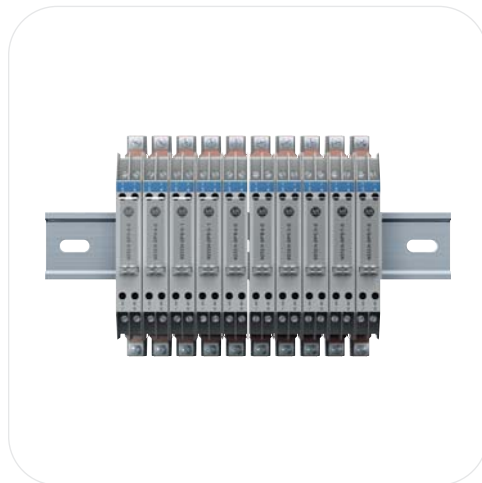


Intrinsic Safety Modules



LISTEN.
THINK.
SOLVE.™

Table of Contents



Isolated Barriers	3
Switch Amplifiers	5
Solenoid Driver	21
SMART Power Supplies	23
Temperature Repeater	29
SMART Current Driver	31



Converter Barriers	33
Universal Temperature Converter	35
Frequency Converters	37
Transmitter Power Supply	43
HART Loop Converter	46
Strain Gauge Converter	49



Zener Barriers	51
1-channel, 327 Ohm Max	55
2-channel, 327 Ohm Max	57
2-channel, 646 Ohm Max	59
2-channel, 36 Ohm + 0.9 V Max	61
2-channel, 250 Ohm Max	63



Accessories	65
Power Feed Module	65
Power Rail	67
USB Interface Cable	68

Isolated Barriers

With galvanic optical or transformer isolation, these modules provide an interface within the intrinsic safety circuit that is electrically separated from the control system. A key advantage of isolated barriers is that they do not require a ground between the module and the intrinsically safe device. Available in 12.5 mm (0.5 in) and 20mm (0.8 in) widths.

Switch Amplifiers

Switch Amplifiers are used to transfer digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area. Select modules are available with relay output or transistor output, in addition to signal splitters. A unique collective error messaging feature is available when used with the Power Rail system. Due to its compact housing design and low heat dissipation, this device is useful for detecting positions, end stops, and switching states in space-critical applications.



SMART Current Drivers

SMART Current Drivers drive SMART I/P converters, electrical valves, and positioners in hazardous areas.



Solenoid Drivers

Solenoid Drivers supply power to solenoids, LEDs, and audible alarms located in a hazardous area.



SMART Transmitter Power Supplies

SMART Transmitter Power Supplies supply 2-wire SMART transmitters in a hazardous area, and can also be used with 2-wire SMART current sources. They transfer the analog input signal to the safe area as an isolated current value. Modules with splitter feature provide two isolated output signals.



Temperature Repeaters

Temperature Repeaters transfer RTD resistance values from hazardous areas to safe areas. A 2-, 3-, or 4-wire mode is available depending on the required accuracy. The monitor registers the same load as if it were connected directly to the resistance in a hazardous area.



Catalog Number Explanation

Note: Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; some combinations may not produce a valid catalog number.

937T **H** - **DI** **SAR** - **KD** **1**
a *b* *c* - *d* *e*

a

Module Profile	
Code	Description
H	High-density 12.5mm module
S	Standard 20 mm module

b

I/O Type	
Code	Description
DI	Digital In
DO	Digital Out
AI	Analog In
AO	Analog Out

c

Functionality	
Code	Description
SAR	Switch Amplifier with Relay Output
SRS	Switch Amplifier with Relay Output, Splitter
SAT	Switch Amplifier with Transistor Output
STS	Switch Amplifier with Transistor Output, Splitter
SND	Solenoid Driver
TXP	SMART Transmitter, Power Supply
TXS	SMART Transmitter, Power Supply, Splitter
RRP	Repeater, Resistance Measuring
SCD	SMART Current Driver

d

Power	
Code	Description
IP	Input Loop Powered
DC	24V DC
BC	20...90V DC/48...253V AC
KD	115V AC
KF	230V AC

e

Channels	
Code	Description
1	Single Channel
2	Dual Channel

Switch Amplifier, Relay Output

2-ch, 115V AC

937TS-DISAR-KD2



Features

- 2-channel isolated barrier
- 115V AC supply
- Dry contact or NAMUR inputs
- Relay contact output
- Line fault detection (LFD)
- Reversible mode of operation
- Up to SIL2 acc. to IEC 61508/IEC 61511

This isolated barrier is used for intrinsic safety applications. It transfers digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area. The proximity sensor or switch controls a form C changeover relay contact for the safe area load. The normal output state can be reversed using switches S1 and S2. Switch S3 is used to enable or disable line fault detection of the field circuit. During an error condition, the relays revert to their de-energized state and the LEDs indicate the fault according to NAMUR NE44.

Specifications

Supply	
Connection	terminals 14, 15
Rated voltage	103.5 ... 126V AC, 45 ... 65 Hz
Power loss	1.2 W
Power consumption	≤ 1.3 W
Input	
Connection	terminals 1+, 2+, 3-; 4+, 5+, 6-
Rated values	acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current	approx. 8V DC / approx. 8 mA
Switching point/switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection	breakage I ≤ 0.1 mA, short-circuit I > 6 mA
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms
Output	
Connection	output I: terminals 7, 8, 9; output II: terminals 10, 11, 12
Output I	signal ; relay
Output II	signal ; relay
Energized/De-energized delay	approx. 20 ms / 20 ms
Mechanical life	10 ⁷ switching cycles
Transfer characteristics	
Switching frequency	≤ 10 Hz
Electrical isolation	
Input/Output	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Input/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/Output	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 61010-1:2010
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Input	EN 60947-5-6:2000

Switch Amplifier, Relay Output

2-ch, 115V AC, *continued*

937TS-DISAR-KD2

Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 150 g
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 in), housing type B2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

Data for application in connection with Ex-areas	
Group, category, type of protection	<Ex> II (1) G [Ex ia] IIC, II (1) D [Ex ia] IIIC
Input	[Ex ia] IIC, [Ex ia] IIIC
Voltage U_0	10.6V
Current I_0	19.1 mA
Power P_0	51 mW (linear characteristic)

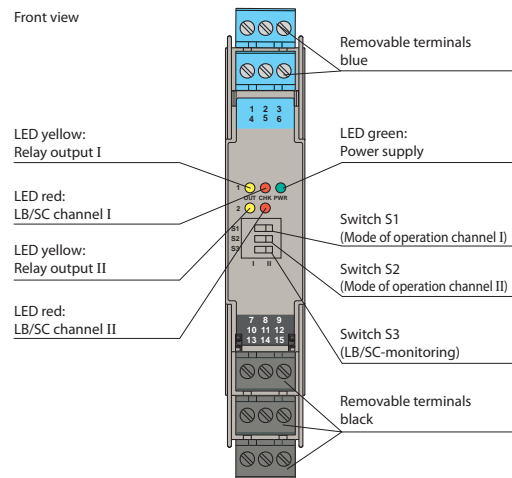
Supply	
Maximum safe voltage U_m	126.5V AC

Output	
Contact loading	253V AC/2 A/cos $\phi > 0.7$; 126.5V AC/4 A/cos $\phi > 0.7$; 40V DC/2 A resistive load
Maximum safe voltage U_m	253V AC

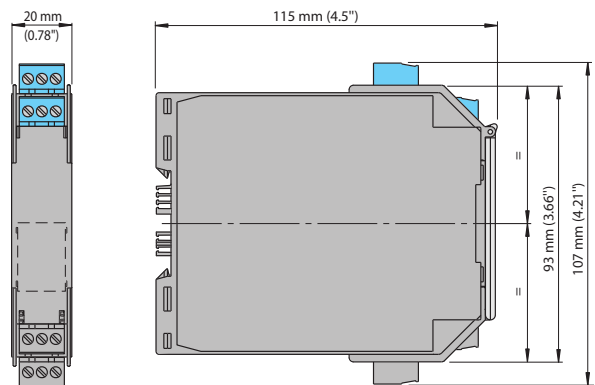
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V

Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 61241-11:2006

Note: Maximum safe voltage is not rated voltage.

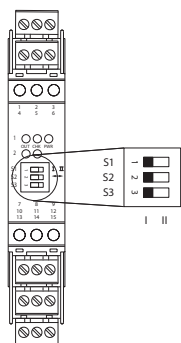


Product Features
Cat. No. 937TS-DISAR-KD2



Approximate Dimensions
Cat. No. 937TS-DISAR-KD2

Configuration



Switch position

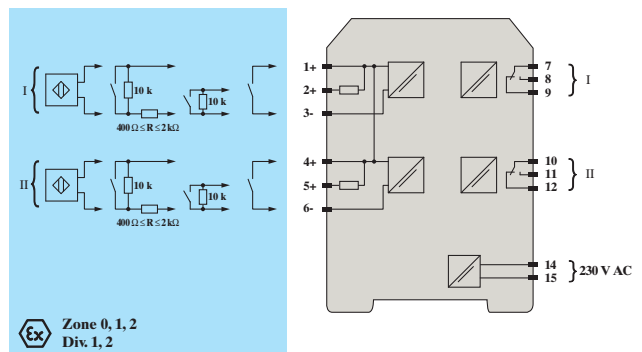
S	Function	Position
1	Mode of operation Output I (relay) energized	I
	with high input current	II
2	Mode of operation Output II (relay) energized	I
	with low input current	II
3	Line fault detection	ON
		OFF

Operating status

Control circuit	Input signal
Initiator high impedance / contact opened	low input current
Initiator low impedance / contact closed	high input current
Lead breakage lead short-circuit	Line fault

Factory settings: switch 1, 2 and 3 in position I

Configuration
Cat. No. 937TS-DISAR-KD2



Wiring Diagram
Cat. No. 937TS-DISAR-KD2

Switch Amplifier, Relay Output

2-ch, 230V AC

937TS-DISAR-KF2



Features

- 2-channel isolated barrier
- 230V AC supply
- Dry contact or NAMUR inputs
- Relay contact output
- Line fault detection (LFD)
- Reversible mode of operation
- Up to SIL2 acc. to IEC 61508/IEC 61511

This isolated barrier is used for intrinsic safety applications. It transfers digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area. The proximity sensor or switch controls a form C changeover relay contact for the safe area load. The normal output state can be reversed using switches S1 and S2. Switch S3 is used to enable or disable line fault detection of the field circuit. During an error condition, the relays revert to their de-energized state and the LEDs indicate the fault according to NAMUR NE44.

Specifications

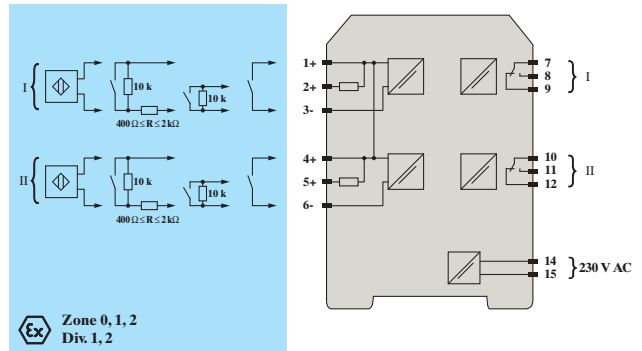
Description	230V AC, 2-channel
Signal Type	Digital input, relay output
Supply	
Connection	terminals 14, 15
Rated voltage	207 ... 253V AC, 45 ... 65 Hz
Power loss	1.2 W
Power consumption	≤ 1.3 W
Input	
Connection	terminals 1+, 2+, 3-; 4+, 5+, 6-
Rated values	acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current	approx. 8V DC / approx. 8 mA
Switching point/switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection	breakage I ≤ 0.1 mA, short-circuit I > 6 mA
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms
Output	
Connection	output I: terminals 7, 8, 9 ; output II: terminals 10, 11, 12
Output I	signal ; relay
Output II	signal ; relay
Energized/De-energized delay	approx. 20 ms / 20 ms
Mechanical life	10 ⁷ switching cycles
Transfer characteristics	
Switching frequency	≤ 10 Hz
Electrical isolation	
Input/Output	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Input/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/Output	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 61010-1:2010
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Input	EN 60947-5-6:2000

Switch Amplifier, Relay Output

2-ch, 230V AC, *continued*

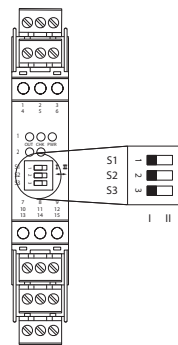
937TS-DISAR-KF2

Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 150 g
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 in), housing type B2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1) G [Ex ia] IIC, II (1) D [Ex ia] IIIC
Input	[Ex ia] IIC, [Ex ia] IIIC
Voltage U _o	10.6 V
Current I _o	19.1 mA
Power P _o	51 mW (linear characteristic)
Supply	
Maximum safe voltage U _m	253V AC
Output	
Contact loading	253V AC/2 A/cosφ > 0.7; 126.5V AC/4 A/cos φ > 0.7; 40V DC/2 A resistive load
Maximum safe voltage U _m	253V AC
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 61241-11:2006



Wiring Diagram
Cat. No. 937TS-DISAR-KF2

Configuration



Switch position

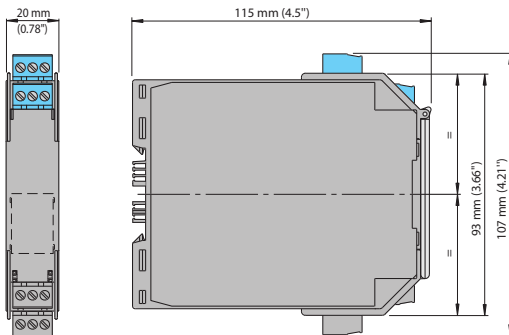
S	Function	Position
1	Mode of operation Output I (relay) energized	I
	with high input current t	II
2	Mode of operation Output II (relay) energize	I
	with low input current t	II
3	Line fault detection	ON
		OFF

Operating status

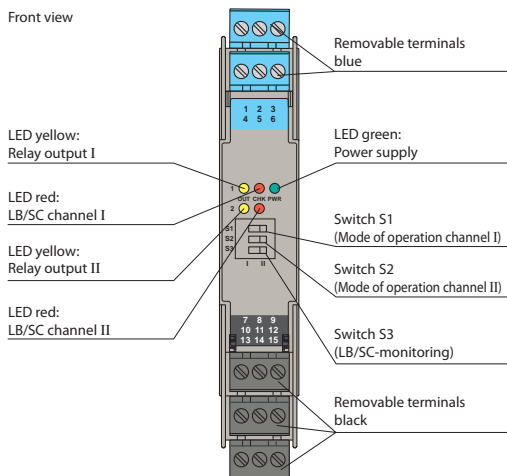
Control circuit	Input signal
Initiator high impedance / contact opened	low input current
Initiator low impedance / contact closed	high input current
Lead breakage lead short-circuit	Line fault

Factory settings: switch 1, 2 and 3 in position I

Configuration
Cat. No. 937TS-DISAR-KF2



Approximate Dimensions
Cat. No. 937TS-DISAR-KF2



Product Features
Cat. No. 937TS-DISAR-KF2

Switch Amplifier, Relay Output

2-ch, 24V DC

937TH-DISAR-DC2



Features

- 2-channel isolated barrier
- 24V DC supply (Power Rail)
- Dry contact or NAMUR inputs
- Relay contact output
- Line fault detection (LFD)
- Housing width 12.5 mm
- Up to SIL2 acc. to IEC 61508

This isolated barrier is used for intrinsic safety applications. It transfers digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area. The proximity sensor or switch controls a form A normally open relay contact for the safe area load. The normal output state can be reversed using switches S1 and S2. Switch S3 is used to enable or disable line fault detection of the field circuit. During an error condition, relays revert to their de-energized state and LEDs indicate the fault according to NAMUR NE44. A unique collective error messaging feature is available when used with the Power Rail system. Due to its compact housing design and low heat dissipation, this device is useful for detecting positions, end stops, and switching states in space-critical applications.

Specifications

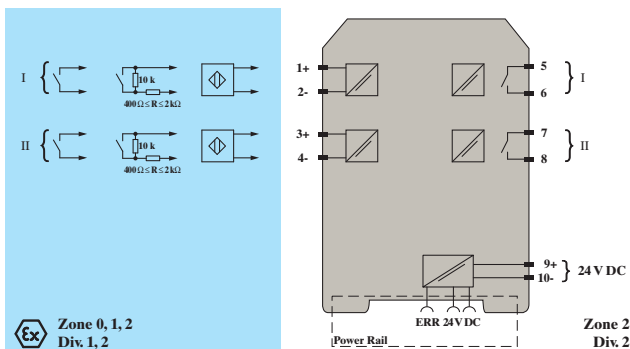
Description	24V, 2-channel
Signal Type	Digital Input
Supply	
Connection	Power Rail or terminals 9+, 10-
Rated voltage	19 ... 30V DC
Ripple	≤ 10%
Rated current	≤ 30 mA
Power loss	≤ 600 mW
Power consumption	≤ 600 mW
Input	
Connection	terminals 1+, 2-; 3+, 4-
Rated values	acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current	approx. 10V DC / approx. 8 mA
Switching point/switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection	breakage I ≤ 0.1 mA, short-circuit I > 6.5 mA
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms
Output	
Connection	terminals 5, 6; 7, 8
Output I	signal ; relay
Output II	signal ; relay
Minimum switch current	2 mA / 24V DC
Energized/De-energized delay	≥ 20 ms / ≥ 20 ms
Mechanical life	107 switching cycles
Transfer characteristics	
Switching frequency	≤ 10 Hz
Electrical isolation	
Input/Output	reinforced insulation acc. to EN 50178, rated insulation voltage 300V _{eff}
Input/power supply	reinforced insulation acc. to EN 50178, rated insulation voltage 300V _{eff}
Output/power supply	reinforced insulation acc. to EN 50178, rated insulation voltage 300V _{eff}
Input/input	Basic insulation according to EN 50178, rated insulation voltage 300V _{eff}
Output/Output	reinforced insulation acc. to EN 50178, rated insulation voltage 300V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 61010-1:2010
Conformity	
Electromagnetic compatibility	NE 21
Protection degree	IEC 60529

Switch Amplifier, Relay Output

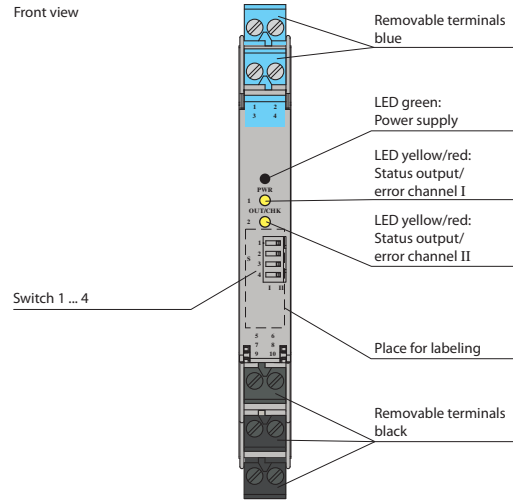
2-ch, 24V DC, *continued*

937TH-DISAR-DC2

Environmental and Mechanical Specifications	
Operating Temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Mass	approx. 100 g
Dimensions	12.5 x 114 x 119 mm (0.5 x 4.5 x 4.7 in), housing type A2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	<Ex> II (1)G [Ex ia Ga] IIC, <Ex> II (1)D [Ex ia Da] IIIC, <Ex> I (M1) [Ex ia Ma] I
Input	[Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I
Voltage U_0	10.5V
Current I_0	17.1 mA
Power P_0	45 mW (linear characteristic)
Supply	
Maximum safe voltage U_m	253V AC
Output	
Contact loading	253V AC/2 A/cos $\varphi > 0.7$; 126.5V AC/4 A/cos $\varphi > 0.7$; 30V DC/2 A resistive load
Maximum safe voltage U_m	253V AC
Group, category, type of protection, temperature class	<Ex> II 3G Ex nA nC IIC T4 Gc
Output I, II	
Contact loading	50V AC/2 A/cos $\varphi > 0.7$; 30V DC/ 2 A resistive load
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 60079-15:2005, EN 61241-11:2006

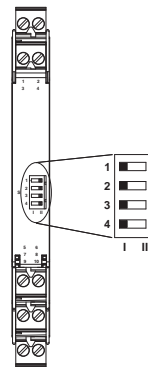


Wiring Diagram
Cat. No. 937TH-DISAR-DC2



Product Features
Cat. No. 937TH-DISAR-DC2

Configuration



Switch position

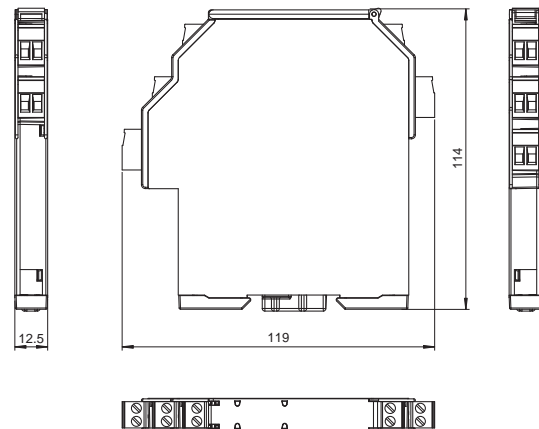
S	Function	Position
1	Mode of operation Output I (relay) energized	with high input current I
		with low input current II
2	Mode of operation Output II (relay) energized	with high input current I
		with low input current II
3	Line fault detection Input I	ON I
		OFF II
4	Line fault detection Input II	ON I
		OFF II

Operating status

Control circuit	Input signal
Initiator high impedance/contact opened	low input current
Initiator low impedance/contact closed	high input current
Lead breakage, lead short-circuit	Line fault

Factory settings: switch 1, 2, 3 and 4 in position I

Configuration
Cat. No. 937TH-DISAR-DC2



Approximate Dimensions
Cat. No. 937TH-DISAR-DC2

Switch Amplifier, Relay Output with Splitter

1-ch, 115V AC

937TS-DISRS-KD1



Features

- 1-channel isolated barrier
- 115V AC supply
- Dry contact or NAMUR inputs
- Relay contact output
- Fault relay contact output
- Line fault detection (LFD)
- Reversible mode of operation
- Up to SIL2 acc. to IEC 61508/IEC 61511

This isolated barrier is used for intrinsic safety applications. It transfers digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area. The proximity sensor or switch controls a form C changeover relay contact for the safe area load. The normal output state can be reversed using switch S1. Switch S2 allows output II to be switched between a signal output or an error message output. Switch S3 is used to enable or disable line fault detection of the field circuit. During an error condition, the relays revert to their de-energized state and the LEDs indicate the fault according to NAMUR NE44.

