AUTOMATISME, INFORMATIQUE & ÉLECTRICITÉ

User manual

Temperature acquisition modules

THM01 & THS01 (v1.1)
THM02 & THS02 (v2.0)

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Last update: 01-25-2023

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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.

Contents :

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 THM01-PT (master device) is used to cooperate with 31×THS01-PT (slave device) temperature control module. THS01-PT can control 14 PT1000/PT100 sensor each. Full device configuration is 1 x THM01-PT and 31 x THS01-PT which allows you to check the temperature from 31*14 = 434 PT1000/PT100 sensors.

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 highquality 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

Technical data:

Power supply:
10-24VDC (screw terminals 3,5mm) or PoE
IEEE 802.3af via LAN port 1.

Power consumption: max 1,5W

Inputs:

Number of inputs: 21,
Inputs for PT1000/PT100 sensor.

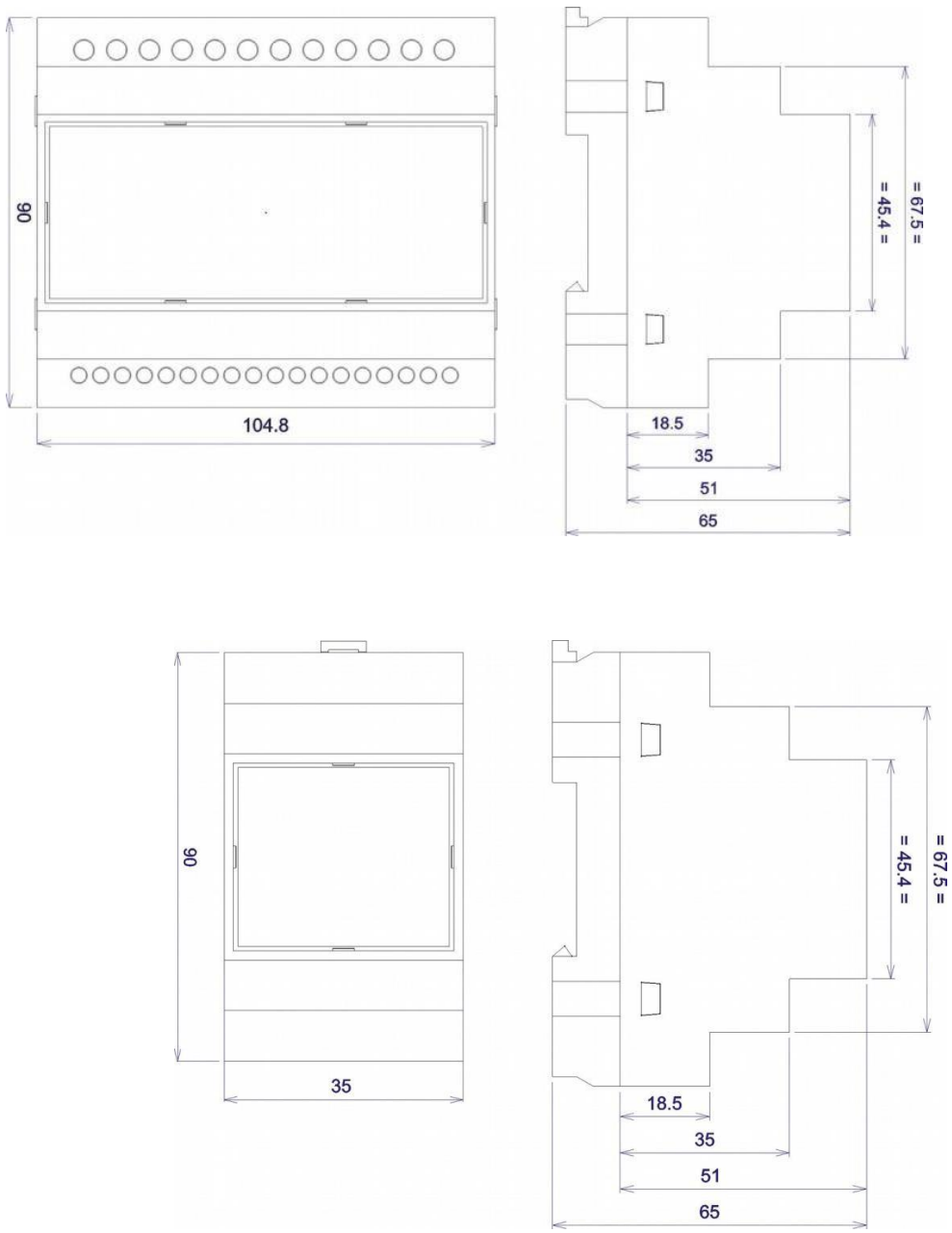
Communication:

Ethernet 2×10/100 Mbps, RJ45, built-in switch for connecting other LAN devices.

1 RS485 port, modbus RTU,
Transmission speed: 1200, 2400, 4800, 9600, 19200, 38400, 57600bps,
Parity: None, Odd, Even, Mark, Space, 2 Stops,
Designed for connecting the **THS01-PT** module

Dimensions :

All dimension values are in millimeters.



5.2 Description of the module connectors and LED indicators

The THM01-PT device has been equipped with several LED indicators.

