

Analogue signal conditioning

Analogue signal conditioning

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Analogue signal conditioning – overview

DK-SERIES



- 6 mm wide
- optionally 4 or 5 screw connections
- conductor cross-section acceptance 0.5...4 mm²

MICROSERIES



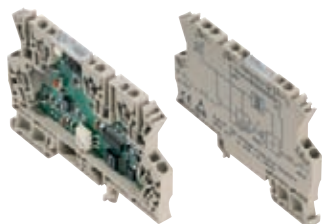
- 6.1 mm wide
- optionally up to 6 screw or tension clamp connection
- plug-in cross-connection for bridging power supply

RS-SERIES



- open type
- high connection density
- conductor cross-section acceptance 0.5...2.5 mm²

MCZ-SERIES



- 6 mm wide
- tension spring connection reduces assembly costs
- integrated plug-in cross-connection minimizes wiring workload
- conductor cross-section acceptance 0.5...1.5 mm²

WAVESERIES



- electronic modules optionally in 3 different sizes
- 12.5, 17.7 and 22.5 mm wide
- PCB plugs in without tools
- power supply can be bridged from one module to another via plug-in cross-connections
- hinged transparent cover
- optionally pluggable screw or tension spring system
- conductor cross-section acceptance 0.5...2.5 mm²

CMA-SERIES



- lead-through housing for conductor cross-sections up to 35 mm²
- side-by-side mounting
- mounts on TS35 rail

JACKPAC®



- IP68 class of protection
- M12 connection technology
- DC/DC 3-way technology
- 2-way passive disconnecter
- special functions

further information in catalogue section A

Analogue signal conditioning

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.

D

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.

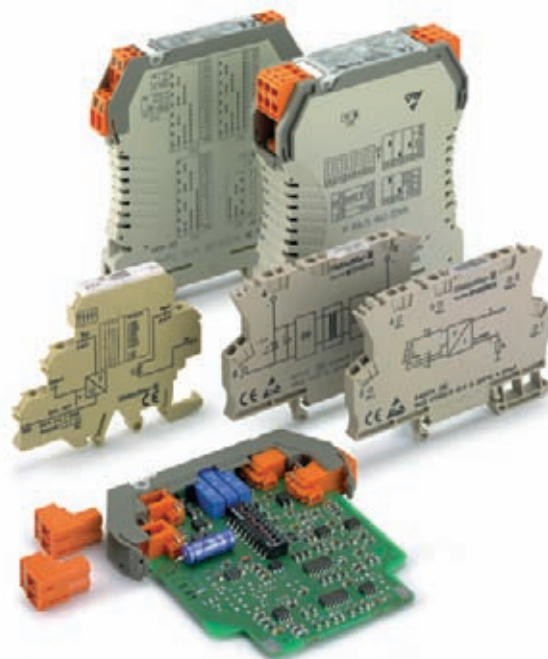
The wide range of Weidmüller products completely covers the functions involved in signal conversion, signal separation and signal monitoring. The products can thus handle nearly all applications in industrial measuring technology, and safeguard elementary functions between field signals and further processing 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.

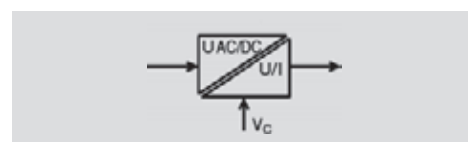
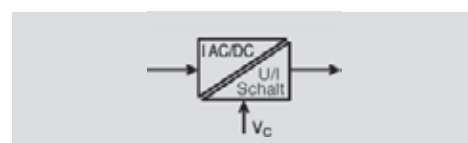
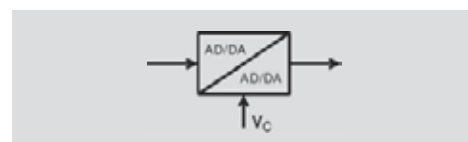
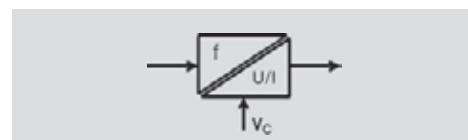
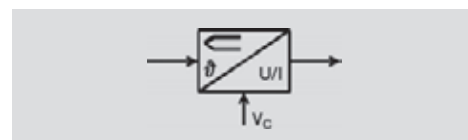
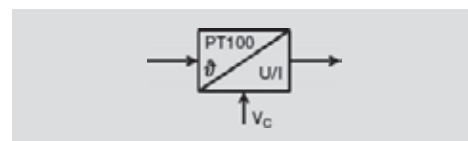
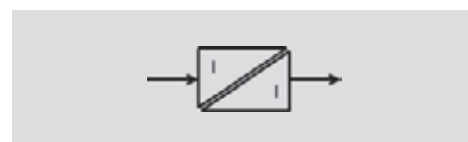
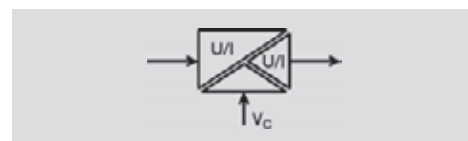
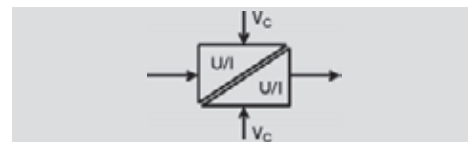
The modules for connecting conventional thermoelements are fitted with cold trap compensation as standard. Furthermore, they amplify and linearise the voltage signal provided by the thermocouple. This guarantees accurate analogue signal conditioning while eliminating sources of interference or error.

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 or 12-bit processors are available on the digital side.

Current monitoring modules permit the control of currents up to 60 A AC or DC. Currents above or below the set value cause a switched output to be triggered. Components with analogue outputs monitor the current load continuously via downstream controls.

Voltage monitoring modules can be used to monitor AC and DC voltages. Voltage fluctuations due to switching processes or mains overloads can be reliably detected and signalled by means of the user-defined switching threshold.



D

Advantages of the MICROSERIES and MCZ-SERIES

Width

Just 6 mm wide (without cover plate), the MCZ-SERIES offers enough space for electronic circuits.

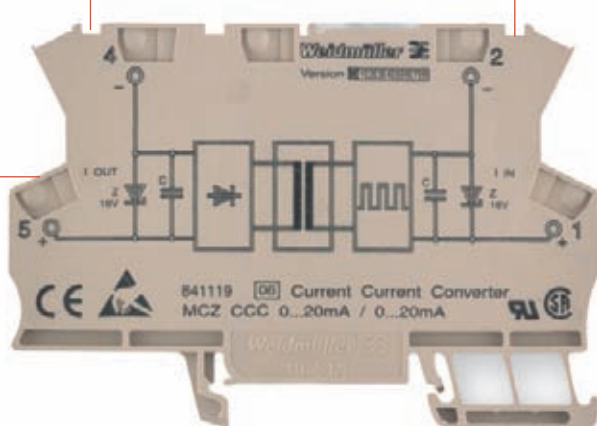
Connecting

Tension clamp connection



Cross-connection

The power supply and another potential can be cross-connected

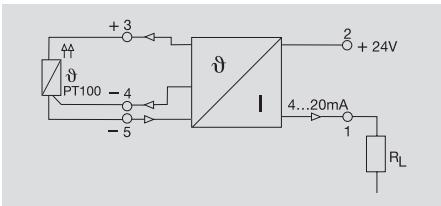
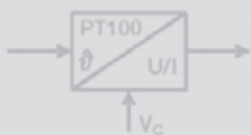
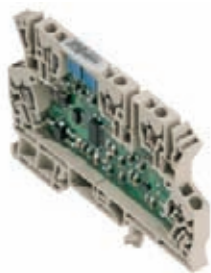


MCZ-SERIES - PT100/RTD signal isolator

PT100, 2-/3-conductor converter

- For 2- or 3-conductor PT100 sensors
- Loop-fed output current
- High accuracy and linearity

MCZ PT100/3 CLP



Technical data

Input	
Sensor	
Supply current/Supply voltage	
Output	
Output current	
Load impedance, voltage/Current	
Accuracy/Influence of cable resistance	
Response time	
General data	
Operating temperature/Storage temperature	
Approvals	
Standards	
EMC standards	
Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

PT100/2-/3-conductor (to IEC 751)
0.8 mA /9 - 30 V DC
4...20 mA (current loop)
/≤ 600 Ω
typical 0.2%, max. 0.5% of FSR /max. 0.006 K/Ω
10 ms
0 °C...+50 °C / -20 °C...+85 °C
CSA;UL/UR;CE;
EN 50178, EN 60751, IEC751
EMVG, EN 61000-6
Tension clamp connection
1.5 / 0.5 / 1.5
91 x 6 x 63.2
Tu=23°C, single module

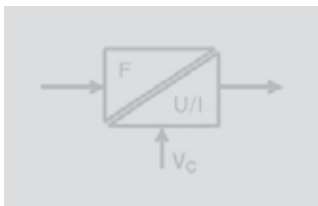
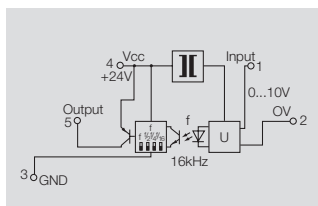
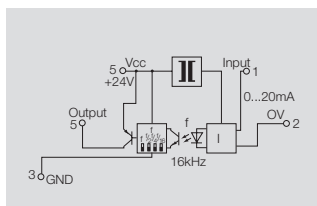
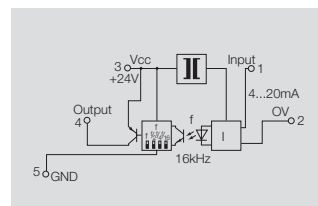
Ordering data

Temperature input range	Type of connection
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
Note	

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
Cross-connectors for power supply and markers - see MCZ-SERIES accessories		

DC/f converter

The conversion of analogue signals to frequencies means it is possible to import analogue signals from the field via the counter inputs of the controller.

**MCZ VFC****MCZ CFC****MCZ CFC****Technical data****Input**

Input voltage/Input current
max. voltage/max. current
Input resistance, voltage/Current
Voltage drop

Output

Output frequency
Output level
Output current
Accuracy
Temperature coefficient
Status indicator

General data

Supply voltage
Current consumption
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity
Clearance & creepage distance

0...10 V /
30 V /
100 kΩ /

0...1/ 4/ 8/ 16 kHz
PNP, Ub-0.7 V
max. 20 mA
0.2% of FSR
≤ 250 ppm/K
LED, pulsing

24 V DC ± 10 %
14 mA without load
≤ 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
≥ 1,5 mm

/0...20 mA
/50 mA
/50 Ω
1 V at 20 mA

0...1/ 4/ 8/ 16 kHz
PNP, Ub-0.7 V
max. 20 mA
0.2% of FSR
≤ 250 ppm/K
LED, pulsing

24 V DC ± 10 %
14 mA without load
≤ 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
≥ 1,5 mm

/4...20 mA (current loop)
/50 mA
/50 Ω
5.8...6.4 V at 20 mA

0...1/ 4/ 8/ 16 kHz
PNP, Ub-0.7 V
max. 20 mA
0.15 % of FSR
≤ 250 ppm/K
LED, pulsing

24 V DC ± 20 %
14 mA without load
≤ 20 A
0 °C...+50 °C
-20 °C...+85 °C
CE;

EN 50178
EN 55011, EN 61000-6
150 V
2.5 kV
1 kV DC
III
2
≥ 2 mm

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note**Tension clamp connection**

1.5 / 0.5 / 1.5
91 x 6 x 63.2

Tension clamp connection

1.5 / 0.5 / 1.5
91 x 6 x 63.2

Tension clamp connection

1.5 / 0.5 / 1.5
91 x 6 x 63.2

without DC/DC converter input
current loop-fed

Ordering data**Type of connection**

Tension clamp connection

Type (Qty.=1) Order No.
MCZ VFC 0-10V 8461470000

Type (Qty.=1) Order No.
MCZ CFC 0-20mA 8461480000

Type (Qty.=1) Order No.
MCZ CFC 4-20mA 8461490000

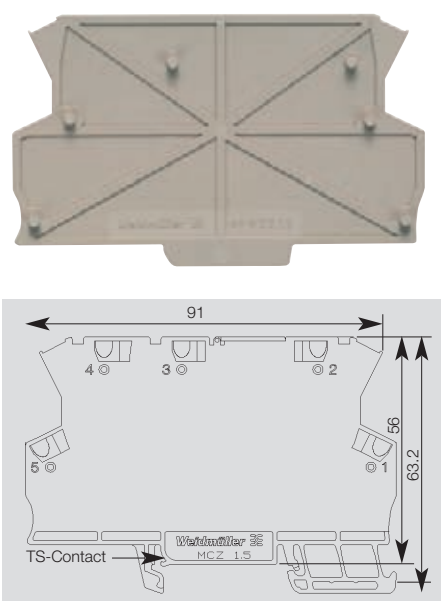
Note**Accessories****Note**

Cross-connectors for power supply and
markers - see MCZ-SERIES accessories

Cross-connectors for power supply and
markers - see MCZ-SERIES accessories

Cross-connectors for power supply and
markers - see MCZ-SERIES accessories

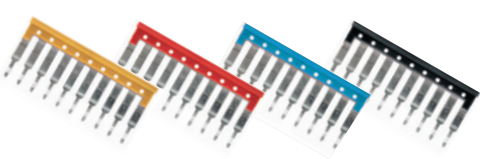
MCZ accessories



Ordering data

End plate

Type	Qty	Order No.
AP MCZ 1.5	50	8389030000



Ordering data

	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	10
Plug-in cross-connection, yellow	20
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	20
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	20
Plug-in cross-connection, black	2
Plug-in cross-connection, black	3
Plug-in cross-connection, black	4
Plug-in cross-connection, black	10
Plug-in cross-connection, black	20

Type	Qty	Order No.
ZQV 4N / 2 GE	60	1758250000
ZQV 4N / 3 GE	60	1762630000
ZQV 4N / 4 GE	60	1762620000
ZQV 4N / 10 GE	20	1758260000
ZQV 4N / 20 GE	20	1909020000
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 / 20 RT	20	1909150000
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 / 20 BL	20	1909100000
ZQV 4N / 2 SW	60	1793970000
ZQV 4N / 3 SW	60	1794000000
ZQV 4N / 4 SW	60	1794030000
ZQV 4N / 10 SW	20	1794060000
ZQV 4N / 20 SW	20	1909120000

Ordering data

Marker

Type	Qty	Order No.
WS10/6	200	1060960000

Introduction

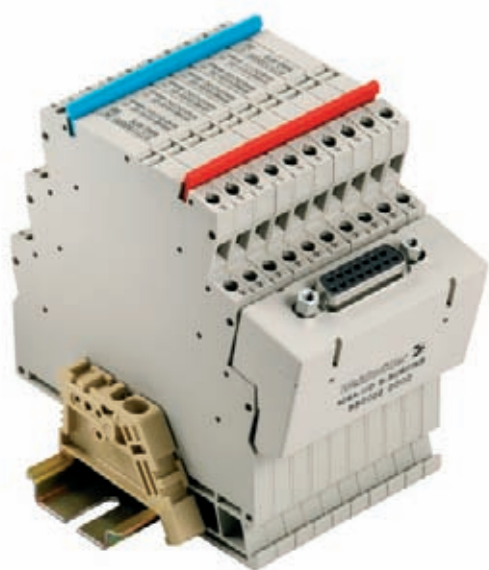
MICROINTERFACE Analogue sets standards in analogue signal processing. It offers wide-ranging functionality within a width of just 6 mm.

The new adapter module MICROINTERFACE Analogue simplifies the wiring of your installation. The time-consuming individual wiring so vulnerable to mistakes 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 via the 15-pole SUB-D plug-in connector with pre-assembled cables.

The features of MICROINTERFACE Analogue

- Electrical separation and signal conversion of analogue signals
- Upgrading of SPS I/O cards and fieldbus modules without electrical separation
- Block setup for 8 or 2 x 4 signals in a width of just 60 mm
- Adapter for all MICROINTERFACE Analogue modules, with mixed assemblies also possible
- Optional power supply via signal line, cross-connectable



Interface module

2 Microanalogue power supply modules are required to provide the power supplies. The voltage applied may not exceed 50 V_{eff}.

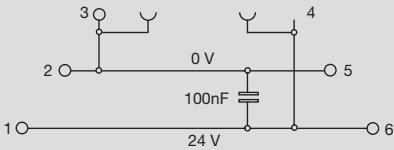
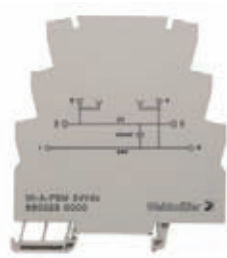
MI 8 A-I/O S-SUBD15B

Interface module analogue



MI-A-PSM24 V DC

Power supply module



D

Technical data

General data

Supply voltage
Current-carrying capacity

Operating temperature
Storage temperature

Insulation coordination

Rated voltage
Pollution severity
Surge category
Clearance & creepage distance

max. 30 V AC/DC
Signal paths SUB D Pin 1...8: max. 250 mA;Power supply
SUB D Pin 9 & 14: 300 mA; 10 & 15: 1.3 A
0 °C...+50 °C
-20 °C...+85 °C

50 V
2
III
0.9 mm

max. 30 V AC/DC

0 °C...+50 °C
-20 °C...+85 °C

50 V
2
II

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

SUB D socket, 15-pole

32 x 61 x 42

Screw connection

2.5 / 0.5 / 2.5
88 x 6.1 x 97.8

Ordering data

Type of connection

SUB D socket, 15-pole

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

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

Note

Accessories

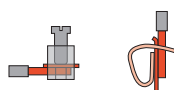
Note

Advantages of the MICROSERIES

D

Connecting

BLZ screw connection or BLZF tension clamp offers the the greatest possible flexibility at the wiring stage (up to 2.5 mm²).

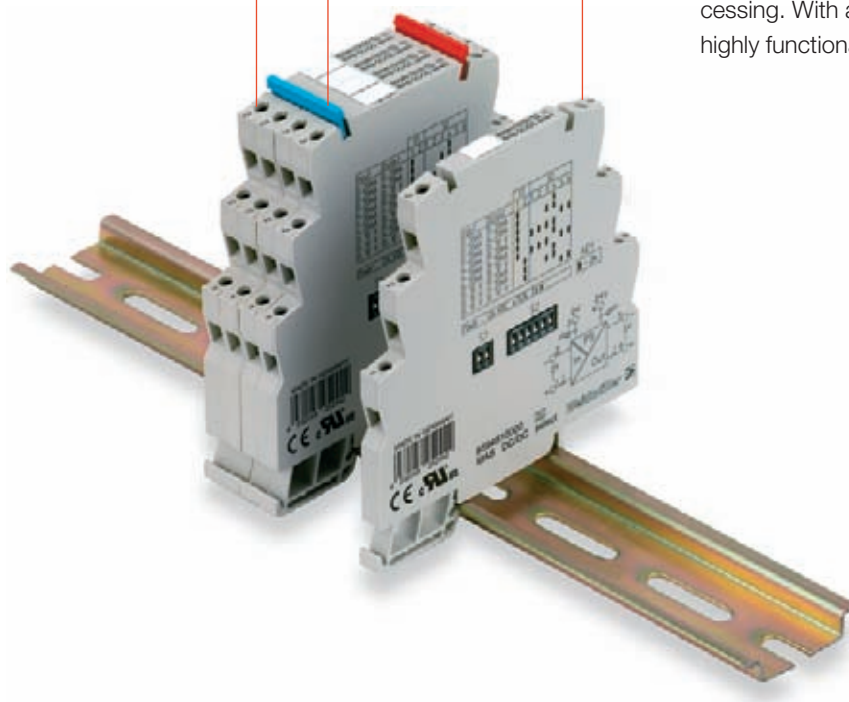


Cross-connection

The supply voltage can be bridged from one module to the next.

