

# Ethernet controller **TCW180B** (FW 2.xx)

## Users manual



### 1. Short description

**TCW180B** is 8-channel Ethernet relay board, which is designed to work in IP-based networks and managed by WEB interface or SNMP programs. This device can be used as standalone or as a part of control and monitoring systems. Its I/O interface - 8 relay outputs and 1 digital input, is suitable for solving specific problems in various fields such as remote control, process automation, home automation and others.

### 2. Features

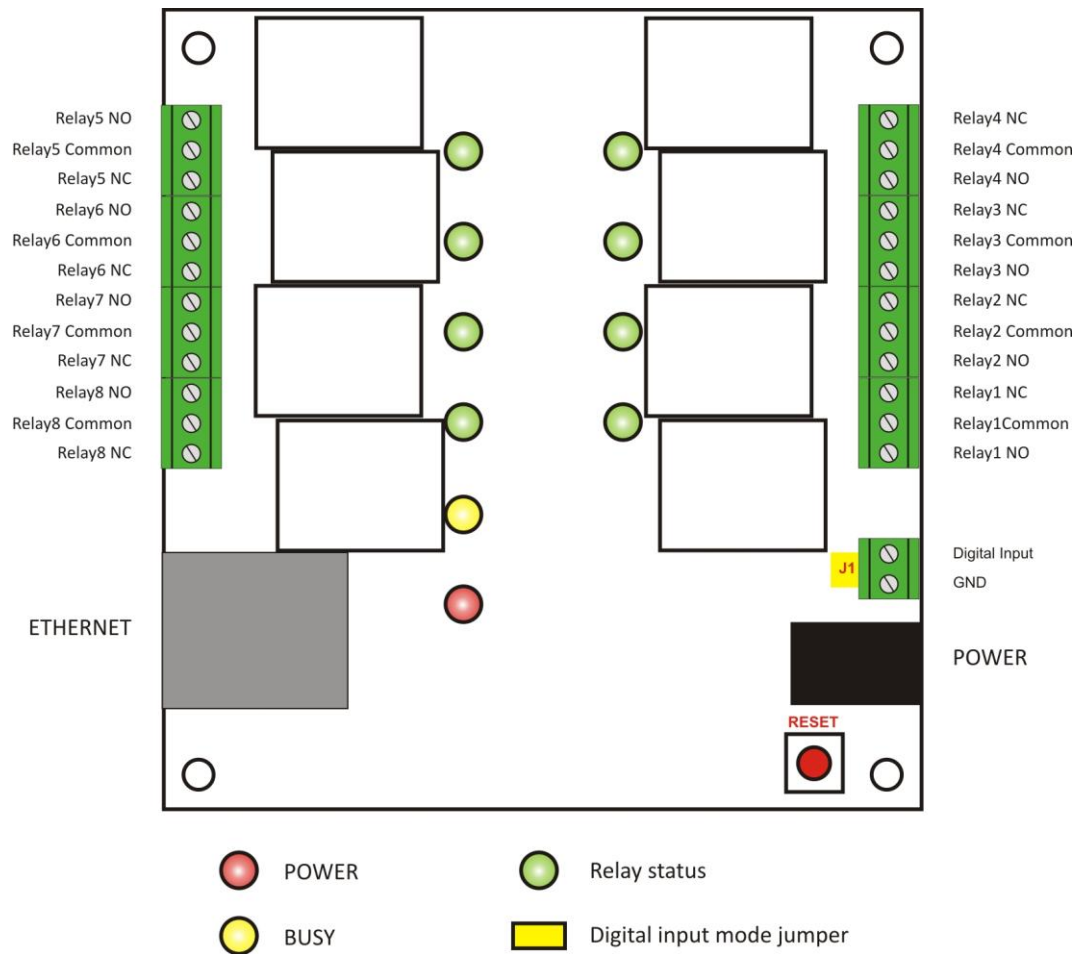
- 10 Mb Ethernet connectivity;
- Password protected web based configuration and control;
- 1 digital input with "logic level" and "dry contact" modes;
- 8 relays with NO and NC contacts;
- SNMP v.1 and ICMP support;
- Sending SNMP Traps messages under certain conditions;
- Sending E-mail messages under certain conditions;
- SMTP with authorization (SSL is not supported);
- XML reports and HTTP API commands;
- Remote firmware update.