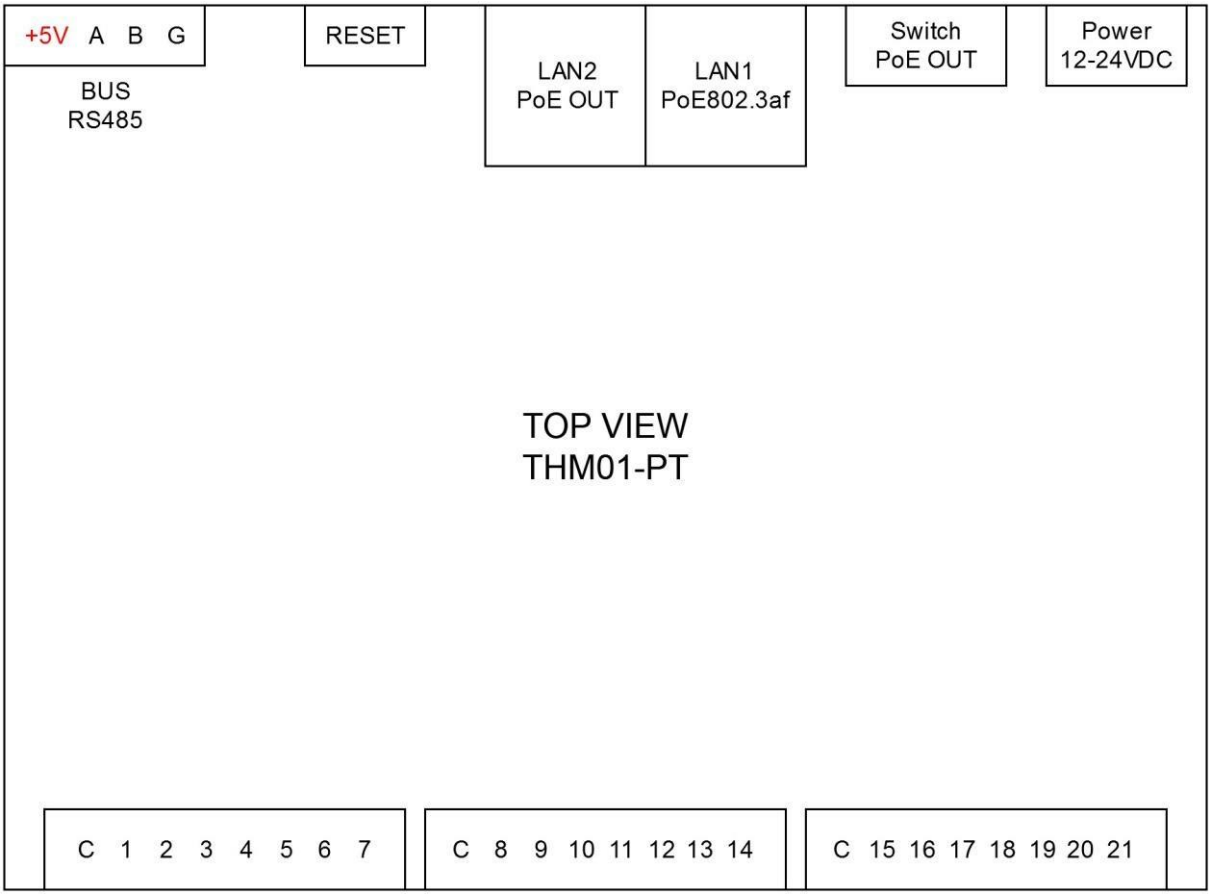
Name	Description
POWER	Indicating power supply connected to the device
ACK	Indicating LAN connection present
LINK	Indicating LAN connection present
DHCP	DHCP active indicator
NORM	Normal operating mode indicator
BOOT	Indicates that the device is in BOOTLOADER mode
INPUTS	Control status of connected THS01-PT modules
ERROR	Indicating error state
1-16/17-31	Button for changing the device numbers of displayed statuses, DHCP (hold for 5-10sec) and reset to default (hold for 10-15sec).

Terminal name	Description
BUS RS485	RS485 port for connecting the THS01-PT module
Reset	Reset button
LAN 2	LAN socket 2– PoE for other LAN device
LAN 1	LAN socket 1– Communication and power supply
SWITCH POE OUT	Switch to turn on the poe power on port 2
Reset	Reset button

C	1	2	3	4	5	6	7	C	8	9	10	11	12	13	14	C	15	16	17	18	19	20	21

Connectors for PT1000/PT100 sensors

The device connectors are shown below.



Warning! When THM01-PT is powered by PoE (LAN port 1) and the power select switch is set to downward position (On), electric potential from the LAN port 1 will show up on the LAN port 2. The user can connect another LAN device.

5.3 THS01-PT

Power supply:

Connect device to the THM01-PT – main module.

Inputs:

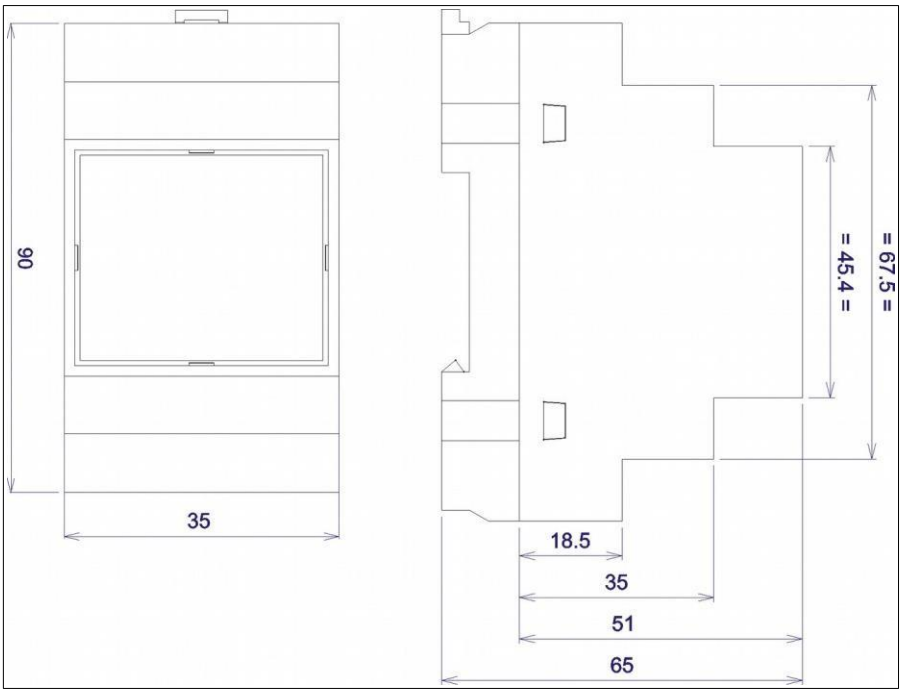
Number of inputs: 14,
Inputs for PT1000/PT100 sensor.

Communication:

2x RS485, modbus RTU, (daisy chain),
Transmission speed: 1200, 2400, 4800, 9600, 19200, 38400, 57600bps, Parity: None, Odd, Even, Mark, Space, 2 Stops,

Dimensions:

All dimension values are in millimeters.



