range)
E -200°C...-150°C	± (4K + 0,1% of set range)
-150°C...1000°C	± (3K + 0,1% of set range)
N -200°C...-150°C	± (6K + 0,1% of set range)
-150°C...1300°C	± (3K + 0,1% of set range)
R -50°C...200°C	± (10K + 0,1% of set range)
200°C...1760°C	± (6K + 0,1% of set range)
S -50°C...200°C	± (10K + 0,1% of set range)
200°C...1760°C	± (6K + 0,1% of set range)
B 50°C...250°C	± (25K + 0,1% of set range)
250°C...500°C	± (10K + 0,1% of set range)
500°C...1820°C	± (6K + 0,1% of set range)

**Thermo converter type:**  
**K,J,T,E,N,R,S,B**

- No calibration necessary
- Internal cold-junction compensation
- Output signal selectable
- Power supply can be cross-connected using plug-in jumpers.
- Suitable for insulated thermocouples
- No galvanic isolation between input and output circuits

**Thermo Select**



**Technical data**

Input	
Sensor	
Temperature input range	
Output	
Output voltage / Output current	
Load impedance, voltage/current	
Temperature coefficient	
Step response time	
Wire break detection	
General data	
Supply voltage	
Current consumption	
Current-carrying capacity of cross-connect.	
Ambient temperature	
Storage temperature	
Approvals	
Insulation coordination	
Standards	
EMC standards	

Thermo element (IEC 584) type: K,J,T,E,N,R,S,B
-200...+1820 °C
0...10 V / 0(4)...20 mA
≥ 1 kΩ / ≤ 500 Ω
± (200 ppm from the span + 0.075 K/K)
With filter: 1.1 s; without filter: 6 s
LED flashing (output value: > 20 mA, >10 V)
24 V DC ± 20 %
< 38 mA @ I <sub>out</sub> = 20 mA
≤ 2 A
0 °C...+55 °C
-20 °C...+85 °C
cULus; CSA; CE
EN 50178, EN 60584, IEC 584
EN 55011, EN 61000-6

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 12.5 / 112.4	92.4 / 12.5 / 112.4

**Ordering data**

Screw connection	
Tension clamp connection	

Type	Qty.	Order No.
WTS4 THERMO	1	8432300000
WTZ4 THERMO	1	8432310000

Note
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**Accessories**

Cross-connector for power supplies and markers – refer to Accessories
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**Switch position/setting options**

SW 1				SW 2					
Type	1	2	3	Span	1	2	3	4	5
K	■	■	■	100 °C	■	■	■	■	■
J	□	□	■	150 °C	■	■	■	■	■
T	■	□	■	200 °C	■	■	■	■	■
E	□	□	■	250 °C	■	■	■	■	■
N	■	■	□	300 °C	■	■	■	■	■
R	■	□	□	350 °C	■	■	■	■	■
S	■	□	□	400 °C	■	■	■	■	■
B	□	□	□	450 °C	■	■	■	■	■
				500 °C	■	■	■	■	■
				550 °C	■	■	■	■	■
				600 °C	■	■	■	■	■
				650 °C	■	■	■	■	■
				700 °C	■	■	■	■	■
				750 °C	■	■	■	■	■
				800 °C	■	■	■	■	■
				850 °C	■	■	■	■	■
				900 °C	■	■	■	■	■
				950 °C	■	■	■	■	■
				1000 °C	■	■	■	■	■
				1050 °C	■	■	■	■	■
				1100 °C	■	■	■	■	■
				1150 °C	■	■	■	■	■
				1200 °C	■	■	■	■	■
				1250 °C	■	■	■	■	■
				1300 °C	■	■	■	■	■
				1350 °C	■	■	■	■	■
				1400 °C	■	■	■	■	■
				1450 °C	■	■	■	■	■
				1500 °C	■	■	■	■	■
				1600 °C	■	■	■	■	■
				1700 °C	■	■	■	■	■
				1800 °C	■	■	■	■	■
SW 2									
Output	6	7							
0 - 10 V	■	□							
0 - 20 mA	□	■							
4 - 20 mA	□	■							
Filter 8									
off	□								
on	■								

Temperature coefficient	
K	-200 °C...-150 °C ± (5K + 0,1% of set range)
	-150 °C...1200 °C ± (3K + 0,1% of set range)
	1200 °C...1372 °C ± (4K + 0,1% of set range)
J	-200 °C...-150 °C ± (4K + 0,1% of set range)
	-150 °C...1200 °C ± (3K + 0,1% of set range)
T	-200 °C...-150 °C ± (5K + 0,1% of set range)
	-150 °C...400 °C ± (3K + 0,1% of set range)
E	-200 °C...-150 °C ± (4K + 0,1% of set range)
	-150 °C...1000 °C ± (3K + 0,1% of set range)
N	-200 °C...-150 °C ± (6K + 0,1% of set range)
	-150 °C...1300 °C ± (3K + 0,1% of set range)
R	-50 °C...200 °C ± (10K + 0,1% of set range)
	200 °C...1760 °C ± (6K + 0,1% of set range)
S	-50 °C...200 °C ± (10K + 0,1% of set range)
	200 °C...1760 °C ± (6K + 0,1% of set range)
B	50 °C...250 °C ± (25K + 0,1% of set range)
	250 °C...500 °C ± (10K + 0,1% of set range)
	500 °C...1820 °C ± (6K + 0,1% of set range)



# WAVEANALOG PRO Frequency

## Settings help, for any input and output values

### Setting the input range using the DIP switches (doesn't require a frequency generator):

There are 2 different methods:

#### 1. Lower measuring frequency = 0 Hz

- Choose operating mode “= ... fmax”  
S2.3 = 0 and S2.4 = 0
- Set the upper measuring frequency using DIP switches S1 and S2.1, S2.2 (see table)
- That's all!

#### 2. Lower measuring frequency ≠ 0 Hz

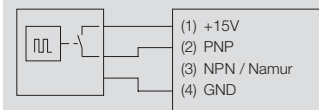
- First the lower measuring frequency must be saved.  
Select mode “save fmin”.  
S2.3 = 1 and S2.4 = 0.  
Set the frequency using DIP switches S1 and S2.1, S2.2 (see table)  
To save the frequency, briefly connect the module to the power supply.
- Select mode “fmin ... fmax”  
S2.3 = 0 and S2.4 = 1
- Set the upper measuring frequency using DIP switches S1 and S2.1, S2.2 (see table).
- That's all!

### Adjusting the input range using a frequency generator:

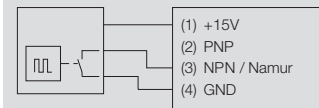
- Select the switch setting for saving the frequency: S2.1 = 0, S2.2 = 1, S2.3 = 1 and S2.4 = 1
- Apply min. frequency to the module
- Connect the module to the power supply
- The LED lights up when the input frequency is being measured. If the LED goes off, the frequency has been saved and the module can be disconnected from the power supply again.
- Repeat with max. frequency: S2.1 = 1, S2.2 = 0, S2.3 = 1 and S2.4 = 1
- Select special range: S2.1 = 1, S2.2 = 1, S2.3 = 1 and S2.4 = 1

### Connection configuration for the sensors

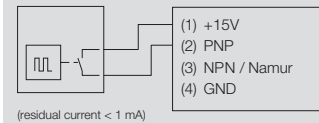
3-wire initiator with PNP output



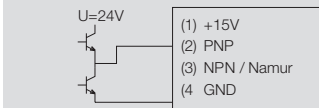
3-wire initiator with NPN output



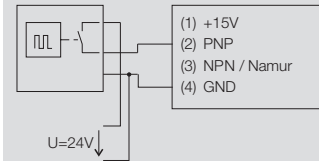
2-wire initiator



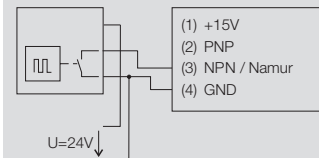
Push pull output cascade



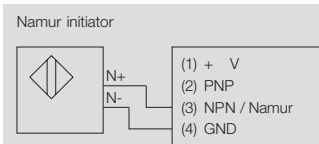
3-wire initiator with PNP output and external supply



3-wire initiator with NPN output and external supply

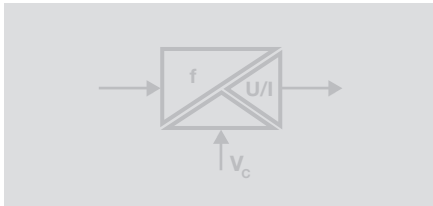


Namur initiator



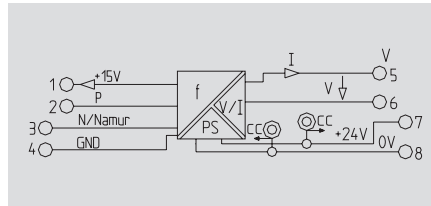
f/DC isolator/converter

- 3-way isolation
- Max. input frequency: 100 kHz
- Input and output ranges adjustable via DIP switch
- No calibration necessary
- Programmable custom range
- WAVETOOL software helps with configuration. Download at [www.weidmuller.com](http://www.weidmuller.com)



PRO Frequency

UL Class I, Div. 2



Technical data

Input	
Sensor	
Rated input level	
Output	
Output voltage / Output current	
Load impedance, voltage/current	
Offset current / Offset voltage	
Status indicator	
General data	
Supply voltage	
Power consumption	
Accuracy	
Temperature coefficient	
Step response time	
Ambient temperature	
Storage temperature	
Approvals	
Insulation coordination	
Standards	
EMC standards	
Rated voltage	
Impulse withstand voltage	
Insulation voltage	
Overvoltage category	
Pollution severity	
Clearance & creepage distances	
Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Ordering data

	Screw connection
	Tension clamp connection
Note	

Accessories

Cross-connector for power supplies and markers – refer to Accessories

2-, 3-wire PNP/NPN, Namur initiator, push-pull step	
Threshold/hysteresis: Namur: approx. 1.7 mA/approx. 0.2 mA; NPN: approx. 6.5 V/approx. 0.2 V; PNP: approx. 6.7 V/approx. 0.5 V	
Output	
0...10 V / 0(4)...20 mA	
≥ 1 kΩ / ≤ 600 Ω	
max. 100 μA / max. 0.05 V	
Green LED	
Supply voltage	
24 V DC ± 25 %	
Power consumption	
Max. 1.6 W at I <sub>OUT</sub> = 20 mA	
Accuracy	
< 0.2% of output range	
Temperature coefficient	
Max. 200 ppm/K of output range	
Step response time	
360 ms + 2 times the period time of input frequency	
Ambient temperature	
0 °C...+55 °C	
Storage temperature	
-20 °C...+85 °C	
Approvals	
cULus; cULusEX; CE	
Standards	
EN 50178 (secure separation)	
EN 55011, EN 61000-6, EN 61326	
300 V	
6 kV	
4 kV <sub>eff</sub> / 5 s	
III	
2	
≥ 5.5 mm	
Screw connection	
2.5 / 0.5 / 2.5	
92.4 / 12.5 / 112.4	
Tension clamp connection	
1.5 / 0.5 / 2.5	
92.4 / 12.5 / 112.4	
Type	
Qty.	Order No.
WAS4 PRO Freq	1 8581180000
WAZ4 PRO Freq	1 8581190000
Note	

Selecting the operating mode		
Operating mode	Switch 2	
	3	4
0 ... fmax	<input type="checkbox"/>	<input type="checkbox"/>
fmin ... fmax	<input type="checkbox"/>	<input checked="" type="checkbox"/>
saving fmin	<input checked="" type="checkbox"/>	<input type="checkbox"/>

f = (A+B) x C

Selecting the frequency				
A	Switch 1			
	1	2	3	4
0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Selecting the frequency				
B	Switch 1			
	5	6	7	8
0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0.2	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
0.3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0.4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0.6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
0.7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

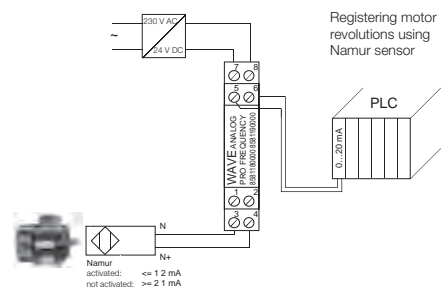
Selecting the frequency		
C	Switch 2	
	1	2
x1	<input type="checkbox"/>	<input type="checkbox"/>
x10	<input type="checkbox"/>	<input type="checkbox"/>
x100	<input checked="" type="checkbox"/>	<input type="checkbox"/>
x1000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Selecting the output				
Output	Switch 2			
	5	6	7	8
0...10 V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0...20 mA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4...20 mA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0...5 V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Special range (frequency generator is required)				
Function	Switch 2			
	1	2	3	4
save min. frequency	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
save max. frequency	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
select special range	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

■ = on  
□ = off

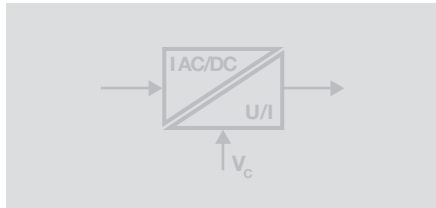
Application



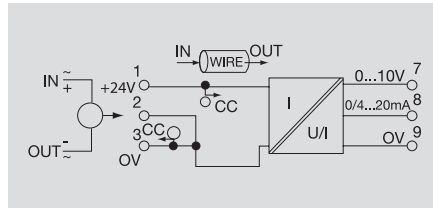
WAVESERIES - Current monitoring

Analogue output

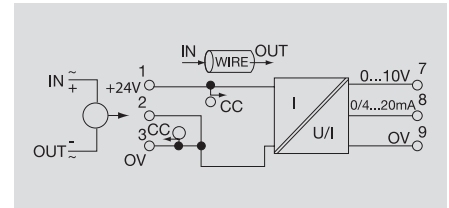
- Galvanic isolation between input / output
- Input and output ranges adjustable via DIP switch



5/10 A AC/DC



20/25/30 A AC/DC



Technical data

Input	
Input current	0...5 A AC/DC / 0...10 A AC/DC
Input frequency	0...2 kHz (True RMS)
Max. current	Depends on wire cross-section
Voltage of measuring circuit	400 V AC, > 400V AC depending on wire insulation
Sensor	Hall sensor (internal)
Diameter of cable feed-through	8 mm
Output	
Output current / Output voltage	0(4)...20 mA / 0...10 V
Offset current	max. 150 µA
Output signal limit	Approx. 13 V or 24 mA
Load impedance, voltage/current	≥ 1 kΩ / ≤ 600 Ω
Step response time	typ. 700 ms
Accuracy	1 % FSR
Temperature coefficient	≤ 650 ppm/K
Status indicator	LED ON: OK; FLASHING: signal out of range; LED OFF: Error
General data	
Supply voltage	24 V DC ± 10 %
Current consumption	50 mA @ I <sub>OUT</sub> = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Ambient temperature / Storage temperature	0 °C...+50 °C / -20 °C...+70 °C
Default setting	0.5 A, 4...20 mA
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	6 kV
Pollution severity	2
Overvoltage category	III
Clearance & creepage distances	≥ 5.5 mm
Insulation voltage	4 kV <sub>eff</sub> / 5 s
Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection		Tension clamp connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>	Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm	Length x width x height	mm
2.5 / 0.5 / 2.5		92.4 / 22.5 / 112.4	
92.4 / 22.5 / 112.4		2.5 / 0.5 / 2.5	
		92.4 / 22.5 / 112.4	
Note		Note	

Screw connection		Tension clamp connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>	Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm	Length x width x height	mm
2.5 / 0.5 / 2.5		92.4 / 22.5 / 112.4	
92.4 / 22.5 / 112.4		2.5 / 0.5 / 2.5	
		92.4 / 22.5 / 112.4	
Note		Note	

Ordering data

Type	Qty.	Order No.
WAS2 CMA 5/10A uc	1	8526610000
WAZ2 CMA 5/10A uc	1	8526620000

Type	Qty.	Order No.
WAS2 CMA 20/25/30A uc	1	8545830000
WAZ2 CMA 20/25/30A uc	1	8545840000

Accessories

Cross-connectors for power supplies and markers – refer to Accessories

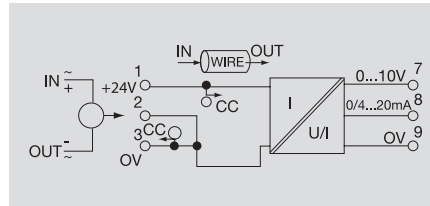
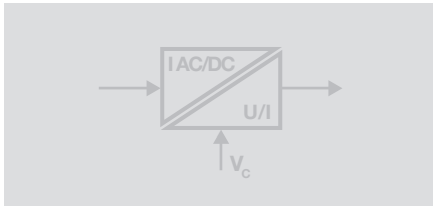
Cross-connectors for power supplies and markers – refer to Accessories

Cross-connectors for power supplies and markers – refer to Accessories

### Analogue output

- Galvanic isolation between input / output
- Input and output ranges adjustable via DIP switch

### 40/50/60 A AC/DC



### Technical data

Input	
Input current	0...40 A AC/DC / 0...50 A AC/DC / 0...60 A AC/DC
Input frequency	0...2 kHz (True RMS)
Max. current	Depends on wire cross-section
Voltage of measuring circuit	400 V AC, > 400V AC depending on wire insulation
Sensor	Hall sensor (internal)
Diameter of cable feed-through	8 mm
Output	
Output current / Output voltage	0(4)...20 mA / 0...10 V
Offset current	max. 150 µA
Output signal limit	Approx. 13 V or 24 mA
Load impedance, voltage/current	/ ≤ 600 Ω
Step response time	typ. 700 ms
Accuracy	1 % FSR
Temperature coefficient	≤ 650 ppm/K
Status indicator	LED ON: OK; FLASHING: signal out of range; LED OFF: Error
General data	
Supply voltage	24 V DC ± 10 %
Current consumption	50 mA @ I <sub>OUT</sub> = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Ambient temperature / Storage temperature	0 °C...+50 °C / -20 °C...+70 °C
Default setting	0...50 A, 4...20 mA
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	6 kV
Pollution severity	2
Overtoltage category	III
Clearance & creepage distances	≥ 5.5 mm
Insulation voltage	4 kV <sub>eff</sub> / 5 s
Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5		1.5 / 0.5 / 2.5	
92.4 / 22.5 / 112.4		92.4 / 22.5 / 112.4	

### Ordering data

	Screw connection
	Tension clamp connection

Type	Qty.	Order No.
WAS2 CMA 40/50/60A uc	1	8513330000
WAZ2 CMA 40/50/60A uc	1	8526590000

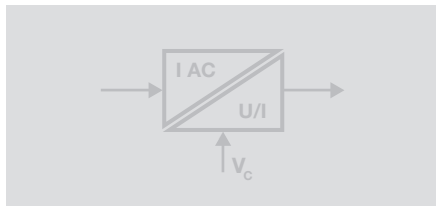
Note

### Accessories

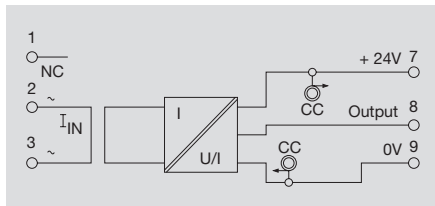
Cross-connectors for power supplies and markers – refer to Accessories

Analogue output

- Galvanic isolation between input / output
- Input and output ranges adjustable via DIP switch

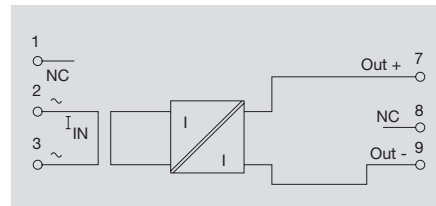


1/5/10 A AC



1/5/10 A AC 4...20 mA

Loop-powered



Technical data

Input	
Input current	0...1 A AC / 0...5 A AC / 0...10 A AC
Input frequency	50...60 Hz
Max. current	100 A for 1s
Voltage of measuring circuit	250 V AC
Sensor	Transforming (internally)
Output	
Output current / Output voltage	0(4)...20 mA / 0...10 V
Offset current	max. 100 µA
Output signal limit	Approx. 13 V or 24 mA
Load impedance, voltage/current	/ ≤ 600 Ω
Step response time	typ. 700 ms
Accuracy	0.5 % FSR
Temperature coefficient	≤ 200 ppm/K
Status indicator	LED ON: OK; FLASHING: signal out of range; LED OFF: Error
General data	
Supply voltage	24 V DC ± 10 %
Current consumption	40 mA @ I <sub>OUT</sub> = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Ambient temperature / Storage temperature	0 °C...+50 °C / -20 °C...+70 °C
Default setting	0...5 A AC, 4...20 mA
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	6 kV
Pollution severity	2
Overvoltage category	III
Clearance & creepage distances	≥ 5.5 mm
Insulation voltage	4 kV <sub>eff</sub> / 5 s

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5	72 / 22.5 / 92.4	1.5 / 0.5 / 2.5	72 / 22.5 / 92.4

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5	72 / 22.5 / 92.4	1.5 / 0.5 / 2.5	72 / 22.5 / 92.4

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Ordering data

Screw connection	WAS1 CMA 1/5/10A ac	1	8523400000
Tension clamp connection	WAZ1 CMA 1/5/10A ac	1	8523410000

Note

Accessories

Cross-connectors for power supplies and markers – refer to Accessories

Type	Qty.	Order No.
WAS1 CMA 1/5/10A ac	1	8523400000
WAZ1 CMA 1/5/10A ac	1	8523410000

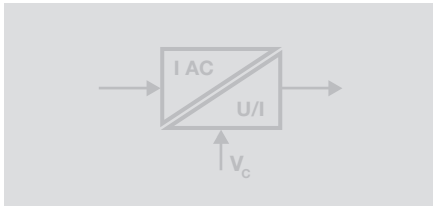
Type	Qty.	Order No.
WAS1 CMA LP 1/5/10A ac	1	8528650000
WAZ1 CMA LP 1/5/10A ac	1	8528660000

Note

Cross-connectors for power supplies and markers – refer to Accessories

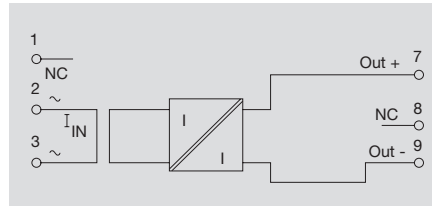
### Analogue output

- Galvanic isolation between input / output
- Input and output ranges adjustable via DIP switch
- No calibration required
- ATEX II 3 G nL IIC T4
- UL Class I, Div.2



### 1/5/10 A AC 4...20 mA

Loop-powered



### Technical data

Input	
Input current	0...1 A AC/ 0...5 A AC/ 0...10 A AC
Input frequency	50...60 Hz
Max. current	100 A for 1s
Voltage of measuring circuit	250 V AC
Sensor	Transforming (internally)
Output	
Output current / Output voltage	Current loop /
Offset current	max. 100 µA
Output signal limit	Approx. 24 mA
Load impedance, voltage/current	/ ≤ 600 Ω
Step response time	typ. 700 ms
Accuracy	0.5 % FSR
Temperature coefficient	≤ 200 ppm/K
Status indicator	LED ON: OK; FLASHING: signal out of range; LED OFF: Error
General data	
Supply voltage	13...30 V DC
Current consumption	
Current-carrying capacity of cross-connect.	
Ambient temperature / Storage temperature	0 °C...+50 °C / -20 °C...+70 °C
Default setting	0...5 A AC, 4...20 mA
Approvals	cULus; CE; cULusEX; ATEX
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	6 kV
Pollution severity	2
Overvoltage category	III
Clearance & creepage distances	≥ 5.5 mm
Insulation voltage	4 kV <sub>eff</sub> / 5 s
Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5		1.5 / 0.5 / 2.5	
72 / 22.5 / 92.4		72 / 22.5 / 92.4	

### Ordering data

	Screw connection
	Tension clamp connection

Type	Qty.	Order No.
WAS1 CMA LP 1/5/10A EX	1	8975590000
WAZ1 CMA LP 1/5/10A EX	1	8975610000

**Note**

### Accessories

Cross-connectors for power supplies and markers – refer to Accessories

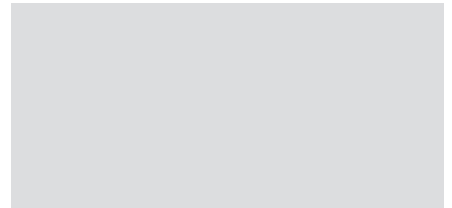
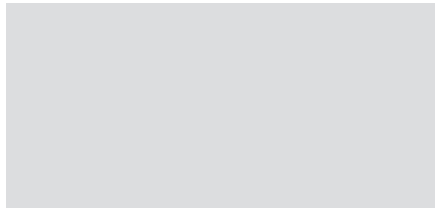
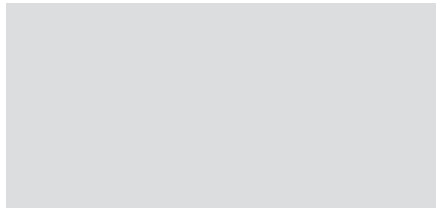
**CMA - Current monitoring**

**Analogue output**

- Max. conductor diameter 35 mm
- Can be mounted side by side
- For mounting on TS 35 rail

**CMA 100/5 A**

**CMA 250/5 A**



**Technical data**

<b>Input</b>
Input current
Input frequency
Max. current
Voltage of measuring circuit
Diameter of cable feed-through
<b>Output</b>
Output current
Load impedance, voltage/current
Accuracy
<b>General data</b>
Ambient temperature
Storage temperature
Approvals
<b>Insulation coordination</b>
Insulation voltage

100 A AC
Class 1: 50...60Hz
Class 1.5: 16...400Hz
Thermal current $I_{th} > 3$ kA
600 V <sub>eff</sub> (non-insulated wire)
35 mm
5 A AC
/ ≤ 600 Ω
Class 1 / 1.5; residual current factor < 5
-5 °C...+40 °C
-40 °C...+85 °C
GOSTME25; CE
4 kV <sub>eff</sub> / 1 min.

250 A AC
Class 1: 50...60Hz
Class 1.5: 16...400Hz
Thermal current $I_{th} > 3$ kA
600 V <sub>eff</sub> (non-insulated wire)
35 mm
5 A AC
/ ≤ 600 Ω
Class 1 / 1.5; residual current factor < 5
-5 °C...+40 °C
-40 °C...+85 °C
GOSTME25; CE
4 kV <sub>eff</sub> / 1 min.

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	
Length x width x height	mm
<b>Note</b>	

<b>Clamping yoke connection (secondary)</b>
50 / 78 / 90.5

<b>Clamping yoke connection (secondary)</b>
50 / 78 / 90.5

**Ordering data**

Clamping yoke connection (secondary)
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Type	Qty.	Order No.
CMA 100/5A	1	8662140000

Type	Qty.	Order No.
CMA 250/5A	1	8664570000

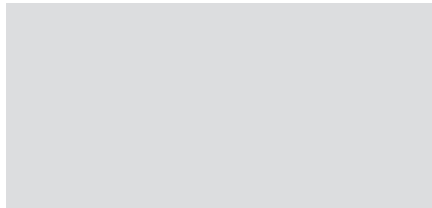
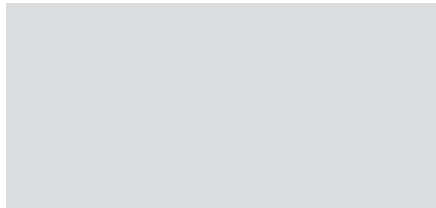
<b>Note</b>
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**Accessories**

**Analogue output**

- Max. conductor diameter 35 mm
- Can be mounted side by side
- For mounting on TS 35 rail

**CMA 500/5 A**



**Technical data**

Input	
Input current	500 A AC
Input frequency	Class 1: 50...60Hz Class 1.5: 16...400Hz
Max. current	Thermal current $I_{th} > 3$ kA
Voltage of measuring circuit	600 V <sub>eff</sub> (non-insulated wire)
Diameter of cable feed-through	35 mm
Output	
Output current	5 A AC
Load impedance, voltage/current	/ ≤ 600 Ω
Accuracy	Class 1 / 1.5; residual current factor < 5
General data	
Ambient temperature	-5 °C...+40 °C
Storage temperature	-40 °C...+85 °C
Approvals	GOSTME25; CE
Insulation coordination	
Insulation voltage	4 kV <sub>eff</sub> / 1 min.

Dimensions	
Clamping range (nominal / min. / max.)	
Length x width x height	mm
Note	

Clamping yoke connection (secondary)	
	50 / 78 / 90.5
Note	

**Ordering data**

Type	Qty.	Order No.
Clamping yoke connection (secondary) CMA 500/5A	1	8664580000

Note	

**Accessories**

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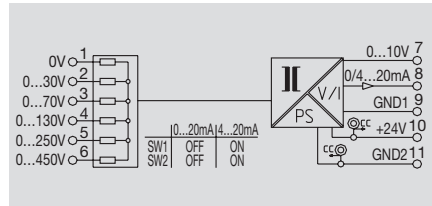
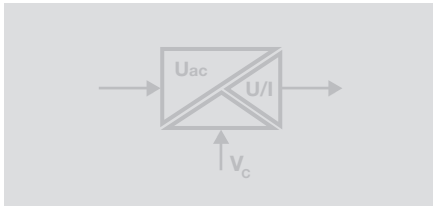
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Analogue output

- 3-way isolation
- Max. measuring voltage 450 V AC<sub>eff</sub>
- Output ranges selectable via DIP switch
- No calibration necessary

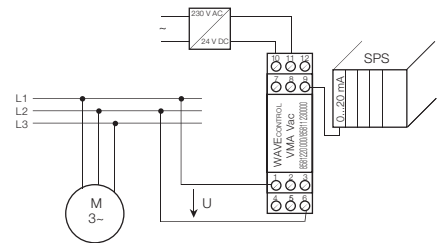
VMA V AC



Technical data

<b>Input</b>	0...30 / 0...70 / 0...130 / 0...250 / 0...450 V AC
Input voltage	40...400 Hz sinus
Input frequency	45 / 100 / 180 / 270 / 475 V AC (briefly)
Max. voltage	
<b>Output</b>	0...10 V / 0(4)...20 mA
Output voltage / Output current	max. 0.02 V / max. 40 µA
Offset voltage / Offset current	≥ 1 kΩ / ≤ 600 Ω
Load impedance, voltage/current	1,3 % (40...60 Hz) typ. 1 %; 2% (70...400 Hz) typ. 1,5 %
Accuracy	≤ 250 ppm/K
Temperature coefficient	< 300 ms
Step response time	Green LED
Status indicator	
<b>General data</b>	
Supply voltage	24 V DC ± 25 %
Current consumption	40...30...24 mA @ I <sub>out</sub> = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Default setting	0...10V / 0...20mA
Ambient temperature / Storage temperature	0 °C...+50 °C / -20 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 61000-2-6, EN 61000-6, EN 61326
Rated voltage	supply/output: 300 V; input/output, supply/output: 600 V
Impulse withstand voltage	Supply/output: 4 kV; input/output, supply/output: 6kV
Insulation voltage	4 kV <sub>eff</sub> / 5 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	Supply/output: 3 mm; input/output, supply/output: 5.5 mm

Application



<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 22.5 / 112.4	92.4 / 22.5 / 112.4

Ordering data

	Screw connection
	Tension clamp connection

Type	Qty.	Order No.
WAS2 VMA V ac	1	8581220000
WAZ2 VMA V ac	1	8581230000

<b>Note</b>	
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Accessories

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	Cross-connector for power supplies and markers – refer to Accessories
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# Trip amplifier for monitoring AC/DC circuits

<b>Trip amplifier for monitoring AC/DC circuits</b>	Trip amplifier for monitoring AC/DC circuits – Overview	D.2
	WAVESERIES – Threshold monitoring	D.4
	PLUGCONTROL – Threshold monitoring	D.8

# Trip amplifier for monitoring AC/DC circuits

## Monitoring AC/DC currents and voltages within single-phase and three-phase power nets.

Some WAVESERIES products provide the function of monitoring the voltage and current. Typical uses include low voltage distribution applications. The includes the monitoring of phase voltages and current while controlling actuators. Another use is monitoring dropouts of on power supply units, accumulators and feed-in systems within industrial production flows. There are many possible uses for a threshold monitoring component in process automation. It can be used to process standard signals in order to monitor fill levels, flow quantities or standardised temperature signals.

The PLUGCONTROL series of current monitoring components can monitor DC current up to 10 amps. They can be used in applications to monitor the functioning of valves, servo-controls and DC motors. The monitoring plug is designed so that it can be plugged onto the PLUGSERIES socket base. This makes it quick and easy to bridge the potentials in input and output circuits using the pluggable ZQV cross-connection. The multi-purpose lever can be used to quickly attach and release.

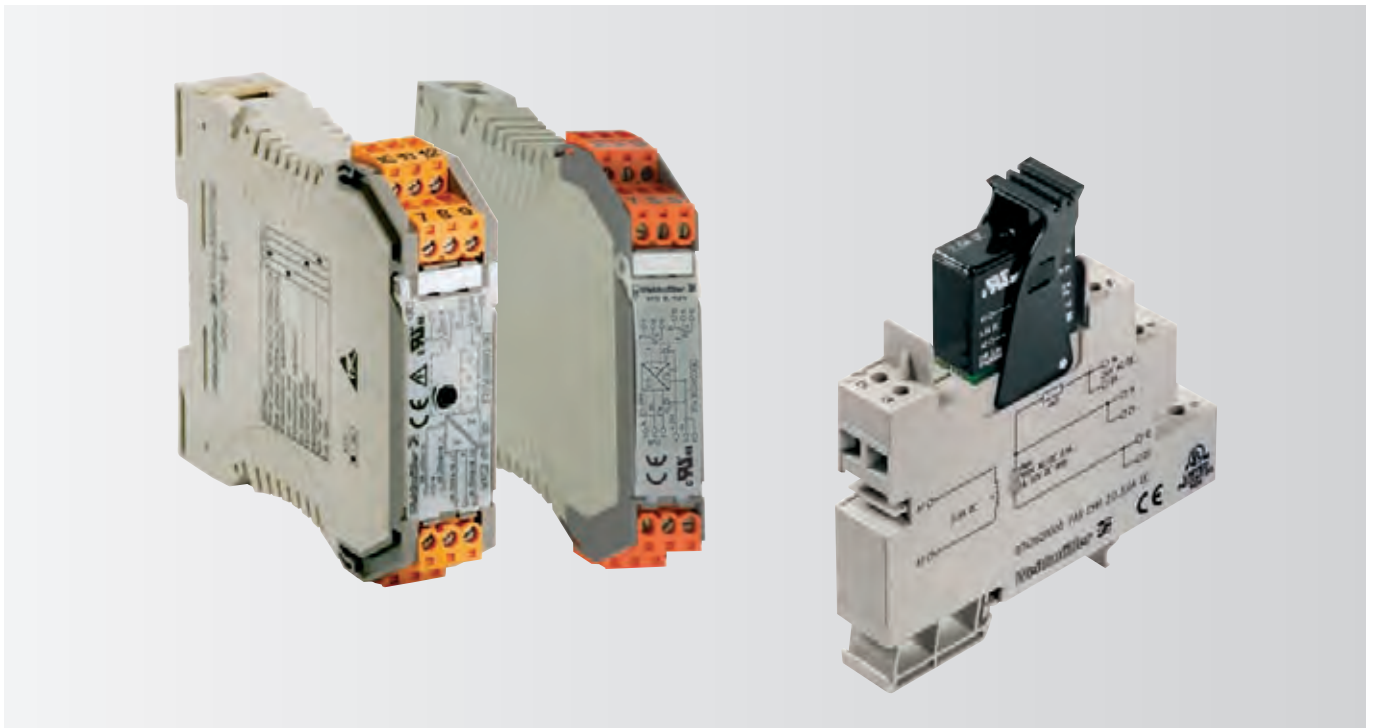
## Features

### WAVECONTROL:

- Threshold monitoring of analogue standard signals
- Measuring AC currents ranging from 1 to 30 A
- Monitoring DC and AC voltages up to 400 V
- Universal adjustable switching thresholds
- Relay outputs for monitoring threshold
- Versatile pluggable connection method – screw or spring
- Tool-free installation

### PLUGCONTROL:

- Monitoring for DC currents ranging from 0.5 to 10 A
- Very small, pluggable monitoring unit
- Reed relay contact for monitoring and measuring current
- Install on standard base
- Quick initial commissioning – with replaceable electronics
- Minimal wiring effort – with pluggable ZQV 2,5N cross-connector



### Trip amplifier for monitoring AC/DC circuits



#### **DC/Alarm**

Threshold monitoring of analogue standard signals



#### **CMR**

Current monitoring for AC currents from 1 to 30 A



#### **VMR V AC 1ph**

Voltage monitoring for DC and single-phase AC circuits



#### **VMR V AC 3ph**

Voltage monitoring for three-phase circuits



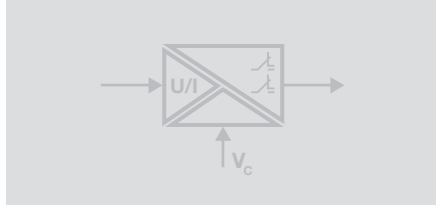
#### **PAS CMR**

Current monitoring for DC circuits

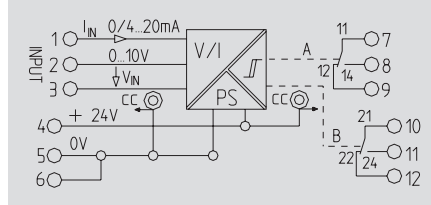
# WAVESERIES - Threshold monitoring

## Relay output

- 3-way isolation
- Low trip / High trip
- FAILSAFE / NON-FAILSAFE
- 2 Relay outputs



## DC/Alarm



## Switch position/setting options

function	SW 1			
	1	2	3	4
Channel A High Trip	■			
Channel A Low Trip	□			
Channel B High Trip		■		
Channel B Low Trip		□		
FAILSAFE, Channel 1 & 2			□	□
NON FAILSAFE, Chan. 1 & 2			■	■

■ = on  
□ = off

**NON FAILSAFE:** The relay picks up when the alarm is triggered.

**FAILSAFE:** The relay drops out when the alarm is triggered. An alarm is also triggered in the FAILSAFE mode, if for example, the operating voltage to the moduls fail.

**Low Trip:** Alarm is triggered if the signal is undershoot the threshold.

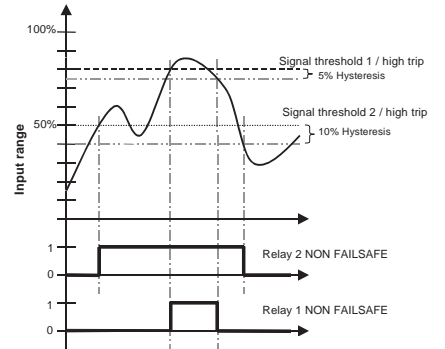
**High Trip:** Alarm is triggered if the signal is overshoot the threshold.

**Signal threshold:** Adjustments of the signal threshold (1...90%) are made for channel 1 with the potentiometer P1, and separately for channel 2 via potentiometer P2.

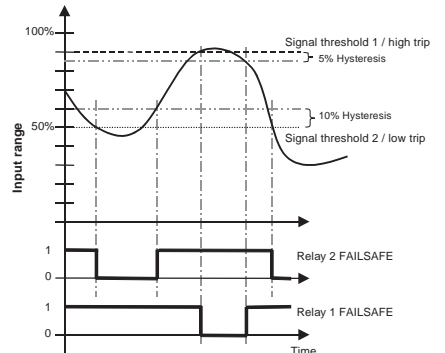
**Hysteresis:** Adjustments of the hysteresis (1...10)% are made for channel 1 with the potentiometer P3, and separately for channel 2 via potentiometer P3.

## WAVEANALOG DC/Alarm - Alarm indication

### Example 1



### Example 2



## Technical data

Input	
Input voltage	0...10 V
Input current	0(4)...20 mA
Input resistance, voltage/current	≥ 100 kΩ / ≤ 110 Ω
Output	
Contact assembly	2 CO contacts
Contact material	AgNi 90/10
Switching thresholds	1...90% (independently for channel 1 and channel 2)
Hysteresis	1...10% (independent for channel 1 and channel 2)
Switching voltage AC, max.	253 V
Continuous current	3 A
Function	Open-circuit/closed-circuit principle
Temperature coefficient	≤ 500 ppm/K
Status indicator	LED green ON: OK, LED red ON: alarm (per channel)
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	Typically 1 W both relays picked up
Current-carrying capacity of cross-connect.	≤ 2 A
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Default setting	Channel A/B: low trip and FAILSAFE
Approvals	cULus; GOSTME25; CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 61000-4-2, -3, -4, -5, -6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Pollution severity	2
Overvoltage category	III
Clearance & creepage distances	≥ 3 mm
Insulation voltage	2 kV <sub>eff</sub> / 5 s

Screw connection		Tension clamp connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>	2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
Length x width x height	mm	92.4 / 17.5 / 112.4	92.4 / 17.5 / 112.4

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

## Ordering data

Screw connection	WAS5 DC/Alarm
Tension clamp connection	WAZ5 DC/Alarm

Note	

## Accessories

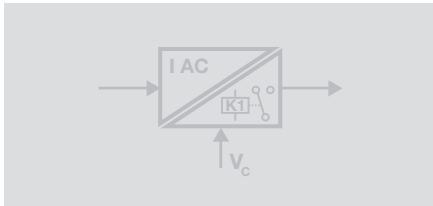
Cross-connector for power supplies and markers – refer to Accessories	
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Type	Qty.	Order No.
WAS5 DC/Alarm	1	8543820000
WAZ5 DC/Alarm	1	8543880000

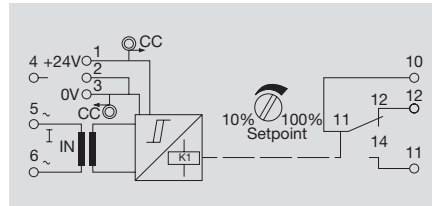
Note	
Cross-connector for power supplies and markers – refer to Accessories	

### Relay output

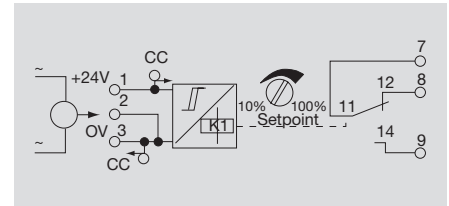
- Current ranges adjustable via DIP switch
- Switchable hysteresis
- Operating or closed-circuit current principle



### 1/5/10 A AC



### 20/40/60 A AC



### Technical data

Input	
Input current	0...1 A AC / 0...5 A AC / 0...10 A AC
Input frequency	50...60 Hz
Max. current	100 A for 1s
Max. voltage	250 V AC
Sensor	Transforming (internally)
Diameter of cable feed-through	
Output	
Switching thresholds	Adjustable 10...100% with front potentiometer
Contact assembly	1 CO contact
Hysteresis	5% or 10% of threshold value
Switching voltage AC / Switching voltage DC	6 V...250 V / 6 V...60 V
Switching current	≤ 7 mA, ≥ 100 mA
Continuous current	3 A
Step response time	typ. 700 ms
Temperature coefficient	≤ 800 ppm/K
Status indicator	Green LED
General data	
Supply voltage	24 V DC ± 10 %
Ambient temperature / Storage temperature	0 °C...+50 °C / -20 °C...+70 °C
Default setting	0...5 A / 10 % hysteresis / open-circuit principle
Approvals	cULus; GOSTME25; CE
Insulation coordination	
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Pollution severity	2
Overvoltage category	III
Clearance & creepage distances	≥ 3 mm
Insulation voltage	4 kV <sub>eff</sub> / 5 s

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5	2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 22.5 / 112.4	92.4 / 22.5 / 112.4	92.4 / 22.5 / 112.4	92.4 / 22.5 / 112.4

Screw connection		Tension clamp connection	
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5	2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 / 22.5 / 112.4	92.4 / 22.5 / 112.4	92.4 / 22.5 / 112.4	92.4 / 22.5 / 112.4

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

### Ordering data

Type	Qty.	Order No.
WAS2 CMR 1/5/10A ac	1	8516560000
WAZ2 CMR 1/5/10A ac	1	8516570000

Type	Qty.	Order No.
WAS2 CMR 20/40/60A ac	1	8513340000
WAZ2 CMR 20/40/60A ac	1	8526600000

Note	
Screw connection	
Tension clamp connection	

Note	
Screw connection	
Tension clamp connection	

### Accessories

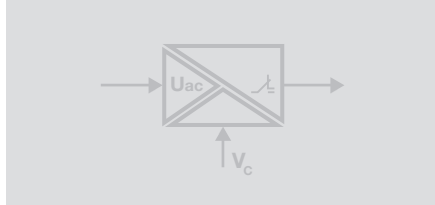
Cross-connector for power supplies and markers – refer to Accessories
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Cross-connector for power supplies and markers – refer to Accessories
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## WAVESERIES - Threshold monitoring

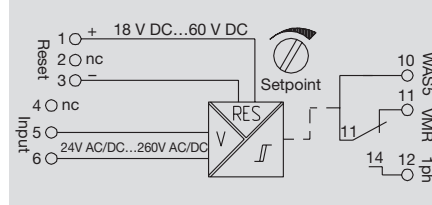
### Relay output

- 3-way isolation
- Monitoring of single-phase systems up to 260 V AC/DC
- 4 input ranges per DIP switch can be selected
- 1 relay with CO contact
- Switchable hysteresis
- Switch adjusted via potentiometer
- Reset input



### VMR V AC / DC

Single-phase



### Technical data

<b>Input</b>	
Input voltage	24...70 / 70...140 / 140...210 / 210...260 V AC / DC
Input frequency	50...60 Hz
Max. voltage	260 V AC / DC
<b>Output</b>	
Switching voltage AC, max.	250 V
Switching current	8 A
Continuous current	3 A
Hysteresis	24...70 V AC, small = 5 V / large = 10 V
Temperature coefficient	≤ 250 ppm/K
Step response time	< 300 ms
Repeat accuracy	< 0.3% of set range
Status indicator	LED green = OK / LED yellow/red = alarm status
<b>General data</b>	
Supply voltage	from the measuring circuit
Reset input voltage, min./max.	18 V DC / 30 V DC
Pulse duration	≤ 700 ms
Default setting	DIP switches: ON = 1,2,5,8 / OFF = 3,4,6,7
Ambient temperature	-10 °C...+55 °C
Storage temperature	-20 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6, EN 61326
Rated voltage	input/output, input/reset input, reset input/output: 300 V
Impulse withstand voltage	Input/output, input/reset input, reset input/output: 4 kV
Insulation voltage	2 kV <sub>eff</sub>
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 3 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

### Ordering data

	Screw connection
--	------------------

<b>Note</b>	
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### Accessories

	Markers – refer to Accessories.
--	---------------------------------

<b>Screw connection</b>	
	2.5 / 0.5 / 2.5
	96.5 / 17.5 / 112.5

<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
WAS5 VMR 1ph	1	8705640000

### Table of setting options

Input	1	2	3	4	5	6	7	8
24 V AC/DC...70 V AC/DC			■	□	□	□		
70 V AC/DC...140 V AC/DC				□	□	□	■	
140 V AC/DC...210 V AC/DC					□	■	□	
210 V AC/DC...260 V AC/DC						□	□	□
<b>Trip</b>								
High Trip		■						
Low Trip		□						
<b>Memory</b>								
Memory on			□					
Memory out			■					
<b>Hysteresis</b>								
Hysteresis small				□				
Hysteresis large					■			
<b>Input voltage</b>								
AC voltage								■
DC voltage								□

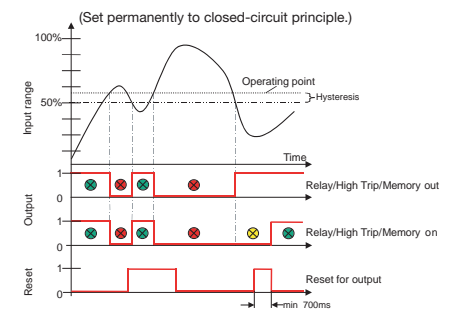
■ = on  
□ = out

### Status indicator

- Set value not exceeded.
- ⊗ Alarm status.
- ⊗ Alarm status can be reset because set value has been exceeded.

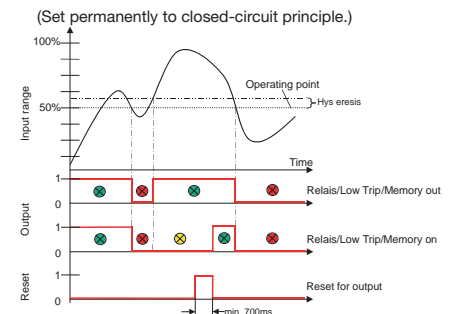
### Abb.1: Overvoltage monitoring

Alarm set to "high trip"  
(Set permanently to closed-circuit principle.)



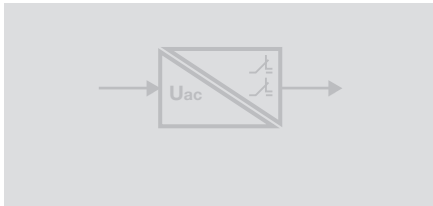
### Abb.2: Undervoltage monitoring

Alarm set to "low trip"  
(Set permanently to closed-circuit principle.)



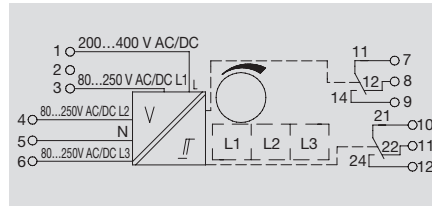
**Relay output**

- 2-way isolation
- Monitoring of 1- and 3-phase systems from 80 to 400 V AC/DC
- Adjustable by DIP switches
- Monitoring of low and surge voltages
- Detects phase loss
- 2 relays with CO contact



**VMR V AC**

Three-phase



**Technical data**

<b>Input</b>	
Input voltage	200...400 V AC/DC 1~, 80...250 V AC/DC 3~
Input current	< 10 mA DC; 15 mA AC
<b>Output</b>	
Contact assembly	2 CO contacts
Switching voltage AC, max.	250 V
Continuous current	3 A
Hysteresis	5% of final value
Temperature coefficient	≤ 300 ppm/K
Step response time	< 300 ms
Repeat accuracy	< 0.3% of set range
Status indicator	Green LED
<b>General data</b>	
Supply voltage	from the measuring circuit
Default setting	DIP switches: ON = 1,2,4 / OFF = 3
Ambient temperature	0 °C...+50 °C
Storage temperature	-25 °C...+85 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6, EN 61326
Rated voltage	600 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV <sub>eff</sub> / 1 min.
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	Output circuit: 1.8 mm; input circuit, output circuit 1/output circuit 2: 3 mm; input/output: 5.5 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

	Screw connection
--	------------------

<b>Note</b>	
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**Accessories**

	Markers – refer to Accessories.
--	---------------------------------

<b>Screw connection</b>	
	2.5 / 0.5 / 2.5
	96.5 / 22.5 / 112.5

<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
WAS2 VMR 3ph	1	8705630000

**Table of setting options**

Input	1	2	3	4
3 phases 80 V AC/DC...250 V AC/DC		■		
1 phase 200 V AC/DC...400 V AC/DC			□	
<b>Limit value</b>				
Setting to upper switching point		■		
Setting to lower switching point			□	
<b>Hysteresis</b>				
Hysteresis, small			■	
Hysteresis, large				□
<b>Fault tolerance</b>				
Operating current method				■
Closed-circuit current method				□

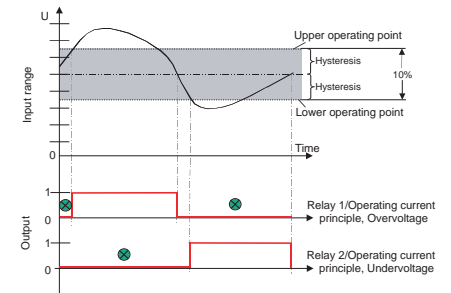
■ on  
□ off

**Status indicator**

- Voltage is in set range

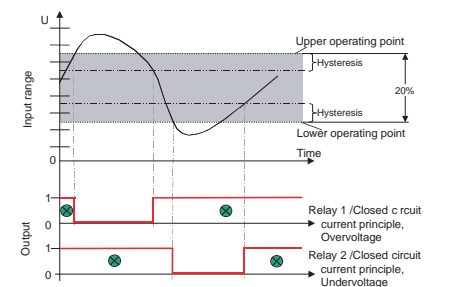
**Fig. 1: Overvoltage and undervoltage monitoring, example of setting**

- 3-phase monitoring
- Setting threshold to upper operating point: 230 V Hysteresis 5% = -12,5 V
- Lower operating point 10% less 230 V - 25 V = 205 V Hysteresis 5% = +12,5 V
- The device operates with the operating current principle.
- All 3 phases monitored in parallel



**Fig. 2: Overvoltage and undervoltage monitoring, example of setting**

- 3-phase monitoring
- Setting threshold to lower operating point: 150 V Hysteresis 5% = +12,5 V
- Upper operating point 20% greater 150 V + 50 V = 200 V Hysteresis 5% = -12,5 V
- The device operates with the closed-circuit current principle.
- All 3 phases monitored in parallel



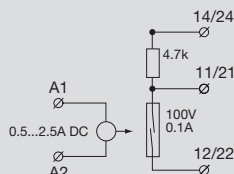


## PLUGCONTROL - Threshold monitoring

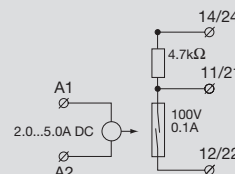
### Relay output

- Monitoring of currents up to 10 A DC
- For use with valves, servocontrols or DC motors
- Pull-up / pull-down resistor 4.7 k $\Omega$

### PAS CMR 0.5...2.5 A DC



### PAS CMR 2.0...5.0 A DC



### Technical data

Input	
Input current	0.5...2.5 A DC
Max. current	7.5 A for 10 s
Making current threshold	$\leq 500$ mA
Resistance of sensor circuit	50 $\Omega$
Secure off	$\leq 50$ mA
Pulse duration	min. 1 ms
Output	
Switching current	$\leq 100$ mA
Switching voltage AC / Switching voltage DC	1 V...100 V / 1 V...100 V
Max. switching frequency	15 Hz
Contact assembly	1 NO contact
Contact material	RH/Rd (Reed contact)*
General data	
Ambient temperature	0 °C...+55 °C
Storage temperature	-40 °C...+85 °C
Humidity	5...95 % rel. humidity
	T <sub>st</sub> = 40°C, no condensation
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6-1, 2, 3, 4
Rated voltage	300 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV <sub>eff</sub> / 1 min.
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	$\geq 5$ mm (grout encapsulated)

Input current	0.5...2.5 A DC
Max. current	7.5 A for 10 s
Making current threshold	$\leq 500$ mA
Resistance of sensor circuit	50 $\Omega$
Secure off	$\leq 50$ mA
Pulse duration	min. 1 ms
Switching current	$\leq 100$ mA
Switching voltage AC / Switching voltage DC	1 V...100 V / 1 V...100 V
Max. switching frequency	15 Hz
Contact assembly	1 NO contact
Contact material	RH/Rd (Reed contact)*
Ambient temperature	0 °C...+55 °C
Storage temperature	-40 °C...+85 °C
Humidity	5...95 % rel. humidity
	T <sub>st</sub> = 40°C, no condensation
Approvals	cULus; CE
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6-1, 2, 3, 4
Rated voltage	300 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV <sub>eff</sub> / 1 min.
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	$\geq 5$ mm (grout encapsulated)

Input current	2...5.0 A DC
Max. current	15 A for 10 s
Making current threshold	$\leq 2$ A
Resistance of sensor circuit	50 $\Omega$
Secure off	$\leq 300$ mA
Pulse duration	min. 1 ms
Switching current	$\leq 100$ mA
Switching voltage AC / Switching voltage DC	1 V...100 V / 1 V...100 V
Max. switching frequency	15 Hz
Contact assembly	1 NO contact
Contact material	RH/Rd (Reed contact)*
Ambient temperature	0 °C...+55 °C
Storage temperature	-40 °C...+85 °C
Humidity	5...95 % rel. humidity
	T <sub>st</sub> = 40°C, no condensation
Approvals	cULus; CE
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6-1, 2, 3, 4
Rated voltage	300 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV <sub>eff</sub> / 1 min.
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	$\geq 5$ mm (grout encapsulated)

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

### Ordering data

Type	Qty.	Order No.
PAS CMR 0.5...2.5 A DC	10	8742610000

Type	Qty.	Order No.
PAS CMR 0.5...2.5 A DC	10	8742610000

Type	Qty.	Order No.
PAS CMR 2.0...5.0 A DC	10	8742620000

Type	Qty.	Order No.
PAS CMR 0.5...2.5 A DC	10	8742610000

Type	Qty.	Order No.
PAS CMR 0.5...2.5 A DC	10	8742610000

Type	Qty.	Order No.
PAS CMR 2.0...5.0 A DC	10	8742620000

### Accessories

Cross-connectors and markers - refer to WAVESERIES accessories
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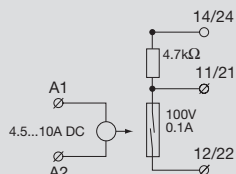
Cross-connectors and markers - refer to WAVESERIES accessories
--

Cross-connectors and markers - refer to WAVESERIES accessories
--

**Relay output**

- Monitoring of currents up to 10 A DC
- For use with valves, servocontrols or DC motors
- Pull-up / pull-down resistor 4.7 kΩ

**PAS CMR 4.5...10 A DC**



**Technical data**

Input	
Input current	4.5...10 A DC
Max. current	30 A for 10 s
Making current threshold	≤ 4.5 A
Resistance of sensor circuit	50 Ω
Secure off	≤ 600 mA
Pulse duration	min. 1 ms
Output	
Switching current	≤ 100 mA
Switching voltage AC / Switching voltage DC	1 V...100 V / 1 V...100 V
Max. switching frequency	15 Hz
Contact assembly	1 NO contact
Contact material	RH/Rd (Reed contact)*
General data	
Ambient temperature	0 °C...+55 °C
Storage temperature	-40 °C...+85 °C
Humidity	5...95 % rel. humidity
	T <sub>st</sub> = 40°C, no condensation
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	EN 55011, EN 61000-6-1, 2, 3, 4
Rated voltage	300 V
Impulse withstand voltage	6 kV
Insulation voltage	4 kV <sub>eff</sub> / 1 min.
Overtoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 5 mm (grout encapsulated)

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	
* The peak current should be limited to 100mA when under capacitive loads	

**Ordering data**

Type	Qty.	Order No.
PAS CMR 4,5...10 A DC	10	8742630000

Note
Screw connection

**Accessories**

Cross-connectors and markers - refer to WAVESERIES accessories
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# Signal converters and monitoring components in 6 mm width

## Signal converters and monitoring components in 6 mm width

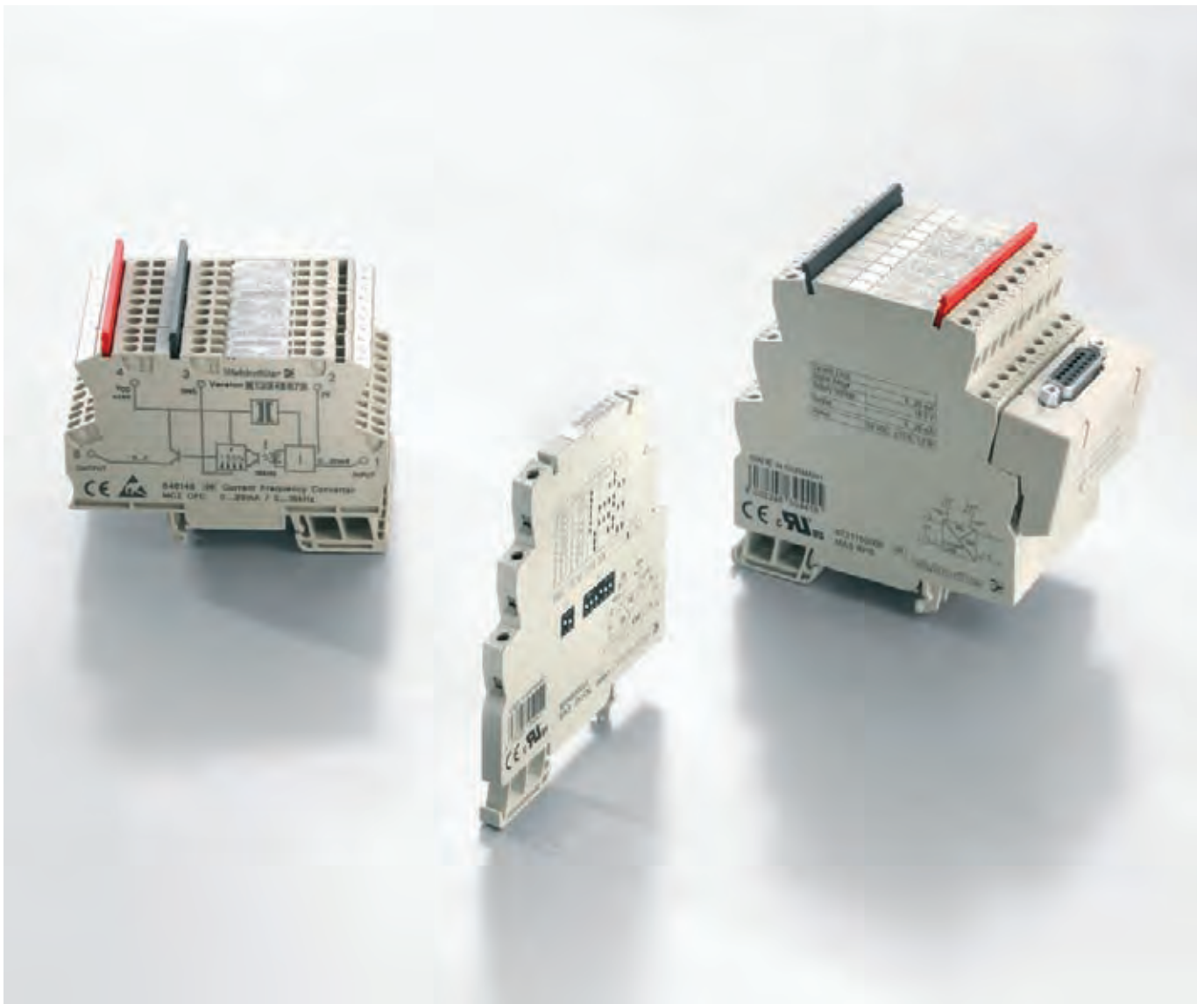
Universal signal converter and monitoring components in 6 mm width – Overview	E.2
MICROSERIES – Overview	E.4
MICROSERIES – DC/DC 3-way isolator	E.6
MICROSERIES – Supply isolator	E.8
MICROSERIES – PT100/RTD signal isolator / converter	E.10
MICROSERIES – Thermocouple signal isolator / converter	E.12
MICROSERIES PLC – Analogue interface	E.16
MCZ-SERIES – Overview	E.18
MCZ-SERIES – DC/DC passive isolator	E.20
MCZ-SERIES – PT100/RTD signal converter	E.21
MCZ-SERIES – Frequency signal converter	E.22
MCZ-SERIES – Threshold monitoring	E.23

## Analogue signal converter in 6 mm width

**The thinnest signal converter for isolating, converting and monitoring analogue signals.**

The signal converters in the MCZ and MICROSERIES enable you to integrate many signal channels within a compact space. These products not only provide electrical isolation – they also isolate and adapt the temperature and DC standard signals. Both series come with either screw connections or tension clamp connections for speedy installation. Pluggable cross-connections simplify installation and make it easier to wire up the power supply.

E





**MICROSERIES**



**MICROSERIES PLC –  
Analogue interface**



**MCZ-SERIES**

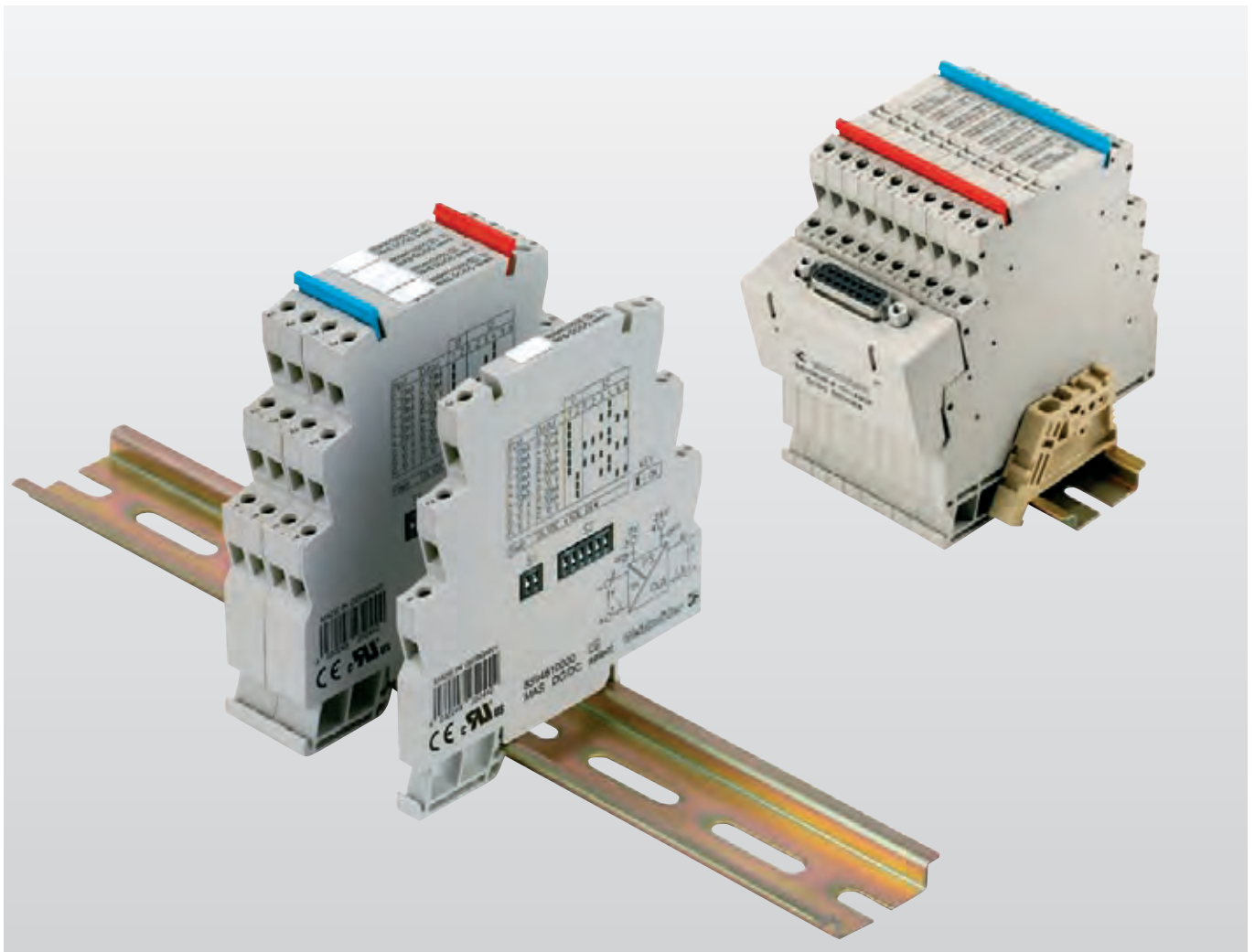
# MICROSERIES

## Thin shape – great functionality

The MICROSERIES leads the field in analogue signal conditioning. It packs much functionality into its thin 6.1 mm width. The enclosed version of the signal converter is available with a screw connection (as MAS variants) and with a tension clamp connection (as MAZ variants). The MICROSERIES modules measure PT100 signals, thermocouple signals and DC-current/voltage signals. They then electrically isolate and convert them into standardised analogue signals.

The DC/DC Select modules are one of the highlights in this series. These 3-way isolators function to isolate and convert DC standard signals. A DIP switch can be used to adapt them to the particular application. The DC/DC Select HI (HIGH) has a high rated voltage of 300 V.

The RPS/RPSH modules are compact-sized 4...20 mA supply isolators with 300-V / 3-way isolation and supply for sensors. The HART® Transparent RPSH enables HART®-compatible sensors to be connected. The MICROINTERFACE Analog adapter module makes it easier to wire up a facility. There is no longer any need for the time-consuming and error prone individual wiring process. A block is constructed of eight MICROSERIES modules and two power supply modules. This can then be bridged electrically using pluggable ZQV cross-connectors. The MICROINTERFACE Analog is mounted and connected to the signal connection terminals (input or output). Signals are transmitted via the 15-pole SUB-D connector and connected with pre-fabricated cables.





**Security**

Electrical isolation increases the safety of operations and reduces the risk of facility malfunctions.



**Simple signal conditioning**

The DIP switches on the side can be used to adapt the sensor signals to the standard DC signals of 0/4 to 20 mA or 0 to 10 V.



**Saves space in the electrical cabinet**

The high component density allows you to save more than 50 % of the space on a DIN rail when compared to standard widths over 12.5.



**Simple wiring**

A time-saving cabling system with MICROINTERFACE; the power supply can be bridged from one module to the next using cross-connections.



