EIB KNX Motion detector
SPHINX 331, 331 S / SPHINX 332, 332 S

EIB KNX Motion detector:	SPHINX 331	107 9 211
	SPHINX 332	107 9 212
	SPHINX 331 S	107 9 215
	SPHINX 332 S	107 9 216

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1 Functional characteristics

1.1 Comparison of SPHINX 331 / SPHINX 332

1.1.1 SPHINX 331

The motion detector switches on the light for a programmable time if a motion is detected within its detection range.
Depending on the parameterization, this function can work in dependence of daylight or permanently.
A constant light control can also be realised

1.1.2 SPHINX 332

Same characteristics as SPHINX 331 but includes an additional channel for heating contol in dependence of room usage.
This channel has a Switch on delay that prevents unnecessary heating
when the room is only used for a short time.
A magnetic sensor behind the front lens also allows the physical address to be programmed when fitted

1.2 Benefits

- Master/Slave function for multi-device systems
- Constant light control with dimming telegrams possible
- Teach-in brightness threshold for daylight-dependent switching
- Lock objects for motion detector and constant light control
- Detects and sends the current brightness
- Very flat design
- Second motion-dependent channel for heating control (SPHINX 332 only)

1.3 Special features

The brightness thresholds for daylight-dependent switching and constant light control can be programmed directly via 3 **teach-in objects**.
Either the prevailing brightness is used or a freely defined brightness value can be programmed in as the new brightness threshold.

The second channel with Switch on and switch-off delay on SPHINX 332 can selectively activate the heating depending on room occupation.

1.4 Technical data

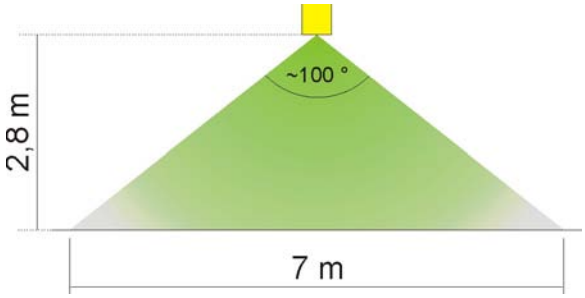
1.4.1 Dimensions

Table 1

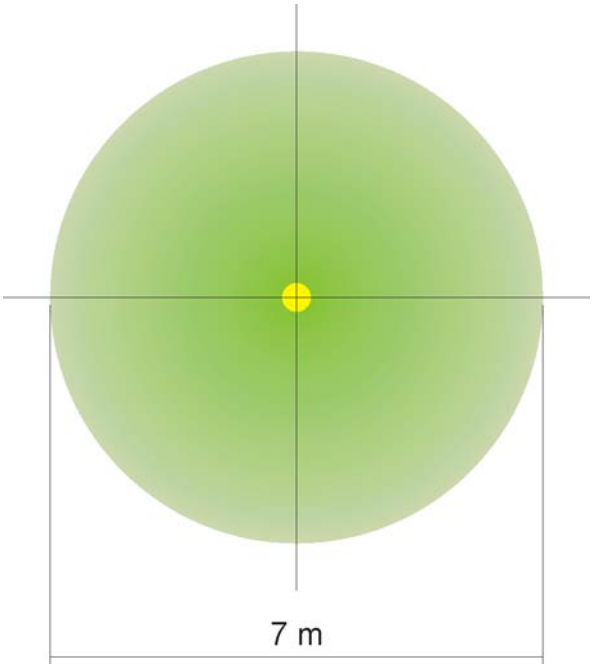
Installation opening	∅ 64 mm or 68 mm with compensating ring
Front	∅ 76 mm
Installation height	approx. 5 mm
Installation depth	65 mm

1.4.2 Detection range

With an installation height of 2.8 m



Covered area (at floor height)



Key

High sensitivity
Low sensitivity

Table 2: Covered area at floor height in dependence of installation height

Installation height	Covered ∅
2.5 m	6.25 m
2.8 m	7 m
3.0 m	7.5 m

2 The Application Programs "Sphinx 331", "SPHINX 332"

2.1 Selection in the product database

Manufacturer	Theben AG
Product family	Phys. sensors
Product type	Motion detector
Program name	Sphinx 331 V1.0 / Sphinx 332 V1.0

The ETS databases can be found on our website: http://www.theben.de/

2.2 Parameter pages

Table 3

Name	Description
Motion channel 1	Response for motion detection
Motion channel 2*	2. channel e.g. for heating control
Constant light control	Selection and setting of constant light function
Brightness level	Settings for the brightness sensor

* Sphinx 332 ONLY

2.3 Communication objects

2.3.1 Object characteristics

Motion detector SPHINX 331 has 11 communication objects.
SPHINX 332 features 15 communication objects.

