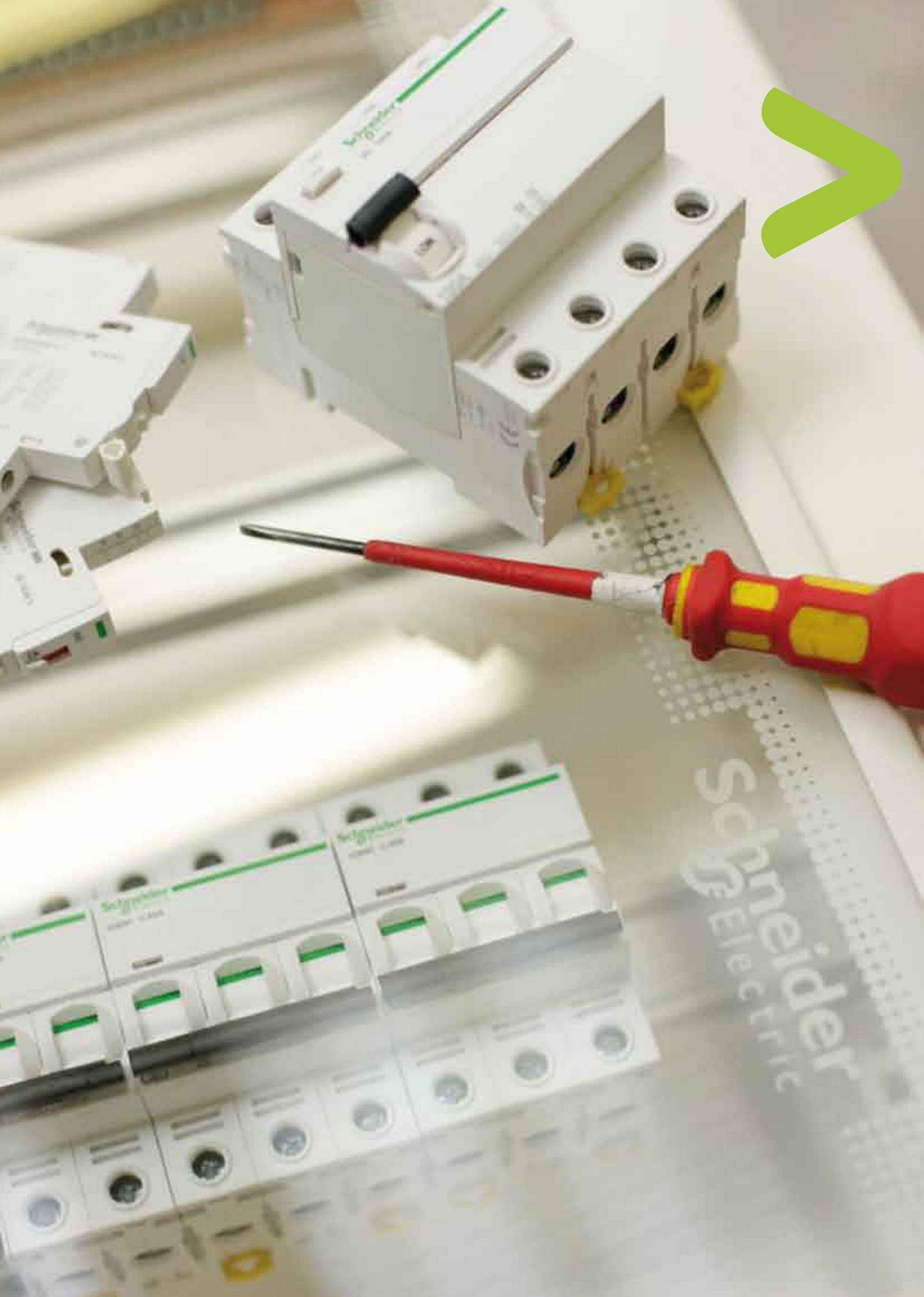


Load control and protection guide



**Simple solutions
for improving safety,
control and protection**

Schneider
Electric



General Content

Energy Efficiency challenge p. **2**

Lighting control
simple solutions p. **8**

Simple solutions for improving
safety, control and protection p. **48**

Energy, What is in our future?

50%

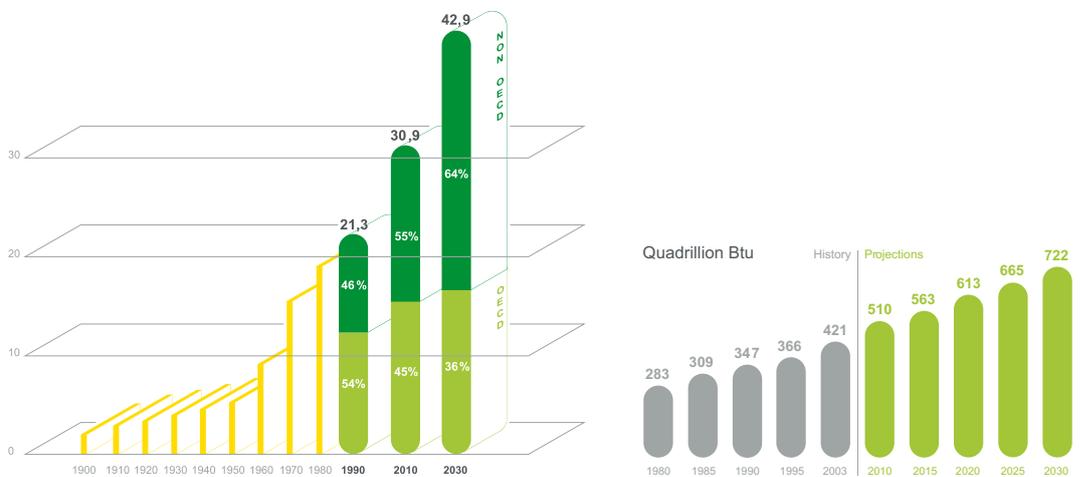
The required emissions reduction of GHG (Greenhouse Gas) to stabilize the greenhouse effect by 2050.

30%

Possible savings with today's technology that could reduce emissions or electrify the rest of the non electrified world.

Why the pressure on energy use will not go away

- World energy consumption has risen 45% since 1980. It is projected to be 70% higher by 2030.
 - Emerging markets (including China and India) account for more than 75% of new demand placing new pressures on global resources. Meanwhile, mature markets such as North America, Europe and Japan will also face increased demand and limited resources. These mature markets will continue legislating to reduce consumption, shift to alternative energy sources, and improve energy security.
 - Increased resources competition and political instability will cause oil and natural gas prices to remain at or above current levels for the foreseeable future. Coal will continue to be a cheap and plentiful resource especially in emerging markets. This will maintain pressure on reducing emissions and sustain the need for global climate change actions.
 - More than ever, global warming is at the top of the agenda. Environmental concerns and public opinion on climate change will drive continued actions by legislators, opinion leaders, and special interest groups forcing industry to respond.
- **The trends we see now will continue for the next 25 years.**



“ We must learn to adapt and manage energy consumption, energy costs, and pollutants.”



Prepare & Understand

30%

Energy savings in 2020
could avoid the construction
of 1000 new power plants.

We can all adapt to the new energy world

Energy use reduction and management will be a continued focus of policy makers. Key targets for future policies will be:

- ● Limiting final energy consumption in all sectors.
- ● Measuring and tracking energy use to establish benchmarks and targets.
- ● Promoting alternative green energy sources and technologies.
- ● Opening markets to promote emissions trading and demand reduction.

Buildings and Industry offer the largest and most accessible opportunities for savings.

Commit to understand the impact and opportunity in your business. Energy efficiency is the quickest, cheapest, cleanest way to extend our world's energy supplies.



Industry

- Over 30% of consumed energy.
- Motors account for 60% of the electricity usage.
- Average facility can reduce its energy consumption by 10 to 20%.



Buildings

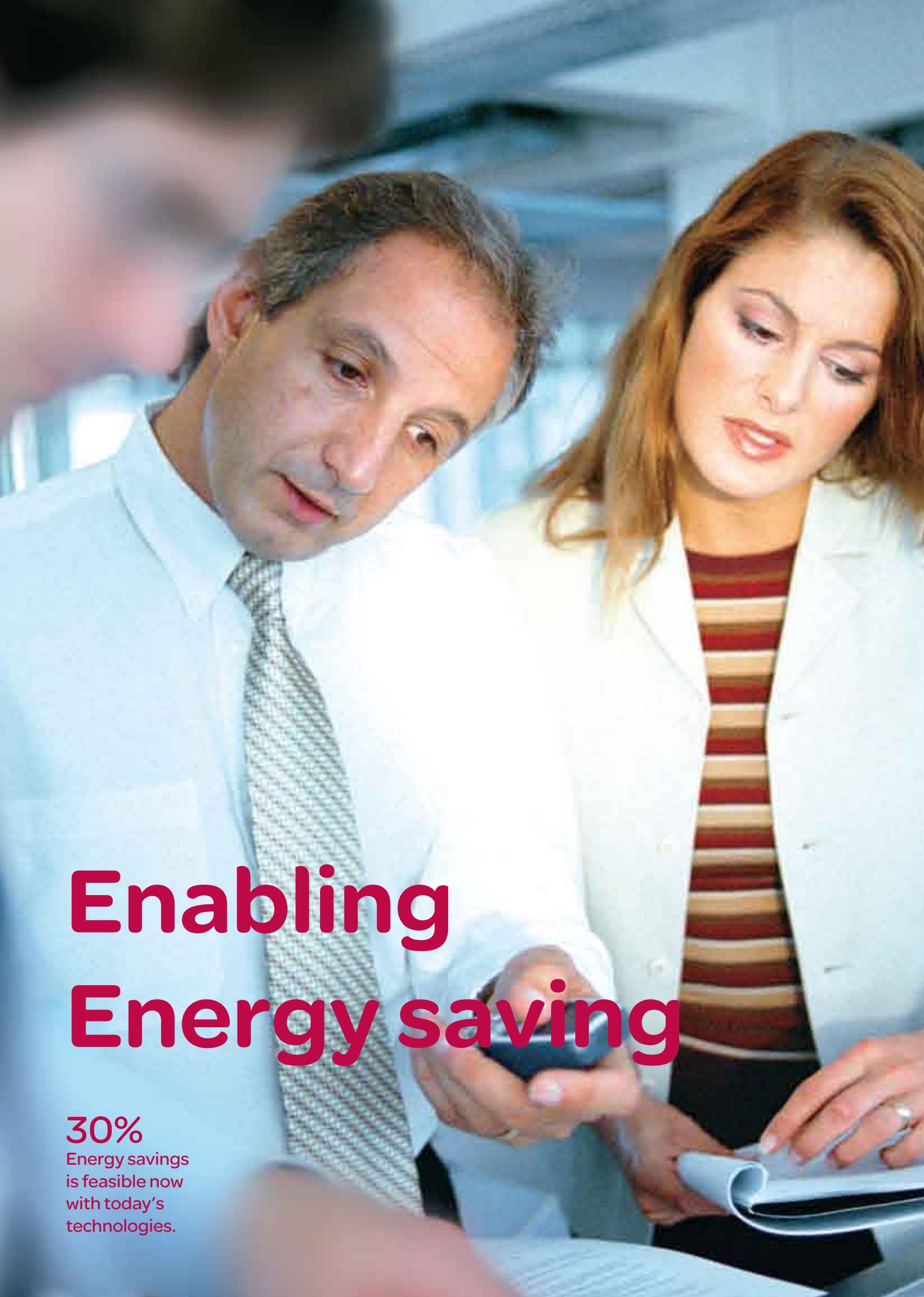
- Over 20% of consumed energy and going (EU & US).
- 3 key areas: HVAC, lighting & integrated building solutions.
- Technical projects can yield up to 30% of energy savings.



Residential

- Over 20% of consumed energy (EU & US).
- Using energy efficient products may save 10% to 40% electricity.

“Schneider Electric has made this commitment and we can help you.”



Enabling Energy saving

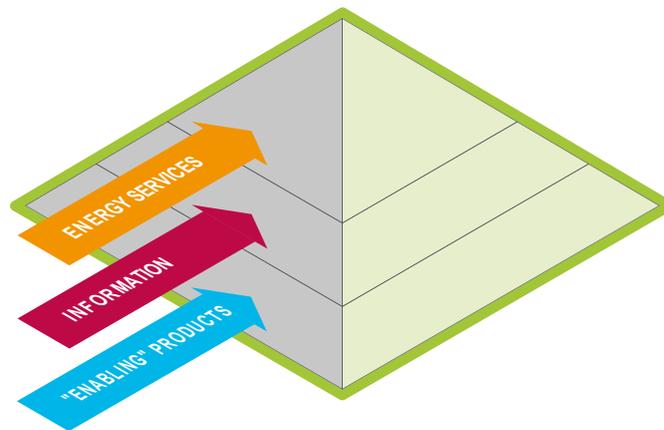
30%

Energy savings
is feasible now
with today's
technologies.

Solutions that enable and sustain energy efficiency

Our products & solutions are at every link in the energy chain enabling 10 to 30% or more in energy savings.

- Technology is crucial to achieving energy efficiency. Energy smart innovations will continue to have significant impact on enabling energy and emissions reduction.
- Information, expertise and knowledge are crucial to apply technologies in practical and economically feasible ways.
- Behavioral and procedural actions facilitate the ability initiate and to sustain all savings.



Help customers make the right decisions to manage energy.
Provide information that evokes confidence in decision making.
Technology & Solutions to enable sustainable savings.

Solutions & Knowledge

- HVAC, Ventilation, Fan control, Lighting control & management
- Pump, compressor control, Motor control & management
- Power management, Critical power solutions
- Facility management, Process optimization
- Energy Information services, Audits & Assessments
- Energy services...

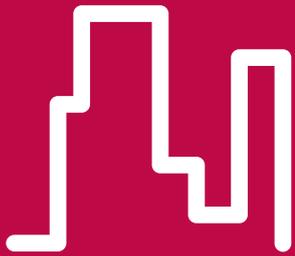
Enabling technology

- Metering, Monitoring & Control, Automation & Sensors
- Drives & motor control, Lighting control systems
- Building automation systems, Electrical distribution
- Power Factor Correction, Power Filtering
- Uninterruptible Power Systems
- SCADA, Information Systems
- Management Tools...

“Schneider Electric enables customers to make a difference!”

How to realize smart lighting control and energy saving?

Energy savings with Lighting Control



Lighting can represent
over **35%** of energy
consumption in buildings
depending on the business.

**Lighting control is one of the easiest ways
to save energy costs and one of the most
common applications!**

Content



Lighting Control simple solutions

Single circuit

Manual

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Manual

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Automatic

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Control from ON/OFF push-buttons



User/customer benefits

Ease of use: the zone's lighting circuit can be operated from several locations. It is well appreciated in corridors, staircases and large rooms.

Comfort: the impulse relay offers silent continuous operation compared to same application using contactors. The distribution board can be installed in quiet rooms (bedrooms, offices) without disturbing users.

Energy savings: when remote control is needed, the impulse relay is the equipment with the lowest self-consumption. This is due to the fact that energy is only needed to change its state from ON to OFF, OFF to ON. No energy is needed to maintain the ON state.

+ Functions - Installer advantages

- **The iTL impulse relay** closes or opens its contact every time a mains voltage pulse is applied to its coil terminals. The pulse is generated by depressing one of the push-buttons. All the push-buttons are connected in parallel.
- **Maintenance operations** are facilitated by the ON/OFF toggle with locking system on the front face of the impulse relay.

> Zoom on

iTL

Impulse relay!



iTL

For more details see catalogue.

