2|15

Day by DIN

An ABB technical journal for
Low Voltage products
Installers, Consultants
and Panel Builders

News and know-how for informed professionals

Long life to the Expo Village
An important contribution to host people with different cultures, languages and habits of the largest social housing project in Italy

Ensuring well-being and energy savings through green building technologies
Using home automation as a tool for monitoring and managing energy consumption at home

Power and productivity
for a better world™

System pro *E* comfort MISTRAL41. Create your own masterpiece.

Freedom is an essential factor for innovation, modernization and unlimited possibilities. The new System pro *E* comfort MISTRAL41 series of consumer units offer that freedom in both flush and wall-mounted versions. These IP41-rated units have been designed from scratch to enhance the unique features you expect from ABB. Ample internal space, elegant design and a unified range of accessories give you the freedom and flexibility to create high-quality work you can be proud of. For more information visit **www.abb.com/lowvoltage**

Power and productivity
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Ensuring well-being and energy savings through green building technologies (66)

Day by DIN 2|15

Valentina Surini
Product Marketing Manager
DIN-Rail Products

Dear readers,
welcome to Day by DIN 2|15!
It's great to see the subscriptions to our magazine are continuously increasing, we are glad to receive plenty of emails and we do our best to reply to everyone: the more curious and interesting questions go directly in the section Good morning DIN-Rail!
This edition focuses mostly on a topic that we think you will find interesting for your daily job, which is the residential installations. For this reason, you will find a special in-depth analysis about IEC 61439-3, the standard for low-voltage switchgear and controlgear assemblies for distribution boards intended to be operated by ordinary persons.
About residential applications, you will find articles about energy saving and lighting control for hotels and houses, like the new Wunderhaus residence: entirely made in wood, it helps to balance the temperature and at the same time it ensures a good visual impact which can aesthetically fit in countryside areas.
Talking about unconventional houses, you will discover how to use in the best way devices from building space in a yacht with the help of Elettromar, a company which realized that the automation expertise acquired in the mining field could be applied successfully to firms operating in other sectors, in this case, the marine.
I am looking forward to read your suggestions, inputs and questions for the next issues of Day by DIN. Send your emails at mail.daybydin@abb.com.
Enjoy the reading!

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News and facts

The expert answers

Did you know that?

Doktor Wise

Report

Curiosity

Technical

Time to relax

Special Insert
Welcome to the IEC 61439-1-3, the new reference standard for contemporary DBO

Jump in the box

Discover in this section brand new solutions offered by ABB for protection, intelligent building control and automation that can make your business grow.

Protection

SU 200 M

The next generation of Miniature Circuit Breakers for UL/CSA applications within the proven System pro *M* compact® range

The SU 200 M miniature circuit breaker is an ABB solution for UL489 protection in branch circuits for voltages up to 480Y/277VAC.
This circuit breaker provides enhanced ratings for applications in North American and global markets with approvals according to UL, CSA, and IEC. Furthermore, the SU 200 M MCB is fully compatible with existing UL489 System pro *M* compact® accessories.

For more information: http://new.abb.com/low-voltage/products/system-pro-m/miniature-circuit-breakers

Benefits

- Rated breaking capacity 10 kA acc. UL489 / CSA 22.2 No. 5 and 15kA acc. IEC / EN 60947-2
- Certified up to In = 40 A at 480 Y / 277 V AC acc. to UL 489 / CSA 22.2 No.5
- 40°C reference temperature acc. to UL and CSA
- Clear contact position indication in red / green (“real CPI”)
- New robust thermoplastic housing

Protection

S 200 80 / 100A

High performance in only 17.5 mm module width

The miniature circuit breakers of the System pro *M* compact® range S 200 series provide state-of-the-art safety and comfort. They stand out due to their high performance and the wide range of accessories and approvals.
The additional ratings of 80 A and 100 A complement the current portfolio of the System pro *M* compact® and offer maximum performance in a single module width.

For more information: http://new.abb.com/low-voltage/products/system-pro-m/miniature-circuit-breakers

Benefits

- Clear contact position indication in red/green (“real CPI”)
- Unique, patented twin terminal with captive screws and an increased opening for cables up to max. 50 mm², finger-proof (IP20)
- Busbar slot in the back for smooth installation
- High performance in building installations and industrial applications up to 6 kA at Ue = 400 V AC acc. to IEC/EN 60947-2 and IEC/EN 60898-1
- Approved acc. to IEC/EN 60898-1 and IEC/EN 60947-2 for global use

Home Automation

ABB-free@home®

Making home automation easier than ever

ABB-free@home® is totally flexible – from installation till configuration through an app on your tablet or laptop. Whether blinds, lights or heating control and door communication - comfort, safety and energy efficiency are easy to network. With the new Firmware update (version 1.2) it is also possible to integrate Philips hue LEDs into the system and control them via the ABB-free@home® app. This allows not only the intensity of the light to be adjusted, but also its colour. Many options - one operating concept.

For more information: www.abb.com/freeathome

Benefits

- The user-friendly app of ABB-free@home®, used via smartphone or tablet, make home automation for residents easy as surfing the internet
- Easy to install, configure and easy to reprogram thanks to the intuitive operation of the ABB-free@home® system
- Fast change of scene(ry)
- Philips hue LED integration

Smart Home and Intelligent Building Control

Thermoelectric Valve Drives

Controlling valves in HVAC applications

The new range of thermoelectric valve drives can be used to open and close valves in heating, ventilation and air conditioning systems.
The drives are available in a 230 V and 24 V version and consume only 1 Watt during operation. The devices feature a compact and splash proof housing and can be mounted on all common valves by means of special valve adapters.

For more information: www.abb.com/knx

Benefits

- Energy efficient, thanks to an operation power consumption of just 1 W
- Compact housing and state of the art design
- Valve adapters fitting to all common valve types
- Available with 230 V and 24 V operational voltage

Smart Home and Intelligent Building Control

ABB i-bus KNX Fan Coil Actuators

Energy efficient and flexible room climate control

With the new range of four Fan Coil Actuators for controlling Fan Coil Units, ABB offers new solutions for an energy efficient and flexible room climate control with KNX. The new Fan Coil Actuators are available in two variants, each with or without manual operation. The variants differ in the kind of valve control. One variant features two analogue output channels to control two motor valve drives by 0-10 V signals. The other variant features four electronic outputs to control up to four thermoelectric valve drives by Pulse Width Modulation (PWM) or up to two motor valve drives. The kind of control can be flexible to be programmed for each output channel. The new Fan Coil Actuators support the ABB i-bus Tool enabling advanced diagnosis and improved commissioning – for saving time on the construction site.

For more information: www.abb.com/knx

Benefits

- Support of the ABB i-bus Tool for advanced diagnosis and improved commissioning
- 3 universal inputs (binary or analog) for the connection of binary contacts (e.g. drip tray, window contact) or temperature sensors
- Cost efficient devices without manual operation and premium versions with manual operation for easier commissioning and installation

Modern light management.
New Busch-Presence detectors KNX.

Saving Energy smart with an ultra slim design – detection quality without compromise. The enlarged assortment includes solutions for offices, classrooms, warehouses and sports facilities. Harvesting the daylight and saving up to 40% energy, it is perfectly designed to meet EN15232:2012 and with 8, 12 and 24 meter, it guarantees a bigger detection area than before. The premium versions offers 4 separate channels, IR receiver and even includes a full room temperature controller. Find more information at **www.busch-jaeger.de/en/**

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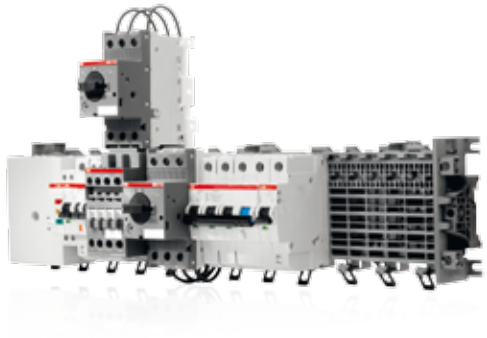
Protection

SMISSLINE TP System upgrades

Power and Safety



The SMISSLINE TP plug-in socket system allows for load-free plugging-in and unplugging of live devices and components without requirement of additional personal safety equipment for protection against electrical hazards. It allows saving of time thanks to the plug-in devices and saving of space in the control cabinet thanks to the vertical installation of the bus-bar sockets. Easy and quick maintenance of the switchboard is guaranteed thanks to input wiring already integrated in the plug-in socket system, thus the installation is better arranged and tidier to be checked, even by a non-high qualified personnel.
SMISSLINE TP is upgraded with the introduction of new generation products: new S400 MCBs, new FS403 RCBOs and new Universal Adapters, improving once more the specific benefits of the entire solutions.

For more information: http://new.abb.com/low-voltage/products/system-pro-m/smissline-tp

Benefits

- Safety: similar to all the System pro *M* compact® S200, even S400 MCBs are suited with a real contact position indication (real CPI). You can easily identify, if the MCB is in the ON or the OFF position – easy and safe maintenance work is possible.
- Furthermore both S400 MCBs and FS403 RCBOs are now equipped with bi-directional cylinder-lift terminal for easier and quicker connections. It also avoids errors by preventing the use of free cable seats and with it eliminates industrial accidents deriving from incorrect wiring right from the start.
- Easy and quick maintenance: thanks to the label carrier included now in both MCB and RCBO range, the installation will be tidier and the identification of the protected circuit will be easier and quicker, especially during service, reducing once more and once again the amount of time for maintenance, which saves money.
- Environmentally friendly: new generation of both S400 MCBs and FS403 RCBOs move to the new latest generation of halogen free thermoplastics, making the devices completely recyclable without environmental pollution.
- Easy selection: new range of Universal Adapters for ease of installation on the SMISSLINE TP socket for traditional DIN rail non-pluggable devices, confirming the higher flexibility of the system. New single pole adapter are now equipped with moveable plug-in back terminal that can be moved easily between L1, L2 and L3 according to the project requirements. It is not anymore necessary to know in advance the final use of the adapters, single pole, 2-poles, 3-poles + neutral, but it can be purchased at the real beginning of the project, creating even a stock, and adapted according to the use during the installation. You can easily create multi poles version combining different adapters together with a simple connector.

SMISSLINE TP. Touch proof system. Power and Safety.

Absolutely safe without protective equipment: SMISSLINE TP ensures that load-free devices and components can be snapped on and off under supply voltage without the need of additional personal protective equipment to guard against electrical hazards. This opens up completely new prospects when it comes to installation, operation and flexibility. **www.abb.com/lowvoltage**

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ABB

Smart Home and Intelligent Building Control

KNX presence and movement detectors

A new generation of KNX presence and movement detectors

ABB has developed a new generation of KNX presence and movement detectors. All the models have an excellent detection quality and range, despite being extremely flat – the installation depth for flush-mounting on the ceiling is merely 16 or 23 mm, depending on the type. Not only this technology is innovative, but it is also delivered with an elegant design, based on a quadratic structure with rounded corners.
Presence and movement detectors make a valuable contribution towards more comfort and energy efficiency, as they switch the light on and off as required, for instance, when entering or leaving a room or at specific time.
The Premium and Sky versions can also be switched on in programming mode using a standard, infrared, remote control.
For surface mounting, special surface housings with a bayonet connection are available.

Brochure: BJE 0001-0-1259

Benefits

- ABB's new generation of models offers ideal solutions to suit the different requirements for KNX installations in the private sector, as well as in offices, schools and hospitals
- Harvesting the daylight and saving up to 40% energy is the perfect design to meet EN15232:2012 with 8,12 and 24 meters detection area much bigger than before
- Simple and fast installation to set-up
- Premium models are additionally fitted with a temperature sensor and can also act as room temperature controller
- The new ETS applications also include the option for switching the light off in two stages

Can we keep turnarounds brief?

Definitely.

Until the AF range was installed, voltage sags were affecting MacGregor's deck cranes. Conventional contactors welded shut, leading to several stoppages a week. No longer. Thanks to the superior quality and ability to operate in the most hostile environments, MacGregor deck cranes enjoy a global reputation for reliability. A small but vital component, the AF contactor helps maintain this reputation.
To keep things moving, you need Control.
Connect to Control. www.abb.com/connecttocontrol

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ABB

Enclosures

System pro *E* energy TwinLine S 43

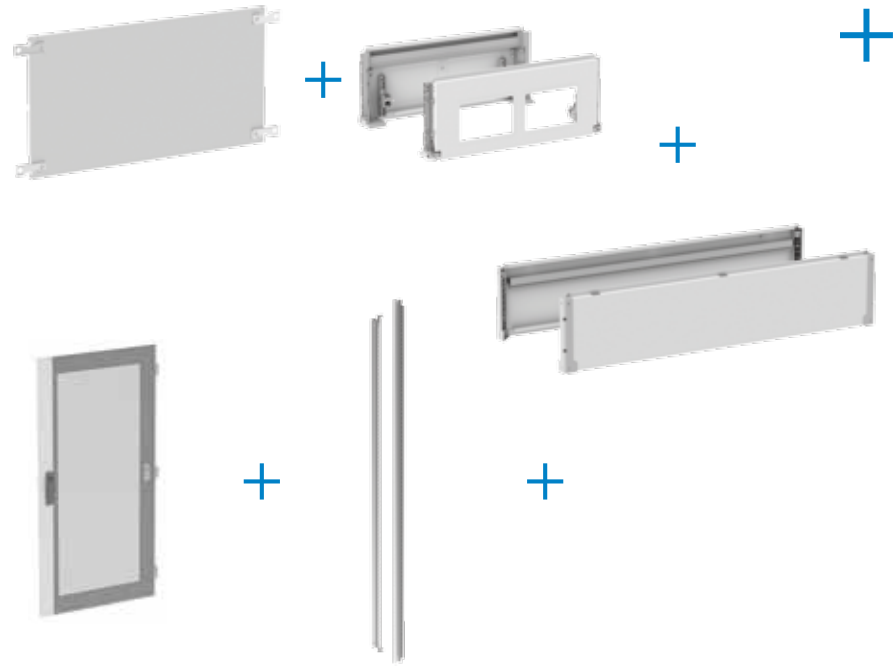
ABB's new innovative Sub-distribution system

With its TwinLine S 43 system, ABB offers a tailored and proven concept of modular wall-mounting and floor-standing cabinets. This fully comprehensive product range includes the cabinet types TwinLine-G (depth of 225 mm) and TwinLine-L (depth of 275 mm) and provides solutions for every application.
All cabinets are designed according to IEC 61439. The modular system offers a simple planning, quick assembly and is safe in application. Highlights such as the innovative flange technology, optimal accessibility, ease of cabinet connection, the modular plinth concept and a flexible assembly of the new internal configuration, guarantee a modern energy distribution system.
System pro E energy TwinLine S 43 will be the successor of ArTu L and has already been launched as welded version for the North European area. With the new TwinLine S 43 system and the internal configuration system CombiLine S, ABB offers a tailored and proven concept of modular wall-mounting and floor-standing cabinets.

TwinLine Product benefits at a glance:
- Fast and quick assembly of the enclosure
- Innovative cable entry
- Simple connection of all cabinets
- Modular plinth concept
- Optimal accessibility
- Flexibility in assembly

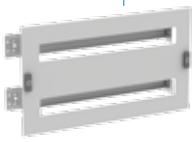
CombiLine S, the new modular distribution panel system with metal covers is simple, quick and safe to assemble. One intern system fits all cabinets of TwinLine S 43. With its full range of applications and optimal accessibility for installation it is simple to configure and quick to build-up.

For more information: http://new.abb.com/low-voltage/products/system-pro-e/system-pro-e-energy



Tmax breakers

OT breakers



DIN rail components

Standard covers

Covers for measuring instruments

Mounting plates

Internal form of separation form 2b

Busbar systems

Accessories

Benefits

- Innovative cable entry
  The usable cable entry area is one of largest one available on the market. A wide range of flange types provide the right solution for every application. All flanges are suited for all flange openings and knockouts of the complete TwinLine cabinets. The flanges can be attached without the need of tools thanks to the handy push and lock technology.
- Simple connection of all cabinets
  All TwinLine cabinets can be connected in both directions, horizontal and vertical. Uprights for side-by-side positioning and connection sets for stacking the cabinets can be easily installed.
- Modular plinth concept
  The new plinth concept provides a safe transport in the workshop and on-site. The plinth contains knockouts and has the possibility to install wiring ducts for cable support. The standard heights of 50 mm and 100 mm can be stacked and combined in order to fulfill installation needs.
- Optimal accessibility
  TwinLine offers unrestricted access during operation, expansion, maintenance and functional monitoring. With its 180-degree door opening and the door locking system, with the possibility to switch the door hinges from right to left, it guarantees excellent flexibility. The removable frame as standard option gives the possibility to remove all covers in one handling and provides a quick assembly.
- New internal configuration system
  With its wide range of the new modular distribution panel system, called CombiLine S, ABB offers the right solution for every application. The internal configuration system fits in all TwinLine S 43 cabinets. CombiLine S provide a time-saving installation due to the hook-in technology and a simple closure system for covers with the ¼ turn quick-lock.
- Flexibility in assembly
  With its new mounting concept for the CombiLine S system, TwinLine provides more flexibility and access for installation and wiring, even outside of the cabinet. There is also the option to have continuous mounting plates that can be adjusted in depth.

Control

E 290 / E 297
Latching and installation relays

Lighting up every application

E 290 and E 297 are the new latching and installation relays used to realize a simple, energy saving and efficient lighting control system, in all buildings which need the lights to be controlled. The main function is to make possible the control of lights, air conditioning system switch and fans from more than two points without the need of difficult wiring.

Catalog: 2CCC441020C0201

Benefits

- Completeness: a wide and complete range of accessories for switching and control
- Easy installation thanks to the connection diagrams directly printed on the housing of the product
- Products delivered with open terminals: ready for a faster installation
- Control more lamps: with the additional contact module you can control up to 4 lines with the same latching relay
- Flexibility: all the accessories can be installed to the devices according to application's needs
- Expand your applications thanks to the wide range of coil voltages, both for AC and DC
- Easy maintenance: the lever shows the status of the contacts, providing the possibility to manually test its functionality during the first installation.
- Energy saving, thanks to the coils' optimized consumptions

Flexibility without complexity?

TwinLine S 43

ABB's innovative sub-distribution System pro *E* energy – TwinLine S 43. With its new modular system, ABB offers a tailored and proven concept of modular wall-mounting and floor-standing cabinets. This fully comprehensive product range includes the cabinet types TwinLine-G (depth of 225 mm) and TwinLine-L (depth of 275 mm) and provides solutions for every application. All cabinets are designed according to IEC 61439. This modular system is simple in planning, quick in assembly and safe in application. Highlights such as the innovative flange technology, optimal accessibility, ease of cabinet connection, the modular plinth concept and a flexible assembly of the new internal configuration, guarantee a modern energy distribution system.
Simple in planning – quick in assembly – safe in application!

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In the news

Many apps, software, brochures and leaflets are available to provide support, in-depth and detailed product information. Documents and software can be downloaded from http://www.abb.com/abblibrary/DownloadCenter/

Technical catalog

S800 technical catalog

The high performance MCB

ABB high performance miniature circuit breakers are an everlasting worldwide success, thanks to continuous innovation and development of new products and accessories for selected segments like wind, solar power and process automation. The new edition of S800/S500 technical catalogue features all new products introduced in the last years plus a new technical chapter featuring derating's tables.

Catalog: 2CCC413003C0204

Brochure

SMISSLINE TP - Touch proof system

Power and Safety

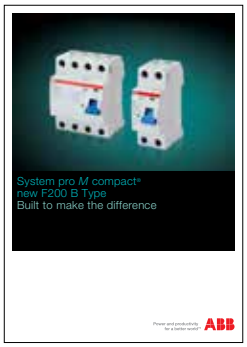
SMISSLINE TP system is the best solution for sub-distribution systems when it comes to meet high demanding requirements and expectations in Critical Power applications: Data Center, Hospital, Airports, Banks and Insurance buildings. In this brochure you can learn in quick and easy way the main benefits and advantages SMISSLINE TP system can bring for specific application.

Leaflet: 2CCC451045L0201

Brochure

F200 B Type Brochure and Landing page

Built to make the difference



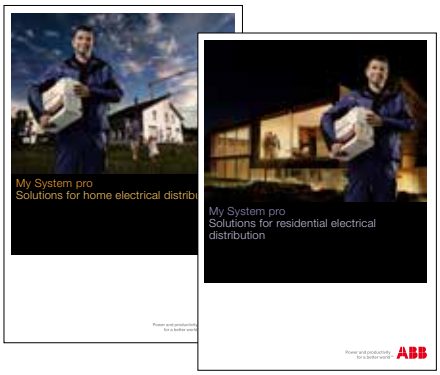
F200 B Type is now available on ABB.com giving the overview of the product, explaining the benefit and features at a glance.
Follow QR code below in order to download the Brochure for RCCB B Type. In the brochure you find detailed information about the product, the application overview, Technical informations, product codes and FAQs. Explore to know more about RCCB B Type.

Brochure: 2CSC423015B0201

Technical catalogs

Residential catalogs

Enclosures and DIN Rail solutions for residential installations



The brand new international catalogs about residential solutions and products are now available! Many application and examples are displayed to get the best protection and comfort using a comprehensive fully integrated range of highly reliable and easy to install products.
Depending on the requirement in your respective country you can focus on product selection from both versions of the catalogs which showcase products and solutions as follows:

- My System pro. Solutions for home electrical distribution. If you are offering SH200 MCBs and FH200 RCCBs on local residential segment, this catalog is your best choice!
- My System pro. Solutions for residential electrical distribution. It is the right choice if you are offering S 200 MCBs and F200 RCCBs for all applications. Use it today to grow ABB penetration, turnover and market share in residential segment!

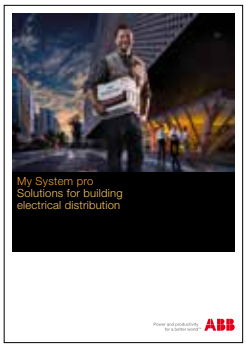
My System pro. Solutions for home electrical distribution: 2CSC000004D0201

My System pro. Solutions for residential electrical distribution: 2CSC000003D0201

Technical catalog

Building catalog

Enclosures and DIN Rail solutions for buildings



System pro main catalog is now focused on building applications. Made to be the Customers' all-in-one toolbox - from system design, to product selection, to installation - System pro features more than 7.000 items.
For every product presented into the catalog, Customers can find:

- a detailed description with application and benefits
- product selection tables
- technical features table
- technical insights such as data sheets, coordination tables, Standards background, application wiring schemes
- overall dimension drawings
- Approvals and Standards

A special annex is also available dedicated to technical information like characteristic curves, power loss values, installation tips etc.

My System pro. Solutions for building electrical distribution: 2CSC000001D0201

Technical specification

Switchboards for insulated networks (IT-M)

Technical specification document

ABB range of switchboards for group 2 medical locations is worldwide recognized and appreciated for its reliability, completeness and high level performance: for this reason, it fulfills strict requirements in order to ensure maximum safety and service continuity. If you are a Consultant and you want to find the right information, download the document using the QR code; inside you will find Standards and requirements, specific technical characteristics according to power, main equipments and more.

Technical specification: 9AAK10103A1453

Web Content

Discover the new LP Solar Segment App on your iPad

Low Voltage products and Solutions for Solar Photovoltaic

ABB offers the most comprehensive solar solutions portfolio in the industry, supported by a global sales, service and manufacturing footprint. We can meet product, solution and service needs for residential or commercial rooftop applications, large-scale PV plants, grid connection and integration solutions as well as microgrid or solar pump applications.This app enables you to discover our full solar offering across applications, including the industry's broadest range of solar inverters, low voltage products, monitoring and control systems, grid connection, stabilization and integration products, as well as complete electrical balance of plant solutions. ABB also offers a wide range of services including remote operation and maintenance.

Apple App Store

Web Content

Discover the new LP Solar Segment webpage

Low Voltage products and Solutions for Solar Photovoltaic

ABB provides the most comprehensive portfolio of products, systems and solutions along the solar PV value chain that enable the generation, transmission and distribution of solar power for both on-grid and off-grid applications.
The ABB product range includes circuit breakers, switch disconnectors, fuse disconnectors, fuses, residual current-operated circuit-breakers, grid connection relays, metering devices, surge arresters, voltage & current sensors, remote switching contactors, consumer units and enclosures suitable for outdoor installation, all specially designed for these applications. ABB can also provide a series of "plug & play" solutions, i.e. finished, wired and certified string/combiner boxes able to suit the requirements of a vast range of installations: from individual strings for residential applications to large photovoltaic plants.

