control solutions
TERACOM



TCW122B-WD

IP watchdog monitoring module

Revision 4.9 / October 2024

USER MANUAL

www.teracomsystems.com

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1. Short description

TCW122B-WD is an IP watchdog monitoring module, based on TCW122 hardware. It has 2 digital and 2 analog inputs. It supports up to two temperature/humidity sensors on its 1-Wire interface. The IP watchdog controller has also two relays with normally open and normally closed contacts.

TCW122B-WD is dedicated to IP watchdog monitoring as a stand-alone device.

The controller supports also SNMP v1 as M2M protocol. It can also be used as a part of small to medium SCADA systems for environmental monitoring of server rooms.

2. Features

- Password protected, web-based configuration and control;
- 2 digital inputs with " dry contact" and "logic level" modes;
- 2 analog inputs with 0 to 60VDC range;
- 2 relays with NO and NC contacts;
- 1-Wire interface for up to 2 temperature (TST1XX) or temperature/humidity (TSH2xx) sensors;
- SNMP v.1 support, SNMP trap alerts;
- SNMP traps for alert conditions;
- HTTP and SNMP port changing;
- VLAN, MAC address filtering;
- ICMP watchdog monitoring;
- Remote firmware update.

3. Specifications

- Physical characteristics

  Dimensions: 109 x 82 x 32 mm
  Weight: 110 g
- Environmental limits

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

  Warranty period: 3 years
- Power supply

  Operating voltage range (including -15/+20% according to IEC 62368-1): 10 to 14 VDC
  Current consumption (with both relays ON): 0.2 A @ 12 VDC
- Ethernet connectivity
  10 Mbit/s transfer rate
  Half-duplex mode only
  Auto-negotiation not supported
- Digital inputs

  Isolation: Non-isolated
  Mode: Dry contact or Logic level
  Maximum input voltage: +5.5VDC
  Minimum input voltage for high logic level: +2.5VDC
  Maximum input voltage for low logic level: +0.8VDC
  Sampling rate: 10ms
  Digital filtering time interval: 30ms

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- Analog inputs

  Isolation: Non-isolated
  Type: Single-ended
  Resolution: 10 bits
  Mode: Voltage
  Input Range: 0 to 60 VDC
  Accuracy: ±1%
  Sampling Rate: 37.6ms per channel (averaged value of 64 samples)
  Input Impedance: 1 mega-ohm (min.)

- Relay outputs

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

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

- 1-Wire interface

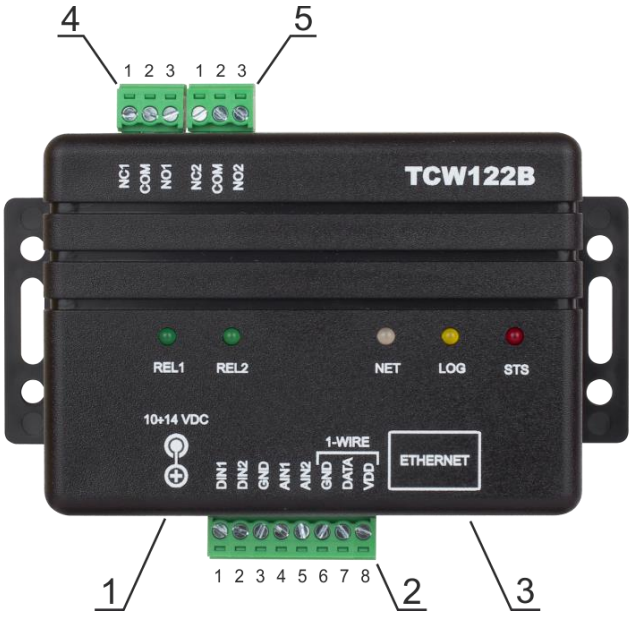
  Output voltage (+VW): 5.3 ± 0.2 VDC
  Maximum output current (+VW): 0.2 A

- Internal FLASH memory

  Endurance: 100 000 cycles (Every relay status and settings change is a memory cycle.)

4. Connectors

Inputs and outputs locations are shown below:



Connector 1 – Power - 2.1x5.5mm connector, central positive
Connector 2, Pin1 – Digital input 1 (**Din1**)*
Connector 2, Pin2 – Digital input 2 (**Din2**)*
Connector 2, Pin3 – Ground
Connector 2, Pin4 – Analog input 1 (**Ain1**)
Connector 2, Pin5 – Analog input 2 (**Ain2**)
Connector 2, Pin6 – Ground
Connector 2, Pin7 – 1-Wire data
Connector 2, Pin8 – 1-Wire power supply
Connector 3 – Ethernet - RJ45
Connector 4, Pin1 – NC Relay1
Connector 4, Pin2 – COM Relay1
Connector 4, Pin3 – NO Relay1
Connector 5, Pin1 – NC Relay2
Connector 5, Pin1 – COM Relay2
Connector 5, Pin1 – NO Relay2

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* Operating mode is selected by jumper DI1/DI2 - closed for "dry contact" and open for "logic level". By default, jumpers are closed.

5. LED indicators

The following indicators show the status of the controller:

- Relay1/Relay2 (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 the controller is executed;
- Log (yellow) – indicates that somebody is logged via the WEB interface;
- Net (green/red) – red when the device is linked, yellow when there is an activity.

6. Powering

TCW122B-WD 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 the secondary circuit.

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

7. Installation

This device must be installed by qualified personnel.

This device must not be installed directly outdoors.

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

TCW122B-WD can be wall or flat, not flammable surface mounted, in a clean and dry location room. Ventilation is recommended for installations where the 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 in fig.2 in Appendix A, this provides ventilation and electrical isolation.

