



EthernetcontrollerTCW111

Users manual



1. Short description

TCW111 is an Ethernet based controller, which is designed to work in IP-based networks. Its functionality allows solving a range of tasks that are specific to the automation projects. The analog input is suitable for various sensors. The list with supported 1-Wire sensors can be found on www.teracom.cc. The I/O interface - relay output, analog and digital inputs is suitable for solving specific problems in various fields such as temperature and humidity measurement, temperature control in cooling and heating systems, remote control, alarm systems, industrial process automation, control and management of computer networks etc.

2. Features

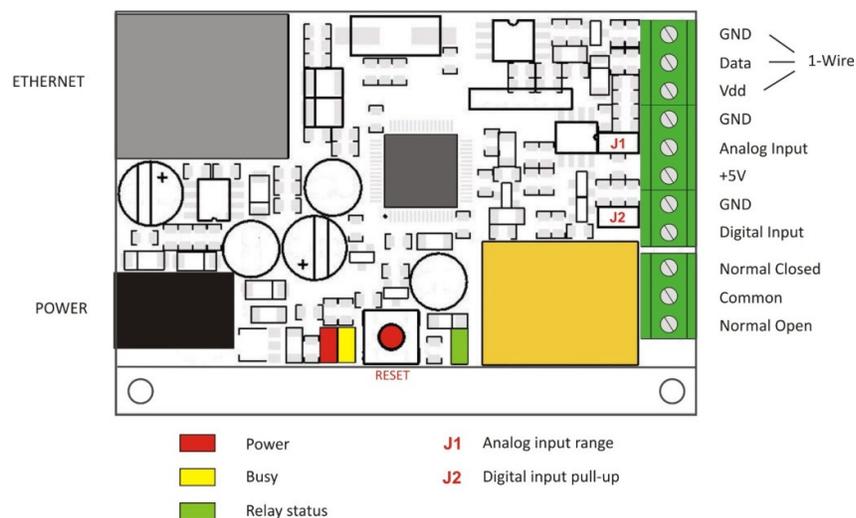
- 10 Mbit Ethernet connectivity
- Password protected, web based configuration and control
- 1 digital input, 1 analog input, 1-Wire sensors support, 3A/24VDC Relay output
- SNMP traps when an alert condition takes place
- E-mail when an alert condition takes place
- Temperature & humidity control
- Long 1-Wire sensor support
- Connects to SNMP monitoring systems
- usage as stand-alone device or as a part of control and monitoring system
- MAC Address filtering
- Remote FTP firmware update

3. Technical parameters

Supply Voltage, VDC	12
Weight, g	40
Dimensions, mm	72 x 50 x 18
Operating temperature, °C	0 ÷ 40
Storage temperature, °C	-40 ÷ 85
Analog input range, VDC	0 ÷ 5 0 ÷ 100
Minimum high level digital input voltage, V	2.5
Maximum low level digital input voltage, V	0.8
Maximum input voltage for digital inputs, V	5.5
Max. switchable current (at 220 VAC), A	3
Max. switchable voltage, VAC/VDC	250/110

4. Connectors & LED indicators

The location of the connectors is shown in the figure below ;



- **Power** -∅ 2mm power connector;
- **1-Wire bus** – supports 1-Wire sensors with cable length up to 100m(applies to sensors that use Category 5, twisted-pair copper wire and have 5V bus power supplied by the master);
- **Analog input** -the input range is selected by jumper**J1**;
- **+5V** – power supply for analog sensors;
- **Digital input** – operating mode is selected by jumper **J2**;
- **Relay output** –normal open and normal close contacts are available;
- **J1** - range selection for analog input - 0-5V (close) and 0-100V (open);
- **J2** –mode selection for digital input – dry contact (close) and logic level (open);

