JOY SR HC AO2DO| HC 3AO | RS485 Modbus

Room Regulator (from Version 2.6.x)

thermokon®
HOME OF SENSOR TECHNOLOGY

Datasheet

Subject to technical alteration
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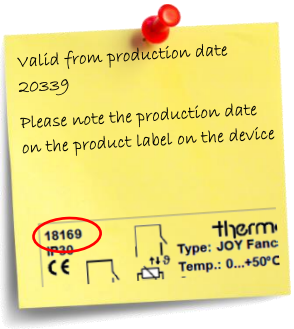


»APPLICATION

JOY SR HC AO2DO (85..260 V ~)
The 230 V supplied type AO2DO controls the 230 V heating and cooling valve as a 2-point or thermal 230 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.

JOY SR HC 3AO (24 V =/~)
The 24 V supplied type 3AO has three 0..10 V outputs for controlling heating/cooling valves or a 6-way valve. 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.

» 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.

CAUTION! Risk of electric shock due to live components within the enclosure, especially devices with mains voltage supply (usually between 90..265 V).

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

» 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

» NOTES ON DISPOSAL

The crossed-out wheelie 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

» 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

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).

» APPLICATION NOTICE

Software	Software description on https://www.thermokon.de/
MicroSD-Card	Storage medium to be used for update, upgrade or configuration, parameterization receive channels. - Formatting in FAT file system required - NTFS and exFAT file systems are not supported! - Read in/out Enocean configuration
Bootloader	A MicroSD card bootloader for applications (update, upgrade) or configurations is integrated in the device. *Active bootloader = ring illumination flashes (1 sec. cycle), display is not activated.*
Firmware Update	- Remove upper part, insert MicroSD card with valid update file, place upper part on lower part. - Valid update file is recognized and update process is started (ring illumination flashes at 300ms intervals). - New application is started after update (approx. 20-30 sec.). - Remove upper part to remove MicroSD card from device!
Device Configuration	- Remove upper part, insert MicroSD card with device configuration file, place upper part on lower part. - Configuration file is recognized and device is configured - Device ready for operation - Remove upper part, remove MicroSD card from device, place upper part on lower part.
	Note: The parameters for the display, the setpoints and the controller can only be changed via the configuration software.
Enocean Configuration	- Remove upper part, insert MicroSD card with Enocean configuration file, place upper part on lower part. - Configuration file is recognized and device is configured - Device restarts after update. - Device ready for operation - Remove upper part, remove MicroSD card from device, place upper part on lower part.
Save Enocean Configuration on MicroSD-Card	- Remove upper part, insert empty microSD card, place upper part on lower part. - Device starts - Configuration file is saved on MicroSD card - Remove upper part, remove MicroSD card from device, place upper part on lower part.
	Note: EasySens receivers (SAB valve actuators or actuators, SRC/STC-x) still require the ID of the transmitter (Joy) via manually triggered teach-in telegram.

» UPDATE FUNCTION ADVICE

An update of the device software is only possible within the version main numbers.

3.0.2 ► 3.0.11 ✓ **2.6.6 ► 2.3.0** ✓ **2.x ► 3.x** ✗ **2.x ► 1.x** ✗

» CONFIGURATION VIA UCONFIG | MICROSD-CARD OR MODBUS

Configuration software:
uConfig | *Windows 10 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.
Download-Section

» TECHNICAL DATA

» JOY SR HC AO2DO | HC 3AO

Measuring values	temperature, humidity *(optional)*	
Network technology	RS485 Modbus RTU, **Fail-safe Biasing erforderlich**	
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 *(optional)*	0..100% rH non-condensing	
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	**Terminal 1..8** terminal block max. 1,5 mm²	**Terminal 9..12** terminal block max. 1.0 mm²
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	

» JOY SR HC AO2DO (85..260 V ~)

Output voltage	0..10 V =, max. load 5 mA, (for 6-way valves)	
Output switch contact	2x normally open contacts (heating/cooling), 240 V max. load 500 mA	
Power supply	85..260 V ~	
Power consumption	max. 2 VA (260 V ~)	
Inputs	**DI 1** input for NTC 10 K or change-over sensor	**DI 2** digital input for non-floating contact (230 V ~)

» JOY SR HC AO2DO 3AO (24 V =/~)

Output voltage	3x 0..10 V, max. load 5 mA, 6-way valve control, heating & cooling	
Power supply	24 V = (±10%) or 24 V ~ (±10%) SELV	
Power consumption	max. 1,5 W (24 V =)	
Inputs	**DI 1** 1 input for NTC10K or floating contact	**DI 2** 1 input for floating contact

***Power supply**

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 my cause damage to it.

