SOLUTIONS GUIDE 1.0 - 2024

Lighting Control System

Modern light management

About ABB group

ABB's purpose is to enable a more sustainable and resource efficient future with our technology leadership in electrification and automation.

Building on over 140 years of excellence, our more than 105,000 employees are committed to delivering on our purpose by driving innovations that create success for ABB and all our stakeholders. Together, we address the world's energy challenges, transform industries, reduce emissions, preserve natural resources, promote social progress, and push the frontiers of technology to make things possible that were not possible before.

Our solutions connect engineering know-how and software to optimize how things are manufactured, moved, powered, and operated.

ABB's purpose is why we are in business and our guiding star.

ABB'S PURPOSE

We enable a more sustainable and resource-efficient future with our technology leadership in electrification and automation.

ABB in India: 100+ years, 74 years of manufacturing, global R&D and business services

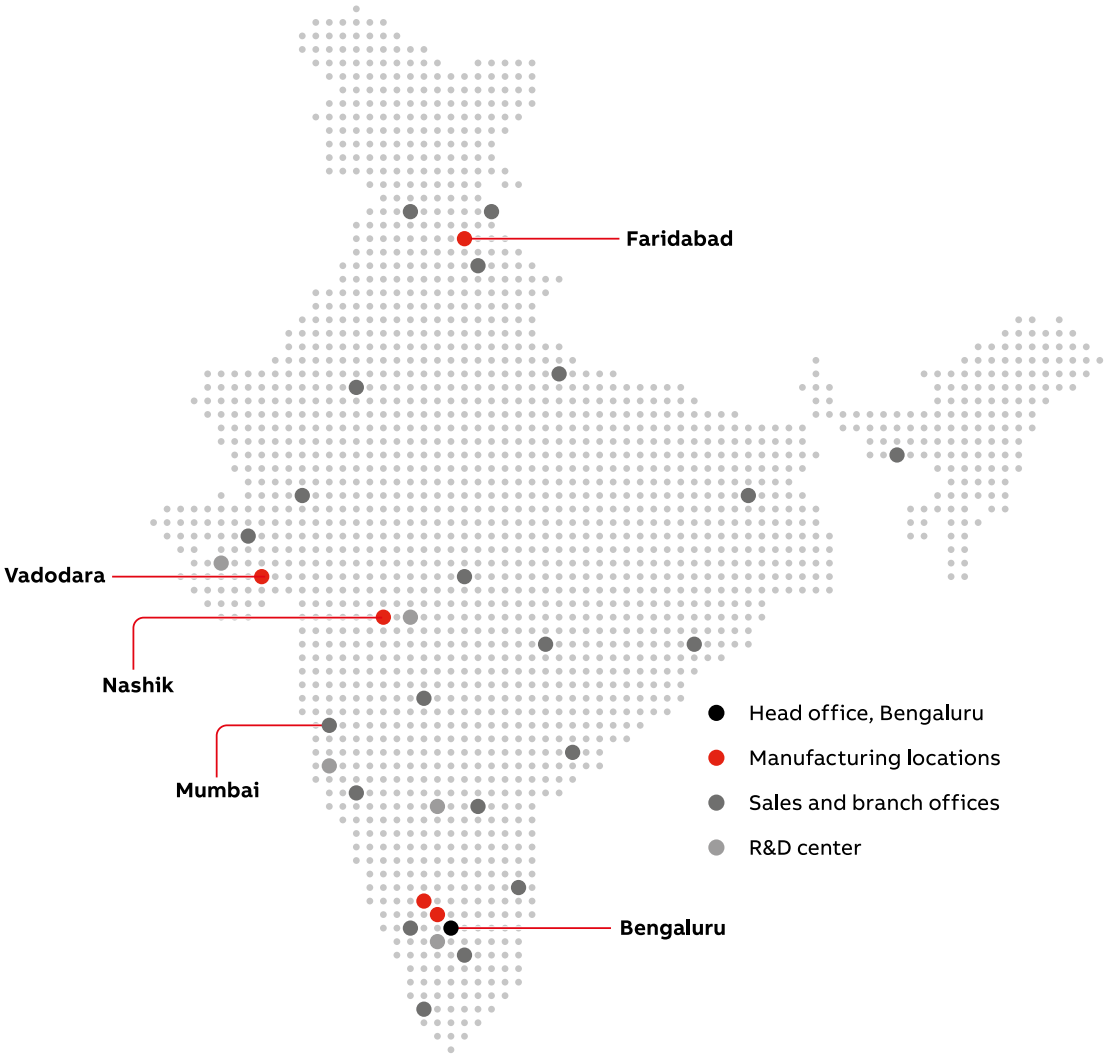
5 Manufacturing locations

28 Sales offices

9,500+ Employees

25 Plants

750+ Partners



Lighting control

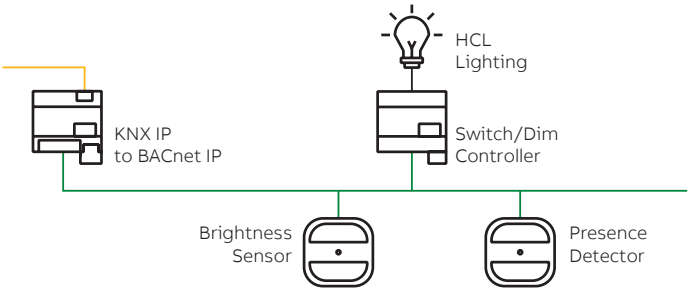
ABB i-bus® KNX ensures optimum lighting of industrial and office buildings as well as private dwellings.

The illuminance is monitored and remotely controlled depending on the lighting requirements. In addition, subsystems (such as 1 - 10 V lighting control and DALI) and their interfaces are supported.

Digital Addressable Lighting Interface also known as DALI is a two-way open protocol. It is widely used communication protocol among lighting control devices such as lighting fixtures, lighting controllers etc. DALI protocols facilitate control and monitoring of lighting devices. Lighting control can be broadly classified in two categories i.e. Artificial lighting control and Natural lighting control.

Artificial lighting control

The term 'artificial lighting' generally refers to lighting that comes from electrical lamps such as incandescent, fluorescent, and light emitting diode. Artificial light is manipulated to achieve the required lighting outcome by increasing or decreasing, directing, focusing, and changing color of light to increase comfort, safety, convenience, health, and wellbeing of occupants. Basic building blocks of artificial lighting control are light sensors, occupancy sensors, fixtures, and lighting.