Table 4

No.	Object name	Function	Type	Flags			
				C	R	W	T
0	Motion	Switches when motion is sensed	EIS 1 1-bit	✓			✓
1	PIR-Locking	PIR-Locking	EIS 1 1-bit	✓		✓	
2	Master trigger	Input/output	EIS 1 1-bit	✓	✓	✓	✓
3	Recall/save actual lux level	$01 = recall / $81 = save	DPT. 18.001 1-byte	✓		✓	
4	Lux-level for motion	Setpoint Lux level	2-byte EIS 5	✓	✓	✓	✓
5	Constant light control	Dimming	EIS 2 4 bits 1-byte	✓	✓		✓
6	locking of Constant light control	Constant light-control locking	EIS 1 1-bit	✓		✓	
7	Lux level for constant light control	Setpoint Lux level	EIS 5 2-byte	✓	✓	✓	✓
8	Recall/save lux level	$01 = recall / $81 = save	DPT. 18.001 1-byte	✓		✓	
9	Brightness value	Brightness value	EIS 5 2-byte	✓			✓
10	Test mode	input	EIS 1 1-bit	✓		✓	
Objects for channel 2 on SPHINX 332							
11	Motion 2	Switch on motion	EIS 1 1-bit	✓			✓
12	PIR-Locking 2	PIR-Locking	EIS 1 1-bit	✓		✓	
13	Recall/save actual lux level 2	$01 = recall / $81 = save	DPT. 18.001 1-byte	✓		✓	
14	Lux-level 2 for motion	Setpoint Lux level	2-byte EIS 5	✓	✓	✓	✓
				C	R	W	T

Table 5: Object flags

Flag	Name	Meaning
C	Communication	Object can communicate
R	Read	Object status can be viewed (ETS / display etc.)
W	Write	Object can receive
T	Transmit	Object can transmit

Table 6

	Sphinx 331	Sphinx 332
Number of communication objects:	11	15
Number of group addresses:	41	41
Number of associations:	41	41

2.3.2 Description of objects

- **Objekte 0 "*Motion*"**

Object for motion-dependent light switching:
0 = No motion
1 = Motion detected

- **Object 1 "*PIR-Locking*"**

1 = Set lock
0 = Unlock
The response for setting the lock and unlocking is configured on the "motion" parameter page

- **Object 2 "*Master Trigger*"**

In Master mode
Receipt of a 1 causes the same reaction as when a motion is detected.
When the light is switched off, i.e. at the end of the switch-off delay, the object sends a 0 to the slave to prevent it from being switched on again when the light is switched off.
The master does not send “1” telegrams”.

In Slave mode
The object sends a 1 every 10 s for as long as motions are detected.
If motions are not detected, no telegrams are sent, i.e. the slave does not send “0” telegrams.

If a 0 is received, the slave no longer reacts to motions for the configured “time between on and off” as it is not switched back on when the light is switched off.

See also Appendix: Master / Slave mode

- **Object 3 “*Recall/save actual lux level*“**

Teach-in via measurement
This object can be used to overwrite or call up the programmed setting for the brightness threshold.
During teach-in (81_{hex}), the current measured brightness value is accepted as a new value for the brightness threshold. This overwrites the previously set value.

To check the setting, the value 01_{hex} is sent to the object and this in turn sends the currently programmed brightness threshold from object 4 to the bus.

- **Object 4 "*Lux-level for motion*"**

Teach-in via setpoint.
This object can be used to program in the new setpoint for the brightness threshold directly as a EIS5 brightness value. This overwrites the previously set value.
The maximum teach-in value depends on the set calibration factor for the brightness sensor.
See appendix: Limiting the r teach-in values

- **Object 5 "*Constant light control*"**

Output object for the dimmer control if the "constant light control" function has been activated.
Depending on parameterisation, this object can sent telegrams in 4-bit format for relative dimming (lighter/darker) or in 8-bit format for absolute dimming
(dimming value in 0%).

- **Objekt 6 "*locking of Constant light control* "**

The lock acts on object 5.
Depending on parameterisation, the disable status is triggered with a 1 or a 0.
The disabled status can be cancelled again with an inverted telegram.
The response for setting the lock is set on the "Constant light control" parameter page.
Once the lock is cancelled, the constant light control continues to run as normal.

If the control is set to "yes", i.e. independent of motion detection, this object can be used to switch the controlled light on and off.

- **Object 7 "*Lux level for constant light control* "**

Teach-in via setpoint
This object can be used to overwrite the previous setpoint for the constant light control with a new value (teach-in value).
The maximum teach-in value depends on the set calibration factor for the brightness sensor.
See appendix: Limiting the teach-in values

- **Object 8 *"Recall/save lux level "***

Teach-in via measurement
This object can be used to overwrite or call up the programmed setpoint for the brightness threshold.
During teach-in (81_{hex}), the current measured brightness value is accepted as a new setpoing for the brightness threshold. This overwrites the previously set value.

To check the setting, the value 01_{hex} is sent to the object and this in turn sends the currently programmed setpoint from object 7 to the bus.

- **Object 9 *"Brightness value"***

Depending on the parameterisation, sends the measured brightness value either if there is a change in brightness
and / or cyclically taking into account the calibration factor.
Sending occurs after reset in dependence of the "Sending brightness value" and "Cyclically sending brightness value" and when the brightness control threshold is reached.

- **Object 10 *"Test mode"***

If a "1" is sent to this object, the motion sensor function always switches independent of brightness. The switch-off delay is a fixed 3 sec. and the retrigger function is inactive.

