

MB-gateway

Technical manual



TABLE OF CONTENTS

1 INTRODUCTION	25
2 INSTALLATION MANUAL	25
2.1 Connection	25
2.2 Installation	26
2.3 Configuring	26
2.4 Restoring factory defaults	26
2.5 Updating of the firmware using MicroSD card	26
2.6 FTP server	27
3 MODULE WEB INTERFACE	28
4 WEB CONTROL OF THE AIR HANDLING UNIT WITH PRV AUTOMATICS	30
4.1 Main window	30
4.2 Temperature setting window	31
4.3 Fan speed setting window	32
4.4 Fault List window	33
4.5 Menu window	34
4.6 Settings window. Set the "BOOST" function time	35
4.7 Settings window. Set the desired CO2 level	36
4.8 Settings window. Night-time cooling function settings	37
4.9 Date and time Settings window	38
4.10 Filter timer settings window	39
4.11 State monitoring window	40
4.12 Weekly schedule setting window	41
4.13 Weekly schedule setting window. Copying of day's events	42
5 PROGRAMMER'S GUIDE	43
5.1 HTTP requests	43
5.2 Modbus transmitter	43

INTRODUCTION

Network Module MB-GATEWAY is used to connect SALDA air handling units to the computer network (Ethernet). Module functions:

- TCP/IP Modbus gateway
- IPV4 protocol
- WEB server
- FTP server
- Building of Modbus commands using HTTP requests
- Authorized connection
- Automatic data communication between Modbus units
- Updating of the module firmware using MicroSD memory card (the update can be loaded using FTP client as well)
- RT clock
- Galvanically insulated RS485 communication line

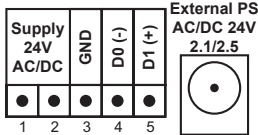
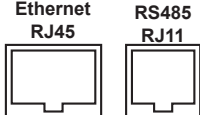
If the network module is not installed factory, you may install it as an option. To do this you need an installation kit consisting of:

1. MB-GATEWAY module with 4GB MicroSD memory card;
2. Sticker with a MAC address and fields for writing down connection settings
3. UTP cable (0.5 m)
4. RS485 communication cable with RJ11 plugs (2 m)
5. Adapter
6. Installation Manual

2

INSTALLATION MANUAL

2.1 Connection

	<p>1 and 2 – power supply connection (e.g. from another (standalone) power supply). 12 V DC/ AC to 25 V DC/AC supply voltage is used, power supply should be at least 2 W. Polarity of the power supply terminals is not important.</p> <p>3 – GND of RS485 communication line</p> <p>4 – D0 (-) of RS485 communication line</p> <p>5 – D1 (+) of RS485 communication line</p> <p><i>Note: Communication line is galvanically insulated from the power supply.</i></p> <p>External PS – power supply with AC/DC adapter (included).</p>
	<p>Ethernet RJ45 – network adapter connector.</p> <p>RS485 RJ11 – RS485 communication line connector.</p>

2.2 Installation

The module can be installed in any convenient for user place (mounting rail is recommended), where the following conditions are ensured:

- ambient temperature -20 ... 70 °C
- relative humidity 30% ... 85% (without condensation);
- protection against vertical falling water drops (IP 20).

2.3 Configuring

If you are going to use some MB-GATEWAYS in the same LAN, you need to change their IP addresses. LAN cannot have more than one unit using the same IP address, thus for configuring of the MB-GATEWAY you need to connect it directly to the PC.

Step-by-step configuration:

1 Apply static TCP/IP settings for the network interface card in the PC that will be used to connect the unit. These settings depend on the OS used, see the OS documentation:

- IP address should begin with 192.168.0 and end with number 0 to 255 except 51, for example: 192.168.0.11

- Subnet mask: 255,255,255.0.

2 Connect the power supply (included).

3 Connect the MB-GATEWAY to the properly configured PC using UTP (RJ45) cable (included). If the connection does not work (the PC does not support Auto MDI-X), connect the PC and MB-GATEWAY to the switch.

4 Enter the MB-GATEWAY IP address (the default one is 192.168.0.51) into the browser (Google Chrome is recommended) address bar.

5 Each page is password protected. When you open the configuration page, you will be asked to enter user name and password. Default user name is "admin", password – "admin". We recommend to change password for security. If you forget your login details you can restore the parameters to factory default settings (see "Restoring factory defaults").

6 If you performed the above steps properly, the MB-GATEWAY configuration page opens. Here you can select the language, set IP address, Modbus (RS485) baudrate, Modbus (RS485) parity, date and time, change user name and password, page theme, open the help file, air handling unit controller's WEB page.