Link: http://new.abb.com/low-voltage/industries/solar

New E 90 50/125 fuse disconnectors.
Perfect integration, guaranteed innovation

Overloads and short circuits protection in installations with rated currents up to 125A, compliance with the major international standards, compactness and reliability: these are the winning features of the new line of fuse disconnectors E 90 50/125. A wide range of solution offering the technology state-of-the-art in safety and comfort (such as LED for blown fuse indication), designed to assure the maximum efficiency in industrial applications, manufacturing systems and power generation - everywhere in the world. **www.abb.com/lowvoltage**

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ABB

Software

e-Design

New engineering software suite

ABB presents e-Design, the new engineering software suite to meet the needs of electrical sector professionals working in a constantly changing market. e-Design makes it possible to design an electrical system, optimizing production times to the maximum, thanks to the ability to access a product portfolio to be used in synergy through intuitive and simple functionalities. The suite's appealing and brand-new look, combined with a general optimization of the functionalities that have always characterized ABB software, make it an innovative tool in step with the technologies currently available in this sector.

Download e-Design suite:

www.abb.com/edesign-software

Smartphone Apps

Low Voltage Wizard

The right choice always in your hand

Low Voltage Wizard is an APP to easily select products for low voltage installations with few simple steps wherever you are.
Low Voltage Wizard helps you to select ABB codes among the following product ranges:

- S 200 Miniature Circuit Breakers
- EQ Energy Meters
- OVR Surge protective devices
- DS201 residual current breaker operators RCBO
- E 90 DIN-Rail fuse holders and E 9F cylindrical fuses
- CT current transformers for measuring system
- Power transformers
- OTDC switch disconnectors for photovoltaic application
- EOT enclosed switches
- AF contactors
- Electro Wizard, helps you know the voltage, frequency and ABB DIN rail socket that could be installed in each country.

With a few clicks, the Low Voltage Wizard displays the correct product code, lists technical characteristics and documenation links.
Features:

- Step-by-step selection of ABB product code
- Selection starts with installation requirements
- Email export of the results
- Documentation links (web site, technical catalogue, instructions manual and brochures)

Apple App Store

Google Play

Marketing Tool

Garage Nuggets

Multimedia contents for multichannel marketing

ABB Garage Nuggets is the new multimedia platform intended to communicate information to customers and installers in a clear and simple format. ABB Garage Nuggets are short videos telling about low voltage products and their applications. The contents are selected keeping the installers in mind. By seeing nuggets we make their life simpler and easier to understand the applications and the related product offering from ABB.
There are presently 3 nuggets available. To suit the requirements for various countries the nuggets are available in English, French and Spanish versions.

ABB Garage Nugget #1
Seen from inside! Hidden aspect of OVR T1 SPDs

ABB Garage Nugget #2
Let's construct the safety on the extra low voltage

ABB Garage Nugget #3
The importance of energy saving starting with a twilight switch

Web Content

Just launched – ABB new building portal

Experience ABB's full range of innovative building technologies

ABB recently launched its new building portal featuring a full range of innovative building technologies that offer customers sustainable solutions and modern design.
ABB customers can now select easily all relevant products that make their buildings smarter, more efficient and comfortable by visiting ABB's Building portal. With buildings consuming about 40% of the world's energy*, ABB can help customers achieve 20 to 40% in potential energy savings.
The new portal focuses on two distinct segments:

(1) Living Space® which features residential and home solutions.
(2) Building Space® highlighting solutions for commercial and industrial buildings including hotels, hospitals or other public buildings such as universities or stadiums.

*Source: World Energy Council

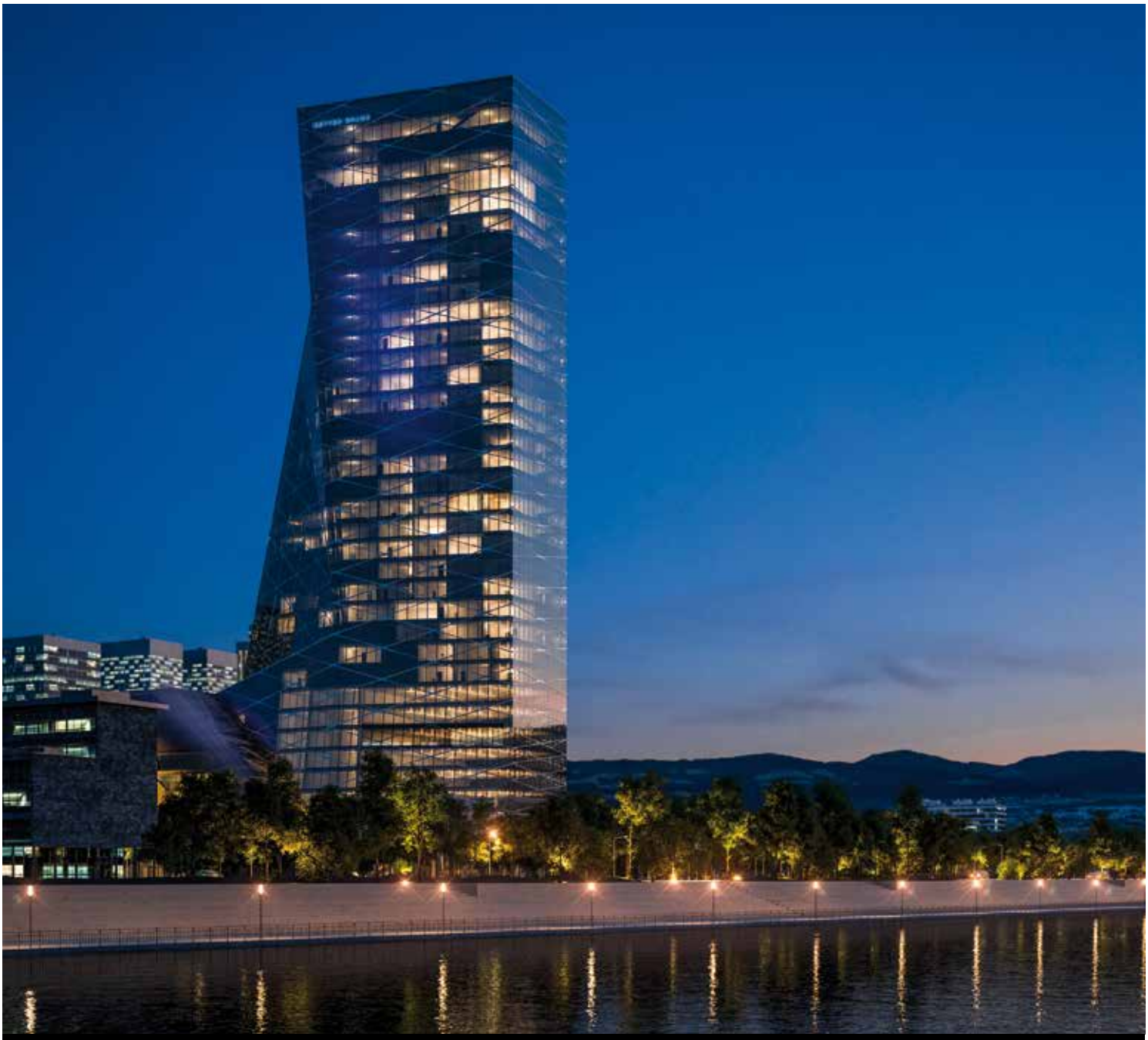
Visit **http://new.abb.com/buildings**
to learn more about ABB's building offerings.

Web Content

Discover the "Better Space Hotel"

Comprehensive solutions for hotels

Have you ever walked through a large, modern hotel and asked yourself if ABB products are inside? Of course, very fast you´ll discover switches, touch points or emergency lightings from ABB. But inside the electrical room and behind the walls there are many more products from ABB.
ABB has a huge offering for hotels. That's why ABB created a virtual hotel that showcases its offerings to architects, system integrators, consultants and many more.
Within the so called "Better Space Hotel", ABB customers can find numerous components from low voltage products to drives and motors to power products. The goal is to present the complete hotel offering by the end of 2015. Nevertheless, it is worth to already discover the hotel of the future.
Visit **http://new.abb.com/buildings/hotels**
to learn more about ABB's hotel offerings.



Check in at a better hotel?

Hotel guests of today expect perfection in everything: design, comfort, security and energy efficiency. ABB offers comprehensive solutions for hotels in order to fulfill these requirements. Discover the ABB Better Space Hotel and experience how everything is interactively linked: energy distribution and management, architecture, air conditioning, lighting and entertainment. Check in to the future now: **new.abb.com/buildings/hotels**

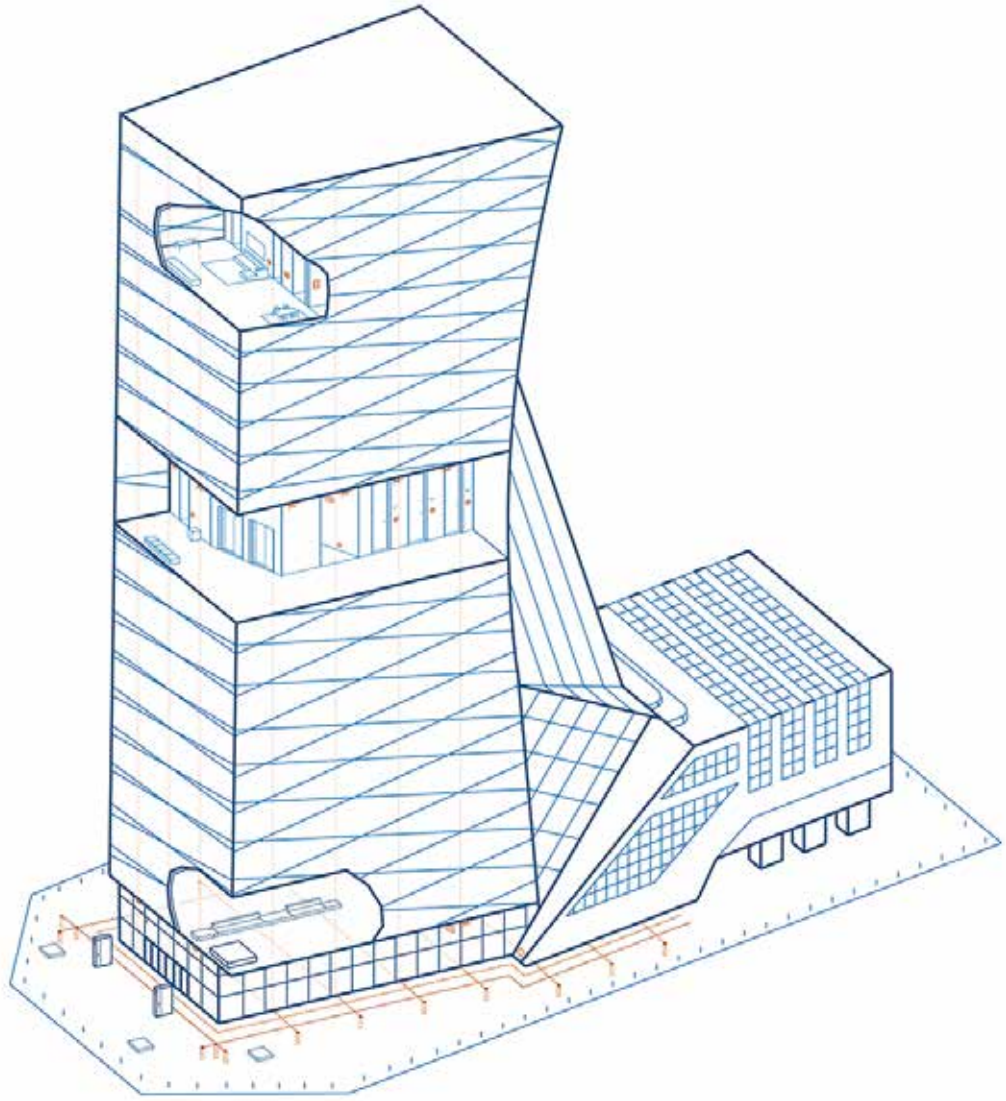
Now.

Power and productivity
for a better world™

ABB

Top 7

Thanks to its expertise, ABB offers the best solutions and most effective products for Hotel application: a comprehensive fully integrated range of highly reliable, easy-to-install products, covering several function and needs. Comfort and protection are closely linked. They are linked to factors such as personal safety, energy savings, environmental sustainability, economic advantage. Nowadays, new buildings are based on higher building standards and regulations: state-of-the-art materials and products are designed, installed and operated to deliver unimaginable levels of well-being and safety.



Sub distribution

System pro *E* energy and comfort

System pro *E* energy and System pro *E* comfort® Reliability and freedom of choice with ABB

System pro *E* energy and System pro *E* comfort® are the latest generation of ABB enclosures for the sub distribution and the final distribution. Thanks to their reliability and wide availability of ranges and sizes, they can fit perfectly in any kind of building intended for people's lodging: from simple and sober hostels up to the most luxurious and modern hotels. With System pro *E* energy and System pro *E* comfort®, the whole hospitality industry can rely on a first-class quality assortment of enclosures and accessories able to satisfy any kind of requirement in terms of electrical enclosures system: elegant and discreet consumer units and extremely sturdy and safe sub distribution enclosures (up to 850A rated current) with endless possible internal configurations.

Sub distribution

DIN-Rail

Safety with ABB

Through its System pro *M* Compact® range, ABB makes a full product portfolio available to residential and non-residential building plant designers and installers. Reliable, easy to use, based on advanced technology these products were born of the research and know-how of one of the world's greatest industrial leaders. Protecting means safeguarding users, environments and equipment against risks and damage linked to improper usage conditions or breakdown. Surge, overloads, short circuits or earth leakage currents are dangerous situations which, with no adequate control, can damage the plant and lead to bad accidents like fulmination, fire, flooding or explosion. Miniature circuit breakers (MCBs), residual current devices (RCDs) allow you to make installations and equipments safer, offering users the certainty that their plants always satisfy parameters established by the most binding international standards.

Sub distribution

Metering

Energy efficiency with ABB

Climate change and growing shortages of resources are the biggest challenges of our time. Following the areas of transport and power generation, building technology is the largest consumer of energy. Heating, cooling and lighting in residential and office buildings make up approximately 40 % of the energy consumed in industrial nations – a share that leaves a lot of scope for energy optimization. Using metering to identify where the energy is consumed and implementing ABB's building automation solution enables energy savings in the double-digits percentage in hotels - a significant contribution to climate protection and to reduce the operational costs of hotels.

Lightning Protection

OVR

For a safe surge and lightning protection

OVR is ABB range of surge protective devices (SPDs) made for surge and lightning protection in service entrance and sub-distribution boards location.
The choice of surge arrester is made accordingly to several characteristics:

- Maximum discharge capability: Iimp or Imax
- Protection level : Up
- Network earthing system
- Operating voltage (Uc) according to the nominal voltage (Un)

There are two types of SPDs: Type 1 (10/350µs) and Type 2 (8/20µs) that use two major technologies, Spark gap / Gas Tube and Varistors (MOVs).They are developed to fit in all type of networks, in particular OVR TC, OVR T1 and OVR T2 which are suitable for commercial and residential applications.

Lightning Protection

ABB Furse

Protection against lightnings and overvoltage failures

ABB Furse provide leading earthing, lightning and electronic system protections. From the design and manufacturing of the products through to the risk assessment and system design advice.
From air termination systems including air rods and strike plates to capture lightning strikes, through to a comprehensive range of down conductors and lightning protection components which channel lightning energy safely to an earth termination network.
Additionally the exhaustive range of equipotential bonding and transient overvoltage SPDs provide fully coordinated protection against transient overvoltages on all incoming and outgoing metallic service lines including power, data, signal & telecoms.
These products, coupled with expert design and technical support services including risk assessments, soil resistivity surveys, design verification and engineered designs to specific client specifications, means a truly comprehensive Total Solution is available for all earthing and lightning protection requirements.

Building Automation

ABB i-bus KNX

Modern electrical installation technology at your service

ABB i-bus KNX helps guarantee a luxurious and comfortable environment - ensuring that guests will want to visit again and again. A hotel is made up of much more than just rooms, it is a building teeming with life and emotions. Furthermore, it possesses many different spaces with diverse usage. Here too, ABB‘s intelligent building control solutions offer outstanding options for assuring efficient and environmentally friendly operation in e.g., receptions, public areas, seminar rooms, restaurants and outdoor facilities.

Wiring Accessories

Wiring Accessories

Design, Comfort, Efficiency and Safety

Design, comfort and a sense of security are what characterize the atmosphere in high-class hotels. Modern electrical installation technology sets the tone for days activities. You will transport guests into the future with fascinating switch ranges and state-of-the-art technology for the perfect control of light, shading, climate, media and at the same time profit from efficiency, because most of them will automatically adjust.

Good morning DIN-Rail

ABB answers many questions posted for our experts through email. Send your technical questions to mail.daybydin@abb.com, the most interesting ones will be published and answered in the next issues of Day by DIN.

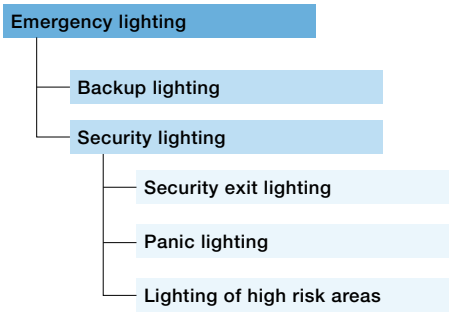
Valentina Surini: *Product Marketing Manager - DIN-Rail Products*

Safety lighting

To which standard are the different types of emergency lighting compliant and how they differentiate one from another?

The benchmark in the field of emergency lighting is the standard UNI EN 1838, which is designed to provide lighting requirements. Section 56 of CEI 64-8, conversely, contains provisions in terms of power supply systems for security services, including security lighting. The mandatory nature of providing security lighting derives mainly from national laws. For the purposes of the provisions, the regulatory standard states that the term "emergency lighting" has a generic meaning and, according to the purpose, can be distinguished as:

– backup lighting;
– security lighting.



Regarding security lighting, a further distinction is made for:

– security exit lighting;
– panic lighting;
– lighting of high risk areas.

Panic lighting

Designed to avoid panic situations, it provides the necessary illumination to reach a place where an escape route can be identified.

To fulfill this function, the minimum lighting requirements prescribed by the standard UNI EN 1838 are:

– horizontal illumination on the ground of no less than 0.5 lx over the entire area, with the exception of a peripheral band 0.5 m wide (uniformity 40:1, high-low ratio);
– must guarantee 50% of the illumination required within 5 s, 100% within 60 s;
– minimum autonomy of no less than 1 hour.

Exit lighting

Must ensure that escape routes are clearly identified. To fulfill this function, the minimum technical lighting requirements of the standard UNI EN1838 are:

– horizontal illuminance on the floor of the escape route at least 1 lx on the center line and at least 50% of the previous value on the central strip, minimum 2 m wide (uniformity 40: 1, high-low ratio);
– must guarantee 50% of the illumination required within 5 s, 100% within 60 s;
– minimum autonomy of no less than 1 hour.

Lighting of high risk areas

Aims to ensure the safety of persons involved in hazardous work processes and the implementation of safety procedures.

To fulfill this function, the minimum lighting requirements prescribed by the standard UNI EN 1838 are:

– horizontal illumination on the reference plane no less than 10% of expected illuminance during normal activities and, in any case, no less than 15 lx (uniformity 10: 1, high-low ratio);
– must ensure 100% of required lighting within 0.5 s, or permanent lighting depending on the application;
– minimum autonomy not explicitly set, but at least it should be the time needed to implement safety procedures.

Minimum installation points

The standard UNI EN 1838 also sets the minimum installation points for security luminaires, including each exit door intended for use in an emergency and close to every staircase (light directed at every ramp), change of level or direction, intersection of corridors, exit points (outside and in the vicinity), first aid point, fire prevention system or reporting point.

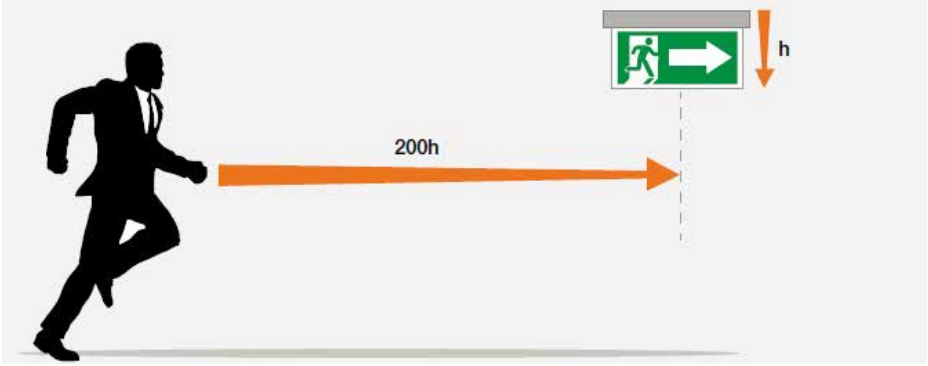
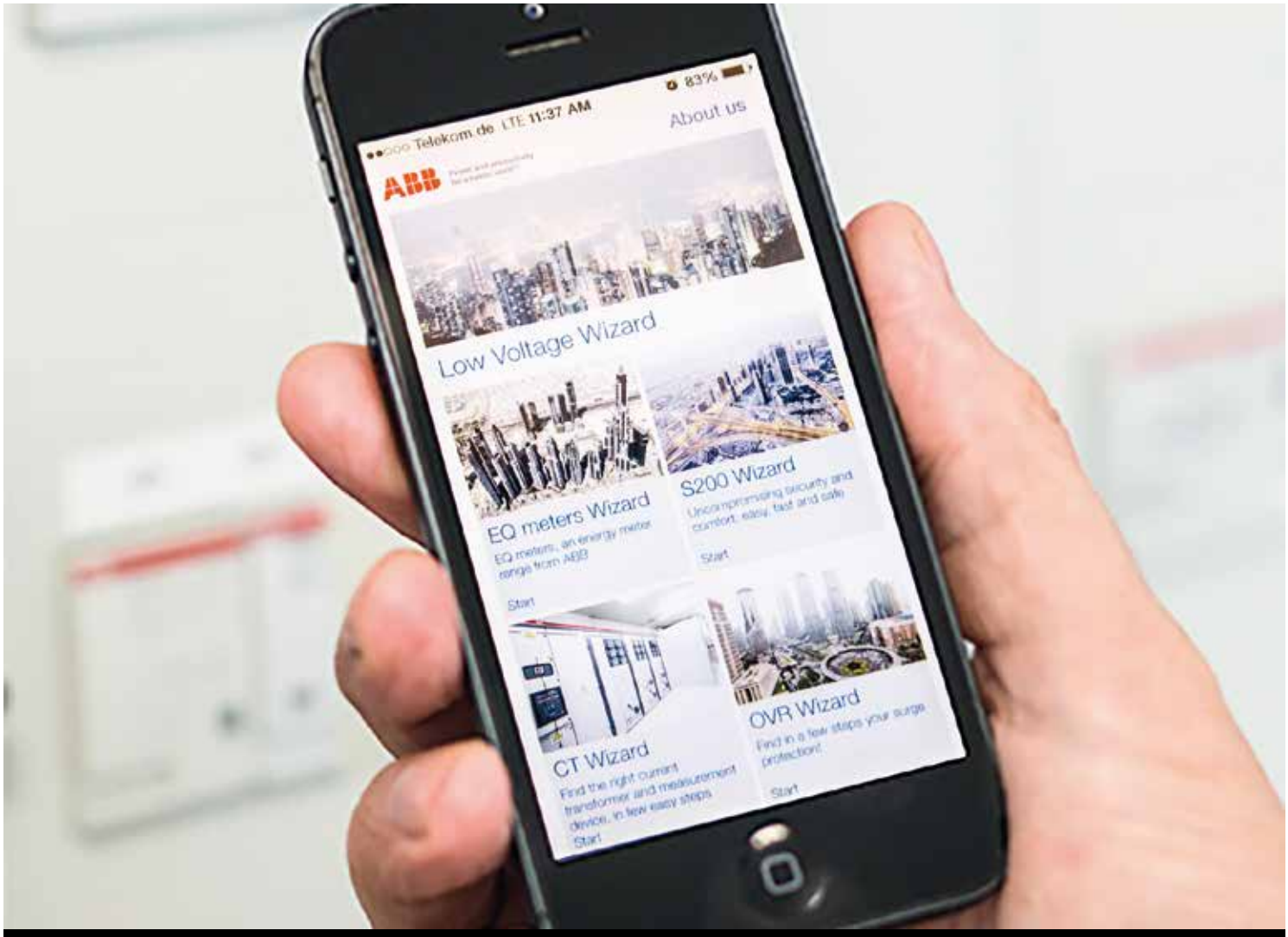


ABB offers a complete portfolio of emergency lighting systems giving support through experts that can assist you with the EN 1838 emergency lighting Standard.

For more information:
http://new.abb.com/low-voltage/products/lighting-emergency-lighting/emergency-lighting



Low Voltage Wizard. The right choice always in your hand.

