Smarter safety

IEC low- and medium-voltage arc flash mitigation solutions for greater protection and productivity

- Maximum protection
- Maximum uptime
- Maximum peace of mind

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The occurrence of an arc flash is the most serious fault within a power system. Its destructive impacts can lead to severe personnel injuries, costly equipment damage and long outages. ABB offers a wide range of solutions to prevent and mitigate the effects of arc flash events, thus enhancing safety, minimizing damage and reducing downtime.

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SMARTER SAFETY

There is a real business case for arc flash protection and mitigation and at ABB we are proud that our wide range of solutions goes beyond compliance with standards and regulations to bring you the best possible value.

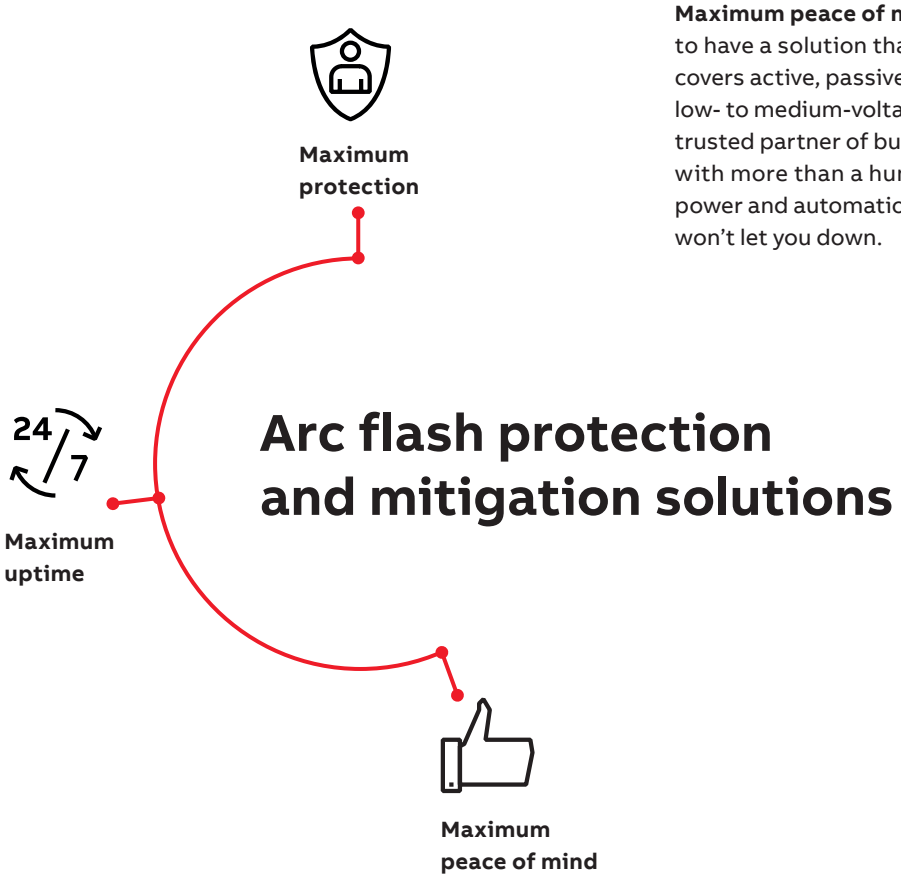
Putting the protection of your people first is a smart choice. Because safety is not a cost, it is an investment.

It goes without saying that safety should be a priority for every business. Arc flash mitigation solutions are essential because they save lives. But that's not all. Taking the right precautions today can save you time and money in the future: protecting people and assets, reducing the cost of injuries and damage, limiting downtime and maintenance requirements. There is a real business case for arc flash protection and mitigation and at ABB we are proud that our wide range of solutions goes beyond compliance with standards and regulations to bring you the best possible value.

Maximum protection. Protect personnel with solutions ranging from passive protection to ultra-fast arc mitigation solutions. ABB's portfolio provides enhanced future-proof solutions exceeding the requirements of the current regulations. Innovative features such as remote condition monitoring lower risk by reducing the interaction of personnel and equipment.

Maximum uptime. ABB's arc flash mitigation solutions keep your business running, improving uptime by limiting the energy of arc faults, therefore limiting the damage they cause to switchgear and assets and the repair time required. Predictive maintenance solutions ensure downtime is kept to a minimum and reduce the likelihood of unexpected failure during operation.

Maximum peace of mind. You can count on ABB to have a solution that's right for you – our range covers active, passive and preventive solutions from low- to medium-voltage applications. We are the trusted partner of businesses all over the world, with more than a hundred years' experience in power and automation. Our high quality solutions won't let you down.



What is an arc flash?
How can it be avoided?

Arc flash is one of the most dangerous and potentially deadly incidents that can occur in electrical installations, causing severe harm to the people and equipment involved. An arc flash is an electrical fault or short-circuit which passes through a physical air gap, or bridge, between two electrodes.

Arc flash incidents can be caused by:
- Dust, impurities, corrosion, condensation, animal intrusion
- Dropping or left behind tools
- Failure of insulating materials
- Improper installation
- Loose bus or cable connections
- Lack of, or inappropriate maintenance
- Inappropriate operating conditions

Human impact
Arc flash incidents are rare, but they have the highest mortality rate of any accidents in electrical installations. The inhalation of toxic gases, damage to hearing, injuries due to the ejection of materials and burns are all possible consequences.

