Movement and Presence Sensor KNX 18.5K PRO and 18.4K PRO

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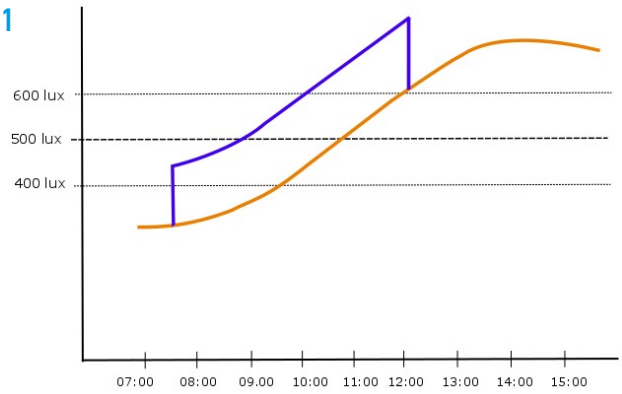
1 PRODUCT OVERVIEW

This device is a presence detector/motion sensor for use building interiors, allowing for the control and adjustment of lighting according to the brightness and occupancy of the room.
Furthermore, with Dynamic constant light regulation the brightness can be controlled dynamically to very closely follow the brightness setpoint.
The device can also be used for the control of heaters, fans, and air conditioning according to the occupancy within the detection range of the device.
And finally, using the Master/Slave function account can be taken of occupancy detected in other areas surveyed by other sensors - as an example through using the On/Off object of other FINDER 18.xK devices.
There are several methods of regulating and controlling the lighting according to the number and type of lighting units being considered and these are described as follows.

1.1 HYSTERESIS LIGHT SWITCH FUNCTION - OVERVIEW

Figure 1 shows an example of operation in the case of an output linked to the presence condition with brightness setpoint of 500 lux and hysteresis 20% (100 lux).

Fig.1



Starting from 7:40 AM the device constantly detects the presence condition (movement).
Since at that moment the natural brightness (orange curve) is lower than the setpoint - hysteresis (400 lux), the device turns on the lights, increasing the total brightness (blue curve).
After an interval of 5 seconds from switching on the lights in the case of LED / halogen lamps, or 2 minutes in the case of fluorescent lamps, the device will register the increase in brightness due to switching on, which in this example is about 120 lux.

IMPORTANT
While waiting for the increase in brightness to be registered, the lights remain On regardless of the presence state.

Over time, the natural brightness in the room increases. At approximately 12:15 PM the natural brightness exceeds the setpoint value + hysteresis and therefore the device turns off the lights, since their contribution of 120 lux is no longer necessary to satisfy the desired condition.
If while the lights are switched on, the device doesn't detect movement for a time longer than the minimum interval the lights have to remain on (parameter ON time), the lights will switch off.
The lighting will also turn off, even with presence detected, if the device determines that the contribution of artificial light is no longer needed. If it is required to override the On state at any time, to avoid lighting over unwarranted periods of time such as holidays or the temporary vacating of the property then this is possible using the "**Temporary Off object**", sent for example by a push button.
When the device receives the ON value on this object by pressing the push button, it will set the lights to the value assigned to the OFF condition if, at the moment of pressing, lights are at the value assigned to the ON condition.
It will resume the normal function of hysteresis light switch next time the button is pressed, or receiving the OFF value on the object.
The "**Temporary On object**" allows the temporary activation of the output at the programmed value for the ON condition if it is in OFF condition, interrupting the programmed hysteresis light switch function mode and also the temporary Off condition, if activated at that moment.
Example of command sequence:
Output at ON condition (lights on)
Temporary Off = ON, output switches to OFF condition (lights off permanently)
Temporary On = ON, output switches to ON condition (lights on permanently),
Temporary On = OFF, output switches to OFF condition (lights off permanently),
Temporary Off = OFF, programmed Hysteresis light switch function restart.

IMPORTANT
If the temporary Off/On functions are used, it is advisable to use push buttons or switches with LEDs for displaying the output status (LED on = output ON, LED off = output OFF), or in any case to visually distinguish the status of the button that controls the functions, as they interrupt the "Hysteresis light switch" mode programmed for the output, which might otherwise be misconstrued as a fault with the device.