Specifications

937TS-DISRS-KD1

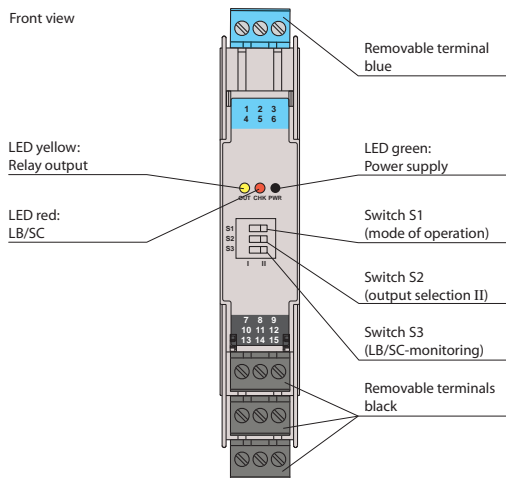
Description	115V AC, 1-channel with Splitter
Signal Type	Digital Input, Relay Output
Supply	
Connection	terminals 14, 15
Rated voltage	103.5 ... 126V AC, 45 ... 65 Hz
Power loss	1.2 W
Power consumption	≤ 1.3 W
Input	
Connection	terminals 1+, 2+, 3-
Rated values	acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current	approx. 8V DC / approx. 8 mA
Switching point/switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection	breakage I ≤ 0.1 mA, short-circuit I > 6 mA
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms
Output	
Connection	output I: terminals 7, 8, 9; output II: terminals 10, 11, 12
Output I	signal; relay
Output II	signal or error message; relay
Energized/De-energized delay	approx. 20 ms / 20 ms
Mechanical life	10 ⁷ switching cycles
Transfer characteristics	
Switching frequency	≤ 10 Hz
Electrical isolation	
Input/Output	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Input/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/Output	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 61010-1:2010
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Input	EN 60947-5-6:2000

Switch Amplifier, Relay Output with Splitter

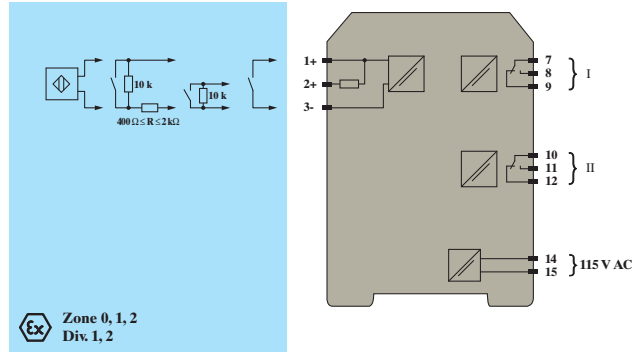
1-ch, 115V AC, *continued*

937TS-DISRS-KD1

Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 150 g
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 in)
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	<Ex> II (1) G [Ex ia] IIC, II (1) D [Ex ia] IIIC
Input	[Ex ia] IIC, [Ex ia] IIIC
Voltage U_0	10.6 V
Current I_0	19.1 mA
Power P_0	51 mW (linear characteristic)
Supply	
Maximum safe voltage U_m	126.5V AC
Output	
Contact loading	253V AC/2 A/cos $\varphi > 0.7$; 126.5V AC/4 A/cos $\varphi > 0.7$; 40V DC/2 A
Maximum safe voltage U_m	253V AC
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V

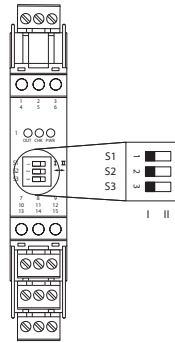


Product Features
Cat. No. 937TS-DISRS-KD1



Wiring Diagram
Cat. No. 937TS-DISRS-KD1

Configuration



Switch position

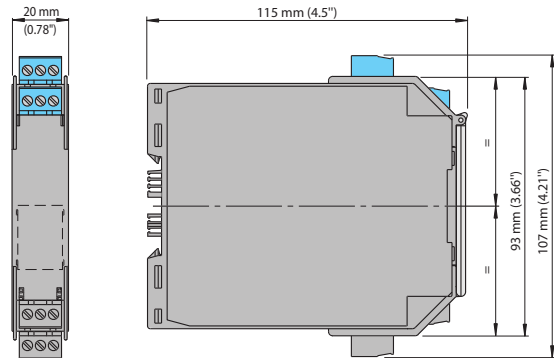
S	Function	Position
1	Mode of operation Output I (relay) energized	with high input current with low input current
	switching state like output I	I II
2	Assignment Output II (relay)	fault signal output (de-energized if fault)
	Line fault detection	ON OFF
		I II

Operating status

Control circuit	Input signal
Initiator high impedance/contact opened	low input current
Initiator low impedance/contact closed	high input current
Lead breakage, lead short-circuit	Line fault

Factory settings: switch 1, 2 and 3 in position I

Configuration
Cat. No. 937TS-DISRS-KD1



Approximate Dimensions
Cat. No. 937TS-DISRS-KD1

Switch Amplifier, Relay Output with Splitter

1-ch, 230V AC

937TS-DISRS-KF1



Features

- 1-channel isolated barrier
- 230V AC supply
- Digital input, relay output

This isolated barrier is used for intrinsic safety applications. It transfers digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area. The proximity sensor or switch controls a form C changeover relay contact for the safe area load. The normal output state can be reversed using switch S1. Switch S2 allows output II to be switched between a signal output or an error message output. Switch S3 is used to enable or disable line fault detection of the field circuit. During an error condition, the relays revert to their de-energized state and the LEDs indicate the fault according to NAMUR NE44.

Specifications

Description	230V AC, 1-channel with Splitter
Signal Type	Digital Input, Relay Output
Supply	
Connection	terminals 14, 15
Rated voltage	207 ... 253V AC, 45 ... 65 Hz
Power loss	1.2 W
Power consumption	≤ 1.3 W
Input	
Connection	terminals 1+, 2+, 3-
Rated values	acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/ short-circuit current	approx. 8V DC / approx. 8 mA
Switching point/switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection	breakage I ≤ 0.1 mA, short-circuit I > 6 mA
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms
Output	
Connection	output I: terminals 7, 8, 9 ; output II: terminals 10, 11, 12
Output I	signal ; relay
Output II	signal or error message ; relay
Energized/De-energized delay	approx. 20 ms / 20 ms
Mechanical life	10 ⁷ switching cycles
Transfer characteristics	
Switching frequency	≤ 10 Hz
Electrical isolation	
Input/Output	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Input/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/Output	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 61010-1:2010
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Input	EN 60947-5-6:2000

Switch Amplifier, Relay Output with Splitter

1-ch, 230V AC, *continued*

937TS-DISRS-KF1

Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 150 g
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 in), housing type B2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

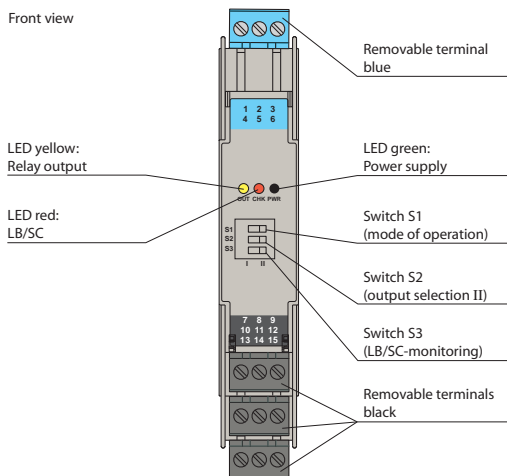
Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1) G [Ex ia] IIC, II (1) D [Ex ia] IIIC
Input	[Ex ia] IIC, [Ex ia] IIIC
Voltage U_0	10.6V
Current I_0	19.1 mA
Power P_0	51 mW (linear characteristic)

Supply	
Maximum safe voltage U_m	253V AC

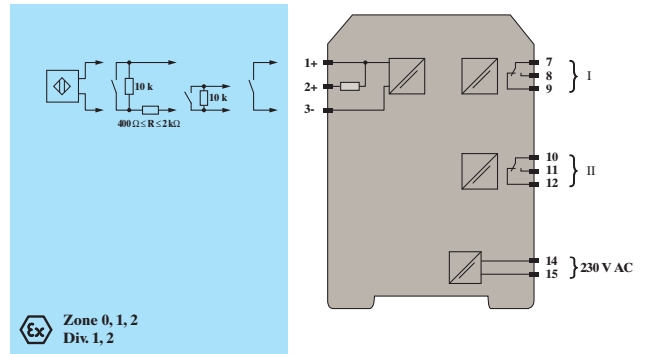
Output	
Contact loading	253V AC/2 A/cos $\varphi > 0.7$; 126.5V AC/4 A/cos $\varphi > 0.7$; 40V DC/2 A resistive load
Maximum safe voltage U_m	253V AC

Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V

Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 61241-11:2006

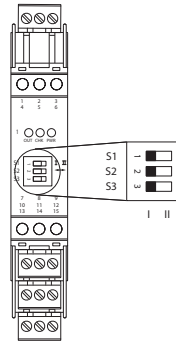


Product Features
Cat. No. 937TS-DISRS-KF1



Wiring Diagram
Cat. No. 937TS-DISRS-KF1

Configuration



Switch position

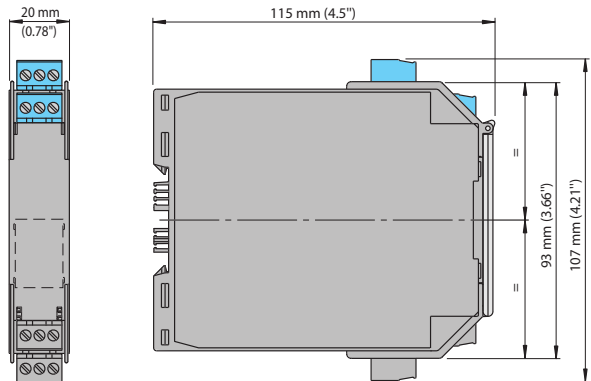
S	Function	Position
1	Mode of operation	with high input current
	Output I (relay) energized	with low input current
2	Assignment	switching state like output I
		fault signal output (de-energized if fault)
3	Line fault detection	ON
		OFF

Operating status

Control circuit	Input signal
Initiator high impedance/contact opened	low input current
Initiator low impedance/contact closed	high input current
Lead breakage, lead short-circuit	Line fault

Factory settings: switch 1, 2 and 3 in position I

Configuration
Cat. No. 937TS-DISRS-KF1



Approximate Dimensions
Cat. No. 937TS-DISRS-KF1

Switch Amplifier, Relay Output with Splitter

1-ch, 24V DC

937TH-DISRS-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- Dry contact or NAMUR inputs
- Relay contact output
- Fault relay contact output
- Housing width 12.5 mm
- Up to SIL2 acc. to IEC 61508

This isolated barrier is used for intrinsic safety applications. It transfers digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area. The proximity sensor or switch controls a form A normally open relay contact for the safe area load. The normal output state can be reversed using switch S1. Switch S2 allows output II to be switched between a signal output and an error message output. Switch S3 enables or disables line fault detection of the field circuit.

During an error condition, relays revert to their de-energized state and LEDs indicate the fault according to NAMUR NE44. A unique collective error messaging feature is available when used with the Power Rail system.

Due to its compact housing design and low heat dissipation, this device is useful for detecting positions, end stops, and switching states in space-critical applications.

Specifications

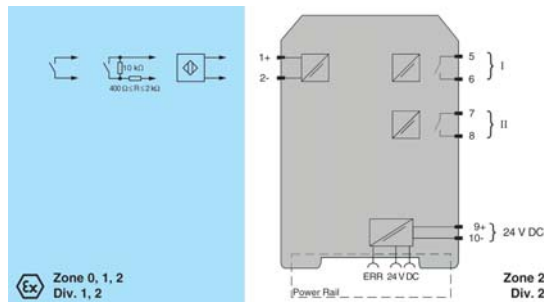
Description	24VDC, 1-channel with splitter
Signal Type	Digital Input, Relay Output
Supply	
Connection	Power Rail or terminals 9+, 10-
Rated voltage	19 ... 30V DC
Ripple	≤ 10%
Rated current	≤ 30 mA
Power loss	≤ 500 mW
Power consumption	≤ 500 mW
Input	
Connection	terminals 1+, 2-
Rated values	acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current	approx. 10V DC / approx. 8 mA
Switching point/switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection	breakage I ≤ 0.1 mA, short-circuit I > 6.5 mA
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms
Output	
Connection	output I: terminals 5, 6 ; output II: terminals 7, 8
Output I	signal ; relay
Output II	signal or error message ; relay
Minimum switch current	2 mA / 24V DC
Energized/De-energized delay	≤ 20 ms / ≤ 20 ms
Mechanical life	10 ⁷ switching cycles
Transfer characteristics	
Switching frequency	≤ 10 Hz
Electrical isolation	
Input/Output	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Input/power supply	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Output/power supply	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Output/Output	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 61010-1:2010
Conformity	
Electromagnetic compatibility	NE 21
Protection degree	IEC 60529

Switch Amplifier, Relay Output with Splitter

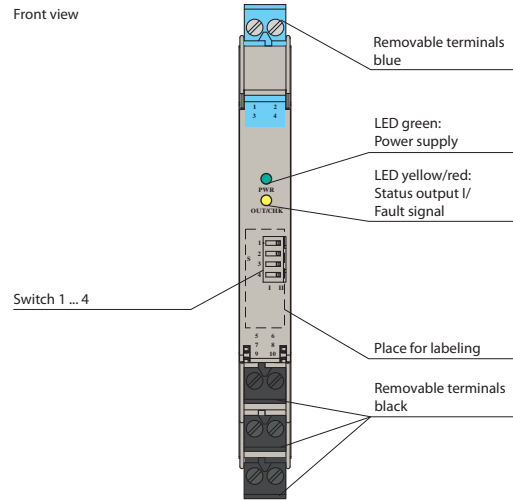
1-ch, 24V DC, *continued*

937TH-DISRS-DC1

Environmental and Mechanical Specifications	
Operating Temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Mass	approx. 100 g
Dimensions	12.5 x 114 x 119 mm (0.5 x 4.5 x 4.7 in) , housing type A2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1)G [Ex ia Ga] IIC , Ex II (1)D [Ex ia Da] IIIc < Ex> I (M1) [Ex ia Ma] I
Input	[Ex ia Ga] IIC, [Ex ia Da] IIIc, [Ex ia Ma] I
Voltage U_0	10.5 V
Current I_0	17.1 mA
Power P_0	45 mW (linear characteristic)
Supply	
Maximum safe voltage U_m	253V AC
Output I, II	
Maximum safe voltage U_m	253V AC
Contact loading	253V AC/2 A/cos $\varphi > 0.7$; 126.5V AC/4 A/cos $\varphi > 0.7$; 30V DC/2 A resistive load
Group, category, type of protection, temperature class	Ex II 3G Ex nA nC IIC T4 Gc
Output I, II	
Contact loading	50V AC/2 A/cos $\varphi > 0.7$; 30V DC/2 A resistive load
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007 , EN 60079-15:2005 , EN 61241-11:2006

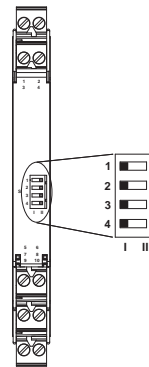


Wiring Diagram
Cat. No. 937TH-DISRS-DC1



Product Features
Cat. No. 937TH-DISRS-DC1

Configuration



Switch position

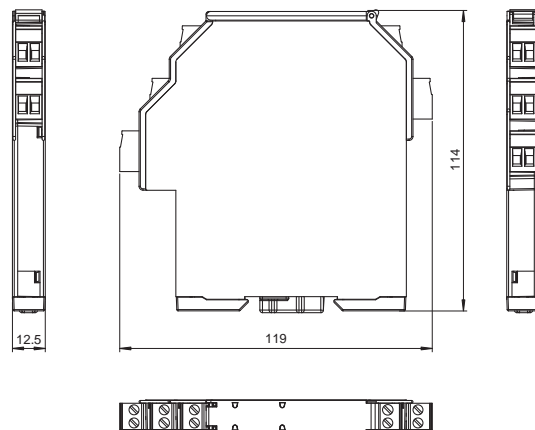
S	Function	Position
1	Mode of operation Output I (relay) energized	with high input current I with low input current II
	Assignment Output II (relay)	switching state like relay I I fault signal output (de-energized if fault) II
3	Line fault detection	ON I
		OFF II
4	no function	

Operating status

Control circuit	Input signal
Initiator high impedance/contact opened	low input current
Initiator low impedance/contact closed	high input current
Lead breakage lead short-circuit	Line fault

Factory settings: switch 1, 2, 3 and 4 in position I

Configuration
Cat. No. 937TH-DISRS-DC1



Approximate Dimensions
Cat. No. 937TH-DISRS-DC1

Switch Amplifier Transistor Output

2-ch, 24V DC

937TH-DISAT-DC2



Features

- 2-channel isolated barrier
- 24V DC supply (Power Rail)
- Housing width 12.5 mm
- Up to SIL2 acc. to IEC 61508

This isolated barrier is used for intrinsic safety applications. The device transfers digital signals (NAMUR sensors or dry contacts) from a hazardous area to a safe area. Each input controls a passive transistor output. Via switches the mode of operation can be reversed and the line fault detection can be switched off. A fault is signaled by LEDs acc. to NAMUR NE44 and a separate collective error message output

Specifications

Description	24V, 2-channel
Signal Type	Digital Input, Transistor Output
Supply	
Connection	Power Rail or terminals 9+, 10-
Rated voltage	19 ... 30V DC
Ripple	≤ 10%
Rated current	30 ... 20 mA
Power loss	≤ 800 mW including maximum power dissipation in the output
Power consumption	—
Input	
Connection	terminals 1+, 2-; 3+, 4-
Rated values	acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current	approx. 10V DC / approx. 8 mA
Switching point/switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection	breakage I ≤ 0.1 mA, short-circuit I > 6.5 mA
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms
Output	
Connection	terminals 5, 6; 7, 8
Output I	signal ; Transistor
Output II	signal ; Transistor
Minimum switch current	2 mA / 24V DC
Energized/De-energized delay	≤ 20 ms / ≤ 20 ms
Mechanical life	10 ⁷ switching cycles
Transfer characteristics	
Switching frequency	≤ 5 kHz
Electrical isolation	
Input/Output	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Input/power supply	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Output/power supply	basic insulation according to EN 50178, rated insulation voltage 50 V _{eff}
Output/Output	basic insulation according to EN 50178, rated insulation voltage 50 V _{eff}
Directive conformity	
Electromagnetic compatibility	Directive 2004/108/EC
Conformity	
Electromagnetic compatibility	NE 21:2011
Degree of protection	IEC 60529:2001
Protection against electrical shock	IEC 61010-1:2010
Input	EN 60947-5-6:2000

Switch Amplifier Transistor Output

2-ch, 24V DC, *continued*

937TH-DISAT-DC2

Environmental and Mechanical Specifications	
Operating Temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Mass	approx. 100 g
Dimensions	12.5 x 114 x 119 mm (0.5 x 4.5 x 4.7 in), housing type A2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1)G [Ex ia Ga] IIC
	Ex II (1)D [Ex ia Da] IIIC
	Ex I (M1) [Ex ia Ma] I

