

**COMET SYSTEM**

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**P8610 intelligent thermometer  
with PoE**

**P8631 intelligent 3-channel transducer  
with PoE**

**USER MANUAL**

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## Introduction

*This chapter provides basic information about device. Before starting please read this manual carefully.*

P8610 Intelligent Thermometer and P8631 Transducer are used to measure temperature using a digital sensor DS18B20. Temperature can be displayed in °C or °F. Communication with the device is realized via Ethernet network. Device can be powered from external power supply adapter or by using power over Ethernet – PoE.

P8610 Thermometer has compact design and measures the temperature in place of installation. To P8631 Transducer is possible connect up to three probes. Temperature probes are available as accessories.

## General safety rules

*The following summary is used to reduce the risk of injury or damage the device. To prevent injury, please follow instructions in this manual.*



The device can be services only by a qualified person. The device contains no serviceable parts inside standard means.

Don't use the device, if it doesn't work correctly. If you think, that the device is not working correctly, let check it by qualified service person.

Don't disassemble the device. It's forbidden to use the device without the cover. Inside the device can be a dangerous voltage and may be risk of electric shock.

Use only the appropriate power adapter according to manufacturer specifications and approved according to relevant standards. Make sure, that the adapter does not have damaged cables or covers.

Connect the device only to network elements approved according to relevant standards. Where power over Ethernet is used, the network infrastructure must be compatible with IEEE 802.3af standard.

Connect and disconnect the device properly. Don't connect or disconnect Ethernet cable or probes, if the device is powered.

The device may be installed only in prescribed areas. Never expose the device higher or lower temperatures than is allowed. The device has not improved resistance to moisture. Protect it from dripping or splashing water and do not use at areas with condensation.

Don't use device in explosive environments.

Don't stress the device mechanically.

## Device description and important notices

*This chapter contains informations about basic features. Also there are important notices concerning to functional safety.*

Values from the device can be read using an Ethernet connection. The following formats are supported:

- Web pages with user changeable look
- Modbus TCP protocol
- SNMPv1 protocol
- SOAP protocol

The device can also be used to check measured values and if the limit is exceeded, device sends warning messages. Possible ways to sending warning messages:

- Sending e-mails up to 3 e-mail addresses (SMTP authentication is not supported in current firmware version)
- Sending SNMP traps up to 3 configurable IP addresses
- Displaying the alarm status on web page
- Sending messages to Syslog server

The device setup can be made by the TSensor software or via Telnet. TSensor software can be free downloaded from the manufacturer's website. Also you will find there latest firmware for your device.

If you want to use PoE, you must use PoE switch compatible with IEEE 802.3af standard. As a low cost solution can be recommended Repotec switch RP-PE8T/4.



Reliability of warning messages delivering (e-mail trap), depends on actual availability of necessary network services. The device should not be used for critical applications, where malfunction could cause to injury or loss of human life. For highly reliable systems, redundancy is essential. For more information please see standard IEC 61508.



Never connect the device directly to the Internet. If it is necessary connect the device to the internet, properly configured firewall must be used. Firewall can be partially replaced with the NAT.

## Getting started

*Here you can find informations necessary to put newly purchased equipment to operation. This procedure is only informative.*

### What is needed for operation

To install the unit you need to the following equipment. Before installation check if it's available.

- P8610 Thermometer or P8631 Transducer
- power supply adapter 5V/250mA or switch with PoE. Before using the device is necessary to decide which way of powering will be used.
- RJ45 LAN connection with appropriate cable
- free IP address in your network
- for P8631 Transducer up to 3 temperatures probes type DSTR162/C

### Mounting the device

- check if the equipments from previous chapter are available
- install the latest version of TSensor software. This software is used to all device settings
- TSensor software can be free downloaded from the manufacturer's website. Software can be also supplied on CD.
- contact your network administrator to obtain following informations for the connection to the network:

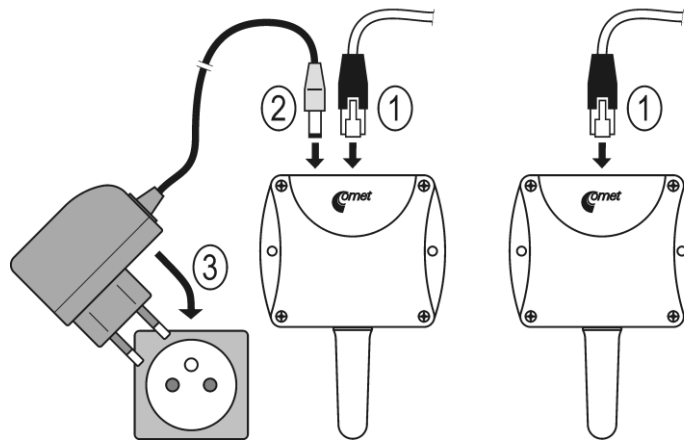
IP address:	_____.	_____.	_____.	_____.
Gateway:	_____.	_____.	_____.	_____.
Netmask:	_____.	_____.	_____.	_____.

- also check if there is no IP address conflict when you connect the device to network for the first time. The device has factory set the IP address to

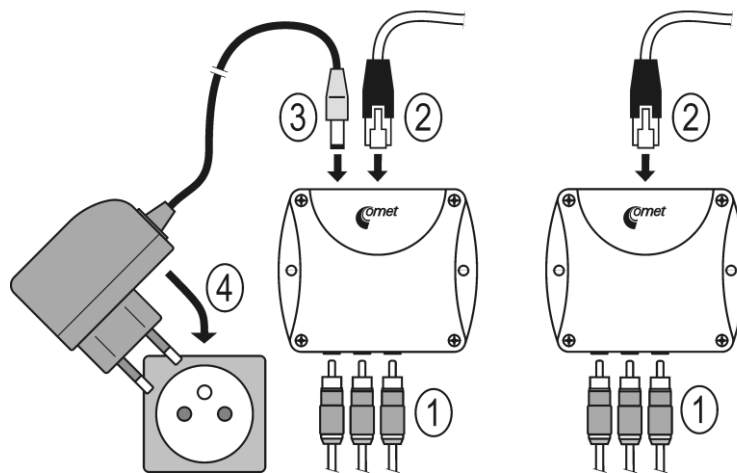
**192.168.1.213.** This address must be changed according to informations from the previous point. When installing several new devices, connect them to the network one after another.

- connect DSTR162/C probe at P8631 Transducer
- connect the Ethernet connector
- if the power over Ethernet (PoE) is not used, connect the power adapter 5V/250mA
- LEDs on LAN connector should blink after connecting the power

P8610 Thermometer connection (power supply adapter, Power over Ethernet):

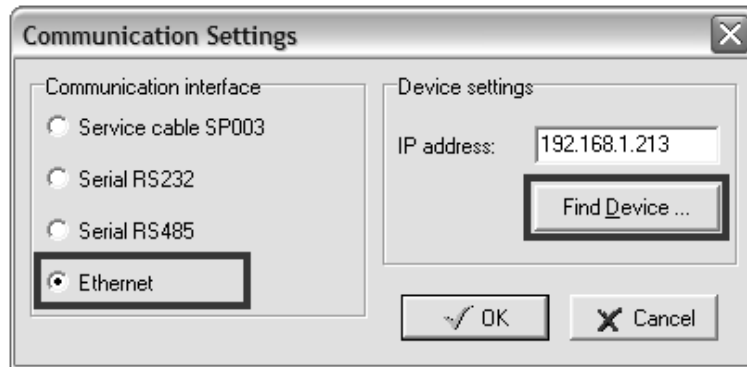


P8631 Transducer connection (power supply adapter, Power over Ethernet):

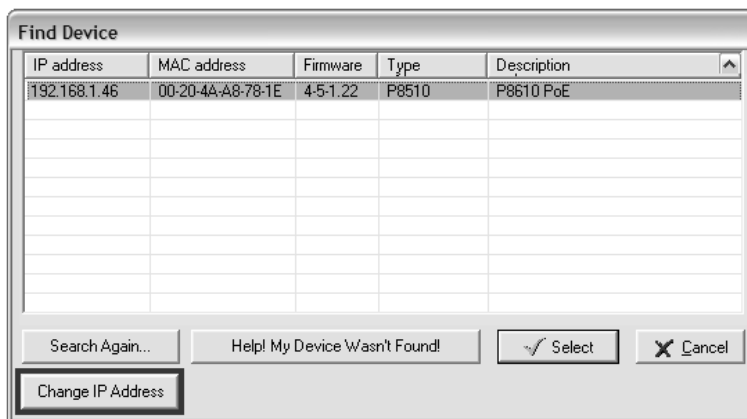


## Device settings

- run configuration software TSensor on your PC
- switch to an **Ethernet** communication interface
- press **Find device...**



