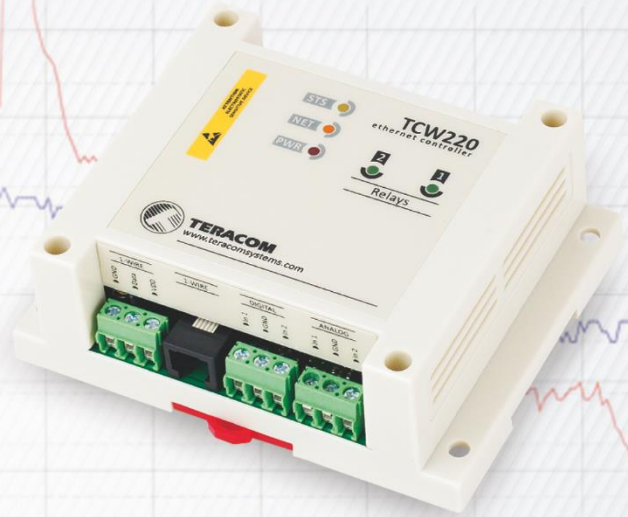
control solutions
TERACOM




# TCW220 Ethernet data logger

**Revision 4.23 / April 2026**

# USER MANUAL

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www.teracomsystems.com

# Ethernet data logger TCW220

## 1. Introduction

The TCW220 is a versatile, stand-alone Ethernet data logger designed for data acquisition applications. It features two 10-bit resolution analog inputs and two digital "dry contact" inputs. Additionally, it supports up to 8 Teracom 1-Wire sensors through its 1-Wire interface, enabling measurement of parameters such as temperature, humidity, CO2 levels, current, 4/20mA signals, and galvanically isolated analog voltages.

The TCW220 includes two relays with both normally open and normally closed contacts. These relays can be activated either remotely (via web interface, SNMP, HTTP API, Modbus TCP/IP, etc.) or locally based on the status of a monitored parameter (1-Wire sensor, analog voltage, or dry contact input).

All monitored data can be logged into the device's internal flash memory, either at pre-set time intervals or when alarm conditions are triggered. Logged data can be periodically uploaded to a designated server via HTTP/HTTPS POST, and the stored information can be viewed in graphical form across four different graph pages.

The TCW220 can also periodically upload an XML or JSON file containing all monitored parameters to a server via HTTP/HTTPS POST.

For each monitored parameter, the device can send alarm notifications via email or SNMP traps to up to 5 recipients. Alarm alerts can also be transmitted using HTTP/HTTPS POST, along with the XML/JSON status file.

## 2. Features

- 10/100 Mbps Ethernet connectivity with Auto-MDIX support
- Ethernet data logging with storage for up to 70,000 records
- Graphical display of logged data
- Password-protected web-based configuration and control
- 2 digital "dry contact" inputs
- 2 analog inputs (0 to 10VDC range) with 10-bit resolution
- Configurable multiplier, offset, and unit of measurement for analog inputs
- 2 relays with normally open (NO) and normally closed (NC) contacts
- 1-Wire interface supporting up to 8 Teracom sensors
- SNMP v2 support
- SNMP traps for alarm alerts, sent to up to 5 recipients
- Modbus TCP/IP support
- Support for TLS 1.0, 1.1, and 1.2
- SMTP with TLS security
- Periodic HTTP/HTTPS POST of XML/JSON status files for client-server systems
- Email alerts to up to 5 recipients for alarms
- HTTP API command support
- Dynamic DNS support with DynDNS, No-IP, and DNS-O-Matic
- NTP (Network Time Protocol) support
- Configurable ports for HTTP, SNMP, and Modbus TCP/IP
- Wide power supply voltage range
- Remote firmware update capability

## 3. Applications

The TCW220 is well-suited for a wide range of applications, including industrial automation, data acquisition, environmental monitoring, and local control of both electrical and non-electrical parameters. It is also an excellent choice for building automation systems.

The device can operate as a standalone unit controlled via a web browser, or it can be integrated into small or large industrial control systems, such as SCADA (Supervisory Control and Data Acquisition systems).

Some example applications include:

- Stand-alone or system-integrated Ethernet data logger
- Industrial process automation
- Industrial environmental monitoring
- Environmental monitoring and control in mushroom farms and wineries
- Integration into small to large SCADA systems
- Ethernet data logging for storage facilities.

## 4. Specifications

- Physical characteristics
  Dimensions: 115 x 90 x 40 mm
  Weight: 170 g

- Environmental limits
  Operating temperature range: -20 to 55°C
  Storage temperature range: -25 to 60°C
  Operating relative humidity range: 5 to 85% (non-condensing)

- Warranty
  Warranty period: 3 years

- Power supply
  Operating voltage range (including -15/+20% according to IEC 62368-1): 10 to 28 VDC
  Current consumption: 240 mA @ 12 VDC (with all relays ON)

- Digital inputs
  Isolation: Non isolated
  Mode: Dry contact
  Maximum input voltage: +5.5VDC
  Sampling rate: 10mS
  Digital filtering time interval: 30mS

- Analog inputs
  Isolation: Non isolated
  Type: Single ended
  Resolution: 10 bits
  Mode: Voltage
  Input Range: 0 to 10 VDC
  Accuracy: ±1%
  Sampling Rate: 500mS per channel (averaged value of 500 samples)
  Input Impedance: 150 kilo-ohms (min.)

- Relay outputs
  Type: Form C (N.O. and N.C. contacts)
  Contact current rating: 3 A @ 24 VDC/30 VAC (resistive load)
  Initial insulation resistance: 100 mega-ohms (min.) @ 500 VDC
  Mechanical endurance: 10 000 000 operations
  Electrical endurance: 100 000 operations @ 3 A resistive load
  Contact resistance: 50 milli-ohms max. (initial value)
  Minimum pulse output: 1 Hz at rated load

  ⚠ **Caution:** The device does not contain any internal overcurrent protection facilities on the relay's contact lines. External fuses or short circuit current limiting circuit breakers, rated to 3 Amps, are to be used for overcurrent protection of the connecting lines.

- 1-Wire interface
  Output voltage (+VW): 5.0 ± 0.3 VDC
  Maximum output current (+VW): 0.2 A

- Internal FLASH memory
  Endurance: 100 000 cycles (Every settings change is a memory cycle.)

- Lithium battery
  Type: CR1220

  ⚠ **Caution:** Replacing the battery with an incorrect type may result in an explosion.

# 5. LED indicators

The TCW220 controller includes the following LED indicators to display its status:

- **Relay1-Relay2** (green) – Illuminates when the corresponding relay is activated (NO contact closed, NC contact open);
- **PWR** (red) – Steady ON in normal operation; blinks in sync with the STS LED in the event of a hardware error;
- **STS** (yellow) – Flashes to indicate that the controller's main program is running;
- **NET** (orange) – Indicates network status; remains ON when a network link is established, and blinks to show network activity.

# 6. Installation and setup

Qualified personnel must install the device. It shouldn't be installed outside directly.

The installation process involves mounting the device, connecting it to an IP network, attaching inputs and outputs, supplying power, and configuring it through a web browser.

## 6.1. Mounting

TCW220 must be installed in a clean, dry, and non-flammable location. Ventilation is recommended for high ambient temperature environments.

To mount the device, use two plastic dowels (e.g. Würth GmbH 0912 802 002) and two dowel screws (e.g. Würth GmbH 0157 06 70) to secure it to a wall. Refer to fig.1 in Appendix A for mechanical details.

Leave 50 mm of space on all sides for ventilation and electrical isolation. Refer to fig.2 in Appendix A.

The device can also be attached to a standard DIN rail (35mm by 7.55mm) by hooking the back of the enclosure onto the rail and snapping the bottom into place.

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## 6.2. Connection

**Warning! Power off before wiring.**

Follow these steps for correct wiring:

- Turn off power;
- Connect wires to terminals;
- Turn on the power.

Ensure that wires are securely attached to terminals and tightened. Improper wiring or configuration can cause permanent damage to TCW220 or connected equipment.

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| | |
|---|---|
| **Connector 1** | Ethernet - RJ45 |
| **Connector 2** | Power - 2.1x5.5mm connector, central positive |
| **Connector 3** | Pin1 – Power positive<br>Pin2 – Power negative |
| **Connector 4** | Pin1 – NC Relay2<br>Pin2 – COM Relay2<br>Pin3 – NO Relay2<br>Pin4 – NC Relay1<br>Pin5 – COM Relay1<br>Pin6 – NO Relay1 |
| **Connector 5** | Pin1 – 1-Wire GND<br>Pin2 – 1-Wire Data<br>Pin3 – 1-Wire +VDD |
| **Connector 6** | Pin1 – GND (most left)<br>Pin2 – GND<br>Pin3 – 1-Wire Data<br>Pin4 – 1-Wire GND<br>Pin5 – 1-Wire +VDD<br>Pin6 – 1-Wire +VDD (most right) |
| **Connector 7** | Pin1 – Digital In 1<br>Pin2 – GND<br>Pin3 – Digital In 2 |
| **Connector 8** | Pin1– Analog In 1<br>Pin2 – GND<br>Pin3 – Analog In 2 |

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### 6.2.1. Power supply

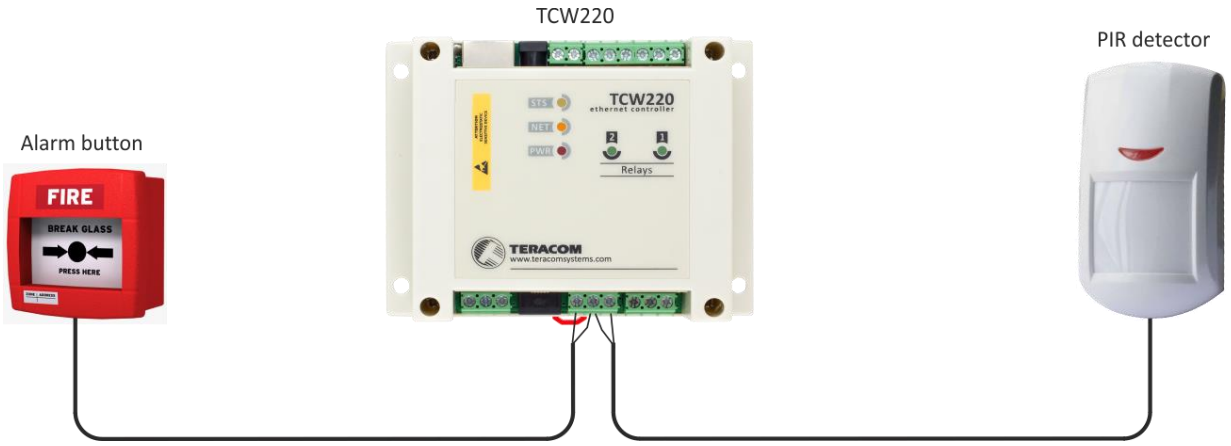
TCW220 must be powered by the adapter SYS1308(N)-2412-W2E or equivalent, suitable for overvoltage category II and certified for safety compliance. The power supply device should be able to withstand short circuits and secondary circuit overloads. Ensure the equipment is easily accessible for disconnecting from the power supply during use.

### 6.2.2. Digital inputs

Note that all inputs are not isolated from the power supply.

These inputs are designed for monitoring devices with "dry contact" outputs, such as door contact switches, push buttons, and PIR detectors.

The diagram below demonstrates how to connect a dry contact switch to the TCW220 input. One side of the contact is connected to the "Digital In" terminal, while the other side is connected to the "GND" terminal.



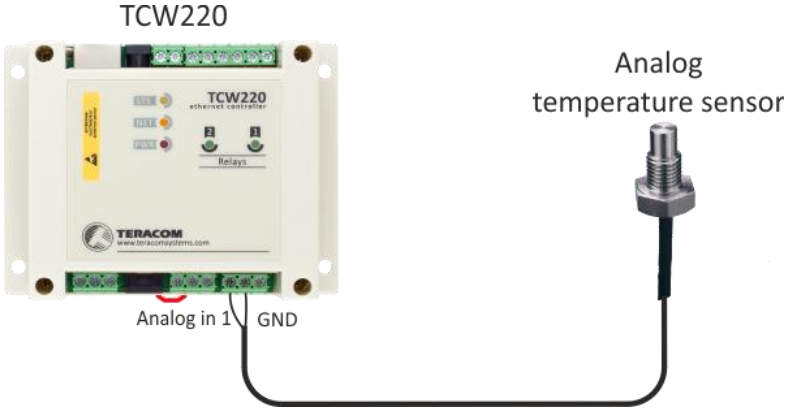

The maximum cable length should not exceed 30 meters.

### 6.2.3. Analog inputs

Note that all inputs are not isolated from the power supply.

The analog inputs support a standard industrial range of 0 to 10VDC and can be directly connected to analog sensors with outputs of either 0 to 5VDC or 0 to 10VDC. These inputs are factory-calibrated to ensure better accuracy. The device offers built-in functions for each analog input, such as "Multiplier", "Offset", and "Dimension" allowing it to be used with a wide variety of analog sensors. This functionality ensures that the directly measured parameters are displayed accurately. Additionally, the TCW220 can monitor voltages higher than 10VDC by using external resistive dividers.

The diagram below demonstrates how to connect a high-temperature sensor to the analog input of the TCW220. The sensor's output is connected to the “Analog In” terminal, and the shield is connected to the “GND” terminal.




The maximum cable length should not exceed 30 meters.



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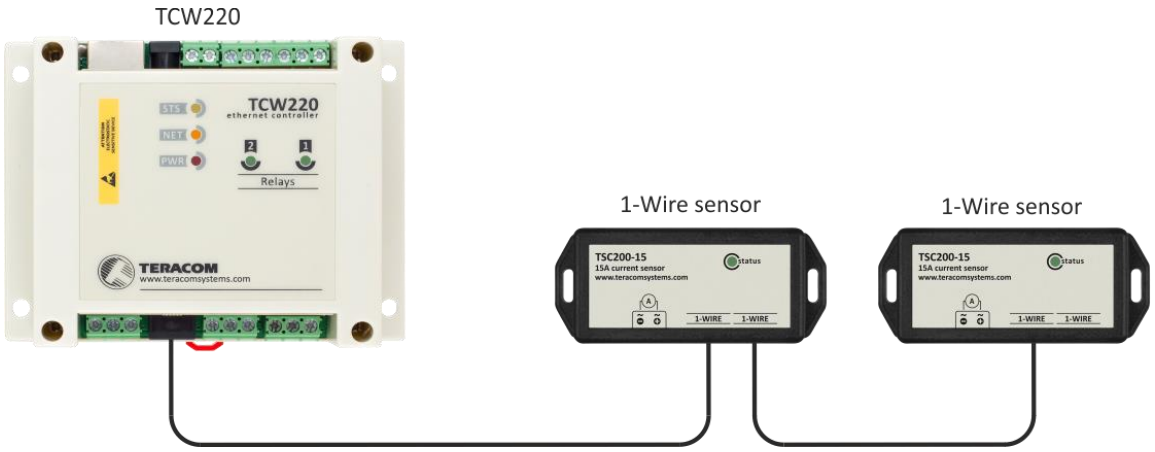
### 6.2.4. 1-Wire interface

The TCW220 supports the connection of up to eight 1-Wire sensors. Compatible sensors include those for temperature, temperature/humidity, CO2, DC current, AC current, 4/20mA signals, galvanically isolated analog voltage, barometric pressure, and more. Connected sensors are automatically detected, and the appropriate measurement units are assigned.

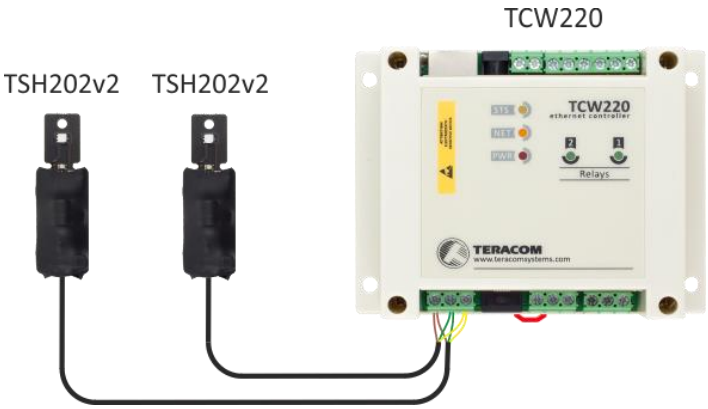
1-Wire, a registered trademark of Analog devices Inc., is designed for connecting multiple sensors over short wiring distances. It is not suitable for long distances or environments with significant electromagnetic interference (EMC). For best practices, refer to Guidelines for Reliable Long-Line 1-Wire Networks.

The sensors typically have three wires: positive voltage (+VDD), ground (GND), and bidirectional data (Data). The specific wire colors for each sensor are provided in the sensor's user manual.

For reliable operation with multiple sensors, it is strongly recommended to use a "daisy-chained" (linear) topology:




A "star" topology should only be used as a last resort, supporting a maximum of 4 sensors and a total cable length of up to 10 meters:




Connections to the 1-Wire interface can be made either through a screw terminal connector or a standard RJ-11 connector.

Several factors influence the maximum allowable length of the wires, including the type of cable used, the number of sensors, ambient electromagnetic noise, and the network topology of the sensor connections.

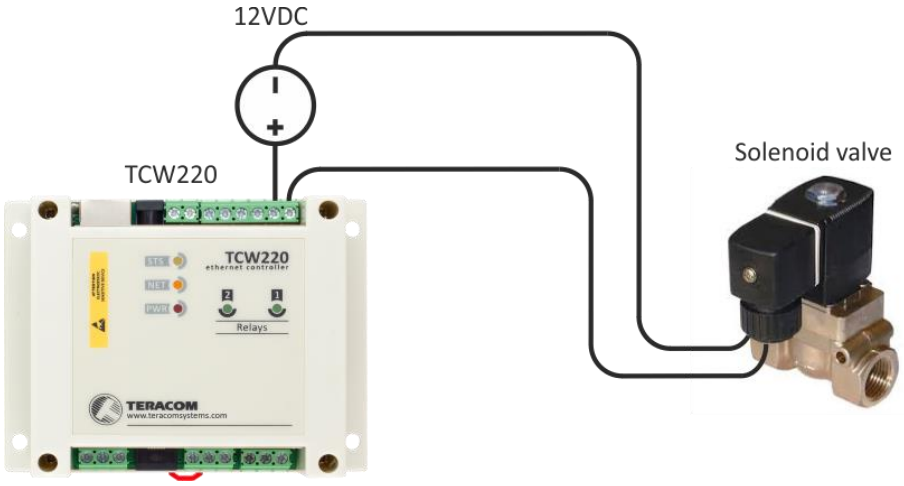
It is strongly recommended to use only UTP (Unshielded Twisted Pair) or FTP (Foiled Twisted Pair) cables, with a total cable length limited to 30 meters. While longer distances may still function, error-free operation cannot be guaranteed beyond the recommended length.

For optimal performance, Teracom guarantees proper operation only when using Teracom 1-Wire sensors.

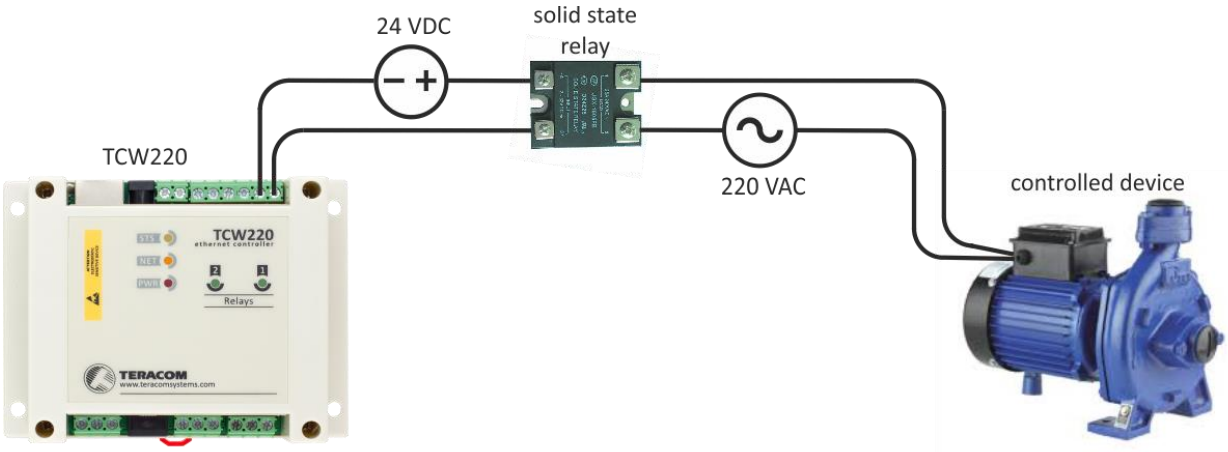
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### 6.2.5. Relays

The relay contacts are directly connected to the terminal connectors. Each relay provides normally open (NO), normally closed (NC), and common (COM) contacts for easy integration.