**DC/DC 3-way isolator**

The signal isolator is widely configurable using the DIP switch



**Supply isolator**

3-way current converter with sensor supply



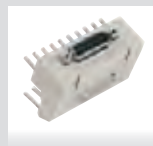
**PT100 / RTD signal isolator / converter**

Temperature transducer for RTD signals



**Thermocouple signal isolator / converter**

Temperature transducer for thermo signals



**MICROINTERFACE analogue**

Pluggable adapter for connecting to system cable

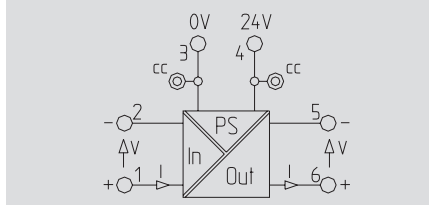
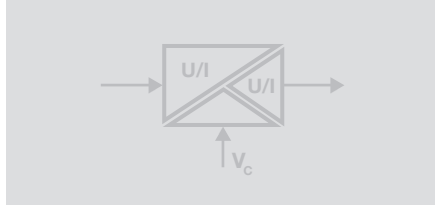


# MICROSERIES - DC/DC 3-way isolator

## Configurable

- 3-way isolation 2,5kV
- Can be configured via DIP switch
- Power supply can be cross-connected
- Minimal power loss

## DC/DC select HI



## Technical data

Input	
Input voltage / Input current	0...10 V / 0(4)...20 mA
Input resistance, voltage/current	100 kΩ / ≤ 5 Ω
Voltage drop	< 0.1 V @ I <sub>N</sub> = 20 mA (current input)
Output	
Output voltage / Output current	0...10 V / 0(4)...20 mA
Load impedance, voltage/current	≥ 10 kΩ / ≤ 600 Ω
Cut-off frequency (-3 dB)	> 100 Hz
General data	
Supply voltage	24 V DC ± 15 %
Power consumption	ca. 0.6 W
Accuracy	< 0.2 % at current / < 0.3 % at voltage of measured value
Temperature coefficient	≤ 150 ppm/K of of final value
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cURus; CE
Insulation coordination	
Standards	EN 50178
EMC standards	DIN EN 61326
Rated voltage	300 V
Insulation voltage	2.5 kV <sub>eff</sub>
Overvoltage category	II
Pollution severity	2

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

## Ordering data

Screw connection
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Note	
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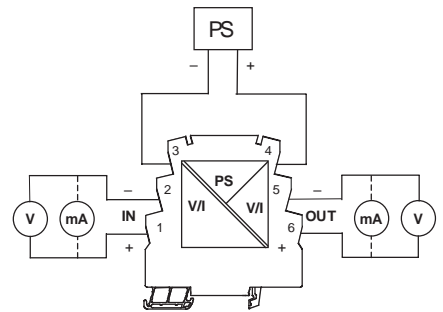
## Accessories

Cross-connectors for power supplies and markers – refer to Accessories
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Setting options/switch position									
	Switch								
	S1                      S2								
Input	Output	1	2	1	2	3	4	5	6
0 ... 20 mA	0 ... 20 mA	■	□	□	□	□	■	□	□
0 ... 20 mA	4 ... 20 mA	■	□	□	□	■	■	□	□
0 ... 20 mA	0 ... 10 V	■	□	□	□	□	□	□	■
4 ... 20 mA	0 ... 20 mA	■	□	■	■	■	■	□	□
4 ... 20 mA	4 ... 20 mA	■	□	□	□	□	□	□	□
4 ... 20 mA	0 ... 10 V	■	□	■	■	■	■	■	■
0 ... 10V	0... 20 mA	□	■	□	□	■	□	□	□
0 ... 10V	4... 20 mA	□	■	□	□	■	■	□	□
0 ... 10V	0... 10 V	□	■	□	□	□	□	■	■

■ = on  
□ = off

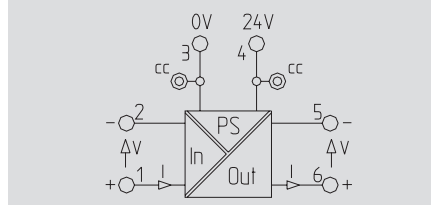
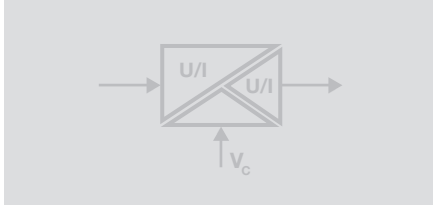
Connection	
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**Configurable**

- 3-way isolation
- Can be configured via DIP switch
- Power supply can be cross-connected
- Minimal power loss

**DC/DC select**



**Technical data**

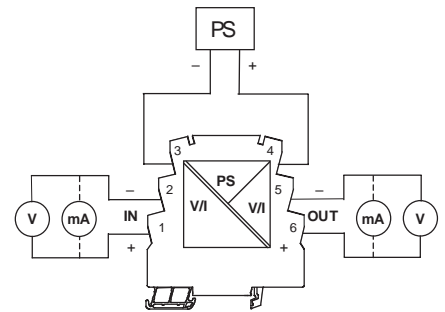
<b>Input</b>	0...10 V / 0(4)...20 mA
Input voltage / Input current	100 kΩ / ≤ 5 Ω
Input resistance, voltage/current	< 0.1 V @ I <sub>N</sub> = 20 mA (current input)
Voltage drop	
<b>Output</b>	0...10 V / 0(4)...20 mA
Output voltage / Output current	≥ 10 kΩ / ≤ 500 Ω
Load impedance, voltage/current	> 100 Hz
Cut-off frequency (-3 dB)	
<b>General data</b>	24 V DC ± 15 %
Supply voltage	ca. 0.6 W
Power consumption	< 0.5 % of end value
Accuracy	≤ 150 ppm/K of of final value
Temperature coefficient	0 °C...+55 °C
Ambient temperature	-20 °C...+85 °C
Storage temperature	cURus; CE
Approvals	
<b>Insulation coordination</b>	EN 50178
Standards	DIN EN 61326
EMC standards	50 V
Rated voltage	500 V <sub>eff</sub> / 1 s
Insulation voltage	II
Overvoltage category	2
Pollution severity	

**Setting options/switch position**

Input	Output	Switch							
		S1		S2					
		1	2	1	2	3	4	5	6
0 ... 20 mA	0 ... 20 mA	■	□	□	□	□	□	■	□
0 ... 20 mA	4 ... 20 mA	■	□	□	□	□	□	□	■
0 ... 20 mA	0 ... 10 V	■	□	□	□	□	□	□	■
4 ... 20 mA	0 ... 20 mA	■	□	■	■	■	■	■	□
4 ... 20 mA	4 ... 20 mA	■	□	□	□	□	□	□	■
4 ... 20 mA	0 ... 10 V	■	□	■	■	■	■	■	■
0 ... 10V	0... 20 mA	□	■	□	□	□	■	□	□
0 ... 10V	4... 20 mA	□	■	□	□	□	■	□	□
0 ... 10V	0... 10 V	□	■	□	□	□	□	■	■

■ = on  
□ = off

**Connection**



<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
88 / 6.1 / 97.8	92 / 6.1 / 97.8

**Ordering data**

	Screw connection
	Tension clamp connection

Type	Qty.	Order No.
MAS DC/DC select	1	8594810000
MAZ DC/DC select	1	8594840000

<b>Note</b>
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**Accessories**

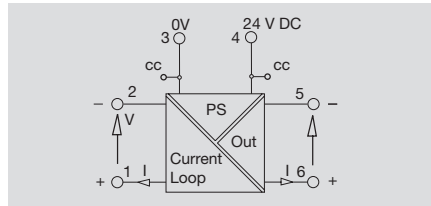
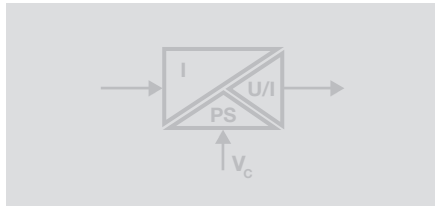
Cross-connectors for power supplies and markers – refer to Accessories
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## MICROSERIES - Supply isolator

### With HART®

- 2-conductor system
- 3-way isolation
- With Hart® transmission
- Output signal can be configured
- With sensor feed

### MAS RPSH

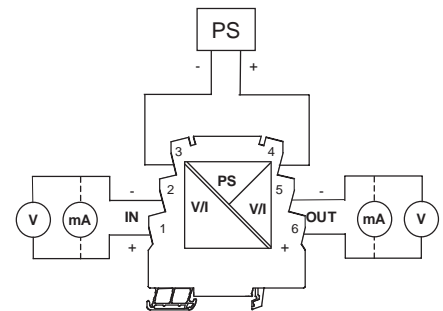


### Technical data

Input	
Input current	4...20 mA
Sensor	2-wire
Sensor supply	16.5 V / constant for 3 – 22 mA
Output	
Output current	0(4)...20 mA
Output voltage	0...10 V
Output signal limit	22...25 mA or 11...12.5 V
Load impedance, voltage/current	$\geq 10 \text{ k}\Omega$ / $\leq 500 \Omega$
Offset current	$< 30 \mu\text{A}$
General data	
Supply voltage	24 V DC $\pm 15 \%$
Power consumption	ca. 1 W
Accuracy	$I_{\text{OUT}}: < 0.1 \%$ / $U_{\text{OUT}}: < 0.2\%$
Step response time	$\leq 2 \text{ ms}$
Temperature coefficient	$\leq 50 \text{ ppm/K}$
Ambient temperature	0 °C...+55 °C
Storage temperature	-25 °C...+85 °C
Approvals	cURus; CE
Insulation coordination	
Standards	EN 50178 (secure separation)
EMC standards	DIN EN 61326 class B
Rated voltage	600 V
Insulation voltage	2.5 kV <sub>eff</sub>
Overvoltage category	II
Pollution severity	2

Setting options/switch position				
Output	Switch			
	1	2	3	4
4 ... 20 mA	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
0 ... 20 mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
0 ... 10 V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

■ = on  
□ = off



Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
	1.5 / 0.5 / 2.5
	88 / 6.1 / 97.8
Note	

### Ordering data

Screw connection
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Type	Qty.	Order No.
MAS RPSH	1	8721170000

Note
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### Accessories

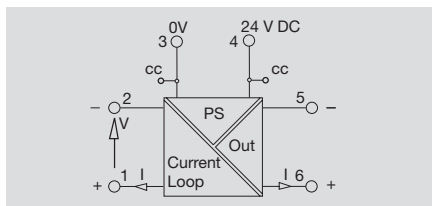
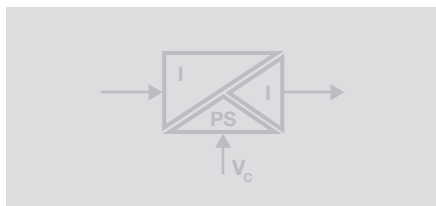
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Cross-connectors for power supplies and markers – refer to Accessories

**Without HART®**

- 2-conductor system
- 3-way isolation
- Power supply can be cross-connected
- With sensor power supply

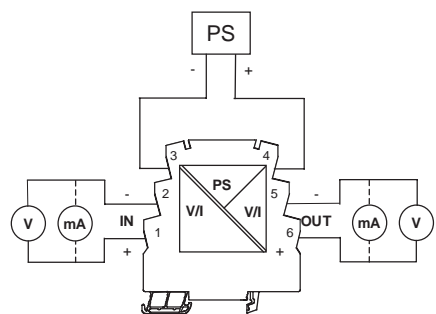
**MAS RPS**



**Technical data**

<b>Input</b>	
Input current	4...20 mA
Sensor	2-wire
Sensor supply	16.5 V / constant for 3 – 22 mA
<b>Output</b>	
Output current	4...20 mA
Output signal limit	22...25 mA
Load impedance, voltage/current	/ ≤ 500 Ω
Offset current	< 30 μA
<b>General data</b>	
Supply voltage	24 V DC ± 15 %
Power consumption	ca. 1 W
Accuracy	< 0,1 %
Step response time	≤ 2 ms
Temperature coefficient	≤ 50 ppm/K
Ambient temperature	0 °C...+55 °C
Storage temperature	-25 °C...+85 °C
Approvals	cURus; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	DIN EN 61326 class B
Rated voltage	300 V
Insulation voltage	1.5 kV <sub>eff</sub>
Overvoltage category	II
Pollution severity	2

**Connection**



**E**

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	
	2.5 / 0.5 / 2.5
	88 / 6.1 / 97.8
<b>Note</b>	

**Ordering data**

Screw connection
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Type	Qty.	Order No.
MAS RPS	1	8721150000

<b>Note</b>
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**Accessories**

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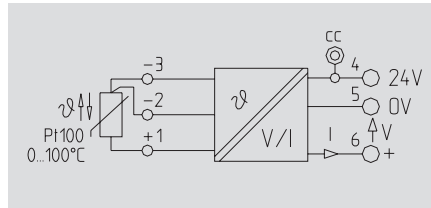
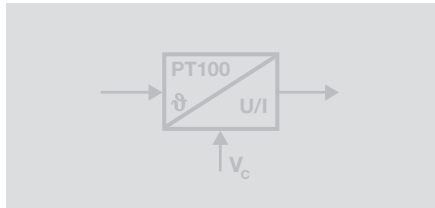
Cross-connectors for power supplies and markers – refer to Accessories
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## MICROSERIES - PT100/RTD signal isolator / converter

### RTD 2-/3-wire converter

- 2-way isolation between input and output / power supply
- PT100 2-/3-wire
- Output can be calibrated via DIP switch

### PT100 output select



### Technical data

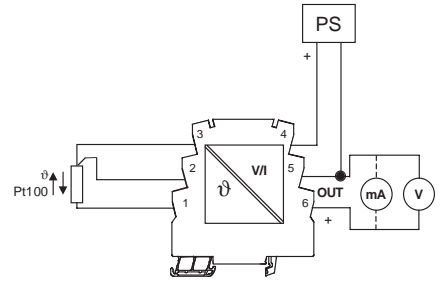
Input	
Sensor	PT100/2-/3-wire (in compliance with IEC 751)
Sensor supply	0.8 mA
Temperature input range	0...100 °C
Output	
Output voltage / Output current	0...10V / 0...5V / 0(4)...20 mA
Load impedance, voltage/current	≥ 10 kΩ / ≤ 400 Ω @ 24 V
General data	
Supply voltage	24 V DC ± 10 %
Power consumption	ca. 0.6 W
Accuracy	< 0.5 % of measuring range
Step response time	< 0.7 s
Temperature coefficient	≤ 250 ppm/K of final value
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE
Insulation coordination	
Standards	EN 50178, EN 60751, IEC751
EMC standards	EN 55011, EN 61000-6 /-2, EN 61326
Rated voltage	100 V
Impulse withstand voltage	1.5 kV
Insulation voltage	500 V <sub>eff</sub> / 1 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 1.5 mm

### Setting options/switch position

Output	Switch			
	1	2	3	4
0 ... 10 V	■	■	■	□
0 ... 20 mA	□	□	□	□
4 ... 20 mA	□	□	□	■
0 ... 5 V	■	■	■	■

■ = on  
□ = off

### Connection



Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
88 / 6.1 / 97.8	92 / 6.1 / 97.8

### Ordering data

Screw connection
Tension clamp connection

Type	Qty.	Order No.
MAS PT100 0...100C	1	8594820000
MAZ PT100 0...100C	1	8594850000

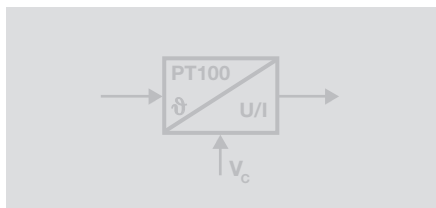
Note
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### Accessories

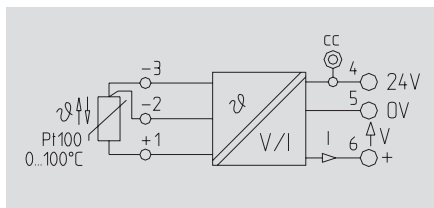
Cross-connectors for power supplies and markers – refer to Accessories

**RTD 2-/3-wire converter**

- 2-way isolation between input and output / power supply
- PT100 2-/3-wire
- Output can be calibrated via DIP switch
- ATEX II 3 G Ex nA IIC T4
- UL Class I, Div. 2



**PT100 output select**



**Technical data**

<b>Input</b>	
Sensor	PT100/2-/3-wire (in compliance with IEC 751)
Sensor supply	0.8 mA
Temperature input range	0...100 °C
<b>Output</b>	
Output voltage / Output current	0...10V / 0...5V / 0(4)...20 mA
Load impedance, voltage/current	≥ 10 kΩ / ≤ 400 Ω @ 24 V
<b>General data</b>	
Supply voltage	24 V DC ± 10 %
Power consumption	ca. 0.6 W
Accuracy	< 0.5 % of measuring range
Step response time	< 0.7 s
Temperature coefficient	≤ 250 ppm/K of final value
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE; cULusEX; ATEX
<b>Insulation coordination</b>	
Standards	EN 50178, EN 60751, IEC751
EMC standards	EN 55011, EN 61000-6 /-2, EN 61326
Rated voltage	100 V
Impulse withstand voltage	1.5 kV
Insulation voltage	500 V <sub>eff</sub> / 1 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 1.5 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

	Screw connection
	Tension clamp connection

<b>Note</b>	
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**Accessories**

	Cross-connectors for power supplies and markers – refer to Accessories
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	PT100/2-/3-wire (in compliance with IEC 751)
	0.8 mA
	0...100 °C
	0...10V / 0...5V / 0(4)...20 mA
	≥ 10 kΩ / ≤ 400 Ω @ 24 V
	24 V DC ± 10 %
	ca. 0.6 W
	< 0.5 % of measuring range
	< 0.7 s
	≤ 250 ppm/K of final value
	0 °C...+55 °C
	-20 °C...+85 °C
	cULus; CE; cULusEX; ATEX
	EN 50178, EN 60751, IEC751
	EN 55011, EN 61000-6 /-2, EN 61326
	100 V
	1.5 kV
	500 V <sub>eff</sub> / 1 s
	III
	2
	≥ 1.5 mm

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
88 / 6.1 / 97.8	92 / 6.1 / 97.8

<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
MAS PT100 0...100C EX	1	8975690000
MAZ PT100 0...100C EX	1	8975700000

<b>Note</b>	
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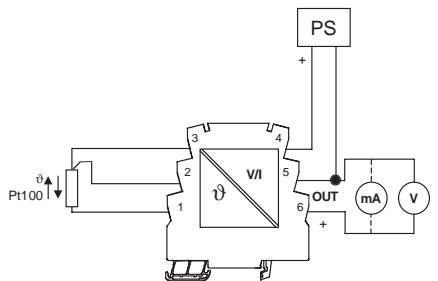
	Cross-connectors for power supplies and markers – refer to Accessories
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**Setting options/switch position**

	<b>Switch</b>			
<b>Output</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
0 ... 10 V	■	■	■	□
0 ... 20 mA	□	□	□	□
4 ... 20 mA	□	□	□	■
0 ... 5 V	■	■	■	■

- = on
- = off

**Connection**

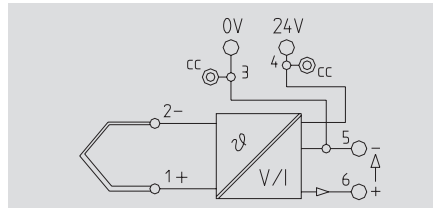
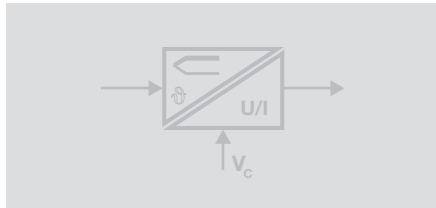


**MICROSERIES - Thermocouple signal isolator / converter**

**Thermo isolator/converter type K**

- 2-way isolation between input and output / power supply
- Cold junction compensation
- Linearisation
- Output can be calibrated via DIP switch

**Thermo-K output select**



**Technical data**

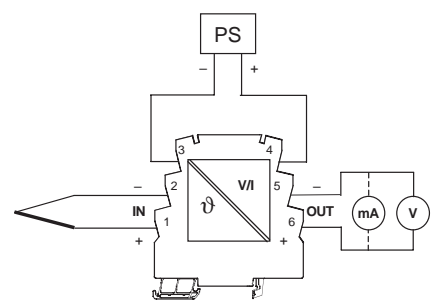
<b>Input</b>	
Sensor	Thermocouple acc. to IEC 584, type: K
Temperature input range	0...1000 °C
<b>Output</b>	
Output voltage / Output current	0...10V / 0...5V / 0(4)...20 mA
Load impedance, voltage/current	≥ 10 kΩ / ≤ 400 Ω @ 24 V
Wire break detection	Output value: > 20 mA, >10 V
<b>General data</b>	
Supply voltage	24 V DC ± 10 %
Power consumption	ca. 0.6 W
Accuracy	< 0.6 % of measuring range
Step response time	< 0.7 s
Temperature coefficient	≤ 250 ppm/K of final value
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Standards	EN 50178, EN 60584, IEC 584
EMC standards	EN 55011, EN 61000-6 /-2, EN 61326
Rated voltage	100 V
Impulse withstand voltage	1.5 kV
Insulation voltage	500 V <sub>eff</sub> / 1 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 1.5 mm

**Setting options/switch position**

Output	Switch			
	1	2	3	4
0 ... 10 V	■	■	■	□
0 ... 20 mA	□	□	□	□
4 ... 20 mA	□	□	□	■
0 ... 5 V	■	■	■	■

■ = on  
□ = off

**Connection**



<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm

**Note**

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
88 / 6.1 / 97.8	92 / 6.1 / 97.8

**Ordering data**

Screw connection	
Tension clamp connection	

Type	Qty.	Order No.
MAS Thermo-K 0...1000°C	1	<b>8594830000</b>
MAZ Thermo-K 0...1000°C	1	<b>8594860000</b>

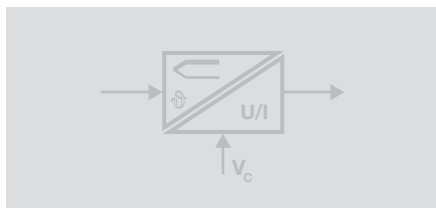
**Note**

**Accessories**

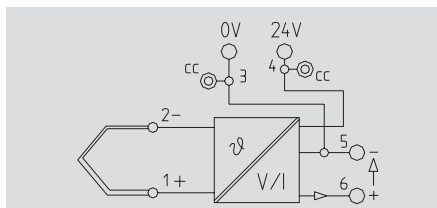
Cross-connectors for power supplies and markers – refer to Accessories

**Thermo isolator/converter type K**

- 2-way isolation between input and output / power supply
- Cold junction compensation
- Linearisation
- Output can be calibrated via DIP switch
- ATEX II 3 G Ex nA nL IIC T4
- UL Class I, Div. 2



**Thermo-K output select**



**Technical data**

<b>Input</b>	Sensor Temperature input range
<b>Output</b>	Output voltage / Output current Load impedance, voltage/current Wire break detection
<b>General data</b>	Supply voltage Power consumption Accuracy Step response time Temperature coefficient Ambient temperature Storage temperature Approvals
<b>Insulation coordination</b>	Standards EMC standards Rated voltage Impulse withstand voltage Insulation voltage Overvoltage category Pollution severity Clearance & creepage distances

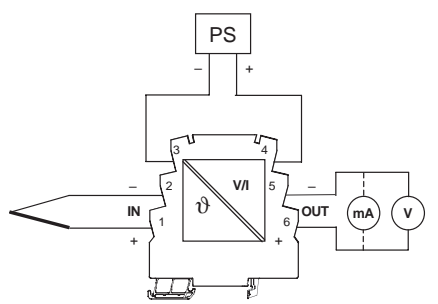
Thermocouple acc. to IEC 584, type: K	0...1000 °C
0...10V / 0...5V / 0(4)...20 mA	$\geq 10 \text{ k}\Omega / \leq 400 \Omega @ 24 \text{ V}$ Output value: > 20 mA, >10 V
24 V DC $\pm 10 \%$	ca. 0.6 W
< 0.6 % of measuring range	< 0.7 s
$\leq 250 \text{ ppm/K}$ of final value	0 °C...+55 °C
-20 °C...+85 °C	cULus; CE; cULusEX; ATEX
EN 50178, EN 60584, IEC 584	EN 55011, EN 61000-6 /-2, EN 61326
100 V	1.5 kV
500 V <sub>eff</sub> / 1 s	III
2	$\geq 1.5 \text{ mm}$

**Setting options/switch position**

Output	Switch			
	1	2	3	4
0 ... 10 V	■	■	■	□
0 ... 20 mA	□	□	□	□
4 ... 20 mA	□	□	□	■
0 ... 5 V	■	■	■	■

■ = on  
□ = off

**Connection**



<b>Dimensions</b>	Clamping range (nominal / min. / max.)	mm <sup>2</sup>
	Length x width x height	mm
<b>Note</b>		

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
88 / 6.1 / 97.8	92 / 6.1 / 97.8

**Ordering data**

Screw connection
Tension clamp connection

Type	Qty.	Order No.
MAS Thermo-K 0...1000C EX	1	<b>8975710000</b>
MAZ Thermo-K 0...1000C EX	1	<b>8975720000</b>

<b>Note</b>
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**Accessories**

Cross-connectors for power supplies and markers – refer to Accessories

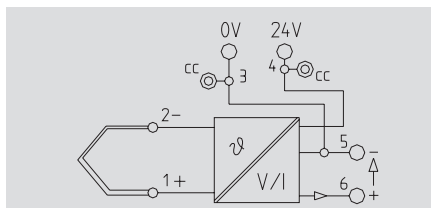
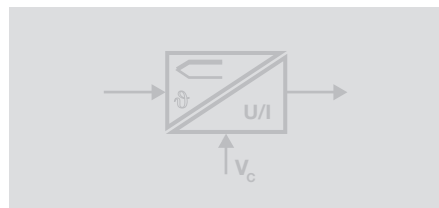


## MICROSERIES - Thermocouple signal isolator / converter

### Thermo isolator/converter type J

- 2-way isolation between input and output / power supply
- Cold junction compensation
- Linearisation
- Output can be calibrated via DIP switch

### Thermo-J output select



## E

### Technical data

<b>Input</b>	
Sensor	Thermocouple acc. to IEC 584, type: J
Temperature input range	0...700 °C
<b>Output</b>	
Output voltage / Output current	0...10V / 0...5V / 0(4)...20 mA
Load impedance, voltage/current	≥ 10 kΩ / ≤ 400 Ω @ 24 V
Wire break detection	Output value: > 20 mA, >10 V
<b>General data</b>	
Supply voltage	24 V DC ± 10 %
Power consumption	ca. 0.6 W
Accuracy	< 0.7 % of measuring range
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	< 0.7 s
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Standards	EN 50178, EN 60584, IEC 584
EMC standards	EN 55011, EN 61000-6 /-2, EN 61326
Rated voltage	100 V
Impulse withstand voltage	1.5 kV
Insulation voltage	500 V <sub>eff</sub> / 1 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 1.5 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

### Ordering data

	Screw connection
	Tension clamp connection

<b>Note</b>	
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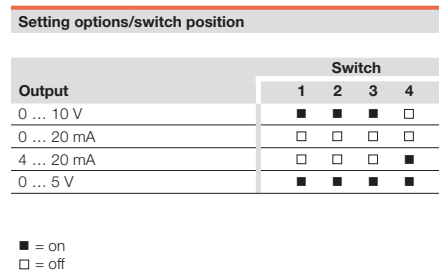
### Accessories

	Cross-connectors for power supplies and markers – refer to Accessories
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<b>Setting options/switch position</b>	
<b>Output</b>	<b>Switch</b>
0 ... 10 V	1 2 3 4
0 ... 20 mA	■ ■ ■ □
4 ... 20 mA	□ □ □ □
0 ... 5 V	■ ■ ■ ■

■ = on  
□ = off

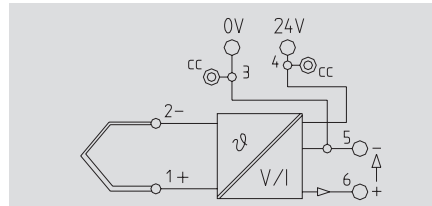
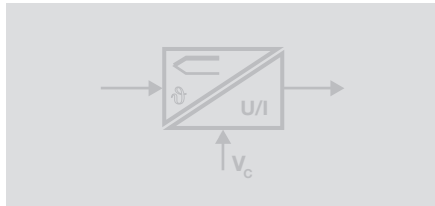
<b>Connection</b>	
<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
88 / 6.1 / 97.8	92 / 6.1 / 97.8



**Thermo isolator/converter type J**

- 2-way isolation between input and output / power supply
- Cold junction compensation
- Linearisation
- Output can be calibrated via DIP switch
- ATEX II 3 G Ex nA nL IIC T4
- UL Class I, Div. 2

**Thermo-J output select**



**Technical data**

<b>Input</b>	
Sensor	Thermocouple acc. to IEC 584, type: J
Temperature input range	0...700 °C
<b>Output</b>	
Output voltage / Output current	0...10V / 0...5V / 0(4)...20 mA
Load impedance, voltage/current	≥ 10 kΩ / ≤ 400 Ω @ 24 V
Wire break detection	Output value: > 20 mA, >10 V
<b>General data</b>	
Supply voltage	24 V DC ± 10 %
Power consumption	ca. 0.6 W
Accuracy	< 0.7 % of measuring range
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	< 0.7 s
Ambient temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	cULus; CE; cULusEX; ATEX
<b>Insulation coordination</b>	
Standards	EN 50178, EN 60584, IEC 584
EMC standards	EN 55011, EN 61000-6 /-2, EN 61326
Rated voltage	100 V
Impulse withstand voltage	1.5 kV
Insulation voltage	500 V <sub>eff</sub> / 1 s
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	≥ 1.5 mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

Screw connection	
Tension clamp connection	

**Note**

**Accessories**

Cross-connectors for power supplies and markers – refer to Accessories

<b>Setting options/switch position</b>	
<b>Output</b>	<b>Switch</b>
	1   2   3   4
	0 ... 10 V
	0 ... 20 mA
	4 ... 20 mA
0 ... 5 V	
■ = on □ = off	
<b>Connection</b>	

<b>Screw connection</b>	<b>Tension clamp connection</b>
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
88 / 6.1 / 97.8	92 / 6.1 / 97.8

<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
MAS THERMO-J 0...700C EX	1	<b>8975730000</b>
MAZ THERMO-J 0...700C EX	1	<b>8975740000</b>

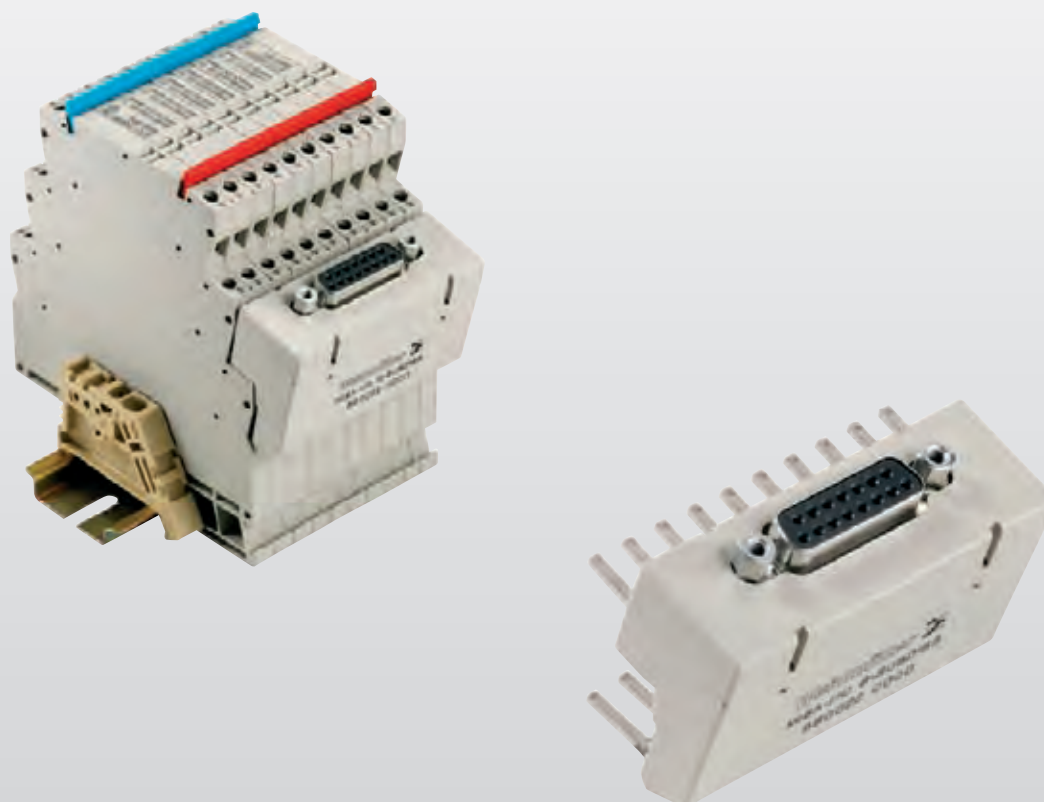
## MICROINTERFACE Analogue

The adapter module MICROINTERFACE Analogue simplifies the wiring of your installation. The time-consuming and fault-prone wiring is no longer necessary. From eight MAS modules and two power supply modules, a block is created that is then electrically bridged with ZQV plug-in cross-connections.

Mount the MICROINTERFACE Analogue adapter on the signal terminals (input or output) and connect it. Signal transmission is connected via the 15-pole SUB-D plug-in connector with pre-assembled cables.

### The features of MICROINTERFACE Analogue

- Block setup for 8 signals in a width of just 60 mm
- Adapter for all MICROINTERFACE Analogue modules, with mixed assemblies also possible
- Optional power supply via the SUB-D connection



**Pluggable interface module**

The Microanalog power supply module is required for feeding the power supply. The applied power supply must not exceed 50 V<sub>eff</sub>.

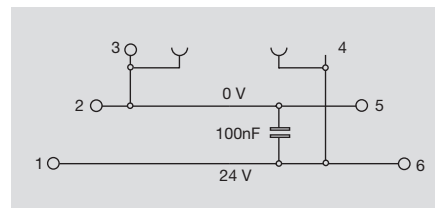
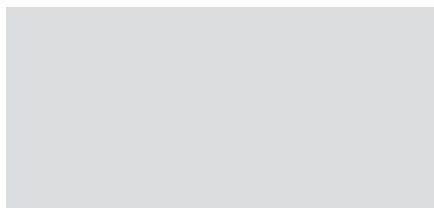
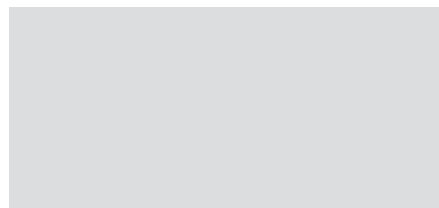
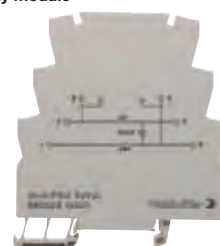
**MI 8 A-I/O S-SUBD15B**

Interface module analogue



**MI-A-PSM24 V DC**

Power supply module



**Technical data**

General data	
Supply voltage	
Ambient temperature	
Storage temperature	
Insulation coordination	
Rated voltage	
Pollution severity	
Overtoltage category	
Clearance & creepage distances	

max. 30 V AC/DC
0...+50°C
-20...+85 °C
50 V
2
III
0,9 mm

max. 30 V AC/DC
0...+50°C
-20...+85 °C
50 V
2
II

E

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

15 pole female SUB D	
/ /	
32 / 61 / 42	

Screw connection	
2.5 / 0.5 / 2.5	
88 / 6.1 / 97.8	

**Ordering data**

15 pole female SUB D
----------------------

Type	Qty.	Order No.
MI8A-I/O S SUBD15B	10	8800220000

Type	Qty.	Order No.
MI-A-PSM24Vdc	10	8800230000

Note
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Note
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Note
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**Accessories**

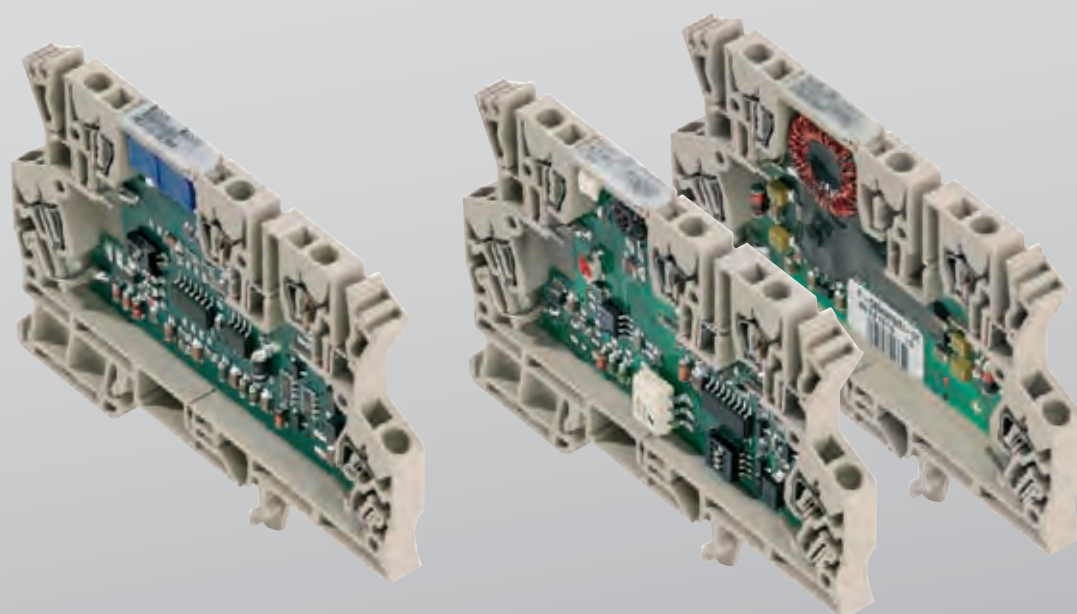
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Cross-connectors and markers - refer to Accessories
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## Signal converter in terminal format

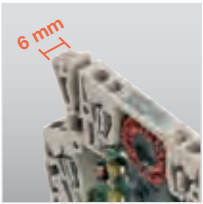
The slim terminal design can convert, isolate and monitor analogue signals. The MCZ-SERIES features five tension clamp connections. The housing is open on one side and can be closed with a form-fitting cover plate. The housing has a low height of just 6.3 cm. It also accommodates a cross-connector for potential distribution. Two WS10/6 markers can be used for labelling. These are available in MultiCard format and can be printed using Weidmüller's professional printing system.





**Security**

Electrical isolation increases the safety of operations and reduces the risk of facility malfunctions.



**Saves space in the electrical cabinet**

The high component density (only 6 mm wide) helps you to save space on the DIN rail.



**Simple wiring**

The power supply can easily be bridged from one module to the next using pluggable cross-connections.



**DC/DC passive disconnecter**

Input current loop feed



**PT100 /RTD signal converter**

PT100, 2-/3-wire converter



**Frequency signal converter**

DC/f converter



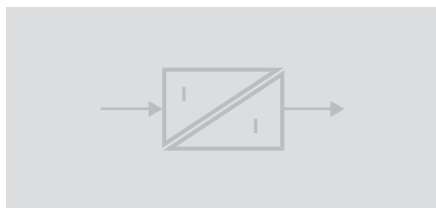
**Threshold monitoring**

Transistor output

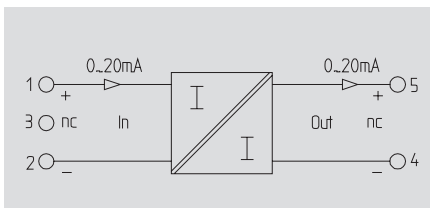
## MCZ SERIES - DC/DC passive isolator

### Input current loop feed

Passive isolator for galvanic isolation of standard signals from 0/4 to 20 mA. Power is supplied to the module via the measurement signal, so that no auxiliary power supply is required. It is distinguished by its low energy use and its pick-up current of less than 100  $\mu$ A.



### MCZ CCC



### Technical data

#### Input

Input voltage / Input current  
Pick-up current  
Voltage drop

#### Output

Output voltage / Output current  
Load impedance, voltage/current  
Accuracy  
Temperature coefficient  
Cut-off frequency (-3 dB)

#### General data

Ambient temperature  
Storage temperature  
Approvals

#### Insulation coordination

Standards  
EMC standards  
Insulation voltage

/ 0(4)...20 mA current loop

< 100  $\mu$ A

2.5...3 V at 20 mA

max. 10 V / 0(4)...20 mA

/  $\leq$  500  $\Omega$

< 0.1 % of end value

$\leq$  50 ppm/K of measured value at 0  $\Omega$  load resistance

Approx. 200 kHz

-25 °C...+60 °C

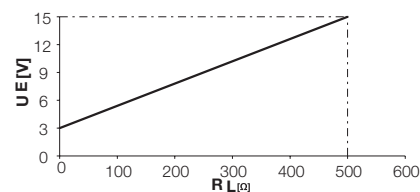
-40 °C...+85 °C

cURus; CSA; CE

EN 60529, EN 61010-1

EN 61000-6

510 V<sub>eff</sub>



#### Dimensions

Clamping range (nominal / min. / max.) mm<sup>2</sup>  
Length x width x height mm

#### Note

#### Tension clamp connection

1.5 / 0.5 / 1.5  
91 / 6 / 63.2

### Ordering data

Tension clamp connection

Type	Qty.	Order No.
MCZ CCC 0-20mA/0-20mA	10	8411190000

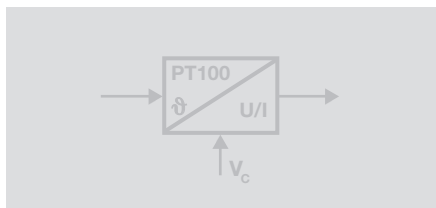
#### Note

### Accessories

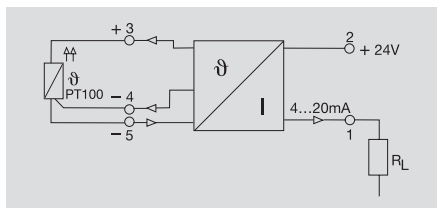
Cross-connectors for power supplies and markers – refer to Accessories

**RTD 2-/3-wire converter**

- For 2- or 3-conductor PT100 sensors
- Output current loop feed



**MCZ PT100/3 CLP**



**Technical data**

<b>Input</b>	
Sensor	PT100/2-/3-wire (in compliance with IEC 751)
Sensor supply	0.8 mA / 9...30 V DC
<b>Output</b>	
Output current	4...20 mA (current loop)
Load impedance, voltage/current	/ ≤ 600 Ω
<b>General data</b>	
Ambient temperature / Storage temperature	0 °C...+50 °C / -20 °C...+85 °C
Accuracy	Typical 0.2%, max. 0.5% of FSR
Approvals	cURus; CSA; CE
Standards	EN 50178, EN 60751, IEC751
EMC standards	EN 61000-6

<b>Input</b>	
Sensor	PT100/2-/3-wire (in compliance with IEC 751)
Sensor supply	0.8 mA / 9...30 V DC
<b>Output</b>	
Output current	4...20 mA (current loop)
Load impedance, voltage/current	/ ≤ 600 Ω
<b>General data</b>	
Ambient temperature / Storage temperature	0 °C...+50 °C / -20 °C...+85 °C
Accuracy	Typical 0.2%, max. 0.5% of FSR
Approvals	cURus; CSA; CE
Standards	EN 50178, EN 60751, IEC751
EMC standards	EN 61000-6

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Tension clamp connection</b>	
1.5 / 0.5 / 1.5	
91 / 6 / 63.2	
<b>Note</b>	

**Ordering data**

0...100 °C	Tension clamp connection
0...120 °C	Tension clamp connection
0...150 °C	Tension clamp connection
0...200 °C	Tension clamp connection
0...300 °C	Tension clamp connection
-50...+150 °C	Tension clamp connection
-40...+100 °C	Tension clamp connection
<b>Note</b>	

Type	Qty.	Order No.
MCZ PT100/3 CLP 0...100C	10	8425720000
MCZ PT100/3 CLP 0...120C	10	8483680000
MCZ PT100/3 CLP 0...150C	10	8604420000
MCZ PT100/3 CLP 0...200C	10	8473010000
MCZ PT100/3 CLP 0...300C	10	8473020000
MCZ PT100/3 CLP -50C...+150C	10	8473000000
MCZ PT100/3 CLP -40C...100C	10	8604430000
<b>Note</b>		

**Accessories**

Cross-connectors for power supplies and markers – refer to Accessories



## MCZ SERIES - Frequency signal converter

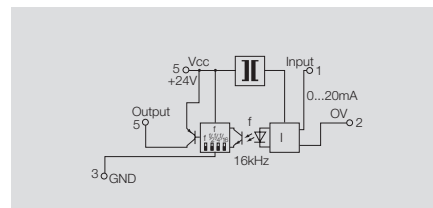
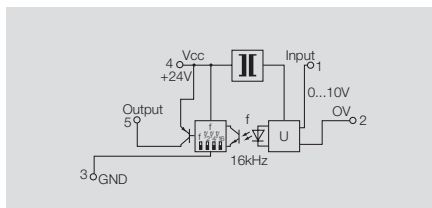
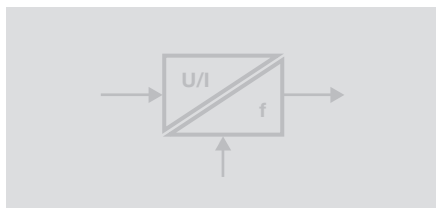
### DC/f converter

The analogue input signal is converted into a configurable frequency signal. Thus analogue signals can be read by the PLC's counter inputs.

### MCZ VFC



### MCZ CFC



### Technical data

E

<b>Input</b>	
Input voltage / Input current	0...10 V /
Input resistance, voltage/current	100 kΩ /
Voltage drop	
<b>Output</b>	
Output frequency	0...1/ 4/ 8/ 16 kHz
Output level	PNP, $U_b - 0.7$ V
Output current	max. 20 mA
Accuracy	0.2% of FSR
Temperature coefficient	$\leq 250$ ppm/K
Status indicator	LED, pulsing
<b>General data</b>	
Supply voltage	24 V DC $\pm 10$ %
Current consumption	14 mA without load
Current-carrying capacity of cross-connect.	$\leq 20$ A
Ambient temperature	0 °C...+50 °C
Storage temperature	-20 °C...+85 °C
Approvals	CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	100 V
Impulse withstand voltage	1.5 kV
Insulation voltage	1 kV DC
Overvoltage category	III
Pollution severity	2
Clearance & creepage distances	$\geq 1.5$ mm

	0...10 V /
	100 kΩ /
	0...1/ 4/ 8/ 16 kHz
	PNP, $U_b - 0.7$ V
	max. 20 mA
	0.2% of FSR
	$\leq 250$ ppm/K
	LED, pulsing
	24 V DC $\pm 10$ %
	14 mA without load
	$\leq 20$ A
	0 °C...+50 °C
	-20 °C...+85 °C
	CE
	EN 50178
	EN 55011, EN 61000-6
	100 V
	1.5 kV
	1 kV DC
	III
	2
	$\geq 1.5$ mm

	/ 0...20 mA
	/ 50 Ω
	1 V at 20 mA
	0...1/ 4/ 8/ 16 kHz
	PNP, $U_b - 0.7$ V
	max. 20 mA
	0.2% of FSR
	$\leq 250$ ppm/K
	LED, pulsing
	24 V DC $\pm 10$ %
	14 mA without load
	$\leq 20$ A
	0 °C...+50 °C
	-20 °C...+85 °C
	CE
	EN 50178
	EN 55011, EN 61000-6
	100 V
	1.5 kV
	1 kV DC
	III
	2
	$\geq 1.5$ mm

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Tension clamp connection</b>	
	1.5 / 0.5 / 1.5
	91 / 6 / 63.2

<b>Tension clamp connection</b>	
	1.5 / 0.5 / 1.5
	91 / 6 / 63.2

### Ordering data

Tension clamp connection
--------------------------

Type	Qty.	Order No.
MCZ VFC 0-10V	10	8461470000

Type	Qty.	Order No.
MCZ CFC 0-20MA	10	8461480000

<b>Note</b>
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### Accessories

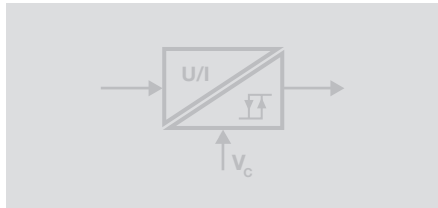
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Cross-connectors for power supplies and markers – refer to Accessories
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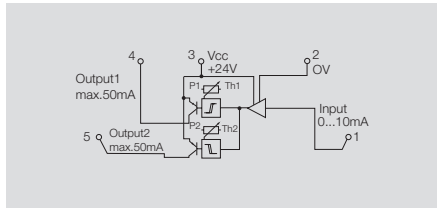
Cross-connectors for power supplies and markers – refer to Accessories
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**Transistor output**

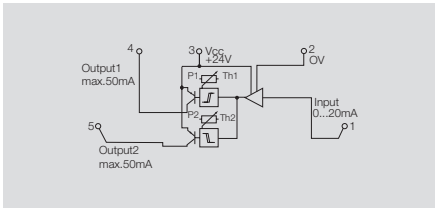
- 2 digital outputs
- Monitoring of upper and lower threshold
- 3 input ranges can be selected: 300 mV...10 V, 30 mV...1 V, 10 mV...100 mV



**MCZ SC 0...10 V**



**MCZ SC 0...20 mA**



**Technical data**

<b>Input</b>	
Input voltage / Input current	0...10 V /
Input resistance, voltage/current	60 kΩ /
Voltage drop	
<b>Output</b>	
Contact assembly	double switch output PNP
Function	$U_N < U_{Th1}$ : Output 1 active / $U_N > U_{Th2}$ : Output 2 active
Switching thresholds	Via 2 potentiometers (12 turns)
Hysteresis	1% of adjusted final value
Switching current	50 mA - per channel (voltage drop at transistor: < 1.2 V at 50 mA)
Step response time	< 250 μs (Threshold at 90% of max. Input signal; $R_f \leq 1$ kΩ)
Cut-off frequency (-3 dB)	100 Hz
Temperature coefficient	250 ppm/K (max. 500 ppm/K)
<b>General data</b>	
Supply voltage	24 V DC $\pm$ 20 %
Ambient temperature	0 °C...+50 °C
Storage temperature	-25 °C...+60 °C
Approvals	cURus; CSA; CE
<b>Insulation coordination</b>	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6

/ 0.5...20 mA	
/ 50 Ω	
1 V	
double switch output PNP	
$I_N < I_{Th1}$ : Output 1 active / $I_N > I_{Th2}$ : Output 2 active	
Via 2 potentiometers (12 turns)	
1% of adjusted final value	
50 mA - per channel (voltage drop at transistor: < 1.2 V at 50 mA)	
< 250 μs (Threshold at 90% of max. Input signal; $R_f \leq 1$ kΩ)	
100 Hz	
max. 250 ppm/K	
24 V DC $\pm$ 20 %	
0 °C...+50 °C	
-25 °C...+60 °C	
CSA; cURus; CE	
EN 50178	
EN 55011, EN 61000-6	

/ 0.5...20 mA	
/ 50 Ω	
1 V	
double switch output PNP	
$I_N < I_{Th1}$ : Output 1 active / $I_N > I_{Th2}$ : Output 2 active	
Via 2 potentiometers (12 turns)	
1% of adjusted final value	
50 mA - per channel (voltage drop at transistor: < 1.2 V at 50 mA)	
< 250 μs (Threshold at 90% of max. Input signal; $R_f \leq 1$ kΩ)	
100 Hz	
max. 250 ppm/K	
24 V DC $\pm$ 20 %	
0 °C...+50 °C	
-25 °C...+60 °C	
CSA; cURus; CE	
EN 50178	
EN 55011, EN 61000-6	

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Tension clamp connection</b>	
1.5 / 0.5 / 1.5	
91 / 6 / 63.2	

<b>Tension clamp connection</b>	
1.5 / 0.5 / 1.5	
91 / 6 / 63.2	

**Ordering data**

Tension clamp connection
--------------------------

Type	Qty.	Order No.
MCZ SC 0-10V	10	8260280000

Type	Qty.	Order No.
MCZ SC 0-20MA	10	8227350000

<b>Note</b>
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**Accessories**

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Cross-connectors for power supplies and markers – refer to Accessories
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Cross-connectors for power supplies and markers – refer to Accessories
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# Process monitoring

<b>Process monitoring</b>	Process monitoring – Overview	F.2
	Process monitoring with analogue and relay outputs and display – Overview	F.4
	Process monitoring with analogue and relay outputs and display	F.6
	Frequency isolator / transformer with alarm function – Overview	F.12
	Frequency isolator / transformer with alarm function	F.14
	Process monitoring with relay output and display – Overview	F.16
	Process monitoring with relay output and display	F.18
	Process monitoring with relay output – Overview	F.24
	Process monitoring with relay output	F.26

# Process monitoring

## Process instruments from the AR, UPI, R and DPA-SERIES

Weidmüller's process instruments from the AR, UPI, R and DPA-SERIES are part of a wide-ranging line of innovative products designed for analogue signal conditioning. These instruments are specially specified for the complex and demanding requirements of modern process automation applications. The product series, ranging from simple dedicated units to complex microprocessor-controlled devices, can be used with almost all signal types and measurement sensors. The products also offer a variety of integrated functions, such as timing delays, adjustable threshold values, high-/low-trip switching behaviour, and scalable displays.

This includes the capture of normalized analogue signals, temperatures, frequencies, conductivities, and also the conversion of analogue DC currents and DC voltages into frequency pulses. LED displays and user-configurable alarm outputs are integrated on the device side.

## Process monitoring modules

Modules from the R and DPA-SERIES come with two-channel alarm outputs. They monitor facility-dependent measurements and can issue event-related alerts to external monitoring units. All typical signal types can be processed on the input side. The setpoint values can be easily set with an operating panel located on the front. Microprocessor-controlled modules with integrated LED displays are available which offer additional functions for more complex applications.

## Measurement isolating transformer with alarm function

Measurement isolators from the AR and UPI-SERIES are capable of converting, filtering, isolating and monitoring the low-level signals that come from standard sensors.



## Product line

The products in Weidmüller's AR, UPI, R and DPA-SERIES provide analogue signal conditioning solutions for process automation. The universal adjustment options on the front side naturally make the rail-mounted modules wider when compared to the MICROSERIES and WAVESERIES. The sturdy anodized metal housing ensures that they are easy to handle even in the harsh surroundings of the process industry.

## Features

- High degree of accuracy and stability
- Analogue and relay contact outputs
- Parameters adjustable on front side
- Live configuration using membrane push buttons for the input/output parameters, display areas and alarm settings
- Easy to navigate menu for configuration and data backups
- Backup for the setting parameters via password or line link
- Sturdy anodized metal housing can be mounted on rail



### AR-SERIES

Measurement isolating transformer with display and threshold monitoring



### UPI-SERIES

Analogue frequency converter with display and threshold monitoring



### R-SERIES

Process monitoring with display



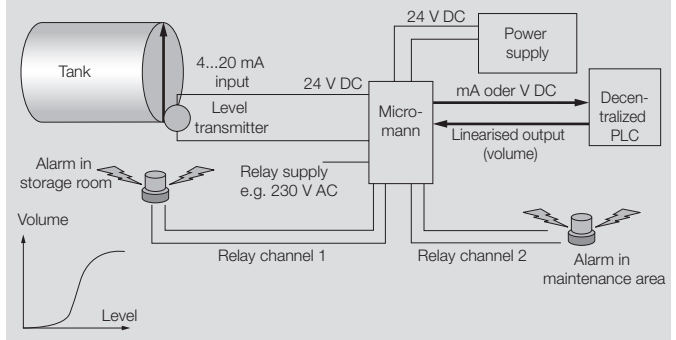
### DPA-SERIES

Process monitoring

# The AR-SERIES – process monitoring with analogue and relay outputs and display

The AR-SERIES signal isolating converters, with alarm function for process automation, provide a flexible interface between the sensor and the control system. The output side features analogue standard signals and two relay outputs for limit monitoring. On the input side, parameters can be processed depending on the module. This includes signal isolating converters for processing analogue signals such as current, voltage, temperature (PT100 and thermocouple sensors), frequency, conductivity, curve linearisation/characterization, and additional math functions. The process monitoring components from the AR-SERIES come with a four-character, scalable LED display. The scaling of the input parameters is done automatically. External passive sensors can be supplied directly via the input circuit of the signal isolating converter. The user-friendly menus are easy and navigate and make it easy to configure the operating parameters. Specific parameters can be selected and changed using the keyboard and display. The isolators from the AR-SERIES feature complete 2-kV electrical isolation. Wires are connected on the front side with a pluggable screw mechanism. The modules can be directly mounted on TS35/TS32 DIN rails.

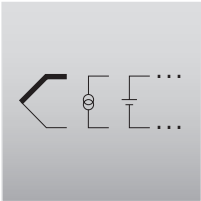
## Typical application of AR-SERIES CLCAR



## Technical features

- Configurable analogue current/voltage output
- Supplies external passive loop-powered sensors
- Two alarm outputs via relay and LED status display
- LED display can be parameterised according to a physical unit system.
- Live configuration of input/output parameters, display ranges and alarm settings using the membrane press buttons.
- Complete 3-way electrical isolation
- Pluggable screw connection mechanism
- Sturdy metal housing for mounting on DIN-rail





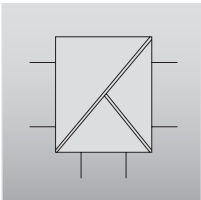
**All-purpose**

Captures all key physical input parameters. The analogue and relay outputs can be used to best monitor the processes.



**Saves time**

Changing parameters is quick and easy with the membrane keyboard and the four-character LED display.



**Security**

Data that has already been saved can be password protected even after you have changed the settings. Three-way electrical isolation between the input/output and power supply.



**Protection**

The sturdy anodized aluminium housing enables use in harsh process industry applications. Meets all EMC requirements.



**UCVAR**

Analogue current and voltage input



**UTCAR**

Thermocouple temperature measurement



**URRAR**

RTD temperature measurement



**CNDAR**

Conductivity measurement



**CLCAR**

Linearisation of non-linear sensors



**UHZAR**

Frequency measurement

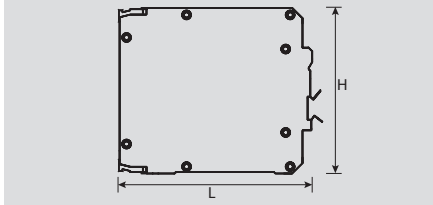


## Process monitoring with analogue and relay outputs and display

### Micromann AR-SERIES

Universal, galvanically-isolated signal converters with alarm function

- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

<b>Input</b>	
Input signal	-55...+55 mA / -55...55 V
Input resistance, voltage/current	22 Ω / 1 MΩ
Resolution	1 μA/ mV per bit for small ranges
Sensor supply	24 V DC (up to 25 mA)
<b>Output analogue</b>	
Type (analogue output)	Voltage and current output (configurable)
Load impedance, voltage/current	≥ 1 kΩ / ≤ 900 Ω
Output current	0...22 mA
Output voltage	0...11 V
Transmit function	direct or inverted
<b>Alarm output</b>	
Type	Alarm output with 2 NO contacts and suppressor circuit
Switching current	1 A @ 240 V AC / 30 V DC
Switching thresholds	25 % of display range
<b>Display</b>	
Type	4-character display
Display range	-999...9999
Display value	Percentage or real value display
Resolution (display)	0.001 of displayed value
<b>General data</b>	
Supply voltage	12...50 V DC
Accuracy	< 0,1 %
Linearity	± 0.1 % typ.
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Insulation voltage	2 kV input / output / power supply
Impulse withstand voltage	4 kV (1.2/50 μs)
Rated voltage	300 V <sub>eff</sub>
EMC standards	DIN EN 61326
<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

### Ordering data

Current input / Voltage input
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<b>Note</b>
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### Accessories

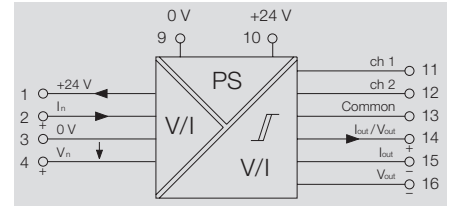
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### UCVAR

#### Current und voltage input



- Conversion, isolation and filtering of signals
- Supply of active input devices
- Bi-polar inputs
- Linearisation



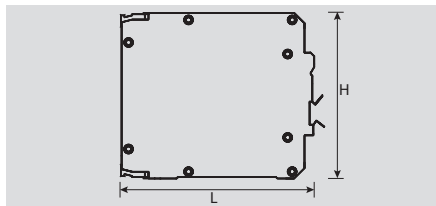
### Connections

Terminal	Signal
1	24 V DC
2	Signal + Current
3	Signal -
4	Signal + Voltage
5	Unassigned
6	

**Micromann AR-SERIES**

Universal, galvanically-isolated signal converters with alarm function

- External power supply
- Pluggable connection terminals
- Compact enclosure



**Technical data**

<b>Input</b>	Input signal Input resistance
<b>Output analogue</b>	Type (analogue output) Load impedance, voltage/current Output current Output voltage Transmit function
<b>Alarm output</b>	Type Switching current Switching thresholds
<b>Display</b>	Type Display range Display value Resolution (display)
<b>General data</b>	Supply voltage Cold-junction compensation error Humidity Temperature coefficient Long-term drift Step response time  Ambient temperature / Storage temperature Approvals
<b>Insulation coordination</b>	Insulation voltage Impulse withstand voltage Rated voltage EMC standards

<b>Dimensions</b>	Clamping range (nominal / min. / max.) mm <sup>2</sup> Length x width x height mm
<b>Note</b>	

**Ordering data**

Temperature signal converters
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<b>Note</b>
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**Accessories**

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**UTCAR**

Temperature input / thermocouple

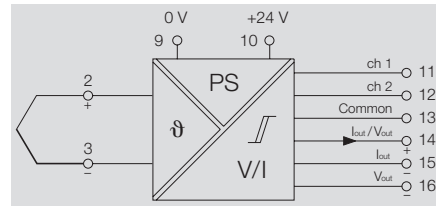


- Thermocouple (J, K, T, E, B, S, R)
- Temperature display in °C / °F
- Burn-out alarm
- Cold junction compensation

Thermocouple (type J,K,T,E,B,S,R) or mV signals	≤ 1 kΩ
Voltage and current output (configurable)	≥ 1 kΩ / ≤ 900 Ω 0...22 mA 0...11 V direct or inverted
Alarm output with 2 NO contacts and suppressor circuit	1 A @ 240 V AC / 30 V DC 25 % of display range
4-character display	Depends on input type °C / °F or V 1 °C / °F or 0.01 mV
Supply voltage	12...50 V DC
Cold-junction compensation error	≤ 0.02 / °C ambient temperature
Humidity	0 to 90 % (no condensation)
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10,000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
Insulation voltage	2 kV input / output / power supply
Impulse withstand voltage	4 kV (1.2/50 μs)
Rated voltage	300 V <sub>eff</sub>
EMC standards	DIN EN 61326

<b>Screw connection</b>	1.5 / 0.5 / 2.5 120 / 46 / 97 PE connection direct on enclosure
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Type	Qty.	Order No.
UTCAR	1	7940012190



**Connections**

Terminal	Signal	Signal temperature
1	Unassigned	Cold-junction compensation
2	Signal + mV	
3	Signal - mV	
4	Unassigned	
5	Unassigned	
6	Unassigned	

**Thermocouple (Type J, K, N, T, E, B, S, R) or mV signals**

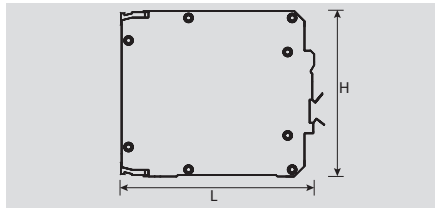
Input type	Display limits	
	highest	lowest
J	870 °C (1598 °F)	-50 °C (-58 °F)
K	1372 °C (2502 °F)	
N	1300 °C (2372 °F)	
T	400 °C (752 °F)	
E	700 °C (1292 °F)	
B	1800 °C (3272 °F)	
S	1768 °C (3214 °F)	0 °C (32 °F)
R	1768 °C (3214 °F)	-50 °C (-58 °F)
mV	60 mV	-9.99 m

Process monitoring with analogue and relay outputs and display

Micromann AR-SERIES

Universal, galvanically-isolated signal converters with alarm function

- External power supply
- Pluggable connection terminals
- Compact enclosure



URTAR

Temperature input (RTD)



- Processes 2- or 3-wire PT100 signals
- Temperature display in °C / °F
- Automatic Cable-length compensation

Technical data

<b>Input</b>	
Input signal	2-/3-wire PT100, Ni120
Line resistance in measuring circuit	30 Ω
<b>Output analogue</b>	
Type (analogue output)	Voltage and current output (configurable)
Load impedance, voltage/current	≥ 1 kΩ / ≤ 900 Ω
Output current	0...22 mA
Output voltage	0...11 V
Transmit function	direct or inverted
<b>Alarm output</b>	
Type	Alarm output with 2 NO contacts and suppressor circuit
Switching current	1 A @ 240 V AC / 30 V DC
Switching thresholds	25 % of display range
<b>Display</b>	
Type	4-character display
Display range	Depends on selected range
Display value	°C or °F
Resolution (display)	1 °C / °F or 0.1 °C / °F
<b>General data</b>	
Supply voltage	12...50 V DC
Accuracy	< 1 °C for 1 °C resolution
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable (250 ms...32 s)
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Insulation voltage	2 kV input / output / power supply
Impulse withstand voltage	4 kV (1.2/50 μs)
Rated voltage	300 V <sub>eff</sub>
EMC standards	DIN EN 61326
<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
PE connection direct on enclosure	

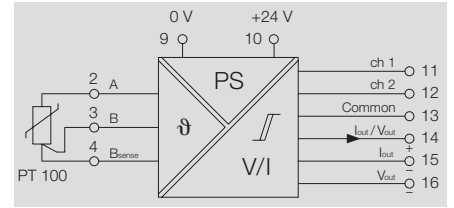
Ordering data

Temperature signal converters
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Type	Qty.	Order No.
URTAR	1	7940010250

<b>Note</b>
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<b>Accessories</b>
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Connections

Terminal	Signal
1	Unassigned
2	A
3	B
4	B-Sense
5	Unassigned
6	

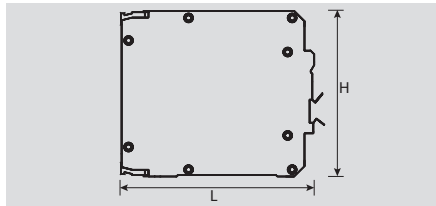
2- or 3-wire PT100 RTD (BS1904:1984 / IEC751:1983)

Max. display range		Resolution
highest	lowest	
700 °C	-200 °C	1 °C
1292 °F	-328 °F	1 °F
200.0 °C	-99.9 °C	0.1 °C
400 °F	-99.9 °F	0.1 °F

**Micromann AR-SERIES**

Universal, galvanically-isolated signal converters with alarm function

- External power supply
- Pluggable connection terminals
- Compact enclosure



**Technical data**

<b>Input</b>	Input signal
Supply voltage	
<b>Output analogue</b>	Type (analogue output) Load impedance, voltage/current Output current Output voltage Transmit function
<b>Alarm output</b>	Type Switching current Switching thresholds
<b>Display</b>	Type Display range Display value Resolution (display)
<b>General data</b>	Supply voltage Accuracy Linearity Temperature coefficient Long-term drift Step response time
Ambient temperature / Storage temperature	
Approvals	
<b>Insulation coordination</b>	Insulation voltage Impulse withstand voltage Rated voltage EMC standards
<b>Dimensions</b>	Clamping range (nominal / min. / max.) mm <sup>2</sup> Length x width x height mm
<b>Note</b>	

**Ordering data**

Voltage / current output
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**Note**

**Accessories**

**CNDAR**

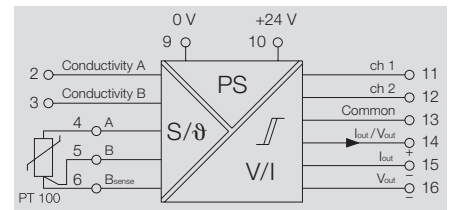
**Conductivity measurement**



- Suitable for all conductivity probes
- Automatic measuring range selection
- Compensation for probe temperature
- Programmable cell constant
- Linearized probe characteristic

0 to 200 µS (0.1 µS resolution)
0 to 1000 / 5000 µS (1 µS resolution)
0 to 20 mS (0.01 mS resolution)
0 to 200 °C (0.1 °C resolution)
< 6 V <sub>ss</sub> @ 400 Hz
Voltage and current output (configurable)
≥ 1 kΩ / ≤ 900 Ω
0...22 mA
0...11 V
direct or inverted
Alarm output with 2 NO contacts and suppressor circuit
1 A @ 240 V AC / 30 V DC
25 % of display range
4-character display
-999...9999
µS, mS, µS/cm, mS/cm or °C
Refer to input signal
12...50 V DC
± 0.05% of final value
± 0.05 % of signal range
≤ 0.02 % / °C
0.1 % / 10.000 h
320 ms (10...90 %), adjustable (250 ms...32 s)
0 °C...+60 °C / -25 °C...+70 °C
cULus; CE
2 kV input / output / power supply
4 kV (1,2/50 µs)
300 V <sub>eff</sub>
DIN EN 61326
<b>Screw connection</b>
1.5 / 0.5 / 2.5
120 / 46 / 97
PE connection direct on enclosure

Type	Qty.	Order No.
CNDAR	1	7940010232



**Connections**

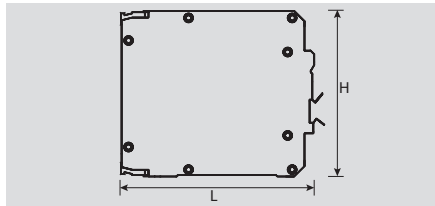
Terminal	Signal
1	Unassigned
2	A Conductivity
3	B Conductivity
4	A Temperature
5	B Temperature
6	B-Sense Temperature

Process monitoring with analogue and relay outputs and display

Micromann AR-SERIES

Universal, galvanically-isolated signal converters with alarm function

- External power supply
- Pluggable connection terminals
- Compact enclosure

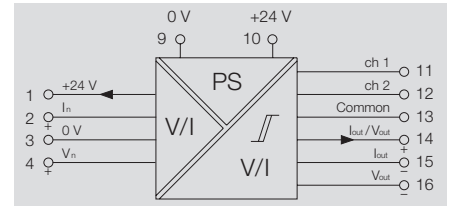


CLCAR

Linearisation



- Linearized measurements of non-linear sensors
- Processing of control signals



Technical data

<b>Input</b>	
Input signal	-24...24 mA / -12...12 V
Input resistance, voltage/current	22 Ω / 1 MΩ
Sensor supply	24 V DC (up to 25 mA)
<b>Output analogue</b>	
Type (analogue output)	Voltage and current output (configurable)
Load impedance, voltage/current	≥ 1 kΩ / ≤ 900 Ω
Output current	0...22 mA
Output voltage	0...11 V
Transmit function	direct or inverted
<b>Alarm output</b>	
Type	Alarm output with 2 NO contacts and suppressor circuit
Switching current	1 A @ 240 V AC / 30 V DC
Switching thresholds	25 % of display range
<b>Display</b>	
Type	4-character display
Display range	-999...9999
Display value	Percentage or real value display
Resolution (display)	0.001 of displayed value
<b>General data</b>	
Supply voltage	12...50 V DC
Linearity	101 adjustable measurement points, universal signal
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable (250 ms...32 s)
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Insulation voltage	2 kV input / output / power supply
Impulse withstand voltage	4 kV (1.2/50 μs)
Rated voltage	300 V <sub>eff</sub>
EMC standards	DIN EN 61326

Connections

Terminal	Signal
1	24 V DC
2	Signal + Current
3	Signal -
4	Signal + Voltage
5	Unassigned
6	

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
PE connection direct on enclosure	

Ordering data

Voltage / current output
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Type	Qty.	Order No.
CLCAR	1	7940010489

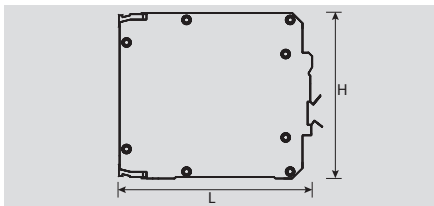
<b>Note</b>
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<b>Accessories</b>
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**Micromann AR-SERIES**

Universal, galvanically-isolated signal converters with alarm function

- External power supply
- Pluggable connection terminals
- Compact enclosure



**Technical data**

<b>Input</b>	
Input signal	0...10 kHz
Input voltage	50 mV...250 V AC/DC
<b>Output analogue</b>	
Type (analogue output)	Voltage and current output (configurable)
Load impedance, voltage/current	≥ 1 kΩ / ≤ 900 Ω
Output current	0...22 mA
Output voltage	0...11 V
Transmit function	direct or inverted
<b>Alarm output</b>	
Type	Alarm output with 2 NO contacts and suppressor circuit
Switching current	1 A @ 240 V AC / 30 V DC
Switching thresholds	25 % of display range
<b>Display</b>	
Type	4-character display
Display range	-999...9999
Display value	Percentage or real value display
Resolution (display)	0.001 of displayed value
<b>General data</b>	
Supply voltage	12...50 V DC
Accuracy	< 0.5 % of measuring range
Linearity	< 0.05 % of signal range
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable (250 ms...32 s)
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Insulation voltage	2 kV input / output / power supply
Impulse withstand voltage	4 kV (1.2/50 μs)
Rated voltage	300 V <sub>eff</sub>
EMC standards	DIN EN 61326

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

Frequency converter
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<b>Note</b>
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**Accessories**

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**UHZAR**

**Frequency input**



- Wide-range input
- Supply of active input devices

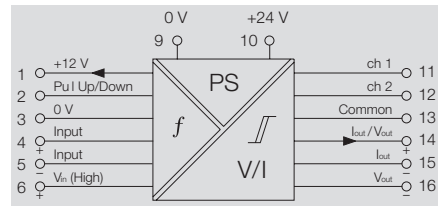
<b>Input</b>	
Input signal	0...10 kHz
Input voltage	50 mV...250 V AC/DC
<b>Output analogue</b>	
Type (analogue output)	Voltage and current output (configurable)
Load impedance, voltage/current	≥ 1 kΩ / ≤ 900 Ω
Output current	0...22 mA
Output voltage	0...11 V
Transmit function	direct or inverted
<b>Alarm output</b>	
Type	Alarm output with 2 NO contacts and suppressor circuit
Switching current	1 A @ 240 V AC / 30 V DC
Switching thresholds	25 % of display range
<b>Display</b>	
Type	4-character display
Display range	-999...9999
Display value	Percentage or real value display
Resolution (display)	0.001 of displayed value
<b>General data</b>	
Supply voltage	12...50 V DC
Accuracy	< 0.5 % of measuring range
Linearity	< 0.05 % of signal range
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable (250 ms...32 s)
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Insulation voltage	2 kV input / output / power supply
Impulse withstand voltage	4 kV (1.2/50 μs)
Rated voltage	300 V <sub>eff</sub>
EMC standards	DIN EN 61326

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Ordering data</b>		
<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
UHZAR	1	7940010184

<b>Note</b>
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<b>Accessories</b>
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**Connections**

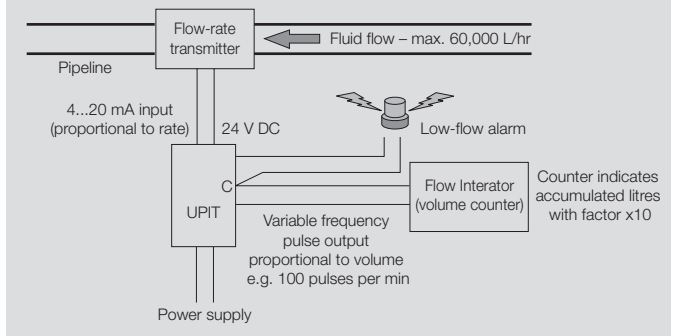
Terminal	Signal
1	12 V DC
2	Pull Up / Down
3	0 V
4	Signal +
5	Signal -
6	High Signal

# The UPI-SERIES – frequency isolator / transformer with alarm function

The frequency isolators with alarm function from the UPI-SERIES convert standard analogue current and voltage signals into a proportional frequency. Measurement errors (which can occur with low input frequencies) are eliminated with a programmable frequency suppression. In addition, a quadratic function linearizes the signals. External passive sensors can be supplied directly via the analogue frequency isolating transformer. An alarm output is available for monitoring the input signal. The four-character LED display can be set universally. The corresponding scaling for the input parameters is then carried out automatically. The user-friendly menus are easy and navigate and make it easy to configure the operating parameters. Specific parameters can be selected and changed using the keyboard and display. The analogue frequency isolating transformer from the UPI-SERIES feature complete 2-kV electrical isolation. Wires are connected on the front side with a pluggable screw mechanism. The modules can be directly mounted on TS35/TS32 DIN rails.

