

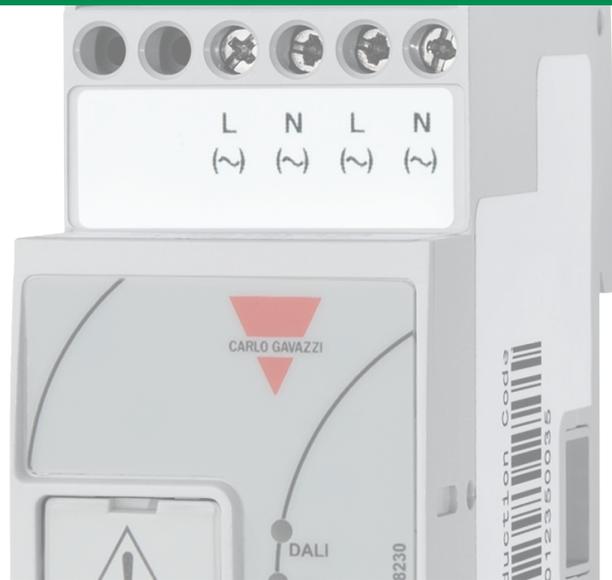
## Tunable white DALI control

# Controls

# DALI control

## Create an efficient environment

A variety of international regulations, including EN 15232, the European Energy Performance of Buildings Directive (EPBD 2010), ISO 50 001 and sustainability and energy certificates such as LEED (US) or Energy Star (US), have led to the creation of technical standards such as open communication protocols (BACnet and DALI) and specialized applications designed to optimize the energy efficiency of building and room automation systems. Energy savings of up to 30% can be achieved by raising awareness, making energy consumption transparent and introducing targeted energy management and control.



### From profitability to sustainability

Lower energy use increases the competitive edge:

- It reduces operating costs by 13.5% in new buildings and by 8.5% in old ones\*
- It increases the asset value
- Lower energy use increases the return on investment:
- ROI improvements of 9.9% in new buildings and 19.2% in old ones\*
- Rent increases of 6.1% in new buildings and 1% in old ones\*



