



## **User manual**

# **NANO TEMPERATURE SENSOR**



Soft >= 1.1

**Dear Customer!**

**INVEO s.c.**

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Thank you very much for choosing our product. Please carefully read this user manual as it contains most appropriate ways of dealing with this device, taking into account the basic principles of safety and maintenance. Please also keep the user guide that you can use it during subsequent use.

### **Manufacturer Liability!**

**The manufacturer is not liable for any damage caused by improper or incompatible use of this device, as well for any faults to the device resulting from improper use.**

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## 1 Preliminary information

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**Before using the module please read the user manual carefully and follow the instructions contained within!**

Description of visual symbols used in this user manual:



This symbol is responsible for reviewing the appropriate place in the user instructions, warnings and important information. Failure to follow warnings could cause injury or damage to the module.



Important information and guidelines.



Following this guidelines makes the use of the module easier.

Attention: The appearance of the screen shots shown in this manual may differ slightly from the actual work with the module. The differences may relate to the size and font type and size of symbols. There are no differences in the content of the information.

## 2 Device description

---

NANO Temperature Sensor module is used to read temperature over different LAN protocols. The temperature readout is possible using built in www website, HTTP GET, Modbus TCP, SNMP and MQTT protocols. This module can communicate with other Inveo modules and trigger relay actions

## 3 Warranty and liability of the manufacturer

---



The manufacturer provides a 2-year warranty on the module. The manufacturer also provides post-warranty service for 10 years from the date of the introducing the module on the market. The warranty covers all defects in material and workmanship.

The manufacturer undertakes to comply with the contract of guarantee, if the following conditions are met:

- All repairs, alterations, extensions and device calibrations are performed by the manufacturer or authorized service,
- supply network installation meets applicable standards in this regard,
- device is operated in accordance with the recommendations outlined in this manual,
- device is used as intended.

The manufacturer assumes no responsibility for consequences resulting from improper installation, improper use of the module, not following this manual and the repairs of the module by individuals without permission.



**This device doesn't contain serviceable parts. The repairs can be done only by manufacturers approved repair service.**

## 4 Safety guidelines

---

The module has been constructed using modern electronic components, according to the latest trends in the global electronics.

In particular, much emphasis was placed on ensuring optimum safety and reliability of control.

The device has a housing with high quality plastic.

### 4.1 Power supply



The device is designed to supply 10-24V DC and PoE IEEE 802.3af.

### 4.2 Storage, working environment and transportation

The module has to be used in closed environments free from fumes and corrosive atmosphere.

Environmental conditions for storage:

- Temperature: -30°C to +60°C,
- Relative humidity: <90% (unacceptable condensation)
- Atmospheric pressure: 700 – 1060hPa.

Environmental conditions for use:

- Temperature: +10°C to +55°C,
- Relative humidity: 30% to 75%,
- Atmospheric pressure: 700 to 1060hPa.

### 4.3 Installation and use of the module



**The module should be used following the guidelines shown in next part of the user manual.**

### 4.4 Utilization of the module

When it becomes necessary to liquidate the device (e.g., after the time of use), please contact the manufacturer or its representative, who are obliged to respond appropriately, i.e., collecting the module from the user. You can also ask the companies involved in utilization and / or liquidation of electrical or computer equipment. Under no circumstances should you place the device along with other garbage.

## 5 Module description

---

### 5.1 General features

Overall view of the module is shown on the picture below.



**NANO Temperature Sensor**

There are several ways to communicate with the module:

- using built in WWW server via any web browser,
- windows / linux command line programs.
- MODBUS TCP protocol,
- SNMP protocol,
- HTTP protocol,
- MQTT Inveo protocol,
- User application – communication protocol available for user

The module is equipped with a LED display which displays the current temperature measured in the form of **22.4** or **Err** in case of no communication with the sensor.

