control solutions
TERACOM


# TCW260
# Energy monitoring module

# USER MANUAL

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Measurement and data acquisition solutions

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# 1. Introduction

TCW260 is an energy monitoring module with Ethernet connectivity and data logging capability. All monitored parameters can be seen as numbers and as graphs.

The device has 4 digital inputs, S0+ compatible. The inputs can work in two modes – OPEN/CLOSED for a reading of “dry contact” outputs and COUNTER mode for direct connection of energy meters with pulse outputs.

The energy monitoring module has also 6 analog inputs. Every analog input can work either in voltage (0/10V) or current loop (0/20mA) modes. The mode is changed over the user interface.

All digital and analog inputs are fully isolated from the power supply ground.

TCW260 supports Modbus RTU interface for up to 24 Teracom and third-party sensors. The used RS-485 interface is fully isolated from the power supply ground.

The user can arrange up to 24 independent monitoring channels from the inputs and sensor readings. Every channel can be set up using up to 2 input parameters and/or constants. There are three type of channels – discrete (for OPEN/CLOSED outputs monitoring), general (for general monitoring) and cumulative (for energy, volume, etc. monitoring).

The user can also arrange up to 24 independent alarms with 5 different user selectable states. Every alarm can be set up using up to 2 limits and hysteresis. The alarm can be assigned to a specific channel. In this case, in an alarm state, the assigned channel is colored on the monitoring page and graphs.

The device supports SNMP, HTTP API, Modbus TCP/IP and MQTT as machine-to-machine (M2M) communication.

# 2. Features

- 10/100 Mb Ethernet connectivity with Auto-MDIX;
- HTTP/HTTPS server support
- Password protected, web-based configuration and control;
- 4 digital inputs, S0-pulse interface compatible;
- 6 analog inputs with 0/10V and 0/20mA modes;
- Modbus RTU interface for up to 24 sensors (registers);
- Up to 24 channels for monitoring;
- Up to 24 independent alarms;
- SNMPv2 and SNMPv3 support;
- SNMP traps sending for alert conditions;
- SMTP with SSL/TLS security;
- TLS 1.0, TLS 1.1 and TLS 1.2 support;
- HTTP and SNMP port changing;
- HTTP API commands;
- Periodical HTTP/HTTPS POST of XML/JSON status files for client-server systems;
- Modbus TCP/IP support;
- MQTT 3.1.1 support;
- Dynamic DNS with DynDNS, No-IP and DNS-O-Matic support;
- NTP protocol support;
- Data logger for up to 70000 records;
- DIN Rail Mountable;
- Wide power supply voltage range;
- Backup/restore of settings;
- Remote firmware update.

## 3. Applications

The energy monitoring module TCW260 is dedicated to monitoring and recording the parameters of the measurement of resources - electricity meters, gas meters, water meters, and others. Rising resource costs require reliable analysis and optimization. Depending on the search result, this can be done at a micro level (separate machine) or macro level (company).

The monitoring module can integrate seamlessly into already working objects. With proper selection of sensors, this can happen even without interrupting the production process.

Of course, the module can be used also for general monitoring of industrial processes.

A few example applications include:

- Energy analysis and optimization;
- Water consumption analysis;
- Gas consumption optimization;
- A building management system;
- Industrial processes monitoring;
- General SCADA systems.

## 4. Specifications

- Physical characteristics
  Dimensions: 145 x 90 x 40mm
  Weight: 200g

- Environmental limits
  Operating temperature range: -20 to 55°C
  Storage temperature range: -25 to 60°C
  Operating relative humidity range: 10 to 80% (non-condensing)

- Warranty
  Warranty period: 3 years

- Power supply
  Operating voltage range (including -15/+20% according to IEC 62368-1): 10 to 28VDC
  Current consumption: 220mA @ 12VDC (without RS-485 powering)

- RS-485 interface
  Isolation: Isolated (1000VDC)
  Output voltage (pin 7 of RJ-45): 5.0 ± 0.3VDC
  Maximum output current (pin 7 of RJ-45): 0.2A

- Digital inputs
  Isolation: Isolated (1000VDC)
  Mode: OPEN/CLOSED (“Dry contact”) or COUNTER (S0-pulse interface outputs)
  Maximum input voltage: +5.5VDC
  Sampling rate: 1mS
  Digital filtering time interval: 5 to 60000mS

- Analog inputs
  Isolation: Isolated (1000VDC)
  Type: Single ended
  Resolution: 12 bits
  Mode: Voltage or current loop
  Input range: 0/10V or 0/20mA
  Accuracy: ±1%
  Sampling rate: 600mS per channel (averaged value of 100 samples)
  Input impedance in voltage mode: 1mega-ohm (min.)
  Input impedance in current loop mode: 455ohm

- Internal FLASH memory
  Settings segment endurance: 100 000 cycles (Every setting change is a memory cycle).
  Data logger segment endurance: 100 000 cycles of 70000 records.
  Update segment endurance: 100 000 cycles (updates).

- Lithium battery
  Type: CR1220

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

## 5. LED indicators

The following indicators show the status of the controller:

- **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, supplying power, and configuring it through a web browser.

### 6.1. Mounting

TCW260 must be installed in a clean, dry, and non-flammable location. Ventilation is recommended for high ambient temperature environments.

Mount the device to a wall by using two plastic dowels 8x60mm (example Würth GmbH 0912 802 002) and two dowel screws 6x70mm (example Würth GmbH 0157 06 70). Attach the screws to the surface vertically. See Appendix D, fig. 1 for mechanical details.

Maintain spacing from adjacent equipment. Allow 50 mm of space on all sides, as shown in fig. 2 in Appendix D, this provides ventilation and electrical isolation

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.

### 6.2. Connection

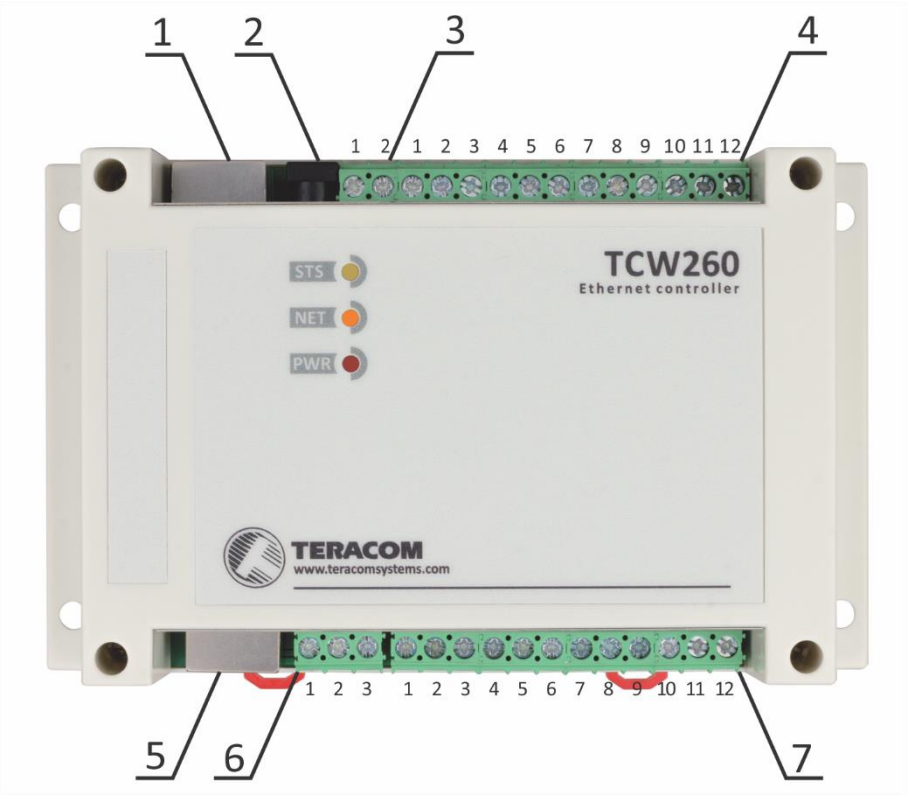
**Warning! Power off before wiring.**

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 TCW260 or connected equipment.




**Connector 1** Ethernet - RJ45

**Connector 2** Power - 2.1x5.5mm connector, (Central positive)

**Connector 3**
**Pin1** – Power positive
**Pin2** – Power negative (GND)

**Connector 4**
**Pin1** – S04- (SGND)
**Pin2** – not connected
**Pin3** – S04+ (Digital in 4)
**Pin4** – S03- (SGND)
**Pin5** – not connected
**Pin6** – S03+ (Digital in 3)
**Pin7** – S02- (SGND)
**Pin8** – not connected
**Pin9** – S02+ (Digital in 2)
**Pin10** – S01- (SGND)
**Pin11** – not connected
**Pin12** – S01+ (Digital in 1)

**Connector 5**
**Pin1** – not connected (most left)
**Pin2** – not connected
**Pin3** – not connected
**Pin4** – RS485-
**Pin5** – RS485+
**Pin6** – not connected
**Pin7** – +VDD
**Pin8** – SGND

**Connector 6**
**Pin1** – RS485+
**Pin2** – SGND
**Pin3** – RS485-

**Connector 7**
**Pin1** – Analog in 1
**Pin2** – SGND
**Pin3** – Analog in 2
**Pin4** – SGND
**Pin5** – Analog in 3
**Pin6** – SGND
**Pin7** – Analog in 4
**Pin8** – SGND
**Pin9** – Analog in 5
**Pin10** – SGND
**Pin11** – Analog in 6
**Pin12** – SGND

It is recommended using grounding configuration with isolated local ground and PE.

### 6.2.1. Power supply connection

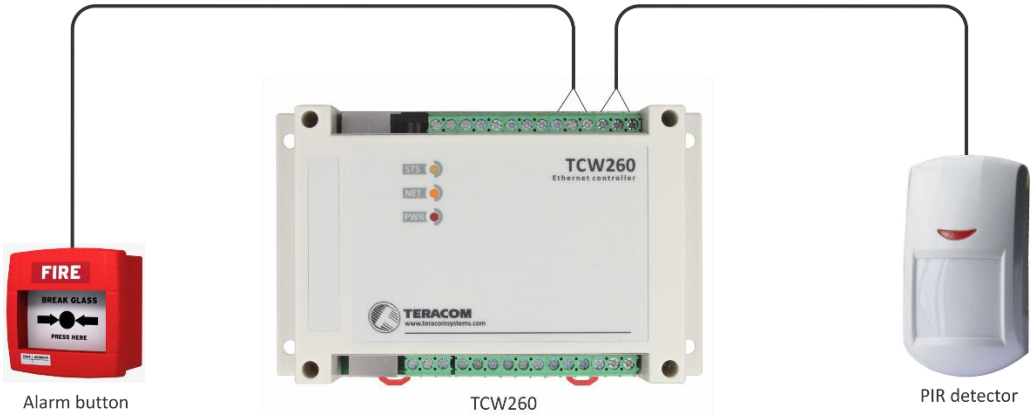
TCW260 must be powered by the adapter SYS1308(N)-2412-W2E or equivalent, suitable for overvoltage category II and certified for safety compliance. The power supply device should be able to withstand short circuits and secondary circuit overloads. Ensure the equipment is easily accessible for disconnecting from the power supply during use.

### 6.2.2. Digital inputs connection

All inputs are galvanic isolated from the power supply ground.

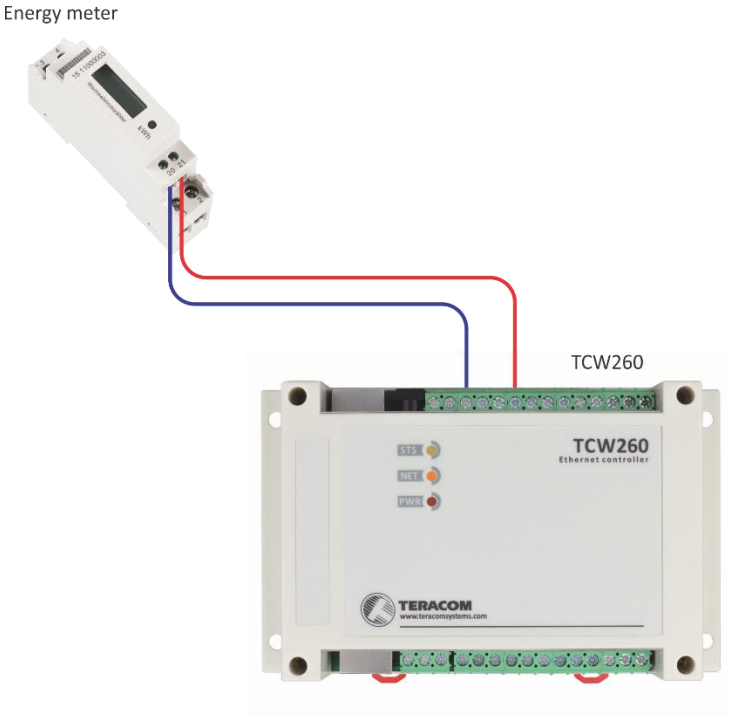
The digital inputs of the TCW260, when set to OPEN/CLOSED mode, allow monitoring of devices with “dry contact” outputs—such as door contact switches, push buttons, and PIR detectors.

The following diagram illustrates the connection of a dry contact switch to the TCW260 input: one side of the contact connects to the “S0+” terminal, while the other connects to the “S0-” terminal.




When set to COUNTER mode, the digital inputs of the TCW260 can monitor devices with an S0-pulse interface, such as energy meters and water meters.

The diagram below shows how to connect an energy meter to the TCW260 input: connect one side of the contact to the “S0+” terminal and the other side to the “S0-” terminal.



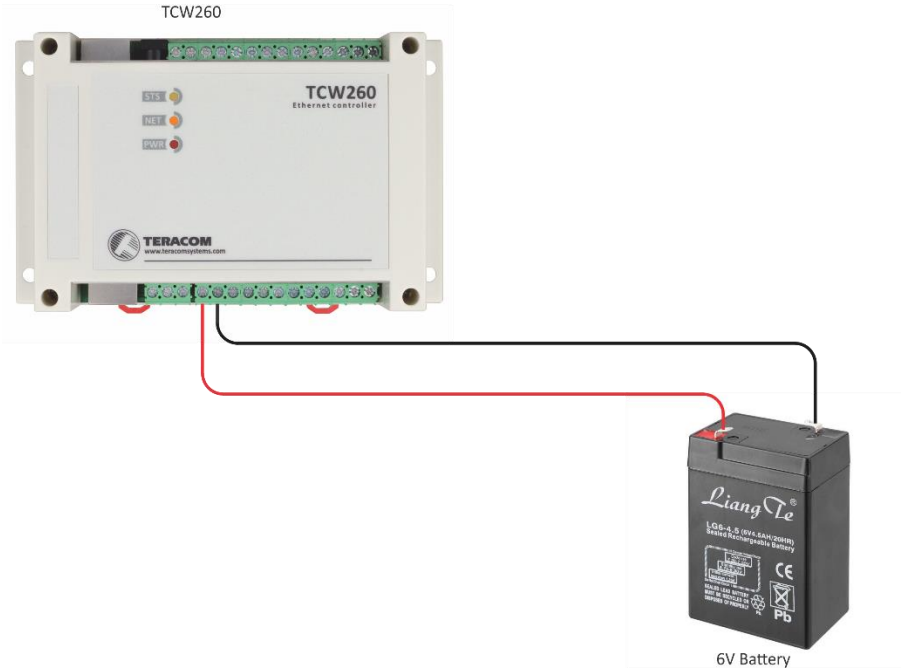

For optimal performance, the cable length should not exceed 30 meters.

### 6.2.3. Analog inputs connection

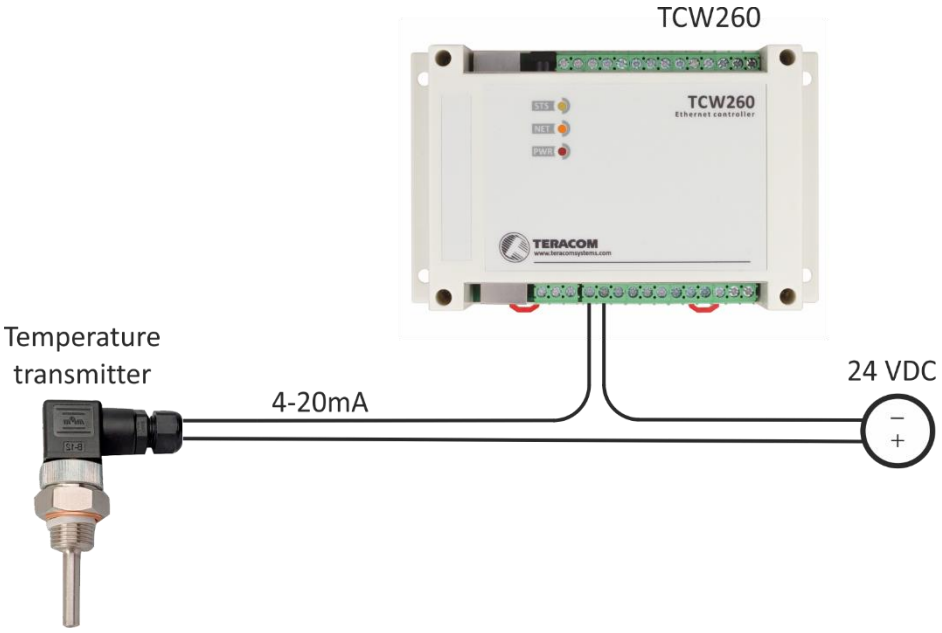
All inputs are galvanic isolated from the power supply ground.

The analog inputs of the TCW260 can monitor devices with voltage and current loop outputs, allowing direct connections to analog sensors such as temperature and humidity sensors, or current/voltage transducers.

The diagram below illustrates how to connect a battery to the analog input of the TCW260 in voltage mode: connect the positive terminal to “Analog In” and the negative terminal to “GND”.




The diagram below shows how to connect a temperature sensor with a current loop output to the analog input of the TCW260: connect the active terminal to “Analog In” and the shield terminal to “GND”.




For optimal performance, the cable length should not exceed 30 meters.

### 6.2.4. RS-485 connection

The RS-485 interface on the TCW260 is galvanically isolated from the power supply ground, providing additional protection.

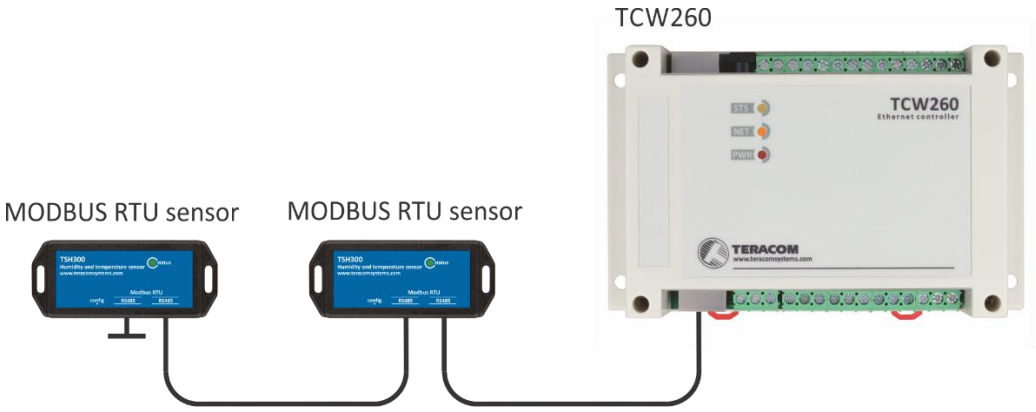
RS-485 is an industry-standard for serial communication, ideal for long-distance connections and environments with high electrical noise, such as industrial settings.

The TCW260 is compatible with Modbus RTU (over RS-485) slave devices and supports connections with up to 24 compatible devices, including those from Teracom and third-party manufacturers.

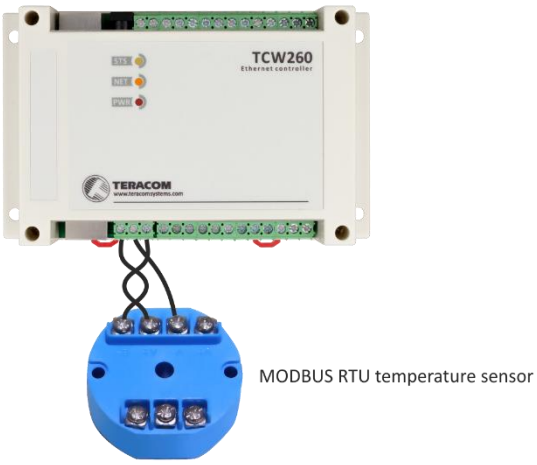
Connections are made using a standard RJ-45 connector, with the pinout specified in the "Modbus over Serial Line Specification and Implementation Guide" available at www.modbus.org.

To maintain signal integrity, it is essential to use 120-ohm line terminators at both ends of the RS-485 bus. The TCW260 includes one terminator and should be installed at one end of the line, leaving the other end for the user to terminate.

For setups with multiple devices, a daisy-chain (linear) topology is strongly recommended:



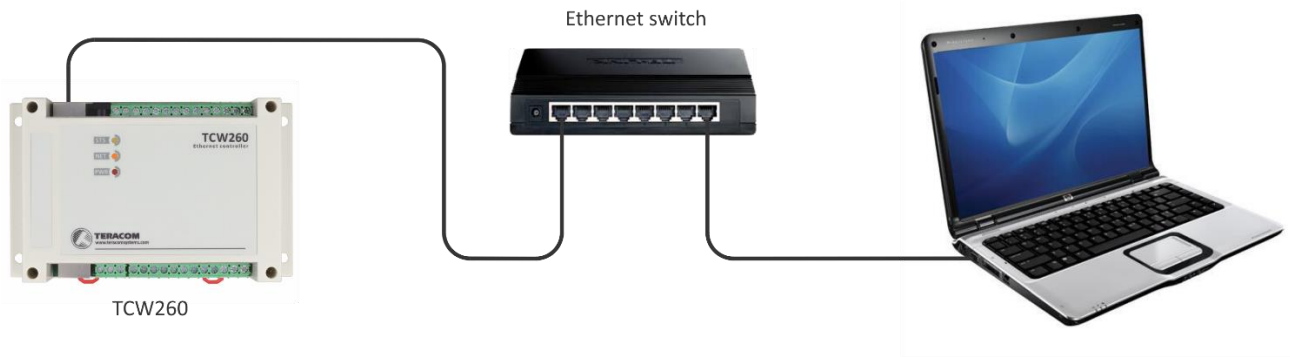

For Modbus RTU devices with screw terminals, the following connection options are available:



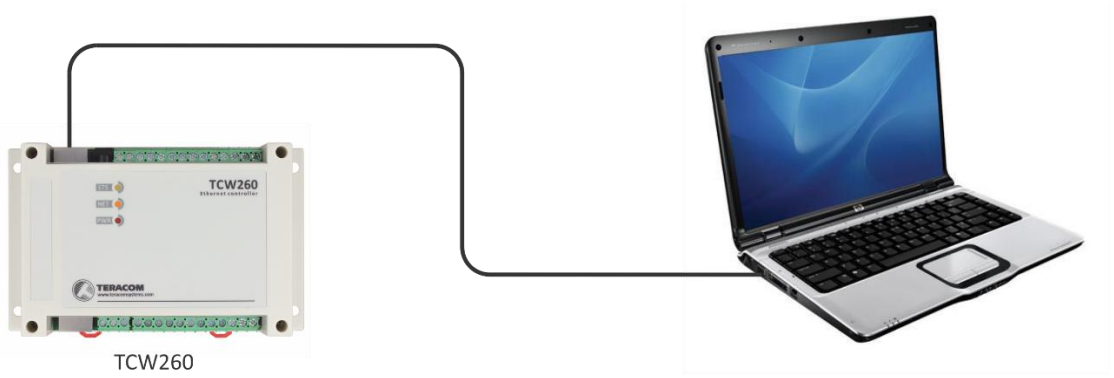

It is recommended to use only UTP or FTP cables. Keep the total cable length within 30 meters; however, functionality has been observed over longer distances.

### 6.2.5. Network connection

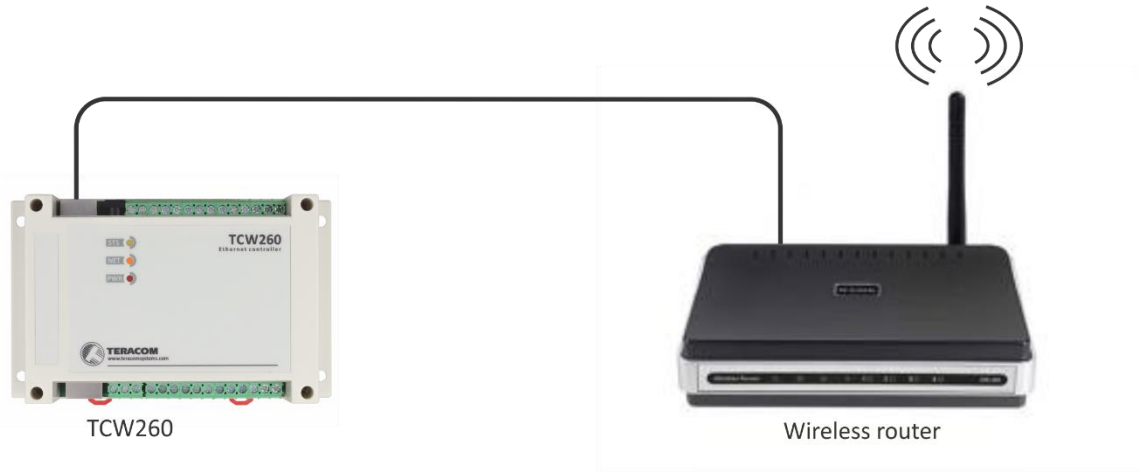
The Ethernet port of TCW260 should be connected to a 10/100 Base-T Ethernet hub, switch, or router.




For configuration purposes, the TCW260 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.




TCW260 can also be integrated into a wireless network by connecting it through a wireless router.

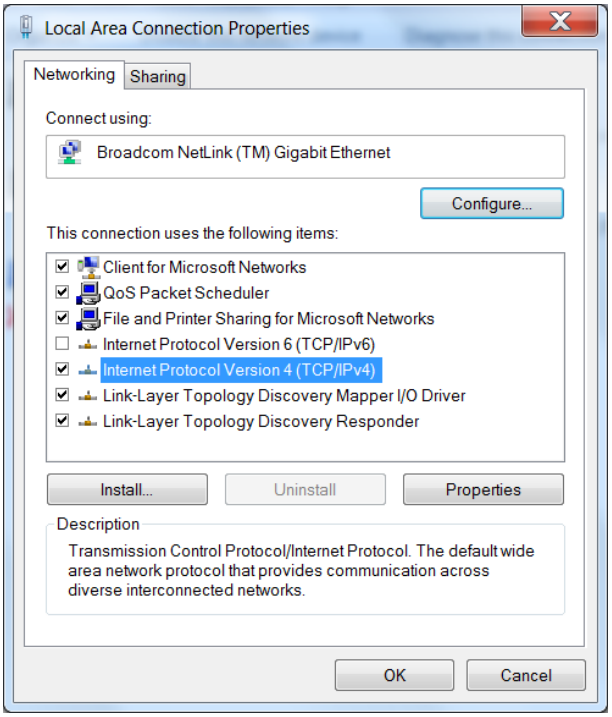


## 6.3. Communication setup

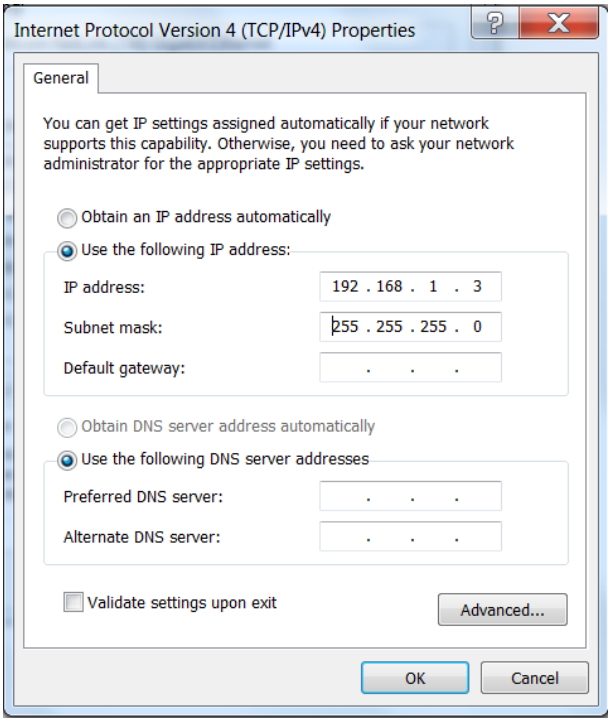
The TCW260 is shipped with the following default network settings:

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

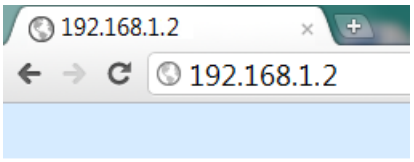
To establish communication with the TCW260, you can assign a temporary IP address to your computer. For computers running Windows OS, this can be done through the “Local Area Connection Properties”:



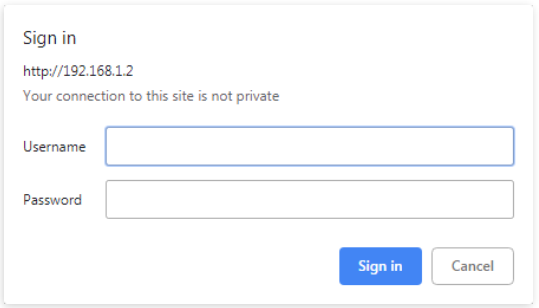

The temporary IP address should be on the same network; for example, you can use 192.168.1.3:



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. Set up concept

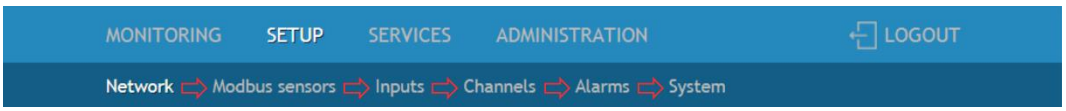
The primary setup channel for the device is the web interface, which is recommended for use, as it provides access to more settings than are available through SNMP and HTTP API commands.

The device setup begins with configuring the network settings. Next, the primary parameters—such as Modbus RTU sensors/registers, analog inputs, and digital inputs—are set.

Channels are created from the configured primary parameters. Each channel can combine up to two primary parameters and constants using mathematical operations; however, a channel can also be formed by a single primary parameter.

Once all channels are configured, alarms can be set up. It's important to note that alarms operate with channels, not with primary parameters. Each alarm can have up to two conditions, which may involve different channels. While alarms are independent of channels, they can also be assigned to a specific channel.

In summary, the correct setup should follow this order:




Once all previous settings are configured correctly, the desired services—such as the data logger, SNMP, HTTP API, etc.—can be activated.

## 8. Web interface

The web interface facilitates configuration and monitoring tasks, with all pages encoded in UTF-8. The controller accommodates multiple active sessions, and for the web interface, the device is compatible with both HTTP and HTTPS.

## 8.1. Monitoring

This section displays the status of all channels and alarms – textually and graphically.

The pages “Channels” and “Alarms” are automatically refreshed on an interval of 0 to 253 seconds. Zero means no automatic refresh. This parameter is set in section “Setup-System- Refresh of channels and alarms pages”. By default, the refresh interval is 1 second.