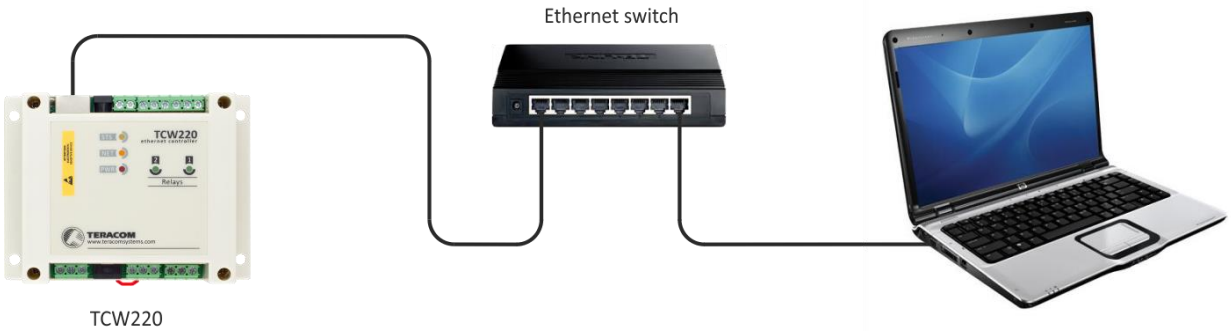

For loads that exceed the specified current or voltage limits, an external relay should be used.



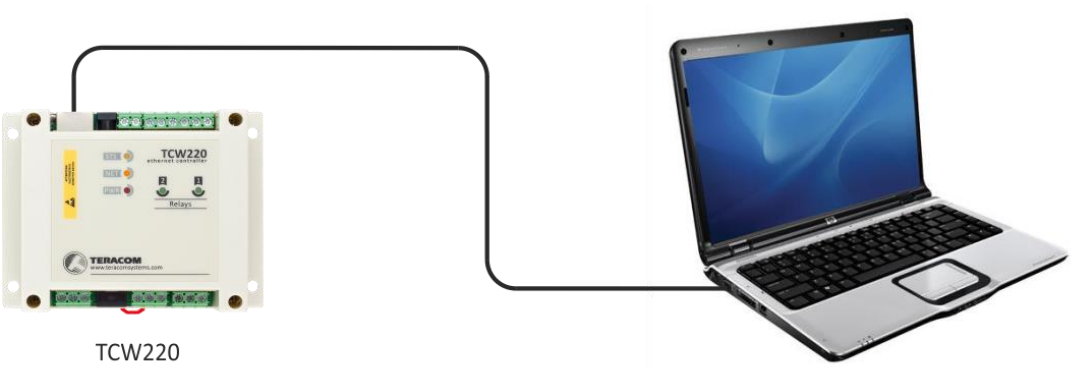

When switching inductive loads, such as motors, transformers, or other relays, mechanical relays are subject to contact arcing each time the contacts open. This can lead to wear and reduced relay lifespan. To mitigate this, it is recommended to use relay contact protection devices when switching inductive loads.

### 6.2.6. Network connection

The Ethernet port of TCW220 should be connected to 10/100 Base-T Ethernet hub, switch or router.




For configuration purposes, the TCW220 can be directly connected to the Ethernet port of a computer. The device supports Auto-MDIX, so either a standard "straight-through" cable or a "crossover" cable can be used.




TCW220

TCW220 can also be integrated into a wireless network by connecting it through a wireless router.

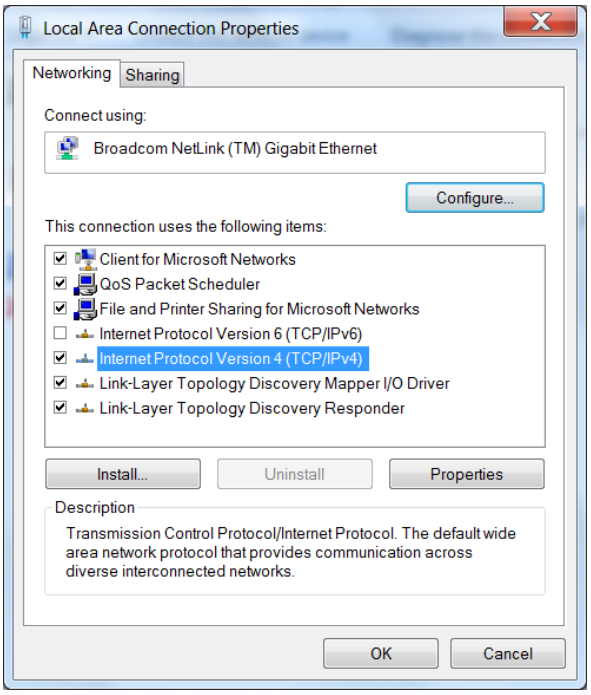



## 6.3. Communication setup

The TCW220 is shipped with the following default network settings:

- IP Address: 192.168.1.2
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.1.1

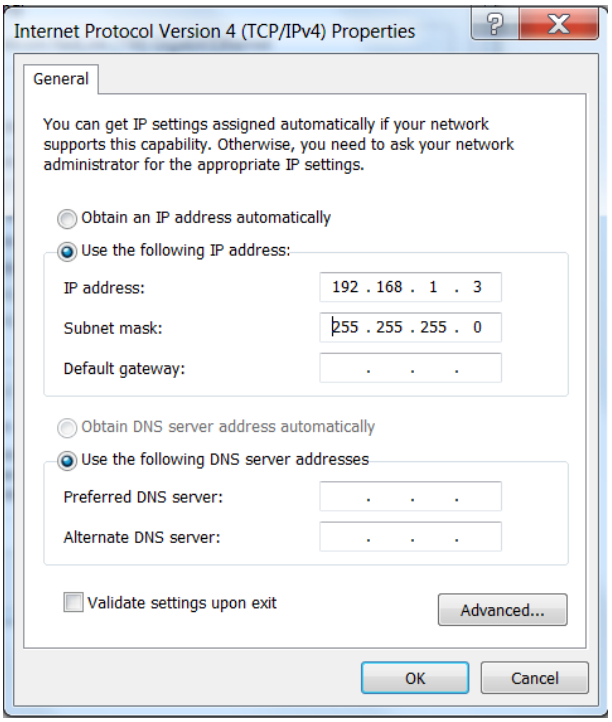
To establish communication with the TCW220, you can assign a temporary IP address to your computer. For computers running Windows OS, this can be done through the “Local Area Connection Properties”:



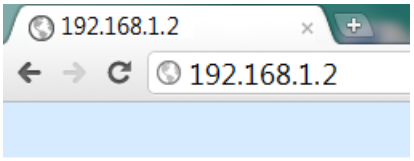



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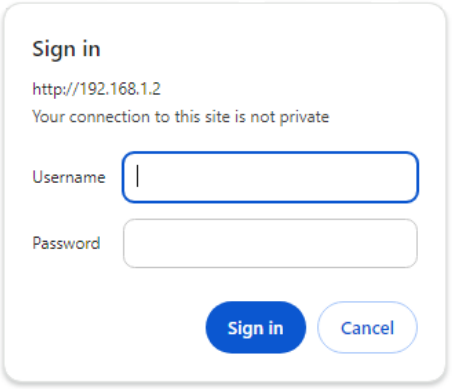
The temporary IP address should be on the same network; for example, you can use 192.168.1.3:




To access the web interface, enter http://192.168.1.2 into your browser's address bar:




If the network settings are configured correctly, a login pop-up window will appear:




The default authorization credentials are as follows: username: admin and password: admin.

It is highly recommended to change both the username and password to prevent unauthorized access.

All TCWxxx controllers connected to the LAN can be easily located using the free tool “TCW Discoverer.” This tool is available for both Windows and Mac operating systems and can be downloaded from www.teracomsystems.com

# 7. Web interface

The web interface enables configuration, monitoring, and control of the TCW220. All pages are UTF-8 encoded. Please note that the device supports HTTP only; HTTPS is not available.

The controller supports multiple active sessions simultaneously.

## 7.1. Monitoring

The Monitoring menu provides access to all parameters in two formats: data view (Monitoring -> Data) and graphical view (Monitoring -> Graph).

The Data page shows the current state of the TCW220 and is divided into four sections: Sensors, Digital Inputs, Analog Inputs, and Relays. Each section can be independently added or removed from the monitoring page by adjusting the settings in the "Setup -> System -> Display" menu.

Each parameter (sensor, input, relay) has a description of up to 15 characters. These default descriptions can be modified in the "Setup -> Input/Output" section.

The Monitoring page can automatically refresh at intervals between 0 and 253 seconds, with 0 meaning no automatic refresh. This interval is configurable in the "Setup -> System -> Monitoring Page Automatic Refresh" section. The default refresh interval is 1 second.

The Graph pages display all logged data in a 2D format. There are four graph pages available, and each graph page can display up to four parameters with up to two different dimensions.

### 7.1.1. Sensors section

All detected 1-Wire sensors are displayed in this section. Detection can occur either upon powering on the device or by clicking the “Scan for New Sensors” button. The found sensors are listed in ascending order based on their unique ID numbers.

For each sensor, information is provided, including a description, value, and ID. The readings from Teracom 1-Wire sensors are shown in the Value 1 column. For dual sensors, such as the TSH2xx temperature/humidity sensors, the second parameter is displayed in the Value 2 column.

It is possible to lock sensors in a specific position. To do this, each sensor must be added individually. After adding a sensor, a new scan should be performed, and the newly detected sensor should be locked in its position. Once all sensors are locked, removing one from the middle will not affect the positions of the other sensors after a reset. This feature is particularly useful when the TCW220 is integrated into a monitoring and control system managed via SNMP or HTTP API commands.

For certain sensors, options for “Unit”, “Multiplier”, and “Offset” can be configured in the “Setup-Input/Output” section.

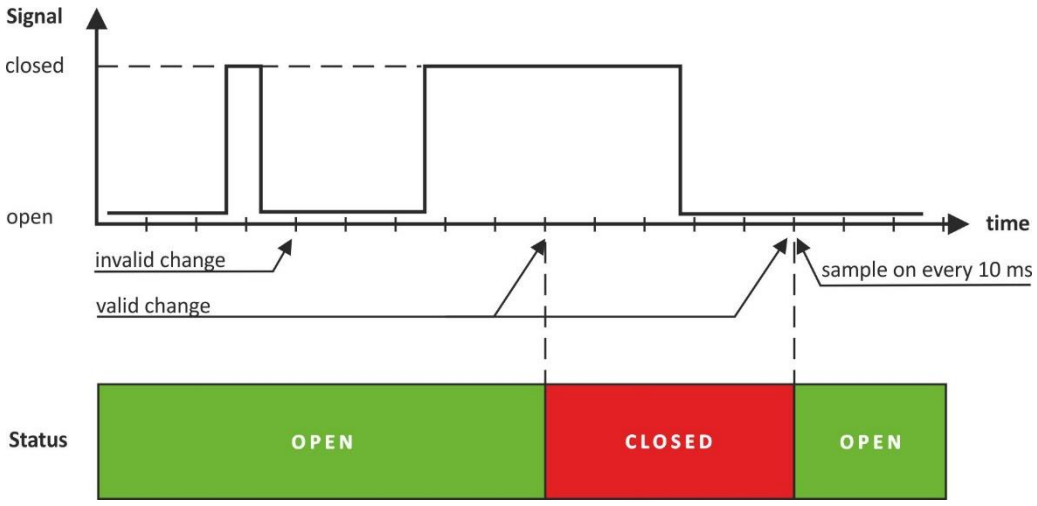
| Pos | Description | Value 1 | Value 2 | ID | Lock |
|---|---|---|---|---|---|
| 1 | S1:TST1xx | 23.188°C | ------ | [2867895F07000058] | ☐ |
| 2 | S2:TSH2xx | 24.375°C | 33.313%RH | [015225B71700FF45] | ☐ |
| 3 | S3 | ------ | ------ | [0000000000000000] | ☐ |
| 4 | S4 | ------ | ------ | [0000000000000000] | ☐ |
| 5 | S5 | ------ | ------ | [0000000000000000] | ☐ |
| 6 | S6 | ------ | ------ | [0000000000000000] | ☐ |
| 7 | S7 | ------ | ------ | [0000000000000000] | ☐ |
| 8 | S8 | ------ | ------ | [0000000000000000] | ☐ |

Scan for new sensors

### 7.1.2. Digital inputs section

Digital inputs can be utilized to monitor the status of discrete devices, such as motion sensors, door contacts, relay contacts, and alarm outputs. Please note that all digital inputs are not galvanically isolated.

Each contact is connected to the "Digital In" pin on one side and the "GND" pin on the other. Digital inputs are sampled every 10 milliseconds. An input status change is considered valid if the same value is recorded in three consecutive samples (30 milliseconds), provided that the low-to-high and high-to-low delays (configured in Setup -> Conditions) are set to zero.




The status of each input is indicated by both text and color, with red representing an alarm condition.

| Digital input | Status | Digital input | Status |
|---|---|---|---|
| Digital Input 1 | CLOSED | Digital Input 2 | OPEN |

Default descriptions can be modified on the “Setup -> Input/Output” page.

### 7.1.3. Analog inputs section

The Analog Inputs section allows monitoring of analog sensors with 0 to 5V or 0 to 10V voltage outputs.

Please note that none of the analog inputs are galvanically isolated, so take precautions when connecting sensors to avoid electrical interference or ground loops.

| Analog input | Value | Analog input | Value |
|---|---|---|---|
| Analog Input 1 | 0.031V | Analog Input 2 | 5.046V |

For each analog input, three variables can be configured in the “Setup -> Input/Output” section: “Unit”, “Multiplier”, and “Offset”.

### 7.1.4. Relays section

This section displays the current status of the relays and provides buttons to change their states.

| Relay | Status | Control | En |
|---|---|---|---|
| Relay 1 | OFF | controlled by Analog Input 1 | ☑ |
| Relay 2 | OFF | ON OFF Pulse | ☐ |
| | | All On All Off Pulse All | |

Each relay can be activated remotely via the web interface, HTTP API, or SNMP, or locally based on the status of a monitored parameter (such as a 1-Wire sensor, analog voltage, or dry contact).

Local control of the relay can be configured using either a single parameter or any "alarm" condition.

For web control, each relay features “On”, “Off”, and “Pulse” buttons. Additionally, there are “All On”, “All Off”, and “Pulse All” buttons for collective control of the relays. The pulse duration, in seconds, can be configured individually for each relay in the “Setup -> Input/Output -> Relay Outputs” section.

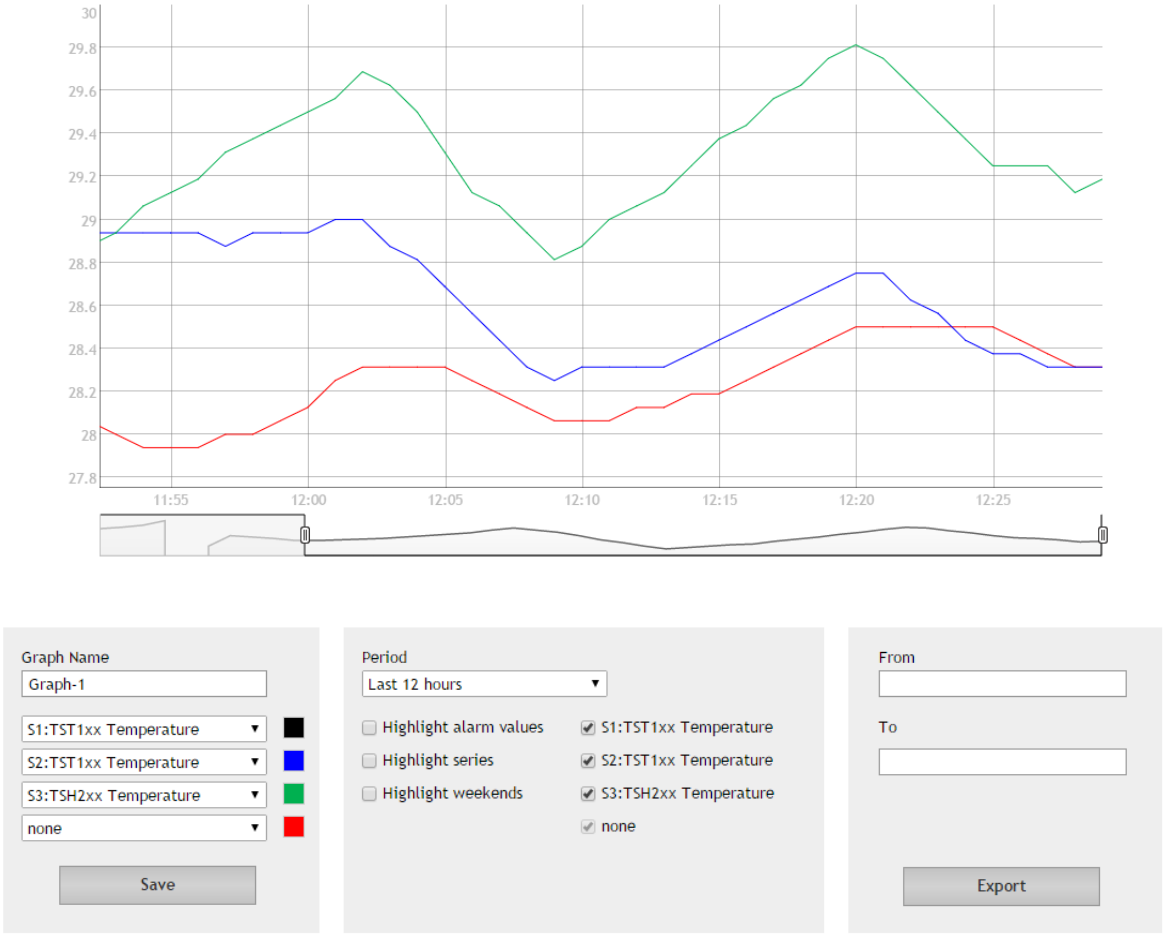
For relays activated locally, a text description of the controlling parameter is displayed instead of buttons. The parameters for local relay activation can be set in the “Setup -> Input/Output -> Relay Outputs” section. Relay control adheres to the conditions established in the “Setup -> Alarm Conditions” section.

Each locally activated relay features an "En" checkbox, which allows for the temporary disabling of automatic control. This enables manual adjustments via buttons, after which the system can return to automatic control. By default, this checkbox is turned off.

### 7.1.5. Graph

Each Graph page can display up to four parameters (including relay status) with up to two different dimensions.

You can assign a different color for each parameter to distinguish them easily. Additionally, there are several checkboxes available for customizing the display.

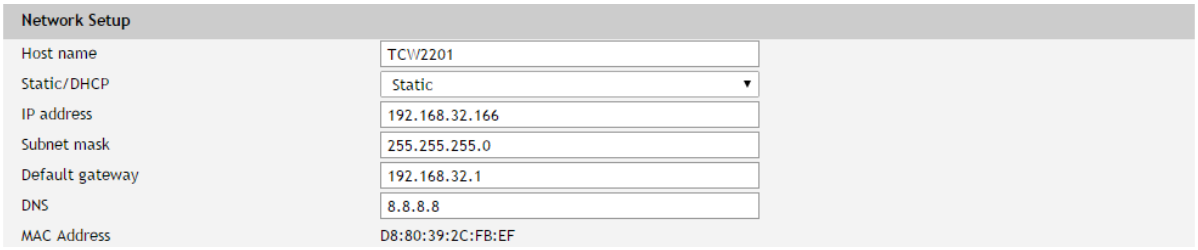



Monitored data can also be exported directly from the graph page for further analysis or record-keeping.

## 7.2. Setup

### 7.2.1. Network

Network parameters are configured in this section.




The controller supports both static and dynamic IP addresses. It is advisable to change the default IP address of the controller immediately after the first power-on to prevent potential IP address conflicts when multiple devices are connected to the same network.

Each time a new device is connected to the network, it may be necessary to clear the ARP cache. This can be done by entering arp -d in the command prompt on the computer.

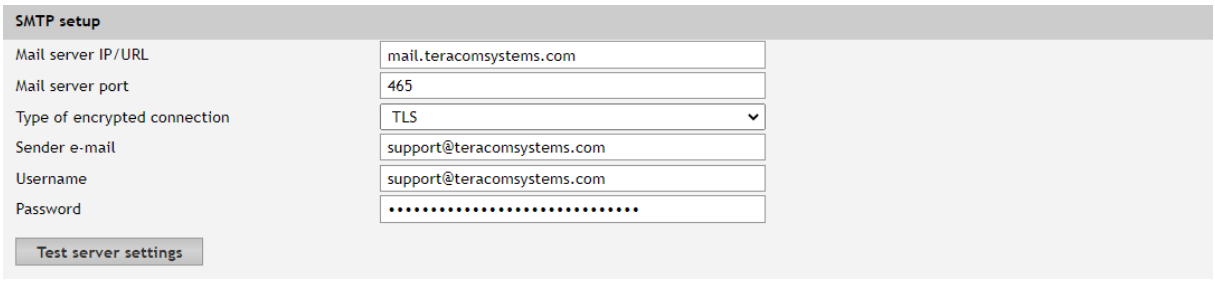
The “Hostname” can be up to 15 characters long and will appear in the search results of the TCW Discoverer tool.

