

Isolators

Transmitter supply unit

Ex i field circuit

9160/23-10-10s Art. No. 214903



- Can be used universally for two- and three-wire transmitters and mA sources (four-wire transmitters)
- High degree of accuracy
- Standard versions can be used up to SIL 2, special version up to SIL 3 (IEC/EN 61508) available

WebCode 9160A



9160 series transmitter supply units can be used for the intrinsically safe operation of two- and three-wire transmitters or intrinsically safe mA sources such as four-wire transmitters. The unit allows HART signals to be transmitted in both directions. The portfolio includes single- and dual-channel units and a version for signal duplication. Special versions are available for lower output voltages and SIL 3.

Technical Data

Explosion Protection

Application range (zones)	2
Ex interface zone	0 1 2 20 21 22
IECEX gas certificate	IECEX BVS 08.0050 X
IECEX gas explosion protection	Ex nA [ia Ga] IIC T4 Gc
IECEX dust certificate	IECEX BVS 08.0050 X
IECEX dust explosion protection	[Ex ia Da] IIIC
IECEX firedamp certificate	IECEX BVS 08.0050 X
IECEX firedamp protection	[Ex ia Ma] I
ATEX gas certificate	DMT 03 ATEX E 010 X
ATEX gas explosion protection	⊕ II 3 (1) G Ex nA [ia Ga] IIC T4 Gc
ATEX dust certificate	DMT 03 ATEX E 010 X
ATEX dust explosion protection	⊕ II (1) D [Ex ia Da] IIIC
ATEX firedamp certificate	DMT 03 ATEX E 010 X
ATEX firedamp protection	⊕ I (M1) [Ex ia Ma] I
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 Mounting vert. at Ta = 70°C , or horizontal Ta = 60°C See Doc. 91 606 01 31 1

Explosion Protection

Certificates	ATEX (BVS), Brazil (ULB), Canada (FM), China (NEPSI), IECEx (BVS), Korea (KTL), SIL (exida), USA (FM)
Ship approval	CCS, EU RO MR (DNV)
Declaration of Conformity	ATEX (EUK), China (CCC)

Safety Data

Max. voltage U_o	27 V
Max. current I_o	88 mA
Max. power P_o	576 mW
Max. permissible external capacity C_o for IIC	0.09 μ F
Max. permissible external capacity C_o for IIB	0.705 μ F
Max. permissible external capa.IIA	2330 nF
Max. permissible external capacity C_o for I	3750 nF
Max. permissible external inductance L_o for IIC	2.3 mH
Max. permissible external inductance L_o for IIB	17 mH
Max. permissible external inductance L_o for IIA	28 mH
Max. permissible external inductance L_o for I	40 mH
Max. voltage U_i	30 V
Max. voltage U_o isolation amplifier	4.1 V
Max. current I_i note	Internally limited
Max. power P_i	100 mW
Internal capacitance	Negligible
Internal capacitance isolation amplifier	Negligible
Internal inductance	Negligible
Internal inductance L_i isolation amplifier	Negligible
Safety-related max. voltage	253 V AC

