Isolating power supplies with HART

SITRANS I100

Overview

Analog input 0/4 ... 20 mA

The isolating power supplies are used for the intrinsically safe operation of 2- and 3-wire transmitters and for connecting to intrinsically safe mA sources.

The 2- and 3-wire transmitters are supplied with auxiliary power from the transmitter supply unit.

For 2-wire transmitters the isolators transfer the HART communication signal bidirectionally.

Benefits

- Active output 0/4 ... 20 mA
- Suitable for 2-, 3-wire transmitters, 2-wire HART transmitters and mA sources
- Intrinsically safe input [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Open-circuit and short-circuit monitoring and messaging for input and output (can be switched off)
- Installation possible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC 61508)

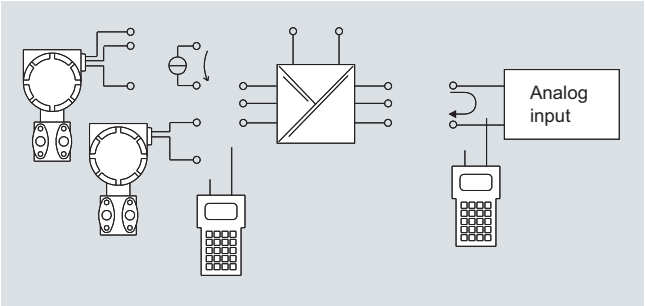
	Zones					
	0	**1**	**2**	**20**	**21**	**22**
Ex i interfaces	X	X	X	X	X	X
Installation in			X			X

Design

The HART isolating power supply is comprised of a compact plastic enclosure (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be connected individually using push-in screw terminals or jointly for up to 40 units using pac-Bus.



SITRANS I100 isolating power supply, function block diagram

Technical specifications

SITRANS I100 Isolating Power Supplies with HART	
Ex i input	
Input signal	0/4 ... 20 mA with HART
Functional range	0 ... 24 mA
Max. input current for mA sources	50 mA
Transmitter supply voltage	≥ 16 V at 20 mA (for 2-, 3-wire)
Supply voltage residual ripple	≤ 25 mV_{eff}
No-load voltage	≤ 26 V
Short-circuit current	≤ 35 mA
Input resistance (AC impedance HART)	≈ 500 Ω
Input resistance for mA sources	30 Ω
Communication signal (on 2-wire transmitters)	Bidirectional HART transmission, 0.5 kHz ... 30 kHz
Output	
Output signal	0/4 ... 20 mA with HART
Load resistance R_L	0 ... 600 Ω (terminal 1+/2-) 0 ... 379 Ω (terminal 3+/2-) (with internal 221 Ω resistance for HART)
Residual ripple	≤ 40 μA_{eff}
No-load voltage	≤ 15,5 V
Communication signal	Bidirectional HART transmission, 0.5 kHz ... 30 kHz
Response time (10 % ... 90 %)	≤ 25 ms
Measuring accuracy Accuracy, typical data expressed as % of calibrated span at U_N, 23 °C	
Linearity error	≤ 0,1 %
Offset error	≤ 0,1 %
Temperature influence	≤ 0,1 %/10 K
Power supply effect within voltage range	≤ 0,01 %
Load resistance effect	≤ 0,02 %

Rated conditions	
Degree of protection of enclosure	IP30
Degree of protection of terminals	IP20
Ambient conditions	
• Ambient temperature	-20 ... +60 °C/+70 °C (-4 ... +140 °F/+158 °F) (see operating instructions)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Relative humidity (no condensation)	≤ 95 %
Electromagnetic compatibility	Tested under the following standards and regulations: EN 61326-1 Use in the industrial environment
Mechanical specifications	
Screw terminals	
• One-wire connextion	
- Rigid	0,2 ... 2,5 mm^2 (0.00031 ... 0.0039 in^2)
- Flexible	0,2 ... 2,5 mm^2 (0.00031 ... 0.0039 in^2)
- Flexible with end ferrules (without/with plastic ferrule)	0,25 ... 2,5 mm^2 (0.00039 ... 0.0039 in^2)
• Two-wire connection	
- Rigid	0,2 ... 1 mm^2 (0.00031 ... 0.00155 in^2)
- Flexible	0,2 ... 1,5 mm^2 (0.00031 ... 0.0023 in^2)
- Flexible with end ferrules	0,25 ... 1 mm^2 (0.00039 ... 0.00155 in^2)
Weight	approx. 160 g (0.35 lb)
Type of installation	On DIN rail according to EN 50022 (NS35/15; NS35/7.5)
Mounting position	Vertical or horizontal
Enclosure material	PA 6.6
Fire protecting class (UL-94)	V0
Auxiliary power	
Rated voltage U_N	24 V DC
Voltage range	18 ... 31,2 V
Residual ripple within voltage range	≤ 3,6 V_{SS}
Rated current (U_N, 20 mA)	70 mA
Power consumption (U_N, 20 mA)	1,7 W
Power loss (at U_N, R_L = 250 Ω)	1,3 W
Operation indicator	Green "PWR" LED
Reverse polarity protection	Yes
Undervoltage monitoring	Yes (no faulty module/output states)
Galvanic isolation	
• Test voltage according to EN 60079-11	
- Ex i input to output	1,5 kV AC
- Ex i input to auxiliary power	1,5 kV AC
- Ex i input to Error contact	1,5 kV AC
• Test voltage according to EN 50178	
- Output to auxiliary power	350 V AC
- Error contact to auxiliary power and output	350 V AC