ABB's Low Voltage Wizard allows you to easily find low voltage products for your installation needs. Instead of spending hours searching through catalogs or web sites, use the ABB Wizard everywhere to find the right product at the right time. Navigate quickly to specific product part numbers as well as brochures, catalogs, technical data, etc. Download the app now by clicking on the QR code from iTunes or Google Play store. For more information please visit: **www.abb.com/lowvoltage**

Power and productivity
for a better world™

Doktor Wise
The expert answers

Electricity - life can no longer be imagined without. But as helpful electricity is, we need to protect ourselves and our property from failures such as short circuits or overloads. Therefore Miniature Circuit Breakers (MCBs) are used every day. As there are a lot of different applications and various MCBs available, it is important to choose the right device. This article will give some useful hints about the tripping curve of ABB's MCBs.

Stefan Riemensperger: *Product Marketing Manager - DIN-Rail products*

How to read a tripping curve – Part 2

It's "just" an MCB – this is what we hear very often. But going into the details we figure out that MCBs are much more complicated. Designing an energy distribution system means not only taking care of some "frame-conditions" like breaking capacity and nominal current – many other points have to be observed.

Part 1 of this article was issued in the Day by DIN 1|2015. It is about the basic funtions of an MCB and the basic interpretation of a tripping curve. As MCBs are electromechanical devices they underlay different circumstances. So part 2 will close some gaps in terms of influences such as temperature or altitude.

Components of an MCB

From the former article we know that an MCB has major properties:

Short circuit protection, realized by a coil; overload protection, realized by a bi-metal re-closable, using the toggle in the front; free tripping mechanism, to prevent operating error.

Temperature

Let's talk about a "normal", natural ambient temperatures. This has no influence on the tripping mechanism, so re-closing or the free tripping mechanism are not affected. Also the coil and therefore the short circuit protection is temperature independent. But the overload protection, realized by a bimetal, is definitely influenced!

An MCB has an inner resistance (copper, contacts etc.). Due to this resistance, the device is generating a power-loss, which is at least "heat"! As long as an MCB is installed "free in air", the air can circulate around the MCB, it is cooled down and nothing happens. This is how MCBs are tested in the lab according to the standards and the values for the datasheets are measured. But imagine: have you ever seen an application with an MCB "free in air"?

So what can influence "temperature"?

- The ambient temperature
- Devices mounted in an enclosure
  If there is no active ventilation build in, the air inside the enclosure will be heated up by the devices built in (power-loss)
- Adjacent devices
  Mounting two or more MCBs next to each other means, the air can't circulate good enough anymore and the devices heat up

Ambient temperature

Of course the ambient temperature has an influence on the MCB, but as the MCB is e.g. operated @ -10°C the cable connected to the MCB is also operated @ -10°C! Evaluate carefully if this can influence the system!
As an example (table 1) an S 200 C16 MCB is operated @ 50°C: the nominal current is no longer 16A but reduced to 14.1A.

Influence of adjacent devices

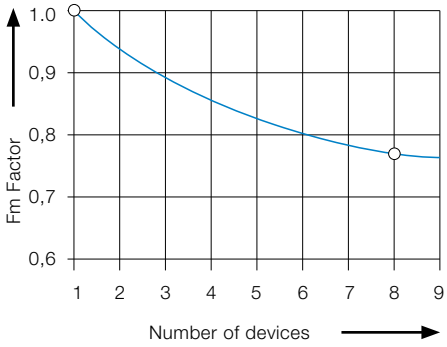
Operating 3 of the mentioned S 200 C16 MCBs @ 30°C, please refer to table 2.
Calculation (example):
I_n = 16A x 0.9 = 14.4A

B, C and D	Ambient temperature T (°C)													
In (A)	-40	-30	-25	-20	-10	0	10	20	30	40	50	55	60	70
10.0	13.3	12.9	12.7	12.5	12.0	11.5	11.1	10.5	10.0	9.4	8.8	8.5	8.2	7.5
13.0	17.3	16.8	16.5	16.2	15.6	15.0	14.4	13.7	13.0	12.3	11.5	11.1	10.6	9.7
16.0	21.3	20.7	20.4	20.0	19.2	18.5	17.7	16.9	16.0	15.1	14.1	13.6	13.1	11.9
20.0	26.7	25.8	25.4	24.9	24.0	23.1	22.1	21.1	20.0	18.9	17.6	17.0	16.3	14.9

Table 1

Influence of adjacent devices Correction factor Fm	
No, of adjacent devices	Fm
1	1
2	0.95
3	0.9
4	0.86
5	0.82
6	0.795
7	0.78
8	0.77
9	0.76
> 9	0.76

Table 2



Influence of adjacent devices S200, DS200, DDA 200+S 200

The magnetic tripping device

The magnetic tripping device is temperature independent. Therefore different frequencies have an influence as the magnetic field is different. Please see table 3: Operating the example MCB in a 200Hz net, following calculation give us the new values:
Trip @ 50Hz: between 5…10x I_n
Trip @ 200Hz: between (5x1.2)…(10x1.2) xIn = 6…12xI_n

Altitude

Altitude means less air and therefore less ventilation or heat dissipation. Both, magnetic and thermal release are influenced! A reduction factor, as stated in the catalogue, must be taken into consideration.

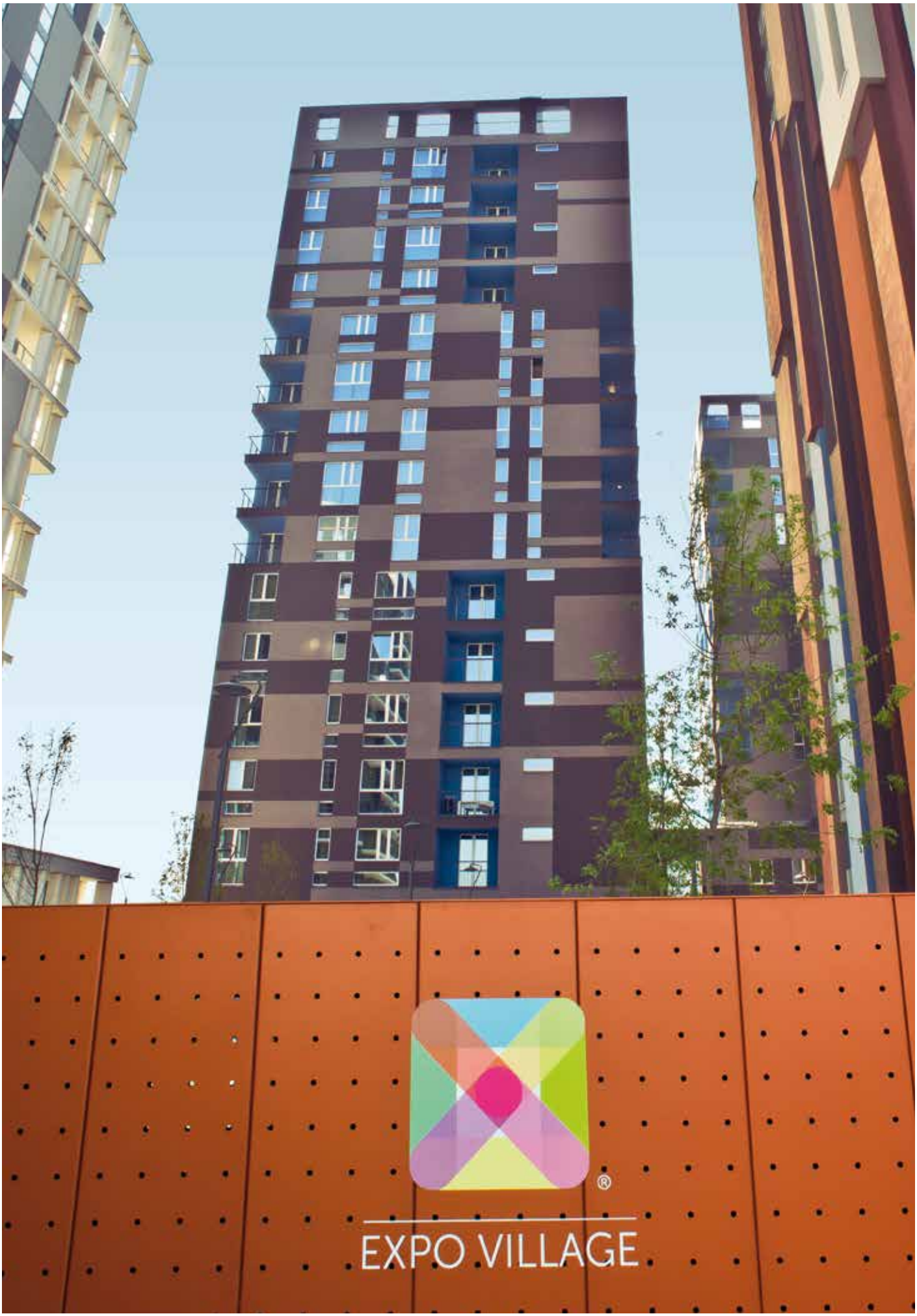
Final remarks

Choosing the right MCB is not as easy as it seems on a first view. The most important thing is to know the situation an MCB is operated in. Accordingly the right device can be identified.
Please check the available catalogues or the material provided online for more information.

Stefan Riemensperger
Product Marketing Manager
DIN-Rail products

Variation of tripping thresholds of MCBs according to network frequency
The circuit-breakers are calibrated for a current with a frequency range between 50 and 60 Hz.

	AC			DC
	100 Hz	200 Hz	400 Hz	
Multipler	1.1	1.2	1.5	1.5


EXPO VILLAGE

Long life to the Expo Village

ABB's residential products to the Expo 2015 test. An important contribution to host people with different cultures, languages and habits, but also to improve the comfort of the future inhabitants of the largest social housing project in Italy.

Federico Mai: *Marketing Communication Account - LP Division*

A re-development project that returns to Milan a modern and innovative district, a cluster of residential towers whose apartments are temporarily hosting Expo delegations and after the universal exhibition will be allocated to a young people target attracted by the charm of the city. Cascina Merlata is all about this, and today and for the coming months is the Expo Village, but it also represents a project that looks to the future, with subsidized housing at affordable prices and with a very high overall quality. The project promoted by EuroMilano was founded with the goal of giving a new identity to a territory with no particular architectural connotations of value, except for Cascina Merlata, recovered and devoted to public offices, around which the new district will be developed.

On the whole, the new district covers an area of 540,000 square meters and hosts residences (divided among social, subsidized and free housing), services (including a school), a shopping center and a large public park of more than 200,000 square meters.

A route of more than 10 km of cycle lanes will cross the district connecting specifically with the "Green Radius no. 7" which in turn intersects the path, under construction, of the "green belt", which connects in a ring the parks outside the city of Milan.

The district is part of the new north-west district of Milan and boasts the proximity of an underground station and a complete infrastructure with a fully revised road system and connections made from scratch to the major road networks.

The proximity to the Expo exhibition site made it possible to include and address two requirements: on one hand, the creation of houses at low cost but with a high added value, on the other, to find a comfortable accommodation close to the exhibition site for more than 1,300 international delegates attending the event. While the challenge was to design a space that could welcome different cultures, the medium - and long-term goal is to leave to the city a developed and sustainable real estate project, a model district that can meet the needs of contemporary living.

The current site plan stems from the contest held by EuroMilano in 2008 to develop the master plan of the area (won by Antonio Citterio & Partners, Caputo Partnership and MCA) and subsequently the 7 residential towers to which 4 more structures will be added at the end of the exhibition, for a total of 690 housing units.

The "green" towers of the Expo Village

Sustainability, residential well-being and quality of the spaces are the hallmarks of a totally sustainable village, built according to the highest architectural and urban quality standards. The design choices adopted in the development of the seven residential towers currently existing, designed by MCA-Mario Cucinella Architects, Teknoarch, B22 and Pura, have achieved the Class A energy certification while respecting a tight budget. This was possible thanks to the use of highly efficient solutions such as photovoltaic panels, district heating, radiant floor heating and air treatment units, combined with solutions for the building that ensure a high insulation, such as facade coatings and the use of doors and windows with excellent performances. Cascina Merlata will be the first, entirely emission-free residential complex: all the buildings are served by renewable energy sources; winter heating and summer air conditioning exploit the ground water, with heat pumps and geothermal systems.

These are major benefits which add to the spaces and public services such as laundry, gym, medical practice, resting area, interfaith area, meeting room, and much more. In short, a social housing, a model that promotes integration and generates the functional mix that allows an urban fabric to be alive and vital and a group of buildings to become a district. The houses are not provided with private garages, but with parking spaces, in the perspective of cost cutting and more generally as a disincentive to the use of private cars to get home and to move around within the district.

Integration and multiculturalism with ABB video intercom systems

In order to offer technological equipment that is able to associate multi-functionality and ease of use for users from different countries and cultures very distant from each other, for the access management to the towers the ABB video door entry system Welcome M was chosen. A

01

02

01 Alessandro Pasquarelli, CEO of EuroMilano, the real estate company that promoted the intervention on Cascina Merlata

02 The Welcome M outdoor panel placed at the entrance of one of the residential towers.

03 The large, fully equipped gym with the latest machinery is one of the most used common areas. The Lusy floor-boxes powering the equipment emerge from the floor.

flexible, yet elegant and modular design that allows to implement different functions with the same distinctive feature; a technology that exploits the versatility of the 2-wire system to provide excellent performances, offer advanced features and satisfy various needs related to access control and audio-video communication. Ideal for large buildings, Welcome M accommodates in a single system a great number of loads, even at a long distance. All this in the name of simplicity of use, essential in the context of this project where technology has to be accessible to all people. The choice of the language, for example, is one of the most appreciated features of Cascina Merlata system and it becomes absolutely necessary to complete the integrated communication project that allows everyone to feel comfortable within the village. In Cascina Merlata houses the Welcome M version with indoor unit equipped with a 4.3'' color monitor has been installed, while for the outdoor units at the entrance of the towers a version was used that includes video and audio modules and a numeric keypad for dialing.

More sprint with Gemini and Lucy floor-boxes

The fully equipped gym is undoubtedly one of the jewels of the common areas of the project. It is a large and bright space located at the base of one of the residential towers; a modern and functional structure with the latest machinery, perfect for different types of exercises to ensure a healthy physical activity.

The proper functioning of equipment and facilities is regulated by a Gemini electrical switchboard, an innovative and versatile element that can accommodate inside it the load optimization and the perfect management of the whole system. Switchgears, control, protection systems and management units are placed in a highly resistant thermoplastic switchboard which allows for maximum flexibility of use and to create integrated and complex solutions for distribution and automation.

Inside the gym, Lusy floor-boxes have been used: floor distribution systems that complete the ABB offer and provide power supply to the sport equipment. These elements in slate color emerge from the floor for just ten centimeters and accommodate sockets and modules (in this specific project Chiara Series components are used) in a device-holding front with a variable angle that facilitates the perfect functionality of the floor-box.

High value-added houses

Quality materials, furniture by famous Italian designer brands, advanced technologies: the designer of the furniture of Expo Village houses comes from an international study in collaboration with the "Politecnico" di Milano (University) which aimed at shaping an internal space that would have the dual feature of meeting the temporary needs of the Expo delegates but at the same time would guarantee a continuity of performance and the durability of each spatial component. The apartment typologies varies from two to five beds; they are wired with 100 MB fiber and equipped with TV and free Wi-Fi also in the common areas and outdoor. Houses designed from scratch

03

Acknowledgments

Real Estate Company
EuroMilano S.p.A.
Alessandro Pasquarelli (CEO)
Via Eritrea, 48
20157 Milan - Italy
www.euromilano.net

Technical Sales Promoter
Angelo Di Gianni
ABB S.p.A. - LP Division

Sales Manager
Gianluca Santilli
ABB S.p.A. - LP Division

for young dwellers, with an informal style and an inclination to share the spaces, who place a great value on these connectivity aspects. A definition of the reference target which also affected the choice of materials, furnishings and technologies designed and developed around the themes of sustainability, aesthetic quality, adaptability, flexibility of use, dismantling, recovery possibilities and recyclability. All in accordance with a tight budget and reaffirming a solid "Made in Italy" value based on concreteness and intelligent solutions designed for the space in which they are integrated.

Simplicity becomes elegance with the Chiara Series

The perfect solution in the context of a young, dynamic and informal style. Starting from its name, this series evokes light and harmony, is marked by a simple yet elegant look where the clean lines of controls and white sockets are enhanced by the variety of plate colors (in the Expo Village project exclusively white plates were used). Supports and plates (made of engineering plastic) are available in 2, 3, 4 and 7 module versions; instead, much wider is the range of elements that make up the series: control devices (circuit breakers, buttons, relays etc.); key covers customized with different symbols (telephone, doors opening, etc.); plug sockets, coaxial outlets for television and satellite systems, telephone plugs, fuse holders, surge arresters and other protective equipment; warning lights, ringers and signaling devices; thermostats and dimmer.

Even in terms of installation, Chiara stands for simplicity and immediacy, a very

Welcome M door entry system

Thanks to the modular design and the versatility of the 2-wire system, the Welcome M door entry system range is already recognized as the industry benchmark. The minimal and elegant shapes, the shiny surfaces, the backlit touch controls give it a sleek and contemporary look, which combine with the small size, makes it the most compact system on the market. The outdoor unit consists of multifunction modules to ensure maximum flexibility; each of them can be programmed to perform different tasks and adapt itself to the specific requirements of the project.

For the realization of Cascina Merlata, indoor units with a 4.3" color monitor and outdoor units with display and numeric keypad were used.

04

05

04 The apartments are furnished with essential and versatile elements and systems developed in collaboration with the Politecnico di Milano and manufactured by Italian companies. Furnishings. Euromobil. Lighting: Artemide

05 Total white look for the Chiara Series. Simple yet elegant, versatile and functional, it is the ideal complement to the informal, urban and contemporary style proposed by Cascina Merlata houses.

important feature in the Expo Village project, also in the future perspective of a partial revision of the system according to the needs of the house dwellers. The 22 mm wide sockets of the Chiara Series fit into all rectangular boxes available on the market, as well as in round boxes with a diameter of 60 mm.

Intelligent system management with new switchboards

Efficiency, security and integration. Not to mention an aesthetically pleasant look, often overlooked in the technical components of the space, but increasingly important today in defining the overall style of the house: these are the strengths of the new series of consumer units System pro *E* comfort MISTRAL®. Their presence in the Expo Village houses is synonymous with efficient control, ease of use and installation that are the hallmarks of the entire project. A new minimalist design follows the most innovative aesthetic trends, also thanks to the transparent door in the new exclusive petrol blue color that ensures elegance and originality and a 180° opening that allows full access to the interior of the unit.

The new Mistral consumer units, with IP41 and IP65 protection degree, offer considerable advantages even in terms of installation thanks to technical features that facilitate the flush mounting and that, thanks to the versatility and efficiency, complete the ABB offer dedicated to the residential sector.

System pro *E* comfort MISTRAL® flush mounted consumer units

Design and functionality, minimalist aesthetics and maximum accessibility, including quality of materials and configuration flexibility: the new Mistral consumer units combine a contemporary look with excellent performance, by ensuring maximum security, ease of installation and durability. Developed to meet the diverse needs of electricians, they offer maximum functionality thanks to the 180° door opening, the symmetry of the front side for a complete reversibility of the opening and the frame with two different levels for positioning the Din Rail for modular molded case and front panel circuit breakers.

ABB named EXPO2015's official Automation and Robotics sponsor

ABB robots are present at EXPO2015's Future Food District where they interact with consumers in an ideal "Supermarket of the Future" thanks to Internet of Things technologies.

Federico Mai: *Marketing Communication Account - LP Division*

ABB is the official Automation and Robotics sponsor at EXPO 2015 in Milan, Italy, the universal exhibition that showcases technological and cultural achievements from around the world.

EXPO 2015 is running from May 1st to Oct. 31st, 2015, and focus on "Feeding the Planet, Energy for Life," a theme aligned with ABB's ambition of providing "Power and Productivity for a Better World." ABB robotics and automation technology help lift competitiveness and improve health and safety while cutting energy consumption and reducing costs.

Inside the "Supermarket of the Future" in EXPO 2015's Future Food District, ABB robots will interact with visitors who will select products based on data regarding their origin, history and characteristics. The Future Food District will showcase how technology is boosting the food chain's integrity, meeting a new generation of customers' demands for sustainable, traceable production, and making life easier.

"Our participation at EXPO 2015 is testimony to our strong commitment to global food and beverage value chains focused on food quality and safety," said Mario Corsi, managing director of ABB in Italy "With our automation and robotics offering, we aim to increasing productivity, competitiveness, flexibility and safety."

ABB has a long history of providing automation solutions for segments of the food and beverage industry, including dairy, edible oil, grain, meat, poultry and seafood as well as in sugar production.

The company has a global installed base of more than 200,000 industrial robots, including robots for precision picking and placing applications required by industries including food and beverage. And with this year's introduction of the collaborative, dual-arm robot, YuMi, ABB is opening up new opportunities for true interaction between people and robots working together safely on the same tasks.

The "Supermarket of the Future" at EXPO 2015's Future Food District, where ABB's robots will be on display, is one of the thematic areas of EXPO Milano 2015. The Future Food District is being created by the design office Carlo Ratti Associati in collaboration with COOP, the largest supermarket chain in Italy.

The Future Food District seeks to allow its visitors to get acquainted with and explore a more ethical and transparent food chain, made possible by new technologies.

"We are proud to contribute to this global event where our automation and robotics technologies will be combined in a real-world experience," commented Mario Corsi.

"We are very pleased to announce ABB decision to become official Automation and Robotics sponsor, their contribution to the Future Food District project is an example on how cutting edge technologies can improve food distribution and supply chain model as well as enable an innovative customer experience", explained Giuseppe Sala, CEO of Expo 2015 Company and Commissioner of the Government of Italy for Expo Milano 2015.

For more info and updates on the theme "Feeding the Planet, Energy for Life" and the Expo 2015 activities visit www.expo2015.org.

EXPO MILANO 2015
FEEDING THE PLANET
ENERGY FOR LIFE

ABB

Official Automation and Robotics Sponsor

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ABB Italy pages

Different types of light sources

Valentina Surini: *Product Marketing Manager - DIN-Rail Products*

The choice of a suitable lamp for a specific application is a complex process during the design phase, since a variety of parameters come into play:
the supply voltage, electric power, luminous flux, luminous efficiency, durability, consumption and energy savings, color rendering index, color temperature, comfort and miniaturization. All these parameters affect the type of activity, the project's aesthetics, the objects you wish to highlight, and visual wellbeing; all of these factors are then coupled with an assessment of the economic and environmental impact. The following is a brief description and classification of the primary artificial light sources.

LED technology

LED technology uses the optical properties of some semiconductor materials to produce photons from a recombination of electron-hole pairs in a special p-n junction diode. LED is in fact an acronym for Light Emitting Diode. LEDs are formed by a thin layer of doped semiconductor material in which, with the application of a direct voltage, in order to reduce the junction's potential barrier, the semiconductor conduction band electrons recombine with the holes in the valence band, releasing a sufficient amount of energy in the form of photons. Thanks to the reduced thickness of the chip, a discrete number of these photons leave the device and are put out as light, or optical photons. Semiconductors used for the production of LEDs can be GaAs (gallium arsenide), GaP (gallium phosphide), GaAsP (gallium arsenide phosphide), SiC (silicon carbide) and GaInN (gallium nitride and indium). The choice of semiconductor determines the peak emission wavelength of the photons, and efficiency in electro-optical conversion, and thus the output light intensity. The color temperature of the emitted radiation depend on the gap between the energy levels of the electrons and holes, and typically corresponds to the value of the forbidden band of the semiconductor in question. The first LED was developed by Nick Holonyak in 1962, but LED lighting applications are far more recent.

High intensity discharge technology

The electric arc triggered in a gas mixture within a discharge tube tends to produce very narrow energy bands at specific frequencies. The spectral distribution of the high intensity discharge lamps consequently shows energy peaks at these specific frequencies. The addition of halides in the discharge gas allows for a more balanced spectral emission, although discontinuities still exist. The spectral emission diagram explains why these lamps have a good "Ra" index - although not outstanding.

Triphosphorous fluorescent technology

Fluorescent light is generated by two separate mechanisms: the mercury atoms excited by the electrons produced by an arc generate energy in a narrow band, exactly as for high intensity discharge lamps, while the fluorescence of a phosphor coating produces a more continuous and balanced visible light spectrum. The diagram of spectral emission of a fluorescent lamp is characterized by several distinct peaks that rise above an average curve. The halo-phosphorus coating composition of a fluorescent lamp is formulated so as to lower the color temperature and generate a light similar to that of a standard incandescent bulb.

Triphosphorous fluorescent technology

The addition of a layer of triphosphors to the halo-phosphorus coating introduces bands of spectral energy in the specific regions of the blue, green and red wavelengths. This technology is the key to improving the chromatic performance of present day fluorescent lamps.
Through the formulation of halo-phosphurus and triphosphorous coatings, the lamp's spectral output can be adjusted to produce warm, medium or cold color temperatures. The triphosphor coating creates powerful spectral energy bands in primary colors, ensuring a good color rendition index, combined with a capacity to effectively render the colors.

