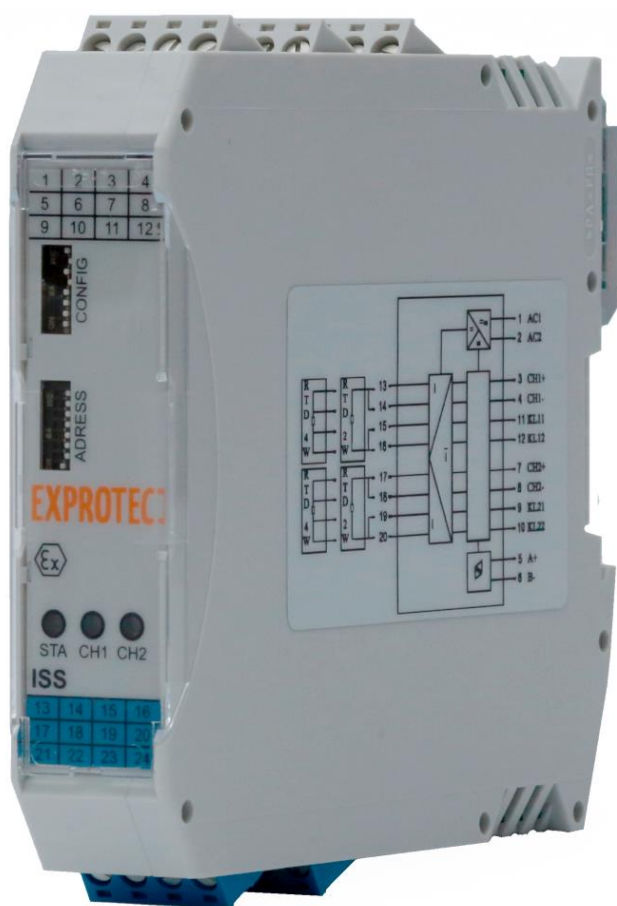


# INTRINSICALLY SAFE SIGNAL SEPARATOR TYPE ISS-2

USER MANUAL NO. BP/10/07/16



# EXPROTEC



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## 1. Introduction

This Operation Manual presents the ISS-2 Intrinsically Safe Signals Separator as an accessory intended for installation in the main chambers of mining equipment in mine undergrounds – in areas at risk of methane and/or coal dust explosion as well as areas at risk of explosion. The unit has measurement channels with the “i<sub>a</sub>” protection level which can be located in potentially explosive atmospheres without the need of switching off in case of methane concentrations exceeding allowable levels.

The ISS-2 Intrinsically Safe Signals Separator has been manufactured in compliance with good engineering practice in terms of safety and meets the requirements of the following standards: PN-EN IEC 60079-0: 2018-09, PN-EN 60079-11:2012.

### 1.1 Copyright

Exprotec Sp. z o.o. reserves all copyrights to the ISS-2 type separator.

### 1.2 Warranty conditions

The warranty conditions are in accordance with the contract "General Terms of Sale and Delivery" specified by the manufacturer.

Claims under warranty and/or liability for property damage or personal injury will not be honoured if arising from one or more of the following:



- the use of the device was incompatible with its intended use;
- improper transport, storage, installation, connection, commissioning, incorrect maintenance, repair, disassembly or recycling;
- the notes in this manual have not been followed;
- unauthorised changes were made to the wiring of the device;
- improper control of wear parts;
- emergency situations have occurred due to contact with foreign objects or other emergency situations.

## 2. Type designation

ISS-2 – Barrier for ptx sensor measurement

## 3. Technical data

**Table 1. Technical parameters**

Design characteristics:		
Explosion protection designation	I (M1) [Ex ia Ma] I II (1)G [Ex ia Ga] IIC II (1)D [Ex ia Da] IIIC	
EU type examination certificate	TEXT 16 ATEX 0037U	—
Enclosure protection rating	IP20	—
Explosion protection type when installed in hazardous area for I M2 and II 2G	Ex d	
Installation location	mounting bracket: TH 35 / TS 35	—
Cross-section of the connected cable	0.25..2.5 (2x1.5)	mm <sup>2</sup>
Wire stripping length	9	mm
Max. terminal tightening torque	0.3	Nm
ISS-2 relay dimensions (h×w×d)	113.6 x 23 x 99	mm
ISS-2 relay ground	300	g