5.4 Description of the module connectors and LED indicators

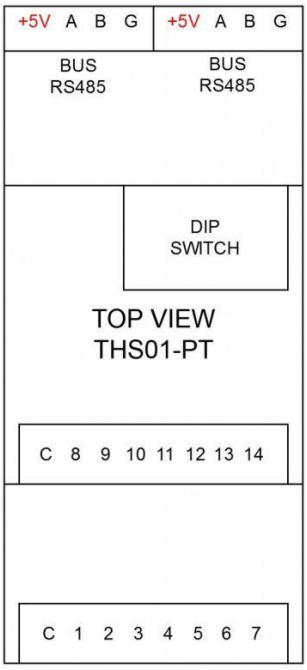
Terminal name	Description
BUS RS485	RS485 port
BUS RS485	RS485 port

Paramétrage adresses des modules
voir Annexe 1

Name	Description
POWER	Indicating power supply connected to the device
TX	Transmitting
RX	Receiving

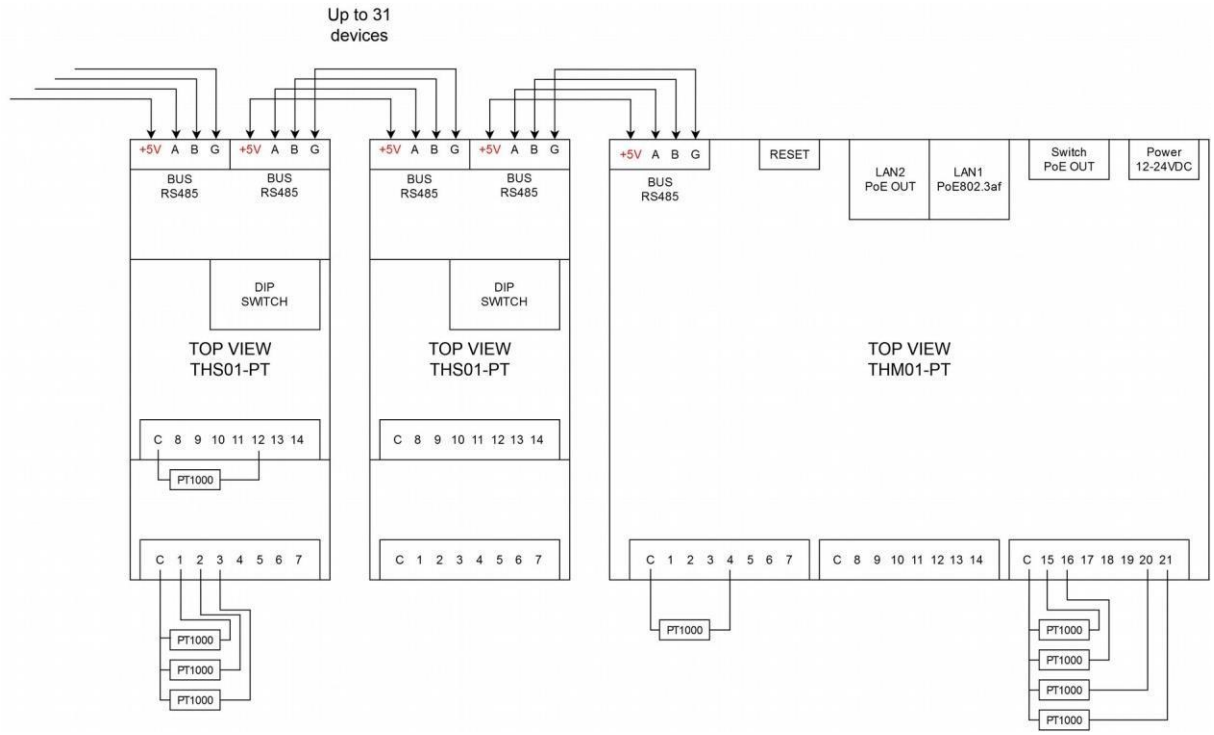
Terminal name	Description
C	Common for inputs no 1-7
C	Common for inputs no 1-14
X=1:14	Input no X,

The device connectors are shown below.



5.5 Devices connection way

The THM01-PT device can work with up to 31 THS01-PT. The way of connecting devices is shown below.



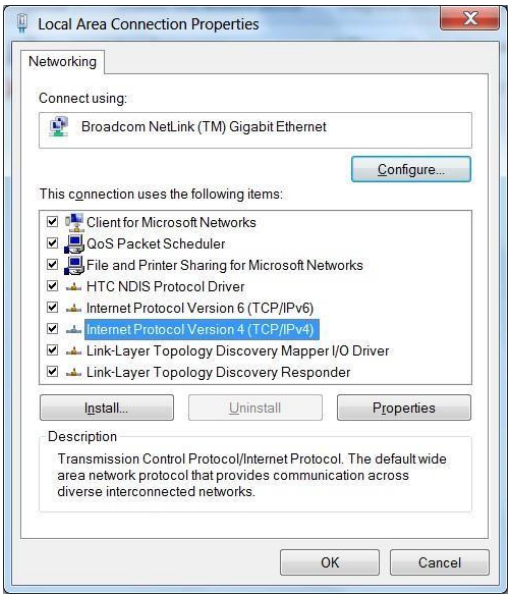
6 Configuration of the device

The device when used for first time needs to be configured. (Stock device IP : 192.168.11.15)

6.1 Changing the PC's subnet address

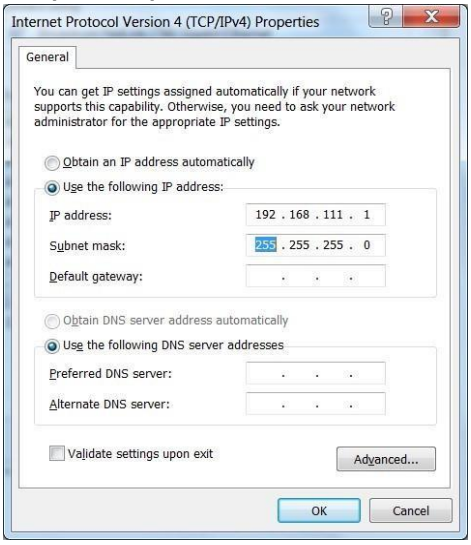
After the device is connected to a network, a subnet address of a PC which is connected the same network has to be changed.