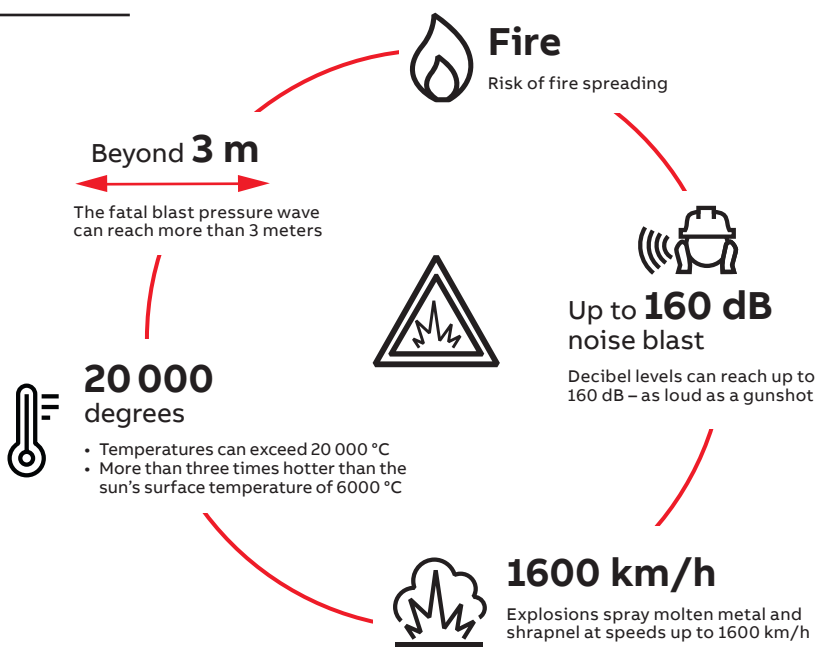
Equipment damage
Arc flash incidents can also be destructive for switchgear and other assets, even buildings, as shown in images 01, 02 and 03. The explosion and resultant fires often cause great damage to equipment and facilities.

Reducing the effects of arc flash
Use of arc energy mitigation solutions can significantly reduce arc energy and the associated impacts. This improves safety and may drastically reduce the time required to repair the switchgear. You can see the difference that a fast active arc mitigation system makes in images 04 and 05 – the switchgear without arc protection is severely damaged compared to the switchgear with fast arcing fault detection and protection.

Scan the QR code to watch this comparison test in action.

Click here to watch online.

Arc flash dangers



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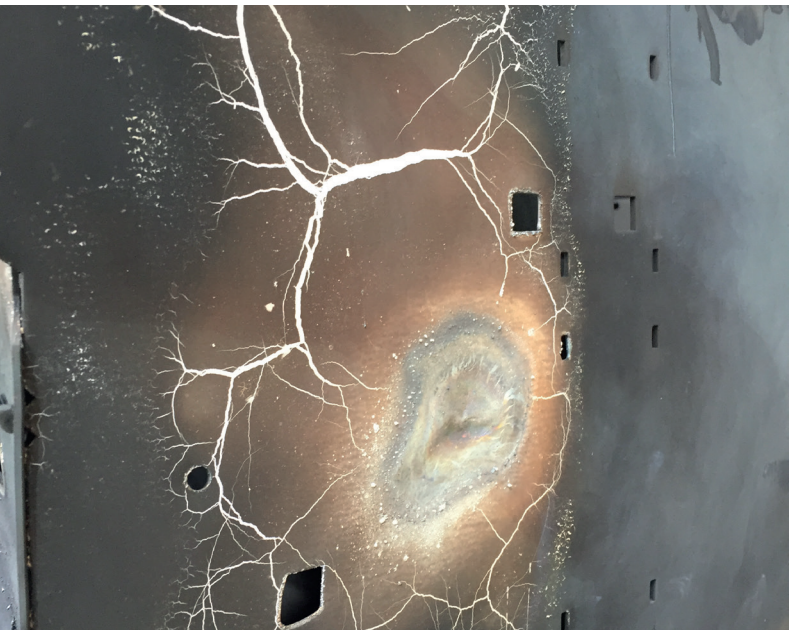
01



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02

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03

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04

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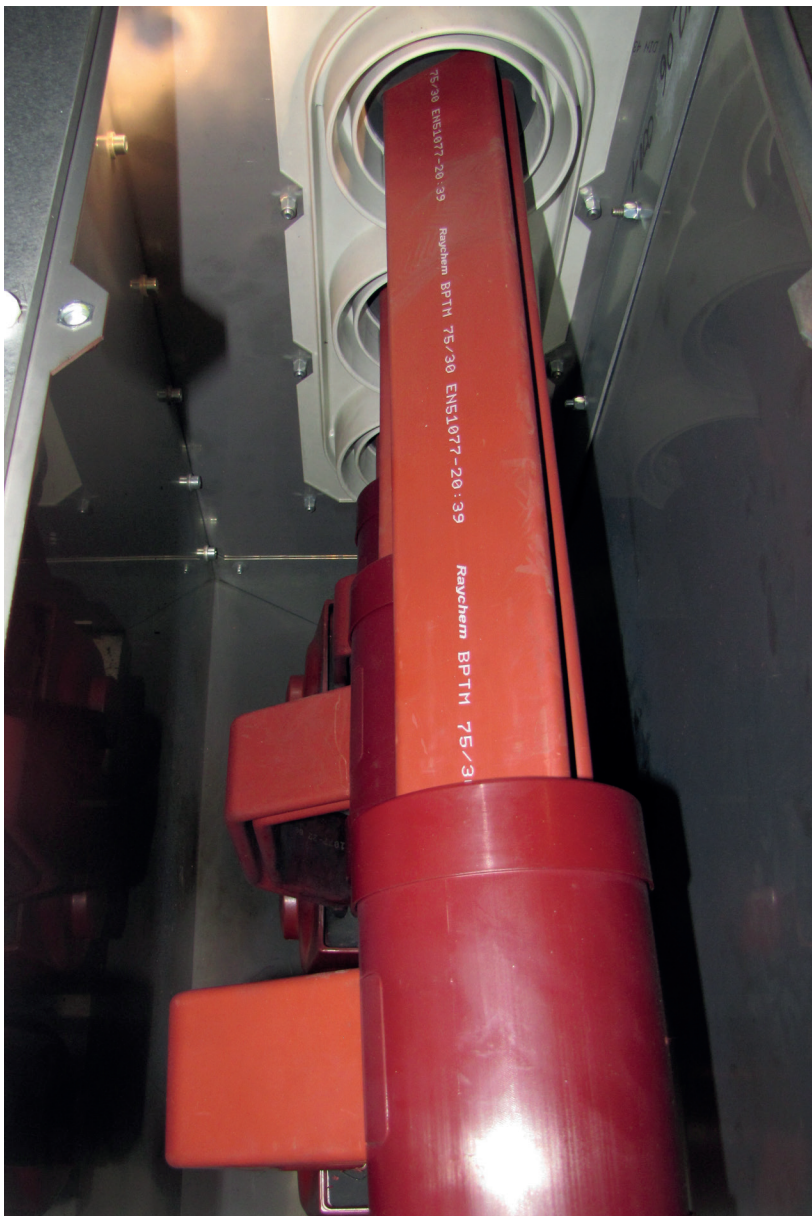
05



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01 Switchgear damaged by an arc flash incident, without an arc flash mitigation system
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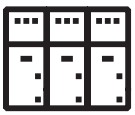
02 Switchgear damaged by an arc flash incident, without an arc flash mitigation system
—
03 MV/LV substation damaged by an arc flash incident due to the absence of an arc flash mitigation system
—
04 Busbar compartment of medium-voltage switchgear after arc flash, without an arc flash mitigation system
—
05 Busbar compartment of medium-voltage switchgear after arc flash, with an ultra-fast arc flash mitigation system

Passive, active and preventive
Arc flash protection and mitigation solutions

Arc flash mitigation solutions reduce damage to equipment, limiting downtime as less time is required for repairs and keeping costs to a minimum. In addition, the safety of personnel is enhanced.