### 3. Technical parameters

Supply voltage, VDC	12 ± 2
Maximum current ( with all relays ON), mA	370
Weight, g	205
Dimensions, mm	115 x 90 x 40
Operating temperature, °C	0 to 40
Minimum high level input voltage for digital input, VDC	2.5
Maximum low level input voltage for digital input, VDC	0.8
Maximum input voltage for digital input, VDC	5.5
Maximum switchable current (at 220 VAC) , A	1
Maximum switchable voltage, VAC/VDC	250/110

### 4. Connectors

Inputs and outputs locations are shown below:



- **J1** – digital input mode selection jumper – dry contact (close) and logic level (open);
- **ETHERNET** – RJ45 connector;
- **POWER** – ø 2mm power connector, central positive;
- **I/O** – screw type terminals.

## 5. LED indicators

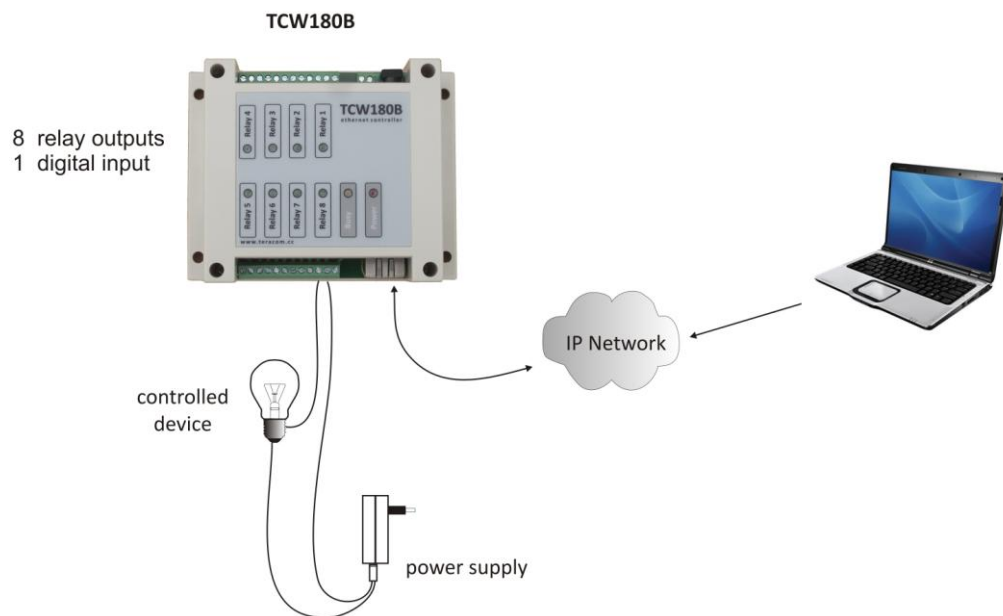
The following indicators show the status of the controller:

- **Relay 1 to 8 status** (green) – the LED illuminates whenever the corresponding relay is activated;
- **Power** (red) – this flashes when the power supply is turned on;
- **Busy** (yellow) – this LED 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.

## 6. Example Application

### 6.1 Remote control

The controlled device is connected in series with the relay contacts. User can operate **TCW180B** using a web browser or SNMP application. The relays can be managed independently of each other.



## 7. Installation

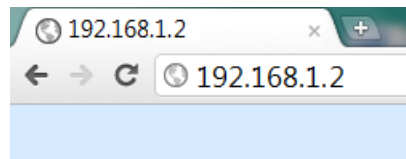
Please follow the steps below for proper installation :

1. Mount the controller in a dry and ventilated place.
2. Connect the Ethernet port to a 10/100MB Ethernet network. 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 red LED blinks, the power supply is OK. By default **TCW180B** 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 **TCW180B** can be established by assigning a temporary IP address to the computer. 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.

## 8. Web-based setup.

The web based interface allows configuration, monitoring and control. Recommended browser is Internet Explorer at 1024x768 resolutions.