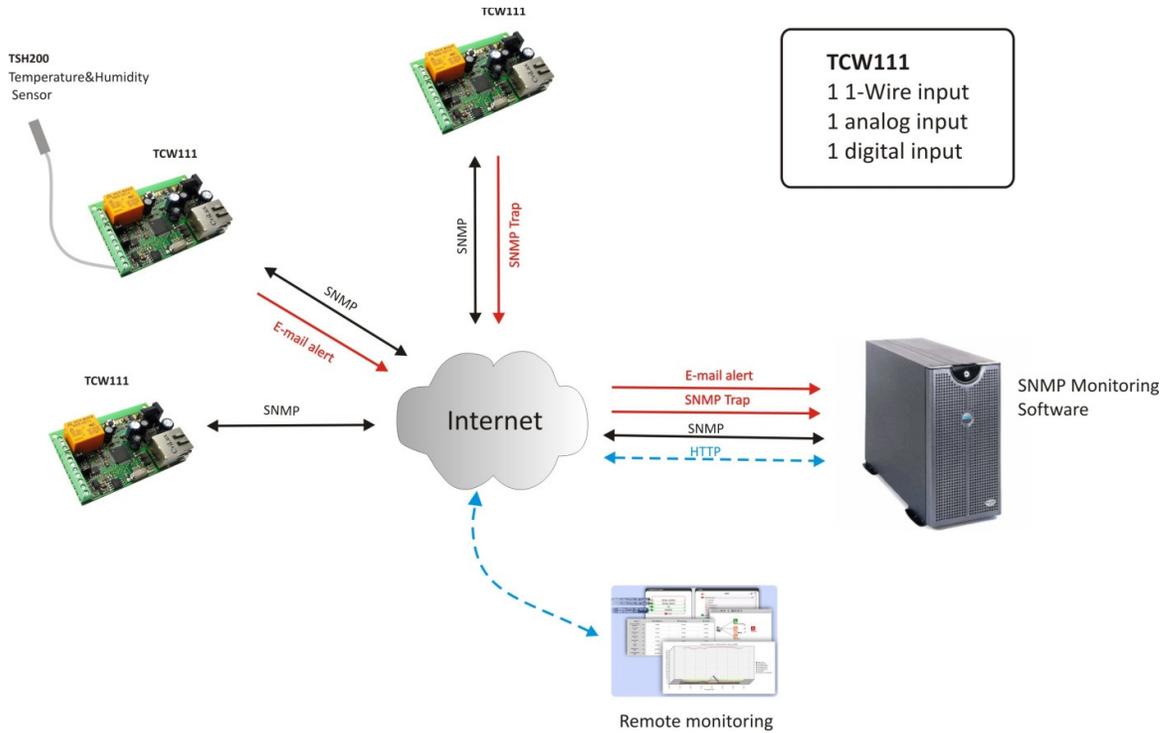
The following indicators show the status of the controller:

- **Relay status** (green) –illuminated whenever the relay is activated (the Normally Open contact is closed);
- **Power** (red) –flashes when the power supply is turned on;
- **Busy** (yellow) –indicates that someone is connected to the controller through web interface;
- **Link** (green) – this LED is located on the Ethernet connector. It indicates that the device is connected to the network ;
- **Act** (yellow) – this LED is located on the Ethernet connector. It flashes when activity is detected on the network.

5. Application examples

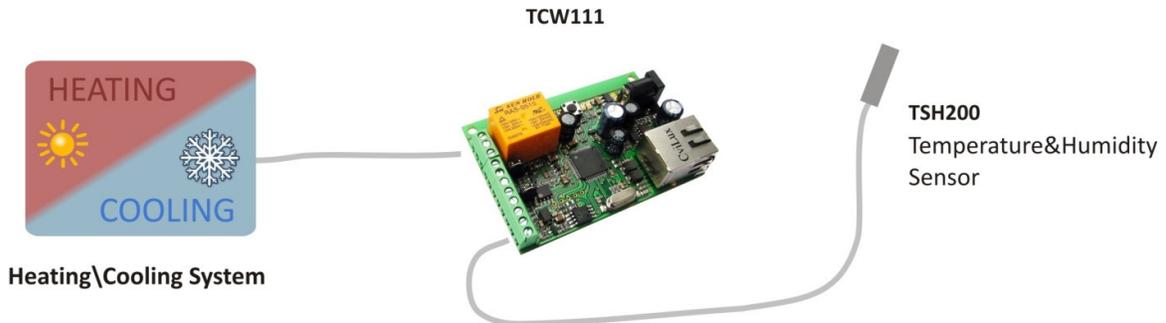
5.1 Data acquisition

The **TCW** series Ethernet controllers are designed for use in data acquisition systems(DAQ).**TCW120B** uses SNMP v.1 protocol for communication with monitoring and management software applications.