2.4 Restoring factory defaults

If you cannot connect to the device (have forgotten the password, IP address etc.), you always can restore the factory defaults. Steps of restoring the factory defaults:

1 Turn off the power supply.

2 Open the top flap.

3 Holding down the button turn on the power supply.

4 When you release the button, the factory defaults are restored (*note: you will need to re-enter settings*).

2.5 Updating of the firmware using MicroSD card

Step-by-step firmware update:

1 Download (<http://salda.lt/lt/products/category/products/>) the update FIRMWARE.BIN and save to the MicroSD root directory:

- a. if you update using FTP client, you do not need to turn off the power supply;

b. If you save the file to the MicroSD card that is removed from the module, turn off the module power supply before inserting the card back. When you have the card inserted, turn the power supply on.

2 If there is a proper file, the module will start the update procedure. Every ~1 second RJ45 LEDs are flashing in an alternating way. Do not turn off the power supply until the process is not finished.

3 In ~2 min. the module will finish the update and restart to the normal state.

4 When the update is finished, the file FIRMWARE.BIN is automatically deleted.

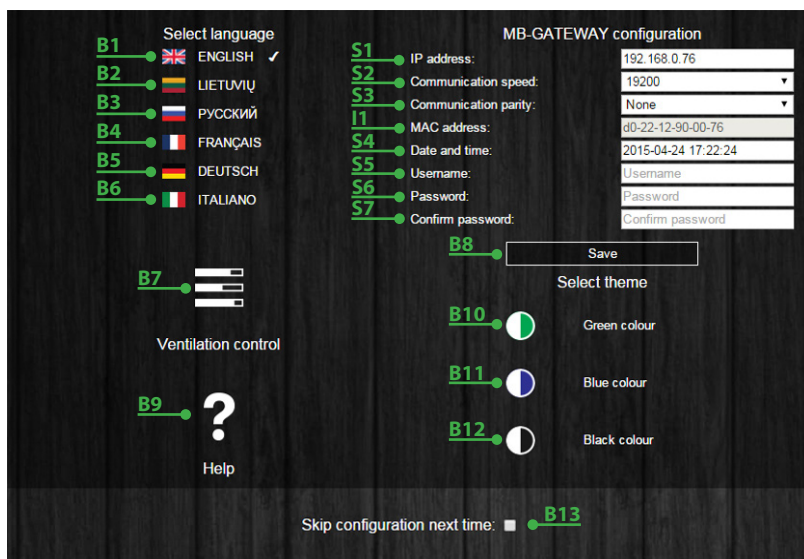
Indications of the RJ45 connector LEDs:

- Both LED indicators flashes slowly and synchronously – MB-GATEWAY has no firmware installed.
- LED indicators flashes slowly in an alternating way – the firmware is being updated.
- LED indicators are off – no power supply and/or connection to the Ethernet.

2.6 FTP server

This module has the built-in FTP server too, so you do not need to remove the MicroSD memory card to access and edit the data on it. FTP server has the same connection data as the protected WEB pages. For the FTP client software use the "Passive Mode" setting.

MODULE WEB INTERFACE



Number	Function
I1	Displays the MAC address of the MB-GATEWAY module

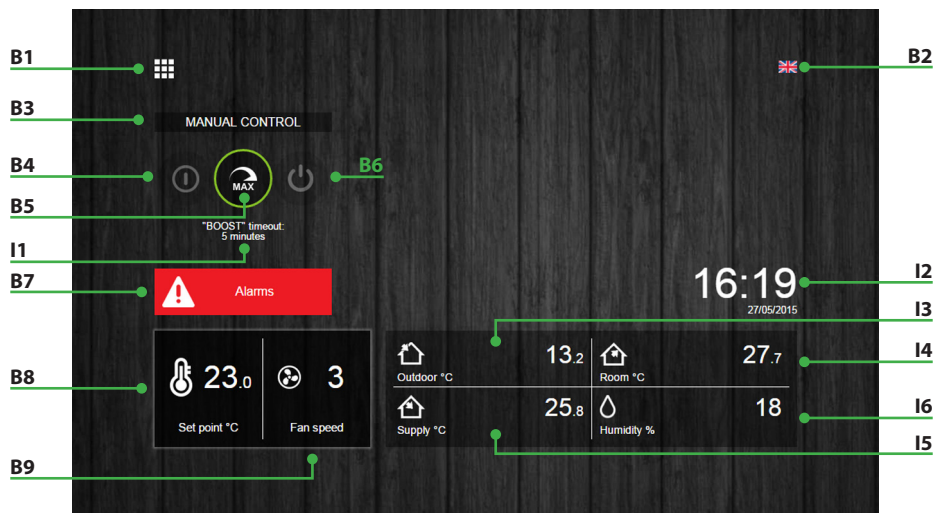
Number	Function
B1	Click to switch to the English language
B2	Click to switch to the Lithuanian language
B3	Click to switch to the Russian language
B4	Click to switch to the French language
B5	Click to switch to the German language
B6	Click to switch to the Italian language
B7	Click to open the control window of automatics. The automatics is recognised automatically. If parameters of the RS485 communication line are wrong or the device is connected improperly, after clicking B7 the message that control board is not found will be displayed.
B8	Click to save the MB-GATEWAY module settings
B9	Click to open the PDF help file
B10	Click to switch to the green theme

