

# Isolator Barriers

Vibration transducer Supply device

Ex i field circuit ISpac

9147/10-99-10s Art. No. 212432



- Space-saving two-channel variant reduces installation costs
- Easily accessible rotary switch makes adjustment simple
- Can be used up to SIL 2 (IEC 61508)

MY R. STAHL 9147A



9147 series vibration transducer power supply units connect vibration, acceleration and speed sensors to analytical systems. The measuring signals are galvanically separated when they are transmitted. They are transmitted at frequencies of up to 50 Hz. These units have already been tested with numerous sensors from well-known manufacturers such as Bently Nevada and are in use in systems across the globe.

## Technical Data

### Explosion Protection

Application range (Zones)	2
Ex interface zone	0 1 2 20 21 22
IECEX gas certificate	IECEX BVS 12.0001 X
IECEX gas explosion protection	Ex ec [ia Ga] IIC T4 Gc
IECEX dust certificate	IECEX BVS 12.0001 X
IECEX dust explosion protection	[Ex ia Da] IIIC
IECEX firedamp certificate	IECEX BVS 12.0001 X
IECEX firedamp protection	[Ex ia Ma] I
ATEX gas certificate	BVS 12 ATEX E 007 X
ATEX gas explosion protection	⊕ II 3 (1) G Ex ec [ia Ga] IIC T4 Gc
ATEX dust certificate	BVS 12 ATEX E 007 X
ATEX dust explosion protection	⊕ II (1) D [Ex ia Da] IIIC
ATEX firedamp certificate	BVS 12 ATEX E 007 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, AEx/Ex nA Group IIC AIS Class I,II,III, Div. 1, Groups A,B,C,D,E,F,G; Class I, Zone 0, [AEx ia]/[Ex ia] IIC T4 at Ta = 70°C See Doc. 9147 6 031 001 1

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## Explosion Protection

Certificates	ATEX (BVS), Canada (FM), China (NEPSI), IECEx (BVS), India (PESO), Korea (KTL), SIL (exida), USA (FM)
Ship approval	CCS, EU RO MR (DNV)
Declaration of Conformity	ATEX (EUK), China (CCC)
Installation	in Zone 2
Further information	see respective certificate and operating instructions

## Safety Data

Max. voltage $U_o/V_{oc}$	26.3 V					
Max. current $I_o/I_{sc}$	88.3 mA					
Max. power $P_o$	579 mW					
Max. permissible external capacity $C_o$ for I	3.95 $\mu$ F					
Max. permissible external inductance $L_o$ for I	58 mH					
Max. permissible external capacitance $C_o/C_a$ for IIC	0.097 $\mu$ F					
Max. permissible external capacitance $C_o/C_a$ for IIB	0.74 $\mu$ F					
Max. permissible external capa.IIA	2.51 $\mu$ F					
Max. permissible external inductance $L_o/L_a$ for IIC	4.4 mH					
Max. permissible external inductance $L_o/L_a$ for IIB	18 mH					
Max. permissible external inductance $L_o$ for IIA	36 mH					
Max. permissible external capacity $C_o$ for IIIC	0.74 $\mu$ F					
Max. permissible external inductance $L_o$ for IIIC	18 mH					
Internal capacitance	2.4 nF					
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]	2.200 mH	1 mH	0.500 mH	0.200 mH	
	$C_o$ [ $\mu$ F]	0.043 $\mu$ F	0.059 $\mu$ F	0.075 $\mu$ F	0.097 $\mu$ F	
IIB	$L_o$ [mH]	17 mH	2 mH	0.500 mH	0.200 mH	0.10 mH
	$C_o$ [ $\mu$ F]	0.320 $\mu$ F	0.340 $\mu$ F	0.480 $\mu$ F	0.620 $\mu$ F	0.740 $\mu$ F
IIA	$L_o$ [mH]	28 mH	1 mH	0.500 mH	0.100 mH	0.005 mH
	$C_o$ [ $\mu$ F]	0.430 $\mu$ F	0.570 $\mu$ F	0.670 $\mu$ F	1 $\mu$ F	2.510 $\mu$ F
IIIC	$L_o$ [mH]	17 mH	2 mH	0.500 mH	0.200 mH	0.10 mH
	$C_o$ [ $\mu$ F]	0.320 $\mu$ F	0.340 $\mu$ F	0.480 $\mu$ F	0.620 $\mu$ F	0.740 $\mu$ F
I	$L_o$ [mH]	40 mH	20 mH	1 mH	0.200 mH	0.002 mH
	$C_o$ [ $\mu$ F]	0.490 $\mu$ F	0.720 $\mu$ F	0.750 $\mu$ F	1.100 $\mu$ F	3.950 $\mu$ F

## Functional Safety

SIL	2
HFT	0

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## Functional Safety

SFF	66%
Lambda SD	0 FIT
Lambda SU	0 FIT
Lambda DD	188 FIT
Lambda DU	95 FIT
PFD <sub>avg</sub> at T <sub>proof</sub> 1 year	7,95E-04
PFD <sub>avg</sub> at T <sub>proof</sub> 2 years	1,17E-03
PFD <sub>avg</sub> at T <sub>proof</sub> 5 years	2,29E-03

