**LIGHTING CONTROLS**

Generally, lighting management will be carried out by presence and brightness detectors. The nature of the detectors, the number, the brightness, and time delay adjustment values ​​will be adapted to the premises and to the controlled lighting sources. Circuits will be properly subdivided so that only dark areas are lit during the day. All detectors must be adjustable by remote control.

**Principles of operation and material requirements**

**1- Small Premises Management:**

Automatic operation by presence and light sensor

Typical detector **PD3N-1C** for ceiling mounting (recessed or surface-mounted depending on the nature of the ceiling) of the **BEG LUXOMAT** brand or technically equivalent and will have the following characteristics:

Degree / protection class: **IP44, FC: IP54/Class II/CE**

Detection area: h=2,50 m: **Ø 10 m across, 6 m towards, 4 m activity seat**

Switching power: **2300W cos φ 1/1150VA cos φ 0.5,** **LED 300W maxi**

Follow-up time: **30 s to 30 min or pulse /** Brightness: **10 to 2500 Lux**

Applications: **Toilets / Lockers rooms / Equipment rooms / Airlocks…**

**2- Technical Building Management:**

The building will be equipped with a BMS allowing the control of different technical batches either by local, automatic, or centralized controls. The system will ensure the modularity of the installations, making it possible to easily modify the partitions, without having to intervene in the lighting or wiring, and will have to be scalable, making it possible to anticipate a possible extension to new installations. The principle will be based on a **KNX BUS**. Commissioning and modifications will be carried out via the dedicated “ETS” programming software, connected locally via a KNX/IP interface or via a WEB interface on the LAN or WLAN network and will be carried out by a KNX certified integrator. The system will allow, via a supervision, a complete control of the installations, a visualization of status and the reception of information for maintenance.

Through the components connected to the BUS, this solution will provide the following characteristics:

2.1**- Lighting Management**

A lighting management system will be installed in each room, allowing the light sources to be completely switched off when unoccupied or when there is sufficient natural light in the room. The system will be composed of ***presence sensors, digital switching*** or ***DALI dimming actuators*** depending on the nature of the luminaires, associated with local ***KNX push-button*** controls.

**Management of Offices, Infirmary, Teachers' Room**

* Occupancy management by absence detection / Lighting variation, constant lighting threshold
* User" overrides by local BP

**Management of Teaching Rooms, Study Rooms**

* Occupancy management by absence detection / Lighting variation, constant lighting threshold
* Lighting segmented into a minimum of 3 groups: Window side, corridor side and blackboard
* User" overrides per local PB, at least 1 for the classroom lighting, 1 for the blackboard
* Creation of a projection scenario: Switching off the blackboard lighting, lowering the room lighting to 10%.

**Management of the refectory**

* Occupancy management by presence detection / Lighting dimming, constant lighting threshold
* Lighting divided into at least 2 groups: Window side management, corridor side management
* Users" derogations by local PB, not accessible to the public

**Management of Circulation, Halls and Stairwells**

* During public occupancy hours: Automatic lighting by the BMS at the minimum regulatory threshold. By presence detection and according to natural light, switching on at the set value.
* Outside public occupancy hours: Lighting by presence detection only
* Users' derogations per local BP, not accessible to the public

2.2**- Air change management**

The air renewal of each room will be controlled automatically, considering the occupation of the room and the quality of the ambient air. Information on room occupancy will be sent to the HVAC package via **presence sensors** and information on air quality via a **VOC sensor** (Volatile Organic Compounds).

2.3**- Temperature management**

Each room will be equipped with a **temperature sensor** and a **presence sensor**, associated with a **weather station** and an **annual time circuit** according to the occupation of the building. The temperature of each room can be adapted to the information retrieved on the KNX bus (temperature increase in advance in case of extreme cold, reduced temperature at night…). By customer request, it will be possible, in each room, to increase or decrease the temperature set point by +/-2°C by means of the thermostat located locally.

2.4**- Shutter and sunshade management**

The control of the sunshades and roller shutters will be carried out automatically by the BMS or locally by **“KNX” type pushbuttons** located in each permanently occupied room (offices, meeting rooms…). The common areas will be controlled solely by the BMS. **A KNX weather station** will be connected to the system to control the brises soleil according to the weather outside.

The **KNX** system selected will be of the brand **BEG LUXOMAT** or **technically equivalent,** comprising the following equipment

* **KNX power supply** type **PSN-230/640/30-KNX-REG**

230V AC / 30V DC BUS KNX / 640mA/ 1000m BUS max

Integrated choke to supply the bus with constant and stabilized current

Up to 64 participants on the KNX BUS (Multi-sensors / PB interfaces / Actuators…)

* **Switching actuator** “TOR” type **SA4/8/230/16/H/KNX REG**

Power supply via KNX BUS

Outputs: **4 (SA4)** or **8 (SA8) 16 A** switching outputs

Current measurement possible with actuator type **SA4/8-230/16/H/EM/KNX REG**



* **KNX blind actuator** type **SBA4-230/10/H/KNX REG**

Power supply via KNX BUS

Control of 4 AC motors 230 V max. 600 W



* **DALI/KNX Gateway** type **DA64-230/KNX REG**

Power supply 230V AC – Communication via KNX BUS

DALI BUS supply for 64 luminaires in 16 groups / 16 scenes

Support for **RGB** and **TW (Tunable White – DALI Type 8)**

* **KNX multi-sensor** type **PDx-KNX-BA/ST/DX**

Power supply and communication via KNX BUS



**PD4-KNX-C SM/FC/FM** (DX): 40 x 5 m angled, 20 x 3 towards, Ø 8 m vertical

Applications: **Circulation**

**PD4-KNX SM/FC/FM** (BA-ST-DX): Ø 24 m across, Ø 8 m towards, Ø 6,40 m seated

Applications: **Offices / Teaching rooms / Study rooms / Refectory / Halls**

**RC-plus 230 KNX** (DX): 20 m across, 6 m towards, 4 m vertical

Applications: **Stairs / Outdoors / Porch**



* **KNX PB interface** type **BP-KNX-DX-4W**

Power supply and communication via KNX BUS

Up to 4 pushbuttons as imput

Can be combined with all manufacturers’ pushbuttons



* **KNX Weather Station** type **KNX-WTS-GPS**

Power supply and communication via KNX BUS

Wind, Rain, Dusk, Temperature and Light Sensors

* **VOC sensor** type **WS-VOC-HVAC-KNX**

Power supply and communication via KNX BUS

Temperature sensors, room thermostat, VOC sensor (Volatile Organic Compounds)

Humidity Sensor and CO2 Sensor

* **KNX Router and IP interface**

Power supply and communication via KNX BUS

Router **LK-IP/KNX-REG:** Enables the transfer of telegrams between different KNX segments via a LAN (IP)

**LAN-IF/KNX-REG** IP interface: Connection of a PC for addressing via LAN bus, programming, and diagnostics of KNX components