Width

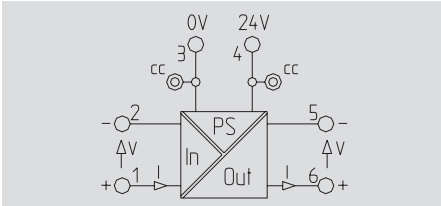
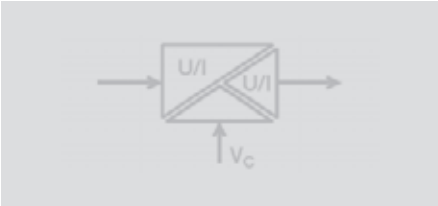
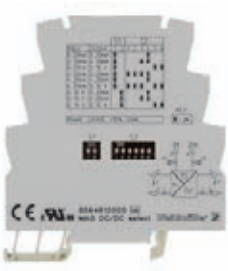
MICROANALOGUE sets standards for analogue signal processing. With a width of just 6 mm, MICROSERIES is highly functional with a completely enclosed housing.



configurable

- 3-way isolation
- Calibrated changeover via DIP switch
- Cross-connection of power supply
- Low power loss

DC/DC select



Technical data

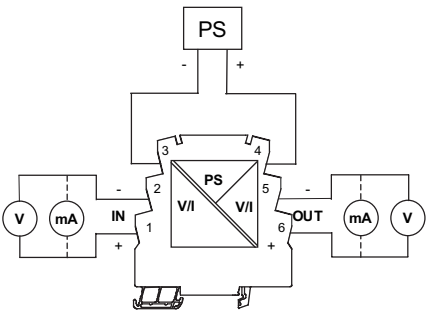
Input	
Input voltage/Input current	0...10 V / 0(4)...20 mA
Input resistance, voltage/Current	100 kΩ / ≤ 5 Ω
Voltage drop	< 0.1 V at I _{IN} = 20 mA (current input)
Output	
Output voltage/Output current	0...10 V / 0(4)...20 mA
Load impedance, voltage/Current	≥ 10 kΩ / ≤ 500 Ω
Accuracy	< 0.5% of final value
Temperature coefficient	≤ 150 ppm/K of final value
Cut-off frequency (-3dB)	> 100 Hz
General data	
Supply voltage	24 V DC ± 15 %
Power consumption	approx. 0.6 W
Current-carrying capacity of cross-connect.	≤ 20 A
Operating temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Default setting	0...20mA / 0...20mA
Approvals	CE / cURus
Insulation coordination	
Standards	EN 50178
EMC standards	DIN EN 61326
Rated voltage	50 V
Isolation voltage input, output	500 V _{eff} / 1 s
Surge category	II
Pollution severity	2

0...10 V /0(4)...20 mA
100 kΩ /≤ 5 Ω
< 0.1 V at I _{IN} =20 mA (current input)
0...10 V /0(4)...20 mA
≥ 10 kΩ /≤ 500 Ω
< 0.5% of final value
≤ 150 ppm/K of final value
> 100 Hz
24 V DC ± 15 %
approx. 0.6 W
≤ 20 A
0 °C...+55 °C
-20 °C...+85 °C
0...20mA / 0...20mA
CE / cURus
EN 50178
DIN EN 61326
50 V
500 V _{eff} / 1 s
II
2

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 ... 10 V	0 ... 20 mA	□	■	□	□	□	□	■	□
0 ... 10 V	4 ... 20 mA	□	■	□	□	■	■	□	□
0 ... 10 V	0 ... 10 V	□	■	□	□	□	□	■	■

■ = on
□ = off

Connection



Dimensions	
Clamping range (rating- / min. / max.)	mm²
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 x 6.1 x 97.8		92 x 6.1 x 97.8	
Note			
T _u =23°C, single module			

Ordering data

Type of connection	
Screw connection	
Tension clamp connection	

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

Note

Accessories

Note

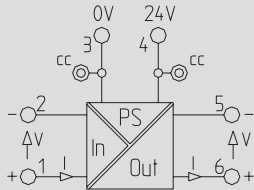
Cross-connectors for power supplies and markers - see MICROSERIES accessories

MICROSERIES - DC/DC 3-way isolator

configurable

- 3-way isolation 2.5kV
- Calibrated changeover via DIP switch
- Cross-connection of power supply
- Low power loss

DC/DC select HI



Technical data

Input	
Input voltage/Input current	
Input resistance, voltage/Current	
Voltage drop	
Output	
Output voltage/Output current	
Load impedance, voltage/Current	
Accuracy	
Temperature coefficient	
Cut-off frequency (-3dB)	
General data	
Supply voltage	
Power consumption	
Current-carrying capacity of cross-connect.	
Operating temperature	
Storage temperature	
Default setting	
Approvals	
Insulation coordination	
Standards	
EMC standards	
Rated voltage	
Isolation voltage input, output	
Surge category	
Pollution severity	

0...10 V / 0(4)...20 mA
100 kΩ / ≤ 5 Ω
< 0.1 V at I _{IN} = 20 mA (current input)
0...10 V / 0(4)...20 mA
≥ 10 kΩ / ≤ 600 Ω
< 0.2 % for current < 0.3 % for voltage of measured value
≤ 150 ppm/K of final value
> 100 Hz
24 V DC ± 15 %
approx. 0.6 W
≤ 20 A
0 °C...+55 °C
-20 °C...+85 °C
0...20mA / 0...20mA
CE / cURus
EN 50178
DIN EN 61326
300 V
2.5 kV _{eff}
II
2

Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

Screw connection	
2.5 / 0.5 / 2.5	
88 x 6.1 x 97.8	
T _u =23°C, single module	

Ordering data

Type of connection	
Screw connection	
Note	

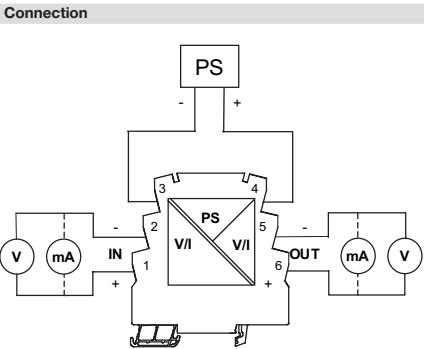
Type	Qty.	Order No.
MAS DC/DC select HI	1	8757530000

Accessories

Note	Cross-connectors for power supplies and markers - see MICROSERIES accessories
-------------	---

		Setting options/switch position					
		Switch					
Input	Output	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 ... 10 V	0 ... 20 mA	□	■	□	□	■	□ □
0 ... 10 V	4 ... 20 mA	□	■	□	□	■	□ □
0 ... 10 V	0 ... 10 V	□	■	□	□	□	■ ■

■ = on
□ = off

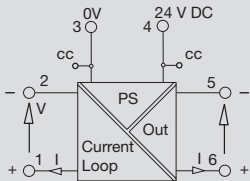


MICROSERIES - Feed isolator

with HART

- 2-conductor system
- 3-way isolation
- With Hart transmission
- Output signal switchable

MAS RPSH



Technical data

Input

Input current 4...20 mA (sensor circuit)
Sensor 2-conductor
Supply voltage 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 resp. 11...12.5 V
Load impedance, voltage/Current $\geq 10\text{ k}\Omega / \leq 500\ \Omega$
Accuracy $I_{out}: < 0.1\% / U_{out}: < 0.2\%$
Step response time $\leq 2\text{ ms}$
Offset current $< 30\ \mu\text{A}$
Temperature coefficient $\leq 50\text{ ppm/K}$
Residual ripple $< 10\text{ mV}_{eff}$

General data

Supply voltage 24 V DC $\pm 15\%$
Power consumption approx. 1 W
Communication to HART specification
Current-carrying capacity of cross-connect. $\leq 20\text{ A}$
Operating temperature 0 °C...+55 °C
Storage temperature -25 °C...+85 °C
Approvals CE; cURus;

Insulation coordination

Standards EN 50178 (protective separation)
EMC standards DIN EN 61326 class B
Rated voltage 600 V
Isolation voltage input, output 2.5 kV_{eff}
Surge category II
Pollution severity 2

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

Screw connection

1.5 / 0.5 / 2.5
88 x 6.1 x 97.8

Ordering data

Type of connection

Screw connection

Note

Type

MAS RPSH

Qty.

1

Order No.

8721170000

Accessories

Note

Cross-connectors for power supplies and markers - see MICROSERIES accessories

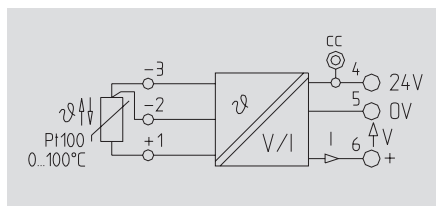
Setting options/switch position

Output	Switch			
	1	2	3	4
4 ... 20 mA	☐	☐	☒	☐
0 ... 20 mA	☒	☐	☒	☐
0 ... 10 V	☒	☒	☐	☒

■ = on
□ = off

PT100, 2-/3-conductor converter

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

PT100 Output select**Technical data**

Input	
Sensor	PT100/2-/3-conductor (to IEC 751)
Supply current	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	$\geq 10 \text{ k}\Omega$ / $\leq 300 \Omega$, $\leq 400 \Omega$ @ 24 V
Accuracy	$< 0.5\%$ of measuring range
Temperature coefficient	$\leq 250 \text{ ppm/K}$ of final value
Step response time	$< 0.7 \text{ s}$
General data	
Supply voltage	24 V DC $\pm 10\%$
Power consumption	approx. 0.6 W
Current-carrying capacity of cross-connect.	$\leq 20 \text{ A}$
Operating temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Default setting	0...20mA
Approvals	CE / cURus
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
Isolation voltage input, output	500 V _{eff} / 1 s
Surge category	III
Pollution severity	2
Clearance & creepage distance	$\geq 1.5 \text{ mm}$

Dimensions	
Clamping range (rating- / min. / max.)	mm ²
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 x 6.1 x 97.8	92 x 6.1 x 97.8
Note	
T _u =23°C, single module	

Ordering data

Type of connection	
Screw connection	
Tension clamp connection	
Note	

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

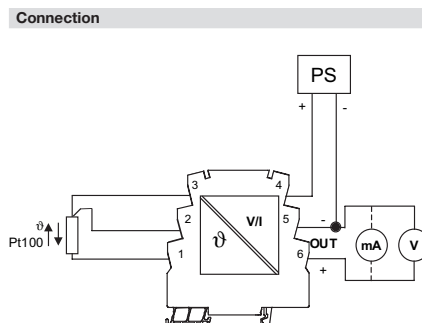
Accessories

Note

Cross-connectors for power supplies and markers - see MICROSERIES accessories

Setting options/switch position				
Output	Switch			
	1	2	3	4
0 ... 10 V	■	■	■	□
0 ... 20 mA	□	□	□	□
4 ... 20 mA	□	□	□	■
0 ... 5 V	■	■	■	■

■ = on
□ = off

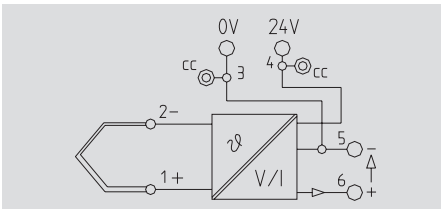
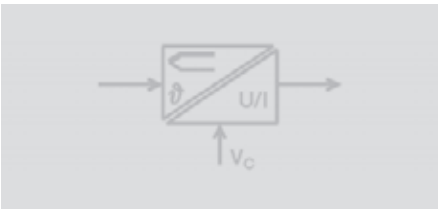


MICROSERIES - Thermo element signal isolator/converter

Thermal isolator/converter type K

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

Thermo K Output Select



Technical data

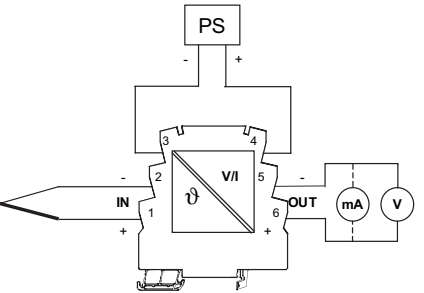
Input	
Sensor	Thermo element to IEC 584, type: K
Temperature input range	0...1000 °C
Output	
Output voltage/Output current	0...10V / 0...5V / 0(4)...20 mA
Load impedance, voltage/Current	$\geq 10\text{ k}\Omega$ / $\leq 300\text{ }\Omega$, $\leq 400\text{ }\Omega$ @ 24 V
Accuracy	< 0.6% of measuring range
Temperature coefficient	$\leq 250\text{ ppm/K}$ of final value
Step response time	< 0.7 s
Wire break detection	output value: > 20 mA, > 10 V
Residual ripple	< 20 mV _{eff}
General data	
Supply voltage	24 V DC $\pm$ 10 %
Power consumption	approx. 0.6 W
Current-carrying capacity of cross-connect.	$\leq 20\text{ A}$
Operating temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Default setting	0...20mA
Approvals	CE / cURus
Insulation coordination	
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
Isolation voltage input, output	500 V _{eff} / 1 s
Surge category	III
Pollution severity	2
Clearance & creepage distance	$\geq 1,5\text{ mm}$
Dimensions	
Clamping range (rating- / min. / max.)	mm ²
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 x 6.1 x 97.8		92 x 6.1 x 97.8			
Note					
T _u =23°C, single module					

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



Ordering data

Type of connection	
Screw connection	
Tension clamp connection	
Note	

Type	Qty.	Order No.
MAS Thermo-K 0...1000°C Output select1		8594830000
MAZ Thermo-K 0...1000°C Output select1		8594860000
Note		

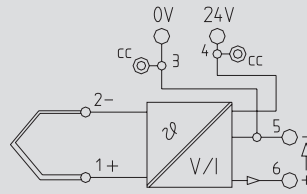
Accessories

Note

Cross-connectors for power supplies and markers - see MICROSERIES accessories

Thermal isolator/converter type J

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

Thermo J Output Select**Technical data****Input**

Sensor
Temperature input range

Output

Output voltage/Output current
Load impedance, voltage/Current
Accuracy
Temperature coefficient
Step response time
Wire break detection
Residual ripple

General data

Supply voltage
Power consumption
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Default setting
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity
Clearance & creepage distance

Thermo element to IEC 584, type: J
0...700 °C

0...10V / 0...5V / 0(4)...20 mA
 $\geq 10 \text{ k}\Omega / \leq 300 \Omega, \leq 400 \Omega @ 24 \text{ V}$
< 0.7% of measuring range
 $\leq 250 \text{ ppm/K}$ of final value
< 0.7 s
output value: > 20 mA, > 10 V
< 20 mV_{eff}

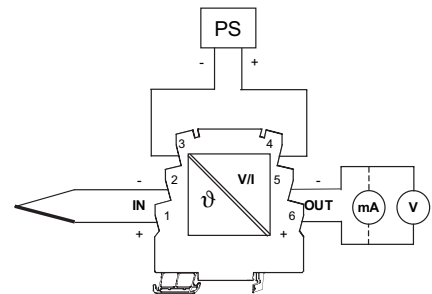
24 V DC $\pm 10\%$
approx. 0.6 W
 $\leq 20 \text{ A}$
0 °C...+55 °C
-20 °C...+85 °C
0...20mA
CE / cURus

EN 50178, EN 60584, IEC 584
EN 55011, EN 61000-6 /-2, EN 61326
100 V
1.5 kV
500 V_{eff} / 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**Dimensions**

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note**Screw connection**

2.5 / 0.5 / 2.5
88 x 6.1 x 97.8

Tension clamp connection

1.5 / 0.5 / 2.5
92 x 6.1 x 97.8

T_u=23°C, single module

Ordering data**Type of connection**

Screw connection
Tension clamp connection

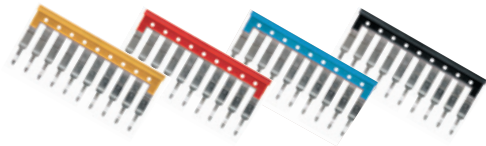
Type	Qty.	Order No.
MAS Thermo-J 0...700°C Output select	1	8615210000
MAZ Thermo-J 0...700°C Output select	1	8615240000

Note**Accessories****Note**

Cross-connectors for power supplies and markers - see MICROSERIES accessories

MICROSERIES – Accessories

Accessories



Plug-in cross-connection

Type yellow	No. of poles	Qty	Order No.
ZQV 4N / 2 GE	2	60	1758250000
ZQV 4N / 3 GE	3	60	1762630000
ZQV 4N / 4 GE	4	60	1762620000
ZQV 4N / 10 GE	10	20	1758260000
ZQV 4N / 20 GE	20	20	1909020000
red			
ZQV 4N / 2 RT	2	60	1793950000
ZQV 4N / 3 RT	3	60	1793980000
ZQV 4N / 4 RT	4	60	1794010000
ZQV 4N / 10 RT	10	20	1794040000
ZQV 4N / 20 RT	20	20	1909150000
blue			
ZQV 4N / 2 BL	2	60	1793960000
ZQV 4N / 3 BL	3	60	1793990000
ZQV 4N / 4 BL	4	60	1794020000
ZQV 4N / 10 BL	10	20	1794050000
ZQV 4N / 20 BL	20	20	1909100000
black			
ZQV 4N / 2 SW	2	60	1793970000
ZQV 4N / 3 SW	3	60	1794000000
ZQV 4N / 4 SW	4	60	1794030000
ZQV 4N / 10 SW	10	20	1794060000
ZQV 4N / 20 SW	20	20	1909120000

Other accessories

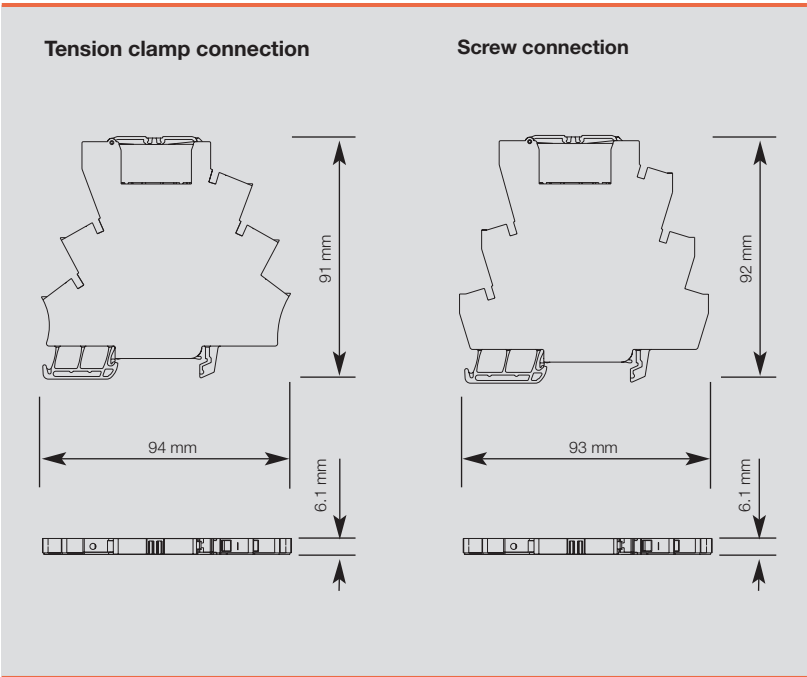
Type	Qty	Order No.
Base only		
MRZ 24VDC 1CO BASIS	10	8826000000
MRS 24VDC 1CO BASIS	10	8826010000
MRZ 120VUC 1CO BASIS	10	8826020000
MRS 120VUC 1CO BASIS	10	8826030000
MRZ 230VAC 1CO BASIS	10	8826040000
MRS 230VAC 1CO BASIS	10	8826050000
Markers		
WS 12/6	12 x 6 mm	200
Labels, Lasermark		
LM MT 300 15/6 ge	484 labels/sheet	10
Screwdriver		
SD 0.6 x 3.5 x 100		10

General data – MICROSERIES

Technical data

Conductor		Tension clamp connection	Screw connection
Solid H07V-U	mm²	0.5 ... 2.5	0.5 ... 4.0
Stranded H07V-K	mm²	0.5 ... 2.5	0.5 ... 2.5
"f" with wire end ferrules to DIN 46228-1	mm²	0.5 ... 1.5	0.5 ... 1.5
"f" with wire end ferrules with plastic collar	mm²	0.5 ... 1.5	0.5 ... 1.5
Max. clamping range	mm²	0.13 ... 2.5	0.13 ... 4.0
Plug gauge to IEC 60 947-1	size	A 2	A 3
General technical data			
Nominal torque		-	0.6
Continuous current for 2-pole cross-connection	A	10	10
Continuous current for multi-pole cross-connection	A	10	10
Stripping length	mm	10	7
Ingress protection class		IP 20	IP 20
Housing material		Wemid	Wemid
UL 94 flammability rating		V-0	V-0
Nominal current	A	6	6
Nominal voltage	V	250	250

Dimensions



WAVESERIES

Advantages WAVESERIES

The modules in the WAVE SERIES are ideal when users need analogue separating transducers. Weidmüller's WAVE SERIES combines the compact, space-saving design of the WAVEBOX housing with many different functions. The product range offers a wide range of signal transducers.

Features

- Independent connection system – screw or tension clamp with plug-in socket connector
- Assembly without tools
- Fast commissioning – plug-in spare boards
- Standardised current and voltage signals
- Cross-connectors for low wiring workload
- Highly functional
- Clear type designations for simple selection
- Ideal size – for more space in the control cabinet
- A cost effective solution

Replacement

The PCB can be removed from the enclosure without any tools. Simply press in the locking hook at the top and pull out the upper part with connection plane and PCB.

Cross-connection

Cross-connectors are used to connect units in the same series to bridge and transmit the power supply from one module to the next.

Safety

“Protective separation” has to be guaranteed as per EN 50178. WAVE SERIES complies with this requirement to the full with analogue signal transmission with potential separation.

Coding

The coding elements can be used to code the module for screw and also tension clamp connections without loss of poles. In this way, it is not possible to confuse the plugs.

Connecting

BLZ (screw) or BLZF (tension clamp) connectors offer the greatest possible flexibility at the wiring stage (up to 2.5 mm²).

Housing (WAVEBOX)

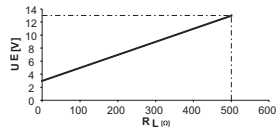
The WAVEBOX is an ideal combination of technology, design and functionality. The enclosure is made of recyclable plastic and comes in three different widths. It needs practically no tools for assembly and fulfils the EMC requirements. Ventilation slots allow good heat dissipation.