Incandescent technology

Incandescent light is produced by heating a solid object, the filament, until it begins to emit light. Incandescent lamps have very high "Ra" indexes, although they obviously do not render all colors in the same manner. Standard incandescent lamps produce very little radiant energy in the shorter wavelength, and therefore do not render colors in the blue area very well - as halogen lamps do instead, having a greater amount of energy in shorter wavelengths.

Valentina Surini
Product Marketing Manager
DIN-Rail Products

Types of lamps and their parameters

LEDs

LEDs are increasingly used in lighting projects to replace conventional sources. From an application standpoint, LEDs are now widely used when a lighting system is required to have the following characteristics:

- miniaturization;
- saturated colors;
- dynamic effects (RGB color variation);
- long life and robustness;
- enhancement of shapes and volumes.

LEDs present the following advantages from a lighting standpoint:

- operating reliability;
- reduced maintenance costs;
- high efficiency (compared to incandescent and halogen lamps);
- clean light because it lacks IR and UV rays;
- easy to manufacture efficient plastic lenses;
- flexibility in installing lighting points;
- saturated colors;
- can provide a strong spot effect (almost point-like source);
- safe operation due to very low voltage (normally between 3 and 24V DC);
- cold-start (up to -40°C) without any problems;
- insensitive to moisture and vibrations;
- mercury-free;
- duration is not influenced by the number of on/off operations.

Discharge lamps

Fluorescent lamps

A fluorescent lamp is a "gas discharge" light source. Light is produced by the stroke of an arc between tungsten electrodes, placed inside a tube containing mercury and low pressure gas. The arc excites the mercury atoms, which generate radiant energy accordingly, mainly in the ultraviolet radiation. Stimulated in turn by this energy, the phosphor coating inside the tube emits light by converting ultraviolet radiation into visible light. Fluorescent lamps have two electrical requirements. A voltage peak must be created to turn on the lamp, triggering the arc. Once the lamp is turned on, the gas has a lower resistance and the current must be limited. For this reason, as for other discharge light sources, fluorescent lamps must operate with a specifically designed power supply unit. Two different types of power supplies are used to control fluorescent lamps: magnetic or electronic type.

Both perform the same functions, but the electronic units offer specific advantages. Firstly, they are much more efficient, providing savings on energy absorbed by the system of up to 27%; moreover, they dissipate less heat and produce a stable, flicker-free light. Another important improvement introduced in fluorescent lamp technology is the development of T8 bulbs in tri-phosphor technology, thereby improving the system's efficiency (up to 30% more luminous flux than a standard lamp of equal power).

Aside from the use of technology closely linked to the sources, substantial savings can be obtained using control units and dedicated timers on lighting systems - such as digital time switches or astronomical switches - optimizing when lights are switched on and increasing energy efficiency.

The application segment for fluorescent technology with the highest growth rate currently lies in compact fluorescent lamps. They consist of a much thinner tube that is folded, and a plastic base which, in some versions, contains a conventional power or electronic power supply. Compact fluorescent lamps are small enough to allow for the replacement of incandescent lamps in applications based on scattered light, thereby providing the benefits of increased efficiency in fluorescent technology to a wider range of luminaires.

High-intensity discharge lamps

The technology of high intensity discharge lamps is similar to that of fluorescent lighting; an arc is generated between two electrodes inside a gas filled tube. In this case, the operating mechanism differs from that of fluorescent lights. The electrodes (placed at the ends of a sealed discharge tube) are only a few centimeters apart, and the gas contained in the tube is at a high pressure.

This allows the arc to generate extremely high temperatures, vaporizing the metallic elements contained in the gas and releasing large amounts of radiant energy in the visible spectrum. Three main types of discharge lamps exist: high intensity mercury vapor, metal halide and sodium. The designations refer to the metallic elements present in the gas shell in which the arc is struck: the different color characteristics and the lamp's efficiency depend on these elements.

High-intensity discharge lamps too have electrical characteristics that must be satisfied by a power supply unit designed according to the type of lamp and power output.

High intensity discharge lamps require a warm-up time to produce their nominal luminous flux: even a momentary absence of voltage requires a restart of the system and warm-up time, a process that can take several minutes.

Mercury vapor lamps

Mercury vapor is the oldest high intensity discharge lamp technology, producing both visible and ultraviolet energy, and requiring an outer bulb capable of filtering UV radiation. In itself, a mercury vapor discharge lamp generates a bluish light with a high color temperature and low chromatic yield. A coating of phosphorus is often used to lower the color temperature and bring the chromatic yield back within acceptable limits. The use of these light sources has been significantly reduced due to technology developments that have made available other types of high intensity discharge lamps, featuring improved efficiency and better chromatic properties.

Metal halide lamps

Metal halide lamps are the most efficient white light sources available today. They provide high efficiency, excellent color rendering, long service life and a low luminous flux decay. These lamps make use of halides, contained in the gas in which the arc occurs, capable of producing light in areas of the spectrum that mercury vapor alone would not be able to generate. Some metal halide lamps use phosphor coatings to further improve their chromatic properties. Precisely because of their many advantages, these lamps are widely used for the illumination of internal commercial environments, particularly when very high ceilings require powerful illumination. Today, their range also extends to small power outputs, allowing for high performance in a compact size, the ideal solution for architectural lighting applications and accent lighting. Yet another technology lies in metal halide lamps with a ceramic discharge tube, which are characterized by exceptional chromatic rendering stability and color temperature.

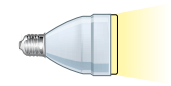
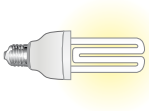
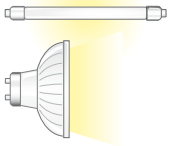
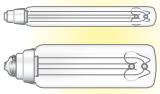
Sodium lamps

High-intensity, high-pressure sodium discharge technology is characterized by an even higher efficiency, but with a low chromatic yield index. By adding sodium to the gases contained in the discharge tube, these lamps generate high performance in terms of luminous efficiency and an extremely long service life. However, sodium lamps produce a light that is concentrated in the yellow/orange portion of the spectrum and has a poor chromatic yield. This limits its use to external and industrial lighting applications in which the benefits of high efficiency and long life counterbalance the disadvantages of a low chromatic yield index. In high-pressure sodium lamps, the discharge tube contains both mercury vapors and sodium. Some types of high-pressure sodium lamps may replace less efficient mercury vapor lamps in a variety of applications. Low pressure sodium lamps are a variant characterized by the emission of light in a single wavelength in the yellow portion of the spectrum. These lamps have the highest efficiency of all light sources and are used wherever high efficiency and long service life are the sole requirements.

Incandescent light sources

Albeit with a number of improvements, incandescent lamps have been using the same basic technology developed over a century ago. A tungsten filament placed inside of a glass bulb is brought to incandescence by the passage of electric current. Modern lamps, however, use a filament composed of tungsten powder, which improves efficiency. In order to prevent combustion, incandescent lamps are filled with mixtures of inert gases (a vacuum was once created inside the bulb).

For a long time, incandescent lamps were the most common light sources. Because standard incandescent lamps have a very low yield, they have been and will be put out of production within the European Union, according to a timetable begun in September 2009. Tungsten halogen lamps are an improvement on incandescent technology, providing improved efficiency (by up to 20%), longer life and a higher quality of light. In a standard incandescent lamp, the tungsten filament, which is subjected to a high temperature, tends to evaporate and deposit on the walls of the bulb, reducing the amount of light emitted. In addition, the filament becomes increasingly thin and eventually breaks.

Type	Typical applications	Advantages	Disadvantages
LED 	All	Size, excellent durability, luminous efficacy	At times, light quality, color rendering
Fluorescent 	General	Average luminous efficiency, good durability	Size, at times, light quality
Mercury vapor 	Public lighting, large service industry environments	Luminous efficiency, long life	Light quality, color rendering, warm-up time
Metal halide 	Public lighting, large service industry environments	Luminous efficiency, long life	Warm-up time
Sodium 	Public lighting, outdoor spaces	Luminous efficiency, long life	Light quality, color rendering, warm-up time
Incandescent halogen 	Accent	Light quality, color rendering	Luminous efficiency, durability

Types of lamps and their parameters

The elements contained in the gas inside a halogen lamp allow the evaporated tungsten atoms to be deposited once again onto the filament. This phenomenon slows the deterioration of the filament, improving the consistency of the luminous flux produced and extending the life of a bulb.

Halogen lamps have a higher color temperature than standard incandescent lamps. Their light contains a greater amount of blue and less yellow, and appears whiter and brighter.

Although both types of light sources have an "Ra" index of 100, the greater color temperature of halogen lamps provide a more pleasant and brighter color rendering for a wide range of colors.

Very low voltage halogen lamp systems can operate efficiently with lower power outputs than voltage network systems, allowing for a high light yield from extremely compact units. This is why, by accurately controlling the light beam, very low voltage halogen lamps are particularly suitable for accent lighting. Halogen lamps are available in many variations, in a wide range of power outputs and light beam opening angles.

For more information, consult the Installation contactors handbook Code: 2CDC103022M0201

KNX ahoy!

A successful idea: the convenience and functionality of ABB i-bus KNX Intelligent Building Control on yachts.

Thomas Rodenbusch-Mohr: *Product Marketing Manager - Building Space®*

This is the story of an intelligent business intuition: to think that the automation expertise acquired in the mining field could be applied successfully to companies operating in other sectors. So it was in reality and, starting from the metalliferous hills of the Grosseto area, the company Elettromar has managed to expand worldwide.

From the mines to the marina

The company was founded in 1981 in Follonica (Grosseto) and initially operated only in the mining sector, the area of expertise of the two founding partners, specializing in the extraction of pyrite from the area's metalliferous hills. The business intuition was to propose the supply, installation and maintenance of electrical and industrial systems designed for process automation also to the local chemical (the TIOXIDE titanium dioxide production plant in Follonica) and steel (the Piombino steel mills, formerly Italsider) industries.

The primary installation and maintenance activities were soon expanded to include a growing specialization in the design and production of switchboards and in the development of software for managing automation systems. The watchword was to develop the highest specialization in several areas, to best even out their cyclical trends.

Traditional activities were joined by the design and production of automation systems in the paper, railway, industrial remote controls sectors remove row break and in the marine sector, with a turnover that doubled over the last three years.

Today Elettromar is an engineering and construction company with a turnover of approximately 15 million euros and 110 employees. Another 100 operators work in the network of partner installation companies, which allows it to manage production peaks better.

The headquarters in Follonica cover a production area of 10,000 sqm, arranged on two floors. Other operational teams are detached to the most important customers: in Taranto, in Florence (Nuovo Pignone), in Pistoia (Ansaldo Breda) and in Leghorn and Viareggio (Benetti).

A software and hardware engineering company

While the annual production has reached an all-time high of 1,000 switchboards, it is equally true that Elettromar aims to establish itself, with 70 employees out of 110, as an engineering company operating in two areas. The first is management of orders and development of software for automation systems at various programming levels: PLC, management interface, SCADA (Supervision Control and Data Acquisition: plant supervision interface).

The second is hardware development in the two macro-areas of switchboard design and field engineering.

Adoption of KNX with ABB's support

When Elettromar began its activities in the marine sector, it installed traditional wire lighting systems on vessels. At the time, in fact, KNX-standard systems were used only in the residential and commercial building sector, in which Elettromar was not active.

The turning point for adopting the KNX standard was the desire of yacht owners to have aboard a Home Automation system. Accustomed to the advantages and comfort offered by their home automation functions, the owners in fact considered it a natural evolution to have them also on their yachts, their homes at sea.

To address this need, in 2010 the collaboration between ABB and Elettromar, well-established over the many years by the supply of industrial components, was extended to KNX solutions and made a quantum leap, with the mutual exchange of information. The development of Elettromar's expertise in KNX is also the result of the increasingly fruitful collaboration between the two companies. Just two concrete examples: in 2012, Elettromar's staff participated in the basic course organized by ABB Italy at its headquarters in Vittuone, and, more recently, in the more advanced session focused on ComfortTouch and priOn.

Another example of ABB's continued support on the field is the day that Diego Carzaniga (Product Manager Home&Building Automation of ABB Italy) spent at Elettromar's headquarters supporting technicians in the programming phases of the ComfortTouch touch panel.

In adopting the KNX system, Elettromar immediately appreciated the fact of having to run fewer wires, with great benefits in terms of space and installation time.

Flexibility helps wishes come true

The great flexibility of the KNX system has also simplified the realization of the extensions and changes to the lighting management, very frequently requested by clients used to having their every wish fulfilled.

It should also be noted that while building a yacht it is crucial not to have to make changes to the systems after the expensive furnishings have been built in. Nevertheless, as we have just seen, the request for changes and improvements is not an unlikely occurrence. The adoption aboard of a home automation system based on the KNX standard has offered a solution to this problem, thus proving to be a further strong point. Thanks to its flexibility, it is possible to make changes even in a project's advanced stages simply by changing the programming of the components and without having to lay new wiring.

Lastly, the distributed intelligence of each device is very important for the reliability of the entire system. This feature helps prevent the typical risk of systems with a single control unit, i.e. a complete block of the entire system.

Flexible solutions aboard a superyacht

With ABB's support, Elettromar is currently constructing systems based on the KNX standard on two vessels. For one of these, a 60-meter superyacht, very specific requests for changes continue to be received even three years after construction began; and these requests must of course be satisfied.

For example, ABB Italy has developed a new feature for the standard version of the Mylos rocker switch series, whereas the standard component manages four ON/OFF controls or, alternatively, two dimmable circuits, the specially customized version made by ABB allowed an increase from two to four dimmable circuits in the same footprint. The advantage for the user is the ability to keep the control of the full lighting system in a seven-module plate, without having to double it. Designed for a custom project, the product turned out to be unique on the market and, therefore, it was subsequently added to the catalog.

Temperatures, lights and curtains can be programmed directly aboard via tab-

Acknowledgments

System Integrator
Elettromar spa
Stefano Tinti (Marine Manager) and Corrado Fiorenzani (KNX Manager and Marine Representative)
via Archimede, 186
58022 Follonica (GR) - Italy
www.elettromar.it

Installation Business Representative Italy North and Central Area
Roberto Barsotti
ABB S.p.A. - LP Division
Florence Branch

Sales Manager
Andrea Ninci
ABB S.p.A. - LP Division
Florence Branch

lets and it is expected to extend the ability to monitor the vessel's various operating parameters, such as the fuel level, even from ashore.

Interfacing conventional switches to KNX? No, thanks.

The residential series Mylos was chosen not just for aesthetic reasons. In its KNX version, in fact, the Mylos components are easily integrated into the system without having to install KNX modular binary inputs, which are multiple input modular interfaces that acquire the open/closed status of the switches. Therefore, the adoption of Mylos guaranteed benefits not only in terms of saving time and costs, since there is one less component to install, but also as regards a maximum amount of flexibility in responding to the owner's demands.

The owner also appreciated the Busch-ComfortTouch Panel, added to the project subsequently, for its excellent aesthetic integration into the surrounding luxurious setting. For Elettromar, instead, it turned out to be an efficient and flexible way to control the temperature of the heated floors and to manage the LED lighting.

The versatility of the KNX standard in Marine applications

Since home automation was designed for the building sector, the lighting normally operates at 220 / 230 V. On vessels, instead, the operation voltage is 24 V and this makes interface modules necessary. ABB and Elettromar collaborated in a research study for a solution that would incorporate the interface in the KNX module.

One key decision factor was also the fact, that KNX is an open and standardized system, so that spare parts, can be available worldwide, even from third party manufactures.

From left: Roberto Barsotti, ABB Installation Business Representative, Florence Branch; Corrado Fiorenzani, KNX Manager and Marine Representative to Elettromar; Stefano Tinti, Marine Elettromar Manager; Andrea Ninci, ABB Florence Branch Sales Manager.

Thomas Rodenbusch-Mohr
Product Marketing Manager
Building Space®

ABB i-bus KNX components

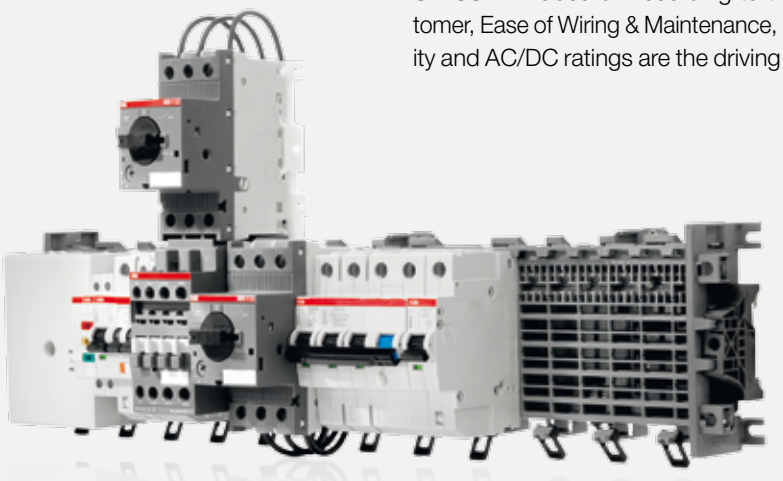
One of the advantages of working with ABB is the wide product range of KNX devices.

Specifically, the following components were on the yacht:

- Busch-ComfortTouch 8136/09-811
- Mylos rocker switches with single or double binary inputs
- JRA/S blind / roller shutter actuators
- 6197 universal dim actuators and SD/S switch / dim actuators
- AE/A analog inputs for measuring the temperature of the heated floors using PT 100 temperature probes
- US/U universal interfaces with 4 and 12 inputs interfacing the IP55 custom lighting switches placed in outdoor areas such as corridors and parts of the bow and stern to the KNX bus system.

SMISSLINE TP
The Boat has been pushed out! 10 Years of SMISSLINE use in custom yachts!

Steve Eggert: *Product Marketing Manager DIN rail products, US Market*



In 2014, a Wisconsin custom yacht builder, an ABB customer for 10 years, launched a $48M Carbon Composite cruiser with ABB SMISSLINE aboard. According to the Customer, Ease of Wiring & Maintenance, Flexibility and AC/DC ratings are the driving factors for their 10 year usage of ABB SMISSLINE. The primary use of SMISSLINE is in 3 circuit configurations in the yacht's Power Distribution system which allows flexibility as the situation demands.

Did you know?

SMISSLINE TP was up for a Showstopper Award at the 2014 NECA show in Chicago

- SMISSLINE TP was one of six ABB and T&B innovative new products chosen as a finalist in the 2014 Product of the Year Awards program
- Sample on display in the ABB/T&B booth and the Showstopper Showcase table

S800 B. High performance miniature circuit breakers. Simply innovative. Safety has never been easier

Limit downtime in industrial electrical systems while ensuring maximum safety for operators and ease of access to devices: S800 B high performance circuit breakers are efficient products at a reasonable cost and designed for overload and short-circuit protection in distribution systems with 16 kA breaking capacity. They comply with Standard CEI EN 60947-2 and feature 80 to 125 A rated current values with B, C, D and K characteristic curves. Thanks to a red/green signal, showing the position of internal moving contacts, and to a switch lever, that stops in the middle position in case of thermal or magnetic tripping, they show why tripping occurred at a glance, enabling prompt maintenance. **www.abb.com/lowvoltage**

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Landlord metering

Aron Svedin: *Product Marketing Manager - DIN-Rail Products*

Fair billing of energy cost for tenants.

When speaking about landlord metering this should be divided into two segments, residential and commercial buildings. The principle is the same but the reasons behind could be totally different. One part they have in common is fair allocation of cost, you only pay for what you should pay for. This means that the user will only be charged of the energy he has consumed. The sub-meter will provide accurate measurement data for that specific user. The opposite would happen if the landlord would estimate the energy cost by tenant based on some parameter, such as square meter, which would be beneficial for high consumers but a loss for low consumers. Knowing that the energy usage will be directly related to the energy bill many times encourage the user using the energy more efficient compared to when knowing that high energy consumption is shared by all tenants. Which in figures mean that if there are 10 tenants in a building, for every additional kWh consumed by one tenant, he or she only have to pay one tenth of the cost, the other nine tenth of the cost is paid by the other tenants.

What is landlord metering? For each building you have a responsible person, a landlord. This building might have inhabitant tenants, whether the tenants are renting an apartment in a residential building or if the tenants are renting space in a commercial building, such as shop owners renting space in a shopping mall or an airport, or a business is renting space for office or warehouse. The building might have one utility meter measuring all energy going into the building. Every month or quarter a bill is sent from the utility company to the landlord. The landlord pays and then collects the money from the different tenants in relation to how much energy cost they should pay. To charge the tenants the fair amount, only for the energy they actual have consumed, the landlord should install sub-meters for each tenant from which the correct amount of kWh is collected and the tenant charged for. These sub-meters are usually owned and installed by the landlord just for this reason, but could in addition also be used to understand the energy consumption of the building.

Landlord metering in residential buildings

Instead of having for every apartment owner their own subscription with the utility, the whole building could have one subscription, one bill, and then divide the cost among the tenants. By cooperation in this manner it is possible to save money for everyone. By having only one subscription there would only be one subscription fee shared by all tenants instead of each tenant having their own. In addition the utility would save money on administration by having only one subscription for a whole residential building instead for having to take care of many small tenants. By accumulating the energy usage for a whole building instead of a small apartment it is possible to negotiate the energy spot rate price, getting a discount due to the much bigger amount of kWhs. With many new building initiatives starting to become mandatory there is a need to measure individual areas of the building, such as the public areas found in the residential building. By using sub-meters measuring each apartment it is easy to calculate the public areas by taking the utility bill subtract-

ing the energy usage for all apartments.

This calculation would have been done any way when dividing the energy cost for the public area among the tenants adding then the energy cost to each specific apartment.

Landlord metering in commercial buildings

In many commercial buildings there is only one utility meter measuring the total energy usage for the building which then the utility company gets paid for by the landlord. If there are tenants in this commercial building the landlord needs to somehow get paid for the energy cost they are consuming. Either he or she can estimate the energy cost based on some parameter such as square meter or by the number of tenants. This is not a very accurate or fair method and could lead to discussion with the tenants whether they are paying too much or too little. By using certified sub-meters measuring the energy usage for each tenant, the cost could be divided fairly and correct. Any discussions the landlord will have with the tenants he or she can show the actual cost based on the measurement values found in the sub-meters.

Fair cost with sub-meters from ABB

As shown above landlord metering is found in both residential and commercial buildings and the reason why might be different but the one part they have in common is to fairly charge the correct cost of the tenants. With the EQ meters range from ABB, which is fulfilling the needed standards, landlord metering is easily done ensuring the most accurate measurements and provides all the necessary features.

Aron Svedin
Product Marketing Manager
DIN-Rail Products

Residual current circuit breakers and leakage currents

Aravind Ramachandran: *Product Marketing Manager - DIN-Rail Products*

One of the parameters to take into account for correctly selecting circuit breakers is the permanent current leakage to ground by the powered circuits. In the absence of outages or low isolation levels, such current dispersions are due to the presence of filters and other impedances between the active line conductors and ground.

The term "stationary" or "permanent" should not be interpreted literally.
We should not think of phenomena that are constant in time, as there are leakages, such as those that occur during the transient start-up of machinery or during a change of operation, whose duration can even reach a few seconds. Although these phenomena vary over time, their relatively long timescale renders them similar to stationary phenomena rather than the rapid transients typical of impulsive phenomena, such network maneuvers or weather related phenomena (whose duration is in the order of tens of microseconds).

Electrical filters

A widespread cause originating with stationary leakage currents is in EMI-RFI filters on the power supply stages of many appliances. These filters are found on personal computers, decoders, variable speed electronic appliances (washing machines, Air conditioners, etc.), power supplies for lamps (reactors), dimmers for adjusting brightness, as well as on industrial machines in general.

These electrical filters have circuit configurations that include capacitors placed between the active cables and the protective PE cable (Figure 1).

These are essentially low pass filters designed to limit the high frequency noise the device injects on the power supply line, draining them towards the system's ground. The capacitive dispersion can also be added onto a resistive component linked to the resistors and surge protection varistors.

The dispersion values, specified in the technical documentation that accompanies each device (Figure 2), depend on the specifications of each filter, as well as their rated current. For household appliances, the typical values of these leakage currents are in the order of 0.5 to 1.5 mA per device.

