# ABB Smart Buildings

A holistic design for
commercial buildings

⊕
- **Building management system**
- **Energy management**
- **Safety and security solutions**
- **Smart IP based connectivity**
- **Serving building control standards like BACnet or KNX**

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**Smart Buildings Solution portfolio helps to achieve ABB's smartainable Mission to Zero for buildings, committed to writing the future of safe, smart, and sustainable electrification for everything from industry and buildings to infrastructure and transportation. Our vision is to achieve a zero-emission reality not only for the future but also today.**

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# Table of contents

Why is it safest to plan with ABB? No one can foresee the future. One thing, however, is certain: more and more is expected of building systems technology and its integration. Serving industries including commercial buildings, workplaces, hospitals, schools, campuses, stadiums, enterprises, and more. Our holistic offering creates value for our customers and provides connected experiences to increase productivity, optimize processes, and ultimately provide higher tenant satisfaction.

**Intelligent IoT BEMS control |
beyond automation**
A well commissioned and programmed BMS will
deliver on schedules, switching lightings on and
off at set times/days and adjusting HVAC
according to expected occupancy.

An intelligent IoT BMS goes beyond schedules and
expectations and operates on actual sensor data
to make adjustments, turn lights on and off, and
adjust HVAC in meeting rooms depending on
occupancy, no need to worry about lights being
left on in empty meeting rooms all day.

And if it's a brighter warmer day than expect,
external temperature sensors, weather data,
room light, and temperature sensors feed
information back to the BMS causing it to react
and make intelligent adjustments to lighting,
shading, and HVAC to ensure occupant comfort
is maintained at all times.

**Flexibility for a smarter world**
Scalable design and flexible building solutions
that allow smart devices, systems, and people to
connect more easily. Our range of IP controllers

built on an open platform provides the
interconnectivity and flexibility required to create
smarter buildings.

When you combine our highly robust, reliable,
and flexible range of controls with our energy
management expertise you get an advanced, top
to bottom Energy Management Solution that
really delivers on your energy-efficient
commitments and goals.

**Reduced operational costs
with energy optimisation**
ABB Building automation controls provide alerts
via any web-enabled device in real-time allowing
building managers to monitor equipment
performance, track anomalies of operation
outside of setpoints and scheduling, and react
to resolve any issues quickly, reducing downtime
and saving on operation costs and unnecessary
energy consumption.

Through continuous monitoring and intelligent
analysis of energy consumption facility managers
can prevent building energy drift of up to 20% per
annum.

# Benefits
## The high level of configurability

ABB Smart building solutions provide the flexibility building owners
and tenants require to control and optimize workspaces while managing
energy usage and reducing costs.

Smart buildings attract and appeal to the
demands of high-quality tenants through the
installation, management, and maintenance of
Smart HVAC, lighting, and room controls that
provide improved air quality, light, shading and
temperature control, providing an optimal
environment for greater work productivity for
occupants, while increasing the value of a
building for investors and building owners.

The high level of configurability of the ABB
system also enables the building owner to
accommodate multi-tenants' requirements very
quickly and with minimum cost. The system can
be extended quickly and easily throughout the
building life cycle protecting your investment into
the future.
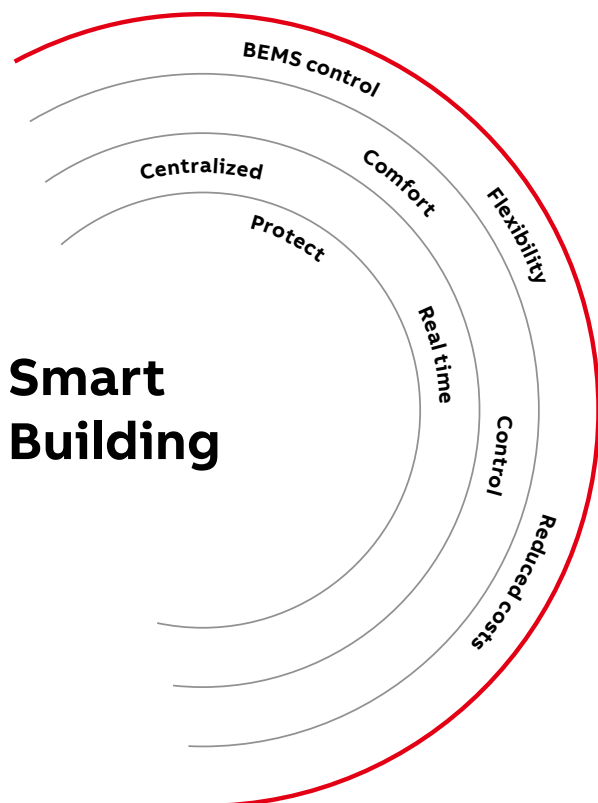
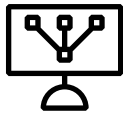**The benefits for the customers**
- Intelligent IoT BEMS control |
  beyond automation
- Flexibility for a smarter world
- Reduced operational costs
  with energy optimisation
- Reduce energy costs
- Occupant comfort
- Put control in users´ hands
- Centralized Supervision
- Real time monitoring
- Assured safety
- Future proof essential plant and equipment
- Protect your investment

BEMS control
Centralized
Comfort
Flexibility
Protect
Real time
Control
Reduced costs

**Smart
Building**

—
Each building is ready
for the future, with the
intelligent control of
light, shading, room
climate and safety.

# Benefits
## Flexibility for a smarter world

**Intelligent IoT BEMS control | beyond automation**
A well commissioned and programmed BMS will deliver on schedules, switching lightings on and off at set times/days and adjusting HVAC according to expected occupancy.

An intelligent IoT BMS goes beyond schedules and expectations and operates on actual sensor data to make adjustments, turn lights on and off, and adjust HVAC in meeting rooms depending on occupancy, no need to worry about lights being left on in empty meeting rooms all day.

And if it's a brighter warmer day than expect, external temperature sensors, weather data, room light, and temperature sensors feed information back to the BMS causing it to react and make intelligent adjustments to lighting, shading, and HVAC to ensure occupant comfort is maintained at all times.

**Flexibility for a smarter world**
Scalable design and flexible building solutions that allow smart devices, systems, and people to connect more easily. Our range of IP controllers built on an open platform provides the interconnectivity and flexibility required to create smarter buildings.
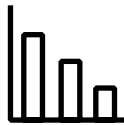
When you combine our highly robust, reliable, and flexible range of controls with our energy management expertise you get an advanced, top to bottom Energy Management Solution that really delivers on your energy-efficient commitments and goals.

### Reduced operational costs with energy optimisation

ABB Building automation controls provide alerts via any web-enabled device in real-time allowing building managers to monitor equipment performance, track anomalies of operation outside of setpoints and scheduling, and react to resolve any issues quickly, reducing downtime and saving on operation costs and unnecessary energy consumption.

### Reduce energy costs

Ensure your building systems are operational only when needed versus expectation with smart room control scheduling and the application of intelligent sensor feedback.

