domat
control system

UC250

Communicative heating and cooling controller, Ethernet

Summary

UC250 is a communicative room controller with two PWM outputs for control of heating (radiator or electrical heater) and cooling (cooling panel). It can work autonomously, or in connection to a primary controller (MiniPLC or SoftPLC) or a building management system (RcWare Vision or any SCADA).

Application

- **Systems with radiators or electric heaters and cooling panels or chilled ceilings, or split cooling units – control and measuring of room temperature**
- **monitoring and communication of room temperatures**

Function

The controller reads actual room temperature, setpoint shift by a knob, and set operation status which is set by short push of the knob. The room temperature is measured in the range of -20 to +50 °C. Measured and set values are processed in a PI algorithm, at the output of which there are PWM controlled triacs which control heating and cooling valves. All values are displayed on a large LCD display.

The output works either as PWM controlled by a PI controller, or on/off (thermostat). The PI – on/off behaviour is set for both outputs together: it is not possible to configure one output as PI and the other as on/off. All control parameters, i.e. P and I constants, and hysteresis for the on/off mode (in the P parameter field), can be set with **ModComTool**, the configuration software, which is free to download at **http://domat-int.com/en/downloads/software**.
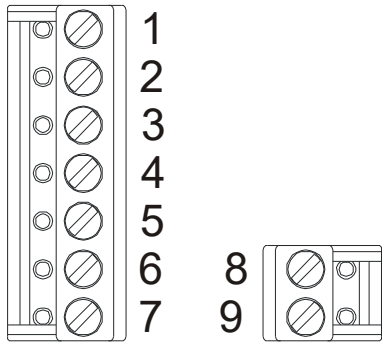
The controller contains real time clock with a weekly scheduler (6 events per day). It changes between three operation modes: Day, Night, and Off. A short push in the Night mode switches to Party mode – Comfort extension by 2 hours, if enabled.

All values can be communicated over an Ethernet interface with Modbus TCP. Basic setup is performed over a web interface.

The Change-over function (communicated over the bus) switches to the cooling mode while cooling setpoints come into effect. This mode is used when heat pumps with change-over mode are installed. The change-over signal is read from the heat pump interface or a thermostat at the supply water piping, and is transmitted to the controllers over the Modbus master. See *Room units and controllers, Communication protocol description handbook for register addressing and communication examples.*

Technical data

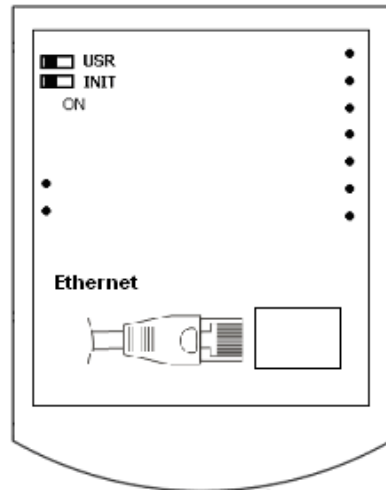|	
Power supply	10...35 V DC, 24 V AC +/- 10%
Consumption	2 W
Temperature measuring range	-20 ÷ 70 °C, +/- 1,5 K (with software correction)
Protection	IP20
Inputs	internal – temperature measuring, setpoint knob
	2x binary input for a dry contact, 24 V AC, max. 5 mA
Outputs	2x solid state relay 24 V AC, 400 mA
Communication	Ethernet 10 Mbit/s - Modbus TCP, web
Terminals	screw terminals for wires 0,14 – 1,5 mm^2
Cover	ABS, RAL9010, other colours
Display	LCD 60 x 60 mm
Weight	0,16 kg
Dimensions	see below

Terminals

As seen when removing the display part.

The wiring goes towards the center of the unit so that the cable can be brought through the aperture in the middle of the bottom part.

