



Intelligent Building Control Systems



Intelligent Building Control Systems and what they mean

A single control solution

KNX is designed to offer a complete building control system that enables optimal energy efficient interaction between different sub-systems. These include:

- Lighting Control
- Heating/ventilation control
- Climate control
- Shutter control
- Energy Management
- Central automation

The reasons why

KNX is the definitive building control system and the future for building management systems. Designed around the premise of both energy and economic efficiency, KNX holds the key to future building design. Its benefits include:

- Energy saving – Complete efficient regulation of all electrical systems from lighting through the heat management.
- Quick and simple adaptation of functions to meet specific needs.
- The building will be up-to-date and profitable in the long term
- Cost savings and efficiencies realized through the life time of the building

Why KNX?

The “KNX” bus system is the world's leading intelligent building control system.

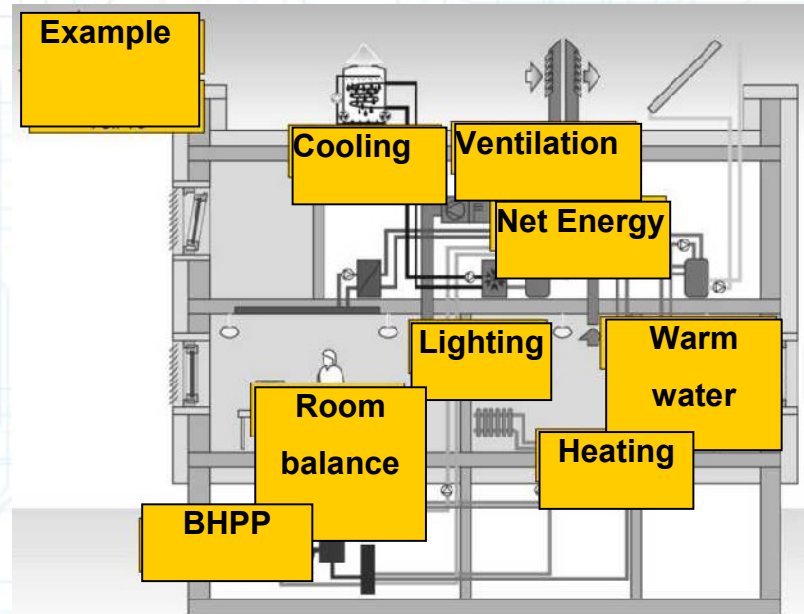
- KNX products are 'open standard' meaning they are created and supported by different manufacturers – all fully interoperable.
- KNX is the first globally standardised system for intelligent networking of electrical installations, standardised in EN 50090 and ISO/IEC 14543.
- Over 120 internationally certified manufacturers are organised in the KNX Association. This is ever growing in number.
- The system is constantly being enhanced and updated
- Only one common software package is required for the planning, project management and commissioning of all KNX installations.
- The ingenuity of KNX lies with its ability to streamline the various functional subsystems of a building and integrate them through a single communicating system.



What to expect

Economic Benefits

- Economic Efficiency – No other installation system makes it possible to run a building more efficiently.
- Individual room control for heating, ventilation, and air conditioning.
- Optimum lighting control for specific requirements.
- Intelligent shutter control.
- Ability to evaluate and regulate energy consumption of buildings.



Cost Analysis & Investment Benefits

What can you expect

Technology that will define the future of building services is always an investment that creates a return. Although the initial investment costs are greater than for a conventional installation these are offset by the functionality and ability of the system. In the longer term the cost relation turns around with significant savings made on energy and running costs.

Installation

A KNX system saves money from the outset when compared to a similar conventional system thanks to:

- Reduced installation costs
- More efficient commissioning
- Easier maintenance and troubleshooting through the processing of fault messages.
- Through presence detection and constant lighting control huge savings on lighting, heating and ventilation costs.
- Greater value and competitive advantages for buildings that contain intelligent building control systems.