Favorite applications

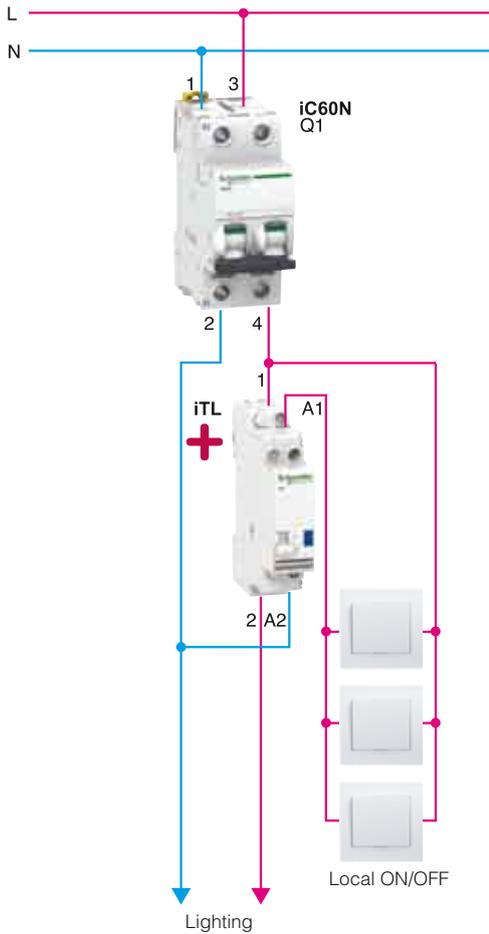
- hotel
- office
- etc



> Savings enabler

> Coil consumption of an impulse relay can be 50% lower than a contactor solution.

Solution diagram



Text for specifications

- The zone lighting shall be activated by several wall push-buttons. The OFF and ON states can be mechanically locked from the distribution board for easy maintenance.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C16 A	1	
iTL	Impulse relay 16 A	1	A9C30811
PB	Push-button	3	

Control from ON/OFF push-buttons with integrated status indicator



User/customer benefits

Energy savings, safety: room lighting can be activated and deactivated locally by users. At a central point (for example reception desk) the attendant can check the state of the lighting on the indicator and turn it ON or OFF in order to avoid wasting energy in case some users forget to switch off.

+ Functions - Installer advantages

- **Local push-buttons** activate the iTLs impulse relay.
- **The remote ON/OFF push-button** is simply connected in parallel with local push-buttons.
- **The lighting status** indicator is controlled by a dedicated auxiliary contact of the iTLs; a different voltage from the power can be used if necessary.
- **Space-saving:** the iTLs impulse relay saves space since the auxiliary contact is integrated. The overall width is still 18 mm.

> Zoom on

iTLs

Impulse relay!



iTLs

For more details see catalogue.

Favorite applications

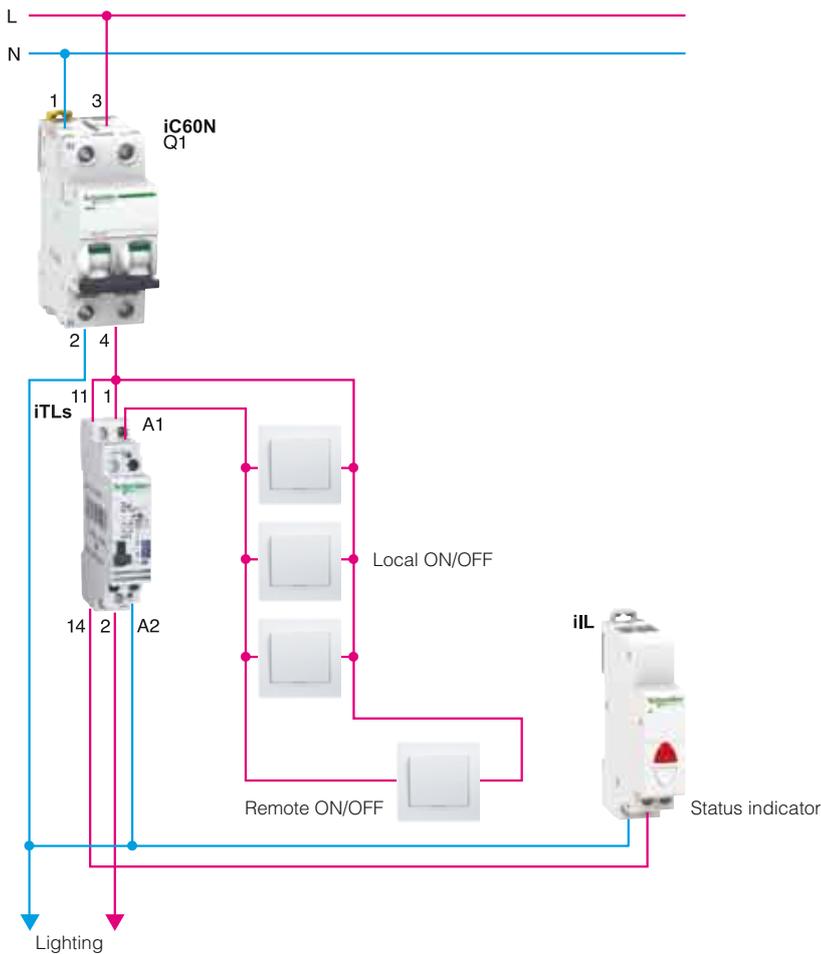
- hotel
- office
- etc



> Savings enabler

> Central ON/OFF push-buttons allow an energy saving of up to 15% on lighting circuit electricity consumption, depending on user's discipline.

Solution diagram



Text for specifications

- The room's lighting circuit shall be activated locally by push-buttons, and also from the reception desk, where a lighting status indicator shall be provided.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C16 A	1	
iTLs	Impulse relay	1	A9C32411
iIL	Red	1	A9E18320
PB	Push-button	4	

Control from two-way switch



User/customer benefits

Ease of use: the status of the lighting circuit is indicated by the position of the two-way switch. The switch can be remote from the illuminated room.

Comfort: the impulse relay offers silent continuous operation. The distribution board can be installed in quiet rooms (bedrooms, offices) without disturbing users.

Energy savings: when remote control is needed, the impulse relay is the equipment with the lowest self-consumption. This is due to the fact that energy is only needed to change its state ON to OFF, OFF to ON. No energy is needed to maintain the final state.

+ Functions - Installer advantages

- **The iTLm impulse relay** is quite similar to a standard impulse relay, except that it is actioned not by an impulse push-button but by a changeover switch. The iTLm closes or opens its contact every time a mains voltage is applied to its ON or OFF terminal. The voltage can be applied via an two-way switch or any contacts from a time switch or other device.
- **Facilitates maintenance operations:** the coil can be manually disconnected by a switch on the front face of the impulse relay.

> Zoom on

iTLm

Impulse relays!



iTLm

For more details see catalogue.

Favorite applications

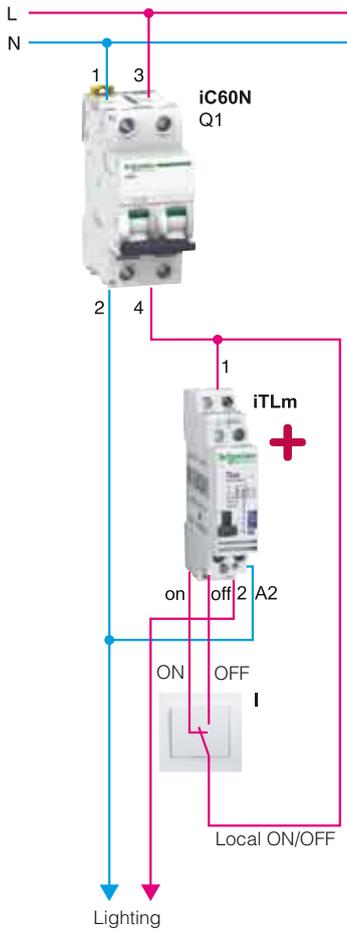
- hotel
- industry
- infrastructure



> Savings enabler

> Coil consumption of an impulse relay can be 50% lower than a contactor solution.

Solution diagram



Text for specifications

- The lighting in the zone shall be activated by an impulse relay controlled by a two-position switch. The OFF and ON states shall be indicated above the switch. The control of the impulse relay can be mechanically disabled for easy maintenance.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C16 A	1	
iTLm	Impulse relay	1	A9C34411
I	two-way switch	1	

Control from dedicated ON + dedicated OFF push-buttons



User/customer benefits

Safety: safe action, as the load is activated by a dedicated ON push-button, OFF with another push-button. Priority to OFF action when both push-buttons are depressed simultaneously.

+ Functions - Installer advantages

- **iCT relay:** closes its contacts as long as its coil is powered. The iACTs closes its contact simultaneously, so the ON push-button is then shorted and the iCT coil will remain powered when the push-button is released. Depressing the OFF push-button will stop the current and unlatch the coil.
- **Isolation:** the iACTs auxiliary contact is specific to the iCT control circuit (low current). Power contacts of the iCT relay remain available for load control (high current).

iACTs



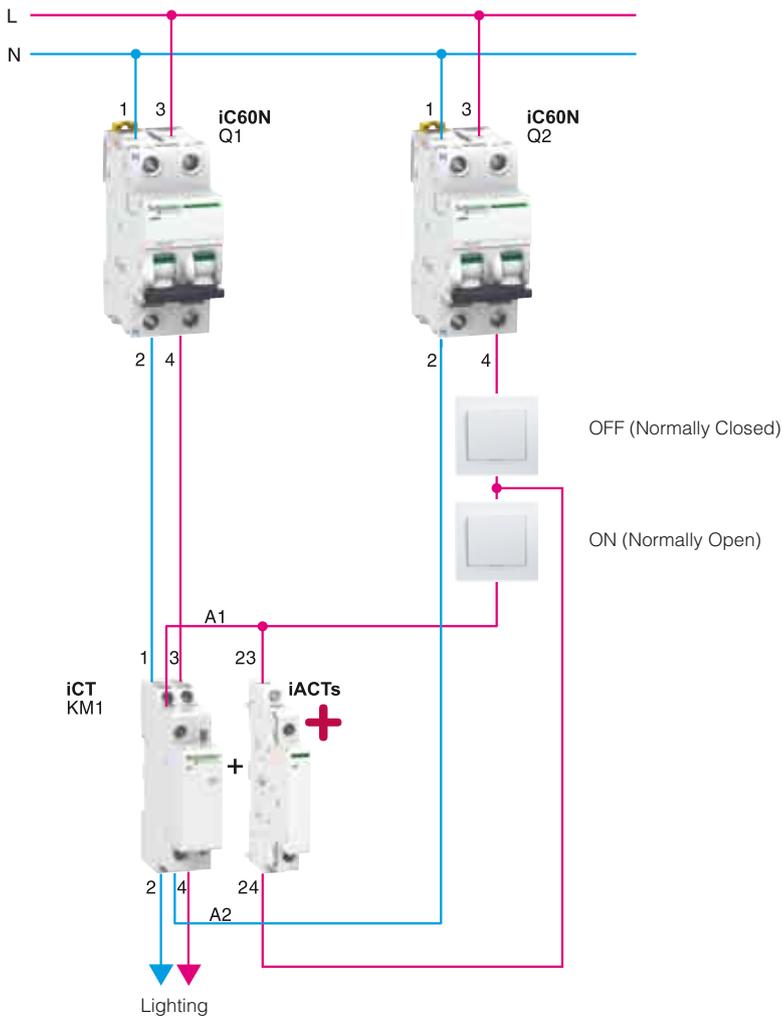
iACTs

For more details see catalogue.

Favorite applications

- hotel
- office
- etc

Solution diagram



Text for specifications

- The lighting shall be controlled by separate ON and OFF push-buttons, with priority to "OFF" if both push-buttons are depressed simultaneously.

> Products used

Product	Description	Unit	Reference
iC60N (Q2)	MCB 1P+N C2 A	1	
iC60N (Q1)	MCB 1P+N C16 A	1	
ICT	Contacteur 1P+N 25 A	1	A9C20732
iACTs	iCT auxiliary contact	1	A9C15915
PB	Push-button	2	

Automatic OFF after 1' to 10 h adjustable delay



User/customer benefits

Energy savings: some equipment (lighting, ventilation, heating, etc.) sometimes needs to be operated for a specific period only.

This solution provides automatic OFF after an adjustable delay, up to 10 hours.

Ease of use: the equipment is simply activated from a push-button.

+ Functions - Installer advantages

- **The iATEt auxiliary module** activates a iCT relay for an adjustable period of time, from 1 second to 10 hours. With this diagram the delay starts when depressing the push-button. Another press of the push-button starts a new timing cycle but no OFF. Other delay scenarios are possible with different iATEt wiring methods.
- Direct connection on iCT: by means of sliding switches integrated into the iATEt.

> Zoom on

iATEt

Multi-function auxiliary timer!



iATEt

For more details see catalogue.

Favorite applications

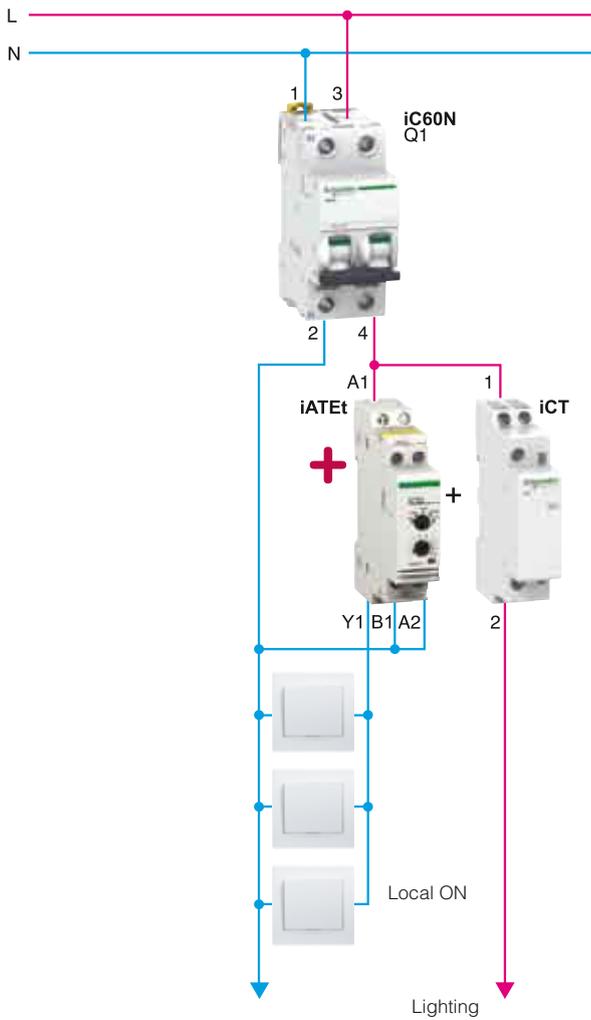
- hotel
- office
- etc



> Savings enabler

Allows an energy saving of up to 10% on lighting circuit electricity consumption, depending on user's discipline.

Solution diagram



Text for specifications

- The lighting shall be operated manually ON from several push-buttons. A long-delay timer will turn it off after a programmable delay of up to 10 hours. Each press of a push-button will reset the timer.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C25 A	1	
iATEt	Multi-function auxiliary timer	1	A9C15419
iCT	Contactor 1P 25 A	1	A9C20731
PB	Push-button	3	

ON/OFF according daylight - sensor-free



User/customer benefits

Energy savings, safety: outside lighting is automatically activated and deactivated according to the position of the sun. The sun position is detected by means of an astronomical time switch that takes the seasons into account.

As a result, outside lighting is only used to ensure safety around the building, without wasting energy. Extra savings can be achieved by providing lighting only on working days.

