

e.control™ Room automation



Reducing **costs**
Increasing **flexibility**
Enhancing **comfort**



People take centre stage

Your building has to meet several requirements: Economical and environmentfriendly operation, flexibility of utilisation throughout its entire service life, while enabling easy and clear management. However, the most important challenge lies in giving your employees the maximum support to facilitate the performance of their tasks. With the focus being on the user, the rooms of your building assume an important central role as places where people reside. The person is literally surrounded in the narrowest space by lighting, sunblinds, ventilation, heating and cooling systems which are to provide a productive environment. To harmonise these systems in an expedient, energy-efficient and cost-saving manner, an integrated automation concept is absolutely imperative: the **e.control™** room automation system.

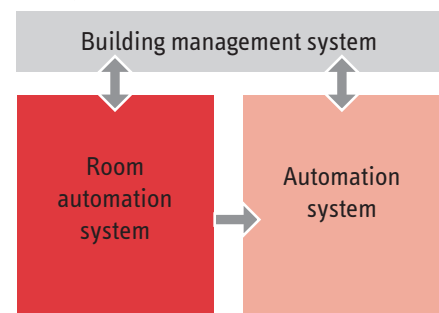
What does **e.control™** do?

e.control™ coordinates the lighting, sun-screening, heating, cooling and ventilation as a holistic room automation system. It thus replaces the traditional systems-oriented partial solutions and, thanks to its high integration, optimally attains the objectives of energy performance, flexibility of utilisation and productivity. By automatically ensuring a glare-free environment, high-contrast illumination of the workplace, a pleasant room temperature and sufficient amount of fresh air, **e.control™** ideally supports the user while he is present in the room. It goes without saying that **e.control™** always achieves these room conditions with a minimum amount of energy. For example, a tracking control system for the blind slats which is adapted to the position of the sun allows for maximum use of daylight while ensuring freedom from glare, thus minimising or, in fact, fully eliminating the need for electric light energy. In rooms that are not used, **e.control™** focuses exclusively on energy performance by switching off the lighting, reducing the air change rate, lowering the room temperature and using the sunlight to support the heating system.

Why is **e.control™** so important?

Only the **e.control™** room automation system is in a position to significantly reduce the energy requirement of a building in relation to the room occupancy and user behaviour by consistently avoiding the wastage of energy. With **e.control™**, lights switched on in unoccupied rooms or radiators glowing while the windows are open are now definitely a thing of the past. The energy requirement and, consequently the costs can thus be reduced by up to 50%. Thanks to this contribution, room automation has become the most important part of modern-day building automation and has the leading edge among the automation stations for systems control.



Room automation is the most important sub-system of building automation







What can e.control™ do for you?



The following checklist shows you which advantages the e.control™ room automation system offers in terms of energy performance, flexibility of utilisation and productivity. Does your building avoid wasting energy? Does your building allow variable room configuration? Does your building ensure optimum working conditions? Check for yourself how your building can benefit from e.control™.

Energy performance checklist	Your 	e.control™ 
Does the light get switched off on leaving the room?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Is the room temperature lowered on leaving the room?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Does the heating or cooling system get switched off when the room is aired?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Is the lighting dimmed or switched off with increasing supply of daylight?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Do your sunblinds operate according to the position of the sun to ensure utilisation of daylight?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Do your sunblinds support the heating system in the winter?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Do your sunblinds actively protect the rooms in the summer against overheating?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Does your automation system minimise the energy requirement of unoccupied rooms?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>

For further information on energy performance, refer to pages 4-5.

