



Electrical components for rolling stock and eVehicles

Designing a low-carbon transportation industry. Maximum efficiency, reliability and safety



- Innovative, safer and smarter solutions for sustainable mobility dealing with modern transport challenges
- ABB is a world leading supplier of edge technologies for transportation, with a comprehensive range of solutions for rail, e-mobility and marine

By developing solutions and products which are innovative, reliable, safe and easy to install, we are consistently meeting the high standard of safety expectations for transportation.

We can contribute to the increased efficiency of your equipment and support transport operators throughout the whole life-cycle of the traction chain, i.e. in the areas of service, maintenance, upgrades, and retrofit projects.

Table of contents

Introduction

02	Our experience and know-how
04	Railway Standards
05	Products and solution for sustainable mobility
06	Applications

Electrical Components

10	Breakers
	Miniature Circuit Breakers
16	S 200 MT, S 200 MT UC and S 200 MTR
18	S 300 P. The next generation of line protection
20	S800S
26	Auxiliary elements and accessories
	Residual Current Circuit Breaker
28	DS201 T 1P+N
30	DS203NC
32	DS301C T
38	Motor protection
	Contactors
42	AF..B contactors and NF..B contactor relays up to 200 kW
44	M mini contactors
45	B, K mini contactors
50	Electronic relays and control
54	Network analyzers
58	Wiring Accessories for rolling stock
62	Cable protection
70	High Speed Circuit Breaker

Our experience and know-how

ABB supports the high levels of expectations for safe means of transport. Being a market leader in supplying products and services to rolling stock, e-vehicles and marine manufacturers, we are present in more than 100 countries and we can provide strong local support to your projects. With a truly global organization, we are committed to local competence and local service. We also support transport operators throughout the whole life cycle of the traction chain, i.e. in the areas of service, maintenance, upgrades, and retrofit projects. The breadth of our product portfolio allowed us to become a leader in the transportation sector.

In order to function reliably and safely, trains, e-vehicles and ships require special equipment. For example, trains that are primarily used in tunnels, high-speed trains as well as night trains with sleeping cars require vibration-proof devices. In addition, passenger safety must be ensured, so that, in an emergency, no additional risk is posed by defective electrical devices. This is a key concern, particularly when escape routes are limited or restricted, for example in tunnel systems. Due to these different requirements, transport applications require different standards than equipment used in building infrastructure such as buildings. Our products can be installed in any environment including passenger or driver cabins, for main or urban lines, underground trains or trams circulating frequently in tunnels or underground passages. Manual motor starters, contactors, contactor relays, overload relays and electronic relays are used in a wide variety of transportation applications.

ABB supports the high levels of expectations for a safe means of transport

ABB is a market leader in supplying innovative and reliable technologies for train, e-vehicles and marine manufacturers and operators. We help to keep the world moving with new sustainable approaches that enable customers to use energy effectively, creating a low carbon transportation industry that operates with maximum efficiency and reliability.

IRIS certification

In 2005, the IRIS Group was established as a UNIFE Group with the goal of securing higher quality in the railway industry. This was to enhance supra-national competition by enabling any railway component supplier to meet globally recognized levels of quality for its railway components. The aim of IRIS is to develop and implement a global system for the evaluation of companies securing a very high quality in the railway industry. The IRIS system defines requirements in content, procedures and evaluation of audits as well as a requirement profile for the certification bodies and auditors. ABB IRIS certified factories are listed on the IRIS internet portal: iris-rail.org/index.php





Speed up your projects

Simplify your installation

The common accessories range enables an easy and fast compact modular frame starting solutions design and installation in a required reduced space. The optimized contactors coil voltage ranges help to decrease logistics and stocks costs.



Safety and protection

Protect persons and equipments

ABB offers a broad range of protection and control devices, meeting the latest Standards, and designed for switching, protecting against electrical shocks, short-circuits, overloads, phase failures and for monitoring various application parameters.

The different connection technologies available, screw and Push-in Spring terminals for standard ferrules, or screw terminals for ring tongue ferrules, will ensure a secured cable connection.



Continuous operation

Secure uptime

Handle the large voltage fluctuation to battery use thanks to control devices. Reduce maintenance costs and downtimes, and make troubleshooting easier with a real motor protection and control.

Reduce energy consumption with lighter devices increasing passenger capacity and 68% less coil energy consumption improving power management.

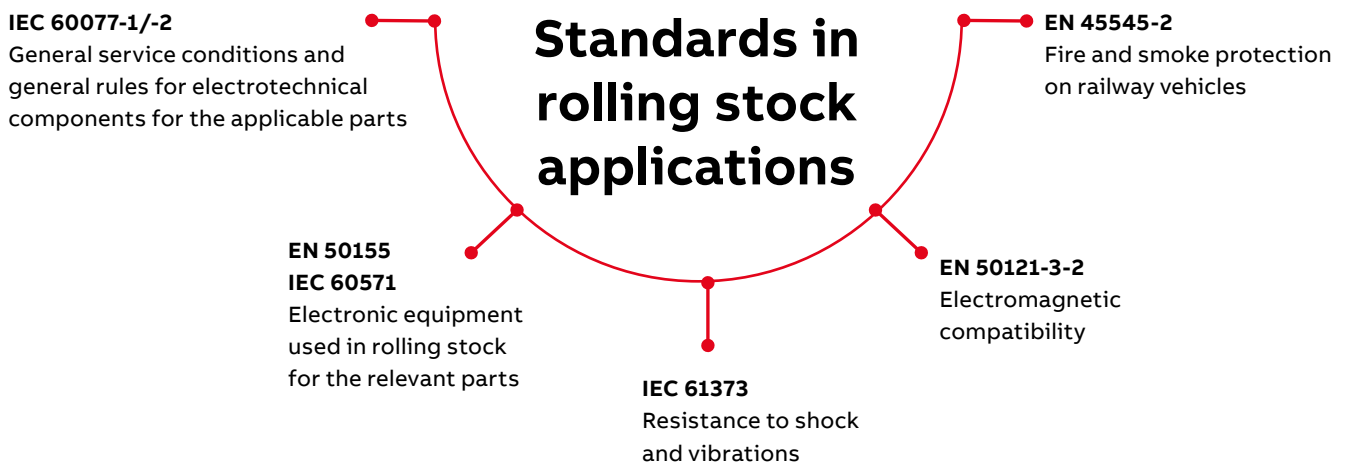


Rail standards keep you on track

Standard overview

The use of electrical products in rolling stock is subject to the highest possible safety standards. Regulations on shock, vibration and fire safety need to be adhered to. The main standards are the ones listed below.

The most important standards for motor protection and control are listed in this umbrella standard, combining all the relevant and applicable electrical and mechanical parts, the highest level of fire and smoke protection requirements for the electrical equipment of rolling stock.



Note: For information on standards, please refer to the section “Standards”.
For standards application, please refer to technical data pages of respective products.



Freedom of movement

Even under the most extreme conditions

Always on the go in heat, cold, humidity – the environmental conditions for rolling stock are usually much more extreme than those for industrial facilities. All rolling stock products are tested and documented on the basis of safety standards.



Climatic conditions

A key factor is the changing climatic conditions. All devices used in rolling stock must prove that they can continue to perform when there are major temperature variations or a rapid temperature increase. Humidity limit values set high standards, so that no failures occur, particularly in tunnels.



Electrical conditions

Voltage variations are common in rail travel. They range from roughly -30 % to +25 % of the rated voltage and can be the cause of major damage. All the electrical components used in the train must provide prior proof that they can work safely within this range.

However, interference emissions from cables or radiation can also impair the function of the electronic devices. Before the devices can be used in rail applications, they must, among other things, prove their electromagnetic compatibility according to the testing and measuring principles, to show that they do not cause any high frequency fault above a specified value.



Mechanical conditions

Resistance to shock and vibrations is essential. All the cable connections must be completely tight, and no screw connection may slacken due to vibrations. The vibration resistant Push-in Spring terminals, as offered by ABB are highly efficacious here.



Easy Connect technology Push-in Spring terminals

Several types of terminals are available to connect cables with standard ferrules or ring tongue ferrules in regards with material design requirements.

In case of standard ferrule use, Push-in Spring terminals 2-in-1 connection allows to use ferruled and rigid cables (Push-in mode) or cables without ferrule (Spring mode) in the same terminal. In Push-in mode, cables can be inserted by just simply pushing them in by hand.

For de-wiring, only one screwdriver size is needed for the entire range. No twisting or turning is required avoiding damages to the terminals and to your installation as a whole. Push-in Spring terminals are completely secure, making your equipment the perfect solution for environments with high levels of vibrations.



Applications

Reliable compact and modular product ranges offer easy integration into all types of application and allows to optimize space, weight and generate energy saving inside the rolling stock vehicles

Distribution Panel Passengers coaches

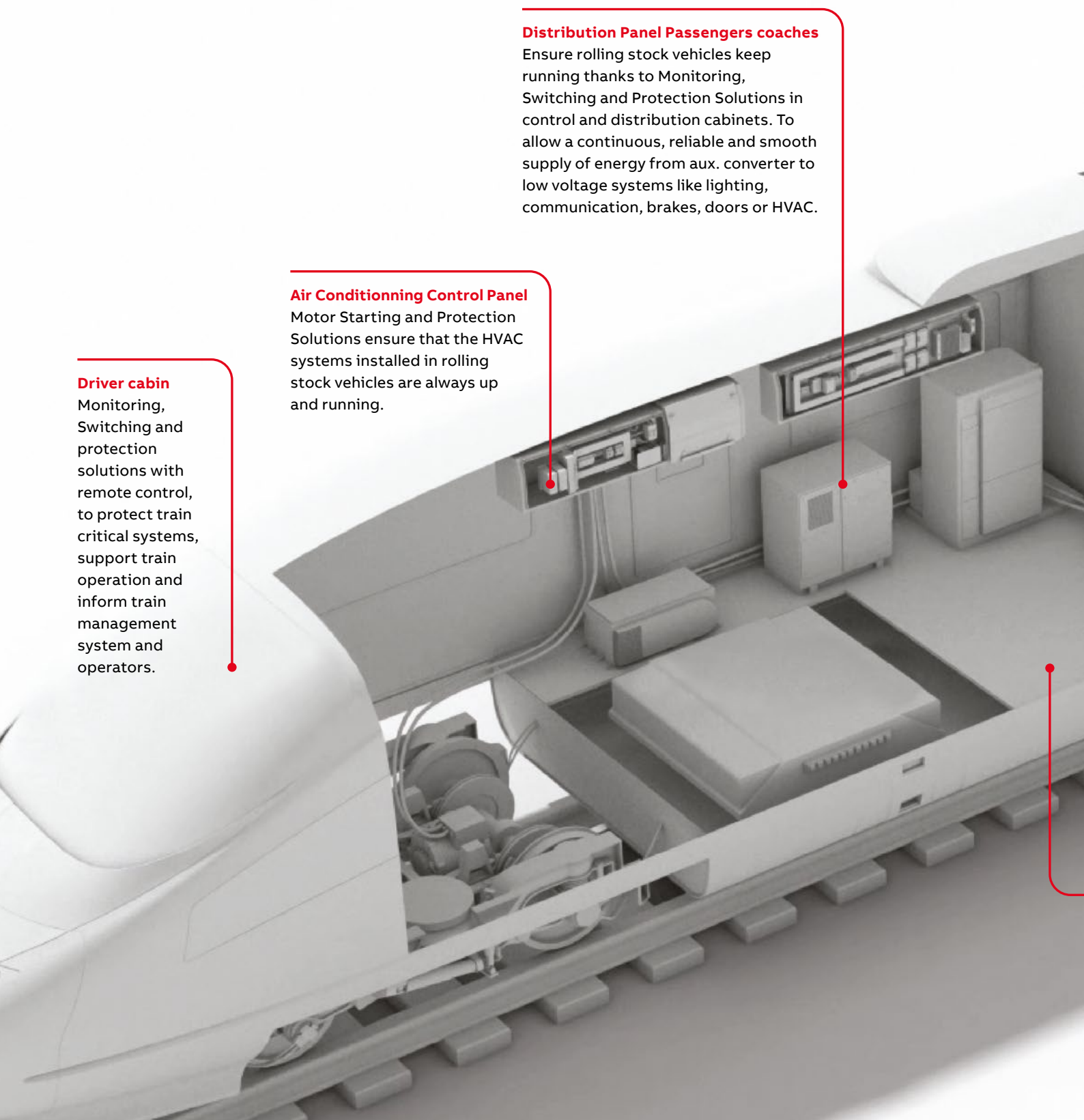
Ensure rolling stock vehicles keep running thanks to Monitoring, Switching and Protection Solutions in control and distribution cabinets. To allow a continuous, reliable and smooth supply of energy from aux. converter to low voltage systems like lighting, communication, brakes, doors or HVAC.

