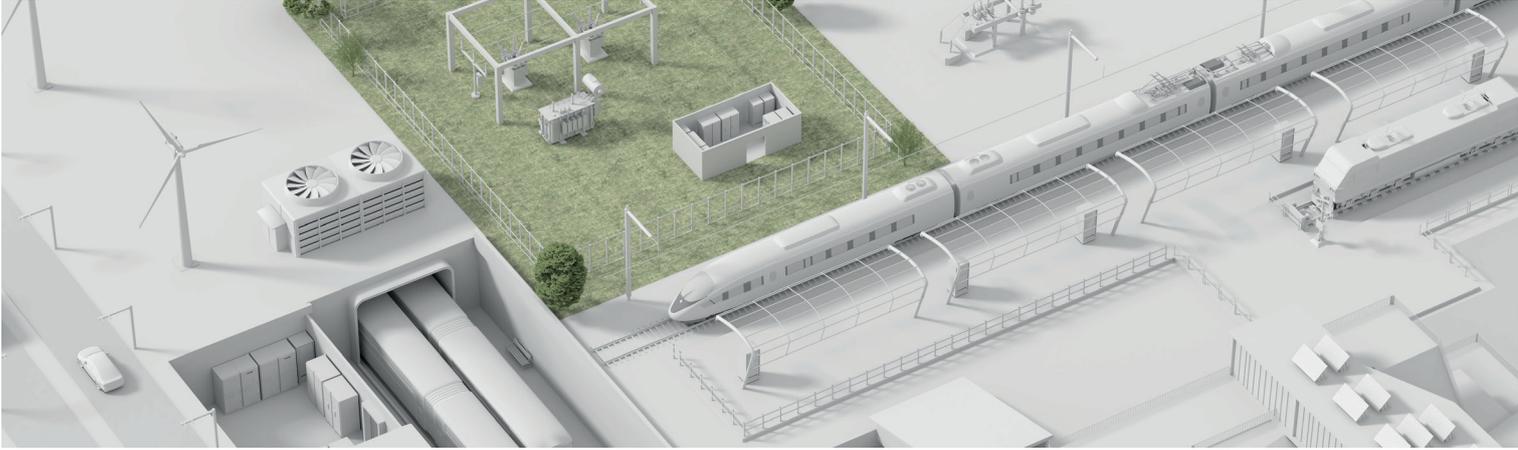

ELECTRIFICATION SOLUTIONS

Transportation rail and infrastructures

Global offering

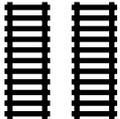


Rail and infrastructures



Rail is being rediscovered as a sustainable and energy-efficient form of transport. We understand the importance and implications of running these railway networks. We provide complete solutions that protect your infrastructure, and meet the expectations of users and transport stakeholders for all key applications. These include infrastructure, passenger stations, control and signaling units, tunnels and rolling stock.

Within this document you can see our global offering of products and solutions. Please refer to the relevant application below. Next to this, we have indicated which sections of this document to refer to for related solutions.

	DC Traction Power Supply (See page 3)	Electrification AC Railway Infrastructure (See page 7)	Infrastructures (See page 9)	Rolling Stock (See page 18)
 Infrastructure AC/DC substation	✓	✓	✓	
 Passenger stations and building		✓	✓	
 Control and signaling		✓	✓	
 Tunnels			✓	
 Rolling stock (metros, trams, locomotives, high speed trains etc.)				✓

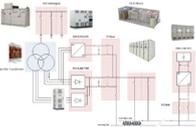
ELECTRIFICATION INFRASTRUCTURE LINE CARD

DC Traction Power Supply

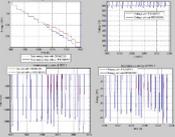
Global product offering for DC traction power supply applications

For decades, ABB has supplied worldwide traction power supply systems to deliver power to the line and power to the supporting infrastructure. With its wide range of products, solutions and services, ABB assists operators, consultants, general contractors and EPCs in designing, building and operating reliable, cost effective and energy efficient systems and solutions for DC traction power supply applications.

Modular systems

Product / Offering	Benefits and features
Packaging 	Complete DC traction power supply solutions including medium-voltage switchgear, transformer-rectifier groups, DC switchgear, low-voltage switchgear, protection and control as well as energy management systems. Key benefits: <ul style="list-style-type: none"> • Comprehensive product portfolio covering all functional requirements • Reliable, cost effective, energy efficient and flexible solutions • Technology leadership, global presence, application knowledge and local expertise
DC eHouse 	DC eHouse is a prefabricated walk-in modular outdoor enclosure to house medium-voltage switchgear, transformer-rectifier group, DC switchgear, and low-voltage as well as auxiliary equipment. It is ready to operate in the field with minimal installation, commissioning and start up time – all contributing to cost reductions.
Medium-voltage primary distribution	
Air-insulated primary switchgear 	UniGear family (up to 40.5 kV) is an innovative solution based on market-leading industry standard air-insulated medium-voltage switchgear called UniGear and makes full use of ABB's Relion® protection and control relays, IEC 61850 communication protocol and is combined with the advantages of sensor technology. All this leads to an advanced switchgear solution addressing important requirements of the future: <ul style="list-style-type: none"> • Flexibility • Increased process efficiency • Lower cost of operation • Maximized integration • Reliability and safety
Gas-insulated primary switchgear 	ZX family (up to 42 kV) provides ultimate protection to medium-voltage electrical distribution. Key benefits: <ul style="list-style-type: none"> • All "live" parts are completely protected from external influences like humidity, dust and vermin • Provides safest operating conditions over extended lifetime while minimizing maintenance • Saves space, in particular at higher voltage levels • Easy "plug & play" installation