Public DNS servers (such as 8.8.8.8 or 8.8.4.4) can be used instead of the default gateway.

### 7.2.2. SMTP

This page allows you to input the valid SMTP settings for email alerts and specify the recipients' addresses.

#### 7.2.2.1. SMTP setup




The mail server address can be configured using either a hostname (e.g., mail.teracomsystems.com) or an IP address. By default, the SMTP port is set to 25 for non-encrypted connections. If the default port does not work, please consult your Internet Service Provider (ISP).

The sender's email, username, and password are standard authentication details, each allowing for up to 128 characters in length.

A button is available to test the server settings, providing feedback on the results. In this test, the sender and recipient email addresses are the same.

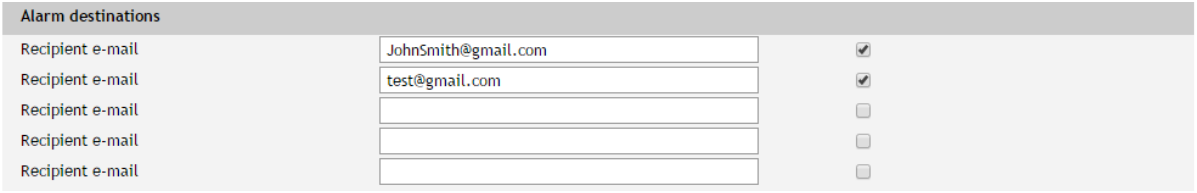
For secure communication with mail servers, the Transport Layer Security (TLS) protocol is employed. The TCW220 supports TLS versions 1.0, 1.1, and 1.2, using RSA for key exchange, agreement, and authentication. This ensures compatibility with nearly all public servers.

Please note that STARTTLS is not supported.

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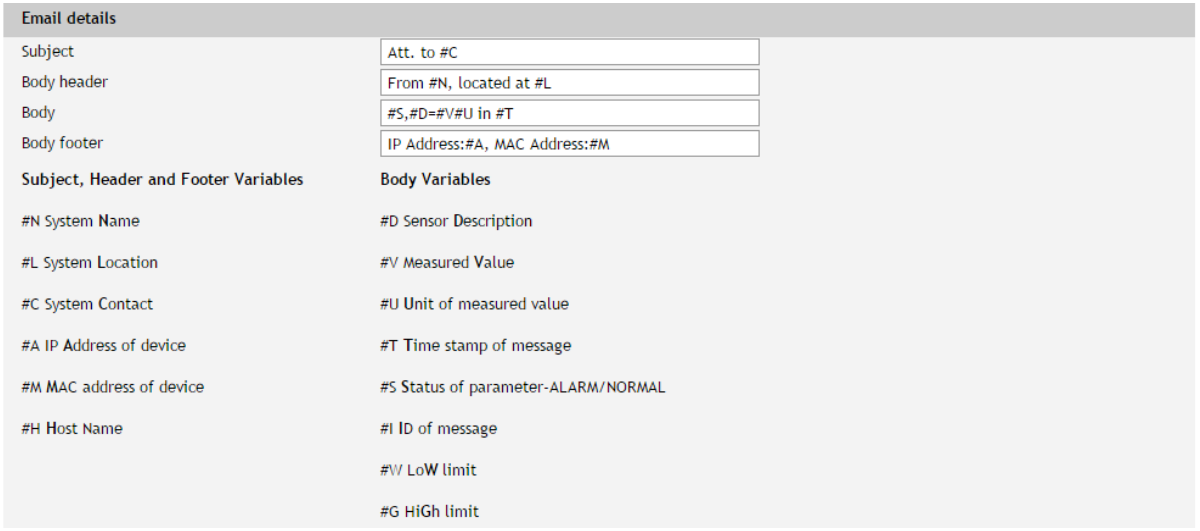
#### 7.2.2.2. Alarm destination

You can configure up to five email recipients, each of whom can be activated independently using a checkbox.




#### 7.2.2.3. E-mail details

The subject, body header, body, and footer of the email can be customized using a predefined set of keys. All available keys are described on the page.

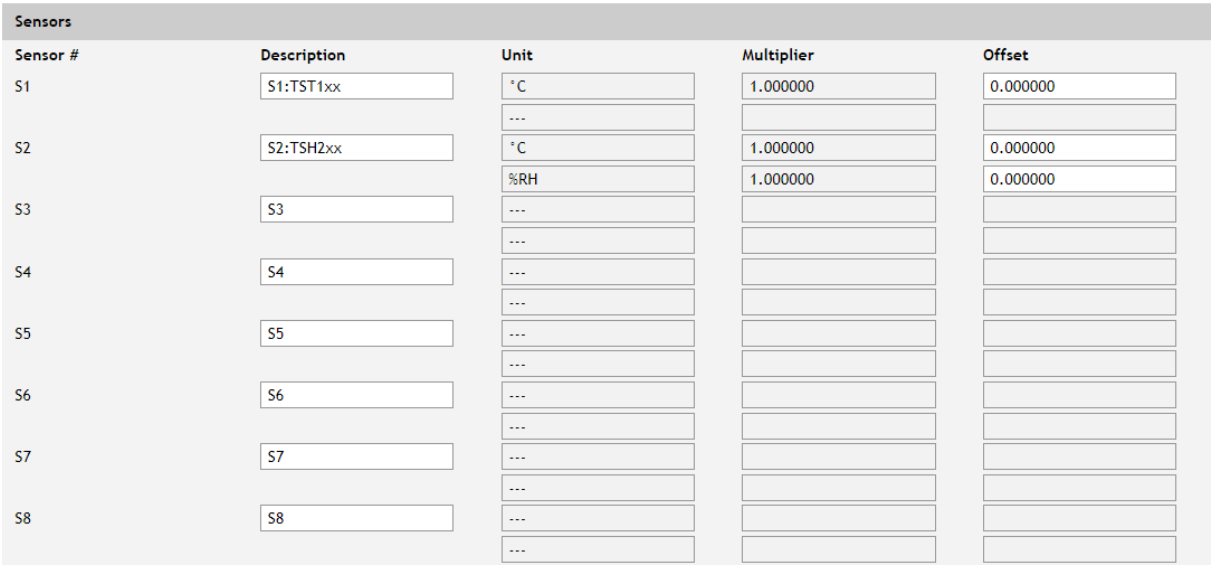



### 7.2.3. Input/Output

#### 7.2.3.1. 1-Wire sensors

A description of up to 15 characters can be assigned to each 1-Wire sensor.

The "Offset" field is available for all sensors, enabling simple adjustments to the displayed value. Furthermore, for specific sensors (such as TSA200, TSV200, etc.), the "Unit" and "Multiplier" fields are also accessible.



### 7.2.3.2. Digital inputs

Each digital input can be assigned a description of up to 15 characters. The text entered in the "Low Level" and "High Level" fields will be displayed on the monitoring page for that input, with each field also allowing up to 15 characters.

| Digital inputs | | | |
|---|---|---|---|
| Input # | Description | Low level | High level |
| DI1 | Digital Input 1 | CLOSED | OPEN |
| DI2 | Digital Input 2 | CLOSED | OPEN |

### 7.2.3.3. Analog inputs

Each analog input can have a description of up to 15 characters assigned to it.

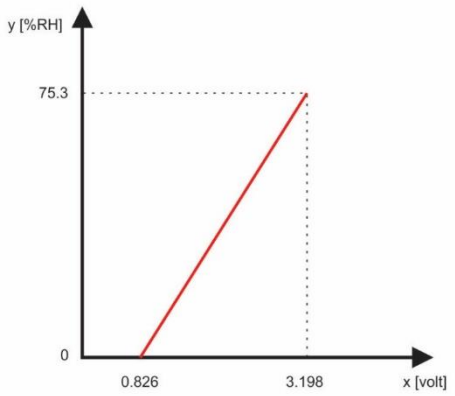
| Analog inputs | | | | |
|---|---|---|---|---|
| Input # | Description | Unit | Multiplier | Offset |
| AI1 | Server room | %RH | 31.740 | 0.8260 |
| AI2 | Analog Input 2 | V | 1.000 | 0.0000 |

For every analog input, the "Unit", "Multiplier", and "Offset" fields are available to convert the raw voltage or current into meaningful engineering units. The scaled value is calculated using the following formula:

SV[Un] = (RV - OF) * MU
Where:
SV – scaled (displayed) value;
Un – unit;
RV – raw voltage from the source;
MU – multiplier;
OF – offset.

Example:
For the humidity sensor HIH-4000-003, the following data is available from the datasheet:

VOUT = 0.826 at 0% RH
VOUT = 3.198 at 75.3% RH




The sensor outputs raw voltage values, but our goal is to convert these into corresponding relative humidity (RH) values. To achieve this, we use a multiplier and an offset. These parameters enable us to calculate the relative humidity for any voltage within the sensor's operational range.

Calculation of the multiplier (MU)

The multiplier (MU) is determined by the ratio of the change in relative humidity (ΔRH%) to the change in voltage (ΔV). Geometrically, this resembles finding the slope of a line. For this sensor, the line is represented by the equation ΔRH%/ΔV. We can calculate the multiplier as follows:

MU = (75.3 - 0) / (3.198 - 0.826) = 75.3 / 2.372 = 31.745 %RH/V

Calculation of the offset (OF)

The offset (OF) is calculated using the multiplier and one of the known points. By substituting the scaled value (SV) and the corresponding raw value (RV) into the equation SV = (RV - OF) * MU, we can solve for the offset:

OF = RV - SV/MU

Using the point where SV = 0 and RV = 0.826, we find:

OF = 0.826 - (0 / 31.745) = 0.826 - 0 = 0.826

We can also calculate the offset using the other known point, where SV = 75.3 and RV = 3.198:

OF = 3.198 - (75.3 / 31.745) = 3.198 - 2.372 = 0.826

Final formula

Thus, the formula for this sensor become:

SV = (RV – 0.826) * 31.745

Verification

To verify the accuracy of this formula, let's check the case where VOUT = 0.826 V (0%RH):

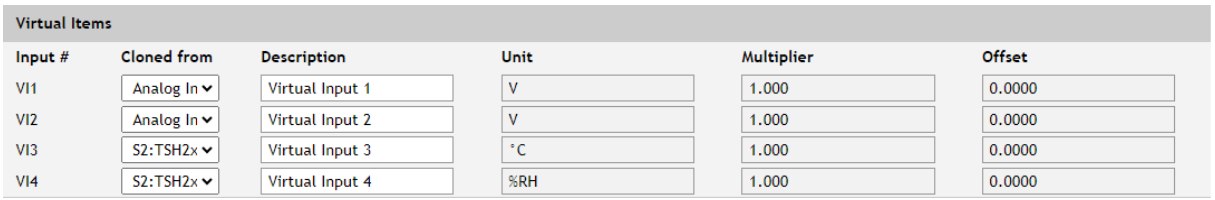
SV = (0.826 – 0.826) * 31.745 = 0 *31.745 = 0 %RH

This confirms that the formula accurately converts voltage readings to their corresponding relative humidity values.

By default, and following the “Factory Default Settings” procedure, the settings are as follows:

Unit - V
Offset - 0.00
Multiplier - 1.00

### 7.2.3.4. Virtual inputs



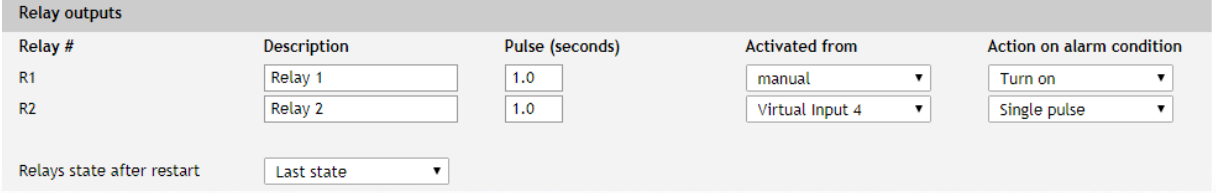

A virtual item is a useful feature that allows you to clone a monitored parameter, such as an analog input or a 1-Wire sensor. You can set different alarm thresholds for the virtual item compared to the original, enabling you to establish multiple alarm notifications for the same parameter.

The values for Unit, Multiplier, and Offset are displayed for informational purposes only. They are inherited from the original parameter and cannot be modified.

Virtual items can be utilized for alarm notifications, incorporated into Functions, and used for local relay activation.

### 7.2.3.5. Relay outputs

For every relay, a description up to 15 characters can be set.






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For every relay different time for pulse duration can be set. The resolution is 0.1 second.

Every relay can be activated remotely or locally – by the value of the monitored parameter.

By default, all relays are activated remotely and in the field “Activated from” is written “manual”.

For local activation, alarm conditions for different sources are used. They are set up in section “Setup-Alarm conditions”. To assign a parameter to relay, following choices are possible:

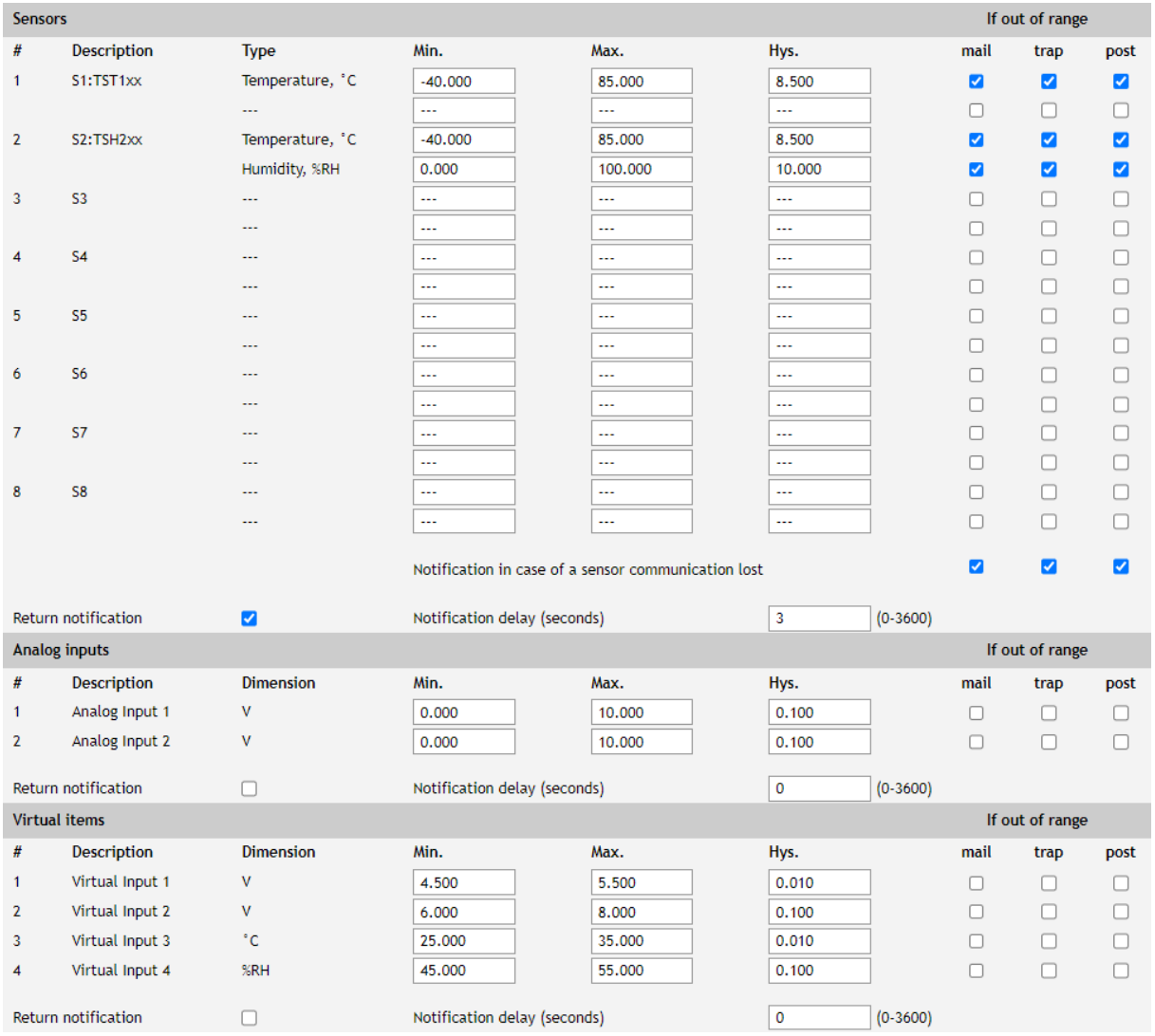
- Sxy – “S” represents a “1-Wire Sensor”, “x” is a number from 1 to 8, and “y” is a number from 1 to 2. The relay activates based on the value measured from the specified 1-Wire sensor, following the rules defined in “Setup->Alarm Conditions”;
- “Analog input z” - The relay activates from the value measured by the specified analog input, with rules based on the ranges defined in “Setup->Alarm Conditions”. Here, “z” is a number from 1 to 2;
- “Virtual input z” - The relay activates from the value of the specified virtual item (a cloned analog input or 1-Wire sensor), governed by the rules established in “Setup->Alarm Conditions”. Again, “z” is a number from 1 to 4;
- “Digital input z” - The relay follows the state of the specified digital input, where “z” is a number from 1 to 2;
- Any alarm - The relay activates based on any of the defined alarm conditions.

### 7.2.4. Conditions

This section is dedicated to configuring the trigger and alert conditions for 1-Wire sensors, analog inputs, virtual items, and digital inputs.

#### 7.2.4.1. 1-Wire sensors, analog inputs and virtual items

For each sensor, there are two types of fields: one for setting trigger conditions (“Min”, “Max”, and “Hys.”) and another for alert notifications (“If out of range”).



| Sensors | | | | | | If out of range | | |
|---|---|---|---|---|---|---|---|---|
| # | Description | Type | Min. | Max. | Hys. | mail | trap | post |
| 1 | S1:TST1xx | Temperature, °C | -40.000 | 85.000 | 8.500 | ☑ | ☑ | ☑ |
| | | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| 2 | S2:TSH2xx | Temperature, °C | -40.000 | 85.000 | 8.500 | ☑ | ☑ | ☑ |
| | | Humidity, %RH | 0.000 | 100.000 | 10.000 | ☑ | ☑ | ☑ |
| 3 | S3 | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| | | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| 4 | S4 | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| | | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| 5 | S5 | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| | | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| 6 | S6 | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| | | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| 7 | S7 | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| | | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| 8 | S8 | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| | | --- | --- | --- | --- | ☐ | ☐ | ☐ |
| | | | Notification in case of a sensor communication lost | | | ☑ | ☑ | ☑ |
| Return notification | | ☑ | Notification delay (seconds) | | 3 (0-3600) | | | |

| Analog inputs | | | | | | If out of range | | |
|---|---|---|---|---|---|---|---|---|
| # | Description | Dimension | Min. | Max. | Hys. | mail | trap | post |
| 1 | Analog Input 1 | V | 0.000 | 10.000 | 0.100 | ☐ | ☐ | ☐ |
| 2 | Analog Input 2 | V | 0.000 | 10.000 | 0.100 | ☐ | ☐ | ☐ |
| Return notification | | ☐ | Notification delay (seconds) | | 0 (0-3600) | | | |

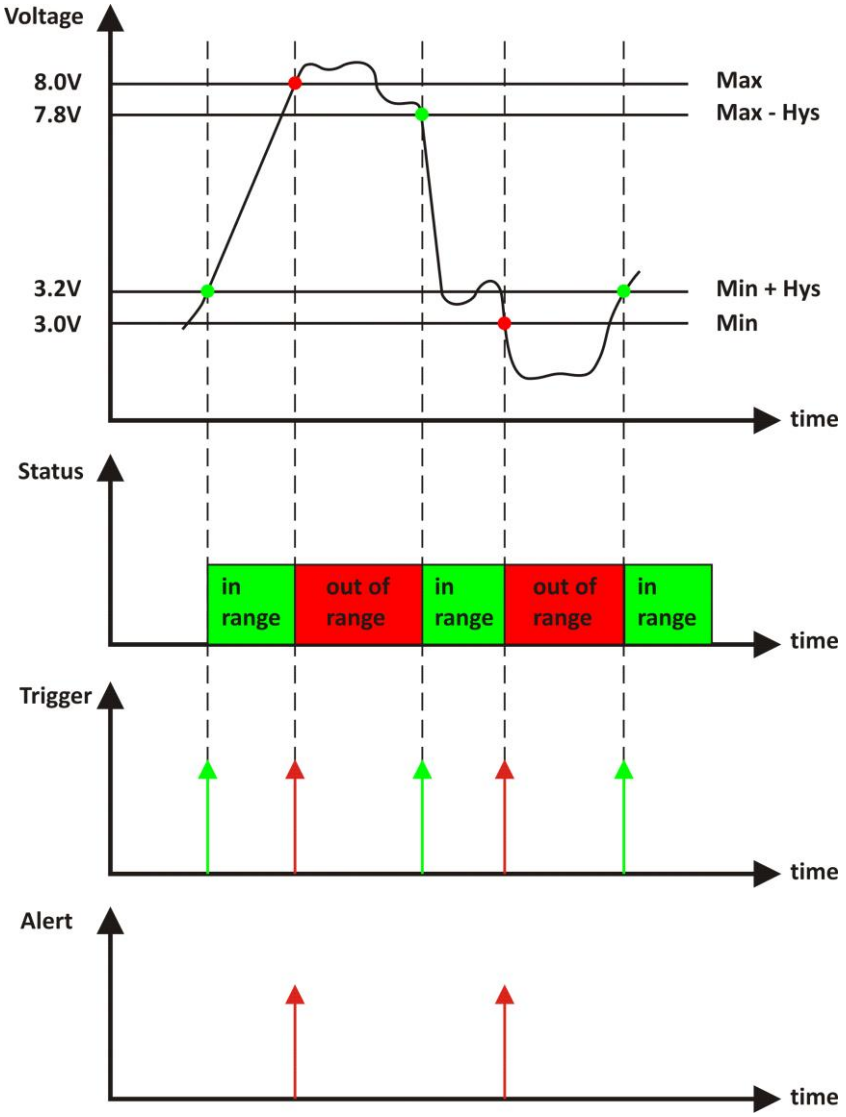
| Virtual items | | | | | | If out of range | | |
|---|---|---|---|---|---|---|---|---|
| # | Description | Dimension | Min. | Max. | Hys. | mail | trap | post |
| 1 | Virtual Input 1 | V | 4.500 | 5.500 | 0.010 | ☐ | ☐ | ☐ |
| 2 | Virtual Input 2 | V | 6.000 | 8.000 | 0.100 | ☐ | ☐ | ☐ |
| 3 | Virtual Input 3 | °C | 25.000 | 35.000 | 0.010 | ☐ | ☐ | ☐ |
| 4 | Virtual Input 4 | %RH | 45.000 | 55.000 | 0.100 | ☐ | ☐ | ☐ |
| Return notification | | ☐ | Notification delay (seconds) | | 0 (0-3600) | | | |

“Min” and “Max” define the operational range for the monitored parameter.