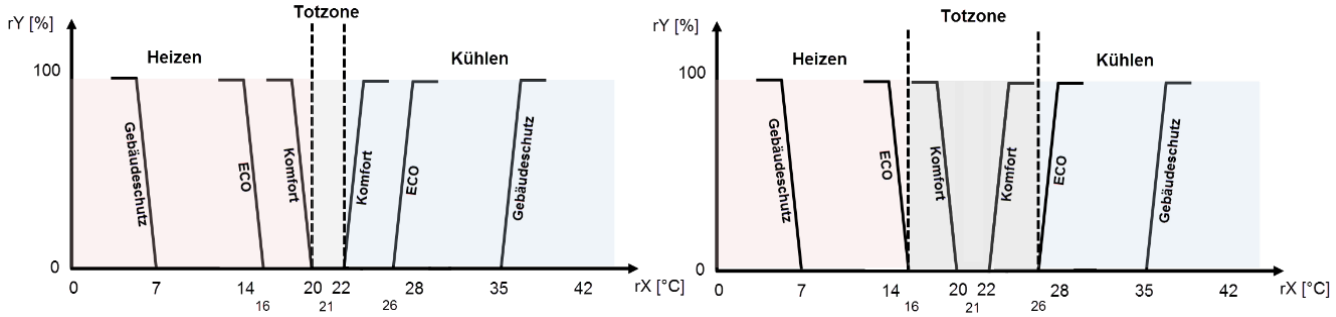
Therefore, pay attention to correct wiring.

» FUNCTION DESCRIPTION – CONTROLLER

JOY HC AO2DO (85..260 V ~)	JOY HC 3AO (24 V ~/=)
PI controller (PWM) & 2-point/3-point controller *(configurable)*	PI controller (0..10 V)

6WV (PI-controller 0..10 V) (all types)
The manipulated variable is output as a proportional control signal at the output for the 6-way valve. The type of valve used is set via the configuration software. You can choose from 2..10 V / 2..10 V INV (Belimo), 0..10 V DN15 / DN15 INV, DN20 / DN20 INV (Sauter). There is also the possibility of a freely parameterizable 6-way valve (generic 6WV).

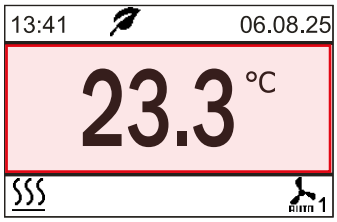
Heating/ cooling with 2-point-/ 3-point-controller (only HC AO2DO)
In the case of temperature control, the 2-point controller only knows the switching states heating ON and heating OFF. The 3-point controller also knows the switching state of cooling. Two - and three-point controller work with a hysteresis.



Heating/ cooling with PI-controller (PWM) (only HC AO2DO)
The time response of the PI control loop depends on the control parameters xp for the proportional area and tn for the reset time of the integral range. In case of an error, the P portion immediately changes the position value proportionally to the error variable, while the integral portion takes effect after a certain time.
The resulting actuating variable is output as a pulse-width-modulated signal directly to the outputs.

Heating/ cooling with PI-controller (0..10 V) (only HC 3AO)
The time response of the PI control loop depends on the control parameters xp for the proportional area and tn for the reset time of the integral range. In case of an error variable, the P portion immediately changes the position value proportionally to the error variable, while the integral portion takes effect after a certain time.
The resulting manipulated variable is output as an analogue 0..10 V signal directly to the outputs.

