control solutions
TERACOM

TCW240B
Ethernet controller

User manual

Version 2.0 / June, 2014

www.teracom.cc

Ethernet controller TCW240B

1. Introduction

TCW240B is a multi-functional device for monitoring and control in Ethernet based networks. It includes 4 digital inputs, 4 analog inputs, 1-Wire interface for up to 8 Teracom 1-Wire sensors like temperature, humidity, CO2, current, 4/20mA, galvanic isolated analog voltage etc. It also has 4 relays with normally open and normally close contacts.

The relays can be activated either remotely (WEB, SNMP, HTTP etc.) or locally – from the status of a monitored parameter (1 Wire sensor, analog voltage and dry contact). Only one parameter can control each relay but for every parameter an alarm e-mail/SNMP trap can be sent.

An Embedded real time clock provides scheduled time control of selected outputs: the tasks can be either single or with weekly repetition.

TCW240B has a built-in web server that provides simple web interface. The device can be accessed directly, using a standard web browser, installed on users' computer or smart phone.

2. Features

- 100 Mb Ethernet connectivity;
- Password protected, web based configuration and control;
- 4 digital inputs with " dry contact" and "logic level" modes;
- 4 analog inputs with 0 to 60VDC range;
- Multiplier and offset for analog inputs
- 4 relays with NO and NC contacts;
- Long 1-Wire support for up to 8 temperature (TST1XX), temperature/humidity (TSH2xx) or other sensors made by Teracom;
- SNMP v.2 support;
- SNMP traps and/or e-mail sending for alert conditions;
- SMTP with authentication;
- 2K SSL support;
- MAC filter for better security;
- HTTP and SNMP port changing;
- XML and HTTP API commands;
- NTP protocol support;
- Push mode for client-server systems;
- Real time clock for scheduled control;
- Extended working temperature range;
- Wide power supply voltage range;
- Auto-MDIX;
- Remote firmware update.

3. Applications

TCW240B is suitable for environmental monitoring and local control of electrical and non-electrical parameter, industrial and building automation, data acquisition systems, general remote control and monitoring.

It works very well as a standalone device that can be controlled using a web browser or as a part of small and medium industrial control systems for SCADA (supervisory control and data acquisition).

A few example applications include:

- Temperature and humidity control in data centers;
- Building management system;
- Industrial cooling/heating control;
- Home automation;
- Alarm systems;
- Mushroom plant automation;
- Process monitor;

4. Technical parameters

Supply voltage, VDC	8 - 32
Maximum current (with all relays ON), mA	300@12VDC
Weight, g	230
Dimensions, mm	145 x 90 x 40
Operating temperature, °C	-20 to +70
Maximum humidity, %RH	70
Minimum high level input voltage for digital inputs, VDC	+2.5
Maximum low level input voltage for digital inputs, VDC	+0.8
Maximum input voltage for digital inputs, VDC	+5.5
Supply voltage for 1-Wire bus **(VDD)**, VDC	5.0 ± 0.3
Maximum output current for 1-Wire bus **(VDD)**, A	0.2
Analog inputs range, VDC	0 to 60
Analog inputs resolution, VDC	0.01
Analog inputs accuracy, %	± 1
Maximum switchable current, A	3
Maximum switchable voltage, VAC/VDC	30/24

5. LED indicators

The following indicators show the status of the controller:

- **Relay1-Relay4** (green) – these LEDs are illuminated whenever the corresponding relay is activated (the NO contact is closed and the NC contact is open);
- **STS** (red) – flashes when the main program of controller is executed;
- **LOG** (yellow) – indicates that somebody is logged via WEB interface;
- **Link** (green) – located on the Ethernet connector, indicates that the device is connected to the network;
- **Act** (yellow) – located on the Ethernet connector, flashes when activity is detected on the network.

6. Installation and setup

This device must be installed by qualified personnel.

This device must not be installed directly outdoors.

Installation consists of mounting the device, connecting to an IP network, connecting inputs and outputs, providing power and configuring via a web browser.

6.1. Mounting

TCW240B should be mounted in a clean and dry location on not flammable surface. Ventilation is recommended for installations where ambient air temperature is expected to be high.

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-A, fig. 1 for mechanical details.

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

TCW240B can be mounted to a standard (35mm by 7.55mm) DIN rail. Attach the controller to the DIN rail by hooking the hook on the back of the enclosure to the DIN rail and then snap the bottom hook into place.

6.2. Connection

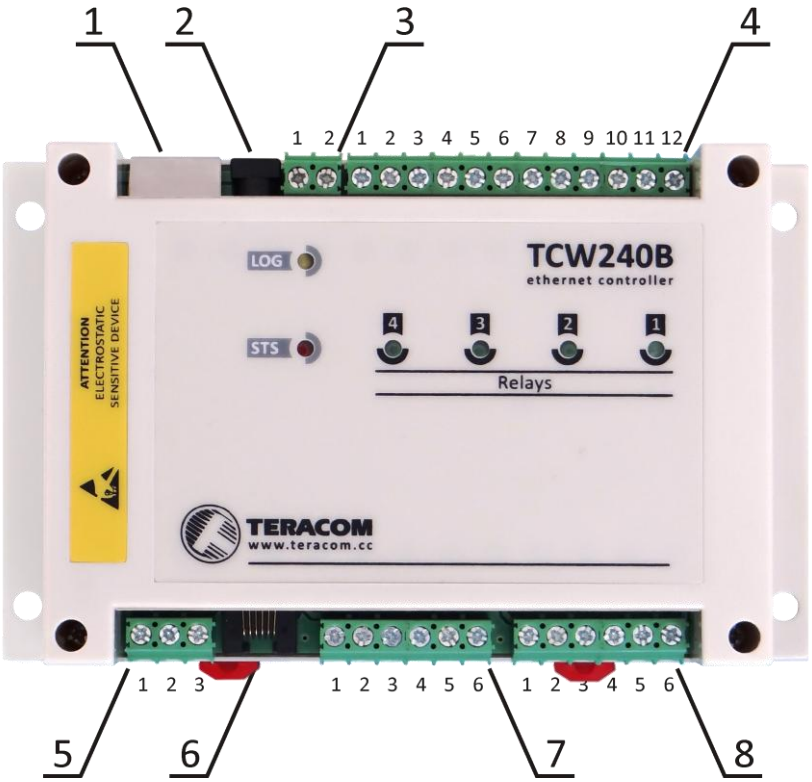
Attention! Disconnect power supply before wiring.

The correct wiring procedure is as follows:

- Make sure power is turned off;
- Make wiring connections to the terminals;
- Apply power.

It is recommended to test and configure **TCW240B** without any controlled device. In this case unexpected turn on will be avoided.

Make sure that wires are properly attached to the terminals and that the terminals are tighten. Not proper wiring and configuration can cause permanent damage of **TCW240B** or the equipment to which it is connected or both.



Connector 1	Ethernet - RJ45
Connector 2	Power - central positive
Connector 3	**Pin1** – Power positive
	Pin2 – Power negative
Connector 4	**Pin1** – NC Relay4
	Pin2 – COM Relay4
	Pin3 – NO Relay4
	Pin4 – NC Relay3
	Pin5 – COM Relay3
	Pin6 – NO Relay3
	Pin7 – NC Relay2
	Pin8 – COM Relay2
	Pin9 – NO Relay2
	Pin10 – NC Relay1
	Pin11 – COM Relay1
	Pin12 – NO Relay1
Connector 5	**Pin1** – 1-Wire GND
	Pin2 – 1-Wire Data
	Pin3 – 1-Wire +VDD
Connector 6	**Pin1** – Not connected (most left)
	Pin2 – Not connected
	Pin3 – 1-Wire Data
	Pin4 – 1-Wire GND
	Pin5 – 1-Wire +VDD
	Pin6 – Not connected (most right)
Connector 7	**Pin1** – Digital In 1
	Pin2 – GND
	Pin3 – Digital In 2
	Pin4 – Digital In 3
	Pin5 – GND
	Pin6 – Digital In 4
Connector 8	**Pin1**– Analog In 1
	Pin2 – GND
	Pin3 – Analog In 2
	Pin4 – Analog In 3
	Pin5 – GND
	Pin6 – Analog In 4

6.2.1. Power supply connection

TCW240B is designed to be supplied by adapter SYS1421-0612-W2E or similar, intended for use in the conditions of overvoltage category II, and priorly assessed for compliance with safety requirements. The power supply equipment shall be resistant to short circuit and overload in secondary circuit.

When in use, do not position the equipment so that it is difficult to disconnect the device from the power supply.

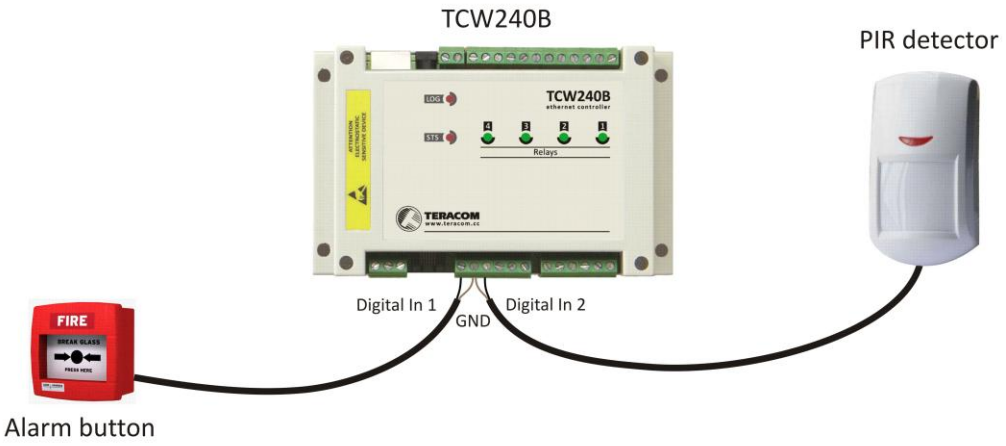
6.2.2. Digital inputs connection

Attention! Digital inputs are NOT galvanic isolated.

The **TCW240B** Digital inputs can be used in two modes – “dry contact” and “logic level”. The mode is determined by the jumper, close to the corresponding input. Closed jumper determines “dry contact” mode while open “logic level”. By default digital inputs are in “dry contact” mode.

In “dry contact” mode digital inputs can be used to monitor the state of a discrete device – door contact switch, push button, PIR detector etc.

Following picture illustrates how a dry contact switch can be connected to the input (or inputs) of **TCW240B**. One side of the contact is connected to “Digital In” and the other side is connected to “GND” terminals.



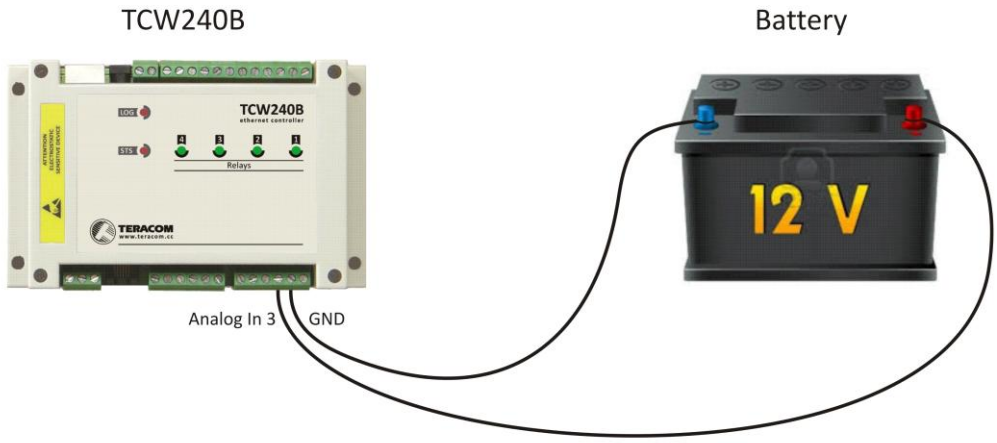
6.2.3. Analog inputs connection

Attention! Analog inputs are NOT galvanic isolated.

Analog inputs of TCW240B can be used for monitoring of DC voltage up to 60VDC. They can be connected directly to batteries, solar panels, power supplies etc.

Built in functionality “Multiplier”, “Offset” and “Dimension” for every analog input gives possibility to monitor sensors with analog outputs and see directly measured parameter. It is also possible to monitor voltages bigger than 60 VDC with external resistive dividers.

Following picture illustrates how a battery can be connected to the analog input of **TCW240B**. One side of the contact is connected to “Analog In” and the other side is connected to “GND” terminals.