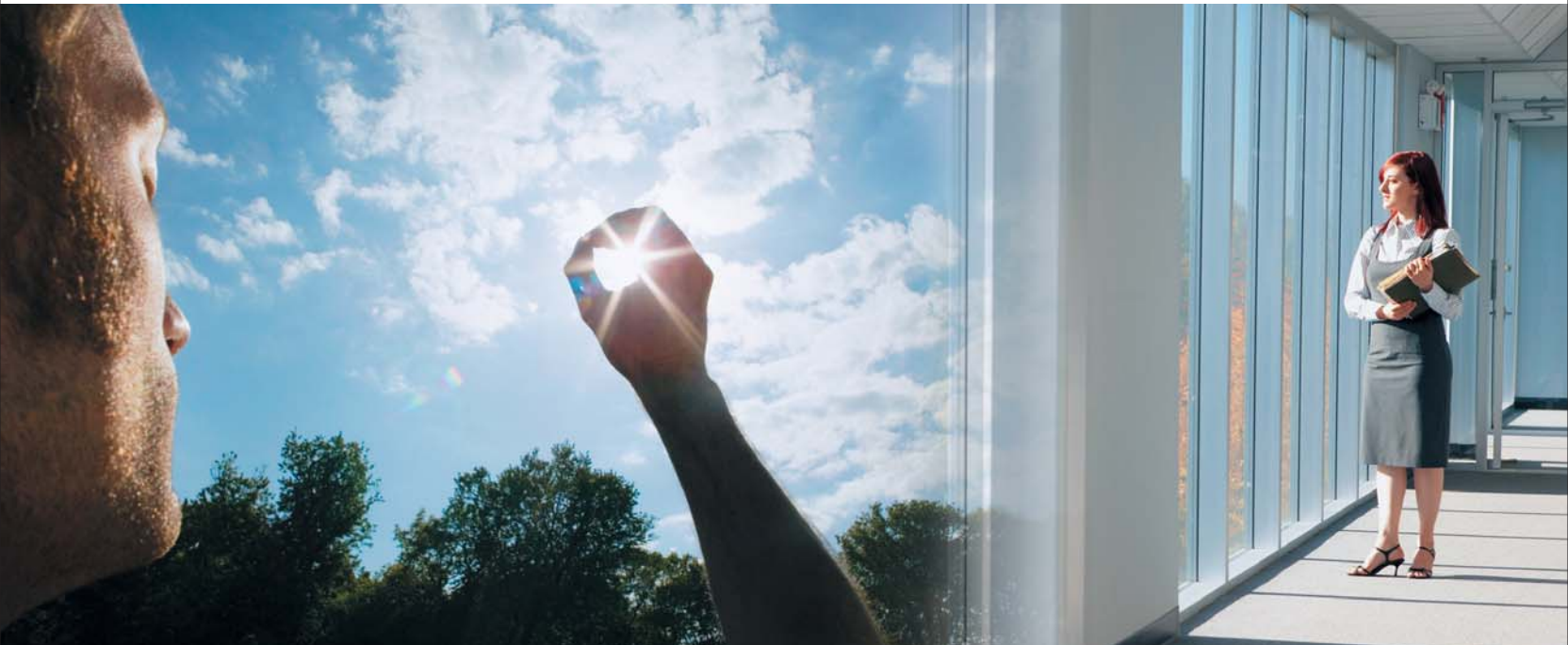
Flexibility checklist	Your 	e.control™ 
Can you change your room configuration without rewiring?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Can you make changes to your room configuration graphically on the computer?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Can you change functions by yourself on the computer?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Can you change the setpoints or parameters at the room level by yourself on the computer?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Can your automation system be extended flexibly and with modules?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Can new functions be added at any time?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>

For further information on flexibility, refer to page 6.

Productivity checklist	Your 	e.control™ 
Can you individually determine the temperature at which you feel happy?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Do your sunblinds ensure an unobstructed view while ensuring antiglare protection at the same time?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Is your workplace always sufficiently lit?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Does the ventilation system ensure sufficient fresh air despite high load?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Do your sunblinds protect against overheating even when you are absent?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Can you influence all these room conditions individually?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Do you have an integrated control device for all functions?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>
Can you also call up extensive scenes by pressing a button?	yes/no <input type="checkbox"/> <input type="checkbox"/>	yes/no <input checked="" type="checkbox"/> <input type="checkbox"/>

For further information on productivity, refer to page 7.





Energy performance

Saving energy has a future!

The energy consumption of buildings is becoming more and more relevant. With more than 40%, it constitutes the lion's share of the overall energy consumption in the industrial countries and has tremendous influence on the profitability of building operation due to the continuously rising energy costs. The saving of energy is becoming a major challenge, both socially and economically, when erecting and reconstructing buildings. Due to the high energy expenditure for air-conditioning and lighting, good insulation and a modern heating system are no longer sufficient. Saving energy, above all, implies avoiding wastage of energy! Cooling or heating a room with a window open, lights switched on despite sufficient daylight, heated but unused rooms are a sign of such energy wastage which constitutes over a third of the overall energy consumption even in today's buildings.

Energy performance functions to save lighting energy

Function*	Energy saved**	Positive influencing factors**
Constant light control (with occupancy sensor)	35 - 50 %	<ul style="list-style-type: none"> • Good supply of daylight • High illuminance (as of 300 lx) • Optimally with sun tracking control
Daylight switching (with occupancy sensor)	25 - 45 %	<ul style="list-style-type: none"> • Good supply of daylight • High illuminance (as of 300 lx)
Sunlight control	5 - 8 %	<ul style="list-style-type: none"> • Good supply of daylight
Sun tracking control	10 - 13 %	<ul style="list-style-type: none"> • Good supply of daylight • Optimally with constant light control
Calculation of shading factors	Project-related	<ul style="list-style-type: none"> • Good supply of daylight • Self-induced or externally induced shading
Automatic light	Project-related	<ul style="list-style-type: none"> • Low presence (e.g. in the hallways)

Energy performance functions for saving thermal and cold energy

Function*	Energy saved**	Positive influencing factors**
Mode changeover (per time program)	5 - 10 %	<ul style="list-style-type: none"> • Long operating time of heating system • Low building mass
Occupancy sensor	5 - 10 %	<ul style="list-style-type: none"> • Longer absence times • Low building mass
Window monitoring	5 - 10 %	<ul style="list-style-type: none"> • Low building mass
Sunblind thermo control	5 %	<ul style="list-style-type: none"> • Good supply of daylight
Summer compensation	Project-related	<ul style="list-style-type: none"> • Only saving of cooling energy
Free night cooling	Project-related	<ul style="list-style-type: none"> • Depending on air circulation
Twilight detectors for sunblinds	Project-related	<ul style="list-style-type: none"> • Reduction of cooling down depends on u-value of the sunblinds

* Room automation function according to LonMark definition, see page 8 ff.

