# 3-fold Busch-triton® switch sensor, FM
Type: 6322-xx-101

The switch sensor application module is placed on a flush-mounted bus coupler or a flush-mounted switch actuator/ sensor.

The 3-fold switch sensor can send e.g. switching, dimming or shutter control telegrams to EIB actuators as well as store and retrieve up to 6 lightscenes. All the individual functions of the operating elements can also be called up using an infrared hand-held transmitter.

The switch sensor has a status LED under the operating elements which can glow red or green.

Each operating element has a backlit labelling field. Special functions (e.g. storing of lightscenes) can be recalled via an integrated auxiliary push button in the centre of the infrared receiving field.

In addition a flush-mounted bus coupler or a flush-mounted switch/actuator sensor as well as a bus connecting terminal are required.

**Technical Data**

| | | |
|---|---|---|
| **Power supply** | – EIB | 24 VDC, via the bus line |
| **Operating and display elements** | – 3 rockers each with 2 switch contacts | |
| | – 1 function key | |
| | – 3 two-colour LEDs | red / green |
| | – 3 backlit labelling fields | |
| | – IR receiver | |
| **Connections** | – Flush-mounted bus coupler or<br>– flush-mounted switch actuator/sensor | 10-pole plug connector |
| **Type of protection** | – IP 20, EN 60 529<br>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<br>obsidian<br>palladium<br>titanium<br>platinum<br>bronze<br>studio white, matt<br>alabaster/studio white<br>hansa blue<br>cobalt blue<br>diamond black<br>alpine white<br>light grey<br>champagne metallic | |
| **Mounting** | – latched onto flush-mounted insert | |
| **Dimensions** | – 85 x 90 mm (H x W) | |
| **Weight** | – 0.06 kg | |
| **Certification** | – EIB-certified | |
| **CE norm** | – in accordance with the EMC guideline and the low voltage guideline | |

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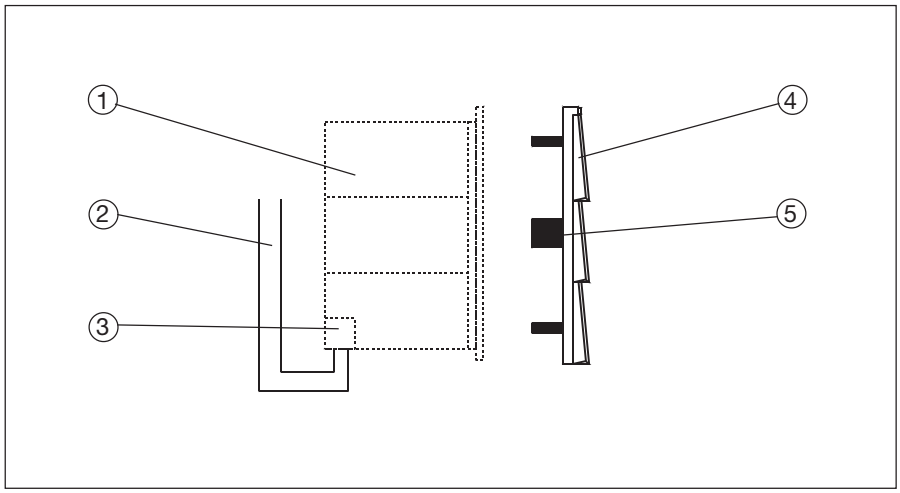
| Application programs | Number of communication objects | Max. number of group addresses | Max. number of associations |
|---|---|---|---|
| For **flush-mounted bus coupler**: | | | |
| IR Switch Dim Shutter Lightscene /6 | 19 | 19 | 19 |
| | | | |
| For **flush-mounted switch actuator/sensor**: | | | |
| IR Switch Dim Shutter Lightscene /7 | 19 | 19 | 19 |
| | | | |
| For 1-fold **switch-/dimmactuator, FM:*** | | | |
| Switch Dim Shutter Flex. allaocation Logic Status /3 | 10 | 16 | 21 |

* A detailed description of the applications for the flush-mounted, compact devices can be found in the technical manual, chapter “Sensor/actuator combinations, FM”

**Wiring diagram**




**1** Flush-mounted bus coupler
**2** Bus cable
**3** Bus terminal
**4** Application module
**5** 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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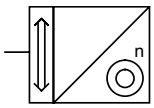
**IR Switch Dim Shutter Lightscene /6**



**Selection in ETS2**

– ABB
  └Push Button triton
    └Push button, 3-fold

The Busch-triton® switch sensor can be used for switching, dimming and shutter control as well as for controlling lightscenes. Various parameters and communication objects can be used for the auxiliary push button and the three rockers depending on the setting selected in the parameter “Number of lightscenes”.

The three rockers of the Busch-triton® switch sensor each have the same set of parameters. With the parameter “Operation mode of rocker”, the basic switch, dimming, shutter control or display function can be selected. Depending on this setting, different parameters and objects are available for the rockers. There is a common parameter “Push button action interpreted as long from” for all the rockers that are used for dimming or shutter control. Normally, the switch sensor detects a long push button action if a rocker is pressed for longer than 420 ms.

