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# Safe and reliable distribution network

ABB portfolio for medium-voltage  
indoor applications

# ABB's products provide a safe and reliable Brighter Network for medium-voltage distribution

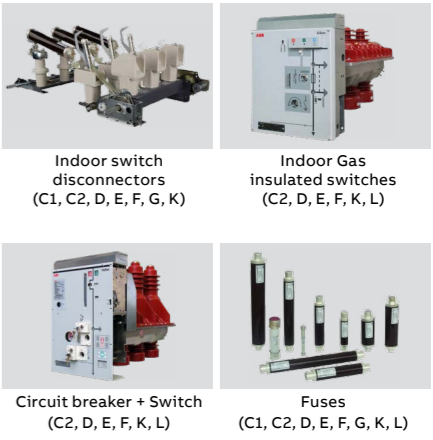
## Complete solution for indoor applications


Medium-voltage products play a pivotal role in the distribution part of the power value chain, facilitating the “last mile” connect that brings electricity to billions of users around the world.

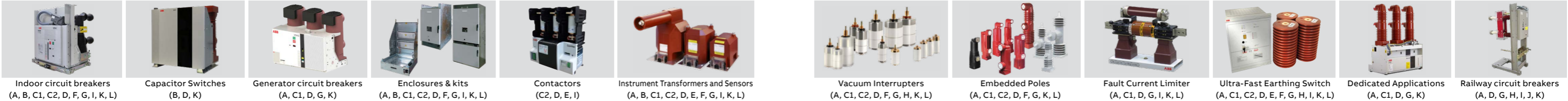
 Click on the segments to discover the ABB related product offering.



ABB's comprehensive medium-voltage portfolio for indoor applications offers the most reliable, efficient, safe and sustainable technologies to address specific customer needs across the whole network:



 Click on the product pictures to know more.



# ABB portfolio for medium-voltage indoor applications

## Shaping a strong and reliable distribution network

Click on the product names to know more.



