

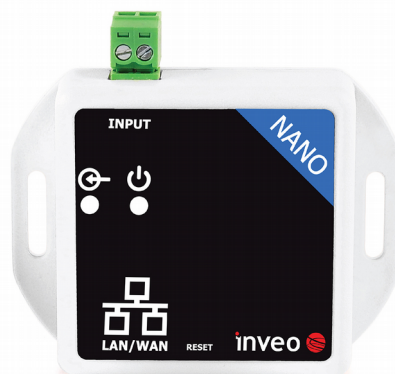


User manual The Digital Input Module

Nano Digital Input PoE



Nano Digital Input



Soft >= 1.21

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Dear Customer!

Thank you very much for choosing our product. Before its use, please read these instructions carefully. Here you find the most appropriate ways of dealing with this device, the basic principles of safety and maintenance. Please, also keep the user manual so that you can read it during later use.

Attention!

The manufacturer is not liable for any damage caused by improper use of the device which differ from its intended purpose, or improper handling, as well as a fault of driver resulting from improper use.

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1 Preliminary information

Before starting work with the device, read The User manual and follow the instructions contained therein!

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 device



Important information and guidelines



Following this guidelines makes the use of the device easier

Attention: The screenshots in this manual can be dissimilar from actual images at the time of the device purchase. Due to continuous development of the devices software, some of the functions may differ from these in the manual. The manufacturer claims no responsibility for any undesirable effects (misunderstanding) caused by changes of the software.

2 Application of the device

The Nano Digital Input device is used to read state of the input through LAN network. The readout can be done using www website, network protocols (HTTP GET, Modbus TCP, SNMP, MQTT) TCP frame or software supplied by manufacturer.

3 Warranty and liability of the manufacturer



The manufacturer provides a 2-year warranty on the device. The manufacturer also provides post-warranty service for 10 years from the date of the introducing the device 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,
- the device is operated in accordance with the recommendations outlined in this manual,
- the device is used as intended.

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



This device doesn't contain serviceable parts.

4 Safety guidelines

The device has been designed and built 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 a high-quality plastic.

4.1 Storage, work and transport conditions

The device has to be stored in enclosed rooms which are free of caustic vapors and substances and also meet the requirements:

- surrounding temperature from -30°C to +60°C,
- humidity from 25 to 90%,
- atmospheric pressure from 700 to 1060hPa.

The device working conditions:

- surrounding temperature from -10°C to +55°C,
- relative humidity from 30% to 75%,
- atmospheric pressure from 700 to 1060hPa.

Recommended transport conditions:

- surrounding temperature from -40°C to +85°C,
- relative humidity from 5% to 95%,
- atmospheric pressure from 700 to 1060hPa.

4.2 Installation and use of the device

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

4.3 Decommissioning of the device

When it becomes necessary to recycle the device (for instance, to decommission the device from service), please contact the manufacturer or its representative, who are obliged to respond, appropriately, i.e. collecting the device from the user. You can also ask the companies involved in recycling of electrical or computer equipment. Under no circumstances should you place the device along with other waste material.

5 Construction of the device

5.1 Nano Digital Input PoE

Technical data:

Power supply::

PoE: 33-57V POE IEEE 802.3af

DC: 10-24VDC (screw terminals 3,5mm)

Power consumption: max 1,5W

Inputs:

1 input: Input type – dry contact NO
 Counter max value: 4 294 967 296
 Max input frequency: 1000Hz

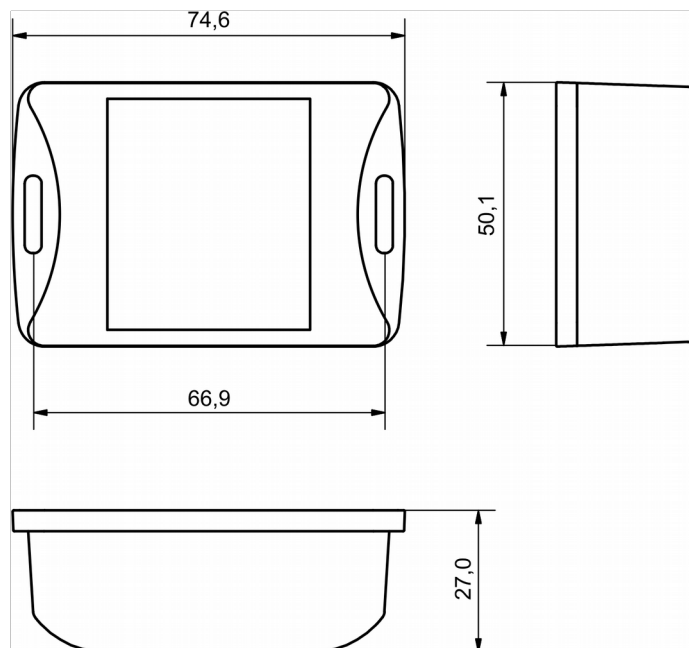
Communication:

1 port Ethernet: 10Mbps
 PoE IEEE 802.3af

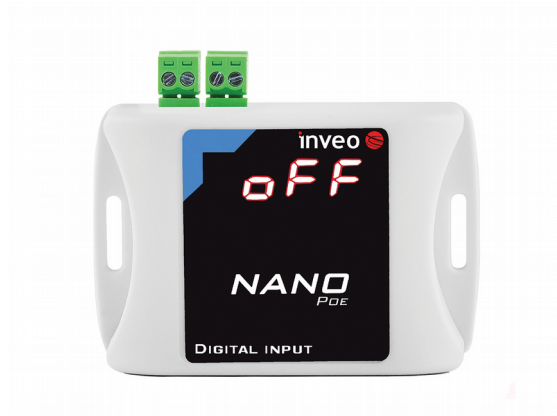
Housing:

IP Code: 30

Dimensions:



General features:

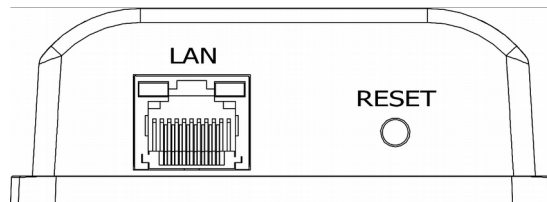


The device has a 7-segment display signaling the current input status (**ON** or **OFF**).

