Remote I/O

Remote I/O IS1+ Temperature input module for Zone 2 Ex i

9482/33-08-10 Art. No. 217644

- Eight channels for resistance temperature detectors, potentiometers, thermocouples, mV sensors and joysticks
- Intrinsically safe Ex ia inputs with line fault monitoring
- Module in Zone 2, Cl. I, II, Div. 2 can be hot swapped

MY R. STAHL **9482B**

The 9482 series temperature input module for Zone 2, Cl. I, II, Div. 2 has eight channels for the Ex i operation of resistance temperature detectors with two-, three- or four-conductor connection and thermocouples. Sensors that comply with DIN, IEC and GOST are supported as well as resistance transmitters up to 10 kΩ and also joysticks for rapid four-channel operation. Earthed thermocouples can be connected. Cold junction compensation can be performed internally or externally.

Technical Data

Explosion Protection	
Application range (zones)	2
Application range (Zone) note	A suitable enclosure in accordance with the area of application must be used. Refer to the operating instructions.
Ex interface zone	0, 1, 2, 20, 21, 22
IECEx gas certificate	IECEx DEK 13.0046X
IECEx gas explosion protection	Ex ec ia [ia Ga] IIC T4 Gb
IECEx dust certificate	IECEx DEK 13.0046X
IECEx dust explosion protection	[Ex ia Da] IIIC
ATEX gas certificate	DEKRA 13 ATEX 0140 X
ATEX gas explosion protection	Ⓔx II 3 (1) G Ex ec ia [ia Ga] IIC T4 Gb
ATEX dust certificate	DEKRA 13 ATEX 0140 X
ATEX dust explosion protection	Ⓔx II (1) D [Ex ia Da] IIIC
FMus certificate	FM17US0332X
cFM certificate	FM16CA0134X
Marking cFMus	NI, Class I, Div. 2, Groups A,B,C,D; Class I, Zone 2, AEx/Ex nA ia [ia] IIC AIS Class I,II,III, Div. 1, Groups A,B,C,D,E,F,G; T4 at Ta = 75°C See Doc. 9482 6 031 002 1
Certificates	ATEX (DEK), Brazil (ULB), Canada (FM), China (NEPSI), IECEx (DEK), India (PESO), Korea (KTL), USA (FM)
Ship approval	ABS, BVIS, EU RO MR (DNV), KR, LR
Declaration of conformity	ATEX (EUK), China (CCC)
Installation	Zones 2, Cl I, Div. 2 and in the safe area
Further information	see operating instructions and certificate
Safety Data	
Internal capacitance	Negligible

Safety Data

Internal inductance	Negligible
Notes	For proof of intrinsic safety, the safety data must be used in accordance with the combination of connections and the corresponding sensor. For further information and combination, see operating instructions.

Combination of connections 1

Sensors	Up to 8 resistance temperature detectors or resistance transmitters
Note	No thermocouple/mV sensor connected
Installation type	Insulated
Max. output voltage U_o ext	6.42 V

Max. current I_o	2-conductor	3-conductor	4-conductor
	6.5 mA	7.8 mA	9.8 mA

Max. power P_o	2-conductor	3-conductor	4-conductor
	10.5 mW	12.5 mW	15.7 mW

Max. connectable inductance L_o/capacitance C_o

IIC	L_o [mH]	100	50	20	2	0.2	0.02	0.002
	C_o [µF]	1.1	1.2	1.4	2.0	3.2	7.0	25
IIB/IIIC	L_o [mH]	100	50	20	2	0.2	0.02	0.002
	C_o [µF]	5	6.3	7.1	10	19	51	570

Combination of connections 2

Sensors	Up to 8 thermocouples or mV sensors
Note	Can be connected simultaneously to resistance temperature detectors and resistance transmitters an external reference junction
Installation type	Earthed
Reference junction	Internal/external
Thermocouple/mV sensor	
Max. output voltage U_o ext	12.92 V
Max. current I_o	25.0 mA
Max. power P_o	81.0 mW

Max. connectable inductance L_o/capacitance C_o

IIC	L_o [mH]	72	50	10	2	1	0.5	0.2
	C_o [µF]	0.17	0.22	0.34	0.46	0.53	0.62	0.78
IIB/IIIC	L_o [mH]	100	20	5	1	0.5	0.2	0.1
	C_o [µF]	1.2	1.6	2.1	3.0	3.5	4.5	5.7

Resistance sensor	See values, combination of connections 3
External reference junctions	See values, combination of connections 4

