Isolator Barriers

Frequency transmitter
Ex i field circuit
9146/20-11-11k Art. No. 159887

- Compact Ex i frequency transmitter for monitoring rotational speed in hazardous areas
- Limit value analysis + frequency-current conversion + pulse divider function over a width of just 17.6 mm
- Parameterization made easy by "ISpac Wizard" software

MY R. STAHL **9146A**

9146 series Ex i- frequency transmitters monitor the speed of rotating parts on one or two channels, e.g. the speed of fans or centrifuges. The frequency measured at the intrinsically safe input (between 0.001 Hz and 20 kHz) is issued as a unit signal (0/4 mA to 20 mA) or processed by a frequency divider. In single-channel devices, these frequency transmitters check whether speeds have exceeded or fallen below the limit values.

Technical Data

Explosion Protection	
Application range (zones)	2
Ex interface zone	0, 1, 2, 20, 21, 22
IECEx gas certificate	IECEx BVS 13.0095 X
IECEX gas certificate	IECEx BVS 13.0095 X
IECEx gas explosion protection	Ex ec nC [ia Ga] IIC T4 Gc
IECEx dust certificate	IECEx BVS 13.0095 X
IECEx dust explosion protection	[Ex ia Da] IIIC
IECEX firedamp certificate	IECEx BVS 13.0095 X
IECEx firedamp protection	[Ex ia Ma] I
ATEX gas certificate	BVS 05 ATEX E 0171 X
ATEX gas certificate	BVS 05 ATEX E 0171 X
ATEX gas explosion protection	Ⓔx II 3 (1) G Ex ec nC [ia Ga] IIC T4 Gc
ATEX dust certificate	BVS 05 ATEX E 0171 X
ATEX dust explosion protection	Ⓔx II (1) D [Ex ia Da] IIIC
ATEX firedamp certificate	BVS 05 ATEX E 0171 X
ATEX firedamp protection	Ⓔx 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 nC 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. 9146 6 031 001 1
Certificates	ATEX (BVS), Canada (FM), IECEx (BVS), India (PESO), USA (FM)
Ship approval	CCS, EU RO MR (DNV)
Declaration of conformity	ATEX (EUK)

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Safety Data

Max. voltage U_o/V_{oc}		10.5 V			
Max. current I_o/I_{sc}		23.4 mA			
Max. power P_o		61.4 mW			
Max. permissible external capacitance C_o/C_a for IIC		2.41 µF			
Max. permissible external inductance L_o/La for IIC		63 mH			
Max. permissible external capacitance C_o/C_a for IIB		16.8 µF			
Max. permissible external inductance L_o/La for IIB		230 mH			
Max. permissible external capa.IIA		75 µF			
Max. permissible external inductance L_o for IIA		450 mH			
Max. permissible external capacity C_o for IIIC		16.8 µF			
Max. permissible external inductance L_o for IIIC		230 mH			
Max. permissible external capacity C_o for I		95 µF			
Max. permissible external inductance L_o for I		600 mH			
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]	20 mH	5 mH	1 mH	0.200 mH
	C_o [µF]	0.490 µF	0.670 µF	0.960 µF	1.400 µF
IIB	L_o [mH]	100 mH	20 mH	2 mH	0.500 mH
	C_o [µF]	1.900 µF	2.700 µF	4.500 µF	6.400 µF
IIA	L_o [mH]	100 mH	10 mH	1 mH	0.100 mH
	C_o [µF]	2.900 µF	4.500 µF	7.300 µF	14 µF
IIIC	L_o [mH]	100 mH	20 mH	2 mH	0.500 mH
	C_o [µF]	1.900 µF	2.700 µF	4.500 µF	6.400 µF
I	L_o [mH]	100 mH	10 mH	2 mH	0.100 mH
	C_o [µF]	4 µF	5.700 µF	7.800 µF	17 µF

Electrical Data

Number of channels	2
LFD relay	Yes
Max. short-circuit current	8.5 mA
Parameterisation	With parameterising set 9199/20-02

Auxiliary Power

Auxiliary power	24 V DC
Auxiliary power voltage range	18 ... 31.2 V
Voltage range residual ripple	≤ 3,6 V_{SS}
Nominal current	75 mA