Product / Offering	Benefits and features
<p>Air-insulated secondary switchgear</p> 	<p>UniSec indoor air-insulated switchgear for medium-voltage secondary distribution up to 24kV.</p> <p>The UniSec metal-enclosed air-insulated switchgear is based on a highly flexible, modular concept with fewer parts and standardized solutions that can be readily configured to meet the specific needs of each application. This approach reduces training and maintenance requirements, ensures fast installation and facilitates future expansion to meet changing needs. UniSec offers the highest level of safety with different solutions in terms of internal arc classification and safety interlocks.</p>
<p>Gas-insulated secondary switchgear</p> 	<p>SafeRing/SafePlus is an SF6 insulated ring main unit/compact switchgear platform for secondary distribution networks up to 40.5kV.</p> <p>Together, SafeRing/SafePlus provide a complete, flexible and compact switchgear system solution. It is a completely sealed system with a stainless steel tank containing all live parts and switching functions. This ensures a high level of reliability and personnel safety, and a virtually maintenance-free system..</p>
Power conversion	
<p>ENVILINE™ TCR – Traction controlled rectifier</p> 	<p>To power trains, metros and trams, it is necessary to use an electronic power converter (traction rectifier) to convert alternating current into direct current. The ENVILINE™ TCR is the right solution for maximizing the distance, balance and stability of the DC line. Additionally, the TCR can reduce losses in rolling stock and prevent interruptions caused by under voltage.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> • DC line voltage control • High reliability and flexibility • Cost-efficiency
<p>ENVILINE™ TDR – Traction diode rectifier</p> 	<p>AC to DC voltage rectification is at the heart of urban transportation infrastructure. The ENVILINE™ TDR is the most reliable and cost effective rectification solution for DC rail transportation.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> • High reliability and flexibility • Cost-efficiency • High energy density resulting in a compact footprint
<p>ENVILINE™ WDR – Withdrawable diode rectifier</p> 	<p>The withdrawable diode rectifier offers the same functionality of a traditional traction diode rectifier, with the difference that the diode modules are installed on a removable trolley, accessible by the front of the unit.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> • Back to the wall installation: the rectifier has a reduced footprint and lines up with transformer and/or DC switchgear for ease of installation • Front access for optimized maintainability • Modular approach with standardized modules to shorten lead times and facilitate spare parts management
<p>ENVILINE™ ITR – Integrated transformer rectifier</p> 	<p>The most compact rectification solution for DC traction power supply. Traditionally, the transformer and rectifier are provided as separate units. ENVILINE™ ITR offers the same performance as traditional transformer-rectifier units, combined in one single enclosure.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> • Reduced footprint • Highest reliability • Easy to install
DC Distribution	
<p>ENVILINE™ DCGear</p> 	<p>DC switchgear serve as control and protection equipment in DC traction power distribution networks. The cubicles are available in different configurations with DC high-speed circuit breakers, disconnectors and/or load break switches. The panels contain proven technology components and are designed and type-tested in accordance with the latest standards.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> • Freestanding rigid metal enclosed cubicle, with separate screened compartments to provide both high active and passive safety for operation and maintenance personnel • Wide range of current ratings • High availability and low maintenance.
<p>Gerapid</p> 	<p>Gerapid is a single-pole, air high speed DC circuit breaker designed for use in high power DS distribution systems. The combination of high interruption capacity, current limiting characteristic and uncompromised reliability, makes Gerapid a perfect solution for use as main protection device in DC traction power substations.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> • Globally recognized and approved brand • Full ratings coverage including heaviest metro applications • Proven safety and reliability performance • Easy of integration and servicing

Product / Offering	Benefits and features
Services and support Distribution Automation 	Web server functionality providing access to substation processes, operations and relays via a web browser (web HMI). Substation Automation function and its features: <ul style="list-style-type: none"> • Process visualization based on web HMI • Alarms and events • EC 61850-based integration to ABB or third party relays • Remote relay parameter setting using SPA protocol or IEC 61850 • Relay disturbance record upload • Operational and user security
Service 	The services offered by ABB for medium-voltage products and systems span the entire value chain, from the moment a customer makes the first inquiry to the disposal and recycling of the product. Throughout the value chain, ABB provides training, technical support and customized contracts. All of this is supported by one of the most extensive global sales and service networks.
Consultancy 	Finding the best technology solution for your electrical system designs is easy with ABB's comprehensive selection tools and extensive technical documentation. We offer highly functional and easy to deploy products to support a wide range of projects. And we want to support you at each stage of your project, with design software, training materials, configuration and product selection tools. Whether you're looking to deliver energy efficiency, space savings, easily maintained systems or overall project cost reduction for your customers, with the breadth of our offering you can deliver customized solutions to meet your project goals and streamline engineering processes.
Network simulation 	For DC traction power supply applications, a profound knowledge and understanding of the entire system's behavior is highly important. In particular for energy management systems, power calculation studies performed with the ENVIsim tool will determine the most effective place of where to install energy recuperation or energy storage systems and enable optimized dimensioning of the chosen system.

Please note: This is ABB's global offering and some products might not be available in your country. Refer to abb.com for your location.

ELECTRIFICATION AC RAILWAY INFRASTRUCTURE LINE CARD

Medium-voltage products, switchgear and modular solutions

Global offering for AC railway infrastructure – fixed installations

For decades, ABB has supplied fixed railway installations with a range of technologies to deliver power to the line and to the supporting infrastructure. Our offerings assist assets owners, engineering firms, consultants, general contractors and EPCs in designing, building and operating reliable, cost efficient, environmentally friendly and sustainable systems and solutions for AC railway power supply.

Medium Voltage

Product / Offering	Benefits and features
Modular substation	
E-house	Metal enclosed buildings providing greater safety, and easier installation, maintenance, engineering and on site testing – all contributing to cost reductions and short lead times.
	
Compact secondary substation	Compact secondary substations are prefabricated substations that include a low-voltage switchboard, transformer, and medium-voltage switchgear. CSS is internal arc tested for higher safety. ABB CSS is the perfect answer to deliver auxiliary power along the track to signalling and communication systems.
	
Outdoor modules	ABB's outdoor railway modules provide a new for-rail substation based on the implementation of complete factory assembled and tested outdoor modules. By design, the offering covers single- and two-phase 25 kV and 15 kV systems, and addresses all project specific concerns such as optimization of the delivery schedule, mitigation of risks due to delays and errors, simplification of interfaces and design work, land savings and cost of civil works, down time and possession planning, etc...
	