Combination of connections 3

Sensors	Up to 8 resistance temperature detectors/resistance transmitters and/or thermocouples/mV sensors
Note	Any combination of sensor types is possible when simultaneously connected
Installation type	Resistance temperature detector and resistance transmitter insulated/ thermocouple and mV sensor earthed
Resistance sensor reference junction	Internal/external
Max. output voltage U_o ext	12.92 V

Max. current I_o		2-conductor		3-conductor		4-conductor		
		13.1 mA		15.7 mA		19.6 mA		
Max. power P_o		2-conductor		3-conductor		4-conductor		
		42.2 mW		50.6 mW		63.3 mW		
Max. connectable inductance L_o/capacitance C_o								
IIC	L_o [mH]	100	50	20	5	1	0.5	0.2
	C_o [µF]	0.19	0.25	0.31	0.40	0.54	0.63	0.78
IIB/IIIC	L_o [mH]	100	20	10	2	1	0.5	0.1
	C_o [µF]	1.3	1.7	1.9	2.5	3.0	3.5	5.7
Thermocouple/mV sensor		See values, combination of connections 2						
External reference junctions		See values, combination of connections 4						
Combination of connections 4								
Sensors		External reference junction						
Note		When connected to thermocouples/mV sensors, also simultaneously connectable to resistance temperature detectors/resistance transmitters						
Installation type		Insulated						
Reference junction		External (3-conductor)						
External reference junction								
Max. output voltage U_o ext		12.92 V						
Max. current I_o		17.4 mA						
Max. power P_o		56.2 mW						
Max. connectable inductance L_o/capacitance C_o								
IIC	L_o [mH]	66	50	20	5	1	0.5	0.2
	C_o [µF]	0.17	0.21	0.29	0.39	0.53	0.62	0.78
IIB/IIIC	L_o [mH]	100	20	5	1	0.5	0.2	0.1
	C_o [µF]	1.2	1.6	2.1	2.9	3.5	4.5	5.7
Resistance sensor		See values, combination of connections 3						
Thermocouple/mV sensor		See values, combination of connections 2						

Electrical Data

Number of channels	(depends on operating mode) 8 or 4 Ex i inputs
Operating mode	4-channel fast (joystick) 8 channel accurate
Connection Ex i field signals	Pluggable, blue terminals, 16-pole, 2.5 mm², screw- or spring-type versions with lock

Auxiliary Power

Power supply connection	BusRail types 9494
Auxiliary power version	Intrinsically safe Ex ia via BusRail
Current consumption	42 mA
Max. power consumption	1 W
Max. power dissipation inputs	1 W

Galvanic Isolation

Test voltage for galvanic separation	Acc. to standard EN 60079-11

Galvanic Isolation	
Auxiliary power/system components	≥ 1500 V AC
I/O module / I/O module	≥ 500 V AC
I/O channels/system components	≥ 500 V AC
I/O channels / ground (PA)	≥ 500 V AC
Input	
Sensor type 1	Resistance transmitter Resistance temperature detector
Resistance range	0 – 10 kΩ
Measuring current	< 200 µA multiplexed
Accuracy of measurement	± 1% (4-channel fast) 0.025% (8-channel accurate)
Linearity 1 (adjustable parameters)	Resistance-linear Temperature-linear
Sensor type 2	Thermocouples mV transmitter
Connection type 2	2-wire circuits
Signal range of inputs	-10 ... +100 mV
Linearity 2 (adjustable parameters)	Voltage-linear Temperature-linear
Max. permissible total line resistance per conductor	100 ohm per core
Input resistance	Max. 10 mΩ per channel
Compensation of reference junctions	Internal (adjustable parameters) External 3-wire circuit
Min. input measuring range	-40 °C
Max. input measuring range	+80 °C
Resolution	0.1 K
Notes	For a breakdown of the sensors see page see table "Ex i inputs"
Accuracy of measurement at reference junctions	Internal: 0.025% External: depends on the sensor type, see connectable resistance temperature detectors
Temperature deviation	±2 K for thermocouples with internal compensation