### 8.1.1. Channels

This page displays the status of all monitored channels – their values and alarm status. The information is updated on the refresh interval.

| Channels | Description | Value | Unit | Status |
|---|---|---|---|---|
| 1 | Temperature | 25.876 | °C | Warning |
| 2 | Humidity | 45.967 | RH | Normal |
| 3 | Digital Input 1 | OPEN | | Critical |
| 5 | V05-Voltage | 229.877 | V | Minor |
| 6 | V06-Current | 4.006 | A | Normal |
| 7 | V07-Energy | 6122.271 | kWh | |

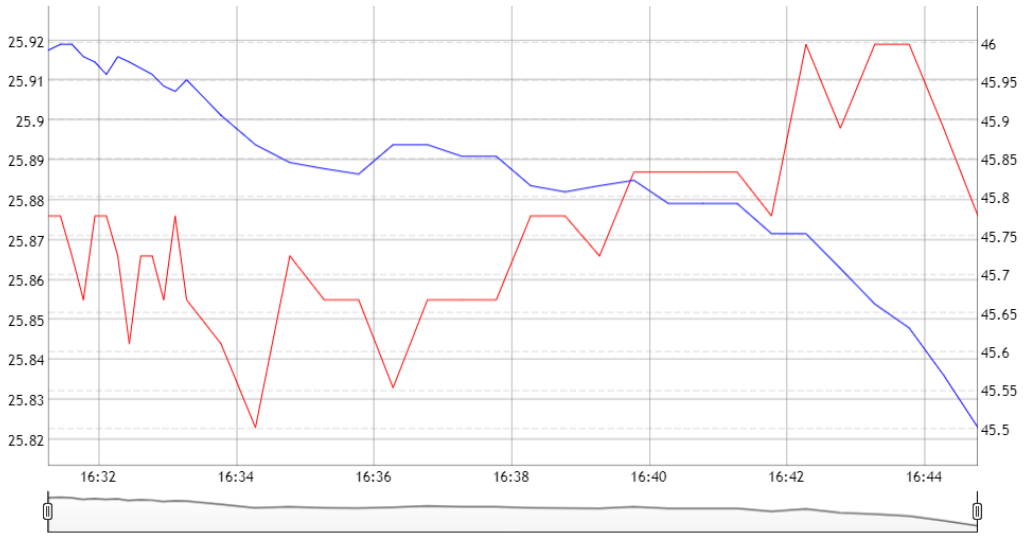
### 8.1.2. Alarms

This page displays the status of all alarms. The information is updated on the refresh interval.

| Alarms | Description | Status |
|---|---|---|
| 1 | AL01-Temp. | Warning |
| 2 | AL02 | Minor |
| 3 | AL03 | Normal |
| 4 | AL04-DI1 | Critical |
| 5 | AL05-Humidity | Normal |

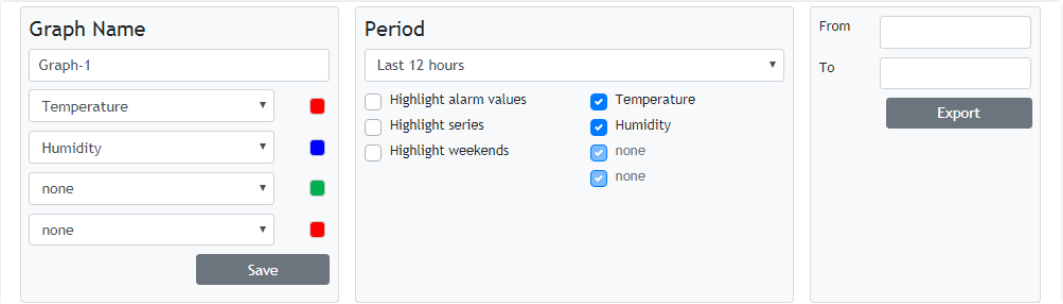
### 8.1.3. Graphs

All channels together with their alarm statuses can be monitored graphically in tabs Graph-1 to Graph-6. Every graph supports up to 4 channels with up to 2 different dimensions. The curve’s color for every channel is selectable. The alarms status colors are fixed. There are a few checkboxes for display modification.




Graphs show information from the past, so it is mandatory that the logger is active.

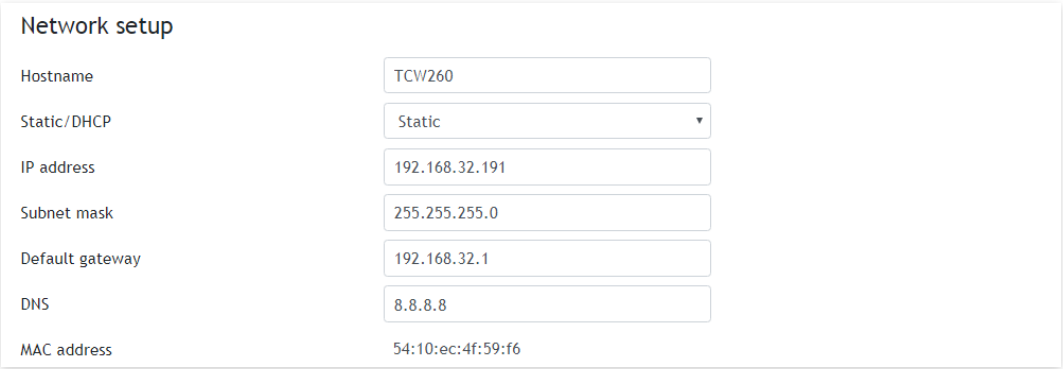
It is important to know that the information on graphs is static, it is not updated whit the newest values. If you want to see the last information, the page should be reloaded. The information can be exported in CSV file.




## 8.2. Setup

### 8.2.1. Network

The network parameters can be set on this page.




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.

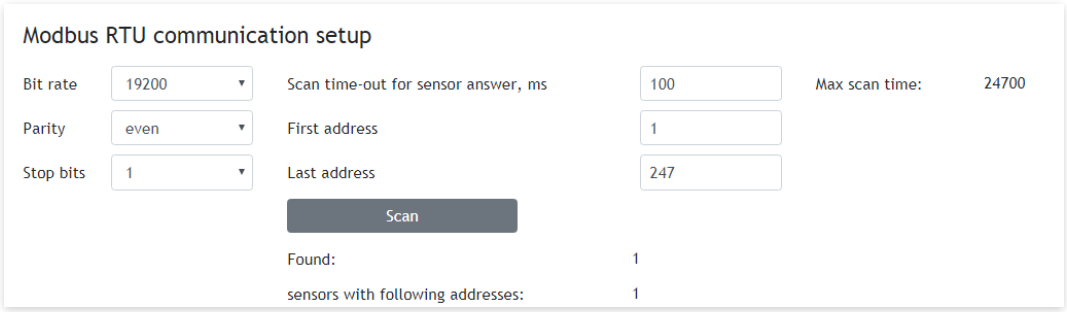
### 8.2.2. Modbus sensors

#### 8.2.2.1. Modbus RTU communication setup

This section allows you to set the communication parameters of the RS-485 interface – bit rate, parity, and a number of stop bits. By default, the settings are 19200, even parity, and 1 stop bit. It is mandatory that all sensors on the bus use the same bit rate, parity, and a number of stop bits. Before to add any sensor to the interface its parameters should be set up properly.

In the right part of the section, there is a tool which scans the bus and reports the number of the found sensor together with their addresses. It is very useful at a time when you add new sensors. It is recommended to use a small address segment to speed up the scan process.

Playing with “Scan time-out for sensor answer” it is possible to find this parameter for an unknown sensor. The test starts with a large time-out (for example 500ms) and gradually decreases the time until the sensor stops responding. In order for the operation sustainability, the found time should be increased with for example 20%.

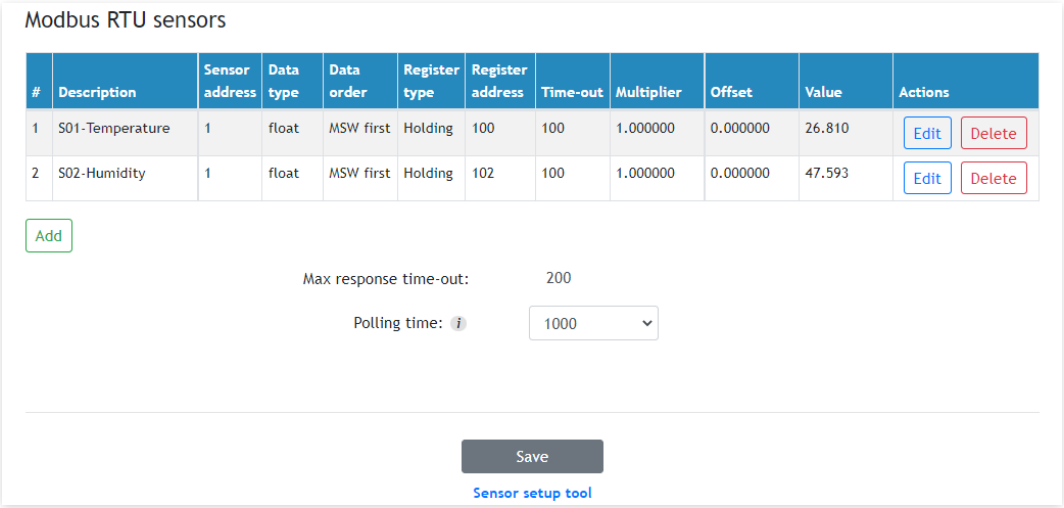



### 8.2.2.2. Modbus RTU sensors

This section allows you to add, delete or edit Modbus RTU sensors/registers. All they are primary parameters and can be used in forming of channels.

It is recommended to add sensors/registers one by one using the scan tool described in 8.2.2.1.

Up to 24 sensors/registers can be added. All they are shown in the table.




According to MODBUS convention, possible addresses for sensors are in the range from 1 to 247.

The Multiplier and offset works as follows:

Value = (Raw_Value * Multiplier) + Offset.

If you want to see the raw value of the sensor/register set Multiplier=1 and Offset=0.

During operation, all sensors are polled consecutively. The controller expects an answer in "response time-out". If the sensor does not respond for that time, the controller addresses the next sensor. If the same sensor does not respond in series 3 times, the device assumes that it is not present in the system but continues to polls it.

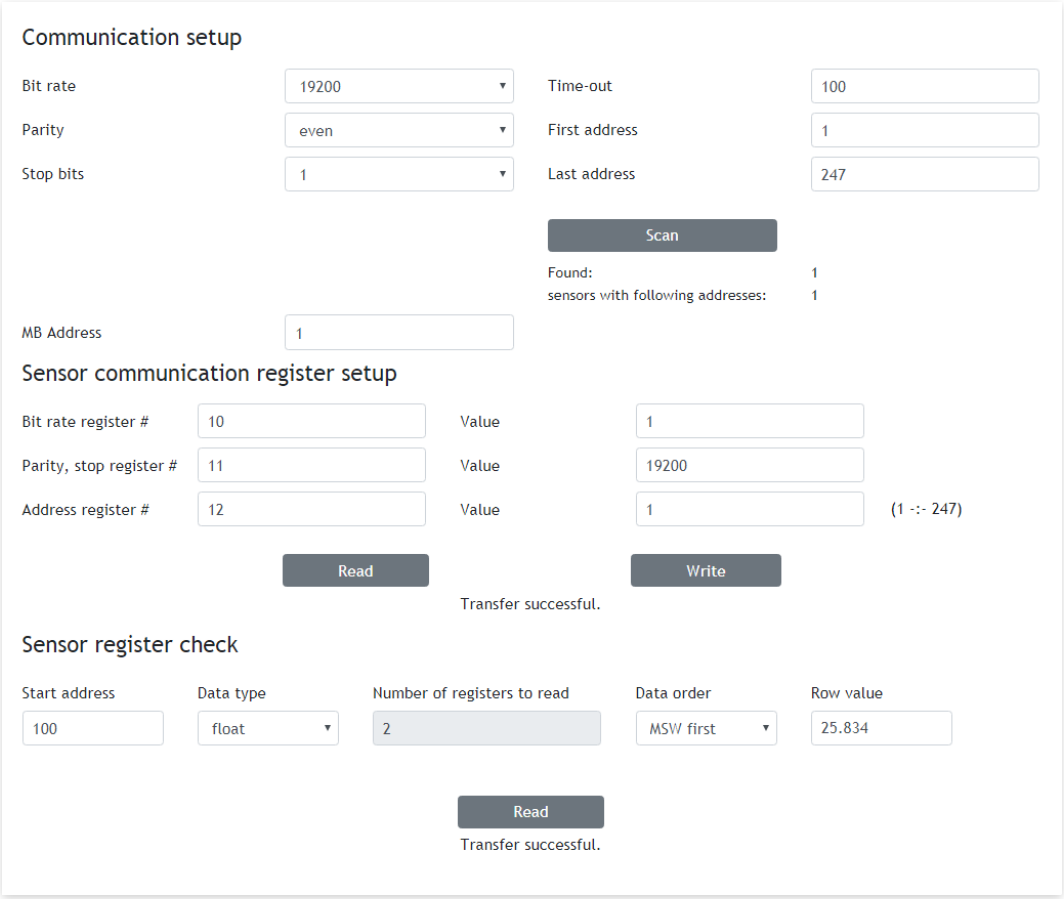
According to the above paragraph, special attention should be paid for response time-out. On the one hand, the time-out should be large enough for the sensor to respond, but on the other hand, the sum of all sensor time-outs forms the "maximum response time-out" of the whole system. The "maximum response time-out" determines the response of the system.

For the sustainable system operation, polling of every sensor is made at a fixed time - "Polling time". It is user selectable and can be 1, 2, 3, 4, 5, 10, 15, 30, 60, 120 and 180 seconds. By default, it is 1 second.

It is mandatory that "Polling time" ≥ "Maximum response time-out".

### 8.2.2.3. Sensor setup tool

The device has also a simple but useful tool for configuration and control of Modbus RTU devices. It can change the addresses and communication parameters of sensors from different manufacturers.

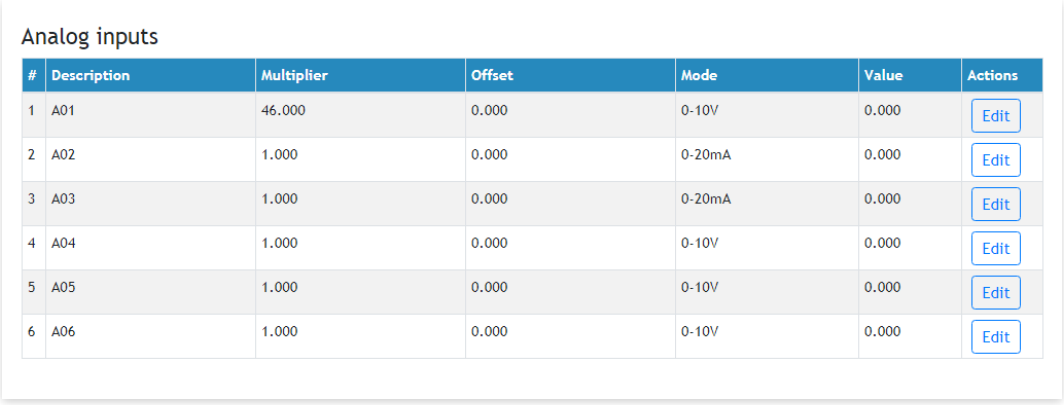



## 8.2.3. Inputs

This page is used for parameterization of analog and digital inputs.

### 8.2.3.1. Analog inputs

TCW260 has 6 analog inputs. All they are isolated from the power supply but use the same ground. Every analog input can work in voltage (0-10V) or current loop mode (0-20mA).




For every analog input, the "Unit" "Multiplier" and "Offset" fields are available to convert the raw voltage or current into meaningful engineering units.

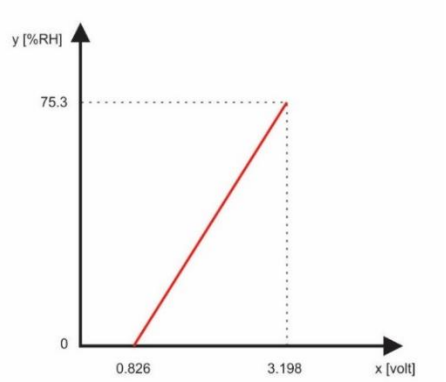
By default and after “Factory default settings” procedure: Multiplier=1.00, Offset=0.00 and Mode=0-10V.

The scaled value is calculated using the following formula:

SV = RV * MU + OF
Where:
SV – scaled (displayed) value;
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 * MU + OF, we can solve for the offset:

OF = SV - (RV * MU)

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

OF = 0 - (0.826 * 31.745) = 0 - 26.22 = -26.22

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

OF = 75.3 - (3.198 * 31.745) = 75.3 - 101.52 = -26.22

Final formula

Thus, the formula for this sensor become:

SV = RV * 31.745 - 26.22

Verification

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

SV = 0.826 * 31.745 - 26.22 = 26.22 - 26.22 = 0 %RH

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

### 8.2.3.2. Digital inputs

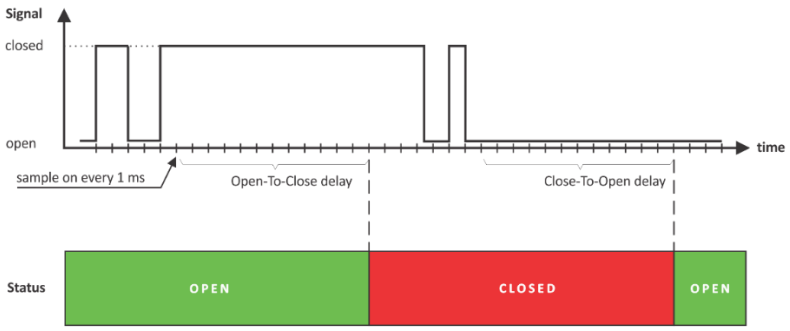
The TCW260 features four digital inputs, all of which are isolated from the power supply but share a common ground. Each digital input can operate in either OPEN/CLOSE mode or COUNTER mode. In COUNTER mode, counting can be configured to occur on rising edges, falling edges, or both.

Additionally, the COUNTER mode allows for the setup of an initial counter value.

Digital inputs

| # | Description | Closed state | Open state | C/O delay | O/C delay | Mode | Value | Actions |
|---|---|---|---|---|---|---|---|---|
| 1 | D1 | CLOSED | OPEN | 5 | 5 | Discrete(Open/Closed) | OPEN | Edit |
| 2 | D2 | CLOSED | OPEN | 5 | 5 | Counter(Rising edge) | 10158 | Edit |
| 3 | D3 | CLOSED | OPEN | 5 | 5 | Counter(Falling edge) | 11 | Edit |
| 4 | D4 | CLOSED | OPEN | 5 | 5 | Counter(Both edges) | 16 | Edit |

There are two configurable delays: Open-to-Close and Close-to-Open, each ranging from 5 to 60,000 milliseconds. These delays can be utilized for additional digital filtering and are applicable in both modes.




In the picture above, the Open-to-Close and Close-to-Open delays are both set to 13 milliseconds.

## 8.2.4. Channels

This section allows you to add, delete, or edit channels. All channels can be monitored on the monitoring pages, and their values can be recorded periodically by the data logger. Up to 24 channels can be configured.

| # | Description | Parameter 1 | OP 1 | Parameter 2 | OP 2 | Coefficient 1 | OP3 | Coefficient 2 | Units | Cumulative | Actions |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Temperature | S01-Temperature | | | | | | | °C | | Edit Delete |
| 2 | Humidity | S02-Humidity | | | | | | | RH | | Edit Delete |
| 3 | Digital Input 1 | D1 | | | | | | | | | Edit Delete |
| 5 | V05-Voltage | A01 | | | | | | | V | | Edit Delete |
| 6 | V06-Current | A02 | | | | | | | A | | Edit Delete |
| 7 | V07-Energy | A01 | * | A02 | * | 1.000 | + | 0.000 | kWh | ✓ | Edit Delete |

Create

There are three types of channels:

- Discrete: Formed by a single digital input in OPEN/CLOSE mode.
- General: Formed by up to two primary parameters and constants.
- Cumulative: Similar to a general channel but with cumulative values over time. Cumulative channels are typically used for monitoring energy, volume, etc., and allow for the configuration of an initial value.

It's important to note that for both general and cumulative channels, the sequence of operations is OP1, followed by OP2, and finally OP3.

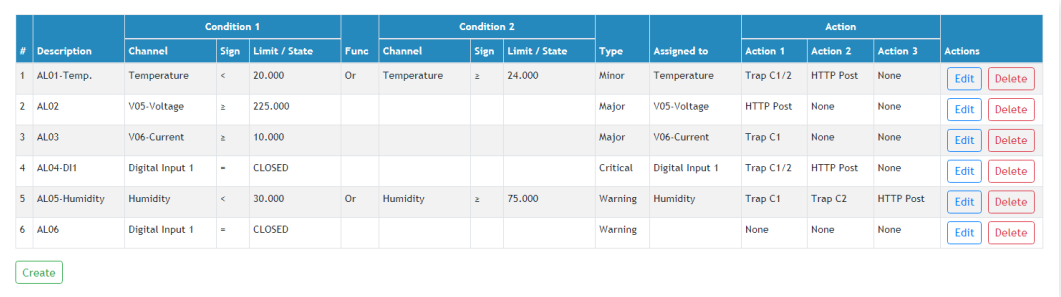
A digital input in OPEN/CLOSE mode can also be used to create a general or cumulative channel. In this case, the values for operations are 0 (for CLOSE) and 1 (for OPEN). This setup is particularly useful if you want to stop the integration for a cumulative channel using an external signal.

### 8.2.5. Alarms

This section allows you to add, delete, or edit alarms, with a maximum of 24 alarms available for configuration.

There are four types of alarms: Warning, Minor, Major, and Critical. Alarms can only be formed using channels. While alarms are independent, they can be assigned to any channel, with no restrictions on which channel can receive the alarm.

Each alarm can utilize up to two conditions, which can be logically combined using the operators AND and OR. It is not mandatory for both conditions to use the same channel; conditions from different channels can be combined within a single alarm.



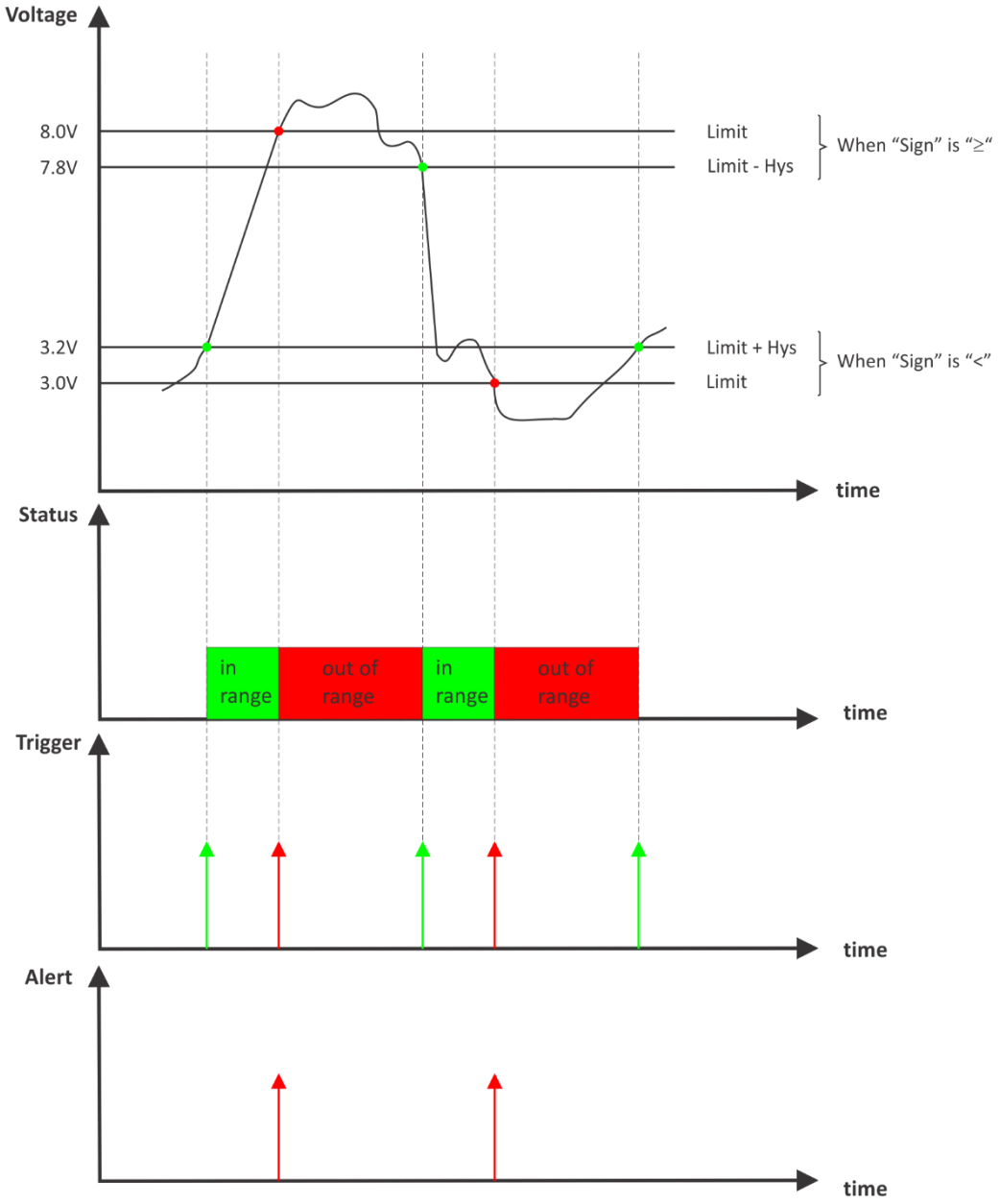
| # | Description | Condition 1 | | | Func | Condition 2 | | | Type | Assigned to | Action | | | Actions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Channel | Sign | Limit / State | | Channel | Sign | Limit / State | | | Action 1 | Action 2 | Action 3 | |
| 1 | AL01-Temp. | Temperature | < | 20.000 | Or | Temperature | ≥ | 24.000 | Minor | Temperature | Trap C1/2 | HTTP Post | None | Edit Delete |
| 2 | AL02 | V05-Voltage | ≥ | 225.000 | | | | | Major | V05-Voltage | HTTP Post | None | None | Edit Delete |
| 3 | AL03 | V06-Current | ≥ | 10.000 | | | | | Major | V06-Current | Trap C1 | None | None | Edit Delete |
| 4 | AL04-DI1 | Digital Input 1 | = | CLOSED | | | | | Critical | Digital Input 1 | Trap C1/2 | HTTP Post | None | Edit Delete |
| 5 | AL05-Humidity | Humidity | < | 30.000 | Or | Humidity | ≥ | 75.000 | Warning | Humidity | Trap C1 | Trap C2 | HTTP Post | Edit Delete |
| 6 | AL06 | Digital Input 1 | = | CLOSED | | | | | Warning | | None | None | None | Edit Delete |

Create

The “Limit” indicates the boundary of the working range for the monitored channel. A trigger condition occurs when the value exceeds the limit (“Sign” is “≥”) or falls below the limit (“Sign” is “<”). In both scenarios, the monitored parameter goes out of range.

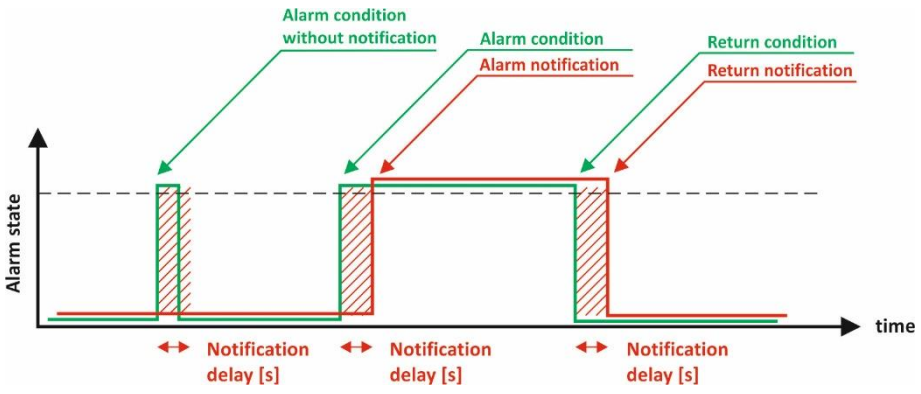
Returning to the acceptable range for the observed channel is considered when the value exceeds the Limit + Hysteresis (“Sign” is “<”) or falls below the Limit – Hysteresis (“Sign” is “≥”). Hysteresis is employed to prevent excessive triggering when the value fluctuates around the trigger point.

It is strongly recommended not to set Hysteresis to 0.0.



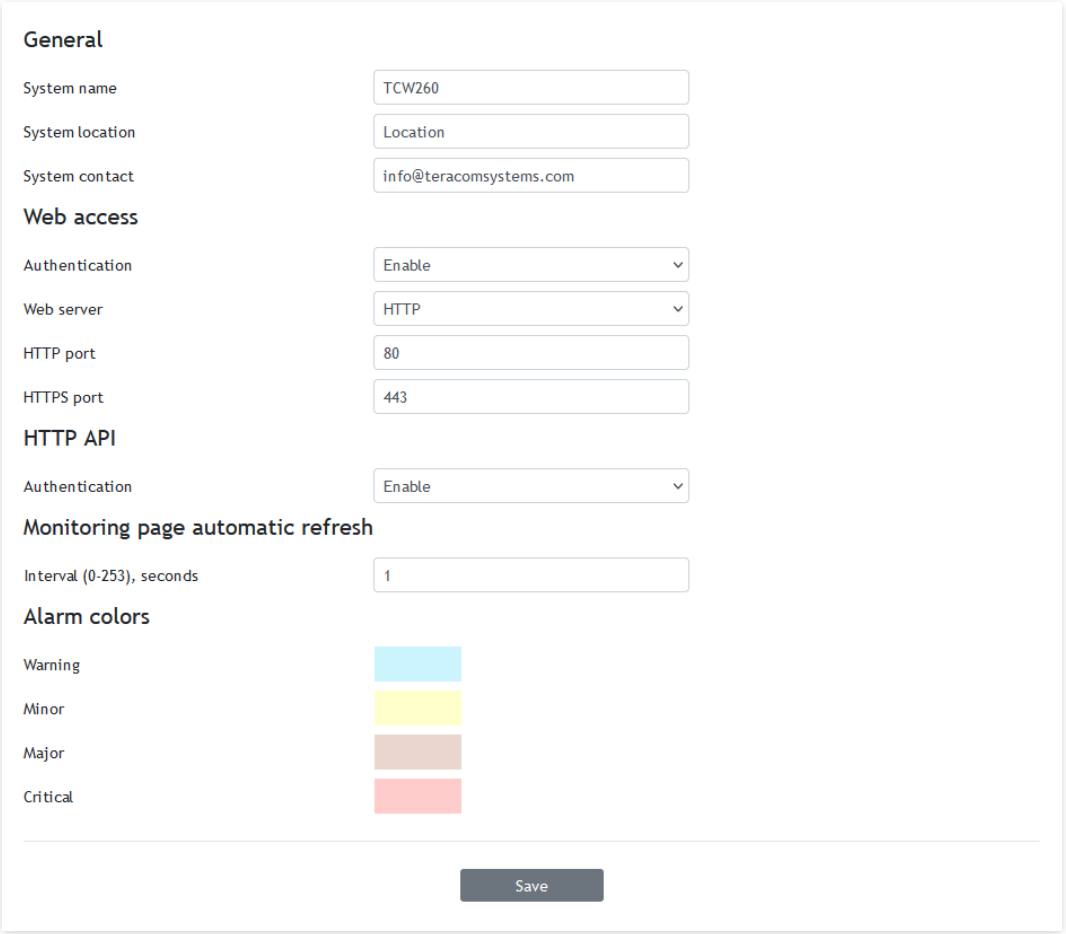

For each alarm, the "Return Notification" option is available. When this option is selected, a notification will also be sent when the parameter returns to the acceptable range.