To do so, go to the PC's MS Windows network configuration: **Start->Control panel >Network and Sharing Center->Network and Internet->Network Connections**, then choose the related controller and right click on „Properties". After selecting this option configuration window will show up:



Changing network settings in MS WINDOWS

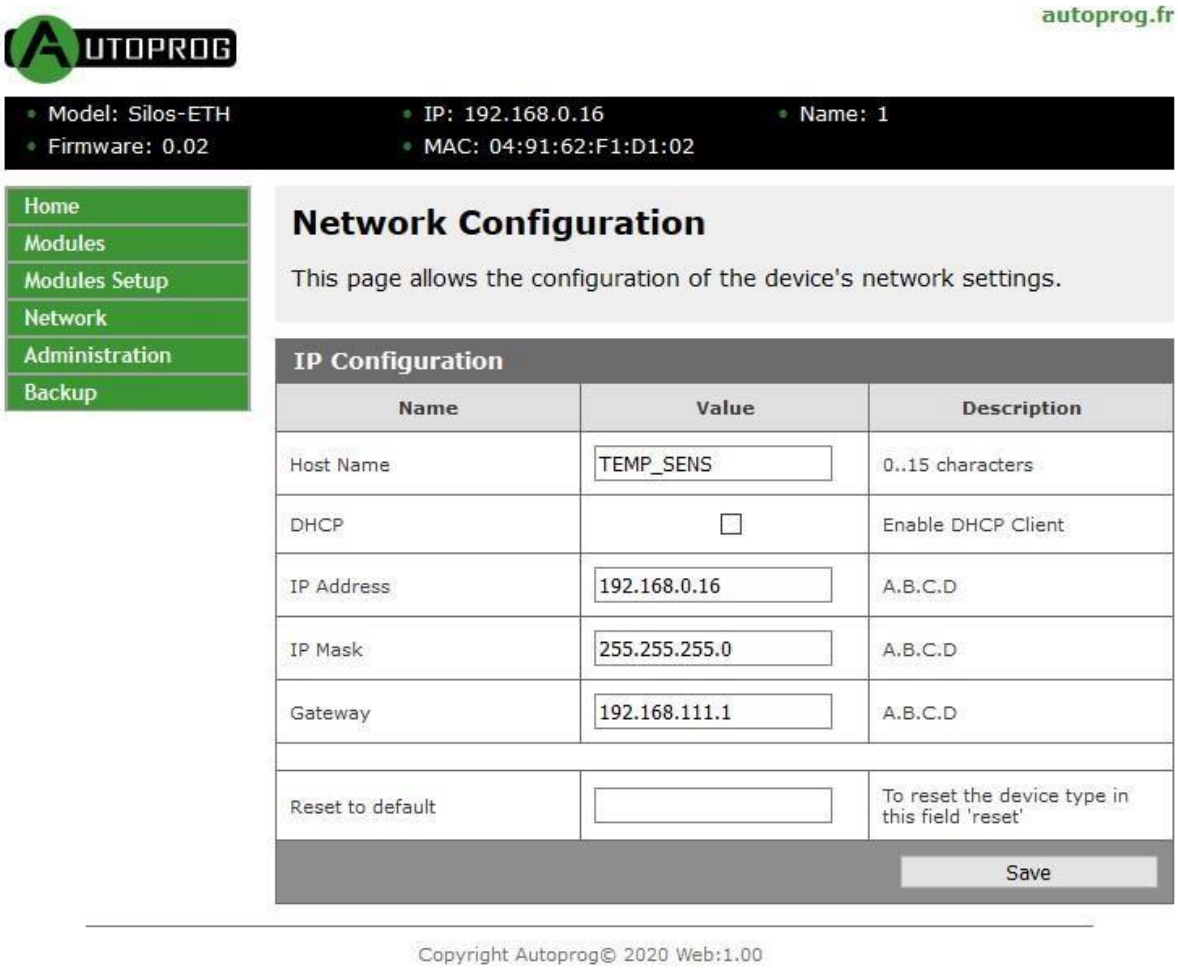
Next choose "Internet Protocol (TCP/IP)", double click on it and enter following settings:



Illustrative TCP/IP protocol settings

After saving changes by clicking OK, open a web browser and enter in the address line: **192.168.111.15**. Next change the following: (**"Default user name / password"** to admin/admin00))

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



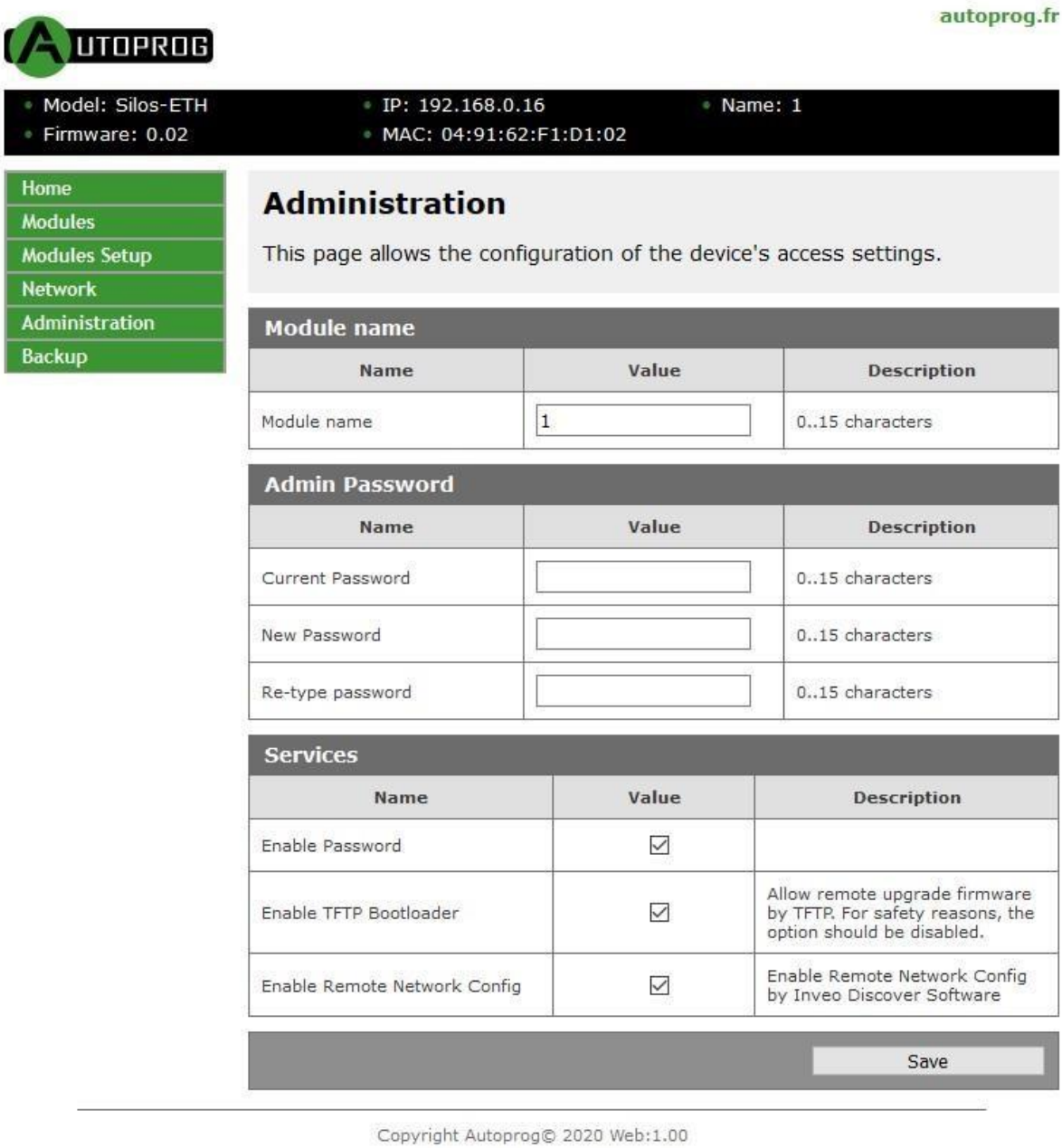
To set up the network settings of the device, use the following fields:

