



DUELUX
by Duemmegi

Full DALI-2 lighting control system



www.casamiatech.uk

DUELUX by Duemmegi



30
1992 - 2022
YEARS
ANNIVERSARY

DALI

Digital Addressable Lighting Interface

DALI technology introduces digital to the world of lighting by enhancing the functionality of a simple device such as a lighting appliance.

In addition to its control, it is in fact possible to exchange detailed information on its operating status and on the presence of faults or anomalies.

The lighting fixtures therefore become “configurable” devices where a series of parameters that can be set by the System Integrator are displayed, so that they behave in the desired way (e.g. minimum and maximum levels of the luminous flux, flux regulation speed, curve or trend of the flow variation, etc...).



IEC 62386 Standard



DALI technology has also been implemented as a regulatory standard. The first edition of the IEC 62386 Standard - Digital Addressable Lighting Interface was published starting from 2009, even if the first specifications relating to electronic ballasts for fluorescent tubes date back to a number of years earlier.

The constituent elements of this technology are summarized in art. 4.1 of the first edition of the standard, highlighting aspects and characteristics such as:



Open regulatory standard;



Interoperability between devices from different manufacturers;



Specific technology for the world of lighting and designed to be controlled, placing itself below the level of building management systems.



Publication of the second edition began in 2014, generally called DALI-2, which introduces a significant technological evolution of the DALI standard:

1

First of all, the new version ensures full compatibility with existing appliances, manufactured according to the first edition of the standard.

2

The "Multi-master" architecture is introduced which allows the insertion of multiple Master devices in a DALI system capable of sending messages.

3

Functional standards relating to control devices (buttons, sensors, etc.) are defined.

4

The list of DALI controls is further enhanced with some new features.

5

The functions implemented by the lighting fixtures are further expanded, with the definition of new and innovative Device Types.

DALI solution - KNX

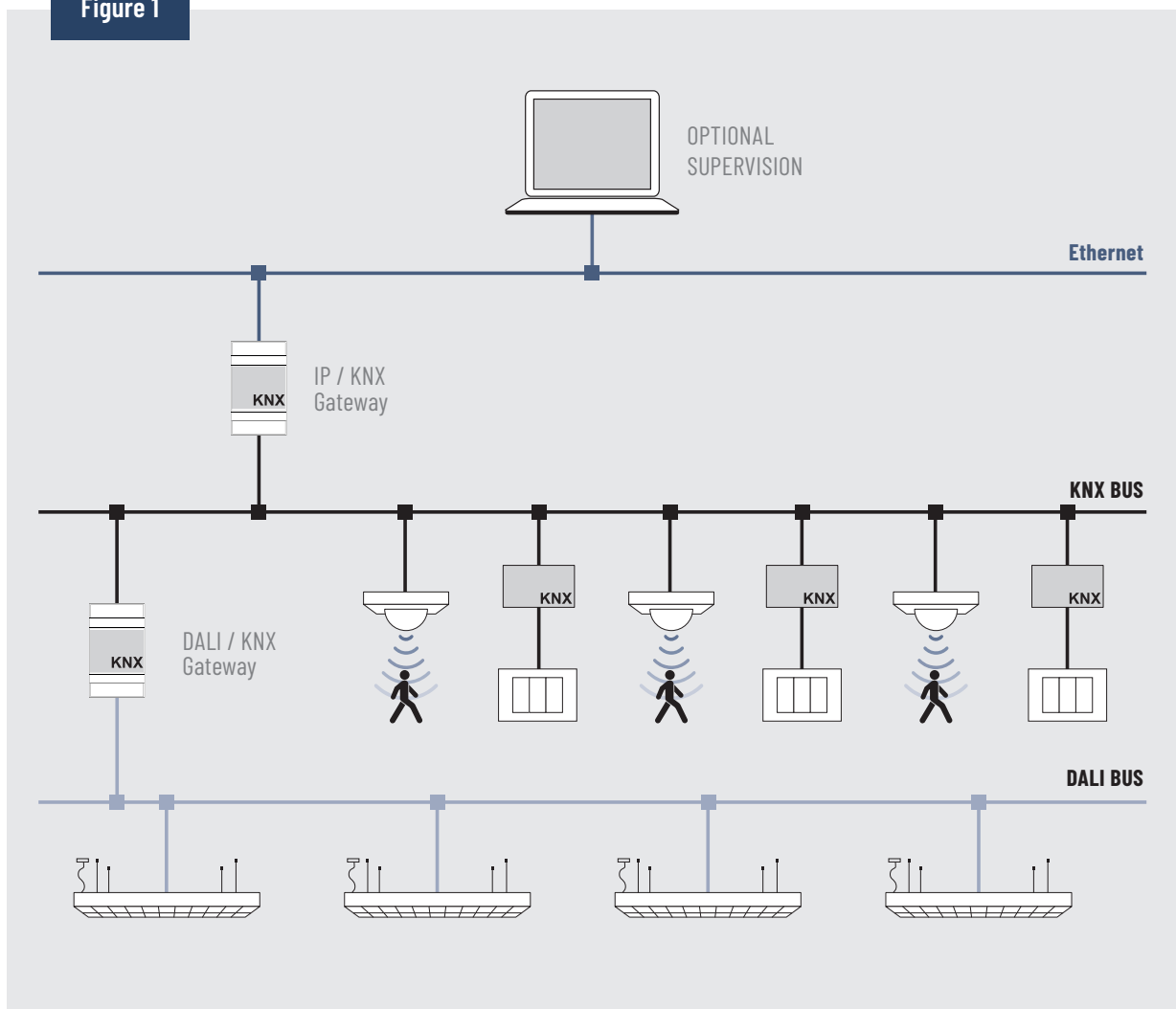
The architecture proposed to date

A **DALI system** has a functional architecture based on the Master/Slave communication paradigm. A single device, the Master, can initiate a communication on the bus, while the Slave devices, on the other hand, receive and execute the commands sent by the Master and, if applicable, can respond to a request from the Master with a message that generally indicates their status or their condition. In no case can a Slave device initiate a communication autonomously.

The architecture below (**Figure 1**) provides a DALI bus for communication with the ballasts/lamps through a DALI/KNX gateway module and a **KNX bus** to which buttons interface modules and presence and/or brightness sensors are connected.

Commands and lamps are linked through programming, creating the desired group and scenario turning on and off.

Figure 1





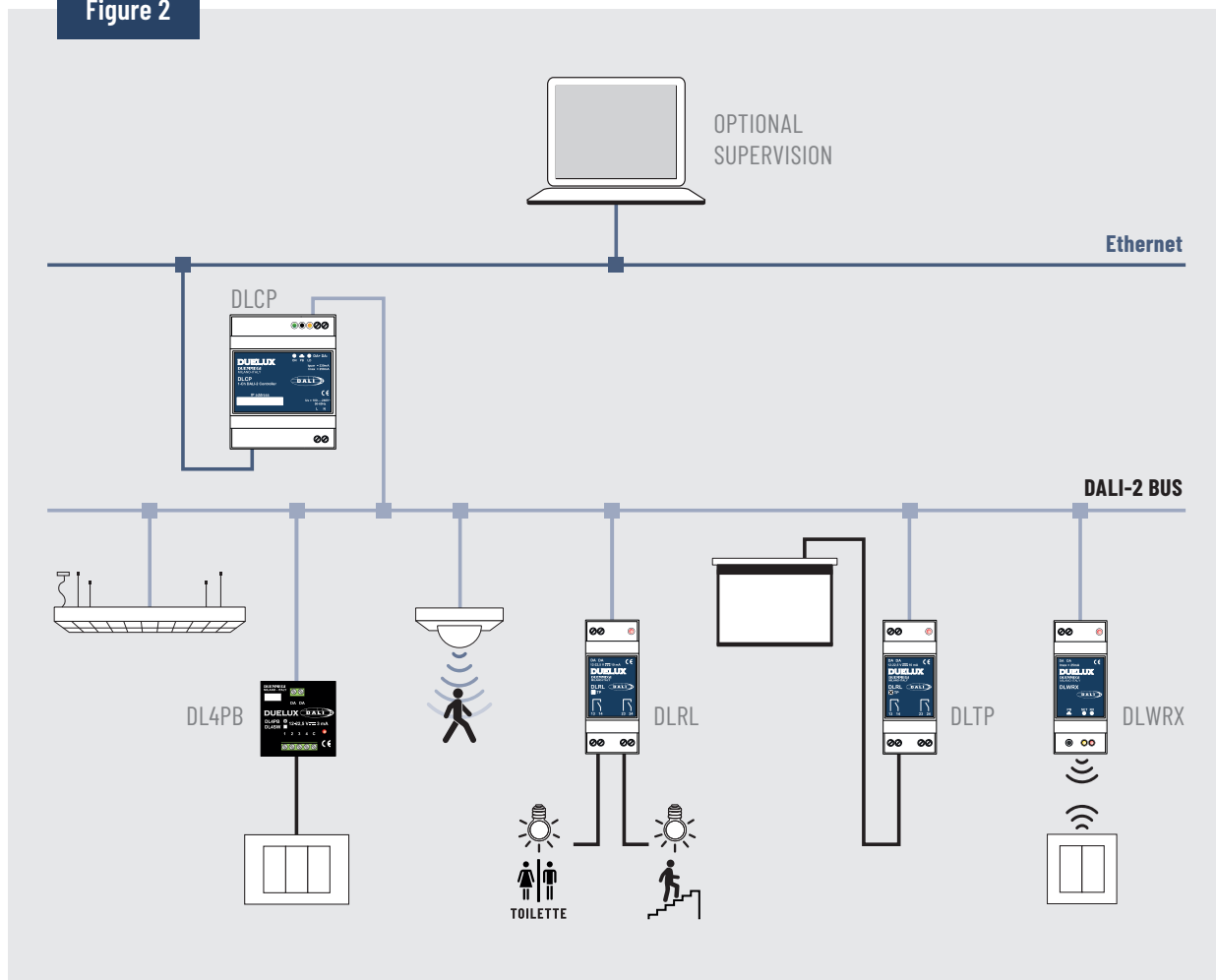
New architecture

The **DUELUX** solution

DALI-2 is the second version of the IEC 62386 Standard which regulates the use of control devices, introducing some important changes to the DALI protocol known up to now:

- 1 • The functioning of the **"Multi-master"** transmitter circuit capable of sending commands on the DALI Bus avoiding collisions;
- 2 • The function of **"Application Controller"** which, among its various tasks, also manages the communication between the buttons/sensors and the lighting devices;
- 3 • The characteristics of the message sent by the command devices (FF) which consists of 3 bytes (24 bits);
- 4 • The flow of communications which for example provides that a button cannot communicate directly with the lamps, but that its message must be sent to the Application Controller which will subsequently forward it to the Slave devices.