Error detection Ex i input	
• Open circuit	< 2 mA
• Short-circuit	> 22 mA
• Output behavior	= Input signal
• Output current at I_{in} = 0	I_{out} = 0 mA
Error detection output	
• Open circuit	< 2 mA
Error messaging Ex i input/output	
• Settings (LF switch)	Activated/deactivated
• Error indication	LED red "LF"
Error messaging and power supply failure	• Contact (30 V/100 mA), closed to ground in case of error • pac-Bus, floating contact (30 V/100 mA)
Certificates and approvals	
Explosion protection ATEX	
• EC type-examination certificate	DMT 03 ATEX E 010 X
• Degree of protection	II 3 (1) G Ex nA nC [ia] IIC T4 II (1) D [Ex iaD]
Installation	In Zone 2, Div. 2 and in the safe area
Other approvals	USA (FM) (**available soon**) Kanada (CSA) (available soon) Shipping (DNV)
Safety specifications (CENELEC)	
• Max. voltage U_o	27 V
• Max. current I_o	88 mA
• Max. power P_o	576 mW
• Max. connectable capacitance C_o for IIC/IIB	90 nF/705 nF
• Max. connectable inductance L_o for IIC/IIB	2,3 mH/14 mH
• Internal capacitance C_i and inductance L_i	Negligible
• Insulation voltage U_m	253 V
• When connecting mA sources:	
- Max. output voltage U_o	4,1 V
- Max. connectable voltage U_i	30 V
- Max. connectable current I_i	100 mA
- Internal capacitance Ci and inductance L_i	Negligible
• For more information and value combinations see certification.	

Isolating power supplies with HART

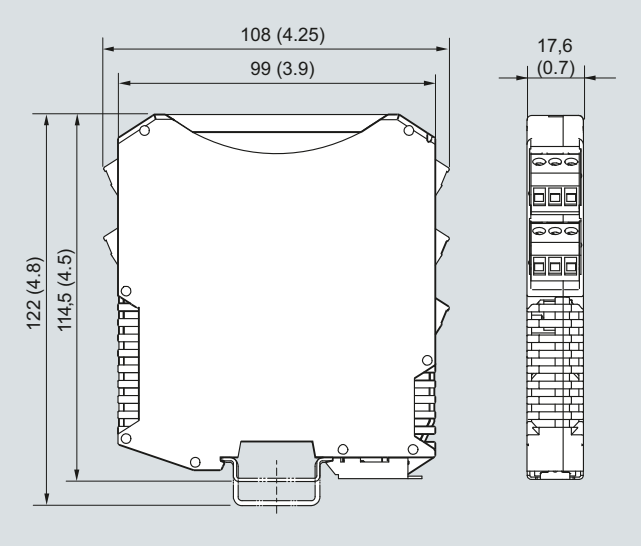
SITRANS I100

Selection and Ordering data

	Order No.
SITRANS I100 Isolating Power Supply with HART ► For rail mounting, for supplying 2-/3-wire transmitters and for mA sources, output 0/4 ... 20 mA, with intrinsically safe input	**7NG4124-0AA00**
Accessories	
pac-Bus basic set ► With 5 single elements and 1 terminal set (beginning and end)	**7NG4998-1AA**
pac-Bus extension set ► With 5 single elements	**7NG4998-1AB**

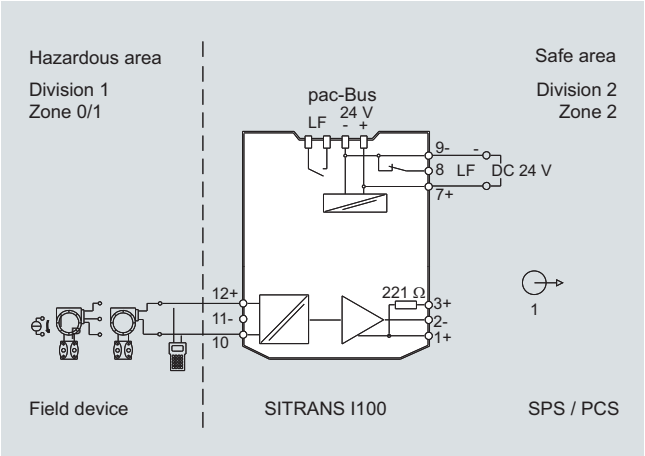
► Available ex stock.