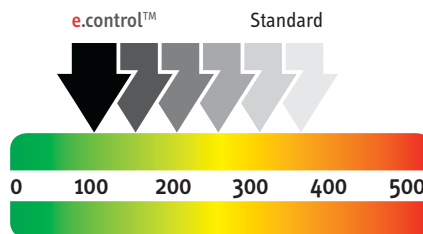
** Saving potential and influencing factors according to LonMark study from the University of Biberach

Avoid wastage

To avoid wastage in your building, an integrated room automation system like **e.control™** needs to be used. **e.control™** measures the necessary conditions in every room, such as room occupancy, temperature, brightness, window position etc. and then adapts the heating or cooling system, ventilation, lighting and the sunblinds to optimally suit one another. In this manner, the desired level of comfort in the occupied rooms as well as the readiness for operation of the unoccupied rooms is maintained with maximum economic efficiency. The LonMark study from the University of Biberach from 2007 proves that a room automation system such as **e.control™** can lower the energy consumption of your office or school building by more than 40% with the help of the integrated energy-efficient automation functions (see table and page 8 ff.).

Beneficial for the energy performance certificate

The energy performance certificate according to the EU Directive 2002/91/EC (EPBD) is the visible proof of the energy quality of a building for investors and tenants. A low value is an indication of favourable operating costs and greatest possible independence from the increasing energy costs. The energy performance documented in the certificate thus becomes a factor that determines the value of your building.



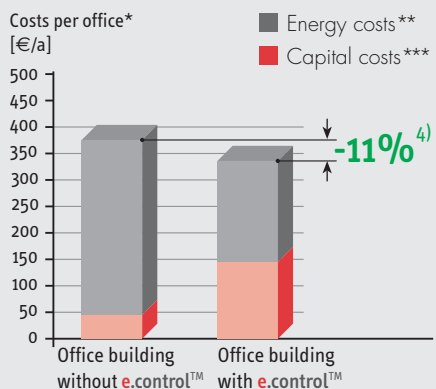
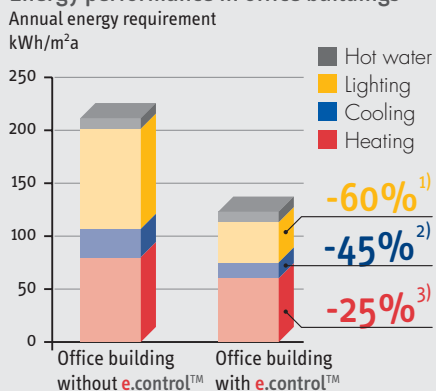
An **e.control™** room automation system is the ideal means of attaining a high overall energy performance. It is the only investment which also simultaneously reduces the need for all forms of energy and can simply be used in new or existing buildings. The investment costs are so low that they are amortised in just a few years.

e.control™ increases liquidity!

Whether an office or administrative building, teaching or school building, **e.control™** always represents a worthwhile investment thanks to the enormous increase in energy performance at comparably low costs. The comparison between a building with an **e.control™** room automation system and a non-automated office building shows capital costs that are € 100 higher per office and year as opposed to savings in energy costs of € 140 such that the overall saving is € 40 per office and year or 11% of the total costs. In school buildings, you see a similar trend. An increase of € 75 in capital costs per classroom and year vis-à-vis savings of € 150 in terms of energy costs, which corresponds to a reduction in the total costs of 16% (see charts).

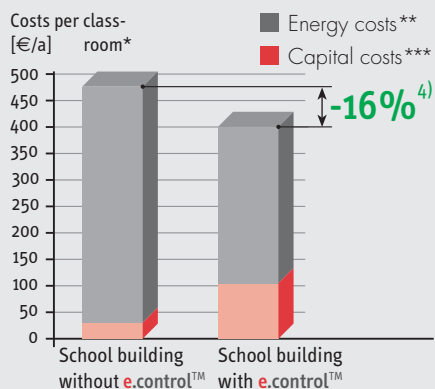
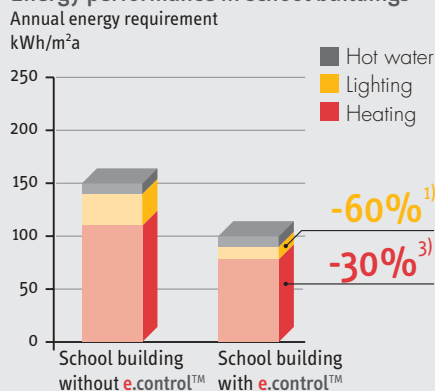
The comparisons show that **e.control™** not only makes your environment happy but also your cash flow.