There are three design philosophies which protect operator and equipment in the event of an arc flash incident, one or more may be adopted within the same switchgear:



Passive arc flash protection solutions
Switchgear designed and tested to mechanically withstand the electric arc. Protection is afforded by the containment of the arc within the switchgear and the means to direct the arc gases and debris to a safe area. Passive solutions also include advanced switchgear design features to reduce the probability of an arc flash occurring, such as insulated busbars, segregation between compartments and creation of arc ignition protected zones (AIPZ).

Active arc flash mitigation solutions
Switchgear equipped with devices and solutions to limit the arc incident energy (the amount of thermal energy generated during an electric arc event[1]) and consequently limit the damage to the equipment.

Preventive arc flash protection solutions
Switchgear equipped for remote operation, so that standard operations such as switching, diagnostic and operational monitoring, racking in/out, etc. can be conducted outside of the dangerous arc flash exposure area. Preventive solutions also include the predictive maintenance of assets, which enables a reduction in the number of live equipment interactions to only the most necessary and targeted actions as identified by analysis of the data provided by these systems. This not only minimizes human-equipment interactions but also improves equipment reliability and reduces maintenance costs.

[1] IEEE std 1584-2018: Guide for Performing Arc-Flash Hazard Calculations

Passive solutions

Protect by containing or preventing an event

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01 NeoGear™

The principle of passive arc flash protection is based on the mechanical design of low- and medium-voltage switchgear. Robust design reduces the risk that a person, standing in front of switchgear with closed and latched doors, will be injured in the event of an arcing current event inside the equipment.

ABB switchgear exceed the standards, as they are always designed and tested to withstand an internal arc caused by a short-circuit current for up to one second. This test is covered by IEC TR 61641 Ed. 3 for low-voltage switchgear (up to 0.5 seconds) and IEC 62271-200 for medium-voltage switchgear (up to 1 second). The testing is not a compulsory requirement in all conditions, but ABB's commitment to personnel safety is a key driver.

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Design

Arc resistant switchgear usually have one of the following characteristics:

- Reinforced mechanical structure able to withstand the stresses (overpressure) caused by internal arcing
- A preferential path inside the assembly for the discharge of hot gases and debris created by arcing
- An arc ignition protected zone (AIPZ) to avoid the occurrence of an arc
- Segregation between compartments to inhibit the propagation of the arc
- With respect to medium-voltage, internally separate gas tank for gas-insulated equipment and plug-in cable connections

Considerations

Passive solutions contain the arc within the switchgear, the first level of protection is to protect nearby personnel. With respect to low-voltage, the next levels contain the arc in the area where it was initiated, and the highest level enables emergency re-use of the equipment following cleaning of the affected areas.

Active solutions

Reduce equipment damage and improve operator safety

The main parameter of the electric arc, which characterizes its destructive ability, is incident energy. This is directly proportional to the arc duration and arc current.

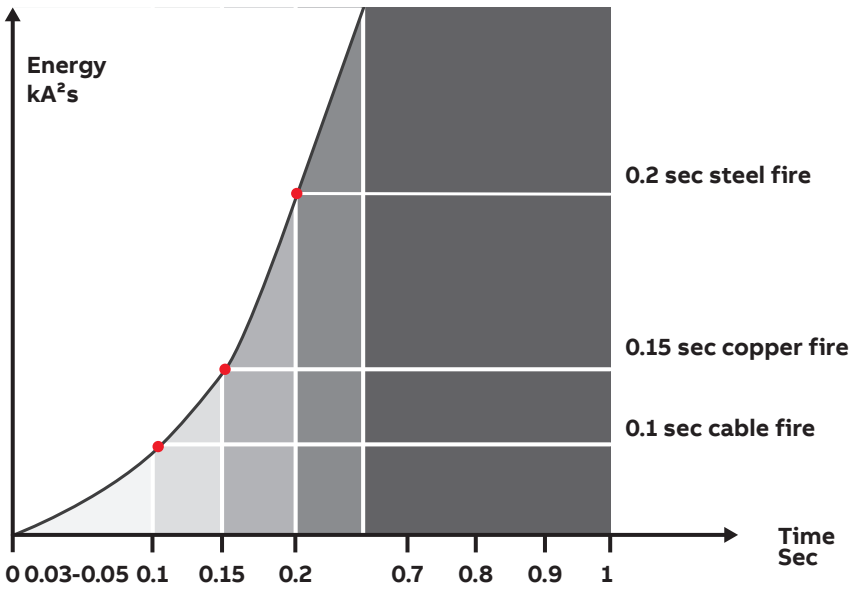
The arcing fault is usually interrupted by a circuit breaker and relay/trip unit or fuses. Without any active arc flash mitigation solutions in place, the arc clearing time (which is the total time between the beginning of a specified overcurrent and the final interruption of the circuit[1]) may vary from 0.2 to 0.4 seconds. However, within this short time, steel, copper and cable can burn, melt and vaporize, as shown in the diagram.

Reducing the arc clearing time
In order to reduce the negative effects of an arc event, the arc clearing time must be reduced. This is the role of active arc flash mitigation solutions.

The following methods and technologies are available:

- **Optical-based internal arc-detection devices**. Relays that detect the arc flash light and current (optional). When the arc flash is detected, it sends the tripping signal to the circuit breaker.
- **Arc quenching system**. Equipment that provides a lower impedance current path after it has detected an internal arc fault in order to cause the arcing current to transfer to the new current path.
- Combination of **arc quenching system** with **current-limiting fuses**.
- **Energy-reducing maintenance switch**. Limits the duration of the fault current by temporarily lowering the trip threshold of the circuit breaker.