- the window shows all available devices on network

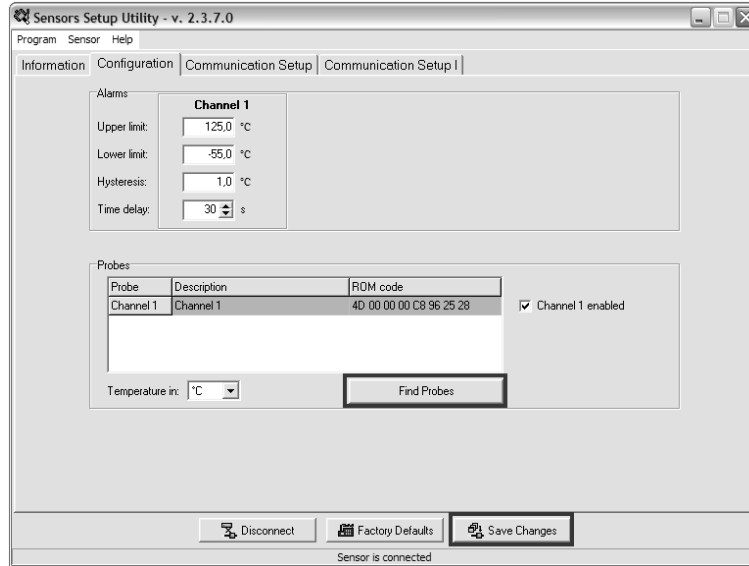


- click to **Change IP address** to set new address according to network administrator instructions. If you need to use DHCP server for obtain IP address set **0.0.0.0**. If your device is not show, then click **Help! My device wasn't found!** Then follow the instructions. MAC address is on product label. The device is factory set to IP **192.168.1.213**.



- gateway may not be entered if you want to use the device only in local network. If you set the same IP address which is already used, the device will not work correctly and there will be collisions on the network. If the device detects a collision of IP address then reboot is performed automatically.

- after changing IP address device is restarted and new IP address is assigned. Restart of the device takes about 10 seconds.
- connect to device using TSensor software and check the measured values. If P8631 Transducer values are not displayed, it's necessary to find probes using button **Search probes**.
- set the other parameters (alarm limits, SMTP server, etc.). Settings are saved after click on button **Save changes**.



## Checking functions

The last step is to check measured values on the device website. In the address bar of the web browser, enter the device IP address. If the default IP address was not changed, then insert **http://192.168.1.213**.

Displayed web page lists actual measured values. If the web pages are disabled, you can see text **ACCESS DENIED**. If the measured value exceeds the measurement range or probe is not correctly installed, then is shown **Error1** value. If the channel is switched off, the web site displayed **OFF** instead of the value.

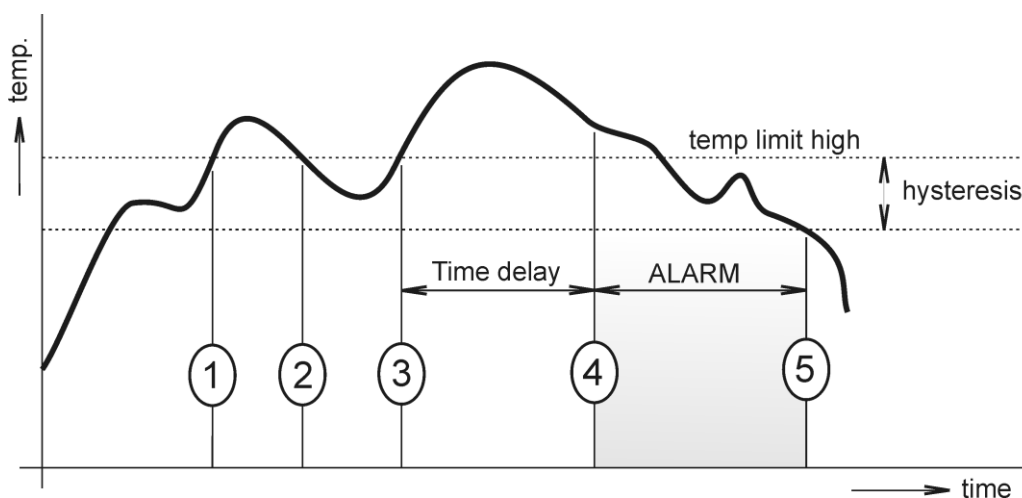
## Device function description

*This chapter describes basic device configuration. There is a description of settings using TSensor software and via Telnet.*