WAVESERIES - DC/DC passive isolator

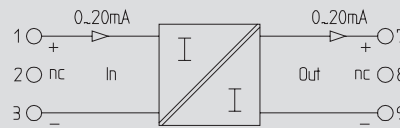
Input current loop feed

- Reliable isolation
- Very low power consumption



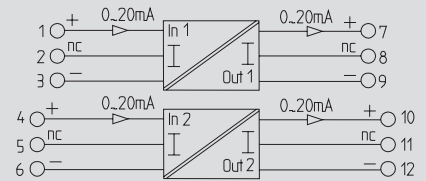
CCC LP

(1-channel)



CCC LP

(2-channel)



Technical data

Input	
Input voltage/Input current	
max. voltage/max. current	
Pick-up current	
Voltage drop	
Output	
Output voltage/Output current	
Load impedance, voltage/Current	
Accuracy	
Temperature coefficient	
Influence of load impedance	
Residual ripple	
Chopper frequency	
General data	
Operating temperature	
Storage temperature	
Approvals	
Insulation coordination	
Standards	
EMC standards	
Rated voltage	
Impulse withstand voltage	
Isolation voltage input, output	
Surge category	
Pollution severity	
Clearance & creepage distance	

/0(4)...20 mA current loop
18 V / 50 mA
< 100 μ A
approx. 3V at $R_L = 0 \Omega$ approx. 13V at $R_L = 500 \Omega (I_{IN} = 20mA)$
/0(4)...20 mA
$\leq 500 \Omega$
< 0.1% of final value
≤ 50 ppm/K of final value
< 0.1% of measurement value/100 Ω load resistance
< 20 mV _{eff}
approx. 170 kHz
-25 °C...+70 °C
-40 °C...+80 °C
CSA / GL / cULus / CE
EN 50178 (protective separation)
EN 55011, EN 61000-6
300 V
6 kV
4 kV _{eff} / 1 s
III
2
$\geq 5,5$ mm

/0(4)...20 mA current loop
18 V / 50 mA
< 100 μ A
approx. 3V at $R_L = 0 \Omega$ approx. 13V at $R_L = 500 \Omega (I_{IN} = 20mA)$
/0(4)...20 mA
$\leq 500 \Omega$
< 0.1% of final value
≤ 50 ppm/K of final value
< 0.1% of measurement value/100 Ω load resistance
< 20 mV _{eff}
approx. 170 kHz
-25 °C...+70 °C
-40 °C...+80 °C
CSA / GL / cULus / CE
EN 50178 (protective separation)
EN 55011, EN 61000-6
300 V
6 kV
4 kV _{eff} / 1 s
III
2
$\geq 5,5$ mm

Dimensions	
Clamping range (rating- / min. / max.)	mm ²
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 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Tu=23°C, single module	

Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Tu=23°C, single module	

Ordering data

Type of connection
Screw connection
Tension clamp connection
Note

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

Accessories

Note

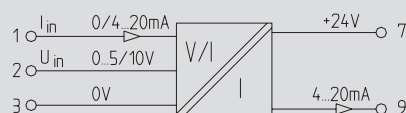
Markers see Accessories WAVESERIES

Markers see Accessories WAVESERIES

Output current loop feed

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

OLP



Technical data

Input

Input voltage
max. voltage
Input resistance, voltage/Current
Input current
max. current

0... (5)10 V
30 V DC
0...5V: 210 k Ω ; 0...10V: 430 k Ω / 51 Ω
0(4)...20 mA
40 mA

Output

Output current
Output signal limit
Load impedance, voltage/Current
Accuracy
Temperature coefficient
Residual ripple
Step response time
Cut-off frequency (-3dB)

4...20 mA (current loop)
approx. 24 mA
 $R_L = (U_B - 12 V) / 20 \text{ mA}$ e.g. 600 Ω at 24 V
0.2% of measuring range final value
 $\leq 150 \text{ ppm/K}$
50 mV_{eff} at 500 Ω
 $< 10 \text{ Hz}$: 80 ms; 100 Hz: 50 ms
10 Hz/ 100 Hz switchable

General data

Supply voltage
Operating temperature
Storage temperature
Default setting
Approvals

min. 12 V DC/ max. 30 V DC
0°C...+55°C (fitted)
-20 °C...+85 °C
0...20mA, 10 Hz
CE / cULus

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity
Clearance & creepage distance

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
4 kV_{eff} / 5 s
III
2
 $\geq 5,5 \text{ mm}$

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Screw connection

2.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4

Tension clamp connection

1.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4

Note

Tu=23°C, single module

Ordering data

Type of connection

Screw connection
Tension clamp connection

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

Note

Accessories

Note

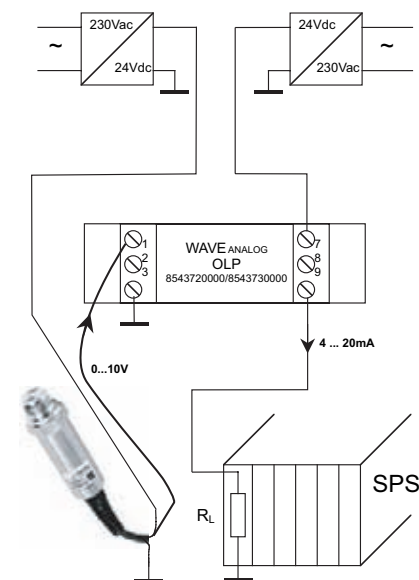
Markers see Accessories WAVESERIES

Setting options/switch position

Input	SW 1			
	1	2	3	4
0...20 mA	☐	☐	☐	☐
4...20 mA	☒	☐	☐	☐
0...5 V	☒	☒	☒	☐
0...10 V	☐	☒	☐	☐
Transmission frequency				
10 Hz	☐	☐	☐	☒
100 Hz	☐	☐	☐	☐

■ = on
□ = off

Example of application

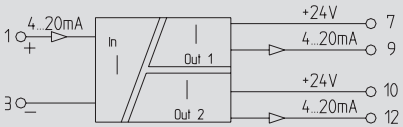


WAVESERIES - DC/DC passive isolator

Signal distributor

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

20LP



Technical data

Input	
Input current	4...20 mA (current loop)
max. current	40 mA
Voltage drop	3.8 V
Output	
Output current	2 x 4...20 mA (current loop)
Output signal limit	approx. 31 mA
Load impedance, voltage/Current	$R_L = (U_B - 12 \text{ V}) / 20 \text{ mA}$ e.g. 600 Ω at 24 V
Accuracy	typical 0.1%, max. 0.2%
Temperature coefficient	$\leq 150 \text{ ppm/K}$
Step response time	$< 20 \text{ ms}$
Cut-off frequency (-3dB)	30 Hz
General data	
Supply voltage	min. 12 V DC/ max. 30 V DC
Operating temperature	0°C...+55°C (fitted)
Storage temperature	-20 °C...+85 °C
Approvals	CE / cULus
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	4 kV _{eff} / 5 s
Surge category	III
Pollution severity	2
Clearance & creepage distance	$\geq 5,5 \text{ mm}$
Dimensions	
Clamping range (rating- / min. / max.)	mm ²
Length x width x height	mm
Note	

4...20 mA (current loop)
40 mA
3.8 V
2 x 4...20 mA (current loop)
approx. 31 mA
$R_L = (U_B - 12 \text{ V}) / 20 \text{ mA}$ e.g. 600 Ω at 24 V
typical 0.1%, max. 0.2%
$\leq 150 \text{ ppm/K}$
$< 20 \text{ ms}$
30 Hz
min. 12 V DC/ max. 30 V DC
0°C...+55°C (fitted)
-20 °C...+85 °C
CE / cULus
EN 50178
EN 55011, EN 61000-6
300 V
4 kV
4 kV _{eff} / 5 s
III
2
$\geq 5,5 \text{ mm}$

Dimensions	Screw connection	Tension clamp connection
Clamping range (rating- / min. / max.)	2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
Length x width x height	92.4 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Note	Tu=23°C, single module	

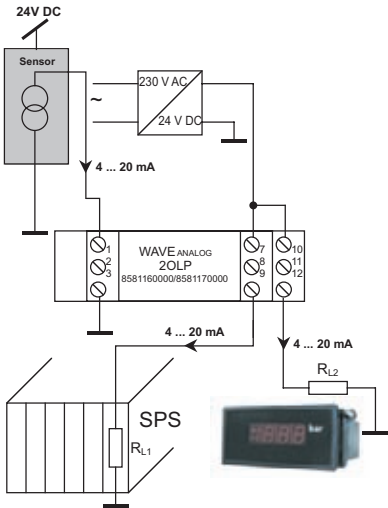
Ordering data

Type of connection	Type	Qty.	Order No.
Screw connection	WAS5 CCC 20LP	1	8581160000
Tension clamp connection	WAZ5 CCC 20LP	1	8581170000
Note			

Accessories

Note	Markers see Accessories WAVESERIES
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Example of application



on output side, power supply

- Signal conversion
- Electrical isolation between input and output signals
- Power supply can be cross-connected using ZQV cross connection system

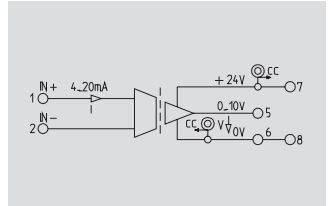
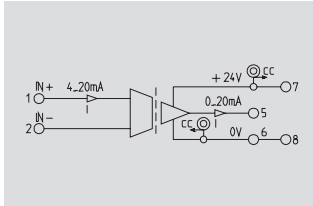
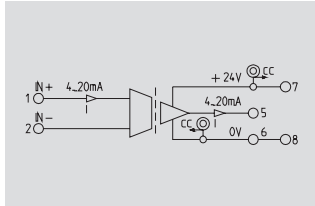
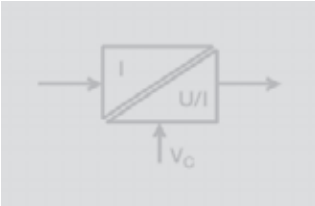
4...20 mA/4...20 mA



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



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



Technical data

Input

Input voltage/Input current
max. voltage
max. current

Output

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

General data

Supply voltage
Current consumption
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity
Clearance & creepage distance

/4...20 mA (current loop)
7 V
25 mA

/4...20 mA
≤ 500 Ω
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 30 ms (typically 20 ms)
≥ 15 Hz (typically 20 Hz)

24 V DC ± 20 %
≤ 32 mA at I_{OUT} = 20 mA
≤ 2 A
0°C...+55°C (fitted)
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
III
2
≥ 3 mm

/4...20 mA (current loop)
7 V
25 mA

/0...20 mA
≤ 500 Ω
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 30 ms (typically 20 ms)
≥ 15 Hz (typically 20 Hz)

24 V DC ± 20 %
≤ 32 mA at I_{OUT} = 20 mA
≤ 2 A
0°C...+55°C (fitted)
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
III
2
≥ 3 mm

/4...20 mA (current loop)
7 V
25 mA

0...10 V /
≥ 1 kΩ /
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 30 ms (typically 20 ms)
≥ 15 Hz (typically 20 Hz)

24 V DC ± 20 %
≤ 20 mA at I_{OUT} = 10 mA
≤ 2 A
0°C...+55°C (fitted)
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
III
2
≥ 3 mm

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

Screw connection Tension clamp c.

2.5 / 0.5 / 2.5 1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4 92.4 x 12.5 x 112.4

Tu=23°C, single module

Screw connection

2.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4

Tu=23°C, single module

Screw connection Tension clamp c.

2.5 / 0.5 / 2.5 1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4 92.4 x 12.5 x 112.4

Tu=23°C, single module

Ordering data

Type of connection

Screw connection
Tension clamp connection

Note

Type	(Qty.=1)	Order No.
WAS4 CCC DC 4-20/4-20mA		8444980000
WAZ4 CCC DC 4-20/4-20mA		8444990000

Type	(Qty.=1)	Order No.
WAS4 CCC DC 4-20/0-20mA		8445010000

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

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

WAVESERIES - DC/DC 2-way isolator

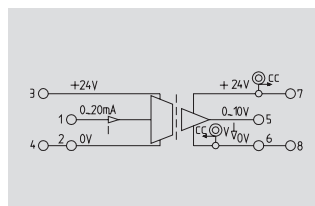
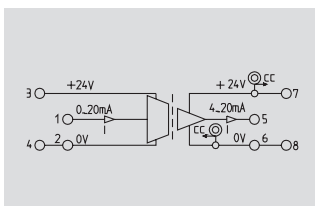
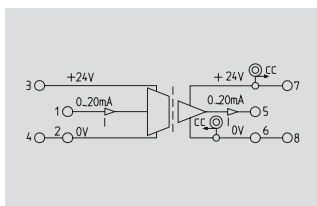
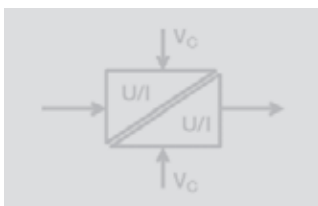
Voltage supply both sides

- Signal conversion
- Electrical isolation between input and output signals
- Power supply can be cross-connected using ZQV cross connection system

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

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

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



Technical data

Input

Input voltage/Input current
max. voltage/max. current
Input resistance, voltage/Current

Output

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

General data

Supply voltage
Current consumption, input
Current consumption, output
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity
Clearance & creepage distance

/0...20 mA
/25 mA
/50 Ω

/0...20 mA
≤ 500 Ω
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 30 ms (typically 16 ms)
≥ 15 Hz (typically 25 Hz)

24 V DC ± 20 %
≤ 11 mA at $I_{IN} = 20$ mA
≤ 32 mA at $I_{OUT} = 20$ mA
≤ 2 A
0°C...+55°C (fitted)
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
III
2
≥ 3 mm

/0...20 mA
/25 mA
/50 Ω

/4...20 mA
≤ 500 Ω
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 30 ms (typically 16 ms)
≥ 15 Hz (typically 25 Hz)

24 V DC ± 20 %
≤ 11 mA at $I_{IN} = 20$ mA
≤ 32 mA at $I_{OUT} = 20$ mA
≤ 2 A
0°C...+55°C (fitted)
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
III
2
≥ 3 mm

/0...20 mA
/25 mA
/50 Ω

0...10 V /
≥ 1 kΩ /
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 30 ms (typically 16 ms)
≥ 15 Hz (typically 25 Hz)

24 V DC ± 20 %
≤ 11 mA at $I_{IN} = 20$ mA
≤ 20 mA at $I_{OUT} = 10$ mA
≤ 2 A
0°C...+55°C (fitted)
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
III
2
≥ 3 mm

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

Screw connection

2.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4
Tu=23°C, single module

Screw connection

2.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4
Tu=23°C, single module

Screw connection Tension clamp c.

2.5 / 0.5 / 2.5 1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4 92.4 x 12.5 x 112.4
Tu=23°C, single module

Ordering data

Type of connection

Screw connection

Note

Type (Qty.=1) Order No.

WAS4 CCC DC 0-20/0-20MA 8445070000

Type (Qty.=1) Order No.

WAS4 CCC DC 0-20/4-20MA 8446970000

Type (Qty.=1) Order No.

WAS4 CVC DC 0-20/0-10V 8447020000

WAZ4 CVC DC 0-20/0-10V 8447030000

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

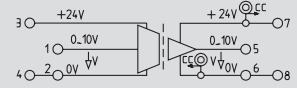
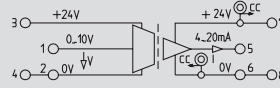
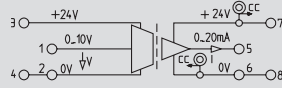
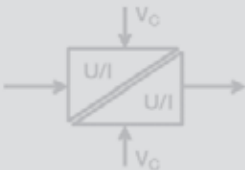
Voltage supply both sides

- Signal conversion
- Electrical isolation between input and output signals
- Power supply can be cross-connected using ZQV cross connection system

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

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

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



Technical data

Input

Input voltage/Input current
max. voltage/max. current
Input resistance, voltage/Current

Output

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

General data

Supply voltage
Current consumption, input
Current consumption, output
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity
Clearance & creepage distance

0...10 V /
15 V /
500 k Ω /

/0...20 mA
/≤ 500 Ω
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 30 ms (typically 25 ms)
≥ 13 Hz (typically 17 Hz)

24 V DC ± 20 %
< 11 mA at $U_{IN} = 10$ V
< 32 mA at $I_{OUT} = 20$ mA
≤ 2 A
0°C...+55°C (fitted)
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
III
2
≥ 3 mm

0...10 V /
15 V /
500 k Ω /

/4...20 mA
/≤ 500 Ω
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 30 ms (typically 25 ms)
≥ 13 Hz (typically 17 Hz)

24 V DC ± 20 %
< 11 mA at $U_{IN} = 10$ V
< 32 mA at $I_{OUT} = 20$ mA
≤ 2 A
0°C...+55°C (fitted)
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
III
2
≥ 3 mm

0...10 V /
15 V /
500 k Ω /

0...10 V /
≥ 1 k Ω /
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 30 ms (typically 25 ms)
≥ 13 Hz (typically 17 Hz)

24 V DC ± 20 %
< 11 mA at $U_{IN} = 10$ V
< 20 mA at $I_{OUT} = 10$ mA
≤ 2 A
0°C...+55°C (fitted)
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
III
2
≥ 3 mm

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

Screw connection Tension clamp c.

2.5 / 0.5 / 2.5 1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4 92.4 x 12.5 x 112.4

Tu=23°C, single module

Screw connection Tension clamp c.

2.5 / 0.5 / 2.5 1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4 92.4 x 12.5 x 112.4

Tu=23°C, single module

Screw connection Tension clamp c.

2.5 / 0.5 / 2.5 1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4 92.4 x 12.5 x 112.4

Tu=23°C, single module

Ordering data

Type of connection

Screw connection
Tension clamp connection

Note

Type	(Qty.=1)	Order No.
WAS4 VCC DC 0-10/0-20mA		8447050000
WAZ4 VCC DC 0-10/0-20mA		8447080000

Type	(Qty.=1)	Order No.
WAS4 VCC DC 0-10/4-20mA		8447100000
WAZ4 VCC DC 0-10/4-20mA		8447110000

Type	(Qty.=1)	Order No.
WAS4 VCC DC 0-10/0-10V		8447130000
WAZ4 VCC DC 0-10/0-10V		8447140000

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

WAVESERIES - DC/DC 3-way isolator

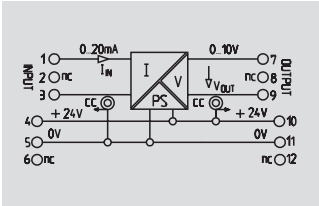
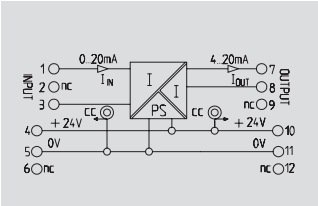
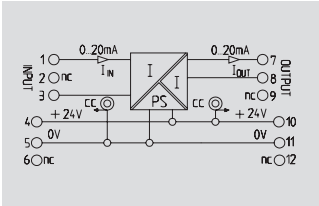
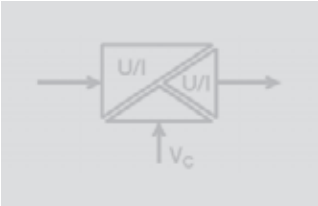
10 Hz limiting frequency

- Signal conversion
- Electrical isolation between input/output signal / power supply
- Power supply can be cross-connected via plug-in bridges

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

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

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



Technical data

Input

Input voltage/Input current
max. voltage
max. current

Output

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

General data

Supply voltage
Power consumption
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity
Clearance & creepage distance

/0(4)...20 mA

25 mA

/0(4)...20 mA

/≤ 600 Ω

0.2 %

± 250 ppm/K

≤ 45 ms

10 Hz

24 V DC ± 25 %

< 1.5 W at I_{OUT} = 20 mA

≤ 2 A

0°C...+55°C (horiz. mounting)

-20 °C...+85 °C

CE / cULus

EN 50178

EN 55011, EN 61000-6

300 V

4 kV

2 kV_{eff} / 5 s

III

2

≥ 3 mm

/0...20 mA

25 mA

/4...20 mA

/≤ 600 Ω

0.2 %

± 250 ppm/K

≤ 45 ms

10 Hz

24 V DC ± 25 %

< 1.5 W at I_{OUT} = 20 mA

≤ 2 A

0°C...+55°C (horiz. mounting)

-20 °C...+85 °C

CE / cULus

EN 50178

EN 55011, EN 61000-6

300 V

4 kV

2 kV_{eff} / 5 s

III

2

≥ 3 mm

/0...20 mA

25 mA

0...10 V /

≥ 1 kΩ /

0.2 %

± 250 ppm/K

≤ 45 ms

10 Hz

24 V DC ± 25 %

< 1.3 W at I_{OUT} = 5 mA

≤ 2 A

0°C...+55°C (horiz. mounting)

-20 °C...+85 °C

CE / cULus

EN 50178

EN 55011, EN 61000-6

300 V

4 kV

2 kV_{eff} / 5 s

III

2

≥ 3 mm

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

Screw connection

Tension clamp c.

2.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4

Tu=23°C, single module

Screw connection

2.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4

Tu=23°C, single module

Screw connection

2.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4

Tu=23°C, single module

Ordering data

Type of connection

Screw connection
Tension clamp connection

Note

Type

(Qty.=1)

Order No.

WAS5 CCC 0-20/0-20mA 8540180000
WAZ5 CCC 0-20/0-20mA 8540190000

Type

(Qty.=1)

Order No.