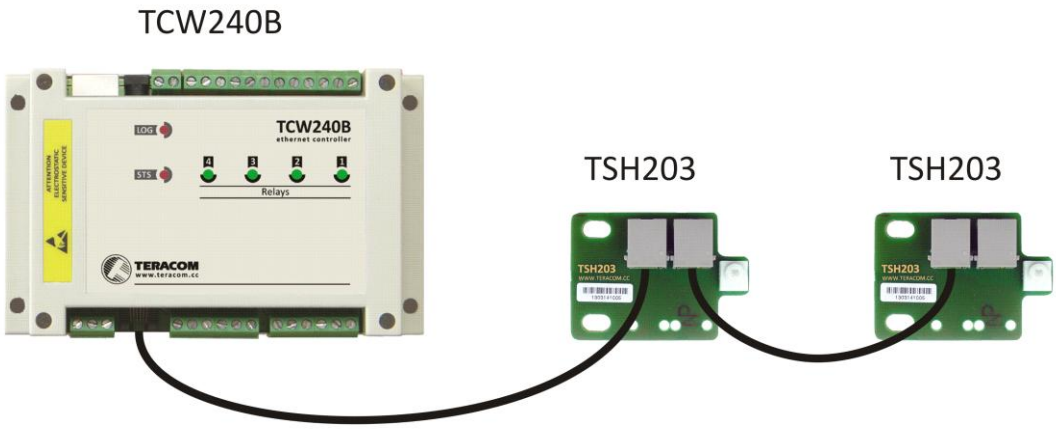
6.2.4. Sensor connection

Up to 8 1-Wire sensors can be connected to TCW240B. The device supports following sensors - temperature, temperature/humidity, CO2, DC current, AC current, 4/20mA, galvanic isolated analog voltage, atmospheric pressure etc. Connected sensors are automatically detected and appropriate dimension is assigned.

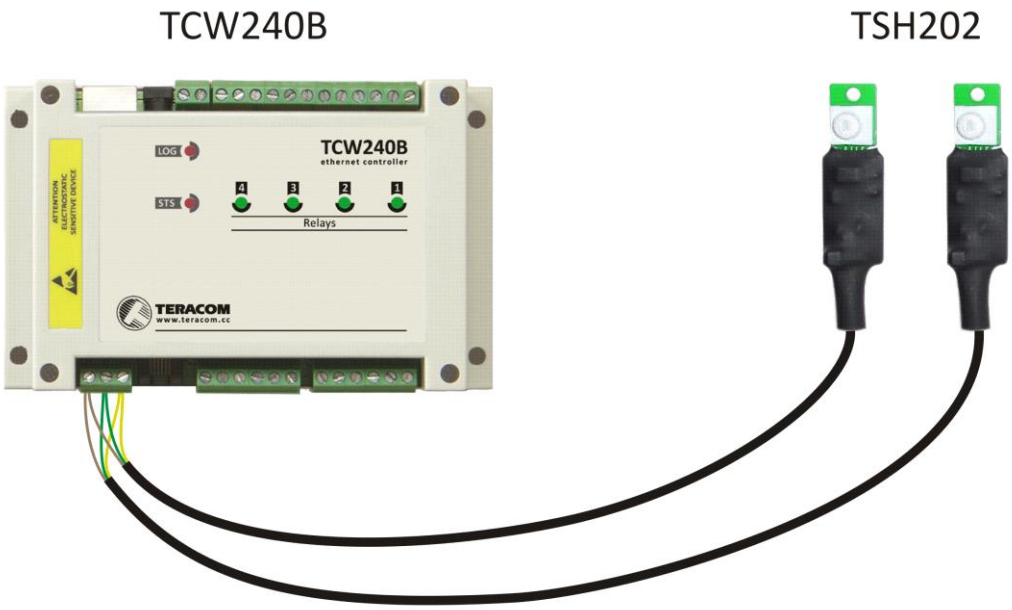
1-Wire is a registered trademark of Maxim Integrated Products, Inc. It is designed to connect several sensors over a short wiring. It is not suitable for long distances or environments with EMC interference. We recommend reading Maxim's 1-Wire tips at http://www.maxim-ic.com/app-notes/index.mvp/id/148.

The sensors have three wires – positive voltage (+VDD), ground (GND) and bidirectional data (Data). The colors of wires for every sensor are specified in its user manual.

It is strongly recommended to use "daisy chained" (linear topology) for multiple sensors:



"Star" topology can be used only as a last resort for up to 4 sensors and total cable length up to 10 meters:



Connections can be realized either by screw terminal connector or by standard RJ-11 connector.

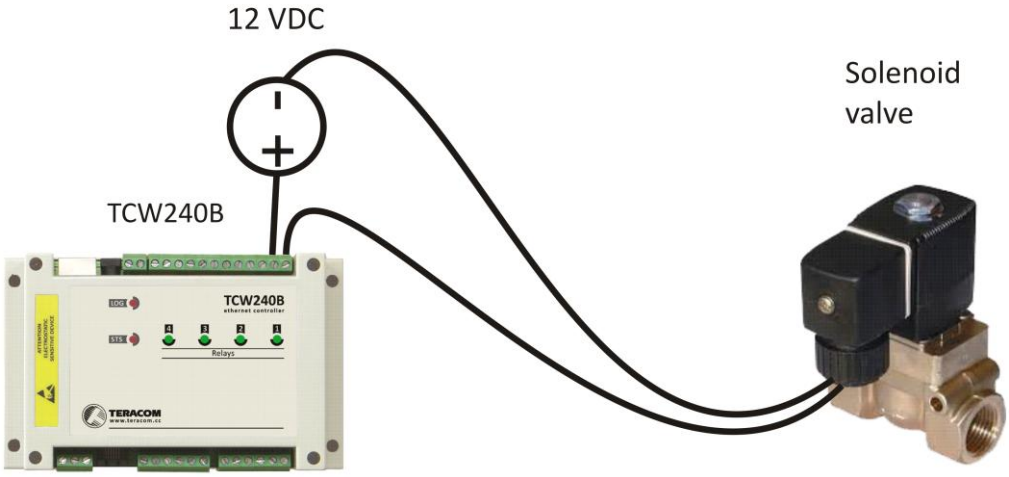
There are many parameters which determine the maximum length of the wires - type of cable, the number of sensors, ambient electromagnetic noise and sensor network topology.

It is strongly recommended to use only UTP/FTP cables and keep total cable length up to 60 m. Although functionality has been achieved in longer distance, we cannot guarantee error-free operation over mentioned wiring length.

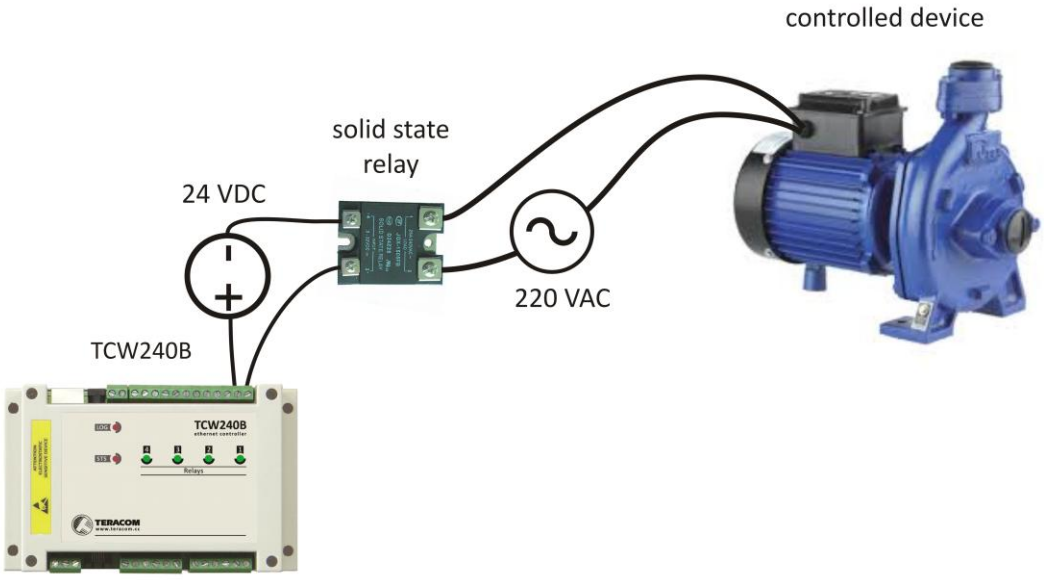
We guarantee proper operation only with Teracom 1-Wire sensors.

6.2.5. Relay connection

The relay contacts are internally connected directly to the terminal connectors. For all relays normally open, normally close and common contacts are available.



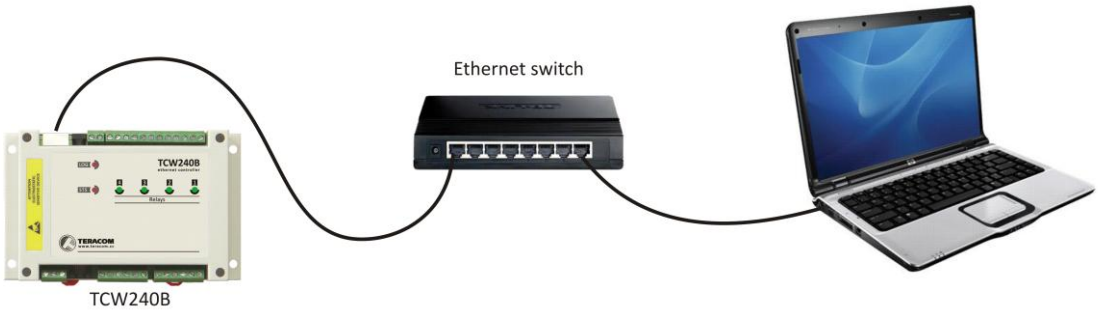
For loads with higher switchable current/voltage than specified, an external relay should be used.



When mechanical relays switch inductive loads such as motors, transformers, relays, etc., the current will arc across the relay contacts each time the contacts open. Over time, this cause wears on the relay contacts which shorten their life. When switching an inductive load, it is recommended that relay contact protection devices are used.

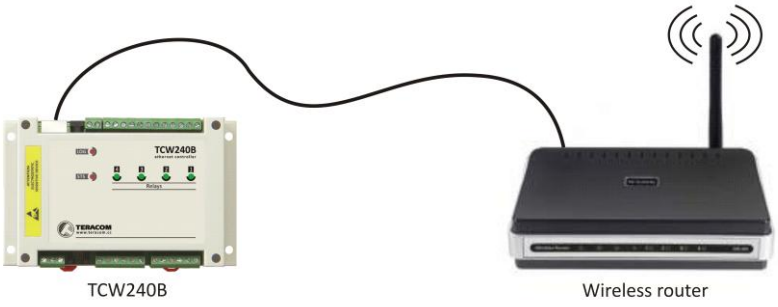
6.2.6. Network connection

The Ethernet port of **TCW240B** should be connected to 10/100 Base-T Ethernet hub, switch or router.



For configuration, **TCW240B** may be connected directly to the Ethernet port on a computer. The device support Auto-MDIX and it is not necessary to use “crossover” cable, standard “straight-through” can be also used.

TCW240B can be used in a wireless network by connecting through a wireless router.

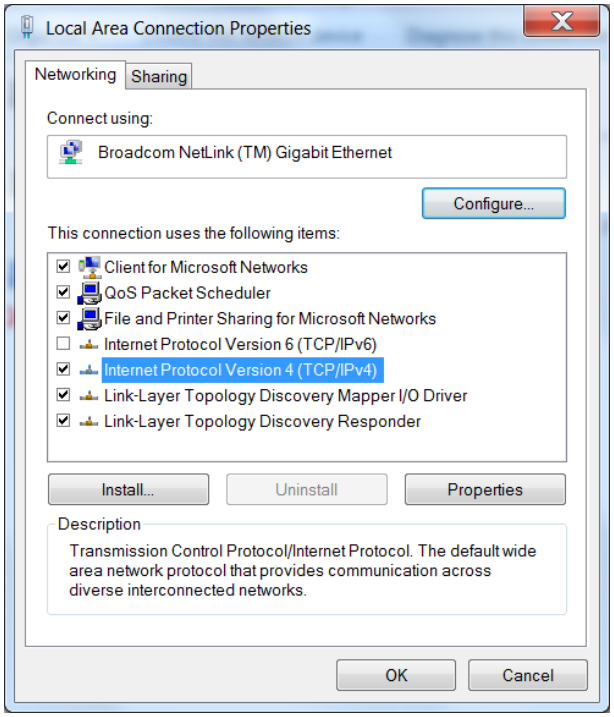


6.3. Communication setup

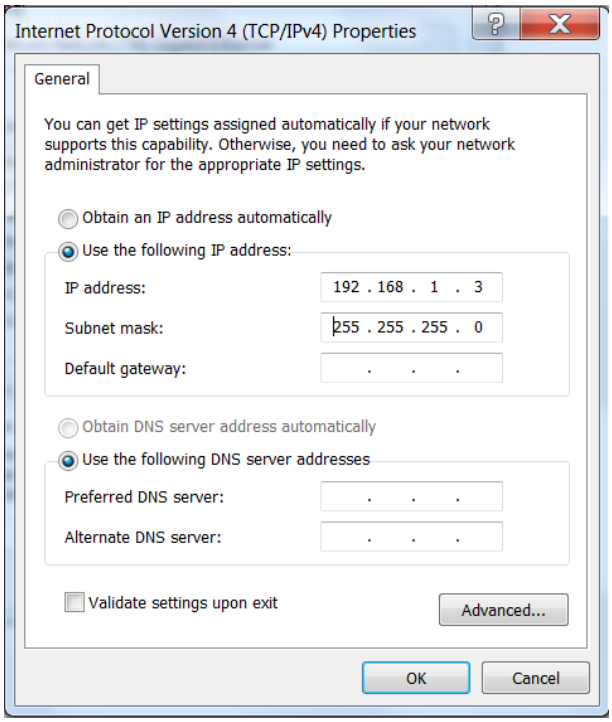
By default **TCW240B** is delivered with the following network settings:

*IP address: **192.168.1.2**, Subnet Mask: **255.255.255.0**, Default Gateway: **192.168.1.1***

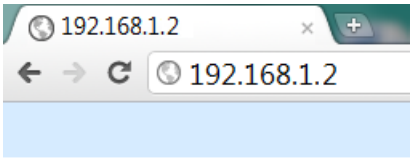
Communication with **TCW240B** can be established by assigning a temporary IP address to the computer. For computers with Windows OS assigning of IP address is made in “Local area connection properties”:



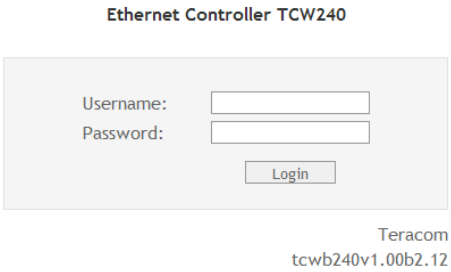
This address should be in the same network - for example 192.168.1.3:



To get access to the web interface, you should type http://192.168.1.2 into the browser.



