Digital I/O Coupler (4-wire)
Series 9413/21

06148E00

- The digital I/O coupler is used to connect 8 intrinsically safe contacts or proximity initiators and 4 intrinsically safe solenoid valves to a FOUNDATION™ fieldbus H1.
- Galvanic isolation between input, output and fieldbus
- Operation at an intrinsically safe (FISCO) or non-intrinsically safe fieldbus (high-energy trunk) is possible
- LED display for power supply and field bus

The Digital I/O Coupler is used for the connection of intrinsically safe contacts or NAMUR proximity switches and intrinsically safe solenoid valves or indicators to a FOUNDATION™ fieldbus H1. The Digital I/O Coupler is connected to an external power supply (4-wire device), the fieldbus can be intrinsically safe (FISCO) or non-intrinsically safe.
FF function blocks for DI, DO, MDI, MDO, AI (frequency), CI (counter) and logic LTB are integrated.
The Digital I/O Couplers are installed on DIN-rails or in enclosures made out of plastic or stainless steel for example.

	ATEX / IECEx					
Zone	0	1	2	20	21	22
Ex interface	x	x	x	x	x	x
Installation in		x	x		x	x

WebCode 9413A

Selection Table

Version	Field enclosure	Power supply	Fieldbus	Order number
Digital I/O coupler without enclosure	without	external	Ex e or Ex i, Ex nL *)	**9413/21-210-84-FF**
Note	*) acc. to FISCO specification IEC 60079-27			

Explosion Protection

Global (IECEx)

Gas and dust	IECEx PTB 13.0038 Ex e mb [ia IIC Ga] IIC T4 Gb Ex tb [ia IIIC Da] IIIC T65 °C Db IP 65

Europe (ATEX)

Gas and dust	PTB 07 ATEX 2029 Ⓔx II 2 (1) G Ex e mb [ia IIC Ga] IIC T4 Gb Ⓔx II 2 (1) D Ex tb [ia IIIC Da] IIIC T65 °C Db IP 65

Certifications and certificates

Certificates	IECEx, ATEX, Brazil (INMETRO), India (PESO), Canada (FM), Kazachstan (TR), Russia (TR), Serbia (SRPS), USA (FM), Belarus (TR)

Further parameters

Installation	in Zones 1, 2, 21, 22 and the safe area
Further information	see respective certifcate and operating instructions

Safety data

I.S. fieldbus

Specification

	FISCO (IEC 60079-27) Ex ia IIC / IIB	Entity Ex ia IIC	Ex ia IIB
Max. voltage U_i	17,5 V DC	24 V DC	24 V DC
Max. current I_i for IIC / IIB	380 mA	360 mA	380 mA
Max. power P_i for IIC / IIB	5,32 W	1,04 W	2,58 W
internal capacitance C_i	5 nF	5 nF	5 nF
internal inductance L_i	10 µH	10 µH	10 µH

I.S. discrete inputs

Specification	Ex ia IIC / IIB			
Max. voltage U_o	9.56 V			
Max. current I_o	10.9 mA			
Max. power P_o	25.9 mW			
Max. connectable capacitance C_o				
IIC	0,5 mF	0,75 mF	1,2 mF	2,1 mF
IIB	2,7 mF	3,9 mF	6,3 mF	12 mF
Max. connectable inductance L_o				
IIC / IIB	100 mH	10 mH	1 mH	0,1 mH

I.S. discrete output

Specification	Ex ia IIC / IIB			
Max. voltage U_o	27.4 V			
Max. current I_o	100 mA			
Max. power P_o	680 mW			
Max. connectable capacitance C_o				
IIC	50 nF	65 nF	82 nF	
IIB	255 nF	355 nF	672 nF	
Max. connectable inductance L_o				
IIC	0,8 mH	0,5 mH	0,2 mH	
IIB	12 mH	1 mH	0,1 mH	

Isolation voltage U_m	253 V Further information and combinations of values, see certification.

