Inveo Sp. z o.o.

Nano Temperature Sensor

Instruction Manual

Overview

Warning

This manual applies only to the firmware version v1.42 onwards. Inveo does not guarantee that the information contained in this document applies to previous firmware revisions.



Purpose of the device

The Nano Temp/Nano Temperature Sensor PoE modules have been designed as advanced devices for precise temperature monitoring in various environments. Their main function is to transmit up-to-date temperature readings over a LAN, enabling fast and efficient control of thermal conditions in the monitored areas.

The modules allow for continuous temperature monitoring, enabling ongoing analysis of environmental conditions. With support for various communication protocols such as HTTP GET, Modbus TCP, SNMP and MQTT, users have the flexibility to integrate the devices into various monitoring and management systems. In addition, they can send control signals to other Inveo modules when abnormal temperature conditions are detected, enabling remote control of the relay or other devices, allowing for rapid correction of the situation.

Changelog

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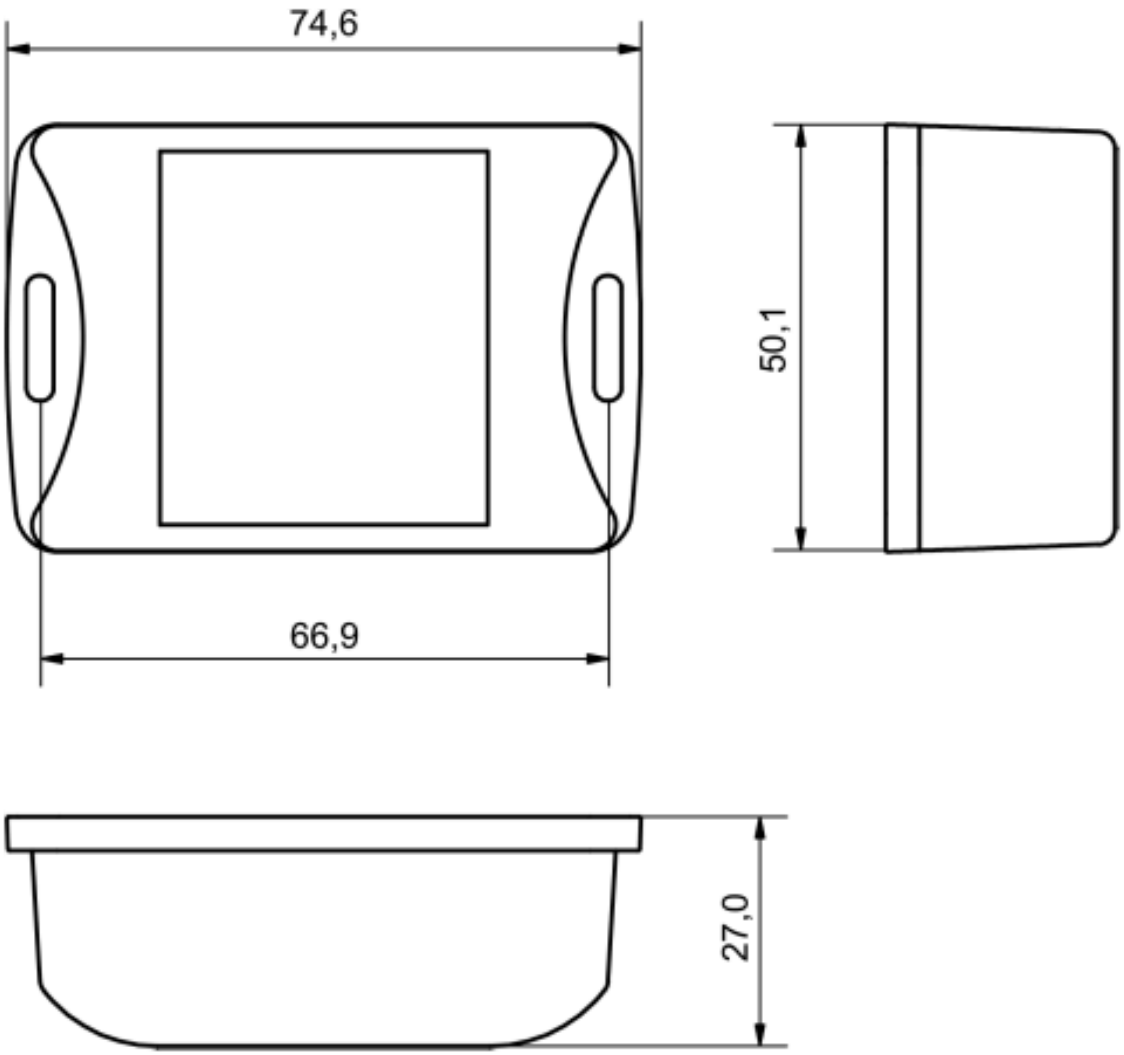
Device construction

Nano Temperature Sensor PoE

Technical characteristics

Parameter	Description
Power supply	Two power supply methods are available: **10-24V DC:** with a 3,5mm pluggable terminal block **PoE:** 33-57V PoE IEEE 802.3af
Power consumption	1,5W
Input	1 input **Input type:** 1-Wire bus, **Sensor type:** DS18B20, **Measured temperature range:** -55°C - +125°C (-67°F - 257°F), **Precision in the range of -10°C to +85°C:** ± 0,5°C **Precision in the range of -55°C to +125°C:** ± 2°C 3,5mm pluggable terminal block connector
Communication	Ethernet 10Mbps Half Duplex, RJ45
Enclosure ingress protection	IP30
Weight	ca. 65g (2,3oz)

Dimensions



Information

All dimensions are in millimeters.

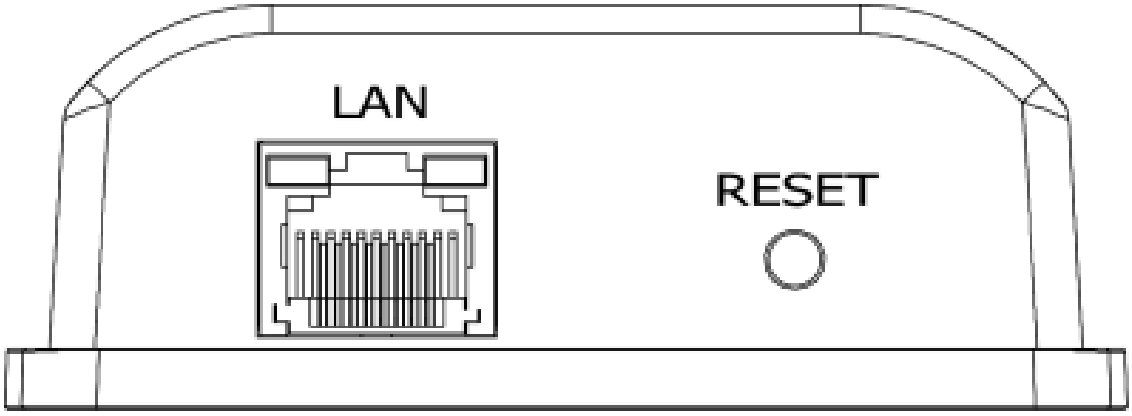
General characteristics



The device is equipped with a 7-segment LED display, on which the current temperature value can be shown. The following communication options are available:

- Built-in WWW server, accessible from a standard web browser,
- Windows/Linux command line programs,
- HTTP GET,
- Modbus TCP,
- SNMP,
- Own application via TCP (shared protocol),
- Inveo MQTT protocol.

Module connectors description:



- **LAN** – LAN and PoE IEEE 802.3af,
- **RESET** – Button used to enable DHCP, check the current IP address and restore the module to factory settings.



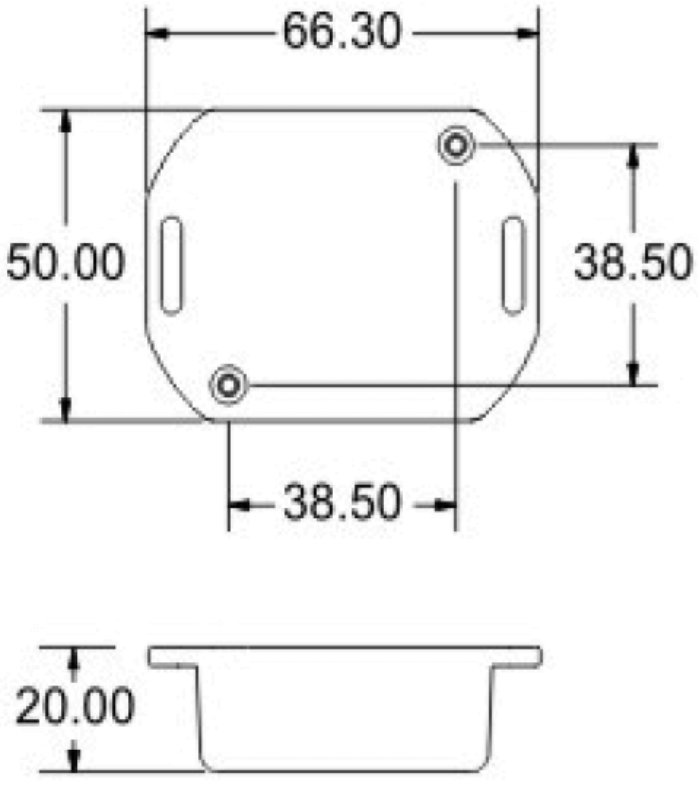
- **1-WIRE** – Temperature sensor connector,
- **POWER** – Additional power connector when PoE is unavailable. Power supply voltage: 10-24V DC.

Nano Temp

Technical data

Parameter	Description
Power supply	**Passive PoE:** 10-24V DC with a PoE adapter
Power consumption	1,5W
Input	1 input **Input type:** 1-Wire bus, **Sensor type:** DS18B20, **Measured temperature range:** -55°C - +125°C (-67°F - 257°F), **Precision in the range of -10°C to +85°C:** ± 0,5°C **Precision in the range of -55°C to +125°C:** ± 2°C 3,5mm pluggable terminal block connector
Communication	Ethernet 10Mbps Half Duplex, RJ45
Enclosure ingress protection	IP30
Weight	ca. 40g (1,4oz)

Dimensions



General characteristics



The module is equipped with LED indicators that indicate power supply and temperature readout.