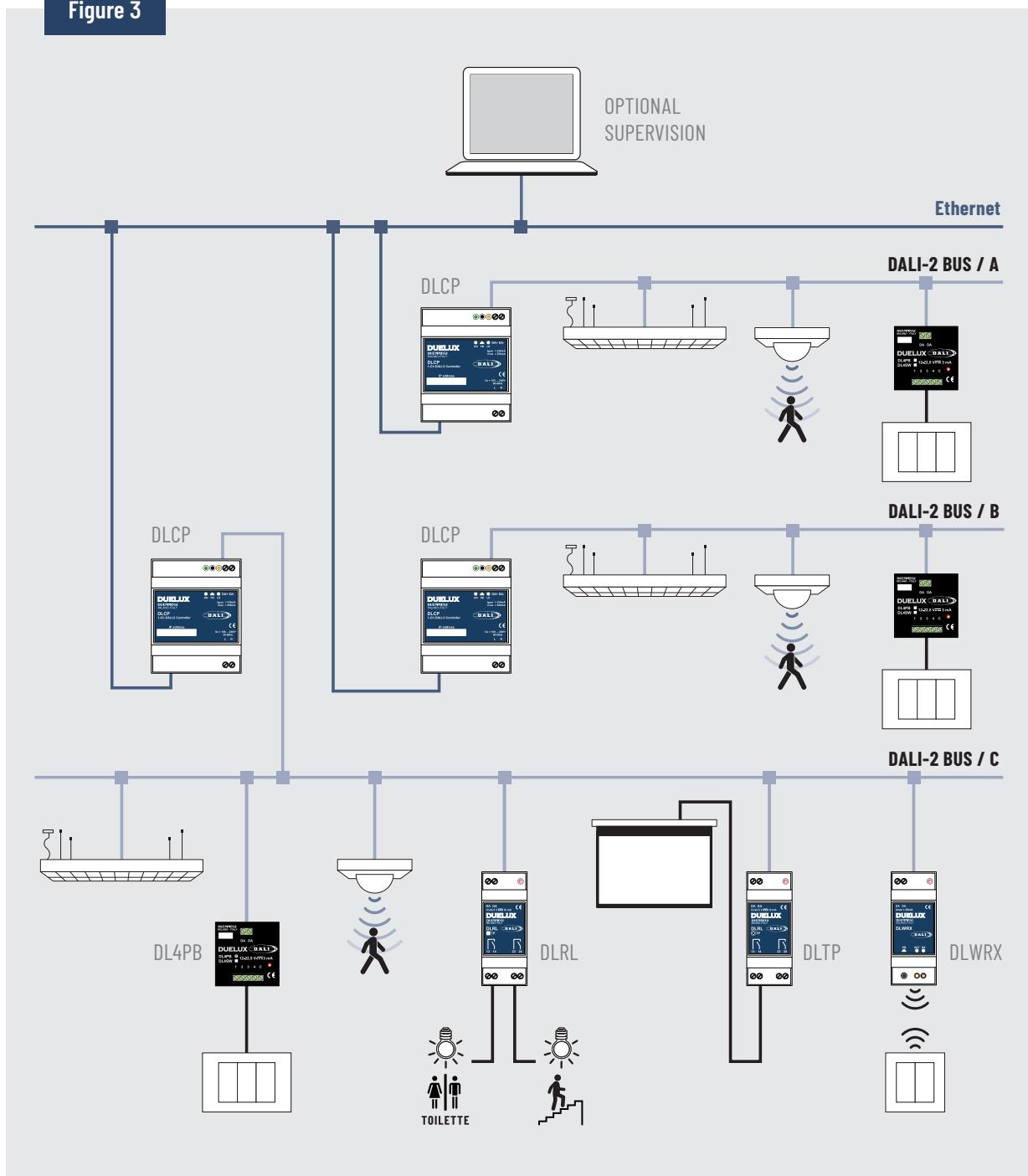
Figure 2



The architecture in **Figure 2** provides for a DALI bus for communication with the ballasts/lamps (maximum 64) connected to the DLCP module; button modules, modules with digital outputs and presence and/or brightness detectors are connected on the same bus.

Figure 3 shows that the interconnection between the various DLCPs takes place through the Lan network.

Figure 3



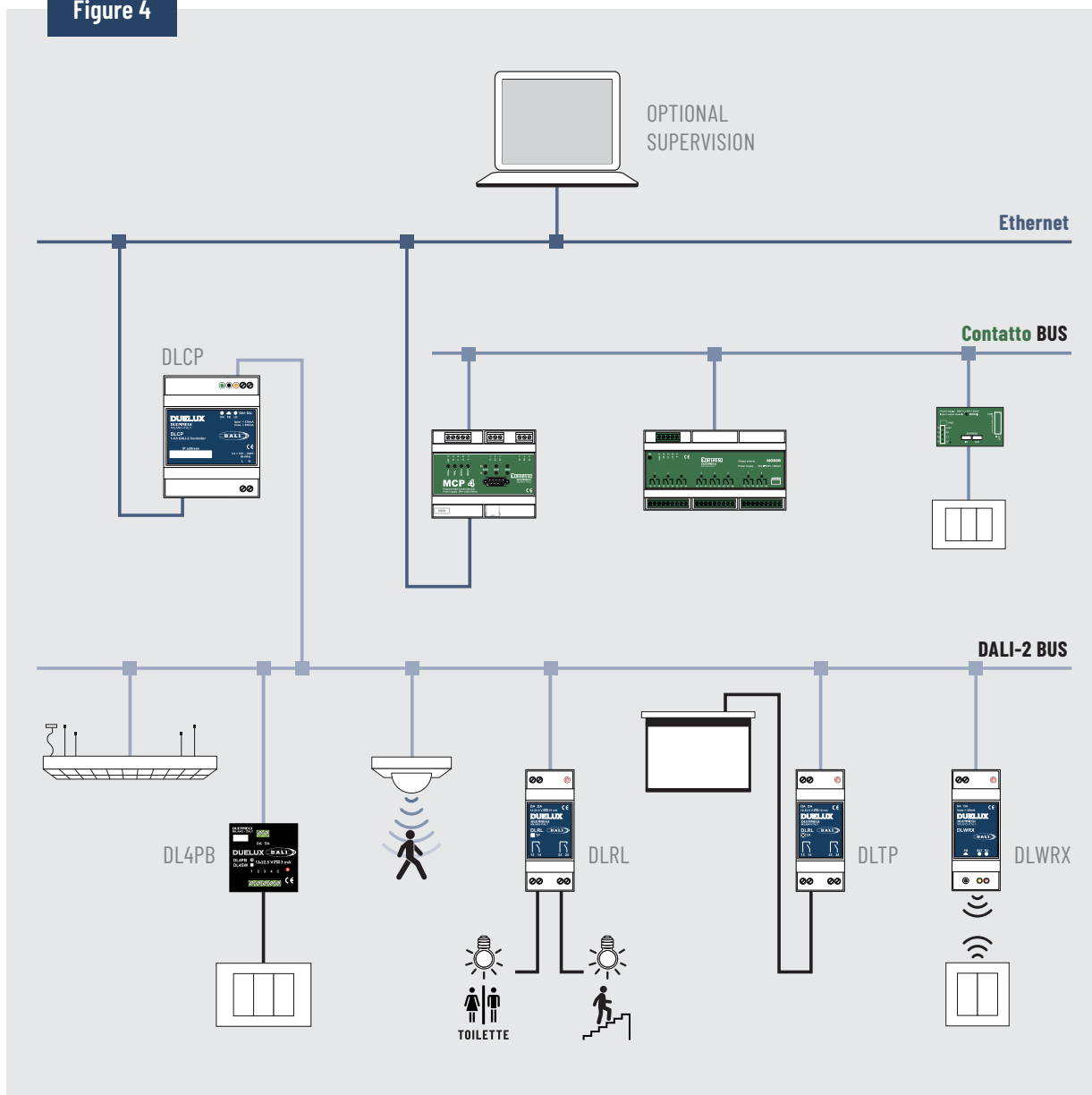
Mixed architecture

DUELUX - CONTATTO®

The architecture in **Figure 4** provides for a DALI bus for communication with the ballasts/lamps (maximum 64) connected to the DLCP module, button modules, modules with digital outputs and presence and/or brightness detectors are connected on the same bus.

The **connection** between the **DALI-2 system** and the **Contatto system** takes place via the Lan network.

Figure 4





THE **DUELUX** PROTAGONISTS

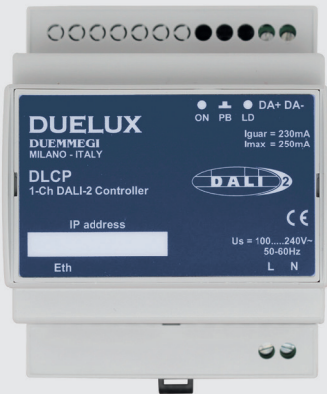
Simplify a lighting control system as much as possible while offering a **complete solution** based on DALI-2 technology, this is Duemmegi's mission with the **DUELUX system**.

The DALI-2/ethernet gateway, the button or switch interface, including wireless and the actuator for ON/OFF commands or motorization control, are the protagonists chosen as fundamental to cover all the needs of a system.