### Occupant comfort

External temperature sensors, weather data, occupancy levels, room light, air quality and temperature sensors feed information back to the BEMS causing it to react and make intelligent adjustments to lighting, shading, and HVAC to ensure occupant comfort is maintained at all times.

### Put control in users' hands

ABB Smart building solutions provide the flexibility tenants require to control and optimize workspaces via user-friendly and intuitive room controls and displays while managing energy consumption and reducing costs.

### Centralized Supervision

Centralized supervision simplifies the management of a single building or across an estate irrespective or geographical location.

Centralized supervision and control enhance operational efficiency proving 24/7 web-enabled access to your BEMS. Facility management can view and modify information including trends, setpoints, schedules, and more from any web-enabled device anywhere, any time keeping you in control.

### Real time monitoring

The BEMS monitors system faults across all zones from a central point making maintenance faster and more responsive. Technical services managers can monitor all the integrated systems without having to visit the various plants or zones.

### Assured safety

The system integrates safety functions with detectors for burglary, fire and smoke, technical alarms, panic and emergency-call functions, automatic illumination and a realistic presence simulation providing safety and assurance to occupants and protecting your assets.

### Future proof essential plant and equipment

Our intuitive energy analysis and management tools provide on-going monitoring and historical alarms that may point to additional problems that require maintenance. Identifying faults and resolving issues early saves on more costly future replacement or repairs.

### Protect your investment

Highly flexible, easily extendable, our range of BEMS controls built on an Open System allows for straightforward expansion or upgrades to the BEMS that may be required in years to come, future-proofing today's BEMS installations.

SMART BUILDING

Everything in the building is interconnected: the lighting with the shading, this in turn with the air conditioning, and this again with the opening of the windows. The potential for saving energy and increasing safety and comfort is almost endless. Either ABB Cylon® BACnet or ABB i-bus® KNX functionally links all data in order to intelligently utilise the options.
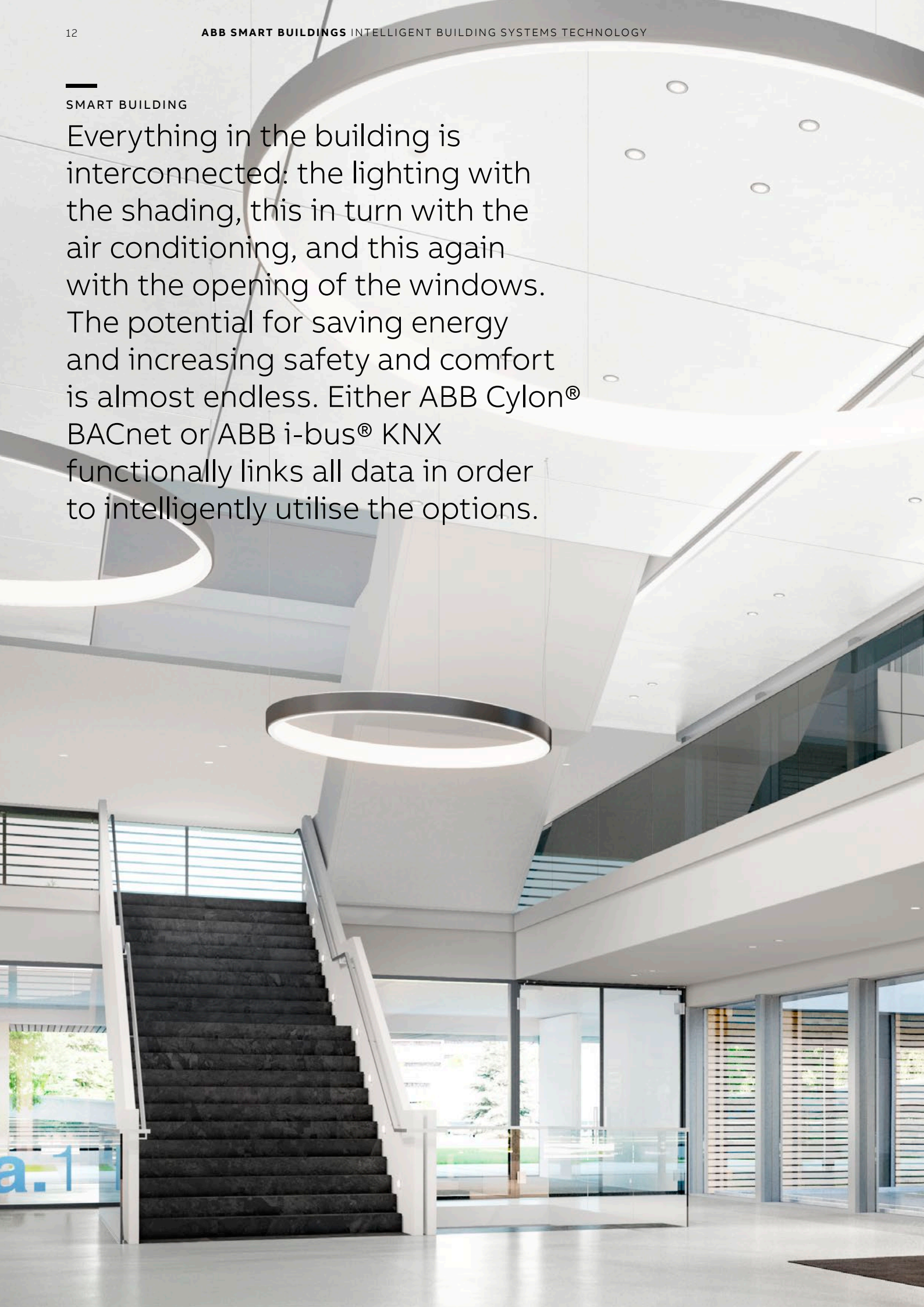
BUILDING SPACE® | OFFICE

# Lighting control
## Illuminating technology

Light in all its facets. The light in office buildings must fulfil a variety of tasks – increase energy savings, provide illumination adjusted to use, and increase productivity. ABB i-bus® KNX has the intelligent logic for all of this combined.