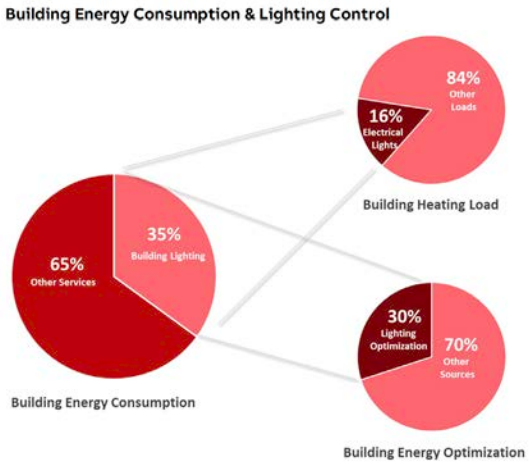
Lighting control

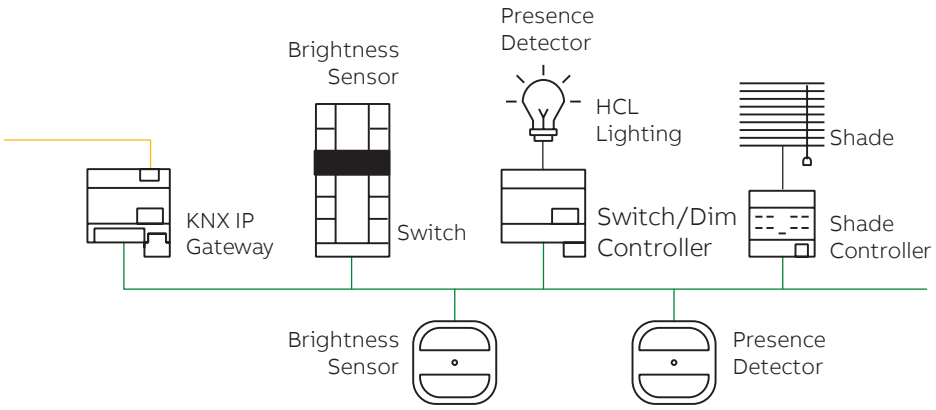
Natural lighting or daylighting control

Natural lighting, also known as daylighting, describes the controlled use of natural light in and around buildings thereby reducing artificial lighting requirements and saving energy. Natural lighting has been proven to increase health and comfort levels for building occupants. Basic building blocks of natural lighting control are, motorized blinds or curtains, light sensor, occupancy sensors, shade controller, lighting controller and lighting fixtures.

Lighting control modes

ABB i-bus® KNX ensures optimum lighting of industrial and office buildings as well as private dwellings. The illuminance is monitored and remotely controlled depending on the lighting requirements. In addition, subsystems (such as 1 - 10 V lighting control and DALI) and their interfaces are supported.





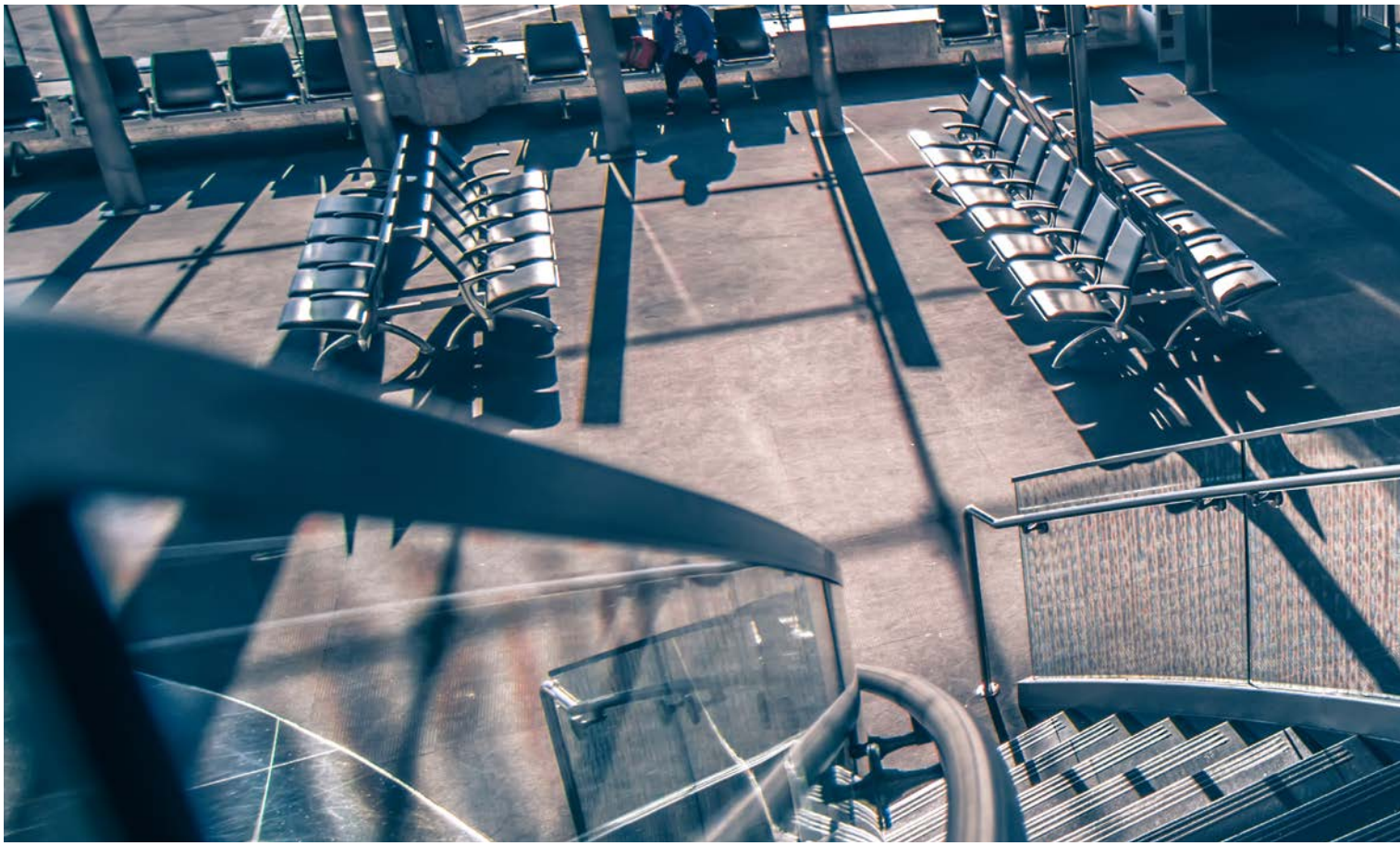
Lighting control

Time-based and occupancy-dependent control (variable occupancy spaces)

Time-based control is achieved via predefined time schedules according to the usage of the building. A dedicated KNX radio time switch shall execute this with the possibility to change time schedules directly on the device without programming tools. An occupancy-dependent control is a control form that uses motion or presence detectors. It detects the movement of persons in the building or in external areas and switches or reduces light level of the corresponding lighting.

Blind/curtain/shutter control for daylight saving (indoor low and high ceiling spaces)

Sensor controlled roller shutters, windows and blinds with sun position controlled louvers not only provide pleasant shading but also allow optimal lighting and room climate conditions and assist in responsible use of energy. Curtain and blind control shall be possible via local operation with switches / push-buttons or touch screen. This can be also used to optimize HVAC. For example in summer by lowering blinds, which can help to reduce cooling demand and hence saving energy.



Switching & dimming control (low ceiling indoor fix occupancy spaces)

