e-Room ECO 4I/4O Modbus

Fan-coil EC controller with Modbus RTU communication

Ordering number: RC.674421-000

EN

Instruction sheet

e-Room® ECO 4I/4O Modbus is a fan-coil EC controller with a 0-10V output for fan speed analog control that provides an optimal degree of comfort in the temperature setting in an area or room, thanks to a proportional-integral (PI) control made by the device over the fan-coil speed, automatically adjusting the speed to the exact level to meet the demand for cool or heat.

The device includes some digital and analog inputs that allow to do an energy management of the room or area, thanks to the different predefined functions of the device that allow controlling the occupancy status through a keycard contact in hotel rooms or motion sensors in combination with other elements, which guarantee at any time an energy saving when the room or zone becomes unoccupied. The device has also energy saving functions by opening the window, an analog input for an external temperature sensor and an input for a changeover heat/cool mode.

Through the standard Modbus RTU communication bus it is possible to manage a complete remote management of the device with a BMS system for global building management.

General features

- 0-10V analog control of the fan speed.
- Accurate speed setting with proportional integral (PI) control.
- Six different configuratons depending on the installation type.
- Two self-configurable dry contact inputs: Keycard contact/ motion detector, window contact.
- Two self-configurable analog inputs: Water temperature sensor/ Door contact, ambient temperature external sensor.
- 0-10V analog output for fan-coil speed control.
- On/Off relay output valve control in 2 and 4 pipes installations.
- Auxiliary relay output for lighting control.
- Modbus RTU communication protocol with RS-485 interface for remote management.
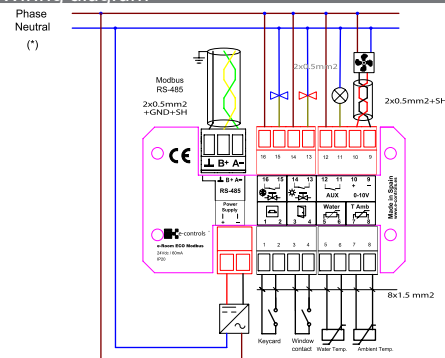- Large display of 64x26 mm with white Led backlight.

- Front panel built in pushbuttons: +Tª / -Tª / Fan-Coil speed / On-Off.
- Front panel built in temperature sensor.
- Selectable temperature units ºC / ºF.
- ECO mode when zone becomes unoccupied (Off / ECO set-point).
- Real setpoint and user setpoint configurable for heat and cool.
- Automatic switch-on for extreme temperatures (over temp. or frost risk)
- Keep fan-coil speed al low level with no demand.
- Configurable setpoint heat/cool temperature on Stand-by mode.
- Configurable heat/cool dead band.
- Time to change into stand-by (ECO) mode when room changes into unoccupied state.

Device configuration for different types of installation

The following table sumarizes the functions performed for each input and output of the device according to the operating mode selected.

NOTE: Read the "Configuration manual" to see the configuration parameters of the device and the mechanism to change the values defined.

Type of Installation	Number of Pipes	Inputs terminals			
		1 - 2	3-4	5 - 6	7 - 8
Option 1	2	Keycard contact	Window contact	Lighting Pushbutton	Tª Ext.
Option 2	2	Keycard contact	Window contact	Tª Water	Tª Ext.
Option 3	4	Keycard contact	Window contact	Tª Water	Tª Ext.
Option 4	2	Motion Sensor	Window contact	Door Contact	Lighting Pushbutton
Option 5	2	Motion Sensor	Window contact	Door Contact	Tª Ext.
Option 6	4	Motion Sensor	Window contact	Door Contact	Tª Ext.

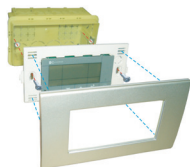| Type of Installation	Number of Pipes	Outputs terminals			
		9 - 10	11-12	13 - 14	15 - 16
Option 1	2	0-10V Output	Lighting	x	EV HEAT/COOL
Option 2	2	0-10V Output	Lighting	x	EV HEAT/COOL
Option 3	4	0-10V Output	Lighting	EV HEAT	EV COOL
Option 4	2	0-10V Output	Lighting	x	EV HEAT/COOL
Option 5	2	0-10V Output	Lighting	x	EV HEAT/COOL
Option 6	4	0-10V Output	Lighting	EV HEAT	EV COOL

Product installation

This device should not be installed on shelves, behind curtains, above or near heat sources, or exposed to direct sunlight. For fast and accurate ambient temperature measurement, the controller should be installed such that air may circulate vertically. Installation height should be approximately 1.5 m from the floor.

Caution:

- Prior to installing or removing the device, ensure that there is no mains voltage present in the wiring to be connected or near the unit.
- Do not cut or roll up the wires to be connected to the device.
- Do not work on the wiring with wet hands.
- Do not open or drill through the device.
- Keep the device and the supply wires away from moisture and dust.
- Use a damp cloth to clean the device.