The following communication options are available:

- Built-in WWW server, available from a standard web browser,
- Windows/Linux command line programs,
- HTTP GET,
- Modbus TCP,
- SNMP,
- Own application via TCP (shared protocol),
- Inveo MQTT protocol.

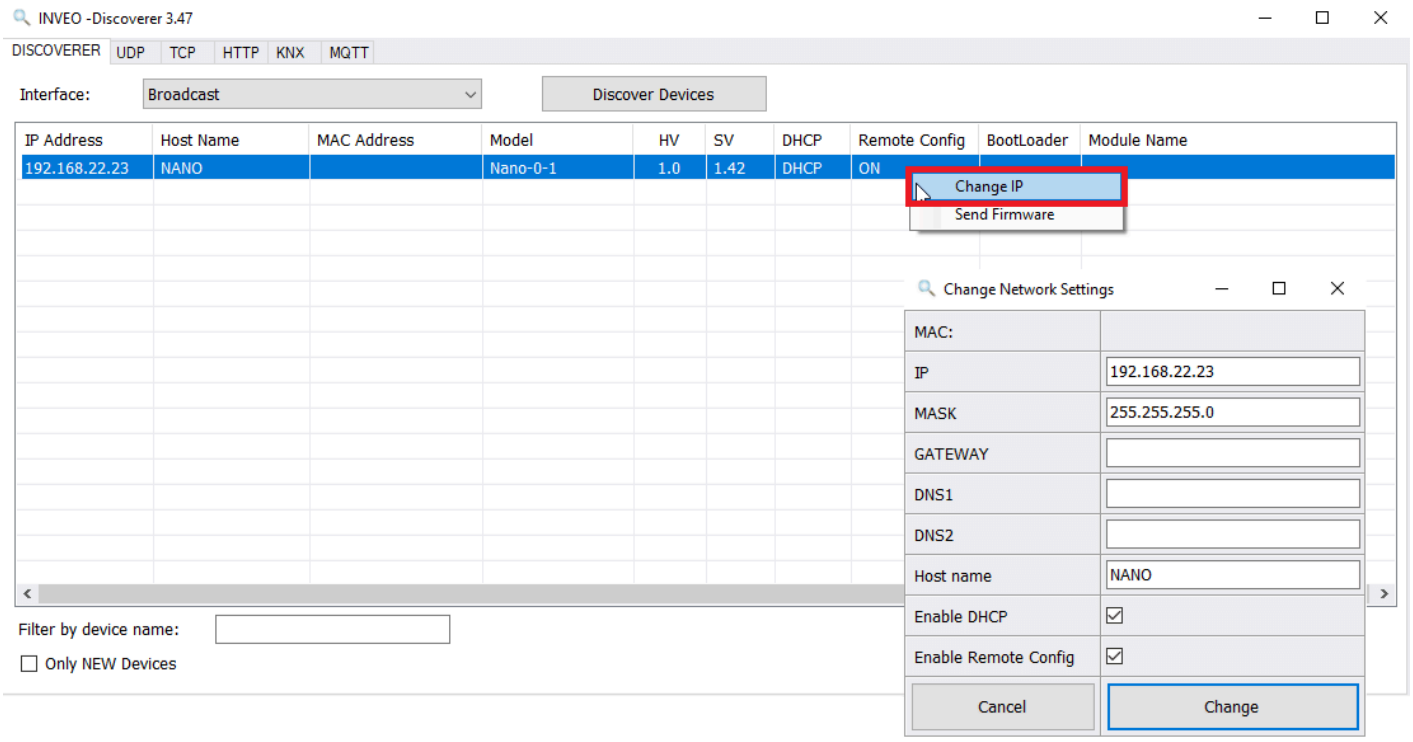
Module connectors description

- **LAN** – LAN and Passive PoE,
- **RESET** – Button used to enable DHCP and restore the module to factory settings,
- **1-WIRE** – Temperature sensor connector.

Network configuration

> **Warning**
>
> **After the initial power-up, it's needed to configure the device. It can be done in two ways, the simplest method is to use the Inveo Discoverer programme.**

Changing the device's IP address - Discoverer programme



After running the **Discoverer** programme and searching for the appropriate device:

1. Right-click the device,
2. Click the **Change** button.

After the dialogue window is opened you can:

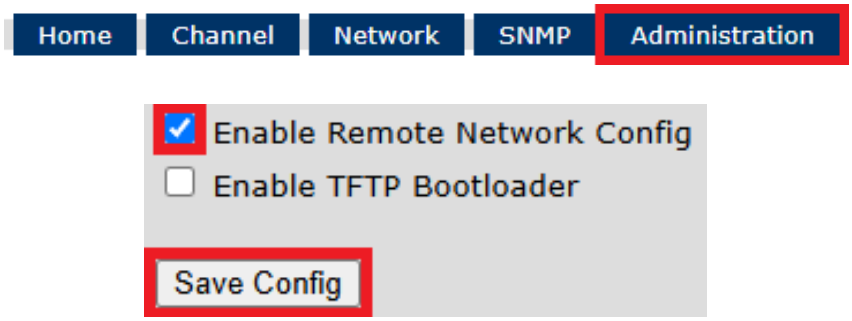
- Set the IP address, mask, gateway, DNS1/DNS2.
- Change the Host name.

> **Note**
>
> **The device will be configured after the Change button is pressed.**

If **Remote Config** is disabled (enabled by default), the device needs to be configured by changing the computer's subnet:

To enable remote configuration:

1. Go to the **Administration** tab,
2. Select **Enable Remote Config**.



> **Tip**
>
> **After making changes, apply them using the Save button**

Changing the computer's subnet address for configuration

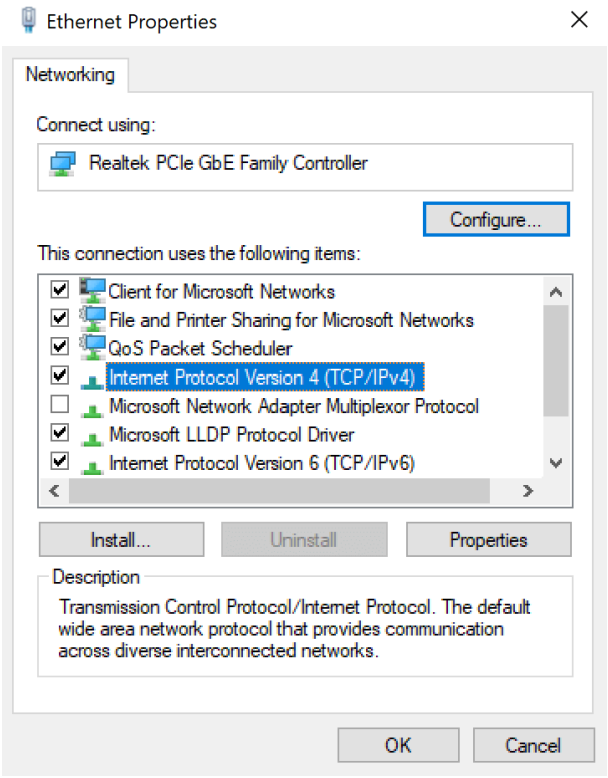
During configuration without **Discoverer** programme, it's needed to change the subnet address of the computer on the same network.

To access the computer's network configuration, do one of the following:

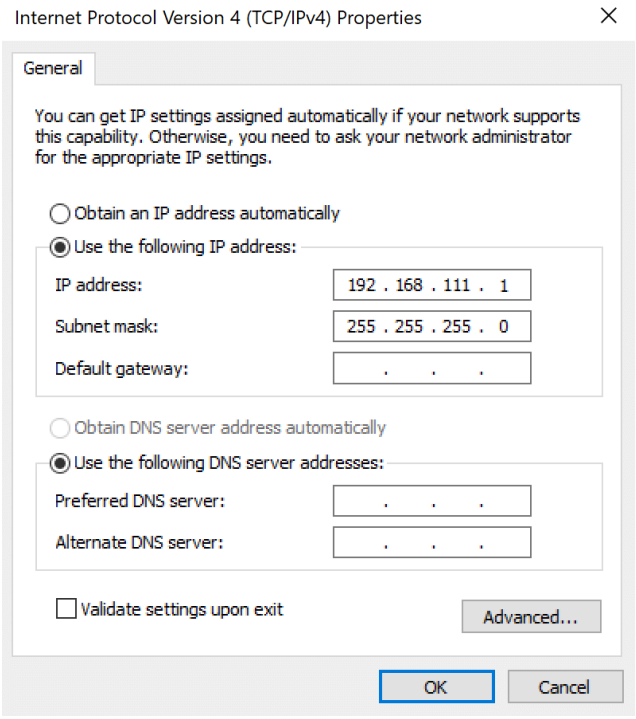
- Press **Win + R**, type in `ncpa.cpl`, and then press **Enter**.
- Alternatively, go to: **Start** → **Control Panel** → **Network and Internet** → **Network and sharing center** → **Change adapter settings**.

Then:

1. Select the network connection.
2. Right-click it and select **Properties**.
3. After selecting this option, network connection configuration screen will appear.