Arc flash damage curve



[1] IEEE std 1584-2018: Guide for Performing Arc-Flash Hazard Calculations

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01 Arc Guard System™ TVOC-2

- **Zone-selective interlocking**. Application of zone selectivity instead of time-current selectivity to reduce the tripping time delays of overcurrent protection devices.
- **Bus differential protection**. Division of the power system into protective zones in order to monitor the current for all connections into and out of the defined zone.
- **Alternative settings group (dual settings)**. Tripping time delays of the overcurrent protection devices are set to lower values than the main time settings.
- Combination of **optical-based internal arc detection device** and circuit breaker's **energy-reducing arc mitigating algorithm**. After receiving a positive signal from the optical sensors, the arc detection device activates the energy-reducing arc mitigating algorithm embedded in the circuit breaker.

Positive results
Reduction of the arc incident energy through the use of active solutions will enhance personnel safety and limit high pressure, dangerous gases and damage to the faulty compartment of the switchgear. As a result, repair costs are lower and the electrical installation can be returned to normal operation faster than installations without an active arc mitigation system, reducing downtime.

A range of options
The products and solutions listed in this brochure have different values of total arc clearing time. Therefore, the effects of arc mitigation are slightly different from product to product. Details on the total arc clearing time of our active arc flash mitigation solutions can be found in the overview table on pages 20-23.

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Preventive solutions
Avoid internal arc events

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01 ABB Ability™ Energy and Asset Manager

An electric arc can occur for several reasons, for example human error or contamination. Electrical maintenance, trouble-shooting personnel and operators are always exposed to these risks when working in the switchgear room. Maintaining a safe distance between personnel and equipment during operations provides the most effective means of avoiding injury. Preventive solutions limit risk by reducing maintenance activity to only the most necessary and targeted actions.

A safer remote operating environment
Remote operation and circuit breaker racking provide a safer operating environment for personnel by increasing the distance between the operator and potential arc flash incident energy from the switchgear. Enhanced switchgear operability preventing human errors can be achieved by:

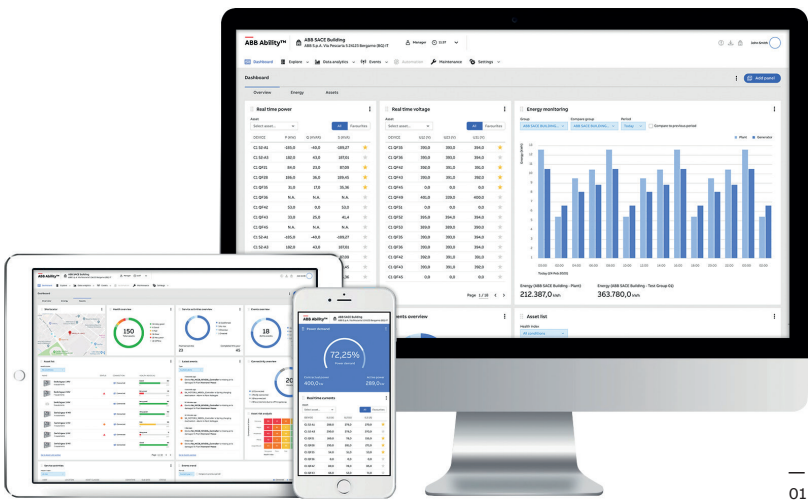
- Remote racking devices
- Embedded plant supervision with metering capabilities and communication protocols to provide status information

- **Condition monitoring and diagnostics**

Asset condition monitoring and diagnostics provide information on the mechanical and electrical health conditions for switchgear and assets, so personnel do not have to approach the switchgear to obtain this information. Furthermore, this information is available 24/7. The information can be used to schedule more targeted and safer condition-based maintenance, which also reduces costs and can improve overall reliability.

Mechanical and electrical health status can be achieved by:

- Condition monitoring systems allow collection of data about equipment usage, temperature of critical electrical joints, vibration and partial discharge as well as environmental factors, which impact equipment reliability.
- Energy and asset management monitoring systems with predictive maintenance algorithm to make maintenance smarter, quicker and less expensive by allowing users to remotely monitor power system health and providing a predictive maintenance analysis so that service is only performed when necessary.



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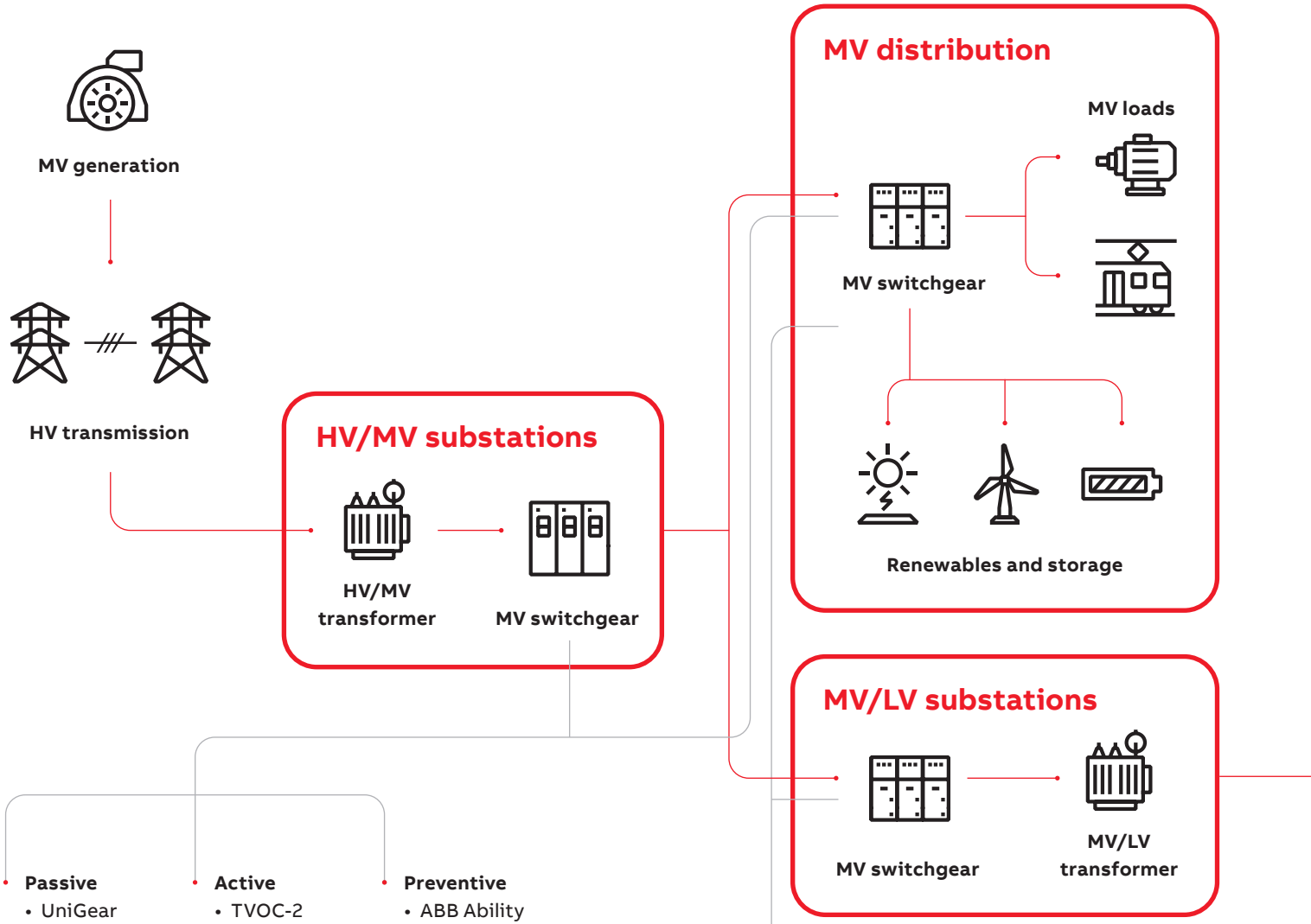
SMARTER SAFETY

