

Busch-triton® switch sensor with thermostat, FM

Type: 6327-xx



The application module is placed on a flush-mounted bus coupler.

The 5-fold switch sensor can for example send telegrams for switching, dimming, shutter control, value or ventilation control to EIB actuators. The two upper rockers can be used together with the auxiliary push button to operate the thermostat.

The two lower rockers can be used to control lightscenes.

The following information can be shown in the integrated display.

- current room temperature
- setpoint temperature
- operation mode

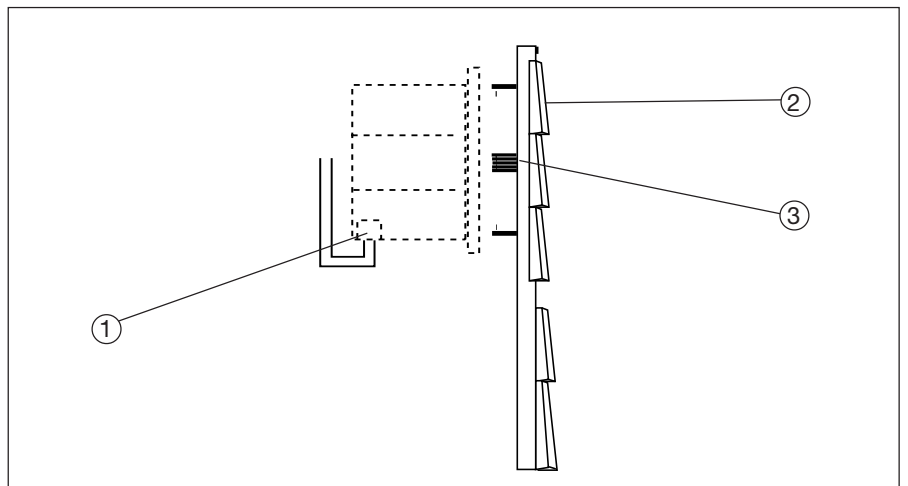
Each operating element has a status LED as well as a backlit labelling field.

Technical data

Power supply	- EIB	24 VDC, via the bus line
Operating and display elements	- 5 rockers, each with 2 switch contacts	
	- 5 two-colour LEDs	red / green
	- 5 backlit labelling fields	
Connections	- Bus coupler UP	10-pole plug connector
Type of protection	- IP 20, EN 60 529	
	mounted on the bus coupler	
Ambient temperature range	- Operation	- 5 °C ... 45 °C
	- Storage	-25 °C ... 55 °C
	- Transport	-25 °C ... 70 °C
Design	- Busch-triton®	
Colour	- amber, obsidian, palladium, titanium, platinum, bronze, studio white matt, alabaster/studio white, hansa blue, cobalt blue, diamond black, alpine white, light grey, champagne metallic	
Mounting	- latched onto bus coupler FM	
Dimensions	- 159.4 x 90 mm (H x W)	
Weight	- 0.13 kg	
Certification	- EIB-certified	
CE norm	- in accordance with the EMC guideline and the low voltage guideline	

Application programs	Number of communication objects	Max. group of group addresses	Max. number of associations
IR Switch Dim Shu. Val. Vent. Heat Cool /1	19	18	18
IR Switch Dim Shu. Val. Vent LS Heat Cool /1	20	20	20

Circuit diagram



1 Bus connection

2 Application module

3 10-pole plug

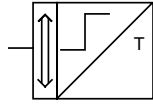
Note

When installing two Busch-triton® switch sensors horizontally, a distance of 112 mm is recommended (using 2 flush-type spacers, e.g. 2 x Kaiser spacers 91).

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IR Switch Dim. Shu. Val. Vent. Heat Cool/1



Selection in ETS2

- ABB
 - └ Heating
 - └ Thermostat triton

- ABB
 - └ Push Button triton
 - └ Push button, 5-fold with thermostat

The application program is intended for the 5-fold Busch-triton® switch sensor with thermostat application module.

The Busch-triton® switch sensor acts as a thermostat and can be used simultaneously for switching, dimming, shutter control, sending 1 byte values and/or ventilation control. Depending on the parameter settings of the five rockers, different communication objects are displayed or hidden.

The application program differentiates between “Low Access” and “High Access” in the parameter settings. If the program is switched to “High Access” in ETS, all the parameters are visible and can be modified.

There is a common parameter “Push button action interpreted as long from” for all the rockers that are used for dimming, shutter control or ventilation control. The value that is set here determines how long a push button must be pressed for the switch sensor to detect a long switch operation. The default setting is 420 ms.

The Busch-triton® switch sensor normally operates in “switch sensor” mode. In this mode, it is possible to send 1 byte values or send switching commands that were defined during commissioning for controlling the lighting, the shutters or the ventilation. In switch sensor mode, the rockers can alternatively also be permanently assigned the operating modes of “Temperature setpoint” or “Standby / comfort”.

If the auxiliary push button is pressed, the Busch-triton® switch sensor functions as a thermostat. The first three rockers can now be used for setting the thermostat functions. The device automatically reverts to the “switch sensor” mode approx. 5 s after the last operation.

LCD

In the “switch sensor” mode, the current room temperature and the current mode of the thermostat are indicated by default on the display. It is possible to display the current setpoint or actual value using the parameter “Display of temperature in sensor mode”.

Alternatively, the temperature display can also be permanently switched off with the setting “no temperature display”.

If the “thermostat” mode is selected using the auxiliary push button, the current setpoint and the operation mode of the thermostat appear in the display. The unit (°C) also starts to flash. The current setpoint is displayed for each operation mode (comfort mode, night operation or frost/heat protection) for the thermostat function.

