STC-DO

Multi-functional Transceiver with Relay output

thermokon®
HOME OF SENSOR TECHNOLOGY

Datasheet

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Application

> **AirConfig tool is mandatory for STC-DO!**
> **All settings must be programmed using airConfig.**

Multi-functional transceiver with relay output, programmed and commissioned using Thermokon's airConfig software in combination with a USB-transceiver (i.e. from airScan field test tool). The STC-DO can be configured for:

- Radiator-thermostat with 2-point control
- Radiator thermostat with modulating control and PWM output for thermal actuator
- Cooling thermostat with 2-point control
- Cooling thermostat with modulating control and PWM output for thermal actuator
- Heating/Cooling thermostat with change-over and 2-point control
- Heating/Cooling thermostat with change-over and modulating control and PWM output for thermal actuator
- Lighting Controller
- Humidistat (2-point controller for humidity)
- 2-point controller based on various sensor signals (special applications)

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

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.

Information about EasySens® (radio) / airConfig general usage

Basic information about EasySens® radio and about general usage of our software airConfig you can find to be download using the link

http://www.thermokon.de/ftp/info/Information_Radio_airConfig_en.pdf

Technical Data

Output switch contact	change-over contact, isolated, load max. 10A
Radio technology	EnOcean (IEC 14543-3-10)
Frequency	868 MHz
Antenna	internal Antenna
Power supply	100..240 V ~
Power consumption	typ. 9,8 VA (100..240 V ~)
Enclosure	ABS, red, flush mounted standard EU box
Protection	IP20 according to EN60529
Connection electrical	Terminal block , max. 1,5 mm²
Ambient condition	-20..+60 °C, max. 85% rH, non-condensing
Weight	55g
Notes	up to 20 sensors can be learned in

Overview of airConfig selectable radio telegrams

Heating	Cooling	Lighting Control	Heating and Cooling	Humistat	Special
D5-00-01	D5-00-01	F6-02-01	D5-00-01	A5-04-01	D5-00-01
A5-02-01…1B					A5-02-01…1B
A5-07-01…3	A5-07-01…3	A5-07-03	A5-07-01…3	A5-07-01…3	A5-07-01…3
A5-08-01	A5-08-01	A5-08-01	A5-08-01	A5-08-01	A5-08-01
A5-10-01-09	A5-10-01-09		A5-10-01-09		
A5-10-0C/0D	A5-10-0C/0D		A5-10-0C/0D		
A5-10-10					
A5-20-12	A5-20-12		A5-20-12		A5-06-01
A5-30-02	A5-30-02		A5-30-02		A5-04-01
A5-10-22/23	A5-10-22/23		A5-10-22/23	A5-10-22/23	

Transmitting-EEP:

A5-11-02	A5-11-02	A5-30-02	A5-11-02	A5-30-02	A5-30-02

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: http://www.enocean-alliance.org/eep/.

Basic Configuration

In the 1st tab "Basic", the "Application" must be selected using the drop down menu. Depending on the selected application airConfig will offer additional tabs to configure the device.

The airConfig screen can be set to display temperatures in °F or °C. However the radio transmission will be done in °C only, according to the IEC standard 13543-3-10. (airConfig will automatically convert all settings from °F to °C).

CRC-8 Checksum adds the checksum to the output status telegram sent by the STC-DO. The CRC-8 detects 1-bit transmission errors. This function is compatible with any EnOcean receiver.

When **Transmit output status** is ticked, STC-DO will generate a telegram whenever the output status changes. For heating, cooling or heating/cooling A5-11-02. The other applications use the EEP A5-30-02.

Send service telegram: independently of the output state it will generate a telegram every 15 minutes with the A5-11-02 or A5-30-02 EEP.

If **Monitor sensor communication** is ticked, STC-DO will indicate a missing telegram either by a blinking LED or by switching the relay on and off periodically if telegram has been not been received for more than 90 minutes.

Key 1-2-3 allows the user to input a 3x8 Bit - PIN Code (000….255) to secure the configuration. Default PIN is 000-000-000

In case of a lost PIN code the device´s configuration is secured and can not be reset or modified and should be replaced with a new unit if changes are required.

LRN generates the LRN-Telegram to learn in the output status telegram into a gateway, i.e. to process the output status using in the BMS.

Applications, "Heating", "Cooling" and "Heating & Cooling"

Controller Type can be set to 2-point control or proportional control (PI-loop) with PWM for thermal actuators.

The application heating & cooling supports 2-pipe configuration with change over sensor (i.e. SR65 VFG) only.