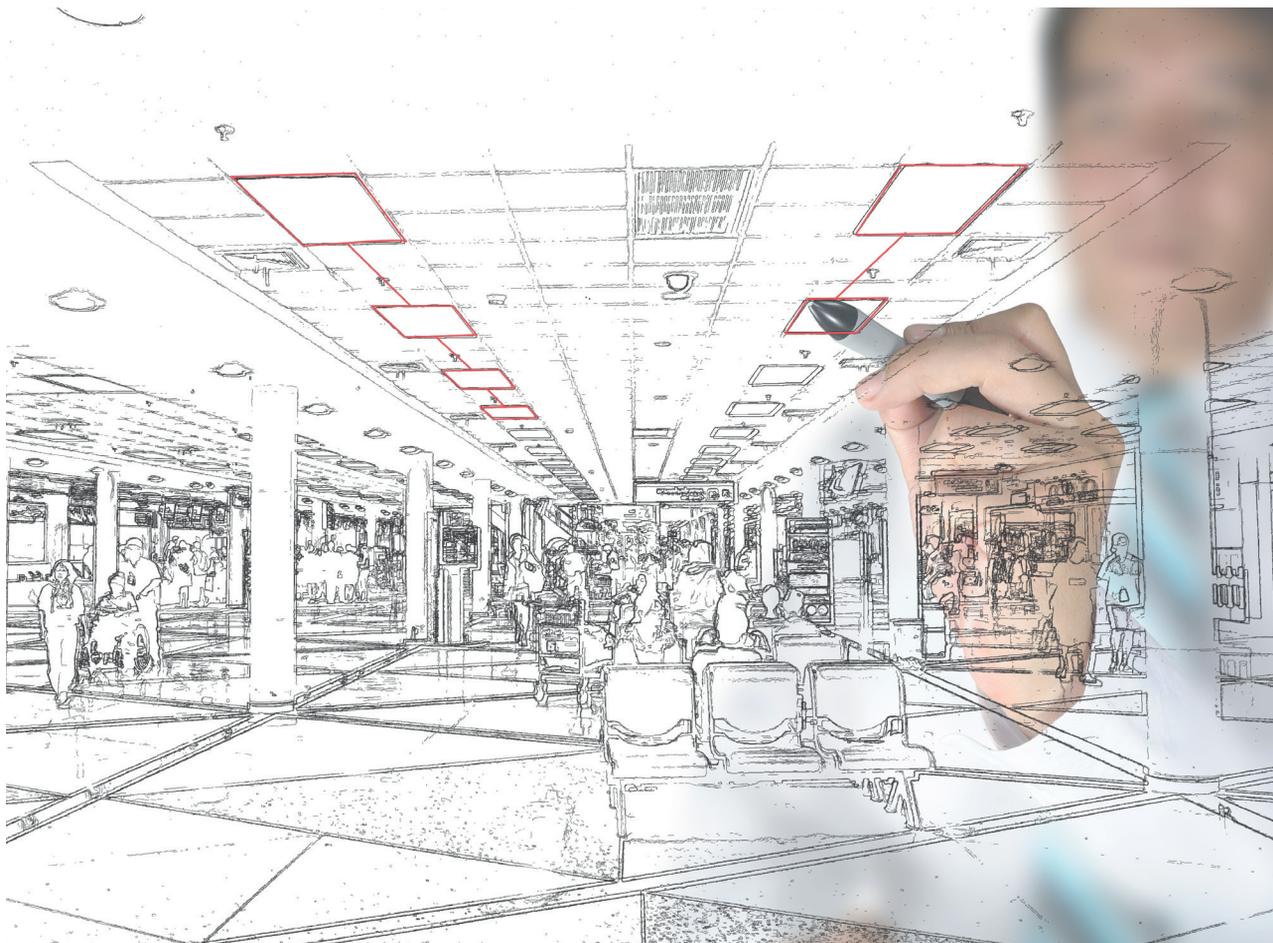
## Your green building

The only way to reach the targets described above, in terms of meeting regulations and profitability, is to use a building automation system: Carlo Gavazzi's solution, based on an open platform empowered by BACnet and DALI worldwide standards, helps you to maximize energy efficiency in relation to the external environmental conditions and occupancy of the building, while providing the highest levels of comfort, safety and quality.

Lighting is one of the major areas to focus on in order to reduce electricity costs, so the ability to control and monitor this is a key feature that can easily be achieved by means of the Sx2WEB controller, the programmable and intelligent unit which manages the Carlo Gavazzi system. The simplicity of the DALI bus, combined with the flexibility and scalability of the Sx2WEB platform, provides a unique and wide range of control strategies which can be adapted at any time according to the changing needs of the tenants.

\*MacGraw Hill Construction, Green outlook 2016

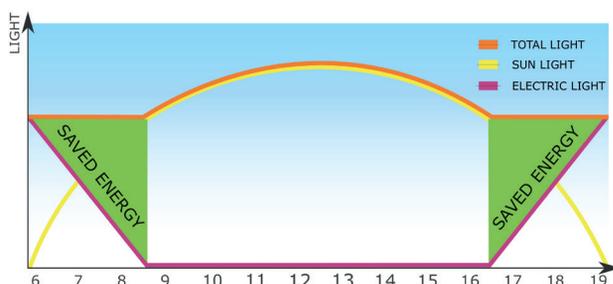
## Precise control to reduce energy bills



### DALI bus

The DALI bus was created thanks to cooperation between the leading lighting manufacturers to create a common digital interface to control light fixtures. Today it is the world's preferred standard, which many companies have adopted. By using the DALI bus, architects, specifiers, integrators and end-users can rely on the compatibility and interchangeability of the different control gears.

The remarkable success of this standard is also due to its very easy installation (just two non-polarized wires with free topology), its low commissioning costs (no certified wires or fees are required) and its scalability and flexibility.