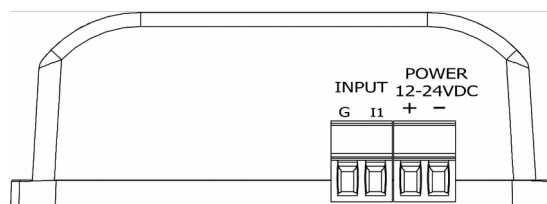
There are several ways to communicate with the module:

- 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 – TCP protocol available for user.

Description of the module connectors:



- **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.



- **INPUT** – digital input NO, dry contact,
- **POWER** – power connector. An additional power connector used in the event of a PoE power failure. Supply voltage 10-24VDC.

5.2 Nano Digital Input

Technical data:

Power supply:

The module is adapted to 12-24VDC power supply.
Power is supplied through the PoE adapter.

Inputs:

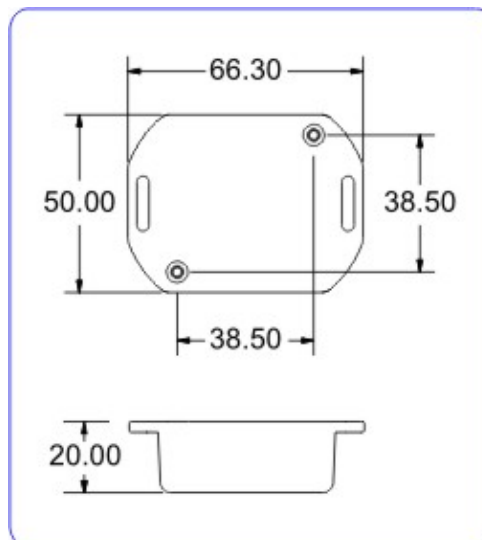
1 input: Input type – dry contact NO
 Counter max value: 4 294 967 296
 Max input frequency: 1000Hz

Communication:

1 port Ethernet: 10Mbps
 passive PoE 12-24VDC power supply

Housing:

IP Code: 30
Dimensions:



General features:



The device has two LEDs. LEDs indicate power supply and input status.

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 – TCP protocol available for user.

Description of the module connectors:

- **LAN** – LAN network and Passive PoE power supply,
- **RESET** – switch used to enabling DHCP service and restoring the module to the factory settings,
- **INPUT** – digital input NO, dry contact.

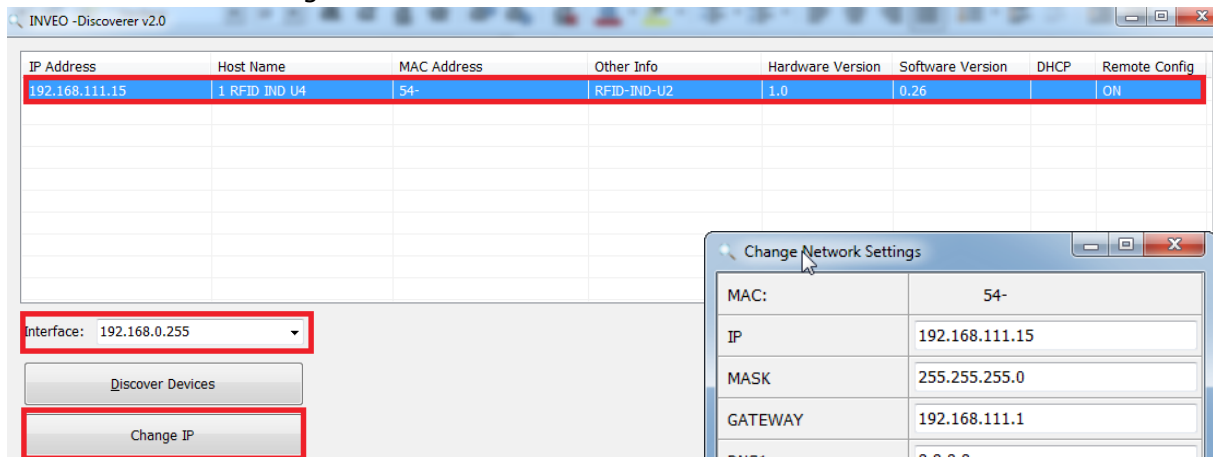
6 Configuration of the device

The device when used for first time needs to be configured.

There are two methods to do so. The network configuration can be easily changed by Inveo "Discoverer" (<https://inveo.com.pl/software/>) software:

6.1 Changing the device's IP address by Discoverer application.

When the "Discoverer" is opened and the relevant device is found, choose Interface list box and click on Change IP button.

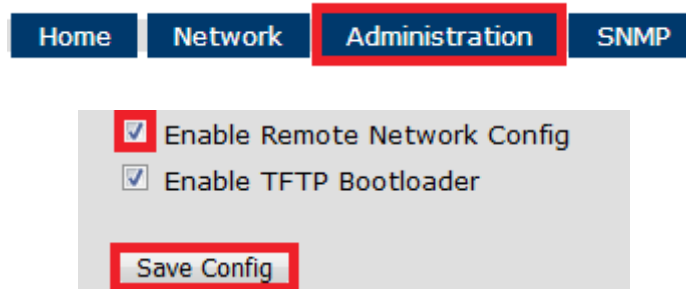


In a new opened dialog box, settings such as IP address, MASK, GATEWAY, DNS1/DNS2 and the Host name can be changed.

Please save correct settings by choosing **Change** button.

If **Remote Config** is disabled (enabled by default), it is necessary to configure the device by changing the computer's subnet (chapter 6.2).

To enable the remote configuration it is necessary to enter **Administration** tab and mark **Enable Remote Network Config**.



