CARLO GAVAZZI
Automation Components

CARLO GAVAZZI

Smart Building System

Fieldbus

Smart Building System
Benefit from the Dupline® decentralized solution

Communication networks are used extensively in Building Automation systems at the automation and management levels, but are less used at the device level, especially within HVAC control systems – in most cases, each data point needs its own wire(s) back to the DDC Controller, which complicates the installation in case of widely distributed data points. There can be many good reasons why traditional star wiring is still used, but surely issues with cost and complexity of the available device level fieldbus solutions are important factors.

The new Smart Building concept from Carlo Gavazzi is about to change this situation. Because this system significantly simplifies the field level wiring, but without increasing material cost. Furthermore it reduces commissioning time and offers the possibility to integrate HVAC and lighting controls at the field level – one network, two solutions. The system is based on bus-powered sensors and actuators, and small I/O modules. The cost savings of this decentralized I/O solution can be substantial.
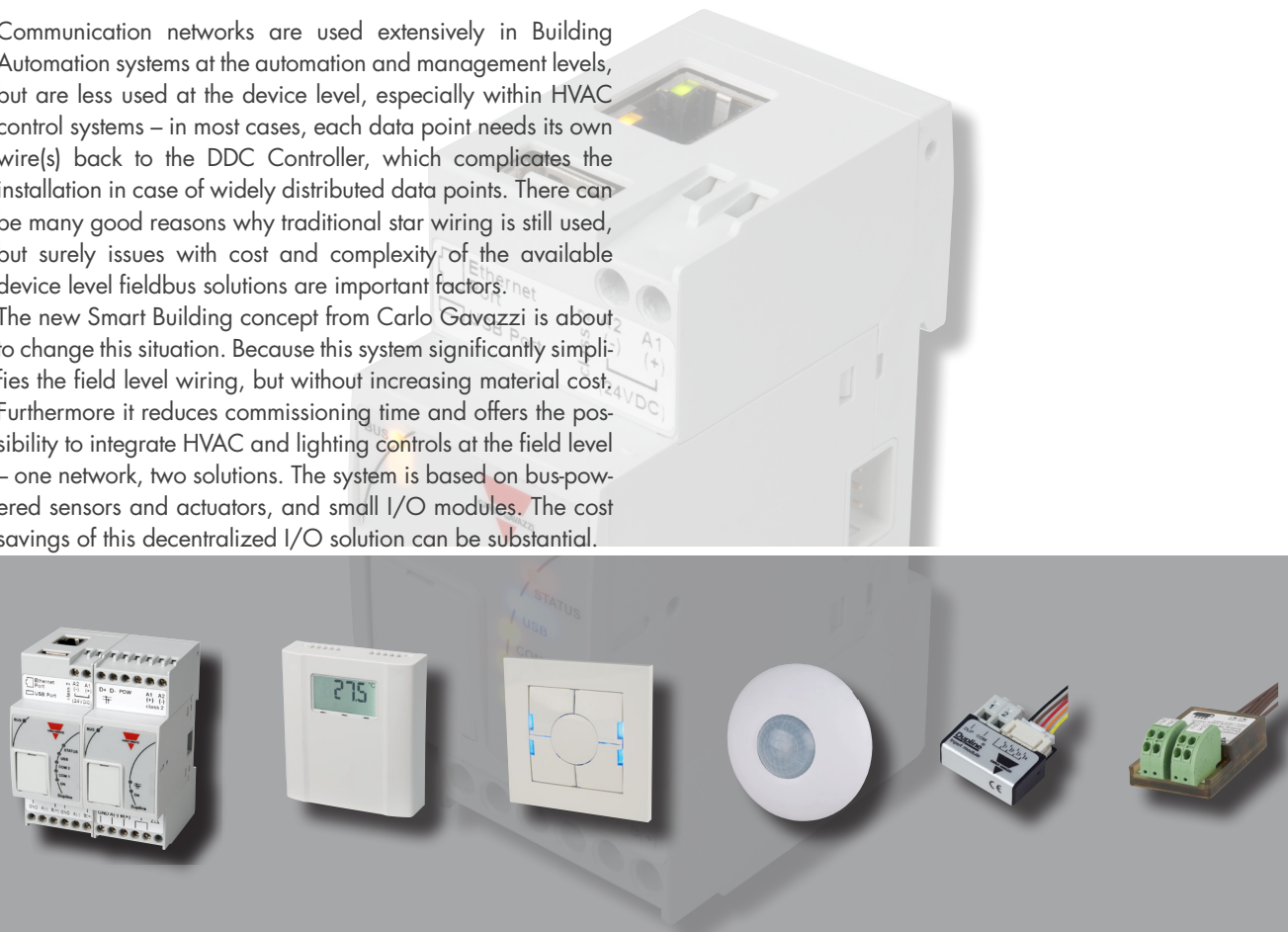
BACnet, DALI and Dupline®
With these 3 fieldbus systems seamless integrated in the SB2WEB controller, any networking requirement within HVAC and lighting control systems can be solved