Energy performance in office buildings



* Calculated with the help of the German electricians' guild
 ** EU average prices 2007: Electricity € 0.13/kWh and oil and gas € 0.06/kWh.
 *** Financing via annuity loans: 10-year duration, interest rate 5%

Energy performance in school buildings



* Calculated with the help of the German electricians' guild
 ** EU average prices 2007: Electricity € 0.13/kWh and oil and gas € 0.06/kWh.
 *** Financing via annuity loans: 10-year duration, interest rate 5%

Savings:

- 1) Saving on electrical energy with lighting
- 2) Saving on electrical energy with air-conditioning
- 3) Saving on thermal energy
- 4) Annual reduction in total costs



Flexibility

Nothing is as constant as change

You want your building to adapt itself to the changing requirements of different tenants and of new process and work organisations. The configuration and utilisation of the area also changes accordingly. For example, what was still an open-plan office yesterday is supposed to accommodate individual offices tomorrow. However, how flexibly can the installed technology keep up with this change? While in conventional technology this invariably results in a cable clutter and can by far not be achieved with most automation systems, in **e.control™** this is fully integrated: the maximum axis-related flexibility of utilisation.

Flexibility as a concept

e.control™ is the only room automation system which is designed from the outset in such a way that each building axis can be operated autonomously. The grouping of axes to rooms is carried out via software and can be varied by you at any time. Consequently, no

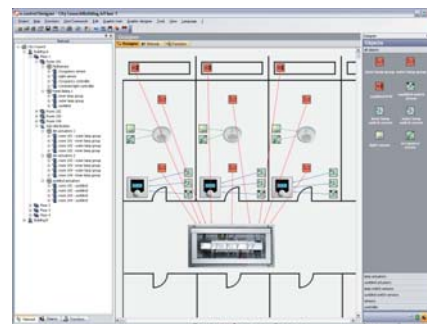
changes are required to be made to the hardware and cabling during the entire service life of the building, and both the conversion costs as well as the idle times can be clearly reduced. In addition, **e.control™** stands out because of an unattainably high functional scope (Page 8 ff.) which is perfectly suited to the axis-oriented flexibility concept.

Maintaining the overview

So that you as the owner can benefit from the advantages of flexibility, spega offers a revolutionary software solution with the **e.control™** Manager. The operation, the setting of parameters and even the re-designing of areas is conducted using a mouse on a planimetric graphical interface, completely dispensing with the need for specialist knowledge. Thus **e.control™** is the only system which gives you full control of all functions of your building.

Open for new things

e.control™ masters even the technical conversion of your building in course of time without any effort. The modular structure of system components makes it possible to easily replace actuators and sensors. For example, a switchable lighting can be upgraded to a constant light controller by replacing the switchable modules by dimmable ones and adding multisensors to the rooms. What's more, in the **e.control™** Manager you retain control also over the new functions.



With the **e.control™** Manager you can tackle all the changes in utilisation.