Electrical parameters:							
Voltage power supply	Permissible supply voltage range					Current consumption	Input power
	nominal	min	max	min	max		
V AC/DC	V	V DC	V DC	V AC	V AC	mA	VA
ISS-1	24-42	19.2	50.4	19.2	50.4	<104	<2

Operating conditions:		
Altitude above sea level	up to 1000	m
Ambient temperature	-20..+70	°C
Relative humidity at 20°C	up to 95	%
Transport temperature	-20..+40	°C
Relative humidity for transport	up to 95	%
Mechanical exposures – frequency	10..500	Hz
Impact resistance	10	g
Vibration resistance (10...500 Hz)	5	g
Operating mode	continuous	—

Table 2. Intrinsically safe and technical parameters

Permissible parameters of circuits on the ISS-2 terminals:													
(13, 14, 15, 16) and ( 17, 18, 19, 20) (measuring circuit) Protection level "ia"										—	U <sub>o</sub> = 4.52	V	
										—	I <sub>o</sub> = 16.2	mA	
										—	P <sub>o</sub> = 18.3	mW	
										—	C <sub>i</sub> = (*)	uF	
										—	L <sub>i</sub> = (*)	mH	
Group I													
L <sub>o</sub> [mH]	100	50	20	10	5	2	1	0.5	0.2	0.1	0.05	0.02	
C <sub>o</sub> [uF]	22	24	27	29	33	39	45	54	71	93	130	250	
Group IIA													
L <sub>o</sub> [mH]	100	50	20	10	5	2	1	0.5	0.2	0.1	0.05	0.02	
C <sub>o</sub> [uF]	16	18	20	23	25	30	36	43	56	73	100	180	
Group IIB and III													
L <sub>o</sub> [mH]	100	50	20	10	5	2	1	0.5	0.2	0.1	0.05	0.02	
C <sub>o</sub> [uF]	11	12	14	16	18	22	26	31	41	53	71	120	
Group IIC													
L <sub>o</sub> [mH]	100	50	20	10	5	2	1	0.5	0.2	0.1	0.05	0.02	
C <sub>o</sub> [uF]	1.8	2.2	2.7	3	3.4	4	4.6	5.4	6.8	8.4	10	15	
~1--2 (power supply)										Um = 250	V		
										Un =24	V AC/DC		
										Un =42	V AC/DC		
(3, 4) and (7, 8) (Analogue output 4-20mA or 2-10V)										Um = 250	V		
										4-20mA or 2-10V			
5, 6 (Modbus transmission)										Um = 250	V		
										According to RS485 standard			
(9, 10) and (11, 12) (Semiconductor output)										Um = 250	V		
										200/150	VDC/VAC		
										80	mA		
Operation of the device													
Description													
Modbus transmission rate										2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200		bps	
Resistance measurement accuracy of the ptx sensor										0.2		%	
Maximum output current of the solid state relay										0.2		%	
Permissible resistance connected to analogue output										For the current output: >400 Ω		For the voltage output: <10k Ω	
Measured resistance range										19Ω<Res<1900Ω			
Compatible temperature sensors										Pt100, Pt200, Pt300, Pt500, Pt1000			

## 4. Identification of hazards caused by the apparatus during its use

### 4.1 Introductory remarks

#### WARNING!

The safe operation of devices requires special training, knowledge and experience. Do not attempt to operate this equipment unless you are qualified to do so. Improper or careless handling can lead to a serious accident or death of the operator and/or other persons.

The device is designed to meet specific technical conditions and customer requirements.

#### WARNING!

Modification of equipment for which authorisation has not been granted or the use of repaired or other replacement parts which do not meet the manufacturer's technical conditions may result in serious risk or loss of guarantees, certifications or approvals.

If modifications of equipment are required, these must be carried out with the written permission of the manufacturer.

### 4.2 Hazards during equipment operation

Before starting up the equipment, make sure that this does not endanger the life and health of other workers.

#### WARNING!

Before starting the unit, make sure that the power cables are undamaged and properly screwed to the screw terminals.

It is forbidden to install makeshift connections. For safe operation, follow all procedures outlined in the safe use manual.

### 4.3 Special conditions for safe use

#### WARNING!

Special conditions for safe use:

- Install the device outside the hazardous area. If placed in a hazardous area, the device should be protected with appropriate explosion protection.
- Ambient temperature range:  $-20^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ .
- Installation shall be carried out with the required separation distances to the external terminals of the device in accordance with section 6.2.1 PN-EN 60079-11.