Connectable resistance temperature detectors/ resistance transmitters

Type	Reference	Measuring range (ITS-90)	Average measurement discrimination
Pt100	IEC 60751	-200 to +850 °C	0.1 K
Pt500	IEC 60751	-200 to +850 °C	0.1 K
Pt1000	IEC 60751	-200 to +850 °C	0.1 K
Ni100	DIN 43760	-60 to +180 °C	0.1 K
Ni500	DIN 43760	-60 to +180 °C	0.1 K
Ni1000	DIN 43760	-60 to +180 °C	0.1 K
Pt46	GOST 6651-94	-200 to +1100 °C	0.15 K
Pt50	GOST 6651-94	-200 to +1100 °C	0.15 K
Pt100	GOST 6651-94	-200 to +1100 °C	0.1 K
Cu53	GOST 6651-94	-50 to +180 °C	0.1 K
M50	GOST 6651-94	-200 to +200 °C	0.15 K
M100	GOST 6651-94	-200 to +200 °C	0.1 K
Resistance trans-mitter (3-conductor)	--	0 to 500 Ω	0.02 Ω
Resistance trans-mitter (3-conductor)	--	0 to 2.5 kΩ	0.10 Ω
(3-conductor)	--	0 to 5 kΩ	0.20 Ω
Resistance trans-mitter (3-conductor)	--	0 to 10 kΩ	0.4 Ω
Resistance trans-mitter (3-conductor)	--	-200 to +850 °C	0.1 K
	--	500 to 10 kΩ	
Resistance trans-mitter (3-conductor)			
Joystick (4-conductor)			

Reaction time

Type	Type of connection	Operating mode 4 channel rapid Error monitoring		Operating mode 8 channel precise Error monitoring	
		Activated	Deactivated	Activat-ed	Deactivat-ed
RTD	2-conductor	400 ms	400 ms	750 ms	720 ms
RTD	3-conductor	400 ms	400 ms	750 ms	
RTD	4-conductor	400 ms	400 ms	750 ms	
R	2-conductor	400 ms	400 ms	750 ms	720 ms
R	in R	90 ms	70 ms	750 ms	
R	3-conductor	400 ms	400 ms	750 ms	
R	in %	90 ms	70 ms	750 ms	
	4-conductor in R				
	4-conductor in %				

To achieve the times with "error control deactivated", the error control must be "OFF" for all channels. As soon as the error control is "ON" for just one channel, the times for "error control activated" apply.

Connectable thermocouples/mV sensors

Type	Reference	Measuring range (ITS-90)	Average measurement discrimination	Average error of measurement based on measuring range
B	IEC 60584-1	-400 to +1800 °C	0.25 K	0.1%
E	IEC 60584-1	-200 to +1000 °C	0.1 K	0.013%
J	IEC 60584-1	-200 to +1200 °C	0.1 K	0.014%
K	IEC 60584-1	-200 to +1370 °C	0.1 K	0.02%
N	IEC 60584-1	-200 to +1300 °C	0.1 K	0.02%
R	IEC 60584-1	-50 to +1767 °C	0.2 K	0.05%
S	IEC 60584-1	-50 to +1767 °C	0.2 K	0.053%
T	IEC 60584-1	-200 to +400 °C	0.1 K	0.042%
L	DIN 43710	-200 to +900 °C	0.1 K	0.027%
U	DIN 43710	-200 to +600 °C	0.1 K	0.038%
XK	GOST 8.585	-50 to +800 °C	0.1 K	0.02%
mV	--	0 to +100 mV	3.6 µV	0.01%

Reaction time

Type of connection	Operating mode 4 channel rapid Error monitoring		Operating mode 8 channel precise Error monitoring	
	Activated	Deactivated	Activated	Deactivated
Thermocouple	2-conductor	500 ms	450 ms	800 ms	750 ms
0 to 100 mV	2-conductor	500 ms	450 ms	800 ms	

To achieve the times with "error control deactivated", the error control must be "OFF" for all channels. As soon as the error control is "ON" for just one channel, the times for "error control activated" apply.

Device Specific Data

Diagnostics message module	OFF ON
Selection reference junction	Internal/external 3-conductor
External reference junction type	PT1000 PT100 GOST PT100
Sensor type	see table (connectable sensors)
Type of connection	2-, 3- and 4-wire circuit
Line fault monitoring	OFF ON
Input behaviour in case of error	hold last value
LED module requires maintenance	"M/S" LED, blue
LED operating conditions	"RUN" LED, green
Retrievable parameters	Type Software revision Serial number Manufacturer Hardware revision