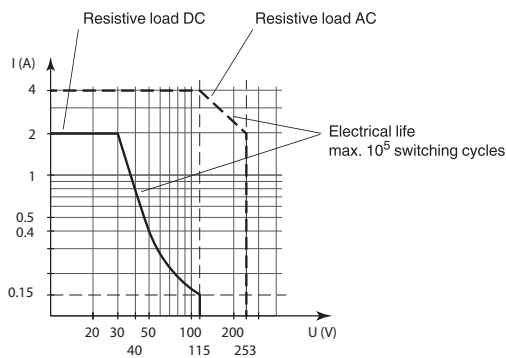
Input Ex ia	
Voltage U_0	10.5 V
Current I_0	17.1 mA
Power P_0	45 mW (linear characteristic)

Supply	
Maximum safe voltage U_m	253V AC

Output	
Maximum safe voltage U_m	253V AC
Group, category, type of protection, temperature class	Ex II 3G Ex nA IIC T4 Gc

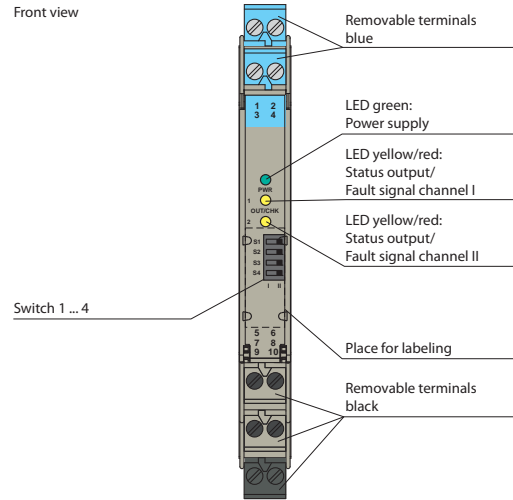
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	Directive 94/9/EC

Maximum switching power of output contacts

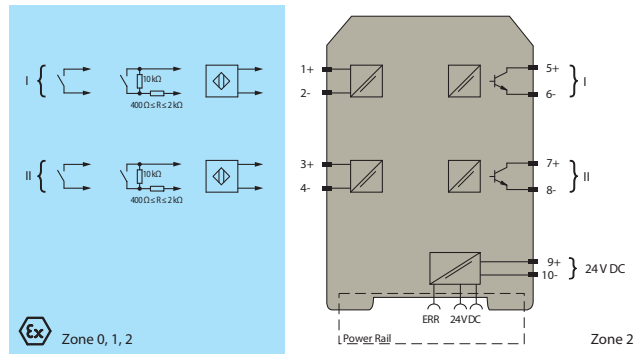


The maximum number of switching cycles is depending on the electrical load and may be higher when reduced currents and voltages are applied

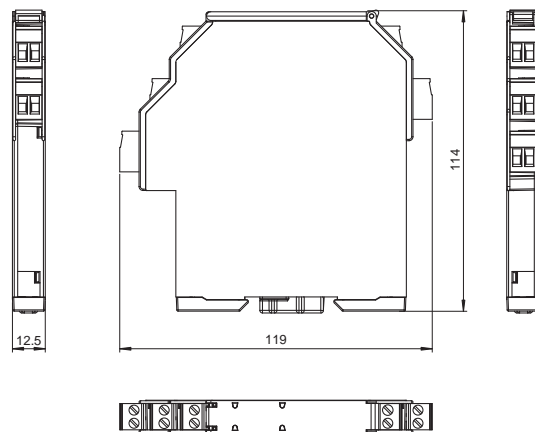
Configuration Cat. No. 937TH-DISAT-DC2



Product Features Cat. No. 937TH-DISAT-DC2



Wiring Diagram Cat. No. 937TH-DISAT-DC2



Approximate Dimensions Cat. No. 937TH-DISAT-DC2

Switch Amplifier, Transistor Output with Splitter

1-ch, 24V DC

937TH-DISTS-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- Housing width 12.5 mm
- Up to SIL2 acc. to IEC 61508

This isolated barrier is used for intrinsic safety applications. The device transfers digital signals (NAMUR sensors or dry contacts) from a hazardous area to a safe area. The input controls two passive transistor outputs. Via switches the mode of operation can be reversed and the line fault detection can be switched off. Via switch the function of the second output can be defined as a signal output or an error output. A fault is signaled by LEDs acc. to NAMUR NE44 and a separate collective error message output.

Specifications

Description	24V, 1-channel with splitter
Signal Type	Digital Input, Transistor Output
Supply	
Connection	Power Rail or terminals 9+, 10-
Rated voltage	19 ... 30V DC
Ripple	≤ 10%
Rated current	30 ... 20 mA
Power loss	≤ 800 mW including maximum power dissipation in the output
Input	
Connection	terminals 1+, 2-; 3+, 4-
Rated values	acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current	approx. 10V DC / approx. 8 mA
Switching point/switching hysteresis	1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection	breakage I ≤ 0.1 mA, short-circuit I > 6.5 mA
Pulse/Pause ratio	≥ 20 ms / ≥ 20 ms
Output	
Connection	terminals 5, 6; 7, 8
Output I	signal ; Transistor
Output II	signal ; Transistor
Minimum switch current	2 mA / 24V DC
Energized/De-energized delay	≤ 20 ms / ≤ 20 ms
Mechanical life	10 ⁷ switching cycles
Transfer characteristics	
Switching frequency	≤ 5 kHz
Electrical isolation	
Input/Output	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Input/power supply	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Output/power supply	basic insulation according to EN 50178, rated insulation voltage 50 V _{eff}
Output/Output	basic insulation according to EN 50178, rated insulation voltage 50 V _{eff}
Directive conformity	
Electromagnetic compatibility	Directive 2004/108/EC
Conformity	
Electromagnetic compatibility	NE 21:2011
Degree of protection	IEC 60529:2001
Protection against electrical shock	IEC 61010-1:2010
Input	EN 60947-5-6:2000

Switch Amplifier, Transistor Output with Splitter

1-ch, 24V DC, *continued*

937TH-DISTS-DC1

Environmental and Mechanical Specifications	
Operating Temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Mass	approx. 100 g
Dimensions	12.5 x 114 x 119 mm (0.5 x 4.5 x 4.7 in), housing type A2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

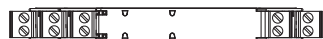
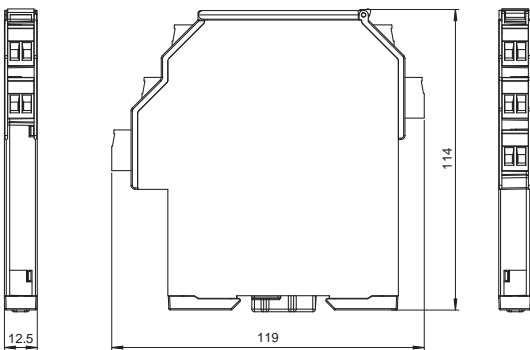
Data for application in connection with Ex-areas	
Input	
Voltage	10.5 V
Current	17.1 mA
Power	45 mW (linear characteristic)

Supply	
Maximum safe voltage	253V AC

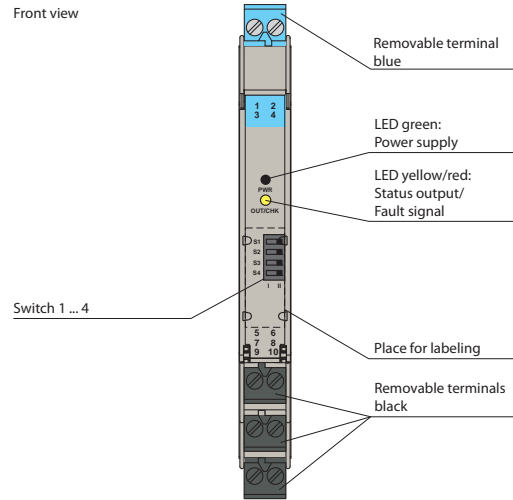
Output	
Maximum safe voltage	253V AC
Group, category, type of protection, temperature class	Ex II 3G Ex nA IIC T4 Gc

Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V

Directive conformity	
Directive 94/9/EC	EN 60079-0:2012, EN 60079-11:2012, EN 60079-15:2010

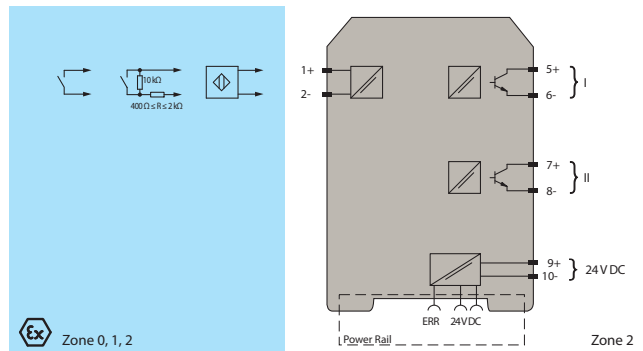


Approximate Dimensions
Cat. No. 937TH-DISTS-DC1



Product Features

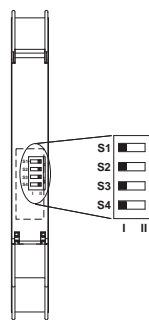
Cat. No. 937TH-DISTS-DC1



Wiring Diagram

Cat. No. 937TH-DISTS-DC1

Configuration



Switch settings

S	Function	Position	
1	Mode of operation output I (active)	with high input current with low input current	I II
	2	Assignment output II	switching state like output I
fault signal output (passive if fault)			II
3	Line fault detection of the input	ON	I
		OFF	II
4	no function		

Operating status

Control circuit	Input signal
Initiator high impedance/contact opened	low input current
Initiator low impedance/contact closed	high input current
Lead breakage, lead short-circuit	Line fault

Factory settings: switch 1, 2, 3 and 4 in position I

Configuration

Cat. No. 937TH-DISTS-DC1

Solenoid Driver

1-ch, 24V DC

937TH-DOSND-IP1



Features

- 1-channel isolated barrier
- 24V DC supply (loop powered)
- Current limit 45 mA at 12V DC
- Housing width 12.5 mm
- Up to SIL3 acc. to IEC 61508

This isolated barrier is used for intrinsicsafety applications. It supplies power to solenoids, LEDs, and audible alarms located in a hazardous area. It is loop powered, so the available energy at the output is received from the input signal. The output signal has a resistive characteristic. As a result the output voltage and current are dependent on the load and the input voltage. At full load, 12 V at 45 mA is available for the hazardous area application.

Specifications

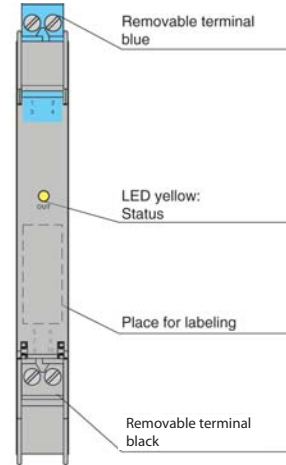
Description	24V DC, 1-channel
Signal Type	Digital Output
Supply	
Connection	Loop powered
Power loss	1 W
Input	
Connection	terminals 5, 6
Rated voltage U_i	19 ... 30V DC
Current	≤ 72 mA at $U_i = 19$ V, ≤ 50 mA at $U_i = 30$ V with 265 W output load
	≤ 45 mA at $U_i = 19$ V, ≤ 31 mA at $U_i = 30$ V with shorted output
	≤ 14 mA at $U_i = 19$ V, ≤ 11 mA at $U_i = 30$ V no load at output
Inrush current	≤ 200 mA after 100 ms
Output	
Connection	terminals 1+, 2-
Internal resistor R_i	$\leq 238 \Omega$
Current I_e	≤ 45 mA
Voltage U_e	≥ 12 V
Open loop voltage U_s	≥ 22.7 V
Output rated operating current	45 mA
Output signal	These values are valid for the rated operating voltage 19 ... 30V DC.
Energized/De-energized delay	single operation: typ. 1.7 ms/50 ms; periodical: typ. 5 ms/50 ms

Solenoid Driver

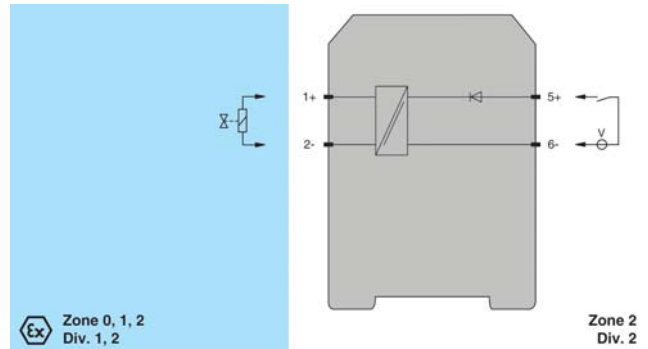
1-ch, 24V DC, *continued*

937TH-DOSND-IP1

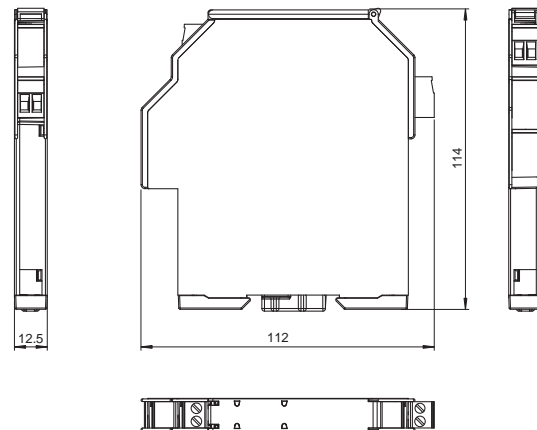
Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 100 g
Dimensions	12.5 x 114 x 119 mm (0.5 x 4.5 x 4.7 in) , housing type A2
Mounting	35 mm DIN Rail per EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1)G [Ex ia Ga] IIC , Ex II (1)D [Ex ia Da] IIIC , Ex I (M1) [Ex ia Ma] I
	[Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I
Output	
Voltage U_0	25.2 V
Current I_0	110 mA
Power P_0	693 mW
Input	
Maximum safe voltage U_m	250V
Group, category, type of protection, temperature class	Ex II 3G Ex nA IIC T4 Gc
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007 , EN 60079-15:2005 , EN 61241-11:2006



Product Features
Cat. No. 937TH-DOSND-IP1



Wiring Diagram
Cat. No. 937TH-DOSND-IP1

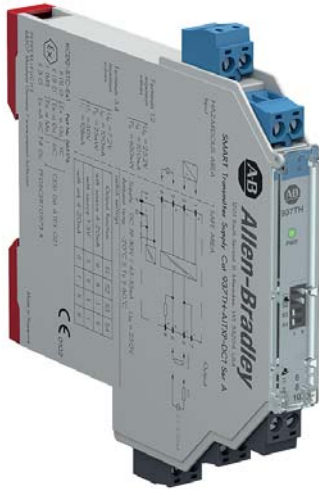


Approximate Dimensions
Cat. No. 937TH-DOSND-IP1

SMART Power Supply

1-ch, 24V DC

937TH-AITXP-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- Input for 2-wire SMART transmitters and current sources
- Output for 4 mA ... 20 mA or 1 V ... 5 V
- Sink or source mode
- Housing width 12.5 mm
- Up to SIL2 acc. to IEC 61508

This isolated barrier is used for intrinsic safety applications. The device supplies 2-wire SMART transmitters in a hazardous area, and can also be used with 2-wire SMART current sources. It transfers the analog input signal to the safe area as an isolated current value. Digital signals may be superimposed on the input signal in the hazardous or safe area and are transferred bi-directionally. Selectable output of current source, sink mode, or voltage output is available via DIP switches. If the HART communication resistance in the loop is too low, the internal resistance of 250 Ω between terminals 6 and 8 can be used. Test sockets for the connection of HART communicators are integrated into the terminals of the device.

Specifications

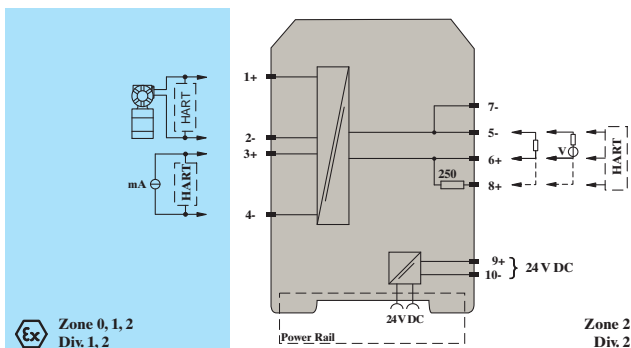
Description	24V DC, 1-channel
Signal Type	Analog input
Supply	
Connection	Power Rail or terminals 9+, 10-
Rated voltage	19 ... 30V DC
Ripple	$\leq 10\%$
Rated current	$\leq 45\text{ mA}$
Power loss	$\leq 800\text{ mW}$
Power consumption	$\leq 1.1\text{ W}$
Input	
Connection	terminals 1+, 2-, 3+, 4-
Input signal	4 ... 20 mA limited to approx. 30 mA
Open circuit voltage/short-circuit current	terminals 1+, 2-: 22 V / 30 mA
Voltage drop	terminals 3+, 4-: approx. 5 V
Available voltage	terminals 1+, 2-: $\geq 15\text{ V}$ at 20 mA
Output	
Connection	terminals 5-, 6+
Load	0 ... 300 W (source mode)
Output signal	4 ... 20 mA or 1 ... 5 V (on 250 W, 0.1% internal shunt) 4 ... 20 mA (sink mode), operating voltage 15.5 ... 26 V
Ripple	20 mV rms
Transfer characteristics	
at 20 °C (68 °F)	
Deviation	$\leq \pm 0.1\%$ incl. non-linearity and hysteresis (source mode 4 ... 20 mA)
	$\leq \pm 0.2\%$ incl. non-linearity and hysteresis (sink mode 4 ... 20 mA)
	$\leq \pm 0.2\%$ incl. non-linearity and hysteresis (source mode 1 ... 5 V)
Influence of ambient temperature	$< 2\text{ mA/K}$ (0 ... 60 °C (32 ... 140 °F)); $< 4\text{ mA/K}$ (-20 ... 0 °C (-4 ... 32 °F)) (source mode and sink mode 4 ... 20 mA)
	$< 0.5\text{ mV/K}$ (0 ... 60 °C (32 ... 140 °F)); $< 1\text{ mV/K}$ (-20 ... 0 °C (-4 ... 32 °F)) (source mode 1 ... 5 V)
Frequency range	field side into the control side: bandwidth with 0.5 Vpp signal 0 ... 3 kHz (-3 dB)
	control side into the field side: bandwidth with 0.5 Vpp signal 0 ... 3 kHz (-3 dB)
Settling time	$\leq 200\text{ ms}$
Rise time/fall time	$\leq 20\text{ ms}$
Electrical isolation	
Input/Output	reinforced insulation acc. to EN 50178, rated insulation voltage 300V _{eff}
Input/power supply	reinforced insulation acc. to EN 50178, rated insulation voltage 300V _{eff}
Output/power supply	reinforced insulation acc. to EN 50178, rated insulation voltage 300V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001

SMART Power Supply

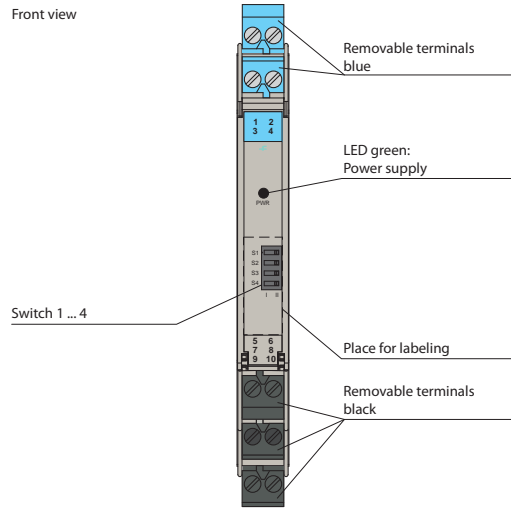
1-ch, 24V DC, *continued*

937TH-AITXP-DC1

Environmental and Mechanical Specifications	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 100 g
Dimensions	12.5 x 114 x 124 mm (0.5 x 4.5 x 4.9 in), housing type A2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	<Ex>II (1)G [Ex ia Ga] IIC, <Ex> II (1)D[Ex ia Da] IIIC, <Ex> I (M1) [Ex ia Ma] I
Input	[Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I
Supply	
Maximum safe voltage U_m	250V AC
Equipment	terminals 1+, 2-
Voltage U_o	25.2 V
Current I_o	100 mA
Power P_o	630 mW
Equipment	terminals 3+, 4-
Voltage U_i	< 30 V
Current I_i	< 128 mA
Voltage U_o	7.2 V
Current I_o	100 mA
Power P_o	25 mW
Group, category, type of protection, temperature class	<Ex> II 3G Ex nA IIC T4 Gc
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 60079-15:2005, EN 60079-26:2007, EN 61241-11:2006, EN 50303:2000

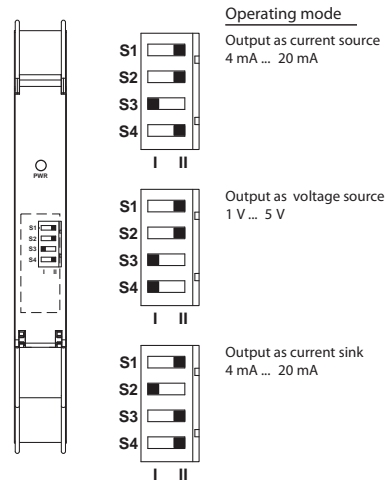


Wiring Diagram
Cat. No. 937TH-AITXP-DC1



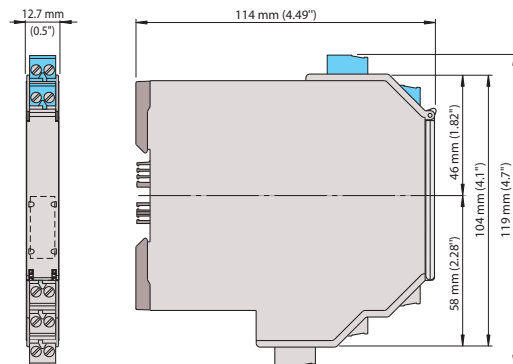
Product Features
Cat. No. 937TH-AITXP-DC1

Configuration



Factory settings: output as current source 4 mA ... 20 mA

Configuration
Cat. No. 937TH-AITXP-DC1



Approximate Dimensions
Cat. No. 937TH-AITXP-DC1

SMART Power Supply

2-ch, 24V DC

937TS-AITXP-DC2



- 2-channel isolated barrier
- 24V DC supply (Power Rail)
- Input 2-wire SMART transmitters
- Output for 0/4... 20 mA
- Terminals with test points
- Up to SIL2 acc. to IEC 61508

This isolated barrier is used for intrinsic safety applications. The device supplies 2-wire SMART transmitters in a hazardous area. It transfers the analog input signal to the safe area as an isolated current value.