### 5.2 Technical specification:

Power supply voltage: 10-24VDC or PoE according to PoE IEEE 802.3af

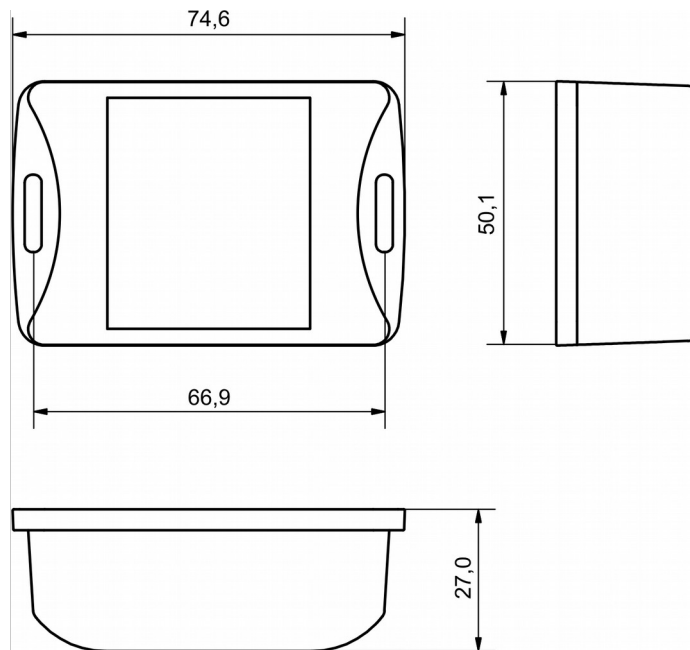
Power consumption: 1.5 W

Ethernet 10Mbit

7-segment LED display red

Weight: 60g

Distensions: height: 27 mm; width: 74.6 mm; length: 50.1 mm



Input:

Input type: 1-wire

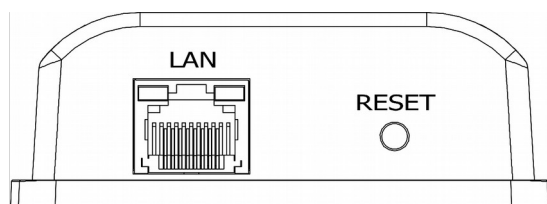
Temperature measured : -55°C do +125°C

Type of sensor: DS18B20

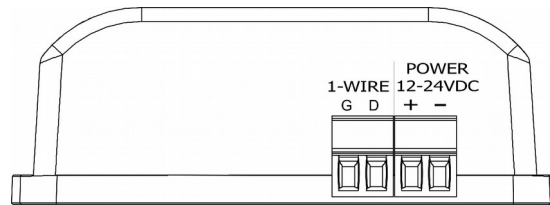
### 5.3 Module input/output terminal description

Module **NANO TEMP** has connection terminals:

- **LAN** - LAN connection and PoE IEEE 802.3af power supply
- **RESET** – switch used to enabling DHCP service, checking the current IP address and restoring the module to the factory settings.



- **1-WIRE** – screw connection disconnected for connection of the temperature sensor
- **POWER** – power connector. An additional power connector used in the event of a PoE power failure. Supply voltage 12-24VDC.

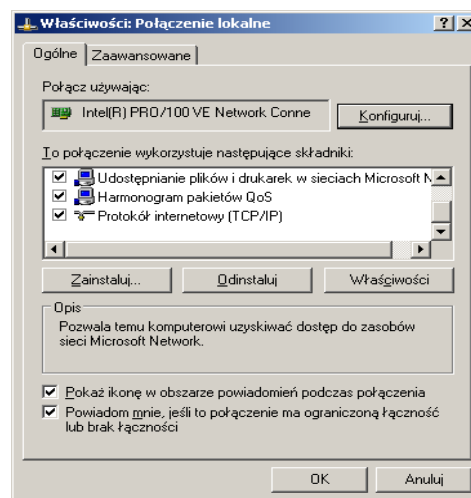


## 6 Module configuration

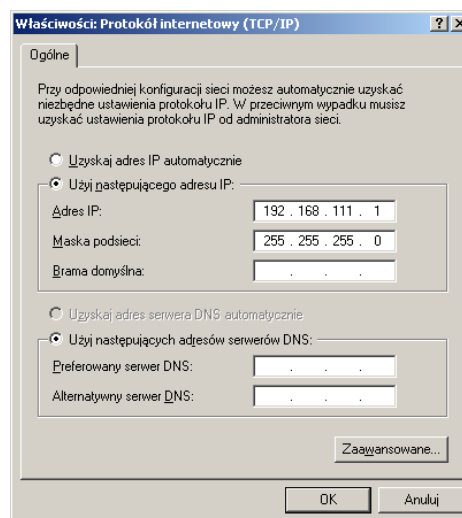
If using the module for the first time it is needed to configure it as shown below

### 6.1 Changing the PC setting for module configuration.

After connecting the module to the network there is a need to change the PC setting. In order to do that navigate to: Start->Control Panel->Network connections. Then right click on the current network connection and click „Properties”. The configuration screen as shown below should be visible on the screen:



Choose the „Internet Protocol (TCP/IP)” and press „Properties”:



TCP/IP example settings

Tick the box „Use the following IP address” and enter:

IP address: **192.168.111.1**

Subnet mask: **255.255.255.0**

The rest of the setting can be left blank.