Select **Internet protocol version 4 (TCP/IPv4)** and type in the following parameters:

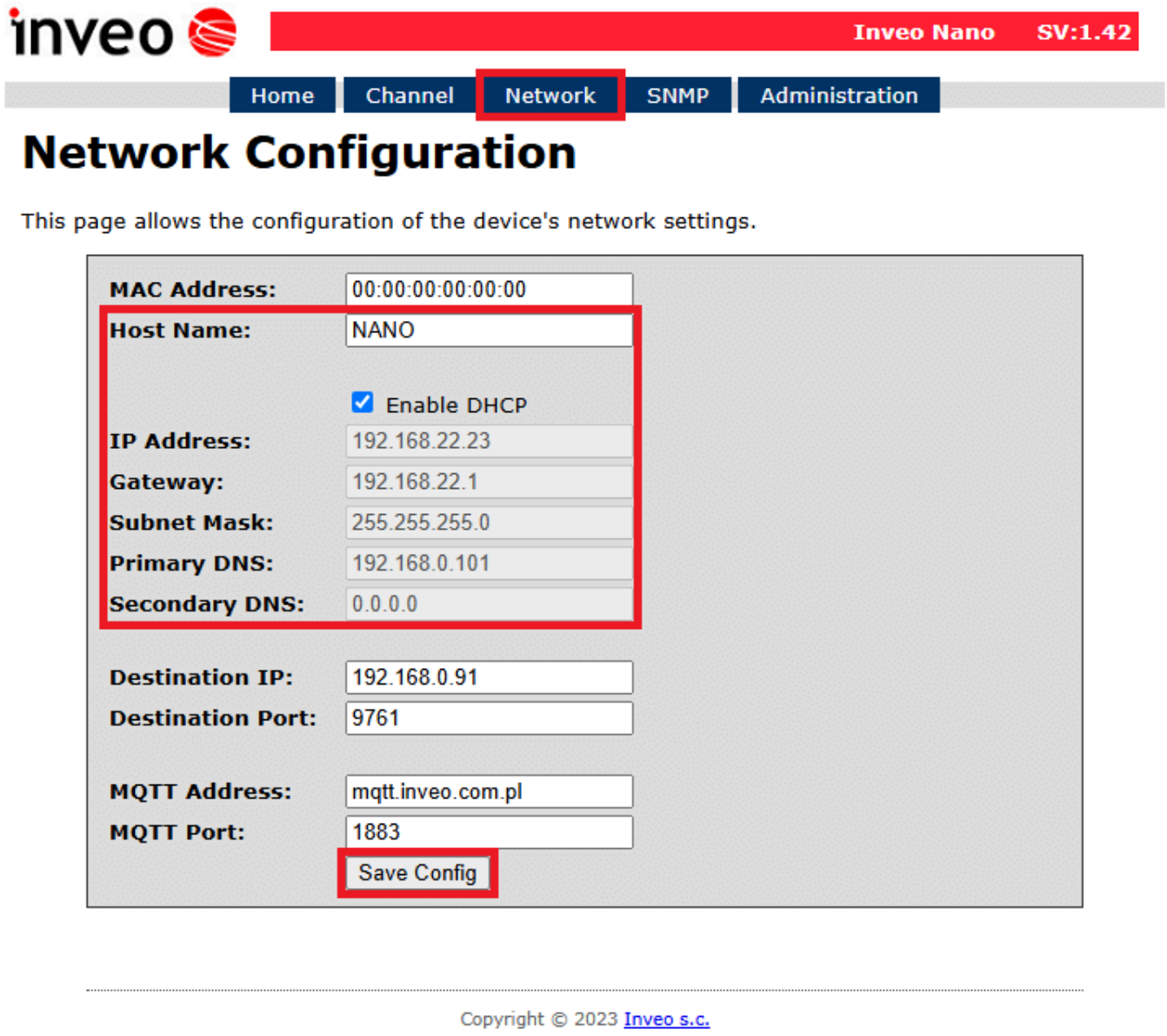


Note

After applying the configuration with OK, start a web browser and type in the following address: 192.168.111.15. (Default user and password: admin/admin00)

Network settings configuration

The **Network** tab allows the user to change LAN settings.



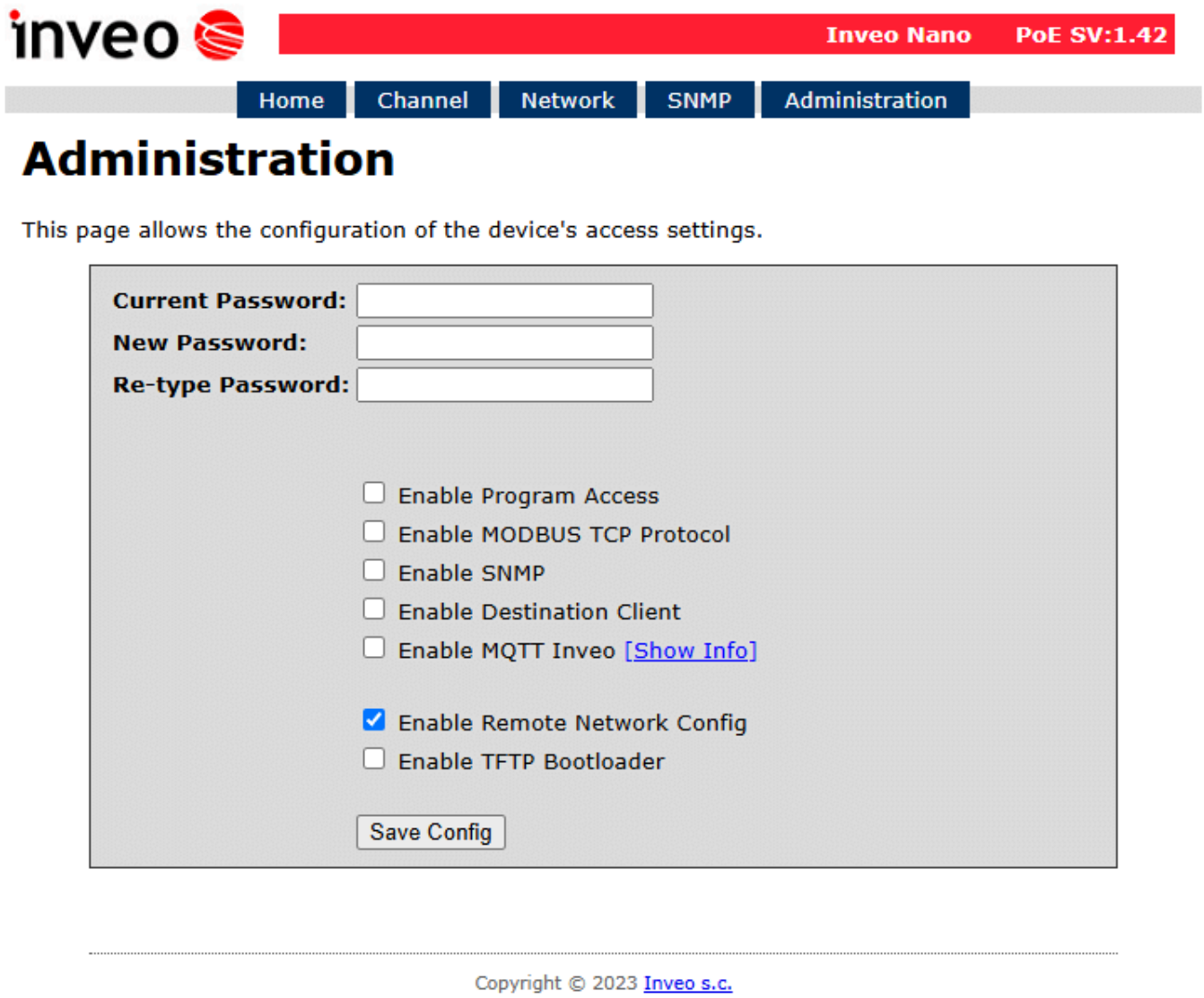
- **Host Name** – NetBios name,
- **DHCP** – Enable the DHCP client; selecting this option forces the use of DHCP assigned IP address,
- **IP Address** – Module IP address,
- **Gateway** – Network gateway,
- **Subnet Mask** – IP subnet mask,
- **DNS1, DNS2** – DNS addresses,
- **Destination IP** – IP address of the module, the input state should be routed to when using M2M communication,
- **Destination Port** – Port, on which the remote device is listening.

Tip

After making changes, apply them using the Save button

Security and services configuration

In **Administration**, active device services and access password can be selected and/or changed.



Changing the password:

To change the password, enter the **Current Password**. Next, type in the new password into the **New Password** and **Re-type Password** fields. Apply the changes with **Save Config**. If you want to remove the password altogether, leave **New Password** empty.

> **Information**
>
> **The maximum password length is 15 characters.**

Services settings:

The device allows selection of services that should be available. To activate the service, select the field next to its name.

- **Enable Program Access** – Enable access by external programs (Windows, Linux) and TCP/IP on port 9761,
- **Enable Modbus TCP Protocol**
- **Enable SNMP**
- **Enable Destination Client** – Forwarding of the input/output states to other modules,
- **Enable MQTT Inveo** – Activate MQTT protocol,
- **Enable Remote Network Config** – (Discoverer programme),
- **Enable TFTP Bootloader**.

> ⚠ **Warning**
>
> **TFTP Bootloader and Remote Network Config should be disabled during normal operation. The settings should only be enabled before firmware update.**

Communication with a module from an external network

If the module is located in a different LAN, port forwarding is required. Depending on the communication method utilized, contact with the network administrator and forwarding of certain ports is needed.

WWW webpage and HTTP protocol:

- TCP port 80

Computer programme or own application:

- TCP port 9761

Modbus TCP:

- TCP port 502

SNMP protocol:

- UDP port 161

Checking the IP address

To check the current device IP address (Nano PoE only):

1. Press and hold the **RESET** button. The screen will display the four groups of an IP address in sequence: eg. 192 168 111 15..
2. After the full address is displayed, release the **RESET** button.

DHCP

To enable or disable DHCP support:

1. Press and hold the **RESET** button for a time between 5 and 10 seconds.

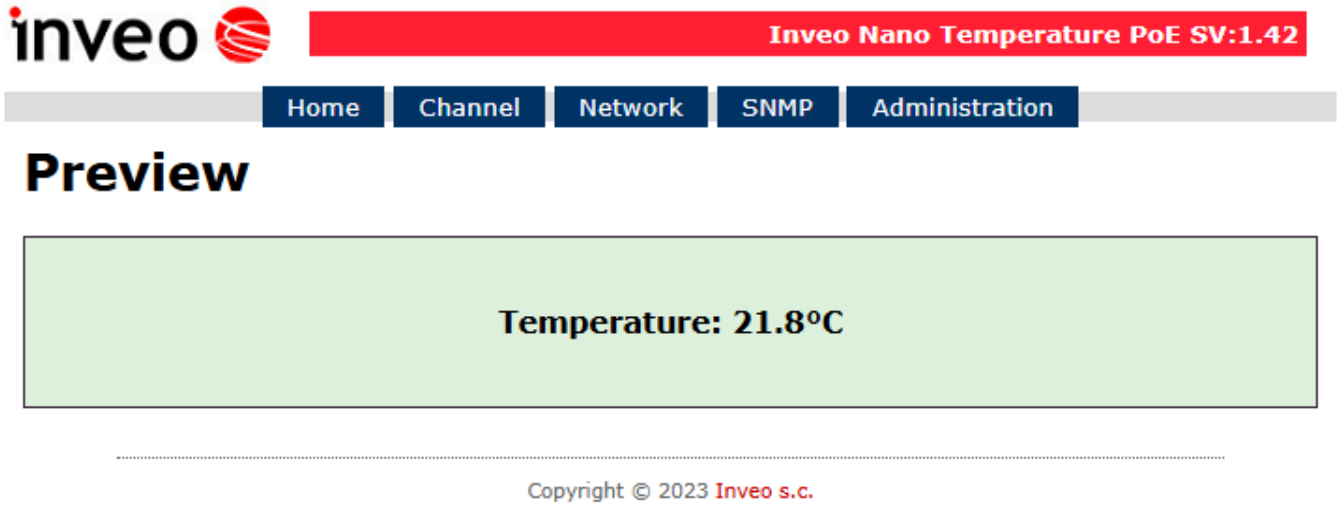
2. The LED will blink about 2 times per second (Nano), the display will show `dhcp` (Nano PoE).
3. Release the **RESET** button.
4. The current DHCP status will be displayed: **On** (enabled) or **Off** (disabled).

