Isolators

Transmitter supply unit
Ex i field circuit
9160/13-11-13s Art. No. 214897

- 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 higher 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 nC [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	Ⓔx II 3 (1) G Ex nA nC [ia Ga] IIC T4 Gc
ATEX dust certificate	DMT 03 ATEX E 010 X
ATEX dust explosion protection	Ⓔx II (1) D [Ex ia Da] IIIC
ATEX firedamp certificate	DMT 03 ATEX E 010 X
ATEX firedamp protection	Ⓔx I (M1) [Ex ia Ma] I
ATEX firedamp protection 2	Ⓔx I (M1) I
FMus certificate	FM16US0122X
cFM certificate	FM16CA0067X

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Explosion Protection	
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
Certificates	ATEX (BVS), Brazil (ULB), Canada (FM), IECEx (BVS), India (PESO), Korea (KTL), SIL (exida), USA (FM)
Ship approval	CCS, EU RO MR (DNVGL)
Notes	CCC, UKCA certificate available from 2022 onward
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 µF
Max. permissible external capacity C_o for IIB	0.705 µF
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. current I_i	100 mA
Max. voltage Uo isolation amplifier	4.1 V
Max. power Pi note	Internally limited
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	3
Electrical Data	
Number of channels	1
Measuring transformer feed operation	Yes
Isolation amplifier operation	Yes
LFD relay	Yes
Communication signal	HART, 0.5 to 10 kHz

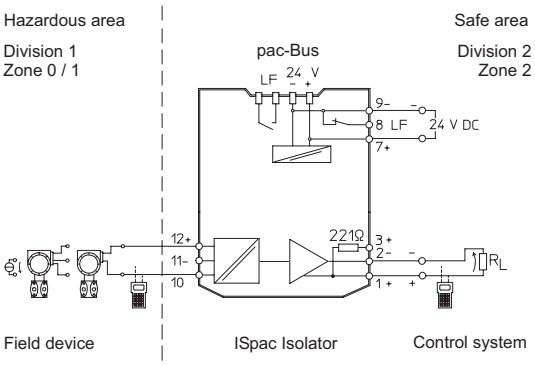
Auxiliary Power	
Auxiliary power	24 V DC
Auxiliary power nominal voltage	24 V DC
Auxiliary power voltage range	18 to 31.2 V
Voltage range residual ripple	≤ 3,6 V_{SS}
Nominal current	113 mA
Auxiliary power max. power dissipation	2.2 W
Power consumption	2.7 W
Polarity reversal protection	Yes
Undervoltage 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 fault message contact	1.5 kV AC
Test voltage as per standard	EN 50178
Output to auxiliary power	350 V AC
Galvanic separation FMC to HE and 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	≤ 26 V
Short-circuit current	≤ 35 mA
Ex i input supply voltage for transmitter	≥ 16 V at 20 mA (for 2-wire)
Supply voltage for transmitter	≥ 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 resistance	≤ 100 ohm
Output	
Output	0/4 to 20 mA with HART
Output signal	0/4 to 20 mA with HART
Function range output	0 – 24 mA
Output A	0/4 to 20 mA
Output current at Ie=0	0 mA
Load resistance R_L	0 ... 600 Ω (terminal 1+ / 2-) 0 ... 379 Ω (terminal 3+ / 2-) (with internal 221 Ω resistor for HART)
Max. load resistance R_L HART	379 Ω
Max R_L load with resistor	379 Ω
Max. load resistance R_L	600 Ω
Max R_L note	With internal 221 ohm resistor

Output	
Output residual ripple	≤ 40 µAeff
Settling time 10-90%	≤ 100 µs
Temperature influence error limits	≤ 0.05% / 10 K
Fault message contact switching capacity	30 V / 100 mA
LF switch user adjustment	Activated/deactivated
Indication of line fault	Red "LF" LED
Wire breakage error detection	< 3.6 mA
Short circuit error detection	> 20.5 mA
Wire breakage error detection OFF	< 3,6 mA
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) -40 °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 mm² flexible 0.25 to 2.5 mm² flexible with core end sleeve
Grid dimension	17.6 mm
Width	17.6 mm
Width, inches	0.69 in
Height	114.5 mm
Length	108 mm
Length, inches	4.25 in
Mounting depth, inches	4.51 in
Weight	0.195 kg
Weight	0.43 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 mm²
Max. rigid conductor cross section	2.5 mm²

Mounting / Installation

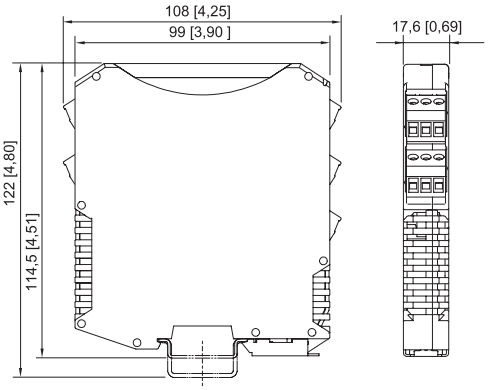
Min. flex conductor cross section	0.2 mm²
Max. flex conductor cross section	2.5 mm²

Technical Drawings – Subject to Alterations



Connection diagram 9160/13-11-13

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

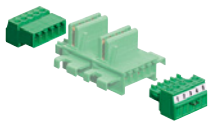


ISpac Series 9146, 9147, 9160, 9162, 9163, 9165, 9167, 9170, 9172, 9175, 9176, 9180, 9182, 9193, ISbus Series 9412 with screw terminal

Accessories

Front cover		Art. No.
	for ISpac modules 91xx yellow, transparent Clear marking of the device for SIL applications. (Packaging unit: 10 pieces)	200914

pac-Bus		Art. No.
	Wiring auxiliary power and collective error message	160731

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

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