### Alarm limits

Alarm limits can be set at bookmark **Configuration** in TSensor software. For each measurement channel is possible to set upper and lower limits of temperature, time-delay for alarm activation (0 – 65535s) and hysteresis for alarm clearing.

Example of setting the limit to the upper alarm limit:



In Point 1 the temperature exceeded the limit. From this time, the time-delay is counting. Because at point 2 the temperature dropped below the limit value before the time delay expired, alarm was not set.

In Point 3 the temperature has risen over limit again. During the time-delay the value does not drop below the set limit, and therefore was in Point 4 caused alarm. At this moment were sent e-mails, traps and set alarm flag on website, SNMP and Modbus.

The alarm lasted up to Point 5, when the temperature dropped below the set hysteresis (temperature limit – hysteresis). At this moment was active alarm cleared.

When alarm occurs, alarm messages will be sent. But if alarm persists alarm messages will not be sent repeatedly. In case of power failure or reset the device (e. g changing the configuration) will new alarm state evaluated and new alarm messages will be send.

## Settings using TSensor software

### Bookmark Information

In bookmark **Information** are the most important informations about the device. Using switch Protocol you can choose the method of reading current values from the device. Selecting item Modbus connects TSensor software to the Modbus TCP server in the device. At this time is not possible to read any values using Modbus in other software.

### Bookmark Configuration

This bookmark allows set alarm limits for each channel (upper limit, lower limit, hysteresis and delay). In item description can be the channel named by user. This description will be displayed on the website of the device. The channel can be enabled or disabled. Measured temperature can be set to °C or °F. After click to **Search probes** is started searching for probes connected to P8631 Transducer.

### Bookmark Communication Setting

At **global settings** items can be set basic network parameters of the device. Before changing IP address, gateway and netmask, consult changes with your network administrator. If IP from DHCP is selected, then after reboot the device asks DHCP server to IP address. Using MTU item can be set maximum Ethernet frame size (512-1400). If you have problems with communication, you can reduce the value from default 1400. You can also enter a password and the name of the device. If the password is set, it is not possible to change device configuration without entering the password.

Under **SMTP** you can set three IP addresses, where will be send SNMP Traps. There is also possible to enter a password for read/write SNMP protocol.

**Modbus** item allows enable or disable the Modbus protocol. Modbus server port on the device can be set. The default port is 502.

Using the item **WWW** can be enabled/disabled web server and set the automatic refresh interval for web pages. In History item you can choose time interval for storing values into tables of history. These values are displayed in the graph and can be exported to a CSV file.

**Global time** allows to set the device time synchronization with SNTP server. Actual time is displayed on webpages of the device. To view the correct time is necessary to set the time offset from GMT (i.e. set time zone).

To send **e-mails** is needed to set IP address of SNTP server. The device allows you to send warning e-mail up to 3 specified addresses. The sender address can be changed. SMTP authentication is not supported in current firmware.

### Bookmark Communication Setting I

To correct sending SOAP messages at the server, you must set IP address of SOAP server, the target path to the service and TCP port for this service. Let the source port set to 0. Sending interval can be selected in the range of 10 – 65535s. If you are using monitoring system DBS Sensor Monitor, set the SOAP protocol according to instructions in the manual of monitoring system.

For sending Syslog messages you need to set only IP address of Syslog server.



