

# Signal conditioner - MACX MCR-UI-UI-UP-SP-NC - 2811569

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Isolating amplifier with safe electrical isolation and wide-range power supply (24 V ... 230 V AC/DC). DIP switches on the front, over 1600 signal conversions can be set. Standard configuration (IN 0 ... 10 V/OUT 0 ... 20 mA), spring-cage connection, SIL.

## Product Features

- Over 1600 signal conversions can be set via DIP switches on the front
- Installation in zone 2 permitted
- Up to SIL 2 according to EN 61508
- Analog signal conditioner for isolating, filtering, amplifying, and converting standard analog signals
- Plug-in screw or spring-cage connection technology (Push-in technology)
- Active or passive output
- Configurable input and output signals including bipolar current and voltage signals
- Status indicator for supply voltage
- Wide-range power supply of 19.2 ... 253 V AC/DC
- 3-way electrical isolation



## Key commercial data

package_quantity	1
GTIN	4046356466998

## Technical data

Note:

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
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## Dimensions

Width	12.5 mm
Height	99 mm
Depth	114.5 mm

## Ambient conditions

Ambient temperature (operation)	-20 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Maximum altitude	≤ 2000 m

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## Technical data

### Ambient conditions

Degree of protection	IP20
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### Input data

Voltage input signal	0 mV ... 50 mV
Voltage input signal	0 mV ... 60 mV
Voltage input signal	0 mV ... 75 mV
Voltage input signal	0 mV ... 100 mV
Voltage input signal	0 mV ... 120 mV
Voltage input signal	0 mV ... 150 mV
Voltage input signal	0 mV ... 200 mV
Voltage input signal	0 mV ... 300 mV
Voltage input signal	0 mV ... 500 mV
Voltage input signal	0 V ... 1 V
Voltage input signal	0 V ... 1.5 V
Voltage input signal	0 V ... 2 V
Voltage input signal	0 V ... 3 V
Voltage input signal	0 V ... 5 V
Voltage input signal	0 V ... 10 V (Configurable via DIP switches)
Voltage input signal	0 V ... 15 V
Voltage input signal	0 V ... 20 V
Voltage input signal	0 V ... 30 V
Voltage input signal	0 V ... 50 V
Voltage input signal	0 V ... 100 V
Voltage input signal	-50 mV ... 50 mV
Voltage input signal	-60 mV ... 60 mV
Voltage input signal	-75 mV ... 75 mV
Voltage input signal	-100 mV ... 100 mV
Voltage input signal	-120 mV ... 120 mV
Voltage input signal	-150 mV ... 150 mV
Voltage input signal	-200 mV ... 200 mV
Voltage input signal	-300 mV ... 300 mV
Voltage input signal	-500 mV ... 500 mV
Voltage input signal	-1 V ... 1 V
Voltage input signal	-1.5 V ... 1.5 V
Voltage input signal	-2 V ... 2 V
Voltage input signal	-3 V ... 3 V
Voltage input signal	-5 V ... 5 V
Voltage input signal	-10 V ... 10 V
Voltage input signal	-15 V ... 15 V
Voltage input signal	-20 V ... 20 V
Voltage input signal	-30 V ... 30 V
Voltage input signal	-50 V ... 50 V

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## Technical data

### Input data

Voltage input signal	-100 V ... 100 V
Voltage input signal	1 V ... 5 V
Voltage input signal	2 V ... 10 V
Current input signal	0 mA ... 1 mA (Configurable via DIP switches)
Current input signal	0 mA ... 1.5 mA
Current input signal	0 mA ... 2 mA
Current input signal	0 mA ... 3 mA
Current input signal	0 mA ... 5 mA
Current input signal	0 mA ... 10 mA
Current input signal	0 mA ... 15 mA
Current input signal	0 mA ... 20 mA
Current input signal	0 mA ... 30 mA
Current input signal	0 mA ... 50 mA
Current input signal	0 mA ... 100 mA
Current input signal	-1 mA ... 1 mA
Current input signal	-1.5 mA ... 1.5 mA
Current input signal	-2 mA ... 2 mA
Current input signal	-3 mA ... 3 mA
Current input signal	-5 mA ... 5 mA
Current input signal	-10 mA ... 10 mA
Current input signal	-15 mA ... 15 mA
Current input signal	-20 mA ... 20 mA
Current input signal	-30 mA ... 30 mA
Current input signal	-50 mA ... 50 mA
Current input signal	-100 mA ... 100 mA
Current input signal	1 mA ... 5 mA
Current input signal	2 mA ... 10 mA
Current input signal	4 mA ... 20 mA
Max. input voltage	± 100 V
Max. input current	± 100 mA
Input resistance of voltage input	approx. 1 MΩ (± 1 V DC ... ± 100 V DC)
Input resistance current input	approx. 10 Ω (± 10 mA DC ... ± 100 mA DC)