**WARNING!**

The device can be operated in mining plants, in workings classified as class "a", "b" or "c" methane explosion hazard and class "A" or "B" coal dust explosion hazard, only when installed in a flameproof enclosure of Ex d design.

The device can be operated in explosive gas atmospheres of zone 1, 1 or 2 (G) and operated in a location where dust explosive atmospheres of zone 21 or 22 (D) occur, only when installed in a shield with appropriate explosion protection.

## 5. Construction and principle of operation

### 5.1 Mechanical part

The Intrinsically Safe Signals Separator type ISS-2 (Fig. 1) consists of a printed circuit board and a ME-MAX 22.5 plastic enclosure by Phoenix Contact with IP20 protection.

The wires are connected to the screw terminals located on the sides of the enclosure. The separator is equipped with sockets and plugs without possibility of changing the connection order. To make improper connections impossible, the plugs and terminal blocks have coding inserts. Additionally, colour coding was applied (intrinsically safe circuit has a blue plug-socket, non-intrinsically safe circuit has a grey plug-socket), which facilitates proper connection. The relay enclosure is adapted for mounting on a TH 35 / TS 35 bus bar.

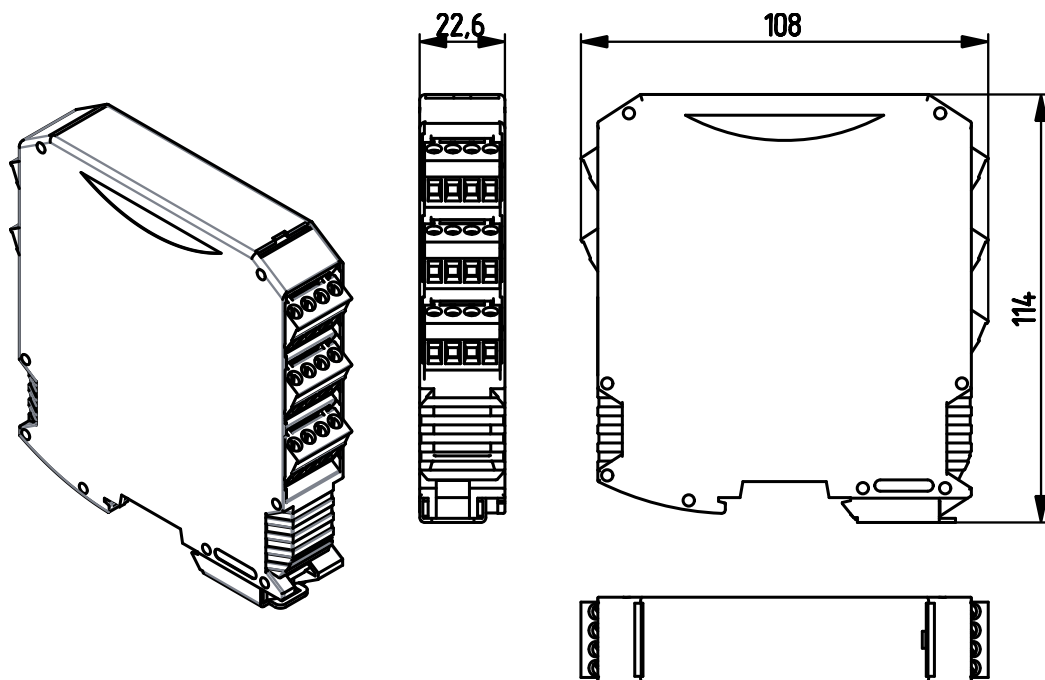


Fig. 1. General view of the ISS-2 relay



Fig. 2. View of the front and description of the ISS-2 relay

## 5.2 ISS-2

### 5.2.1 Electrical part

The presented unit is designed for measuring resistance of the temperature sensor installed in potentially explosive atmospheres.

A view of the front and description of the ISS-2 relay is shown in Fig. 2.

