# » SAB+

EasySens® wireless radiator valve actuator for room temperature control

thermokon®
HOME OF SENSOR TECHNOLOGY

## Datasheet

Subject to technical alteration
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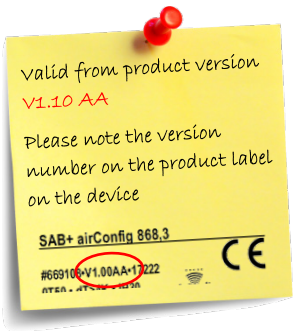


enocean®

airConfig

## »APPLICATION

With the electronic radiator valve SAB+, battery changes and the laying of cable harnesses are a thing of the past. It produces the electrical energy required for operation itself and therefore functions without battery or power connection. Maintenance is therefore superfluous. This not only saves heating costs, but also eliminates all other applications due to the maintenance-free operation. The new electronic miniature actuator uses the temperature difference between a warm radiator and a cooler room to produce electrical energy by means of a thermoelectric generator. This energy is stored in a buffer so that the actuator can be permanently supplied with electricity

## »TYPES AVAILABLE

**Battery-free valve actuator EnOcean with thermal energy harvesting**

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|---|---|
| SAB+ | EEP A5-20-01 |

## »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

## »NOTES ON DISPOSAL

As a component of a large-scale fixed installation, Thermokon products are intended to be used permanently as part of a building or a structure at a pre-defined and dedicated location, hence the Waste Electrical and Electronic Act (WEEE) is not applicable. However, most of the products may contain valuable materials that should be recycled and not disposed of as domestic waste. Please note the relevant regulations for local disposal.

## »TECHNICAL DATA

| | |
|---|---|
| **Radio Technology** | EnOcean (IEC 14543-3-10), transmission power <10 mW |
| **Frequency** | 868 MHz |
| **Antenna** | internal transmitting/receiving antenna |
| **Data transmission** | bidirectional, airConfig ready |
| **Power supply** | maintenance-free thermal energy harvesting, micro-USB port (type B) |
| **Measuring range temp.** | 0..+40 °C |
| **Measuring interval** | every 2..20 min., configured via airConfig, (in 1 min. steps) |
| **Transmission interval** | = Measuring interval |
| **Functions** | radio interface, actuator operation, self-control mode, automatic closing point control, frost protection function |
| **Display** | status-LED, red |
| **Enclosure** | PC, pure white, aluminium |
| **Protection** | IP40 according to EN 60529 |
| **Ambient condition** | 0..+50 °C, max. 85% rH non-condensing |
| **Mounting** | screw mounted, M30 x 1,5 |
| **Notes** | configuration software “airConfig” can be downloaded from Thermokon website. EnOcean USB stick, (i.e. contained in the test tool airScan (item No. 566704) will be required to communicate. Integrated temperature sensor, Operational noise <35 dB(A), nominal stroke 3.8 mm, max. speed 0,24 mm/s, Min. force 100 N |

## »ENERGY HARVESTING - ENERGIEVERSORGUNG

The SAB + valve actuator is supplied by the temperature difference between the mounting flange and the metal housing. From a temperature difference of> 5K, a Peltier element generates a low electrical voltage, which is stored in the long-term stored in the internal lithium storage.

For permanent operation, it must be ensured that the energy balance (harvesting consumption) is positive.

When installing the valve make sure:

- that the temperature difference is as large as possible (eg. no accumulation of heat due to cladding)
- the transmission interval of the SAB + is selected as long as possible
- the response from the controller (Message Server) is sent as soon as possible

The SAB + valve actuator awakens and transmits the current status cyclically in accordance with EEP A5-20-01 and the set measurement / transmission interval and then expects new values from the controller/gateway (eg EVC gateway). For a positive energy balance, i.a. the response time does not exceed 100ms. Thermokon Message Server and Gateways with Message Server functionality typically respond within 50 ms.

The power consumption changes proportionally with the response time and inversely proportional to the wake-up interval. Outside of the heating period, the "summer bit" should be sent to the SAB + by the gateway/controller, which extends the wake-up interval to 8 hours.

The SAB includes its energy status in each telegram and indicates a low memory status or imminent failure.

**If necessary, the actuator can be recharged via a standard USB power supply (no power bank)**

## »PRODUCT TESTING AND CERTIFICATION

**Declaration of conformity**

The declaration of conformity of the products can be found on our website https://www.thermokon.de/.

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

**EasySens® - airConfig**

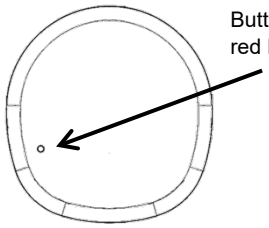
Basic information about EasySens® radio and about general usage of our airConfig software, please download from our website.

## » 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.

## » MOUNTING ADVICES AND COMMISSIONING




The SAB+ can be mounted directly on a standard valve with M30x1.5 thread. For mounting on valves with different mountings metal adapters are available on request. The installation on a heating valve must be carried out before pairing with the MSG server (Gateway).