8. Configuration

Please follow the steps below for proper installation:

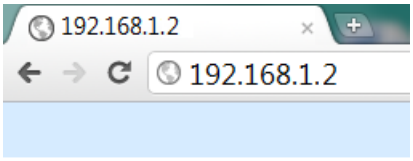
1. Mount the controller in a dry and ventilated place.
2. Connect the Ethernet port to a 10/100MB Ethernet network. For direct connection to a PC using a “crossover” cable.
3. Connect the I/O pins of the controller according to the required application.
4. Connect the power supply.

If the red LED (STS) blinks, the main program of the controller is executed. By default TCW122B-WD comes 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 TCW122B-WD can be established by assigning a temporary IP address to the computer. This address should be on 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.

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

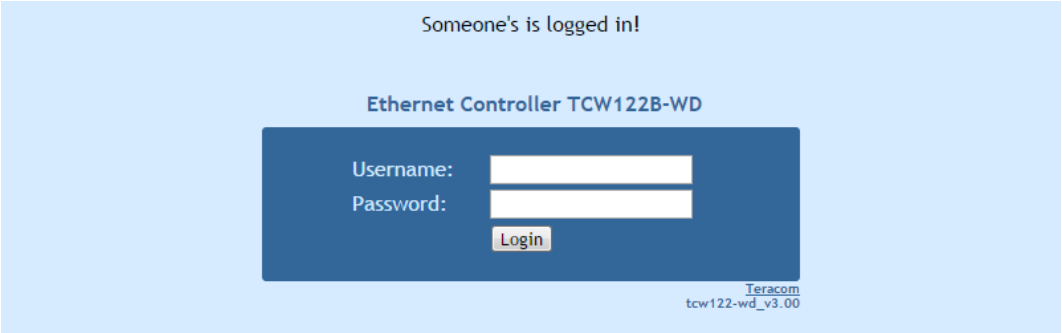
The web-based interface allows configuration, monitoring, and control.

8.1. 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.



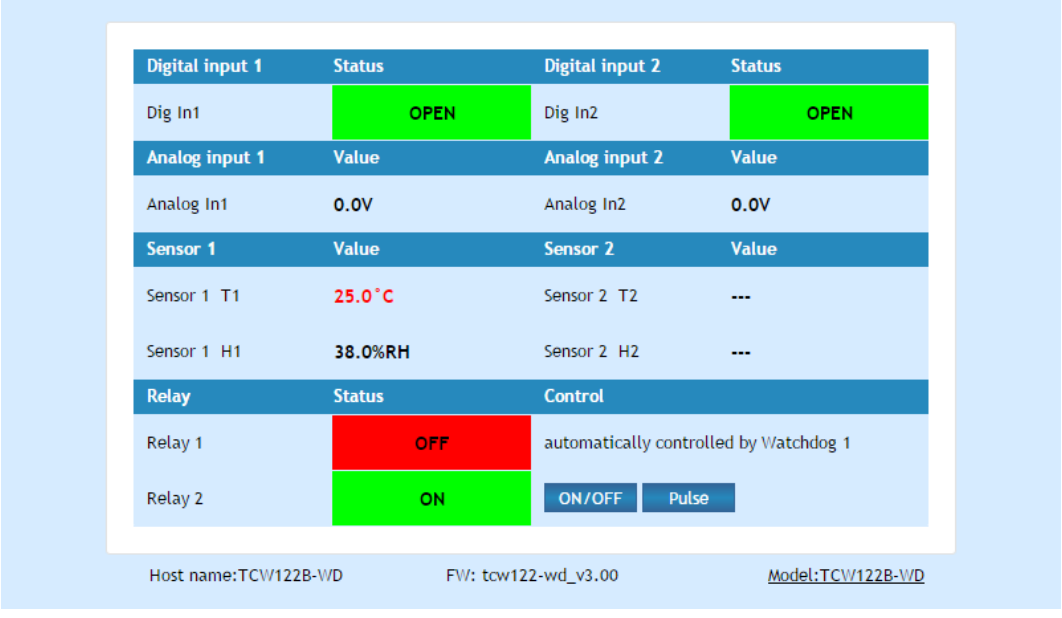
The controller supports one active session – only one user can operate the device. If another user tries to log in, the message “Someone’s logged in” appears:



The active session will stay open until the "Monitoring" page is open. Inactivity on other pages or closing the browser without logoff will terminate the session automatically in 4 minutes.

8.2. Monitoring page

After successful authorization, the “Monitoring” page appears:



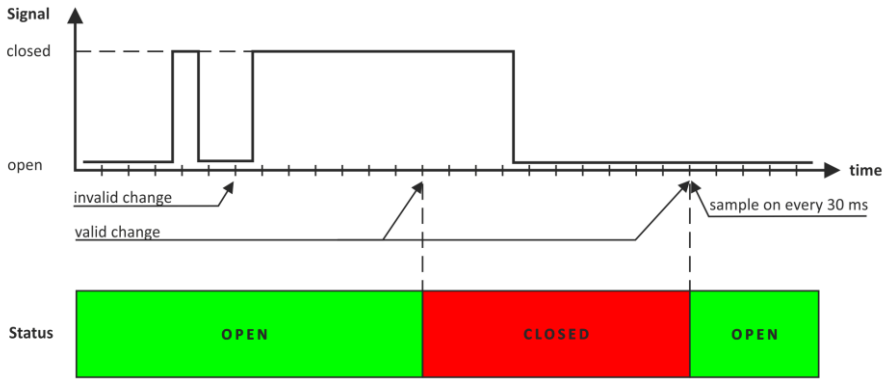
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The “Monitoring” page provides information about the state of the relays and digital inputs, values of analog voltages (applied on analog inputs), temperature and humidity.

The state of the relay can be changed by appropriate “ON/OFF” button. To change the state of the relay for a specified time, “Pulse” button should be pressed. Duration of the pulse is specified in “Pulse Duration” field of “I/O Setup” page.

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 another side is connected to “GND” pins.