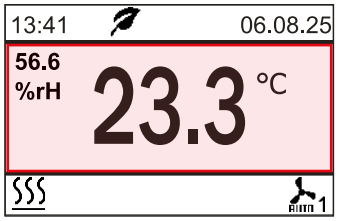
» DISPLAY

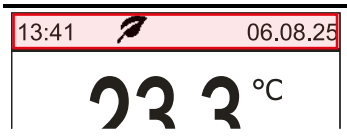


Value Screen
internal sensor values

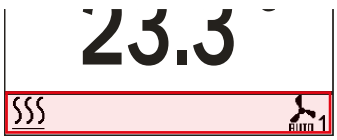
external sensor values
(configurable)

(additional humidity value optionally configurable)





Header *(value/ symbol display)*
Time, weekday, date, ECO symbol (mode dependent)
Alarm symbol (higher priority than ECO-Symbol)



Footer *(symbol display)*
Symbols for heating/cooling mode, occupancy, window contact, etc.

The symbol „Timechannel active“ is only shown when a time channel is active.

Occu-pancy		Window contact/ dew point	
Heating/ Cooling			
Time-channel active			

» FUNCTION DESCRIPTION – BUTTONS

On the touch surface, there are adjustment options for setpoint and fan speed regulation.

While pressing these buttons, the white ring-LED of the Power-button lights up for visual feedback.

Setpoint change (setpoint range ± 3 °C, default, configurable).

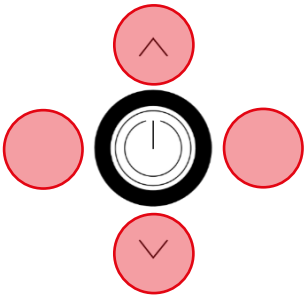
Power button for Standbymode, or Presence key*

*If the key is used as a presence key at the same time, the key must be pressed for at least 3s, in all other cases a short press is sufficient.

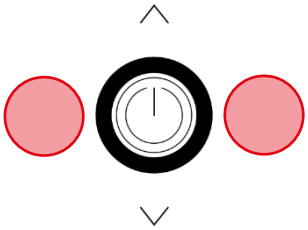
3 seconds without any interaction, the display returns back to main screen.

Standby mode (not compatible with Keycard-switch function)
In standby mode the display and all outputs are switched off (controller deactivated). The frost and heat protection monitoring remains active.

Navigation Parametermenu (up, down, left, right)



Open submenu (right)
In header left to leave the submenu



Confirmation

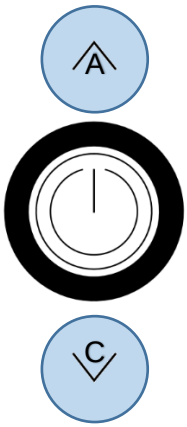
» DIAGNOSTICS MENU

To access the diagnostics menu, select the header in the startscreen of the parameter menu, and press the ENTER key. Here you will find various information, such as device type, software version, state of the inputs and outputs and controller state (current manipulated variable).

» 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

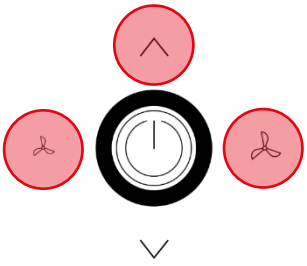
Address (default: 32)
Adjustable address (1-247)

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

Parity (default: even)
Non | odd | even

»CONFIGURATION

» Parametermenu



Access to Parametermenu:
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.

»MENU → TIME CHANNELS

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

Up to 3 time channels with 4 time periods each can be parameterized. The time channels are prioritized, channel 3 has the highest priority.