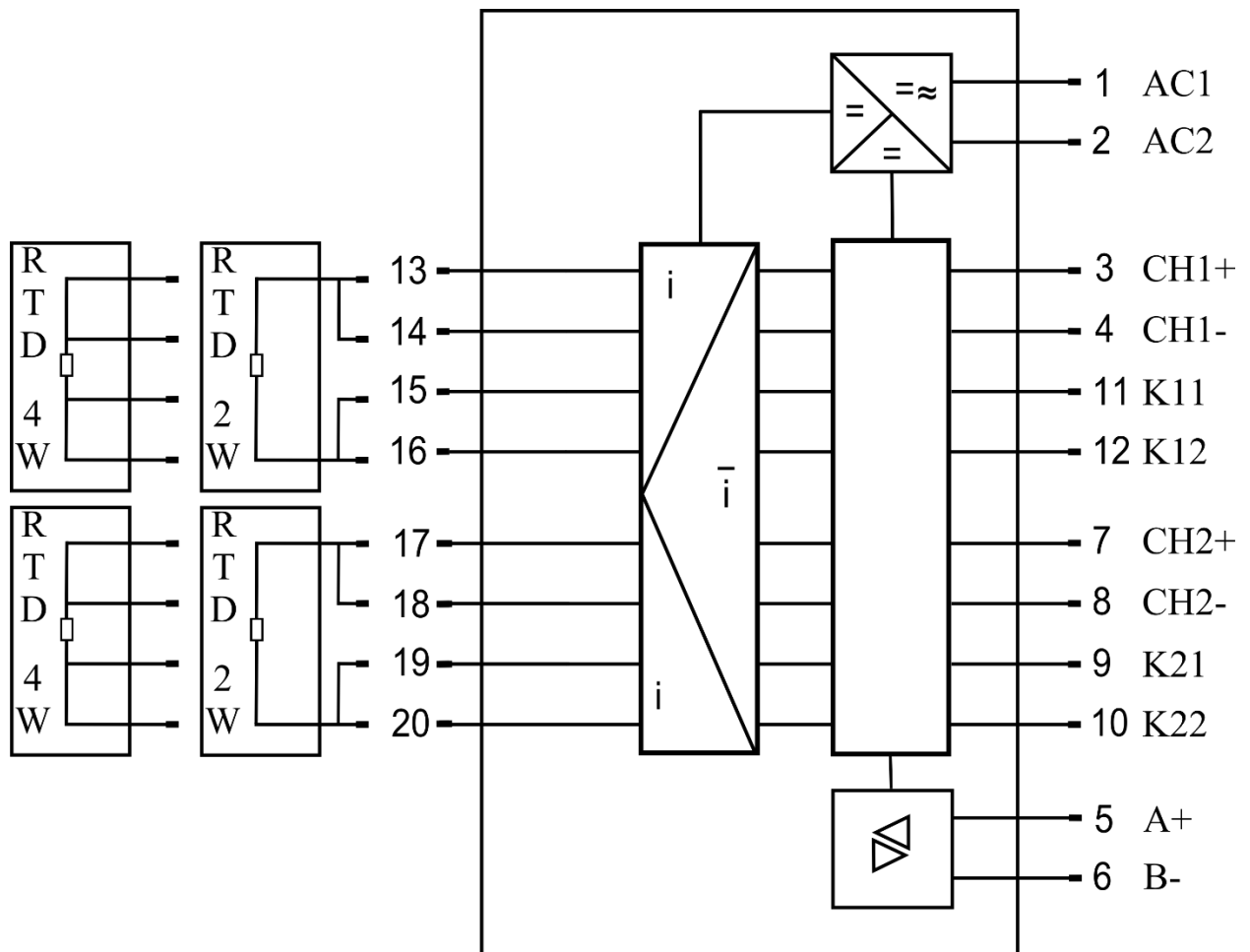
ISS-2 is equipped with two intrinsically safe measurement channels with „i<sub>a</sub>” protection. The intrinsically safe section is separated from the non-intrinsically safe section. The unit is equipped with three LEDs.

ISS-2 separator LED:

- **STA – Signals the operation of the device:**
  - Green colour – device ready for operation
  - Red colour – inoperable device
- **CH1 – Indicates the operating status of the CH1 measurement channel:**
  - Green colour – sensor detected
  - Red colour – damaged or missing sensor
  - Flashing red – faulty channel
- **CH2 – Indicates the operating status of the CH2 measurement channel (see CH1),**

**Table 3. Designation and description of ISS-2 contacts**

Power circuit		
Sym.	Description	Function
~1	(+/-) DC, (-) AC	Power supply circuit, any polarity
~2	(-/+ ) DC, (-) AC	
Transmission		
Sym.	Description	Function
3	CH1+	Analogue output 2-10V or 4-20mA(+)
4	CH1-	Analogue output 2-10V or 4-20mA(-)
5	A+	RS485 differential output
6	B-	RS485 differential output
7	CH2+	Analogue output 2-10V or 4-20mA(+)
8	CH2-	Analogue output 2-10V or 4-20mA(-)
9, 10	K11, K12	Solid state relay output channel 1
11, 12	K21, K22	Solid state relay output channel 2
13	I1+	Positive current output channel 1
14	U1+	Positive voltage input channel 1
15	U1-	Negative voltage input channel 1
16	I1-	Negative current output channel 1
17	I2+	Positive current output channel 2
18	U2+	Positive voltage input channel 2
19	U2-	Negative voltage input channel 2
20	I2-	Negative current output channel 2
21, 22, 23, 24	NC	No terminals