B11	Click to switch to the blue theme
B12	Click to switch to the black theme
B13	Click to switch on/off the display of this window during start up

Number	Function
S1	The IP address of the MB-GATEWAY module is set
S2	The baud rate of MB-GATEWAY module RS485 communication line is set
S3	The parity of MB-GATEWAY module RS485 communication line is set
S4	The date and time of MB-GATEWAY module is set
S5	The user name of the MB-GATEWAY module is set
S6	The password of the MB-GATEWAY module is set
S7	The password of the MB-GATEWAY module is repeated

WEB CONTROL OF THE AIR HANDLING UNIT WITH PRV AUTOMATICS

4.1. Main window



Number	Function
I1	Displays the remaining time of the BOOST function in minutes. It is displayed when the BOOST function is active.
I2	Displays the date and time
I3	Displays the outdoor air temperature
I4	Displays the extract (room) air temperature
I5	Displays the supply air temperature
I6	Displays the extract air humidity

Number	Function
B1	Click to open the menu window
B2	Click to select the language
B3	Click to select the system mode: "OFF", "MANUAL CONTROL", "BY SCHEDULE"

B4	Click to turn on/off the ventilation
B5	Click to turn on/off the "BOOST" function (now it is active)
B6	Click to turn on/off the "Stand-by" mode
B7	Click to open the Alarms list window. It is displayed when there is at least one active fault message
B8	Click to open the temperature setting window
B9	Click to open the fan speed setting window

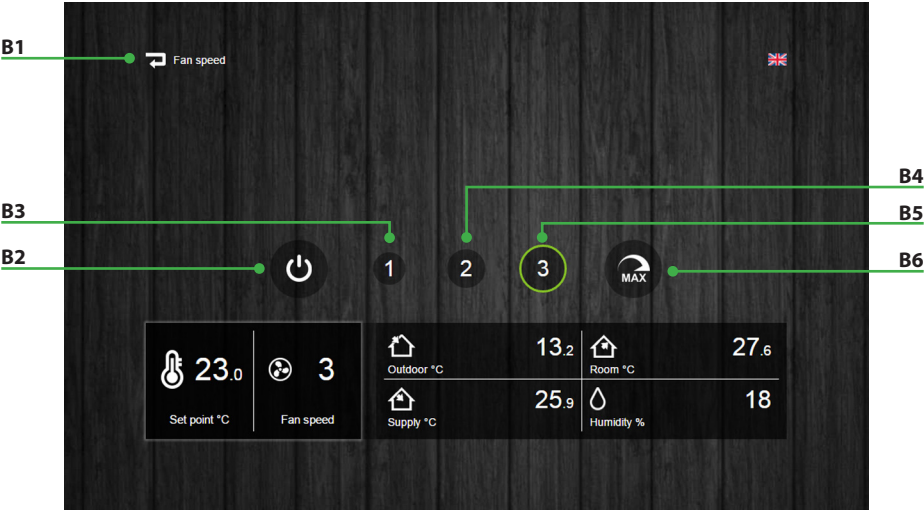
4.2 Temperature setting window



Number	Function
I1	Displays the temperature setting

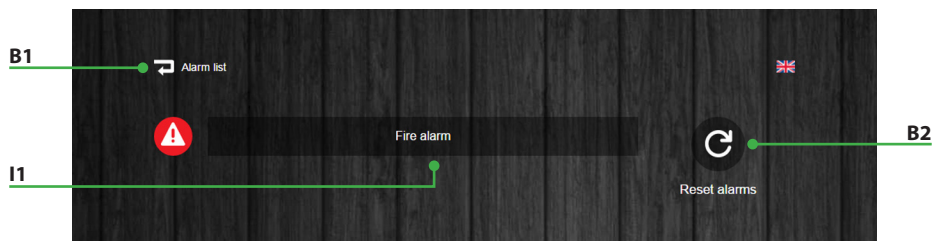
Number	Function
B1	Click to set the entered temperature and to return to the main window
B2 B3	Click to increase/decrease the temperature
B4	Click to select one of four recent temperature settings