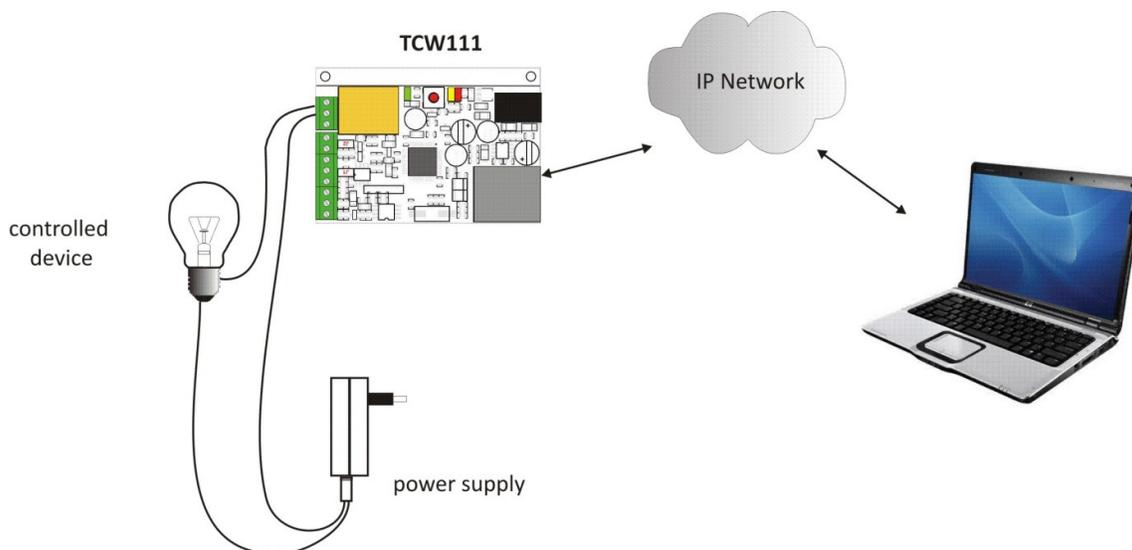
5.2 Temperature&Humidity control

TCW111 supports 1-Wire temperature and humidity sensors, which makes it suitable for use in heating and cooling systems.



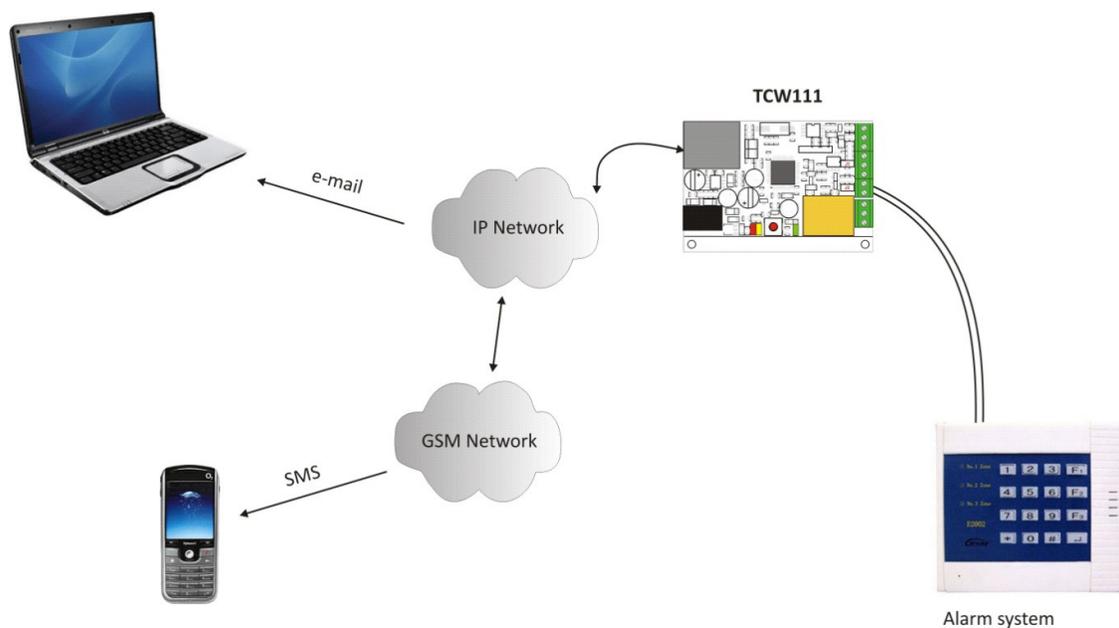
5.3 Remote control

The controlled device is connected in series with the relay contact. Users can operate **TCW111** using a web browser or by using custom SNMP applications.



5.4 Remote monitoring

A relay output from the monitored device is connected to digital input of **TCW111**. When an event occurs – the controller sends an E-mail message to a predefined e-mail address. SNMP Trap message is sent if custom SNMP monitoring software is used.



6. Installation

Please follow the steps below for proper installation :

1. Mount the controller in a dry and ventilated place.
2. Connect the Ethernet port to a 10/100 Base T Ethernet connection. For direct connection to a PC use a “crossover” cable.
3. Connect the I/O pins of the controller according to the required application.
4. Connect the power supply.

