

Introduction

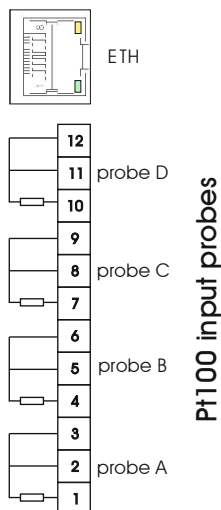
This manual is for NEX ETH device (NEX device with Ethernet Port). This is an addendum to the NEX standard manual. To use the standard functionalities (connections, programming etc.) read the NEX device manual. In this addendum will be highlighted only the differences from the standard device and the communication protocol.

Functionality

The NEX ETH device is equipped with RJ-45 connector for the Ethernet Port. The supported Ethernet connector is 10/100 Mb. The implemented protocol is a subset of the MODBUS RTU over TCP/IP protocol.

Connections

Power supply and relays connections remain the same. Compared to the standard NEX, an RJ-45 connector has been inserted. Beside a diagram of the board connections.



Protocol

The NEX ETH implements a subset of the MODBUS RTU over TCP/IP (technical references at www.modbus.org referring to the document “MODBUS Application Protocol Specification”).

The NEX ETH device is configured as a TCP server, so the client must open the communication.

The connection takes place according to the TCP/IP standard therefore, for LAN communications, is necessary to configure an IP address and a TCP socket. Gateway and Subnet Mask are optional.

For safety reasons, the device should not be exposed directly to the Internet except via firewall and/or direct management by the network administrator. The device has no internal protection elements from cyber-attacks.

While programming TCP/IP parameters, the socket is closed. Once the data is correctly programmed and confirmed the socket will be open again.

The NEX ETH device manage only one socket and one request at a time.

The Protocol data Unit (PDU) composition is (Function Code) + (Data)

The table below the available **function codes implemented**:

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

In case of error an answer with its associated error code is provided following.

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

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

Notes:

- In case of an invalid read/write address request, the PDU answer will be:
(function code + 080h) + (error code)

Status bit table for NEXn ETH 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:

- an UNDERRANGE bit is settled for temperatures below -50 °C or for damaged probe (white wire not connected)
- an OVERRANGE bit is settled 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	00	DATA

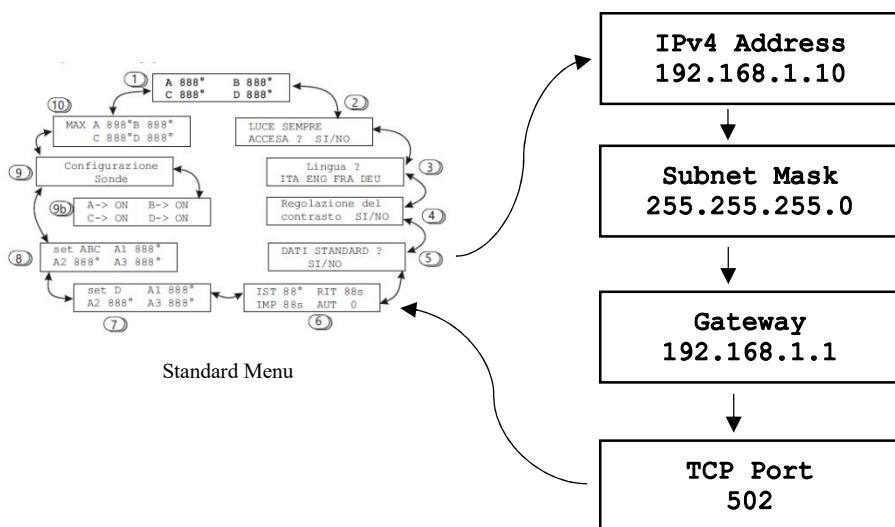
	register will not give significant data.		
26	Writing in this register the value Aah (170d) the NEXs device resets all maximum value reached by probes.	00	DATA

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. This information is in the standard manual.

Programming

Some communication setup pages have been added. To navigate and program data to the NEX ETH device please refer to the correspondent chapter in the NEX standard manual. The added pages are inserted between pages 5 and 6 of the standard NEX device menu.



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