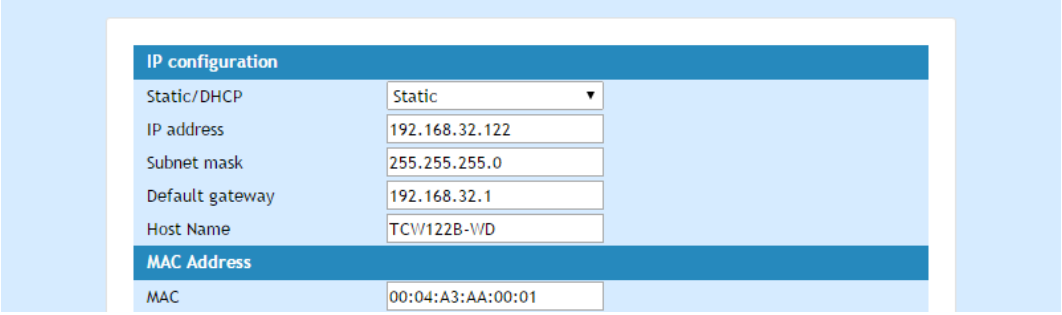
Digital inputs are sampled every 30ms. The change of input status is considered valid if the same value is read in seven consecutive samples.



8.3. Network Setup page

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

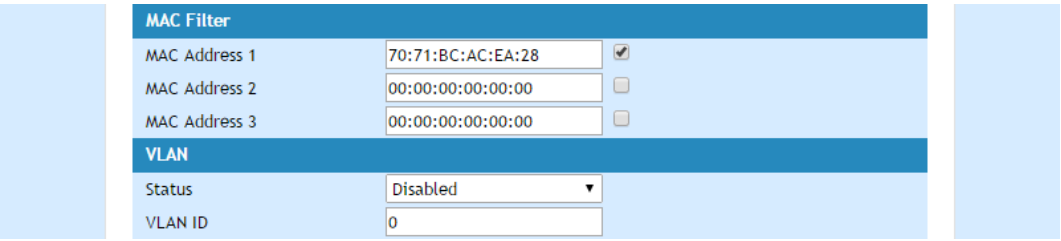
- IP configuration – IP Address can be static or dynamic (DHCP server should be present in the network);
- IP address, Subnet mask, Default gateway – these fields are active if the IP address is static;
- Host Name – up to 16 symbols
- MAC – device MAC address.



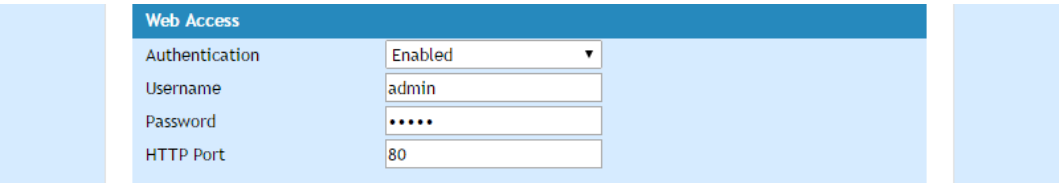
The good practice is to change the default IP address of the controller immediately after first power-on. This will avoid collisions if many devices are used on the same network. It may be necessary to clear the arp cache, each time you connect a new device to the network. This is done by typing “arp –d” in the command prompt window of the computer.

VLAN and MAC address filtering are supported. Up to 3 MAC addresses (including Default Gateway) can be active in MAC filtering.

Attention! If you are not familiar with VLAN and MAC filtering, leave these sections by default.



Username and password for WEB access to TCW122B-WD can be changed in the Web Access section. Setting the authentication to “disabled” will provide access to monitoring page without entering username and password. The HTTP port can be changed also in this section.



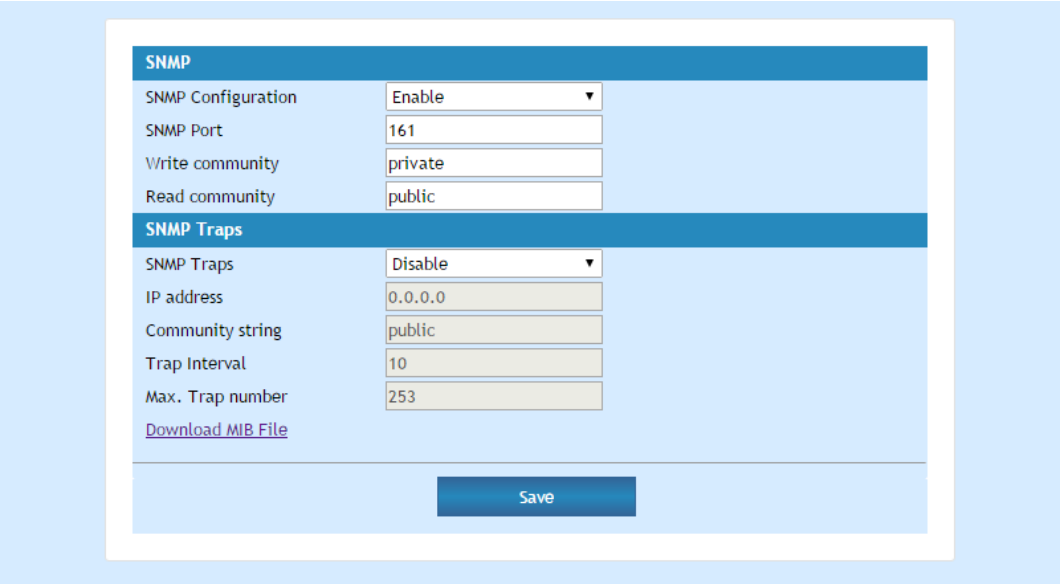
8.4. SNMP Setup page

TCW122B-WD supports SNMP v.1. This enables the device to be part of large monitoring and control networks. The possible settings for “SNMP” section are:

- SNMP Configuration – enable/disable SNMP;
- SNMP Port – allows standard port changing;
- Write/Read community – performs client authentication;
- SNMP Traps – enable/disable SNMP trap messages;
- IP address – IP address of the receiving host;
- Community string – performs client authentication;
- Trap Interval - time interval in seconds for SNMP trap messages;
- Max. Traps number – the maximum number of SNMP trap messages sent if trap condition is present.