If the parameter “Setpoint heat protection” on the “Setpoints” parameter page is set to “Cooling disabled” and an “On” telegram is received at the “Frost/heat protection” object when the cooling is switched on, then the display only indicates the “Off” state instead of the current setpoint.

LED backlighting

The backlit text fields indicate the functions of the rockers even in the dark. The text field and the status LEDs can be switched on or off depending on the parameters assigned. Alternatively, they can also be switched via rocker 3 in the “thermostat” mode or via the “Night operation” communication object.

The status LED and the LCD backlighting can be coupled to the behaviour of the text field LEDs or permanently switched on.

In switch sensor mode, the LEDs can be selected for use as an orientation light or for status display with the parameter “Operation mode of LED”. When selected as an orientation light, the colour of each LED can be set separately.

IR

In addition to using the rockers, the Busch-triton® switch sensor can also be controlled remotely via an infrared hand-held transmitter. The five rockers and the auxiliary push button can be assigned to the white or blue infrared area of the hand-held transmitter. The relevant setting must then be selected via the slide switch on the transmitter.

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The MEMO button of the transmitter corresponds to the function of the auxiliary push button of the Busch-triton® switch sensor.

Switch

In the default setting of the Busch-triton® switch sensor, there is a switch function with a 1 bit communication object available for each rocker. The rocker then toggles when it is operated.

If the parameter “Number of switch functions” is increased to “2 Functions -> 2 Objects” for more complex applications, two 1 bit communication objects are available for each rocker for switching. The parameter “Working mode of the rocker” determines which value the switch sensor sends when the left or the right side of the rocker is pressed.

Dim

If the operation mode of the rocker is set to “dimming sensor”, the rocker has the communication objects “Rocker ... short” for switching and “Rocker ... long” for dimming.

When carrying out a switching operation, the switch sensor does not distinguish by default between whether the rocker is pressed briefly on the left side, the right side or in the middle. In this case it always toggles. If the switch function of the right or left rocker should be defined, this is carried out with the parameter “Dimming direction”.

It is also determined via the parameter “Dimming direction” which side of the rocker must be pressed and held down in order to dim up or down. When the rocker is released, the switch sensor sends the telegram “Stop dimming”.

Shutter

If the operation mode of the rocker is set to “shutter sensor”, the switch sensor sends “Move shutter up/down” telegrams when it is pressed for a long period. If it is pressed for a short period, it sends telegrams to stop shutter movement or for step-by-step lamella adjustment.

The parameter “Shutter direction” determines which side of the rocker must be pressed in order to raise or lower the shutter.

With the parameter “Automatic shading”, it is possible to integrate the shutters in the cooling system. To do so, the parameter must be changed from the default setting “inactive” to “send ON telegram” or “send OFF telegram”. The sending of an “On” or “Off” telegram is dependent on the type of shutter actuator used. Normally, a shutter is always lowered with an “On” telegram (see also “Heat and cool”).

Value

If the operation mode of the rocker is set to “value”, the switch sensor sends 1 byte values when the rockers are pressed.

The parameter “Rocker ... value (0..255)” determines which value is sent when the left or right push button is pressed.

Continuous ventilation

If the operation mode of the rocker is set to “Ventilation continuous”, the switch sensor reads the 1 byte value from the bus when the rocker is pressed and indicates it as a percentage in the display. After further switch operations, the current setpoint is increased or reduced in 5% steps. The new value is sent approx. 3 s after the last operation.

The parameter “Lower limit of ventilation” and “Upper limit of ventilation” specify the setpoint range for ventilation control which can be adjusted via the rockers.

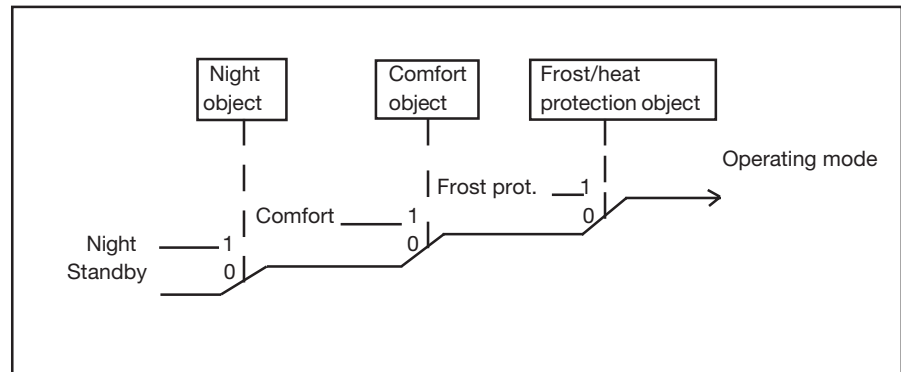
The parameter “Working mode of the rocker” determines which side of the rocker raises or lowers the value.

Temperature setpoint

The modification of the setpoint normally takes place by changing to the thermostat mode. If the parameter “Operation mode of rocker” is set to “Temperature setpoint”, a rocker can also modify the setpoint temperature in switch sensor mode.

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The setpoint is lowered by pressing the left side of the rocker and raised by pressing the right side of the rocker.

Standby / comfort

The comfort and standby operating modes are normally toggled in thermostat mode. If the operating mode of the rocker is set to “Standby / comfort”, the operating mode can also be toggled in switch sensor mode.

The left side of the rocker switches to standby mode while the right side switches to comfort mode.