Integrated HVAC and lighting control
- Bus-powered sensors and actuators for HVAC and lighting are connected to the same Dupline® bus thus eliminating the need for two separate networks and allowing data sharing at the field level
- The SB2WEB is a full featured and fully scalable lighting controller with DALI master capability and can either operate stand-alone or integrated with a DDC control system
- For the HVAC part, the SB2WEB provides a flexible and efficient link to the field I/O via the Dupline® 2-wire bus, while the DDC's run the strategy

Seamless integration with any DDC system
- The BACnet/IP server of the SB2WEB provides a direct seamless interface with industry accepted DDC solutions and building management systems

Simplified wiring at the field level
- The Dupline® 2-wire bus eliminates expensive wiring home runs, saving money on wiring and installation costs versus traditional Device-to-DDC solutions
- The significant installation cost reduction is achieved without increasing material cost due to reduced need for DDC I/O's and standard sensors
- Dupline® is a robust and proven technology with over 150,000 installations worldwide including building automation, mining, oil drilling, railroads, and many, many, more...

Fewer subpanels and DDC controllers
- Distance from subpanel or DDC to field devices is greatly increased using Dupline® 2-wire bus technology
- Number of I/Os of DDC Controller is substantially increased
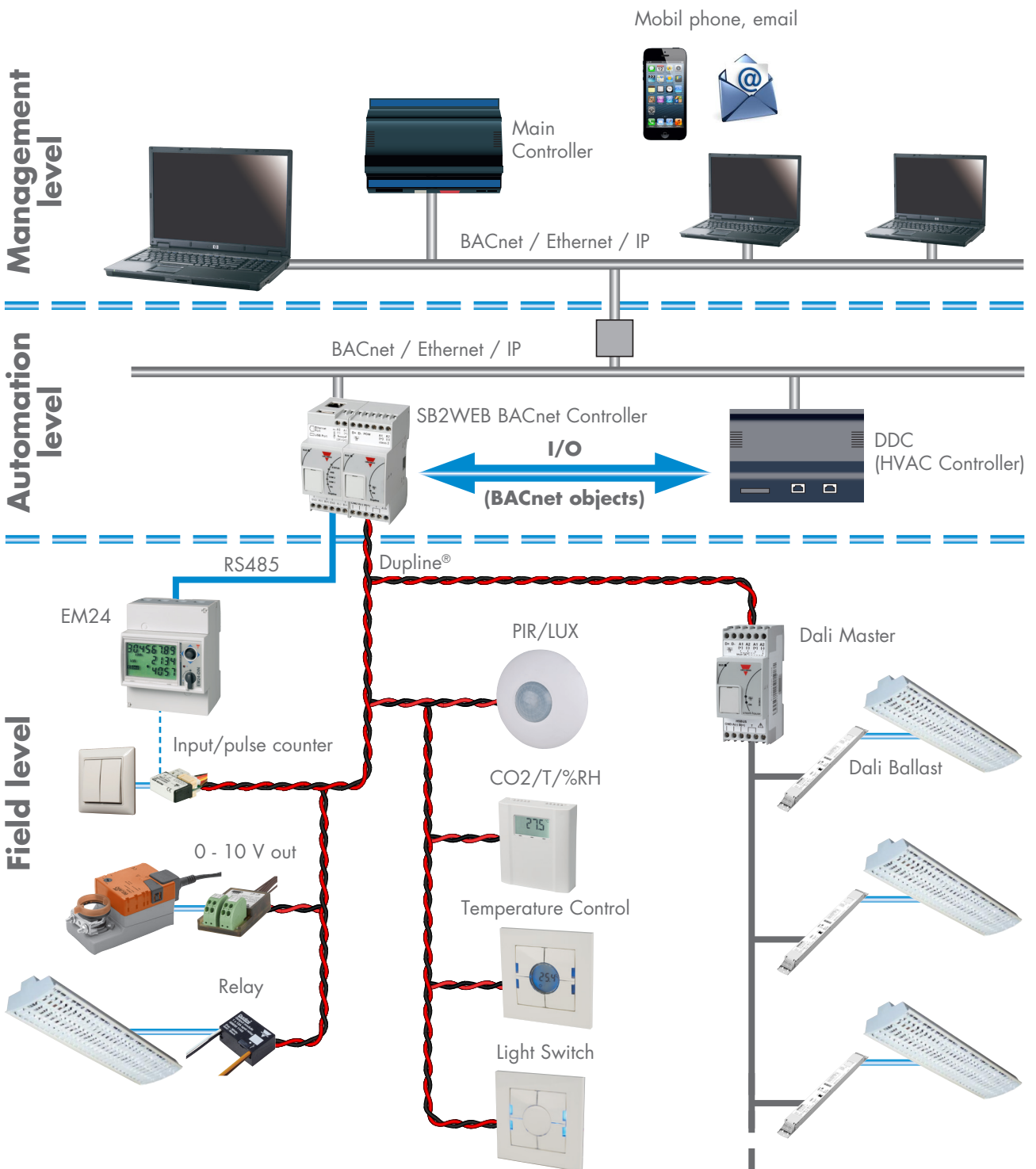
Flexible, modular and expandable
- System can easily be expanded by simply extending the Dupline® bus cable and adding the desired modules
- System flexibility, backwards compatibility and expandability save costs by minimizing the requirements for the system
- Last minute changes are easily accommodated

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Integrated HVAC and lighting control with SB2WEB

The SB2WEB BACnet controller is the brain and central unit of the system. It interfaces to DDC's and the BMS through BACnet/IP, and can manage up to 7 Dupline® bus generators. The Dupline® fieldbus links together all the sensors, actuators and indicators needed for the HVAC and lighting systems in a free topology network. The robust and noise-immune bus runs on an un-shielded 2-wire cable with no need for end-of-line cable terminations. Several hundreds of meters cable length can be achieved depending on the load of bus-powered devices and cable dimensions. The DALI master provides the link from Dupline® to the DALI lighting actuators.

Mobil phone, email

Management level

Main Controller

BACnet / Ethernet / IP

Automation level

BACnet / Ethernet / IP

SB2WEB BACnet Controller

I/O

(BACnet objects)

DDC (HVAC Controller)

