



„ORIGINAL INSTRUCTIONS“

IMPORTANT NOTE:

Read this manual carefully before installing or operating your new air conditioning unit.
Make sure to save this manual for future reference.

SCMI-01.5 CONTROL MODULE – DESCRIPTION AND INSTRUCTION MANUAL

1. INTRODUCTION

The SCMI-01.5 control module is designed for controlling outdoor inverter units ASGE-12BI2 to ASGE-60BI2 that use R32 refrigerant. This module can operate in the autonomous pressure (evaporation temperature) control mode, autonomous temperature control mode for cooling or heating, or as a slave unit. In the slave mode, the module serves as a converter between the control system and outdoor unit according to voltage 0-10V or via Modbus data protocol from an external control system. The module is placed in a standard box for mounting on the DIN rail. The front panel has an LCD with 2x8 characters and 4 LED indicators. The green LED indicates the power-on state and three yellow LEDs indicate the switching state of the module relays. Setting up the module and downloading the stored data is done using 4 control keys and a USB connector. The module is powered by an AC voltage of 230V/50Hz. To control the outdoor unit, the module is equipped with a 1200bps special communication channel. For controlling other devices, the module contains three relays with selectable features and a 230V/2A NO (normally open) contact. In addition, this module has two digital TTL inputs, one voltage input 0-10V/100k Ω , one current input 4-20mA and two inputs for 10k Ω resistance thermometers ($\beta=3435$). For monitoring communication with an outdoor unit, or for controlling the SCMI-01.5 module via the Modbus protocol, it includes a standard RS485 serial interface.

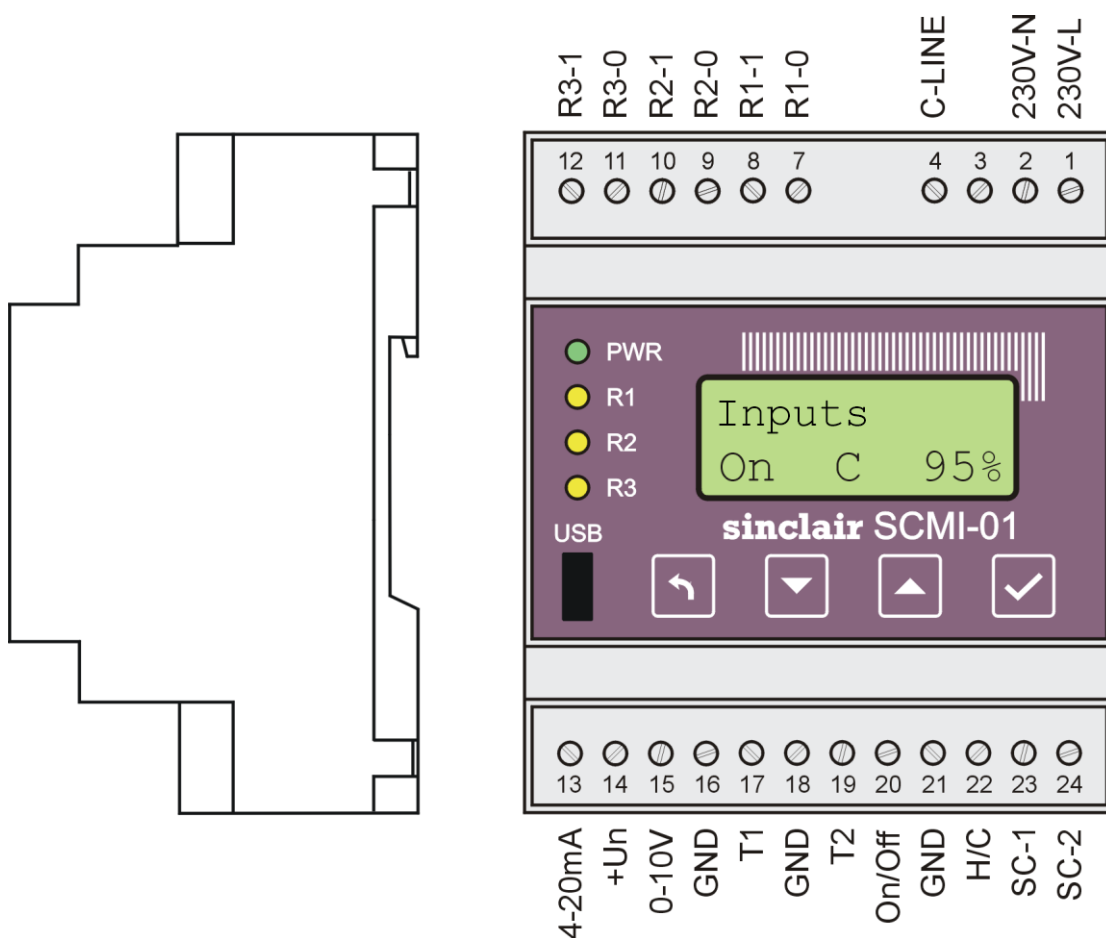


Fig. 1. SCMI-01.5 control module

2. SAFETY INSTRUCTIONS

WARNING



Please read this manual carefully before installing this device!

- This manual is a part of the product and must be kept near the device to be available for easy reference.
- This device is not intended to be used for other purposes than those described below.
- Before commissioning, please check the range of operating conditions of the given installation.
- The SCMI-01.5 control module may be installed only by a company that has the relevant qualification and is authorized by the manufacturer.
- This device is designed for mounting on a DIN rail in a dry and dust-free environment. Do not allow the water to get into the electrical components; there is a risk of electric shock or damage to the unit.
- Do not allow persons without the necessary qualification, and especially children, to manipulate the device.
- Cleaning and maintenance may only be performed by persons with suitable qualification. Otherwise, personal injury or property damage may occur. Do not dismantle or repair the device.
- Disconnect the device from the power supply before cleaning or maintenance. Otherwise, an electric shock may occur.
- Do not touch the device with wet hands, do not operate it in a wet environment and do not wash it with water. There is a risk of electric shock.
- Damaged power cables must be replaced by the manufacturer, authorized service centre or appropriately qualified person.
- Do not repair the device yourself. Otherwise, electric shock or damage to the device may occur. Contact your dealer, if you need to repair the device.
- Immediately turn off the device and disconnect it from the power supply, if any of the following conditions occurs. Then ask your dealer or an authorized service centre for repair. If you let the device run under these conditions, this may cause a malfunction, electric shock or fire.
 - The power cord overheats or it is damaged.
 - An abnormal noise during operation.
 - An upstream breaker repeatedly trips.
 - The device smells like something is burning.
- Ensure that the wires for sensors, load and power supply are led separately and far enough from each other, without crossing or parallel leading.

3. TERMINALS AND WIRING THE UNITS

The SCMI-01.5 module is equipped with 22 screw terminals to connect the external circuits. On one side of the module, there are terminals for connection cable between the SCMI module and the outdoor unit (230V-L, 230V-N and C-LINE) and terminals for NO contacts of output relays R1 to R3. Terminals on the other side of the module allow you to connect a current output of 4-20mA from a relative pressure sensor 0-18bar, output 0-10V from an external performance control, two 10k Ω resistance thermometers with coefficient $\beta=3435$, two digital TTL inputs and two wires of a serial communication line for controlling an outdoor unit. To connect external signals from temperature sensors, pressure sensors, control voltage of 0-10V, **ON/OFF** control and **H/C** control, ordinary wires with a cross-section of 0.35-1.5mm² can be used. To connect the RS485 serial communication, a corresponding data cable must be used. The length of the connecting wires is not critical. Regarding the thermometers used, if the wire cross-section is 0,35mm², the temperature measurement error due to wire resistance is 0.1°C at a length of approx. 130m. The maximum distance between the control unit and outdoor unit with respect to the command transmission errors is about 30m, when using the communication rate of 1200bps and wire cross section of 0,75mm². To connect the supply voltage of 230V/50Hz, high-voltage communication and relay outputs, it is necessary to use wires (cables) rated for 230V/50Hz with a cross-section of 0.5-1.5mm².

No.	Label	Signal type	Description
1	230V-L	Input 230V L	Input of the mains supply voltage – phase wire
2	230V-N	Input 230V N	Input of the mains supply voltage – neutral wire
3	230V-N	Input 230V N	Input of the mains supply voltage – neutral wire
4	C-LINE	Communication s.	High-voltage communication with outdoor unit
7	R1-0	Relay output	R1 relay NO contact 230V/2A
8	R1-1	Relay output	R1 relay NO contact 230V/2A
9	R2-0	Relay output	R2 relay NO contact 230V/2A
10	R2-1	Relay output	R2 relay NO contact 230V/2A
11	R3-0	Relay output	R3 relay NO contact 230V/2A
12	R3-1	Relay output	R3 relay NO contact 230V/2A
13	4-20mA	Current input	Current input 4-20mA for a pressure sensor
14	+Un	Sensor power supply	Output +(18 to 24)V to power a pressure sensor
15	0-10V	Voltage input	Voltage input 0-10V for an external control voltage
16	GND	GND	Common terminal for an external control voltage
17	T1	Resistance input	Resistance input for T1 temperature sensor (10k Ω , $\beta=3435$)
18	GND	GND	Common terminal for T1&T2 temperature sensors
19	T2	Resistance input	Resistance input for T2 temperature sensor (10k Ω , $\beta=3435$)
20	On/Off	Digital input	Digital input for On/Off signal
21	GND	GND	Common terminal for digital inputs
22	H/C	Digital input	Digital input for Heating/Cooling signal
23	RS485-B	Communication s.	Serial communication line for SCMI control/monitoring
24	RS485-A	Communication s.	Serial communication line for SCMI control/monitoring

Recommended accessories:

- 1) Carel NTC015WF00 temperature sensors (NTC type, IP67, 1.5m cable), 2pcs
- 2) Alco Controls PT5-18M pressure sensor + cable PT4-M15 (1.5m)

The control module is equipped with four keys to control and set the module. Press these keys to access and use the module menus. These menus contain a number of items (or submenus). You can select or set the menu items using the ▼/▲ keys. Use the **ENTER** key to confirm the selected menu item or use the **ESC** key to exit the current menu and return one level back. Press this key repeatedly to get to the default screen of the module.