Primary and Secondary Distribution Switchgear	
MV distribution primary and secondary switchgear	ABB offers a wide variety of medium voltage primary (ZX, UniGear) and secondary switchgears (Unisec, Safe Plus/ Safe Ring) for safe and reliable, state of the art, cost efficient power distribution for your infrastructures (depots, passenger stations, tunnels, ventilation shafts, etc ...)
	With an air- and gas-insulated portfolio, ABB offers a large choice to meet project-specific requirements such as footprint, ease of installation, ease of service, etc...

Product / Offering	Benefits and features
<p>Medium-voltage air-insulated switchgear</p> 	<p>UniGear R, part of ABB's well-proven UniGear family, offers maximum flexibility for railway AC systems by providing a cost-effective and reliable power supply. Its metal clad arc-proof construction ensures a high level of operator and system safety combined with ease of servicing thanks to the use of a withdrawable system for core switching elements. UniGear R has worldwide track records in 1x15 kV/16.7 Hz and 1x 25 kV/50 Hz (60) Hz Networks in various applications such as feeding points, coupling and track-sectioning points, depots, testing stations, converter stations, etc ...</p>
<p>Medium-voltage gas insulated switchgear</p> 	<p>ZX1.5-R, part of the well-known ABB's ZX1 series, offers maximum flexibility for railway AC systems by providing a cost-effective and reliable power supply. Its arc-proof construction ensures a high level of operator and system safety combined with ease of servicing thanks to a "sealed for life" gas compartment. The superior insulation properties of SF6 are key to providing a very compact design to reduce footprint demand. Finally, the use of "Plug In" systems eliminate the need for gas work on site, and contributes to shorter installation and commissioning times. Zx1.5-R has worldwide track records in 1x 25 kV and 2x 25 kV/50 Hz (60) Hz Networks in various applications such as feeding points, coupling and track-sectioning points, depots, testing stations, autotransformer stations, etc ...</p>
Medium-Voltage Traction Power Supply Apparatus	
<p>Indoor circuit breaker</p> 	<p>The GSx II range is the first commercially available single-phase vacuum circuit breaker for railway power supply applications to feature a vacuum interrupter, magnetic actuator and electronic controller. This solution is robust, reliable and essentially maintenance-free. The GSx II range is suitable for new installations, refurbishments and upgrades. It can be used for any indoor installations insulated in air, e.g. panels, shelters and containers. It can be offered to OEMs and panel builders as a loose product, or mounted on a trolley with or without a current transformer.</p>
<p>Outdoor breaker – low AC frequency applications</p> 	<p>FSG and GSL are purpose-built vacuum load break switches intended for railway power-supply. Designed as a heavy-duty outdoor breaker and widely used for 16.7 Hz railway networks, this range ABB's solution for applications that require fast triggering. Extremely high mechanical endurance and the outstanding electrical performance of vacuum interrupters provides highly reliable maintenance-free products with low life cycle costs. FSG and GSL have worldwide track records in single and two-phase 16.7 Hz and 25 Hz railway networks...</p>
<p>Outdoor breaker – industrial AC frequency applications</p> 	<p>The FSK II + vacuum breaker uses a well-proven combination of a magnetic actuator and electronic controller that eliminates several moving parts, making it robust, reliable and essentially maintenance-free.</p> <p>FSK II+ is nowadays recognised by the market as the benchmark thanks to:</p> <ul style="list-style-type: none"> • Compactness and low footprint needs • Eco-efficient and environmentally friendly design • Adaptability and flexibility • Suitability for new installations, refurbishments and upgrades • Use in 1x25 kV and 2x25 kV lines, classic and high-speed, discrete structure mounted outdoor switchgear (SMOS), and integrated modules
<p>Outdoor disconnectors</p> 	<p>EZC are purpose-built disconnectors intended for railway power supply. They are suitable for new installations, refurbishments and upgrades, and designed for use with 1x25 kV and 2x25 kV lines, classic structure mounted outdoor switchgear (SMOS), and integrated modules, overhead lines or feeding points. Several options can be chosen to meet specific requirements, such as motor or hand operated control units and integrated or independent earthing switches. The use of polymeric insulators guarantees superior performance in the harsh and demanding conditions of AC railways.</p>
Service	
<p>Service</p> 	<p>With a global installed base and domain expertise, our services improve the operational efficiency, reliability and performance of your systems and equipment across the complete lifecycle while lowering environmental impact. ABB offers Global Support Centers providing 24/7 phone response, monitoring centers and online support.</p>

Please note: This is ABB's global offering and some products might not be available in your country. Refer to abb.com for your location.

Low-voltage products and systems

Transportation infrastructure global product offering

Understanding the importance and complexity of running and operating transportation infrastructure, ABB offers products and solutions to meet all your requirements. With a new range of power circuit breakers, switchboards, distribution cabinets and protection products, ABB ensures maximum safety and efficiency for your installations.

Low voltage

Product / Offering

Benefits and features

The well-established ABB i-bus® KNX system is available today for the demands of tomorrow.

It is based on the worldwide KNX standard and is open for ever increasing demands – for the utmost safety in planning.

Lighting Control



ABB i-bus® KNX ensures optimum lighting in industrial and office buildings as well as private dwellings by monitoring and controlling lighting requirements. In addition, subsystems, such as 1-10 V lighting control and DALI and their interfaces are supported.

Shading Control



ABB i-bus® KNX controlled roller shutters, windows and blinds with sun position controlled louvers allow optimal lighting conditions and contribute to improved temperature and climate control in a room.

Heating, ventilation and air conditioning



ABB i-bus® KNX integrates heating, air conditioning and ventilation for comfortable and efficient climate control. Measured temperature values in the rooms are recorded and supplied to the heating and cooling control system to generate the optimum temperature and air quality.

Security



The combination of professional ABB security technology components and ABB i-bus® KNX devices provides optimum building monitoring and warning against unauthorized entry. Emergency call stations allow immediate notification if help is required. Technical detection alarms (water, smoke, gas) can also be integrated.