RS485   Dupline®

Field level

EM24

PIR/LUX

Dali Master

Input/pulse counter

CO2/T/%RH

Dali Ballast

0 - 10 V out

Temperature Control

Relay

Light Switch

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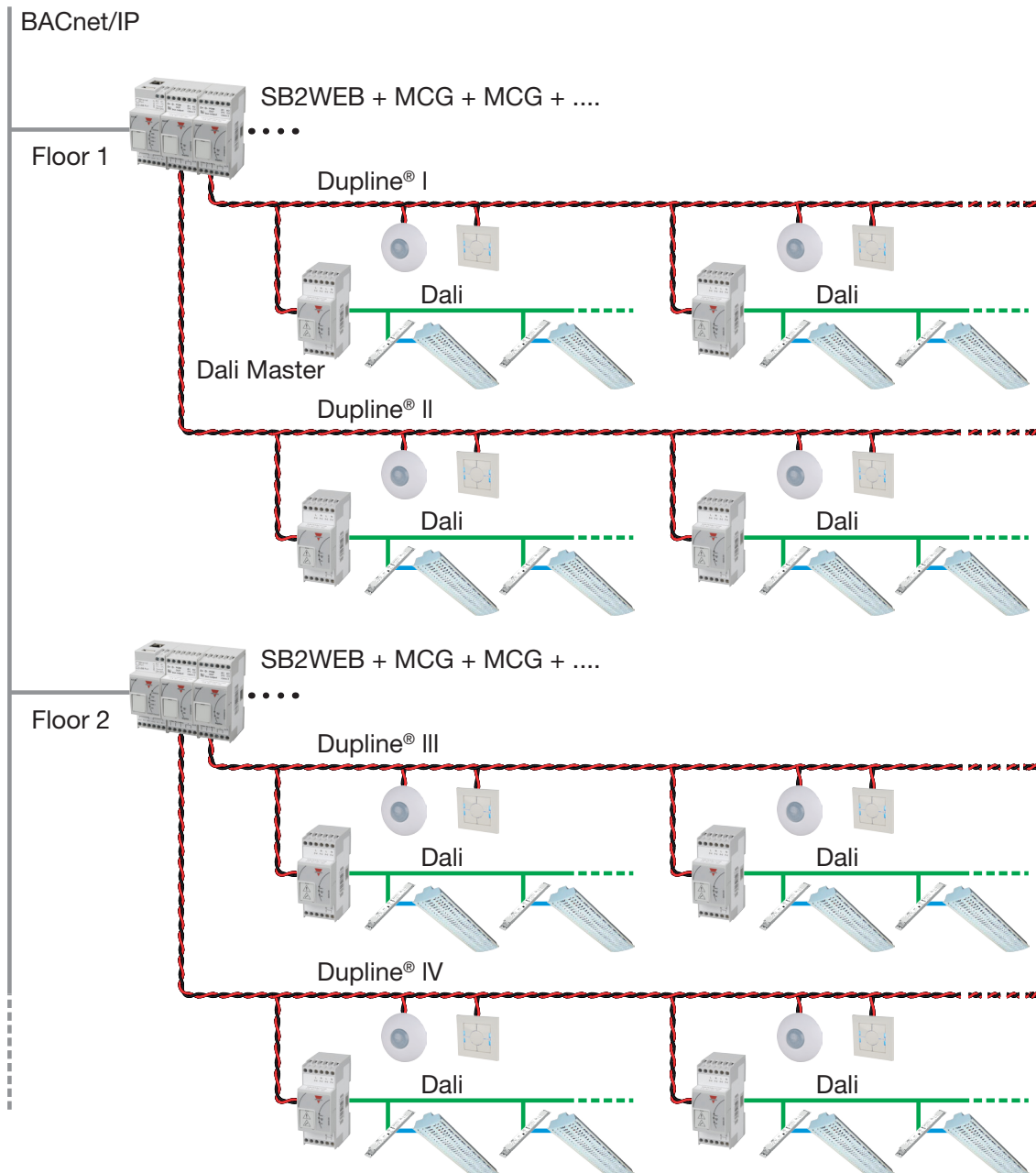
Fieldbus   3

Smart Building System
Benefit from the Dupline® decentralized solution

Completely scalable Lighting control

The SB2WEB lighting control system is based on a combination of Dupline®, DALI and BACnet/IP. The system has been designed to use these specific bus systems in combination with each other in order to achieve an optimized integrated solution, easy to configure. At the field level, the Dupline® bus is used for the PIR/LUX sensors and light switches typically used in lighting control. The DALI master provides the link from Dupline® to the DALI lighting actuators, while other lighting loads can be controlled directly by means of Dupline® relays or dimmers. BACnet/IP provides the link to the BMS.

The programming of the entire system with addressing, grouping and functions setup is carried out in a single PC-based configuration tool with seamless integration of data points from Dupline®, DALI and BACnet/IP. This simplifies commissioning considerably, because there is no need to configure the bridges between the networks, it happens automatically. The system is completely scalable, because each Dupline® network can have up to 7 DALI masters, and each SB2WEB can manage up to 7 Dupline® networks, and multiple SB2WEB's can be linked via BACnet/IP.