Press OK to accept the changes.

Start the web browser and enter the following address into address bar:  
**192.168.111.15**. Then select the "NETWORK" menu

**The default user name is „admin“ with password „admin00“**

The screenshot shows the 'Network Configuration' page of the Inveo Nano Out SV:1.11 device. The page has a navigation bar with 'Home', 'Channel', 'Network', 'SNMP', and 'Administration' tabs. The 'Network' tab is selected. Below the navigation bar, the title 'Network Configuration' is displayed. A subtitle states: 'This page allows the configuration of the device's network settings.' The main configuration area contains several fields: 'MAC Address' (54:10:EC:65:9B:CD), 'Host Name' (NANO), 'IP Address' (192.168.111.15), 'Gateway' (0.0.0.0), 'Subnet Mask' (255.255.255.0), 'Primary DNS' (0.0.0.0), 'Secondary DNS' (0.0.0.0), 'Destination IP' (0.0.0.0), and 'Destination Port' (0). There is an 'Enable DHCP' checkbox which is currently unchecked. A 'Save Config' button is located at the bottom of the configuration area. The footer of the page reads 'Copyright © 2015 Inveo s.c.'.

### Network connection setup

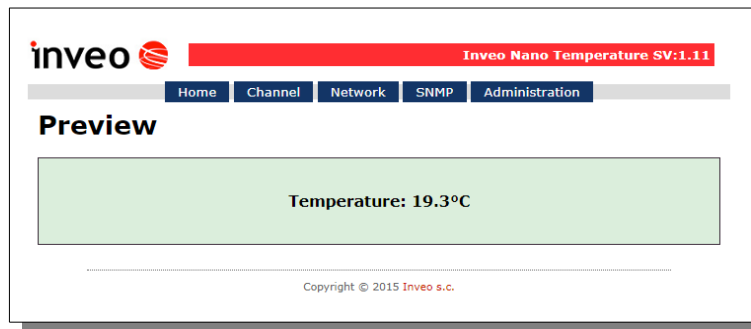
There are several fields used to configure the module network settings:

- MAC Address – MAC address of the module,
- Host Name – NETBIOS host name of the module,
- Enable DHCP – When this box is ticked the module will get its address from DHCP server,
- IP Address – IP address of the module – when configured manually,
- Gateway – Network gateway,
- Subnet Mask – Subnet mask of the module,
- Primary DNS, Secondary DNS – DNS servers addresses,
- Destination IP – Network address of the server that the module will connect to - optional,
- Destination Port – Network port of the server that the module can connect to.

After changing the configuration press the „Save Config“ button.

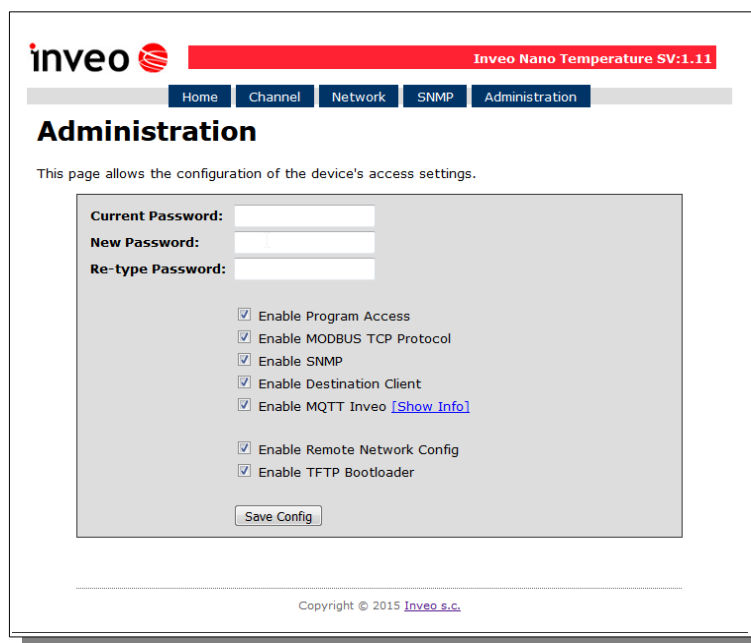
## 6.2 Preview of the measured temperature

In the **Home** tab, the current temperature read from the sensor connected to the bus is displayed and the over temperature condition is signaled.