Air Conditioning Control Panel

Motor Starting and Protection Solutions ensure that the HVAC systems installed in rolling stock vehicles are always up and running.

Driver cabin

Monitoring, Switching and protection solutions with remote control, to protect train critical systems, support train operation and inform train management system and operators.



Sockets and USB chargers

Our switches, sockets and USB chargers for rolling stock, fully compliant with railway standards, are specially designed to save space on trains but increasing passenger comfort.

Brake Systems Control

Customer safety is a must in rolling stock and our contactors, relays, safety PLCs and circuit breakers are key to protect brake control systems according to railway standards.

Main supply short-circuit protection

Solutions for the protection of electric traction and auxiliary circuits on Metro, EMU and LRV vehicles.

Control & Distribution panel**Contactors and contactor relays**

Our contactor and 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, ventilator and door control. They are available with nondetachable screws for standard or ring tongue ferrules and meet all rolling stock standards.

Power & Auxiliary Converters**Electronic relays and control**

Installed in trains, they are constantly exposed to a harsh operating environment: continuous vibrations, high electrical and mechanical load and changing environmental temperatures. These conditions therefore require superior quality.

ABB's electronic relays meet the requirements for rolling stock standards and are reliable even under constant strain.

Battery Protection

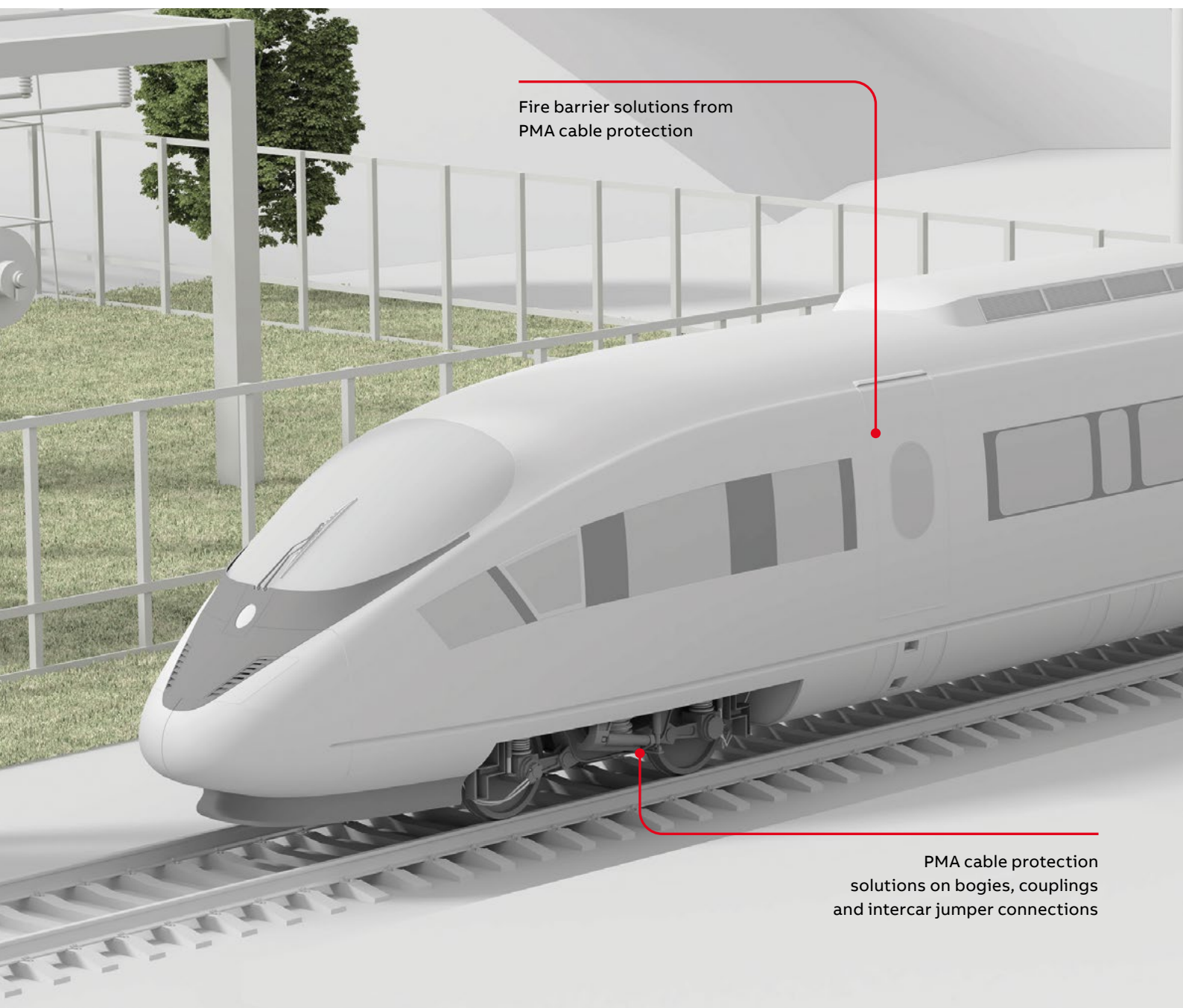
Switching and protection solutions with remote control in compliance with rail standards, to ensure continuous power on the train, protecting both batteries and upstream systems.

Applications with PMA Cable Protection System

PMA products have proven their dependability in railway construction projects around the world. This is the reason why large corporations including Siemens, Alstom, Bombardier, PESA, CSR/CNR, Deutsche Bahn, and SNCF have chosen us as supplier over a period of many years.

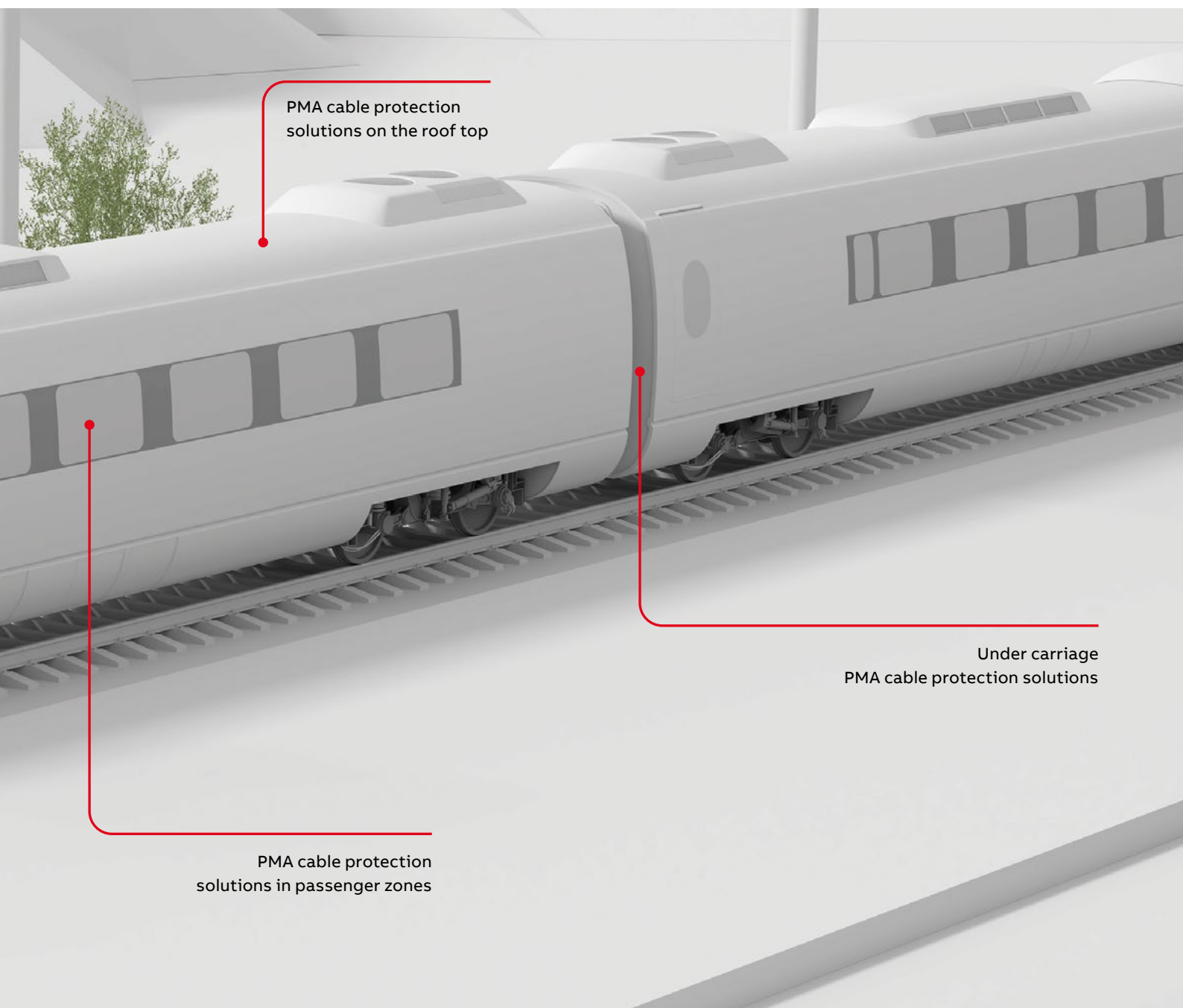
Our special railway engineering product line provides protection for cables on intercarriage junctions, couplings and bogies, as well as for roof, and underfloor equipment. The range of applications is very extensive.