Device Specific Data	
Module status and alarms	Internal bus error primer / redundant No response from IOM Configuration does not correspond to the module Hardware error Excess temperature Slot error Module requires maintenance
Signal status bit	1 = Signal valid 0 = Signal interrupted
Wire breakage input	Thermocouples > 1000 ohm Resistance transmitter > 100 Ω Resistance thermometer > 100 ohm mV transmitter > 1000 ohm
Short circuit input	Res.temp. detector < 15 ohm Resistance transmitter < 15 ohm
Measuring range	Shortfall Overshoot
Influence of ambient temperature	0,025 % / 10 K
Diagnostics	
LED group error	"ERR" LED, red
Ambient Conditions	
Ambient temperature °C	-40°C ... +75°C
Ambient temperature °F	-40°F ... +167°F
Storage temperature °C	-40°C ... +80°C
Storage temperature °F	-40°F ... +176°F
Max. operating altitude	< 2000 m
Max. relative humidity	95% (without condensation)
Shock (semi-sinusoidal)	(IEC EN 60068-2-27) 15 g (3 shocks per axis and direction)
Vibration (sinusoidal)	(IEC EN 60068-2-6) Frequency range 2 … 13.2 Hz Amplitude 1 mm (peak value) Frequency range 13.2 … 100 Hz Acceleration amplitude 0.7 g
Electromagnetic compatibility	Tested to the following standards and regulations: EN 61326-1 (2006) IEC 61000-4-1 to 61000-4-6, NAMUR NE 21
	0.1 % (8 channel precise) under strong electromagnetic influence
Note	(observe operating instructions)
Mechanical Data	
Degree of protection (IP) (IEC 60529)	IP20
Module enclosure	Polyamide 6GF
Fire resistance (UL 94)	V2
Pollutant class	Corresponds to G3
Width	96.5 mm
Width, inches	3.8 in
Height	67 mm
Length	128 mm
Length in inches	5.04 in
Mounting depth in inches	2.64 in
Weight	275 g

Remote I/O

Remote I/O IS1+ Temperature input module
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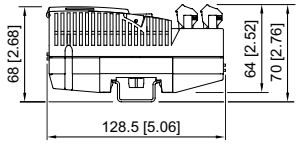
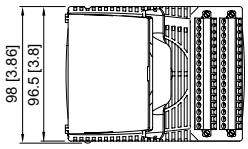
Mechanical Data	
Weight	0.61 lb
Mounting / Installation	
Mounting orientation	Vertical Horizontal
Connection type 1	2-, 3- and 4-wire circuit

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





Accessories

External reference junction		Art. No.
	External reference junction for 2 x thermocouple (1 x Pt100 for 2-, 3- or 4-wire connection) integrated into the 4-pin terminal block. Mounted on a DIN rail.	160675

Pluggable terminal		Art. No.
	2.5 mm² with lock, 16-pin, screw connector, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Labelling: 1 to 16 Note: A second terminal is additionally required for I/O module Series 9470 and 9482 Labelling: 17 to 32	162702
	2.5 mm² with lock, 16-pin, screw connector, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits Labelling: 17 to 32	162718
	2.5 mm² with lock, 16-pin, spring clamp connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits, incl. test jacks Labelling: 1 to 16 Note: A second terminal is additionally required for I/O module Series 9470 and 9482 Labelling: 17 to 32	162695
	2.5 mm² with lock, 16-pin, spring clamp connection, blue, for connecting the field signals to I/O modules, for intrinsically safe field circuits, incl. test jacks Labelling: 17 to 32	162716

Remote I/O

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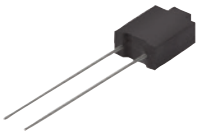
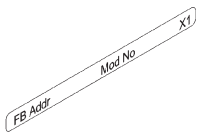
Partition		Art. No.
	For mounting between intrinsically safe and non-intrinsically safe connections between I/O modules to maintain a tight string length of 50 mm	220101

Resistor error message suppression		Art. No.
	The resistors are used to suppress error messages for unused I/O channels Resistance value: 62R/0.5 W Suitable for: AOM 9468; UMH 9469; DIOM 9472; TIM 9482	244912

Warning label		Art. No.
	"Clean modules only with a damp cloth."	162796

DIN A4 sheet		Art. No.
	For label plate on I/O modules; 6 plates per sheet; IS Wizard printout; packaging unit = 20 sheets	162832

Labelling strips		Art. No.
	"FB Addr … Mod No …" for pluggable terminal, 26 pieces on the sheet	162788

Vibration bracket set		Art. No.
	When installed in environments with extreme vibration (> 0.7 g and max. 4 g), the 9490 vibration brackets may be used as an additional measure and provide mechanical stability for the individual modules. For mounting: All I/O modules, except 9477/12 and 9478 Number of brackets in a set: 8 Screws (item no. 275516) must be ordered separately.	271920

Set of screws		Art. No.
	Set of M5 x 14 screws (self-tapping) for 9490 vibration brackets Number of screws in a set: 25	275516