### Automatic saving
The light adjusts itself to the use of the room – essential for saving energy. Sensors in the form of intelligent presence detectors gather a variety of data, which is sent to the actuators. The constant light control is convincing: the daylight is included, the illumination is where it is needed, the light slowly gets brighter as soon as someone enters the room and extinguishes as soon as the room is exited.
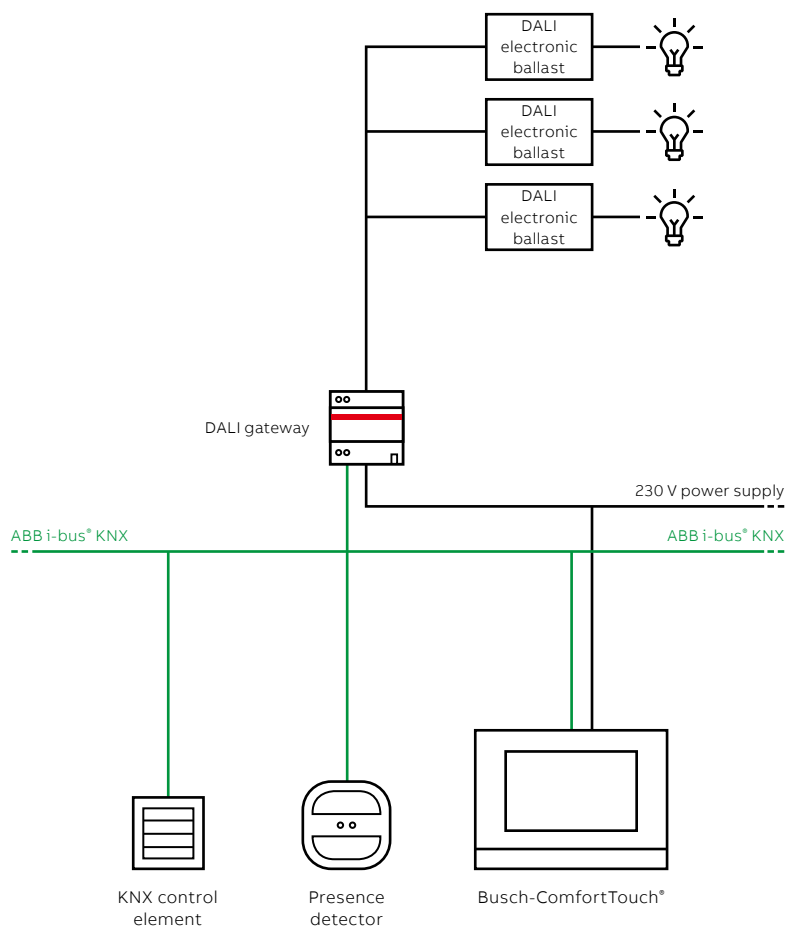
### Smarter dimming
Control via the KNX bus is powerful, because it provides well-designed, comprehensive dimming. Numerous lights need to be controlled in large buildings, and this system allows them to be dimmed directly or in scenes according to their use. Depending on complexity and requirement, it is possible to integrate a 1–10 V or DALI control, or, if the colour of light is to be adjusted, an RGB control.

**Types of control with KNX:**
- 1–10 V control
- DALI control
- RGB control

**Comprehensive light control:**
- Switching
- Dimming
- Constant light control
- Automatic light
- Light scenes



DALI electronic ballast

DALI electronic ballast

DALI electronic ballast

DALI gateway

230 V power supply

ABB i-bus® KNX

ABB i-bus® KNX

KNX control element

Presence detector

Busch-ComfortTouch®



**Setting light into the scene**
Light has numerous functions. Rooms can be optimally used with a clever scene out of blind and light. The RGB colour light control is a real eyecatcher. It lends rooms their individual charm. Everything functions simply for the user: at the press of a button.

**Versatile control options**
An intelligent building controls itself automatically and ensures an atmosphere of well-being, irrespective of the time of day. Precisely this is what the KNX bus makes possible. The intensity of the artificial light can be regulated depending on the incoming sunlight to guarantee optimum of every room: whether direct illumination at the work station in the office or a pleasant ambience at the coffee bar, all subtleties can be controlled.

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# Taking building performance to a new level
## Modern buildings require smart HVAC systems

Depending on geographical location and weather conditions, HVAC can represent 40-60% of the energy consumption of commercial buildings. Taking intelligent control of HVAC can produce significant energy cost savings. ABB range of FLXeon BACnet/IP automation control solutions deliver powerful control, connectivity, and visualization for intelligent buildings.
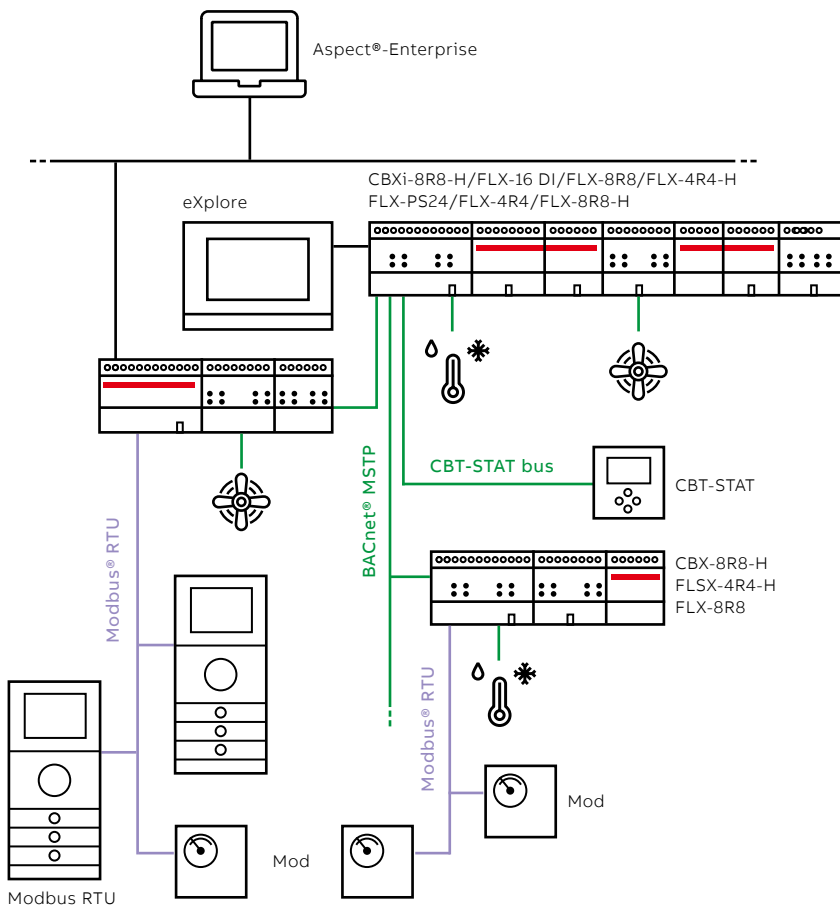
### A wide range
Ideally suited for a wide range of applications for intelligent control of HVAC equipment, such as Central Plant, Boilers, Chillers, Cooling Towers, Pump Systems, Air Handling Units (Constant Volume, Variable Air Volume and Multi-zone), and Rooftop Units. Electrical systems such as lighting control, variable frequency drives and metering.
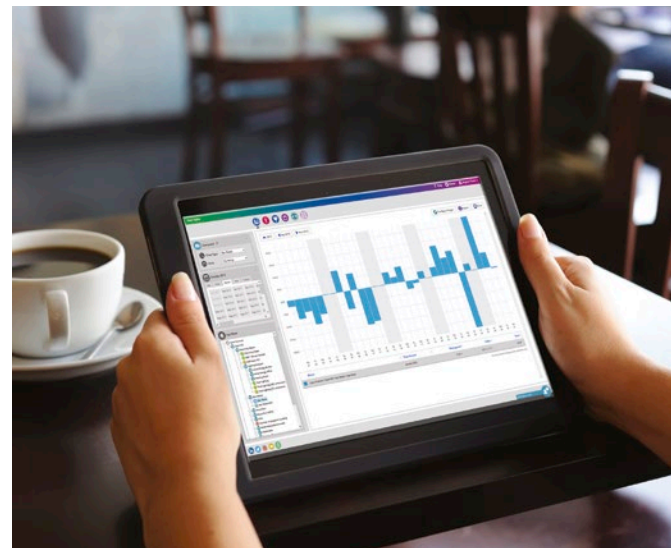
### Integration options
By integrating our web-enabled Building Automation system, HVAC equipment can easily be adjusted according to weather conditions. Occupancy and setpoint values can be adjusted remotely with everyday software like Microsoft Outlook or with mobile devices in the hands of facility managers.