PMA products contribute to the safe operation of trains, trams, locomotives, freight cars, high-speed trains, and even roller coasters.



Fire barrier solutions from
PMA cable protection

PMA cable protection
solutions on bogies, couplings
and intercar jumper connections



PMA cable protection
solutions on the roof top

Under carriage
PMA cable protection solutions

PMA cable protection
solutions in passenger zones







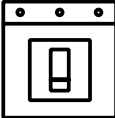
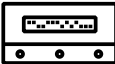
Breakers

SACE Tmax XT. Break new ground

The SACE Tmax XT series of Moulded Case Circuit Breakers (MCCBs) are designed to maximize ease of use, integration and connectivity while reliably delivering safety and quality. Rather than just offering standalone protection, they are seen as key elements of the system that give you complete

flexibility, extreme breaking capabilities and reliable performance under pressure. With seven different sizes and protection features of up to 1600A there's a solution for every purpose.

Possible combinations within the range

	Tmax XT1	Tmax XT2	Tmax XT3	Tmax XT4	Tmax XT5	Tmax XT6
						
	Basic functionality (Icu@480V<70 kA)	■	■	■	■	■
	Heavy duty (Icu@480V>70 kA)		■	■	■	
	Thermal-magnetic trip units	■	■	■	■	■
	Ekip Dip (standard electronic)		■	■	■	■
	Ekip Touch/Hi-Touch (smart electronic)		■	■	■	

Selection, ordering and handling

30% faster thanks to part numbers reduction (-10%), online configurator (-40% time) and smart packaging (-30% space).



Speed up
your projects



Optimize d
logistics

Commissioning

The SACE Tmax XT range offers the potential to save serious time. Thanks to simplified installation of frames, integrating the circuit-breakers into a communication network, trip unit settings performed via LCD and Bluetooth and Ekip Mobile connectivity, you stand to save up to 40% time overall.



Speed up
your projects



Easy to
install



Space
saving

SACE Tmax XT1 - The founder

Small, reliable, versatile. Your reliable partner for all standard applications.

At a glance:

- Up to 160A
- For basic functionalities
- Dimensions 76.2x70x130 (WxDxH mm)
- Thermal-magnetic trip unit

SACE Tmax XT2 - The aspirer

Compact yet powerful. It fits everywhere and is able to deal with all complex tasks.

At a glance:

- Up to 160A
- For heavy duty
- Dimensions 90x82.5x130 (WxDxH mm)
- Thermal-magnetic, Ekip Dip, Ekip Touch/Hi-Touch

SACE Tmax XT3 - The workhorse

Small and experienced. For standard applications that need few efforts.

At a glance:

- Up to 250A
- For basic functionalities
- Dimensions 105x70x150 (WxDxH mm)
- Thermal-magnetic trip unit

SACE Tmax XT4 - The entrepreneur

A forward-thinking, multitasker. It finds solutions for all levels of complexity.

At a glance:

- Up to 250A
- For heavy duty
- Dimensions 105x82.5x160 (WxDxH mm)
- Thermal-magnetic, Ekip Dip, Ekip Touch/Hi-Touch

SACE Tmax XT5 - The gamechanger

Compact, extremely powerful and flexible. It shows the world what a circuit-breaker of the future can do, today.

At a glance:

- Up to 630A
- For heavy duty
- Dimensions 140x103x205 (WxDxH mm)
- Thermal-magnetic, Ekip Dip, Ekip Touch/Hi-Touch

SACE Tmax XT6 - The carpenter

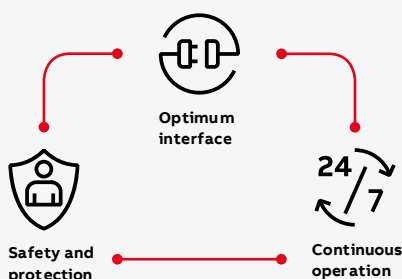
Built to last. It completes all assignments it has been entrusted with.

At a glance:

- Up to 1000A
- For basic functionalities
- Dimensions 210x103.5x268 (WxDxH mm)
- Thermal-magnetic, Ekip Dip

Diagnostics and maintenance

With up to 30% more data available on the cloud and ABB unique power controller concept, it is far easier to diagnose problems and carry out necessary maintenance. This helps to prevent faults, restore energy more quickly and avoid any unnecessary charging of utilities.

**Energy saving**



The SACE Tmax XT range comes with the exclusive ABB-patented Ekip Power Controller which monitors installation loads and can limit the amount of power consumed at any time. The result is an overall reduction in power consumption of up to 20% and lower energy bills. Furthermore, you have 1% energy measurement accuracy.





Breakers





AC overview

		Tmax XT1						Tmax XT2			
											
Rated uninterrupted current	[A]	160						160			
Poles	[No.]	3, 4						3, 4			
Rated service voltage, Ue	(AC) 50-60Hz [V]	690						690			
Rated insulation voltage, Ui	[V]	800						1000			
Rated impulse withstand voltage, Uimp	[kV]	8						8			
Versions		Fixed, Plug-in ⁽¹⁾						Fixed, Withdrawable, Plug-in			
Max supply voltage on bottom side (F, P, W)	[V]	690						≤ 480			
Breaking capacities according to IEC 60947-2		B	C	N	S	H	N	S	H	L	V
Rated ultimate short-circuit breaking capacity, Icu											
Icu @ 220-230-240V 50-60Hz (AC)	[kA]	25	40	65	85	100	65	85	100	150	200
Icu @ 380V 50-60Hz (AC)	[kA]	18	25	36	50	70	36	50	70	120	150
Icu @ 415V 50-60Hz (AC)	[kA]	18	25	36	50	70	36	50	70	120	150
Icu @ 440V 50-60Hz (AC)	[kA]	15	25	36	50	65	36	50	65	100	150
Icu @ 500V 50-60Hz (AC)	[kA]	8	18	30	36	50	30	36	50	60	70
Icu @ 525V 50-60Hz (AC)	[kA]	6	8	22	35	35	20	25	30	36	50
Icu @ 690V 50-60Hz (AC)	[kA]	3	4	6	8	10	10	12	15	18	20
Rated service short-circuit breaking capacity, Ics											
Ics @ 220-230-240V 50-60Hz (AC)	[kA]	100%	100%	75% (50)	75%	75%	100%	100%	100%	100%	100%
Ics @ 380V 50-60Hz (AC)	[kA]	100%	100%	100%	100%	75%	100%	100%	100%	100%	100%
Ics @ 415V 50-60Hz (AC)	[kA]	100%	100%	100%	75%	50% (37.5)	100%	100%	100%	100%	100%
Ics @ 440V 50-60Hz (AC)	[kA]	75%	50%	50%	50%	50%	100%	100%	100%	100%	100%
Ics @ 500V 50-60Hz (AC)	[kA]	100%	50%	50%	50%	50%	100%	100%	100%	100%	100%
Ics @ 525V 50-60Hz (AC)	[kA]	100%	100%	50%	50%	50%	100%	100%	100%	100%	100%
Ics @ 690V 50-60Hz (AC)	[kA]	100%	100%	75% (5)	50% (5)	50%	100%	100%	100%	75% (15)	75%
Rated short-circuit making capacity, Icm											
Icm @ 220-230-240V 50-60Hz (AC)	[kA]	52.5	84	143	187	220	143	187	220	330	440
Icm @ 380V 50-60Hz (AC)	[kA]	36	52.5	75.6	110	154	75.6	110	154	264	330
Icm @ 415V 50-60Hz (AC)	[kA]	36	52.5	75.6	110	154	75.6	110	154	264	330
Icm @ 440V 50-60Hz (AC)	[kA]	30	52.5	75.6	110	143	75.6	110	143	220	330
Icm @ 500V 50-60Hz (AC)	[kA]	13.6	36	63	75.6	110	63	75.6	110	132	154
Icm @ 525V 50-60Hz (AC)	[kA]	9	13.6	46.2	73.5	73.5	40	52.5	63	75.6	110
Icm @ 690V 50-60Hz (AC)	[kA]	4.26	5.88	9	13.6	17	17	24	30	36	40
Breaking capacities according to NEMA-AB1											
@ 240V 50-60Hz (AC)	[kA]	25	40	65	85	100	65	85	100	150	200
@ 480V 50-60Hz (AC)	[kA]	8	18	30	36	65	30	36	65	100	150
Utilization Category (IEC 60947-2)		A						A			
Icw	[kA]	-						-			
Reference Standard		IEC 60947-2						IEC 60947-2			
Insulation behaviour		■						■			
Mounted on DIN rail		DIN EN 50022						DIN EN 50022			
Mechanical life	[No. operations]	25,000						25,000			
	[No. hourly operations]	240						240			
Electrical life @ 415 V (AC)	[No. operations]	8,000						8,000			
	[No. hourly operations]	120						120			

⁽¹⁾ XT1 plug-in In max=125A

⁽²⁾ In<32A Icu=25kA/Ics=20kA, with magnetic trip unit only and In≤52A/Icu=Ics=5kA

⁽³⁾ Ics=100% Icu up to 250 A with EF, ES, Rear and external FC CuAl (2x...) terminal. When any other terminals are used and load >200A Icu=25%



Tmax XT3						Tmax XT4				Tmax XT5				Tmax XT6 ⁽⁴⁾					
																			
250						160 / 250				400 / 630				800 / 1000 (6)					
3, 4						3, 4				3. 4				3. 4					
690						690				690				690					
800						1000				1000				1000					
8						8				8				8					
Fixed, Plug-in						Fixed, Withdrawable, Plug-in				Fixed. Withdrawable. Plug-in ⁽⁸⁾				Fixed. Withdrawable					
690						≤ 600				690				690					
N	S	N	S	H	L	V	X	N	S	H	L	V	X	N	S	H			
50	85	65	85	100	150	200	200	70	85	100	150	200	200	70	85	100			
36	50	36	50	70	120	150	200	36	50	70	120	200	200	36	50	70			
36	50	36	50	70	120	150	200	36	50	70	120	200	200	36	50	70			
25	40	36	50	65	100	150	200	36	50	65	100	180	200	30	45	50			
20	30	30	36	50	60	85	100	25	30	50	85	150	150	25	35	50			
13	20	20	25	45	50	70	100	25	30	50	85	100	120	25	35	50			
5	6	10	12	15	20	50 ⁽²⁾	100	20	25	40	70	80	100	20	22	25			
75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
75%	50% (27)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
75%	50% (27)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
50% ⁽³⁾	50%	100%	100%	100%	100%	100% ⁽³⁾	100% ⁽³⁾	100%	100%	100% ⁽⁵⁾	100% ⁽⁶⁾	100% ⁽⁶⁾	100% ⁽⁶⁾	100%	100%	100%			
110	187	143	187	220	330	440	440	154	187	220	330	440	440	154	187	220			
75.6	110	75.6	110	154	264	330	440	75.6	110	154	264	440	440	75.6	110	154			
75.6	110	75.6	110	154	264	330	440	75.6	110	154	264	440	440	75.6	110	154			
52.5	84	75.6	110	143	220	330	440	75.6	110	143	220	396	440	63	94.5	110			
40	63	63	75.6	110	132	187	220	52.5	63	110	187	330	330	52.5	73.5	110			
26	40	40	52.5	94.5	110	154	220	52.5	63	110	187	220	264	52.5	73.5	110			
7.5	9	17	24	30	40	110	220	40	52.5	84	154	176	220	40	46.2	52.5			
50	85	65	85	100	150	200	200												
25	35	30	36	65	100	150	100												
A						A				A (up to 630A). B (up to 500A) ⁽⁷⁾				A (up to 1000A) - B (800A) ⁽⁷⁾					
-						-				6				10					
IEC 60947-2						IEC 60947-2				IEC 60947-2				IEC 60947-2					
■						■				■				■					
DIN EN 50022						DIN EN 50022				-				-					
25,000						25,000				20				20					
240						240				120				120					
8,000						8,000		10,000		7,000 (400A) - 5,000 (630A)				5					
120						120				60				60					