**Fig. 3. Electrical diagram of the ISS-2 relay**



## 5.2.2 Settings description

The separator is configured by settings on the DIP Switches or according to data in stored Modbus registers. The unit reads the configuration when it is powered on. The software allows reconfiguration by executing the appropriate command stored in the Modbus register. The CONFIG switch is responsible for configuring the unit and the ADDRESS switch is used to set the address for the Modbus network.

**Table 4. CONFIG switch settings**

Number	Description
8	Selection the separator configuration mode: ON: Settings read from the DIP Switch OFF: Settings read from Modbus registers
7	Modbus baud rate setting (Configuration with the Dip Switch): ON: 9.6 kbps OFF: 19.2 kbps
6	Modbus transmission setting (Configuration with the Dip Switch): ON: No parity OFF: Parity (further configuration in 4th bit)
5	Parity in Modbus transmission (Configuration with the Dip Switch): ON: Even OFF: Odd
4	Configuration of the analogue output for channel 1: ON: 4-20mA OFF: 0-10V
3	Configuration of the analogue output for channel 2: ON: 4-20mA OFF: 0-10V
2	Tripped when sensor in channel 1 is missing or defective ON: The current/voltage value is 10V/20mA OFF: The current/voltage value is 0V/mA
1	Tripped when sensor in channel 2 is missing or defective ON: The current/voltage value is 10V/20mA OFF: The current/voltage value is 0V/mA

**Table 5. ADDRESS switch settings<sup>1</sup>**

Address	Switch	Address	Switch	Address	Switch	Address	Switch	Address	Switch	Address	Switch
N/A	0000 0000	43	0010 1011	86	0101 0110	129	1000 0001	172	1010 1100	215	1101 0111
1	0000 0001	44	0010 1100	87	0101 0111	130	1000 0010	173	1010 1101	216	1101 1000
2	0000 0010	45	0010 1101	88	0101 1000	131	1000 0011	174	1010 1110	217	1101 1001
3	0000 0011	46	0010 1110	89	0101 1001	132	1000 0100	175	1010 1111	218	1101 1010
4	0000 0100	47	0010 1111	90	0101 1010	133	1000 0101	176	1011 0000	219	1101 1011
5	0000 0101	48	0011 0000	91	0101 1011	134	1000 0110	177	1011 0001	220	1101 1100
6	0000 0110	49	0011 0001	92	0101 1100	135	1000 0111	178	1011 0010	221	1101 1101
7	0000 0111	50	0011 0010	93	0101 1101	136	1000 1000	179	1011 0011	222	1101 1110
8	0000 1000	51	0011 0011	94	0101 1110	137	1000 1001	180	1011 0100	223	1101 1111
9	0000 1001	52	0011 0100	95	0101 1111	138	1000 1010	181	1011 0101	224	1110 0000
10	0000 1010	53	0011 0101	96	0110 0000	139	1000 1011	182	1011 0110	225	1110 0001
11	0000 1011	54	0011 0110	97	0110 0001	140	1000 1100	183	1011 0111	226	1110 0010
12	0000 1100	55	0011 0111	98	0110 0010	141	1000 1101	184	1011 1000	227	1110 0011
13	0000 1101	56	0011 1000	99	0110 0011	142	1000 1110	185	1011 1001	228	1110 0100
14	0000 1110	57	0011 1001	100	0110 0100	143	1000 1111	186	1011 1010	229	1110 0101
15	0000 1111	58	0011 1010	101	0110 0101	144	1001 0000	187	1011 1011	230	1110 0110
16	0001 0000	59	0011 1011	102	0110 0110	145	1001 0001	188	1011 1100	231	1110 0111
17	0001 0001	60	0011 1100	103	0110 0111	146	1001 0010	189	1011 1101	232	1110 1000
18	0001 0010	61	0011 1101	104	0110 1000	147	1001 0011	190	1011 1110	233	1110 1001
19	0001 0011	62	0011 1110	105	0110 1001	148	1001 0100	191	1011 1111	234	1110 1010
20	0001 0100	63	0011 1111	106	0110 1010	149	1001 0101	192	1100 0000	235	1110 1011
21	0001 0101	64	0100 0000	107	0110 1011	150	1001 0110	193	1100 0001	236	1110 1100
22	0001 0110	65	0100 0001	108	0110 1100	151	1001 0111	194	1100 0010	237	1110 1101
23	0001 0111	66	0100 0010	109	0110 1101	152	1001 1000	195	1100 0011	238	1110 1110
24	0001 1000	67	0100 0011	110	0110 1110	153	1001 1001	196	1100 0100	239	1110 1111
25	0001 1001	68	0100 0100	111	0110 1111	154	1001 1010	197	1100 0101	240	1111 0000
26	0001 1010	69	0100 0101	112	0111 0000	155	1001 1011	198	1100 0110	241	1111 0001
27	0001 1011	70	0100 0110	113	0111 0001	156	1001 1100	199	1100 0111	242	1111 0010
28	0001 1100	71	0100 0111	114	0111 0010	157	1001 1101	200	1100 1000	243	1111 0011

