

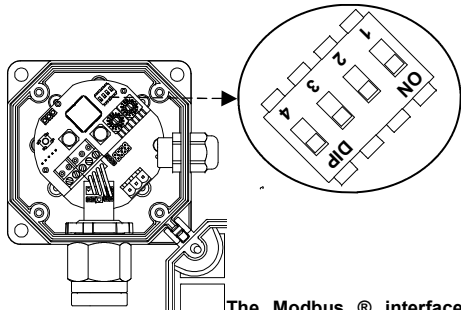
COMMUNICATION

- Interface: RS485.
- Parameters: 19200, 8, N, 1.
- Protocol: Modbus ® RTU (rif.: www.modbus.org)
- CRC is 16bit (2 bytes) long and its value spans from 0x0000 to 0xFFFF.
- The CRC bytes order is defined as 'Little-Endian', i.e. the LO byte is sent first and the HI byte is following.
- The minimum time that must occur between two requests from the Master must be at least 250ms.
- For specific details about the registers at location as well as the implemented functions please read the table in the annex.
- For any further detail about the Modbus ® communication please refer to the official site www.modbus.org.

CONFIGURATION

DIP-SWITCH SETTING

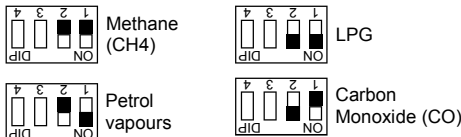
The Modbus ® interface is equipped with a 4-pin dip-switch (shown in Fig. 1), which can be activated using the key provided and must be set according to the features of the transmitter connected to it:



The Modbus ® interface leaves the factory with all the pins in the OFF position.

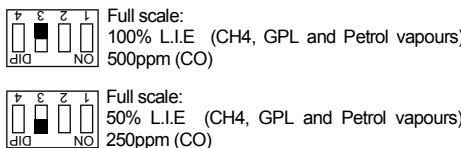
Setting the type of gas

Pins 1 and 2 allow setting the type of gas connected to the installed transmitter:



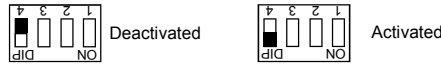
Setting the full scale

Pin 3 allows setting the full scale related to the installed transmitter:



Setting the termination resistor (120 Ohm)

Pin 4 allows activating or deactivation the 120 Ohm termination resistor. This resistor must be activated only if the transmitter is the last element of the Bus. Do not activate more than two termination resistors per system (see Fig. 6 and 7).



SETTING THE ROTARY-SWITCH

The Modbus ® interface is equipped with two rotary-switches (A and B in Fig. 1), which can be activated using a small screwdriver and are used to allocate a number to the transmitter, with which it will be detected by the gas control unit.

Rotary-Switch A:

The unit is set to value ranging between 0 and 9.

Rotary-Switch B:

The tenths are set to value ranging between 0 and 9.

Example:

Rotary-Switch A: 2

Rotary-Switch B: 1

Set number: 12

WARNING

- The same number cannot be allocated to several transmitters connected to the same RS485 network.
- Numbers can be set only from 01 to 32.

WARRANTY

In the view of a constant development of their products, the manufacturer reserves the right for changing technical data and features without prior notice. The consumer is guaranteed against any lack of conformity according to the European Directive 1999/44/EC as well as to the manufacturer's document about the warranty policy. The full text of warranty is available on request from the seller.

AC IMB0 0001 SE

MODBUS ® COMMUNICATION INTERFACE FOR SX SERIES GAS TRANSMITTERS



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- RS485 serial communication with Modbus ® standard
- Detection of fault condition in the transmitter connected to it
- Interface configuration through Dip-Switch setting
- Transmitter address setting through Rotary-Switch.
- Visual LED indicators
- Storage of gas transmitter operating hours.

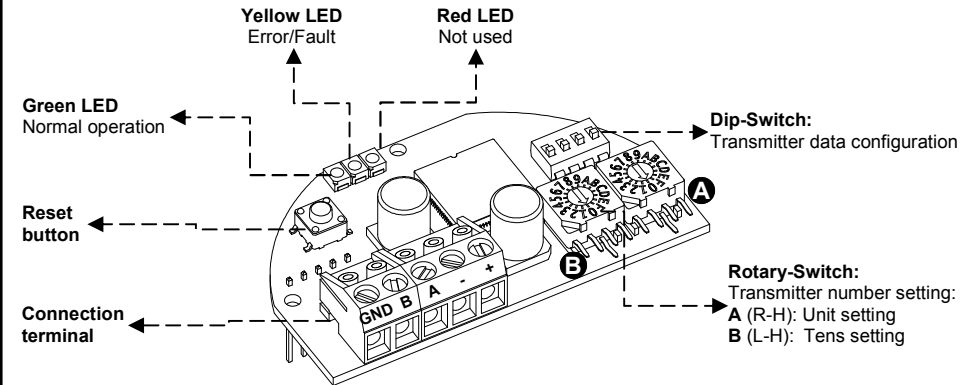


Fig. 1: View of components.