⁽⁴⁾ Not suitable for IT distribution systems > 440Vac⁽⁵⁾ Ics = 75% In > 500A⁽⁶⁾ Ics = 50% In > 500A⁽⁷⁾ Category B: only when equipped with an electronic trip unit⁽⁸⁾ Plug-in/Withdrawable: max In 40°C=600A (6) 1000A only for fixed execution with EF, ES, R and FCCuAl terminals. EF terminals are supplied as standard if no other terminals are ordered







Breakers

DC overview

Tmax XT1							Tmax XT2				
											
Rated uninterrupted current	[A]	160					160				
Poles	[No.]	3, 4					3, 4				
Rated service voltage, Ue	(DC) [V]	500					500				
Rated insulation voltage, Ui	(DC) [V]	800					1000				
Rated impulse withstand voltage, Uimp	[kV]	8					8				
Versions	Fixed, Plug-in ⁽²⁾						Fixed, Withdrawable, Plug-in				
Breaking capacities according to IEC 60947-2		B	C	N	S	H	N	S	H	L	V
Rated ultimate short-circuit breaking capacity, Icu											
Icu @ 250V (DC) 2-pole in series	[kA]	18	25	36	50	70	36	50	70	85	100
Icu @ 500V (DC) 2-pole in series	[kA]	–	–	–	–	–	–	–	–	–	–
Icu @ 500V (DC) 3-pole in series ⁽¹⁾	[kA]	18	25	36	50	70	36	50	70	85	100
Icu @ 750V (DC) 3-pole in series	[kA]	–	–	–	–	–	–	–	–	–	–
Rated service short-circuit breaking capacity, Ics											
Ics @ 250V (DC) 2-pole in series	[kA]	100%	100%	100%	100%	75%	100%	100%	100%	100%	100%
Ics @ 500V (DC) 2-pole in series	[kA]	–	–	–	–	–	–	–	–	–	–
Ics @ 500V (DC) 3-pole in series ⁽¹⁾	[kA]	100%	100%	100%	100%	75%	100%	100%	100%	100%	100%
Ics @ 750V (DC) 3-pole in series	[kA]	–	–	–	–	–	–	–	–	–	–
Utilization Category (IEC 60947-2)		A					A				
Reference Standard		IEC 60947-2					IEC 60947-2				
Insulation behaviour		✓					✓				
Mounted on DIN rail		DIN EN 50022					DIN EN 50022				
Mechanical life	[No. operations]	25,000					25,000				
	[No. hourly operations]	240					240				
Dimensions											
Fixed	3 poles	[mm]	76.2 x 70 x 130				90 x 82.5 x 130				
(Width x Depth x Height)	4 poles	[mm]	101.6 x 70 x 130				120 x 82.5 x 130				
Trip units for power distribution											
TMD/TMA							■				
TMD/TMF		■									
MF/MA							■				
Trip units with low magnetic (TMG)											
TMG							■				
Interchangeable trip units							✓				
Weight											
Fixed	3/4 poles	[kg]	1.1 / 1.4				1.2 / 1.6				
Plug in (EF terminals)	3/4 poles	[kg]	2.21 / 2.82				2.54 / 3.27				
Withdrawable (EF terminals)	3/4 poles	[kg]					3.32 / 4.04				

⁽¹⁾ XT1: a 4 poles in series connection is required to be used in 500 V DC installations.

⁽²⁾ XT1 plug-in In max=125A

Tmax XT3		Tmax XT4						Tmax XT5						Tmax XT6		
																
250		160 / 250						400 / 630						800 / 1000		
3, 4		3, 4						3, 4						3, 4		
500		750						750						750		
800		1000						1000						1000		
8		8						8						8		
Fixed, Plug-in		Fixed, Withdrawable, Plug-in						Fixed, Withdrawable, Plug-in						Fixed, Withdrawable		
N	S	N	S	H	L	V	X	N	S	H	L	V	X	N	S	H
36	50	36	50	70	85	100	100	25	35	50	70	85	100	35	50	70
–	–	36	50	70	85	100	100	25	35	50	70	85	100	20	35	50
36	50	36	50	70	85	100	100	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	50	70	–	–	–	–	85	100	18	24	36
100%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50% (35kA)	50%
–	–	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	50%
100%	75%	100%	100%	100%	100%	100%	100%	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	100%	100%	–	–	–	–	100%	100%	100%	75%	50%
A							A						A			A
IEC 60947-2							IEC 60947-2						IEC 60947-2			IEC 60947-2
✓							✓						✓			✓
DIN EN 50022							DIN EN 50022						–			–
25,000							25,000						20,000			20,000
240							240						120			120
105 x 70 x 150							105 x 82.5 x 160						140 x 103 x 205			210 x 103.5 x 268
140 x 70 x 150							140 x 82.5 x 160						186 x 103 x 205			280 x 103.5 x 268
■							■						■			■
■							■									
■							✓						✓			✓
1.7 / 2.1							2.5 / 3.5						3.25 / 4.15			9.5 / 12
3.24 / 4.1							4.19 / 5.52						5.15 / 6.65			–
							5 / 6.76						5.4 / 6.9			12.1 / 15.1

Miniature Circuit Breakers

MCB S 200 MT, S 200 MT UC and S 200 MTR

A range designed for rolling stock equipments



Twin terminal for separate feeding of busbar and conductor.



Easy product name, easy identification, easy life.



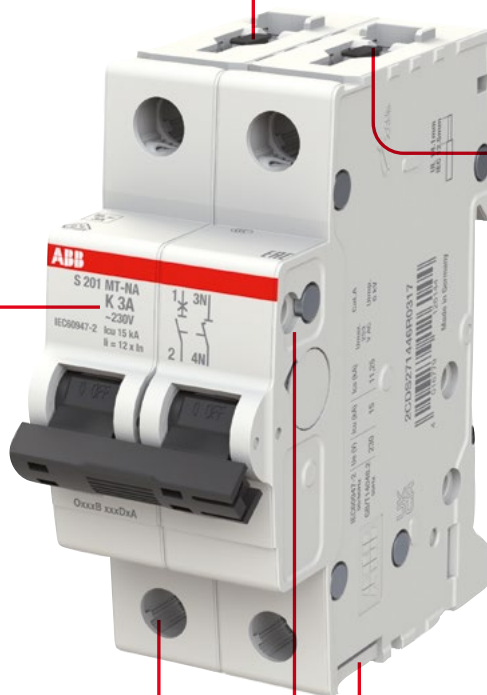
Captive screws: don't loose what's important for you.



IP20 - finger safety.



Wide range of accessories are available for rolling stock and rail infrastructure applications



01

Dedicated materials for rolling stock

In the S200 range of MCBs for traction, specific materials are used that are classified with an hazard level R26/HL3 according to EN 45545-2.

02

Shock and vibration resistance

Additionally to the high quality standards and the flammability requirements, rail applications have specific demands that have to be fulfilled like resistance to shocks and vibrations. The resistance to vibrations and shocks of MCBs S 200 has been positively tested according to: IEC 61373 Rolling stock equipment – Shock and vibration tests considering Category 1, Class A and Class B.

03

Open to all sides

All devices can be supplied from top or bottom either with cables or busbars. Can be mounted flexibly in all positions.



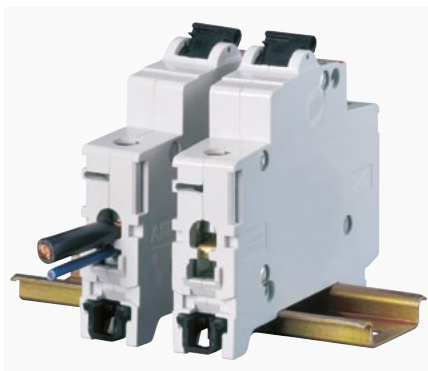
01 Dedicated materials for rolling stock



02 Shock and vibration resistance



03 Open to all sides



04 High-quality terminal system



05 Contact position indication



06 Advanced features

04

High-quality terminal system

The integrated captive terminals and cable connection screws facilitate every electrician's life. ABB guarantees highest safety standards. The certification according to EN 41140 stands for protection against electric shock. And the certification according to the DIN EN 50 274 stands for terminals that are safe from touch by the back of the hand and the finger (IPXXB or IP20). The high safety standards become clear through the integrated and failsafe cable connecting terminals.

05

Contact position indication

All System pro *M compact*® MCBs are suited with a contact position indication (CPI) on the toggle. You can easily identify if the MCB is in the ON or the OFF position – easy and safe maintenance work is possible.

06

Advanced features

Auxiliary switches S2C-H10 (1 NO) and S2C-H01 (1 NC) and all S2C accessories can be retrofitted. They can be mounted individually and without modification of the existing busbar. At the same time, the supply of the MCB remains unaffected.

Miniature Circuit Breakers

MCB S 300 P. The next generation of line protection
The new dimension in efficiency and power

Twin terminal for separate feeding of busbar and conductor.

Easy identification of the product and high resistant laser marking.

Trip indicator for easy trip identification on site.

QR-Code for direct internet access to all Product data/files.

Contact position indication: visualization of the contact position, independent from the toggle position.

Captive screws: don't loose what's important for you.

Dual DIN-Rail release for easy mounting even with busbars attached.

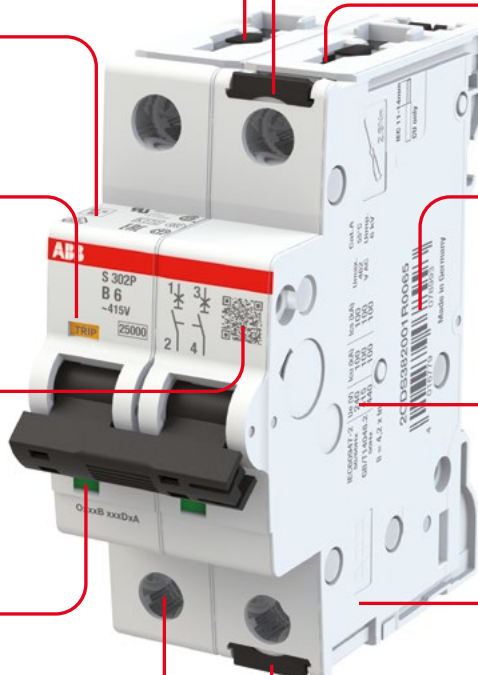
IP20 - finger safety.