Main function	Vacuum Interrupters	Embedded Poles	Circuit Breakers / IEC indoor	Circuit Breakers / ANSI indoor	Circuit Breakers / AC rail transport	Circuit Breakers/ DC rail transport	Generator Circuit Breakers	Contactors	Enclosures & Kits	Air Insulated Switch Disconnecter	Gas Insulated Switch Disconnecter	Indoor & Outdoor Fuses	Circuit Breaker + Switch	Switching of dedicated application
Type	VS#; VG#	PT#; P#; OP#	VD4; VM1; HD4	ADVAC®; AMVAC	FSKII; FSG; GSx	Gerapid; DCBreak	VD4G; ADVAC®G	ConVac	PB family; Advance; L-Frame	NAL/F; VersaRupter	GSec	CEF; CMF; CLC; CIL; CXP; COL; CXLP	HySec	VD4-AF; VD4-AF1; VD4-CS
Applicable Standard	-	-	IEC (GB; GOST)	ANSI	IEC; ANSI; GB; GOST	EN; IEC; ANSI	IEC; ANSI	IEC; GB (all versions); UL CSA (7.2 kV freestanding)	IEC; ANSI	IEC; ANSI; GOST; CSA	CSA IEC; GB	IEC; ANSI	IEC	IEC 62271-100
Maximum Rated Voltage	40.5 kV	46 kV	46 kV	38 kV	27.5 kV	800 V to 3600 V DC	15 kV	12 kV	38/40.5 kV	36/38 kV	24 kV	40.5 kV	24 kV	38 kV
Maximum Rated Current	4000 A	4000 A	4000 A	4000 A	2500 A	1500 A to 8000 A	4000 A	400 A	4000 A	1250 A	800 A	315 A	630 A	2500 A (VD4-AF/VD4-AF1) – 1250 A (VD4-CS)
Maximum Icc	63 kA	50 kA	63 kA	63 kA	31.5 kA	30 kA to 200 kA	63kA	6 kA	50 kA	31.5 kA	25 kA	63 kA (Breaking)	21 kA	32 kA
Applications	Providing reliable electrical interruption technology for: Indoor/Outdoor circuit breakers (CBs) & switches, contactors, switch disconnectors, ring main units.	Key component containing vacuum interrupter technology for: Indoor/Outdoor CBs, Contactors, Reclosers.	Primary and secondary distribution protection, CBs from ABB are available for original equipment manufacturers (OEM) to incorporate in their own installations or for use in repair, retrofit and upgrade projects.	Primary distribution protection, CBs from ABB are available for OEM to incorporate in their own installations or for use in repair, retrofit and upgrade projects.	Vacuum CBs designed to cover single- and double-phase applications for the railway power supply and applying a combination of a maintenance-free vacuum interrupter, magnetic actuator and electronic controller.	High speed DC circuit breakers designed for use in high energy, high reliability DC power distribution systems and for rolling stock application.	Generation protection and control (generators, transformers), CBs from ABB are available for OEM to incorporate in their own installations or for use in repair, retrofit and upgrade projects.	Suitable for operating in alternating current, normally used to control loads requiring a high number of operations or to be switched frequently.	Preassembled units designed to house ABB apparatus and suitable to develop arc-proof switchgear and to design switchgear retrofits or upgrades.	Line switch disconnectors with or without fuses for: cable sectionalizer and transformer switch; motor switch (with motor fuse CMF); switching of capacitor banks. Local manufactured panels. Switch cubicles. Compact substation (kiosk). Utility and industrial application.	Three-position gas insulated switch disconnecter for: secondary distribution switchgear; feeders, transformer protection and ring networks. Incoming/outgoing panels with CBs or in combination with fuses.	Protection of distribution transformers, motors, capacitor banks against overload currents. Back-up, general purpose and full range fuses. Suitable for voltage transformers, contactors, compact switchgear and ring main units.	Multifunction apparatus including CB, line disconnector and earthing switch suitable for secondary distribution switchgear.	Steel furnace (VD4-AF/VD4-AF1), Reactive power compensation (VD4-CS).
Technology	Vacuum interruption	Vacuum with solid dielectric insulation	Vacuum or gas interruption / Solid dielectric insulation / Front or lateral lineup / Spring or magnetic mechanism	Vacuum interruption / Solid dielectric insulation / Front lineup / Spring or magnetic mechanism	Vacuum interruption / Magnetic mechanism	Arc interrupted in air. Arc chute design based on cold cathode splitting plate technology. Instantaneous closing and opening w/o charging mechanism.	Vacuum interruption / Spring mechanism	Vacuum interruption with monostable electromagnetic actuation	-	-	-	-	Vacuum interruption / Gas insulation/Airplus insulation	Servomotor actuation/ Controlled switching / New vacuum interrupter technology
Main features	Compact and robust design. Reliability and long life from state-of-the-art manufacturing processes. Silicone moulding for maximum external dielectric strength. Most frequently used switching technology worldwide for medium voltage. Eco-efficient and maintenance-free. Proven with over 7 million products in service.	High dielectric strength without any further external precautions. Optimum protection of the vacuum interrupter from moisture, dust and external damage. Suitable for all conceivable climatic conditions and site altitudes. Easy assembly on CBs. Maintenance-free. Efficient increase in dielectric strength without use of greenhouse gases.	The world's most successful range of MV vacuum and SF6 gas CBs. Full engineering and technical support. Proven reputation for reliability, performance and long life. Products tailored for local markets. Short lead times. Vacuum interrupters (VIs) embedded or assembled in the poles. Embedded poles protect interrupter from impacts, dust deposits and humidity.	The ANSI most successful range of MV vacuum CBs. Full engineering and technical support. Proven reputation for reliability, performance and long life. Products tailored for local markets. Short lead times. Vacuum interrupters embedded or assembled in the poles. Embedded poles protect interrupter from impacts, dust deposits and humidity.	The GSx family (GSH II and GSR II) includes a suitable range of vacuum CBs designed to cover single and double-phase applications for the railway power supply.	Single pole DC circuit breakers for use in traction substations, at rolling stock vehicles and in other DC applications that require highest performance, up to 3600 V DC. High speed opening characteristics limiting fault current. Fire proof insulation materials are non toxic and are RoHS compliant. Cadmium-free contact system, asbestos-free arc chutes and halogen-free cabling make breakers non toxic, safe for personnel and have low impact on environment. Embedded control circuits provide easy integration with panels and enclosures. Quick inspection and servicing with minimum spare parts required.	The world's most compact MV vacuum generator CB. Full engineering and technical support. Type tested in accordance to the specific, global dual logo IEC/ IEEE standard. Proven reputation for reliability, performance and long life. Products tailored for local markets. Short lead times. Vacuum interrupters embedded or assembled in the poles.	Monostable electromagnetic actuator. Available with electrical or mechanical latching. Compact dimensions. Specific VIs for motor switching. Up to 2,000,000 operations. Fixed and withdrawable versions. Plug and play accessories for an easy customization.	Compact dimensions. Limited weight. With or without earthing switch with making capacity. Upgrade obsolete switchgear to new standards. Availability of interlocks. With or without cable compartment. Cassette type or floor rolling.	Modular principle for wide range of functionality. Safe switching combination between disconnector and current limiting fuse. Dual arc extinguishing system, ensuring efficient load current interruption. Unique design enables high switching capacity. Highest electrical performance in the market. CSA and UL listed.	Three-position SF6-insulated switch-disconnector (Line-Open-Earth). Metallic Partition – Interlocks to prevent incorrect operation. Separate operating seats for isolation and earthing operations. Applicable in combination with fuses and CBs. Wide range of "plug and play" accessories. Compactness: only 375mm wide. Maintenance-free with sealed for life technology. Up to 5,000 close-open operations. Integrated capacitive dividers for voltage presence indicator system.	Unified voltage ratings for more application. Flexibility. Integrated striker pin with temperature control unit to prevent overheating in installation place. Overload spots control internal arc initiation and determine outstanding temperature performance. Graved fuse data for long term fuse recognition. Low power losses & high current limitation extends insulation life time. High energy capability individual capacitor fuse.	<ul style="list-style-type: none"><li>Safe: mechanical interlocks, circuit breaker-line, disconnector-earthing switch-panel door.</li><li>Long lasting: 10.000 CO operations.</li><li>Simple: CB, isolator and interlock functions in one single apparatus.</li><li>Compact: fitting panels wide 500 mm C2 class for capacitive switching.</li></ul>	New vacuum interrupter technology and innovative actuation systems up to 38 kV, 2500 A/1250 A, 31.5 kA. Superior noise-free performances. Embedded advanced diagnostics. Higher performance than the market standard with 150,000/10,000 maintenance-free operations. Elimination of inrush limiting reactors and resistances, leading to significant cost and space savings.