Control

Three control functions “Heat and cool”, “Heat” and “2-step heat” can be set. Once the control function has been selected, the parameters required for further settings are made available.

Using the auxiliary push button, it is possible to switch to the thermostat mode. The following are defined in this mode:

- first rocker for changing the setpoint temperatures,
- second rocker for toggling between comfort or standby mode; for activation/deactivation of party mode during night operation; for manual suppression of frost/heat protection (comfort extension),
- third rocker for switching the backlighting on or off.

It is possible to prevent a change to the thermostat mode by disabling the parameter “Function of auxiliary push button”. This setting is advisable in functional buildings.

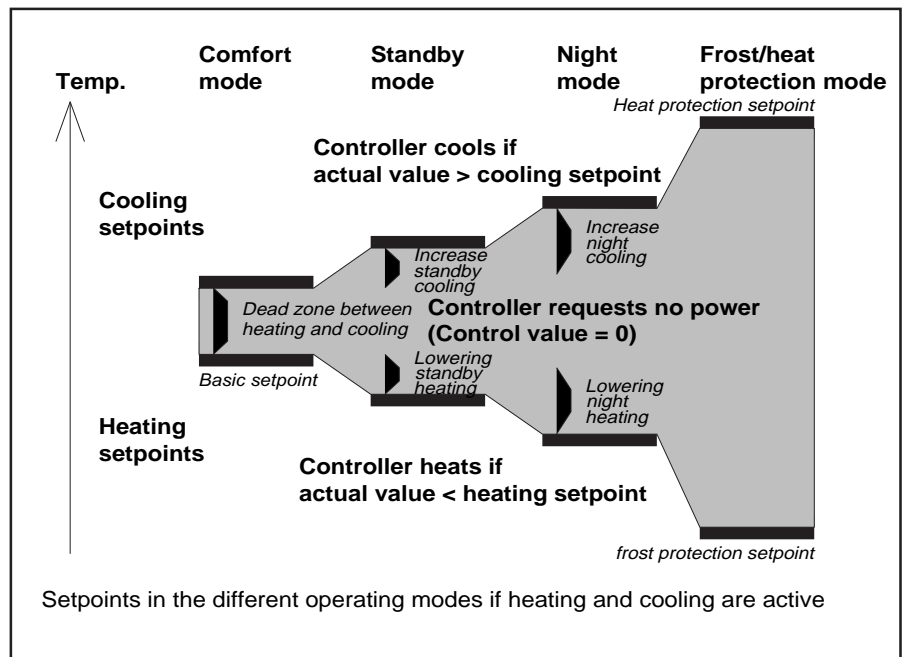
The thermostat has four operating modes. The frost protection mode has the highest priority i.e. if this mode is active, it is not possible to switch to another mode. The frost protection mode must be deactivated again first e.g. by closing an open window. The comfort mode has the next highest priority followed by night operation. If none of these three modes is active, the thermostat is set to standby mode (see also the diagram of the operating modes on the next page).

It is possible to disable or limit the manual adjustment of setpoints via the parameter “Range for manual setting of the setpoint”. In addition, upward or downward adjustment can be limited or prevented via the parameters “Max. increase...” or “Max. reduction of setpoint”. A setpoint adjustment affects all the setpoints that are dependent on the comfort temperature. For example, if the standby temperature is increased by 1°C, all the setpoints for comfort mode, night operation and standby in heat and cool mode are likewise reduced by 1°C. The setpoints for frost and heat protection cannot be modified manually.

The base setpoint can also be changed as often as required via the bus. A 2 byte telegram value must be sent to the “Base setpoint” object.

Party time (comfort extension)

It is possible to recall a party mode i.e. the user is able to select a comfort extension period during night operation when the switch sensor is in thermostat mode. The party mode can be activated by pressing the right side of rocker 2 (changes into comfort mode). Once the party time has elapsed, the thermostat reverts to night operation.



During the party mode, the symbols for night operation and comfort mode are indicated in the display. By pressing the left side of rocker 2, the party mode can be manually reset to night reduction.

If required, this function can also be used for the temporary deactivation of heat and frost protection. As in the case of night operation, the comfort mode is selected for the set period. The function is switched on and off in the same way. During this comfort extension period, the symbols for frost protection and comfort are indicated in the display.

Heat and Cool

The following setpoint values can be set for heat mode: "Base setpoint in °C (16..35)", "Reduced heating in standby mode in K (1..8)", "Reduced heating during the night in K (1..12)" and "Setpoint frost protection in °C".

The comfort temperature for cool mode can be set via the parameter "Insensitive range between heat and cool in K (1-10)". The setpoint settings for standby mode and night operation then refer to this value: "Increased cooling in standby mode in K (1..8)" and "Increased cooling during night in K (1..12)".

If the base setpoint is for example set at 22°C and the room is to be cooled in comfort mode at 25°C, it is necessary to select an insensitive zone of 3°C. If the room is then to be cooled in standby mode at 27°C, the value must be increased by 2°C. Cooling the room during night operation with a minimum temperature of 29°C requires this value to be increased by 4°C.

It is possible to preselect a setpoint for heat protection which enables the room to be cooled despite the window being open. If heat protection is not required, the cooling mode can be disabled. In this case, the receipt of an "On" telegram at the frost/heat protection object causes the value 51°C to be output via the setpoint object instead of the current setpoint. The display in the thermostat mode then indicates "OFF".

In the default setting, the thermostat automatically toggles between heat and cool. If this is not required, the toggling can be carried out by an external, central controller via the object "Heat/cool". To do so, the parameter "Toggle between heat and cool" must be set to "via Object heat/cool".

