

Isolators

Transmitter supply unit

Ex i field circuit

9160/19-11-10s Art. No. 214901



- Can be used universally for 2- and 3-wire transmitters and mA sources (4-wire transmitters)
- High accuracy
- For use up to SIL 2, special variant up to SIL 3 (IEC/EN 61508)

MY R. STAHL 9160A



Series 9160 Ex i transmitter supply units are used for the intrinsically safe operation of 2- and 3-wire transmitters or intrinsically safe mA sources such as 4-wire transmitters. The device transmits HART signals in both directions. The range includes one- and two-channel devices, as well as a variant 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), 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 I | 3750 nF | | | | |
| Max. permissible external inductance L_o for I | 40 mH | | | | |
| 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 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. 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 | | | | |
| Intrinsically safe limiting values inductance L_o /capacitance C_o | Jointly connectable inductance L_o /capacitance C_o | | | | |
| IIC | L_o [mH] | 2 mH | 1 mH | 0.500 mH | 0.200 mH |
| | C_o [μ F] | 0.042 μ F | 0.056 μ F | 0.072 μ F | 0.090 μ F |
| IIB | L_o [mH] | 17 mH | 2 mH | 0.500 mH | 0.200 mH |
| | C_o [μ F] | 0.290 μ F | | | |
| IIA | L_o [mH] | 28.000 mH | 2.000 mH | 1.000 mH | 0.200 mH |
| | C_o [μ F] | 0.410 μ F | 0.320 μ F | 0.540 μ F | 0.820 μ F |
| IIIC | L_o [mH] | 17.000 mH | 2.000 mH | 0.500 mH | 0.200 mH |
| | C_o [μ F] | 0.290 μ F | 0.320 μ F | 0.460 μ F | 0.600 μ F |
| I | L_o [mH] | 40.000 mH | 20.000 mH | 0.500 mH | 0.100 mH |
| | C_o [μ F] | 0.480 μ F | 0.660 μ F | 0.810 μ F | 1.200 μ F |

Functional Safety

| | |
|-----|---|
| SIL | 2 |
|-----|---|

Functional Safety

| | |
|--|----------|
| 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 | 1 |
| Measuring transformer feed operation | Yes |
| 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 | ≤ 3,6 V _{SS} |
| Nominal current | 131 mA |
| Auxiliary power max. power dissipation | 2.3 W |
| Power consumption | 3.1 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 |
| 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 ... 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 |

Input

| | |
|--|---|
| Line fault and loss of power signalisation | - Contact (30 V/100 mA), closed against earth in case of error - pac-Bus, potential-free contact (30 V/100 mA) |
| Input resistance | ≤ 100 ohm |

Output

| | |
|--|---|
| Output | 0/4 ... 20mA with/without HART |
| Output signal | 0/4 to 20 mA with HART |
| Function range output | 0 – 24 mA |
| Output A | 0/4 to 20 mA |
| Output B | 0/4 to 20 mA (without HART) |
| Output current at I _e =0 | 0 mA |
| Load resistance R _L | 0 to 600 Ω (terminal 1+/2- or 5+/6-) 0 to 379 Ω (terminal 3+/2- or 4+/6-) (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 residual ripple | ≤ 40 μA _{eff} |
| Communication signal note | Only for output 1 |
| Settling time 10-90% | ≤ 100 μs |
| Settling time note | Output 2: ≤ 200 ms, typ. 100 ms |
| 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 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 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 |

Isolators

Transmitter supply unit

Ex i field circuit

9160/19-11-10s Art. No. 214901



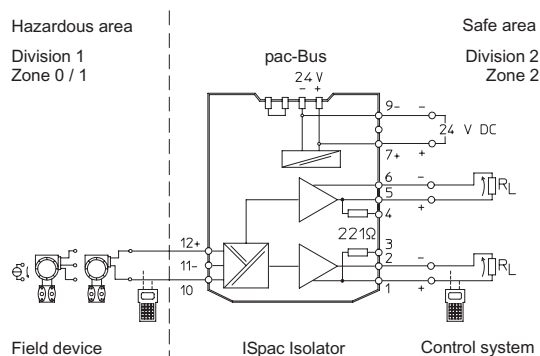
Mechanical Data

| | |
|------------------------|----------|
| 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

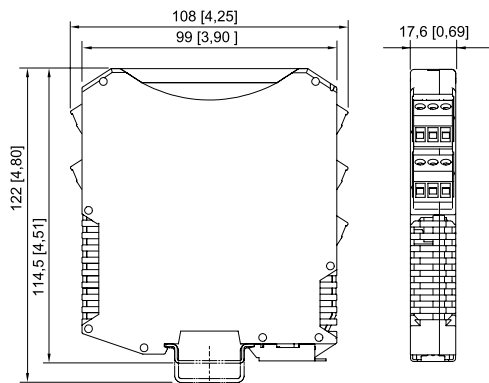
| | |
|------------------------------------|----------------------------|
| Mounting type | DIN rail NS35/15, NS35/7.5 |
| Mounting orientation | Vertical Horizontal |
| Connection type | Screw terminal |
| Min. rigid conductor cross section | 0.2 mm ² |
| Max. rigid conductor cross section | 2.5 mm 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 9160/19-11-10

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

Isolators

Transmitter supply unit

Ex i field circuit

9160/19-11-10s Art. No. 214901



Transparent cover

Art. No.



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

200914

pac-Bus

Art. No.

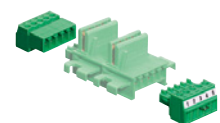


Wiring auxiliary power and collective error message

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



Isolators

Transmitter supply unit

Ex i field circuit

9160/19-11-10s Art. No. 214901



| | | |
|--|--|--------|
|  | 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.