If the Power LED is blinking, it indicates that the power supply is OK. By default **TCW111** comes with the following network settings:

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

Communication with **TCW111** may be established by assigning a temporary IP address to your computer that is on the same network (for example 192.168.1.5). To get access to the web interface of the controller, you should type the following URL into the browser : <http://192.168.1.2> . If the network settings are correct, the “Login” page will appear.

7. Web-based setup

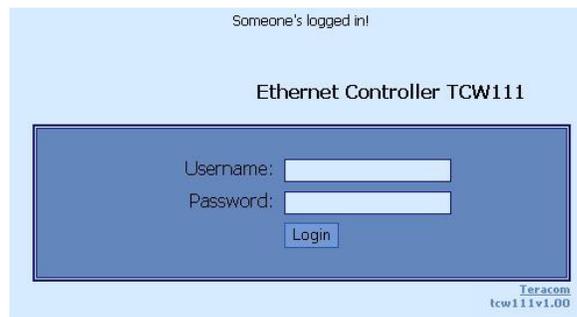
The web interface allows the **TCW111** to be configured, controlled and monitored via web browser. Recommended programs are Mozilla Firefox, Chrome and Internet Explorer 6 (or higher version) at 1024x768 resolution.

7.1 Login page

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.



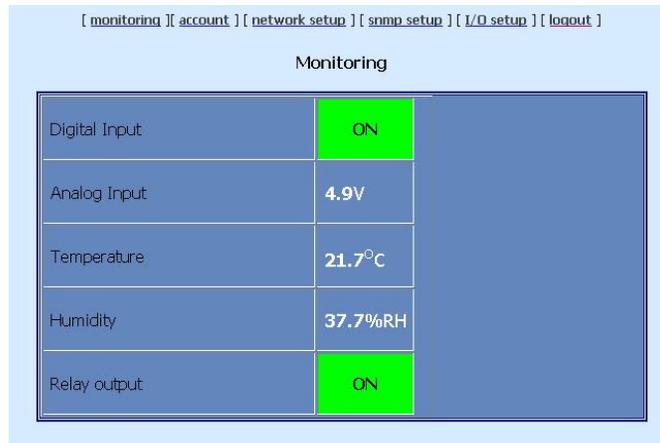
The controller supports one active session – only one user can operate the device. If another user tries to login, the message “Someone’s logged in” appears:



The active session will be terminated automatically, if the current user stays inactive for 2 minutes.

7.2 Monitoring page

After successful authorization, the Monitoring page appears:



The screenshot shows a web interface with a navigation bar at the top containing links: [monitoring] [account] [network setup] [snmp setup] [I/O setup] [logout]. Below the navigation bar is the title "Monitoring". The main content is a table with the following data:

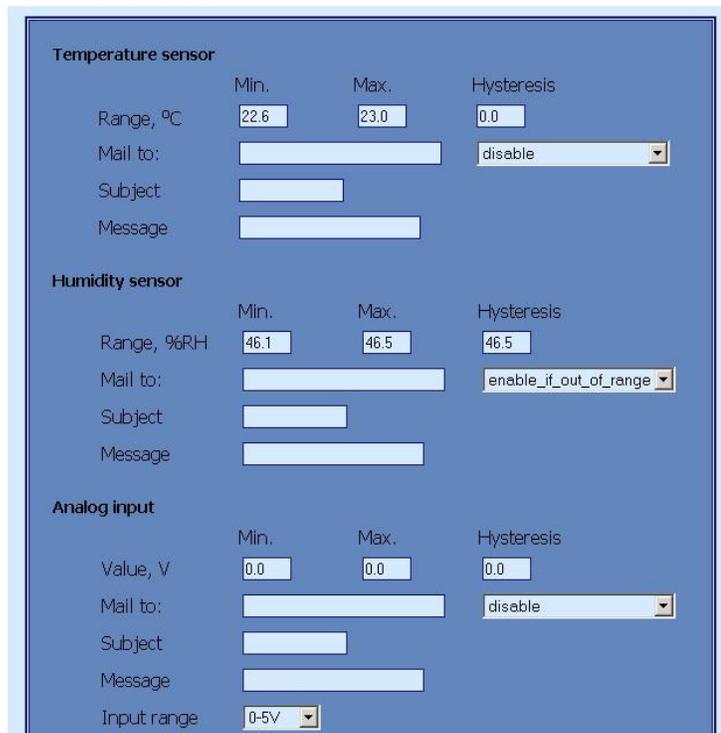
Parameter	Value
Digital Input	ON
Analog Input	4.9V
Temperature	21.7°C
Humidity	37.7%RH
Relay output	ON

The Monitoring page provides information about the state of the digital and analog inputs, relay status, temperature and humidity (if there is connected sensor to the controller) .