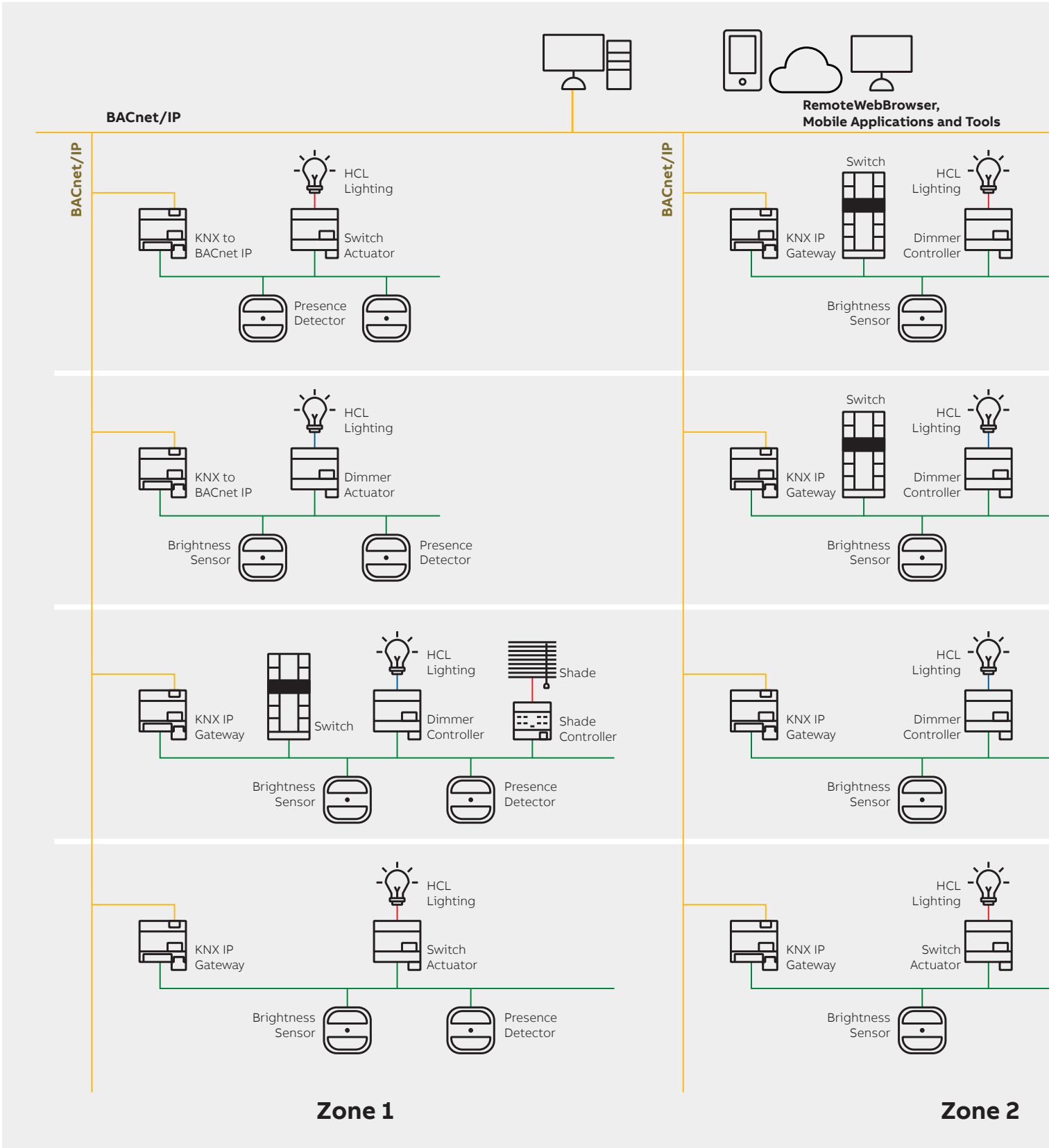
Dimmer controls provide variable indoor lighting and can be operated manually, or with timers or sensors. When luminaires are dim, it reduces energy consumption and output, which helps save energy. The dimming control system is ideally based on DALI (Digital Addressable Lighting Interface) according to the technical standard IEC 62 386 in combination with KNX. Up to 2 DALI lines with 64 ballast can controlled in group or individually. In addition, ABB also provides a wide variety direct/ universal dimmer ranging from 210VA to 2400VA with ±10% derating. These direct dimmers are used for loads such as incandescent, low voltage halogen, halogen, cold cathode, xenon etc. All direct dimmers are DIN-Rail mounted and self-contained.

Human centric lighting (variable occupancy special occasion spaces)

As an additional benefit to users in a building, “Human Centric Lighting” (HCL) can be enabled in areas, where occupants enjoy their breaks. Because human’s physiological response to light depends on the properties of light such as color spectrum, intensity and timing, the impact of artificial light in building environments are of great importance. Solutions with Human Centric Lighting can promote the circadian rhythm, improve the ability to concentrate, prevent sleep disorders and increase the general wellbeing, motivation, and productivity. The proposed DALI gateways in the reference architecture feature applications to enable human centric lighting and is also compatible with self-contained emergency lighting.

