# COMET SYSTEM

**P2520 two-channel current loop converter**

# USER GUIDE

**Revision history**

This manual describes devices with latest firmware version according to table below. Older version of manual can be obtained from a technical support.

| Document version | Date of issue | Firmware version | Note |
|---|---|---|---|
| IE-SNC-P2520-01 | 2014-01-14 | 7-5-0-x | Initial revision of manual. |
| IE-SNC-P2520-02 | 2021-04-07 | 7-5-1-0 | Added DNS support for SOAP and email<br>Added chapter with XML and JSON description<br>Added support for SNMP sysLocation<br>New revision of texts and images |
| IE-SNC-P2520-03 | 2022-07-01 | unchanged | change of case material |

# Table of contents

**Chapter**

# 1

# Introduction

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

P2520 two-channel current loop converter is designed to connect sensors with output 0-20 mA or 4-20 mA into Ethernet network. Current can be recalculated to physical value measured by the connected sensor. Sensors can be powered directly from the P2520 Converter. P2520 have two current inputs. These inputs are not galvanically isolated.

## 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 carefully.*

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

Do not use the device, if it does not work correctly. Let check device by the qualified service person if you think that is not working properly.

It is forbidden to use the device without the cover. Inside the device can be a dangerous voltage and may be risk of electric shock.

Appropriate power supply adapter according to manufacturer specifications and approved according to relevant standards may to be used only. Please make sure, that the adapter does not have damaged cables or covers.

Connect the device to network parts approved according to relevant standards only.

Connect and disconnect the device properly. Do not connect or disconnect Ethernet cable or current inputs when the device is powered.

Do not short-circuit power supply terminals +U1 and +U2 to the GND terminals.

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

Do not use device in potentially explosive environments.

Do not stress the device mechanically.

# Device description and important notices

*This chapter contains information about basic features and device functional safety.*

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

- Web pages with XML and JSON files
- 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
- 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 web interface. Latest firmware version can be obtained from the technical support. Do not upload to your device firmware which is not designed for it. Unsupported firmware can damage your device.

Reliability of warning messages delivering (e-mail, trap, syslog), 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 additional 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. For a remote connection to the device should be VPN or similar secured access used only.

**Chapter**

# 2

# Getting started

*Here you can find information necessary to put newly purchased equipment to operation. Read information about current loop connection carefully.*

## What is needed for operation

To install the unit, you need to the following equipment. Please check if it is available before installation.

- P2520 current loop converter

- screwdriver for removing cover

- power supply – according to specification (commonly DC 24 V/1.0 A)

- RJ45 LAN connection with appropriate cable

- free IP address in your network

- sensor(s) with current loop output (4-20 mA or 0-20 mA)

## Mounting the device

- check if the equipment from the previous chapter is available

- install the latest version of TSensor software. This software will help you find device on network and to change IP address of the device. Device configuration is made using web interface. TSensor software can be downloaded from the manufacturer's website.

- contact your network administrator to obtain following information for the connection to the network:

| | |
|---|---|
| IP address: | _____._____._____._____ |
| Gateway: | _____._____._____._____ |
| Netmask: | _____._____._____._____ |
| DNS IP address: | _____._____._____._____ |

- check if there is no IP address conflict when you connect the device into network for the first time. The device has from factory set the IP address to **192.168.1.213**. This address must be changed according to information from the previous point. When you install several new devices, connect them to the network one after another.

- remove device cover, connect current loops, and power supply terminals according to image below. **Inputs channels on the device are not galvanically isolated. Power supply is not isolated from inputs as well!** Device is isolated from communication line side only. Carefully consider how connect sensor with current output into your P2520.