- ***Host Name*** – NETBIOS name,
- ***DHCP*** – checking this box force use of the address assigned by the DHCP server
- ***IP Address*** – the IP address of the device (at this address, the device will be visible on the network),
- ***IP Mask*** – IP subnet mask,
- ***Gateway*** – network gateway,
- **Reset to default** – reset the device to factory default setting. Write in the empty field word "reset" and confirm by selecting Save button.

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

6.2 Communications protocols and administration

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



The device name

The controller device used in a controlling system can be uniquely named and identified.

Module name		
Name	**Value**	**Description**
Module name		0..15 characters

Admin Password change

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

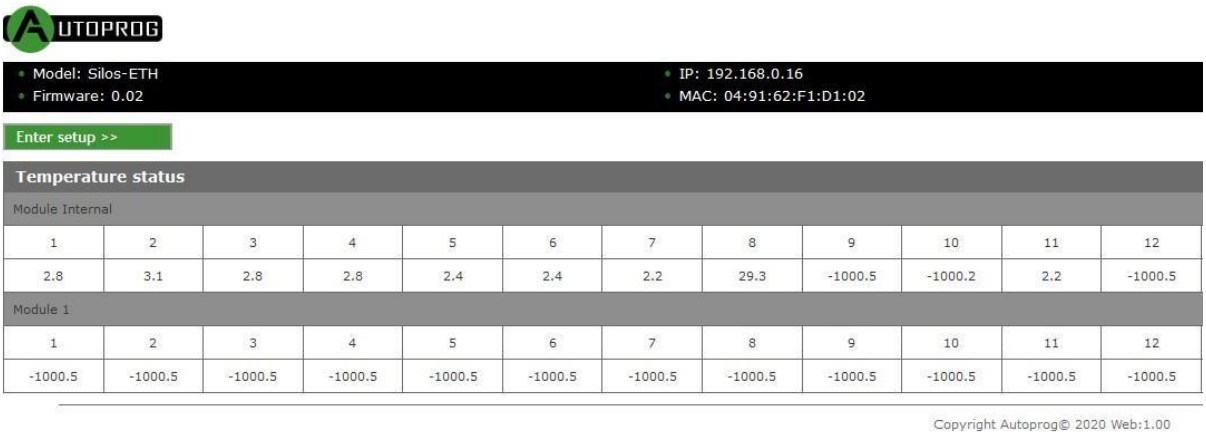
Admin Password		
Name	**Value**	**Description**
Current Password		0..15 characters
New Password		0..15 characters
Re-type password		0..15 characters

Admin Password – an administrator password change (login: admin, has access to the device all configurations settings)
Current Password- current admin password
New Password – a new admin password
Re-type Password – a new admin password confirmation

7 The device functions

7.1 Temperature status

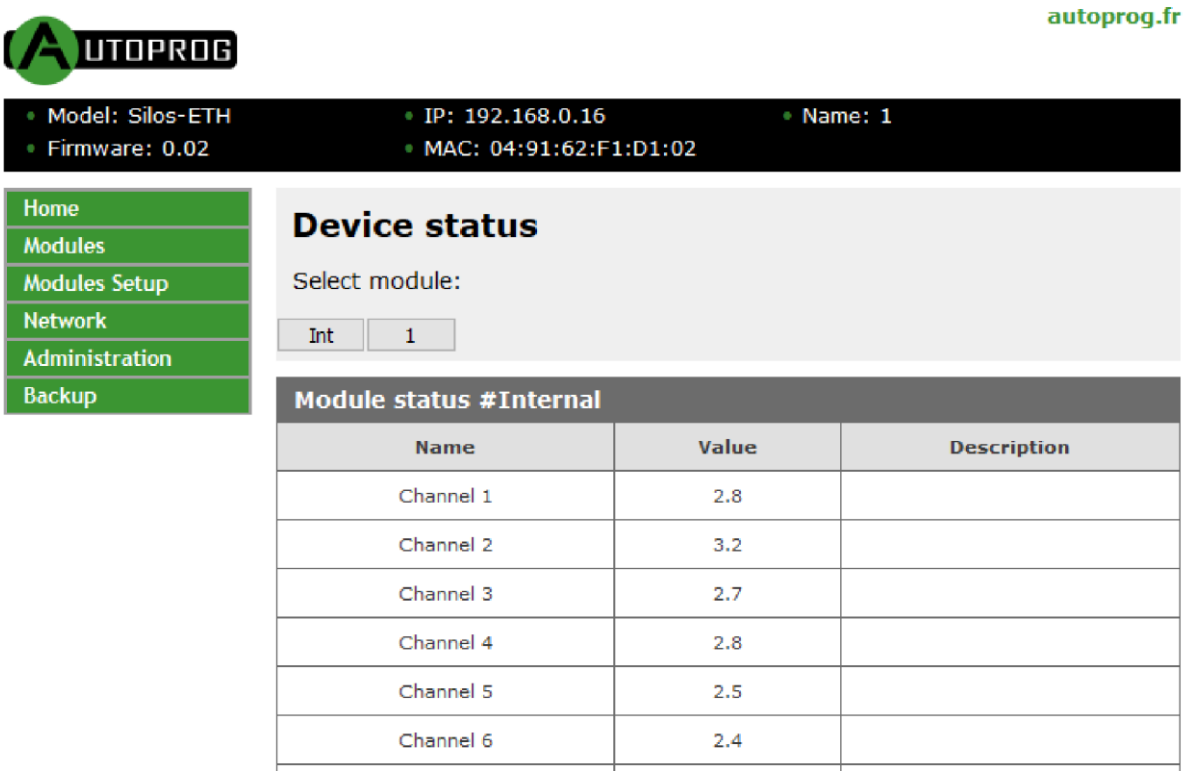
The module status can be found at the ***Main*** tab.



