User manual
Nano OUT

Soft >= v1.xx

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Dear Customer!

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.

Contents:

1 Preliminary information

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

The NANO OUT device is used to control one electrical circuit using relay. The relay can be controlled using www website, network protocols or software supplied by manufacturer.

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 module power supply must be in range of 10-24V AC or DC.
The power to module is delivered via POE adapter (Power Over Ethernet).

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: + 5°C to +45°C,
- Relative humidity: <75%,
- Atmospheric pressure: 700 – 1060hPa.

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

Recommended conditions for transportation:
- Temperature: -10°C to +45°C,
- Relative humidity: 20 to 95%,
- 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 Utilisation 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 Out

There are several ways to communicate with the module:

- using built in WWW server via any web browser,
- MODBUS TCP protocol,
- SNMP protocol,
- HTTP protocol,
- User application – communication protocol available for user

NANO module is equipped with two LEDs indicators: power and output status.

5.2 Technical specification:

Power supply voltage: 10-24VDC (POE)
Power consumption: 1.5 W

Output

Max voltage: 250V AC, 30V DC,
Max current: 5A,
NO (normal open),
Engage time: 10ms,
Disengage time: 5ms,

LAN: Ethernet 1x10Mbps, RJ45

5.3 Module input/output terminal description

Module **NANO OUT** has two connection terminals:

- RJ45 socket – LAN network and POE
- Screw terminal – input

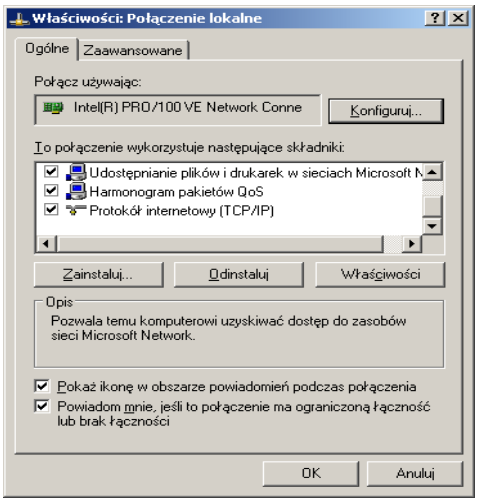
Teminal No	Name	Description
1	Relay output	
2	RESET	Reset to factory defaults: **IP:192.168.111.15** **username: admin** **password: admin00**
3	LAN	LAN network connections Pins: 1,2,3,6 -data 4,5,7,8 - power

6 Module configuration

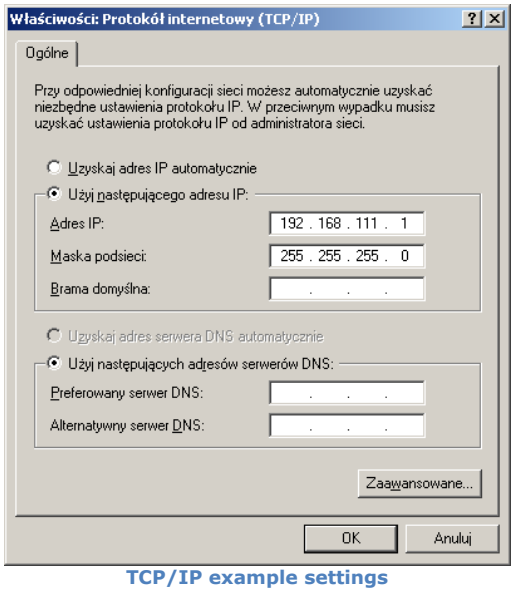
If using the module for the first time it is needed to configure it as shown below

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":