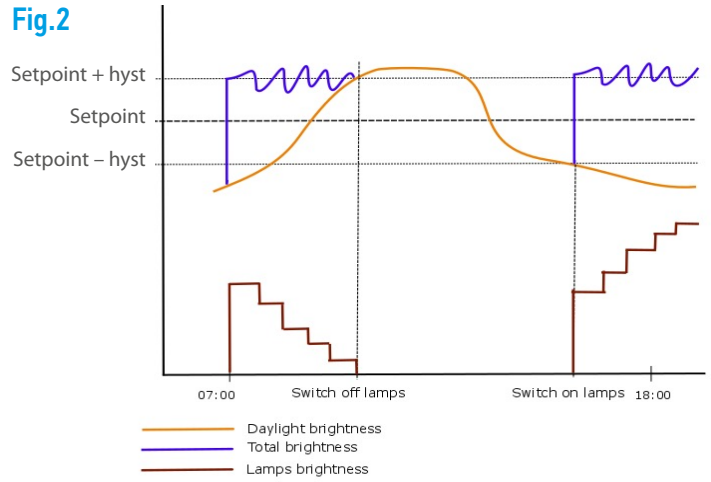
IMPORTANT
After a power on/reset of the device this function will be activated with the following delays:
5 seconds if the output is released from the presence detection
(Disable presence detection parameter = YES); 25 seconds if the output is linked to presence detection (Disable presence detection parameter = NO), which are the times necessary for the device to polarize its presence sensor according to the parameter.

1.2 DYNAMIC CONSTANT LIGHT REGULATION FUNCTION

1.2.1 WITH BRIGHTNESS CALIBRATION OF THE OUTPUTS - OVERVIEW

Figure 2 shows an example of operation in the case of outputs enabled by the presence condition with a setpoint of 500 lux and hysteresis of 20% (100 lux). The following description refers to the use of outputs 1 and 4 in adjusting the brightness with DPT dimmer 0-100%.

Fig.2



Starting from 7:00 AM, the device constantly detects the presence condition. Since at that moment the natural brightness is lower than the setpoint – hysteresis, it evaluates through the curve constructed with the calibration how much artificial brightness is necessary so that the total brightness is mantained around the setpoint value + hysteresis and turns on the lights, for example with the percentages OUT1 = 30 %, OUT4 = 20%.
As the natural brightness increases, the device continues to adjust the two outputs to keep the total brightness approximately constant around the (setpoint + hysteresis). Example of lighting sequence as follows:

TIME	OUTPUTS VARIATIONS
07:00	OUT1=30%, OUT4=20%
07:45	OUT1=20%
08:30	OUT4=10%
09:40	OUT1=10%
10:30	OUT4= 0% OFF
11:10	11:10 OUT1= 0% OFF

Table 1

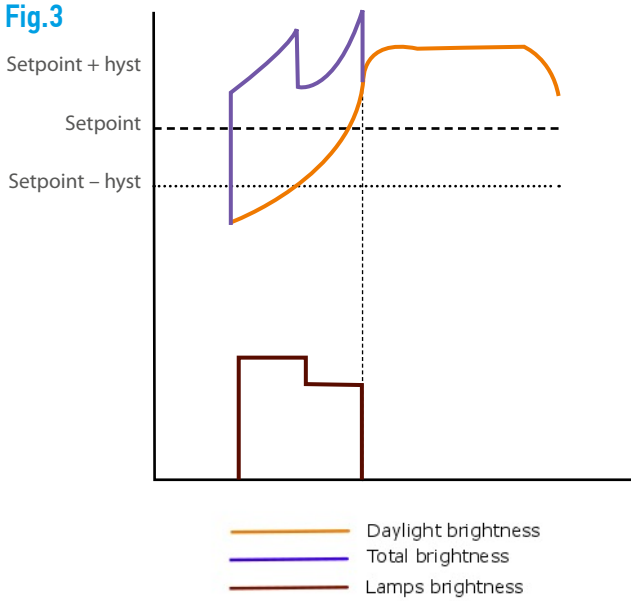
At approximately 11:10 AM all lighting has been switched off even in the presence condition as the natural brightness is sufficient to satisfy the required conditions. From this moment the total brightness in the room (blue curve) coincides with the natural brightness (orange curve).
Around 04:00 PM the natural brightness falls below the setpoint value – hysteresis and the lights are switched on again, for example by setting OUT1 = 30% and OUT4 = 20%. While the natural brightness decreases the device continues to adjust the two outputs to keep the total brightness constant.
Example of lighting sequence as follows:

TIME	OUTPUT VARIATIONS
04:00 PM	OUT1=30%, OUT4=20%
04:45 PM	OUT4=30%
05:20 PM	OUT1=40%
06:00 PM	OUT4=40%

Table 2

If, with the lighting switched On, the brightness of the room decreases (for example due to temporary cloud cover) such that it falls below the setpoint – hysteresis value, the device will act accordingly by increasing the percentages of the outputs with the appropriate value obtained from the calibration.
As long as the total brightness remains within the setpoint +/- hysteresis limits, the device will not make any changes to the outputs.
While the lights are turned on, if the device doesn't detect any movement for a time longer than the period the lights have to remain on under such conditions (see sec. 2.1.9), the lights are switched off.
If the brightness set point + hysteresis is set so high that it cannot immediately be reached with the lights switched on at 100% then the outputs will stay on until such time as the total brightness increases to a level that will permit their change of status.
With lights turned on, if the natural brightness reaches a value such that the desired conditions could be satisfied even if the lights were switched off, then the device will turn them off without further regulation.
An example is given in figure 3, relating to the same setpoint and hysteresis conditions as in figure 2.