Technical Data

Electrical data

Power supply	
Power supply	external
Nominal voltage U_N	24 V DC
Voltage range	17 ... 32 V
Max. nominal current consumption	(all inputs short circuit; outputs full load; LED module installed)

at 17 V	at 22 V	at 24 V	at 28 V
200 mA	150 mA	140 mA	120 mA

Max. current consumption at under voltage	300 mA at 12 V
Operation indication	LED green "PWR"
Polarity reversal protection	yes
Galvanic separation	
Test voltage under regulations EN 50020	
Inputs, Outputs to Fieldbus	1.5 kV AC
Inputs to Outputs	500 V AC
Inputs, Outputs each other	no
External supply to Inputs, Outputs, Fieldbus	1.5 kV AC
Fieldbus	
Version	I.S. or non-I.S. (Ex e)
Specification	IEC 61158-2
Voltage range	9 ... 32 V
Max. nominal current consumption	12 mA
Max. fault current	17 mA
Operation indication	LED green "PWR"
Communications indication	LED green "TRUNK"
Discrete inputs, Ex i	
Number of channels	8
Input signal	acc. to EN 60947-5-6 (NAMUR)
Current for ON / OFF	≥ 2.1 mA / ≤ 1.2 mA
Max. switching frequency Input 1 and 2	as frequency input (without error detction) 3 ... 20 kHz
No-load voltage	8.7 V
Short-circuit current	7.25 mA
Max. line resistance	20 Ω
Internal resistance	1200Ω
Indication status ON / OFF (optional)	LED yellow "IN" each input
Digital outputs, Ex i	
Number of channels	4
No load voltage	23.5
Internal resistance	≤ 340Ω
Min. starting current (0 ... 50 ms)	30 mA
Min. holding current (> 50 ms)	15 mA
Max. switching frequency	10 Hz
Max. line resistance	20 Ω
Indication status ON / OFF (optional)	LED yellow "OUT" each output
Grounding	
Grounding of coupler	grounding bolt M6
Direct grounding fieldbus shield	terminal "SHIELD" or external grounding bar
Capacitive grounding cable shield 3.3 nF	terminal "SHIELD"

Technical Data

Electrical data

Error detection	
Failure cyclic bus communication	LED red "BUS"
Discrete input	
Open-circuit	I < 0.05 ... 0.35 mA
Short-circuit	R < 100 Ω ... 360 Ω
Display (optional)	LED red "ERR"
Monitoring, can be switched off	yes (Transducer Block parameter)
Discrete output	
Open-circuit	R > 26 k Ω
Short-circuit	R < 90 k Ω
Display (optional)	LED red "ERR"
Monitoring / test current, can be switched off	yes (Transducer Block parameter)
Electromagnetic compatibility	Tested under the following standards and regulations: EN 61326 (IEC/EN 61000-4-1...--6 and 11; EN 55022 Class B) NAMUR NE21 (IEC/EN 61000-4-1...--6 and 11; EN 55022 Class B)
MTBF (according to SN 29500)	approx. 20 years (at 40 °C)

Ambient conditions

Ambient temperature	without enclosure: -20 ... +65 °C Observe the "Cabinet installation guide"
Storage temperature	-20 ... +65 °C
Maximum relative humidity	≤ 95% (no condensation)
Sinusoidal vibration (IEC EN 60068-2-6)	2 g (9 ... 200 Hz) 4 g (2 ... 200 Hz)
Semi-sinusoidal shock (IEC EN 60068-2-27)	15 g (11 ms) 25 g (6 ms)

Mechanical data

Weight	approx. 1.5 kg
Degree of protection without enclosure	IP30 / IP20
Enclosure material	PA6
Fire resistance (UL-94)	HB
Software	
Test version	ITK 5.1
Functions	
FF stack	Softing
Function blocks for FF	DO, DI, MDO, MDI, AI, CI, MDO, MDI, LTB