## 6.3 Access configuration

The Administration menu allows the User to configure which services are to be active in the device and to change the access password.



### Changing the password

Enter old password into *Current Password* field.

Enter new password into *New Password* field and into *Re-type Password* field then press „Save Config” to save new passwords.

### Enabling/disabling particular service

This function enables/disables different services. By enabling the tick box next to a service user can turn it on or off.

#### Module Access configuration

- **Enable Program Access** – access service by a computer program (Windows, Linux) and TCP / IP protocol operating on port 9761
- **Enable MODBUS TCP Protocol** – enables/disables access using MODBUS TCP protocol.
- **Enable SNMP** – enables/disables access using SNMP protocol.
- **Enable Destination client** – enables/disables connection service with a remote host
- **Enable MQTT Inveo** -enables/disables service sending data to the INVEO MQTT cloud
- **Enable Remote Network Config** – enables/disables service of remote change of network settings by the INVEO DISCOVERER program
- **Enable TFTP bootloader** – enables/disables bootloader mode

#### Warning:

**TFTP Bootloader should be disabled during normal operation. Enabling should take place only before the software update.**

### 6.4 Configuration of the input channel.

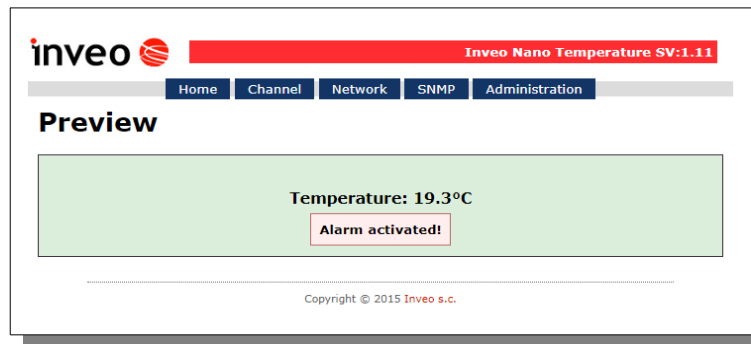
In the Channel tab there are settings of temperature thresholds after exceeding which the alarm is triggered.

The screenshot shows the 'Channel configuration' page of the 'Inveo Nano Temperature SV:1.11' web interface. The page has a navigation bar with tabs: Home, Channel, Network, SNMP, and Administration. The 'Channel' tab is selected. The main content area is titled 'Channel configuration' and contains a 'Temperature Alarm' section. This section has a sub-section 'Alarm Mode' with four radio buttons: 'Off', 'Lower', 'Higher', and 'Lower or Higher'. The 'Lower' radio button is selected. To the right of the 'Alarm Mode' section are two input fields: 'Temperature Low' and 'Temperature High', both set to '50 °C'. To the right of these fields is a 'Client mode' dropdown menu showing 'Dest 5'. A 'Save' button is located at the bottom right of the configuration area. The footer of the page reads 'Copyright © 2015 Inveo s.c.'.

#### Alarm Mode

- **Off** -alarm disabled
- **Lower** -the alarm is activated if the measured temperature is lower than the value set in the field **Temperature Low**.
- **Higher** -the alarm is activated if the measured temperature is higher than the value set in the field **Temperature High**.
- **Lower or Higher** -the alarm is activated if the measured temperature is higher than typed in field **Temperature High** or lower than typed in **Temperature Low**.

The occurrence of an alarm condition is signaled on the homepage of the module, and the LED display on the device flashes.



The virtual output 1 is activated in the status.xml resource (**<on>00000001</on>**)

**http://192.168.111.15/status.xml**

```
<response>
<prod_name>PE-DS</prod_name>
<out>00000000</out>
<on>00000001</on>
<in>00000000</in>
<counter1>0</counter1>
<temp1>18.4</temp1>
<mac>54:10:EC:65:50:21</mac>
</response>
```

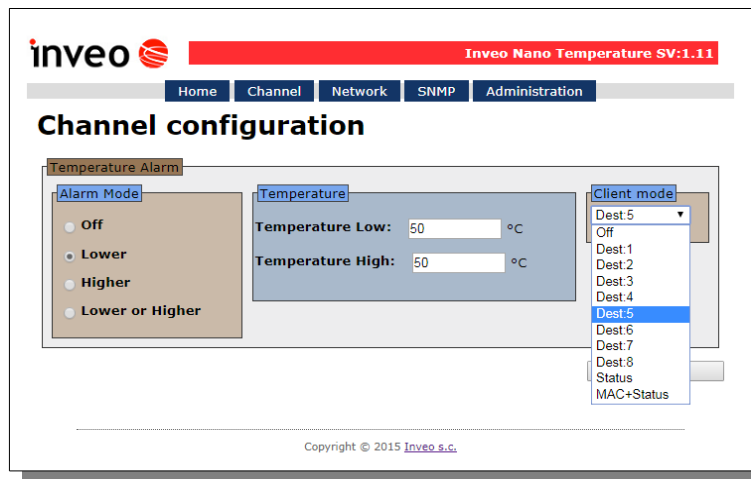
If the SNMP service has been configured, the module can send TRAP to the appropriate IP address.