Fig.3



Starting from 7:00 in the morning, the device constantly detects presence and turns on the lights by applying for example output1 = 30%, output4 = 20%, introducing artificial brightness equal to 260 lux for example and so reaching the value of 605 lux.
At 9:15 AM the natural brightness increased by about 50 lux and the device decreases the output 1 to 20%, for example losing 90 lux of artificial light, which becomes 170 lux.
The total brightness of the room reaches about 565 lux. Towards 11:00 AM the natural brightness reaches the value of 550 lux (the total will therefore be about 720 lux) increasing with respect to the value of 9:15 AM by about 155 lux.
The device determines that even by turning off the lights and losing the 170 lux relative to the percentages of the outputs both set to 20%, the required brightness conditions within in the range [setpoint to (setpoint + hysteresis)] or between 500 lux and 600 lux are satisfied and turns off the lights, saving energy.

In the case the output is released from the presence condition, in order to avoid the the lights being on during unwanted periods (meetings, during the night, holidays, etc.) it will be possible to temporarily disable the function using the "**Dynamic regulation temporary Off outputs object**" sent for example by a push button.
When the device receives the ON value on this object by pressing the button, it will turn off the lights involved in the dynamic regulation that are on at that moment.
It will resume the normal dynamic constant light regulation function at the next button press, or by receiving the OFF value on the object.
The object "**Dynamic regulation temporary On outputs**" allows temporarily activation of the outputs at the maximum value, whether they are off or on at a value lower than the maximum, interrupting the programmed 'dynamic constant light regulator mode and also the temporary off condition, if active at that moment (see example sec. 1.1).

IMPORTANT
If the temporary Off/On functions are used, it is advisable to use push buttons or switches with LEDs for displaying the output status (LED on = output ON, LED off = output OFF), or in any case to visually distinguish the status of the button that controls the function, as they interrupt the 'dynamic constant light regulator function' mode programmed for the outputs, which might otherwise be misconstrued as a fault with the device.

IMPORTANT
When setting the brightness setpoint and hysteresis values, take into account that:
- the limit setpoint – hysteresis is the reference used by the device to switch on the lights
- the limit setpoint + hysteresis is the reference used by the device to adjust the lights while the brightness changes;

NOTE 1
After a power on/reset of the device this function will be activated with the following delays, according to the parameter 'Control time in dynamic regulation (s) = CTDR' (see sec. 2.1.5), to allow the device the correct polarization of the circuitry of its presence sensor:

1) if the outputs are released from the presence detection (Disable presence detection parameter = YES), at least 5 seconds or CTDR seconds, if CTDR> 5

2) if the outputs are linked to presence detection (Disable presence detection parameter = NO), at least 25 seconds, or CTDR seconds if TCRD> 25

1.2.2 WITHOUT BRIGHTNESS CALIBRATION OF THE OUTPUTS - OVERVIEW

If the calibration procedure for the outputs is not performed, the device executes the regulation algorithm with the limitations of this case. The dynamic regulation function works as follows:
when the device detects the need to turn on the lights according to the brightness conditions, it will switch them on by setting the outputs to the maximum value 100%.
Then the device proceeds with the regulation lowering the outputs in a sequence by steps of 10%, each time the total brightness reaches a value to do so, until the lights are switched off if the natural brightness exceeds the setpoint value + hysteresis. In this way the device keeps the total brightness almost constant in the range [setpoint to (setpoint + hysteresis)].

IMPORTANT
If it is required to override the presence/movement condition then use the "**Dynamic regulation temporary On/Off outputs**" objects to switch the lights as described in the previous 1.2.1.
After a power on/reset of the device, what has been said in NOTE 1 of sec. 1.2.1 above applies.

1.3 BRIGHTNESS CORRECTION (DAYLIGHT)

The percentage of reflected light that the device detects strongly depends on the reflective surface below it. If a luxmeter measures 500 LUX on the work surface, and below the ceiling where the device is placed it measures only 200 LUX, brightness correction is necessary allowing the device to set the correction factor.

If the general parameter "Correction of internal brightness" is set to "**NO**", the device will use the brightness values detected by its internal sensor without any correction (correction factor = 1.0), both when driving outputs during normal operation, and during any output calibration procedure.

1.3.1 HYSTERESIS LIGHT SWITCH FUNCTION

To drive the outputs in this mode all that is required is to determine a brightness correction factor that establishes the correct correlation between daylight brightness as detected at the device and as it appears at the work surface.
This brightness correction factor depends particularly on the reflective nature of the surface below the device.
The adjustment procedure is as follows:

1 Ensure the room where the sensor is installed is illuminated only by natural light (lights are off)
IMPORTANT
If the sensor is installed in a room not open to natural light, turn the lights on and perform steps 2 and 3 of the procedure - as in this context there is no distinction between natural and artificial light.