Additionally, each alarm has a "Notification Delay" parameter, which serves as a useful filter for brief alarm conditions.



### 8.2.6. System

This page allows you to configure various general system parameters.




The system name, system location, and system contact information are used for device identification and are presented in SNMPv3 and XML/JSON status files.

By default, web access authentication is enabled with the credentials admin/admin. The web server typically operates over the HTTP protocol through port 80, which is customizable. This flexibility is particularly useful for routers that do not support separate outside/inside ports for port forwarding.

To enhance security, the web server can transition to HTTPS, defaulting to port 443, also customizable. The implementation of HTTPS utilizes TLS 1.0, TLS 1.1, and TLS 1.2, with RSA serving as the key exchange, agreement, and authentication mechanism.

It's important to note that the TCW260 uses a self-signed certificate for HTTPS, which may trigger a "Your connection is not private" warning in some web browsers. Additionally, the TCW260 operates with limited resources, meaning that running in HTTPS mode may be slower than in HTTP mode. For optimal performance in HTTPS mode, we recommend using Firefox due to its lower resource requirements compared to other browsers.

HTTP API access authentication is also enabled by default, with the same credentials as web access. The controller supports two types of authentication; further details can be found in the explanation for the HTTP API below.

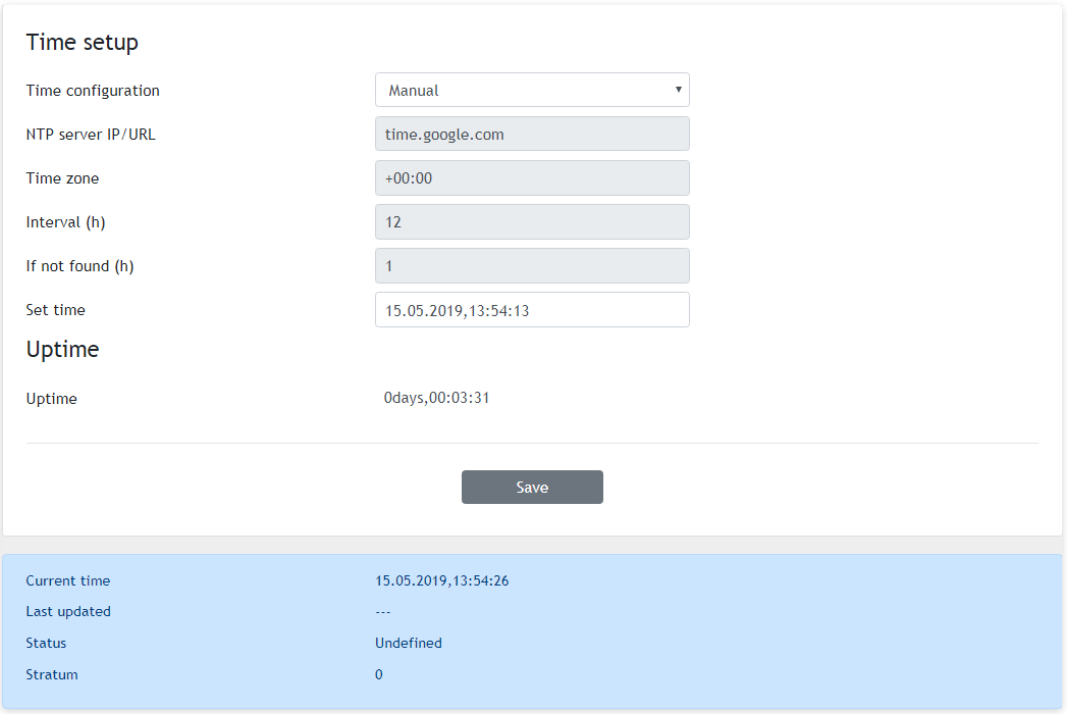
The refresh interval can be set between 0 and 253 seconds, where a setting of zero means no automatic refresh.

Alarm colors are fixed and provided here for informational purposes only.

## 8.3. Services

### 8.3.1. NTP

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



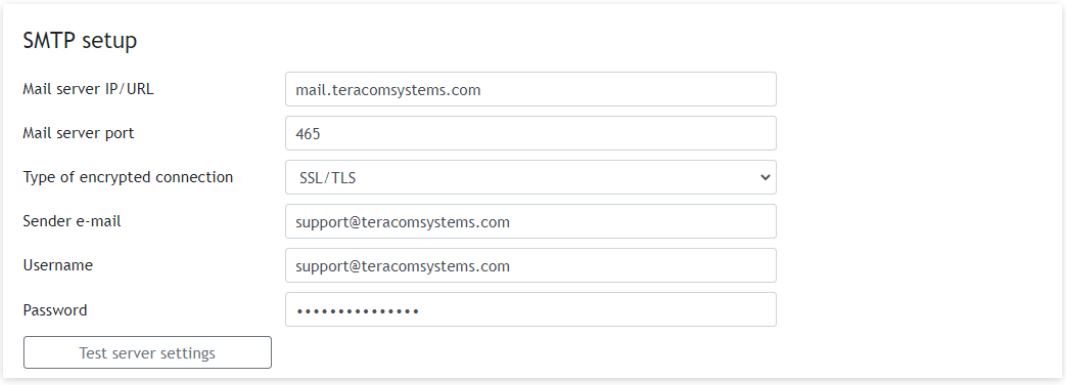

For automatic clock synchronization, the controller supports NTP (Network Time Protocol), and all necessary parameters for this synchronization are available in this section.

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.

### 8.3.2. SMTP

This page is used to enter valid SMTP settings for email alerts and recipients' addresses.

#### 8.3.2.1. 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).

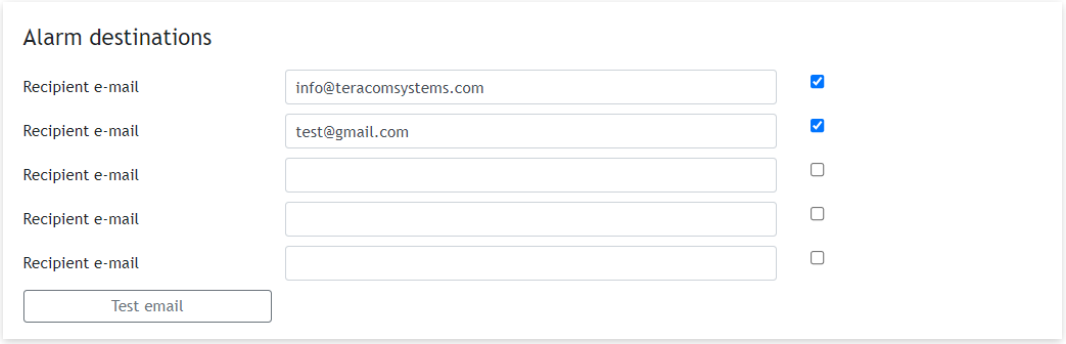
The sender's email, username, and password are standard authentication details. In the TCW260, each of these fields can accommodate up to 128 characters in length.

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 TCW260 supports TLS versions 1.0, 1.1, and 1.2, using RSA for key exchange, agreement, and authentication. STARTTLS is also supported.

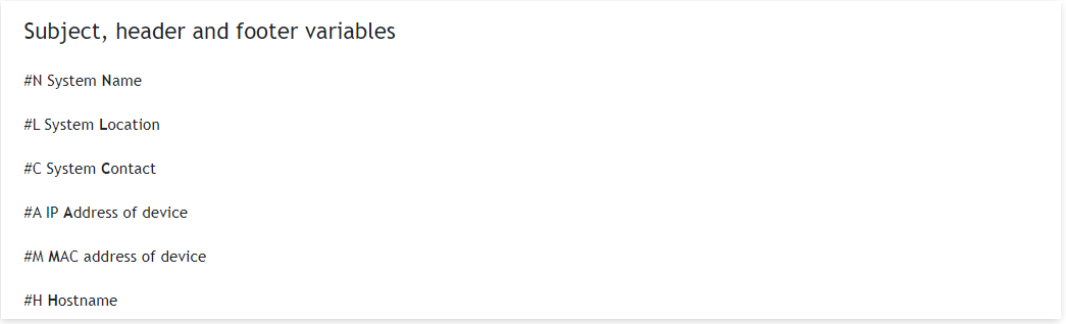
#### 8.3.2.2. Alarm destination

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




#### 8.3.2.3. 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.




### 8.3.3. SNMP

The TCW260 supports SNMPv2 and SNMPv3. The default parameters are as follows:

- SNMP: Disabled
- Port: 161
- SNMPv3: Disabled
- read community: public
- write community: private
- Security User Name: teracom
- Security Level: noAuthNoPriv
- Authentication Protocol none
- Authentication Password Trc:Auth#135
- Privacy Protocol none
- Privacy Password Trc:Priv&246

The more advanced SNMPv3 offers enhanced security management for administration, authentication, and privacy. SNMPv3 provides the following configuration options:

- No authentication and no privacy (noAuthNoPriv) - Typically used for monitoring;
- Authentication and no privacy (authNoPriv) - Usually employed for control;
- Authentication and privacy (authPriv) - Commonly used for handling sensitive data.

User-based Authentication Mechanism is based on the following:

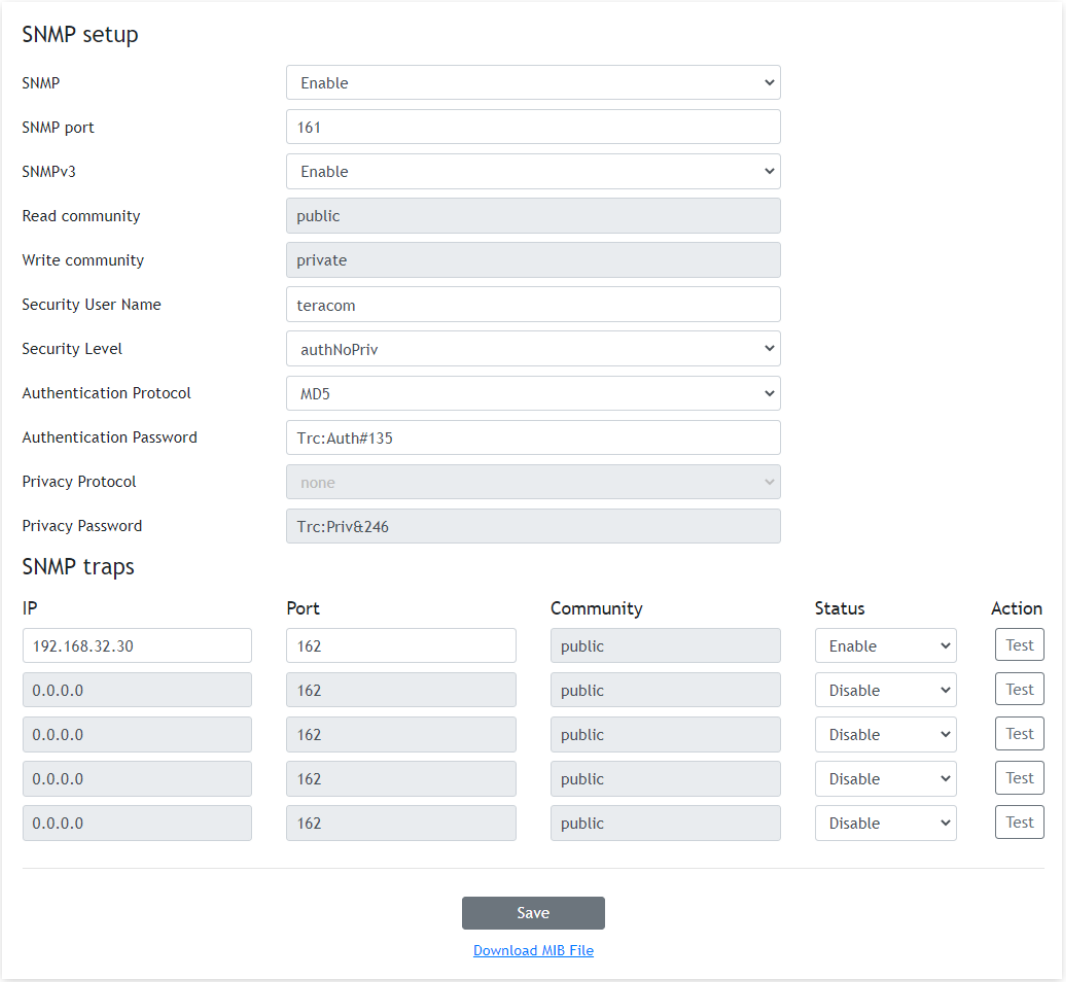
- MD5 message-digest algorithm in HMAC;
- SHA, an optional alternative algorithm;
- None authentication.

User-based Privacy Mechanism is based on the following:

- Data Encryption Standard (DES);
- Advanced Encryption Standard (AES);
- None encryption.

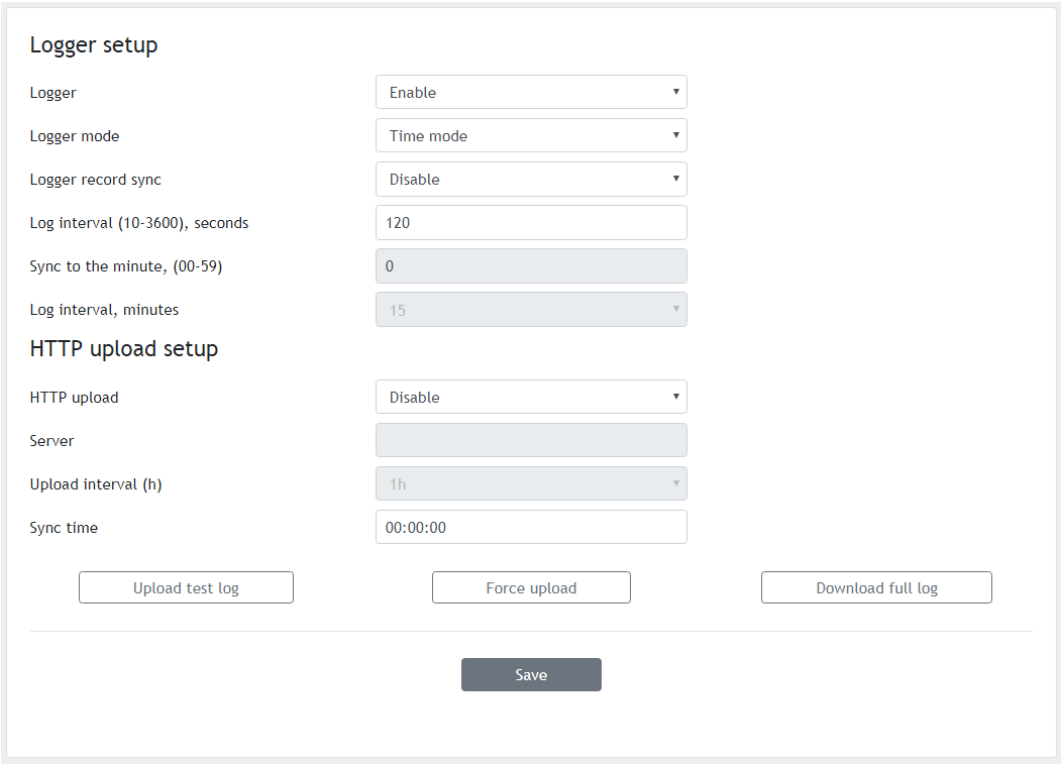
For alarm notifications, an SNMP trap can be sent to up to five independent recipients. Each trap can use a different port and community. An SNMP trap is also sent after a reset.

The current MIB file can be downloaded from the link at the bottom of the web page.



### 8.3.4. Logger

The TCW260 supports logger for all channels and alarms.




The logger operates in three modes: Time, Alarm, and Time & Alarm. Each mode defines what triggers a record to be saved in the logger's memory.

- In Time mode, records are created at regular intervals defined by the "Log Interval" setting.
- In Alarm mode, records are generated whenever an alarm condition occurs.
- In Time & Alarm mode, both conditions are used to determine when records are logged.

The log interval specifies the duration between two log entries. It's important to note that reducing the log interval increases the resolution of the data but also decreases the duration for which records can be retained.

The logger can be synchronized to a specific minute within each hour, which is particularly useful for monitoring utilities such as electricity, water, or gas meters. The log interval can be selected from a dropdown menu, allowing for values between 1 and 60 minutes. The "Sync to the Minute" field indicates which minute of each hour will be used for synchronization. While any minute can be selected, it is recommended to use the default value of 00 for optimal performance.

Example:

Current settings:

- Current time: 09:12
- Logger record sync: Enable;
- Sync to the minute: 00;
- Sync interval: 15 minutes.

With these settings, the logger will create four records per hour at HH:00, HH:15, HH:30, and HH:45.

When the device powers up, the first record will be created immediately at 09:12. Subsequent records will be logged at 09:15, 09:30, 09:45, 10:00, 10:15, and so on.

There are two methods to access the logger records:

- Download Full Log File: Use the “Download Full Log” option in the web interface;
- Periodic Upload: The last unsent records can be automatically uploaded to a designated HTTP server.

Records are uploaded in CSV file format using either the HTTP or HTTPS protocol. The HTTPS upload is secured using TLS 1.0, TLS 1.1, or TLS 1.2, with RSA used for key exchange and authentication.

The upload interval can be selected from the menu, ranging from 1 to 24 hours. If this service is enabled, ensure that the real-time clock (NTP service) is functioning correctly.

The server for uploads can be specified by either a domain name or an IP address, so be sure to configure the DNS settings properly.

The “Sync Time” setting determines the specific moment in the day when the upload period is synchronized.

Example:

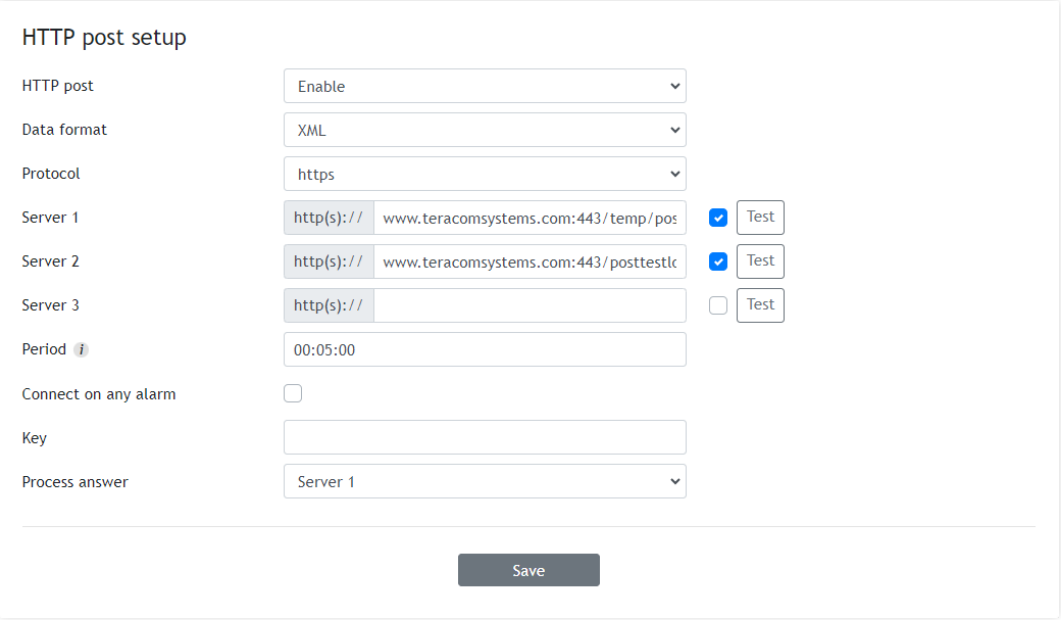
If the upload period is set to 3 hours and the sync time is 09:00, the upload schedule will be as follows: 09:00, 12:00, 15:00, 18:00, 21:00, 00:00, 03:00, and 06:00. If the current time is 19:31 and periodic upload is enabled, the first upload will occur at 21:00.

The “Force Upload” button allows you to manually initiate an upload of the recorded information between the last periodic upload and the current time.

By default, the logger is disabled. For additional information about the logger, please refer to the Data Logger section.

### 8.3.5. HTTP POST

TCW260 can periodically upload a file to a designated server using HTTP or HTTPS POST. The HTTPS connection utilizes TLS 1.0, TLS 1.1, and TLS 1.2 for secure key exchange and authentication via RSA. The posting interval can be set between 10 seconds and 14,400 seconds, and the supported file formats include XML and JSON.




HTTP/HTTPS POST requests can be sent to up to three independent servers. These servers can be addressed using either a domain name or an IP address.

The “Period” can be set between 1 minute and 48 hours and can also be changed remotely via the HTTP API. This parameter determines how frequently the control software receives up-to-date information from the TCW260, allowing it to make changes to some parameters. A shorter “Period” means closer to real-time operation; however, this also results in increased data traffic across the network.

If the checkbox “Connect on any alarm” is selected, the HTTP/HTTPS POST request will be sent during an alarm condition.

The “Key” field is user-defined; its value is sent in the XML/JSON file and can be used for device identification.

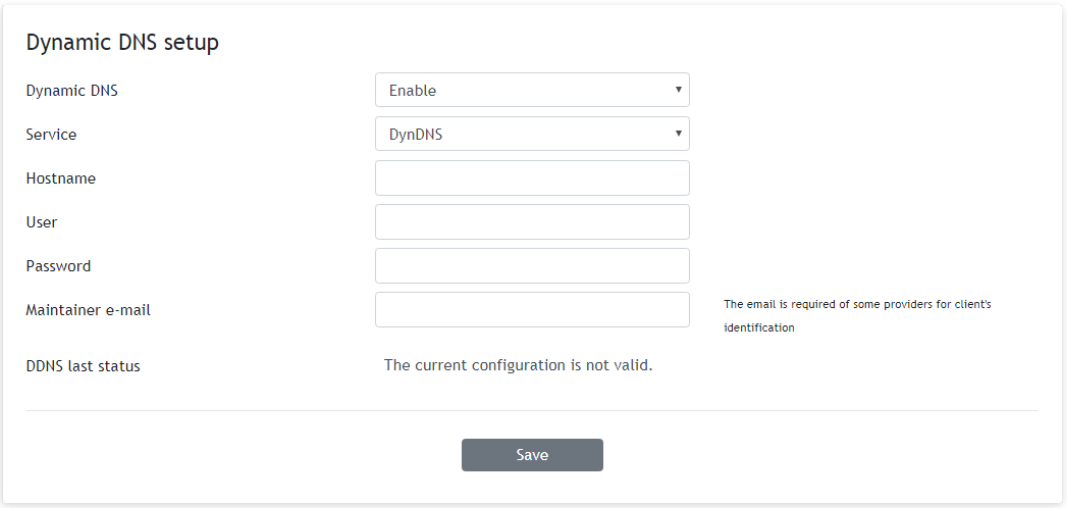
If the “Process Answer” option is enabled, the TCW260 will execute commands sent by the remote server as a response to the HTTP/HTTPS POST.

For more details about HTTP/HTTPS POST, please refer to the HTTP API section.

### 8.3.6. Dynamic DNS

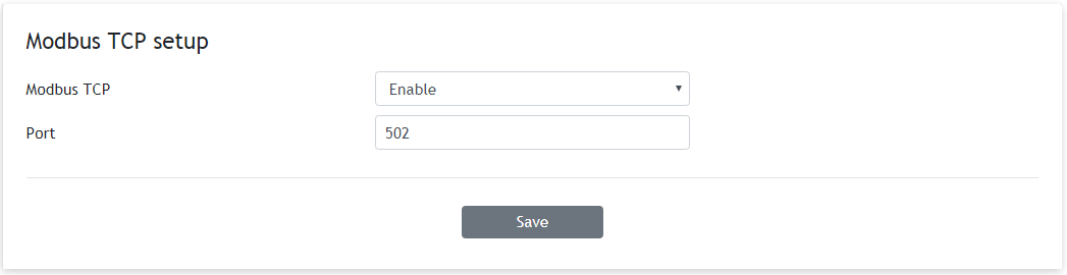
With dynamic DNS, the TCW260 can be accessed from the public Internet without the need for a broadband account with a static IP address.

TCW260 supports the following DNS services: DynDNS, No-IP, and DNS-O-Matric.




### 8.3.7. Modbus TCP/IP

TCW260 supports Modbus TCP/IP via the Ethernet interface.




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

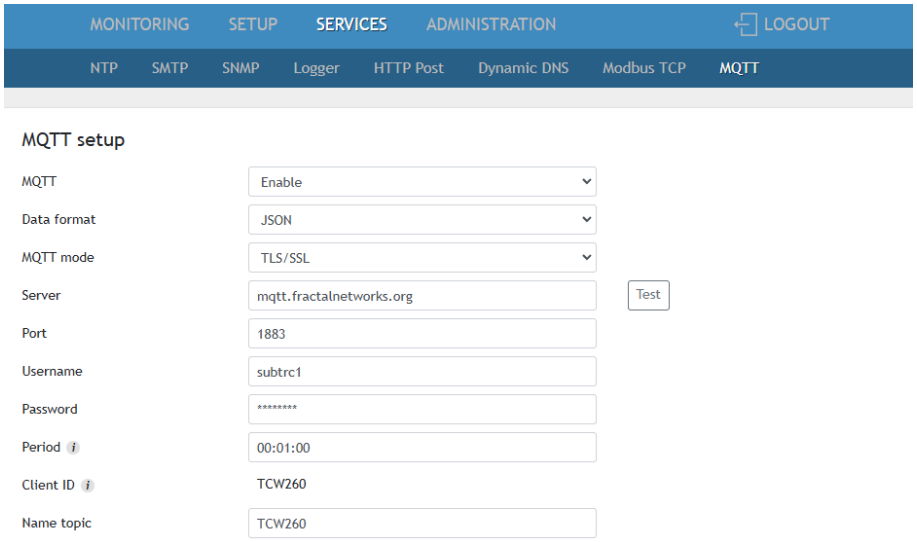
A table containing the register addresses can be found in section " Modbus TCP/IP”.

## 8.3.8. MQTT

The TCW260 supports MQTT version 3.1.1 exclusively in "Publisher" mode. This section provides the settings for configuring the MQTT protocol on the device.

### 8.3.8.1. MQTT General setup

This section allows configuration of the general parameters for MQTT operation. By default, the MQTT service is disabled. After enabling it, the controller establishes a connection with the MQTT broker, whose parameters are configured in the fields “Server”, “Port”, “Username”, and “Password”. The “Username” and “Password” fields allow up to 31 characters, while the “Server name” field supports up to 127 characters. The publishing interval ranges from 1 minute to 48 hours.



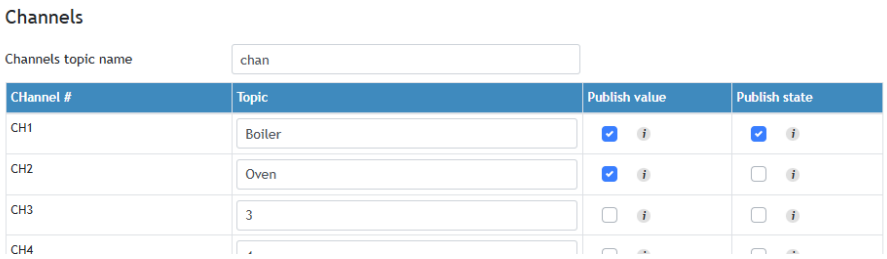

Messages can be sent to the MQTT broker in JSON or plain text format, with an option for an encrypted (TLS) or unencrypted connection.

In the "Topic name" field, the root topic is set, in which the MQTT publish service will operate.

Note: The System ID is used as the Client ID.

### 8.3.8.2. MQTT Channels topics

In this section, the publishing parameters for each channel are configured.

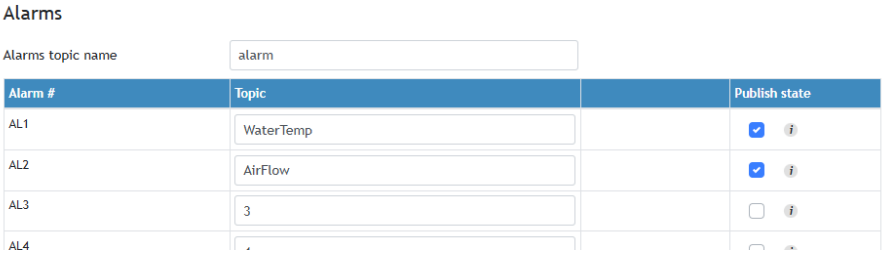



It is possible to monitor all 24 channels, with each channel's value and status available for publishing. With these settings, the exact topics for values and statuses will be:

- TCW260/chan/Boiler/value
- TCW260/chan/Boiler/state
- TCW260/chan/Oven/value

### 8.3.8.3. MQTT Alarms topics

In this section, the publishing parameters for each alarm are configured.




With these settings, the exact topics for alarm statuses will be:

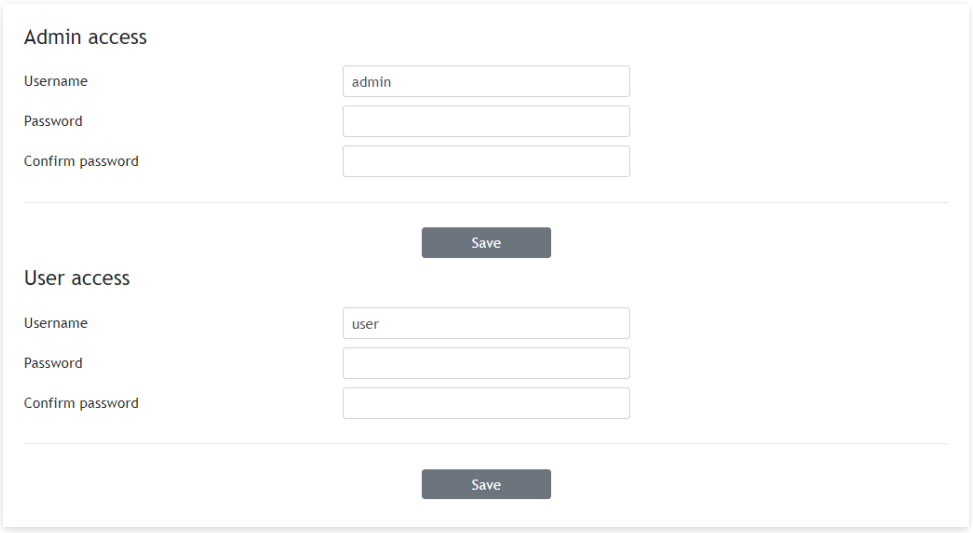
- TCW260/alarm/WaterTemp/state
- TCW260/alarm/AirFlow/state

It is possible to monitor all 24 alarms, with the status of each alarm available for publishing.

## 8.4. Administration

### 8.4.1. User/Pass

The TCW260 supports two user roles: "Admin" and "User".