Timechannels	
Timechannel 1	Mo - Fr ▸
Timechannel 2	▷
Timechannel 3	▷

Timechannels/Timer1		
from day	◁-/+▷	Mo
to day	◁-/+▷	Fr
1: 06:00h	- A -	22.0° ✓▸
2: 08:30h	- 1 -	20.0° ✓▷
3: 16:00h	- A -	22.0° ✓▷
4: 22:30h	- 0 -	22.0°ECO ✓▷

Periods/Period1		
Start	◁-/+▷	06:00h
Fan	◁-/+▷	AUTO
Temp	◁-/+▷	22.0°
ECO-Mode		✓

Time Channel
Time period within one week configuration ◀- / +▶ via button left / right
4 periods

Periods
Start – configuration start setpoint (24h format)
Fan – selection fanstage (depends on type)
Temperatur – setpoint (in °C or °F depends on configuration)
ECO mode – *In ECO mode, the dead zone between heating and cooling is automatically set to the ECO dead zone configured in the "General Settings" menu (default: 10 K).*

»MENU → TIME/DATE

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

In the Time/ Date menu the time, date and the display format can be configured.

Datetime setting/Time		
Hour	◂-/+▸	13
Minute	◁-/+▷	07
12h/24h	◁-/+▷	24h
Daylight saving	◁-/+▷	CET
Date		▷

Datetime setting/Date		
Day	◂-/+▸	12
Month	◁-/+▷	08
Year	◁-/+▷	15
Presentation	◁-/+▷	T.M.J

Default settings:
24h display format
Daylight savings settings (CET)
Date presentation Day.Month.Year

»MENU → SENSOR SETTINGS

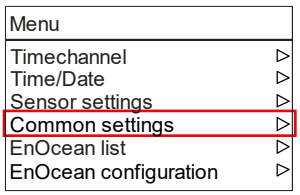
Menu	
Timechannel	▷
Time/Date	▷
Sensor settings	▷
Common settings	▷
EnOcean list	▷
EnOcean configuration	▷

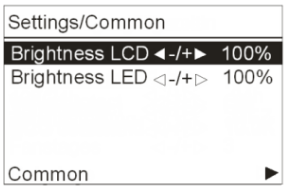
Offset correction settings for internal and external sensor value.
Value display of internal and external temperature sensors

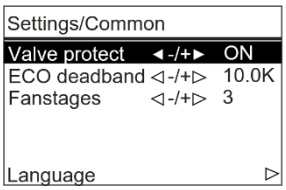
Sensor settings		
Offset int.	◂-/+▸	0.6 K
Value int.		22.1°C
Offset ext.	◁-/+▷	0.2 K
Value ext.		22.1°C
Unit	◁-/+▷	Celsius

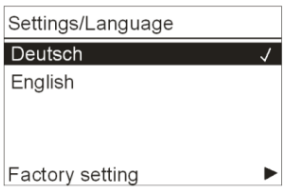
Unit – Setting the temperature unit in celsius / fahrenheit.

»MENU → COMMON SETTINGS









Common device settings:
Brightness
Valve protection
ECO deadband
Fanstages
Language
Factory setting (reset)

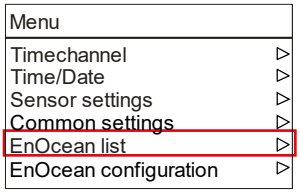
Brightness
Configuration of the LCD brightness/ LED ring brightness during button operation/ usage.

Valve protection
A valve protection function actuates the heating and cooling valves regularly to prevent locking during non-usage times.
The function is executed fridays at 11.00 (heating valve) and 11.15 (cooling valve). The corresponding valve is triggered for 5 minutes, if not activated during the last 96 hours.

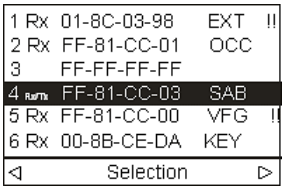
ECO deadband
The dead band can be adjusted (default 10.0 K)
* further information in the software specification file

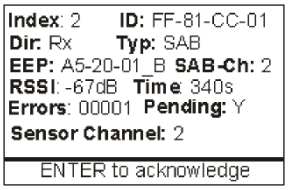
Factory setting
By selecting “Factory setting”, the room thermostat will be reset and restore the device to factory default settings.

»MENU → ENOCEAN LIST



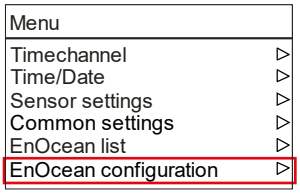
In this list, all channels with the taught-in sensors or actuators are displayed.