BACnet/IP

SB2WEB + MCG + MCG + ...

Floor 1

Dupline® I

Dali

Dali

Dali Master

Dupline® II

Dali

Dali

SB2WEB + MCG + MCG + ...

Floor 2

Dupline® III

Dali

Dali

Dupline® IV

Dali

Dali

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SB2WEB – BACnet Controller

The SB2WEB is the controller in Carlo Gavazzi's modular concept for Smart Buildings. The Linux-based controller is equipped with an Etherport for BACnet/IP and Modbus/TCP communication. Via the two RS485 ports it can collect data from Carlo Gavazzi energy meters and various 3'rd party modbus devices,

and subsequently make the all the electrical parameters available as BACnet/IP objects.

Through the local bus connector in the side it connects to up to 7 Dupline® driver modules, each able to manage more than 400 data points. Also DIN-rail I/O-modules can be connected this way.

The SB2WEB provides functions for control of lighting, blinds, temperature, logic, scheduling, sequencing, alarms and data logging. The functions can be controlled, monitored and operational parameters changed via BACnet objects, e.g. the lux setpoint for a constant light function.

USB
USB port supports flash for data transfer

Local bus 2
GSM modem

USB, SD
Data transfer using PC or SD card

RS485
Modbus-RTU devices

RJ connection
- BACnet/IP
- Modbus/TCP
- Webserver

Local bus 1
Communication modules (up to 7)
- Dupline®

RS485
Energy meters

Dupline® environmental sensors

Carlo Gavazzi's line of bus-powered CO2, temperature and humidity sensors provides significant wiring advantages in HVAC control systems, especially in those cases where the sensors are widely distributed into several rooms of the building. The Dupline® 2-wire

bus cable is simply multi-dropped from sensor to sensor collecting all the measured values – no power supply is required. Furthermore, since the measured values are transferred from the SB2WEB controller to the DDC controller via BACnet/IP, there is no need for expen-

sive analog inputs on the DDC side.

If additional sensors are needed later on, it is merely a question of connecting them to the already existing bus cable. The measured values can be shown on the optional backlit LCD display.

Smart Building System
Benefit from the Dupline® decentralized solution

BACnet building controller

SB2WEB24
- BACnet Controller for HVAC and lighting systems
- Functions for control of lighting, blinds, temperature, logic, scheduling, sequencing, alarms and data logging
- Up to 7 Dupline® networks with decentralized I/O can be managed by one SBWEB
- Data Points from Dupline® and Energy Meters are automatically converted to BACnet/IP objects
- SBWEB functions and parameters can be monitored and controlled via BACnet/IP objects
- Easy-to-use PC-based configuration tool
- 2-DIN housing
- DC Power Supply

Bus drivers

SH2MCG24
- Master Channel Generator for one Dupline® bus segment
- Capacity for 120 DigIn, 116 Dig-Out, 256 Analogue I/O
- Provides power and communication for the connected Dupline® modules
- Compact 2-DIN housing
- DC Power Supply

SB2DALI230
- DALI Master
- Connects directly to the Dupline® bus
- Up to 7 DALI masters on one Dupline® bus
- Built-in DALI power supply
- Up to 64 DALI actuators on one SB2DALI230
- Compact 2-DIN housing
- 115-240 VAC power supply

Digital output modules - DIN-rail

SH2RE16A2E230
- DC powered module with 2x16A relay outputs and built-in load energy metering (kWh, W, V, A ..)