**Benefits of HVAC:**
- Energy savings
- Measurable quality
- Availabilty



Aspect®-Enterprise

eXplore

CBXi-8R8-H/FLX-16 DI/FLX-8R8/FLX-4R4-H
FLX-PS24/FLX-4R4/FLX-8R8-H

BACnet® MSTP

CBT-STAT bus

CBT-STAT

CBX-8R8-H
FLSX-4R4-H
FLX-8R8

Modbus® RTU

Modbus® RTU

Mod

Mod

Modbus RTU

**Active Energy Manager**
Active Energy Manager analyses and monitors performance, allowing facilities teams to adjust and optimize HVAC controls for optimum occupancy comfort.

**The future**
FLXeon also supports multi- protocol communications simultaneously future proofing your investment in your building energy management system.

In addition to an extensive range of HVAC controls our energy management tools analyse and optimize HVAC controls performance.

Over time building energy performance can drift out of tolerance from the original design intent. Changes can occur in HVAC performance because of occupancy changes or building usage, or overriding and permanent adjustments to temperature setpoints resulting in simultaneous heating and cooling, manual locking of outside air dampers, etc.

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## ABB Drives for HVAC

Comprehensive comfort control with variable speed drives that ensure reliable and effortless operation of your HVAC applications
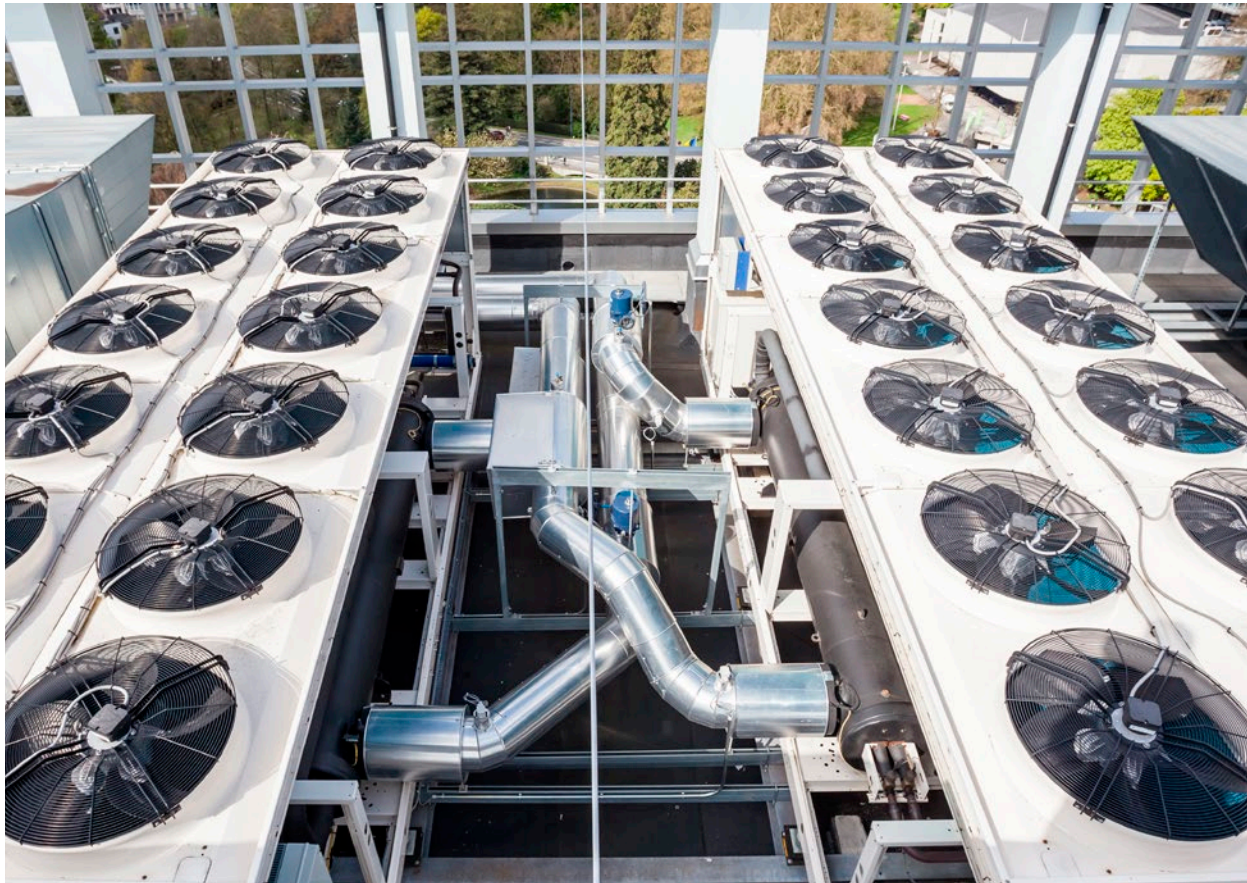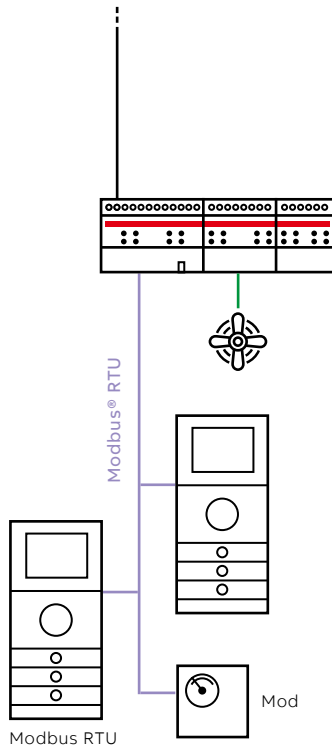


**Comfort**
It is something we take for granted in the buildings we live and work in. But comfort requires efficient systems controlling heating, ventilation, air conditioning and cooling (HVAC/R) to ensure the air we breathe is pure and the temperature is comfortable. We also need to ensure air quality in the most energy-efficient and cost-effective way – as well as safety – in both normal and mission-critical situations.

