

# JOY SR HC AO2DO RS485 Modbus

Room Regulator (from Version 4.x)

**thermokon**<sup>®</sup>  
HOME OF SENSOR TECHNOLOGY

## Datasheet

Subject to technical alteration  
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## » APPLICATION

The 230 V supplied type AO2DO controls the 24 V heating and cooling valve as a 2-point or thermal 24 V actuator via PWM. The analog output is also used to control a 6-way valve. Two configurable inputs can be used as sensor input, room occupancy or energy lock. In addition to wired valve drives and sensors, sensors and actuators can also be controlled by radio. In addition, as an alternative to wired sensors, an external radio temperature sensor, radio motion detector, a radio temperature sensor for changeover function and radio window contacts/handles can be learnt in. The override by radio is possible by means of higher-level controller profile and cable-bound via Modbus. Radio and wired sensors and actuators are processed identically and can be used in any combination. This guarantees individual and energy-efficient room air conditioning. The device (front of glass in white or black) has a monochrome display and touch-sensitive control buttons. It has a timer with three time channels of four time periods each. Mounting is designed for a flush-mounted box. For hotel applications, the device offers the option of an additional zone (bathroom heating) in conjunction with room temperature sensor and radio actuator SAB.

This product is intended for use as part of an automation solution for (functional) buildings. It transmits sensor data within a building over short distances unencrypted by radio to suitable receivers. No personal data or location data is transmitted.

The product cannot communicate directly with the Internet and is not intended for applications that use the Internet to forward unprocessed sensor data. Automation stations that forward data via the Internet, e.g. to visualise the building status, must ensure that the data to be forwarded is encrypted as required by law.

## » SECURITY ADVICE – CAUTION

The installation and assembly of electrical equipment should only be performed by authorized personnel.



The product should only be used for the intended application. Unauthorised modifications are prohibited! The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or assets. Ensure all power is disconnected before installing. Do not connect to live/operating equipment.

Please comply with

- Local laws, health & safety regulations, technical standards and regulations
- Condition of the device at the time of installation, to ensure safe installation
- This data sheet and installation manual

## » TECHNICAL DATA

Measuring values	temperature, humidity* ( <i>optional</i> )
Network technology	RS485 Modbus RTU, <b>Fail-safe Biasing required</b>
Radio technology	EnOcean (IEC 14543-3-10), transmission power <10 mW
Frequency	868 MHz
Measuring range temp	0..+50 °C
Accuracy temperature	±1 °C (typ. at 21 °C)
Measuring range humidity ( <i>optional</i> )	0..100% rH non-condensing

\*Humidity measured value is not processed internally. The values are displayed and can be read out by higher-level systems for evaluation and further use.

Accuracy humidity (optional)	±2% between 10..90% rH (typ. at 21 °C)	
Control functions	setpoint adjustment +0..+50 °C	
Display	LCD 60x44 mm, 240x160 px, white backlighting	
Functions	integrated PI- and 2-point-/ 3-point-controllers, 2nd control loop: 2-point controller, MSG server for 2nd control loop via radio	
Enclosure	PC and glass, optional black or white	
Protection	IP30 according to EN 60529	
Connection electrical	<b>Terminal 1..8</b> terminal block max. 1,5 mm <sup>2</sup>	<b>Terminal 9..12</b> terminal block max. 1.0 mm <sup>2</sup>
Ambient condition	0..+50 °C, max. 85% rH non-condensing	
Weight	195 g	
Mounting	flush mounted with standard EU box (Ø=60 mm)	
Notes	there are 20 EnOcean transmit / receive channels available for various functions	

Output voltage	0..10 V =, max. load 5 mA, (for 6-way valves)	
Output switch contact	2x normally open contacts (heating/cooling), 24 V max. load 3 A	
Power supply	24 V = (±10%) or 24 V ~ (±10%)	
Power consumption	max. 2,5 W (24 V ~)	
Inputs	<b>DI 1</b> input for NTC 10 K or change-over sensor	<b>DI 2</b> digital input for non-floating contact (230 V ~)

When several BUS devices are supplied by one 24 V AC voltage supply, it is to be ensured that all "positive" operating voltage input terminals (+) of the field devices are connected with each other and all "negative" operating voltage input terminals (-) (=reference potential) are connected together (in-phase connection of field devices).

In case of reversed polarity at one field device, a supply voltage short-circuit would be caused by that device. The consequential short-circuit current flowing through this field may cause damage to it.