## Typical application of UPI-SERIES

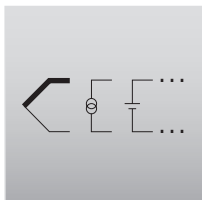
### Analogue frequency isolating transformer



### Technical features

- Configurable analogue frequency output
- Supplies external passive loop-powered sensors
- Alarm output via relay and LED status display
- LED display can be parameterised according to a physical unit system.
- Live configuration using membrane push buttons for the input/output parameters, display areas and alarm settings
- Complete 3-way electrical isolation
- Pluggable screw connection mechanism
- Sturdy metal housing for mounting on DIN-rail

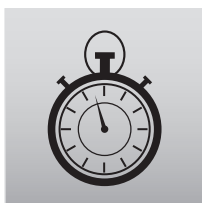




**All-purpose**

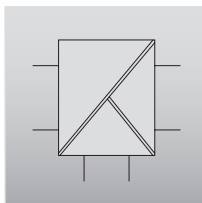
Converts analogue standard signals into low frequency signals or high frequency signals. This can be used for measuring flow quantities, controlling step motors, event counters or for post-processing in DCS/PLC systems.

Industrial processes can be best monitored using the frequency outputs and relay outputs.



**Saves time**

Changing parameters is quick and easy with the membrane keyboard and the four-character LED display



**Security**

Data that has already been saved can be password protected even after you have changed the settings. Three-way electrical isolation between the input/output and power supply



**Protection**

The sturdy anodized aluminium housing enables use in harsh process industry applications Meets all EMC requirements.



**UPIR**

Low frequency output up to 25 Hz with relay contact



**UPIT**

Frequency output up to 1 kHz with open-collector circuitry

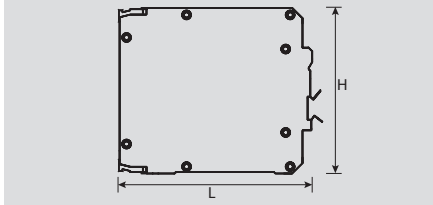


## Frequency isolator / transformer with alarm function

### Micromann UPI-SERIES

Analog frequency converter for all standard current and voltage signals

- Frequency pulse output
- 24 V DC supply of the active input device
- Integrated linearisation
- Pluggable connection terminals

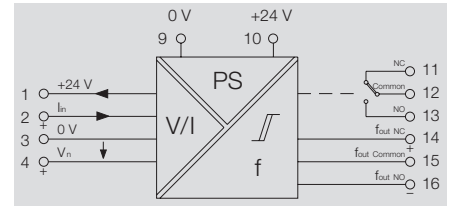


### UPIR

Low frequency output [relay]



- Frequencies up to 25 Hz
- 1-pole change-over switch with relay contact/ frequency output and alarm channel



### Technical data

Input	
Input signal	-55...+55 mA / -55...+55 V
Input resistance, voltage/current	22 Ω / 1 MΩ
Sensor supply	24 V DC (up to 25 mA)
Resolution	1 μA/1 mV per bit
Output	
Type	Frequency-controlled relay output (CO)
Output frequency	≤ 25 Hz
Alarm output	
Type	Relay output (CO)
Switching current	3 A @ 240 V AC (resistive load) 3 A @ 24 V DC / 110 V AC (resistive load)
Switching thresholds	Adjustable
Display	
Type	4 digits, red LED, 7 mm
Display range	0...9999
Display value	Output frequency per s, min or h
General data	
Supply voltage	12...50 V DC
Linearity	± 0.1 % typ.
Accuracy	< 0,1 %
Repeat accuracy	± 0.05 % of signal range
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Approvals	cULus; CE
Insulation coordination	
Insulation voltage	2 kV input / output / power supply
Impulse withstand voltage	4 kV (1.2/50 μs)
EMC standards	DIN EN 61326

### Connections

Terminal	Signal	
11	Normally closed	Alarm output
12	Common	
13	Normally open	
14	Normally closed	Frequency output
15	Common	
16	Normally open	

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
Note	
PE connection direct on enclosure	

### Ordering data

Frequency converter
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Type	Qty.	Order No.
UPIR	1	7940010908

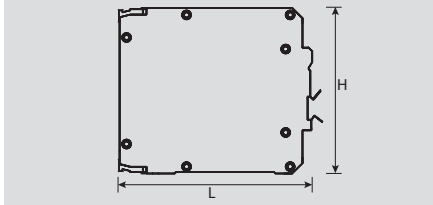
Note
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Accessories
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**Micromann UPI-SERIES**

Analog frequency converter for all standard current and voltage signals

- Frequency pulse output
- 24 V DC supply of the active input device
- Integrated linearisation
- Pluggable connection terminals



**Technical data**

<b>Input</b>	
Input signal	-55...+55 mA / -55...+55 V
Input resistance, voltage/current	22 Ω / 1 MΩ
Sensor supply	24 V DC (up to 25 mA)
Resolution	1 μA/1 mV per bit
<b>Output</b>	
Type	Frequency-controlled transistor output
Output frequency	999,9 Hz
<b>Alarm output</b>	
Type	Transistor output
Switching current	200 mA
Switching voltage	≤ 50 V DC
Switching thresholds	Adjustable
<b>Display</b>	
Type	4 digits, red LED, 7 mm
Display range	0...9999
Display value	Output frequency per s, min or h
<b>General data</b>	
Supply voltage	12...50 V DC
Linearity	± 0.1 % typ.
Accuracy	< 0,1 %
Repeat accuracy	± 0.05 % of signal range
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Approvals	cULus; CE
<b>Insulation coordination</b>	
Insulation voltage	2 kV input / output / power supply
Impulse withstand voltage	4 kV (1.2/50 μs)
EMC standards	DIN EN 61326

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

Frequency converter
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<b>Note</b>
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**Accessories**

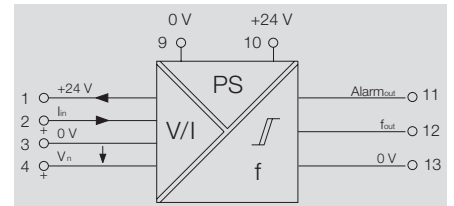
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**UPIT**

**High-frequency output [Transistor]**



- Frequencies up to 1 kHz
- Open collector-transistor output with alarm channel



**Connections**

Terminal	Signal
11	Alarm output
12	Frequency pulse output
13	0 V

# The R-SERIES – process monitoring with relay output and display

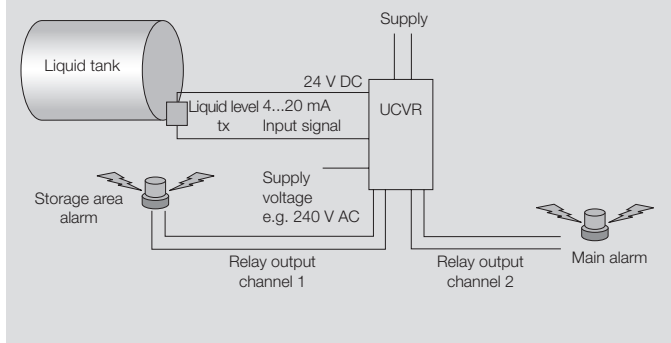
The threshold monitoring modules from the R-SERIES feature two relay contacts on the output side for the alarm function. Each product version is designed for a defined type of signal and sensor. These types include analogue signals such as current, voltage, temperature (thermocouple and PT100 sensors), frequency and conductivity.

Monitoring components with temperature measurement inputs are equipped with wire break detection mechanisms. They come standard with programmable functions for setpoint, deadband, high/low-trip switching behaviour, coil energizing and a variable timer delay on each channel.

The XFAR (U/I input) features extra extensions to the standard functions. This includes an optional alarm function which can be configured in connection with various input parameters, such as a change in the signal frequency, a signal loss or for individual signal formats. The XFAR is equipped with two alarm outputs for more complex applications. Each can be secured individually. The four-character LED display can be set universally. The corresponding scaling for the input parameters is then carried out automatically.

The user-friendly menus are easy to navigate and make it easy to configure the operating parameters. Specific parameters can be selected and changed using the keyboard and display. Monitoring modules from the R-SERIES feature complete 2-kV electrical isolation. Wires are connected on the front side with a pluggable screw mechanism. The modules can be directly mounted on TS35/TS32 DIN rails.

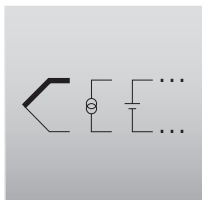
## Typical application of R-SERIES UCVR



## Technical features

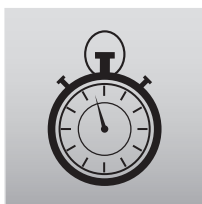
- Custom module-specific input parameters
- Two alarm outputs via relay and LED status display
- LED display can be parameterised according to a physical unit system.
- Live configuration using membrane push buttons for the input/output parameters, display areas and alarm settings
- Complete 3-way electrical isolation
- Pluggable screw connection mechanism
- Sturdy metal housing for mounting on DIN-rail





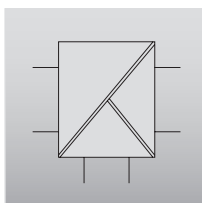
**All-purpose**

Captures all key physical input parameters. The analogue and relay outputs can be used to best monitor the processes.



**Saves time**

Changing parameters is quick and easy with the membrane keyboard and the four-character LED display.









**Security**

Data that has already been saved can be password protected even after you have changed the settings. Three-way electrical isolation between the input/output and power supply.



**Protection**

The sturdy anodized aluminium housing enables use in harsh process industry applications. Meets all EMC requirements.

	<b>UCVR</b> Analogue current and voltage monitoring
	<b>UTCRR</b> Thermocouple temperature monitoring
	<b>URTR</b> RTD temperature monitoring
	<b>CNDR</b> Conductivity monitoring
	<b>XFAR</b> Analogue current and voltage monitoring with special functions
	<b>UHZR</b> Frequency monitoring

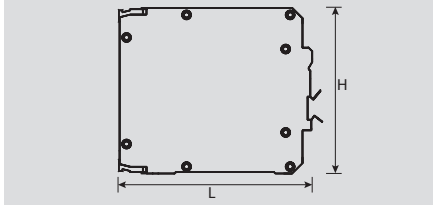
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## Process monitoring with relay output and display

### Micromann R-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

Input	
Input signal	-55...+55 mA / -55...+55 V
Input resistance, voltage/current	1 M $\Omega$ / 22 $\Omega$
Resolution	1 $\mu$ A / 1 mV per bit
Supply voltage	24 V DC (up to 25 mA)
Alarm output	
Type	CO contact
Switching current	1 A @ 240 V AC / 30 V DC (resistive load)
Switching thresholds	All values in display range are configurable
Display	
Type	4 digits, red LED, 7 mm
Display value	Percentage or real value display
Display range	-999...9999
Resolution (display)	0.001 of displayed value
General data	
Supply voltage	12...50 V DC
Temperature coefficient	$\leq$ 0.02 % / $^{\circ}$ C
Long-term drift	0.1 % / 10,000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Ambient temperature / Storage temperature	0 $^{\circ}$ C...+60 $^{\circ}$ C / -25 $^{\circ}$ C...+70 $^{\circ}$ C
Approvals	cULus; CE
Insulation coordination	
Impulse withstand voltage	4 kV (1.2/50 $\mu$ s)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

### Ordering data

Relay output
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Note
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### Accessories

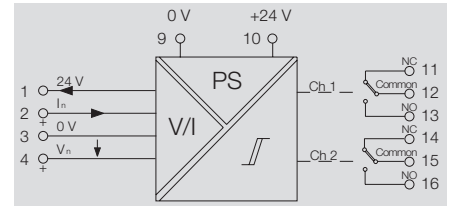
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### UCVR

#### Current / voltage monitoring



- Conversion, isolation and filtering of analog signals
- Bi-polar inputs
- Linear or quadratic input signal



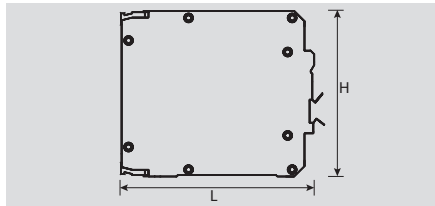
### Connections

Terminal	Signal
1	24 V DC
2	Signal + Current
3	Signal -
4	Signal + voltage
5	Unassigned
6	

### Micromann R-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

Input	
Sensor	
Input resistance	
Alarm output	
Type	
Switching current	
Switching thresholds	
Display	
Type	
Display value	
Display range	
Resolution (display)	
General data	
Cold-junction compensation error	
Supply voltage	
Temperature coefficient	
Long-term drift	
Step response time	
Ambient temperature / Storage temperature	
Approvals	
Insulation coordination	
Impulse withstand voltage	
Insulation voltage	
EMC standards	

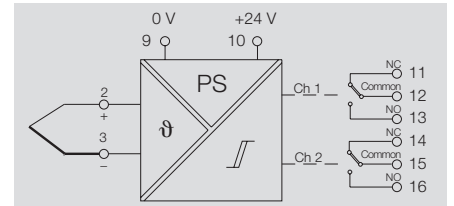
### UTCR

Temperature monitoring (thermo converter)



- Thermocouples type J, K, T, E, B, S, R
- Temperature display in °C / °F
- Wire-break recognition
- Cold junction compensation

Thermocouples (type J,K,N,T,E,B,S,R) or mV
Input resistance ≤ 1 kΩ
CO contact
1 A @ 240 V AC / 30 V DC (resistive load)
All values in display range are configurable
4 digits, red LED, 7 mm
°C / °F or mV
Depends on selected input type
1 °C / °F or 0.01 mV
≤ 0.02 % / °C ambient temperature
12...50 V DC
≤ 0.02 % / °C
0.1 % / 10.000 h
320 ms (10...90 %), adjustable to 250 ms...32 s
0 °C...+60 °C / -25 °C...+70 °C
cULus; CE
4 kV (1.2/50 μs)
2 kV input / output / power supply
DIN EN 61326



### Connections

Terminal	Signal	Signal temperature
1	Unassigned	Cold-junction compensation
2	Signal + mV	
3	Signal - mV	
4	Unassigned	
5	Unassigned	
6	Unassigned	

### Thermocouples (Type J, K, N, T, E, B, S, R) or mV signals

Input type	Max. display range	
	highest	lowest
J	870 °C (1598 °F)	-50 °C (-58 °F)
K	1372 °C (2502 °F)	
N	1300 °C (2372 °F)	
T	400 °C (752 °F)	
E	700 °C (1292 °F)	
B	1800 °C (3272 °F)	
S	1768 °C (3214 °F)	-50 °C (-58 °F)
R	1768 °C (3214 °F)	-50 °C (-58 °F)
mV	60 mV	-9.99 m

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
Note	
PE connection direct on enclosure	

### Ordering data

Relay output
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Type	Qty.	Order No.
UTCR	1	7760000017

Note
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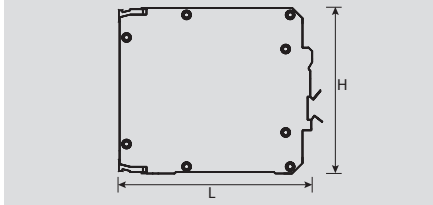
Accessories
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## Process monitoring with relay output and display

### Micromann R-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

Input	
Input signal	PT100 / Ni 120 RTD
Line resistance in measuring circuit	30 Ω
Cable-length compensation	< 0.05 %
Alarm output	
Type	CO contact
Switching current	1 A @ 240 V AC / 30 V DC (resistive load)
Switching thresholds	All values in display range are configurable
Display	
Type	4 digits, red LED, 7 mm
Display value	°C / °F
Display range	Depends on selected range
Resolution (display)	1 or 0.1 °C / °F
General data	
Supply voltage	12...50 V DC
Temperature coefficient	± 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
Insulation coordination	
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

### Ordering data

Relay output
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Note
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Accessories
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### URTR

#### Temperature monitoring (RTD)



- Processes 2- or 3-wire PT100 signals
- Temperature display in °C / °F
- Compensation for the measurement lines

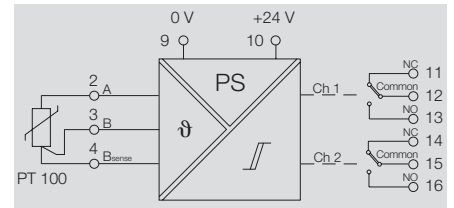
Input	
Input signal	PT100 / Ni 120 RTD
Line resistance in measuring circuit	30 Ω
Cable-length compensation	< 0.05 %
Alarm output	
Type	CO contact
Switching current	1 A @ 240 V AC / 30 V DC (resistive load)
Switching thresholds	All values in display range are configurable
Display	
Type	4 digits, red LED, 7 mm
Display value	°C / °F
Display range	Depends on selected range
Resolution (display)	1 or 0.1 °C / °F
General data	
Supply voltage	12...50 V DC
Temperature coefficient	± 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
Insulation coordination	
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

Screw connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Type	Qty.	Order No.
URTR	1	7940011087

Note
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Accessories
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### Connections

Terminal	Signal
1	Unassigned
2	A
3	B
4	B-Sense
5	Unassigned
6	

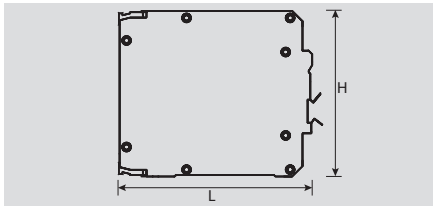
### 2- or 3-wire PT100 RTD (BS1904:1984 / IEC751:1983)

highest	Max. display range		Resolution
	lowest		
700 °C	-200 °C		1 °C
1292 °F	-328 °F		1 °F
200.0 °C	-99.9 °C		0.1 °C
400 °F	-99.9 °F		0.1 °F

### Micromann R-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

<b>Input</b>	
Input signal	
Supply voltage	
Battery constant	
Cable-length compensation	
<b>Alarm output</b>	
Type	
Switching current	
Switching thresholds	
<b>Display</b>	
Type	
Display value	
Display range	
Resolution (display)	
<b>General data</b>	
Supply voltage	
Temperature coefficient	
Long-term drift	
Step response time	
Ambient temperature / Storage temperature	
Approvals	
<b>Insulation coordination</b>	
Impulse withstand voltage	
Insulation voltage	
EMC standards	

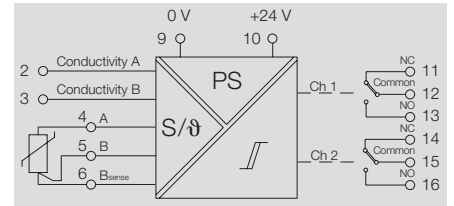
### CNDR

#### Conductivity monitoring



- Suitable for all conductivity probes
- Automatic measuring range selection
- Compensation for probe temperature
- Programmable cell constant
- Linearized probe characteristic

0...200 µS (0.1 µS resolution)
0...1000 / 5000 µS (1 µS resolution)
0...20 mS (0.01 mS resolution)
≤ 6 V <sub>DC</sub> @ 400 Hz
0.01...99.99 / cm
< 2 % (up to 30 Ω)
CO contact
1 A @ 240 V AC / 30 V DC (resistive load)
All values in display range are configurable
4 digits, red LED, 7 mm
µS, mS, µS/cm, mS/cm or °C
Depends on selected input signal
0.1 µS / 1 µS / 0.01 mS / 0.1 °C
12...50 V DC
≤ 0.02 % / °C
0.1 % / 10,000 h
320 ms (10...90 %), adjustable to 250 ms...32 s
0 °C...+60 °C / -25 °C...+70 °C
cULus; CE
4 kV (1.2/50 µs)
2 kV input / output / power supply
DIN EN 61326



### Connections

Terminal	Signal
1	Unassigned
2	A Conductivity
3	B Conductivity
4	A Temperature
5	B Temperature
6	B-Sense Temperature

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>		
1.5 / 0.5 / 2.5		
120 / 46 / 97		
PE connection direct on enclosure		

### Ordering data

Relay output
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Type	Qty.	Order No.
CNDR	1	7940017921

<b>Note</b>
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<b>Accessories</b>
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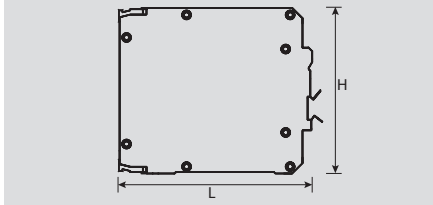


## Process monitoring with relay output and display

### Micromann R-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure

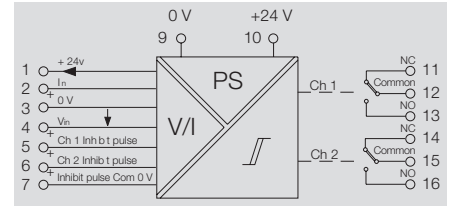


### XFAR

#### Current / voltage monitoring



- Alarm triggered by rising or falling signal level
- Alarm when deviation occurs from desired setpoint value
- Alarm suppression for each channel
- Suppression of alarm function for undefined signal levels



### Technical data

Input	
Input signal	-22...+22 mA / -11...+11 V
Sensor supply	24 V DC (up to 25 mA)
Blocking pulse	High: 4...40 V; Low: < 3 V
Input resistance, voltage/current	1 MΩ / 22 Ω
Alarm output	
Type	CO contact
Switching current	1 A @ 240 V AC / 30 V DC (resistive load)
Switching thresholds	All values in display range are configurable
Display	
Type	4 digits, red LED, 7 mm
Display value	Percentage or real value display
Display range	-999...9999
Resolution (display)	0.001 of displayed value
General data	
Supply voltage	12...50 V DC
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
Insulation coordination	
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

### Connections

Terminal	Signal
1	12 V DC
2	Signal + Current
3	Signal -
4	Signal + voltage
5	Channel 1 signal of external control (inhibit pulse)
6	Channel 2 signal of external control (inhibit pulse)
7	Inhibit pulse 0 V

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
Note	
PE connection direct on enclosure	

### Ordering data

Relay output
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Type	Qty.	Order No.
XFAR	1	7940014450

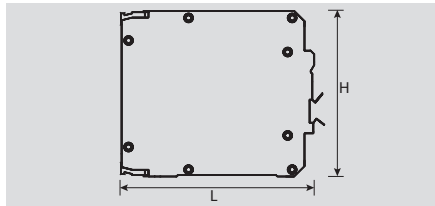
Note
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Accessories
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### Micromann R-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

<b>Input</b>	
Input signal	0...10 kHz
Input voltage	50 mV...250 V
Sensor supply	12 V DC to 25 mA
<b>Alarm output</b>	
Type	CO contact
Switching current	1 A @ 240 V AC / 30 V DC (resistive load)
Switching thresholds	All values in display range are configurable
<b>Display</b>	
Type	4 digits, red LED, 7 mm
Display value	Percentage or real value display
Display range	-999...9999
Resolution (display)	0.001 of displayed value
<b>General data</b>	
Supply voltage	12...50 V DC
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Impulse withstand voltage	4 kV (1.2/50 µs)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

### Ordering data

Relay output
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<b>Note</b>
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### Accessories

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### UHZR

#### Frequency monitoring



- Wide-range input
- Supply of active input devices

<b>Input</b>	
Input signal	0...10 kHz
Input voltage	50 mV...250 V
Sensor supply	12 V DC to 25 mA
<b>Alarm output</b>	
Type	CO contact
Switching current	1 A @ 240 V AC / 30 V DC (resistive load)
Switching thresholds	All values in display range are configurable
<b>Display</b>	
Type	4 digits, red LED, 7 mm
Display value	Percentage or real value display
Display range	-999...9999
Resolution (display)	0.001 of displayed value
<b>General data</b>	
Supply voltage	12...50 V DC
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	320 ms (10...90 %), adjustable to 250 ms...32 s
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Impulse withstand voltage	4 kV (1.2/50 µs)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

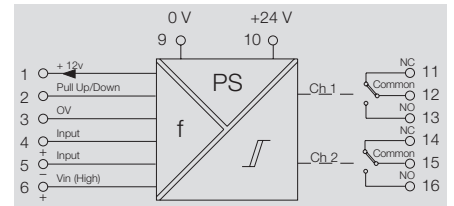
<b>Screw connection</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

Type	Qty.	Order No.
UHZR	1	7940015213

<b>Note</b>
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### Accessories

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### Connections

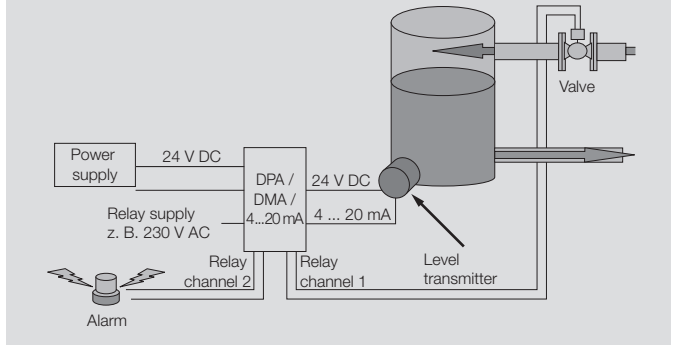
Terminal	Signal
1	12 V DC
2	Pull Up / Down
3	0 V
4	Signal +
5	Signal -
6	High Signal +

# The DPA-SERIES – process monitoring with relay output

Modules in the DPA-SERIES are used for monitoring threshold. They can be configured for a wide variety of industrial signals and feature two alarm outputs on the output side. A potentiometer on the front side is used to custom adjust the setpoints and deadbands. The deadband reduces chatter from the alarm relay during switching operations. The reset point of the alarm contact is individually adjusted away from the hysteresis (setpoint). In order to generate an alarm in the event of a power outage, you should select the „energized“ operational status for one or both of the output relays. A high/low-trip switching behaviour can also be set independently for each channel. The following analogue input signals can be processed with the current DPA-SERIES: temperature (thermocouple and PT100 temperature sensors), AC/DC currents and voltages, measuring wire and potentiometer positions, resistances, differential currents and differential resistances.

The monitoring modules from the DPA-SERIES feature complete 2-kV electrical isolation. Wires are connected on the front side with a pluggable screw mechanism. The modules can be directly mounted on TS35/TS32 DIN rails.

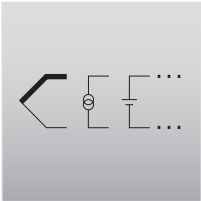
## Typical application of DPA-SERIES DPAMA



## Technical features

- Custom module-specific input parameters
- Two alarm outputs via relay and LED status display
- Min./max. switching commands in any combination
- Front-side adjustments for deadzones and setpoints
- Reduction of contact chatter gives the alarm outputs high switching precision.
- Complete 3-way electrical isolation
- Pluggable screw connection mechanism
- Sturdy metal housing for mounting on DIN-rail





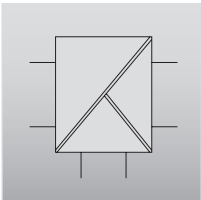
**All-purpose**

Captures all key physical input parameters. The analogue and relay outputs can be used to best monitor the processes.



**Saves time**

Easy to configure with potentiometer on front



**Security**

Saved data can be backed up over a connected line even after you have changed the settings. Three-way electrical isolation between the input/output and power supply



**Protection**

The sturdy anodized aluminium housing enables use in harsh process industry applications. Meets all EMC requirements.



**DPADMA**

Current monitoring 4...20 mA



**DPADMV**

Voltage monitoring 0...10 (100) mV



**DPADCV**

Voltage monitoring 0...10 V/1...5 V



**DPAAVX**

Voltage monitoring 0...250 V AC



**DPARTD**

Temperature monitoring (RTD)



**DPATCX**

Temperature monitoring (thermo converter)



**DPAPOT**

Potentiometer monitoring



**DPARES**

Resistance monitoring



**DPAMAS**

Monitoring of residual current



**DPADRT**

Monitoring of two resistance values

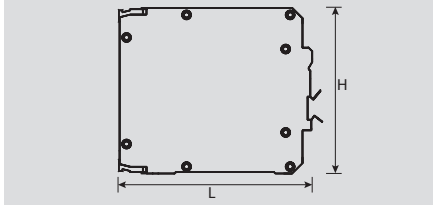


## Process monitoring with relay output

### DPA-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

<b>Input</b>	
Type	Current input [mA]
Input signal	4...20 mA @ 10 Ω
Input resistance, voltage/current	/ ≥ 10 Ω
Input measurement range	20 μA...500 mA
<b>Output digital</b>	
Type	Relay output, change-over contact
Number of channels	2
Switching current	3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC
<b>Settings</b>	
Fine adjustment	Potentiometer, 20 turns
Hysteresis	1...25 % of max. input value
Switching thresholds	0...100 % of max. input value
<b>General data</b>	
Supply voltage	24 V DC ± 10 %
Power consumption	3 W @ 24 V DC
Repeat accuracy	± 0.05 % of signal range
Long-term drift	0.1 % / 10.000 h
Humidity	0 to 90 % (no condensation)
Temperature coefficient	< 0.04 % / °C
Step response time	typ. 5 ms
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

### Ordering data

Current input
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<b>Note</b>
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### Accessories

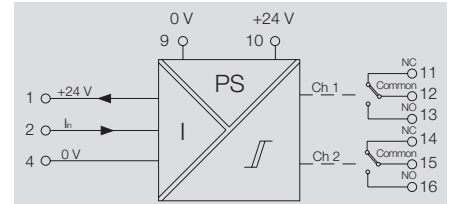
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### DPADMA

#### Current monitoring 4 - 20 mA



- For current signals [mA DC]
- Low input impedance
- Bi-polar input signals on request
- Supply of active input devices



### Connections

Terminal	Signal
1	24 V DC
2	Signal +
3	Unassigned
4	Signal -

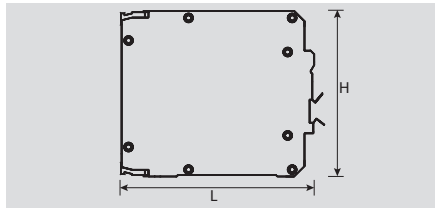
<b>Screw connection</b>		
1.5 / 0.5 / 2.5		
120 / 46 / 97		
PE connection direct on enclosure		

Type	Qty.	Order No.
DPADMA 4-20mA	1	7940011294

**DPA-SERIES**

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



**Technical data**

<b>Input</b>	
Type	
Input signal	
Input resistance, voltage/current	
Input range	
Offset	
<b>Output digital</b>	
Type	
Number of channels	
Switching current	
<b>Settings</b>	
Fine adjustment	
Hysteresis	
Range of adjustment	
<b>General data</b>	
Supply voltage	
Power consumption	
Repeat accuracy	
Long-term drift	
Humidity	
Temperature coefficient	
Step response time	
Ambient temperature / Storage temperature	
Approvals	
<b>Insulation coordination</b>	
Impulse withstand voltage	
Insulation voltage	
EMC standards	

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

<b>Connection system</b>	
	Voltage input
	Voltage input

<b>Note</b>
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**Accessories**

**DPADMV**

Voltage monitoring 0...10(100) mV



- For voltage signals [mV DC]
- High input impedance
- Bi-polar input signals on request

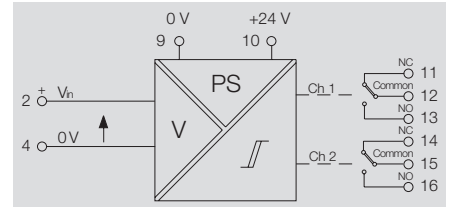
Voltages ( $\leq 100$ mV)
0–10 mV or 0–100 mV
10 M $\Omega$ /
8...100 mV DC
0...500 % of signal range
Relay output, change-over contact
2
3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC
Potentiometer, 20 turns
1...25 % of max. input value
0 - 100 % of max. input value
24 V DC $\pm 10$ %
3 W @ 24 V DC
$\pm 0.05$ % of signal range
0.1 % / 10.000 h
0 to 90 % (no condensation)
< 0.04 % / °C
typ. 5 ms
0 °C...+60 °C / -25 °C...+70 °C
cULus; CE
4 kV (1.2/50 $\mu$ s)
2 kV input / output / power supply
DIN EN 61326

<b>Screw connection</b>	
	1.5 / 0.5 / 2.5
	120 / 46 / 97
	PE connection direct on enclosure

<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
DPADMV 0-100mV	1	7940017849
DPADMV 0-10mV	1	7940017848

<b>Note</b>
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<b>Accessories</b>
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**Connections**

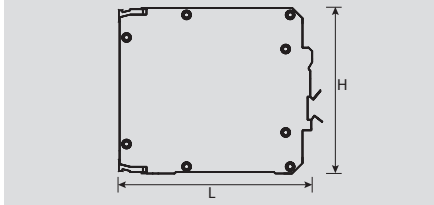
Terminal	Signal
1	Unassigned
2	Signal +
3	Unassigned
4	Signal -

## Process monitoring with relay output

### DPA-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure

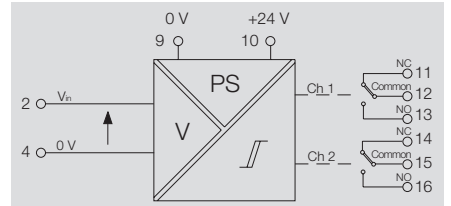


### DPADCV

Voltage monitoring 0...10 V / 1...5 V



- For voltage signals [V DC]
- High input impedance
- Bi-polar inputs on request



### Technical data

Input	
Type	DC voltage [ $> 500$ mV]
Input signal	0...10 V or 1...5 V
Input resistance	1 M $\Omega$ (0...10 V) or 500 k $\Omega$ (1...5 V)
Input range	0,1...300 V DC
Offset	0...500 % of signal range
Output digital	
Type	Relay output, change-over contact
Number of channels	2
Switching current	3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC
Settings	
Fine adjustment	Potentiometer, 20 turns
Hysteresis	1...25 % of max. input value
Range of adjustment	0 - 100 % of max. input value
General data	
Supply voltage	24 V DC $\pm$ 10 %
Power consumption	3 W @ 24 V DC
Repeat accuracy	$\pm$ 0.05 % of signal range
Long-term drift	0.1 % / 10.000 h
Humidity	0 to 90 % (no condensation)
Temperature coefficient	$<$ 0.04 % / $^{\circ}$ C
Step response time	typ. 5 ms
Ambient temperature / Storage temperature	0 $^{\circ}$ C...+60 $^{\circ}$ C / -25 $^{\circ}$ C...+70 $^{\circ}$ C
Approvals	cULus; CE
Insulation coordination	
Impulse withstand voltage	4 kV (1.2/50 $\mu$ s)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

### Connections

Terminal	Signal
1	Unassigned
2	Signal +
3	Unassigned
4	Signal -

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
Note	
PE connection direct on enclosure	

### Ordering data

Connection system	
Voltage input	
Voltage input	
Note	

Type	Qty.	Order No.
DPADCV 0-10V	1	7940011718
DPADCV 1-5V	1	7940012970

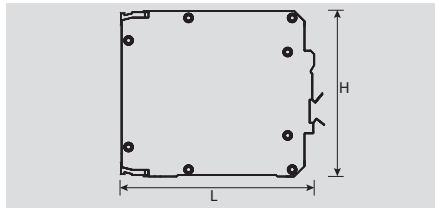
Note	
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### Accessories

**DPA-SERIES**

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



**DPAAVX**

Voltage monitoring 0...125 V AC



- For voltage signals [V AC]
- High input impedance
- Accuracy Class 0.5

**Technical data**

Input	
Type	
Input frequency	
Input resistance, voltage/current	
Input signal	
Input range	
Offset	
Output digital	
Type	
Number of channels	
Switching current	
Settings	
Fine adjustment	
Hysteresis	
Range of adjustment	
General data	
Supply voltage	
Power consumption	
Repeat accuracy	
Long-term drift	
Humidity	
Temperature coefficient	
Step response time	
Ambient temperature / Storage temperature	
Approvals	
Insulation coordination	
Impulse withstand voltage	
Insulation voltage	
EMC standards	

Spannung [AC]	47...63 Hz
> 1 MΩ /	0...125 V AC
8 mV...250 V AC	0...500 % of signal range
Relay output, change-over contact	2
3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC	Potentiometer, 20 turns
1...25 % of max. input value	0 - 100 % of max. input value
24 V DC ± 10 %	3 W @ 24 V DC
± 0.05 % of signal range	0.1 % / 10.000 h
0.1 % / 10.000 h	0 to 90 % (no condensation)
< 0.04 % / °C	typ. 150 ms
0 °C...+60 °C / -25 °C...+70 °C	cULus; CE
4 kV (1.2/50 μs)	2 kV input / output / power supply
DIN EN 61326	

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
1.5 / 0.5 / 2.5	120 / 46 / 97
PE connection direct on enclosure	

**Ordering data**

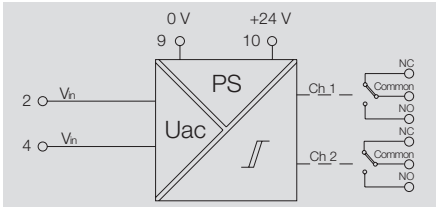
Voltage input
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Type	Qty.	Order No.
DPAAVX 0-125Vac	1	7940017847

Note
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**Accessories**

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**Connections**

Terminal	Signal
1	Unassigned
2	AC Voltage
3	Unassigned
4	AC Voltage

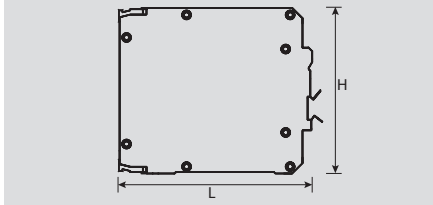


## Process monitoring with relay output

### DPA-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

<b>Input</b>	
Type	PT100 2-/3-wire
Sensor current	0.5 mA
<b>Output digital</b>	
Type	Relay output, change-over contact
Number of channels	2
Switching current	3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC
<b>Settings</b>	
Fine adjustment	Potentiometer, 20 turns
Hysteresis	1...25 % of max. input value
Range of adjustment	0 - 100 % of max. input value
<b>General data</b>	
Cable-length compensation	The cable-length compensation reduces the influence of conductor resistances by a factor of 100.
Supply voltage	24 V DC ± 10 %
Power consumption	3 W @ 24 V DC
Repeat accuracy	± 0.05 % of signal range
Long-term drift	0.1 % / 10,000 h
Humidity	0 to 90 % (no condensation)
Temperature coefficient	< 0.04 % / °C
Step response time	typ. 5 ms
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Impulse withstand voltage	4 kV (1.2/50 µs)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

### Ordering data

<b>Connection system</b>	
Temperature signal converters	
Temperature signal converters	
Temperature signal converters	
<b>Note</b>	

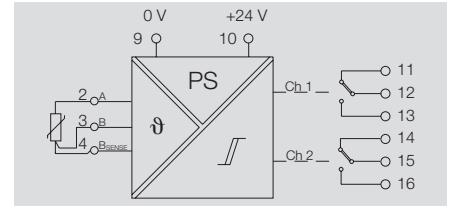
### Accessories

### DPARTD

#### Temperature monitoring (RTD)



- For temperature signals [°C]
- 2- or 3-wire connection
- Automatic cable-length compensation



### Connections

Terminal	Signal
1	Unassigned
2	A
3	B
4	B-Sense

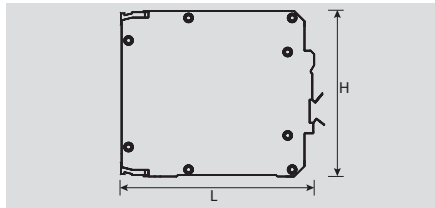
<b>Screw connection</b>	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
PE connection direct on enclosure	

Type	Qty.	Order No.
DPARTD 0-100C	1	7940014900
DPARTD 0-200C	1	7940017852
DPARTD 0-50C	1	7940014212

**DPA-SERIES**

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



**Technical data**

<b>Input</b>	
Type	
Input signal	
Input resistance	
Interference characteristic	
<b>Output digital</b>	
Type	
Number of channels	
Switching current	
<b>Settings</b>	
Fine adjustment	
Hysteresis	
Range of adjustment	
<b>General data</b>	
Options	
Supply voltage	
Power consumption	
Repeat accuracy	
Long-term drift	
Humidity	
Temperature coefficient	
Step response time	
Ambient temperature / Storage temperature	
Approvals	
<b>Insulation coordination</b>	
Impulse withstand voltage	
Insulation voltage	
EMC standards	

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

Temperature signal converters
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<b>Note</b>
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**Accessories**

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**DPATCX**

Temperature monitoring (thermo converter)



- For all standard thermocouples
- Automatic cold-junction compensation
- Wire-break recognition can be set

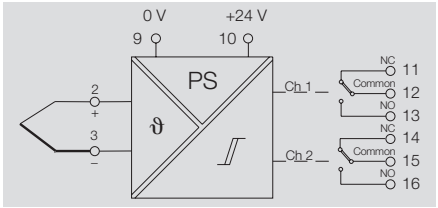
Thermocouple
Type K (0...1000 °C)
10 MΩ
High or Low Alarm
Relay output, change-over contact
2
3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC
Potentiometer, 20 turns
1...25 % of max. input value
0 - 100 % of max. input value
Wire-break recognition: High Alarm / Low Alarm
24 V DC ± 10 %
3 W @ 24 V DC
± 0.05 % of signal range
0.1 % / 10.000 h
0 to 90 % (no condensation)
< 0.04 % / °C
typ. 5 ms
0 °C...+60 °C / -25 °C...+70 °C
cULus; CE
4 kV (1.2/50 μs)
2 kV input / output / power supply
DIN EN 61326

<b>Screw connection</b>	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
PE connection direct on enclosure	

<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
DPATCX K/0-1000C	1	7940017853

<b>Note</b>
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**Connections**

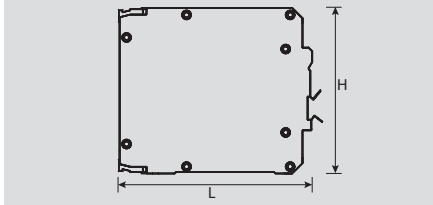
Terminal	Signal
1	Unassigned
2	Signal +
3	Unassigned
4	Signal -

## Process monitoring with relay output

### DPA-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

<b>Input</b>	
Type	
Input signal	
<b>Output digital</b>	
Type	
Number of channels	
Switching current	
<b>Settings</b>	
Fine adjustment	
Hysteresis	
Range of adjustment	
<b>General data</b>	
Supply voltage	
Power consumption	
Repeat accuracy	
Long-term drift	
Humidity	
Temperature coefficient	
Step response time	
Ambient temperature / Storage temperature	
Approvals	
<b>Insulation coordination</b>	
Impulse withstand voltage	
Insulation voltage	
EMC standards	

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

### Ordering data

<b>Connection system</b>	
	Resistance input
	Resistance input
<b>Note</b>	

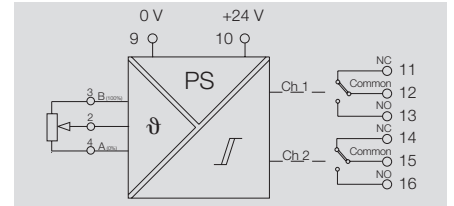
### Accessories

### DPAPOT

#### Position monitoring



- Position detection
- Potentiometer and loop input



### Connections

Terminal	Signal
1	Unassigned
2	Wiper
3	B
4	A

	3-conductor partial-voltage meter or measuring conductor
	10 Ω...1 MΩ (percentage of potentiometer range)
	Relay output, change-over contact
	2
	3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC
	Potentiometer, 20 turns
	1...25 % of max. input value
	0 - 100 % of max. input value
	24 V DC ± 10 %
	3 W @ 24 V DC
	± 0.05 % of signal range
	0.1 % / 10.000 h
	0 to 90 % (no condensation)
	< 0.04 % / °C
	typ. 5 ms
	0 °C...+60 °C / -25 °C...+70 °C
	cULus; CE
	4 kV (1.2/50 μs)
	2 kV input / output / power supply
	DIN EN 61326

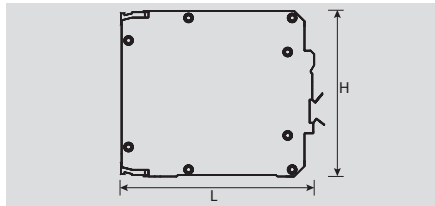
<b>Screw connection</b>	
	1.5 / 0.5 / 2.5
	120 / 46 / 97
	PE connection direct on enclosure

Type	Qty.	Order No.
DPAPOT 10KΩhm/0-100%	1	7940017851
DPAPOT 1KΩhm/0-100%	1	7940017850

**DPA-SERIES**

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



**Technical data**

<b>Input</b>	
Type	
Input signal	
<b>Output digital</b>	
Type	
Number of channels	
Switching current	
<b>Settings</b>	
Fine adjustment	
Hysteresis	
Range of adjustment	
<b>General data</b>	
Supply voltage	
Power consumption	
Repeat accuracy	
Long-term drift	
Humidity	
Temperature coefficient	
Step response time	
Ambient temperature / Storage temperature	
Approvals	
<b>Insulation coordination</b>	
Impulse withstand voltage	
Insulation voltage	
EMC standards	

**DPARES**

**Resistance monitoring**



- 2-wire input

Type	2-wire resistance
Input signal	0...1 kΩ
Output	Relay output, change-over contact
Number of channels	2
Switching current	3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC
Fine adjustment	Potentiometer, 20 turns
Hysteresis	1...25 % of max. input value
Range of adjustment	0 - 100 % of max. input value
Supply voltage	24 V DC ± 10 %
Power consumption	3 W @ 24 V DC
Repeat accuracy	± 0.05 % of signal range
Long-term drift	0.1 % / 10.000 h
Humidity	0 to 90 % (no condensation)
Temperature coefficient	< 0.04 % / °C
Step response time	typ. 5 ms
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

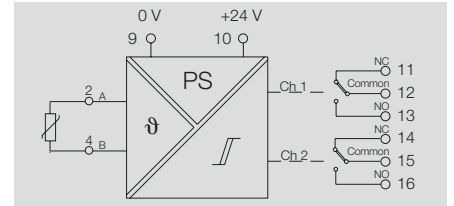
**Ordering data**

<b>Connection system</b>	Resistance input
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<b>Type</b>	<b>Qty.</b>	<b>Order No.</b>
DPARES 0-1KOhm	1	7940017917

<b>Note</b>	
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<b>Accessories</b>	
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**Connections**

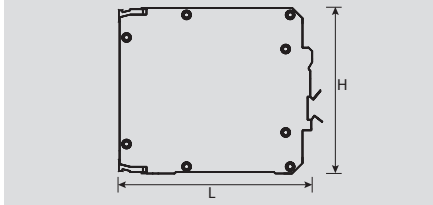
Terminal	Signal
1	Unassigned
2	A
3	Unassigned
4	B

## Process monitoring with relay output

### DPA-SERIES

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



### Technical data

<b>Input</b>	
Type	2 current inputs [mA]
Input signal	4...20 mA
Input resistance	≥ 10 Ω
<b>Output digital</b>	
Type	Relay output, change-over contact
Number of channels	2
Switching current	3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC
Transmit function	output x A-B
<b>Settings</b>	
Fine adjustment	Potentiometer, 20 turns
Hysteresis	1...25 % of max. input value
Range of adjustment	0 - 100 % of max. input value
<b>General data</b>	
Supply voltage	24 V DC ± 10 %
Power consumption	3 W @ 24 V DC
Repeat accuracy	± 0.05 % of signal range
Long-term drift	0.1 % / 10.000 h
Humidity	0 to 90 % (no condensation)
Temperature coefficient	< 0.04 % / °C
Step response time	typ. 5 ms
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
Approvals	cULus; CE
<b>Insulation coordination</b>	
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	2 kV input / output / power supply
EMC standards	DIN EN 61326

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

### Ordering data

Current input
---------------

<b>Note</b>
-------------

### Accessories

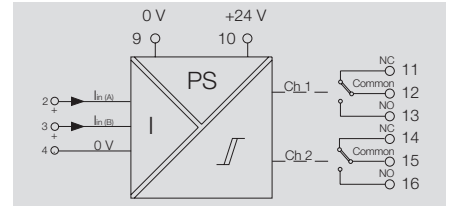
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### DPAMAS

#### Monitoring of residual current



- Residual current measuring
- Monitoring of two current signals



### Connections

Terminal	Signal
1	Unassigned
2	Signal A+
3	Signal B+
4	Signal -

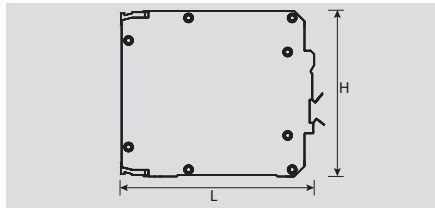
<b>Screw connection</b>	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
PE connection direct on enclosure	

Type	Qty.	Order No.
DPAMAS 4-20mA	1	7940016144

**DPA-SERIES**

Universal, galvanically-isolated signal converters with alarm function and two setpoint adjustments.

- Two alarm channels
- External power supply
- Pluggable connection terminals
- Compact enclosure



**Technical data**

<b>Input</b>	
Type	
Input signal	
Input range	
<b>Output digital</b>	
Type	
Number of channels	
Switching current	
<b>Settings</b>	
Fine adjustment	
Hysteresis	
Range of adjustment	
<b>General data</b>	
Transmit function	
Supply voltage	
Power consumption	
Repeat accuracy	
Long-term drift	
Humidity	
Temperature coefficient	
Step response time	
Ambient temperature / Storage temperature	
Approvals	
<b>Insulation coordination</b>	
Impulse withstand voltage	
Insulation voltage	
EMC standards	

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

Resistance input
------------------

<b>Note</b>
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**Accessories**

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**DPADRT**

**Resistance monitoring**



- Residual current measuring
- Monitoring of two resistance values

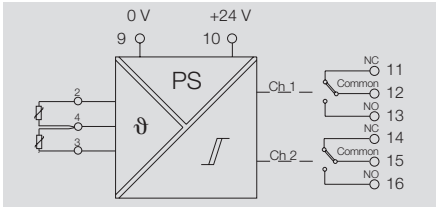
Two resistors R1 and R2, in two-wire configuration, with R1 > R2
(R1-R2) 20 Ω...100 kΩ
Relay output, change-over contact
2
3 A @ 240 V AC, 3 A @ 24 V DC / 110 V AC
Potentiometer, 20 turns
1...25 % of max. input value
0 - 100 % of max. input value
output x R1-R2
24 V DC ± 10 %
3 W @ 24 V DC
± 0.05 % of signal range
0.1 % / 10.000 h
0 to 90 % (no condensation)
< 0.04 % / °C
typ. 5 ms
0 °C...+60 °C / -25 °C...+70 °C
cULus; CE
4 kV (1.2/50 μs)
2 kV input / output / power supply
DIN EN 61326

<b>Screw connection</b>	
1.5 / 0.5 / 2.5	
120 / 46 / 97	
PE connection direct on enclosure	

Type	Qty.	Order No.
DPADRT 200Ohm20-40Ohm	1	7940017919

<b>Note</b>
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**Connections**

Terminal	Signal
1	Unassigned
2	R <sub>1</sub>
3	R <sub>2</sub>
4	Common



# Indicators and configurable displays

<b>Indicators and configurable displays</b>	Indicators and configurable displays – Overview	G.2
	Counters	G.4
	Indicators and configurable displays for analogue signals	G.8
	Indicators and configurable displays for temperature	G.12
	Universal auto-manual stations	G.16
	Indicators and configurable displays	G.18
	Indicators and configurable displays in IP67 for field mounting	G.22

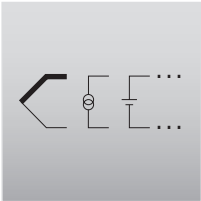


# Indicators and configurable displays

In industrial and process automation, displays provide a visual rendering of data and an analogue presentation of electrical and non-electrical measurements. They provide essential diagnostics, logging and operational guidance when operating machines and facilities.

Displays make dialog-based operations possible. They show measurements, error messages and also allow processes to be monitored. Displays can also feature digital and analogue outputs, interference-suppression functions, or the ability to calculate certain process variables internally. This turns a simple display into a high-quality process interface capable of independently controlling sub-processes.





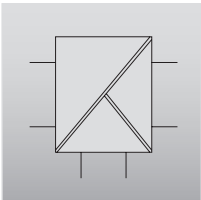
**All-purpose**

A fitting solution for any application – with the multitude of input ranges, external of input loop-powered supply, and analogue or digital outputs.



**Security**

No additional signal isolation is required since there is a high insulation voltage.



**Saves time**

Easy push-button configuration.



**Protection**

IP65 protection allows for use in harsh industrial surroundings.



**PTX800 SERIES**



**PMX420 SERIES**



**PMX400 SERIES**



**AMS400 SERIES**



**DI350 SERIES**



**LPD350 SERIES**



**LPD450F SERIES**



# PTX800 SERIES

## Panel-mounted totaliser/counter/rate monitor

The configurable monitors of the PTX800 SERIES are available in two designs:

- PTX800A for analogue current/voltage flow quantity measurements
- PTX800D with digital inputs (NAMUR, NPN/PNP sensors, TTL, etc)

The eight-digit LED rate/total display can be changed via a button on the front of the unit. Both versions make use of output relays to close valves when the „total“ setpoint is reached. They also have electrically-isolated analogue outputs for re-transmission.

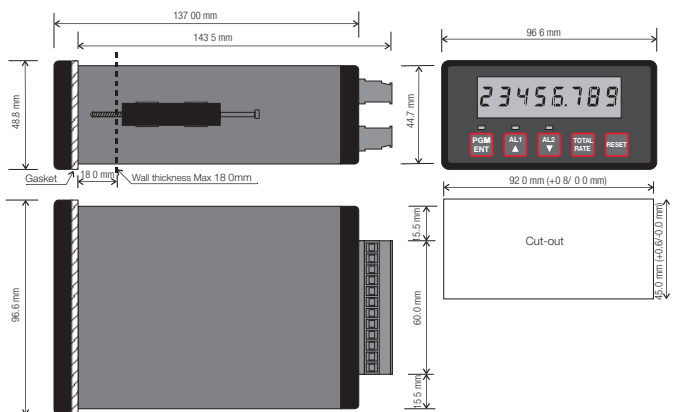
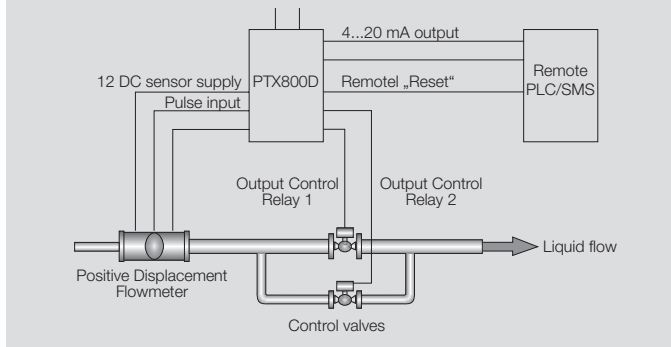
The display can be globally scaled based on the flow quantity per second, minute, hour or day. The flow-quantity counter can be multiplied by factors of 0.001, 0.01, 0.1, 1, 10, 100 or 1000. This allows for best use of the display.

The PTX800A counter processes standardised analogue current and voltage signals. Linearisation and fitting functions are available for processing measurement signals. In addition, the counter has a 24 V DC power supply for loop-powered sensors.

The PTX800D can be connected on the input side to all standard initiators (NPN/PNP/Namur) and with other current/voltage transmitters. The monitor will accept any periodic signal type and can total the input pulses into a „total“ display.

It can also calculate the resulting flow rate. External proximity switches can be supplied with 12 V DC directly from the PTX800D.

## Typical application of PTX800



## Technical Features

- Display of the flow quantity/rate
- Easily-readable eight-digit LED display
- Up to two outputs for alarm monitoring or control
- Optional analogue output
- Pulse output
- Reset function can be controlled locally or remotely, for fill-quantity monitoring (batching)
- The most recent measured value is stored in case of a power outage
- DC power supply
- LED display for values outside of range
- Complete electrical isolation
- DIN-standard 1/8 front panel with IP65 protection
- Integrated power supply for initiators
- Changing the device configuration is possible without performing a new calibration
- No internal adjustments needed

## Common technical data

Display	
Type	Eight digits, red LED, 7.2 mm
Brightness	Adjustable to 14 levels of brightness
Display value	Percent or real-value displayed
Partial display	Display from 0 to 50,000 (five digits)
Time range, partial display	per sec., min., hour (PT800A also per day)
Total display	Display from 0 to 99,999,999 (8 digits)
Decimal point	Adjustable separately for partial and total display
Status indicator	Alarm 1/2; Status LED
Pulse output	
Type	Transistor output
Display value	One pulse per signal jump of the total display
Pulse duration	32 ms
Cut-off time	Minimum of 32 ms
Analogue output (optional)	
Type	Current or voltage output configurable with jumper
Display range	Dependent on the calibration (within 0 to 22 mA, or 0 to 11 V)
Resolution	1.6 $\mu$ A or 0.8 mV / Bit
Load resistance, current	$\leq 900 \Omega$
Load resistance, voltage	$\geq 1 \text{ k}\Omega$
Residual ripple	$< 20 \text{ mV}_{\text{rms}}$
Alarm output (optional)	
Type	2 relay contacts (CO)
Switching current	3 A at 240 V AC, 5 A at 24 V DC / 110 V AC (resistive load)
Isolation	1.5 kV between ports
Input reset	
Type	Normally open
Function	Complete reset (display/alarm)
General information	
Supply voltage	24 V DC $\pm 10 \%$
Power consumption	6 W at 24 V DC
Accuracy	$< 0,05 \%$
Linearity	$< 0,05 \%$
Repeat accuracy	$\pm 0.02 \%$ of signal range
Humidity	0...90 % (no condensation)
Temperature coefficient	$< 0.02 \%$ of signal range
Long-term drift	0.1 % / 10,000 h
Impulse withstand voltage	4 kV (1.2/50 $\mu$ s)
Ambient temperature (operational)/storage temperature	0 °C...60 °C / -25 °C...70 °C

## Connections

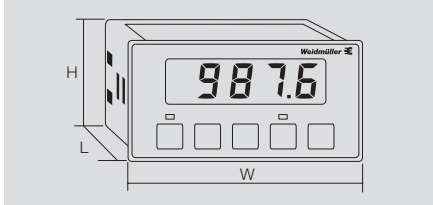
Terminal	Signal	
1	L -	Supply voltage.
2	L +	
3	Signal +	Analogue output (optional)
4	Signal -	
5	0 V	Pulse output
6	Pulse	
7	Optional, depending on type	Inputs
8		
9		
10		
11		
12		
13	NO contacts	Alarm channel 1 (optional)
14	Common	
15	NC contact	Alarm channel 2 (optional)
16	NO contacts	
17	Common	
18	NC contact	

## Counters

### PTX800 SERIES

Counter and totaliser with additional functionality and threshold monitoring

- Control panel assembly
- Pluggable connection terminals
- Scalable impulse and frequency counters for digital inputs signals
- Suitable on the input side for all common types of initiators



### Technical data

#### Input

Type

Input signal

Sensor supply

Input voltage

Total display, display range

#### Analogue output (optional)

Type (analogue output)

#### Input reset

Pulse duration, min.

#### Pulse output

Pulse rate, max.

#### General data

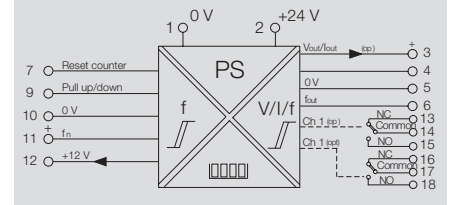
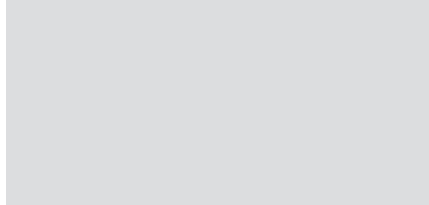
Type

EMC standards

Approvals

### PTX800D

#### Digital pulse input



### Connections

Terminal	Signal	
7	Reset by connection to class 12	Reset
8	Setup configuration by connection to class 12	Inputs
9	Pull Up/Down	
10	Signal -/0 V	
11	Signal +	
12	12 V DC	

#### Dimensions

Clamping range (nominal / min. / max.) mm<sup>2</sup>

Length x width x height mm

#### Note

#### Screw connection

1.5 / 0.5 / 2.5

137 / 96.6 / 48.8

### Ordering data

#### Connection system

without analogue / alarm output  
with analogue/alarm output

Type	Qty.	Order No.
PTX800D	1	7940011133
PTX800D RO/AO	1	7940012323

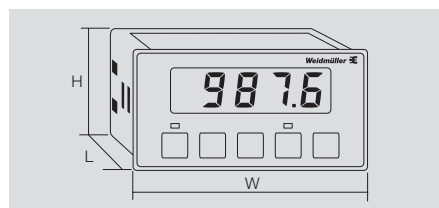
#### Note

### Accessories

### PTX800 SERIES

Counter and totaliser with additional functionality and threshold monitoring

- Control panel assembly
- Pluggable connection terminals
- Configurable counter and totaliser for analogue current and voltage signals
- Linearisation and interference suppression functions for matching up with a variety of sensor types
- Power supply for external sensors

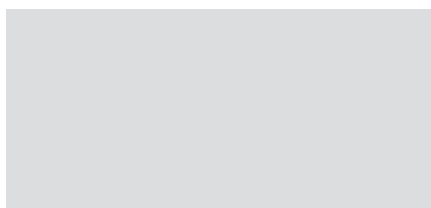


### Technical data

Input	
Type	
Input signal	
Sensor supply	
Resolution	
Input resistance	
Total display, display range	
Analogue output (optional)	
Type (analogue output)	
Input reset	
Pulse duration, min.	
Pulse output	
Pulse rate, max.	
General data	
Type	
EMC standards	
Approvals	

### PTX800A

Analogue current input / voltage input



Conversion of linear/quadratic input signals into analogue signals
-24...+24 mA / -11...+11 V
24 V DC (up to 25 mA)
0.6 μ, A / 0.3 mV
22 Ω (current input) or 1 MΩ (voltage input)
0,001; 0,01; 0,1; 1; 10; 100; 1000
Current of voltage output, configured with jumper
250 ms
15 / s
RO/AO version with 1 analogue output and 2 alarm outputs
DIN EN 61326
cULus; CE

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
1.5 / 0.5 / 2.5	
137 / 96.6 / 48.8	

### Ordering data

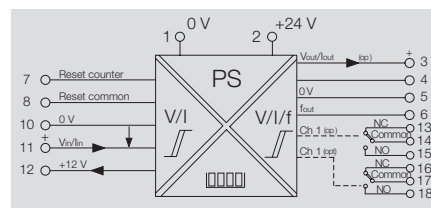
Connection system	
without analogue / alarm output	
with analogue/alarm output	

Type	Qty.	Order No.
PTX800A 4-20mA	1	7940010243
PTX800A 4-20mA/RO/AO	1	7940014374

Note
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### Accessories

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### Connections

Terminal	Signal	
7	Reset by connection to class Kl. 8	Reset
8	Common	
9	Setup configuration by connection to class 8	Configuration
10	Signal -/0 V	Inputs
11	Signal +	
12	24 V DC	



# PMX420 SERIES

## Universal, four-digit, current/voltage display

The current/voltage displays of the PMX420 SERIES are available as a pure PMX420 display unit or optionally with analogue outputs/4 alarm outputs.

The basic model is suitable for displaying all standard current or voltage signals. The input signals are electrically isolated, smoothed and scaled. An integrated power supply can be used for supplying external sensors and input devices.

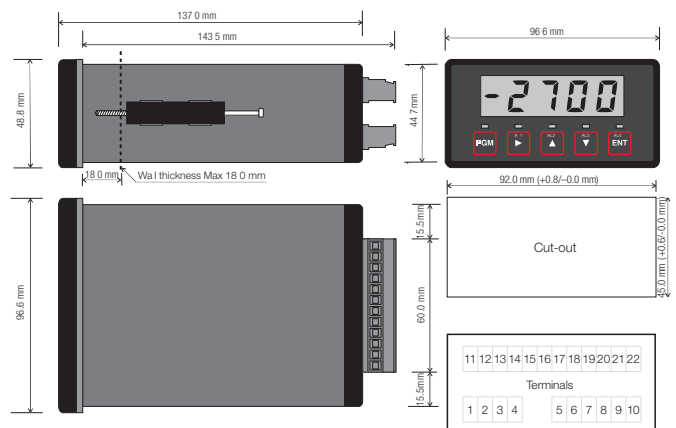
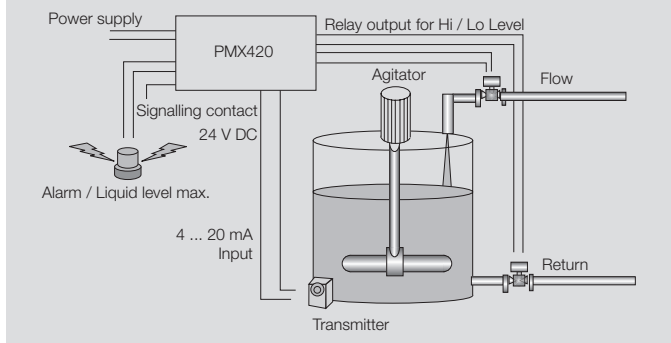
The PMX420Plus adds four alarm channels (each with its own status indicator and relay contact outputs) and a fully isolated analogue current/voltage output.