"Protecting customers is at the forefront of our product innovation, and is central to ABB's product philosophy and global mission. Our arc flash mitigation solutions are designed to offer added peace of mind when it comes to protecting people, assets and buildings. And it's clear that taking the right precautions today can lead to efficiencies in the future – that's what makes arc flash mitigation from ABB a smart choice."

Carlo Roncorini, Product management excellence manager, Distribution Solutions division
Anatoly Kosyakin, Global application specialist, Smart Power division

A broad portfolio

Covering every level of low- and medium-voltage power distribution



Passive
- UniGear
- ZX

Active
- TVOC-2
- REA
- Relion®
- UFES
- Zone selective interlocking
- Dual settings
- SSC600
- Ith Limiter

Preventive
- ABB Ability SWICOM
- Remote Racking TruckMaster

Passive
- UniSec
- SafeRing/ SafePlus

Active
- TVOC-2
- REA
- Relion
- UFES
- Arc Suppressor

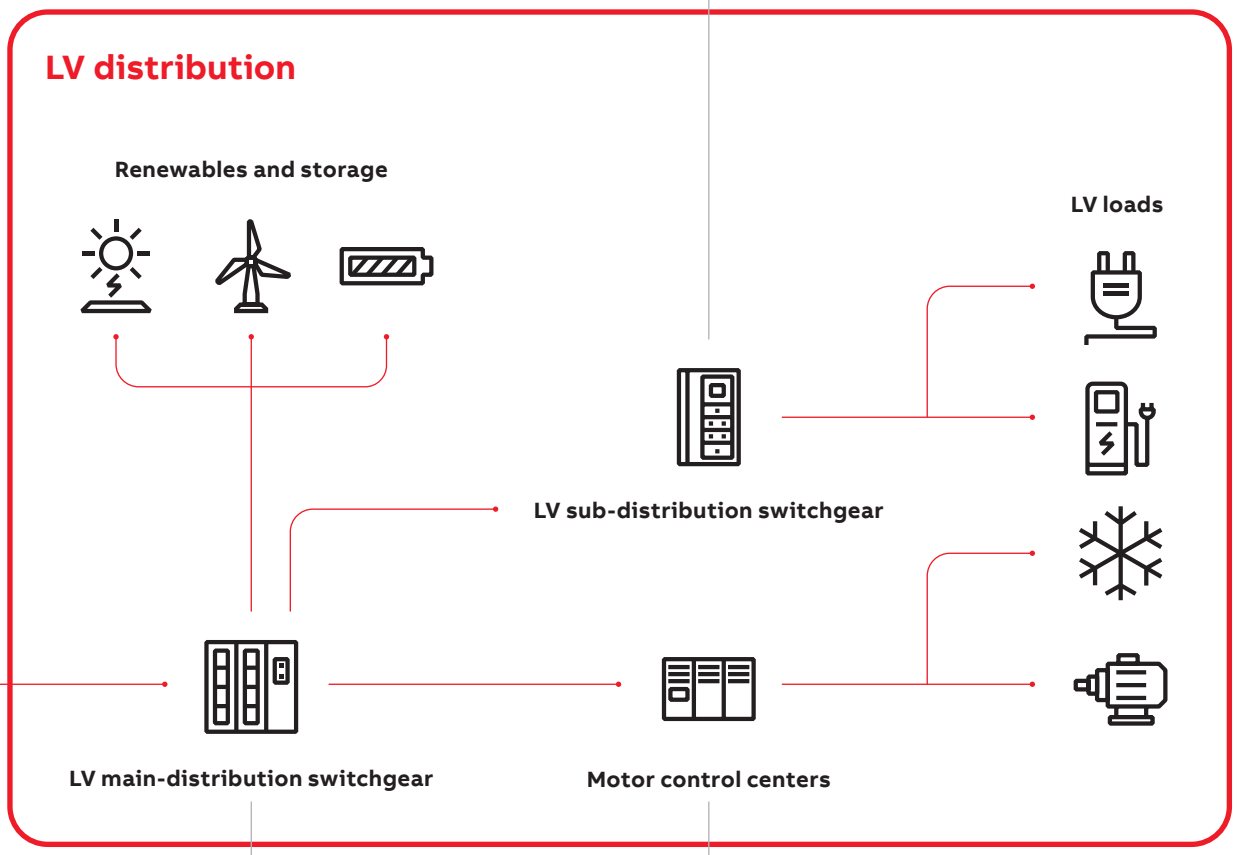
Preventive
- ABB Ability Energy and Asset Manager
- ABB Ability SWICOM
- Remote Racking TruckMaster