4.3 Fan speed setting window



Number	Function
B1	Click to return to the main window
B2	Click to activate the "Stand-by" mode
B3	Click to turn on the fan speed 1
B4	Click to turn on the fan speed 2
B5	Click to turn on the fan speed 3
B6	Click to turn on/off the "BOOST" function

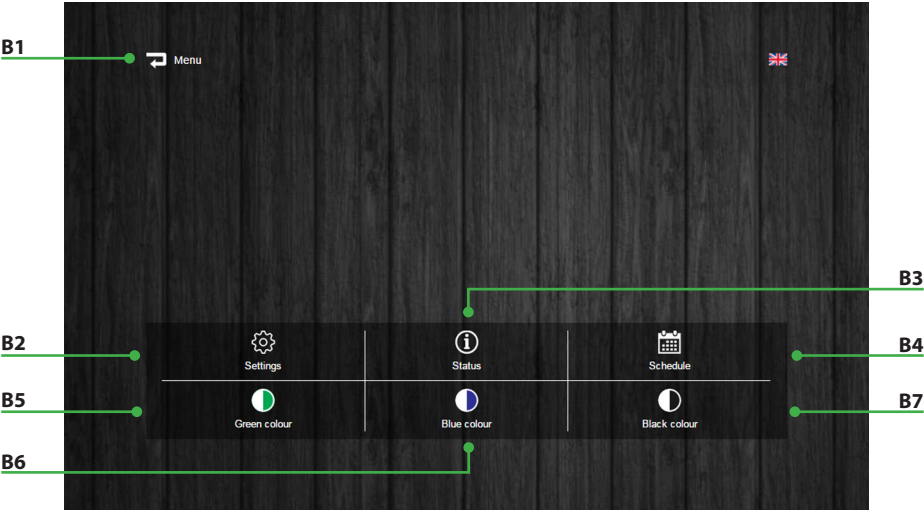
4.4 Alarm list window



Number	Function
I1	Displays the message about active protection (see the table in pg. 11)

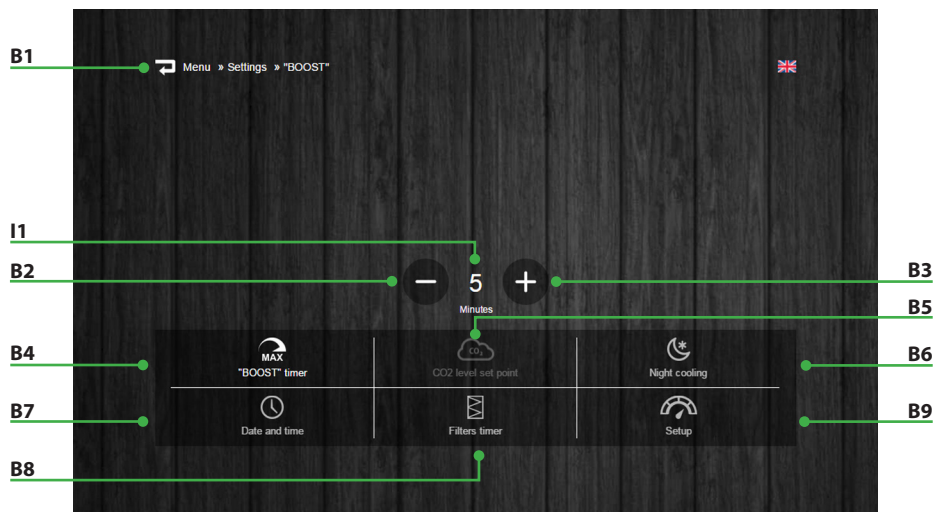
Number	Function
B1	Click to return to the main window
B2	Click to clear alarms and to restart the system

Meaning
Plate heat exchanger frost protection function
Fire alarm
Dirty filter alarm
Fans overheat alarm
Low voltage
DJT(100) temperature sensor alarm
Exhaust air temperature sensor alarm
Supply air temperature sensor alarm
DTJ(100) HUMIDITY sensor alarm (controller works, in determining the moisture content of 70%)
Return water temperature sensor alarm
Outside air temperature sensor alarm
Overheat alarm