## Factory configuration

Using TSensor software – **Factory configuration** button, the device can be set to factory configuration. Network parameters (IP address, Subnet mask, Gateway) are left without changes. Factory parameters settings:

Parameter	Value
IP address of SMTP server	0.0.0.0
E-mail recipients addresses	cleared
E-mail sender	sensor@IP
E-mail sending enabled	no
IP addresses SNMP traps recipients	0.0.0.0
Password for SNMP reading	public
Password for SNMP writing	private
Sending SNMP Trap	yes
Website refresh interval [s]	60
Website enabled	yes
Modbus TCP protocol port	502
Modbus TCP enabled	yes
History storage interval [s]	60
SOAP server IP address	0.0.0.0
SOAP source port	0
SOAP destination port	80
SOAP service target site	cleared
SOAP protocol enabled	no
Syslog server IP address	0.0.0.0
Syslog protocol enabled	no
SNTP server IP address	0.0.0.0
GMT offset [min]	0
SNTP synchronization enabled	no
MTU	1400
Turn on all channels	yes
Upper limit [°C]	125
Lower limit [°C]	-55
Hysteresis – hysteresis for alarm clearing [°C]	1
Delay – time-delay of alarm activation [s]	30
Password to access the settings	cleared
Device name	P8610 sensor or P8631 sensor

## Communication protocols

*Short introduction to communication protocols of the device. To use some communication protocols is necessary software, which can use the protocol. This software is not included. Detailed description of protocols and application notes can be found in the manual appendix.*

### Website

The device supports displaying of measured values, limits, alarm status and history graphs on its websites. Webpages can be viewed using standard web browsers (Internet Explorer, Mozilla Firefox or Opera). If the device has IP address **192.168.1.213** type into your browser **http://192.168.1.213**. Using TSensor software can be set automatic webpages refresh in interval 10-65535s. The default value is 60s.

Measured value has in graph green colour. Error or still unmeasured values are displayed as grey broken line. Upper/lower alarm value is in graph displayed as red/blue line. If all values are over upper/lower limit, the alarm line will be in the bottom/top graph part displayed.

Values from history can be exported in CSV format. History storage interval can be set using TSensor software. If the value has not been measured yet, is in table **Error1**. History is erased after every reboot of the device. Reboot of the device is executed when the power supply is disconnected and also after configuration change using TSensor software.

If the website are disabled or is being performed configuration using Telnet interface is on website displayed: **ACCESS DENIED**.

The device allows you to customize the design of web pages. Details of how to change the design, you can find in the manual appendix. Manual appendix can be obtained from the manufacturer's website.

### SMTP – sending e-mails

When measured values are over the set limits, the device allows send e-mail to a maximum of 3 addresses. For correct sending of e-mails it is necessary to set IP address of SMTP server. SMTP authentication is not supported in current firmware. Contact your network

administrator to obtain IP address of SMTP server. For communication with SMTP server is used **TCP** connection on **port 25**. E-mail sent by the device can not be answered.

## SNMP

Using SNMP protocol you can read actual measured values, alarm status and alarm parameters. Via SNMP protocol is also possible to get last 600 measured values from history table. Writing via SNMP protocol is not supported. It is supported only **SNMPv1** protocol version. SNMP used **UDP port 161**. OID keys description can be found in the MIB table, which can be obtained from manufacturer's website. The password for reading is factory set to **public**. The change can be made using TSensor software.

Time interval of storing to history table can be set using TSensor software. If the value has not been measured yet, is in table value **9999**. History table is erased after each reboot of the device.

When alarm occurred a warning messages (trap) can be sent to selected IP addresses. Addresses can be set using TSensor software. Traps are sent via **UDP** protocol on **port 162**. The device can send following traps:

Trap	Description
0/0	Reset of the device
1/0	Testing Trap
1/0	Configuration was changed using Modbus TCP protocol
1/1	Synchronization error with NTP server
1/2	Firmware was upgraded
1/3	Password was cleared
1/3	Error sending SOAP messages
1/5	
6/3	Signalization of alarm/clearing alarm

## Modbus TCP

Device supports Modbus protocol for communication with SCADA systems. Device use Modbus TCP protocol. **TCP port** is set to **502** by default. Port can be changed using TSensor software. The device processes only one request at one time. Before sending a new request you must wait for the previous answer. Only one device can be connected to the device at one moment. Modbus device address (**Unit Identifier**) is set to **1**. Specification and description of the Modbus protocol is free to download on: [www.modbus.org](http://www.modbus.org).