Device functions can be configured, specifically for the application, using the integrated keypad on the front panel. There are also several other handy features like maximum and minimum value recall, integrated linearisation, an acoustic alarm, a group alarm function, and the option for manual or automatic alarm reset.

### Technical features:

- Four-digit digital LED display
- Suitable for current and voltage signals
- Bipolar inputs
- Integrated square root function
- Retrieval of min. and max. values
- Integral power supply for active sensors
- DC power supply
- Complete electrical isolation
- Four alarm channels and an analogue current/voltage output (PMX420Plus)
- LED alarm status indication
- DIN-standard 1/8 front panel with IP65 protection
- Decimal point can be adjusted to any position
- Configurable via front-panel keypad

## Typical application of PMX 420 Plus



## Common technical data

Display	
Type	4 Digits, red LED, 14.2 mm
Display value	Percent or real-value displayed
Display range	9999 to +9999
Status indicator	Alarm channel 1-4; status LED
Input	
Type	Current or voltage input is programmable
Input current limits	-22...+22 mA (preset for 4...20 mA)
Input voltage limits	-11...+11 V
Input resistance	25 $\Omega$ (current input) or 1.5 M $\Omega$ (voltage input)
Resolution	4 $\mu$ A / 2 mV
Sensor current	4...20 mA
Feed voltage	24 V DC $\pm$ 1.5 V DC (to 25 mA)
Attenuation factor	0...99; programmable digital filter
Functions	
Values	Linear or $\sqrt{\quad}$
General information	
Supply voltage	18...50 V DC, other voltages on request
Power input	8.5 W at 24 V DC
Accuracy	Typically $\pm$ 0.1 % of signal range
Linearity	< 0.05 %
Repeat accuracy	$\pm$ 0.02 of signal range
Humidity	0...90 % (no condensation)
Temperature coefficient	< 0.02 % / $^{\circ}$ C at 100 %
Long-term drift	0.1 % / 10,000 h
Cut-off frequency (-3 dB)	5 Hz
Step response time	300 ms (10...90 %)
Impulse withstand voltage	4 kV (1.2/50 $\mu$ s)
Isolation voltage	2 kV between ports
Data backup	> 10 years without power supply
Ambient temperature (operational)/storage temperature	0 $^{\circ}$ C...60 $^{\circ}$ C / -25 $^{\circ}$ C...+70 $^{\circ}$ C
EMC standard	DIN EN 61326
Approvals	CE, cULus

## Connections

Terminal	Signal	
1	-	Supply voltage
2	+	High level
3	+	Supply voltage
4	-	Low level
5	Signal + sensor supply	Inputs
6	Configuration	
7	Signal + voltage input	
8	Signal + current input	
9	Signal 0 V	
10	Not used	
11	NC contact	Alarm channel 1 (only PMX420Plus)
12	Common	
13	NO contacts	Alarm channel 2 (only PMX420Plus)
14	NC contact	
15	Common	Alarm channel 3 (only PMX420Plus)
16	NO contacts	
17	NO contacts	Alarm channel 4 (only PMX420Plus)
18	Common	
19	NO contacts	Analogue Output (only PMX420Plus)
20	Common	
21	Signal +	
22	Signal -	



## Indicators and configurable displays for analogue signals

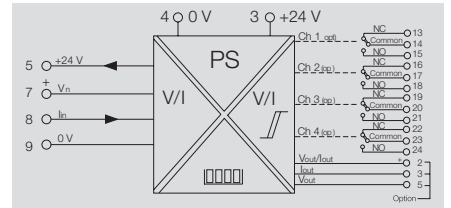
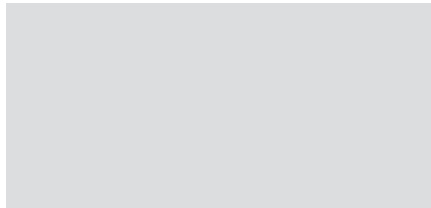
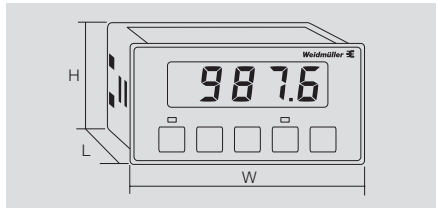
### PMX420 SERIES

Universal, 4-character current/voltage display

- Display instrument for control panel installation
- Pluggable connection terminals
- 4-character, scalable display
- Simple menu-driven configuration

### PMX420Plus

Display with analogue output and 4 alarm channels



### Technical data

Alarm	
Type	Adjustable output for current or voltage
Scaling	Variable
Output current	0...22 mA
Output voltage	0...11 V
Transmit function	direct or inverted
Load impedance, voltage/current	850 Ω @ 20 mA (current output) / < 500 Ω (voltage output)
Residual ripple	≤ 20 mV <sub>pp</sub>
Alarm	
Type	Internal Alarm via LED or output signal to external controller
Number of channels	4
Type of contact	2 CO contact und 2 NO contacts
Switching current	5 A @ 240 V AC, 10 A @ 24 V DC
Insulation voltage	2 kV input / power supply
Leakage current quenching	internal

### Connections

Terminal	Signal	
1	-	Supply voltage
2	+	High level
3	+	Supply voltage
4	-	Low level
5	Signal + sensor supply	Inputs
6	Configuration	
7	Signal + voltage input	
8	Signal + current input	
9	Signal 0 V	
10	Not used	
11	NC contact	Alarm channel 1
12	Common	
13	NO contacts	Alarm channel 2
14	NC contact	
15	Common	Alarm channel 3
16	NO contacts	
17	NO contacts	Alarm channel 4
18	Common	
19	NO contacts	Analogue Output
20	Common	
21	Signal +	
22	Signal -	

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

### Ordering data

Connection system
Voltage input/Current input

Type	Qty.	Order No.
PMX420Plus	1	7940018957

Note

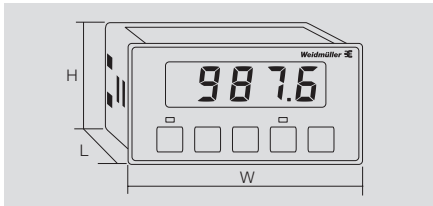
### Accessories

### PMX420 SERIES

- Universal, 4-character current/voltage display
- Display instrument for control panel installation
  - Pluggable connection terminals
  - 4-character, scalable display
  - Simple menu-driven configuration

### PMX420

#### Display



#### Technical data

##### Alarm

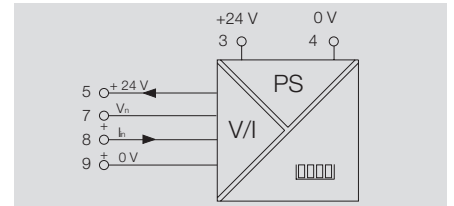
- Type
- Scaling
- Output current
- Output voltage
- Transmit function
- Load impedance, voltage/current
- Residual ripple

##### Alarm

- Type
- Number of channels
- Type of contact
- Ratings
- Leakage current quenching

not available

not available



#### Connections

Terminal	Signal	
1	-	Supply voltage
2	+	High level
3	+	Supply voltage
4	-	Low level
5	Signal + sensor supply	Inputs
6	Configuration	
7	Signal + voltage input	
8	Signal + current input	
9	Signal 0 V	
10	Not used	

G

#### Dimensions

Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm

#### Note

#### Screw connection

1.5 / 0.5 / 2.5
137 / 96.6 / 48.8

#### Ordering data

##### Connection system

Voltage input/Current input

Type	Qty.	Order No.
PMX420	1	7940018956

#### Note

#### Accessories

# PMX400 SERIES

## Four-digit temperature and frequency display with analogue-value read-out and alarm monitoring

The PMX400 SERIES consists of two modules:

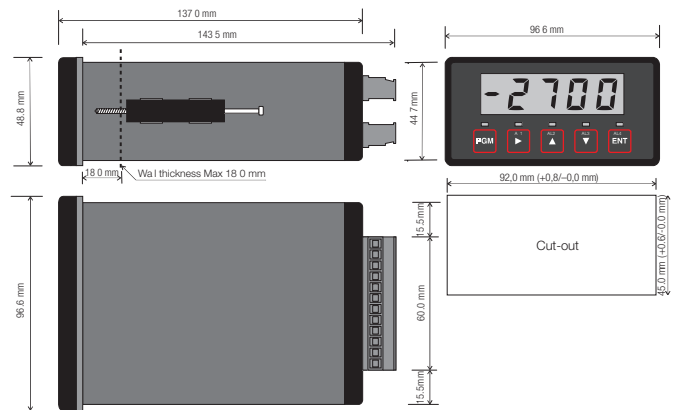
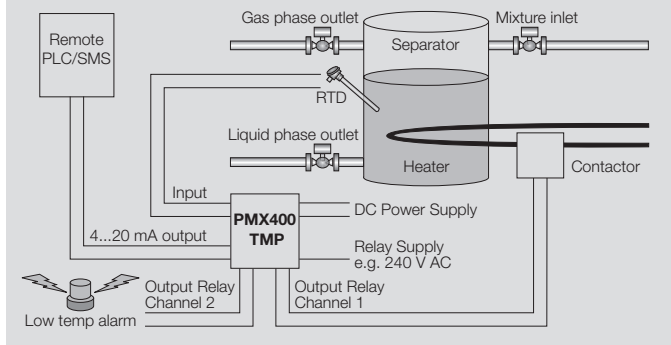
- Temperature display
- Frequency display / tachometer

A variety of temperature or frequency signals can be processed. On the output side, optional analogue signals are available, as well as either two or four relay contacts for alarm monitoring. The PMX400 HZX frequency display module offers, as default, two open-collector outputs as the relay contacts. The outputs are designated for the alarm function. An integrated power supply can be used for supplying external sensors and input devices.

### Technical features:

- Four-digit digital LED display
- Up to four alarm channels and an analogue current/voltage output
- Retrieval of min. and max. values
- Integral power supply for active sensors
- DC power supply
- Complete electrical isolation
- LED alarm status indication
- DIN-standard 1/8 front panel with IP65 protection
- Decimal point can be adjusted to any position
- configurable via front-panel keypad

### Typical application of PMX400



**Common technical data**

Display	
Type	Four-digit, red LED, 14.2 mm
Display value	Percent or real-value displayed
Display range	-9999 to +9999
Status indicator	Alarm channel 1-4; Status LED
Output	
Type	Current or voltage output
Scaling	Variable
Output signal limits	0...20 mA or 0...11 V
Load resistance	≤ 850 Ω (current), ≥ 1 MΩ (voltage)
Residual ripple	< 20 mVss
Transmit function	direct or reverse
General information	
Accuracy	Typically ± 0.1 % of signal range
Linearity	≥ 0.05 %
Repeat accuracy	± 0.02 % of signal range
Humidity	0...90 % (no condensation)
Temperature coefficient	≤ 0.02 % / °C
Long-term drift	0.1 % / 10,000 h
Cut-off frequency (-3 dB)	5 Hz
Impulse withstand voltage	4 kV (1.2/50 μs)
Isolation voltage	1 kV between ports
Data backup	≥ 100 years (without power supply)
Ambient temperature (operational)/storage temperature	0 °C...60 °C / -25 °C...75 °C
EMC standard	DIN EN 61326
Approvals	CE, cULus

Four-digit, red LED, 14.2 mm
Percent or real-value displayed
-9999 to +9999
Alarm channel 1-4; Status LED
Current or voltage output
Variable
0...20 mA or 0...11 V
≤ 850 Ω (current), ≥ 1 MΩ (voltage)
< 20 mVss
direct or reverse
Typically ± 0.1 % of signal range
≥ 0.05 %
± 0.02 % of signal range
0...90 % (no condensation)
≤ 0.02 % / °C
0.1 % / 10,000 h
5 Hz
4 kV (1.2/50 μs)
1 kV between ports
≥ 100 years (without power supply)
0 °C...60 °C / -25 °C...75 °C
DIN EN 61326
CE, cULus

**Connections**

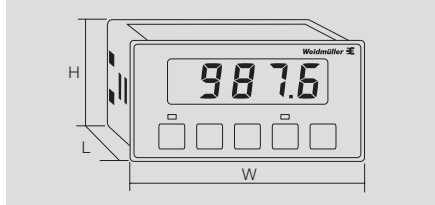
Terminal	Signal	
1	-	Supply voltage
2	+	
3	Signal +	Analogue output (only for AO version)
4	Signal - current	
5		Optional, depending on type
6		
7		
8		
9		
10		
11		
12		
8		
9		
10		
11		
12		
8		
9		
10		
11		
12		
13	NO contacts	Alarm channel 1 (only for 4RO version)
14	Common	
15	NC contact	Alarm channel 2 (only for 4RO version)
16	NO contacts	
17	Common	
18	NC contact	
19		Depending on the individual module
20		
21		
22		
23		
24		

## Indicators and configurable displays for temperature

### PMX400 SERIES

- Temperature measuring and monitoring (PT100, thermocouple, mV)
- Automatic sensor detection
- Automatic compensation for RTD measurement leads
- Cold-junction compensation for thermocouple inputs
- Display instrument for control panel installation

### PMX400TMP



### Technical data

Display	
Display value	Percentage or real value display
Input	
Type	Thermocouple, PT100 RTD or mV
Input signal	Configurable for 10 ranges
cold junction compensation	automatic
Cable-length compensation	automatic
Alarm	
Type	Status relay, CO contact
Switching current	3 A @ 240 V AC / 24 V DC (resistive load)
General data	
Supply voltage	20...28 V DC
Power consumption	6 W @ 24 V DC
Step response time	300 ms (10...90 %)
Sampling rate	5x pro s
Attenuation factor	0...99, programmable digital filter
Type	RO/AO version with 1 analogue output and alarm outputs
Insulation voltage	1 kV input / output / power supply
EMC standards	DIN EN 61326
Approvals	cULus; CE

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	
Screw connection	
1.5 / 0.5 / 2.5	
137 / 96.6 / 48.8	
Note	

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

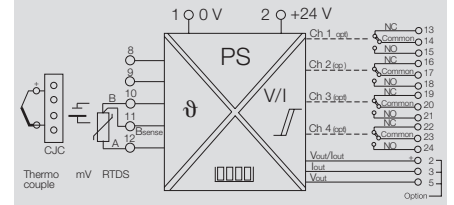
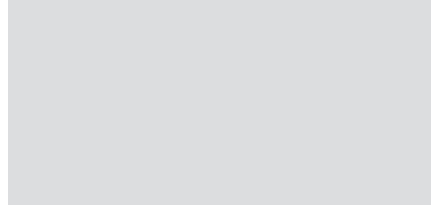
### Ordering data

Connection system	
without analogue / alarm output	
with analogue/alarm output	
Note	

Note	

### Accessories

Note	



### Connections

Terminal	Signal	
1	-	Supply voltage
2	+	
3	Signal +	Analogue output (only for AO version)
4	Signal - current	
5	Signal - voltage	Configuration
6	Connections for changing setup	
7		Thermocouple inputs
8		
9	Cold-junction compensation	
10		
11		RTD inputs
12	Not used	
8		mV inputs
9	Not used	
10	B	mV inputs
11	B-Sense	
12	A	mV inputs
8	Not used	
9		mV inputs
10	mV Signal -	
11	mV Signal +	mV inputs
12	Not used	
13	NO contacts	Alarm channel 1 (only for 4RO version)
14	Common	
15	NC contact	Alarm channel 2 (only for 4RO version)
16	NO contacts	
17	Common	Alarm channel 3 (only for 4RO version)
18	NC contact	
19	NO contacts	Alarm channel 4 (only for 4RO version)
20	Common	
21	NC contact	Alarm channel 4 (only for 4RO version)
22	NO contacts	
23	Common	Alarm channel 4 (only for 4RO version)
24	NC contact	

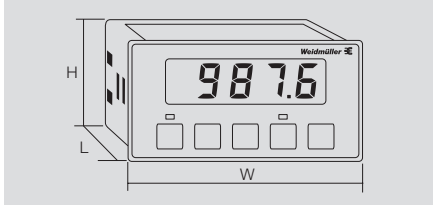
### Thermocouple (type J, K, N, T, E, B, S, R), RTD or mV signals

Input Type	Max. display range	
	highest	lowest
J	870 °C (1598 °F)	-50 °C (-58 °F)
K	1372 °C (2502 °F)	
N	1300 °C (2372 °F)	
T	400 °C (752 °F)	
E	700 °C (1292 °F)	
B	1800 °C (3272 °F)	0 °C (32 °F)
S	1768 °C (3214 °F)	-50 °C (-58 °F)
R	1768 °C (3214 °F)	-50 °C (-58 °F)
RTD	820 °C (1508 °F)	-220 °C (-364 °F)
mV	200 mV	-200 mV

**PMX400 SERIES**

- Frequency measuring and monitoring (3-wire NPN/PNP, NPN/PNP Open Collector, TTL logic, solid-state switch, potential-free contacts)
- Integrated power supply for external sensors
- Two outputs for monitoring threshold
- De-bouncing of switched input pulses

**PMX400HZX**



**Technical data**

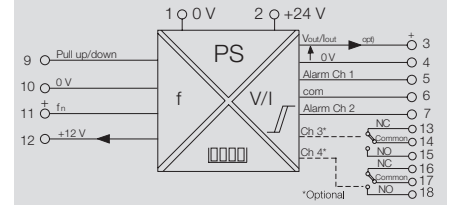
<b>Display</b>	
Display value	Percentage or real value display
<b>Input</b>	
Type	Adjustable frequencies
Input signal	Configurable for 4 ranges
Sensor supply	12 V DC to 25 mA
Input voltage	50 mV...250 V AC oder 3...250 V DC
<b>Alarm (channel 1/2)</b>	
Type	Channel 1/2: transistor output channel 3/4: relay contact (CO)
Rated switching current	200 mA
Rated switching voltage	50 V DC
<b>Alarm (channel 3/4)</b>	
Type	Channel 1/2: transistor output channel 3/4: relay contact (CO)
Switching current	Channel 3/4: 3 A @ 240 V AC / 24 V DC (resistive load)
<b>General data</b>	
Supply voltage	24 V DC ± 10 %
Power consumption	6 W @ 24 V DC
Step response time	220 ms (10...90 %)
Attenuation factor	0...99, programmable digital filter
Type	RO/AO version with 1 analogue output and alarm outputs
Insulation voltage	1 kV input / output / power supply
EMC standards	DIN EN 61326
Approvals	cULus; CE

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

<b>Connection system</b>	
	without analogue / alarm output
	with analogue/alarm output
<b>Note</b>	

**Accessories**



**Connections**

Terminal	Signal	
1	-	Supply voltage
2	+	
3	Signal +	Analogue output (only for AO version)
4	Signal -	
5	Common	Alarm channel 1 and 2 (only for 4RO version)
6	Channel 1	
7	Channel 2	Inputs/Configuration (Set-up: 12/8 connection)
8	Configuration	
9	Pull up / pull down	
10	Signal -	
11	Signal +	Alarm channel 3 (only for 4RO version)
12	12 V DC	
13	Common	Alarm channel 4 (only for 4RO version)
14	NC contact	
15	NO contacts	
16	Common	
17	NC contact	
18	NO contacts	

Input range	Offset	Resolution
0...9.999 Hz	0...9.998 Hz	0.001 Hz
0...99.99 Hz	0...99.98 Hz	0.01 Hz
0...999.9 Hz	0...999.8 Hz	0.1 Hz
0...9999 Hz	0...9998 Hz	1 Hz

<b>Screw connection</b>		
		1.5 / 0.5 / 2.5
		137 / 96.6 / 48.8

Type	Qty.	Order No.
PMX400HZX	1	7940015595
PMX400HZX RO/AO	1	7940011979



## Universal auto-manual stations

## AMS400A

## Universal auto-manual station

The AMS400A module is an interface device which can be used between control units and devices in the field. It carries out manual take-over of automatically controlled processes.

Typical applications are:

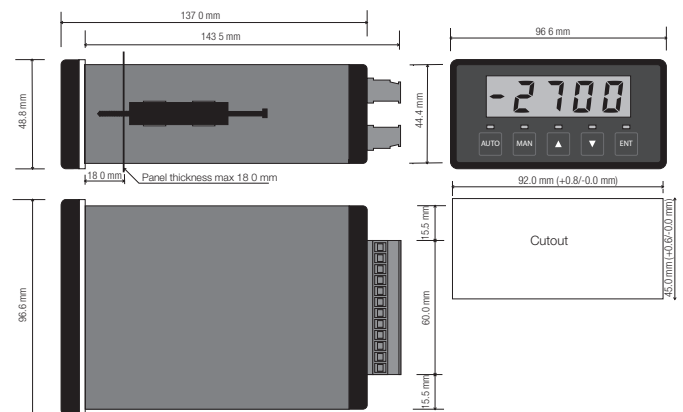
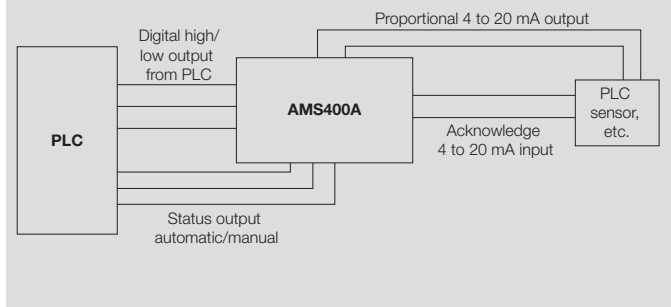
- Manual start-up of sensitive processes before handover to automatic control
- Manual over-ride in case of controller failure or malfunction.

The AMS400A offers three different I/O configurations, which serve as interfaces between:

- Analogue control equipment and analogue control devices
- Digital control equipment and analogue control devices
- Digital control equipment and digital control devices

During analogue-analogue operating mode, it is possible to use the digital outputs for switching between manual and automatic operations. Ramp rates and additional handover modes can be set globally in order to output signals to external controllers.

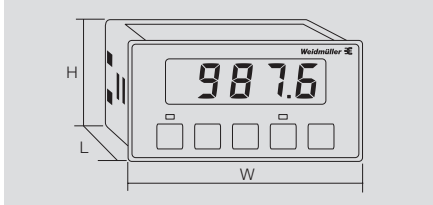
## Typical application of AMS400A



## AMS400A

Universal auto-manual stations

- Display instrument for control panel installation
- 1/8 DIN standard front
- IP65 fully insulated
- Pluggable connection terminals



### Technical data

<b>Display</b>	
Type	4-digit, red LED, 14.2 mm
Display value	Percentage or real value display
Display range	-9999...9999
<b>Input</b>	
Type	Current input or digital input (pulse-controlled or no-voltage contact)
Input signal	0...24 mA / 0...12 V DC
Input resistance	50 Ω (mA) / 10 MΩ (V)
Sampling rate	5x per sec. (current input)
Pulse width, min.	64 ms (digital input)
<b>Output</b>	
Type	Analogue and digital output
Output analogue	Current or voltage, configured with jumper
Output digital	2 optocouplers, 50 V DC / 200 mA
Output current	0...24 mA
Output voltage	0...18 V
Last resistor, max.	900 Ω @ 20 mA
<b>Alarm (RO version only)</b>	
Type	Status relay
Number of channels	2
Type of contact	CO contact
Ratings	3 A @ 240 V AC or 5 A @ 24 V DC
<b>General data</b>	
Supply voltage	24 V DC ± 10 %, other voltages on request
Power consumption	6 W @ 24 V DC
Accuracy	Typically ± 0.1 % of signal range
Repeat accuracy	± 0.02 % of signal range
Temperature coefficient	< 0.02 % / °C
Cut-off frequency (-3 dB)	5 Hz
Step response time	300 ms (10...90 %)
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	1 kV input / output / power supply
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
EMC standards	DIN EN 61326
Approvals	cULus; CE
<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

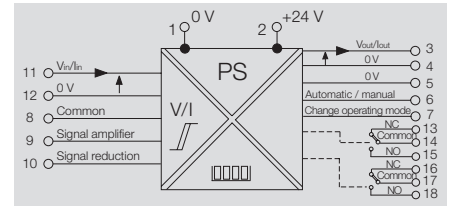
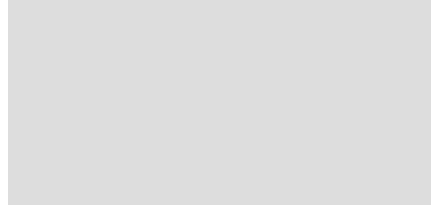
### Ordering data

<b>Connection system</b>	
	Analogue output
	Analogue and relay output
<b>Note</b>	

### Accessories

## AMS400A

Universal auto-manual stations



### Connections

Terminal	Signal	
1	-	Supply voltage
2	+	
3	Signal +	Analogue Output
4	Signal -	
5	Signal - 0 V	
6	Automatic / manual	Status outputs
7	Change operating mode	
8	Common	Digital inputs
9	Signal amplifier	
10	Signal reduction	
11	Signal +	Analogue inputs
12	Signal -	
13	NC contact	Relay output, signal amplifier
14	Common	
15	NO contacts	
16	NC contact	Relay output, signal reduction
17	Common	
18	NO contacts	

<b>Display</b>	
Type	4-digit, red LED, 14.2 mm
Display value	Percentage or real value display
Display range	-9999...9999
<b>Input</b>	
Type	Current input or digital input (pulse-controlled or no-voltage contact)
Input signal	0...24 mA / 0...12 V DC
Input resistance	50 Ω (mA) / 10 MΩ (V)
Sampling rate	5x per sec. (current input)
Pulse width, min.	64 ms (digital input)
<b>Output</b>	
Type	Analogue and digital output
Output analogue	Current or voltage, configured with jumper
Output digital	2 optocouplers, 50 V DC / 200 mA
Output current	0...24 mA
Output voltage	0...18 V
Last resistor, max.	900 Ω @ 20 mA
<b>Alarm (RO version only)</b>	
Type	Status relay
Number of channels	2
Type of contact	CO contact
Ratings	3 A @ 240 V AC or 5 A @ 24 V DC
<b>General data</b>	
Supply voltage	24 V DC ± 10 %, other voltages on request
Power consumption	6 W @ 24 V DC
Accuracy	Typically ± 0.1 % of signal range
Repeat accuracy	± 0.02 % of signal range
Temperature coefficient	< 0.02 % / °C
Cut-off frequency (-3 dB)	5 Hz
Step response time	300 ms (10...90 %)
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	1 kV input / output / power supply
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
EMC standards	DIN EN 61326
Approvals	cULus; CE
<b>Screw connection</b>	
	1.5 / 0.5 / 2.5
	137 / 96.6 / 48.8

Type	Qty.	Order No.
AMS400A 4-20mA/AO	1	7940011895
AMS400A 4-20mA/AO/RO	1	7940015937

<b>Note</b>	
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# DI350

## 3½-digit digital display with auxiliary power

The DI350 is an inexpensive 3½-digit digital display for analogue current and voltage signals, for use in industrial applications. With this display, analogue signals from 4...20 mA or 0...10 V can be displayed.

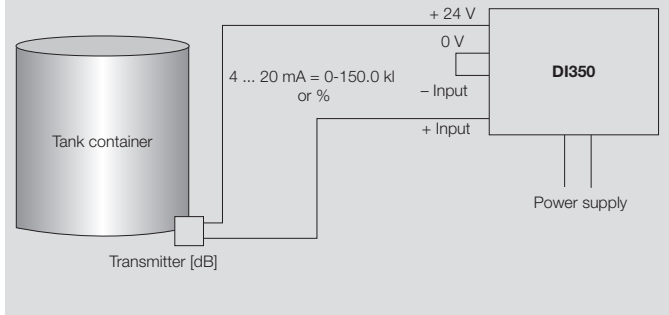
An integrated regulated power supply can be used to supply two-wire transmitters.

The decimal point can be moved to any of the positions (1.XXX, 1X.XX, 1XX.X or 1XXX) so that it can display values in any range.

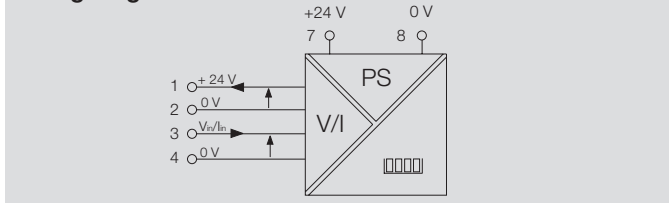
The bright seven-segment LEDs are easily visible even in weak lighting. The special filtering properties of the front face give it a wide viewing angle.

The DIN-standard 1/8 front panel with IP65 protection ensures reliable operation in wet areas. The connection uses pluggable screw-connection elements.

### Typical application of DI350

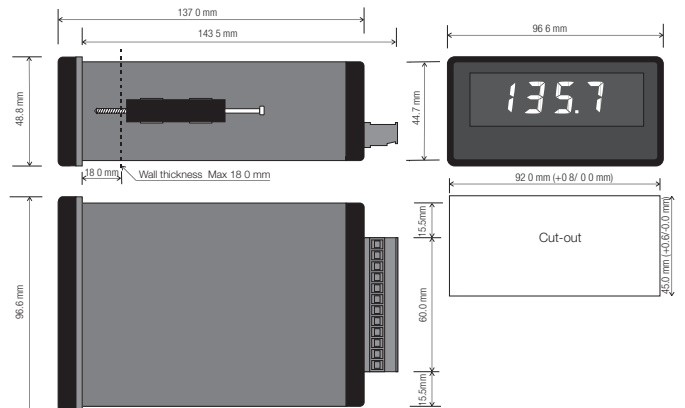


### Wiring diagram DI350



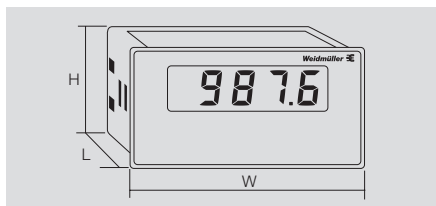
### Connections

Terminal	Signal		
1	24 V DC power supply sensor	Inputs	
2	0 V DC power supply sensor		
3	Input signal +		
4	Input signal -		
5	Not used		
6			
7	L -	Supply voltage	
8	L +		



### DI350

- Display instrument for control panel installation
- 1/8 DIN standard front
- 3½ Digits
- IP65 fully insulated
- Pluggable connection terminals



#### Technical data

Input	
Input signal	0...10 V
Input resistance	1 MΩ
Supply voltage	24 V DC (up to 25 mA)
Display	
Type	3.5 digits, red LED, 14.2 mm
Display range	-1999...1999
Display value	Percentage or real value display
Format	1-line / decimal point: 1.000, 100.0, 10.00
Settings	
Offset	± 1200 digital steps
Range of adjustment	20 - 2100 digital steps
General data	
Supply voltage	24 V DC (12...35 V DC)
Power consumption	6 W @ 24 V DC
Linearity	< 0.1 % typ.
Humidity	0 to 90 % (no condensation)
Temperature coefficient	± 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	200 ms (10...90 %)
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	1 kV input / power supply
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
EMC standards	DIN EN 61326
Approvals	cULus; CE

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

#### Ordering data

Connection system	Voltage input/Current input
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Note	
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#### Accessories

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### DI350

#### Display with voltage inputs



- Integrated power supply for external sensors
- Linearity with an accuracy of 0.1% of the measuring range
- Complete galvanic isolation

Input	
Input signal	0...10 V
Input resistance	1 MΩ
Supply voltage	24 V DC (up to 25 mA)
Display	
Type	3.5 digits, red LED, 14.2 mm
Display range	-1999...1999
Display value	Percentage or real value display
Format	1-line / decimal point: 1.000, 100.0, 10.00
Settings	
Offset	± 1200 digital steps
Range of adjustment	20 - 2100 digital steps
General data	
Supply voltage	24 V DC (12...35 V DC)
Power consumption	6 W @ 24 V DC
Linearity	< 0.1 % typ.
Humidity	0 to 90 % (no condensation)
Temperature coefficient	± 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	200 ms (10...90 %)
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	1 kV input / power supply
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
EMC standards	DIN EN 61326
Approvals	cULus; CE

Screw connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Type	Qty.	Order No.
DI350 0-10V/0-100.0	1	7940011570

Note	
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### DI350

#### Display with current inputs



- Integrated power supply for external sensors
- Linearity with an accuracy of 0.1% of the measuring range
- Complete galvanic isolation

Input	
Input signal	4...20 mA
Input resistance	22 Ω
Supply voltage	24 V DC (up to 25 mA)
Display	
Type	3.5 digits, red LED, 14.2 mm
Display range	-1999...1999
Display value	Percentage or real value display
Format	1-line / decimal point: 1.000, 100.0, 10.00
Settings	
Offset	± 1200 digital steps
Range of adjustment	20 - 2100 digital steps
General data	
Supply voltage	24 V DC (12...35 V DC)
Power consumption	6 W @ 24 V DC
Linearity	< 0.1 % typ.
Humidity	0 to 90 % (no condensation)
Temperature coefficient	± 0.02 % / °C
Long-term drift	0.1 % / 10.000 h
Step response time	200 ms (10...90 %)
Impulse withstand voltage	4 kV (1.2/50 μs)
Insulation voltage	1 kV input / power supply
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
EMC standards	DIN EN 61326
Approvals	cULus; CE

Screw connection	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Type	Qty.	Order No.
DI350 4-20mA/0-100.0	1	7940010185

Note	
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# LPD350

## 3½-digit digital display, loop powered

The LPD350 is a compact, cost effective, 3½ digit digital indicator designed specifically for current loop signals. The decimal point can be moved to any position (1.XXX, 1X.XX, 1XX.X or 1XXX) so that it can display values in a range of  $\pm 1999$ .

The LPD350 uses a liquid crystal display which can be read even under poor lighting conditions.

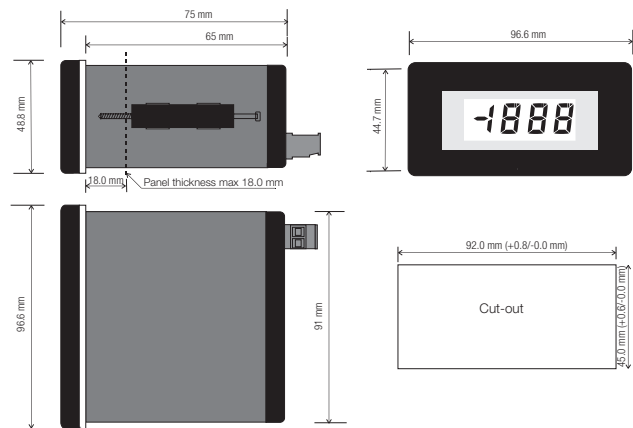
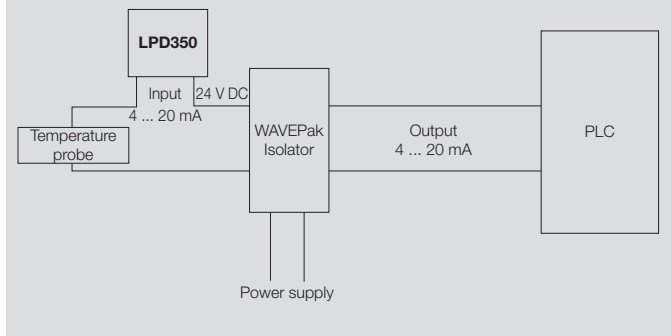
No additional wiring is needed for a power supply. The user can simply break the loop and connect to the LPD350.

The housing has a DIN-standard 1/8 front panel with IP65 protection. The connection uses pluggable screw-connection elements.

### Technical features:

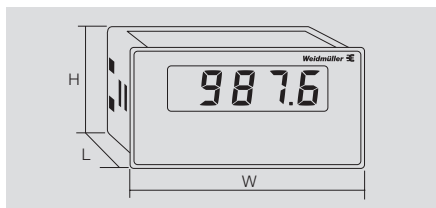
- Large 3½-digit digital LED display
- 4...20 mA input
- Loop-powered two-wire design (125  $\Omega$  loop load)
- Direct or reverse-action display
- Linearity is  $\pm 0.1$  % of the corresponding signal range
- DIN-standard front-panel with IP65 protection
- Pluggable screw-connection mechanism

### Typical application of LPD350



**LPD350**

- Display instrument for control panel installation
- 1/8 DIN standard front
- 3½ Digits
- IP65 fully insulated
- Pluggable connection terminals



**Technical data**

<b>Input</b>	
Input current	4...20 mA
Voltage drop	2.5 V @ 20 mA
Input resistance	125 Ω
Input current, max.	100 mA constant / 500 mA for 10 sec.
Input current, max. when wired incorrectly	500 mA constant
<b>Display</b>	
Type	3.5 digits, black LCD with clear background, 12.7 mm
Display range	-1999...1999
Format	Single-line
<b>Settings</b>	
Offset	± 1999 digital steps in two switching ranges
Range of adjustment	0...3998 in three switching ranges
<b>General data</b>	
Accuracy	± 0.05 % from signal range ± 1 digital step
Repeat accuracy	± 0.05% of signal range
Temperature coefficient	Offset ± 0.1 digital steps per °C adjustment range ± 0.1 digital steps per °C
Step response time	200 ms (10...90 %)
Sampling rate	2,5 x pro s
Ambient temperature / Storage temperature	-20 °C...+70 °C / -25 °C...+85 °C
EMC standards	DIN EN 61326
Approvals	cULus; CE

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

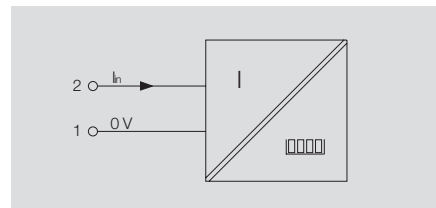
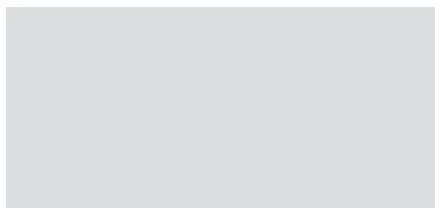
<b>Connection system</b>	Current input
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**Note**

**Accessories**

**LPD350**

**Current input**



**Connections**

Terminal	Signal
1	Input -
2	Input +

<b>Input</b>	
Input current	4...20 mA
Voltage drop	2.5 V @ 20 mA
Input resistance	125 Ω
Input current, max.	100 mA constant / 500 mA for 10 sec.
Input current, max. when wired incorrectly	500 mA constant
<b>Display</b>	
Type	3.5 digits, black LCD with clear background, 12.7 mm
Display range	-1999...1999
Format	Single-line
<b>Settings</b>	
Offset	± 1999 digital steps in two switching ranges
Range of adjustment	0...3998 in three switching ranges
<b>General data</b>	
Accuracy	± 0.05 % from signal range ± 1 digital step
Repeat accuracy	± 0.05% of signal range
Temperature coefficient	Offset ± 0.1 digital steps per °C adjustment range ± 0.1 digital steps per °C
Step response time	200 ms (10...90 %)
Sampling rate	2,5 x pro s
Ambient temperature / Storage temperature	-20 °C...+70 °C / -25 °C...+85 °C
EMC standards	DIN EN 61326
Approvals	cULus; CE

<b>Screw connection</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

Type	Qty.	Order No.
LPD350 4-20mA/0-100.0	1	7940010163

**Note**

# LPD450F

## 4½-digit digital display, loop powered for field mounting

The display is loop powered by the 4...20 mA current loop with no external supply required. The twenty-mm LCD displays can be read even under poor light conditions.

A sheet of perforated self-adhesive labels comes included in delivery. They include standard engineering units and can be used for all label needs.

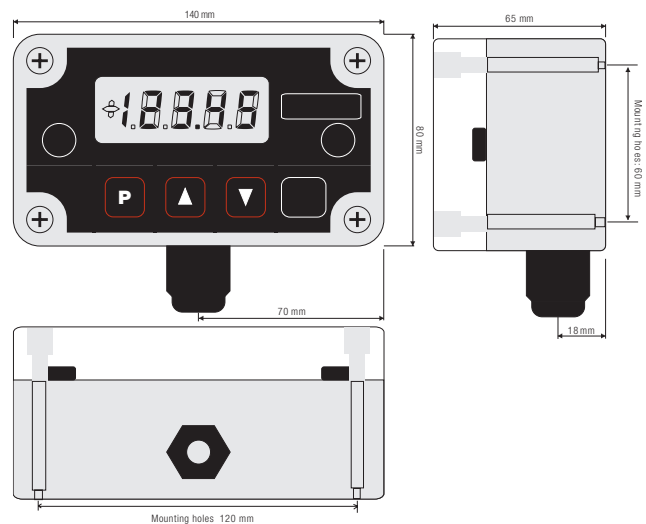
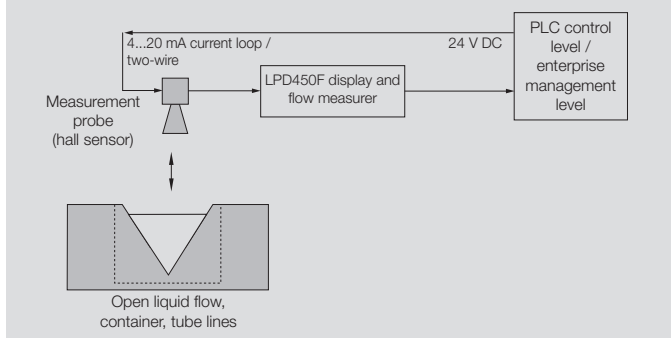
The electronic subassembly is housed in a rugged, glass reinforced polycarbonate, IP67 case. This housing is suitable for any industrial environment.

Optionally available is a pipe mounting bracket which can be used for horizontal and vertical mounting.

### Technical features:

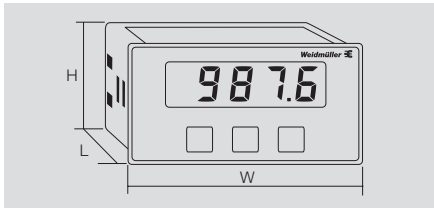
- Big 20 mm LCD display
- 4...20 mA inputs (two-wire loop-powered)
- Integrated signal linearisation ( $\sqrt{\quad}$ ,  $x^{3/2}$ ,  $x^{5/2}$  or user-defined)
- Min./max. value display feature
- IP67 protection
- Pipe mount bracket option

## Typical application of LPD450F



**LPD450F**

- Display instrument for outdoor use
- 4 1/2 Digits
- IP67 fully insulated
- Optionally available with fixing clips for pipe mounting



**Technical data**

<b>Input</b>	
Input current	4...20 mA
Transmit function	$\sqrt{\quad}$ , $x^{3/2}$ , $x^{5/2}$ or programmable (2-21 steps)
<b>Display</b>	
Type	4.5-character, black LCD with clear background, 20 mm
Display value	Percentage or real value display
Display range	$\pm 19.999$ (0.00...100.00 factory setting)
Decimal point	18888, 1.8888, 18.888, 188.88, 1888.8
<b>General data</b>	
Supply voltage	Loop powered, via 4–20 mA input
Voltage drop	< 4.3 V
Accuracy	$\pm 0.05\%$ from signal range $\pm 1$ digital step
Repeat accuracy	$\pm 0.01\%$ of signal range
Temperature coefficient	Offset $\pm 0.01\%$ / °C adjustment range $\pm 0.1$ digital steps or 0.01 % / °C
Humidity	10...90 % (no condensation)
Step response time	Programmable in 99 steps from 1...30 sec.
Sampling rate	16 x pro s
Change of display	2 x per sec.
Ambient temperature / Storage temperature	0 °C...+60 °C / -25 °C...+70 °C
EMC standards	DIN EN 61326
Approvals	cULus; CE

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

**Ordering data**

<b>Connection system</b>	Current input
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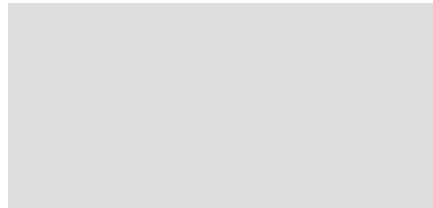
<b>Note</b>	
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**Accessories**

Fixing clip Pipe Mount Kit - 7940010667
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**LPD450F**

**Current input**



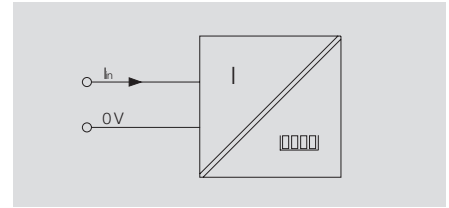
Input current	4...20 mA
Transmit function	$\sqrt{\quad}$ , $x^{3/2}$ , $x^{5/2}$ or programmable (2-21 steps)
Type	4.5-character, black LCD with clear background, 20 mm
Display value	Percentage or real value display
Display range	$\pm 19.999$ (0.00...100.00 factory setting)
Decimal point	18888, 1.8888, 18.888, 188.88, 1888.8
Loop powered, via 4–20 mA input	< 4.3 V
Accuracy	$\pm 0.05\%$ from signal range $\pm 1$ digital step
Repeat accuracy	$\pm 0.01\%$ of signal range
Offset $\pm 0.01\%$ / °C	adjustment range $\pm 0.1$ digital steps or 0.01 % / °C
Humidity	10...90 % (no condensation)
Programmable in 99 steps from 1...30 sec.	16 x pro s
2 x per sec.	0 °C...+60 °C / -25 °C...+70 °C
DIN EN 61326	cULus; CE

<b>Screw connection</b>	
1.5 / 0.5 / 2.5	
65 / 140 / 80	

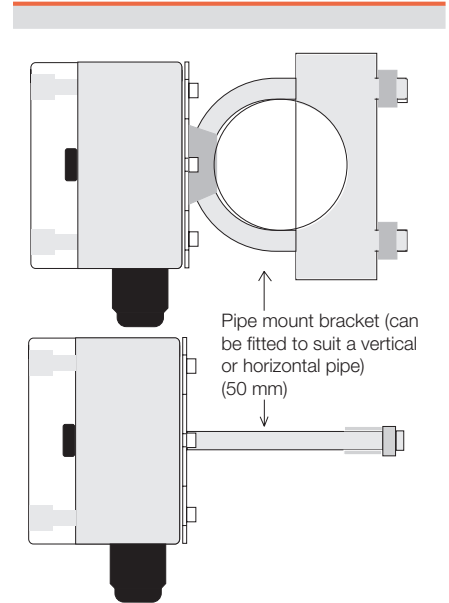
Type	Qty.	Order No.
LPD450F 4-20mA	1	7940010236

<b>Note</b>	
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Fixing clip Pipe Mount Kit - 7940010667
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**Mounting sketch**





# Interface converter, AD/DA converter

<b>Interface converter, AD/DA converter</b>	Interface converter, AD/DA converter – Overview	H.2
	Serial interface converter	H.4
	AD/DA converter	H.6



# Isolating converter for serial interfaces and AD-/DA converter

## Isolating converter for serial interfaces RS232/RS485/422 or TTY

Serial interface are used for exchanging data between data processing systems, controllers and peripherals. The WDS2 interface isolating converter is particularly well suited for harsh surrounding located near the process. Versions are available for a variety of industrial applications:

- RS-232/RS-422 or RS-485
- RS-232/TTY.

The thin (22.5 mm wide) rail-mounted modules come with a 9-pole SUB-D connector for the RS232 connection and a shield connection for the RS485/422 or TTY signal line. In order to ensure high transmission security, the serial interface isolating converters are equipped with high-quality 4-kV 3-way electrical isolation.

## H

- **Easy to service:** the electronic components can be removed from the housing/base without using any tools. Terminating resistor can be selected with DIP switch.
- **High data transmission speeds** up to 115 kBit/s and freely adjustable
- **Secure connection:** 9-pole Sub-D connector for the RS232 interface.

For the serial RS485/422 and TTY connection, you can contact the shield using the LLBU or the EMC Set (1067470000).

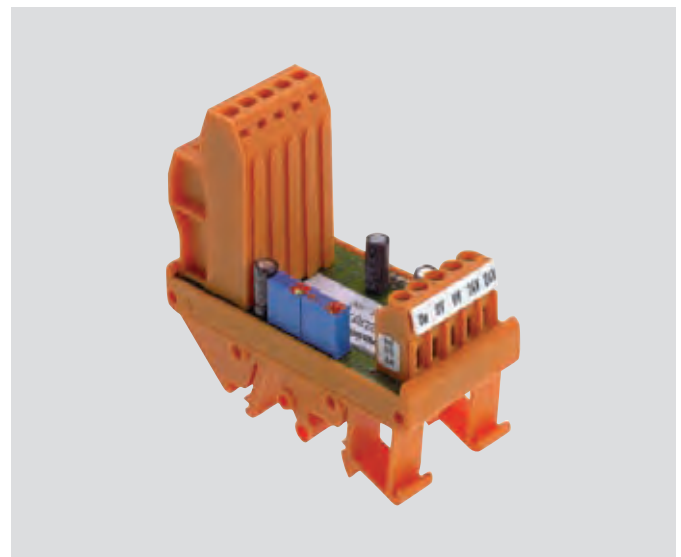
## AD/DA converter

It may be necessary to convert analogue signals into digital signals when you need the analogue signal from the surroundings to work with the typical digital processing requirements of process monitoring. A/D and D/A converters can be used generally for converting standardised analogue current/voltage signals into digital signals, or for converting bit structures into their corresponding analogue signals.

RS U/I-D8 A/D converters digitise standardised analogue current signals and have 8-bit accuracy. The RS D8-I /U D/A converter converts digital data with 8-bit parallel structure into analogue standard signals. All modules are equipped with a hold-and-enable function, so that the momentary output value is maintained even during a change to the input value.

You can find additional information describing the input/output characteristics of the D/A and A/D converters on our web site at [www.weidmuller.de](http://www.weidmuller.de) => downloads.

- **All-purpose:** 8-bit A/D and D/A converters for all typical analogue standard signals.
- **Persistent memory:** integrated hold-and-enable function
- **A secure connection:** the proven screw connection method



**Isolating converter for serial interfaces and AD-/DA converter**



**WDS2 RS232/RS485/422**

Converts RS232 into RS485/422 signals



**WDS2 RS232/TTY**

Converts RS232 into TTY signals



**RS I/U-D8**

Converts analogue current/voltage signals into an 8-bit data word



**RS D8-I/U**

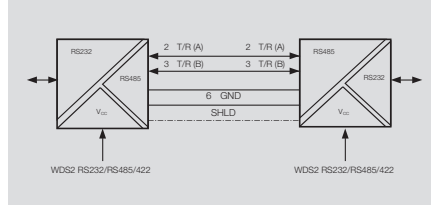
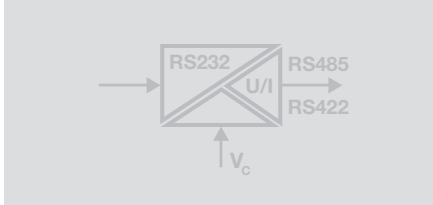
Converts 8-bit data words into analogue current/voltage signals

## Serial interface converter

### RS232/RS485/422

- 3-way isolation
- RS232 connection via SUB-D 9
- RS485/422, TTY shield connection via locking bar
- Switchable DTE or DCE assignment
- Bidirectional communication

### RS232/RS485/422



### Technical data

#### RS232

Connection type / Input current  
Assignment

#### RS485/422

Terminating resistors  
Type of connection  
Bit distortion  
Bit delay  
Control of data direction  
Shield connection  
Status indicator  
Transmission rate  
Transmission channels

Transmission distance

#### General data

Supply voltage  
Power consumption  
Ambient temperature  
Storage temperature  
Approvals

#### Insulation coordination

Standards  
EMC standards  
Rated voltage  
  
Impulse withstand voltage  
Pollution severity  
Overvoltage category  
Clearance & creepage distances  
  
Insulation voltage

SUB-D9 (male plug) /  
DTE/DCE switchable with DIP switch

Pull-down/pull-up via DIP switch  
Screw connection  
< 5 %  
≤ 3 μs  
Automatic or via RS232 RTS/CTS  
KLBÜ 4-6/Z1  
LED green: supply voltage, TxD, RxD  
115.2 kBit/s  
Half duplex (RS485, 2-wire)  
Full duplex (RS485, 4-wire and RS422)  
Max. 1200 m twisted pair

24 V DC ± 25 %  
ca. 1.5 W  
0 °C...+55 °C  
-20 °C...+85 °C  
cULus; GL; CE  
  
EN 50178  
EN 55011, EN 61000-6-2, EN 61000-6-4  
between adjacent electric circuits: 300 V  
between electric circuits and PE: 150 V  
4 kV  
2  
III  
Between adjacent circuits: 3 mm  
between the circuits and PE: 1.5 mm  
2 kV DC / 1 min.

#### Dimensions

Clamping range (nominal / min. / max.)      mm<sup>2</sup>  
Length x width x height                              mm

#### Note

#### Screw connection

2.5 / 0.5 / 2.5  
92.4 / 22.5 / 112.4

### Ordering data

#### Connection system

Screw connection

Type	Qty.	Order No.
WDS2 RS232/RS485/422	1	8615700000

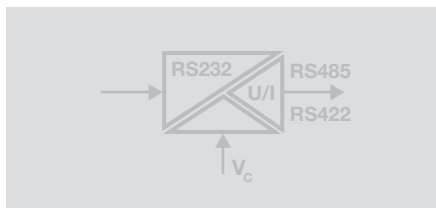
#### Note

### Accessories

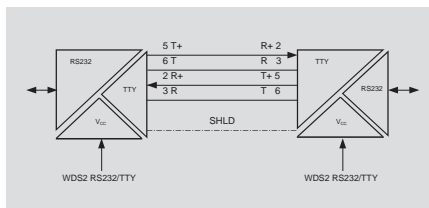
Cross-connector for power supplies and markers – refer to Accessories

### RS232/TTY

- 3-way isolation
- RS232 connection via SUB-D 9
- RS485/422, TTY shield connection via locking bar
- Switchable DTE or DCE assignment
- Bidirectional communication



### RS232/TTY



### Technical data

<b>RS232</b>	Connection type / Input current Assignment
<b>TTY</b>	Type of connection Bit distortion Bit delay Load Shield connection Status indicator Transmission rate Transmission channels Transmission distance
<b>General data</b>	Supply voltage Power consumption Ambient temperature Storage temperature Approvals
<b>Insulation coordination</b>	Standards EMC standards Rated voltage  Impulse withstand voltage Pollution severity Overvoltage category Clearance & creepage distances  Insulation voltage

SUB-D9 (male plug) / DTE/DCE switchable with DIP switch
Screw connection < 1.5% ≤ 3 μs ≤ 500 Ω KLBÜ 4-6/Z1 LED green: supply voltage, TxD, RxD 19.2 kBit/s full duplex Max. 1000 m twisted pair
24 V DC ± 25 % ca. 0.8 W 0 °C...+55 °C -20 °C...+85 °C cULus; GL; CE
EN 50178 EN 55011, EN 61000-6-2, EN 61000-6-4 between adjacent electric circuits: 300 V between electric circuits and PE: 150 V 4 kV 2 III Between adjacent circuits: 3 mm between the circuits and PE: 1.5 mm 2 kV DC / 1 min.

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	
2.5 / 0.5 / 2.5	
92.4 / 22.5 / 112.4	

### Ordering data

<b>Connection system</b>	Screw connection
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Type	Qty.	Order No.
WDS2 RS232/TTY	1	8615690000

<b>Note</b>	
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### Accessories

Cross-connector for power supplies and markers – refer to Accessories

## AD/DA converter

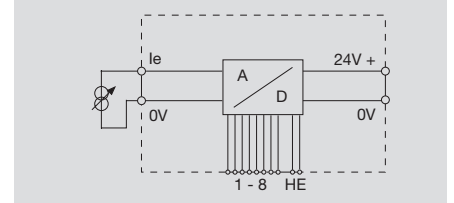
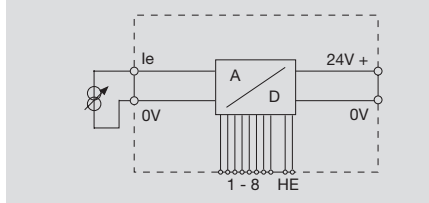
### AD converter, 8-bit

- Hold function for current bit combination storing
- More information and table for input/output characteristics of A/D, D/A converters available at [www.weidmueller.com](http://www.weidmueller.com)

### RS I-D8 0...20 mA



### RS I-D8 4...20 mA



### Technical data

#### Input

Input voltage / Input current  
Rated voltage / Rated current  
Input resistance, voltage/current

#### Output

Number of outputs  
Output level

Signs  
Output current  
Accuracy  
Cut-off frequency (-3 dB)  
Conversion time

#### General data

Supply voltage  
Current consumption  
Ambient temperature  
Storage temperature  
Approvals

#### Insulation coordination

Standards  
EMC standards

/ 0...20 mA  
3.5 V / 25 mA  
50 kΩ per input /

8-bit (1-bit signed)  
17 V = H, 0 V = L

≤ 25 mA (as source)  
± 1 LSB  
5 kHz at full scale (sinus)  
≤ 4 μs

24 V DC ± 20 %  
35 mA (plus output current)  
0 °C...+50 °C  
-40 °C...+80 °C  
CE

EN 50178  
EN 61000-6

/ 4...20 mA  
3.5 V / 25 mA  
/ ≥ 51 Ω

8-bit (1-bit signed)  
17 V = H, 0 V = L

≤ 25 mA (as source)  
± 1 LSB  
5 kHz at full scale (sinus)  
≤ 4 μs

24 V DC ± 20 %  
35 mA (plus output current)  
0 °C...+50 °C  
-40 °C...+80 °C  
CE

EN 50178  
EN 61000-6

#### Dimensions

Clamping range (nominal / min. / max.) mm<sup>2</sup>  
Length x width x height mm

#### Note

#### Screw connection

4 / 0,5 / 4  
70 / 35 / 72

#### Screw connection

4 / 0,5 / 4  
70 / 35 / 72

### Ordering data

#### Connection system

Screw connection

Type	Qty.	Order No.
RS I-D8 0...20MA	1	1160561001

Type	Qty.	Order No.
RS I-D8 4...20MA	1	1168561001

#### Note

### Accessories

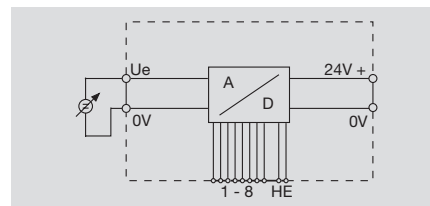
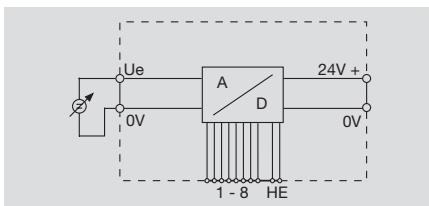
**AD converter, 8-bit**

- Hold function for current bit combination storing
- More information and table for input/output characteristics of A/D, D/A converters available at [www.weidmueller.com](http://www.weidmueller.com)

**RS U-D8 +/-10 V**



**RS U-D8 0...10 V**



**Technical data**

Input	
Input voltage / Input current	-10...+10 V /
Rated voltage / Rated current	/ ≤ 55 μA
Input resistance, voltage/current	≥ 200 kΩ /
Output	
Number of outputs	8-bit (1-bit signed)
Output level	17 V = H, 0 V = L
Signs	MSB: H = positive; L = negative
Output current	≤ 25mA (as source)
Accuracy	± 1 LSB
Cut-off frequency (-3 dB)	5 kHz at full scale (sinus)
Conversion time	≤ 4 μs
General data	
Supply voltage	24 V DC ± 20 %
Current consumption	35 mA (plus output current)
Ambient temperature	0 °C...+50 °C
Storage temperature	-40 °C...+80 °C
Approvals	CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 61000-6

Input	
Input voltage / Input current	-10...+10 V /
Rated voltage / Rated current	/ ≤ 55 μA
Input resistance, voltage/current	≥ 200 kΩ /
Output	
Number of outputs	8-bit (1-bit signed)
Output level	17 V = H, 0 V = L
Signs	MSB: H = positive; L = negative
Output current	≤ 25mA (as source)
Accuracy	± 1 LSB
Cut-off frequency (-3 dB)	5 kHz at full scale (sinus)
Conversion time	≤ 4 μs
General data	
Supply voltage	24 V DC ± 20 %
Current consumption	35 mA (plus output current)
Ambient temperature	0 °C...+50 °C
Storage temperature	-40 °C...+80 °C
Approvals	CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 61000-6

Input	
Input voltage / Input current	0...10 V /
Rated voltage / Rated current	/ ≤ 25 μA
Input resistance, voltage/current	≥ 400 kΩ /
Output	
Number of outputs	8-bit (1-bit signed)
Output level	17 V = H, 0 V = L
Signs	MSB: H = positive; L = negative
Output current	≤ 25mA (as source)
Accuracy	± 1 LSB
Cut-off frequency (-3 dB)	5 kHz at full scale (sinus)
Conversion time	≤ 4 μs
General data	
Supply voltage	24 V DC ± 20 %
Current consumption	35 mA (plus output current)
Ambient temperature	0 °C...+50 °C
Storage temperature	-40 °C...+80 °C
Approvals	CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 61000-6

Dimensions	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
Note	

Screw connection	
4 / 0,5 / 4	
70 / 35 / 72	
Note	

Screw connection	
4 / 0,5 / 4	
70 / 35 / 72	
Note	

**Ordering data**

Connection system	Screw connection
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Type	Qty.	Order No.
RS U-D8 +/-10V	1	1122361001

Type	Qty.	Order No.
RS U-D8 0...10V	1	1160361001

Note	
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**Accessories**

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Note	
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Note	
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## AD/DA converter

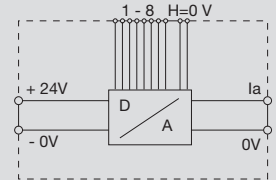
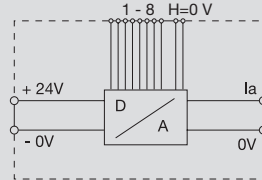
### DA converter 8-bit

- Hold function for current bit combination storing
- More information and table for input/output characteristics of A/D, D/A converters available at [www.weidmueller.com](http://www.weidmueller.com)

### RS D8-I 0...20 mA



### RS D8-I 4...20 mA



### Technical data

#### Input

Input/Output  
Rated voltage  
Rated current  
Input voltage / Input current  
Input resistance, voltage/current  
Signs

#### Output

Output voltage / Output current  
Offset current / Offset voltage  
Load impedance, voltage/current  
Accuracy  
Conversion time

#### General data

Supply voltage  
Current consumption  
Ambient temperature  
Storage temperature  
Approvals

#### Insulation coordination

Standards  
EMC standards

8 bit / analogue  
Max. 30 V

5...24 V /  
50 kΩ per input /

/ 0...20 mA (as source)  
max. 0.08 mA /  
≤ 500 Ω /  
± 1 LSB  
≤ 30 μs

24 V DC ± 20 %  
25 mA (plus output current)  
0 °C...+50 °C  
-40 °C...+80 °C  
CE

EN 50178  
EN 61000-6

8 bit / analogue  
Max. 30 V

5...24 V /  
50 kΩ per input /

/ 4...20 mA (as source)  
4 mA /  
≤ 500 Ω /  
± 1 LSB  
≤ 30 μs

24 V DC ± 20 %  
25 mA (plus output current)  
0 °C...+50 °C  
-40 °C...+80 °C  
CE

EN 50178  
EN 61000-6

#### Dimensions

Clamping range (nominal / min. / max.) mm<sup>2</sup>  
Length x width x height mm

#### Note

#### Screw connection

4 / 0,5 / 4  
70 / 35 / 72

#### Screw connection

4 / 0,5 / 4  
70 / 35 / 72

### Ordering data

Connection system  
Screw connection

Type	Qty.	Order No.
RS D8-I 0...20MA	1	1165861001

Type	Qty.	Order No.
RS D8-I 4...20MA	1	1169261001

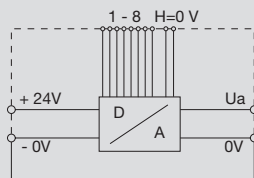
#### Note

### Accessories

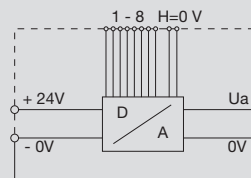
**DA converter 8-bit**

- Hold function for current bit combination storing
- More information and table for input/output characteristics of A/D, D/A converters available at [www.weidmueller.com](http://www.weidmueller.com)

**RS D8-U +/-10 V**



**RS D8-U 0...10 V**



**Technical data**

<b>Input</b>	
Input/Output	
Rated voltage	
Rated current	
Input voltage / Input current	
Input resistance, voltage/current	
Signs	
<b>Output</b>	
Output voltage / Output current	
Offset current / Offset voltage	
Load impedance, voltage/current	
Accuracy	
Conversion time	
<b>General data</b>	
Supply voltage	
Current consumption	
Ambient temperature	
Storage temperature	
Approvals	
<b>Insulation coordination</b>	
Standards	
EMC standards	

8 bit / analogue
Max. 30 V
2.5 mA
5...24 V /
50 kΩ per input /
MSB: H = positive; L = negative
-10...+10 V / ≤ 10 mA max. current
/ ≤ 20 mV
≥ 1 kΩ /
± 1 LSB
≤ 30 μs
24 V DC ± 20 %
25 mA (plus output current)
0 °C...+50 °C
-40 °C...+80 °C
CE
EN 50178
EN 61000-6

8 bit / analogue
Max. 30 V
2.5 mA
5...24 V /
50 kΩ per input /
0...10 V / ≤ 10 mA max. current
/ ≤ 20 mV
≥ 1 kΩ /
± 1 LSB
≤ 30 μs
24 V DC ± 20 %
25 mA (plus output current)
0 °C...+50 °C
-40 °C...+80 °C
CE
EN 50178
EN 61000-6

<b>Dimensions</b>	
Clamping range (nominal / min. / max.)	mm <sup>2</sup>
Length x width x height	mm
<b>Note</b>	

<b>Screw connection</b>	
4 / 0.5 / 4	
70 / 35 / 72	

<b>Screw connection</b>	
4 / 0.5 / 4	
70 / 35 / 72	

**Ordering data**

<b>Connection system</b>	Screw connection
--------------------------	------------------

Type	Qty.	Order No.
RS D8-U +/-10V	1	1123361001

Type	Qty.	Order No.
RS D8-U 0...10V	1	1160761001

<b>Note</b>	
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**Accessories**

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# Accessories Analogue Signal Conditioning

<b>Accessories</b>	Accessories Analogue Signal Conditioning – Overview	I.2
<b>Analogue Signal Conditioning</b>	USB configuration interface	I.4
	Calibrators	I.6
	ACT20X/ACT20P – Accessories	I.10
	WAVESERIES – Accessories	I.11
	MICROSERIES – Accessories	I.12
	MCZ-SERIES – Accessories	I.13

# Accessories Analogue Signal Conditioning

## Configure, calibrate, mount, mark, (cross-) connect.

A comprehensive line of accessories is also available for the analogue signal converter product line. The line includes configuration adapters for software-programmable products, interface modules, calibrators and mounting accessories (such

as cross-connectors, end plates and terminal connectors) – all naturally in the top Weidmüller quality that you've come to expect.





**USB configuration interface**



**Calibrators**



**ACT20X/ACT20P – Accessories**



**WAVESERIES Accessories**



**MICROSERIES Accessories**



**MCZ Accessories**

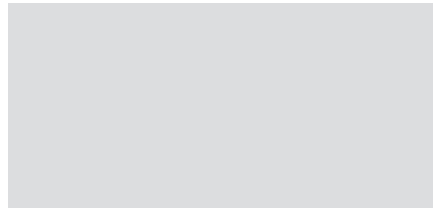
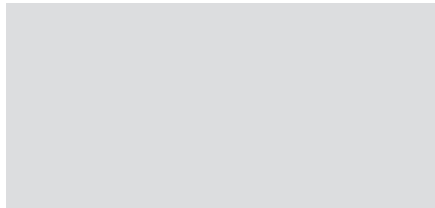


## USB configuration interface

### CBX200

- Configuration Interface with galvanic isolation
- USB port for PC
- TX and RX status displays
- WI-Manager and TTA Set configuration software programs: download at [www.weidmueller.com](http://www.weidmueller.com)

### CBX200 USB



The CBX200 USB is a USB2.0/RS232-interface converter with galvanic isolation. It has additional functionality for controlling and supplying the connected RS232 device. The CBX200 USB makes it possible to configure the intrinsically safe ACT20X product line and the WAVE TTA signal converter. The CBX200 USB is not compatible with the CBX100 USB.

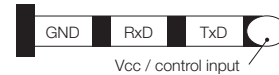
### Technical data

Input	
Type	USB 2.0 (USB type A plug)
Input current	≤ 100 mA
Input resistance	22 kΩ
Input voltage	1.6 ... 5.6 V
Output	
Type	RS232 (4-pole 2.5 mm jack plug)
Output voltage	3.3 V regulated
Output current	3 A
Level on interfaces	1.8...5.6 V (automatically adapted)
Baud rate	≤ 115 kBd
Activation signal	9...15 V typ. 12 V / 4 mA
Insulation coordination	
Insulation voltage	2.5 kV (input / output)

### Table for selecting a configuration adapter

Product	CBX100	CBX200
ACT20X		X
WAVE TTA	X	X
ITX+	X	

### Pin assignments for jack plug



DTR*	Vcc
0	3.3 V
1	0 V

Control input	RTS*	RS232 interface
12 V	1	active
12 V	0	active
0 V	1	active
0 V	0	not active

\* RTS and DTR are internal control signals

### Installation notes

The power supply to the device comes from the USB port via a USB type-A plug. The output-side of the RS232 interface uses a four-pole 2.5 mm jack plug to connect. This jack plug is also capable of activating the RS232 interface when needed with a 12-V control voltage. With the assistance of the DTM, the USB interface is diverted to a COM interface. The RS232 interface can be activated with an RTS signal (RTS = 1 → output activated) via the diverted COM interface. The jack plug is also capable of supplying the RS232 node with a regulated voltage of 3.3 V at 4 mA current. The DTR signal (DTR = 0 → supply activated) is used for control. It is also possible to query the status using the DSR signal (DSR = 0 → output activated).