DHCP can also be enabled or disabled in the network settings. Access the **Network** tab or use the Discoverer programme.

Device functions

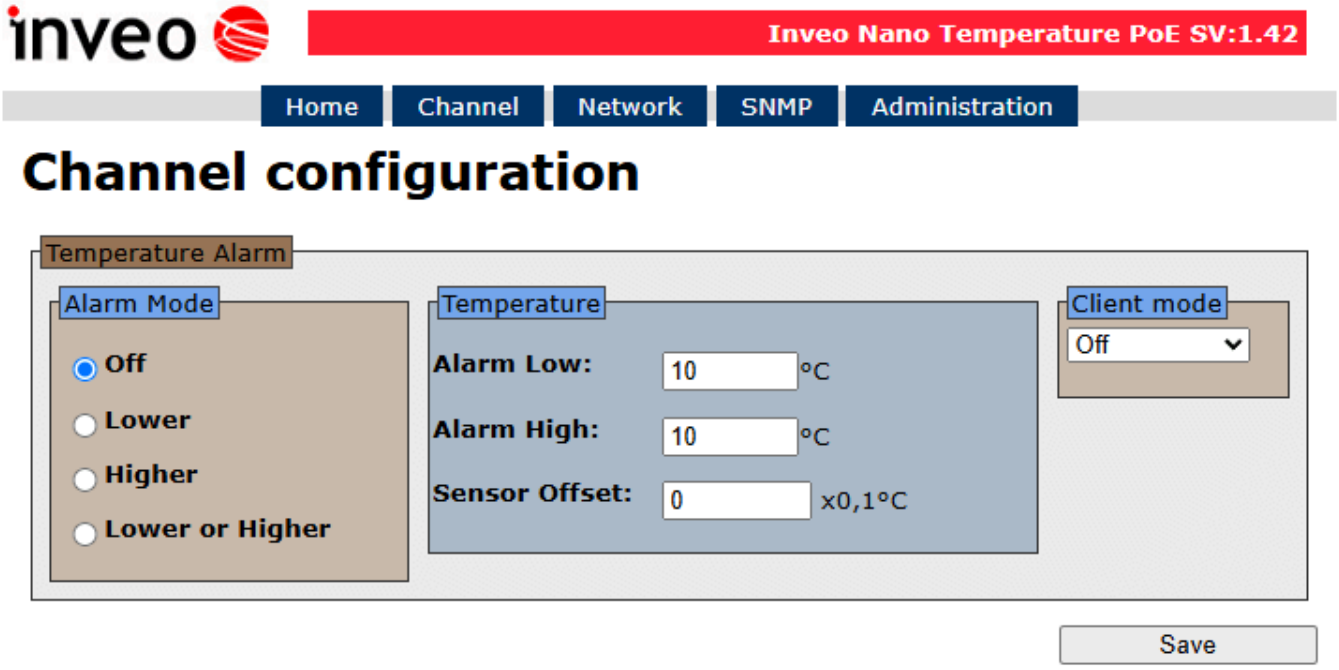
Temperature preview

In the **Home** tab, the current temperature read from the sensor and alarm states are displayed.



Alarms

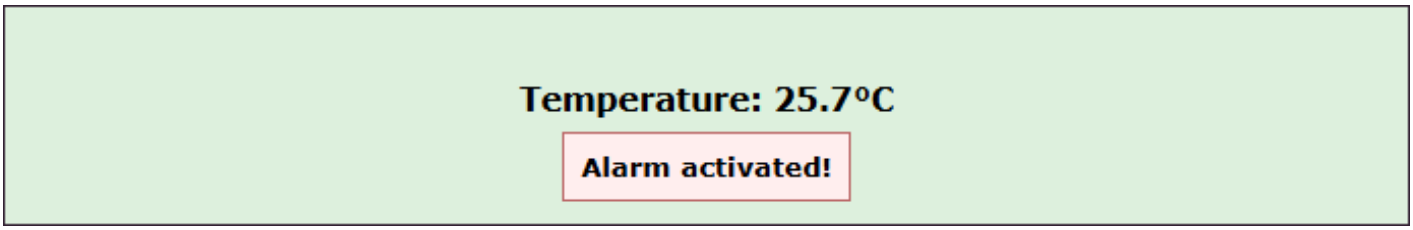
In this tab, temperature thresholds can be set, exceeding of which will trigger an alarm.



Alarm Mode

- **Off** – Alarm disabled,
- **Lower** – Alarm is activated when the measured temperature is lower than **Alarm Low**,
- **Higher** – Alarm is activated when the measured temperature is higher than **Alarm High**,
- **Lower or Higher** – Alarm is activated when the measured temperature exceeds the value in **Alarm High** or drops below **Alarm Low**.

Presence of an alarm state is displayed on the module's home page. The LED display or LED indicator on the device's enclosure blinks.



After an alarm is triggered, a virtual output No. 1 is activated in the `status.xml` resource (`<on>00000001</on>`).
`http://192.168.111.15/status.xml`

```
<response>
    <prod_name>Nano-DS</prod_name>
    <sv>1.42</sv>
    <mac>00:00:00:00:00:00</mac>
    <out>00000000</out>
    <on>00000001</on>
    <in>00000000</in>
    <counter1>0</counter1>
    <temp1>18.8</temp1>
</response>
```

Information

If an alarm has been activated, the device will resume normal operation (without indicating an alarm) only after the 1°C hysteresis zone is exceeded. For example, if the "Lower" alarm is set to 20°C, it will activate at 20°C and deactivate after the temperature exceeds 21°C.

The **Sensor Offset** field allows to offset the temperature readings by a value if needed.

Tip

After making changes, apply them using Save

Destination Client (M2M)

Inveo devices shuch as Lantick, Nano Temp/Nano Temperature Sensor PoE, Nano In/Nano Digital Input PoE, Nano OUT/Nano Relay Output PoE etc. can send the data to a server or other module equipped with outputs using TCP or UDP. Thanks to this, the remote module can receive sensor readings, react to channel activation and activate/deactivate relay outputs in real-time if an alarm occurs. The messages are sent after each change of state and every 5 seconds.

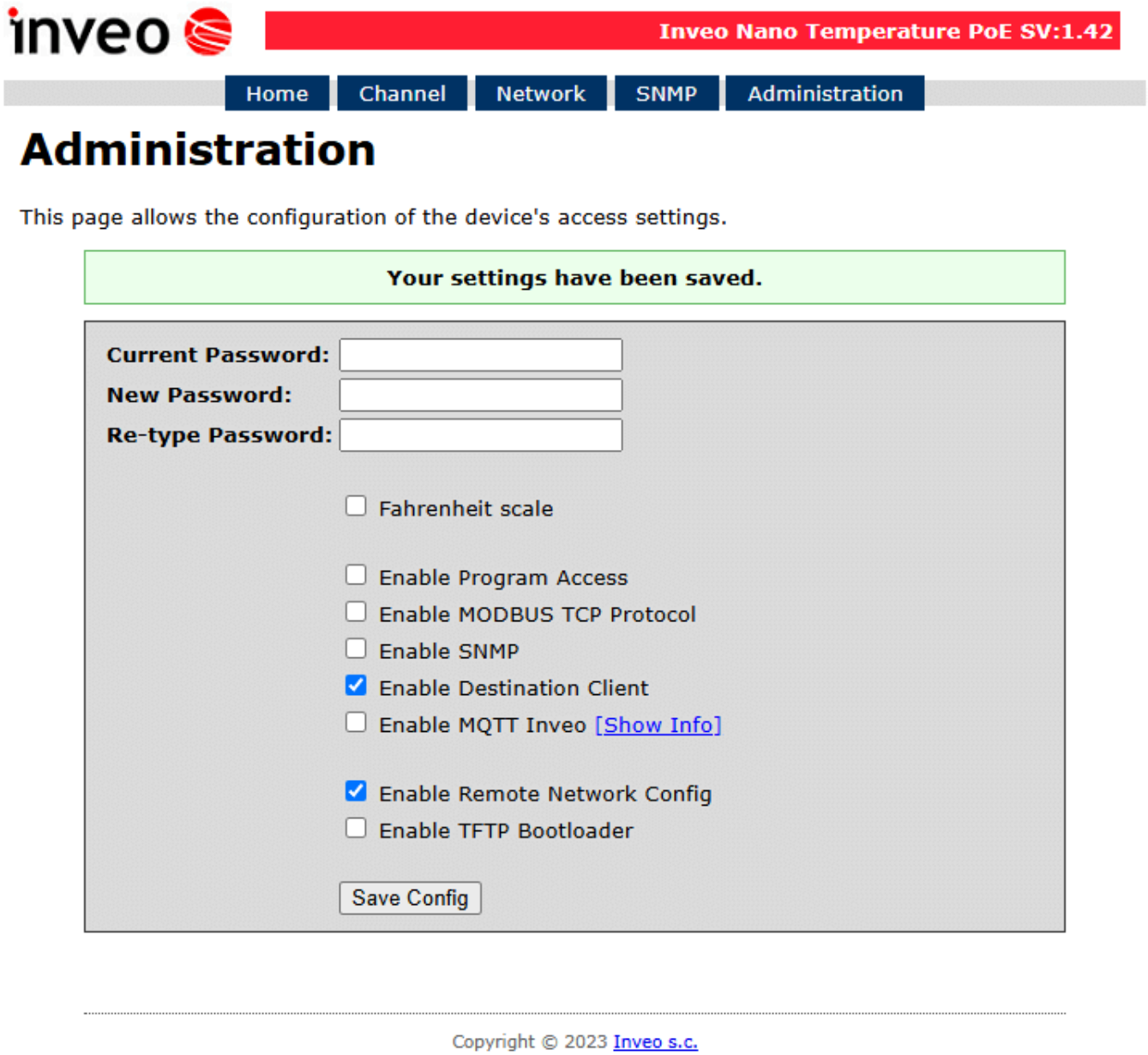
Configuration for receiving modules (target devices):

Step 1: Enable the service In **Administration**, select **Enable Program access** and **Save config**.