- ← - ESC key to exit the setting without any change or exit the menu.
- ▼ - Down arrow key to decrease the value or move down in the menu.
- ▲ - Up arrow key to increase the value or move up in the menu.
- ✓ - ENTER key to confirm the value or shift to the right.

Fig. 2. Keys of the SCMI-01.5 module

4. SETTING THE MODULE

The SCMI-01.5 control module can operate in one of the eight modes: Slave unit modes (**Reg.U** and **Reg.M**), Temperature control for cooling (**Reg. T***), Temperature control for heating (**Reg T+**), Heating/cooling control depending on the status of the digital input H/C (**Reg Tx**), Pressure control affected by T2 temperature (**Reg PT**), Heating/cooling control depending on the status of the digital input H/C and with temperature correction by using a voltage of 0-10V (**Reg TxU**), and Automatic heating/cooling switching mode (**Reg TxA**).

After the power supply is switched on, the module is initialized. During this process, the version of the module software, its language variant, and the type of connected external unit (ODU) are displayed gradually. If the **ESC** button is pressed when the power supply is switched on (at least until the SW version is displayed), the selected RS485 communication mode (Modbus or monitoring of communication with outdoor unit) will also be displayed during the initialization of the module. In the monitoring mode, the parameters are predetermined; for Modbus, its type, communication method (number of data bits, parity, and number of stop bits), module address and communication rate are displayed.

After initializing the module in the slave unit mode, when the outdoor unit compressor is stopped, the display shows:

Inputs Off 0%

When the compressor is running in the Cooling mode, the display shows:

Inputs On C xx%

Character **C** indicates the **Cooling** mode and **xx** represents the desired compressor performance in percent. After switching to the **Heating** mode (using the **H/C** input), the character **H** instead of **C** is displayed.

In the heating/cooling control mode with temperature correction by using a voltage of 0-10V (Reg. TxU), the display shows first:

▲H xx.x°C Posxx.x°C

where **Pos** (desired temperature) is the target heating/cooling temperature modified by a delta (**Del.heat** or **Del.cool**) multiplied by a weighting coefficient of 0-100% determined by the value of the analogue voltage of 0-10V at the input of the SCMI-01.5 module. (When cooling, there is a **C** after the **▲** symbol).

In other modes, this screen is omitted and **T1** and **T2** temperatures, which are measured by the resistance thermometers of the SCMI-01.5 module, will appear first. The T1 sensor detects the temperature of the indoor unit heat exchanger, while the T2 sensor detects the temperature of the indoor unit supply air.

T1 xx.x°C T2 xx.x°C

After pressing the **▲** key again:

P x.xx b T xx.x°C

The first line shows the pressure (in bars), which is measured by the SCMI-01.5 module, and the second line shows the corresponding calculated evaporation temperature for the specific refrigerant type. The pressure and the calculated evaporation temperature are displayed and used for control only in the autonomous pressure (evaporation temperature) control mode. **For the other modes, if the pressure sensor is connected, the pressure and the evaporation temperature are also displayed, but these values are for information only, and they are not used to control.**

After pressing the **▲** key again:

Cset xx% Cact xx%

The **xx** represents the set (**Cset**) and current (**Cact**) compressor performance in %. The actual performance of the compressor depends on the capability of the outdoor unit to achieve the desired performance value. In limit states of the unit, it may take longer to reach the desired value and in extreme cases may not reach it at all. After pressing the **▲** key again, the current speed **Fact** of the evaporator fan and the current position **ExV** of the expansion valve are displayed.

Fact xxx ExV xxx
--

After pressing the **▲** key again:

CurrMode Stop<

Character **<** indicates the current operation (**Stop, Cool, Heat, Wait**).

If any error of the outdoor unit is detected, the current error code is displayed in the last position:

Error xx yy zz

where in place of **xx yy zz** the error codes of sensors connected to the module inputs (thermometers T1, T2, pressure sensor P) or error codes of the external unit according to the list of these errors can be displayed. For example, when a short circuit occurs on the T1 thermometer, the following is displayed during the duration of this error:

Error T1 Short

Or when the T1 circuit is broken, the following is displayed:

Error T1 Open

Similarly, if the T2 thermometer or pressure sensor error occurs.

Errors are continuously written to eight registers; each register can store multiple errors. To display them, press the **ENTER** and **ESC** keys simultaneously; the display will show up to three errors from the last written register, which is displayed first.

Err -1 T1 Ex D2

The **ENTER** key can be used to sequentially display other errors stored in this register until no error is displayed in the last position.

Err -1 T2 e7

The **▼** key can be used to display the errors stored in other registers; viewing them is similar. The above procedure can be repeated until no more errors are recorded in the next register x (valid if not all registers are occupied by errors). Press the **ESC** key to exit the error log viewing.

Error -x No errors

Important cautions:

The actual performance of the compressor (**Cact**), the current fan speed (**Fact**), the current position of the expansion valve (**ExV**) and errors are detected by the outdoor unit and transmitted to the SCMI-01.5 control module via the communication line.

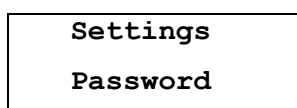
When controlling the outdoor unit performance, the SCMI-01.5 module determines the compressor speed to achieve the required power. The outdoor unit increases the compressor speed according to its algorithm, and when a certain speed is achieved, about a 3-minute delay is used to stabilize the operation. These delays are used usually when 30%, 45% (and also 75% for some units) of the compressor speed is achieved, and the SCMI-01.5 module takes this feature of the outdoor units into account.

Press the **ENTER** key to enter the main menu for module setting when the default screen is displayed. This menu consists of the following items (submenus):

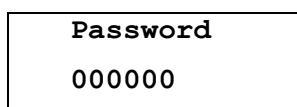
- | | |
|-----------------|--|
| Goal C | - This menu allows you to set the desired temperature in the cooling mode; it is not available when the module is in the Reg.U and Reg.M modes. |
| Del.cool | - Limits of change of the output temperature by voltage of 0-10V; only in TxU mode. |
| Goal H | - This menu allows you to set the desired temperature in the heating mode; it is not available when the module is in the Operated mode. |
| Del.heat | - Limits of change of the output temperature by voltage of 0-10V; only in TxU mode., |
| Function | - This menu allows you to select one of the eight operation modes of the module. |
| Defrost | - This menu allows you to set the method and necessary parameters to defrost the indoor unit evaporator. |
| Outputs | - This menu allows you to set the function and the switching logic of the output relays of the module. |
| Reg.cons | - This menu allows you to set the control constants needed for the operation of the module. |
| Display | - This menu allows you to set the display of the control module. |
| Password | - This menu allows you to log in to set up the control module. Without logging, you can only view the set parameters; they cannot be changed. After successful login, this menu is not displayed! |

4.1. Using the Password to Set Up the SCMI Module

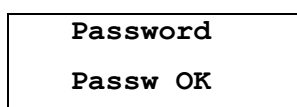
The module settings are **protected by the six-digit password 201201, which must be entered in advance (to log on)**. If you try to change settings without logging, the display returns one level back. Under the default settings of the SCMI-01.5 control module, you can only change the display backlight and contrast without logging in. Once the module is connected to the USB port of the computer, you can use the **USBCommunicator program** to disable the password to set also the target temperature for heating and cooling. When the default screen is displayed, press the **ENTER** key to enter the module setting, and select the **Password** menu.



After opening this menu, the display shows:



The cursor blinks on the first digit. Use the **▼/▲** keys to set the first digit of the password and **short press the ENTER key** to move to the next digit. Repeat this operation to enter all digits of the password. After setting all digits, **long press the ENTER key to confirm the set password**. If the password is correct, the following message briefly appears:



If an incorrect password has been entered, the display shows **Error** and then the display returns one level back.

If the correct password has been entered, it is possible to change the module settings for 30 minutes; then the operator is logged out. While the log-on state remains valid, menu Password is not displayed in the main setting menu of the SCMI-01.5 module.

4.2. Using the Password to Select the Outdoor Unit

This function is used if the outdoor unit is not detected automatically. By entering the password **5232D2**, you can access the menu for the manual selection of the connected outdoor unit.

Set ODU ASGExx-1

Where the outdoor unit number (12 to 60) is displayed in place of the **xx** characters. The desired unit can be selected using the **▼/▲** keys and written into the module memory by long pressing the **ENTER** key. Successful writing is briefly confirmed by the message:

Saved OK ASGExx-1

4.3. Setting the Desired Temperature in the Cooling Mode

Menu **Goal C** allows you to set the desired value of the output or evaporation temperature in the cooling mode in the range of -10.0°C to +55.0°C. The factory preset temperature is +10°C. In the slave mode, the target value is not being set on the module and the compressor performance is controlled by an external voltage 0-10V. Press the **ENTER** key to enter the setting menu and select the menu for setting the target value.

Settings Goal C

After opening this menu:

Goal C +xx.x

The set value is displayed. You can use the **▼/▲** keys to set the selected digit. After pressing the **ENTER** key, you can change the sign. If you next press the **ENTER** key, you can set another digit. **Long press the ENTER key to save the settings.**

Saved OK +yy.y

Then the display returns one level back in the menu. When attempting to write a lower than the permitted value, the error message **Err.min** appears on the first line of the display and the minimum permitted value of the set parameter is displayed on the second line. Similarly, when attempting to write a higher than the permitted value, the error message **Err.max** appears on the first line of the display and the maximum permitted value of the set parameter is displayed on the second line.

4.4. Setting the Correction Limit for Cooling in the TxU Mode

Menu **Del.cool** is accessible only in the TxU mode, i.e. in the switched heating/cooling mode with temperature correction by voltage of 0-10V applied to the input of SCMI-01.5 module. This menu allows setting of limit temperature correction for cooling in the range of -20°C to +20°C; the preset value is +10°C. The actual value of the temperature correction for cooling depends on the voltage applied to the 0-10V input of the module during operation. At zero voltage (0%), the resulting temperature correction will be also zero; at a voltage of 10V (100%), it will be equal to the set value **Del.cool**. Press the **ENTER** key to enter the setting menu and select the menu for setting the **Del.cool**.

Settings
Del.cool

After opening this menu:

Del.cool
±xx.x

The set value is displayed. You can use the ▼/▲ keys to set the selected digit. After pressing the **ENTER** key, you can change the sign. If you next press the **ENTER** key, you can set another digit. **Long press the ENTER key to save the settings.**

Saved OK
±yy.y

Then the display returns one level back in the menu. When attempting to write lower or higher than the allowed value, an error message with the limit allowed value is displayed as in the previous setting of the target value.