Quick identification thanks to laser printed EAN marking.

Save your time – all important data available right away.

Whatever your application need is applicable with a wide range of accessories.

Dual DIN-Rail release for easy mounting.



01

Contact position indication and trip indicator

All System pro M compact® MCBs are suited with a contact position indication (CPI) on the toggle. You can easily identify, if the MCB is in the ON or the OFF position – easy and safe maintenance work is possible. The green/red window indicates the real position of the contacts independently of the toggle position. The trip indicator will signalize tripping events of the MCB directly on site.

02

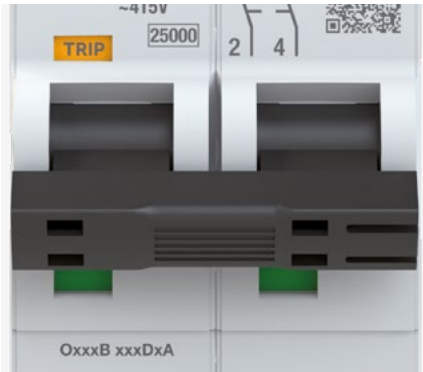
Approvals printed on the dome

S 300 MCBs comply to IEC/EN 60898-1 and IEC/EN 60947-2 and carry all relevant approval marks for each market and segment they are destined to. The certification markings are also printed on the dome of the MCB. Thus make it possible to see the markings also in the mounted position. For control and acceptance procedure – certification marks visible on fitted devices on the dome.

03

Housing material and improved performance

With the latest generation of thermoplastics it's possible to recycle the MCBs – especially the thermoplastic housing-material can be re-used. By using the latest generation of thermoplastics the material stability of all System pro M compact® MCBs is improved. S 300 MCBs are 100% free of halogens – no environmental pollution. The new level of strong electrical performance ensures high breaking capacity of 25kA and improved energy efficiency for all kinds of high performance applications.



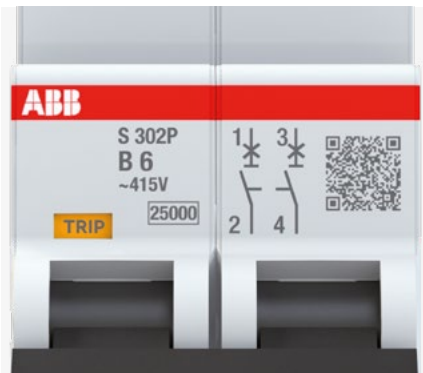
01 Contact position indication and trip indicator



02 Approvals printed on the dome



03 Housing material and improved performance



04 Laser printing



05 IP 20 - finger safe terminals



06 Dual DIN-Rail Release

04

Laser printing

All printings of the S 300 MCBs, like the approvals on the dome and the product identification, are printed by a laser. The laser printing ensures a friction, scratch and solvent resistant marking on the MCBs. Easy identification of the products in case of maintenance or replacements due to safe laser printing. The QR-Code will give you direct access to all product related data, certificates and documents.

05

IP 20 - finger safe terminals

The System pro M compact® MCB's are equipped with 35 mm² + 10 mm² cylinder lift twin terminals, a well proven and reliable technology - designed for sophisticated industrial use. The cross wiring can easily be done by inserting the System pro M compact® busbars into the rear terminal part and then the incoming wires into the front part of the terminal.

06

Dual DIN-Rail Release

With the new Dual DIN-Rail Release the toolless installation and uninstallation will be much faster and easier, even with already attached busbars.

High Performance Circuit Breakers

MCB S800S

Incomparable performances to meet the demand in rolling stock equipment

Interchangeable terminal,
failsafe cage or ring lug
terminal

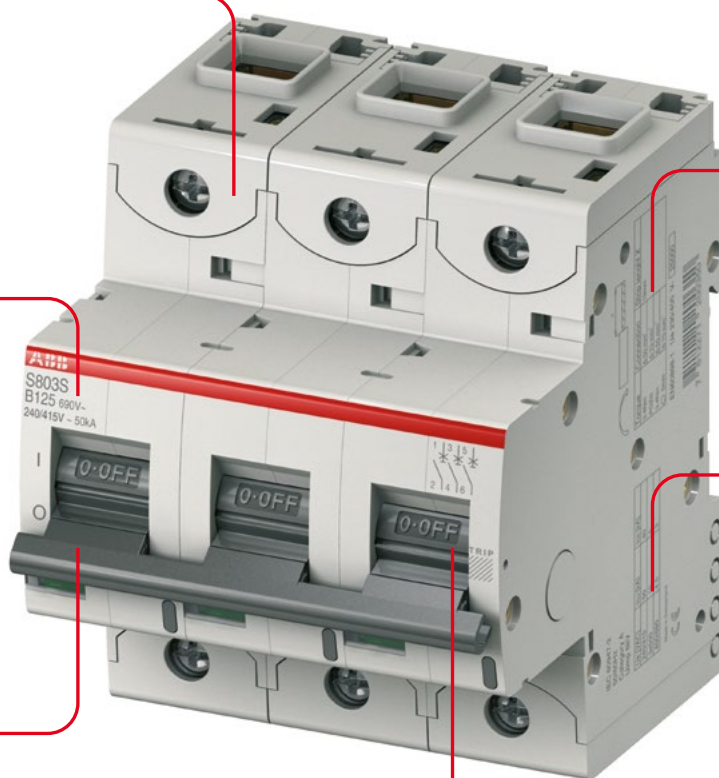
Easy product name, easy
identification,
easy life.

Clear identification of the
moving contact position
thanks to toggle
identification ON/OFF and
TRIP position

Clear identification of the
reason of cut-off thanks to
TRIP position of the toggle

Quick identification of
technical characteristics
thanks to laser-printing of
all data

Wide range of accessories
to enlarge product
functionality



01

Housing materials

In the S800 range of MCBs for traction, specific materials are used that are classified with an hazard level R26/HL3 according to EN 45545-2.

02

Shock and vibration resistance

Additionally to the high quality standards and the flammability requirements, rail applications have specific demands that have to be fulfilled like resistance to shocks and vibrations. The resistance to vibrations and shocks of S800 has been positively tested according to: IEC 61373 – 2010 – 05 Edition 2.0 Rolling stock equipment – Shock and vibration tests considering Category 1, Class A and Class B.

03

Play it safe: display the operational state

The mechanical drive of the S800 high performance MCB is equipped with a trip-free release. The trip position display thereby always reliably displays the exact position of the moving contact. The trip position provides additional trip detection allowing to easily identify the reason for the cut-off. The switch lever moves to the middle position in case of thermal or magnetic tripping.



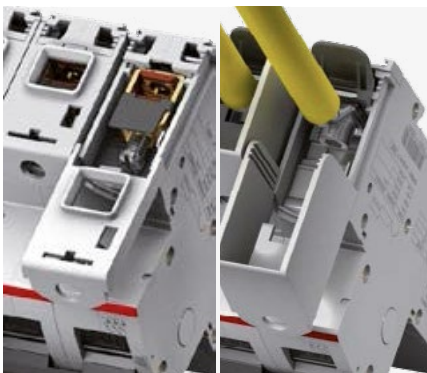
01 Housing materials



02 Shock and vibration resistance



03 Play it safe: display the operational state



04 Cage and ring terminals



05 Reliable: the disconnecter properties



06 Wide range of accessories

04

Cage and ring terminals

The S800 standard equipment with interchangeable terminal adapter for wires, cables and rigid conductors guarantees a high level of flexibility and comfort. Fast and safe connection of the conductors is ensured by the “onboard terminal shutter” integrated into the body of the terminal, thereby preventing incorrect underclamping of the connections.

05

Reliable: the disconnecter properties

In OFF position (0 position), the S800 high performance MCB guarantees safe electrical isolation of the circuit compliant to IEC 60947-2.

06




Wide range of accessories






S800 MCB range is completed with a wide range of accessories that enlarge the functions of the MCB not only as a protection devices, but even for control and monitor remotely the installation. The range of accessories include auxiliary contacts, aux/signal contacts, remote switching unit, short circuit limiter, shunt operation releases, undervoltage releases and busbars.



Miniature Circuit Breakers

Selection table



				S 200 MT (2023)		S 200 MT UC		S 300P	
									
Hazard level acc. EN45545-2				R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3
V0 according EN 60695-11-10 and UL94				yes	yes	yes	yes	yes	yes
NFPA-130					yes				
Shock and vibration IEC 617373				Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted
Number of Poles				1P, 2P, 3P, 4P, 1P+N, 3P+N	1P, 2P, 3P, 4P, 1P+N, 3P+N	1P, 2P, 3P, 4P	1P, 2P, 3P, 4P	1P, 2P, 3P, 4P, 1P+N, 3P+N	
Characteristics				B, C, D, K, Z	B, C, D, K, Z	B, C, K, Z	B, C, K, Z	B, C, D, K, Z	
Rated Currents (A)				0.2....40	50....63	0.2....40	50....63	0.2....6	
Breaking Capacity				kA	Nr.Poles Ue (V)				
IEC/ EN60947-2				Icu	1, 1+N	133	25	20	100
Alternating current					2,3,4, 3+N	230	25	20	
						400	15	10	100
						440	15	10	100
					1, 1+N	133	18,75	15	100
						230	11,25	7,5	100
						250		7,5	6
					2,3,4, 3+N	230	18,75	15	100
						400	11,25	7,5	100
						440	11,25	7,5	7,5
								6	
IEC/ EN60947-2				Icu	1, 1+N	110		20	20
direct current T=I/R≤5ms						220		10	10
					2	220		25	25
						440		10	10
					3,4	220		25	25
						375		10	10
						440		10	10
				Ics	1, 1+N	60	10	10	
						110		10	10
						220		10	10
					2	125	10	10	
						220		20	20
						250			
						440		10	10
					3,4	220		20	20
						250			
						440		10	10
UL1077 Alternating current				I	1	120			10, U1
						240			10, U1
						277	6, U1	6, U1	10, U1
					2,3,4	240			10, U1
						480V/ 277	6, U1	6, U1	10, U1
UL1077 direct current				I	1	48	10, U1		10, U1
						250		10, U1	10, U1
min. 2-poles connecting in series					2,3,4	96	10, U1		10, U1
						500		10, U1	10, U1
Temperature Range						-40 °C up to +70°C	-40 °C up to +70°C	-40 °C up to +70°C	-40 °C up to +70°C