Digital signals may be superimposed on the input signal in the hazardous or safe area and are transferred bi-directionally.

If the HART communication resistance in the loop is too low, the internal resistance of 250 Ω between terminals 8, 9 and 11, 12 can be used.

Test sockets for the connection of HART communicators are integrated into the terminals of the device.

The device supports the following SMART protocols:

- HART
- BRAIN
- Foxboro

Specifications

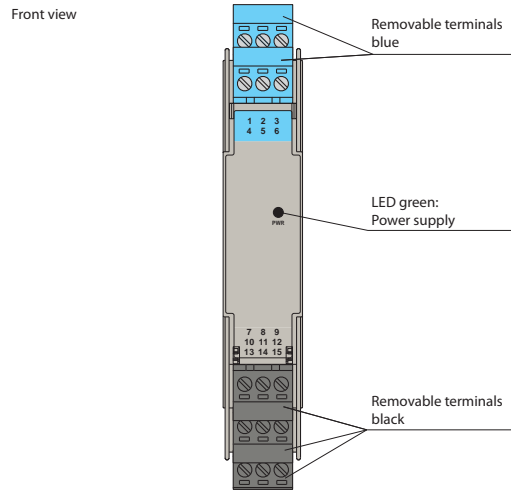
Description	24V DC, 2-channel
Supply	
Connection	Power Rail or terminals 14+, 15-
Rated voltage	20 ... 35V DC
Ripple	within the supply tolerance
Power loss	1.8 W
Power consumption	≤ 2.7 W
Input	
Connection	terminals 1+, 3-, 4+, 6-
Input signal	0/4 ... 20 mA
Available voltage	≤ 16 V at 20 mA, terminals 1+, 3
Output	
Connection	terminals 7-, 8+; 10-, 11+
Load	0 ... 550 Ohm
Output signal	0/4 ... 20 mA (overload > 25 mA)
Ripple	50 mA rms
Transfer characteristics	
Deviation	at 20 °C (68 °F), 0/4 ... 20 mA
	≤ 10 mA incl. calibration, linearity, hysteresis, loads and fluctuations of supply voltage
Influence of ambient temperature	0.25 μ A/K
Frequency range	field side into the control side: band width with 1 Vpp signal 0 ... 7.5 kHz (-3 dB)
	safe area to hazardous area: band width with 1 VSS signal 0.3 ... 7.5 kHz (-3 dB)
Settling time	200 μ s
Rise time/fall time	20 μ s
Electrical isolation	
Output/power supply	functional insulation, rated insulation voltage 50V AC
Output/Output	functional insulation, rated insulation voltage 50V AC
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Conformity	
Electromagnetic compatibility	NE 21:2011
Degree of protection	IEC 60529:2001
Protection against electrical shock	UL 61010-1:2004

SMART Power Supply

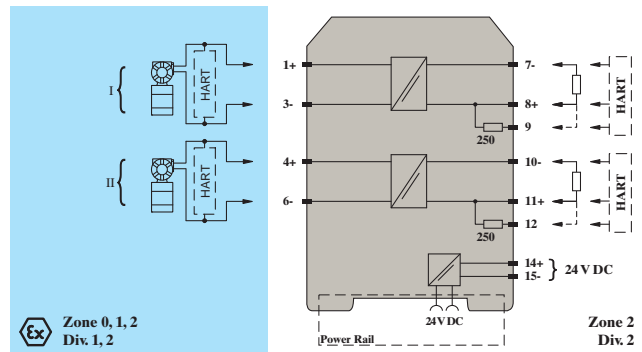
2-ch, 24V DC, *continued*

937TS-AITXP-DC2

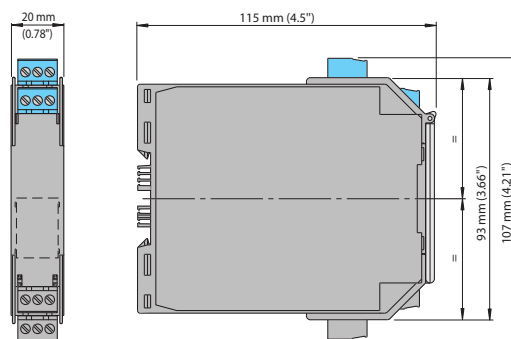
Environmental and Mechanical Specifications	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 150 g
Dimensions	20 x 124 x 115 mm (0.8 x 4.9 x 4.5 in), housing type B2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T _{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]
Input	Ex ia IIC
Voltage	25.2 V
Current	93 mA
Power	0.586 W
Supply	
Maximum safe voltage	250V
Group, category, type of protection, temperature class	Ex II 3G Ex nA II T4 [device in zone 2]
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2012, EN 60079-11:2007, EN 60079-15:2010, EN 61241-11:2006



Product Features
Cat. No. 937TS-AITXP-DC2



Wiring Diagram
Cat. No. 937TS-AITXP-DC2



Approximate Dimensions
Cat. No. 937TS-AITXP-DC2

SMART Power Supply with Splitter

1-ch, 24V DC

937TH-AITXS-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- Input for 2-wire SMART transmitters and current sources
- Signal splitter (1 input and 2 outputs)
- Dual output 0/4 mA ... 20 mA or 0/1 V ... 5 V
- Terminal blocks with test sockets
- Up to SIL2 acc. to IEC 61508

This isolated barrier is used for intrinsic safety applications. The device supplies 2-wire transmitters in the hazardous area, and can also be used with current sources. It transfers the analog input signal to the safe area as two isolated output signals. Bi-directional communication is supported for SMART transmitters that use current modulation to transmit data and voltage modulation to receive data. The output is selected as a current source, current sink, or voltage source via switches. Test sockets for the connection of HART communicators are integrated into the terminals of the device.

Specifications

Description	24V DC, 1-channel with Splitter
Signal Type	Analog input
Supply	
Connection	Power Rail or terminals 9+, 10-
Rated voltage	18 ... 30V DC
Ripple	within the supply tolerance
Rated current	—
Power loss	approx. 1.4 W at 20 mA transfer current, 250 W in both outputs
Power consumption	2 W
Input	
Connection	terminals 1+, 2- (sink); 3+, 4- (source)
Input signal	0/4 ... 20 mA
Voltage drop	≤ 6.1 V at 20 mA (terminals 3, 4)
Input Resistance	terminals 3+, 4-: ≤ 310 Ω terminals 1+, 2-: ≤ 500 Ω (250 Ω load)
Available voltage	≥ 15 V at 20 mA terminals 1+, 2-
Output	
Connection	source: terminals 5-, 6+; 7-, 8+ sink: terminals 5+, 6-, 7+, 8-
Load	channel 1: 0 ... 500 Ω channel 2: 0 ... 500 Ω
Output signal	0/4 ... 20 mA or 0/1 ... 5 V
Ripple	≤ 50 μA _{rms}
Transfer characteristics	
Deviation	$I_{out} < 20 \text{ mA}; V_{out} < 7.5 \text{ mV}$ incl. calibration, linearity, hysteresis and fluctuation of supply voltage, at 20 °C (68 °F), 0/4 ... 20 mA, 0/1 ... 5 V
Influence of ambient temperature	0.25 μA/K
Frequency range	field side into the control side: bandwidth with 0.5 Vpp signal 0 ... 7.5 kHz (-3 dB) control side into the field side: bandwidth with 0.5 Vpp signal 0.3 ... 7.5 kHz (-3 dB)
Settling time	200 μs
Rise time/fall time	20 μs
Electrical isolation	
Output/power supply	functional insulation, rated insulation voltage 50V AC
Output/Output	functional insulation, rated insulation voltage 50V AC
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Protection against electrical shock	UL 61010-1

SMART Power Supply with Splitter, *continued*

1-ch, 24V DC, *continued*

937TH-AITXS-DC1

Environmental and Mechanical Specifications

Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 100 g
Dimensions	12.5 x 114 x 124 mm (0.5 x 4.5 x 4.9 in), housing type A2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

Data for application in connection with Ex-areas

Group, category, type of protection	<Ex> II (1)G [Ex ia Ga] IIC, <Ex> II (1)D [Ex ia Da] IIC, <Ex> I (M1) [Ex ia Ma] I
Input	[Ex ia Ga] IIC, [Ex ia Da] IIC, [Ex ia Ma] I

Supply

Maximum safe voltage U_m	250V
Equipment	terminals 1+, 2-
Voltage U_0	25.2V
Voltage U_q	28.2V
Current I_0	93 mA
Power P_0	656 mW
Equipment	terminals 3+, 4-
Voltage U_i	30V
Current I_i	115 mA
Power P_i	700 mW
Voltage U_0	5V
Current I_0	6.8 mA
Power P_0	1.6 mW

Output

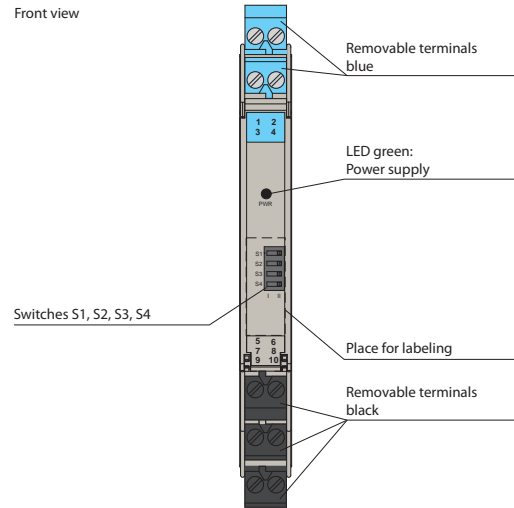
Maximum safe voltage U_m	250V
Group, category, type of protection, temperature class	<Ex> II 3G Ex nA II T4 Gc [device in zone 2]

Electrical isolation

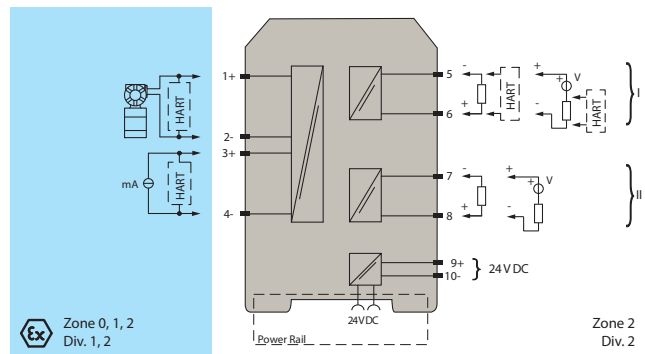
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Input/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V

Directive conformity

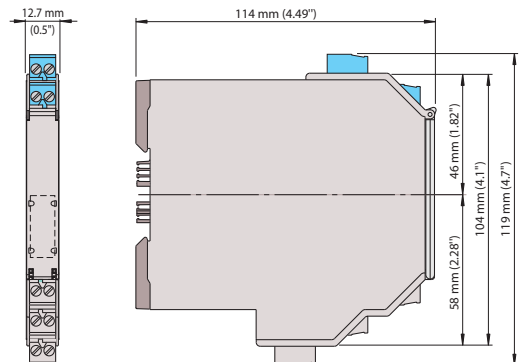
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11: 2012, EN 60079-15: 2010
-------------------	---



Product Features
Cat. No. 937TH-AITXS-DC1



Wiring Diagram
Cat. No. 937TH-AITXS-DC1



Approximate Dimensions
Cat. No. 937TH-AITXS-DC1

Temperature Repeater

1-ch, 24V DC

937TH-AIRRP-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- Resistance and RTD input (Pt100, Pt500, Pt1000)
- Resistance output
- Accuracy 0.1 %
- Line fault detection (LFD) for Pt100
- Housing width 12.5 mm

This isolated barrier is used for intrinsic safety applications. It transfers resistance values of RTDs or potentiometers from hazardous areas to safe areas. A 2-, 3-, or 4-wire technique is available depending on the required accuracy. The input card of the control system measures the same load as if it were connected directly to the resistance in a hazardous area.

Specifications

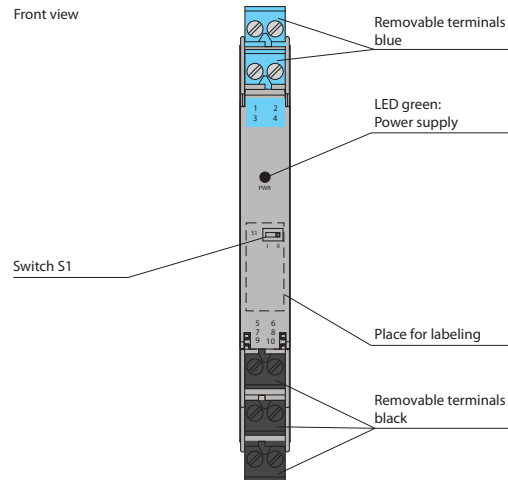
Description	24V DC, 1-channel
Signal Type	Digital Output
Supply	
Connection	Power Rail or terminals 9+, 10-
Rated voltage	19 ... 30V DC
Ripple	within the supply tolerance
Rated current	<20 mA
Power consumption	0.35 W (24 V and 1 mA sense current)
Input	
Connection	terminals 1, 2, 3, 4
Line fault detection	yes, at Pt100
Lead resistance	<10 % of resistance value
Transmission range	0 ... 10 mA
Available voltage	9V
Line fault detection	50 nA
Output	
Connection	terminals 5-, 7-, 6+, 8+
Current	0 ... 10 mA
Available voltage	0 ... 7V
Fault signal	<10 Ω or >400 Ω, depending on lead disconnected (measuring current ≤ 1 mA)
Transfer characteristics	
Deviation	$I_m \geq 1 \text{ mA}$: $\pm 0.1 \%$ of R_m or $\pm 0.1 \Omega$ (the larger value is applicable)
	$I_m < 1 \text{ mA}$: accuracy reduces in proportion to I_m . e.g. $I_m = 0.1 \text{ mA}$: $\pm 1 \%$ of R_m or 1Ω (the larger value is applicable).
Influence of ambient temperature	$I_m \geq 1 \text{ mA}$, $R_m \geq 100 \Omega$: 0.01 %/K in the range -20 ... +60 °C (253 ... 333 K)
	$I_m < 1 \text{ mA}$ or $R_m < 100 \Omega$: temperature stability reduces in proportion to I_m or R_m
Rise time	signal response time $\leq 2 \text{ ms}$ (10 ... 90 %)
	response to application of I_m : $R_m > 50 \Omega$ and $I_m < 5 \text{ mA}$: $< 5 \text{ ms}$
	response to application of I_m : $R_m > 30 \Omega$ and $I_m < 5 \text{ mA}$: $< 10 \text{ ms}$
	response to application of I_m : $R_m > 18 \Omega$ and $I_m < 5 \text{ mA}$: $< 20 \text{ ms}$
Electrical isolation	
Input/Output	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Input/power supply	reinforced insulation acc. to EN 50178, rated insulation voltage 300 V _{eff}
Output/power supply	functional insulation, rated insulation voltage 50V AC
Directive conformity	
Electromagnetic compatibility Directive 2004/108/EC	EN 61326-1:2006
Directive 2004/108/EC	EN 61326-1:2006
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Protection against electrical shock	UL 61010-1

Temperature Repeater

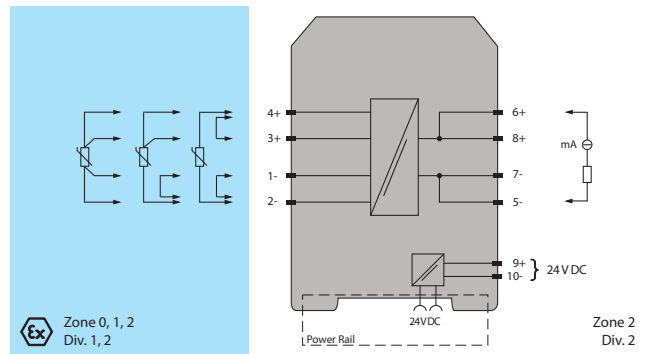
1-ch, 24V DC, *continued*

937TH-AIRRP-DC1

Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 100 g
Dimensions	12.5 x 114 x 119 mm (0.5 x 4.5 x 4.7 in), housing type A2
Mounting	35 mm DIN Rail per EN 60715:2001



Product Features Cat. No. 937TH-AIRRP-DC1

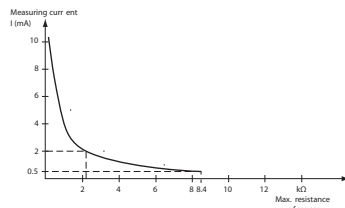


Measurement range

The resistance repeater can convey a maximum of 10 mA and a maximum of 7 V. The maximum connectable resistance value can be calculated with the following equations

- Resistance value = 4.2 V / measuring current
- Resistance value = 9 V / measuring current - 758 Ω

Use the smaller of these two resistance values as maximum allowed load. The measuring current is determined by control.



An example of the maximum transferable resistance value:

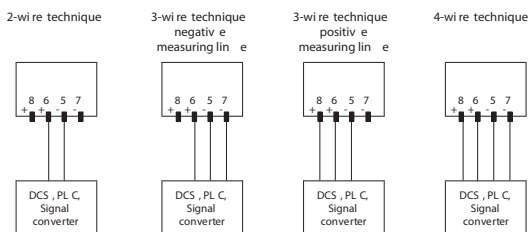
- 6.4 kΩ at 0.5 mA measuring current
- 2.1 kΩ at 2 mA measuring current

Line Fault Detection (LFD)

The output will indicate less than 10 Ω or greater than 400 Ω for a lead breakage at terminals 1, 2, 3 or 4 for measuring current of less than or equal to 1 mA i.e. out of range for Pt100.

Output Curve Cat. No. 937TH-AIRRP-DC1

Connection types control side (safe area)



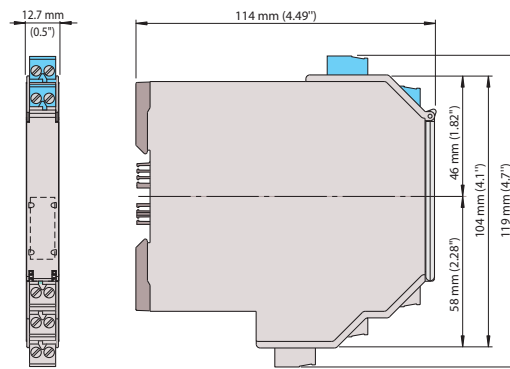
Connection types field side (hazardous area)

The resistance in the hazardous area can be measured with a 2-, 3- or 4-wire technique.

- 2-wire technique: Link terminals 1 and 2 and terminals 3 and 4. Connect the resistance to terminal 4 and terminal 2. Switch S1 in the position II.
- 3-wire technique: Link terminals 1 and 2. Connect the resistance to terminals 3 and 4 and terminal 2. Switch S1 in the position I.
- 4-wire technique: Connect the resistance to terminals 3 and 4 and terminals 1 and 2. Switch S1 in the position II.