- close device cover

- connect the Ethernet connector

- power on the power supply adapter

- LEDs on LAN connector should blink after connecting the power
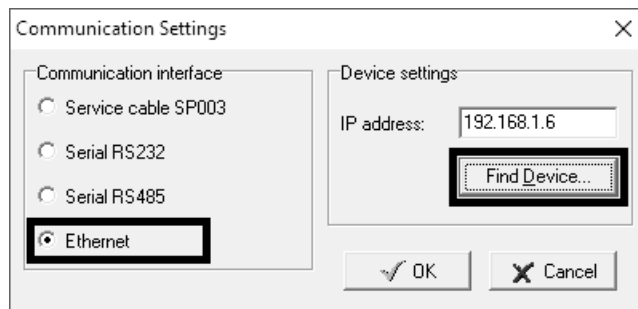
P2520 inputs schematic:
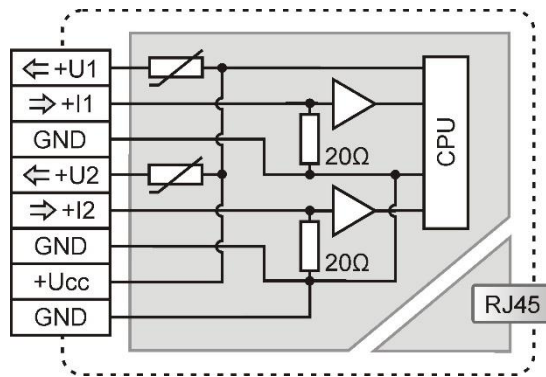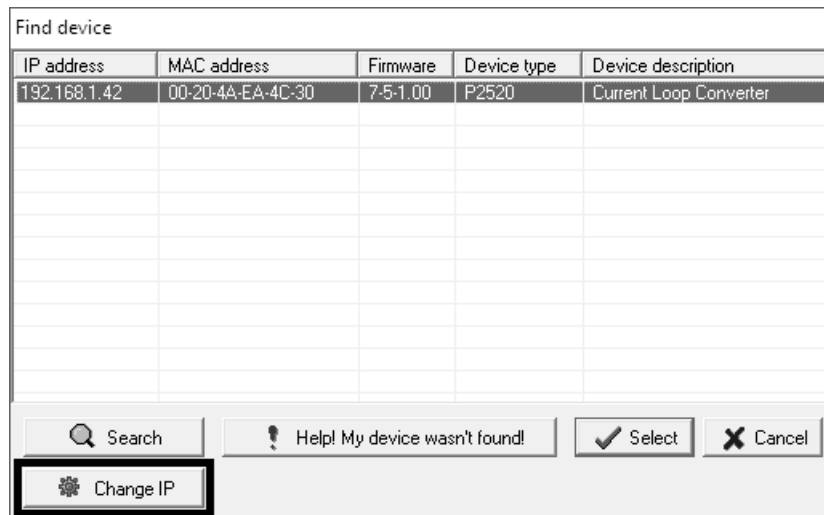


Sensor connection example:
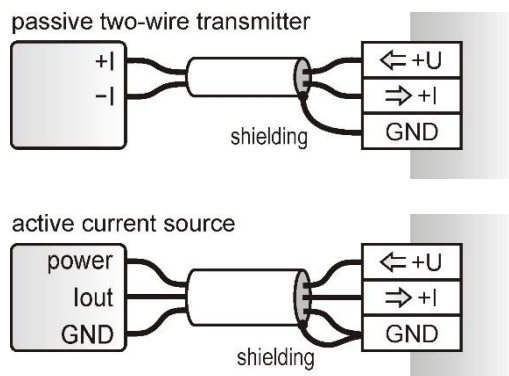


# Device settings

- run configuration software TSensor on your PC

- switch to an **Ethernet** communication interface

- press button **Find device...**

- the window shows all available devices on your network



- click to **Change IP** to set new address according to network administrator instructions. If your device is not listed, 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**.
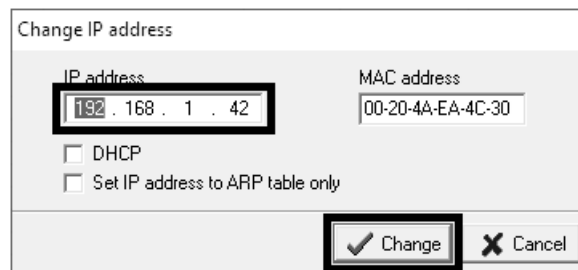


- gateway may not be entered if you want to use the device in local network only. If you set the same IP address which is already used, the device will not work correctly due to IP address collision. If the device detects a collision of IP address, then reboot is performed automatically.

- after changing IP address device is restarted and new IP address is assigned. Restart of the device takes up to 10 seconds.

- connect to device using TSensor software. TSensor software will forward you to web interface. On the web interface you can set your device according to requirements.