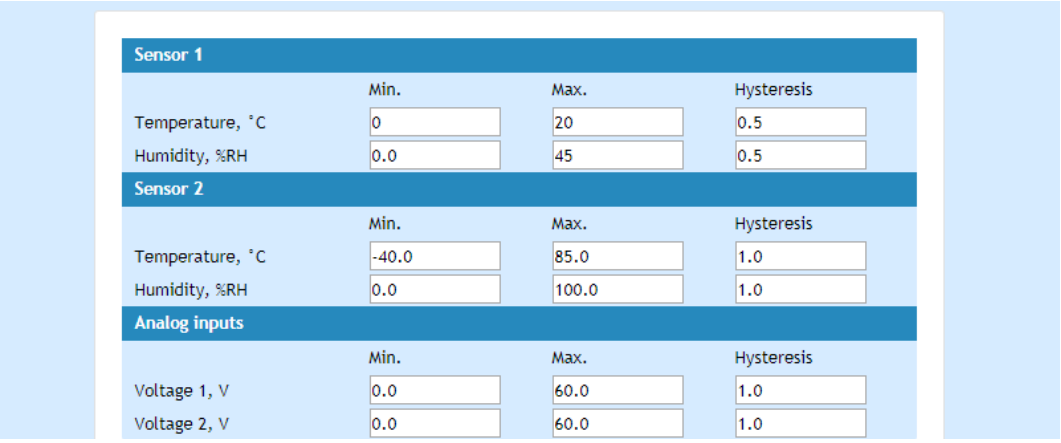
SNMP traps are sent if:

- event occurs (status change) on Digital Input 1 or Digital Input 2;
- measured voltage on Analog Input 1 or Analog Input 2 goes outside the range;
- measured temperature goes outside the range;
- measured humidity goes outside the range;
- restart condition.



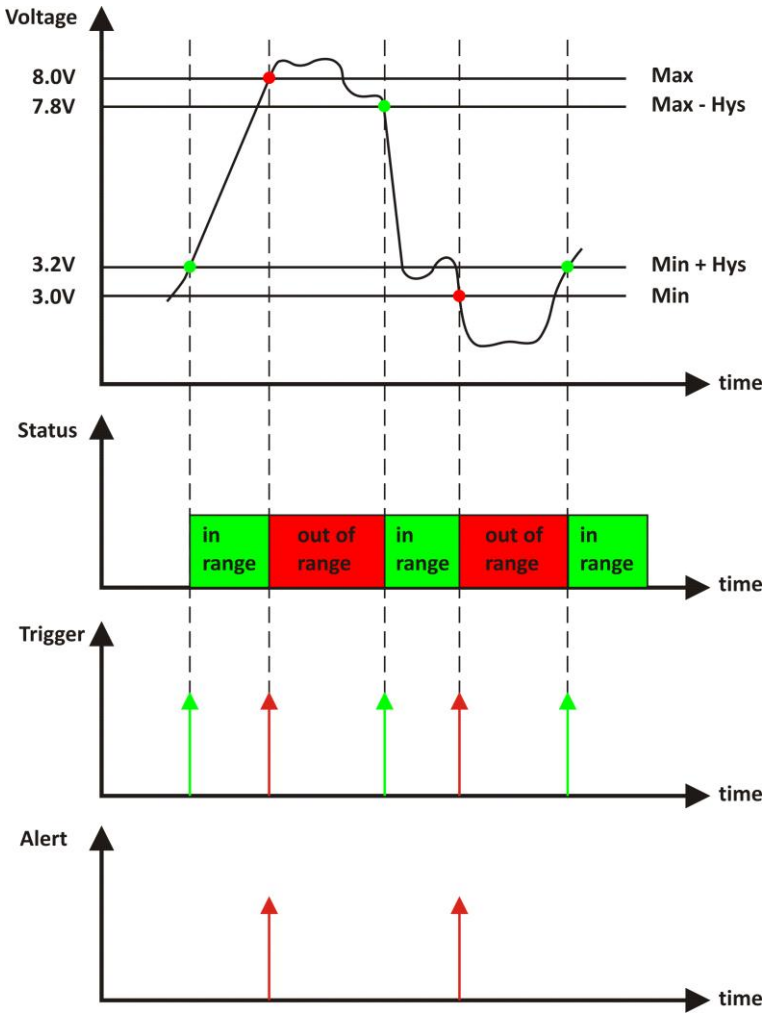
8.5. I/O setup page

I/O settings can be made here. For temperature, humidity and analog value MIN, MAX, and HYSTERESIS values can be set. These values define the thresholds for all monitored parameters.



When the measured value goes out of range SNMP trap (if enabled) will be sent. Leaving range is considered when the parameter goes lower than MIN values or higher than MAX. Coming back in the range is considered when the parameter goes higher than (MIN + HYSTERESIS) or lower than (MAX – HYSTERESIS).

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For IP watchdog monitoring following parameters can be set:

- Mode – outgoing (echo request) or incoming (echo replay) mode can be chosen;
- IP address - IP address of ICMP corresponding host;
- Activation options – the relay activation options – Pulse OFF, Pulse ON, Permanent OFF, Permanent ON
- Outgoing ping interval – the time between two echo requests;
- Ping timeout for activation – timeout before activation of the relay;
- Maximum number of activations – the maximum number of activation of the relay (restarts) after the timeout has expired.

Ping timeout for activation should be longer than Outgoing ping interval.