Connection Types Cat. No. 937TH-AIRRP-DC1

Wiring Diagram Cat. No. 937TH-AIRRP-DC1

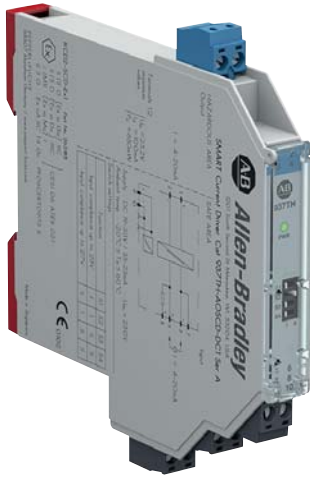


Approximate Dimensions Cat. No. 937TH-AIRRP-DC1

SMART Current Driver

1-ch, 24V DC

937TH-AOSCD-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- Current output up to 650 Ohm load
- HART I/P and valve positioner
- Lead breakage monitoring
- Accuracy 0.1 %
- Housing width 12.5 mm
- Up to SIL2 acc. to IEC 61508

This isolated barrier is used for intrinsic safety applications. It drives SMART I/P converters, electrical valves, and positioners in hazardous areas. Digital signals are superimposed on the analog values at the field or control side and are transferred bi-directionally. Current transferred across the DC/DC converter is repeated at terminals 1 and 2. An open field circuit presents a high input impedance to the control side to allow lead breakage monitoring by control system. If the loop resistance for the digital communication is too low, an internal resistor of 250 Ω between terminals 6 and 8 is available, which may be used as the HART communication resistor. Sockets for the connection of a HART communicator are integrated into the terminals of the device.

Specifications

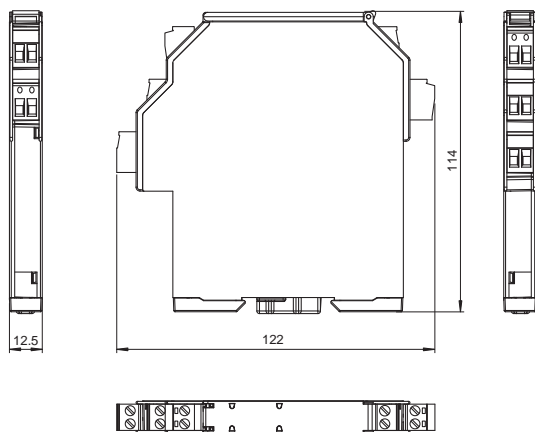
Description	24V DC, 1-channel
Signal Type	Analog Output
Supply	
Connection	Power Rail or terminals 9+, 10-
Rated voltage	19 ... 30V DC
Ripple	≤ 10 %
Rated current	≤ 30 mA
Power loss	≤ 600 mW
Power consumption	≤ 700 mW
Input	
Connection	terminals 5-, 6+
Input signal	4 ... 20 mA limited to approx. 30 mA
Input voltage	depending on switch configuration
	open loop voltage of the control system < 23V open loop voltage of the control system < 27V
Voltage drop	depending on switch configuration
	open loop voltage of the control system < 23V: approx. 6 V at 20 mA open loop voltage of the control system < 27V: approx. 10 V at 20 mA
Input resistance	> 100 k Ω , with field wiring open
Output	
Connection	terminals 1+, 2-
Current	4 ... 20 mA
Load	0 ... 650 Ω
Voltage	≥ 13 V at 20 mA
Ripple	20 mV _{rms}
Transfer characteristics	
Deviation	at 20 °C (68 °F), 0/4 ... 20 mA
	$\leq \pm 0.1$ % incl. non-linearity and hysteresis
Influence of ambient temperature	< 2 mA/K (0 ... 60 °C (32 ... 140 °F)); < 4 mA/K (-20 ... 0 °C (-4 ... 32 °F))
	field side into the control side: bandwidth with 0.5 Vpp signal 0 ... 3 kHz (-3 dB)
Frequency range	control side into the field side: bandwidth with 0.5 Vpp signal 0 ... 3 kHz (-3 dB)
	Rise time
Electrical isolation	
Input/Output	reinforced insulation acc. to EN 50178, rated insulation voltage 300V _{eff}
Input/power supply	
Output/power supply	
Directive conformity	
Directive 2004/108/EC	EN 61326-1:2006
Electromagnetic compatibility	NE 21
Protection degree	IEC 60529

SMART Current Driver

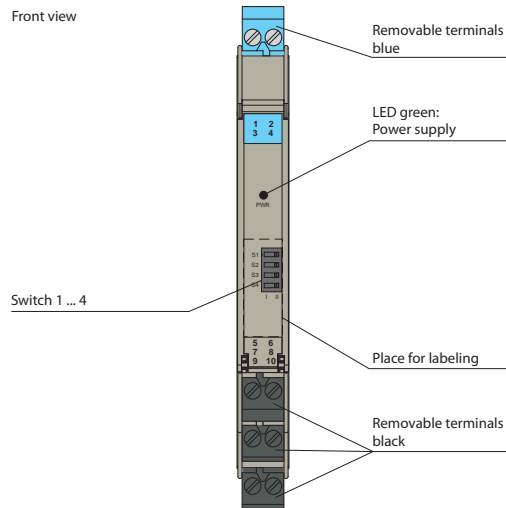
1-ch, 24V DC, *continued*

937TH-AOSCD-DC1

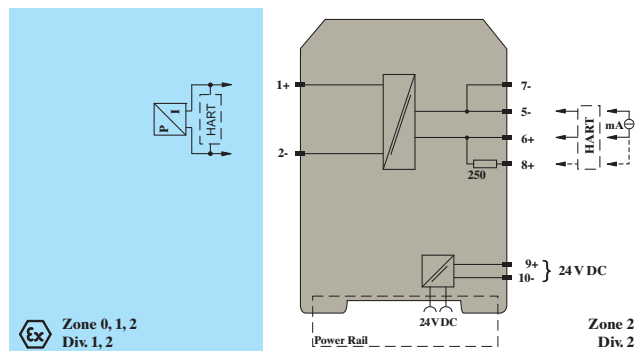
Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 100 g
Dimensions	12.5 x 114 x 119 mm (0.5 x 4.5 x 4.7 in) housing type A2
Mounting	35 mm DIN Rail per EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	<Ex> II (1)G [Ex ia Ga] IIC, <Ex> II (1)D [Ex ia Da] IIC, <Ex> I (M1) [Ex ia Ma] I
Output	[Ex ia Ga] IIC, [Ex ia Da] IIC, [Ex ia Ma] I
Supply	
Maximum safe voltage Um	250V AC
Equipment	terminals 1+, 2-
Voltage Uo	25.2V
Current Io	100 mA
Power Po	630 mW
Group, category, type of protection, temperature class	<Ex> II 3G Ex nA IIC T4 Gc
Electrical isolation	
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Output/power supply	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 60079-15:2005, EN 60079-26:2007, EN 61241-11:2006, EN 50303:2000



Approximate Dimensions
Cat. No. 937TH-AOSCD-DC1

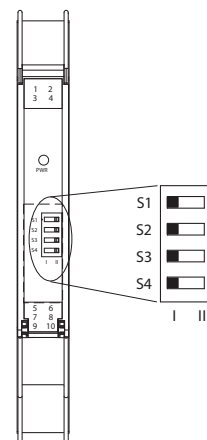


Product Features
Cat. No. 937TH-AOSCD-DC1



Wiring Diagram
Cat. No. 937TH-AOSCD-DC1

Configuration



Switch position

Function	S1	S2	S3	S4
Open loop voltage of the control system < 23 V	I	I	II	II
Open loop voltage of the control system < 27 V	II	I	II	II

Factory settings: open loop voltage of the control system < 23 V

Configuration
Cat. No. 937TH-AOSCD-DC1

Converter Barriers

Converters add functionality to the isolators by receiving signals from a hazardous area instrument e.g., temperature sensors, or load cells and then converting them to an industry standardized signal such as 0/4...20mA or 0/2...10V. Pulse evaluation units process a frequency signal at the input. A lead fault monitoring system signals a lead breakage or lead short-circuit on the signal cables.



Universal Temperature Converters

Universal Temperature Converters are designed to connect RTDs, thermocouples or potentiometers in the hazardous area, and provide a proportional 0/4 mA ... 20 mA signal to the safe area.



Strain Gauge Converters

Strain Gauge Converters are used with strain gauges, load cells and resistance measuring bridges.



Transmitter Supply Converters

Transmitter Supply Converters supply 2-wire and 3-wire transmitters in a hazardous area, and can also be used with active current sources.



Universal Frequency Converters

Universal Frequency Converters change a digital input (NAMUR sensor/mechanical contact) into a proportional, adjustable 0/4 mA ... 20 mA analog output and functions as a switch amplifier and a trip alarm.



HART Loop Converters

HART Loop Converters provide power to transmitters or can be connected to existing HART loops in parallel. They are able to evaluate up to four HART variables (PV, SV, TV, QV). Of those four HART variables, the data contained in any three of them can be converted to three different 4 mA ... 20 mA current signals.

FDT Interface

Configuring converter modules is convenient with a PC using Field Device Tool (FDT) software. Some specialized functions can only be selected using the FDT. The FDT interface is the specification describing the standardized data exchange between devices and control system or engineering or asset management tools. Examples include: PACTware™, FieldCare, FactoryTalk AssetCentre, and Process Device Configuration. FDT frame software can be downloaded at <http://www.pactware.com>. PACTware is trademark of PACTware Consortium

Catalog Number Explanation

Note: Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; some combinations may not produce a valid catalog number.

937C **U** - **AI** **TXF** - **KD** **1**
a *b* *c* - *d* *e*

a

Module Profile	
Code	Description
H	High-density 12.5mm module
S	Standard 20 mm module
U	Universal 40 mm module

c

Functionality	
Code	Description
TMP	Converter, Temperature ★
FRQ	Converter, Frequency with trip alarm
TXF	Converter, Transmitter Power Supply with trip alarm
HLP	Converter, HART Loop Power
STR	Converter, Strain Gauge

d

Power	
Code	Description
IP	Input Loop Powered
DC	24V DC
BC	20...90V DC/48...253V AC
KD	115V AC
KF	230V AC

b

I/O Type	
Code	Description
DI	Digital In
DO	Digital Out
AI	Analog In
AO	Analog Out

★ FDT Software required to program this module.

e

Channels	
Code	Description
1	Single Channel
2	Dual Channel

Universal Temperature Converter

1-ch, 24V DC

937CS-AITMP-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- TC, RTD, potentiometer or voltage input
- Current output 0/4 mA ... 20 mA
- Sink or source mode
- Configurable by PACTware
- Line fault (LFD) and sensor burnout detection
- Up to SIL2 acc. to IEC 61508/IEC 61511

This isolated barrier is used for intrinsic safety applications. It is designed to connect RTDs, thermocouples, or potentiometers in the hazardous area, and provide a proportional 0/ 4 mA ... 20 mA signal to the safe area. The barrier offers 3-port isolation between input, output, and power supply.

A removable terminal block is available for thermocouples when internal cold junction compensation is desired (Cat. No. 937A-TCJC).

A fault is indicated by a red flashing LED per NAMUR NE44 and user-configured fault outputs.

The unit is easily programmed with the FDT configuration software. A collective error messaging feature is available when used with the Power Rail system.

Specifications

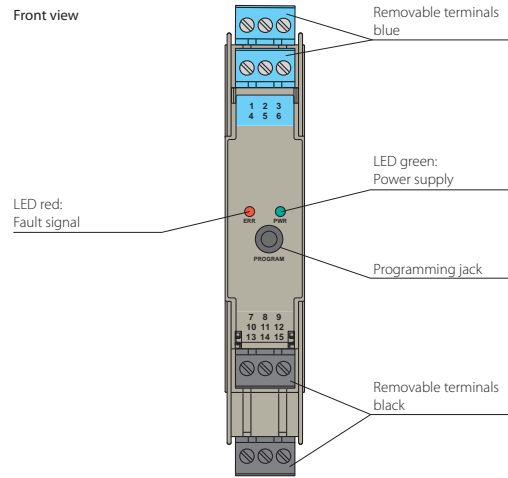
Description	24V DC, 1-channel
Signal Type	Analog Input
Supply	
Connection	terminals 14+, 15- or power feed module/Power Rail
Rated voltage	20 ... 30V DC
Ripple	within the supply tolerance
Power loss/power consumption	≤ 0.98 W / 0.98 W
Input	
Connection	terminals 1, 2, 3, 4
RTD	type Pt10, Pt50, Pt100, Pt500, Pt1000 (EN 60751: 1995)
	type Pt10GOST, Pt50GOST, Pt100GOST, Pt500GOST, Pt1000GOST (6651-94)
	type Cu10, Cu50, Cu100 (P50353-92)
	type Ni100 (DIN 43760)
Measuring current	approx. 200 mA with RTD
Types of measuring	2-, 3-, 4-wire connection
Lead resistance	≤ 50 Ω per lead
Measuring circuit monitoring	sensor breakage, sensor short-circuit
Thermocouples	type B, E, J, K, N, R, S, T (IEC 584-1: 1995)
	type L (DIN 43710: 1985)
	type TXK, TXKH, TXA (P8.585-2001)
Cold junction compensation	external and internal
Measuring circuit monitoring	sensor breakage
Voltage	selectable within the range -100 ... 100 mV
Potentiometer	0 ... 20 kΩ (2-wire connection), 0.8 ... 20 kΩ (3-wire connection)
Input resistance	≥ 1 M Ω (-100 ... 100 mV)
Output	
Connection	output I: terminal 7: source (-), sink (+), terminal 8: source (+), terminal 9: sink(-)
Output	Analog current output
Current range	0 ... 20 mA or 4 ... 20 mA
Fault signal	downscale 0 or 2 mA, upscale 21.5 mA (acc. NAMUR NE43)
Source	load 0...500 Ω
	open-circuit voltage ≤ 18V
Sink	Voltage across terminals 5 ... 30 V. If the current is supplied from a source > 16.5 V, series resistance of $\geq (V - 16.5)/0.0215 \Omega$ is needed, where V is the source voltage.
	The maximum value of the resistance is (V - 5)/0.0215 Ω

Universal Temperature Converter

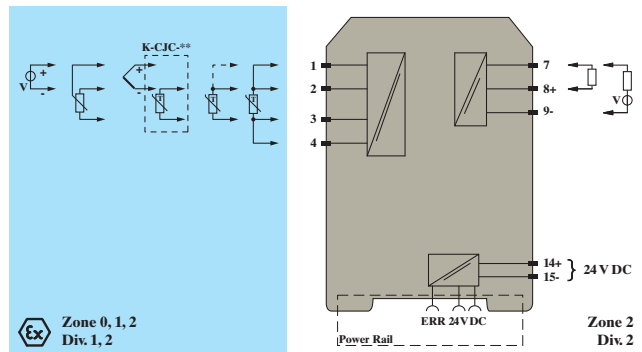
1-ch, 24V DC, *continued*

937CS-AITMP-DC1

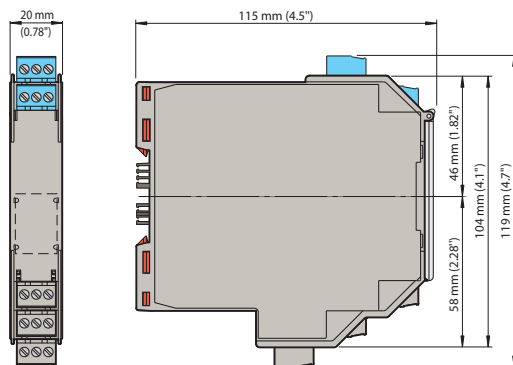
Transfer characteristics	
Deviation	
After calibration	Pt100: $\pm (0.06\% \text{ of measurement value in K} + 0.1\% \text{ of span} + 0.1 \text{ K (4-wire connection)})$
	thermocouple: $\pm (0.05\% \text{ of measurement value in } ^\circ\text{C} + 0.1\% \text{ of span} + 1 \text{ K (1.2 K for types R and S)})$
	this includes $\pm 0.8 \text{ K}$ error of the cold junction compensation
	mV: $\pm (50 \text{ mV} + 0.1\% \text{ of span})$
Influence of ambient temperature	potentiometer: $\pm (0.05\% \text{ of full scale} + 0.1\% \text{ of span, (excludes errors due to lead resistance)})$
	deviation of CJC included:
	Pt100: $\pm (0.0015\% \text{ of measurement value in K} + 0.006\% \text{ of span}) / \text{K } \Delta T_{\text{amb}}^*$
	thermocouple: $\pm (0.02 \text{ K} + 0.005\% \text{ of measurement value in } ^\circ\text{C} + 0.006\% \text{ of span}) / \text{K } \Delta T_{\text{amb}}^*$
	mV: $\pm (0.01\% \text{ of measurement value} + 0.006\% \text{ of span}) / \text{K } \Delta T_{\text{amb}}^*$
Influence of supply voltage	Potentiometer: $\pm 0.006\% \text{ of span} / \text{K } \Delta T_{\text{amb}}$
	ΔT_{amb} = ambient temperature change referenced to 23 °C (296 K)
Influence of load	$< 0.01\% \text{ of span}$
Reaction time	$\leq 0.001\% \text{ of output value per } 100 \Omega$
	worst case value (sensor breakage and/or sensor short circuit detection enabled)
Electrical isolation	mV: 1 s, thermocouples with CJC: 1.1 s, thermocouples with fixed reference temperature: 1.1 s, 3- or 4-wire RTD: 920 ms, 2-wire RTD: 800 ms, Potentiometer: 2.05 s
	functional insulation, rated insulation voltage 50V AC
	There is no electrical isolation between the programming input and the supply.
Output/supply, programming input	The programming cable provides galvanic isolation so that ground loops are avoided.
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Protection against electrical shock	UL 61010-1:2004
Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 130 g
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 in) , housing type B2
Mounting	35 mm DIN Rail per EN 60715:2001



Product Features
Cat. No. 937CS-AITMP-DC1



Wiring Diagram
Cat. No.937CS-AITMP-DC1



Approximate Dimensions
Cat. No. 937CS-AITMP-DC1

Frequency Converter

1-ch, 24V DC

937CU-DIFRQ-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- Input for NAMUR sensors or dry contacts
- Input frequency 1 mHz ... 5 kHz
- Current output 0/4 mA ... 20 mA
- Relay and transistor output
- Start-up override
- Line fault detection (LFD)
- Up to SIL2 acc. to IEC 61508/IEC 61511

This isolated barrier is used for intrinsic safety applications. The device is a universal frequency converter that changes a digital input signal into a proportional free adjustable 0/4 mA ... 20 mA analog output signal and functions as a switch amplifier and a trip alarm.

The functions of the switch outputs (2 relay outputs and 1 potential free transistor output) are easily adjustable [trip value display (min/max alarm), serially switched output, pulse divider output, error signal output]. The device is easily configured by the use of keypad or with the PACTware configuration software. A fault is signaled by LEDs acc. to NAMUR NE44 and a separate collective error message output.