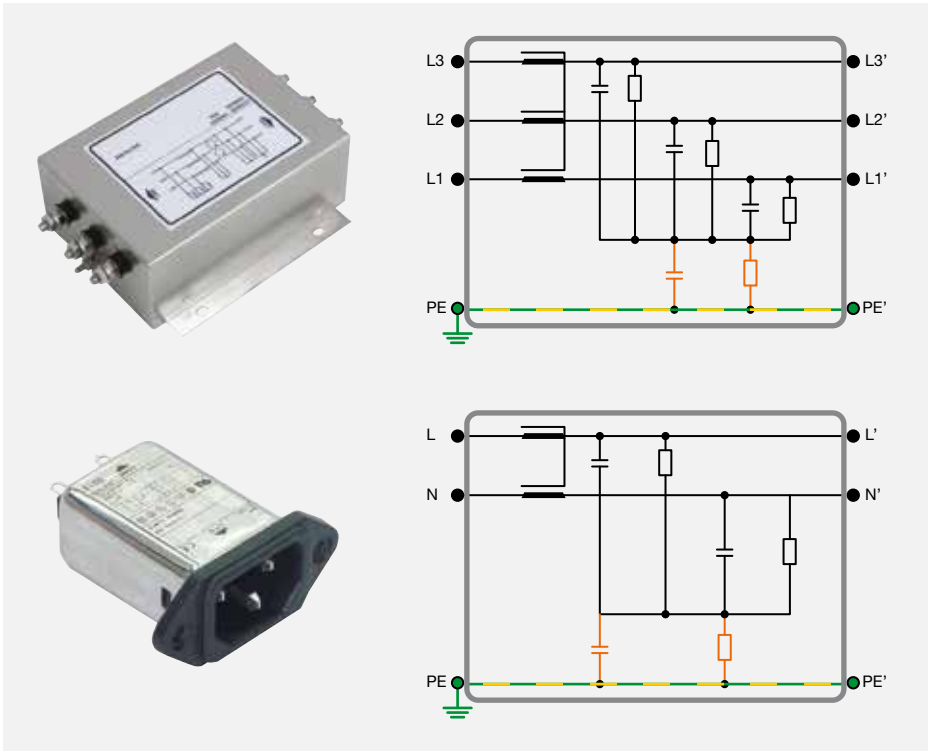

Figure 1 - The presence of filters causes the emergence of dispersions at higher frequencies than the mains (harmonics and high frequencies, depending on the type of filter). These dispersions are normally generated by electronic power circuits on the filtered appliances (switching power supplies, inverters, etc.).

.100.M	105	100	9	1000	1,1	42
Total current leakage at 230V phase to ground at 50Hz / 40°C						Nominal <10mA Worst condition <80mA

Mechanical dimensions (mm)

2

Figure 2 - The dispersion values are shown in the technical documentation accompanying each device.

Cable capacities

Yet another cause of permanent current leakage lies in the electrical system itself, i.e. the cables it consists of. In fact, active cables, particularly phase conductors which have a voltage of 230V with respect to ground, run parallel to the PE protection cables, forming a long capacitor which drains a small capacitive current towards the ground (Figure 3). For single-core cables channeled into an insulating pipe, this capacity is approximately 150 pF per meter of cable, which corresponds to a current of about 10 µA/m.

Higher values, up to 500 pF/m, are obtained in the case of shielded cables or cables channeled in protective metallic pipes. Assuming a few hundred meters for the entire system, this results in a total capacitive leakage of a few milliamperes. This is obviously a small background dispersion present in any system, and fully functional and without any load feed. However, in the case of more extensive systems, the contribution to the total leakage current may be significant.

A special situation occurs in the case of equipment with motors powered by variable frequency drives (Inverters - Figure 4). The inverter output has a voltage full of frequencies that are higher than the network's, resulting in a high rate of dispersion not only through the electrical filters but also along the motor cables, usually with grounded shielding. The longer the motor cable, the greater the leakage current.

Figure 3 - Conductors running parallel go on to form a distributed capacitor.

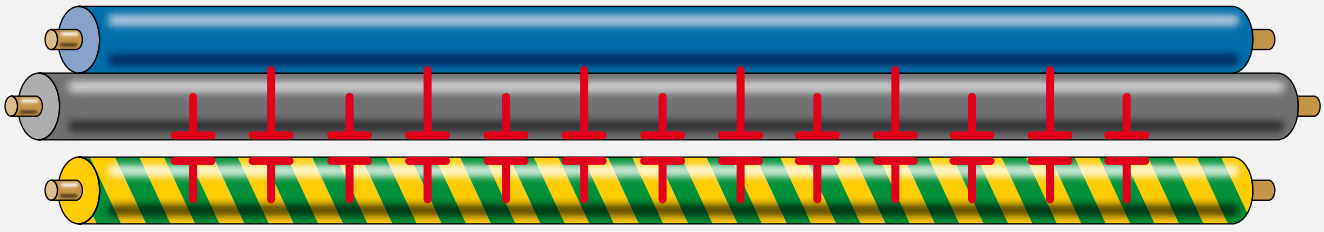

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Figure 4 - In inverter systems, a high leakage rate occurs not only through the electrical filters but also long the motor cables.

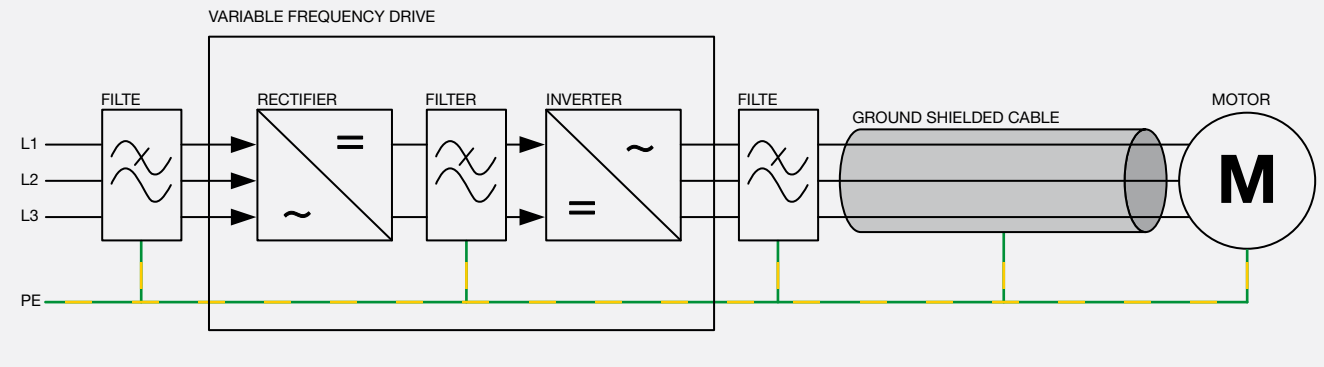

Figure 5 - Estimated values of leakage currents for various equipment

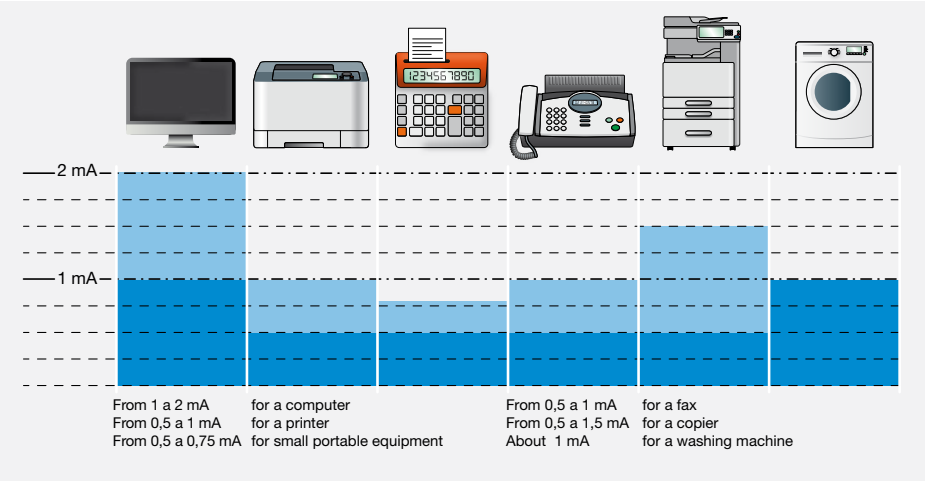

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Figure 6 - Table of IEC 61140 standard

	Maximum protection cable current	
Equipment rated current	**Plug-powered equipment up to a rated current of 32 A**	**Other equipment**
≤ 4 A	2 mA	3,5 mA
> 4 A, ≤ 10 A	0,5 mA/A	0,5 mA/A
> 10 A	5 mA	10 mA

6

Distribution of loads on different circuit breakers

If many appliances are powered via a single residual current circuit breaker, it is clear that the leakage currents are added together[1)] causing a triggering even in the absence of a malfunction. Indeed, a residual current circuit breaker is incapable of distinguishing between environmental disturbances and a ground fault or a earth leakage. Permanent and impulse type leakage currents caused by electrical operations or atmospheric phenomena, are among the major causes of premature triggering of circuit breakers.

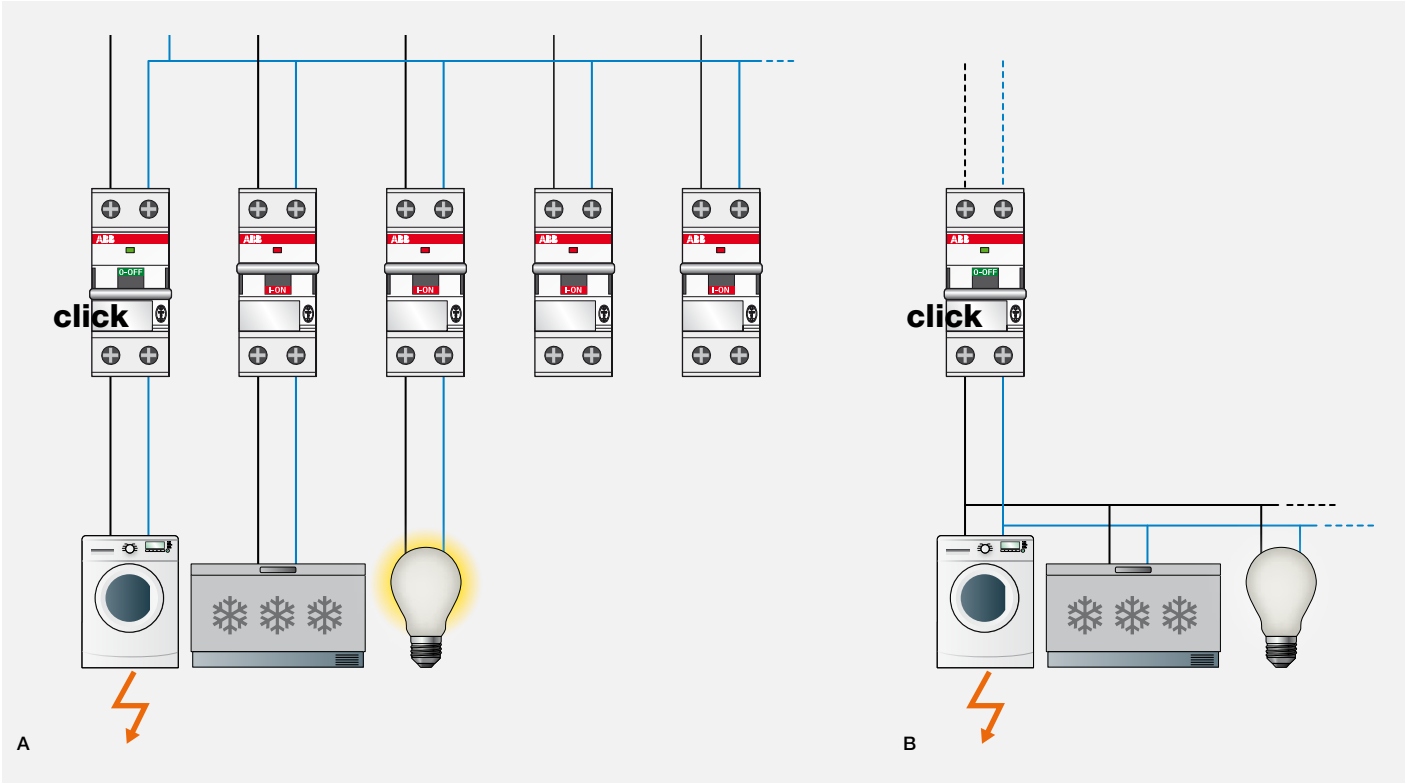
A first solution to the system against the unwanted tripping of circuit breakers, particularly those with $I_{\Delta n}$ less than or equal to 0.03 A, is to divide the loads on several residual current circuit breakers in parallel. This solution must take into account the number of machines protected by a single circuit breaker, and their specifications. This way, leakage currents are distributed rather than adding up under a single residual current circuit breaker. This approach is especially effective in the case of devices with high permanent dispersions (including start-up devices), such as computer equipment, inverters or lamps with an electronic ballast.

Practical information about the correct distribution of loads under several residual current circuit breakers can be found in the publication CEI 23-98: "Guide to the correct use of circuit breakers for household and similar installations," (section 7.3.1) derived from the corresponding international guide IEC/TR 62350. It includes estimates of leakage current values, as shown in Figure 5.

Another useful reference is provided by IEC 61140, which determines the limits for maximum current in the protective cables of user equipment in the absence of a fault, as shown in Figure 6.

In the above mentioned CEI Guide, the recommended arithmetic sum of the leakage currents for the different devices, multiplied by 0.7/0.8, should not exceed 30% of the circuit breaker's residual intervention current. If the total leakage current is higher

1) In the case of three-phase circuit breakers, this phenomenon is partly reduced because the sum of the leakage currents is on the three phases.



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than this value, the loads must be divided onto several circuits, installing a residual current circuit breaker for each of them. Or, consistent with security requirements, increase the residual current intervention $I_{\Delta n}$. For instance, in the case of equipment powered via a plug with a rated current of 10 A, it is advisable to power no more than 2/3 units through the same circuit breaker, with a residual current intervention of 0.03A so that leakage currents do not cause tripping.

The best solution, of course, is a separate circuit breaker for each load, or for each of the system's terminal circuits (horizontal selectivity). This way, the tripping of a residual current circuit breaker will exclude the relevant circuit without any effect on other circuits, guaranteeing maximum service continuity even in the presence of an actual fault (Figure 7A). Moreover, the most suitable protection level can be adopted depending on the type of environment or application (e.g. use RCCBs with an $I_{\Delta n}$ of 0.01 A in areas most at risk, such as bathrooms, which would otherwise result in unwanted tripping if the same circuit breaker protected all of the other loads). On the contrary, the least suitable solution for the purposes of service continuity, and therefore not recommended, is a single RCCB located at the origin of the system supplying all of the loads (Figure 7B). Under national regulatory norms in some countries, this type of installation is not recommended or even prohibited[2)].

Figure 7A - Example of horizontal selectivity

Figure 7B - A single RCCB for all loads is often not recommended or prohibited

[2)] Under IEC 64-8, Sect. 37 a division of circuits is required for electrical household installations of at least two RCCBs.

Aravind R
Product Marketing Manager - DIN-Rail Products

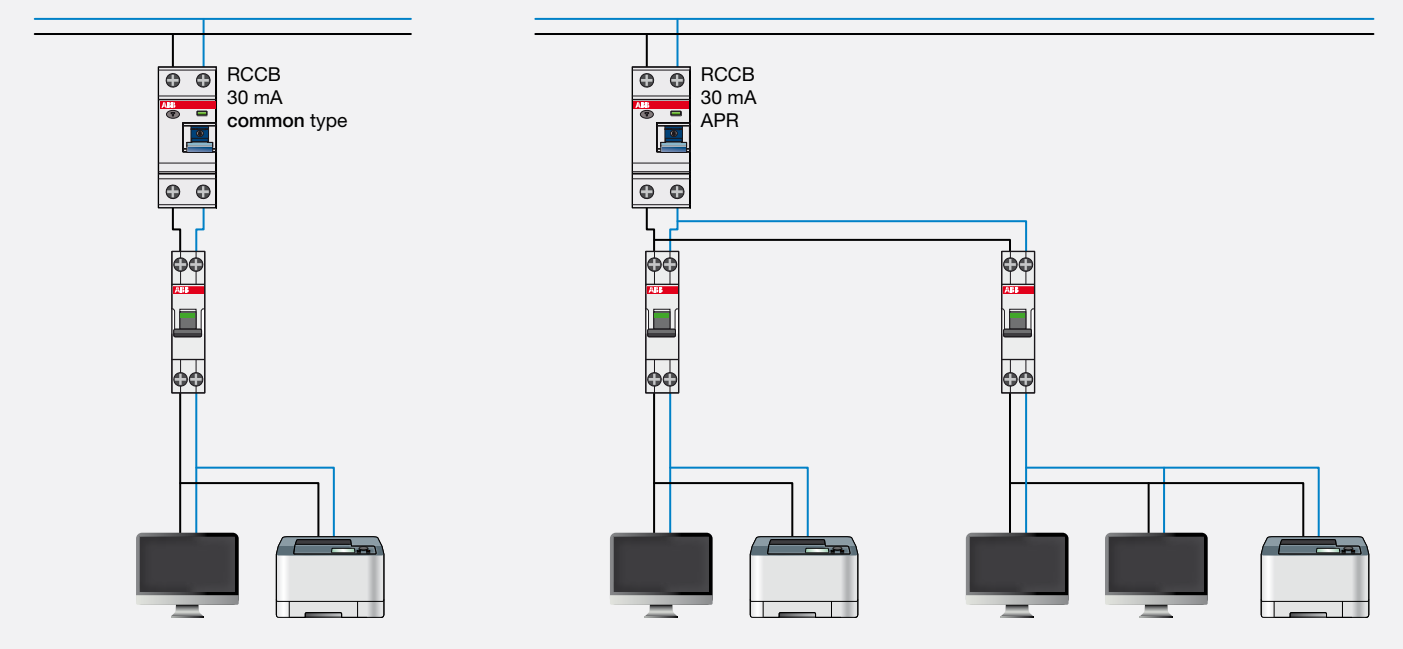

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Figure 8 - Maximum service continuity is achieved by combining the loads under more APR or selective circuit breakers.

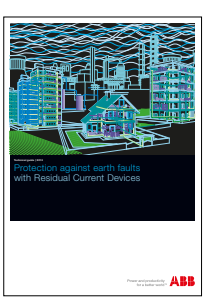
The correct choice of RCCBs

Yet another effective solution against the drawbacks of leakage currents are circuit breakers that are insensitive to residual currents for short duration, such as the ABB's APR range of reinforced immunity products. These devices provide the best solution against unwanted tripping caused by impulsive disturbances due to maneuvers or atmospheric phenomena. These versions are effective even with permanent leakages. Indeed, permanent leakages are often coupled with transient factors, for instance, to the inclusion of equipment or interference on the network (the same capacitive impedances to the ground are responsible for both permanent and transient leakages).

Moreover, the filter frequency effect that is typical of these circuit breakers is effective against permanent leakage currents containing high-frequency contributors. Even S-type (selective) circuit breakers have immunity properties against unwanted tripping, similar to those of APR circuit breakers [3].

Maximum service continuity is thus obtained by combining the distribution of loads under several circuit breakers (APR or selective). Within certain limitations, APR versions allow for an increase in the number of loads powered by the same RCCB, without causing unwanted tripping, since they perform against transient contributors and against high frequencies of leakage currents (Figure 8).

[3] Clearly, S-type RCCBs can be installed without any downstream circuit breakers with $I_{\Delta n}$ less or equal to 0.03A only where system standards do not require additional protection.



**For more information, consult the guide "Protection against ground faults with residual current devices"
Code: 2CSC420004B0202**

System pro *M* compact®, new F200 B Type RCCB
Built to make the difference

ABB's technological excellence has created the new F200 B Type residual current circuit breaker: compact, safe and perfectly integrated into the range of modular products and accessories of System pro *M* compact. The F200 B Type residual current circuit breaker guarantees maximum protection and service continuity in any fault condition. Because ABB's research and technological innovation always strive for your safety. Make the right choice for your safety; choose ABB.
For further information: **www.abb.com/lowvoltage**

Power and productivity
for a better world™

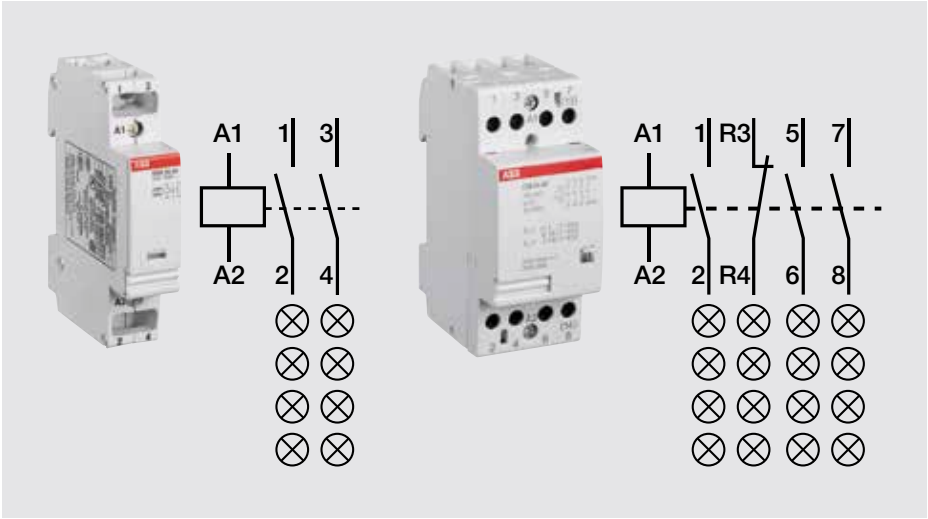
Installation contactors in residential applications

Discover the main applications for residential buildings.

Claudia Togliardi: *Product Marketing Assistant - DIN-Rail Products*

A simple action like switching the light involves multiple activities that occur in the electrical system of your home where installation contactors play a main role. Let's understand better how they operate. Installation contactors are electromagnetic operating switches that, when control power flows through the magnet coil of a contactor, the resulting magnetic field attracts the mechanical contact carrier; by the interruption of the coil control circuit, the installation contactor returns in the starting position.

They are essentially used in automated building equipment, industry and offices for terminal circuit controlling < 63 A AC-1 (incandescent lamps, fluorescent lamps, convectors heating, batteries, regulation systems, ovens, drying systems), small motors controlling < 15 kW AC-3 (ventilation, air conditioning, pumping, watering, automatic systems) and unballasting systems in energy management (possibly enslavement from clocks, unballasting relays, telebreakers, thermostats). These devices are designed to be installed on DIN Rail bars in combination with the Low Voltage portfolio offer. They provide a safe switching and control of different applications plus protection against overvoltages and current peaks. They can also provide cost effecting solution, thanks to the low power consumption of DC coils. The applications for the residential and commercial segments can be very different.



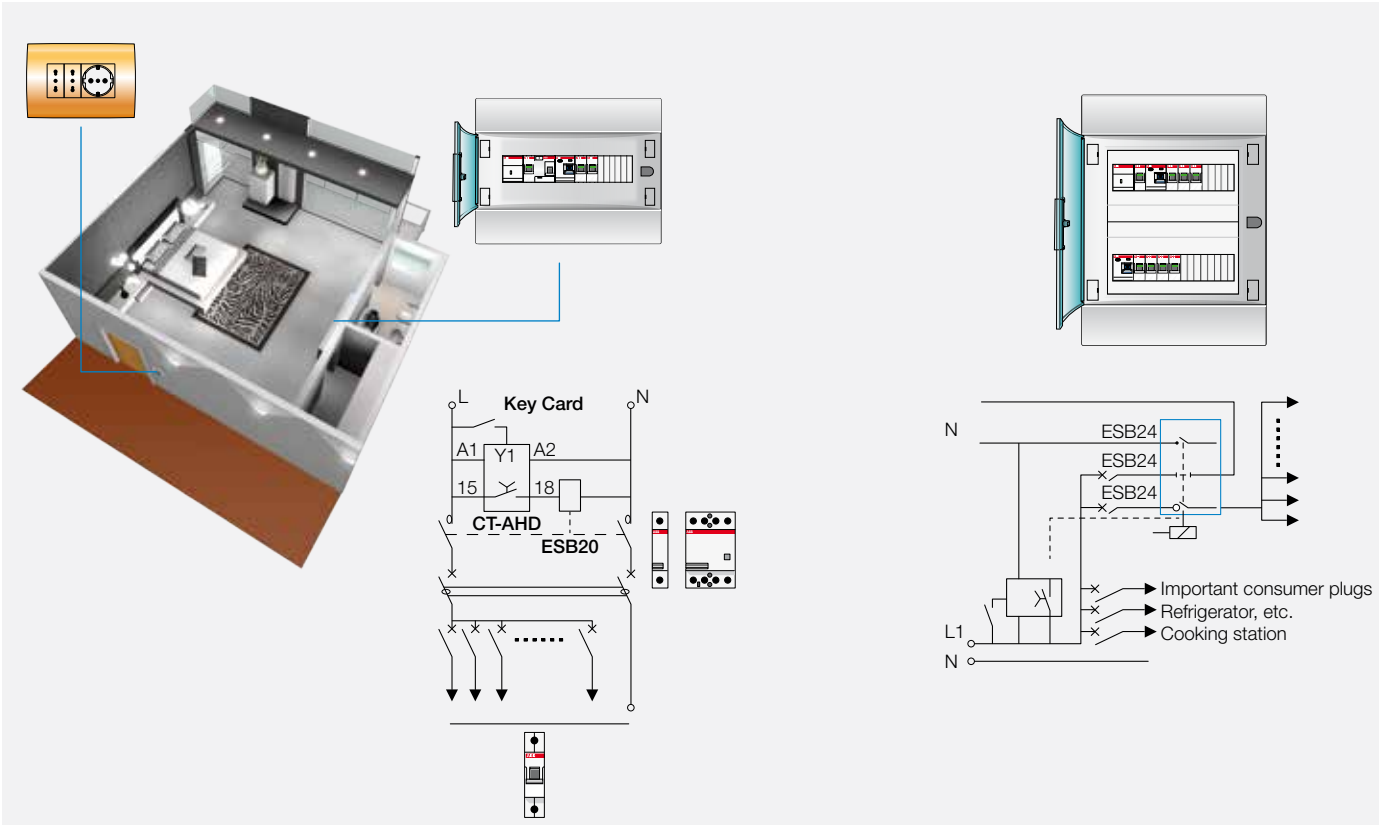
Claudia Togliardi
Product Marketing Assistant
DIN-Rail Products

Lighting

The main application of installation contactors is the switching of lamps, where high inrush current peaks can occur. This is influenced by the length and cross section of the wire, the type of power supply unit and the specifications of the individual lamp brand.
For example, lamp loads cause capacitive inrush current peaks that can be a multiple of the operating current. Depending on the types of lamps and wiring strategies, the main contacts of a contactor will be loaded very differently.