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If automatic toggling is selected, the thermostat decides when it should toggle between heat and cool. The object "Delete external setpoint" is also available to reset the manual setpoint (e.g. +3 K). If a "0" or "1" is sent to the object, the setpoint is set to zero.

If the automatic toggling between heat and cool is replaced by external toggling, the heating or cooling symbols are permanently visible for the duration of the relevant operating mode.

The external toggling between heat and cool is carried out via the object "Delete external setpoint". If a telegram with a "1" is received, the heating is activated while the cooling mode is activated by a telegram with the value "0". Heating is active after a reset.

With the setting "Behaviour when receiving a base setpoint value", it is defined whether the manual setpoint is reset or not once a setpoint has been received.

If a base setpoint is sent e.g. from a central time switch, it is advisable to reset the values that have been set locally (e.g. +3 K). All the thermostats that are addressed thus have the same setpoint. In the operating mode "Heat and cool", both control values are sent cyclically.

In order to prevent the room from warming up in cooling mode due to sunlight, at least one rocker can carry out automatic shading when operated as a shutter sensor by lowering the shutter. The setpoint is set via the parameter "Automatic shading ...". This parameter must also be activated for the shutter sensors which are to be used for shading (see also "Shutter").

Via the parameter "Change of actual temperature for automatic sending", it is defined which temperature change causes a new temperature value to be sent. By default, the current setpoint is sent once a new temperature has been sent. It is also possible to deactivate the sending of the setpoint.

A cyclic time also specifies when the thermostat sends the current temperature, without dependence on a temperature variation.

If the measured temperature value is invalidated by the bus or mains coupler generating their own heat, the user can set an "Offset for temperature measurement". The default setting "0" is recommended as an offset value for bus couplers.

In order to be able to address the various control systems for heating and cooling, the Busch-triton® switch sensor can be assigned parameters for continuous or switching control. In the case of the switching control mode, it is also possible to select whether the control is two-step or by pulse width modulation.

In the case of a switching PWM controller, the output value of the controller (0...255) is converted into an ON/OFF function. For example, if a control value of 70% is to be produced, the ON time will be 7 minutes and the OFF time will be 3 minutes with a preselected cyclic interval of 10 minutes. The dynamic range can also be limited here as for the continuous controller.

The preset control parameters about the type of heating or cooling system can be used for continuous control and switching PWM control. If other control parameters are required, these can be set individually via more detailed parameters. A certain level of experience in control technology is required in order to use this option.

The continuous controller gives its control value to a 1 byte object. The minimum or maximum control value of the controller can be adapted for specific control valves that do not use the complete dynamic range (0...255) because their own dynamic range only extends from 25 to 180. The dynamic range of the system (thermostat + control valve) is thus increased. The control value "0" is sent in order to close the control valve.

To prevent unnecessary bus loads, it is possible to select what size the change of the control valve must be before it may be sent on the bus. The setting is a percentage value. The sending of the control value is also limited by a cyclic interval e.g. every 30 minutes.

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In order to optimise the control characteristics of the heating or cooling system, the “Cyclic time of the switching control value” can be defined. When setting the cyclic time, it is important to consider the type of heating or cooling as well as the valve drive that is being used. The following recommendations can therefore be used:

a) Thermal control valve

It takes approx. 2-3 minutes to open an electrothermal valve completely. It is therefore not a good idea to set a shorter cyclic time than 15 minutes.

b) Floor heating

The time constant of a floor heating system is very large. A cyclic time of 20 minutes is therefore sufficient.

c) Warm water heating

This type of heating makes frequent use of electrothermal drives. A cyclic time of 15 minutes produces excellent control-action results.

d) Electric heating

Cyclic times between 10 and 15 min are recommended, depending on the electric heating system and the conditions in the room.

If a two-step controller is used for heating or cooling control, it is possible to select different sizes for the hysteresis which fluctuates by the setpoint value. If the setpoint for heating mode lies at 20°C and the hysteresis is set at 0.5 K, then the controller switches on at 19.5°C and switches off again at 20.5°C. The selected hysteresis is then orientated to how quickly the heating or cooling system can warm up or cool down the room and how sensitive the customer is to the temperature. The hysteresis should not be too small as otherwise the valve drive continually opens and closes. It should also not be too large as there is a relatively high level of temperature fluctuation in the room.

The parameter “Reduction of hysteresis” serves to increase the accuracy of the controller. If this parameter is active, the hysteresis will be reduced e.g. by 0.1 K every minute until it reaches 0 K. The temperature fluctuations are effectively reduced during the control phase due to the reduction of the hysteresis. If the hysteresis is to be reduced, a setting smaller than one fifth of the hysteresis is recommended.

e.g. hysteresis 0.5 K =>
reduction < 0.1 K/min

In specific cases (floor heating), it may be necessary to install a quick-acting additional heating system in order to heat the room up rapidly. In the “two-step heating” mode, the thermostat offers a second heating system which can be regulated via switching control (1 bit) or continuous control with 1 byte values 0% to 100%.

The parameters “Setpoint difference of basic heating to additional heating” and “Hysteresis (one-sided)” are used to determine when the additional heating is switched on and off. As for the basic heating, unnecessary bus loads can be avoided by assigning a suitable cyclic time for the control value.

As some valve drives close with a 1 byte value of “255” or a 1 bit value of “1” and open with other values, the “Mode of control output” can also be inverted.

In the case of voltage failure, it can also be selected which operation mode the thermostat should have after bus voltage recovery.