If the network settings are correct, the “Login” page will appear:

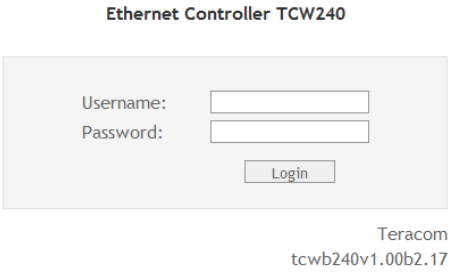


All TCW controllers connected to LAN can be easily found by free tool “TCW discoverer”. It is available for Win and Mac operating systems and can be downloaded from www.teracom.cc

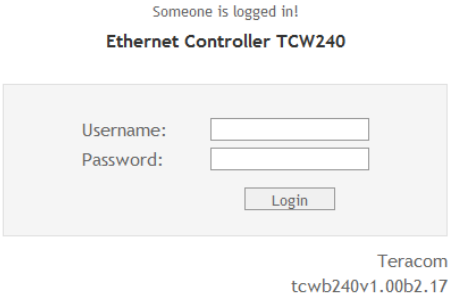
7. Web interface

The web based interface allows configuration, monitoring and control.

After opening the “Login” page, authorization data must be entered (by default username=admin, password=admin). It is recommended to change the username and password to prevent unauthorized access to the controller.



The controller supports only one active session – only one user can operate the device. If another user tries to login, the message “Someone is logged in!” appears:



7.1. Monitoring page

Monitoring page displays the current state of **TCW240B** and presents buttons that can be used to control the relays.

The page has 4 sections – “Sensors”, “Digital inputs”, “Analog inputs” and “Relays”. All they can be added/removed from “Monitoring page” independently by appropriate setup - see “Setup-System-Display” section.

For every parameter (sensor, input, relay) there is a description of up to 11 characters. Default ones can be changed in “Setup-Input/Output”.

The Monitoring page can be automatically refreshed on an interval of 0 to 254 seconds. Zero means no automatic refresh. This parameter is set in section “Setup-System-Monitoring page automatic refresh”. By default it is 10 seconds.

7.1.1. Sensors section

All detected 1-Wire sensors are shown in this section.

Detection is made either after power on or by button “Scan for new sensors”. All found sensors are shown in ascending order refer their unique ID number.

For every sensor there are description, value, and ID information.

Teracom 1-Wire sensors readings are shown in the Value 1 column. Dual sensors such as the (TSH2xx) temperature/humidity sensors have the 2nd parameter shown on the Value 2 column.

It is possible to lock sensors in a specific position. To do this all sensors should be added one by one. After every addition new scan should be made and newly found sensor should be locked in its position. If all sensors are locked, removing one “in the middle” will not change the positions of following sensors after reset. This option is very useful when **TCW240B** is used like a part of monitoring and control system managed either by SNMP or HTTP API commands.

For some sensors 3 variables – “Unit”, “Multiplier” and “Offset” can be set in section “Setup-Input/Output”.

Pos	Description	Value 1	Value 2	ID	Lock
1	Sensor1	20.5°C	---	[000004B9206D]	☑
2	Sensor2	21.4°C	---	[000004B898FD]	☑
3	Sensor3	20.6°C	---	[000004B8D718]	☑
4	Sensor4	20.6°C	---	[000004B8FF24]	☑
5	Sensor5	20.3°C	---	[000004B8EF0C]	☑
6	Sensor6	20.4°C	---	[000004B85419]	☑
7	Sensor7	20.4°C	---	[000004B8EF95]	☑
8	Sensor8	20.5°C	43.8%RH	[FF001624F695]	☑

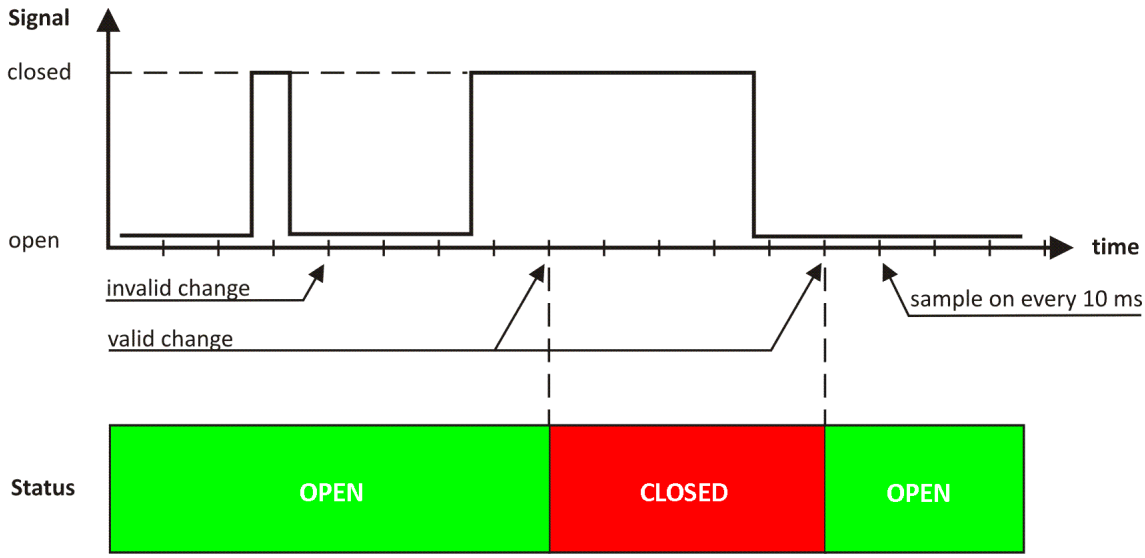
Scan for new sensors

7.1.2. Digital inputs section

Digital inputs can be used for monitoring the state of discrete devices – motion sensor, door contact, relay contact, alarm output etc. All digital inputs are not galvanic isolated.

One side of the contact is connected to “Digital In” and the other side is connected to “GND” pins.

Digital inputs are sampled every 10mS. The change of input status is considered valid if the same value is read in two consecutive samples.



Status of every input is shown by text and by color.

Digital input	Status	Digital input	Status
Digital In1	CLOSED	Digital In2	OPEN
Digital In3	OPEN	Digital In4	CLOSED

Default descriptions can be changed in “Setup-Input/Output”.

7.1.3. Analog inputs section

Analog inputs can be used for monitoring of DC voltage sources – analog sensors, batteries, power supplies, solar panels etc. All analog inputs are not galvanic isolated.

One side of source is connected to “Analog In” and the other side is connected to “GND” pins.

Analog input	Value	Analog input	Value
Analog In1	30.03volts	Analog In2	20.12volts
Analog In3	11.98volts	Analog In4	5.00volts

For every analog input 3 variables – “Unit”, “Multiplier” and “Offset” can be set in section “Setup-Input/Output”.

7.1.4. Relay section

The section displays the current state of relays and presents buttons that can be used to change their status.

Relay	Status	Control
volets	OFF	ON OFF Pulse
eclairage	ON	automatically controlled by S1 Temp
climatiseur	OFF	ON OFF Pulse
portail	OFF	automatically controlled by A1
		All On All Off Pulse All

Each relay can be activated either remotely by the WEB interface or locally, from the status of a monitored parameter (1 Wire sensor, analog voltage and dry contact). Only one parameter can control the relay at the same time.

For every WEB activated relay there are “On”, “Off” and “Pulse” buttons. There are also “All On”, “All Off” and “Pulse All” for common control of relays. Pulse duration can be set separately for each relay in “Setup-Input/Output-RelayOutputs”.

For locally activated relays a text description of the controlling parameter is displayed rather than buttons. Parameters for local relay activation can be set in “Setup-Input/Output-RelayOutputs”. Control of relays follows conditions set in “Setup-Alarm conditions”.

7.2. Setup page

7.2.1. Network

7.2.1.1. IP configuration

The network parameters are set in this section.

IP configuration			
Static/DHCP	Static	IP address	192.168.32.122
		Subnet mask	255.255.255.0
		Default gateway	192.168.32.1
Host name	TCW240B	DNS	192.168.32.1

The controller supports static and dynamic IP addresses.

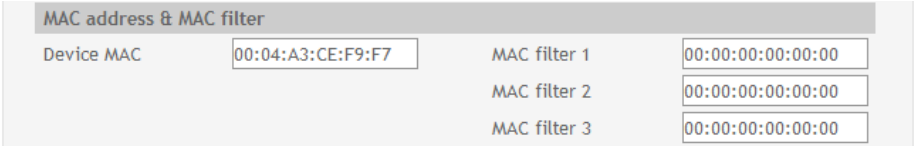
It is good practice to change the default IP address of controller immediately after first power-on. This will avoid collisions if many devices are used in the same network. It may be necessary to clear the

arp cache, each time you connect a new device to the network. This is done by typing *arp -d* in the command prompt window of computer.

The “Host name” is up to 15 characters and is used as subject for outgoing e-mails. The “Host name” is shown in search results of TCW discoverer.

7.2.1.2. Mac address and MAC filter

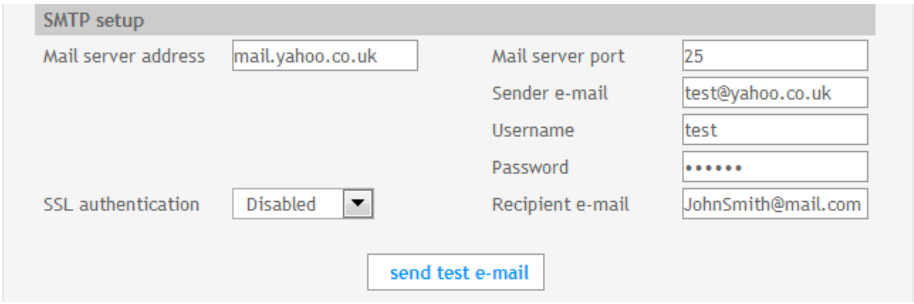
MAC address of device can be changed in this section. After factory default procedure default MAC address is assigned.



MAC address filtering is supported. Up to 3 MAC addresses can be entered.
Attention! If you are not familiar with MAC filtering leave this part by default.

7.2.1.3. SMTP setup

This section is used to enter alarm email parameters.
SSL (Secure Socket Layer) up to 2k is supported. By default it is enabled.



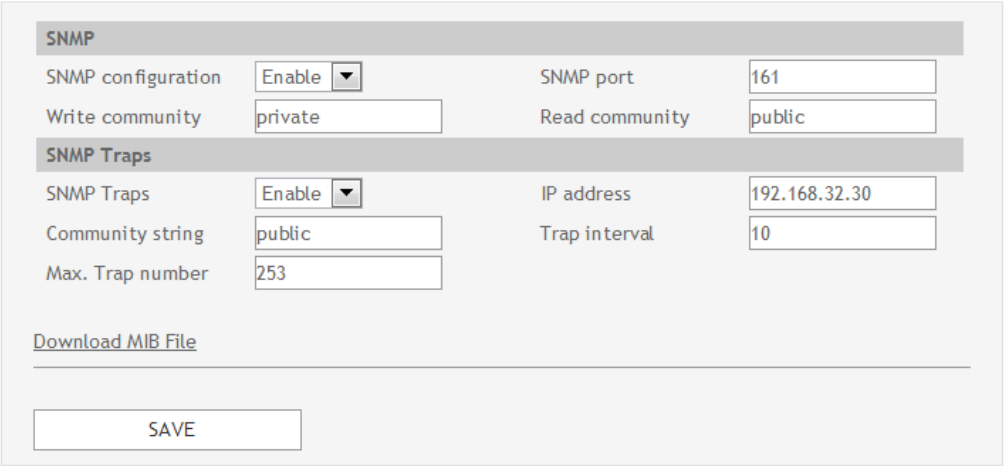
There is a button to check e-mail sending.