+ Functions - Installer advantages

- **Maintenance free:** the IC Astro offers similar functionality to a twilight switch but does not require a light sensor. Therefore, no cleaning and no replacement due to vandalism are required.
- **Easier installation:** than for a twilight switch since wiring for a light sensor is no longer required.
- **Geographical optimization:** sunrise and sunset times can be adjusted to take into account the local longitude, shading from higher buildings, nearby cliffs, etc.
- **Extension:** an override 230 V AC input is provided in the IC Astro. An external switch will provide ON override for testing during maintenance operations.

IC Astro

Astronomic programmable switch!



IC Astro

For more details see catalogue.

Favorite applications

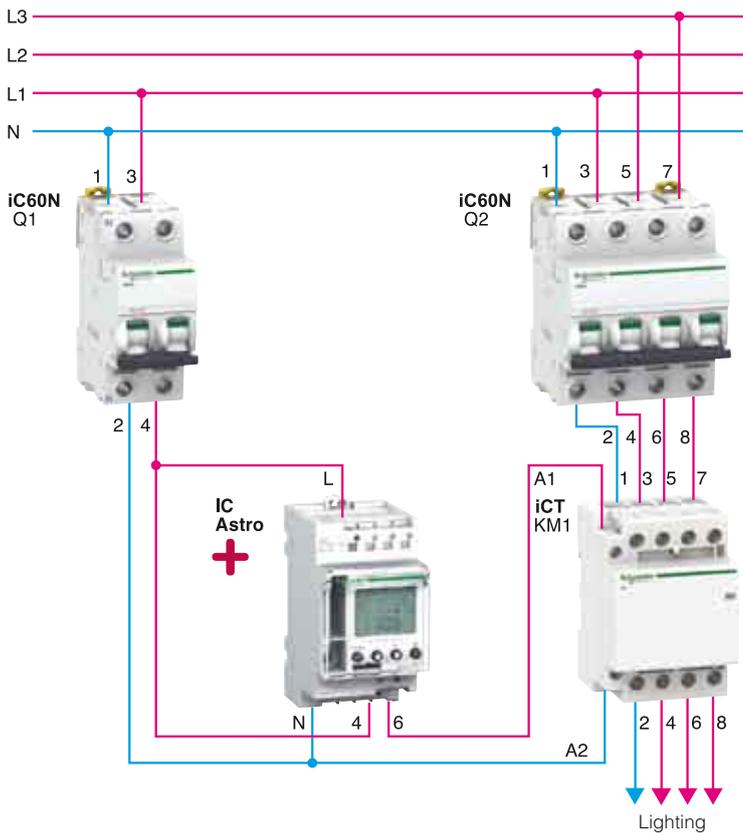
- hotel
- office
- etc



> Savings enabler

> Up to 25% energy saving can be expected, depending on settings.

Solution diagram



Text for specifications

- Outside lighting shall be controlled by a time switch taking into account local sunrise and sunset hours.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C16 A	1	
iC60N (Q2)	MCB 3P+N C25 A	1	
IC Astro	Programmable astronomical twilight switch	1	CCT15223 ⁽¹⁾ , CCT15224 ⁽²⁾
iCT	Modular contactor 3P+N 25 A	1	A9C20834

(1) English, French, Spanish, Portuguese, Hungarian, Polish, Romanian, Czech, Slovak, Bulgarian, Greek, Slovene, Serbian, Croatian languages.
 (2) English, French, Italian, German, Swedish, Dutch, Finnish, Danish, Russian, Ukrainian, Latvian, Lituaniien, Estonian, Turkish languages.

> Lighting Control

ON/OFF according daylight and presence with override



User/customer benefits

Energy savings, safety: people movements are detected and if light is required it will come on automatically and turn off after a while when they have left. This saves unnecessary lighting and improves safety, since there is no wall switch to look for in the darkness.

Flexibility: a two-way switch at the reception desk (for example) provides a continuous ON override option for special occasions

Sensitivity: a presence detector is much more sensitive than a movement detector (PIR). It will detect the slightest movement.

+ Functions - Installer advantages

- **The PIR** activates a relay for higher power handling. Sensitivity is adjustable for taking into account the natural light, as is the timer for the ON state delay after the last movement is detected.
- **The two-way switch** provides the option of continuous supply of the relay.

> Zoom on

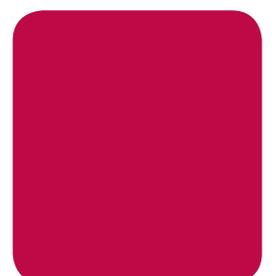
Argus Presence

Presence detector!



Argus Presence

For more details see catalogue.

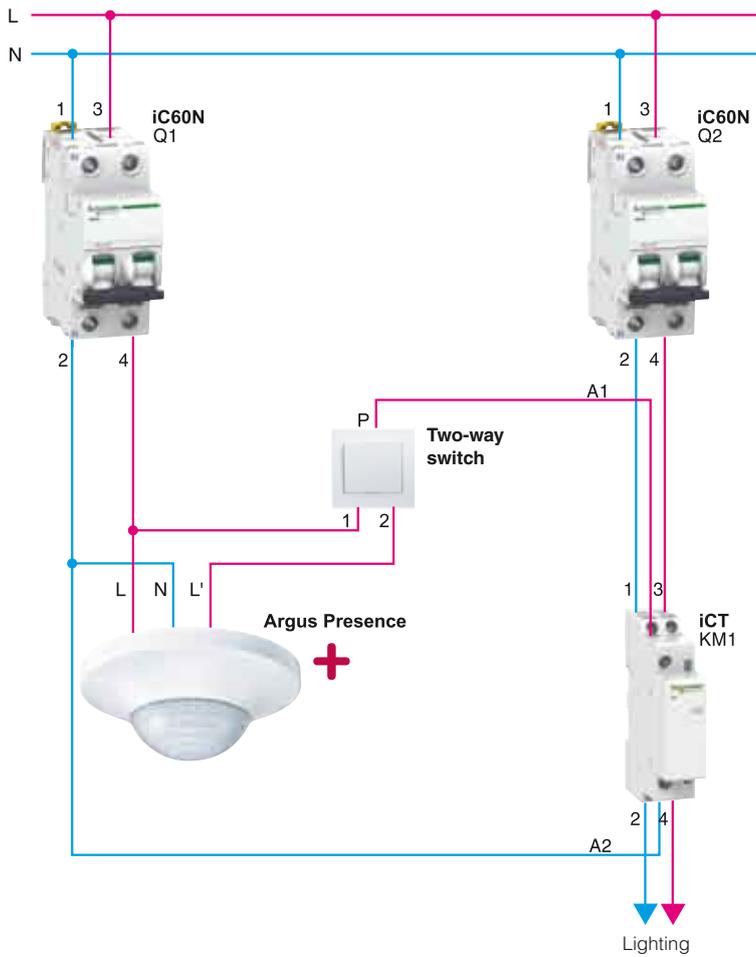




> Savings enabler

> PIR enables 20 to 80% savings on lighting circuit electricity consumption, depending on adjustment and flow of persons.

Solution diagram



Text for specifications

- The zone lighting shall be activated by movement detection, taking into account the natural light.
- The lighting can be set continuously ON from a remote switch.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2)	MCB 1P+N C32 A	1	
Argus Presence	Presence detector	1	MTN 550590
iCT	Contacteur 1P+N 25 A	1	A9C20732
Two-way switch		1	

Centralized ON+OFF push-buttons with local ON/OFF



User/customer benefits

Energy savings, safety: the lighting for each zone can be activated and deactivated locally by users. At a central point (for example reception desk) the attendant can turn off all the lighting zones in one action to avoid wasting energy in case some users forget to switch off.

For safety reasons all the lighting zones can also be turned on in one action.

+ Functions - Installer advantages

- Local push-buttons activate impulse relays, individually, for each lighting circuit.
- One central ON and one central OFF push-button are connected to every iTLc impulse relay. So all the impulse relays can react simultaneously to common commands.
- The iTLc impulse relay saves wiring and space as the central command interface is integrated. The overall width is still 18 mm.

iTLc

Impulse relays!



iTLc

For more details see catalogue.

Favorite applications

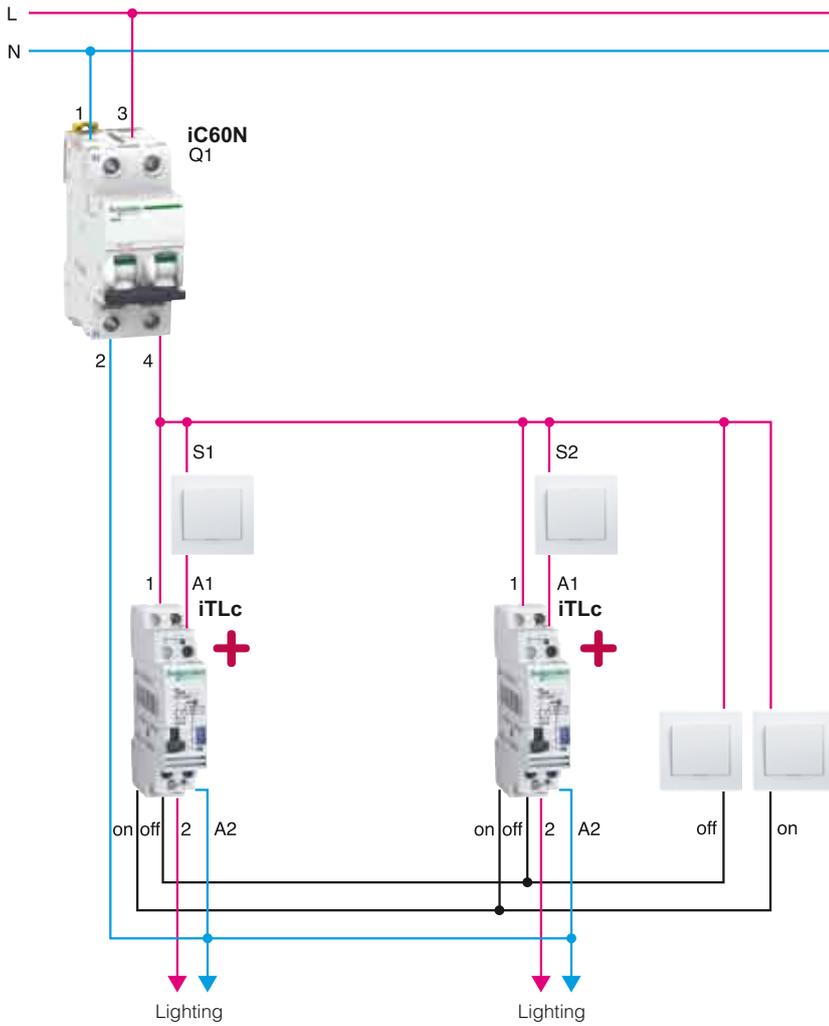
- hotel
- office
- etc



> Savings enabler

> Central ON/OFF push-buttons allow an energy saving of up to 15% on lighting circuit electricity consumption, depending on user's discipline.

Solution diagram



Text for specifications

- Each lighting circuit shall be activated by local push-buttons and from general ON and OFF push-buttons from the reception desk.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C16 A	1	
iTL	Impulse relay 16 A	1	A9C30811
iTLc	Impulse relay 16 A	2	A9C33411
PB	Push-button	4	

Centralized ON+OFF push-buttons with status indicator, local ON/OFF



User/customer benefits

Energy savings, safety: the lighting for each zone can be activated and deactivated locally by users. At a central point (for example reception desk) the attendant can turn ON or OFF all the lighting zones in one action to avoid wasting energy in case some users forget to switch off.

A lighting status indicator gives visual feedback of the action.

+ Functions - Installer advantages

- **iTL impulse relays:** each one drives a single lighting circuit in a conventional way with local push-buttons.
- **iATLc+s auxiliary module:** provides iTL status changeover contacts and collects common ON and OFF command. It is compatible with standard iTL impulse relay for new or upgrading existing installations.
- **Common remote ON and OFF push-buttons** are connected to every iATLc+s on the related ON inputs and OFF inputs. All impulse relays will react simultaneously to common commands.

> Zoom on

iATLc+s

Central command!



iTL+iATLc+s

For more details see catalogue.

Favorite applications

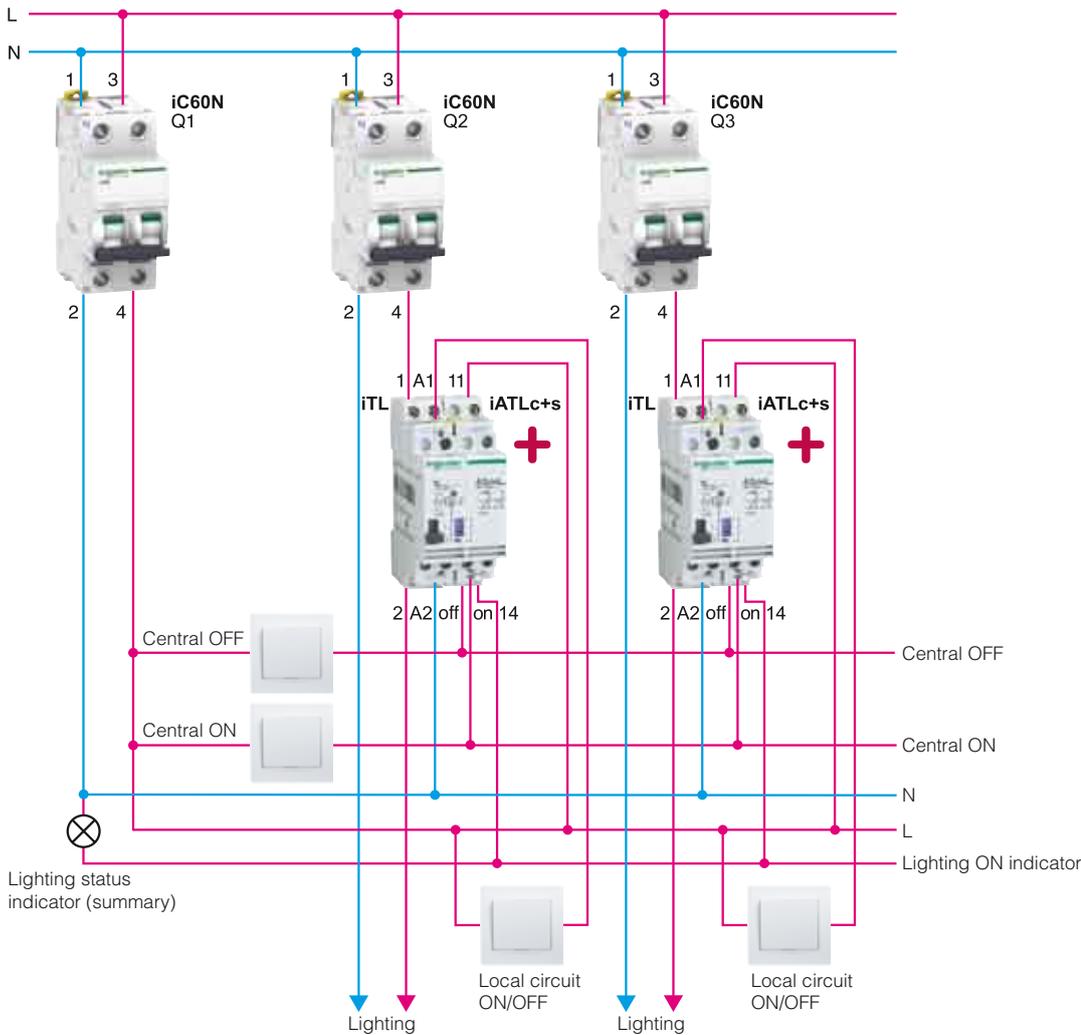
- office + education
- hotel
- industry
- retail
- etc



> Savings enabler

> Central ON/OFF push-buttons allow energy saving of up to 10-15% on lighting circuit electricity consumption, depending on user's discipline.