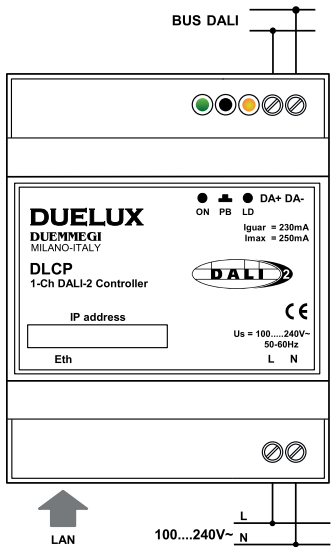
DLCP

controller module for DALI-2 bus

The DLCP controller module allows all the management logic of a DALI system to be created.



CONNECTION
DIAGRAM



Recommended
DALI cables

Up to 120 m	2 x 0.50 sq.mm
Up to 175 m	2 x 0.75 sq.mm
Up to 230 m	2 x 1.00 sq.mm
Up to 300 m	2 x 1.50 sq.mm

CHARACTERISTICS

- Power supply 100 ÷ 240 V~
- Manages up to 128 DALI logic devices including lamp drivers, sensors, button modules, relays
- Routing of the connected DALI devices
- Auto detection of connected DALI devices
- 16 DALI groups
- 16 environments with 8 different scenarios per environment
- Ethernet, WiFi connectivity (via optional access point)
- Information exchange between different buses via ETH port
- Simple configuration of the system by creating environments and adding groups of lamps, buttons, sensors, relays
- On-board clock with backup battery for the creation of time bands
- Button on the module for switching on, off and dimming all the connected lamps even in the absence of programming
- **Control of DALI-2 compliant emergency lamps in accordance with standard 62386-202.**
- **HCL (Human Centric Lighting) & DT8 DALI driver management**
- Red diagnostic LED

CERTIFICATIONS

DALI-2 certified
DLCP compliant to IEC 62386-101, -103

TECHNICAL FEATURES

POWER SUPPLY	100 ÷ 240 V~, 50-60Hz
MAX ABSORPTION	7.5 W
CURRENT AVAILABLE DALI BUS	250 mA
NUMBER OF DALI GROUPS	16
NUMBER OF ENVIRONMENTS	16
NUMBER OF SCENARIOS	8 for environment
CONNECTIVITY	Ethernet Port
STANDARD PROTOCOLS	MODBUS TCP/I - MODBUS RTU over IP
OPERATING TEMPERATURE	-5 ÷ +50 °C
STORAGE TEMPERATURE	-20 ÷ +70 °C
DEGREE OF PROTECTION	IP20
DIMENSIONS	4 DIN - 71 x 90 x 58 mm

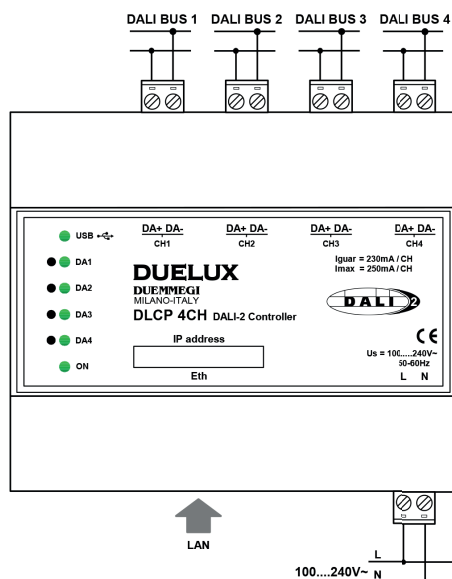
DLCP 4CH

controller module for 4 DALI-2 bus channels

The DLCP controller module allows all the management logic of a DALI system to be created. The device allows for managing **up to 4 DALI-2 bus channels**.



CONNECTION DIAGRAM



CERTIFICATIONS

DALI-2 certified
DLCP 4 CH compliant to IEC 62386-101, -103

Recommended DALI cables

Up to 120 m	2 x 0.50 sq.mm
Up to 175 m	2 x 0.75 sq.mm
Up to 230 m	2 x 1.00 sq.mm
Up to 300 m	2 x 1.50 sq.mm

CHARACTERISTICS

- Power supply 100 ÷ 240 V~
- It manages DALI logical devices such as lamp drivers, sensors, button modules, and relays.
- 4 DALI bus channels
- Routing of the connected DALI devices
- Auto detection of connected DALI devices
- 16 DALI groups for each DALI channel
- 64 environments with 8 different scenarios per environment
- Ethernet, USB and WiFi connectivity (via optional access point)
- Information exchange between different buses via ETH port
- Simple configuration of the system by creating environments and adding groups of lamps, buttons, sensors, relays
- On-board clock with backup battery for the creation of time bands
- Button on the module for switching on, off and dimming all the connected lamps even in the absence of programming
- **DALI-2 emergency lights control (if compliant with standard 62386-202)**
- **HCL (Human Centric Lighting) & DT8 DALI driver management**
- Red diagnostic LED

TECHNICAL FEATURES

POWER SUPPLY	100 ÷ 240 V~, 50-60Hz
MAX ABSORPTION	20 W
NUMBER OF DALI CHANNELS	4
CURRENT AVAILABLE DALI BUS	250 mA (each channel)
NUMBER OF DALI GROUPS	16 for channel
NUMBER OF ENVIRONMENTS	64 in total
NUMBER OF SCENARIOS	8 for environment
CONNECTIVITY	Ethernet Port / USB Port
STANDARD PROTOCOLS	MODBUS TCP/I - MODBUS RTU over IP
OPERATING TEMPERATURE	-5 ÷ +50 °C
STORAGE TEMPERATURE	-20 ÷ +70 °C
DEGREE OF PROTECTION	IP20
DIMENSIONS	6 DIN - 106 x 90 x 58 mm

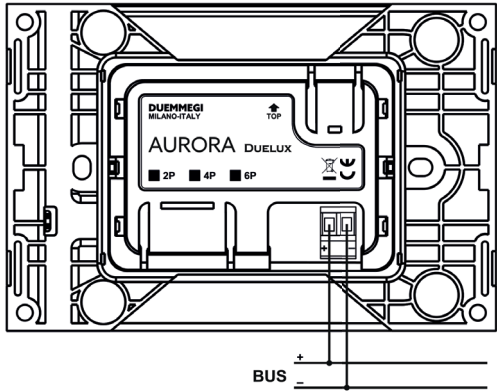
AURORA DALI-2

smart switches for DALI-2 bus

The AURORA smart switch is a DALI-2 version with 6, 4 and 2 buttons and offers an unparalleled control experience. The capacitive touch technology enables smooth and precise navigation, while the integrated RGBW LEDs provide its suggestive illumination. The luminous feedback and backlighting enhance the visibility and usability of this smart switch, making interaction with it more seamless. You can choose between the standard version or the complete version featuring the **temperature and humidity sensor**, to tailor it to your specific needs. AURORA is available in various finishes, including glass, metal, and a range of textured effects.



CONNECTION DIAGRAM



CHARACTERISTICS

- 6, 4 or 2 touch switches
- Absorbtion < 24mA (12 DALI devices)
- Automatic polarity on the connection to the DALI bus
- Occupies 1 DALI address
- Version with and without integrated temperature and humidity probe
- Button illumination with RGBW LEDs
- Red identification LED

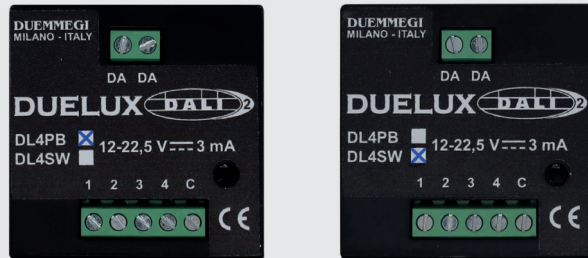
TECHNICAL FEATURES

ABSORPTION	< 24mA (12 DALI devices)
NUMBER OF BUTTONS	6, 4, or 2 capacitive touch buttons
NUMBER OF DALI ADDRESSES	1
OPERATING TEMPERATURE	-5 ÷ +50 °C
STORAGE TEMPERATURE	-20 ÷ +70 °C
DEGREE OF PROTECTION	IP20
DIMENSIONS	For 503 recessed boxes

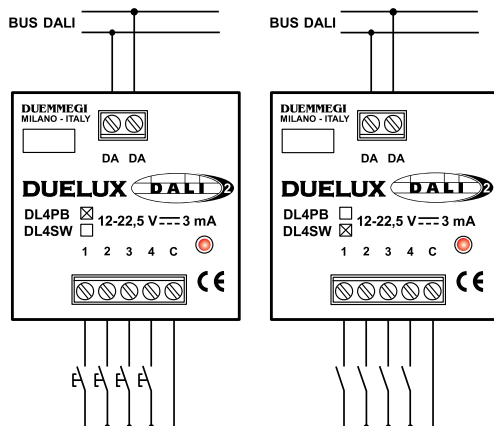
DL4PB - DL4SW

button interface module (PB) or switches (SW) for DALI-2 bus

The DL4PB module allows interfacing 4 buttons to the DALI-2 bus; in the case of ON-OFF switches, use the DL4SW version.



CONNECTION DIAGRAM



For the DL4PB module the buttons must normally be open. For the DL4SW the connection is the same, but the inputs must be connected to ON-OFF switches.