4.5. Setting the Desired Temperature in the Heating Mode

Menu **Goal H** allows you to set the desired value of the output temperature in the range of -10.0°C to +55.0°C in the heating mode; the preset temperature is +25°C. Press the **ENTER** key to enter the setting menu and select the menu for setting the target value in the heating mode.

Settings
Goal H

After opening this menu:

Goal H
+xx.x

The set value is displayed. You can change and save the desired temperature in the heating mode in the same way as when setting the desired temperature in the cooling mode.

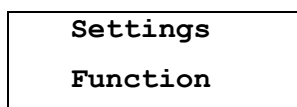
Saved OK
+yy.y

4.6. Setting the Correction Limit for Heating in the TxU Mode

The setting of the limit correction **Del.heat** for heating in the TxU mode and the operation of the SCMI-01.5 module in this mode is similar to that for cooling in the TxU mode; see Chapter 4.4.

4.7. Setting the Operation Mode of the SMCI-01.5 Control Module

Press the **ENTER** key to enter the setting menu and use the ▼/▲ keys to select the **Function** menu.



Press the **ENTER** key to open this menu and then you can use the ▼/▲ keys to select the module function. The current (selected) mode is followed by the sign <. You can choose from the following modes:

- | | |
|----------------|---|
| Reg.U | - The slave unit is controlled by an external voltage of 0-10V. Depending on the external voltage value, the module controls the outdoor unit compressor performance. |
| Reg.M | - The slave unit is controlled via Modbus from an external control system. |
| Reg. T* | - Autonomous temperature control mode for cooling. |
| Reg. T+ | - Autonomous temperature control mode for heating. |
| Reg. Tx | - Autonomous temperature control mode for heating or cooling depending on the status of the digital input H/C (heating/cooling), |
| Reg. PT | - Autonomous pressure (evaporation temperature) control mode affected by T2 temperature. |
| Reg TxU | - Control mode for switched heating/cooling and with temperature correction by using a voltage of 0-10V. |
| Reg TxA | - Control mode for automatic switching heating/cooling. |

Use the ▼/▲ keys to select the desired mode and press the **ENTER** key to confirm it. Changing of the mode is briefly confirmed by the message **Saved OK** and then the display returns one level back in the menu.

Slave unit controlled by an external voltage of 0-10V – Reg.U mode

Outdoor unit compressor performance of **0-100%** is controlled by the SCMI-01.5 module according to the DC voltage of **0-10V** from an external device. The **On/Off** switch must be in the **On** position and, at the same time, the control voltage must be higher than 0.5V. Otherwise, if the control voltage drops below 0.5V, the module switches to the **Off** state. The slave unit can operate in the heating mode (**Heat**) or cooling mode (**Cool**). **In the cooling mode**, the outdoor unit heat exchanger operates as a condenser and transfers the heat to the surrounding environment. The thermometer **T1** measures the temperature of the indoor unit heat exchanger (which operates as an evaporator), and based on the measured temperature T1, the evaporator defrosting is controlled. **In the heating mode**, the outdoor unit heat exchanger operates as an evaporator and its defrosting is controlled by the outdoor unit circuits. The indoor unit heat exchanger operates as a condenser and its temperature **T1** is used to control the outdoor unit and to protect against exceeding the condensation temperature of the refrigerant used. The thermometer **T2** measures the temperature of the indoor unit supply air. The heating (cooling) mode can be set via the input H/C and the control module can be activated via the input On/Off. **If the input H/C is not connected, the module operates in the cooling mode; if this input is connected to the common wire (terminal 21), the module operates in the heating mode.** If the input On/Off is not connected, the module is switched off; if this input is connected to the common terminal, the module is switched on. The outdoor unit is controlled via the C-LINE high-voltage communication and the SCMI module is powered by 230V/50Hz mains voltage from the outdoor unit.

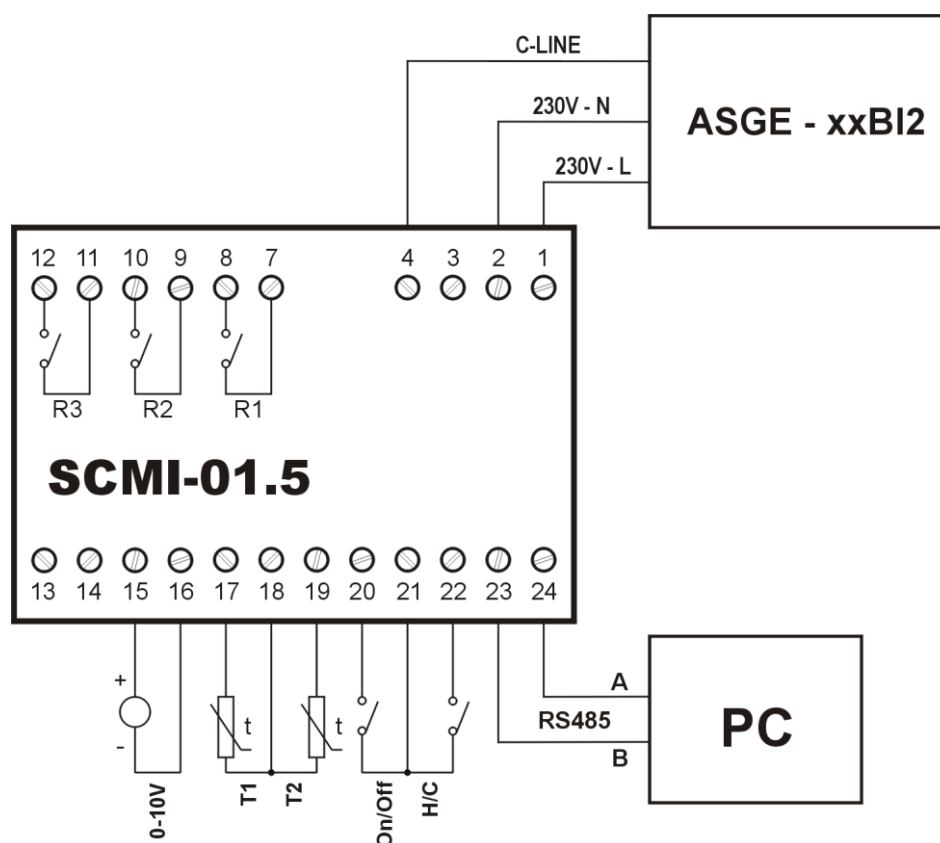


Fig. 3. SCMI-01.5 control module in the slave mode Reg.U

Slave unit controlled via Modbus – Reg.M mode

Outdoor unit compressor performance is controlled by the SCMI-01.5 module according to the instructions received from an external device via a Modbus connected to the RS485 serial communication terminals. The wiring of the temperature sensors and the On/Off input is the same as in the previous mode. The H/C input is not used, the mode selection is made by writing to the appropriate register. The outdoor unit is also controlled via the C-LINE high-voltage communication and the SCMI module is powered by 230V/50Hz mains voltage from the outdoor unit.

For correct operation of the control via the Modbus, it is necessary to set the delay time (Time Out) in the Modbus parameters longer (preferably at least twice) than the period of commands from the external device. If no command is received and correctly evaluated within the set delay, the outdoor unit will be stopped. The list of Modbus control registers is given in a separate Annex.

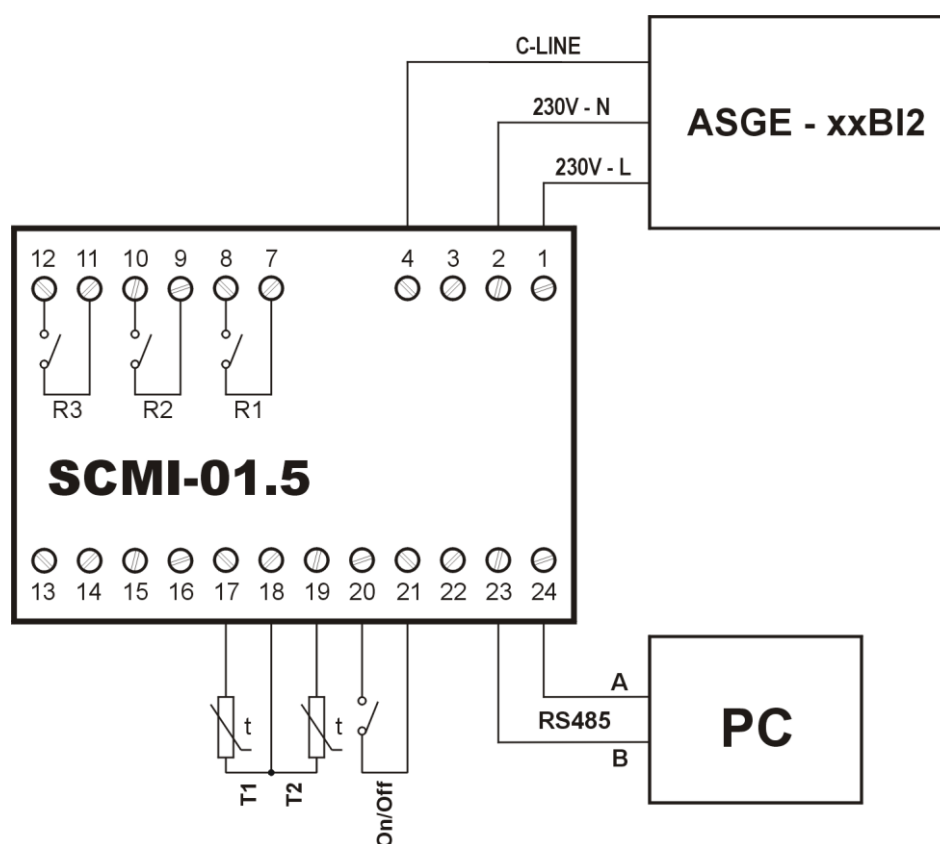


Fig. 4. SCMI-01.5 control module in the slave mode Reg.M

Autonomous temperature control mode for cooling (heating) – Reg. T* (T+)

In this mode, the outdoor unit compressor performance is controlled to keep the set temperature for cooling (or heating). The room temperature is measured by the resistance thermometer **T2**. The thermometer **T1** measures the temperature of the indoor unit heat exchanger. The thermometer **T2** measures the temperature of the indoor unit supply air. In the cooling mode, this heat exchanger operates as an evaporator and the measured temperature is used to control its defrosting, while in the heating mode, it operates as a condenser and the measured temperature is used to control the outdoor unit and protect against exceeding the condensation temperature of the refrigerant used. The control module can be activated remotely using the digital input **On/Off**. **If the input On/Off is not connected, the module is switched off; if this input is connected to the common wire, the module is switched on.** The outdoor unit is controlled via the C-LINE high-voltage communication and the SCMI module is powered by 230V/50Hz mains voltage from the outdoor unit.