Additional objects for channel 2 on SPHINX 332

- **Object 11 "*Motion 2*"**

Object for motion-dependent heating switching:
Switch on and switch-off delays can be set individually.
0 = No motion
1 = Motion detected

- **Object 12 *"PIR-Locking 2 "***

1 = Set lock
0 = Unlock
The response for setting the lock and unlocking is configured on the "motion" parameter page

- **Object 13 *"Recall/save actual lux level 2"***

Teach-in via measurement
This object can be used to overwrite or call up the programmed setting for the brightness threshold.
During teach-in (81_{hex}), the current measured brightness value is accepted as a new value for the brightness threshold. This overwrites the previously set value.

To check the setting, the value 01_{hex} is sent to the object and this in turn sends the currently programmed brightness threshold from object 4 to the bus.

- **Object 14 *"Lux-level 2 for motion"***

Teach-in via setpoint.
This object can be used to program in the new setpoint for the brightness threshold directly as a EIS5 brightness value. This overwrites the previously set value.
The maximum teach-in value depends on the set calibration factor for the brightness sensor.
See appendix: Limiting the teach-in values

2.4 Parameters

2.4.1 Motion channel 1 / channel 2*

Table 7

Designation	Values	Meaning
Master/Slave	**Master**	The device receives telegrams from slave devices and assumes the light on/off function. **Sphinx 332**: The parameter page for the second channel will be displayed.
	Slave	The device signals detected motion to the master. See appendix: Master / Slave mode A second channel (Sphinx 332) is not available.
Switch on	**on motion and with Master Trigger**	The channel responds to a detected motion or when a 1 is received on object 2 *Master Trigger* .
	Only with Master Trigger	The channel does not respond to motion und sends only when a 1 is received on object 2 *Master Trigger* . This function is only available with channel 1, as this is intended specifically for light control.

* SPHINX 332

Continuation:

Designation	Values	Meaning
ON-delay		This parameter is **only** for **SPHINX 332** (channel 2) and only available in*Master mode*
	none	The channel responds immediately to a motion or when a 1 is received on object 2 *Master Trigger* .
	5 min. **10 min.** 15 min.	The channel does not respond until the set delay time has elapsed. However, this delay is reset if no further motion is detected within one minute. Entering a room briefly can therefore be ignored. This is especially useful if the channel is used to switch the heating on and off.
Do you want additional parameters? *(only in slave mode)*	**no**	Detect only motion and signal to master device.
	yes	Slave signals motion to master and sends a switching telegram to its own light group.

Continuation:

Designation	Values	Meaning
Retrigger		Response on detecting motion while the configured switch-off delay is running.
	ON	With each detected motion within the switch-off delay time, this is re-started and the light is not switched off until there is no motion within the delay time.
	OFF	The light is switched on when the first motion is detected and switched off again at the end of the switch-off delay, even when further motion is detected. The lighting cannot be switched on again until the configured *time between Switch on and switch-off* (when motion is detected) has elapsed.
Timebase for Off-delay	**Seconds** Minutes	The switch-off delay determines how long after a motion is detected the light is to be switched off again. To determine the delay time, the time basis is multiplied by the switch-off delay factor.
Factor for Off-delay (0..120) (0 = no OFF telegram)	Manual input 0..120	Enables delay times from 1 to 120 seconds and/or 1 to 120 minutes. When the device is set to 0, only an ON telegram is sent. This enables a staircase light timer, for example, to be actuated.

Continuation:

Designation	Values	Meaning
Time between switch off and switch on	0.5..2 s in 0.1 s increments	As the functional principle of a PIR motion sensor is based on thermal radiation measurement, a light switch-off may be interpreted as motion and trigger Switch on. In order to avoid this effect, motion sensor detection is deactivated for a fixed time with this parameter on switch-off.
Brightness-dependent switching *(only in master mode)*	 no **yes**	When is the motion detector to be active? always Only if the ambient brightness is below the configured brightness threshold.
Lux level after download in 10 lx (1..100)	Manual input 1..100	Brightness threshold for brightness-dependent mode. Example: 50 = (50 . 10 lx) = 500 lx
Action on locking	**Send no telegram** Switch-off Switch on	The device will not send telegrams while the disable object is set. Send OFF telegram Send ON telegram
Action on unlocking	 **Send no telegram** Switch-off Switch on	Restore normal mode and: Send no additional telegram. Send OFF telegram Send ON telegram **Note:** When the lock is cancelled the timer for the switch-off delay is reset. The channel can then be switch on again as soon as the next motion is detected.

2.4.2 Constant light control

Table 8

Designation		Values	Meaning
Constant light control		**no**	No control
		yes	The light is permanently controlled to the configured value and can be switched on and off via the disable object.
		Only on motion	The light is controlled and switched on and off by motion.
Object type for control		**4-bit object**	Type of dimmer actuation: Brighter / darker
		8-bit object	Percentage values 0...100%
Lux level after download in 10 lx (20...255)		Manual input 20 ...255	Setpoint value for constant light control Example: 80 = (80 x 10 lx) = 800 lx
Hysteresis for lux level		10 % **20 %** 30 % 40 % 50 %	No further correction takes place while the brightness is within the hysteresis (e.g. ±20%). This prevents frequent reactions after slight changes in brightness.
4-Bit object	Reaction on no motion	**no action**	Behaviour at end of switch-off delay: the light stays on
		Dimm down	up to 0% dimming
		Dimm up	up to 100% dimming
8-bit object	Reaction on no motion	no action	the light stays on
		0 %,	The light is dimmed down to 0%
		10 %, 20 %, 30 % 40 %, 50 %, 60 % 70 %, 80 %, 90 % 100 %	The light is dimmed to the choosen value