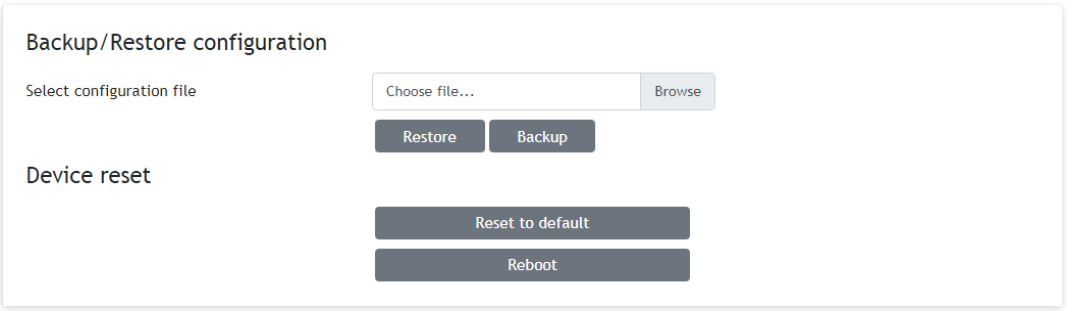

The Admin role has full administrative rights and can modify all settings.

The User role has limited access, allowing only viewing of the Monitoring page and preventing any modifications to settings.

Both usernames and passwords can be up to 31 characters in length.

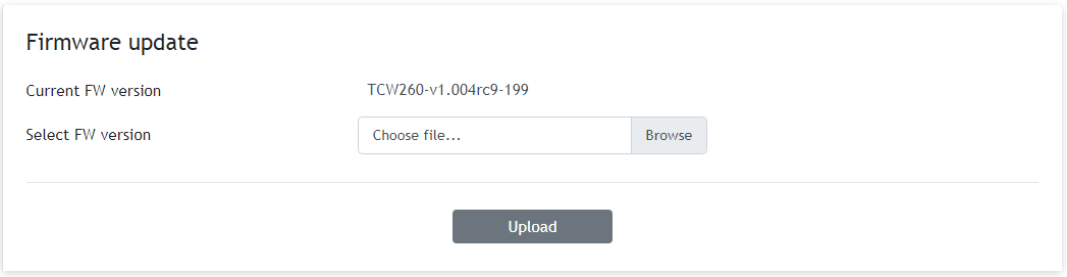
### 8.4.2. Backup/Restore

The TCW260 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.



### 8.4.3. FW update

The TCW260 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**.**

## 8.5. Logout

The TCW260 supports multi-session access; however, it is recommended to log out after completing your tasks for security and best practices.

# 9. Protocols and API

## 9.1. SNMP

The TCW260 supports SNMP (Simple Network Management Protocol), a standard protocol for managing IP network devices, enabling administrative computers (managers) to monitor and control these devices. The device can be configured and monitored using an SNMP v.2 or v.3 compatible program, with parameters organized by function. To obtain a valid OID number, replace "!" with "1.3.6.1.4.1.38783". To save configuration changes, set configurationSaved (OID !.8.6.3.0) to "1".

**product**

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| !.6.1.1.0 | name | read-only | Device name | DisplayString |
| !.6.1.2.0 | version | read-only | Firmware version | DisplayString |
| !.6.1.3.0 | date | read-only | Release date | DisplayString |

**setup -> network**

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| !.6.2.1.1.0 | deviceID | read-only | Device ID (default MAC address) | MacAddress |
| !.6.2.1.2.0 | hostName | read-only | Hostname | DisplayString (SIZE (0..38)) |
| !.6.2.1.3.0 | deviceIP | read-only | Device IP address | IpAddress |

**setup -> parameters -> mbSensors -> mbSensorsTable -> mbSensorsEntry -> msSensIndex 1 to 24**

replace “**?**“ with a number from 1 to 24 in the table below

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| !.6.2.2.1.1.1.2.?.0 | mbSenDescription.? | read-write | Sensor description | DisplayString |
| !.6.2.2.1.1.1.3.?.0 | mbSenMult.? | read-write | Sensor multiplier x1000 in Integer format | Integer32 |
| !.6.2.2.1.1.1.4.?.0 | mbSenOffset.? | read-write | Sensor offset x1000 in Integer format | Integer32 |
| !.6.2.2.1.1.1.5.?.0 | mbSenVal.? | read-only | Sensor value x1000 in Integer format | Integer32 |
| !.6.2.2.1.1.1.6.?.0 | mbSenCounter.? | read-only | Sensor as 32-bit Counter | Counter32 |

**setup -> parameters -> analogInputs -> analogInpTable -> analogInpEntry -> analogInpIndex 1 to 6**
replace "**?**" with a number from 1 to 6 in the table below

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| !.6.2.2.2.1.1.2.?.0 | analogInpDescription.? | read-write | Analog input description | DisplayString |
| !.6.2.2.2.1.1.3.?.0 | analogInpMult.? | read-write | Analog input multiplier x1000 in Integer format | Integer32 |
| !.6.2.2.2.1.1.4.?.0 | analogInpOffset.? | read-write | Analog input offset x1000 in Integer format | Integer32 |
| !.6.2.2.2.1.1.5.?.0 | analogInpMode.? | read-write | Analog input mode - 0-10V or 4-20mA | Integer32 |
| !.6.2.2.2.1.1.6.?.0 | analogInpValue.? | read-only | Analog input value x1000 in Integer format | Integer32 |

**setup -> parameters -> digitalInputs -> digitalInpTable -> digitalInpEntry -> digitalInpIndex 1 to 4**
replace "**?**" with a number from 1 to 4 in the table below

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| !.6.2.2.3.1.1.2.?.0 | digInpDescription.? | read-write | Digital Input description | DisplayString |
| !.6.2.2.3.1.1.3.?.0 | digInplowLevel.? | read-write | Digital Input closed state | DisplayString |
| !.6.2.2.3.1.1.4.?.0 | digInphighLevel.? | read-write | Digital Input open state | DisplayString |
| !.6.2.2.3.1.1.5.?.0 | digInpMode.? | read-write | Digital Input mode - Discrete or Counter | INTEGER { openclosed(0), risingEdge(1), fallingEdge(2), bothEdges(3) } |
| !.6.2.2.3.1.1.6.?.0 | digInpCloseToOpenDelay.? | read-write | Digital input Close To Open delay | Integer32(0..60000) |
| !.6.2.2.3.1.1.7.?.0 | digInpOpenToCloseDelay.? | read-write | Digital input Open To Close delay | Integer32(0..60000) |
| !.6.2.2.3.1.1.8.?.0 | digInpCounterInitValue.? | read-only | Digital input counter initial value | Integer32 |
| !.6.2.2.3.1.1.9.?.0 | digInpValue.? | read-only | Digital input value | Unsigned32 |

**monitorNcontrol -> channels -> chanTable -> chanEntry -> chIndex 1 to 24**
replace "**?**" with a number from 1 to 24 in the table below

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| !.6.3.1.1.1.2.?.0 | chType.? | read-write | Channel type | INTEGER {general(0), cumulative(1), discrete(2), counter(3)} |
| !.6.3.1.1.1.3.?.0 | chdescription.? | read-write | Channel description | DisplayString |
| !.6.3.1.1.1.4.?.0 | chParam1.? | read-write | Channel parameter 1 | INTEGER {none(0), s01(3), s02(4), s03(5), s04(6), s05(7), s06(8), s07(9), s08(10),s09(11), s10(12), s11(13), s12(14), s13(15), s14(16), s15(17), s16(18), s17(19), s18(20), s19(21), s20(22), s21(23), s22(24), s23(25), s24(26), a01(27), a02(28), a03(29), a04(30), a05(31), a06(32), d01(33), d02(34), d03(35), d04(36)} |
| !.6.3.1.1.1.5.?.0 | chOP1.? | read-write | Channel operand 1 | INTEGER{none(0), multiplication(1), division(2), sum(3), subtract(4)} |
| !.6.3.1.1.1.6.?.0 | chParam2.? | read-write | Channel parameter 2 | INTEGER {none(0), one(1), null(2), s01(3), s02(4), s03(5), s04(6), s05(7), s06(8), s07(9), s08(10),s09(11), s10(12), s11(13), s12(14), s13(15), s14(16), s15(17), s16(18), s17(19), s18(20), s19(21), s20(22), s21(23), s22(24), s23(25), s24(26),a01(27), a02(28), a03(29), a04(30), a05(31), a06(32),d01(33), d02(34), d03(35), d04(36)} |
| !.6.3.1.1.1.7.?.0 | chOP2.? | read-write | Channel operand 2 | INTEGER {none(0), multiplication(1), division(2), sum(3), subtract(4)} |
| !.6.3.1.1.1.8.?.0 | chCoef1.? | read-write | Channel coefficient 1 x1000 in Integer format | Integer32 |

| | | | | |
|---|---|---|---|---|
| !.6.3.1.1.1.9.?.0 | chOP3.? | read-write | Channel operand 3 | INTEGER {none(0), multiplication(1), division(2), sum(3), subtract(4)} |
| !.6.3.1.1.1.10.?.0 | chCoef2.? | read-write | Channel coefficient 2 x1000 in Integer format | Integer32 |
| !.6.3.1.1.1.11.?.0 | chUnit.? | read-write | Channel unit | DisplayString |
| !.6.3.1.1.1.12.?.0 | chCumulInitValue.? | read-write | Channel cumulative initial value | Integer32 |
| !.6.3.1.1.1.13.?.0 | chValue.? | read-only | Channel value x1000 in Integer format | Integer32 |
| !.6.3.1.1.1.14.?.0 | chCounter.? | read-only | Channel as 32-bit counter | Counter32 |
| !.6.3.1.1.1.15.?.0 | chAlarmStatus.? | read-only | Channel alarm status | INTEGER {undefined(0), normal(1), indeterminate(2), warning(3), minor(4), major(5), critical(6)} |

**monitorNcontrol -> alarmsTable -> alarmsEntry -> alIndex 1 to 24**

replace "**?**" with a number from 1 to 24 in the table below

| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| !.6.3.2.1.1.2.?.0 | alDescription.? | read-write | Alarm description | DisplayString |
| !.6.3.2.1.1.3.?.0 | alCond1Channel.? | read-write | Alarm condition 1 channel | INTEGER {none(0), v01(1), v02(2), v03(3), v04(4), v05(5), v06(6), v07(7), v08(8), v09(9), v10(10), v11(11), v12(12), v13(13), v14(14), v15(15), v16(16), v17(17), v18(18), v19(19), v20(20), v21(21), v22(22), v23(23), v24(24)} |
| !.6.3.2.1.1.4.?.0 | alCond1Operand.? | read-write | Alarm condition 1 operand | INTEGER{larger(1), less(2)} |
| !.6.3.2.1.1.5.?.0 | alCond1Limit.? | read-write | Alarm condition 1 limit x1000 in Integer format | Integer32 |
| !.6.3.2.1.1.6.?.0 | alCond1Hys.? | read-write | Alarm condition 1 hysteresis x1000 in Integer format | Integer32 |
| !.6.3.2.1.1.7.?.0 | alCond1AlarmState.? | read-write | Alarm condition 1 discrete alarm state | INTEGER {open(0), closed(1)} |
| !.6.3.2.1.1.8.?.0 | alCondLogic.? | read-write | Alarm conditions logic | INTEGER{none(0), and(1), or(2)} |
| !.6.3.2.1.1.9.?.0 | alCond2Channel.? | read-write | Alarm condition 2 channel | INTEGER {none(0), v01(1), v02(2), v03(3), v04(4), v05(5), v06(6), v07(7), v08(8), v09(9), v10(10), v11(11), v12(12), v13(13), v14(14), v15(15), v16(16), v17(17), v18(18), v19(19), v20(20), v21(21), v22(22), v23(23), v24(24)} |
| !.6.3.2.1.1.10.?.0 | alCond2Operand.? | read-write | Alarm condition 2 operand | INTEGER{larger(1), less(2)} |
| !.6.3.2.1.1.11.?.0 | alCond2Limit.? | read-write | Alarm condition 2 limit x1000 in Integer format | Integer32 |
| !.6.3.2.1.1.12.?.0 | alCond2Hys.? | read-write | Alarm condition 2 hysteresis x1000 in Integer format | Integer32 |
| !.6.3.2.1.1.13.?.0 | alCond2AlarmState.? | read-write | Alarm condition 2 discrete alarm state | INTEGER {open(0), closed(1)} |
| !.6.3.2.1.1.14.?.0 | alType.? | read-write | Alarm type | INTEGER {warning(3), minor(4), major(5), critical(6)} |
| !.6.3.2.1.1.15.?.0 | alAssigned.? | read-write | Alarm assigned to | INTEGER {none(0), v01(1), v02(2), v03(3), v04(4), v05(5), v06(6), v07(7), v08(8),v09(9), v10(10), v11(11), v12(12), v13(13), v14(14), v15(15), v16(16),v17(17), v18(18), v19(19), |

| | | | | |
|---|---|---|---|---|
| | | | | v20(20), v21(21), v22(22), v23(23), v24(24)} |
| !.6.3.2.1.1.16.?.0 | alActionDelay.? | read-write | Alarm action delay | Integer32 |
| !.6.3.2.1.1.17.?.0 | alActionOnReturn.? | read-write | Alarm action on return | INTEGER {no(0), yes(1)} |
| !.6.3.2.1.1.18.?.0 | alAction1.? | read-write | Alarm action 1 | INTEGER {none(0), trapcond1(1), trapcond2(2), trapcond1and2(3), postiostate(4) , mqttpublish(6)} |
| !.6.3.2.1.1.19.?.0 | alAction2.? | read-write | Alarm action 2 | INTEGER {none(0), trapcond1(1), trapcond2(2), trapcond1and2(3), postiostate(4), mqttpublish(6)} |

| | | | | |
|---|---|---|---|---|
| !.6.3.2.1.1.20.?.0 | alAction3.? | read-write | Alarm action 3 | INTEGER {none(0), trapcond1(1), trapcond2(2), trapcond1and2(3), postiostate(4) , mqttpublish(6)} |
| !.6.3.2.1.1.21.?.0 | alStatus.? | read-write | Alarm status | INTEGER {undefined(0), normal(1), indeterminate(2), warning(3), minor(4), major(5), critical(6)} |

**monitorNcontrol**

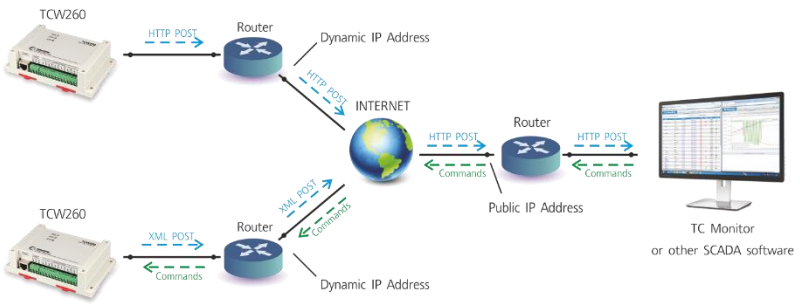
| OID | Name | Access | Description | Syntax |
|---|---|---|---|---|
| !.6.3.3.0 | configurationSaved | read-write | Configuration save status SAVED/UNSAVED | INTEGER { unsaved(0), saved(1) } |
| !.6.3.4.0 | restartDevice | read-write | Restart Device | INTEGER { cancel(0), restart(1) } |
| !.6.3.5.0 | hardwareErr | read-only | Hardware Error | INTEGER { noErr(0), hwErr(1) } |

## 9.2. HTTP API

### 9.2.1. HTTP POST

TCW260 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 9.2.3 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 TCW260 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 20190420103318_status.xml.

### 9.2.2. HTTP/HTTPS GET

HTTP/HTTPS GET can be utilized to monitor the TCW260 by retrieving XML or JSON files. The format for accessing the status is as follows:

http(s)://device.ip.address/status.xml

http(s)://device.ip.address/status.json

For further details regarding the structure of these files, refer to Appendix A XML file structure and Appendix B JSON file structure.

HTTP/HTTPS GET requests can be sent at any time to the TCW260 if it is on the same network or has appropriate routing.

If there is no direct access to the device, an HTTP/HTTPS GET can be sent immediately after receiving an HTTP/HTTPS POST from the same device.

#### 9.2.2.1. Commands

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

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

Where:

yyy is the command;

xxx is the parameter.

Example:

To set the POST period to 300 seconds, the following command can be used

http(s)://device.ip.address/status.xml?pper=300

#### 9.2.2.2. HTTP/HTTPS GET authentication

If HTTP/HTTPS 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(s)://device.ip.address/status.xml?a=uuuu:pppp |
| disabled | http(s)://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(s)://device.ip.address/status.xml?a=admin:admin&pper=120

### 9.2.3. List of HTTP API commands

| Command | Description |
|---|---|
| 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 |
| purl1=yyy | URL for HTTP POST to Server 1, where yyy is a full path to php file. Example: purl=212.25.45.120:30181/xampp/test/posttest1.php |
| purl2=yyy | URL for HTTP POST to Server 1, where yyy is a full path to php file. Example: purl=212.25.45.120:30181/xampp/test/posttest2.php |
| purl3=yyy | URL for HTTP POST to Server 1, where yyy is a full path to php file. Example: purl=212.25.45.120:30181/xampp/test/posttest3.php |
| pper=x | HTTP POST period in seconds (x is between 10 and 14400) |
| dk=xxx | HTTP POST key – xxx is up to 17 characters |
| mdata=x | Data format JSON/Plain text for MQTT Publish – 0 JSON, 1 Plain text |
| mmode=x | Publish protocol, where x is 0 for unsecure and 1 for TLS/SSL |
| muser=xxxx | Username authentication for MQTT, where xxxx is a username |
| mpass=xxxx | Password authentication for MQTT, where xxxx is a password |
| murl=yyy | URL for MQTT publish, where yyy is a path murl=212.25.45.120 |
| mport=yyyy | Port for MQTT publish, where yyyy is a port mport=1883 |

| | |
|---|---|
| mper=x | MQTT publish period in seconds<br>(x is between 60 and 172800)<br>mper=600 – will set MQTT publish period to 600 seconds |
| save | Save all previous changes (except relays' one) in theFLASH 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) |

## 9.3. 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.

### 9.3.1. Codes and answers

#### 9.3.1.1. Read Discrete Inputs (FC=02)

Request
This command is requesting the content of 4 discrete inputs

**02 0064 0004**
02: The Function Code 2 (read Discrete Inputs)
0064: The Data Address of the first register requested (0064 hex = 100)
0004: The total number of discrete inputs requested

Response
**02 01 0C**
02: The Function Code 2 (read Discrete Inputs)
01: The number of data bytes to follow
0C: Inputs status (0x0000 1100)
In the example above, the value of DI4=1, DI3=1, DI2=0, DI1=0.

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

Request
This command is requesting the content of holding registers 19300 – Channel 1 value.
**03 4B64 0002**
03: The Function Code 3 (read Holding Registers)
4B64: The Data Address of the first register requested (4B64 hex = 19300)
0002: The total number of registers requested (read 2 registers each 2 bytes = 4 bytes)

Response

**03 04 41DD 4210**

03: The Function Code 3 (read Channel 1 Holding Registers)
04: The number of data bytes to follow (2 registers x 2 bytes each = 4 bytes)
41DD 4210: 4 bytes value
All holding registers with float value are sent in big-endian.
In the example above, the value of 27.6572571 is sent.

Request

This command is requesting the content of holding registers 18100 – Channel 1 description.

**03 46B4 0008**

03: The Function Code 3 (read Holding Registers)
46B4: The Data Address of the first register requested (46B4 hex = 18100)
0008: The total number of registers requested (read 8 registers each 2 bytes = 16 bytes)

Response

**03 10 54 65 6D 70 65 72 61 74 75 72 65 00 00 00 00 00**

03: The Function Code 3 (read Analog Output Holding Registers)
10: The number of data bytes to follow (8 registers x 2 bytes each = 16 bytes)
54 65 6D 70 65 72 61 74 75 72 65 00 00 00 00 00: 16 bytes value
All holding registers with strings are sent in big-endian.
The answer is padded with 0.
In the example above, the string “Temperature” is sent.

#### 9.3.1.3. Write Single Register (FC=06)

Request

This command is  write value in a single register with address 18300 – Channel 1 parameter 1, where s01(sensor 1) is selected.

**06 477C 0003**

06: The Function Code 6 (write Single register)
477C: The Data Address of the register (477C hex = 18300)
0003: The value to be write – 3(s01).

Response

**06 477C 0003**

06: The Function Code 6 (write Single register)
477C: The Data Address of the register (477C hex = 18300)
0003: The value to be write – 3(s01).

#### 9.3.1.4. Write Multiple Registers (FC=16)

Request

This command is  write a value in contiguous registers starting at address 18300 – Channel 1 parameter 1 and Channel 2 parameter 1.

**10 477C 0002 04 0003 0004**

10: The Function Code 16(10 hex)
477C: Starting Address of the firsrt register(477C hex = 18300)
0002: Quantity of registers
04: Byte count
0003: The value to be write 3(s01) in first register, address 18300
0004: The value to be write 4(s02) in second register, address 18301

Response
**10 477C 0002**

10: The Function Code 16(10 hex)
477C: Starting Address of the fisrt register (477C hex = 18300)
0002: Quantity of registers

#### 9.3.1.5. 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.

### 9.3.2. Main registers address table

The table below lists the most commonly used registers. A complete list of Modbus TCP/IP registers can be found in Appendix C.

Note: Changes can be saved by setting "Configuration Saved" to 1.

| Parameter | FC | PDU decimal address | Data size | Data |
|---|---|---|---|---|
| Digital input 1 | 02 | 100 | Discrete | |
| Digital input 2 | 02 | 101 | Discrete | |
| Digital input 3 | 02 | 102 | Discrete | |
| Digital input 4 | 02 | 103 | Discrete | |
| | | | | |
| Analog input 1 value | 03 | 14400 | 32-bit Float | |
| Analog input 2 value | 03 | 14402 | 32-bit Float | |
| Analog input 3 value | 03 | 14404 | 32-bit Float | |
| Analog input 4 value | 03 | 14406 | 32-bit Float | |
| Analog input 5 value | 03 | 14408 | 32-bit Float | |
| Analog input 6 value | 03 | 14410 | 32-bit Float | |
| | | | | |
| Channel 1 value | 03 | 19300 | 32-bit Float | |
| Channel 2 value | 03 | 19302 | 32-bit Float | |
| Channel 3 value | 03 | 19304 | 32-bit Float | |
| Channel 4 value | 03 | 19306 | 32-bit Float | |
| Channel 5 value | 03 | 19308 | 32-bit Float | |
| Channel 6 value | 03 | 19310 | 32-bit Float | |
| Channel 7 value | 03 | 19312 | 32-bit Float | |
| Channel 8 value | 03 | 19314 | 32-bit Float | |
| Channel 9 value | 03 | 19316 | 32-bit Float | |
| Channel 10 value | 03 | 19318 | 32-bit Float | |

| | | | | |
|---|---|---|---|---|
| Channel 11 value | 03 | 19320 | 32-bit Float | |
| Channel 12 value | 03 | 19322 | 32-bit Float | |
| Channel 13 value | 03 | 19324 | 32-bit Float | |
| Channel 14 value | 03 | 19326 | 32-bit Float | |
| Channel 15 value | 03 | 19328 | 32-bit Float | |
| Channel 16 value | 03 | 19330 | 32-bit Float | |
| Channel 17 value | 03 | 19332 | 32-bit Float | |
| Channel 18 value | 03 | 19334 | 32-bit Float | |
| Channel 19 value | 03 | 19336 | 32-bit Float | |
| Channel 20 value | 03 | 19338 | 32-bit Float | |
| Channel 21 value | 03 | 19340 | 32-bit Float | |
| Channel 22 value | 03 | 19342 | 32-bit Float | |
| Channel 23 value | 03 | 19344 | 32-bit Float | |
| Channel 24 value | 03 | 19346 | 32-bit Float | |
| | | | | |
| Alarm 1 status | 03 | 22000 | 16-bit unsign int | undefined(0), normal(1), indeterminate(2), warning(3), minor(4), major(5), critical(6) |
| Alarm 2 status | 03 | 22001 | 16-bit unsign int | —"— |
| Alarm 3 status | 03 | 22002 | 16-bit unsign int | —"— |
| Alarm 4 status | 03 | 22003 | 16-bit unsign int | —"— |
| Alarm 5 status | 03 | 22004 | 16-bit unsign int | —"— |
| Alarm 6 status | 03 | 22005 | 16-bit unsign int | —"— |
| Alarm 7 status | 03 | 22006 | 16-bit unsign int | —"— |
| Alarm 8 status | 03 | 22007 | 16-bit unsign int | —"— |
| Alarm 9 status | 03 | 22008 | 16-bit unsign int | —"— |
| Alarm 10 status | 03 | 22009 | 16-bit unsign int | —"— |
| Alarm 11 status | 03 | 22010 | 16-bit unsign int | —"— |
| Alarm 12 status | 03 | 22011 | 16-bit unsign int | —"— |
| Alarm 13 status | 03 | 22012 | 16-bit unsign int | —"— |
| Alarm 14 status | 03 | 22013 | 16-bit unsign int | —"— |
| Alarm 15 status | 03 | 22014 | 16-bit unsign int | —"— |
| Alarm 16 status | 03 | 22015 | 16-bit unsign int | —"— |
| Alarm 17 status | 03 | 22016 | 16-bit unsign int | —"— |
| Alarm 18 status | 03 | 22017 | 16-bit unsign int | —"— |
| Alarm 19 status | 03 | 22018 | 16-bit unsign int | —"— |
| Alarm 20 status | 03 | 22019 | 16-bit unsign int | —"— |
| Alarm 21 status | 03 | 22020 | 16-bit unsign int | —"— |
| Alarm 22 status | 03 | 22021 | 16-bit unsign int | —"— |
| Alarm 23 status | 03 | 22022 | 16-bit unsign int | —"— |
| Alarm 24 status | 03 | 22023 | 16-bit unsign int | —"— |
| | | | | |
| Save configuration | 03,06 | 24000 | 16-bit unsign int | unsaved(0), saved(1) |

## 9.4. Modbus RTU

### 9.4.1. Communication parameters

For Modbus RTU, TCW260 supports the following communication parameters:

- Baud rate – 2400, 4800, 9600, 19200, 38400, or 57600;
- Data bits – 8;
- Stop bits – 1 or 2;
- Parity – Odd or Even;

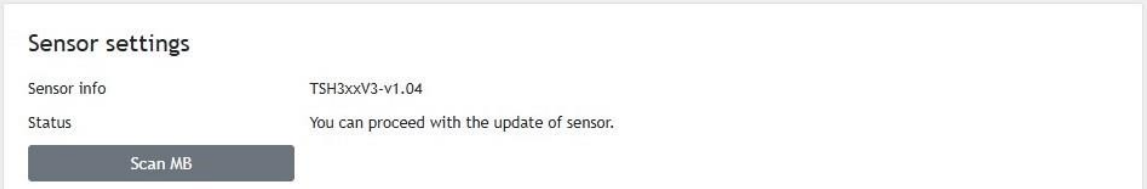
The factory default communication parameters for the device are the standard ones for Modbus RTU:

- Baud rate – 19200;
- Data bits – 8;
- Stop bits – 1;
- Parity – Even;

### 9.4.2. Teracom sensors update tool

The TCW260 supports the Teracom sensor firmware update tool, which is available at http://device.ip.address/teracom485.htm.
**Attention!** To make any changes to a Modbus RTU sensor, it should be the only device on the RS-485 bus.

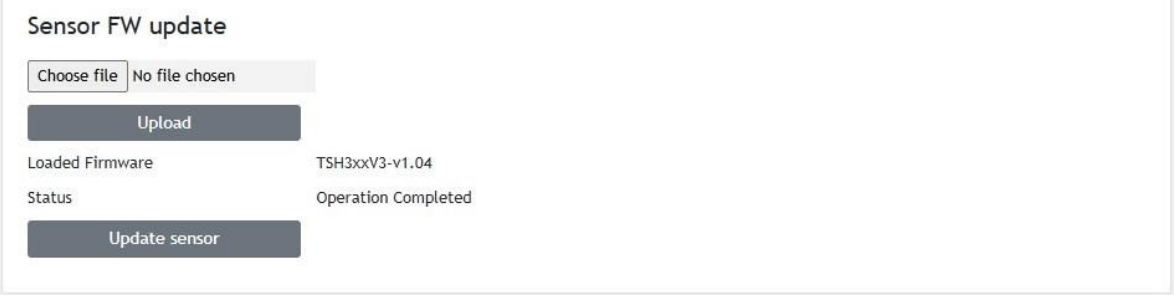
#### 9.4.2.1. Sensor settings




The tool operates using the current Modbus RTU communication parameters. To avoid communication collisions, it is advisable to configure both the TCW260 and the sensor with the factory default Modbus RTU communication parameters. This practice ensures smooth operation. The default Modbus RTU communication parameters for the TCW260 are detailed in Section 9.4.1.

Before making any changes, it is strongly recommended to scan for the sensor settings. This scan will provide information about the current firmware version of the sensor and verify whether the sensor is the only device on the bus.

#### 9.4.2.2. Sensor FW update




To initiate the firmware update, the appropriate file must first be uploaded to the sensor. After the upload is complete, click the “Update sensor” button to proceed.

## 9.5. MQTT

MQTT (Message Queuing Telemetry Transport) is a lightweight, client-server publish/subscribe messaging transport protocol. It is open, simple, and designed for easy implementation. MQTT is widely used across various industries, including automotive, manufacturing, telecommunications, oil, and gas, among others.

The TCW260 supports “Publish” mode only.

The official site for the MQTT protocol is mqtt.org.

For comprehensive explanations suitable for both beginners and professionals, refer to these resources:

- The Easiest Guide to Getting Started with MQTT at emqx.com
- MQTT Essentials at hivemq.com

## 9.6. Data Logger

The logger utilizes a circular buffer in FLASH memory. When the buffer is full, new data overwrites the oldest entries, ensuring that the FLASH memory continuously stores a complete log. There is no command to clear the log, but a copy of the full log is always available for download.
The number of records that can be stored depends on the length of the descriptions and the types of characters used. In the worst-case scenario—using 15-byte descriptions with characters from the upper range of UTF-8—the total number of records is approximately 52,371. This capacity is sufficient for 36 days of logging at one-minute intervals.
In most cases, the data logger can retain around 71,400 records, which allows for 49 days of logging at one-minute intervals.
New records can be periodically uploaded as a CSV file to a designated HTTP server at intervals of 1, 2, 3, 4, 6, 8, 12, and 24 hours. A semicolon is used as the delimiter in the CSV format.
The first row of the log file always contains the header. All rows, including the header, begin with the record ID and timestamp.