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



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

### 8.2 Monitoring page

After successful authorization, the “Monitoring” page appears:



The “Monitoring” page provides information about the state of the relays and digital input.

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

Three buttons are located on the bottom of the page:

- “All ON” – click on this button will turn all relays ON
- “All OFF” – click on this button will turn all relays OFF
- “Pulse All” – click on this button will change the states of all relay outputs for a time, specified in “Pulse Duration” field of “I/O Setup” page.

### 8.3 Network Setup page

The Network parameters are set on this page.

For “IP configuration” and “MAC address” section, 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 IP address is static;
- **DNS** – this field is mandatory, if domain names are used instead of IP addresses. By default DNS has the same Ip address as Default gateway;
- **Time Server** and **Time Zone** – these fields are not mandatory, they are used when e-mail must be sent;
- **Host Name** – up to 16 symbols, it appears as a “Subject” in sent e-mails;
- **MAC** – device MAC address.

**Network Setup**

<b>IP configuration</b>	
Static/DHCP	Static ▾
IP address	192.168.32.207
Subnet mask	255.255.255.0
Default gateway	192.168.32.1
DNS	192.168.32.1
Time server	clock.via.net
Time zone	+0000
Host Name	TCW
<b>MAC Address</b>	
MAC	00-04-A3-AA-0A-C1

The good practice is 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 of window computer.

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

- **Mail server [IP:port]** – domain or IP address + port of SMTP mail server. To use domain name, IP address in field DNS must be correct;
- **E-mail** – sender e-mail;
- **Username** and **Password** – authentication details for mail server.

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

<b>SMTP</b>	
Mailserver [IP:port]	mail.yahoo.co.uk 25
Sender e-mail	test@yahoo.co.uk
Username	test
Password	•••••

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

<b>Web Access</b>	
Authentication	Enabled ▾
Username	admin
Password	•••••
HTTP Port	80

This section enables the access to XML/HTTP API. Detailed information can be found in chapter 14 “XML and HTTP API commands”.

<b>XML/HTTP API</b>	
Authentication	Disabled ▾

## 8.4 SNMP Setup page

**TCW180B** supports SNMP v.1 that enables trap delivery to an SNMP management application. 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** – SNMP port can be changed. By default port 161 is used;
- **Write community** – performs client authentication;
- **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** – maximum number of SNMP trap messages sent, if trap condition is present

SNMP traps are sent if:

- event occurs (status change) on Digital Input;
- restart condition.

## 8.5 I/O Setup page

The following parameters can be set for the relays:

- **Description** – brief description of the output, maximum 10 characters can be used;
- **Pulse Duration** – time for relay activation when "Pulse" button on "Monitoring" page is pressed. This setting applies to all 8 relays.

Every change on digital input can manage e-mail sending. Following parameters must be set:

- **Mail to** – e-mail address of recipient;
- **Subject** – e-mail subject;
- **Message** – e-mail body.

**Digital input**

Mail to:

Subject:

Message:

**Important!** It is necessary to set SMTP server settings on "Network Setup" page, to successfully send e-mail messages.

In the example above, if an event occurs (closing contact) the controller will send e-mail message to [johnsmith@mail.com](mailto:johnsmith@mail.com) with subject "input alarm" and body "door open".

Automatic monitoring page refresh interval can be set from 1 to 253 second. If 0 is chosen - no automatic refresh.

**Monitoring page**

Refresh Interval  sec(0 - 253)

## 9. SNMP setup

**TCW180B** 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 "1.3.6.1.4.1.38783". To save the changes **configurationSaved** (OID x.6.0) should be set to "1".

### 9.1 Product

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

### 9.2 SNMP Setup

OID	Name	Access	Description	Syntax
x.2.1.0	trapEnabled	read-write	TRAP messages enable/disable	INTEGER { Yes(1), No(0) }
x.2.2.0	trapReceiverIPAddress	read-write	TRAP messages receiver address	IpAddress
x.2.3.0	trapCommunity	read-write	TRAP community	String (SIZE (0..13))