S 300P			S 200 MTR		S 200 MTR DC	ST200 MTR	ST200 MTR DC
							
R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3	R26/HL3 R22/HL3
yes	yes	yes	yes	yes	yes	yes	yes
Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	yes	yes
1P, 2P, 3P, 4P, 1P+N, 3P+N	1P, 2P, 3P, 4P, 1P+N, 3P+N	1P, 2P, 3P, 4P, 1P+N, 3P+N	1P, 2P, 3P, 4P, 1P+N, 3P+N	1P, 2P, 3P, 4P, 1P+N, 3P+N	1P, 2P, 4P	1P, 2P, 3P, 4P	1P, 2P, 4P
B, C, D, K, Z	B, C, D, K, Z	B, C, D, K, Z	B, C, K, Z	B, C, K, Z	B, C, K, Z	K, Z	K, Z
8....25	32....40	50....63	0.2....25	32....63	0.2....63	0.5....63	0.5....63
50	40	40	25	25			
			25	25			
25	25	25					
15	15	15	25	15			
20	20	20	12,5	12,5			
12,5	10	7,5					
			12,5	7,5			
20	20	20	12,5	12,5			
12,5	10	7,5					
			12,5	7,5			
					20		
					10		
					20		
					10		
					20		
					10		
					20		
					10		
					20		
					10		
10, U1	10, U1	10, U1					
10, U1	10, U1	10, U1					
10, U1	10, U1	10, U1				6, U1	
10, U1	10, U1	10, U1					
10, U1	10, U1	10, U1				6, U1	
10, U1	10, U1	10, U1					
							10, U1
10, U1	10, U1	10, U1					
							10, U1
			-40 °C up to +70°C	-40 °C up to +70°C	-40 °C up to +70°C	-40 °C up to +70°C	-40 °C up to +70°C



Miniature Circuit Breakers

Selection table




				S800 S	S800 S UC
					
Hazard level acc. EN45545-2				R26/HL3 R22/HL3	R26/HL3 R22/HL3
V0 according EN 60695-11-10 and UL94				yes	yes
Shock and vibration IEC 617373		Category 1 - Class A/B Body mounted		Category 1 - Class A/B Body mounted	
Number of Poles				1, 2, 3, 4	
Characteristics				B, C, D, K	
Rated Currents (A)				0.5...125	
Breaking Capacity	kA	Nr.Poles Ue (V)			
IEC/EN 60898	Icn	230/400			
IEC/ EN60947-2 Alternating current	Icu	1	240	50	
		2,3,4	240	50	
			254		
			289		
			415	50	
			440	30	
			500		
			690		
	Ics	1	240	40	
			250		
		2,3,4	240	40	
			415	40	
			440	22,5	
IEC/ EN60947-2 direct current T=I/R≤5ms	Icu	1	125	30	
			250		50
		2	250	30	
			500		50
		3	375	30	
			750		50
		4	500	30	
			750		50 (63... 125A)
			1000		50 (Up to 50A)
	Ics	1	125	30	
			250		50
		2	250	30	
			500		50
		3	375	30	
			750		50
		4	500	30	
			750		50 (63... 125A)
			1000		50 (Up to 50A)

* Internal factory certificate only

● Characteristics B, C, D

¹⁾ 3 poles







²⁾ 4 poles




S800 N	S800 C	S800 P
		
R26/HL3 R22/HL3	R26/HL3 R22/HL3	
yes	yes	
Category 1 - Class A/B Body mounted	Category 1 - Class A/B Body mounted	
B,C,D	B,C,D,K	B,C,D,K
6...125	10...125	80...125
		25* ● (80 A) 15* ● (100...125 A)
36	25	50
36	25	
		30*
		6* (80 A), 4.5* (100...125A)
36	25	50
20	15	30*
		15* (80 A), 10* (100...125 A)
		6* (80 A), 4.5* (100...125A)
30	18	40
	10	
30	18	
30	18	40
15	10	
20	10	30*
20	10	30
20	10	30* ● ¹⁾
20	10	30* ● ²⁾
20	10	
20	10	
20	10	
20	10	











Auxiliary elements and accessories

Selection tables

Accessory	Auxiliary and Signal Contacts					
	S2C-S/H6R	S2C-H6R	S2C-H6-xxR	S2C-HxxL	S 2C-S/H6R	S 2C-H6R
						
Standards						
EN 45545	R26/HL3	R26/HL3	R26/HL3	R26/HL3		
IEC 61373	Category 1 - Class A/B	Category 1 - Class A/B	Category 1 - Class A/B	Category 1 - Class A/B	Category 1 - Class A/B	Category 1 - Class A/B
Combinable with:						
S 200 MT	■	■	■	■		
S 200 MTR					■	■
ST 200 MTR					■	■
S 300 P	■	■	■			
S 200 C						
S800 S						
S800 S UC			■			
DS 201 T	■	■	■			

Accessory	Shunt trip		
	S2C-Ax	S800-SOR	S2C-A1TU
			
Standards			
EN 45545	R26/HL3	R26/HL3	
IEC 61373	Category 1 - Class A/B	Category 1 - Class B	Category 1 - Class B
Combinable with:			
S 200 MT	■		
S 200 MT UC	■		
S 200 MT UC	■		
S 200 MTR			■
ST 200 MTR			■
S 300 P	■		
S800 S		■	
S800 S UC		■	
DS 201 T		■	

S2C-H..	G2C-H	G2C-S/H	S800-AUX	S800 AUX/ALT
				
R26/HL3 Category 1 - Class A/B	R26/HL3 Category 1 - Class B	R26/HL3 Category 1 - Class B	R26/HL3 Category 1 - Class B	R26/HL3 Category 1 - Class B
■				
■				
	■			
		■		
		■		
■				

Remote Switch Unit		Short Circuit Limiter
S800-UVR	S800-RSU-H	S803S-SCL
		
R26/HL3 Category 1 - Class B	R26/HL3 -	R26/HL3 Category 1 - Class B
■	■	■
■	■	■

Residual Current Circuit Breaker

RCBO DS201 T 1P+N. The details make the difference
A range designed for rolling stock equipments

Easy to install

Bi-directional cylindrical terminal ensure higher safety of connecting operations, making them easier.

Test pushbutton

Test pushbutton to verify the correct functioning of the device.

Earth fault indicator

Blue flag on the toggle to identify earth fault trips.
I ON – 0 OFF indication molded on the toggle.

Contact position indicator (CPI)

To indicate the status of the contacts independently from the toggle position: green (open), red (closed).

Anti counterfeiting

DS201 is equipped with a tag RFid in order to authenticate the product.

Laser printed information

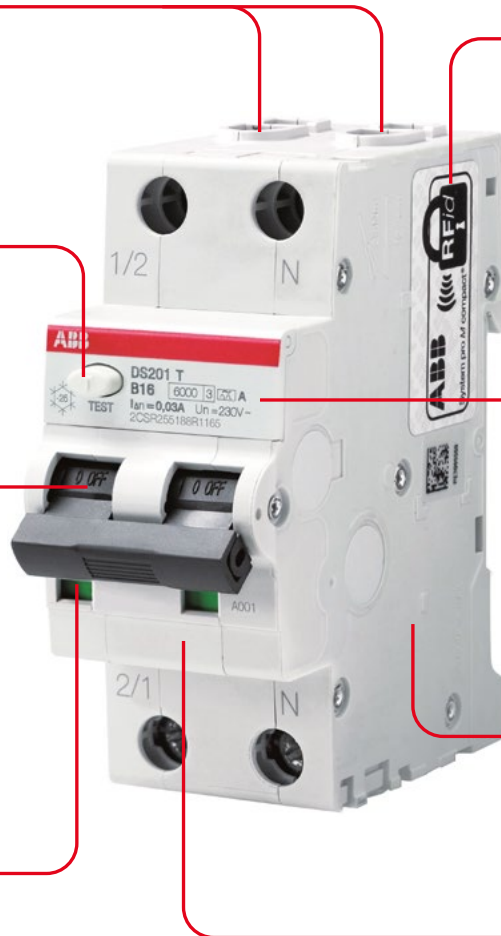
Information on the device are laser printed to ensure readability over time.

Combination with accessories

Improved combination with System pro M compact® accessories, including also the auxiliary contact for bottom fitting and motor operating device.

Dedicated space for label

Dedicated space to insert labels in order to clearly identify the protected lines.



01

Easy installation

The terminals available on DS201 make easier the supply operation in parallel with cables and busbars as they are composed by two different seats: a front seat for 25 mm² cables and a back seat for 10 mm² busbars. Supply is possible either from top or bottom side.

02

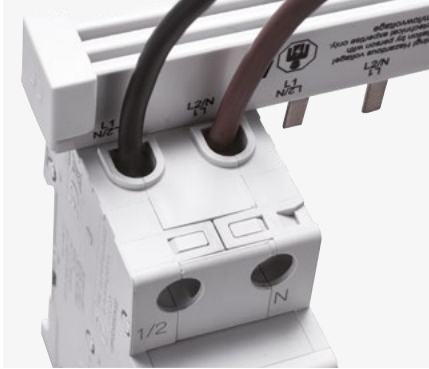
Mounting clip

Stable fixing on DIN rail, easy and fast mounting and dismounting operations thanks to the standard mounting clip.

03

Display the operational status

Easy troubleshooting and reduced downtime for maintenance operations thanks to both the blue indicator, that signals the differential tripping to immediately identify any earth fault (it cannot be activated in case of manual operation on the toggle) and the contact position indicator (CPI) that helps to always know the status of the contacts (red: closed contacts; green: open contacts).



01 Easy installation



02 Mounting clip



03 Display the operational status



04 Reliable in extreme conditions



05 Additional laser printing



06 RFI

04

Reliable in extreme conditions

RCBO DS201 can be used in ambient conditions where the temperature of the surrounding atmosphere has values between -25 °C (snowflake laser printed on the front of the device) and +55°C.

05

Additional laser printing

Additional information are laser printed on the lateral side of the device, including also the wiring diagram and the EAN code respectively for an easier installation and for an easier stock management.

06

RFI

Product Made in Italy, with RFI tag on the product side containing a unique serial number assigned to ABB according to the standard ISO/IEC FCD 15693-3 in order to authenticate the product.

Residual Current Circuit Breaker

RCBO DS203NC. The effective choice

The benefits of a product with the highest quality standards

Compact size for easy installation in small spaces and retrofitting of already existing facilities.

Test pushbutton to verify the correct functioning of the device.

Operating toggle can be sealed into on/off position to ensure maintenance in complete safety.

Space for identification labels of the protected line.

Terminals designed to ease the installation.

Same profile as the System pro M compact® range.

The indication of the status of the contacts is done with a mechanical connection to the mobile contacts and independently from the toggle position. The contacts position indicator (CPI) allows to exactly know the status of the contacts of the device (green: open contacts, red: closed contacts).



01

Use with cables and with busbars

Terminals with two slots allow to use different types of conductors: one housing is designed for cables up to 25 mm², the other for busbars or cables up to 10 mm².

02

RFid

Radio frequency tracking via a radio frequency tag to facilitate logistics and to be assured of the originality of the product.

03

Differential trip indicator

In case of tripping due to earth fault, a blue flag appears on the toggle thus immediately showing the cause of trip of the device. This feature helps in troubleshooting on the network and reduces the downtime for maintenance.



01 Use with cables and with busbars



02 Rfid



03 Differential trip indicator



04 Laser print information



05 Mounting clip



06 Approval stamps

04

Laser print information

All the necessary technical and installation information are laser printed on the front and side of units ensuring visibility along the time, including order code on front of device for future orders.

05

Mounting clip

The mounting clip eases the installation and removal from the DIN rail, even when used in a battery of devices with busbars on bottom terminals (without need of remove other devices).

06

Approval stamps

DS203NC residual current circuit breakers with overcurrent protection can meet the different installation habits in the various countries and are approved by the most important certification bodies like IMQ, VDE, EAC, KEMA.