## **6.5 TCP/IP communication**

The NANO TEMPERATURE SENSOR PoE module is able to send temperature and alarm status to another module or to the server using the TCP protocol. This means that when an alarm occurs, a message will be sent to another device that can react, for example, by activating a relay

The IP address of the device to which information is to be sent should be set in the tab **Network** Destination IP, Destination Port.

The message is sent whenever an alarm status changes, and additional every 5 seconds.



In the **Client mode** field, you can select the frame format:

- **Off** -sending frames disabled
- **Dest: 1..8** -sending TCP frames in the **format #1** (compatible with INVEO devices)
- **Status** -sending TCP frames in the **format #2**
- **MAC + Status** -sending TCP frames in the **format #3**

## 6.6 TCP frames format

### Format #1

The frame in the format #1 is sent in binary form.

An example of a TCP frame sent with active alarm and **Dest:5** set

| SOF  | CMD  | CH          | F_ID | ALARM       | !ALARM | TEMP        | RES  | RAW LSB     | RAW MSB     | CRC  |
|------|------|-------------|------|-------------|--------|-------------|------|-------------|-------------|------|
| 0x0F | 0x01 | <b>0x04</b> | 0xFF | <b>0x01</b> | 0xFE   | <b>0x0F</b> | 0x00 | <b>0x01</b> | <b>0x57</b> | 0x7F |

An example TCP frame sent with inactive alarm and **Dest:5** set

| SOF  | CMD  | CH          | F_ID | ALARM       | !ALARM | TEMP        | RES  | RAW LSB     | RAW MSB     | CRC  |
|------|------|-------------|------|-------------|--------|-------------|------|-------------|-------------|------|
| 0x0F | 0x01 | <b>0x04</b> | 0xFF | <b>0x00</b> | 0xFF   | <b>0x0F</b> | 0x00 | <b>0x01</b> | <b>0x57</b> | 0x7F |

Values **RAW\_LSB** and **RAW\_MSB** is the temperature read directly from the sensor.  
The temperature read off should be divided by 16.

Value **TEMP** it's the temperature without the decimal part.

Calculation of CRC:

CRC = (BYTE) SUMA (SOF+CMD+CH+F\_ID+ALARM+!ALARM+TEMP+RES+RAW\_LSB+RAW\_MSB)

### Format #2

The frame #2 is sent as a string (STRING).

<ALARM>[SPACE]<TEMPERATURE>

- **ALARM** -value 1 means an alarm is active, 0 means an alarm is inactive

- **TEMPERATURE** -read temperature

| Value in HEX |    |    |    |    |    | STRING |
|--------------|----|----|----|----|----|--------|
| 30           | 20 | 33 | 39 | 2E | 35 | 0 39.5 |

### Format #3

The frame #3 is sent as a string (STRING).

<MAC>[SPACE]<ALARM>[SPACE]<TEMPERATURE>

- **MAC** -network address of the module
- **ALARM** value 1 means an alarm is active, 0 means an alarm is inactive
- **TEMPERATURE** -read temperature

| Value in HEX |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | STRING |                     |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--------|---------------------|
| 35           | 34 | 31 | 30 | 45 | 43 | 36 | 35 | 35 | 30 | 32 | 31 | 20 | 30 | 20 | 34 | 36 | 2E | 39     | 5410EC655021 0 46.9 |

The TCP frame can be supported with your own software.

An example of using the netcat command for Linux:

Format #1

```
192.168.0.101 - PuTTY
root@debian:~# nc -l -s 192.168.111.101 -p 9761 | hexdump -C
00000000  0f 01 03 ff 00 ff 2c 00  02 ce 0d                |.....,....|
0000000b
root@debian:~#
```

Format #2

```
192.168.0.101 - PuTTY
root@debian:~# nc -l -s 192.168.111.101 -p 9761 | hexdump -C
00000000  30 20 34 34 2e 38                |0 44.8|
00000006
root@debian:~#
```

Format #3

```
192.168.0.101 - PuTTY
root@debian:~# nc -l -s 192.168.111.101 -p 9761 | hexdump -C
00000000  35 34 31 30 45 43 36 35  35 30 32 31 20 30 20 34  |5410EC655021 0 4|
00000010  35 2e 33                |5.3|
00000013
root@debian:~#
```

## 6.7 SNMP configuration

The module is equipped with an SNMP v2c server.