### Output data

Configurable/programmable	Yes, can be switched
Voltage output signal	0 V ... 10 V (Configurable via DIP switches)
Voltage output signal	0 V ... 5 V
Voltage output signal	2 V ... 10 V
Voltage output signal	1 V ... 5 V
Voltage output signal	-10 V ... 10 V
Voltage output signal	-5 V ... 5 V
Voltage output signal	0 V ... 2.5 V

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## Technical data

### Output data

Voltage output signal	0.5 V ... 2.5 V
Voltage output signal	-2.5 V ... 2.5 V
Current output signal	0 mA ... 5 mA
Current output signal	0 mA ... 10 mA
Current output signal	0 mA ... 20 mA (Configurable via DIP switches)
Current output signal	1 mA ... 5 mA
Current output signal	2 mA ... 10 mA
Current output signal	4 mA ... 20 mA
Current output signal	-5 mA ... 5 mA
Current output signal	-10 mA ... 10 mA
Current output signal	-20 mA ... 20 mA
Max. output voltage	15 V
Max. output current	35 mA
Load/output load voltage output	≥ 1 kΩ (10 V)
Load/output load current output	≤ 600 Ω (20 mA; active)
Load/output load current output	(passive: ≤ (UB-2 V) / I <sub>outmax</sub> )

### Power supply

Supply voltage range	24 V ... 230 V AC/DC (-20%/+10%, 50/60 Hz)
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### Connection data

Connection method	Spring-cage conn.
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	1.5 mm <sup>2</sup>
Conductor cross section stranded min.	0.2 mm <sup>2</sup>
Conductor cross section stranded max.	1.5 mm <sup>2</sup>
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	16
Stripping length	8 mm
Connection method	COMBICON

### General

Maximum transmission error	≤ 0.1 % (Compared to the final value)
Maximum temperature coefficient	0.0075 %/K
Limit frequency (3 dB)	10 kHz (Can be switched to 30 Hz)
Alignment zero	± 4 %
Alignment span	± 4 %
Step response (10-90%)	35 μs (at 10 kHz)
Step response (10-90%)	11 ms (At 30 Hz)
Protective circuit	Transient protection
Surge voltage category	II
Pollution degree	2
Rated insulation voltage	300 V AC

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## Technical data

### General

<b>Color</b>	green
<b>Housing material</b>	PA 66-FR
<b>Mounting position</b>	Any
<b>Conformance</b>	CE-compliant
<b>ATEX</b>	# II 3 G Ex nA IIC T4 Gc
<b>IECEX</b>	Ex nA IIC T4 Gc
<b>Functional safety (SIL)</b>	SIL 2