CHARACTERISTICS

- 4 inputs for potential free contacts
- Absorption < 3mA (1.5 DALI devices)
- Automatic polarity on the connection to the DALI bus
- Occupies 1 DALI address
- Red identification LED

CERTIFICATIONS

DALI-2 certified
DL4PB compliant to IEC 62386-101, -103, -301
DL4SW compliant to IEC 62386-101, -103, -302

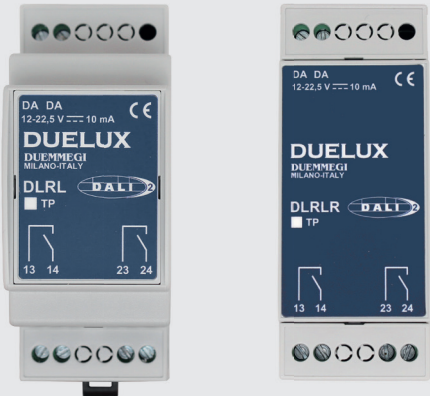
TECHNICAL FEATURES

ABSORPTION	< 3mA (1.5 DALI devices)
NUMBER OF BUTTONS (DL4PB) OR SWITCHES (DL4SW)	4, for potential-free contacts
MAX LENGTH ALLOWED DIGITAL INPUT CABLES	• MAX 20m using 0.50"0.75mmq multi-polar cables, laid in dedicated conduits • MAX 0.5m with uni-polar cables 0.50"0.75mmq
NUMBER OF DALI ADDRESSES	1
OPERATING TEMPERATURE	-5 ÷ +50 °C
STORAGE TEMPERATURE	-20 ÷ +70 °C
DEGREE OF PROTECTION	IP20
DIMENSIONS	DL4PB: RECESS - 39 x 39 x 13 mm DL4SW: RECESS - 39 x 39 x 13 mm

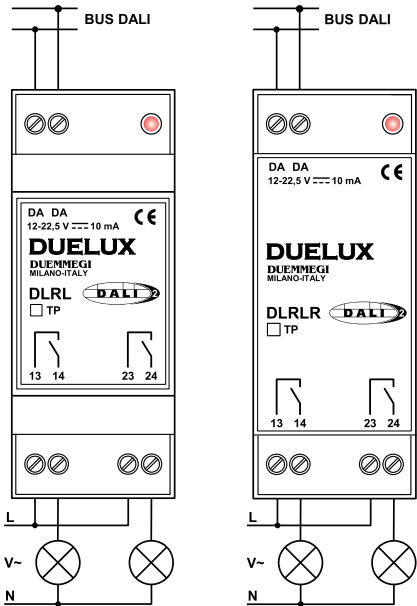
DLRL - DLRLR

2 relay module for DALI-2 bus

The DLRL two-relay output module allows the control, via the DALI bus, of 2 loads (typically lamps).



CONNECTION DIAGRAM



CHARACTERISTICS

- 2 electrically separated output contacts
- Available in a 2-unit container for DIN bar, both in the standard version and in the lowered version (DLRLR)
- Dual coil latching relays for low current consumption
- Choice of the status of each contact at power up (ON, OFF or No-Change)
- Absorption < 10mA (5 DALI devices)
- Automatic polarity on the connection to the DALI bus
- Occupies 2 DALI addresses
- Red identification LED

CERTIFICATIONS

DALI-2 certified
Compliant to IEC 62386-101, -102, -208

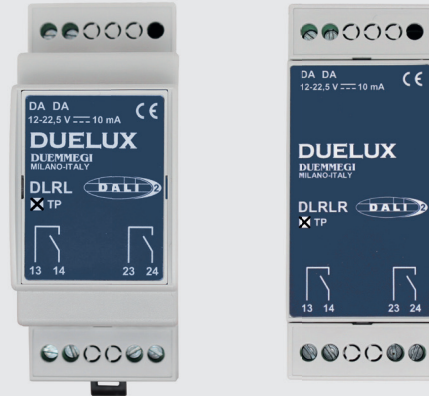
TECHNICAL FEATURES

ABSORPTION	< 10mA (5 DALI devices)
NUMBER OF OUTPUTS	2, dual coil latching relays
CAPACITY OF EACH OUTPUT CONTACT (MAX)	• Resistive load ($\cos\phi = 1$): 12A at 250V~ (3000VA) • Inductive load ($\cos\phi = 0.5$): 3.6A at 250V~ (900VA) • Incandescent lamps: 8A at 250V~ (2000VA) • Fluorescent lamps: 350W with total power factor correction capacitor of 42uF max
MAXIMUM CONTACT SWITCHING VOLTAGE	250V~
NUMBER OF DALI ADDRESSES	2
OPERATING TEMPERATURE	-5 ÷ +50 °C
STORAGE TEMPERATURE	-20 ÷ +70 °C
DEGREE OF PROTECTION	IP20
DIMENSIONS	DLRL: 2 DIN - 35,8 x 90 x 58 mm DLRLR: 2 DIN lowered - 35,8 x 90 x 33 mm

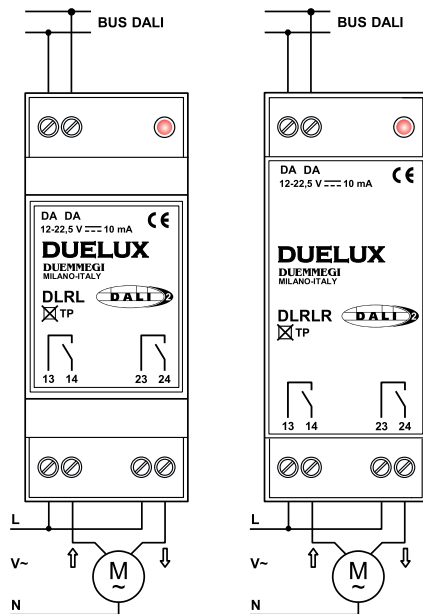
DLTP - DLTPR

230V~ 2-winding motor controller module for DALI-2 bus

The DLTP two-relay output module allows to control, via the DALI bus, a 230V~ 2-winding motor (typically roller shutters, motorized windows, etc.).



CONNECTION DIAGRAM



CHARACTERISTICS

- 2 electrically separated output contacts complete with interlocking logic to avoid simultaneous powering of the two windings
- Pause time before reversing
- Available in a 2-unit container for DIN bar, both in the standard version and in the lowered version (DLTPR)
- Dual coil latching relays for low current consumption
- Absorption < 10mA (5 DALI devices)
- Automatic polarity on the connection to the DALI bus
- Occupies 1 DALI addresses
- Red identification LED

TECHNICAL FEATURES

ABSORPTION	< 10mA (5 DALI devices)
NUMBER OF OUTPUTS	2, dual coil latching relays
CAPACITY OF EACH OUTPUT CONTACT (MAX)	• Resistive load ($\cos\phi = 1$): 12A at 250V~ (3000VA) • Inductive load ($\cos\phi = 0.5$): 3.6A at 250V~ (900VA)
SINGLE-PHASE MOTOR CAPACITY	550VA (0.75HP)
MAXIMUM CONTACT SWITCHING VOLTAGE	250V~
NUMBER OF DALI ADDRESSES	1
OPERATING TEMPERATURE	-5 ÷ +50 °C
STORAGE TEMPERATURE	-20 ÷ +70 °C
DEGREE OF PROTECTION	IP20
DIMENSIONS	DLTP: 2 DIN - 35.8 x 90 x 58 mm DLTPR: 2 DIN lowered - 35.8 x 90 x 33 mm

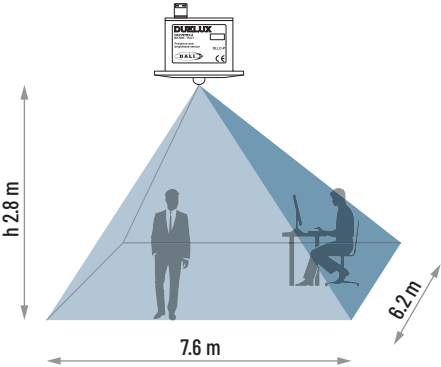
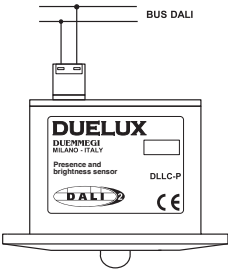
DLLC-P

presence and brightness sensor for DALI-2 bus

DLLC-P module allows to transmit, over the DALI-2 bus, presence and ambient brightness value detected by the sensor integrated in the module itself. The brightness sensor detects the light reflected by the surface under it (for instance the floor or a desk). The special integrated sensor has the same spectral sensitivity of the human eye.



CONNECTION DIAGRAM



CHARACTERISTICS

- Absorption < 6mA (3 DALI devices)
- Automatic polarity on the connection to the DALI bus
- Occupies 1 DALI address
- Red identification LED

CERTIFICATIONS

DALI-2 certified
Compliant to IEC 62386-101, -103, -303, -304

TECHNICAL FEATURES

ABSORPTION	< 6mA (3 DALI devices)
LIGHT SENSOR TYPE	Photo sensor with spectral response equivalent to the human eye sensitivity
NUMBER OF DALI ADDRESSES	1
BRIGHTNESS SENSOR AT FULL-SCALE	1000 points
PRESENCE SENSOR	Passive infrared (PIR)
COVERAGE ANGLE	ca. 90°
MOUNTING HEIGHT	2 - 5 m
OPTIMAL MOUNTING HEIGHT	2,5 - 3 m
OPERATING TEMPERATURE	-5 ÷ +50 °C
STORAGE TEMPERATURE	-20 ÷ +70 °C
DEGREE OF PROTECTION	IP20

DLSUN

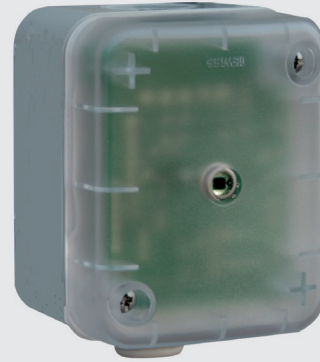
lighting sensor for external use

The DLSUN module allows transmitting the ambient brightness value detected by the internal sensor on the DALI-2 bus. The DLSUN module is suitable for both outdoor light detection (including sunlight up to 160 klux) and indoor light regulation in various environments (e.g., industrial warehouses, logistics facilities, etc.).

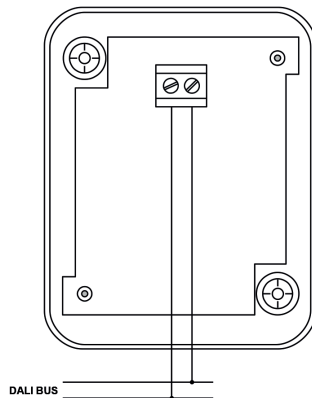
The incorporated special sensor has a highly precise spectral response and extreme infrared light rejection, enabling the DLSUN module to accurately measure light intensity as perceived by the human eye, regardless of the type of light source.