Solution diagram



Text for specifications

- Each lighting circuit shall be activated by local push-buttons and by common ON and OFF push-buttons at the reception desk where a summary status indicator will be provided.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2, Q3)	MCB 1P+N C10 A	2	
iTL	Impulse relay	2	A9C30811
iATLc+s	Central command	2	A9C15409
Indicator		1	
PB	Push-button	4	

Centralized ON overriding with local ON/OFF



User/customer benefits

Energy savings, safety: the lighting for each zone can be activated and deactivated locally by users.

At a central point (for example reception desk) the attendant can turn off all the lighting zones in one action to avoid wasting energy in case some users forget to switch off.

+ Functions - Installer advantages

- **Local push-buttons** activate impulse relays, individually, for each lighting circuit.
- **One central OFF push-button** is connected to every iATLc auxiliary module for iTL or directly to every iTLc impulse relay. As a result, all the impulse relays can react simultaneously to common commands.
- **The iTLc impulse relay** saves wiring and space as the central command interface is integrated; overall width is still 18 mm.
- **The iATLc central command interface** is compatible with the standard iTL impulse relay for upgrading existing installations, iATLc+iTL is equivalent to iTLc.

> Zoom on

iTLc

Impulse relays!



iTLc

For more details see catalogue.

Favorite applications

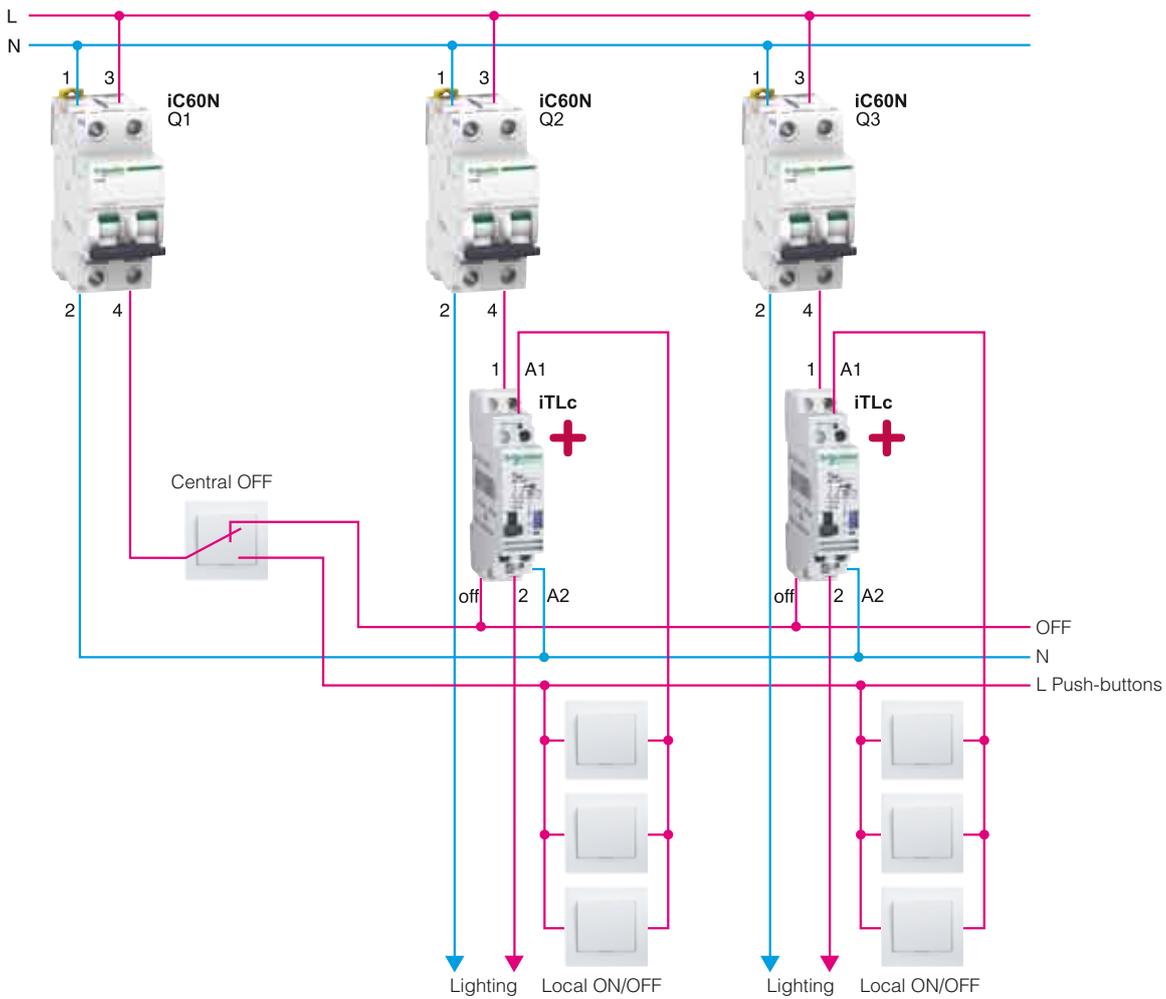
- office + education
- hotel
- industry
- retail
- infrastructure
- etc



> Savings enabler

> Central OFF push-button allows an energy saving of up to 10-15% on lighting circuit electricity consumption, depending on user's discipline.

Solution diagram



Text for specifications

- Each lighting circuit shall be activated by local push-buttons and from a general OFF push-button at the reception desk.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2, Q3)	MCB 1P+N C16 A	2	
iTLc or iTL+iATLc	Impulse relay	2	A9C33411
PB	Push-button	6	
Two-way switch	Changeover switch	1	

> Lighting Control

Centralized ON+OFF overriding with local ON/OFF



User/customer benefits

Energy savings, safety: the lighting for each zone can be activated and deactivated locally by users. At a central point (for example reception desk) the attendant can turn off by overriding all the lighting zones in one action to avoid wasting energy in case some users forget to switch off.

For safety reasons all the lighting zones can be turned ON in one action.

Local actions are permitted only when central overriding is deactivated.

+ Functions - Installer advantages

- Local push-buttons activate impulse relays, individually, for each lighting circuit.
- One central ON switch and one central OFF switch are connected to every iTLc impulse relay.
- **Savings:** the iTLc impulse relay saves wiring and space as the central command interface is integrated; overall width is still 18 mm.
- **Extension:** by adding one MCB and iTLc per extra lighting zone. The connection method is similar.

> Zoom on

iTLc

Impulse relays!



iTLc

For more details see catalogue.

Favorite applications

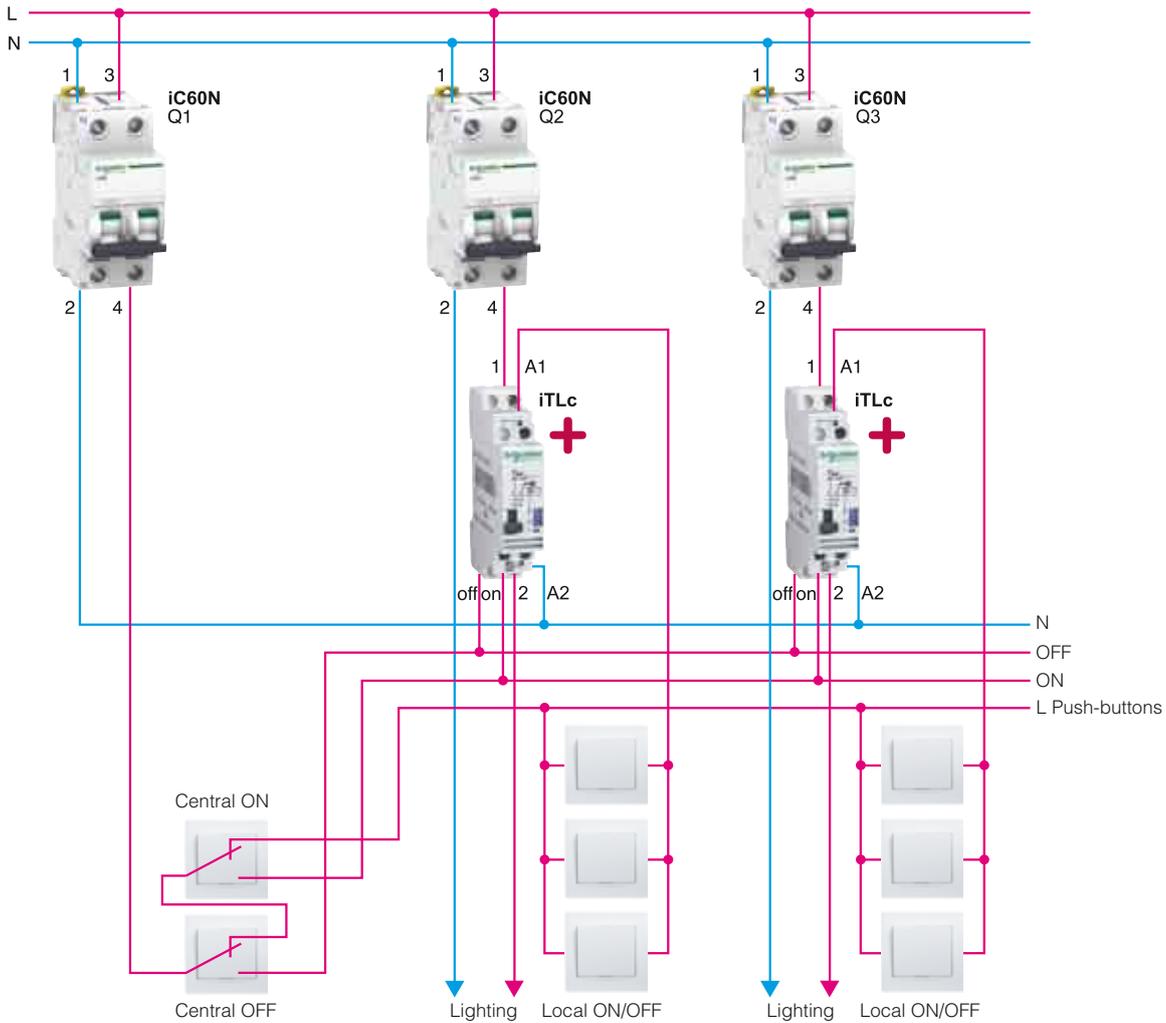
- office + education
- hotel
- industry
- retail
- infrastructure
- etc



> Savings enabler

> Central ON/OFF push-buttons allow an energy saving of up to 10-15% on lighting circuit electricity consumption, depending on user's discipline.

Solution diagram



Text for specifications

- Each lighting circuit shall be activated by local push-buttons and from general ON and OFF push-buttons at the reception desk.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2, Q3)	MCB 1P+N C16 A	2	
iTLc	Impulse relay	2	A9C33411
PB	Push-button	6	
Two-way switches	Changeover switch	2	

Local ON/OFF push-buttons enabled by a keycard



User/customer benefits

Energy savings: the user enables the room lighting by inserting the keycard into its support. Local push-buttons will be active.

The lighting is turned off when the card is removed.

+ Functions - Installer advantages

- **Keycard switch:** the changeover contact energizes the push-buttons when the card is inserted and the OFF inputs of the impulse relays when it is removed.
- **iTLc impulse relay:** drives a single lighting circuit in a conventional way with local push-buttons. Independent ON and OFF inputs are provided for centralized control.

> Zoom on

iTLc

Impulse relays!



iTLc

Keycard switch

For more details see catalogue.

Favorite applications

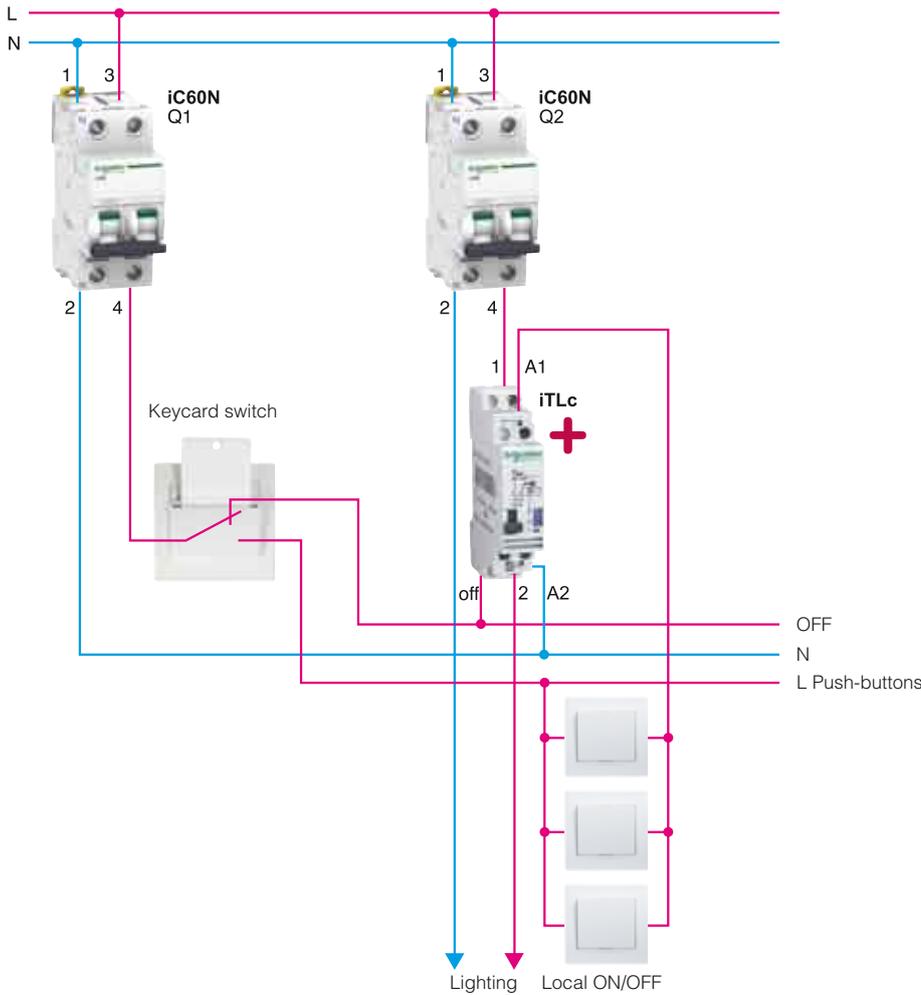
- office + education
- hotel
- industry
- retail
- infrastructure
- etc



> Savings enabler

> Keycard control allows an energy saving of up to 10-15% on lighting circuit electricity consumption, depending on user's discipline.

Solution diagram



Text for specifications

- Use of the lighting is enabled by keycard detection. When the card is in its base, pressing a push-button turns it ON and pressing again or removing the card will turn it OFF.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2)	MCB 1P+N C10 A	1	
Keycard switch	Changeover contact type	1	
iTLc	Impulse relay	1	A9C33411
PB	Push-button	3	

Centralized ON+OFF overriding and local ON/OFF push-buttons enabled by a keycard



User/customer benefits

Energy savings: use of the room's lighting circuits is enabled while the keycard is inserted into its base.

Convenience: since a push-button is provided for each lighting circuit, Room ON and Room OFF push-buttons are provided for faster use.

+ Functions - Installer advantages

- **Keycard switch:** when the card is inserted the NO changeover contact is closed, energizing the push-button line and making the Room ON and Room OFF push-buttons operational. When the card is removed, the NC contact feeds the OFF input of the iTLc relay.
- **iTLc impulse relay:** drives a single lighting circuit in a conventional way with local push-buttons. A 230 V signal on the OFF input from the Room OFF push-button or from the keycard's NC contact will reset the relay. The room ON signal sent to the ON inputs activates the relays.