### Safety characteristic data

<b>Integrity requirement</b>	IEC 61508 - Low demand
<b>Designation</b>	Input isolator (live zero signals)
<b>Architecture</b>	Single-channel, 1oo1
<b>Equipment type</b>	Type A
<b>Safety Integrity Level (SIL)</b>	Up to 2
<b>Safe Failure Fraction (SFF)</b>	85.9 %
<b>MTBF</b>	231 Years
$\lambda_{SU}$	$3.7 \times 10^{-7}$ (370 FIT)
$\lambda_{SD}$	0
$\lambda_{DU}$	$6 \times 10^{-8}$ (60 FIT)
$\lambda_{DD}$	0
<b>Probability of a hazardous failure on demand (PFD<sub>AVG</sub>)</b>	$2.7 \times 10^{-4}$ (1 year)
<b>Diagnostic coverage (DC)</b>	0 %
<b>Integrity requirement</b>	IEC 61508 - Low demand
<b>Designation</b>	Output isolator (live zero signals)
<b>Architecture</b>	Single-channel, 1oo1
<b>Equipment type</b>	Type A
<b>Safety Integrity Level (SIL)</b>	Up to 2
<b>Safe Failure Fraction (SFF)</b>	82.7 %
<b>MTBF</b>	233 Years
$\lambda_{SU}$	$3.5 \times 10^{-7}$ (350 FIT)
$\lambda_{SD}$	0
$\lambda_{DU}$	$7.3 \times 10^{-8}$ (73 FIT)
$\lambda_{DD}$	0
<b>Probability of a hazardous failure on demand (PFD<sub>AVG</sub>)</b>	$3.2 \times 10^{-4}$ (1 year)
<b>Diagnostic coverage (DC)</b>	0 %
<b>Integrity requirement</b>	IEC 61508 - High demand
<b>Designation</b>	Input isolator (live zero signals)
<b>Architecture</b>	Single-channel, 1oo1
<b>Equipment type</b>	Type A
<b>Safety Integrity Level (SIL)</b>	Up to 2
<b>Safe Failure Fraction (SFF)</b>	85.9 %

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## Technical data

### Safety characteristic data

<b>MTBF</b>	231 Years
$\lambda_{SU}$	$3.7 \times 10^{-7}$ (370 FIT)
$\lambda_{SD}$	0
$\lambda_{DU}$	$5.97 \times 10^{-8}$ (59.7 FIT)
$\lambda_{DD}$	0
<b>Probability of a hazardous failure per hour (PFH<sub>D</sub>)</b>	$6.0 \times 10^{-8}$
<b>Diagnostic coverage (DC)</b>	0 %
<b>Integrity requirement</b>	IEC 61508 - High demand
<b>Designation</b>	Output isolator (live zero signals)
<b>Architecture</b>	Single-channel, 1oo1
<b>Equipment type</b>	Type A
<b>Safety Integrity Level (SIL)</b>	Up to 2
<b>Safe Failure Fraction (SFF)</b>	82.7 %
<b>MTBF</b>	233 Years
$\lambda_{SU}$	$3.5 \times 10^{-7}$ (350 FIT)
$\lambda_{SD}$	0
$\lambda_{DU}$	$7.3 \times 10^{-8}$ (73 FIT)
$\lambda_{DD}$	0
<b>Probability of a hazardous failure per hour (PFH<sub>D</sub>)</b>	$7.3 \times 10^{-8}$
<b>Diagnostic coverage (DC)</b>	0 %

## classifications

### eCl@ss

<b>eCl@ss 4.0</b>	27210120
<b>eCl@ss 4.1</b>	27210120
<b>eCl@ss 5.0</b>	27210120
<b>eCl@ss 5.1</b>	27210120
<b>eCl@ss 6.0</b>	27210120
<b>eCl@ss 7.0</b>	27210120
<b>eCl@ss 8.0</b>	27210120

### ETIM

<b>ETIM 2.0</b>	EC001485
<b>ETIM 3.0</b>	EC001485
<b>ETIM 4.0</b>	EC001485
<b>ETIM 5.0</b>	EC001485

### UNSPSC

<b>UNSPSC 6.01</b>	30211506
<b>UNSPSC 7.0901</b>	39121008
<b>UNSPSC 11</b>	39121008

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## classifications

### UNSPSC

UNSPSC 12.01	39121008
UNSPSC 13.2	39121008

## approvals

IECEX / ATEX / UL Listed / cUL Listed / cULus Listed / UL Listed / cUL Listed / GL / Functional Safety / cULus Listed /