Continuation:

Designation	Values	Meaning
Telegram for locking*	Function is locked by an OFF telegram	0 = lock 1 = cancel lock **Caution:** With this setting, the light control is locked immediately after download or reset.
	Function is locked by an ON-telegram	0 = cancel lock, 1 = lock
Response when setting the lock	**Send no telegram**	The control will not send telegrams while the disable object is set.
	Dim darker	The light is dimmed down to 0%.
	Dim brighter	The light is dimmed up to 100%.
Tuning of the light control	**by using pre-defined values (recommended)**	Enables simple setting of the control speed.
	with internal values	For special applications.
Dimming rate	slow (telegrams every 9 sec.) **medium (telegrams every 7 sec.)** fast (telegrams every 5 sec.)	How fast should the dimmer actuate the new value? See appendix: If the brightness sensor has a high calibration factor, a slow control is preferred. See: The constant control / control speed
Parameters for tuning by using own values		
Control telegram increments 0 = small, 7 = large	Manual input 0 ..0.7	How fine is the differential (increments and/or percentage value) between 2 control telegrams?
Dimming rate (0 .. 31, 0 = 1 sec, 1 = 2 sec, …)	Manual input 0 ..0.31	Defines after how many seconds a new dimming value is reached and send as required.

* The “locking telegram” parameter appears only when the “Constant light control” parameter is set to “yes”.

2.4.3 Brightness value

Table 9

Designation	Values	Meaning
Correction factor of brightness sensor	0,50…8,00	Compensates any unfavorable orientation of the brightness sensor. Calculation: $\text{Factor} = \frac{\text{Actual brightness}}{\text{Measured value}}$ If, for example, the sensor measures 500 lx with an actual brightness of 1000 lx, a factor of 1000/500 = 2.00 is derived **Important:** This factor influences the maximum teach-in brightness thresholds for motion-dependent switching and light control. See appendix: The teach-in function
Send brightness on change	Do not send send on change of 10 % send on **change of 20 %** send on change of 30%	Do not send on a change, send only cyclically where applicable. Send if the value has changed by 10%, 20% or 30% since it was last sent.
Send brightness value cyclically	**Don't send** send every minute send every 2 minutes send every 3 minutes send every 5 minutes send every 7 minutes send every 10 minutes send every 15 min.	How often should the brightness value be sent?

3 Appendix

3.1 Typical applications

3.1.1 Motion and brightness-dependent switching on dimming with start-up and teach-in.

If the ambient brightness is too low, the Sphinx 331 should switch on the light as soon as a motion is detected.
The switching threshold should be taught-in locally
(see below: The teach-in function).

For function testing the system, Test mode is activated with a telegram to Obj. 10.

The telegrams for teaching-in the brightness threshold and the Test mode are generated with ETS 3 (menu *Diagnostics/Group telegrams*) in the project group monitor (*Read/Send* button).

3.1.1.1 Devices:

- SPHINX 331 (Order No. 1079211)
- RMG 4 S / RMG 4 C-Load (Order No. 4900204 / 4900206)

3.1.1.2 Overview

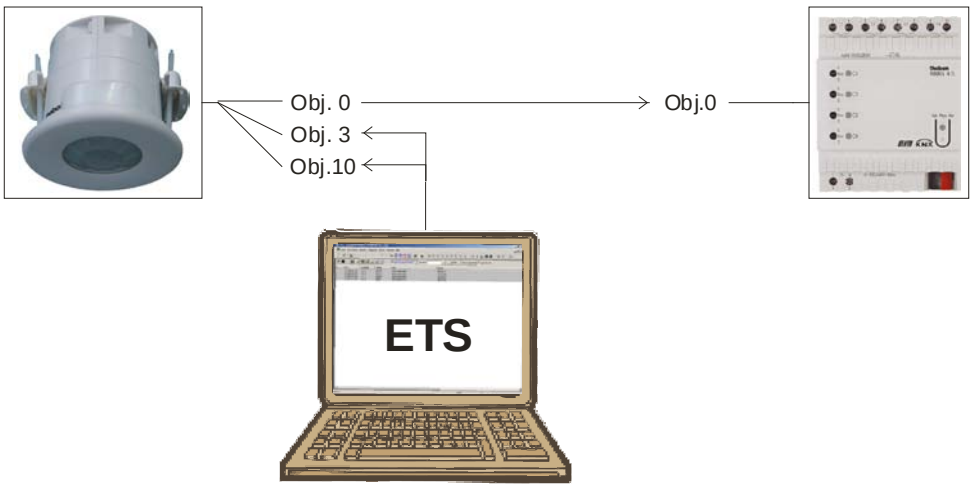


Figure 1

3.1.1.3 Objects and links

Table 10: Links

No.	SPHINX 331 Object name	No.	RMG 4 S Object name	Comments
0	*motion*	0	*GM RMG 4 channel 1*	Switching command for the lighting
3	*Recall /save lux level*	-	-	Teach-in telegram: The ETS transmits the value $81 (128) and the current brightness value is saved as a new threshold.
10	*Test mode*	-	-	The Test mode is then started with a “1” and finished with a “0”. In this modem the channel switches on immediately every time motion is detected and switches off again after 3 s. Switching occurs independent of brightness.