Watchdog 1		
Mode	outgoing ping	
IP address	8.8.8.8	0.0.0.0 - no IP address filtering
Activation options	Pulse ON	
Outgoing ping interval	3	sec(1-253)
Ping time out for activation	12	sec(2 - 65000)
Max. number of activations	1	(1 - 253)
Watchdog 2		
Mode	disable	
IP address	0.0.0.0	0.0.0.0 - no IP address filtering
Activation options	Pulse ON	
Outgoing ping interval	1	sec(1-253)
Ping time out for activation	10	sec(2 - 65000)
Max. number of activations	1	(1 - 253)

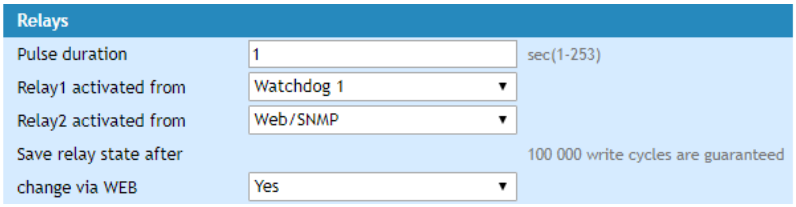
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Relays can be activated manually from the WEB interface or automatically in function of the watchdog.

By default, relay state changes via the WEB interface are memorized in non-volatile memory. After the power on, the relay goes in its last state, before the power down.

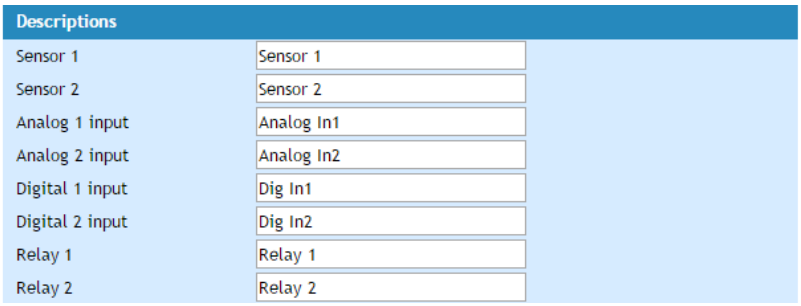
If the “Save relay state after change via WEB” is No, after power on the relay is always OFF.

The guaranteed write cycles (every change saving) are 100000.



When Web/SNMP activation is selected, “Pulse” and “ON/OFF” buttons on “Monitoring” page are active. The duration of the pulse for relay activation can be set from 1 to 253 seconds.

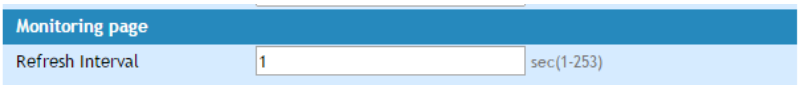
For every sensor, analog input, digital input and relay description with a length of 11 characters can be set.



Temperature units can be changed between Fahrenheit and Celsius.



Automatic monitoring page refresh interval can be set from 1 to 253 second.



8.6. Update page

For details see chapter 12. Firmware update.