## 9.3 Monitor and control

OID	Name	Access	Description	Syntax
x.3.1.0	digitalInput	read-only	Digital input state	INTEGER { High(1), Low(0) }
x.3.2.0	Relay1	read-write	Relay 1 state	INTEGER { ON(1), OFF(0) }
x.3.3.0	Relay2	read-write	Relay 2 state	INTEGER { ON(1), OFF(0) }
x.3.4.0	Relay3	read-write	Relay 3 state	INTEGER { ON(1), OFF(0) }
x.3.5.0	Relay4	read-write	Relay 4 state	INTEGER { ON(1), OFF(0) }
x.3.6.0	Relay5	read-write	Relay 5 state	INTEGER { ON(1), OFF(0) }
x.3.7.0	Relay6	read-write	Relay 6 state	INTEGER { ON(1), OFF(0) }
x.3.8.0	Relay7	read-write	Relay 7 state	INTEGER { ON(1), OFF(0) }
x.3.9.0	Relay8	read-write	Relay 8 state	INTEGER { ON(1), OFF(0) }
x.3.10.0	Pulse1	read-write	Relay 1 pulse state	SYNTAX INTEGER (0..255)
x.3.11.0	Pulse2	read-write	Relay 2 pulse state	SYNTAX INTEGER (0..255)
x.3.12.0	Pulse3	read-write	Relay 3 pulse state	SYNTAX INTEGER (0..255)
x.3.13.0	Pulse4	read-write	Relay 4 pulse state	SYNTAX INTEGER (0..255)
x.3.14.0	Pulse5	read-write	Relay 5 pulse state	SYNTAX INTEGER (0..255)
x.3.15.0	Pulse6	read-write	Relay 6 pulse state	SYNTAX INTEGER (0..255)
x.3.16.0	Pulse7	read-write	Relay 7 pulse state	SYNTAX INTEGER (0..255)
x.3.17.0	Pulse8	read-write	Relay 8 pulse state	SYNTAX INTEGER (0..255)
x.3.18.0	allOn	read-write	Set all relays On	SYNTAX INTEGER (0..255)
x.3.19.0	allOff	read-write	Set all relays Off	SYNTAX INTEGER (0..255)
x.3.20.0	allPulse	read-write	Pulse all relays	SYNTAX INTEGER (0..255)

## 9.4 Network

OID	Name	Access	Description	Syntax
x.4.1.0	deviceIPAddress	read-write	Device IP address	IpAddress
x.4.2.0	subnetMask	read-write	Subnet Mask	IpAddress
x.4.3.0	gateway	read-write	Gateway	IpAddress
x.4.4.0	deviceMACAddress	read-write	Device MAC Address	OCTET STRING (SIZE(6))
x.4.5.0	dhcpConfig	read-write	DHCP ON/OFF	INTEGER { ON(1), OFF(0) }

## 9.5 I/O Setup

OID	Name	Access	Description	Syntax
x.5.1.0	relayPulseDuration	read-write	Global Pulse duration	INTEGER (0..255)
x.5.2.0	Relay1description	read-write	Relay 1 description	String (SIZE (0..10))
x.5.3.0	Relay2description	read-write	Relay 2 description	String (SIZE (0..10))
x.5.4.0	Relay3description	read-write	Relay 3 description	String (SIZE (0..10))
x.5.5.0	Relay4description	read-write	Relay 4 description	String (SIZE (0..10))
x.5.6.0	Relay5description	read-write	Relay 5 description	String (SIZE (0..10))
x.5.7.0	Relay6description	read-write	Relay 6 description	String (SIZE (0..10))
x.5.8.0	Relay7description	read-write	Relay 7 description	String (SIZE (0..10))
x.5.9.0	Relay8description	read-write	Relay 8 description	String (SIZE (0..10))
x.5.10.0	digitalInputAction	read-write	Digital Input Action condition	INTEGER { FALLING(2),RISING(1), DISABLED(0) }
x.5.11.0	digitalInputTo	read-write	Digital Input event receiver's e-mail address	String (SIZE (0..38))
x.5.12.0	digitalInputSubject	read-write	Digital Input event e-mail's subject	String (SIZE (0..11))
x.5.13.0	digitalInputBody	read-write	Digital Input event e-mail's body	String (SIZE (0..22))
x.6.0	configurationSaved	read-write	Configuration save status SAVED/UNSAVED	INTEGER { SAVED(1), UNSAVED(0) }
x.7.0	restartDevice	read-write	Restart Device	INTEGER { RESTART(1), CANCEL(0) }