Lighting control

Distributed architecture - small building



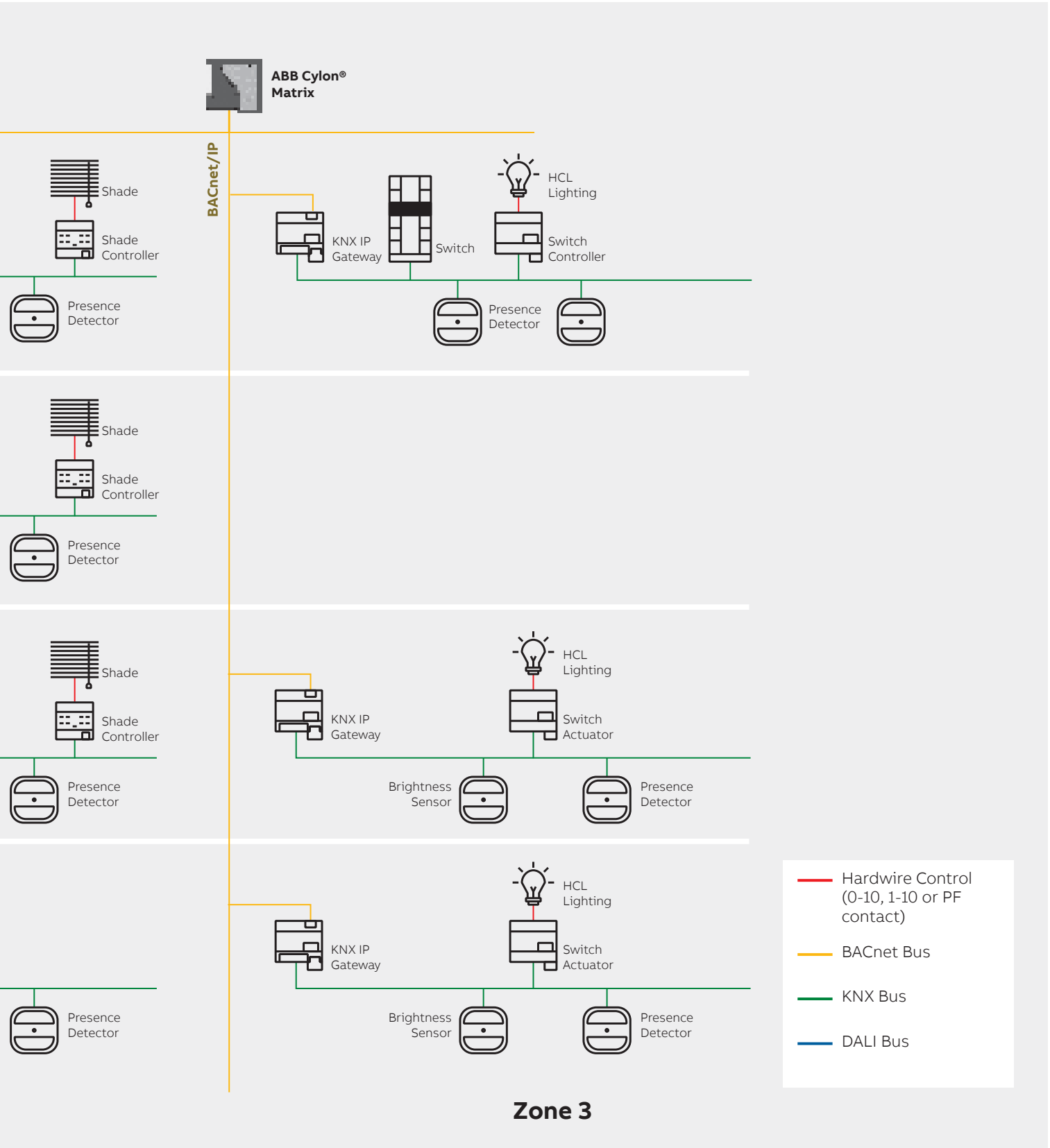


ABB Cylon®
Matrix
BACnet/IP
Shade
Shade
Controller
Presence
Detector
KNX IP
Gateway
Switch
HCL
Lighting
Switch
Controller
Presence
Detector
Shade
Shade
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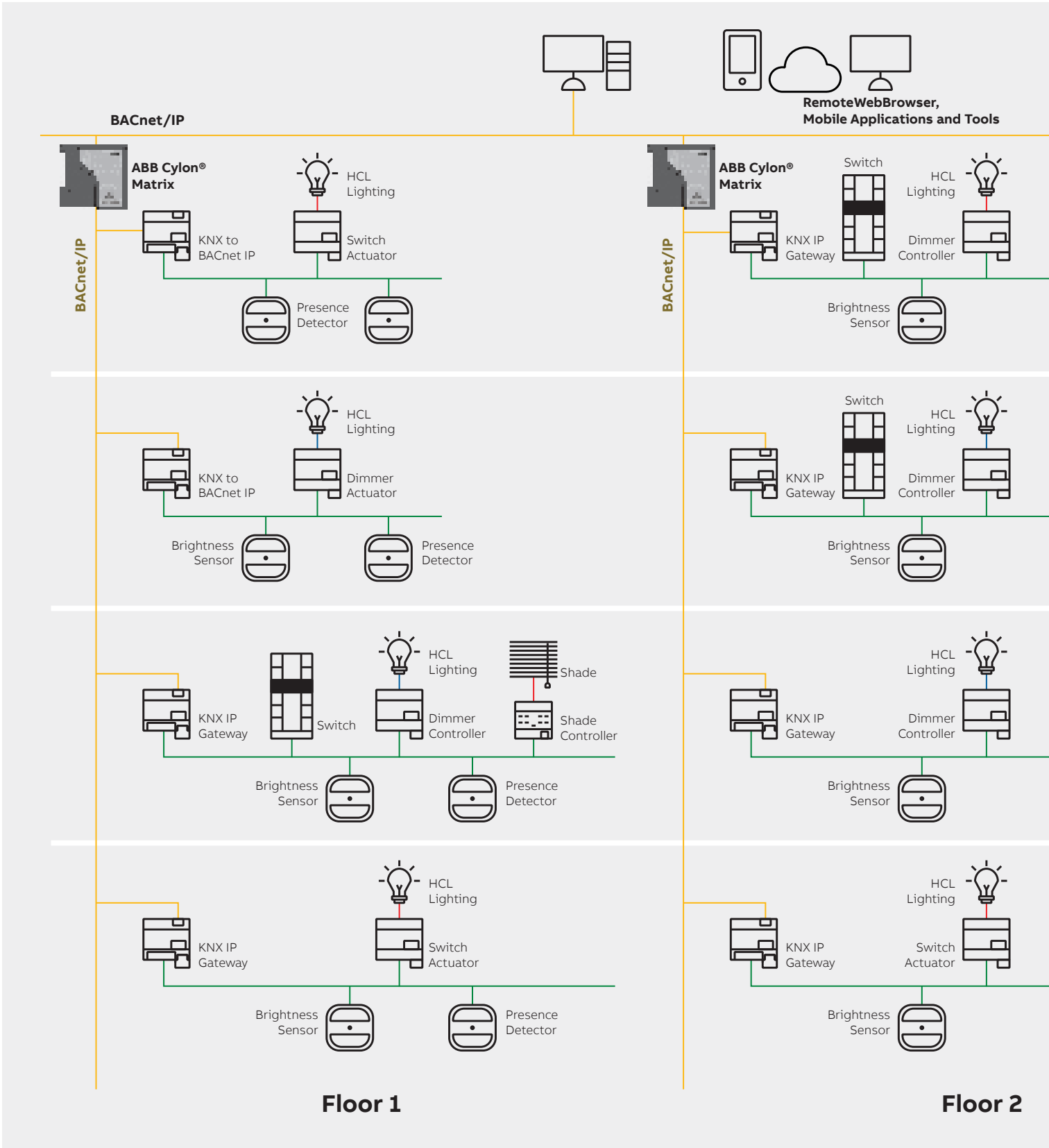
Presence
Detector
Shade
Shade
Controller
Presence
Detector
KNX IP
Gateway
HCL
Lighting
Switch
Actuator
Brightness
Sensor
Presence
Detector
Presence
Detector
KNX IP
Gateway
HCL
Lighting
Switch
Actuator
Brightness
Sensor
Presence
Detector
Hardwire Control
(0-10, 1-10 or PF
contact)
BACnet Bus
KNX Bus
DALI Bus