The "WI-Manager" software, the "TTA Set" and the DTM library can all be downloaded free of charge from [www.Weidmüller.com](http://www.Weidmüller.com).

Note

### Ordering data

Connection system	Type	Qty.	Order No.
	CBX200 USB	1	8978580000

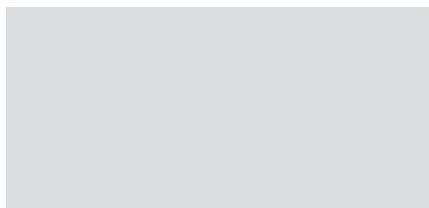
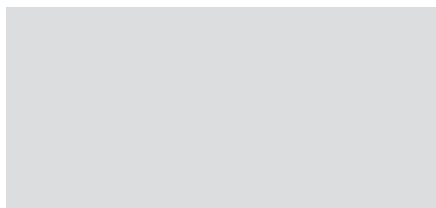
Note

### Accessories

### CBX100

- Configuration interface
- USB port for PC
- Tx and Rx status displays
- Configuration software (T-Set) can be downloaded at [www.weidmueller.com](http://www.weidmueller.com)!

### CBX100 USB



### Technical data

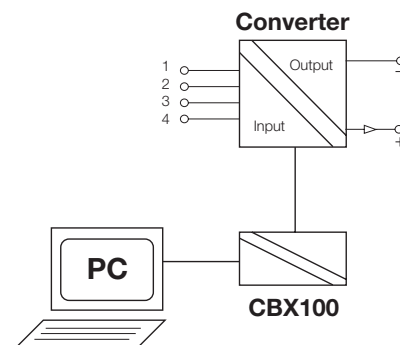
<b>Display</b>
Status indicator
<b>General data</b>
Insulation voltage
Ambient temperature / Storage temperature
Humidity
Approvals

LED (send / receive)
500 V for 60 s
-20 °C...+70 °C / -25 °C...+70 °C
10...90 % (no condensation)
cULus; CE

Table for selecting a configuration adapter

Product	CBX100	CBX200
ACT20X		X
WAVE TTA	X	X
ITX+	X	

### Wiring diagram



Note

### Ordering data

Connection system
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Type	Qty.	Order No.
CBX100USB	1	7940025031

Note

### Accessories

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Note

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# Portacal 1000

## Calibration device for current and voltage signals

The Portacal 1000 is a calibration device which is controlled by microprocessor. It is used for current and voltage signals. It has three output modes for simulating signals:

- **Voltage source:** for the simulation of externally-supplied voltage transmitters
- **Current source:** for the simulation of externally-supplied current sensors
- **Current sink mode:** simulates the outputs of a two-wire (loop-powered) transmitter.

Commonly used calibration functions can be invoked for each mode by pressing a button. Up to 9 storage locations per mode are available to save the individual values.

Furthermore, the Portacal 1000 can be programmed in a way that all modes can be cycled automatically. The corresponding values are controlled continually for a pre-defined time by means of a value storage. The following values can be checked and parameterised:

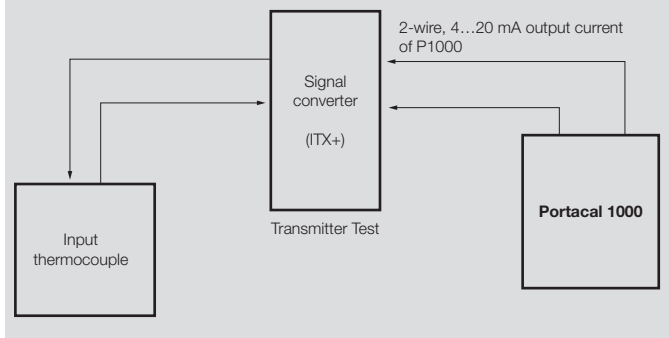
- Voltage outputs
- Current outputs
- Two-wire transmitter outputs

The Portacal 1000 provides the necessary voltage supply for the sensor in order to check a two-wire transmitter.

### Technical features:

- Complete diagnosis tool for current and voltage supply
- Measuring and simulating of voltage and current signals
- Simulation of function of signal transmitter, which can be auxiliary-powered or process-powered (two-wire type)
- Continually adjustable step and ramping function
- Accuracy < 0.05 % in all signal domains
- Light and portable
- Supply via NiMH rechargeable battery or comparable battery
- Signal tone at the press of a button

## Typical application of Portacal 1000



## Portacal 1000

## Instrument Calibrator

## Technical data

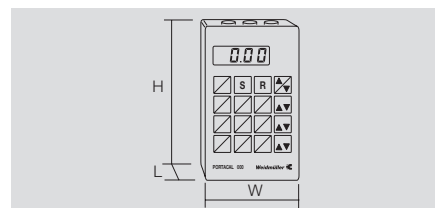
<b>Output voltage mode</b>	
Output voltage	0...13 V
Resolution	0.01 V
Load current	0...10 mA
Accuracy	±5 mV
Residual ripple	< 1 mV
Interner Speicher	Nine user-defined voltages
<b>Output current mode</b>	
Output current	0...26 mA
Resolution	0.01 mA
Load resistance	600 Ω @ 20 mA (power source) 100 Ω (current sink)
max. input voltage current sink	9...45 V DC
Accuracy	±5 µA
Residual ripple	< 1 µA
Internal storage	Nine user-defined currents
<b>Input voltage mode</b>	
Input voltage	0...13 V
Input resistance	200 kΩ
Accuracy	±5 mV or ±1 digital step
<b>Input current mode</b>	
Input current	0...26 mA
Input resistance	47 Ω
Accuracy	±5 µA or ±1 digital step
<b>Loop powered mode</b>	
Type	Mode for loop-powered signal-converters
Input current	0...26 mA
Feed voltage	16 V ±10 %
Accuracy	±5 µA or ±1 digital step
<b>Auto step/ramp mode</b>	
Step	Output of each value within a certain time period
Ramp	Output via a programmed ramp function
Number of recorded values	2...9
Time interval	10...4200 s
<b>Display</b>	
Type	Four-digit display with LCD, 12 mm
Status indicator	Five LEDs for output mode, signal amplification and reduction
Display value	Percent or real-value displayed
<b>Keyboard</b>	
Type	16 buttons with acoustic signal
Calibration	Adjustable fixed values: 0, 2, 4, 8, 10, 12, 16, 18, 20 mA 0, 1, 2, 4, 5, 6, 8, 9, 10 V Nine freely-definable values
Memory	1 / 0.1 / 0.01 mA or V
Decimals	
<b>General data</b>	
Supply voltage	Battery, 4x type 'AA'
Temperature coefficient	< 0.01 % / °C at 100 %
Ambient temperature (operational)/storage temperature	0 °C...60 °C / -25 °C...+70 °C
Type of connection	Sockets
EMC standard	DIN EN 61326
Approvals	CE, cULus
<b>Dimensions</b>	
Length x width x height	44 x 100 x 180 mm
<b>Note</b>	

## Ordering data

Type	Qty.	Order No.
Portacal 1000	1	7940010194
2x 1 m test cable sw/rt with banana plug/terminal		

## Accessories

<b>Note</b>
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# Portacal 275

## Hand-held signal source and loop calibrator

The Portacal 275 is a precise hand-held signal source for current and voltage signals. It can be used in four modes which allows the calibration of standard current/voltage transmitters.

The operating mode „voltage source“ simulates auxiliary-powered transmitters with proportional voltage outputs. The mode „current source“ allows emulation of transmitters with proportional current outputs. The „mv source“ mode simulates a variety of other analogue signals from many different applications. The „current sink“ mode simulates the outputs of a two-wire (loop powered) transmitter.

The Portacal 275 is equipped with a scalable potentiometer (0 to 100%) that can be adjusted in steps to an accuracy of 0.1%. Together with the output-range switch, the potentiometer allows for a quick and precise adjustment of the signal value. A typical accuracy of  $\pm 0.25\%$  is possible. An integrated test point, for connecting external measurement devices, allows for a higher accuracy of  $\pm 0.1\%$ .

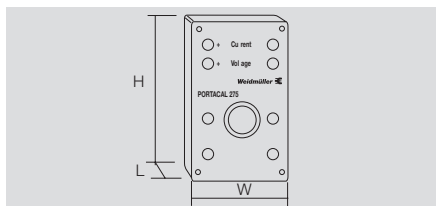
### Technical features:

- Light and portable device
- Simulates loop-powered transmitter operation
- LED for indication of source/sink operating mode
- Current ranges: 0 to 20 mA / 4 to 20 mA /  
Voltage ranges: 0 to 5 V / 1 to 5 V / 0 to 200 mV
- 0.1 % accurate current source
- Test points for current output monitoring
- Switch select 0 %, 100 % or variable output
- Signal outputs can be adjusted with spindle potentiometer for high accuracy
- Powered from two 9 V block batteries

### Portacal 275

Calibration device for current and voltage signals

### Portacal 275



#### Technical data

Output of voltage mode	
Output voltage	0...5 V / 1...5 V; 0...200 mV / 40...200 mV
Resolution	0.01 V
Output resistance	250 Ω @ V / 10 Ω @ mV
Accuracy	< 0.2 % (0 % and 100 %)
Output current mode	
Output current	0 (4)...20 mA
Resolution	0.01 mA
Last resistor, max.	700 Ω (current source) ( $V_{out} - 4$ ) / 0.02 Ω (current sink)
Output voltage, max. @ current sink	4...45 V DC
Accuracy	< 0.1 % (0 % and 100 %)
Residual ripple	< 1 μA
Settings	
Range of adjustment	0 (4)...20 mA / 0...200 mA (current source), 0...5 V (voltage source) or as current sink selectable with toggle switch 0...100 % with precision potentiometer 0 or 100 % with toggle switch
General data	
Temperature coefficient	typ. 40 ppm @ °C
Accuracy	0.25 % of signal range
Supply voltage	Batteries, 2 x 9-V blocks 6...22 mA (current source) 2 mA (current sink)
Ambient temperature	0 °C...+60 °C
Storage temperature	-25 °C...+70 °C
Type of connection	Sockets
EMC standards	DIN EN 61326
Approvals	cULus; CE

Dimensions	
Length x width x height	mm
	31 / 62 / 112

Note	
	Including 2 x 1m test lead sw/rt with banana plug/clip and 1 x bridge lead

#### Ordering data

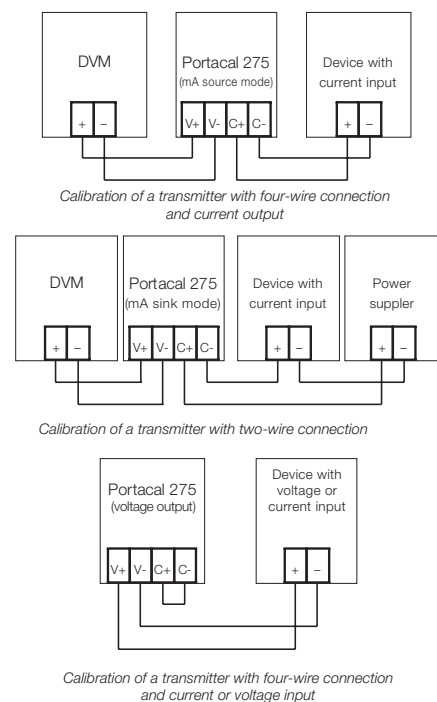
Connection system	Type	Qty.	Order No.
	P275	1	7940010202

Note	

#### Accessories

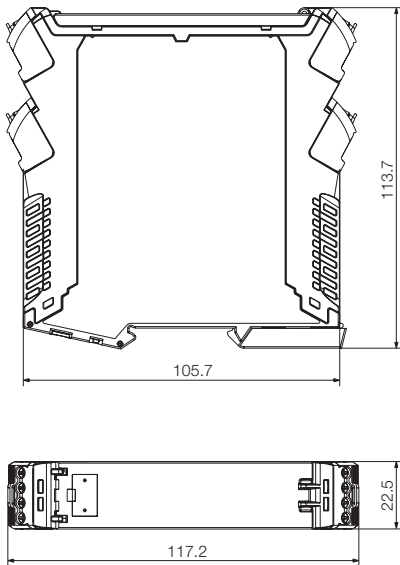
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#### Wiring diagram



## ACT20X/ACT20P – Accessories

### ACT20X/ACT20P



Dimensions in mm

### Connection terminals

Colour of housing	Release lever colour	Print	Print colour	Type	Order No.			
black	blue	65/66/67/68	white	BHZ 5.00/04/90LH BK/BL PRT 65	1086480000			
		55/56/57/58	white	BHZ 5.00/04/90LH BK/BL PRT 55	1086470000			
		45/46/47/48	white	BHZ 5.00/04/90LH BK/BL PRT 45	1086460000			
		61/62/63/64	white	BHZ 5.00/04/90LH BK/BL PRT 61	1086420000			
		51/52/53/54	white	BHZ 5.00/04/90LH BK/BL PRT 51	1086410000			
		41/42/43/44	white	BHZ 5.00/04/90LH BK/BL PRT 41	1086400000			
	black	black	65/66/67/68	white	BHZ 5.00/04/90LH BK/BK PRT 65	1086240000		
			55/56/57/58	white	BHZ 5.00/04/90LH BK/BK PRT 55	1086230000		
			45/46/47/48	white	BHZ 5.00/04/90LH BK/BK PRT 45	1086220000		
			61/62/63/64	white	BHZ 5.00/04/90LH BK/BK PRT 61	1086180000		
			51/52/53/54	white	BHZ 5.00/04/90LH BK/BK PRT 51	1086170000		
			41/42/43/44	white	BHZ 5.00/04/90LH BK/BK PRT 41	1086160000		
			black	blue	35/36/37/38	white	BHZ 5.00/04/90LH BK/BL PRT 35	1086450000
					25/26/27/28	white	BHZ 5.00/04/90LH BK/BL PRT 25	1086440000
15/16/17/18	white	BHZ 5.00/04/90LH BK/BL PRT 15			1086430000			
31/32/33/34	white	BHZ 5.00/04/90LH BK/BL PRT 31			1086390000			
21/22/23/24	white	BHZ 5.00/04/90LH BK/BL PRT 21			1086380000			
11/12/13/14	white	BHZ 5.00/04/90LH BK/BL PRT 11			1086370000			
black	black	35/36/37/38		white	BHZ 5.00/04/90LH BK/BK PRT 35	1086210000		
		25/26/27/28		white	BHZ 5.00/04/90LH BK/BK PRT 25	1086200000		
		15/16/17/18		white	BHZ 5.00/04/90LH BK/BK PRT 15	1086190000		
		31/32/33/34		white	BHZ 5.00/04/90LH BK/BK PRT 31	1086150000		
		21/22/23/24		white	BHZ 5.00/04/90LH BK/BK PRT 21	1086140000		
		11/12/13/14		white	BHZ 5.00/04/90LH BK/BK PRT 11	1086130000		

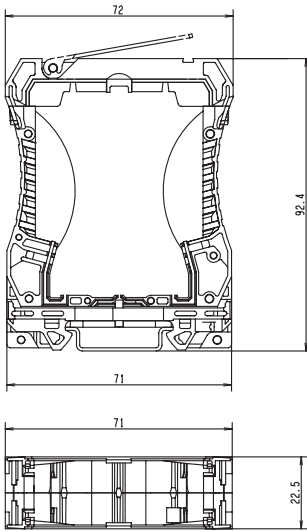
### Cold-junction compensation terminals (optional for the ACT20X temperature modules)

<b>(1-channel)</b>					
black	blue	11/12/13/14	white		1160640000
<b>(2-channel)</b>					
black	blue	11/12/13/14	white		1160650000

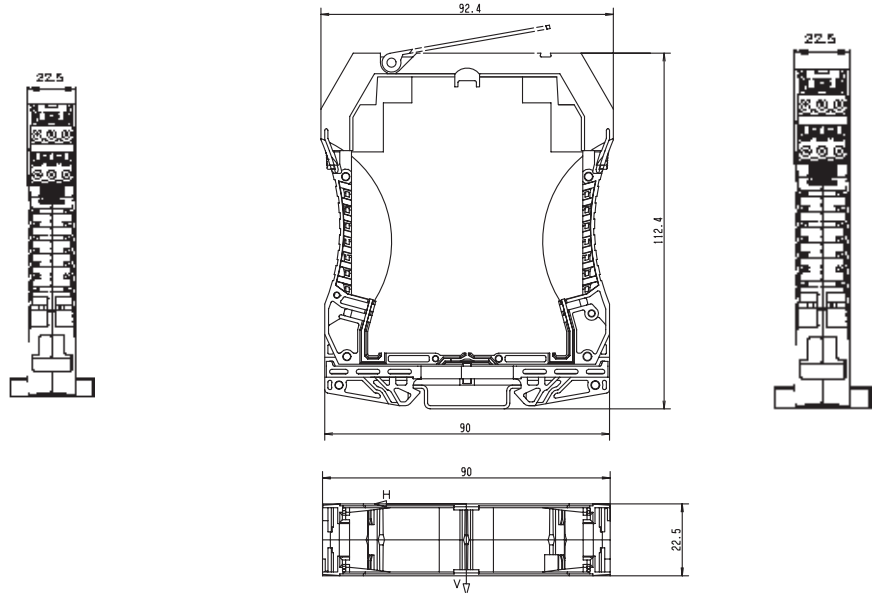
### Markers

Type	Version	Dimensions	Qty.	Order No.
ESG 66/20BHZ500/04	Individual markers	6.6 x 20 mm	200	1082540000
ESG 8/13.5/43.3 SAI AV	MultiCard (24 individual markers per MultiCard)	8 x 13.5 mm	5	1912130000

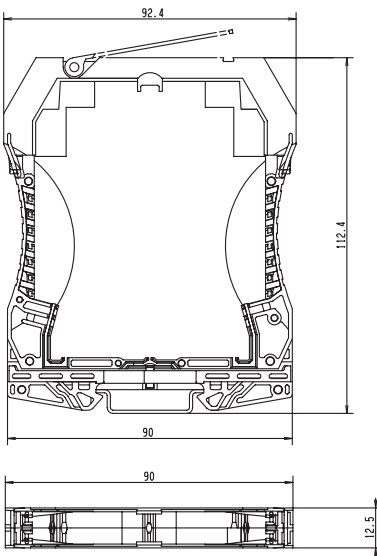
**WAVEBOX S 22.5**



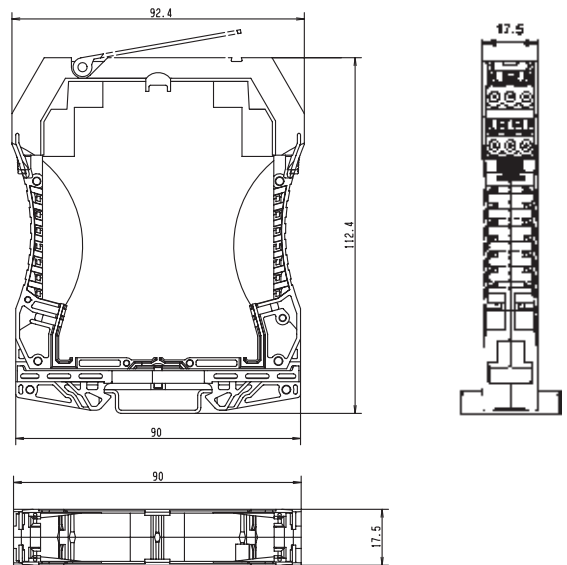
**WAVEBOX L 22.5**



**WAVEBOX 12.5**



**WAVEBOX 17.5**



Dimensions in mm



**Ordering data cross-connections**

	No. of poles
Plug-in cross-connection, black	2
Plug-in cross-connection, red	2
Plug-in cross-connection, blue	2
Plug-in cross-connection, yellow	2

Type	Qty.	Order No.
ZQV 2.5N/2 sw	60	1718080000
ZQV 2.5N/2 rt	60	1717900000
ZQV 2.5N/2 bl	60	1717990000
ZQV 2.5N/2 ge	60	1693800000



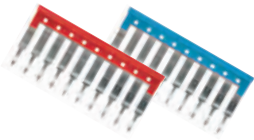
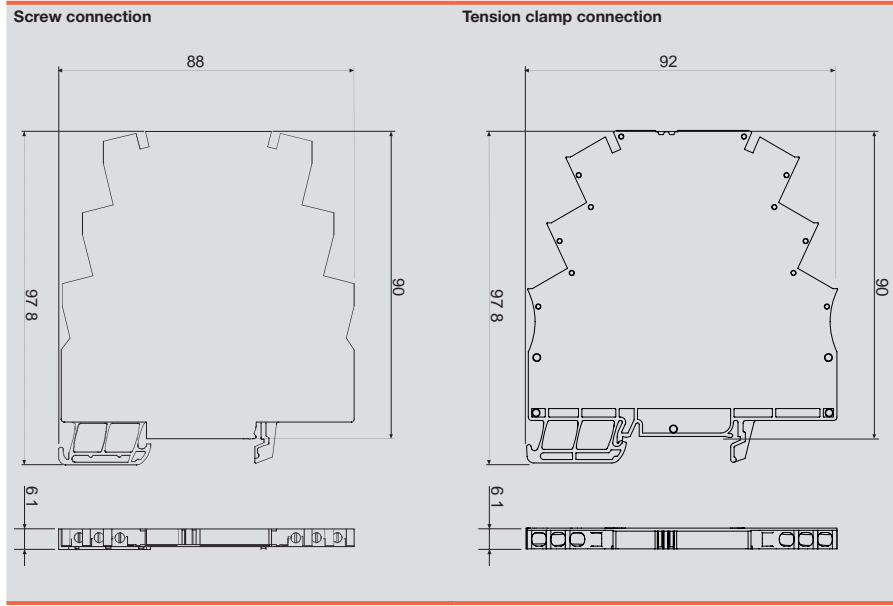
**Ordering data markers**

Type	Qty.	Order No.
Terminal markers MultiCard	920	1935000000
Terminal markers MultiCard	480	1609880000
Terminal markers MultiCard	600	1828450000

Type	Qty.	Order No.
WS10/5 MC	920	1935000000
WS15/5 MC	480	1609880000
WS10/6 MC	600	1828450000

**MICROSERIES – Accessories**

**MICROSERIES**



**Ordering data cross-connections**

	No. of poles
Plug-in cross-connection, red	2
Plug-in cross-connection, red	3
Plug-in cross-connection, red	4
Plug-in cross-connection, red	10
Plug-in cross-connection, red	41
Plug-in cross-connection, blue	2
Plug-in cross-connection, blue	3
Plug-in cross-connection, blue	4
Plug-in cross-connection, blue	10
Plug-in cross-connection, blue	41

Type	Qty.	Order No.
ZQV 4N / 2 RT	60	1793950000
ZQV 4N / 3 RT	60	1793980000
ZQV 4N / 4 RT	60	1794010000
ZQV 4N / 10 RT	20	1794040000
ZQV 4N / 41 RT	10	1794070000
<b>blue</b>		
ZQV 4N / 2 BL	60	1793960000
ZQV 4N / 3 BL	60	1793990000
ZQV 4N / 4 BL	60	1794020000
ZQV 4N / 10 BL	20	1794050000
ZQV 4N / 41 BL	20	1794080000

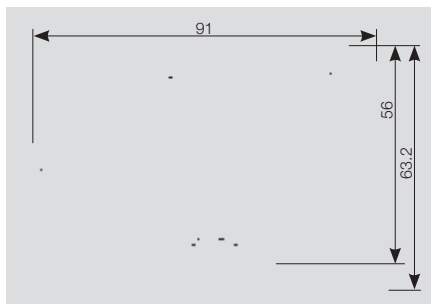


**Ordering data markers**

Terminal markers MultiCard
----------------------------

Type	Qty.	Order No.
WS10/6 MC	600	1828450000

**Accessories MCZ**



**Ordering data end plates**

End plate
-----------

Type	Qty.	Order No.
AP MCZ 1.5	50	8389030000



**Ordering data cross-connections**

	No. of poles
Plug-in cross-connection, yellow	2
Plug-in cross-connection, yellow	3
Plug-in cross-connection, yellow	4
Plug-in cross-connection, yellow	5
Plug-in cross-connection, yellow	6
Plug-in cross-connection, yellow	7
Plug-in cross-connection, yellow	8
Plug-in cross-connection, yellow	9
Plug-in cross-connection, yellow	10

Type	Qty.	Order No.
ZQV 4N / 2 GE	20	1608950000
ZQV 4N / 3 GE	20	1608960000
ZQV 4N / 4 GE	20	1608970000
ZQV 4N / 5 GE	20	1608980000
ZQV 4N / 6 GE	20	1608990000
ZQV 4N / 7 GE	20	1609000000
ZQV 4N / 8 GE	20	1609010000
ZQV 4N / 9 GE	20	1609020000
ZQV 4N / 10 GE	20	1609030000



**Ordering data markers**

Terminal markers MultiCard
----------------------------

Type	Qty.	Order No.
WS10/6 MC	600	1828450000



# Fieldbus distributor

<b>Fieldbus distributor</b>	Fieldbus distributor – Overview	J.2
	PROFIBUS-DP	J.6
	PROFIBUS-PA	J.10
	PROFIBUS-PA ATEX	J.26
	Accessories	J.34



# FBCon Fieldbus distributor

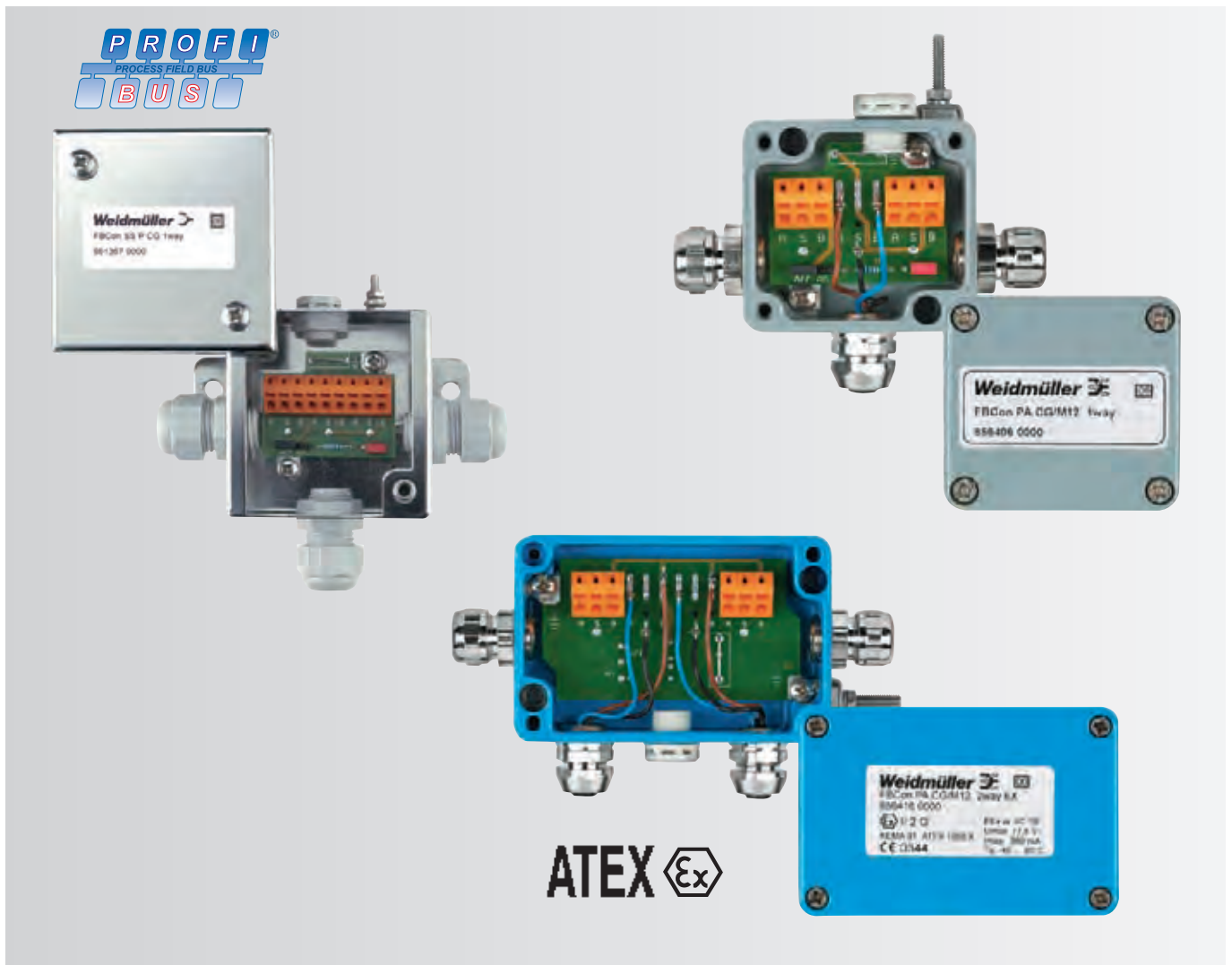
## PROFIBUS-PA Fieldbus distributor: sturdy and well-tested

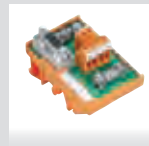
FBCon fieldbus distributors are available in industrial and EEx (ia) versions. They are used for coupling 1–8 field devices or sensors. The connection is made via spur. The spur is connected optionally by an M12 plug-in connector or directly via an EMC cable gland. The communication and device powering is handled by a common 2-core wire.

The PROFIBUS-PA distributors normally feature a switchable terminating resistor. For the Ex zone, the terminating resistor is made with a separate box. Current-limiting variants help to ensure that the facility can operate smoothly.

Weidmüller offers a comprehensive line of accessories including pre-assembled PROFIBUS-PA cables in the standard lengths, and plug-in connectors for a wide variety of applications.

- Fieldbus distributor for PROFIBUS-PA and PROFIBUS-DP
- Standard distributor for use in the safe zone Aluminium housing for connecting from 1 to 8 field devices
- Stainless steel distributor for applications in the food processing industry, for connecting from 1 to 8 field devices
- Intrinsically safe (ia) Ex version in aluminium housing for connecting from 1 to 8 field devices
- EMC cable gland for a secure contact with the shielding





**PROFIBUS-DP**

IP20 T-piece PROFIBUS-DP



**PROFIBUS-DP**

Standard distributor without bus connection



**PROFIBUS-DP**

Standard distributor with bus connection (active)



**PROFIBUS-PA**

Standard distributor



**PROFIBUS-PA**

Standard distributor with surge protection (OVP)



**PROFIBUS-PA**

Standard distributor with current limiter

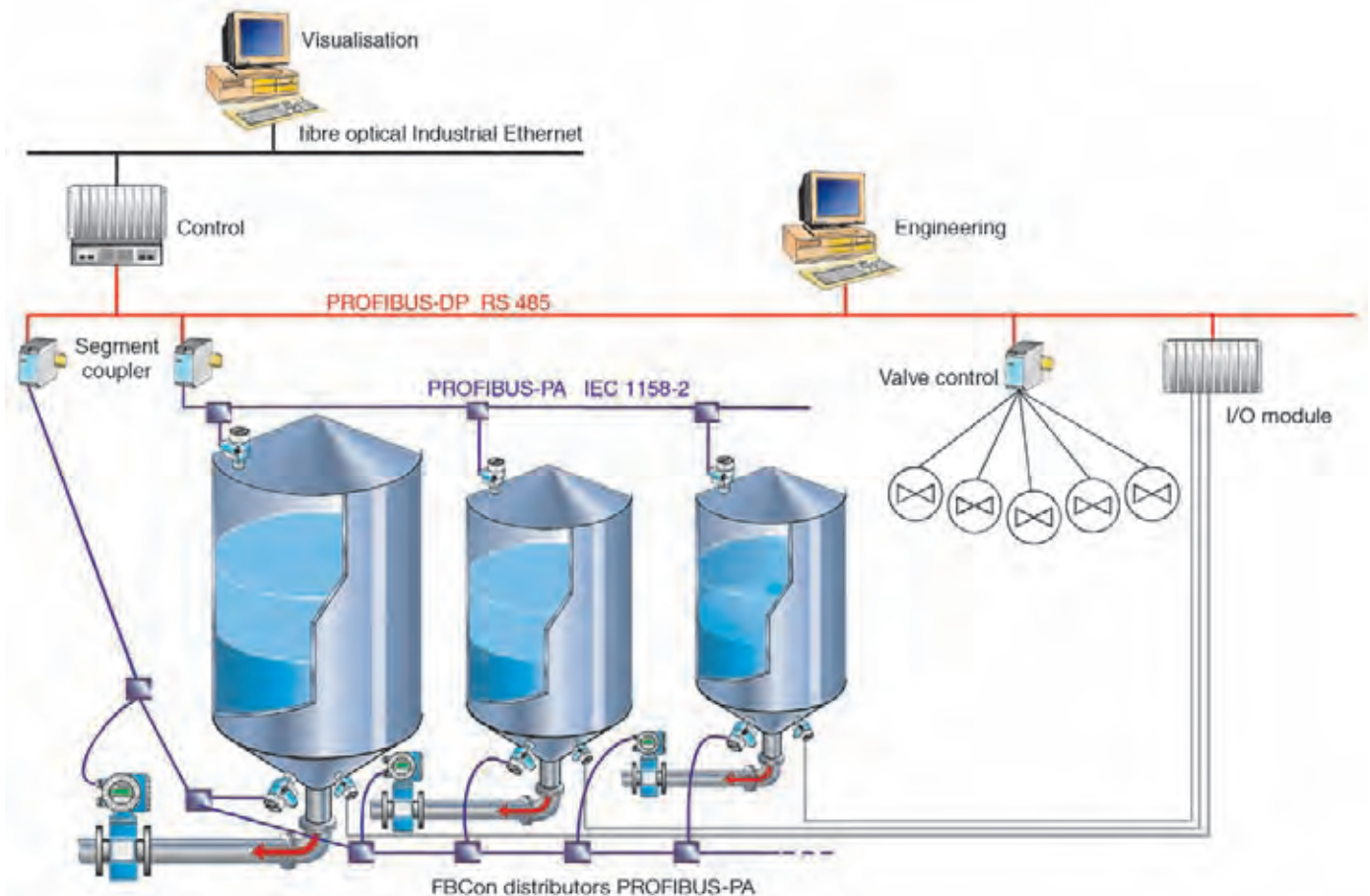
# System description, fieldbus components

FBCon fieldbus distributors are available in industrial and EEx (ia) versions. They are used for coupling 1–8 field devices or sensors. The connection is made via spur. The spur is connected by an M12 plug-in connector or directly via an EMC cable gland. The communication and device powering is handled by a common 2-core wire.

The distributors offer the following features irrespective of the version:

- Tension clamp connection technology
- Surge protection for the main line
- Current limiter for each stub line
- EMC cable gland
- M12 plug-in connectors
- External earth stud
- Interruption-free bus operation
- Industrial specification
- Bus termination integrated (non EX)
- Ⓜ ATEX explosion-proof version
- Pressure-equalising element
- IP65, IP66, IP67 Ingress protection class
- Stainless steel versions
- PROFIBUS-PA compatible

## Typical PROFIBUS system layout



# Product coding

The FBCon family of distributors includes various forms. The product name indicates the respective features as follows:

FBCon	Field Bus Connection
PA	PROFIBUS-PA Process Automation
DP	PROFIBUS-DP Decentralised Periphery
SS	Stainless Steel
CG	Stainless steel cable gland on stainless steel housing. On standard aluminium housings, the cable gland is nickel-plated brass.
PCG	Plastic Cable Gland
CG/M12	M12 plug-in connector for the stub cables and cable gland for the trunk cable
1way	Number of outgoing stub lines
Limiter	Current limiter: protects the PROFIBUS-PA network in the event of an overload in the stub line
OVP	Surge protection: protects the system in the event of a voltage surge
EX	Approved for potentially explosive areas
ATEX	For explosive atmospheres

The standard distributors are grey. The Ex-approved distributors are painted blue.

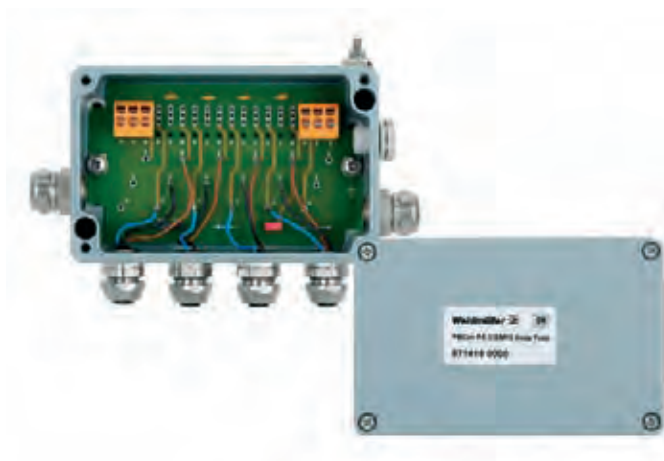
PROFIBUS-PA distributors are generally equipped with a switch-in terminating resistor. In potentially explosive areas, the terminating resistor is manufactured with a separate box. This must be used instead of the right-hand cable gland. In the case of PROFIBUS-DP, an additional external 24 V DC power supply is required. This makes the terminator independent of the last station in the network.



**FBCon PA CG/M12 1way Limiter**



**FBCon SS PCG 1way**



**FBCon PA CG 1way Ex**

# PROFIBUS-DP IP 20 T-distributor

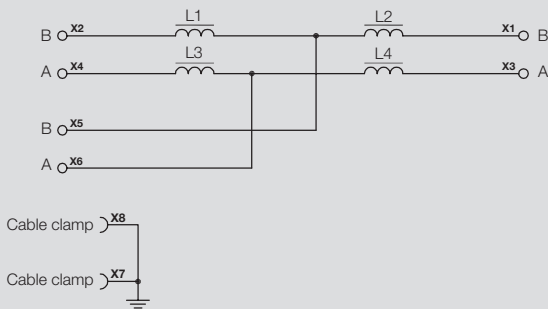


The distributor for PROFIBUS-DP enables the user to connect it conveniently in the electrical cabinet.

They can be mounted on TS32/35 rails and used to connect standardised PROFIBUS-DP lines. Spur cables can also be connected. Please note that spur cables should be kept short as possible. Part No. 8788580000 has a 9-pin sub-D socket for connecting analysis/programming devices.

- T-piece functions
- Good shield contact
- Ample space for connecting the bus cable
- TS 32/35 terminal rail mounting
- Standardised Sub-D connection for PROFIBUS-DP

## RS PB-DP T



## Technical data

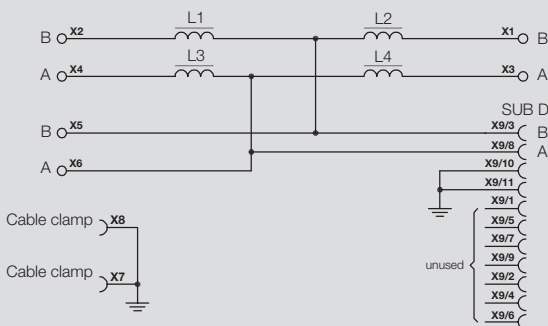
Data transmission rate		max. 1.5 Mbps (with max. 6.6 m spur line) max. 12 Mbps (no spur lines)
Operating temperature	°C	0 ... 55
Storage temperature	°C	-25 ... +70
Ingress protection class		IP 20
Dimensions (LxWxH)	mm	70 x 45 x 42
Plug-in connector		sub-D 9-pin
Cable diameter	mm	4.5 ... 8
Single conductor cross-section	mm <sup>2</sup>	0.5 ... 2.5
Type of connection		screw

## Information

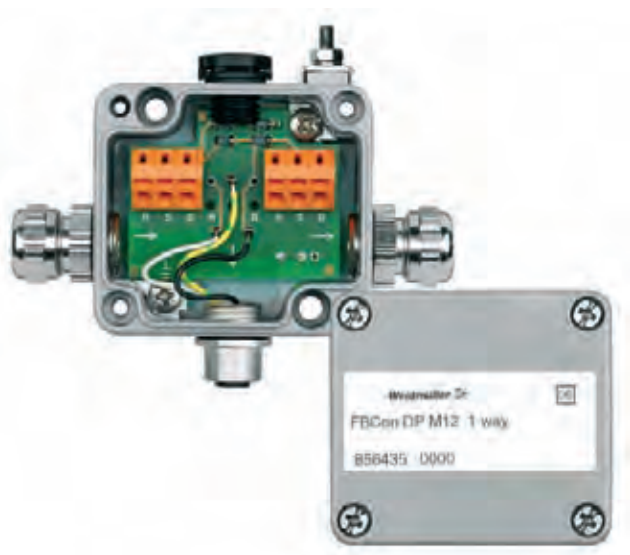
## Ordering data

Type	Qty.	Order No.
RS PB-DP T	1	8800040000
RS PB-DP T SUB-D	1	8788580000

## RS PB-DP T SUB-D



# PROFIBUS-DP distributors



## PROFIBUS-DP distributor

The PROFIBUS-DP topology is a line structure. The spur (T-distributor) connect the individual field devices or remote I/Os to the bus cable. The length of the spur cable depends on the transmission rate and should be as short as possible. The total of all spur lengths for transmission rates up to 1.5 MBaud may not exceed max. 6.6 m. The trunk cable passes through an EMC cable gland into an aluminium enclosure where it is connected to a tension clamp terminal. The spur line to the device is connected using a B-coded M12 socket or an EMC cable gland. Terminating resistors must be wired onto the start and end of the PROFIBUS-DP network. The Terminator modules can take care of this task. The electrically isolated 24-VDC power supply for the bus terminator is routed into the cable gland on the right side. The housing features a pressure-compensation mechanism that counters the effects of climatic fluctuations. The guidelines issued by the PROFIBUS user organisation must be observed.

## PROFIBUS-DP

### Technical data

Operating temperature	-25 °C to 55 °C
Ingress protection class	IP 66
Enclosure material	High grade aluminium alloy (AL - SI 12)
Finish	Painted RAL 7001
PROFIBUS-DP connection	Tension clamp terminals 0.5 - 1.5 mm <sup>2</sup>
Cable entry	Cable gland M16
Cable gland clamping range	5.5 - 9.5 mm
Contact surface	M12 plug/socket CuZnAu
Transmission rate	Max. 1.5 MBaud
Power supply bus connection	Bus terminator 24 VDC +/-10 %
Trunk cable via cable gland	

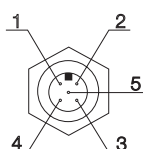
### Installation advice

Torques	
M16 cable gland at enclosure	6.0 Nm
Union nut, M16 cable gland	4.0 Nm
Enclosure cover	1.8 - 2.0 N
External earthing cable	1.8 - 2.0 Nm
Adaptor/stud cable	0.5 Nm

### Pin assignment

Pin no.	Connection	Wire colour
Pin 1	unassigned	
Pin 2	RxDx/TxD-N / A-wire	green
Pin 3	unassigned	
Pin 4	RxDx/TxD-N / B-wire	red
Pin 5	shield	
Cable gland	shield	

### Socket B-coded



## PROFIBUS-DP

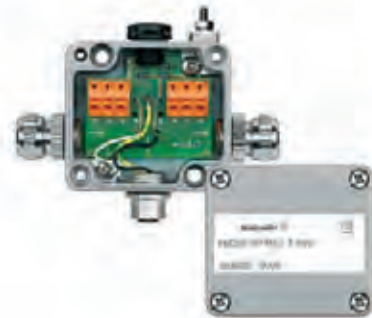
### 1-channel distributor

Cable gland



### 1-channel distributor

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon DP CG 1way	branch line CG	1	8564340000
<b>Stainless steel enclosure</b>			
FBCon SS DP PCG 1way	all connections PCG	1	8714260000

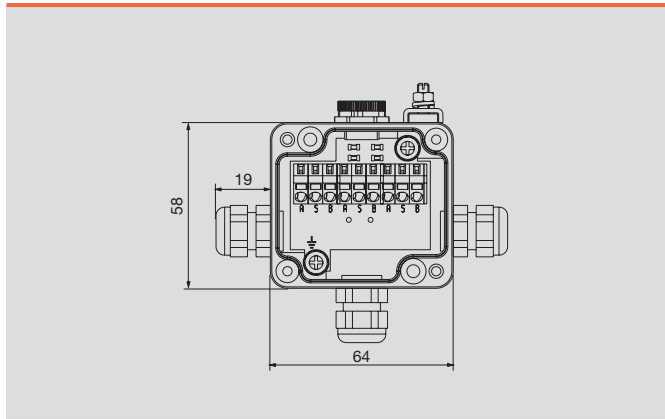
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon DP M12 1way	branch line M12	1	8564350000
<b>Stainless steel enclosure</b>			
FBCon SS DP M12 1way	branch line M12	1	8714270000

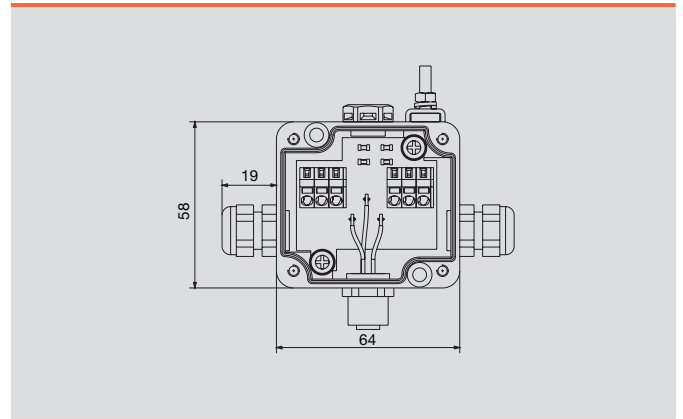
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

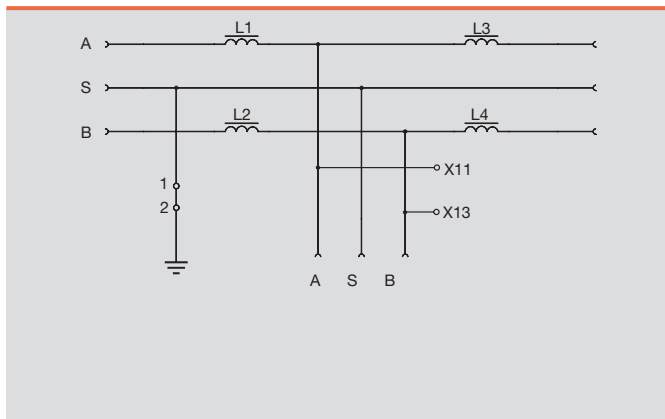
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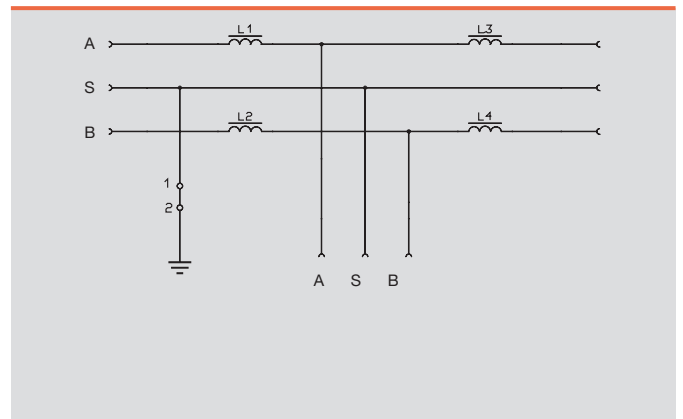
#### Dimensioned drawing



#### Wiring diagram



#### Wiring diagram



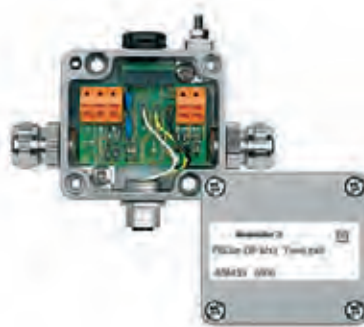
### Terminator

Cable gland



### Terminator

M12 connection



### Ordering data

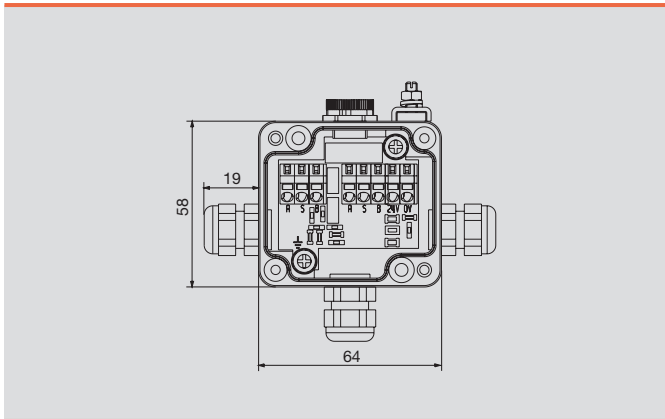
Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon DP CG Term 24V	branch line CG	1	8564290000
<b>Stainless steel enclosure</b>			
FBCon SS DP PCG Term 24V	all connections PCG	1	8714240000

### Ordering data

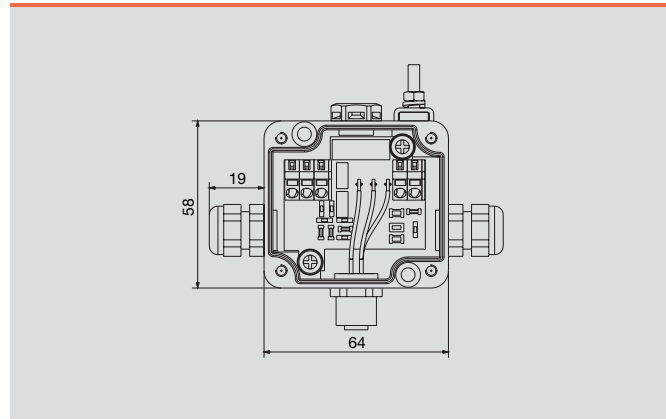
Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon DP M12 Term 24V	branch line M12	1	8564330000
FBCon DP M12 Term 5V	branch line M12	1	8564320000
<b>Stainless steel enclosure</b>			
FBCon SS DP M12 Term 24V	branch line M12	1	8714250000

CG = brass cable gland  
PCG = plastic cable gland

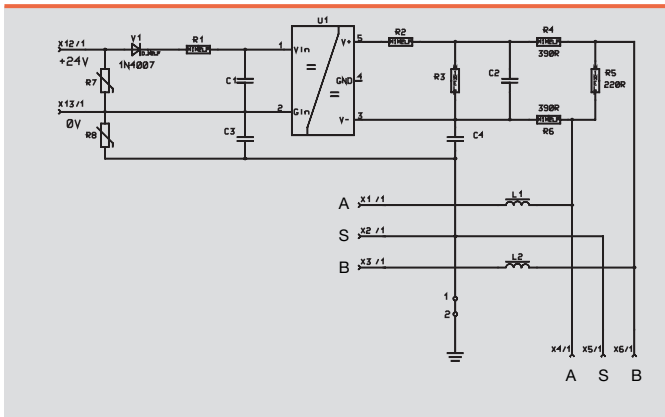
### Dimensioned drawing



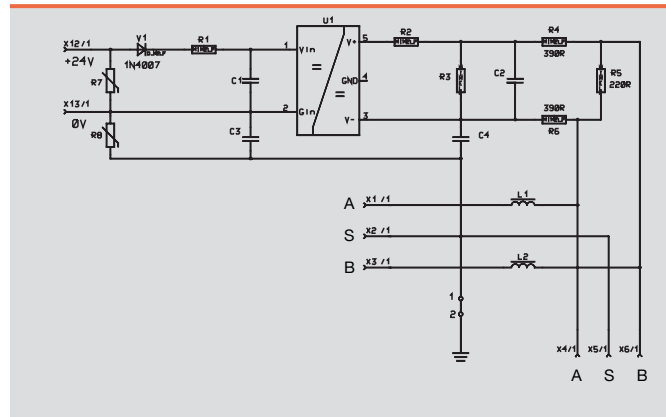
### Dimensioned drawing



### Wiring diagram



### Wiring diagram





# FBCon distributors for the industrial segment



## PROFIBUS-PA T-connector

- for industrial applications
- standard

The **PROFIBUS-PA** installation products are increasingly used in the:

- food and beverage industry
- Process industries and
- chemical industry.

The product range offers a wide choice of customer solutions also for use in harsh conditions. This includes standard and EX versions of single and multi-way design with M12 plug-in connection or cable gland. Weidmüller offers a solution for almost every application. If you cannot find your solution here, please contact the branch / sales office responsible for you.

## PROFIBUS-PA T-connector standard

- 1, 2, 4, 8-way with EMC cable gland Industrial + EX / ATEX
- Surge protection optional

The **PROFIBUS-PA T-connector** is intended for direct coupling of measuring devices, sensors, actuators, etc.

- IP 66 Ingress protection class
- Modular design
- Uninterruptible bus operation for service situations
- Simple handling
- Low installation costs
- External earth stud
- Pressure equalising element
- EMC cable gland





### The PROFIBUS-PA

is an open fieldbus standard (EN 50170, IEC 1158-2, DIN 19245). It was specifically designed for the requirements of process engineering, such as remote powering and intrinsic safety. The PROFIBUS-PA enables operation of several PA sensors and actuators on one bus line.

The devices are powered using twin cable technology, and the transmission of process data is digital.

Integration in the PROFIBUS-DP network is done by means of a segment coupler.

Specific advantages of PROFIBUS-PA:

- Low wiring costs
- Minimal planning costs for the process control system
- Remote interrogation or programming of the field device
- Further development and support by the PROFIBUS User Organisation

Whether for servicing or system modification, the PROFIBUS-PA FB connectors from Weidmüller enable connection or replacement of field devices without interrupting the bus system.

An extensive range of accessories such as pre-assembled cables and plug connectors rounds off the programme.

### Technical data for PROFIBUS-PA standard distributors

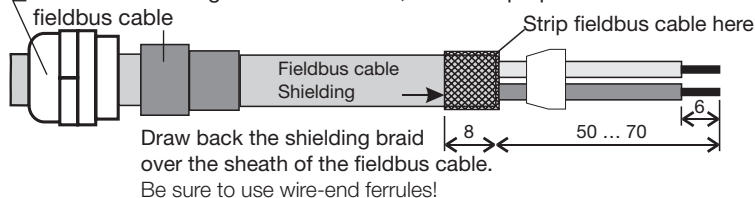
Temperature range	
Operating temperature	from -40 °C to 85 °C
Ingress protection class	IP 66
Housing material	High-quality aluminium alloy (AL-Si 12)
Surface	Stove-enamelled RAL 7001
PROFIBUS-PA connection	Tension clamp connection 0.5 - 1.5 mm <sup>2</sup>
Cable entry	Cable gland M16
Clamping range	5.5 - 9.5 mm
Measuring device connector M12 x 14-pin	Contacts MS, surface CUZnAu
Information	

### Handling information

Torques	
M16 gland to housing	6.25 Nm
M16 union nut on cable gland	4.5 Nm
Housing cover	1.8 - 2.0 Nm
External earth stud	1.8 - 2.0 Nm

Shield is connected to the enclosure via the EMC cable glands.

Thread the cable gland onto the seal, on the unprepared



## PROFIBUS-PA

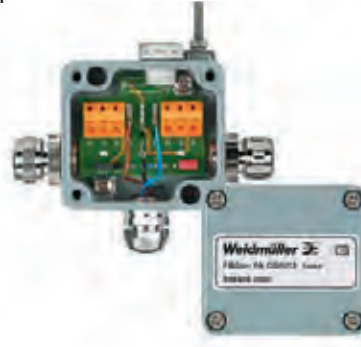
### 1-channel distributor

Cable gland



### 1-channel distributor

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 1way	branch line CG	1	8564090000
<b>Stainless steel enclosure</b>			
FBCon SS CG 1way	branch line CG	1	8703430000
FBCon SS PCG 1way	all connections PCG	1	8613670000

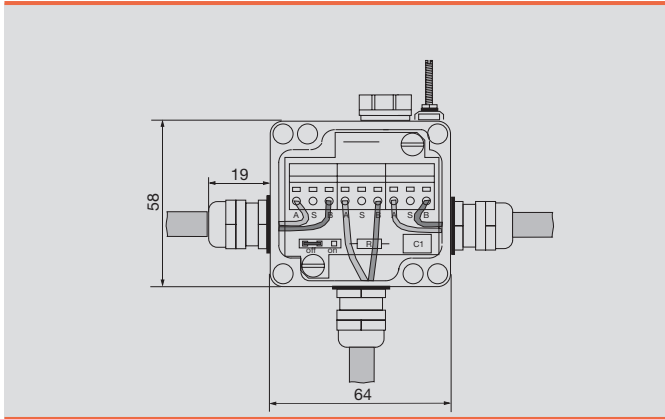
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 1way	branch line M12	1	8564060000
<b>Stainless steel enclosure</b>			
FBCon SS CG/M12 1way	branch line M12	1	8726020000

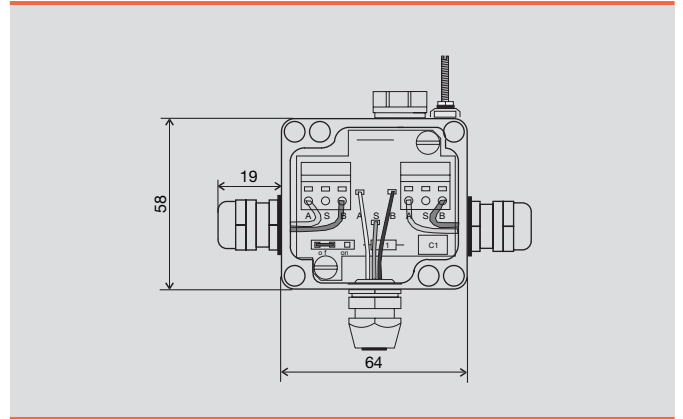
CG = brass cable gland  
PCG = plastic cable gland

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PCG = plastic cable gland

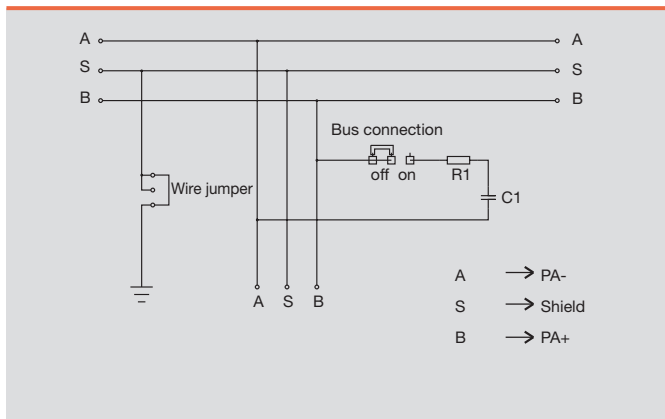
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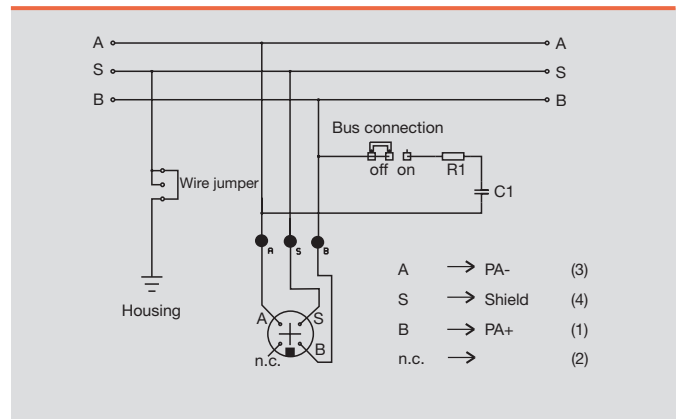
#### Dimensioned drawing



#### Wiring diagram



#### Wiring diagram



### 2-channel distributor

Cable gland



### 2-channel distributor

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 2way	branch line CG	1	8564100000
<b>Stainless steel enclosure</b>			

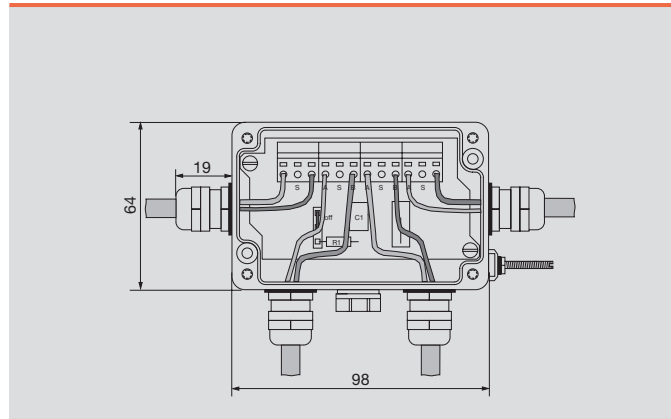
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 2way	branch line M12	1	8564070000
<b>Stainless steel enclosure</b>			

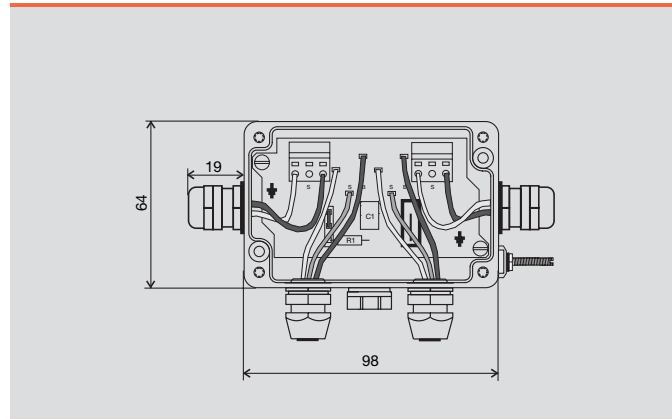
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PCG = plastic cable gland

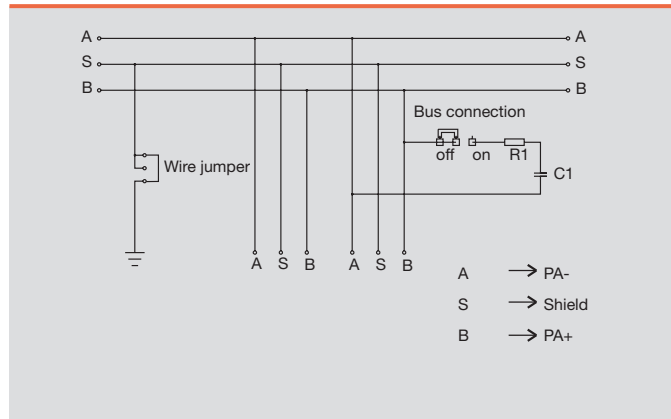
#### Dimensioned drawing



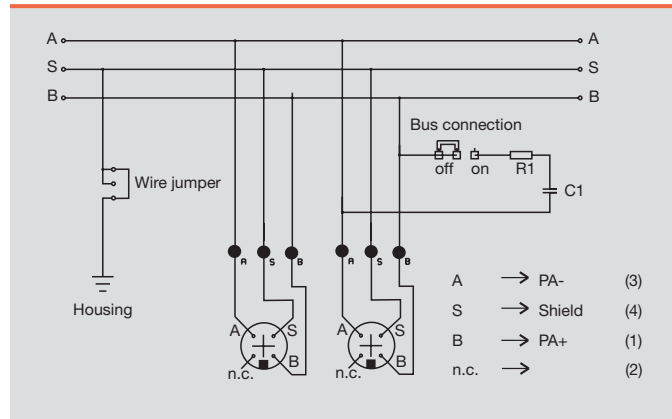
#### Dimensioned drawing



#### Wiring diagram



#### Wiring diagram



**PROFIBUS-PA**

**4-channel distributor**

Cable gland

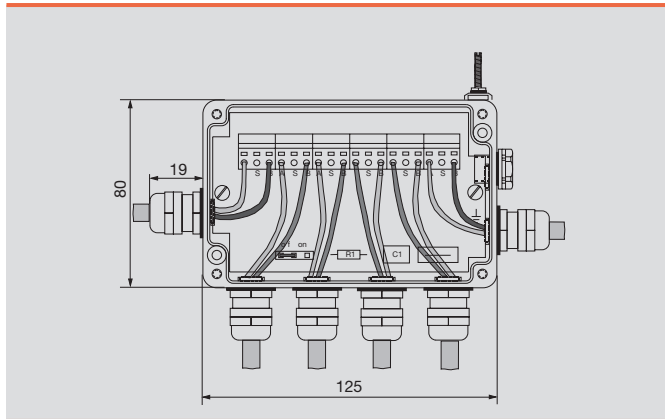


**Ordering data**

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 4way	branch line CG	1	8564110000
<b>Stainless steel enclosure</b>			
FBCon SS CG 4way	branch line CG	1	8703450000
FBCon SS PCG 4way	all connections PCG	1	8613680000

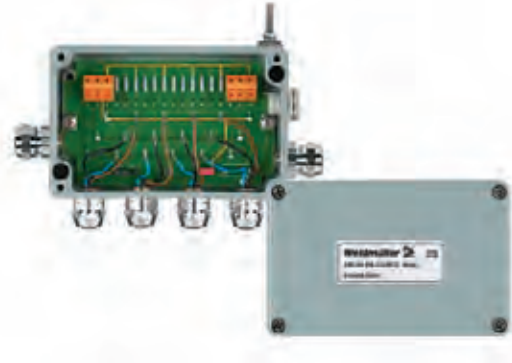
CG = brass cable gland  
PCG = plastic cable gland

**Dimensioned drawing**



**4-channel distributor**

M12 connection

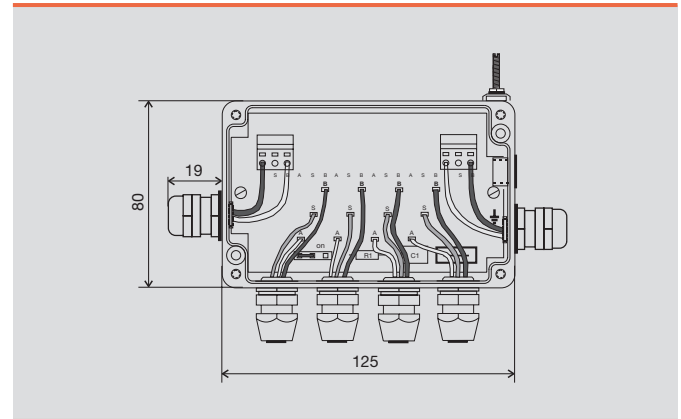


**Ordering data**

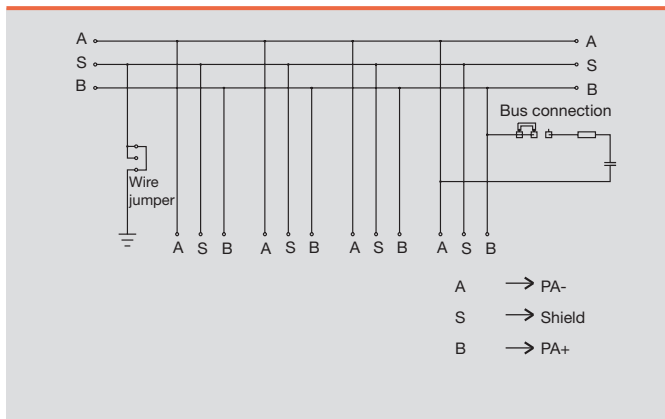
Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 4way	branch line M12	1	8564080000
<b>Stainless steel enclosure</b>			
FBCon SS CG/M12 4way	branch line M12	1	8726040000

CG = brass cable gland  
PCG = plastic cable gland

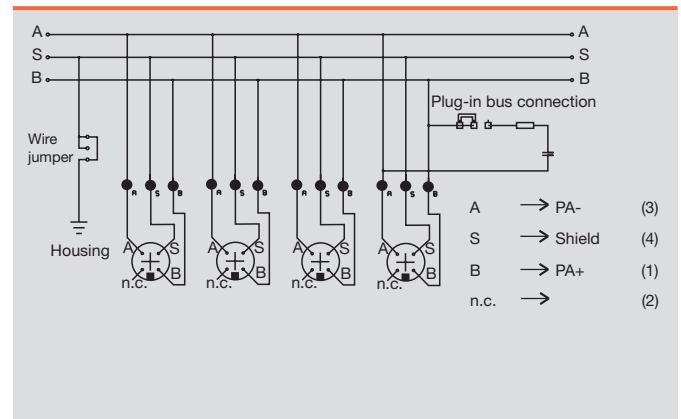
**Dimensioned drawing**



**Wiring diagram**



**Wiring diagram**



### 8-channel distributor

Cable gland



### 8-channel distributor

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 8way	branch line CG	1	8564300000
<b>Stainless steel enclosure</b>			
FBCon SS CG 8way	branch line CG	1	8703470000
FBCon SS PCG 8way	all connections PCG	1	8640720000

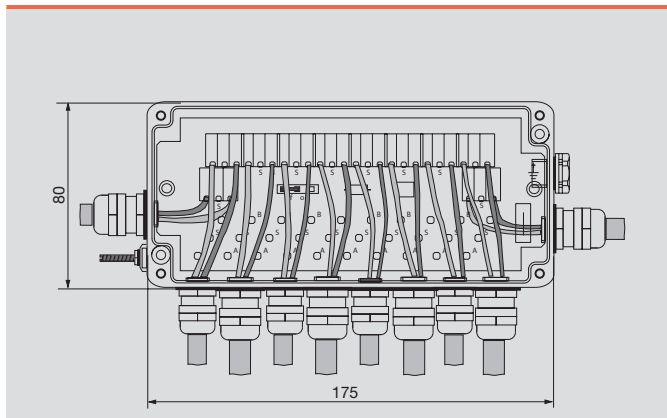
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 8way	branch line M12	1	8564310000
<b>Stainless steel enclosure</b>			
FBCon SS CG/M12 8way	branch line M12	1	8726050000

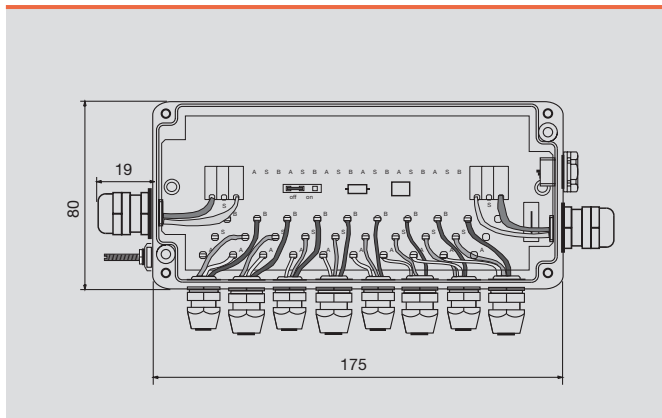
CG = brass cable gland  
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CG = brass cable gland  
PCG = plastic cable gland

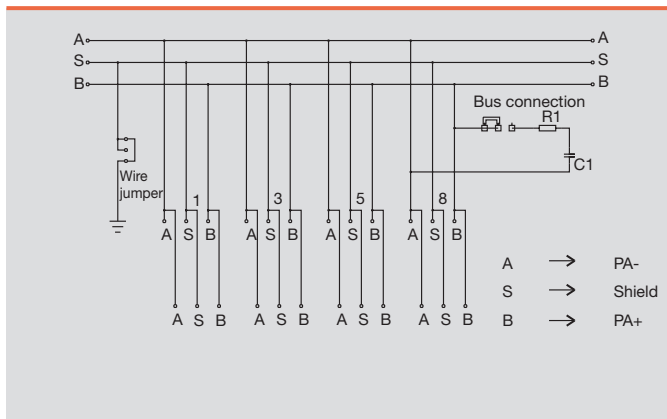
#### Dimensioned drawing



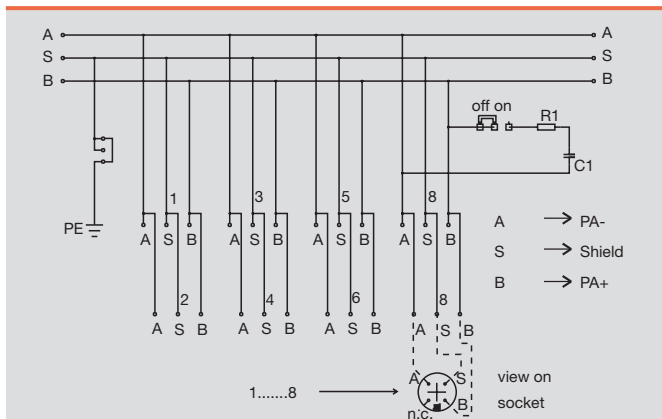
#### Dimensioned drawing



#### Wiring diagram

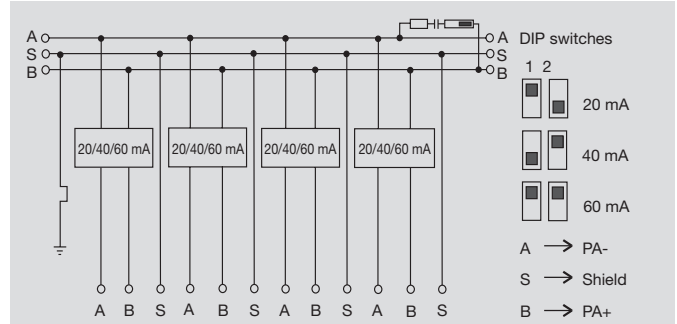


#### Wiring diagram



## PROFIBUS-PA

### Fieldbus components for industrial applications with surge protection or current limiter



**Example: 4-way module with current limiter**

### PROFIBUS-PA T-connectors

Fine surge protection or integrated current limiting mechanisms are designed for protecting connected measuring devices, sensors or actuators from surge voltages. Gas-discharge tubes and suppressor diodes are voltage-limiting protection mechanisms. If a rapidly rising voltage pulse reaches the input of a T-connector with surge protection, the gas discharge tube ignites and discharges a high current.