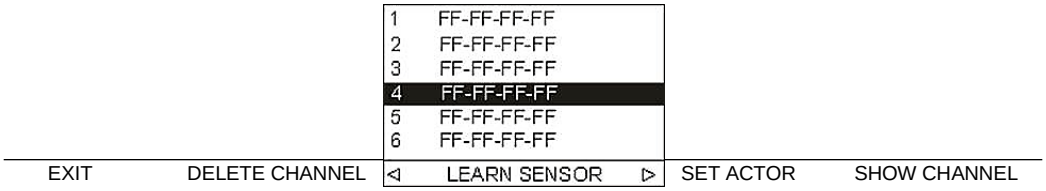


After selecting a device further information are displayed.

»MENU → ENOCENAN CONFIGURATION



In this menu item, the radio channels can be configured and individual information can be called up.



In the footer, various menu items can be selected with the LEFT / RIGHT keys and the corresponding menu item is selected with the ENTER key.

SAB valve actuators are learned in with the function **<SET ACTOR>**

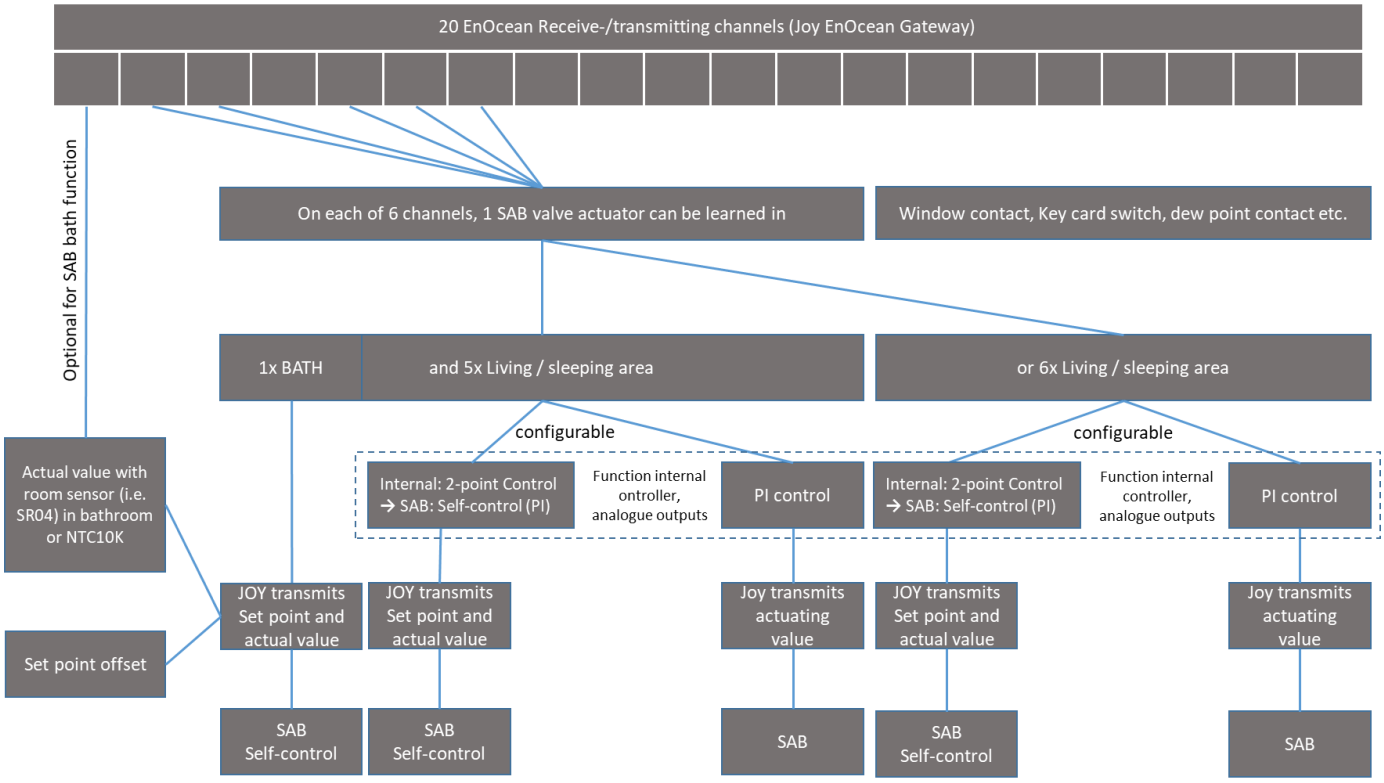
The access to the menu <**EnOcean configuration**> can be protected with a password via Modbus. The login remains unlocked in the EnOcean menu until 10 minutes after the last key press. **Default password: 2030**