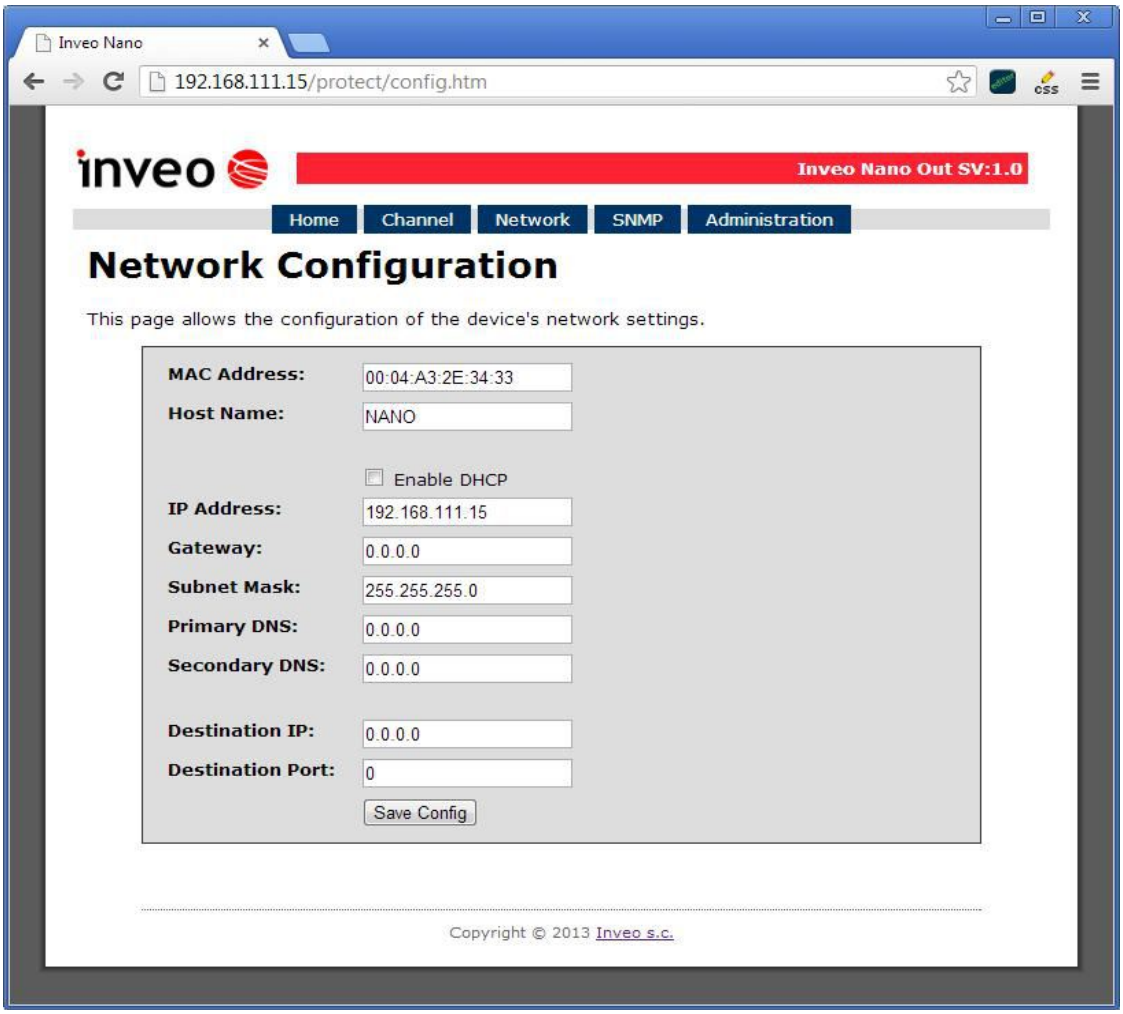


TCP/IP example settings

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.

6.2 Configuration of the module module through web browser

Start the web browser and enter the following address into address bar: **192.168.111.15**.



The default user name is „admin" with password „admin00"