Zone 3

Lighting control

Distributed architecture - mid-sized buildings



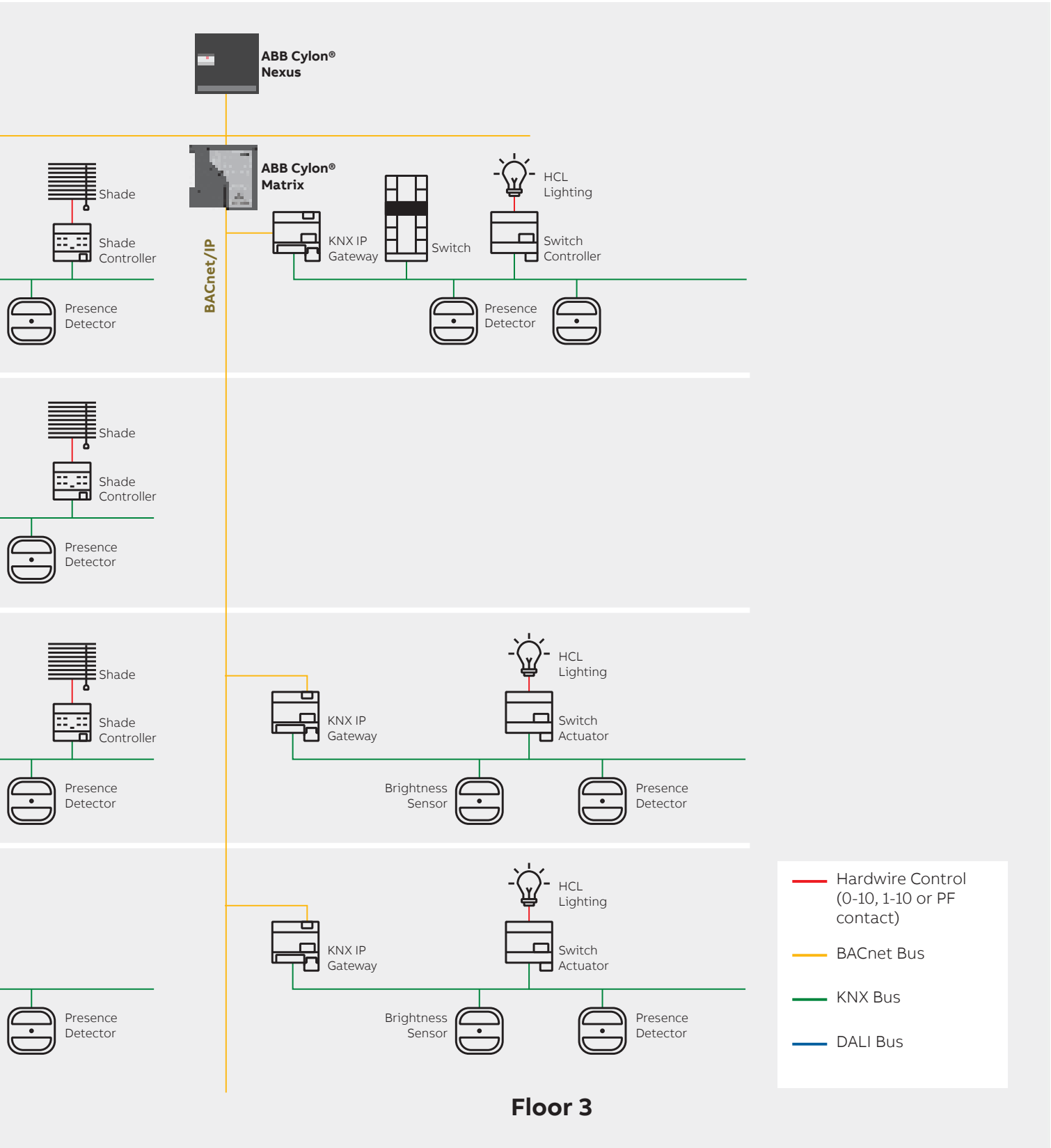


ABB Cylon®
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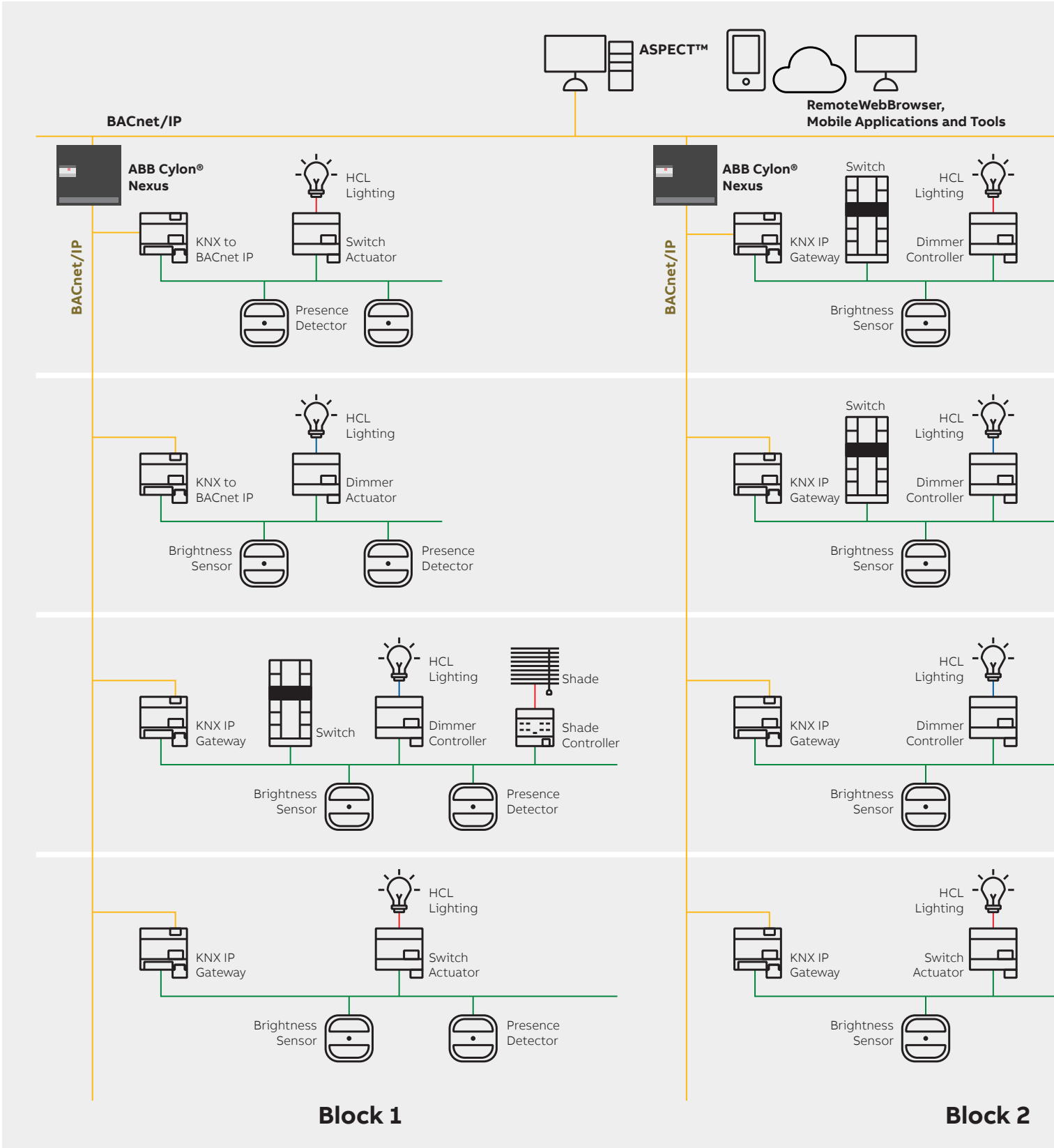
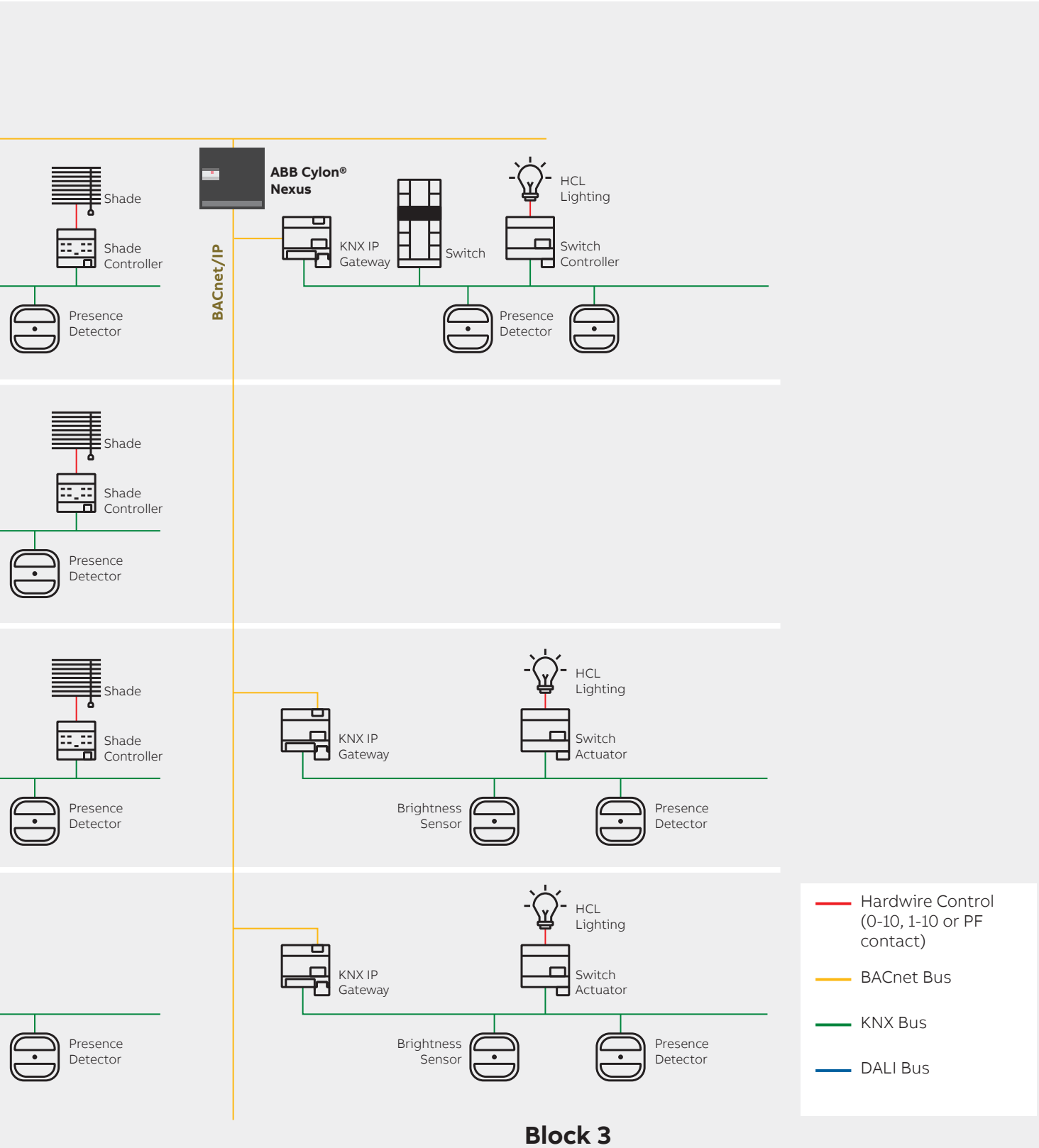
Brightness
Sensor
Presence
Detector
Hardwire Control
(0-10, 1-10 or PF
contact)
BACnet Bus
KNX Bus
DALI Bus