All changed information in above sections is saved with button “Save”.

7.2.2. SNMP

The **TCW240B** supports SNMP v.2. This enables the device to be part of monitoring and control systems over SNMP protocol.

In this section all necessary parameters for proper operation of SNMP can be set.



“Trap Interval” is time, in seconds, between repeating the sent SNMP trap messages. It is in range between 1 and 255 seconds.

“Max. Traps number” is a maximum number of SNMP trap messages sent, if trap condition is present. It is in range between 1 and 255.

SNMP traps can be sent if:

- event occurs (status change) on Digital Inputs;
- measured parameter on Analog Inputs goes outside the range;
- measured parameter on 1-Wire bus goes outside the range;
- restart condition.

Necessary *.MIB file for SNMP manager programs can be downloaded from the controller.

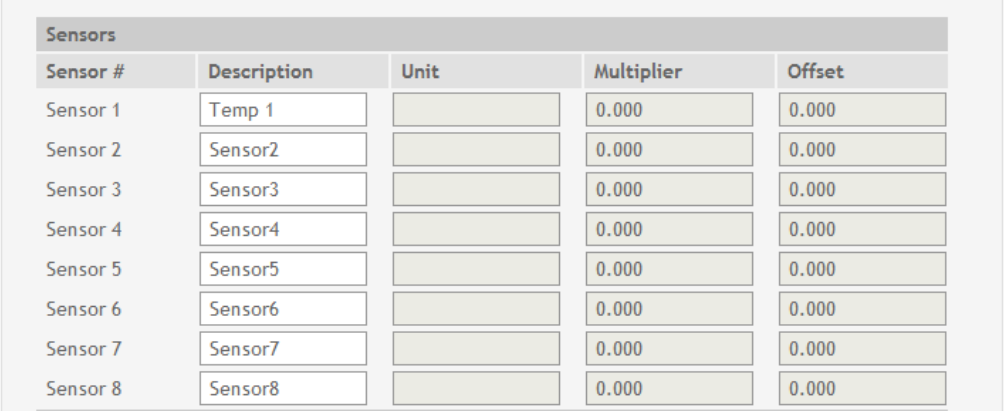
All changed information in above sections is saved with button “Save”.

7.2.3. Input/Output

7.2.3.1. 1-Wire sensors

For every 1-Wire sensors description, up to 11 characters, can be set.

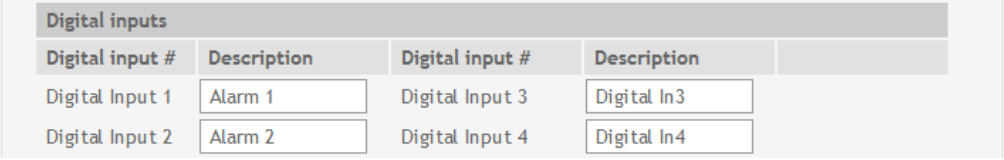
For some specific sensor fields “Unit”, “Multiplier” and “Offset” are available for use.



Sensors				
Sensor #	Description	Unit	Multiplier	Offset
Sensor 1	Temp 1		0.000	0.000
Sensor 2	Sensor2		0.000	0.000
Sensor 3	Sensor3		0.000	0.000
Sensor 4	Sensor4		0.000	0.000
Sensor 5	Sensor5		0.000	0.000
Sensor 6	Sensor6		0.000	0.000
Sensor 7	Sensor7		0.000	0.000
Sensor 8	Sensor8		0.000	0.000

7.2.3.2. Digital inputs

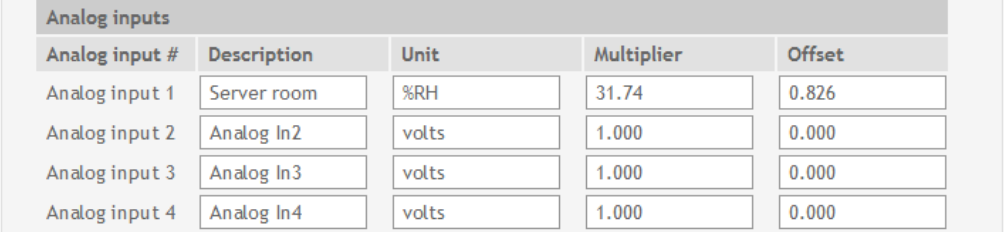
For every digital input description, up to 11 characters can be set.



Digital inputs			
Digital input #	Description	Digital input #	Description
Digital Input 1	Alarm 1	Digital Input 3	Digital In3
Digital Input 2	Alarm 2	Digital Input 4	Digital In4

7.2.3.3. Analog inputs

For every analog input description, up to 11 characters can be set.



Analog inputs				
Analog input #	Description	Unit	Multiplier	Offset
Analog input 1	Server room	%RH	31.74	0.826
Analog input 2	Analog In2	volts	1.000	0.000
Analog input 3	Analog In3	volts	1.000	0.000
Analog input 4	Analog In4	volts	1.000	0.000

For every analog input field “Unit”, “Multiplier” and “Offset” parameters are available to convert the raw voltage input to meaningful engineering units if required. The shown value is calculated by:

DV[Un] = (AV – OF) * MU

Where:

DV – displayed value;
Un – unit;
AV – real analog voltage from source;
MU – multiplier in dimension [parameter/Volt];
OF – offset.

Example:

For humidity sensor HIH-4000-003 following parameter (coming from data sheet) should be set for fine work:

Unit - %RH
Offset - 0.826
Multiplier - 31.74, the value is inversed of slope parameter (1/0.0315);

If the output voltage of this sensor is 3.198V on the monitoring page will be shown 75.28% RH:

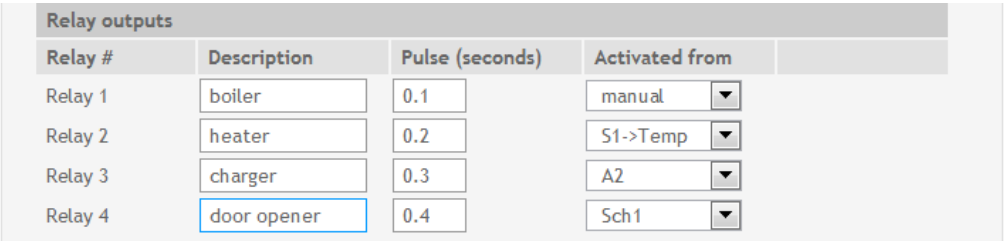
75.28 = (3.198 – 0.826) * 31.74

By default and after “Factory default settings” procedure:

Unit - V
Offset - 0.00
Multiplier - 1.00

7.2.3.4. Relay outputs

For every relay description, up to 11 characters can be set.



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

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

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

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

- S? – “S” stands for “**S**ensor 1-Wire”. The relay is activated from value measured from specified 1-Wire sensor and rules for ranges specified in “Setup-Alarm conditions”. Question mark masks number from 1 to 8;
- A? - “A” stands for “**A**nalog input”. The relay is activated from value measured from specified analog input and rules for ranges specified in “Setup-Alarm conditions”. Question mark masks number from 1 to 4;
- D? - “D” stands for “**D**igital input”. The relay follows the state of specified digital input. Question mark masks number from 1 to 4;
- Sch? - “Sch” stands for “**Sch**eduler”. The relay is activated from rules, specified in appropriate scheduler. Question mark masks number from 1 to 4.

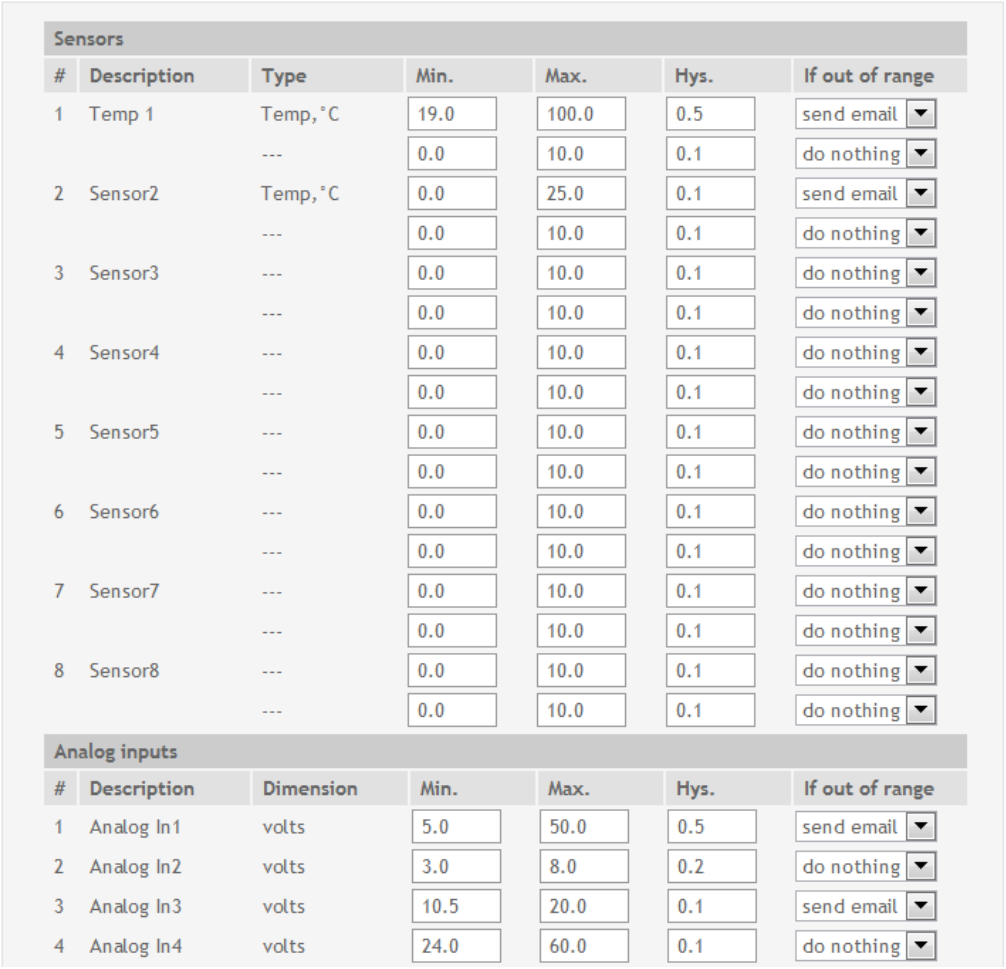
All changed information in above sections is saved with button “Save”.

7.2.4. Trigger and alert conditions

This section is used for parameterization of trigger and alert conditions for 1-Wire sensors, analog and digital inputs.

7.2.4.1. 1-Wire sensors and analog inputs

For every sensor two type of fields are presented – one for set of trigger conditions (“Min”, “Max” and “Hys.”) and other one for e-mail alert (“If out of range”).



Sensors

#	Description	Type	Min.	Max.	Hys.	If out of range
1	Temp 1	Temp, °C	19.0	100.0	0.5	send email
		---	0.0	10.0	0.1	do nothing
2	Sensor2	Temp, °C	0.0	25.0	0.1	send email
		---	0.0	10.0	0.1	do nothing
3	Sensor3	---	0.0	10.0	0.1	do nothing
		---	0.0	10.0	0.1	do nothing
4	Sensor4	---	0.0	10.0	0.1	do nothing
		---	0.0	10.0	0.1	do nothing
5	Sensor5	---	0.0	10.0	0.1	do nothing
		---	0.0	10.0	0.1	do nothing
6	Sensor6	---	0.0	10.0	0.1	do nothing
		---	0.0	10.0	0.1	do nothing
7	Sensor7	---	0.0	10.0	0.1	do nothing
		---	0.0	10.0	0.1	do nothing
8	Sensor8	---	0.0	10.0	0.1	do nothing
		---	0.0	10.0	0.1	do nothing