7.3 I/O setup page

The input and output settings can be made in "I/O Setup" page.

For the first three parameters – temperature, humidity and analog value, can be set range with MIN, MAX and HISTERESYS values.



The screenshot shows the "I/O Setup" page with three sections: "Temperature sensor", "Humidity sensor", and "Analog input". Each section has a table for sensor parameters and fields for email notifications.

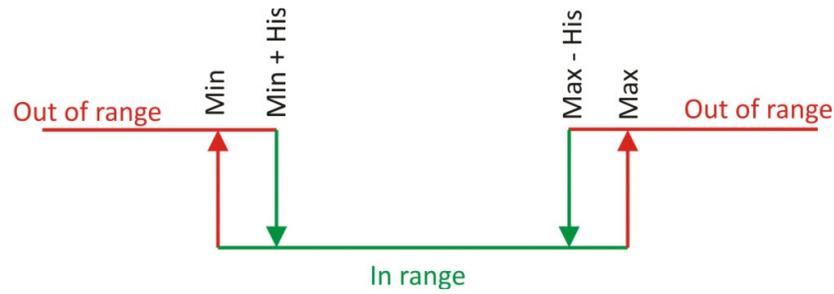
Temperature sensor			
	Min.	Max.	Hysteresis
Range, °C	22.6	23.0	0.0
Mail to:			disable
Subject			
Message			

Humidity sensor			
	Min.	Max.	Hysteresis
Range, %RH	46.1	46.5	46.5
Mail to:			enable_if_out_of_range
Subject			
Message			

Analog input			
	Min.	Max.	Hysteresis
Value, V	0.0	0.0	0.0
Mail to:			disable
Subject			
Message			
Input range	0-5V		

Every going out of range generates e-mail (if enabled), with appropriate "Subject" and "Message". Leaving range is considered when the parameter goes higher than MAX or lower than

MIN values. Coming back in the range is consider when the parameter goes lower than $MAX - HISTERESYS$ or higher than $MIN + HISTERESYS$.



For analog input also input range can be set. It is mandatory that chosen range correspond with the range selection jumper (J1) - 0-5V (close) and 0-100V (open).

For digital input, conditional e-mail sending can be arranged by following part of the page:

Relay activation can be made automatically from ranges of humidity, temperature or analog input and changes on digital input or manually. Only one parameter can be assigned for relay switching, at the same time:

When manual activation is selected, "Pulse" and "ON/OFF" buttons are active on Monitoring page. The duration of pulse activation of relay can be from 1 to 253 seconds.

Automatic monitoring page refresh interval can be set from 1 to 253 second. If 0 is chosen for this parameter – there is no automatic refresh.

7.4 Network Setup page

The Network parameters are set on this page. The following parameters can be changed:

- **IP configuration** – IP Address configuration can be static or dynamic (DHCP)
- **IP address, Subnet mask, Default gateway** – these fields are active if IP address is static
- **Host Name**
- **MAC** – device MAC address

IP configuration:

IP configuration:

IP address:

Subnet mask:

Default gateway:

DNS:

Host Name:

MAC Address:

MAC: xx-xx-xx-xx-xx-xx

If multiply **TCW111** controllers are used on the same network, please change the IP address after connecting the device to the network. This will avoid devices installed on the network with the same factory default IP address at the same time. It may be necessary to clear the arp cache each time you connect new device to the network. This is done by typing *arp -d* in the command prompt of a Windows computer.

In order to reduce network traffic and to limit the access, the controller supports VLAN and MAC address filtering. In addition to the MAC address of the Default Gateway, another 2 MAC addresses can be added to the filter. The filter is enabled by marking the appropriate check box after the MAC address.

VLAN configuration

VLAN Status:

VLAN ID:

MAC Filter

MAC 1: (Default Gateway)

MAC 2: xx-xx-xx-xx-xx-xx

MAC 3: xx-xx-xx-xx-xx-xx

To set up the SMTP server the following fields should be completed:

SMTP

Mailserver [IP:port]: :

E-mail: (sender e-mail)

Username:

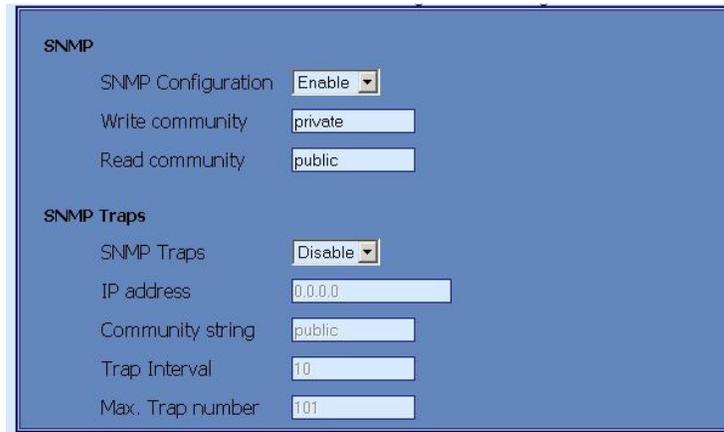
Password:

Mail server is considered server for sending mails. Secure Socket Layer is not supported.

7.5 SNMP Setup page

TCW111 supports SNMP v.1 that enable trap delivery to an SNMP management application. This enables the device to be part of large monitoring and control networks. The possible settings are:

- **SNMP Configuration** – enable SNMP v.1
- **Read-Write community** – performs client authentication
- **Read-Only community** – performs client authentication



The image shows a configuration window for SNMP. It is divided into two sections: 'SNMP' and 'SNMP Traps'. In the 'SNMP' section, 'SNMP Configuration' is set to 'Enable', 'Write community' is 'private', and 'Read community' is 'public'. In the 'SNMP Traps' section, 'SNMP Traps' is set to 'Disable', 'IP address' is '0.0.0.0', 'Community string' is 'public', 'Trap Interval' is '10', and 'Max. Trap number' is '101'.

Section	Parameter	Value
SNMP	SNMP Configuration	Enable
	Write community	private
	Read community	public
SNMP Traps	SNMP Traps	Disable
	IP address	0.0.0.0
	Community string	public
	Trap Interval	10
	Max. Trap number	101

SNMP trap messages are sent for the following conditions:

- when event occurs on **Digital Input 1** (the signal changes its state)
- measured voltage on **Analog Input 1** is outside the predefined range
- measured temperature is outside the predefined range
- restart

Setting range for sending SNMP trap messages is done only through SNMP. The following parameters can be changed:

- **SNMP Traps** – enable SNMP trap messages
- **IP address** – IP address of the receiving host
- **Community string** – performs client authentication
- **Trap Interval** - time interval for SNMP trap messages
- **Max. number of Traps** – maximum number of SNMP trap messages sent, if trap condition is present

8. Control and monitoring using SNMP

TCW111 can be configured and monitored through SNMP (Simple Network Management Protocol). This could be done using every SNMPv.1 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 the prefix ".1.3.6.1.4.1.17095". To save the changes you should set a value "1" of the configurationSaved(OID x.8.0).

8.1 product

OID	Name	Access	Description	Syntax
x.1.1.0	name	read-only	Device name	String
x.1.2.0	version	read-only	Firmware version	String
x.1.3.0	date	read-only	Firmware release date	String

8.2 setup

network				
OID	Name	Access	Description	Syntax
x.2.1.1.0	deviceIPAddress	read-write	Device IP address	IpAddress
x.2.1.2.0	subnetMask	read-write	Subnet Mask	IpAddress
x.2.1.3.0	gateway	read-write	Gateway IP address	IpAddress
x.2.1.4.0	deviceMACAddress	read-write	Device MAC address	OCTET STRING (SIZE(6))
x.2.1.5.0	dhcpConfig	read-write	DHCP configuration ON/OFF	INTEGER { ON(1), OFF(0) }
x.2.1.6.0	DNS	read-write	Domain Name Server Address	IpAddress
x.2.1.7.0	hostName	read-write	Host Name	String (SIZE (0..38))

VLAN				
OID	Name	Access	Description	Syntax
x.2.2.1.0	vlanStatus	read-write	VLAN Status ENABLED/DISABLED	INTEGER { ENABLED(1), DISABLED(0) }
x.2.2.2.0	vlanId	read-write	VLAN ID (0-4095)	INTEGER (0..4095)

macFilter				
OID	Name	Access	Description	Syntax
x.2.3.1.0	filterMACAddress1	read-only	filter1 MAC address (Gateway)	OCTET STRING (SIZE(6))
x.2.3.2.0	filterMACEnable1	read-write	MAC filter 1 Enable ENABLED/DISABLED	INTEGER { ENABLED(1), DISABLED(0) }
x.2.3.3.0	filterMACAddress2	read-write	Filter2 MAC address	OCTET STRING (SIZE(6))
x.2.3.4.0	filterMACEnable2	read-write	MAC filter 2 Enable ENABLED/DISABLED	INTEGER { ENABLED(1), DISABLED(0) }
x.2.3.5.0	filterMACAddress3	read-write	Filter3 MAC address	OCTET STRING (SIZE(6))
x.2.3.6.0	filterMACEnable3	read-write	MAC filter 3 Enable ENABLED/DISABLED	INTEGER { ENABLED(1), DISABLED(0) }