3.1.1.4 Important parameter settings

Standard or customer-defined parameter settings apply for unlisted parameters.

Table 11: SPHINX 331

Parameter page	Parameters	Setting
Motion channel 1	*Master/Slave*	*Master*
	Switch on	*on motion and with Master Trigger*
	Brightness-dependent switching	*yes*
	Lux level after downl. in 10 lx (1..100, max 650 lx x correction factor)	*5**

*corresponds to 50 Lux.

Table 12: RMG 4 S

Parameter page	Parameters	Setting
RMG 4 channel 1	*Function*	*Switching On/Off*

3.1.2 Motion/brightness-dependent switching and heating control

Sphinx 332 controls the lighting with channel 1.
Channel 2 is used as a prescence detector for the heating control.
As soon as motion is detected, channel 1 switches on the room lighting.
Channel 2 is not activated until the Switch on delay has elapsed.

3.1.2.1 Devices:

- SPHINX 332 (Order No. 1079212)
- Mix combination: RMG 4 S (or C-Load) + upgrade module HME 4 (Order No. 4900204 / 4900206 + 4910211)

3.1.2.2 Overview

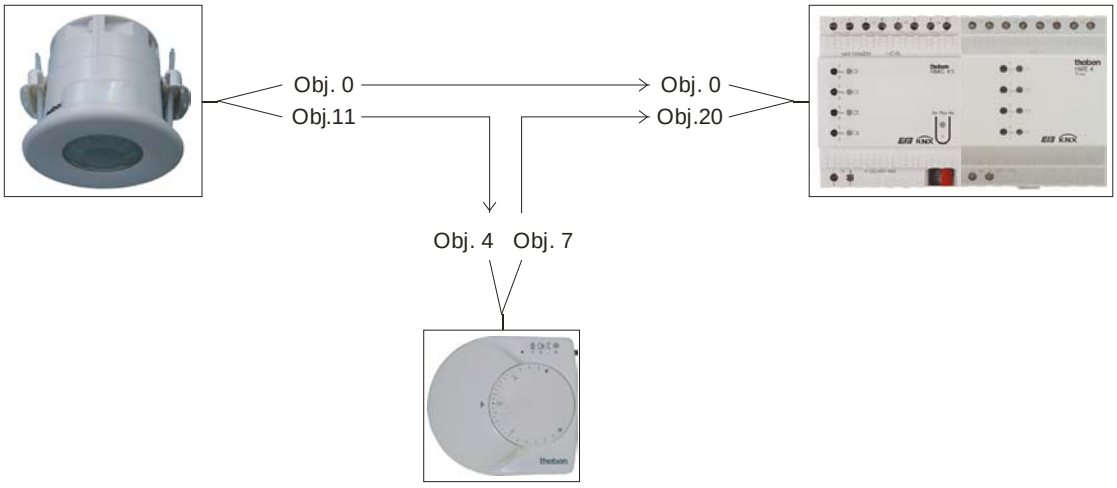


Figure 2

3.1.2.3 Objects and links

Table 13: Links

No.	SPHINX 332 Object name	No.	MiX combination Object name	Comments
0	*Motion 1*	0	*GM RMG 4 channel 1*	Switching command for the lighting

No.	SPHINX 332 Object name	No.	RAM 713 S Object name	Comments
11	*Motion 2*	4	*Presence*	Sets the presence object, RAM 713 S switches to comfort mode.

No.	RAM 713 S Object name	No.	HME 4 Object name	Comments
7	*Switch input 1*	20	*EM HME4 Channel 1*	RAM 713 S sends the heating control variable to the heating actuator

3.1.2.4 Important parameter settings

Standard or customer-defined parameter settings apply for unlisted parameters.

Table 14: SPHINX 332

Parameter page	Parameters	Setting
Motion channel 1	*Master/Slave*	*Master*
	Switch on	*with motion and with Master Trigger*
	Brightness-dependent switching	*yes*
	Lux level after downl. *In 10 lx* *(1..100, max 650 lx x calibration factor)*	*5**
Motion channel 2	*Switch on*	*with motion and with Master Trigger*
	Switch on delay	*10 min.*
	Retrigger	*ON*

*corresponds to 50 Lux.

Table 15: RAM 713 S

Parameter page	Parameters	Setting
Operating mode	*Objects to select operating mode*	*new: Operating mode, presence, window status*
	Operating mode after reset	*Standby*
	Type of presence sensor on object 4)	*Presence detector*
*Heating control**	*Kind of regulation*	*Continuous control*

* This setting is only required in on the *Setting*s parameter page, *user-defined control* is selected.