WAS5 CCC 0-20/4-20mA 8540250000

Type

(Qty.=1)

Order No.

WAS5 CVC 0-20mA/0-10V 8540270000

Accessories

Note

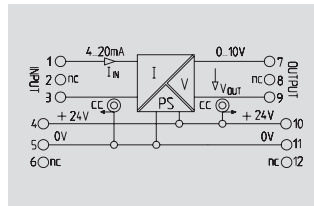
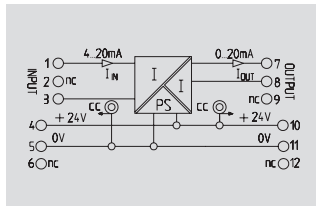
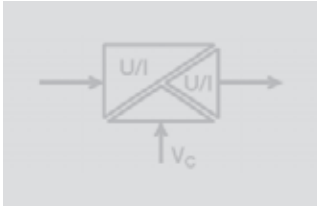
Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

10 Hz limiting frequency

- Signal conversion
- Electrical isolation between input/output signal / power supply
- Power supply can be cross-connected via plug-in bridges

4...20 mA/0...20 mA**4...20 mA/0...10 V****Technical data****Input**

Input voltage/Input current
max. voltage
max. current

Output

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

General data

Supply voltage
Power consumption
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity
Clearance & creepage distance

/4...20 mA

25 mA

/0...20 mA

/≤ 600 Ω

0.2 %

± 250 ppm/K

≤ 45 ms

10 Hz

24 V DC ± 25 %

< 1.5 W at I_{OUT} = 20 mA

≤ 2 A

0°C...+55°C (horiz. mounting)

-20 °C...+85 °C

CE / cULus

EN 50178

EN 55011, EN 61000-6

300 V

4 kV

2 kV_{eff} / 5 s

III

2

≥ 3 mm

/4...20 mA

25 mA

0...10 V /

≥ 1 kΩ /

0.2 %

± 250 ppm/K

≤ 45 ms

10 Hz

24 V DC ± 25 %

< 1.3 W at I_{OUT} = 5 mA

≤ 2 A

0°C...+55°C (horiz. mounting)

-20 °C...+85 °C

CE / cULus

EN 50178

EN 55011, EN 61000-6

300 V

4 kV

2 kV_{eff} / 5 s

III

2

≥ 3 mm

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note**Screw connection**

2.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4

Tu=23°C, single module

Screw connection

2.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4

Tu=23°C, single module

Ordering data**Type of connection**

Screw connection

Type (Qty.=1) Order No.WAS5 CCC 4-20/0-20mA **8540200000****Type (Qty.=1) Order No.**WAS5 CVC 4-20mA/0-10V **8540230000****Note****Accessories****Note**

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

WAVESERIES - DC/DC 3-way isolator

10 Hz limiting frequency

- Signal conversion
- Electrical isolation between input/output signal / power supply
- Power supply can be cross-connected via plug-in bridges

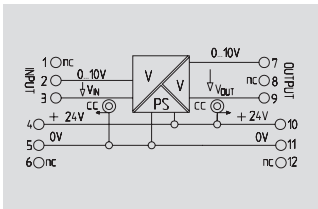
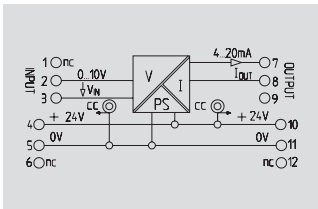
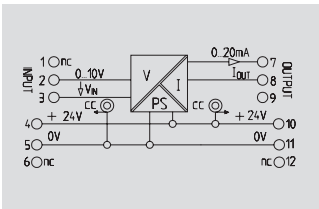
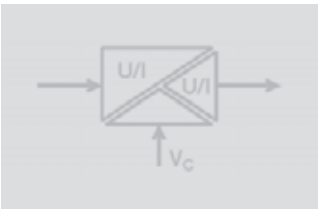
0...10 V/0...20 mA



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



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



Technical data

Input	
Input voltage/Input current	0...10 V /
max. voltage	15 V
max. current	
Output	
Output voltage/Output current	/0...20 mA
Load impedance, voltage/Current	/≤ 600 Ω
Accuracy	0.2 %
Temperature coefficient	± 250 ppm/K
Step response time	≤ 45 ms
Cut-off frequency (-3dB)	10 Hz
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.5 W at I _{OUT} = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature	0°C...+55°C (horiz. mounting)
Storage temperature	-20 °C...+85 °C
Approvals	CE / cULus
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	2 kV _{eff} / 5 s
Surge category	III
Pollution severity	2
Clearance & creepage distance	≥ 3 mm

Input	
Input voltage/Input current	0...10 V /
max. voltage	15 V
max. current	
Output	
Output voltage/Output current	/0...20 mA
Load impedance, voltage/Current	/≤ 600 Ω
Accuracy	0.2 %
Temperature coefficient	± 250 ppm/K
Step response time	≤ 45 ms
Cut-off frequency (-3dB)	10 Hz
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.5 W at I _{OUT} = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature	0°C...+55°C (horiz. mounting)
Storage temperature	-20 °C...+85 °C
Approvals	CE / cULus
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	2 kV _{eff} / 5 s
Surge category	III
Pollution severity	2
Clearance & creepage distance	≥ 3 mm

Input	
Input voltage/Input current	0...10 V /
max. voltage	15 V
max. current	
Output	
Output voltage/Output current	/4...20 mA
Load impedance, voltage/Current	/≤ 600 Ω
Accuracy	0.2 %
Temperature coefficient	± 250 ppm/K
Step response time	≤ 45 ms
Cut-off frequency (-3dB)	10 Hz
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.5 W at I _{OUT} = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature	0°C...+55°C (horiz. mounting)
Storage temperature	-20 °C...+85 °C
Approvals	CE / cULus
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	2 kV _{eff} / 5 s
Surge category	III
Pollution severity	2
Clearance & creepage distance	≥ 3 mm

Input	
Input voltage/Input current	0...10 V /
max. voltage	15 V
max. current	
Output	
Output voltage/Output current	0...10 V /
Load impedance, voltage/Current	/≥ 1 kΩ /
Accuracy	0.2 %
Temperature coefficient	± 250 ppm/K
Step response time	≤ 45 ms
Cut-off frequency (-3dB)	10 Hz
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.3 W at I _{OUT} = 5 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature	0°C...+55°C (horiz. mounting)
Storage temperature	-20 °C...+85 °C
Approvals	CE / cULus
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	2 kV _{eff} / 5 s
Surge category	III
Pollution severity	2
Clearance & creepage distance	≥ 3 mm

Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

Screw connection	Tension clamp c.
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Tu=23°C, single module	

Screw connection	Tension clamp c.
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Tu=23°C, single module	

Screw connection	Tension clamp c.
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Tu=23°C, single module	

Ordering data

Type of connection
Screw connection
Tension clamp connection
Note

Type	(Qty.=1)	Order No.
WAS5 VCC 0-10V/0-20mA		8540310000
WAZ5 VCC 0-10V/0-20mA		8540320000

Type	(Qty.=1)	Order No.
WAS5 VCC 0-10V/4-20mA		8540290000
WAZ5 VCC 0-10V/4-20mA		8540300000

Type	(Qty.=1)	Order No.
WAS5 VCC 0-10V/0-10V		8540330000
WAZ5 VCC 0-10V/0-10V		8540340000

Accessories

Note

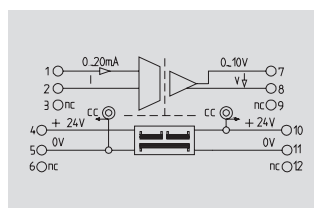
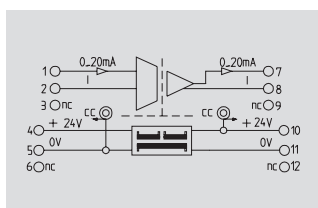
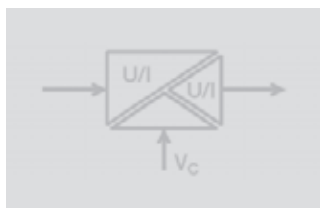
Cross-connectors for power supplies and markers - see WAVESERIES accessories
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Cross-connectors for power supplies and markers - see WAVESERIES accessories
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Cross-connectors for power supplies and markers - see WAVESERIES accessories
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20 kHz limiting frequency

- Signal conversion
- Electrical isolation between input/output signal / power supply
- Power supply can be cross-connected via plug-in bridges

0(4)...20 mA/0(4)...20 mA**0...20 mA/0...10 V****Technical data****Input**

Input voltage/Input current
max. voltage/max. current
Input resistance, voltage/Current

Output

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

General data

Supply voltage
Power consumption
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Coupling capacitance, I/O, power supply
Surge category
Pollution severity
Clearance & creepage distance

/0(4)...20 mA
/50 mA
/50 Ω

/0(4)...20 mA
/≤ 500 Ω

< 0.2% of final value
≤ 250 ppm/K of final value
≤ 40 μs (typically 30 μs)
≥ 15 kHz (typ. 20 kHz)

24 V DC ± 25 %
≤ 1.5 W at I_{OUT} = 20 mA
≤ 2 A
0 °C...+55 °C
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
1 nF
III
2
≥ 3 mm

/0...20 mA
/50 mA
/50 Ω

0...10 V /
≥ 2 kΩ /

< 0.2% of final value
≤ 250 ppm/K of final value
≤ 40 μs (typically 30 μs)
≥ 15 kHz (typ. 20 kHz)

24 V DC ± 25 %
≤ 1.3 W at I_{OUT} = 5 mA
≤ 2 A
0 °C...+55 °C
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
1 nF
III
2
≥ 3 mm

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note**Screw connection Tension clamp c.**

2.5 / 0.5 / 2.5 1.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4 92.4 x 17.5 x 112.4

Tu=23°C, single module

Screw connection

2.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4

Tu=23°C, single module

Ordering data**Type of connection**

Screw connection
Tension clamp connection

Note

Type	(Qty.=1)	Order No.
WAS5 CCC HF 0-20/0-20mA		8447160000
WAZ5 CCC HF 0-20/0-20mA		8447170000

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

Note**Accessories****Note**

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

WAVESERIES - DC/DC 3-way isolator

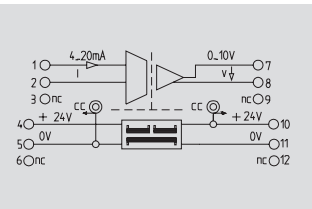
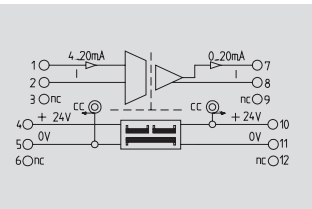
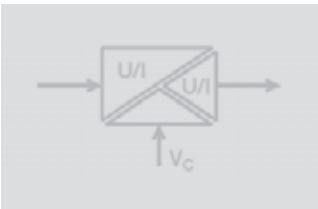
20 kHz limiting frequency

- Signal conversion
- Electrical isolation between input/output signal / power supply
- Power supply can be cross-connected via plug-in bridges

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



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



Technical data

Input	
Input voltage/Input current	/4...20 mA
max. voltage/max. current	/50 mA
Input resistance, voltage/Current	/50 Ω
Output	
Output voltage/Output current	/0...20 mA
Load impedance, voltage/Current	/≤ 500 Ω
Accuracy	< 0.2% of final value
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	≤ 40 μs (typically 30 μs)
Cut-off frequency (-3dB)	≥ 15 kHz (typ. 20 kHz)
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	≤ 1.5 W at I _{OUT} = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	CSA / cULus / CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	1.2 kV _{eff} / 5 s
Coupling capacitance, I/O, power supply	1 nF
Surge category	III
Pollution severity	2
Clearance & creepage distance	≥ 3 mm

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

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

Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

Screw connection	
2.5 / 0.5 / 2.5	
92.4 x 17.5 x 112.4	
Tu=23°C, single module	

Screw connection	
2.5 / 0.5 / 2.5	
92.4 x 17.5 x 112.4	
Tu=23°C, single module	

Ordering data

Type of connection
Screw connection
Note

Type	(Qty.=1)	Order No.
WAS5 CCC HF 4-20/0-20MA		8447250000

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

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories
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Cross-connectors for power supplies and markers - see WAVESERIES accessories
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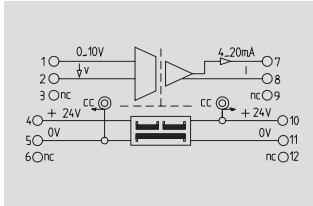
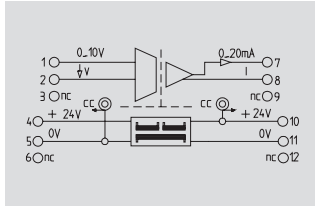
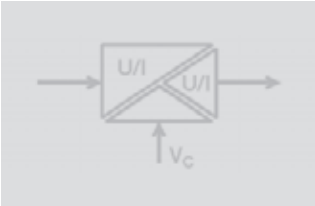
20 kHz limiting frequency

- Signal conversion
- Electrical isolation between input/output signal / power supply
- Power supply can be cross-connected via plug-in bridges

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



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



Technical data

Input

Input voltage/Input current
max. voltage/max. current
Input resistance, voltage/Current

Output

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

General data

Supply voltage
Power consumption
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Coupling capacitance, I/O, power supply
Surge category
Pollution severity
Clearance & creepage distance

0...10 V /
15 V /
500 kΩ /

/0...20 mA
/≤ 500 Ω
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 40 μs (typically 30 μs)
≥ 15 kHz (typ. 20 kHz)

24 V DC ± 25 %
≤ 1.5 W at I_{OUT} = 20 mA
≤ 2 A
0 °C...+55 °C
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
1 nF
III
2
≥ 3 mm

0...10 V /
15 V /
500 kΩ /

/4...20 mA
/≤ 500 Ω
± 0.2% of final value
≤ 250 ppm/K of final value
≤ 40 μs (typically 30 μs)
≥ 15 kHz (typ. 20 kHz)

24 V DC ± 25 %
≤ 1.5 W at I_{OUT} = 20 mA
≤ 2 A
0 °C...+55 °C
-20 °C...+85 °C
CSA / cULus / CE

EN 50178
EN 55011, EN 61000-6
300 V
4 kV
1.2 kV_{eff} / 5 s
1 nF
III
2
≥ 3 mm

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

Screw connection

2.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4
Tu=23°C, single module

Screw connection Tension clamp c.

2.5 / 0.5 / 2.5 1.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4 92.4 x 17.5 x 112.4
Tu=23°C, single module

Ordering data

Type of connection

Screw connection

Note

Type (Qty.=1) Order No.

WAS5 VCC HF 0-10/0-20MA 8447310000

Type (Qty.=1) Order No.

WAS5 VCC HF 0-10/4-20MA 8447340000

WAZ5 VCC HF 0-10/4-20MA 8447350000

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Cross-connectors for power supplies and markers - see WAVESERIES accessories

WAVESERIES - DC/DC 3-way isolator

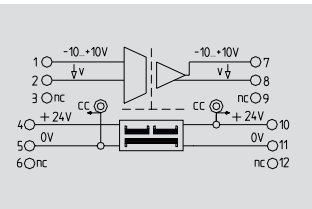
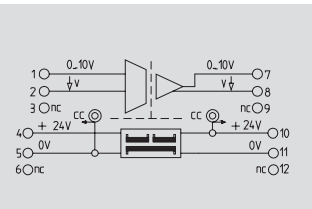
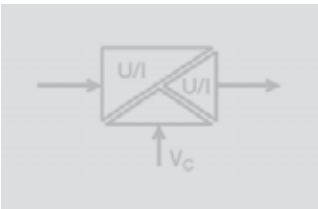
20 kHz limiting frequency

- Signal conversion
- Electrical isolation between input/output signal / power supply
- Power supply can be cross-connected via plug-in bridges

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



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



Technical data

Input	
Input voltage/Input current	0...10 V /
max. voltage/max. current	15 V /
Input resistance, voltage/Current	500 kΩ /
Output	
Output voltage/Output current	0...10 V /
Load impedance, voltage/Current	≥ 2 kΩ /
Accuracy	± 0.2% of final value
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	≤ 40 μs (typically 30 μs)
Cut-off frequency (-3dB)	≥ 15 kHz (typ. 20 kHz)
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.3 W at I _{OUT} = 5 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	CSA / cULus / CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	1.2 kV _{eff} / 5 s
Coupling capacitance, I/O, power supply	1 nF
Surge category	III
Pollution severity	2
Clearance & creepage distance	≥ 3 mm

Input	
Input voltage/Input current	0...10 V /
max. voltage/max. current	15 V /
Input resistance, voltage/Current	500 kΩ /
Output	
Output voltage/Output current	0...10 V /
Load impedance, voltage/Current	≥ 2 kΩ /
Accuracy	± 0.2% of final value
Temperature coefficient	≤ 250 ppm/K of final value
Step response time	≤ 40 μs (typically 30 μs)
Cut-off frequency (-3dB)	≥ 15 kHz (typ. 20 kHz)
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.3 W at I _{OUT} = 5 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	CSA / cULus / CE
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	1.2 kV _{eff} / 5 s
Coupling capacitance, I/O, power supply	1 nF
Surge category	III
Pollution severity	2
Clearance & creepage distance	≥ 3 mm

Input	
Input voltage/Input current	-10...+10 V /
max. voltage/max. current	± 15 V /
Input resistance, voltage/Current	500 kΩ /
Output	
Output voltage/Output current	-10...+10 V /
Load impedance, voltage/Current	≥ 2 kΩ /
Accuracy	± 0.2% of measuring range
Temperature coefficient	≤ 250 ppm/K of measuring range
Step response time	≤ 40 μs (typically 30 μs)
Cut-off frequency (-3dB)	≥ 15 kHz (typ. 20 kHz)
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	< 1.3 W at I _{OUT} = 5 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Approvals	CE / cULus
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	1.2 kV _{eff} / 5 s
Coupling capacitance, I/O, power supply	1 nF
Surge category	III
Pollution severity	2
Clearance & creepage distance	≥ 3 mm

Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

Screw connection	Tension clamp c.
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Tu=23°C, single module	

Screw connection	
2.5 / 0.5 / 2.5	
92.4 x 17.5 x 112.4	
Tu=23°C, single module	

Ordering data

Type of connection
Screw connection
Tension clamp connection
Note

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

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

Accessories

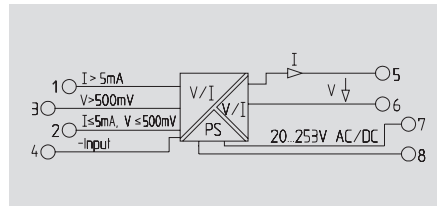
Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories
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Cross-connectors for power supplies and markers - see WAVESERIES accessories
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configurable

- Universal adjustable via DIP switch
- Service tool WAVETOOL via Internet
- Voltage supply 20...230 V AC/DC
- Low 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	□	□	□	□	□	□	□	■
0 ... ±100 mV	■	□	□	□	□	□	□	■
0 ... ±150 mV	□	■	□	□	□	□	□	■
0 ... ±300 mV	■	■	□	□	□	□	□	■
0 ... ±500 mV	□	□	■	□	□	□	□	■
0 ... ±1 V	■	□	■	□	□	■	□	■
0 ... ±5 V	□	■	■	□	□	■	□	■
0 ... ±10 V	■	■	■	□	□	■	□	■
0 ... ±100 V	□	□	□	■	□	□	□	■
0 ... ±-0.3 mA	■	□	□	■	■	□	□	■
0 ... ±1 mA	□	■	□	■	■	□	□	■
0 ... ±5 mA	■	■	□	■	■	□	□	■
0 ... ±10 mA	□	□	■	■	■	□	□	■
0 ... ±20 mA	■	□	■	■	■	□	□	■
0 ... ±50 mA	□	■	■	■	■	□	□	■
4 ... ±20 mA*	■	■	■	■	■	□	□	■

*Offset conversion not calibrated

Switch S2		4
calibrated ranges		■
Span-pot. activated: input x 0.33 ... x 3.30		

Output	Switch					
	S1			S3		
Output range	5	6	7	1	2	
0 ... ±10 V	□	□	□	■	■	
2 ... 10 V	■	□	□	■	■	
0 ... ±5 V	□	■	□	■	■	
1 ... 5 V	■	■	□	■	■	
0 ... ±20 mA	□	□	■	□	□	
4 ... 20 mA	■	□	■	□	□	

Offset (in % of output voltage)	S1			S2
	8	9	10	5
0 %	□	□	□	■
-100 %	■	□	□	■
-50 %	□	■	□	■
+50 %	■	■	□	■
+100 %	□	□	■	■

Zero pot. activated: additional ±25 %

Switch S3		3
Bandwidth 10 kHz		□
Bandwidth 10 Hz		■
Set range can be documented on side of housing.		