**Chapter**

# 3

# Device setup

*This chapter describes basic device configuration. There is a description of settings using web interface.*

## Setup using web interface

Web interface can be managed by the web browser. Main page will be shown when you insert device address into address bar of your web browser. There you find actual measured values. Page with history graphs is shown when you click to tile with actual values. Access to device setup is possible via tile **Settings**.

## General

Device name can be changed using item **Device name**. Measured values are stored into memory according to **History storage interval** field. After changing of this interval all history values will be cleared. Be aware that content of memory for history values is not preserved after device restart or power lost. Changes must be confirmed by **Apply settings** button.



## Network

Network parameters can be obtained automatically from DHCP server using option **Obtain an IP address automatically**. Static IP address is configurable via field **IP address**. It is not necessary setup **Default gateway** while is device used inside one subnet only. **DNS server IP** is used to resolving addresses for SOAP protocol or communication with SMTP (mail) server. Option **Standard subnet mask** sets network mask automatically according to A, B or C network class. **Subnet mask** field must be set manually when network with non-standard range is used. **Periodic restart interval** enables to restart device after selected time since device start.

## Alarm limits

For each measurement channel is possible to set upper and lower limits, time-delay for alarm activation (0 – 30000 s) and hysteresis for alarm clearing.



Example of setting the limit to the upper alarm limit:
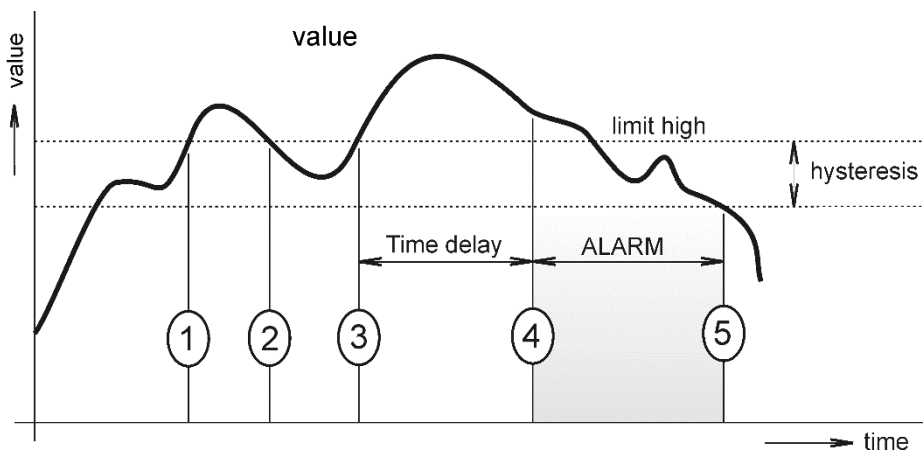


In Point 1 the measured value exceeded the limit. From this time, the time-delay is counting. Because at point 2 the value dropped below the limit value before the time delay expired, alarm was not set.

In Point 3 the value 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 measured value dropped below the set hysteresis (high limit – hysteresis). At this moment was active alarm cleared and e-mail send.

When alarm occurs, alarm messages will be sent. In case of power failure or device reset (e.g. changing the configuration) will new alarm state evaluated and new alarm messages will be send.

## Channels

Channel can be enabled or disabled for measuring using checkbox **Enabled**. Channel can be renamed, and unit of channel can be changed. Measured current is recalculated to physical representation according to selected linear equation. Number of decimal places is selectable. All changes must be confirmed using **Apply settings** button. History values are cleared after changing of channel settings.



## SOAP protocol

SOAP protocol can be enabled by option **SOAP protocol enabled**. Address of the destination http server is configurable via **SOAP server address** filed. For setup of destination server port can be used option **SOAP server port**. Device sends SOAP message according selected **Sending interval**. Option **Send SOAP message when alarm occurs** sends message when an alarm on channel occurs or alarm is cleared. These SOAP messages are sent asynchronously to selected interval.

SOAP protocol is used for data transfers into COMET Cloud or COMET Database. Detail description of setup you find at documentation for each data acquisition system.

## Email

**Email sending enabled** option allows email features. It is necessary set address of the SMTP server into **SMTP server address** field. Default port of the SMTP server can be changed using item **SMTP server port**. SMTP authentication can be enabled using **SMTP authentication** option. When authentication is enabled **Username** and **Password** must be set.