Table 16: MiX combination RMG 4 S (or C-Load) and upgrade module HME 4

Parameter page	Parameters	Setting
General	*Number of extension modules*	*1 Extension module / 2 Extension modules**
	Type of 1st extension module EM1	*EM1 is an HME 4*
RMG 4 channel 1	*Function*	*Switching On/Off*
EM1 HME4 H1	*Type of actuating value*	*Continuous*

*depending on application.

3.1.3 Constant light control

Sphinx 332 controls the daylight brightness automatically at 600 Lux.
The lighting should stay off at night and over the weekend.
The brightness is controlled with a dimmer (DMG2) and the
night-time switch-off is realised with a timer (TR 644 S EIB).

3.1.3.1 Devices:

- SPHINX 332 (Order No. 1079212)
- DMG 2 (Order No. 4910220)
- TR 644 S EIB / DCF (6449203 / 6449204)

3.1.3.2 Overview

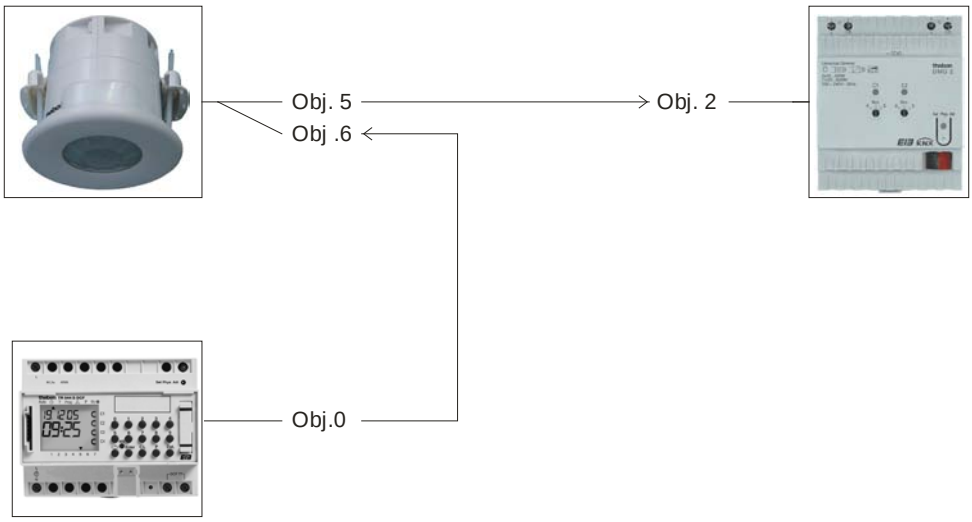


Figure 3

3.1.3.3 Objects and links

Table 17: Links

No.	SPHINX 332 Object name	No.	DMG 2 Object name	Comments
5	*Constant light control*	2	*GM DMG2 Channel 1*	Dimming telegrams

No.	TR 644 S* Object name	No.	SPHINX 332 Object name	Comments
0	Channel -1 switch	6	*locking of Constant light control*	A timer switches off the light control during nighttime hours

* Application *TR 644 EIB with time transmits, switches, value, priority* or *TR 644 EIB with time receives/switches, value, temp*

3.1.3.4 Important parameter settings

Standard or customer-defined parameter settings apply for unlisted parameters.

Table 18: SPHINX 332

Parameter page	Parameters	Setting
Constant light control	*Constant light control*	*yes*
	Type of control object	*8-bit object*
	Brightness threshold after downl. in 10 lx (20..255, max 500 lx x calibration factor)	*60**
	Telegram for locking	*function ist locked by an ON-Telegramm*
	Action on locking	*0 %*

*corresponds to 600 Lux with calibration factor = 1.00.

Note:
When the light control is switched on, SPHINX 331 / 332 always starts with a dimming value 25 % before the required brightness is activated.

Table 19: TR 644 S – Lock light control

Parameter page	Parameters	Setting
Channel 1	Object type	Switching
	Switching response	Clock On -> On / Clock Off -> Off
	Sending mode	only at switching

Switching program example: Mo-Fr 18:00 ON – 6:00 OFF.

Table 20: Dimmer DMG 2

Parameter page	Parameters	Setting
DMG2 Channel 1 S1	*Minimum brightness*	*5 %*
	Dimming time from 0 % to 100 %	*1 sec.*
	Behaviour when receiving a dimming value	*set value directly*

3.1.4 Master/Slave mode

A winding corridor should be covered with 4 Sphinx 331.
One device is used as master, the other 3 as slaves.
The slaves trigger the master when motion is detected.
Delay times and brightness thresholds are configured in the master.

3.1.4.1 Devices:

- SPHINX 332 (Order No. 1079212)
- DMG 2 (Order No. 4910220)
- TR 644 S EIB / DCF (6449203 / 6449204)