Mixed loads

Mixed loads include a variety of inrush currents. Installation contactors play an important role in realizing widespread applications, such as load shedding circuits, access control with card readers in apartments and hotel. Thanks to them, a complete shutdown of the whole power supply or of the individual circuit when leaving the facilities can be realized.



Installation contactors brochure
2CDC103013B0202

For an easy contactor selection, you can refer to the lamp load table included in the Installation contactors handbook
2CDC103022M0201

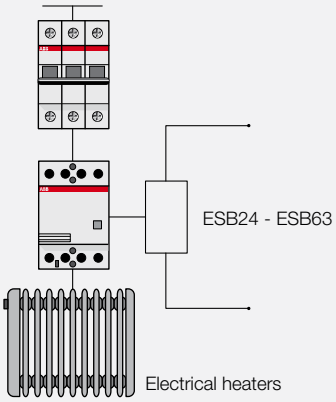
ESB / EN Installation contactors
ABB offers a complete range of equipment for controlling, remote switching and protecting electrical installations in residential buildings and hotel.
The ESB range includes 4 ratings, from 20 A to 63 A with 2 or 4 pole.
The EN range offers 3 ratings, from 20 A to 40 A with an additional switch on the front for manual controlling during commissioning and maintenance operations.
ESB / EN from 24 to 63 A operate without vibration thanks to the DC coil technology, so they are a perfect match for application in commercial and residential building, where silent operations are necessary for people's wellbeing.

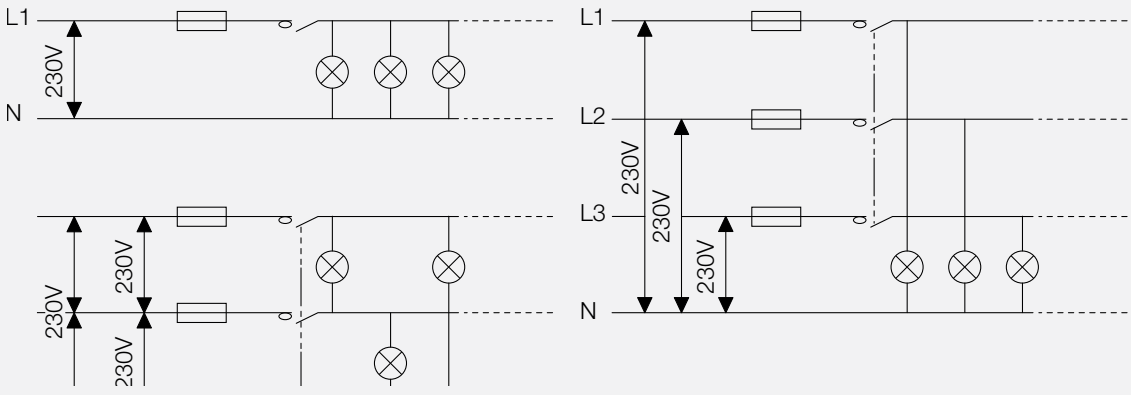
Resistive loads - Heatings

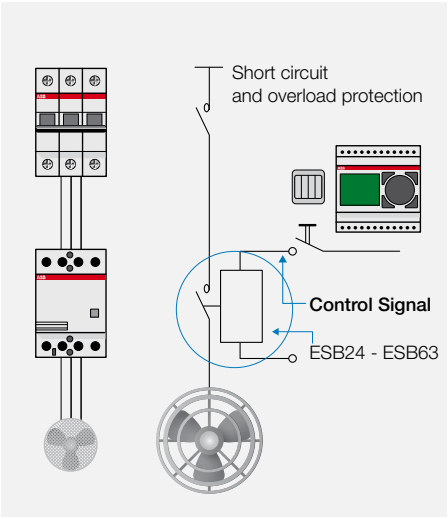
This application concerns the conversion of current into forms of energy i.e. heat, specifically electrical heaters and incandescent lighting bulbs. In resistive loads, the current rises immediately to its steady-state value without an initial peak.

Motors and ventilation systems

Another common application of installation contactors is when there is the need of guaranteeing an appropriate ventilation, meaning fresh and clean air, typically in washrooms and elevators. In hotel applications, the function of an installation contactor is very critical because it has to control big sized heaters or air conditioning systems using large ventilators.



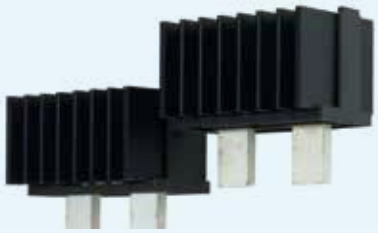




Did you know that?

Alexandros Roumpies: *Product Manager High Performance MCB S800*

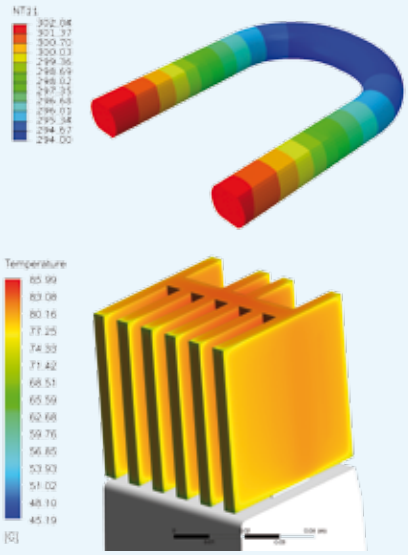
How to reduce the temperature rise in combiner box using S800PV connectors



Circuit breakers used to protect photovoltaic equipment are exposed to high ambient temperatures during operation up to 50°C or even more. When a circuit breaker with rated current of 125A is used, roughly 50% of heat generated by the current is dispersed through the conductors or wires which are connected via the terminals to the breaker as well as the incoming and outgoing.
If the incoming conductors or wires, which are located in the upper part of the circuit breaker, are eliminated and replaced by a short wire, in form of an electrical bridge, there is no possibility to take out the heat generated in the circuit breaker and this can result in overheating of the breaker. Due to the high ambient temperatures, the excessive amount of heat generated in circuit breakers can lead to a considerable increase in the combiner's box temperature and this can lead to malfunction i.e. early tripping of the MCB or even overheating of the MCB.
The pole connector is an evolutionary form of electric connector, which is capable to dissipate the heat generated, and improves significantly the thermal conditions of the application.
The pole connector dissipates the heat by natural convection, and because of its dielectric strength it is safe even if it is touched.

Advantages of the pole connector:

- Avoid hazardous situation due to high temperatures in demanding applications
- Avoid early tripping of the MCB
- Reduce heat dissipation of the MCBs in the enclosure with significant temperature reduction
- Rated current range of 50A and 125A used in 2 pole and 4 pole breakers
- Avoid isolation damage by excessive bent of the cable (not following cable manufacturer limits)



Simulation results for pole connector 125A and cable10cm 35mm2 cross section in ambient temperature 45°C

ABB-free@home

Last year, the home automation system “ABB-free@home®” was successfully introduced to the market. This system makes home automation easier than ever, sets new standards for easy installation, commissioning and configuration.
Thanks to ABB-free@home a variety of solutions can be realized in private housing or small commercial buildings.

Alexander Grams: *Marketing - Communications Manager - BU LPWA*

As examples here are two case studies:

Home automation brings ambience to Libéma Vakantiepark Dierenbos
After two apartments are burned down, Libéma built three pilot bungalows in which they wanted to have a good automation system. ABB was engaged for assistance. The new bungalow contained the first ABB-free@home home automation system in the Netherlands. This system provides extra comfort for the occupant. It controls the lighting and electricity in the house easily with the ABB-free@homeTouch.

ABB-free@home solution is key selling point for new home developer in Poland
For Maciej Piórkowski, housing developer, ABB-free@home was a main differentiator, when selling homes in an exclusive residential suburb in Poland. He is an entrepreneur who invests in housing projects but also owns a small electrical installation company. And here is where Piórkowski has had a long-term relationship with ABB buying various low voltage products such as miniature circuit breakers, wiring accessories, and KNX technology based products.
For his new project, called Ossowska 85 features 24 multi-family homes in the midst of meadows- near to Warsaw, Piórkowski was looking for a key selling point that would add value to his housing project and asked ABB for support. ABB-free@home was selected because of the option to combine all functions of a modern home automation in a user-friendly system and cost-efficient way.


ABB-free@home®
Home automation brings ambience to Libéma Vakantiepark Dierenbos

More information can be found in the case note 1SPC801094L0201 Available also in polish language.

Is there such a thing as easy home automation?

ABB-free@home® is totally uncomplicated – from installation to configuration via an app on your tablet or laptop. Whether blinds, light, heating, air-conditioning or door communication – at last, comfort, safety and energy efficiency are easy to network. It takes little effort to meet all your customer‘s home automation needs. This gives electricians a clear competitive advantage.
www.abb.com/freeathome

Of course.

Power and productivity
for a better world™

ABB

Ensuring well-being and energy savings through green building technologies

Using home automation as a tool for monitoring and managing energy consumption at home, Wunderhaus proposes an offer designed to meet the needs of users who are sensitive to energy efficiency issues, in contrast to a market that is currently marked by anonymous, standardized systems and solutions.

Francesca Sassi: *Product Marketing Manager - DIN-Rail products*

We interviewed Roberto Varacalli, for three years now co-owner with John Bodracco of Wunderhaus, a design and construction company of energy efficient thermal comfort buildings, in line with the principles of bioclimatic bioarchitecture. The highly innovative nature of Wunderhaus projects has led to an invitation being extended to Roberto Varacalli to present lectures at the Technology Innovation course held by Professor Mario Voerzio at the Faculty of Architecture of the Politecnico di Torino. Among the bio-architecture principles that have inspired Wunderhaus is the essential choice of adopting natural recyclable materials, particularly wood.

Where does the idea of building structures entirely out of wood come from?

In a closed environment, the perception of wellbeing is achieved when the temperature of the walls, flooring and air are very similar. To achieve a standard environmental comfort zone of 18°C, the coolest wall temperature (14°C) is generally balanced with hot air at 24°C, resulting in energy consumption figures that are certainly not optimal.

Wunderhaus has chosen to use wooden structures because of their ability to naturally ensure a proper temperature balance between the various parts that make up an environment.

The X-LAM cross-laminated timber used (the so-called futuristic wood) is created by stacking, folding and assembling several layers of red spruce wood bearing PFEC forest certification.

An extreme compression process that totally eliminates oxygen and provides an unexpectedly fire resistant product.

Indeed, contrary to popular belief, a wooden structure fares much better in a fire than reinforced concrete, whose steel parts are prone to collapse suddenly and without warning in situations of extreme thermal shock, such as what happened for example during the attack on the Twin Towers of the World Trade Center in New York on September 11th, 2001.

What characteristics of the building market have you chosen to differentiate yourselves from?

Proposals for homes on the market generally follow the criterion of a "per square meter, turnkey" price with an approach that is seemingly transparent and easy to understand. In reality, information on building solutions and systems is often scarce and inserted in almost identical specification fact sheets to minimize design costs.

Our assessment of costs, on the other hand, is much more complex because it starts from an analysis of the customer's specific needs and resulting solutions.

01

What is your position on energy certification?

A lack of information concerning the profound positive implications of energy certification has often transformed it into a further levy and source of discomfort.

According to Wunderhaus, this type of certification instead has a very important value, because its states to the user the real value of a residential unit with respect to energy consumption. By implementing it as a qualifying specification on a construction project, in addition to class A national energy certification, we've adopted the Casa Clima Gold standard that provides rigorous preliminary studies and analyses prior to on-site work and inspections for specific tests on building solutions.

What are your leverages for asserting yourselves on the market?

We focus highly on energy excellence. For the current building project we're undertaking in Piossasco (TO), we'll be providing an energy certification for each of the 20 apartment units, taking into account several specific factors, such as the building's exposure and position. We also feel that it's very important to be able to provide customers with the information and tools they need to easily monitor and manage their home systems (comparable to an "energy machine"), thereby optimizing both the home's perceived wellbeing and operating costs. Home automation is an indispensable tool in rendering this type of management simple. Just consider, for instance, the simplicity of touching a button to simultaneously activate multiple energy efficient processes. This is the reason why one of the project design objectives we've adopted is level three of the Italian CEI 64-8 Directive, which corresponds to the implementation of automation functions and their centralized control. We're therefore proposing a breakthrough in the stagnant housing market, by presenting in this new building an actual implementation of the innovative building solutions we're capable of. Our goal is to reach out to potential customers, of course, but also to professionals, behind which is a major network of businesses, craftsmen and other industry operators.

01 The residences must be aesthetically identical to traditional housing units, in order to contrast with the idea, which is as instinctive as it is far from the truth, that wooden structures are necessarily chalets. Or worse, simple shacks.

Francesca Sassi
Segment Manager Residential and Commercial Building

02

02 Wood was chosen as a building material for the structures, since it ensures maximum comfort, thanks to uniform temperatures for the floors, walls and ambient air.

In your opinion, how important is the builder's role in the choice of technology?

Builders undoubtedly have a great deal of responsibility in applying qualitative project design aspects and appropriate technology choices, being fully aware that each element must be perfectly integrated within the system it belongs to. As such, we're the only ones who can effectively select the most appropriate domotics solutions, as essential monitoring and management tools.

What are the benefits of home automation that users are most sensitive to?

Even within a context still characterized by a general lack of information, we can certainly say that security is the most emotionally relevant benefit for users, mainly in the sense of providing protection against intrusions.

However, this immediate perception can easily be supported with an understanding of the overall importance of centralizing controls for properly managing energy consumption. As a very commonplace example, simultaneously lowering all the shutters in your home at preset times is a virtuous action in terms of energy savings; in the wintertime it helps conserve heat, and in the summer it protects from solar radiation.

How important is ABB's contribution to training and technical updates?

For those who, like us, reject a "this is how it's always been done" logic, being informed on technology developments (and home automation in particular) and their relative competitive advantages is simply essential. This is why ongoing training and updates for our ABB staff is important.

Our willingness to seek out information is absolutely total, so those continuous updates are mandatory.

How is information conveyed?

Exchanges of professionally significant information occurs within a network of relationships. In our case, in particular, it was the installer who established the first contact between us and ABB. The relation-

ship was then maintained through a continuous flow of information regarding the technology developments we develop and adopt according to our goals. We strongly believe in the logic of teamwork and the importance of gathering and exchanging information within a relationship of mutual trust.

What positive aspects do you see in the collaboration with ABB?

The collaboration with ABB, which provides construction builders with a Domustech solution on favorable terms, is perfectly in line with our strategy of maximum energy efficiency, while providing a quality offer with a stronger positive connotation than the average.

Even from an emotional standpoint, delivering an apartment with a highly advanced anti-intrusion monitoring system is a strong statement, providing a concrete view of the presence and simplicity of automation functions.

ABB Home Automation solutions allow users to detect and display consumption data, providing immediate and concrete feedback on energy efficiency targets. In addition, shutters are centrally closed, non-priority utilities are automatically detached in the event of a power overload (anti-blackout function), and scenarios are customized according to the customer's needs.

What's also appreciable is ABB's availability to create marketing tools (brochures, panels, posters) to enhance, among other aspects, the technological advantages of the solutions installed, including those that can easily be integrated later on.

Should an innovative proposal make use of new information tools?

Of course! The sheer number of "Likes" we've received on our Facebook page is very flattering. We're currently evaluating an application (perhaps one that is dedicated to builders and which ABB is already developing) that allows potential customers to show and share the realization of solutions through mobile devices.

We'll surely use the new communication tools for the official presentation of the new Piossasco 20 apartment building complex.

What influences the customer's perception more: the manufacturer's logo or that of the builder?

Value is generally recognized for skill and expertise, not for a brand name, which plays a much less crucial role in our industry compared to other markets. This is especially true for the builder's role as a guarantor for the quality of the systems solutions adopted.

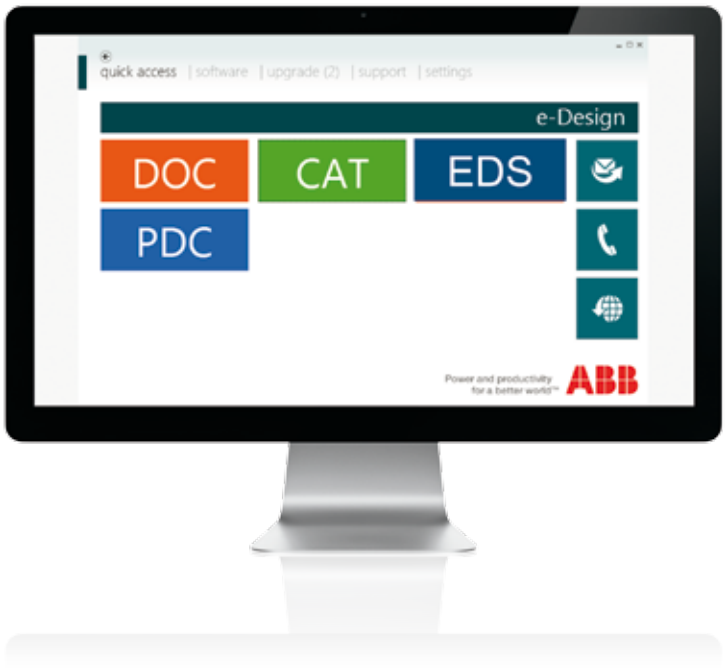
Interview conducted thanks to the collaboration of:
Architect Roberto Varacalli:
owner of Wunderhaus (Piossasco - Turin - Italy)
Stefano Sacchetto and Andrea Brossa:
ABB S.p.A. - LP Division - Turin Branch

ABB's philosophy to design distribution boards

e-Design. Do you need to configure switchboards or to project an electrical dimensioning? We have the solution to make it happen!

Eric Bogaard: *Product Marketing Manager - Enclosures*

e-Design combines several existing ABB calculation software tools to one simple platform for designers, panel builders, wholesalers and technicians. Thanks to it, you can design in a simple and fast way a distribution board up to 6300A.

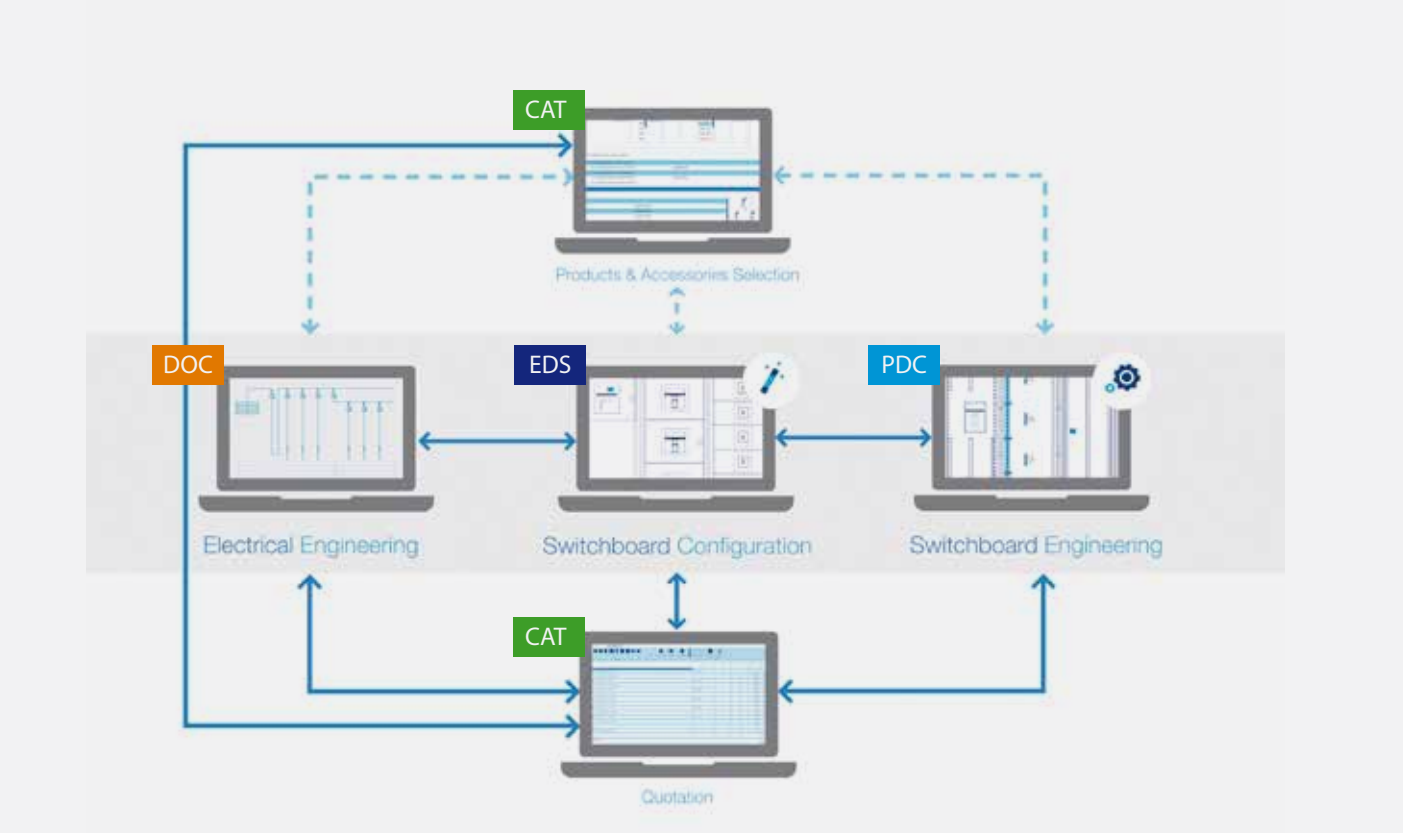


e-Design has been developed to meet the needs and habits at a global level, in accordance to user registration data and IEC standards.

e-Design is available in English, Spanish, Portuguese, German, Italian and Russian and it is continuously updated.

Inside, you can find also tools like:

– "Easy rail Designer" – designer for terminal connectors and blocks.
– "SMISSLINE designer" - range of pluggable miniature circuit breakers.



Overview of the various functionalities embedded in e-Design tool.

The philosophy is solution and application driven. Less experienced users can project very fast without the knowledge of individual components: this is possible because the tool itself ensures compatibility between products, assembly kits and busbar systems.

For experienced users the process can be even more direct, using product codes and the drawing of a single-line diagram, thanks to predefined macros, to configure distribution boards up to 6300A.

Eric Bogaard
Product Marketing Manager
Enclosures

From electrician to marketer

Team Building and Group Coaching. Motivating people to reach targets.

Federico Mai: *Marketing Communication Account - LP Division*

Products, technical specifications, performances, features and application examples are essential items of knowledge to work as a professional electrical system installer. However, it is equally clear that in today's ever increasingly competitive market it becomes even more essential to acquire skills in areas that lie outside the technical sphere and allow you to stand out from the competition in order to increase your business volume. And for this reason this article offers you information, tips and some "tasty tidbits" that we believe can help you better understand certain marketing and communication concepts and practices that can make a difference in approaching a client by stimulating creative thinking for new ideas and solutions. Or simply to help answer questions like, "Where do I start from?" or "How could I do that?"