In the delivery state, the pin of the device should be fully retracted. If not, press the button for approx.. 3..6 sec. by means of a thin pin (see button opening). If the valve pin is not fully retracted, the valve actuator cannot be installed correctly to the thermostat valve.

## » TEACH-IN PROCESS

The teach-in process of the SAB + to the gateway (MSG server) corresponds to the battery powered model SAB05.

1. **IMPORTANT! For the teach-in process it is necessary that the SAB+ is mounted on a heating valve.**
   → *This is important so that the valve drive can correctly perform the reference operation.*

2. Set the gateway (MSG server) to the teach-in mode.
   → *(See instructions for radio receivers)*

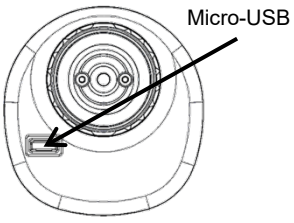
3. Press the SAB+ learn button once. The sensor will be learned into the MSG Server and vice-versa.
   → *Possibly a manual triggering of a learn-in telegram of the gateway is necessary in order to teach it into the valve drive. Please note the instructions of the gateway.*
   → *The successful teach-in is confirmed by a single flashing of the LED.*
   → *If the LED flashes 3 times, the learning process must be repeated. If necessary, shorten the radio range.*

4. The SAB+ performs automatically a initial drive to identify the mechanical limits (valve fully closed, fully open) after the first successful teaching and starts normal operation.
   → *If there is no automatic initialization run, it must be triggered manually.*

## » FUNCTION DESCRIPTION

By default the SAB+ communicates with the room controller every 10 minutes to receive a new position or – if in self-controlled mode - setpoint and room temperature. The communication interval can be set using the airConfig software tool from 2 min up to 20 min by increments of 1 min.

In case of loss of communication SAB+ does switch to self-controlled mode using the parameters set by airConfig.




In the unlikely event of insufficient power status SAB+ will move to the “valve safe position” to harvest energy.

A micro-USB port (type B) is located on the inside of the valve actuator. Via this connection, the internal battery of the device can be charged directly to the socket via a USB power supply. The duration for completely charge is about 3.5 hours.

An integrated frost protection function prevents the room temperature from dropping below 8°C. The actuator opens the valve until the ambient room temperature reaches 10°C again (hysteresis 2 K).

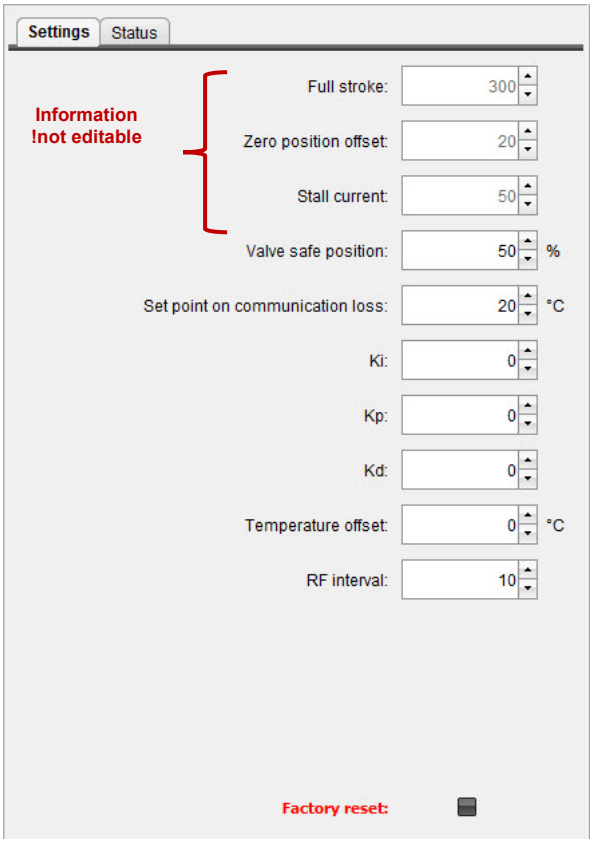
## » SELF-CONTROL MODE IN CASE OF COMMUNICATION LOSS

In case the MSG-Server does not respond to the request issued by SAB+ the current valve position will be maintained until the MSG-Server failed to respond for the 9$^{th}$ time. After 9 telegrams w/o answer SAB+ will switch to self-controlled mode and calculated the valve position internally, using the internal temperature sensor and the “Set point on communication loss”, which can be modified by airconfig. Once per hour SAB+ will try to re-establish the communication with the MSG-Server. Once the MSG-Server answers again the self-controlled mode will be stopped and the normal operation will be restarted.

## » CONFIGURATION VIA AIRCONFIG

**airConfig version 5.03.03 or newer is necessary to configure the SAB + valve actuator.**

After pressing the LRN-Button SAB+ will show up at the sensor tab first and after few seconds, when all parameters have been read in the devices list.