## 10. 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.

Below is the structure of the **status.xml** file :

<Monitor>	
<Device>TCW180B</Device>	Device Type
<FW>tcw180v2.01</FW>	Firmware version
<DigitalInput>OPEN</DigitalInput>	Digital input state
<Relay1>ON</Relay1>	Relay 1 state
<Relay2>OFF</Relay2>	Relay 2 state
<Relay3>ON</Relay3>	Relay 3 state
<Relay4>OFF</Relay4>	Relay 4 state
<Relay5>ON</Relay5>	Relay 5 state
<Relay6>OFF</Relay6>	Relay 6 state
<Relay7>ON</Relay7>	Relay 7 state
<Relay8>OFF</Relay8>	Relay 8 state
</Monitor>	

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

XML/HTTP API authentication	Format
enabled	<a href="http://admin:admin@device.ip.address/status.xml">http://admin:admin@device.ip.address/status.xml</a>
disabled	<a href="http://device.ip.address/status.xml">http://device.ip.address/status.xml</a>

The relay outputs can be controlled by sending HTTP commands:

Command	Description
<a href="http://device.ip.address/status.xml?rX=1">http://device.ip.address/status.xml?rX=1</a>	Turn Relay <b>X</b> ON
<a href="http://device.ip.address/status.xml?rX=0">http://device.ip.address/status.xml?rX=0</a>	Turn Relay <b>X</b> OFF
<a href="http://device.ip.address/status.xml?tgX=1">http://device.ip.address/status.xml?tgX=1</a>	Toggle Relay <b>X</b> state
<a href="http://device.ip.address/status.xml?plX=1">http://device.ip.address/status.xml?plX=1</a>	Pulse Relay <b>X</b>
<a href="http://device.ip.address/status.xml?rX=1&amp;rY=1">http://device.ip.address/status.xml?rX=1&amp;rY=1</a>	Turn both relays <b>X</b> and <b>Y</b> ON
<a href="http://device.ip.address/status.xml?rX=0&amp;rY=0">http://device.ip.address/status.xml?rX=0&amp;rY=0</a>	Turn both relays <b>X</b> and <b>Y</b> OFF

Note: **X** and **Y** are the number of the corresponding relay output (1 to 8)

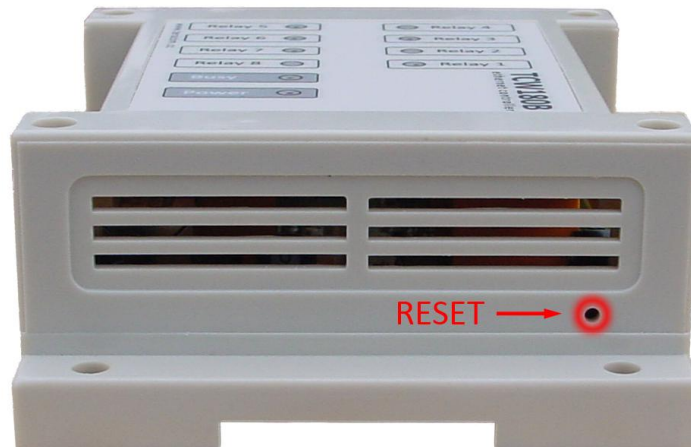
If XML/HTTP API authentication is enabled, basic access authentication is required to send HTTP commands. The format of the commands is shown in the table below:

XML/HTTP API authentication	Format
enabled	<a href="http://admin:admin@device.ip.address/status.xml?r1=1">http://admin:admin@device.ip.address/status.xml?r1=1</a>
disabled	<a href="http://device.ip.address/status.xml?r1=1">http://device.ip.address/status.xml?r1=1</a>

## 11. Restoring Factory Default Settings

If the IP address or password is forgotten, **TCW180B** can be restored to its original factory default settings. To do this, please follow the steps below:

- Turn off 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 14 times, after that they will turn on. In this moment the RESET button should be released.



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

## 12. Firmware update

**TCW180B** supports remote firmware update. To update the device use the WEB interface.

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