To enable this feature go to Administration tab-> Enable SNMP.

The SNMP protocol allows you to read the current temperature.

The MIB file describing the structure can be downloaded the SNMP tab.

The basic parameters that can be read from the NANO TEMPERATURE SENSOR module are in the table:

| Name                     | Format  | OID                           |
|--------------------------|---------|-------------------------------|
| Temperature              | STRING  | .1.3.6.1.4.1.42814.14.3.5.1.0 |
| Temperature (total part) | INTEGER | .1.3.6.1.4.1.42814.14.3.5.2.0 |
| Temperature x10          | INTEGER | .1.3.6.1.4.1.42814.14.3.5.3.0 |
| Alarm activated          | INTEGER | .1.3.6.1.4.1.42814.14.3.1.1.0 |

Module can send TRAP messages after input activation. Destination address should be entered in **Trap IP Address 1** and **Trap IP Address 2**. fields.

## 6.8 Managing the module using windows command line software

The module can be operated using windows command line software – the software is delivered with the module.

Syntax is as follows:

: TCPRel.exe [Parameters]

| Parameter           | Description        |
|---------------------|--------------------|
| <b>-in=1</b>        | Input number       |
| <b>-host=[HOST]</b> | Module IP address  |
| <b>-port=[PORT]</b> | Module Port number |
| <b>-readtemp</b>    | Read temperature   |

### Example:

Read temperature from module at IP address 192.168.111.15 and port 9761:

```
TCPRel -in=1 -host=192.168.111.15 -port=9761 -readtemp
```

## 6.9 Managing the module using Linux command line software

The module can be configured using Linux command line software – the software is delivered with the module.

Syntax is as follows:

`./TcpRel.exe [Parameters]`

| Parameter        | Description        |
|------------------|--------------------|
| <b>-i 1</b>      | Input number       |
| <b>-h [HOST]</b> | Module IP address  |
| <b>-p [PORT]</b> | Module Port number |
| <b>-t</b>        | Read temperature   |

### Example:

Read temperature from module at IP address 192.168.111.15 and port 9761:

```
./tcprel -i 1 -h 192.168.111.15 -p 9761 -t
```

## 6.10 Managing the module using MODBUS TCP

MODBUS TCP protocol is listening on port 502.

The module supports following functions of MODBUS protocol:

- 0x01 Read Coils,
- 0x03 Read Holding Register,
- 0x05 Write Single Coil,
- 0x06 Write Single Register,
- 0x0F Write Multiple Coils,
- 0x10 Write Multiple Registers.

The registers description is shown in tables below.

## MODBUS TCP - Coils

| Register | Name      | Mode:<br>R-read<br>W-write | Description                  |
|----------|-----------|----------------------------|------------------------------|
| 1000     | On1       | R                          | Over Temperature             |
| 1002     | SensError | R                          | Sensor error (0-ok, 1-error) |

## MODBUS TCP - Holding Registers

| Register | Name             | Mode:<br>R- read<br>W-write | Description                                                                                                                                   |
|----------|------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 4000     | ThermostatL      | R/W                         | Thermostat low setting                                                                                                                        |
| 4001     | ThermostatH      | R/W                         | Thermostat high setting                                                                                                                       |
| 4002     | Alarm mode       | R/W                         | 1- <b>OFF</b> (disabled)<br>2- <b>Lower</b> (lower than)<br>3- <b>Higher</b> (higher than)<br>4- <b>Lower &amp; Higher</b> (lower and higher) |
| 4004     | Temperature x10  | R                           | Temperature x 10 (ie. 10,5st.C to 105)                                                                                                        |
| 4005     | Temperature Int  | R                           | Integral part of temperature                                                                                                                  |
| 4006     | Temperature Frac | R                           | Decimal part of temperature                                                                                                                   |
| 4007     | MAC 0            | R                           | MAC Address                                                                                                                                   |
| 4008     | MAC 1            | R                           | MAC Address                                                                                                                                   |
| 4009     | MAC 2            | R                           | MAC Address                                                                                                                                   |
| 4010     | MAC 3            | R                           | MAC Address                                                                                                                                   |
| 4011     | MAC 4            | R                           | MAC Address                                                                                                                                   |
| 4012     | MAC 5            | R                           | MAC Address                                                                                                                                   |
| 4013     | StoreConfig      | W                           | Entering 144 will save to configuration to EEPROM                                                                                             |

### 6.11 Communication via the MQTT Inveo protocol.

If the MQTT Inveo service has been enabled in the **Administration** menu, the module sends to mqtt.inveo.com.pl server the value of measured temperature every 1 minute and additionally at each change.

