Application note

spaceLYnk trend logs and graphs

for KNX PIR presence/monitoring/light control



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Schneider Electric

1 Disclaimer

The attached file contains an Application Note. The instructions and specifications within the document are expected to work within the constraints described in the Introduction, Design and Configuration sections. Use of this document has the potential to modify system configuration and should only be used by competent personnel. The document is not intended for end-customer use. If you have questions regarding this document, please contact your local =S= contact. Suggestions for improvement are welcome but may not result in immediate changes to the document.

2 Introduction

Following application note describes possibility of visualization and logging of the PIR motion/presence/light detectors with spaceLYnk.
There are few necessary competencies to follow procedures mentioned in this application note. It is mandatory to have knowledge of KNX commissioning trough KNX ETS software, basic spaceLYnk configuration knowledge and knowledge of Lua scripting language in the scope described in the Product manual.
Basic graphical outputs are provided directly by spaceLYnk graphics interface, CSV format is available for export to other spread sheet or graphs visualization programs (e.g. MS Excel, MS Power View...).

Procedures contained in this application note were tested on the spaceLYnk with firmware version 1.0

Commercial number	Device ID	Description
LSS100200	spaceLYnk	KNX IP logic controller with 1.0 firmware
MNT684016	SCHNEIDER KNX PIR detector	Presence/monitoring/light control/IR 1335/1.0, art. no. MNT 684016
630919	MERTEN KNX PIR detector	Presence/monitoring/light control/IR 1335/1.0, art. no. 6309xx

Table 1: List of used HW

2.1 Potential users and benefits

1) System integrators –for accurate setting of PIR detectors properties:

    - Sensors positioning, sensitivity and directing settings
    - Timing, times and delays settings
    - Brightness levels and dependences

2) Service personals – for trouble shooting of installed PIR detectors:

    - False alarms/insufficient sensitivity of presence/motion detection
    - Excessive number of light switching
    - Light service life prediction

3) Facility managers – for monitoring of light connected values:

    - Frequency of occupant's presence in given areas
    - The ratio of utilization of given areas
    - Course of brightness levels during short/long time period (e.g. in winter/summer)