> Zoom on

iTLc

Impulse relays!



iTLc

Keycard switch

For more details see catalogue.

Favorite applications

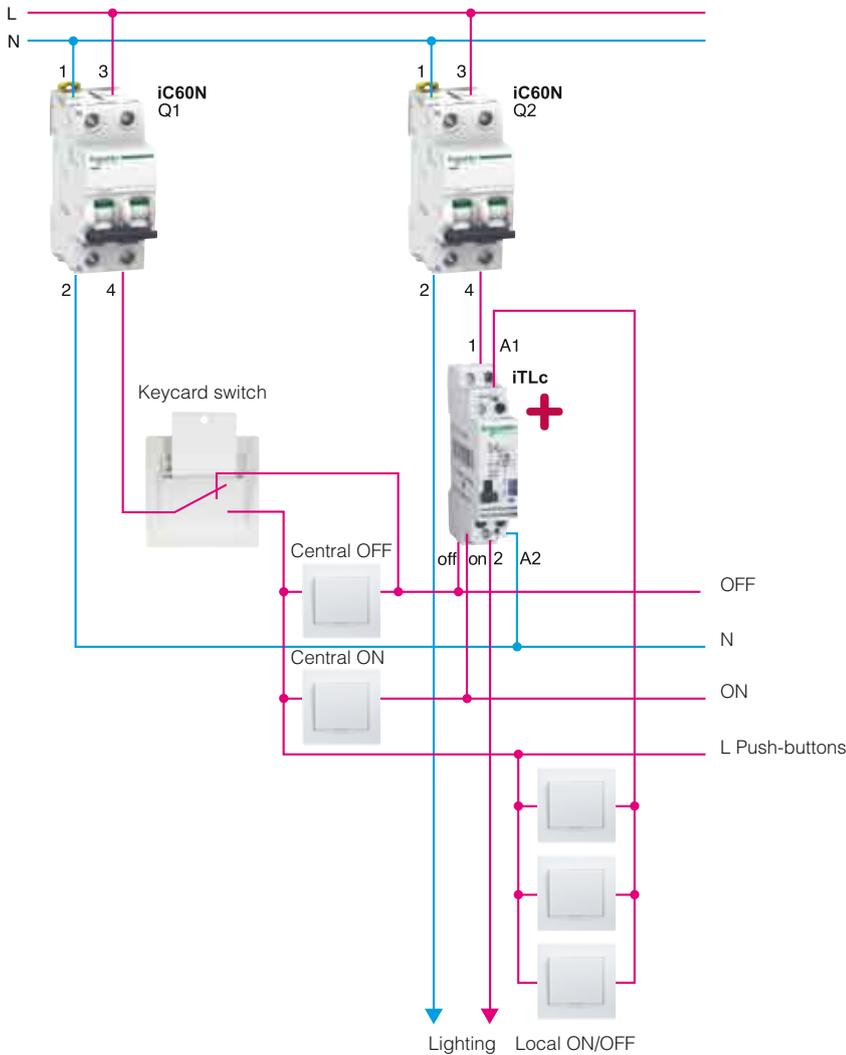
- office + education
- hotel
- industry
- retail
- infrastructure
- etc



> Savings enabler

> Keycard control allows an energy saving of up to 10-15% on lighting circuit electricity consumption, depending on user's discipline.

Solution diagram



Text for specifications

- Use of the lighting is enabled by keycard detection. Each circuit can be controlled separately by a separate push-button and collectively by Room ON and Room OFF push-buttons.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2)	MCB 1P+N C10 A	1	
Keycard switch	Changeover contact type	1	
iTLc	Impulse relay	1	A9C33411
PB	Push-button	5	

Centralized ON+OFF overriding and local ON/OFF push-buttons enabled by a keycard, delayed disabling



User/customer benefits

Energy savings: use of the room's lighting circuits is enabled when the keycard is inserted into its base.

Convenience: push-buttons are provided for each lighting circuit. Room ON and Room OFF push-buttons are provided for faster use (action on several circuits).

Safety: the lighting stays ON for the preset time once the card has been removed.

+ Functions - Installer advantages

- **Keycard switch:** when the card is inserted the NO changeover contact is closed, so the push-button line is energized, Room ON and Room OFF push-buttons are operational. When the card is removed, the NC contact feeds the OFF input of the iTLc impulse relay.
- **RTC time delay relay:** its changeover contact energizes the push-button line as soon as the Y1 input is high. The adjustable time delay starts when the keycard switch contact opens, then the changeover contact energizes the OFF inputs of the iTLc impulse relays.
- **iTLc impulse relay:** drives a single lighting circuit in a conventional way with local push-buttons. A 230 V signal on the OFF input from the Room OFF push-button or NC contact of the RTC will reset the relay. The Room ON signal sent to the ON input activates the relay.

> Zoom on

RTC

Time delay relay!



RTC

Keycard switch

For more details see catalogue.

Favorite applications

- office + education
- hotel
- industry
- retail
- infrastructure

Lighting and wall socket circuits enabled by a keycard with delayed disabling



User/customer benefits

Energy savings: use of electrical appliances in the room is enabled when the keycard is inserted into its base.

Safety, comfort: electrical appliances are turned off after a time delay starting when the card is removed, making it easier to have a last look before leaving.

+ Functions - Installer advantages

- **Keycard switch:** the NO contact is closed when the card is inserted; it energizes the Y1 time delay input.
- **RTC time delay relay:** its changeover contact energizes the push-button line as soon as the Y1 input is high. The adjustable time delay starts when the keycard switch contact opens, then the changeover contact energizes the OFF inputs of the iTLc impulse relays.
- **iTLc impulse relay:** drives a single lighting circuit in a conventional way with local push-buttons. A 230 V signal on the OFF input will reset the relay.
- **iCT relay:** the power relay is directly fed by the RTC time delay relay when the card is inserted. The iCT relays control the switched lighting circuit and the wall socket circuit.

> Zoom on

RTC

Time delay relay!



RTC



Keycard switch For more details see catalogue.

Favorite applications

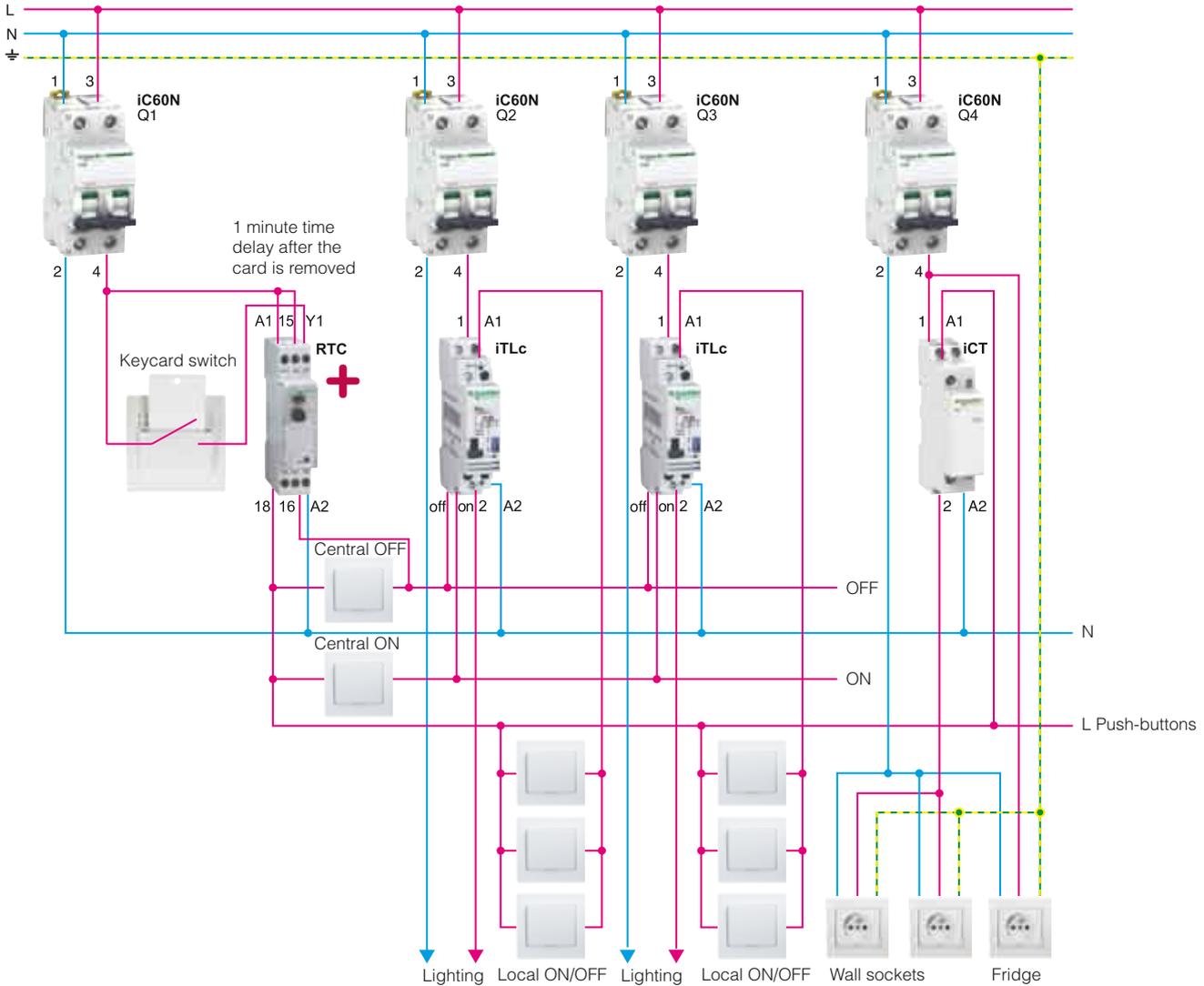
- office + educations
- hotel
- industry
- retail
- infrastructure
- etc



> Savings enabler

> Keycard control allows an energy saving of up to 10-15% on lighting circuit electricity consumption, depending on user's discipline.

Solution diagram



Text for specifications

- Use of the room's lighting and wall sockets is enabled by keycard detection. The end of enablement comes after a presettable time delay starting when the card is removed.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2, Q3)	MCB 1P+N C10 A	2	
iC60N (Q4)	MCB 1P+N C16 A	1	
Keycard switch	NO contact type	1	
RTC	Time delay relay	1	16067
iTLc	Impulse relay	2	A9C33411
ICT	Contactor 1P+N 16 A	1	A9C22712
PB	Push-button	8	
Wall socket		3	

Time scheduled OFF and local ON/OFF push-buttons



User/customer benefits

Ease of use: zone lighting is ON/OFF-activated with local push-buttons.

Energy savings: the lighting is automatically deactivated at the programmed closing time and then periodically.

Flexibility of use: light can still be switched ON after switch-off time. It will be deactivated after the next programmed interval if no manual OFF comes earlier.

Global building energy performance: this application can be selected as C-class energy performance.

+ Functions - Installer advantages

- ON/OFF control of lighting circuits (unlimited number of circuits): with **iTLc impulse relays**.
- **Time scheduling:** an **IHP+** time switch sends periodic OFF pulses starting at closing time. The interval is programmable. Pulses are collected by the iTLc.
- **Savings:** minimum wiring and maximum space saving as the iTLc does not need any auxiliary override module.
- **Extension:** by adding one MCB and iTLc per extra lighting zone. The connection method is similar.

iTLc

Impulse relays!



iTLc

For more details see catalogue.

Favorite applications

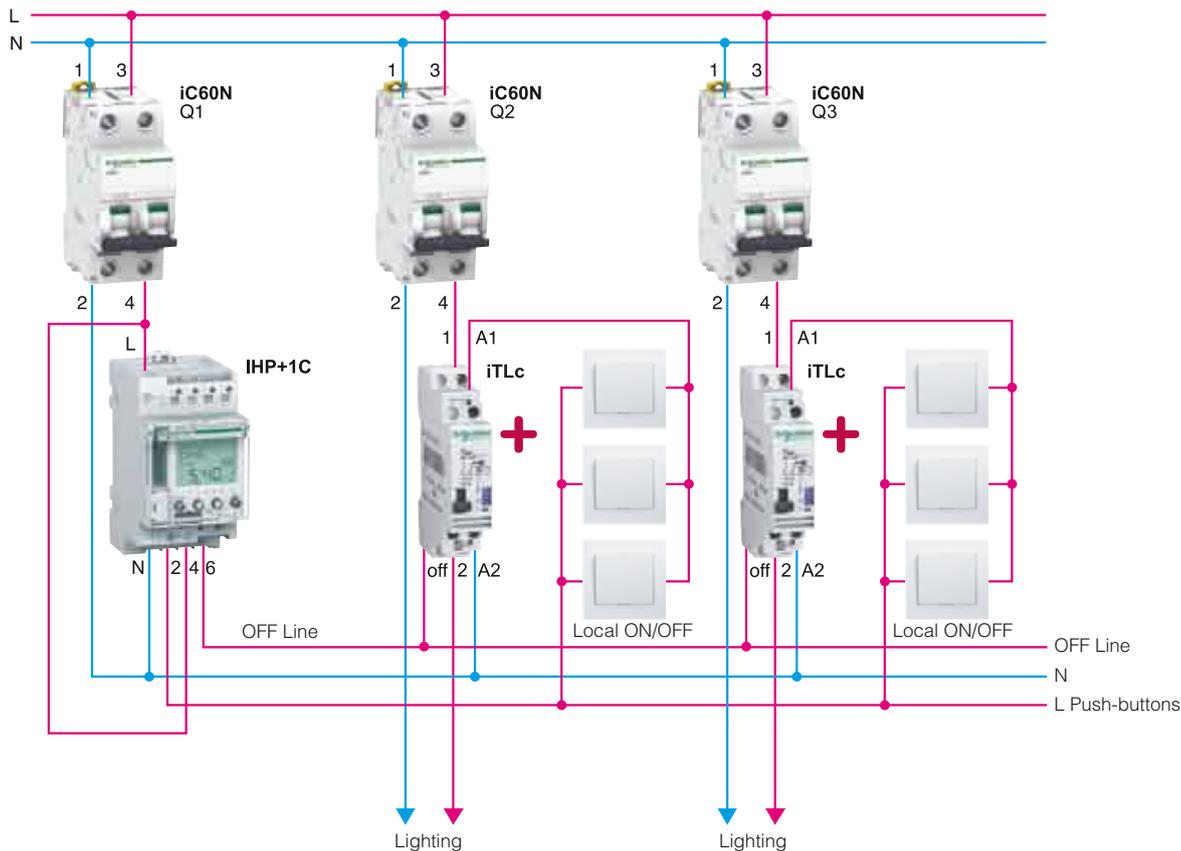
- office + education
- industry
- retail
- infrastructure
- etc



> Savings enabler

> Up to Up to 15% energy saving can be expected, depending on user's discipline.

Solution diagram



Text for specifications

- The zone's lighting circuits shall be manually operated by local push-buttons. At the preset closing time the lighting shall be automatically switched off, periodic off shall occur at programmable intervals during closing time, while reactivation with push-buttons will remain available.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2, Q3)	MCB 1P+N C16 A	2	
iTLc 16 A	Impulse relay	2	A9C33411
IHP+ 1C	Programmable time switch	1	CCT15851
PB	Push-button	6	

Time scheduled ON+OFF and local ON/OFF push-buttons



User/customer benefits

Energy savings: the lighting for all zones is automatically activated at the beginning of the programmed occupancy hours and deactivated at the end. Lights can be switched off for the midday break.

Flexibility: from every zone users can activate and deactivate the local lighting from a single push-button. The automatic ON and OFF will still be active.