Number	Function
B1	Click to return to the main window
B2	Click to open the settings window
B3	Click to open the status monitoring window
B4	Click to open the weekly schedule setting window
B5	Click to switch to the green theme
B6	Click to switch to the blue theme
B7	Click to switch to the black theme

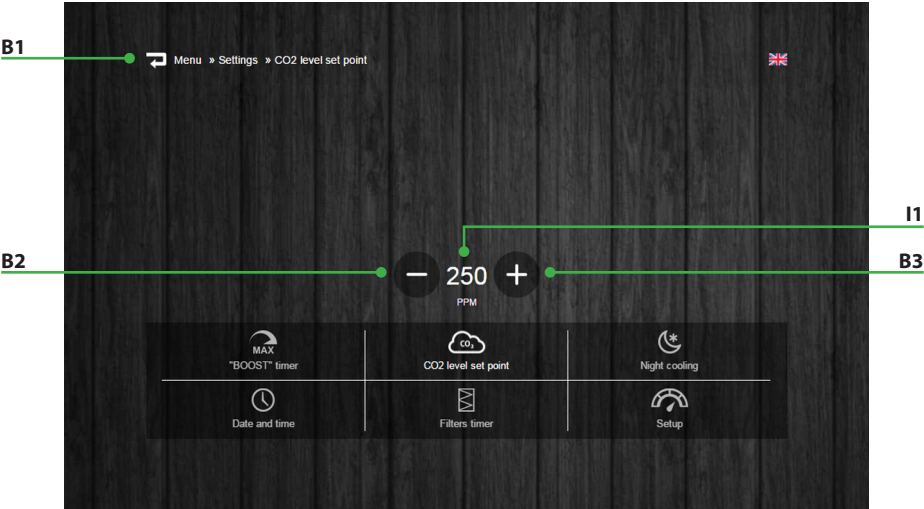
4.6 Settings window. Set the "BOOST" function time




Number	Function
I1	Displays the setting of the BOOST function time in minutes

Number	Function
B1	Click to return to the settings window
B2 B3	Click to increase/decrease the „BOOST" function time
B4	Click to open the BOOST function timer setting window (currently open)
B5	Click to open the desired CO2 level setting window. The selection is active when the CO2 sensor is used (currently inactive)
B6	Click to open the night-time cooling function settings window
B7	Click to open the date and time settings window
B8	Click to open the filter timer settings window
B9	Click to open the MB-GATEWAY module settings window which is shown when it is connected for the first time

4.7 Settings window. Set the desired CO2 level

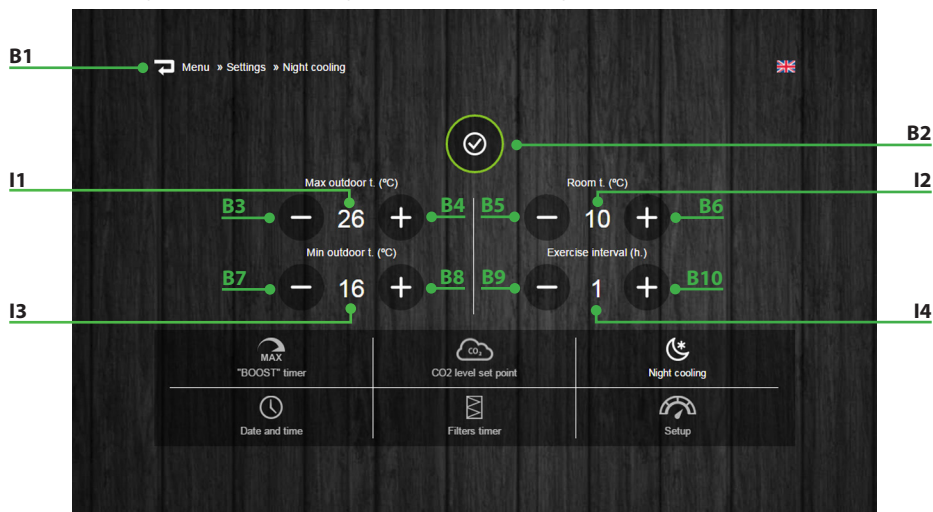


 The selection is active when the CO2 sensor is used.