<sup>1</sup> (ON means "1", 1 on the switch is LSB)

Address	Switch	Address	Switch	Address	Switch	Address	Switch	Address	Switch	Address	Switch
29	0001 1101	72	0100 1000	115	0111 0011	158	1001 1110	201	1100 1001	244	1111 0100
30	0001 1110	73	0100 1001	116	0111 0100	159	1001 1111	202	1100 1010	245	1111 0101
31	0001 1111	74	0100 1010	117	0111 0101	160	1010 0000	203	1100 1011	246	1111 0110
32	0010 0000	75	0100 1011	118	0111 0110	161	1010 0001	204	1100 1100	247	1111 0111
33	0010 0001	76	0100 1100	119	0111 0111	162	1010 0010	205	1100 1101	248	1111 1000
34	0010 0010	77	0100 1101	120	0111 1000	163	1010 0011	206	1100 1110	249	1111 1001
35	0010 0011	78	0100 1110	121	0111 1001	164	1010 0100	207	1100 1111	250	1111 1010
36	0010 0100	79	0100 1111	122	0111 1010	165	1010 0101	208	1101 0000	251	1111 1011
37	0010 0101	80	0101 0000	123	0111 1011	166	1010 0110	209	1101 0001	252	1111 1100
38	0010 0110	81	0101 0001	124	0111 1100	167	1010 0111	210	1101 0010	253	1111 1101
39	0010 0111	82	0101 0010	125	0111 1101	168	1010 1000	211	1101 0011	254	1111 1110
40	0010 1000	83	0101 0011	126	0111 1110	169	1010 1001	212	1101 0100	255	1111 1111
41	0010 1001	84	0101 0100	127	0111 1111	170	1010 1010	213	1101 0101		
42	0010 1010	85	0101 0101	128	1000 0000	171	1010 1011	214	1101 0110		

### 5.2.3 Analogue output

The separator is equipped with two analogue channels, assigned to the corresponding measurement channel. The analogue can work as a current output (4-20mA or 0-20mA) or voltage output (2-10V or 0-10V). Output parameters are set by modbus registers.

### 5.2.4 Solid state relay

The separator is equipped with two solid state outputs. The logical state of the output can be negated. The relay performs the following functions:

- Lower than the set value from the register
- Greater than the set value from the register
- Between the set values from the register
- Outside of the set values from the register

The parameters of the solid state relay are set via modbus registers.

### 5.2.5 Modbus

The Separator has a possibility of remote access to the measurement and configuration data via the Modbus protocol in the RTU mode, using a physical RS-485 interface. For technical questions related to the protocol and not covered in this manual, please refer to the official Modbus protocol documentation available on the website of the organisation that maintains the protocol: <http://www.modbus.org>.

