

# Isolator Barriers

## Transmitter supply unit With limit contact

Ex i field circuit

9162/13-11-14s Art. No. 238251



- Compact limit value switch with 2 configurable limiting values and 4 ... 20 mA output
- Suitable for 2-, 3-wire transmitter, 2-wire HART transmitter and mA-sources
- Intrinsically safe input [Ex ia] IIC
- Open-circuit and short-circuit monitoring and messaging
- For use up to SIL 2 (IEC 61508)

MY R. STAHL 9162A



9162 series Ex i transmitter power supply units with limit values can be used for the intrinsically safe operation of two- and three-conductor transmitters or for connecting to intrinsically safe mA sources. Two limit values can be easily set using the "ISpac Wizard" software. If the value exceeds or falls below these limit values, these units will issue an alert. A wire-breakage and short-circuit monitoring system provides increased availability.

### Technical Data

#### Explosion Protection

Application range (zones)	2
Ex interface zone	0, 1, 2, 20, 21, 22
IECEX gas certificate	IECEX BVS 15.0013 X
IECEX gas certificate	IECEX BVS 15.0013 X
IECEX gas explosion protection	Ex nA nC [ia Ga] IIC T4 Gc
IECEX dust certificate	IECEX BVS 15.0013 X
IECEX dust explosion protection	[Ex ia Da] IIIC
ATEX gas certificate	BVS 15 ATEX E018 X
ATEX gas certificate	BVS 15 ATEX E018 X
ATEX gas explosion protection	⊕ II 3 (1) G Ex nA nC [ia Ga] IIC T4 Gc
ATEX dust certificate	BVS 15 ATEX E018 X
ATEX dust explosion protection	⊕ II (1) D [Ex ia Da] IIIC
FMus certificate	FM16US0122X
cFM certificate	FM16CA0067X
Marking cFMus	Class I, Div. 2, Groups A,B,C,D; Class I, Zone 2, nA nC Group IIC AIS Class I,II,III, Div. 1, Groups A,B,C,D,E,F,G; Class I, Zone 0, [Ex ia] IIC T4 at Ta = 70°C See Doc. 9162 6 031 001 1
Certificates	ATEX (BVS), Canada (FM), China (NEPSI), IECEX (BVS), SIL (exida), USA (FM)
Ship approval	CCS, EU RO MR (DNV)
Declaration of conformity	ATEX (EUK), China (CCC)

#### Safety Data

Max. voltage $U_o/V_{oc}$	27 V
Max. current $I_o/I_{sc}$	87.9 mA

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## Safety Data

Max. power $P_o$	574 mW			
Max. permissible external capacitance $C_o/C_a$ for IIC	0.09 $\mu$ F			
Max. permissible external inductance $L_o/L_a$ for IIC	2.3 mH			
Max. permissible external capacitance $C_o/C_a$ for IIB	0.705 $\mu$ F			
Max. permissible external inductance $L_o/L_a$ for IIB	14 mH			
Max. permissible external capacity $C_o$ for IIIC	0.705 $\mu$ F			
Max. permissible external inductance $L_o$ for IIIC	14 mH			
Max. voltage $U_o$ (3-wire)	27 V			
Max. current $I_o$ (3-conductor)	88.3 mA			
Max. power $P_o$ (3-conductor)	574 mW			
Max. permissible external capacity $C_o$ for IIC (3-wire)	0.09 $\mu$ F			
Max. permissible external inductance $L_o$ for IIC (3-wire)	2.3 mH			
Max. permissible external capacity $C_o$ for IIB (3-wire)	0.705 $\mu$ F			
Max. permissible external inductance $L_o$ for IIB (3-wire)	14 mH			
Max. permissible external capacity $C_o$ for IIIC (3-wire)	0.705 $\mu$ F			
Max. permissible external inductance $L_o$ for IIIC (3-wire)	14 mH			
Internal capacitance (3-conductor)	negligible			
Internal inductance (3-conductor)	negligible			
Max. voltage $U_o$ isolation amplifier	4.1 V			
Max. current $I_o$ isolation amplifier	$\approx$ 0 mA			
Max. power $P_o$ isolation amplifier	$\approx$ 0 mW			
Internal capacitance isolation amplifier	Negligible			
Internal inductance $L_i$ isolation amplifier	Negligible			
Max. voltage $U_i$	30 V			
Max. current $I_i$	100 mA			
Internal capacitance	Negligible			
Internal inductance	Negligible			
Safety-related max. voltage	253 V			
Intrinsically safe limiting values inductance $L_o$ /capacitance $C_o$	Jointly connectable inductance $L_o$ /capacitance $C_o$			
IIC	$L_o$ [mH]	1 mH	0.500 mH	0.200 mH
	$C_o$ [ $\mu$ F]	0.056 $\mu$ F	0.072 $\mu$ F	0.090 $\mu$ F
IIB	$L_o$ [mH]	10 mH	1 mH	0.200 mH
	$C_o$ [ $\mu$ F]	0.290 $\mu$ F	0.380 $\mu$ F	0.600 $\mu$ F