UC250 (two binary inputs, two SSR binary outputs)

1: DO1   digital output 1 - heating
2: COM1 digital output 1 - heating
3: DI1   digital input 1 - presence
4: DI2   digital input 2 – window
5: G0   power – common point
6: G0   power – common point
7: G   power (+)

8: DO2   digital output 2 - cooling
9: COM2 digital output 2 - cooling

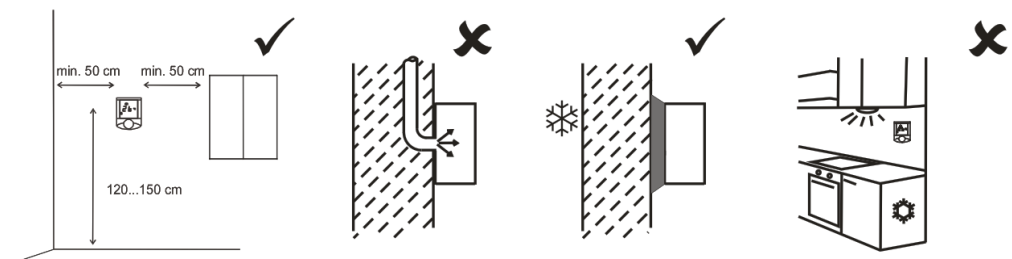**DIP switches**

Back of the PCB

USR: in the ON position, the web access is blocked to increase security

INIT: to set default IP values (IP address 192.168.1.99, mask 255.255.255.0, default gateway 192.168.1.1) set the INIT switch to ON and apply power. After new values have been set and saved over the web interface, set the INIT switch back to OFF, so that the new data is not overwritten by the default values at the next reboot, and switch the power off and on.

Installation

Units are intended for operating in a normal and chemically non-aggressive environment. They do not need any servicing or maintenance. Install them in a vertical position at places where they can be operated easily and measure correct values of temperature, i.e. in the height of about 150 cm, with no direct sunlight or other heat / cool source (AHU outlets, refridgerator, electrical appliances). The device consists of two parts: bottom with screw terminal block and cover containing PCB, display, and the knob. The bottom part is fixed by 2 or 4 screws to any flat surface or a flush-mounting box Ø 50 mm. At the back of the bottom there is an aperture for cabling. The bottom should be installed and cabling connected first, and the upper part inserted after the construction works have been finished to prevent damage to the unit.

Seal the conduits to avoid influencing the sensor by draught. Use insulating pad when installing the sensor on cold walls. Avoid sensor exposition to sunlight or other heat sources.

Opening the cover

When removing the display part, proceed as follows:

- press gently the side parts of the unit and pull the right of the display part by several milimeters
- pull the left of the display part
- pull the display part and remove it from the bottom.

Do not bend the display part too much, the connector pins could be damaged. The locks are only at the sides of the display part, not at the top nor bottom.

When removing the Ethernet cable, use a small flat screwdriver or similar tool to bend the Ethernet connector lock and unplug the cable at the same time.

Network settings

The IP address and other network parameters are set over a web interface. The INIT switch in the ON position sets the default IP parameters:

IP address   192.168.1.99
Network mask   255.255.255.0
Default gateway 192.168.1.1

All the parameters, input and output properties etc. are stored in the EEPROM memory. The unit communicates with the master (SCADA, PLC) over Ethernet 10 Mbit/s using Modbus TCP and it can be used in a range of systems. The register description is available in a separate document *Room units UI... – Communication description. User manual for ModComTool and detailed description of the room unit functions find in the document Room units configuration – User manual.*
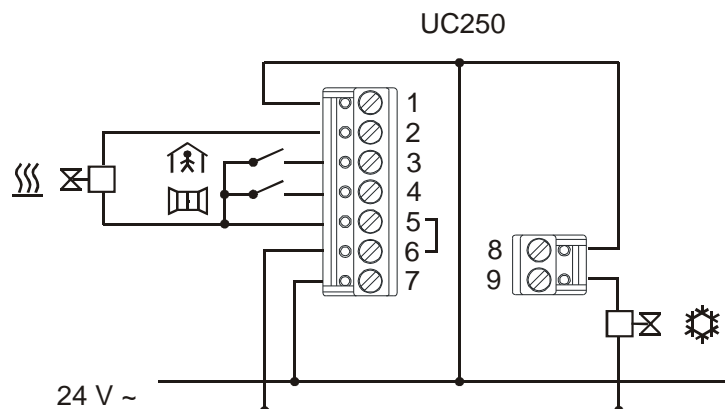
Display