This page shows the temperature values from individual channels of connected devices.

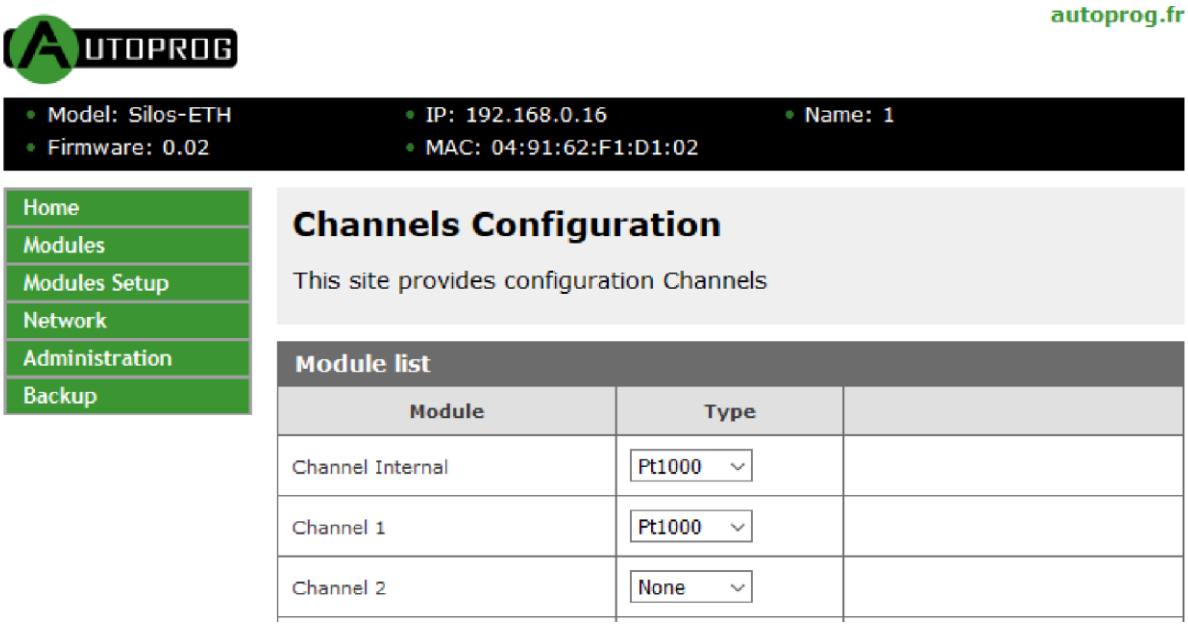
7.2 The device status

The **modules** tab allows to check the temperature value of each channel of the connected module.



7.3 Channels configuration

Configuration of channels of connected modules is possible in the **Module Setup** tab.



You can choose the type of probe connected to the module: PT1000, PT100, CTN1 to CTN4 (See Appendix 2 for CTN correspondence).

7.4 Modbus

The device supports Modbus TCP protocol on port 502.

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.

Holding Registers

The values in registers 1 – 1024 represent the temperature x10 e.g: value 105 means 10,5°C.

Address	Name	R/W	Description
The THM01-PT device			
1	Temp x10, channel 1	R	Temperature value x10, channel 1
2	Temp x10, channel 2	R	As above for channel 2
…	…	…	…
21	Temp x10, channel 21	R	As above for channel 21
22	Reserved	R	Reserved
…	…	…	…
32	Reserved	R	Reserved

Address	Name	R/W	Description
Every 32 addresses: temperature values for connected THS01-PT modules (device No.1)			
33	Temp x10, channel 1	R	Temperature value x10, channel 1
34	Temp x10, channel 2	R	As above for channel 2
...	...	...	...
46	Temp x10, channel 14	R	As above for channel 14
47	Reserved	R	Reserved
...	...	...	...
64	Reserved	R	Reserved
Temperature values for connected THS01-PT modules (device No.2)			
65	Temp x10, channel 1	R	Temperature value x10, channel 1
66	Temp x10, channel 2	R	As above for channel 2
...	...	...	...
78	Temp x10, channel 14	R	As above for channel 14
79	Reserved	R	Reserved
...	...	...	...
96	Reserved	R	Reserved
Temperature values for connected THS01-PT modules (device No.x) x=3:30			
...	...	...	...
...	...	...	...
...	...	...	...
As above			
...	...	...	...
...	...	...	...
...	...	...	...
Temperature values for connected THS01-PT modules (device No.31)			
993	Temp x10, channel 1	R	Temperature value x10, channel 1
994	Temp x10, channel 2	R	As above for channel 2
...	...	...	...
1006	Temp x10, channel 14	R	As above for channel 14
1007	Reserved	R	Reserved
...	...	...	...
1024	Reserved	R	Reserved

Attention!

The value -10002 means the value is out of range.
The value -10005 means sensor error or sensor not connected.

8 DHCP

To enable/disable DHCP service:

1. Press and hold the button on the top of the housing for 5 to 10 seconds.
2. The LED will indicate that the DHCP service is on.
3. Release the reset button.

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

9 Restoring factory defaults

To reset the device to factory settings:

1. Press and hold the button on the top of the housing for 10 to 15 seconds.
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 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.

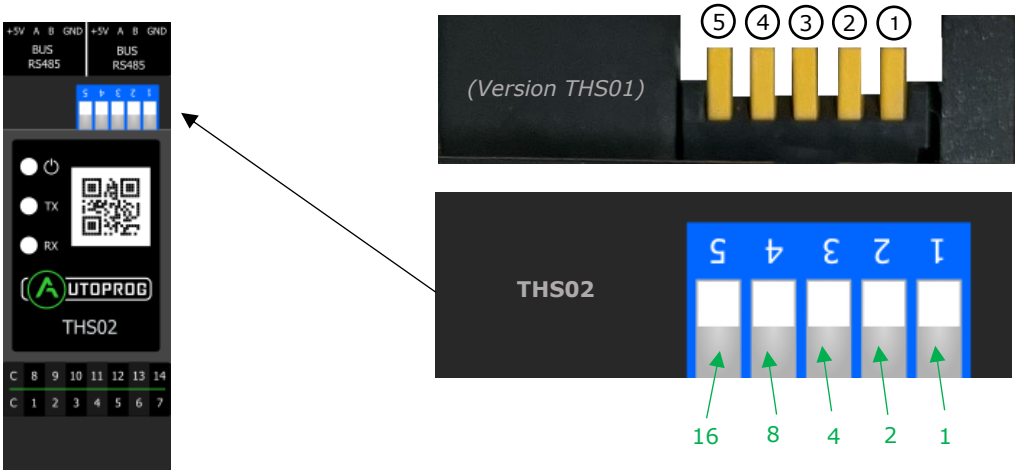
11 Web interface update

The device has the possibility to update the WEB interface. The software update program is provided as a *.bin file.