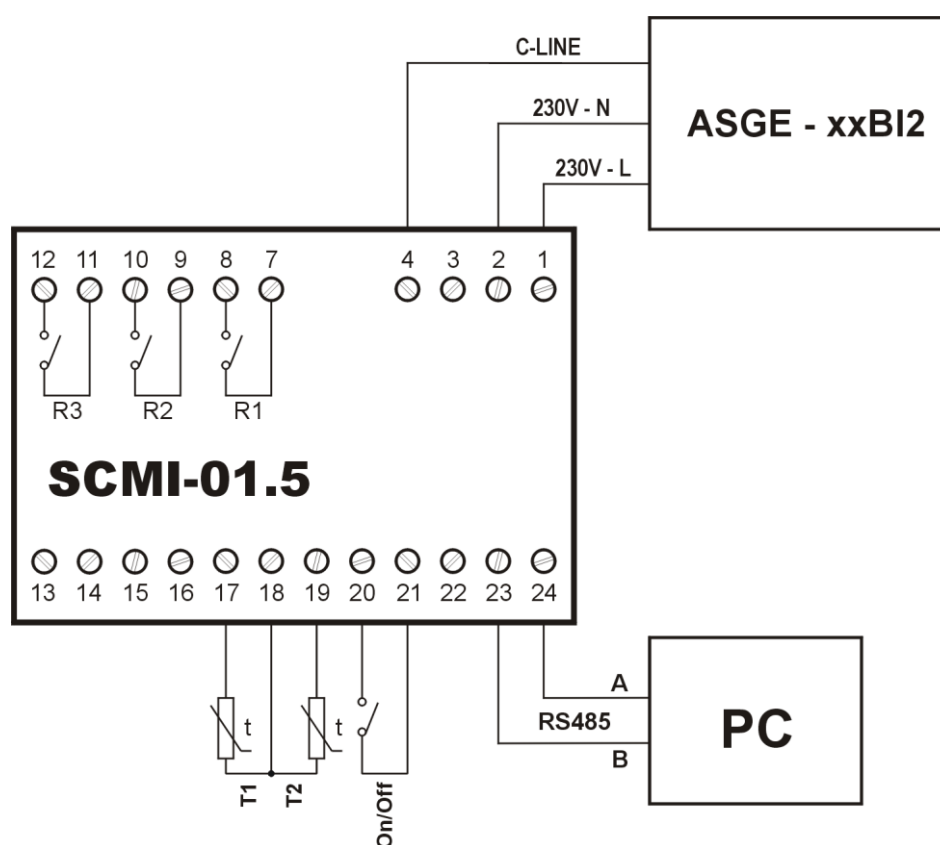


Fig. 5. SCMI-01.5 control module in the autonomous supply air temperature control mode

Autonomous temperature control mode for switched cooling/heating – Reg. Tx

In this mode, alike in the previous mode, the outdoor unit compressor performance is controlled to keep the set temperature for cooling (**Goal C**) or heating (**Goal H**), which is measured by the resistance thermometer **T2**. The thermometer **T1** measures the temperature of the indoor unit heat exchanger. The thermometer **T2** measures the temperature of the indoor unit supply air. In the cooling mode, this heat exchanger operates as an evaporator and the measured temperature is used to control its defrosting, while in the heating mode, it operates as a condenser and the measured temperature is used to control the outdoor unit and protect against exceeding the condensation temperature of the refrigerant used. The control module can be activated remotely using the digital input **On/Off**, and the current mode is set according to the status of the digital input **H/C**. **If the input H/C is not connected, the module operates in the cooling mode; if this input is connected to the common terminal, the module operates in the heating mode.** The outdoor unit is controlled via the C-LINE high-voltage communication and the SCMI module is powered by 230V/50Hz mains voltage from the outdoor unit.

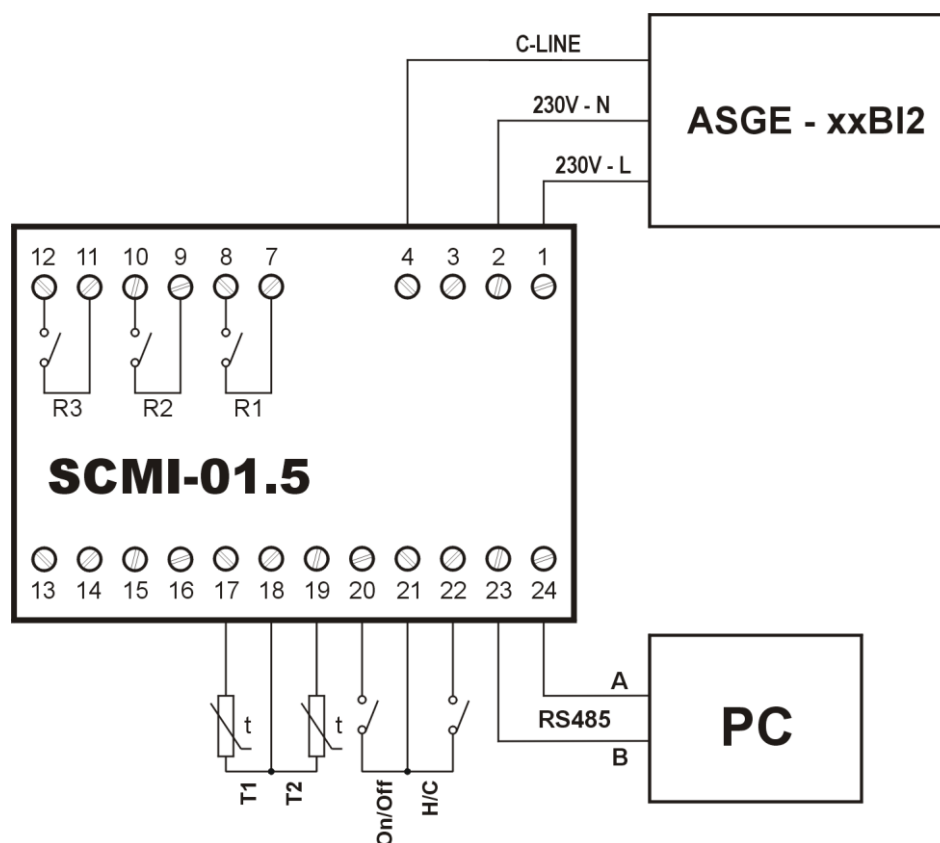


Fig. 6. SCMI-01.5 control module in the switched heating/cooling mode

Autonomous pressure (evaporation temperature) control affected by T2 temperature – Reg. PT

In this mode, the outdoor unit compressor performance is controlled to keep the desired pressure behind the indoor unit evaporator and thereby also the evaporating temperature of the refrigerant R32. The T2 temperature is also included in the algorithm to start the unit. To start the unit, the T2 temperature must exceed the selected evaporation temperature by the set value – **delta**. In addition, the pressure (evaporation temperature) control is suppressed for the adjustable time (**compressor fixed time**) during which the compressor is running with a constant speed (**compressor fixed speed**) after start-up of the unit. This allows to adapt the evaporation pressure to the ambient temperature. **If the compressor fixed time is set to zero, the regulation and start-up are based on pressure only.** The wiring diagram is the same as for the simple pressure (evaporation temperature) control. The pressure is measured by the pressure sensor with the output of **4-20mA** in the range of 0-18bar (relative). The resistance thermometer **T1** measures the temperature of the indoor unit evaporator and the SCMI-01.5 control module uses this temperature to control the evaporator defrosting. The thermometer **T2** measures the temperature of the indoor unit supply air. The control module can be activated remotely using the digital input **On/Off**. **If the input On/Off is not connected, the module is switched off; if this input is connected to the common wire, the module is switched on.**

The necessary parameters for the simple pressure (evaporation temperature) control affected by T2 temperature can be set via **USBCommunicator** programme – see Chapter 5 of the manual. After selecting the **Reg. PT** mode, a smaller window opens in the program window in which **Delta above the target value** in the range of 0 to 25.5°C, **compressor fixed time** from 0 to 25.5 minutes (for this time, the pressure control is suppressed after the start-up of the unit) and **compressor fixed speed** from 0 to 100% can be set.