■ = on
□ = off**Technical data****Input**

Input voltage/Input current
Input resistance, voltage/Current
max. current

Output

Output voltage/Output current
Load impedance, voltage/Current
Accuracy
Temperature coefficient
Cut-off frequency (-3dB)
Offset
Adjustment range, zero point
Adjustment range, amplification
Displacement

General data

Supply voltage
Power consumption
Operating temperature
Storage temperature
Default setting
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity

± 20 mV...± 200 V / ± 0.1mA...± 100 mA
ca. 1 MΩ / < 5 mA: approx. 100 Ω; > 5 mA: approx. 5 Ω
 $I_{IN} < 5 \text{ mA}$: < 100 mA, $I_{IN} > 5 \text{ mA}$: < 300 mA
0...±10 V / 0...±20 mA
≥ 1 kΩ / ≤ 600 Ω
< 0.1% of final value
≤ 60 ppm/K of end value
> 10 kHz / < 10 Hz
20 μA or 10 mV
± 25% of measuring range of chosen output range
0.33...3.30 x final value of selected output range
-100%, -50%, 0%, 50%, 100% of measuring range

22...230 V AC/DC +10 %/ 48...62 Hz
approx. 1 W
-10 °C...+70 °C
-40 °C...+85 °C
0...10V / 0...10V / 10Hz
GL / CE / cURus

EN 50178
DIN EN 61326, EN 61326/A1, EN 61000-6 /-2
600 V
5 kV, 1.2/50 μs (IEC 255-4)
4 kV_{eff}
III
2

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

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

T_u=23°C, single module**Ordering data****Type of connection**

Screw connection
Tension clamp connection

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

Note**Accessories****Note**

Cross-connectors for power supplies and markers - see WAVESERIES accessories

WAVESERIES - PT100/RTD - signal converter

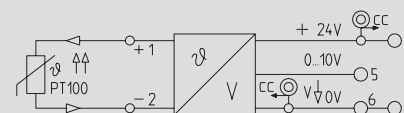
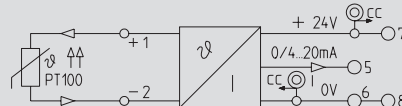
PT100, 2-conductor converter

- 2-conductor system
- Temperature range adjustable from -200°C...+800°C
- Power supply can be cross-connected with plug-in bridges
- No electrical isolation between input and output circuit

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



PT100/2 0...10 V



Technical data

Input	
Sensor	PT100
Supply current	1.45 mA
Output	
Output voltage/Output current	/0(4)...20 mA
Load impedance, voltage/Current	/≤ 500 Ω
Accuracy	± 0.5% of measuring range
General data	
Supply voltage/Current consumption	24 V DC ± 20 % / < 48 mA at I _{OUT} = 20 mA
Operating temperature/Storage temperature	0 °C...+55 °C / -20 °C...+85 °C
Approvals	CSA / cULus / CE
Standards	EN 50178, EN 60751, IEC751
EMC standards	EN 55011, EN 61000-6
Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

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 x 12.5 x 112.4	92.4 x 12.5 x 112.4	92.4 x 12.5 x 112.4	92.4 x 12.5 x 112.4
Tu=23°C, single module		Tu=23°C, single module	

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 x 12.5 x 112.4	92.4 x 12.5 x 112.4	92.4 x 12.5 x 112.4	92.4 x 12.5 x 112.4
Tu=23°C, single module		Tu=23°C, single module	

Ordering data

Temperature input range	Type of connection
adjustable -200...+800°C	Screw connection
adjustable -200...+800°C	Tension clamp connection
Special adjustment	Screw connection
Special adjustment	Tension clamp connection
0...100 °C	Tension clamp connection
0...100 °C	Screw connection
Note	

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 variable	1	8432219999
WTZ4 PT100/2 C 0/4-20mA variable	1	8432229999
WTZ4 PT100/2 C 0-20mA 0...100C	1	8432220001
WTS4 PT100/2 C 4-20mA 0...100C	1	8432210011
Note		
Cross-connectors for power supplies and markers - see WAVESERIES accessories		

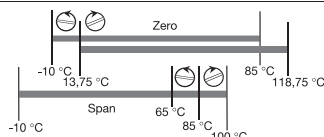
Type	Qty.	Order No.
WTS4 PT100/2 V 0-10V	1	8432180000
WTZ4 PT100/2 V 0-10V	1	8432190000
WTS4 PT100/2 V 0-10V variable	1	8432189999
WTZ4 PT100/2 Vn 0-10V variable	1	8432199999
WTS4 PT100/2 V 0-10V 0...100C	1	8432180001
Note		
Specify temperature range for special calibrations.		

Application

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 < 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

	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	■	■	■

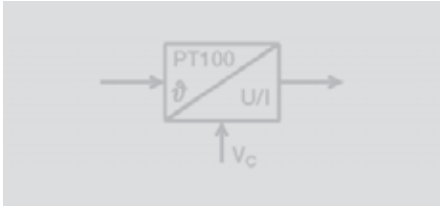
Output 1)		PT 100			
Range	7	8	9	10	
0 ... 20 mA	■	■	■	■	
4 ... 20 mA	■	■	■	■	
		2 - wire	■	■	■
		3 - wire	■	■	■
		4 - wire	■	■	■

1) only modules with current output

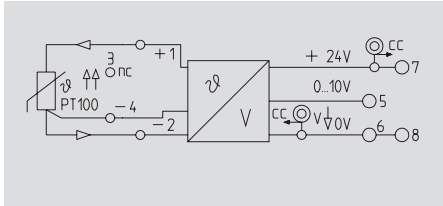
■ = on
□ = off

PT100, 3-conductor converter

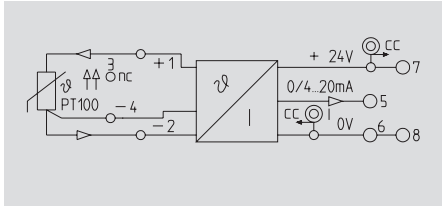
- 3-conductor system
- Temperature range adjustable from -200°C...+800°C
- Power supply can be cross-connected with plug-in bridges
- No electrical isolation between input and output circuit



PT100/3 0...10 V



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



Technical data

Input	
Sensor	PT100/3-conductor
Supply current	1.45 mA
Output	
Output voltage/Output current	0...10 V /
Load impedance, voltage/Current	≥ 1 kΩ /
Accuracy	± 0.5% of measuring range
General data	
Supply voltage/Current consumption	24 V DC ± 20 % / < 38 mA at I _{OUT} = 20 mA
Operating temperature/Storage temperature	0 °C...+55 °C / -20 °C...+85 °C
Approvals	CSA / cULus / CE
Standards	EN 50178, EN 60751, IEC751
EMC standards	EN 55011, EN 61000-6
Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

PT100/3-conductor	
1.45 mA	
0...10 V /	
≥ 1 kΩ /	
± 0.5% of measuring range	
24 V DC ± 20 % / < 38 mA at I _{OUT} = 20 mA	
0 °C...+55 °C / -20 °C...+85 °C	
CSA / cULus / CE	
EN 50178, EN 60751, IEC751	
EN 55011, EN 61000-6	
Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4	92.4 x 12.5 x 112.4
T _u =23°C, single module	

PT100/3-conductor	
1.45 mA	
/0(4)...20 mA	
/≤ 500 Ω	
± 0.5% of measuring range	
24 V DC ± 20 % / < 48 mA at I _{OUT} = 20 mA	
0 °C...+55 °C / -20 °C...+85 °C	
CSA / cULus / CE	
EN 50178, EN 60751, IEC751	
EN 55011, EN 61000-6	
Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4	92.4 x 12.5 x 112.4
Tu=23°C, single module	

Ordering data

Temperature input range	Type of connection
adjustable -200...+800°C	Screw connection
adjustable -200...+800°C	Tension clamp connection
Special adjustment	Screw connection
Special adjustment	Tension clamp connection
0...100 °C	Screw connection
Note	

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
Specify temperature range for special calibrations.		

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
Cross-connectors for power supplies and markers - see WAVESERIES accessories		

Application

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						
0 ... 20 mA	□						
4 ... 20 mA	■						
1) only modules with current output							
■ = on							
□ = off							

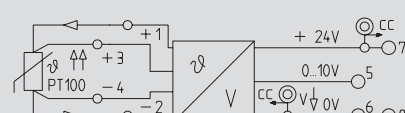
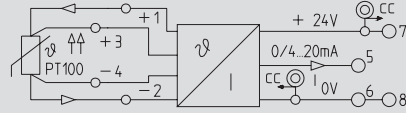
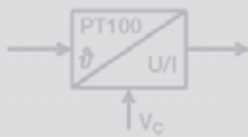
WAVESERIES - PT100/RTD - signal isolator/converter

PT100, 4-conductor converter

- 4-conductor system
- Temperature range adjustable from -200°C...+800°C
- Power supply can be cross-connected with plug-in jumpers
- No electrical isolation between input and output circuit

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

PT100/4 0...10 V



Technical data

Input	
Sensor	PT100
Supply current	1.45 mA
Output	
Output voltage/Output current	/0(4)...20 mA
Load impedance, voltage/Current	/≤ 500 Ω
Accuracy	100K ≤ measuring range < 600K: 0.1%; measuring range ≥ 600K: 0.2%; of measuring range
General data	
Supply voltage/Current consumption	24 V DC ± 20 % / < 48 mA at I _{OUT} = 20 mA
Operating temperature/Storage temperature	0 °C...+55 °C / -20 °C...+85 °C
Approvals	CSA / cULus / CE
Standards	EN 50178, EN 60751, IEC751
Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

PT100/4-conductor	
1.45 mA	
/0(4)...20 mA	
/≤ 500 Ω	
100K ≤ measuring range < 600K: 0.1%; measuring range ≥ 600K: 0.2%; of measuring range	
24 V DC ± 20 % / < 48 mA at I _{OUT} = 20 mA	
0 °C...+55 °C / -20 °C...+85 °C	
CSA / cULus / CE	
EN 50178, EN 60751, IEC751	
Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4	92.4 x 12.5 x 112.4
Tu=23°C, single module	

PT100/4-conductor	
1.45 mA	
0...10 V /	
≥ 1 kΩ /	
100K ≤ measuring range < 600K: 0.1%; measuring range ≥ 600K: 0.2%; of measuring range	
24 V DC ± 20 % / < 38 mA at I _{OUT} = 20 mA	
0 °C...+55 °C / -20 °C...+85 °C	
CSA / cULus / CE	
EN 50178, EN 60751, IEC751	
Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4	92.4 x 12.5 x 112.4
Tu=23°C, single module	

Ordering data

Temperature input range	Type of connection
adjustable -200...+800°C	Screw connection
adjustable -200...+800°C	Tension clamp connection
Special adjustment	Screw connection
Special adjustment	Tension clamp connection
0...100 °C	Screw connection
Note	

Type	Qty.	Order No.
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 variable	1	8432279999
WTZ4 PT100/4 C 0/4-20mA variable	1	8432289999
WTS4 PT100/4 C 4-20mA 0...100C	1	8432270011
Note		
Cross-connectors for power supplies and markers - see WAVESERIES accessories		

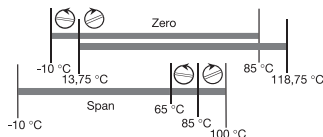
Type	Qty.	Order No.
WTS4 PT100/4 V 0-10V	1	8432240000
WTZ4 PT100/4 V 0-10V	1	8432250000
WTS4 PT100/4 V 0-10V variabel	1	8432249999
WTZ4 PT100/4 V 0-10V variabel	1	8432259999
WTS4 PT100/4 V 0-10V 0...100C	1	8432240001
Note		
Specify temperature range for special calibrations.		

Application

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 < 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

	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

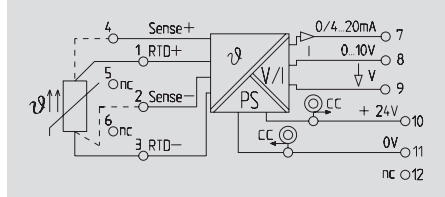
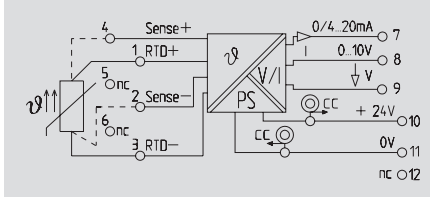
■ = on
□ = off

RTD, signal isolator/converter

- Universally adjustable via DIP switch
- 3-way isolation
- Linearisation
- Power supply can be cross-connected using ZQV cross connection system

PRO RTD

PRO RTD 1000



Technical data

Input			
Sensor		PT100/2-/3-/4-cond., Ni100/2-/3-/4-cond., potentiometer:	PT1000/2-/3-/4-cond.; Ni1000/2-/3-/4-cond.; potentiometer:
Temperature input range		min. 0-100 Ω, max. 0-100 kΩ, resistor: 0-450 Ω	min. 0-1kΩ, max. 0-100kΩ; resistor: 0-4.5kΩ
Output			
Output current/Output voltage		0(4)...20 mA / 0...10 V	0(4)...20 mA / 0...10 V
Offset current/Offset voltage		max. 100 µA / max. 0.05 V	max. 100 µA / max. 0.05 V
Load impedance, voltage/Current		≥ 1 kΩ / ≤ 600 Ω	≥ 1 kΩ / ≤ 600 Ω
Step response time		fast/slow: 2-/3-/4-conductor: 1.2 s/2.2 s; potentiometer: 0.5 s/1.1 s	fast/slow: 2-/3-/4-cond.: 1.2s/2.3s; potentiometer: 0.5s/1.2s
Line resistance in measuring circuit		50 Ω for 3- and 4-conductor	50 Ω for 3- and 4-conductor
Influence of cable resistance		max. + 0.25°C at 50 Ω conductor resistance	max. + 0.25°C at 50 Ω conductor resistance
Wire break detection		LED flashes (output value > 20 mA, >10 V)	LED flashes (output value > 20 mA, >10 V)
Fine adjustment		± 5%, Version 1: ± 12.5% / Poti: 12.5%...25%	± 12.5% of FSR; Poti: ± 12.5% ... ± 25%
Status indicator		active: LED on/cond. broken: LED flashing/Error: LED off	active: LED on/cond. broken: LED flashing/Error: LED off
General data			
Supply voltage		24 V DC ± 25 %	24 V DC ± 25 %
Power consumption		830...880...980mW at I _{OUT} = 20 mA	830...880...980mW at I _{OUT} = 20 mA
Current-carrying capacity of cross-connect.		≤ 2 A	≤ 2 A
Operating temperature		0 °C...+55 °C	0 °C...+55 °C
Storage temperature		-20 °C...+85 °C	-20 °C...+85 °C
Default setting		PT100/3-cond./ 0...100°C / 4...20 mA / man. fine calib.: off / slow step response	PT1000/3-cond./ 0...100°C / 4...20mA / man. adjustment: off / slow step response
Approvals		GL / CE / cULus	GL / CE / cULus
Insulation coordination			
Standards		EN 50178, EN 60751, IEC 751, DIN 43760	EN 50178, EN 60751, IEC 751, DIN 43760
EMC standards		EN 55011, EN 61000-6	EN 55011, EN 61000-6
Rated voltage		300 V	300 V
Impulse withstand voltage		4 kV	4 kV
Isolation voltage input, output		2 kV _{eff} / 5 s	2 kV _{eff} / 5 s
Surge category		III	III
Pollution severity		2	2
Clearance & creepage distance		≥ 3 mm	≥ 3 mm
Dimensions			
Clamping range (rating- / min. / max.)		mm ²	
Length x width x height		mm	
Note			
		Tu=23°C, single module	Tu=23°C, single module
Screw connection		Tension clamp connection	
		2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
		92.4 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Screw connection			
		2.5 / 0.5 / 2.5	
		92.4 x 17.5 x 112.4	

Ordering data

Type of connection	Type	Qty.	Order No.	Type	Qty.	Order No.
Screw connection	WAS5 PRO RTD	1	8560700000	WAS5 PRO RTD 1000	1	8679490000
Tension clamp connection	WAZ5 PRO RTD	1	8560710000			
Note						

Accessories

Note		
	Cross-connectors for power supplies and markers - see WAVESERIES accessories	Cross-connectors for power supplies and markers - see WAVESERIES accessories

WAVESERIES – PT100/RTD signal separator/converter, configurable

WAVEANALOG PRO RTD

WAVEANALOG PRO RTD 1000

Switch positions/setting options

Input	Selection of input		
	Switch 1		
	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

Switch positions/setting options

Input	Selection of input		
	Switch 1		
	1	2	3
PT10002-conductor	■	■	■
PT10003-conductor	□	■	■
PT10004-conductor	■	□	■
R 2-conductor	□	□	■
Ni1000 2-conductor	■	■	□
Ni1000 3-conductor	□	■	□
Ni1000 4-conductor	■	□	□
Potentiometer	□	□	□

■ = on
□ = off

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

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

D

Selection of minimum input size			
∅ _{min}	R _{min}	Pot _{min}	Switch 1
			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			
∅ _{min}	R _{min}	Pot _{min}	Switch 1
			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			□ □ □ ■

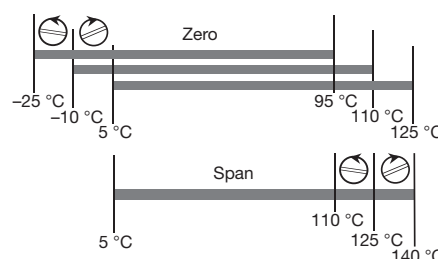
Choice of measuring range			
T	R	Potentiometer	Switch 2
			1 2 3 4 5
40K	20 Ω	20 %	■ ■ ■ ■ ■
50K	25 Ω	25 %	■ ■ ■ ■ □
60K	30 Ω	30 %	■ ■ ■ □ ■
70K	35 Ω	35 %	■ ■ ■ □ □
80K	40 Ω	40 %	■ ■ □ ■ ■
90K	45 Ω	45 %	■ ■ □ ■ □
100K	50 Ω	50 %	■ ■ □ □ ■
110K	55 Ω	55 %	■ ■ □ □ v
120K	60 Ω	60 %	■ □ ■ ■ ■
125K	62.5 Ω	62.5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

Choice of measuring range			
T	R	Potentiometer	Switch 2
			1 2 3 4 5
40K	200 Ω	20 %	■ ■ ■ ■ ■
50K	250 Ω	25 %	■ ■ ■ ■ □
60K	300 Ω	30 %	■ ■ ■ □ ■
70K	350 Ω	35 %	■ ■ ■ □ □
80K	400 Ω	40 %	■ ■ □ ■ ■
90K	450 Ω	45 %	■ ■ □ ■ □
100K	500 Ω	50 %	■ ■ □ □ ■
110K	550 Ω	55 %	■ ■ □ □ v
120K	600 Ω	60 %	■ □ ■ ■ ■
125K	625 Ω	62.5 %	■ □ ■ ■ □
130K	650 Ω	65 %	■ □ ■ □ ■
140K	700 Ω	70 %	■ □ ■ □ □
150K	750 Ω	75 %	■ □ □ ■ ■
160K	800 Ω	80 %	■ □ □ ■ □
170K	850 Ω	85 %	■ □ □ □ ■
180K	900 Ω	90 %	■ □ □ □ □
190K	950 Ω	95 %	□ ■ ■ ■ ■
200K	1000 Ω	100 %	□ ■ ■ ■ □
250K	1250 Ω	---	□ ■ ■ □ ■
300K	1500 Ω	---	□ ■ ■ □ □
350K	1750 Ω	---	□ ■ □ ■ ■
400K	2000 Ω	---	□ ■ □ ■ □
450K	2250 Ω	---	□ ■ □ □ ■
500K	2500 Ω	---	□ ■ □ □ □
550K	2750 Ω	---	□ □ ■ ■ ■
600K	3000 Ω	---	□ □ ■ ■ □
650K	3250 Ω	---	□ □ ■ □ ■
700K	3500 Ω	---	□ □ ■ □ □
750K	3750 Ω	---	□ □ □ ■ ■
800K	4000 Ω	---	□ □ □ ■ □
850K	4250 Ω	---	□ □ □ □ ■
900K	4500 Ω	---	□ □ □ □ □

Accuracy, slow/fast step response	
PT 100, Ni100: 0.3 % of measuring range	0.8 %
Measuring range:	
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	
Temperature setting:	
Output	4 ... 20 mA
DIP switch	-10 °C ... +110 °C
Range	75 ... 110 °C
Range	
120 °C	
Range adjustment	± 12.5 %

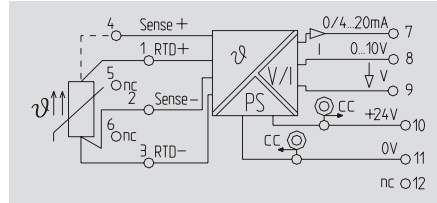


WAVEtool setting aid
The service tool is used for fast, uncomplicated configuration of WAVEANALOGUE PRO.
Download from the internet:
<http://www.weidmuller.com>

RTD, signal isolator/converter

- Universally adjustable via DIP switch
- 3-way isolation
- Linearisation
- Power supply can be cross-connected using ZQV cross connection system

PRO RTD Cu



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

Selection of minimum input values				
θ _{min}	Switch 1			
	4	5	6	7
- 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					
Span	Switch 2				
	1	2	3	4	5
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		Switching on the manual fine adjustment	
Output	Switch 2	man. adj.	Switch 1
0...10 V	6 7		8
0...20 mA	□ □	off	□
4...20 mA	□ ■	on	■

Selection of step set time	
Time of step response	Switch 2
slow	■
fast	□

■ = on
□ = off

Technical data

Input	
Sensor	Cu 10, Cu 25, Cu 50, Cu 100; 3-/4-conductor
Temperature input range	adjustable -200...+260°C
Output	
Output current/Output voltage	0(4)...20 mA / 0...10 V
Offset current/Offset voltage	max. 100 µA / max. 0.05 V
Load impedance, voltage/Current	≥ 1 kΩ / ≤ 600 Ω
Step response time	fast: 1.2 s / slow: 2.2 s
Line resistance in measuring circuit	5 Ω Cu 10; 15 Ω Cu 25; 25 Ω Cu 50; 50 Ω Cu 100
Influence of cable resistance	max. + 0.25°C at max. conductor resistance
Wire break detection	LED flashes (output value > 20 mA, >10 V)
Fine adjustment	± 12.5% of FSR
Status indicator	active: LED on/cond. broken: LED flashing/Error: LED off
General data	
Supply voltage	24 V DC ± 25 %
Power consumption	880...980...1030mW at I _{OUT} = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature	0 °C...+55 °C
Storage temperature	-20 °C...+85 °C
Default setting	CU 10/3-cond.; 0...100°C; 4...20 mA; no filter, no manual fine calib.; slow step response
Approvals	GL / CE / cULus
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Isolation voltage input, output	2 kV _{eff} / 5 s
Surge category	III
Pollution severity	2
Clearance & creepage distance	≥ 3 mm
Dimensions	
Clamping range (rating- / min. / max.)	mm ²
Length x width x height	mm
Note	
Tu=23°C, single module	
Screw connection	
2.5 / 0.5 / 2.5	
92.4 x 17.5 x 112.4	
Type	
WAS5 PRO RTD Cu	
Qty.	
1	
Order No.	
8638950000	

Ordering data

Type of connection	Type	Qty.	Order No.
Screw connection	WAS5 PRO RTD Cu	1	8638950000
Note			

Accessories

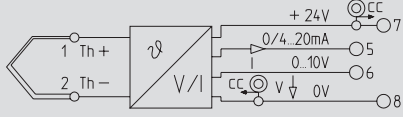
Note	Cross-connectors for power supplies and markers - see WAVESERIES accessories
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WAVESERIES - Thermo element signal converter, configurable

Thermal converter type K, J, T, E, N, R, S, B

- No calibration necessary
- Cold-junction compensation
- Output signal selectable
- Power supply can be cross-connected with plug-in bridges
- Suitable for insulated thermoelements
- No electrical isolation between input and output circuit

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.
Operating 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 range + 0.075 K)/K
with filter: 1.1 s; without filter: 6 s
LED flashes (output value > 20 mA, >10 V)

24 V DC ± 20 %
< 38 mA at I_{OUT} = 20 mA
≤ 2 A

0 °C...+55 °C
-20 °C...+85 °C
CSA / cULus / CE

EN 50178, EN 60584, IEC 584
EN 55011, EN 61000-6

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

Screw connection

2.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4
TU=23°C, single module

Tension clamp connection

1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4

Ordering data

Type of connection

Screw connection
Tension clamp connection

Note

Type

WTS4 THERMO 1 8432300000
WTZ4 THERMO 1 8432310000

Qty.