HV: High-voltage (above 66 kV)
MV: Medium-voltage (between 1 kV AC, or 1.5 kV DC, to 66 kV)
LV: Low-voltage (below 1 kV AC, or 1.5 kV DC)

Passive
- MNS®
- SEN Plus
- System pro E power

Active
- TVOC-2
- REA
- Zone selective interlocking
- Dual settings
- RELT Module

Preventive
- ABB Ability Energy and Asset Manager
- ABB Ability CMES
- Ekip Signalling 3T
- Remote Racking Emax 2



Passive
- NeoGear
- MNS
- SEN Plus
- System pro E power

Active
- TVOC-2
- REA
- UFES
- ArcLimiter
- Zone selective interlocking
- Dual settings
- RELT Module

Preventive
- ABB Ability Energy and Asset Manager
- ABB Ability CMES
- Ekip Signalling 3T
- Remote Racking Emax 2

Passive
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- ArcLimiter
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- Dual settings
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- ABB Ability CMES
- Ekip Signalling 3T
- Remote Racking Emax 2

Passive arc flash protection solutions
Ensuring personnel safety

	NeoGear	MNS
Switchgear manufacturer	ABB	ABB
Product type	Main and sub-distribution board, motor control center	Main and sub-distribution board, motor control center
Low-voltage application	Up to 415 (690) V AC 3200 (6300) A 80 (100) kA	Up to 690 V AC 6300 A 120 kA
Medium-voltage application	-	-
Arc classification standard	IEC TR 61641 Ed. 3.0 Max. Class I (AIPZ) Min. Class C, 0.5 s	IEC TR 61641 Ed. 3.0 Up to Class C, 0.3 s Additional tests with modules removed and open doors
Insulated busbars	Yes (insulated laminated bus plates)	Available as an option
Segregation between compartments	Up to Form 4b	Up to Form 4b
Product web page	**Click here for more information**	**Click here for more information**

	SEN Plus	System pro E power
Switchgear manufacturer	OEMs / ABB	Panel Builders
Product type	Main and sub-distribution board, motor control center	Main and sub-distribution board
Low-voltage application	Up to 690 V AC 6300 A 100 kA	Up to 690 V AC 6300 A 120 kA (Top Busbar System) 150 kA (Rear Busbar System)
Medium-voltage application	-	-
Arc classification standard	IEC TR 61641 Ed. 3.0 In progress	IEC TR 61641 Ed. 3.0[2] Up to Class A (Top Busbar System) Up to Class B (Rear Busbar System)
Insulated busbars	Yes[1]	No
Segregation between compartments	Up to Form 4b	Up to Form 4b
Product web page	**Click here for more information**	**Click here for more information**

[1] On request for direct business only
[2] System pro E power switchgear has to respect the following technical features to obtain certification: max Icw 65 kA, Form 3b or 4b, panels with gasket, IP40/IP41, max. 480 V AC, dedicated kit for top panels with flaps.

Passive arc flash protection solutions
Ensuring personnel safety

	UniGear	UniSafe	UniSec
Switchgear manufacturer	ABB	OEMs	ABB / OEMs
Product type	Air-insulated MV switchgear for primary distribution	Air-insulated MV switchgear for primary distribution	Air-insulated MV switchgear for secondary distribution
Low-voltage application	-	-	-
Medium-voltage application	Up to 46 kV AC 4000 A 63 kA	Up to 24 kV AC 4000 A 40 kA	Up to 24 kV AC 1250 A 25 kA
Arc classification standard	IEC 62271-200 Up to AFLR, 1 s	IEC 62271-200 Up to AFLR, 1 s	IEC 62271-200 Up to AFLR, 1 s
Insulated busbars	Yes	Yes	Yes
Segregation between compartments	Up to LSC2B	Up to LSC2B	Up to LSC2B
Segregated tank and plug-in cable connection	No	No	No
Product web page	**Click here for more information**		**Click here for more information**

	ZX	SafeRing / SafePlus
Switchgear manufacturer	ABB / OEMs	ABB / OEMs
Product type	Gas-insulated MV switchgear for primary distribution	Gas-insulated MV switchgear for secondary distribution
Low-voltage application	-	-
Medium-voltage application	Up to 42 kV AC 3150 A 40 kA	Up to 40.5 kV AC 630 A 25 kA
Arc classification standard	IEC 62271-200 Up to AFLR, 1 s	IEC 62271-200 Up to AFLR, 1 s
Insulated busbars	Yes	Yes
Segregation between compartments	Up to LSC2A	Up to LSC2A
Segregated tank and plug-in cable connection	Yes	Yes
Product web page	**Click here for more information**	**Click here for more information**

Active arc flash mitigation solutions
Improve safety, reduce damage

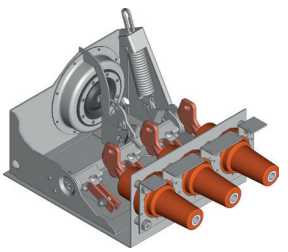
	Arc Guard System TVOC-2	REA arc protection system
Technology type	Optical-based internal arc detection and mitigation, which trips LV or MV circuit breaker	Optical-based internal arc detection and mitigation, which trips LV or MV circuit breaker
Dedicated product or optional function	Dedicated product for arc flash mitigation	Dedicated product for arc flash mitigation
Application	Low-voltage, medium-voltage	Low-voltage, medium-voltage
Operating time	1-2 ms	1-2.5 ms
Total arc clearing time	With LV ABB circuit breaker: 45 … 50 ms With MV ABB circuit breaker: 50 … 100 ms	With LV ABB circuit breaker: 45 … 50 ms With MV ABB circuit breaker: 50 … 100 ms
Certifications	DNV, ABS, BV, TÜV (SIL 2)	DNV-GL, BV
Enables personnel safety during maintenance	Yes	Yes
Enables arc mitigation 24x7	Yes	Yes
Benefits and features	Increased personnel safety. Significant reduction of overpressure, toxic gases. – Outstanding reaction time < 1 ms (< 2 ms with CSU-2) – All-in-one unit with up to 30 single point sensors in three separate zones for selectivity – Suitable for MV and LV applications with light only detection or both light and current detection – Open loop Rogowski coils simplify installation and retro fit – Simple commissioning of TVOC-2 and CSU-2 through HMI, Modbus RTU or Ekip Connect – Factory calibrated sensors – no need for on-site adjustment – Modbus RTU and ABB Ability Energy and Asset Manager connectivity	Increased personnel safety. Significant reduction of overpressure, toxic gases. Can be used as redundant solution with protection relays. Compact, flexible and easy to integrate additional modules available to extend selective tripping capabilities, to create multiple loops or add more lens detectors. Light detection can be with: – fiber loop sensor (cost-effective) – multiple point lens sensors (increased selectivity) Adjustable light and current detection thresholds.
Product web page	**Click here for more information**	**Click here for more information**