### Carlo Gavazzi's clever control strategy

The DALI bus, together with the powerful Sx2WEB controller, can help you achieve a higher energy efficiency rating and meet your local green building requirements for energy savings.

The main control strategies provided by the Sx2WEB controller are:

- Daylight harvesting, which provides automatic dimming to compensate for the amount of natural light
- Automatic sunrise and sunset calculation
- Real-time clock and schedulers to switch on/off, dim or change scenario
- Light levels control according to people presence and timers
- Zone control

In addition to this, the Sx2WEB equips you with reporting files with all the data you need to check if the energy targets are met or if any further improvement can be made.

# DAI control

## Tunable white DALI control

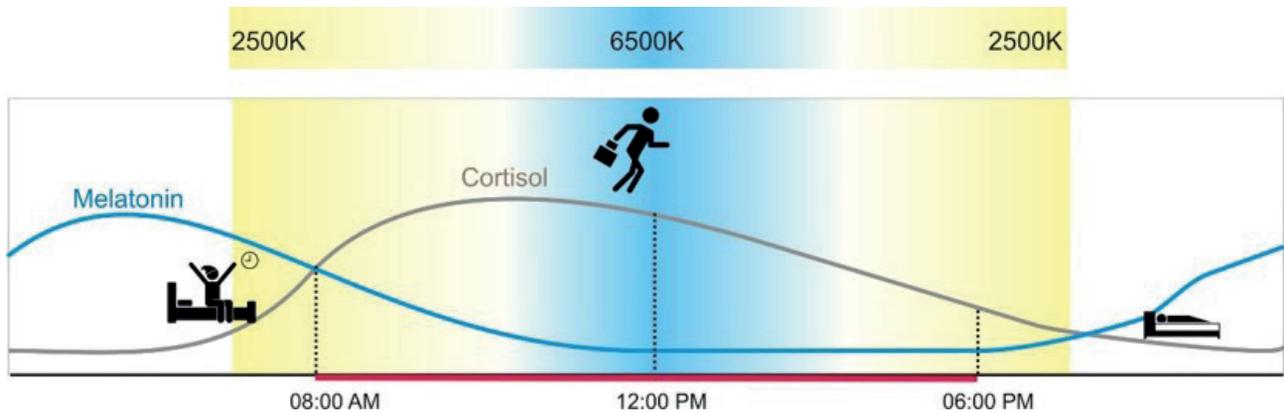
### Wellbeing and performance are influenced by light

Our biological clock is regulated by light and darkness:

- In the morning, as the sun comes up, light levels increase, the colour of light shifts towards cooler colour temperatures, and we wake up and become active.
- In the evening, as the sun goes down and the colour of light shifts towards warmer colour temperatures, we

unwind, relax and prepare for sleep.

Our body's hormone levels rise and fall with these light cycles, so mimicking this behaviour is becoming more and more popular in indoor lighting, to improve the quality of life and performance of people.



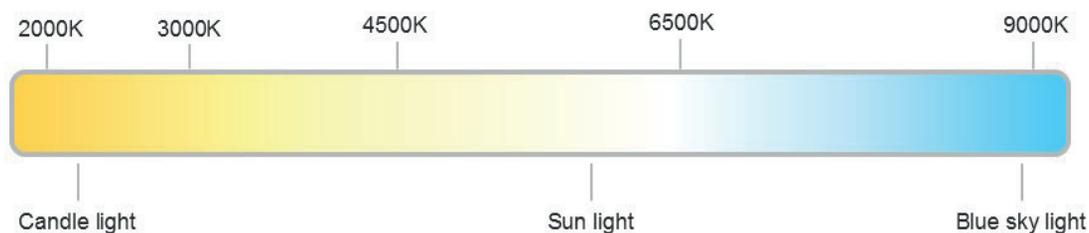
The graph above shows how our hormones change during the day according to the colour temperature: cortisol is our waking hormone, whilst melatonin controls our sleeping rhythm. Warmer temperature is more relaxing, while cooler temperature creates a motivating environment.