#### 5.2.5.1 Supported commands

- Read Holdings Registers (0x03)
- Write Single Register (0x06)
- Write Multiple Registers (0x0A)

#### 5.2.5.2 Modbus registers

**Table 6. Modbus holdings registers**

Ad- dress	Data type	Access type	Contents
1	sint 16	o	Temperature value channel 1 [°C*10]
2	-	o	Reserved
3	-	o	Reserved
4	sint 16	o	Temperature value channel 2 [°C*10]
5	-	o	Reserved
6	-	o	Reserved

Ad- dress	Data type	Access type	Contents
7	uint 16	o	Main word indicating the status of the unit. Bit designations: 0: Incorrect data stored in memory 1: Configuration via Modbus registers 2: Failure of the sensor connected to channel 1 3: Failure of the sensor connected to channel 2 4: Damage to the measurement part of channel 1 5: Damage to the measurement part of channel 2 6: Emergency shutdown tripped channel 1 7: Emergency shutdown tripped channel 2 Other reserved bits
8	sint 16	o/z	Upper range value of measured temperature channel 1 [°C]
9	sint 16	o/z	Lower range value of measured temperature channel 1 [°C]
10	sint 16	o/z	Upper emergency shutdown tripping value channel 1 [°C]
11	sint 16	o/z	Lower emergency shutdown tripping value channel 1 [°C]
12	uint 16	o/z	Compensation value for the resistance of the cables connecting the sensor to the unit for channel 1 [mΩ]
13	uint 16	o/z	The four youngest bits [3:0] represent the type of sensor connected to channel 1 of the separator: 0: Automatic      1: Pt100      2: Pt200      3: Pt300 4: Pt500          5:Pt1000 Other values reserved. Automatic mode is available for the range 0-200°C, the unit itself detects whether a pt100 or pt1000 sensor is connected.
14	uint 16	o/z	Bits[1:0] configure the tripping of the emergency output for channel 1 0: temperature value < register 8 value 1: temperature value > register 8 value 2: register 11 value < temperature value < register 10 value 3: register 11 value > temperature value > register 10 value Bit [2] negates the emergency output The next bit [3] trips the emergency shutdown output Other values reserved.
15	uint 16	o/z	The two youngest bits [1:0] represent the analogue output type for channel 1: 0: 4-20mA 1: 0-20mA 2: 0-10V 3: 2-10V Other reserved bits
16	uint 16	o/z	Alarm tripping delay value for channel 1 [ms]
17	uint 16	o/z	Current value when the sensor is missing or damaged in channel 1. [mA*10] (value < 22mA)
18	uint 16	o/z	Voltage value when the sensor is missing or damaged in channel 1. [V*10] (value < 11V)
19	sint 16	o/z	Upper range value of measured temperature channel 2 [°C]
20	sint 16	o/z	Lower range value of measured temperature channel 2 [°C]
21	sint 16	o/z	Upper emergency shutdown tripping value channel 2 [°C]
22	sint 16	o/z	Lower emergency shutdown tripping value channel 2 [°C]
23	uint 16	o/z	Compensation value for the resistance of the cables connecting the sensor to the unit for channel 2 [mΩ]

Ad- dress	Data type	Access type	Contents
24	uint 16	o/z	The four youngest bits [3:0] represent the type of sensor connected to channel 2 of the separator: 0: Automatic      1: Pt100      2: Pt200      3: Pt300 4: Pt500          5:Pt1000 Other values reserved. Automatic mode is available for the range 0-200°C, the unit itself detects whether a pt100 or pt1000 sensor is connected.
25	uint 16	o/z	Bits[1:0] configure the tripping of the emergency output for channel 2 0: temperature value < register 21 value 1: temperature value > register 21 value 2: register 22 value < temperature value < register 21 value 3: register 22 value > temperature value > register 21 value Bit [2] negates the emergency output The next bit [3] trips the emergency shutdown output Other values reserved.
26	uint 16	o/z	The two youngest bits [1:0] represent the analogue output type for channel 2: 0: 4-20mA 1: 0-20mA 2: 0-10V 3:2-10V Other reserved bits
27	uint 16	o/z	Alarm tripping delay value for channel 2 [ms]
28	uint 16	o/z	Current value when the sensor is missing or damaged in channel 2. [mA*10] (value < 22mA)
29	uint 16	o/z	Voltage value when the sensor is missing or damaged in channel 2. [V*10] (value < 11V)
30	uint 16	o/z	Modbus transmission configuration word, the two youngest bits [1:0] represent parity configuration: 0: Odd parity                                 1: No parity 2: Even parity                                 3: Reserved The next bit [2] represents the Modbus transmission stop bit configurations 0: 1 stop bit   1: 2 stop bits
31	uint 16	o/z	The next bits [2:0] represent the Modbus baud rate setting: 0:2400 bps    1:4800 bps    2: 9600 bps    3:14400 bps 4: 19200 bps    5: 38400 bps    6: 57600 bps    7:115200 bps Other values reserved.
32	uint 16	o/z	Register executing typed commands with the value: <ul style="list-style-type: none"> <li>0xAE01: registers [18:6] stored in memory</li> <li>0xAE02: separator reset</li> <li>0xAE03: registers [18:6] stored in memory together with separator reset</li> </ul>
33	uint 16	o	Register in which the unit address in the Modbus network is stored
34	uint 16	o	The setting on SW1 Dip Switch is displayed. A logic state of "1" indicates an "ON" setting on the Dip Switch. Number 1 on the Dip Switch CONFIG is the least significant bit