Auxiliary Power	
Power consumption	1.8 W
Max. power dissipation	1.5 W
Polarity reversal protection	Yes
Undervoltage monitoring	Yes
Operation indication	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
Fault message contact to auxiliary power	350 V AC
Fault message contact to output	350 V AC
Input	
Input signal	As per EN 60947-5-6 (NAMUR)
Input current for ON	≥ 2.1 mA
Input current for OFF	≤ 1.2 mA
Hysteresis	Approx. 0.2 mA
Input internal resistance R_i	1000 Ω
Input for open-circuit voltage U_a	8,5 V
Short-circuit current	≤ 8.5 mA
Input frequency	0.0010 – 20000 Hz
Input for centre resolution note	< 0.1 % of measuring range
Output	
Output signal	0/4 to 20 mA
Function range output	0 – 20.5 mA
Load resistance R_L	0 ... 600 Ω
Operating modes	Counter, period measurement, variable gate time
Limit contact (per channel)	without
Pulse output	without
LF switch user adjustment	Activated/deactivated
Wire breakage error detection input	I_E < 0.05 to 0.35 mA
Short circuit error detection input	R_E < 100 to 360 ohm
Behaviour of the output at line fault	configurable
Behaviour of the output at line fault note	with deactivated line fault: Short circuit: 3.8 mA, wire breakage: 20.5 mA
Line fault indication	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
Average measurement fault	≤ 0,1%
Temperature influence	≤ 0,05% / 10 K

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
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
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	128 mm
Length in inches	5.04 in
Weight	135 g
Weight	0.3 lb
Mounting / Installation	
Mounting type	DIN rail NS35/15, NS35/7.5
Mounting orientation	Vertical Horizontal
Connection type	Spring clamp terminal
Min. rigid conductor cross section	0.2 mm²
Max. rigid conductor cross section	2.5 mm²
Min. flex conductor cross section	0.2 mm²
Max. flex conductor cross section	2.5 mm²
Connection cross-section AWG	24 ... 14

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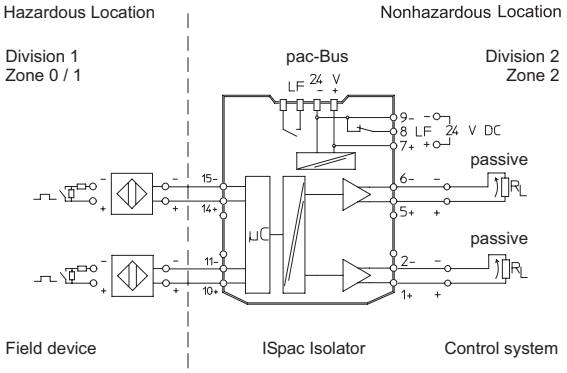
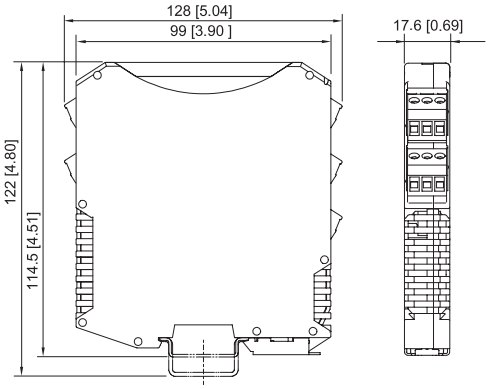
Technical Drawings – Subject to Alterations



Connection diagram 9146/20-11-11

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



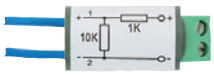
ISpac Series 9146, 9147, 9160, 9162, 9163, 9165, 9167, 9170, 9172, 9175, 9176, 9180, 9182, 9193, Fieldbus Power Supply Series 9412 with spring clamp terminal

Accessories

9146 Parameterisation		Art. No.
	Parameterisation ex works optionally available for all variants.	270534

Parameterization set ISpac - Wizard		Art. No.
	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	202595

Resistive coupling element		Art. No.
	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)	273968

	Additional connection of contacts also in hazardous areas to enable short-circuit and wire breakage detection	105944

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.