Supported Modbus commands (functions):

Command	Code	Description
Read multiple register(s)	0x03	Read 16b register(s)
Write multiple register(s)	0x10	Write 16b register(s)

Modbus device registers. Address could be by 1 higher, depending on type used communication library:

Address [DEC]	Address [HEX]	Value	Type	R/W
40000	0x9C40	channel 1 temperature	Int*10	R
40001	0x9C41	channel 1 alarm status	Ascii	R
40002	0x9C42	channel 1 upper limit	Int*10	R/W
40003	0x9C43	channel 1 lower limit	Int*10	R/W
40004	0x9C44	channel 1 hysteresis	Int*10	R/W
40005	0x9C45	channel 1 delay	uInt	R/W
40006	0x9C46	channel 2 temperature	Int*10	R
40007	0x9C47	channel 2 alarm status	Ascii	R
40008	0x9C48	channel 2 upper limit	Int*10	R/W
40009	0x9C49	channel 2 lower limit	Int*10	R/W
40010	0x9C4A	channel 2 hysteresis	Int*10	R/W
40011	0x9C4B	channel 2 delay	uInt	R/W
40012	0x9C4C	channel 3 temperature	Int*10	R
40013	0x9C4D	channel 3 alarm status	Ascii	R
40014	0x9C4E	channel 3 upper limit	Int*10	R/W
40015	0x9C4F	channel 3 lower limit	Int*10	R/W
40016	0x9C50	channel 3 hysteresis	Int*10	R/W
40017	0x9C51	channel 3 delay	uInt	R/W

Description:

R	read only register
W	register is designed for write
Int*10	registry is in format integer*10 – 16 bits
uInt	registry range is 0-65535
Ascii	character

Possible alarm states:

no	no alarm
lo	value is lower than set limit
hi	value is higher than set limit

## SOAP

The device allows you to send currently measured values via **SOAP v1.1** protocol. The device sends values in XML format to the web server. The advantage of this protocol is that communication is initialized by the device side. Due to it is not necessary use port forwarding. Sending interval can be set in range 10-65535s using TSensor software. If the SOAP message can not be delivered, warning message via SNMP Trap or Syslog protocol is sent. The file with the XSD schema can be downloaded from: [www.cometsystem.cz/schemas/soapP85xx\\_v2.xsd](http://www.cometsystem.cz/schemas/soapP85xx_v2.xsd).

SOAP protocol uses monitoring software DBS Sensor monitor. This software can be purchased as optional accessories.

## Syslog

The device allows sending text message to selected Syslog server. Events are send using **UDP** protocol on **port 514**. Events when Syslog messages are send:

Text	Event
<00001> Device restart	Device reboot
<00001> SOAP connection error	Error sending SOAP messages
<00002> Alarm channel 1 temp high/low	Alarm activation
<00002> Alarm channel 2 temp high/low	
<00002> Alarm channel 3 temp high/low	
<00003> NTP connection error	NTP synchronization error
<00004> Settings changed	Change settings via Modbus
<00004> Hostname error	Error sending SOAP messages
<00006> Clearing channel 1 alarm	Alarm determination
<00006> Clearing channel 2 alarm	
<00006> Clearing channel 3 alarm	
<00006> Testing message	Test Syslog message

## SNTP

The device allows time synchronization with NTP (SNTP) server. Time synchronization is made every 8 hours. SNTP IP address can be set using TSensor software. It is also possible set GMT offset for correct time zone. Time is used in history tables and history CSV files. Maximum jitter between two time synchronizations can be 30s.

## Troubleshooting

*The chapter describes the common problems with P8610 Thermometer, P8631 Transducer and methods how to fix these problems. Please read this chapter before you will call technical support.*

### I forgot the device IP address

IP address is factory set to **192.168.1.213**. If you had changed it and forgot new IP address, run the TSensor software and press **Find device...** In the window are displayed all available devices.

### I can not connect to the device

#### In search window is only IP and MAC address displayed

Other details are marked **N/A**. This problem occurs if IP address of the device is set to another network.

Select the window **Find device** in TSensor software and press **Change IP address**. Follow the software instructions. To assign IP address automatically using DHCP server, set the device IP address to **0.0.0.0**.

#### Device IP address is not displayed in window Find device

In TSensor software menu press **Help! My device was not found!** in window **Find device**. Follow the software instructions. MAC address of the device can be found on product label.