3 Design

3.1 General topology

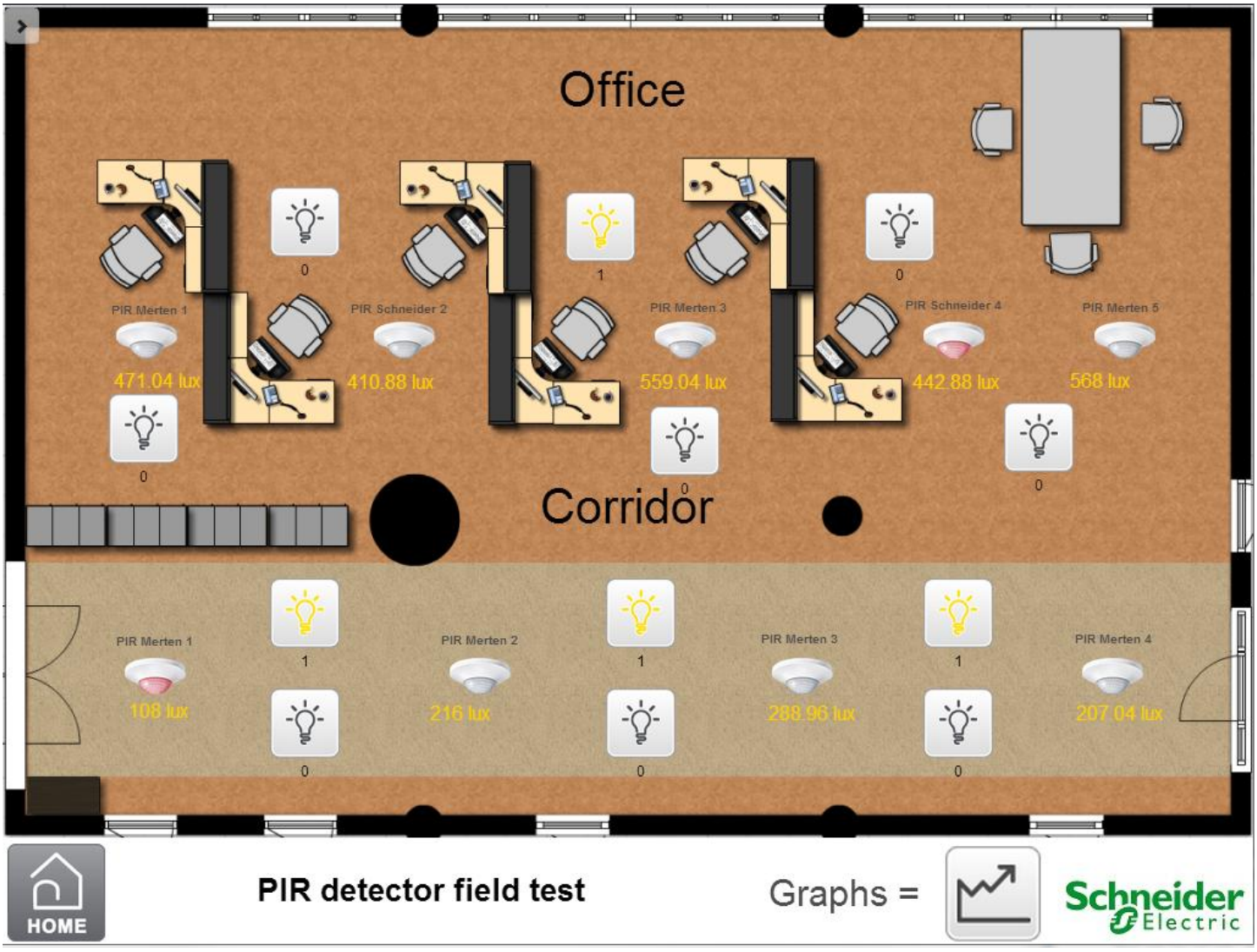
General topology of the light control solution. Please note that spaceLYnk device can be used either for visualization purposes as well as for KNX ETS commissioning. Proper setting of PIR detectors in the ETS software is mandatory, because spaceLYnk is reading all data from KNX bus communication.