**Facts:**
- Energy costs are reduced by 70 percent
- saving 6,000 pounds a year
- CO2 emissions are cut by 12 tons per year



Modbus® RTU

Mod

Modbus RTU

**ABB**

For half a century, ABB has been leading the way in optimizing HVAC systems using drive control to ensure that you can take comfort for granted. ABB variable frequency drives (VFDs) provide the quality, reliability, and energy savings you expect, and are easy to use and safe to maintain. All you need to do is to set the drive up, and then focus on what counts.

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# Roller blinds, windows and blinds
## Sensitive sun protection

Intelligent control of light and shading. Technology adjusts the sunlight to the requirements. Sensors control the adjustment of the blind slats to the current position of the sun. Daylight is also included in the lighting scenes. And, finally, the air conditioning is influenced. ABB i-bus® KNX combines everything.



**Controlling sunlight**
There is real energy potential between the slats of the blind. You just have to take advantage of it. Because the slats can be precisely adjusted according to the position of the sun thanks to the sensor data. This is how optimum working conditions are created at the desks behind the windows and how energy is saved because the artificial light can be dimmed accordingly.
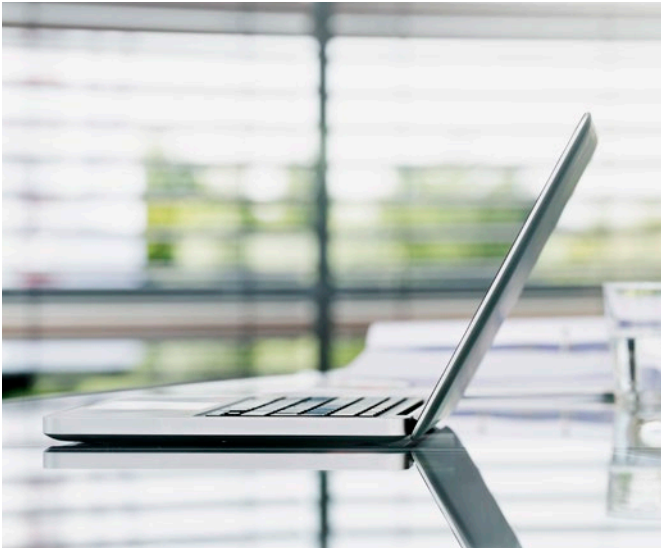
**Capturing energy**
The most economical heating energy comes directly from the sun. Especially in winter the sunny hours can be used by the automatic blind control. The blinds are moved up to warm the room with the energy from the sun; and in reverse, unnecessary heating can be prevented in summer with the aid of the blind.
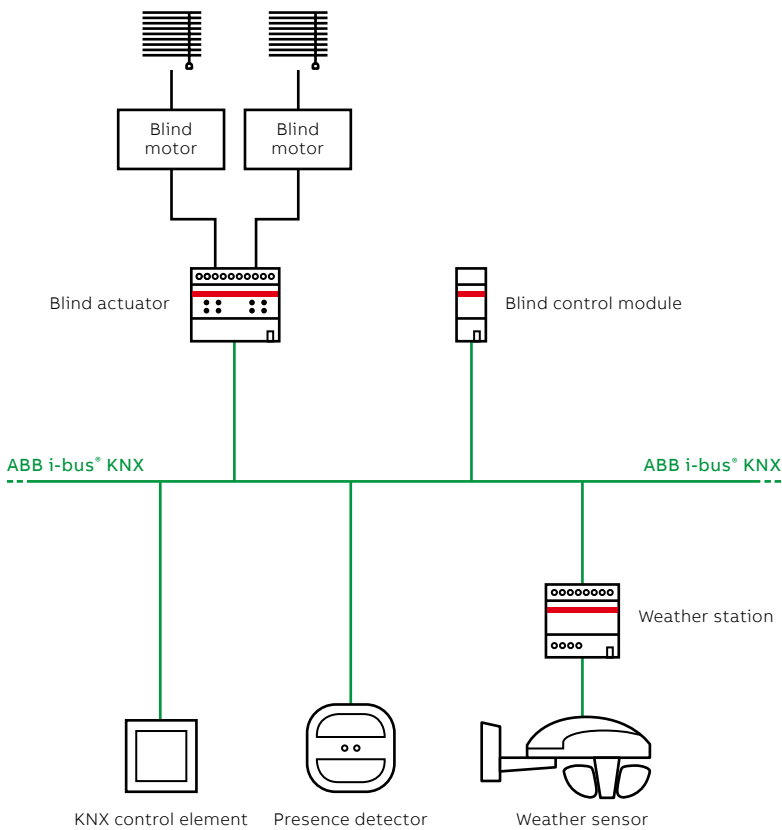
**Complete with ABB i-bus® KNX:**
- Roller shutters and window control
- Blind control with repositioning of slats
- Automatic sun protection
- Curtain and roller blind activation
- SMI interfaces



Blind motor

Blind motor

Blind actuator

Blind control module

ABB i-bus® KNX

ABB i-bus® KNX

Weather station

KNX control element

Presence detector

Weather sensor

**Planning success factors**
The sun is also an energy source for creativity at the workplace. The planner can also make an offer here, because ABB i-bus® KNX doses the sunlight in connection with the lighting control and the air conditioning, so that versatile light scenes fit precisely into the corporate culture. Efficiency due to new ideas.

**Increasing safety**
Consistent working conditions are essential for the value of an industrial or office building. Nothing should be disrupted or fail. This is how constant light control always creates the right conditions. If the blinds are moved up automatically during a storm, the other lighting factors simply adjust.

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# Building surveillance and personal protection
## Comprehensive safety

Only a 100% solution applies to protective measures. Uniform system technology is the first choice. One which combines all sensors and actuators into a smooth solution, and one which perfectly automates alarm functions while at the same time providing a clear overview. KNX dispenses with island solutions and creates a safe network instead.
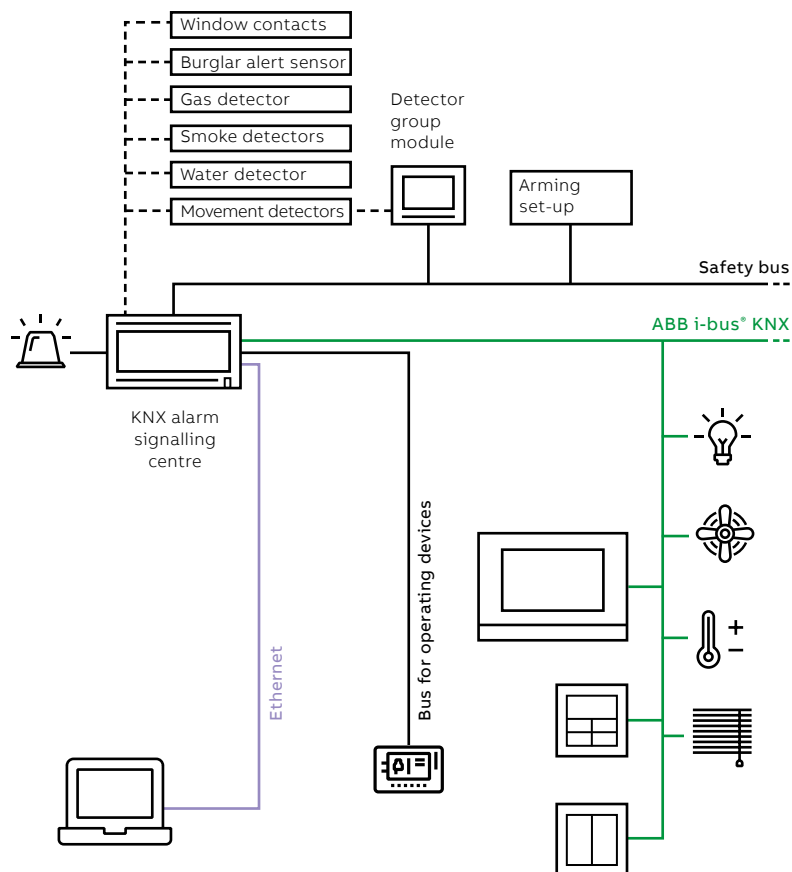


