MACX MCR-EX-SL-RPSSI-I-UP - Power/input isolating amplifier

2865793

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Ex i repeater power supply and input signal conditioner, HART-transparent. Transmits supplied or active 0/4 … 20 mA signals from the Ex area to a load (active or passive) in the safe area. SIL 2 (1oo1) / SIL 3 (1oo2), wide-range supply.

Your advantages

- 250 Ω resistor that can be activated via DIP switches to increase HART impedance for low-resistance systems
- Up to SIL 2 in accordance with EN 61508
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Wide-range power supply of 19.2 ... 253 V AC/DC
- 3-way electrical isolation
- Plug-in screw or spring-cage connection technology (Push-in technology), with integrated sockets for HART communicators
- 0/4 ... 20 mA input, [Ex ia] IIC (powered or not powered)
- Bidirectional transmission of digital HART communication signals
- 0/4 ... 20 mA output (active or passive), 0/1 ... 5 V, can be selected via DIP switches

Technical data

Product properties

Product type	Repeater power supplies
Product family	MACX Analog
Application	Analog IN
No. of channels	1
Type	Ex i signal conditioners with SIL functional safety
Configuration	DIP switches

Electrical properties

Electrical isolation	3-way isolation
Electrical isolation between input and output	yes
Step response (10-90%)	< 600 µs (for 4 mA ... 20 mA step)
Maximum temperature coefficient	< 0.01 %/K
Maximum transmission error	< 0.1 % (of final value)
Transmission error, typical	< 0.05 % (of final value)

Electrical isolation

Test voltage	2.5 kV AC (50 Hz, 60 s)
Overvoltage category	II
Pollution degree	2

Electrical isolation Input/output/power supply IEC/EN 61010-1

Standards/regulations	IEC/EN 61010-1
Rated insulation voltage	300 V_{rms}
Insulation	Safe isolation

Electrical isolation Input/output IEC/EN 60079-11

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	265 V_{rms}

Electrical isolation Input/power supply IEC/EN 60079-11

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	265 V_{rms}

Electrical isolation Output/supply IEC/EN 60079-7

Standards/regulations	IEC/EN 60079-7
Rated insulation voltage	265 V_{rms}

Supply

Designation	Repeater power supply operation
Nominal supply voltage range	24 V AC/DC ... 230 V AC/DC -20 % ... +10 % (50/60 Hz)
Supply voltage range	19.2 V AC/DC ... 253 V AC/DC (50/60 Hz)
Max. current consumption	< 80 mA (24 V DC / 20 mA)

Power dissipation	< 1.6 W (24 V DC / 20 mA)
Power consumption	< 2.2 W

Supply

Designation	Signal conditioner operation
Nominal supply voltage range	24 V AC/DC ... 230 V AC/DC -20 % ... +10 % (50/60 Hz)
Supply voltage range	19.2 V AC/DC ... 253 V AC/DC (50/60 Hz)
Max. current consumption	< 45 mA (24 V DC / 20 mA)
Power dissipation	< 1.1 W (24 V DC / 20 mA)

Input data

Signal: Repeater power supply operation

Description of the input	Active current input, intrinsically safe
Number of inputs	1
Current input signal	4 mA ... 20 mA
Transmitter supply voltage	> 16 V (20 mA)
	> 15.3 V (22.5 mA)

Signal: Signal conditioner operation

Description of the input	Passive current input, intrinsically safe
Current input signal	0 mA ... 20 mA
	4 mA ... 20 mA
Voltage drop	< 3.5 V (in input isolating amplifier operation)

Output data

Signal: Repeater power supply operation

Output description	Current output (active and passive)
Number of outputs	1
Voltage output signal	1 V ... 5 V (internal resistance, 250 Ω, 0.1%)
	Configurable via DIP switches
Current output signal	4 mA ... 20 mA (active)
	4 mA ... 20 mA (14 ... 26 V ext. source voltage)
Load/output load current output	< 600 Ω (20 mA)
	< 525 Ω (22.5 mA)
Output ripple	< 20 mV_{rms}
Output behavior in the event of an error	0 mA (Cable break in the input)
	≥ 22.5 mA (Cable short-circuit in the input)

Signal: Signal conditioner operation

Output description	Current output (active and passive)
Voltage output signal	0 V ... 5 V (internal resistance, 250 Ω, 0.1%)
	1 V ... 5 V (internal resistance, 250 Ω, 0.1%)
	0 mA ... 20 mA (active)

Current output signal	4 mA ... 20 mA (active)
	0 mA ... 20 mA (14 ... 26 V ext. source voltage)
	4 mA ... 20 mA (14 ... 26 V ext. source voltage)
Load/output load current output	< 600 Ω (20 mA)
	< 525 Ω (22.5 mA)
Output ripple	< 20 mV_{rms}
Output behavior in the event of an error	0 mA (Cable break in the input)
	0 mA (Cable short-circuit in the input)