Residual Current Circuit Breaker

RCBO DS301C T

Slim solutions for a complete protection

Easy to install

Bi-directional cylindrical terminals improve the level of safety and ease of connecting operations.

Test button

To verify the correct RCD functioning.

Contact position indicator (CPI)

The toggle has a clear color that indicates the level position ON/OFF.

Earth fault indicator (DTI)

A dedicated window that changes from grey to blue to indicate if the trip is caused by an earth fault.

Reliable DIN-Rail clip

The top and bottom clips ensure a secure grip on the rail and a stable vertical position.

Clear terminal identification

To prevent misuses.

Laser printed information

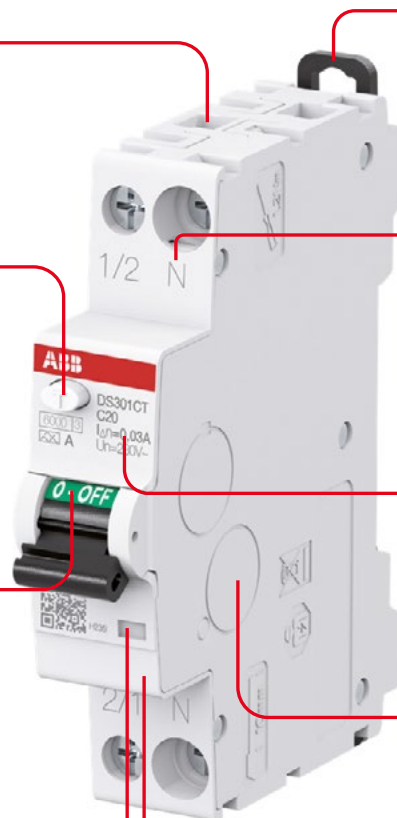
The device information is laser printed to ensure readability over time.

Combination with accessories

Interface to combine DS301C with DIN-Rail accessories.

Dedicated space for label

Clearly identify the protected circuits.



Value proposition



SMART IDENTIFICATION

- QR code make easier to find all product information online for troubleshooting



SPACE SAVING

- To have a smaller enclosure making it more discrete
- To free space for future extension
- Access retrofit extension when space is limited
- Busbar for installation in stretch space enclosure with rail distance = 12.5 cm

RCBOs DS301C & Busbar Psc Benefits



SLIM SIZE

1 module width (17.6 mm) & reduce heating



CONTINUITY OF SERVICE

Interrupting the circuit with issues only

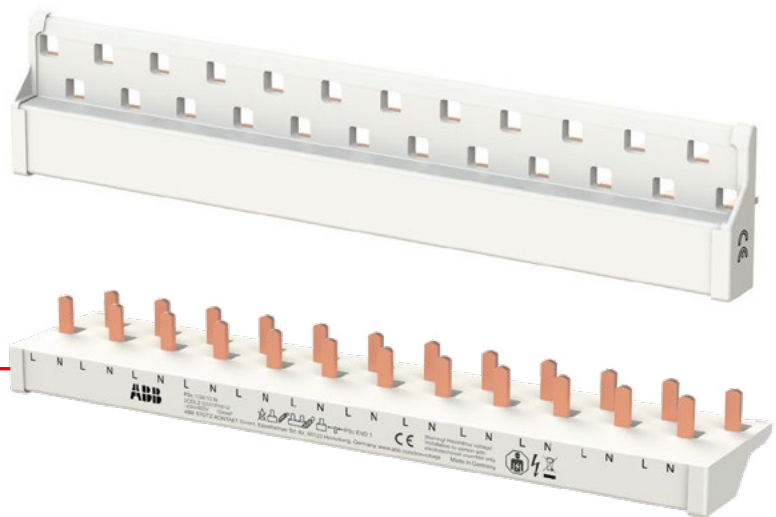


EASY TO INSTALL

Failsafe terminal & Special Busbar

Compactness

Create more comfort inside the panel thanks to reduced occupied space (less than 24 mm height).



EASY TO INSTALL

- Clear phase and Neutral identification
- Up to 16 mm² cable section
- Pin busbar compatible for bottom connection



CONTINUOUS OPERATION

- Disconnecting only the circuit with electrical issues



HEATING

- Enhanced Powerloss values contributes in less heating inside the panel and allows the enclosure size reduction



Residual Current Circuit Breaker

Selection table

DS201 T



Electrical features			IEC/EN 61009-1; IEC/EN 61009-2-1
Standards			IEC/EN 61009-1; IEC/EN 61009-2-1
Type (wave form of the earth leakage sensed)			A - APR
Number of poles			1P + N
Rated current I_n	A		$6 \leq I_n \leq 40$
Rated sensitivity $I_{\Delta n}$	A		0.03
Rated voltage U_e	V		230-240
Insulation voltage U_i	V		500 V AC
Overvoltage category			III
Pollution degree			2
Operating voltage of circuit test U_t	V		170 - 264
Rated frequency	Hz		50/60
Rated breaking capacity acc. to IEC/EN 61009-1	I_{cn}	A	6000
Rated breaking capacity acc. to IEC/EN 60947-2 (only referring to short circuit test)	ultimate I_{cu}	kA	10
	service I_{cs}	kA	7.5
Rated residual breaking capacity $I_{\Delta m}$ according to EN 61009-1	$I_{\Delta m}$	A	6000
Rated residual breaking capacity $I_{\Delta m}$ according to IEC 61009-1	$I_{\Delta m}$	A	6000 up to 25 A; 4500 for 32A and 40A
Rated impulse withstand voltage (1.2/50) U_{imp}		kV	4 kV
Dielectric test voltage at ind. freq. for 1 min.		kV	2.5 kV (50 / 60Hz, 1 min.)
Thermomagnetic release - characteristic	B: $3 I_n \leq I_n \leq 5 I_n$		■
	C: $5 I_n \leq I_n \leq 10 I_n$		■
	K: $10 I_n \leq I_n \leq 14 I_n$		■
Energy limiting class acc. to EN 61009-1			3
Surge current resistance (wave 8/20)		A	NA for A version; 3000 for APR version
Powerloss (average per pole)			
Mechanical features			
Housing			Insulation group I - II, RAL 7035
Toggle			Insulation group II, Black RAL 9005
Flag indicator			
Contact position indication			sealable in ON-OFF positions
Earth fault trip indication			Blue flag on toggle
Electrical life	operations		10000
Mechanical life	operations		20000
Protection degree acc. to EN 60529	housing		IP4X
	terminals		IP2X
Shock resistance acc. to IEC/EN 60068-2-27			25g - 2 shocks - 13ms
Vibration resistance acc. to IEC/EN 60068-2-6			0.1 mm or 1 g - 20 cycles at 5...150...5 Hz without load
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	°C/RH		28 cycles with 55°C/90-96% and 25°C/95-100%
Reference temperature for setting of thermal element	°C		30
Ambient temperature (with daily average $\leq +35$ °C)	°C		-25...+55
Storage temperature	°C		-40...+70

DS203NC L



DS203NC



DS301CT



IEC/EN 61009-1; IEC/EN 61009-2-1	IEC/EN 61009-1; IEC/EN 61009-2-1	IEC/EN 61009-1; IEC/EN 61009-2-1
AC, A, APR	AC, A, APR, S	A
3P+N	3P+N	1P + N (1 pole protected)
$6 \leq I_n \leq 32A$	$6 \leq I_n \leq 32A$	$6 \leq I_n \leq 20$
30-300	30-100-300	0.03
400-415V	400-415V	230-240
500 V AC	500 V AC	500 V AC
III	III	III
2	2	2
195 (300 for 30 mA) - 440		170
50/60	50/60	50
4500	6000	6000
6	10	6
4.5	5	6
4.5	6	6000 A (4500 A for In 20 A)
4.5	4.5	4500 A (3000 A for In 20 A)
4	4	4
2.5	2.5	2.5 (50 Hz, 1 min).
■	■	■
	■	■
	■	-
-	-	3
NA for A, AC versions; 3000 for APR version	NA for A, AC versions; 3000 for APR version; 5000 for S version	NA
		1.42
Insulation group II, RAL 7035	Insulation group II, RAL 7035	Insulation group 1-II, RAL 7035
black, sealable in ON-OFF positions	black, sealable in ON-OFF positions	Insulation group II, Black RAL 9005, sealable in ON-OFF positions
Differential trip indicator:	Differential trip indicator:	-
blue on toggle	blue on toggle	On toggle
CPI on window	CPI on window	Blue flag window
10000	10000	7000
20000	20000	7000
IP4X	IP4X	IP4X
IP2X	IP2X	IP2X
30g - 2 shocks - 13ms	30g - 2 shocks - 13ms	25g—2 shocks—13ms
0,35mm or 5g - 20 cycles at 5...150...5 Hz without load	0,35mm or 5g - 20 cycles at 5...150...5 Hz without load	0.1 mm or 1 g—20 cycles at 5...150...5 Hz Category 1, Class B according to IEC 61373
28 cycles with 55°C/90-96% and 25°C/95-100%	28 cycles with 55°C/90-96% and 25°C/95-100%	28 cycles with 55°C/90-96% and 25°C/95-100%
30	30	30
-25...+55	-25...+55	-25...+55
-40...+70	-40...+70	-40...+70



Residual Current Circuit Breaker

Selection table

DS201 T



Installation

Terminal type	top / bottom		failsafe bi-directional cylinder-lift terminal (shock protected)
Terminal size for cables	top / bottom	mm ²	25/25
Terminal size for busbars	top / bottom	mm ²	10/10
Solid /stranded wiring			1 x 0,75-25 mm ² for front terminal and 1 x 1-10 mm ² for rear terminal; 2 x 0,75-10 mm ² for front terminal
Flexible wires with or without ferrules			1 x 0,75-16 mm ² for front terminal and 1 x 1-4 mm ² for rear terminal; 2 x 0,75-6 mm ² for front terminal
Solid /stranded and flexible wiring with or without ferrules			2 x 0,75-4 mm ² for front terminal and 2 x 1,5 mm ² or 1 x 2,5-4 mm ² for rear terminal
Tightening torque	top / bottom	Nm	2.8
Stripping length of the cable		mm	12
Mounting			on DIN rail EN 60715 (35mm) by means of mounting clip
Mounting position			Any
Supply from			Top/Bottom terminals

Dimensions weight

Dimensions (H x D x W)	mm	85 x 69 x 35
Weight	g	200

Combination with auxiliary elements

Auxiliary contact	yes
Signal contact / auxiliary contact	yes
Shunt trip	yes
Auxiliary contact for bottom fitting	yes
Undervoltage release	yes
Overvoltage release	yes
Motor operating device	yes

Motor Protection

MS and MO manual motor starters

A complete motor protection concept

Right solution for your application
MS132-(K)B offers protection up to 32 A and a breaking capacity up to 100 kA – all in a 45 mm wide housing. They are designed to meet requirements of most railway applications.

Troubleshooting made easy
MS132-(K)B and MS165-B feature a magnetic trip indicator. This way, every tripping event will be distinguished, making troubleshooting a lot easier and faster.

High performance in compact size
MS132-(K)B and MS165-B manual motor starters cover short-circuit breaking capacities up to 100 kA. In addition, every manual motor starter is temperature compensated up to 60 °C.