	Relion 615-620-640	Ultra-Fast Earthing Switch UFES	ArcLimiter
Technology type	Optical-based internal arc detection and mitigation, which trips MV circuit breaker	Arc quenching system with arc detection and switching devices	Combination of arc quenching system with current-limiting fuses
Dedicated product or optional function	Optional card and sensors for Relion family	Dedicated product for arc flash mitigation	Dedicated product for arc flash mitigation
Application	Medium-voltage	Low-voltage, medium-voltage	Low-voltage arc mitigation with medium-voltage application
Operating time	2.5-6 ms	1.5 ms	1.5-2.5 ms
Total arc clearing time	With MV ABB circuit breaker: 60 … 110 ms	In combination with TVOC-2 or REA: <4 ms In combination with Relion: <10 ms	In combination with REA: 4 ms
Certifications	DNV, LR, BV, KEMA, RMRS, UL, ABS, GL	DNV, VdS, UL	As per REA and UFES systems
Enables personnel safety during maintenance	Yes	Yes	Yes
Enables arc mitigation 24x7	Yes	Yes	Yes
Benefits and features	Increased personnel safety. Significant reduction of overpressure and toxic gases. Compact and easy to integrate additional card into multifunctional relay; is the perfect solution if a relay for protection is required. Light detection by use of: – loop (cost effective) – single point (increased selectivity) – supervised FO on REX640 up to 4 loops of 60 m Adjustable threshold levels.	Increased personnel safety. 20 times faster than standard arc protection. Significant reduction of overpressure and toxic gases. Compact switching devices and detection electronics enable easy integration into almost every switchgear. Tremendous reduction of downtime and repair costs, up to 98%. Monitoring system compatible with REA, TVOC-2 and Relion Relays. Ultra-fast switching vacuum interrupter and operating system integrated in one compact unit. Fast and reliable micro-gas generator operating mechanism. Available as loose product, within ABB MV and LV switchgear or as retrofit solution by ABB Service.	Unique solution which uses ultra-fast earthing switch (UFES) in combination with fuses, solves the LV arc fault problem at MV level. Improves power quality for upstream processes during mitigation. Reduces voltage dip duration seen by upstream devices during fault clearing. Incident energy reduced to under 1 cal/cm^2, resulting in hazard risk category (HRC) zero. Embeds UFES benefits as part of the system solution. Suitable for upgrading existing plants, allowing use of existing MV fused switches and thereby avoiding replacement with relay and breakers. Also covers the area between transformer secondary and line side of the LV breaker.
Product web page	**Click here for more information**	**Click here for more information**	**Click here for more information**

Active arc flash mitigation solutions

Improve safety, reduce damage

	Emax 2 and Tmax XT		
Technology type	Zone-selective interlocking	Alternative settings group (dual settings)	Energy-reducing maintenance switch with RELT module
Dedicated product or optional function	Optional function of Emax 2 and Tmax XT circuit breakers	Optional function of Emax 2 and Tmax XT circuit breakers	Optional function of Emax 2 and Tmax XT circuit breakers
Application	Low-voltage	Low-voltage	Low-voltage
Operating time	40 ms with S protection (ANSI 50TD, 51)	5-7 ms to change alternate settings	2.5 ms
Total arc clearing time	Depends on circuit breaker frame and fault current	Depends on circuit breaker frame and fault current	Emax 2: 28 … 42 ms at 60 Hz
Certifications			
Enables personnel safety during maintenance	Yes	Yes	Yes
Enables arc mitigation 24x7	Yes	No	No
Benefits and features	Increased personnel safety with hardwired or digital zone selectivity between circuit breakers. Can be used for zone selectivity interlocking i.e. selective short circuit, ground fault, instantaneous and directional protections. Digital zone selectivity can be provided with Ekip Link or Ekip Com IEC61850 to integrate the ABB circuit breakers in a substation automation system.	Increased personnel safety. Add an extra level of protection with two user selectable sets of settings for circuit breakers. All protection settings can be changed between SET A and SET B to reduce trip protection thresholds and time delays. Can be easily activated by Ekip Connect. Different input can be set for the parameter change, e.g. selector switch, open door microswitch.	Increased personnel safety. Dramatically reducing the impact of an arc flash event. The 2I is a temporary protection that is faster than the normal instantaneous protections. Depending on the fault current, this function can provide a total clearing time as low as 1.5 cycles at 60 Hz. – Cannot be deactivated remotely. – Positive feedback provides a clear indication that the safety function is working properly. – Easy to use wizard is automatically engaged during initial installation. – Commissioning can be executed through the circuit breaker touch screen.
Product web page	**Click here for more information**	**Click here for more information**	**Click here for more information**