Specifications

Description	24V DC, 1-channel
Signal Type	Digital Input
Supply	
Connection	terminals 23+, 24- or power feed module/Power Rail
Rated voltage	20 ... 30V DC
Rated Current	approx. 100 mA
Power loss/power consumption	≤ 2 W / 2.2 W
Input	
Connection	Input I: intrinsically safe: terminals 1+, 3- Input II: non-intrinsically safe: terminals 13+, 14-
Input I	sensor acc. to EN 60947-5-6 (NAMUR) or mechanical contact
Pulse duration	> 50 μs
Input frequency	0.001 ... 5000 Hz
Lead monitoring	breakage I ≤ 0.15 mA; short-circuit I > 6.5 mA
Input II	startup override: 1 ... 1000 s, adjustable in steps of 1 s
Active/Passive	I > 4 mA (for min. 100 ms) / I < 1.5 mA
Open circuit voltage/ short-circuit current	18V / 5 mA
Output	
Connection	output I: terminals 10, 11, 12
	output II: terminals 16, 17, 18
	output III: terminals 19+, 20-
	output IV: terminals 8+, 7-
Output I, II	signal, relay
Mechanical life	5 x 10 ⁷ switching cycles
Energized/De-energized delay	approx. 20 ms / approx. 20 ms
Output III	electronic output, passive
Contact loading	40V DC
Signal level	1-signal: (L+) - 2.5V (50 mA, short-circuit/overload proof)
	0-signal: switched off (off-state current ≤ 10 μA)
Output IV	analog
Current range	0 ... 20 mA or 4 ... 20 mA
Open loop voltage	≤ 24V DC
Load	≤ 650 W
Fault signal	downscale I ≤ 3.6 mA, upscale ≥ 21.5 mA (acc. NAMUR NE43)
Collective error message	Power Rail

Frequency Converter

1-ch, 24V DC, *continued*

937CU-DIFRQ-DC1

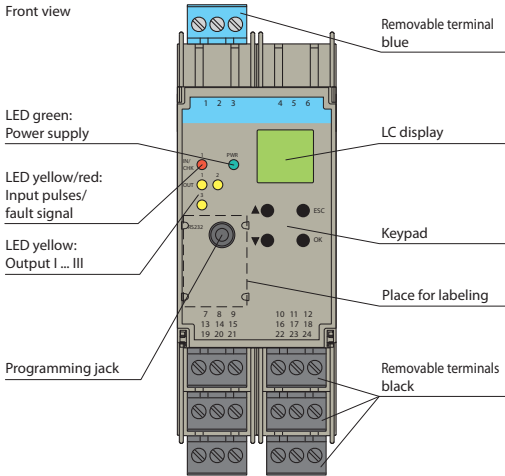
Transfer characteristics	
Input I	
Measurement range	0.001 ... 5000 Hz
Resolution	0.1 % of the measurement value, ≥ 0.001 Hz
Accuracy	0.1 % of the measurement value, > 0.001 Hz
Measuring time	< 100 ms
Influence of ambient temperature	0.003 %/K (30 ppm)
Output I, II	
Response delay	≤ 200 ms
Output IV	
Resolution	< 10 mA
Accuracy	< 20 mA
Influence of ambient temperature	0.005 %/K (50 ppm)
Electrical isolation	
Input I/other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Output I, II/other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Mutual output I, II, III	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Output III/ power supply and collective error	basic insulation according to IEC/EN 61010-1, rated insulation voltage $50V_{eff}$
Output III/ start-up override	basic insulation according to IEC/EN 61010-1, rated insulation voltage $50V_{eff}$
Output III/IV	basic insulation according to IEC/EN 61010-1, rated insulation voltage $50V_{eff}$
Output IV/power supply and collective error	functional insulation acc. to IEC 62103, rated insulation voltage $50V_{eff}$
Start-up override/power supply and collective error	functional insulation acc. to IEC 62103, rated insulation voltage $50V_{eff}$
Interface/power supply and collective error	functional insulation acc. to IEC 62103, rated insulation voltage $50V_{eff}$
Interface/output III	basic insulation according to IEC/EN 61010-1, rated insulation voltage $50V_{eff}$
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 61010-1:2010
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Input	EN 60947-5-6:2000

Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	approx. 130 g
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 in), housing type B2
Mounting	35 mm DIN Rail per EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	$<Ex>$ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C $\leq T_{amb} \leq 60$ °C)
Supply	
Maximum safe voltage U_m	40V DC
Input I	terminals 1+, 3- Ex ia IIC, Ex iaD
Voltage U_o	10.1V
Current I_o	13.5 mA
Power P_o	34 mW (linear characteristic)
Input II	terminals 13+, 14- non-intrinsically safe
Maximum safe voltage U_m	40V
Output I, II	terminals 10, 11, 12; 16, 17, 18 non-intrinsically safe
Maximum safe voltage U_m	253V
Contact loading	253V AC/2 A/cos $\phi > 0.7$; 40V DC/2 A resistive load (TÜV 99 ATEX 1471)
Output III	terminals 19+, 20- non-intrinsically safe
Maximum safe voltage U_m	40V
Output IV	terminals 8+, 7- non-intrinsically safe
Maximum safe voltage U_m	40V DC
Interface	RS 232
Maximum safe voltage U_m	40V
Group, category, type of protection, temperature class	$<Ex>$ II 3G Ex nA nC IIC T4
Output I, II	
Contact loading	50V AC/2 A/cos $\phi > 0.7$; 40V DC/1 A resistive load
Electrical isolation	
Input I/other circuits	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 60079-15:2005, EN 60079-26:2007, EN 61241-11:2006

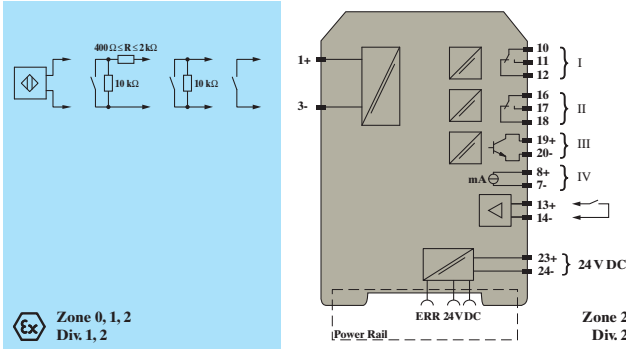
Frequency Converter

1-ch, 24V DC, *continued*

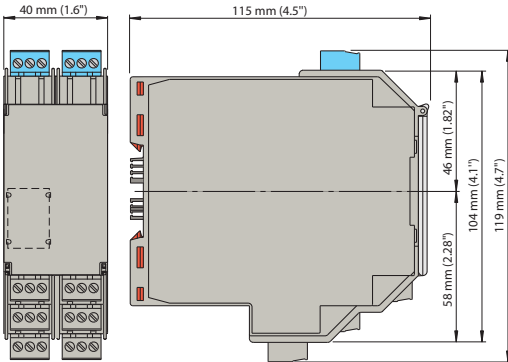
937CU-DIFRQ-DC1



Product Features
Cat. No. 937CU-DIFRQ-DC1



Wiring Diagram
Cat. No. 937CU-DIFRQ-DC1



Approximate Dimensions
Cat. No. 937CU-DIFRQ-DC1

Frequency Converter

1-ch, AC/DC

937CU-DIFRQ-BC1



Features

- 1-channel isolated barrier
- Universal usage at different power supplies
- Input for NAMUR sensors or dry contacts
- Input frequency 1 mHz ... 5 kHz
- Current output 0/4 mA ... 20 mA
- Relay and transistor output
- Start-up override
- Line fault detection (LFD)
- Up to SIL2 acc. to IEC 61508/IEC 61511

This isolated barrier is used for intrinsic safety applications. The device is a universal frequency converter that changes a digital input signal into a proportional free adjustable 0/4 mA ... 20 mA analog output signal and functions as a switch amplifier and a trip alarm.

The functions of the switch outputs (2 relay outputs and 1 potential free transistor output) are easily adjustable [trip value display (min/max alarm), serially switched output, pulse divider output, error signal output]. The device is easily configured by the use of keypad or with the PACTware configuration software. A fault is signaled by LEDs acc. to NAMUR NE44.

Specifications

Description	20..90V DC/48...253V AC, 1-channel
Signal Type	Digital Input
Supply	
Connection	terminals 23+, 24-
Rated voltage	20 ... 90V DC/48...253V AC 50..60Hz
Rated Current	approx. 100 mA
Power loss/power consumption	≤ 2 W / 2.2 W
Input	
Connection	Input I: intrinsically safe: terminals 1+, 3- Input II: non-intrinsically safe: terminals 13+, 14-
Input I	sensor acc. to EN 60947-5-6 (NAMUR) or mechanical contact
Pulse duration	> 50 μs
Input frequency	0.001 ... 5000 Hz
Lead monitoring	breakage I ≤ 0.15 mA; short-circuit I > 6.5 mA
Input II	startup override: 1 ... 1000 s, adjustable in steps of 1 s
Active/Passive	I > 4 mA (for min. 100 ms) / I < 1.5 mA
Open circuit voltage/ short-circuit current	18V / 5 mA
Output	
Connection	output I: terminals 10, 11, 12
	output II: terminals 16, 17, 18
	output III: terminals 19+, 20-
	output IV: terminals 8+, 7-
Output I, II	signal, relay
Mechanical life	5 x 10 ⁷ switching cycles
Energized/De-energized delay	approx. 20 ms / approx. 20 ms
Output III	electronic output, passive
Contact loading	40V DC
Signal level	1-signal: (L+) - 2.5V (50 mA, short-circuit/overload proof) 0-signal: switched off (off-state current ≤ 10 mA)
Output IV	analog
Current range	0 ... 20 mA or 4 ... 20 mA
Open loop voltage	≤ 24V DC
Load	≤ 650 Ω
Fault signal	downscale I ≤ 3.6 mA , upscale ≥ 21.5 mA (acc. NAMUR NE43)

Frequency Converter

1-ch, AC/DC, *continued*

937CU-DIFRQ-BC1

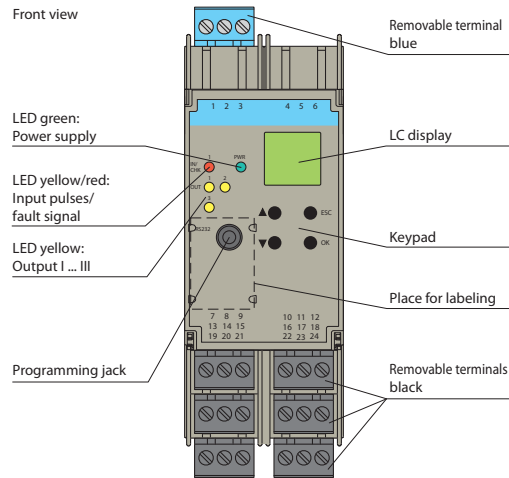
Transfer characteristics	
Input I	
Measurement range	0.001 ... 5000 Hz
Resolution	0.1 % of the measurement value, ≥ 0.001 Hz
Accuracy	0.1 % of the measurement value, > 0.001 Hz
Measuring time	< 100 ms
Influence of ambient temperature	0.003 %/K (30 ppm)
Output I, II	
Response delay	≤ 200 ms
Output IV	
Resolution	< 10 mA
Accuracy	< 20 mA
Influence of ambient temperature	0.005 %/K (50 ppm)
Electrical isolation	
Input I/other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Output I, II/other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Mutual output I, II, III	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Output III/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Output III/start-up override	basic insulation according to IEC/EN 61010-1, rated insulation voltage $50V_{eff}$
Output III/IV	basic insulation according to IEC/EN 61010-1, rated insulation voltage $50V_{eff}$
Output IV/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Start-up override/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Interface/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300V_{eff}$
Interface/output III	basic insulation according to IEC/EN 61010-1, rated insulation voltage $50V_{eff}$
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 61010-1:2010
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Input	EN 60947-5-6:2000

Environmental and Mechanical Specifications	
Operating temperature	$-20 \dots 60$ °C ($-4 \dots 140$ °F)
Protection degree	IP20
Weight	approx. 130 g
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 in), housing type B2
Mounting	35 mm DIN Rail per EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	$<Ex>$ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C $\leq T_{amb} \leq 60$ °C)
Supply	
Maximum safe voltage U_m	253V AC / 125V DC
Input I	terminals 1+, 3- Ex ia IIC, Ex iaD
Voltage U_0	10.1V
Current I_0	13.5 mA
Power P_0	34 mW (linear characteristic)
Input II	terminals 13+, 14- non-intrinsically safe
Maximum safe voltage U_m	40V
Output I, II	terminals 10, 11, 12; 16, 17, 18 non-intrinsically safe
Maximum safe voltage U_m	253V
Contact loading	253V AC/2 A/cos $\varphi > 0.7$; 40V DC/2 A resistive load (TÜV 99 ATEX 1471)
Output III	terminals 19+, 20- non-intrinsically safe
Maximum safe voltage U_m	40V
Output IV	terminals 8+, 7- non-intrinsically safe
Maximum safe voltage U_m	40V DC
Interface	RS 232, Programming adapter for parameterization via the USB interface of a PC/Notebook
Maximum safe voltage U_m	40V
Electrical isolation	
Input I/other circuits	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 60079-26:2007, EN 61241-11:2006

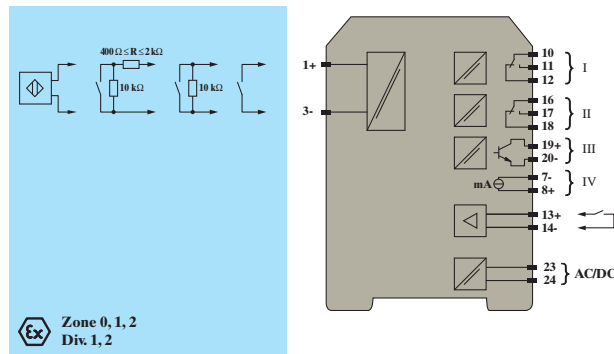
Frequency Converter

1-ch, AC/DC, *continued*

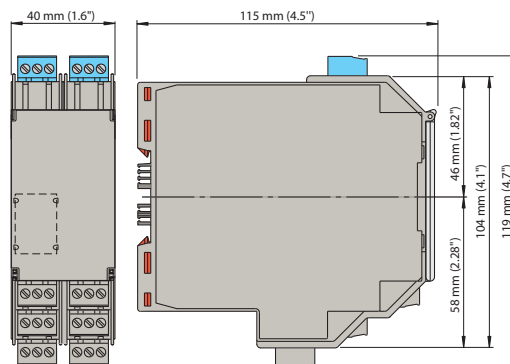
937CU-DIFRQ-BC1



Product Features
Cat. No. 937CU-DIFRQ-BC1



Wiring Diagram
Cat. No. 937CU-DIFRQ-BC1



Approximate Dimensions
Cat. No. 937CU-DIFRQ-BC1

Transmitter Power Supply

1-ch, 24V DC

937CU-AITXF-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- Input 2-wire and 3-wire transmitters and 2-wire current sources
- Output 0/4 mA ... 20 mA
- Two relay contact outputs
- Programmable high/low alarm
- Linearization function (max 20 points)
- Line fault detection (LFD)
- Up to SIL2 acc. to IEC 61508/IEC 61511

This isolated barrier is used for intrinsic safety applications. The device supplies 2-wire and 3-wire transmitters, and can also be used with current sources. Two relays and an active 0/4 mA ... 20 mA current source are available as outputs. The relay contacts and the current output can be integrated in security-relevant circuits. The current output is easily scaled. On the display the measured value can be indicated in various physical units. The device is easily configured by the use of keypad or with the PACTware configuration software. The input has a line fault detection. A fault is signaled by LEDs acc. to NAMUR NE44 and a separate collective error message output.

Specifications

Description	24V DC, 1-channel
Signal Type	Analog Input
Supply	
Connection	Power Rail or terminals 23+, 24-
Rated voltage	20 ... 30V DC
Rated current	approx. 130 mA
Power loss	2 W
Power consumption	2.5 W
Input	
Connection	terminals 1, 2, 3,
Input signal	0/4 ... 20 mA
Available voltage	≥ 15V at 20 mA
Open circuit voltage/ short-circuit current	24V / 33 mA
Input resistance	45 Ω (terminals 2, 3)
Lead monitoring	breakage I < 0.2 mA; short-circuit I > 22 mA
Output	
Connection	output I: terminals 10, 11, 12 output II: terminals 16, 17, 18 output III: terminals 8+, 7-
Output signal	0 ... 20 mA or 4 ... 20 mA
Output I, II	signal, relay
Contact loading	250V AC / 2 A / cos φ 0.7 ; 40 DC / 2 A
Mechanical life	5 x 10 ⁷ switching cycles
Output III	Signal, analog
Current range	0 ... 20 mA or 4 ... 20 mA
Open loop voltage	≤ 24V DC
Load	≤ 650 W
Fault signal	downscale I ≤ 3.6 mA, upscale I ≥ 21 mA (acc. NAMUR NE43)

Transmitter Power Supply

1-ch, 24V DC, *continued*

937CU-AITXF-DC1

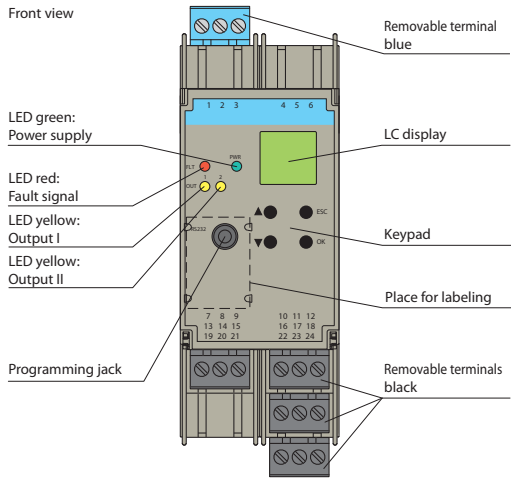
Transfer characteristics	
Input I	
Accuracy	< 30 mA
Influence of ambient temperature	0.003 %/K (30 ppm)
Output I, II	
Response delay	≤ 200 ms at bounce from 0 ... 20 mA
Output III	
Resolution	≤ 10 mA
Accuracy	< 20 mA
Influence of ambient temperature	0.005 %/K (50 ppm)
Reaction time	< 650 ms at bounce from 0 ... 20 mA at the input, 90 % of output full-scale value
Electrical isolation	
Input/Other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300V _{eff}
Output I, II/other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300V _{eff}
Mutual output I, II, III	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300V _{eff}
Output III/power supply and collective error	functional insulation acc. to IEC 62103, rated insulation voltage 50V _{eff}
Interface/power supply and collective error	functional insulation acc. to IEC 62103, rated insulation voltage 50V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 61010-1:2010
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001

Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	300 g
Dimensions	40 x 119 x 115 mm (1.6 x 4.7 x 4.5 in) , housing type C3
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	TÜV 01 ATEX 1701
Group, category, type of protection	<Ex> II (1) G [Ex ia] IIC
	<Ex> II (1) D [Ex iaD]
Input	Ex ia IIC, Ex iaD
Supply	
Maximum safe voltage U _m	40V DC
Equipment	terminals 1+, 3-
Voltage U ₀	25.8V
Current I ₀	93 mA
Power P ₀	0.603 W
Equipment	terminals 2-, 3
Voltage U _i	< 30V
Current I _i	115 mA
Voltage U _o	5V
Current I _o	0.3 mA
Power P _o	0.3 mW
Equipment	terminals 1+, 2 / 3-
Voltage U _o	25.8V
Current I _o	112 mA
Power P _o	720 mW
Output I, II	terminals 10, 11, 12; 16, 17, 18 non-intrinsically safe
Maximum safe voltage U _m	253V AC / 40V DC
Contact loading	253V AC/2 A/cos φ > 0.7; 40V DC/2 A resistive load (TÜV 01 ATEX 1701)
Output III	terminals 8+, 7- non-intrinsically safe
Maximum safe voltage U _m U _m	40V
Interface	RS 232
Maximum safe voltage U _m	40V
Statement of conformity	TÜV 02 ATEX 1885 X , observe statement of conformity
Group, category, type of protection, temperature class	<Ex> II 3G Ex nA nC IIC T4
Output I, II	
Contact loading	50V AC/2 A/cosφ > 0.7; 40V DC/1 A resistive load
Electrical isolation	
Input/Other circuits	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN60079-15:2005 , EN 60079-26:2007 , EN 61241-11:2006

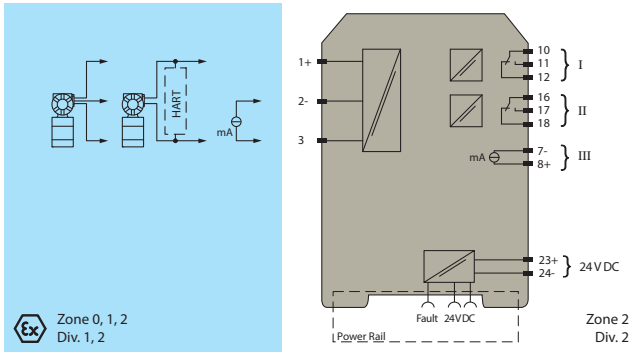
Transmitter Power Supply

1-ch, 24V DC, *continued*

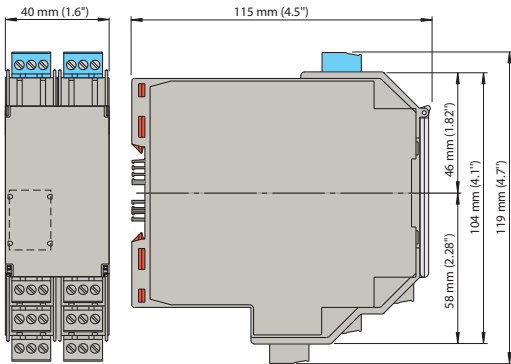
937CU-AITXF-DC1



Product Features
Cat. No. 937CU-AITXF-DC1



Wiring Diagram
Cat. No. 937CU-AITXF-DC1



Approximate Dimensions
Cat. No. 937CU-AITXF-DC1

HART Loop Converter

1-ch, 24V DC

937CU-AIHLP-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- HART field device input (revision 5 to 7) with transmitter power supply
- Usable as signal splitter (1 input and multiple outputs)
- Two relay outputs (changeover contacts)
- Three analog outputs 4 mA ... 20 mA
- Sink and source mode output
- Configurable by keypad

This isolated barrier is used for intrinsic safety applications. It is a HART loop converter that provides power to transmitters or can be connected to existing HART loops in parallel. It is able to evaluate up to four HART variables (PV, SV, TV, QV). Of those four HART variables, the data contained in any three of them can be converted to three different 4 mA ... 20 mA current signals. These loop signals can be connected to display devices or analog inputs on the process control system/ control system. In addition to the current outputs, two form C changeover relay contacts are available and can be programmed to operate at trip values from the HART variables. The unit is easily programmed by the use of a keypad located on the front of the unit or with the PACTware™ configuration software.