### 5.2.5.3 Separator configuration via Modbus

Changing the value of Modbus registers does not affect the operation of the separator. The new value of the registers will be stored until a power supply interruption. To store the Modbus register values, enter the command that performs the write operation.

## 6. Marking

Each intrinsically safe device has a rating plate, made of a self-adhesive paper label, attached to the enclosure cover (from the outside) containing the following data: supervising unit number, manufacturer's name, device name, type, Ex symbol in a hexagon, explosion-proof design marking, intrinsically safe parameters, protection degree, factory number / year of manufacture.

## 7. Operation setup

### 7.1 Installation

The device should be mounted inside control cabinets and boxes. The permissible deviation from vertical should not exceed the value given in the technical data. Connect the power and control circuits according to the electrical documentation.

### 7.2 Protection against electric shock

**WARNING!**

**The enclosure does not provide protection for live parts against direct contact**

## 8. Storage and transport conditions

The unit must be stored in closed storage rooms at the temperature and relative humidity specified in the technical data, in an environment free from harmful vapours and corrosive gases. Transport in a horizontal or vertical position, secured against possible displacement.

## 9. Inspection and maintenance rules

During operation, ad hoc and periodic inspections should be carried out in order to ensure trouble-free operation of the device.

- **Ad hoc inspections:**  
Ad hoc inspections should be carried out when the installation location changes and when damaged components or subassemblies need to be replaced.
- **Periodic inspections:**  
Periodic inspections must be carried out at intervals of 6 to 12 months, depending on the operating conditions.

**WARNING!**

**Observe the safety instructions before and during inspections and maintenance. Maintenance and repair work must be carried out by qualified personnel. This work may only be carried out when the supply voltage is switched off and protected against unauthorised switching on.**

## 9.1 Inspections and Maintenance

The enclosure of the device together with plugs and connectors should be checked for mechanical damage. If damage is found, send the device to the manufacturer to eliminate the defect.

Inspect the electrical connections to detect any mechanical damage to the insulation of the wires connected to the terminals. If the insulation is damaged, replace the cable with a new one.

Check that the functionality of the device has not been damaged during operation. If a malfunction is found, send to the manufacturer for repair.

## 10. List of spare parts

The manufacturer does not provide spare parts. Any repairs or overhauls are performed solely by the manufacturer's service department.

## 11. List of standards and regulations

This equipment complies with the following standards and regulations:

**Table 7. Standards and regulations**

Directive/Standard	Description
<b>Directive 2014/34/EU</b>	Equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
<b>PN-EN IEC 60079-0:2018-09</b> (EN IEC 60079-0:2018)	Explosive atmospheres – Part 0: Equipment. General requirements.
<b>PN-EN 60079-11:2012</b> (EN 60079-11:2012)	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i".
<b>PN-EN 50303:2004</b> (EN 50303:2000)	Group 1, category m1 equipment intended to remain functional in atmospheres endangered by firedamp and/or coal dust.

## 12. Disposal

After the end of its service life, the unit must be disposed of in accordance with the applicable environmental regulations.

In case of a lack of knowledge in the matter, local town or municipal office will provide all necessary information.

## 13. Orders and Service

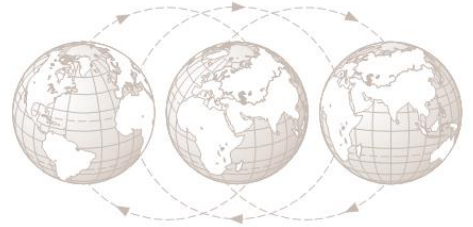
**EXPROTEC Polska Sp. z o.o.**  
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Replacement of enclosure components shall be performed by the manufacturer or a company authorised by the manufacturer.

The manufacturer shall not be responsible for the quality of the equipment in the event of repairs or replacement of components made by the customer themselves.

# EXPROTEC

**EXPROTEC**  
**protects the people**  
**and the environment**  
**by the**  
**safety of**  
**its components,**  
**systems**  
**and equipment**



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