![domat control system logo]

UI0xxBL

Communicative room units and sensors with backlight display

Summary

The UI...BL room unit range is a family of universal communicative human-machine interface for control of HVAC units and plants, and IRC controllers. The units communicate over Modbus RTU / RS485 and they can be used as open system components with majority of building control system and controllers. Compared to the old series UI09x, these types dispose of knob and display blue backlight function and more accurate sensors.

Application

- ▪ **ripening and cooling boxes, datacenters, controlled climate storage rooms, alarm messaging systems etc.**
- ▪ **systems with fancoils, convectors, floor and radiator heating, AHUs, air conditioning units.**
- ▪ **control of boilers, DHW, heating circuits, building controls in general**
- ▪ **monitoring of room temperature and humidity**
- ▪ **with a SCADA system: temperature, humidity and status recording, remote control.**

Function

The units acquire temperature and optionally relative humidity in room, temperature correction (knob) and required operation status which is set by push of the button or in menu. In the configurable menu following values can be set and displayed:

- - temperature, actual temperature correction
- - humidity (actual value only at room units containing the humidity sensor)
- - time (only display at room units with RTC)
- - basic setpoint - day
- - basic setpoint - night
- - outside temperature for heating enable
- - DHW temperature
- - heating curve type (1...4)
- - operation mode (Residential with Day, Night, Time schedule, Off, or Hotel / Office with Comfort, Standby, Party, Off)

- fan stage (Auto, Off, St.1, St. 2, St. 3)
- A/C mode (Auto, Heating, Cooling, Off, Fan only)
- weekly scheduler: 7 days, up to 6 events per day
- another 5 variables (air quality, fan speed etc.) – each has a profile where max. and min. values, step, number of decimals, and symbol set are defined.

It is also possible to set / reset any of the LCD symbols on the display over Modbus.

The turn / push knob has three basic functions:
- instant edit (turning the knob) – settings of one predefined analogue value, usually room temperature correction
- quick edit (short push) – change of predefined state, e.g. Presence (Comfort / Standby / Off), Air condition (Auto / Heating / Cooling / Fan only / Off) etc.
- long push – jump to menu where values are listed by turning the knob, short push selects the value to be edited, and the value is changed by turning the knob followed by short push for confirmation.

After definable inactivity time, the display goes back to its basic state with rolling display of selected values (e.g. actual temperature and humidity).

Backlight function

Types UI0xxBL dispose of knob and display blue backlight function. It is possible to set brightness 0-100 % separately for knob and display. If user make some action with knob, display and knob shine for defined time. All of the functions could be set from Modbus master.

The unit Modbus address and functionality is defined over the RS485 interface with service software **ModComTool** which is free for download at **http://domat-int.com/en/downloads/software** To interface the room unit to the computer use the USB/485 converter **M080**, RS232/RS485 converter **R012**, or any suitable RS485 converter.

Technical data	
Power supply	24 V AC +/- 20%, 1 W
Temperature measuring range	-20 ... 70 °C (accuracy ±1 °C)
Humidity measuring range	digital sensor 10 ÷ 90 %rH accuracy ±3%
Protection	IP20
Inputs (specific types only, see table below)	2x potential-free contact (dry contact) against G0, 24 V AC, 5 mA
Outputs (specific types only, see table below)	1x - 2x solid state relay, zero switching, for AC load 24 V AC, max. 0.4 A, AC1, general usage, non-inductive load according to EN 60947-4-1, galvanic isolation 1.5 kV
Setpoint	according to configuration, +/- 10 to +/- 1 K
Communication	RS485 - Modbus RTU, slave
	selectable speed 1200 ... 115200 bps, parity and bits are set in service SW
	default 9600/N/8/1
	The interface is optically separated 1 kV (except for UI010 and UI010BL).
Display	LCD 60 x 60 mm, symbol set see above
Terminals	recommended wire cross-section 0,14 – 1,5 mm^2
Cover	ABS, RAL9010, other colours
Weight	0,13 kg
Dimensions	90 x 115 x 30 mm, see below
Ambient conditions	According to DIN EN 60721-3-3. Climate class 3K5 (-5 to +45 ° C, 5% to 95% RH non-condensing humidity)
Storage conditions	According to DIN EN 60721-3-1 Climatic class 1K3 (-5 to +45 ° C, 5% to 95% non-condensing relative humidity).
Standards conformity	EMC ed.3 EN 61000-6-2: 2005, EN 55022 ed.3: 2010 (industrial environment) Electrical safety EN 60950-1 ed.2: 2006 + A11: 2009 + A12: 2011 + A1: 2010 + A2: 2014 + Opr.1: 2012 Restriction of hazardous substances EN 50581: 2012
EU legislation	Council Directive 2014/35/EC, The Low Voltage Directive (LVD)
	Council Directive 2014/30/EC, Electromagnetic Compatibility (EMC) Directive
	Council Directive 2011/65/EC, RoHS2 Directive

Terminals
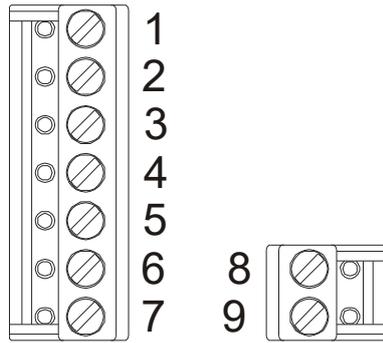
As seen when removing the display part.