The structure of one row (record) in the log is as follows:

| ID | Time | Type of record | Channels - values/units | Channels - states/units | Alarms - values/descriptions |
|---|---|---|---|---|---|

| | |
|---|---|
| ID | 32-bit unique number for every row (record). |
| Time | a time stamp of record, in format dd.mm.yyyy, hh:mm:ss. |
| Type of record | following types of records are available:<br>"Time" for periodical record;<br>"Event" for record initiated by alarm condition;<br>"Type" for header record;<br>"Start" after power-up condition;<br>"Restart" after reset condition;<br>"Power Down" after power-down condition;<br>"Bad" for a problematic record |
| Channels - values/units | Channels 1 to 24 values/units |
| Channels - states/units | Channels 1 to 24 states/units<br>For chanel types General, Cumulative and Discrete following states are available:<br>0 – “Undefined”<br>1 – “Normal”<br>2 – “Indeterminate”<br>3 – “Warning” |

| | |
|---|---|
| | 4 – “Minor”<br>5 – “Major”<br>6 – “Critical”<br>For chanel type Counter following states are available:<br>8 – “Undefined”<br>9 – “Normal”<br>10 – “Indeterminate”<br>11 – “Warning”<br>12 – “Minor”<br>13 – “Major”<br>14 – “Critical” |
| Alarms - values/descriptions | Alarms 1 to 24 values/descriptions<br>Following alarm values are available:<br>0 – “Undefined”<br>1 – “Normal”<br>2 – “Indeterminate”<br>3 – “Warning”<br>4 – “Minor”<br>5 – “Major”<br>6 – “Critical” |

An example of the log file /fragment channels - values/units/:

```
ID;Time;Type;Ch1/°C;Ch2;Ch3;Ch4;Ch5;Ch6;Ch7;Ch8;Ch9;Ch10;Ch11;Ch12;Ch13;Ch14;Ch15;Ch16;Ch17;Ch18;Ch19;Ch20;Ch21;Ch22;Ch23;Ch24....
25114;14.05.2019,16:49:49; Time;25.319;1.000;118.833;229.877;0.000;6587.396;;;;;;;;;;;;;;;;;;;;....
```

An example of the log file /fragment channels - states/units/:

```
ID;Time;Type;....Ch1/°C;Ch2;Ch3;Ch4;Ch5;Ch6;Ch7;Ch8;Ch9;Ch10;Ch11;Ch12;Ch13;Ch14;Ch15;Ch16;Ch17;Ch18;Ch19;Ch20;Ch21;Ch22;Ch23;Ch24....
25114;14.05.2019,16:49:49;Time;....1;1;3;6;10;11;;;;;;;;;;;;;;;;;;;;....
```

An example of the log file /fragment alarms - values/descriptions/:

```
ID;Time;Type;...AL1/AL1-temp;AL2;AL3;AL4;AL5;AL6;AL7;AL8;AL9;AL10;AL11;AL12;AL13;AL14;AL15;AL16;AL17;AL18;AL19;AL20;AL21;AL22;AL23;AL24....
25114;14.05.2019,16:49:49;Time;....1;1;1;3;4;5;;;;;;;;;;;;;;;;;;
```

# 10. Factory default settings

TCW260 can be restored to its original factory default settings in three different ways.

## 10.1. Factory reset without network settings

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

## 10.2. Factory reset for network settings only

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.

## 10.3. Full factory reset

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:

| | |
|---|---|
| Username | 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 |
| Analog inputs mode | Voltage |
| Digital inputs mode | Open/Closed |

## 11. 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.

## 12. 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 correctly by referring to this user manual;
- Log into the device using a web browser;
- Configure the necessary settings;
- Navigate to SETUP → INPUTS and set up Digital Input 1 as “Discrete OPEN/CLOSED;
- Short the “S01+ (Digital In 1)” and “S01- (SGND)” terminals;
- Verify that the correct value for Digital Input 1 is displayed in the corresponding field;
- Observe that the flashing “STS” LED indicates proper operation.

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.

## 13. 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.

## XML file structure

```
<Monitor>
  <DeviceInfo>
    <DeviceName>TCW260</DeviceName>
    <HostName>TCW260 </HostName>
    <ID>54:10:ec:4f:59:f6</ID>
    <FwVer>TCW260-v1.004</FwVer>
    <MnfInfo>www.teracomsystems.com</MnfInfo>
    <SysContact>info@teracomsystems.com</SysContact>
    <SysName>TCW260</SysName>
    <SysLocation>Location</SysLocation>
  </DeviceInfo>
  <CH>
    <CH1>
      <type>0</type>
      <description>Temperature</description>
      <value>24.386</value>
      <valuebin/>
      <unit>°C</unit>
      <alarmbin>4</alarmbin>
      <alarm>Minor</alarm>
      <selch>3</selch>
    </CH1>
    <CH2>
      <type>0</type>
      <description>Humidity</description>
      <value>51.323</value>
      <valuebin/>
      <unit>RH</unit>
      <alarmbin>1</alarmbin>
      <alarm>Normal</alarm>
      <selch>4</selch>
    </CH2>
    <CH3>
      <type>2</type>
      <description>Digital Input 1</description>
      <value>OPEN</value>
      <valuebin>1</valuebin>
      <unit/>
      <alarmbin>1</alarmbin>
      <alarm>Normal</alarm>
      <selch>33</selch>
    </CH3>
    <CH4>
      <type>0</type>
      <description>V04</description>
      <value>---</value>
      <valuebin/>
      <unit/>
      <alarmbin>0</alarmbin>
      <alarm/>
      <selch>0</selch>
    </CH4>
    <CH5>
      <type>0</type>
      <description>V05-Voltage</description>
      <value>0.000</value>
      <valuebin/>
      <unit>V</unit>
      <alarmbin>1</alarmbin>
      <alarm>Normal</alarm>
      <selch>27</selch>
    </CH5>
    <CH6>
      <type>0</type>
      <description>V06-Current</description>
      <value>0.000</value>
      <valuebin/>
      <unit>A</unit>
      <alarmbin>1</alarmbin>
      <alarm>Normal</alarm>
      <selch>28</selch>
    </CH6>
```

```
<CH7>
  <type>1</type>
  <description>V07-Energy</description>
  <value>6587.396</value>
  <valuebin/>
  <unit>kWh</unit>
  <alarmbin>0</alarmbin>
  <alarm/>
  <selch>27</selch>
</CH7>
<CH8>
  <type>0</type>
  <description>V08</description>
  <value>---</value>
  <valuebin/>
  <unit/>
  <alarmbin>0</alarmbin>
  <alarm/>
  <selch>0</selch>
</CH8>
<CH9>
  <type>0</type>
  <description>V09</description>
  <value>---</value>
  <valuebin/>
  <unit/>
  <alarmbin>0</alarmbin>
  <alarm/>
  <selch>0</selch>
</CH9>
<CH10>
  <type>0</type>
  <description>V10</description>
  <value>---</value>
  <valuebin/>
  <unit/>
  <alarmbin>0</alarmbin>
  <alarm/>
  <selch>0</selch>
</CH10>
<CH11>
  <type>0</type>
  <description>V11</description>
  <value>---</value>
  <valuebin/>
  <unit/>
  <alarmbin>0</alarmbin>
  <alarm/>
  <selch>0</selch>
</CH11>
<CH12>
  <type>0</type>
  <description>V12</description>
  <value>---</value>
  <valuebin/>
  <unit/>
  <alarmbin>0</alarmbin>
  <alarm/>
  <selch>0</selch>
</CH12>
<CH13>
  <type>0</type>
  <description>V13</description>
  <value>---</value>
  <valuebin/>
  <unit/>
  <alarmbin>0</alarmbin>
  <alarm/>
  <selch>0</selch>
</CH13>
<CH14>
  <type>0</type>
  <description>V14</description>
  <value>---</value>
  <valuebin/>
  <unit/>
  <alarmbin>0</alarmbin>
```

```
    <alarm/>
    <selch>0</selch>
  </CH14>
  <CH15>
    <type>0</type>
    <description>V15</description>
    <value>---</value>
    <valuebin/>
    <unit/>
    <alarmbin>0</alarmbin>
    <alarm/>
    <selch>0</selch>
  </CH15>
  <CH16>
    <type>0</type>
    <description>V16</description>
    <value>---</value>
    <valuebin/>
    <unit/>
    <alarmbin>0</alarmbin>
    <alarm/>
    <selch>0</selch>
  </CH16>
  <CH17>
    <type>0</type>
    <description>V17</description>
    <value>---</value>
    <valuebin/>
    <unit/>
    <alarmbin>0</alarmbin>
    <alarm/>
    <selch>0</selch>
  </CH17>
  <CH18>
    <type>0</type>
    <description>V18</description>
    <value>---</value>
    <valuebin/>
    <unit/>
    <alarmbin>0</alarmbin>
    <alarm/>
    <selch>0</selch>
  </CH18>
  <CH19>
    <type>0</type>
    <description>V19</description>
    <value>---</value>
    <valuebin/>
    <unit/>
    <alarmbin>0</alarmbin>
    <alarm/>
    <selch>0</selch>
  </CH19>
  <CH20>
    <type>0</type>
    <description>V20</description>
    <value>---</value>
    <valuebin/>
    <unit/>
    <alarmbin>0</alarmbin>
    <alarm/>
    <selch>0</selch>
  </CH20>
  <CH21>
    <type>0</type>
    <description>V21</description>
    <value>---</value>
    <valuebin/>
    <unit/>
    <alarmbin>0</alarmbin>
    <alarm/>
    <selch>0</selch>
  </CH21>
  <CH22>
    <type>0</type>
    <description>V22</description>
    <value>---</value>
```

```
      <valuebin/>
      <unit/>
      <alarmbin>0</alarmbin>
      <alarm/>
      <selch>0</selch>
    </CH22>
    <CH23>
    <type>0</type>
      <description>V23</description>
      <value>---</value>
      <valuebin/>
      <unit/>
      <alarmbin>0</alarmbin>
      <alarm/>
      <selch>0</selch>
    </CH23>
    <CH24>
      <type>0</type>
      <description>V24</description>
      <value>---</value>
      <valuebin/>
      <unit/>
      <alarmbin>0</alarmbin>
      <alarm/>
      <selch>0</selch>
    </CH24>
  </CH>
  <AL>
    <AL1>
      <description>AL01-Temp.</description>
      <alarmbin>4</alarmbin>
      <alarm>Minor</alarm>
      <assign>1</assign>
    </AL1>
    <AL2>
      <description>AL02</description>
      <alarmbin>1</alarmbin>
      <alarm>Normal</alarm>
      <assign>5</assign>
    </AL2>
    <AL3>
      <description>AL03</description>
      <alarmbin>1</alarmbin>
      <alarm>Normal</alarm>
      <assign>6</assign>
    </AL3>
    <AL4>
      <description>AL04-DI1</description>
      <alarmbin>1</alarmbin>
      <alarm>Normal</alarm>
      <assign>3</assign>
    </AL4>
    <AL5>
      <description>AL05-Humidity</description>
      <alarmbin>1</alarmbin>
      <alarm>Normal</alarm>
      <assign>2</assign>
    </AL5>
    <AL6>
      <description>AL06</description>
      <alarmbin>1</alarmbin>
      <alarm>Normal</alarm>
      <assign>3</assign>
    </AL6>
    <AL7>
      <description>AL07</description>
      <alarmbin>0</alarmbin>
      <alarm/>
      <assign>0</assign>
    </AL7>
    <AL8>
      <description>AL08</description>
      <alarmbin>0</alarmbin>
      <alarm/>
      <assign>0</assign>
    </AL8>
    <AL9>
```

```
    <description>AL09</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL9>
  <AL10>
    <description>AL10</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL10>
  <AL11>
    <description>AL11</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL11>
  <AL12>
    <description>AL12</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL12>
  <AL13>
    <description>AL13</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL13>
  <AL14>
    <description>AL14</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL14>
  <AL15>
    <description>AL15</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL15>
  <AL16>
    <description>AL16</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL16>
  <AL17>
    <description>AL17</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL17>
  <AL18>
    <description>AL18</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL18>
  <AL19>
    <description>AL19</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL19>
  <AL20>
    <description>AL20</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL20>
  <AL21>
    <description>AL21</description>
    <alarmbin>0</alarmbin>
    <alarm/>
    <assign>0</assign>
  </AL21>
```

```
    <AL22>
      <description>AL22</description>
      <alarmbin>0</alarmbin>
      <alarm/>
      <assign>0</assign>
    </AL22>
    <AL23>
      <description>AL23</description>
      <alarmbin>0</alarmbin>
      <alarm/>
      <assign>0</assign>
    </AL23>
    <AL24>
      <description>AL24</description>
      <alarmbin>0</alarmbin>
      <alarm/>
      <assign>0</assign>
    </AL24>
  </AL>
  <HTTPPost>
    <Key/>
    <PostPeriod>300</PostPeriod>
  </HTTPPost>
  <MQTT>
     <Period>300</Period>
  </MQTT>
  <Sys>
    <hwerr/>
    <HighAlarmbin>4</HighAlarmbin>
    <HighAlarm>Minor</HighAlarm>
  </Sys>
  <Time>
    <Date>15.05.2019</Date>
    <Time>10:32:44</Time>
  </Time>
</Monitor>
```

Where:

<CH1>… <CH24> - channels;

<AL1> … <AL24> - alarms;

<alarmbin> - number values from 0 to 6;

<alarm>  - Undefined, Normal, Indeterminate, Warning, Minor, Major, Critical;

<assign>0</assign> - alarm not assigned to any channel;

<selch>0</selch> - channel is not displayed on Monitoring -> Channels section

## JSON file structure


```
{
  "Monitor": {
    "DeviceInfo": {
      "DeviceName": "TCW260",
      "HostName": "TCW260       ",
      "ID": "54:10:ec:4f:59:f6",
      "FwVer": "TCW260-v1.004",
      "MnfInfo": "www.teracomsystems.com",
      "SysContact": "info@teracomsystems.com",
      "SysName": "TCW260",
      "SysLocation": "Location"
    },
    "CH": {
      "CH1": {
        "type": "0",
        "description": "Temperature",
        "value": "24.268",
        "valuebin": "",
        "unit": "°C",
        “alarmbin”: "4",
        “alarm”: "Minor",
        "selch":"3"
      },
      "CH2": {
        "type": "0",
        "description": "Humidity",
        "value": "52.490",
       "valuebin": "",
        "unit": "RH",
        “alarmbin”: "1",
        “alarm”: "Normal",
        "selch":"4"
      },
      "CH3": {
        "type": "2",
        "description": "Digital Input 1",
        "value": "OPEN",
        "valuebin": "1",
        "unit": "",
        “alarmbin”: "1",
        “alarm”: "Normal",
        "selch":"33"
      },
      "CH4": {
        "type": "0",
        "description": "V04",
        "value": "---",
        "valuebin": "",
        "unit": "",
        “alarmbin”: "0",
        “alarm”: "",
        "selch":"0"
      },
      "CH5": {
        "type": "0",
        "description": "V05-Voltage",
        "value": "0.000",
        "valuebin": "",
        "unit": "V",
        “alarmbin”: "1",
        “alarm”: "Normal",
        "selch":"27"
      },
      "CH6": {
        "type": "0",
        "description": "V06-Current",
        "value": "0.000",
        "valuebin": "",
        "unit": "A",
        “alarmbin”: "1",
        “alarm”: "Normal",
        "selch":"28"
      },
```

```
"CH7": {
   "type": "1",
   "description": "V07-Energy",
   "value": "6587.396",
   "valuebin": "",
   "unit": "kWh",
   “alarmbin”: "0",
   “alarm”: "",
   "selch":"27"
},
"CH8": {
   "type": "0",
   "description": "V08",
   "value": "---",
   "valuebin": "",
   "unit": "",
   “alarmbin”: "0",
   “alarm”: "",
   "selch":"0"
},
"CH9": {
   "type": "0",
   "description": "V09",
   "value": "---",
   "valuebin": "",
   "unit": "",
   “alarmbin”: "0",
   “alarm”: "",
   "selch":"0"
},
"CH10": {
   "type": "0",
   "description": "V10",
   "value": "---",
   "valuebin": "",
   "unit": "",
   “alarmbin”: "0",
   “alarm”: "",
   "selch":"0"
},
"CH11": {
   "type": "0",
   "description": "V11",
   "value": "---",
    "valuebin": "",
   "unit": "",
   “alarmbin”: "0",
   “alarm”: "",
   "selch":"0"
},
"CH12": {
   "type": "0",
   "description": "V12",
   "value": "---",
   "valuebin": "",
   "unit": "",
   “alarmbin”: "0",
   “alarm”: "",
   "selch":"0"
},
"CH13": {
   "type": "0",
   "description": "V13",
   "value": "---",
   "valuebin": "",
   "unit": "",
   “alarmbin”: "0",
   “alarm”: "",
   "selch":"0"
},
"CH14": {
   "type": "0",
   "description": "V14",
   "value": "---",
   "valuebin": "",
   "unit": "",
   “alarmbin”: "0",
```

```
    “alarm”: "",
    "selch":"0"
  },
  "CH15": {
    "type": "0",
    "description": "V15",
    "value": "---",
    "valuebin": "",
    "unit": "",
    “alarmbin”: "0",
    “alarm”: "",
    "selch":"0"
  },
  "CH16": {
    "type": "0",
    "description": "V16",
    "value": "---",
    "valuebin": "",
    "unit": "",
    “alarmbin”: "0",
    “alarm”: "",
    "selch":"0"
  },
  "CH17": {
    "type": "0",
    "description": "V17",
    "value": "---",
    "valuebin": "",
    "unit": "",
    “alarmbin”: "0",
    “alarm”: "",
    "selch":"0"
  },
  "CH18": {
    "type": "0",
    "description": "V18",
    "value": "---",
    "valuebin": "",
    "unit": "",
    “alarmbin”: "0",
    “alarm”: "",
    "selch":"0"
  },
  "CH19": {
    "type": "0",
    "description": "V19",
    "value": "---",
    "valuebin": "",
    "unit": "",
    “alarmbin”: "0",
    “alarm”: "",
    "selch":"0"
  },
  "CH20": {
    "type": "0",
    "description": "V20",
    "value": "---",
    "valuebin": "",
    "unit": "",
    “alarmbin”: "0",
    “alarm”: "",
    "selch":"0"
  },
  "CH21": {
    "type": "0",
    "description": "V21",
    "value": "---",
    "valuebin": "",
    "unit": "",
    “alarmbin”: "0",
    “alarm”: "",
    "selch":"0"
  },
  "CH22": {
    "type": "0",
    "description": "V22",
    "value": "---",
```

```
      "valuebin": "",
      "unit": "",
      “alarmbin”: "0",
      “alarm”: "",
      "selch":"0"
    },
    "CH23": {
      "type": "0",
      "description": "V23",
      "value": "---",
      "valuebin": "",
      "unit": "",
      “alarmbin”: "0",
      “alarm”: "",
      "selch":"0"
    },
    "CH24": {
      "type": "0",
      "description": "V24",
      "value": "---",
      "valuebin": "",
      "unit": "",
      “alarmbin”: "0",
      “alarm”: "",
      "selch":"0"
    }
  },
  "AL": {
    "AL1": {
      "description": "AL01-Temp.",
      “alarmbin”: "aa(0)",
      “alarm”: "Minor",
      "assign":"1"
    },
    "AL2": {
      "description": "AL02",
      “alarmbin”: "aa(1)",
      “alarm”: "Normal",
      "assign":"5"
    },
    "AL3": {
      "description": "AL03",
      “alarmbin”: "aa(2)",
      “alarm”: "Normal",
      "assign":"6"
    },
    "AL4": {
      "description": "AL04-DI1",
      “alarmbin”: "aa(3)",
      “alarm”: "Normal",
      "assign":"3"
    },
    "AL5": {
      "description": "AL05-Humidity",
      “alarmbin”: "aa(4)",
      “alarm”: "Normal",
      "assign":"2"
    },
    "AL6": {
      "description": "AL06",
      “alarmbin”: "aa(5)",
      “alarm”: "Normal",
      "assign":"3"
    },
    "AL7": {
      "description": "AL07",
      “alarmbin”: "aa(6)",
      “alarm”: "",
      "assign":"0"
    },
    "AL8": {
      "description": "AL08",
      “alarmbin”: "aa(7)",
      “alarm”: "",
      "assign":"0"
    },
    "AL9": {
```

```
    "description": "AL09",
    “alarmbin”: "aa(8)",
    “alarm”: "",
    "assign":"0"
  },
  "AL10": {
    "description": "AL10",
    “alarmbin”: "aa(9)",
    “alarm”: "",
    "assign":"0"
  },
  "AL11": {
    "description": "AL11",
    “alarmbin”: "aa(10)",
    “alarm”: "",
    "assign":"0"
  },
  "AL12": {
    "description": "AL12",
    “alarmbin”: "aa(11)",
    “alarm”: "",
    "assign":"0"
  },
  "AL13": {
    "description": "AL13",
    “alarmbin”: "aa(12)",
    “alarm”: "",
    "assign":"0"
  },
  "AL14": {
    "description": "AL14",
    “alarmbin”: "aa(13)",
    “alarm”: "",
    "assign":"0"
  },
  "AL15": {
    "description": "AL15",
    “alarmbin”: "aa(14)",
    “alarm”: "",
    "assign":"0"
  },
  "AL16": {
    "description": "AL16",
    “alarmbin”: "aa(15)",
    “alarm”: "",
    "assign":"0"
  },
  "AL17": {
    "description": "AL17",
    “alarmbin”: "aa(16)",
    “alarm”: "",
    "assign":"0"
  },
  "AL18": {
    "description": "AL18",
    “alarmbin”: "aa(17)",
    “alarm”: "",
    "assign":"0"
  },
  "AL19": {
    "description": "AL19",
    “alarmbin”: "aa(18)",
    “alarm”: "",
    "assign":"0"
  },
  "AL20": {
    "description": "AL20",
    “alarmbin”: "aa(19)",
    “alarm”: "",
    "assign":"0"
  },
  "AL21": {
    "description": "AL21",
    “alarmbin”: "aa(20)",
    “alarm”: "",
    "assign":"0"
  },
```

```
      "AL22": {
        "description": "AL22",
        “alarmbin”: "aa(21)",
        “alarm”: "",
        "assign":"0"
      },
      "AL23": {
        "description": "AL23",
        “alarmbin”: "aa(22)",
        “alarm”: "",
        "assign":"0"
      },
      "AL24": {
        "description": "AL24",
        “alarmbin”: "aa(23)",
        “alarm”: "",
        "assign":"0"
      }
    },
    "HTTPPost": {
      "Key": "",
      "PostPeriod": "300"
    },
    “MQTT”: {
       “Period”: “300”
    },
    "Sys": {
      "hwerr": "",
      "HighAlarmbin": "4",
      "HighAlarm": "Minor"
    },
    "Time": {
      "Date": "15.05.2019",
      "Time": "10:30:00"
    }
  }
}
```

## Modbus TCP/IP full address table

| Parameter | FC | PDU decimal address | Data size | Data |
|---|---|---|---|---|
| Digital input 1 | 02 | 100 | Discrete | |
| Digital input 2 | 02 | 101 | Discrete | |
| Digital input 3 | 02 | 102 | Discrete | |
| Digital input 4 | 02 | 103 | Discrete | |
| | | | | |
| Digital input 1 Description | 03,16 | 12000 | 16 bytes UTF-8 | |
| Digital input 2 Description | 03,16 | 12008 | 16 bytes UTF-8 | |
| Digital input 3 Description | 03,16 | 12016 | 16 bytes UTF-8 | |
| Digital input 4 Description | 03,16 | 12024 | 16 bytes UTF-8 | |
| | | | | |
| Digital input 1 closed state description | 03,16 | 12100 | 16 bytes UTF-8 | |
| Digital input 2 closed state description | 03,16 | 12108 | 16 bytes UTF-8 | |
| Digital input 3 closed state description | 03,16 | 12116 | 16 bytes UTF-8 | |
| Digital input 4 closed state description | 03,16 | 12124 | 16 bytes UTF-8 | |
| | | | | |
| Digital input 1 open state description | 03,16 | 12200 | 16 bytes UTF-8 | |
| Digital input 2 open state description | 03,16 | 12208 | 16 bytes UTF-8 | |
| Digital input 3 open state description | 03,16 | 12216 | 16 bytes UTF-8 | |
| Digital input 4 open state description | 03,16 | 12224 | 16 bytes UTF-8 | |
| | | | | |
| Digital input 1 mode | 03,06,16 | 12300 | 16-bit unsign int | openclosed(0), risingEdge(1), fallingEdge(2), bothEdges(3) |
| Digital input 2 mode | 03,06,16 | 12301 | 16-bit unsign int | —"— |
| Digital input 3 mode | 03,06,16 | 12302 | 16-bit unsign int | —"— |
| Digital input 4 mode | 03,06,16 | 12303 | 16-bit unsign int | —"— |
| | | | | |
| Digital input 1 close to open delay | 03,16 | 12400 | 32-bit unsign int | |
| Digital input 2 close to open delay | 03,16 | 12402 | 32-bit unsign int | |
| Digital input 3 close to open delay | 03,16 | 12404 | 32-bit unsign int | |
| Digital input 4 close to open delay | 03,16 | 12406 | 32-bit unsign int | |
| | | | | |
| Digital input 1 open to close delay | 03,16 | 12500 | 32-bit unsign int | |
| Digital input 2 open to close delay | 03,16 | 12502 | 32-bit unsign int | |

| | | | | |
|---|---|---|---|---|
| Digital input 3 open to close delay | 03,16 | 12504 | 32-bit unsign int | |
| Digital input 4 open to close delay | 03,16 | 12506 | 32-bit unsign int | |
| | | | | |
| Digital input 1 counter init value | 03,16 | 12600 | 32-bit unsign int | |
| Digital input 2 counter init value | 03,16 | 12602 | 32-bit unsign int | |
| Digital input 3 counter init value | 03,16 | 12604 | 32-bit unsign int | |
| Digital input 4 counter init value | 03,16 | 12606 | 32-bit unsign int | |
| | | | | |
| Digital input 1 counter value | 03 | 12700 | 32-bit unsign int | |
| Digital input 2 counter value | 03 | 12702 | 32-bit unsign int | |
| Digital input 3 counter value | 03 | 12704 | 32-bit unsign int | |
| Digital input 4 counter value | 03 | 12706 | 32-bit unsign int | |
| | | | | |
| Analog input 1 description | 03,16 | 14000 | 16 bytes UTF-8 | |
| Analog input 2 description | 03,16 | 14008 | 16 bytes UTF-8 | |
| Analog input 3 description | 03,16 | 14016 | 16 bytes UTF-8 | |
| Analog input 4 description | 03,16 | 14024 | 16 bytes UTF-8 | |
| Analog input 5 description | 03,16 | 14032 | 16 bytes UTF-8 | |
| Analog input 6 description | 03,16 | 14040 | 16 bytes UTF-8 | |
| | | | | |
| Analog input 1 multiplier | 03,16 | 14100 | 32-bit Float | |
| Analog input 2 multiplier | 03,16 | 14102 | 32-bit Float | |
| Analog input 3 multiplier | 03,16 | 14104 | 32-bit Float | |
| Analog input 4 multiplier | 03,16 | 14106 | 32-bit Float | |
| Analog input 5 multiplier | 03,16 | 14108 | 32-bit Float | |
| Analog input 6 multiplier | 03,16 | 14100 | 32-bit Float | |
| | | | | |
| Analog input 1 offset | 03,16 | 14200 | 32-bit Float | |
| Analog input 2 offset | 03,16 | 14202 | 32-bit Float | |
| Analog input 3 offset | 03,16 | 14204 | 32-bit Float | |
| Analog input 4 offset | 03,16 | 14206 | 32-bit Float | |
| Analog input 5 offset | 03,16 | 14208 | 32-bit Float | |
| Analog input 6 offset | 03,16 | 14200 | 32-bit Float | |
| | | | | |
| Analog input 1 mode(V/mA) | 03,06,16 | 14300 | 16-bit unsign int | 0-10V(0), 4-20mA(1) |
| Analog input 2 mode(V/mA) | 03,06,16 | 14301 | 16-bit unsign int | 0-10V(0), 4-20mA(1) |
| Analog input 3 mode(V/mA) | 03,06,16 | 14302 | 16-bit unsign int | 0-10V(0), 4-20mA(1) |
| Analog input 4 mode(V/mA) | 03,06,16 | 14303 | 16-bit unsign int | 0-10V(0), 4-20mA(1) |
| Analog input 5 mode(V/mA) | 03,06,16 | 14304 | 16-bit unsign int | 0-10V(0), 4-20mA(1) |
| Analog input 6 mode(V/mA) | 03,06,16 | 14305 | 16-bit unsign int | 0-10V(0), 4-20mA(1) |
| | | | | |
| Analog input 1 value | 03 | 14400 | 32-bit Float | |
| Analog input 2 value | 03 | 14402 | 32-bit Float | |
| Analog input 3 value | 03 | 14404 | 32-bit Float | |

| | | | | |
|---|---|---|---|---|
| Analog input 4 value | 03 | 14406 | 32-bit Float | |
| Analog input 5 value | 03 | 14408 | 32-bit Float | |
| Analog input 6 value | 03 | 14410 | 32-bit Float | |
| | | | | |
| MB sensor 1 description | 03,06,16 | 16000 | 16 bytes UTF-8 | |
| MB sensor 2 description | 03,06,16 | 16008 | 16 bytes UTF-8 | |
| MB sensor 3 description | 03,06,16 | 16016 | 16 bytes UTF-8 | |
| MB sensor 4 description | 03,06,16 | 16024 | 16 bytes UTF-8 | |
| MB sensor 5 description | 03,06,16 | 16032 | 16 bytes UTF-8 | |
| MB sensor 6 description | 03,06,16 | 16040 | 16 bytes UTF-8 | |
| MB sensor 7 description | 03,06,16 | 16048 | 16 bytes UTF-8 | |
| MB sensor 8 description | 03,06,16 | 16056 | 16 bytes UTF-8 | |
| MB sensor 9 description | 03,06,16 | 16064 | 16 bytes UTF-8 | |
| MB sensor 10 description | 03,06,16 | 16072 | 16 bytes UTF-8 | |
| MB sensor 11 description | 03,06,16 | 16080 | 16 bytes UTF-8 | |
| MB sensor 12 description | 03,06,16 | 16088 | 16 bytes UTF-8 | |
| MB sensor 13 description | 03,06,16 | 16096 | 16 bytes UTF-8 | |
| MB sensor 14 description | 03,06,16 | 16104 | 16 bytes UTF-8 | |
| MB sensor 15 description | 03,06,16 | 16112 | 16 bytes UTF-8 | |
| MB sensor 16 description | 03,06,16 | 16120 | 16 bytes UTF-8 | |
| MB sensor 17 description | 03,06,16 | 16128 | 16 bytes UTF-8 | |
| MB sensor 18 description | 03,06,16 | 16136 | 16 bytes UTF-8 | |
| MB sensor 19 description | 03,06,16 | 16144 | 16 bytes UTF-8 | |
| MB sensor 20 description | 03,06,16 | 16152 | 16 bytes UTF-8 | |
| MB sensor 21 description | 03,06,16 | 16160 | 16 bytes UTF-8 | |
| MB sensor 22 description | 03,06,16 | 16168 | 16 bytes UTF-8 | |
| MB sensor 23 description | 03,06,16 | 16176 | 16 bytes UTF-8 | |
| MB sensor 24 description | 03,06,16 | 16184 | 16 bytes UTF-8 | |
| | | | | |
| MB sensor 1 multiplier | 03,16 | 16200 | 32-bit Float | |
| MB sensor 2 multiplier | 03,16 | 16202 | 32-bit Float | |
| MB sensor 3 multiplier | 03,16 | 16204 | 32-bit Float | |
| MB sensor 4 multiplier | 03,16 | 16206 | 32-bit Float | |
| MB sensor 5 multiplier | 03,16 | 16208 | 32-bit Float | |
| MB sensor 6 multiplier | 03,16 | 16210 | 32-bit Float | |
| MB sensor 7 multiplier | 03,16 | 16212 | 32-bit Float | |
| MB sensor 8 multiplier | 03,16 | 16214 | 32-bit Float | |
| MB sensor 9 multiplier | 03,16 | 16216 | 32-bit Float | |
| MB sensor 10 multiplier | 03,16 | 16218 | 32-bit Float | |
| MB sensor 11 multiplier | 03,16 | 16220 | 32-bit Float | |
| MB sensor 12 multiplier | 03,16 | 16222 | 32-bit Float | |
| MB sensor 13 multiplier | 03,16 | 16224 | 32-bit Float | |
| MB sensor 14 multiplier | 03,16 | 16226 | 32-bit Float | |
| MB sensor 15 multiplier | 03,16 | 16228 | 32-bit Float | |
| MB sensor 16 multiplier | 03,16 | 16230 | 32-bit Float | |
| MB sensor 17 multiplier | 03,16 | 16232 | 32-bit Float | |
| MB sensor 18 multiplier | 03,16 | 16234 | 32-bit Float | |
| MB sensor 19 multiplier | 03,16 | 16236 | 32-bit Float | |