Example

Lighting Control – Time Controlled

By means of time controlled switching (ON / OFF) of lighting in temporarily used rooms as well as in rooms with defined occupancy times **up to 10% energy savings** are possible in a reference building according to DIN V 18599 resp. EN 15232 in comparison to manual switching.

Time control can be realised using time switches, the Application Unit ABZ/S2.1, as well as the integrated timer function of the touch panels.

In an ABB i-bus® KNX installation the time controlled switching and dimming of any lighting can be realised without additional wiring expenditure.



Lighting Control – Presence Detection



Using automatic presence detection in corridors and in temporarily used rooms **up to 20% energy savings** are possible in a reference building according to DIN V 18599 resp. EN 15232 in comparison to manual switching (ON / OFF).

Switching ON and OFF or sending values can also be controlled in combination to ambient light levels.

Combining presence detection with time control allows:

- a guaranteed basic illumination for well defined periods
- different lighting control scenarios according to the time of day, e.g. presence dependant switching of the lighting for short periods at relatively low levels at certain times or higher light levels for longer periods, for example, during peak times.

Additionally, the life expectancy of the lamps can be increased by dimming down to a basic brightness instead of switching OFF completely during active periods.

Lighting Control – Presence + Brightness



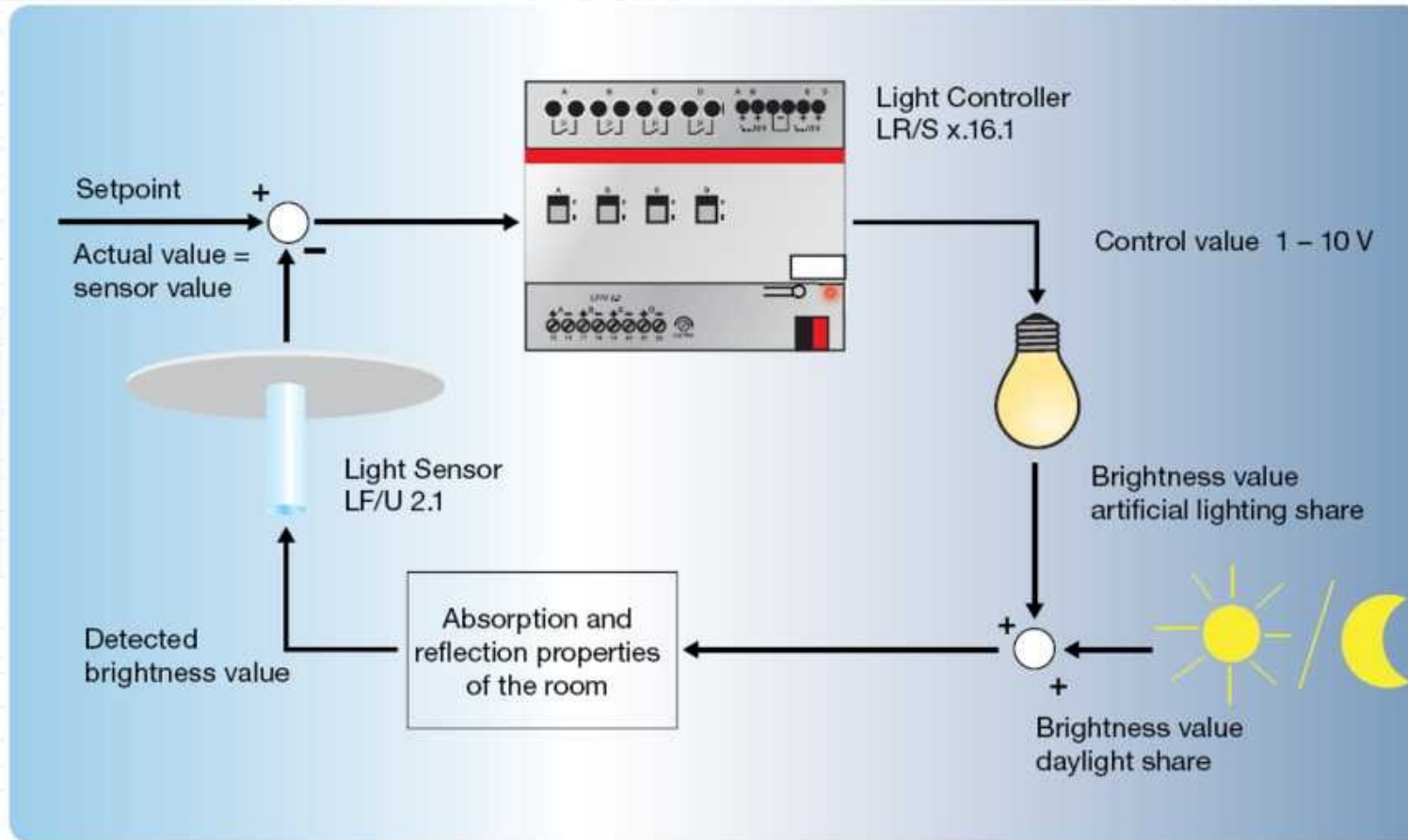
By combining presence detection and light control in accordance with outside light levels **up to 40% energy savings** are possible in a reference building according to DIN V 18599 resp. EN 15232 in comparison to manual switching (ON / OFF).