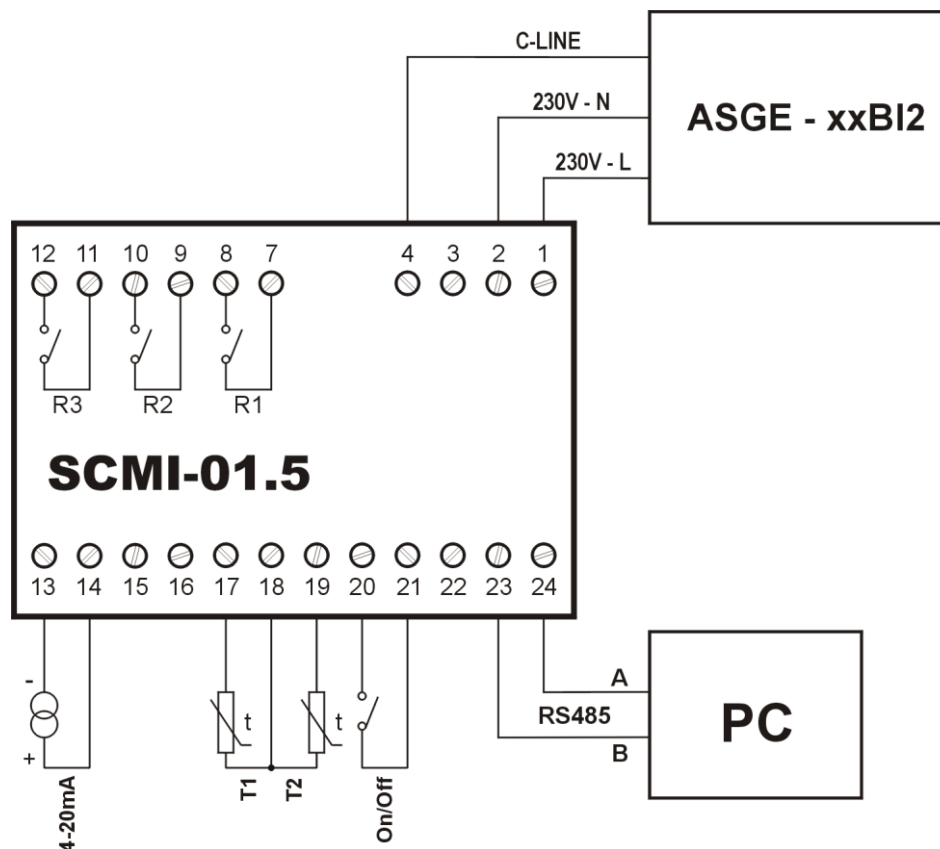


Fig. 7. SCMI-01.5 control module in the autonomous pressure control mode affected by T2 temperature

Control mode for switched heating/cooling and with temperature correction by using a voltage of 0-10V – Reg TxU

In this mode, alike in the **Reg Tx** mode, the outdoor unit compressor performance is controlled to keep the set temperature (**Goal**) for cooling or heating. The room temperature is measured by the resistance thermometer **T2**. The desired temperature is calculated from the set target temperatures **Goal C** and **Goal H** corrected by the set deltas **Del.cool** and **Del.heat** multiplied by a weighting coefficient determined by the value of analogue voltage 0-10V at the input of SCMI-01.5 module (voltage 0 to 10V corresponds to weighting coefficient 0 to 100%). The thermometer **T1** measures the temperature of the indoor unit heat exchanger. The thermometer **T2** measures the temperature of the indoor unit supply air. The control module can be activated remotely using the digital input **On/Off** and the current mode is set according to the status of the digital input **H/C**. **If the input H/C is not connected, the module operates in the cooling mode; if this input is connected to the common wire (terminal 21), the module operates in the heating mode.** The outdoor unit is controlled via the C-LINE high-voltage communication and the SCMI module is powered by 230V/50Hz mains voltage from the outdoor unit.

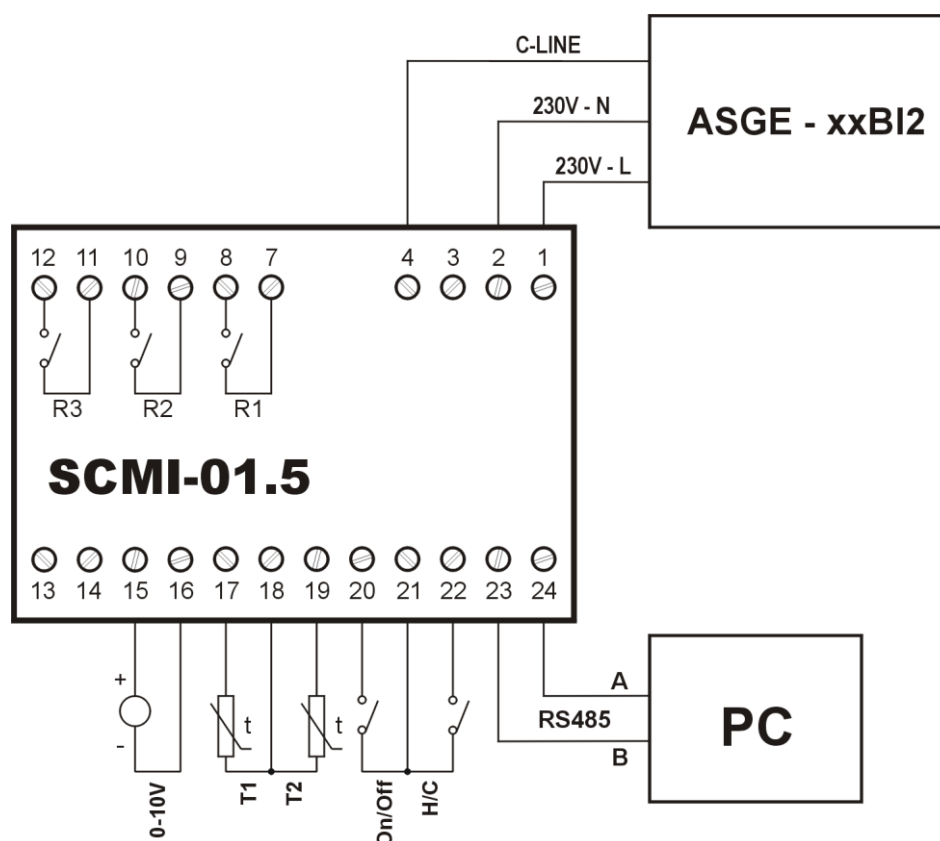


Fig. 8. SCMI-01.5 control module in the switched heating/cooling mode with temperature correction by using voltage of 0-10V

Control mode for automatic switching heating/cooling – Reg TxA

In this mode, the outdoor unit compressor performance is controlled to keep the set temperature (measured by the resistance thermometer **T2**) by automatically switching between heating and cooling. The thermometer **T1** measures the temperature of the indoor unit heat exchanger. The thermometer **T2** measures the temperature of the indoor unit supply air. For the correct function of the automatic switching between heating/cooling mode, the target temperature for heating must be at least 3°C lower than the target temperature for cooling. For example, at the target heating temperature of 22°C and the target cooling temperature of 25°C, the unit will be switched to heating mode at a T2 temperature lower than 22°C; it will not heat or cool between 22 and 25°C (however, an unfinished cycle may be completed); and it will be automatically switched to cooling mode at a temperature higher than 25°C. The control module can be activated remotely using the digital input **On/Off**. **If the input On/Off is not connected, the module is switched off; if this input is connected to the common wire, the module is switched on.** The outdoor unit is controlled via the C-LINE high-voltage communication and the SCMI module is powered by 230V/50Hz mains voltage from the outdoor unit.

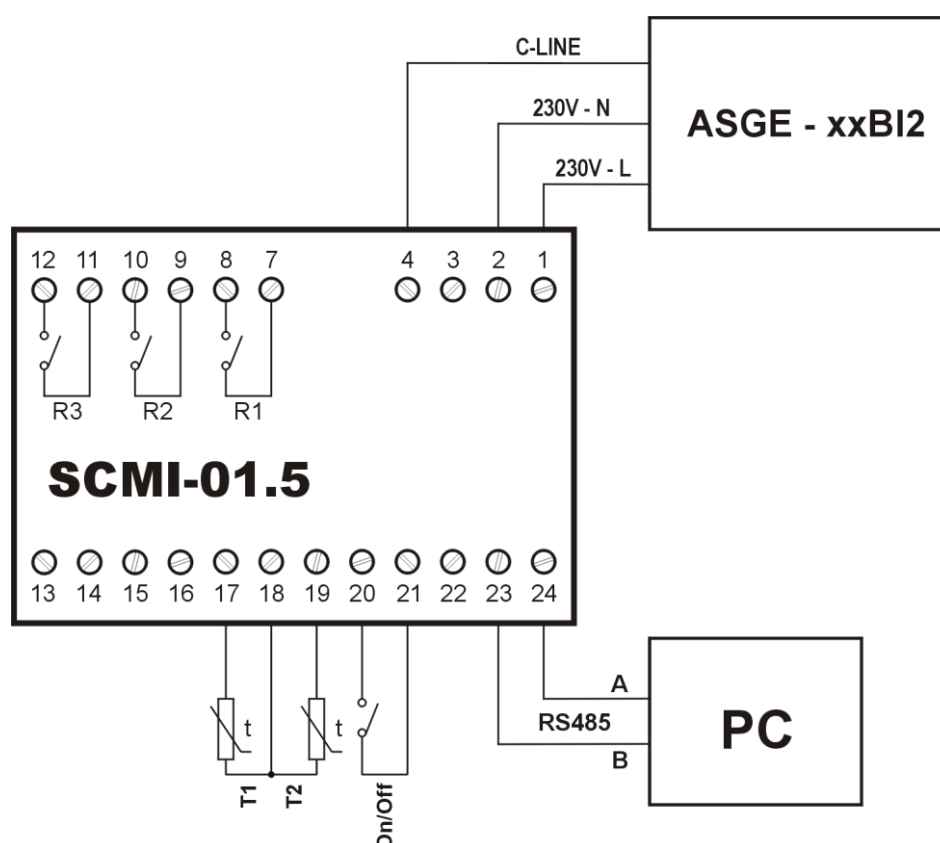
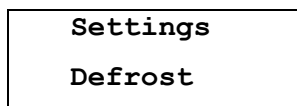


Fig. 9. SCMI-01.5 control module in the autonomous supply air temperature control mode

4.8. Setting the Evaporator Defrosting

This menu allows you to set the method and required parameters to control the defrosting of the evaporator of the indoor unit when running in the cooling modes. In the heating modes, the indoor unit heat exchanger operates as a condenser and defrosting of the outdoor unit evaporator is controlled by the outdoor unit. Press the **ENTER** key to enter the setting menu and use the **▼/▲** keys to select the **Defrost** menu.



After opening this menu, you can use the **▼/▲** keys to select and set the following parameters:

- | | | |
|----------------|---|--|
| Mode | - | Setting the defrosting mode of the indoor unit evaporator. |
| Period | - | Setting the minimum time period (in minutes) between successive defrosting cycles of the indoor unit evaporator. |
| Length | - | Setting the maximum duration (in minutes) of the defrosting cycle of the indoor unit evaporator. |
| Start | - | Setting the T1 temperature to start defrosting of the indoor unit evaporator. |
| Stop | - | Setting the T1 temperature to stop defrosting of the indoor unit evaporator. |
| ODU now | - | Displayed only when the outdoor unit is running; it will defrost the ODU. |

To start defrosting of the indoor unit evaporator, the set temperature to start defrosting must be reached **and simultaneously** the set minimum period must have elapsed since the last defrosting. Evaporator defrosting is stopped when the set temperature to stop defrosting is reached **or** the set maximum time length of the defrosting cycle has elapsed.