Presence Detection



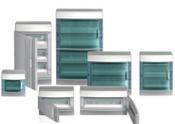
Knowing if people are in or moving around the building is a valuable asset for the efficient automation of any property. The ABB i-bus® KNX range of innovative motion and presence detectors helps to control and manage daily tasks in every sector of the building – indoors and outdoors. Whether lighting, heating, air-conditioning or security related functions, this portfolio of premium design, high quality detectors can significantly improve levels of safety, efficiency and comfort throughout the building.

Energy Management



ABB i-bus® KNX is designed to reduce building operating costs and to employ the required energy consumption according to demand. Objectives are optimization of resources, climate protection, and cost saving while keeping the comfort level of users at its highest.

Product / Offering	Benefits and features
<p>Visualization, display and signalling</p> 	<p>Networked structures work much more efficiently than individual systems. In both residential and business facilities, energy consumption is reduced, thereby cutting operating costs. At the same time, networked structures provide added comfort and security. ABB KNX control elements form the interface between this state-of-the-art technology and the user.</p>
<p>User operation - Push buttons and sensors</p> 	<p>The comprehensive ABB i-bus® KNX sensor ranges enable you to be creative and help you to fulfil the requirements. Increasing demands made on versatile functionality in the functional building sector require the total compatibility of all components. Either the functional building range or other ranges of ABB will support you on this.</p>
<p>Energy monitoring and asset management</p> 	<p>ABB Ability™ Electrical Distribution Control System (EDCS) collects and processes data to provide energy consumption control in the building and passenger station, all in a single location. The ABB Ability™ EDCS predictive maintenance feature ensures high reliability with lower maintenance costs.</p>
<p>Switch disconnectors</p> 	<p>The OT range of switch disconnectors from 16 to 4000A is suitable for diverse applications such as machinery, power distribution and motor control centers. Thanks to a modular design, OT switches are available in different pole configurations. Mounting is possible in any direction and a wide range of accessories is available.</p>
<p>Air circuit breakers</p> 	<p>ABB SACE Emax 2 sets a new benchmark for air circuit breakers: it not only monitors power, but has evolved into a true power manager. It is offered in frame sizes up to 6300A with exclusive integrated functions such as the Ekip power controller, generator protection, and network analyzer functions. ABB SACE Emax 2 is the only breaker that protects electrical circuits and optimizes energy consumption based on the user's needs.</p>
<p>Cable distribution cabinets and outdoor distribution boards.</p> 	<p>Kabeldon cable distribution cabinets fit well in outdoor environments. They come in various designs and sizes, and perform well even under very tough conditions. The Kabeldon system provides a reliable solution that enables continuous operation over its entire life time. The products are designed and optimized to work together and tested and verified as a system.</p>
<p>Cable ties, tools and accessories</p> 	<p>ABB offers one of the industry's broadest ranges of fastening solutions, including the trusted Ty-Rap® brand. With Ty-Rap rail, ABB offers specially developed cable ties for the rail industry (RW) that meet all requirements for modern rail vehicles. The type MX-RW cable ties offer UV protection according to ISO 4892-2 for outdoor use, and are also tested according to IEC / EN 62275 and UL 1565 and EN 45545 HL2 (R22 and R23) and I3/F2 in the French standard NF F 16-101 / -102 for use in areas with special fire protection requirements such as passenger carriages.</p>

Product / Offering	Benefits and features
<p data-bbox="76 286 355 315">Cable trays and metal framing</p> 	<p data-bbox="451 286 1513 360">T&B® cable trays are a cost effective, reliable and adaptable alternative to conduit systems. Additionally, ABB offers a comprehensive line of metal framing and cable trays, including the industry's only 100% plated products, our 1" modular system, and hundreds of accessories to complete any job.</p>
<p data-bbox="76 548 209 577">Cam switches</p> 	<p data-bbox="451 548 1513 622">OC and OL cam switches are suitable for even the most demanding applications. A versatile selection of handles, mounting options, and accessories make it easy to create the perfect solution. With the online configurators Camweb and Camweb2, users can design their own cam switch with confidence.</p>
<p data-bbox="76 810 387 840">Compression cable lugs and tools</p> 	<p data-bbox="451 810 1513 884">AWG, IEC and DIN compression connectors, made of the highest-grade materials offering high conductivity/low resistance, meet or exceed all industry standards. The range includes straight and angled connectors and splices, plus a full selection of mechanical, pneumatic, and battery operated compression tools.</p>
<p data-bbox="76 1072 268 1102">Conduit and fittings</p> 	<p data-bbox="451 1072 1513 1198">ABB is a market leader in flexible conduit systems. With PMA and Adaptaflex, ABB offers one of the world's broadest ranges of cable protection products and solutions for the railway industry. The range covers non-metallic and metallic flexible conduit systems for the protection of critical power and data cables. Our special railway engineering product line provides protection and safety for signaling, high voltage, points heating, wheel sensor, breaking, rail crossing and tunnel installations, and other applications for railway infrastructure.</p>
<p data-bbox="76 1335 371 1413">Modular uninterruptible power supplies: DPA 250 S4 and PowerLine DPA</p> 	<p data-bbox="451 1335 1513 1460">The ABB uninterruptible power supplies (UPSs) provide power protection solutions for crucial rail applications. The modular UPSs are based on ABB's Decentralized Parallel Architecture (DPA) that ensures the very best UPS design in terms of availability, flexibility, and ease of use. The UPSs for railway applications have a high-efficiency architecture that offers best reliability for environmentally conscious organizations that also need zero downtime and low cost of ownership.</p>
<p data-bbox="76 1597 225 1626">Consumer units</p> 	<p data-bbox="451 1597 1513 1697">ABB's series of consumer units combines versatility and performance in an elegant design. Built to reduce cabling times, the consumer units allow the total integration of several kinds of DIN rail devices, installed either on a mounting plate or on blind front panels. With the wide range of sizes and models ABB's consumer units are one of the most comprehensive ranges on the market and complete ABB's offer for protection, control and monitoring.</p>
<p data-bbox="76 1859 300 1921">Control and automation boards</p> 	<p data-bbox="451 1859 1513 1984">ABB's range of metal enclosures for automation and control panels are perfectly suitable for installation in most industrial environments. They conform to the IEC 62208, IEC 60439-1 and IEC 61439-1-2 standards. Thanks to the high IP degrees of protection and IK resistance to mechanical impact, the enclosures offer high performance in demanding environments. The range includes enclosures in steel powder coated steel sheets and enclosures in stainless steel AISI 304, allowing for indoor and outdoor installations.</p>