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.

UI010BL, UI0x1BL (no hardware inputs / outputs)

1: NC   not connected
2: NC   not connected
3: K-   communication RS485 -
4: K+   communication RS485 +
5: G0   power – common point
6: G0   power – common point
7: G   power

8: --   connector not installed
9: --   connector not installed

UI0x2BL (2 binary inputs, one binary SSR output)

1: DI1   input1
2: DI2   input2
3: DO1   output 1, 24 V AC against G0
4: NC   not connected
5: G0   power, output – common point
6: G0   power, output – common point
7: G   power

8: K-   communication RS485 -
9: K+   communication RS485 +

UI020BL, UI0x5BL (2 binary inputs, 2 binary SSR outputs)

1: DI1   input 1
2: DI2   input 2
3: DO1   output 1, 24 V AC against G0
4: DO2   output 2, 24 V AC against G0
5: G0   power, outputs, inputs – common point
6: G0   power, outputs, inputs – common point
7: G   power

8: K-   communication RS485 -
9: K+   communication RS485 +

Type table	Type	LCD	Knob	DI	DO	t	rH	RTC	Type
	UI010BL	✓	✓	✓	-	-	✓	✓	
	UI011BL	✓	✓	✓	-	-	✓	✓	5
	UI012BL	✓	✓	✓	2	1	✓	✓	✓
	UI020BL	✓	✓	✓	2	2	✓	✓	✓
	UI051BL	✓	✓		-	-	✓	✓	
	UI052BL	✓	✓		2	1	✓	✓	✓
	UI055BL	✓	✓		2	2	✓	✓	✓

Units with no knobs are used as indicators, optionally with remote controlled inputs / outputs. Process control algorithms (activating of the outputs by increased / decreased temperature, humidity etc.) must be implemented in a master controller.

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 and humidity, 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.

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.

**Dimensions**
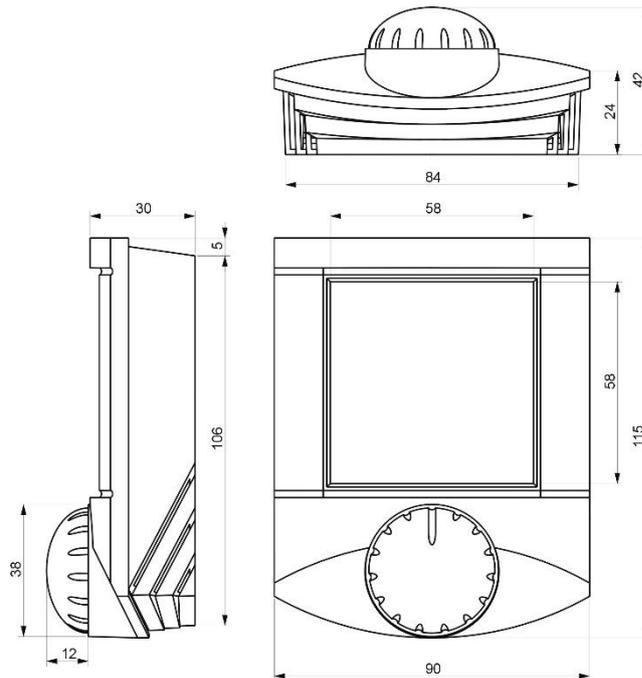
All dimensions in *mm*.

Display

Over Modbus, it is possible to set / reset the complete symbol set except for the 7 segment digits, „Error" and „Setting" texts, and symbols of °C, °F, %, and rH. Those are part of the configurable menu profiles. The register description is available in a separate document *Room units UI... – Communication description.*

LCD symbol set (see in the picture).

DIP switches
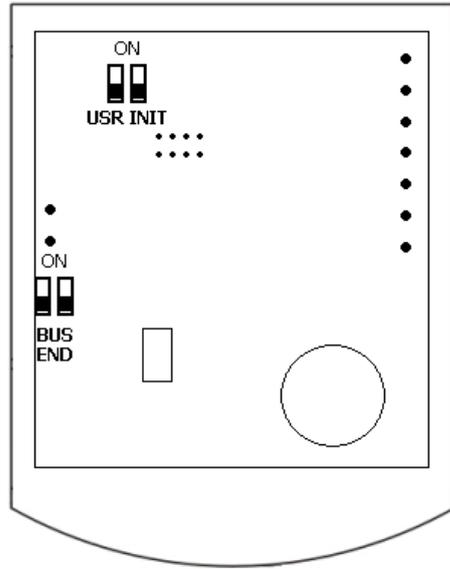
Back of the PCB

BUS END: if ON, the bus is terminated (if last device on the line)

USR: not used, reserved for future applications

INIT: sets the controller into default state and sets bus address to 1, baud rate to 9600. To init, proceed as follows:
- connect the device over RS485 to a PC with the **ModComTool** config tool
- set INIT to ON
- apply power (use only the connector without bottom)
- find the controller in the tool (Scan)
- set INIT to OFF
- in the ModComTool, open the controller window
- click the Init button in the tool
- remove and apply power

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 version   01/2017 — The first datasheet version.