OVERVIEW

The Modbus ® interface is a device equipped with an RS485 serial communication port and specifically designed to be installed on transmitters of the SX series, thereby allowing for the remote connection between the transmitter and the gas detection control unit.

The Modbus ® interface must be configured according to the type of transmitter connected to it and to the position it shall have in the RS485 network (see paragraph 'Dip-Switch Setting').

The Modbus ® interface is equipped with 3 spacers to connect it to the transmitter and a dedicated key for easy dip-switch setting.

TECHNICAL FEATURES

Power supply:	12Vdc
Mean current consumption:	23mA @ 12Vdc
Protection rating:	IP 00
Operating temperature:	0°C .. +40°C
Storage temperature:	-10°C .. +50°C
Humidity limits:	20% .. 80% RH non-condensing

NORMATIVE REFERENCES

The product complies with the following standards (EMC 2004/108/CE and LVD 2006/95/CE):
EMC reference standards: EN 50270-1 (2000)

LED INDICATORS

The Modbus ® interface is equipped with 3 LEDs shown in Fig. 1:

Green LED on:

Indicates normal operation of the Modbus ® interface.

Blinking yellow LED:

Indicates an Modbus ® interface error.

Blinking yellow LED:

Indicates an Modbus ® interface malfunction.

Red LED:

Used for custom indication. This LED can be set directly through the proper Modbus ® command.

RESET

To reset the Modbus ® interface, press the Reset button shown in Fig. 1.

INSTALLATION

To install the Modbus[®] interface on the transmitter, proceed as follows:

1. Ensure that the transmitter is not powered.
2. Loosen the four screws on the transmitter cover and remove it.
3. Insert the three turrets provided into the transmitter, as shown in Fig. 2).

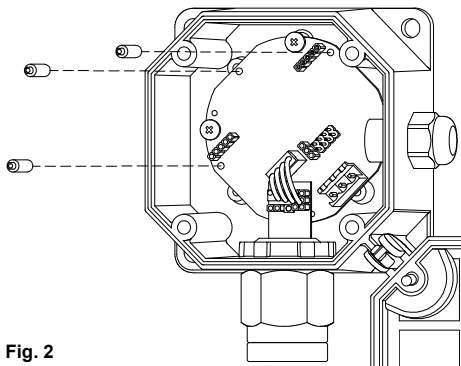


Fig. 2

4. Insert the Modbus[®] interface in the transmitter as shown in Fig. 3, taking care that the three turrets, previously inserted in the transmitter, correspond to the holes on the interface board and that the interface pin strip corresponds to the connector on the basic transmitter board, as shown in Fig. 4.

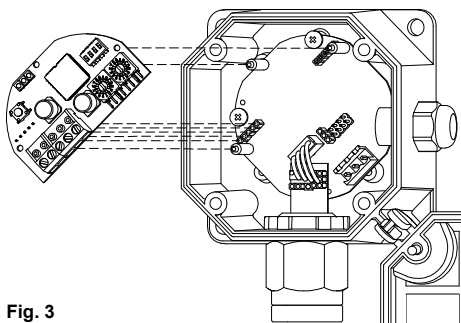


Fig. 3

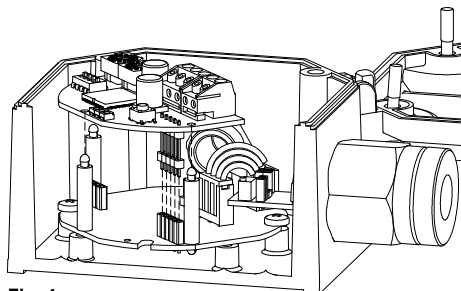


Fig. 4

5. Make all the electrical connections as indicated in paragraph 'Electrical connections'.

6. Configure the Modbus[®] interface as described in paragraph 'CONFIGURATION'.
7. Place the cover back on and screw it in, verifying the tightness of the closure.

ELECTRICAL CONNECTIONS

The electrical connection between the transmitter and the Modbus[®] interface must be made through the terminal block on the Modbus[®] interface board, in compliance with the connection diagram in Fig. 5.

The Modbus[®] interface is powered by a 12Vdc voltage. The RS485 serial output is used to connect the transmitters to the control unit.

Every transmitter is identified by a number set by a pair of rotary switches on the Modbus[®] interface board; the transmitters can have non-consecutive addresses but there cannot be transmitters having the same identification number. For more information, carefully read the gas control unit instruction manual.

For the electrical connections, please refer to the connection diagram shown in Fig. 5.