Product / Offering	Benefits and features
<p>Earthing, grounding and lightning, and surge protection</p> 	<p>With our Blackburn® and Furse brands, we offer a complete range of grounding and lightning protection systems, grounding connectors, and surge protection devices (SPD) to protect your building, processes and people</p>
<p>EasyLine XLP, fuse switch disconnectors</p> 	<p>The EasyLine range of fuse disconnectors ensures high protection and reliable operation in critical power applications, distribution boards, switchboards, and capacitor banks. A wide range of cable terminals and snap-on accessories make the installation easy and fast. EasyLine can be fitted into different distribution systems by means of busbar adapters.</p>
<p>E-Klips fasteners for rail heater fixings</p> 	<p>E-Klips fasteners for rail applications offer a quick, easy and reliable method of fixing services to steelwork without the need for bracket making, drilling holes or the use of nuts and bolts. The fasteners are strong, easy to install and lightweight. The Z600+ anti-corrosion system (zinc based, chromium free coating) passed a 600 hour salt-spray test. A design with multiple points of contact prevents clips from moving or being pulled off even under extreme conditions. Carbon spring steel offers excellent shape retention for operating in extreme temperatures.</p>
<p>Electricity meters</p> 	<p>Transparency of energy consumption allows precise planning. ABB's scalable energy meters for sub-metering enable the monitoring of energy usage, from incoming energy to the last branch, and comply with relevant international standards (IEC, MID annex B and annex D). All electricity meters allow measurement of active power, voltage, current and power factor.</p>
<p>Time relays</p> 	<p>The time relays of the CT range have been used in applications worldwide and have proven their excellent functionality in daily use, even under the toughest conditions. Three ranges of time relays provide timing functions for all applications. ABB ensures all low-voltage timing control needs are met with our wide variety of product options from economic to highly sophisticated, all providing maximum value.</p>
<p>Measuring and monitoring relays</p> 	<p>ABB offers all the important measuring and monitoring relays required for a wide range of applications, no matter for what environment. All electrical key parameters of single- and three-phase networks can be monitored. Further products offer reliable temperature measurement and help to protect motors and other equipment. Liquid level monitors ensure accuracy in filling and draining applications. Reliable protection of assets is ensured by choosing from this large range of high quality multi-function or single-function products.</p>
<p>Emergency lighting</p> 	<p>ABB offers of a comprehensive portfolio of stylish and robust emergency and residential lighting, central battery supply, and monitoring systems. With our optimized lighting optics based on the latest LED technology, we are able to offer slim and stylish luminaries that lower energy and maintenance costs. (Note: Building and safety standards and brands vary by country.)</p>

Product / Offering	Benefits and features
<p data-bbox="76 286 248 315">Enclosed switches</p> 	<p data-bbox="451 286 1525 360">Our range of enclosed switches is one of the most complete on the market. Whether you need a main disconnect or a safety switch, you can always find a high quality product that suits your application. ATEX and fire rated enclosed switches are also available. The enclosures are made of plastic, sheet steel, aluminum, or stainless steel.</p>
<p data-bbox="76 548 185 577">Twister® S1</p> 	<p data-bbox="451 548 1525 622">The Twister® S1 is a universal and central energy source for safety purposes. It remains dormant as long your energy provider's grid is supplying power. However, if the power cuts out just once, the Twister® S1 springs into action within one second to guarantee that the energy supply continues throughout the power outage.</p>
<p data-bbox="76 810 288 840">Installation contactors</p> 	<p data-bbox="451 810 1525 936">ESB installation contactors offer a complete portfolio (from 16 to 100 A) and are mainly used for switching and controlling lighting, heating, ventilation, motors and pumps. They are suitable for use in several different conditions and environments, designed to match ABB modular DIN-Rail components and can be easily integrated in dedicated panels. EN contactors also have a built-in toggle switch for automatic and manual application. Tool-free auxiliary contact blocks are available for the complete range.</p>
<p data-bbox="76 1072 260 1131">Interface relays and optocouplers</p> 	<p data-bbox="451 1072 1525 1227">ABB's interface relays and optocouplers can be used for switching both AC and/or DC loads. They ensure a reliable voltage conversion between process peripherals and higher level control systems. They provide electrical isolation for sensitive electronics such as PLCs and are also suitable for an assortment of machinery. Available in a range of different coil voltages, and compatible plug-in function modules, ABB's interface relay and optocoupler portfolio is suitable for many different applications and can even operate under extreme environmental conditions. This wide variety of pluggable interface relays can be equipped with standard or logical sockets.</p>
<p data-bbox="76 1335 213 1364">Limit switches</p> 	<p data-bbox="451 1335 1525 1417">Our limit switches product range combines different types of actuators, casings and contacts to covers most applications as they are IP67 designed to operate in the most difficult environments. They will secure installation and uptime.</p>
<p data-bbox="76 1597 308 1655">Main distribution boards System pro E power</p> 	<p data-bbox="451 1597 1525 1729">System pro E power is ABB's solution for main distribution switchgears with rated current up to 6300A and short-circuit current up to 120kV. The system meets all plant requirements depending on the type of installation, required degree of protection, and electrical and mechanical specifications. ABB provides complete solutions for main electric power distribution in infrastructure and industries in accordance with the regulatory frameworks. In addition, System pro E power guarantees full compatibility with all other ABB products.</p>
<p data-bbox="76 1859 284 1888">Manual motor starters</p> 	<p data-bbox="451 1859 1525 1991">Manual motor starters are electromechanical protection devices for the main circuit. They are mainly used to switch motors ON/OFF manually and to provide fuseless protection against short-circuit, overload and phase failures. Fuseless protection saves costs, space and ensures a quick reaction under short-circuit condition by switching the motor off within milliseconds. Starter combinations are setup together with contactors and are available with screw or push-in spring terminals.</p>