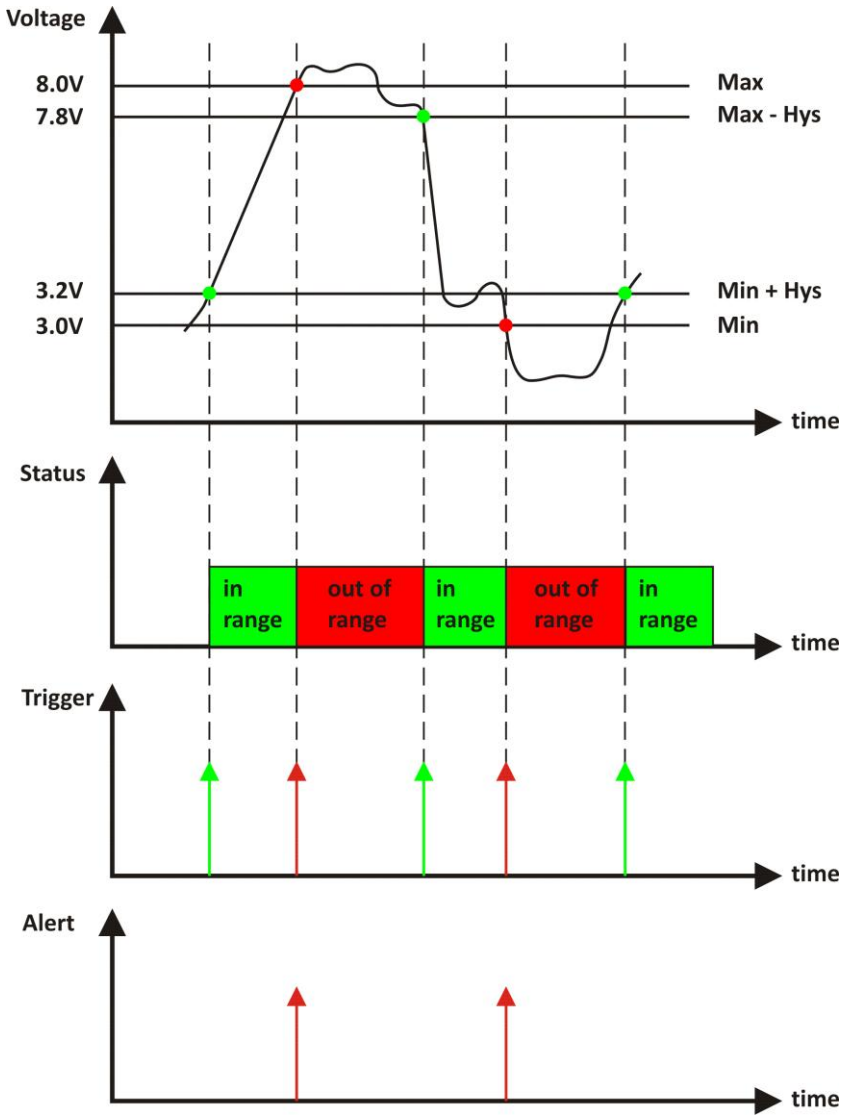
Analog inputs

#	Description	Dimension	Min.	Max.	Hys.	If out of range
1	Analog In1	volts	5.0	50.0	0.5	send email
2	Analog In2	volts	3.0	8.0	0.2	do nothing
3	Analog In3	volts	10.5	20.0	0.1	send email
4	Analog In4	volts	24.0	60.0	0.1	do nothing

“Min” and “Max” indicate border of working range for observed parameter.

A “Max” trigger condition occurs when the value exceeds the trigger set point. A “Min” trigger condition occurs when the value is lower than the trigger set point. In both cases the monitored parameter goes out of range.

Coming back in range for observed parameter is considered when the value goes higher than (Min + Hys) or lower than (Max – Hys). Hysteresis (“Hys”) is used to prevent from excessively triggering when the value vacillates around trigger point.



Example:

TCW240B, TST100 and appropriate heater are used to control the room temperature. The wanted minimum temperature is 19°C. The initial temperature is 17°C.

TST100 is assigned on the first position for 1-Wire sensors.

For Relay1 local activation from Sensor1 is set.

Following parameters are set for Sensor1: Min=19, Max=100 and Hys=0.5.

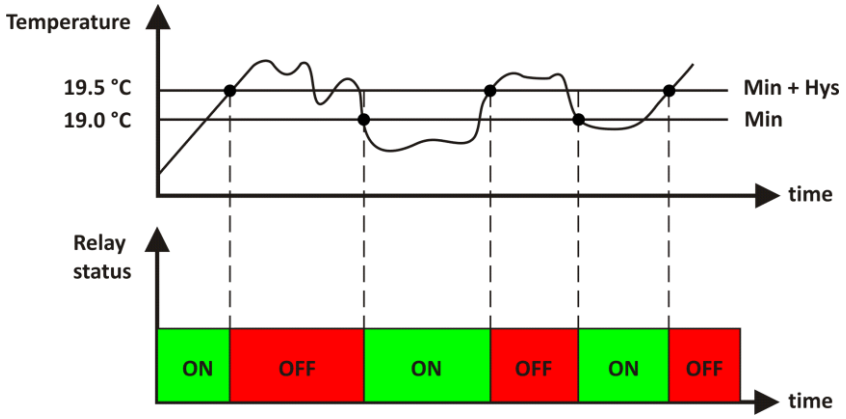
Sensors

#	Description	Type	Min.	Max.	Hys.	If out of range
1	Temp 1	Temp,°C	19.0	100.0	0.5	send email

When the controller is switched on, Relay1 is immediately activated because the monitored temperature is out of range. This switches the heater on. The temperature is going higher.

When temperature reaches 19.5°C (19.0 + 0.5) it goes in range (trigger condition) and Relay1 is deactivated. The heater is switched off.

The temperature falls and when it reached 19°C it goes out of range (trigger and alert conditions). The relay is activated (heater is switched on) and e-mail is sent.

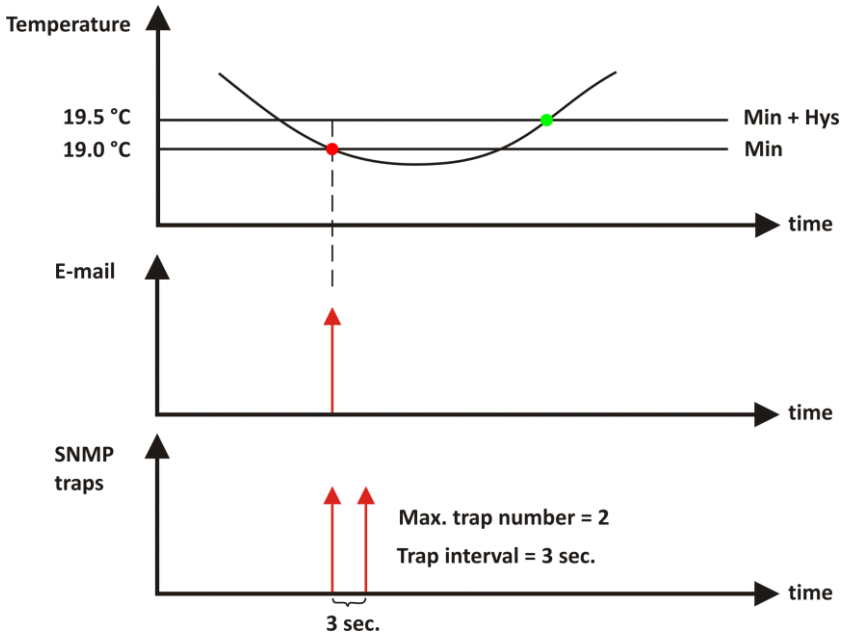


The “Max” value is set far enough from the wanted temperature to avoid trigger/alert conditions around it.

E-mail options when observed value goes out of range are:

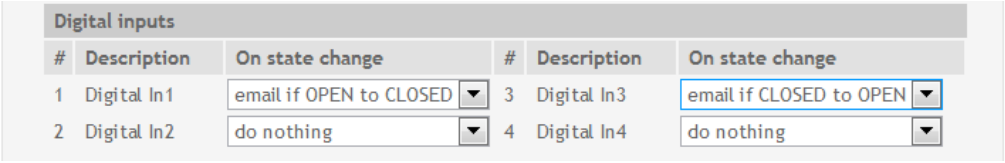
- Do noting;
- Send email with details set in “Setup-Networks-SMTP setup”. Only one e-mail is sent when the value goes out of range (alert condition). No more e-mails are sent even the value stays continually out of range.

If SNMP traps are enabled and there is an alert condition, traps will be sent. Sending depends of parameters “Trap interval”, “Max trap number” and how long the observer value stay outside the range.



7.2.4.2. Digital inputs

For all digital inputs alert condition is consider the transition between states – “Open-to close” and “Close-to-open”. For both of them e-mail alert can be sent.



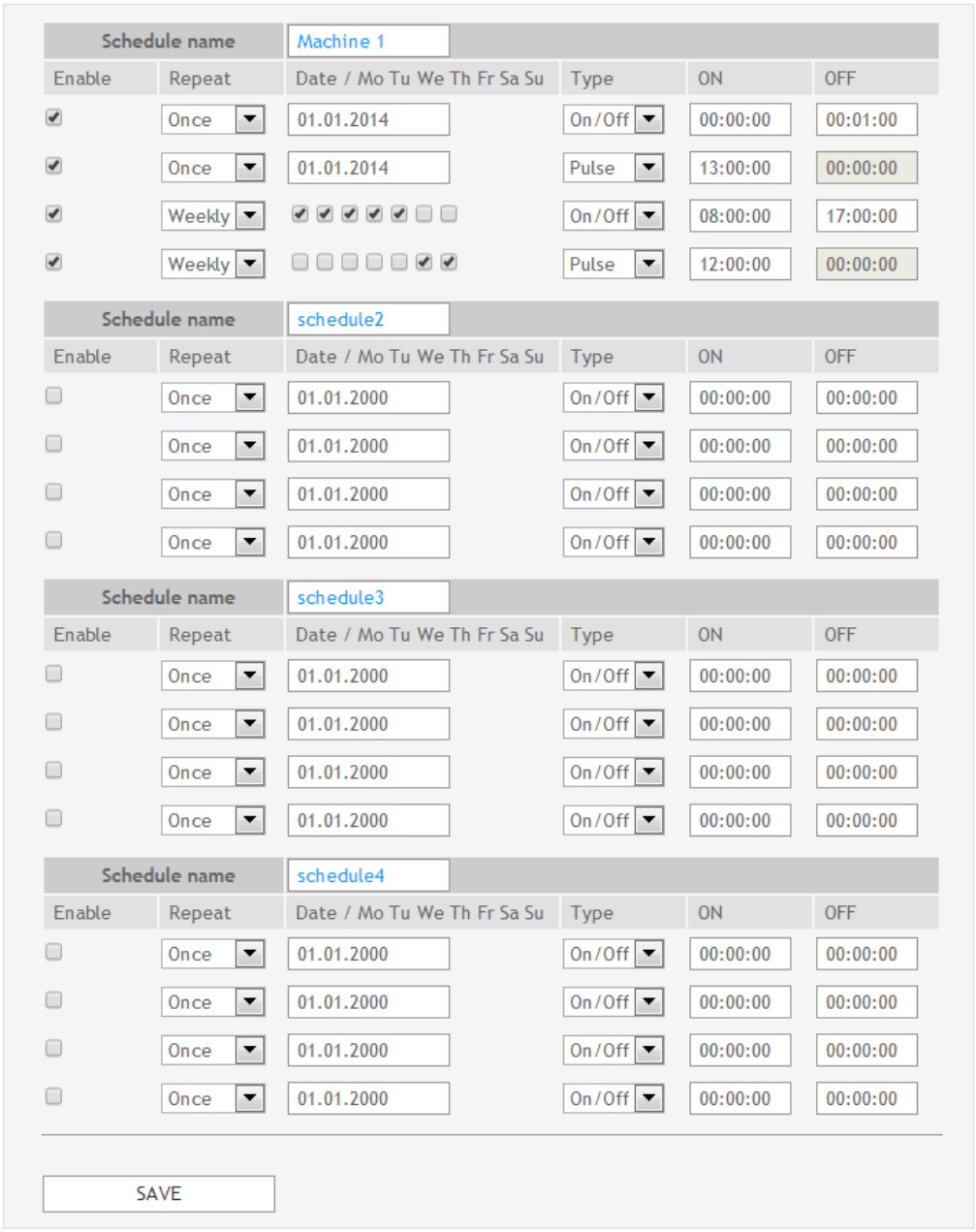
In the example above e-mail alerts will be sent if there is transition from “Open” to “Close” for Digital input 1 and from “Close” to “Open” for Digital input 2.

All changed information in above sections is saved with button “Save”.

7.2.5. Schedule

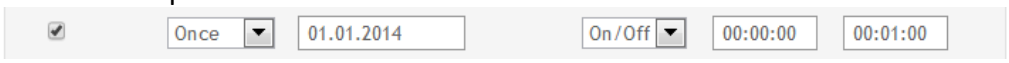
TCW240B supports four schedules. In every schedule up to four different tasks can be set.

The schedules are useful for creating tasks that vary with calendar dates. It is possible to combine two relays in control of one device - one relay follows monitored parameter and other follows schedule. In this case more complex control can be arranged.

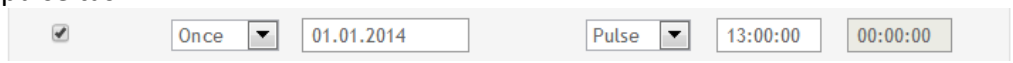


There are four type of schedule depending of repetition and duration:

- Single task for time period:

  With above setting there will be event on 1.1.2014 starts in 00:00 and ends in 00:01.
- Single pulse task:

  With above setting there will be pulse event on 1.1.2014 in 13:00:00. The pulse duration is depends of chosen relay's setting – section "Setup-Inputs/Outputs-Relay outputs".
- Weekly task for time period:

  With above setting there will be event every working day of the week starts in 08:00 and ends in 17:00.