| | | | | |
|---|---|---|---|---|
| MB sensor 20 multiplier | 03,16 | 16238 | 32-bit Float | |
| MB sensor 21 multiplier | 03,16 | 16240 | 32-bit Float | |
| MB sensor 22 multiplier | 03,16 | 16242 | 32-bit Float | |
| MB sensor 23 multiplier | 03,16 | 16244 | 32-bit Float | |
| MB sensor 24 multiplier | 03,16 | 16246 | 32-bit Float | |
| | | | | |
| MB sensor 1 offset | 03,16 | 16300 | 32-bit Float | |
| MB sensor 2 offset | 03,16 | 16302 | 32-bit Float | |
| MB sensor 3 offset | 03,16 | 16304 | 32-bit Float | |
| MB sensor 4 offset | 03,16 | 16306 | 32-bit Float | |
| MB sensor 5 offset | 03,16 | 16308 | 32-bit Float | |
| MB sensor 6 offset | 03,16 | 16310 | 32-bit Float | |
| MB sensor 7 offset | 03,16 | 16312 | 32-bit Float | |
| MB sensor 8 offset | 03,16 | 16314 | 32-bit Float | |
| MB sensor 9 offset | 03,16 | 16316 | 32-bit Float | |
| MB sensor 10 offset | 03,16 | 16318 | 32-bit Float | |
| MB sensor 11 offset | 03,16 | 16320 | 32-bit Float | |
| MB sensor 12 offset | 03,16 | 16322 | 32-bit Float | |
| MB sensor 13 offset | 03,16 | 16324 | 32-bit Float | |
| MB sensor 14 offset | 03,16 | 16326 | 32-bit Float | |
| MB sensor 15 offset | 03,16 | 16328 | 32-bit Float | |
| MB sensor 16 offset | 03,16 | 16330 | 32-bit Float | |
| MB sensor 17 offset | 03,16 | 16332 | 32-bit Float | |
| MB sensor 18 offset | 03,16 | 16334 | 32-bit Float | |
| MB sensor 19 offset | 03,16 | 16336 | 32-bit Float | |
| MB sensor 20 offset | 03,16 | 16338 | 32-bit Float | |
| MB sensor 21 offset | 03,16 | 16340 | 32-bit Float | |
| MB sensor 22 offset | 03,16 | 16342 | 32-bit Float | |
| MB sensor 23 offset | 03,16 | 16344 | 32-bit Float | |
| MB sensor 24 offset | 03,16 | 16346 | 32-bit Float | |
| | | | | |
| MB sensor 1 value | 03 | 16400 | 32-bit Float | |
| MB sensor 2 value | 03 | 16402 | 32-bit Float | |
| MB sensor 3 value | 03 | 16404 | 32-bit Float | |
| MB sensor 4 value | 03 | 16406 | 32-bit Float | |
| MB sensor 5 value | 03 | 16408 | 32-bit Float | |
| MB sensor 6 value | 03 | 16410 | 32-bit Float | |
| MB sensor 7 value | 03 | 16412 | 32-bit Float | |
| MB sensor 8 value | 03 | 16414 | 32-bit Float | |
| MB sensor 9 value | 03 | 16416 | 32-bit Float | |
| MB sensor 10 value | 03 | 16418 | 32-bit Float | |
| MB sensor 11 value | 03 | 16420 | 32-bit Float | |
| MB sensor 12 value | 03 | 16422 | 32-bit Float | |
| MB sensor 13 value | 03 | 16424 | 32-bit Float | |
| MB sensor 14 value | 03 | 16426 | 32-bit Float | |
| MB sensor 15 value | 03 | 16428 | 32-bit Float | |
| MB sensor 16 value | 03 | 16430 | 32-bit Float | |
| MB sensor 17 value | 03 | 16432 | 32-bit Float | |

| | | | | |
|---|---|---|---|---|
| MB sensor 18 value | 03 | 16434 | 32-bit Float | |
| MB sensor 19 value | 03 | 16436 | 32-bit Float | |
| MB sensor 20 value | 03 | 16438 | 32-bit Float | |
| MB sensor 21 value | 03 | 16440 | 32-bit Float | |
| MB sensor 22 value | 03 | 16442 | 32-bit Float | |
| MB sensor 23 value | 03 | 16444 | 32-bit Float | |
| MB sensor 24 value | 03 | 16446 | 32-bit Float | |
| | | | | |
| MB sensor 1 counter | 03 | 16500 | 32-bit unsign int | |
| MB sensor 2 counter | 03 | 16502 | 32-bit unsign int | |
| MB sensor 3 counter | 03 | 16504 | 32-bit unsign int | |
| MB sensor 4 counter | 03 | 16506 | 32-bit unsign int | |
| MB sensor 5 counter | 03 | 16508 | 32-bit unsign int | |
| MB sensor 6 counter | 03 | 16510 | 32-bit unsign int | |
| MB sensor 7 counter | 03 | 16512 | 32-bit unsign int | |
| MB sensor 8 counter | 03 | 16514 | 32-bit unsign int | |
| MB sensor 9 counter | 03 | 16516 | 32-bit unsign int | |
| MB sensor 10 counter | 03 | 16518 | 32-bit unsign int | |
| MB sensor 11 counter | 03 | 16520 | 32-bit unsign int | |
| MB sensor 12 counter | 03 | 16522 | 32-bit unsign int | |
| MB sensor 13 counter | 03 | 16524 | 32-bit unsign int | |
| MB sensor 14 counter | 03 | 16526 | 32-bit unsign int | |
| MB sensor 15 counter | 03 | 16528 | 32-bit unsign int | |
| MB sensor 16 counter | 03 | 16530 | 32-bit unsign int | |
| MB sensor 17 counter | 03 | 16532 | 32-bit unsign int | |
| MB sensor 18 counter | 03 | 16534 | 32-bit unsign int | |
| MB sensor 19 counter | 03 | 16536 | 32-bit unsign int | |
| MB sensor 20 counter | 03 | 16538 | 32-bit unsign int | |
| MB sensor 21 counter | 03 | 16540 | 32-bit unsign int | |
| MB sensor 22 counter | 03 | 16542 | 32-bit unsign int | |
| MB sensor 23 counter | 03 | 16544 | 32-bit unsign int | |
| MB sensor 24 counter | 03 | 16546 | 32-bit unsign int | |
| | | | | |
| Channel 1 type | 03,06,16 | 18000 | 16-bit unsign int | general(0), discrete(2) , counter(3) |
| Channel 2 type | 03,06,16 | 18001 | 16-bit unsign int | —"— |
| Channel 3 type | 03,06,16 | 18002 | 16-bit unsign int | —"— |
| Channel 4 type | 03,06,16 | 18003 | 16-bit unsign int | —"— |
| Channel 5 type | 03,06,16 | 18004 | 16-bit unsign int | —"— |
| Channel 6 type | 03,06,16 | 18005 | 16-bit unsign int | —"— |
| Channel 7 type | 03,06,16 | 18006 | 16-bit unsign int | —"— |
| Channel 8 type | 03,06,16 | 18007 | 16-bit unsign int | —"— |
| Channel 9 type | 03,06,16 | 18008 | 16-bit unsign int | —"— |
| Channel 10 type | 03,06,16 | 18009 | 16-bit unsign int | —"— |
| Channel 11 type | 03,06,16 | 18010 | 16-bit unsign int | —"— |
| Channel 12 type | 03,06,16 | 18011 | 16-bit unsign int | —"— |
| Channel 13 type | 03,06,16 | 18012 | 16-bit unsign int | —"— |
| Channel 14 type | 03,06,16 | 18013 | 16-bit unsign int | —"— |
| Channel 15 type | 03,06,16 | 18014 | 16-bit unsign int | —"— |

| | | | | |
|---|---|---|---|---|
| Channel 16 type | 03,06,16 | 18015 | 16-bit unsign int | —"— |
| Channel 17 type | 03,06,16 | 18016 | 16-bit unsign int | —"— |
| Channel 18 type | 03,06,16 | 18017 | 16-bit unsign int | —"— |
| Channel 19 type | 03,06,16 | 18018 | 16-bit unsign int | —"— |
| Channel 20 type | 03,06,16 | 18019 | 16-bit unsign int | —"— |
| Channel 21 type | 03,06,16 | 18020 | 16-bit unsign int | —"— |
| Channel 22 type | 03,06,16 | 18021 | 16-bit unsign int | —"— |
| Channel 23 type | 03,06,16 | 18022 | 16-bit unsign int | —"— |
| Channel 24 type | 03,06,16 | 18023 | 16-bit unsign int | —"— |
| | | | | |
| Channel 1 description | 03,16 | 18100 | 16 bytes UTF-8 | |
| Channel 2 description | 03,16 | 18108 | 16 bytes UTF-8 | |
| Channel 3 description | 03,16 | 18116 | 16 bytes UTF-8 | |
| Channel 4 description | 03,16 | 18124 | 16 bytes UTF-8 | |
| Channel 5 description | 03,16 | 18132 | 16 bytes UTF-8 | |
| Channel 6 description | 03,16 | 18140 | 16 bytes UTF-8 | |
| Channel 7 description | 03,16 | 18148 | 16 bytes UTF-8 | |
| Channel 8 description | 03,16 | 18156 | 16 bytes UTF-8 | |
| Channel 9 description | 03,16 | 18164 | 16 bytes UTF-8 | |
| Channel 10 description | 03,16 | 18172 | 16 bytes UTF-8 | |
| Channel 11 description | 03,16 | 18180 | 16 bytes UTF-8 | |
| Channel 12 description | 03,16 | 18188 | 16 bytes UTF-8 | |
| Channel 13 description | 03,16 | 18196 | 16 bytes UTF-8 | |
| Channel 14 description | 03,16 | 18204 | 16 bytes UTF-8 | |
| Channel 15 description | 03,16 | 18212 | 16 bytes UTF-8 | |
| Channel 16 description | 03,16 | 18220 | 16 bytes UTF-8 | |
| Channel 17 description | 03,16 | 18228 | 16 bytes UTF-8 | |
| Channel 18 description | 03,16 | 18236 | 16 bytes UTF-8 | |
| Channel 19 description | 03,16 | 18244 | 16 bytes UTF-8 | |
| Channel 20 description | 03,16 | 18252 | 16 bytes UTF-8 | |
| Channel 21 description | 03,16 | 18260 | 16 bytes UTF-8 | |
| Channel 22 description | 03,16 | 18268 | 16 bytes UTF-8 | |
| Channel 23 description | 03,16 | 18276 | 16 bytes UTF-8 | |
| Channel 24 description | 03,16 | 18284 | 16 bytes UTF-8 | |
| | | | | |
| Channel 1 parameter 1 | 03,06,16 | 18300 | 16-bit unsign int | none(0), s01(3), s02(4), s03(5), s04(6), s05(7), s06(8), s07(9), s08(10), s09(11), s10(12), s11(13), s12(14), s13(15), s14(16), s15(17), s16(18), s17(19), s18(20), s19(21), s20(22), s21(23), s22(24), s23(25), s24(26), a01(27), a02(28), a03(29), a04(30), d01(31), d02(32), d03(33), d04(34) |
| Channel 2 parameter 1 | 03,06,16 | 18301 | 16-bit unsign int | —"— |
| Channel 3 parameter 1 | 03,06,16 | 18302 | 16-bit unsign int | —"— |
| Channel 4 parameter 1 | 03,06,16 | 18303 | 16-bit unsign int | —"— |
| Channel 5 parameter 1 | 03,06,16 | 18304 | 16-bit unsign int | —"— |

| | | | | |
|---|---|---|---|---|
| Channel 6 parameter 1 | 03,06,16 | 18305 | 16-bit unsign int | —"— |
| Channel 7 parameter 1 | 03,06,16 | 18306 | 16-bit unsign int | —"— |
| Channel 8 parameter 1 | 03,06,16 | 18307 | 16-bit unsign int | —"— |
| Channel 9 parameter 1 | 03,06,16 | 18308 | 16-bit unsign int | —"— |
| Channel 10 parameter 1 | 03,06,16 | 18309 | 16-bit unsign int | —"— |
| Channel 11 parameter 1 | 03,06,16 | 18310 | 16-bit unsign int | —"— |
| Channel 12 parameter 1 | 03,06,16 | 18311 | 16-bit unsign int | —"— |
| Channel 13 parameter 1 | 03,06,16 | 18312 | 16-bit unsign int | —"— |
| Channel 14 parameter 1 | 03,06,16 | 18313 | 16-bit unsign int | —"— |
| Channel 15 parameter 1 | 03,06,16 | 18314 | 16-bit unsign int | —"— |
| Channel 16 parameter 1 | 03,06,16 | 18315 | 16-bit unsign int | —"— |
| Channel 17 parameter 1 | 03,06,16 | 18316 | 16-bit unsign int | —"— |
| Channel 18 parameter 1 | 03,06,16 | 18317 | 16-bit unsign int | —"— |
| Channel 19 parameter 1 | 03,06,16 | 18318 | 16-bit unsign int | —"— |
| Channel 20 parameter 1 | 03,06,16 | 18319 | 16-bit unsign int | —"— |
| Channel 21 parameter 1 | 03,06,16 | 18320 | 16-bit unsign int | —"— |
| Channel 22 parameter 1 | 03,06,16 | 18321 | 16-bit unsign int | —"— |
| Channel 23 parameter 1 | 03,06,16 | 18322 | 16-bit unsign int | —"— |
| Channel 24 parameter 1 | 03,06,16 | 18323 | 16-bit unsign int | —"— |
| | | | | |
| Channel 1 op 1 | 03,06,16 | 18400 | 16-bit unsign int | none(0), multiplication(1), division(2), sum(3), subtract(4) |
| Channel 2 op 1 | 03,06,16 | 18401 | 16-bit unsign int | —"— |
| Channel 3 op 1 | 03,06,16 | 18402 | 16-bit unsign int | —"— |
| Channel 4 op 1 | 03,06,16 | 18403 | 16-bit unsign int | —"— |
| Channel 5 op 1 | 03,06,16 | 18404 | 16-bit unsign int | —"— |
| Channel 6 op 1 | 03,06,16 | 18405 | 16-bit unsign int | —"— |
| Channel 7 op 1 | 03,06,16 | 18406 | 16-bit unsign int | —"— |
| Channel 8 op 1 | 03,06,16 | 18407 | 16-bit unsign int | —"— |
| Channel 9 op 1 | 03,06,16 | 18408 | 16-bit unsign int | —"— |
| Channel 10 op 1 | 03,06,16 | 18409 | 16-bit unsign int | —"— |
| Channel 11 op 1 | 03,06,16 | 18410 | 16-bit unsign int | —"— |
| Channel 12 op 1 | 03,06,16 | 18411 | 16-bit unsign int | —"— |
| Channel 13 op 1 | 03,06,16 | 18412 | 16-bit unsign int | —"— |
| Channel 14 op 1 | 03,06,16 | 18413 | 16-bit unsign int | —"— |
| Channel 15 op 1 | 03,06,16 | 18414 | 16-bit unsign int | —"— |
| Channel 16 op 1 | 03,06,16 | 18415 | 16-bit unsign int | —"— |
| Channel 17 op 1 | 03,06,16 | 18416 | 16-bit unsign int | —"— |
| Channel 18 op 1 | 03,06,16 | 18417 | 16-bit unsign int | —"— |
| Channel 19 op 1 | 03,06,16 | 18418 | 16-bit unsign int | —"— |
| Channel 20 op 1 | 03,06,16 | 18419 | 16-bit unsign int | —"— |
| Channel 21 op 1 | 03,06,16 | 18420 | 16-bit unsign int | —"— |
| Channel 22 op 1 | 03,06,16 | 18421 | 16-bit unsign int | —"— |
| Channel 23 op 1 | 03,06,16 | 18422 | 16-bit unsign int | —"— |
| Channel 24 op 1 | 03,06,16 | 18423 | 16-bit unsign int | —"— |
| | | | | |
| Channel 1 parameter 2 | 03,06,16 | 18500 | 16-bit unsign int | none(0), s01(3), s02(4), s03(5), s04(6), s05(7), |

| | | | | |
|---|---|---|---|---|
| | | | | s06(8), s07(9), s08(10), s09(11), s10(12), s11(13), s12(14), s13(15), s14(16), s15(17), s16(18), s17(19), s18(20), s19(21), s20(22), s21(23), s22(24), s23(25), s24(26), a01(27), a02(28), a03(29), a04(30), d01(31), d02(32), d03(33), d04(34) |
| Channel 2 parameter 2 | 03,06,16 | 18501 | 16-bit unsign int | —"— |
| Channel 3 parameter 2 | 03,06,16 | 18502 | 16-bit unsign int | —"— |
| Channel 4 parameter 2 | 03,06,16 | 18503 | 16-bit unsign int | —"— |
| Channel 5 parameter 2 | 03,06,16 | 18504 | 16-bit unsign int | —"— |
| Channel 6 parameter 2 | 03,06,16 | 18505 | 16-bit unsign int | —"— |
| Channel 7 parameter 2 | 03,06,16 | 18506 | 16-bit unsign int | —"— |
| Channel 8 parameter 2 | 03,06,16 | 18507 | 16-bit unsign int | —"— |
| Channel 9 parameter 2 | 03,06,16 | 18508 | 16-bit unsign int | —"— |
| Channel 10 parameter 2 | 03,06,16 | 18509 | 16-bit unsign int | —"— |
| Channel 11 parameter 2 | 03,06,16 | 18510 | 16-bit unsign int | —"— |
| Channel 12 parameter 2 | 03,06,16 | 18511 | 16-bit unsign int | —"— |
| Channel 13 parameter 2 | 03,06,16 | 18512 | 16-bit unsign int | —"— |
| Channel 14 parameter 2 | 03,06,16 | 18513 | 16-bit unsign int | —"— |
| Channel 15 parameter 2 | 03,06,16 | 18514 | 16-bit unsign int | —"— |
| Channel 16 parameter 2 | 03,06,16 | 18515 | 16-bit unsign int | —"— |
| Channel 17 parameter 2 | 03,06,16 | 18516 | 16-bit unsign int | —"— |
| Channel 18 parameter 2 | 03,06,16 | 18517 | 16-bit unsign int | —"— |
| Channel 19 parameter 2 | 03,06,16 | 18518 | 16-bit unsign int | —"— |
| Channel 20 parameter 2 | 03,06,16 | 18519 | 16-bit unsign int | —"— |
| Channel 21 parameter 2 | 03,06,16 | 18520 | 16-bit unsign int | —"— |
| Channel 22 parameter 2 | 03,06,16 | 18521 | 16-bit unsign int | —"— |
| Channel 23 parameter 2 | 03,06,16 | 18522 | 16-bit unsign int | —"— |
| Channel 24 parameter 2 | 03,06,16 | 18523 | 16-bit unsign int | —"— |
| | | | | |
| Channel 1 op 2 | 03,06,16 | 18600 | 16-bit unsign int | none(0), multiplication(1), division(2), sum(3), subtract(4) |
| Channel 2 op 2 | 03,06,16 | 18601 | 16-bit unsign int | —"— |
| Channel 3 op 2 | 03,06,16 | 18602 | 16-bit unsign int | —"— |
| Channel 4 op 2 | 03,06,16 | 18603 | 16-bit unsign int | —"— |
| Channel 5 op 2 | 03,06,16 | 18604 | 16-bit unsign int | —"— |
| Channel 6 op 2 | 03,06,16 | 18605 | 16-bit unsign int | —"— |
| Channel 7 op 2 | 03,06,16 | 18606 | 16-bit unsign int | —"— |
| Channel 8 op 2 | 03,06,16 | 18607 | 16-bit unsign int | —"— |
| Channel 9 op 2 | 03,06,16 | 18608 | 16-bit unsign int | —"— |
| Channel 10 op 2 | 03,06,16 | 18609 | 16-bit unsign int | —"— |
| Channel 11 op 2 | 03,06,16 | 18610 | 16-bit unsign int | —"— |
| Channel 12 op 2 | 03,06,16 | 18611 | 16-bit unsign int | —"— |
| Channel 13 op 2 | 03,06,16 | 18612 | 16-bit unsign int | —"— |
| Channel 14 op 2 | 03,06,16 | 18613 | 16-bit unsign int | —"— |
| Channel 15 op 2 | 03,06,16 | 18614 | 16-bit unsign int | —"— |

| | | | | |
|---|---|---|---|---|
| Channel 16 op 2 | 03,06,16 | 18615 | 16-bit unsign int | —"— |
| Channel 17 op 2 | 03,06,16 | 18616 | 16-bit unsign int | —"— |
| Channel 18 op 2 | 03,06,16 | 18617 | 16-bit unsign int | —"— |
| Channel 19 op 2 | 03,06,16 | 18618 | 16-bit unsign int | —"— |
| Channel 20 op 2 | 03,06,16 | 18619 | 16-bit unsign int | —"— |
| Channel 21 op 2 | 03,06,16 | 18620 | 16-bit unsign int | —"— |
| Channel 22 op 2 | 03,06,16 | 18621 | 16-bit unsign int | —"— |
| Channel 23 op 2 | 03,06,16 | 18622 | 16-bit unsign int | —"— |
| Channel 24 op 2 | 03,06,16 | 18623 | 16-bit unsign int | —"— |
| | | | | |
| Channel 1 coeff 1 | 03,16 | 18700 | 32-bit Float | |
| Channel 2 coeff 1 | 03,16 | 18702 | 32-bit Float | |
| Channel 3 coeff 1 | 03,16 | 18704 | 32-bit Float | |
| Channel 4 coeff 1 | 03,16 | 18706 | 32-bit Float | |
| Channel 5 coeff 1 | 03,16 | 18708 | 32-bit Float | |
| Channel 6 coeff 1 | 03,16 | 18710 | 32-bit Float | |
| Channel 7 coeff 1 | 03,16 | 18712 | 32-bit Float | |
| Channel 8 coeff 1 | 03,16 | 18714 | 32-bit Float | |
| Channel 9 coeff 1 | 03,16 | 18716 | 32-bit Float | |
| Channel 10 coeff 1 | 03,16 | 18718 | 32-bit Float | |
| Channel 11 coeff 1 | 03,16 | 18720 | 32-bit Float | |
| Channel 12 coeff 1 | 03,16 | 18722 | 32-bit Float | |
| Channel 13 coeff 1 | 03,16 | 18724 | 32-bit Float | |
| Channel 14 coeff 1 | 03,16 | 18726 | 32-bit Float | |
| Channel 15 coeff 1 | 03,16 | 18728 | 32-bit Float | |
| Channel 16 coeff 1 | 03,16 | 18730 | 32-bit Float | |
| Channel 17 coeff 1 | 03,16 | 18732 | 32-bit Float | |
| Channel 18 coeff 1 | 03,16 | 18734 | 32-bit Float | |
| Channel 19 coeff 1 | 03,16 | 18736 | 32-bit Float | |
| Channel 20 coeff 1 | 03,16 | 18738 | 32-bit Float | |
| Channel 21 coeff 1 | 03,16 | 18740 | 32-bit Float | |
| Channel 22 coeff 1 | 03,16 | 18742 | 32-bit Float | |
| Channel 23 coeff 1 | 03,16 | 18744 | 32-bit Float | |
| Channel 24 coeff 1 | 03,16 | 18746 | 32-bit Float | |
| | | | | |
| Channel 1 op 3 | 03,06,16 | 18800 | 16-bit unsign int | none(0), multiplication(1), division(2), sum(3), subtract(4) |
| Channel 2 op 3 | 03,06,16 | 18801 | 16-bit unsign int | —"— |
| Channel 3 op 3 | 03,06,16 | 18802 | 16-bit unsign int | —"— |
| Channel 4 op 3 | 03,06,16 | 18803 | 16-bit unsign int | —"— |
| Channel 5 op 3 | 03,06,16 | 18804 | 16-bit unsign int | —"— |
| Channel 6 op 3 | 03,06,16 | 18805 | 16-bit unsign int | —"— |
| Channel 7 op 3 | 03,06,16 | 18806 | 16-bit unsign int | —"— |
| Channel 8 op 3 | 03,06,16 | 18807 | 16-bit unsign int | —"— |
| Channel 9 op 3 | 03,06,16 | 18808 | 16-bit unsign int | —"— |
| Channel 10 op 3 | 03,06,16 | 18809 | 16-bit unsign int | —"— |
| Channel 11 op 3 | 03,06,16 | 18810 | 16-bit unsign int | —"— |
| Channel 12 op 3 | 03,06,16 | 18811 | 16-bit unsign int | —"— |

| | | | | |
|---|---|---|---|---|
| Channel 13 op 3 | 03,06,16 | 18812 | 16-bit unsign int | —"— |
| Channel 14 op 3 | 03,06,16 | 18813 | 16-bit unsign int | —"— |
| Channel 15 op 3 | 03,06,16 | 18814 | 16-bit unsign int | —"— |
| Channel 16 op 3 | 03,06,16 | 18815 | 16-bit unsign int | —"— |
| Channel 17 op 3 | 03,06,16 | 18816 | 16-bit unsign int | —"— |
| Channel 18 op 3 | 03,06,16 | 18817 | 16-bit unsign int | —"— |
| Channel 19 op 3 | 03,06,16 | 18818 | 16-bit unsign int | —"— |
| Channel 20 op 3 | 03,06,16 | 18819 | 16-bit unsign int | —"— |
| Channel 21 op 3 | 03,06,16 | 18820 | 16-bit unsign int | —"— |
| Channel 22 op 3 | 03,06,16 | 18821 | 16-bit unsign int | —"— |
| Channel 23 op 3 | 03,06,16 | 18822 | 16-bit unsign int | —"— |
| Channel 24 op 3 | 03,06,16 | 18823 | 16-bit unsign int | —"— |
| | | | | |
| Channel 1 coeff 2 | 03,16 | 18900 | 32-bit Float | |
| Channel 2 coeff 2 | 03,16 | 18902 | 32-bit Float | |
| Channel 3 coeff 2 | 03,16 | 18904 | 32-bit Float | |
| Channel 4 coeff 2 | 03,16 | 18906 | 32-bit Float | |
| Channel 5 coeff 2 | 03,16 | 18908 | 32-bit Float | |
| Channel 6 coeff 2 | 03,16 | 18910 | 32-bit Float | |
| Channel 7 coeff 2 | 03,16 | 18912 | 32-bit Float | |
| Channel 8 coeff 2 | 03,16 | 18914 | 32-bit Float | |
| Channel 9 coeff 2 | 03,16 | 18916 | 32-bit Float | |
| Channel 10 coeff 2 | 03,16 | 18918 | 32-bit Float | |
| Channel 11 coeff 2 | 03,16 | 18920 | 32-bit Float | |
| Channel 12 coeff 2 | 03,16 | 18922 | 32-bit Float | |
| Channel 13 coeff 2 | 03,16 | 18924 | 32-bit Float | |
| Channel 14 coeff 2 | 03,16 | 18926 | 32-bit Float | |
| Channel 15 coeff 2 | 03,16 | 18928 | 32-bit Float | |
| Channel 16 coeff 2 | 03,16 | 18930 | 32-bit Float | |
| Channel 17 coeff 2 | 03,16 | 18932 | 32-bit Float | |
| Channel 18 coeff 2 | 03,16 | 18934 | 32-bit Float | |
| Channel 29 coeff 2 | 03,16 | 18936 | 32-bit Float | |
| Channel 20 coeff 2 | 03,16 | 18938 | 32-bit Float | |
| Channel 21 coeff 2 | 03,16 | 18940 | 32-bit Float | |
| Channel 22 coeff 2 | 03,16 | 18942 | 32-bit Float | |
| Channel 23 coeff 2 | 03,16 | 18944 | 32-bit Float | |
| Channel 24 coeff 2 | 03,16 | 18946 | 32-bit Float | |
| | | | | |
| Channel 1 unit | 03,16 | 19000 | 16 bytes UTF-8 | |
| Channel 2 unit | 03,16 | 19008 | 16 bytes UTF-8 | |
| Channel 3 unit | 03,16 | 19016 | 16 bytes UTF-8 | |
| Channel 4 unit | 03,16 | 19024 | 16 bytes UTF-8 | |
| Channel 5 unit | 03,16 | 19032 | 16 bytes UTF-8 | |
| Channel 6 unit | 03,16 | 19040 | 16 bytes UTF-8 | |
| Channel 7 unit | 03,16 | 19048 | 16 bytes UTF-8 | |
| Channel 8 unit | 03,16 | 19056 | 16 bytes UTF-8 | |
| Channel 9 unit | 03,16 | 19064 | 16 bytes UTF-8 | |
| Channel 10 unit | 03,16 | 19072 | 16 bytes UTF-8 | |

| | | | | |
|---|---|---|---|---|
| Channel 11 unit | 03,16 | 19080 | 16 bytes UTF-8 | |
| Channel 12 unit | 03,16 | 19088 | 16 bytes UTF-8 | |
| Channel 13 unit | 03,16 | 19096 | 16 bytes UTF-8 | |
| Channel 14 unit | 03,16 | 19104 | 16 bytes UTF-8 | |
| Channel 15 unit | 03,16 | 19112 | 16 bytes UTF-8 | |
| Channel 16 unit | 03,16 | 19120 | 16 bytes UTF-8 | |
| Channel 17 unit | 03,16 | 19128 | 16 bytes UTF-8 | |
| Channel 18 unit | 03,16 | 19136 | 16 bytes UTF-8 | |
| Channel 19 unit | 03,16 | 19144 | 16 bytes UTF-8 | |
| Channel 20 unit | 03,16 | 19152 | 16 bytes UTF-8 | |
| Channel 21 unit | 03,16 | 19160 | 16 bytes UTF-8 | |
| Channel 22 unit | 03,16 | 19168 | 16 bytes UTF-8 | |
| Channel 23 unit | 03,16 | 19176 | 16 bytes UTF-8 | |
| Channel 24 unit | 03,16 | 19184 | 16 bytes UTF-8 | |
| | | | | |
| Channel 1 comulative value | 03,16 | 19200 | 32-bit Float | |
| Channel 2 comulative value | 03,16 | 19202 | 32-bit Float | |
| Channel 3 comulative value | 03,16 | 19204 | 32-bit Float | |
| Channel 4 comulative value | 03,16 | 19206 | 32-bit Float | |
| Channel 5 comulative value | 03,16 | 19208 | 32-bit Float | |
| Channel 6 comulative value | 03,16 | 19210 | 32-bit Float | |
| Channel 7 comulative value | 03,16 | 19212 | 32-bit Float | |
| Channel 8 comulative value | 03,16 | 19214 | 32-bit Float | |
| Channel 9 comulative value | 03,16 | 19216 | 32-bit Float | |
| Channel 10 comulative value | 03,16 | 19218 | 32-bit Float | |
| Channel 11 comulative value | 03,16 | 19220 | 32-bit Float | |
| Channel 12 comulative value | 03,16 | 19222 | 32-bit Float | |
| Channel 13 comulative value | 03,16 | 19224 | 32-bit Float | |
| Channel 14 comulative value | 03,16 | 19226 | 32-bit Float | |
| Channel 15 comulative value | 03,16 | 19228 | 32-bit Float | |
| Channel 16 comulative value | 03,16 | 19230 | 32-bit Float | |
| Channel 17 comulative value | 03,16 | 19232 | 32-bit Float | |
| Channel 18 comulative value | 03,16 | 19234 | 32-bit Float | |
| Channel 19 comulative value | 03,16 | 19236 | 32-bit Float | |
| Channel 20 comulative value | 03,16 | 19238 | 32-bit Float | |
| Channel 21 comulative value | 03,16 | 19240 | 32-bit Float | |
| Channel 22 comulative value | 03,16 | 19242 | 32-bit Float | |
| Channel 23 comulative value | 03,16 | 19244 | 32-bit Float | |
| Channel 24 comulative value | 03,16 | 19246 | 32-bit Float | |
| | | | | |
| Channel 1 value | 03 | 19300 | 32-bit Float | |
| Channel 2 value | 03 | 19302 | 32-bit Float | |
| Channel 3 value | 03 | 19304 | 32-bit Float | |
| Channel 4 value | 03 | 19306 | 32-bit Float | |
| Channel 5 value | 03 | 19308 | 32-bit Float | |
| Channel 6 value | 03 | 19310 | 32-bit Float | |
| Channel 7 value | 03 | 19312 | 32-bit Float | |
| Channel 8 value | 03 | 19314 | 32-bit Float | |