Number	Function
I1	Displays the desired CO2 level setting (PPM)

Number	Function
B1	Click to return to the settings window
B2 B3	Click to increase/decrease the CO2 level setting

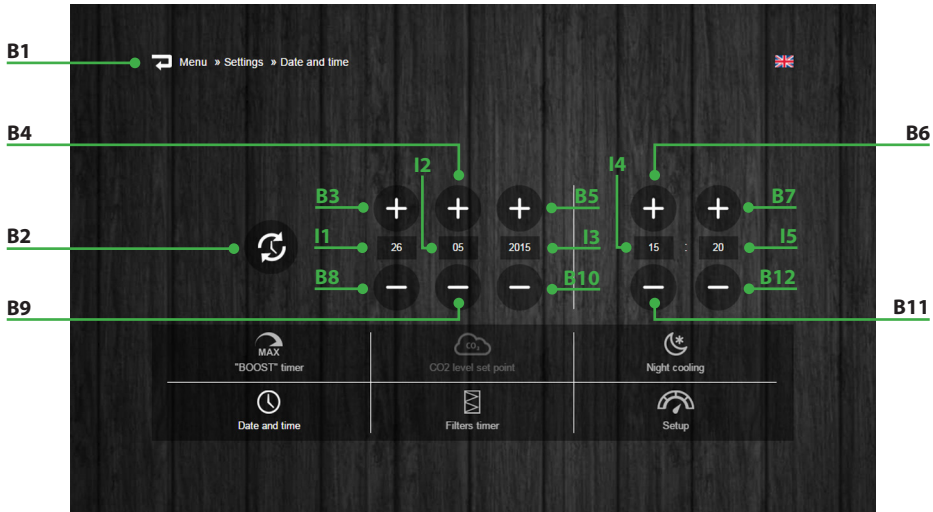
4.8 Settings window. Night-time cooling function settings



Number	Function
I1	Displays the maximum allowable outdoor air temperature setting
I2	Displays the room air temperature setting
I3	Displays the minimum allowable outdoor air temperature setting
I4	Displays the air change interval setting in hours

Number	Function
B1	Click to return to the settings window
B2	Click to turn on/off the night-time cooling function (now it is turned on)
B3 B4	Click to increase/decrease the maximum outdoor air temperature setting
B5 B6	Click to increase/decrease the room air temperature setting
B7 B8	Click to increase/decrease the minimum outdoor air temperature setting
B9 B10	Click to increase/decrease the air change interval setting in hours

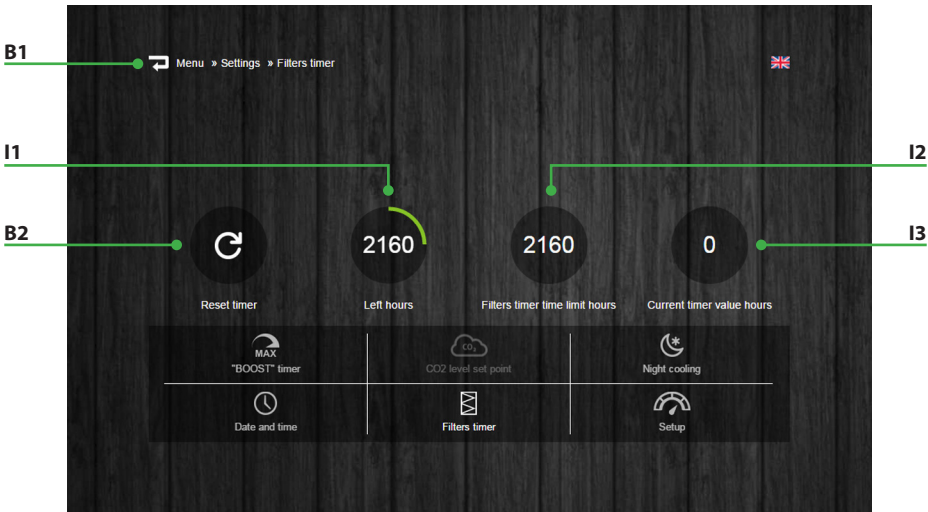
4.9 Date and time settings window



Number	Function
I1	Displays the day
I2	Displays the month
I3	Displays the year
I4	Displays hours
I5	Displays minutes

Number	Function
B1	Click to return to the settings window
B2	Click to synchronize the time with the PC clock
B3 B8	Click to increase/decrease the day setting
B4 B9	Click to increase/decrease the month setting
B5 B10	Click to increase/decrease the year setting
B6 B11	Click to increase/decrease the hour setting
B7 B12	Click to increase/decrease the minute setting