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

There are 20 channels available that can be assigned different functions. A channel can be configured as a receive channel, as a send channel or as a message server (SAB communication).

6 channels can be configured with SAB valve actuator, one of these can be set with the bath function. For the SAB with the bath function, an additional setpoint offset can be set. If SAB valve actuators are learned in, the analogue outputs to the internal controller remain active and can also be used.

»FUNCTIONAL OVERVIEW SAB



The profiles used are divided into functional groups:

SRW/SRG	Window contact and window handle. Both have an influence on the window contact function and are linked to the digital inputs or the Modbus default. Up to five sensors can be learned-in.
VFG	Sensor for chngeover control. Only one changeover sensor can be learned in.
EXT/WRF	Receiving channel: Temperature preset by an external room temperature sensor. Overrides the internal temperature sensor. Max. one sensor can be learned in. An EnOcean room operating unit is displayed on the send channel.
OCC	Up to 3 motion sensors can be learned in and affect the occupancy function. The last changed value (Modbus,EnOcean, Button) will be accepted. If several EnOcean motion sensors have been learned-in, the "ROOM UNOCCUPIED" value will only be accepted once all sensors have signaled "ROOM UNOCCUPIED".
KEY	Controls the internal keycard function. When learning a key card switch, the card must not be plugged in AND pulled immediately during the learn-in process. It is necessary to wait at least 5 seconds until the second action is performed with the card. Only then will the switch be assigned as key card switch, otherwise it will be learned in as a radio rocker switch (function group RPS).
SUP	A superior control unit to override the internal functions.
SAB (5+1 Bath)	Up to 6 SAB´s can be learned in. One pcs. can be assigned with the „Bath“ function. The other channels can be used optionally for heating or cooling. For each SAB channel, an offset for the setpoint can be configured via Modbus.
OUT	Only in direction of transmission. A controller status (A5-11-02) every 15 minutes (configurable) and with every change of any value.

»INFORMATION ABOUT EASYSENS® (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.

»SUPPORTED PROFILES

Receiving profiles

EnOcean-EEP	Type	Direction	Description	Thermokon Devices	Max. Quantity	LCD/ Funktions-gruppe
F6-02-01	RPS	Rx	EnOcean button	Diverse	1	RPS
D5-00-01	1BS	Rx	Windows contacts	SRW01	max.5	SRW
F6-10-00	RPS	Rx	Windows handle	SRG02		SRG
A5-02-06	4BS	Rx	Temperature 0-50°C	SR65 VFG, SR65 TF, SR65 AKF, SR65	1	VFG
A5-02-16	4BS	Rx	Temperature 0-80°C			VFG
A5-02-05	4BS	Rx	Room Sensor (Temperature 0-40°C)	SR04, LC-SR04, SR07, SR65	1	EXT
A5-10-03	4BS	Rx	(Room Operating Panel) Temperatur, Set Point	SR07P, SR04P, SR06 2T/2T+		WRF
A5-07-01	4BS	Rx	Room Sensor (Occupancy)	SR-MDS Solar, SR-MOC Solar, SR-MOW Solar	max. 3	OCC
A5-08-01	4BS	Rx	Room Sensor (Occupancy, Light, Temperature)	SR-MDS		OCC
F6-04-01	RPS	Rx	Keycard	SR-KCS02, SR-KCS	1	KEY
A5-20-01	4BS	Rx/Tx	SAB	SAB+, SAB05	max. 6	SAB
A5-20-12	4BS	Rx	Superior Control Unt (Fan. Set Point, Controller, Energy Hold OFF/Dew point, Occup)		1	SUP

