



LABOR – ASTER

INDUSTRIAL AUTOMATION



Certyfikat nr QS/14/07



AC 083
QMS

SIGNAL TRANSLATOR type S2-MOD

- Translation of analog signal into serial digital transmission RS485 MODBUS RTU
- Transmission speed up to 115200 bd
- Possibility of connection up to 254 devices to the network
- Input: any standard U, I, Pt100, thermocouple
- Additional power supply 24V/25mA for two-wire transmitters
- Digital linearization of thermoelectric sensors and thermocouple cold endings compensation
- Input, output and power supply circuits mutually separated



APPLICATION:

The **S2-MOD** translator converts input measurement signal into serial RS485 transmission.

Input signal can be any standard current or voltage signals (0...20mA, 4...20mA, 0...10V). Additional 24V voltage on the input allows to supply two-wire transmitter. Optionally, the translator can operate with Pt100 sensors and thermocouples.

Each of the translators has its own address. It allows to have up to 254 devices in one branch. The translator performs the function of the "SLAVE" (answers to the messages from the "MASTER") and performs transmission in compliance with MODBUS-RTU protocol.

Transmitted character contains start bit, 8 data bits and one stop bit.

From the point of view of the protocol service the translator acts as three measurement registers and six configure registers. Shorting RES terminals makes the translator to operate with the factory default parameters which enables changing number of the device as well as the transmission speed.

Circuits: input, output and power supply are mutually separated.

Operating of the translator with factory default parameters:

- - connect a jumper on **RES** input – it sets the operation of the communication on the factory default parameters:
 - device number = **127 (07F hex)**
 - transmission speed = **2 (9600b/s)**
- - then the translator can be programmed with device number and transmission speed selected by the user
- - disconnect the jumper from **RES** input

(Factory new translator without the jumper on RES input has set transmission speed 19200 bd and address = 01 – last parameters after testing).

BASIC TECHNICAL PARAMTERES

Input signal:	standard	-	voltage 0...10V / 100kΩ
	optional	-	current 0...20mA, 4...20mA / 50Ω
		-	sensor Pt100, Ni100
		-	thermocouple J, K, S, N, T, B
		-	or other in accordance with order
Two-wire transmitters supply		-	24V/25mA
Output		-	RS485 MODBUS RTU
		-	(special version RS232)
Transmission speed		-	2400, 4800, 9600, 19200, 38400, 57600, 115200 bd
Result refreshing		-	4 times per second
Data bits		-	8
Stop bits		-	1
Parity		-	none
Device number in network		-	max 254
Transmission line length		-	max 1200m
Power supply		-	20...28V / 60mA
Class		-	0,1%
Resolution		-	12 bits
Nonlinearity		-	±0,05%
Temperature drift		-	±0,01%/°C
Galvani separation		-	2kV ; 50Hz between all circuits
Settable parameters		-	Transmission speed, device number, digital filter, JF range
Operation state indication		-	Power supply – diode PWR
		-	Data transmission – diode RS
Ambient temperature		-	0...55°C
Relative humidity		-	<90%
Housing		-	rail IP20 with a width of 22.5mm
	mounting	-	on rail TS35
Safety requirements		-	PN-EN 61010-1:2002
EMC requirements		-	PN-EN 61000-6-1
		-	PN-EN 61000-6-3

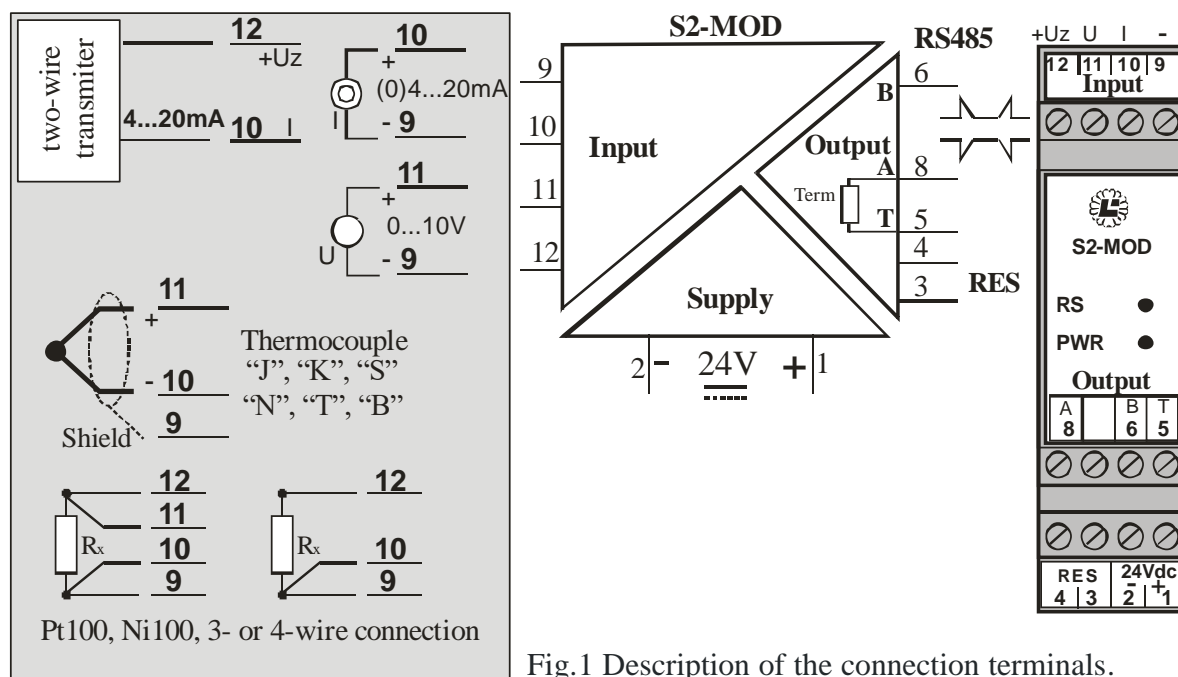


Fig.1 Description of the connection terminals.