No lightscenes are used in the default setting. In this case, the Busch-triton® switch sensor makes two special functions available which are fault protection and switching the backlighting and LEDs.

## Fault protection

The fault protection function causes only one basic function to be triggered when any of the rockers of the switch sensor are pressed. For example, pressing one of the three rockers via communication object no. 1 “Fault protection” switches the base lighting alternately on or off.

The fault protection system can be permanently activated or for example be timed to switch on or off via the EIB using object no. 0 “Fault protection Off/On”. If the parameter “Function of auxiliary push button” is set to “Interrupt fault protection”, the three rockers can be used for different functions after pressing the auxiliary push button for approximately 5 seconds.

## Backlighting

The backlit text fields display the functions of the rockers even in the dark. Using the communication object “Backlighting/LED”, the backlighting and status LEDs can if required be switched on or off.

The auxiliary push button can also be used for manual switching. The parameter “Function of auxiliary push button” must be set to “Backlighting and LED on/off”. When the auxiliary push button is pressed, not only is the lighting of the switch sensor switched on or off but a telegram is sent via the communication object “Backlighting/LED”. It is therefore possible to switch on the lighting for several Busch-triton® switch sensors at the same time via a common group address.

By default, the backlighting switches on after bus voltage recovery. This can also be changed via the parameter “Behaviour of text field illumination...”.

## LED

Using the parameter “Operation mode of LED”, the LEDs can be selected for use either as an orientation light or for status display.

If used as an orientation light, the colour of each LED can be set individually.

Each LED has its own 1 bit communication object for status display. It is also possible here to select the colour of each LED.

## IR

In addition to using the rockers, the Busch-triton® switch sensor can also be controlled remotely via an infrared hand-held transmitter.

The three rockers and the auxiliary push button can be assigned individually 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 hand-held transmitter.

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

# 3-fold Busch-triton® switch sensor, FM
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The three rockers of the Busch-triton® switch sensor can each be assigned separately to push buttons 1 … 5 of the IR hand-held transmitter. However only one rocker may be assigned to a push button.

## Switch

In the default setting of the Busch-triton® switch sensor, there are two 1 bit communication objects available for switching for the rockers that are not assigned lightscenes. For simple applications, it is also possible to set the parameter “Number of switch functions” so that the rocker only has one communication object.

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 rocker can either be pressed briefly on the left, on the right or in the middle. The switch sensor always toggles in this case.

For dimming, it is 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 the rocker is pressed for a short period, it sends “Adjust lamella/stop” telegrams.

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

## Lightscenes

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

The lightscenes can be specified using further parameters or they can also be reprogrammed at a later date by the user while the installation is in operation without the need for a PC or ETS2. The auxiliary push button is used for storing new lightscenes. To do this, the parameter “Function of auxiliary push button” must be set to “Saving lightscenes”. To be able to use this function, the transmitting group addresses and flags must be assigned correctly when configuring the actuators.

Once the general parameter “Number of lightscenes” is set to at least “2”, additional parameters and other communication objects are displayed. The lightscenes are designed according to the following process.

1. For each of the actuator groups A ... F, 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 13 … 18 are used for the control of actuator groups A … F.
2. For each of the six lightscenes, values can be preset for the actuator groups on their own parameter page.
3. Using the parameter “Lightscenes are available”, it can be determined which rocker should be used for recalling lightscenes. A note then appears on the parameter page of the corresponding rocker to confirm that the rocker is assigned two lightscenes. It is now possible to specify whether the rocker is assigned to an IR push button or not. The rockers that are not used for lightscenes are still available for switching, dimming or shutter control.

If a rocker is used for recalling lightscenes, there are two options available for controlling the LEDs: the LED can be switched off or it indicates which side of the rocker has been pressed. In this case, it glows red when the left side is pressed and green when the right side is pressed.

Application example:

In a training room, there are two groups of luminaires above the seminar participants (lamps 1 and 2) and one group of luminaires (lamp 3) above the lecture area. The room can be made darker using an electrically driven shutter.

From door 1, it should be possible to switch and dim the lamps above the seminar participants individually and to operate the shutter. At the same it should be possible to set a base lighting level using a single push button action.

From door 2, it should be possible to switch and dim the lights in the lecture area and to recall various lightscenes.

Two Busch-triton® switch sensors, three switch/dimming actuators and one shutter actuator are to be used.

The Busch-triton® switch sensor at door 1 has the following parameter settings:
Number of lightscenes:
  0
Function of auxiliary push button:
  Interrupt fault protection
Operation mode of rocker 1:
  dimming sensor
Operation mode of rocker 2:
  dimming sensor
Operation mode of rocker 3:
  shutter sensor
Each rocker is assigned to its own IR push button and the IR area is defined as white.

The 1 bit and 4 bit communication objects of the upper and middle rockers are linked with the corresponding objects of the actuators for lamps 1 and 2. The objects of the lower rocker are linked with the objects of the shutter actuator.