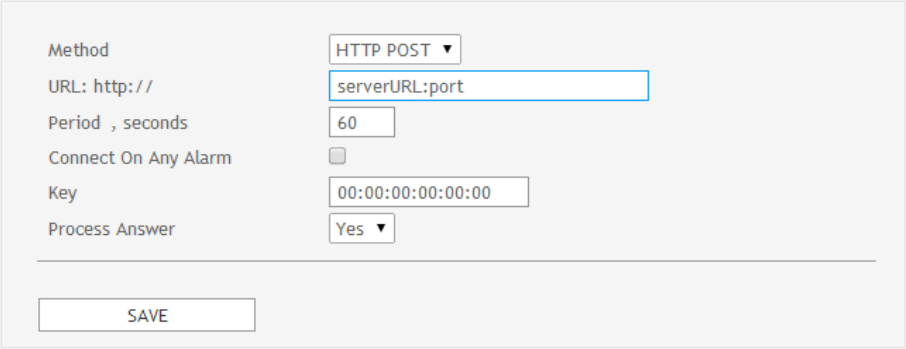
- Weekly pulse task:

With above setting there will be pulse event every Saturday and Sunday 12:00:00. The pulse duration can be set in section “Setup-Inputs/Outputs-Relay outputs”.

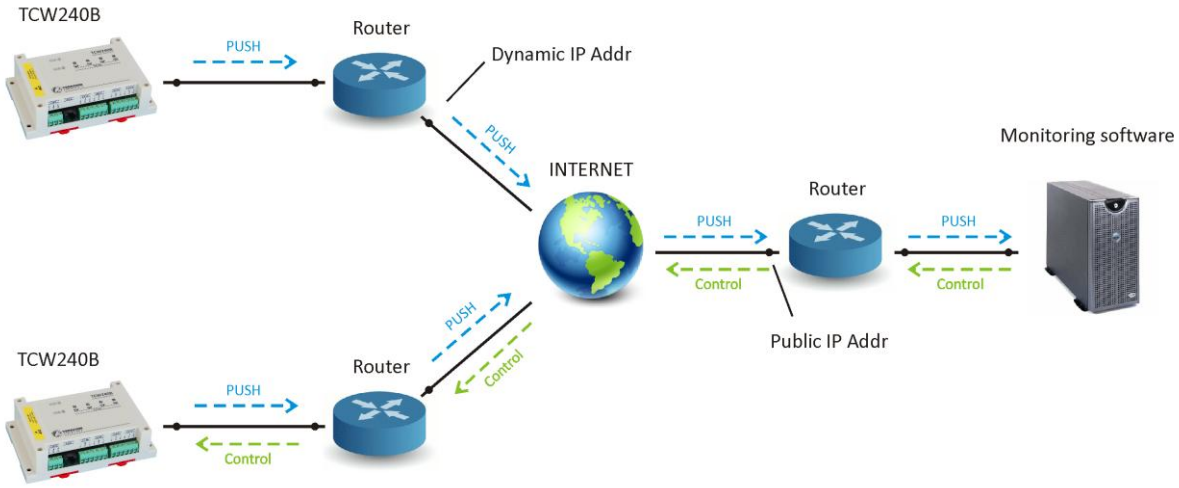
All changed information in above sections is saved with button “Save”.

7.2.6. Push mode

Push mode is intended for use in monitoring systems in which controllers and monitoring software are in different networks. By selecting the method "HTTP POST", the controller will start sending periodically **status.xml** file (using HTTP Post) to a remote server. If the checkbox “Connect on any alarm” is selected, the XML file will be send if alarm condition is present. The “Key” field value is sent in the XML and can be used for device identification. If “Process Answer” option is enabled, the **TCW240B** controller will be able to process the answer of the remote server. List of valid commands are described in section “XML and HTTP API commands”



Typical monitoring application is shown on the picture below:



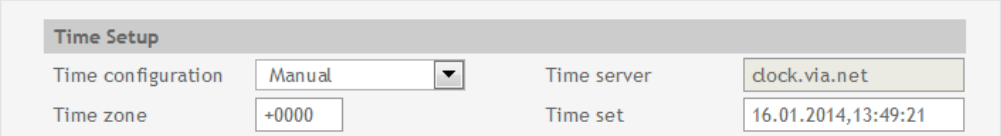
The main advantage of the PUSH technique is that the controllers can be installed in private networks (behind the routers without port forwarding arrangement). The server should have public IP address.

7.2.7. System

On this page all common settings for controller are made. There is also section for firmware update.

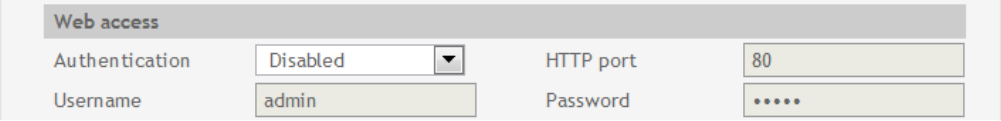
7.2.7.1. Time setup

The **TCW240B** utilizes real time clock for schedules. The clock can be set manually or automatically. For automatic adjustments appropriate NTP server should be used.



7.2.7.2. WEB access

Enable/disable of WEB access authentication, change of HTTP port and change of login information can be adjusted in this section.



7.2.7.3. XML/HTTP API

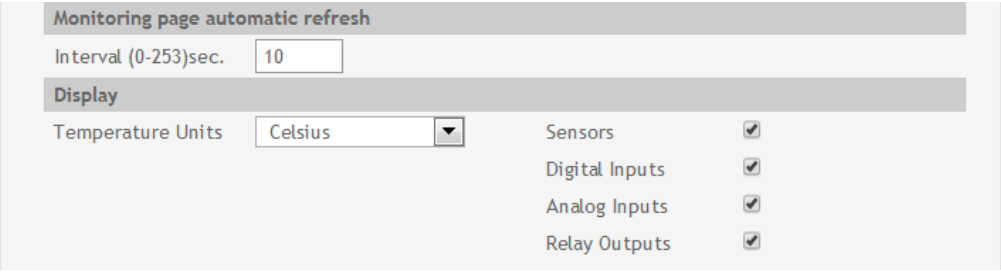
Enable/disable of XML/HTTP API access authentication can be adjusted in this section. “Basic authentication” only is supported.

7.2.7.4. Monitoring page setup

Monitoring page refresh interval can be set between 0 and 253 seconds. Zero means no automatic refresh.

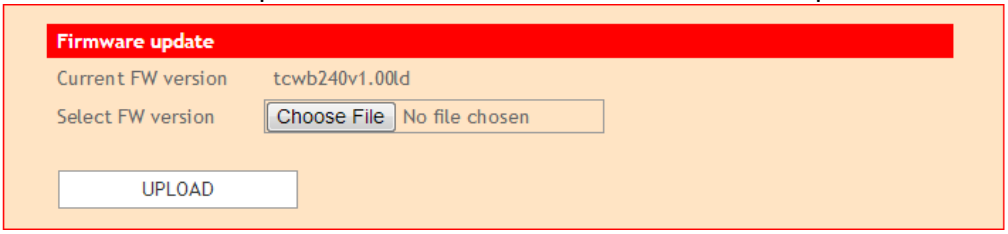
Celsius or Fahrenheit temperature units can be selected.

All four sections on “Monitoring page” can be added or removed independently by appropriate setup here.



7.2.7.5. Firmware update

This section is for firmware update. For more details see “7. Firmware update”.



All changed information in above sections is saved with button “Save”.

7.3. Logout

Closing the browser is not enough to close the session (WEB interface) with controller.

To avoid the message “Someone is logged in!” it is recommended you click the "Logout" button before closing the browser window.

8. SNMP protocol description

The **TCW240B** can be configured and monitored through SNMP (Simple Network Management Protocol). This could be done using every SNMP v.2 compatible program. Parameters that can be changed, are grouped according to their functions in the tables below. To obtain a valid OID number it is necessary to replace the “x” symbol with ”1.3.6.1.4.1.38783”. To save the changes **configurationSaved** (OID x.1.3.5.0) should be set to "1".

8.1. product

OID	Name	Access	Description	Syntax
x.1.1.1.0	name	read-only	Device name	String
x.1.1.2.0	version	read-only	Firmware version	String
x.1.1.3.0	date	read-only	Release date	String

8.2. setup -> network

OID	Name	Access	Description	Syntax
x.1.2.1.1.0	deviceID	read-only	Device ID (default MAC address)	MAC Address
x.1.2.1.2.0	hostName	read-only	Hostname	String
x.1.2.1.3.0	deviceIP	read-only	Device IP address	IP address

8.3. setup ->io-> Sensors->sensor1setup

OID	Name	Access	Description	Syntax
x.1.2.2.1.1.1.0	s1description	read-write	Sensor 1 description	String
x.1.2.2.1.1.2.0	s11MAXx10Int	read-write	S11 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.1.3.0	s11MINx10Int	read-write	S11 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.1.4.0	s11HYSTx10Int	read-write	S11 hysteresis value x10 in Integer format	INTEGER
x.1.2.2.1.1.5.0	s12MAXx10Int	read-write	S12 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.1.6.0	s12MINx10Int	read-write	S12 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.1.7.0	S12HYSTx10Int	read-write	S12 hysteresis value x10 in Integer format	INTEGER

8.4. setup ->io-> Sensors->sensor2setup

OID	Name	Access	Description	Syntax
x.1.2.2.1.2.1.0	S2description	read-write	Sensor 2 description	String
x.1.2.2.1.2.2.0	S21MAXx10Int	read-write	S21 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.2.3.0	S21MINx10Int	read-write	S21 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.2.4.0	S21HYSTx10Int	read-write	S21 hysteresis value x10 in Integer format	INTEGER
x.1.2.2.1.2.5.0	S22MAXx10Int	read-write	S22 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.2.6.0	S22MINx10Int	read-write	S22 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.2.7.0	S22HYSTx10Int	read-write	S22 hysteresis value x10 in Integer format	INTEGER

8.5. setup ->io-> Sensors->sensor3setup

OID	Name	Access	Description	Syntax
x.1.2.2.1.3.1.0	S3description	read-write	Sensor 3 description	String
x.1.2.2.1.3.2.0	S31MAXx10Int	read-write	S31 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.3.3.0	S31MINx10Int	read-write	S31 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.3.4.0	S31HYSTx10Int	read-write	S31 hysteresis value x10 in Integer format	INTEGER
x.1.2.2.1.3.5.0	S32MAXx10Int	read-write	S32 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.3.6.0	S32MINx10Int	read-write	S32 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.3.7.0	S32HYSTx10Int	read-write	S32 hysteresis value x10 in Integer format	INTEGER

8.6. setup ->io-> Sensors->sensor4setup

OID	Name	Access	Description	Syntax
x.1.2.2.1.4.1.0	S4description	read-write	Sensor 4 description	String
x.1.2.2.1.4.2.0	S41MAXx10Int	read-write	S41 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.4.3.0	S41MINx10Int	read-write	S41 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.4.4.0	S41HYSTx10Int	read-write	S41 hysteresis value x10 in Integer format	INTEGER
x.1.2.2.1.4.5.0	S42MAXx10Int	read-write	S42 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.4.6.0	S42MINx10Int	read-write	S42 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.4.7.0	S42HYSTx10Int	read-write	S42 hysteresis value x10 in Integer format	INTEGER

8.7. setup ->io-> Sensors->sensor5setup

OID	Name	Access	Description	Syntax
x.1.2.2.1.5.1.0	S5description	read-write	Sensor 5 description	String
x.1.2.2.1.5.2.0	S51MAXx10Int	read-write	S51 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.5.3.0	S51MINx10Int	read-write	S51 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.5.4.0	S51HYSTx10Int	read-write	S51 hysteresis value x10 in Integer format	INTEGER
x.1.2.2.1.5.5.0	S52MAXx10Int	read-write	S52 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.5.6.0	S52MINx10Int	read-write	S52 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.5.7.0	S52HYSTx10Int	read-write	S52 hysteresis value x10 in Integer format	INTEGER

8.8. setup ->io-> Sensors->sensor6setup

OID	Name	Access	Description	Syntax
x.1.2.2.1.6.1.0	S6description	read-write	Sensor 6 description	String
x.1.2.2.1.6.2.0	S61MAXx10Int	read-write	S61 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.6.3.0	S61MINx10Int	read-write	S61 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.6.4.0	S61HYSTx10Int	read-write	S61 hysteresis value x10 in Integer format	INTEGER
x.1.2.2.1.6.5.0	S62MAXx10Int	read-write	S62 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.6.6.0	S62MINx10Int	read-write	S62 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.6.7.0	S62HYSTx10Int	read-write	S62 hysteresis value x10 in Integer format	INTEGER

8.9. setup ->io-> Sensors->sensor7setup

OID	Name	Access	Description	Syntax
x.1.2.2.1.7.1.0	S7description	read-write	Sensor 7 description	String
x.1.2.2.1.7.2.0	S71MAXx10Int	read-write	S71 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.7.3.0	S71MINx10Int	read-write	S71 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.7.4.0	S71HYSTx10Int	read-write	S71 hysteresis value x10 in Integer format	INTEGER
x.1.2.2.1.7.5.0	S72MAXx10Int	read-write	S72 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.7.6.0	S72MINx10Int	read-write	S72 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.7.7.0	S72HYSTx10Int	read-write	S72 hysteresis value x10 in Integer format	INTEGER