Dimensional drawings

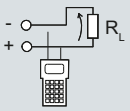


SITRANS I100 isolating power supply with HART, dimensions in mm (inch)

Schematics



SITRANS I100 isolating power supply with HART, connection diagram



SITRANS I100 isolating power supply with HART, output configuration

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Output isolators with HART

SITRANS I200

Overview

Analog output 0/4 ... 20 mA for HART

The output isolators are used for the intrinsically safe operation of valve positioners, i/p converters or indicators.

Operation of intrinsically safe HART valve positioners (e.g. SIPART PS2 and SITRANS VP300) is also possible. The units transfer a superimposed HART communication signal bidirectionally.

Benefits

- For HART output signals 0/4 ... 20 mA
- Intrinsically safe output [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Open-circuit and short-circuit monitoring and messaging (can be switched off)
- Installation possible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC 61508)

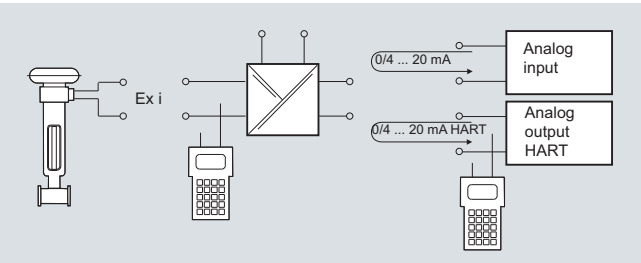
	Zonen					
	0	1	2	20	21	22
Ex i interface	X	X	X	X	X	X
Installation in			X			X

Design

The HART output isolator is comprised of a compact plastic housing (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be connected individually using push-in screw terminals or jointly for up to 40 units using pac-Bus.



SITRANS I200 output isolator, function block diagram

Technical specifications

SITRANS I200 output isolator with HART	
Input	
Input signal	0/4 ... 20 mA with HART
Functional range	0 ... 24 mA
Max. input current	50 mA
Input resistance (changeable switch LI)	225 Ω / 550 Ω
Communication signal	Bidirectional HART transmission, 0.5 kHz ... 30 kHz
Ex i output	
Output signal	0/4 ... 20 mA with HART
Connectable load resistance	0 ... 800 Ω
Min. load resistance for short-circuit monitoring	150 Ω
Residual ripple	≤ 50 mV
No-load voltage	≤ 25,6 V
Response time (10 % ... 90 %)	≤ 25 ms
Measuring accuracy Accuracy, typical data expressed as % of calibrated span at U_N, 23 °C	
Linearity error	≤ 0,1 %
Offset error	≤ 0,1 %
Temperature influence	≤ 0,1 %/10 K
Power supply effect within voltage range	≤ 0,01 %
Load resistance effect	≤ 0,02 %
Rated conditions	
Degree of protection of enclosure	IP30
Degree of protection of terminals	IP20
Ambient conditions	
• Ambient temperature	-20 °C ... +70 °C (-4 ... +158 °F) (see poerating instructions)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Relative humidity (no condensation)	≤ 95 %
Electromagnetic compatibility	Tested under the following standards and regulations: EN 61326-1 Use in the industrial environment

Mechanical specification	
Screw terminals	
• One-wire connection	
- Rigid	0,2 ... 2,5 mm^2 (0.00031 ... 0.0039 in^2)
- Flexible	0,2 ... 2,5 mm^2 (0.00031 ... 0.0039 in^2)
- Flexible with end ferrules (without/with plastic ferrule)	0,25 ... 2,5 mm^2 (0.00039 ... 0.0039 in^2)
• Two-wire connection	
- Rigid	0,2 ... 1 mm^2 (0.00031 ... 0.00155 in^2)
- Flexible	0,2 ... 1,5 mm^2 (0.00031 ... 0.0023 in^2)
- Flexible with end ferrules	0,25 ... 1 mm^2 (0.00039 ... 0.00155 in^2)
Weight	Approx. 160 g (0.35 lb)
Type of installation	On DIN rail according to EN 50022 (NS35/15; NS35/7.5)
Mounting position	Vertical or horizontal
Enclosure material	PA 6.6
Fire protecting class (UL-94)	V0
Auxiliary power	
Rated voltage U_N	24 V DC
Voltage range	18 ... 31,2 V
Residual ripple within voltage range	≤ 3,6 V_{SS}
Rated current (U_N, 20 mA)	80 mA
Power consumption (U_N, 20 mA)	1,3 W
Power loss (at U_N, R_L = 500 Ω)	1,1 W
Operation indicator	Green "PWR" LED
Reverse polarity protection	Yes
Undervoltage monitoring	Yes (no faulty module/output states)
Galvanic isolation	
• Test voltage according to EN 60079-11	
- Ex i output to input	1,5 kV AC
- Ex i output to auxiliary power	1,5 kV AC
- Error contact to Ex i output	1,5 kV AC
• Test voltage according to EN 50178	
- Input to auxiliary power	350 V AC
- Error contact to auxiliary power and input	350 V AC
Error detection Ex i output	
• Open circuit	> 10 kΩ
• Short-circuit	< 15 Ω
• Input behavior	> 6 kΩ
• Open-circuit detection only for input current	≥ 3,6 mA
• Settings (LF switch)	Activated/deactivated
• Error indication	LED red "LF"
• Error messaging and power supply failure	• Contact (30 V/100 mA), closed to ground in case of error • pac-Bus, floating contact (30 V/100 mA)