#### Tunable white: indoor light follows our circadian rhythm

Thanks to ever-improving LED technology, all the mainstream LED lighting companies are moving to offer products which can change the white of the light from warm (2500K) to cold (6000K) to follow the behaviour of natural white.

This feature is called tunable white or Kelvin colour temperature-change or CCT (Correlated Colour Temperature) and is the capability of changing the temperature (K) of the colour of the light. Thanks to Tunable White, we can now personalise lighting to support the healthy functioning of our circadian rhythms and improve mood, performance, and sense of wellbeing. Such daylight simulation is ideal, for example, for use in offices where we have little access to the beneficial properties of daylight, helping us to feel on top form every day since static lighting conditions might disrupt our biological rhythms.

Here are some examples of colour temperature:



#### Carlo Gavazzi's solution optimizes the environment

The Sx2WEB system can be used to mimic the natural cycle of daylight, or it can be programmed to create specific scenes at certain times of the day. You can choose longer periods of more motivating light at peak times (6000K), or seamlessly move between relaxing and motivating lighting scenes (2500K) to match work and break times during the day. Systems can be pre-programmed to meet the demands

of the user or commissioned on site and updated at any time. Thanks to the integrated astronomical clock, dawn and dusk are automatically calculated according to the location, and colour temperature can be chosen to suit the need of the space.

Schedulers can be programmed to move from warm to cool light or the user can set scenarios manually by using push-buttons or by means of their smart-device.

## Appealing work spaces

Nowadays people are the most important resource a company must take care of: people engagement, mood and commitment can easily be empowered taking care

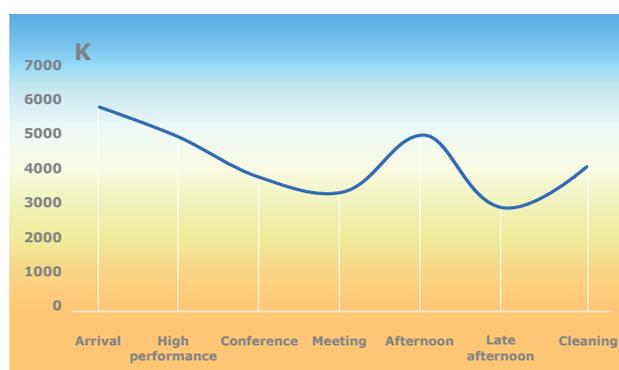
of the work space in terms of CO<sub>2</sub> level, temperature and illumination.



## Improve people performance and efficiency

As regards indoor light in a commercial environment, tunable white lighting can:

- **Improve productivity**
- **Improve staff welfare**
- **Create a vibrant workplace**
- **Bring flexibility to multi-use spaces**



The diagram above shows some example of scenarios to provide the perfect atmosphere for each activity during a working day: cooler temperatures to support concentration and focus or to compensate for an afternoon dip in energy levels, warmer temperatures during activities which require creativity and cooperation.

Thanks to the flexible and comprehensive solution by Carlo Gavazzi, the satisfaction of employees can easily be increased by optimizing colour temperatures and brightness to provide better visual comfort.

# DAI control

## Tunable white DAI control

### Motivating educational spaces

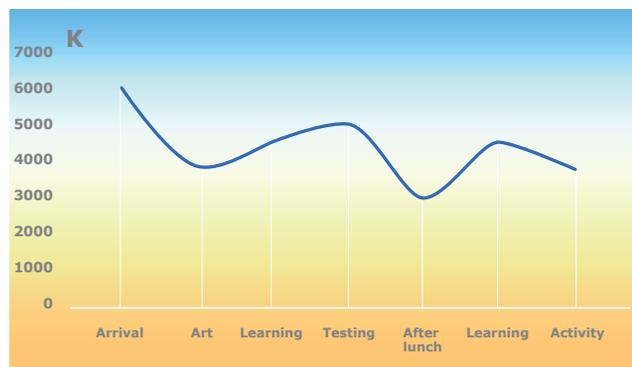
Thanks to the Sx2WEB system, teachers can easily activate the perfect light scene for any day's activity, maximizing the students' learning curve.