Application configuration - MQTT client:

Address: mqtt.inveo.com.pl  
Port: 1883  
User name: nanouser  
User password: nanouser  
Topic: /nanoT/<MAC>

After click [\[Show Info\]](#) the settings for the MQTT client will be displayed:

☒ Enable Destination Client  
☒ Enable MQTT Inveo [\[Show Info\]](#)

### MQTT Client Configuration:

- Server: mqtt.inveo.com.pl
- Port: 1883
- Username: nanouser
- Password: nanouser
- Topic: /nanoT/5410ec655021/

☒ Enable Remote Network Config  
☒ Enable TFTP Bootloader

Save Config

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There are many applications on Android, IOS or PC that can display data sent by the module.

## 6.12 Communication with module using HTTP.

Modules can be controlled using HTTP get.

- **status.xml** -resource containing basic information about the module
- **temp1.txt** -temperature shown in text form

To read current state of the module refer to a resource such as <http://192.168.111.15/status.xml>

XML file consist all of the information

```

<response>
<prod_name>PE-DS</prod_name>
<out>00000000</out>
<on>00000000</on>
<in>00000000</in>
<counter1>0</counter1>
<temp1>21.3</temp1>
</response>

```

| Section                      | Description                                          |
|------------------------------|------------------------------------------------------|
| <prod_name>PE-DS</prod_name> | Type of module<br>In this case PE_DS.                |
| <out>00000000</out>          | Output state (enabled/disabled).<br>N/A in NANO TEMP |
| <on>00000000</on>            | Output state - N/A in NANO TEMP                      |

|                              |                                                          |
|------------------------------|----------------------------------------------------------|
| <in>00000000</in>            | Input state (Active/Inactive)<br>N/A in NANO TEMP        |
| <counter1>0</counter1>       | Counter inputs<br>N/A in NANO TEMP                       |
| <temp1>21.3</temp1>          | Temperature sensor reading<br>Temperature is 21.3 degree |
| <mac>54:10:EC:65:50:21</mac> | The network address of the module                        |

### Example of temperature reading with CURL command.

Warning:

Access to the stat.php resource requires authorization.

Access to the resources status.xml and temp1.txt does not require authorization.

curl "<http://192.168.111.15/temp1.txt>" -w "\n"

```

192.168.0.101 - PuTTY
root@debian:~# curl "http://192.168.111.15/temp1.txt" -w "\n"
42.7
root@debian:~#

```

curl "http://192.168.111.15/status.xml" -w "\n" 2>/dev/null | grep 'temp1' | awk -F "[><]" '/temp1/{print \$3}'

```

192.168.0.101 - PuTTY
root@debian:~# curl "http://192.168.111.15/status.xml" -w "\n" 2>/dev/null | gre
p 'temp1' | awk -F "[><]" '/temp1/{print $3}'
43.1
root@debian:~#

```

curl -u admin:admin00 "http://192.168.111.15/stat.php" -w "\n" 2>/dev/null | grep 'prod\_name' | awk -F "[><]" '/prod\_name/{print \$3}'

```

192.168.0.101 - PuTTY
root@debian:~# curl -u admin:admin00 "http://192.168.111.15/stat.php" -w "\n" 2
>/dev/null | grep 'prod_name' | awk -F "[><]" '/prod_name/{print $3}'
PE-DS
root@debian:~#