2 Using a luxmeter, measure the brightness value on the working surface below the sensor

3 Send this value via the communication object # 22 brightness adjustment (daytime).
The correction factor is automatically calculated by the device
IMPORTANT
Bear in mind that a correction factor calculated under conditions of natural light will be affected by temporary conditions such as passing cloud cover.

1.3.2 DYNAMIC CONSTANT LIGHT REGULATOR FUNCTION - BRIGHTNESS CORRECTION

After daylight brightness correction has been performed (steps 1-3 sec 1.3.1), and where one or more outputs are used for driving the lights by "**dynamic constant light regulator**" and the brightness detected by the device, in conditions of artificial light only (shutters lowered), differs too much from the one measured by a luxmeter (for example the difference is greater than 100 lux in absolute value) it is necessary to adjust the brightness proportional to the outputs values.
In case the parameter "**Correction of internal brightness**" is set to – With daylight and artificial light adjustment – the adjustment procedure is the following:

1 Turn on all the lights that will be used for the regulation.
If the type of lamps is fluorescent, wait until their maximum intensity is reached

2 Completely darken the space where the device is installed by lowering the shutters and/or closing the doors. If this cannot be done, the adjustment procedure must be done in the absence of daylight (for example after sunset)

3 Measure with a luxmeter the brightness value on the work surface located below the device

4 Send this value through the communication objects "**brightness adjustment (output X)**" for all the outputs X that will be used for the regulation

5 The correction factor of the brightness relative to the outputs is automatically calculated by the device and will be the one used by the device during the calibration procedure by which the brightness curve of the regulation function is calculated

IMPORTANT
If, for application needs, the outputs configuration set in the last adjustment procedure change (for example adding one more output to the function), the adjustment procedure must be repeated.

1.3.3 PROCEDURE FOR RESETTING ALL BRIGHTNESS CORRECTION FACTORS AROUND THE DEFAULT VALUE (1.0)

This procedure is useful for resetting the values of all the brightness correction factors around the default value (1.0), for example after sending an incorrect value on communication objects #22 to #27.

1 In conditions of daylight light only (lights turned off), record for a few seconds the cyclic brightness values transmitted every second by the device and transmitted on communication object #2, identifying approximately the maximum of these values

2 Send the maximum value to object #22 immediately after the transmission of a cyclic brightness value close to the maximum
Example:
Sequence of lux detected every second by the device and sent on communication object #2
824, 832, 816, 808, 827, 826, 805, 816, 845, 831, ...
827 = lux detected by the device before sending the maximum value on the adjustment objects #22
845 = maximum value detected
Reset value of the adjustment factor = 845/827 = 1.02

3 Repeat steps 1) and 2) for the other communication objects #23 - #27

IMPORTANT
If the brightness correction factors are reset to the default value (1.0) after a calibration procedure, it is recommended to repeat the procedure performing a new brightness adjustment if necessary, since in this case the last calibration curve validated by the sensor may be no longer conform to the reset values.

1.4 DEVICE CALIBRATION PROCEDURE OF THE OUTPUTS

This procedure is necessary every time you intend to use the dynamic constant light regulator function, so that the device calculates the brightness curve proportional with the values of the outputs used by the function.
Without the execution of this procedure the device will perform the function as described in sec.1.2.2.
The procedure has a maximum execution time of 15 minutes, after which it is aborted, and consists of the following steps:

1 Activate all the outputs involved in the dynamic constant light regulation function

2 If necessary, make the adjustments of the brightness detected by the internal sensor, based on the settings of the general parameter "**Correction of internal brightness**";

3 Set the parameter "**Use output for dynamic regulation**" to YES for all outputs used by the function

4 Send the ON value through the communication object #28 "**Start/Stop calibration**".
The device will carry out preliminary checks on the consistency of the brightness correction factors of the outputs, based on the type of adjustment selected with the parameter "**Correction of internal brightness**", after which it will turn on the lights by activating all outputs at maximum value

5 Completely darken the room where the device is installed (no natural light) by lowering the shutters and/or closing the doors. If this operation cannot be performed, the calibration procedure must be executed in the absence of daylight (see sec. 1.3)

6 If the lamps are fluorescent, wait until their intensity reaches maximum value

7 Confirm the calibration procedure by sending the ON value once again via the communication object #28 "**Start/Stop calibration**".
The device will activate the outputs decreasing their values in sequence by steps of 10% every 10 seconds, starting from the maximum value, recording the detected brightness each time

Example in the case of only outputs 1 and 2 with DPT values 0-100%.
The sequence will be:
OUT1 = 100%,
OUT2 = 100%: start values
OUT2 = 90%,
OUT1 = 90%,
OUT2 = 80%,
OUT1 = 80%,
OUT2 = 70%,
OUT1 = 70%,
...
OUT2 = 10%,
OUT1 = 10%,
OUT2 = 0%,
OUT1 = 0%
If the procedure is succesfull, at the end of the sequence the device turns the lights back on, activating the outputs to their maximum value and sending by the object #29 "**Calibration result**" the value ON.