Product / Offering	Benefits and features
<p data-bbox="76 286 443 338">Circuit breaker for transformer protection</p> 	<p data-bbox="451 286 1511 409">Circuit breakers for transformer protection are specially designed for fuse-less protection on the primary side of control transformers against overloads and short-circuits. It also allows the transformer to connect and disconnect manually from the mains. At start-up, transformers generate very high peak currents (inrush currents) so regular protection is often not enough. Where transformer must be appropriately protected, ABB's new MS132-T is the ideal solution.</p>
<p data-bbox="76 555 443 629">3-pole contactors and overload relays for motor starting and power switching</p> 	<p data-bbox="451 555 1511 678">ABB 3-pole contactors offer an exhaustive selection of products for simple and extreme applications. AF contactor technology revolutionizes how we use contactors and enables functionality in all parts of the world and in a variety of network conditions. Furthermore, the mini-contactor range offers compact dimensions and specific connection possibilities. You can choose terminals between screw, push-in spring and ring tongue through our ranges. So whatever your need of a contactor might be, ABB will have a variant meeting just that.</p>
<p data-bbox="76 824 443 869">4-Pole Contactors for power switching</p> 	<p data-bbox="451 824 1511 925">ABB's AF 4-pole contactor range is a complement to the family of 3-pole AF contactors and motor protection equipment. Unmatched performance in a variety of applications and environments has made the AF contactors well appreciated by customers throughout the world. You can also benefit from the compactness of the 4-pole mini contactors available with 3 connection types.</p>
<p data-bbox="76 1093 443 1115">Overload relays</p> 	<p data-bbox="451 1093 1511 1216">Overload relays offer a reliable and affordable protection for motor starting solutions. It signals when an overload current or a phase failure unexpectedly occurs in an electrical circuit. There are two different technologies: the thermal version and the electronic version, which suits perfectly fine for standard applications. Both versions include reset (manual or automatically), test and stop functions. They are mounted directly to the correspondent contactors or they can be used for standalone applications (Single mounting kit needed).</p>
<p data-bbox="76 1361 443 1384">Electronic compact starters</p> 	<p data-bbox="451 1361 1511 1462">Transportation infrastructure demands products that are highly reliable, offer superior functionality and require little space in control cabinets. ABB's answer is the HF range- 30 million electrical switching cycles and a wide array of functions are combined in a compact housing only 22.5 mm wide. It includes direct-on-line and reversed starting as well as motor overload protection up to 3kW/400 V AC in just one device.</p>
<p data-bbox="76 1630 443 1653">Universal motor controller</p> 	<p data-bbox="451 1630 1511 1753">The intelligent ABB universal motor controller UMC100.3 combines motor protection and control functions, fieldbus and Ethernet communication, as well as fault diagnosis in just one device. It provides detailed operational, diagnostic and service data continuously, providing an effective data source for modern predictive maintenance systems in any plant. The device can be easily expanded when needed- for example with analog and temperature inputs, voltage measurement or digital inputs and outputs. Due to its flexible configuration options, the engineering effort can be significantly reduced and the number of modifications to a project limited to a minimum.</p>
<p data-bbox="76 1899 443 1921">Arc Guard TVOC-2</p> 	<p data-bbox="451 1899 1511 1955">The Arc Guard System™ increases safety to personnel and equipment and minimizes downtime after an arc accident has happened. The easy-to-read interface makes reading status information quick and easy. A simple start-up menu quickens installation and setup. SIL-2 approval ensure maximum reliability.</p>

Product / Offering	Benefits and features
<p>Miniature circuit breakers (MCBs)</p> 	<p>Miniature circuit breakers protect electrical installations against overloads and short circuits, guaranteeing reliability and safety for operations. The System pro M compact S200 series are current limiting overcurrent protective devices. They have two different tripping mechanisms: a delayed thermal tripping mechanism for overload protection, and a magnetic tripping mechanism for short circuit protection. For rail applications the following MCB types are suitable: S 200 MT, S 200 MT UC, S 200 M UC, S 200 P</p>
<p>High-performance circuit breakers</p> 	<p>ABB's S800S high-performance circuit breakers are the best choice worldwide for industrial heavy duty applications. Thanks to an innovative short circuit extinguishing technology, S800S and S800S UC are the right solution when both size and performance matter. The compact and reliable solutions for line protection are available with a breaking capacity up to 50kA and rated current up to 125A.</p>
<p>Modular DIN rails components (MDRCs)</p> 	<p>Modular DIN rail Components, or MDRC, comprise a range of components that provide all functions related to measuring, controlling and commanding, to complete the offering of an electric switchboard. They can be plugged into a standard DIN-Rail in just one click.</p> <p>Protection devices and relays include fuse holders, load management devices and insulation monitors. Among the command and signalling devices there are switch disconnectors, latching relays, installation contactors, socket outlets and dimmers. Within the control and automation range you can find timers, twilight switches and temperature controllers.</p>
<p>Moulded case circuit breakers</p> 	<p>SACE Tmax XT moulded case circuit breakers guarantee extremely high performance while being progressively smaller in size, simple to install and able to provide absolute protection and full connectivity. Tmax XT range consists of seven frame sizes from 160A up to 1600A.</p>
<p>Pilot devices</p> 	<p>Our products are engineered for total reliability. Their innovative design simplify the entire process, from selection to installation.</p> <ul style="list-style-type: none"> • Modular range for flexible solutions with high electrical ratings • Compact range with all-in-on design reducing installation time and cost.
<p>Primary switch mode power supplies</p> 	<p>The CP range offers the latest technology in a compact construction of power supplies. Modern power supply units are a vital component in most areas of energy management and automation technology. ABB pays the utmost attention to these areas' requirements. Innovation is the key to a substantial enlargement of our power supply product program.</p>
<p>Residual current devices (RCDs)</p> 	<p>Residual current devices protect people from life-threatening indirect contact with electricity. ABB's range of RCDs includes RCCBs, RCBOs, RCD blocks, earth leakage relays (DIN-Rail and front panels). Compliant with IEC/EN 61008 or IEC/EN 61009 they can be installed in all residential, commercial and industrial applications. For rail applications DS201 T is specifically suitable.</p>