**» Valve safe position**

Fixed, pre-set position in which the valve actuator operates when the internal power supply is lost.

**» Set point on communication loss**

Set point that the valve actuator uses as long as the communication is lost for the self-controlled mode.

**» Ki**

Increase Ki until the steady-state error with respect to the setpoint is corrected fast enough, without affecting the initial dynamics too much. Typical value = 100

**» Kp**

Raise Kp until the system's response is sufficiently fast to track step changes in your setpoint. This proportional component of a PID defines the 'stiffness' of your control system's response. Typical value = 10

**» Kd**

Raise Kd until the system's response is adequately damped. You don't need this if you don't have an overshoot. This component defines an artificial damping for your system. Typical value = 0

**» Temperature offset**

The valve actuator is **mounted** directly on the radiator, therefore the measured temperature most likely will be too high. The set value is subtracted from the internal sensed value.

**» RF interval**

The transmission/reception interval can be set in 1 min increments from 2 min up to 20 min. Please note that more frequent transmission results in higher energy consumption which may exceed the amount of harvested energy. In this case the valve will move to the safe position and may stop working until the internal energy buffer is sufficiently charged.

**» Factory Reset**:

Resets the device to factory settings.

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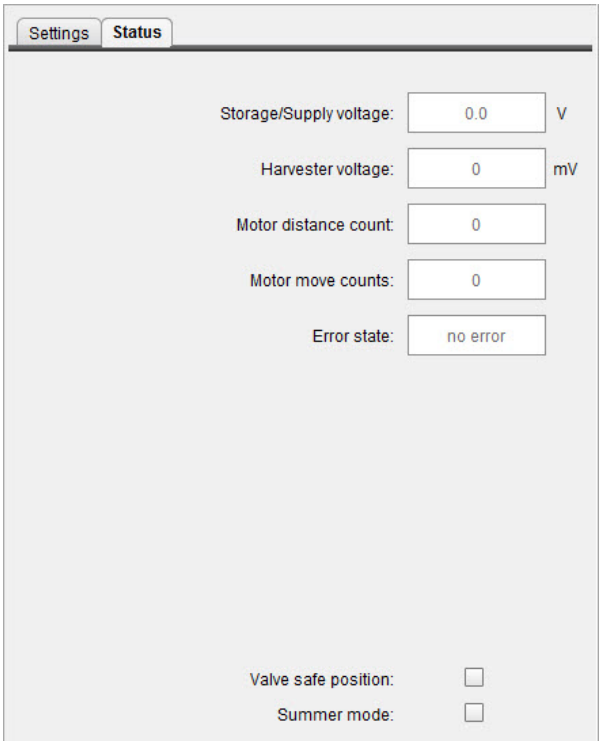



**» Status Tab**

The Status tab provides information on the characteristics performed so far.
Voltage of the internal storage will be displayed as well as the harvester voltage.

Motor distance counts (incremental steps) and move counts (incremented by 1 when leaving the current position and travel to a new position)

**» Valve safe position (Info Box)**

Fixed, pre-set position in which the valve actuator operates when the internal power supply is lost.

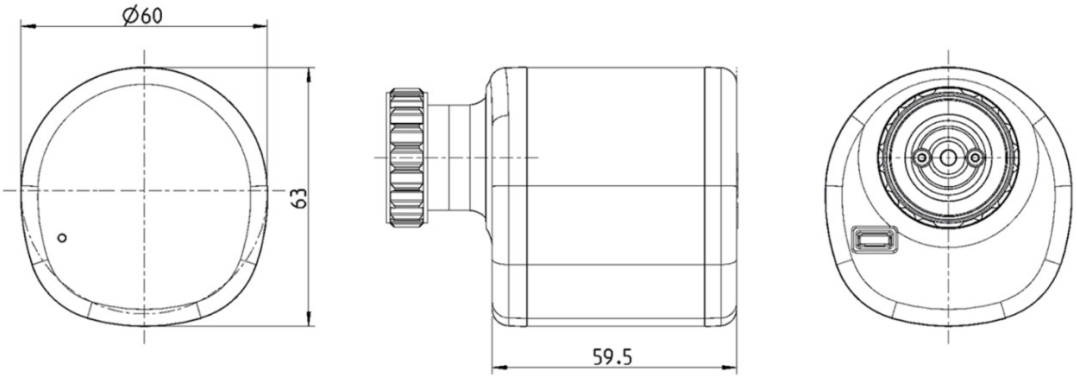
**» Summer Mode (Info Box)**

Reduces the energy consumption by extending the wake-up interval to 8h.

## » UNMOUNTING / RESET

To unmount the SAB+ from the valve, press the button for approx. 3..6 seconds. The SAB+ will move in the mounting position with the stem fully retracted and stops communicating until the LRN button is pressed again.

## » DIMENSIONS (MM)




## » ACCESSORIES (OPTIONAL)

EnOcean USB transceiver for airConfig/airScan (incl. license) Item No. 566704