Connection data

Connection method	Screw connection
Stripping length	7 mm
Screw thread	M3
Conductor cross section rigid	0.2 mm² ... 2.5 mm²
Conductor cross section flexible	0.2 mm² ... 2.5 mm²
Conductor cross section AWG	24 ... 14
Tightening torque	0.5 Nm ... 0.6 Nm

Test socket

Max. diameter	2 mm

Ex data

Ex installation (EPL)	Gc
	Div. 2
Ex i circuits (EPL)	Ga
	Da
	Ma
	Div. 1

Safety data: Repeater power supply operation

Max. output voltage U_o	25.2 V
Max. output current I_o	93 mA
Max. output power P_o	587 mW
Safety-related maximum voltage U_m	253 V AC/DC (Supply terminals)
	253 V AC (Output terminals)
	125 V DC (Output terminals)
I (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	40 mH / 4.8 µF
IIA (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	26 mH / 2.9 µF
IIB (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	14 mH / 820 nF
IIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	3 mH / 107 nF

IIA (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	26 mH / 470 nF, 20 mH / 570 nF, 1 mH / 630 nF, 0.5 mH / 720 nF, 0.1 mH / 1.1 µF, 0.005 mH / 2.9 µF
IIB/III (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	16 mH / 370 nF, 500 µH / 510 nF, 200 µH / 660 nF, 100 µH / 820 nF
IIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	2.2 mH / 47 nF, 2 mH / 49 nF, 1 mH / 63 nF, 500 µH / 80 nF, 200 µH / 107 nF
I (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	37 mH / 0.54 µF, 0.35 mH / 1 µF, 0.009 mH / 2.9 µF, 0.001 mH / 4.15 µF

Safety data: Signal conditioner operation

Input voltage U_i	≤ 30 V
Input current I_i	≤ 150 mA
Max. internal inductance L_i	negligible
Max. internal capacitance C_i	negligible
Safety-related maximum voltage U_m	253 V AC/DC (Supply terminals)
	253 V AC (Output terminals)
	125 V DC (Output terminals)

Interfaces

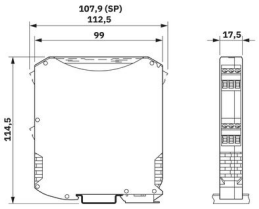
Data communication (bypass)

HART function	Yes
Protocols supported	HART-transparent

Signaling

Status display	Green LED (supply voltage)

Dimensions

Dimensional drawing	
Width	17.5 mm
Height	112.5 mm
Depth	113.7 mm
Depth NS 35/7,5	114.5 mm (Snapped onto DIN rail NS 35/7,5 in accordance with EN 60715)

Material specifications

Color	gray (RAL 7042)
Flammability rating according to UL 94	V0 (Housing)
Housing material	PA 6.6-FR

Environmental and real-life conditions

Ambient conditions

Degree of protection	IP20 (not assessed by UL)
Ambient temperature (operation)	-40 °C ... 60 °C (Any mounting position)
	-40 °C ... 70 °C (Derating)
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Permissible humidity (operation)	10 % ... 95 % (non-condensing)

Altitude range (≤ 2000 m)

Altitude	≤ 2000 m (The technical data refers to altitudes ≤2000 m above mean sea level. For altitudes >2000 m above mean sea level, refer to the data sheet.)
Ambient temperature (operation)	-40 °C ... 60 °C
	-40 °C ... 70 °C (Derating)
Rated insulation voltage	375 V_{PP} (Power supply, input / output)

Altitude range (≤ 3000 m)

Height range	> 2000 m ... 3000 m
Ambient temperature (operation)	-40 °C ... 54 °C
	-40 °C ... 63 °C (Derating)
Rated insulation voltage	190 V AC (Power supply, input / output)
	110 V DC (Power supply, input / output)

Altitude range (≤ 4000 m)

Height range	> 3000 m ... 4000 m
Ambient temperature (operation)	-40 °C ... 48 °C
	-40 °C ... 56 °C (Derating)
Rated insulation voltage	60 V AC/DC (Power supply, input / output)

Altitude range (≤ 5000 m)

Height range	> 4000 m ... 5000 m
Ambient temperature (operation)	-40 °C ... 42 °C
	-40 °C ... 49 °C (Derating)
Rated insulation voltage	60 V AC/DC (Power supply, input / output)

Approvals

CE

Certificate	CE-compliant
Note	and EN 61326

ATEX

Identification	Ⓔx II (1) G [Ex ia Ga] IIC
	Ⓔx II (1) D [Ex ia Da] IIIC
	Ⓔx II 3(1) G Ex ec [ia Ga] IIC T4 Gc