Order No.

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories

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	■	□	■	■	□
SW 1									
Tmin	4	5	6	7					
0 °C	■	■	■	■	650 °C	■	■	□	□
-10 °C	■	■	■	□	700 °C	■	□	□	■
-20 °C	■	■	□	■	750 °C	■	□	□	■
-30 °C	■	■	□	□	800 °C	■	□	□	■
-40 °C	■	□	■	■	850 °C	■	□	□	□
-50 °C	■	□	■	□	900 °C	□	■	■	■
-100 °C	■	□	□	■	950 °C	□	■	■	□
-150 °C	■	□	□	□	1000 °C	■	■	■	■
-200 °C	□	■	■	■	1050 °C	□	■	■	□
+50 °C	□	■	■	□	1100 °C	□	■	□	■
+100 °C	□	■	□	■	1150 °C	□	■	□	■
+150 °C	□	■	□	□	1200 °C	□	■	□	■
+200 °C	□	□	■	■	1250 °C	□	■	□	□
+250 °C	□	□	■	□	1300 °C	□	□	■	■
+500 °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			■						

■ = on
□ = off

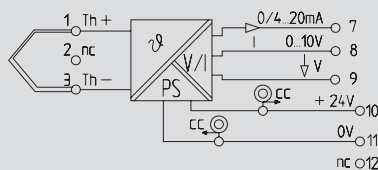
Temperature coefficient

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)

Thermal converter type K, J, T, E, N, R, S, B

- 3-way isolation
- No calibration necessary
- Cold-junction compensation
- Output signal selectable
- Power supply can be cross-connected using ZQV cross connection system

PRO Thermo



Select of thermocoupler				Selection of minimum temperature				
Typ	SW1			ϑ _{min}	SW1			
	1	2	3		4	5	6	7
K	■	■	■	0°C	■	■	■	■
J	□	■	■	-10°C	■	■	■	□
T	■	□	■	-20°C	■	■	□	■
E	□	□	■	-30°C	■	■	□	■
N	■	■	□	-40°C	■	□	■	■
R	□	■	□	-50°C	■	□	■	■
S	■	□	□	-100°C	■	□	■	■
B	□	□	□	-150°C	■	□	□	■
				-200°C	□	■	■	■
				+50°C	□	■	■	■
				+100°C	□	■	■	■
				+150°C	□	■	□	■
				+200°C	□	□	■	■
				+250°C	□	□	■	■
				500°C	□	□	□	■
				Special range	□	□	□	□

Selection of temperature span					Selection of output		
Span	SW2				Output	SW2	
100°C	■	■	■	■	0...10V	■	□
150°C	■	■	■	□	0...20mA	□	□
200°C	■	■	□	□	4...20mA	□	■
250°C	■	■	□	□			
300°C	■	■	□	□			
350°C	■	■	□	□			
400°C	■	■	□	□			
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	□	□	■	□			

Switching on the manual fine adjustment	
man. adjust.	SW1
off	□
on	■

Switching on the filter function	
Filter	SW2
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)

Technical data

Input	
Sensor	
Temperature input range	
Output	
Output voltage/Output current	
Load impedance, voltage/Current	
Offset current/Offset voltage	
Step response time	
Line resistance in measuring circuit	
Wire break detection	
Fine adjustment	
Status indicator	
General data	
Supply voltage	
Power consumption	
Current-carrying capacity of cross-connect.	
Operating temperature	
Storage temperature	
Default setting	
Approvals	
Insulation coordination	
Standards	
EMC standards	
Rated voltage	
Impulse withstand voltage	
Isolation voltage input, output	
Surge category	
Pollution severity	
Clearance & creepage distance	

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	
max. 1.4 s; with filter: max. 7.5 ms	
50 Ω	
LED flashes (output value > 20 mA, >10 V)	
± 5% (switchable)	
active: LED on/cond. broken: LED flashing/Error: LED off	
General data	
24 V DC ± 25 %	
800...850...950 mW at I _{OUT} = 20 mA	
≤ 2 A	
0 °C...+55 °C	
-20 °C...+85 °C	
type K; 0...1000°C; 4...20mA; filter: off; man. calib.: off	
GL / CE / cULus	
Insulation coordination	
EN 50178, EN 60584, IEC 584	
EN 55011, EN 61000-6	
300 V	
4 kV	
2 kV _{eff} / 5 s	
III	
2	
≥ 3 mm	

Dimensions	
Clamping range (rating- / min. / max.)	mm²
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 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Note	
TU=23°C, single module	

Ordering data

Type of connection	
Screw connection	
Tension clamp connection	
Note	

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

Accessories

Note

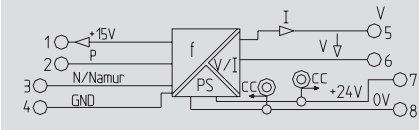
Cross-connectors for power supplies and markers - see WAVESERIES accessories
--

WAVESERIES - Frequency signal isolator/converter, configurable

f/DC isolator/converter

- 3-way isolation
- Max. input frequency 100 kHz
- Input and output ranges adjustable via
DIP switch
- No calibration necessary
- Special ranges can be programmed

PRO Frequency



Technical data

Input

Sensor/
Rated input level

Resolution

Output

Output voltage/Output current
Load impedance, voltage/Current
Offset current/Offset voltage
Accuracy
Temperature coefficient
Step response time
Status indicator

General data

Supply voltage
Power consumption
Current-carrying capacity of cross-connect.
Operating temperature
Storage temperature
Default setting
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output/
Surge category
Pollution severity
Clearance & creepage distance

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

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. 0.2V; PNP: approx. 6.7V/approx. 0.5V
0.1 mHz resp. 5 ppm of measurement value

0...10 V /0(4)...20 mA
≥ 1 kΩ /≤ 600 Ω
max. 100 μA /max. 0.05 V
0.2% of output range
max. 200 ppm/K of output range
360 ms + 2-fold period time of input frequency
green LED

24 V DC ± 25 %
max. 1.6 W at I_{OUT} = 20 mA
≤ 2 A
0 °C...+55 °C
-20 °C...+85 °C
0...10kHz / 4...20mA
CE / cULus

EN 50178 (protective separation)
EN 55011, EN 61000-6 /-2, EN 61326
300 V
6 kV
4 kV_{eff} / 5 s /
III
2
≥ 5,5 mm

Screw connection

2.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4

Tension clamp connection

1.5 / 0.5 / 2.5
92.4 x 12.5 x 112.4

TU=23°C, single module

Ordering data

Type of connection

Screw connection
Tension clamp connection

Note

Type	Qty.	Order No.
WAS4 PRO Freq	1	8581180000
WAZ4 PRO Freq	1	8581190000

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories

Selecting the operating mode			
Operating mode	Switch 2	3	4
0...fmax	☐	☐	☐
fmin...fmax	☐	☒	☐
saving	☐	☐	☐
fmin	☒	☐	☐

$$f = (A+B) \times C$$

Selecting the frequency				
A	1	2	3	4
0	☐	☐	☐	☐
1	☐	☐	☐	☒
2	☐	☐	☒	☐
3	☐	☐	☒	☒
4	☐	☒	☐	☐
5	☐	☐	☐	☒
6	☐	☒	☐	☐
7	☐	☒	☒	☐
8	☒	☐	☐	☐
9	☒	☐	☐	☒
10	☒	☐	☒	☐
11	☒	☐	☒	☒
12	☒	☒	☐	☐
13	☒	☒	☐	☒
14	☒	☒	☒	☐
15	☒	☒	☒	☒

Selecting the frequency				
	Switch 1			
B	5	6	7	8
0	☐	☐	☐	☐
0.1	☐	☐	☐	☒
0.2	☐	☐	☒	☐
0.3	☐	☐	☒	☒
0.4	☐	☒	☐	☐
0.5	☐	☒	☐	☒
0.6	☐	☒	☒	☐
0.7	☐	☒	☒	☒
0.8	☒	☐	☐	☐
0.9	☒	☐	☐	☒

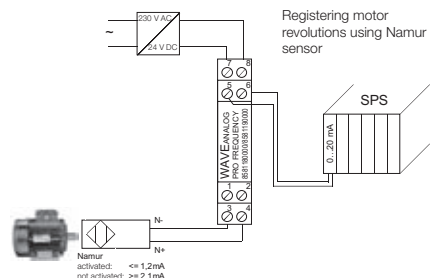
Selecting the frequency		
C	Switch 2	1
x1	☐	☐
x10	☐	☒
x100	☒	☐
x1000	☒	☒

Selecting the output				
Output	5	6	7	8
0...10 V	☒	☐	☐	☒
0...20 mA	☐	☐	☐	☐
4...20 mA	☐	☒	☐	☐
0...5 V	☒	☒	☒	☒

Special range (frequency generator is required)				
Function	1	2	3	4
save min. frequency	☐	☐	☒	☒
save max. frequency	☒	☐	☐	☐
select special range	☒	☒	☒	☒

■ = on
□ = off

Application



WAVEANALOG PRO Frequency

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

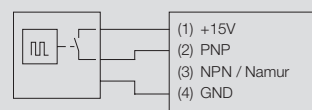
- First the lower measuring frequency must be saved.
Select mode “save fmin”.
S2.3 = 1 and S2.4 = 0.
Set the frequency using DIP switches S1 and S2.1, S2.2 (see table)
To save the frequency, briefly connect the module to the power supply.
- Select mode “fmin ... fmax”
S2.3 = 0 and S2.4 = 1
- Set the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

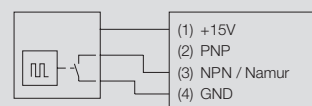
- Select the switch setting for saving the frequency: S2.1 = 0, S2.2 = 1, S2.3 = 1 and S2.4 = 1
- Apply min. frequency to the module
- Connect the module to the power supply
- The LED lights up when the input frequency is being measured. If the LED goes off, the frequency has been saved and the module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

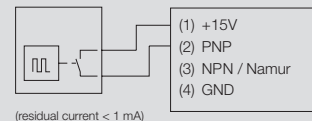
3-wire initiator with PNP output



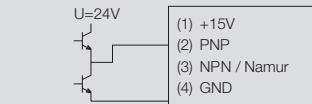
3-wire initiator with NPN output



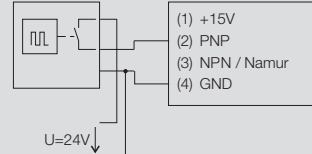
2-wire initiator



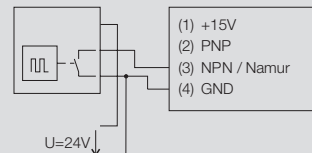
Push pull output cascade



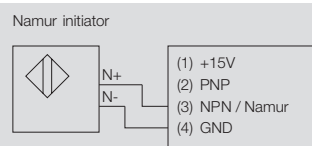
3-wire initiator with PNP output and external supply



3-wire initiator with NPN output and external supply



Namur initiator

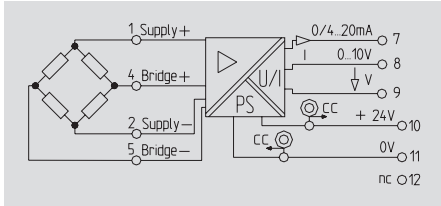
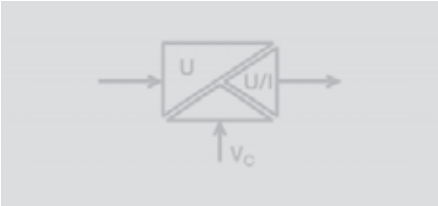


WAVESERIES - Bridge-type measuring isolating transformer

configurable

- 3-way isolation
- Input and output ranges adjustable via DIP switch
- No calibration necessar
- Inverse output signals possible

PRO BRIDGE



Technical data

Input	
Input voltage/	
Input resistance, voltage	
Output	
Output voltage/Output current	
Load impedance, voltage/Current	
Offset current/Offset voltage	
Accuracy	
Temperature coefficient	
Step response time	
Status indicator	
Wire break detection	
Bridge supply voltage	
General data	
Supply voltage	
Power consumption	
Current-carrying capacity of cross-connect.	
Operating temperature	
Storage temperature	
Default setting	
Approvals	
Insulation coordination	
Standards	
EMC standards	
Rated voltage	
Impulse withstand voltage	
Isolation voltage input, output/	
Surge category	
Pollution severity	
Clearance & creepage distance	

-500 mV...+500 mV /
> 1 MΩ
0...5 V, 5...0 V, 10...0 V, 0...10 V / 0...20 mA, 20...0 mA,
4...20 mA, 20...4 mA
≥ 1 kΩ / ≤ 600 Ω
max. 100 μA / max. 0.05 V
0.3% of output range
± 250 ppm/K of output range
typically < 200 ms
green LED
output: 0 V resp. 0/4 mA
+10 V, +5 V, 4.8...10.2 V; offset adjustable; max. 40mA
24 V DC ± 25 %
max. 1.9 W at I _{OUT} = 20 mA
≤ 2 A
0 °C...+55 °C
-20 °C...+85 °C
-500 mV...+500 mV / 0...10 V / + 10 V / standard
CE / cULus
EN 50178
EN 61000-6 /-2
300 V
4 kV
2 kV _{eff} / 5 s /
III
2
≥ 3 mm

Dimensions	
Clamping range (rating- / min. / max.)	mm²
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 x 17.5 x 112.4	92.4 x 17.5 x 112.4
TU=23°C, single module	

Ordering data

Type of connection
Screw connection
Tension clamp connection

Note

Accessories

Note

Type	Qty.	Order No.
WAS5 PRO Bridge	1	8581200000
WAZ5 PRO Bridge	1	8581210000

Note

Note

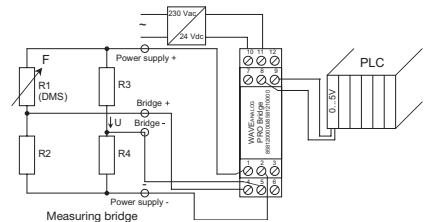
Switch position/setting options

Input voltage	SW 1									
	1	2	3	4	5	6	7	8	9	10
0...10 mV							□	□	□	□
0...20 mV							□	□	□	■
0...50 mV							□	□	■	□
0...100 mV							□	□	■	■
0...200 mV							□	■	□	□
0...500 mV							□	□	■	■
-10 mV...10 mV							■	□	□	□
-20 mV...20 mV							■	□	□	■
-50 mV...50 mV							■	□	■	□
-100 mV...100 mV							■	□	■	■
-200 mV...200 mV							■	■	□	□
-500 mV...500 mV							■	■	□	■
Output										
0...+10 V							□	□		
0...+5 V							□	■		
0...20 mA							■	□		
4...20 mA							■	■		
Bridge supply voltage										
+10V							■	□	□	
+5V							■	□	■	
+4.8...+10.2V adjustable							□	■	□	
+4.8...+10.2V adjustable man. adjustment and offset possible							□	■	■	
Transmission method										
standard output signal										□
inverse output signal										■

■ = on
□ = off

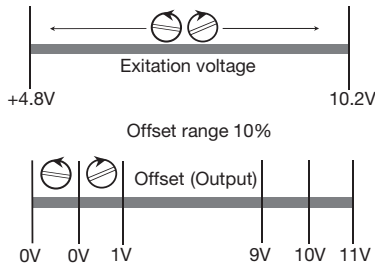
Status LED	
LED on	normal operating
LED off	Error
LED blinks slow	measurement range undershoot U _{in} < U _{max} + 10%
LED blinks fast	measurement range overshoot U _{in} < U _{max} - 10 %

Application



Example for bridge supply voltage

Temperature adjustment:	
Input voltage	0...10 mA
Output	0...10 V
Bridge supply voltage	+4.8...10.2 V
Bridge excitation	1 mV/V
(Declaration from manufacturer)	



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 module fails

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

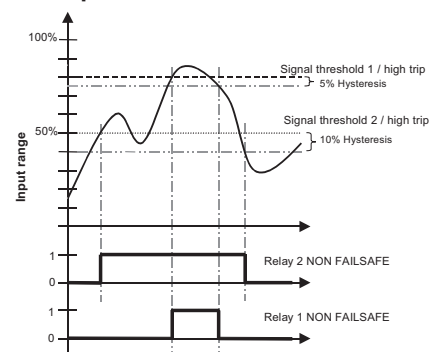
High Trip: Alarm is triggered if the signal is overshoot the threshold.

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.

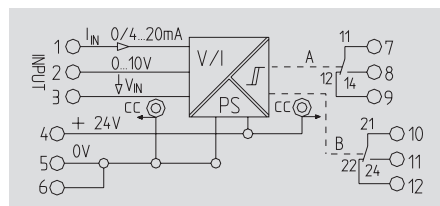
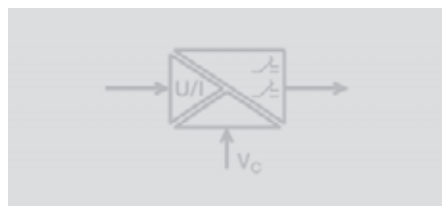
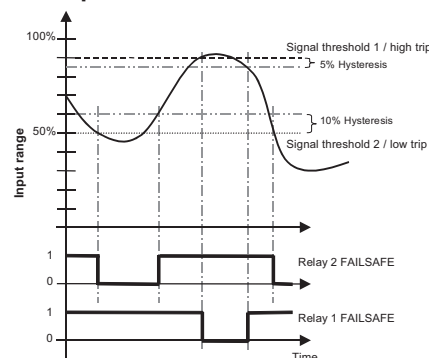
Hysteresis: Adjustments of the hysteresis (1...10%) are made for channel 1 with the potentiometer P3, and separately for channel 2 via potentiometer P3.