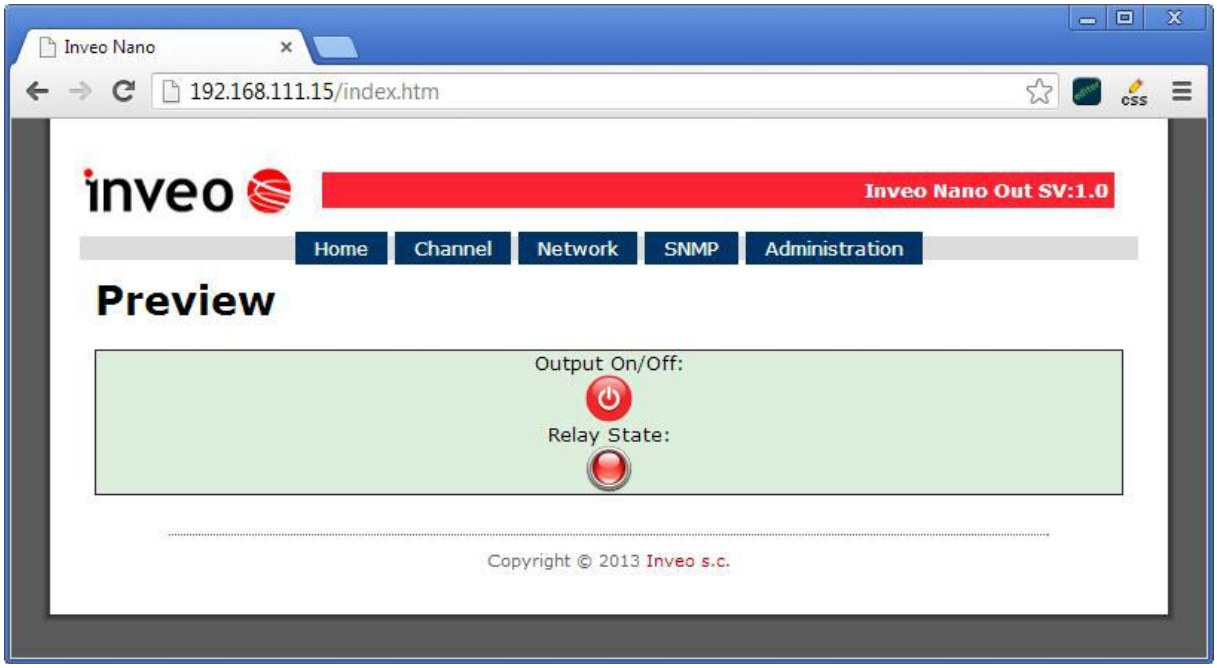
There are several fields used to configure the module network settings:

- 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.

6.3 Changing the state of the output.

Visualisation of output state is shown below.



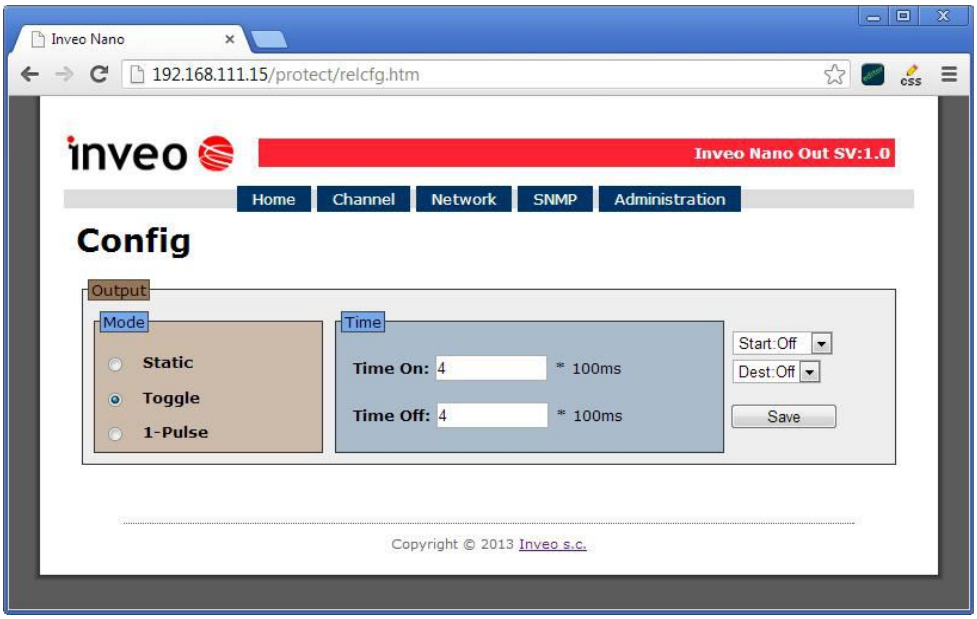
Output control

Output

To change state of the output press ***Output On/Off*** button.

Relay State shows current state of output relay.