SMTP				
OID	Name	Access	Description	Syntax
x.2.4.1.0	smtpServerAddress	read-write	Sender Server Address	String (SIZE (0..38))
x.2.4.2.0	smtpPort	read-write	SMTP Port (1-65535)	INTEGER (1..65535)
x.2.4.3.0	senderEmailAddress	read-write	Sender e-mail address	String (SIZE (0..38))

SNMP				
OID	Name	Access	Description	Syntax
x.2.5.1.0	SNMPConfiguration	read-write	SNMP Configuration ENABLED/DISABLED	INTEGER { ENABLED(1), DISABLED(0) }
x.2.5.2.0	trapEnabled	read-write	Indicates if this trap entry is enabled or not	INTEGER { Yes(1), No(0) }
x.2.5.3.0	trapReceiverIPAddress	read-write	Trap receiver IP address	IpAddress
x.2.5.4.0	trapCommunity	read-write	Trap community	String (SIZE (0..13))
x.2.5.5.0	trapInterval	read-write	Trap Interval	INTEGER (0..255)
x.2.5.6.0	maxNumberOfTraps	read-write	Max Number of Traps	INTEGER (0..255)

humidity				
OID	Name	Access	Description	Syntax
x.2.6.1.0	humidityMin	read-write	Humidity minimum value	String (SIZE (0..13))
x.2.6.2.0	humidityMax	read-write	Humidity maximum value	String (SIZE (0..13))
x.2.6.3.0	humidityHyst	read-write	Humidity hysteresis	String (SIZE (0..13))
x.2.6.4.0	humidityAction	read-write	Humidity Action	INTEGER { SEND_MAIL(1), NO_ACTION(0) }
x.2.6.5.0	humidityTo	read-write	Humidity Destination e-mail address	String (SIZE (0..38))
x.2.6.6.0	humiditySubject	read-write	Humidity e-mail subject	String (SIZE (0..10))
x.2.6.7.0	humidityBody	read-write	Humidity e-mail body	(SIZE (0..21))

temperature				
OID	Name	Access	Description	Syntax
x.2.7.1.0	temperatureMin	read-write	Temperature minimum value	String (SIZE (0..6))
x.2.7.2.0	temperatureMax	read-write	Temperature maximum value	String (SIZE (0..6))
x.2.7.3.0	temperatureHyst	read-write	Temperature hysteresis	String (SIZE (0..6))
x.2.7.4.0	temperatureAction	read-write	Temperature Action	INTEGER { SEND_MAIL(1), NO_ACTION(0) }
x.2.7.5.0	temperatureTo	read-write	Temperature Destination e-mail address	String (SIZE (0..38))
x.2.7.6.0	temperatureSubject	read-write	Temperature e-mail subject	String (SIZE (0..10))
x.2.7.7.0	temperatureBody	read-write	Temperature e-mail body	String (SIZE (0..21))

analogInput				
OID	Name	Access	Description	Syntax
x.2.8.1.0	voltageMin	read-write	Voltage minimum value	String (SIZE (0..6))
x.2.8.2.0	voltageMax	read-write	Voltage maximum value	String (SIZE (0..6))
x.2.8.3.0	voltageHyst	read-write	Voltage hysteresis	String (SIZE (0..6))
x.2.8.4.0	voltageAction	read-write	Voltage Action	INTEGER { SEND_MAIL(1), NO_ACTION(0) }
x.2.8.5.0	voltageTo	read-write	Voltage Destination e-mail address	String (SIZE (0..38))
x.2.8.6.0	voltageSubject	read-write	Voltage e-mail subject	String (SIZE (0..10))
x.2.8.7.0	voltageBody	read-write	Voltage e-mail body	String (SIZE (0..21))

digitalInput				
OID	Name	Access	Description	Syntax
x.2.9.1.0	digitalInputAction	read-write	Digital Input Action	INTEGER { SEND_MAIL(1), NO_ACTION(0) }
x.2.9.2.0	digitalInputEdge	read-write	Digital Input Edge	RISING-FALLING
x.2.9.3.0	digitalInputTo	read-write	Digital Input Destination e-mail address	String (SIZE (0..38))
x.2.9.4.0	digitalInputSubject	read-write	Digital Input e-mail subject	String (SIZE (0..10))
x.2.9.5.0	digitalInputBody	read-write	Digital Input e-mail body	String (SIZE (0..21))

relay				
OID	Name	Access	Description	Syntax
x.2.10.1.0	relayControl	read-write	Relay Control Item	INTEGER { ANALOG_INPUT(4), DIGITAL_INPUT(3), HUMIDITY(2), TEMPERATURE(1), MANUAL(0) }
x.2.10.2.0	relayPulseWidth	read-write	Relay Pulse Width	INTEGER (0..255)