+ Functions - Installer advantages

- **Manual ON/OFF** control of each lighting circuit (unlimited number): with **iTLc impulse relays**.
- **Time scheduling:** an **IHP+** 2-channel time switch sends ON and OFF pulses at opening and closing times. Pulses are collected by the iTLcs on their ON/OFF override inputs. It is suggested that several OFF pulses are programmed overnight to prevent misuse of manual activation.
- **Extension:** more iTLc can be added and connected in parallel on the ON/OFF pulse lines.

> Zoom on

iTLc

Impulse relays!



iTLc

For more details see catalogue.

Favorite applications

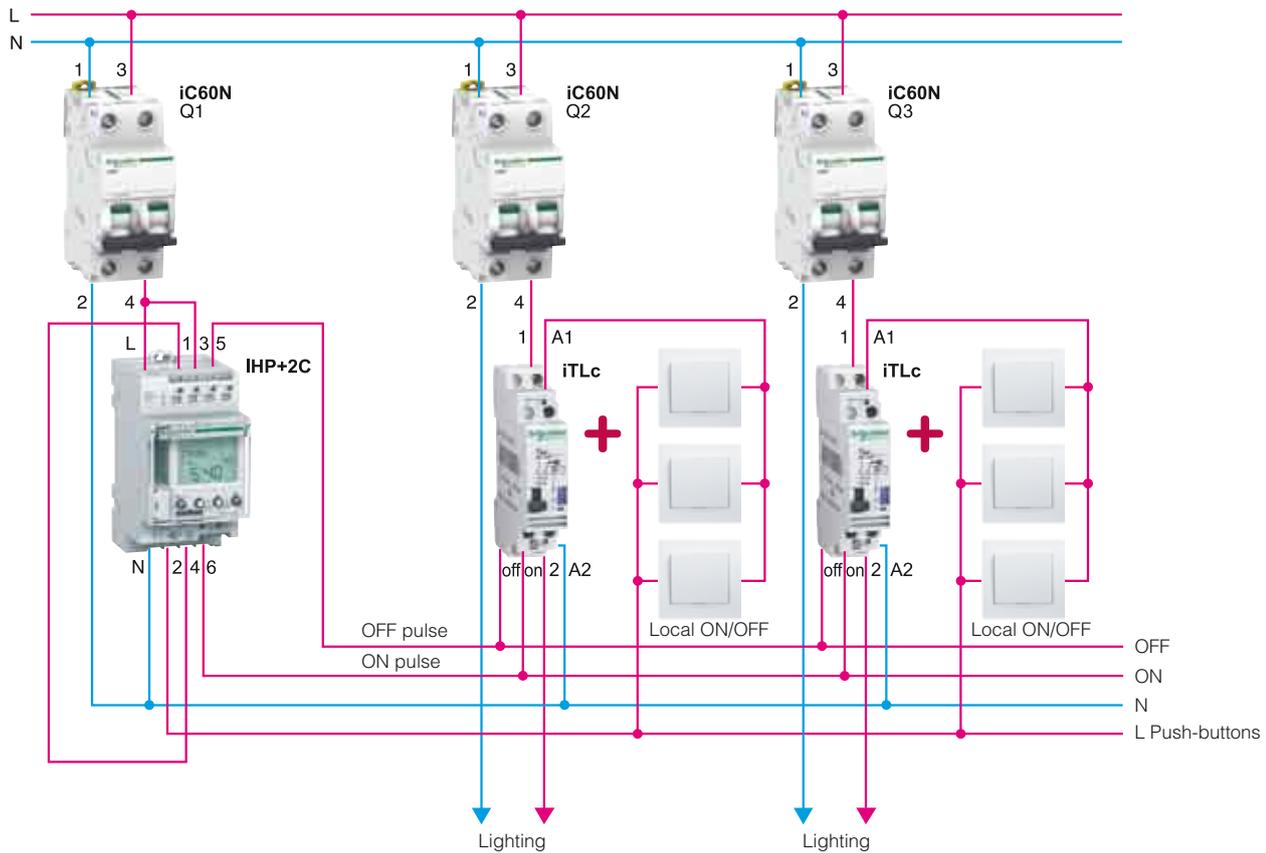
- office + education
- industry
- retail
- infrastructure
- etc



> Savings enabler

> Depending on user's discipline, savings of 10 to 20% can be expected.

Solution diagram



Text for specifications

- The zone's lighting circuits shall be manually operated by local push-buttons. At the preset opening time the lighting for all zones shall be automatically switched on and then switched off at the closing time and periodically during the closing time. The local push-buttons will still be active.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2, Q3)	MCB 1P+N C16 A	2	
iTLc 16 A	Impulse relay	2	A9C33411
IHP+ 2C	Programmable time switch	1	CCT15853
PB	Push-button	6	

Building vacancy program with zone OFF push-buttons and local ON/OFF push-buttons



User/customer benefits

Energy savings: the lighting of rooms on different floors is automatically turned OFF at a defined preset time (closing time of the building). Each floor can be turned off manually with a dedicated push-button. Each room can be turned ON and OFF locally.

Convenience: outside the closing period the lighting can be switched ON locally; it will stay ON until the next periodic stop sent by the time switch.

+ Functions - Installer advantages

- **Hard-wired solution:** for lighting applications, group control and time scheduling. Provided with conventional electrotechnical equipment. Testing is simple, extension is by addition of iTLc impulse relay.
- **iTLc impulse relay:** controls one lighting circuit with a dedicated push-button. Its ON and OFF inputs get the common Floor OFF order from a push-button and building OFF from the building time switch.
- **iATLc+c:** there is one auxiliary module per floor. This module isolates the common OFF order of its floor, preventing it from turning OFF the other floors.
- **IHP+ 1C:** this impulse 1 channel time switch defines the closing time of the building. A 1 second impulse must be programmed at the closing time and later, every x hours during the closing period, depending on the desired frequency of the periodic stops.
- **Option:** common ON order can be provided by cabling the ON inputs of iTLcs the same way as the OFF inputs. For an automatic ON impulse at the beginning of a working day, replace the IHP+ 1C with an IHP+ 2C connected to every iATLc+s (second diode) and every ON input.

> Zoom on

iATLc+c

Central control for impulse relays!



iATLc+c

For more details see catalogue.

Favorite applications

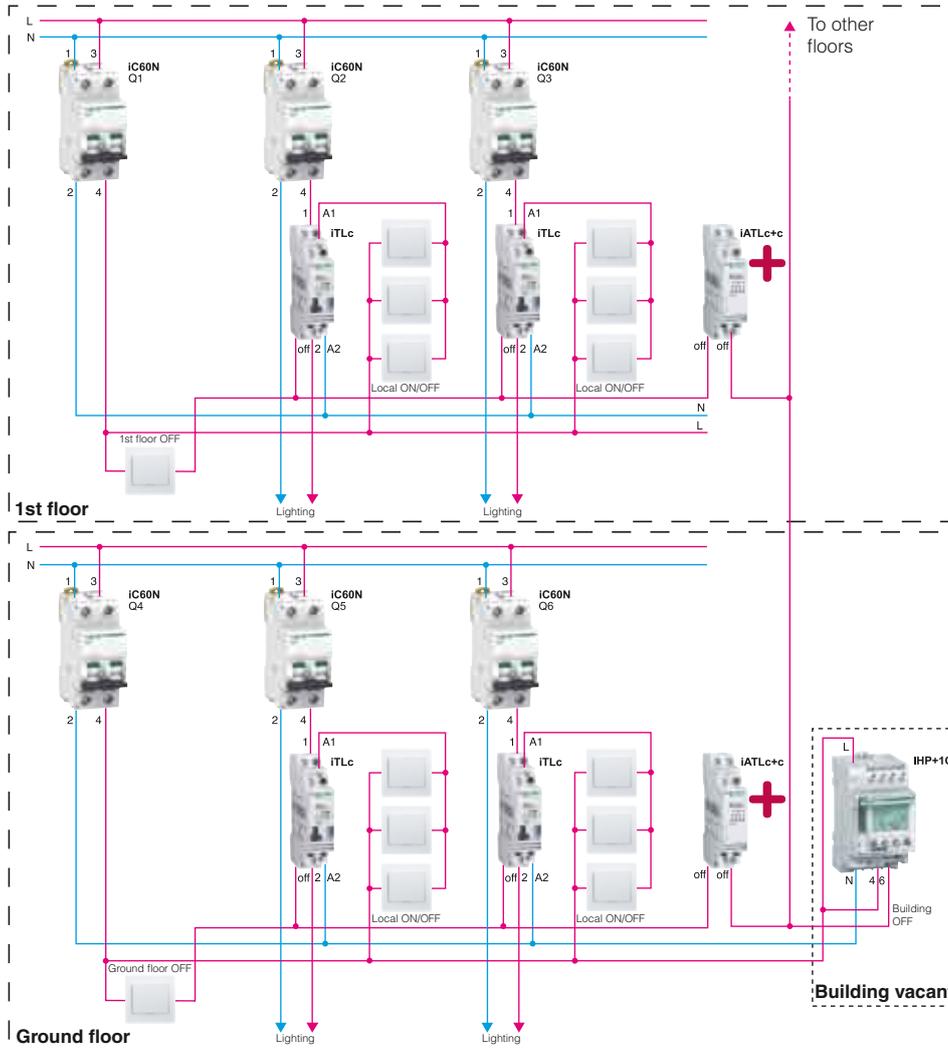
- office + education
- industry
- retail
- infrastructure
- etc



> Savings enabler

> Up to 30% depending on programming and user's discipline

Solution diagram



Text for specifications

- Each lighting circuit shall be activated individually by local push-buttons. A lighting de-activation push-button shall be provided on each floor, with action on the defined lighting zone. A zone is a group of circuits. All floors shall be de-activated at the closing time defined in a time switch and then periodically until the building is opened again. Manual action is possible between periodical stops.

> Products used

Product	Description	Unit	Reference
IC60N (Q1, Q4)	MCB 1P+N C2 A	2	
IC60N (Q2, Q3, Q5, Q6)	MCB 1P+N C10 A	4	
iATLc+c	Central command	2	A9C15410
iTLc 16 A	Impulse relay	4	A9C33411
IHP+ 1C	Programmable time switch	1	CCT15851
PB	Push-button (NO)	14	

> Lighting Control

Centralized ON+OFF and local ON/OFF push-buttons, 1 circuit enabled by daylight condition



User/customer benefits

Energy savings: once the lighting circuit closest to the windows is defined, this circuit is automatically turned off when there is sufficient natural light, and action on its push-button is cancelled. The other lighting circuits in the room remain independent from this automatic control.

Efficient use: users can activate and de-activate each lighting circuit from a single push-button. Room ON and OFF push-buttons are provided for efficient use on all of the room's circuits.

+ Functions - Installer advantages

- **Circuit manual ON/OFF:** control of each lighting circuit (unlimited number) with push-buttons coupled to iTLc impulse relays.
- **Room manual ON/OFF push-buttons** activate and de-activate all iTLc impulse relays simultaneously, from their ON/OFF inputs.
- **Twilight switch + outdoor sensor:** an IC2000 delivers the supply to the push-buttons on the window circuit only when the natural light level is low. When the light is sufficient or by actioning the general OFF push-button a general OFF signal is sent to all iTLc.
- **Extension:** more iTLc can be added and connected in parallel on the ON/OFF lines.

> Zoom on

IC2000

Light sensitive switch!



IC2000 + Cell

For more details see catalogue.

Favorite applications

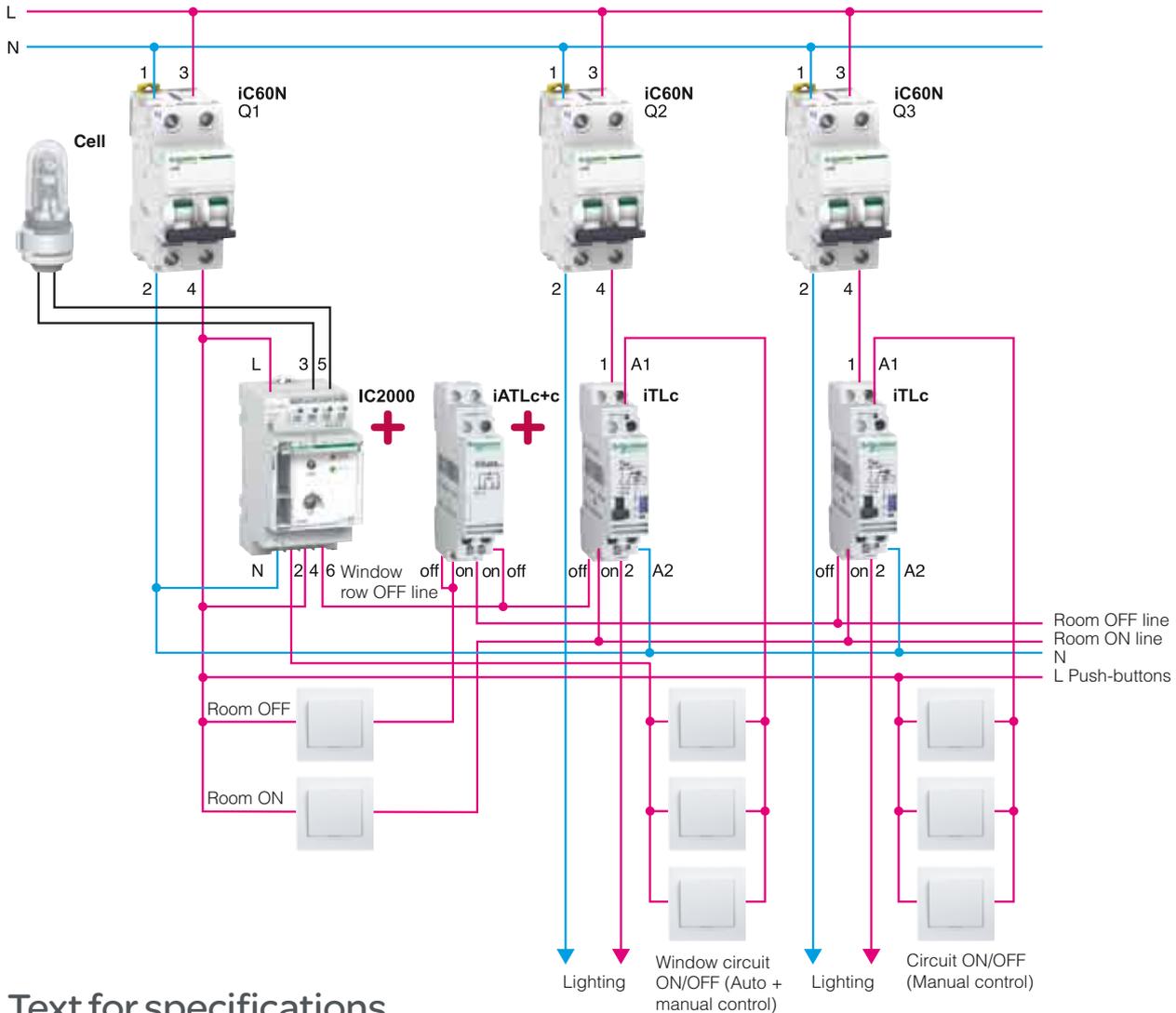
- office + education
- industry
- retail
- infrastructure
- etc



> Savings enabler

> Depending on the user's discipline, a saving of 20% can be expected.

Solution diagram



Text for specifications

- The room's lighting circuits shall be individually operated by dedicated push-buttons and simultaneously by Room ON and Room OFF push-buttons. Manually actioning the lighting circuit closest to the windows will only be possible when the natural light level is insufficient; it will be automatically turned OFF when sufficient light is detected.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2, Q3)	MCB 1P+N C10 A	2	
IC2000	Twilight switch + outdoor sensor (cell)	1	CCT15368
iATLc+c	Central command	1	A9C15410
iTLc 16 A	Impulse relay	2	A9C33411
PB	Push-button	8	

How to provide smart load protection and control to maximize safety?