Mounting / Installation

Installation conditions	
Mounting type	on DIN rail acc. to EN 50022 (NS35/15; NS35/7.5) (optional accessories) or mounting plate
Mounting orientation	Horizontal or vertical
Field Device Coupler in a standard enclosure	
Version	

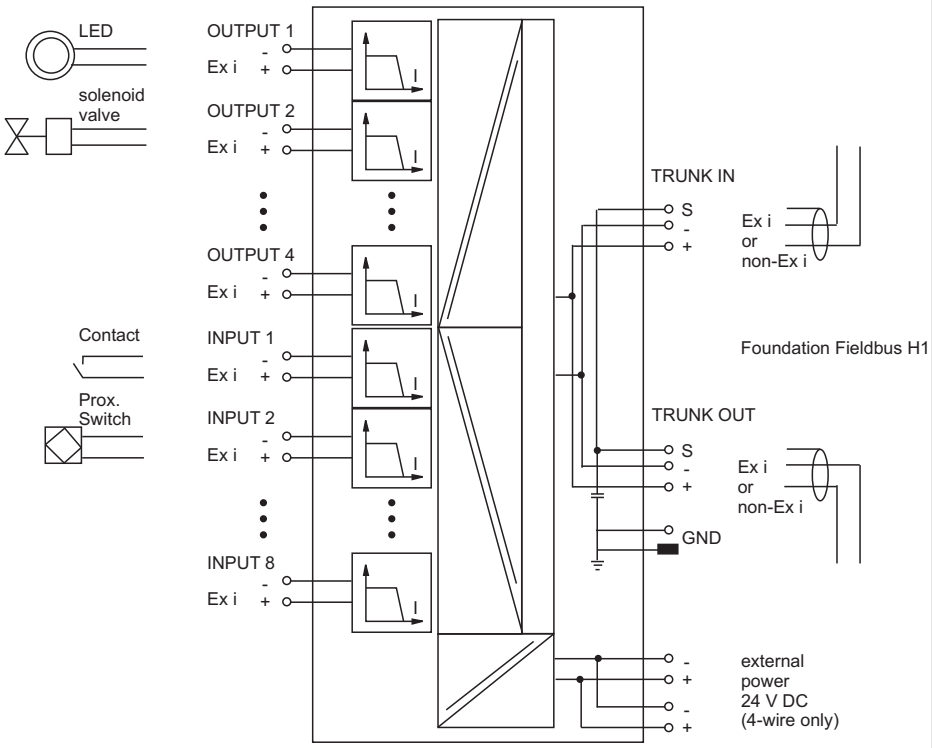
Material	Enclosure series	Field device coupler
polyester	8146/.S71	9413/21-221-84
stainless steel	8125/.073	9413/21-222-84

Degree of protection	IP66
Connectors	
Screw terminal	flexible or rigid wire: 0.2 ... 2.5 mm^2 flexible with end covering sleeves: 0.25 ... 1.5 mm^2

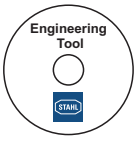
Technical Data

Mounting / Installation

Connection diagram



Accessories and Spare Parts

Designation	Figure	Description	Art. no.	Weight kg
Top rail mounting set	 06988E00	for installation onto DIN rails NS35/15 for Digital I/O Coupler, Series 9413	**168202**	0.430
Terminator	 06501E00	Fieldbus Terminator "Ex m"	**168062**	0.080
		Fieldbus Terminator "Ex i"	**168063**	0.080
Fieldbus Wizard Engineering Tool	 07376E00	Engineering tool for design of fieldbus foundation or Profibus PA fieldbus segments Download under www.fieldbus-solutions.info		
Fieldbus Power Supply	 12783E00	fieldbus power supply and diagnostics	**200586**	0.135
	 12809E00	fieldbus power supply, diagnostics and adjustable warning level	**200588**	0.135