So that the seminar participants do not have to search first for the correct rokker, the object “Fault protection” is linked with the 1 bit objects of the dimming actuators. The group addresses for the fault protection function should not be entered at the actuators as a transmitting group address. The value for the base lighting (e.g. 80 %) can be set in the parameters of the dimming actuators.

The Busch-triton® switch sensor at door 2 has the following parameter settings:
Number of lightscenes:
  4
Function of auxiliary push button:
  Saving lightscenes
Lightscenes are available:
  Rockers 1 and 2
Operation mode of rocker 3:
  dimming sensor
Each rocker is assigned to its own IR push button and the IR area is defined as 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 D:
  switch or shutter actuator (1 bit)

The 1 bit and 4 bit communication objects of the lower rocker are linked with the objects of the actuator for lamp 3. The 1 byte communication objects of the actuator groups A … C are linked with the 1 byte objects of the dimming actuators.

Due to the fact that different IR areas are assigned for the two Busch-triton® switch sensors, the lecturer can operate all the functions comfortably from any position.

The various preset options of the actuator groups for lightscenes 1 … 4 can still be corrected later. Possible combinations are for example:
Lightscene 1: Base lighting
Actuator group A: 80%,
Actuator group B: 80%,
Actuator group C: 80%,
Actuator group D: UP
Lightscene 2: OFF
Actuator group A: 0%,
Actuator group B: 0%,
Actuator group C: 0%,
Actuator group D: UP
Lightscene 3: Lecture without projection
Actuator group A: 70%,
Actuator group B: 70%,
Actuator group C: 95%,
Actuator group D: UP
Lightscene 4: Lecture with projection
Actuator group A: 40%,
Actuator group B: 40%,
Actuator group C: 20%,
Actuator group D: DOWN

If the preset options are to be corrected later, it is important to note the flags of the communication objects. The 1 byte objects of the dimming actuators require the read flag in this case. The read flag should not be set for the shutter actuator and the lower rocker of the first switch sensor, to prevent the motor from being inadvertently set in motion during the storing of lightscenes.

The definition of the lightscenes follows the steps below.
1. The required values of the lamps are set via the rockers of the switch sensors or the infrared hand-held transmitter.
2. The auxiliary push button of the second switch sensor is pressed in order to prepare for the storing of lightscenes. The LEDs of the second switch sensor glow orange in order to indicate this.
3. The rocker that is to recall this lightscene later is pressed.
4. The Busch-triton® switch sensor sends a “Read value” telegram for each of the groups of actuators and stores the 1 byte values of the dimming actuators.
5. After storing the values, the LEDs glow either red or green.

In order to have a clear assignment of the LEDs of the switch sensors to the dimming actuators even when lightscenes are being used, the 1 bit communication objects of the dimming actuators can be used for status display. For this purpose, the transmission 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 should be observed.

# 3-fold Busch-triton® switch sensor, FM
Type: 6322-xx-101

**Communication objects**

| No. | Type | Object name | Function |
|---|---|---|---|
| 7 | 1 bit | LED 1 | Change of colour |
| 8 | 1 bit | LED 2 | Change of colour |
| 9 | 1 bit | LED 3 | Change of colour |
| 10 | 1 bit | Backlighting/LED | Switching |
| 13 | 1 bit | Rocker 1 left | Telegr. switch |
| 14 | 1 bit | Rocker 1 right | Telegr. switch |
| 15 | 1 bit | Rocker 2 left | Telegr. switch |
| 16 | 1 bit | Rocker 2 right | Telegr. switch |
| 17 | 1 bit | Rocker 3 left | Telegr. switch |
| 18 | 1 bit | Rocker 3 right | Telegr. switch |

**Communication objects**
for rockers
for switch sensor with one function

| No. | Type | Object name | Function |
|---|---|---|---|
| ... | | | |
| 13 | 1 bit | Rocker 1 | Telegr. switch |
| 15 | 1 bit | Rocker 2 | Telegr. switch |
| 17 | 1 bit | Rocker 3 | Telegr. switch |

**Communication objects**
for rockers
with shutter sensor

| No. | Type | Object name | Function |
|---|---|---|---|
| ... | | | |
| 13 | 1 bit | Rocker 1 -long | Telegr. move shutter Up-Down |
| 14 | 1 bit | Rocker 1 -short | Telegr. lamella adj./stop |
| 15 | 1 bit | Rocker 2 -long | Telegr. move shutter Up-Down |
| 16 | 1 bit | Rocker 2 -short | Telegr. lamella adj./stop |
| 17 | 1 bit | Rocker 3 -long | Telegr. move shutter Up-Down |
| 18 | 1 bit | Rocker 3 -short | Telegr. lamella adj./stop |

**Communication objects**
for rockers
with dimming sensor

| No. | Type | Object name | Function |
|---|---|---|---|
| ... | | | |
| 13 | 1 bit | Rocker 1 -short | Telegr. switch |
| 14 | 4 bit | Rocker 1 -long | Telegr. dimming |
| 15 | 1 bit | Rocker 2 -short | Telegr. switch |
| 16 | 4 bit | Rocker 2 -long | Telegr. dimming |
| 17 | 1 bit | Rocker 3 -short | Telegr. switch |
| 18 | 4 bit | Rocker 3 -long | Telegr. dimming |