Communication objects
for switch sensor, heat and cool and switching control

No.	Type	Object name	Function
0	1 bit	Operation mode	Frost/heat protection
1	1 bit	Operation mode	Night mode
2	1 bit	Operation mode	Comfort mode
3	1 bit	Control value	Heat (switching)
5	2 byte	Base setpoint	Teleg. temperature
6	2 byte	Current temperature	Room temperature
7	2 byte	Current setpoint	Teleg. temperature
8	1 bit	Operation mode	Reset of manual adjustment
9	1 bit	Rocker 1	Teleg. switch
11	1 bit	Rocker 2	Teleg. switch
13	1 bit	Rocker 3	Teleg. switch
15	1 bit	Rocker 4	Teleg. switch
17	1 bit	Rocker 5	Teleg. switch

Communication objects
for switch sensor with 2 switch functions

No.	Type	Object name	Function
...			
9	1 bit	Rocker 1 left	Teleg. switch
10	1 bit	Rocker 1 right	Teleg. switch
11	1 bit	Rocker 2 left	Teleg. switch
12	1 bit	Rocker 2 right	Teleg. switch
13	1 bit	Rocker 3 left	Teleg. switch
14	1 bit	Rocker 3 right	Teleg. switch
15	1 bit	Rocker 4 left	Teleg. switch
16	1 bit	Rocker 4 right	Teleg. switch
17	1 bit	Rocker 5 left	Teleg. switch
18	1 bit	Rocker 5 right	Teleg. switch

Communication objects
for dimming sensor

No.	Type	Object name	Function
...			
9	1 bit	Rocker 1 -short	Teleg. switch
10	4 bit	Rocker 1 -long	Teleg. dimming
11	1 bit	Rocker 2 -short	Teleg. switch
12	4 bit	Rocker 2 -long	Teleg. dimming
13	1 bit	Rocker 3 -short	Teleg. switch
14	4 bit	Rocker 3 -long	Teleg. dimming
15	1 bit	Rocker 4 -short	Teleg. switch
16	4 bit	Rocker 4 -long	Teleg. dimming
17	1 bit	Rocker 5 -short	Teleg. switch
18	4 bit	Rocker 5 -long	Teleg. dimming

Communication objects
for shutter sensor

No.	Type	Object name	Function
...			
9	1 bit	Rocker 1 -long	Teleg. Move up/down
10	1 bit	Rocker 1 -short	Teleg. lamella adj./stop
11	1 bit	Rocker 2 -long	Teleg. Move up/down
12	1 bit	Rocker 2 -short	Teleg. lamella adj./stop
13	1 bit	Rocker 3 -long	Teleg. Move up/down
14	1 bit	Rocker 3 -short	Teleg. lamella adj./stop
15	1 bit	Rocker 4 -long	Teleg. Move up/down
16	1 bit	Rocker 4 -short	Teleg. lamella adj./stop
17	1 bit	Rocker 5 -long	Teleg. Move up/down
18	1 bit	Rocker 5 -short	Teleg. lamella adj./stop

Communication objects
for value sensor

No.	Type	Object name	Function
...			
9	1 byte	Rocker 1	Telegr. value
11	1 byte	Rocker 2	Telegr. value
13	1 byte	Rocker 3	Telegr. value
15	1 byte	Rocker 4	Telegr. value
17	1 byte	Rocker 5	Telegr. value

Communication objects
for ventilation sensor

No.	Type	Object name	Function
...			
9	1 byte	Rocker 1 ventilation	Telegr. value
11	1 byte	Rocker 2 ventilation	Telegr. value
13	1 byte	Rocker 3 ventilation	Telegr. value
15	1 byte	Rocker 4 ventilation	Telegr. value
17	1 byte	Rocker 5 ventilation	Telegr. value

Communication objects
for continuous control

No.	Type	Object name	Function
...			
3	1 byte	Control value	Heat (continuous)
4	1 byte	Control value	Cool (continuous)
...			

Communication objects
for switching control

No.	Type	Object name	Function
...			
3	1 bit	Control value	Heat (switching)
4	1 bit	Control value	Cool (switching)
...			

Communication objects
for 2-step heat (switching)

No.	Type	Object name	Function
...			
3	1 bit	Control value	Heat (switching)
4	1 bit	Control value	Additional heating (switching)
...			

Communication objects
for 2-step heat (continuous)

No.	Type	Object name	Function
...			
3	1 byte	Control value	Heat (continuous)
4	1 byte	Control value	Additional heating (continuous)
...			

Communication objects
for external toggling of heat and cool

No.	Type	Object name	Function
...			
8	1 bit	Operation mode	Heat/cool
...			

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Parameters

The default setting for the values is **printed in bold type**.

General:	
- Function of auxiliary push button	no function Adj. of thermostat
- IR area	blue white no IR
- Behaviour of text field LEDs	always off control only via rocker 3 Switched off in night mode always on
Only if LEDs are switched off:	
- Switching off of the LCD lighting	with text field LEDs Disable switching off
- Switching off of the status LEDs	with text field LEDs Disable switching off
Only if LEDs are always switched on:	
- Switching off of the LCD lighting	Disable switching off
- Switching off of the status LEDs	Disable switching off
- Push button action interpreted as long from	280 ms / 420 ms / 560 ms / 700 ms / 840 ms
Controller general:	
- Used control functions	Heat and cool Heat 2-step heat
- Party time (comfort enlargement)	inactive 30 min 1 h 1.5 h 2 h 2.5 h 3 h 3.5 h 4 h
- Frost/heat mode suppressable (comfort enlargement)	not used disabled
- Display of temperature in sensor mode	Current value Current setpoint no temperature display
- Operation mode after reset	Standby Comfort mode Night Frost/heat protection

Parameters

The default setting for the values is **printed in bold type**.