Functional Safety

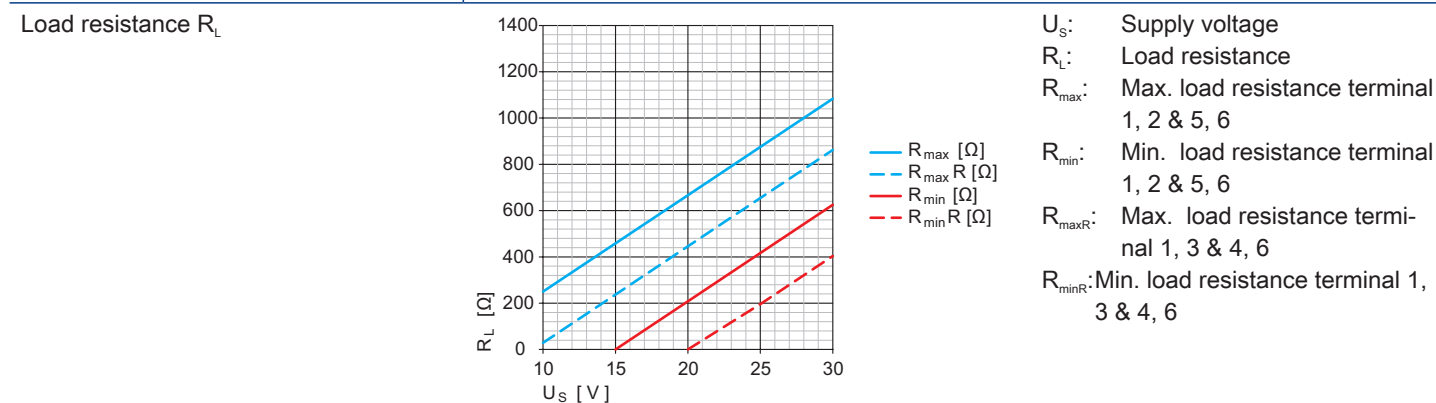
SIL	2
HFT	0
SFF	85%
Lambda SD	0 FIT
Lambda SU	0 FIT
Lambda DD	163 FIT
Lambda DU	28 FIT
PFD_{avg} at T_{proof} 1 year	2,29E-04
PFD_{avg} at T_{proof} 2 years	3,38E-04
PFD_{avg} at T_{proof} 5 years	6,64E-04

Electrical Data

Number of channels	2
Measuring transformer feed operation	Yes

Electrical Data

Isolation amplifier operation	Yes
LFD relay	No
Communication signal	HART, 0.5 to 10 kHz



Auxiliary Power

Auxiliary power	24 V DC
Auxiliary power nominal voltage	24 V DC
Auxiliary power voltage range	18 to 31.2 V
Voltage range residual ripple	$\leq 3,6 V_{SS}$
Nominal current	100 mA
Auxiliary power max. power dissipation	1.7 W
Power consumption	2.3 W
Polarity reversal protection	Yes
Undervoltage monitoring	Yes
Operation indication	Green "PWR" LED

Galvanic Isolation

Test voltage as per standard	IEC EN 60079-11
Ex i input to output	1.5 kV AC
Ex i input to auxiliary power	1.5 kV AC
Ex i input to Ex i input	500 V
Test voltage as per standard	EN 50178
Output to auxiliary power	350 V AC
Output to output	350 V AC

Input

Input function	Isolation amplifier Transmitter power unit
Input	0/4 to 20 mA with HART
Input signal	0/4 to 20 mA with HART
Function range input	0 ... 24 mA
Max. input current, mA sources	50 mA
Input for open-circuit voltage U_a	$\leq 26 V$
Short-circuit current	$\leq 35 mA$
Ex i input supply voltage for transmitter	$\geq 16 V$ at 20 mA (for 2-wire)
Supply voltage for transmitter	$\geq 16 V$ at 20 mA
Line fault and loss of power signalisation	- Contact (30 V / 100 mA) closed to ground in case of fault - pac-Bus, floating contact (30 V / 100 mA)

Input

Input resistance	≤ 100 ohm
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Output

Output	Passive with HART
Function range output	0 – 24 mA
Output A	Passive
Output B	Passive
Output voltage	≤ 30 V
Max. load resistance R_L HART	See characteristic curve
Max. load resistance R_L note	See characteristic curve
Output residual ripple	≤ 40 μ Aeff
Settling time 10-90%	≤ 100 μ s
Temperature influence error limits	≤ 0.05% / 10 K
Deviation	≤ 0,1 %
Behaviour of the output	= input signal
Behaviour of the output note	Accuracy, typical data expressed as % of calibrated span (20 mA) at U_N , 23 °C