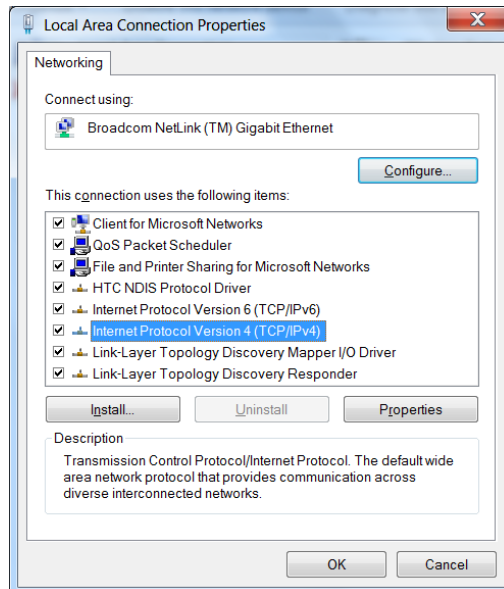
Save the setup by selecting **Save Config** button.

6.2 Changing the PC's subnet address, for the device configuration

After the device is connected to a network, a subnet address of a PC which is connected to the same network has to be changed.

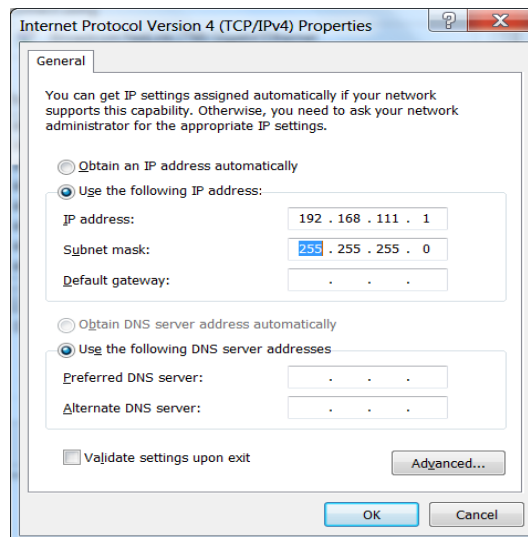
To do so, go to the PC's MS Windows network configuration: Start->Control panel ->Network and Sharing Center->Network and Internet->Network Connections, choose the related controller and right click on „Properties“.

After selecting this option configuration window will show up:



Changing network settings in MS WINDOWS

Next choose "Internet Protocol (TCP/IP)", double click on it and enter following settings:




Illustrative TCP/IP protocol settings

After saving changes by clicking OK, open an Internet browser and enter in the browser's address line: **192.168.111.15**.

Default user name/password: admin/admin00

In the **Network** tab it is possible to change LAN parameters.

inveo  Inveo Nano Temperature SV:1.17

Home Channel **Network** SNMP Administration

Network Configuration

This page allows the configuration of the device's network settings.

MAC Address:	<input type="text"/>
Host Name:	<input type="text" value="NANO"/>
	<input type="checkbox"/> Enable DHCP
IP Address:	<input type="text" value="192.168.111.17"/>
Gateway:	<input type="text" value="192.168.111.1"/>
Subnet Mask:	<input type="text" value="255.255.255.0"/>
Primary DNS:	<input type="text" value="8.8.8.8"/>
Secondary DNS:	<input type="text" value="8.8.4.4"/>
Destination IP:	<input type="text" value="0.0.0.0"/>
Destination Port:	<input type="text" value="0"/>
	<input type="button" value="Save Config"/>

To change the network settings, use the following fields:

- **Host Name** – NETBIOS name,
- **DHCP** – checking this box forces use of the address assigned by the DHCP server,
- **IP Address** – the IP address of the reader,
- **Gateway** – network gateway,
- **Subnet Mask** – IP subnet mask,
- **DNS1, DNS2** – DNS servers addresses.

- **Destination IP** – the IP address of the server or of the external device in the M2M connection (chapter 7.3),
- **Destination Port** – the listening port of the server or of the external device in the M2M connection.

After all changes, select **Save Config**.

6.3 Security settings and administration

The **Administration** settings allow for changing access password and to enable/disable particular services in the device.

The screenshot shows the 'Administration' page of the Inveo Nano Temperature SV:1.17. The page has a red header with the Inveo logo and the device name. Below the header is a navigation bar with buttons for Home, Channel, Network, SNMP, and Administration. The Administration page title is 'Administration'. Below the title is a description: 'This page allows the configuration of the device's access settings.' The main content area contains three password input fields: 'Current Password:', 'New Password:', and 'Re-type Password:'. Below these are seven checkboxes for enabling services: 'Enable Program Access', 'Enable MODBUS TCP Protocol', 'Enable SNMP', 'Enable Destination Client', 'Enable MQTT Inveo [Show Info]', 'Enable Remote Network Config' (checked), and 'Enable TFTP Bootloader'. At the bottom of the form is a 'Save Config' button.

Password change

To change password, in the **Current Password** field write a current password. Next, in the **New Password** field write your new password and confirm it at **Re-type Password** field.

Service settings

The device allows to choose which services are to be available. Selecting the check box next to the service name activates the selected service.

Enable Program Access – a service of access by a computer program (Windows, Linux) and TCP / IP protocol operating on port 9761,

Enable MODBUS TCP Protocol – enables Modbus TCP server,

Enable SNMP – enables SNMP protocol supporting,

Enable Destination Client – connecting to a remote host service (chapter 7.2),

Enable MQTT Inveo – a service that sends data to the INVEO MQTT cloud,

Enable Remote Network Config – remote configuration (via the Discoverer application),

Enable TFTP Bootloader – enables a bootloader.

Attention:

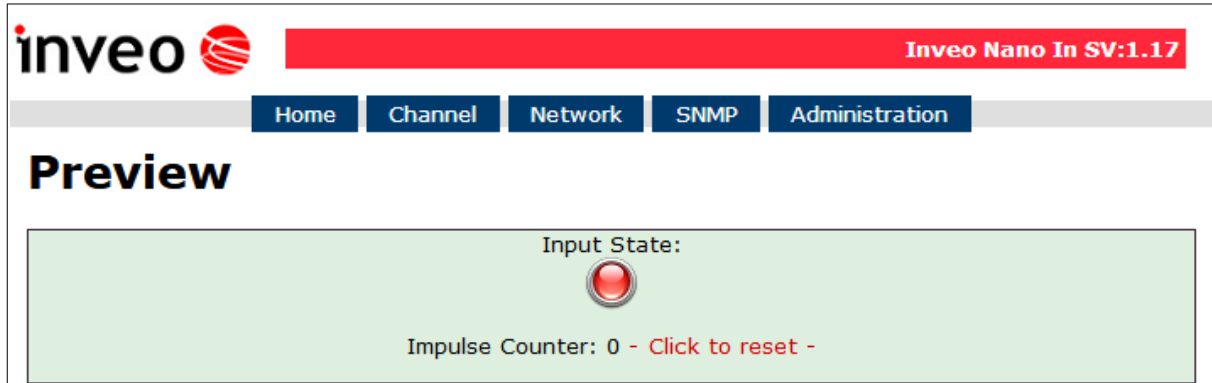
TFTP Bootloader and **Remote Network Config** ought to be disabled during normal work operation. It should be enabled for a firmware update only.



