EY-RU 110: Room sensor, EnOcean, ecoUnit110

EY-RU110F201

How energy efficiency is improved

Room climate control with precise, wireless-transmitted and energy-autonomous temperature measurement for energy optimisation in the room

Features

- Part of the SAUTER modulo system family
- Room sensor with integrated digital temperature sensor
- Compatible with ecosCom581 and EnOcean interfaces from third-party manufacturers
- Battery-free with integrated solar panel
- Expandable with ecoUnit106 as additional solar panel supply
- Device insert with transparent front, fits into frame with 55 x 55 mm aperture
- Frame can be ordered as an accessory
- Frames and foils in many colours and designs possible

Technical data

Power supply		
	Power supply	3 V, from integrated solar panel (external battery operation optional)
	Illuminance	Min. 250 lux, min. 5 hours daily in 5 of 7 days
	Dark period[1)]	60 h of full operation, additional 7 days at least in low power mode
Parameters		
	Technology	EnOcean, STM 300
	Frequency	868 MHz band (868.3 MHz)
	Range	Up to 30 m, depending on building structure (planning recommendation: 10 m)
Sensor (temperature)	Measuring range	0…40 °C
	Resolution[2)]	0.2 K (hysteresis)
	Time constant	Approx. 7 min.
	Measuring accuracy, temperature	Typ. 0.5 K in the 15…35 °C range
Ambient conditions[3)]		
	Operating temperature	0...45 °C
	Storage and transport temperature	−25…70 °C
	Ambient humidity	5…85% rh, no condensation
Interfaces and communication		
	Connection[4)]	No wiring necessary, teach-in (pairing) with ecosCom581 or ecoMod580 wireless interface via SLC/RS-485
	EnOcean Equipment Profile[5)]	EEP: A5-10-01 (unidirectional)
Construction		
	Weight	0.05 kg
	Dimensions W x H x D	59.5 × 59.5 × 27.8 mm
	Housing	Pure white (similar to RAL 9010)
	Labelling insert	Silver (similar to Pantone 877 C)

1) *Bridging time without lighting when the internal energy storage/battery is fully charged*
2) *Measurement value hysteresis for spontaneous transmission (EnOcean telegram)*
3) *The device may be active during transport. The device is equipped with a permanently installed lithium cell (energy storage/battery)*
4) *See quick reference for ecosCom581/ecoMod580*
5) *EEP V2.6.8 or higher*
The ecoUnit110 room sensor currently only supports the temperature value of EEP A5-10-01 and no other EEP as a temperature sensor, such as A5-02-05 (temp. sensor 0...40 °C)

	Fitting	Recessed/surface-mounted (see accessories)
Standards and directives		
	Type of protection	IP30 (EN 60529)
	Protection class	III (EN 60730-1)
	Environment class	3K3 (IEC 60721)
CE conformity according to	EMC Directive 2014/30/EU	EN 61000-6-1, EN 61000-6-3
	Low-Voltage Directive 2014/35/EU	EN 60730-1
	RED Directive 2014/53/EU	ETSI EN 300 220-2 (V3.1.1)
	RoHS Directive 2011/65/EU	EN 50581

Overview of types

Type	Description
EY-RU110F201	Room sensor, EnOcean, temperature sensor, solar panel

The device is supplied with a silver-coloured labelling insert. Spare inserts: 0940001510 (10 pcs.)

Order frame and mounting plate separately (see accessories)

Accessories

Type	Description
EY-SU106F100	Push-button unit with solar panel, 6 push-buttons, without frame
0940240***	For frames, mounting plates and adapters for third-party frames, see product data sheet 94.055
0949241301	Transparent cover for EY-RU and EY-SU, 10 pcs.
0949360004	Push-in terminal RU/SU (for wire), 2 × 10 pcs. 2-pin (01/02, 03/04)
0940360012	Screw terminal RU/SU (optional for braid), 2 × 10 pcs. 2-pin (01/02, 03/04)
0949570001	Battery pack, 10 pcs.
0940001510	Labelling insert, foil, silver, without button symbols, 10 pcs.

EY-SU106F100: Can be used as an extended solar panel for the EY-RU110F201 room sensor, but not as a push-button unit.

0949570001: Suitable as energy supply in permanently darkened rooms.

Description of operation

The ecoUnit110 room sensor measures the room temperature and transmits it via an EnOcean wireless interface to a room automation station with an EnOcean interface.
The device is wireless and communicates via the EnOcean wireless protocol. Power is supplied by the integrated solar cell. Thus, no battery is required.
The device can be operated with wireless interfaces from third-party manufacturers. The wireless interfaces must comply with the EnOcean standard and support the EnOcean Equipment Profile used (EEP: A5-10-01). Together with the ecosCom581 wireless interface, the device can be used with ecos 5 and ecos311 room controllers and modulo 6 automation stations.

Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the “Description of operation” section.
All related product regulations must also be adhered to. Changing or converting the product is not admissible.

Engineering and fitting notes

The ecoUnit110 room sensor is suitable for various fitting methods. Product data sheet 94.055 shows the fitting options and available frames, as well as other accessories.
The use of third-party frames usually needs to be checked in advance. Frames made of metal or with metal coating can significantly reduce the wireless range.
The room sensor can be supplied with additional solar energy by means of an extension with the ecoUnit106 push-button unit. ecoUnit106 cannot perform any other functions, e.g. switching functions. The room sensor can be supplied with power by an external button cell battery as an alternative or in addition to the ecoUnit106.
The ecoUnit106 push-button unit is connected to the room sensor with a 4-core connection. The total cable length between the two devices must not exceed 1 metre.
When selecting a suitable place of installation with regard to wireless characteristics and solar energy supply, the application notes for the ecosCom581 wireless interface with ecoUnit 1 must be followed.

More information about EnOcean wireless technology and the positioning of the wireless interface and the room operating units is available in the “Engineering using EnOcean wireless technology” manual.

Additional technical documents

Document/name	
Fitting instructions	P100018767
Quick reference (BA)	P100013784
Declaration on materials and the environment	MD 94.012
Product data sheet “Frame for device insert”	PDS 94.055
Product data sheet “Wireless Interface, EnOcean, ecosCom581”	PDS 94.016
Manual “Engineering with EnOcean wireless technology” (SAUTER EnOcean application notes)	7010084001, see SAUTER extranet
ROOM_UNIT function module	Online help for CASE Suite/Engine

Connection to controllers and automation stations

The room sensor sends information to the ecosCom581 wireless interface and cannot receive any data itself. The wireless interface is connected to the SLC interface of the automation station or controller by means of a 4-core cable. The unit must be disconnected from the electrical supply when the wireless interface is being connected to the station. Up to four ecoUnit110 for ecos 5 and modulo 6 or one ecoUnit110 for ecos311 can be assigned to a wireless interface.
Further information on the wireless interface can be found in the product data sheet 94.016.

Addressing

The room sensor transmits its data based on the EnOcean standard. Each room sensor has a unique address (EnOcean ID) due to the EnOcean wireless sensor module (STM 300) that is used. This address is permanently stored in the wireless interface during the teach-in and assigned to a channel. No address setting is required on the room sensor.

Energy supply and selecting the place of installation

The energy is supplied by the integrated solar panel; the solar energy is stored in a small industrial lithium cell.
The following dependencies with regard to incoming light must be considered when selecting the place of installation:

Minimum illuminance	Lighting duration at place of installation
EY-RU110F201:	
125 lux	Min. 10 h a day
250 lux	Min. 5 h a day
EY-RU110F201 with EY-SU106F100:	
125 lux	Min. 5 h a day

The lighting times are for a weekly cycle of five days' bright period followed by a dark period of two days. The minimum illuminance applies to artificial light (fluorescent tube with colour code 840). More favourable values may occur in daylight. The minimum illuminance, with the appropriate lighting duration, is sufficient for a measuring cycle of 180 seconds (as delivered ex works). Shorter measuring cycles require more energy and, therefore, a higher illuminance or lighting duration.
The integrated energy storage is completely filled after a lighting cycle with minimum lighting parameters. It is recommended to charge the unit in daylight with at least 1000 lux for several days before using it. For comparison: The workplaces ordinance prescribes a minimum illuminance of 500 lux for office workstations.
The device should ideally be installed so that the solar panel faces the window. However, direct solar radiation should be avoided. Direct solar radiation would result in incorrect values when measuring the temperature. Additionally, direct solar radiation over a lengthy period can permanently reduce the effectiveness of the built-in solar panel.
Walls and niches that are not sufficiently illuminated during the day should be avoided. The place of installation should also be selected based on the future use of the room, ensuring that shadowing caused by users is avoided, e.g. via items of furniture or office materials.

Bridging time without lighting and the Low Power mode

Thanks to the integrated energy storage, the full operation of the room sensor is ensured even during extended periods of darkness, e.g. in unused rooms over the weekend. The room sensor independently monitors the state of charge of the energy storage and switches to Low Power mode when the charge is low. The temperature measurement every 10 minutes remains available. The specified bridging times are determined conservatively for the room sensor and may be higher. The specified bridging time relates to a completely charged energy store.

Rooms with insufficient daylight

A button cell battery (CR2032) can be used to supply power to the device in rooms with insufficient daylight, see accessory 0949570001. The plug of the battery pack is connected to terminals 01, 02, 03 (NC, –, +) and stored on the rear of the unit.
The operating time of the room sensor with the battery is approx. 5 years.