Picture 1: Suggested topology

3.2 Sample visualization

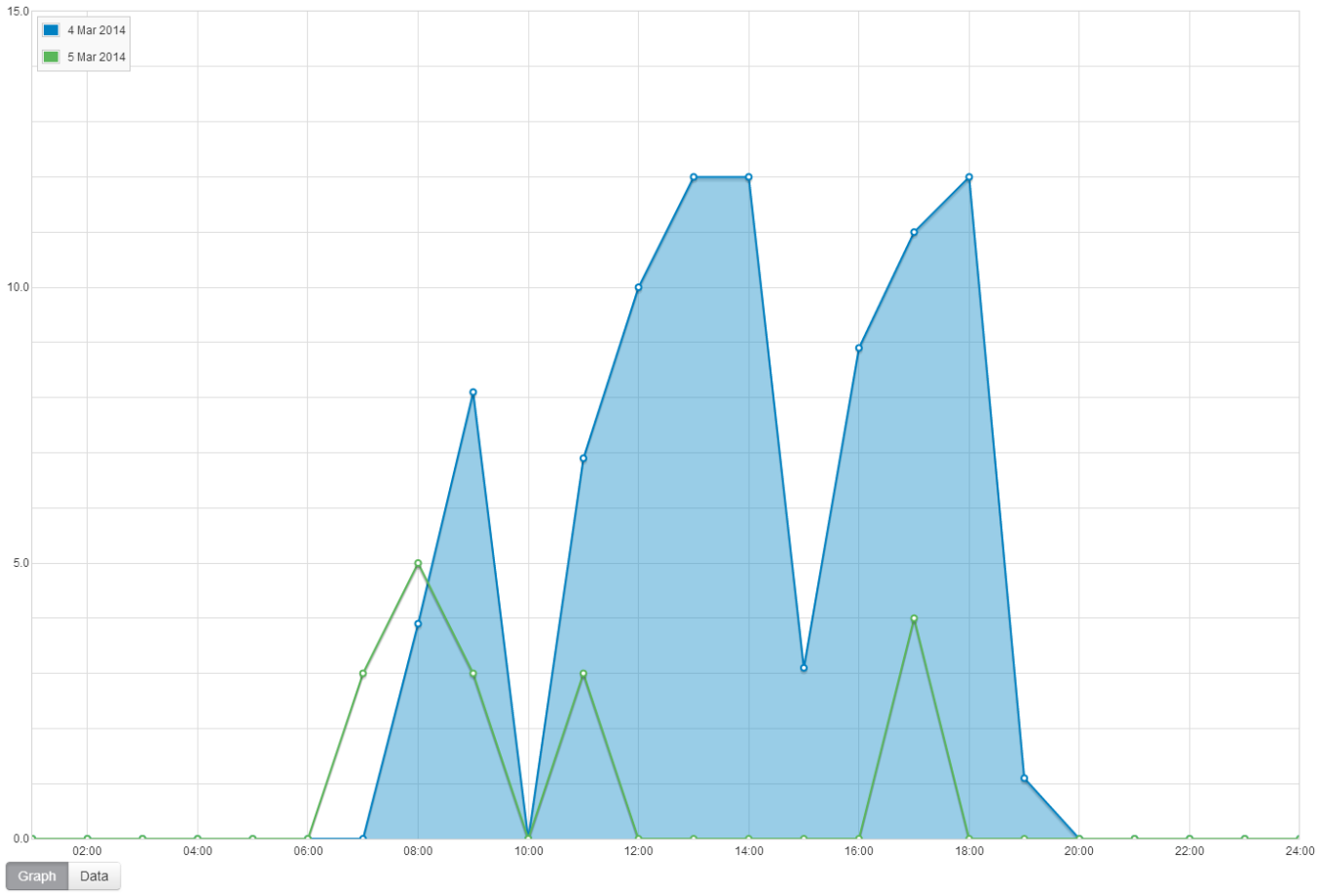
spaceLYnk sample visualization preview of the office room with 9 PIR motion detectors with 8 light circuits (circa 100 m$^{2)}$. Status of lights (ON/OFF), Status of PIR motion detectors (No movement/movement detected) and Actual brightness (in LUX) are visualised. Graph link lead to the trend visualization of PIRs activities and measured brightness.



Picture 3: Visualization sample

3.3 spaceLYnk Trend log visualization

Example of motion detection frequency logging for PIR detector in above visualized office, during busy (blue) and quiet (green) working day. As spaceLYnk can only refresh trend values on every hour, script was made to count number of periods per hour when motion was detected. Sleeping period of the PIR detector was set to 5 minutes. Maximum amount of detection is 12/h = movement was detected whole hour.