A “Max” trigger condition is activated when the value exceeds the specified upper limit.

A “Min” trigger condition is activated when the value falls below the specified lower limit. In both instances, the monitored parameter is considered out of range.

Returning to the operational range is recognized when the value exceeds (Min + Hys) or falls below (Max – Hys). The hysteresis (“Hys”) is implemented to minimize unnecessary triggering caused by fluctuations around the trigger points.




Example:

In this scenario, a TCW220 controller, a TST100 sensor, and an appropriate heater are used to manage room temperature. The desired minimum temperature is set at 19°C, while the initial temperature is 17°C. The TST100 sensor is assigned as the first 1-Wire sensor.

Local activation for Relay1 is configured based on Sensor1 with the following parameters:

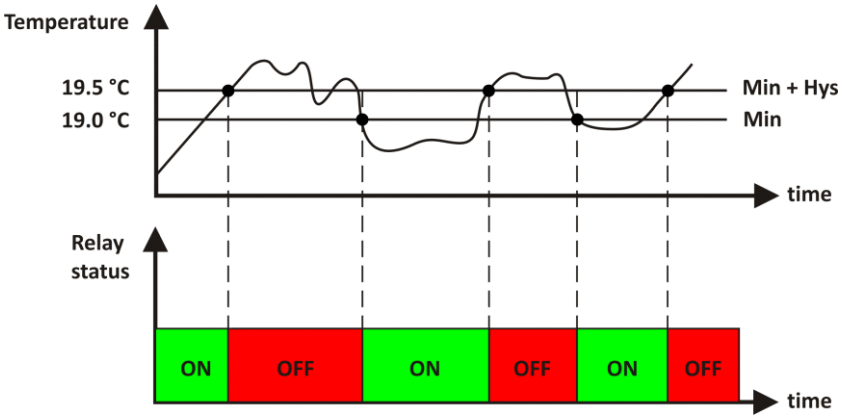
Min = 19, Max = 85, and Hys = 0.5.

| Sensors | | | | | | If out of range | | |
|---|---|---|---|---|---|---|---|---|
| # | Description | Type | Min. | Max. | Hys. | mail | trap | post |
| 1 | S1:TST1xx | Temperature, °C | 19.000 | 85.000 | 0.500 | ☑ | ☑ | ☑ |

When the controller is powered on, Relay1 is immediately activated because the monitored temperature is below the acceptable range. This action turns on the heater, causing the temperature to rise.

As the temperature increases and reaches 19.5°C (19.0 + 0.5), it falls within the defined range (trigger condition), and Relay1 is deactivated, turning the heater off.

However, as the temperature begins to drop and reaches 19°C, it goes out of range (trigger and alert conditions), which reactivates the relay, turning the heater back on. Additionally, an email notification is sent to alert about the temperature change.



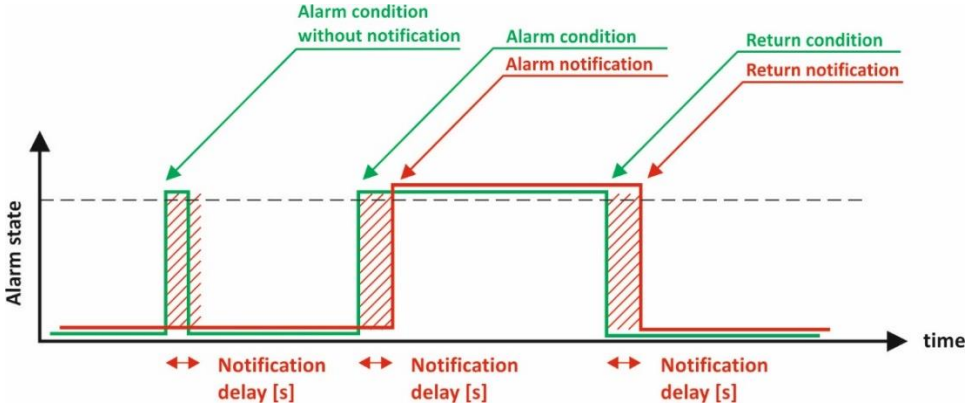

The “Max” value should be set sufficiently high above the desired temperature to prevent unnecessary trigger and alert conditions.

Each sensor or analog input has three independent alert methods available when an alarm condition occurs: email notifications, SNMP traps, and HTTP/HTTPS POSTs (XML file). Each method can be activated via a checkbox.

The “Max” value should be set sufficiently high above the desired temperature to prevent unnecessary trigger and alert conditions. Each sensor or analog input has three independent alert methods available when an alarm condition occurs: email notifications, SNMP traps, and HTTP/HTTPS POSTs (XML file). Each method can be activated via a checkbox.

There is a global checkbox labeled “Return notification” for all sensors and analog inputs. When selected, notifications will also be sent when a parameter returns to within the defined range.

Additionally, a “Notification delay” parameter is available globally for all sensors and analog inputs. This feature acts as a filter for short alarm conditions, helping to reduce false alerts.




### 7.2.4.2. Digital inputs

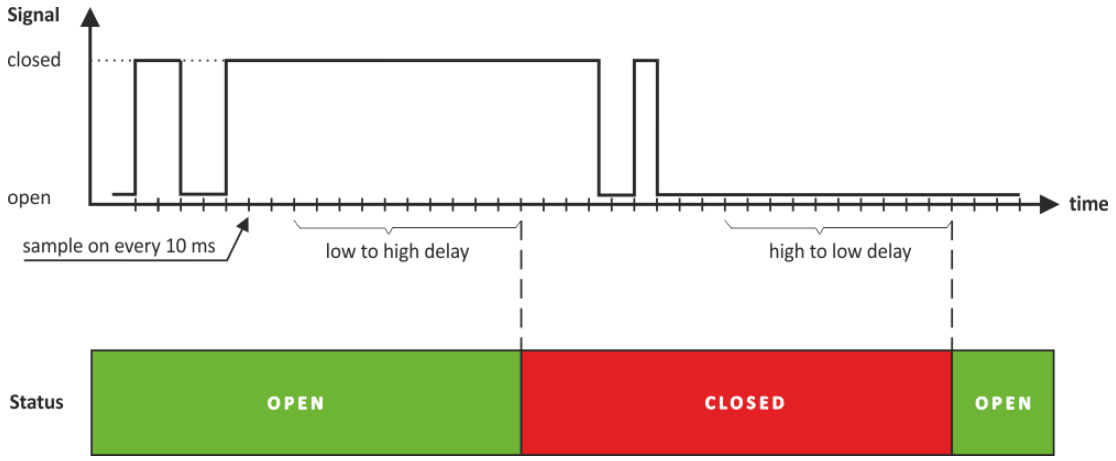
For each digital input, you need to select the alarm state—either Open or Closed. When the input transitions to an alarm state, three independent alert methods can be activated: email notifications, SNMP traps, and HTTP/HTTPS POSTs (XML file).

There is a global checkbox labeled “Return notification” for all digital inputs. When selected, notifications will also be sent when the parameter returns to its normal state. Additionally, a “Notification delay” parameter is available globally for all digital inputs, which serves as a filter for short alarm conditions.

| Digital inputs | | | | | | On active alarm | | |
|---|---|---|---|---|---|---|---|---|
| # | Description | Current state | Select alarm state | Low to high delay | High to low delay | mail | trap | post |
| 1 | Digital input 1 | OPEN | CLOSED | 0.0 (0-3600) | 0.0 (0-3600) | ☑ | ☑ | ☑ |
| 2 | Digital input 2 | OPEN | CLOSED | 0.0 (0-3600) | 0.0 (0-3600) | ☑ | ☑ | ☑ |
| Return notification | | ☑ | Notification delay (seconds) | | 0 (0-3600) | | | |

When an input is in an alarm state, the corresponding input on the Monitoring page will be highlighted in red.

There are two delay settings for changes in digital inputs: low-to-high and high-to-low. These delays are added to the standard delay of 30 milliseconds, with a resolution of 100 milliseconds and a default setting of zero. These options can be used to provide additional debouncing.



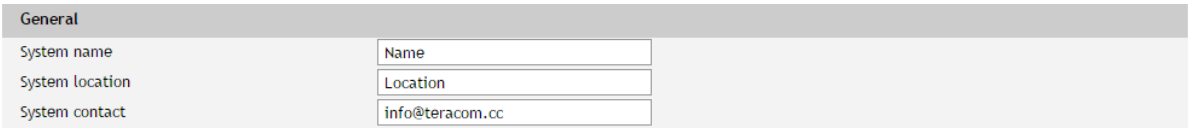

In the example shown above, both the low-to-high and high-to-low delays are set to 0.1 seconds.

### 7.2.5. System

This page allows you to configure various general settings for the system.

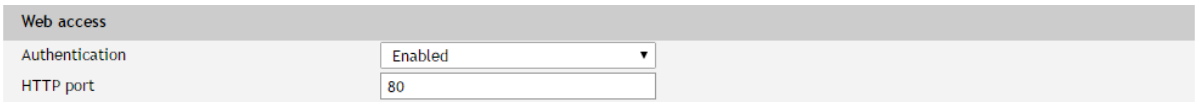
#### 7.2.5.1. General

This section allows you to configure general parameters for device identification.




#### 7.2.5.2. WEB access

This section allows you to deactivate WEB access authentication, which is enabled by default with the credentials of admin/admin. You can also change the HTTP port for WEB access, which can be useful for certain routers that do not support separate outside/inside ports for port forwarding. The default HTTP port is set to 80.




#### 7.2.5.3. HTTP API

This section allows you to activate or deactivate HTTP API access authentication, which is enabled by default.




The authentication details are the same as for WEB access. The controller supports two types of authentications; refer to the explanation for HTTP API below for more information.

#### 7.2.5.4. Monitoring page automatic refresh

The refresh interval for the monitoring page can be configured to range from 0 to 253 seconds. A setting of zero indicates that automatic refresh is disabled.




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#### 7.2.5.5. Display

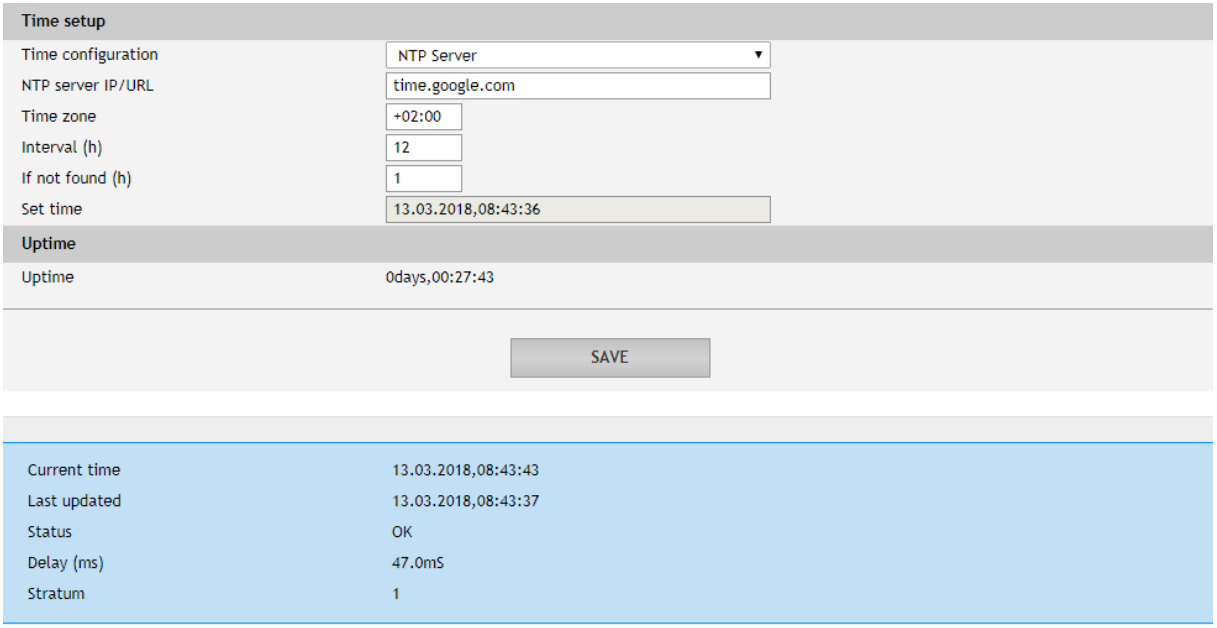
In this section, you can select the working units for temperature (Celsius or Fahrenheit) and pressure (hPa, mbar or mmhg).

Each section of the Monitoring Page has a checkbox; when checked, the corresponding section will be displayed.




### 7.2.6. NTP

The internal real-time clock (RTC) of the controller can be configured either manually or automatically.




For automatic clock synchronization, the controller supports NTP (Network Time Protocol), and all necessary parameters for this synchronization are available in this section.

By default, NTP synchronization is disabled, with the server set to time.google.com, a time zone of +00:00, and an interval of 12 hours.

## 7.3. Services

### 7.3.1. Modbus TCP/IP

TCW220 supports Modbus TCP/IP via the Ethernet interface.



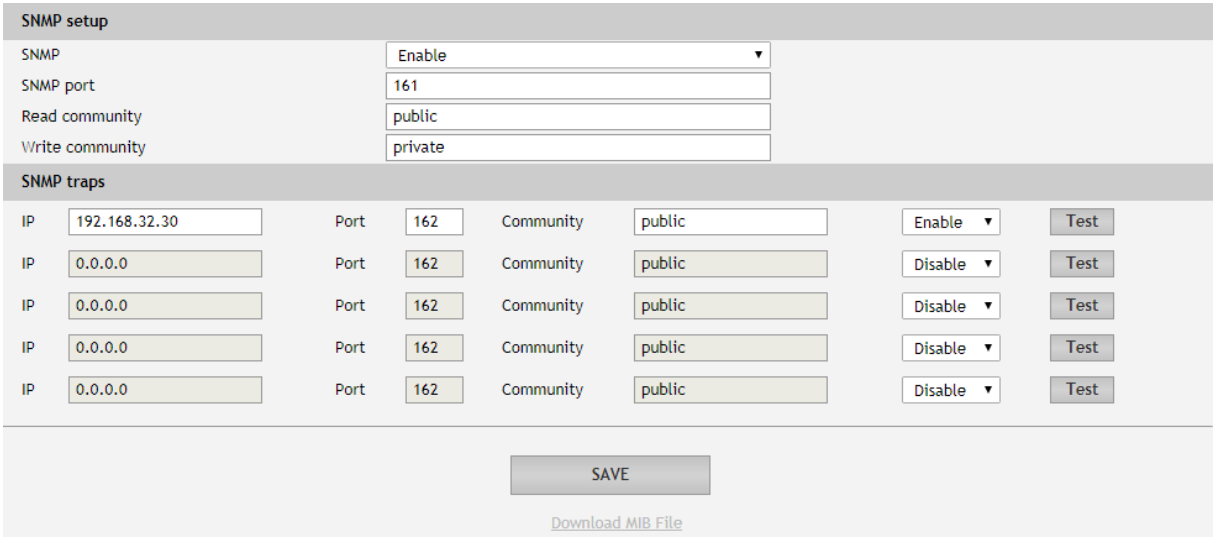

By default, Modbus TCP/IP functionality is disabled. The standard port for this protocol is 502.

A table containing the register addresses can be found in section, titled " Modbus TCP/IP".

### 7.3.2. SNMP

The TCW220 supports SNMP v.2, allowing the device to integrate into monitoring and control systems using the SNMP protocol.

This section allows you to configure all necessary parameters for the proper operation of SNMP.




By default, SNMP is disabled, with the port set to 161. The read community is set to "public" and the write community is set to "private." In the event of an alarm condition, SNMP traps can be sent to up to five independent recipients, each capable of having different ports and communities. A dedicated button is available for testing the SNMP trap functionality.

SNMP traps can be triggered under the following conditions:

- An event occurs (status change) on Digital Inputs.
- A measured parameter on Analog Inputs falls outside the specified range.
- A measured parameter on the 1-Wire bus exceeds the defined limits.
- A restart condition is initiated.

An SNMP trap will be sent following a reset.

The current MIB file can be downloaded from here.

### 7.3.3. Logger

The TCW220 supports data logging for all monitored parameters and relay statuses, allowing historical records to be stored locally and periodically uploaded to a remote server.

The logger operates in three modes: Time, Alarm, and Time & Alarm, providing flexible recording based on time intervals, alarm events, or both.

- In Time mode, records are created at regular intervals defined by the Log Interval setting.
- In Alarm mode, records are generated only when an alarm condition occurs.
- In Time & Alarm mode, both periodic intervals and alarm events trigger new log records.

The log interval is configurable from 10 to 3600 seconds, allowing higher-resolution data collection when shorter intervals are selected.

For synchronized logging, the device supports Logger Record Sync, which aligns log records to a specific time reference. When synchronization is enabled, the logger creates records at exact intervals based on the configured synchronization point rather than simply counting from the moment the device starts. This is useful for applications requiring precise time-based measurements or synchronization with external systems.

The Sync to the minute parameter defines the exact second within each minute when synchronized logging begins. This ensures predictable and consistent timestamps across all recorded data.

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Example:

If the current time is 09:12:22, Logger Record Sync is enabled, Sync to the minute is set to 00, and the Log Interval is set to 15 minutes, the logger will create records at 09:15:00, 09:30:00, 09:45:00, 10:00:00, 10:15:00, and so on.

When the device powers up, the first record is created immediately, and subsequent records follow the synchronized schedule.

The TCW220 supports periodic upload of stored log records to a remote HTTP or HTTPS server in CSV format, enabling seamless integration with cloud platforms, monitoring software, and custom backend systems.

For secure communication, HTTPS connections support TLS 1.0, TLS 1.1, and TLS 1.2, providing encrypted data transfer and server authentication.

The upload interval is configurable from 1 to 24 hours, with synchronization to a user-defined daily time reference.