**Communication objects**
for lightscene control
with switch actuators

| No. | Type | Object name | Function |
|---|---|---|---|
| ... | | | |
| 13 | 1 bit | Actuator group A | Telegr. switch |
| 14 | 1 bit | Actuator group B | Telegr. switch |
| 15 | 1 bit | Actuator group C | Telegr. switch |
| 16 | 1 bit | Actuator group D | Telegr. switch |
| 17 | 1 bit | Actuator group E | Telegr. switch |
| 18 | 1 bit | Actuator group F | Telegr. switch |

**Communication objects**
for lightscene control
with dimming actuators

| No. | Type | Object name | Function |
|---|---|---|---|
| ... | | | |
| 13 | 1 byte | Actuator group A | Telegr. brightness value |
| 14 | 1 byte | Actuator group B | Telegr. brightness value |
| 15 | 1 byte | Actuator group C | Telegr. brightness value |
| 16 | 1 byte | Actuator group D | Telegr. brightness value |
| 17 | 1 byte | Actuator group E | Telegr. brightness value |
| 18 | 1 byte | Actuator group F | Telegr. brightness value |

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

| | |
|---|---|
| General: | |
| – Object for backlighting switches | **text field and status LED**<br>only text field LED |
| – Behaviour of text field illumination after bus recovery | **ON**<br>OFF |
| Without lightscene mode: | |
| – Function of auxiliary push button | **no function / display operation**<br>Interrupt fault protection (approx. 5 s)<br>Backlighting and LED on/off |
| With lightscene mode: | |
| – Function of auxiliary push button | no function / display operation<br>**Saving lightscenes** |
| – IR area of auxiliary push button | **no IR**<br>blue<br>white |
| – Number of lightscenes | **0** / 2 / 4 / 6 |
| If 2 lightscenes are selected: | |
| – Lightscenes are available | **Rocker 1**<br>Rocker 2<br>Rocker 3 |
| If 4 lightscenes are selected: | |
| – Lightscenes are available | **Rockers 1 and 2**<br>Rockers 2 and 3 |
| If 6 lightscenes are available: | |
| – Lightscenes are available | **Rockers 1 to 3** |
| – Wait state between telegrams by activating lightscenes (140 ms) | **0** |
| – Push button action interpreted as long from | 280 ms / … / **420 ms** / … / 2.1 s |

**Parameters without lightscene mode**
The default setting for the values is **printed in bold type.**

| | |
|---|---|
| Separate for the three rockers: | |
| – Operation mode of rocker | no function / display operation<br>Shutter sensor<br>Dimming sensor<br>**Switch sensor** |
| For switch sensor operation mode: | |
| – Number of switch functions | **2 Functions => 2 Objects**<br>1 Function => 1 Object |
| If 2 functions are selected: | |
| – Working mode of the rocker | **left = TOGGLE, right = TOGGLE**<br>left = TOGGLE, right = OFF<br>left = OFF, right = TOGGLE<br>left = OFF, right = OFF<br>left = TOGGLE, right = ON<br>left = OFF, right = ON<br>left = ON, right = TOGGLE<br>left = ON, right = OFF<br>left = ON, right = ON |
| If 1 function is selected: | |
| – Working mode of the rocker | TOGGLE<br>left = OFF, right = ON<br>left = ON, right = OFF |
| – Operation mode of LED | Orientation light<br>**Shows value of object** |
| For display of object value: | |
| – Colour of LED | OFF = green, ON = red<br>OFF = red, ON = green |
| For orientation light: | |
| – Colour of LED | **always green**<br>always red<br>always off |

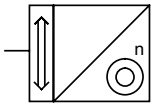
| | |
|---|---|
| For dimming sensor: | |
| – Dimming direction | **left = darker, right = brighter**<br>left = brighter, right = darker |
| For shutter sensor: | |
| – Shutter direction | **left = down, right = up**<br>left = up, right = down |
| – Operation mode of LED | Orientation light<br>**Shows value of object** |
| For orientation light: | |
| – Colour of LED | **always green**<br>always red<br>always off |
| For display of object value: | |
| – Colour of LED | **OFF = green, ON = red**<br>OFF = red, ON = green |
| – Rocker is assigned to IR push button | **no IR** / 1 / 2 / 3 / 4 / 5 |
| Only when rocker is assigned to push button: | |
| – IR area | **white**<br>blue |

**Parameters with lightscene mode**
The default setting for the values is **printed in bold type.**

| | |
|---|---|
| For each rocker that is assigned a lightscene: | |
| – Rocker is assigned two lightscenes | <------ NOTE |
| – Rocker is assigned to IR push button | **no IR** / 1 / 2 / 3 / 4 / 5 |
| Only when rocker is assigned to push button: | |
| – IR area | **white**<br>blue |
| Separate for actuator types A..F: | |
| – Type of actuator group … | **switch or shutter actuator (1 bit)**<br>dimming actuator (8 bit) |
| Separate for lightscenes 1 ... 6 if switch or shutter actuator is selected: | |
| – Preset actuator group … | **OFF / UP**<br>ON / DOWN |
| Separate for lightscenes 1 ... 6 if dimming actuator is selected: | |
| – Preset actuator group … | **0 %** / 5 % / 10 % / … / 100 % |

# 3-fold Busch-triton® switch sensor, FM
Type: 6110 U-500 + 6322-xx-101

**IR Switch Dim Shutter Lightscene /7**



**Selection in ETS2**

– ABB
  └Push Button triton
    └Push button, 3-fold for 1SA

The application module is specifically for the 3-fold Busch-triton® switch sensor in combination with the flush-mounted switch actuator/sensor.