Indication of translator operation state (LED diodes)

- Yellow LED diode "RS" indicates with pulse each correct package sent
- Green LED diode "PWR" indicates power supply and correct process of the internal processor during typical operation (constant light) or during operation with factory default parameters (blinking with frequency of about 2Hz).

DESCRIPTION OF THE TRENSLATOR REGISTERS

The Translator has three measurement registers and six configure registers.

MEASUREMENT REGISTERS:

Address	Index	Type of variable	Description
00H	01H	integer (2 bytes)	AI – Measurement from A/C
01H	02H	integer (2 bytes)	AIF – Filtered measurement
02H	03H	integer (2 bytes)	AIFS – Scaled measurement

Measurement format from A/C and filtered measurement for registers 1 and 2 (integer 14 bits) is described in below table. Scaled measurement from register 3 is counted according to the values saved in configure registers 4 and 5 (ZJF0 and ZJF100)

Measured value		Result representation	
		DEC	HEX
0 V	0 mA	0	0H
2 V	4 mA	3 276	C CCH
10 V	20 mA	16 384	40 00H
max 11 V	max 22mA	18 022	46 66H

CONFIGURE REGISTERS:

Address	Index	Parameter description	Range
00H	01H	NRS – translator address in the network	1 ... 254
01H	02H	BAUD – transmission speed	0 ... 6
02H	03H	WF – filter code	0 ... 5
03H	04H	ZJF0 – range 0%	
04H	05H	ZJF100 – range 100%	
05H	06H	Identifier*)	55 01H

*) Identifier of the device is constant value read only.

(5501H – for standard input,
5502H - input Pt100 3 wires,
5503H - input Pt100 4 wires,
5504H – thermocouple input)

NRS – individual device address in the transmission line.

BAUD – values of transmission speed codes are in below table:

Transmission speed codes:	
Code	Speed
0	2400 bd
1	4800 bd
2	9600 bd
3	19200 bd
4	38400 bd
5	57600 bd
6	115 200 bd

WF – applied filter is iterative filter of the first row with time constant given in below table.

Time constants of the digital filter:	
Code	Time constant
0	no filtering
1	0,2 sec
2	0,5 sec
3	1 sec
4	2 sec
5	4 sec
6	8 sec

ZJF0 – physical values range corresponding to the measured signal 0000H

ZJF100 – physical values range corresponding to the measured signal 4000H

List of transmitted packages:**Package 04** – reads measurement register**Package 03** – reads configure registers**Package 06** – writes configure register**Negative responses:**

The translator responds negatively on received packages from “MASTER” unit in case of:

- Illegal register address – error code **02**
- Illegal data value - error code **03**

The translator does not respond in case of CRC error or illegal function code.

Package form

Next package bytes means:

1. Number of substation ”SLAVE”
2. Function code
3. Register address older byte
4. Register address younger byte
5. Number of registers older byte
6. Number of registers younger byte
7. Control byte CRC older byte
8. Control byte CRC younger byte

Packages exchange examples:

Example 1 Reading of the measured value from A/C:

MASTER sends:

01 04 00 00 00 01 31 CA (slave address 1, function 4, start address 0, amount 1, CRC)

SLAVE responds:

01 04 02 07 FF FB 40 (slave address 1, function 4, bytes 2, value 7FF, CRC)

Example 2 Reading of the physical unit range 0%:

MASTER sends:

01 03 00 03 00 01 74 0A (slave address 1, function 3, start address 3, amount 1, CRC)

SLAVE responds:

01 03 02 01 55 79 EB (slave address 1, function 3, bytes 2, value 155, CRC)

Example 3 Saving of the filter code = 2:

MASTER sends:

01 06 00 02 00 02 A9 CB (slave address 1, function 6, start address 2, value 2, CRC)

SLAVE responds:

01 06 00 02 00 02 A9 CB (the same package)

ORDER CODE:**S2-MOD - -**

Input signal (0 ... 3)

- 0 - standard 0/4 ... 20mA, 0 ... 10V, auxiliary power supply
- 1 - Pt100 - 3-wire connection
- 2 - Pt100 - 4-wire connection
- 3 - thermocouple

Input range

- temperature range and thermoresistance sensor type
- temperature range and thermocouple type

In case of other requirements than given, please described them in the order.

Order example:

- 1). Translator Analog/Modbus : standard input type **S2-MOD – 0**
- 2). Translator Analog/Modbus : input Pt100, range 0...100°C, three-wire connection of the sensor type **S2-MOD – 1 – (0...100°C)**

Production and distribution:**LABOR – ASTER**

Poland, 04-218 Warsaw, ul. Czechowicka 19

tel. +48 22 610 71 80 ; +48 22 610 89 45; fax. +48 22 610 89 48

e-mail: biuro@labor-automatyka.pl labor@labor-automatyka.pl ; [http:// www.labor-automatyka.pl](http://www.labor-automatyka.pl)

The manufacturer reserves the right to make changes to the product.

Issue 04/2022