**Therefore, pay attention to correct wiring.**

## » MOUNTING ADVISE ROOM SENSORS

The Accuracy of the room sensors are influenced by the technical specifications as well as the positioning and the installation type.

### During Assembly:

- Seal mounting box (if present).
- Installation type, air draught, heat source, radiation heat or direct sunlight can affect the measurement.
- Bulding material specific properties of the installation place (*brick-, concrete-, partition wall, cavity wall, ...*) can affect the measurement.

### Assembly not recommendet in...

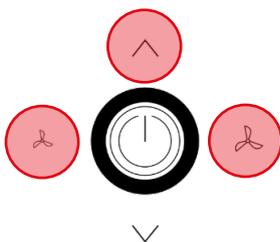
- Air draught (e.g.: close to windows / doors / fans ...)
- Near heating sources,
- Direct sunlight
- Niches / between furniture / ...

## » MOUNTING ADVICES JOY

Plasterboard boxes shall be covered by wall paper or paint to avoid that the plasterboard box's front rim will be partially visible underneath JOY. Maybe consider using white plasterboard boxes (i.e. Kaiser 9063-77).

## » CONFIGURATION

### » Paramettermenu



Access to Paramettermenu:  
Press buttons for 3 seconds simultaneously

Menu	
Timechannel	▷
Time/Date	▷▷
Sensor settings	▷▷
Common settings	▷▷
EnOcean list	▷▷
EnOcean configuration	▷▷

**If no entry is made for 8 minutes, the parameter menu is left automatically.**

## » JOY MODBUS SOFTWARE MANUAL



Detailed information on device functions and software  
<https://www.thermokon.de/direct/files/joy-rs485-modbus-manual.zip>

## » PARAMETER MENU – MODBUS INTERFACE

The configuration menu is activated by simultaneously pressing the buttons “up” (A) and “down” (C) for at least 5 seconds.

The menu is enabled during the first 60 minutes after switching on the supply voltage as long as the device is not actively involved in Modbus communication. As soon as the device receives a valid request addressed to the device from a DDC, access to the menu is blocked. Without valid communication, access is blocked after 60 minutes!

Modbus settings		
Address	◀-/▶	32
Baudrate	◀-/▶	19200
Parity	◀-/▶	Even

**Address (default: 32)**  
Adjustable address (1-247)

**Baud rate (default: 19200)**  
9600Bd | 19200Bd | 38400Bd | 57600Bd

**Parity (default: even)**  
Non | odd | even

## » CONFIGURATION VIA UCONFIG | MICROSD-CARD OR MODBUS



### Configuration software:

uConfig | Microsoft Windows is required to use the uConfig configuration software.

The JOY room thermostat can be parameterised using the uConfig configuration software. An SD card is used to transfer the created configuration file to the device. For BUS devices, a live configuration can also be performed via the BUS interface.

The installer for the configuration software can be found in the Download-Section on our website. The installer retrieves all necessary files and plug-ins from our web server. In this version an update function is integrated in the software.

<https://www.thermokon.de/download>

## » MENU → ENOCENAN CONFIGURATION



The access to the menu <EnOcean configuration> can be protected with a password via Modbus. The login remains unlocked in the EnOcean menu until 10 minutes after the last key press. Default password: 0000 (deactivated)

More detailed information for the configuration of the EnOcean channels can be found in the specification.

## » INFORMATION ABOUT EASYSSENS® (RADIO) / AIRCONFIG GENERAL USAGE



### EasySens® - airConfig

Basic information about EasySens® radio and about general usage of our airConfig software, please download from our website: <https://www.thermokon.de/direct/files/airconfig-software-manual-en.pdf>

## » OVERVIEW OF THE RADIO TELEGRAMS



### EEP

The structure of the data contained in the telegram can be found in the EEP (EnOcean equipment profile) list provided by the EnOcean Alliance.