You have to go to a browser at the address : http://<address IP>/pageupload

Choose the *.bin file and click on "UPLOAD".

Appendix 1: address settings



We add the dipswitches in binary

Examples :

Module 1 :

Module 2 :

Module 3 : (2 + 1)

Module 4 :

Module 5 : (4 + 1)

Module 6 : (4 + 2)

Module 7 : (4 + 2 + 1)

Module 8 :

Module 9 : (8 + 1)

Module 10 : (8 + 2)

Module 11 : (8 + 2 + 1)

Module 12 : (8 + 4)

Module 13 : (8 + 4 + 1)

Module 14 : (8 + 4 + 2)

Module 15 : (8 + 4 + 2 + 1)

Module 16 :

Module 17 : (16 + 1)

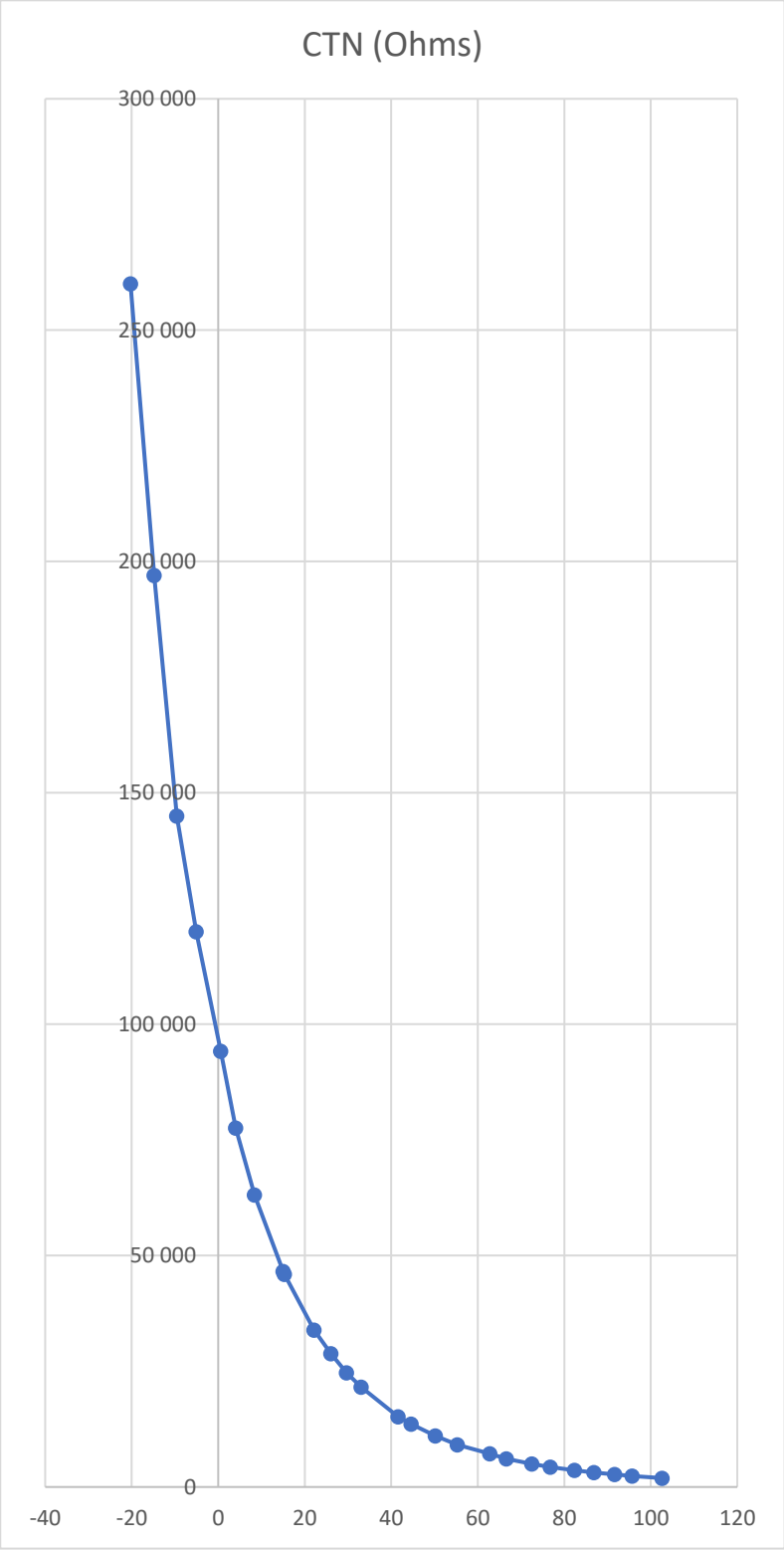
Etc. Up to 31

Appendix 2 : NTC

Characteristics of CTN1 35k :

With this type of NTC, the measurements will not be influenced if the probe is equipped with diodes in series with the measuring elements.