For successfully email sending it is necessary insert **Email sender address**. This address is usually same as username of the SMTP authentication. Into fields **Recipient 1** to **Recipient 3** it is possible set address of email recipients. Option **Short email** enable sending emails in short format. This format is usable when you need to forward emails into SMS messages.

When option **Alarm email repeat sending interval** is enabled and there is active alarm on channel, then emails with actual values are sent repeatedly. **Info email sending interval** option enables sending emails at selected time interval. CSV history file can be sent together with the repeat/info emails. This feature can be enabled by **Alarm and Info emails attachment** option.

It is possible to test email function using button **Apply and test**. This button saves a new setting and send a testing email immediately.

## Modbus a Syslog protocols

ModbusTCP and Syslog protocol settings are configurable via menu **Protocols**. Modbus server is enabled by default. Deactivation is possible via **Modbus server enabled** option. Modbus port can be changed via **Modbus port** field. Syslog protocol can be enabled using item **Syslog enabled**. Syslog messages are sent to IP address of the Syslog server - field **Syslog server IP address**.



## SNMP

For reading values via SNMP it is necessary to know password - **SNMP read community**. SNMP Trap can be delivered up to three IP address - **IP address of the Trap recipient**. SNMP Traps are sent at alarm or error state on the channel. Trap feature can be enabled by option **Trap enabled**.

## Time

Time synchronization with SNTP server can be enabled by **Time synchronization enabled** option. IP address of the SNTP is necessary to set into **SNTP server IP address** item. SNTP time is synchronized at UTC format, and due to be necessary set corresponding time offset – **GMT offset [min]**. Time is synchronized every 24 hours by default. Option **NTP synchronization every hour** decreases this synchronization interval to one hour.



## WWW and security

Device security features can be enabled by the **Security enabled** option. When security is enabled it is necessary to set administrator password. This password will be required for device settings. When secured access is required even to actual values reading it is possible to enable **User account only for viewing**. Port of the www server can be changed from the default value 80 using filed **WWW port**. Web pages with actual values are refreshed according to **Web refresh interval** field.

# Backup

Device configuration may to be saved into file. This file can be used to restoring configuration or cloning configuration between devices. Configuration can be cloned between same device models only. It may to be restored all device settings with exception network settings, www and security settings.

# Factory defaults

**Factory defaults** button set the device into factory configuration. Network parameters (IP address, Subnet mask, DNS, Gateway) are left without changes.



Network parameters are changed while you press button inside the device. For more information, please read chapter *Factory defaults*.

Factory parameters settings:

| Parameter | Value |
|---|---|
| SMTP server address | example.com |
| SMTP server port | 25 |
| Alarm email repeat sending interval | off |
| Info email sending interval | off |
| Alarm and Info emails attachment | off |
| Recipients addresses | cleared |
| Email sender address | sensor@websensor.net |
| SMTP authentication | off |
| SMTP user/SMTP password | cleared |
| Email sending enabled | off |
| IP addresses SNMP traps recipients | 0.0.0.0 |
| SNMP read community | public |
| Sending SNMP Trap | off |
| SNMP System location | cleared |
| Web refresh interval [sec] | 10 |
| Web server enabled | yes |
| WWW port | 80 |
| Security | off |
| Administrator password | cleared |
| User password | cleared |
| Modbus port | 502 |
| Modbus server enabled | yes |
| History storage interval [sec] | 60 |
| SOAP server address | cleared |
| SOAP server port | 80 |
| SOAP sending interval [sec] | 60 |
| Send SOAP message when alarm occurs | yes |
| SOAP protocol enabled | off |
| Syslog server IP address | 0.0.0.0 |
| Syslog protocol enabled | off |
| SNTP server IP address | 0.0.0.0 |
| GMT offset [min] | 0 |
| NTP synchronization every hour | off |
| Time synchronization enabled | off |
| MTU size | 1400 |
| Periodic restart interval | off |
| Demo mode | off |
| Turn on all channels | yes |
| High limit | 15.0 |
| Low limit | 10.0 |
| Hysteresis – hysteresis for alarm clearing | 1.0 |
| Time delay – time-delay of alarm activation [sec] | 30 |
| Unit on the channel | mA |
| Channel name | Channel X (where X is 1 and 2) |
| Current low | 4.0 |
| Current high | 20.0 |
| Readings value low | 4.0 |
| Readings value high | 20.0 |

| Number of decimal places | 2 |
|---|---|
| Device name | Current Loop Converter |