3.1.4.2 Overview

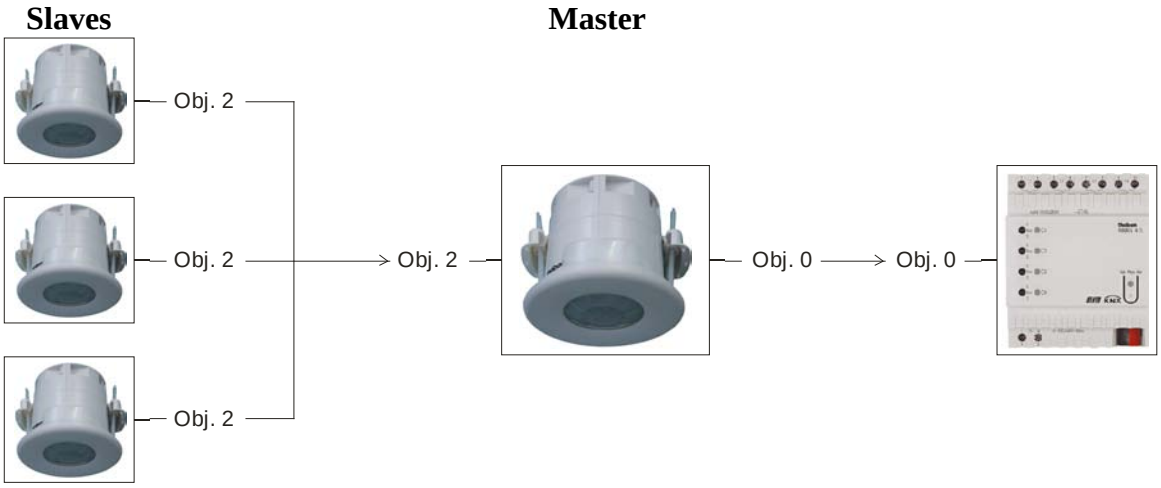


Figure 4

3.1.4.3 Objects and links

Table 21: Links

No.	SPHINX 331 **Slave** devices Object name	No.	SPHINX 331 / 332 **Master** device Object name	Comments
2	*Master trigger*	2	*Master trigger*	As long as a motion is detected, the affected slave device sends a 1 every 10 s to the master device*. During switch-off, the master device sends a 0 to the slave device, which allows the configured*time between switch-off and Switch on* to take effect.

* After no further motion is detected, the slave devices stop sending.
A 0 is never sent.

No.	SPHINX 331 / 332 Master device Object name	No.	RMG 4 S / C-Load Object name	Comments
0	*Motion 1*	0	*GM RMG 4 channel 1*	The master device switches the lighting.

3.1.4.4 Important parameter settings

Standard or customer-defined parameter settings apply for unlisted parameters.

Table 22: SPHINX 331 Slave devices

Parameter page	Parameters	Setting
Motion channel 1	*Master/Slave*	*Slave*
	Do you want additional parameters	*no*

Table 23: SPHINX 331/332 Master device

Parameter page	Parameters	Setting
Motion channel 1	*Master/Slave*	*Master*
	Switch on	*On motion and with Master Trigger*
	Retrigger	*ON*

3.1.5 Special function: Switching light off only

This function is useful in meeting rooms, for example.

If the room is occupied for only a short time, e.g. to open the windows, no light is required. If a meeting is held, the light should be switched on manually as required. Any EIB push-button can be used for this purpose.

When the room is left, the light must be guaranteed to switch off.
This function is performed by a Sphinx 331 / 332 or by the push-button.

The switching actuator is controlled by object 2 (Master Trigger) of the Sphinx in combination with any EIB push-button.
The push-button can send both switch ON and switch OFF commands to the switching actuator.
The motion detector's sole purpose is to switch off the lighting.

Object 0 of the motion detector is **not** used.

3.1.5.1 Devices:

- SPHINX 332 (Order No. 1079212)
- RMG 4 S / C-Load (Order No. 4900204 / 4900206)
- EIB push-button

3.1.5.2 Overview

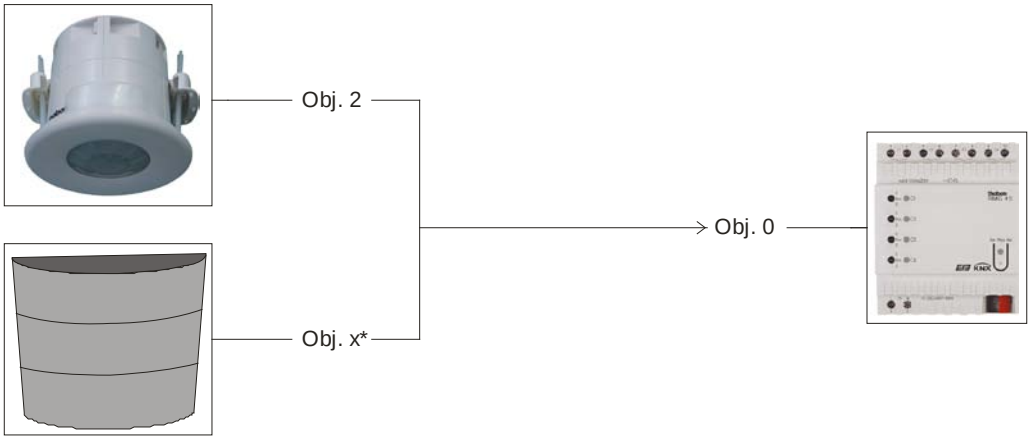


Figure 5

*depending on used push-button

3.1.5.3 Objects and links

Table 24: Links

No.	Any EIB key Object name	No.	RMG 4 S / C-Load Object name	Comments
x	*e.g. key 1*	0	*GM RMG 4 channel 1*	The light can be switched on and off using the key.