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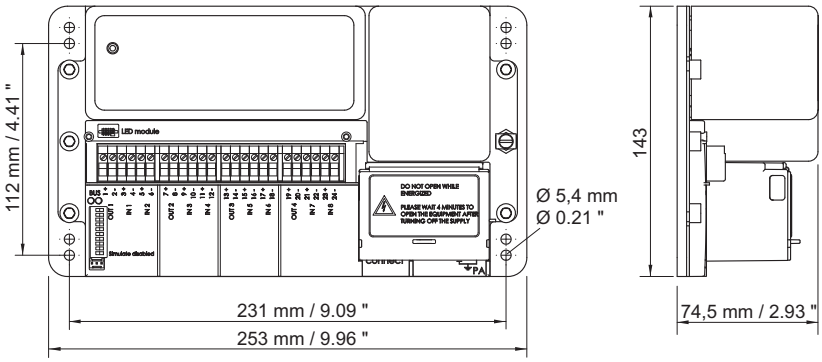
Dimensional Drawings(All Dimensions in mm / inches) - Subject to Alterations



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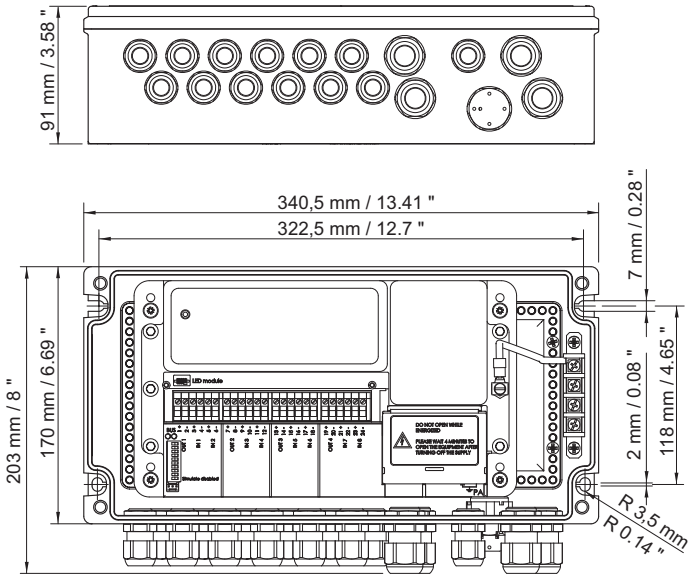
9413/21-210-84-FF
without enclosure



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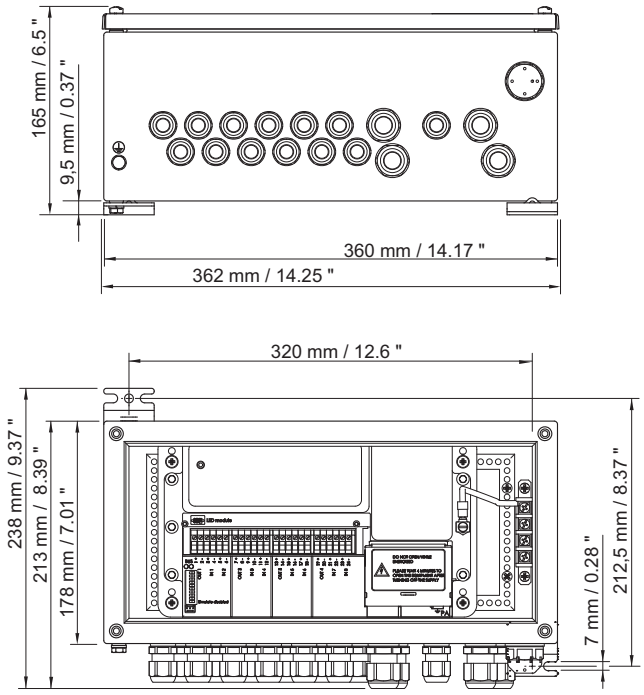
9413/21-211-84-FF
Enclosure 8146/.S71 incl. digital I/O coupler

Dimensional Drawings(All Dimensions in mm / inches) - Subject to Alterations



05995E00

9413/21-212-84-FF
Enclosure 8125/.073 incl. digital I/O coupler

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.