SH2RE16A4
- Bus-powered module with 4x16A relay outputs

SH2SSTRI424
- DC powered module with 4x10W TRIAC outputs for heating valve control

SH2ROAC224
- DC powered modules with 4x5A interlock relay outputs for control of 2 roller blind motors, AC or DC

> **NOTE:** All modules of the Smart Building system are cUL approved

Digital input modules - DIN-rail

SH2INDI424
- Module with 4 digital inputs
- Input types: NPN, PNP or voltage free
- Inputs can be used as counters
- Compact 2-DIN housing
- DC Power Supply

Digital input modules - decentralized

BDB-INCON4-U
- Bus-powered small-dimension 4 x contact input module

BDB-INCON8-U
- Bus-powered small-dimension 8 x contact input module

BDB-IOCP8-U
- Bus-powered small-dimension 4 x contact input / 4 x PNP output module

BDA-INVOL-U
- Bus-powered small-dimension 1 x voltage input module

SHPINCNT4 / SHPINCNTS04
- Bus-powered small-dimension 4 x contact / S0 input counter module

Digital output modules - decentralized

BDA-RE13A-U
- Bus-powered small-dimension 1 x 13A relay output module
- High inrush current capability (130A), thereby suitable for direct lighting loads
- cUL approved

SHDRODC230
- AC-powered small-dimension 2 x 5A relay outputs for control of roller blind motor
- Relay interlock function for roller blind motor protection

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Analogue I/O modules - decentralized

SHPINNI2
- Bus-powered small-dimension 2 x Pt1000/Ni1000 input module

SHPINT1P1
- Bus-powered small-dimension 1 x 10K3 + 1 x Variable resistor input module

SHPINV324
- DC powered small-dimension 3 x 0-10 V input module

SHPINA224
- DC powered small-dimension 2 x 4-20 mA / 0-20 mA input module

SHPINV2T1P124
- DC powered small-dimension 1 x 10K3 + 1 x Variable resistor + 2 x 0-10 V input module

SHPOUTV224
- DC powered small-dimension 2 x 0-10 V output module

Environmental sensors

- Bus-powered, low current consumption sensors for CO_2, temp. and %RH
- Wall-mounting
- Available in different combinations
- CO_2 measuring range: 0 to 2000 ppm
- CO_2 measurement: Dual source infrared NDIR technology
- Temperature measuring range: -20 to +50°C (-4 to 122°F)
- Humidity measuring range: 0 to 100 %RH

SHSUXXXXD
- Environmental sensor with backlit LCD display
- Touch button in the front to switch on backlighting and select value

SHSUXXXXL
- Environmental sensor with RGB traffic light for CO_2 level indication

SHSUXXXX
- Environmental sensor with blind front plate

PIR/LUX sensors

SHSQP360L
- Bus-powered PIR detector 360° for ceiling mounting

SHXXXP90L & SHSDP90L
- Bus-powered 90° PIR detector with LUX for wall-mounting

SHSPP90L
- Bus-powered 90° PIR detector with LUX for outdoor use

SHSPP90LA
- Bus-powered 90° PIR detector with LUX

NOTE: All modules of the Smart Building system are cUL approved

Light switches

SHE5XLS4TH
- Bus-powered light switch with 4 programmable pushbutton inputs + 4 LED outputs
- Fits into sockets from Gira, Jung and ELKO (55x55 mm)
- Built-in temperature and humidity sensors
- Temperature range: -40 to +60°C (-40 to 140°F)
- Humidity range: 5-95 %RH

SHA4XLS4TH
- Fits into sockets from Schneider (DK), Nico (B) and Legrand
- Other functions and features are identical to SHE5XLS4TH (see above)

Temperature controllers

SHE5XTEMDIS
- Temperature controller with display
- Fits into sockets from Gira, Jung and ELKO (55x55 mm)
- Shows room, floor and outdoor temperatures
- Switch ON/OFF heating / cooling
- Set wanted room/floor temperature
- Energy Save through 3 heating/cooling setpoints

SHA4XTEMDIS
- Fits into sockets from Schneider (DK), Nico (B) and Legrand
- Other functions and features are identical to SHE5XTEMDIS (see above)

Other sensors and detectors

BSN-ANE-U
- Bus-powered wind sensor

BSF-WAT-U
- Bus-powered water leakage detector

BSG-SMOA-U
- Buspowered smoke detector without battery backup

BSG-SMO-U
- Buspowered smoke detector with battery backup

BSH-LUX-U
- Buspowered lux sensor

BSI-TEMANA-U
- Buspowered outdoor temperature sensor

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