Installation steps:

1º Install the flush mount back box on the wall

2º Connect all wires to the appropriate device terminals ensuring that there isn't any voltage on it, following the wiring diagram.

3º Insert and screw the device in the box

4º Fit the frame onto the device

5º Remove the front panel anti-scratch protective foil

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Wiring diagram

(*) Herein is defined a functional diagram. It shall be the responsibility of installer to protect properly the installation in accordance with applicable regulations of each country.

Remote device management through Modbus port

The device is including a Modbus RS-485 communication port through which is possible to communicate with the device using the Modbus RTU protocol. The device is an slave device in a network and has different parameters to configure the bus. For mor information about the input/output registers, read the document "RC.674421-000 - e-Room ECO Modbus - Modbus Registers V1.1.0 – DMCEN".

Technical features

Supply power

Operating voltage . . . . 24Vdc ± 20%

Maximum rated current. . . . . 60 mA

Comunication

Interface RS-485

Terminals . . . . .A-, B+, GND

Protocol . . . . Modbus RTU

Transmission speed configurable. . . . . .1200...115200 Baud

Modbus Configuration 8E1, 8O1, 8N1, 8N2

Digital Inputs (Keycard, Window, Detector)

Open circuit voltage . . . . 11,4 Vdc ±0,2 V

Short circuit current . . . . 3,4 mA

Close circuit input impedance. . . . . <230 KΩ

Open circuit Input impedance . . . . >440 KΩ

Analog Inputs (Water, External sensor)

Type . . . . Resistive

Characteristics. . . . . NTC interchangeable, 1% 10 KΩ a 25ºC (77ºF)

Temperature measuring range . . . . +5ºC a +45ºC (+41ºF a 113ºF)

Resolution 0,5ºC

Analog 0-10V Output (Fan-Coil EC)

Output voltage range . . . . .0 to 10 V

Maximum current . . . . 20 mA

Protected agains overvoltages and overcurrent (short circuit)

Digital Outputs (Valve actuators/Lighting)

Contact type. . . . . Potential free relay Normally Open

Maximum operating voltage . . . . 250 Vca

Maximum current . . . . 5 A, resistive load 3 A, inductive load

Built-in temperature sensor

Temperature measuring range . . . . +5ºC a +45ºC (+41ºF a 113ºF)

Resolution 0,5ºC

LCD Display

Type . . . . .Black backlight liquid crystal

Dimensions visible area 64x26mm

Backlight type . . . . .White LED

LED front panel indicator

Climate activated. . . . . Led switch off

Climate standby . . . . Green Led switch on

Reset device . . . . Red Led switch on

Front panel pushbuttons

+T / -T / Fan-Coil Speed / ON-OFF

Temperature

Operating . . . . 0ºC a +50ºC (32ºF a 104ºF)

Storage . . . . -20ºC a +85ºC (-4ºF a +185ºF)

Humidity (non condensing)

Operating . . . . 10% a 90% RH a 50ºC

Storage . . . . 95% RH a 50ºC

Installation

Type installation . . . . Flush mounting

Flush mount back box . . . . Bticino 504E

Recommended installation height . . . . 1,5mts from floor

Mechanical features

Dimensions (with frame) . . . . 142x86x42 mm

Weight . . . . 200 g

Plug-in connectors. . . . . Yes

Cross sectional area conductor . . . . 0,5 mm2 a 2,5 mm2

Protection index . . . . IP20 (EN 60529:1991)

Electrical safety . . . . Class III

Conformidad CE

Low Voltage Directive (LVD) 2006/95/EC

Electromagnetic Compatibility Directive 2004/108/EC

Standards

Product standard . . . . EN 60730-1:2011 EN 50491-3:2009

Electrical safety . . . . EN 60730-1:2011 EN 50491-3:2009 EN 50491-4-1:2012

Electromagnetic compatibility . . . . EN 60730-1:2011 EN 50491-5-1:2010 EN 50491-5-2:2010

Ordering numbers

e-Room ECO 4I/4O Modbus, Fan-coil EC controller with 0-10V analog output, white finished RC.674421-001

e-Room ECO 4I/4O Modbus, Fan-coil EC controller with 0-10V analog output, black finished RC.674421-000

Accessories (not included with the product)

Plastic frame, white color LNA4804A

Plastic frame, anthracite color LNA4804AR

Flush mounting enclosure for brick wall. 504E

Flush mounting enclosure for panel wall PB504N

Contact sensor for doors and windows, finished in white plastic . . . . CVP-NC

e-Detector Noiseless, Ceiling flush mounting motion sensor, with optocoupler output DP.801110-010

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