7 The device functions

7.1 Preview of the input status

The main function of the Nano Digital Input module is to control the state of the input channel. The current Input state is available in the **Home** tab.

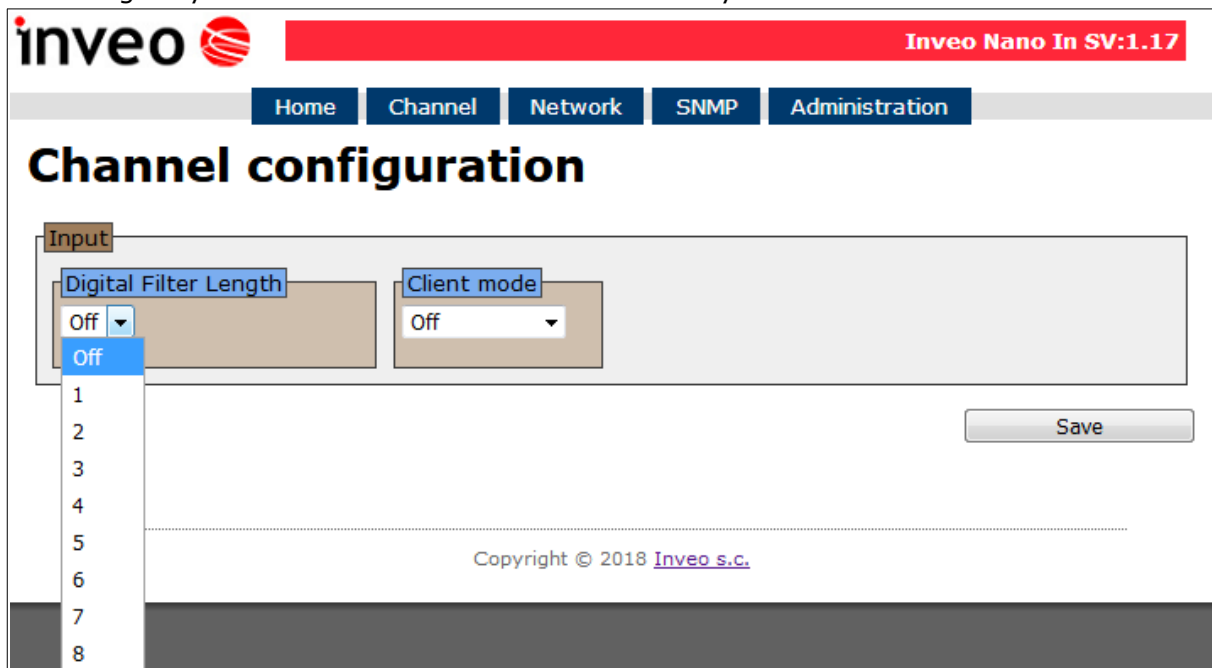


The device counts how many times the input has been enabled. If necessary, it is possible to reset the counter by pressing - [Click to reset](#) - .

7.2 Input signal filter

The Nano Digital Input module has a built-in median filter. The filter has a sampling time set to 20ms. During this time, the system takes the current state of the input signal and then sorts the values 0 and 1 (low and high status). The middle value of the sorted sample chain determines the module input status.

To enable filter, select the desired number of samples in the **Channel** tab. Changing the filter length by 1 introduces an additional 10 ms delay.



7.3 Destination Client (M2M)

Inveo devices as LanTick, Nano Temperature Sensor, Nano Digital Input, Nano Relay Output or others **are able to send information data to the server or to another module with outputs** using the TCP or UDP protocol. It means that this another module can react to activation of channel or when alarm occurs (Nano Sensors). The message is sent each time state is changed and additionally every 5 seconds.

Configuration of devices receiving messages (external devices)

To enable the service, enter the **Administration** tab and select **Enable Program Access** and confirm with the **Save Config** button.

Configuration of devices sending alarm status messages

To enable the service, enter the **Administration** tab and select **Enable Destination Client** and confirm with the **Save Config** button.

Home Channel Network SNMP **Administration**

Administration

This page allows the configuration of the device's access settings.

Current Password:

New Password:

Re-type Password:

Enable Program Access

Enable MODBUS TCP Protocol

Enable SNMP

Enable Destination Client

Enable MQTT Inveo [\[Show Info\]](#)