Setting the defrosting mode of the indoor unit evaporator

Press the **ENTER** key to enter the setting menu and use the **▼/▲** keys to select the **Defrost** menu. After opening this menu, select and set the **Mode** menu with the following options:

- | | | |
|-----------------|---|--|
| Off | - | Defrosting the indoor unit evaporator is not in use. |
| External | - | If the condition for defrosting the indoor unit evaporator is met, the compressor is stopped until the condition for termination of defrosting is met. Simultaneously, to accelerate the defrosting process, a relay with the Defrost function can activate an external device (the heating cable, fan etc.). |
| Reverse | - | If the condition for defrosting the indoor unit evaporator is met, the operating mode is switched from cooling to heating, the function of indoor and outdoor heat exchangers is swapped, and the indoor unit evaporator is defrosted. After the condition for termination of defrosting is met, the operating mode returns to its original state. |

You can use the **▼/▲** keys to select the desired indoor unit evaporator defrosting mode and confirm it with the **ENTER** key. Changing of the defrost mode is briefly confirmed by the message **Saved OK** and then the display returns one level back in the menu.

Setting the minimum defrosting period

Press the **ENTER** key to enter the setting menu and use the ▼/▲ keys to select the **Defrost** menu. After opening this menu, select the **Period** menu.

Defrost
Period

After opening this menu, the display shows:

Period
xx.x

The **xx.x** represents the set minimum defrosting period in hours. Use the ▼/▲ keys and the **ENTER** key to set the individual digits. **You can set 0.1-99.9 hours**; the default value is 1 hour. **Long press the ENTER key to save the set value**; the following message briefly appears:

Saved OK
yy.y

Then the display returns one level back in the menu.

Setting the maximum duration of defrosting

Press the **ENTER** key to enter the setting menu and use the ▼/▲ keys to select the **Defrost** menu. After opening this menu, select the **Length** menu.

Defrost
Length

After opening this menu, the display shows

Length
xx.x

The **xx.x** represents the set maximum duration of defrosting in minutes. Use the ▼/▲ keys and the **ENTER** key to set the individual digits. **You can set 1.0-99.9 minutes**; the default value is 10 minutes. **Long press the ENTER key to save the set value**; the following message briefly appears:

Saved OK
yy.y

Then the display returns one level back in the menu.

Setting the T1 temperature to start defrosting

Press the **ENTER** key to enter the setting menu and use the ▼/▲ keys to select the **Defrost** menu. After opening this menu, select the **Start** menu.

Defrost
Start

After opening this menu, the display shows:

Start
-xx.x

The set temperature to stop!!! defrosting is displayed. Use the ▼/▲ keys and the **ENTER** key to set the individual digits and sign. **You can set -20.0°C to +5.0°C**; the default value is -5.0°C. **Long press the ENTER key to save the set value**; the following message briefly appears:

Saved OK
-yy.y

Then the display returns one level back in the menu.

Setting the T1 temperature to stop defrosting

Press the **ENTER** key to enter the setting menu and use the ▼/▲ keys to select the **Defrost** menu. After opening this menu, select the **Stop** menu.

Defrost
Stop

After opening this menu, the display shows:

Stop
+xx.x

The set temperature to stop defrosting is displayed. Use the ▼/▲ keys and the **ENTER** key to set the individual digits. **You can set +3.0°C to +25.0°C**; the default value is +7.0°C. **Long press the ENTER key to save the set value**; the following message briefly appears:

Saved OK
yy.y

Then the display returns one level back in the menu.

Manual defrosting of the outdoor unit

This function is only available when the outdoor unit is running. When it is activated, a defrost command is sent to the outdoor unit. The defrosting is performed if the conditions for it are met. To switch the mode safely, the outdoor unit is stopped for about 3 minutes before defrosting.

Press the **ENTER** key to enter the setting menu and use the **▼/▲** keys to select the **Defrost** menu. After opening this menu, select the **ODU now**.

Defrost
ODU now

After confirmation with the **ENTER** key, a confirmation message briefly appears:

Saved OK
ODU now

and then the display will return to the main menu.

Settings
Defrost

4.9. Setting the Output Relays

The SCMI-01.5 module has three output relays with NO (normally-open) contacts, which can switch 230V/2A. Press the **ENTER** key to enter the setting menu and use the **▼/▲** keys to select the **Outputs** menu. After opening this menu, you can select the desired output:

- | | | |
|----------------|---|--|
| Relay 1 | - | Setting the output relay R1 of the control module. |
| Relay 2 | - | Setting the output relay R2 of the control module. |
| Relay 3 | - | Setting the output relay R3 of the control module. |

Then you can set the function and switching logic for the selected relay.

Relay function

This menu allows you to set the function of the selected relay.

Relay x
Function

Individual relays of the control module may have the following functions:

ON/OFF	- The relay is controlled by the digital input On/Off of the control module.
Compres.	- The relay is controlled identically with the outdoor unit compressor.
Defrost	- The relay is controlled identically with the defrosting of the indoor unit evaporator.
Error	- The relay is activated when an error state is detected.
Heat/Coo	- The relay is controlled by the current state of the system (Heat/Cool).
Limiting	- The relay is activated when the set limit of the compressor output is exceeded.
Oil <-	- The relay is activated when oil is returning to the outdoor unit.

No other parameters are set for the most of the relay functions, only for the relay with the **Limiting** function you need to set the following parameters after you select and confirm this function:

Min sp.	- Setting the compressor output limit (minimum speed) to deactivate the relay with the Limiting function.
Max sp.	- Setting the compressor output limit (maximum speed) to activate the relay with the Limiting function.
Delay	- Setting the period of time for which the Max sp. must be overcome.

Setting the compressor output limit to deactivate the relay – Min sp.

This parameter allows you to set the lower output limit of the outdoor unit compressor in % of its maximum output. If the relay with the **Limiting** function has been activated due to exceeding the **Max sp.**, and then the compressor output drops below the **Min sp.** for some time, the relay will be deactivated. You can set this value **from 0.0 to 99.0% by 1%**. When the compressor output drops below the set limit, the relay will be deactivated with about 30s delay.

Setting the compressor output limit to activate the relay – Max. sp.

This parameter allows you to set the upper output limit of the outdoor unit compressor in % of its maximum output. If the compressor output exceeds the **Max sp.** for **Delay** minutes, the relay with **Limiting** function will be activated. You can set this value **from 0.0 to 99.0% by 1%**.

Setting the duration of the condition for changing the relay state – Delay

This parameter allows you to set the period of time in minutes for which the compressor output must exceed the **Max sp.** to activate the relay with **Limiting** function. You can set the value **from 0.0 to 99.0% by 0.1 minute**.

Relay logic

This menu allows you to set the switching logic of the selected relay. Relay switching logic can be direct or inverse:

Direct	- The relay contact is closed if the relay function is activated (and vice versa).
Inverse	- The relay contact is opened if the relay function is activated (and vice versa). (This applies only when the module is turned on.)

4.10. Setting the Control Constants

This menu allows you to set the control constants of the SCMI-01.5 module. Press the **ENTER** key to enter the setting menu and use the **▼/▲** keys to select the **Reg.cons** menu. After opening this menu, you can select and set the control constants:

- | | |
|-----------------|--|
| Time con | - Setting the time constant of the module. |
| Prop.con | - Setting the proportional constant of the module. |
| Int.cons | - Setting the integral constant of the module. |
| Der.cons | - Setting the derivative constant of the module. |

Time constant

It determines the time period to perform the control and can be set **from 10 to 999** sec. The default value of the time constant is 30 seconds.

Proportional constant

It has a basic effect on the control process. The smaller proportional constant, the minor interventions of the controller in the period given by the time constant. The default value is 35 and can be set from **0 to 999**.

Integral constant

It allows to reach the minimum deviation of the regulation. Use caution when adjusting the integral constant. If this constant is too high, the controlled system may be unstable and prone to oscillation. The default value is 0 and can be set from **0 to 999**.

Derivative constant

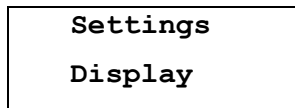
It determines, how the rate of the changes of the controlled variable effects the control process. At higher derivative constant, the system will be more responsive to the changes and will counteract these changes. The default value is 60 and can be set from **0 to 999**.

How to set the control constants

Characteristics of the controlled system must be considered when adjusting the control constants. According to the rate of change of the controlled variable, the time constant must be set first. The time constant should be generally at least twice the time it takes for a change of the desired value, set on the control module, to start to appear in the system output. It is not recommended to set the time constant value lower than about 30 seconds. The value of the proportional constant affects the control accuracy and also the influence of the derivative and integral constants on the controlled process. If you cannot achieve the desired value with the required minimum deviation, it is necessary to increase the proportional constant. It is also necessary to monitor the deviation between the desired and actual value and adjust the derivative constant according to this deviation. If the system responds too fast to the interventions of the controller and there is overshooting of the controlled variable, it is necessary to increase the derivative constant. If the system cannot reach the desired minimum deviation from the desired value for a long time, it is necessary to carefully increase the integral constant. Settings of the control constants for the given operation mode of control module may need to be adjusted and adapted to the new conditions if the mode is changed.

4.11. Settings the Display

This menu allows you to set the parameters of the display of the SMCI-01.5 control module. Press the **ENTER** key to enter the setting menu and use the **▼/▲** keys to select the **Display** menu.

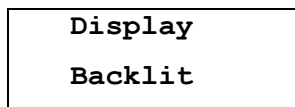


After opening this menu, you can set the following display parameters:

- | | | |
|-----------------|---|---|
| Backlit | - | Setting the brightness of the LCD backlight. |
| Contrast | - | Setting the contrast of the LCD. |
| IdleTime | - | Setting the time period to restore the default screen of the display if the operator is idle. |
| Language | - | Setting the language version. |

Setting the backlight and contrast of the LCD

Both settings are similar and you can change them without entering the password to log in. After opening the **Display** menu, the menu item for setting the backlight is displayed.



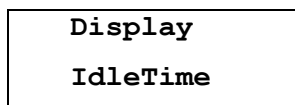
After opening this menu, the current backlight level is displayed using 1 to 16 bars:



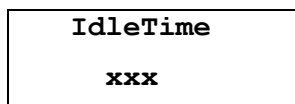
You can use the **▼/▲** keys to change the backlight level and then use the **ENTER** key to save the setting. In a similar way, you can set the **Contrast** of the LCD.