### Completing components
The ABB safe&smart system includes suitable components in ABB quality and with tested compatibility for all alarm and KNX functions – a practical combination of security technology and building systems technology. This means that in case of an alarm, the blinds are automatically moved up and the lights activated in the entire building.

### Networking functions
Safety thanks to KNX: operating devices at various locations allow full access to the system. This access makes it possible to trigger alarms, activate and deactivate the system, and activate various functions. One of these functions is the panic switch; here, in addition to the alarm functions, light and roller shutter drives can also be activated.

**ABB i-bus® KNX links safety:**

- Protection of persons and objects
- Door and window monitoring
- Fire and smoke detection
- Danger and burglary message
- Technical alarms
- Emergency signals
- Presence simulation

Window contacts

Burglar alert sensor

Gas detector

Smoke detectors

Water detector

Movement detectors

Detector group module

Arming set-up

Safety bus

ABB i-bus® KNX

KNX alarm signalling centre

Bus for operating devices

Ethernet

**Overview of live status**

The status of the system can already be seen during commissioning via tablet or web interface on the PC. The live status provides clarity. Errors, short-circuits or an overload of the system can then already be detected before installation is finished and rectified in time.

**Speed-up of commissioning**

The system can be set up and operated via a standard browser without any additional software. The current configuration of the alarm system is transmitted to the ETS via mouse click. The automatic scanning mode detects all system components that have already been connected to the bus. Nothing is overlooked.

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# Energy Management
## ABB Cylon® Active Energy Manager

Explore the energy operation of
your BEMS with Active Energy Manager.
Reducing energy use and making real savings is
impossible without good data on which to make
management and investment decisions.



**Active Energy Manager shows you how …**

- Energy alerts in real-time | Active Energy Manager issues alarms via email and social media (e.g. twitter) when it detects anomalies in expected consumption, putting you in control. Alarms can be viewed via the map-based interface, particularly useful for a quick overview of multiple buildings in multiple locations for bureau or monitoring centres. Analysis of historical alarms can help identify potential ongoing issues that require further investigation.

- Reports are an important tool for ongoing energy control by helping managers and key decision makers keep track of energy saving initiatives, verify if and where savings have been made, and when targets have been achieved. Active Energy Manager fully customized reporting feature generates instant or scheduled reports on energy consumption, costs, carbon emissions, performance versus targets, meter comparisons, as well as department or tenant costs reports.

**Easy to access and easy to use**
- Cloud-based
- Flexible multi-user access
- Ease of installation and use

**Benefits of ABB Cylon® Active Energy Manager**
- Save up to 25% on your energy consumption
- Extended monitoring and control helps you pinpoint and eliminate wasted energy
- Maximise the efficiency of your BEMS immediately and over the longer-term
- By encouraging behavioural change, you can save an additional 10% on your energy consumption
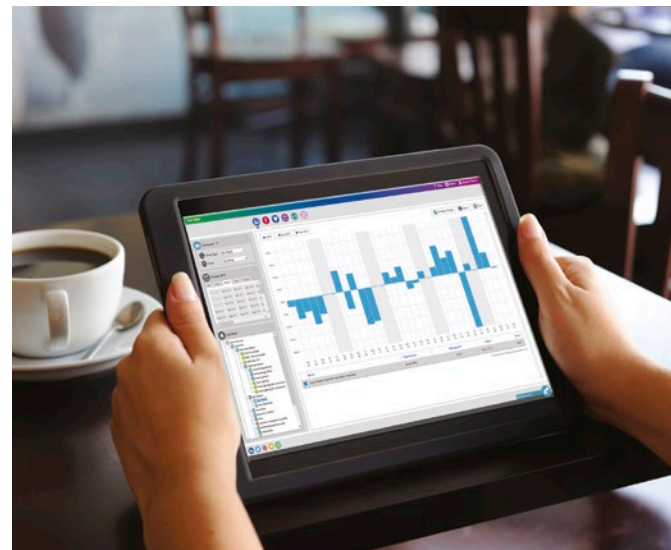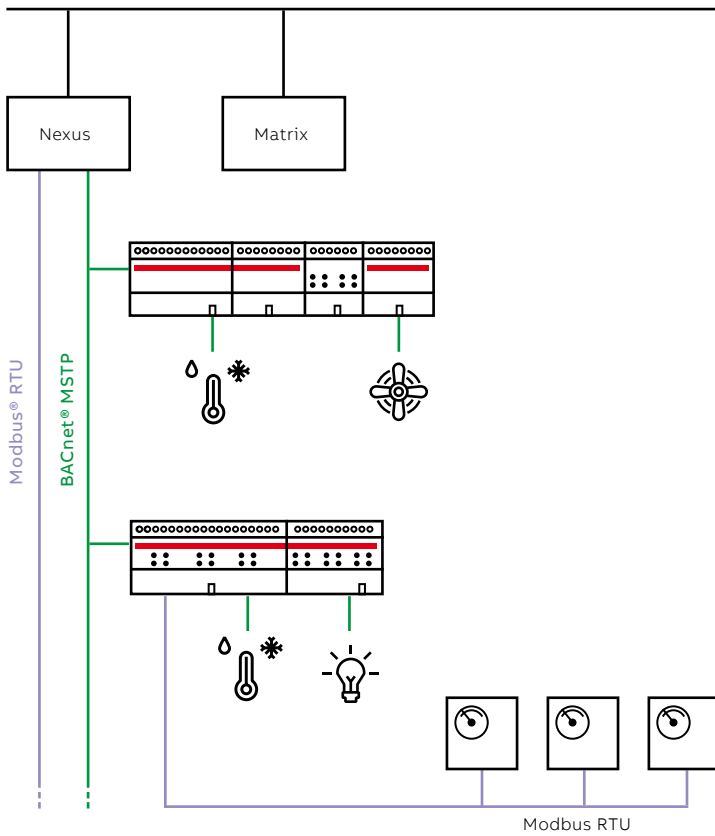


**Active Energy Manager**
Active Energy Manager focuses on BEMS analysis and energy management to analyse energy consumption and target savings, providing scope for energy efficiency improvements and continuous commissioning

- View actual normalised energy usage against patterns of expected consumption to identify the drivers of your energy consumption to produce information you can act on that will help deliver energy savings.