```

### 6.13 Communication protocol description

| Byte                    | 1   | 2   | 3   | 4                                          | 5            | 6        | 7        | 8         | 9         | 10              | 11  |          |                                             |
|-------------------------|-----|-----|-----|--------------------------------------------|--------------|----------|----------|-----------|-----------|-----------------|-----|----------|---------------------------------------------|
| Name                    | SOF | CMD | CH  | Data 1                                     | Data 2       | Data 3   | Data 4   | Data 5    | Data 6    | Data 7          | CRC | Return   |                                             |
| Command                 |     |     |     |                                            |              |          |          |           |           |                 |     |          |                                             |
| Set output              | 15  | 1   | 0-7 | Mode [1-3]*                                | ON/OFF [0,1] | TON LSB* | TON MSB* | TOFF LSB* | TOFF MSB* | Restart state** | CRC | ON or NO |                                             |
| Read channel parameters | 15  | 2   | 0-7 | x                                          | x            | x        | x        | x         | x         | x               | CRC |          |                                             |
| Set counter             | 15  | 10  | 0-7 | [0:7]                                      | [8:15]       | [16:23]  | [24:31]  |           |           |                 | CRC |          |                                             |
| Read counter            | 15  | 11  | 0-7 | [0:7]                                      | [8:15]       | [16:23]  | [24:31]  |           |           |                 | CRC |          |                                             |
| WWW control             | 15  | 99  | x   | 1 - status<br>0x55 - off<br>all other - on | x            | x        | x        | x         | x         | x               | CRC | ON or NO |                                             |
| Read channels           | 15  | 100 | x   | x                                          | x            | x        | x        | x         | x         | x               | CRC | CH7-CH0  | Chx - 2 bytes;<br>output state 2 coil state |
| Read channel name       | 15  | 101 | 0-7 | x                                          | x            | x        | x        | x         | x         | x               | CRC | String   |                                             |
| Read device name        | 15  | 200 | x   | x                                          | x            | x        | x        | x         | x         | x               | CRC | String   |                                             |

\*only Lantick and PE-2-1

\*\* only Lantick

\*\*\* - Reading parameters returns:

| SOF | CMD | Ch  | Data 1                  | Data 2      | Data 3     | Data 4     | Data 5      | Data 6      | Data 7        | CRC |
|-----|-----|-----|-------------------------|-------------|------------|------------|-------------|-------------|---------------|-----|
| 15  | 2   | 0-7 | Mode[1-3],<br>100-input | ON/OFF[0,1] | TON<br>LSB | TON<br>MSB | TOFF<br>LSB | TOFF<br>MSB | Restart state | CRC |

| Description | Value    | State   |
|-------------|----------|---------|
| ON/OFF      | 0        | off     |
|             | 1        | on      |
|             |          |         |
| MODE        | 1        | static  |
|             | 2        | toggle  |
|             | 3        | 1-pulse |
| CRC         | Byte sum |         |

As default modules are listening on port 9761

Frame examples:

Reading the current temperature from the module NANO TEMPERATURE SENSOR.

| SOF  | CMD  | CH   | D1   | D2   | D3   | D4   | D5   | D6   | D7   | CRC  |
|------|------|------|------|------|------|------|------|------|------|------|
| 0x0F | 0x0C | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x1B |

CRC = (BYTE) SUM (SOF+CMD+CH+D1..D7)

#### **6.14 Communication with module from outside network**

If the module is in the LAN network different than PC that connects to it, the redirection of ports is necessary.

Depending on the form of communication different ports need to be redirected:

**Using web interface:**

- port TCP/IP 80

**Computer software or customer application:**

- port TCP/IP 9761

**Using MODBUS TCP protocol:**

- port TCP/IP 502

**Using SNMP protocol:**

- port UDP 161

## **7 Checking the IP address**

---

To check the current IP address of the device:

1. Press and hold the reset button until the display shows the four parts of the IP number, e.g.  
  
192  
168  
111  
15
2. Release the reset button.

## 8 DHCP

---

To enable/disable DHCP service:

1. Press and hold RESET button until the display shows: **dhcP**
2. Release the reset button.
3. Depending on the current DHCP setting, the message will be displayed **-on** or **-oFF**

## 9 Restoring factory defaults

---

In order to restore the module to its factory defaults:

1. Press and hold reset button until the display shows: **-St**
2. Release the reset button.

With factory defaults restored the module settings are as follows:

- IP address : 192.168.111.15
- IP mask : 255.255.255.0
- User name : admin
- Password: admin00

## 10 Firmware update

---

The module has the ability to update the firmware. The firmware is supplied as a file with .bin extension.

**Note! Improper use of the update feature may damage the module. Make sure that undisturbed power is connected to the module for duration of programming.**

To perform the programming operation, go to the Windows command line (Start-> Run-> type 'cmd' and confirm with Enter).

Then navigate to the directory where the file resides and enter the command

```
tftp -i <module_ip_adress> PUT filename.bin
```

where: < module\_ip\_adress > is the IP address of the module  
*filename.bin* – is the firmware supplied by Inveo s.c.

The programming takes about 1 minute and it's confirmed by "File Transferred" message.

## Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.