Applications	Vacuum Interrupters	Embedded Poles	Circuit Breakers / IEC Indoor	Circuit Breakers / ANSI Indoor	Circuit Breakers / Railways AC and DC	Circuit Breakers / Railways CB	Generator Circuit Breakers	Contactors	Enclosures & Kits	Air Insulated Switch Disconnecter	Gas Insulated Switch Disconnecter	Indoor & Outdoor Fuses	Circuit Breaker + Switch	Indoor Disconnectors & Earthing Switches
Primary Distribution Panel Builders			•	•			•	•	•	•		•		•
Secondary Distribution Panel builders	•		•	•				•		•	•	•	•	
CSS manufacturers			•	•				•		•		•		•
MECB			•	•				•		•		•	•	
Motors manufacturers			•	•	•			•				•		
Power transformers	•		•	•			•							•
Distribution transformers	•		•	•						•		•		
MV Apparatus (CBs, Contactors, etc)	•	•										•		
Capacitors			•	•				•				•	•	
Generators			•	•	•		•							•
Traction power substations						•								
Rolling stock vehicles						•								
Power converters						•								

# Indoor medium-voltage Instrument Transformers and Sensors

World-class quality, reliability and efficiency

## INSTRUMENT TRANSFORMERS

The ABB indoor instrument transformers family includes more than 100 products types for indoor applications in medium-voltage systems.