Relay configuration can be change in Channel tab

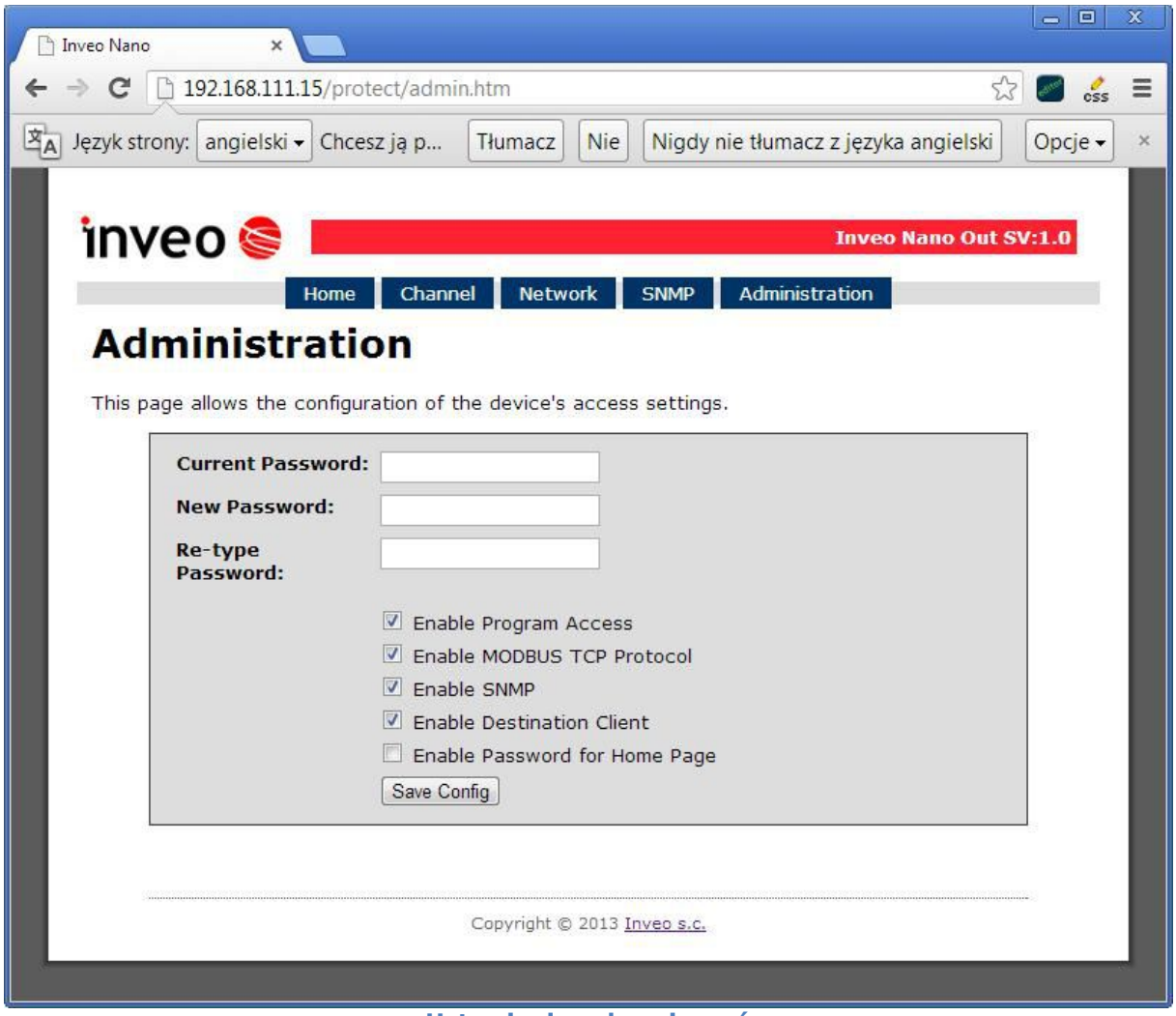


Description of output relay settings:

Static	monostable.
Toggle	bistable
1-Pulse	1 time pulse
Time On	On time in Toggle lub 1-Pulse modes
Time Off	Off time in Toggle mode
Start:Off	Disables relay after power reset
Start:On	Enables relay after power reset
Start:Last	Relay set to the same state as before power reset
Dest. Off	Disables sending output state to different devices
Dest. 1	Sends state of output 1 to different devices
Dest. 2	Sends state of output 2 to different devices
...	...
Dest. 8	Sends state of output 8 to different devices

6.4 Access configuration

Web site used to configure the access to the module is shown below.
These settings allow for changing the access password and to enable/disable particular services.