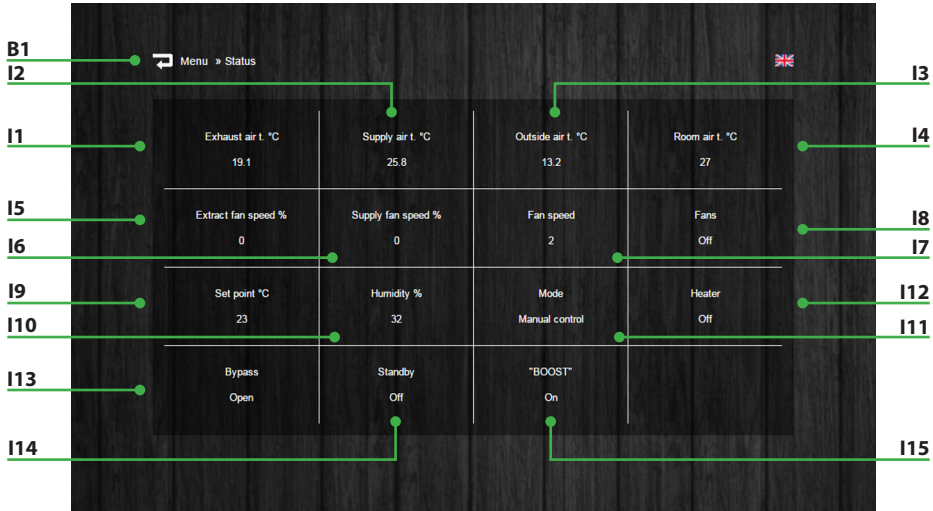
4.10 Filter timer settings window



Number	Function
I1	Displays the remaining filter time in hours
I2	Displays the set filter timer limit in hours
I3	Displays working time in hours

Number	Function
B1	Click to return to the settings window
B2	Click to reset the filter timer

4.11 State monitoring window

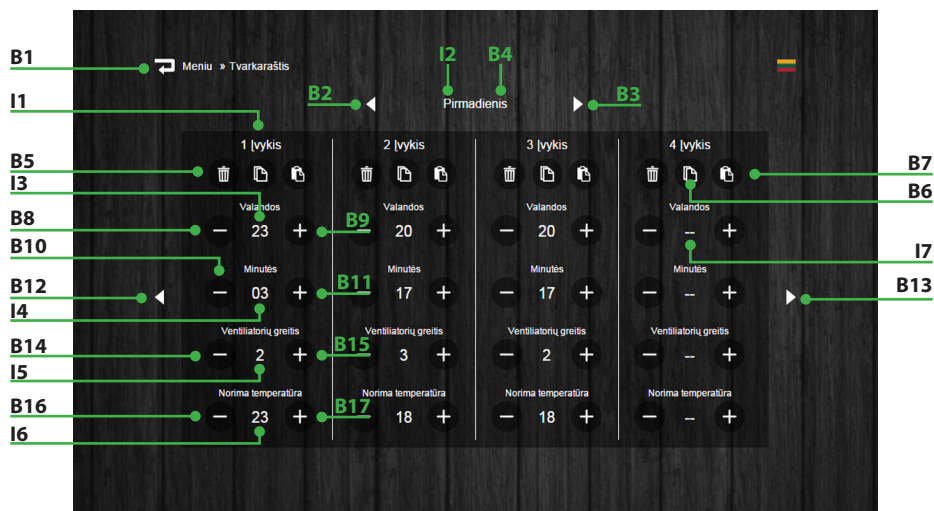


This window is for monitoring of system status. Amount of the information changes dynamically depending on the configuration.

Number	Function
I1	Exhaust air temperature
I2	Supply air temperature
I3	Outdoor air temperature
I4	Extract (room) air temperature
I5	Percentage of the extract air fan speed
I6	Percentage of the supply air fan speed
I7	Fan speed setting
I8	The state of the fan power circuit (turned on/off)
I9	Set Point system temperature
I10	Extract air humidity
I11	Active system mode
I12	The state of the heater power circuit (turned on/off)
I13	The state of the by-pass valve
I14	The state of the stand-by function
I15	The state of the BOOST function

Numeris	Funkcija
B1	Click to return to the menu window

4.12 Weekly schedule setting window



Number	Function
I1	Displays the event number. 8 total events per day
I2	Displays the selected weekday
I3	Displays the hour of event beginning
I4	Displays the minute of event beginning
I5	Displays the set event fan speed
I6	Displays the set event temperature
I7	Displays details of deleted event