Comfort

Comfort implies productivity

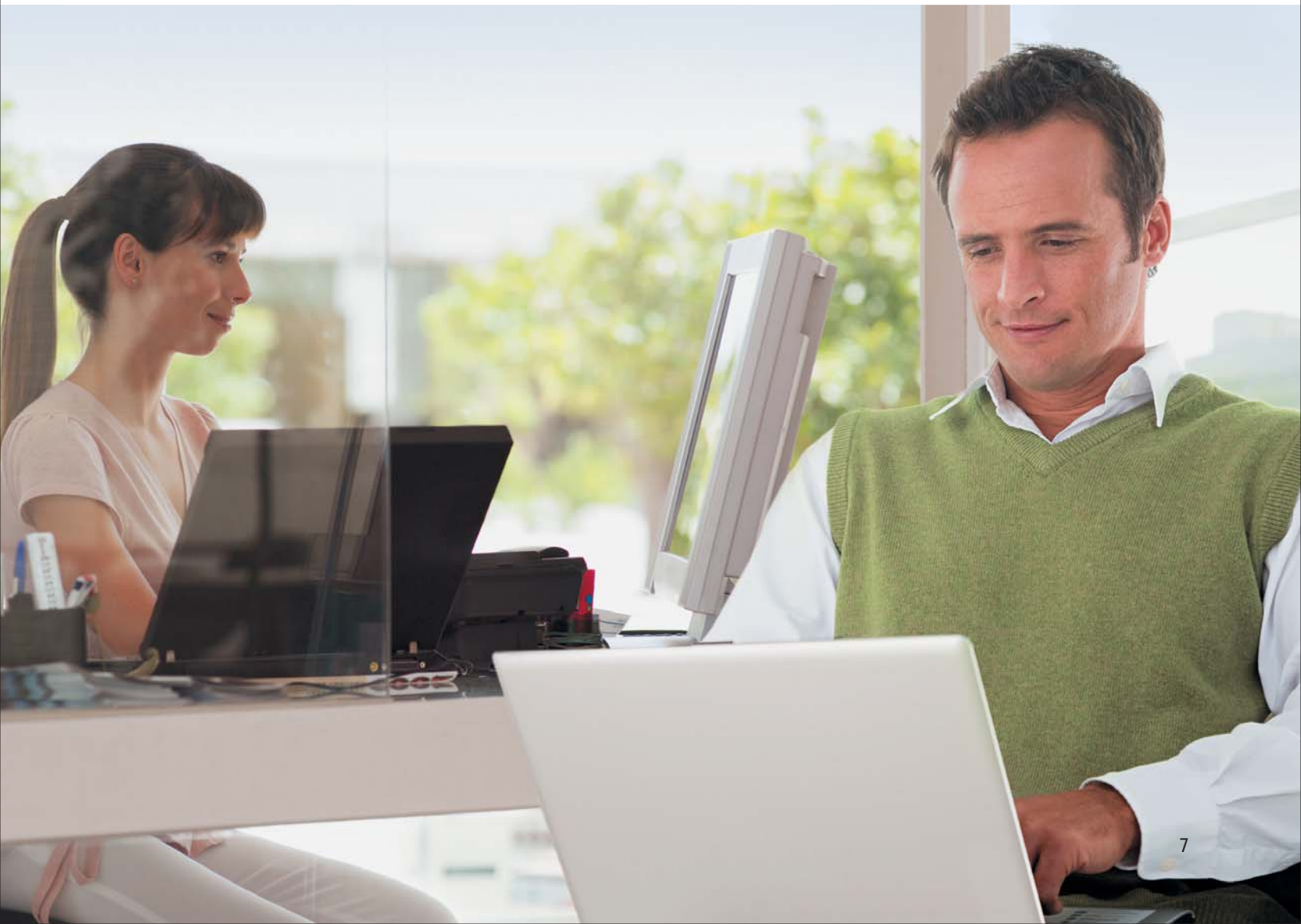
Your employees reflect the potential of your company and their readiness to perform constitutes the basis for success. Scientific studies show that already since the end of the sixties it has been possible to attain a 15% increase in productivity through an ideal working environment compared with average ambient conditions. These are primarily due to parameters which can be perfectly influenced by a room automation system like **e.control™**: lighting, temperature and the quality of air. This implies that a room automation system should be as much a natural part of an office as ergonomic furniture, also for reasons of productivity.

Focusing on employees' needs

For **e.control™**, your employees are what count: They can individually decide about the desired room conditions, for example, the room temperature. In the background, **e.control™** in parallel ensures glare-free working, sufficient illuminance and the maintenance of room temperature or the quality of air. In addition to all this comfort, the users have full control during their stay in the room because they can manually override every single function at the control device. This ability to individually influence the room conditions guarantees a high degree of acceptance and satisfaction.

Totally automatic comfort levels

e.control™ manages the sunblinds, the lighting, the heating and cooling system and the ventilation simultaneously and thus guarantees optimum comfort through correct tuning. For this purpose, even opposing requirements such as antiglare protection and daylight maximisation have to be solved depending on the room and weather conditions. This is something which only an integrated system can handle with success, a system which moreover also has functions that are perfectly tuned to one another, namely **e.control™**!





Unique scope of functions

With **e.control™** you have decided in favour of the cutting-edge room automation system with a unique scope of functions. All of them can be combined together and are optimally matched. Your building thus works exactly according to your wishes. That's guaranteed!

General **e.control™** functions

Time programs



The **e.control™** time programs can vary the room functions at specified times and adapt them to the room utilisation expected. Time programs for increasing energy performance, for example, adapt the operating modes of the room temperature controllers or switch off the lighting systems. Basically, all **e.control™** room functions can be switched on via time programs so that a vast range of user requests can be met.

Occupancy sensors



By means of occupancy sensors, e.g. in the lumina MS3 multisensor, **e.control™** automatically recognises the presence of persons. With this information,

the room automation functions for lighting, sunblinds or room climate control can be operated in a particularly energy-efficient manner.

Scene control



Certain settings for lighting, sunblinds or room climate functions can be jointly stored in **e.control™** in the form of scenes and called up at any time. The user can thus easily master the most complex room situations, for instance in conference rooms, by pressing a button. All **e.control™** devices serially possess a scene memory so that no special components are required.

e.control™ functions for lighting, antiglare protection and daylight utilisation

Constant light control



A sensor for detecting the brightness of the room, e.g. in the lumina MS3 multisensor, makes sure that the lighting level is precisely adapted to the task to be performed. **e.control™** offers the requisite

dimactable actuators for all standard lighting systems. Through optimum utilisation of daylight, the constant light controller in conjunction with the occupancy sensor is able to save more than 50% of the light energy.