Transmitting profiles

EnOcean-EEP	Type	Direction	Descripton	Max. Quantity	LCD
A5-10-02 (V2.1.1 +)	4BS	Tx	*Valid from Version 2.1.1 (up to 2.1.0: A5-10-01)* Room operating panel (Fan,Temp, Sollwert, Occup)	1	WRF
A5-10-06 (V2.1.1 +)	4BS	Tx	*Valid from Version 2.1.1 (up to 2.1.0: A5-10-05)* Room operating panel (Temp, Sollwert, Occup)		
A5-11-02	4BS	Tx	Temperature Controller (Fan, Set point, alarming, Controller state, Energy Hold OFF, Occup)	1	OUT
A5-20-01	4BS	Rx/Tx	SAB	max. 5+1	SAB

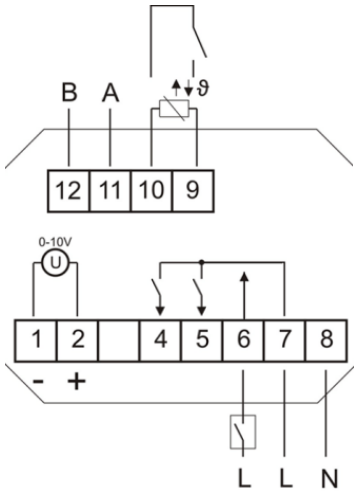
»INPUTS

Up to 2 inputs are configurable for functions such as windows contact, dew point, occupancy, change-over or external sensor option.
The overview of possible combinations can be found in the software specification of the JOY.

Sensor (NTC10K)	The value of an external sensor will be shown if connected and configured accordingly. In this case, the room thermostat controls according to the external sensor. Alternatively, an external temperature sensor can be used at the universal input to protect floor heating. If a configured temperature is exceeded, the heating sequence is suspended.
Change-Over DI	Which controller is active depends on the state of the Change-Over contact. (Factory default: contact open heating controller active, contact closed cooling controller active). The terminals 4 and 5 are used as outputs for heating rsp. cooling.
Change-Over Sensor	The Change-Over Sensor is used for switching between heating and cooling mode automatically. If the temperature is below 22 ° C, the controller is in cooling mode. If it is above 25 ° C, it is a heating mode. If an input is configured as a change-over, the room thermostat is automatically in 2-pipe operating mode and both outputs (terminals 4 and 5) are used as outputs for heating rsp. cooling.
Window contact/Energy hold off	If a window contact is enabled via the digital input, the reference will switch to a setback set point (Heat SP/Cool SP).
Dewpoint	An active dewpoint contact locks the cooling controller.
Occupancy	If occupancy-function is active, the symbol will be displayed automatically. In state of “unoccupied” the heating set point is reduced by 2K (default setting) rsp. the cooling set point raised by 2K.
Keycard-Switch	When the card is not inserted, the device is switched in sleep mode. Operation of the keys is locked, the display is switched off and the controller adjusts to the nominal values of the "unoccupied"-State.
Alarm contact	An alarm symbol can be shown in the header of the display. The backlight flashes when the alarm is active. This symbol is in the same position as the ECO symbol. The alarm symbol has a higher priority and overwrites the ECO symbol!