Configuration for messaging modules (output status):

Step 1: Enable Destination Client

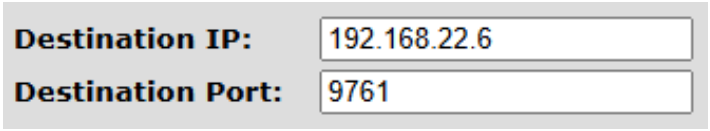
In **Administration**, select **Enable Destination Client** and **Save config** to activate the service.



Step 2: Network settings

In the **Network** tab, fill in the fields:

- **Destination IP** – Target device or server IP address,
- **Destination Port** – Port, on which the remote device is listening. 9761 by default.

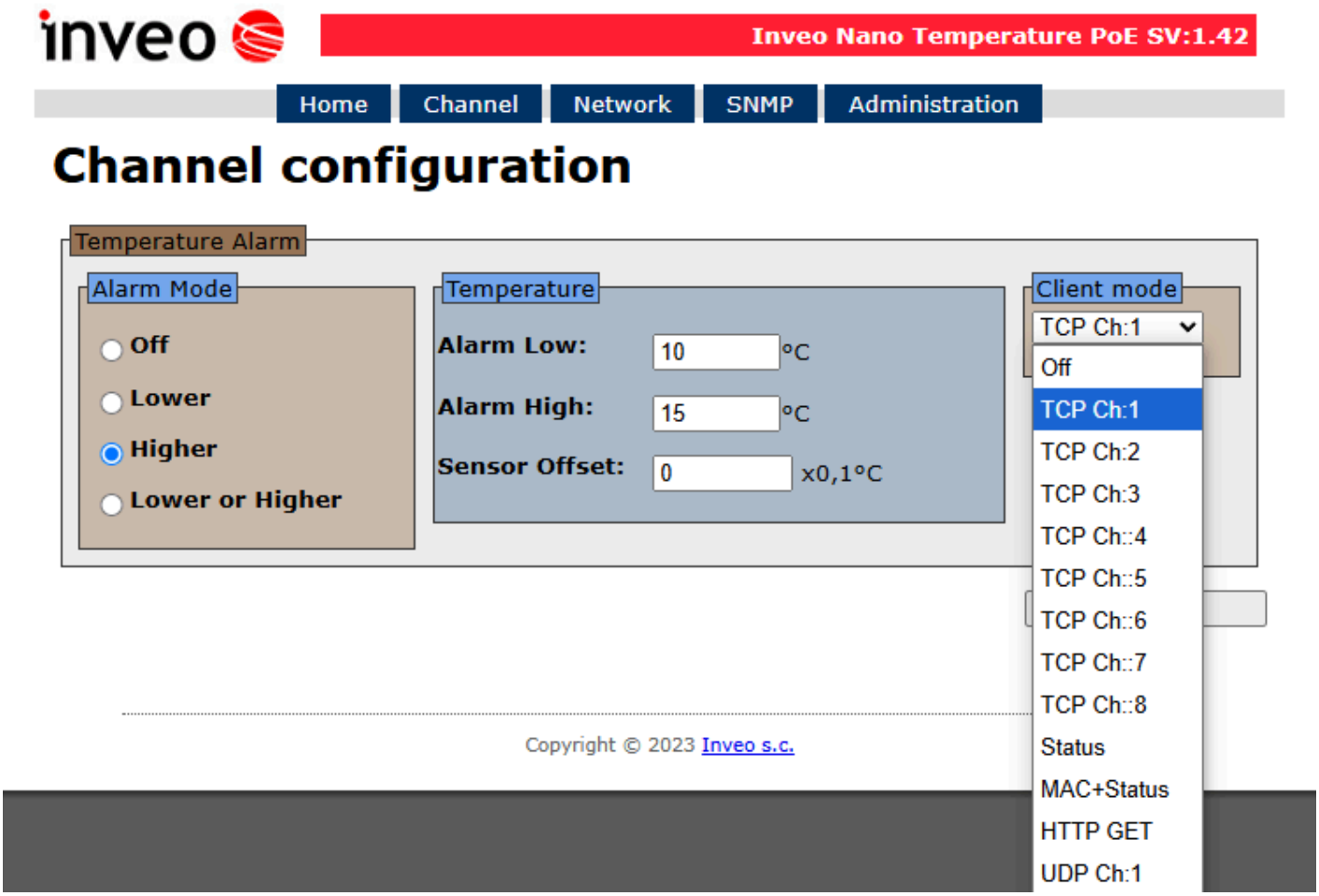


Step 3:

Go to the **Channel** tab and select the type of message to be sent. If using TCP and UDP, select the channel that will be controlled on the taget device.

The following options are available:

- Off
- TCP Ch:x
- UDP Ch:x
- Status
- MAC+Status
- HTTP GET



TCP Ch:x and UDP CH:x

TCP Ch:x – This function uses the connection oriented protocol (TCP). Ch:x is the target output channel in the remote device (eg. Lantick) that will be controlled after the local device channel state changes. TCP frame format #1.

UDP Ch:x – Function uses the connectionless protocol (UDP). Ch:x is the target output channel in the remote device (eg. Lantick) that will be controlled after the local device channel state changes. UDP frame format #1.

The format #1 frame is sent in HEX form. Example TCP frame sent while an alarm is active and Ch:1 is set:

SOF	CMD	CH	F_ID	ALARM	!ALARM	TEMP	RES	RAW MSB	RAW LSB	CRC
0x0F	0x01	**0x00**	0xFF	0x01	0xFE	0x1E	0x00	0x01	0xED	0x1A

Example TCP frame sent while an alarm is inactive and Ch:1 is set:

SOF	CMD	CH	F_ID	ALARM	!ALARM	TEMP	RES	RAW MSB	RAW LSB	CRC
0x0F	0x01	**0x00**	0xFF	0x00	0xFF	0x16	0x00	0x01	0x63	0x88

CH determines the output channel in the target device that will be controlled when an alarm occurs.

ALARM – 01 - alarm active, 00 - alarm inactive.

TEMP value is the temperature without its decimal part.

RAW_MSB and **RAW_LSB** is the temperature read directly from the sensor. This temperature should be divided by 16.

Example

Raw MSB – 01
Raw LSB – 63
(hex) 157 = (dec) 355
355/16=22,19

Calculating CRC:

```
CRC = (SOF+CMD+CH+F_ID+ALARM+!ALARM+TEMP+RES+RAW_MSB+RAW_LSB) MOD 256
```

Format 1:

```
09:03:33 data from 192.168.22.31: 0f 01 00 ff 00 ff 16 00 01 66 8b
```

Status

Selection of this message type will cause the device to send its channel state. TCP frame format #2.

The format #2 frame is sent in the form of a character string.

```
<ALARM>[SPACE]<TEMPERATURE>
```

- **ALARM** – 01 - alarm active, 00 - alarm inactive.

HEX value	STRING
30 20 33 39 2E 35	0 39.5

Format 2:

09:08:03 data from 192.168.22.31: 0 22.3

MAC + Status

Selection of this message type will cause the module to send its MAC address and current channel state. TCP frame format #3.

The format #3 frame is sent in the form of a character string.

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

- **MAC** – Module MAC address,
- **ALARM** – 01 - alarm active, 00 - alarm inactive,
- **TEMPERATURE** – Temperature reading.

HEX Value	STRING
00 00 00 00 00 00 00 00 00 00 00 00 20 30 20 34 36 2E 39	000000000000 0 46.9

Format 3:

09:08:48 data from 192.168.22.31: [redacted] 0 22.3

HTTP GET

The module sends its MAC address and channel state. Frame format #4.

Setting **Client Mode** to **HTTP GET** makes the device send data to the server in the following form:

`nano.php?mac=<MAC>&io=<ALARM>&value=<TEMPERATURE>`

- **MAC** – Module MAC address,
- **ALARM** – 01 - alarm active, 00 - alarm inactive,
- **TEMPERATURE** – Temperature reading.

Example

Example frame received by the server:
GET /nano.php?mac=000000000000&io=1&value=26.2
MAC address = 000000000000,
io=1, (alarm active)
value=26.2 (temperature is 26.2)

The TCP frame can be handled by own software.