Number	Function
B1	Click to return to the menu window
B2 B12	Click to open the previous event page
B3 B13	Click to open the next event page
B4	Click to open the weekdays copying window
B5	Click to delete the event
B6	Click to copy the event details

B7	Click to paste copied details of another event
B8 B9	Click to decrease/increase hour value
B10 B11	Click to decrease/increase minute value
B14 B15	Click to decrease/increase the set fan speed value
B16 B17	Click to decrease/increase the set temperature value

4.13 Weekly schedule setting window.
Copying of day's events

B1
B3
B2

B4



Number	Function
B1	Click to close the copying window
B2	Click to copy day's events to clipboard
B3	Click to delete weekday events
B4	Click to paste day's events from clipboard

PROGRAMMER'S GUIDE

This network module can be used as:

- TCP/IP Modbus gateway
- Tool that helps to access the ModBus network using HTTP requests
- Modbus transmitter between Modbus Slave devices, which can automatically send data from one device to another.

5.1 HTTP requests

The default IP address is 192.168.0.51, referred as "address".

• IP address changing: „http://address/IP(x.x.x.x)". E.g. „http://address/IP(192.168.0.60)" – IP address will be changed to 192.168.0.60.

• RS485 baudrate changing (default 19200): „http://address/SPEED(parameter)" – Available parameter values: 2400, 4800, 9600, 19200, 38400, 57600, 115200. E.g. „http://address/SPEED(57600)" – RS485 baudrate is changed to 57600.

• Parity changing: „http://address/PARITY(parameter)" – (default 0 (None)). Available parameter values: 0 – None, 1 – Even, 2 – Odd. E.g. „http://address/PARITY(1)" – parity is changed to 1 (Even).

• Setting date and time: „http://address/TIME(Y,M,D,WD,h,m,s)". Parameters: Y – year, M – month, D – day, WD – weekday, h – hours, m – minutes, s – seconds. E.g. „http://address/TIME (14,01,01,01,12,30,30)" – time is changed to 2014-01-01 12:30:30.

• Modbus request (without CRC): „http://address/FUNC(a,b,c,d,e)". Parameters:

- o a – format of returned value: 1 – float, 2 – integer, 3 – full Modbus response, 4 – if request returns more than 1 value, all values are semicolon separated
- o b – device address
- o c – Modbus function code
- o d – decimal representation of variable address
- o e – value (for writing request) or amount (for reading request, when reading some consecutive addresses)

• Full Modbus request (with CRC): „http://address/F(request)". E.g. „http://address/F(1106000100039A9B)". Function returns a full Modbus response.

• The main MB-GATEWAY parameters in XML format: „http://address/INFO"

• http://address/TON – enabling Modbus transmitter state.

• http://address/TON(filename) – enabling Modbus transmitter state providing the request file. E.g. „http://address/TON(custom.txt)" – activated

• http://address/TOFF – disabling Modbus transmitter state.

5.2 Modbus transmitter

Modbus transmitter is a tool that allows to interconnect some Modbus Slave devices. This tool is disabled by default, but if the file "tranceiv.txt" is created on the MicroSD card, then the Modbus transmitter starts automatically when module is turned on.

This function can be enabled and disabled using HTTP requests: "http://address/TON" to activate, "http://address/TOFF" to deactivate. If you would like to not start this tool automatically or you need to change transmitter requests using HTTP requests, you can use HTTP request "http://address/TON(filename)". The Modbus transmitter will work using the specified file. E.g.: „http://address/TON(custom.txt)" – requests from "custom.txt" file will be processed.

The data reading command, direction symbol ">" and command to save received data is entered to each line of Modbus transmitter request file. Until this function is active, commands are processed as a consecutive loop.

Example of Modbus transmitter request file:

```
140323870006>0110214F;
```

```
01031FFF0006>14102381;
```

```
1403237C0005>011020FF;
```

```
0103208F0005>14102377;
```

Explanation of file content:

- "140323870006>0110214F;":
 - o "14" – read from a device that has an address of 20 (0x14);
 - o "03" – Modbus command (Read Holding Registers);
 - o "2387" – starting with address 9095 (0x2387);
 - o "0006" – 6 variables;
 - o ">" – delimiter;
 - o "01" – write to a device that has an address of 01;
 - o "10" – Modbus command 16 (0x10) (Preset Multiple Registers);
 - o „214F" – starting with 8527 (0x214F) address 6 variables are written;
 - o „;" – the end of the statement.
- Similarly, all the other lines.

You can see the content of file "tranceiv.txt" using web browser at "http://address/ tranceiv.txt".