8.10. setup ->io-> Sensors->sensor8setup

OID	Name	Access	Description	Syntax
x.1.2.2.1.8.1.0	s1description	read-write	Sensor 2 description	String
x.1.2.2.1.8.2.0	S81MAXx10Int	read-write	S81 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.8.3.0	S81MINx10Int	read-write	S81 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.8.4.0	S81HYSTx10Int	read-write	S81 hysteresis value x10 in Integer format	INTEGER
x.1.2.2.1.8.5.0	S82MAXx10Int	read-write	S82 maximum value x10 in Integer format	INTEGER
x.1.2.2.1.8.6.0	S82MINx10Int	read-write	S82 minimum value x10 in Integer format	INTEGER
x.1.2.2.1.8.7.0	S82HYSTx10Int	read-write	S82 hysteresis value x10 in Integer format	INTEGER

8.11. setup ->io-> analog ->analog1setup

OID	Name	Access	Description	Syntax
x.1.2.2.2.1.1.0	voltage1description	read-write	Voltage 1 description	String
x.1.2.2.2.1.2.0	Voltage1max	read-write	Voltage 1 maximum	INTEGER
x.1.2.2.2.1.3.0	Voltage1min	read-write	Voltage 1 minimum	INTEGER
x.1.2.2.2.1.4.0	Voltage1hyst	read-write	Voltage 1 hysteresis	INTEGER

8.12. setup ->io-> analog ->analog2setup

OID	Name	Access	Description	Syntax
x.1.2.2.2.2.1.0	Voltage2description	read-write	Voltage 2 description	String
x.1.2.2.2.2.2.0	Voltage2max	read-write	Voltage 2 maximum	INTEGER
x.1.2.2.2.2.3.0	Voltage2min	read-write	Voltage 2 minimum	INTEGER
x.1.2.2.2.2.4.0	Voltage2hyst	read-write	Voltage 2 hysteresis	INTEGER

8.13. setup ->io-> analog ->analog3setup

OID	Name	Access	Description	Syntax
x.1.2.2.2.3.1.0	Voltage3description	read-write	Voltage 3 description	String
x.1.2.2.2.3.2.0	Voltage3max	read-write	Voltage 3 maximum	INTEGER
x.1.2.2.2.3.3.0	Voltage3min	read-write	Voltage 3 minimum	INTEGER
x.1.2.2.2.3.4.0	Voltage3hyst	read-write	Voltage 3 hysteresis	INTEGER

8.14. setup ->io-> analog ->analog4setup

OID	Name	Access	Description	Syntax
x.1.2.2.2.4.1.0	Voltage4description	read-write	Voltage 4 description	String
x.1.2.2.2.4.2.0	Voltage4max	read-write	Voltage 4 maximum	INTEGER
x.1.2.2.2.4.3.0	Voltage4min	read-write	Voltage 4 minimum	INTEGER
x.1.2.2.2.4.4.0	Voltage4hyst	read-write	Voltage 4 hysteresis	INTEGER

8.15. setup ->io-> digital

OID	Name	Access	Description	Syntax
x.1.2.2.3.1.0	Digitalinput1description	read-write	Digital Input 1 description	String
x.1.2.2.3.2.0	Digitalinput2description	read-write	Digital Input 2 description	String
x.1.2.2.3.3.0	Digitalinput3description	read-write	Digital Input 3 description	String
x.1.2.2.3.4.0	Digitalinput4description	read-write	Digital Input 4 description	String

8.16. setup ->io-> relays->relay1setup

OID	Name	Access	Description	Syntax
x.1.2.2.4.1.1.0	Relay1description	read-write	Relay 1 description	String
x.1.2.2.4.1.2.0	Relay1pulseWidth	read-write	Relay 1 Pulse x100ms	INTEGER
x.1.2.2.4.1.3.0	Relay1controlledBy	read-write	Relay 1 control logic	INTEGER {manual(0), sensor11(1), sensor21(2), sensor31(3), sensor41(4), sensor51(5), sensor61(6), sensor71(7), sensor81(8), sensor12(9), sensor22(10), sensor32(11), sensor42(12), sensor52(13), sensor62(14), sensor72(15), sensor82(16), analog1(17), analog2(18), analog3(19), analog4(20), digital1(21), digital2(22), digital3(23), digital4(24), scheduler1(25), scheduler2(26), scheduler3(27), scheduler4(28) }

8.17. setup ->io-> relays->relay2setup

OID	Name	Access	Description	Syntax
x.1.2.2.4.2.1.0	Relay2description	read-write	Relay 2 description	String
x.1.2.2.4.2.2.0	Relay2pulseWidth	read-write	Relay 2 Pulse x100ms	INTEGER
x.1.2.2.4.2.3.0	Relay2controlledBy	read-write	Relay 2 control logic	INTEGER {manual(0), sensor11(1), sensor21(2), sensor31(3), sensor41(4), sensor51(5), sensor61(6), sensor71(7), sensor81(8), sensor12(9), sensor22(10), sensor32(11), sensor42(12), sensor52(13), sensor62(14), sensor72(15), sensor82(16), analog1(17), analog2(18), analog3(19), analog4(20), digital1(21), digital2(22), digital3(23), digital4(24), scheduler1(25), scheduler2(26), scheduler3(27), scheduler4(28) }

8.18. setup ->io-> relays->relay3setup

OID	Name	Access	Description	Syntax
x.1.2.2.4.3.1.0	Relay31description	read-write	Relay 3 description	String
x.1.2.2.4.3.2.0	Relay3pulseWidth	read-write	Relay 3 Pulse x100ms	INTEGER
x.1.2.2.4.3.3.0	Relay3controlledBy	read-write	Relay 3 control logic	INTEGER {manual(0), sensor11(1), sensor21(2), sensor31(3), sensor41(4), sensor51(5), sensor61(6), sensor71(7), sensor81(8), sensor12(9), sensor22(10), sensor32(11), sensor42(12), sensor52(13), sensor62(14), sensor72(15), sensor82(16), analog1(17), analog2(18), analog3(19), analog4(20), digital1(21), digital2(22), digital3(23), digital4(24), scheduler1(25), scheduler2(26), scheduler3(27), scheduler4(28) }

8.19. setup ->io-> relays->relay4setup

OID	Name	Access	Description	Syntax
x.1.2.2.4.4.1.0	Relay4description	read-write	Relay 4 description	String
x.1.2.2.4.4.2.0	Relay4pulseWidth	read-write	Relay 4 Pulse x100ms	INTEGER
x.1.2.2.4.4.3.0	Relay4controlledBy	read-write	Relay 4 control logic	INTEGER {manual(0), sensor11(1), sensor21(2), sensor31(3), sensor41(4), sensor51(5), sensor61(6), sensor71(7), sensor81(8), sensor12(9), sensor22(10), sensor32(11), sensor42(12), sensor52(13), sensor62(14), sensor72(15), sensor82(16), analog1(17), analog2(18), analog3(19), analog4(20), digital1(21), digital2(22), digital3(23), digital4(24), scheduler1(25), scheduler2(26), scheduler3(27), scheduler4(28) }

8.20. monitor_control -> Sensors -> sensor1

OID	Name	Access	Description	Syntax
x.1.3.1.1.1.0	S11x10Int	read-only	S11 value x10 in Integer format	INTEGER
x.1.3.1.1.2.0	S12x10Int	read-only	S12 value x10 in Integer format	INTEGER
x.1.3.1.1.3.0	S1ID	read-only	Sensor 1 ID	Mac Address

8.21. monitor_control -> Sensors -> sensor2

OID	Name	Access	Description	Syntax
x.1.3.1.2.1.0	S21x10Int	read-only	S21 value x10 in Integer format	INTEGER
x.1.3.1.2.2.0	S22x10Int	read-only	S22 value x10 in Integer format	INTEGER
x.1.3.1.2.3.0	S2ID	read-only	Sensor 2 ID	Mac Address

8.22. monitor_control -> Sensors -> sensor3

OID	Name	Access	Description	Syntax
x.1.3.1.3.1.0	S31x10Int	read-only	S31 value x10 in Integer format	INTEGER
x.1.3.1.3.2.0	S32x10Int	read-only	S32 value x10 in Integer format	INTEGER
x.1.3.1.3.3.0	S3ID	read-only	Sensor 3 ID	Mac Address

8.23. monitor_control -> Sensors -> sensor4

OID	Name	Access	Description	Syntax
x.1.3.1.4.1.0	S41x10Int	read-only	S41 value x10 in Integer format	INTEGER
x.1.3.1.4.2.0	S42x10Int	read-only	S42 value x10 in Integer format	INTEGER
x.1.3.1.4.3.0	S4ID	read-only	Sensor 4 ID	Mac Address

8.24. monitor_control -> Sensors -> sensor5

OID	Name	Access	Description	Syntax
x.1.3.1.5.1.0	S51x10Int	read-only	S51 value x10 in Integer format	INTEGER
x.1.3.1.5.2.0	S52x10Int	read-only	S52 value x10 in Integer format	INTEGER
x.1.3.1.5.3.0	S5ID	read-only	Sensor 5 ID	Mac Address

8.25. monitor_control -> Sensors -> sensor6

OID	Name	Access	Description	Syntax
x.1.3.1.6.1.0	S61x10Int	read-only	S61 value x10 in Integer format	INTEGER
x.1.3.1.6.2.0	S62x10Int	read-only	S62 value x10 in Integer format	INTEGER
x.1.3.1.6.3.0	S6ID	read-only	Sensor 6 ID	Mac Address

8.26. monitor_control -> Sensors -> sensor7

OID	Name	Access	Description	Syntax
x.1.3.1.7.1.0	S71x10Int	read-only	S71 value x10 in Integer format	INTEGER
x.1.3.1.7.2.0	S72x10Int	read-only	S72 value x10 in Integer format	INTEGER
x.1.3.1.7.3.0	S7ID	read-only	Sensor 7 ID	Mac Address

8.27. monitor_control -> Sensors -> sensor8

OID	Name	Access	Description	Syntax
x.1.3.1.8.1.0	S81x10Int	read-only	S81 value x10 in Integer format	INTEGER
x.1.3.1.8.2.0	S82x10Int	read-only	S82 value x10 in Integer format	INTEGER
x.1.3.1.8.3.0	S8ID	read-only	Sensor 8 ID	Mac Address

8.28. monitor_control -> analog

OID	Name	Access	Description	Syntax
x.1.3.2.1.0	Voltage1x10Int	read-only	Voltage1 x10 in Integer format	INTEGER
x.1.3.2.2.0	Voltage2x10Int	read-only	Voltage2 x10 in Integer format	INTEGER
x.1.3.2.3.0	Voltage3x10Int	read-only	Voltage3 x10 in Integer format	INTEGER
x.1.3.2.4.0	Voltage4x10Int	read-only	Voltage4 x10 in Integer format	INTEGER

8.29. monitor_control -> digital

OID	Name	Access	Description	Syntax
x.1.3.3.1.0	digitalInput1State	read-only	Digital1 Input State	INTEGER {closed(0), open(1)}
x.1.3.3.2.0	digitalInput2State	read-only	Digital2 Input State	INTEGER {closed(0), open(1)}
x.1.3.3.3.0	digitalInput3State	read-only	Digital3 Input State	INTEGER {closed(0), open(1)}
x.1.3.3.4.0	digitalInput4State	read-only	Digital4 Input State	INTEGER {closed(0), open(1)}

8.30. monitor_control ->relays -> relay1

OID	Name	Access	Description	Syntax
x.1.3.4.1.1.0	relay1State	read-write	Relay1 State	INTEGER {off(0), on(1)}
x.1.3.4.1.2.0	Relay1pulse	read-write	Relay1 pulse length	INTEGER

8.31. monitor_control ->relays -> relay2

OID	Name	Access	Description	Syntax
x.1.3.4.2.1.0	Relay2State	read-write	Relay2 State	INTEGER {off(0), on(1)}
x.1.3.4.2.2.0	Relay2pulse	read-write	Relay2 pulse length	INTEGER

8.32. monitor_control ->relays -> relay3

OID	Name	Access	Description	Syntax
x.1.3.4.3.1.0	Relay3State	read-write	Relay3 State	INTEGER {off(0), on(1)}
x.1.3.4.3.2.0	Relay3pulse	read-write	Relay3 pulse length	INTEGER

8.33. monitor_control ->relays -> relay4

OID	Name	Access	Description	Syntax
x.1.3.4.4.1.0	Relay4State	read-write	Relay4 State	INTEGER {off(0), on(1)}
x.1.3.4.4.2.0	Relay4pulse	read-write	Relay4 pulse length	INTEGER

8.34. monitor_control

OID	Name	Access	Description	Syntax
x.1.3.5.0	configurationSaved	read-write	Configuration save status SAVED/UNSAVED	INTEGER {unsaved(0), saved(1)}
x.1.3.6.0	restartDevice	read-write	Restart Device	INTEGER {cancel(0), restart(1)}
x.1.3.7.0	temperatureUnit	read-only	Unit of the all temperature values	INTEGER {Celsius(0), Fahrenheit(1)}

9. XML and HTTP API commands

XML is often preferred choice when it comes to M2M communication and system integration. The monitored values are transmitted in status.xml file that can be easily processed by software applications.