ABB instrument transformers are cast in epoxy resin and manufactured according to the latest IEC 61869 standard. Also, they can be manufactured conforming to any of the following standards: GOST, ANSI, BS, VDE, AS, CSN and others. The portfolio reflects the market trends being continuously developed according to the customer's requirements.

Click on the product names to know more.



	Current transformers (CTs) TPU	Voltage transformers (VTs) TJC, TJP, TDC	Cable current transformers: KOKM, KOLMA, KOLA, BD
	CTs are designed as single-or-multi turn transformers, with one transformer ratio, or with the possibility to have primary or secondary re-connectable ratio. The quantity of cores depends on the combination of parameters. Capacitive divider can be built in as an option for voltage indication.	VTs are designed as single pole or double pole VT and upon request could be manufactured re-connectable version. Single pole VTs can be equipped with fuse which is integral part of primary winding. The transformer can be mounted in any position.	Cable current transformers include a wide range of dimensions and designs which could be manufactured as a single or multi-ratio type. The primary conductor of such CT is either an insulated cable or a busbar, which provides insulation for the application voltage.
Maximum Rated Voltage	up to 40.5 kV	up to 40.5 kV	0.72 or 1.2 kV (insulation granted by insulated cable or busbar)
Maximum Rated Current	up to 3,200 A	-	up to 10,000 A
Secondary I/U	5A or 1A	100:V3 V; 110:V3; 120:V3 /100:3; 110:3; 120:3 V - 100; 110; 120; 230 V	5A or 1A
Ith/Idyn	up to 100 kA/1s; up to 250 kA	-	up to 100 kA/1s; up to 250 kA
Accuracy class	0.2; 0.2s; 0.5; 0.5s; 1; 3 - 5P; 10P	0.2; 0.5; 1 - 3P; 6P	0.2; 0.2s; 0.5; 0.5s; 1; 3 - 5P; 10P
Application	up to 6 cores + capacitive divider	over voltage factor: single pole VT 1,9xUn /8h; double pole VT 1,2x Un/continuously	inner diameter for ring CT from 33 mm up to 500 mm; up to 3 cores

## SENSORS

ABB sensors offer a state-of-the-art way of providing the current and voltage signals which are needed for the protection and measurement of medium-voltage power systems. The output signal is linear over the whole measuring range. ABB sensors open-up numerous advantages and benefits for their users such as fast and easy design process, quick delivery time, minimized cost during the life cycle, flexibility, safety and reliability. ABB sensors product portfolio has more than 17 product families and 52 different product variants, including UL certified sensor solutions covering various applications from primary to secondary air and gas insulated switchgear.

Click on the product names to know more.



	Current sensors	Voltage sensors	Combined sensors
Maximum Rated primary current or voltage	up to 4000 A	up to 40.5 kV	up to 3200 A & up to 40.5 kV.
Rated transformation ratio	80; 250; 500; 1,600 A / 150(180) mV at 50(60) Hz	1:10,000 3.25 V secondary output for 3rd party IEDs	80; 250; 500; 1,600 A / 150(180) mV at 50(60) Hz (current measurement) 1: 10,000 (voltage measurement)
Accuracy class	up to 0.5/5P630	up to 0.5/3P	up to 0.5/5P630 & 0.5/3P
Sensor principle	Rogowski coil	Resistive or capacitive dividers	Rogowski coil Resistive or capacitive dividers

MV Sensors are compatible with ABB Relion IEDs and also 3rd party IEDs which support voltage sensors according to IEC 61869-11 standards. ABB Relion product family offers wide range of protection relays which covers solutions from basic range up to high-end. Examples being RIO600, REF601, REJ601, REM601, REF615, REM615, RED615, REC615, REF620, REM620 and REX640.

## SUCCESS FROM INNOVATION

We are shaping the future trends of electrification, developing groundbreaking technological innovations with a vital role to play in delivering sustainable progress.



## Technology and innovation are at the core of ABB's medium-voltage product offering

### Success from innovation

Click on the product names to know more.