Separate for each rocker:	
- Operation mode of rocker	Switching sensor Dimming sensor Shutter sensor Value Ventilation continuous Temperature setpoint Standby / comfort
In switch sensor mode:	
- Number of switch functions	2 Functions => 2 Objects 1 Function => 1 Object
With only 1 switch function:	
- Working mode of the rocker	TOGGLE left = OFF, right = ON left = ON, right = OFF
If 2 switch functions are selected:	
- Working mode of the rocker	left = TOGGLE, right = TOGGLE left = TOGGLE, right = OFF left = OFF, right = TOGGLE left = OFF, right = OFF left = TOGGLE, right = ON left = OFF, right = ON left = ON, right = TOGGLE left = ON, right = OFF left = ON, right = ON
In dimming sensor mode:	
- Dimming direction	left = darker/TOGGLE, right = brighter/TOGGLE left = brighter/TOGGLE, right = darker TOGGLE left = darker/OFF, right = brighter/ON left = brighter/ON, right = darker/OFF
In shutter sensor mode:	
- Shutter direction	left = DOWN, right = UP left = UP, right = DOWN
- Automatic shading (see also at setpoint)	inactive send ON telegram send OFF telegram
In switch, shutter and dimming sensor mode:	
- Operation mode of LED	orientation light shows value of object rocker -long
Only for display of object value:	
- Colour of the LED	OFF = green , ON = red OFF = red, ON = green
Only for orientation light:	
- Colour of the LED	always green always red always off

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Parameters

The default setting for the values is **printed in bold type**.

In value mode:	
- Rocker left - value (0..255)	0
- Rocker right - value (0..255)	255
- Operation mode of LED	Operation of the rocker orientation light
Only for operation of the rocker:	
- Colour of the LED	left = green , right = red left = red, right = green
Only for orientation light:	
- Colour of the LED	always off always red always green
In continuous ventilation mode:	
- Working mode of the rocker	left = down, right = up left = up, right = down
- Lower limit of ventilation	0% / 10% / 20% / 30%
- Upper limit of ventilation	70% / 80% / 90% / 100%
- Colour of the LED	always green always red always off
In temperature setpoint mode:	
- Working mode of the rocker	left= decrease, right = increase
- Colour of the LED	always green always red always off
In standby/comfort mode:	
- Working mode of the rocker	left = standby, right = comfort
- Colour of the LED	always green always red always off
Room temperature:	
- Change of actual temperature for automatic sending	inactive at 0.2 K at 0.4 K at 0.6 K at 0.8 K at 1.0 K at 1.2 K at 1.4 K at 1.6 K at 1.8 K at 2.0 K
- Send current setpoint if changes	inactive active
- Cyclic time for automatic sending of temp. difference	inactive every 3 min every 5 min every 10 min every 15 min every 30 min every 60 min
- Offset for temperature measurement (-128 ... 127) x 0.1 K	0

Parameters

The default setting for the values is **printed in bold type**.

Setpoints	
- Base setpoint in °C (16..31)	16 °C / ... / 21 °C / ... / 31 °
- Reduced heating in standby mode in K (1..8)	1 K / 2 K / ... / 8 K
- Reduced heating during the night in K (1..8)	1 K / ... / 4 K / ... / 8 K
- Setpoint frost protection in °C	5 °C / ... / 7 °C / ... / 10 °C
- Automatic shading (is only active on rockers with shutter mode)	current temp. > comfort setpoint heating + 2 K current temp. > comfort setpoint heating + 4 K current temp. > comfort setpoint heating + 6 K current temp. > comfort setpoint heating + 8 K
Only for heat and cool:	
- Insensitive range between heat and cool in K (1..8)	1 K / 2 K / ... / 8 K
- Increased cooling in standby mode in K (1..8)	1 K / 2 K / ... / 8 K
- Increased cooling during night in K (1..8)	1 K / 4 K / ... / 8 K
- Setpoint heat protection	Cooling disabled 30 °C 35 °C 40 °C 44 °C
- Toggle between heat and cool	automatically/ object "delete external setpoint" via Object "heat/cool"

Busch-triton® switch sensor with thermostat, FM

Type: 6327-xx

Parameters

The default setting for the values is **printed in bold type**.