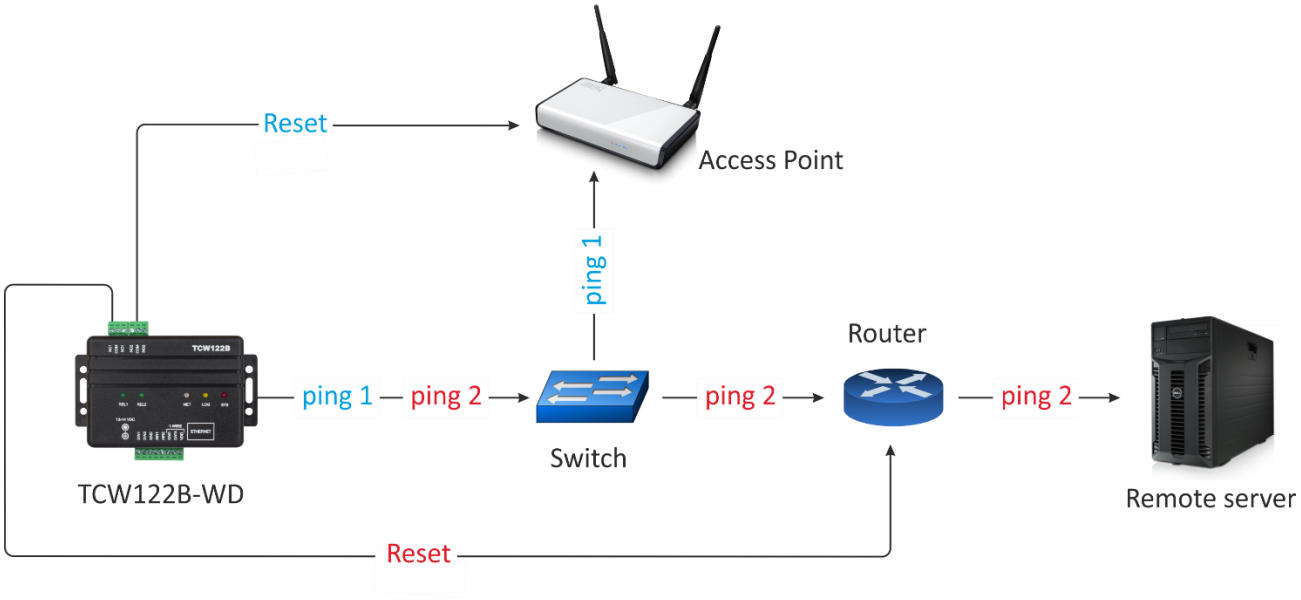
9. Application examples

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Teracom Ltd. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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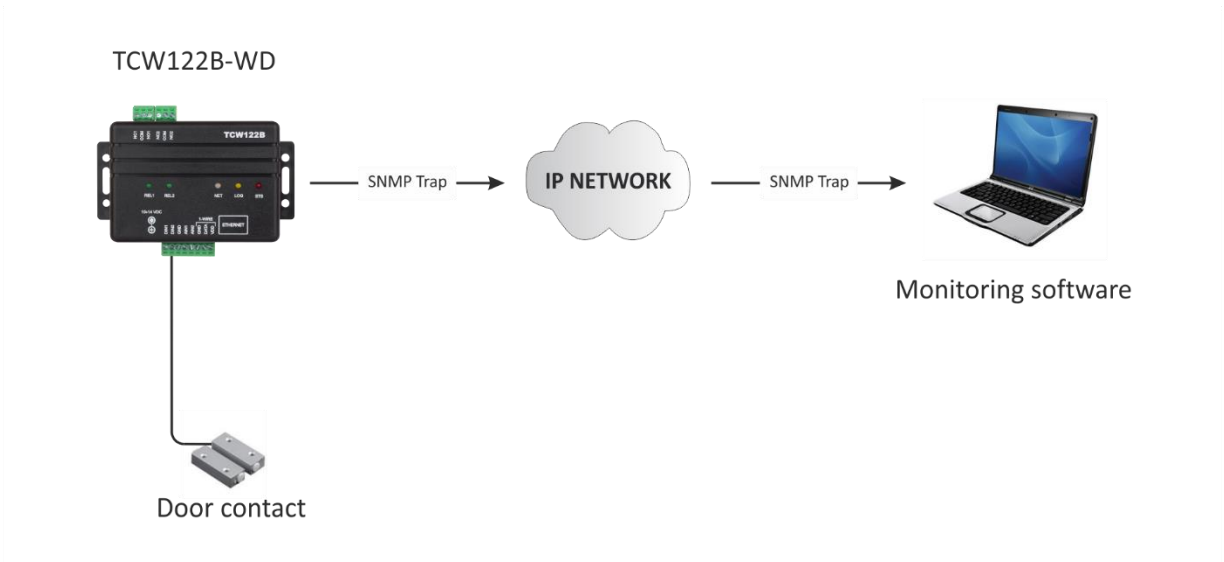
9.1. Watchdog

TCW122B-WD is set to send a periodic ping to AP (Local network) and the remote server (Internet). If there is no answer in “Ping timeout for restart”, the corresponding relay is activated in order to reset particular network equipment.



9.2. Dry contact monitoring

The monitored contacts are connected to digital inputs (Din1 and Din2) and ground (GND). Changes in the state of contacts can be monitored either by WEB or SNMP interface. If SNMP traps are allowed and properly set, every change of state will generate a trap to the server.



10. 1-Wire Bus

1-Wire is a registered trademark of Maxim Integrated Products, Inc. It is designed to connect several sensors over short wiring. The bus carries power and a single data wire. It is not suitable for long distances or environments with EMC interference.

We strongly recommend reading Maxim's 1-Wire tips at https://www.teracomsystems.com/wp-content/uploads/1-wire/guidelines-for-reliable-long-line-1-wire-networks.pdf.

The total wiring length should be up to 30m, although functionality has been achieved in the longer distance. We cannot guarantee error-free operation over mentioned wiring length.

We guarantee proper operation only with our 1-Wire sensors series TST1XX and TSH2XX.

11. SNMP protocol

TCW122B-WD can be configured and monitored through SNMP (Simple Network Management Protocol). This could be done using every SNMP v.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 "1.3.6.1.4.1.38783".

To save the changes **configurationSaved** (OID x.3.13.0) should be set to "1".

11.1 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	Release date	String

11.2 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	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 { off(0), on(1) }
x.2.1.6.0	dns	read-write	Domain Name Server address	IpAddress
x.2.1.7.0	hostName	read-write	Device Host name	String (SIZE (0..38))

11.3 Setup -> VLAN

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

11.4 Setup -> macFilter

OID	Name	Access	Description	Syntax
x.2.3.1.0	filterMACAddress1	read-only	MAC Filter 1	OCTET STRING (SIZE(6))
x.2.3.2.0	filterMACEnable1	read-write	MAC Filter 1 ENABLED/DISABLED	INTEGER { disabled(0), enabled(1) }
x.2.3.3.0	filterMACAddress2	read-write	MAC Filter 2	OCTET STRING (SIZE(6))
x.2.3.4.0	filterMACEnable2	read-write	MAC Filter 2 ENABLED/DISABLED	INTEGER { disabled(0), enabled(1) }
x.2.3.5.0	filterMACAddress3	read-write	MAC Filter 3	OCTET STRING (SIZE(6))
x.2.3.6.0	filterMACEnable3	read-write	MAC Filter 3 ENABLED/DISABLED	INTEGER { disabled(0), enabled(1) }

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11.5 Setup -> SNMP

OID	Name	Access	Description	Syntax
x.2.4.1.0	snmpConfiguration	read-write	SNMP Configuration	INTEGER { disabled(0), enabled(1) }
x.2.4.2.0	trapEnabled	read-write	TRAP messages ENABLED/DISABLED	INTEGER { no(0), yes(1) }
x.2.4.3.0	trapReceiverIPAddress	read-write	TRAP receiver IP address	IpAddress
x.2.4.4.0	trapCommunity	read-write	TRAP community	String (SIZE (0..13))
x.2.4.5.0	trapInterval	read-write	TRAP messages interval	INTEGER (1..253)
x.2.4.6.0	maxNumberOfTraps	read-write	Maximum number SNMP traps	INTEGER (1..253)

11.6 Setup -> oneWireSensor1 -> temperature1

OID	Name	Access	Description	Syntax
x.2.5.1.1.0	temperature1Min	read-write	Temperature1 range (min. value)	INTEGER (-400..1250)
x.2.5.1.2.0	temperature1Max	read-write	Temperature1 range (max. value)	INTEGER (-400..1250)
x.2.5.1.3.0	temperature1Hyst	read-write	Hysteresis	INTEGER (0..1250)