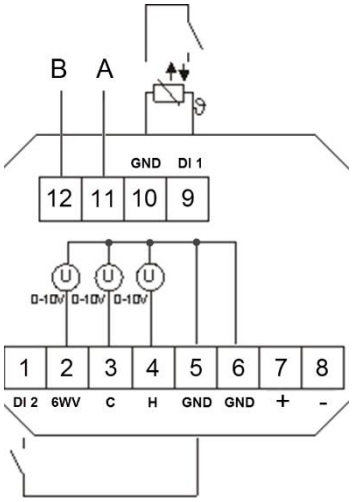
»CONNECTION PLAN

JOY HC AO2DO (85..260 V ~)



1 GND (6-way valve)	
2 0..10 V (6-way valve)	
4 Cooling	
5 Heating	
6 Digital Input 2 (230V)	
7 L	
8 N	
9 Digital Input 1 (or NTC10K)	
10 GND DI 1	
11 Modbus A	
12 Modbus B	

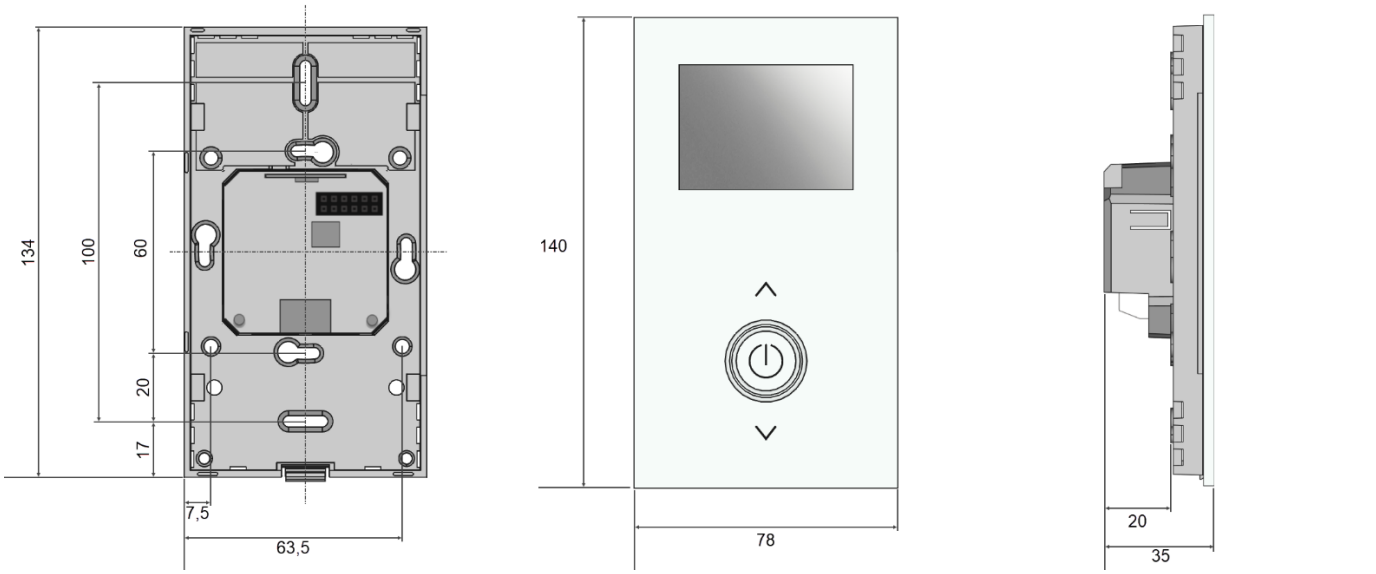
JOY HC 3AO (24 V ~/=)



	1 Digital Input 2
	2 6-way valve (0..10 V)
	3 Cooling (0..10 V)
	4 Heating (0..10 V)
	5 GND DI2
	6 GND
	7 24 V = (±10%) or 24 V ~ (±10%)
	8 GND
	9 Digital Input 1 (or NTC10K)
	10 GND DI 1
	11 Modbus A
	12 Modbus B

Note: Parallel connection of the potential-loaded inputs is not permitted!
If the operating mode (change-over DI) of several devices is to be switched together by one contact, the potential-free 230V input must be used (DI2, only possible with the 230V version). 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	Item No. 760201
Frame for surface mounting JOY black	Item No. 760951
Decorative frame pure white for JOY	Item No. 681452
Decorative frame black for JOY	Item No. 740951
MicroSD card 2GB	Item No. 500098
RS485 Biasing Adapter	Item No. 811378
USB RS485 Modbus RTU Logger	Item No. 809917
Converter RS485 Modbus - USB	Item No. 668293