Ustawienia zabezpieczeń

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 user password – enables/disables requirement for user password*

- *Enable admin password – enables/disables requirement for admin password*
- *Enable Program Access* – enables/disables the connection to the module via PC software – Windows or Linux OS.
- *Enable MODBUS TCP Protocol* – enables/disables access using MODBUS TCP protocol.
- *Enable SNMP* – enables/disables access using SNMP protocol.
- *Enable Destination client* – enables/disables access using mode of operation „customer".
- *Enable TFTP bootloader – enables/disables 10 second bootloader mode after module reboot*

6.5 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
-out=1	Output number, for NANO always 1
-host=[HOST]	Module IP address
-port=[PORT]	Module Port number
-on | -off	Enables or disables output
-verb	Enabled display of additional info
-stat	Displays current state of output

Examples:

Enables relay - module address 192.168.111.15 listening on port 9761:

```
TCPRel -out=1 -host=192.168.111.15 -port=9761 -on
```

Read output state:

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

6.6 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
-o 1	Output number, for NANO always 1
-h [HOST]	Module IP address
-p [PORT]	Module Port number
-s [0,1]	Enables or disables output
-l	Displays current state of output

Examples:

Enables relay - module address 192.168.111.15 listening on port 9761:

```
./tcprel -o 1 -h 192.168.111.15 -p 9761 -s 1
```

Read output state::

```
./tcprel -h 192.168.111.15 -p 9761 –o 1 -l
```

6.7 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,
- 0x05 Write Single Coil,

The registers description is shown in tables below

MODBUS TCP - Coils

Register	Name	Mode: R-read W-write	Description
1000	On1	R/W	Enable relay

MODBUS TCP - Holding Registers

Register	Name	Mode: R-read W-write	Description
4000	T1On	R/W	Relay engage time (*100ms)
4001	T1Off	R/W	Relay disengage time (*100ms)
4002	Rel1Mode	R/W	Mode of operation: 1 – Static 2 – Toggle 3 – 1-Pulse

6.8 Communication with module using HTTP.

NANO OUT modules can be controlled using HTTP. To read current state of the module inputs/outputs access this address - http://192.168.111.15/stat.php – in web browser.

XML file consist all of the information:

```
<response>
<prod_name>PE-1-0</prod_name>
<out>00000000</out>
<on>00000000</on>
<in>00000000</in>
<counter1>0</counter1>
<temp1>0.0</temp1>
</response>
```

Section	Description
<prod_name>PE-1-0</prod_name>	Type of module In this case PE-1-0.
<out>00000000</out>	Output state (enabled/disabled). In this case output inactive
<on>00000000</on>	Output state
<in>00000000</in>	In NANO-OUT always read as 0
<counter1>0</counter1>	In NANO-OUT always read as 0
<temp1>0.0</temp1>	In NANO-OUT always read as 0

Command	Description
http://nr_ip/stat.php?on=1	Enable output relay.
http://nr_ip/stat.php?off=1	Disable output relay.
http://nr_ip/stat.php?inv=1	Invert output state.
http://nr_ip/stat.php?set=0000000x	Set output. Options x=: 1-Enable 0-Disable n-Invert

Example:
1.Enable relay output:
http://192.168.111.15/stat.php?on=1

2.Invert output relay state :
http://192.168.111.15/stat.php?inv=1

3.Disable relay output:
http://192.168.111.15/stat.php?off=1

6.9 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 0x55 – off 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; 1 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], 100-input	ON/OFF[0,1]	TON LSB	TON MSB	TOFF LSB	TOFF 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:

Enabling output 1 in static mode

SOF	CMD	CH	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7	CRC
15	1	0	0	1	1	0	0	0	0	18

Set counter 2 to 100

SOF	CMD	CH	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7	CRC
15	10	1	100	0	0	0	0	0	0	132

Moduł standardowo nasłuchuje na porcie TCP 9761.

Przykładowe ramki:

Załączenie wyjścia #1 w trybie static

SOF	CMD	CH	D1	D2	D3	D4	D5	D6	D7	CRC
15	1	0	1	1	0	0	0	0	0	18

6.10 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:

1 port TCP/IP 9761

Using MODBUS TCP protocol:

- port TCP/IP 502

Using SNMP protocol:

- port UDP 161

7 DHCP

To enable disable DHCP:

1. Press and hold RESET button for 5-10 seconds
2. Green LED will start flashing 2 times a second
3. Release RESET button

8 Restoring factory defaults

In order to restore the module to its factory defaults press and hold reset button for at least 10-15 seconds. The green LED will start flashing 4 times second
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

9 Firmware update

The module has the ability to update the firmware. The firmware is supplied as a file with .hex 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 <module*_ip_adress*> **PUT** filename*.hex*

where: < module*_ip_adress* > is the IP address of the module
filename.hex – is the firmware supplied by Inveo s.c.

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

Notes