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IIIC	L <sub>o</sub> [mH]	10 mH	1 mH	0.200 mH
	C <sub>o</sub> [μF]	0.290 μF	0.380 μF	0.600 μF

## Functional Safety

HFT	0
SFF	90%
Lambda SD	0 FIT
Lambda SU	0 FIT
Lambda DD	436 FIT
Lambda DU	46 FIT
PFD <sub>avg</sub> at T <sub>proof</sub> 1 year	2,23E-04
PFD <sub>avg</sub> at T <sub>proof</sub> 2 years	4,19E-04
PFD <sub>avg</sub> at T <sub>proof</sub> 5 years	1,10E-03

## Electrical Data

Number of channels	1
Transmitter feed operation	Yes
Isolation amplifier operation	Yes
LFD relay	Yes
Communication signal	HART, 0.5 to 10 kHz
Limiting values configuration	Using ISpac Wizard (V3.04 and more recent)

## Auxiliary Power

Auxiliary power	24 V DC
Auxiliary power nominal voltage	24 V DC
Auxiliary power voltage range	18 ... 31.2 V
Voltage range residual ripple	≤ 3,6 V <sub>SS</sub>
Nominal current	85 mA
Max. power dissipation	1.5 W
Power consumption	2 W
Polarity reversal protection	Yes
Undervoltage monitoring	Yes
Operation indication	Green "PWR" LED

## Galvanic Isolation

Test voltage as per standard	EN IEC 60079-11
Ex i input to output	1.5 kV AC
Ex i input to auxiliary power	1.5 kV AC
Ex i input to fault message contact	1.5 kV AC
Test voltage as per standard	EN 50178
Output to auxiliary power	350 V AC
Output to output	350 V AC
Galvanic separation FMC to HE and output	350 V AC

## Input

Input function	Isolation amplifier Transmitter power unit
Input	4 to 20 mA with HART
Input signal	4 to 20 mA with HART
Function range input	2 – 22 mA

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## Input

Max. input current, mA sources	50 mA
Input for open-circuit voltage $U_a$	$\leq 26$ V
Short-circuit current	$\leq 35$ mA
Supply voltage for transmitter	$\geq 16$ V at 20 mA
Note about supply voltage	( $T < -10$ °C: US - 0.2 V / 10K)
HART input resistance (AC)	$> 250$ $\Omega$
Input resistance	30 $\Omega$

## Output

Output	4 to 20 mA with HART
Output signal	4 to 20 mA with HART
Function range output	2 – 22 mA
Behaviour of the output	= input signal
Output residual ripple	$\leq 40$ $\mu$ Aeff
Load resistance $R_L$	0 to 600 $\Omega$ (terminal 1+/2-)
Load resistance influence	$\leq 0,02$ %
Analog signal delay	$< 30$ ms
Settling time 10-90%	$< 45$ ms
Limit contact (per channel)	2 NO
Switching voltage limiting values	$\leq \pm 30$ V
Switching current limiting values	$\leq 170$ mA
Limit value contact switching current (max. 1 ms)	$\leq 500$ mA
Switch-on resistance	$\leq 2.5$ ohm (typical $< 1$ ohm)
Switching state indication	Yellow "OUT" LED
Switching delay	$< 80$ ms
Switch-back delay	$< 100$ ms
Reclosing lockout	Reset using DIP switch or "Power off" (configurable)
LF switch user adjustment	Activated/deactivated
Wire breakage error detection input	$< 3.6$ mA
Short circuit error detection input	$> 21$ mA
Line fault indication	Red "LF" LED
Fault message contact switching capacity	30 V / 100 mA
Line fault and loss of power signalization	- Contact (30 V/100 mA), closed against earth in case of error - pac-Bus, potential-free contact (30 V/100 mA)
Deviations / error note	Information in % of the measuring range (20 mA) at $U_N$ , 23 °C
Deviation	$\leq 0,2$ %
Temperature influence error limits	$\leq 0.1\%/10$ K
Auxiliary power influence error limits	$\leq 0,01$ %
Linearity error	$\leq 0,1$ %
Offset error	$\leq 0,1$ %
Behaviour of the output	= input signal

## Device Specific Data

Operating status LED designation	PWR
Operating conditions LED colour	green

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## Ambient Conditions

Ambient temperature °C	-40 °C ... 70 °C (Single device) -40 °C ... 60 °C (Group assembly)
Ambient temperature °F	-40 °F ... +158 °F (Single device) -40 °F ... +140 °F (Group assembly)
Note	"The installation conditions affect the ambient temperature. Observe the "Cabinet installation guide""
Storage temperature °C	-40 °C ... 80 °C
Storage temperature °F	-40 °F ... +176 °F
Max. relative humidity	95%
Use at the height of	< 2000 m
Max. operating altitude	2000 m
Electromagnetic compatibility	Tested to the following standards and regulations: EN 61326-1 For use in industrial areas; NAMUR NE 21