11.7 Setup -> oneWireSensor1 -> humidity1

OID	Name	Access	Description	Syntax
x.2.5.2.1.0	humidity1Min	read-write	Humidity1 range (min. value)	INTEGER (0..1000)
x.2.5.2.2.0	humidity1Max	read-write	Humidity1 range (max. value)	INTEGER (0..1000)
x.2.5.2.3.0	humidity1Hyst	read-write	Hysteresis	INTEGER (0..1000)

11.8 Setup -> oneWireSensor2 -> temperature2

OID	Name	Access	Description	Syntax
x.2.6.1.1.0	temperature2Min	read-write	Temperature2 range (min. value)	INTEGER (-400..1250)
x.2.6.1.2.0	temperature2Max	read-write	Temperature2 range (max. value)	INTEGER (-400..1250)
x.2.6.1.3.0	temperature2Hyst	read-write	Hysteresis	INTEGER (0..1250)

11.9 Setup -> oneWireSensor2 -> humidity2

OID	Name	Access	Description	Syntax
x.2.6.2.1.0	humidity2Min	read-write	Humidity2 range (min. value)	INTEGER (0..1000)
x.2.6.2.2.0	humidity2Max	read-write	Humidity2 range (max. value)	INTEGER (0..1000)
x.2.6.2.3.0	humidity2Hyst	read-write	Hysteresis	INTEGER (0..1000)

11.10 Setup -> analogInput -> input1

OID	Name	Access	Description	Syntax
x.2.7.1.1.0	voltage1Min	read-write	Voltage1 alarm range (min. value)	INTEGER (0..1000)
x.2.7.1.2.0	voltage1Max	read-write	Voltage1 alarm range (max. value)	INTEGER (0..1000)
x.2.7.1.3.0	voltage1Hyst	read-write	Voltage1 hysteresis	INTEGER (0..1000)

11.11 Setup -> analogInput -> input2

OID	Name	Access	Description	Syntax
x.2.7.2.1.0	voltage2Min	read-write	Voltage2 alarm range (min. value)	INTEGER (0..1000)
x.2.7.2.2.0	voltage2Max	read-write	Voltage2 alarm range (max. value)	INTEGER (0..1000)
x.2.7.2.3.0	voltage2Hyst	read-write	Voltage2 hysteresis	INTEGER (0..1000)

11.12 Setup -> relay

OID	Name	Access	Description	Syntax
x.2.9.1.0	relay1ControlledBy	read-write	Relay1 control item	INTEGER { manual(0), watchdog1(1), watchdog2(2) }
x.2.9.2.0	relay2ControlledBy	read-write	Relay2 control item	NTEGER { manual(0), watchdog1(1), watchdog2(2) }
x.2.9.3.0	relayPulseWidth	read-write	Relay Pulse Width	INTEGER{ 1..253 }

11.13 Setup -> watchdog1

OID	Name	Access	Description	Syntax
x.2.10.1.0	wdg1Mode	read-write	Watchdog 1 Mode - Incomming or Outgoing Ping	INTEGER { disabled(0), incomingPing(1), outgoingPing(2) }
x. 2.10.2.0	wdg1OutgoingPingInterval	read-write	Watchdog 1 Outgoing Ping Interval	INTEGER { 1..253 }
x. 2.10.3.0	wdg1PingTimeOutForRestart	read-write	Watchdog 1 Ping Time out for restart	INTEGER {2..65000}
x. 2.10.4.0	wdg1PingIPAddress	read-write	Watchdog 1 Ping IP address	IpAddress
x.2.10.5.0	wdg1NumberOfRestarts	read-write	Watchdog 1 Max Number of restarts	INTEGER (1..253)

11.14 Setup -> watchdog2

OID	Name	Access	Description	Syntax
x.2.11.1.0	wdg2Mode	read-write	Watchdog 2 Mode - Incomming or Outgoing Ping	INTEGER { disabled(0), incomingPing(1), outgoingPing(2) }
x. 2.11.2.0	wdg2OutgoingPingInterval	read-write	Watchdog 2 Outgoing Ping Interval	INTEGER { 1..253 }
x. 2.11.3.0	wdg2PingTimeOutForRestart	read-write	Watchdog 2 Ping Time out for restart	INTEGER {2..65000}
x. 2.11.4.0	wdg2PingIPAddress	read-write	Watchdog 2 Ping IP address	IpAddress
x.2.11.5.0	wdg2NumberOfRestarts	read-write	Watchdog 2 Max Number of restarts	INTEGER (1..253)