8 Re-open the shutters. If this operation cannot be done go to step 9)

9 Send the OFF value to the communication object #28 "Start/Stop calibration" to finish the calibration procedure.
The device will turn off all lights and starts the regulation function adjusting the brightness according to the calibration curve

The calibration procedure will be aborted by the device when:

a) Steps 1) 2) and 3) have not been performed, i.e. when no output has been activated for dynamic light regulation and the necessary correction of the internal brightness detected by the device have not been made based on the general parameter "**Correction of internal brightness**"

b) If the maximum time of 15 minutes assigned to the procedure expires

c) If the device fails to construct a strictly decreasing calibration curve according to the sequence imposed on the outputs, or when near the final part of the calibration sequence it is unable to uniquely discriminate the dark condition. Typically this can happen when more than one output is involved in the dynamic regulation and/or the light lines driven by the outputs are equipped with lamps that do not support a lower dimming limit of 20% (for example lamps are not lighted with outputs set to 10%)

IMPORTANT
If the calibration procedure is aborted following case c), it is suggested if possible to:
- change the type of lamps to ones that can dim over the range 10% -100%
- repeat the calibration procedure after a reset of correction factors of the outputs used in last calibration (see sec. 1.3.3) using only one output for dynamic regulation, chosen from the five available on the device.

1.5 CALIBRATION RESET PROCEDURE

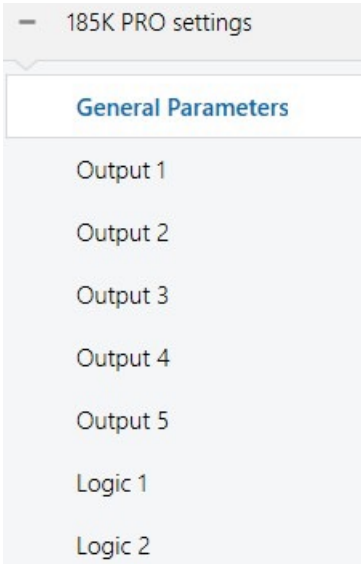
With a long press of the programming button for more than 10 seconds, the device enters in programming mode and deletes the data of the last calibration curve performed, maintaining the previously calculated internal brightness correction factors. At the end of the long press, release the button and press it again with a short press to exit the programming mode.

IMPORTANT
After the calibration reset procedure, the dynamic regulation of the lights will take place as if the device outputs were not calibrated (see sec. 1.2.2)

2 PARAMETER CONFIGURATION PAGES

2.1 GENERAL PARAMETERS

The device has 8 main configuration pages:
By setting the logic channels as "Logic Gate", the configuration pages for the inputs and outputs of the channels will also appear.



2.1.1 PIR THRESOLD (%)

Sets the threshold for detecting the motion condition in the proximity of the device.
Whenever the output signal of the internal motion sensor on the device exceeds its bias voltage by a percentage equal to the threshold value, the presence condition is detected.

2.1.2 MOTION CHECK TIME (X100MS)

Defines the interval in multiples of 100 ms for resetting the motion scanning timer.
Whenever there is movement in the proximity of the device, the timer is reset.
The presence condition continues to persist as long as movement is detected near the device at the end of the interval. This parameter is used to filter the frequency of the detection of the presence condition.
The values to be set will be chosen as multiples of 0.1 seconds (for example 500ms = 5, 1000ms = 10, 1500ms = 15, etc.).

IMPORTANT
For the main applications of the device in presence conditions, it is recommended to set a value greater than or equal to 10 (1sec).

2.1.3 CORRECTION OF INTERNAL BRIGHTNESS

Defines the type of correction for the brightness detected by the internal sensor of the device:
- NO: no correction
- With daylight adjustment – correction of daylight only (natural light)
- With daylight and artificial light adjustment – correction of daylight and artificial light

2.1.4 TYPE OF LAMPS

Select the type of lamps used. When using the device as a hysteresis light switch, it defines the waiting time from the moment the lights are switched on before registering their contribution to the brightness of the room. In the case of LED or halogen lamps the waiting is 5 seconds, in the case of fluorescent lamps the waiting is 2 minutes.

2.1.5 DYNAMIC REGULATION TIME (S) [CTDR]

Sets the cyclical execution period of the dynamic regulation algorithm for controlling the brightness and presence condition. Let CTDR be the value in seconds of the parameter, the algorithm will run cyclically every CTDR seconds (for the first execution after a power on/reset (see NOTE 1 sec. 1.2.1)

IMPORTANT
This interval affects the time the lights remain turned on in the absence of movement, set by the parameter "Dynamic regulation ON time (s)" (see sec. 2.1.9).