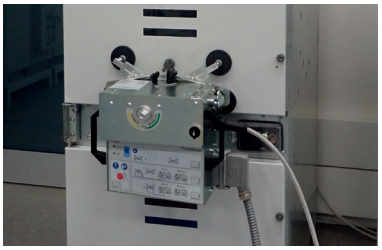
	Smart Substation Control SSC600	Ith Limiter	Arc-Suppressor
Technology type	Bus differential protection and optical-based internal arc-detection and mitigation, which trips MV circuit breaker	Mechanical-based internal arc-detection and mitigation devices, which trips MV circuit breaker	Mechanical-based internal arc-detection and mitigation devices, which short circuit incoming feeder
Dedicated product or optional function	Centralized protection based on Relion inputs	Optional devices for ABB UniGear switchgear	Optional devices for ABB SafeRing/ SafePlus switchgear
Application	Medium-voltage	Medium-voltage	Medium-voltage
Operating time	2.5-6 ms	15 ms	Less than 30 ... 50 ms
Total arc clearing time	60 ... 80 ms	70 ... 90 ms	30 ... 50 ms
Certifications	UL, Intertek		Tested according to IEC
Enables personnel safety during maintenance	Yes	Yes	Yes
Enables arc mitigation 24x7	Yes	Yes	Yes
Benefits and features	Increased personnel safety. Significant reduction of overpressure and toxic gases. Compact and easy to integrate: additional card into multifunctional relay; is the perfect solution if a relay for protection is required. Low-impedance busbar current differential can also detect busbar faults without light detection. Operates based on detection of light and current from arc, which trips the MV circuit breaker or busbar differential. Light detection can be with: – loop (cost effective) – single point (increased selectivity) – differential current on 1 or 2 busbar sections Adjustable threshold levels and high logical selectivity.	Increased personnel safety with a basic solution. Integrated system with UniGear platform. Operates based on the indirect detection of overpressure generated by the arc. Mechanical switches mounted on the pressure relief flaps trip the MV circuit breaker.	Increased personnel safety. No overpressure outside switchgear compartment. The arc is extinguished without any emission of hot gases. Internal arc fault in the tank will have no impact on the surroundings. Integrated solution with SafeRing and SafePlus platform: 12kV, 24kV and 36kV. Insensitive to corrosion and environmental impact give optimum reliability. No links or release mechanisms outside gas compartment. The pressure detector is insensitive to pressure changes due to variation in atmospheric temperature or pressure, as well as external phenomena such as vibrations or shocks. Operates based on the direct detection of overpressure generated by the arc inside gas compartment. Optional mechanical switch for electrical signaling.
Product web page	**Click here for more information**	**Click here for more information**	**Click here for more information**

Preventive arc flash protection solutions
Safer operations at a distance

	ABB Ability Energy and Asset Manager	ABB Ability Condition Monitoring for electrical systems
Technology type	Energy and asset management cloud-computing platform and predictive maintenance indication	Condition monitoring and energy management on-premise based platform
Dedicated product or optional function	Dedicated product	Dedicated product
Application	Low-voltage, medium-voltage	Low-voltage, medium-voltage
Benefits and features	ABB Ability Energy and Asset Manager, the innovative cloud-computing solution designed to monitor, optimize, predict and control the electrical system. ABB Ability Energy and Asset Manager assists anytime and anywhere via smartphone, tablet or personal computer. The user can: **Monitor** Oversee site performance, supervise the electrical system and allocate costs. **Explore** Visualize the system structure, verify asset health and get actionable insights following predictions and prescriptions. **Analyze** Schedule and analyze automatic data exports, improve the use of assets and make the right business decision. **Act** Set up alerts to notify key personnel while remotely implementing an effective efficiency strategy, managing maintenance activities and scheduling next actions.	On-premise solution for plant-wide condition and energy monitoring. Data storage and analytics to prevent failures, predict asset maintenance and optimize production. Simple web browser access to intuitive user dashboard with health index, single line and panel views, trends. Integrated Knowledge Base provides root cause and suggested action on any event. Integrated data analysis to provide detailed insights on asset health and prediction of upcoming maintenance needs. Monitoring temperature of critical connection with detailed analysis of switchgear thermal situation and early warning about developing issues. Report function of switchgear condition and statistics as well as energy report, which indicates trends up to each individual load in low-voltage switchgear and MCC. Integration capability of ABB and 3rd-party products based on Modbus communication protocol.
Product web page	**Click here for more information**	**Click here for more information**

	ABB Ability Condition Monitoring for switchgear – SWICOM	Ekip Signalling 3T module and PT1000 probes – Emax 2 and Tmax XT
Technology type	Condition monitoring	Condition monitoring
Dedicated product or optional function	Dedicated product	Optional module for Emax 2 and Tmax XT
Application	Medium-voltage	Low-voltage
Benefits and features	Monitoring and diagnostic unit providing mechanical and electrical health status of a fleet lineup. Any new or existing panel can become truly ABB digital compliant by having SWICOM onboard, regardless of age, design or brand. One unit covers information from the whole switchgear lineup. Detects the primary circuit hot spots and monitors their trends as one of its crucial health monitoring tasks. Detects partial discharges (surface, corona, inner void and floating electrode discharges) before the insulation component is further degraded, to prevent complete breakdown of insulation resulting in a possible arc fault. Fully integrated monitoring solution providing detailed analysis of switchgear health situation and early warnings about developing issues.	ABB PT1000 sensor can be installed directly on the busbar, Ekip Connect software allows easy programming for plug-and-play installations. Emax 2, Tmax XT or Ekip UP can replace the external unit for temperature monitoring. Ekip Signalling 3T can monitor three PT1000 sensors and one 4-20 mA input. Ekip Signalling 3T acquires signals from three PT1000 temperature sensors directly connected to the module. Additional channel 4-20 mA collects information from external sensors or equipment. Emax 2, Tmax XT or Ekip UP can house two modules: Ekip Signalling 3T-1 and Ekip Signalling 3T-2. Pressure, relative humidity, vibration and further data monitoring is also possible using the additional 4-20 mA input.
Product web page	**Click here for more information**	**Click here for more information**

Preventive arc flash protection solutions
Safer operations at a distance



	Remote Racking Device – Emax 2	Remote Racking TruckMaster
Technology type	Remote racking	Remote racking
Dedicated product or optional function	Optional device for Emax 2 circuit breakers	Optional device for MV circuit breakers
Application	Low-voltage	Medium-voltage
Benefits and features	The new Remote Racking Device (RRD) for Emax 2 enables operation of the circuit breakers from a distance. The remote control is connected to the main device with a 10 meter (33 ft) cable. RRD improves employee safety due to the distance between the circuit breaker and the operator. Immediate visual verification of the circuit breaker position, thanks to the 3 LEDs on the device and on the remote control. It is possible to interrupt the operation at any time using the emergency pushbutton on the remote control. Certification: RRDs have been investigated by UL in accordance with the Standard(s) UL 2876.	TruckMaster allows remote and safe racking in and out of a circuit breaker with the panel door closed. Reduces exposure to arc flash energy; preserves mechanism and interlock integrity. Easy application due to the detachable driver docking technology. Only one driver docking needed for the whole switchgear motorization. Connects to the original circuit breaker door without or with minor modifications.
Product web page	**Click here for more information** **Watch the video**	**Click here for more information**

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