120 ohm termination resistor.

The elements at the ends of the RS485 network (gas control unit - transmitter) must have an activated 120 Ohm termination resistor.

The termination resistors on the gas control unit are activated by a Jumper and those on the Modbus[®] interface by a dip-switch.

The elements at the ends of the network can be either a control unit and a transmitter or two transmitters, according to how the devices are arranged in the network (see the connection examples in Fig. 6 and Fig. 7).

Do not activate more than two termination resistors per system.

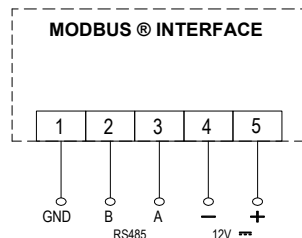


Fig. 5

⚠ WARNING

- Refer to the gas control unit instruction manual to choose the RS485 network connection cables and the supply line.
- The installation and electrical connections of this device must be carried out by qualified technical personnel and in compliance with current technical and safety standards.
- Ensure the system is powered off before making the electrical connections.
- The installer is responsible for setting up a detection system compliant with current regulations, both at a national and European level, and choosing suitable types of loads to connect to the control unit, as well as configuring the system parameters correctly. Contact the retailer for any queries.

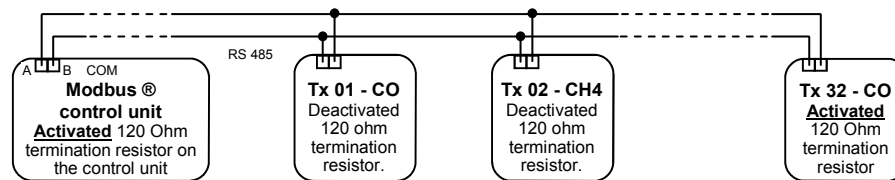


Fig. 7: Termination connection example: Control unit - Transmitter.

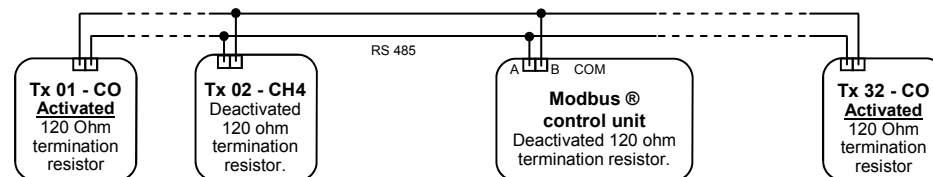


Fig. 7: Termination connection example: Transmitter - Transmitter.

REGISTERS AND ERRORS TABLE

REGISTERS						
Address	Description	Range	Value	Bytes	R/W	Modbus [®] Function
0x0000	Test	Not used	0	2	R	3
0x0001	Firmware	0x0000 .. 0xFFFFE *	MSWord (Big Endian)	2	R	3
0x0002	Version	0x0000 .. 0xFFFFE *	LSWord (Big Endian)	2		
0x0003	Device Name	0x0000 .. 0xFFFFE *	0x49(I) 0x4D(M) (Big Endian)	2	R/W	3, 6
0x0004	(default 'IMB0')	0x0000 .. 0xFFFFE *	0x42(B) 0x30(O) (Big Endian)	2		
0x0005	Communication	Not used	0	2	R	3
0x0006	Address	Not used	0	2	R	3
0x0007	Sensor elaps. life	0 .. 9999 *	Unit = Day	2	R/W	3, 6
0x0008	Gas type **	0x00 .. 0x03	0x00=CH4 0x11=LPG 0x01=CO 0x10=GAS VAP	1	R	3
0x0009	Red LED	0 .. 1 .. 2	0=Off 1=Flashing 2=On steady	1	R/W	3, 6
0x000A	Board failure	0 .. 1	0=Normal Condition 1=Fault Condition	1	R	3
0x000B	Gas level as ADC count	0 .. 4095	0=0.8V =0%LEL =0ppm *** 4095=4.0V =100%LEL =FSppm	2	R	3
0x000C	Board supply voltage	0 .. 4095	0=0.0V 4095=5.0V	2	R	3
0x000D	Full range **	0 .. 1	0=100% LEL 1=50% LEL	1	R	3
*	0xFFFF = EEPROM memory error.					
**	This parameter is set through the dip-switches located on the interface board.					
***	The zero value can change according to the environmental conditions.					
ERRORS						
Error	Error codes and description					Bytes
0x01	ILLEGAL_FUNCTION = The required function is not recognized by the SLAVE.					1
0x02	ILLEGAL_DATA_ADDR = The required address is not valid.					1
0x03	ILLEGAL_DATA_VALUE = The received value is not valid.					1
0xFF	ILLEGAL_CRC_VALUE = CRC value is wrong.					1