## » PRODUCT TESTING AND CERTIFICATION

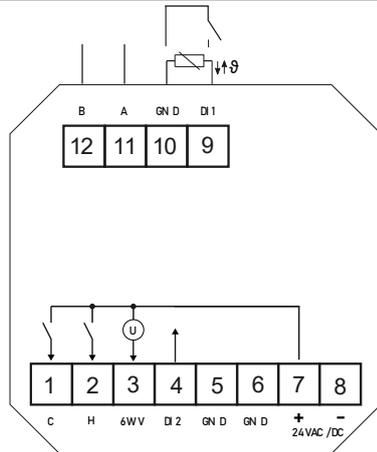


### Declaration of conformity

The declaration of conformity of the products are available on our website  
<https://www.thermokon.de/direct/en-gb/categories/joy-hc>

## » CONNECTION PLAN

### JOY HC AO2DO (24 V ~/=)



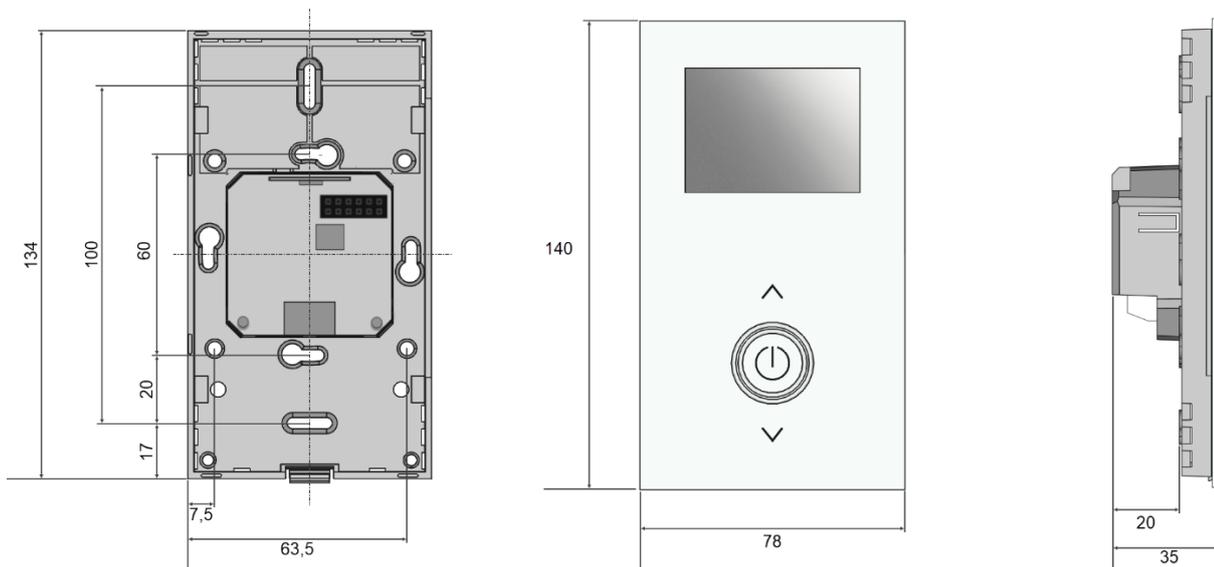
- 1 Cooling
- 2 Heating
- 3 0..10 V (6-way valve)
- 4 Digital Input 2
- 5 GND
- 6 GND
- 7 24 V = ( $\pm 10\%$ ) or 24 V ~ ( $\pm 10\%$ )
- 8 GND

- 9 Digital Input 1 (or NTC10K)
- 10 GND DI 1
- 11 A
- 12 B

#### Note:

The inputs for floating contacts must not be connected in parallel. If the function (Change-Over DI, window contact, dewpoint,...) of several devices is to be switched by one contact, the input for the floating contacts must be used. It must be ensured that the same phase is used for jointly switched devices.

## » DIMENSIONS (MM)



## » ACCESSORIES (OPTIONAL)

Frame for surface mounting JOY pure white  
 Frame for surface mounting JOY black  
 Decorative frame pure white for JOY  
 Decorative frame black for JOY  
 MicroSD card 2GB

Item No. 760201  
 Item No. 760951  
 Item No. 681452  
 Item No. 740951  
 Item No. 500098

RS485 Biasing Adapter  
 USB RS485 Modbus RTU Logger  
 Converter RS485 Modbus - USB

Item No. 811378  
 Item No. 809917  
 Item No. 668293

## » NOTES ON DISPOSAL



The crossed-out wheeled bin symbol indicates that the product or removable batteries must not be disposed of with household or commercial waste. Within the EU, you are legally obliged to dispose of the product separately and appropriately in accordance with the national laws of your country. Alternatively, please contact your supplier or Thermokon Sensortechnik GmbH. Further information can be found at: [www.thermokon.com](http://www.thermokon.com)