The residual pulse is limited by a suppressor diode.

In the case of a slow rise in voltage, the pulse is processed by

the diode alone. The housing is connected to the protective earth via an external earth stud.

When using the connectors for current limiting, the PROFIBUS-PA network is protected against short circuits with protective circuitry.

The current can be set to either 20 mA, 40 mA or 60 mA by means of two DIP switches.

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### Überspannungsschutz Technische Daten

Operating temperature	-40 °C to 85 °C
Ingress protection class	IP 67
Enclosure material	High grade aluminium alloy (AL - SI 12)
Finish	Painted RAL 7001
PROFIBUS-PA connection	Tension clamp terminals 0.5 - 1.5 mm <sup>2</sup>
Cable entry	Cable gland M16
Branch	M12 socket (4-pin)
Cable gland clamping range	5.5 - 9.5 mm
Nominal voltage DC/AC	U <sub>N</sub> = 24 V DC/18 V AC
Max. permissible operating voltage	U <sub>C</sub> = 30 V DC/21 V AC
Rated current at 30 °C	I <sub>N</sub> = 500 mA
Trip surge voltage (1 kV/μs)	< 600 V
Rated discharge surge current (8/20 μs)	I <sub>SN</sub> = 10 KA (wire-wire, wire-PE)
Output voltage limit (8/20 μs)	U <sub>p</sub> = 65 V
PROFIBUS-PA bus terminator	Via jumper

### Installation advice

Torques	
Screw terminals	0.4 Nm
M16 cable gland at enclosure	6.0 Nm
Union nut M16 cable gland	4.0 Nm
Enclosure cover	1.8 - 2.0 Nm
External earthing cable	1.8 - 2.0 Nm

### Limiter Technical data

Operating temperature	-40 °C to 85 °C
Ingress protection class	IP 67
Enclosure material	High grade aluminium alloy (AL - SI 12)
Finish	Painted RAL 7001
PROFIBUS-PA connection	Tension clamp terminals 0.5 - 1.5 mm <sup>2</sup>
Cable entry	Cable gland M16
Branch	M12 socket (4-pin)
Cable gland clamping range	5.5 - 9.5 mm
Short-circuit protection per station	20, 40, 60 mA settings
PROFIBUS-PA bus terminator	Via jumper

### Installation advice

Torques	
Screw terminals	0.4 Nm
M16 cable gland at enclosure	6.0 Nm
Union nut M16 cable gland	4.0 Nm
Enclosure cover	1.8 - 2.0 Nm
External earthing cable	1.8 - 2.0 Nm

### 1-channel distributor (OVP)

Cable gland



### 1-channel distributor (OVP)

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 1way OVP	branch line CG	1	8714120000
<b>Stainless steel enclosure</b>			
FBCon SS PCG 1way OVP	all connections PCG	1	8715270000

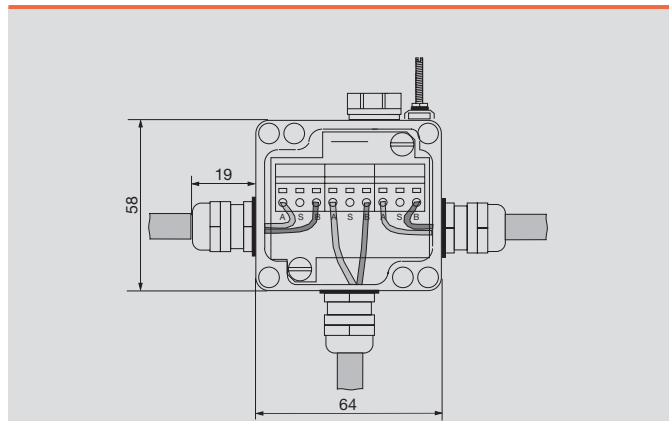
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 1way OVP	branch line M12	1	8714080000
<b>Stainless steel enclosure</b>			

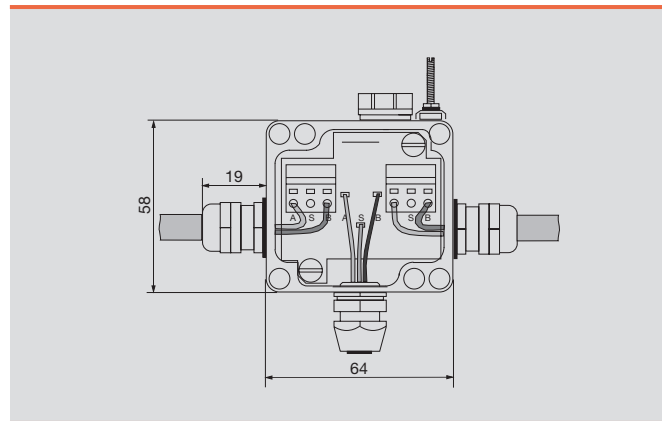
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

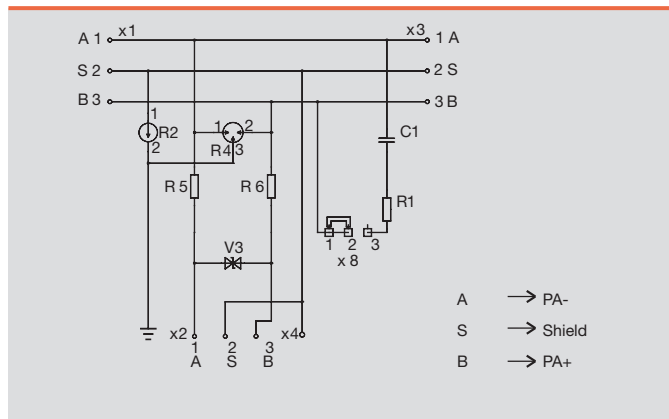
#### Dimensioned drawing



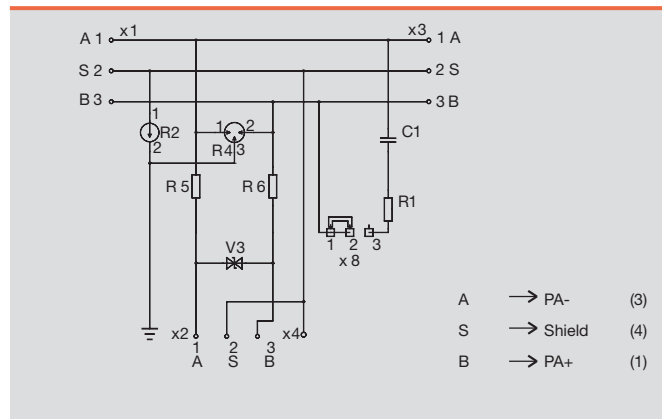
#### Dimensioned drawing



#### Wiring diagram



#### Wiring diagram

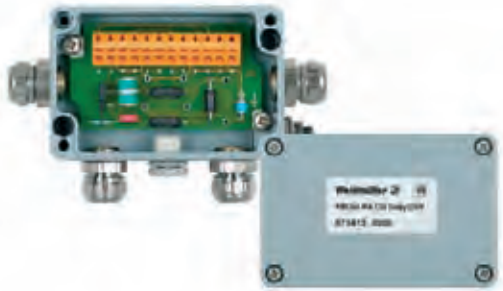




**PROFIBUS-PA**

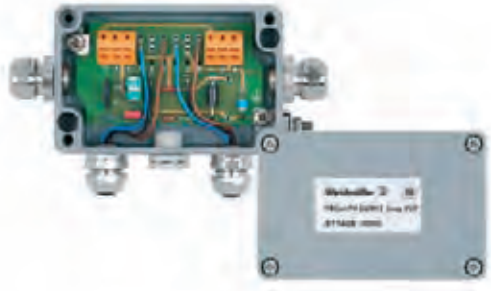
**2-channel distributor (OVP)**

Cable gland



**2-channel distributor (OVP)**

M12 connection



**Ordering data**

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 2way OVP	branch line CG	1	8714130000
<b>Stainless steel enclosure</b>			

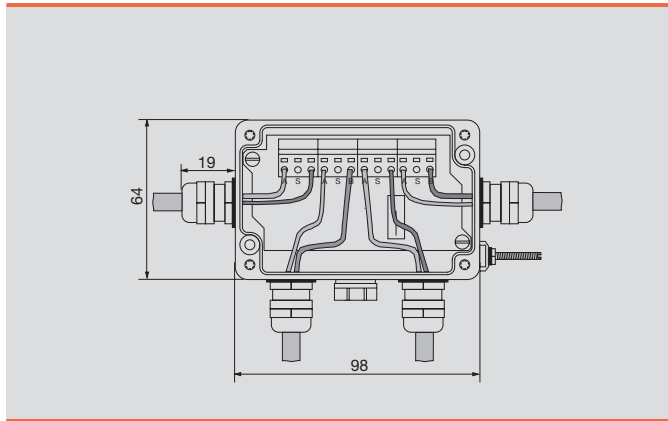
**Ordering data**

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 2way OVP	branch line M12	1	8714090000
<b>Stainless steel enclosure</b>			

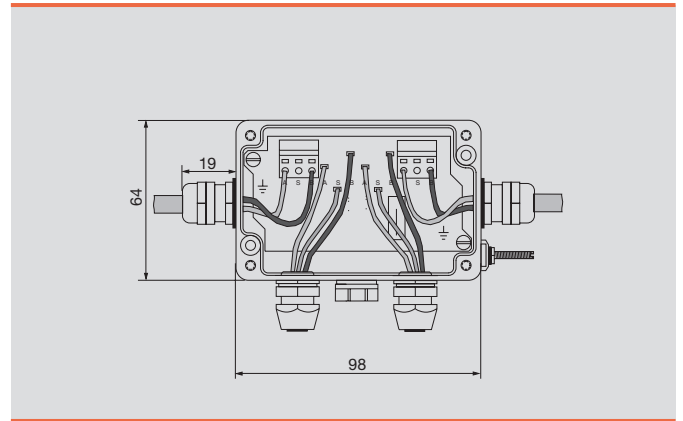
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

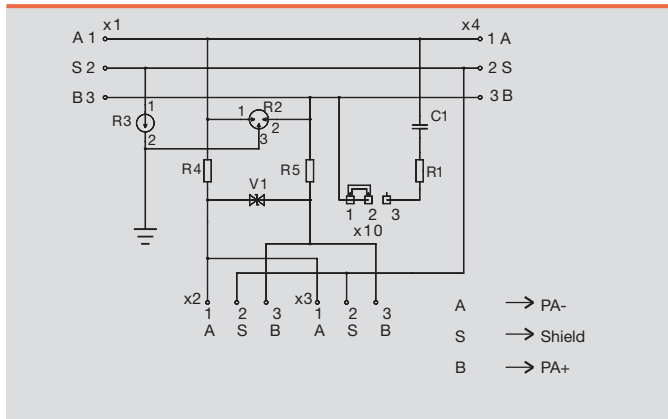
**Dimensioned drawing**



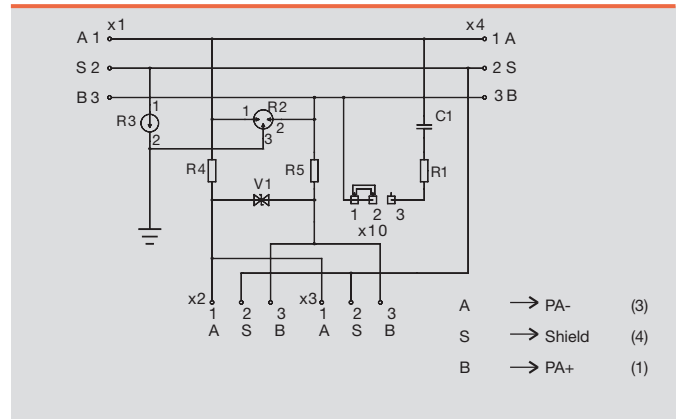
**Dimensioned drawing**



**Wiring diagram**

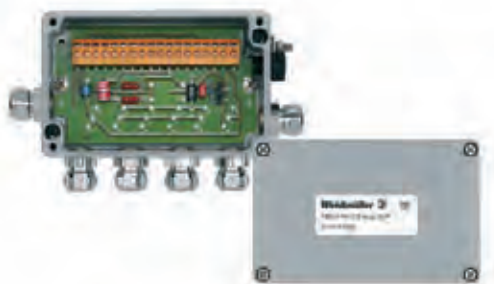


**Wiring diagram**



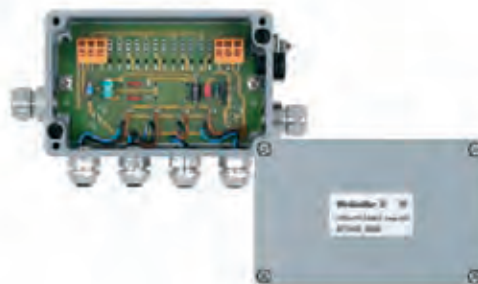
### 4-channel distributor (OVP)

Cable gland



### 4-channel distributor (OVP)

M12 connection



### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 4way OVP	branch line CG	1	8714140000
<b>Stainless steel enclosure</b>			
FBCon SS PCG 4way OVP	all connections PCG	1	8726080000

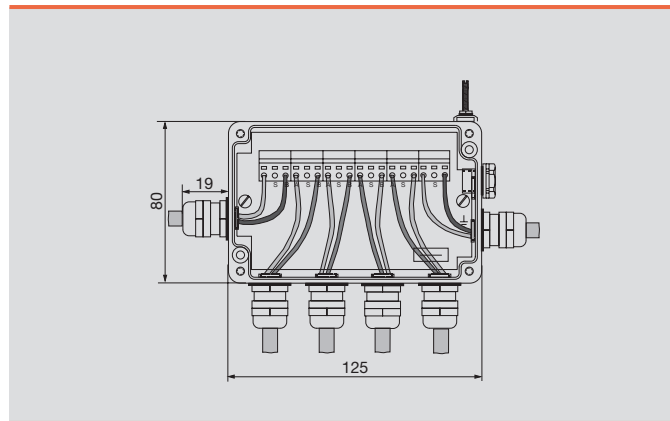
### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 4way OVP	branch line M12	1	8714100000
<b>Stainless steel enclosure</b>			

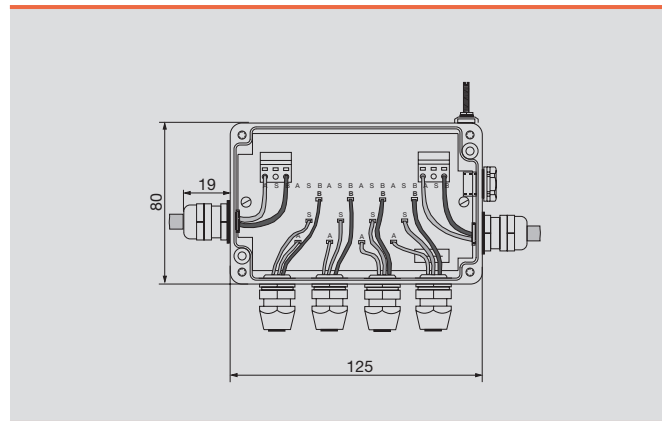
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

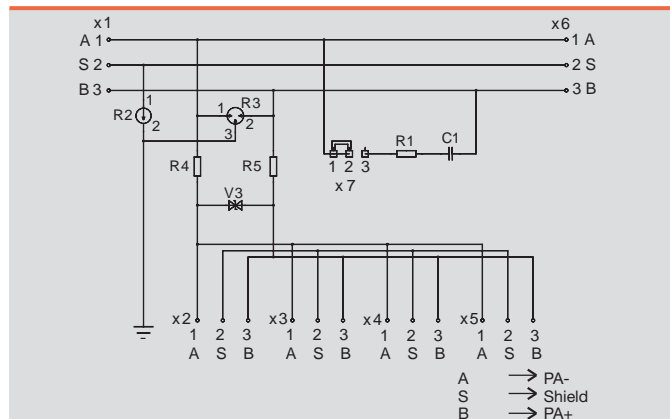
### Dimensioned drawing



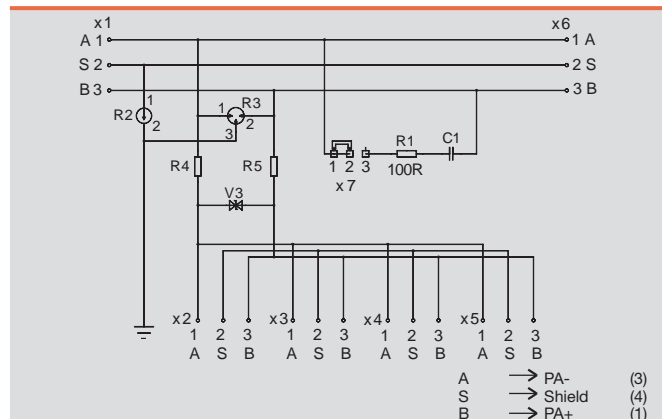
### Dimensioned drawing



### Wiring diagram



### Wiring diagram



**PROFIBUS-PA**

**8-channel distributor (OVP)**

Cable gland

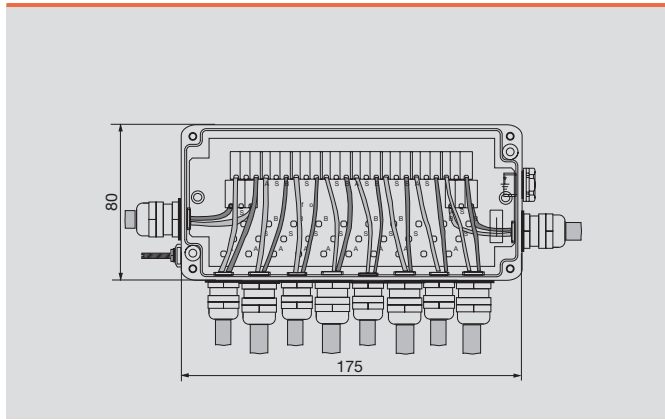


**Ordering data**

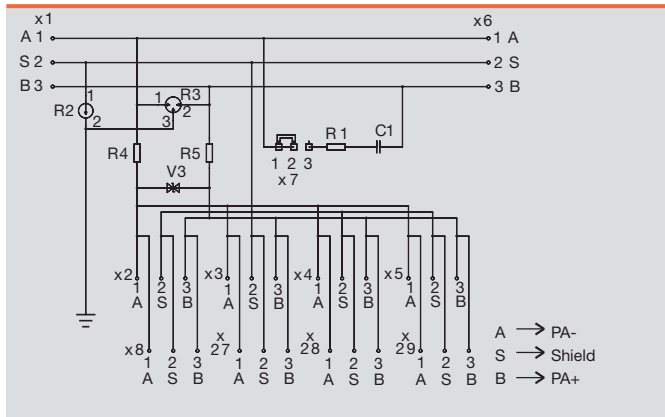
Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 8way OVP	branch line CG	1	8714150000
<b>Stainless steel enclosure</b>			
FBCon SS PCG 8way OVP	all connections PCG	1	8726090000

CG = brass cable gland  
PCG = plastic cable gland

**Dimensioned drawing**

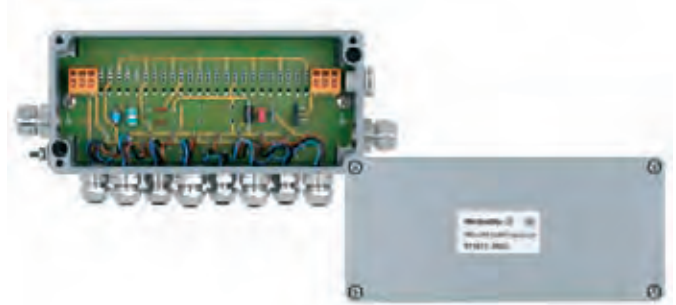


**Wiring diagram**



**8-channel distributor (OVP)**

M12 connection

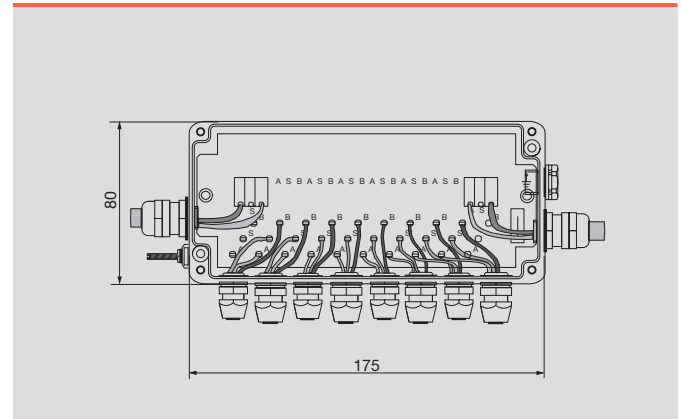


**Ordering data**

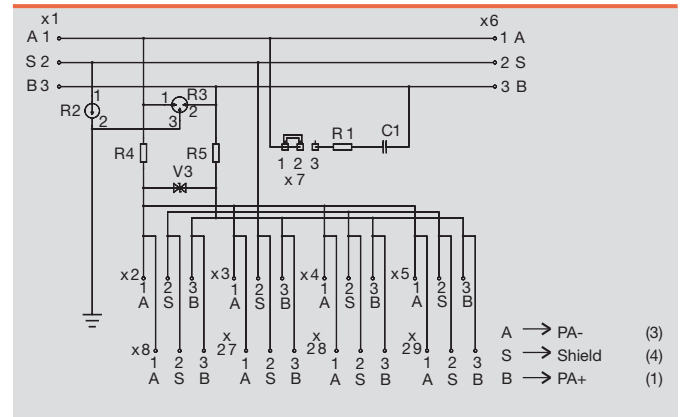
Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 8way OVP	branch line M12	1	8714110000
<b>Stainless steel enclosure</b>			

CG = brass cable gland  
PCG = plastic cable gland

**Dimensioned drawing**



**Wiring diagram**



### 1-channel distributor (limiter)

Cable gland



### 1-channel distributor (limiter)

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 1way Limiter	branch line CG	1	8714200000
<b>Stainless steel enclosure</b>			
FBCon SS PCG 1way Limiter	all connections PCG	1	8726110000

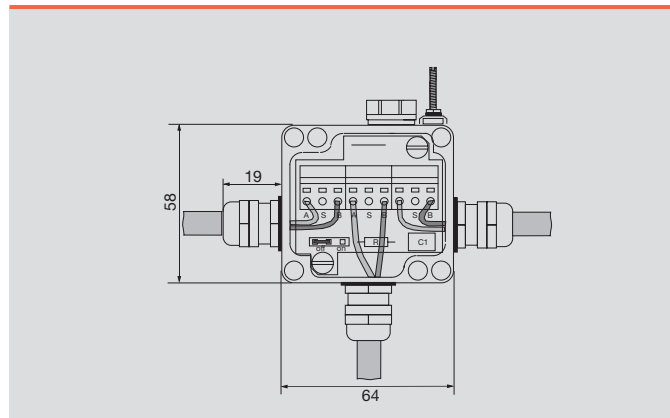
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 1way Limiter	branch line M12	1	8714160000
<b>Stainless steel enclosure</b>			

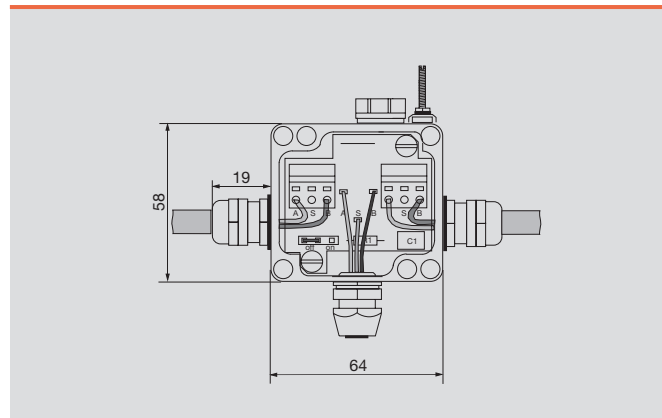
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

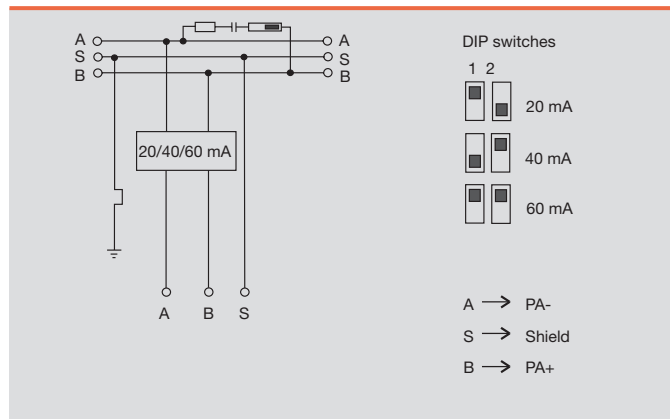
#### Dimensioned drawing



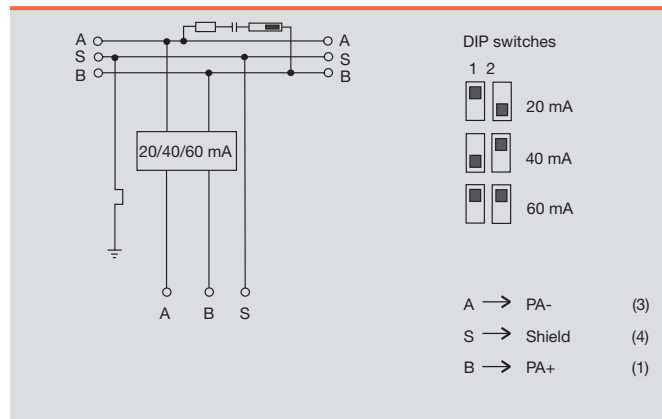
#### Dimensioned drawing



#### Wiring diagram



#### Wiring diagram



**PROFIBUS-PA**

**2-channel distributor (limiter)**

Cable gland



**2-channel distributor (limiter)**

M12 connection



**Ordering data**

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 2way Limiter	branch line CG	1	<b>8714210000</b>
<b>Stainless steel enclosure</b>			

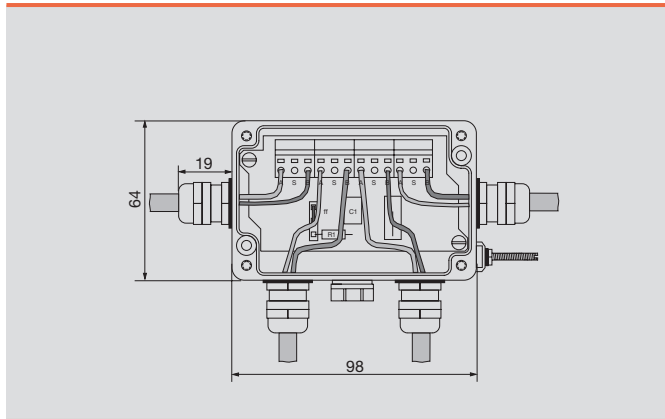
**Ordering data**

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 2way Limiter	branch line M12	1	<b>8714170000</b>
<b>Stainless steel enclosure</b>			

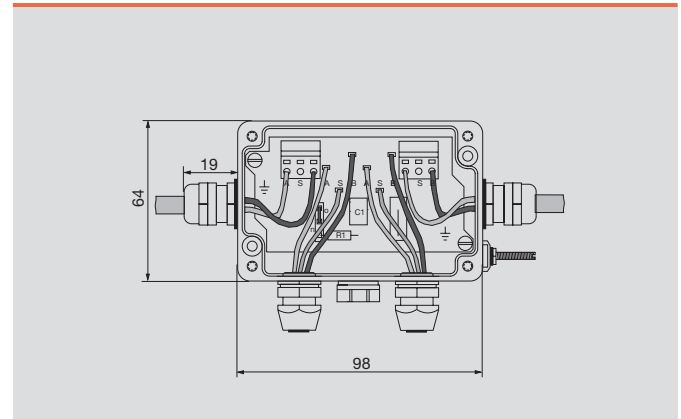
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

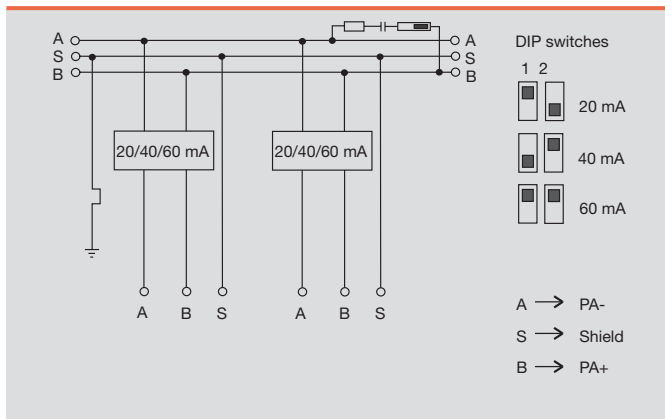
**Dimensioned drawing**



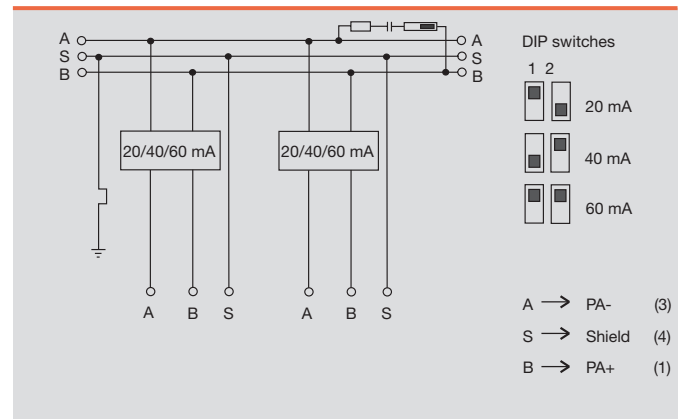
**Dimensioned drawing**



**Wiring diagram**



**Wiring diagram**



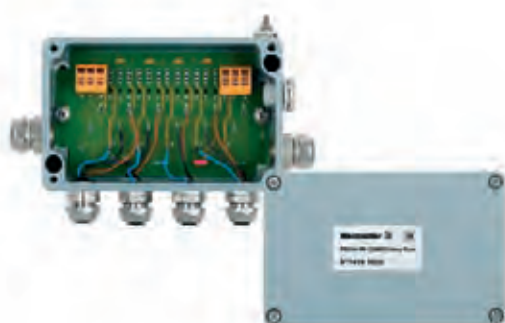
### 4-channel distributor (limiter)

Cable gland



### 4-channel distributor (limiter)

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 4way Limiter	branch line CG	1	8714220000
<b>Stainless steel enclosure</b>			
FBCon SS PCG 4way Limiter	all connections PCG	1	8715260000

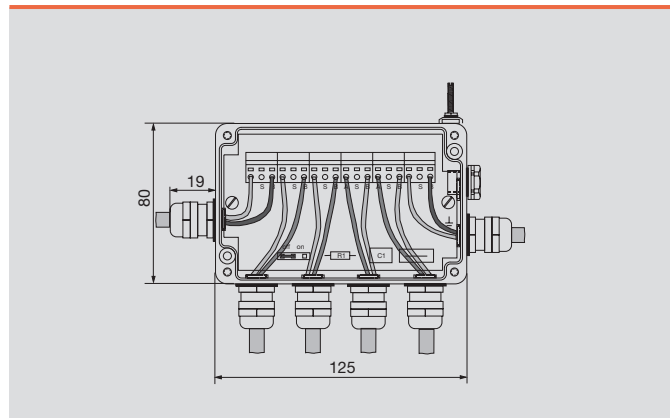
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 4way Limiter	branch line M12	1	8714180000
<b>Stainless steel enclosure</b>			

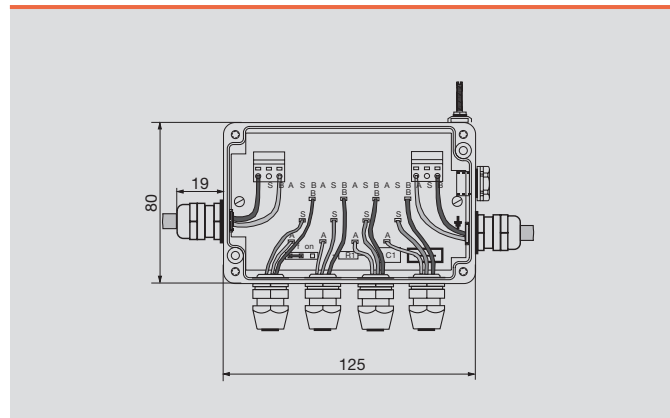
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

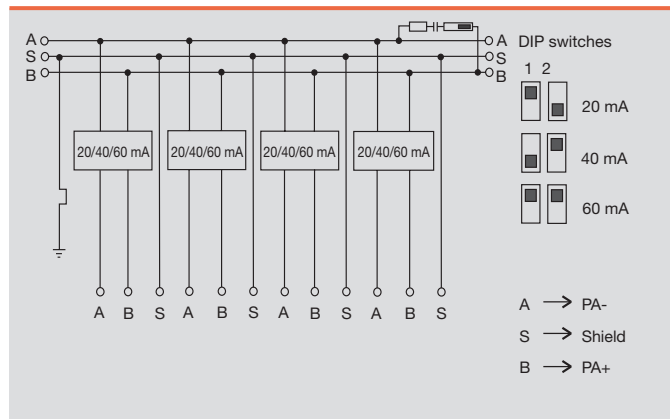
#### Dimensioned drawing



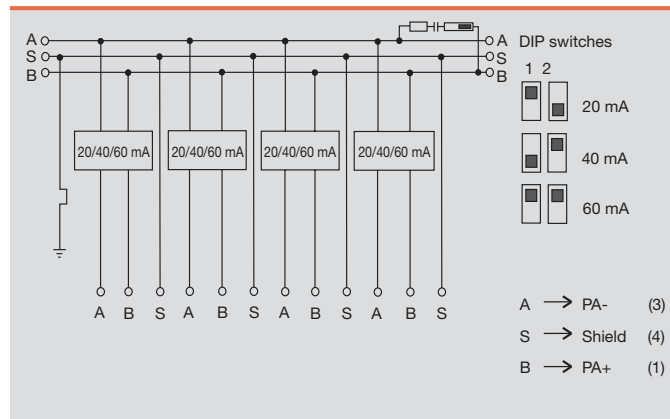
#### Dimensioned drawing



#### Wiring diagram



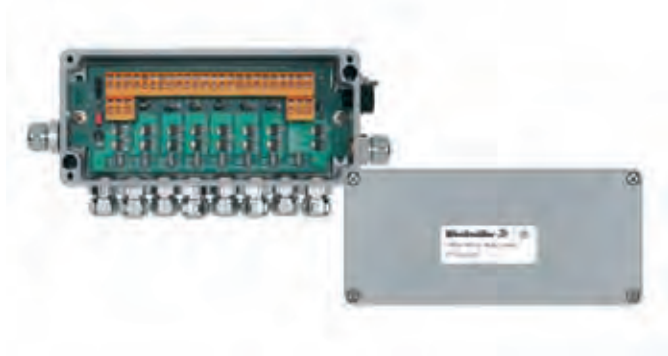
#### Wiring diagram



**PROFIBUS-PA**

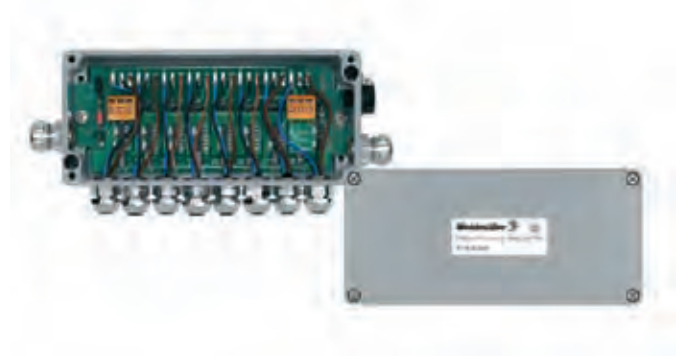
**8-channel distributor (limiter)**

Cable gland



**8-channel distributor (limiter)**

M12 connection



**Ordering data**

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 8way Limiter	branch line CG	1	8714230000
<b>Stainless steel enclosure</b>			
FBCon SS PCG 8way Limiter	all connections PCG	1	8726160000

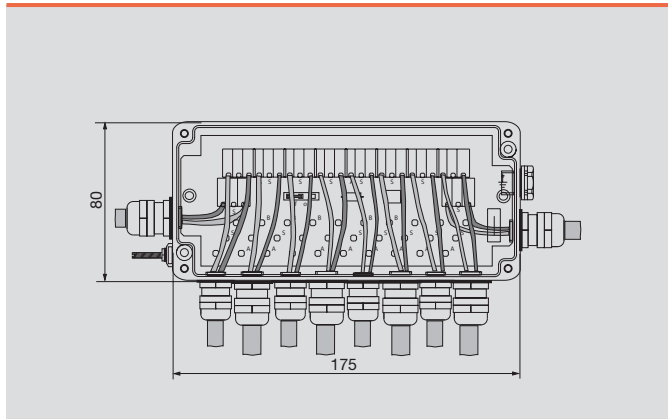
**Ordering data**

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 8way Limiter	branch line M12	1	8714190000
<b>Stainless steel enclosure</b>			

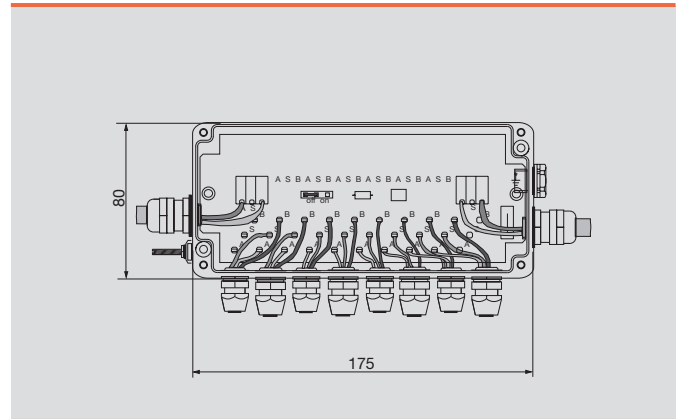
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

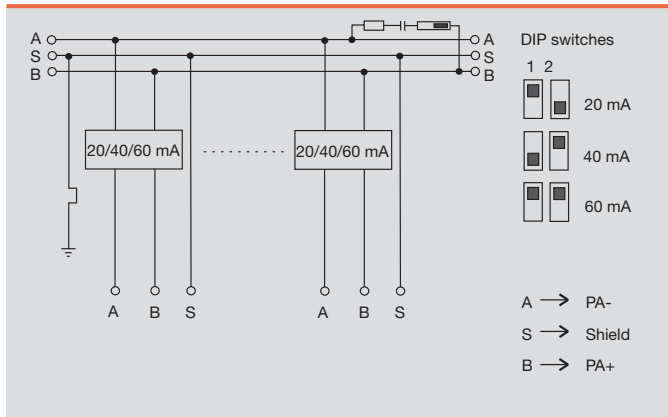
**Dimensioned drawing**



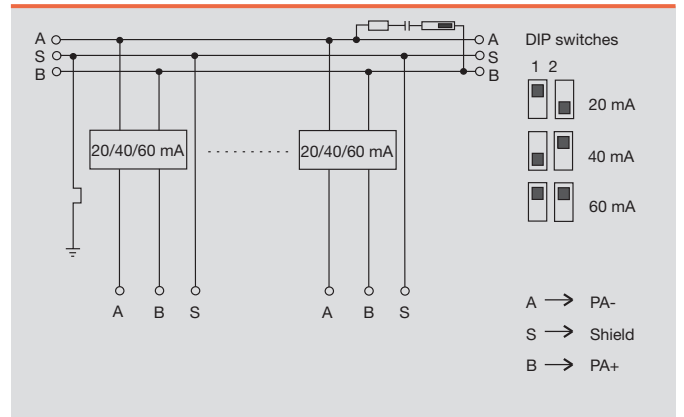
**Dimensioned drawing**



**Wiring diagram**



**Wiring diagram**







# FBCon distributors for Ex areas



## PROFIBUS-PA T-connector

- EEx (ia)

The PROFIBUS-PA installation products are increasingly used in

- food industry
- basic industries and
- chemical industry.

The product range offers a wide choice of customer solutions also for use in harsh conditions. This includes standard and EX versions of single and multi-way design with M12 plug-in connection or cable gland. Weidmüller offers a solution for almost every application. If you cannot find your solution here, please contact the branch / sales office responsible for you.

## PROFIBUS-PA T-connector

- EEx (ia)
- 1-way
- 2-way
- 4-way
- 8-way

The PROFIBUS-PA T-connector in EEx (ia) specification is intended for direct coupling of measuring devices, sensors, actuators, etc. in potentially explosive areas.

- Approval for intrinsically safe use ATEX approval
- IP 66 Ingress Protection Class
- Modular design
- Uninterruptible bus operation
- Simple handling
- External earth terminal
- External bus terminator





**PROFIBUS-PA ATEX**

**1-channel distributor Ex**

Cable gland



**1-channel distributor Ex**

M12 connection



**Ordering data**

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 1way Ex	branch line CG	1	8564180000
<b>Stainless steel enclosure</b>			

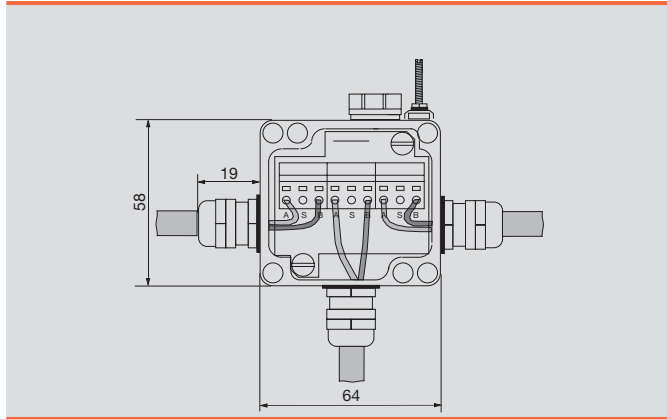
**Ordering data**

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 1way Ex	branch line M12	1	8564150000
<b>Stainless steel enclosure</b>			

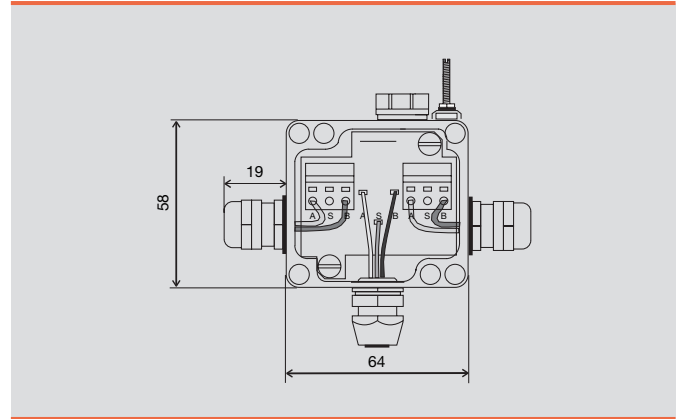
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

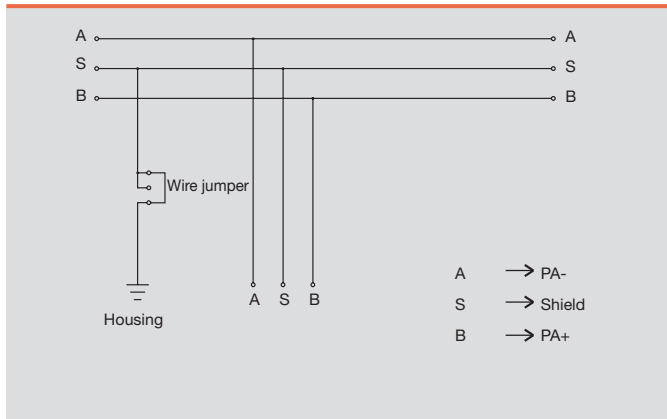
**Dimensioned drawing**



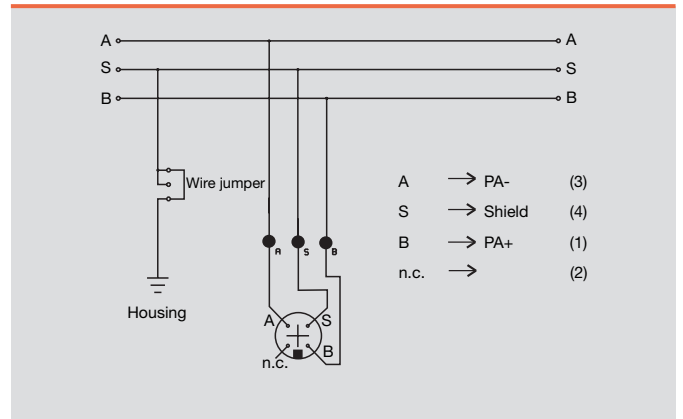
**Dimensioned drawing**



**Wiring diagram**



**Wiring diagram**



### 2-channel distributor Ex

Cable gland



### 2-channel distributor Ex

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 2way Ex	branch line CG	1	8564190000
<b>Stainless steel enclosure</b>			

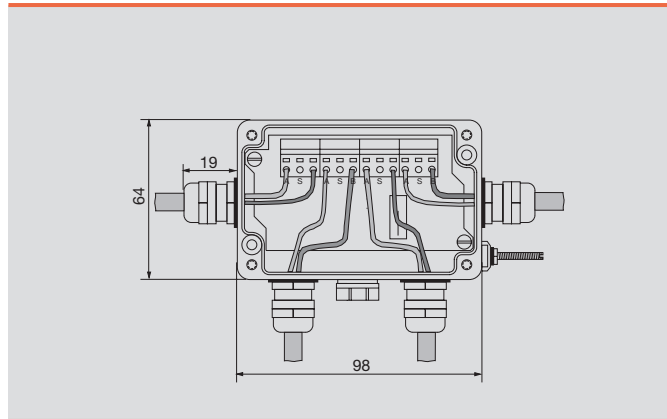
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 2way Ex	branch line M12	1	8564160000
<b>Stainless steel enclosure</b>			

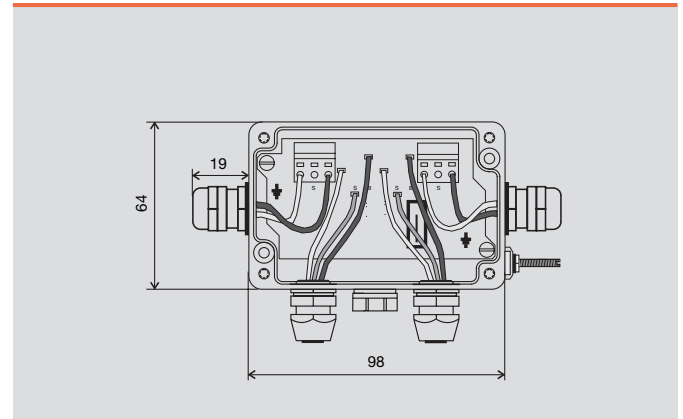
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

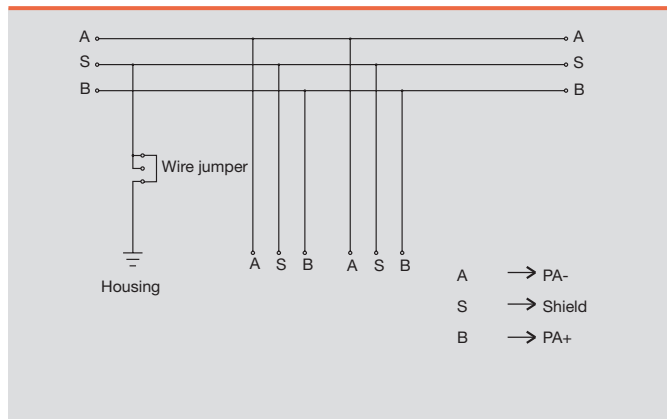
#### Dimensioned drawing



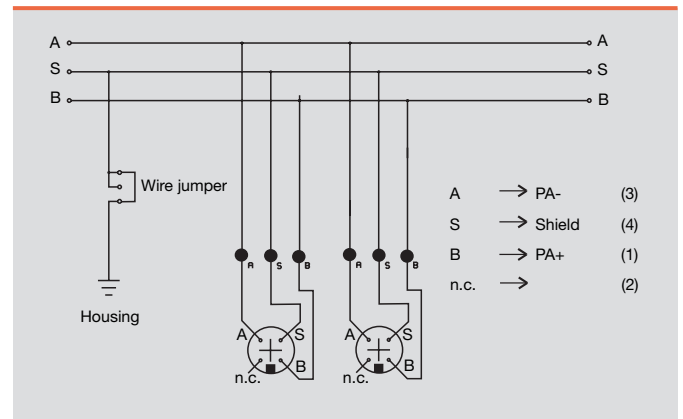
#### Dimensioned drawing



#### Wiring diagram



#### Wiring diagram



## PROFIBUS-PA ATEX

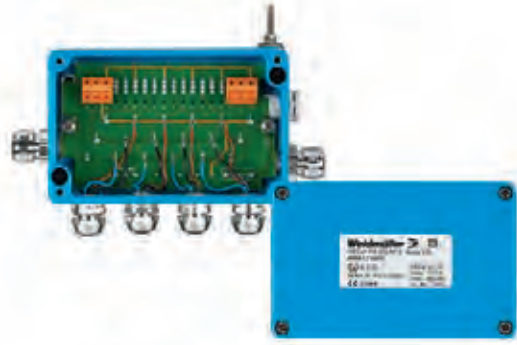
### 4-channel distributor Ex

Cable gland



### 4-channel distributor Ex

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 4way Ex	branch line CG	1	8564200000
<b>Stainless steel enclosure</b>			

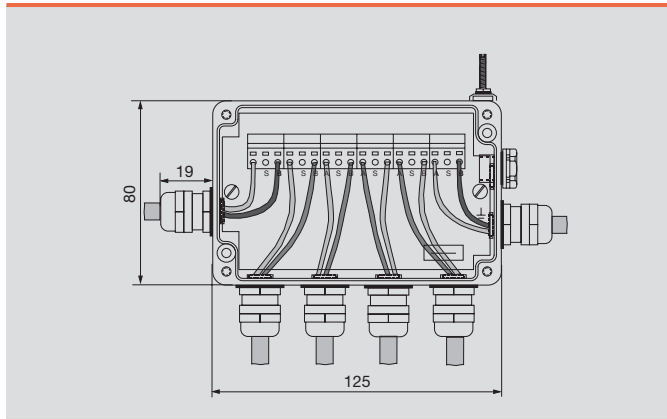
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 4way Ex	branch line M12	1	8564170000
<b>Stainless steel enclosure</b>			

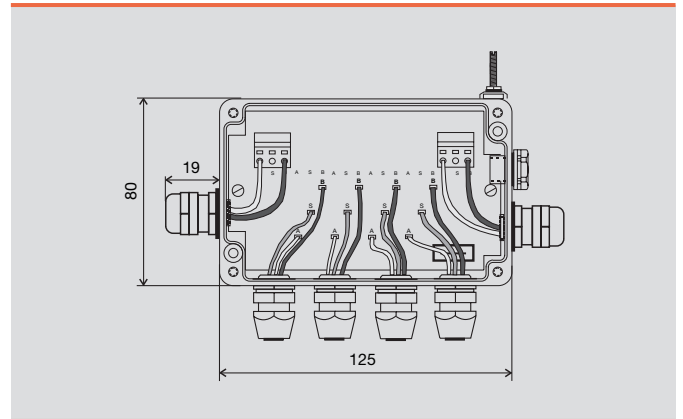
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

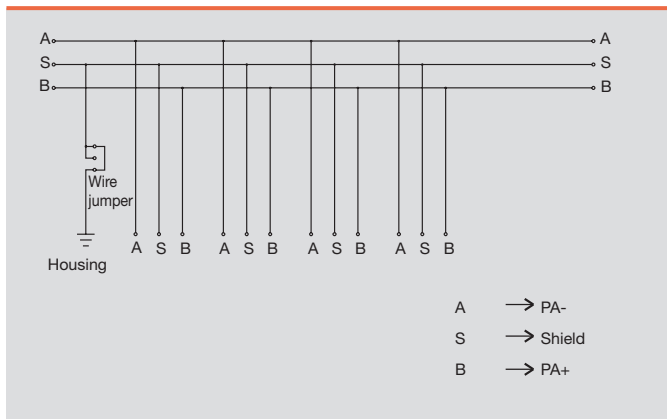
#### Dimensioned drawing



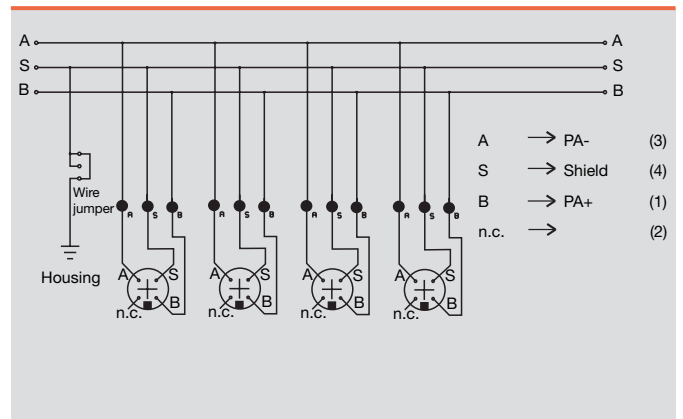
#### Dimensioned drawing



#### Wiring diagram

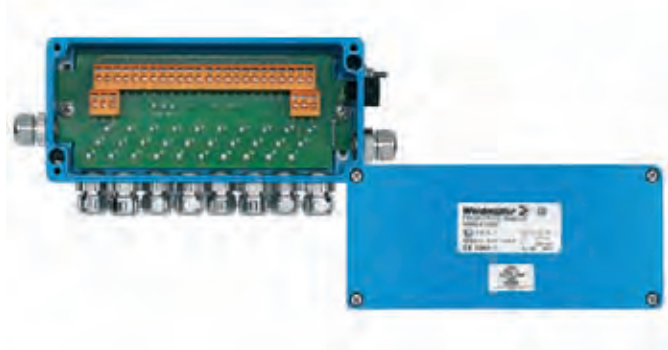


#### Wiring diagram



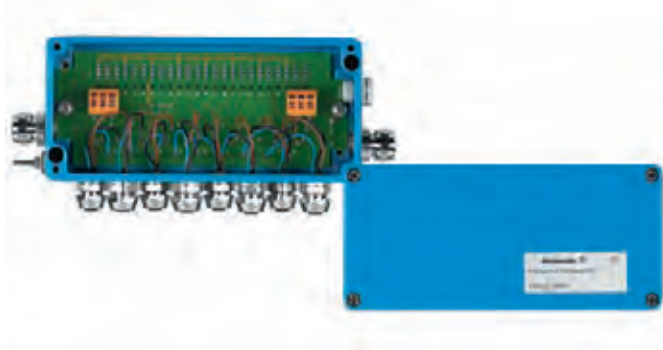
### 8-channel distributor Ex

Cable gland



### 8-channel distributor Ex

M12 connection



#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG 8way Ex	branch line CG	1	8564240000
<b>Stainless steel enclosure</b>			

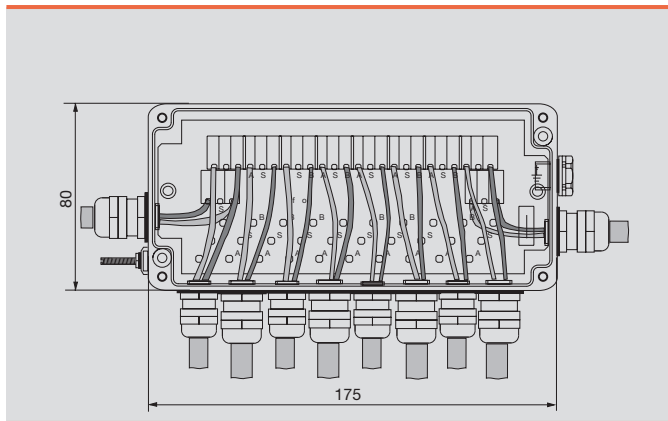
#### Ordering data

Type	Type of connection	Qty.	Order No.
<b>Aluminium housing</b>			
FBCon PA CG/M12 8way Ex	branch line M12	1	8564250000
<b>Stainless steel enclosure</b>			

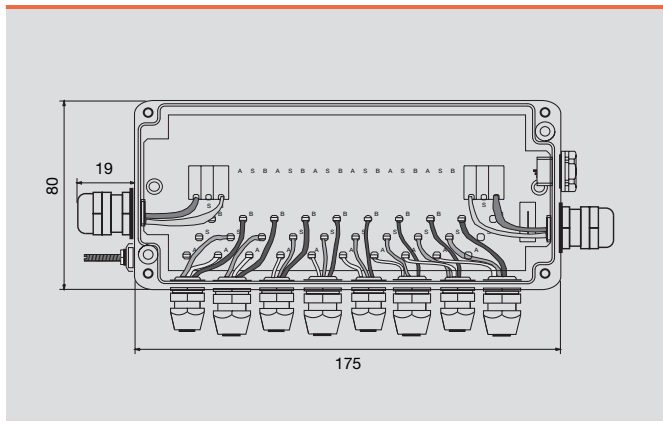
CG = brass cable gland  
PCG = plastic cable gland

CG = brass cable gland  
PCG = plastic cable gland

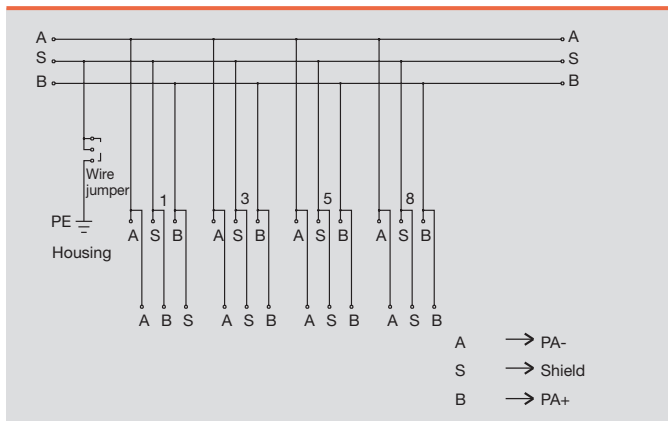
#### Dimensioned drawing



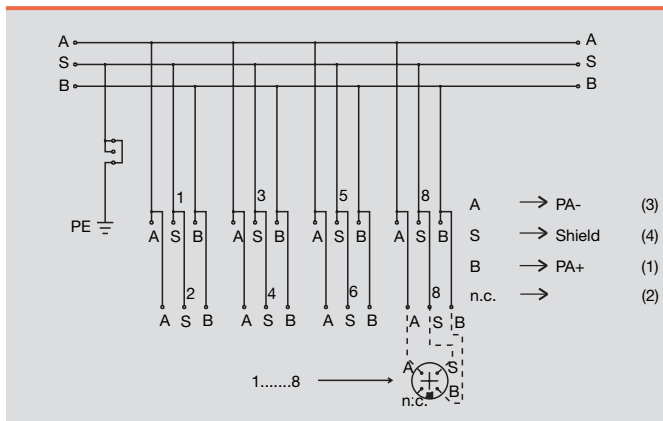
#### Dimensioned drawing



#### Wiring diagram

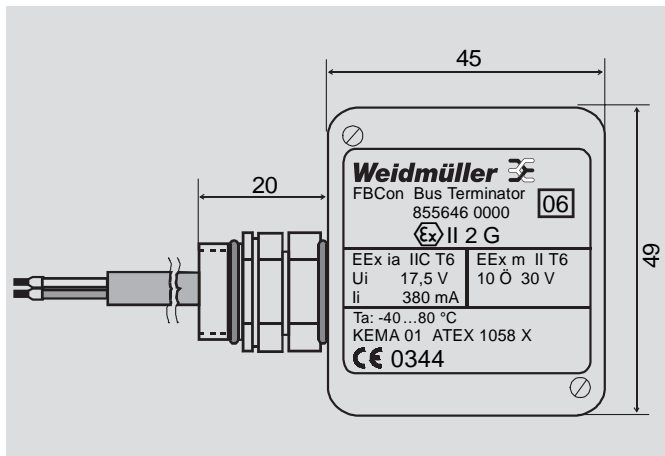


#### Wiring diagram



**PROFIBUS-PA ATEX**

**FBCon bus terminator**  
**FBCon bus terminator without earth connection**



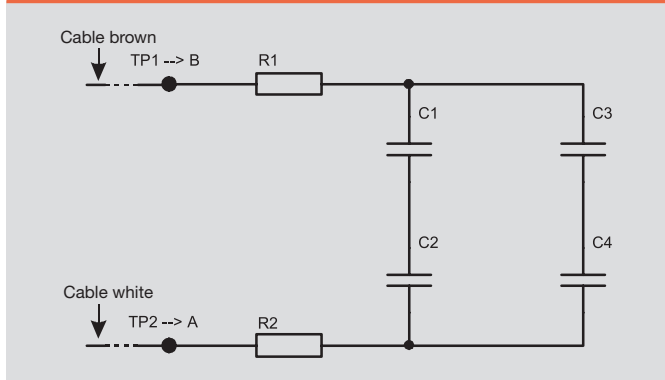
**Ordering data**

Type	Qty.	Order No.
FBCon bus terminator EEx with locking clip, without earth connection	1	8556460000
FBCon bus terminator EEx without locking clip, without earth connection	1	8606190000

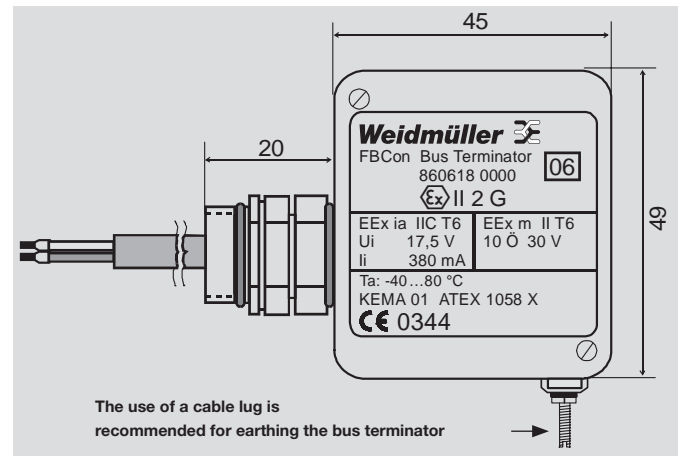
**Technical data**

Operating temperature	-40 °C to 80 °C
Ingress protection class	IP 66
Enclosure material	High grade aluminium alloy (Al - Si 12)
Finish	Black powder-coated
Connection lead	2 x 0.14 mm <sup>2</sup>
Cable entry	Bus adapter M16

**Wiring diagram**



**FBCon Bus Terminator with earth connection**



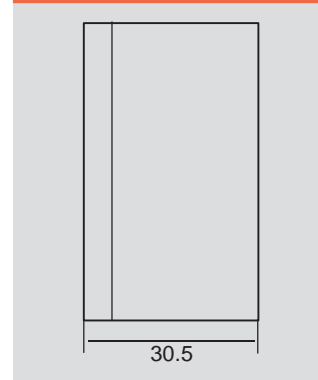
**Ordering data**

Type	Qty.	Order No.
FBCon Bus Terminator EEx mit Rastfuß + mit Erdschluss	1	8606180000
FBCon Bus Terminator EEx ohne Rastfuß + mit Erdschluss	1	8606200000

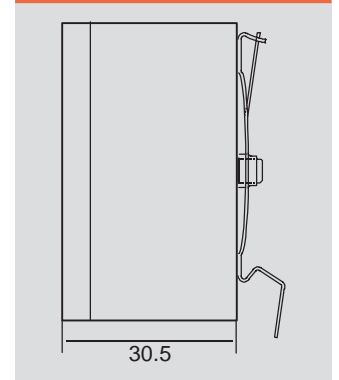
**Technical data**

Operating temperature	-40 °C to 80 °C
Ingress protection class	IP 66
Enclosure material	High grade aluminium alloy (Al - Si 12)
Finish	Black powder-coated
Connection lead	2 x 0.14 mm <sup>2</sup>
Cable entry	Bus adapter M16

**Housing cover without clip-on foot**



**Housing cover with clip-on foot**







**Accessories – Bus cables**

**PROFIBUS-PA cables**

**Straight version**



TM-I marker sleeve

**PROFIBUS-PA Ex i cables**

**Straight version**



TM-I marker sleeve

**Ordering data**

Designation	
<b>Industrial zone</b>	
One side without connector, male	
M12 EMC/black/1M	1 m
M12 EMC/black/2M	2 m
M12 EMC/black/5M	5 m
M12 EMC/black/10M	10 m
One side without connector, female	
M12 EMC/black/1M	1 m
M12 EMC/black/2M	2 m
M12 EMC/black/5M	5 m
M12 EMC/black/10M	10 m
Connecting cables, male – female	
M12 EMC/black/1M	1 m
M12 EMC/black/2M	2 m
M12 EMC/black/5M	5 m
M12 EMC/black/10M	10 m
<b>Information</b>	

Type	Order No.
<b>PROFIBUS-PA cable</b>	
FBC PA M12 M 1M	<b>1785120100</b>
FBC PA M12 M 2M	<b>1785120200</b>
FBC PA M12 M 5M	<b>1785120500</b>
FBC PA M12 M 10M	<b>1785121000</b>
FBC PA M12 FM 1M	<b>1785110100</b>
FBC PA M12 FM 2M	<b>1785110200</b>
FBC PA M12 FM 5M	<b>1785110500</b>
FBC PA M12 FM 10M	<b>1785111000</b>
FBC PA M12 M-FM 1M	<b>1785100100</b>
FBC PA M12 M-FM 2M	<b>1785100200</b>
FBC PA M12 M-FM 5M	<b>1785100500</b>
FBC PA M12 M-FM 10M	<b>1785101000</b>
Other lengths available on request.	