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 complement	2 change-over contacts
Contact material	AgNi 90/10
Switching thresholds	1...90% (independently for channel 1 and channel 2)
Hysteresis	1...90% (independently for channel 1 and channel 2)
Switching voltage, min./max.	/253 V AC
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
Operating temperature	0°C...+55°C (fitted)
Storage temperature	-20 °C...+85 °C
Default setting	channel A/B: low trip and FAILSAFE
Approvals	CE / cULus
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
Surge category	III
Clearance & creepage distance	≥ 3 mm
Isolation voltage input, output	2 kV _{eff} / 5 s

Dimensions	
Clamping range (rating- / min. / max.)	mm²
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 x 17.5 x 112.4	92.4 x 17.5 x 112.4
Note	
Tu=23°C, single module	

Ordering data

Type of connection	
Screw connection	
Tension clamp connection	
Note	

Type	Qty.	Order No.
WAS5 DC/Alarm	1	8543820000
WAZ5 DC/Alarm	1	8543880000
Note		

Accessories

Note

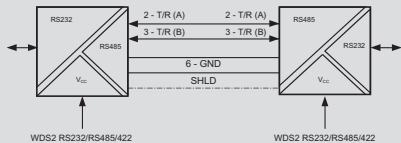
Cross-connectors for power supplies and markers - see WAVESERIES accessories
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WAVESERIES - Serial interface converter

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/Input current	
Assignment	
RS485/422	
Terminating resistors	
Connection	
Bit distortion	
Bit delay	
Control of data direction	
Shield connection	
Status indicator	
max. transmission rate	
Transmission channels	
Transmission distance	
General data	
Supply voltage	
Power consumption	
Operating temperature	
Storage temperature	
Approvals	
Insulation coordination	
Standards	
EMC standards	
Rated voltage	
Impulse withstand voltage	
Pollution severity	
Surge category	
Clearance & creepage distance	
Isolation voltage input, output	
Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

SUB-D9 (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 %
approx. 1.5 W
0°C...+55°C (horiz. mounting)
-20 °C...+85 °C
CE / cURus / GL
EN 50178
EN 61000-6-2, EN 61000-6-4, EN 55011
between adjacent electric circuits: 300 V
between electric circuits and PE: 150 V
4 kV
2
III
between adjacent electric circuits: 3 mm
between electric circuits and PE: 1.5 mm
2 kV DC / 1 min.
Screw connection
2.5 / 0.5 / 2.5
92.4 x 22.5 x 112.4
Tu=23°C, single module

Ordering data

Type of connection	Screw connection
Note	

Type	Qty.	Order No.
WDS2 RS232/RS485/422	1	8615700000

Accessories

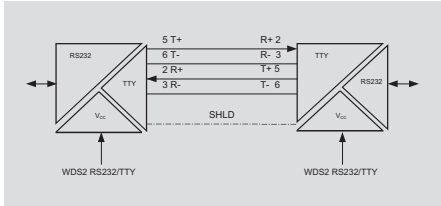
Note

Cross-connectors for power supplies and markers - see WAVESERIES 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

RS232	
Connection/Input current	
Assignment	
TTY	
Connection	
Bit distortion	
Bit delay	
Load	
Shield connection	
Status indicator	
max. transmission rate	
Transmission channels	
Transmission distance	
General data	
Supply voltage	
Power consumption	
Operating temperature	
Storage temperature	
Approvals	
Insulation coordination	
Standards	
EMC standards	
Rated voltage	
Impulse withstand voltage	
Pollution severity	
Surge category	
Clearance & creepage distance	
Isolation voltage input, output	
Dimensions	
Clamping range (rating- / min. / max.)	mm²
Length x width x height	mm
Note	

SUB-D9 (plug) / DTE/DCE switchable with DIP switch
Screw connection
< 1.5%
≤ 3 μs
≤ 500 Ω
KLBU 4-6 Z/1
LED green: supply voltage, TxD, RxD
19.2 kBit/s
full duplex
max. 1000 m twisted pair
24 V DC ± 25 %
approx. 0.8 W
0°C...+55°C (horiz. mounting)
-20 °C...+85 °C
CE;cURus;
EN 50178
EN 61000-6-2, EN 61000-6-4, EN 55011
between adjacent electric circuits: 300 V
between electric circuits and PE: 150 V
4 kV
2
III
between adjacent electric circuits: 3 mm
between electric circuits and PE: 1.5 mm
2 kV DC / 1 min.
Screw connection
2.5 / 0.5 / 2.5
92.4 x 22.5 x 112.4
Tu=23°C, single module

Ordering data

Type of connection	Screw connection
Note	

Type	Qty.	Order No.
WDS2 RS232/TTY	1	8615690000

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories
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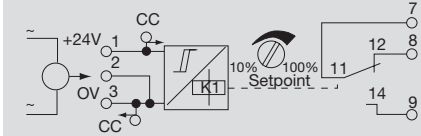
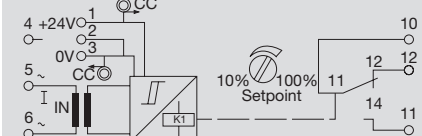
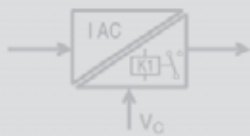
WAVESERIES - Current monitoring

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 1 s
max. voltage	250 V AC
Sensor	Transforming (internally)
Diameter of entry	
Output	
Switching thresholds	adjustable 10...100% with front potentiometer
Hysteresis	5% or 10% of threshold value
Switching voltage, min./max.	6 V AC/DC /60 V DC/ 250 V AC
Switching current min./max.	100 mA /7 A
Continuous current	0.7 A DC / 3 A AC
Step response time	typ. 700 ms
Temperature coefficient	≤ 800 ppm/K
Status indicator	green LED
General data	
Supply voltage	24 V DC ± 10 %
Current consumption	8.3 mA (relay not triggered)/ 24 mA (relay triggered)
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature/Storage temperature	0 °C...+50 °C /-20 °C...+70 °C
Default setting	0...5 A / 10% Hysteresis / operating current principle
Approvals	CE / cULus
Contact complement	1 changeover contact
Insulation coordination	
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Pollution severity	2
Surge category	III
Clearance & creepage distance	≥ 3 mm
Isolation voltage input, output	4 kV _{eff} / 5 s

1/5/10 A AC	
Input current	0...1 A AC/ 0...5 A AC/ 0...10 A AC
Input frequency	50...60 Hz
max. current	100 A for 1 s
max. voltage	250 V AC
Sensor	Transforming (internally)
Diameter of entry	
Output	
Switching thresholds	adjustable 10...100% with front potentiometer
Hysteresis	5% or 10% of threshold value
Switching voltage, min./max.	6 V AC/DC /60 V DC/ 250 V AC
Switching current min./max.	100 mA /7 A
Continuous current	0.7 A DC / 3 A AC
Step response time	typ. 700 ms
Temperature coefficient	≤ 800 ppm/K
Status indicator	green LED
General data	
Supply voltage	24 V DC ± 10 %
Current consumption	8.3 mA (relay not triggered)/ 24 mA (relay triggered)
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature/Storage temperature	0 °C...+50 °C /-20 °C...+70 °C
Default setting	0...5 A / 10% Hysteresis / operating current principle
Approvals	CE / cULus
Contact complement	1 changeover contact
Insulation coordination	
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Pollution severity	2
Surge category	III
Clearance & creepage distance	≥ 3 mm
Isolation voltage input, output	4 kV _{eff} / 5 s

20/40/60 A ac	
Input current	0...20 A AC/ 0...40 A AC/ 0...60 A AC
Input frequency	50...60 Hz
max. current	depends on conductor cross-section
max. voltage	400 V AC, > 400 V AC depends on wire insulation
Sensor	Hall sensor (internal)
Diameter of entry	8 mm
Output	
Switching thresholds	adjustable 10...100% with front potentiometer
Hysteresis	5% or 10% of threshold value
Switching voltage, min./max.	6 V AC/DC /60 V DC/ 250 V AC
Switching current min./max.	100 mA /7 A
Continuous current	0.7 A DC / 3 A AC
Step response time	typ. 700 ms
Temperature coefficient	≤ 250 ppm/K
Status indicator	green LED
General data	
Supply voltage	24 V DC ± 10 %
Current consumption	23 mA (relay not triggered)/ 47 mA (relay triggered)
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature/Storage temperature	0 °C...+50 °C /-20 °C...+70 °C
Default setting	0...40 A / 10% Hysteresis / operating current principle
Approvals	CE / cULus
Contact complement	1 changeover contact
Insulation coordination	
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	4 kV
Pollution severity	2
Surge category	III
Clearance & creepage distance	≥ 3 mm
Isolation voltage input, output	4 kV _{eff} / 5 s

Dimensions	
Clamping range (rating- / min. / max.)	mm²
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 x 22.5 x 112.4	92.4 x 22.5 x 112.4
Tu=23°C, single module	

Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 22.5 x 112.4	92.4 x 22.5 x 112.4
Tu=23°C, single module	

Ordering data

Type of connection
Screw connection
Tension clamp connection
Note

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

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

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories
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Cross-connectors for power supplies and markers - see WAVESERIES accessories
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Analogue output

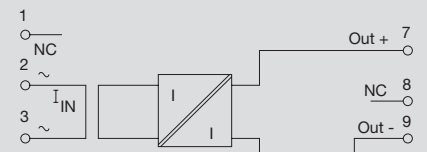
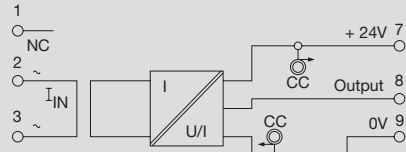
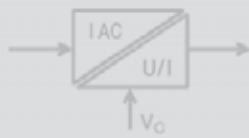
- Input/output electrically isolated
- DIP switches for setting input and output ranges
- No calibration necessary

1/5/10 A AC



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

Loop Powered



Technical data

Input

Input current
Input frequency
max. current
Voltage of measuring circuit
Sensor

0...1 A AC/ 0...5 A AC/ 0...10 A AC
50...60 Hz
100 A for 1s
250 V AC
Transforming (internally)

0...1 A AC/ 0...5 A AC/ 0...10 A AC
50...60 Hz
100 A for 1s
250 V AC
Transforming (internally)

Output

Output current/Output voltage
Offset current
Output signal limit
Load impedance, voltage/Current
Step response time
Accuracy
Temperature coefficient
Status indicator

0(4)...20 mA / 0...10 V
max. 100 μ A
approx. 13 V resp. 24 mA
 $\geq 1 \text{ k}\Omega$ / $\leq 600 \Omega$
typ. 700 ms
0.5% FSR
 $\leq 200 \text{ ppm/K}$
LED ON: OK; FLASHING: signal out of range;
LED OFF: Error

4...20 mA (current loop) /
max. 100 μ A
approx. 24 mA
/ $\leq 600 \Omega$
typ. 700 ms
0.5 % FSR
 $\leq 200 \text{ ppm/K}$
LED ON: OK; FLASHING: signal out of range;
LED OFF: Error

General data

Supply voltage
Current consumption
Current-carrying capacity of cross-connect.
Operating temperature/Storage temperature
Default setting
Approvals

24 V DC $\pm 10 \%$
40 mA at $I_{OUT} = 20 \text{ mA}$
 $\leq 2 \text{ A}$
0 °C...+50 °C / -20 °C...+70 °C
0...5 A AC, 4...20 mA
CE; cULus;

13...30 V DC

0 °C...+50 °C / -20 °C...+70 °C
0...5 A AC, 4...20 mA
CE; cULus;

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Pollution severity
Surge category
Clearance & creepage distance
Isolation voltage input, output

EN 50178 (protective separation)
EN 55011, EN 61000-6
300 V
6 kV
2
III
 $\geq 5,5 \text{ mm}$
4 kV_{eff} / 5 s

EN 50178 (protective separation)
EN 55011, EN 61000-6
300 V
6 kV
2
III
 $\geq 5,5 \text{ mm}$
4 kV_{eff} / 5 s

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Screw connection

2.5 / 0.5 / 2.5
72 x 22.5 x 92.4

Tension clamp connection

1.5 / 0.5 / 2.5
72 x 22.5 x 92.4

Screw connection

2.5 / 0.5 / 2.5
72 x 22.5 x 92.4

Tension clamp connection

1.5 / 0.5 / 2.5
72 x 22.5 x 92.4

Note

Tu=23°C, single module

Tu=23°C, single module

Ordering data

Type of connection

Screw connection
Tension clamp connection

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

Accessories

Note

Cross-connectors for power supplies and markers - see WAVESERIES accessories

WAVESERIES - Current monitoring

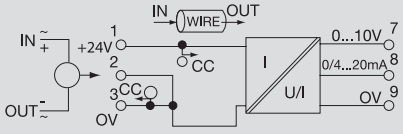
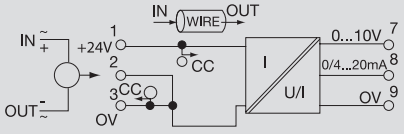
Analogue output

- Input/output electrically isolated
- DIP switches for setting input and output ranges
- No calibration necessary

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 to DC converter)
max. current	depends on conductor cross-section
Voltage of measuring circuit	400 V AC, >400V AC depends on conductor insulation
Sensor	Hall sensor (internal)
Diameter of entry	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 resp. 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 at I _{OUT} = 20 mA
Current-carrying capacity of cross-connect.	≤ 2 A
Operating temperature/Storage temperature	0 °C...+50 °C / -20 °C...+70 °C
Default setting	0...5 A, 4...20 mA
Approvals	CE / cULus
Insulation coordination	
Standards	EN 50178 (protective separation)
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	6 kV
Pollution severity	2
Surge category	III
Clearance & creepage distance	≥ 5,5 mm
Isolation voltage input, output	4 kV _{eff} / 5 s
Dimensions	
Clamping range (rating- / min. / max.)	mm ²
Length x width x height	mm
Note	

0...5 A AC/DC / 0...10 A AC/DC	
0...2 kHz (true RMS to DC converter)	
depends on conductor cross-section	
400 V AC, >400V AC depends on conductor insulation	
Hall sensor (internal)	
8 mm	
0(4)...20 mA / 0...10 V	
max. 150 µA	
approx. 13 V resp. 24 mA	
≥ 1 kΩ / ≤ 600 Ω	
typ. 700 ms	
1 % FSR	
≤ 650 ppm/K	
LED ON: OK; FLASHING: signal out of range;	
LED OFF: Error	
24 V DC ± 10 %	
50 mA at I _{OUT} = 20 mA	
≤ 2 A	
0 °C...+50 °C / -20 °C...+70 °C	
0...5 A, 4...20 mA	
CE / cULus	
EN 50178 (protective separation)	
EN 55011, EN 61000-6	
300 V	
6 kV	
2	
III	
≥ 5,5 mm	
4 kV _{eff} / 5 s	
Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 22.5 x 112.4	92.4 x 22.5 x 112.4
Tu=23°C, single module	

0...20 A AC/DC / 0...25 A AC/DC / 0...30 A AC/DC	
0...2 kHz (true RMS to DC converter)	
depends on conductor cross-section	
400 V AC; >400V AC depends on conductor insulation	
Hall sensor (internal)	
8 mm	
0(4)...20 mA / 0...10 V	
max. 150 µA	
approx. 13 V resp. 24 mA	
≥ 1 kΩ / ≤ 600 Ω	
typ. 700 ms	
1 % FSR	
≤ 650 ppm/K	
LED ON: OK; FLASHING: signal out of range;	
LED OFF: Error	
24 V DC ± 10 %	
50 mA at I _{OUT} = 20 mA	
≤ 2 A	
0 °C...+50 °C / -20 °C...+70 °C	
0...25 A, 4...20 mA	
CE / cULus	
EN 50178 (protective separation)	
EN 55011, EN 61000-6	
300 V	
6 kV	
2	
III	
≥ 5,5 mm	
4 kV _{eff} / 5 s	
Screw connection	Tension clamp connection
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 22.5 x 112.4	92.4 x 22.5 x 112.4
Tu=23°C, single module	

Ordering data

Type of connection
Screw connection
Tension clamp connection
Note

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

Note

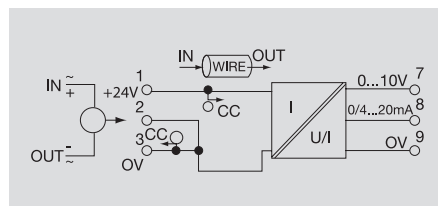
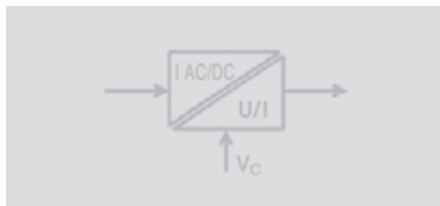
Cross-connectors for power supplies and markers - see WAVESERIES accessories
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Cross-connectors for power supplies and markers - see WAVESERIES accessories
--

Analogue output

- Input/output electrically isolated
- DIP switches for setting input and output ranges
- No calibration necessary

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 to DC converter)
max. current	depends on conductor cross-section
Voltage of measuring circuit	400 V AC, >400V AC depends on conductor insulation
Sensor	Hall sensor (internal)
Diameter of entry	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 resp. 24 mA
Load impedance, voltage/Current	$\geq 1 \text{ k}\Omega$ / $\leq 600 \Omega$
Step response time	typ. 700 ms
Accuracy	1 % FSR
Temperature coefficient	$\leq 650 \text{ ppm/K}$
Status indicator	LED ON: OK; FLASHING: signal out of range; LED OFF: Error
General data	
Supply voltage	24 V DC $\pm 10 \%$
Current consumption	50 mA at $I_{OUT} = 20 \text{ mA}$
Current-carrying capacity of cross-connect.	$\leq 2 \text{ A}$
Operating temperature/Storage temperature	0 °C...+50 °C / -20 °C...+70 °C
Default setting	0...50 A, 4...20 mA
Approvals	CE / cULus
Insulation coordination	
Standards	EN 50178 (protective separation)
EMC standards	EN 55011, EN 61000-6
Rated voltage	300 V
Impulse withstand voltage	6 kV
Pollution severity	2
Surge category	III
Clearance & creepage distance	$\geq 5,5 \text{ mm}$
Isolation voltage input, output	4 kV _{eff} / 5 s
Dimensions	
Clamping range (rating- / min. / max.)	mm ²
Length x width x height	mm
Note	
Tu=23°C, single module	
Screw connection	
2.5 / 0.5 / 2.5	1.5 / 0.5 / 2.5
92.4 x 22.5 x 112.4	92.4 x 22.5 x 112.4
Tension clamp connection	

Ordering data

Type of connection	Type	Qty.	Order No.
Screw connection	WAS2 CMA 40/50/60A uc	1	8513330000
Tension clamp connection	WAZ2 CMA 40/50/60A uc	1	8526590000
Note			

Accessories

Note
Cross-connectors for power supplies and markers - see WAVESERIES accessories

WAVESERIES - Voltage monitoring

Relay output

- 3-way isolation
- Monitoring of single-phase systems up to 260 V AC/DC
- 4 input ranges selected by DIP switches
- 1 relay with change-over contact
- Switchable hysteresis
- Switch adjusted via potentiometer
- Reset input

VMR V AC

single-phase

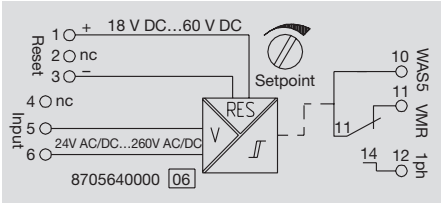


Table of setting options

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				□	■	□	□	
Trip								
High Trip		■						
Low Trip		□						
Memory								
Memory on		□						
Memory out			■					
Hysteresis								
Hysteresis small			□					
Hysteresis large				■				
Input voltage								
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.)

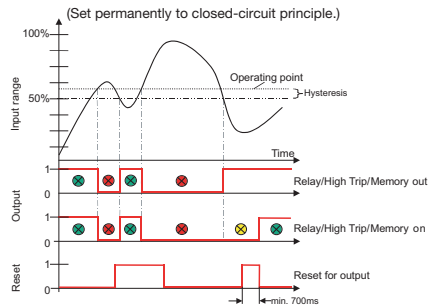
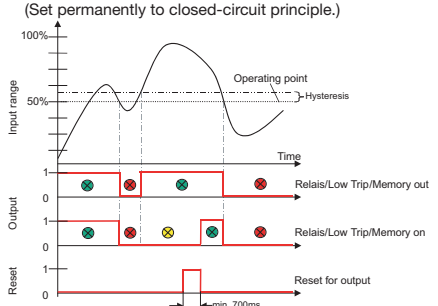


Abb.2: Undervoltage monitoring
Alarm set to "low trip"
(Set permanently to closed-circuit principle.)