Floor 3

Lighting control

Distributed architecture - large building

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KNX IP
Gateway
HCL
Lighting
Switch
Actuator
Brightness
Sensor
Presence
Detector
Hardwire Control
(0-10, 1-10 or PF
contact)
BACnet Bus
KNX Bus
DALI Bus

Block 3

Lighting control

Control, automation and supervision of the environment

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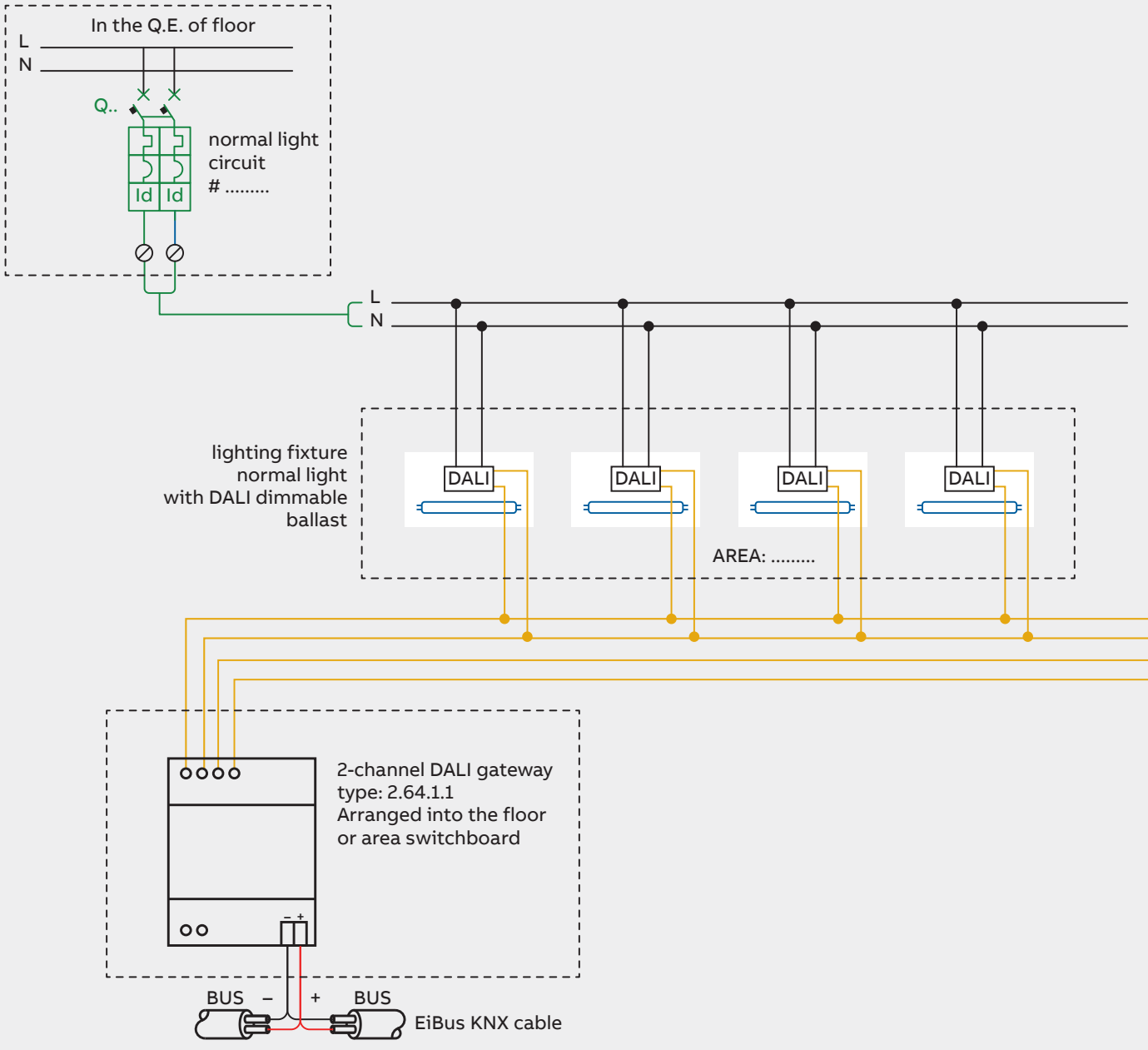
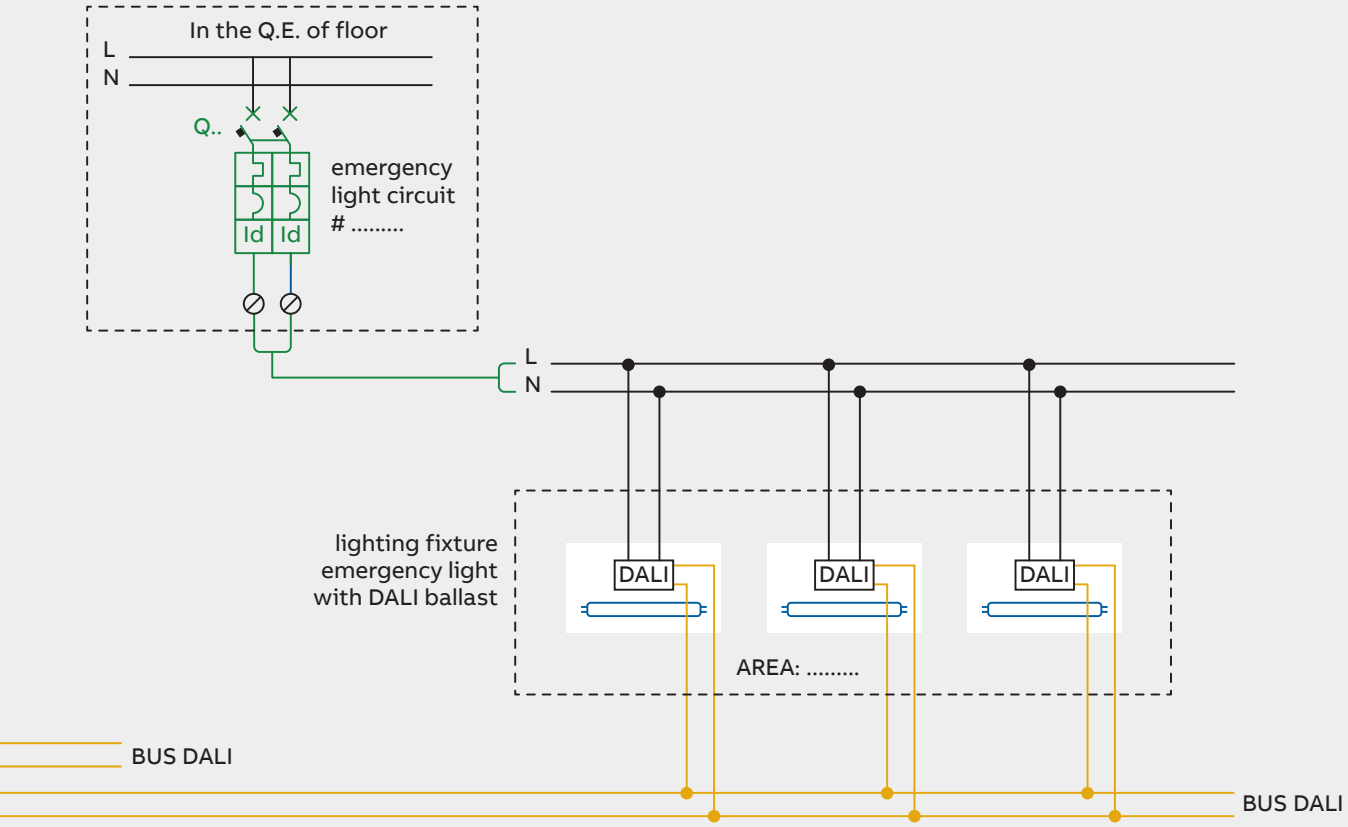
“DALI” light device controller