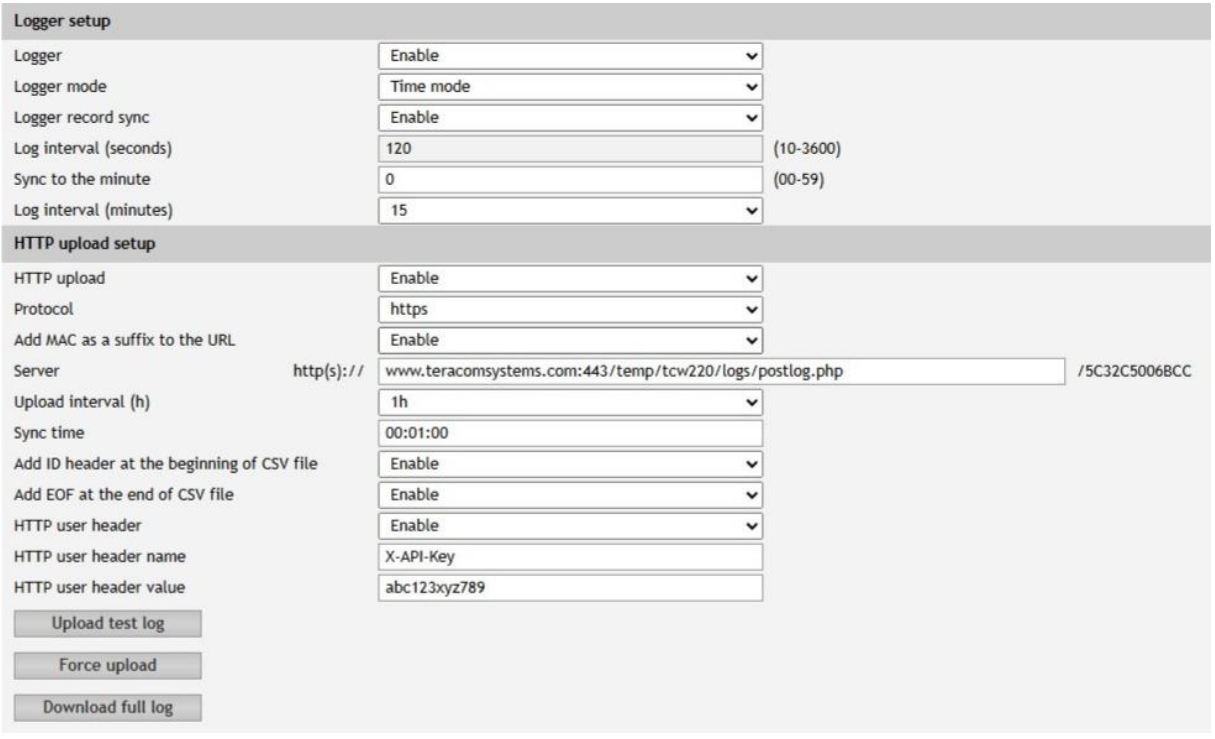
The Sync Time parameter defines the exact time of day used as a reference point for periodic uploads. This ensures uploads occur at predictable intervals aligned to the configured schedule.

Example:

If the upload interval is set to 3 hours and the Sync Time is 09:00, uploads will occur at 09:00, 12:00, 15:00, 18:00, 21:00, 00:00, 03:00, and 06:00.

If the current time is 19:31 and periodic upload is enabled, the first upload will occur at 21:00.

To improve compatibility with server-side processing and file organization, the TCW220 provides additional CSV upload options, including automatic MAC address suffixing in the upload URL, optional CSV header row insertion, configurable end-of-file markers, and custom HTTP headers for authenticated or API-based endpoints.




Configuration parameters:

- Logger – Enables or disables the logger functionality.
- Logger mode – Defines when data is recorded:

  Time – Records data at regular intervals.



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Alarm – Records data only when an alarm event occurs.

Time & Alarm – Records data periodically and on alarm events.

- Logger record sync – Enables synchronization of log records to the configured time reference.
- Log interval (seconds) – Defines the interval between log records. Adjustable from 10 to 3600 seconds.
- Sync to the minute – Defines the exact second within each minute used for synchronized logging.
- HTTP upload – Enables or disables periodic HTTP/HTTPS upload of logger records.
- Protocol – Selects the communication protocol for uploads (HTTP/HTTPS).
- Add MAC as a suffix to the URL – Appends the device MAC address to the configured server URL, allowing unique identification of uploaded files from multiple devices.
- Server – Specifies the destination server address (IP address, domain name, and optional port) where CSV log files will be uploaded.
- Upload interval (h) – Defines how often stored records are uploaded to the server.
- Sync time – Defines the daily reference time for upload synchronization.
- Add ID header at the beginning of CSV file – Adds a header row at the beginning of the CSV file containing parameter identifiers for easier automated processing.
- Add EOF at the end of CSV file – Appends an end-of-file marker to improve compatibility with server-side parsers.
- HTTP User Header – Enables or disables sending a custom HTTP header with the upload request.
- HTTP User Header Name – Defines the custom HTTP header field name.
- HTTP User Header Value – Defines the value associated with the custom HTTP header field.
- Upload test log – Sends a test CSV file to verify server connectivity and upload configuration.
- Force upload – Immediately uploads all unsent logger records to the configured server.
- Download full log – Downloads the complete logger file from the device for local storage or analysis.

### 7.3.4. HTTP POST

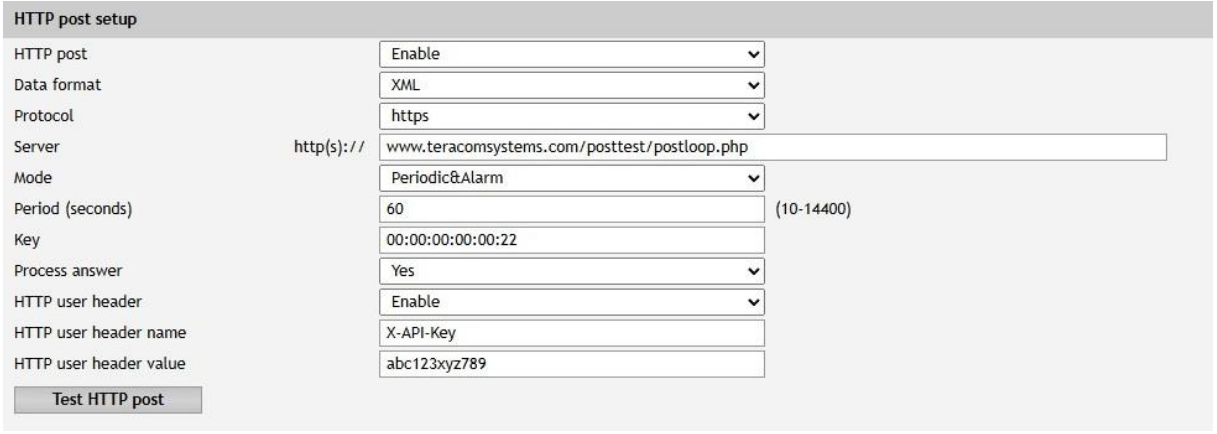
The TCW220 supports automatic data transmission to a remote server through HTTP or HTTPS POST requests, enabling seamless integration with cloud platforms, SCADA systems, monitoring software, and custom backend applications.

The device can periodically upload operational data, alarm events, or both, in structured XML or JSON format, making it easy to process and integrate with external systems.

For secure communication, HTTPS connections support TLS 1.0, TLS 1.1, and TLS 1.2, providing encrypted data transfer and server authentication.

The transmission interval is configurable from 10 to 14,400 seconds (4 hours), allowing flexible reporting rates depending on application requirements.

The TCW241 supports adding custom HTTP headers to outgoing POST requests, enabling compatibility with modern APIs, cloud services, and authenticated endpoints.




Configuration parameters:

- HTTP  POST - Enables or disables the HTTP POST functionality
- Data format - Defines the payload structure sent to the server – XML/JSON
- Server - Specifies the destination server address (IP address, domain name, and optional port) where the data will be posted.
- Mode - Defines when data is transmitted:

  Periodic & Alarm – Sends data at regular intervals and immediately when an alarm event occurs.

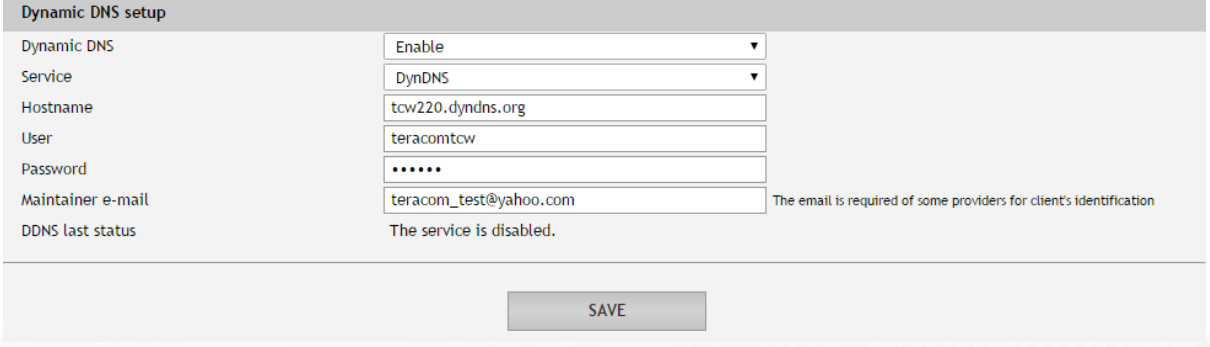
  Periodic only – Sends data only at the configured interval.

  Alarm only – Sends data only when an alarm condition is triggered.
- Period (seconds) - Sets the interval between periodic transmissions. Adjustable from 10 to 14,400 seconds.
- Key - A user-defined identifier included in every XML/JSON payload. This can be used by the receiving server to identify the source device, associate data with a specific installation, or authenticate incoming requests.
- Process answer - When enabled, the TCW241 processes the HTTP response from the remote server. This allows the server to send supported API commands back to the device for remote control or configuration updates (see HTTP API Commands section).
- HTTP User Header - Enables or disables sending a custom HTTP header.
- HTTP User Header Name - Defines the header field name (for example: Authorization, X-API-Key, Content-Type).
- HTTP User Header Value - Defines the value associated with the header field.

### 7.3.5. Dynamic DNS

With dynamic DNS, the TCW220 can be accessed from the public Internet without the need for a broadband account with a static IP address.

TCW220 supports the following DNS services: DynDNS, No-IP, and DNS-O-Matric.



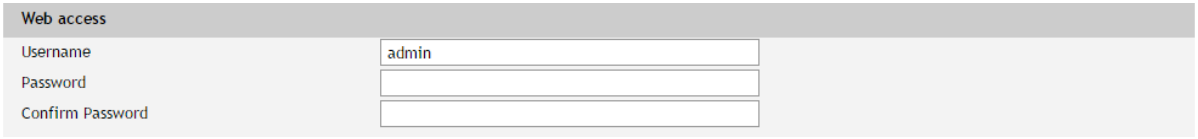



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## 7.4. Administration

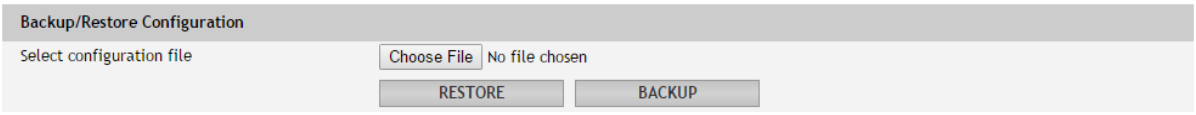
### 7.4.1. User/Password

The TCW220 supports a single user with administrative rights. Both the username and password can be up to 31 characters in length.



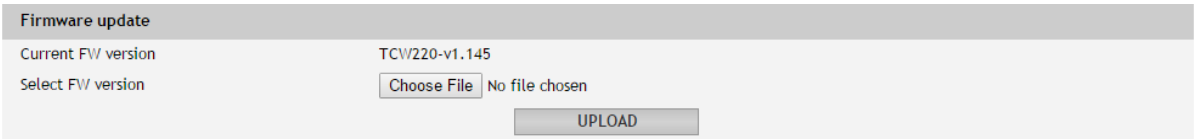

### 7.4.2. Backup/Restore

The TCW220 allows for the backup and restoration of all user settings. These settings are saved in an XML backup file, which can be utilized for restoring configurations on multiple devices. This feature is particularly useful for applying similar settings across a batch of controllers.




### 7.4.3. FW update

The TCW220 can be updated through the web interface.




To update the device, follow these steps:

- Go to www.teracomsystems.com and download the latest firmware;
- From Administration->FW update select downloaded .cod file and click “Upload” button;
- Once the firmware update is complete, the Login page will appear.

**Important:** Do not turn off the power supply during the update process, as this can damage the device.

## 7.5. Logout

The TCW220 supports multi-session access; however, it is recommended to log out after completing your tasks for security and best practices.

# 8. Protocols and API

## 8.1. SNMP

The Simple Network Management Protocol (SNMP) is a standard internet protocol used for managing devices on IP networks. In typical SNMP implementations, one or more administrative computers, referred to as managers, monitor and control devices on a Local Area Network (LAN). Each managed device continuously runs a software component known as an agent, which reports information via SNMP to the manager.

The TCW220 can be configured and monitored using SNMP. This can be achieved with any SNMP v.2 compatible program. The parameters that can be modified are organized by function in the tables below. To obtain a valid Object Identifier (OID) number, replace the “x” symbol with “1.3.6.1.4.1.38783.” To save the changes, set configurationSaved (OID x.2.3.5.0) to "1".

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### product

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.1.1.0 | name | read-only | Device name | DisplayString |
| x.2.1.2.0 | version | read-only | Firmware version | DisplayString |
| x.2.1.3.0 | date | read-only | Release date | DisplayString |

### setup -> network

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.1.1.0 | deviceID | read-only | Device ID (default MAC address) | MacAddress |
| x.2.2.1.2.0 | hostName | read-only | Hostname | DisplayString |
| x.2.2.1.3.0 | deviceIP | read-only | Device IP address | IpAddress |

### setup -> io -> sensorsSetup -> sensor1setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.1.1.1.0 | s1description | read-write | Sensor 1 description | DisplayString |
| x.2.2.2.1.1.2.1.0 | s11MAXInt | read-write | S11 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.1.2.2.0 | s11MINInt | read-write | S11 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.1.2.3.0 | s11HYSTInt | read-write | S11 hysteresis value x1000 in Integer format | Integer32 |
| x.2.2.2.1.1.3.1.0 | s12MAXInt | read-write | S12 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.1.3.2.0 | s12MINInt | read-write | S12 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.1.3.3.0 | s12HYSTInt | read-write | S12 hysteresis value x1000 in Integer format | Integer32 |

### setup -> io -> sensorsSetup -> sensor2setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.1.2.1.0 | s2description | read-write | Sensor2 description | DisplayString |
| x.2.2.2.1.2.2.1.0 | s21MAXInt | read-write | s21 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.2.2.2.0 | S21MINInt | read-write | S21 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.2.2.3.0 | S21HYSTInt | read-write | S21 hysteresis value x1000 in Integer format | Integer32 |
| x.2.2.2.1.2.3.1.0 | S22MAXInt | read-write | S22 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.2.3.2.0 | S22MINInt | read-write | S22 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.2.3.3.0 | S22HYSTInt | read-write | S22 hysteresis value x1000 in Integer format | Integer32 |

### setup -> io -> sensorsSetup -> sensor3setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.1.3.1.0 | S3description | read-write | Sensor 3 description | DisplayString |
| x.2.2.2.1.3.2.1.0 | S31MAXInt | read-write | S31 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.3.2.2.0 | S31MINInt | read-write | S31 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.3.2.3.0 | S31HYSTInt | read-write | S31 hysteresis value x1000 in Integer format | Integer32 |
| x.2.2.2.1.3.3.1.0 | S32MAXInt | read-write | S32 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.3.3.2.0 | S32MINInt | read-write | S32 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.3.3.3.0 | S32HYSTInt | read-write | S32 hysteresis value x1000 in Integer format | Integer32 |

### setup -> io -> sensorsSetup -> sensor4setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.1.4.1.0 | S4description | read-write | Sensor 4 description | DisplayString |
| x.2.2.2.1.4.2.1.0 | S41MAXInt | read-write | S41 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.4.2.2.0 | S41MINInt | read-write | S41 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.4.2.3.0 | S41HYSTInt | read-write | S41 hysteresis value x1000 in Integer format | Integer32 |
| x.2.2.2.1.4.3.1.0 | S42MAXInt | read-write | S42 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.4.3.2.0 | S42MINInt | read-write | S42 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.4.3.3.0 | S42HYSTInt | read-write | S42 hysteresis value x1000 in Integer format | Integer32 |

### setup -> io -> sensorsSetup -> sensor5setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.1.5.1.0 | S5description | read-write | Sensor 5 description | DisplayString |
| x.2.2.2.1.5.2.1.0 | S51MAXInt | read-write | S51 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.5.2.2.0 | S51MINInt | read-write | S51 minimum value x1000 in Integer format | Integer32 |



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| | | | | |
|---|---|---|---|---|
| x.2.2.2.1.5.2.3.0 | S51HYSTInt | read-write | S51 hysteresis value x1000 in Integer format | Integer32 |
| x.2.2.2.1.5.3.1.0 | S52MAXInt | read-write | S52 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.5.3.2.0 | S52MINInt | read-write | S52 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.5.3.3.0 | S52HYSTInt | read-write | S52 hysteresis value x1000 in Integer format | Integer32 |

### setup -> io -> sensorsSetup -> sensor6setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.1.6.1.0 | S6description | read-write | Sensor 6 description | DisplayString |
| x.2.2.2.1.6.2.1.0 | S61MAXInt | read-write | S61 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.6.2.2.0 | S61MINInt | read-write | S61 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.6.2.3.0 | S61HYSTInt | read-write | S61 hysteresis value x1000 in Integer format | Integer32 |
| x.2.2.2.1.6.3.1.0 | S62MAXInt | read-write | S62 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.6.3.2.0 | S62MINInt | read-write | S62 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.6.3.3.0 | S62HYSTInt | read-write | S62 hysteresis value x1000 in Integer format | Integer32 |

### setup -> io -> sensorsSetup -> sensor7setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.1.7.1.0 | S7description | read-write | Sensor 7 description | DisplayString |
| x.2.2.2.1.7.2.1.0 | S71MAXInt | read-write | S71 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.7.2.2.0 | S71MINInt | read-write | S71 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.7.2.3.0 | S71HYSTInt | read-write | S71 hysteresis value x1000 in Integer format | Integer32 |
| x.2.2.2.1.7.3.1.0 | S72MAXInt | read-write | S72 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.7.3.2.0 | S72MINInt | read-write | S72 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.7.3.3.0 | S72HYSTInt | read-write | S72 hysteresis value x1000 in Integer format | Integer32 |

### setup -> io -> sensorsSetup -> sensor8setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.1.8.1.0 | S8description | read-write | Sensor 8 description | DisplayString |
| x.2.2.2.1.8.2.1.0 | S81MAXx10Int | read-write | S81 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.8.2.2.0 | S81MINx10Int | read-write | S81 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.8.2.3.0 | S81HYSTx10Int | read-write | S81 hysteresis value x1000 in Integer format | Integer32 |
| x.2.2.2.1.8.3.1.0 | S82MAXx10Int | read-write | S82 maximum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.8.3.2.0 | S82MINx10Int | read-write | S82 minimum value x1000 in Integer format | Integer32 |
| x.2.2.2.1.8.3.3.0 | S82HYSTx10Int | read-write | S82 hysteresis value x1000 in Integer format | Integer32 |

### setup -> io -> analogSetup -> analog1setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.2.1.1.0 | voltage1description | read-write | Voltage 1 description | DisplayString |
| x.2.2.2.2.1.2.0 | voltage1max | read-write | Voltage 1 maximum | Integer32 |
| x.2.2.2.2.1.3.0 | voltage1min | read-write | Voltage 1 minimum | Integer32 |
| x.2.2.2.2.1.4.0 | voltage1hyst | read-write | Voltage 1 hysteresis | Integer32 |

### setup -> io -> analogSetup -> analog2setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.2.2.1.0 | voltage2description | read-write | Voltage 2 description | DisplayString |
| x.2.2.2.2.2.2.0 | voltage2max | read-write | Voltage 2 maximum | Integer32 |
| x.2.2.2.2.2.3.0 | voltage2min | read-write | Voltage 2 minimum | Integer32 |
| x.2.2.2.2.2.4.0 | voltage2hyst | read-write | Voltage 2 hysteresis | Integer32 |

### setup -> io -> digitalSetup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.3.1.0 | digitalInput1description | read-write | Digital Input 1 description" | DisplayString |
| x.1.2.2.3.2.0 | digitalInput2description | read-write | Digital Input 2 description | DisplayString |

### setup -> io -> relaysSetup -> relay1setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.4.1.1.0 | relay1description | read-write | Relay 1 description | DisplayString |
| x.2.2.2.4.1.2.0 | relay1pulseWidth | read-write | Relay1 Pulse x100ms | Integer32 |
| x.2.2.2.4.1.3.0 | relay1controlledBy | read-write | Relay1 control logic | Integer32 { manual(0),sensor11(1),sensor12(2),sensor21(3),sensor22(4), sensor31(5),sensor32(6),sensor41(7),sensor42(8),sensor51(9), sensor52(10),sensor61(11),sensor62(12),sensor71(13),sensor72(14), sensor81(15),sensor82(16),analog1(17),analog2(18), digital1(19),digital2(20),anyAlarm(21), virtual1(22),virtual2(23),virtual3(24),virtual4(25)} |

### setup -> io-> relaysSetup -> relay2setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.4.2.1.0 | relay2description | read-write | Relay 2 description | DisplayString |
| x.2.2.2.4.2.2.0 | relay2pulseWidth | read-write | Relay 2 Pulse x100ms | Integer32 |
| x.2.2.2.4.2.3.0 | relay2controlledBy | read-write | Relay 2 control logic | Integer32 { manual(0),sensor11(1),sensor12(2),sensor21(3),sensor22(4), sensor31(5),sensor32(6),sensor41(7),sensor42(8),sensor51(9), sensor52(10),sensor61(11),sensor62(12),sensor71(13),sensor72(14), sensor81(15),sensor82(16),analog1(17),analog2(18), digital1(19),digital2(20),anyAlarm(21), virtual1(22),virtual2(23),virtual3(24),virtual4(25)} |