The Busch-triton® switch sensor can be used for switching, dimming and shutter control as well as for controlling lightscenes. Various parameters and communication objects can be used for the auxiliary push button and the three rockers depending on the setting in the parameter “Number of lightscenes”.

The three rockers of the Busch-triton® switch sensor each have the same set of parameters. With the parameter “Operation mode of rocker”, the basic switch, dimming or shutter control function can be selected. Depending on this setting, different parameters and objects are available for the rokkers. There is a common parameter “Push button action interpreted as long from” for all the rockers that are used for dimming or shutter control. Normally, the switch sensor detects a long push button action if a rocker is pressed for longer than 420 ms.

No lightscenes are used in the default setting. In this case, the Busch-triton® switch sensor makes two special functions available which are fault protection and switching the backlighting and LEDs.

## Fault protection

The fault protection function causes only one basic function to be triggered when any of the rockers of the switch sensor are pressed. For example, pressing one of the three rockers via communication object no. 1 “Fault protection” switches the base lighting alternately on or off.

The fault protection system can be permanently activated or for example be timed to switch on or off via the EIB using object no. 0 “Fault protection Off/On”. If the parameter “Function of auxiliary push button” is set to “Interrupt fault protection”, the three rockers can be used for different functions according to their respective parameter settings once the auxiliary push button has been pressed for approximately 5 seconds.

## Backlighting

The backlit text fields display the functions of the rockers even in the dark. Using the communication object “Backlighting/LED”, the backlighting and status LEDs can if required be switched on or off.

The auxiliary push button can also be used for manual switching. The parameter “Function of auxiliary push button” must be set to “Backlighting and LED on/off”. When the auxiliary push button is pressed, not only is the lighting of the switch sensor switched on or off but a telegram is sent via the communication object “Backlighting/LED”. It is therefore possible to switch on the lighting for several Busch-triton® switch sensors at the same time via a common group address.

By default, the backlighting switches on after bus voltage recovery. This can also be changed via the parameter “Behaviour of text field illumination...“.

## LED

Using the parameter “Operation mode of LED”, the LEDs can be selected for use either as an orientation light or for status display.

If the LEDs are used for status display, it is possible to set which colour (red or green) is assigned to the object values “0” or “1”.

If the setting “Orientation light” is selected for the LEDs, they can either glow always red or always green or can be switched off.

## IR

In addition to using the rockers, the Busch-triton® switch sensor can also be controlled remotely via an infrared hand-held transmitter. The three rokkers and the auxiliary push button can be assigned individually 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 hand-held transmitter. The MEMO button on the hand-held transmitter corresponds to the function of the auxiliary push button on the Busch-triton® switch sensor.

The three rockers of the Busch-triton® switch sensor can each be assigned separately to push buttons 1 … 5 of the IR hand-held transmitter. However only one rocker may be assigned to a push button.

### Switch actuator

The relay contact can be parameterised for various applications as a normally open or normally closed contact.

The relay output has its own communication object “Actuator”. The relay output can thus be switched via the EIB independently of the Busch-triton® switch sensor. If the relay is to be controlled for example by a rocker of the Busch-triton® switch sensor, the corresponding communication objects need to be linked with a common group address.

Normally, the relay output can also be assigned switch ON and switch OFF delays. These intervals are a combination of a time base and time factor.

In the staircase lighting function mode, there is a further parameter “Reset switch ON delay” available. This parameter enables you to specify whether the activation period of the actuator should be restarted with another telegram to the communication object “Switch”.

The parameter “Logical connection” is used if the relay output is to be assigned a logic function.  A logic AND or OR function can be assigned. A further communication object then becomes available.

The actuator can also send its status to the EIB. To do this, the parameter “Status response” must be set to “yes”.

### Switch

In the default setting of the Busch-triton® switch sensor, there are two 1 bit communication objects available for switching for the rockers that are not assigned lightscenes. For simple applications, it is also possible to set the parameter “Number of switch functions” so that the rocker only has one communication object.

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 rocker can either be pressed briefly on the left, on the right or in the middle. The switch sensor always toggles in this case.

For dimming, it is 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 the rocker is pressed for a short period, it sends “Adjust lamella/stop” telegrams.

The parameter “Shutter direction” determines which side of the rocker must be pressed in order the move the shutter up or down.