Tip

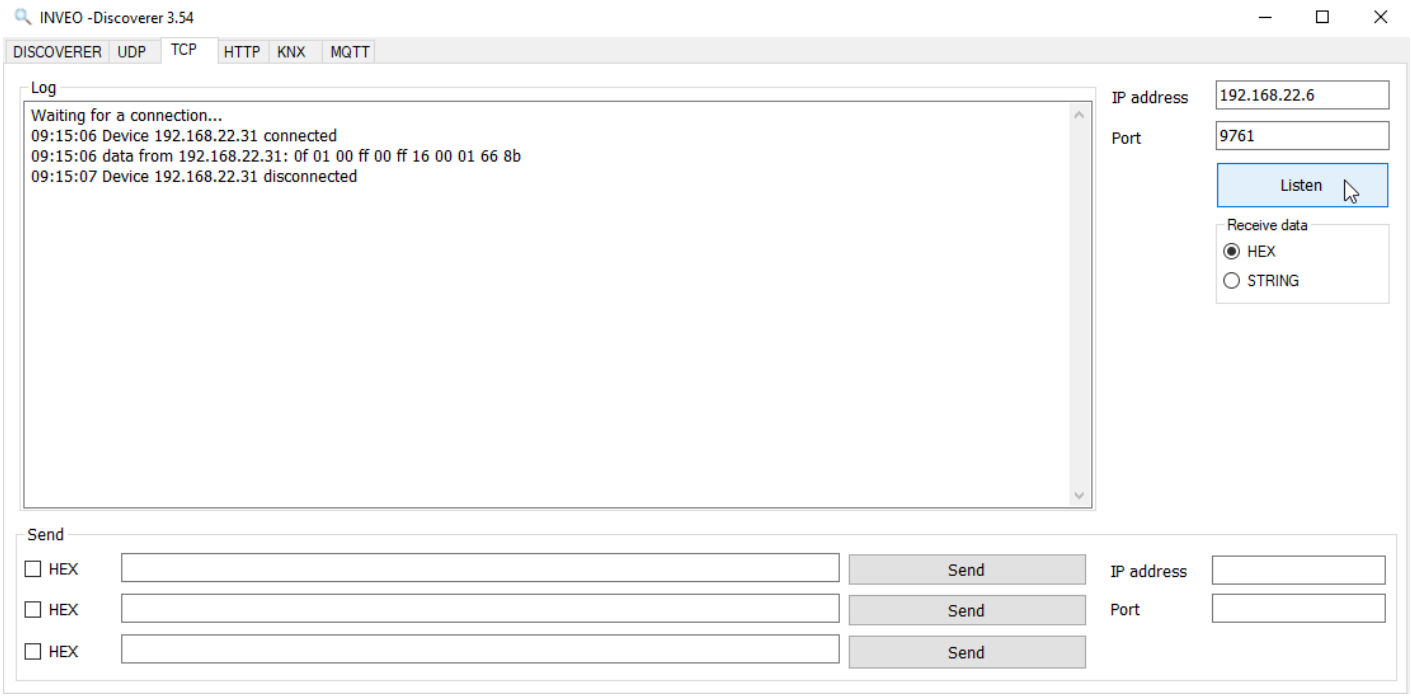
Data transfer can be tested using the Inveo Discoverer programme.

To test the data transfer, go to **Administration**, select **Enable Destination Client**, and click **Save Config**.

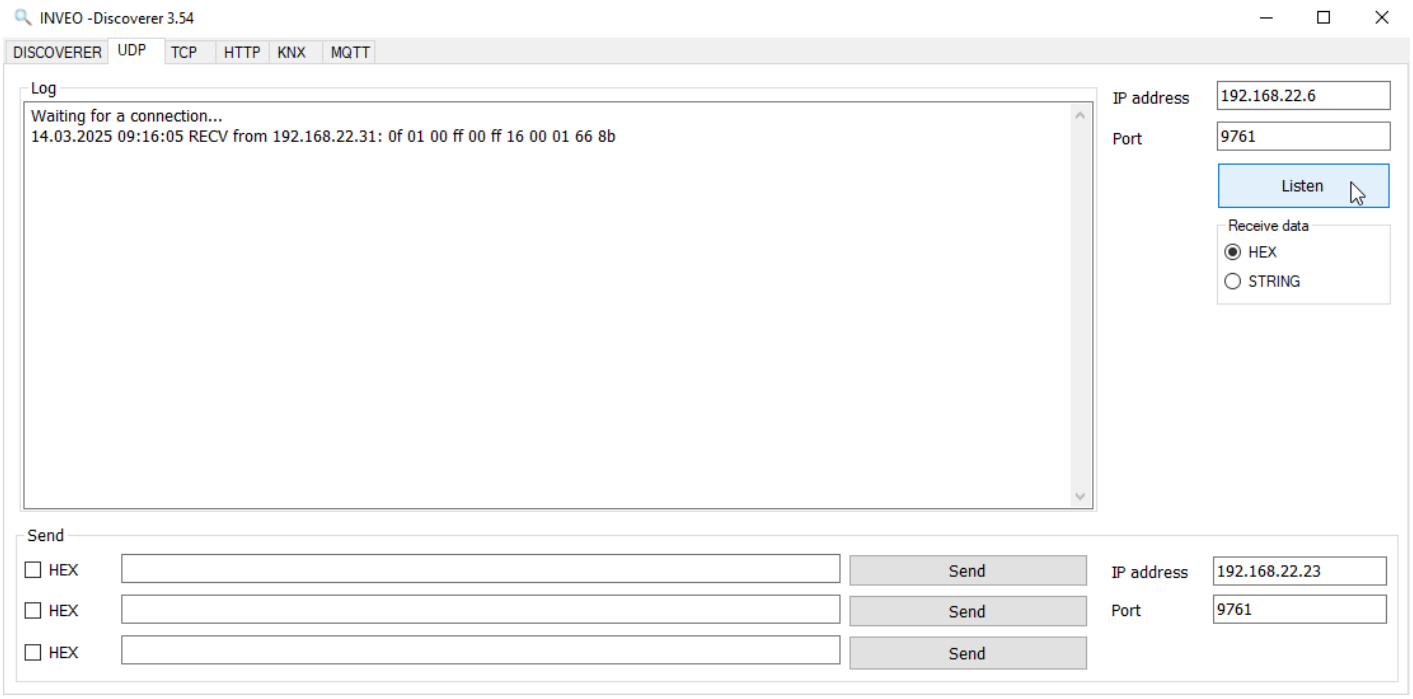
In the **Network** tab, fill in the following fields:

- **Destination IP** – Computer's IP address,
- **Destination Port** – Port, on which the remote device is listening on (default 9761).

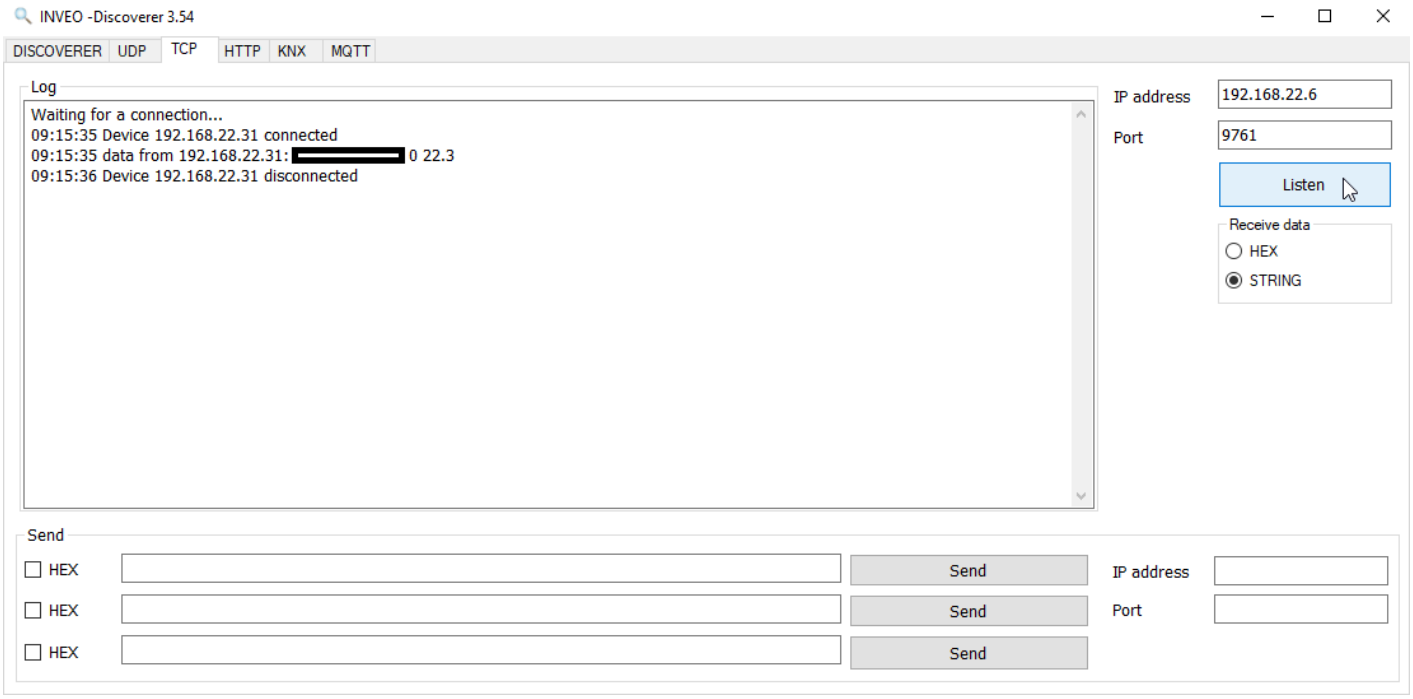
To test the TCP message type, select **TCP Ch:x** in the **Channel** tab. The next step is to run Inveo Discoverer and click **TCP**. Input the values from **Network** into the **IP address** and **Port** fields. Select **HEX** in **Receive Data**, then click **Listen**.