### setup -> io -> virtualSetup -> virtual1setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.5.1.1.0 | virtualInput1description | read-write | Virtual input 1 description | DisplayString |
| x.2.2.2.5.1.2.0 | virtualInput1max | read-write | Virtual input 1 maximum | Integer32 |
| x.2.2.2.5.1.3.0 | virtualInput1min | read-write | Virtual input 1 minimum | Integer32 |
| x.2.2.2.5.1.4.0 | virtualInput1hyst | read-write | Virtual input 1 hysteresis | Integer32 |
| x.2.2.2.5.1.5.0 | virtualInput1Parent | read-write | Virtual input 1 parent | INTEGER{none(0),sensor11(1),sensor12(2),sensor21(3),sensor22(4),sensor31(5),sensor32(6),sensor41(7),sensor42(8),sensor51(9),sensor52(10),sensor61(11),sensor62(12),sensor71(13),sensor72(14), sensor81(15),sensor82(16),analog1(17),analog2(18)} |

### setup -> io -> virtualSetup -> virtual2setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.5.2.1.0 | virtualInput2description | read-write | Virtual input 2 description | DisplayString |
| x.2.2.2.5.2.2.0 | virtualInput2max | read-write | Virtual input 2 maximum | Integer32 |
| x.2.2.2.5.2.3.0 | virtualInput2min | read-write | Virtual input 2 minimum | Integer32 |
| x.2.2.2.5.2.4.0 | virtualInput2hyst | read-write | Virtual input 2 hysteresis | Integer32 |
| x.2.2.2.5.2.5.0 | virtualInput2Parent | read-write | Virtual input 2 parent | INTEGER{none(0),sensor11(1),sensor12(2),sensor21(3),sensor22(4),sensor31(5),sensor32(6),sensor41(7),sensor42(8),sensor51(9),sensor52(10),sensor61(11),sensor62(12),sensor71(13),sensor72(14),sensor81(15),sensor82(16),analog1(17),analog2(18)} |

### setup -> io -> virtualSetup -> virtual3setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.5.3.1.0 | virtualInput3description | read-write | Virtual input 3 description | DisplayString |
| x.2.2.2.5.3.2.0 | virtualInput3max | read-write | Virtual input 3 maximum | Integer32 |
| x.2.2.2.5.3.3.0 | virtualInput3min | read-write | Virtual input 3 minimum | Integer32 |
| x.2.2.2.5.3.4.0 | virtualInput3hyst | read-write | Virtual input 3 hysteresis | Integer32 |
| x.2.2.2.5.3.5.0 | virtualInput3Parent | read-write | Virtual input 3 parent | INTEGER{none(0),sensor11(1),sensor12(2),sensor21(3),sensor22(4),sensor31(5),sensor32(6),sensor41(7),sensor42(8),sensor51(9),sensor52(10),sensor61(11),sensor62(12),sensor71(13),sensor72(14),sensor81(15),sensor82(16),analog1(17),analog2(18)} |

### setup -> io -> virtualSetup -> virtual4setup

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.2.2.5.4.1.0 | virtualInput4description | read-write | Virtual input 4 description | DisplayString |
| x.2.2.2.5.4.2.0 | virtualInput4max | read-write | Virtual input 4 maximum | Integer32 |
| x.2.2.2.5.4.3.0 | virtualInput4min | read-write | Virtual input 4 minimum | Integer32 |
| x.2.2.2.5.4.4.0 | virtualInput4hyst | read-write | Virtual input 4 hysteresis | Integer32 |
| x.2.2.2.5.4.5.0 | virtualInput4Parent | read-write | Virtual input 4 parent | INTEGER{none(0),sensor11(1),sensor12(2),sensor21(3),sensor22(4),sensor31(5),sensor32(6),sensor41(7),sensor42(8),sensor51(9),sensor52(10),sensor61(11),sensor62(12),sensor71(13),sensor72(14),sensor81(15),sensor82(16),analog1(17),analog2(18)} |

### monitorNcontrol -> sensors -> sensor1

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.1.1.1.0 | s11Int | read-only | S11 value x1000 in Integer format | Integer32 |
| x.2.3.1.1.2.0 | s12Int | read-only | S12 value x1000 in Integer format | Integer32 |
| x.2.3.1.1.3.0 | s1ID | read-only | S1 ID value | Mac Address |

### monitorNcontrol -> sensors -> sensor2

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.1.2.1.0 | s21Int | read-only | S21 value x1000 in Integer format | Integer32 |
| x.2.3.1.2.2.0 | s22Int | read-only | S22 value x1000 in Integer format | Integer32 |
| x.2.3.1.2.3.0 | s2ID | read-only | S2 ID value | OCTET STRING (SIZE (16)) |

### monitorNcontrol -> sensors -> sensor3

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.1.3.1.0 | s31Int | read-only | S31 value x1000 in Integer format | Integer32 |
| x.2.3.1.3.2.0 | s32Int | read-only | S32 value x1000 in Integer format | Integer32 |
| x.2.3.1.3.3.0 | s3ID | read-only | S3 ID value | OCTET STRING (SIZE (16)) |

### monitorNcontrol -> sensors -> sensor4

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.1.4.1.0 | s41Int | read-only | S41 value x1000 in Integer format | Integer32 |
| x.2.3.1.4.2.0 | s42Int | read-only | S42 value x1000 in Integer format | Integer32 |
| x.2.3.1.4.3.0 | s4ID | read-only | S4 ID value | OCTET STRING (SIZE (16)) |

### monitorNcontrol -> sensors -> sensor5

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.1.5.1.0 | s51Int | read-only | S51 value x1000 in Integer format | Integer32 |
| x.2.3.1.5.2.0 | s52Int | read-only | S52 value x1000 in Integer format | Integer32 |
| x.2.3.1.5.3.0 | s5ID | read-only | S5 ID value | OCTET STRING (SIZE (16)) |

### monitorNcontrol -> sensors -> sensor6

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.1.6.1.0 | s61Int | read-only | S61 value x1000 in Integer format | Integer32 |
| x.2.3.1.6.2.0 | s62Int | read-only | S62 value x1000 in Integer format | Integer32 |
| x.2.3.1.6.3.0 | s6ID | read-only | S6 ID value | OCTET STRING (SIZE (16)) |

### monitorNcontrol -> sensors -> sensor7

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.1.7.1.0 | s71Int | read-only | S71 value x1000 in Integer format | Integer32 |
| x.2.3.1.7.2.0 | s72Int | read-only | S72 value x1000 in Integer format | Integer32 |
| x.2.3.1.7.3.0 | s7ID | read-only | S7 ID value | OCTET STRING (SIZE (16)) |

### monitorNcontrol -> sensors -> sensor8

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.1.8.1.0 | s81Int | read-only | S81 value x1000 in Integer format | Integer32 |
| x.2.3.1.8.2.0 | s82Int | read-only | S82 value x1000 in Integer format | Integer32 |
| x.2.3.1.8.3.0 | s8ID | read-only | S8 ID value | OCTET STRING (SIZE (16)) |

### monitorNcontrol -> analog

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.2.1.0 | voltage1Int | read-only | Voltage1 x1000 in Integer format | Integer32 |
| x.2.3.2.2.0 | voltage2Int | read-only | Voltage2 x1000 in Integer format | Integer32 |

### monitorNcontrol -> digital

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.3.1.0 | digitalInput1State | read-only | Digital1 Input State | INTEGER {closed(0), open(1)} |
| x.2.3.3.2.0 | digitalInput2State | read-only | Digital2  Input State | INTEGER {closed(0), open(1)} |

### monitorNcontrol -> relays -> relay1

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.4.1.1.0 | relay1State | read-write | Relay1 State | INTEGER {off(0), on(1)} |
| x.2.3.4.1.2.0 | relay1Pulse | read-write | Relay1 Pulse | INTEGER {off(0), on(1)} |

### monitorNcontrol -> relays -> relay2

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.4.2.1.0 | relay2State | read-write | Relay2 State | INTEGER {off(0), on(1)} |
| x.2.3.4.2.2.0 | relay2pulse | read-write | Relay2 pulse length | INTEGER {off(0), on(1)} |

### monitorNcontrol

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.5.0 | configurationSaved | read-write | Configuration save status SAVED/UNSAVED | INTEGER { unsaved(0), saved(1)} |
| x.2.3.6.0 | restartDevice | read-write | Restart Device | INTEGER { cancel(0), restart(1)} |
| x.2.3.7.0 | temperatureUnit | read-only | Unit of the all temperature values | INTEGER {celcius(0), fahrenheit(1)} |
| x.2.3.8.0 | hardwareErr | read-only | Hardware Error | INTEGER {noErr(0), owErr(1), hwErr(2)} |
| x.2.3.9.0 | pressureUnit | read-only | Unit of the pressure value | INTEGER {hPa(0), mbar(1), mmhg(2)} |

### monitorNcontrol -> virtual

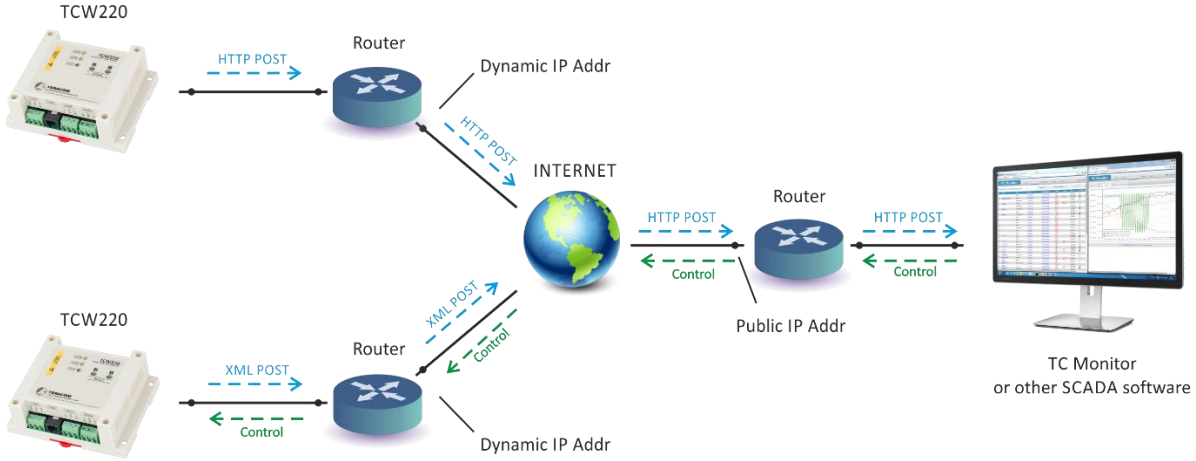
| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| x.2.3.11.1.0 | virtualInput1Int | read-write | Virtual input 1 x1000 in Integer format | Integer32 |
| x.2.3.11.2.0 | virtualInput2Int | read-write | Virtual input 2 x1000 in Integer format | Integer32 |
| x.2.3.11.3.0 | virtualInput3Int | read-write | Virtual input 3 x1000 in Integer format | Integer32 |
| x.2.3.11.4.0 | virtualInput4Int | read-write | Virtual input 4 x1000 in Integer format | Integer32 |

## 8.2. HTTP API

### 8.2.1. HTTP POST

TCW220 can execute HTTP/HTTPS POST requests to upload XML or JSON files to a dedicated server. This functionality is particularly useful when the controller is situated behind a router without a public IP address or when the user lacks access to the router's configuration. It is important to note that the server should possess a public IP address.

The typical monitoring application is shown in the picture below:




HTTP/HTTPS POSTs can be sent either periodically or periodically in conjunction with alarm conditions. In response, the server can send an HTTP GET request with the appropriate command—refer to section 8.2.3 for details on HTTP API commands.

To test HTTP/HTTPS POST functionality, follow these steps:

- Save following code as post.php:

```
<?php
    define("FILENAME", 'status.xml');
    define("FOLDER", '');
    define("SEPARATOR", '');
    define("STR_SUCCESS", 'set FIN');
    define("STR_ERROR", 'error');

    if($_SERVER['REQUEST_METHOD'] == 'POST'){
        $datePrefix = date('YmdHis', strtotime('now'));
        $pathname = FOLDER.SEPARATOR.$datePrefix.'_'.FILENAME;
        $postdata = file_get_contents("php://input");
        $handle = fopen($pathname, 'w+');
        $content = var_export($postdata, true);
        fwrite($handle, substr($content, 1, strlen($content)-2));
        fclose($handle);
        echo (($handle === false) ? STR_ERROR : STR_SUCCESS)."\r\n";
    }
        else {
            echo "The PHP script is working!";
        }
?>
```

  - Upload the post.php file to a public web server that supports PHP. To ensure the script is functioning correctly, enter the URL (for example, www.yourserverURL.com/post.php) in your web browser. If successful, a webpage displaying “The PHP script is working!” will appear.
  - Configure the TCW220 controller to send HTTP/HTTPS POST requests to your web server. Input the URL (yourserverURL.com/post.php) in the URL field, and click the “Test HTTP POST” button.
  - If the HTTP/HTTPS POST request is received and processed successfully, “OK” will be displayed next to the button. Additionally, an XML file will be created in the same directory where post.php is located. The filename will include a timestamp, formatted as 20151120103318_status.xml.

### 8.2.2. HTTP GET

HTTP GET can be utilized to monitor the TCW220 by retrieving XML or JSON files. The format for accessing the status is as follows:

http://device.ip.address/status.xml

http://device.ip.address/status.json

For further details regarding the structure of these files, refer to sections 8.2.4 XML file structure and 8.2.5 JSON file structure.

HTTP GET requests can be sent at any time to the TCW220 if it is on the same network or has appropriate routing. If there is no direct access to the device, an HTTP GET can be sent immediately after receiving an HTTP POST from the same device.

#### 8.2.2.1. Commands

All commands used with HTTP POST are also applicable to HTTP GET. The correct format for sending commands is:

http://device.ip.address/status.xml?yyy=xxx

Where:

yyy is the command;

xxx is the parameter.



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Example:

To turn Relay 1 ON, the following command can be used
http://device.ip.address/status.xml?ron=1.

#### 8.2.2.2. HTTP GET authentication

If HTTP API authentication is enabled, basic access authentication is required to access the status.xml file. The format of the command is detailed in the table below:

| XML/HTTP API authentication | Format |
|---|---|
| enabled | http://device.ip.address/status.xml?a=uuuu:pppp |
| disabled | http://device.ip.address/status.xml |

Example:

To set the POST period to 120 seconds, the following command can be used, assuming the username is admin and the password is admin
http://device.ip.address/status.xml?a=admin:admin&pper=120

### 8.2.3. List of HTTP API commands

| Command | Description |
|---|---|
| ron=**n** | Turn relay **n** ON<br>(**n** is 1 or 2 for the respective relay)<br>ron=1 - will turn ON relay 1<br>ron=2 - will turn ON relay 2 |
| ron=1&ron=2 | Turn both relays ON |
| rof=**n** | Turn relay **n** OFF<br>(**n** is 1 or 2 for the respective relay)<br>rof=1 - will turn OFF relay 1<br>rof=2 - will turn OFF relay 2 |
| rof=1&rof=2 | Turn both relays OFF |
| rtg=**n** | Toggle relay **n** state<br>(**n** is 1 or 2 for the respective relay)<br>rtg=1 - will toggle relay 1 state<br>rtg=2 - will toggle relay 2 state |
| rpl=**n** | Pulse relay **n**<br>(**n** is 1 or 2 for the respective relay)<br>rpl=1 – will pulse relay 1<br>rpl=2 – will pulse relay 2 |
| vn**f**=10.0 | Set Min of analog input to 10.0<br>(**f** is 1 or 2 for the respective input)<br>vn1=10.0 will set Min for analog input 1 |
| vx**f**=20.0 | Set Max of analog input to 20.0<br>(**f** is 1 or 2 for the respective input)<br>vx2=20.0 will set Max for analog input 2 |
| vy**f**=1.0 | Set Hys of analog input to 1.0<br>(**f** is 1 or 2 for the respective input)<br>vy1=1.0 will set Hys for analog input 1 |
| sn**pt**=30.0 | Set Min of sensor to 30.0<br>(**p** is 1,2,3,4,5,6,7 or 8 for the respective sensor<br>**t** is 1 or 2 for the respective parameter of sensor)<br>sn12=30.0 will set Min for sensor 1, parameter 2 |
| sx**pt**=40.0 | Set Max of sensor to 40.0<br>(**p** is 1,2,3,4,5,6,7 or 8 for the respective sensor<br>**t** is 1 or 2 for the respective parameter of sensor)<br>sx42=40.0 will set Min for sensor 4, parameter 2 |

| | |
|---|---|
| sy**pt**=2.0 | Set Hys of sensor to 2.0<br>(**p** is 1,2,3,4,5,6,7 or 8 for the respective sensor<br>**t** is 1 or 2 for the respective parameter of sensor)<br>sy81=2.0 will set Hys for sensor 8, parameter 1 |
| delsen=xxxx | Notification delay for sensors<br>(xxxx is between 0 and 3600) |
| delanl=xxxx | Notification delay for analog inputs<br>(xxxx is between 0 and 3600) |
| deldig=xxxx | Notification delay for digital inputs<br>(xxxx is between 0 and 3600) |
| dda1=xxxx | Low to high delay for digital input 1<br>(xxxx is between 0 and 3600) |
| ddd1=xxxx | High to low delay for digital input 1<br>(xxxx is between 0 and 3600) |
| dda2=xxxx | Low to high delay for digital input 2<br>(xxxx is between 0 and 3600) |
| ddd2=xxxx | High to low delay for digital input 2<br>(xxxx is between 0 and 3600) |
| dataf=x | Data format XML/JSON for HHTP POST – 0 XML, 1 JSON |
| pushtls=x | HTTP/HTTPS protocol, where x is 0 for HTTP and 1 for HTTPS |
| purl=yyy | URL for HTTP POST to Server 1, where yyy is a full path to php file. Example:<br>purl=212.25.45.120:30181/xampp/test/posttest.php |
| pper=x | HTTP POST period in seconds<br>(x is between 10 and 14400) |
| dk=xxx | HTTP POST key – xxx is up to 17 characters |
| save | Save all previous changes (except relays' one) in the FLASH memory.<br>**As every save reflects the FLASH cycles (endurance), this command should be used very carefully.**<br>pper=120&save – will set POST period to 120 seconds and save it |
| FIN | Terminate session.<br>(It works with HTTP/HTTPS POST, but not with HTTP GET) |

### 8.2.4. XML file structure

```
<Monitor>
    <DeviceInfo>
        <DeviceName>TCW220</DeviceName>
        <HostName>TCW220</HostName>
        <ID>5C:32:C5:00:69:02</ID>
        <FwVer>TCW220-v1.252</FwVer>
        <MnfInfo>www.teracomsystems.com</MnfInfo>
        <SysContact>info@teracomsystems.com</SysContact>
        <SysName>SysName</SysName>
        <SysLocation>SysLocation</SysLocation>
    </DeviceInfo>
    <S>
        <S1>
            <description>S1:TST1xx</description>
            <id>2867895F07000058</id>
            <item1>
                <value>23.313</value>
                <unit>°C</unit>
                <alarm>0</alarm>
                <min>-40.000</min>
                <max>85.000</max>
                <hys>8.500</hys>
            </item1>
            <item2>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
                <min>---</min>
                <max>---</max>
                <hys>---</hys>
            </item2>
        </S1>
        <S2>
            <description>S2:TSH2xx</description>
            <id>015225B71700FF45</id>
            <item1>
                <value>24.563</value>
                <unit>°C</unit>
                <alarm>0</alarm>
                <min>-40.000</min>
                <max>85.000</max>
                <hys>8.500</hys>
            </item1>
            <item2>
                <value>34.313</value>
                <unit>%RH</unit>
                <alarm>0</alarm>
                <min>0.000</min>
                <max>100.000</max>
                <hys>10.000</hys>
            </item2>
        </S2>
        <S3>
            <description>S3</description>
            <id>0000000000000000</id>
            <item1>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
                <min>---</min>
                <max>---</max>
                <hys>---</hys>
            </item1>
            <item2>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
                <min>---</min>
                <max>---</max>
                <hys>---</hys>
            </item2>
        </S3>
        <S4>
            <description>S4</description>
            <id>0000000000000000</id>
```