In the Q.E. of floor
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Q..
Id
Id
emergency
light circuit
.....
L
N
lighting fixture
emergency light
with DALI ballast
DALI
DALI
DALI
AREA: .....
BUS DALI
BUS DALI

Lighting control

High quality presence detector 6131/31 and Dali DG/S gateway

This group of devices can perfect the lighting levels in different environments by adjusting the system based on the presence of occupants or on different distribution of the light within the environment itself.
This ensures the best level of lighting comfort and a significant reduction in consumption. It can be supported with a thermoregulation system which activates or deactivates the cooling or heating function based on the same parameters.
The platform can be integrated with the anti-intrusion systems to switch off all the lights automatically when the alarm system is activated.

Premium DALI gateway

Together with the KNX building automation systems, this unit offers the most innovative solution for lighting control and management in all buildings during normal activities.
ABB's Gateway Premium allows for variable adjustment of the color temperature of artificial light according to natural light variation over the day.
When the color temperature and illuminance are correctly dosed, artificial light can improve people's wellbeing for all day. The system also allows to track the working period of the lamps, programming maintenance cycles in advance.

Lighting control

KNX switch actuator

Flexibility combined with compact design – the Combi Switch Actuators offer switching and shading functionality in a device half the size. Ideally suited to meet the dynamic requirements of modern residential projects.

The Combi Switch Actuators feature high channel density, freely selectable switching and shading functionality in a single device, increased safety and intuitive usage thanks to the unified manual operation concept – offering customers maximum flexibility and comfort in planning, installing and commissioning.

KNX lighting control

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Main benefits

- Increases energy efficiency by constant lighting and presence dependent control
- Maximum flexibility in lighting design, improved comfort and wellbeing with light scenes and sequences
- More flexibility through reprogramming or adding devices while in operation to meet changing needs

Lighting control

KNX shading control

Sensor controlled roller shutters, windows and blinds with sun position controlled louvers not only provide pleasant shading, they also allow optimal lighting and room climate conditions and assist in responsible use of energy.

Main features

- Control of independent drives via ABB i-bus® KNX
- Electro-mechanically interlocked outputs prevent possible destruction of the drives
- Additional safety is possible when used in combination with weather station e.g. protection of shutters against frost, wind, precipitation

KNX power supply

ABB i-bus® KNX power supplies provide the safe bus voltage for the connected KNX devices. Three versions for bus loads of 160, 320 and 640 mA are available, each with integrated choke and wide range mains input for worldwide usage. In addition, the 320 mA and 640 mA versions are available with expanded diagnostics for monitoring, e.g. bus voltage and current.

Main features

- Bus line is decoupled from the power supply by an integrated choke
- Voltage output is short-circuit and overload protected
- Premium range with enhanced diagnostics provides bus state via LED display and KNX communication objects

Lighting control

KNX room display

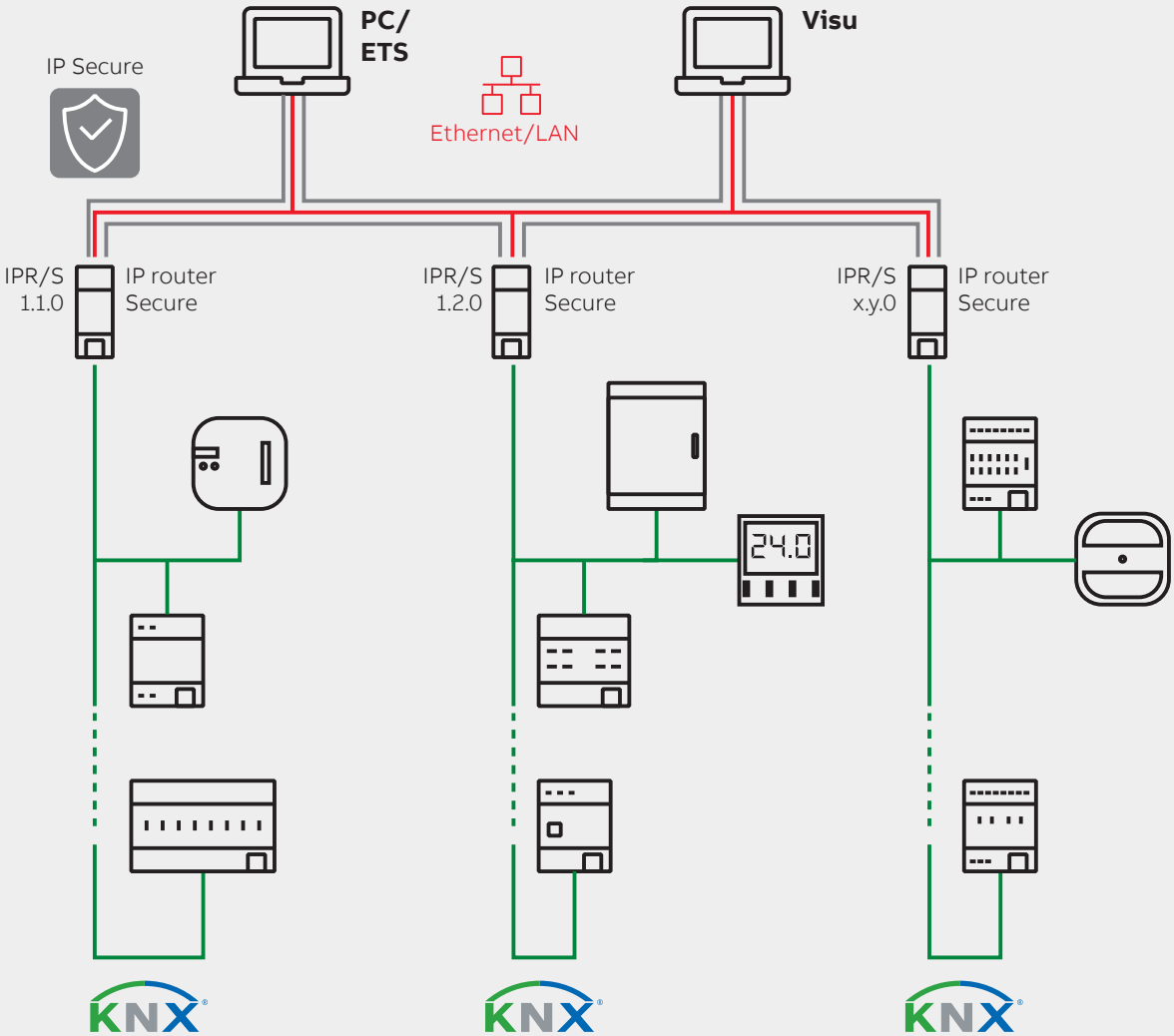
Networked structures work much more efficiently than individual systems. In residential buildings and on business premises, they reduce energy consumption and operating costs. At the same time, they provide added comfort and security. Busch-Jaeger KNX control elements form the interface between this state-of-the-art technology and the user.