### The perfect scenario to facilitate learning

In an educational environment, tunable white lighting can:

- Improve concentration
- Improve learning outcomes
- Create a dynamic environment
- Match the lighting to the learning need



The diagram above shows some examples of scenarios to meet the perfect atmosphere for each activity during a school day: cooler temperatures to support concentration and focus during test activities, warmer temperatures during activities which require creativity and cooperation or relaxation.

Pre-set light levels and colour can be scheduled according to weekly activities, but at the same time teachers can personalise the pre-sets to achieve a more individualised lighting control of the learning environment..

## High quality healthcare environment

Carlo Gavazzi’s tunable white solution helps recovery and well-being in patients: whatever the clinic is, a hospital, an elderly care home or an assisted living facility, the

ability to change light intensity and colour temperature according to the needs of people improves the quality of the care.

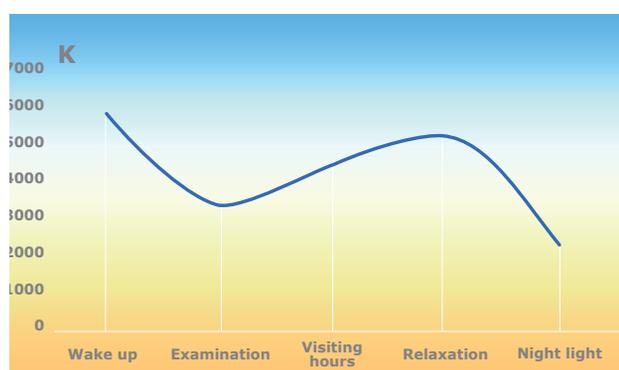


## Shorten recovery time

In a healthcare environment, tunable white lighting can:

- **Decrease recuperation time**
- **Improve patient sleep pattern**
- **Give patients control over their environment**
- **Enhance quality of care**

The diagram above shows some examples of scenarios to meet the perfect atmosphere for any time of day in a care environment: cooler temperatures to speed up the inner body clock in the morning, warmer temperatures for relaxation. Pre-set light levels and colour can be scheduled according to the time of the day, but at the same time patients can personalise



the pre-sets to achieve greater comfort, thus improving their satisfaction.