The DLSUN module can be configured via the DALI-2 bus to operate in three different full-scale ranges:

- 6500 lux with a resolution of 0.1 lux
- 65000 lux with a resolution of 1 lux (default setting)
- 160000 lux with a resolution of 10 lux



CONNECTION DIAGRAM



CHARACTERISTICS

- Current consumption < 10mA (3 DALI devices)
- Automatic polarity on the connection to DALI bus
- Occupies 1 DALI-2 address
- Ambient correction factor to adapt the measurement to the different types of installations
- Red identification LED

CERTIFICATIONS

DALI-2 certified
Compliant to IEC 62386-101, -103, -304

TECHNICAL FEATURES

ABSORPTION	10mA MAX
LIGHT SENSOR TYPE	Photo sensor with spectral response equivalent to the human eye sensitivity and high rejection to infrared light
FULL SCALE OF LIGHT MEASUREMENT	3 ranges: • 6500 lux, 0,1 lux res. • 65000 lux, 1 lux res. • 160 klux, 10 lux res.
NUMBER OF DALI ADDRESSES	1
LIGHT MEASUREMENT RESOLUTION	16 bits
OPERATING TEMPERATURE	-20 ÷ +70 °C
STORAGE TEMPERATURE	-20 ÷ +70 °C
DEGREE OF PROTECTION	IP55

DLWRX

wireless receiver module

The DLWRX module allows interfacing up to 4 wireless transmitters with ENOCEAN technology (wireless and battery-less) with the DALI bus. Each DLWRX module can manage up to 16 points.

The only connection required for the DLWRX module are the two cables of the DALI bus; the power supply necessary for the operation of the module is obtained from the bus itself.

The coupling of a button unit to a receiver is done using the button and the two LEDs located on the lower side of the module. The DLWRX module occupies, within the DALI bus, up to 4 “control device” addresses, one for each keypad that has been combined.



CONNECTION DIAGRAM



CERTIFICATIONS
DALI-2 certified
Compliant to IEC 62386-101, -103, -301

TECHNICAL FEATURES

ABSORPTION	25mA MAX (12.5 DALI devices)
NUMBER OF TRANSMITTERS MANAGED	4, for a total of 16 input points
NUMBER OF DALI ADDRESSES	4
OPERATING TEMPERATURE	-5 ÷ +50 °C
STORAGE TEMPERATURE	-20 ÷ +70 °C
DEGREE OF PROTECTION	IP20
DIMENSIONS	2 DIN - 35.8 x 90 x 58 mm

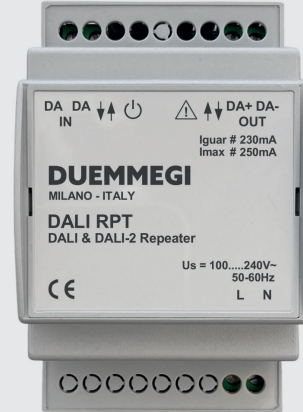
DALI RPT

DALI & DALI-2 bus repeater module

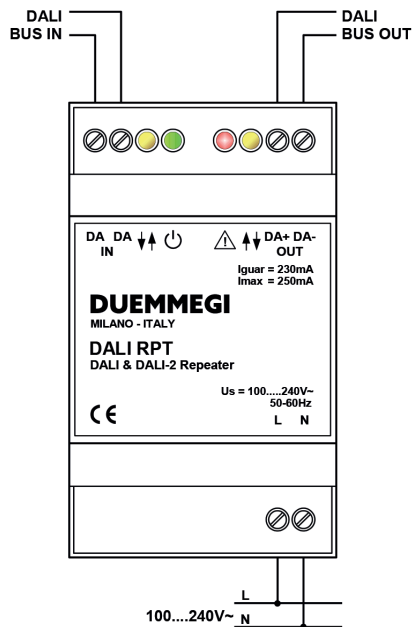
The DALI RPT repeater module allows extending the maximum length of the DALI bus from 300m to 600m and provides an additional 250mA of DALI current. The powered DALI network, usually connected to the application controller, must be connected to the IN side, while the extended network should be connected to the OUT side.

The IN side is powered by the bus master, whereas the OUT side is powered by the repeater, which, in turn, is powered by the 100...240V~ AC network. Multiple DALI RPT repeaters can be connected in parallel on the IN side. However, it is not possible to connect multiple DALI repeaters in series due to the inevitable propagation delay. In other words, cascading multiple RPTs is not possible.

Please note that the DALI RPT module does not provide additional DALI addresses. The DALI limit of 64 addresses for control gears (LED drivers, relays, etc.) and 64 addresses for control devices (sensors, buttons, etc.) still applies.



CONNECTION DIAGRAM



CHARACTERISTICS

- IN side powered by DALI master bus (no additional power supply required)
- OUT side powered by electrical network IN side
- Consumption < 2mA (1 DALI device)
- Guaranteed current on OUT side: 230mA
- 3-unit enclosure for DIN rail
- 4 diagnostic LEDs

TECHNICAL FEATURES

POWER SUPPLY	100...240 V~, 50-60Hz
IN SIDE CONSUMPTION	2mA MAX (1 DALI device)
POWER CONSUMPTION FROM AC NETWORK	5W MAX
DALI BUS VOLTAGE OUT	15V
GUARANTEED CURRENT ON DALI BUS	230 mA
MAXIMUM CURRENT ON DALI BUS	250mA
NUMBER OF DALI ADDRESSES	None
COMPLIANCE	DALI-2 IEC 62386-101
OPERATING TEMPERATURE	-5 °C +50 °C
STORAGE TEMPERATURE	-20 °C +70 °C
PROTECTION RATING	IP20
DIMENSIONS	3 DIN modules (3M)

VARIOUS AREAS OF USE

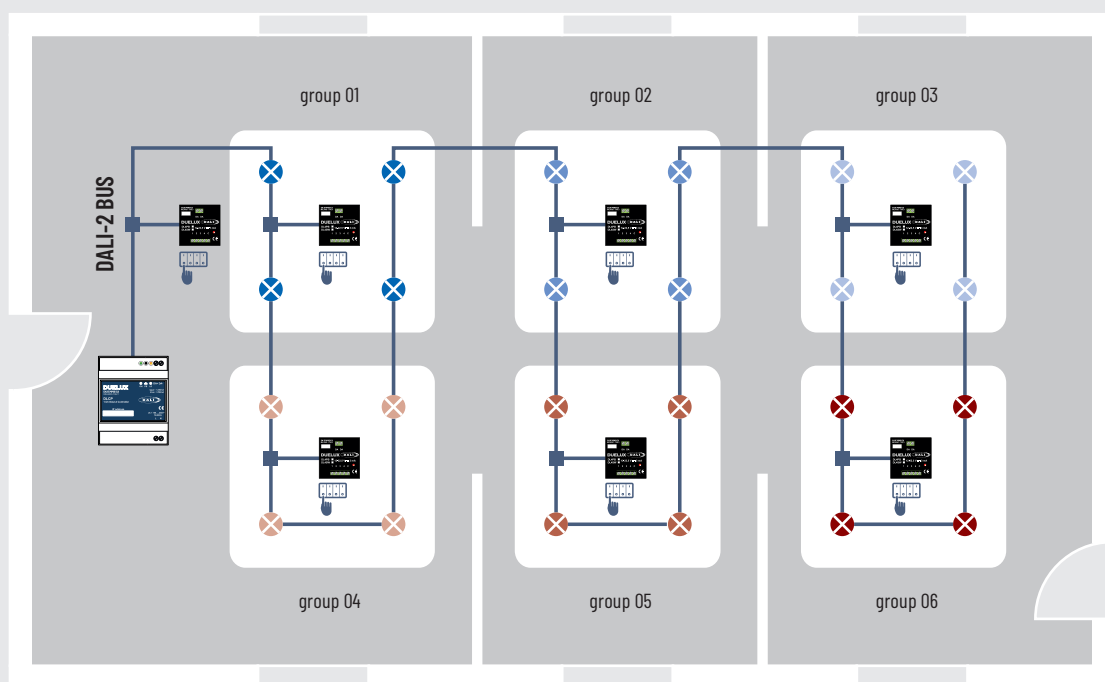
open-space offices



Office example:

Manual button management

01



DALI 230 Vac Lamp



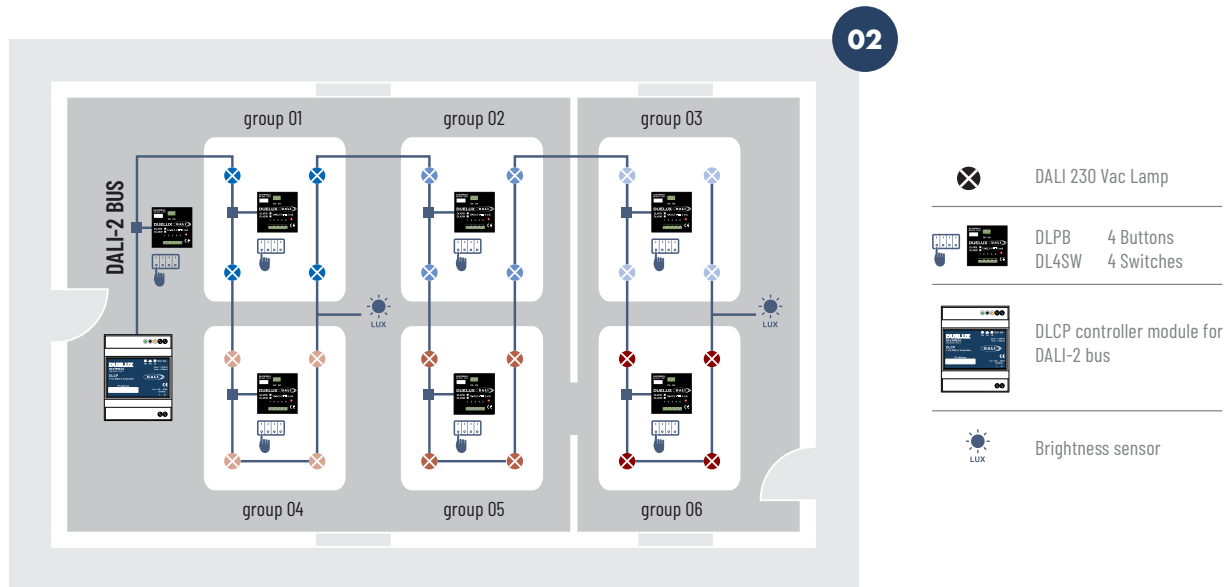
DLPB 4 Buttons
DL4SW 4 Switches



DLCP controller module for DALI-2 bus

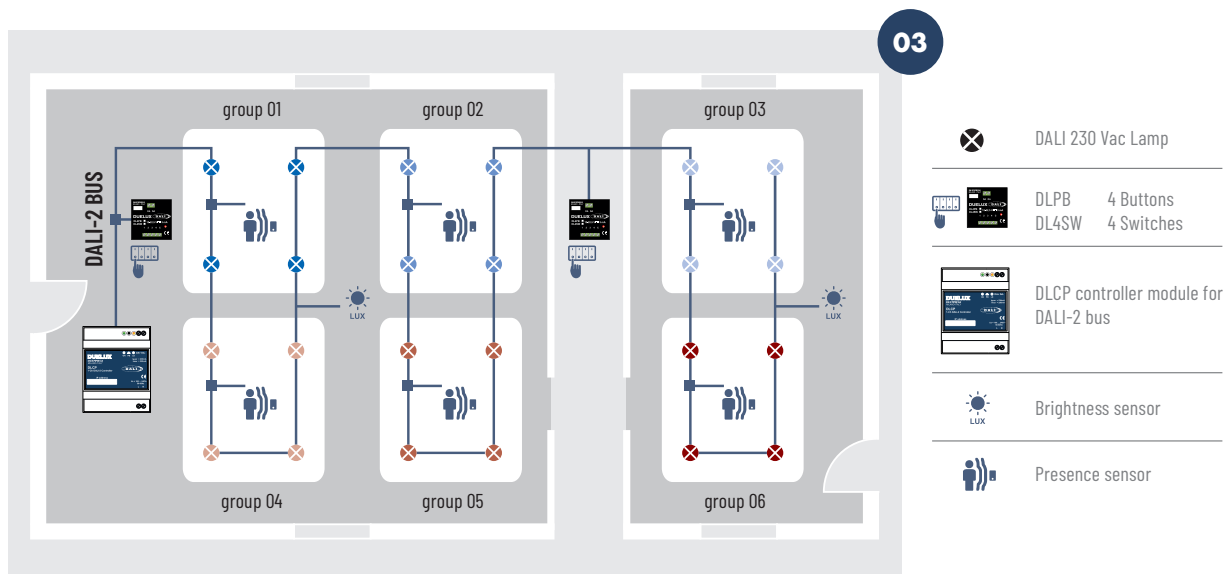
Office example:

Manual or automatic management with brightness sensor



Office example:

Manual or automatic management with brightness / presence sensor



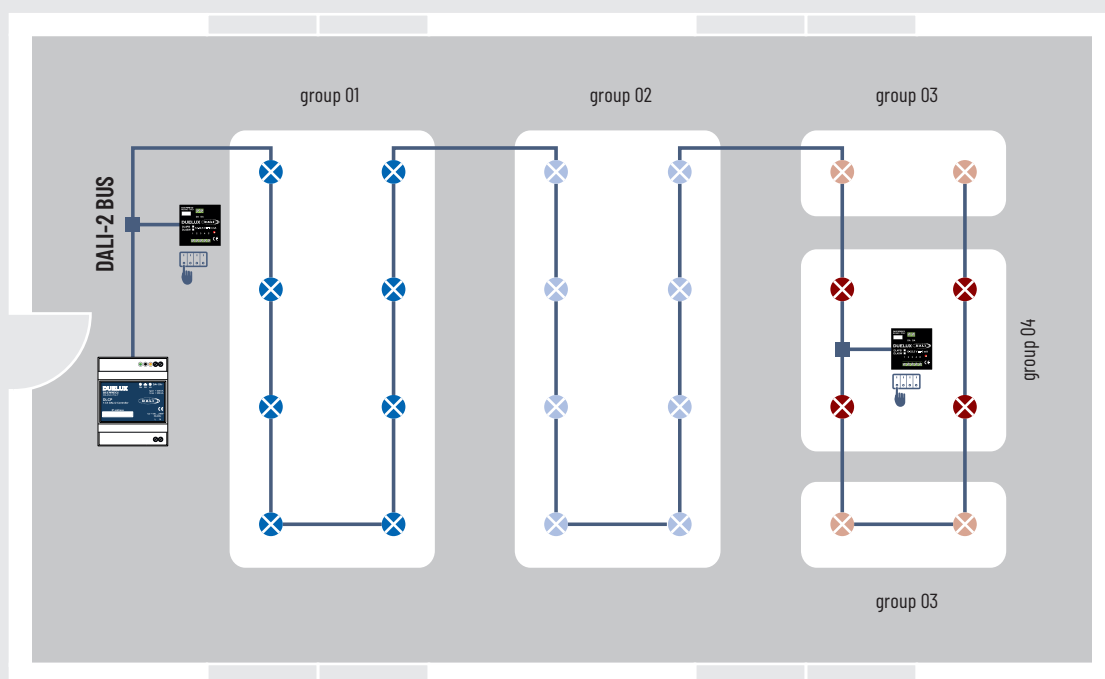
classrooms - conference rooms - auditoriums



Conference room example:

Manual button management

04



DALI 230 Vac Lamp



DLPB 4 Buttons
DL4SW 4 Switches



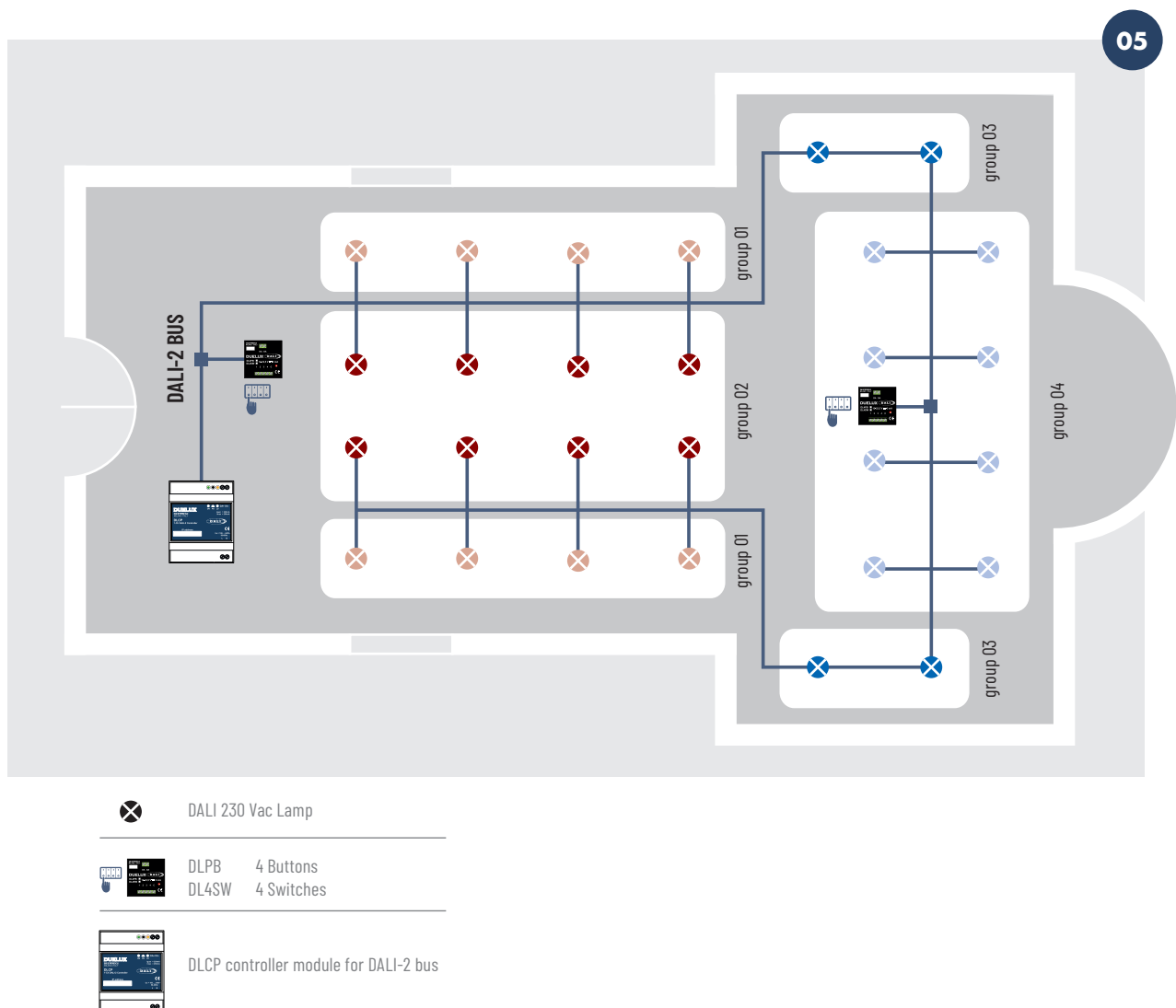
DLCP controller module for DALI-2 bus

churches



Church example:

Manual button management



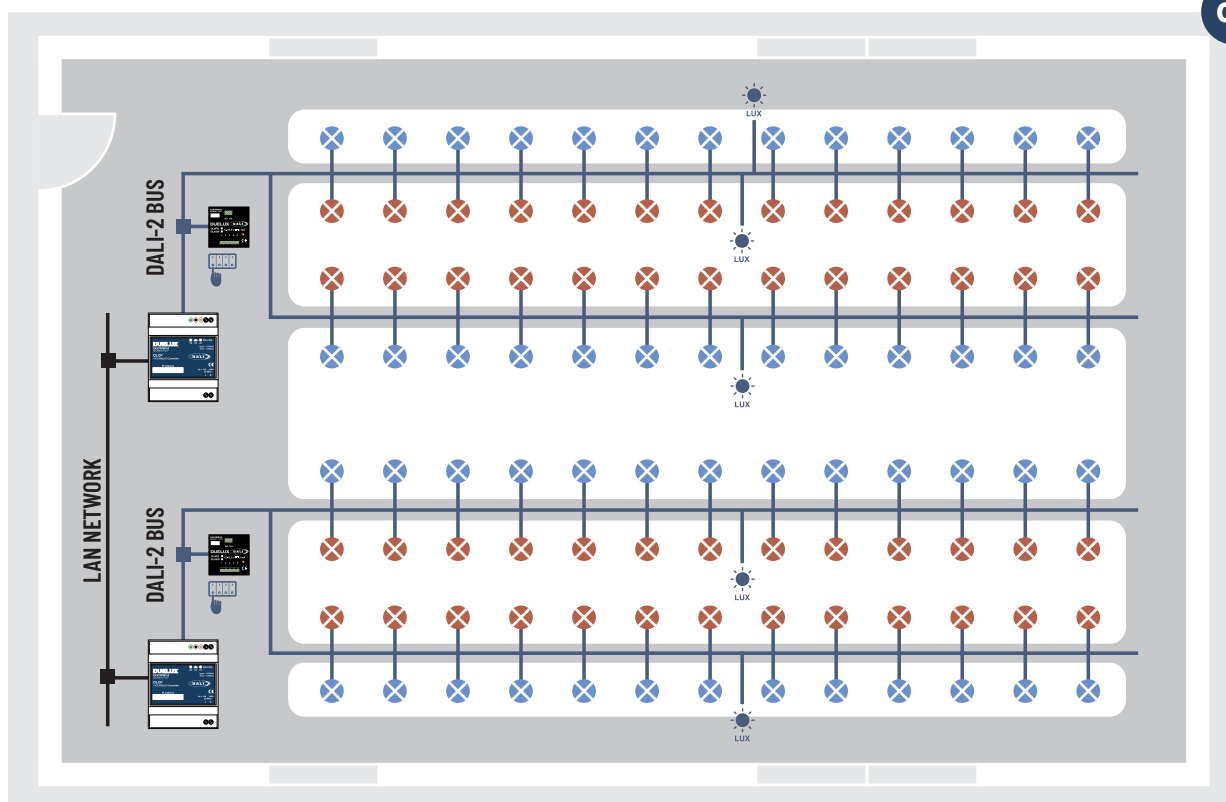
warehouses - logistics



Warehouse example:

Manual or automatic management with brightness sensor

06



DALI 230 Vac Lamp



DLCP 4 Buttons
DL4SW 4 Switches



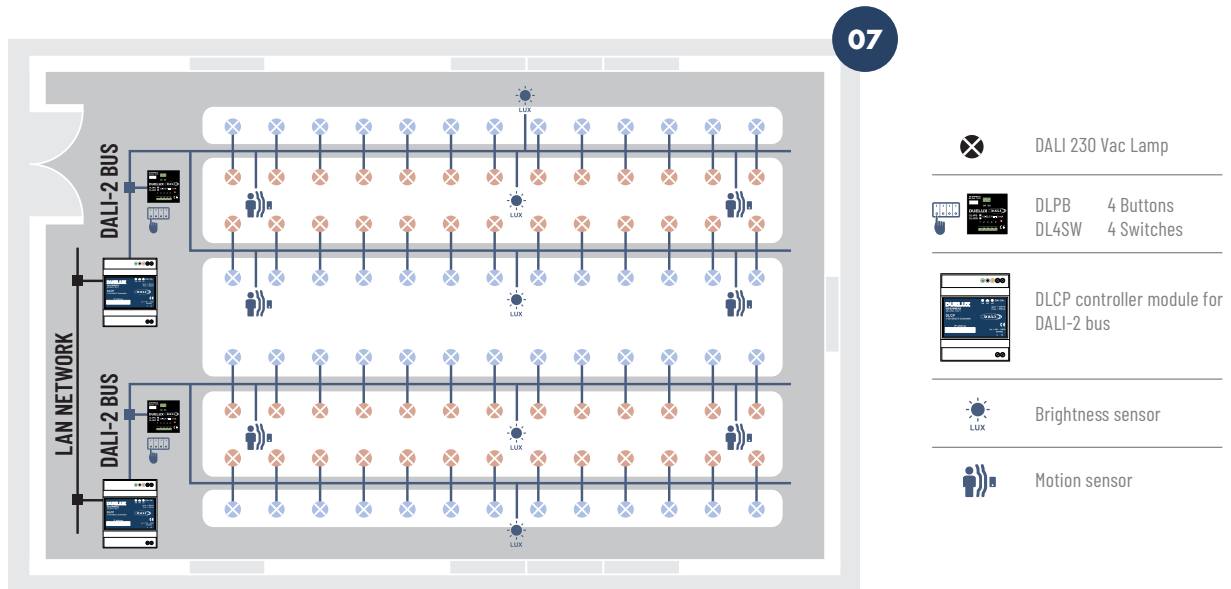
Brightness sensor



DLCP controller module for DALI-2 bus

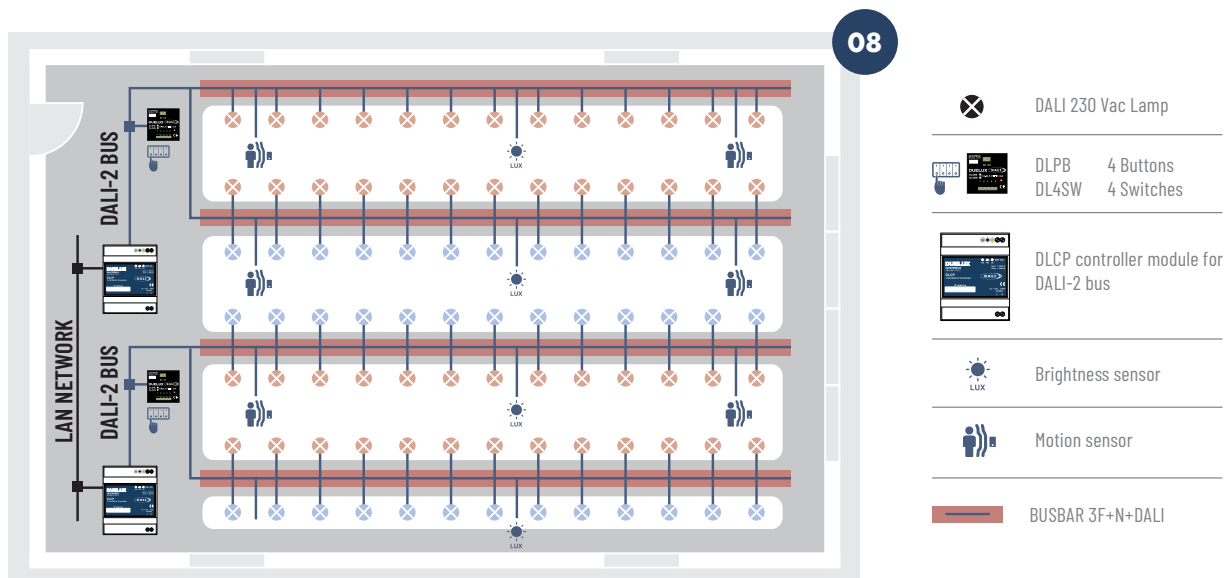
Warehouse example:

Manual or automatic management with brightness / motion sensor



Warehouse example with DALI busbar:

Manual or automatic management with brightness / motion sensor



POSSIBILITY OF WIRELESS CONTROL



The **DLWRX module** allows up to 4 wireless transmitters with ENOCEAN technology (wireless and battery-less) to be interfaced with the DALI bus. Each DLWRX module can manage up to 16 points.

The only connection required for the DLWRX module are the two DALI bus cables; the power supply necessary to operate the module is obtained from the bus itself.

The coupling of a button group to a receiver is performed using the button and the two LEDs located on the lower side of the module. The DLWRX module occupies, within the DALI bus, up to 4 "control device" addresses, one for each keypad that has been coupled.



Example office with wireless controls:

Manual button management



DUELUX:

A completely configurable system via browser

The **DUELUX** system is also innovative in its configuration.

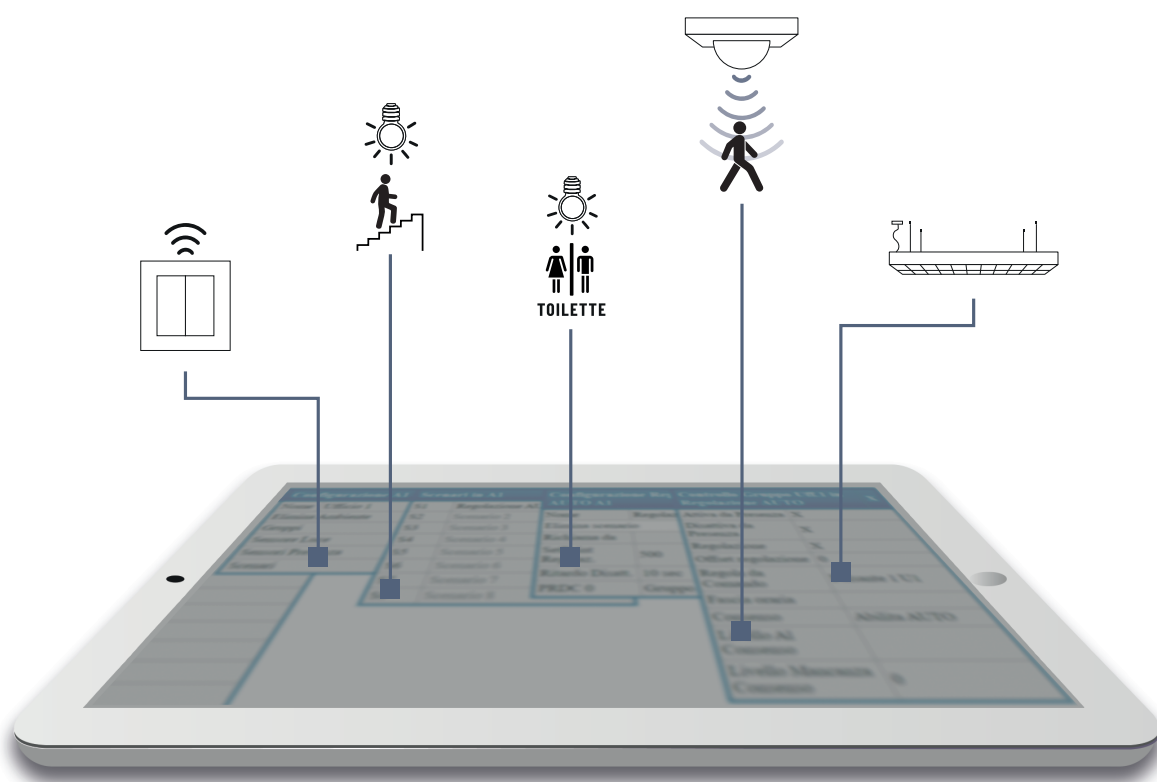
The simplicity of the **DUELUX** system continues even at the moment of bringing the system to life.