Enable Remote Network Config

Enable TFTP Bootloader

Save Config

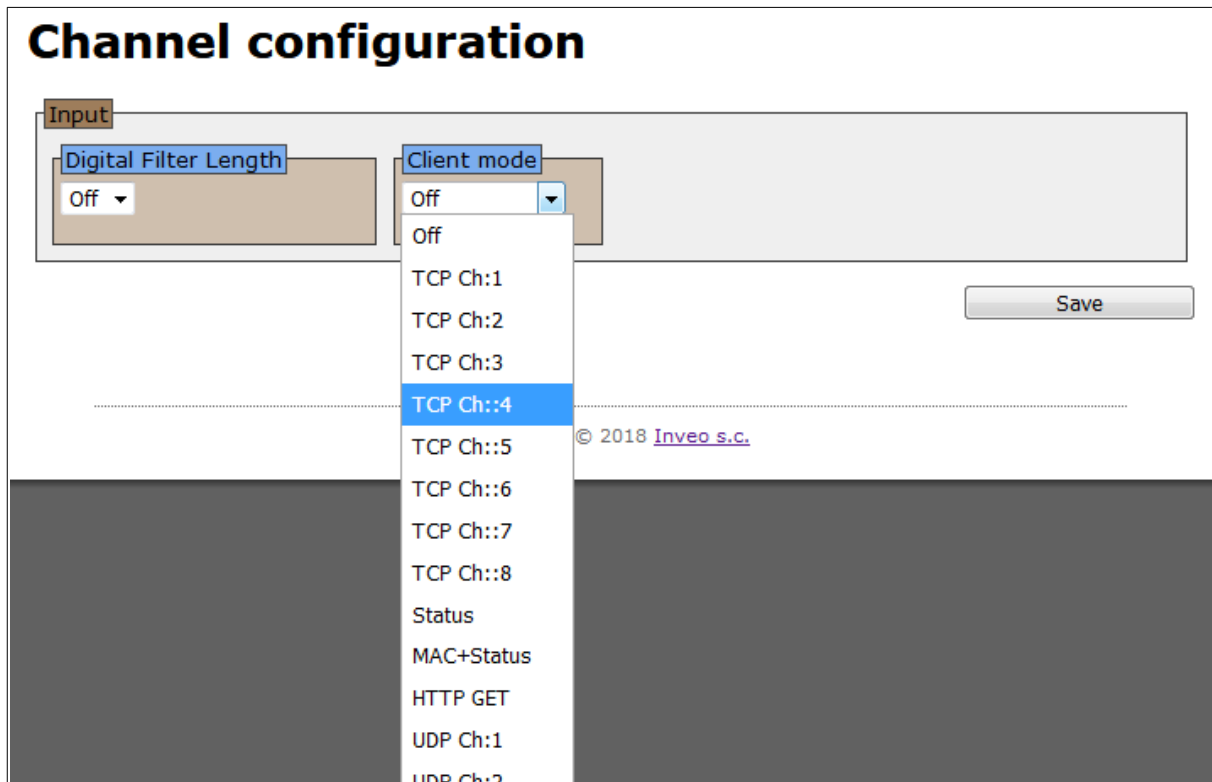
In the **Network** tab, fill in the **Destination IP** and **Destination Port** fields. The **Destination IP** field is an IP address of the external device or server. The **Destination Port** field is a port number of the external device (9731 by default).

Destination IP:

Destination Port:

Save Config

Then, in the **Channel** tab select the appropriate output which will be enabled in the external device or – select type of the message.



The user can choose the following fields:

- **TCP Ch:x** – the function uses **the connection protocol** i.e. the TCP protocol. Number **Ch:x** is selected output channel in an external device, e.g. LanTick, which will be enabled when the channel state of the local device changes. The TCP frame sends in the **format #1**,
- **UDP Ch:x** – the function uses **the connectionless protocol** i.e. the UDP protocol. Number **Ch:x** is selected output channel in an external device, e.g. LanTick, which will be enabled when the channel state of the local device changes. The UDP frame sends in the **format #1**,
- **Status** – sends the device channel status, TCP frame sent in the **format #2**,
- **MAC+Status** – sends the MAC address of the device and current channel status, TCP frame sent in the **format #3**,
- **HTTP GET** – sends the MAC address of the device and current channel status, frame sent in the **format #4**.

Frame formats:

Format #1

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

Example of TCP frames:

Active input and set **Ch:5**

SOF	CMD	CH	F_ID	IN	!IN	CNT0	CNT1	CNT2	CNT3	CRC
0x0F	0x01	0x04	0xFF	0x01	0xFE	0x1E	0x00	0x00	0x00	0x30

Inactive input and set **Ch:5**

SOF	CMD	CH	F_ID	IN	!IN	CNT0	CNT1	CNT2	CNT3	CRC
0x0F	0x01	0x04	0xFF	0x00	0xFF	0x1E	0x00	0x00	0x00	0x30

CRC:

$$\text{CRC} = (\text{SOF} + \text{CMD} + \text{CH} + \text{F_ID} + \text{IN} + \text{!IN} + \text{CNT0} + \text{CNT1} + \text{CNT2} + \text{CNT3}) \text{ MOD } 256$$

Format #2

The frame in the #2 format is sent as a string.

<Input status>[Space]<Counter>

- **Input status** – value 1 means active input, 0 means inactive input
- **Counter** – counter status

HEX value				STRING
30	20	33	30	0 30

Format #3

The frame in the #3 format is sent as a string.

<MAC>[Space]<Input status>[Space]<Counter>

- **MAC** – MAC address
- **Input status** – value 1 means active input, 0 means inactive input
- **Counter** – counter status

HEX value														STRING			
35	34	31	30	45	43	36	35	38	38	32	42	20	30	20	33	30	5410EC65882B 0 30

Format #4

Setting Client Mode to **HTTP GET** causes that the device sends data to the server in the form:

nano.php?mac=<MAC>&io=<Input status>&cnt=<Counter>

- **MAC** – MAC address
- **Input status** – value 1 means active input, 0 means inactive input
- **Counter** – counter status

An example of a frame received by the server:

GET /nano.php?mac=**123456789012**&io=**0**&cnt=**7**

MAC address = 123456789012,

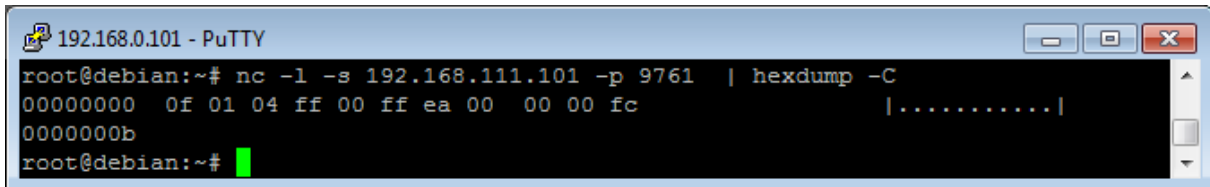
io=0, the input is inactive

cnt=7, the counter indicates the value 7

The TCP frame can be handled with your own software.