**Chapter**

# 4

# 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.*

## Website

The device supports displaying of measured values, history graphs and configuration using web browser. History graphs are based on HTML5 canvas. Web browser must support this feature for proper function of graphs. Firefox, Opera, Chrome, or Edge can be used. If the device has IP address **192.168.1.213** type into your browser **http://192.168.1.213**. Actual measured values can be obtained using file **values.xml** or using **values.json**.

Values from history can be exported in CSV format. History storage interval can be set using web interface. History is erased after every reboot of the device. Reboot of the device is performed when the power supply is disconnected and after some configuration changes.

## SMTP – sending e-mails

When measured values are over the set limits, the device allows send e-mail to a maximum of 3 addresses. E-mail is sent when alarm condition on the channel is cleared or a measuring error occurs. It is possible to set repeat interval for email sending. For correct sending of e-mails it is necessary to set address of SMTP server. SMTP authentication is supported but SSL/TLS not. Standard SMTP port 25 is used by default. SMTP port can be changed. Contact your network administrator to obtain configuration parameters of your SMTP server. E-mail sent by the device cannot be answered.

## SNMP

Using SNMP protocol, you can read actual measured values, alarm status. Writing via SNMP protocol is not supported. It is supported **SNMPv1** protocol version only. SNMP used **UDP port 161**. OID keys description can be found in the MIB table, which can be obtained from

device website or from your distributor. The password for reading is factory set to **public**. OID keys:

| OID | Description | Type |
|---|---|---|
| .1.3.6.1.4.1.22626.1.6.1 | Device information | |
| .1.3.6.1.4.1.22626.1.6.1.1.0 | Device name | String |
| .1.3.6.1.4.1.22626.1.6.1.2.0 | Serial number | String |
| .1.3.6.1.4.1.22626.1.6.1.3.0 | Device type | Integer |
| .1.3.6.1.4.1.22626.1.6.2.ch | Measured value (where ch is channel number) | |
| .1.3.6.1.4.1.22626.1.6.2.ch.1.0 | Channel name | String |
| .1.3.6.1.4.1.22626.1.6.2.ch.2.0 | Unit | String |
| .1.3.6.1.4.1.22626.1.6.2.ch.3.0 | Value | String |
| .1.3.6.1.4.1.22626.1.6.2.ch.4.0 | Actual value – 16bit (12dgrC=12) | Integer |
| .1.3.6.1.4.1.22626.1.6.2.ch.5.0 | Actual value – 16bit (12.5dgrC=125) | Int*10 |
| .1.3.6.1.4.1.22626.1.6.2.ch.6.0 | Actual value – 16bit (12.53dgrC=1253) | Int*100 |
| .1.3.6.1.4.1.22626.1.6.2.ch.7.0 | Actual value – 16bit (12dgrC=12) | Integer |
| .1.3.6.1.4.1.22626.1.6.2.ch.8.0 | Actual value – 32bit (12.5dgrC=125) | Int*10 |
| .1.3.6.1.4.1.22626.1.6.2.ch.9.0 | Actual value – 32bit (12.53dgrC=1253) | Int*100 |
| .1.3.6.1.4.1.22626.1.6.2.ch.10.0 | Actual current [mA] | String |
| .1.3.6.1.4.1.22626.1.6.2.ch.11.0 | Actual current [uA] (120uA=120) | Integer |
| .1.3.6.1.4.1.22626.1.6.2.ch.12.0 | Alarm on channel (0, 1, 2) | Integer |
| .1.3.6.1.4.1.22626.1.6.2.ch.13.0 | Alarm on channel (none, high, low) | String |
| .1.3.6.1.4.1.22626.1.6.3.1.0 | SNMP Trap text | String |