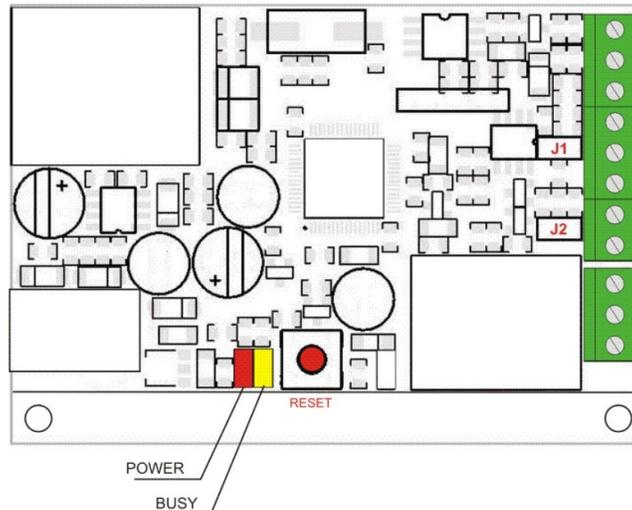
8.3 monitor&control

OID	Name	Access	Description	Syntax
x.3.1.0	digitalInputState	read-write	Digital Input State	INTEGER { ON(1), OFF(0) }
x.3.2.0	relayState	read-write	Relay State	INTEGER { ON(1), OFF(0) }
x.3.3.0	relayPulse	read-write	Relay Pulse	INTEGER { ON(1), OFF(0) }
x.3.4.0	temperature	read-only	Temperature	String (SIZE (0..4))
x.3.5.0	tempx10Int	read-only	Temperature x10 in Integer format	INTEGER (-400..1750)
x.3.6.0	humidityValue	read-only	Humidity Value	String (SIZE (0..4))
x.3.7.0	humix10Int	read-only	Humidity x10 in Integer format	INTEGER (0..65000)
x.3.8.0	voltageValue	read-only	Voltage Value	String (SIZE (0..4))
x.3.9.0	voltx10Int	read-only	Voltage x10 in Integer format	INTEGER (0..65000)
x.3.10.0	configurationSaved	read-write	Configuration save status SAVED/UNSAVED	INTEGER { SAVED(1), UNSAVED(0) }
x.3.11.0	restartDevice	read-write	Restart Device	INTEGER { RESTART(1), CANCEL(0) }

9. Restoring Factory Default Settings

If the IP address or password are forgotten, **TCW111** can be restored to its original factory default settings. To do this, please follow the steps below:

- remove the power supply from the unit;
- press and hold the RESET button then turn on the power supply. The LED's POWER and BUSY will flash 12 times, after that they will turn on. In this moment the RESET button should be released.



The factory default settings are shown in the table below:

User Name (Admin)	admin
Password (Admin)	admin
User Name (User)	user
IP Address	192.168.1.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
SNMPConfiguration	enabled
readCommunity	public
writeCommunity	private

10. Firmware update

TCW111 supports remote firmware update. To do this please follow the steps below:

- Download the latest firmware version from www.teracom.cc . The extension of the update file is .cod .
- Open Command Prompt window. In the example below in **blue** are the commands that must be entered, and in **red** are the descriptions of these commands :

```
C:\> -- go to the directory where the update file is located( .cod extension)
C:\>ftp 212.73.154.53-- FTP connection to the controller is made
Connected to 212.73.154.53.
220 Ready
User (212.73.154.53:(none)): admin -- enter username
331 Password required
Password: ***** -- enter password
230 Logged in
ftp>put tcw111v1.00.cod -- the update file is sent for update
200 Ok
150 Transferring data...
150 DON'T UNPLUG POWER CABLE FOR NEXT 2 MINUTES!!! -- 2 minutes after this message
appears, the device will be successfully updated
```



**DO NOT TURN OFF THE POWER SUPPLY DURING THESE 2 MINUTES!
TURNING OFF THE POWER SUPPLY WILL DAMAGE THE DEVICE!**



```
ftp: 157822 bytes sent in 60.89Seconds 2.59Kbytes/sec
```

```
ftp>
```

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