Certificates and approvals	
Explosion protection ATEX	
• EC type-examination certificate	DMT 03 ATEX E 012 X
• Degree of protection	II 3 (1) G Ex nA nC [ia] IIC T4 II (1) D [Ex iaD]
Installation	In Zone 2, Div. 2 and in the safe area
Other approvals	USA (FM) (available soon) Canada (CSA) (available soon) Shipping (DNV)
Safety specifications (CENELEC)	
• Max. voltage U_o	25,6 V
• Max. current I_o	96 mA
• Max. power P_o	605 mW
• Max. connectable capacitance C_o for IIC/IIB	103 nF/800 nF
• Max. connectable inductance L_o for IIC/IIB	1,9 mH/11 mH
• Internal capacitance C_i and inductance L_i	Negligible
• Insulation voltage U_m	253 V
• For more information and value combinations see certification.	

Selection and Ordering data

	Order No.
SITRANS I200 output isolator with HART ►	**7NG4131-0AA00**
For rail mounting, input 0/4 ... 20 mA, output 0/4 ... 20 mA, intrinsically safe	
Accessories	
pac-Bus basic set ►	**7NG4998-1AA**
With 5 single elements and 1 terminal set (beginning and end)	
pac-Bus extension set ►	**7NG4998-1AB**
With 5 single elements	

► Available ex stock.

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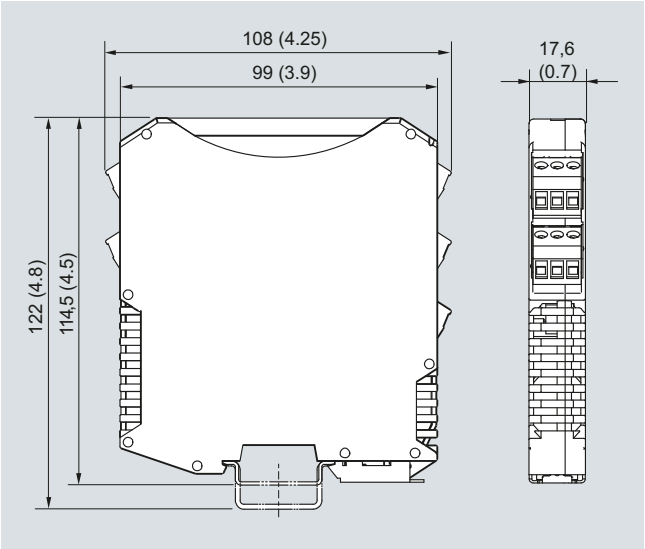
Output isolators with HART

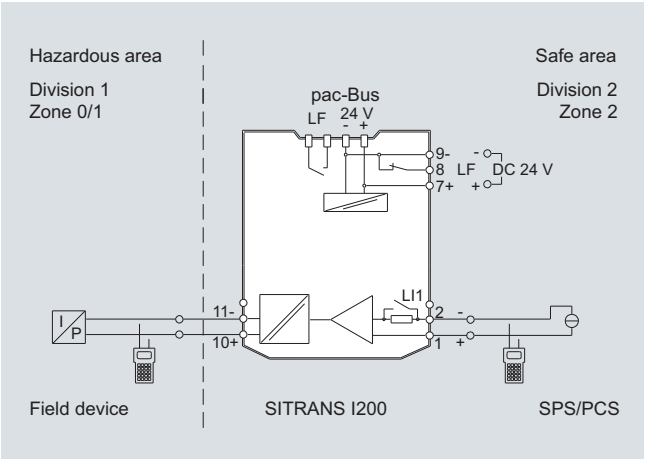
SITRANS I200

Dimasional drawings



SITRANS I200 output isolator with HART, dimensions in mm (inch)

Schematics



SITRANS I200 output isolator with HART, connection diagram

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