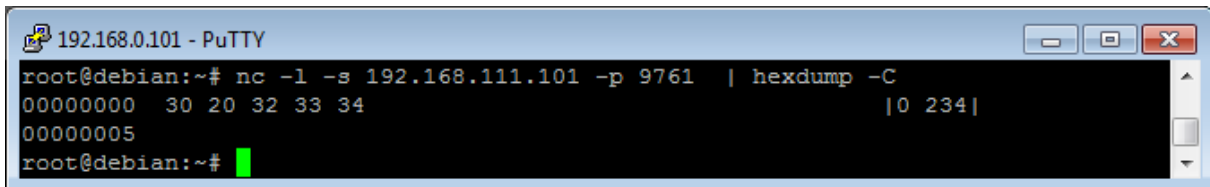
An example of using the netcat command for Linux:

Format #1



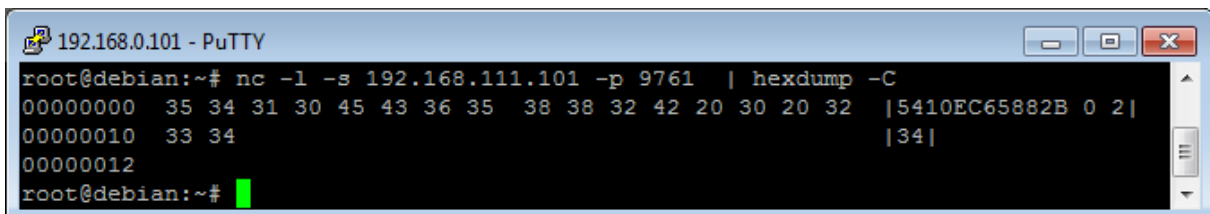
```
192.168.0.101 - PuTTY
root@debian:~# nc -l -s 192.168.111.101 -p 9761 | hexdump -C
00000000 0f 01 04 ff 00 ff ea 00 00 00 fc |.....|
0000000b
root@debian:~#
```

Format #2



```
192.168.0.101 - PuTTY
root@debian:~# nc -l -s 192.168.111.101 -p 9761 | hexdump -C
00000000 30 20 32 33 34 |0 234|
00000005
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 38 38 32 42 20 30 20 32 |5410EC65882B 0 2|
00000010 33 34 |34|
00000012
root@debian:~#
```

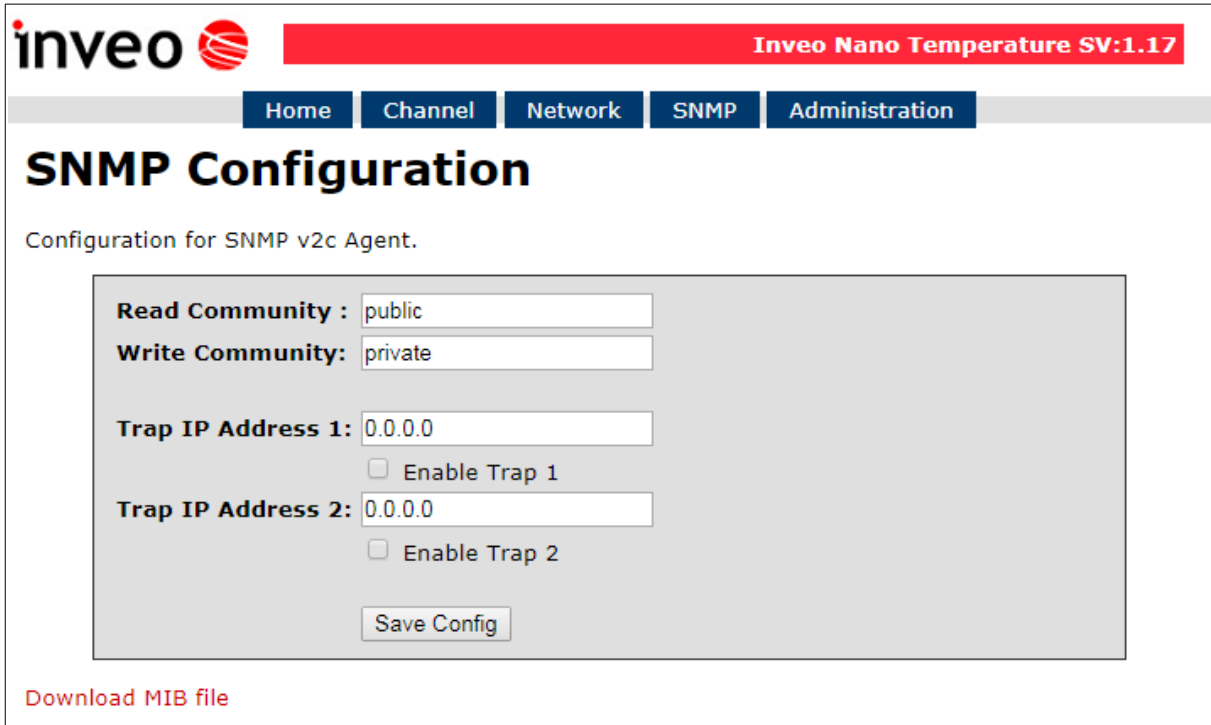
7.4 SNMP configuration

The module is equipped with an SNMP v2c server.

To enable this feature go to **Administration** tab and check **Enable SNMP** option.

The SNMP protocol allows to read the current value.

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



inveo Inveo Nano Temperature SV:1.17

Home Channel Network **SNMP** Administration

SNMP Configuration

Configuration for SNMP v2c Agent.

Read Community : public

Write Community: private

Trap IP Address 1: 0.0.0.0
 Enable Trap 1

Trap IP Address 2: 0.0.0.0
 Enable Trap 2

Save Config

[Download MIB file](#)

To use the SNMP protocol, save the MIB file by right-clicking on the **Download MIB file** link. Then select the **Save link as** option. Download the file to the MIB Browser program.

The basic parameters that can be read from the Nano Digital Input module can be found in the table:

Name	Format	OID
State of the input channel	INTEGER	.1.3.6.1.4.1.42814.14.3.3.1.0
State of the counter	INTEGER	.1.3.6.1.4.1.42814.14.3.4.1.0

Module can send TRAP messages when the input channel is changed. Destination address should be entered in **Trap IP Address 1** and **Trap IP Address 2** fields.

7.5 Windows command line software

The input state can be checked by Windows command line.

To use the Windows command line, enable the **Program Access** service in the **Administration** tab.