Everyone speaks positively of teamwork, but in the practice it rarely goes well spontaneously. Our history says we find it hard working in a team. All those who work in a company knows it: little confidence, **high levels of conflict**, lack of individual accountability, unclear and almost never achieved objectives make the teamwork difficult. But everyone also knows that today **working in a team** is necessary and that a tight-knit group is an extraordinary asset. The process is known as "team building", literally **"construction of a team"**, and is a training technique that achieves great results improving relations between people, as long as the following conditions are met:

1. all **management levels**, even the highest ones, must **agree** on programs and objectives;
2. the head of the group (the leader) participates in the training course as every other member;
3. at least two subsequent **test meetings** are held;
4. the leader of the group accepts an individual support and guidance (coaching) path to complement the work;
5. the training **meetings** are held **far from the company premises.**

The first requirement is that all top managers are really convinced that the group is a company strength and that this belief is explicitly reflected in their behavior. It is important to understand that the relationships inside a group develop both among people and with the leader and that problems can reside anywhere. That's why the leader's presence and **participation are really essential**. During the course, the trainer will use practices (analogical and metaphorical experiences) different from those usually carried out by the participants. All techniques will present useful aspects for generating a **cooperation and mutual trust process**. Activities can be the most varied, e.g. sailing, cooking, team sports, etc. The trainer will use the performing of activity to comment on situations and trends, to highlight the similarities and to allow the group to learn from experience. The training must continue and, above all, root in everyday life, so it is necessary **to plan** at least **two subsequent stages** after one month, during which the trainer will help the group to overcome any difficulties that have arisen and to appreciate the results, which are always present. **In everyday life** it will be up to the leader to protect and facilitate the new climate. This task is not easy and the coaching aims at helping him/her to adopt behaviors in line with the new strength of the group. The place where to live this educational experience has a fundamental role: to bring the group **away from the workplace** means to convey a message of implicit trust and offer a real chance to make experiences in freedom. To be resident increases the concentration, fully exploiting the time with no distractions. Furthermore, the **physical proximity** among people helps to break down barriers of misunderstanding and fosters empathic communication. The group is aware of its new possibilities and verifies that these are related to cooperation and mutual trust. This feeling is exciting and the group becomes aware of his own strength.

Group Coaching: event or training?

The economic crisis has forced companies to reduce the resources allocated to training and events, but it did not remove the need for both. Group coaching could be a solution.

An event to help people grow

Today, the general rule is to do more with less and the focus is on significantly shorter and interactive formats which help acquiring skills that can be transferred to the workplace and contain even a little training. Group coaching is a training methodology that can also be easily used as a corporate event, with all the advantages of both worlds. It can definitely help you, if you are looking for an event that leaves a mark and that:

a. does not imply the absence from work of many employees on the same day;
b. is suitable for small workgroups (6-12 people), without the time and budget investments required by traditional formats;
c. has also an incentive value, and can be presented as a reward;
d. generates an easy-to-manage follow-up.

A group coaching session can be integrated in a broader corporate event, or be the event itself.

The advantages of group coaching

Coaching is a method to help individuals finding autonomously their own personal and/or professional goals and then to plan and put into practice the necessary actions. The trainer, just like a good sport coach, stands by the individual, supporting, promoting self-esteem, encouraging and guiding him/her. During group coaching, the coach interacts with a group, but each person works on his/her own development target and establish an action plan to achieve the desired result through methods and timing that are strictly individual. Group coaching is therefore an "individual group coaching" where instances of personal growth and group trends cross and reinforce each other. Choosing the group coaching for a corporate event offers several benefits, including:

a. stimulate participants to focus on their personal growth targets;
b. convey the message that the company believes in their potential;
c. use a customizable format according to the business needs (both content and logistics);
d. reduce the costs, as no expensive equipment is needed.

How to prepare a group coaching session

Few but essential steps to ensure the effectiveness of the event in accordance with the business objectives and the appreciation of the experience by participants.

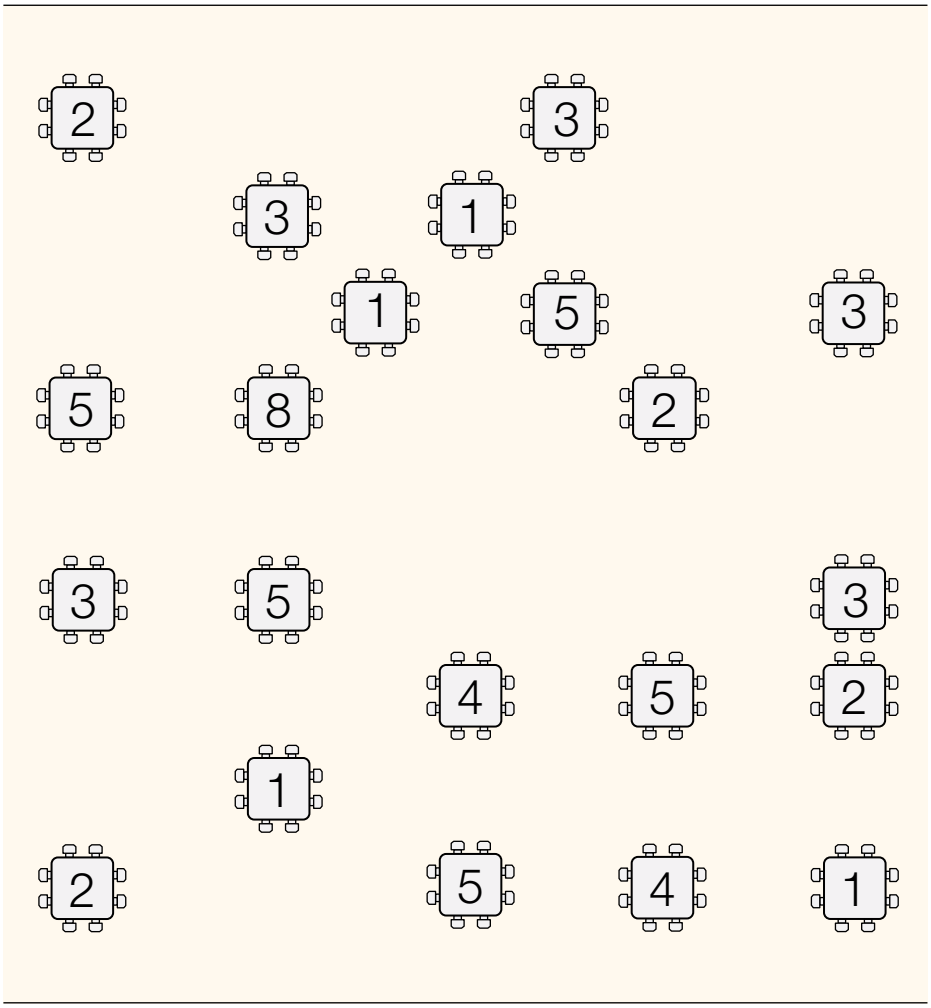
a. To define a conceptual macro-area and the company's expectations for improvement. For example, if the goal is to communicate a change in the management, you will aim to achieve: 'innovation capacity' or 'flexibility'. To reorganize or motivate a commercial network, you will seek 'result orientation', 'persuasive communication', 'objection handling'.
b. To identify people to be involved. Group coaching is indicated for small groups, up to a maximum of 10 - 12 people. In case of higher numbers, you can create multiple subgroups. It is not necessary that the participants are part of the same team or corporate function.
c. To find the right place. It must have enough room to allow the group working and moving freely; it should have an attractive appearance and ergonomic characteristics, a flexible layout and the possibility to use multiple visual aids. An external location is advisable, in order to avoid interruptions or distractions.
d. To establish the duration. Depending on the number of participants, from a minimum of half a day up to the whole day.

Practically, how does a group coaching session work?

The session consists of a standard path with some stages. Each person is called to:

a. Establish his/her own development target within the macro-area identified by the company. For example, if the work area is the result orientation, someone might want to improve the ability of 'meeting the standards', someone else his/her 'decision-making skill', someone still might want to increase the capacity of 'addressing obstacles'.
b. Identify one's own way of reaching the goal and changing oneself (leaving one's 'comfort zone').
c. Identify and discover how to overcome the barriers which might hinder the path.
d. Define a detailed action plan indicating the actions to be taken, their priorities and deadlines.

Connect the boxes
Train your brain.



Task

You must complete an electrical system by connecting junction boxes with cable conduits.

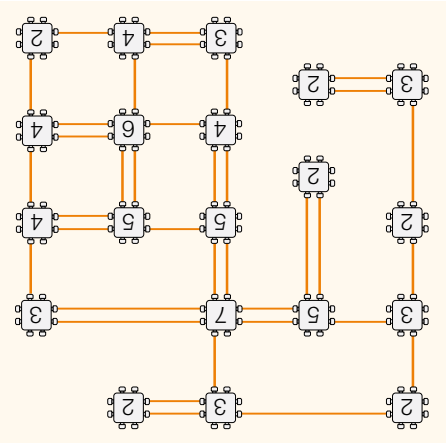
An electrician has already installed all the junction boxes on the wall and laid down the required connections, but then he left the job unfinished without explanation.

Your task is therefore to connect all of the boxes indicated.

Instructions

- Each box must be connected to the others and the number of connections must correspond to that indicated on the box.
- Two different boxes can be connected with each other, but without exceeding two connections.
- Connections can be made either horizontally or vertically. Cross-connections are not allowed.
- There is only one correct solution and can be found purely by logical reasoning. No specific technical skills are required.

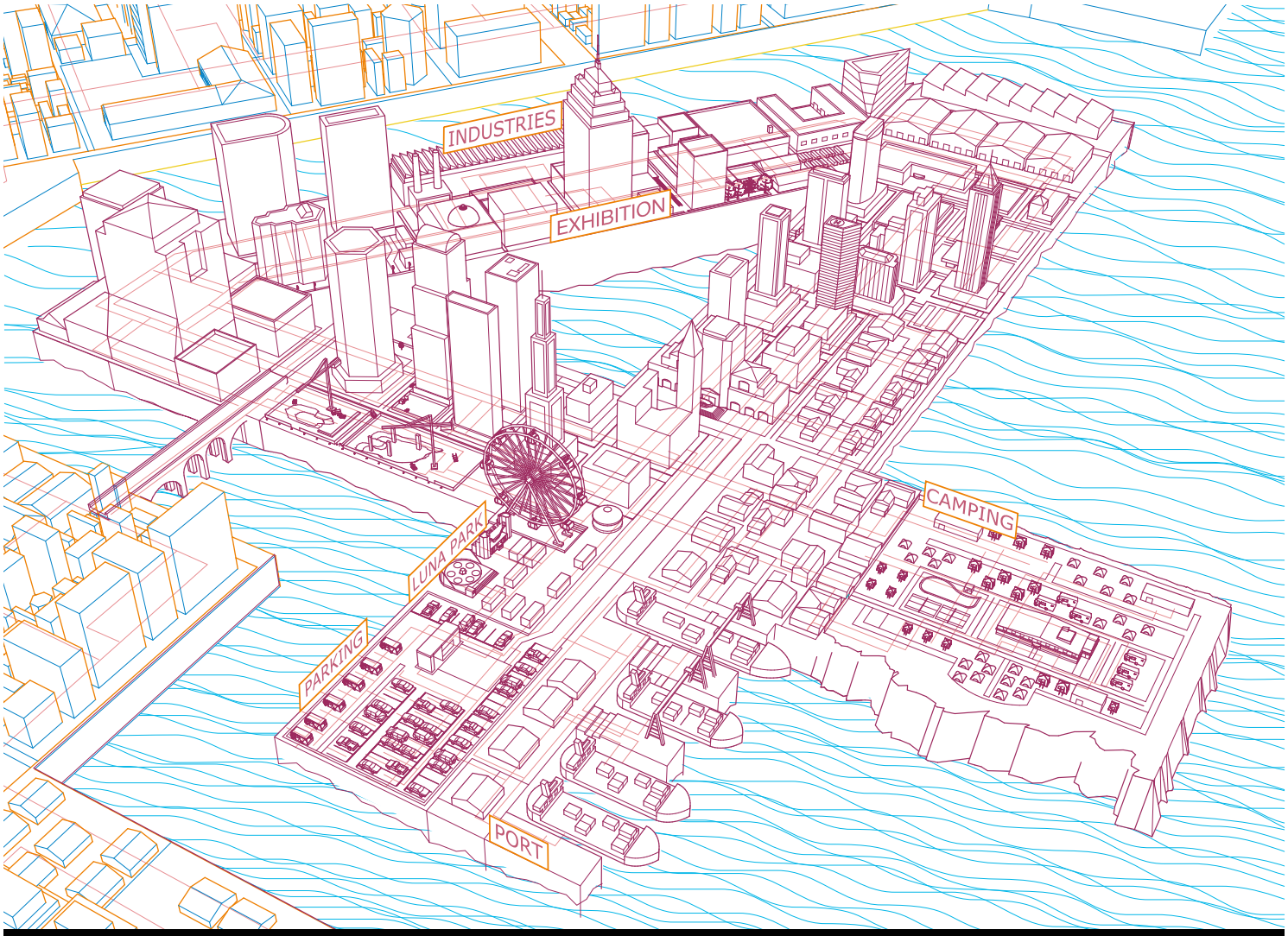
The solutions to Connect the boxes



T Line Twilight Switches. Understanding light to control efficiency.

Designed for automated lighting control, the new ABB T Line twilight switches can be used in all public areas where an optimal and efficient management of brightness and energy is required at sunset. The T1 versions are preset to 10 Lux and equipped with a switching delay and two LED indicators to display the setpoint value, while the advanced versions T1 PLUS, adjustable on four different scale values up to a maximum of 15,000 Lux, allow you to program the switching delay and are ideal for daytime applications. For installation on poles/walls, ABB offers the T1 POLE version, preset to 10 Lux, with integrated photo resistance and inputs for the wiring including cable gland seals.
www.abb.com/lowvoltage

Power and productivity
for a better world™



Minimum space, maximum protection
DS203NC: 3P+N RCBOs in 4 modules

Designed to be compact, DS203NC 3P+N RCBOs are suitable in all those applications where size can be an obstacle. They provide reliable and complete protection from overcurrent and earth fault currents. DS203NC RCBOs are available in two ranges with different breaking capacities to cover all the applications in commercial and industrial installations; DS203NC L with 4.5kA and DS203NC with 6kA breaking capacity according to IEC/EN 61009. The range includes types AC, A, APR and S and tripping curves B, C or K. **www.abb.com/lowvoltage**

Power and productivity
for a better world™

Special Insert

Welcome to the IEC 61439-1-3, the new reference standard for contemporary DBO

Power and productivity
for a better world™

01

Pierpaolo Rizzi: *Product Marketing Manager - Enclosures*

01 What is a DBO assembly?
A distribution board intended to be operated by ordinary persons, namely an assembly on which ordinary (unskilled) people can do manoeuvres and replace fuses in a household environment.
The output circuits contain protective equipment, intended for use by ordinary people, for example compliant with the IEC 60898- 1, IEC 61008, IEC 61009, IEC 62423 and IEC 60269-3 (I_n< 125 A);
It is suitable for the distribution of electrical power in fixed enclosures, intended for indoor and outdoor use.
The DBOs are made either as single element or completely standardized components produced in large volumes.
The DBOs can be assembled outside the factory of the original manufacturer.
The DBOs are at least compliant with the overvoltage category III (U_{imp} = 4 kV)

Once upon a time...

Following the first IEC 60439 standard concerning the '80s low-voltage switchgear and controlgear assemblies, other four additional editions have been issued with dozens of variations and improvements, and four other parallel standards dedicated to specific types of electrical assembly.

- IEC 60439-2: busbar trunking systems;
- IEC 60439-3: particular requirements for low-voltage switchgear and controlgear assemblies which are to be installed in locations where unskilled persons have access for their use
- IEC 60439-4: particular requirements for assemblies for construction sites (ACS)
- IEC 60439-5: particular requirements for assemblies intended to be installed outdoors in public places (cable distribution cabinets (CDCs) for power distribution in networks).

Among the novelties of the 90s, stands the definition of tasks and responsibilities for the various manufacturers, through which the assembly is born as a result of the proper integration of loose devices, synergistically interacting with each other.

The TTA (type-tested assemblies) and PTTA (partially type-tested assemblies) triggered this functional and inevitable separation, that the latest 61439 standards have revised and re-launched. In fact, with the 61439... standard a new duality in terms of functional skills of the persons involved has been redesigned: the "original manufacturer" responsible for carrying out the original design and the associated verification of the

Development of assembly standards	
IEC 60439-1	CEI EN 61439-1 general standards
	CEI EN 61439-2 power assemblies
IEC 60439-3	CEI EN 61439-3 distribution assemblies
IEC 60439-4	CEI EN 61439-4 construction site assemblies
IEC 60439-5	CEI EN 61439-5 power distribution assemblies
IEC 60439-2	CEI EN 61439-6 busbar systems

From the previous five 60439 standards to the new six 61439... standards

IEC 61439 standard tree

The IEC 61439-3 standard is to be interpreted in conjunction with IEC 61439-1 standard. The general provisions, covered in IEC 61439-1 (Part 1), apply to this standard when they are cited. When this standard states “addition”, “amendment” or “replacement”, the relevant text of Part 1 is to be adapted accordingly.

assembly and the “assembly manufaurer” (e.g panel builder or installer) who using an assembly system from an Original Manufacturer, assuming responsibility for the completed assembly (following the assembling and the routine verifications) In this regard, an important change concerns the operating procedure which in the past has generated quite a few uncertainties: the possibility to extrapolate the assembly, that from TTA-type became PTTA-type. In 61439... standards it was preferred to transfer this task from the assembly manufacturer to the original manufacturer, who now, becomes the “leading actor” of the compliance of the assembly to the standard.

in addition to the verification by testing, the original manufacturer has two new types of verification:
the verification by calculation/measurement and verification by application of design rules.
The three verification fully replaces TTA and PTTA and contrary to these previous categories , they have practically the same relevance (although they have to be selected and adopted according to the characteristic to be verified).

The excellent collaboration and synergy between the two manufacturers lead to the longed for design-verified assemblies, without further misleading classifications.

To increase the publishing efficiency, in the 61439... standard the pre-existing independence among the five ”sisters”standards (each of them comprehensive and monographic) was trashed and a single base standard was set up. All others standards are based on this one, and better specify or interpret the mother “directive”, according to the spe-

No.	Characteristic to be verified	Clauses or subclauses	Verification options available		
			Testing	Comparison with a reference design	Assessment
1	**Strength of material and parts:**	10.2			
	Resistance to corrosion	10.2.2	yes	no	no
	Properties of insulating materials:	10.2.3			
	Thermal stability	10.2.3.1	yes	no	no
	Resistance to abnormal heat and fire due to internal electric effects	10.2.3.2	yes	no	yes
	Resistance to ultra-violet (UV) radiation	10.2.4	yes	no	yes
	Lifting	10.2.5	yes	no	no
	Mechanical impact	10.2.6	yes	no	no
	Marking	10.2.7	yes	no	no
2	**Degree of protection of enclosures**	10.3	yes	no	yes
3	**Clearances**	10.4	yes	no	no
4	**Creepage distances**	10.4	yes	no	no
5	**Protection against electric shock and integrity of protective circuits:**	10.5			
	Effective continuity between the exposed conductive parts of the ASSEMBLY and the protective circuit	10.5.2	yes	no	no
	Short-circuit withstand strength of the protective circuit	10.5.3	yes	yes	no
6	**Incorporation of switching devices and components**	10.6	no	no	yes
7	**Internal electrical circuits and connections**	10.7	no	no	yes
8	**Terminals for external conductors**	10.8	no	no	yes
9	**Dielectric properties:**	10.9			
	Power-frequency withstand voltage	10.9.2	yes	no	no
	Impulse withstand voltage	10.9.3	yes	no	yes
10	**Temperature-rise limits**	10.10	yes	yes	yes
11	**Short-circuit withstand strength**	10.11	yes	yes	no
12	**Electromagnetic compatibility (EMC)**	10.12	yes	no	yes
13	**Mechanical operation**	10.13	yes	no	no

02

02 List of design verifications to be performed.

cific assembly requirements. This is how the current regulatory package is born, consisting of a mother IEC 61439-1 standard, plus five daughter standards, such as IEC 61439-2 and IEC 61439-3.

To recap...

In summary, among the changes introduced by the new 61439 family, it is worth remembering:

1) The new IEC 61439... standards and the previous IEC 60439 standards have coexisted and the old ones are going to be smoothly superseded over a wide span of time (on average four years) from the new publication;
2) Overcoming the previous TTA and PTTA duality and the subsequent positive "convergence in the design-verified assemblies", to avoid possible misunderstandings or subjection of the quality of the finished assembly;
3) Accreditation of the two new technical professionals, the "original manufacturer" and the "assembly manufacturer".The first is entrusted with the responsibility of the type testing and other two methods (comparison with reference design and assessment), to offer the maximum range available in order to choose the best construction system. The second, that is the final assembler, relieved from the old extrapolation work, can focus on the installation and the final testing of the assembly that will be placed in the system;
4) Expansion of the previous seven verifications, up to the total thirteen expected, adding six entirely new verifications, as shown in the important summary table D of the relevant annex to the "mother" standard 61439-1

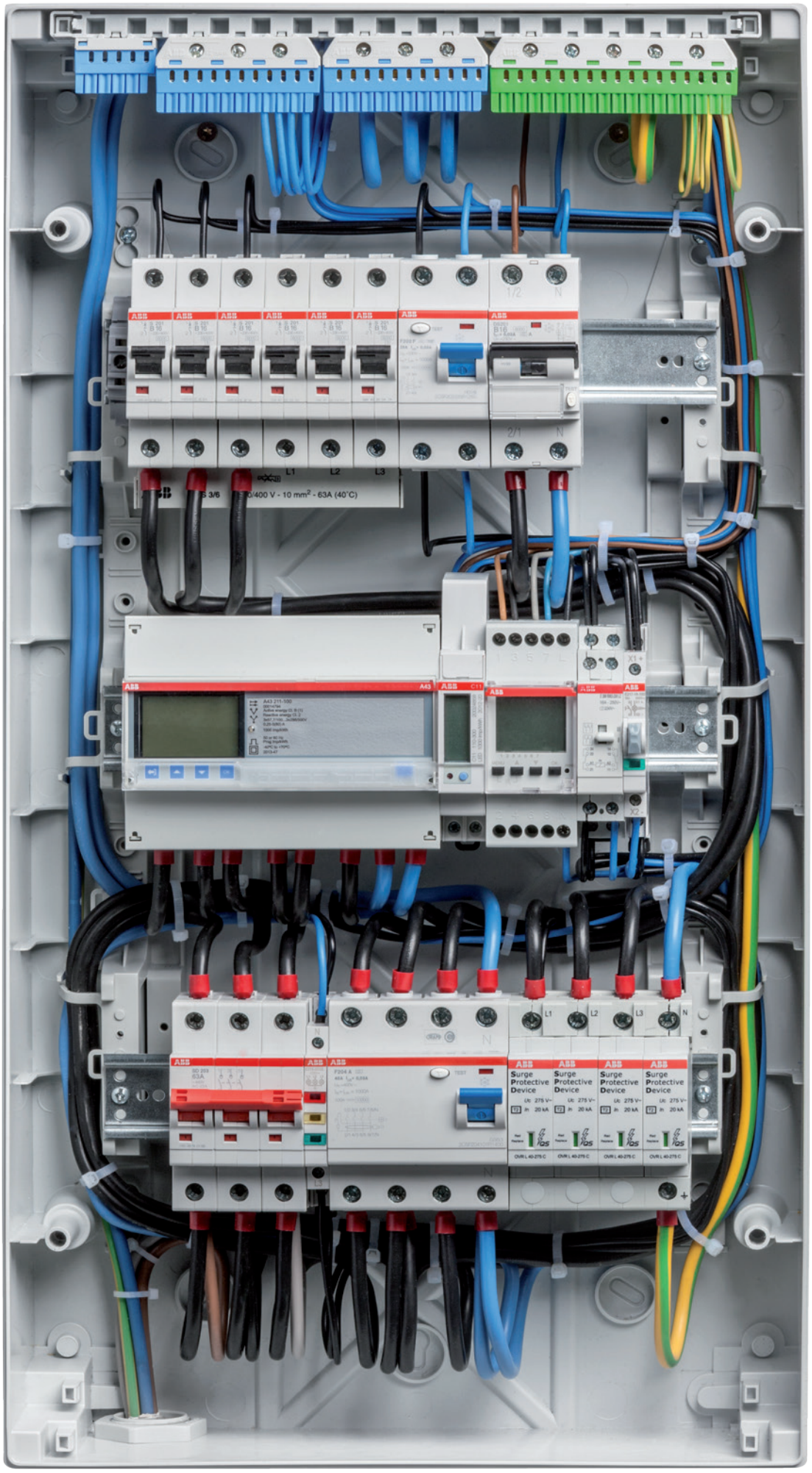


ABB
L1
L2
L3
Surge Protective Device

The final handover

As decided at the expiry of the announced period of coexistence, in September 2014 the old IEC 60439-1 standard was withdrawn and the new exclusive IEC-61439-1 (mother) and - 2 (daughter) standards were made mandatory.