For heat and cool mode:	
- Output of control value	continuous switching
Only for switching control value:	
- Control mode	Two-step control PWM control
Only for PWM control:	
- Control parameter	by installation type more detailed
Only for heating:	
- Type of heating	Warm water heating (1.5 K/100 min) Electrical heating (1.5 K/50 min) Floor heating (4 K/200 min)
Only for cooling:	
- Type of cooling	cool ceiling (5 K/240 min) SplitUnit / Fan coil (4 K/90 min)
Only if "more detailed" is selected:	
- Proportional range	1 K / 1.5 K / 2 K / 2.5 K / 3 K / 4 K / 5 K / 6 K / 8 K
- Readjust time in min.	0 min / 10 min / ... / 100 min / ... / 240 min
- Cyclic time of the switching control value	3 min / 5 min / 10 min / 15 min / 20min / 30 min
- PWM cycle is 0 % up to an output value	0% / 5% / 10% / 15% / ... / 30%
- PWM cycle is 100 % up to an output value	70% / 75% / ... / 90% / 95% / 100%
Only for two-step control:	
- Hysteresis	0.3 K / 0.5 K / 0.7 K / 1.0 K / 1.5 K / 2 K
- Reduction of hysteresis	inactive 0.2 K/min 0.1 K/min 0.066 K/min 0.05 K/min 0.04 K/min 0.033 K/min 0.029 K/min
- Cyclic time for automatic sending	every 3 min every 5 min every 10 min every 15 min every 30 min every 60 min
Only for continuous control:	
- Control parameter	by installation type more detailed
Only for heating control:	
- Type of heating	Warm water heating (1.5 K/100 min) Electrical heating (1.5 K/50 min) Floor heating (4 K/200 min)
Only for cooling control:	
- Type of cooling	cool ceiling (5 K/240 min) SplitUnit / Fan coil (4 K/90 min)
Only if "more detailed" is selected:	
- Proportional range	1 K / 1.5 K / 2 K / 2.5 K / 3 K / 4 K / 5 K / 6 K / 8 K
- Readjust time in min.	0 min / 10 min / ... / 100 min / ... / 240 min
- Minimum control value	0% / 5% / 10% / 15% / ... / 30%
- Maximum control value	70% / 75% / ... / 90% / 95% / 100%
- Change for automatic sending of control output	2 % / 5 % / 10 % / inactive

Parameters

The default setting for the values is **printed in bold type**.

- Cyclic time for automatic sending of control output	every 3 min every 5 min every 10 min every 15 min every 30 min every 60 min
- Mode of control output	normal inverted

For two-step heat (additional heating):

- Setpoint difference of basic heating to additional heating	1 K / 2 K / 3 K
- Hysteresis (one-sided)	0.3 K / 0.5 K / 0.7 K / 1.0 K / 1.5 K / 2 K
- Cyclic time for automatic sending of control output	inactive like basic heating
- Type of control value	continuous (1 Byte : 0% or 100%) switching (1 Bit)
- Mode of control value	normal inverted

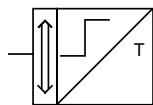
Manual setpointing:

- Range for manual setting of the setpoint	disabled +/- 1 K +/- 3 K +/- 5 K
- Max. increase of setpoint at heating	0 K / 1 K / 2 K / 3 K / 4 K / 5 K

Only for "Heat and cool":

- Max. reduction of setpoint at cooling Example: range of setpoint adj.: +/- 5 K Max. increase at heating: 3 K Max. reduction cooling: 1 K	0 K / 1 K / 2 K / 3 K / 4 K / 5 K Range at heating: -5 K ... +3 K Range at cooling: -1 K ...+5 K
- Behaviour when receiving a base setpoint value	manual setpointing unchanged reset manual setpointing

IR Switch Dim Shu. Val. Vent. LS Heat Cool/1



Selection in ETS2

- ABB
 - └ Heating
 - └ Thermostat triton

- ABB
 - └ Push Button triton
 - └ Push button, 5-fold with thermostat

Note: The descriptions for

- LCD,
 - LED backlighting,
 - IR,
 - switching,
 - dimming,
 - shutter,
 - value,
 - continuous ventilation,
 - temperature setpoint,
 - toggling standby/comfort,
 - controller,
 - party time (comfort extension)
- and heating and cooling have already been outlined in the application description "IR Switch Dim Shu. Val. Vent. Heat Cool".

The additional functions of lightscenes are described in the following section.

If the auxiliary push button is pressed, the Busch-triton® switch sensor is switched to the thermostat operating mode. The first three rockers can be used for setting the thermostat functions. The fourth and fifth rockers are fixed and are used to control lightscene telegrams. The device automatically reverts to the operating mode of switch sensor with lightscenes approx. 5 s after the last operation.

Lightscenes

In lightscene mode, up to four scenes with up to five different groups of actuators can be controlled without special lightscene modules.

The lightscenes can be specified via the device parameters. The user can then reconfigure the parameters individually according to his requirements while the installation is in operation. The auxiliary push button is used for storing new lightscenes (parameters). To do this, the parameter "Function of auxiliary push button" must be set to "Storage of lightscenes" or "Adj. of thermostat/Storage of lightscenes". To be able to use this function, the transmitting group addresses and flags must be assigned correctly when configuring the actuators.

The lightscenes are configured according to the following process.

1. There are four lightscenes which are recalled via rockers 4 and 5.
2. For each of the actuator groups A ... E, it must be determined with the parameter "Type of actuator group ...", whether they use 1 bit communication objects (switch or shutter actuators) or 8 bit communication objects (dimming actuators). Depending on this setting, the ETS2 program displays various parameters and communication objects. Communication objects 15 ... 19 are used for the control of actuator groups A ... E.
3. For each of the lightscenes, values can be preset for the actuator groups on their own parameter page.
4. The first three rockers continue to be available for switching, dimming, shutter control, ventilation control or for sending values.

The LEDs of rockers 4 and 5 change colour to indicate which side of the rocker has been pressed. The LED lights up red when the left side has been pressed and glows green when the right side has been pressed.

Application example:

In a training room, there are two groups of luminaires above the seminar participants (luminaires 1 and 2) and one group of luminaires above the lecture area (luminaire 3). The room can be made darker using two electrically driven blinds. The room temperature should be controlled.

From the lecture area, luminaires 1 and 2 should be switched and dimmed together while luminaire 3 should be switched and dimmed separately. The blinds should likewise be operated and four lightscenes recalled (base lighting, OFF, lecture without projector and lecture with projector). In addition, the room temperature in the lecture area should be controlled with a thermostat.