The structure of status.xml file is:

```
<Monitor>
    <DeviceInfo>
        <ID>00:04:A3:CE:F9:F8</ID>
        <DeviceName>TCW240B</DeviceName>
        <Key>00:00:00:00:00:00</Key>
        <HostName>TCW240B</HostName>
        <Alarmed>1</Alarmed>
    </DeviceInfo>
    <S>
        <S1>
            <description>Sensor1</description>
            <id>FFFFFFFFFFFF</id>
            <item1>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
            </item1>
            <item2>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
            </item2>
        </S1>
        <S2>
            <description>Sensor2</description>
            <id>FFFFFFFFFFFF</id>
            <item1>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
            </item1>
            <item2>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
            </item2>
        </S2>
        <S3>
            <description>Sensor3</description>
            <id>FFFFFFFFFFFF</id>
            <item1>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
            </item1>
            <item2>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
            </item2>
        </S3>
        <S4>
            <description>Sensor4</description>
            <id>FFFFFFFFFFFF</id>
            <item1>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
            </item1>
            <item2>
                <value>---</value>
                <unit>---</unit>
                <alarm>0</alarm>
            </item2>
        </S4>
        <S5>
            <description>Sensor5</description>
```

```
        <id>FFFFFFFFFFFF</id>
        <item1>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
        </item1>
        <item2>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
        </item2>
    </S5>
    <S6>
        <description>Sensor6</description>
        <id>FFFFFFFFFFFF</id>
        <item1>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
        </item1>
        <item2>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
        </item2>
    </S6>
    <S7>
        <description>Sensor7</description>
        <id>FFFFFFFFFFFF</id>
        <item1>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
        </item1>
        <item2>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
        </item2>
    </S7>
    <S8>
        <description>Sensor8</description>
        <id>FFFFFFFFFFFF</id>
        <item1>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
        </item1>
        <item2>
            <value>---</value>
            <unit>---</unit>
            <alarm>0</alarm>
        </item2>
    </S8>
</S>

<AI>
    <AI1>
        <description>Analog In1</description>
        <value>0.00</value>
        <unit>volts</unit>
        <multiplier>31.740</multiplier>
        <offset>0.826</offset>
        <alarm>0</alarm>
    </AI1>
    <AI2>
        <description>Analog In2</description>
        <value>0.00</value>
        <unit>volts</unit>
        <multiplier>31.740</multiplier>
        <offset>0.826</offset>
        <alarm>0</alarm>
    </AI2>
    <AI3>
        <description>Analog In3</description>
        <value>0.00</value>
        <unit>volts</unit>
        <multiplier>1.000</multiplier>
```

```
            <offset>0.000</offset>
            <alarm>0</alarm>
        </AI3>
        <AI4>
            <description>Analog In4</description>
            <value>0.00</value>
            <unit>volts</unit>
            <multiplier>1.000</multiplier>
            <offset>0.000</offset>
            <alarm>0</alarm>
        </AI4>
    </AI>

    <DI>
        <DI1>
            <description>Digital In1</description>
            <value>OPEN</value>
        </DI1>
        <DI2>
            <description>Digital In2</description>
            <value>OPEN</value>
        </DI2>
        <DI3>
            <description>Digital In3</description>
            <value>OPEN</value>
        </DI3>
        <DI4>
            <description>Digital In4</description>
            <value>OPEN</value>
        </DI4>
    </DI>

    <R>
        <R1>
            <description>Relay1</description>
            <value>OFF</value>
        </R1>
        <R2>
            <description>Relay2</description>
            <value>OFF</value>
        </R2>
        <R3>
            <description>Relay3</description>
            <value>OFF</value>
        </R3>
        <R4>
            <description>Relay4</description>
            <value>OFF</value>
        </R4>
    </R>
</Monitor>
```

Where:

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

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

If XML/HTTP API authentication is enabled, basic access authentication is required to access the **status.xml** file. The format of the command is:

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

Where **uuuu** is user name and **pppp** is password. Both parameters are unencrypted.

The relay outputs can be controlled by sending HTTP commands:

Command	Description
http://device.ip.address/status.xml?r1=1	Turn Relay 1 ON
http:// device.ip.address/status.xml?r1=0	Turn Relay 1 OFF
http://device.ip.address/status.xml?r2=1	Turn Relay 2 ON
http://device.ip.address/status.xml?r2=0	Turn Relay 2 OFF
http://device.ip.address/status.xml?tg1=1	Toggle Relay 1 state
http://device.ip.address/status.xml?pl1=1	Pulse Relay 1
http://device.ip.address/status.xml?r1=1&r2=1	Turn both relays ON
http://device.ip.address/status.xml?r1=0&r2=0	Turn both relays OFF

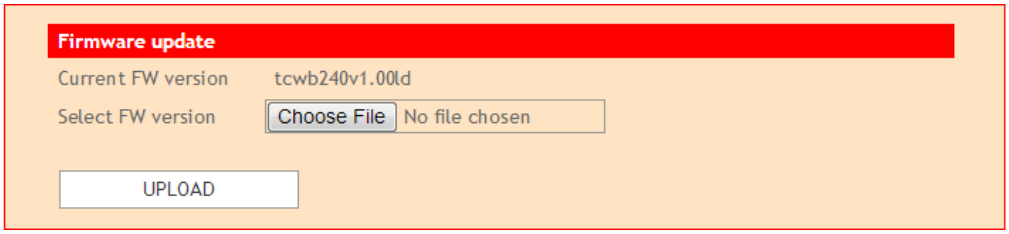
If XML/HTTP API authentication is enabled, the format of the commands is shown in the table below (user name=admin, pass=admin):

XML/HTTP API authentication	Format
enabled	http://device.ip.address/status.xml?a=admin:admin&r1=1
disabled	http://device.ip.address/status.xml?r1=1

10. Firmware update

TCW240B supports remote firmware update. To update the device follow the steps below:

- Go to www.teracom.cc and download the latest firmware;
- Go to the device login page, enter user name and password and press the “Login” button;
- Go to “Setup-System-Firmware update” section, select the update .cod file and press “upload” button;



- After the firmware update is completed, you will be forwarded to the device Login page.

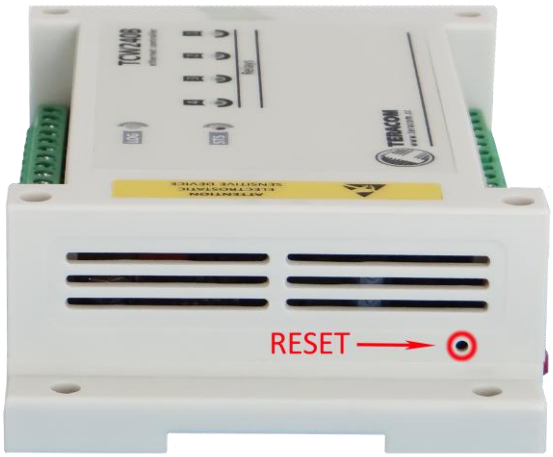
Attention! Don’t turn off the power supply during the update. Turning off the power supply will damage the device.

For some updates factory default settings procedure is mandatory.

11. Factory default settings

The **TCW240B** can be restored to its original factory default settings, following the steps below:

- Turn off the power supply;
- Press and hold the RESET button then turn on the power supply;
- After turning the power supply release the RESET button. The LED's STS and LOG will flash 14 times, after that only the STS LED will continue to blink. The controller is restored to its default settings.



The factory default settings are:

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

12. Environment information

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

When the controller is a part of a system, the other elements of the system shall comply with the EMC requirements and shall be intended for use in the same ambient conditions.

13. Safety

This device must not be used for medical, life saving purposes or for any purpose where its failure could cause serious injury or the loss of life.

To reduce the risk of fire, only flexible stranded wire, with cross section 0.5mm² or larger for wiring of digital and analog inputs and relay output of the device should be used.

To avoid electric shock and fire hazard, 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 (damage) of controller, if recommended free spaces to adjacent devices are not ensured. Joint part with external component shall have space for attachment/removal of the cable after installation.

Teracom does not guarantee successful operation of the product if the product was used under conditions deviating from the product specifications.

To ensure that the device works correctly follow the steps below:

- ensure that the device is installed correctly, refer this user manual;
- log in to the devices via browser program;
- make proper set up;
- set up the digital inputs to work in “dry contact” mode;
- short the “Din1” and “GND”;
- install sensor TSH1XX or TST1XX on 1-Wire bus;
- go to “Monitoring page” of WEB interface – proper parameters value should be displayed in the same time flashing “STS” led should indicate the 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.

14. Maintenance

Upon completion of any service or repairs to the device or once per year, safety check must be perform to determine that this product is in proper operating condition.

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

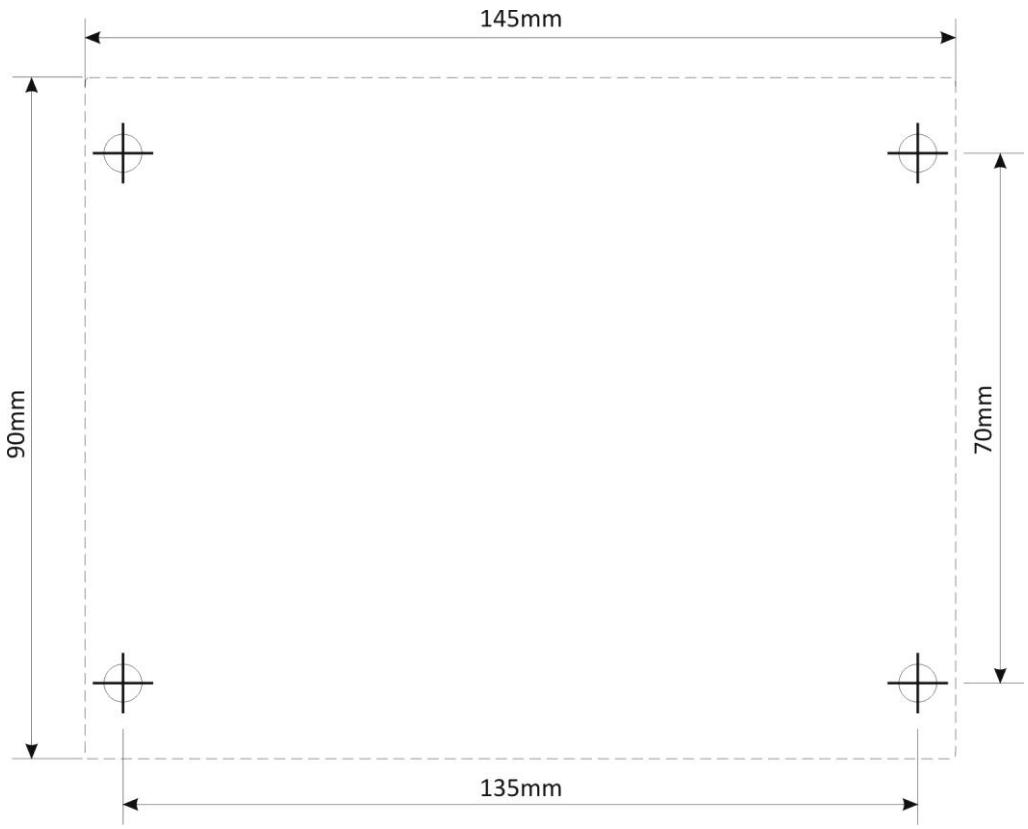


Fig.1

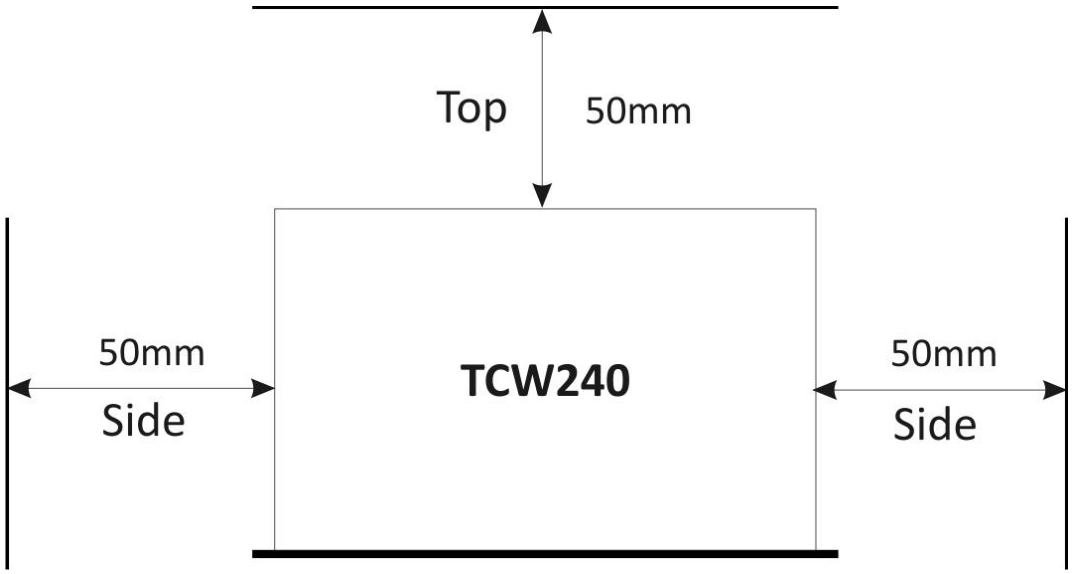


Fig.2