Ambient Conditions

Ambient temperature	-20 °C ... +70 °C (Single device) -20 °C ... +60 °C (Group assembly)
Ambient temperature	-4 °F ... +158 °F (Single device) -4 °F ... +140 °F (Group assembly)
Storage temperature	-40 °C ... +80 °C
Storage temperature	-40 °F ... +176 °F
Maximum relative humidity	95%
Use at the height of	< 2000 m
Electromagnetic compatibility	Tested to the following standards and regulations: EN 61326-1 Use in industrial environment; 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 ² flexible 0.25 to 2.5 mm ² flexible with core end sleeve
Grid dimension	17.6 mm
Width	17.6 mm
Width, inches	0.69 in
Height	114.5 mm
Height, inches	4.51 in
Length	108 mm
Length, inches	4.25 in
Mounting depth, inches	4.51 in
Weight	195 g
Weight	0.43 lb

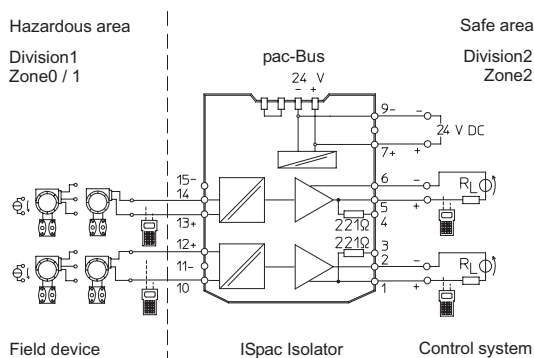
Mounting / Installation

Mounting type	DIN rail NS35/15, NS35/7.5
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Mounting / Installation

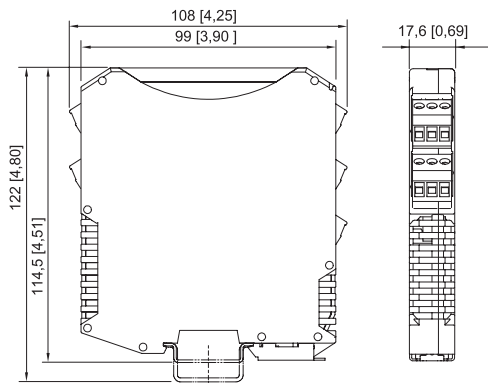
Mounting orientation	Vertical Horizontal
Connection type	Screw terminal
Min. rigid conductor cross section	0.2 mm ²
Max. rigid conductor cross section	2.5 mm ²
Min. flex conductor cross section	0.2 mm ²
Max. flex conductor cross section	2.5 mm ²
Connection cross-section AWG	24 – 14

Technical Drawings – Subject to Alterations



Connection diagram 9160/23-10-10

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

Front cover

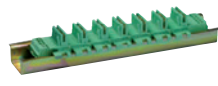


for ISpac modules 91xx
yellow, transparent
Clear marking of the device for SIL applications.
(Packaging unit: 10 pieces)

Art. No.

200914

pac-Bus



Wiring auxiliary power and collective error message

Art. No.

160731

Isolators

Transmitter supply unit

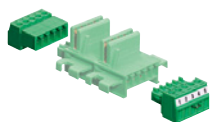
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Terminal set for pac-Bus




Art. No.

	For the supply of 24 V DC auxiliary power via terminals (alternative to using the supply module 9193/21-11-11), with jumper for error message chain for ISpac module 91xx	160730
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Spare Parts



Screw terminal

Art. No.

	3-pole plug, screw connector thread: M3 stripping length: 7 mm colour: green	112817
	3-pole plug, screw connector thread: M3 stripping length: 7 mm colour: black	112816
	3-pole plug, screw connector thread: M3 stripping length: 7 mm colour: 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 colour: green	112825
	3-pole plug with test tap, spring clamp connection stripping length: 10 mm colour: black	112824
	3-pole plug with test tap, spring clamp connection stripping length: 10 mm colour: 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.