Specifications

Description	24V DC, 1-channel
Signal Type	Analog Input
Supply	
Connection	Power Rail or terminals 23+, 24-
Rated voltage	19 ... 30V DC
Rated current	approx. 130 mA at 24V DC
Power loss	2.5 W
Power consumption	3.1 W
HART signal channels (intrinsically safe)	
Conformity	HART field device input (revision 5 to 7)
Input	
Connection	terminals 1, 2, 3, 4, 5, 6
Input signal	HART communication, transmitter supply
Open circuit voltage/short-circuit current	typ. 24V / 28 mA
Open circuit voltage/short-circuit current	250 Ω 5 % (terminals 2, 3 and with jumper on 5, 6)
Available voltage	≥ 15.5V at 20 mA, short-circuit protected
Output	
Connection	output I: terminals 10, 11, 12, output II: terminals 16, 17, 18
	output III: terminals 7, 8, 9, output IV: terminals 13, 14, 15, output V: terminals 19, 20, 21
Output I, II	
Output signal	relay and LED yellow
Mechanical life	10 ⁷ switching cycles
Energized/De-energized delay	approx. 20 ms / approx. 20 ms
Output III, IV, V	
Output signal	analog
Current range	4 ... 20 mA, source or sink mode
Load	≤ 650 Ω, source mode
Voltage range	5 ... 30V, sink mode from external supply
Fault signal	downscale I ≤ 2 mA, upscale I ≥ 21.5 mA (acc. NAMUR NE43) or hold measurement value
Other outputs	HART communicator on terminals 22, 24
Collective error message	Power Rail and LED red

HART Loop Converter

1-ch, 24V DC, *continued*

937CU-AIHLP-DC1

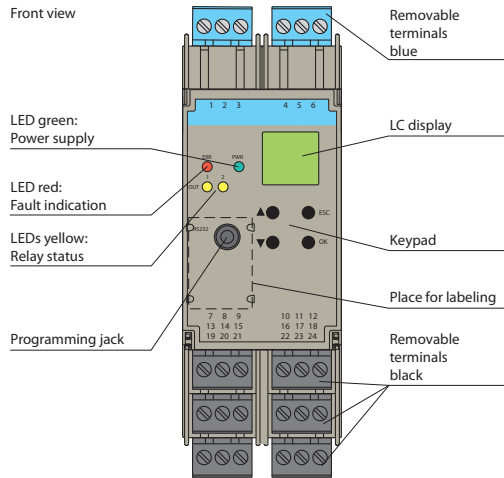
Transfer characteristics	
Output III, IV, V	
Resolution	≤ 2 mA
Accuracy	< 20 mA, 10 mA typ.
Influence of ambient temperature	< ± 2 mA/K
Duration of measurement/Response delay	HART message acquisition time plus 100 ms
Relay	programmable either for fault or trip value (with direction, hysteresis and delay)
Electrical isolation	
Output I/II	functional insulation acc. to IEC 62103, rated insulation voltage 250V _{eff}
Output I, II/other circuits	reinforced insulation acc. to IEC 62103, rated insulation voltage 300V _{rms}
Output III/IV/V/power supply	functional insulation acc. to IEC 62103, rated insulation voltage 50V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 50178:1997
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Protection against electrical shock	IEC 60664-1

Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	300 g
Dimensions	40 x 119 x 115 mm (1.6 x 4.7 x 4.5 in), housing type C3
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	<Ex> II (1)GD [Ex ia] IIC, [Ex iaD]
Input	Ex ia, Ex iaD
Supply	
Maximum safe voltage U _m	253V AC
Equipment	terminals 1, 4/3 (with link between terminals 4 and 5)
Voltage U ₀	25.2V
Current I ₀	104.9 mA
Power P ₀	0.661 W
Equipment	terminals 2, 5/3
Voltage U _i	< 28V
Power P _i	< 1.33 W
Voltage U ₀	1.1V
Current I ₀	11.9 mA
Power P ₀	4 mW
Output I, II	terminals 10, 11, 12; 16, 17, 18, non-intrinsically safe
Maximum safe voltage U _m	253V
Contact loading	253V AC/1 A/cos φ > 0.7; 30V DC/1 A resistive load (BASEEFA 07 ATEX 0174) 50V AC/1 A/cos φ > 0.7; 30V DC/1 A resistive load (self-declared)
Output III, IV, V	terminals 7, 8, 9; 13, 14, 15; 19, 20, 21, non-intrinsically safe
Maximum safe voltage U _m	253V
Electrical isolation	
Input/Other circuits	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	
Directive 94/9/EC	EN 60079-0, EN 60079-11, EN 61241-0, EN 61241-11

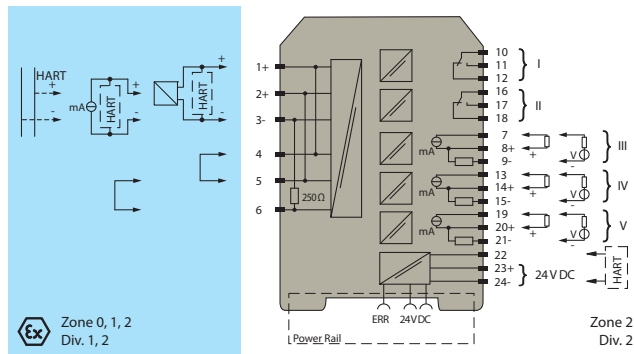
HART Loop Converter

1-ch, 24V DC, *continued*

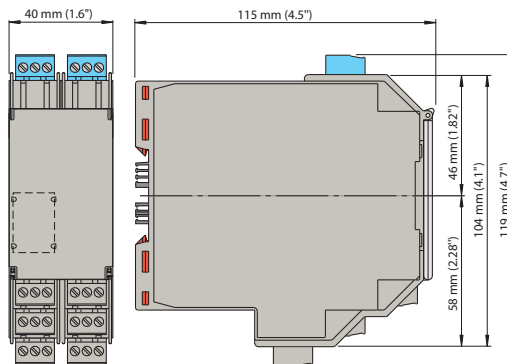
937CU-AIHLP-DC1



Product Features Cat. No. 937CU-AIHLP-DC1



Wiring Diagram Cat. No. 937CU-AIHLP-DC1



Approximate Dimensions Cat. No. 937CU-AIHLP-DC1

Strain Gauge Converter

1-ch, 24V DC

937CU-AISTR-DC1



Features

- 1-channel isolated barrier
- 24V DC supply (Power Rail)
- Strain gauge input (full or half bridge)
- Output 0 mA ... ± 20 mA or 0V ... ± 10 V
- Relay contact output
- Programmable high/low alarm
- Configurable by PACTware or keypad
- RS 485 interface
- Line fault detection (LFD)

This isolated barrier is used for intrinsic safety applications. The device is used with strain gauges, load cells and resistance measuring bridges. Designed to provide 5V excitation voltage, this barrier's high quality A/D converter allows it to be used with those devices requiring 10V. Up to four 350 Ω strain gauges connected in parallel may be powered and evaluated. The device is easily configured by the use of keypad or with the PACTware configuration software. The current measurement for tare, zero point, and final value can be entered in this manner. A fault is signaled by LEDs acc. to NAMUR NE44 and a separate collective error message output.

Specifications

Description	24V DC, 1-channel
Signal Type	Analog Input
Supply	
Connection	Power Rail or terminals 23+, 24-
Rated voltage	20 ... 35V DC
Ripple	within the supply tolerance
Power consumption	≤ 3 W
Interface	
Connection	Power Rail or terminals 19+, 20 GND, 21-
Type	RS 485
Programming interface	RS232, Programming adapter for parameterization via the USB interface of a PC/Notebook
Field circuit	
Connection	terminals 1+, 2-, 3+, 4-, 5+, 6-
Lead resistance	≤ 25 W per lead
Connection	terminals 1+, 2-
Sensor supply	1 ... 5V
Connection	terminals 3+, 4- (supply); 5+, 6- (signal)
Short-circuit current	50 mA
Load	$\geq 116 \Omega$ up to 5V, $\geq 85 \Omega$ up to 4V
Input	
Connection	Input I: terminals 1+, 2-; Input II: terminals 13+, 14-; Input III: terminals 15+, 14-
Programmable Tare	0 ... 500 % of span
Input I	Signal, analog
Input signal	-100 ... 100 mV
Input resistance	1 M Ω for voltage measurement
Input II, III	tare adjustment, calibration and zero
Open circuit voltage/short-circuit current	18V / 5 mA
Active/Passive	I > 4 mA / I < 1.5 mA
Output	
Connection	Output I: terminals 10, 11, 12; Output II: terminals 16, 17, 18; Output III: terminals 7-, 8+, 9-
Output I, II	Relay output
Contact loading	253V AC/2 A/500 VA/cos ϕ min. 0.7; 40V DC/2 A resistive load
Mechanical life	2×10^7 switching cycles
Output III	Analog output
Current range	-20 ... 20 mA
Load	$\leq 550 \Omega$
Analog voltage output	0 ... ± 10 V; output resistance 500 W (bridge between terminal 7 and 9)
Analog current output	0 ... ± 20 mA or 4 ... 20 mA; load 0 ... 550 W (terminals 7 and 8)
Line fault detection	downscale -21.5 mA (-10.75V) or 2 mA (1V), upscale 21.5 mA (10.75V)

Strain Gauge Converter

1-ch, 24V DC, *continued*

937CU-AISTR-DC1

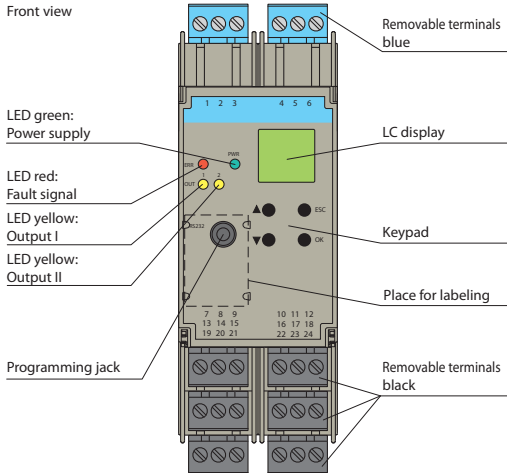
Transfer characteristics	
Deviation	
Resolution/accuracy	$\leq \pm 0.05$ % incl. non-linearity and hysteresis
Temperature _{effect}	$\leq \pm 0.01$ %/K
Reaction time	300 ... 850 ms
Electrical isolation	
Output I, II against each other	reinforced insulation according to IEC 61140, rated insulation voltage 300V _{eff}
Output I, II/other circuits	reinforced insulation according to IEC 61140, rated insulation voltage 300V _{eff}
Other circuits from each other	functional insulation, rated insulation voltage 50V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 50178:1997
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Protection against electrical shock	IEC 61140

Environmental and Mechanical Specifications	
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP20
Weight	250 g
Dimensions	40 x 119 x 115 mm (1.6 x 4.7 x 4.5 in) , housing type C3
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
Group, category, type of protection	<Ex> II (1)GD [Ex ia] IIC, [Ex iaD], [circuit(s) in zone 0/1/2]
Supply	Power Rail or terminals 23+, 24- non-intrinsically safe
Maximum safe voltage U _m	40V DC
Input I	terminals 1+, 2- Ex ia IIC, Ex iaD
Voltage U ₀	14V
Current I ₀	238 mA
Power P ₀	833 mW (linear characteristic)
Input II and III	terminals 13+, 14-, 15+, 14- non-intrinsically safe
Maximum safe voltage U _m	40V DC
Output I, II	terminals 10, 11, 12; 16, 17, 18 non-intrinsically safe
Maximum safe voltage U _m	253V AC / 40V DC
Contact loading	253V AC/2 A/500VA/cos φ min. 0.7; 40V DC/2 A resistive load
Output III	terminals 7-, 8+, 9- non-intrinsically safe
Maximum safe voltage U _m	40V DC
Interface	RS232, Programming adapter for parameterization via the USB interface of a PC/Notebook
Maximum safe voltage U _m	40V DC
Electrical isolation	
Input I/other circuits	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375V
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006, EN 60079-11:2007, EN 60079-26:2007 EN 61241-0:2006, EN 61241-11:2006

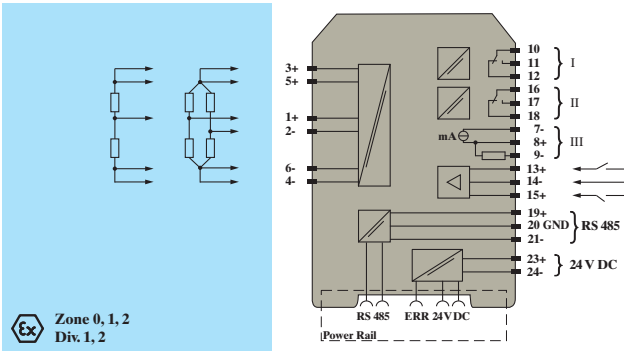
Strain Gauge Converter

1-ch, 24V DC, *continued*

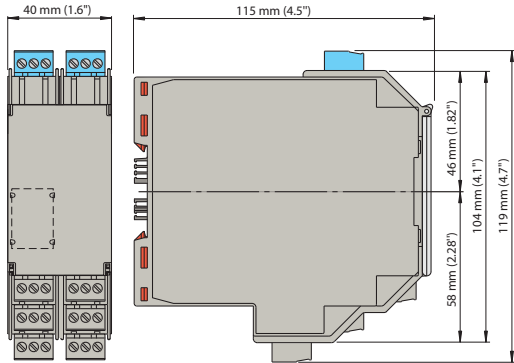
937CU-AISTR-DC1



Product Features
Cat. No. 937CU-AISTR-DC1



Wiring Diagram
Cat. No. 937CU-AISTR-DC1



Approximate Dimensions
Cat. No. 937CU-AISTR-DC1

Notes

Zener Barriers

Zener barriers have long been a cost-effective solution for providing an intrinsically safe interface with field devices located in the hazardous area. Allen-Bradley Zener barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space. Zener barrier prevents the transfer of unacceptably high energy from the safe area into the hazardous area. These Zener barriers have a positive polarity, which means the anodes of the Zener diodes are grounded. Depending on the application, increased or decreased intrinsic safety parameters apply for serial or parallel connection. These barriers simply snap onto a standard DIN rail for easy installation and grounding.

Zener barriers are available in the following types:

- Standard one- or two-channel barriers
- The diode return feature prevents a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero
- In addition to the diode return feature, the high power version has a smaller serial resistance and therefore provides higher voltage to the field device



Catalog Number Explanation

Note: Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; some combinations may not produce a valid catalog number.

937Z **H** - **DP** **A** **N** - **1**
a *b* *c* *d* *e*

a

Module Profile	
Code	Description
H	High-density 12.5mm module

c

Max. Series Resistance	
Code	Description
A	646 Ohm
B	327 Ohm
C	36 Ohm + 0.9V
D	250 Ohm

d

Options	
Code	Description
D	Diode Return
P	Diode Return w/High Power
N	None

b

Type	
Code	Description
DP	DC Positive Polarity

e

Channels	
Code	Description
1	Single Channel
2	Dual Channel

Zener Barrier

1-Ch, 327 Ohm Max

937ZH-DPBN-1



The Zener Barrier prevents the transfer of unacceptably high energy from the safe area into the hazardous area. The zener diodes in the Zener Barrier are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow. The Zener Barrier has a positive polarity, i. e. the anodes of the zener diodes are grounded.

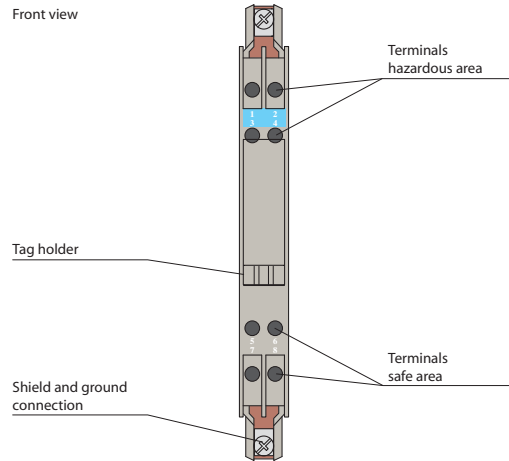
Specifications

Signal Type	DC Positive Polarity
Nominal resistance	300 Ohm
Series resistance	max. 327 Ohm
Fuse rating (non-replaceable)	50 mA
Hazardous area Connection	terminals 1, 2
Safe area Connection	terminals 7, 8
Working voltage	max. 26.9V , 26.5 V at 10 μ A
Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1)GD, I (M1) [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I (-20 °C \leq Tamb \leq 60 °C) [circuit(s) in zone 0/1/2]
Voltage	28 V
Current	93 mA
Power	650 mW
Supply	
Maximum safe voltage	250 V
Series resistance	min. 301 Ohm
Group, category, type of protection, temperature class	Ex II 3G Ex nA IIC T4 Gc [device in zone 2]
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 61241-11:2006 , EN 60079-15:2010
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	max. 75 % , without moisture condensation
Degree of protection	IP20
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm ²
Weight	approx. 150 g
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

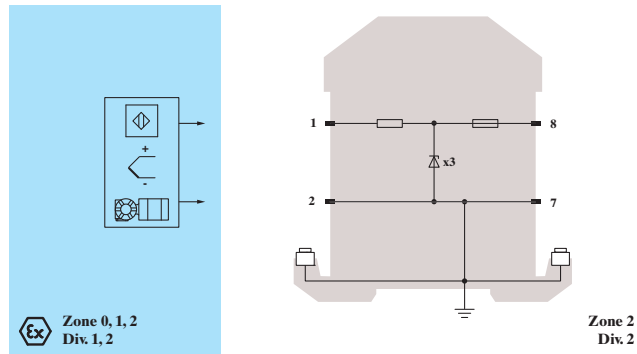
Zener Barrier

1-Ch, 327 Ohm Max, *continued*

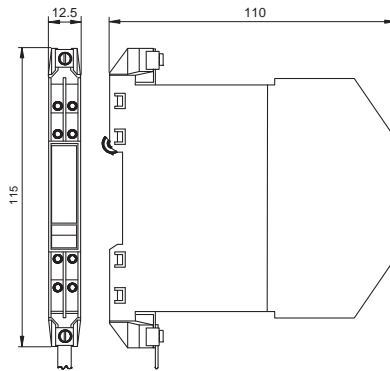
937ZH-DPBN-1



Product Features
Cat. No. 937ZH-DPBN-1



Wiring Diagram
Cat. No. 937ZH-DPBN-1



Approximate Dimensions
Cat. No. 937ZH-DPBN-1

Zener Barrier

2-Ch, 327 Ohm Max

937ZH-DPBN-2



The Zener Barrier prevents the transfer of unacceptably high energy from the safe area into the hazardous area. The zener diodes in the Zener Barrier are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow. The Zener Barrier has a positive polarity, i. e. the anodes of the zener diodes are grounded. Depending on the application, increased or decreased intrinsic safety parameters apply for serial or parallel connection. For the detailed parameters refer to the Zener Barrier certificate.