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```
        <item1>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
            <min>---</min>
            <max>---</max>
            <hys>---</hys>
        </item1>
        <item2>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
            <min>---</min>
            <max>---</max>
            <hys>---</hys>
        </item2>
    </S4>
    <S5>
        <description>S5</description>
        <id>0000000000000000</id>
        <item1>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
            <min>---</min>
            <max>---</max>
            <hys>---</hys>
        </item1>
        <item2>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
            <min>---</min>
            <max>---</max>
            <hys>---</hys>
        </item2>
    </S5>
    <S6>
        <description>S6</description>
        <id>0000000000000000</id>
        <item1>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
            <min>---</min>
            <max>---</max>
            <hys>---</hys>
        </item1>
        <item2>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
            <min>---</min>
            <max>---</max>
            <hys>---</hys>
        </item2>
    </S6>
    <S7>
        <description>S7</description>
        <id>0000000000000000</id>
        <item1>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
            <min>---</min>
            <max>---</max>
            <hys>---</hys>
        </item1>
        <item2>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
            <min>---</min>
            <max>---</max>
            <hys>---</hys>
        </item2>
    </S7>
```

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```
        <S8>
            <description>S8</description>
            <id>0000000000000000</id>
            <item1>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
                <min>---</min>
                <max>---</max>
                <hys>---</hys>
            </item1>
            <item2>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
                <min>---</min>
                <max>---</max>
                <hys>---</hys>
            </item2>
        </S8>
    </S>
    <AI>
        <AI1>
            <description>Analog Input 1</description>
            <value>0.033</value>
            <unit>V</unit>
            <multiplier>1.000</multiplier>
            <offset>0.0000</offset>
            <alarm>0</alarm>
            <min>0.000</min>
            <max>10.000</max>
            <hys>0.100</hys>
        </AI1>
        <AI2>
            <description>Analog Input 2</description>
            <value>0.033</value>
            <unit>V</unit>
            <multiplier>1.000</multiplier>
            <offset>0.0000</offset>
            <alarm>0</alarm>
            <min>0.000</min>
            <max>10.000</max>
            <hys>0.100</hys>
        </AI2>
    </AI>
    <VI>
        <VI1>
            <description>Virtual Input 1</description>
            <value>0.033</value>
            <unit>V</unit>
            <multiplier>1.000</multiplier>
            <offset>0.0000</offset>
            <alarm>1</alarm>
            <min>4.500</min>
            <max>5.500</max>
            <hys>0.010</hys>
        </VI1>
        <VI2>
            <description>Virtual Input 2</description>
            <value>0.033</value>
            <unit>V</unit>
            <multiplier>1.000</multiplier>
            <offset>0.0000</offset>
            <alarm>1</alarm>
            <min>6.000</min>
            <max>8.000</max>
            <hys>0.100</hys>
        </VI2>
        <VI3>
            <description>Virtual Input 3</description>
            <value>24.563</value>
            <unit>°C</unit>
            <multiplier>1.000</multiplier>
            <offset>0.0000</offset>
            <alarm>1</alarm>
            <min>25.000</min>
            <max>35.000</max>
```




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```
            <hys>0.010</hys>
        </VI3>
        <VI4>
            <description>Virtual Input 4</description>
            <value>34.313</value>
            <unit>%RH</unit>
            <multiplier>1.000</multiplier>
            <offset>0.0000</offset>
            <alarm>1</alarm>
            <min>45.000</min>
            <max>55.000</max>
            <hys>0.100</hys>
        </VI4>
    </VI>
    <DI>
        <DI1>
            <description>Digital Input 1</description>
            <value>OPEN</value>
            <valuebin>1</valuebin>
            <alarmState>CLOSED</alarmState>
            <alarm>0</alarm>
        </DI1>
        <DI2>
            <description>Digital Input 2</description>
            <value>OPEN</value>
            <valuebin>1</valuebin>
            <alarmState>CLOSED</alarmState>
            <alarm>0</alarm>
        </DI2>
    </DI>
    <R>
        <R1>
            <description>Relay 1</description>
            <value>OFF</value>
            <valuebin>0</valuebin>
            <pulseWidth>0.1</pulseWidth>
            <control>0</control>
        </R1>
        <R2>
            <description>Relay 2</description>
            <value>OFF</value>
            <valuebin>0</valuebin>
            <pulseWidth>0.2</pulseWidth>
            <control>0</control>
        </R2>
    </R>
    <HTTPPush>
        <Key/>
        <PushPeriod>60</PushPeriod>
    </HTTPPush>
    <hwerr/>
    <Alarmed>1</Alarmed>
    <Scannig/>
    <Time>
        <Date>11.10.2023</Date>
        <Time>09:54:36</Time>
    </Time>
</Monitor>
```

Where:

*<value>--- </value>* and *<unit>--- </unit>* means no 1-Wire sensor on this position;

*<alarm>1</alarm>* means there is trigger condition.

### 8.2.5. JSON file structure


```
{
  "Monitor": {
    "DeviceInfo": {
      "DeviceName": "TCW220",
      "HostName": "TCW220",
      "ID": "5C:32:C5:00:69:02",
      "FwVer": "TCW220-v1.252",
      "MnfInfo": "www.teracomsystems.com",
      "SysContact": "info@teracomsystems.com",
      "SysName": "SysName",
      "SysLocation": "SysLocation"
    },
    "S": {
      "S1": {
        "description": "S1:TST1xx",
        "id": "2867895F07000058",
        "item1": {
          "value": "23.375",
          "unit": "°C",
          "alarm": "0",
          "min": "-40.000",
          "max": "85.000",
          "hys": "8.500"
        },
        "item2": {
          "value": "---",
          "unit": "---",
          "alarm": "0",
          "min": "---",
          "max": "---",
          "hys": "---"
        }
      },
      "S2": {
        "description": "S2:TSH2xx",
        "id": "015225B71700FF45",
        "item1": {
          "value": "24.625",
          "unit": "°C",
          "alarm": "0",
          "min": "-40.000",
          "max": "85.000",
          "hys": "8.500"
        },
        "item2": {
          "value": "34.438",
          "unit": "%RH",
          "alarm": "0",
          "min": "0.000",
          "max": "100.000",
          "hys": "10.000"
        }
      },
      "S3": {
        "description": "S3",
        "id": "0000000000000000",
        "item1": {
          "value": "---",
          "unit": "---",
          "alarm": "0",
          "min": "---",
          "max": "---",
          "hys": "---"
        },
        "item2": {
          "value": "---",
          "unit": "---",
          "alarm": "0",
          "min": "---",
          "max": "---",
          "hys": "---"
        }
      },
      "S4": {
        "description": "S4",
```


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```
    "id": "0000000000000000",
    "item1": {
      "value": "---",
      "unit": "---",
      "alarm": "0",
      "min": "---",
      "max": "---",
      "hys": "---"
    },
    "item2": {
      "value": "---",
      "unit": "---",
      "alarm": "0",
      "min": "---",
      "max": "---",
      "hys": "---"
    }
  },
  "S5": {
    "description": "S5",
    "id": "0000000000000000",
    "item1": {
      "value": "---",
      "unit": "---",
      "alarm": "0",
      "min": "---",
      "max": "---",
      "hys": "---"
    },
    "item2": {
      "value": "---",
      "unit": "---",
      "alarm": "0",
      "min": "---",
      "max": "---",
      "hys": "---"
    }
  },
  "S6": {
    "description": "S6",
    "id": "0000000000000000",
    "item1": {
      "value": "---",
      "unit": "---",
      "alarm": "0",
      "min": "---",
      "max": "---",
      "hys": "---"
    },
    "item2": {
      "value": "---",
      "unit": "---",
      "alarm": "0",
      "min": "---",
      "max": "---",
      "hys": "---"
    }
  },
  "S7": {
    "description": "S7",
    "id": "0000000000000000",
    "item1": {
      "value": "---",
      "unit": "---",
      "alarm": "0",
      "min": "---",
      "max": "---",
      "hys": "---"
    },
    "item2": {
      "value": "---",
      "unit": "---",
      "alarm": "0",
      "min": "---",
      "max": "---",
      "hys": "---"
    }
```


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```
    },
    "S8": {
      "description": "S8",
      "id": "0000000000000000",
      "item1": {
        "value": "---",
        "unit": "---",
        "alarm": "0",
        "min": "---",
        "max": "---",
        "hys": "---"
      },
      "item2": {
        "value": "---",
        "unit": "---",
        "alarm": "0",
        "min": "---",
        "max": "---",
        "hys": "---"
      }
    }
  },
  "AI": {
    "AI1": {
      "description": "Analog Input 1",
      "value": "0.033",
      "unit": "V",
      "multiplier": "1.000",
      "offset": "0.0000",
      "alarm": "0",
      "min": "0.000",
      "max": "10.000",
      "hys": "0.100"
    },
    "AI2": {
      "description": "Analog Input 2",
      "value": "0.033",
      "unit": "V",
      "multiplier": "1.000",
      "offset": "0.0000",
      "alarm": "0",
      "min": "0.000",
      "max": "10.000",
      "hys": "0.100"
    }
  },
  "VI": {
    "VI1": {
      "description": "Virtual Input 1",
      "value": "0.033",
      "unit": "V",
      "multiplier": "1.000",
      "offset": "0.0000",
      "alarm": "1",
      "min": "4.500",
      "max": "5.500",
      "hys": "0.010"
    },
    "VI2": {
      "description": "Virtual Input 2",
      "value": "0.033",
      "unit": "V",
      "multiplier": "1.000",
      "offset": "0.0000",
      "alarm": "1",
      "min": "6.000",
      "max": "8.000",
      "hys": "0.100"
    },
    "VI3": {
      "description": "Virtual Input 3",
      "value": "24.625",
      "unit": "°C",
      "multiplier": "1.000",
      "offset": "0.0000",
      "alarm": "1",
      "min": "25.000",
```




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```
            "max": "35.000",
            "hys": "0.010"
          },
          "VI4": {
            "description": "Virtual Input 4",
            "value": "34.438",
            "unit": "%RH",
            "multiplier": "1.000",
            "offset": "0.0000",
            "alarm": "1",
            "min": "45.000",
            "max": "55.000",
            "hys": "0.100"
          }
        },
        "DI": {
          "DI1": {
            "description": "Digital Input 1",
            "value": "OPEN",
            "valuebin": "1",
            "alarmState": "CLOSED",
            "alarm": "0"
          },
          "DI2": {
            "description": "Digital Input 2",
            "value": "OPEN",
            "valuebin": "1",
            "alarmState": "CLOSED",
            "alarm": "0"
          }
        },
        "R": {
          "R1": {
            "description": "Relay 1",
            "value": "OFF",
            "valuebin": "0",
            "pulseWidth": "0.1",
            "control": "0"
          },
          "R2": {
            "description": "Relay 2",
            "value": "OFF",
            "valuebin": "0",
            "pulseWidth": "0.2",
            "control": "0"
          }
        },
        "HTTPPush": {
          "Key": "",
          "PushPeriod": "60"
        },
        "hwerr": "",
        "Alarmed": "1",
        "Scannig": "",
        "Time": {
          "Date": "11.10.2023",
          "Time": "10:07:15"
        }
      }
    }
```

## 8.3. Modbus TCP/IP

Modbus TCP/IP is a serial communications protocol originally published by Modicon in 1979. It facilitates master-slave/client-server communication between intelligent devices. This protocol is commonly employed to connect a supervisory computer with a remote terminal unit (RTU) within supervisory control and data acquisition (SCADA) systems.

Modbus TCP/IP operates over Ethernet, enabling communication between devices such as sensors, actuators, and controllers. The protocol is widely adopted due to its simplicity and reliability in industrial and automation applications. It allows for the exchange of data and commands, making it an essential component for integrating and monitoring various devices within a networked environment.

### 8.3.1. Codes and answers

#### 8.3.1.1. Read Coil Status (FC=01)

Request

This command is requesting the ON/OFF status of discrete coils on address 100.

**01 0064 0001**

01: The Function Code 1 (read Coil Status)
0064: The Data Address of the coil to read ( 0064 hex = 100)
0001: The total number of coils requested. (01 hex = 1)

Response

**01 01 01**

01: The Function Code 1 (read Coil Status)
01: The number of data bytes to follow
01: 7 space holders & Coils 1 (0000 0001)
Due to the number of coils requested, the last data field **01** contains the status of only 1 coil. The 7 most significant bits in this data field are filled in with zeroes. The activated relay is 1.

#### 8.3.1.2. Force Single Coil (FC=05)

Request

This command is writing the contents of discrete on address 100 to ON.

**05 0064 FF00**

05: The Function Code 5 (Force Single Coil)
0064: The Data Address of the coil. ( 0064 hex = 100)
FF00: The status to write ( FF00 = ON, 0000 = OFF )

Response

The normal response is an echo of the query, returned after the coil has been written.

**05 0064 FF00**

05: The Function Code 5 (Force Single Coil)
0064: The Data Address of the coil. (0064 hex = 100)
FF00: The status written ( FF00 = ON, 0000 = OFF )

#### 8.3.1.3. Read Input Status (FC=02)

Request

This command is requesting the ON/OFF status of discrete input 1

**02 0064 0001**

02: The Function Code 2 (read Input Status)
0064: The Data Address of the input to read ( 0064 hex = 100 )
0001: The total number of coils requested.

Response

**02 01 01**

02: The Function Code 2 (read Input Status)
01: The number of data bytes to follow
01: 7 space holders & Discrete Input 100 (0000 0001)
The 7 most significant bits are filled in with zeroes.

#### 8.3.1.4. Read Holding Registers (FC=03)

Request

This command is requesting the content of holding registers 19800.

**03 4D58 0002**

03: The Function Code 3 (read Holding Registers)
4D58: The Data Address of the first register requested (4D58 hex = 19800)
0002: The total number of registers requested. (read 2 registers each 2 byte = 4 bytes)

Response

**03 4 41BD 0655**

03: The Function Code 3 (read Sensor 1 Part 1 Holding Registers)
04: The number of data bytes to follow (2 registers x 2 bytes each = 4 bytes)
41BD 0655: 4 bytes value

All holding registers with float value are sent in big-endian.

In the example, the above value of 23.628 is sent.

Request

This command is requesting the content of holding registers 18100.

**03 46B4 0020**

03: Function Code 3 (read Sensor 1 description Holding Registers)
46B4: The Data Address of the first register requested (46B4 hex = 18100)
0020: The total number of registers requested (read 32 registers each 2 byte = 64 bytes)

Response

**03 40 5365 6E73 6F72 3100 0000 0000 0000

#### 8.3.1.5. Exception codes

All exceptions are signaled by adding 0x80 to the function code of the request, and following this byte by a single reason byte for example as follows:

01 Illegal function

The function code received in the query is not an allowable action for the controller.

02 Illegal data address

The data address received in the query is not an allowable address for the slave. More specifically, the combination of the reference number and the transfer length is invalid. For a controller with 100 registers, a request with offset 96 and length 4 would succeed, a request with offset 96 and length 5 will generate exception 02.

### 8.3.2. Address table

| Parameter | FC | PDU decimal address | Data size | Data |
|---|---|---|---|---|
| Relay 1 | 01,05,15 | 100 | Discrete | |
| Relay 2 | 01,05,15 | 101 | Discrete | |
| | | | | |
| Digital input 1 | 02 | 100 | Discrete | |
| Digital input 2 | 02 | 101 | Discrete | |
| | | | | |
| Relay 1 description | 03,16 | 15000 | 64 bytes UTF-8 | |
| Relay 2 description | 03,16 | 15032 | 64 bytes UTF-8 | |
| | | | | |
| Relay 1 pulse width | 03,16 | 15200 | 32-bit Float | |
| Relay 2 pulse width | 03,16 | 15202 | 32-bit Float | |
| | | | | |
| Relay 1 activated from | 03,06,16 | 15300 | 16-bit unsign int | manual(0),<br>sensor11(1), sensor12(2),<br>sensor21(3), sensor22(4),<br>sensor31(5), sensor32(6),<br>sensor41(7), sensor42(8),<br>sensor51(9), sensor52(10),<br>sensor61(11), sensor62(12),<br>sensor71(13), sensor72(14),<br>sensor81(15), sensor82(16),<br>analog1(17), analog2(18),<br>digital1(19), digital2(20),<br>anyAlarm(21),<br>virtual1(22), virtual2(23),<br>virtual3(24), virtual4(25) |
| Relay 2 activated from | 03,06,16 | 15301 | 16-bit unsign int | —"— |
| | | | | |
| Relay 1 action on alarm | 03,06,16 | 15400 | 16-bit unsign int | on (0), pulse (2) |
| Relay 2 action on alarm | 03,06,16 | 15401 | 16-bit unsign int | —"— |
| | | | | |
| Relays state after restart | 03,06 | 15500 | 16-bit unsign int | off (0), on (1), last state (2) |
| | | | | |

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| | | | | |
|---|---|---|---|---|
| Digital input 1 description | 03,16 | 16000 | 64 bytes UTF-8 | |
| Digital input 2 description | 03,16 | 16032 | 64 bytes UTF-8 | |
| | | | | |
| Digital input 1 alarm state | 03 | 16200 | 16-bit unsign int | |
| Digital input 2 alarm state | 03 | 16201 | 16-bit unsign int | |
| | | | | |
| Analog input 1 description | 03,16 | 17000 | 64 bytes UTF-8 | |
| Analog input 2 description | 03,16 | 17032 | 64 bytes UTF-8 | |
| | | | | |
| Analog input 1 max | 03,16 | 17200 | 32-bit Float | |
| Analog input 2 max | 03,16 | 17202 | 32-bit Float | |
| | | | | |
| Analog input 1 min | 03,16 | 17300 | 32-bit Float | |
| Analog input 2 min | 03,16 | 17302 | 32-bit Float | |
| | | | | |
| Analog input 1 hysteresis | 03,16 | 17400 | 32-bit Float | |
| Analog input 2 hysteresis | 03,16 | 17402 | 32-bit Float | |
| | | | | |
| Analog input 1 value | 03 | 17500 | 32-bit Float | |
| Analog input 2 value | 03 | 17502 | 32-bit Float | |
| | | | | |
| Sensor 1 description | 03,16 | 18100 | 64 bytes UTF-8 | |
| Sensor 2 description | 03,16 | 18132 | 64 bytes UTF-8 | |
| Sensor 3 description | 03,16 | 18164 | 64 bytes UTF-8 | |
| Sensor 4 description | 03,16 | 18196 | 64 bytes UTF-8 | |
| Sensor 5 description | 03,16 | 18228 | 64 bytes UTF-8 | |
| Sensor 6 description | 03,16 | 18260 | 64 bytes UTF-8 | |
| Sensor 7 description | 03,16 | 18292 | 64 bytes UTF-8 | |
| Sensor 8 description | 03,16 | 18324 | 64 bytes UTF-8 | |
| | | | | |
| Sensor 1, S11 dimension | 03 | 18400 | 64 bytes UTF-8 | |
| Sensor 1, S12 dimension | 03 | 18432 | 64 bytes UTF-8 | |
| Sensor 2, S21 dimension | 03 | 18464 | 64 bytes UTF-8 | |
| Sensor 2, S22 dimension | 03 | 18496 | 64 bytes UTF-8 | |
| Sensor 3, S31 dimension | 03 | 18528 | 64 bytes UTF-8 | |
| Sensor 3, S32 dimension | 03 | 18560 | 64 bytes UTF-8 | |
| Sensor 4, S41 dimension | 03 | 18592 | 64 bytes UTF-8 | |
| Sensor 4, S42 dimension | 03 | 18624 | 64 bytes UTF-8 | |
| Sensor 5, S51 dimension | 03 | 18656 | 64 bytes UTF-8 | |
| Sensor 5, S52 dimension | 03 | 18688 | 64 bytes UTF-8 | |
| Sensor 6, S61 dimension | 03 | 18720 | 64 bytes UTF-8 | |
| Sensor 6, S62 dimension | 03 | 18752 | 64 bytes UTF-8 | |
| Sensor 7, S71 dimension | 03 | 18784 | 64 bytes UTF-8 | |
| Sensor 7, S72 dimension | 03 | 18816 | 64 bytes UTF-8 | |
| Sensor 8, S81 dimension | 03 | 18848 | 64 bytes UTF-8 | |
| Sensor 8, S82 dimension | 03 | 18880 | 64 bytes UTF-8 | |
| | | | | |
| | | | | |