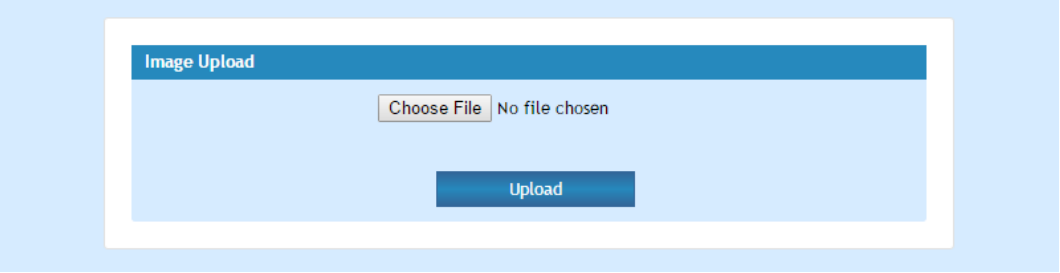
11.15 Monitor and control

OID	Name	Access	Description	Syntax
x.3.1.0	digitalInput1State	read-only	Digital Input1 state	INTEGER { closed(0), open(1) }
x.3.2.0	digitalInput2State	read-only	Digital Input2 state	INTEGER { closed(0), open(1) }
x.3.3.0	relay1State	read-write	Relay1 state	INTEGER { off(0), on(1) }
x.3.4.0	relay1Pulse	read-write	Relay1 pulse	INTEGER { off(0), on(1) }
x.3.5.0	relay2State	read-write	Relay2 state	INTEGER { off(0), on(1) }
x.3.6.0	relay2Pulse	read-write	Relay2 pulse	INTEGER { off(0), on(1) }
x.3.7.0	voltage1x10Int	read-only	Voltage1 x10 in integer format	INTEGER{ 0..1000 }
x.3.8.0	voltage2x10Int	read-only	Voltage2 x10 in integer format	INTEGER{ 0..1000 }
x.3.9.0	temp1x10Int	read-only	Temperature1 x10 in integer format	INTEGER{ -400..1250 }
x.3.10.0	temp2x10Int	read-only	Temperature2 x10 in integer format	INTEGER{ -400..1250 }
x.3.11.0	humi1x10Int	read-only	Humidity1 x10 in integer format	INTEGER{ 0..1000 }
x.3.12.0	humi2x10Int	read-only	Humidity2 x10 in integer format	INTEGER{ 0..1000 }
x.3.13.0	configurationSaved	read-write	Configuration save status	INTEGER { unsaved(0), saved(1) }
x.3.14.0	restartDevice	read-write	Restart device	INTEGER { cancel(0), restart(1) }
x.3.15.0	temperatureUnits	read-write	Temperature Units	INTEGER { celsius(0), fahrenheit(1) }

12. Firmware update

TCW122B-WD supports remote firmware update. To update the device follow the steps below:

- Go to www.teracomsystems.com and download the latest firmware version file from TCW122B-WD product page;
- Go to the device Login page, enter a username, and password and press the “Login” button;
- Go to the “Update” menu, 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.

13. Factory default settings

TCW122B-WD 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)	admin
Password (Admin)	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

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14. 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.

15. 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 the controller if recommended free spaces to adjacent devices are not ensured. A joint part with external component shall have space for attachment/removal of the cable after installation.

Teracom does not guarantee a 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 into the devices via a browser;
- make proper setup;
- set up the digital inputs to work in “dry contact” mode;
- short the “Din1” and “GND”;
- install sensor TSH1XX or TST1XX on the 1-Wire bus;
- go to “Monitoring page” of WEB interface – proper parameters value should be displayed at 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.

16. Maintenance

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

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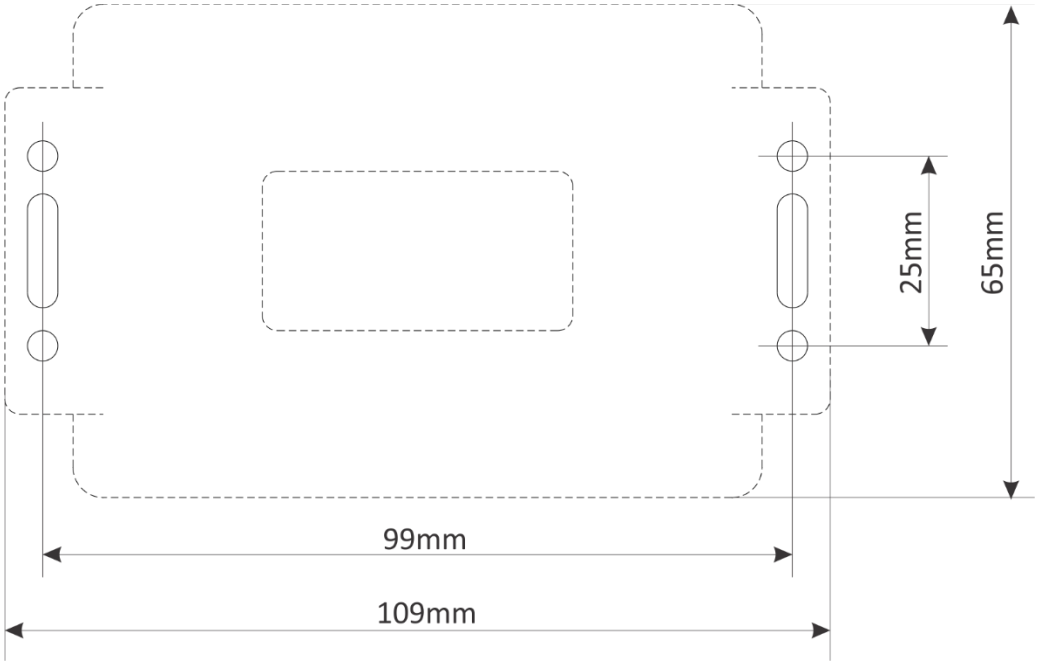


Fig.1

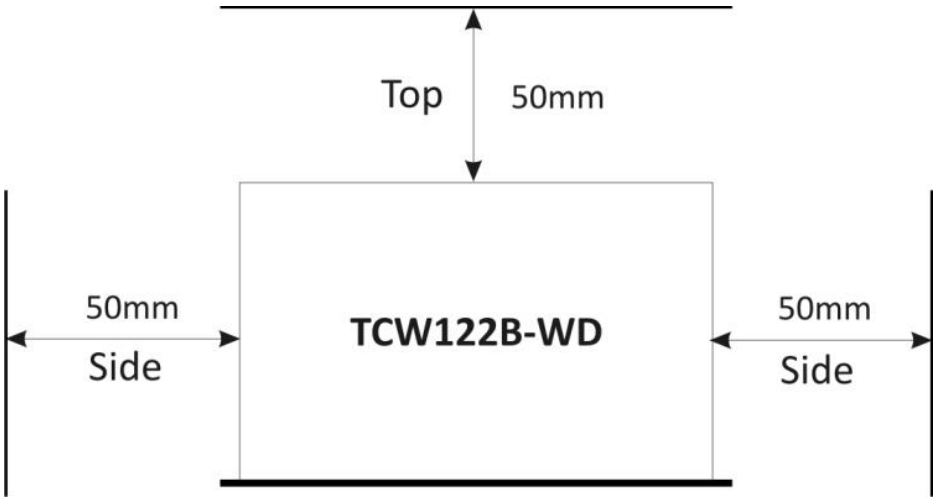


Fig.2