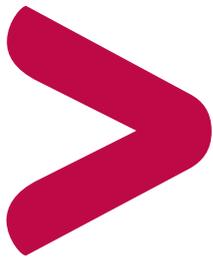
Improving safety with power and control to ensure that critical equipment functions efficiently.



Improving the way applications are controlled. Making it more “intelligent” provides a better match between the way and time applications run and the specific needs of the processes involved.

Content

Simple solutions for improving safety,
control and protection



Automatic protection

Automatic Stop in case of power drop or failure	50-51
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Manual control

Simple manual process ON/OFF	62-63
Safe, remote, power supply OFF	64-65
Process emergency stop	66-67

Automatic Stop in case of power drop or failure



User/customer benefits

Safe stop of process: in case of a control system power failure motors will stop, heating elements will cool down, electromagnets will be released, etc.

Clear diagnostics: a red indicator is displayed on the tripping module if it is the cause of the trip.

Safe restart: resetting is only possible if the problem is resolved.

+ Functions - Installer advantages

- **Circuit breaker:** provides protection of the process or machine power circuit. A control system failure will make it open.
- **iMN:** the tripping module. It is clipped on the circuit breaker and has a mechanical action on it. The iMN requires a 230 V AC supply; it will trip the circuit breaker in the event that the power falls from 70 to 35% of nominal voltage or total failure.
- **Other version:** iMN for 48 V AC or DC supply.

iMN

Release!



iMN

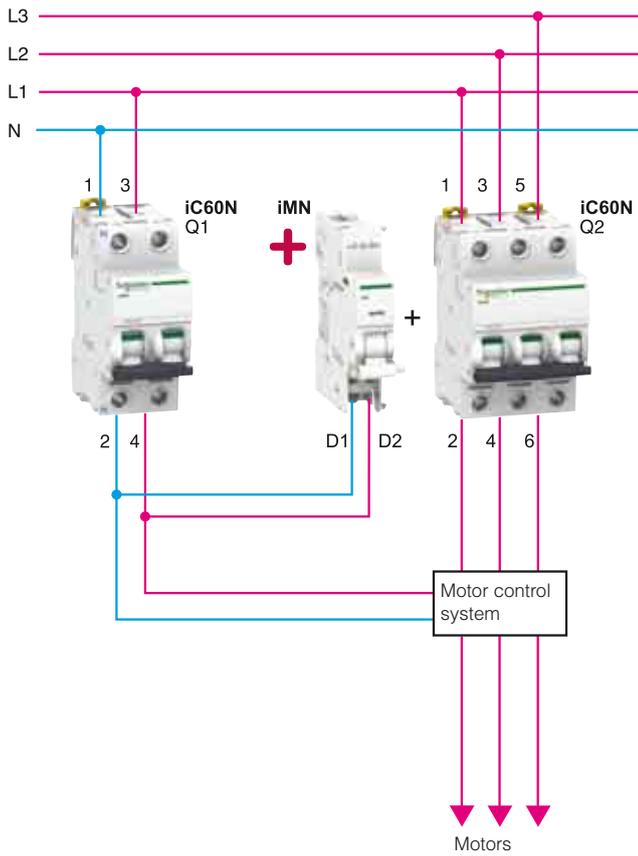
For more details see catalogue.

Favorite applications

- industry
- hotel
- office
- ...

- > Safety
- > Improved protection for machinery

Solution diagram



Text for specifications

- The motor circuit breaker shall be automatically tripped if the motor control system power supply fails.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C10 A	1	
iC60N (Q2)	MCB 3P C32 A	1	
iMN	Undervoltage release	1	A9A26960

Protect loads against overvoltage due to neutral failure - 3-phase



User/customer benefits

Avoid risks due to power line incidents: protection of loads against permanent overvoltage is a real concern in areas where power lines are exposed to specific risks: falling trees or posts due to storms, for instance, may break the lines totally or partially. If the neutral line is broken, electrical equipment may be exposed to an unbalanced power supply, causing destructive overvoltage between phase and neutral.

Automatic disconnection: when an overvoltage is detected, the power supply is interrupted by the circuit breaker within 30 ms. All the loads connected on the circuit are preserved.

+ Functions - Installer advantages

- **iMSU auxiliary module:** permanently checks the voltage between phase and neutral. If it increases to over 255 or 275 V (depending on the model), the iMSU causes the MCB to trip by action on its toggle and a red indicator lights up on the iMSU. 3 iMSUs are needed for 3 phase circuits.
- **Direct clic'on:** installing iMSU on a circuit breaker is simple as it is directly clipped on the side. A maximum of 3 iMSUs can be clipped together on the same MCB.

> Zoom on

iMSU

Voltage threshold release!



iMSU

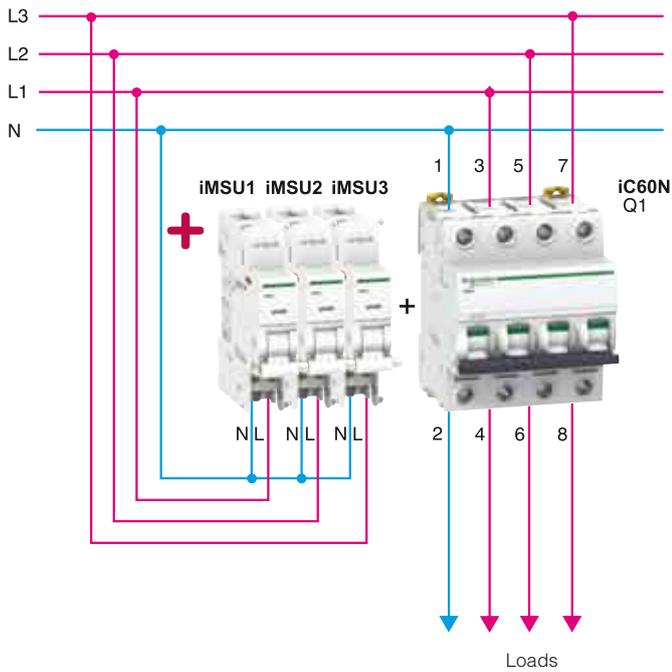
For more details see catalogue.

Favorite applications

- hotel
- industry
- hospital

> Improved protection for machinery

Solution diagram



Text for specifications

- The electrical feeders shall be protected from long-lasting overvoltages. Overvoltage shall cause the circuit breaker to trip.

> Products used

Product	Description	Unit	Reference
iMSU	or Voltage threshold release 255 V	3	A9A26479
	Voltage threshold release 275 V	3	A9A26979
iC60N (Q1)	MCB 3P+N C63 A	1	

Protect electrical motor against phase asymmetry or inversion



User/customer benefits

Avoid the risk due to a power source fault:

Electric motors can be seriously affected by a power source fault. Destructive vibrations or overheating may damage the motors. Missing or inverted phase or a large voltage drop on one phase may occur especially when the installation is powered by a faulty or inappropriate auxiliary generator. Overload may also cause similar problems.

Automatic disconnection:

The motors critical to the process are controlled and automatically stopped if a faulty power supply is detected. They restart as soon as the problem has disappeared.

+ Functions - Installer advantages

- **RCP relay:** constantly checks each phase of the circuit. If a phase is missing, inverted, or its voltage falls below 5 to 25% (adjustable) of the others the output changes state. The fault indicator is illuminated.
- **iCT relay:** the motor's power line is controlled by the iCT relay. Its action is conditioned by the state of S1 and the output from the RCP. The coil can be energized only if no fault is detected.

> Zoom on

RCP

Phase control relay!



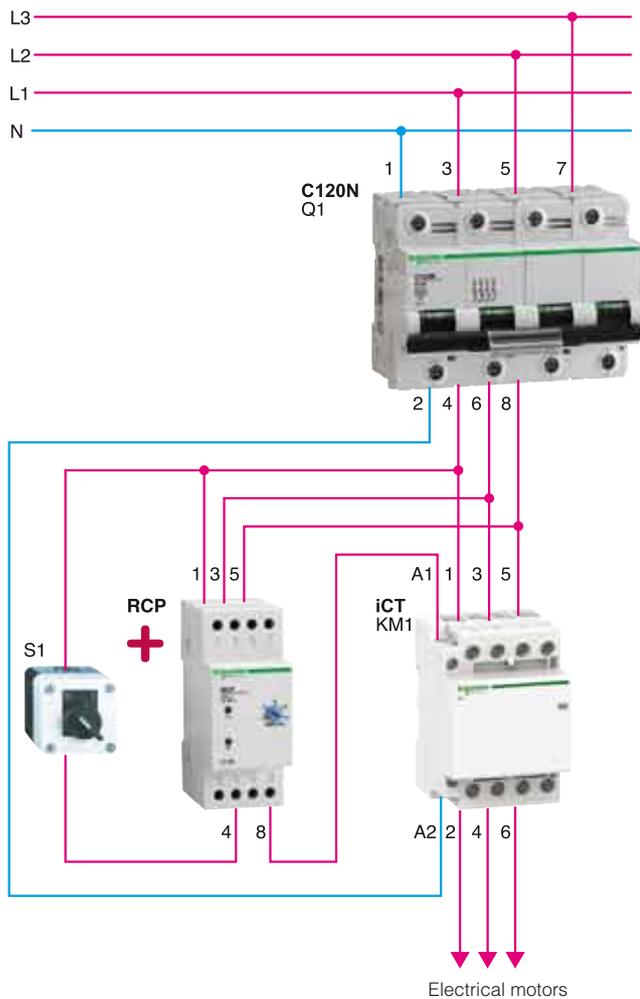
RCP

For more details see catalogue.

Favorite applications

- industry
- hotel
- office
- etc

Solution diagram



Text for specifications

- The equipment shall be protected against instability of the auxiliary power sources.

> Products used

Product	Description	Unit	Reference
C120N (Q1)	MCB 3P+N C63 A	1	
RCP	Phase control Relay	1	21180
ICT	Contactor 3P 40 A	1	A9C20843
I (S1)	Switch	1	

Protect compressor from short cycling and voltage fluctuation



User/customer benefits

Avoid the risk due to compressor destruction: protection of compressors against short power cuts and large voltage fluctuations is a real concern in areas where poor quality mains supply is frequent. The life of the compressor is shortened when short cycling (ON-OFF) or working on an inappropriate voltage (insufficient lubrication, overheating, etc.).

Automatic disconnection:

when a power cut or voltage fault is detected, the compressor is deactivated for a minimum of 3 or 6 minutes. During this period the different pressures will stabilize and thus allow the compressor to start again in good conditions.

+ Functions - Installer advantages

- **RCC relay:** permanently checks the voltage between phase and neutral. If it varies above a limit of ± 5 to $\pm 15\%$ (adjustable) of 230 V AC the relay will open its contact. It will close after 3 or 6 minutes (adjustable) if the voltage conditions are normal again. An LED indicator is activated when the RCC relay is open.
- **iCT relay:** directly controls the compressor. If an external regulation is provided, the iCT relay should be the final element of the power circuit.

> Zoom on

RCC

Compressor control relay!



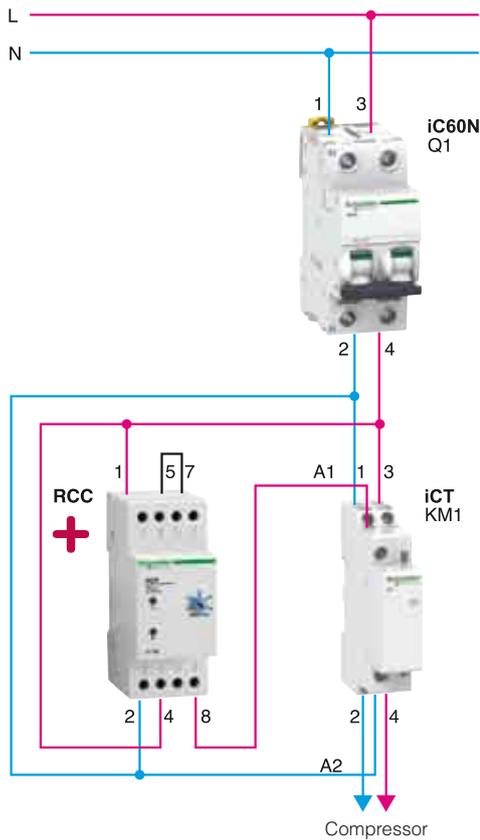
RCC

For more details see catalogue.

Favorite applications

- industry
- hotel
- office
- etc

Solution diagram



Text for specifications

- The compressor shall be protected from short power cuts and voltage fluctuations above ± 5 to $\pm 15\%$ (adjustable) of 230 V AC. The deactivation period should not last less than 3 minutes.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N	1	
RCC	Compressor control Relay	1	21183
ICT	Contactor 1P+N 40 A	1	A9C20842

Automatic Stop in case of overload



User/customer benefits

Safety: in the event of an increase in operating current (e.g.: motor overload), the process will stop, heating elements will cool down and electromagnets will be released, avoiding an electrical and fire hazard.

Clear diagnostic: on the overcurrent relay (RCI) a red indicator will come on when the overload is detected; this is complemented by a remote indicator.

Safe restart: restarting the process is only possible if the RCI relay has been reset.

+ Functions - Installer advantages

- **Circuit breaker:** provides protection of the process or machine power circuit. It will be automatically opened in case of overload.
- **iMN:** the tripping module. It is clipped on the circuit breaker and has a mechanical action on it. The iMN requires a 230 V AC supply; it will trip the circuit breaker in the event that the power drops from 70 to 35% of nominal voltage or in a total failure.
- **RCI:** current control relay. The relay monitors the current drained by the process either directly (up to 10 A) or via a current transformer. A changeover contact will change state if the measured current is over the I_{max} setting (switch in «Ir» mode position). It will return to its initial state when the current decreases to below the threshold + hysteresis (Memo mode: OFF) or in the same conditions but after a power reset of the RCI relay (Memo mode: ON). A tripping time delay and hysteresis adjustment are provided.

> Zoom on

iMN

Release!



iMN

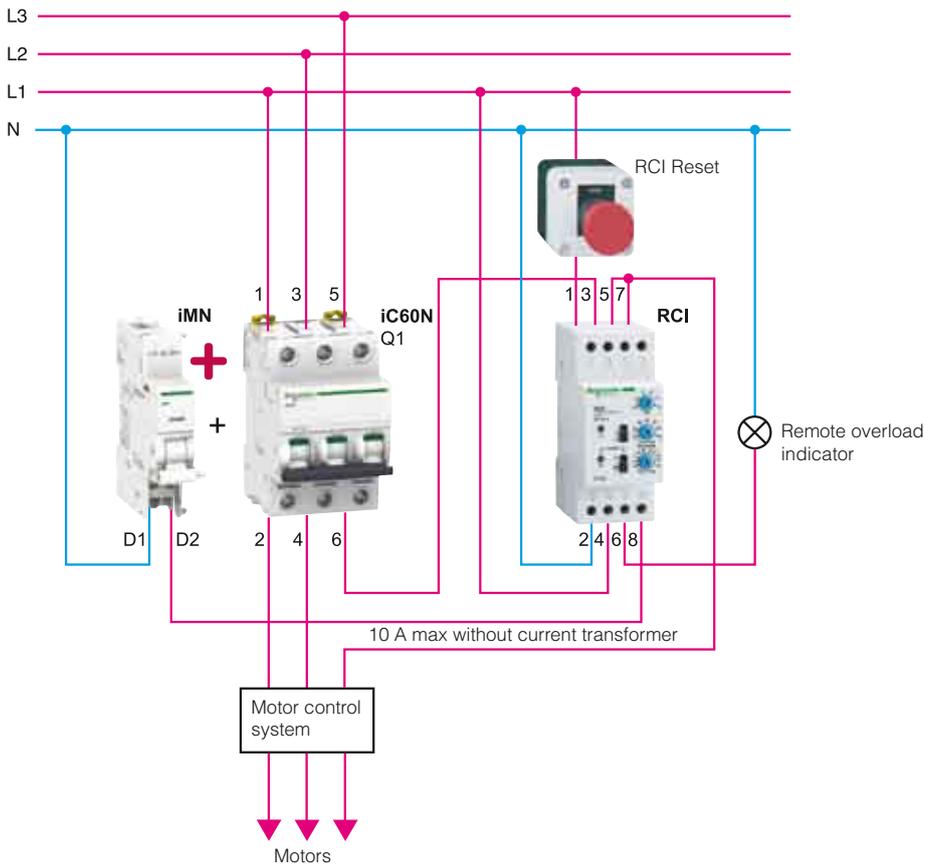
For more details see catalogue.