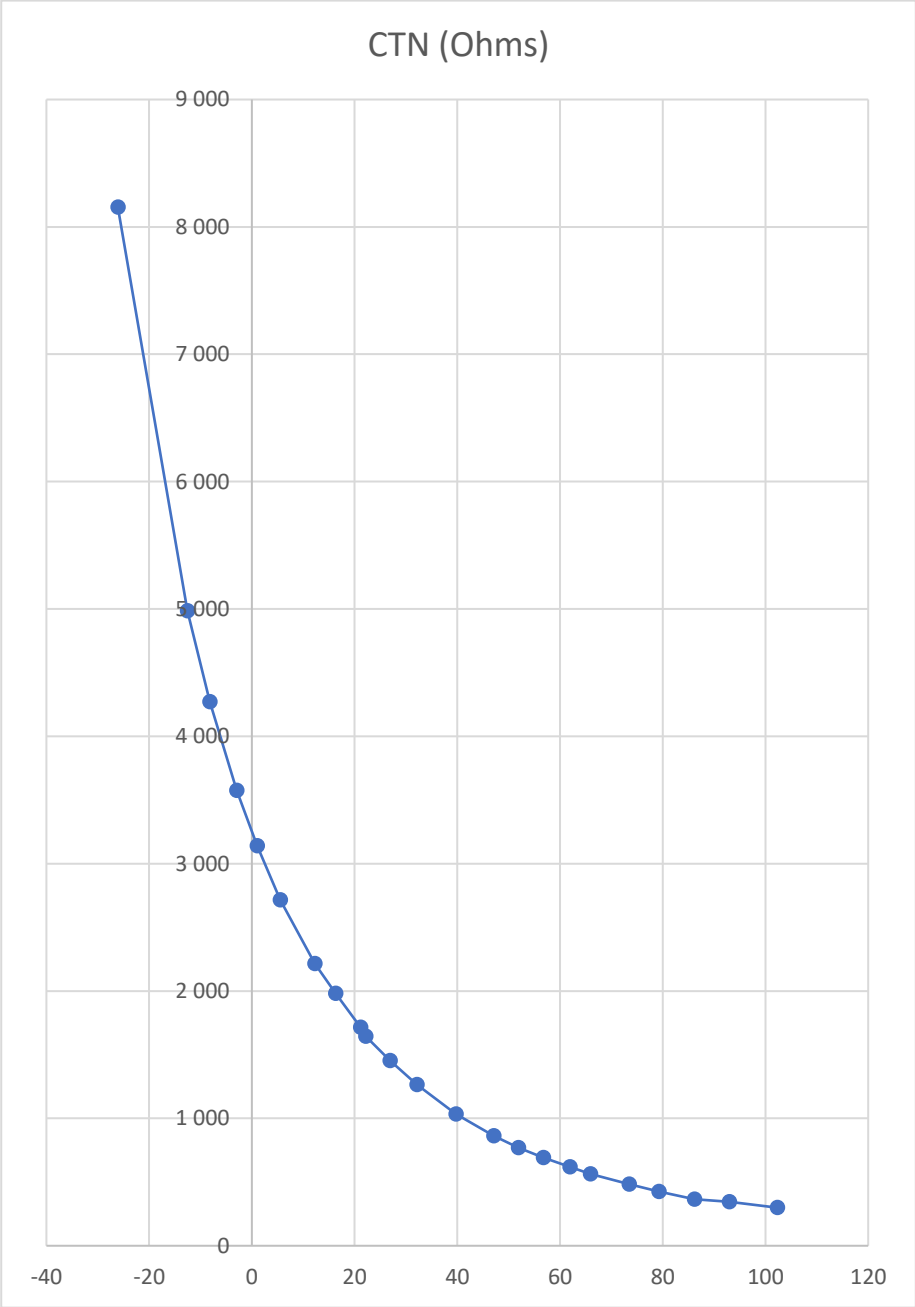
CTN1	
Temp (°C)	**CTN (Ohms)**
-20,28	260 000
-14,78	197 000
-9,54	145 000
-5,10	120 000
0,60	94 200
4,07	77 600
8,42	63 100
15,00	46 600
15,30	46 000
22,15	33 900
26,06	28 800
29,69	24 700
33,03	21 600
41,63	15 200
44,62	13 610
50,21	11 020
55,30	9 120
62,81	7 220
66,60	6060
72,51	4 970
76,77	4 320
82,37	3 600
86,91	3 120
91,67	2 690
95,70	2 380
102,60	1 920



Characteristics of CTN2 1,7k :

With this type of NTC, the probe must not contain diodes in series with the thermistors.

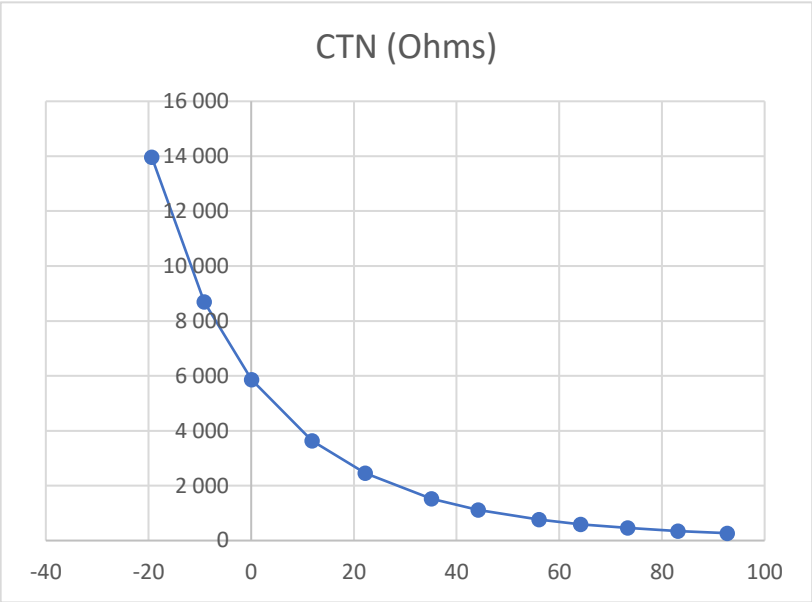
CTN2	
Temp (°C)	**CTN (Ohms)**
-26,09	8 155
-12,56	4 985
-8,16	4 272
-2,93	3 576
1,06	3 139
5,54	2 716
12,28	2 215
16,31	1 982
21,19	1 715
22,16	1 644
26,88	1 453
32,13	1 265
39,72	1 035
47,09	862
51,89	770
56,76	692
61,90	620
65,89	565
73,45	484
79,27	425
86,18	365
92,99	344
102,30	299



Characteristics of CTN3 2.7k :

With this type of NTC, the measurements will not be influenced if the probe is equipped with diodes in series with the measuring elements.

CTN3	
Temp (°C)	**CTN (Ohms)**
-19,37	13 968
-9,18	8 693
0,08	5 857
11,88	3 632
22,22	2 457
35,08	1 519
44,24	1 112
56,07	764
64,18	595
73,31	458
83,12	346
92,72	269



Characteristics of CTN4 3.9k :

With this type of NTC, the measurements will not be influenced if the probe is equipped with diodes in series with the measuring elements.

CTN4	
Temp (°C)	**CTN (Ohms)**
-19,61	30 474
-9,62	17 061
0,86	9 972
10,43	6 135
18,45	4 183
25,27	3 064
32,04	2 262
43,63	1 342
50,24	1 005
60,25	615
70,26	344
80,27	152