Daylight switch

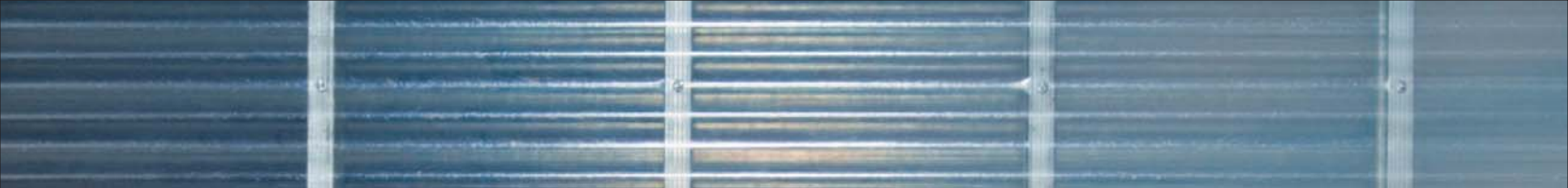


The "younger brother" of the constant light controller is used wherever the lighting is only of switchable design. Here too, a sensor is required in the room to detect the brightness. If the daylight is less than the required room brightness, artificial light is automatically switched on in one or two stages and switched off again when the proportion of daylight increases. Here also, the combination with the occupancy sensor is recommended. The saving potential is up to 45%.

Automatic light




In rooms without sufficient supply of daylight, for example, in hallways or in sanitary rooms, energy can be saved by just temporarily switching on the lighting. The occupancy sensor provides the




requisite sensor data for this. A settable cut-out delay allows for lighting comfort. The potential energy savings depend considerably on the frequency of utilisation.


Sunlight control

 Blinds, above all, guarantee glare-free workplaces and are therefore indispensable despite the unavoidable reduction in the daylight coming into the room. The **e.control™** sunlight control system in conjunction with a weather station makes sure that the sunblinds assume an adjustable antiglare position whenever a certain intensity of sunlight is exceeded. After the expiry of an adjustable delay period, the sunblinds move back automatically into the final position to ensure better supply of daylight in the case of cloudy skies.


Sun tracking control

 The **e.control™** sun tracking controller is the systematic further development of the sunlight control system. In case of high intensity of sunlight, the sunblind moves into a position which is cyclically adapted to the position of the sun. The supply of daylight is thus maximised by preserving the anti-dazzle function. From the point of view of energy, the combination with the constant light controller is recommended which continuously responds to the optimisation and can thus once again save more than 10% of the lighting energy.


Calculation of shading factors

 Surrounding buildings or parts of your own building produce shadows on the façades. This makes the anti-dazzle function unnecessary at times for the blinds which are in the shadow. The blinds should be kept open during this period for better supply of daylight. All **e.control™** sunblind actuators are therefore equipped with a system which calculates the shading factors and works in conjunction with the sunlight control or the sun tracking controller.

Twilight detector


 Whether for outdoors or indoors or for illuminating a building, the following applies: Light is only required when it gets dark. Since the time varies depending on the season, the twilight detector independently ensures that the light is activated at the best possible time. In addition to the lighting, the sunblinds can naturally also be positioned depending on the twilight.

Sunblind protection control

 The **e.control™** sunblind protection control functions take the wind right out of the weather's sails. High-precision sensors for temperature, rain, wind speed and direction ensure that the ombra W8 sensor unit always keeps an overview of weather conditions and protects the blinds from wind, rain or frost well in time. Motor-actuated windows are also included in the protection function.


e.control™ functions for heating, cooling and ventilation

Mode change-over


 To enhance the energy performance, the operating modes Comfort, Standby or Economy can be selected

individually for every room. Dedicated setpoints are allocated to these operating modes. A change-over can be carried out via time programs, manual operating buttons or occupancy sensors. A particularly energy-saving variation is to switch from Economy to Standby in the morning using a time switch. The function of the **e.control™** occupancy sensor is to increase the setpoints to the Comfort level. In this manner, more than 20% of heat and cooling energy can be saved.

Free night cooling

 Cool night air can be used for cooling down the room temperature if windows or shutters can be opened by motor-actuation or if there are fan coils with air intake flaps. The **e.control™** temperature controllers enable a decentralised free night cooling without additional devices.

Anti-frost protection

 To prevent damage by frost to the heating or cooling system, all **e.control™** controllers have a Building Protection mode and a separate frost warning system.



Window monitoring



In the event of windows being open, the **e.control™** window monitoring system automatically stops the supply of heating or cooling energy to avoid energy wastage. The condition of the windows is read via contacts and reported to the **e.control™** temperature controller. The savings attained amount to 10% of the heating and cooling energy.

Load optimisation



The use of the integrated **e.control™** system makes it possible for each mixer circuit to identify the room with the maximum energy requirement and to automatically adapt the inlet temperature to the load. This function eliminates losses of energy in the distribution system by means of a needs-oriented control system and thus replaces the traditional control by atmospheric conditions.

Sunblind thermo control



The sunlight entering through the windows produces heat input in the room which is either welcome or unwelcome energy depending on the room temperature. The **e.control™** sunblind thermo controller controls the sunblinds in unoccupied rooms. In this manner, overheating is avoided in the summer and the load on the heating system is reduced in the winter through solar energy.