A large (60 x 60 mm) display clearly shows actual room temperature and controller status with 7-segment digits and standard Day, Night, Off, and Time scheduler symbols. Active output is indicated by a heating symbol. In the upper part, there are week days used for time scheduler setup. Other symbols are not used.
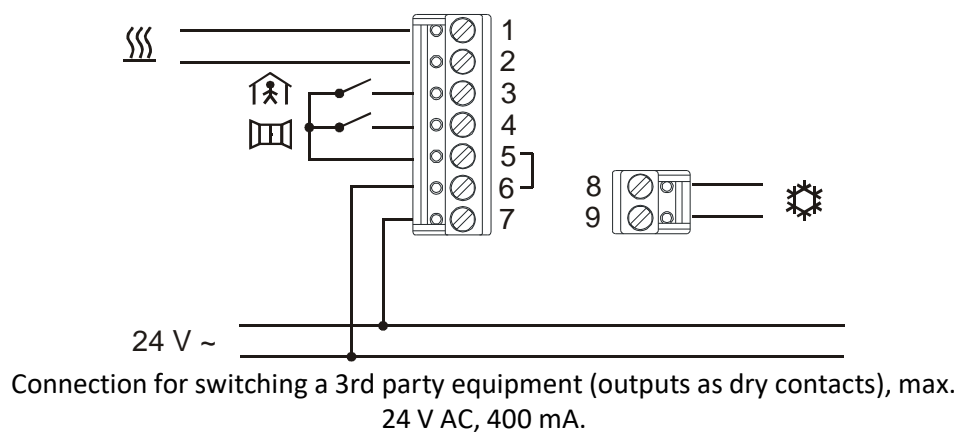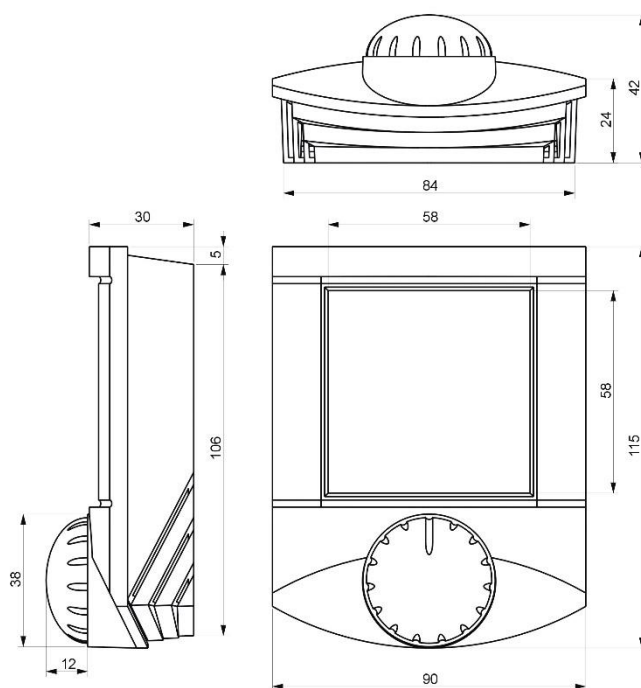

LCD symbol set

Connection

UC250

Connection for thermic valves powered by 24 V AC.

UC250

Connection for switching a 3rd party equipment (outputs as dry contacts), max. 24 V AC, 400 mA.

Dimensions

All dimensions in *mm*.

RoHS notice   The device contains a non-rechargeable battery which backups the real-time clock and part of the memory. After the device is not operable, please return it to the manufacturer or dispose of it in compliance with local regulations.

Changes in versions	09/2016 — Changed reference to the configuration software and deleted Modbus TCP communication. 03/2017 — Added picture and description of the installation and link on the datasheet with other colours. 05/2018 – Change technical data.