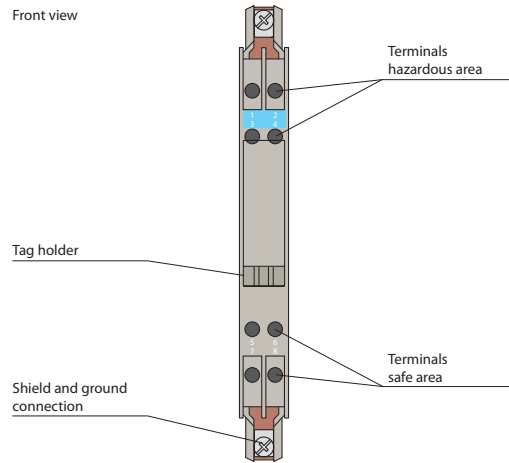
Specifications

Signal Type	DC Positive Polarity
Nominal resistance	300 Ohm
Series resistance	max. 327 Ohm
Fuse rating (non-replaceable)	50 mA
Hazardous area Connection	terminals 1, 2; 3, 4
Safe area Connection	terminals 5, 6; 7, 8
Working voltage	max. 27 V, 26.5 V at 10 μ A
Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1)GD, I (M1) [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I (-20 °C \leq Tamb \leq 60 °C) [circuit(s) in zone 0/1/2]
Voltage	28 V
Current	93 mA
Power	650 mW
Supply	
Maximum safe voltage	250 V
Series resistance	min. 301 Ohm
Group, category, type of protection, temperature class	Ex II 3G Ex nA IIC T4 Gc [device in zone 2]
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 61241-11:2006, EN 60079-15:2010
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	max. 75 %, without moisture condensation
Degree of protection	IP20
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm ²
Weight	approx. 150 g
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

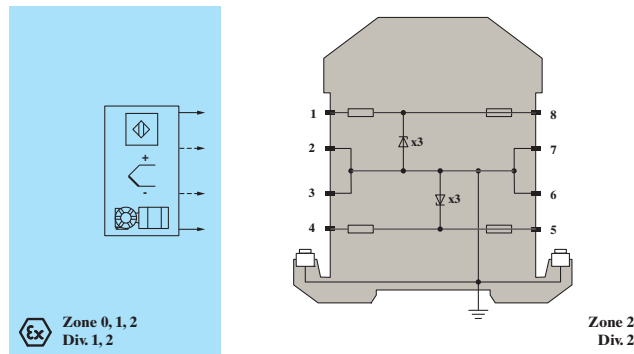
Zener Barrier

2-Ch, 327 Ohm Max, *continued*

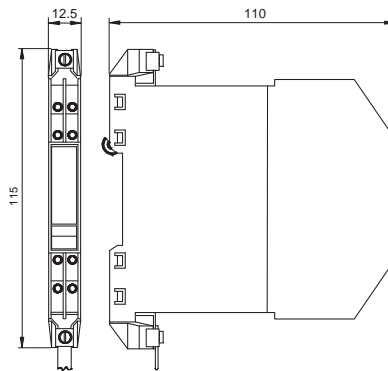
937ZH-DPBN-2



Product Features
Cat. No. 937ZH-DPBN-2



Wiring Diagram
Cat. No. 937ZH-DPBN-2



Approximate Dimensions
Cat. No. 937ZH-DPBN-2

Zener Barrier

2-Ch, 646 Ohm Max

937ZH-DPAN-2



The Zener Barrier prevents the transfer of unacceptably high energy from the safe area into the hazardous area. The zener diodes in the Zener Barrier are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow. The Zener Barrier has a positive polarity, i. e. the anodes of the zener diodes are grounded. Depending on the application, increased or decreased intrinsic safety parameters apply for serial or parallel connection. For the detailed parameters refer to the Zener Barrier certificate.

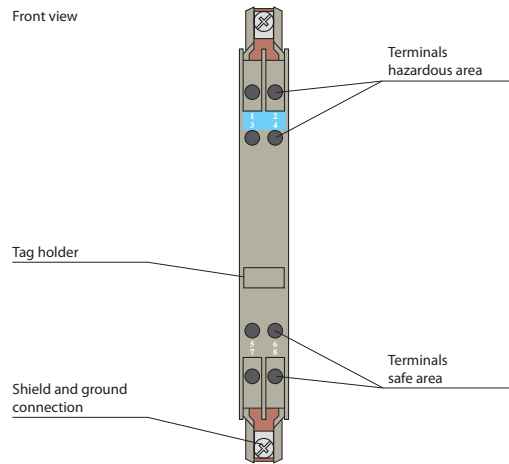
Specifications

Signal Type	DC Positive Polarity
Nominal resistance	600 Ohm
Series resistance	max. 646 Ohm
Fuse rating (non-replaceable)	50 mA
Hazardous area Connection	terminals 1, 2; 3, 4
Safe area Connection	terminals 5, 6; 7, 8
Working voltage	max. 27 V, 26.5 V at 10 μ A
Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1)GD, I (M1) [Ex ia Ga] IIC, [Ex ia Da] IIC, [Ex ia Ma] I (-20 °C \leq Tamb \leq 60 °C) [circuit(s) in zone 0/1/2]
Voltage	28 V
Current	46 mA
Power	320 mW
Supply	
Maximum safe voltage	250 V
Series resistance	min. 607 Ohm
Group, category, type of protection, temperature class	Ex II 3G Ex nA IIC T4 Gc [device in zone 2]
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 61241-11:2006, EN 60079-15:2010
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	max. 75 %, without moisture condensation
Degree of protection	IP20
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm ²
Weight	approx. 150 g
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

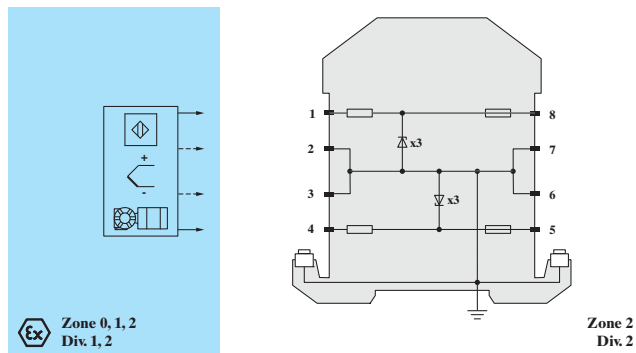
Zener Barrier

2-Ch, 646 Ohm Max, *continued*

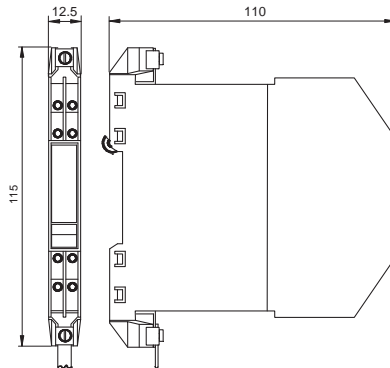
937ZH-DPAN-2



Product Features
Cat. No. 937ZH-DPAN-2



Wiring Diagram
Cat. No. 937ZH-DPAN-2



Approximate Dimensions
Cat. No. 937ZH-DPAN-2

Zener Barrier

2-Ch, 36 Ohm + 0.9V Max

937ZH-DPCD-2



The Zener Barrier prevents the transfer of unacceptably high energy from the safe area into the hazardous area. The zener diodes in the Zener Barrier are connected in the reverse direction. The breakdown voltage of the diodes is not

exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow. The Zener Barrier has a positive polarity, i. e. the anodes of the zener diodes are grounded.

The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero. Depending on the application, increased or decreased intrinsic safety parameters apply for serial or parallel connection. For the detailed parameters refer to the Zener Barrier certificate. Application examples can be found in the system description of the Zener Barriers.

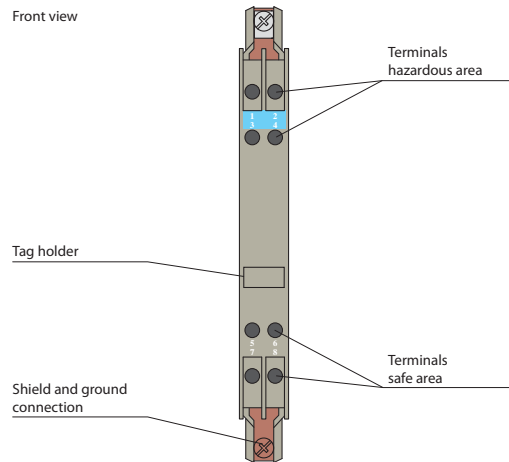
Specifications

Signal Type	DC Positive Polarity
Nominal resistance	diode
Series resistance	max. 36 Ohm + 0.9V
Voltage drop	1.2 V + (36 Ohm x signal current)
Fuse rating (non-replaceable)	50 mA
Hazardous area Connection	terminals 1, 2; 3, 4
Safe area Connection	terminals 5, 6; 7, 8
Working voltage	max. 27V , 26.5V at 10 μ A
Data for application in connection with Ex-areas	
Voltage U_0	28V
Supply	
Maximum safe voltage U_m	250V
Series resistance	diode
Group, category, type of protection, temperature class	
Directive conformity	Directive 94/9/EC
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	max. 75 % , without moisture condensation
Degree of protection	IP20
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm ²
Weight	approx. 150 g
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

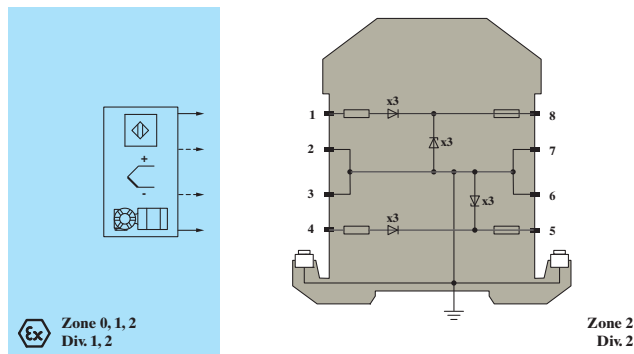
Zener Barrier

2-Ch, 36 Ohm + 0.9V Max, *continued*

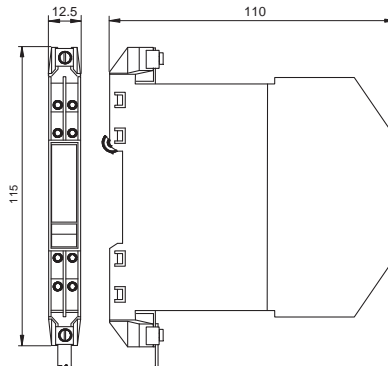
937ZH-DPCD-2



Product Features Cat. No. 937ZH-DPCD-2



Wiring Diagram Cat. No.937ZH-DPCD-2



Approximate Dimensions Cat. No.937ZH-DPCD-2

Zener Barrier

2-Channel, 250 Ohm Max

937ZH-DPDP-2



The Zener Barrier prevents the transfer of unacceptably high energy from the safe area into the hazardous area. The zener diodes in the Zener Barrier are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow. The Zener Barrier has a positive polarity, i. e. the anodes of the zener diodes are grounded.

This high power version has a smaller serial resistance and therefore provides higher voltage to the field device. The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the

hazardous area, therefore the current assumption for intrinsic safety calculations is zero. Depending on the application, increased or decreased intrinsic safety parameters apply for serial or parallel connection. For the detailed parameters refer to the Zener Barrier certificate. Application examples can be found in the system description of the Zener Barriers.

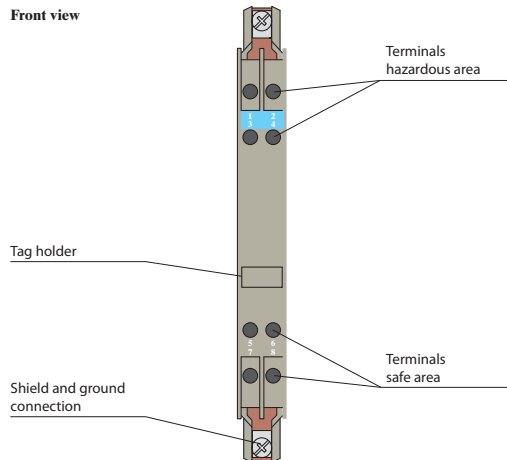
Specifications

Signal Type	DC Positive Polarity
Nominal resistance	240 Ohm
Series resistance	max. 250 Ohm
Fuse rating (non-replaceable)	80 mA
Hazardous area Connection	terminals 1, 2; 3, 4
Safe area Connection	terminals 5, 6; 7, 8
Working voltage	max. 27 V, 26.5 V at 10 μ A
Data for application in connection with Ex-areas	
Group, category, type of protection	Ex II (1)GD, I (M1) [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I (-20 °C ≤ Tamb ≤ 60 °C) [circuit(s) in zone 0/1/2]
Voltage U_0	28 V
Current C_0	120 mA
Power P_0	830 mW
Supply	
Maximum safe voltage	250 V
Series resistance	min. 235 Ohm
Statement of conformity	TÜV 99 ATEX 1484 X, observe statement of conformity Group, category, type of protection, temperature class
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-11:2007, EN 61241-11:2006, EN 60079-15:2010
Operating temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	max. 75 %, without moisture condensation
Degree of protection	IP20
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm ²
Weight	approx. 150 g
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001

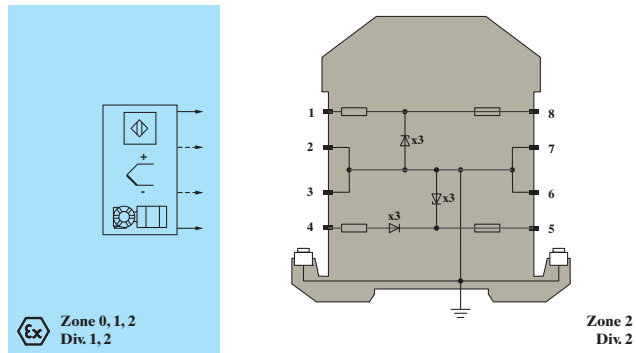
Zener Barrier

2-Channel, 250 Ohm Max, *continued*

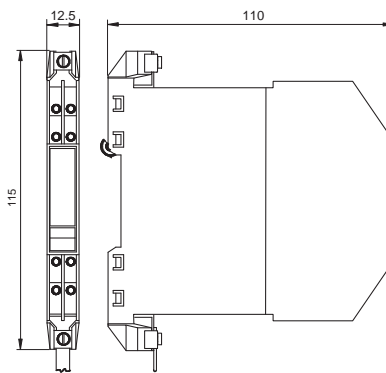
937ZH-DPDP-2



Product Features
Cat. No.937ZH-DPDP-2



Wiring Diagram
Cat. No. 937ZH-DPDP-2



Approximate Dimensions
Cat. No. 937ZH-DPDP-2

Power Feed Module

24V DC

937A-PSFD



Features

- Interface for Power Rail
- Used for redundant configuration
- Supply rating 4 A, external fused
- Relay contact output, reversible
- LED status indication

The power feed module is used to supply the devices with 24V DC via the Power Rail. The fuse-protected power feed module can supply up to 150 individual modules depending on the power consumption of the devices. Collective error messages received from the Power Rail activate a galvanically-isolated mechanical contact.

Specifications

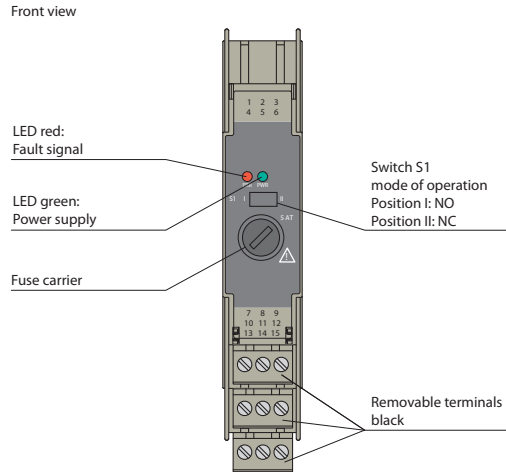
Description	Redundant Power Feed Module
Supply	
Connection	terminals 11+, 12- terminals 8+, 9-
Rated voltage	20 ... 30 V DC The maximum rated operating voltage of the devices plugged onto the Power Rail must not be exceeded.
Power loss	≤ 2.4 W
Output	
Power Rail feed	Output current ≤ 4 A
Fault signal	relay output: NO contact
Contact loading	30V AC/ 2 A / $\cos \varphi \geq 0.7$; 40V DC/ 2 A
Energized/De-energized delay	approx. 20 ms / approx. 20 ms
Fusing	5 AT
Conformity	
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529:2001
Environmental and Mechanical Specifications	
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Protection degree	IP20
Mass	approx. 100 g
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 in),
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with Ex-areas	
Statement of conformity	TÜV 00 ATEX 1618 X
Group, category, type of protection, temperature class	<Ex> II 3G Ex nA nC IIC T4
Directive conformity	
Directive 94/9/EC	EN 60079-0:2009, EN 60079-15:2010

Note: The accessories listed are for use with 937Intrinsic Safety Isolated Barriers, and Converter Barriers.

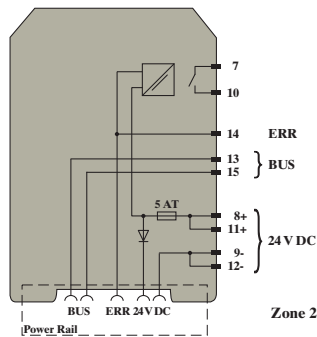
Power Feed Module

24V DC, *continued*

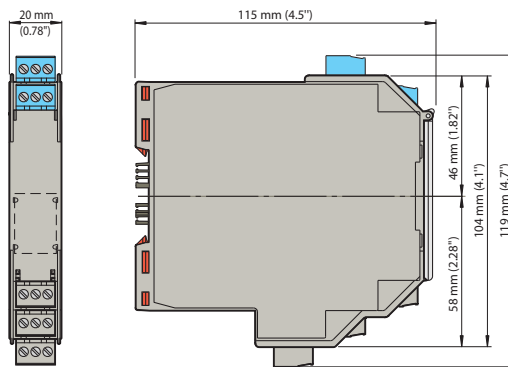
937A-PSFD



Product Features
Cat. No. 937A-PSFD



Wiring Diagram
Cat. No. 937A-PSFD



Approximate Dimensions
Cat. No. 937A-PSFD

Power Rail

937A-PR08, -PR20

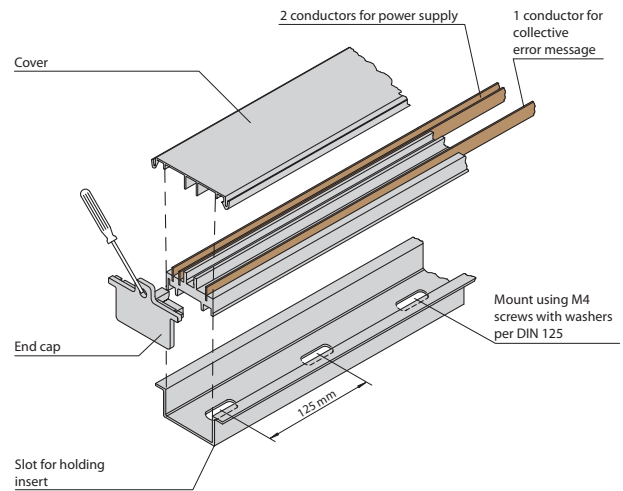
Power Rail has two conductors for 24VDC power and one conductor for collective error messaging. Power Rail reduces wiring and maintenance costs because it eliminates the need to daisy-chain the wires. It also simplifies expansion – just snap in a new Isolated Barrier or Converter Barrier when you're ready to expand a system. Power Rail is available in 2 Meter or 0.8 meter lengths, it can be cut to size per application needs. Power Rail comes standard with two 937A-PREC end caps and a cover. Additional 937A-PREC end caps can be ordered separately.

Features

- 35 mm DIN mounting rail with 3-conductor insert
- Provides DC supply voltage to all equipped 937 modules
- Simple to customize to application space
- Eliminates daisy-chains
- Available in 0.8 and 2 M lengths

Specifications

Cat. No.	937A-PR08	937A-PR20	937A-PREC
Description	Power Rail, Pkg. Qty. 1, .08M length	Power Rail - Pkg. Qty. 1, 2 M length	Power Rail End Cap Pkg. Qty. 10
Electrical specifications			
Rated voltage	24V DC		—
Rated current	4A		—
Environmental specifications			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Dimensions	35 x 15 x 800 mm (1.4 x 0.6 x 31.5 in)	35 x 15 x 2000 mm (1.4 x 0.6 x 78.7 in)	17 x 37 x 24 mm (0.67 x 1.46 x 0.95 in)



Product Features
Cat. No. 937A-PR

USB Interface Cable

937A-USBA



Features

- Isolated USB Interface cable for 937C Modules only
- For use with FDT configuration software

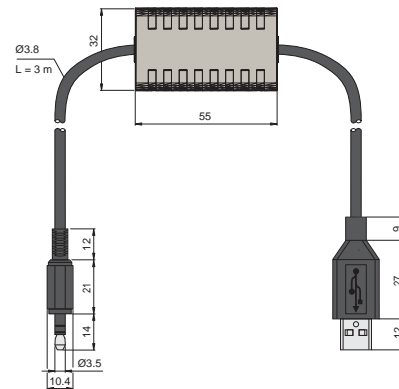
This programming cable is used to configure 937C Converter Barriers with FDT software via USB port on a computer.

FDT Interface

Configuring converter modules is convenient with a PC using Field Device Tool (FDT) software. Some specialized functions can only be selected using the FDT. The FDT interface is the specification describing the standardized data exchange between devices and control system or engineering or asset management tools. Examples include: PACTware™, FieldCare, FactoryTalk AssetCentre, and Process Device Configuration. FDT frame software can be downloaded at <http://www.pactware.com> PACTware™ is trademark of PACTware Consortium

Specifications

Electrical specifications	
Current consumption	50 mA (via USB)
Electrical isolation	functional insulation acc. to IEC 62103, rated insulation voltage 50 Veff
Environmental and Mechanical Specifications	
Operating Temperature	-20 ... 60 °C (-4 ... 140 °F)
Connection to the PC:	USB type A
Cable Length	3 m



Approximate Dimensions
Cat. No. 937A-USBA

Cold Junction Compensation Device

937A-TCJC

Description		Cat. No.
Cold junction compensation for 937CS-AITMP-DC1 (thermocouples)	Pkg. Qty. 1	937A-TCJC

Allen-Bradley, Rockwell Software, Rockwell Automation, and LISTEN. THINK. SOLVE are trademarks of Rockwell Automation, Inc.
Trademarks not belonging to Rockwell Automation are property of their respective companies.

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846