#### UFES

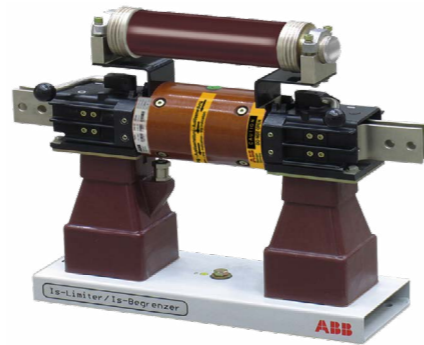
The Ultra-Fast Earthing Switch (UFES) provides innovative arcfault protection, offering the highest possible level of safety for personnel and equipment, the maintenance of secure power supply and the reduction of production outages.

- Drastic reduction of downtime and repair costs
- Reduced pressure level allowing active protection concepts eg. where gas ducts are not applicable
- Minimized release of toxic gases due to effective reduction of arc duration
- Combinable with different arc protection devices, including REA, TVOC-2 or non-ABB devices as well as standard protection relays including Relion® series or non-ABB relays supporting IEC 61850 Communication Standard
- Easy integration into new and existing low- and medium-voltage systems
- Available for switchgear ratings up to 40.5 kV and 100 kA

#### Fault Current Limiter (FCL)

ABB's fault current limiters, Is-Limiter and FC-Protector are the efficient solution for short-circuit current challenges in newly installed and existing electrical networks.

- Increase uptime and redundancy of power distribution systems
- Solving short circuit challenges by minimal integration cost in green and brownfield projects
- Plug and play installation for indoor and outdoor applications
- Available as loose component or panel solution with minimal footprint
- Available for standard to complex applications (e.g. extended tripping criteria, coordination of several FCLs in one system,...)
- FCL portfolio covering low- and medium-voltage ratings up to 40.5 kV



#### DS1 capacitor switch

The first medium-voltage indoor dry-air diode based capacitor switch with servomotors actuation for capacitor banks.

The first synchronous switch able to perform operations on capacitor banks without causing any transient voltage or inrush current. DS1 eliminates the probability of prestrike and restrike occurrence extending capacitors life and network reliability.

- Up to 17.5 kV, 630 A, 20 kA
- Up to 50,000 close-open operations
- Integrated control unit for synchronization and switch diagnostics

Click on the product names to know more.



#### VD4-AF

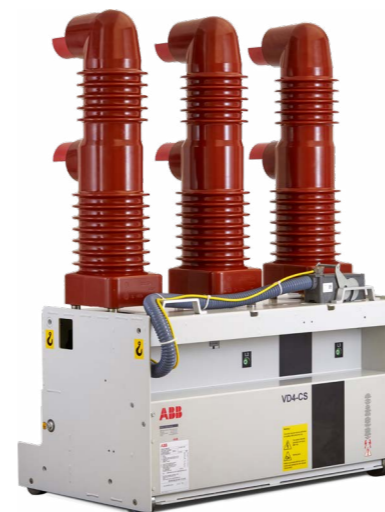
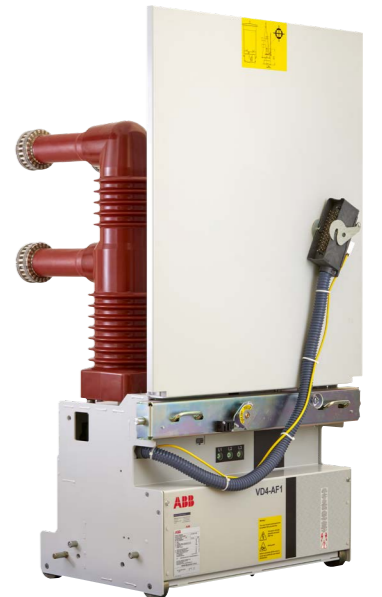
Medium-voltage circuit breaker based on servomotors actuators.