Product / Offering	Benefits and features
<p data-bbox="76 293 256 338">SlimLine XR, switch disconnector fuse</p> 	<p data-bbox="451 293 1509 383">The SlimLine XR meets increasing industry demand for safe and reliable energy distribution. Thanks to its unique contact design and compact size, installation is safe, fast and easy. For remote operation and monitoring, SlimLine XR is available with an integrated motor, electronic fuse monitor (EFM), or the new integrated energy monitoring device ITS2.</p>
<p data-bbox="76 562 225 584">Safety products</p> 	<p data-bbox="451 562 1509 629">ABB offers a complete range of premium intelligent machine safety products and solutions, including safety PLCs, safety controllers, safety relays, safety sensors, switches and locks, optical safety devices, emergency stops, safety control devices, pressure sensitive devices and fencing systems.</p>
<p data-bbox="76 831 284 853">Spring steel fasteners</p> 	<p data-bbox="451 831 1509 898">Spring steel fasteners offer a quick, easy and reliable method of fixing services to steelwork without the need for making brackets, drilling holes, or using nuts and bolts. All products are manufactured to EN1449 — part 1.15 grade CS70, and are suitable for indoor or outdoor use, and for mildly corrosive environments.</p>
<p data-bbox="76 1099 300 1122">Sub-distribution boards</p> 	<p data-bbox="451 1099 1509 1234">With the TwinLine system, another benchmark in the field of modern power distribution is set. TwinLine has been tested according to IEC 61439 and DIN EN 61439 Parts 1, 2 and 3. Continuity is the guiding principle for these new wall-mounted and stand-alone cabinets for distribution board assembly, from their high degree of protection, to their ease of installation, to a portfolio that can meet all requirements in the field. System intelligence comes as standard with TwinLine because in combination with CombiLine - modules, TwinLine offers unlimited possibilities for internal configuration.</p>
<p data-bbox="76 1368 236 1413">Surge protective devices (SPDs)</p> 	<p data-bbox="451 1368 1509 1413">The OVR range is designed to protect electrical systems and equipment against transitory surges and impulses caused by lightning and operations on the electrical grid.</p> <p data-bbox="451 1424 1509 1491">ABB's SPDs are available for all kinds of electrical networks (TT, TNC, TNS, IT) and can be installed in all applications, from low-voltage power to data and telecom lines, CCTV PV, WT, LED and self-protected. They are fully equipped with end of life indicator, safety reserve system and auxiliary contacts.</p>
<p data-bbox="76 1637 193 1659">Switch fuses</p> 	<p data-bbox="451 1637 1509 1682">OS switch fuses range from 20 to 1250A and are suitable for different types of fuses: DIN, BS, NFC, J and L. OS switch fuses have a modular design and are available in different pole configurations. ABB offers ready and tested type 2 coordination tables for the easy and fast selection of motor control devices.</p>
<p data-bbox="76 1906 240 1928">Transfer switches</p> 	<p data-bbox="451 1906 1509 1951">ABB offers a wide variety of transfer switches from 16 to 3200A, including switches for the manual, remote, or automatic transfer of loads from one source to another. The switches are designed to be virtually maintenance free across their entire extended lifespan and offer safe and reliable change-over performance.</p>

Product / Offering	Benefits and features
Wire termination and tools	A full line that includes insulated and non-insulated terminals, wire joints, ferrules, heat-shrinkable terminals, splices and disconnects in imperial and true metric sizes. A complete set of tooling is included.
	
Wiring duct	Premium quality duct for point-to-point wiring is ideal for electrical enclosures, machine building and data/communications panels and cabinets. ABB's offering includes imperial, metric and DIN duct in standard materials and specialty materials that are halogen-free.
	
Service and support	With a global installed base and domain expertise, our service products and services improve the operational efficiency, reliability and performance of your systems and equipment across the complete lifecycle, thanks to replacement and retrofit solutions. ABB offers Support Centers providing 24/7 phone response and online support, asset management with remote monitoring and predictive maintenance, and the availability of spare parts for the latest or legacy low voltage equipments.
	

ROLLING STOCK LINE CARD

Low-and medium-voltage products and systems

Rolling stock global product offering

Working worldwide with leading vehicle manufacturers and transport operators, ABB offers a broad range of low- and medium-voltage solutions, for rolling stock to suit each of your applications and increase the efficiency of your equipment.

Product / Offering	Benefits and features
<p data-bbox="76 992 264 1039">Cable ties, tools and accessories</p> 	<p data-bbox="451 992 1508 1160">ABB offers one of the industry's broadest ranges of fastening solutions, including the trusted Ty-Rap® brand. With Ty-Rap rail, ABB offers specially developed cable ties and mounting bases for the rail industry (RW) that meet all the requirements for modern rail vehicles. The type MX-RW cable ties offer UV protection according to ISO 4892-2 for outdoor use and are also tested according to IEC/EN 62275 and UL 1565 and EN 45545 HL2 (R22 and R23) and I3/F2 in the French standard NF F 16-101/-102 for use in areas with special fire protection requirements such as passenger carriages. We also offer Bind It, robust, flame-retardant braided sleeves for the bundling and protection of cables, tested according to EN 45545-2: HL3, and to NF F 16 101/-102: I2-F1.</p>
<p data-bbox="76 1256 296 1303">Compression cable lugs and tools</p> 	<p data-bbox="451 1256 1508 1328">AWG, IEC and DIN compression connectors, made of the highest-grade materials offering high conductivity/low resistance, that meet or exceed all industry standards. The range includes straight and angled connectors and splices, plus a full offering of mechanical, pneumatic, and battery operated compression tools.</p>
<p data-bbox="76 1520 236 1545">Electronic timers</p> 	<p data-bbox="451 1520 1508 1664">ABB's electronic timers are used in railway applications worldwide and have proven their excellent functionality in daily use, even under the toughest conditions. The CT-S range is designed for harsh environments and offers not only standard screw type terminals but also push-in terminals with excellent vibration resistance - perfect for use in rolling stock. The electronic timers are available as single or multifunctional devices, covering all timing control needs in e.g. passenger compartments or other railway infrastructure applications. Special product versions of the CT-S range offer extended performance for applicable parts of rolling stock standards.</p>
<p data-bbox="76 1785 264 1809">Conduit and fittings</p> 	<p data-bbox="451 1785 1508 1906">ABB is a market leader in flexible conduit systems. With PMA and Adaptaflex, ABB offers one of the world's broadest ranges of cable protection products and solutions for the railway industry. The range covers non-metallic and metallic flexible conduit systems for the protection of critical power and data cables. Our special railway engineering product line provides protection and safety for signaling, high voltage, points heating, wheel sensor, breaking, rail crossing and tunnel installations, and other applications for railway infrastructure.</p>