A 5-fold Busch-triton® switch sensor with thermostat is used together with three switch/dim actuators and two shutter actuators.

Busch-triton® switch sensor with thermostat, FM

Type: 6327-xx

The 5-fold Busch-triton® switch sensor with thermostat in the lecture area has the following parameters:

- Function of auxiliary push button: Adj. of thermostat
- Operation mode of rocker 1: Dimming sensor
- Operation mode of rocker 2: Dimming sensor
- Operation mode of rocker 3: Shutter sensor
- Operation mode of rocker 4: Rocker is assigned to two lightscenes
- Operation mode of rocker 5: Rocker is assigned to two lightscenes
- IR area: blue
- Type of actuator group A: Dimming actuator (8 Bit)
- Type of actuator group B: Dimming actuator (8 Bit)
- Type of actuator group C: Dimming actuator (8 Bit)
- Type of actuator group E: Switch or shutter actuator (1 Bit)

Rocker 1 should be able to switch and dim luminaire 3. The 1 bit communication object of rocker 1 is thus linked to the switching object of the actuator for luminaire 3. The 4 bit communication object of rocker 1 is linked to the dimming object of the actuator for luminaire 3. Rocker 2 should switch and dim luminaires 1 and 2 together. The communication objects of rocker 2 are therefore linked to the dimming objects of the actuators for luminaires 1 and 2. The third rocker should be able to raise and lower the blinds together. The 1 bit communication objects of rocker 3 are thus linked with the objects of the actuators for the shutters. The 1 byte communication objects of actuator groups A to C are linked with the 1 byte objects of the dimming actuators and the 1 bit communication objects of actuator groups D and E are linked with the 1 bit objects of the shutter actuators.

The lecturer can operate all the functions conveniently from any position via IR remote control.

The various preset options of the actuator groups for lightscenes 1 to 4 are fixed so that the seminar participants cannot inadvertently store incorrect lightscene values. It is also still possible to change to the thermostat mode.

Possible lightscenes are for example:

- Lightscene 1: Base lighting
 - Actuator group A: 80%,
 - Actuator group B: 80%,
 - Actuator group C: 80%,
 - Actuator group D: UP,
 - Actuator group E: UP
- Lightscene 2: OFF
 - Actuator group A: 0%,
 - Actuator group B: 0%,
 - Actuator group C: 0%,
 - Actuator group D: UP,
 - Actuator group E: UP
- Lightscene 3: Lecture without projector
 - Actuator group A: 70%,
 - Actuator group B: 70%,
 - Actuator group C: 95%,
 - Actuator group D: UP,
 - Actuator group E: UP
- Lightscene 4: Lecture with projector
 - Actuator group A: 40%,
 - Actuator group B: 40%,
 - Actuator group C: 20%,
 - Actuator group D: DOWN,
 - Actuator group E: DOWN

To be able to maintain a unique assignment of the LEDs of the switch sensors to the dimming actuators even during lightscene operation, the 1 bit communication objects of the dimming actuators are used for status response. To do so, the transmit flags are set for the 1 bit communication objects of the dimming actuators and the objects are linked with the LEDs. The correct assignment of the transmitting group addresses i.e. the group address that ETS2 displays as the first group address of an object, should be noted.

Communication objects

switch sensor with 4 lightscenes and
switch or shutter actuator types

No.	Type	Object name	Function
0	1 bit	Operation mode	Frost/heat protection
1	1 bit	Operation mode	Night mode
2	1 bit	Operation mode	Comfort mode
3	1 bit	Control value	Heat (switching)
5	2 byte	Base setpoint	Teleg. temperature
6	2 byte	Current temperature	Room temperature
7	2 byte	Current setpoint	Teleg. temperature
8	1 bit	Operation mode	Reset of manual adjustment
9	1 bit	Rocker 1	Teleg. switch
11	1 bit	Rocker 2	Teleg. switch
13	1 bit	Rocker 3	Teleg. switch
15	1 bit	Actuator group A	Teleg. switch
16	1 bit	Actuator group B	Teleg. switch
17	1 bit	Actuator group C	Teleg. switch
18	1 bit	Actuator group D	Teleg. switch
19	1 bit	Actuator group E	Teleg. switch

Communication objects

for 4 lightscenes with dimming actuator
types

No.	Type	Object name	Function
...			
15	1 byte	Actuator group A	Teleg. brightness value
16	1 byte	Actuator group B	Teleg. brightness value
17	1 byte	Actuator group C	Teleg. brightness value
18	1 byte	Actuator group D	Teleg. brightness value
19	1 byte	Actuator group E	Teleg. brightness value

Additional **parameters**

The default setting for the values is **printed in bold type**.

General:	
- Function of auxiliary push button	no function Storage of lightscenes Adj. of thermostat Adj. of thermostat/Storage of lightscenes
- Factor of wait state between telegrams by activating lightscenes [0...255] (base 140ms)	10
Separate for rockers 1 to 3:	
- Operation mode of rocker	Switching sensor Dimming sensor Shutter sensor Value Ventilation continuous Temperature setpoint Standby / comfort
For rockers 4 and 5:	
- Rocker is assigned to two lightscenes	<--- NOTE
For actuator types A to E:	
- Type of actuator group ...	Switch or shutter actuator (1 Bit) Dimming actuator (8 Bit)
Separate for each lightscene:	
For switch and shutter actuator types:	
- Preset actuator group ...	OFF / UP ON / DOWN
For dimming actuator types:	
- Preset actuator group ...	0 % / 5 % / ... / 95 % / 100 %