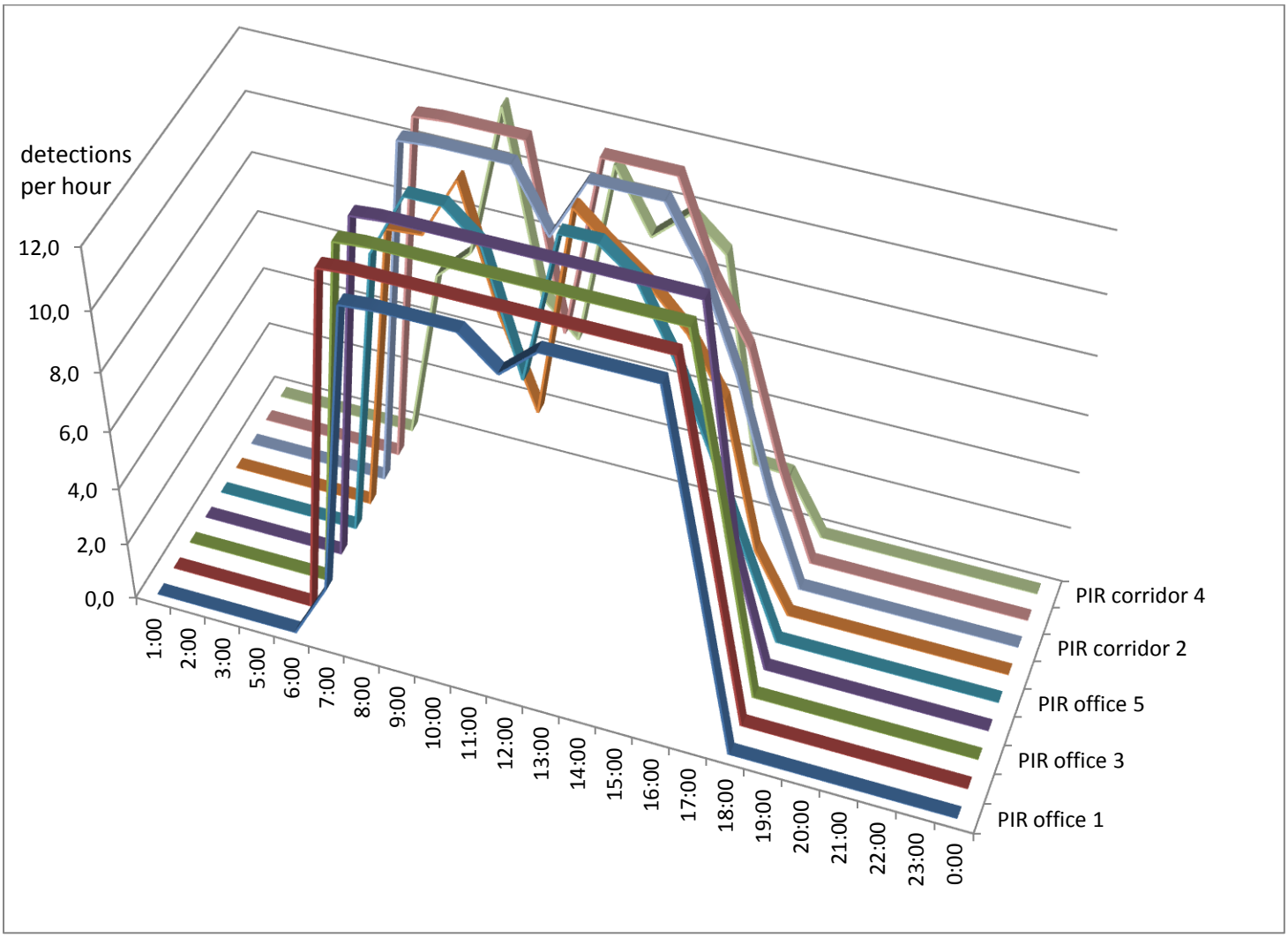
Picture 4 spaceLYnk graph visualization

This feature can be used for service and statistic purposes. Please note that spaceLYnk can only visualize two values at the time. For more complex visualizations export of data in CSV values can be used for more complex graphs:

Download CSV

3.4 3rd party visualization

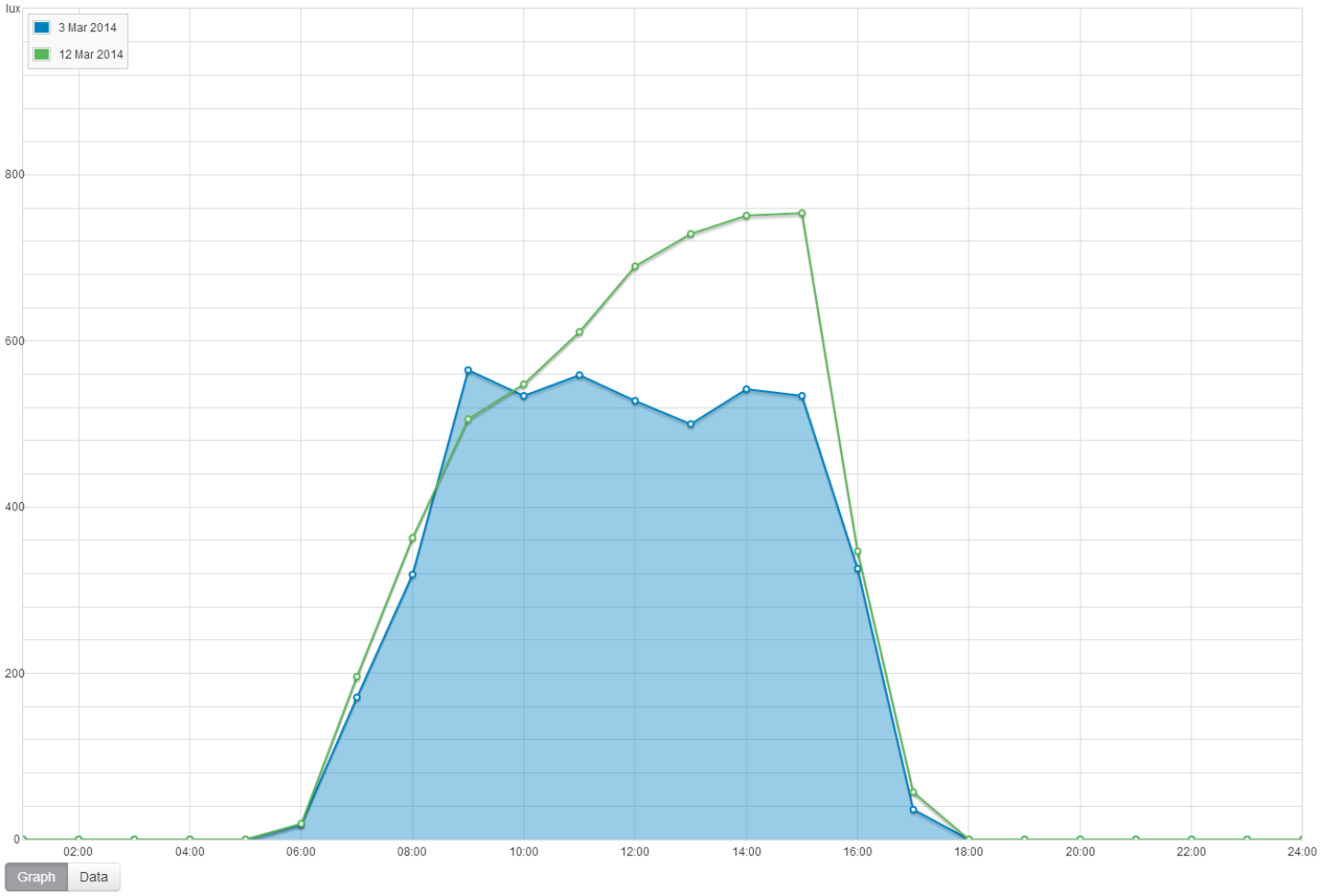
Example of graphical visualization of one day activity of all 9 PIR in above mentioned office in Microsoft Excel with data exported from spaceLYnk in the CSV format. Please note the difference between corridors and offices PIRs detectors and decrease of traffic in corridors during lunch time. This graph can be used i.e. for facility management:



Picture 5 Graph made in the MS Excel with CVS export from spaceLYnk

3.5 Brightness log

Trend visualization can be used for other properties of PIR detector as well. In example for trend visualization of brightness. Please note the difference between cloudy day (blue) and sunny day (green). This graph can be used i.e. for health and safety purposes (guaranteeing of sufficient light level):