When alarm occurred a warning messages (trap) can be sent to selected IP addresses. Addresses can be set using web interface. 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 | Settings was changed | |
| 6/0 | Testing Trap | |
| 6/1 | NTP synchronization error | |
| 6/2 | E-mail sending error | SMTP server login error |
| 6/3 | | SMTP authentication error |
| 6/4 | | Some error occurred during SMTP communication |
| 6/5 | | TCP connection to server cannot be opened |
| 6/6 | | DNS error |
| 6/7 | SOAP message sending error | SOAP file not found inside web memory |
| 6/8 | | DNS error or MAC address cannot be obtained |
| 6/9 | | TCP connection to server cannot be opened |
| 6/10 | | Wrong response code from the SOAP server |
| 6/11, 6/12 | Upper alarm on channel | |
| 6/21, 6/22 | Lower alarm on channel | |
| 6/31, 6/32 | Clearing alarm on channel | |
| 6/41, 6/42 | Measuring error | |

## 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 web interface. Only two Modbus clients can be connected to device at one moment. Modbus device address (Unit Identifier) can be arbitrary. Modbus write command is not supported. Specification and description of the Modbus protocol is free to download on: www.modbus.org.

Supported Modbus commands (functions):

| Command | Code | Description |
|---|---|---|
| Read Holding Register (s) | 0x03 | Read 16b register(s) |
| Read Input Register(s) | 0x04 | Read 16b register(s) |

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

| Address [DEC] | Address [HEX] | Description | Type |
|---|---|---|---|
| 39970 | 0x9C22 | 1st two digits from serial number | BCD |
| 39971 | 0x9C23 | 2nd two digits from serial number | BCD |
| 39972 | 0x9C24 | 3rd two digits from serial number | BCD |
| 39973 | 0x9C25 | 4th two digits from serial number | BCD |
| 39974 | 0x9C26 | Device type | Int16b |
| 39975, 39976 | 0x9C27, 0x9C28 | Current on channel [uA] | Int16b |
| 39977 – 39978 | 0x9C29 – 0x9C2A | Actual value channel1 | Float32b |
| 39979 – 39980 | 0x9C2B – 0x9C2C | Actual value channel2 | |
| 39981, 39982 | 0x9C2D, 0x9C2E | Actual value | Int16b |
| 39983, 39984 | 0x9C2F, 0x9C30 | Actual value | Int16b*10 |
| 39985, 39986 | 0x9C31, 0x9C32 | Actual value | Int16b*100 |
| 39987, 39988 | 0x9C33, 0x9C34 | Unit on the channel | Ascii |
| 39989, 39990 | 0x9C35, 0x9C36 | Channel alarm state | uInt16b |
| 39991 – 39999 | 0x9C37 – 0x9C3F | Unused | n/a |
| 40000 | 0x9C40 | Channel 1 actual value | Int16b*10 |
| 40001 | 0x9C41 | Channel 1 alarm status | Ascii |
| 40002 | 0x9C42 | Channel 1 current [uA] | Int16b*10 |
| 40003 – 40004 | 0x9C43 – 0x9C44 | Channel 1 Actual value | Int32b*100 |
| 40005 | 0x9C45 | Unused | n/a |
| 40006 | 0x9C46 | Channel 2 actual value | Int*10 |
| 40007 | 0x9C47 | Channel 2 alarm status | Ascii |
| 40008 | 0x9C48 | Channel 2 current [uA] | Int16b*10 |
| 40009 – 40010 | 0x9C49 – 0x9C4A | Channel 2 Actual value | Int32b*100 |
| 40011 | 0x9C4B | Unused | n/a |

Description:

Int16b          registry range is -31999 to 32767, error value <= -32000

Int16b*10      registry is in format integer*10 – 16 bits, 12.5dgrC = 125, error value <= -32000

Int16b*100     registry is in format integer*100 – 16 bits, 12.53dgrC = 1253, error value <= -3200

| | |
|---|---|
| Float32b | two Modbus registers containing IEEE754 float, lower 16bits first, error value = -inf |
| Int32b*100 | two Modbus registers containing 32bit signed integer*100, 12.53dgrC = 1253, lower 16bits first, error value <= -320000000 |
| Ascii | two ASCII character in register |
| BCD | registry is coded as BCD |
| n/a | item is not defined, should be read |