Summary of functions and communication (unidirectional)

The room sensor is a unidirectional room operating unit that is used exclusively for temperature measurement. Only the temperature value of the EEP is transmitted from the room sensor to the wireless interface. The actual temperature value is transmitted periodically (4BS wireless telegram) based on the set transmission parameters of the room sensor. The data is synchronised between the wireless interface and the room sensor.
The room sensor can also be operated with receivers from third-party manufacturers if EEP A5-10-01 (unidirectional Room Operating Panel) is supported.

Note

The ecoUnit110 room sensor does not have a display and therefore cannot be reconfigured manually. As a result, only the following default values (factory settings) apply:

- Measuring cycle: 180 sec.
- Mandatory cycle: every 5 measuring cycles
- Measured value hysteresis for spontaneous transmission: 0.2 K

If the hysteresis threshold is exceeded, the measured value is transmitted immediately, regardless of the mandatory cycle.

EnOcean transmission standard

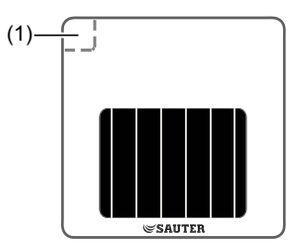
The ecoUnit110 room sensor transmits its data according to the EEP specification (V 2.6.8 or higher): EEP A5-10-01 via 4BS wireless telegram (only DB_1 is user data)

Description of the wireless telegram

EnOcean profile: Temperature sensor; setpoint, fan speed and presence mode			
Data byte	Contents	Value range	Function
DB_3	Fan, speed AUTO, speed 0...3	255	Unused
DB_2	Setpoint adjusters	255	Unused
DB_1	Temperature	0…40 °C, linear n = 255…0	Temperature sensor
DB_0.BIT_3	Teach-in button	0 = Teach-in telegram 1 = Data telegram	Teach-in/data mode
DB_0.BIT_0	Presence button	1	Unused

Teach-in

Teaching in or addressing takes place in the operating mode of the ecoUnit110. When button (1) is pressed for at least 5 seconds, the ecoUnit110 sends a teach-in telegram. The immediate transmission of the temperature is also forced.



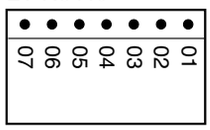
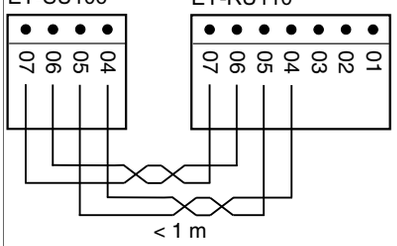
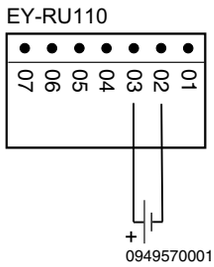
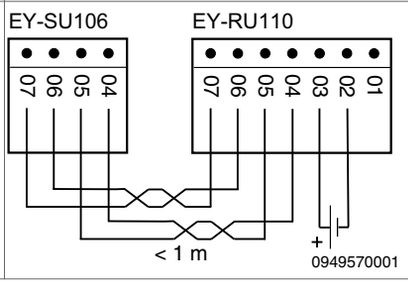
(1) Teach-in button

The receiver, ecosCom581, is always put in learning mode first (the teach-in procedure is a characteristic of the receiver used). The room sensor is then manually prompted to send a learning telegram. If the receiver is not in learning mode, a room sensor cannot be assigned. Any learning telegram that may have been sent has no effect.

Disposal

When disposing of the product, observe the currently applicable local laws.
More information on materials can be found in the Declaration on materials and the environment for this product.

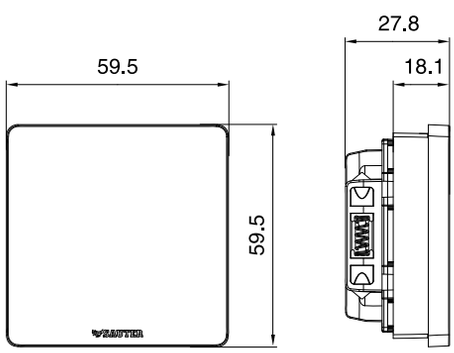
Connection diagram

Connection without push-button unit	Connection with push-button unit	Terminal	Description
EY-RU110 	EY-SU106 EY-RU110 	01	Not used
		02	– Battery (GND)
		03	+ Battery (typ. 3 V)
		04/05	Solar panel
		06/07	When connected, no button functions
Connection without push-button unit, with battery	Connection with push-button unit, with battery		
EY-RU110 	EY-SU106 EY-RU110 		

Note
Use only battery from accessory 0949570001.

Dimension drawing

All dimensions in millimetres.



Fr. Sauter AG
Im Surinam 55
CH-4058 Basel
Tel. +41 61 - 695 55 55
www.sauter-controls.com