| | | | | |
|---|---|---|---|---|
| Channel 9 value | 03 | 19316 | 32-bit Float | |
| Channel 10 value | 03 | 19318 | 32-bit Float | |
| Channel 11 value | 03 | 19320 | 32-bit Float | |
| Channel 12 value | 03 | 19322 | 32-bit Float | |
| Channel 13 value | 03 | 19324 | 32-bit Float | |
| Channel 14 value | 03 | 19326 | 32-bit Float | |
| Channel 15 value | 03 | 19328 | 32-bit Float | |
| Channel 16 value | 03 | 19330 | 32-bit Float | |
| Channel 17 value | 03 | 19332 | 32-bit Float | |
| Channel 18 value | 03 | 19334 | 32-bit Float | |
| Channel 19 value | 03 | 19336 | 32-bit Float | |
| Channel 20 value | 03 | 19338 | 32-bit Float | |
| Channel 21 value | 03 | 19340 | 32-bit Float | |
| Channel 22 value | 03 | 19342 | 32-bit Float | |
| Channel 23 value | 03 | 19344 | 32-bit Float | |
| Channel 24 value | 03 | 19346 | 32-bit Float | |
| | | | | |
| Channel 1 counter | 03 | 19400 | 32-bit unsign int | |
| Channel 2 counter | 03 | 19402 | 32-bit unsign int | |
| Channel 3 counter | 03 | 19404 | 32-bit unsign int | |
| Channel 4 counter | 03 | 19406 | 32-bit unsign int | |
| Channel 5 counter | 03 | 19408 | 32-bit unsign int | |
| Channel 6 counter | 03 | 19410 | 32-bit unsign int | |
| Channel 7 counter | 03 | 19412 | 32-bit unsign int | |
| Channel 8 counter | 03 | 19414 | 32-bit unsign int | |
| Channel 9 counter | 03 | 19416 | 32-bit unsign int | |
| Channel 10 counter | 03 | 19418 | 32-bit unsign int | |
| Channel 11 counter | 03 | 19420 | 32-bit unsign int | |
| Channel 12 counter | 03 | 19422 | 32-bit unsign int | |
| Channel 13 counter | 03 | 19424 | 32-bit unsign int | |
| Channel 14 counter | 03 | 19426 | 32-bit unsign int | |
| Channel 15 counter | 03 | 19428 | 32-bit unsign int | |
| Channel 16 counter | 03 | 19430 | 32-bit unsign int | |
| Channel 17 counter | 03 | 19432 | 32-bit unsign int | |
| Channel 18 counter | 03 | 19434 | 32-bit unsign int | |
| Channel 19 counter | 03 | 19436 | 32-bit unsign int | |
| Channel 20 counter | 03 | 19438 | 32-bit unsign int | |
| Channel 21 counter | 03 | 19440 | 32-bit unsign int | |
| Channel 22 counter | 03 | 19442 | 32-bit unsign int | |
| Channel 23 counter | 03 | 19444 | 32-bit unsign int | |
| Channel 24 counter | 03 | 19446 | 32-bit unsign int | |
| | | | | |
| Channel 1 alarm status | 03 | 19500 | 16-bit unsign int | undefined(0), normal(1), indeterminate(2), warning(3), minor(4), major(5), critical(6) |
| Channel 2 alarm status | 03 | 19501 | 16-bit unsign int | —"— |
| Channel 3 alarm status | 03 | 19502 | 16-bit unsign int | —"— |
| Channel 4 alarm status | 03 | 19503 | 16-bit unsign int | —"— |

| | | | | |
|---|---|---|---|---|
| Channel 5 alarm status | 03 | 19504 | 16-bit unsign int | —"— |
| Channel 6 alarm status | 03 | 19505 | 16-bit unsign int | —"— |
| Channel 7 alarm status | 03 | 19506 | 16-bit unsign int | —"— |
| Channel 8 alarm status | 03 | 19507 | 16-bit unsign int | —"— |
| Channel 9 alarm status | 03 | 19508 | 16-bit unsign int | —"— |
| Channel 10 alarm status | 03 | 19509 | 16-bit unsign int | —"— |
| Channel 11 alarm status | 03 | 19510 | 16-bit unsign int | —"— |
| Channel 12 alarm status | 03 | 19511 | 16-bit unsign int | —"— |
| Channel 13 alarm status | 03 | 19512 | 16-bit unsign int | —"— |
| Channel 14 alarm status | 03 | 19513 | 16-bit unsign int | —"— |
| Channel 15 alarm status | 03 | 19514 | 16-bit unsign int | —"— |
| Channel 16 alarm status | 03 | 19515 | 16-bit unsign int | —"— |
| Channel 17 alarm status | 03 | 19516 | 16-bit unsign int | —"— |
| Channel 18 alarm status | 03 | 19517 | 16-bit unsign int | —"— |
| Channel 19 alarm status | 03 | 19518 | 16-bit unsign int | —"— |
| Channel 20 alarm status | 03 | 19519 | 16-bit unsign int | —"— |
| Channel 21 alarm status | 03 | 19520 | 16-bit unsign int | —"— |
| Channel 22 alarm status | 03 | 19521 | 16-bit unsign int | —"— |
| Channel 23 alarm status | 03 | 19522 | 16-bit unsign int | —"— |
| Channel 24 alarm status | 03 | 19523 | 16-bit unsign int | —"— |
| | | | | |
| Alarm 1 description | 03,16 | 20000 | 16 bytes UTF-8 | |
| Alarm 2 description | 03,16 | 20008 | 16 bytes UTF-8 | |
| Alarm 3 description | 03,16 | 20016 | 16 bytes UTF-8 | |
| Alarm 4 description | 03,16 | 20024 | 16 bytes UTF-8 | |
| Alarm 5 description | 03,16 | 20032 | 16 bytes UTF-8 | |
| Alarm 6 description | 03,16 | 20040 | 16 bytes UTF-8 | |
| Alarm 7 description | 03,16 | 20048 | 16 bytes UTF-8 | |
| Alarm 8 description | 03,16 | 20056 | 16 bytes UTF-8 | |
| Alarm 9 description | 03,16 | 20064 | 16 bytes UTF-8 | |
| Alarm 10 description | 03,16 | 20072 | 16 bytes UTF-8 | |
| Alarm 11 description | 03,16 | 20080 | 16 bytes UTF-8 | |
| Alarm 12 description | 03,16 | 20088 | 16 bytes UTF-8 | |
| Alarm 13 description | 03,16 | 20096 | 16 bytes UTF-8 | |
| Alarm 14 description | 03,16 | 20104 | 16 bytes UTF-8 | |
| Alarm 15 description | 03,16 | 20112 | 16 bytes UTF-8 | |
| Alarm 16 description | 03,16 | 20120 | 16 bytes UTF-8 | |
| Alarm 17 description | 03,16 | 20128 | 16 bytes UTF-8 | |
| Alarm 18 description | 03,16 | 20136 | 16 bytes UTF-8 | |
| Alarm 19 description | 03,16 | 20144 | 16 bytes UTF-8 | |
| Alarm 20 description | 03,16 | 20152 | 16 bytes UTF-8 | |
| Alarm 21 description | 03,16 | 20160 | 16 bytes UTF-8 | |
| Alarm 22 description | 03,16 | 20168 | 16 bytes UTF-8 | |
| Alarm 23 description | 03,16 | 20176 | 16 bytes UTF-8 | |
| Alarm 24 description | 03,16 | 20184 | 16 bytes UTF-8 | |
| Alarm 1 condition 1 channel | 03,06,16 | 20200 | 16-bit unsign int | none(0), v01(1), v02(2), v03(3), v04(4), v05(5), v06(6), v07(7), v08(8), |

| | | | | |
|---|---|---|---|---|
| | | | | v09(9), v10(10), v11(11), v12(12), v13(13), v14(14), v15(15), v16(16), v17(17), v18(18), v19(19), v20(20), v21(21), v22(22), v23(23), v24(24) |
| Alarm 2 condition 1 channel | 03,06,16 | 20201 | 16-bit unsign int | —"— |
| Alarm 3 condition 1 channel | 03,06,16 | 20202 | 16-bit unsign int | —"— |
| Alarm 4 condition 1 channel | 03,06,16 | 20203 | 16-bit unsign int | —"— |
| Alarm 5 condition 1 channel | 03,06,16 | 20204 | 16-bit unsign int | —"— |
| Alarm 6 condition 1 channel | 03,06,16 | 20205 | 16-bit unsign int | —"— |
| Alarm 7 condition 1 channel | 03,06,16 | 20206 | 16-bit unsign int | —"— |
| Alarm 8 condition 1 channel | 03,06,16 | 20207 | 16-bit unsign int | —"— |
| Alarm 9 condition 1 channel | 03,06,16 | 20208 | 16-bit unsign int | —"— |
| Alarm 10 condition 1 channel | 03,06,16 | 20209 | 16-bit unsign int | —"— |
| Alarm 11 condition 1 channel | 03,06,16 | 20210 | 16-bit unsign int | —"— |
| Alarm 12 condition 1 channel | 03,06,16 | 20211 | 16-bit unsign int | —"— |
| Alarm 13 condition 1 channel | 03,06,16 | 20212 | 16-bit unsign int | —"— |
| Alarm 14 condition 1 channel | 03,06,16 | 20213 | 16-bit unsign int | —"— |
| Alarm 15 condition 1 channel | 03,06,16 | 20214 | 16-bit unsign int | —"— |
| Alarm 16 condition 1 channel | 03,06,16 | 20215 | 16-bit unsign int | —"— |
| Alarm 17 condition 1 channel | 03,06,16 | 20216 | 16-bit unsign int | —"— |
| Alarm 18 condition 1 channel | 03,06,16 | 20217 | 16-bit unsign int | —"— |
| Alarm 19 condition 1 channel | 03,06,16 | 20218 | 16-bit unsign int | —"— |
| Alarm 20 condition 1 channel | 03,06,16 | 20219 | 16-bit unsign int | —"— |
| Alarm 21 condition 1 channel | 03,06,16 | 20220 | 16-bit unsign int | —"— |
| Alarm 22 condition 1 channel | 03,06,16 | 20221 | 16-bit unsign int | —"— |
| Alarm 23 condition 1 channel | 03,06,16 | 20222 | 16-bit unsign int | —"— |
| Alarm 24 condition 1 channel | 03,06,16 | 20223 | 16-bit unsign int | —"— |
| | | | | |
| Alarm 1 condition 1 operand | 03,06,16 | 20300 | 16-bit unsign int | larger(0), less(1) |
| Alarm 2 condition 1 operand | 03,06,16 | 20301 | 16-bit unsign int | larger(0), less(1) |
| Alarm 3 condition 1 operand | 03,06,16 | 20302 | 16-bit unsign int | larger(0), less(1) |
| Alarm 4 condition 1 operand | 03,06,16 | 20303 | 16-bit unsign int | larger(0), less(1) |
| Alarm 5 condition 1 operand | 03,06,16 | 20304 | 16-bit unsign int | larger(0), less(1) |
| Alarm 6 condition 1 operand | 03,06,16 | 20305 | 16-bit unsign int | larger(0), less(1) |
| Alarm 7 condition 1 operand | 03,06,16 | 20306 | 16-bit unsign int | larger(0), less(1) |
| Alarm 8 condition 1 operand | 03,06,16 | 20307 | 16-bit unsign int | larger(0), less(1) |
| Alarm 9 condition 1 operand | 03,06,16 | 20308 | 16-bit unsign int | larger(0), less(1) |
| Alarm 10 condition 1 operand | 03,06,16 | 20309 | 16-bit unsign int | larger(0), less(1) |
| Alarm 11 condition 1 operand | 03,06,16 | 20310 | 16-bit unsign int | larger(0), less(1) |
| Alarm 12 condition 1 operand | 03,06,16 | 20311 | 16-bit unsign int | larger(0), less(1) |
| Alarm 13 condition 1 operand | 03,06,16 | 20312 | 16-bit unsign int | larger(0), less(1) |
| Alarm 14 condition 1 operand | 03,06,16 | 20313 | 16-bit unsign int | larger(0), less(1) |
| Alarm 15 condition 1 operand | 03,06,16 | 20314 | 16-bit unsign int | larger(0), less(1) |
| Alarm 16 condition 1 operand | 03,06,16 | 20315 | 16-bit unsign int | larger(0), less(1) |
| Alarm 17 condition 1 operand | 03,06,16 | 20316 | 16-bit unsign int | larger(0), less(1) |
| Alarm 18 condition 1 operand | 03,06,16 | 20317 | 16-bit unsign int | larger(0), less(1) |
| Alarm 19 condition 1 operand | 03,06,16 | 20318 | 16-bit unsign int | larger(0), less(1) |

| | | | | |
|---|---|---|---|---|
| Alarm 20 condition 1 operand | 03,06,16 | 20319 | 16-bit unsign int | larger(0), less(1) |
| Alarm 21 condition 1 operand | 03,06,16 | 20320 | 16-bit unsign int | larger(0), less(1) |
| Alarm 22 condition 1 operand | 03,06,16 | 20321 | 16-bit unsign int | larger(0), less(1) |
| Alarm 23 condition 1 operand | 03,06,16 | 20322 | 16-bit unsign int | larger(0), less(1) |
| Alarm 24 condition 1 operand | 03,06,16 | 20323 | 16-bit unsign int | larger(0), less(1) |
| | | | | |
| Alarm 1 condition 1 limit | 03,16 | 20400 | 32-bit Float | |
| Alarm 2 condition 1 limit | 03,16 | 20402 | 32-bit Float | |
| Alarm 3 condition 1 limit | 03,16 | 20404 | 32-bit Float | |
| Alarm 4 condition 1 limit | 03,16 | 20406 | 32-bit Float | |
| Alarm 5 condition 1 limit | 03,16 | 20408 | 32-bit Float | |
| Alarm 6 condition 1 limit | 03,16 | 20410 | 32-bit Float | |
| Alarm 7 condition 1 limit | 03,16 | 20412 | 32-bit Float | |
| Alarm 8 condition 1 limit | 03,16 | 20414 | 32-bit Float | |
| Alarm 9 condition 1 limit | 03,16 | 20416 | 32-bit Float | |
| Alarm 10 condition 1 limit | 03,16 | 20418 | 32-bit Float | |
| Alarm 11 condition 1 limit | 03,16 | 20420 | 32-bit Float | |
| Alarm 12 condition 1 limit | 03,16 | 20422 | 32-bit Float | |
| Alarm 13 condition 1 limit | 03,16 | 20424 | 32-bit Float | |
| Alarm 14 condition 1 limit | 03,16 | 20426 | 32-bit Float | |
| Alarm 15 condition 1 limit | 03,16 | 20428 | 32-bit Float | |
| Alarm 16 condition 1 limit | 03,16 | 20430 | 32-bit Float | |
| Alarm 17 condition 1 limit | 03,16 | 20432 | 32-bit Float | |
| Alarm 18 condition 1 limit | 03,16 | 20434 | 32-bit Float | |
| Alarm 19 condition 1 limit | 03,16 | 20436 | 32-bit Float | |
| Alarm 20 condition 1 limit | 03,16 | 20438 | 32-bit Float | |
| Alarm 21 condition 1 limit | 03,16 | 20440 | 32-bit Float | |
| Alarm 22 condition 1 limit | 03,16 | 20442 | 32-bit Float | |
| Alarm 23 condition 1 limit | 03,16 | 20444 | 32-bit Float | |
| Alarm 23 condition 1 limit | 03,16 | 20446 | 32-bit Float | |
| | | | | |
| Alarm 1 condition 1 hysteresis | 03,16 | 20500 | 32-bit Float | |
| Alarm 2 condition 1 hysteresis | 03,16 | 20502 | 32-bit Float | |
| Alarm 3 condition 1 hysteresis | 03,16 | 20504 | 32-bit Float | |
| Alarm 4 condition 1 hysteresis | 03,16 | 20506 | 32-bit Float | |
| Alarm 5 condition 1 hysteresis | 03,16 | 20508 | 32-bit Float | |
| Alarm 6 condition 1 hysteresis | 03,16 | 20510 | 32-bit Float | |
| Alarm 7 condition 1 hysteresis | 03,16 | 20512 | 32-bit Float | |
| Alarm 8 condition 1 hysteresis | 03,16 | 20514 | 32-bit Float | |
| Alarm 9 condition 1 hysteresis | 03,16 | 20516 | 32-bit Float | |
| Alarm 10 condition 1 hysteresis | 03,16 | 20518 | 32-bit Float | |
| Alarm 11 condition 1 hysteresis | 03,16 | 20520 | 32-bit Float | |
| Alarm 12 condition 1 hysteresis | 03,16 | 20522 | 32-bit Float | |
| Alarm 13 condition 1 hysteresis | 03,16 | 20524 | 32-bit Float | |

| | | | | |
|---|---|---|---|---|
| Alarm 14 condition 1 hysteresis | 03,16 | 20526 | 32-bit Float | |
| Alarm 15 condition 1 hysteresis | 03,16 | 20528 | 32-bit Float | |
| Alarm 16 condition 1 hysteresis | 03,16 | 20530 | 32-bit Float | |
| Alarm 17 condition 1 hysteresis | 03,16 | 20532 | 32-bit Float | |
| Alarm 18 condition 1 hysteresis | 03,16 | 20534 | 32-bit Float | |
| Alarm 19 condition 1 hysteresis | 03,16 | 20536 | 32-bit Float | |
| Alarm 20 condition 1 hysteresis | 03,16 | 20538 | 32-bit Float | |
| Alarm 21 condition 1 hysteresis | 03,16 | 20540 | 32-bit Float | |
| Alarm 22 condition 1 hysteresis | 03,16 | 20542 | 32-bit Float | |
| Alarm 23 condition 1 hysteresis | 03,16 | 20544 | 32-bit Float | |
| Alarm 24 condition 1 hysteresis | 03,16 | 20546 | 32-bit Float | |
| | | | | |
| Alarm 1 condition 1 discrete al. state | 03,06,16 | 20600 | 16-bit unsign int | open(0), closed(1) |
| Alarm 2 condition 1 discrete al. state | 03,06,16 | 20601 | 16-bit unsign int | open(0), closed(1) |
| Alarm 3 condition 1 discrete al. state | 03,06,16 | 20602 | 16-bit unsign int | open(0), closed(1) |
| Alarm 4 condition 1 discrete al. state | 03,06,16 | 20603 | 16-bit unsign int | open(0), closed(1) |
| Alarm 5 condition 1 discrete al. state | 03,06,16 | 20604 | 16-bit unsign int | open(0), closed(1) |
| Alarm 6 condition 1 discrete al. state | 03,06,16 | 20605 | 16-bit unsign int | open(0), closed(1) |
| Alarm 7 condition 1 discrete al. state | 03,06,16 | 20606 | 16-bit unsign int | open(0), closed(1) |
| Alarm 8 condition 1 discrete al. state | 03,06,16 | 20607 | 16-bit unsign int | open(0), closed(1) |
| Alarm 9 condition 1 discrete al. state | 03,06,16 | 20608 | 16-bit unsign int | open(0), closed(1) |
| Alarm 10 condition 1 discrete al. state | 03,06,16 | 20609 | 16-bit unsign int | open(0), closed(1) |
| Alarm 11 condition 1 discrete al. state | 03,06,16 | 20610 | 16-bit unsign int | open(0), closed(1) |
| Alarm 12 condition 1 discrete al. state | 03,06,16 | 20611 | 16-bit unsign int | open(0), closed(1) |
| Alarm 13 condition 1 discrete al. state | 03,06,16 | 20612 | 16-bit unsign int | open(0), closed(1) |
| Alarm 14 condition 1 discrete al. state | 03,06,16 | 20613 | 16-bit unsign int | open(0), closed(1) |
| Alarm 15 condition 1 discrete al. state | 03,06,16 | 20614 | 16-bit unsign int | open(0), closed(1) |
| Alarm 16 condition 1 discrete al. state | 03,06,16 | 20615 | 16-bit unsign int | open(0), closed(1) |

| | | | | |
|---|---|---|---|---|
| Alarm 17 condition 1 discrete al. state | 03,06,16 | 20616 | 16-bit unsign int | open(0), closed(1) |
| Alarm 18 condition 1 discrete al. state | 03,06,16 | 20617 | 16-bit unsign int | open(0), closed(1) |
| Alarm 19 condition 1 discrete al. state | 03,06,16 | 20618 | 16-bit unsign int | open(0), closed(1) |
| Alarm 20 condition 1 discrete al. state | 03,06,16 | 20619 | 16-bit unsign int | open(0), closed(1) |
| Alarm 21 condition 1 discrete al. state | 03,06,16 | 20620 | 16-bit unsign int | open(0), closed(1) |
| Alarm 22 condition 1 discrete al. state | 03,06,16 | 20621 | 16-bit unsign int | open(0), closed(1) |
| Alarm 23 condition 1 discrete al. state | 03,06,16 | 20622 | 16-bit unsign int | open(0), closed(1) |
| Alarm 24 condition 1 discrete al. state | 03,06,16 | 20623 | 16-bit unsign int | open(0), closed(1) |
| | | | | |
| Alarm 1 function | 03,06,16 | 20700 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 2 function | 03,06,16 | 20701 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 3 function | 03,06,16 | 20702 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 4 function | 03,06,16 | 20703 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 5 function | 03,06,16 | 20704 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 6 function | 03,06,16 | 20705 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 7 function | 03,06,16 | 20706 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 8 function | 03,06,16 | 20707 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 9 function | 03,06,16 | 20708 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 10 function | 03,06,16 | 20709 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 11 function | 03,06,16 | 20710 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 12 function | 03,06,16 | 20711 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 13 function | 03,06,16 | 20712 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 14 function | 03,06,16 | 20713 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 15 function | 03,06,16 | 20714 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 16 function | 03,06,16 | 20715 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 17 function | 03,06,16 | 20716 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 18 function | 03,06,16 | 20717 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 19 function | 03,06,16 | 20718 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 20 function | 03,06,16 | 20719 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 21 function | 03,06,16 | 20720 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 22 function | 03,06,16 | 20721 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 23 function | 03,06,16 | 20722 | 16-bit unsign int | none(0}, and(1), or(2) |
| Alarm 24 function | 03,06,16 | 20723 | 16-bit unsign int | none(0}, and(1), or(2) |
| | | | | |
| Alarm 1 condition 2 channel | 03,06,16 | 20800 | 16-bit unsign int | none(0), v01(1), v02(2), v03(3), v04(4), v05(5), v06(6), v07(7), v08(8), v09(9), v10(10), v11(11), v12(12), v13(13), v14(14), v15(15), v16(16), v17(17), v18(18), v19(19), v20(20), v21(21), v22(22), v23(23), v24(24) |

| | | | | |
|---|---|---|---|---|
| Alarm 2 condition 2 channel | 03,06,16 | 20801 | 16-bit unsign int | —"— |
| Alarm 3 condition 2 channel | 03,06,16 | 20802 | 16-bit unsign int | —"— |
| Alarm 4 condition 2 channel | 03,06,16 | 20803 | 16-bit unsign int | —"— |
| Alarm 5 condition 2 channel | 03,06,16 | 20804 | 16-bit unsign int | —"— |
| Alarm 6 condition 2 channel | 03,06,16 | 20805 | 16-bit unsign int | —"— |
| Alarm 7 condition 2 channel | 03,06,16 | 20806 | 16-bit unsign int | —"— |
| Alarm 8 condition 2 channel | 03,06,16 | 20807 | 16-bit unsign int | —"— |
| Alarm 9 condition 2 channel | 03,06,16 | 20808 | 16-bit unsign int | —"— |
| Alarm 10 condition 2 channel | 03,06,16 | 20809 | 16-bit unsign int | —"— |
| Alarm 11 condition 2 channel | 03,06,16 | 20810 | 16-bit unsign int | —"— |
| Alarm 12 condition 2 channel | 03,06,16 | 20811 | 16-bit unsign int | —"— |
| Alarm 13 condition 2 channel | 03,06,16 | 20812 | 16-bit unsign int | —"— |
| Alarm 14 condition 2 channel | 03,06,16 | 20813 | 16-bit unsign int | —"— |
| Alarm 15 condition 2 channel | 03,06,16 | 20814 | 16-bit unsign int | —"— |
| Alarm 16 condition 2 channel | 03,06,16 | 20815 | 16-bit unsign int | —"— |
| Alarm 17 condition 2 channel | 03,06,16 | 20816 | 16-bit unsign int | —"— |
| Alarm 18 condition 2 channel | 03,06,16 | 20817 | 16-bit unsign int | —"— |
| Alarm 19 condition 2 channel | 03,06,16 | 20818 | 16-bit unsign int | —"— |
| Alarm 20 condition 2 channel | 03,06,16 | 20819 | 16-bit unsign int | —"— |
| Alarm 21 condition 2 channel | 03,06,16 | 20820 | 16-bit unsign int | —"— |
| Alarm 22 condition 2 channel | 03,06,16 | 20821 | 16-bit unsign int | —"— |
| Alarm 23 condition 2 channel | 03,06,16 | 20822 | 16-bit unsign int | —"— |
| Alarm 24 condition 2 channel | 03,06,16 | 20823 | 16-bit unsign int | —"— |
| | | | | |
| Alarm 1 condition 2 operand | 03,06,16 | 20900 | 16-bit unsign int | larger(0), less(1) |
| Alarm 2 condition 2 operand | 03,06,16 | 20901 | 16-bit unsign int | larger(0), less(1) |
| Alarm 3 condition 2 operand | 03,06,16 | 20902 | 16-bit unsign int | larger(0), less(1) |
| Alarm 4 condition 2 operand | 03,06,16 | 20903 | 16-bit unsign int | larger(0), less(1) |
| Alarm 5 condition 2 operand | 03,06,16 | 20904 | 16-bit unsign int | larger(0), less(1) |
| Alarm 6 condition 2 operand | 03,06,16 | 20905 | 16-bit unsign int | larger(0), less(1) |
| Alarm 7 condition 2 operand | 03,06,16 | 20906 | 16-bit unsign int | larger(0), less(1) |
| Alarm 8 condition 2 operand | 03,06,16 | 20907 | 16-bit unsign int | larger(0), less(1) |
| Alarm 9 condition 2 operand | 03,06,16 | 20908 | 16-bit unsign int | larger(0), less(1) |
| Alarm 10 condition 2 operand | 03,06,16 | 20909 | 16-bit unsign int | larger(0), less(1) |
| Alarm 11 condition 2 operand | 03,06,16 | 20910 | 16-bit unsign int | larger(0), less(1) |
| Alarm 12 condition 2 operand | 03,06,16 | 20911 | 16-bit unsign int | larger(0), less(1) |
| Alarm 13 condition 2 operand | 03,06,16 | 20912 | 16-bit unsign int | larger(0), less(1) |
| Alarm 14 condition 2 operand | 03,06,16 | 20913 | 16-bit unsign int | larger(0), less(1) |
| Alarm 15 condition 2 operand | 03,06,16 | 20914 | 16-bit unsign int | larger(0), less(1) |
| Alarm 16 condition 2 operand | 03,06,16 | 20915 | 16-bit unsign int | larger(0), less(1) |
| Alarm 17 condition 2 operand | 03,06,16 | 20916 | 16-bit unsign int | larger(0), less(1) |
| Alarm 18 condition 2 operand | 03,06,16 | 20917 | 16-bit unsign int | larger(0), less(1) |
| Alarm 19 condition 2 operand | 03,06,16 | 20918 | 16-bit unsign int | larger(0), less(1) |
| Alarm 20 condition 2 operand | 03,06,16 | 20919 | 16-bit unsign int | larger(0), less(1) |
| Alarm 21 condition 2 operand | 03,06,16 | 20920 | 16-bit unsign int | larger(0), less(1) |
| Alarm 22 condition 2 operand | 03,06,16 | 20921 | 16-bit unsign int | larger(0), less(1) |
| Alarm 23 condition 2 operand | 03,06,16 | 20922 | 16-bit unsign int | larger(0), less(1) |
| Alarm 24 condition 2 operand | 03,06,16 | 20923 | 16-bit unsign int | larger(0), less(1) |