## 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. If the SOAP message cannot be delivered, warning message via SNMP Trap or Syslog protocol is sent. The file with the XSD schema can be downloaded from: http://cometsystem.cz/schemas/soapP2520.xsd. SOAP message example:

```
Host: 192.168.1.132
Content-Type: text/xml; charset=utf-8
Content-Length: 656
SOAPAction: "http://tempuri.org/InsertP2520Sample"

<?xml version="1.0" encoding="utf-8"?>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">

<soap:Body>
  <InsertP2520Sample xmlns="http://cometsystem.cz/schemas/soapP2520.xsd">

    <name>Current Loop Converter</name>
    <sn>11940986</sn>
    <tmr>60</tmr>
    <kind>4357</kind>

    <c1>
      <n>Channel 1</n>
      <v>3.25</v>
      <f>00005040</f>
      <u>mA</u>
      <a>no</a>
      <p>2</p>
      <e>1</e>
    </c1>

    <c2>
      <n>Channel 2</n>
      <v>18.00</v>
      <f>00009041</f>
      <u>mA</u>
      <a>no</a>
      <p>2</p>
      <e>0</e>
    </c2>

  </InsertP2520Sample>
  </soap:Body>

</soap:Envelope>
```

## XML and JSON

Measured values can be read from http server by http GET requests. Values are available at two data formats - XML and JSON. Values can be obtained via files **values.xml** and **values.json**. Webserver needs to be enabled to be values available.

Example of values.xml file:

```xml
<root>

  <err>0</err>
  <devname>My device</devname>
  <devsn>13940001</devsn>
  <time>2021-04-06T07:48:44+01:00</time>
  <timeunix>1617695324</timeunix>
  <synch>1</synch>

  <ch1>
    <name>Humidity</name>
    <unit>%RH</unit>
    <aval>34.93</aval>
    <alarm>1</alarm>
  </ch1>

  <ch2>
    <name>Temperature</name>
    <unit>C</unit>
    <aval>22.31</aval>
    <alarm>0</alarm>
  </ch2>

</root>
```

Example of values.json file:

```json
{
  "devname":"My device",
  "devsn":"13940001",
  "time":"07:58:32 2021-04-06",
  "timeunix":"1617695912",
  "synch":"1",

  "ch1":
  {
    "name":"Humidity",
    "unit":"%RH",
    "aval":"34.94",
    "alarm":1
  },

  "ch2":
  {
    "name":"Temperature",
    "unit":"C",
    "aval":"22.49",
    "alarm":0
  }
}
```

# Syslog

The device allows sending text message to selected Syslog server. Events are send using **UDP** protocol on **port 514**. Syslog protocol implantation is according to RFC5424 and RFC5426. Events when Syslog messages are send:

| Text | Event |
| --- | --- |
| Sensor - fw 7-5-x.x | Reset of the device |
| Settings changed | Settings was changed |
| NTP synchronization error | NTP synchronization error |
| Testing message | Test Syslog message |
| Email dns error | E-mail sending error |
| Email login error | |
| Email auth error | |
| Email some error | |
| Email socket error | |
| SOAP file not found | SOAP message sending error |
| SOAP dns error | |
| SOAP host error | |
| SOAP sock error | |
| SOAP delivery error | |
| High alarm CHx | Upper alarm on channel |
| Low alarm CHx | Lower alarm on channel |
| Clearing CHx | Clearing alarm on channel |
| Error CHx | Measuring error |

# SNTP

The device allows time synchronization with NTP (SNTP) server. SNMP protocol version 3.0 is supported (RFC1305). Time synchronization is made every 24 hours. Time synchronization every hour can be enabled. For time synchronization it is necessary set IP address to the SNTP server. It is also possible set GMT offset for correct time zone. Time is used in graphs and history CSV files. Maximum jitter between two synchronization of time is 90sec at 24 hours interval.

**Chapter**

**5**

# Troubleshooting

*The chapter describes the common problems with P2520 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 cannot 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 (subnet).

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 the 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 press **Help! My device was not found!** in window **Find device**. As new IP address set **0.0.0.0**. Follow the software instructions. An alternative is to reset device to factory defaults using factory-defaults button.