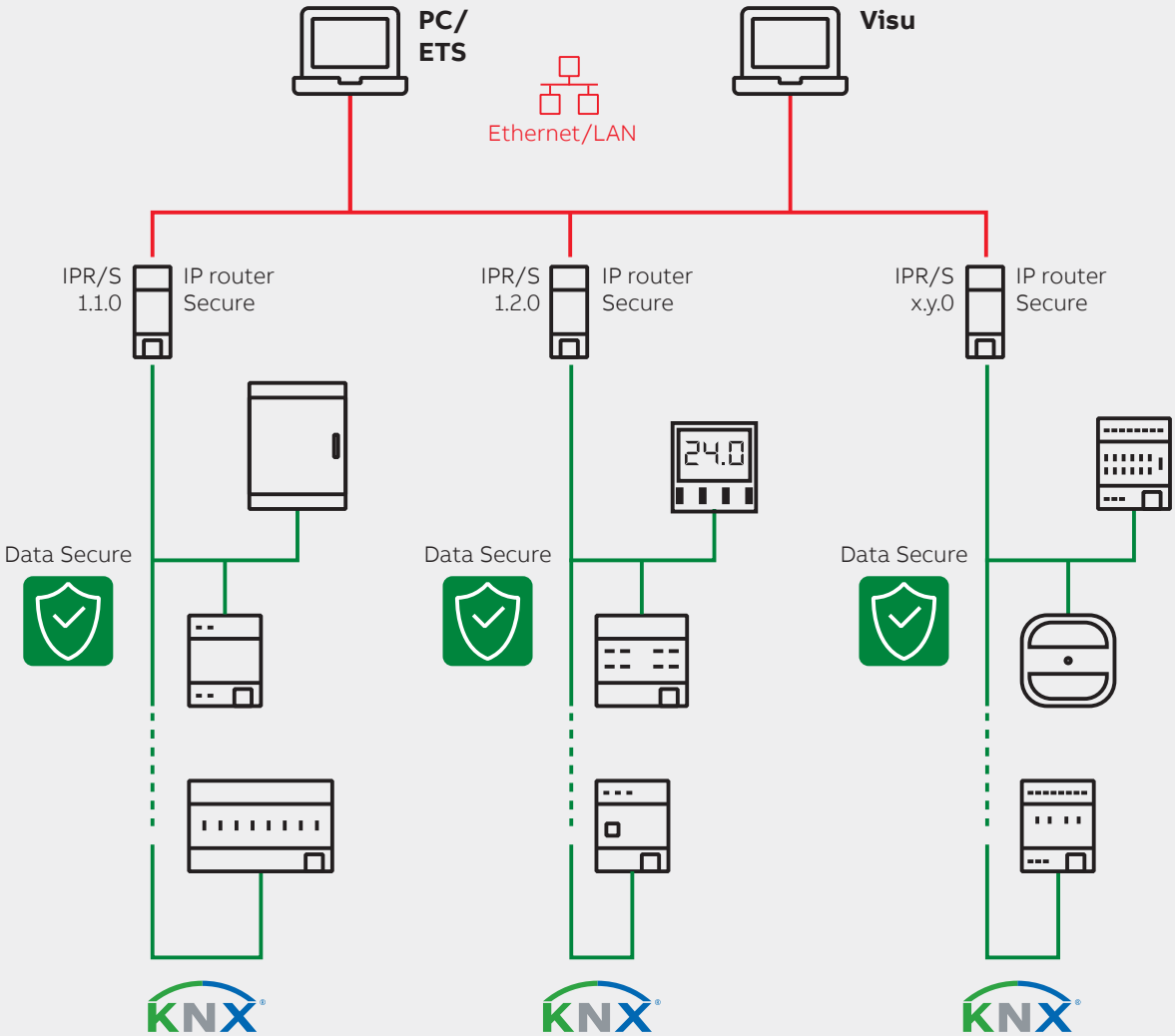
Presence detection

Knowing if people are in or moving around the building is a valuable asset for the efficient automation of any property. The ABB i-bus® KNX range of innovative motion and presence detectors help to control and manage daily tasks in every sector of the building – indoors and outdoors. Whether lighting, heating, air-conditioning or security related functions, this portfolio of premium design, high quality detectors can significantly improve levels of safety, efficiency and comfort throughout the building.

Lighting control
Data security

Reference architecture




PC/
ETS
Visu
Ethernet/LAN
IPR/S
1.1.0
IP router
Secure
IPR/S
1.2.0
IP router
Secure
IPR/S
x.y.0
IP router
Secure
24.0
Data Secure
Data Secure
Data Secure
KNX
KNX
KNX

Lighting control
Bill of materials

The bill of material for the lighting control equipment in the reference architecture is summarized in the following tables:

Purpose	Type	Order code	Description
Complete BOM			
KNX gateway	IPS/S 3.1.1	2CDG110175R0011	KNX gateway
KNX power supply	SV/S 30.640.3.1	2CDG110167R0011	KNX power supply
Shading control	JRA/S 4.24.5.1	2CDG110125R0011	Shading controller
Presence detector	6131/40-24-500	2CKA006132A0350	Presence detector
Busch-Presence detector corridor	6131/50-24-500	2CKA006132A0344	Presence detector
Busch-Presence detector mini premium KNX	6131/21-24-500	2CKA006132A0344	Presence detector
Busch-Presence detector mini KNX 8 meters	6131/20-24-500	2CKA006132A0342	Presence detector
KNX Lighting control	DG/S1.64.5.1	2CDG110273R0011	Lighting controller
KNX BACnet gateway	AC/S 1.2.1	2CDG110206R0011	BACnet gateway
KNX gateway	IPR/S 3.5.1	2CDG110176R0011	IP secure
Touch panel	ST/U 10.1.1-811	2TMA310051W0001	Smart touch panel
Keypad	SBR/U 10.0.1-84	2CK006330A0008	Keypad

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