

MACX MCR-EX-SL-RPSSI-2I-1S - Repeater power supply



2908855

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Ex i measuring transducer repeater power supply and input signal conditioner, only output 1 is HART-transparent. Transmits supplied or active electrically isolated signals from the Ex area to two loads. SIL 2 in accordance with IEC 61508, screw connection.

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Technical data

Notes

Utilization restriction

EMC note	EMC: class A product, see manufacturer's declaration in the download area
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Product properties

Product type	Repeater power supplies
Product family	MACX Analog
No. of channels	1
Type	Ex i signal conditioners with SIL and PL Functional Safety

Electrical properties

Electrical isolation between input and output	yes
Signal transmission behavior	In = Out
Step response (10-90%)	1.3 ms (Output 1, for jump 4 mA ... 20 mA, typical) < 100 ms (Output 2, for jump 4 mA ... 20 mA)
Maximum temperature coefficient	< 0.01 %/K
Maximum transmission error	< 0.1 % (of final value)
Transmission error, typical	< 0.05 % (of final value)

Electrical isolation

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}
Test voltage	2.5 kV AC (50 Hz, 60 s)
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 1/output 2

Test voltage	1.5 kV AC (50 Hz, 60 s)
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Supply

Designation	Repeater power supply operation
Nominal supply voltage	24 V DC -20 % ... +25 %

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Supply voltage range	19.2 V DC ... 30 V DC
Max. current consumption	< 75 mA (24 V DC / 20 mA)
Power dissipation	< 1.45 W (24 V DC / 20 mA)
Power consumption	≤ 1.8 W

Supply

Designation	Signal conditioner operation
Nominal supply voltage	24 V DC -20 % ... +25 %
Supply voltage range	19.2 V DC ... 30 V DC
Max. current consumption	< 46 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	Repeater power supply operation
Number of inputs	1
Current input signal	4 mA ... 20 mA
Transmitter supply voltage	> 16 V (20 mA) > 15.1 V (23 mA)
Polarization and surge protection	Yes
Underload/overload signal range	0 mA ... 24 mA (Extended transmission range for diagnostics)

Signal: Signal conditioner operation

Description of the input	Signal conditioner operation
Current input signal	0 mA ... 20 mA 4 mA ... 20 mA
Voltage drop	approx. 3.9 V (in input isolating amplifier operation)
Underload/overload signal range	0 mA ... 24 mA (Extended transmission range for diagnostics)

Output data

Signal: Repeater power supply operation

Output description	Repeater power supply operation
Number of outputs	2
Current output signal	4 mA ... 20 mA (Output 1 and output 2 active)
Load/output load current output	< 450 Ω (20 mA) < 380 Ω (23 mA)
Output ripple	< 20 mV _{rms}
Output behavior in the event of an error	0 mA (Cable break in the input) ≥ 23 mA (Cable short-circuit in the input)
Underload/overload signal range	0 mA ... 24 mA (Extended transmission range for diagnostics)

Signal: Signal conditioner operation

Output description	Signal conditioner operation
Current output signal	0 mA ... 20 mA (active)

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	4 mA ... 20 mA (active)
Load/output load current output	< 450 Ω (20 mA)
	< 380 Ω (23 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)
Underload/overload signal range	0 mA ... 24 mA (Extended transmission range for diagnostics)

Connection data

Connection method	Screw connection
Stripping length	7 mm
Screw thread	M3
Conductor cross section rigid	0.2 mm ² ... 2.5 mm ²
Conductor cross section flexible	0.2 mm ² ... 2.5 mm ²
Conductor cross section AWG	24 ... 14
Tightening torque	0.5 Nm ... 0.6 Nm

Test socket

Max. diameter	2 mm
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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
	125 V DC
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

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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 μ H / 80 nF, 200 μ H / 107 nF
I (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	37 mH / 0.54 μ F, 0.35 mH / 1 μ F, 0.009 mH / 2.9 μ F, 0.001 mH / 4.15 μ F

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
	125 V DC

Interfaces

Data communication (bypass)

HART function	Yes
Protocols supported	HART-transparent
Protocol	HART (only output 1)

Signaling

Status display	Green LED (supply voltage)
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Dimensions

Dimensional drawing	
Width	12.5 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)

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	-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	⊕ II (1) G [Ex ia Ga] IIC ⊕ II (1) D [Ex ia Da] IIIC ⊕ II 3(1) G Ex ec [ia Ga] IIC T4 Gc ⊕ I (M1) [Ex ia Ma] I
Certificate	BVS 10 ATEX E 143 X