For lighting control in combination with outside light levels the Brightness Sensor HS/S3.1 or the Weather Unit WZ/S1.1 in combination with the Weather Sensor WES/A1.1 can be used.

Lighting control in combination with outside light levels is especially advantageous in conjunction with constant light in big production halls or gymnasiums.



Lighting Control – Constant Light Control



HVAC – Set Point Control via Presence Detection



Using time control to preset the set points for heating and cooling according to a 'room time schedule' **up to 10% energy savings** are possible in a reference building according to DIN V 18599 respectively EN 15232. This is in comparison to temporarily used rooms as well as rooms with well defined occupancy times in which manual control of the heating and cooling (ON / OFF) takes place.

By controlling set points for heating and cooling in individual rooms using presence detection **up to 25% energy savings** are possible in a reference building according to DIN V 18599 respectively EN 15232. This is in comparison to temporarily used rooms as well as rooms with well defined occupancy times in which manual control of the heating and cooling (ON / OFF) takes place.

It makes sense to combine the presence detection control with an underlying time and temperature profiles for the set points

Should the room become occupied presence detectors will change the set point from „stand-by“ to occupied, i.e. „comfort“

Reducing heating or cooling if windows are opened.

Automatic opening of windows for “night cooling” respectively automatic ventilation via air ducts.

Integration and Interaction of Application Fields



- Reducing heating or cooling if windows are opened
- Automatic opening of windows for “night cooling” respectively automatic ventilation via air ducts
- Integration of advanced heating / cooling automation into shutter control to maintain constant temperature
Set point „heating“ < Set point heat-/cool-automation
Set point „cooling“ > Set point heat-/cool-automation
- Combination of constant light control with shutter control in accordance with the sun’s position
- Reducing stand-by consumption by switching off consumers during night time respectively outside of working hours (especially IT-devices)
- By combining all efficiency measures energy savings of up to 50% for cooling purposes can be achieved

Amortisation of Constant Light Control



Seminar room of 100 m² with approx. 1400 W of lighting
(12 EVGs 2x58 W -> 1392 W)

41 weeks p.a. occupied for 5 h per day -> 2280 kWh
(41 x 7 -> 287 x 5 -> 1435 x 1,4 -> 2009)



At 15 ct/kWh the electricity costs are 342 € p.a. Using constant light control savings of 171 € p.a. (50%) are made.



Investment for the KNX devices

1/40	Power Supply	SV/S30.640.1	9 €
1/4	Light Controller	LR/S4.16.1	97 €
1	Light Sensor	LF/U2.1	64 €
1	Push Button Interface	US/U2.2	54 €
3/4h	Parameterisation and adjustment		38 €

262 €



The pay back period for the allocatable investment is around 1.7 years.