The configuration of a BUS system must be **quick and intuitive**, for this reason we have chosen to offer users an **ONLINE INTERFACE** that could be reached from **any device with a web browser** such as PC, tablet, smartphone, etc., regardless of the device's operating system.

An active internet connection is not required, it is sufficient to connect an access point to the DLCP controller module in order to have access to the entire system.

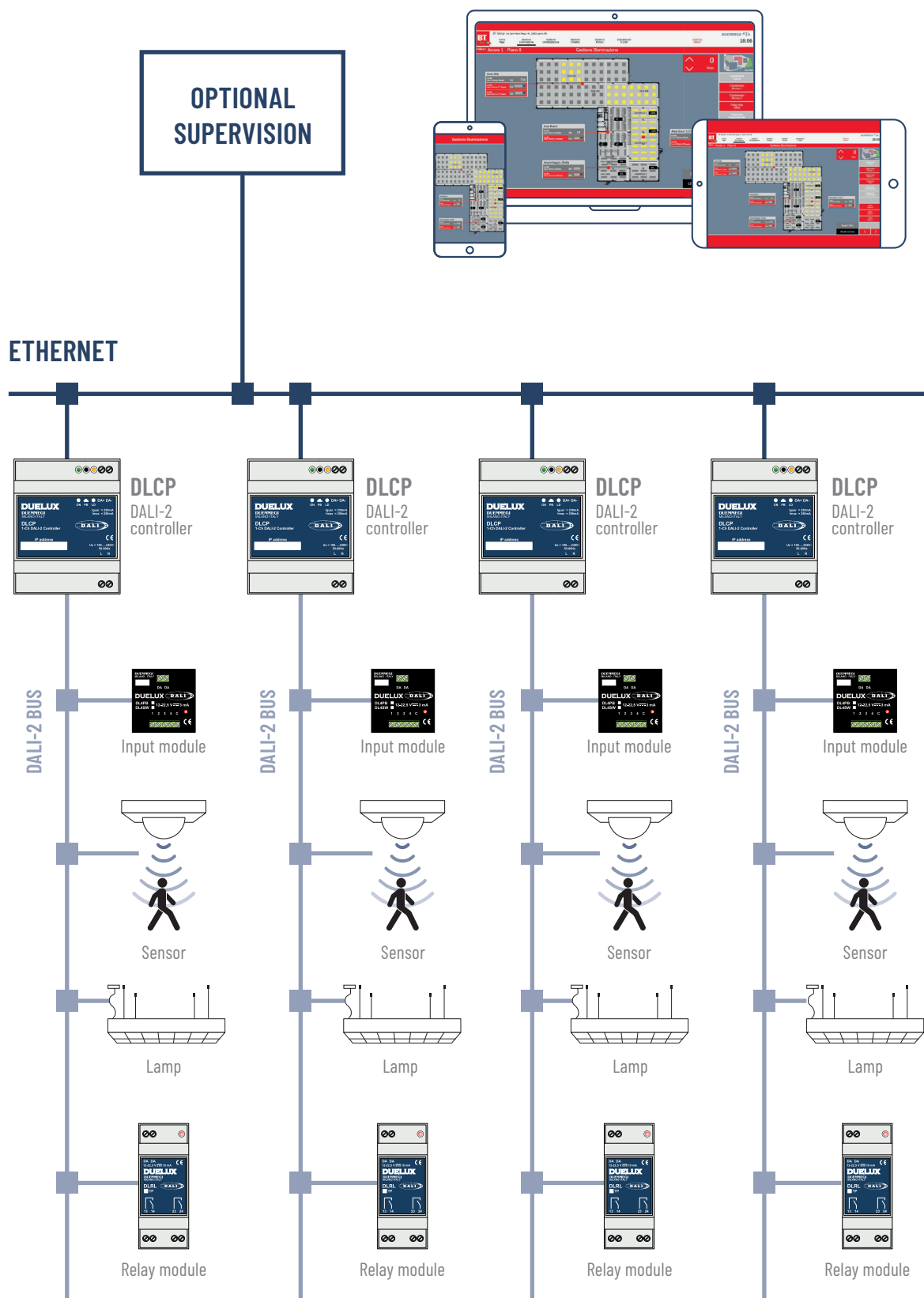
The automatic addressing of the area (DALI lamps, sensors, input modules, wireless keypad panels, relay actuators, etc.), group creation field, the definition of scenarios and command logics, the setting of time bands, the exchange of information and commands between several DALI-2 buses that refer to different DLCPs etc. are carried out easily through a web based interface.

- Scenario configuration - Automatic adjustment
- Scheduler
- Acquisition and addressing of the DALI field
- Lamp configuration
- Button logic configuration
- Sensor configuration
- Keypad configuration

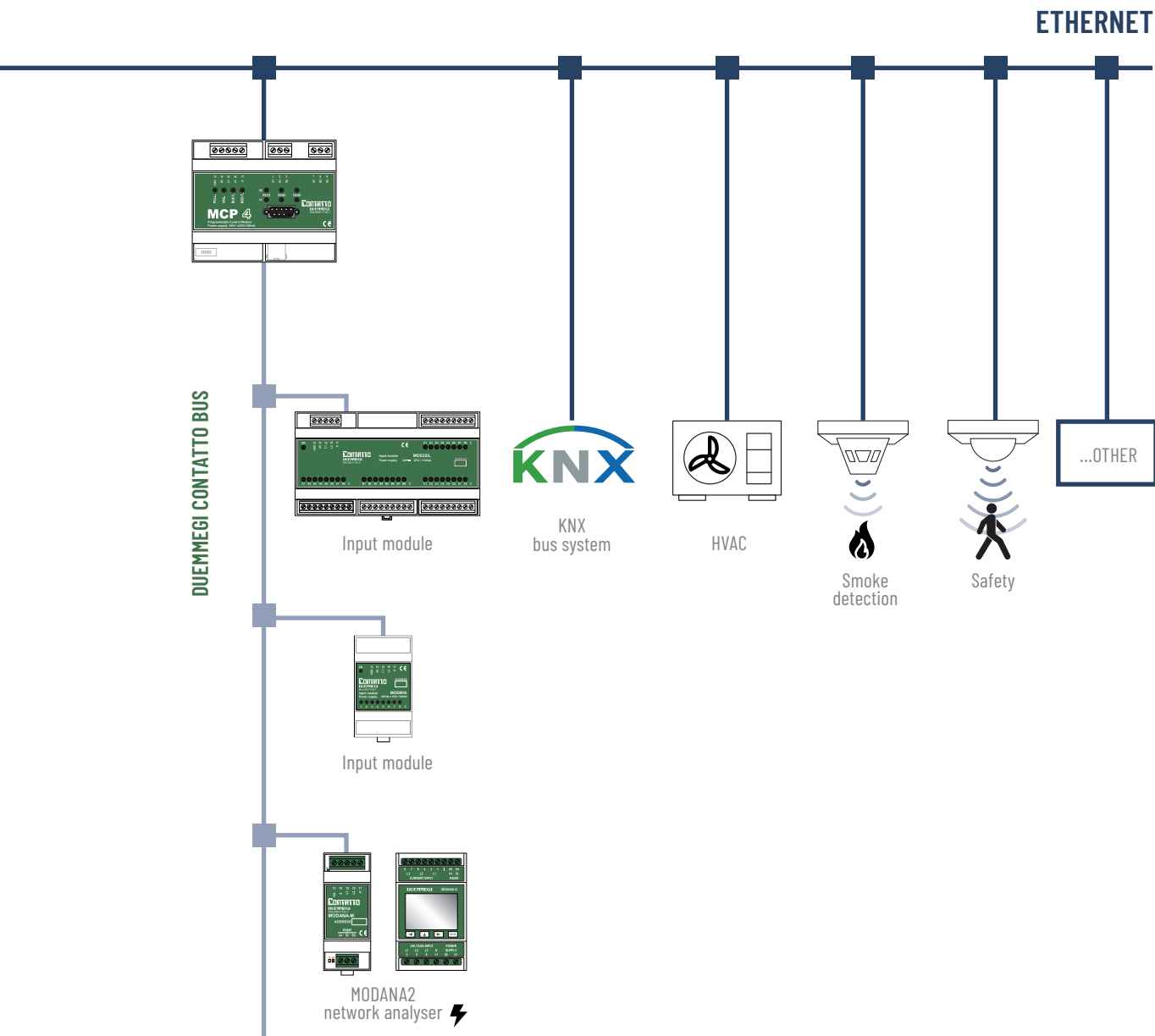




BMS ARCHITECTURE EXAMPLE



...WITH SOME OF THE POSSIBLE INTEGRATIONS



NOTE

DUELUX

by

DUEMMEGI 
HOME AND BUILDING AUTOMATION

30
1992 - 2022
YEARS
ANNIVERSARY



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