#### The device is not found even after manually setting MAC address

This problem occurs especially in cases when the IP address of the device belongs to another network and also Subnet mask or Gateway are incorrect.

In this case is DHCP server in the network necessary. In TSensor software menu press **Help! My device was not found!** in window **Find device**. As new IP address set **0.0.0.0**. Follow the software instructions.

## Error1 is displayed instead the measured value

**Error1** is displayed immediately after start or reboot the device. If the error code is displayed permanently, check if the temperature probe is connected to device correctly. Check if the temperature probes are not at a temperature outside the measuring range and check probes cables. Perform new search of probes using TSensor software.

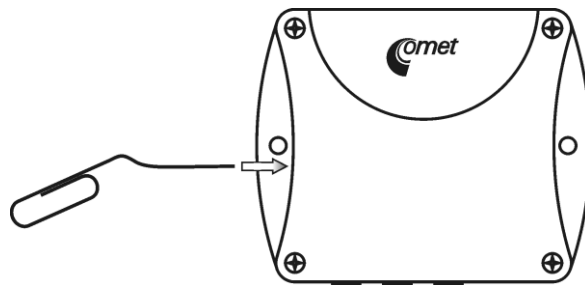
## Error2 is displayed in all channels instead the measured value

**Error2** indicates short-circuit of measurement bus. Check if correct probes are connected. Probes Pt100/Pt1000/Ni100/Ni1000 can not be used with this device. Make sure the cables of probes are not damaged.

## I forgot the password for setup

To clear the password from the device, follow these steps:

- disconnect the power supply (power adapter or RJ45 connector if PoE is used)
- use something with thin tipped (e.g. paper clip) and press the hole on the left side



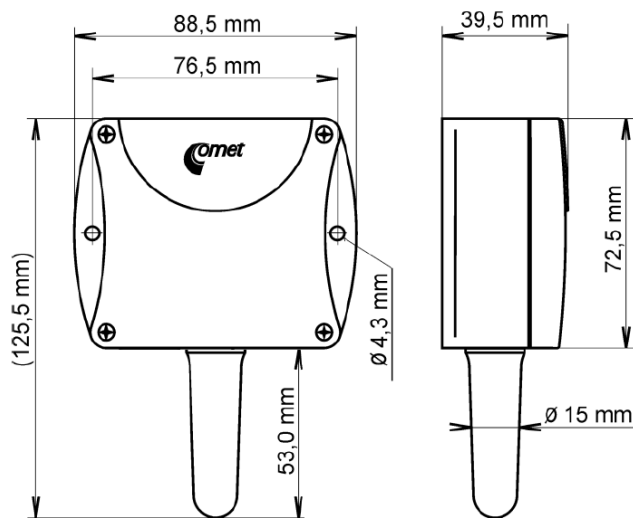
- connect the power, wait for 10s and release the button

## Technical specifications

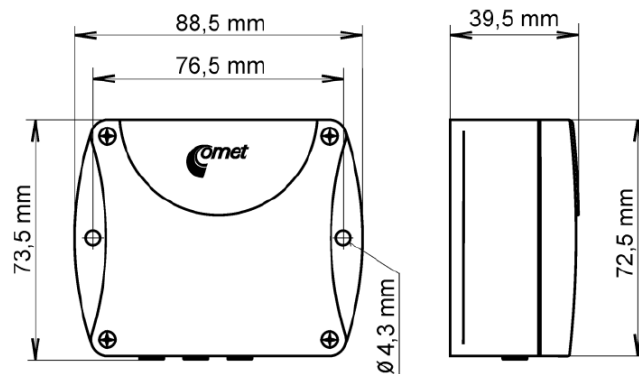
*Informations about technical specifications of the device.*

### Dimensions

P8610 Thermometer:



P8631 Transducer:



## Basic parameters

Supply voltage:

power over Ethernet according to IEEE 802.3af, PD Class 0 (max. 15.4W), voltage from 36V to 57V DC. For PoE are used pairs 1, 2, 3, 6 or 4, 5, 7, 8.

or DC voltage from 4.9V to 6.1V, coaxial connector, 5x 2.1mm diameter, positive pole in the middle, min. 250mA

Consumption:

~ 1W depending on the operating mode

Protection:

IP30 case with electronic

Measuring interval:

2s

Accuracy P8610:

$\pm 0.8^{\circ}\text{C}$  in temperature range from  $-10^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$

$\pm 2.0^{\circ}\text{C}$  in temperature range from  $-10^{\circ}\text{C}$  to  $-20^{\circ}\text{C}$

Accuracy P8631 (depending on used probe – e.g. probe DSTR162/C parameters):

$\pm 0.5^{\circ}\text{C}$  in temperature range from  $-10^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$

$\pm 2.0^{\circ}\text{C}$  in temperature range from  $-10^{\circ}\text{C}$  to  $-40^{\circ}\text{C}$

Resolution:

$0.1^{\circ}\text{C}$

P8610 temperature measurement range:

$-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$

P8631 temperature measurement range (limited by temperature range of used probe):

$-55^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$

Recommended probe P8631:

DSTR162/C or DSTGL40/C max. length 10m

Wiring Cinch connector P8631:

DS18B20 DQ pin to connector pin, VDO and GND connect to the connector shield

Communication port:

RJ45 connector, 10Base-T/100Base-TX Ethernet

Recommended Connector Cable:

for industrial use is recommended Cat5e STP cable, in less demanding applications can be replaced by Cat5 cable, maximum cable length 100m

Case material:

ABS

Mounting the device:

With two holes at the bottom of the unit

Weight P8610:

~145g

Weight P8631:

~140g

EMC emission:

ČSN EN 61326-1:2006 + cor. 1:2007, Class A, clause 7

ČSN EN 55011 ed.3:2010 + cor. A1:2011, ISM equipment group 1, Class A, clause 6.2.2.3

ČSN EN 55022 ed.2:2007 + change A1:2008, Class A ITE, clause 5.2

**Warning** - This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures to correct this interference.

EMC resistance:

ČSN EN 61326-1:2006 + cor. 1:2007

Electrical safety:

ČSN EN 60950-1 ed. 2:2006

## **Operating terms**

Temperature and humidity range in case with electronic:

-20°C to +60°C, 0 to 100% RH (no condensation)

Temperature range of recommended probe DSTR162/C for P8631:

-40°C to +80°C

P8610 working position:

with sensor cover downwards. When mounting in RACK 19" with universal holder MP046 (accessories) then sensor cover can be placed horizontally.

P8631 working position:

arbitrary

## End of operation



Disconnect the device and dispose it according to current legislation for dealing with electronic equipment. Electronic devices must be professionally destroyed in accordance with EU Directive 2002/96/ES of 27th January 2003.

## Technical support and service

Technical support and service is provided by distributor. Contact is included in warranty certificate.

## Preventive maintenance

Make sure the cables and probes are not damaged periodically. Recommended calibration interval is 2 years.

## Optional accessories

*This chapter contains list of optional accessories, which can be ordered by extra cost. Manufacturer recommends using only original accessories.*

### Temperature probe DSTR162/C

Temperature probe -40 to +80°C with a digital sensor DS18B20 and with Cinch connector for P8631 Transducer. Accuracy  $\pm 0.5^{\circ}\text{C}$  from -10 to +80°C,  $\pm 2.0^{\circ}\text{C}$  below -10°C. Length of the plastic case 25mm, diameter 10mm. Guaranteed watertight (IP67), sensor connected to PVC cable with lengths 1, 2, 5 or 10m.

### Power supply Adapter A1825

Power supply adapter with CEE 7 plug, 100-240V 50-60Hz/5V DC, 1.2A for P8610 Thermometer or P8631 Transducer. Adapter must be used if the device is not powered by Ethernet cable.

### Device case holder for RACK 19" MP046

Universal holder for easy mounting of P8610 Thermometer and P8631 Transducer in RACK 19".

### Probes holder for RACK 19" MP047

Universal holder for easy mounting probes in RACK 19".

### Dual Lock MD036

Self adhesive Dual Lock for easy mounting in places where is not possible to attach the case with screws.

## **Database software DBS Sensor monitor**

Database software DBS Sensor Monitor for online data collection and data analysis from Ethernet sensors. It contains all components for data acquisition from sensors, including a one license DBV Database Viewer. For more informations please visit our webpages [www.cometsystem.cz](http://www.cometsystem.cz).