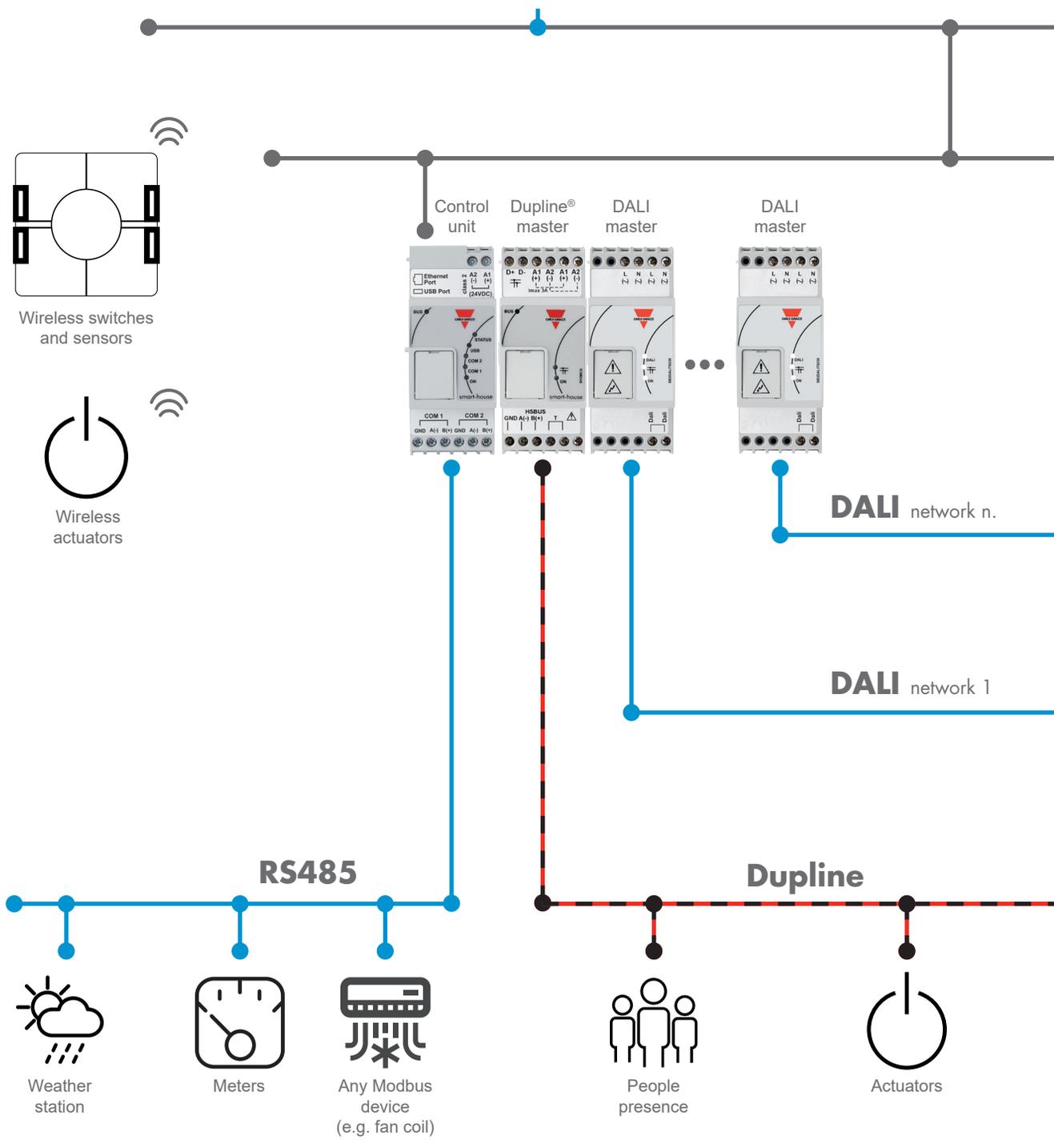
At the same time, a stimulating workplace engages healthcare professionals and supports their well-being and efficiency.

# DALI control

## Carlo Gavazzi's comprehensive system

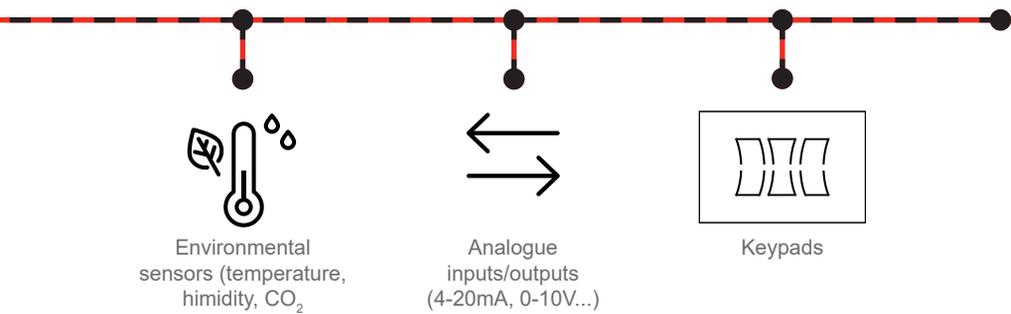
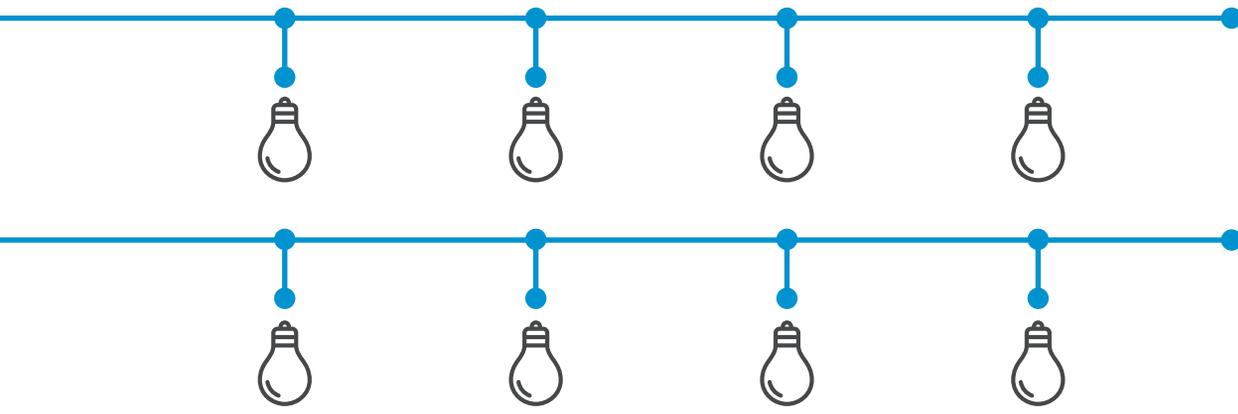