### Approval details

IECEX

ATEX

UL Listed

cUL Listed

cULus Listed

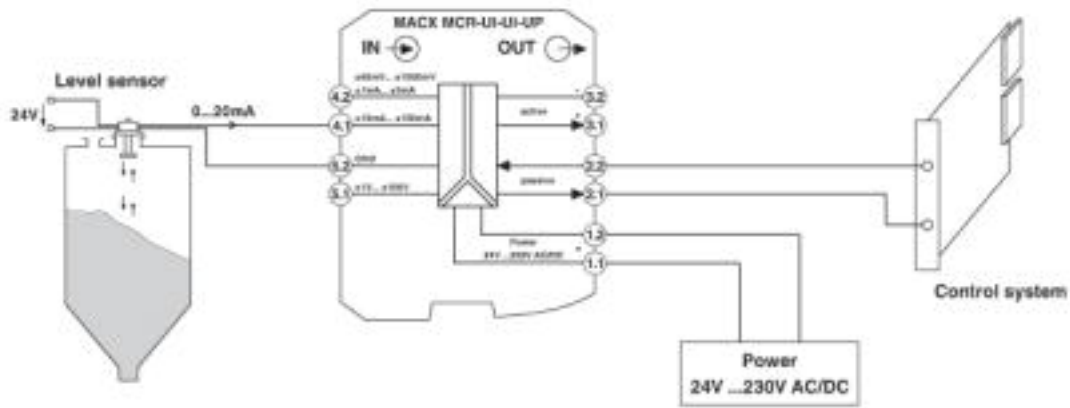
GL

Functional Safety

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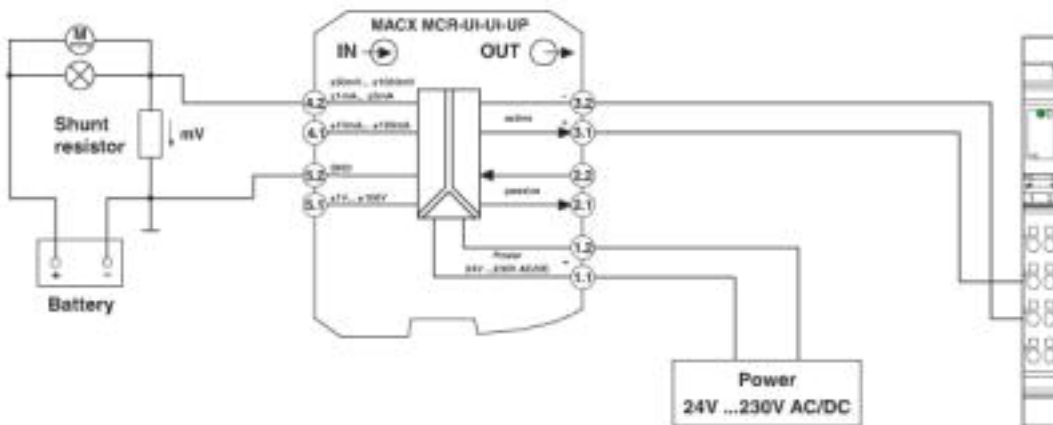
## Drawings

### Application drawing



Level measurement with analog input terminals (active input card)