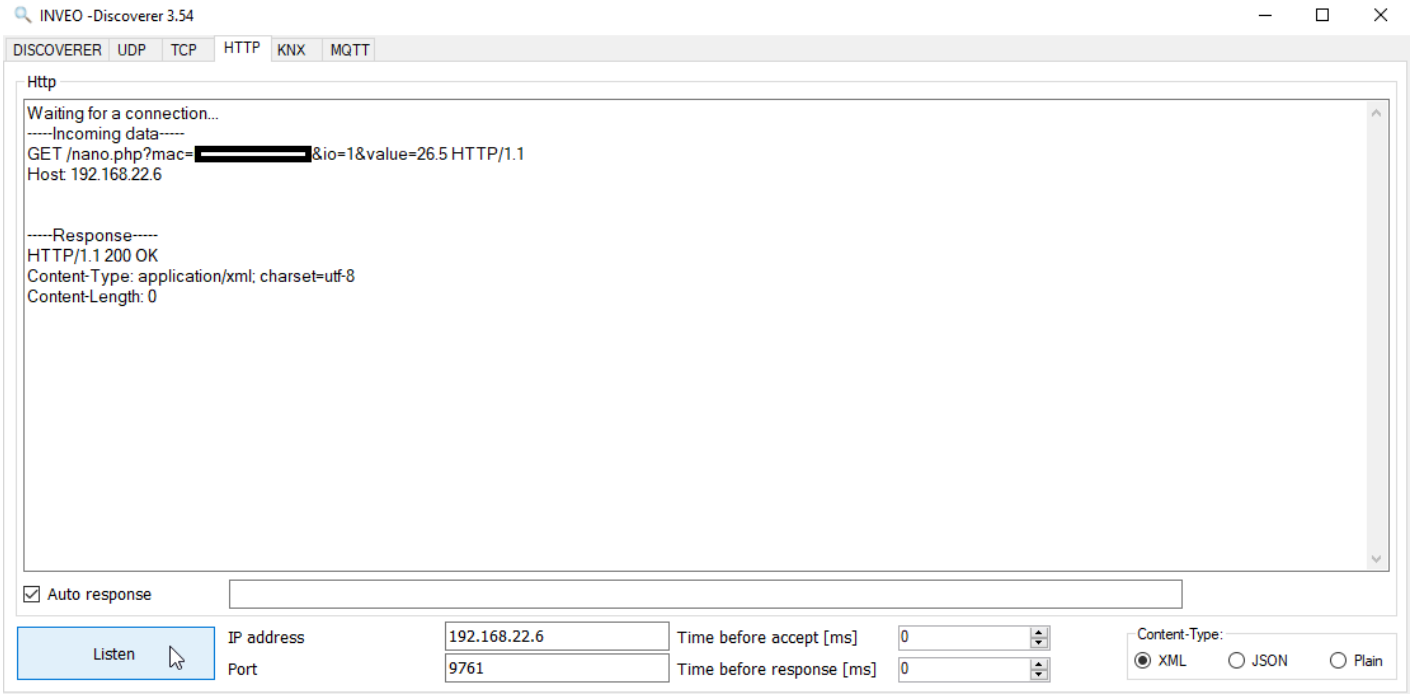
To test the UDP message type, select **UDP Ch:x** in the **Channel** tab. The next step is to run Inveo Discoverer and click **UDP**. Input the values from **Network** into the **IP address** and **Port** fields. Select **HEX** in **Receive Data**, then click **Listen**.



To test the Status and Mac+status message types, select **Status** or **Mac+status** in the **Channel** tab accordingly. The next step is to run Inveo Discoverer and click **TCP**. Input the values from **Network** into the **IP address** and **Port** fields. Select **STRING** in **Receive Data**, then click **Listen**.



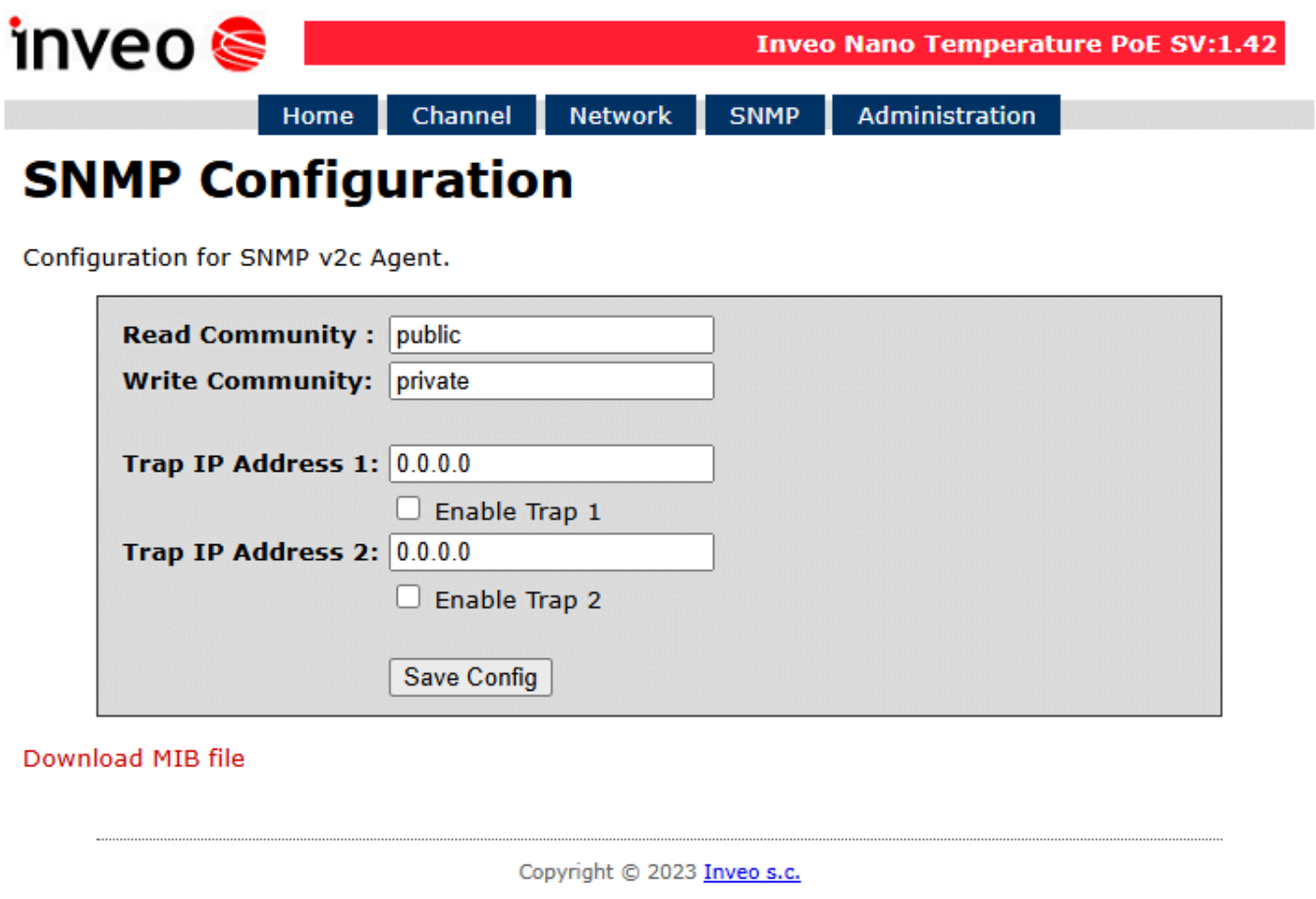
To test the HTTP message type, select **HTTP** in the **Channel** tab. The next step is to run Inveo Discoverer and click **HTTP**. Input the values from **Network** into the **IP address** and **Port** fields, then click **Listen**.



SNMP configuration

Nano Temperature Sensor is equipped with an SNMP v2c server, making remote readout of input state possible. To **Enable SNMP**, go to the **Administration** tab.

Configuration options are located in the **SNMP** tab:



SNMP allows readout of module parameters. To use this function, download the MIB file (describing the data structure) first. To do that, right-click **Download MIB file** and select **Save link as**. Import the downloaded MIB file into the MIB Browser programme.

The basic parameters that can be read from the module are displayed in the following table:

Name	Format	OID
Temperature	STRING	.1.3.6.1.4.1.42814.14.3.5.1.0
Temperature (integer)	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 active	INTEGER	.1.3.6.1.4.1.42814.14.3.1.1.0

The module also has the ability to send TRAP notifications if the temperature exceeds a certain threshold. To configure the destination addresses for those notifications, input them into **Trap IP Address 1** and **Trap IP Address 2**.

Windows command line control programme

When controlling the module from the command line, the cURL program can be used. First, enable **Program Access** in the **Administration** tab.

Example

Read output state, module IP address 192.168.0.231:
To read the measured temperature, recall temp1.txt. `http://192.168.0.231/temp1.txt` - The temperature will be displayed in the form of text.

Access to `stat.php` requires authentication. In this case, we precede the command with `-u login:password`. `curl –u admin:admin00 http://192.168.0.231/stat.php`

In response, the device will send the following information:

```
<response>
    <prod_name>Nano-DS</prod_name>
    <sv>1.42</sv>
    <mac>00:00:00:00:00:00</mac>
    <out>00000000</out>
    <on>00000000</on>
    <in>00000000</in>
    <counter1>0</counter1>
    <temp1>21.8</temp1>
</response>
```

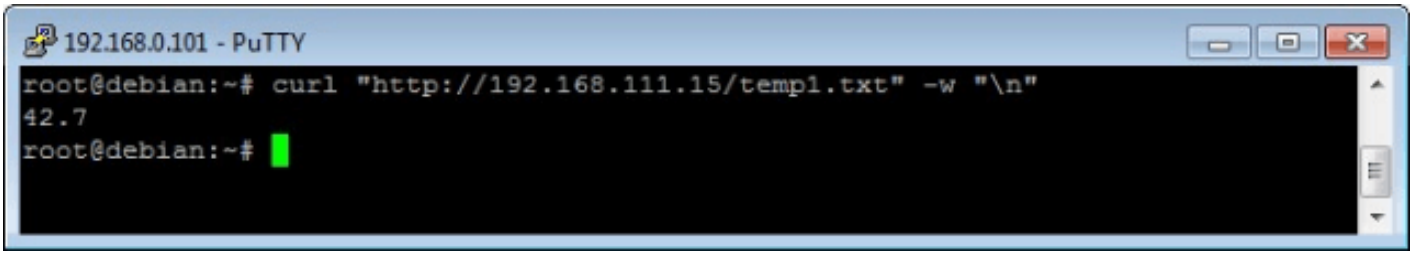
Section	Description
`<prod_name>`	Module type
`<sv>`	Firmware version
`<mac>`	Module MAC address
`<out>`	Output mode (Not used in Nano Temperature Sensor)
`<on>`	Output state (Activated/Deactivated), in Nano Temperature Sensor: **00000001** means that an alarm occurs
`<in>`	Always 0 in Nano Temperature Sensor
`<counter1>`	Always 0 in Nano Temperature Sensor
`<temp1>`	Measured temperature

Linux control programme

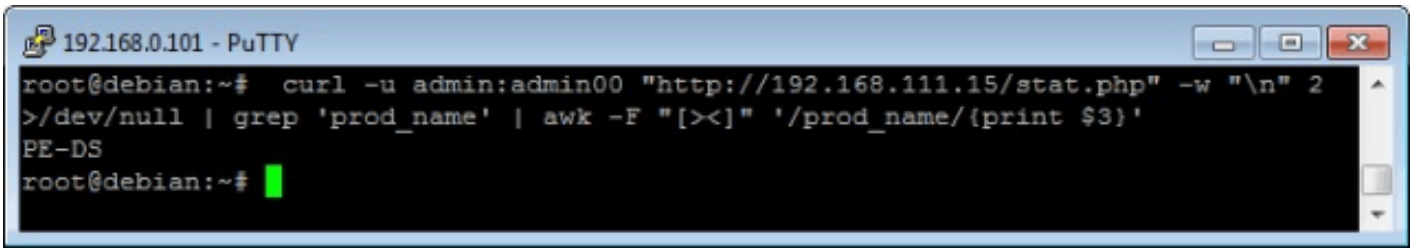
cURL can be used in Linux:

> **Tip**
>
> **Access to `stat.php` requires authentication.**
> **Access to `status.xml` does not require authentication.**

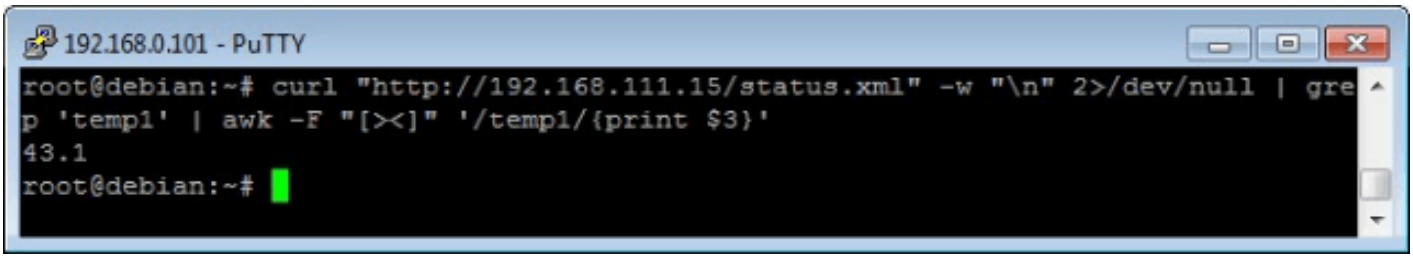
```
curl "http://192.168.111.15/temp1.txt" -w "\n"
```




```
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}'
```




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



Modbus TCP

To activate the function of sending data using Modbus TCP protocol, select **Enable Modbus TCP protocol** in the **Administration** tab.

Modbus is available via the LAN connector.

Modbus TCP listens on port 502.

The device supports the following Modbus functions:

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

Coils addressing

Address	Name	R/W	Description
1000	On1	R	Temperature exceeded
1002	SensError	R	Sensor error (0-ok, 1-error)

Holding Registers addressing

Address	Name	R/W	Description
4000	ThermostatL	R/W	Lower alarm threshold
4001	ThermostatH	R/W	Upper alarm threshold
4002	Alarm mode	R/W	1 – OFF 2 – Lower (alarm low) 3 – Higher (alarm high) 4 – Lower or Higher
4004	Temperature x10	R	Temperature x 10 (eg. 10,5C is 105)
4005	Temperature Int	R	Temperature integer
4006	Temperature Frac	R	Temperature fraction
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	Writing 144 will save the configuration to EEPROM

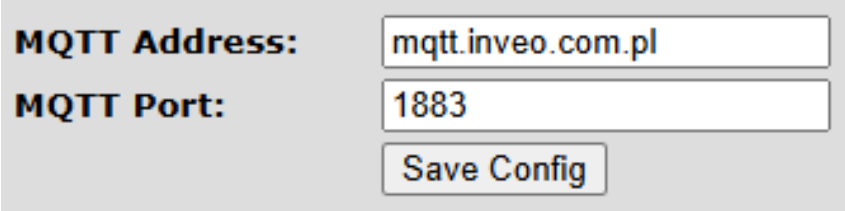
MQTT

The device supports MQTT protocol. Data from the device is sent to the server every minute and after each value change. The data is not encrypted. The user subscribes the device data after connecting with the broker. The amount of users that can receive the data from a single device is unlimited.

In addition to the default Inveo MQTT broker, the user can specify their own MQTT server for temperature monitoring purposes.

Configuration:

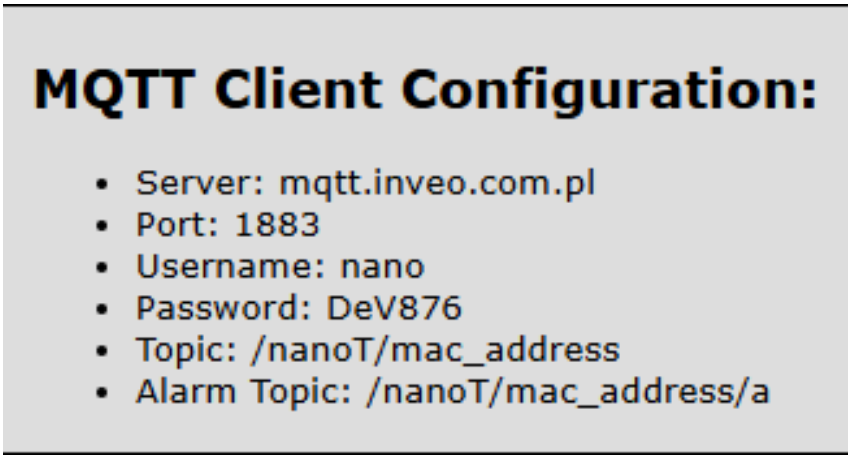
Firstly, **Enable MQTT Inveo** in **Administration**. In the **Network** tab, MQTT broker address and port can be configured:



Tip

For the Inveo broker, the settings should be as follows:
- MQTT Address: mqtt.inveo.com.pl
- MQTT Port: 1883
A computer with the Inveo Monitoring application installed can be used as a broker. To do that, type the PC's IP address into the MQTT Address field.

In the **Administration** tab, after clicking **Show info** for **Enable MQTT Inveo**, MQTT client settings that will be needed for launching the application will be displayed:



Many Android/IOS applications support MQTT, enabling the user to receive the data on their telephone (eg. MQTT dash) and PC (MQTT explorer).

HTTP GET

The modules can be controlled using the HTTP GET protocol. To read the current module state, recall the resource using a web browser eg. `http://192.168.111.15/status.xml`

The module will display all important information in the form of an XML file:

```
<response>
    <prod_name>Nano-DS</prod_name>
    <sv>1.42</sv>
    <mac>00:00:00:00:00:00</mac>
    <out>00000000</out>
    <on>00000000</on>
    <in>00000000</in>
    <counter1>0</counter1>
    <temp1>19.4</temp1>
</response>
```

Section	Description
`<prod_name>`	Module type
`<sv>`	Firmware version
`<mac>`	Module MAC address
`<out>`	Output mode (Not used in Nano Temperature Sensor)
`<on>`	Output state (Activated/Deactivated), in Nano Temperature Sensor: **00000001** means that an alarm occurs
`<in>`	Always 0 in Nano Temperature Sensor
`<counter1>`	Always 0 in Nano Temperature Sensor
`<temp1>`	Measured temperature

In order to only read the measured temperature, recall temp1.txt `http://192.168.111.17/temp1.txt`. The temperature will be displayed in the form of text.

TCP/UDP/IP

Nano Temperature Sensor communications data frame:

Command name	Byte number	1	2	3	4	5	6	7	8	9	10	11	
	Byte name	SOF	CMD	Channel	Data1	Data2	Data3	Data4	Data5	Data6	Data7	CRC	Returns
Temperature reading	dec	15	12	0	0	0	0	0	0	0	0	CRC	2 bytes +CRC
	hex	0x0F	0x0C	0x00	0	0	0	0	0	0	0	CRC	2 bytes +CRC

The module listens on TCP port 9761 by default.

Read current temperature value from the 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)
```

The request will return 2 bytes (current temperature) and CRC (sum of 2 previous bytes).

Examples

Temperature value measured by the sensor	Value returned by the module to port 9761		Conversion to dec format		Calculated temperature value (dec/16)
dec	2 bytes	CRC	hex	dec	
-18,0	EO FE	DE	FFFF-FEE0	287	-17,9375
-5,1	AE FF	AD	FFF-FFAE	81	-5,0625
26,5	A8 01	A9	1A8	424	26,5
33,8	1E 02	20	21E	542	33,875

The converted decimal value should be divided by 16.

Factory settings

Restoring factory settings

To restore the factory settings:

- Power up the device,
- Press the **RESET** button for a time period between 10 and 15 seconds,
- The **TAG** LED will start flashing about 4 times a second (Nano, Nano RFID PoE), `rSt` will appear on the display (Nano In/Out/Temp PoE),
- Release the **RESET** button.

Once the above steps have been completed, the device will be set to the following parameters:

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

Warranty and manufacturer's liability

> **Warning**
>
> **The manufacturer provides a two-year warranty for the device and post-warranty service for a period of 10 years from the date of introduction of the device to the market. The warranty covers all material and production defects.**

The manufacturer undertakes to respect the warranty agreement, if the following conditions are met:

- All repairs, changes, expansions and device calibrations are carried out by the manufacturer or an authorized service center,
- The power supply system meets the applicable standards,
- The device is operated in accordance with the suggestions presented in this manual,
- The device is operated in accordance with its intended purpose.

The manufacturer assumes no responsibility for consequences resulting from improper installation, improper use of the device, failure to comply with the instruction manual, and repairs made by unauthorized personnel.

> **Warning**
>
> **The device contains no user serviceable parts inside.**

Storage, operation and transport conditions

The device should be stored in enclosed rooms, where the atmosphere is free from vapours and corrosive substances:

- Environment temperature from -30°C to +60°C (-22°F - 140°F),
- Humidity from 25% to 90% (condensation unacceptable),
- Atmospheric pressure from 700 to 1060 hPa.

The device is intended to operate in the following conditions:

- Environment temperature from -10°C do +55°C (14°F - 131°F),
- Humidity from 30% to 75%,
- Atmospheric pressure from 700 to 1060 hPa.

Recommended transport conditions:

- Environment temperature from -40°C do +85°C (-40°F - 185°F),
- Humidity from 5% to 95%,
- Atmospheric pressure from 700 to 1060 hPa.

Installation and device operation:

- The module should be operated in accordance with recommendations provided later in this manual.

Disposal and decommissioning

In an event the device needs to be decommissioned (eg. after its intended life period is surpassed), it is recommended to contact the manufacturer or his representative, who are responsible to respond appropriately, i.e., to collect the device from the user. The user can alternatively contact companies specializing in electronic device or computer equipment disposal and/or decommissioning. Under no condition should the device be placed with other waste.