## Mechanical Data

Degree of protection (IP)	IP30
Degree of protection (IP) terminals	IP20
Fire resistance (UL 94)	V0
Enclosure material	Polyamide
Connection cross-section	0.2 to 2.5 mm <sup>2</sup> flexible 0.25 to 2.5 mm <sup>2</sup> flexible with core end sleeve
Grid dimension	17.6 mm
Width	17.6 mm
Width, inches	0.69 in
Height	114.5 mm
Height in inches	4.51 in
Length	108 mm
Length in inches	4.25 in
Weight	225 g
Weight	0.5 lb

## Mounting / Installation

Mounting type	DIN rail NS35/15, NS35/7.5
Mounting orientation	Vertical Horizontal
Connection type	Screw terminal
Min. rigid conductor cross section	0.2 mm <sup>2</sup>
Max. rigid conductor cross section	2.5 mm <sup>2</sup>
Min. flex conductor cross section	0.2 mm <sup>2</sup>
Max. flex conductor cross section	2.5 mm <sup>2</sup>
Connection cross-section AWG	24 ... 14

# Isolator Barriers

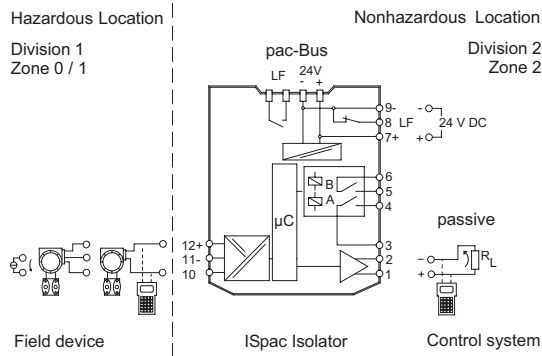
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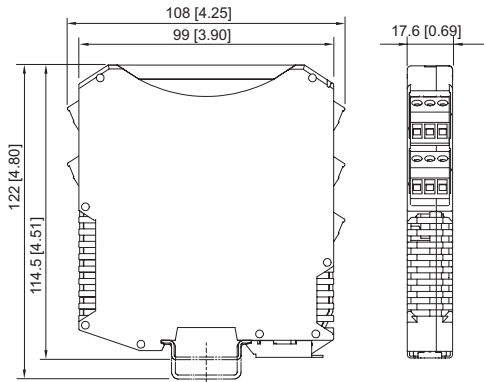


## Technical Drawings – Subject to Alterations



Connection diagram 9162/13-11-14

## Dimensional Drawings (All Dimensions in mm [inches]) – Subject to Alterations



ISpac Series 9143, 9146, 9147, 9160, 9162, 9163, 9165, 9167, 9170, 9172, 9175, 9176, 9180, 9182, 9193, ISbus Series 9412 with screw terminal

## Accessories

### 9162 Parameterisation



Parameterisation ex works optionally available for all variants.

Art. No.

270538

### Parameterization set ISpac - Wizard



The software serves for commissioning, configuring and diagnosing the ISpac isolators Series 9146, 9162, 9182 and 9282.

For further information, see operating instructions.

Form of delivery: USB stick; parameterization software incl. parameterization cable / adaptor

System requirements:

IBM compatible PC with MS XP, Vista, Windows 7, 10

RS 232 C interface

RS 232 / USB adaptor

Art. No.

202595

### Resistive coupling element



The 0/4 to 20 mA signal of channel 1 is converted to a 0/2 to 10 V signal. The resistive coupling element replaces the existing connection terminal. (Set with 5 pieces)

Art. No.

273968

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## Spare Parts

Screw terminal		Art. No.
	3-pole plug, screw connector thread: M3 stripping length: 7 mm color: green	112817
	3-pole plug, screw connector thread: M3 stripping length: 7 mm color: black	112816
	3-pole plug, screw connector thread: M3 stripping length: 7 mm color: blue	112818
Screw terminal with test tap		Art. No.
	3-pole plug with test tap, screw connector thread: M3 stripping length: 7 mm colour: black	113005
	3-pole plug with test tap, screw connector thread: M3 stripping length: 7 mm colour: blue	113004
Spring clamp terminal		Art. No.
	3-pole plug with test tap, spring clamp connection stripping length: 10 mm color: green	112825
	3-pole plug with test tap, spring clamp connection stripping length: 10 mm color: black	112824
	3-pole plug with test tap, spring clamp connection stripping length: 10 mm color: blue	112826

We reserve the right to make alterations to the technical data, dimensions, weights, designs and products available without notice. The illustrations cannot be considered binding.