| | | | | |
|---|---|---|---|---|
| Alarm 1 condition 2 limit | 03,16 | 21000 | 32-bit Float | |
| Alarm 2 condition 2 limit | 03,16 | 21002 | 32-bit Float | |
| Alarm 3 condition 2 limit | 03,16 | 21004 | 32-bit Float | |
| Alarm 4 condition 2 limit | 03,16 | 21006 | 32-bit Float | |
| Alarm 5 condition 2 limit | 03,16 | 21008 | 32-bit Float | |
| Alarm 6 condition 2 limit | 03,16 | 21010 | 32-bit Float | |
| Alarm 7 condition 2 limit | 03,16 | 21012 | 32-bit Float | |
| Alarm 8 condition 2 limit | 03,16 | 21014 | 32-bit Float | |
| Alarm 9 condition 2 limit | 03,16 | 21016 | 32-bit Float | |
| Alarm 10 condition 2 limit | 03,16 | 21018 | 32-bit Float | |
| Alarm 11 condition 2 limit | 03,16 | 21020 | 32-bit Float | |
| Alarm 12 condition 2 limit | 03,16 | 21022 | 32-bit Float | |
| Alarm 13 condition 2 limit | 03,16 | 21024 | 32-bit Float | |
| Alarm 14 condition 2 limit | 03,16 | 21026 | 32-bit Float | |
| Alarm 15 condition 2 limit | 03,16 | 21028 | 32-bit Float | |
| Alarm 16 condition 2 limit | 03,16 | 21030 | 32-bit Float | |
| Alarm 17 condition 2 limit | 03,16 | 21032 | 32-bit Float | |
| Alarm 18 condition 2 limit | 03,16 | 21034 | 32-bit Float | |
| Alarm 19 condition 2 limit | 03,16 | 21036 | 32-bit Float | |
| Alarm 20 condition 2 limit | 03,16 | 21038 | 32-bit Float | |
| Alarm 21 condition 2 limit | 03,16 | 21040 | 32-bit Float | |
| Alarm 22 condition 2 limit | 03,16 | 21042 | 32-bit Float | |
| Alarm 23 condition 2 limit | 03,16 | 21044 | 32-bit Float | |
| Alarm 24 condition 2 limit | 03,16 | 21046 | 32-bit Float | |
| Alarm 1 condition 2 hysteresis | 03,16 | 21100 | 32-bit Float | |
| Alarm 2 condition 2 hysteresis | 03,16 | 21102 | 32-bit Float | |
| Alarm 3 condition 2 hysteresis | 03,16 | 21104 | 32-bit Float | |
| Alarm 4 condition 2 hysteresis | 03,16 | 21106 | 32-bit Float | |
| Alarm 5 condition 2 hysteresis | 03,16 | 21108 | 32-bit Float | |
| Alarm 6 condition 2 hysteresis | 03,16 | 21110 | 32-bit Float | |
| Alarm 7 condition 2 hysteresis | 03,16 | 21112 | 32-bit Float | |
| Alarm 8 condition 2 hysteresis | 03,16 | 21114 | 32-bit Float | |
| Alarm 9 condition 2 hysteresis | 03,16 | 21116 | 32-bit Float | |
| Alarm 10 condition 2 hysteresis | 03,16 | 21118 | 32-bit Float | |
| Alarm 11 condition 2 hysteresis | 03,16 | 21120 | 32-bit Float | |
| Alarm 12 condition 2 hysteresis | 03,16 | 21122 | 32-bit Float | |
| Alarm 13 condition 2 hysteresis | 03,16 | 21124 | 32-bit Float | |
| Alarm 14 condition 2 hysteresis | 03,16 | 21126 | 32-bit Float | |
| Alarm 15 condition 2 hysteresis | 03,16 | 21128 | 32-bit Float | |
| Alarm 16 condition 2 hysteresis | 03,16 | 21130 | 32-bit Float | |
| Alarm 17 condition 2 hysteresis | 03,16 | 21132 | 32-bit Float | |

| | | | | |
|---|---|---|---|---|
| Alarm 18 condition 2 hysteresis | 03,16 | 21134 | 32-bit Float | |
| Alarm 19 condition 2 hysteresis | 03,16 | 21136 | 32-bit Float | |
| Alarm 20 condition 2 hysteresis | 03,16 | 21138 | 32-bit Float | |
| Alarm 21 condition 2 hysteresis | 03,16 | 21140 | 32-bit Float | |
| Alarm 22 condition 2 hysteresis | 03,16 | 21142 | 32-bit Float | |
| Alarm 23 condition 2 hysteresis | 03,16 | 21144 | 32-bit Float | |
| Alarm 24 condition 2 hysteresis | 03,16 | 21146 | 32-bit Float | |
| | | | | |
| Alarm 1 condition 2 discrete al. state | 03,06,16 | 21200 | 16-bit unsign int | open(0), closed(1) |
| Alarm 2 condition 2 discrete al. state | 03,06,16 | 21201 | 16-bit unsign int | open(0), closed(1) |
| Alarm 3 condition 2 discrete al. state | 03,06,16 | 21202 | 16-bit unsign int | open(0), closed(1) |
| Alarm 4 condition 2 discrete al. state | 03,06,16 | 21203 | 16-bit unsign int | open(0), closed(1) |
| Alarm 5 condition 2 discrete al. state | 03,06,16 | 21204 | 16-bit unsign int | open(0), closed(1) |
| Alarm 6 condition 2 discrete al. state | 03,06,16 | 21205 | 16-bit unsign int | open(0), closed(1) |
| Alarm 7 condition 2 discrete al. state | 03,06,16 | 21206 | 16-bit unsign int | open(0), closed(1) |
| Alarm 8 condition 2 discrete al. state | 03,06,16 | 21207 | 16-bit unsign int | open(0), closed(1) |
| Alarm 9 condition 2 discrete al. state | 03,06,16 | 21208 | 16-bit unsign int | open(0), closed(1) |
| Alarm 10 condition 2 discrete al. state | 03,06,16 | 21209 | 16-bit unsign int | open(0), closed(1) |
| Alarm 11 condition 2 discrete al. state | 03,06,16 | 21210 | 16-bit unsign int | open(0), closed(1) |
| Alarm 12 condition 2 discrete al. state | 03,06,16 | 21211 | 16-bit unsign int | open(0), closed(1) |
| Alarm 13 condition 2 discrete al. state | 03,06,16 | 21212 | 16-bit unsign int | open(0), closed(1) |
| Alarm 14 condition 2 discrete al. state | 03,06,16 | 21213 | 16-bit unsign int | open(0), closed(1) |
| Alarm 15 condition 2 discrete al. state | 03,06,16 | 21214 | 16-bit unsign int | open(0), closed(1) |
| Alarm 16 condition 2 discrete al. state | 03,06,16 | 21215 | 16-bit unsign int | open(0), closed(1) |
| Alarm 17 condition 2 discrete al. state | 03,06,16 | 21216 | 16-bit unsign int | open(0), closed(1) |
| Alarm 18 condition 2 discrete al. state | 03,06,16 | 21217 | 16-bit unsign int | open(0), closed(1) |
| Alarm 19 condition 2 discrete al. state | 03,06,16 | 21218 | 16-bit unsign int | open(0), closed(1) |
| Alarm 20 condition 2 discrete al. state | 03,06,16 | 21219 | 16-bit unsign int | open(0), closed(1) |

| | | | | |
|---|---|---|---|---|
| Alarm 21 condition 2 discrete al. state | 03,06,16 | 21220 | 16-bit unsign int | open(0), closed(1) |
| Alarm 22 condition 2 discrete al. state | 03,06,16 | 21221 | 16-bit unsign int | open(0), closed(1) |
| Alarm 23 condition 2 discrete al. state | 03,06,16 | 21222 | 16-bit unsign int | open(0), closed(1) |
| Alarm 24 condition 2 discrete al. state | 03,06,16 | 21223 | 16-bit unsign int | open(0), closed(1) |
| | | | | |
| Alarm 1 type | 03,06,16 | 21300 | 16-bit unsign int | warning(3), minor(4), major(5), critical(6) |
| Alarm 2 type | 03,06,16 | 21301 | 16-bit unsign int | —"— |
| Alarm 3 type | 03,06,16 | 21302 | 16-bit unsign int | —"— |
| Alarm 4 type | 03,06,16 | 21303 | 16-bit unsign int | —"— |
| Alarm 5 type | 03,06,16 | 21304 | 16-bit unsign int | —"— |
| Alarm 6 type | 03,06,16 | 21305 | 16-bit unsign int | —"— |
| Alarm 7 type | 03,06,16 | 21306 | 16-bit unsign int | —"— |
| Alarm 8 type | 03,06,16 | 21307 | 16-bit unsign int | —"— |
| Alarm 9 type | 03,06,16 | 21308 | 16-bit unsign int | —"— |
| Alarm 10 type | 03,06,16 | 21309 | 16-bit unsign int | —"— |
| Alarm 11 type | 03,06,16 | 21310 | 16-bit unsign int | —"— |
| Alarm 12 type | 03,06,16 | 21311 | 16-bit unsign int | —"— |
| Alarm 13 type | 03,06,16 | 21312 | 16-bit unsign int | —"— |
| Alarm 14 type | 03,06,16 | 21313 | 16-bit unsign int | —"— |
| Alarm 15 type | 03,06,16 | 21314 | 16-bit unsign int | —"— |
| Alarm 16 type | 03,06,16 | 21315 | 16-bit unsign int | —"— |
| Alarm 17 type | 03,06,16 | 21316 | 16-bit unsign int | —"— |
| Alarm 18 type | 03,06,16 | 21317 | 16-bit unsign int | —"— |
| Alarm 19 type | 03,06,16 | 21318 | 16-bit unsign int | —"— |
| Alarm 20 type | 03,06,16 | 21319 | 16-bit unsign int | —"— |
| Alarm 21 type | 03,06,16 | 21320 | 16-bit unsign int | —"— |
| Alarm 22 type | 03,06,16 | 21321 | 16-bit unsign int | —"— |
| Alarm 23 type | 03,06,16 | 21322 | 16-bit unsign int | —"— |
| Alarm 24 type | 03,06,16 | 21323 | 16-bit unsign int | —"— |
| | | | | |
| Alarm 1 assigned to channel | 03,06,16 | 21400 | 16-bit unsign int | none(0), v01(1), v02(2), v03(3), v04(4), v05(5), v06(6), v07(7), v08(8),v09(9), v10(10), v11(11), v12(12), v13(13), v14(14), v15(15), v16(16),v17(17), v18(18), v19(19), v20(20), v21(21), v22(22), v23(23), v24(24) |
| Alarm 2 assigned to channel | 03,06,16 | 21401 | 16-bit unsign int | —"— |
| Alarm 3 assigned to channel | 03,06,16 | 21402 | 16-bit unsign int | —"— |
| Alarm 4 assigned to channel | 03,06,16 | 21403 | 16-bit unsign int | —"— |
| Alarm 5 assigned to channel | 03,06,16 | 21404 | 16-bit unsign int | —"— |
| Alarm 6 assigned to channel | 03,06,16 | 21405 | 16-bit unsign int | —"— |
| Alarm 7 assigned to channel | 03,06,16 | 21406 | 16-bit unsign int | —"— |
| Alarm 8 assigned to channel | 03,06,16 | 21407 | 16-bit unsign int | —"— |

| | | | | |
|---|---|---|---|---|
| Alarm 9 assigned to channel | 03,06,16 | 21408 | 16-bit unsign int | —"— |
| Alarm 10 assigned to channel | 03,06,16 | 21409 | 16-bit unsign int | —"— |
| Alarm 11 assigned to channel | 03,06,16 | 21410 | 16-bit unsign int | —"— |
| Alarm 12 assigned to channel | 03,06,16 | 21411 | 16-bit unsign int | —"— |
| Alarm 13 assigned to channel | 03,06,16 | 21412 | 16-bit unsign int | —"— |
| Alarm 14 assigned to channel | 03,06,16 | 21413 | 16-bit unsign int | —"— |
| Alarm 15 assigned to channel | 03,06,16 | 21414 | 16-bit unsign int | —"— |
| Alarm 16 assigned to channel | 03,06,16 | 21415 | 16-bit unsign int | —"— |
| Alarm 17 assigned to channel | 03,06,16 | 21416 | 16-bit unsign int | —"— |
| Alarm 18 assigned to channel | 03,06,16 | 21417 | 16-bit unsign int | —"— |
| Alarm 19 assigned to channel | 03,06,16 | 21418 | 16-bit unsign int | —"— |
| Alarm 20 assigned to channel | 03,06,16 | 21419 | 16-bit unsign int | —"— |
| Alarm 21 assigned to channel | 03,06,16 | 21420 | 16-bit unsign int | —"— |
| Alarm 22 assigned to channel | 03,06,16 | 21421 | 16-bit unsign int | —"— |
| Alarm 23 assigned to channel | 03,06,16 | 21422 | 16-bit unsign int | —"— |
| Alarm 24 assigned to channel | 03,06,16 | 21423 | 16-bit unsign int | —"— |
| | | | | |
| Alarm 1 delay | 03,16 | 21500 | 32-bit Float | |
| Alarm 2 delay | 03,16 | 21502 | 32-bit Float | |
| Alarm 3 delay | 03,16 | 21504 | 32-bit Float | |
| Alarm 4 delay | 03,16 | 21506 | 32-bit Float | |
| Alarm 5 delay | 03,16 | 21508 | 32-bit Float | |
| Alarm 6 delay | 03,16 | 21510 | 32-bit Float | |
| Alarm 7 delay | 03,16 | 21512 | 32-bit Float | |
| Alarm 8 delay | 03,16 | 21514 | 32-bit Float | |
| Alarm 9 delay | 03,16 | 21516 | 32-bit Float | |
| Alarm 10 delay | 03,16 | 21518 | 32-bit Float | |
| Alarm 11 delay | 03,16 | 21520 | 32-bit Float | |
| Alarm 12 delay | 03,16 | 21522 | 32-bit Float | |
| Alarm 13 delay | 03,16 | 21524 | 32-bit Float | |
| Alarm 14 delay | 03,16 | 21526 | 32-bit Float | |
| Alarm 15 delay | 03,16 | 21528 | 32-bit Float | |
| Alarm 16 delay | 03,16 | 21530 | 32-bit Float | |
| Alarm 17 delay | 03,16 | 21532 | 32-bit Float | |
| Alarm 18 delay | 03,16 | 21534 | 32-bit Float | |
| Alarm 19 delay | 03,16 | 21536 | 32-bit Float | |
| Alarm 20 delay | 03,16 | 21538 | 32-bit Float | |
| Alarm 21 delay | 03,16 | 21540 | 32-bit Float | |
| Alarm 22 delay | 03,16 | 21542 | 32-bit Float | |
| Alarm 23 delay | 03,16 | 21544 | 32-bit Float | |
| Alarm 24 delay | 03,16 | 21546 | 32-bit Float | |
| | | | | |
| Alarm 1 action on return | 03,06,16 | 21600 | 16-bit unsign int | no(0), yes(1) |
| Alarm 2 action on return | 03,06,16 | 21601 | 16-bit unsign int | no(0), yes(1) |
| Alarm 3 action on return | 03,06,16 | 21602 | 16-bit unsign int | no(0), yes(1) |
| Alarm 4 action on return | 03,06,16 | 21603 | 16-bit unsign int | no(0), yes(1) |
| Alarm 5 action on return | 03,06,16 | 21604 | 16-bit unsign int | no(0), yes(1) |
| Alarm 6 action on return | 03,06,16 | 21605 | 16-bit unsign int | no(0), yes(1) |

| | | | | |
|---|---|---|---|---|
| Alarm 7 action on return | 03,06,16 | 21606 | 16-bit unsign int | no(0), yes(1) |
| Alarm 8 action on return | 03,06,16 | 21607 | 16-bit unsign int | no(0), yes(1) |
| Alarm 9 action on return | 03,06,16 | 21608 | 16-bit unsign int | no(0), yes(1) |
| Alarm 10 action on return | 03,06,16 | 21609 | 16-bit unsign int | no(0), yes(1) |
| Alarm 11 action on return | 03,06,16 | 21610 | 16-bit unsign int | no(0), yes(1) |
| Alarm 12 action on return | 03,06,16 | 21611 | 16-bit unsign int | no(0), yes(1) |
| Alarm 13 action on return | 03,06,16 | 21612 | 16-bit unsign int | no(0), yes(1) |
| Alarm 14 action on return | 03,06,16 | 21613 | 16-bit unsign int | no(0), yes(1) |
| Alarm 15 action on return | 03,06,16 | 21614 | 16-bit unsign int | no(0), yes(1) |
| Alarm 16 action on return | 03,06,16 | 21615 | 16-bit unsign int | no(0), yes(1) |
| Alarm 17 action on return | 03,06,16 | 21616 | 16-bit unsign int | no(0), yes(1) |
| Alarm 18 action on return | 03,06,16 | 21617 | 16-bit unsign int | no(0), yes(1) |
| Alarm 19 action on return | 03,06,16 | 21618 | 16-bit unsign int | no(0), yes(1) |
| Alarm 20 action on return | 03,06,16 | 21619 | 16-bit unsign int | no(0), yes(1) |
| Alarm 21 action on return | 03,06,16 | 21620 | 16-bit unsign int | no(0), yes(1) |
| Alarm 22 action on return | 03,06,16 | 21621 | 16-bit unsign int | no(0), yes(1) |
| Alarm 23 action on return | 03,06,16 | 21622 | 16-bit unsign int | no(0), yes(1) |
| Alarm 24 action on return | 03,06,16 | 21623 | 16-bit unsign int | no(0), yes(1) |
| | | | | |
| Alarm 1 action 1 | 03,06,16 | 21700 | 16-bit unsign int | none(0), trapcond1(1), trapcond2(2), trapcond1and2(3), postiostate(4), mqttpublish(6) |
| Alarm 2 action 1 | 03,06,16 | 21701 | 16-bit unsign int | —"— |
| Alarm 3 action 1 | 03,06,16 | 21702 | 16-bit unsign int | —"— |
| Alarm 4 action 1 | 03,06,16 | 21703 | 16-bit unsign int | —"— |
| Alarm 5 action 1 | 03,06,16 | 21704 | 16-bit unsign int | —"— |
| Alarm 6 action 1 | 03,06,16 | 21705 | 16-bit unsign int | —"— |
| Alarm 7 action 1 | 03,06,16 | 21706 | 16-bit unsign int | —"— |
| Alarm 8 action 1 | 03,06,16 | 21707 | 16-bit unsign int | —"— |
| Alarm 9 action 1 | 03,06,16 | 21708 | 16-bit unsign int | —"— |
| Alarm 10 action 1 | 03,06,16 | 21709 | 16-bit unsign int | —"— |
| Alarm 11 action 1 | 03,06,16 | 21710 | 16-bit unsign int | —"— |
| Alarm 12 action 1 | 03,06,16 | 21711 | 16-bit unsign int | —"— |
| Alarm 13 action 1 | 03,06,16 | 21712 | 16-bit unsign int | —"— |
| Alarm 14 action 1 | 03,06,16 | 21713 | 16-bit unsign int | —"— |
| Alarm 15 action 1 | 03,06,16 | 21714 | 16-bit unsign int | —"— |
| Alarm 16 action 1 | 03,06,16 | 21715 | 16-bit unsign int | —"— |
| Alarm 17 action 1 | 03,06,16 | 21716 | 16-bit unsign int | —"— |
| Alarm 18 action 1 | 03,06,16 | 21717 | 16-bit unsign int | —"— |
| Alarm 19 action 1 | 03,06,16 | 21718 | 16-bit unsign int | —"— |
| Alarm 20 action 1 | 03,06,16 | 21719 | 16-bit unsign int | —"— |
| Alarm 21 action 1 | 03,06,16 | 21720 | 16-bit unsign int | —"— |
| Alarm 22 action 1 | 03,06,16 | 21721 | 16-bit unsign int | —"— |
| Alarm 23 action 1 | 03,06,16 | 21722 | 16-bit unsign int | —"— |
| Alarm 24 action 1 | 03,06,16 | 21723 | 16-bit unsign int | —"— |
| | | | | |

| | | | | |
|---|---|---|---|---|
| Alarm 1 action 2 | 03,06,16 | 21800 | 16-bit unsign int | none(0), trapcond1(1), trapcond2(2), trapcond1and2(3), postiostate(4), mqttpublish(6) |
| Alarm 2 action 2 | 03,06,16 | 21801 | 16-bit unsign int | —"— |
| Alarm 3 action 2 | 03,06,16 | 21802 | 16-bit unsign int | —"— |
| Alarm 4 action 2 | 03,06,16 | 21803 | 16-bit unsign int | —"— |
| Alarm 5 action 2 | 03,06,16 | 21804 | 16-bit unsign int | —"— |
| Alarm 6 action 2 | 03,06,16 | 21805 | 16-bit unsign int | —"— |
| Alarm 7 action 2 | 03,06,16 | 21806 | 16-bit unsign int | —"— |
| Alarm 8 action 2 | 03,06,16 | 21807 | 16-bit unsign int | —"— |
| Alarm 9 action 2 | 03,06,16 | 21808 | 16-bit unsign int | —"— |
| Alarm 10 action 2 | 03,06,16 | 21809 | 16-bit unsign int | —"— |
| Alarm 11 action 2 | 03,06,16 | 21810 | 16-bit unsign int | —"— |
| Alarm 12 action 2 | 03,06,16 | 21811 | 16-bit unsign int | —"— |
| Alarm 13 action 2 | 03,06,16 | 21812 | 16-bit unsign int | —"— |
| Alarm 14 action 2 | 03,06,16 | 21813 | 16-bit unsign int | —"— |
| Alarm 15 action 2 | 03,06,16 | 21814 | 16-bit unsign int | —"— |
| Alarm 16 action 2 | 03,06,16 | 21815 | 16-bit unsign int | —"— |
| Alarm 17 action 2 | 03,06,16 | 21816 | 16-bit unsign int | —"— |
| Alarm 18 action 2 | 03,06,16 | 21817 | 16-bit unsign int | —"— |
| Alarm 19 action 2 | 03,06,16 | 21818 | 16-bit unsign int | —"— |
| Alarm 20 action 2 | 03,06,16 | 21819 | 16-bit unsign int | —"— |
| Alarm 21 action 2 | 03,06,16 | 21820 | 16-bit unsign int | —"— |
| Alarm 22 action 2 | 03,06,16 | 21821 | 16-bit unsign int | —"— |
| Alarm 23 action 2 | 03,06,16 | 21822 | 16-bit unsign int | —"— |
| Alarm 24 action 2 | 03,06,16 | 21823 | 16-bit unsign int | —"— |
| | | | | |
| Alarm 1 action 3 | 03,06,16 | 21900 | 16-bit unsign int | none(0), trapcond1(1), trapcond2(2), trapcond1and2(3), postiostate(4), mqttpublish(6) |
| Alarm 2 action 3 | 03,06,16 | 21901 | 16-bit unsign int | —"— |
| Alarm 3 action 3 | 03,06,16 | 21902 | 16-bit unsign int | —"— |
| Alarm 4 action 3 | 03,06,16 | 21903 | 16-bit unsign int | —"— |
| Alarm 5 action 3 | 03,06,16 | 21904 | 16-bit unsign int | —"— |
| Alarm 6 action 3 | 03,06,16 | 21905 | 16-bit unsign int | —"— |
| Alarm 7 action 3 | 03,06,16 | 21906 | 16-bit unsign int | —"— |
| Alarm 8 action 3 | 03,06,16 | 21907 | 16-bit unsign int | —"— |
| Alarm 9 action 3 | 03,06,16 | 21908 | 16-bit unsign int | —"— |
| Alarm 10 action 3 | 03,06,16 | 21909 | 16-bit unsign int | —"— |
| Alarm 11 action 3 | 03,06,16 | 21910 | 16-bit unsign int | —"— |
| Alarm 12 action 3 | 03,06,16 | 21911 | 16-bit unsign int | —"— |
| Alarm 13 action 3 | 03,06,16 | 21912 | 16-bit unsign int | —"— |
| Alarm 14 action 3 | 03,06,16 | 21913 | 16-bit unsign int | —"— |
| Alarm 15 action 3 | 03,06,16 | 21914 | 16-bit unsign int | —"— |
| Alarm 16 action 3 | 03,06,16 | 21915 | 16-bit unsign int | —"— |
| Alarm 17 action 3 | 03,06,16 | 21916 | 16-bit unsign int | —"— |

| | | | | |
|---|---|---|---|---|
| Alarm 18 action 3 | 03,06,16 | 21917 | 16-bit unsign int | —"— |
| Alarm 19 action 3 | 03,06,16 | 21918 | 16-bit unsign int | —"— |
| Alarm 20 action 3 | 03,06,16 | 21919 | 16-bit unsign int | —"— |
| Alarm 21 action 3 | 03,06,16 | 21920 | 16-bit unsign int | —"— |
| Alarm 22 action 3 | 03,06,16 | 21921 | 16-bit unsign int | —"— |
| Alarm 23 action 3 | 03,06,16 | 21922 | 16-bit unsign int | —"— |
| Alarm 24 action 3 | 03,06,16 | 21923 | 16-bit unsign int | —"— |
| | | | | |
| Alarm 1 status | 03 | 22000 | 16-bit unsign int | undefined(0), normal(1), indeterminate(2), warning(3), minor(4), major(5), critical(6) |
| Alarm 2 status | 03 | 22001 | 16-bit unsign int | —"— |
| Alarm 3 status | 03 | 22002 | 16-bit unsign int | —"— |
| Alarm 4 status | 03 | 22003 | 16-bit unsign int | —"— |
| Alarm 5 status | 03 | 22004 | 16-bit unsign int | —"— |
| Alarm 6 status | 03 | 22005 | 16-bit unsign int | —"— |
| Alarm 7 status | 03 | 22006 | 16-bit unsign int | —"— |
| Alarm 8 status | 03 | 22007 | 16-bit unsign int | —"— |
| Alarm 9 status | 03 | 22008 | 16-bit unsign int | —"— |
| Alarm 10 status | 03 | 22009 | 16-bit unsign int | —"— |
| Alarm 11 status | 03 | 22010 | 16-bit unsign int | —"— |
| Alarm 12 status | 03 | 22011 | 16-bit unsign int | —"— |
| Alarm 13 status | 03 | 22012 | 16-bit unsign int | —"— |
| Alarm 14 status | 03 | 22013 | 16-bit unsign int | —"— |
| Alarm 15 status | 03 | 22014 | 16-bit unsign int | —"— |
| Alarm 16 status | 03 | 22015 | 16-bit unsign int | —"— |
| Alarm 17 status | 03 | 22016 | 16-bit unsign int | —"— |
| Alarm 18 status | 03 | 22017 | 16-bit unsign int | —"— |
| Alarm 19 status | 03 | 22018 | 16-bit unsign int | —"— |
| Alarm 20 status | 03 | 22019 | 16-bit unsign int | —"— |
| Alarm 21 status | 03 | 22020 | 16-bit unsign int | —"— |
| Alarm 22 status | 03 | 22021 | 16-bit unsign int | —"— |
| Alarm 23 status | 03 | 22022 | 16-bit unsign int | —"— |
| Alarm 24 status | 03 | 22023 | 16-bit unsign int | —"— |
| | | | | |
| Save configuration | 03,06 | 24000 | 16-bit unsign int | unsaved(0), saved(1) |
| Restart device | 03,06 | 24001 | 16-bit unsign int | cancel(0), restart(1) |
| HW error | 03 | 24002 | 16-bit unsign int | noErr(0), hwErr(1) |
| Device ID | 03 | 24100 | 18 bytes UTF-8 | Example: 5c:32:c5:00:ac:52 |
| Hostname | 03 | 24200 | 16 bytes UTF-8 | |
| Device IP | 03 | 24300 | 16 bytes UTF-8 | Example: 192.168.1.2 |

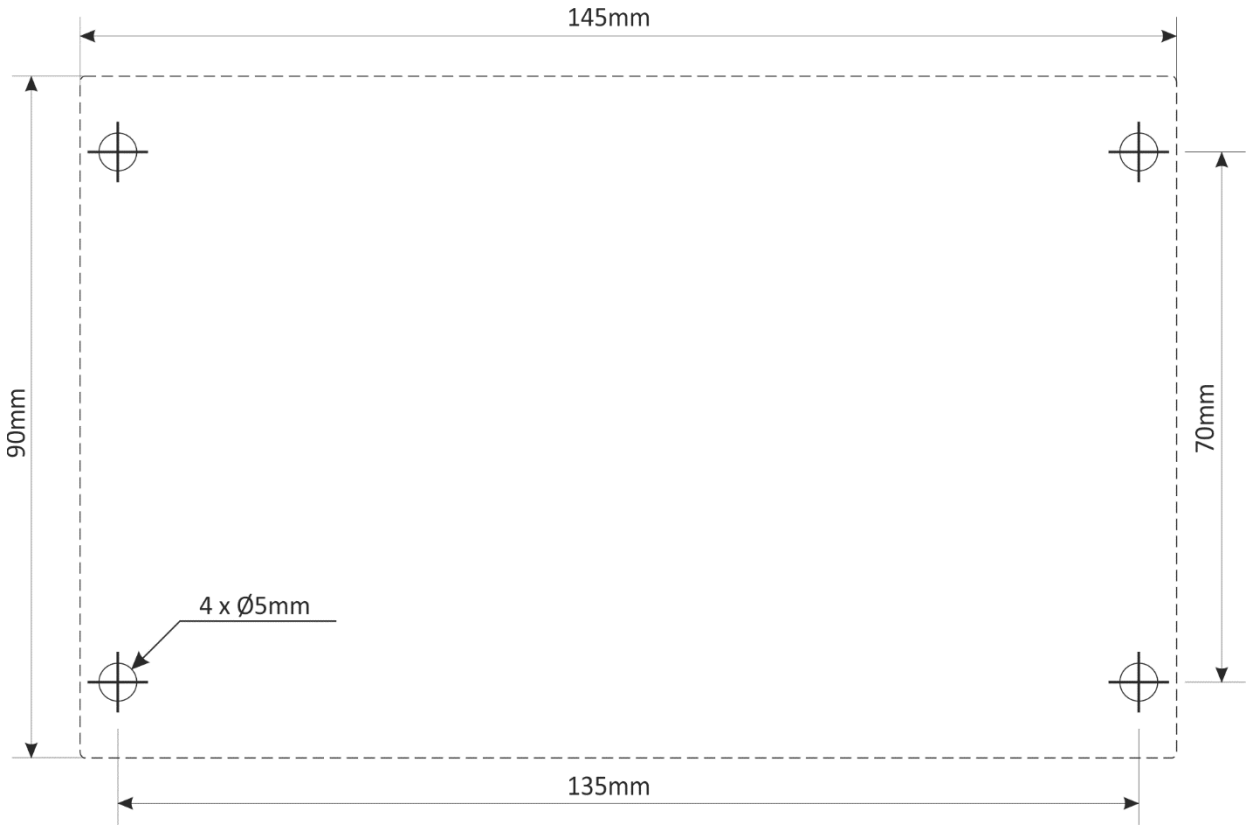

145mm
90mm
70mm
4 x Ø5mm
135mm

Fig.1

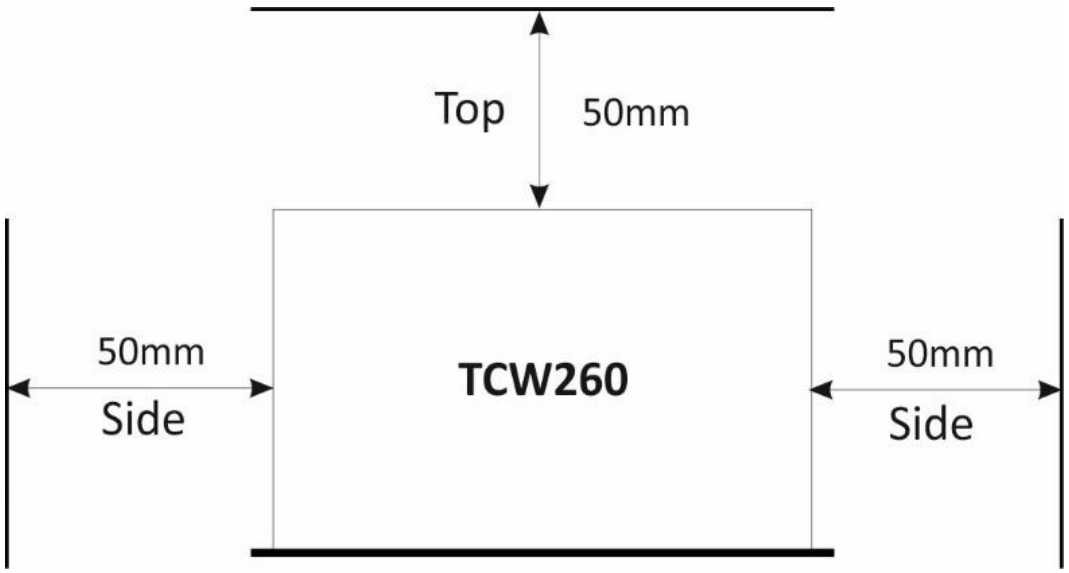

Top
50mm
50mm
Side
TCW260
50mm
Side

Fig.2