Amortisation of Constant Light Control



Office space of 100 m² with approx. 1400 W of lighting
(12 EVGs 2x58 W -> 1392 W)

52 weeks p.a. occupied for 9h per day -> 3276 kWh
(52 x 5 -> 260 x 9 -> 2340 x 1,4 -> 3276)



At 15 ct/kWh the electricity costs are 491 € p.a. Using constant light control savings of 245 € p.a. (50%) are made.

Investment for the KNX devices

1/40	Power Supply	SV/S30.640.1	9 €
1/4	Light Controller	LR/S4.16.1	97 €
1	Light Sensor	LF/U2.1	64 €
1	Push Button Interface	US/U2.2	54 €
3/4h	Parameterisation and adjustment		38 €

262 €

The pay back period for the allocatable investment is approximately 1 year.



Heating with Time / Temperature Profiles



Office space of 100 m² according to WSVO 1994 (Heat Insulation Ordinance), i.e., 100 kWh per m² and year

Calculated total consumption of 10,000 kWh p.a.



At about 8 ct/kWh (oil) the energy costs are 800 € p.a. Using time / temperature profiles savings of 80 € p.a. (10%) are made.

Investment for the KNX devices

1/40	Power Supply	SV/S30.640.1	9 €
1/4	Electronic Actuator	ES/S4.1.1	60 €
4	Valve Drives	TSA/K	32 €
1	Room Thermostat	RDF/A	195 €
1/2h	Parameterisation and Adjustment		25 €

			421 €



The pay back period for the allocatable investment is approximately 5 years.



Heating with Time / Temperature Profiles



Office space of 100 m² according to WSVO 1977 (Heat Insulation Ordinance), i.e., 250 kWh per m² and year

Calculated total consumption of 25,000 kWh p.a.



At about 8 ct/kWh (oil) the energy costs are 2000 € p.a. Using time / temperature profiles savings of 200 € p.a. (10%) are made.

Investment for the KNX devices

1/40	Power Supply	SV/S30.640.1	9 €
1/4	Electronic Actuator	ES/S4.1.1	60 €
4	Valve Drives	TSA/K	32 €
1	Room Thermostat	RDF/A	195 €
1/2h	Parameterisation and Adjustment		25 €

			421 €



The pay back period for the allocatable investment is approximately 2 years.



Building Types

Hospitals

- Hospitals demand high levels of reliability, security and efficiency from their electrical supply and infrastructure.

KNX offers a perfect, robust alternative to a conventional system but with the benefits of energy efficiency, error checking and tracing and centralised control. These benefits can be incorporated at the design stage and also allow efficient implementation and maintenance procedures to be devised..

- These benefits are integral to making considerable contributions to cost saving and preventing unnecessary energy consumption in day to day operations



Hotels & Office Buildings

- Hotels benefit from KNX systems through leading edge technology both in terms of integrity and monitoring capabilities.
- Efficiencies are achieved through the 'networked' system and it's ability give an immediate overview of all the rooms and systems deployed and the ability to react in case of malfunctions.
- Considerable energy saving benefits can be achieved by KNX along with the ability to streamline efficiencies. Lighting, climate control are the main areas where costs can be greatly reduced in both office and hotel buildings.
- These benefits visibly offer the consumer, client or tenant an attractive, competitive advantage.



Apartments

- The ability to accurately modify the living environment offers great comfort and control to individual wishes and makes KNX perfect for residential properties. Modern lifestyle functions like audio/video and Internet are all controllable through the KNX system.
- This ability to add comfort with huge cost savings for heating or ventilation adds value both for the investor or the resident.

Industrial Buildings

- Industrial buildings often contain large and expensive equipment and infrastructure. Lighting control and the reporting of machine malfunctions and monitoring are all within the capabilities of KNX.
- Bus lines can be integrated into local IT network and monitoring of the building and equipment can be centralised making facility management and maintenance simpler.
- These benefits once again offer efficiencies and savings in energy and maintenance costs.