### Application drawing

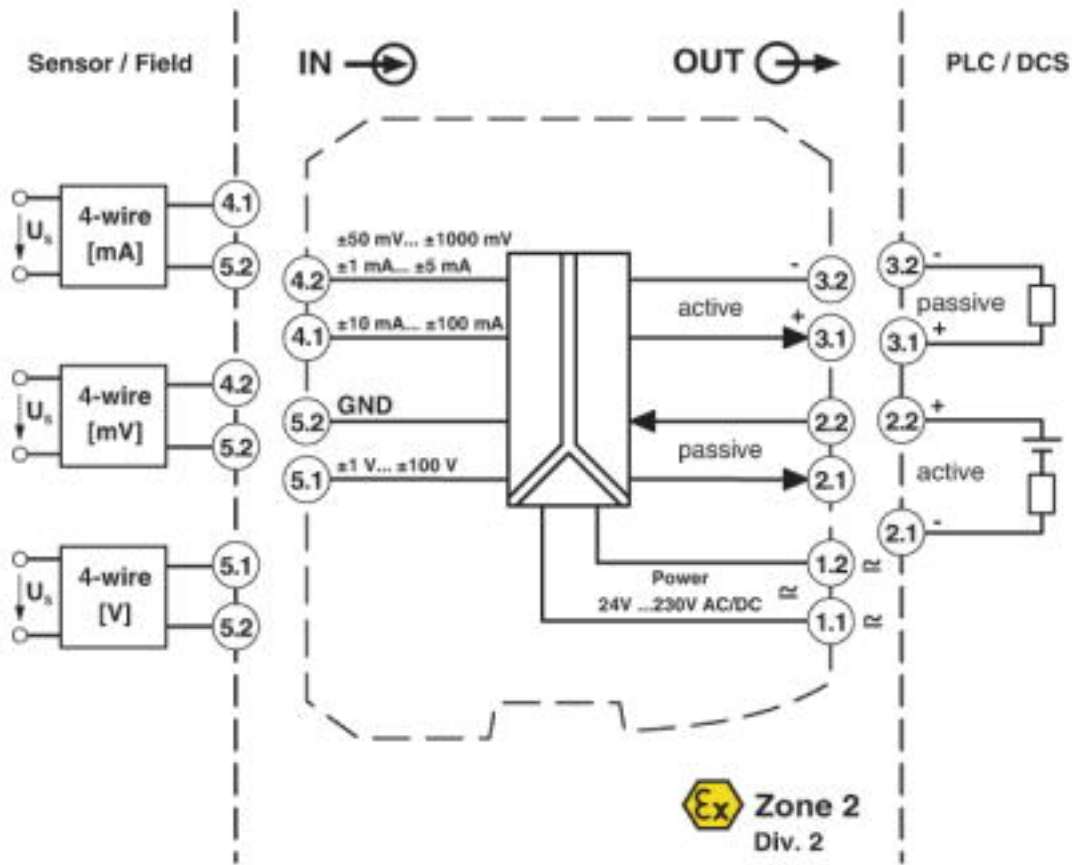


Shunt measurement and Inline terminal with analog input channels within an Inline station (passive input card)



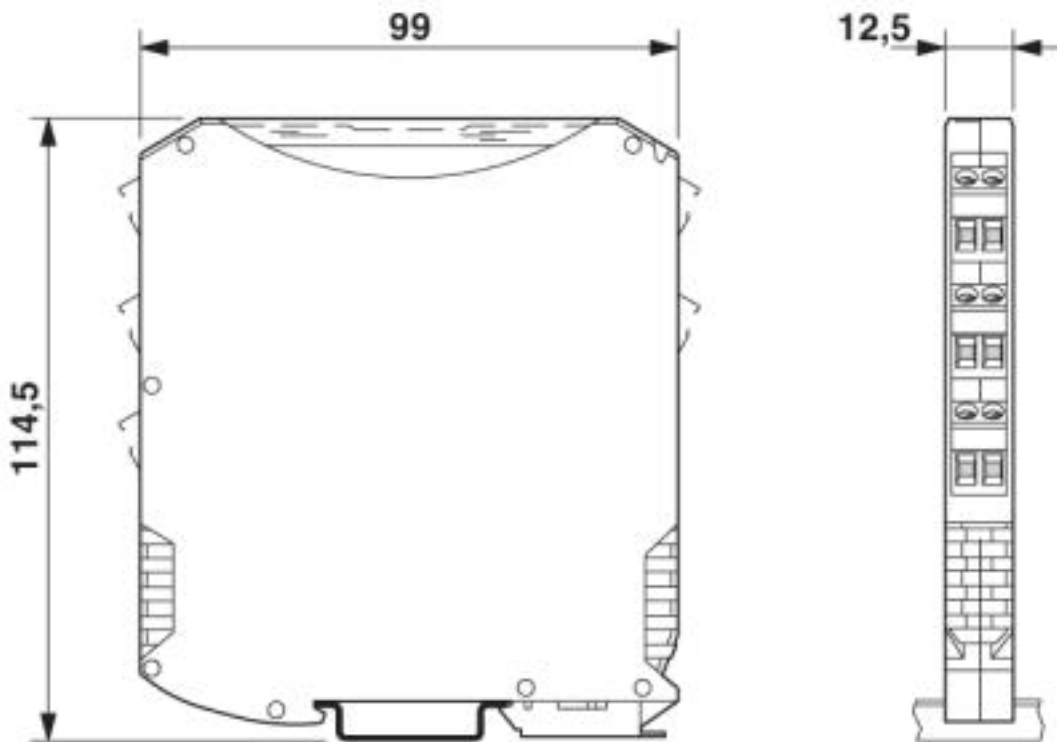
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Block diagram



# Signal conditioner - MACX MCR-UI-UI-UP-SP-NC - 2811569

Dimensioned drawing



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