Setting the idle time

This menu allows you to set the time period after which the display returns to the default screen if the operator is not active. To set the time period of inactivity, open the **Display** menu and then open the **IdleTime** menu:



After opening this menu:



You can use the **▼/▲** and **ENTER** keys to set the timeout from **1 to 999** sec. and then long press the **ENTER** key to save the set value. Saving is briefly confirmed by the message **Save OK** and then the display returns one level back in the menu.

Setting the language version

Display Language <
--

After opening this menu:

Language Cesky <

The current language version is followed by the sign <. When changing the language version, for example to English, use the ▼/▲ keys to select the desired English version:

Language English

Press the **ENTER** key to confirm this option. The change of the language version is briefly confirmed by the message:

Saved OK English

Then the display returns one level back in the menu.

Display Language

Similarly, you can switch directly using the keyboard of the SMCI-01.5 module among the English, Czech, German, Polish, Croatian, Hungarian, French, and Spanish language versions of the program.

5. SETTING THE SCMI-01.5 MODULE USING THE COMPUTER

The module settings can also be made from a PC using the USBCommunicator software. The connector for the computer connection is located under the cover on the module front panel. The module does not need to be connected to the power supply when setting the parameters from the computer, as it is powered from the USB connector of the computer. After the module is connected to the computer running the USBCommunicator program, the module settings are read into the computer and displayed in the opened window. If necessary, the module settings can be read using the **Read** button located in the lower left corner of the USBCommunicator window. Changes made to the module settings can be transferred to the module using the **Write** button. Using the **RT data** button, the runtime data can be monitored similarly to using an external **Multifunctional Tester**.

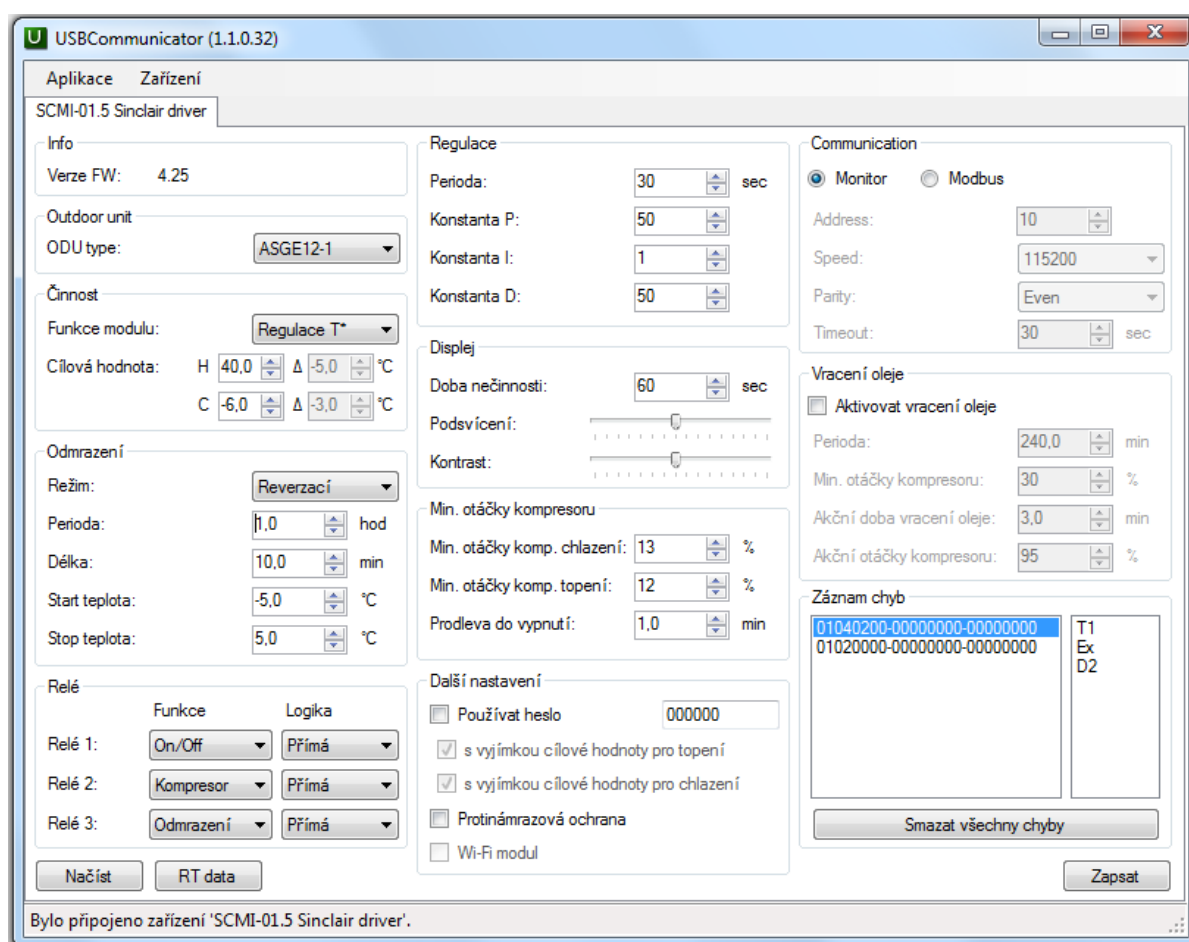


Fig. 10. Default settings of the SCMI-01.5 module

With the actual version of the program, the SCMI-01.5 module has a number of new functions, which can be activated or whose parameters can be set by using only the USBCommunicator program.

Setting the parameters of the P+T Control function

When selecting the **P+T Control** function, a sub-window is opened in which **Delta above the target value** in the range of 0 to 25.5°C, **compressor fixed time** from 0 to 25.5 minutes (for this time, the pressure control is suppressed after the start-up of the unit) and **compressor fixed speed** from 0 to 100% is to be set.

Setting the parameters of the TxU Control function

If the function **TxU Control** is selected, it is necessary to set the target temperatures for heating and cooling (**Goal C** and **Goal H**) in the same way as for the Tx Control function. Besides, the limit values for the target values correction (Del.heat and Del.cool) are also set here. The desired temperature is then calculated from the set target temperatures corrected by the set values **Del.cool** and **Del.heat** multiplied by a weighting coefficient determined by the value of analogue voltage 0-10V at the input of SCMI-01.5 module (voltage 0 to 10V corresponds to the weighting coefficient 0 to 100%).

Setting the parameters of the TxA Control function

For the correct function of the automatic switching between heating/cooling mode TxA, the target temperature for heating must be at least 3°C lower than the target temperature for cooling. If the temperature T2 is lower than the set target heating temperature, the unit will be switched to heating mode; if the temperature T2 is higher than the set target cooling temperature, the unit will be switched to cooling mode. It will not heat or cool between these limits, but an unfinished cycle may be completed.

Setting the minimum compressor speed

The SCMI-01.5 module will not control the compressor speed below the set minimum. Depending on the module function (mode) selected, the control is performed as follows:

In the controlled mode, the compressor speed is controlled by the voltage from 0 to 10V from the master system. If this system requires a lower speed, than the **minimum compressor speed** set while the control voltage is greater than 0.5V, the compressor speed will be equal to the set minimum speed. If the control voltage drops below 0.5V, the compressor is switched off.

In the other modes, the control aims to the target value, and if it is reached, the compressor speed starts to decrease. When the set **minimum compressor speed** is reached, the deceleration will stop and the compressor speed will remain at the set minimum value for the set **delay to switch off**. After this delay, the SCMI unit will give the command to switch off the compressor. The minimum compressor speed can be set from 0 to 100%, and the delay to switch off can be set from 0 to 25.5 minutes. The minimum compressor speed can be set separately for heating and cooling.

Activation of the oil return

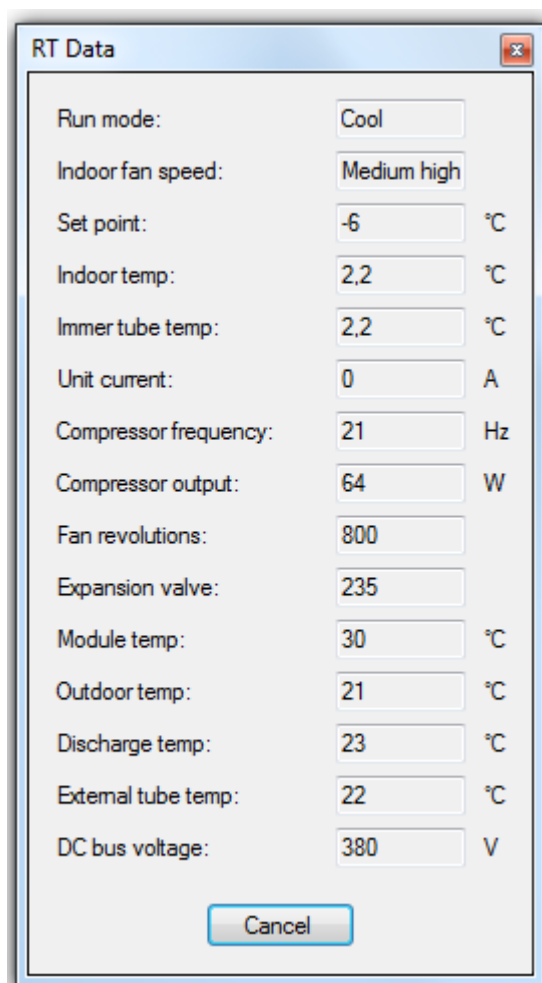
Activation of the oil return makes available the items to set the parameters for this process in the USBCommunicator window. These are **Period**, **Minimum compressor speed** for activation, **Oil return action time** and **Compressor action speed** for the oil return process. An oil return problem may occur when the compressor runs at the minimum speed for a long time. If the compressor runs below the minimum speed for the Period, the oil return is activated. In this case, the compressor speed is increased to the compressor preset (action) speed for the preset oil return (action) time. At the same time, the relay with the oil return function is activated.

Setting the communication

You can choose between monitoring the communication between the SCMI unit and the outdoor unit or controlling the outdoor unit using the Modbus protocol. When monitoring communication, a fixed communication rate of 19200Bd without parity is set.