	Ⓔx I (M1) [Ex ia Ma] I
Certificate	BVS 08 ATEX E 094 X

IECEx

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
	[Ex ia Ma] I
Certificate	IECEx BVS 08.0035X

CCC / China-Ex

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
Certificate	2022122316115974

UL, USA/Canada

Identification	Class I Div 2; IS for Class I, II, III Div 1
Certificate	c Ⓤ L us C.D.-No 83104549

Safety Integrity Level (SIL / SILCL, IEC 61508)

Identification	2
Certificate	ZP/C031/20

Systematic Capability (SC / SILCL)

Identification	3

INMETRO

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
Certificate	DNV 18.0138 X

EMC data

Noise immunity	EN 61000-6-2
Note	When being exposed to interference, there may be minimal deviations.
Electromagnetic compatibility	Conformance with EMC directive
Noise emission	EN 61000-6-4

Electromagnetic HF field

Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
Typical deviation from the measuring range final value	1 %

Fast transients (burst)

Designation	Fast transients (burst)

Standards/regulations	EN 61000-4-4
Typical deviation from the measuring range final value	1 %

Conducted interference

Designation	Conducted interferences
Standards/regulations	EN 61000-4-6
Typical deviation from the measuring range final value	1 %

Standards and regulations

Electrical isolation	3-way isolation

GB Standard

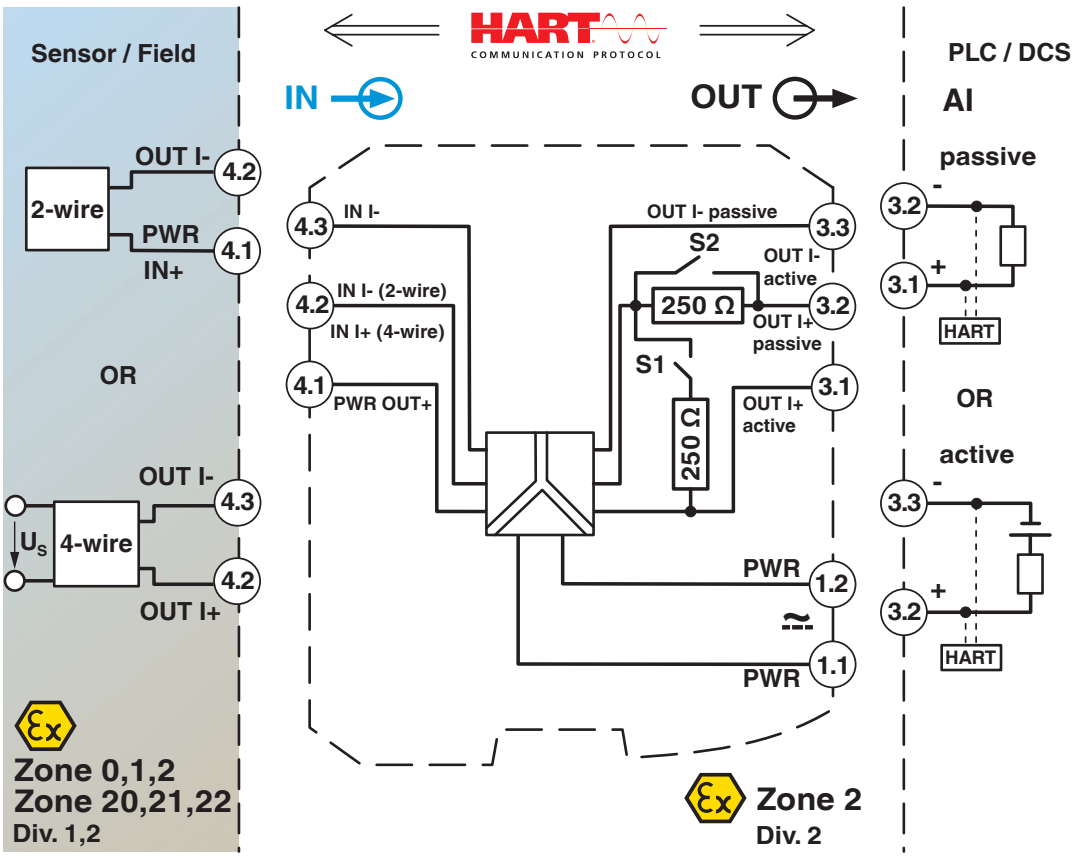
Standards/regulations	GB/T 3836.1
	GB/T 3836.3
	GB/T 3836.4
	GB/T 16935.1