- Reduced operation cost up to 50%
- Reduced maintenance burden and tied-up investment by 30%
- Increased circuit breaker performances level, 5-10 times compared to standard solution
- Designed for steel furnace application
- Rated up to 38 kV, 2500 A, 150,000 maintenance-free operations
- Embedded advanced diagnostics

#### VD4-AF1

New vacuum circuit breaker with servomotor actuation and controlled switching technology.

- Enables increased lifespan of transformers by more than 10% in e.g. 3 years
- Reduction of hazards due to improved protection range
- Up to 5-to-10-times higher endurance performance than the market standard
- Eliminated compensation losses up to 10% to increase power quality
- Cost saving by as much as 20%
- Designed for transformers protection
- Rated up to 38 kV, 2500 A, 31.5 kA and up to 150,000 operations with extremely low inrush
- Elimination of inrush limiting reactors and resistances, leading to significant cost and space savings



#### VD4-CS

VD4-CS is the unique solution based on new vacuum interrupter technology to support reactive power compensation applications.

- Up to 5-times higher performance than the market standard with 10,000 operations
- Cost saving by as much as 20%
- Enables increased lifespan of capacitors by more than 10% in e.g. 3 yrs thanks to predictive health indication
- Designed for capacitor banks
- Rated up to 38 kV, 1250 A, 31.5 kA, 10,000 maintenance-free operations
- Noise-free operations
- Embedded advanced diagnostics

## INNOVATIVE AND ENERGY-EFFICIENT TECHNOLOGIES

Our world must face several challenges in the nearest future: heavy urbanization trend of the living areas, accelerated globalization and increasing environmental awareness where the major goal is to reduce greenhouse gas emissions. These are drivers for the increasing demand to deliver more efficient solutions for urban, suburban, intercity and freight.

## Indoor medium-voltage Railway products

### Innovative and energy-efficient technologies



Click on the product names to know more.

ABB is the world leader in electrification and offers a wide range of solutions for safe, stable and reliable power supply for rail industry.

ABB's railway circuit breakers are globally recognized products, certified and homologated by largest rail transport operators across the globe.

Amongst other systems, ABB offers a comprehensive range of the railway AC and DC MV apparatuses. These are suitable for use in all railway power supply systems, starting from AC 15 kV, 16.7 Hz and 25 kV 50/60 Hz for main railway, as well as for urban and light rail DC transport systems from 600 V up to 3 000 V. ABB also offers DC circuit breakers for rolling stock applications up to 1500 V.



#### Gerapid – DC fixed applications

Single pole MV DC circuit breaker with 20 years of history and a unique design. It is designed to provide maximum safety of operation, highest ratings coverage, easy maintenance, easy integration in panels and high customization levels. Reliable performance at the DC ratings not available for AC CBs.

- Enclosed construction reduce risks of flashovers
- Ratings up to 3600/V, 8000 A DC.
- Interruption capacity up to 200 kA.
- Control and maintenance-free main contacts.
- RoHS and REACH compatible.
- Available type test reports for EN/IEC/ANSI standards.



#### DCBreak – DC rolling stock application

Single pole MV DC circuit breaker. DCBreak combines a small footprint, reduced weight, high flexibility and reliable operation with minimal maintenance. It is ABB's first in a line of new products intended for the DC railway transportation market. It is designed to high safety standards as well as relevant environmental directives and industry standards.

- Rated operational voltage 900 V and 1800 V, rated current 1500 A, breaking capacity 30 kA.
- Remote and magnetic releases with trip band up to 3,6 kA.
- Available type test reports for EN/IEC standards.
- For rolling stock, traction power substation, auxiliary railway systems, power converters, motor drives, energy storage systems.
- 200,000 mechanical cycles.
- Easy to use as retrofit for other breakers of the same class.
- Cadmium-free solution with low environment impact.



#### GSx - Indoor AC vacuum circuit breaker

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.

- Available for 1x27.5 kV, 1x17.5 kV configurations.
- Integrating configurable set of functions (under voltage release, anti-pumping, lock in open position, local/remote mode, etc.).
- For 16.7 (25) Hz and 50 (60) Hz networks.
- Suitable for new installations, refurbishments and upgrades.



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