2.1.6 DYNAMIC REGULATION THRESHOLD (LUX)

Sets the brightness setpoint for the function "Dynamic constant light regulator".

2.1.7 DYNAMIC REGULATION HYSTERESIS (%)

Sets the hysteresis percentage proportional to the brightness setpoint for the function "**Dynamic constant light regulator**".

2.1.8 DYNAMIC REGULATION DISABLE MOVEMENT DETECTION

Sets whether or not to detect the presence condition for the function "**Dynamic constant light regulator**". If set to YES, the parameters "**Dynamic regulation time ON (s)**" and "**Dynamic regulation enable Master/ Slave function**" will not appear.

IMPORTANT
See also NOTE 1 sec. 1.2.1

2.1.9 DYNAMIC REGULATION ON TIME (S)

This parameter allows you to set, together with the parameter "Dynamic regulation control time", the interval in seconds in which the output remains in the ON state in the condition of no movement in its vicinity.

DESCRIPTION OF THE ACRONYMS	
CTDR	Value in seconds of the parameter "Dynamic regulation control time (s)"
T_ON	Value in seconds of the parameter "Dynamic regulation ON time (s)"

Each time the device runs the dynamic regulation algorithm and detects the presence condition it resets the timer for keeping the lights on in absence of movement in its vicinity.

CTDR >= T_ON
In this case, the lights are turned off after CTDR seconds from the last time that the device, by executing the dynamic regulation algorithm, has detected movement before the presence condition permanently ceases (the resolution is in hundred of ms).

CTDR < T_ON
In this case, let T0 be the instant corresponding to the last execution of the dynamic regulation algorithm in a condition of presence (movement) in the vicinity of the device. If before the next execution of the algorithm, accordingly with the parameter value CTDR, the movement condition ceases permanently, the lights are turned off within a maximum time from T0 given by the formula:

(M+1)*CTDR, M = integer part of the quotient T_ON/TCRD
Example:
CTDR = 30 seconds
T_ON = 50 seconds
M = 1
T0 = 10:15:32
The lights will be switched off within 1 minute from T0, that means within T1 = 10:16:32 (the resolution is of hundred ms).

2.1.10 DYNAMIC REGULATION - MASTER/SLAVE FUNCTION ENABLE

Enables/disables the reception of the presence condition by remote devices (communication objects #3 to #6) for the function "Dynamic constant light regulator".

2.1.11 CYCLIC SENDING

Sets the cyclical sending of communication objects #1 and #2 "percentage of movement (PIR cyclic)" and "brightness detected (LUX cyclic)"

- **DISABLE**: no sending
- **ONLY PIR**: sending only object #1 "percentage of movement"
- **ONLY LUX**: sending only object #2 "brightness detected" this setting is useful in adjusting the brightness detected by the internal sensor of the device see par 1.3
- **PIR** and **LUX**: sending both the objects #1 and #2

2.2 OUTPUTS PARAMETERS

2.2.1 ACTIVATE OUTPUT

Enable or disable the use of the output.

2.2.2 OUTPUT TYPE

Defines the type of communication object for the output according to the following table:

SELECTION	OBJECT TYPE
1 bit	1.001 switch
1 byte 0...100%	5.001 percentage (0..100%)
1 byte 0...255	5.010 counter pulses (0..255)
Scene number (1-64)	17.001 scene number
HVAC	20.102 HVAC mode

Table 3

2.2.3 USE OUTPUT FOR DYNAMIC REGULATION

Appears only if 1 byte 0… 100% or 1 byte 0… 255 is selected as output type. Defines whether the output is used for the function 'Dynamic constant light regulator'. By selecting YES, the parameters of the dynamic constant light regulator function must be configured in the General Parameters page.

2.2.4 VALUE FOR SWITCH ON

Sets the value for the ON condition.

2.2.5 VALUE FOR SWITCH OFF

Sets the value for the OFF condition.

2.2.6 DISABLE PRESENCE DETECTION

Allows to release the output management from the detection of the presence condition. If set to YES, the "**ON time (s)**" and "**Enable Master / Slave function**" parameters will not appear.
IMPORTANTE
If set to "**NO**", after a power on/reset the device waits about 25 seconds for the PIR signal stabilization due to the polarization of the movement sensor circuitry. The activation of the outputs occurs with this delay after a power on/reset of the device (see also sec. 1.1 and NOTE 1 of sec. 1.2.1).

2.2.7 OUTPUT TIME ON (S)

Defines the interval in seconds in which the output remains in the ON condition from the instant in which the device no longer detects movement in its proximity.

2.2.8 ENABLE MASTER/SLAVE FUNCTION

Enables or disables the reception of the presence state of other remote devices (objects # 3 to # 6) for driving the output.