Displaying the RT data

The **RT Data** button can be used to monitor the runtime data, similar to using an external **Multifunctional Tester**.



The screenshot shows a window titled "RT Data" with a list of runtime parameters and their current values. The parameters are listed on the left, and the values are displayed in input fields on the right. The units are indicated to the right of each value. A "Cancel" button is located at the bottom of the window.

Parameter	Value	Unit
Run mode:	Cool	
Indoor fan speed:	Medium high	
Set point:	-6	°C
Indoor temp:	2,2	°C
Immer tube temp:	2,2	°C
Unit current:	0	A
Compressor frequency:	21	Hz
Compressor output:	64	W
Fan revolutions:	800	
Expansion valve:	235	
Module temp:	30	°C
Outdoor temp:	21	°C
Discharge temp:	23	°C
External tube temp:	22	°C
DC bus voltage:	380	V

Fig. 11. Display of runtime data of the SCMI-01.5 module

For some outdoor units, the data of the compressor current consumption and output power are not available; in these cases, zeros are displayed in the corresponding positions of the table.

Error log

The left part shows the numerical error codes and the right part shows their interpretation displayed on the SCMI unit display. Their meaning is given in the documentation of the relevant Sinclair outdoor unit.

6. ERROR MESSAGES

6.1. Sensors and Communication Errors of the SCMI-01.5 Module

During its operation, the SCMI-01.5 module tests the connection of the T1 & T2 resistance thermometers, and in the autonomous pressure control mode, it also tests the connection of the pressure sensor to the input 4-20mA. It also tests the resistance of temperature sensors. If some limit values are detected, it sends a command to the outdoor unit to gradually stop the compressor and displays a corresponding error message, distinguishing between a short and open circuit of the temperature sensor. Errors are indicated in the following sequence. The possible error of the T1 thermometer will be displayed first, and the next error may be displayed only after fixing the previous error. Example: Open circuit of the T1 thermometer:

Error T1
Open

Only after fixing this error, the next error, such as a short circuit of the T2 thermometer, may appear:

Error T2
Short

If both thermometers are functioning properly, the short/open circuit of the pressure sensor connected to the current input 4-20mA may be indicated next. In addition, a low-pressure error on the suction side of the outdoor unit compressor may appear:

Error P
Too Low

Also in this case, the SCMI-01.5 module sends a command to stop the outdoor unit compressor; the operation will resume after the pressure exceeds the minimum allowed value. If the communication between the active SCMI-01.5 module and the outdoor unit is interrupted, the unit remains in the set operation.

In addition to the above errors, the unit automatically checks each parameter setting whether the set values are within the allowed range. When attempting to write a lower than the permitted value, the error message **Err.min** appears on the first line of the display and the minimum permitted value of the set parameter is displayed on the second line. Similarly, when attempting to write higher than the permitted value, the error message **Err.max** appears on the first line of the display and the maximum permitted value of the set parameter is displayed on the second line.

6.2. Checking the Errors Recorded in SCMI-01.5 Module

To display the errors of the connected system, you need to press the ENTER and ESC keys simultaneously and up to three errors stored in the module memory can be displayed together.

Err -1
T1 Ex D2

You can use the ENTER key to scroll the displayed errors to the left and check any additional errors within the given time interval. For example, if there are four errors, after the first press of the ENTER key, the display shows:

Err -1
Ex D2 H4

After a longer press:

Err -1
D2 H4

The empty position on the right means that all recorded errors of the given time interval have already been displayed.

Using the ▼ key, the older error groups can be displayed one by one; to display more errors in the group, you need to use the ENTER key again.

Err -2
T2 e7

Older error groups are displayed until no more are recorded.

Err -3
No errors

Press the **ESC** key to exit the error log viewing.

In the documentation for the relevant Sinclair outdoor unit, the error codes are listed together with their interpretation of each error status.

6.3. Deleting the Error Logs in the SCMI-01.5 Module

In the error viewing mode, you can delete the error records in the SCMI-01.5 module by simultaneously pressing ▼ and ENTER keys. After you press these keys, the display will show:

Delete errors ?

Press the ESC key to cancel this function, or press the ENTER key to clear the error logs. If errors were stored in memory, confirmation with the ENTER key clears all errors and the module will display a confirmation message:

Saved OK NoErrors

If no errors were stored in memory, after confirming with the ENTER key, the module will return to the state before displaying the errors.

7. SPECIFICATIONS

Supply voltage range:	230V/50Hz $\pm 10\%$
Maximum input power:	15VA
Net dimensions (W x D x H):	70 x 58 x 90 mm
Net weight:	210 g
Operating temperature:	0°C to +60°C
Storage temperature:	-25°C to +70°C
Inputs:	2 x digital input with 3.3V TTL level 2 x input for temperature sensors Carel NTC015WF00, 10k Ω β = 3435 1 x voltage input 0-10V with input resistance of 100k Ω 1 x current input 4-20mA for pressure sensor 0-18bar Alco Controls PT5-18M
Outputs:	3 x relay with NO (normally open) contact 230V/2A
Communication:	C-LINE high-voltage serial communication for controlling the outdoor unit RS485 serial communication for connecting Modbus or for monitoring the SCMI module using an external computer
Service connector:	USB, Mini-B connector

8. PACKAGE CONTENTS

SCMI-01.5 communication module	1pc
Temperature sensor	2pc
Instruction manual (CD)	1pc

9. OVERVIEW OF THE SCMI1.5 UNIT SETTINGS

Menu	Submenu/Option			Range	Default	Note:	
Goal C	Setting the desired temperature in the cooling mode			-10 to +55	+10,0°C	p. 8	
Del.cool	Limit of temperature change by voltage of 0-10V; only in TxU mode.			-20 to +20	+10,0°C	p. 9	
Goal H	Setting the desired temperature in the heating mode			-10 to +55	+25,0°C		
Del.heat	Limit of temperature change by voltage of 0-10V; only in TxU mode.			-20 to +20	+10,0°C	p. 10	
Function	Reg.U	Slave unit mode; the module is controlled by an external voltage of 0-10V.			Reg. T*	p. 11	
	Reg.M	Autonomous pressure (evaporation temperature) control mode				p. 12	
	Reg. T*	Autonomous temperature control mode for cooling				p. 13	
	Reg. T+	Autonomous temperature control mode for heating					
	Reg. Tx	Mode for manual switching heating/cooling				p. 14	
	Reg. PT	Autonomous pressure control mode affected by T2 temperature				p. 15	
	Reg. TxU	Mode for switched heating/cooling and with temperature correction by using a voltage of 0-10V.				p. 16	
	Reg. TxA	Mode for automatic switching heating/cooling				p. 17	
Defrost	Mode	Off	Defrosting the indoor unit evaporator is not in use		Off	p. 18	
		External	Defrosting with an external support (heating cable etc.)				
		Reverse	Defrosting by switching from cooling to heating mode.				
	Period	Setting the minimum time period between defrosting cycles	0.1 to 99.9	1 hour	p. 19		
	Length	Setting the maximum duration of defrosting	1.0 – 99.9	10 min			
	Start	Setting the temperature to start defrosting	-20 to +5.0	-5,0°C		p. 20	
	Stop	Setting the temperature to stop defrosting	+3 to +25.0	+7,0°C			
	ODU now	Displayed only when the outdoor unit is running; it will defrost the ODU				p. 21	
	Outputs	Relay 1	Function	ON/OFF	The relay is controlled by On/Off input.		On/Off
Compres.				The relay is controlled according to the compressor			
Defrost				Relay is controlled according to the operation (Heat/Cool)			
Error				The relay is controlled according to the error state			
Heat/Coo				The relay is controlled according to the operation (Heat/Cool)			
Limiting				Min sp.	The relay to limit the long lasting compressor load.		
				Max sp.			
				Delay			
Oil <-			The relay is activated when oil returns				
Logic		Direct	The relay switches with direct logic		Direct		
		Inverse	The relay switches with inverse logic				
Relay 2		Function	This setting is the same as setting the Relay 1			Compres	
		Logic	This setting is the same as setting the Relay 1			Direct	
Relay 3		Function	This setting is the same as setting the Relay 1			Error	
		Logic	This setting is the same as setting the Relay 1			Direct	
Reg.cons	Time con	Setting the time constant of the module.	10 to 999	30sec.	p. 23		
	Prop.con	Setting the proportional constant of the module.	0 to 999	35			
	Int.cons	Setting the integral constant of the module.	0 to 999	0			
	Der.cons	Setting the derivative constant of the module.	0 to 999	60			
Display	Backlit	Setting the LCD backlight.	1 to 16	8	p. 24		
	Contrast	Setting the LCD contrast.	1 to 16	8			
	IdleTime	Setting the time period of the operator inactivity	10 to 999	60			
	Language	Setting the language version	see p. 23	EN	p. 25		
Password	Enter the password before setting the module. After logging in, you can perform settings for about 30 minutes. Without knowing the password, you can only adjust the contrast and backlight brightness of the display.				Used, 201201	p. 7	

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NOTE CONCERNING PROTECTION OF ENVIRONMENT



This product must not be disposed of via normal household waste after its service life, but must be taken to a collection station for the recycling of electrical and electronic devices. The symbol on the product, the operating instructions or the packaging indicate such disposal procedures. The materials are recyclable in accordance with their respective symbols. By means of re-use, material recycling or any other form of recycling old appliances you are making an important contribution to the protection of our environment. Please ask your local council where your nearest disposal station is located.

In case of quality problem or other please contact your local supplier or authorized service center.

Emergency number: 112

PRODUCER

SINCLAIR CORPORATION Ltd.
16 Great Queen Street
WC2B 5AH London
United Kingdom
www.sinclair-world.com

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REPRESENTATIVE

SINCLAIR Global Group s.r.o.
Purkynova 45
612 00 Brno
Czech Republic

TECHNICAL SUPPORT

SINCLAIR Global Group s.r.o.
Purkynova 45
612 00 Brno
Czech Republic
Tel.: +420 800 100 285 | Fax: +420 541 590 124
www.sinclair-solutions.com | info@sinclair-solutions.com



A background image of a roller coaster track with a blue and white train, overlaid with a white grid pattern. The roller coaster track is a light blue color, and the train is a darker blue with white accents. The background is a light blue and white gradient. The white grid pattern is a simple, clean design that covers the entire page.

[illegible]