Windows syntax:

TCPRel.exe [Parameters]

Parameter	Description
-in=1	Input number
-host=[HOST]	Module IP address
-port=[PORT]	Module Port number
-writecounter=0-4228250625	Set counter
-readcounter	Read counter
-verb	Enabled display of additional info
-stat	Displays current state of inputs/outputs

Examples:

Read input state module address 192.168.111.15 listening on port 9761:

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

Reset counter:

```
TCPRel -host=192.168.111.15 -port=9761 -in=1 -writecounter=0
```

Set counter 1 to value of 123:

```
TCPRel -host=192.168.111.15 -port=9761 -in=1 -writecounter=123
```

Read state of counter 1:

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

7.6 Linux control program

The input state can be checked by Linux command line.

To use the Linux control program, enable the **Program Access** service in the **Administration** tab.

Syntax is as follows:

```
./TcpRel.exe [Parameters]
```

Parameter	Description
-i 1	Input number
-h [HOST]	Module IP address
-p [PORT]	Module Port number
-w 0-4228250625	Set counter
-r	Read counter
-l	Enabled display of additional info

Examples:

Read input state, module address 192.168.111.15 listening on port 9761:

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

Reset counter:

```
./tcprel -h 192.168.111.15 -p 9761 -i 1 -w 0
```

Set counter 1 to value of 123:

```
./tcprel -h 192.168.111.15 -p 9761 -i 1 -w 123
```

Read state of counter 1:

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

7.7 Modbus TCP

Modbus TCP protocol is listening on port 502.

To enable the Modbus TCP protocol, check the **Enable Modbus TCP** field in the **Administration** tab.

Supported Modbus functions

The device supports the following MODBUS functions:

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

MODBUS TCP – Coils

Address	Name	R/W	Description
1000	On1	R	Input 1 state

MODBUS TCP – Holding Registers

Address	Name	R/W	Description
4003	Counter1H	R/W	Counter 1 – Higher byte of counter
4004	Counter1L	R/W	Counter 1 – Lower byte of counter

7.8 Communication via the MQTT Inveo protocol

If the MQTT Inveo service has been enabled in the **Administration** tab, the module sends to `mqtt.inveo.com.pl` server the value of measured value 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: `/nanoI/<MAC>`

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



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

7.9 Control via HTTP protocol

Nano modules can be controlled using HTTP GET.

To read the current state of the module, you can refer to the resource in the web browser:

<http://192.168.111.15/status.xml>

XML file consist all of the information:

```
<response>
<prod_name>Nano-0-1</prod_name>
<sv>1.17</sv>
<mac>00:00:00:00:00:00</mac>
<out>00000000</out>
<on>00000000</on>
<in>00000000</in>
<counter1>0</counter1>
<temp1>Err</temp1>
</response>
```

Section	Description
<prod_name>Nano-0-1</prod_name>	Module type
<sv>1.17</sv>	The software version of the module
<mac>00:00:00:00:00:00</mac>	MAC address of the module
<out>00000000</out>	In the Nano Digital Input module always 0
<on>00000000</on>	In the Nano Digital Input module always 0
<in>00000001</in>	Input state
<counter1>35</counter1>	Counter state
<temp1>0.0</temp1>	In the Nano Digital Input module always 0

HTTP GET command	Description
<i>http://nr_ip/stat.php?cnt=x,y</i>	Set counter: x - input number y - set the value of the counter

Examples:

1. Set counter 1 to 500

<http://192.168.111.15/stat.php?cnt=1,500>

2. Reset Counter1

<http://192.168.111.15/stat.php?cnt=1,0>

Example of reading the measured value with the CURL command.

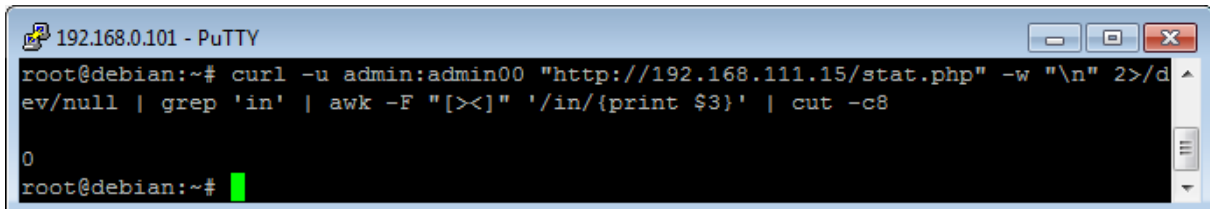
Attention:

Access to resources **stat.php** require authorization.

Access to resources **status.xml** does not require authorization.

Reading the input status:

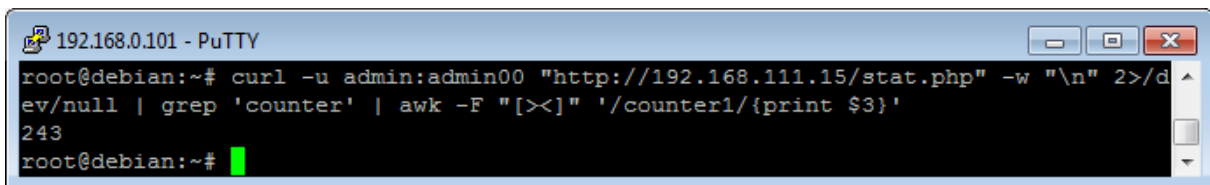
```
curl -u admin:admin00 "http://192.168.111.15/stat.php" -w "\n" 2>/dev/null | grep 'in' | awk -F "[><]" '/in/{print $3}' | cut -c8
```



```
192.168.0.101 - PuTTY
root@debian:~# curl -u admin:admin00 "http://192.168.111.15/stat.php" -w "\n" 2>/dev/null | grep 'in' | awk -F "[><]" '/in/{print $3}' | cut -c8
0
root@debian:~#
```

Reading the counter:

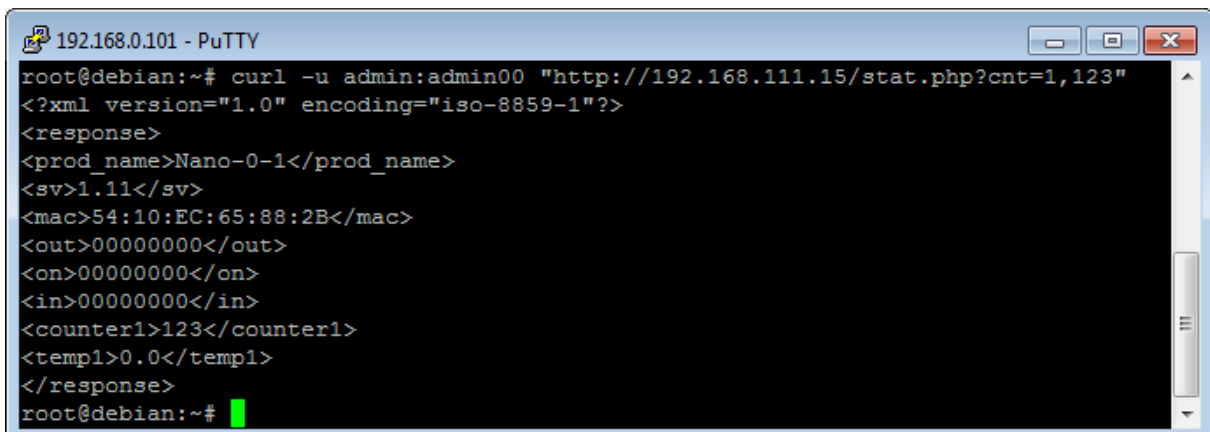
```
curl -u admin:admin00 "http://192.168.111.15/stat.php" -w "\n" 2>/dev/null | grep 'counter1' | awk -F "[><]" '/counter1/{print $3}'
```



```
192.168.0.101 - PuTTY
root@debian:~# curl -u admin:admin00 "http://192.168.111.15/stat.php" -w "\n" 2>/dev/null | grep 'counter' | awk -F "[><]" '/counter1/{print $3}'
243
root@debian:~#
```

Setting the counter:

```
curl -u admin:admin00 "http://192.168.111.15/stat.php?cnt=1,123"
```



```
192.168.0.101 - PuTTY
root@debian:~# curl -u admin:admin00 "http://192.168.111.15/stat.php?cnt=1,123"
<?xml version="1.0" encoding="iso-8859-1"?>
<response>
<prod_name>Nano-0-1</prod_name>
<sv>1.11</sv>
<mac>54:10:EC:65:88:2B</mac>
<out>00000000</out>
<on>00000000</on>
<in>00000000</in>
<counter1>123</counter1>
<temp1>0.0</temp1>
</response>
root@debian:~#
```

7.10 Description of the communication TCP/UDP protocol

Frame for the TCP / UDP port 9761.

Command	Byte	1	2	3	4	5	6	7	8	9	10	11	
	Byte name	SOF	CMD	Channel	Data1	Data2	Data3	Data4	Data5	Data6	Data7	CRC	Return
Set counter	dec	15	10	0x00	0-7	8-15	16-23	24-31	x	x	x	CRC	Ok
	hex	0x0F	0x0A	0x00	0-7	8-F	10-17	18-1F	x	x	x	CRC	Ok
Read counter	dec	15	11	0x00	0-7	8-15	16-23	24-31	x	x	x	CRC	
	hex	0x0F	0x0B	0x00	0-7	8-F	10-17	18-1F	x	x	x	CRC	
Read channels	dec	15	100	x	x	x	x	x	x	x	x	CRC	
	hex	0x0F	0x64	x	x	x	x	x	x	x	x	CRC	
Read device name	dec	15	200	x	x	x	x	x	x	x	x	CRC	String
	hex	0x0F	0xC8	x	x	x	x	x	x	x	x	CRC	String

CRC is the sum of the previous bytes.

The device by default listens at TCP/UDP 9761 port.

Examples of data frames:

- Setting up value of a counter at counter to 100

	SOF	CMD	CH	D1	D2	D3	D4	D5	D6	D7	CRC
dec	15	10	1	100	0	0	0	0	0	0	126
hex	0x0F	0x0A	0x00	0x64	0x00	0x00	0x00	0x00	0x00	0x00	0x7E

- Reading of the counter

	SOF	CMD	CH	D1	D2	D3	D4	D5	D6	D7	CRC
dec	15	11	0	0	0	0	0	0	0	0	26
hex	0x0F	0x0B	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x1A

Device response:

78 05 00 00 → 578hex → 1400dec

The counter value is 1400.

8 Communication with the module from the external network

If the module is in a different LAN network than the computer connecting to it, port forwarding is required.

Depending on the communication method used with the module, it is necessary to contact the Network Administrator and port forwarding:

Support via website and HTTP protocol:

- port TCP 80

Service by a computer program or by your own application:

- port TCP 9761

Support via MODBUS TCP:

- port TCP 502

Support via SNMP protocol:

- port UDP 161

9 Checking the IP address

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

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.

10 DHCP

To enable/disable DHCP service:

1. Press and hold RESET button 5 to 10 second.
2. Green LED will start flashing 2 times a second (Nano Digital Input), the display will show: **dhcP** (Nano Digital Input PoE).
3. Release the reset button.

It is also possible to enable DHCP in the network configuration in the **Network** tab or through **Discoverer** application.

11 Restoring factory defaults

To reset the device to factory settings:

1. Press and hold RESET button for 10 to 15 seconds
2. Green LED will start flashing 2 times a second (Nano Digital Input), the display will show: **rSt** (Nano Digital Input PoE).
3. Release the reset button.

With factory defaults restored the module settings are as follows:

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

12 Firmware update

The device has the ability to update the firmware. The software update program is provided as a *.bin file.

Warning! Incorrect use of the update feature may damage the reader. Make sure that undisturbed power is provided to the device for duration of programming.

To update the software:

- check the **Enable TFTP Bootloader** option, which is located in the Administration tab,
- run the Windows command line (Start-> Run enter 'cmd' and confirm with the Enter key),
- go to the directory where the .bin file is located
- enter the command:

```
tftp -i <address_ip_of the reader> PUT file.bin
```

where: <address_ip_of the reader> is the IP Address of the reader
file.bin – the file with the update program

Programming takes 1-2 minutes. End of programming confirms the message 'File Transferred'.

For correct functioning of the reader, after the update operation the „**Enable TFTP Bootloader**” option has to be switched off.

Step-by-step instruction for firmware updates is available at <https://inveo.com.pl>.

The latest instructions and software are available on the site <https://inveo.com.pl>.