Checklist:	Energy performance	Flexibility*	Comfort
General functions			
Time programs	●	●	●
Occupancy sensors	●	●	●
Scene control		●	●
Lighting/antidazzle/ utilisation of daylight			
Constant light control	●	●	●
Daylight switch	●	●	●
Automatic light	●	●	
Sunlight control	●	●	●
Sun tracking control	●	●	●
Calculation of shading factors	●	●	●
Twilight detector	●	●	
Sunblind protection control		●	
Heating/cooling/ventilation			
Mode change-over	●	●	
Free night cooling	●	●	●
Anti-frost protection	●	●	●
Window monitoring	●	●	
Load optimisation	●	●	
Sunblind thermo control		●	

* Functions are supported by the **e.control™** Manager also in flexible-axis systems.



e.control™ room control

Integrated control panel

 dialog 1 unifies all control and display functions in one device with easy handling and high-quality design. Pressing the button just once signals that the user is in the room, thereby automatically activating all of the functions related to the user's presence. The most important operating functions are directly accessible through favourites while other functions that are rarely used can be found in the menu. Thanks to the full adaptability of the menus, the device is ideally suited for office buildings with changeable room configurations and utilisation.




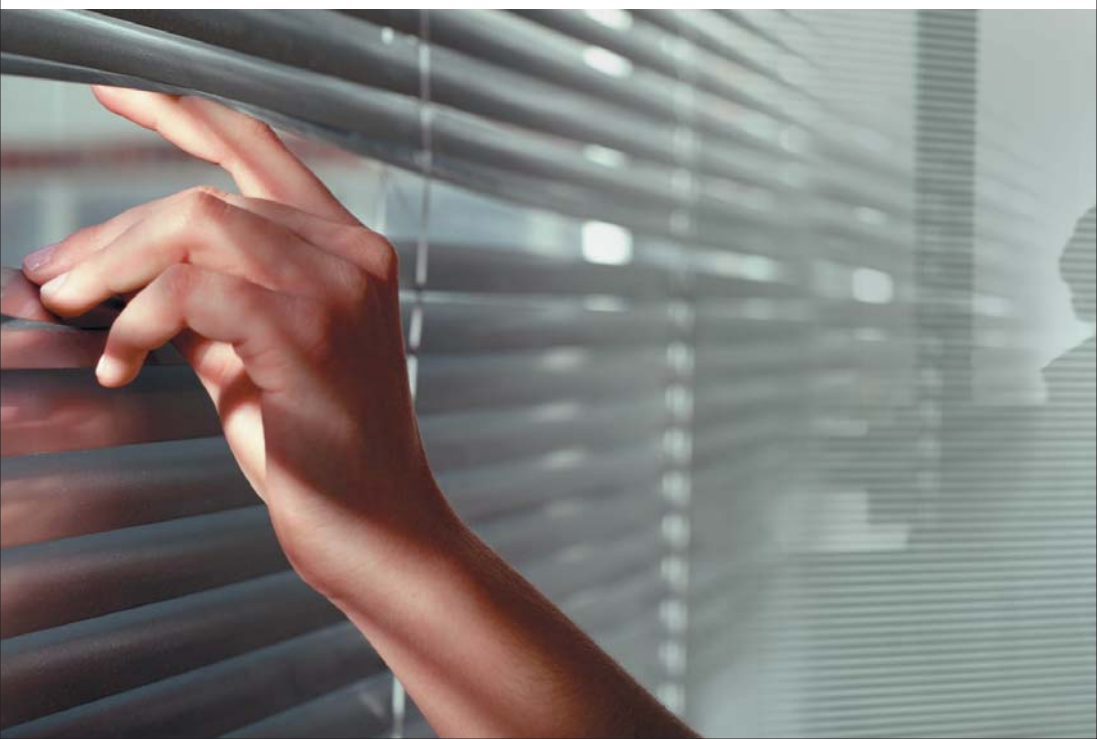
The dialog 1 room control panel combines the thermostat, light switch and operation of the blinds in one device.



The switches become intelligent with e.control™!