Set point offset will usually be used in Comfort mode only, however by ticking Active during non-comfort Modes" the set point offset will be always used.

If the pipe temperature sensed by the SR65 VFG exceeds the threshold "Heating" mode will be activated. If the pipe temperature is lower "Cooling" mode will be activated.

The output can also be inverted.

Basic Set point defines the centre position of a dial type setpoint adjuster

Setpoint Offset is the range by which the user can shift the setpoint up or down.

Freeze-Protection is the threshold to automatically turn on "heating" mode independently of the set point, for frost protection of pipes.

Controls the Valve's **Min** and **Max** range limit

Controller's PI-loop is characterized by parameter **P** (proportional band) and **I** (Integration time)

The PI loop's output will be converted to a **PWM** (pulse width modulation) signal based upon a cycle time representing the control variable of 100% .

Controlled by occupancy sensors the Set point can be lowered to **ECO** or **Stand-by** mode

With a switch, keycard switch or occupancy sensor the mode can be switch from ECO to Comfort and vice versa. The SRxx-MS' sliding switch (EEP: A5-10-06) or the SR65-DI (EEP: A5-30-02) can also switch to **Stand-By** mode.

Restarting after a power failure STC-DO will start with a pre-defined status (ON or OFF) or will restart with the last status before the power failure. Once the room sensor's telegram is received again, the control loop will be updated back to the last program setting.

Lighting Applications

Any side of a rocker can be configured to work as ON, OFF, Switch (Toggle), Switch (Pulse), push button pressed or push button released.

OFF Switches the relay (permanently) Off.

ON switches the relay (permanently) On.

Switch (Toggle) realizes a 1-button operation: ON-OFF-ON-…

Switch / Impulse activates the relay for 5 s.

Push button **Pressed** activates the relay as long as the switch's rocker is pressed. (dead man's switch)

Push button **Released** activates the relay until the switch's rocker is pressed.

If an SR-MDS is assigned, the relay can be controlled by the brightness sensed by the SR-MDS. If the brightness is below the **Set point** the relay will be turned on. If the brightness exceeds Set point the relay will be turned off. This can be activated by ticking box **PIR available**.

The output can be optionally inverted if required.

The relay's status is indicated by the LED, which is lit while the relay is ON.

Restarting after a power failure STC-DO will start with a pre-defined status (ON or OFF) or restart with the last status/operation before the power failure.

Application "Humidistat"

Humidistat application is a 2-point control of the relative humidity using a rH-sensor (EEPs: A5-04-01 or A5-10-10/11/12)

If a sensor without a set point dial is used (SR04 rH) the fixed **Settings** will be used: If the rH sensed exceeds the **ON set point**, the relay will be turned on. Once the rH value drops below the **OFF set point** the relay will be turned off.

When using a sensor with a set point, i.e. SR04P rH the threshold will be calculated from the **base set point** plus the set point dial's position received from the sensor. The parameter **On Setpoint'**, and **Off Setpoint** will not be used in this case. If the rH sensed exceeds the sum of **Base set point** plus **set point shift** received from the sensor, the relay will be turned on. Once the rH value drops below the threshold the relay will be turned off.

The output can be optionally inverted. The relay's status is indicated by the LED, which is illuminated while the relay is ON.

Restarting after a power failure STC-DO will start with a pre-defined status (ON or OFF) or restart with the last status before the power failure.

Applications: Special

Custom programmable applications using 2-point control based on temperature, brightness, CO2, relative humidity or window status. Custom programs can be selected: "more – less – equals" can be selected in combination with a threshold to turn on or off the relay.

To delete a threshold „*" must be chosen. If multiple condition are defined the last condition processed will control the relay.

I.e.: Condition CO_2 ON > 1200ppm and Humidity OFF > 70%. Sensor-data received: 1400ppm and 73%rh. The first condition (CO_2 ON > 1200ppm) is correct and the 2nd condition (Humidity OFF > 70%.) is also correct. The Humidity condition will be processed after the CO2 condition and the relay will stay off.

Restarting after a power failure, STC-DO will start with a pre-defined status (ON or OFF) or restart with the last status before the power failure.

Example: Windows/Door
When the window is opened, the relay switches on.
ON **[open]**
OFF **[closed]**

Delays

For all sensor types: An ON- and OFF-delay can be set from 0..99 sec or 0..99 minutes.

PTM	– Switch
KCS	– Keycard
PIR	– Occupancy
SRW	– Window contact or handle

i.e 2 minute ON- delay for a window contact will prevent the immediate shut off of the heating or AC just because to window is briefly opened and closed.