Product / Offering	Benefits and features
<p>Heat shrink solutions</p> 	<p>A broad range of heat shrink products with different wall thicknesses (thin, medium, thick), packaging (reels, cut lengths, dispenser boxes, pre-cut bags), shrink ratios (2:1, 3:1, 4:1), different colors, pre-molded parts, offered with or without glue (dual).</p>
<p>Measuring and monitoring relays</p> 	<p>ABB offers all the important measuring and monitoring relays required for a wide range of applications, no matter what environment you operate in. All electrical key parameters of single- and three-phase networks can be monitored, including special purpose products, e.g. for insulation and grid feeding monitoring. Further products offer reliable temperature measurement and help to protect motors and other equipment. Reliable protection of assets is ensured by choosing from this large range of high quality multifunction or single function products. Special product version offer extended performance for applicable parts of rolling stock standards.</p>
<p>DCBreak</p> 	<p>The DCBreak circuit breaker family for rolling stock combines a small footprint, reduced weight, high flexibility and reliable operation with minimal maintenance. The DCbreak range is rated 1500 A, 900 V and 1800 V, 1500A/ 30 KA and type tested according to the latest IEC 60077-3 and IEC 61373 standards. It is particularly suitable for on board applications for metro, tramway and light rails. Available as free standing units, or within an optional enclosure, DCBreak circuit breakers are intended for the simple plug-and-play replacement of a majority of similar products from other brands.</p>
<p>Contactors and contactor relays</p> 	<p>3 and 4-pole contactors up to 200 kW/400 V - AC-3, 300 hp/480 V, and up to 600 V AC-1, 4 and 8-pole contactor relays can be installed in any environment, including passenger or driver cabins, for main or urban line trains, underground trains, or trams circulating frequently in tunnels or underground passages. They are used in rolling stock applications such as lighting, heating, breaking, air conditioning, ventilation and door control. They are available with non-detachable screws for standard or ring tongue ferrules and meet all rolling stock standards: EN/IEC 60077-1/2 and EN 50155 for applicable parts, EN/IEC 61373 cat.1 class B, fire and smoke European standards EN45545-2 (HL2 or HL3).</p>
<p>Motor protection</p> 	<p>Starters protected by manual motor starters up to 30 kW or thermal overload relays up to 18.5 kW can be installed in any environment, including passenger or driver cabins, for main or urban line trains, underground trains, or trams circulating frequently in tunnels or underground passages. They are used in rolling stock applications such as breaking, air conditioning and ventilation. All products meet the latest rolling stock and fire and smoke European standards.</p>
<p>Overload relays</p> 	<p>TF42B thermal overload relays are devices to protect motor starting solutions complying with the latest railway rolling stock standards. They can be installed in passengers or driver cabins for trains frequently operated in tunnels or undergrounds.</p> <p>They offer a reliable thermal protection in the event of overload or phase failure. TF42B is fully coordinated with AFZ..B contactors.</p>
<p>Miniature circuit breakers (MCBs)</p> 	<p>Miniature circuit breakers protect electrical installations against overloads and short circuits, guaranteeing reliability and safety for operations. The System pro M compact S200 series are current limiting overcurrent protective devices. They have two different tripping mechanisms: a delayed thermal tripping mechanism for overload protection, and a magnetic tripping mechanism for short circuit protection.</p> <p>For rail applications the following MCB types are suitable: S 200 MT, S 200 MT UC, S 200 M UC, S 200 P</p>

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<p>High-performance circuit breakers</p> 	<p>ABB's S800S high-performance circuit breakers are the best choice worldwide for industrial heavy duty applications. Thanks to an innovative short circuit extinguishing technology, S800S and S800S UC are the right solution when both size and performance matter. The compact and reliable solutions for line protection are available with a breaking capacity up to 50kA and rated current up to 125A.</p>
<p>Moulded case circuit breakers</p> 	<p>SACE Tmax XT moulded case circuit breakers guarantee extremely high performance while being progressively smaller in size, simple to install and able to provide absolute protection and full connectivity. Tmax XT range consists of seven frame sizes from 160A up to 1600A.</p>
<p>Residual current devices (RCDs)</p> 	<p>Residual current devices protect people from life-threatening indirect contact with electricity. ABB's range of RCDs includes RCCBs, RCBOs, RCD blocks, earth leakage relays (DIN-Rail and front panels). Compliant with IEC/EN 61008 or IEC/EN 61009 they can be installed in all residential, commercial and industrial applications. For rail applications DS201 T is specifically suitable.</p>
<p>Surge protective devices (SPDs)</p> 	<p>ABB's SPDs are available for all kinds of electrical networks (TT, TNC, TNS, IT) and can be installed in all applications, from low-voltage power to data and telecom lines, CCTV PV, WT, LED and self-protected. They are fully equipped with end of life indicator, safety reserve system and auxiliary contacts.</p>
<p>Wire termination, shielded connectors and tools</p> 	<p>A full line that includes insulated and non-insulated terminals, wire joints, ferrules, heat-shrinkable terminals, splices and disconnects in imperial and metric sizes. A complete set of tooling is included. In addition, ABB offers crimping technology for shield termination on shielded cables. These very compact connectors have low overall height, require no soldering, and do not risk damage from heat.</p>

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ABB Connect

Your Digital Assistant

Connect to your electrification solutions with your digital assistant, access the latest news and create your own digital workspace.

Available for use on iOS, Android and Windows 10.

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For more information and local contacts, please visit:

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