Technical data

Input	
Input voltage	24...70 / 70...140 / 140...210 / 210...260 V AC / DC
Input frequency	50...60 Hz
max. voltage	260 V AC / DC
Output	
Switching voltage, min./max.	/250 V AC
Switching current min./max.	/8 A
Continuous current/AC switching capacity	3 A /1000 VA
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 red/yellow = alarm status
General data	
Supply voltage	from the measuring circuit
Reset input voltage, min.-max.	18 V DC-30 V DC
Pulse length, min.	700 ms
Default setting	DIP switches: ON = 1,2,5,8 / OFF = 3,4,6,7
Operating temperature	-10°C...+55°C single module
Storage temperature	-20 °C...+70 °C
Approvals	CE / cULus
Insulation coordination	
Standards	EN 50178
EMC standards	EN 55011, EN 61000-6 /-2, 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
Isolation voltage input, output	2 kV _{eff}
Surge category	III
Pollution severity	2
Clearance & creepage distance	input/output, input/reset input, reset input/output: 3 mm
Dimensions	
Clamping range (rating- / min. / max.)	mm ²
Length x width x height	mm
Note	

Screw connection		
	2.5 / 0.5 / 2.5	
	96.5 x 17.5 x 112.5	
Type		
WAS5 VMR 1ph	Qty. 1	Order No. 8705640000
Note		

Ordering data

Type of connection	
	Screw connection
Note	

Accessories

Note	
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Markers see Accessories WAVESERIES	
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Relay output

- 2-way isolation
- Monitoring of single and 3-phase networks of 80...400 V AC/DC
- Setting via DIP switch
- Under- and overvoltage monitoring
- Phase-failure detection
- 2 relays with changeover contact

VMR V AC

3-phase

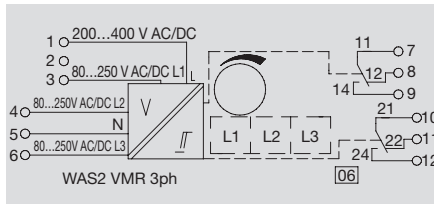


Table of setting options

Input	1	2	3	4
3 phases 80 V AC/DC...250 VAC/DC		■		
1 phase 200 V AC/DC...400 VAC/DC		□		
Limit value				
Setting to upper switching point	■			
Setting to lower switching point	□			
Hysteresis				
Hysteresis, small		■		
Hysteresis, large		□		
Fault tolerance				
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 limit value 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

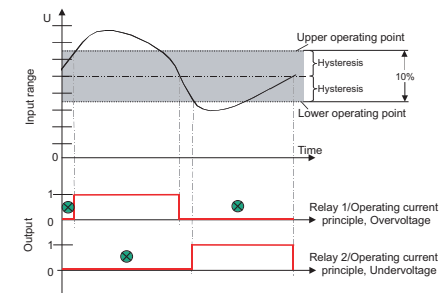
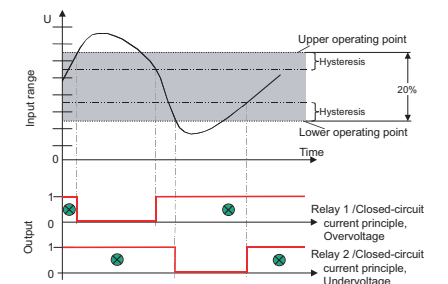


Fig. 2: Overvoltage and undervoltage monitoring, example of setting

- 3-phase monitoring
- Setting limit value 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



Technical data

Input

Input voltage 3~
Input voltage 1~
Input current

Output

Switching voltage, min./max.
Continuous current/AC switching capacity
Hysteresis
Temperature coefficient
Step response time
Repeat accuracy
Status indicator

General data

Supply voltage
Reset input voltage, min.-max.
Pulse length, min.
Default setting
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards
Rated voltage
Impulse withstand voltage
Isolation voltage input, output
Surge category
Pollution severity
Clearance & creepage distance

80...250 V AC/DC
200...400 V AC/DC
< 15 mA AC / < 10 mA DC

/250 V AC

3 A /750 VA

5% of final value

≤ 300 ppm/K

< 300 ms

< 0.3% of set range

green LED

from the measuring circuit

-

DIP switches: ON = 1,2,4 / OFF = 3

0 °C...+50 °C

-25 °C...+85 °C

CE; cULUS;

EN 50178

EN 55011, EN 61000-6 /-2, EN 61326

600 V

6 kV

4 kV_{eff} / 1 min.

III

2

Output circuit: 1.8 mm; input circuit, output circuit 1/output circuit 2: 3 mm; input/output: 5.5 mm

Dimensions

Clamping range (rating- / min. / max.)
Length x width x height

mm²
mm

Note

Screw connection

2.5 / 0.5 / 2.5
96.5 x 22.5 x 112.5

Ordering data

Type of connection

Screw connection

Type

WAS2 VMR 3ph

Qty.

1

Order No.

8705630000

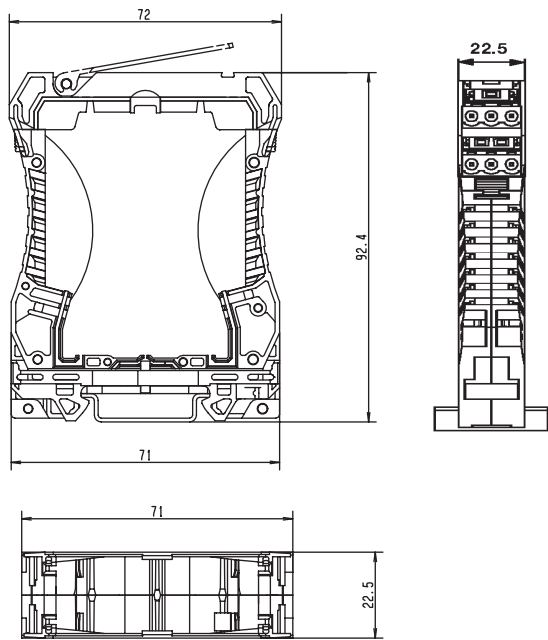
Note

Accessories

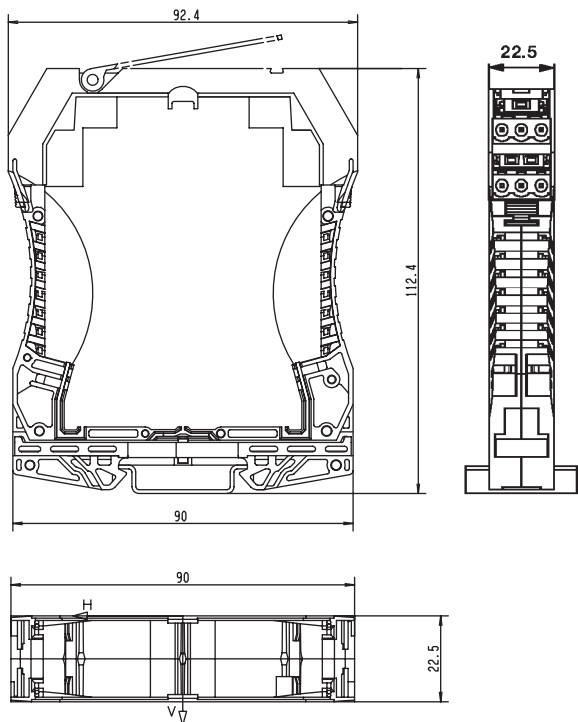
Note

Markers see Accessories WAVESERIES

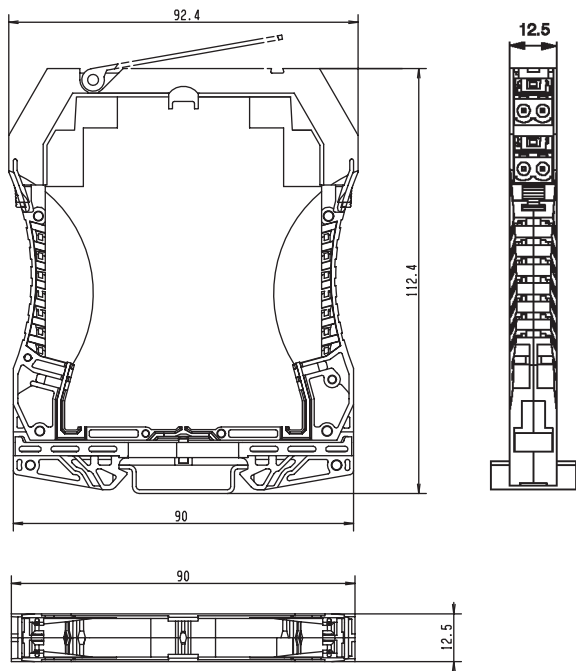
WAVEBOX S 22.5



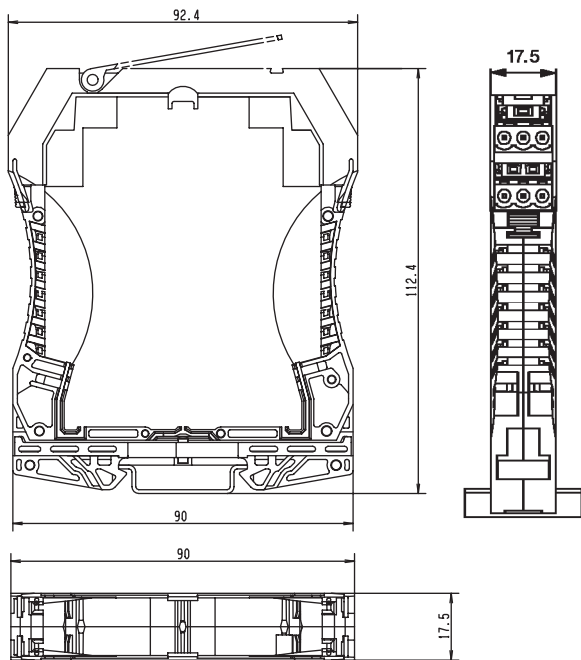
WAVEBOX L 22.5



WAVEBOX 12.5



WAVEBOX 17.5



Dimensions in mm

Accessories	Type	Qty	Order No.
Cross-connection ZQV 2.5N/2, black	ZQV 2.5N/2 sw	60	1718080000
Cross-connection ZQV 2.5N/2, red	ZQV 2.5N/2 rt	60	1717900000
Cross-connection ZQV 2.5N/2, blue	ZQV 2.5N/2 bl	60	1717990000
Cross-connection ZQV 2.5N/2, yellow	ZQV 2.5N/2 ge	60	1693800000
Markers			
WS 10/5 MultiCard for plotter labelling	WS10/5	144	1061160000
WS 10/5 blank	WS10/5 Blank	200	1060860000



CMA - Current monitoring

Analogue output

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

CMA 100/5 A

CMA 250/5 A

CMA 500/5 A



D

Technical data

Input

Input current
Input frequency
max. current
Voltage of measuring circuit
Diameter of entry

Output

Output current
Load impedance, voltage/Current
Accuracy

General data

Operating temperature
Storage temperature
Approvals

Insulation coordination

Isolation voltage input, output

100 A AC
Class 1: 50...60Hz / Class 1.5: 16...400Hz
Thermal current $I_{th} > 3$ kA
600 V_{eff} (unfinished conductor)
35 mm

5 A AC
/≤ 600 Ω
class 1 / 1.5; residual current factor < 5

-5 °C...+40 °C
-40 °C...+85 °C
CE;cURus;

4 kV_{eff} / 1 min.

250 A AC
Class 1: 50...60Hz / Class 1.5: 16...400Hz
Thermal current $I_{th} > 3$ kA
600 V_{eff} (unfinished conductor)
35 mm

5 A AC
/≤ 600 Ω
class 1 / 1.5; residual current factor < 5

-5 °C...+40 °C
-40 °C...+85 °C
CE;cURus;

4 kV_{eff} / 1 min.

500 A AC
Class 1: 50...60Hz / Class 1.5: 16...400Hz
Thermal current $I_{th} > 3$ kA
600 V_{eff} (unfinished conductor)
35 mm

5 A AC
/≤ 600 Ω
class 1 / 1.5; residual current factor < 5

-5 °C...+40 °C
-40 °C...+85 °C
CE;cURus;

4 kV_{eff} / 1 min.

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

Screw connection (secondary)

50 x 78 x 90.5

Screw connection (secondary)

50 x 78 x 90.5

Screw connection (secondary)

50 x 78 x 90.5

Ordering data

Type of connection

Screw connection (secondary)

Type	(Qty.=1)	Order No.
CMA 100/5A		8662140000

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

Type	(Qty.=1)	Order No.
CMA 500/5A		8664580000

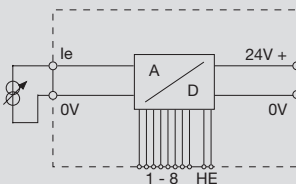
Note

Accessories

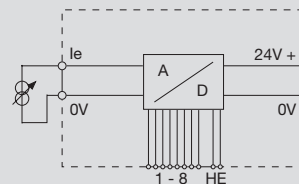
Note

- Hold function for storing the current bit combination
- More information and table for input/output characteristics of A/D, D/A converters available at www.weidmueller.com => downloads

RS I-D8 0...20 mA



RS I-D8 4...20 mA



Input

Input voltage/Input current
max. voltage/max. current
Input resistance, voltage/Current

Output

- Number of outputs
- Output level
- Signs
- Output current
- Accuracy
- Cut-off frequency (-3dB)
- Conversion time

General data

- Supply voltage
- Current consumption
- Operating 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 sign)
17 V $\equiv$ H, 0 V $\equiv$ L

$\leq 25 \text{ mA}$ (as source)
$\pm 1 \text{ LSB}$
5 kHz at full scale (sinus)
$\leq 4 \text{ } \mu\text{s}$

24 V DC $\pm$ 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
$\geq 51 \Omega$

8 Bit (1-bit sign)

17 V $\equiv$ H, 0 V $\equiv$ L

$\leq 25 \text{ mA}$ (as source)
$\pm 1 \text{ LSB}$
5 kHz at full scale (sinus)
$\leq 4 \text{ }\mu\text{s}$

24 V DC $\pm$ 20 %
35 mA (plus output current)
0 °C...+50 °C
-40 °C...+80 °C
CE;

EN 50178
EN 61000-6

Dimensions

Clamping range (rating- / min. / max.)	mm ²
Length x width x height	mm

Note

Screw connection

$$\frac{4 / 0.5 / 4}{70 \times 35 \times 72}$$

Screw connection

$$\frac{4 / 0.5 / 4}{70 \times 35 \times 72}$$

Ordering data

Type of connection	Screw connection

Note

Type	Qty.	Order No.
RS I-D8 0...20MA	1	1160561001

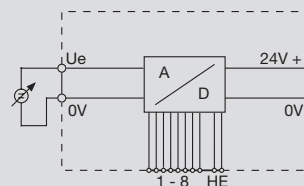
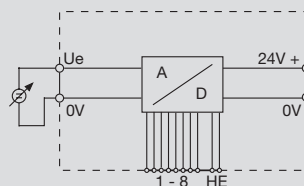
Type	Qty.	Order No.
RS I-D8 4...20MA	1	1168561001

Accessories

Note

AD converter, 8-bit

- Hold function for storing the current bit combination
- More information and table for input/output characteristics of A/D, D/A converters available at www.weidmueller.com => downloads

RS U-D8 +/-10 V**RS U-D8 0...10 V****Technical data****Input**

Input voltage/Input current
max. voltage/max. current
Input resistance, voltage/Current

Output

Number of outputs
Output level
Signs
Output current
Accuracy
Cut-off frequency (-3dB)
Conversion time

General data

Supply voltage
Current consumption
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards

-10...+10 V /
/≤ 55 μA
≥ 200 kΩ /

8 Bit (1-bit sign)
17 V = H, 0 V = L
MSB: H = positive; L = negative
≤ 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

0...10 V /
/≤ 25 μA
≥ 400 kΩ /

8 Bit (1-bit sign)
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 (rating- / min. / max.) mm²
Length x width x height mm

Note**Screw connection**

4 / 0.5 / 4
70 x 35 x 72

Screw connection

4 / 0.5 / 4
70 x 35 x 72

Ordering data**Type of connection**

Screw connection

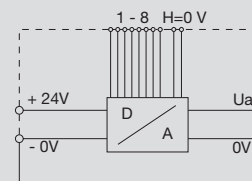
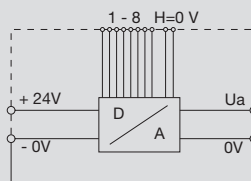
Type	Qty.	Order No.
RS U-D8 +/-10V	1	1122361001

Type	Qty.	Order No.
RS U-D8 0...10V	1	1160361001

Note**Accessories****Note**

DA converter 8-bit

- Hold function for storing the current bit combination
- More information and table for input/output characteristics of A/D, D/A converters available at www.weidmueller.com => downloads

RS D8-U +/-10 V**RS D8-U 0...10 V****Technical data****Input**

Input/Output
max. voltage
max. 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
Operating temperature
Storage temperature
Approvals

Insulation coordination

Standards
EMC standards

8 Bit / Analogue
max. 30 V
2.5 mA
5...24 V /
50 k Ω per input /
MSB: H = positive; L = negative

-10...+10 V / $\leq$ 10 mA max. current
/ $\leq$ 20 mV
 $\geq$ 1 k Ω /
 $\pm$ 1 LSB
 $\leq$ 30 μ s

24 V DC $\pm$ 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 k Ω per input /

0...10 V / $\leq$ 10 mA max. current
/ $\leq$ 20 mV
 $\geq$ 1 k Ω /
 $\pm$ 1 LSB
 $\leq$ 30 μ s

24 V DC $\pm$ 20 %
25 mA (plus output current)
0 °C...+50 °C
-40 °C...+80 °C
CE

EN 50178
EN 61000-6

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note**Screw connection**

4 / 0.5 / 4
70 x 35 x 72

Screw connection

4 / 0.5 / 4
70 x 35 x 72

Ordering data**Type of connection**

Screw connection

Type	Qty.	Order No.
RS D8-U +/-10V	1	1123361001

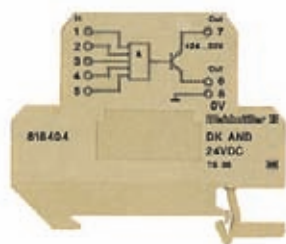
Type	Qty.	Order No.
RS D8-U 0...10V	1	1160761001

Note**Accessories****Note**

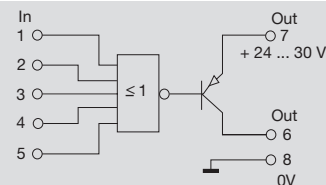
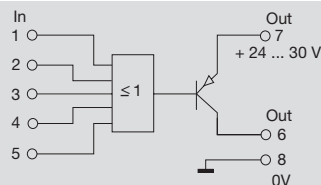
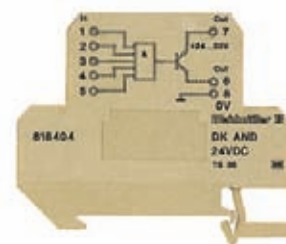
Preprocessing logic

- Logic functions (5 inputs)
- Compact design
- Relieves PLC

OR



NOR



Technical data

Input

Rated input level
Input current
max. voltage
Pulse duration

Output

Output level
Output current
Switching thresholds

General data

Supply voltage
Current consumption
Operating temperature
Storage temperature
Approvals

24 V DC= High, 0 V = Low
approx. 1.5 mA per input (24 V)
30 V DC
≥ 50 μs

PNP, Ub-1.8 V
max. 20 mA
high <15 V, low < 9 V

24...30 V DC
< 5 mA
0 °C...+50 °C
-40 °C...+60 °C
CE

24 V DC= High, 0 V = Low
approx. 1.5 mA per input (24 V)
30 V DC
≥ 50 μs

PNP, Ub-1.8 V
max. 20 mA
high <15 V, low < 9 V

24...30 V DC
< 5 mA
0 °C...+50 °C
-40 °C...+60 °C
CE

Dimensions

Clamping range (rating- / min. / max.) mm²
Length x width x height mm

Note

Screw connection

4 / 0.5 / 4
65 x 12 x 57

Screw connection

4 / 0.5 / 4
65 x 12 x 57

Ordering data

Type of connection

Screw connection

Type	Qty.	Order No.
DK OR 35 24VDC	5	8218440000

Type	Qty.	Order No.
DK NOR 35 24VDC	5	8248330000

Note

Accessories

Note

End plate
AP DK4 0687560000

End plate
AP DK4 0687560000

Distributors with preprocessing electronics



SAI-E processes signals for logic functions AND, OR, NAND and NOR with further version are in preparation. Four inputs can be coupled logically with one output.

The different versions are available in a plastic hood with an M12 plug-in connector in plug&play format, or in a metal hood with a cable gland for assembly by the user.

The logic distributor in the plastic hood can be connected using a pre-assembled M12 cable but also directly to a PCB (both in the same hood or a similar one).

In situ signal processing offers many advantages, with users avoiding the need for large multi core cables with a large number of poles and saving time and material costs. Savings can also be made at the input cards of the PLC by using one input instead of four.

The advantages:

- Cost-savings
- Savings in materials:
 - cables with just a few cores
 - fewer input ports required at the PLC
 - fewer cables to be connected
 - fewer cabling errors
- Hoods easily mounted on standard base module

If an input is not used, an input can be set to active with the simulation plug.



Pin assignment table, hood

Pin	Signal	Description
1	+24 V DC	Voltage supply, logic and sensors
2	+0 V	Reference potential, logic and sensors
3	PE	Earth
4	Output 1 +24 V	Logically connected output 1
5	Output 2 +24 V	Logically connected output 2

Pin assignment table, 5-pole M12 plug

Pin	Voltage	Description
1	+24 V	Voltage supply, +24 V DC, logic and sensors
3	GND	Voltage supply, 0 V DC, logic and sensors
5	PE	Earth
2	Output 1 +24 V	Logically connected output 1
4	Output 2 +24 V	Logically connected output 2

Ordering data

Type	Qty	Order No.
Electronic hood		
SAI-EH-8E/2A logik UND	1	1805420000
SAI-EH-8E/2A logik ODER	1	1816580000
SAI-EH-8E/2A logik NAND	1	1816590000
SAI-EH-8E/2A logik NOR	1	1816570000
Plastic hood		
SAI-EHK-8E/2A logik AND	1	1851830000
SAI-EHK-8E/2A logik NAND	1	1851820000
SAI-EHK-8E/2A logik OR	1	1851810000
SAI-EHK-8E/2A logik NOR	1	1851800000
Base module		
SAI-8 4P M12 UT for 8 inputs	1	1705941000
SAI-4 4P M12 UT for 4 inputs	1	1705921000
Simulation plug		
SAIS-T-4/1-K	1	8726310000