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| | | | | |
|---|---|---|---|---|
| Sensor 1, S11 max | 03,16 | 19200 | 32-bit Float | |
| Sensor 1, S12 max | 03,16 | 19202 | 32-bit Float | |
| Sensor 2, S21 max | 03,16 | 19204 | 32-bit Float | |
| Sensor 2, S22 max | 03,16 | 19206 | 32-bit Float | |
| Sensor 3, S31 max | 03,16 | 19208 | 32-bit Float | |
| Sensor 3, S32 max | 03,16 | 19210 | 32-bit Float | |
| Sensor 4, S41 max | 03,16 | 19212 | 32-bit Float | |
| Sensor 4, S42 max | 03,16 | 19214 | 32-bit Float | |
| Sensor 5, S51 max | 03,16 | 19216 | 32-bit Float | |
| Sensor 5, S52 max | 03,16 | 19218 | 32-bit Float | |
| Sensor 6, S61 max | 03,16 | 19220 | 32-bit Float | |
| Sensor 6, S62 max | 03,16 | 19222 | 32-bit Float | |
| Sensor 7, S71 max | 03,16 | 19224 | 32-bit Float | |
| Sensor 7, S72 max | 03,16 | 19226 | 32-bit Float | |
| Sensor 8, S81 max | 03,16 | 19228 | 32-bit Float | |
| Sensor 8, S82 max | 03,16 | 19230 | 32-bit Float | |
| | | | | |
| Sensor 1, S11 min | 03,16 | 19300 | 32-bit Float | |
| Sensor 1, S12 min | 03,16 | 19302 | 32-bit Float | |
| Sensor 2, S21 min | 03,16 | 19304 | 32-bit Float | |
| Sensor 2, S22 min | 03,16 | 19306 | 32-bit Float | |
| Sensor 3, S31 min | 03,16 | 19308 | 32-bit Float | |
| Sensor 3, S32 min | 03,16 | 19310 | 32-bit Float | |
| Sensor 4, S41 min | 03,16 | 19312 | 32-bit Float | |
| Sensor 4, S42 min | 03,16 | 19314 | 32-bit Float | |
| Sensor 5, S51 min | 03,16 | 19316 | 32-bit Float | |
| Sensor 5, S52 min | 03,16 | 19318 | 32-bit Float | |
| Sensor 6, S61 min | 03,16 | 19320 | 32-bit Float | |
| Sensor 6, S62 min | 03,16 | 19322 | 32-bit Float | |
| Sensor 7, S71 min | 03,16 | 19324 | 32-bit Float | |
| Sensor 7, S72 min | 03,16 | 19326 | 32-bit Float | |
| Sensor 8, S81 min | 03,16 | 19328 | 32-bit Float | |
| Sensor 8, S82 min | 03,16 | 19330 | 32-bit Float | |
| | | | | |
| Sensor 1, S11 hysteresis | 03,16 | 19400 | 32-bit Float | |
| Sensor 1, S12 hysteresis | 03,16 | 19402 | 32-bit Float | |
| Sensor 2, S21 hysteresis | 03,16 | 19404 | 32-bit Float | |
| Sensor 2, S22 hysteresis | 03,16 | 19406 | 32-bit Float | |
| Sensor 3, S31 hysteresis | 03,16 | 19408 | 32-bit Float | |
| Sensor 3, S32 hysteresis | 03,16 | 19410 | 32-bit Float | |
| Sensor 4, S41 hysteresis | 03,16 | 19412 | 32-bit Float | |
| Sensor 4, S42 hysteresis | 03,16 | 19414 | 32-bit Float | |
| Sensor 5, S51 hysteresis | 03,16 | 19416 | 32-bit Float | |
| Sensor 5, S52 hysteresis | 03,16 | 19418 | 32-bit Float | |
| Sensor 6, S61 hysteresis | 03,16 | 19420 | 32-bit Float | |
| Sensor 6, S62 hysteresis | 03,16 | 19422 | 32-bit Float | |
| Sensor 7, S71 hysteresis | 03,16 | 19424 | 32-bit Float | |
| Sensor 7, S72 hysteresis | 03,16 | 19426 | 32-bit Float | |

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| | | | | |
|---|---|---|---|---|
| Sensor 8, S81 hysteresis | 03,16 | 19428 | 32-bit Float | |
| Sensor 8, S82 hysteresis | 03,16 | 19430 | 32-bit Float | |
| | | | | |
| Sensor 1, S11 multiplier | 03,16 | 19500 | 32-bit Float | |
| Sensor 1, S12 multiplier | 03,16 | 19502 | 32-bit Float | |
| Sensor 2, S21 multiplier | 03,16 | 19504 | 32-bit Float | |
| Sensor 2, S22 multiplier | 03,16 | 19506 | 32-bit Float | |
| Sensor 3, S31 multiplier | 03,16 | 19508 | 32-bit Float | |
| Sensor 3, S32 multiplier | 03,16 | 19510 | 32-bit Float | |
| Sensor 4, S41 multiplier | 03,16 | 19512 | 32-bit Float | |
| Sensor 4, S42 multiplier | 03,16 | 19514 | 32-bit Float | |
| Sensor 5, S51 multiplier | 03,16 | 19516 | 32-bit Float | |
| Sensor 5, S52 multiplier | 03,16 | 19518 | 32-bit Float | |
| Sensor 6, S61 multiplier | 03,16 | 19520 | 32-bit Float | |
| Sensor 6, S62 multiplier | 03,16 | 19522 | 32-bit Float | |
| Sensor 7, S71 multiplier | 03,16 | 19524 | 32-bit Float | |
| Sensor 7, S72 multiplier | 03,16 | 19526 | 32-bit Float | |
| Sensor 8, S81 multiplier | 03,16 | 19528 | 32-bit Float | |
| Sensor 8, S82 multiplier | 03,16 | 19530 | 32-bit Float | |
| | | | | |
| Sensor 1, S11 offset | 03,16 | 19600 | 32-bit Float | |
| Sensor 1, S12 offset | 03,16 | 19602 | 32-bit Float | |
| Sensor 2, S21 offset | 03,16 | 19604 | 32-bit Float | |
| Sensor 2, S22 offset | 03,16 | 19606 | 32-bit Float | |
| Sensor 3, S31 offset | 03,16 | 19608 | 32-bit Float | |
| Sensor 3, S32 offset | 03,16 | 19610 | 32-bit Float | |
| Sensor 4, S41 offset | 03,16 | 19612 | 32-bit Float | |
| Sensor 4, S42 offset | 03,16 | 19614 | 32-bit Float | |
| Sensor 5, S51 offset | 03,16 | 19616 | 32-bit Float | |
| Sensor 5, S52 offset | 03,16 | 19618 | 32-bit Float | |
| Sensor 6, S61 offset | 03,16 | 19620 | 32-bit Float | |
| Sensor 6, S62 offset | 03,16 | 19622 | 32-bit Float | |
| Sensor 7, S71 offset | 03,16 | 19624 | 32-bit Float | |
| Sensor 7, S72 offset | 03,16 | 19626 | 32-bit Float | |
| Sensor 8, S81 offset | 03,16 | 19628 | 32-bit Float | |
| Sensor 8, S82 offset | 03,16 | 19630 | 32-bit Float | |
| | | | | |
| Sensor 1 ID | 03 | 19700 | 16 bytes UTF-8 | Example: 2860B85F07000094 |
| Sensor 2 ID | 03 | 19708 | 16 bytes UTF-8 | |
| Sensor 3 ID | 03 | 19716 | 16 bytes UTF-8 | |
| Sensor 4 ID | 03 | 19724 | 16 bytes UTF-8 | |
| Sensor 5 ID | 03 | 19732 | 16 bytes UTF-8 | |
| Sensor 6 ID | 03 | 19740 | 16 bytes UTF-8 | |
| Sensor 7 ID | 03 | 19748 | 16 bytes UTF-8 | |
| Sensor 8 ID | 03 | 19756 | 16 bytes UTF-8 | |
| | | | | |
| | | | | |
| | | | | |

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| | | | | |
|---|---|---|---|---|
| Sensor 1, S11 value | 03 | 19800 | 32-bit Float | |
| Sensor 1, S12 value | 03 | 19802 | 32-bit Float | |
| Sensor 2, S21 value | 03 | 19804 | 32-bit Float | |
| Sensor 2, S22 value | 03 | 19806 | 32-bit Float | |
| Sensor 3, S31 value | 03 | 19808 | 32-bit Float | |
| Sensor 3, S32 value | 03 | 19810 | 32-bit Float | |
| Sensor 4, S41 value | 03 | 19812 | 32-bit Float | |
| Sensor 4, S42 value | 03 | 19814 | 32-bit Float | |
| Sensor 5, S51 value | 03 | 19816 | 32-bit Float | |
| Sensor 5, S52 value | 03 | 19818 | 32-bit Float | |
| Sensor 6, S61 value | 03 | 19820 | 32-bit Float | |
| Sensor 6, S62 value | 03 | 19822 | 32-bit Float | |
| Sensor 7, S71 value | 03 | 19824 | 32-bit Float | |
| Sensor 7, S72 value | 03 | 19826 | 32-bit Float | |
| Sensor 8, S81 value | 03 | 19828 | 32-bit Float | |
| Sensor 8, S82 value | 03 | 19830 | 32-bit Float | |
| | | | | |
| Sensor 1, S11 alarm status | 03 | 20000 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 1, S12 alarm status | 03 | 20001 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 2, S21 alarm status | 03 | 20002 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 2, S22 alarm status | 03 | 20003 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 3, S31 alarm status | 03 | 20004 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 3, S32 alarm status | 03 | 20005 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 4, S41 alarm status | 03 | 20006 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 4, S42 alarm status | 03 | 20007 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 5, S51 alarm status | 03 | 20008 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 5, S52 alarm status | 03 | 20009 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 6, S61 alarm status | 03 | 20010 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 6, S62 alarm status | 03 | 20011 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 7, S71 alarm status | 03 | 20012 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 7, S72 alarm status | 03 | 20013 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 8, S81 alarm status | 03 | 20014 | 16-bit unsign int | normal (0), alarm (1) |
| Sensor 8, S82 alarm status | 03 | 20015 | 16-bit unsign int | normal (0), alarm (1) |
| | | | | |
| Save configuration | 03,06 | 50000 | 16-bit unsign int | unsaved (0), saved (1) |
| Restart device | 03,06 | 50001 | 16-bit unsign int | cancel (0), restart (1) |
| Temperature unit | 03,06 | 50002 | 16-bit unsign int | Celsius (0), Fahrenheit (1) |
| HW error | 03,06 | 50003 | 16-bit unsign int | noErr (0), hwErr (1) |
| Device ID | 03 | 50100 | 18 bytes UTF-8 | Example:<br>5c:32:c5:00:ac:52 |
| Hostname | 03 | 50200 | 16 bytes UTF-8 | |
| Device IP | 03 | 50300 | 16 bytes UTF-8 | Example:<br>192.168.1.2 |

## 8.4. Logger

The logger uses a circular buffer in the device's FLASH memory. When the buffer becomes full, new data automatically overwrites the oldest entries, ensuring that the FLASH memory always holds the most recent complete log. There is no command to clear the log, and a copy of the full log is always available for download.

The number of log entries depends on the length of descriptions and the type of characters used. In the worst-case scenario (with 15-byte descriptions using characters from the upper range of UTF-8), the logger can store approximately 52,000 records, which is sufficient for 36 days with records logged every minute.

New log data can also be periodically uploaded as a file to a dedicated HTTP server at time intervals of 1, 2, 3, 4, 6, 8, 12, or 24 hours. The data is uploaded in CSV format, using a semicolon (;) as the delimiter.

Each log file begins with a header row, and all rows (including the header) start with a record ID and a timestamp.

The structure of each log entry (record) is as follows:

| ID | Time | Type of record | Inputs value | Relays | Alarm conditions |
|---|---|---|---|---|---|

| | |
|---|---|
| ID | A unique 32-bit number assigned to each row (record). |
| Time | The timestamp of the record in the format yyyy.mm.dd, hh:mm. |
| Type of record | Specifies the reason for the log entry. The available record types are:<br>"Time" For periodical record;<br>"Event" For records triggered by an alarm condition;<br>"Type" For header records;<br>"Start" Created after a power-up event;<br>"Restart" Created after a reset event;<br>"Power Down" Generated after a power-down event;<br>"Bad" For problematic records. |
| Inputs value | Lists the values of all monitored inputs in the following order: sensors, analog inputs, and digital inputs. |
| Relays | Displays the status of the relays. |
| Alarm conditions | Indicates the alarm status for each input. A value of "1" means an active alarm condition. |

Example of the log file:


1131901;15.10.2015,01:02:23;Type;S11/°C;S12;S21/°C;S22;S31/°C;S32;S41/°C;S42;S51/°C;S52;S61/°C;S62;S71/°C;S72;S81/°C;S82;A1/V;A2/V;D1;D2;R1;R2;S1
1/°C;S12;S21/°C;S22;S31/°C;S32;S41/°C;S42;S51/°C;S52;S61/°C;S62;S71/°C;S72;S81/°C;S82;A1/V;A2/V;D1;D2;
1131902;15.10.2015,01:02:23;Time;18.250;;18.375;;18.125;;18.500;;18.188;;18.125;;18.375;;18.375;;11.352;0.065;1;0;1;0;1;;1;;1;;1;;1;;1;;1;;1;0;1;0;
1131903;15.10.2015,01:02:23;Event;18.250;;18.438;;18.125;;18.500;;18.188;;18.125;;18.313;;18.375;;11.352;0.066;0;1;0;1;1;;1;;1;;1;;1;;1;;1;;1;0;0;1;
1131904;15.10.2015,01:02:24;Time;18.250;;18.438;;18.125;;18.500;;18.188;;18.125;;18.313;;18.375;;11.352;0.066;0;1;0;1;1;;1;;1;;1;;1;;1;;1;;1;0;0;1;
1131905;15.10.2015,01:02:25;Time;18.250;;18.375;;18.125;;18.500;;18.188;;18.125;;18.313;;18.375;;11.352;0.066;0;1;0;1;1;;1;;1;;1;;1;;1;;1;;1;0;0;1;
1131906;15.10.2015,01:02:26;Time;18.250;;18.375;;18.125;;18.500;;18.188;;18.125;;18.313;;18.313;;11.352;0.066;0;1;0;1;1;;1;;1;;1;;1;;1;;1;;1;0;0;1;
1131907;15.10.2015,01:02:27;Time;18.250;;18.375;;18.125;;18.438;;18.188;;18.125;;18.313;;18.313;;11.352;0.066;0;1;0;1;1;;1;;1;;1;;1;;1;;1;;1;0;0;1;
1131908;15.10.2015,01:02:27;Event;18.250;;18.375;;18.125;;18.438;;18.188;;18.125;;18.313;;18.313;;2.198;9.092;0;1;0;1;1;;1;;1;;1;;1;;1;;1;;0;0;0;1;


# 9. Factory default settings

TCW220 can be restored to its original factory default settings in three different ways.

## 9.1. Factory default from the WEB interface

Pressing the "Factory default" button in the Administration -> Backup/Restore section will reset all parameters to their factory defaults, except for network settings.

## 9.2. Factory default with the reset button

If the reset button is pressed for more than 5 seconds while the device is powered on, all network settings will be reverted to factory defaults.

## 9.3. General factory default with the reset button

To perform a complete factory reset of all parameters, follow these steps:

- Press and hold the RESET button, then turn on the power supply.
- The yellow LED will illuminate, and the red LED will blink approximately five times per second.
- After about 5 seconds, the red LED will turn off, and you can release the button.
- The yellow LED will flash once per second while the red LED remains illuminated, indicating that the device is in working mode with factory default settings.




The factory default settings are:

| | |
|---|---|
| User Name | admin |
| Password | admin |
| IP Address | 192.168.1.2 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 192.168.1.1 |
| SNMPConfiguration | disabled |
| readCommunity | public |
| writeCommunity | private |
| Analog inputs unit | voltage |
| Analog inputs multiplier | 1.000 |
| Analog inputs ofset | 0.000 |

## 10. Environment information

This equipment is intended for use in a Pollution Degree 2 environment, at altitudes of up to 2000 meters.

When the controller is part of a larger system, all other elements of the system must comply with EMC (Electromagnetic Compatibility) requirements and be suitable for use under the same ambient conditions.

## 11. Safety

This device must not be used for medical or life-saving purposes or for any application where its failure could result in serious injury or loss of life.

To reduce the risk of fire, use only flexible stranded wire with a cross-section of 0.5mm² or larger for wiring digital and analog inputs and relay outputs of the device.

To avoid electric shock and fire hazards, do not expose this product to liquids, rain, or moisture. Objects filled with liquids, such as vases, should not be placed on this device.

There is a risk of overheating (and potential damage) to the controller if the recommended free spaces next to adjacent devices are not maintained. Ensure that there is sufficient space for attaching and removing cables after installation.

Teracom does not guarantee the successful operation of the product if it is used under conditions that deviate from the product specifications.

To ensure that the device works correctly follow these steps:

- Ensure that the device is installed according to the instructions in this user manual;
- Log into the device via a web browser;
- Perform the necessary configuration settings;
- Short the “Din1” and “GND” terminals;
- Install a TSH2XX or TST1XX sensor on the 1-Wire bus;
- Navigate to the “Monitoring page” of the web interface. Proper parameter values should be displayed, and the flashing “STS” LED should indicate that the device is operating correctly.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Teracom Ltd. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

## 12. Maintenance

After any service or repair of the device, or at least once a year, a safety check must be performed to ensure that the product is in proper operating condition.

Clean the device only with dry cloth. Do not use liquid cleaners or aerosol cleaners. Do not use a magnetic/static cleaning device (dust remover) or any kind of abrasive materials to clean the device.

Following these guidelines will help maintain the device in optimal condition and ensure its longevity.

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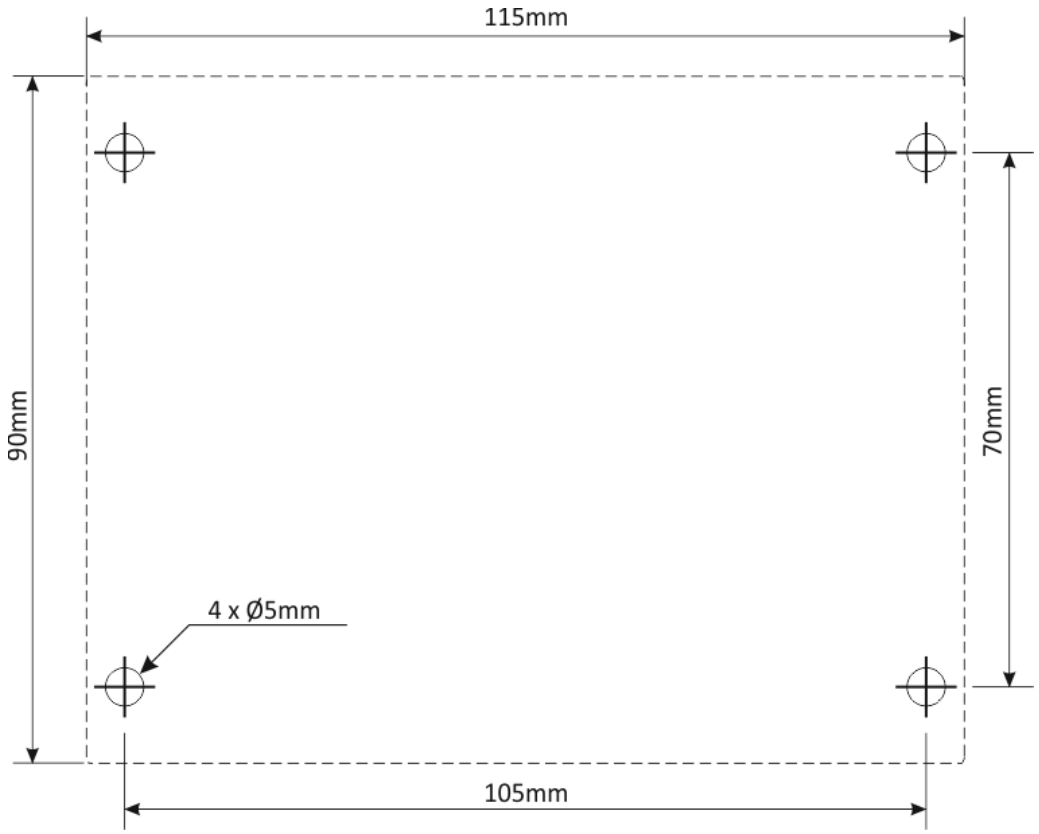

115mm
90mm
70mm
4 x Ø5mm
105mm

Fig.1

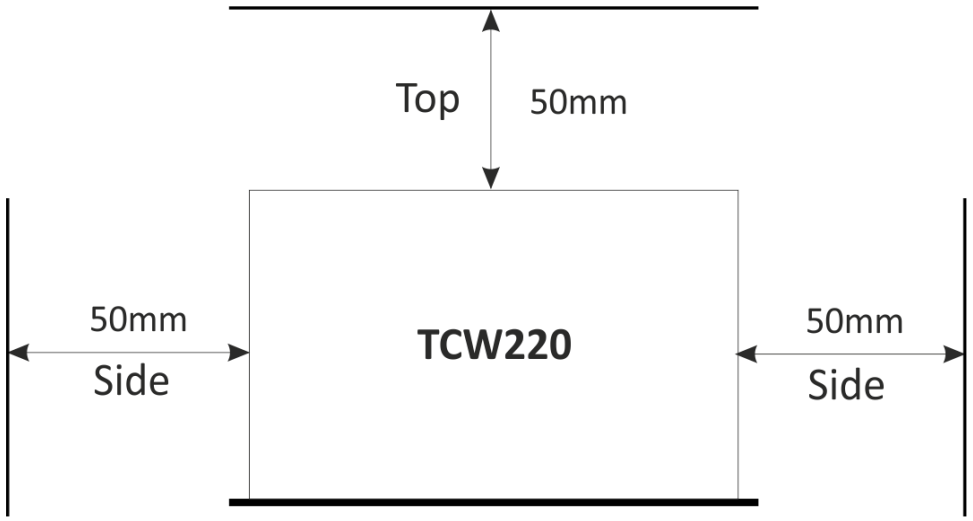

Top
50mm
50mm
Side
TCW220
50mm
Side

Fig.2