Conventional operation

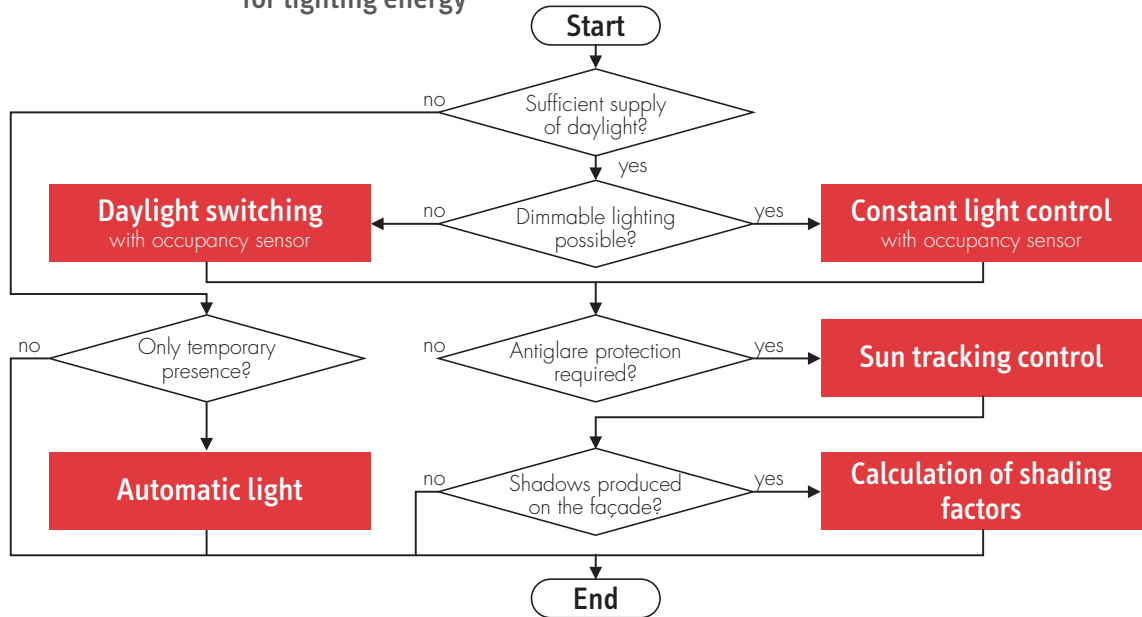
 The functional scope of the e.control™ room automation system can be operated also with traditional installation switches. The clima R2 room temperature controller and the lumina T6 binary input ensure that all switch programs of leading manufacturers are integrated in the e.control™ system. Hence, the lighting, sunblinds and the room climate can be operated by the users in the customary manner thanks to the familiar design.



e.control™ Room automation: Your decision for more energy performance



Performance check for lighting energy



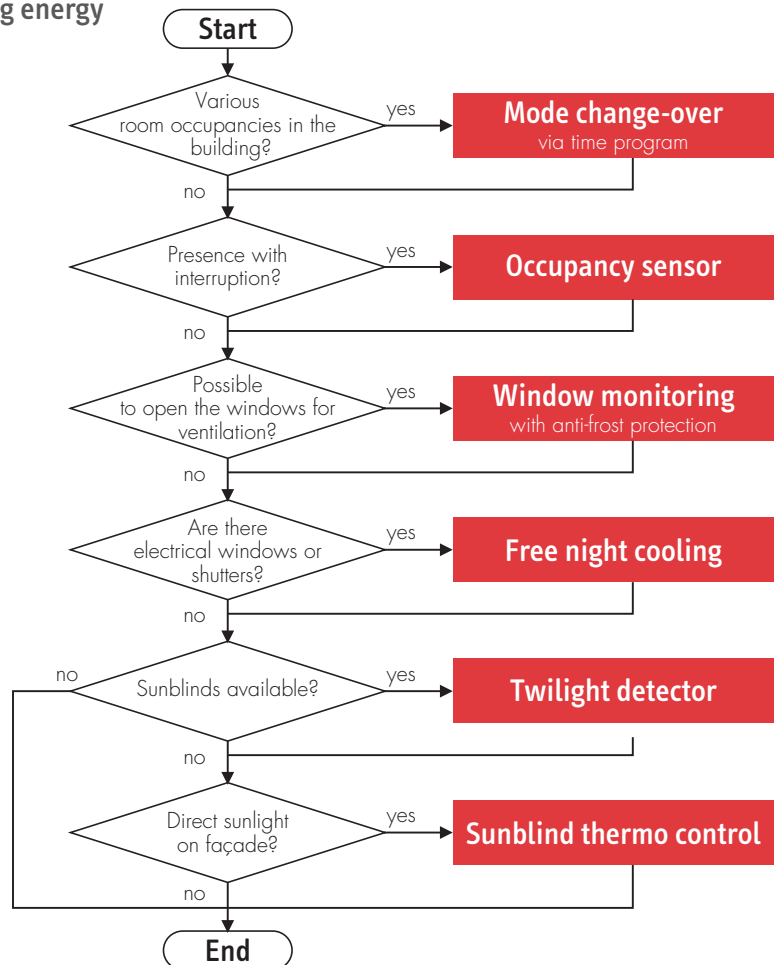
Now it's your turn!

Talk to your technical planner specifically about practical room automation functions for your building. The performance checklist provided here should help get you started and prepare you for asking the right questions. As every building project is unique, e.control™ too is not a finished package. On the contrary, it is a modular system on the basis of which your technical planner can put together the optimum scope of functions for you, also taking into account various installation conditions.

We at spega and our distribution partner regard ourselves as partners of the technical planner and the building owner. With our know-how and our planning-support services and tools, we wish to contribute towards ensuring that your building is perfectly planned, implemented and operated.

Take advantage of our experience and come and talk to us. We will be delighted to advise you.

Performance check for heating and cooling energy





Your local **spega** partner:



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