**Ordering data**

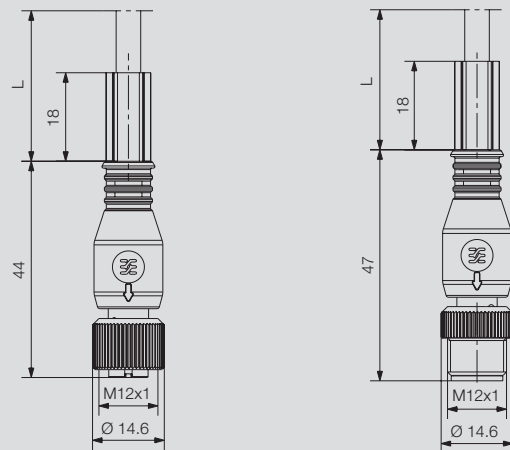
Designation	
<b>Intrinsically safe zone Exi</b>	
One side without connector, male	
M12 EMC/blue/1M	1 m
M12 EMC/blue/2M	2 m
M12 EMC/blue/5M	5 m
M12 EMC/blue/10M	10 m
One side without connector, female	
M12 EMC/blue/1M	1 m
M12 EMC/blue/2M	2 m
M12 EMC/blue/5M	5 m
M12 EMC/blue/10M	10 m
Connecting cables, male – female	
M12 EMC/blue/1M	1 m
M12 EMC/blue/2M	2 m
M12 EMC/blue/5M	5 m
M12 EMC/blue/10M	10 m
<b>Information</b>	

Type	Order No.
<b>PROFIBUS-PA cable</b>	
FBCEX PA M12 M 1M	<b>1785150100</b>
FBCEX PA M12 M 2M	<b>1785150200</b>
FBCEX PA M12 M 5M	<b>1785150500</b>
FBCEX PA M12 M 10M	<b>1785151000</b>
FBCEX PA M12 FM 1M	<b>1785140100</b>
FBCEX PA M12 FM 2M	<b>1785140200</b>
FBCEX PA M12 FM 5M	<b>1785140500</b>
FBCEX PA M12 FM 10M	<b>1785141000</b>
FBCEX PA M12 M-FM 1M	<b>1785130100</b>
FBCEX PA M12 M-FM 2M	<b>1785130200</b>
FBCEX PA M12 M-FM 5M	<b>1785130500</b>
FBCEX PA M12 M-FM 10M	<b>1785131000</b>
Other lengths available on request.	

**Technical data**

Wire resistance (loop)	max. $\Omega$ /km	44
Insulation resistance	min. $G\Omega \times km$	5
Working capacity at 800 Hz	nom. nF/km	52
Inductance 800 Hz	mH/km	approx. 0.4
Characteristic impedance at 31.25 kHz		$100 \pm 20 \%$
	at $\geq 1$ MHz	nom. $\Omega$
Wave attenuation		
– at 39 kHz	max. d/B 100 m	0.3
– at 100 kHz	nom. d/B 100 m	0.35
– at 1 MHz	nom. d/B 100 m	1.2
Signal dispersion speed	nom. %	79
Coupling resistance up to 30 MHz	max. mOhm/m	250
Operating voltage (not for three-phase use)	Peak value V	200
Test voltage	wire/wire $U_{\text{test}}$ V	1500
	wire/shield $U_{\text{test}}$ V	1500
<b>Mechanical specifications</b>		
Stationary bending radius	mm	65
Temperature range	stationary $^{\circ}\text{C}$	-5 ... 60
	moving $^{\circ}\text{C}$	-30 ... 80
<b>Information</b>		

**Dimensioned drawing**



**M12 screw connection Metal (shielded) – A-coded**

**M12 tension-clamp connection  
Stainless steel – A-coded**

**SAIS / SAIB**

**4- and 5-pole, straight**



**Ordering data**

Pin	
	Standard, 4-pole, PG 9
	Standard, 5-pole, PG 9
	Stainless steel, 5-pole, PG 9

Socket	
	Standard, 4-pole, PG 9
	Standard, 5-pole, PG 9
	Stainless steel, 5-pole, PG 9

**Information**

**Technical data**

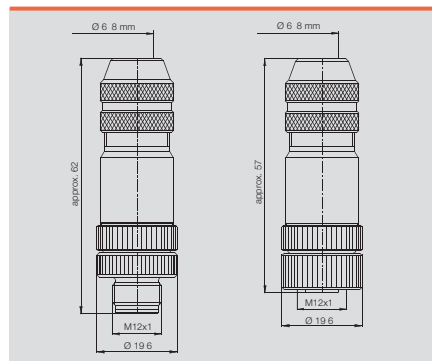
No. of poles	
Type of connection	
Enclosure material	
Connecting thread	
Cable connection diameter	mm
Connection cross-section	mm <sup>2</sup>
Rated current	A
Rated voltage	V
Temperature range	°C
Protection degree	
Contact surface	

**Information**

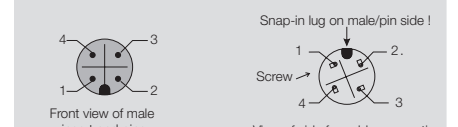
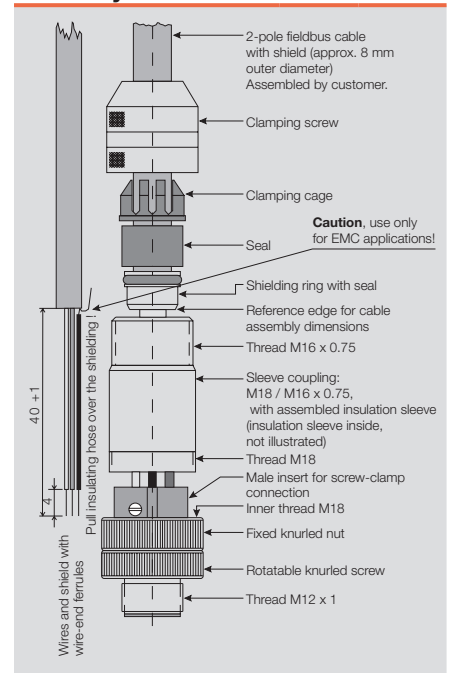
**Dimensioned drawing**

Type	Qty.	Order No.
FBCon M12 4P M EMC	1	<b>9455640000</b>
SAIS-M-5/8S M12 5P A-COD	1	<b>1784740000</b>
SAIS 5/9-VA	1	<b>1920700000</b>
FBCon M12 4P FM EMC	1	<b>8426220000</b>
SAIB-M-5/8S M12 5P A-COD	1	<b>1784750000</b>
SAIB 5/9-VA	1	<b>1920710000</b>
Other variants available on request.		

Standard	Stainless steel (VA)
4/5	5
Screw	Tension clamp connection
Nickel-plated CuZn	14V32
M12	M12
6...8	6...8
0.25...0.75	0.25...0.5
4	4
250 (4-pole)/ 125 (5-pole)	125
-25 ... 85	-25 ... 85
IP 67	IP 69 k
CuSnZn	Au



**Assembly instructions**



Socket	Wire-colour	Bus	Reference
1	brown	PA+	B
2	unassigned	n.c.	n.c.
3	blue	PA+	A
4	black	shield	S

Reference to other Weidmüller PROFIBUS PA products or order numbers:  
9455650000, 8425910000, 8425930000, 8425940000

- Assembly steps:**
- As shown in the illustration, put the clamping screw, clamping cage, seal and shielding ring (with seal) onto the fieldbus cable.
  - Caution:** use only for EMC applications! Strip the fieldbus cable here. Widen the shield and place over the shielding ring. Cut off the remaining shielding braid. As illustrated, the shield can also be connected to connection S. Prepare the cable as shown.
  - Pull the prepared cable end through the sleeve coupling, together with the shield and insulation tube when necessary. Push the shielding ring with seal and shielding braid into the sleeve coupling. Push the seal, clamping cage and clamping screw to the shielding ring. Tighten the clamping ring.
  - Screw the cable end tightly into the male insert. Screw together the sleeve coupling and the male insert. Tighten clamping screw.



Accessories – Positioning plug

Stainless steel

Positioning plug



Ordering data

Positioning plug, PG9 500 mm  
 Adapter PG9 / M20

Type	Qty.	Order No.
SAIE-M12S-4-0.5U-AEH-VA	1	1861220001
SAIE-EW-M20/PG9-SW24-VA	1	1950270000

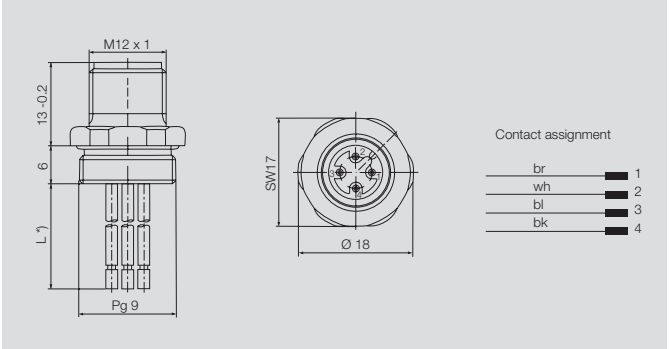
Information

Technical data

No. of poles		4
Version		Pin
Temperature range	°C	-40 to +85
Housing material		Stainless steel (VA)
Connecting thread		PG 9
Plug thread		M12
Cross-section of strands	mm²	0.34
Protection degree		IP 67
Strand length (fitted with wire-end ferrules)	mm	500
Rated current	A	4 per contact
Rated voltage	V	250
Contact surface		Gold-plated

Information

Dimensioned drawing



Positioning plug



Ordering data

- Positioning plug PG 13,5 150 mm
- Positioning plug PG 13,5 300 mm
- Positioning plug M 20 150 mm
- Positioning plug M 20 300 mm

Type	Order No.
POS-4P M12 PG13,5 150mm	9455650000
POS-4P M12 PG13,5 300 mm	8425910000
POS-4P M12 M20 150mm	8425930000
POS-4P M12 M20 300mm	8425940000
<b>Type B-coded</b>	
POS-5P M12/M20 300MM	1795500000

Information

Technical data

No. of poles	
Type of connection	
Connection cross-section	mm²
Connecting thread	
Contact surface	
Type of housing protection acc. to DIN 40050 IEC 529	
Enclosure material	
Flammability acc. to UL-94	
Operating temperature	°C
Rated current per contact	A
Rated voltage acc. to VDE standard 0110 ISO group C	V
Tracking resistance	
Volume resistance acc. to IEC512 part 2	m Ω
Insulation resistance acc. to IEC 512 part 2	Ω

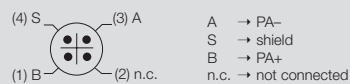
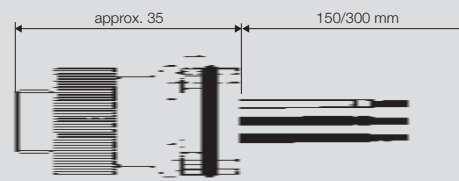
Information

Positioning connectors for connecting field devices	
4/5	
Screw	
1.5 (4-pole) 0.34 (5-pole)	
PG 13.5 / M 20	
CuZnAu	
IP 67	
Cu Zn surface nickel	
V-2	
-40 ... 85	
3	
125 ~ 150 =	
KC 600	
≤ 8	
≥ 10 <sup>12</sup>	

Processing notes

	Torque
Clamping screw	1.8 - 2.0 Nm
Knurled nut	Hand tighten
Counter nut	6.25 Nm

Dimensioned drawing



In cases where a field device is subject to vibration, we recommend using a spur (branched) cable for isolating the vibration.



# Weidmüller Service

<b>Weidmüller Service</b>	Customer specific solutions: best advice, best solutions	V.2
	Overview of services	V.3
	Digital support: Online product catalogue, RailDesigner®, M-Print® PRO label designer	V.6

## Best advice, best solutions

### Services tailored to customers' needs

Service – at Weidmüller that means diversity. And it also means that you can take advantage of our comprehensive resources:

- Production of terminal rails and enclosures fitted with our modular terminals and other modules, and prewired
- Fitting of cable glands and the marking of terminals, conductors and enclosures according to your specification
- Competence in the processing of enclosure materials such as aluminium, plastics, sheet steel and stainless steel
- Flexibility in the product selection: besides Weidmüller products we can also integrate yours and even those of other manufacturers

This range of services enables Weidmüller to act as an external service provider to increase your capacities. And demanding standards guarantee a high level of quality every time.

### The best advice for the best solutions

The start of a good partnership is always characterised by an intensive exchange of information to define the respective positions. Our contribution focuses on detailed advice with respect to:

- Optimum choice of products
- Practical pre-assembly
- Integration into your systems
- Consideration of requirements such as certification, classes of protection or hazard protection as required by your industry

That avoids mistakes right from the start – totally in keeping with the effective handling of the project, totally in keeping with perfect results. Our experience helps you create the foundation for good business and satisfied customers.



## Overview of services



### Production of terminal rails

Terminal rails are manufactured from steel, stainless steel, aluminium or copper to suit the diverse applications. And we can produce terminal rails with elongated or round holes, or in other forms to suit your requirements exactly. Terminal rails are fitted with modular terminals or electronic products, prewired and marked according to your specification.

#### The benefits for you

- No need to procure individual components
- No need to mount individual components
- No unnecessary stocks
- Just one order number for your pre-assembled terminal rail
- Constant high quality



### Production of enclosures

High-tech brings benefits. Our state-of-the-art production methods open up new options for you:

- Inclusion of holes and threads in the enclosure
- Enclosure cover with hinges and other accessories if required
- More complex machining such as milling of contours or reaming of holes
- Special paint finishes: To protect against the effects of the weather, your enclosures can be painted individually. Simply specify the colour and printing you require. Special paint finishes and powder coating are also possible.

Enclosures are adapted to suit the intended application exactly. You get a tailored, individual product and the quality is guaranteed by our adherence to demanding standards. Does your product require a special approval? Our accredited laboratory can test the complete product and confirm that its design complies with the standards! With every delivery we document the corresponding approvals (e.g., ATEX, GL, UL, GOST, etc.).

#### The benefits for you

- Enclosures in various sizes and materials
- Inclusion of optional accessories such as hinges and locks
- Complex machining processes and special packaging
- Ready-to-use, certified products for all types of applications.





## Overview of services



### Electronics production

We manufacture according to your specifications: ranging from PCB assembly to 100%-tested component assemblies. We bring the individual parts together according to your documents: whether for materials procurement, provision, or withdrawal from our stock. All production processes and the entire range of qualified expertise are at our disposal: from hand assembly to SMD assembly. Our state-of-the-art production and testing facilities guarantee consistent quality.

#### The benefits for you

- Solutions for custom tasks
- Complex component assemblies including enclosures from a single-source supplier
- Reduction of your procurement and storage of individual parts



### „RockStar“ heavy-duty connectors and cable assembly

To help ensure that your switchgear cabinets and installations are put into operation without delay, Weidmüller can supply pre-fabricated components such as heavy-duty connectors. These are assembled and prewired according to your specification and are supplied ready to connect. If required, we can also supply the finished enclosure with the heavy-duty connectors already integrated. An entire spectrum of application possibilities are available with our ConCept modular connector system. This modular system enables the flexible combination of diverse modules. Custom crimping and cabling is included on request! Do you prefer a personal touch? We can laser-label your company logo and article number onto our RockStars! In total compliance with your requirements.

#### The benefits for you

- Special requirements with respect to font, number of characters, material and printing durability for your markers
- Prewiring of connectors saves you valuable installation time
- Modular connector system can be ordered pre-crimped



### Marking

Whether multi-line labelling, white or coloured terminal markers or group designations, the Weidmüller range can cater for every marking task – fast, clear and according to European standards. However, we can also supply you with preprinted markers to match your specification. Simply tell us the type of marker you require, the colour, the printing sequence and the text, and we'll look after the rest. If required, we can also install the finished markers during assembly.

### Equipment labelling

Device markers are essential for marking your electrical installations. Therefore, Weidmüller can supply rating plates designed specially for your application. A wide range of different shapes, colours, materials and fixings – riveted, screwed or bonded with adhesive – are available from which to choose. And a whole range of different fonts mean that we can handle every request.

### Integration of special accessories

In some cases it is necessary to integrate special accessories. This is no problem for Weidmüller because we can integrate buttons, switches, warning lamps, plugs or couplings – all properly planned, fitted, connected and tested. And that includes the products of other manufacturers as well as our own. We shall also be happy to advise you on standard accessories such as hinges.

### The benefits for you

- Rating plates in various materials
- Individual printing or laser engraving
- Equipment and accessories to your specification



## Online product catalogue

If you have questions about the specifications and details of our products, perhaps even outside normal business hours,

then our online catalogue at

<http://catalog.weidmueller.com>

open 24 hours a day, 365 days a year – is the perfect source of information.

Besides product features and part numbers, it contains extensive additional information on all product groups. And for further information, offers and your personal contact, simply consult the Weidmüller website at

[www.weidmueller.com](http://www.weidmueller.com)



With one-click selection for the product data sheet of your choice.



# Digital support

## RailDesigner®

RailDesigner® is a Weidmüller program for planning, assembling and ordering both terminal rails and enclosures. And it's so easy to use:

- Fast acquisition of all necessary data
- Realistic-looking graphic user interface and ideal conditions for simple assembly of your terminal rails and enclosures with all the necessary components
- Simply click on all the products you need and add accessories such as markers or cross-connectors
- To configure an individual enclosure, simply choose an enclosure type from a standard range and then add holes and other accessories to suit your requirements

These parameters form the foundation for a perfect software assistant. You can view the enclosure on the screen complete with all the configured products, and print out a hardcopy, or simply send the file to Weidmüller via e-mail in the form of an order. RailDesigner® provides you with optimum planning security and clarity during the design phase. And hence simplifies the ordering process enormously.

## M-Print® PRO label designer

The comprehensive range of Weidmüller services includes the M-Print® PRO software.

This is a professional-standard, Windows®-based program for printing and ordering labels and markers that is coordinated with our current printing systems and marking materials.

M-Print® PRO enables you to design your labelling materials professionally and quickly. Texts, borders, lines, graphics, barcodes, serial numbers and photographs are all possible. The interface to RailDesigner® or your CAE system enables the transfer of all your configured data.





# Technical appendix/Glossary

<b>Technical appendix/Glossary</b>	Introduction	W.2
	Technical data	W.4
	FDT/DTM – The standard solution for device configuration	W.8
	EX basics	W.10
	ATEX	W.16
	Electrical data	W.18
	General technical information	W.20
	Glossary	W.24

## Different types of analogue signalling

The working environment can be measured in many different forms, e.g. in terms of temperature, humidity or air pressure. The values of these physical variables change constantly. Elements that monitor the statuses and status changes of a given environment and supply an indication of this changing environment must be able to portray the continuous change.

In industrial monitoring tasks, sensors are responsible for registering ambient statuses. Sensors provide signals which allow detailed conclusions for downstream evaluation and monitoring systems with detailed conclusions about the statuses or status changes, e.g. in a production process. Sensor signals monitor continuous changes in the field. They occur in digital and analogue form. As a rule, they supply an electrical voltage or current value which corresponds proportionally to the physical variables being monitored.

If automation processes are expected to reach certain statuses or keep them constant, then analogue signal conditioning is required. It is also important in areas where this has already been part of long established practice, e. g. in process engineering or the chemicals industry.

In process engineering, standardised electrical signals are normally used. Currents of 0 ... 20 mA, 4 ... 20 mA or voltages of 0 ... 10 V have become established as the output variables for sensors recording various different physical parameters.

Weidmüller takes account of the growing preference for automation – including and in particular with analogue signal conditioning – and offers a wide range of products tailor-made to the requirements involved in handling sensor signals. Units for the common signals (0 ... 20 mA, 4 ... 20 mA, 0 ... 10 V) generate an output signal as a proportional value of the variable input signal. “Protective separation”, e.g. of the sensor circuit from the evaluation circuit, is also taken into account. “Protective separation” prevents mutual interference among several sensor circuits, e.g. as in the case of earth loops in interlinked measuring circuits.

The wide range of Weidmüller products completely covers the functions involved in signal conversion, signal separation and signal monitoring. The products can thus handle nearly all applications in industrial measuring technology, and safeguard elementary functions between field signals and further processing systems. The mechanical properties of the products are built up around a consistent concept.

Signal converters can be used with other Weidmüller products and combined with each other. They are designed to entail a minimum wiring workload and maintenance in both electrical and mechanical terms.

The product range contains the following functions:

- DC/DC converters
- Current converters
- Voltage converters
- Temperature transformers for resistance thermometers and thermoelements
- Frequency converters
- Potentiometer transducers
- AC transducers
- Bridge transducers (strain gauges)
- Threshold monitoring modules
- AD/DA converters

The products are available as pure signal conversion, 2-way isolation, 3-way isolation and passive disconnectors – depending on the production functions in each case.



**2-way isolation** separates the signals from each other electrically and decouples the measuring circuits. Potential differences – caused by long line lengths and common reference points – are eliminated. Furthermore, the electrical separation protects against irreparable damage caused by overvoltages as well as inductive and capacitive interference.

**3-way isolation** decouples the supply voltage from the input and output circuits as well and enables the function to operate with just one operating voltage.

The **passive separator** offers an extra, decisive advantage – it requires no additional voltage supply. The power supply to the module is achieved via the input or output circuit and is transmitted to the input/output. This current loop feed is characterised by a very low consumption.

A number of products are available for temperature measurements. For example, **PT100** signals in 2-, 3- and 4-wire systems are converted into standard 0...20 mA, 4...20 mA and 0...10 V signals.

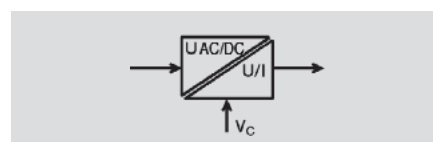
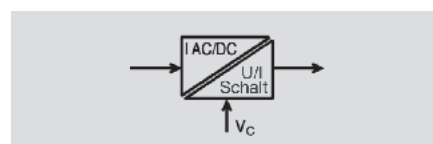
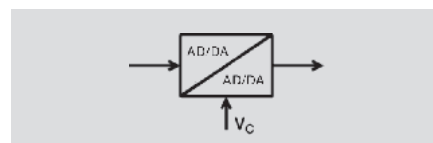
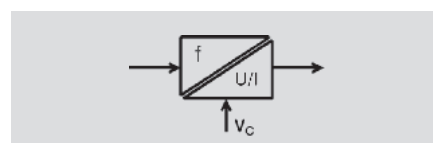
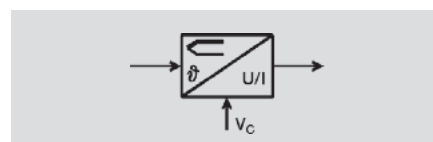
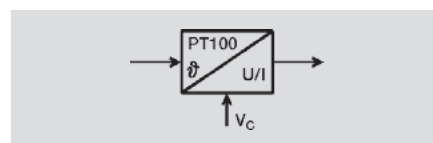
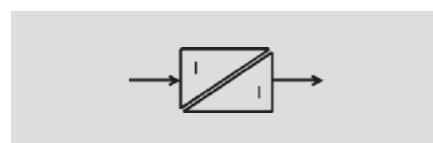
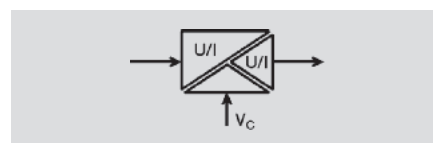
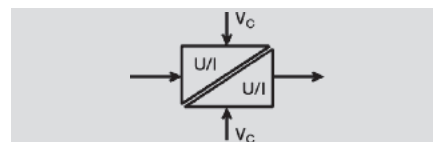
The modules for connecting conventional **thermoelements** are fitted with cold trap compensation as standard. Furthermore, they amplify and linearise the voltage signal provided by the thermocouple. This guarantees accurate analogue signal conditioning while eliminating sources of interference or error.

**Frequency converters** convert frequencies into standard analogue signals. Downstream controls can therefore directly process pulse strings for measuring rpm or speed.

**AD or DA converters** are required for bringing together the analogue signal forms mapping the local conditions and the digital processing in the process monitoring system. Weidmüller can supply such components for the customary 0...20 mA, 4...20 mA and 0...10 V input and output signals. 8-bit processors are available on the digital side.

**Current-monitoring modules** can be used to control DC and AC currents up to 60 amps. A switching operation is triggered when the set current values are not met or exceeded. Components with analogue outputs monitor the current load continuously via downstream controls.

**Voltage monitoring modules** can be used to monitor AC and DC voltages. Adjustable switching thresholds can be used to reliably detect and notify in the event of fluctuations caused by switching operations or mains overloads.





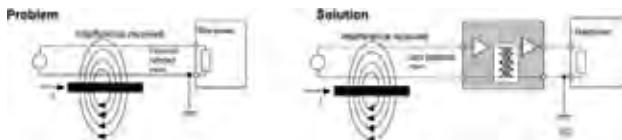
# Technical data



## Common Mode Noise Elimination

- Generally, signals emitted by sensors have low levels and are thus susceptible to capacitive and inductive interference, such as those generated by motors, frequency changers and other change processes.

This noise contents the measuring value and frequently destroy expensive analog I/O cards in the control electronics. Through the utilisation of analog signal isolators this interference, which usually action both signal lines in common mode (push push), is effectively eliminated through the zero potential input.



## Active Isolator / Passive Isolator

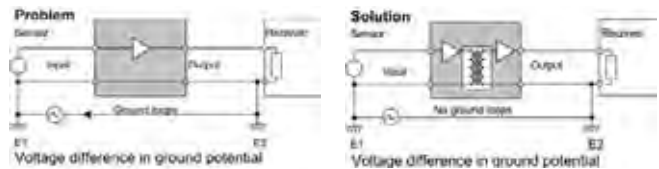
- Active isolators draw their power supply from a separate supply terminal to ensure that they can operate perfectly. Depending upon the applications the input, output and additionally the power supply are isolated from each other. Only one supply is required for 3-port isolation. However, it is isolated from the input and output circuits. Thus even in the event of a short circuit, surge voltage or reverse polarity, the downstream control electronics cannot be damaged. Isolating the signals between the input and output can be conducted either optically or by transformer barrier depending upon the transfer rate. Active isolators are non interacting, i.e. a change in the load does not exert any influence on an input circuit.
- Passive isolators generate the current required for the supply from the measuring signal. The current required internally is

so small that transfer problems do not occur here.

- The feed can be effected from either the input or the output side. Isolation is by transformer barrier. The advantages are: cessation of network influences, outstanding accuracy, low signal delay and low potential requirement. Passive isolators are not non interacting; a change in load in the output circuit will influence the input circuit.

## Ground Loops

- The voltage supply's secondary side is earthed for the purpose of setting up fast and secure ground loop monitoring. If an analog signal is fed in from a separate voltage supply or if the sensing device itself is earthed, then transient currents will flow between the ground potentials across the interconnected ground connectors, which in turn corrupts the measuring signal. Analog signal isolating amplifiers prevent this form of measuring signal corruption and influence.



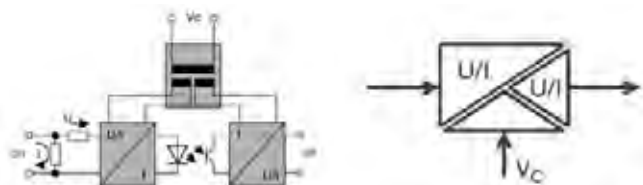
## 2-port Isolation

- The simplest form of analog signal isolator is that of 2-port isolation. It serves to isolate the input circuit from the output circuit as well as the two auxiliary voltages from each other. Depending upon the isolator design and the observed isolation data one refers here to base isolation (galvanic isolation) or safe separation. ① For current signals, 4...20 mA input current loop fed modules are available. An additional auxiliary voltage for the input circuit is not requin with here. ② By connecting the input and output side voltage supplies, the 2-port isolation can be converted to operate as a simple signal converter. This is of particular interest where isolation is not required for an application, but a signal conversion has to be performed.



### 3-port Isolation

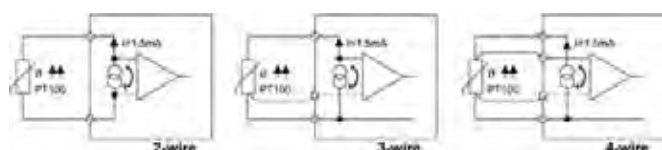
- 3-port isolation is the most universal form of signal isolator
- An optical coupler or transformer isolates the input from the output circuit. Together with the clearance and creepage distances it serves to define the isolation level. For example, the input signal is converted by means of pulse-width modulation into a frequency signal and demodulated again on the output side to form an analog value. An amplifier then generates a standardised analog signal. A galvanic isolated DC/DC converter feeds the input and output circuit with a potential free supply voltage. It too determines the isolation level through its data, air and creepage distances. In the case of these three isolation paths (input/output, input/auxiliary voltage, output/auxiliary voltage) one refers to 3-port isolation.



### Temperature Signal Measuring Method

- Measurement using resistors (RTD)
 

When measuring with temperature-dependent resistors a current of approx. 1.5mA is passed through the resistor from a constant current source in the signal converter.



An operational amplifier is used to measure the potential drop at the resistor (2-wire circuit).

In order to take account of lead length, the voltage drop is measured at the return conductor and calculated with double the value (3-wire circuit). This thus simulates the wire resistances from the feed and return lines.

Accurate measurements are achieved by separately measuring the voltage drop at the feed and return lines (4-wire circuit). The values for the supply lines are calculated against the measured value.

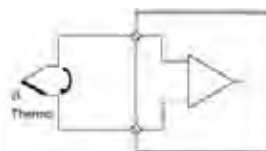
### Temperature Signal Measuring Method

- Measurements using thermocouples
 

When conducting measurements using thermocouples the voltage that is generated when two differently alloyed metals come into contact with each other is measured. A differential amplifier is then used to recondition the signal. The easiest (and thus the most cost effective) method of subsequent processing is conducted by means of an amplifier circuit, which converts these signals into standard signals. High-end components process the measuring signal using a microprocessor, which simultaneously reconditions the signal (filtering, linearisation)

### Cold Junction Compensation For Thermocouples

- Recording temperatures by using thermocouples encounters the problem of a thermal voltage forming at the clamping terminals on the signal converter on account of the different materials in the conductors and bus bar. This voltage then counteracts the thermal element's voltage.



In order to compensate for the error to the measured value which arises here, the temperature is measured at the clamping terminal. The microprocessor in the signal converter reads the value measured there and calculates it against the measured value. This procedure is known as cold junction compensation.

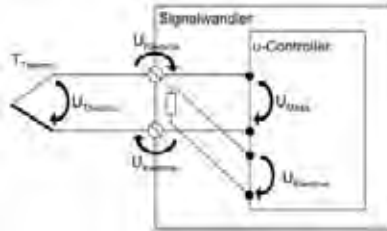
$$\begin{aligned} & \text{Voltage at the measuring point (} V_{\text{meas}} \text{)} \\ & + \text{Voltage at the terminal (} V_{\text{terminal}} \text{)} \\ & = \text{Voltage at the thermocouple (} V_{\text{thermo}} \text{)} \end{aligned}$$

=> **Temperature at the thermocouple (T<sub>thermo</sub>)**

### Linearisation

- Temperature-dependent components do not normally have linear characteristic curves. To ensure that further processing can take place with the necessary accuracy, these characteristic curves have to be linearised to some extent. The graph showing measurements of thermocouples, in particular, reveals significant deviations at some points from the "ideal graph". As a consequence, the signal which has been measured is worked up by a microprocessor.

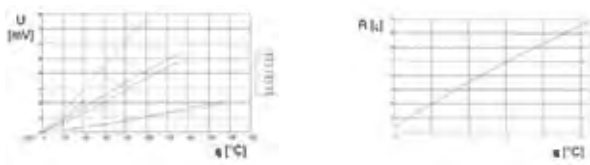
Technical data



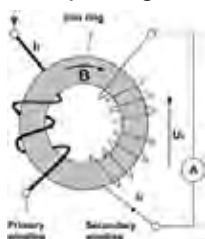
The microprocessor compares the value measured with the characteristic curve for the thermocouple in its memory and calculates the corresponding value on the "ideal characteristic curve". At the output, it supplies the latter to an amplifier, which produces the analogue value in linear form. The output stage converts this into a standardised value or into a switching output with a switching threshold. The linearisation of PT100-elements can be undertaken via simple amplifier stages. The first stage corrects the peak value of the graph of the measurements. The deviation at the end of the graph resulting from this is corrected by a second stage. The under- and over-shooting generated in this way is very slight and is covered by the tolerance for the module.

Current Measurement Using A Measuring Transformer

- Transformer principle Each conductor through which current flows is surrounded by a magnetic field H, the intensity of which is proportional to the current. The field, which is bundled in a magnetic core, generates a magnetic flux B, through which suitable sensors are used to measure current.



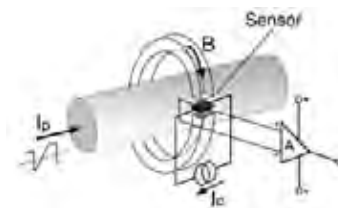
Converters with transformer-type couplings are used to establish the most cost effective measurement method for simple sinusoidal currents. The current to be measured flows directly through the measuring transformer's primary winding.



The secondary winding supplies the measuring electronics with a proportional current signal. Because of power loss this method of measuring current is limited to smaller currents up to 5 A. These converters react sensitively to peak loads and therefore have to be fused on the primary winding side.

Measuring Current Using A Hall-type Sensor

- Hall-type sensor principle Hall-type sensors also measure the magnetic flux B and supply a proportional voltage at the measured output, which is then reconditioned to form a standard signal by an amplifier circuit.
- Components with Hall-type sensors are ideally suited to measuring higher currents, as any possible high residual currents from motors or peak loads cannot damage the component. Additionally, they are also ideal for measuring direct and alternating currents of various curve shapes.

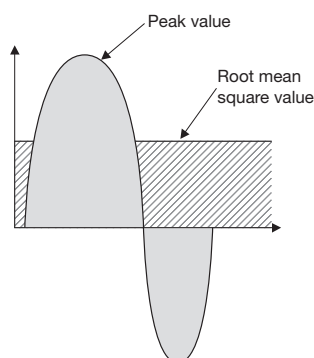


Root Mean Square Measurement / Crest Factor

- The root mean square value (r.m.s) of a sinusoidal shaped alternating current is the value, which in an ohmic resistor converts the same (effective) output as that of an equal sized direct current.
- Non sinusoidal shaped signals can only be measured with "True RMS" capable devices and/or further processed.
- True RMS = True root mean square
- Root mean square measurement is required where the (effective) output content of alternating voltages or currents are to be measured or evaluated.
- The crest factor indicates the ratio of the crest factor to the root mean square value.

### Load / Load Resistor

- The load is a load resistor on the output side of a measuring transducer or isolating amplifier.  
The load is usually less than 500 Ω at the current outputs. Voltage outputs are normally under a load greater than 1 KΩ.



### Galvanic Isolation / Safe Separation

- Galvanic isolation is understood to mean an electrical isolation between the input and output circuit and the circuit's supply voltage. It can be set up either optically using an opto coupler or with a transformer. The isolation serves to safeguard the measuring circuit against damage and to eliminate ground loops, which could cause the measured signal to be corrupted.
- Safe separation is specified under the German DIN VDE 0106 Section 101 standard. This fundamental safety standard is intended to safeguard persons against hazardous body currents and describes the basic requirements for safe separation in electrical operating equipment. Thus, for instance, the voltage supply of 50 V AC/ 75 V DC as under 50178 may not be exceeded. If this voltage is exceeded a reinforced or double insulated and thus an increase in the clearance and creepage distances is stipulated.

### Cut-off Frequency

- Cut-off frequencies indicate the dynamic transfer characteristic of an isolation amplifier.
- The given frequency is the (-3dB-) limit, at which a distinct change occurs to the signal.
- An increased cut-off frequency leads to a transmission of higher-frequency alternating components, which corrupts the required signal.

### Hysteresis

- Hysteresis indicates the percentage difference between the input and output points of a switching contact. It should not be lower than a given minimum value, as otherwise a specified chase can no longer be implemented.

### Broken-wire Detection

- When measuring transformers with broken wire detection the input signal is monitored permanently. In the event of a fault (broken wire) the output signal exceeds its rated range. The downstream control circuit can then analyse the fault case.

### Response Time

- Response time refers to the change in output signal for an input signal jump (10 ... 90 %). It is directly related to the cut-off frequency (inversely proportional).

### Accuracy / Temperature Coefficient

- Accuracy describes the capability of a measuring device to deliver a measured value as accurately as possible. It relates to the end value and is given for ambient temperature (23°C).  
Example:  
An RTD is given with an accuracy of 1 %. The measuring range is set to 0 – 200 °C. The expected effective error of:  $200 \cdot 1 \% = \pm 2K$  applies across the entire measurement range.
- Temperature coefficient describes the deviations in accuracy of the measuring devices dependent on the ambient temperature. It is given as a % or in parts per million / Kelvin (ppm /K).  
Example:  
An RTD with an accuracy of 1 % and a measuring range of 0 – 200 °C has a temperature coefficient of 250 ppm / K. If the device is operated at +40 °C, it will then contribute the following to an expected absolute error:  
 $(([40^{\circ}C - 23^{\circ}C] \cdot 250ppm/K) + 1\%) \cdot 200K = \pm 2,85K$  across the entire measurement range.

# FDT/DTM – The standard solution for device configuration

## Field Device Tool (FDT)

FDT technology specifies and standardises the integration of communicating devices from different manufacturers. It makes use of a superimposed device management program. The key feature is its independence from the communication protocol and software used by the device and the host system. FDT allows access to any device from any host using any protocol.

## Device Type Manager (DTM)

Device manufacturers make available a Device Type Manager (DTM) software driver for each device or device group. The DTM specifies all device-specific information, functions and rules (such as the device structure, communication capabilities, internal dependencies and the human-machine interface (HMI)). DTMs define functions for access to device parameters, troubleshooting, configuration and operation of devices. DTMs are available which can be simple GUIs for setting device parameters or more complex applications that are capable of carrying out calculations for diagnostic or maintenance purposes.

There are several different types of DTMs:

- **Device DTM**  
This is a "normal" field device that uses communication channels to communicate with the connected physical device.
- **Communication DTM**  
This is a communications device that provides communication using communication channels. Communication channels provide access to the communications infrastructure (such as PC interface cards or modems). They are used by device DTMs or gateway DTMs for communication services.
- **Gateway DTM**  
This is a gateway device. It allows data to be exchanged between two communication channels. For example, this could be a gateway between PROFIBUS-DP and PROFIBUS-PA.

The DTM is loaded and started up within a FDT container program or "frame" application.

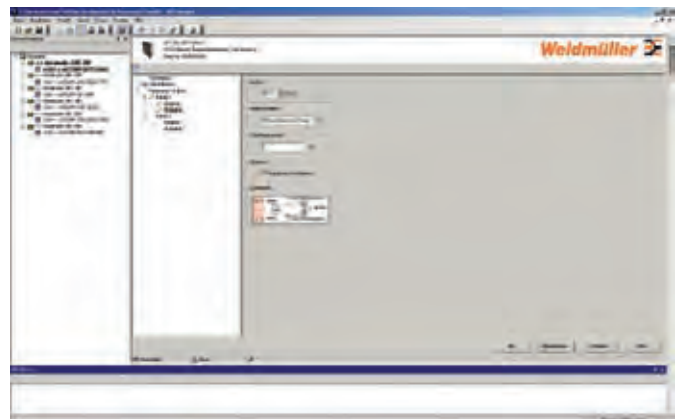


## FDT frame application

Frame applications can be used as a tool to configure devices, plan projects, operate consoles or administer facilities. The FDT frame application provides a PC software environment with the following functions:

- User administration
- DTM administration
- Data management
- Network configuration
- Navigation

Weidmüller offers their WI-Manager FDT frame program to the user for no cost. This certified software is compatible and works together with all certified DTMs. This screenshot shows the WI-Manager with an opened DTM for the ACT20X series.



Download at [www.weidmueller.com/](http://www.weidmueller.com/)



## FDT User Group

The FDT User Group is an alliance of users and manufacturers interested in defining the specifications and moving the FDT/DTM technology forward. Weidmüller is a member of this group along with most process automation manufacturers and work towards advancing this standard further. More details are available at <http://www.fdtgroup.org/>

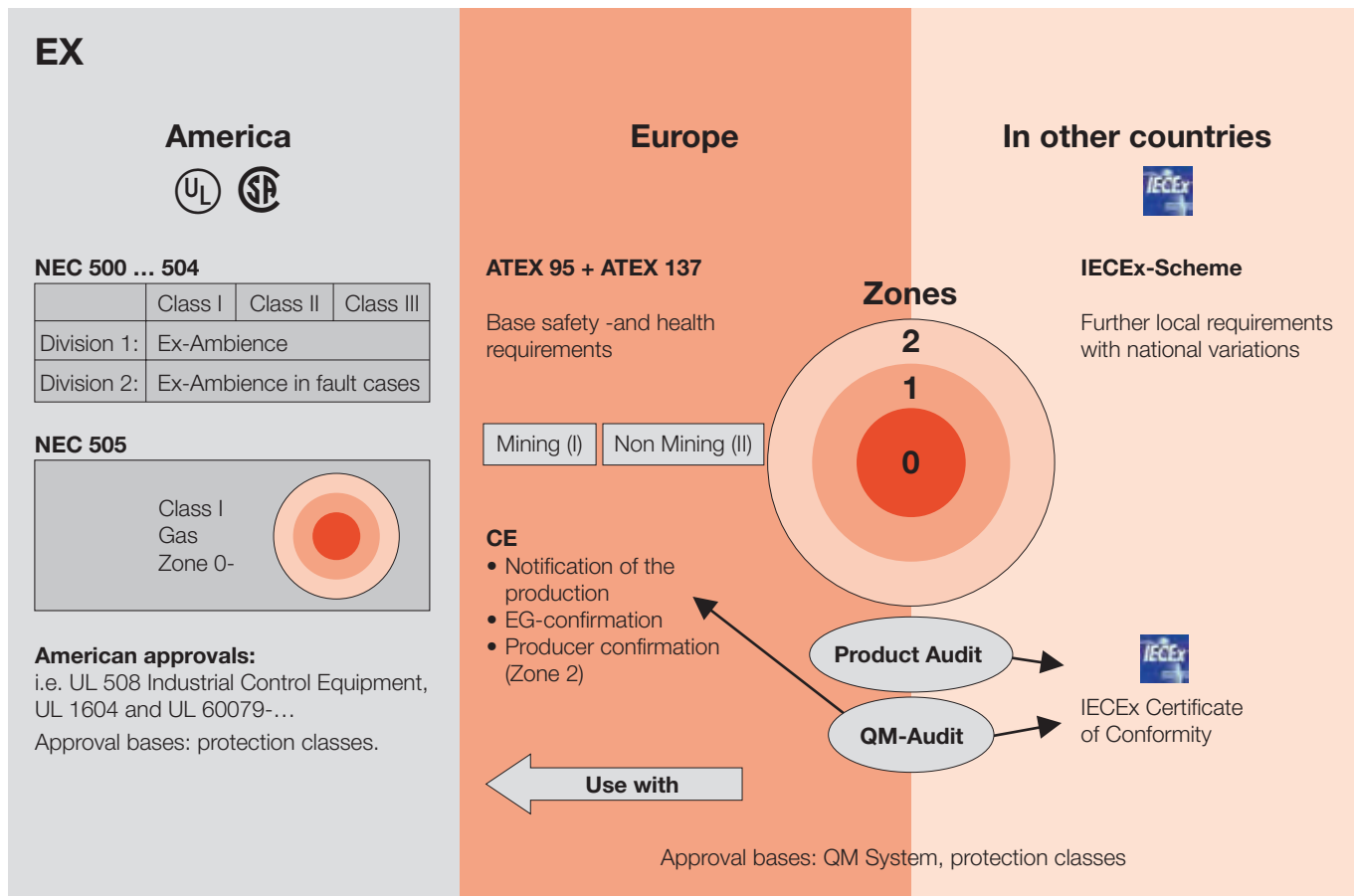
# Safety in hazardous areas

When operating electrical devices within hazardous areas, you must comply with the requirements regulating their use in such zones. Explosive atmospheres may be created from mixtures of flammable gases, mists, vapours or dusts. If their concentration is high enough in the surrounding air, any source of ignition or spark could trigger an explosion. Such explosions can cause death, serious injuries and significant property damages. There are basically two strategies for reducing the risk of explosion. Firstly, no dangerous materials should be released into the air that could create an explosive atmosphere. Secondly, there should be no mechanism present that could create a spark. Many explosions in the past could have been avoided if only the international regulation governing the use of equipment in hazardous areas had been observed.

## But what are the most important global regulations regarding the use of devices in hazardous areas?

In North America, the US National Electric Code (NEC) regulations (Articles 500 to 505 and the Canadian CEC (Canadian Electrical Code) Articles 18-000, -090, -100, -200 and -300 are all valid.

In Europe, both EU directives ATEX 95 (94/9/EG) and ATEX 137 (1992/92/EC) are relevant. They describe preparation (ATEX 95) and usage (ATEX 137) for facilities in potential Ex zones. Throughout the rest of the world, there is a mixture of national regulations (in Eastern Europe) and international IECEx conformity declarations (in Asia) that must be followed. In certain Asian countries, the European ATEX directives have been accepted and applied.



A brief overview of regulations used throughout the world and their basic content.

### The European ATEX Regulation applies to facilities and their usage in hazardous areas.

The term "ATEX" derives from the French phrase "Atmospheres Explosive". The regulation currently includes two directives from the European Union concerning explosion protection. These are the ATEX operational directive 1999/92/EG (ATEX 137) and the ATEX product directive 94/9/EG (ATEX 95). The ATEX 137 operational directive specifies the minimum requirements for improving the protection of health and security of workers in environments at risk of explosions. The ATEX 95 product directive specifies the rules for introducing products on the market that will be used in zones where this is risk of explosion. This directive is the first to include non-electric devices within its jurisdiction.

The purpose of the directive is to protect personnel who work in the hazardous areas. Appendix II of the directive contains the basic health and safety requirements. These must be followed by the manufacturer and compliance must be proven by declarations of conformity. Since June 30, 2003, all devices, components and protective systems brought to the market must be in compliance with the ATEX 95 product directive.

The ATEX 95 directive classifies devices and components for the Ex zone into two main groups:

#### Group I

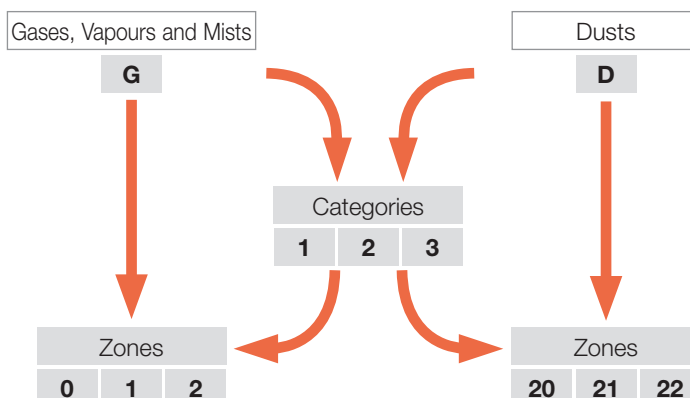
=> Devices for use in mining, for underground and above-ground operations

- Coal dust
- Methane
- Harsh operating conditions



#### Group II

=> Devices for use in the other hazardous areas



For applications in the oil, gas and chemical industries, it is particularly important to follow the Group-II "G" requirements concerning electrical or electronic devices and components.



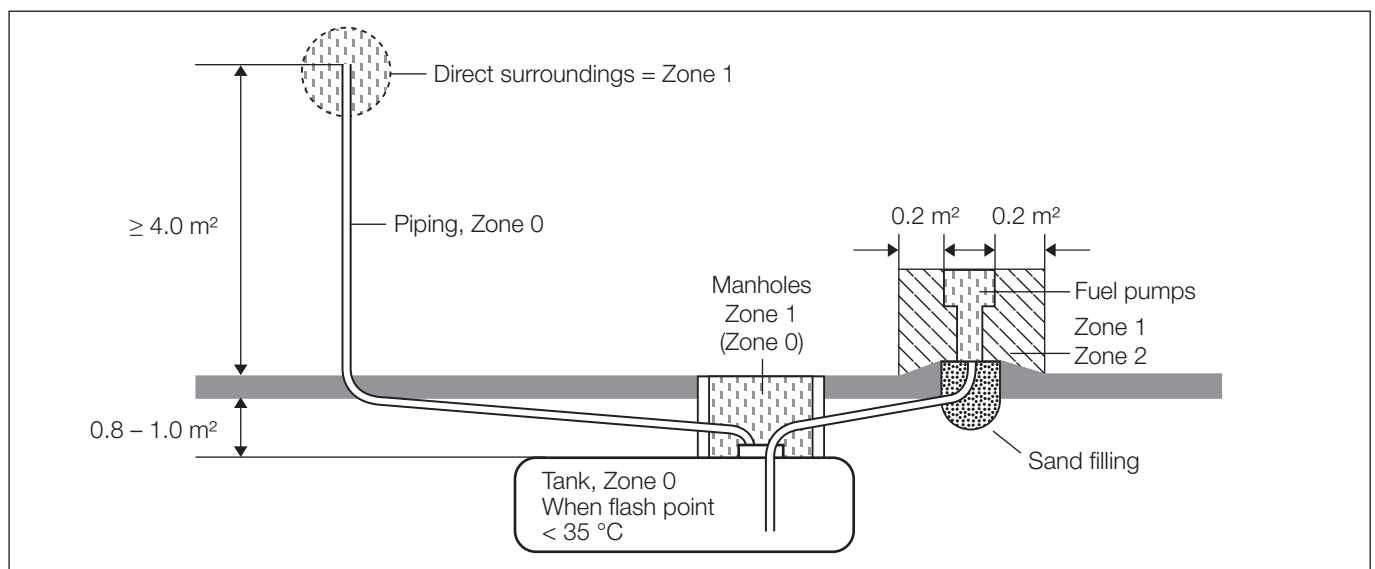
# Safety in hazardous areas

Group II "G" divides the Ex zone into three zones with different safety requirements.

- Zone 0** This zone applies to dangerous explosive atmospheres where the risk is present often or over long time periods.  
 => > 50 % of the operational time, or more than 1.000 hours per year.
- Zone 1** This zone applies to situation where explosive atmospheres may occasionally be present during normal operations.  
 => Occasionally, less than 10 hours per year.
- Zone 2** This zone applies to situation where explosive atmospheres are normally not present or only briefly present during normal operations.  
 => Max. 30 min/year.

## Hazardous areas

	Zone 0	Zone 1	Zone 2	Safe zone
<b>Explosion risk</b>	Continual, long-term, often	Occasionally	Rarely	None
<b>Spark source</b>	None	Rarely and short-term	Occasionally	Continual, long-term, often



Typical division of zones at a fuelling station

### In which operations are ATEX-certified electronic devices (such as signal converters, isolation amplifier, Namur switches and switching amplifiers) used?

ATEX-certified devices are used within industrial facilities and production halls where there is the possibility that explosive gases or dusts may be released.

Transportation and production applications which require the use of such certified devices are listed below:

- Off-shore oil and gas drilling
- Tanker ships which carry oil, gas or chemicals
- Ships which carry potentially explosive materials
- Refineries and other oil or gas production plants
- Transportation and filling stations for oil and gas
- Petro-chemicals

### What are the differences between standard devices and intrinsically safe devices?

For electronic devices that are being used in Zone 0(20) or 1(21), none of the components or electrical circuitry are permitted to generate unallowable high temperatures or sparks, whether during normal operations or during malfunctions. In other words: "All of the circuits in intrinsically safe electrical devices (Ex i) are safe and are not capable of igniting explosive atmospheres".

### What is the device category?

The device Group II (hazardous areas not including underground or above-ground mining operations) is divided into device categories 1, 2 and 3. They have the following safety levels:

Surroundings	Device category	Occurrence and duration of explosive atmosphere	Ignitable materials	Safety levels Permitted errors	Groups and zones Comparison
Group II	1	Constantly occurring Long-term Regularly	Gases, vapours, mist, dust	<b>Very high safety level</b> 2 different protection classes or 2 independent errors	Group II <b>Zone 0 (gas)</b> Zone 20 (dust)
Group II	2	Occurrence probable over a limited time period	Gases, vapours, mist, dust	<b>High safety level</b> 1 protection class For which no more than one error may occur	Group II <b>Zone 1 (gas)</b> Zone 21 (dust)
Group II	3	Occurrence improbable Only for short periods	Gases, vapours, mist, dust	<b>Normal I safety level</b> Required protective measures	Group II <b>Zone 2 (gas)</b> Zone 22 (dust)

# Safety in hazardous areas

## Which explosion protection categories are most commonly used?

- **Pressure-resistant encapsulation (Ex d) in compliance with EN60079-1:**

Components that are capable of triggering an explosion are enclosed in a housing that is capable of withstanding the explosion. Openings in the housing are designed to prevent the explosion from being transmitted externally.

- **Increased safety (Ex e) in compliance with EN60079-1:**

This explosion protection category is normally applied to transformers, motors, batteries, terminal blocks, electrical lines and cables. It is not suitable for the protection of electronic components and spark-generating components (such as switches, relays or surge protection). Additional measures and an increased safety level are implemented in order to prevent any sparks, electrical arcing or unallowable high temperatures which could trigger ignitions. Increased safety is made by possible by housing that prevents dusts from penetrating within.

- **Explosion protection methods (Ex n):**

This explosion protection category may only be used in the hazardous areas 2/22. Here there is no danger of an explosion from the electrical equipment during normal operations or during defined malfunctions. This includes all electrical devices and components that have no spark-forming contacts and that have a water-proof or dust-proof housing. Larger creepage and clearance distances are not required as long as the maximum rated voltage of 60 V AC / 70 V DC is maintained.

- **Intrinsic safety (Ex i) in compliance with EN60079-11:**

Power supply to the electrical equipment is carried out through a safety barrier which functions to limit the current and voltage so that the minimum power and temperature levels for creating an explosive mixture are not reached. Intrinsic safety for electrical and electronic devices is specified so that their circulating or stored power (even in event of malfunction) is never strong enough to trigger an explosion in an explosive atmosphere. You must also remember that not only the electrical device but also all other components connected to the circuit may be exposed to the explosive atmosphere. All switching circuits in intrinsically safe devices must be designed so that they are also intrinsically safe.

These devices are divided into the category groups <ia> and <ib> which differ in the number of occurring malfunctions.

### Category <ia>

=> Switching circuits within category <ia> electrical devices must not be able to cause a spark even if two independent malfunctions take place.

### Category <ib>

=> Switching circuits in electrical devices must not be able to cause a spark when a malfunction.

## Electrical devices for use in explosive gas, vapour and mist atmospheres – in accordance with CENELEC

Explosion protection type	Identification	Protective design
Pressure-resistant encapsulation	Ex d	Encloses the explosion and prevents fire from spreading
Increased safety	Ex e	No spark formation or hot surfaces
Method of explosion protection	Ex n	No spark formation or hot surfaces
Intrinsic safety	Ex i	Limited energy for preventing spark formation or overheated surface temperatures


## CENELEC classification of gases, dusts and the maximum permitted surface temperatures of devices and components

Gas group	Temperature classes					
	T1	T2	T3	T4	T5	T6
I	Methane	-	-	-	-	-
IIA	Ammonia	Ethyl alcohol	Benzene, Kerosene	Acetaldehyde	-	-
	Methane	Cyclohexane				
	Ethane	n-Butane				
	Propane	n-Hexane				
IIB	Lighting gases, Acrylonitrile	Ethylene, Ethylene oxide	Ethylene glycol, Hydrogen sulphide	Ethyl ether	-	-
	Hydrogen	Ethine (Acetylene)	-	-	-	Hydrocarbons

IEC (group II) Classification	Max. surface temperature	Comment
T1	450 °C (842 °F)	The temperature is relevant to all parts of the devices that can come into contact with potentially explosive materials.
T2	300 °C (572 °F)	
T3	200 °C (392 °F)	
T4	135 °C (275 °F)	
T5	100 °C (212 °F)	
T6	85 °C (185 °F)	
Tx	Max. surface temperature undefined	Valid for the closed tank systems used on container ships where the individual contents cannot be monitored in event of a fire. It is the responsibility of the operator to assess each temperature class.

**What labelling is considered proper?**

An example of device labelling:

CE 0539		II	2	G	Ex ia	IIA	T4
↓	↓	↓	↓	↓	↓	↓	↓
Certification authority ex. DEMKO	European Commission mark for Ex devices	Device group "Surface"	Device category zone 1	Gas	Protection explosion type: intrinsically safe category <ia>	Gas group	Surface temperature: max 135 °C

# ATEX directives

Since July 1, 2003, all new facilities in hazardous areas must be certified according to ATEX Directive 94/9/EG or ATEX 95 (ATEX: ATmosphère EXplosive = explosive atmosphere). This directive is one of the “New-Approach” directives. It is valid in all European Union countries, as well as Iceland, Lichtenstein and Norway. In these countries, the directive refers to the sale and commissioning of products which have been designed particularly for high explosion risk environments (where explosive atmospheres exist due to gases, vapours, mists, or dusts). It now also covers the mining sector and purely mechanical devices.

## Class of protection

Type of protection	Code	CENELEC EN	IEC	Product category explosion protect.
General requirements	–	60079-0	60079-0	–
Oil immersion	o	60079-6	60079-6	2
Pressurised apparatus	p	60079-2	60079-2	2
Powder filling	q	60079-5	60079-5	2
Flameproof enclosure	d	60079-1	60079-1	2
Increased safety	e	60079-7	60079-7	2
Intrinsic safety	ia	60079-11	60079-11	1
Intrinsic safety	ib	60079-11	60079-11	2
Intrinsic safety	ic	60079-11	60079-11	3
Type n (Ex n)	n	60079-15	60079-15	3
Encapsulation	m	60079-18	60079-18	2

## Classification for potentially hazardous areas

CENELEC classification IEC60079-10	Presence of potentially explosive atmosphere	Product category	US classification NEC 500	Combustible media
Zone 0	permanent, long-term	1G	Class I, Div 1	gases, vapours
Zone 20	or frequently	1D	Class II, Div 1	dust
Zone 1	occasionally	2G	Class I, Div 1	gases, vapours
Zone 20		2D	Class II, Div 1	dust
Zone 2	rarely and	3G	Class I, Div 2	gases, vapours
Zone 22	briefly	3D	Class II, Div 2	dust

## Explosion groups

Gas (e.g.)	CENELEC	NEC 500
Propane	IIA	D
Ethylene	IIB	C
Hydrogen	IIC	B
Acetylene	IIC	A
Methane (mining)	I	mining (MSHA)

## Temperature classes

Max. surface temperature (°C)	Temperature class CENELEC	Temperature class NEC 500-3
450	T1	T1
300	T2	T2
280	–	T2A
260	–	T2B
230	–	T2C
215	–	T2D
200	T3	T3
180	–	T3A
165	–	T3B
160	–	T3C
135	T4	T4
120	–	T4A
100	T5	T5
85	T6	T6

# Labelling for ATEX approval of a signal converter

## II 3 G Ex nAnCnL IIC T4

- II** = Device group 2: devices for use in hazardous areas (except for mines and above-ground mining facilities that are exposed to flammable dusts or methane)
- 3** = Device category 3: the danger occurs rarely or only for short periods. The requirement is for normal security, suitable for use in zone 2.
- G** = Intended for the gas zone
- Ex** = Explosion protection
- nA** = Non-sparking equipment
- nC** = Enclosed facility (suitable protection)
- nL** = Equipment with limited power
- IIC** = Explosion groups: typical gas for C is hydrogen
- T4** = Temperature class The max. permitted surface temperature for T4 is 135 °C

**Zone 2** a zone for which during normal operations there is at most only a short-term occurrence of dangerous hazardous atmospheres (mixtures of air and flammable gases, vapours or mists).

## II (1) G [Ex ia] IIC/IIB/IIA

- II** = Device group 2: devices for use in hazardous areas (except for mines and above-ground mining facilities that are exposed to flammable dusts or methane)
- (1)** = Device category (1): Equipment from category 1 can be connected to this signal converter. The signal converter must be operated in the safe zone or in zone 2 (II 3 G ...).
- G** = Intended for the gas zone.
- [Ex ia]** = Explosion protection type: protected with intrinsic safety. This signal converter, as accompanying equipment, is intended to be used for the connection of intrinsically safe circuits.
- IIC/IIB/IIA** = Explosion groups – typical gases: propane for A, Ethylene for B, and hydrogen for C.

## II (1) D [Ex iaD]

- II** = Device group 2: devices for use in hazardous areas (except for mines and above-ground mining facilities that are exposed to flammable dusts or methane)
- (1)** = Device category (1): Equipment from category 1 can be connected to this signal converter. The signal converter must be operated in the safe zone or in zone 2 (II 3 G ...).
- D** = Designed for the dust zone.
- [Ex iaD]** = Explosion protection type: protected with intrinsic safety. This signal converter, as accompanying equipment, is intended to be used for the connection of intrinsically safe circuits.



Electrical data

# Design of clearances and creepage distances in electrical equipment – influencing factors

## Rated impulse withstand voltage

The rated impulse withstand voltage is derived from:

- **Voltage conductor – earth**  
(the rated voltage of the network, taking into account all networks)
- **Surge category**

Table 1: Rated impulse withstand voltages for electrical equipment

Rated voltage of power supplies system *) in V		Rated impulse withstand voltage in kV			
Three-phase systems	Single-phase systems with neutral point	Electrical equipment at the supplies point of the installation  (Surge category IV)	Electrical equipment as part of the permanent installation  (Surge category III)	Electrical equipment to be connected to the permanent installation  (Surge category II)	Specially protected electrical equipment  (Surge category I)
	120 to 240	4.00	2.50	1.50	0.80
230/400 277/480		6.00	4.00	2.50	1.50
400/690		8.00	6.00	4.00	2.50
1000		Values depend on the particular project of, if no values are available, the values of the preceding line apply.			
*) to IEC 38					

## Surge categories

are stipulated in accordance with the German standard DIN VDE 0110-1 (for electrical equipment fed directly from the low-voltage network).

### Surge category I

- Equipment that is intended to be connected to the permanent electrical installation of a building. Measures to limit transient surges to the specific level are taken outside the equipment, either in the permanent installation or between the permanent installation and the equipment.

### Surge category II

- Equipment to be connected to the permanent electrical installation of a building, e.g. household appliances, portable tools, etc.

### Surge category III

- Equipment that is part of the permanent electrical installation and other equipment where a higher degree of availability is expected, e.g. distribution boards, circuit-breakers, wiring systems (including cables, busbars, junction boxes, switches, power sockets) in the permanent installation, and equipment for industrial use and some other equipment, e.g. stationary motors with permanent connections to the permanent installation.

### Surge category VI

- Equipment for use at or near the power supplies in the electrical installations of buildings, between the principal distribution and the mains, e.g. electricity meters, circuit-breakers and centralised ripple controllers.

## Pollution severity categories

### Pollution severity category 1

- No pollution, or only dry, non-conductive pollution that has no influence.

### Pollution severity category 2

- Non-conductive pollution only; occasional condensation may cause temporary conductivity.

### Pollution severity category 3

- Conductive pollution, or dry, non-conductive pollution that is liable to be rendered conductive through condensation.

### Pollution severity category 4

- Contamination results in constant conductivity, e.g. caused by conductive dust, rain or snow.

Unless explicitly stated otherwise, the dimensioning of clearance and creepage distances and the resulting rating data for electromechanical components is based on pollution severity 2 and surge category III, taking account of all network types.

# Derating curve (current-carrying capacity curve)

The **derating curve** shows which currents may flow continuously and simultaneously via all possible connections when the component is subjected to various ambient temperatures below its upper limit temperature.

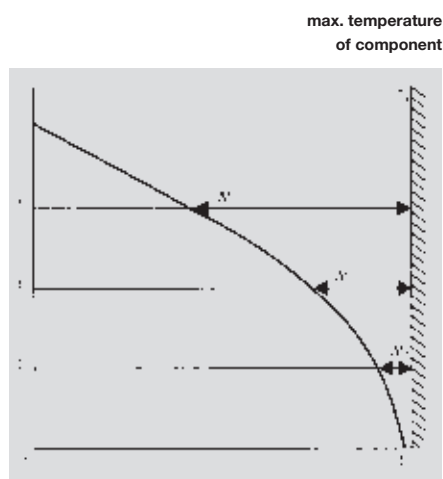
The **upper limit temperature** of a component is the rated value determined by the materials used. The total of the ambient temperature plus the temperature rise caused by the current load (power loss at volume resistance) may not exceed the upper limit temperature of the component, otherwise it will be damaged or even completely ruined.

The current-carrying capacity is hence not a constant value, but rather decreases as the component ambient temperature increases. Furthermore, the current-carrying capacity is influenced by the geometry of the component, the number of poles and the conductor(s) connected to it.

The current-carrying capacity is determined empirically according to DIN IEC 60512-3. To do this, the resulting component temperatures  $t_{b1}$ ,  $t_{b2}$  and the ambient temperatures  $t_{u1}$ ,  $t_{u2}$  are measured for three different currents  $I_1$ ,  $I_2$ .

The values are entered on a graph with a system of linear coordinates to illustrate the relationships between the currents, the ambient temperatures and the temperature rise in the component.

## Base curve



$t_g$  = maximum temperature of component  
 $t_u$  = ambient temperature  
 $I_n$  = current

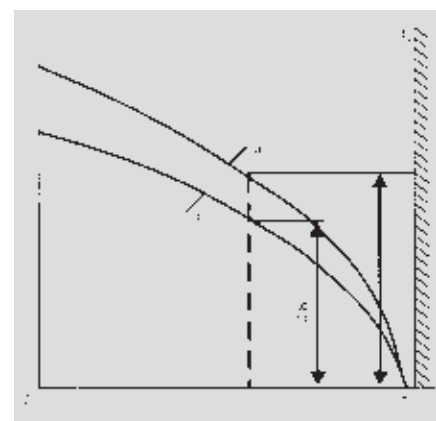
The **loading currents** are plotted on the y-axis, the **component ambient temperatures** on the x-axis.

A line drawn perpendicular to the x-axis at the upper limit temperature  $t_g$  of the component completes the system of coordinates.

The associated average values of the temperature rise in the component,  $\Delta t_1 = t_{b1} - t_{u1}$ ,  $\Delta t_2 = t_{b2} - t_{u2}$ , are plotted for every current  $I_1$ ,  $I_2$  to the left of the perpendicular line.

The points generated in this way are joined to form a roughly parabolic curve.

## Derating curve



$t_g$  = maximum temperature of component  
 $t_u$  = ambient temperature  
 $I_n$  = current  
 a = base curve  
 b = reduced base curve (derating curve)

As it is practically impossible to choose components with the maximum permissible volume resistances for the measurements, the base curve must be reduced. Reducing the currents to 80 % results in the **“derating curve”** in which the maximum permissible volume resistances and the measuring uncertainties in the temperature measurements are taken into account in such a way that they are suitable for practical applications, as experience has shown. If the derating curve exceeds the currents in the low ambient temperature zone, which is given by the current-carrying capacity of the conductor cross-sections to be connected, then the derating curve should be limited to the smaller current in this zone.



# IP class of protection to DIN EN 60529

The class of protection is indicated by a code consisting of the two letters IP and two digits representing the class of protection.

Example: **I P 6 5**  
 | 2nd digit: protection from liquids  
 | 1st digit: protection from solid bod

## Protection against intrusion of external particle matter (1st digit)

Digit		
0		No protection
1		Protection against ingress of large solid bodies with diameter > 50 mm. (Protection to prevent dangerous parts being touched with the back of the hand.)
2		Protection against ingress of large solid bodies with diameter > 12.5 mm. (Protection to prevent dangerous parts being touched with the fingers.)
3		Protection against ingress of large solid bodies with diameter > 2.5 mm. (Protection to prevent dangerous parts being touched with a tool.)
4		Protection against ingress of large solid bodies with diameter > 1 mm. (Protection to prevent dangerous parts being touched with a piece of wire.)
5		Protection against harmful deposits of dust, which cannot enter in an amount sufficient to interfere with satisfactory operation.
6		Complete protection against ingress of dust.

## Protection against penetration of liquids (2nd digit)

Digit		
0		No protection
1		Protection against drops of condensed water falling vertically.
2		Protection against drops of liquid falling at an angle of 15° with respect to the vertical.
3		Protection against drops of liquid falling at an angle of 60° with respect to the vertical.
4		Protection against liquids splashed from any direction.
5		Protection against water jets projected by a nozzle from any direction.
6		Protection against water from heavy sea on ships' decks.
7		Protection against immersion in water under defined conditions of pressure and time.
8		Protection against indefinite immersion in water under defined conditions of pressure (which must be agreed between manufacturer and user and must be more adverse than number 7).

# CE marking / EMC directives

## Overview of CE labelling

The CE marking, seen on various products and their packagings, is neither a sign of quality nor safety. The CE marking is a conformity marking that was introduced to ensure the unhindered movement of goods throughout the European Single Market.

It is not intended to be a reference for end consumers. The CE marking merely shows that the manufacturer has complied with all the EU directives applicable to that product. Therefore, the CE marking should be regarded as verification of conformity with the relevant directives and is aimed at the monitoring authorities responsible. For goods crossing the political borders of the European Union, the CE marking is like a "passport". Weidmüller takes into account all the relevant EU directives according to the best of its knowledge and belief.

Currently the following directives apply:

**73/23 EWG** – Electrical equipment for use within specific voltage ranges (Low-voltage Directive)

**89/336 EWG** – Electromagnetic compatibility (EMC Directive)

**98/37 EG** – Safety of machines (Machinery Directive)

The standards cited in the directives have long since been intrinsic to Weidmüller's development standards. This provides the guarantee of conformity with the EU directives. Our testing laboratory, accredited to EN 45001, performs the tests in accordance with the standards. The test reports are recognised within Europe within the framework of the accreditation process.

**2006/95/EC Low Voltage Directive** – Electrical equipment in the meaning of this directive is all electrical equipment operated with a nominal voltage between 50 and 1000 V AC and between 75 and 1500 V DC. For an electrical product to be given the CE marking, it must fulfil the requirements of the EMC Directive and, if applicable, the Low-voltage Directive (50 V AC or 75 V DC). According to the Low-voltage Directive, a conformity assessment procedure has to be carried out for the product. Conformity with the directive is deemed to be given if there is a reference to a harmonised European standard or another "technical specification", e.g. IEC standards or national standards.

**2004/108/EG EMC directives** – With the decree of the directive of the European Council dated 3 May 1989 for the alignment of the legal requirements of the member states concerning „**E**lectromagnetic **C**ompatibility“, the European Union has declared **EMC** as a protection objective. The former EMC directive 89/336/EWG was replaced on December 31, 2004 by the revised version 2004/108/EG which has been valid since July 20, 2009.

# CE marking / EMC directives

The safety goals are defined in Article 5 of the EMC regulation from December, 31 2004. They state the following:

- The electromagnetic disturbance it generates does not exceed a level allowing radio and telecommunications equipment and other apparatus to operate as intended.
- The apparatus has an adequate level of intrinsic immunity to electromagnetic disturbance to enable it to operate as intended.

Apparatus is defined in the EMC Directive as follows:

- All electrical and electronic appliances together with equipment and installations containing electrical and/or electronic components.

This applies to the active/passive components and intelligent modules produced and stocked by Weidmüller.