- There are no limits to the number of information points or geographical locations that can be connected to the system which make it an ideal central energy monitoring and management tool.

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## Operation and control
ABB Cylon Aspect® Building Control

More than a building management system, award winning Aspect® provides all the tools you need to gain intelligence into your buildings' performance and arm you with the ability to rapidly react to any situation that may adversely affect energy costs, business performance, and ultimately,
your bottom line.

**Seamlessly integrating buildings and business**
Aspect® allows users to view and modify information including trends, setpoints, schedules, and more from their Building Automation System on the fly with their iOS and Android web-enabled smart devices, as well as from any browser.

**Training**
End-users need very little training as the HTML5 interface follows familiar standard web practices. Site dashboards are easily user-customizable, allowing equipment, schedules, trends, and more to be added as favourites for quick access.
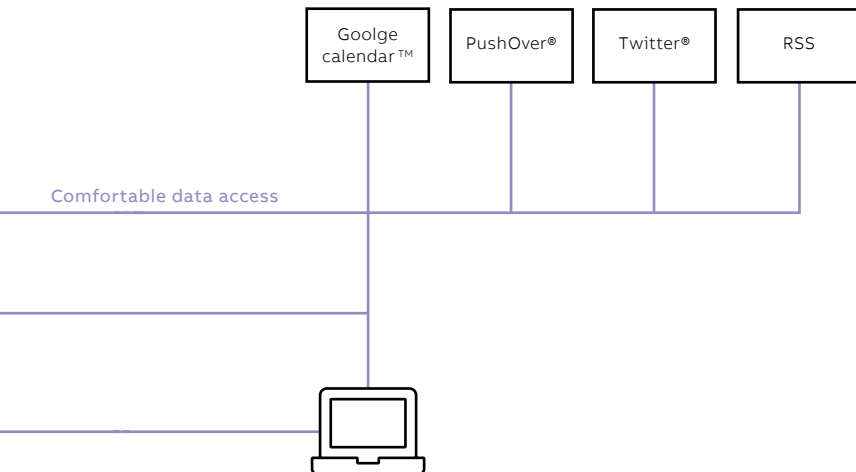
**ABB Cylon Aspect® Building Control**
- turn lights on
- schedule a meeting
- get a message on PushOver®

| Goolge calendar ™ | PushOver® | Twitter® | RSS |

Comfortable data access



**ABB Cylon Aspect®**
Aspect® also incorporates embedded scheduling tools, pre-configured application templates, push notification system, a professional embedded graphics library, and much more.
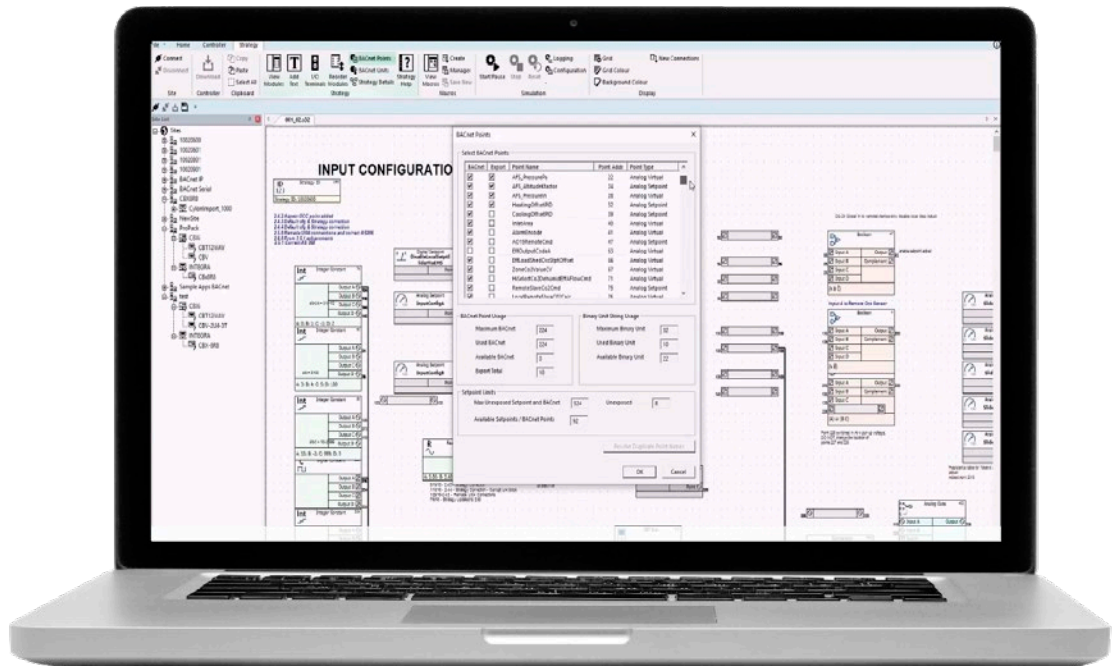
**System changes**
Once deployed projects can be modified and expanded via a browser for fast and convenient system changes without needing a dedicated software application.

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## Operation and control
ABB Cylon Integra™ Building Control

The Integra™ brings extended performance and notable improvements to help businesses take full advantage of IoT.



**Part of the dual platform offering**
With simple configuration, tool-less installation, enhanced integration and high-powered performance, Integra™ provides ultimate flexibility in connecting and controlling buildings worldwide.

**Software platform**
The Integra-Supervisor (IoT) software platform makes managing all buildings at an enterprise level possible, giving facilities managers the ability to quickly respond to problems and insights to optimize their system.