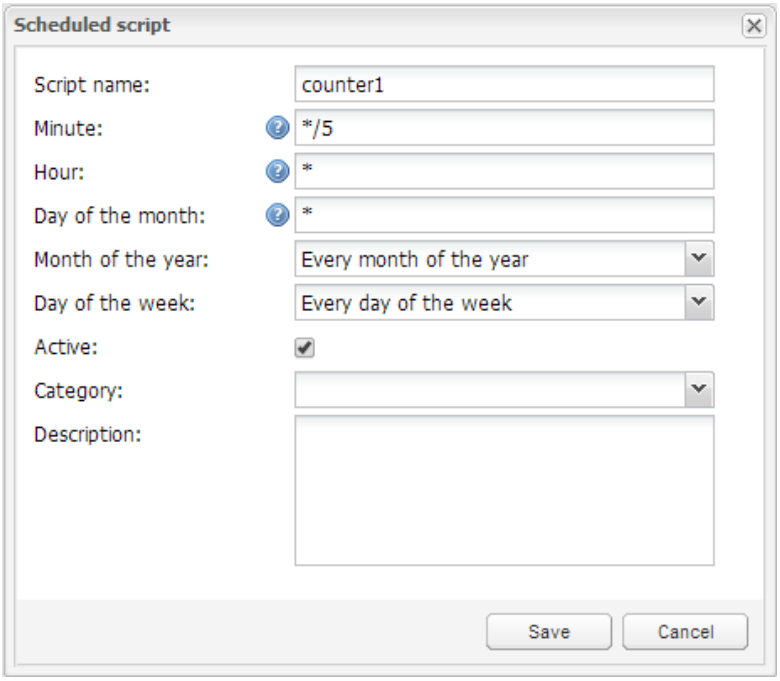
Picture 6 Brightness visualization in spaceLYnk

Please note that as Log type is set to ‘Absolute value’ there is no need for any additional scripting.

4 Configuration

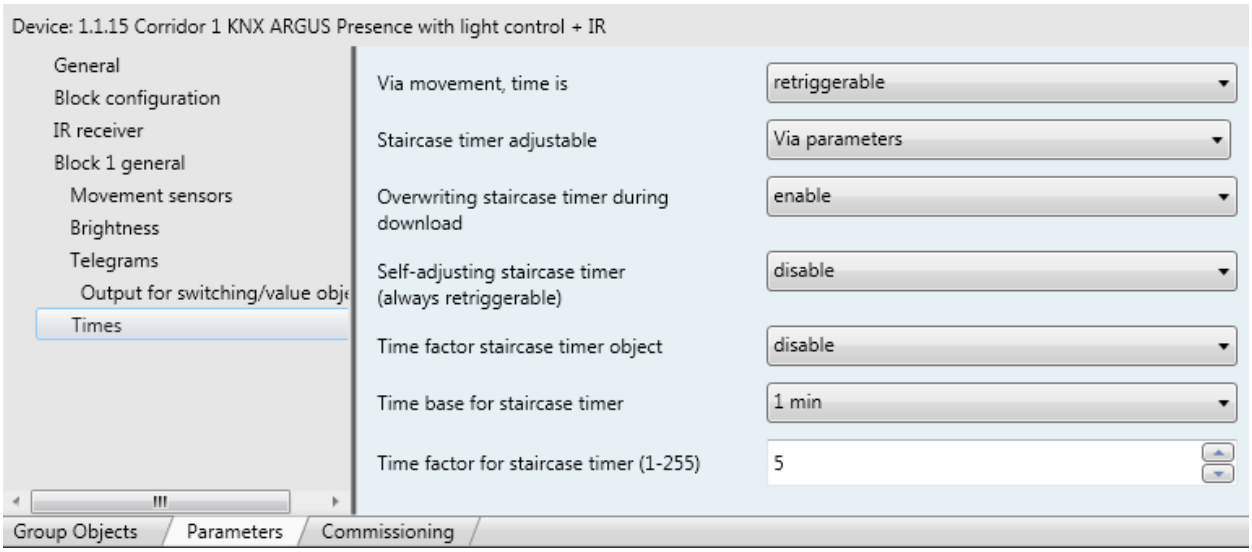
4.1 Script creating

Scheduled script for counting the time and values for all PIRs with 5 minute refreshing period:



Picture 7 Scheduled script settings

Please not that in this case all PIR in office have the same monitoring period as set in the ETS:



Picture 8 KNX ETS4 time setting for PIR

4.2 Script content

If there is different time for different PIRs each time must have its own script with the same time. Sample of script for above office for first two PIRs (both with the same timing 60min/5 min = 12):

Getting the values:

```
local value = grp.getvalue('0/2/0')
if value then
  local counterValue = grp.getvalue('10/1/1')
  counterValue = counterValue + 1
  grp.update('10/1/1', counterValue)
end

local value = grp.getvalue('0/2/1')
if value then
  local counterValue = grp.getvalue('10/1/2')
  counterValue = counterValue + 1
  grp.update('10/1/2', counterValue)
end
```

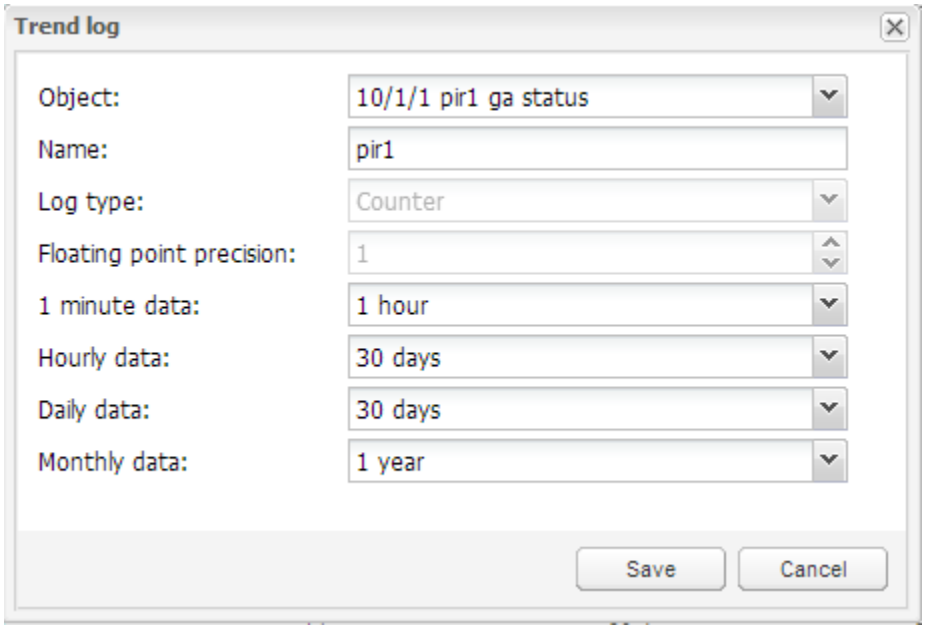
Counting the values and setting the time scale:

```
timeCounter1 = grp.getvalue('10/1/1')
tc = timeCounter1
if tc < 12 then
  tc = tc + 1
  grp.update('10/1/1', tc)
else
  graphCounter = grp.getvalue('10/1/1')
  grp.update('15/1/1', graphCounter)
  tc = 0
end

timeCounter2 = grp.getvalue('10/1/2')
tc = timeCounter2
if tc < 12 then
  tc = tc + 1
  grp.update('10/1/2', tc)
else
  graphCounter = grp.getvalue('10/1/2')
  grp.update('15/1/2', graphCounter)
  tc = 0
end
```

4.3 Visualization

Settings for Trend log visualization. It is important to set graph type to ‘Counter’ and 1 minute data to ‘1 hour’ for correct display of the graph:



Picture 9 Trend log settings

Please note that all changes made will be visible in the visualization after one hour.

5 Conclusion

Trend logs visualization can be used as a powerful tool for accurate setting, troubleshooting and statistic of KNX PIR detectors in real environment. The only limitation of graphs is its low rate sample, but as time base for PIR detectors is usually tens of minutes it is not an issue.

6 Glossary

Abbreviation	Description
CSV	Comma Separated Value – common data format for data export