IECEX

Identification	[Ex ia Ga] IIC [Ex ia Da] IIIC Ex ec [ia Ga] IIC T4 Gc
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	[Ex ia Ma] I
Certificate	IECEX BVS 10.0097X

CCC / China-Ex

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
Certificate	2022122316115971

UL, USA/Canada

Identification	IS for Class I,II,III, Division 1 and Zone 0
	Installation in Class I, Division 2 and Zone 2
Certificate	UL-C.D.-No 83104549

UL, USA/Canada

Identification	Class I Div 2; IS for Class I, II, III Div 1
Certificate	UL-C.D.-No 83104549

Shipbuilding approval

Certificate	DNV GL TAA000020C
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Safety Integrity Level (SIL, IEC 61508)

Identification	2
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Performance Level (ISO 13849)

Identification	d
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INMETRO

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
Certificate	DNV 18.0139 X

DNV GL data

Temperature	B
Humidity	B
Vibration	A
EMC	A
Enclosure	Required protection according to the Rules shall be provided upon installation on board

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

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Standards and regulations

GB Standard

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

Mounting

Mounting type	DIN rail mounting
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Drawings

Dimensional drawing



Diagram



Signal transmission analog and digital at the same time

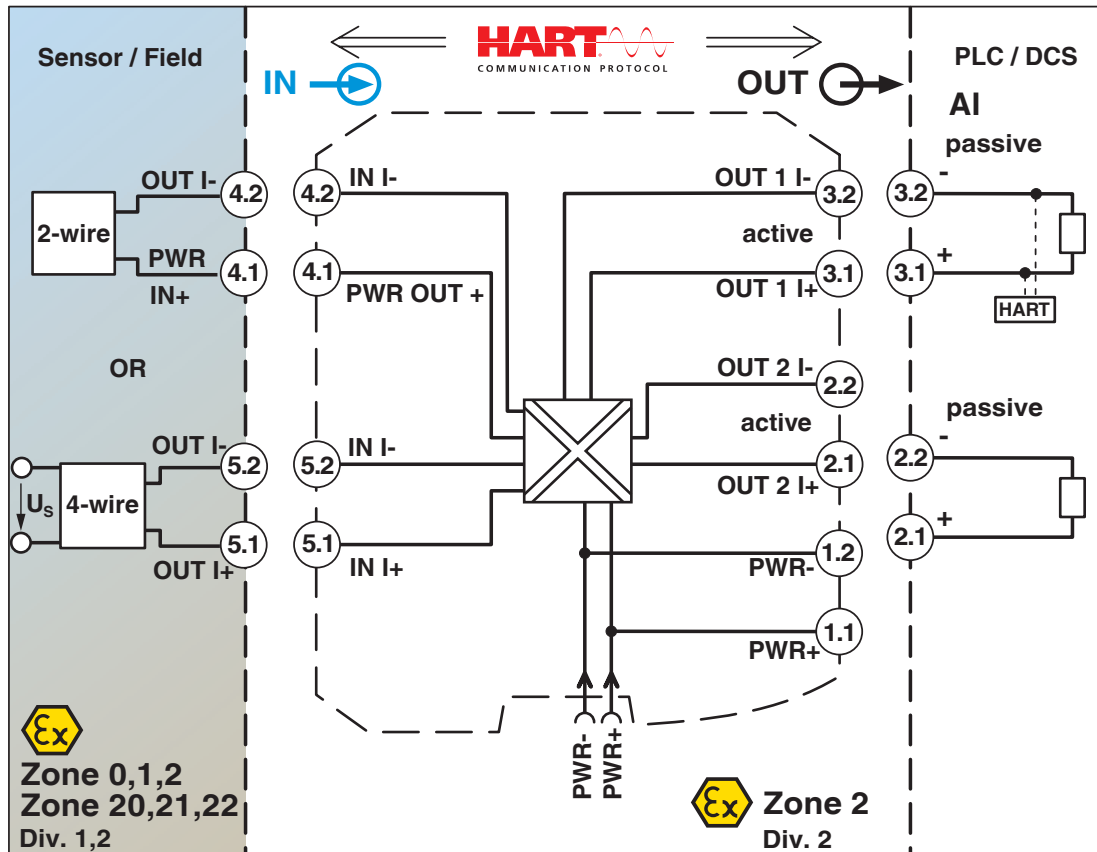
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Block diagram



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