Favorite applications

- industry
- infrastructure
- etc

- > Safety
- > Improved protection for machinery

Solution diagram



Text for specifications

- A current monitoring module shall be provided for the control system. If actioned this shall open the process main circuit breaker.
- Manual reset of the monitoring device is required before restart.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 3P	1	
iMN	Undervoltage release	1	A9A26960
RCI	Current control relay	1	21181
Indicator		1	
PB	Push-button (NC)	1	

Automatic Stop in case of underload



User/customer benefits

Safety: in the event of a decrease in operating current (e.g.: broken link between motor and load, pump cavitation, etc.), the process will stop, avoiding the risk of over speed, overheating and a lubrication incident.

Clear diagnostic: on the RCI relay a red indicator will come on when the underload is detected; this is complemented by a remote indicator.

Safe restart: restarting the process is only possible if the RCI relay has been reset.

+ Functions - Installer advantages

- **Circuit breaker:** provides protection of the process or machine power circuit. It will be automatically opened in the event of an overload.
- **iCT relay:** the power control element. It is manually activated by ON and OFF push-buttons. The coil supply is automatically de-activated by the RCI in the event of an underload.
- **RCI:** current control relay. The relay monitors the current drained by the process either directly (up to 10 A) or via a current transformer. A changeover contact will change state if the measured current falls below the setting (switch in «Ir» mode position). It will return to its initial state when the current stabilizes above the threshold + hysteresis (Memo mode: OFF) or in the same conditions but after a power reset of the RCI relay (Memo mode: ON). A tripping time delay and hysteresis adjustment are provided.

> Zoom on

RCI

Control relay!



RCI

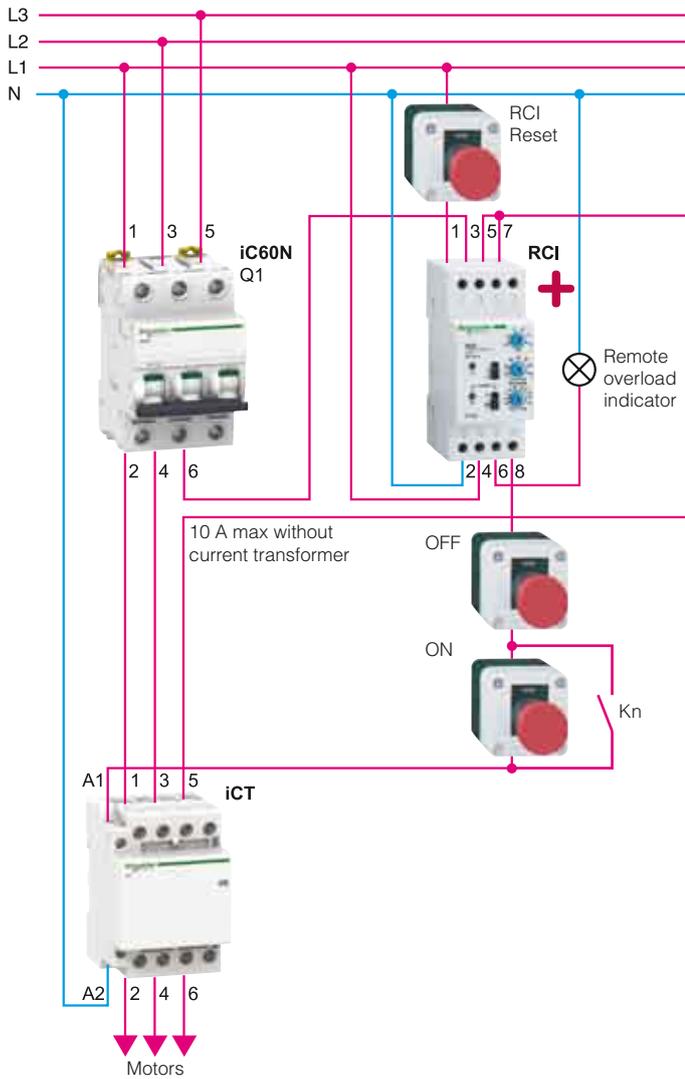
For more details see catalogue.

Favorite applications

- industry
- infrastructure
- etc

- > Safety
- > Improved protection for machinery

Solution diagram



Text for specifications

- An underload monitoring module shall be provided for the control system. If actioned this de-activates the control circuit of the load.
- Manual reset of the monitoring device is required before restart.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 3P	1	
iCT	Contacteur 3P 25 A	1	A9C20833
RCI	Current control relay	1	21181
Indicator		1	
PB	Push-button (NC: RCI reset, OFF), (NO: ON)	3	
Kn	Switch	1	

Simple manual process ON/OFF



User/customer benefits

Safety: safe action, as the load is activated by a dedicated ON push-button, OFF with another push-button. Priority to OFF action when both push-buttons are depressed simultaneously.

+ Functions - Installer advantages

- **iCT relay:** closes its contacts as long as its coil is powered. The iACTs closes its contact simultaneously, so the ON push-button is then shorted and the iCT coil will remain powered when the push-button is released. Depressing the OFF push-button will stop the current and unlatch the coil.
- **Isolation:** the iACTs auxiliary contact is specific to the iCT control circuit (low current). Power contacts of the iCT relay remain available for load control (high current).

> Zoom on

iACTs

Auxiliary contact!



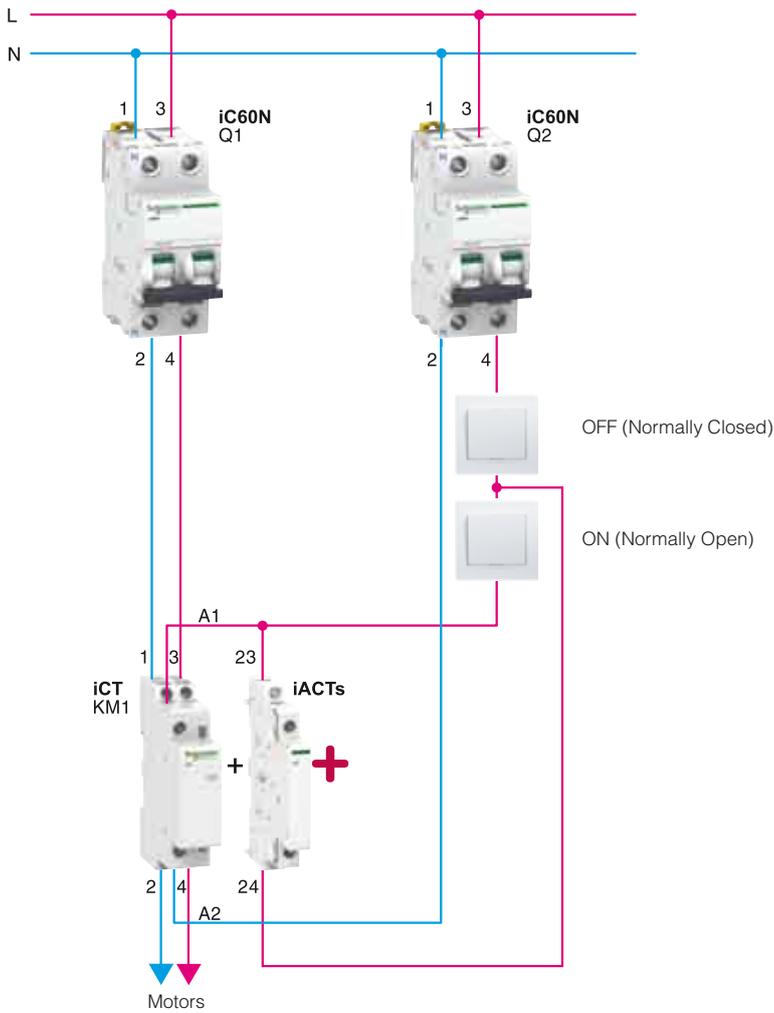
iACTs

For more details see catalogue.

Favorite applications

- hotel
- office
- etc

Solution diagram



Text for specifications

- The motor shall be controlled by separate ON and OFF push-buttons, with priority to "OFF" if both push-buttons are depressed simultaneously.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C2 A	1	
iC60N (Q2)	MCB 1P+N C16 A	1	
iCT	Contacteur 1P+N 25 A	1	A9C20832
iACTs	CT auxiliary contact	1	A9C15914
PB	Push-button	2	

Safe, remote, power supply OFF



User/customer benefits

Stop the process: in case of necessity one of the easiest way of stopping a process is to interrupt the mains supply. Motors will stop, heating elements will cool down, electromagnets will be released, etc.

Avoid disturbance: the tripping system only reacts when the stop push-button is depressed, even if its power supply is cut off. Actioning the push-button can be clearly identified by a red indicator.

+ Functions - Installer advantages

- **Circuit breaker:** provides protection of the power circuit of the process or machine. A manual stop will make it open.
- **iMNx:** the tripping module. It is clipped on the circuit breaker and has a mechanical action on it. The iMNx requires a 230 V AC supply. A stop push-button (NC contact for positive safety) must be connected to the dedicated inputs
- **In case of power failure on Process or iMNx:** the circuit breaker will remain closed. The process will start without a reset action when the power is restored and if the stop push-button is still in the "Run" position; otherwise the circuit breaker will open within 8 ms (causing a mains voltage micropulse).
- **Resetting the circuit breaker:** only possible if the stop push-button is released.
- **Other version:** 400 V iMNx for 3P power supply.

> Zoom on

iMNx

Release for push-button with opening!



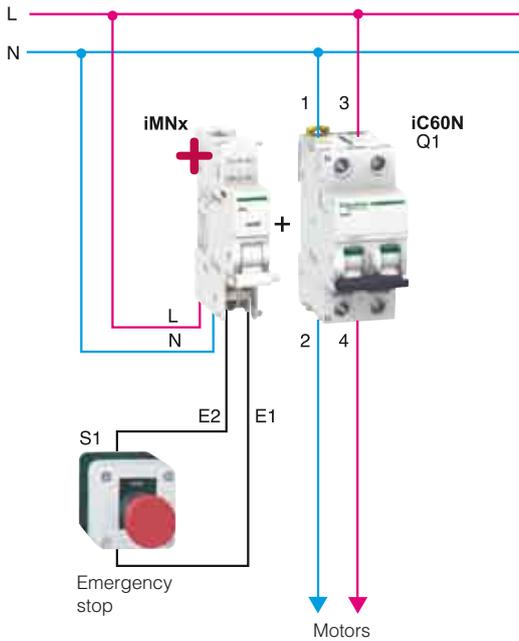
iMNx

For more details see catalogue.

Favorite applications

- hotel
- office
- ...

Solution diagram



Text for specifications

- A stop push-button shall be provided. Actioning the push-button shall open the main circuit breaker. Under no circumstances must opening be caused by a power failure.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C63 A	1	
iMNx	Release for push-button with opening	1	A9A26969
PB	Stop push-button (NC)	1	

Process emergency stop



User/customer benefits

Stop the process: in case of necessity one of the easiest ways of stopping a process is to interrupt the main supply. Motors will stop, heating elements will cool down, electromagnets will be released, etc.

Avoid disturbance: the tripping system only reacts if the stop push-button is depressed, even if its own main supply is interrupted. Actioning of the push-button is clearly identified by a red indicator.

+ Functions - Installer advantages

- **Circuit breaker:** protects the power circuit of the process or machine. A manual Emergency Stop will open it.
- **iMNx:** the tripping module. It is clipped on the circuit breaker and has a mechanical action on it. The iMNx requires a 230 V AC supply. A Stop push-button (NC contact for positive safety) is connected to the dedicated inputs. In case of main failure the circuit breaker will not be opened.
- **Resetting the circuit breaker:** only possible if the Emergency Stop push-button is released.
- **iOF:** this auxiliary contact provides information for machine operation: the light comes ON when the main circuit breaker is open or tripped.
- **Other version:** 400 V iMNx for 3P power supply.

> Zoom on

iMNx

Release for push-button with opening!



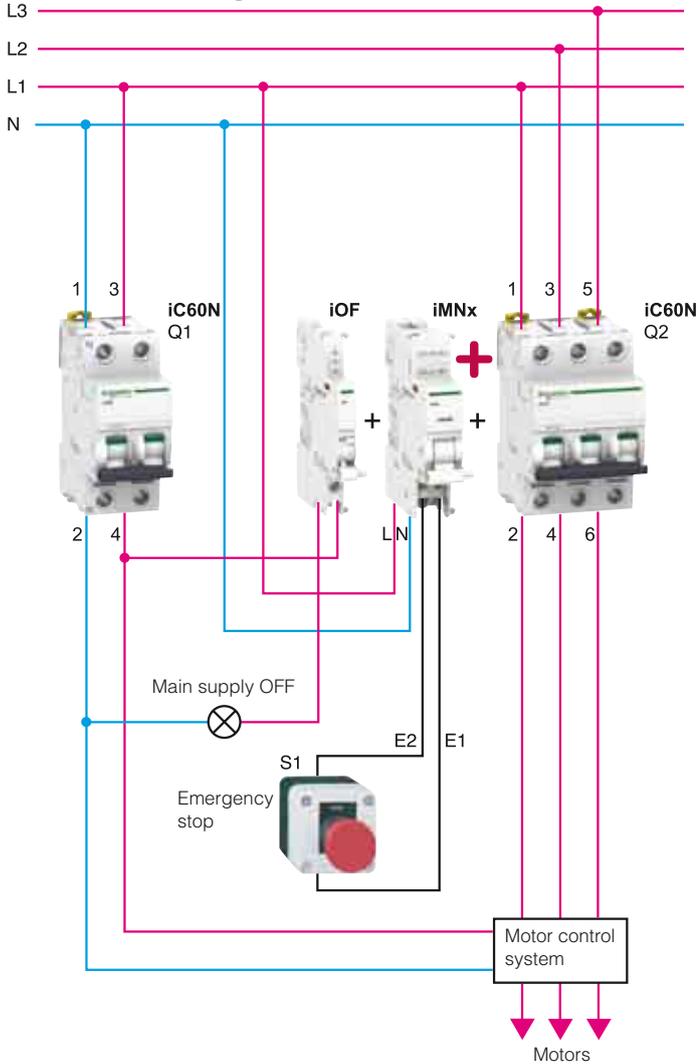
iMNx

For more details see catalogue.

Favorite applications

- industry
- infrastructure
- etc

Solution diagram



Text for specifications

- An Emergency Stop push-button shall be provided. Actioning the push-button shall open the main circuit breaker and activate a remote indicator.
- Under no circumstances must opening be caused by a power failure.

> Products used

Product	Description	Unit	Reference
iC60N (Q1)	MCB 1P+N C10 A	1	
iC60N (Q2)	MCB 3P C32 A	1	
iOF	MCB auxiliary contact	1	A9A26924
iMNx	Release for push-button with opening	1	A9A26969
PB	Stop push-button (NC)	1	
Indicator		1	

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