2.2.9 OUTPUT LUX THRESHOLD (LUX)

Sets the brightness setpoint of the output.

2.2.10 HYSTERESIS (%)

Sets the hysteresis percentage proportional to the brightness setpoint of the output.

2.3 PARAMETERS FOR LOGIC TYPE LOGIC PORT

2.3.1 OPERATOR

Sets the type of logic operator:
AND
OR
XOR
XNOR
NAND
NOR

2.3.2 NUMBER OF INPUTS

Sets the number of inputs associated with the chosen logical operator, in a range from 2 to 4.

2.3.3 INPUT OBJECT TYPE

Set the type of communication object associated with the input, according to the following table:

SELECTION	OBJECT TYPE
1 bit	1.001 switch
1 byte	5.010 counter pulses (0..255)

Table 4

2.3.4 INPUT INITIAL VALUE

Sets the initial value of the input.

2.3.5 LOGIC OF THE INPUT

Sets the Boolean management of the input according to direct logic (1=True, 0=False) or inverse (1=False, 0=True).

2.3.6 OUTPUT OBJECT TYPE

Set the type of communication object associated with the output (see table 3).

2.3.7 SEND OUTPUT OBJECT

Set the mode to send the output object: with a change of the output object (see NOTE 2)

2.3.8 VALUE OUTPUT FOR TRUE

Sets the output value for the "true" condition.

2.3.9 VALUE OUTPUT FOR FALSE

Sets the output value for the "false" condition.

NOTE 2
Setting the same value to the output for the two logic conditions true/false , the logic output will be sent only at a power on/reset of the device.

2.4 PARAMETERS FOR LOGIC TYPE DELAY (WITH/WITHOUT CO CONVERSION)

2.4.1 OBJECT TYPE

Set the type of communication object managed by the logic according to the following table:

SELECTION	OBJECT TYPE
1 bit switching	1.001 switch
1 bit up/down	1.008 up/down
1 byte 0...100%	5.001 percentage (0..100%)
1 byte 0...255	5.010 counter pulses (0..255)
Scene number (1-64)	17.001 scene number
HVAC	20.102 HVAC mode
Conversion bit a byte (1)	1.001 switch in ingresso 5.010 counter pulses (0..255) on output
Conversion byte a bit (1) (2)	5.010 counter pulses (0..255) on input 1.001 switch on output

(1) Also displayed are the parameters of the values to be assigned to the output for the logical conditions of the input.

(2) By assigning the same logic value to the output in the two logic conditions of the input, the value will be sent only at a power on/reset of the device.

2.4.2 DELAY (S)

Set the sending delay of the output at the input reception.
By assigning the value zero, the output will be sent immediately.

2.4.3 RE-ARM DELAY AT INPUT RECEPTION

Allows to set how the delay will be triggered at the input reception:
NO - the output is always sent after the delay independently by input change during the delay.
YES - the output is always sent after the delay starting from the last input change.

3 COMMUNICATION OBJECTS

3.1 GENERAL

3.1.1 CYCLIC SENDING OF MOVEMENT PERCENTAGE

Number	Name	Function	Type
1	PIR cyclic (%)	Output	5.001

This object sends the percentage value of the difference between of the signal detected by the internal motion sensor of the device and the BIAS voltage which polarize the sensor circuitry.
The sending mode is cyclic and set by the PIR sending cyclic time (s) parameter.

3.1.2 CYCLIC SENDING OF BRIGHTNESS DETECTED

Number	Name	Function	Type
2	LUX cyclic(lux)	Output	9.004

This object sends the brightness value detected by the internal sensor of the device.
The sending mode is cyclic and set by the LUX sending cyclic time (s) parameter.

3.1.3 START/STOP CALIBRATION

Number	Name	Function	Type
28	Start/Stop calibration	Input	1.001

This object allows you to start or stop the calibration procedure. It is reset by the device at the end of the calibration sequence and in case of automatic interruption of the procedure in the preliminary check phase or in case of error while the calibration curve is computed (see sec.1.4).

3.1.4 CALIBRATION RESULT

Number	Name	Function	Type
29	Calibration result	Output	1.001

This object provides the result of the calibration procedure. The value On indicates that the procedure has been completed correctly, Off that it was automatically interrupted in the preliminary check phase or in case of error while the calibration curve is computed by the device (see sec.1.4).

3.1.5 OUTPUTS TIME ON (S) FOR FUNCTION "DYNAMIC CONSTANT LIGHT REGULATOR"

Number	Name	Function	Type
43	Dynamic regulation outputs time ON (s)	Input	7.005

This object allows changing the period in seconds that the outputs stay in the ON state when the presence condition ceases permanently (see sec. 2.1.9).
The new value will be valid until the next power on/reset of the device.

3.1.6 BRIGHTNESS DAYLIGHT ADJUSTMENT

Number	Name	Function	Type
22	Brightness adjustment (Daylight)	Input	9.004

This object allows sending the values measured by a luxmeter for the correction of the brightness (daylight) detected by the device.

