

Introduction

This manual for NEXs device (NEX device with RS485 serial communication) is an addendum of standard manual for NEX. To use the device (connections, programming etc.) make reference to NEX device manual. In this manual only the significant differences from standard device and communication protocol will be explained.

Functionality

The NEXs device is equipped with a RS485 serial port and the implemented protocol is a subset of RTU MODBUS protocol. NEXs has an internal clock and memorizes temperatures acquired at selectable interval times for 4075 total readings. Temperature's database can be very usefull to analyze tranformer's use. Data are available from the device's serial interface.

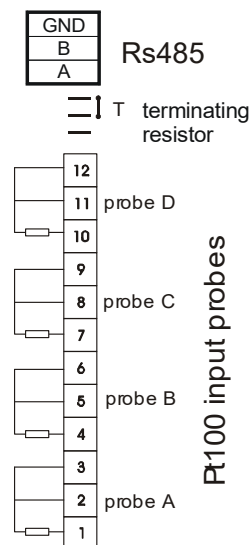
Connections

Power supply and relays' connections remain the same, whereas connectors for PT100 probes are smaller than the ones of NEX to make space to the RS485 communication connector and for the jumper for line termination.

The serial connector has three contacts: GND to which the shield has to be connected and A and B to which the 2 communication wires have to be connected.

The jumper is to end the line. The 120 Ω termination is internal to the device. All devices are configured with the line termination disabled. To enable the line termination you have to move down the jumper. The line termination has to be enabled only for the last device in the line.

The communication port is compliance to EIA-RS-485 specification. The network has to be made with a two poles shielded cable.



Protocol

In NEXs a subset of MODBUS RTU has been implemented (technical references can be found in www.modbus.org).

Next table shows the **communication configuration values** used with NEXs device.

BAUD RATE	2400, 4800,9600, 14400, 19200, 38400, 57600
PARITY	None, even, odd
STOP BIT	1, 2
ADDRESS	1 ÷ 247

Notes:

- If you select no parity you have to use two stop bits.

Only the main **request codes** are available, as shown in the table below

Function code	MODBUS function
02	READ INPUT REGISTER
03	READ HOLDING REGISTER
04	READ DISCRETE INPUT
06	WRITE SINGLE REGISTER

An error answer is provided for each code in this way: the most significant bit of the requested code is set followed by the related error.

The table below shows the **error codes**:

Error code	Error meaning
01	Request code not supported
02	Reading or writing address not valid
03	Data request error

Notes:

- if you request, for example, to read or write at a not valid address, the answer will be (slave address) + (request code + 080h) + (error code) + (CRC)

Example:

MASTER: 01 04 00 09 00 01 xx xx (CRC)

SLAVE: 01 84 02 xx xx (CRC)

Status bit table for NEXs device (DISCRETE INPUTS) (Modbus request 02)

ADDRESS	FUNCTION
00	UNDERRANGE signaling for probe A
01	UNDERRANGE signaling for probe B
02	UNDERRANGE signaling for probe C
03	UNDERRANGE signaling for probe D
04	OVERRRANGE signaling for probe A
05	OVERRRANGE signaling for probe B
06	OVERRRANGE signaling for probe C
07	OVERRRANGE signaling for probe D
08	Probe A below zero
09	Probe B below zero
10	Probe C below zero
11	Probe D below zero
16	Signalling for threshold A1 for A probe
17	Signalling for threshold A1 for B probe
18	Signalling for threshold A1 for C probe
19	Signalling for threshold A1 for D probe
24	Signalling for threshold A2 for A probe
25	Signalling for threshold A2 for B probe
26	Signalling for threshold A2 for C probe
27	Signalling for threshold A2 for D probe
32	Signalling for threshold A3 for A probe
33	Signalling for threshold A3 for B probe
34	Signalling for threshold A3 for C probe
35	Signalling for threshold A3 for D probe

Notes:

- you have an UNDERRANGE for temperatures below -20 °C or for damaged probe: white wire not connected
- you have an OVERRANGE for temperatures over 200 °C or for damaged probe: red wire not connected

Changeable registers table (HOLDING REGISTERS) (Modbus request 03)

ADDRESS	FUNCTION	Byte H	Byte L
00	Threshold A1 for probes A, B, C	00	DATA
01	Threshold A2 for probes A, B, C	00	DATA
02	Threshold A3 for probes A, B, C	00	DATA
03	Threshold A1 for probes D	00	DATA
04	Threshold A2 for probes D	00	DATA
05	Threshold A3 for probes D	00	DATA
06	HYSTERESIS	00	DATA
07	DELAY	00	DATA
08	IMPULSE	00	DATA
09	ALARM MEMORY	00	DATA
15	Temperature value for PROBE A	00	DATA
16	Temperature value for PROBE B	00	DATA
17	Temperature value for PROBE C	00	DATA
18	Temperature value for PROBE D	00	DATA
19	Maximum value reached by probe A	00	DATA
20	Maximum value reached by probe B	00	DATA
21	Maximum value reached by probe C	00	DATA
22	Maximum value reached by probe D	00	DATA
26	Writing in this register the value 55h (85d) the NEXs device loads standard data. Reading this register will not give significant data.	00	DATA
27	Writing in this register the value Aah (170d) the NEXs device resets all maximum value reached by probes.	00	DATA

Notes:

- data programming must be compliance to the device's specifications. For example, thresholds must follow the following rule: A1<A2<A3 and cannot take values over 200 °C. These information are in the standard manual

Programming

For navigation and data programming for NEXs device make reference to the correspondent chapter in standard user manual for NEX device.

The page is for communication parameters visualization and programming.

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