### Lightscenes

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

The lightscenes can be specified using further parameters or they can also be reprogrammed at a later date by the user while the installation is in operation without the need for a PC or ETS2. The auxiliary push button is used for storing new lightscenes. To do this, the parameter “Function of auxiliary push button” must be set to “Saving lightscenes”. To be able to use this function, the transmitting group addresses and flags must be assigned correctly when configuring the actuators.

Once the general parameter “Number of lightscenes” is set to at least “2”, additional parameters and other communcation objects are displayed. The lightscenes are designed according to the following process.

1. For each of the actuator groups A ... F, 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 13 … 18 are used for the control of actuator groups A … F.
2. For each of the six lightscenes, values can be preset for the actuator groups on their own parameter page.
3. Using the parameter “Lightscenes are available”, it can be determined which rocker should be used for recalling lightscenes. A note then appears on the parameter page of the corresponding rocker to confirm that the rocker is assigned two lightscenes. It is now possible to specify whether the rocker is assigned to an IR push button or not. The rockers that are not used for lightscenes are still available for switching, dimming or shutter control. The parameter setting “no function / display operation” must be selected for any unassigned rockers.

If a rocker is used for recalling lightscenes, there are two options available for controlling the LEDs: the LED can be switched off or it indicates which side of the rocker has been pressed. In this case, it glows red when the left side is pressed and green when the right side is pressed.

If the relay is be controlled via one of the rockers, the communication object “Actuator” should be linked via a group address with the communication object of the rocker.

Application example:

In a training room, there are two groups of luminaires above the seminar participants (lamps 1 and 2) and one group of luminaires (lamp 3) above the lecture area. The room can be made darker using an electrically driven shutter.

From door 1, it should be possible to switch and dim the lamps above the seminar participants individually and to operate the shutter. At the same time, it should be possible to set a base lighting level using a single push button action.

From door 2, it should be possible to switch and dim the lights in the lecture area and to recall various lightscenes.

Two Busch-triton® switch sensors, three switch/dimming actuators and one shutter actuator are to be used.

The Busch-triton® switch sensor at door 1 has the following parameter settings:
Number of lightscenes:
0
Function of auxiliary push button:
Interrupt fault protection
Operation mode of rocker 1:
dimming sensor
Operation mode of rocker 2:
dimming sensor
Operation mode of rocker 3:
shutter sensor
Each rocker is assigned to its own IR push button and the IR area is defined as white.
The 1 bit and 4 bit communication objects of the upper and middle rockers are linked with the corresponding objects of the actuators for lamps 1 and 2. The objects of the lower rocker are linked with the objects of the shutter actuator.

So that the seminar participants do not have to search first for the correct rokker, the object “Fault protection” is linked with the 1 bit objects of the dimming actuators. The group addresses for the fault protection function should not be entered as a transmitting group address. The value for the base lighting (e.g. 80%) can be set in the parameters of the dimming actuators.
The Busch-triton® switch sensor at door 2 has the following parameter settings:

# 3-fold Busch-triton® switch sensor, FM
Type: 6110 U-500 + 6322-xx-101

Number of lightscenes:
4
Lightscenes are available:
Rockers 1 and 2
Function of auxiliary push button:
Saving lightscenes
Operation mode of rocker 3:
dimming sensor
Each rocker is assigned to its own IR push button and the IR area is defined as 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 D:
switch or shutter actuator (1 bit)

The 1 bit and 4 bit communication objects of the lower rocker are linked with the objects of the actuator for lamp 3. The 1 byte communication objects of the actuator groups A … C are linked with the 1 byte objects of the dimming actuators.

Due to the fact that different IR areas are assigned for the two Busch-triton® switch sensors, the lecturer can operate all the functions comfortably from any position.

The various preset options of the actuator groups for lightscenes 1 … 4 can still be corrected later. Possible combinations are for example:
Lightscene 1: Base lighting
Actuator group A: 80%,
Actuator group B: 80%,
Actuator group C: 80%,
Actuator group D: UP
Lightscene 2: OFF
Actuator group A: 0%,
Actuator group B: 0%,
Actuator group C: 0%,
Actuator group D: UP
Lightscene 3: Lecture without projection
Actuator group A: 70%,
Actuator group B: 70%,
Actuator group C: 95%,
Actuator group D: UP
Lightscene 4: Lecture with projection
Actuator group A: 40%,
Actuator group B: 40%,
Actuator group C: 20%,
Actuator group D: DOWN

If the preset options are to be corrected later, it is important to note the flags of the communication objects. The 1 byte objects of the dimming actuators require the read flag in this case. The read flag should not be set for the shutter actuator and the lower rocker of the first switch sensor, to prevent the motor from being inadvertently set in motion during the storing of lightscenes.

The definition of the lightscenes follows the steps below.
1. The required values of the lamps are set via the rockers of the switch sensors or the infrared hand-held transmitter.
2. The auxiliary push button of the second switch sensor is pressed in order to prepare for the storing of lightscenes. The LEDs of the second switch sensor glow orange in order to indicate this.
3. The rocker that is to recall this lightscene later is pressed.
4. The Busch-triton® switch sensor sends a “Read value” telegram for each of the groups of actuators and stores the 1 byte values of the dimming actuators.
5. After storing the values, the LEDs glow either red or green.