Member of:





**Ethernet/BACnet/Modbus TCP/IP**



Environmental sensors (temperature, humidity, CO<sub>2</sub>)

Analogue inputs/outputs (4-20mA, 0-10V...)

Keypads

# DALI control

## A simple touch for the perfect scenario

To make the best use of the energy consumed by the building and to tailor the colour and feel of a space to user needs and desires requires very few items with the Carlo Gavazzi system.

### Aurora and Eunica

To empower the user to change the lighting according to the activity or the mood: Eunica and Aurora are 4-gang keypads in 55x55 and 44x44 dimensions. Each push button is fully programmable. They are also available in a wireless solution.



### Glass keypads

For a more sophisticated user experience, touch push buttons can be used to set any light scenario. They are available in black and white and in two dimensions: 80x80 and 80x120 mm.



### Presence and movement sensor

To switch on the light only when it is needed, a presence sensor is a mandatory choice: if it has a light sensor like the Carlo Gavazzi's one included, nothing else is needed to obtain daylight harvesting. The sensor is available in different shapes and mounting options.



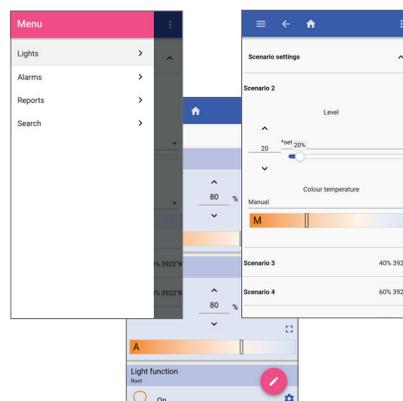
# Stylish and functional remote control

The perfect mood or the perfect energy saving strategy can also be set very easily using your smart devices, your PC or the Carlo Gavazzi's SmartHub display.

## Simply use your smart device

Any smart device can be turned into a remote controller to alter the colour temperature levels between 2700K and 6500K or even change the intensity levels for a particular CCT

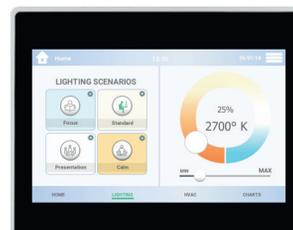
setting. The pages of the web-app can easily be customised according to need.



## Just a finger tip

For centralized room control, the SmartHub display is the ideal solution: pages can be customised with any image or icon and any command/ scenario programmed into the Sx2WEB can easily be changed with just a finger touch.

The display is available in a 4" and 7" version and the mounting is into the wall by means of its wall-box.



## Everything under control

Any PC or notebook can be turned into a configurable interface to control the installation: in the same way in which pages are created for the display, they can also be customised

for any Windows PC and any display dimensions.



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