This means that, since more than six months it is no longer possible to build assemblies according to the old standards (TTA or PTTA), but only according to the new ones (design-verified assemblies). Since the new standards are not retroactive, the assemblies installed normally continue their "career", as both TTA and PTTA, including the usual routine and extraordinary maintenance (replacement of failed components with others of equal or better performance). Please note: In case of intervention on existing assemblies, for expansion or radical changes, with regard to the modified or extended component, the new standards in force must be complied with.

Breaking news...

As announced, the same turnover occurred in March 2015, when the old IEC 60439-3 standard disappeared and only the new IEC 61439-3 standard concerning distribution boards intended to be operated by ordinary persons (DBO) remained in force.

Initially published in November 2012, this new Part 3 replaced the previous well-known IEC 60439-3 standard, while maintaining the same rating. The confirmation of maximum 1000 V a.c., 1500 V d.c. and maximum 250 A input per phase, as upper power rating, demonstrates the strategic importance of this section, which de facto covers more than half of the low-voltage assemblies installed. To complete the limits of the scope there is the maximum permissible 300 V voltage to ground, largely sufficient in the usual 230/400 V consumer systems, and the 125 A maximum permissible current for the output lines, typical usage limit of the modular circuit breakers.

Given the powers involved, in addition to the myriad of switchboards and civil and domestic consumer units, fall under this umbrella legislation even the electrical switchboards for the tertiary and small industry sectors (shops, supermarkets, hotels, schools, workshops, banks, etc.).

Historically this segment provides the switching of the materials, that with the increase of the electrical and mechanical performance, leave the thermoplastic to move to the metal. Moreover, as clearly highlighted by art. 10.10.3.2 of Part 3, DBO assemblies with plastic enclosures are equivalent to metal DBOs, if the higher air overtemperature of the inner surfaces of the plastic enclosure does not exceed the permissible overtemperature (see tables) of the accessible external metal surfaces

The world of DBOs

The special feature that distinguishes and limits these enclosures in terms of field of application, is the letter “O” in the name: DBO. “O” means “Ordinary” and qualifies the generic (or even anonymous and large) users inexperienced of electrical hazards, who can still freely use the DBO (in the previous standard 60439-3 they were named unskilled persons).

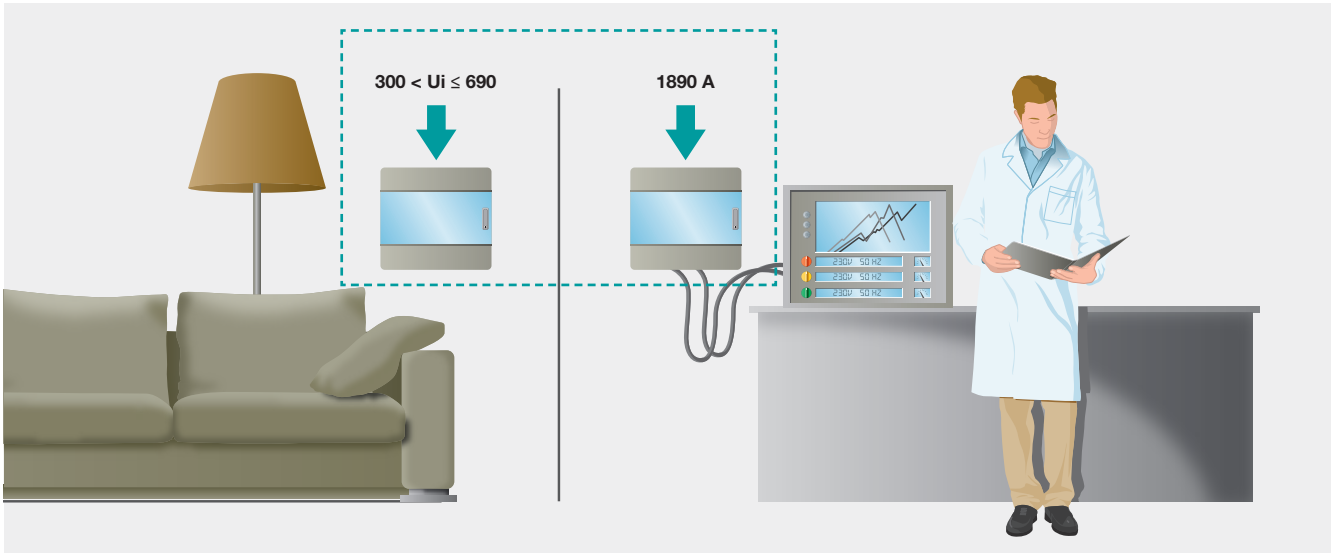
They are ordinary citizens, employees, teachers, waiters, bank clerks and attendants in a broad sense, that are part of the so-called “general public” and, when needed, as users they limit themselves to turn on or off a device and/or activate a room or an electrified structure.

Precisely because of this assumed “good-natured technical ignorance” of the users, in Part 3, among the thirteen design verifications available, are favoured those of the DBO.“external and functional”.

In particular, the following “capabilities” are emphasized in order to ensure safety and reliability:

– overvoltage category III at least, that considering 300 V to ground, means a 4 kV U_{imp} - rated impulse withstand voltage (see below).
– a more informative data plate, that besides the usual few data regarding the 61439-1 standard, also requires I_{nA} and the IP degree of protection of enclosures;
– at least pollution degree 2 (with guaranteed minimum clearances and creepage);
– mechanical impact withstand: IK 05 for indoor DBO, IK 07 for outdoor DBO;
– the degree of protection of a DBO for indoor installation shall be at least IP 2XC
– equipment calibration can not be performed or changed after installation by untrained persons;
– output terminals for neutral, indicated as such and equal to the corresponding phase terminals;
– a minimum of two terminals for electrical installation protective bonding conductors.
– greater severity of the resistance to corrosion test;
– glow wire withstand (like Part 1):
  – 960°C for components intended to keep current-carrying parts in position;
  – 850°C for enclosures intended to be installed in hollow walls;
  – 650°C for all other components, including those intended to keep the PE in position
– Refinement of the overtemperature test (see below).

It is worth to examine more closely some of these properties that daily can affect the choices of the installer who operates in the domestic and (advanced) tertiary fields.



Rated insulation voltage U_i (line to line a.c. or d.c.) V	Dielectric test voltage a.c. r.m.s. V
$U_i \leq 60$	1000
$60 < U_i < 300$	1500
$300 < U_i \leq 690$	1890
$690 < U_i \leq 800$	2000
$800 < U_i \leq 1000$	2200

03

03 The table shows the highest values of Rated insulation voltage and and highest values of Dielectric test voltage used in the laboratory on the thermoplastic enclosures.

The dielectric characteristics.

This is the purest and most exclusive electrical challenge and it almost exclusively takes on concrete form on the verification of the threshold clearances and creepage, that the various live devices will have to maintain once installed in the DBO. The rated characteristic that meets this requirement has always been the rated voltage (U_n).

This value is stated by the original manufacturer in the assembly and to establish it, he refers to a further rated insulation voltage U_i, with reference to which he will have carried out the type testing on prototypes. Once U_i is fixed (which must necessarily be $\geq U_n$), a test alternate voltage even five or six times higher than Ui, will be applied in the lab for a given time.

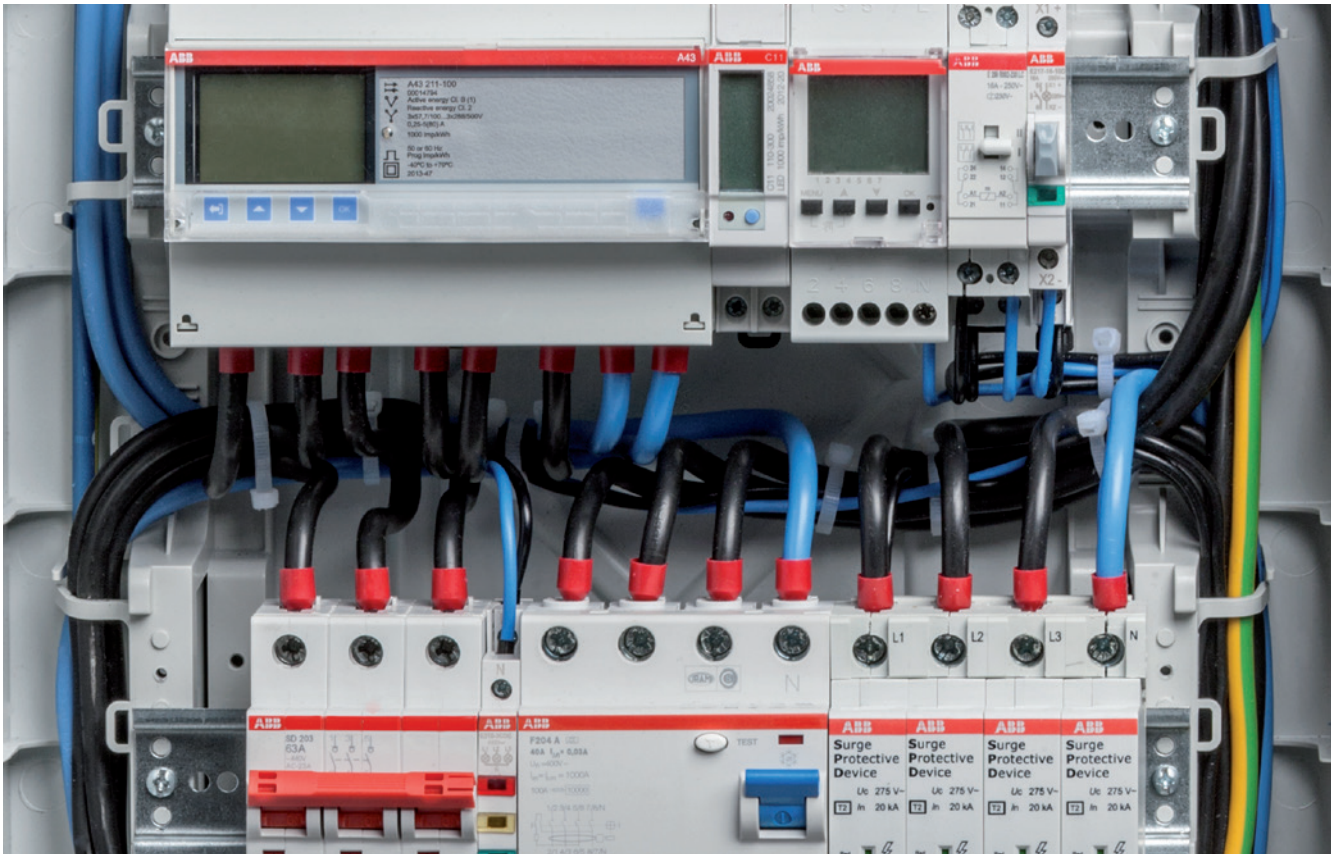
This is established by a table, fully accepted in Part 1 and available in the general section.

For example, in the table (see below) it is understood that, for boasting a U_i of 600 V, it is necessary to pass a test of applied voltage of 1890 V a.c. (three times the U_i).

Depending on the actual system voltage (in some cases imposed by the energy meter of the utility) that the standard calls U_e rated operational voltage, in addition to the enclosures, each component installed will have its own $U_n > U_e$.

In addition to the dielectric strength at 50 Hz, Part 3 also requires verification of impulse withstand voltage U_{imp}. Specifically, in the case of household electrical loads and the like, it is required at least a category III withstand, that from the relevant table results equal to 4 kV for normal single- and -three-phase installations with 230 V to ground.
This performance is achieved by ensuring an air clearance among all live points of at least 3 mm. Obviously, such U_{imp} 4 kV minimum rated impulse withstand voltage, against the discharge, should also be guaranteed in all the components installed on the DBO, usually referring to the relevant technical catalogues.

Possible critical points of surge discharge may be the proximity of live exposed parts (terminals, connections, coils, section bars, metal rods, etc.).



04

Verification of the overtemperature

The overtemperature withstand is perhaps the most innovated design verification than ever before.

As always, the type testing involves an accurate measurement of the temperature of the assembly's various components that have reached steady thermal conditions, whether they are metal elements (panels, terminals, window closures, internal partitions, etc.), and insulating elements (cable film, bar holders, enclosures and control levers, moulded-cases, etc.):

But now, the steady thermal conditions must be reached and processed, having distributed the entire test input current (In_A) to the lowest possible number of output circuits (Inc), in order to concentrate locally the joule effect and do not disperse it throughout the entire cooling volume. All this having duly reduced, according to appropriate rated diversity factors (RDF),the different output currents of the various circuits and get the actual operational currents (Inc).

Given the application range of Part 3 (IEC 6149-3), the temperature-rise limits of the DBO can be verified according to two methods:

1) through a type testing and the compliance with the permissible values at full operation according to table 6 of the 61439-1 standard;
2) by comparison with the maximum power dissipated values from the enclosure provided by the original manufacturer.

The first method

(as mentioned above) is a normal type testing, where a prototype DBO, having a certain $I_{nA} \geq 250$ A, is loaded (in the lab) with a suitable configuration of input and output currents. We need to ensure that the total input current I_{nA} is disposed on the minimum number of output circuits, loaded to 80% of their own rated current or according to the percentage shown in the table, based on the number of existing outputs. The test is passed if, when fully operational, at every point of the DBO, through the accurate measurement of the object temperature, the permissible overtemperature shown in the table 6 is not exceeded.

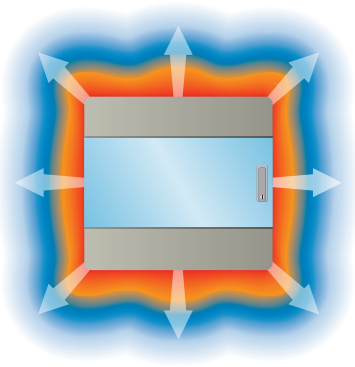
The second method

can be directly applied by the final assembly manufacturer, who knowing the dissipating power of the individual enclosure, available on the relevant catalogue (See below), can compare it with the obtained P_{tot}, by adding up all the real losses of the various hot components under steady conditions. Normally, on assembly catalogues an appropriate table shows the limit P_{inv} for each

Number of outgoing circuits	Assumed loading factor
2 and 3	0,8
4 and 5	0,7
6 to 9 inclusive	0,6
10 and above	0,5

04 Possible critical points of the dielectric strength

System pro *E* comfort MISTRAL65					
Codes	1SL1105A00 1SL1205A00	1SL1106A00 1SL1206A00	1SL1107A00 1SL1207A00	1SL1108A00 1SL1208A00	1SL1109A00 1SL1209A00
Number of modules	36	36	48	54	72
Dimensions (WxHxD) in mm	430 x 435 x 155	320 x 435 x 155	320 x 735 x 155	430 x 600 x 155	430 x 735 x 155
Colour	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey	RAL 7035 grey
Knockout resistance to mechanical impacts	IK08	IK08	IK08	IK08	IK08
Installation temperature	-25°C / +60°C	-25°C / +60°C	-25°C / +60°C	-25°C / +60°C	-25°C / +60°C
Resistance to heat	BPT 70°C	BPT 70°C	BPT 70°C	BPT 70°C	BPT 70°C
IP rating	IP65	IP65	IP65	IP65	IP65
Max. dissipation power	43 W	51 W	64 W	63 W	81 W



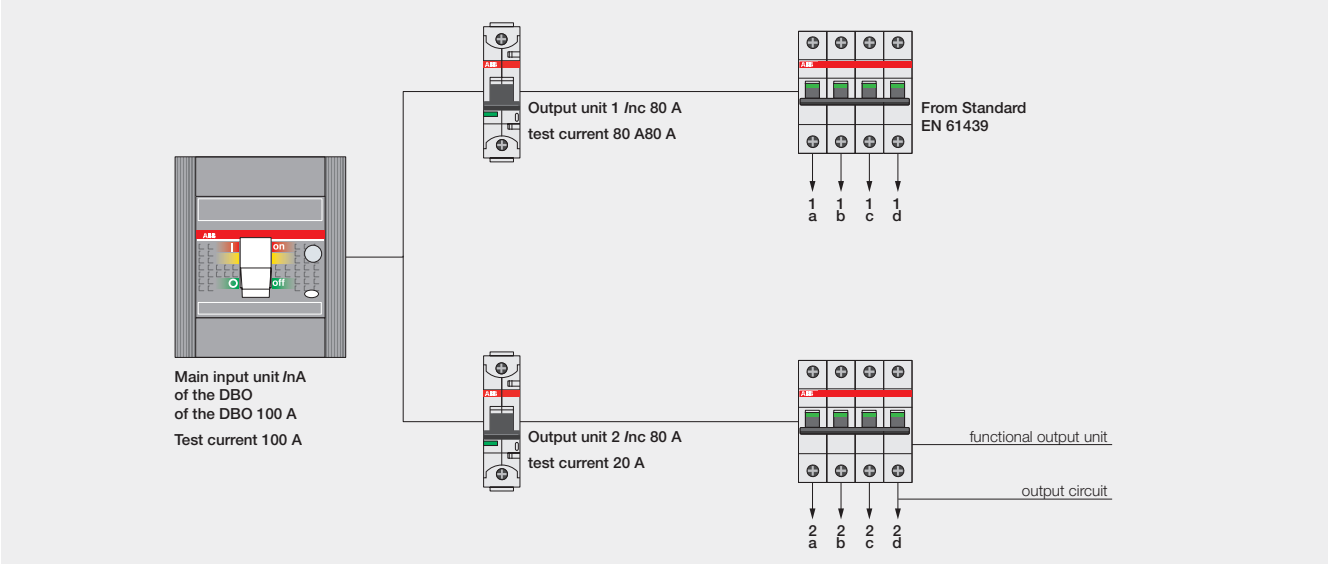
05 Example of configurations for type testing for the compliance with the permitted overtemperatures shown

assembly shape and volume against a certain overtemperature rated value generated on top of the assembly (usually this value is $\Delta T < 30°C$).
The final assembly manufacturer can simply compare the overtemperature with the corresponding permissible overtemperatures for the functioning of the installed components, in order to approve the construction of that kinfd of assembly ($P_{tot} < P_{inv}$).
To determine the most unfavorable group, it's necessary to distribute the I_{nA} between the smallest number possible of outputs, so that each one is loaded with its rated current multiplied by the assumed load factor

When the short-circuit is not a problem

As shown, the DBOs' installation environment, conforming to IEC 61439-3 standard, is typically household, close to the load terminals and far from the MV/LV cabinet. And if we add that the current I_{nA} must be ≤ 250 A, we can conclude that often the installation point is located where the prospective short-circuit current is less than effective 10 kA, which is the upper limit for assemblies with no short-circuit risks.

This helpful exclusion also applies if the DBO is "protected" by a short-circuit protective device (SCPD) that, in case of opening of the actual maximum I_{cp} (Prospective short-circuit current at supply terminals) for the DBO, ensures a limited I_{pk} rated peak withstand current that does not exceed instantaneous 17 kA. If I_{nA} is ≤ 125 A and the DBO's main switch a ABB's modular switch, this safety specification is always guaranteed for any device or short-circuit current, up to the extreme short-circuit power shown on the plate.



05

An extreme example would be a DBO installed inside or near a MV/LV cabinet where the main switch is a ABB's S800S 4-pole automatic miniature circuit breaker with a 125 A I_n rated current (we assume that the I_{nA} value is the same) and 25 kA I_{cn}. Assuming a 23 kA prospective short-circuit current, assessed knowing the upstream transformer power and the short connecting line, in case of dead short the circuit breaker opens safely, having the adequate power (25 kA> 23 kA). In this case, having to assess the protection of the DBO, you can not take advantage of the exemption of 10 kA, since there are assumed 23 kA, but you can take advantage of the active protection of the S800S miniature circuit breaker, which certainly will limit the current peak below the permissible instantaneous 17 kA, protecting the DBO as allowed by 61439-1-3 standards.
In conclusion: any DBO assembly in that point would be protected by that circuit breaker.

The final test

The IEC 61439-3 standard does not change whatsoever the routine verification (to be carried out by the assembly manufacturer), already described in the general section.

The assembly test, as it is known, is carried out with a thorough internal and external visual inspection, with a special focus on the workmanlike realisation as regards the installation of:

1) IP degree of protection of enclosures;
2) clearances and creepage distances (at least 3 mm per voltage category II and U_{imp} 4 kV);
3) protection against electric shock and integrity of protective circuits (PE);
4) incorporation of built-in components and coherence between design and implementation;
5) proper cabling of the internal electrical circuits and connections;
6) terminal block (if present) suitable to the cable cross-section;
7) mechanical operation;
8) dielectric properties
9) wiring, operational performance and function

After accurate visual and functional checks, it is requires only one single instrumental test: the electrical insulation.

As it is known, for assemblies with a I_{nA}< 250 A current, which coincide precisely with DBOs, as an alternative to the applied voltage test, that is often burdensome, complex and expensive (and follows the related type testing), the minimum insulation resistance testing is accepted and considered sufficient.
In practice, it will be enough to check that the insulation resistance between the different live poles (F-F, F-N F-PE), measured by applying a measuring instrument with a voltage of at least 500 V d.c. is at least of 1000 Ω/V for each circuit, referred to the ground voltage of such circuits (300 V max.).

Finally, the rated impulse withstand voltage U_{imp} is tested, resulting 4 kV, noting that in every internal critical point (interstice, cable pass-through, busbars, terminals, etc.) the air clearance between the live components is at least 3 mm (it will be enough to pass between those critical points an insulation template of that thickness).

Main input unit = 100 A

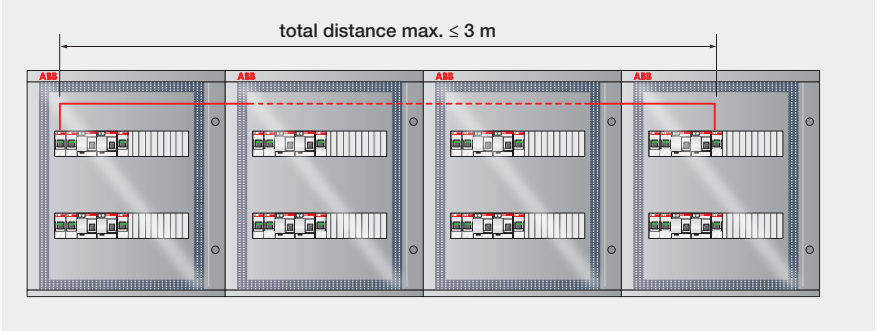
Output unit 1 = test current 80 A
Test current 1a = 63 A x 0,6 = 37,8 A
Test current 1b = 63 A x 0,6 = 37,8 A
Test current 1c = 6 A = 4,4 A
Total 80 A

Output unit 2 = test current 20 A,,
to obtain the input current I_{nA} of the input circuit.
Test current 2a = 32 A x 0,6 = 19,2 A
Test current 2b = 2 A caricato solo a 0,8 A
Total 20 A

The load factor here is 0.6 being eight the total outputs

06 A rated conditional short-circuit current (Icc) may be assigned if the distance on the main and the distribution busbar between the terminals of the input device connected to the main busbar and the power terminals of the output unit does not exceeds 3 m. The main busbar, the distribution busbar and the input device can be tested and sized based on the reduced short-circuit stresses that occur on the load side of the corresponding protection device, against short-circuits within each unit, provided that these wires are arranged so as not to provide an internal short-circuit between the phases and/or between the phases and the ground

07 The new ABB terminal blocks completely insulated ensure easiness and safety during the installation



06

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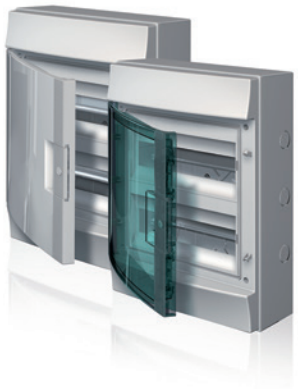
System pro *E* comfort® MISTRAL65.
Unique design. Endless possibilities.



Versatility, efficiency and a unique, elegant, unmistakable design. MISTRAL65 is ABB's new, pioneering series of consumer units with IP65 protection class. The range includes versions with fully reversible blank, or transparent doors in the exclusive petrol blue colour that open up to 180 degrees. The spacious interior is easy to access and has been designed to speed up the wiring operations plus total integration among modular circuit-breakers of the DIN rail, moulded-case and switchgear front type. MISTRAL65 includes a wide range of sizes, with 4 to 72 modules, and is thus ideal both for residential and industrial installations. **www.abb.com/lowvoltage**

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