In order to have a clear assignment of the LEDs of the switch sensors to the dimming actuators even when lightscenes are being used, the 1 bit communication objects of the dimming actuators can be used for status display. For this purpose, the transmission 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 should be observed.

# 3-fold Busch-triton® switch sensor, FM
Type: 6110 U-500 + 6322-xx-101

**Communication objects**
for switch sensor with two functions without lightscenes

| No. | Type | Object name | Function |
|---|---|---|---|
| 7 | 1 bit | Actuator | Switching |
| 10 | 1 bit | Backlighting/LED | Switching |
| 13 | 1 bit | Rocker 1 left | Telegr. switch |
| 14 | 1 bit | Rocker 1 right | Telegr. switch |
| 15 | 1 bit | Rocker 2 left | Telegr. switch |
| 16 | 1 bit | Rocker 2 right | Telegr. switch |
| 17 | 1 bit | Rocker 3 left | Telegr. switch |
| 18 | 1 bit | Rocker 3 right | Telegr. switch |

**Communication objects**
for AND connection
and status response

| No. | Type | Object name | Function |
|---|---|---|---|
| 7 | 1 bit | Actuator | Switching |
| 8 | 1 bit | Actuator | AND connection |
| 9 | 1 bit | Actuator | Status |
| ... | | | |

**Communication objects**
for OR connection
and fault protection

| No. | Type | Object name | Function |
|---|---|---|---|
| 0 | 1 bit | Fault protection Off/On | Input telegr. |
| 1 | 1 bit | Fault protection | Telegr. switch |
| 7 | 1 bit | Actuator | Switching |
| 8 | 1 bit | Actuator | OR connection |
| ... | | | |

**Communication objects**
for switch sensor with one function

| No. | Type | Object name | Function |
|---|---|---|---|
| ... | | | |
| 13 | 1 bit | Rocker 1 | Telegr. switch |
| 15 | 1 bit | Rocker 2 | Telegr. switch |
| 17 | 1 bit | Rocker 3 | Telegr. switch |

**Communication objects**
for rockers
with shutter sensor

| No. | Type | Object name | Function |
|---|---|---|---|
| ... | | | |
| 13 | 1 bit | Rocker 1 -long | Telegr. move shutter Up-Down |
| 14 | 1 bit | Rocker 1 -short | Telegr. lamella adj./stop |
| 15 | 1 bit | Rocker 2 -long | Telegr. move shutter Up-Down |
| 16 | 1 bit | Rocker 2 -short | Telegr. lamella adj./stop |
| 17 | 1 bit | Rocker 3 -long | Telegr. move shutter Up-Down |
| 18 | 1 bit | Rocker 3 -short | Telegr. lamella adj./stop |

**Communication objects**
for rockers
with dimming sensor

| No. | Type | Object name | Function |
|---|---|---|---|
| ... | | | |
| 13 | 1 bit | Rocker 1 -short | Telegr. switch |
| 14 | 1 bit | Rocker 1 -long | Telegr. dimming |
| 15 | 1 bit | Rocker 2 -short | Telegr. switch |
| 16 | 1 bit | Rocker 2 -long | Telegr. dimming |
| 17 | 1 bit | Rocker 3 -short | Telegr. switch |
| 18 | 1 bit | Rocker 3 -long | Telegr. dimming |

**Communication objects**
for lightscene control
with switch actuators

| No. | Type | Object name | Function |
|---|---|---|---|
| ... | | | |
| 13 | 1 bit | Actuator group A | Telegr. switch |
| 14 | 1 bit | Actuator group B | Telegr. switch |
| 15 | 1 bit | Actuator group C | Telegr. switch |
| 16 | 1 bit | Actuator group D | Telegr. switch |
| 17 | 1 bit | Actuator group E | Telegr. switch |
| 18 | 1 bit | Actuator group F | Telegr. switch |

**Communication objects**
for lightscene control
with dimming actuators

| No. | Type | Object name | Function |
|---|---|---|---|
| … | | | |
| 13 | 1 byte | Actuator group A | Telegr. brightness value |
| 14 | 1 byte | Actuator group B | Telegr. brightness value |
| 15 | 1 byte | Actuator group C | Telegr. brightness value |
| 16 | 1 byte | Actuator group D | Telegr. brightness value |
| 17 | 1 byte | Actuator group E | Telegr. brightness value |
| 18 | 1 byte | Actuator group F | Telegr. brightness value |