Integra™-Supervisor

IT-8000

Modbus® RTU

BACnet® MSTP
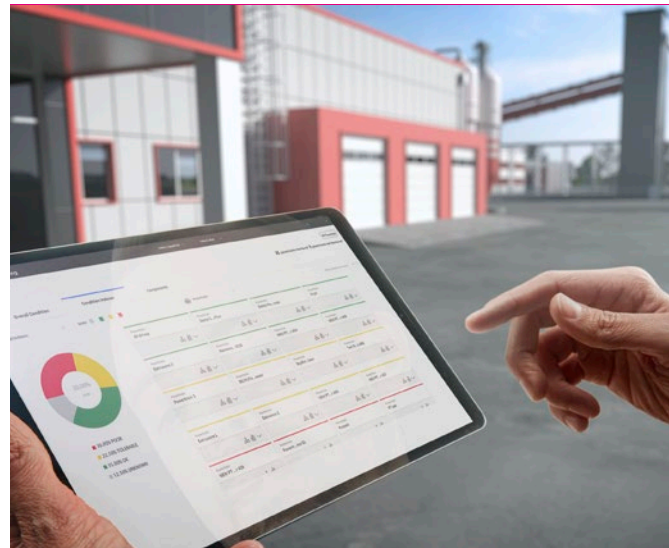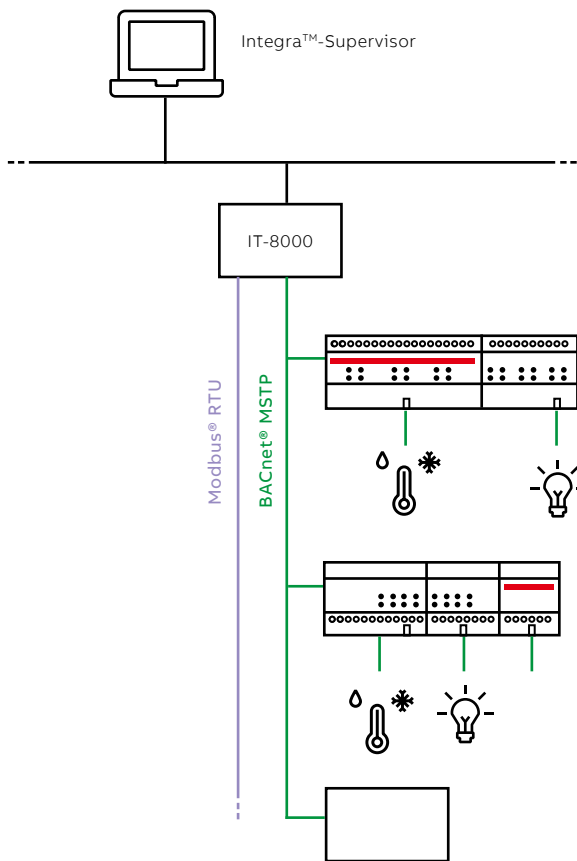


**Ultimate Flexibility**

- Remote connectivity allows control, monitoring, and management of field controllers
- Scalable hardware and software make it suitable for installation in small building to large campus applications.

- Integra™ uses Internet connectivity and web-serving capability to provide integrated control, supervision, network management, scheduling, data logging, alarming, and rich graphical displays through a standard Web browser.

Diversity is the new standard. ABB solutions are fully developed for this purpose and highly efficient. The flexible technology can be installed in every building and for all tasks. What is hidden to the user's eye is the constantly perfect connection between sensors and actuators, but what the user sees are modern control elements that achieve a new level of sensor technology. Its total use is greater than the sum of its functions.
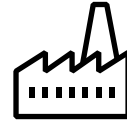
# Vertical market applications
## Integrated design

We deliver scalable, front-end building automation solutions, open protocol building controls, and cloud-based energy analytic tools to meet the need of today's high-performance, green-conscious facilities.
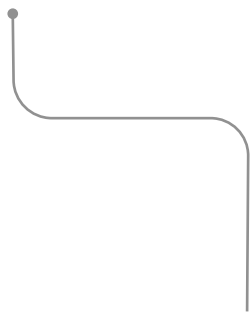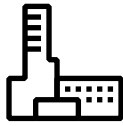
**Commercial Buildings**

**Data Center**

**Industrial
Buildings**

# **Products**
# Functions in top form

The details make the difference. Decades of the practical experience gained by electrical installers flow into every device, every user interface, every sensor and every actuator. Our product portfolio is always state of the art. The interaction between all parts allows components to be flexibly planned and brought into operation in a very short time. It is especially this that creates independence: one standard from a single source.

–
**Switch actuator**
Smart design: the return signal about the actual switching state of the connected loads creates transparency about the status of the building and facilitates maintenance.

–
**DALI light regulator**
Flexible regulation of light with the activation of up to 64 DALI participants in 16 light groups. Up to 14 light scenes can be controlled. With energy-saving constant light control and comprehensive staircase light function.

–
**Blind/roller blind actuators**
The automatic determination of movement time always ensures constant positions. Extended diagnostics messages prevent malfunctions. Integration into room temperature control helps to save energy.

–
**FBVi-2U4-4T**
The ABB Cylon® FBVi-2U4-4T is a freely programmable BACnet® Unitary Controller with native BACnet/IP communications support. The controller is BTL listed as BACnet Building Controller (B-BC) and is ideally suited for the control of Variable Air Volume zoning applications.
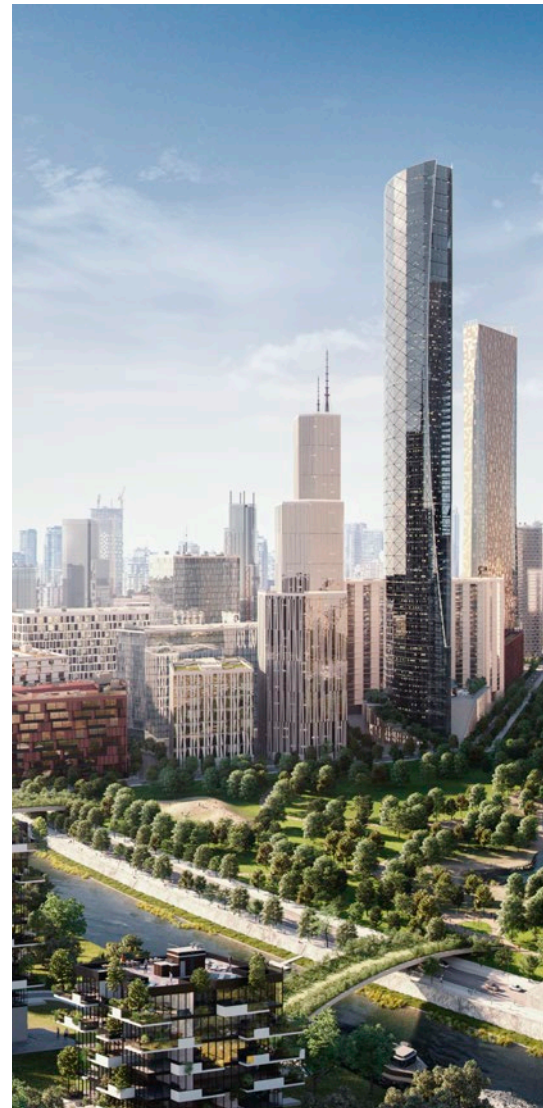
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**CBXi-8R8**
The CBXi-8R8 and CBXi-8R8-H are fully programmable IP-based BTL-listed (pending) BACnet® Building Controllers (B-BC) that support simultaneous multi-protocol communications including BACnet IP, BACnet MS/TP, Modbus TCP and Modbus RTU.

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**FLX-4R4**
This field Level eXpansion (FLX) module features 4 UniPuts™ with Relay and 4 Universal Inputs. The FLX-4R4-H version includes Hand/Off/Auto Local Override function.

**ABB**

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**http://new.abb.com/buildings**