Compliance with this directive is deemed to be given for apparatus that conforms with the harmonised European standards that are published in, for example, in Germany the Gazette of the Federal Minister for Post and Telecommunications.

Such apparatus is utilised in the following areas:

- industrial installations,
- medical and scientific equipment and devices
- information technology devices.

Weidmüller tests its electronic products according to the relevant standards in order to fulfil the agreed protection objectives.

## Electronic products from Weidmüller with respect to EMC directives

### Category 1

All passive components such as:

- terminals with status displays
- fuse terminals with status indicators
- passive interface units with and without status indicators
- surge protection

These products cause no interference and they have a suitable immunity to interference. These products are not labelled with the CE marking concerning the EMC Directive or the German EMC Act.

### Category 2

These products are labelled with the CE marking after the conformity assessment procedure has been carried out which includes the reference to the harmonised European standards.

The following are harmonised standards:

**EN 61000-6-3** – Generic Emission Standard – Part 1: residential, commercial and light industry

**EN 61000-6-1** – Generic Immunity Standard – Part 1: residential, commercial and light industry

**EN 61000-6-4** – Generic Emission Standard – Part 2: industrial environment

**EN 61000-6-2** – Generic Immunity Standard –Part 2: industrial environment

**EN 55011** – Industrial, scientific and medical (ISM) radio-frequency equipment – Radio disturbance characteristics – Limits and methods of measurement

**EN 55022** – Information technology equipment –Radio disturbance characteristics – Limits and methods of measurement

**EN 61000-3-2** – Electromagnetic compatibility (EMC) – Part 3-2: Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).

**EN 61000-3-3** – Electromagnetic compatibility (EMC) – Part 3-3: Limitation of voltage fluctuations and flicker in low-voltage supplies systems for equipment with rated current less than or equal to 16 A per phase and not subject to conditional connection

### Use of Tests

Generic standards are always used when no specific product standard for the particular devices exist. The generic standards EN 61000-6-X are used as the basis for Weidmüller products.

### Note:

The relevance of EN 61000-6-1 for certain products must be checked as well as how far generic standards EN 61000-6-3 or EN 61000-6-2 were considered during testing.

The environment phenomena and test interference levels are specified in the generic immunity standards. In addition, Weidmüller considers the assessment criteria A, B and C.

Extract from the generic standard  
EN 61000-6-2:

### Criterion A

The equipment shall continue to operate as intended.

No degradation of performance or loss of function is allowed below a minimum performance level as specified by the manufacturer, when the equipment is used as intended.

In certain cases the nominal performance level can be replaced

by a permissible loss of performance. If the minimal performance level or permissible loss of performance is not specified by the manufacturer, both of these specifications can be derived from the description of the product, the relevant documentation and from what the operator expects from the equipment during its intended operation.

### Criterion B

The equipment shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a minimum performance level as specified by the manufacturer, when the equipment is used as intended. In certain cases the minimal performance level can be replaced by an permissible loss of performance. During testing degradation of the performance level is permitted; however, changes to the specified operation mode or data loss are not permitted. If the minimal performance level or permissible loss of performance is not specified by the manufacturer, both of these specifications can be derived from the description of the product, the relevant documentation and from what the operator expects from the equipment during its intended operation.

### Criterion C

Temporary loss of function is allowed, provided the loss of function is self-recoverable or can be restored by the operation of the controls.

Criterion B is most frequently specified in the generic standards and is used by Weidmüller.

Taking the example of a WAVEANALOG analogue coupler: During testing, the analogue coupler may convert values that lie outside the permissible tolerances. After testing, however, the values must lie within the given tolerances.

### General installation instructions

In conformity with the performance level and criteria A and B, the products may and can be affected by external influences during a fault. However, the aim should be to suppress this as far as possible by means of an optimum installation.

### Measures

- Install the products in a metal enclosure (control cabinet, metal housing).
- Protect the voltage supplies with a surge protection device
- Use only shielded cables for analogue data signals.
- Apply ESD measures during installation, maintenance and operation.
- Maintain min. 200 mm clearance between electronic modules and sources of interference (e.g. inverters) or power lines.
- Ensure ambient temperature and relative humidity values do not exceed those specified.
- Protect long cables with surge protection devices.

For safety reasons, do not operate walkie-talkies and mobile telephones within a radius of 2 m of the equipment.

# Glossary

## 1-9

<b>2-way isolation</b>	The input and output signals are separated electrically from each other and decoupled. Potential differences caused by long wire lengths and common reference points are eliminated.
<b>3-way isolation</b>	Also decouples the power supply to the input and output circuit and enables supply with only one operating voltage.

## A

<b>A/D converter</b>	Converts standardised analogue current and voltage signals into an 8-bit, 12-bit or 16-bit digital signal. It may be necessary to convert analogue signals into digital signals when you need the analogue signal from the surroundings to work with the typical digital processing requirements of process monitoring.
<b>AC</b>	Alternating current
<b>Accuracy</b>	Describes the ability of an analogue signal isolating converter to transmit a measured value as precisely as possible. It is specified in the percent deviation from the measuring range end value at room temperature.
<b>Active sensor</b>	In an active sensor, an electrical signal is generated from the measurement itself, for example dynamometric or piezo-electric. Thus no auxiliary power source is required. Because of their physical operating principals (since energy cannot be sent during the static and quasi-static states), only a change in the measured variable can be detected.
<b>Actuator</b>	The actuator is a sensor counterpart – it converts electrical current into another form of energy.
<b>Alarm contact</b>	A switching contact that activates when a disturbance occurs (for example, an overload or short circuit).
<b>Ambient temperature</b>	DIN EN 60204-1 uses this term to refer to the temperature of the surrounding air or medium at which the equipment can be properly and safely operated. This is a part of the surrounding physical and operational conditions. Failure to maintain this temperature level can invalidate the product warranty.
<b>Analogue signal</b>	A signal is designated as an analogue signal if it transmits parameter information that is infinitely variable between a minimum and maximum value (this includes instantaneous values such as current, voltage or temperature). This applies to practically all real-world processes or states. It is theoretically possible to register any small signal changes (there is a very large dynamic range).

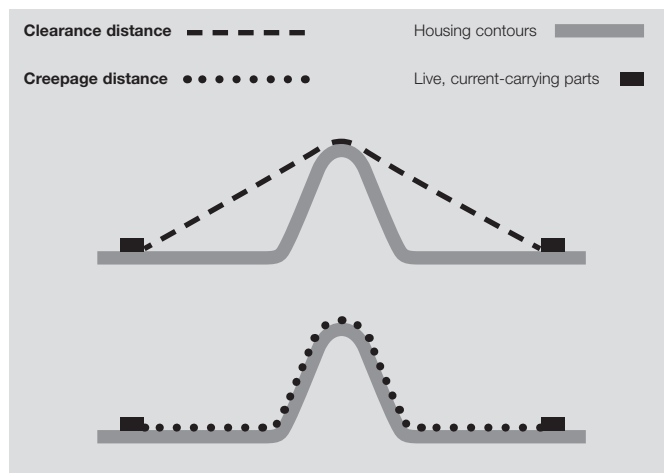
<b>ATEX</b>	<p>The ATEX directive from 23.4.1994 is valid within the EU and the EFTA Western European nations. It applies to devices, machinery components, controllers and protective systems that are to be used in hazardous areas. This directive harmonizes the different national regulations from the EU member nations concerning the proper and intended use of machines and facilities in hazardous areas.</p> <p><b>ATEX</b> is derived from the phrase “<b>AT</b>mosphere <b>EX</b>plosive”. It stipulates that operators should prevent explosions and ensure protection.</p> <p>Regarding explosion protection in a potentially explosive atmosphere, the ATEX directive 94/9/EC has precedence over machinery directives and must be followed. The directive describes the following steps:</p> <ul style="list-style-type: none"> <li>• Describe how often a potentially explosive atmosphere occurs and where it occurs.</li> <li>• These areas are then divided into zones according to the specifications.</li> <li>• Make sure that only properly categorized equipment is present within each different zone. As soon as an area is classified as being dangerous, steps must be taken to limit the potential ignition sources that are present there.</li> </ul>
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## C

<b>Calibration device</b>	A special instrument used for the calibration and configuration of analogue signal conditioning devices. The calibration device produces highly precise standardised signals. It is equipped with a load indicator for quick loop diagnostics.
<b>CE</b>	Abbreviation for <b>C</b> ommunauté <b>E</b> uropéenne (the European Community). Manufacturers use the CE label to confirm that their products comply with the corresponding EC directives and the “essential requirements” therein.
<b>Cold-junction compensation</b>	Thermocouples require a temperature reference point to compensate for unwanted “cold junctions”. The usual method for achieving this is by measuring the temperature at the reference junction with a temperature sensor that can be read immediately. The interfering voltage can then be compensated for in the measurement results. This process is referred to as cold-junction compensation (CJC).
<b>Common-mode interference</b>	Interfering currents and voltages that can occur on the connecting cables between electrical devices and facility components. These can then spread with similar phase and current direction to the feed line and the return line.
<b>Counter</b>	A counter can be used for measuring flow or for counting events. Analogue or digital input signals (pulses) may also be processed. Integrated function such as linearisation, interference suppression, hysteresis configuration and reference values expand the range of use of a counter. Switching contacts are available on the output side for monitoring threshold.

**Creepage and clearance distances**

The safety gaps between two current-carrying wires. The creepage distance is the shortest path along an insulating surface between two live components. The clearance distance is the shortest path in the air between two points of reference.



**D**

**D/A converter**

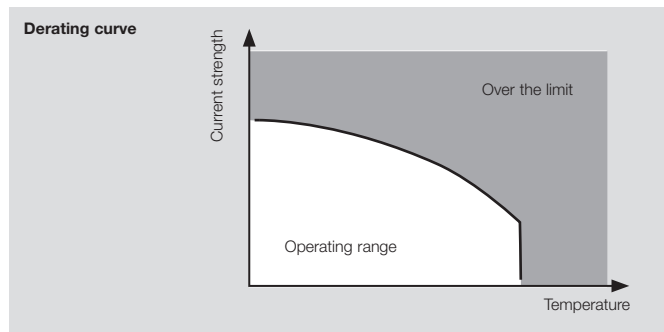
D/A converters convert standardised digital signals (for example, with an 8-bit structure) into analogue current and voltage signals. It may be necessary to convert digital signals into analogue signals when you need the analogue signal from the surroundings to work with the typical digital processing requirements of process monitoring.

**DC**

Direct current

**Derating**

The continuous current level reduction in relation to an ambient temperature increase, represented as a derating curve (a load reduction curve).



<b>Device categories</b>	The device category determines which equipment can be used in which zone. There are six device categories. The categories 1 G, 2 G and 3 G are classifications for gas explosion protection (G = Gas). Equipment with 1 G is suitable for zones 0, 1 and 2. Equipment with 2 G is suitable for zones 1 and 2. Equipment with 3 G is suitable for zone 2. The categories 1 D, 2 D and 3 D are classifications for dust explosion protection (D = Dust). Equipment with 1 D is suitable for zones 20, 21 and 22. Equipment with 2 D is suitable for zones 21 and 22. Equipment with 3 D is suitable for zone 22.
<b>Device groups</b>	Equipment is divided into groups I and II. Group I concerns underground mining while group II concerns explosion protection for gas and dust in all other applications.
<b>DTM</b>	DTMs ( <b>D</b> evice <b>T</b> ype <b>M</b> anager) are software drivers that are vendor- and device-neutral. DTMs define functions for access to device parameters, troubleshooting, configuration and operation of devices. The DTM specifies all device-specific information, functions and rules (such as the device structure, communication capabilities, internal dependencies and the human-machine interface (HMI)). Device manufacturers make available a Device Type Manager (DTM) software driver for each device or device group.

## E

<b>Earth loops</b>	<p>A main cause of error in process systems comes from the earth loops. An earth loop occurs when two or more circuits are connected to each other and referenced to earth or a reference point. This reference point usually does not have the identical electrical potential at each position. When the two ends of the line are earthed at two different positions, the voltage differential between the two earth potentials on the line can lead to a compensating current that may corrupt analogue measurement signals. This occurs when field sensors have a separate earth or separate power feed. Analogue signal isolation amplifiers use electrical isolation to separate the input and output circuits thus preventing the measurement signal from being corrupted.</p> <div> <p><b>Earth and ground loops</b></p> </div>
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<b>EIA-232/ RS232</b>	<p>The term EIA-232 (originally RS-232) refers to a serial interface standard developed by a U.S. standards committee (now known as the EIA – Electronic Industries Alliance) in the early 1960s. EIA-232 specifies the connection between the data terminal equipment (DTE) and the modem (data communication equipment or DCE). It defines timing, voltage level, plug and protocol details. EIA-232 defines a voltage interface. The information bits are encoded using electrical voltage. The data lines (TxD and RxD) use a negative logic whereby a voltage level between -3 V and -15 V (ANSI/EIA/TIA-232-F-1997) represents a logical one and a voltage level between +3 V and +15 V represents a logical zero. Signal levels between -3 V and +3 V are undefined.</p>
<b>EIA-422/ RS422</b>	<p>EIA-422 (also known as RS-422) is an interface standard for cable-based differential, serial data transmission. In contrast to the asymmetric serial interface specified by the EIA-232 standard, the EIA-422 interface is designed for symmetric transmissions. This means that two sets of twisted pair wires are required to carry the positive and negative signals from the sender to the receiver. This minimises common-mode interferences and also increases the data rates in comparison to the asymmetric EIA-232 interface. EIA-422 can be used to establish a full-duplex, point-to-point connection. Multi-drop networks with one sender and up to ten receivers are also possible. The sender and receiver in multi-drop networks can only be operated in half-duplex (in one direction). Because of the high data rate (up to several MBit/s), a wire pair on the EIA-422 interface must be terminated with a terminating resistor (normally 120 ohm).</p>
<b>EIA-485/ RS485</b>	<p>EIA-485, also referred to as RS-485, is an interface standard for digital, cable-based, differential, serial data transmissions. EIA-485 uses a wire pair for transmitting inverted and non-inverted levels for a single-bit data signal. The original data signal is reconstructed by the receiver as the difference between the two voltage levels. This has the advantage of increasing the resistance to interference, since common-mode interference then has no effect on the transmission. The EIA-485 interface operates with a voltage differential of +/-200 mV, so that the voltage interface has a differential related to half of the operational voltage. It normally uses a single wire pair and is operated in half-duplex. However full-duplex operations are possible with two wire pairs. This connection has multi-point capabilities; up to 32 nodes can be connected to an EIA-485 bus. Standard cable lengths run up to 1.2 km in length and support transmission speeds up to 10 MBit/s. The wire pairs must be terminated with resistors (typically 120 Ohm) because of the cable length and high data rates.</p>
<b>Electrical equipment</b>	<p>All of the electrical and electronic components and circuits within an enclosure.</p>
<b>Explosion groups</b>	<p>Depending on the ignition protection, explosion-protected equipment intended for gases, vapours and mists are divided into three explosion groups (IIA-IIIB-IIIC). The explosion group provides a measure of the explosive break-through capability of gases (in an explosive atmosphere). The requirements for the equipment increase in strictness from II A to II C.</p>

<b>Explosion protection types</b>	<p>The ignition protection type is a term used in explosion protection that refers to the various types of protective construction designed into the product. Ignition protection types are formulated to minimise the risk that an ignition source will be present in an explosive atmosphere.</p> <p>The following ignition protection types are specified:</p> <ul style="list-style-type: none"> <li>• <b>For electrical equipment in a gas</b> <ul style="list-style-type: none"> <li>• Intrinsic safety Ex i</li> <li>• Pressure-resistant Ex d encapsulation</li> <li>• Increased safety Ex e</li> <li>• Pressurization encapsulation Ex p</li> <li>• Oil immersion Ex o</li> <li>• Moulded encapsulation Ex m</li> <li>• Sand encapsulation Ex q</li> <li>• Ignition protection type for zone 2 Ex n</li> <li>• Special ignition protection type Ex s</li> </ul> </li> <li>• <b>For electrical equipment in dust</b> <ul style="list-style-type: none"> <li>• Pressurization encapsulation Ex pD</li> <li>• Intrinsic safety Ex iD</li> <li>• Moulded encapsulation Ex mD</li> <li>• Protection provided by housing Ex tD</li> </ul> </li> </ul>
<b>Explosive atmospheres</b>	<p>This is defined as a mixture of flammable materials and oxygen. An ignition leads to a explosive burning process throughout the entire mixture. Usually the oxygen is supplied by the surrounding air. Flammable materials may be gases, liquids, vapours, mists or dusts. Explosion protection considers this to be normal atmospheric conditions. The explosiveness of the mixture depends of the flammability of the materials and the concentration of air or oxygen.</p>

## F

<b>FDT</b>	<p>FDT technology specifies and standardises the integration of communicating devices from different manufacturers. It makes use of a superimposed device management program. The key feature is its independence from the communication protocol and software used by the device and the host system. FDT allows access to any device from any host using any protocol.</p>
<b>Flammability rating</b>	<p>Flammability class specification according to the American UL94 specification. Duration of burning, annealing time and the burning drop formation are all taken into account. The highest category is V-0.</p>
<b>Frequency converter</b>	<p>Converts frequencies into analogue signals (or vice versa). In-line control systems can then directly process pulse strings from speed or rotational measurements.</p>

**G**

<p><b>Galvanic isolation</b></p>	<p>Potential-free isolation between electrical components. Normally, the inputs circuit, output circuit and power supply are designed so that they are electrically isolated from each other. The isolation can be achieved using optical means (an optocoupler) or by using a transformer. The electrical isolation of measurement signals ensures that the differences in earth potentials and common-mode interference are suppressed</p>
<p><b>GOST-R</b></p>	<p>The Russian certification for products, materials and technical facilities.</p>

**H**

<p><b>Hall sensor current measurement</b></p>	<p>Hall sensors can measure the magnetic field of a conducting wire. They then generate a proportional voltage on the measurement output (the Hall voltage). This can be converted to a standardised signal by means of an amplifier circuit. Such a measurement is well suited for measuring high DC and AC currents with frequencies up to 1 kHz. Start-up currents and current peaks cannot damage a Hall sensor.</p>
<p><b>HART®</b></p>	<p>HART® (<b>H</b>ighway <b>A</b>ddressable <b>R</b>emote <b>T</b>ransducer) is a communications protocol for bus-addressed field devices used in process automation. In HART®-based communications, field devices and controllers are connected together over 4–20 mA current loops. This analogue signal is superimposed with a digital signal by using the FSK process (<b>F</b>requency <b>S</b>hift <b>K</b>eying). The process allows additional measurements, configuration and device data to be transmitted without influencing the analogue signal. HART® Ex isolators can also be used in hazardous areas.</p> <div> </div>

<b>Hazardous area</b>	According to the ATEX directive, an hazardous area is where the extent of the explosive atmosphere mandates that extra measures must be taken to safeguard health and protect surrounding machinery. Hazardous areas are classified according to the frequency and duration of the occurrence of the explosive atmosphere (refer to the sub-divided zones).
<b>Hysteresis</b>	Specifies the percent difference between the switch-on and switch-off points of a switching contact. The hysteresis must not fall below a minimal value. Otherwise it would no longer be possible to carry out specific switching during the monitoring of threshold.

## I

<b>IECEX</b>	An international directive regarding the creation of declarations of conformity by the manufacturers of facilities, devices and components that are intended for use in explosion risk zones. This directive is valid throughout the globe but is only currently used in some Asian nations.
<b>Impulse withstand voltage</b>	The high pulse voltage of a specified form and polarity that does not lead to an insulation breakthrough or flashover, under the specific conditions defined in EN 60664-1.
<b>Initiator PNP/NPN switched</b>	Two wires in a three-wire sensor are responsible for keeping the supply activated. The third connecting wire is used for transferring commands (NO/NC contact). Initiators with NPN outputs switch the load in active mode towards the minus potential. Proximity switches with PNP outputs switch toward the plus potential.
<b>Insulation voltage</b>	For electronics components with electrical isolation, this is the maximum AC test voltage that can be applied for a specified time interval (5 s / 60 s) without causing a break-through.
<b>Intrinsic safety “i”</b>	Electrical equipment for hazardous areas with the ignition protection type “Intrinsic safety Ex i” Intrinsic safety is divided into ignition protection types “ia” or “ib” The ignition protection type “intrinsic safety” is a protective strategy that requires a complex analysis of electronic devices. So it is not only important to protect intrinsically safe current from the other unsafe circuits. It is also important to limit the open-circuit voltage, short-circuit current, power, stored energy and the surface temperature of components that will be exposed to the explosive atmosphere. Intrinsically safe circuits are circuits where a spark or thermal effect (as may occur under the testing conditions specified by EN 60079-11) is not capable of igniting an explosive atmosphere (of sub-groups IIA, IIB or IIC) or a dust-air mixture. The testing conditions cover normal operations and certain error conditions as specified in the standard.
<b>Intrinsically safe electrical equipment</b>	Equipment that is being used directly in a hazardous area, or equipment that is capturing signals from the Ex zone or directly controlling actuators in the Ex zone.
<b>IP protection classes</b>	Equipment is assigned an IP protection class to indicate which environmental conditions it can be used in.

Glossary

<b>Isolation amplifier (active isolator)</b>	An isolation amplifier is used to provide electrical isolation for analogue standard signals. They are designed with 2-way or 3-way isolation. The isolation of the potentials eliminates interference on the measurement signal that can be caused by earth loops or common-mode noise. The active isolator makes use of a separate voltage source for its power supply. It functions without feedback; a change on the output side load does not influence the input circuit.
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**L**

<b>Leakage current</b>	The current on the load side of an optocoupler that flows towards the output circuit while in a closed state.
<b>Limiting frequency</b>	The limiting frequency of an analogue signal isolating converter is that frequency where the output signal is reduced to $1/\sqrt{2}$ of the value of the input signal (approx. 70.7 % = -3 dB).
<b>Line break monitoring</b>	Analogue measuring transducer with wire-break detection capability that permanently monitors the input signal. In the event of an fault (a wire break), the output signal jumps up to a defined value over the nominal range so that a controller wired further down the circuit can evaluate the error.
<b>Linearisation</b>	Temperature-dependent components normally do not have a linear characteristic curve. Their characteristic curves must be linearised so that they can be evaluated as precisely as possible. The measurement curves of thermocouples and temperature-dependent resistors (NTC/ PTC), in particular, exhibit significant deviation from an "ideal curve". In the linearisation process, the measurement signal is processed by a microprocessor and an ideal characteristic curve is generated which can then be analysed or processed further.
<b>Load cell</b>	A load cell is a special type of force sensor used in weighing systems (i.e., with scales). They are calibrated in grams (g), kilograms (kg) or tons (t). Load cells usually have a spring mechanism used as a force sensor. The spring is a specially shaped piece of metal whose shape changes slightly when under the influence of weight. This elastic deformation is recorded by strain gauges and converted into an electrical signal. Weights can be recorded ranging from a few hundred grams to several thousand tons.
<b>Load resistance (load)</b>	This is the load resistance on the output side of a measuring transducer or transmitter. For analogue current outputs, the load is 500–600 ohms maximum. Voltage outputs normally have a load of at least 10 kOhm.

**M**

<b>Measurement isolating transformer</b>	Converts electric and non-electric input signals into standard analogue signals. At the same time it provides electrical isolation between the input and output (2-way isolation) or between the input, output and supply (3-way isolation). Measurement isolators are typically used to record temperatures (RTD, thermocouples) or for measuring current, voltage, power, frequency, resistance and conductivity.
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<b>Measuring bridge</b>	Sensors based on Wheatstone bridge circuitry can capture force, pressure and torque. Relatively small length changes under 10 – 4 mm can be recorded using DMS strain gauges in the form of resistance changes. A typical application is for capturing measurements in load cells.
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## N

<b>Namur sensor</b>	<p>NAMUR-compliant sensors (The standardization commission for measuring and control technology in the German chemical industry) operate with a load-independent current. They have four modes so that an analogue evaluative unit can detect a sensor malfunction.</p> <ol style="list-style-type: none"> <li>1) Current of 0 mA =&gt; wire break, circuit is open</li> <li>2) Current of approx. 20 % of the max. value =&gt; Sensor ready, activated</li> <li>3) Current of approx. 60 % of the max. value =&gt; Sensor ready, not activated</li> <li>4) Current at max. value =&gt; short circuit, max. current</li> </ol> <p>NAMUR sensors are suited for use in hazardous areas.</p>
<b>NEC 500 – 505</b>	The relevant directives for the classification of explosion protection in the USA. NEC 500 regulates the standard Ex classifications (class – division – model). The NEC 505 defines the zone model based on the European and IEC classifications.
<b>Nominal switching current – load side</b>	The permitted load current of a relay contact or semiconductor contact when in continuous operations.
<b>Nominal switching voltage – load side</b>	The switching voltage that a relay contact or semiconductor contact uses in relation to its application.

## O

<b>Output-current loop-powered</b>	Output loop powered 2-wire transmitters have a 4 – 20 mA output. The transmitter is supplied with power via the current loop on the output side. A typical loop consists of a regulated DC power supply, the 2-wire transmitter and a receiving device.
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<p><b>Overvoltage category</b></p>	<p>The overvoltage categories are described in DIN EN 60664-1. The category dedicates the insulation clearance gaps required. Category III is the default specification (EN 50178).</p> <ul style="list-style-type: none"> <li>• <b>Overvoltage category I</b> Devices that are intended to be connected to the permanent electrical building installation. The measures for limiting transient surge voltages to the proper level are taken outside of the device. The protective mechanisms can either be in the permanent installation or between the permanent installation and the device.</li> <li>• <b>Overvoltage category II</b> Devices that are intended to be connected to the permanent electrical building installation (such household appliances or portable tools).</li> <li>• <b>Overvoltage category III</b> Devices that are a part of the permanent installation and other devices where a higher degree of availability is required. This includes the distributor panels, power switches, distribution systems (including cable, busbars, distributor boxes, switches and outlets) that are part of the permanent installation, devices intended for industrial use, and devices that are continually connected to the permanent installation (such as stationary motors).</li> <li>• <b>Overvoltage category IV</b> Devices that are intended to be used on or near the power feed in a building's electrical installation – ranging from the main distribution to the mains power system. This includes electrical meters, surge protection switches and ripple control equipment.</li> </ul>
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**P**

<p><b>Passive isolator/ input loop powered</b></p>	<p>Generates its power supply from the input signal (0/4–20 mA). The amount of current needed internally is so small that the measurement signal is not influenced. Transformers are used to provide the isolation between the input and the output. The advantages include: eliminates the influence of the mains power system, highly accurate, minimal signal delay, and minimal power used. Passive isolators do not function free from feedback; so a load change on the output circuit will automatically effect the input circuit as well.</p>
<p><b>Passive sensor</b></p>	<p>Contains passive components whose parameters can be changed by the measured variables. A primary electronic mechanism converts these parameters into electric signals. An auxiliary external power source is needed for the passive sensor. Passive sensors can be used to determine both static and semi-static measured variables. For this reason, the majority of sensors have a passive construction. Examples of this type include load cells and resistance thermometers.</p>

<b>Pollution severity level</b>	<p>The pollution severity level specifies the conditions of the immediate surroundings. It is defined in DIN EN 50178, Section 5.2.15.2.</p> <p>The pollution (contamination) severity level should be used to determine the required creepage distance for the insulation. Pollution degree 2 is the default specification.</p> <ul style="list-style-type: none"> <li>• <b>Pollution severity level 1</b> There is no contamination or only dry occurrences of non-conductive pollution. This pollution has no influence.</li> <li>• <b>Pollution severity level 2</b> There is only non-conductive pollution. Temporary occurrences of conductivity caused by condensation may also occur.</li> <li>• <b>Pollution severity level 3</b> Conductive pollution or dry, non-conductive pollution that can become conductive due to condensation is likely to occur.</li> <li>• <b>Pollution severity level 4</b> The contamination leads to continual conductivity which can be caused by such contaminants as conductive dust, rain or snow.</li> </ul>
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## R

<b>Rated voltage</b>	Specified by the insulation coordination – the rated voltage is the voltage level at which the product can be safely operated, in relation to the corresponding pollution severity level and the surge voltage category.
<b>Relative humidity</b>	The relationship between the actual moisture and the maximum possible quantity of water in the air. Expressed as a percentage.
<b>RoHS</b>	The EC directive 2002/95/EC – concerning the restriction of the use of certain hazardous substances in electrical and electronic equipment – regulates the use of hazardous materials within devices and components. This directive, and its various implementations into national laws, are referred to by the abbreviation RoHS (Restriction of Hazardous Substances).



Glossary

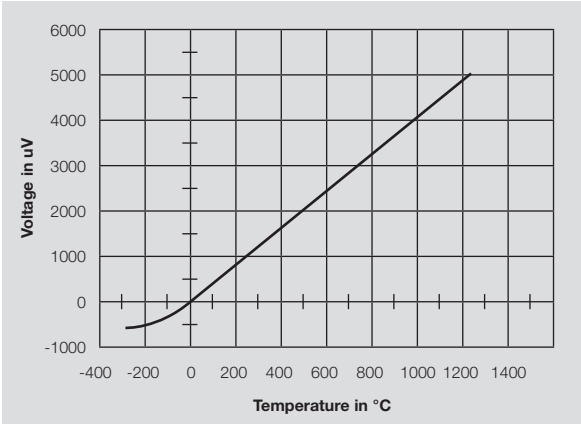
<b>RTD/ PT100/ 1000</b>	<p>RTD sensors are temperature probes that operate based on the resistance changes which take in metal as the temperature changes. They are resistance thermometers based on PTC resistors. The electrical changes in resistance of a platinum wire or platinum film is often used for measuring temperatures ranging from -200 °C to 850 °C. The platinum temperature sensors are characterised by their nominal resistance R0 at a temperature of 0 °C. The standard types include:</p> <ul style="list-style-type: none"> <li>• Pt100 (R0= 100 Ohm)</li> <li>• Pt1000 (R0= 1 kOhm)</li> </ul> <p>A two-wire, three-wire or four-wire electrical connection can be used to electrically connect the PT/RTD sensor to the evaluative electronics. A three-wire or four-wire method eliminates any errors caused by the inherent resistance of the sensor connecting wires.</p> <p>In the three-wire method, one end is equipped with two pigtail connectors. In the four-wire method, both ends are equipped with two pigtail connectors.</p>
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**S**

<b>Self-heating</b>	Self-heating refers to the temperature increase in an operating device caused by the internal power loss.
<b>Sensor</b>	A sensor is a physical component capable of capturing certain physical or chemical properties (such as thermal radiation, temperature, humidity, pressure, noise, brightness or acceleration) as a measurement. It may also be able to analyse the quality of the composition of the material surroundings. These values are captured using physical or chemical phenomena and then converted into another form (usually electrical signals) so they can be post-processed.
<b>Signal distributorsplitter</b>	A signal isolator that accepts an analogue input signal and delivers at least two signals on the output side. This permits the signal to be transmitted to a PLC/DCS system and to a separate display. A signal multiplier is designed either as an active isolator with an external power feed or as an output loop powered version.
<b>SIL</b>	<p><b>Safety Integrity Level.</b></p> <p>The components must meet the requirements of IEC 61508 in order to reduce risk. This standard provides general requirements for avoiding and minimising device and equipment outages. It stipulates organization and technical requirements concerning device development and operation. Four safety levels are defined (from SIL1 for minimal risk to SIL4 for very high risk) for classifying facilities and risk-reduction measures. Risk-reduction measures must be more reliable when the classified risk level is higher.</p>
<b>Status indicator</b>	An LED that displays the operational status, such as operational (yellow), switching (green), and alarm/malfunction (red).
<b>Step response time</b>	This is the time delay in the output signal change when there is a signal jump ranging from 10 to 90 % on the input side. The step response time is inversely proportional to the limiting frequency.
<b>Storage temperature</b>	The permitted ambient temperature, related to a specific relative humidity level, for which the product should be stored while in a current-free state.
<b>Switching threshold</b>	The switch-on or switch-off point.

**W**

## T

<b>Temperature classes</b>	<p>Explosion-protected equipment that is to be installed into the Ex zone is subdivided into six temperature classes (T1 to T6).</p> <p>These temperature classes define the maximum surface temperature permitted for the equipment. The definition is based on an ambient temperature of +40 °C. This temperature may not be exceeded on any part of the equipment at any point in time. In all cases, the maximum surface temperature must be lower than the ignition temperature of the surrounding medium. The requirements placed on the equipment become stricter from class T1 to T6.</p>																																				
<b>Temperature coefficient</b>	<p>The temperature coefficient describes the relative change of a physical variable based on the temperature change relative to a reference temperature (room temperature). It directly influences the precision of an analogue signal converter. The coefficient is specified in ppm/K of the corresponding measuring range end value.</p>																																				
<b>Thermocouple</b>	<p>A thermocouple is a component made of two different materials which are connected to each other at one end. An electrical voltage is created (based on the principle of the Seebeck effect) along a wire that connects the unattached ends when there is a temperature differential.</p> <p>The juncture point and the unattached ends must have different temperatures for a voltage to be generated.</p> <p>The following thermocouples are used for industrial applications:</p> <table border="1"> <thead> <tr> <th>Thermal pair</th> <th>Short name</th> <th>Type</th> <th>Temperature range in °C</th> </tr> </thead> <tbody> <tr> <td>Nickel/Chrome-Nickel/Al</td> <td>NiCr-Ni/Al</td> <td>K</td> <td>-200 ... +1372</td> </tr> <tr> <td>Iron-constantan</td> <td>Fe-CuNi</td> <td>J</td> <td>-200 ... +1200</td> </tr> <tr> <td>Copper-constantan</td> <td>Cu-CuNi</td> <td>T</td> <td>-200 ... +400</td> </tr> <tr> <td>Nickel/Chrome-constantan</td> <td>NiCr-CuNi</td> <td>E</td> <td>-200 ... +1000</td> </tr> <tr> <td>Platinum/10% Rhodium-Platinum</td> <td>Pt10Rh-Pt</td> <td>S</td> <td>-50 ... +1760</td> </tr> <tr> <td>Platinum/13% Rhodium-Platinum</td> <td>Pt13Rh-Pt</td> <td>R</td> <td>-50 ... +1760</td> </tr> <tr> <td>Nickel/Chrome-Nickel/Magnesium</td> <td>NiCr-NiMg</td> <td>N</td> <td>-200 ... +1300</td> </tr> <tr> <td>Platinum/30% Rhodium - Platinum/6% Rhodium</td> <td>Pt30Rh - Pt6Rh</td> <td>B</td> <td>0 ... +1820</td> </tr> </tbody> </table> 	Thermal pair	Short name	Type	Temperature range in °C	Nickel/Chrome-Nickel/Al	NiCr-Ni/Al	K	-200 ... +1372	Iron-constantan	Fe-CuNi	J	-200 ... +1200	Copper-constantan	Cu-CuNi	T	-200 ... +400	Nickel/Chrome-constantan	NiCr-CuNi	E	-200 ... +1000	Platinum/10% Rhodium-Platinum	Pt10Rh-Pt	S	-50 ... +1760	Platinum/13% Rhodium-Platinum	Pt13Rh-Pt	R	-50 ... +1760	Nickel/Chrome-Nickel/Magnesium	NiCr-NiMg	N	-200 ... +1300	Platinum/30% Rhodium - Platinum/6% Rhodium	Pt30Rh - Pt6Rh	B	0 ... +1820
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<b>Threshold monitoring</b>	The limiting values of physical variables must be continually monitored for industrial processes. This includes fill levels, temperatures, speed, positions, weights and frequencies. Specialized threshold monitoring components are used for this purpose. The sensor signals are captured on the input side, evaluated electronically and converted. The corresponding threshold (min/max) are then made available via the digital switching outputs (relays or transistors) to the external devices. Potentiometers can be used to customise each switching point and its minimum/maximum threshold as well as the switching hysteresis.
<b>Transformer-based current measurement</b>	Signal converters with transformer coupling are used for taking cost-effective measurements of sinusoidal currents (50/60 Hz). The current being measured flows directly through the primary coil of the measurement transformer. It is then stepped down and electronically processed in the converter.
<b>True RMS value</b>	True RMS is the measure of the active component of alternating current and voltages. The root mean square (RMS) is a measure of the magnitude of varying quantities (such as alternating current and voltage). It is a constant value that relates to the power consumed by a resistive load in a specified time period. The RMS is dependent on the amplitude and the curve slope. Non-sinusoidal signals can only be measured and processed with "true RMS"-compliant devices.
<b>TTY</b>	The TTY interface is a serial interface. This interface is often referred to as a 20-mA-current interface since a constant DC current of 20 mA flows through it during the idle state. In contrast to RS-232, the data transmission for the asymmetric signal connection is not controlled by voltage changes but by a load-independent line current (typically 20 mA for High and 0 mA for Low). Thus there is no significant length-dependent voltage loss to take into consideration. Here the cable lengths can run up to several kilometres.  TTY interfaces are currently used mostly where dedicated connections are required: for exchanging data between electronic scales, for large industrial displays, or for log printers.
<b>Type of contact</b>	A contact is called normally open (NO) or a make contact if it is open when the armature is dropped out (no current in coil) and closed when the armature is picked up (current flowing in coil). A contact is called a break contact or normally closed (NC) contact if it interrupts the circuit when the armature is picked up. A combination of NC and NO is called a changeover (CO) contact. A relay may have one or more of such contacts:  NC – Normally Closed = break contact (11, 12: NC contact) NO – Normally Open = make contact (13, 14: NO contact) CO – Change Over contact (11, 12, 14: CO contact (11 is the shared (root) contact))

## Z

### Zone division

Hazardous areas are divided into zones. These divisions take into account the various risks from explosive atmospheres. The corresponding explosion protection can then be implemented economically and safely in accordance with the particular conditions of the zone. The zone definitions in the ATEX directive provide comprehensive regulations for the European Community.

IEC 60079-10 is valid for gases and vapours. A similar classification is used for facilities in the USA which are covered by the US standard NEC 505.

IEC 61241-3 covers the division into zones according to the dust level.

Explosion risk areas are classified into zones according to likelihood of explosive atmospheres occurring and their persistence:

**Zone 0:** this zone has an explosive atmosphere that is a mixture of air and flammable gases, vapours or mists. The mixture is present frequently or over long periods.

**Zone 1:** an explosive atmosphere may occasionally occur in this zone under normal operating conditions.

**Zone 2:** an explosive atmosphere is not likely to occur in this zone or may only occur briefly.

**Zone 20:** this zone has an explosive atmosphere that is a flammable mixture of air and dust. The mixture is present often or over long periods.

**Zone 21:** an explosive atmosphere, in the form of a flammable dust/air mixture, may occasionally occur in this zone under normal operating conditions.

**Zone 22:** an explosive atmosphere, in the form of a flammable dust/air mixture, is not likely to occur in this zone or may only occur briefly.



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ACT20X-2SDI-2HDO-S	8965420000	B.11	FBC PA M12 M 10M	1785121000	J.34	MAS PT100 0...100C	8594820000	A.8			
ACT20X-CJC-HTI-S PRT 11	1160640000	L.10	FBC PA M12 M 1M	1785120100	J.34	MAS PT100 0...100C EX	8975690000	E.11			
ACT20X-CJC-HTI-S PRT 21	1160650000	L.10	FBC PA M12 M 2M	1785120200	J.34	MAS RPS	8721150000	E.9			
ACT20X-HAI-2SAO-S	8965430000	B.19	FBC PA M12 M 5M	1785120500	J.34	MAS RPS	8721150000	A.4			
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ACT20X-HDI-SDO-RNO-S	8965340000	B.7	FBC PA M12 M-FM 1M	1785100100	J.34	MAS RPSH	8721170000	A.4			
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ACT20X-HTI-2SAO-S	8965490000	B.17	FBC PA M12 M-FM 5M	1785100500	J.34	Output select	8615210000	E.14			
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AP MCZ1.5	8389030000	L.13	FBC EX PA M12 M 1M	1785150100	J.34	MAZ DC/DC select	8594840000	E.7			
			FBC EX PA M12 M 2M	1785150200	J.34	MAZ DC/DC select	8594840000	A.4			
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BHZ 5.00/04/90LH BK/BK PRT 11	1086130000	L.10	FBC EX PA M12 M-FM 10M	1785131000	J.34	MAZ PT100 0...100C	8594850000	A.8			
BHZ 5.00/04/90LH BK/BK PRT 15	1086190000	L.10	FBC EX PA M12 M-FM 1M	1785130100	J.34	MAZ PT100 0...100C EX	8975700000	E.11			
BHZ 5.00/04/90LH BK/BK PRT 21	1086140000	L.10	FBC EX PA M12 M-FM 2M	1785130200	J.34	Output select	8615240000	E.14			
BHZ 5.00/04/90LH BK/BK PRT 25	1086200000	L.10	FBC EX PA M12 M-FM 5M	1785130500	J.34	MAZ Thermo-J 0...700°C					
BHZ 5.00/04/90LH BK/BK PRT 31	1086150000	L.10	FBCCon DP CG 1way	8664340000	J.8	MAZ Thermo-K 0...1000°C	8594830000	E.12			
BHZ 5.00/04/90LH BK/BK PRT 35	1086210000	L.10	FBCCon DP CG Term 24V	8664290000	J.9	MAZ Thermo-K 0...1000C EX	8975710000	A.8			
BHZ 5.00/04/90LH BK/BK PRT 41	1086160000	L.10	FBCCon DP M12 1way	8664350000	J.8	MAZ Thermo-K 0...1000°C	8594860000	A.8			
BHZ 5.00/04/90LH BK/BK PRT 45	1086220000	L.10	FBCCon DP M12 Term 24V	8664330000	J.9	MAZ Thermo-K 0...1000C EX	8975720000	E.10			
BHZ 5.00/04/90LH BK/BK PRT 51	1086170000	L.10	FBCCon DP M12 Term 5V	8664320000	J.9	MAZ Thermo-K 0...1000C EX	8975720000	E.13			
BHZ 5.00/04/90LH BK/BK PRT 55	1086230000	L.10	FBCCon M12 4P FM EMC	8426220000	J.35	MAZ Thermo-K 0...1000C EX	8975720000	E.10			
BHZ 5.00/04/90LH BK/BK PRT 61	1086180000	L.10	FBCCon M12 4P M EMC	9455640000	J.35	MAZ CCC 0-20mA/0-20mA	8411190000	E.20			
BHZ 5.00/04/90LH BK/BK PRT 65	1086240000	L.10	FBCCon PA CG 1way	8664090000	J.12	MAZ CCC 0-20mA/0-20mA	8411190000	A.4			
			FBCCon PA CG 1way Ex	8664180000	J.18	MCZ CFC 0-20MA	8461480000	E.22			
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			FBCCon PA CG 4way	8664110000	J.14	MCZ PT100/3 CLP 0...150C	8604420000	A.8			
			FBCCon PA CG 4way Ex	8664200000	J.30	MCZ PT100/3 CLP 0...200C	8473010000	E.21			
			FBCCon PA CG 4way Limiter	8714220000	J.23	MCZ PT100/3 CLP 0...200C	8473010000	A.8			
			FBCCon PA CG 4way OVP	8714140000	J.19	MCZ PT100/3 CLP 0...300C	8473020000	E.21			
			FBCCon PA CG 8way	8664300000	J.15	MCZ PT100/3 CLP 0...300C	8473020000	A.8			
			FBCCon PA CG 8way Ex	8664240000	J.13	MCZ PT100/3 CLP -40C...100C	8604430000	E.21			
			FBCCon PA CG 8way Limiter	8714230000	J.24	MCZ PT100/3 CLP -40C...100C	8604430000	A.8			
			FBCCon PA CG 8way OVP	8714150000	J.20	MCZ PT100/3 CLP -50C...+150C	8473000000	E.21			
			FBCCon PA CG/M12 1way	8664060000	J.12	MCZ PT100/3 CLP -50C...+150C	8473000000	A.8			
			FBCCon PA CG/M12 1way Ex	8664150000	J.28	MCZ SC 0-10V	8260280000	E.23			
			FBCCon PA CG/M12 1way Limiter	8714160000	J.21	MCZ SC 0-10V	8260280000	A.10			
			FBCCon PA CG/M12 1way OVP	8714080000	J.17	MCZ SC 0-20MA	8227350000	E.23			
			FBCCon PA CG/M12 2way	8664070000	J.13	MCZ SC 0-20MA	8227350000	A.10			
			FBCCon PA CG/M12 2way Ex	8664160000	J.29	MCZ VFC 0-10V	8461470000	E.22			
			FBCCon PA CG/M12 2way Limiter	8714170000	J.22	MCZ VFC 0-10V	8461470000	A.6			
			FBCCon PA CG/M12 2way OVP	8714090000	J.18	MI8A-I/O S SUBD15B	8800220000	E.17			
			FBCCon PA CG/M12 4way	8664080000	J.14	MI-A-PSM24Vdc	8800230000	E.17			
			FBCCon PA CG/M12 4way Ex	8664170000	J.30						
			FBCCon PA CG/M12 4way Limiter	8714180000	J.23	<b>P</b>					
			FBCCon PA CG/M12 4way OVP	8714100000	J.19	P1000	7940010194	I.7			
			FBCCon PA CG/M12 8way	8664310000	J.15	P275	7940010202	I.9			
			FBCCon PA CG/M12 8way Ex	8664250000	J.31	PAS CMR 0.5...2.5 A DC	8742610000	D.8			
			FBCCon PA CG/M12 8way Limiter	8714190000	J.24	PAS CMR 2.0...5.0 A DC	8742620000	D.8			
			FBCCon PA CG/M12 8way OVP	8714110000	J.20	PAS CMR 4.5...10 A DC	8742630000	D.9			
			FBCCon SS CG 1way	8703430000	J.12	PMX400HZ	7940015595	G.15			
			FBCCon SS CG 4way	8703450000	J.14	PMX400HZ RO/AO	7940011979	G.15			
			FBCCon SS CG 8way	8703470000	J.15	PMX400TMP	7940017862	G.14			
			FBCCon SS CG/M12 1way	8726020000	J.12	PMX400TMP 4RO/AO	7940012968	G.14			
			FBCCon SS CG/M12 4way	8726040000	J.15	PMX420	7940018956	G.11			
			FBCCon SS CG/M12 8way	8726050000	J.14	PMX420Plus	7940018957	G.10			
			FBCCon SS DP M12 1way	8714270000	J.8	POS-4P M12 M20 150mm	8425930000	J.37			
			FBCCon SS DP M12 Term 24V	8714250000	J.9	POS-4P M12 M20 300mm	8425940000	J.37			
			FBCCon SS DP PCG 1way	8714260000	J.8	POS-4P M12 PG13.5 150mm	9455650000	J.37			
			FBCCon SS DP PCG Term 24V	8714240000	J.9	POS-4P M12 PG13.5 300 mm	8425910000	J.37			
			FBCCon SS PCG 1way	8613670000	J.12	POS-5P M12/M20 300MM	1795500000	J.37			
			FBCCon SS PCG 1way Limiter	8726110000	J.21	PTX800A 4-20mA	7940010243	G.7			
			FBCCon SS PCG 1way OVP	8715270000	J.17	PTX800A 4-20mA/RO/AO	7940014374	G.7			
			FBCCon SS PCG 4way	8613680000	J.14	PTX800D	7940011133	G.6			
			FBCCon SS PCG 4way Limiter	8715260000	J.23	PTX800D RO/AO	7940012323	G.6			
			FBCCon SS PCG 4way OVP	8726080000	J.19						
			FBCCon SS PCG 8way	8640720000	J.15	<b>R</b>					
			FBCCon SS PCG 8way Limiter	8726160000	J.24	RS D8-I 0...20MA	1165861001	H.8			
			FBCCon SS PCG 8way OVP	8726090000	J.20	RS D8-I A...20MA	1169261001	H.8			
			FBCCon Term.D Ex	8606190000	J.32	RS D8-U +10V	1123361001	H.9			
			FBCCon Term.D Ex FM	8556460000	J.32	RS D8-U 0...10V	1160761001	H.9			
			FBCCon Term.D Ex FM/PEAN	8606180000	J.32	RS I-D8 0...20MA	1160561001	H.6			
			FBCCon Term.D Ex PEAN	8606200000	J.32	RS I-D8 4...20MA	1168561001	H.6			
						RS PB-DP...	8800040000	J.6			
						RS PB-DP T SUB-D	8788580000	J.6			
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WASS VCC 0-10V/0-20MA	8540310000	A.4	WTS4 PT100/3 V 0-10V	8432090000	C.38
WASS VCC 0-10V/4-20MA	8540290000	C.25	WTS4 PT100/3 V 0-10V	8432090000	A.8
WASS VCC 0-10V/4-20MA	8540290000	A.4	WTS4 PT100/3 V 0-10V variabel	8432099999	C.38
WASS VCC HF 0-10/0-20MA	8447310000	C.20	WTS4 PT100/3 V 0-10V variabel	8432099999	A.8
WASS VCC HF 0-10/0-20MA	8447310000	A.4	WTS4 PT100/3 V 0-10V 0...100C	8432090001	C.38
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WASS VCC HF 0-10/4-20MA	8447340000	A.4	WTS4 PT100/4 C 0/4-20mA	8432270000	C.37
WASS VMR 1ph	8705640000	D.6	WTS4 PT100/4 C 0/4-20mA	8432270000	A.8
WASS VMR 1ph	8705640000	A.10	WTS4 PT100/4 C 0/4-20mA variabel	8432279999	C.37
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WASS VVC HF 0-10/0-10V	8447370000	C.21	WTS4 PT100/4 V 0-10V	8432240000	A.8
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WAZ1 CMA LP 1/5/10A ac	8528660000	A.6	WTZ4 PT100/2 V 0-10V	8432190000	A.8
WAZ2 CMA 20/25/30A uc	8545840000	C.44	WTZ4 PT100/2 V 0-10V variabel	8432199999	C.39
WAZ2 CMA 20/25/30A uc	8545840000	A.6	WTZ4 PT100/2 V 0-10V variabel	8432199999	A.8
WAZ2 CMA 40/50/60A uc	8526590000	C.45	WTZ4 PT100/3 C 0/4-20mA	8432160000	C.38
WAZ2 CMA 40/50/60A uc	8526590000	A.6	WTZ4 PT100/3 C 0/4-20mA	8432160000	A.8
WAZ2 CMA 5/10A uc	8526620000	C.44	WTZ4 PT100/3 C 0/4-20mA variabel	8432169999	C.38
WAZ2 CMA 5/10A uc	8526620000	A.6	WTZ4 PT100/3 C 0/4-20mA variabel	8432169999	A.8
WAZ2 CMR 1/5/10A ac	8516570000	D.5	WTZ4 PT100/3 V 0-10V	8432130000	C.38
WAZ2 CMR 1/5/10A ac	8516570000	A.10	WTZ4 PT100/3 V 0-10V	8432130000	A.8
WAZ2 CMR 20/40/60A ac	8526600000	D.5	WTZ4 PT100/3 V 0-10V variabel	8432139999	C.38
WAZ2 CMR 20/40/60A ac	8526600000	A.10	WTZ4 PT100/3 V 0-10V variabel	8432139999	A.8
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WAZ2 VMA V ac	8581230000	A.6	WTZ4 PT100/4 C 0/4-20mA	8432280000	A.8
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WAZ4 CCC DC 4-20/4-20MA	8444990000	A.4	WTZ4 PT100/4 C 0/4-20mA variabel	8432289999	A.8
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WAZ4 PRO DC/DC	8560750000	A.6	WTZ4 PT100/4 V 0-10V variabel	8432259999	A.8
WAZ4 PRO Freq	8581190000	C.43	WTZ4 THERMO	8432310000	C.41
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WAZ5 CCC 20LP	8581170000	C.30			
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WAZ5 CCC HF 0-20/0-20MA	8447170000	C.18			
WAZ5 CCC HF 0-20/0-20MA	8447170000	A.4			
WAZ5 CCC LP 0-20/0-20mA	8444960000	C.33			
WAZ5 CCC LP 0-20/0-20mA	8463590000	C.33	ZQV 2.5N/2 BL	1717990000	I.11
WAZ5 CCC LP 0-20/0-20mA	8444960000	A.4	ZQV 2.5N/2 GE	1693800000	I.11
WAZ5 CCC LP 0-20/0-20mA	8463590000	A.4	ZQV 2.5N/2 RT	1717900000	I.11
WAZ5 DC/Alarm	8543880000	D.4	ZQV 2.5N/2 SW	1718080000	I.11
WAZ5 DC/Alarm	8543880000	A.10	ZQV 4/10 GE	1609030000	I.13
WAZ5 OLP	8543730000	C.32	ZQV 4/2 GE	1608950000	I.13
WAZ5 OLP	8543730000	A.4	ZQV 4/3 GE	1608960000	I.13
WAZ5 PRO RTD	8560710000	C.34	ZQV 4/4 GE	1608970000	I.13
WAZ5 PRO RTD	8560710000	A.8	ZQV 4/5 GE	1608980000	I.13
WAZ5 PRO Thermo	8560730000	C.40	ZQV 4/6 GE	1608990000	I.13
WAZ5 PRO Thermo	8560730000	A.8	ZQV 4/7 GE	1609000000	I.13
WAZ5 VCC 0-10V/0-20MA	8540320000	C.25	ZQV 4/8 GE	1609010000	I.13
WAZ5 VCC 0-10V/0-20MA	8540320000	A.4	ZQV 4/9 GE	1609020000	I.13
WAZ5 VCC 0-10V/4-20MA	8540300000	C.25	ZQV 4N/10 BL	1794050000	I.12
WAZ5 VCC 0-10V/4-20MA	8540300000	A.4	ZQV 4N/10 RT	1794040000	I.12
WAZ5 VVC 0-10V/0-10V	8540340000	C.26	ZQV 4N/2 BL	1793960000	I.12
WAZ5 VVC 0-10V/0-10V	8540340000	A.4	ZQV 4N/2 RT	1793950000	I.12
WAZ5 VVC HF 0-10/0-10V	8447380000	C.21	ZQV 4N/3 BL	1793990000	I.12
WAZ5 VVC HF 0-10/0-10V	8447380000	A.4	ZQV 4N/3 RT	1793980000	I.12
WAZ6 TTA	8939680000	C.12	ZQV 4N/4 BL	1794020000	I.12
WAZ6 TTA	8939680000	A.6	ZQV 4N/4 RT	1794010000	I.12
WAZ6 TTA EX	8964320000	C.13	ZQV 4N/41 BL	1794080000	I.12
WAZ6 TTA EX	8964320000	A.6	ZQV 4N/41 RT	1794070000	I.12
WDS2 RS232/RS485/422	8615700000	H.4			
WDS2 RS232/TTY	8615690000	H.5			
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WS10/6 MC	1828450000	I.11			
WS10/6 MC	1828450000	I.12			
WS10/6 MC	1828450000	I.13			
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WTS4 PT100/2 C 0/4-20mA	8432210000	C.39			
WTS4 PT100/2 C 0/4-20mA	8432210000	A.8			
WTS4 PT100/2 C 0/4-20mA variabel	8432219999	C.39			
WTS4 PT100/2 C 0/4-20mA variabel	8432219999	A.8			
WTS4 PT100/2 C 4-20mA 0...100C	8432210011	C.39			
WTS4 PT100/2 C 4-20mA 0...100C	8432210011	A.8			
WTS4 PT100/2 V 0-10V	8432180000	C.39			
WTS4 PT100/2 V 0-10V	8432180000	A.8			
WTS4 PT100/2 V 0-10V variabel	8432189999	C.39			
WTS4 PT100/2 V 0-10V variabel	8432189999	A.8			
WTS4 PT100/2 V 0-10V 0...100C	8432180001	C.39			
WTS4 PT100/2 V 0-10V 0...100C	8432180001	A.8			
WTS4 PT100/3 C 0/4-20mA	8432150000	C.38			

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XFAR	7940014450	A.10

## Z

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ZQV 2.5N/2 GE	1693800000	I.11
ZQV 2.5N/2 RT	1717900000	I.11
ZQV 2.5N/2 SW	1718080000	I.11
ZQV 4/10 GE	1609030000	I.13
ZQV 4/2 GE	1608950000	I.13
ZQV 4/3 GE	1608960000	I.13
ZQV 4/4 GE	1608970000	I.13
ZQV 4/5 GE	1608980000	I.13
ZQV 4/6 GE	1608990000	I.13
ZQV 4/7 GE	1609000000	I.13
ZQV 4/8 GE	1609010000	I.13
ZQV 4/9 GE	1609020000	I.13
ZQV 4N/10 BL	1794050000	I.12
ZQV 4N/10 RT	1794040000	I.12
ZQV 4N/2 BL	1793960000	I.12
ZQV 4N/2 RT	1793950000	I.12
ZQV 4N/3 BL	1793990000	I.12
ZQV 4N/3 RT	1793980000	I.12
ZQV 4N/4 BL	1794020000	I.12
ZQV 4N/4 RT	1794010000	I.12
ZQV 4N/41 BL	1794080000	I.12
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8526590000	WAZ2 CMA 40/50/60A uc	C.45	8581180000	WAS4 PRO Freq	C.43	8714270000	FBCon SS DP M12 1way	J.8
8526590000	WAZ2 CMA 40/50/60A uc	A.6	8581180000	WAS4 PRO Freq	A.6	8715260000	FBCon SS PCG 4way Limiter	J.23
8526600000	WAZ2 CMR 20/40/60A ac	D.5	8581190000	WAZ4 PRO Freq	C.43	8715270000	FBCon SS PCG 1way OVP	J.17
8526600000	WAZ2 CMR 20/40/60A ac	A.10	8581190000	WAZ4 PRO Freq	A.6	<b>8720000000</b>		
8526610000	WAS2 CMA 5/10A uc	C.44	8581220000	WAS2 VMA V ac	C.50	8721150000	MAS RPS	E.9
8526610000	WAS2 CMA 5/10A uc	A.6	8581220000	WAS2 VMA V ac	A.6	8721150000	MAS RPS	A.4
8526620000	WAZ2 CMA 5/10A uc	C.44	8581230000	WAZ2 VMA V ac	C.50	8721170000	MAS RPSH	E.8
8526620000	WAZ2 CMA 5/10A uc	A.6	8581230000	WAZ2 VMA V ac	A.6	8721170000	MAS RPSH	A.4
8528650000	WAS1 CMA LP 1/5/10A ac	C.46	<b>8590000000</b>			8726020000	FBCon SS CG/M12 1way	J.12
8528650000	WAS1 CMA LP 1/5/10A ac	A.6	8594810000	MAS DC/DC select	E.7	8726040000	FBCon SS CG/M12 4way	J.14
8528660000	WAZ1 CMA LP 1/5/10A ac	C.46	8594810000	MAS DC/DC select	A.4	8726050000	FBCon SS CG/M12 8way	J.15
8528660000	WAZ1 CMA LP 1/5/10A ac	A.6	8594820000	MAS PT100 0...100C	E.10	8726080000	FBCon SS PCG 4way OVP	J.19
<b>8540000000</b>			8594820000	MAS PT100 0...100C	A.8	8726090000	FBCon SS PCG 8way OVP	J.20
8540180000	WAS5 CCC 0-20/0-20mA	C.22	8594830000	MAS Thermo-K 0...1000°C	E.12	8726110000	FBCon SS PCG 1way Limiter	J.21
8540180000	WAS5 CCC 0-20/0-20mA	A.4	8594830000	MAS Thermo-K 0...1000°C	A.8	8726160000	FBCon SS PCG 8way Limiter	J.24
8540190000	WAZ5 CCC 0-20/0-20mA	C.22	8594840000	MAZ DC/DC select	E.7	<b>8740000000</b>		
8540190000	WAZ5 CCC 0-20/0-20mA	A.4	8594840000	MAZ DC/DC select	A.4	8742610000	PAS CMR 0,5...2,5 A DC	D.8
8540200000	WAS5 CCC 4-20/0-20mA	C.24	8594850000	MAZ PT100 0...100C	E.10	8742620000	PAS CMR 2,0...5,0 A DC	D.8
8540200000	WAS5 CCC 4-20/0-20mA	A.4	8594850000	MAZ PT100 0...100C	A.8	8742630000	PAS CMR 4,5...10 A DC	D.9
8540230000	WAS5 CVC 4-20mA/0-10V	C.24	8594860000	MAZ Thermo-K 0...1000°C	E.12	<b>8750000000</b>		
8540230000	WAS5 CVC 4-20mA/0-10V	A.4	8594860000	MAZ Thermo-K 0...1000°C	A.8	8757530000	MAS DC/DC select HI	E.6
8540250000	WAS5 CCC 0-20/4-20mA	C.22	<b>8600000000</b>			8757530000	MAS DC/DC select HI	A.4
8540250000	WAS5 CCC 0-20/4-20mA	A.4	8604420000	MCZ PT100/3 CLP 0...150C	E.21	<b>8780000000</b>		
8540270000	WAS5 CVC 0-20mA/0-10V	C.23	8604420000	MCZ PT100/3 CLP 0...150C	A.8	8788580000	RS PB-DP T SUB-D	J.6
8540270000	WAS5 CVC 0-20mA/0-10V	A.4	8604430000	MCZ PT100/3 CLP -40C...100C	E.21	<b>8800000000</b>		
8540290000	WAS5 VCC 0-10V/4-20MA	C.25	8604430000	MCZ PT100/3 CLP -40C...100C	A.8	8800400000	RS PB-DP T	J.6
8540290000	WAS5 VCC 0-10V/4-20MA	A.4	8604430000	MCZ PT100/3 CLP -40C...100C	J.32	8800220000	Mi8A-I/O S SUBD15B	E.17
8540300000	WAZ5 VCC 0-10V/4-20MA	C.25	8606180000	FBCon Term.D Ex FM/PEAN	J.32	8800230000	Mi-A-PSM24Vdc	E.17
8540300000	WAZ5 VCC 0-10V/4-20MA	A.4	8606190000	FBCon Term.D Ex	J.32	<b>8930000000</b>		
8540320000	WAZ5 VCC 0-10V/0-20MA	C.25	8606200000	FBCon Term.D Ex PEAN	J.32	8939670000	WAS6 TTA	C.12
8540320000	WAZ5 VCC 0-10V/0-20MA	A.4	<b>8610000000</b>			8939670000	WAS6 TTA	A.6
8540330000	WAS5 WC 0-10V/0-10V	C.26	8613670000	FBCon SS PCG 1way	J.12	8939680000	WAZ6 TTA	C.12
8540330000	WAS5 WC 0-10V/0-10V	A.4	8613680000	FBCon SS PCG 4way	J.14	8939680000	WAZ6 TTA	A.6
8540340000	WAZ5 VVC 0-10V/0-10V	C.26	8615210000	MAS Thermo-J 0...700°C	E.14	<b>8960000000</b>		
8540340000	WAZ5 VVC 0-10V/0-10V	A.4	8615210000	MAS Thermo-J 0...700°C	A.8	8964310000	WAS6 TTA EX	C.13
8543720000	WAS5 OLP	C.32	8615210000	MAS Thermo-J 0...700°C	E.14	8964310000	WAS6 TTA EX	A.6
8543720000	WAS5 OLP	A.4	8615240000	MAZ Thermo-J 0...700°C	E.14	8964320000	WAZ6 TTA EX	C.13
8543730000	WAZ5 OLP	C.32	8615240000	MAZ Thermo-J 0...700°C	A.8	8965340000	ACT20X-HDI-SDO-RNO-S	B.7
8543730000	WAZ5 OLP	A.4	8615690000	WDS2 RS232/TTY	H.5	8965350000	ACT20X-HDI-SDO-RNC-S	B.7
8543820000	WAS5 DC/Alarm	D.4	8615700000	WDS2 RS232/RS485/422	H.4	8965360000	ACT20X-HDI-SDO-S	B.9
8543820000	WAS5 DC/Alarm	A.10	<b>8630000000</b>			8965370000	ACT20X-2HDI-2SDO-RNO-S	B.7
8543820000	WAS5 DC/Alarm	D.4	8638950000	WAS5 PRO RTD Cu	C.36	8965380000	ACT20X-2HDI-2SDO-RNC-S	B.7
8543880000	WAZ5 DC/Alarm	A.10	8638950000	WAS5 PRO RTD Cu	A.8	8965390000	ACT20X-2HDI-2SDO-S	B.9
8543880000	WAZ5 DC/Alarm	D.4	<b>8640000000</b>			8965400000	ACT20X-SDI-HDO-L-S	B.11
8545830000	WAS2 CMA 20/25/30A uc	C.44	8640720000	FBCon SS PCG 8way	J.15	8965410000	ACT20X-SDI-HDO-H-S	B.13
8545830000	WAS2 CMA 20/25/30A uc	A.6	<b>8660000000</b>			8965420000	ACT20X-2SDI-2HDO-S	B.11
8545840000	WAZ2 CMA 20/25/30A uc	C.44	8662140000	CMA 100/5A	C.48	8965430000	ACT20X-HAI-SAO-S	B.19
8545840000	WAZ2 CMA 20/25/30A uc	A.6	8664570000	CMA 250/5A	C.48	8965440000	ACT20X-2HAI-2SAO-S	B.19
<b>8550000000</b>			8664580000	CMA 500/5A	C.49	8965450000	ACT20X-SAI-HAO-S	B.21
8556460000	FBCon Term.D Ex FM	J.32	<b>8670000000</b>			8965460000	ACT20X-2SAI-2HAO-S	B.21
<b>8560000000</b>			8679490000	WAS5 PRO RTD 1000	C.34	8965470000	ACT20X-HTI-SAO-S	B.15
8560700000	WAS5 PRO RTD	C.34	8679490000	WAS5 PRO RTD 1000	A.8	8965480000	ACT20X-2HTI-2SAO-S	B.17
8560700000	WAS5 PRO RTD	A.8	<b>8700000000</b>			8975590000	WAS1 CMA LP 1/5/10A EX	C.47
8560710000	WAZ5 PRO RTD	C.34	8703430000	FBCon SS CG 1way	J.12	8975610000	WAZ1 CMA LP 1/5/10A EX	C.47
8560710000	WAZ5 PRO RTD	A.8	8703450000	FBCon SS CG 4way	J.14	8975640000	WAS5 CCC 2OLP EX	C.31
8560710000	WAZ5 PRO RTD	A.8	8703470000	FBCon SS CG 8way	J.15	8975650000	WAZ5 CCC 2OLP EX	C.31
8560720000	WAS5 PRO Thermo	C.40	8705630000	WAS2 VMR 3ph	D.7	8975690000	MAS PT100 0...100C EX	E.11
8560720000	WAS5 PRO Thermo	A.8	8705630000	WAS2 VMR 3ph	A.10	8975700000	MAZ PT100 0...100C EX	E.11
8560730000	WAZ5 PRO Thermo	C.40	8705640000	WAS5 VMR 1ph	J.13	8975710000	MAS Thermo-K 0...1000C EX	E.13
8560730000	WAZ5 PRO Thermo	A.8	8705640000	WAS5 VMR 1ph	J.14	8975720000	MAZ Thermo-K 0...1000C EX	E.13
8560740000	WAS4 PRO DC/DC	C.16	<b>8710000000</b>			8975730000	MAS THERMO-J 0...700C EX	E.15
8560740000	WAS4 PRO DC/DC	A.6	8714080000	FBCon PA CG/M12 1way OVP	J.17	8975740000	MAZ THERMO-J 0...700C EX	E.15
8560750000	WAZ4 PRO DC/DC	C.16	8714090000	FBCon PA CG/M12 2way OVP	J.17	8978580000	CBX200 USB	I.4
8560750000	WAZ4 PRO DC/DC	A.6	8714100000	FBCon PA CG/M12 4way OVP	J.18	<b>9450000000</b>		
8561610000	WAS5 VVC HF +-10V/+10V	C.21	8714110000	FBCon PA CG/M12 8way OVP	J.20	9455640000	FBCon M12 4P M EMC	J.35
8561610000	WAS5 VVC HF +-10V/+10V	A.4	8714120000	FBCon PA CG 1way OVP	J.31	9455650000	POS-4P M12 PG13,5 150mm	J.37
8564060000	FBCon PA CG/M12 1way	J.12	8714130000	FBCon PA CG 2way OVP	J.9	<b>8580000000</b>		
8564070000	FBCon PA CG/M12 2way	J.13	8714140000	FBCon PA CG 4way OVP	J.15	8581160000	WAS5 CCC 2OLP	C.30
8564080000	FBCon PA CG/M12 4way	J.14	8714150000	FBCon PA CG 8way OVP	J.15	8581160000	WAS5 CCC 2OLP	A.6
8564090000	FBCon PA CG 1way	J.12	8714160000	FBCon PA CG/M12 1way Limiter	J.9	8581170000	WAZ5 CCC 2OLP	C.30
8564100000	FBCon PA CG 2way	J.13	8714170000	FBCon PA CG/M12 2way Limiter	J.21	<b>8580000000</b>		
8564110000	FBCon PA CG 4way	J.14	8714180000	FBCon PA CG/M12 4way Limiter	J.23	8581160000	WAS5 CCC 2OLP	C.30
8564150000	FBCon PA CG/M12 1way Ex	J.28	8714190000	FBCon PA CG/M12 8way Limiter	J.24	8581170000	WAZ5 CCC 2OLP	C.30
8564160000	FBCon PA CG/M12 2way Ex	J.29	8714200000	FBCon PA CG 1way Limiter	J.21	<b>8580000000</b>		
8564170000	FBCon PA CG/M12 4way Ex	J.30	8714210000	FBCon PA CG 2way Limiter	J.22	8581160000	WAS5 CCC 2OLP	C.30
8564180000	FBCon PA CG 1way Ex	J.28	8714220000	FBCon PA CG 4way Limiter	J.23	8581170000	WAZ5 CCC 2OLP	C.30
8564190000	FBCon PA CG 2way Ex	J.29	8714230000	FBCon PA CG 8way Limiter	J.24	<b>8580000000</b>		
8564200000	FBCon PA CG 4way Ex	J.30	8714240000	FBCon SS DP PCG Term 24V	J.9	8581160000	WAS5 CCC 2OLP	C.30
8564240000	FBCon PA CG 8way Ex	J.31	8714250000	FBCon SS DP M12 Term 24V	J.9	8581170000	WAZ5 CCC 2OLP	C.30
8564250000	FBCon PA CG/M12 8way Ex	J.31						
8564290000	FBCon DP CG Term 24V	J.9						
8564300000	FBCon PA CG 8way	J.15						
8564310000	FBCon PA CG/M12 8way	J.15						
8564320000	FBCon DP M12 Term 5V	J.9						
8564330000	FBCon DP M12 Term 24V	J.9						
8564340000	FBCon DP CG 1way	J.8						
8564350000	FBCon DP M12 1way	J.8						

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