No.	SPHINX 331 / 332 Object name	No.	RMG 4 S / C-Load Object name	Comments
2	*Master trigger*	0	*GM RMG 4 channel 1*	A presence is detected but no telegram is sent, since object 0 is not used. The light will remain on while there is motion in the room. When the room is departed, the motion sensor sends a 0 to object 2, which switches the light back off.

3.1.5.4 Important parameter settings

Standard or customer-defined parameter settings apply for unlisted parameters.

Table 25: SPHINX 331 / 332

Parameter page	Parameters	Setting
Motion channel 1	*Master/Slave*	*Master*
	Switch on	*on motion and with Master Trigger*
	Retrigger	*ON*
	Brightness-dependent switching	*no*
	Timebase for Off-delay	*Seconds*

Table 26: EIB key (example)

Parameter page	Parameters	Setting
Key 1 left	*Telegram on pressing the key*	*On*
	Telegram on releasing the key	*no telegram*
Key 1 right	*Telegram on pressing the key*	*Off*
	Telegram on releasing the key	*no telegram*

Table 27: RMG 4 S

Parameter page	Parameters	Setting
RMG 4 channel 1	*Function*	*Switching On/Off*

3.2 The constant light control

3.2.1 Principle

The ambient brightness is measured and the control sends telegrams to a dimmer so that the required brightness is reached and maintained.
Important:

- **Object 0 must not be connected to the dimmer.**
- The device must be positioned so as to guarantee a reliable light measurement.

3.2.2 Functionality

The constant light control can be configured in 2 different ways,
i.e. motion-dependent or motion-independent.

Table 28

Constant light control	Function	Comment
yes	The light control is decoupled from the motion sensor and switched on and off solely by the disable object (obj. 6) (independent of motion).	Object 5 is connected to a dimmer. Object 6 can, e.g. be controlled via a key.
Only on motion	The light control is coupled to the motion sensor. The light is switched on when a motion is detected (controlled) and switched off again when the configured switch-off delay has lapsed. The disable object is omitted.	Object 5 is connected to a dimmer.

After reset or download, a control telegram with 25 % control variable is sent first.

3.2.3 Control speed

The new dimming value is determined taking into account the differential between the current actual value and the brightness setpoint value.
The larger the differential, the greater the variance from the old dimming value.
The control telegram increments influence this calculation.
A value of 0 denotes a smaller variance between old and new dimming value than a value of 7.
A low value therefore results in a slow control and a high value (7) to a fast control.
If the brightness sensor has a high calibration factor, a slow control is preferred.
To great a value, however, can cause overshoots.

3.3 The teach-in function

3.3.1 Principle:

As brightness is difficult to gauge, the configured brightness thresholds are taught-in locally. Both the current ambient brightness and also a fixed default value can be used as reference.

3.3.2 Functionality

Example: Teach-in threshold for brightness-dependent switching (channel 1).

3.3.2.1 With the current ambient brightness

i.e. if the ambient brightness has the exact value required for activating the motion sensor: send
81_{hex} (= 129_{dec}) to object 3.
The current brightness value is stored and overwrites the previous one.

3.3.2.2 With a fixed value

The required value is sent in EIS 5 format (2 Byte Helligkeit) to object 4.

Notes:

- Objects 7 and 8 provide the same function for teaching-in the threshold for the brightness control.
- For the 2nd channel (SPHINX 332) obj. 13 and 14 are used for teach-in.

3.3.2.3 Checking

As soon as the teach-in procedure is complete, the new taught-in value is automatically sent from object 4 to the bus.
Furthermore, the new value can be checked at any time via a request.
This involves sending the value 1 (byte) to object 3.

3.3.2.4 Limiting the teach-in values

The maximum teach-in value depends on the set calibration factor for the brightness sensor. The limitation conforms to the following rule:

$$\text{The quotient } \frac{\text{Teach-in value}}{\text{Brightness sensor calibration factor}}$$

can be maximum 500 lx with the constant light control and maximum 650 lx for the motion-dependent channels (channel 1 and 2).

Higher values are limited as follows.

Table 29:

Calibration factor	Maximum teach-in value	
	Constant light control	Channel 1 / Channel 2
0,50	250 lx	325 lx
1,00	500 lx	650 lx
2,00	1000 lx	1300 lx
3,00	1500 lx	1950 lx
4,00	2000 lx	2600 lx
5,00	2500 lx	3250 lx
6,00	3000 lx	3900 lx
7,00	3500 lx	4550 lx
8,00	4000 lx	5200 lx

3.4 Master / Slave mode

3.4.1 Principle

Long or winding corridors, for example, often have only one common lighting circuit. The existing detection range, however, cannot be covered by one single motion sensor.
In this case, several devices are required.

3.4.2 Functionality

To control the lights, one motion sensor is covered as the master and all others will function as slaves.
The sole function of these slaves is to send a telegram to the master as soon as they have detected a motion. This occurs independent of brightness.
A slave device sends a 1-telegram to the master every 10 s, as long as a motion is detected.

During switch-off, the master device sends a 0 to the slave device, which allows the configured *time between switch-off and Switch on* to take effect.

The master device controls the light via the object 0 (motion).
All devices communicate with each other via Object 2 (Master Trigger).