Mounting

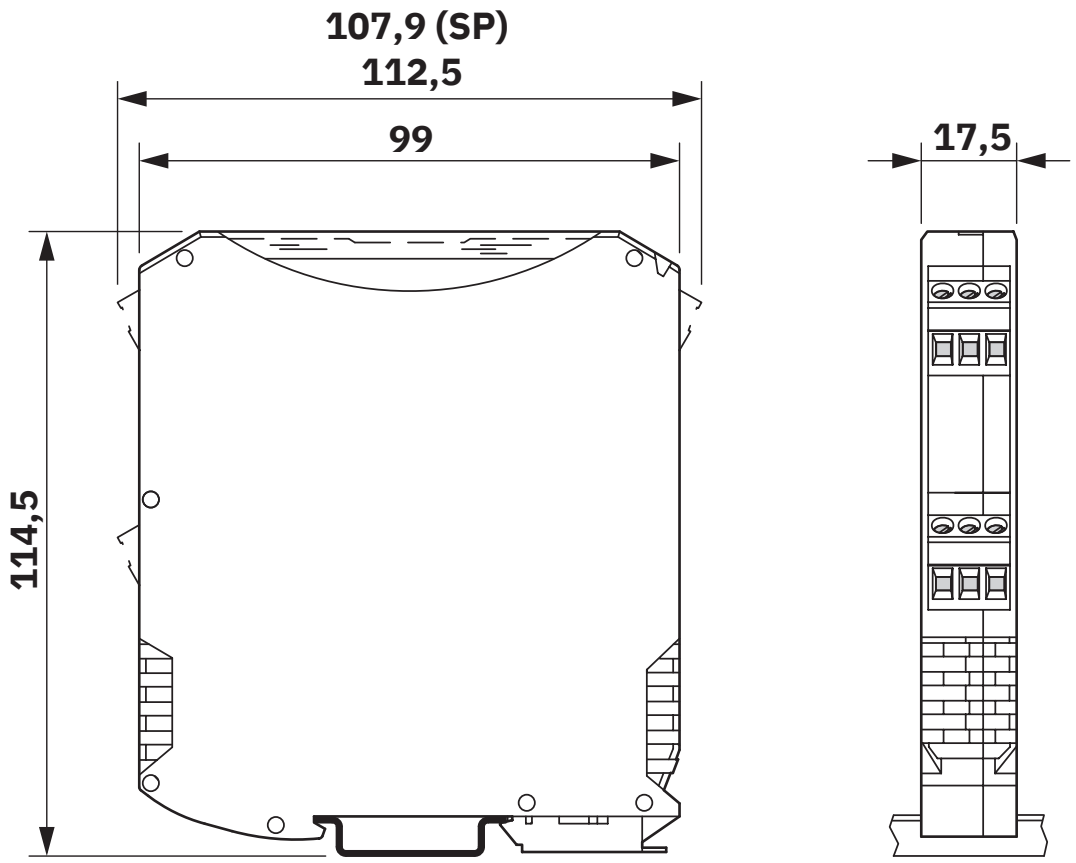
Mounting type	DIN rail mounting

Drawings

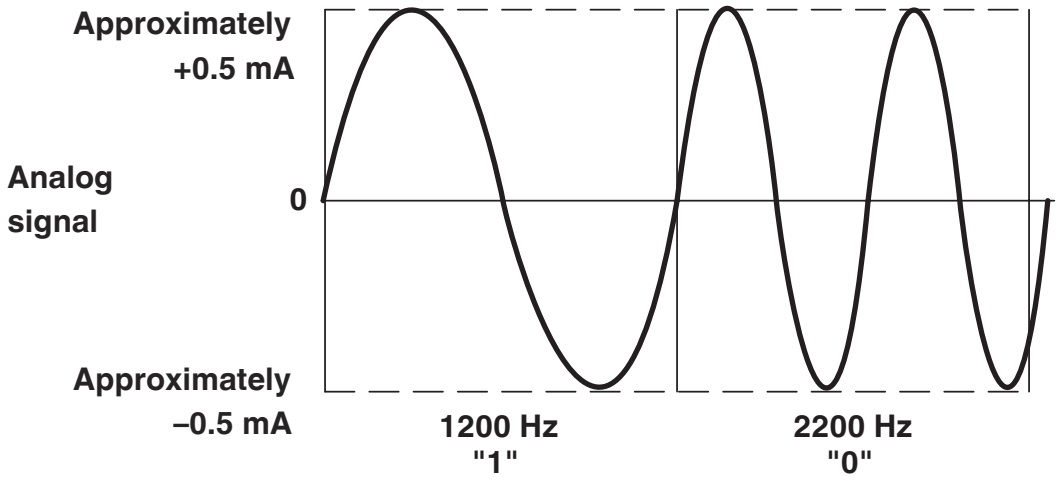
Block diagram



Dimensional drawing



Diagram



Signal transmission analog and digital at the same time

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