## Electrical Data

Number of channels	1																								
LFD relay	No																								
Operation indication	Green "PWR" LED																								
Internal resistance R <sub>i</sub>	30 Ω																								
Output current for 2-wire operation	2.6/4.3/7.9 mA at -10 V																								
Output current for 3-wire operation	10 mA at -20 V; 20 mA at -17 V																								
AC transmission error at U <sub>N</sub> and 20 °C and an offset of 10 V	<table><thead><tr><th>Frequency</th><th>Phase error</th><th>Amplitude error</th></tr></thead><tbody><tr><td>0 to 200 Hz</td><td>≤ 0.5°</td><td>±1%</td></tr><tr><td>&lt; 400 Hz</td><td>≤ 1.0°</td><td>±1%</td></tr><tr><td>&lt; 600 Hz</td><td>≤ 1.5°</td><td>±1%</td></tr><tr><td>&lt; 1 kHz</td><td>≤ 2.5°</td><td>±1%</td></tr><tr><td>&lt; 10 kHz</td><td>≤ 25°</td><td>+1/-5%</td></tr><tr><td>&lt; 20 kHz</td><td>≤ 50°</td><td>1/5%</td></tr><tr><td>&lt; 50 kHz</td><td>≤ 125°</td><td>-1%</td></tr></tbody></table>	Frequency	Phase error	Amplitude error	0 to 200 Hz	≤ 0.5°	±1%	< 400 Hz	≤ 1.0°	±1%	< 600 Hz	≤ 1.5°	±1%	< 1 kHz	≤ 2.5°	±1%	< 10 kHz	≤ 25°	+1/-5%	< 20 kHz	≤ 50°	1/5%	< 50 kHz	≤ 125°	-1%
Frequency	Phase error	Amplitude error																							
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< 10 kHz	≤ 25°	+1/-5%																							
< 20 kHz	≤ 50°	1/5%																							
< 50 kHz	≤ 125°	-1%																							

## Auxiliary Power

Auxiliary power	24 V DC
Nominal voltage V <sub>nom</sub>	24 V DC
Auxiliary power voltage range	18 to 31.2 V
Voltage range residual ripple	≤ 3,6 V <sub>SS</sub>
Nominal current	75 mA
Power consumption	1.8 VA
Max. power dissipation	1.4 W
Polarity reversal protection	Yes
Undervoltage monitoring	Yes
Undervoltage monitoring	Yes (no faulty devices/output states)
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

## Input

Input	-20 to -0.5 V
Input signal	-20 to -0.5 V
Function range input	-24 – 0 V

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## Input

Input resistance	10 k $\Omega$
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## Output

Output	-20 to -0.5 V
Output signal	-20 to -0.5 V
Output internal resistance R <sub>i</sub>	30 $\Omega$
Load resistance R <sub>L</sub>	> 2 k $\Omega$
Signal transmission delay	< 7 $\mu$ s
Temperature influence error limits	< 0.05% / 10 K
Signal transmission phase fluctuation	< 0.6%/period
Signal transmission frequency range	0 – 50 kHz
Auxiliary power influence error limits	< 0,05 %

## Ambient Conditions

Ambient temperature °C	-20 °C ... +70 °C (Single device) -20 °C ... +60 °C (Group assembly)
Ambient temperature °F	-4°F ... +158°F (Single device) -4°F ... +140°F (Group assembly)
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

## Mechanical Data

Degree of protection (IP)	IP30
Degree of protection (IP) terminals	IP20
Fire resistance (UL 94)	V0
Enclosure material	Polyamide
AWG clamping range	24 – 12
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	150 g
Weight	0.33 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>

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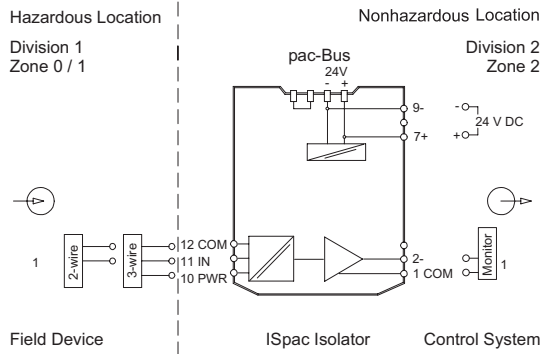
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## Mounting / Installation

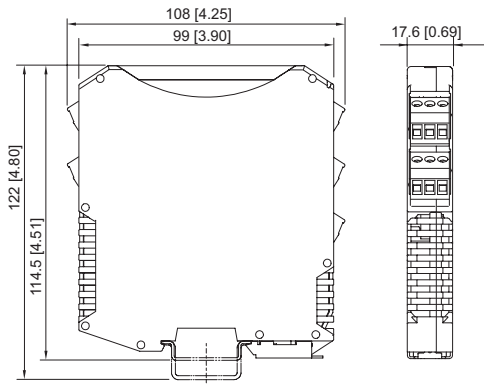
Connection cross-section AWG 24 – 14

### Technical Drawings – Subject to Alterations



Connection diagram 9147/10-99-10

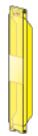
### Dimensional Drawings (All Dimensions in mm [inches]) – Subject to Alterations



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

## Accessories

### Transparent cover



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

Art. No.

200914

## Spare Parts

### Screw terminal



3-pole plug, screw connector  
thread: M3  
stripping length: 7 mm  
color: green

Art. No.

112817

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	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
<b>Screw terminal with test tap</b>		<b>Art. No.</b>
	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
<b>Spring clamp terminal</b>		<b>Art. No.</b>
	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.