## Error codes

Table below describes common error codes from the device:

| Error code | Description | How to resolve problem |
|---|---|---|
| n/a | Value is not available | Value n/a is shown a shortly after device restart. If the error code or n/a is displayed permanently, then channel is not enabled. |
| Error 1 | Value can't be converted to string | Constants for recalculation are wrongly set, change them. |
| Error 2 | Internal Error – communication | Please contact technical support. |
| Error 3 | Register overflow | Measured value cannot be shown at register (16bit). Please use 32bit register or change constants for recalculation. |
| Error 4 | Undocumented error | Please contact technical support. |
| Error 5 | Internal Error – CRC | Please contact technical support. |
| Error 6 | Current is under low limit | Please contact technical support. |
| Error 7 | Current is over high limit | Measured current is over the maximum limit. Check if there is not short-circuit at the current loop. Check function of current transmitter. |

## I forgot the password for setup

Please reset device to factory defaults. Procedure is described at following point.

## Factory defaults

This procedure restore device to factory settings including network parameters (IP address, Subnet mask, etc.). For factory-defaults follow these steps:

- disconnect the power supply, unscrew upper cover of the device case

- press factory-defaults button and connect the power
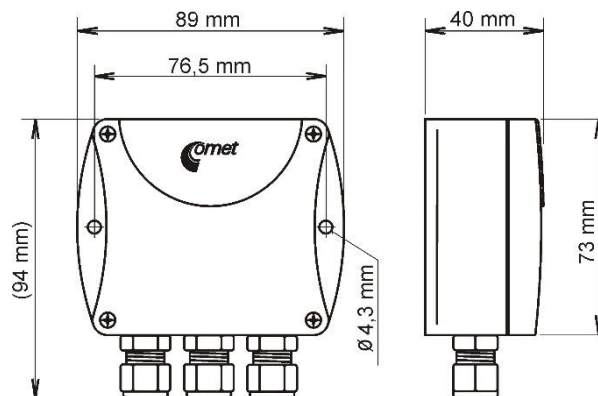
- keep button pressed for 10 sec
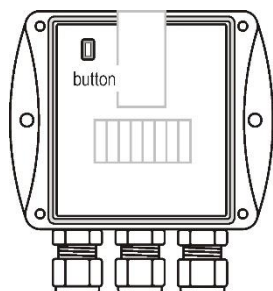


- close the device

# Technical specifications

*Information about technical specifications of the device.*

## Dimensions



## Basic parameters

Supply voltage:

DC voltage from 9 V to 30 V

Consumption:

~ 1 W device without powering connected sensors

Protection:

IP30

Measuring interval:

1 sec, faster readings is available via ModbusTCP protocol, for more information please contact technical support

Accuracy:

±0.1 %FS from 0 °C to +50 °C

±0.3 %FS from -30 °C to +80 °C

Measuring range:

> 0 to 25 mA

Resolution:

> 1 uA

A/D converter resolution:

> 24bit sigma-delta

Input Impedance:

> 20 Ω

Maximum overload current:

> 30 mA

Current load for +U1 and +U2 terminals:

> max. 40 mA each

> terminals are connected to supply voltage via PTC thermistors (overload protection). Output voltage depends on actual current load, it is approximately about 1.2 V lower than supply voltage.

Communication port:

> RJ45 connector – galvanically isolated from communication line, 10Base-T/100Base-TX Ethernet (Auto-Sensing)

Recommended Connector Cable:

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

Supported protocols:

> TCP/IP, UDP/IP, ARP, ICMP, DHCP

> HTTP, SMTP, SNMPv1, ModbusTCP, SNTP, XML, JSON, SOAPv1.1, Syslog

SMTP protocol:

> SMTP authentication – AUTH LOGIN

> Encryption (SSL/TLS/STARTTLS) is not supported

Supported web browsers:

> Mozilla Firefox 87 and later, Google Chrome 89 and later, Microsoft Edge 89 and later. Device should be also compatible with other browsers. Functionality wasn't tested with other web browsers.

Recommended minimum screen resolution:

> 1024 x 768

Memory:

> 1000 values for each channel inside non-backup RAM memory

Case material:

ASA

Mounting the device:

With two holes at the bottom of the unit

Weight:

~ 150 g

EMC:

2014/30/EU, EN 61326-1

## Operating terms

Temperature and humidity range:

-30 °C to +80 °C, 0 to 100 %RH (no condensation)

Working position:

arbitrary

## End of operation

Disconnect the device and dispose it according to current legislation for dealing with electronic waste. Electronic devices must be professionally destroyed.

## Technical support and service

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

## Preventive maintenance

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