Occupancy sensors based on PIR typically are operated using an OFF-delay to maintain the occupancy if the room is left for a few moments only.

Switches (PTM), Keycard switch (KCS) and occupancy sensors (PIR) action the occupancy status.

Window contacts and/or handles (SRW, SRG) shut off heating or cooling, when activated.

Party-Mode can be activated using the push button of SR04xT. When activated it extends the comfort time by the selected time period.

Learn-In of sensors
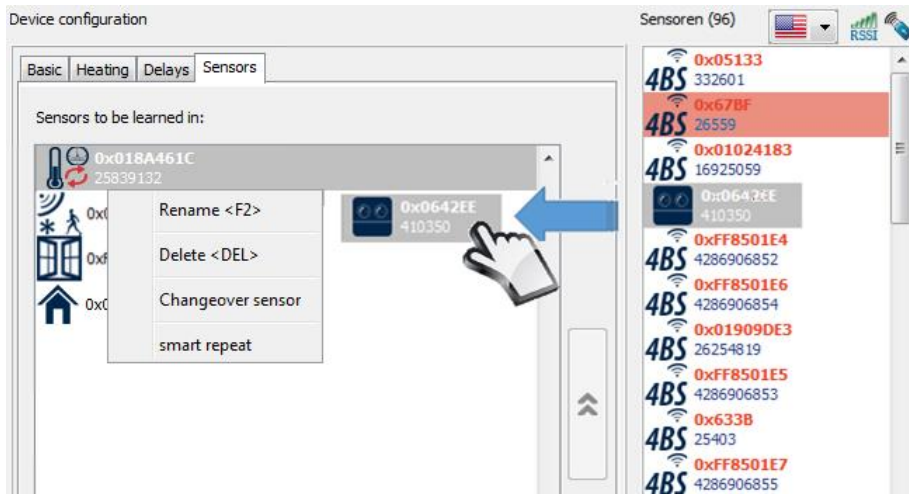
Sensors and devices, within range, are listed on the right side of airConfig. To learn in a specific sensor simply drag and drop the (activated) symbol into the sensors input tab of the STC-DO. The Sensor's (EEP) type must be known to be assigned correctly through activation of the sensor or switch. The sensor type is coded in the EEP, which is included in the sensor's LRN telegram.

Right-clicking on the symbol of the SR65-VFG temperature sensor offers the option to declare this as the change-over sensor, which airConfig indicates by red arrows in a circle.

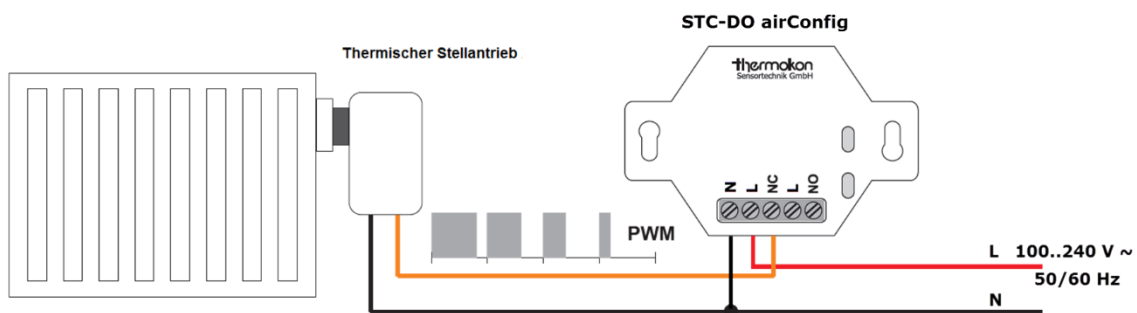## Superior Controller Profile A5-20-12 for heating / cooling / ventilation

The local control loop can be overwritten by the BMS using the superior controller profile EEP A5-20-12. The BMS through a bidirectional gateway such as the LON, Modbus or BACnet gateway will be taught in as shown above. It Because of the special EEP it will override and priority control compared to the local control loop.

To return the control to the local loop the BMS must set back all changes to the default value (send $00\text{-}FF\text{-}80\text{-}08_{hex}$ (DB3..DB0)). STC-DO will monitor the superior Controller profile telegrams, same as any other sensor signal. If a signal is not received for more than 90 minutes the control will be shifted back to the local control loop and replacing the previously received data from the BMS.

Send Configuration

Finally to transfer the configuration made through "airConfig", right-click on the STC-DO's symbol and select the context menu „send configuration"

Electrical Connection

Dimensions (mm)

60

48

70

35

48