3.1.7 BRIGHTNESS ADJUSTMENT OUTPUT 1/2/3/4/5

Number	Name	Function	Type
23 | 24 | 25 | 26 | 27	Brightness adjustment (output 1/2/3/4/5)	Input	9.004

This object allows sending the values measured by a luxmeter for the correction of the brightness detected by the device for artificial light managed by the outputs involved in the function "**Dynamic constant light regulator**"

3.2 OUTPUT

3.2.1 OUTPUT 1/2/3/4/5

Number	Name	Function	Type
12 | 13 | 14 | 15 | 16	Output 1/2/3/4/5	Output	1.001 5.001 5.010 17.001 20.102

This object allows sending to send the output value to a light controller.

3.2.2 TIME ON OUTPUT 1/2/3/4/5 FOR FUNCTION " HYSTERESIS LIGHT SWITCH"

Number	Name	Function	Type
17 | 18 | 19 | 20 | 21	Output 1/2/3/4/5 ON (s)	Input	7.005

This object allows changing the period in seconds the output stays in the On condition from the moment in which the device no longer detects the presence condition.
The new value will be valid until the next power on/reset of the device. It does not override the value of the corresponding parameter.

3.2.3 MINIMUM BRIGHTNESS OUTPUT 1/2/3/4/5 FOR FUNCTION "HYSTERESIS LIGHT"

Number	Name	Function	Type
7 | 8 | 9 | 10 | 11	Minimum Brightness OUT 1/2/3/4/5	Input	9.004

This object allows changing the brightness setpoint of the output until the next reset/power on of the device. It does not override the brightness setpoint parameter.

3.2.4 INPUT REMOTE PRESENCE

Number	Name	Function	Type
3 | 4 | 5 | 6	Input 1/2/3/4 remote	Input	1.001

This object enables inputting the presence status of other remote devices, such as other sensors.
An Off value means no remote presence, an On value means remote presence is detected.

3.2.5 MINIMUM BRIGHTNESS OUTPUTS FOR FUNCTION "DYNAMIC CONSTANT LIGHT REGULATOR"

Number	Name	Function	Type
42	Dynamic regulation min brightness	Input	9.004

This object allows for a temporary change of the brightness setpoint of the outputs used for dynamic regulation until the next reset/power on of the device.
It does not override the brightness setpoint parameter.

3.2.6 TEMPORARY OFF OUTPUTS FOR FUNCTION "DYNAMIC CONSTANT LIGHT REGULATOR"

Number	Name	Function	Type
49	Dynamic regulation temporary Off outputs	Input	1.001

This object allows for a temporary switch off of the outputs used by the function, when they are independent from the detection of the presence condition (see sec. 1.2).

3.2.7 TEMPORARY ON OUTPUTS FOR FUNCTION "DYNAMIC CONSTANT LIGHT REGULATOR"

Number	Name	Function	Type
55	Dynamic regulation temporary On outputs	Input	1.001

This object allows the outputs used by the function to be temporarily switched on at maximum intensity, whether they are off or on at an intensity lower than the maximum (see sec 1.2).

3.2.8 TEMPORARY OFF OUTPUT FOR FUNCTION HYSTERESIS LIGHT SWITCH

Number	Name	Function	Type
44 | 45 | 46 | 47 | 48	Temporary Off Output 1/2/3/4/5	Input	1.001

This object allows to temporarily turn off the output in the hysteresis light switch, when it is released from the detection of the presence condition (see sec 1.1).

3.2.9 TEMPORARY ON OUTPUT FOR FUNCTION HYSTERESIS LIGHT SWITCH

Number	Name	Function	Type
50 | 51 | 52 | 53 | 54	Temporary On Output 1/2/3/4/5	Input	1.001

This object allows to temporarily turn on the output in the hysteresis light switch function, when it is released from the detection of the presence condition (see sec 1.1).

3.3 LOGICS

3.3.1 LOGIC OUTPUT

Number	Name	Function	Type
30 | 35	Logic OUT 1/2	Output	1.001 1.008 5.001 5.010 17.001 20.102

These objects allow to send the logic outputs values.

3.3.2 LOGIC INPUT

Number	Name	Function	Type
31 | 32 | 33 | 34 | 36 | 37 | 38 | 39	Logic 1/2 input 1/2/3/4	Input	1.001 1.008 5.001 5.010 17.001 20.102

These objects allow to receive the logic inputs values.

4 DEVICE LEDS

The device is equipped with two LEDs:
- **RED**: programming
- **BLUE**: this signals the presence condition detected by the internal motion sensor.
  It will light every time the internal motion sensor of the device detects movement, meaning the output signal of the sensor exceeds its polarization voltage by a percentage equal to the PIR movement threshold (see sec. 2.1.1)

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