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

| | |
|---|---|
| General: | |
| – Object for backlighting switches | **text field and status LED**<br>only text field LED |
| – Behaviour of text field illumination after bus voltage recovery | **ON**<br>OFF |
| Without lightscene mode: | |
| – Function of auxiliary push button | **no function / display operation**<br>Interrupt fault protection (approx. 5 s)<br>Backlighting and LED on/off |
| With lightscene mode: | |
| – Function of auxiliary push button | no function / display operation<br>**Saving lightscenes** |
| – IR area of auxiliary push button | **no IR**<br>blue<br>white |
| – Number of lightscenes | **0** / 2 / 4 / 6 |
| If 2 lightscenes are selected: | |
| – Lightscenes are available | **Rocker 1**<br>Rocker 2<br>Rocker 3 |
| If 4 lightscenes are selected: | |
| – Lightscenes are available | **Rockers 1 and 2**<br>Rockers 2 and 3 |
| If 6 lightscenes are selected: | |
| – Lightscenes are available | **Rockers 1 to 3** |
| – Wait state between telegrams by activating lightscenes (140 ms) | **0** |
| – Push button action interpreted as long from | 280 ms / … / **420 ms** / … / 2.1 s |

**Parameters without lightscene mode**
The default setting for the values
is **printed in bold type.**

| | |
|---|---|
| Separate for the actuator: | |
| – Switch behaviour | **Normally open contact**<br>Normally closed contact |
| – Operation mode | **Normal operation**<br>Staircase lighting function |
| If “normal operation” is selected: | |
| – Switch ON delay | **no**<br>yes |
| If “yes” is selected: | |
| – Time base for switch ON delay | 0.5 ms / 8 ms / **130 ms** / 2.1 s / 33 s |
| – Time factor for switch ON delay (1 ... 255) | **10** |
| – Switch OFF delay | **no**<br>yes |
| If “yes” is selected: | |
| – Time base for switch OFF delay | 0.5 ms / 8 ms / 130 ms / **2.1 s** / 33 s |
| – Time factor for switch OFF delay (1 ... 255) | **85** |

**Parameters with lightscene mode**
The default setting for the values is **printed in bold type.**

| | |
|---|---|
| If “staircase lighting function” is selected: | |
| – Switch ON delay | **no**<br>yes |
| – Time base for switch ON delay | 0.5 ms / 8 ms / **130 ms** / 2.1 s / 33 s |
| – Time factor for switch ON delay (1 ... 255) | **10** |
| – Time base for staircase lighting | 0.5 ms / 8 ms / 130 ms / **2.1 s** / 33 s |
| – Factor for staircase lighting (1 ... 255) | **85** |
| – Reset switch ON delay | **no**<br>yes |
| – Logical connection | **no logical connection**<br>AND connection<br>OR connection |
| – Status response | **no**<br>yes |
| Separate for the three rockers: | |
| – Operation mode of rocker | no function / display operation<br>Shutter sensor<br>Dimming sensor<br>**Switch sensor** |
| For switch sensor: | |
| – Number of switch functions | **2 Functions => 2 Objects**<br>1 Function => 1 Object |
| If 2 functions are selected: | |
| – Working mode of the rocker | **left = TOGGLE, right = TOGGLE**<br>left = TOGGLE, right = OFF<br>left = OFF, right = TOGGLE<br>left = OFF, right = OFF<br>left = TOGGLE, right = ON<br>left = OFF, right = ON<br>left = ON, right = TOGGLE<br>left = ON, right = OFF<br>left = ON, right = ON |
| If 1 function is selected: | |
| – Working mode of the rocker | TOGGLE<br>left = OFF, right = ON<br>left = ON, right = OFF |
| – Operation mode of LED | Orientation light<br>**Shows value of object** |
| For display of object value: | |
| – Colour of LED | OFF= green, ON = red<br>OFF = red, ON = green |
| For orientation light: | |
| – Colour of LED | **always green**<br>always red<br>always off |
| For dimming sensor: | |
| – Dimming direction | **left = darker, right = brighter**<br>left = brighter, right = darker |
| For shutter sensor: | |
| – Shutter direction | **left = down, right = up**<br>left = up, right = down |
| – Operation mode of LED | Orientation light<br>**Shows value of object rocker ...** |
| For orientation light: | |
| – Colour of LED | **always green**<br>always red<br>always off |
| For display of object value: | |
| – Colour of LED | **OFF = green, ON = red**<br>OFF = red, ON = green |

| | |
|---|---|
| – Rocker is assigned to IR push button | **no IR** / 1 / 2 / 3 / 4 / 5 |
| Only when rocker is assigned to push button: | |
| – IR area | **white**<br>blue |

| | |
|---|---|
| For each rocker that is assigned a lightscene: | |
| – Rocker is assigned two lightscenes | <------ NOTE |
| – Rocker is assigned to IR push button | **no IR** / 1 / 2 / 3 / 4 / 5 |
| Only when rocker is assigned to push button: | |
| – IR area | **white**<br>blue |
| Separate for actuator groups A …F: | |
| – Type of actuator group … | **switch or shutter actuator (1 bit)**<br>dimming actuator (8 bit) |
| Separate for lightscenes 1 ... 6 if switch or shutter actuator is selected: | |
| – Preset actuator group … | **OFF / UP**<br>ON / DOWN |
| Separate for lightscenes 1 ... 6 if dimming actuator is selected: | |
| – Preset actuator group … | **0 %** / 5 % / 10 % / … / 100 % |