All-in-one
ABB offers fuseless protection against short-circuits, phase failures and overloads including disconnect function – all in one single compact product.



Protection wherever you are

Take into account the highest applicable level of fire and smoke behaviour
European standard: EN 45545-2 (HL2, HL3).

Meet all main rolling stock standards and directives

- Designed in accordance with IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60947-5-1, applicable parts of IEC/EN 60077-1/2
- Withstand against shocks and vibrations in according to IEC 61373 category 1, class B (body mounted).



Ready for IE3 / IE4 motors

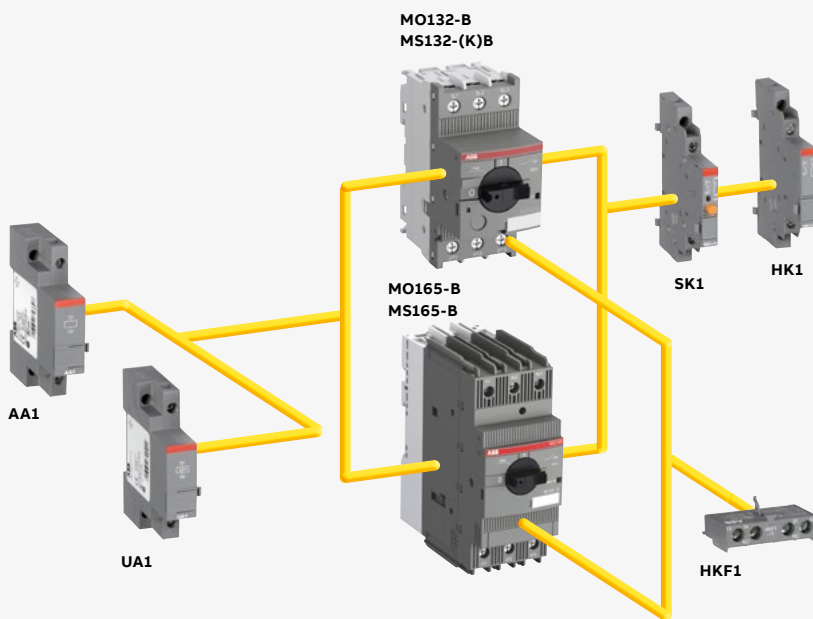
MS132-(K)B/MO132-B/MS165-B/MO165-B comply with the latest IE3 and IE4 N/H and NE/HE motors. NE/HE requires utilization category AC-3e.



Just push it

With the new Push-in Spring terminals, one push is all you need for a faster than ever installation, an easier than ever wiring and a reliable as ever connection.

The right accessories for your applications



Harmonized range of accessories

All types up to 80 A share the same main accessories like auxiliary contacts, signaling contacts, shunt trips and undervoltage releases. This significantly reduces the part list and makes selection of the right accessories easy.



Save wiring time
and avoid mistakes by
using a connecting link



Up to 5 manual motor starters
can be fitted next to each other

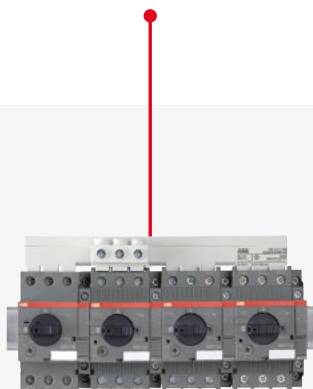


With a lockable handle
maintenance will be safe
for every technician



Easy to connect

Save wiring time and avoid mistakes by using a connecting link between ABB manual motor starters and soft starters or contactors. This creates harmonious and compact starter combinations that are easy to mount.



Busbar connectors and enclosures

With busbar connectors, up to 5 manual motor starters can be fitted next to each other with optional spacing for auxiliary contacts.






Safety at work

With a lockable handle maintenance will be safe for every technician. For MS132-(K)B and MS165-B a lock can seal the handle without the need for an additional accessory.



Motor Protection



Selection table

	MS132-B	MS132-KB	MS165-B
			
Type			
Thermal and electromagnetic protection		Yes	Yes
Electromagnetic protection		-	-
Phase loss sensitivity		Yes	Yes
Switch position		ON/OFF/TRIP	ON/OFF/TRIP
Magnetic trip indication		Yes	Yes
Lockable handle without accessories		Yes	Yes
Disconnecting feature		Yes	Yes
Width		45 mm	55 mm
Rated operational current I _e		0.16 ... 32 A	16 ... 80 A
Setting range		0.1 ... 32 A	10 ... 80 A
Ambient air temperature		-25 ... +60 °C ⁽¹⁾	-20 ... +60 °C ⁽¹⁾
Accessories			
Auxiliary contact			HKF1, HK1 (also available with Push-in Spring terminals)
Signalling contact	for tripped alarm		SK1 (also available with Push-in Spring terminals)
	for short-circuit alarm		CK1
Shunt trip			AA1
Undervoltage release			UA1

⁽¹⁾ Compensated

Short-circuit ratings for 400 V AC

Performance range MS132-(K)B, MS165-B				
Selection parameters			Short-circuit breaking capacity	
Rated operational power	Setting range for thermal release	Type	ICU	ICS
-	0.1 ... 0.16 A	MS132-0.16(K)B	100 kA	100 kA
0.06 kW	0.16 ... 0.25 A	MS132-0.25(K)B	100 kA	100 kA
0.09 kW	0.25 ... 0.4 A	MS132-0.4(K)B	100 kA	100 kA
0.18 kW	0.4 ... 0.63 A	MS132-0.63(K)B	100 kA	100 kA
0.25 kW	0.63 ... 1.0 A	MS132-1.0(K)B	100 kA	100 kA
0.55 kW	1.0 ... 1.6 A	MS132-1.6(K)B	100 kA	100 kA
0.75 kW	1.6 ... 2.5 A	MS132-2.5(K)B	100 kA	100 kA
1.5 kW	2.5 ... 4.0 A	MS132-4.0(K)B	100 kA	100 kA
2.2 kW	4.0 ... 6.3 A	MS132-6.3(K)B	100 kA	100 kA
4.0 kW	6.3 ... 10 A	MS132-10(K)B	100 kA	100 kA
5.5 kW	8 ... 12 A	MS132-12B	100 kA	100 kA
7.5 kW	10 ... 16 A	MS132-16(K)B / MS165-16B	100 kA	100 kA
7.5 kW	14 ... 20 A	MS165-20B	100 kA	100 kA
7.5 kW	16 ... 20 A	MS132-20(K)B	100 kA	100 kA
11 kW	18 ... 25 A	MS165-25B	100 kA	100 kA
11 kW	20 ... 25 A	MS132-25(K)B	50 kA	50 kA
15 kW	25 ... 32 A	MS132-32(K)B	50 kA	30 kA
15 kW	23 ... 32 A	MS165-32B	100 kA	100 kA
22 kW	30 ... 42 A	MS165-42B	50 kA	50 kA
22 kW	40 ... 54 A	MS165-54B	50 kA	30 kA
30 kW	52 ... 65 A	MS165-65B	50 kA	30 kA
37 kW	62 ... 73 A	MS165-73B	30 kA	30 kA
45 kW	70 ... 80 A	MS165-80B	30 kA	30 kA

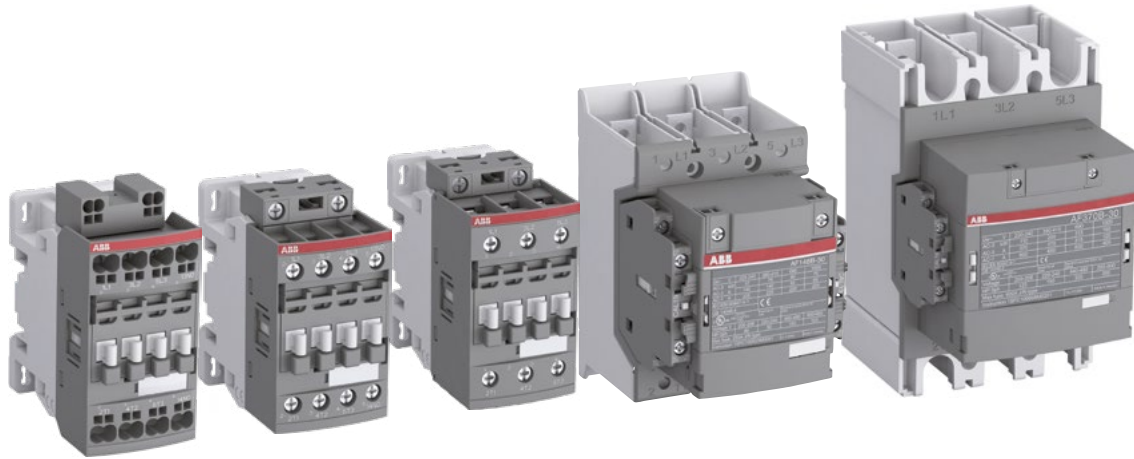
MO132-B		MO165-B	
			
-	-	-	-
Yes	Yes	Yes	Yes
-	-	-	-
ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP
-	-	-	-
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
45 mm	45 mm	55 mm	55 mm
0.16 ... 32 A	0.16 ... 32 A	16 ... 80 A	16 ... 80 A
-	-	-	-
-25 ... +60 °C	-25 ... +60 °C	-25 ... +60 °C	-25 ... +60 °C
HKF1, HK1 (also available with Push-in Spring terminals)			
SK1 (also available with Push-in Spring terminals)			
-			
AA1			
UA1			

Performance range MO132-B, MO165-B			
Type		Short-circuit breaking capacity	
		ICU	ICS
MO132-0.16B		100 kA	100 kA
MO132-0.25B		100 kA	100 kA
MO132-0.4B		100 kA	100 kA
MO132-0.63B		100 kA	100 kA
MO132-1.0B		100 kA	100 kA
MO132-1.6B		100 kA	100 kA
MO132-2.5B		100 kA	100 kA
MO132-4.0B		100 kA	100 kA
MO132-6.3B		100 kA	100 kA
MO132-10B		100 kA	100 kA
MO132-12B		100 kA	100 kA
MO132-16B / MO165-16B		100 kA	100 kA
MO165-20B		100 kA	100 kA
MO132-20B		100 kA	100 kA
-		-	-
MO132-25B / MO165-25B		50 kA / 100 kA	50 kA / 100 kA
MO132-32B		50 kA	30 kA
MO165-32B		100 kA	100 kA
MO165-42B		50 kA	50 kA
MO165-54B		50 kA	30 kA
MO165-65B		50 kA	30 kA
MO165-73B		30 kA	30 kA
MO165-80B		30 kA	30 kA

Contactors

AF..B contactors and NF..B contactor relays up to 200 kW

Features and benefits



Meet all main rolling stock standards and directives

- Designed in accordance with IEC 60947-4-1, IEC 60947-5-1, the applicable parts of IEC 60077-1/2 and EN 50155 standards.
- Withstand against shocks and vibrations in compliance with IEC 61373 category 1, class B (body mounted).

Compliant with RoHS directives.

Reach the highest level of fire and smoke safety behavior while using the best space optimization

European standard: EN 45545-2 (HL2 or HL3).

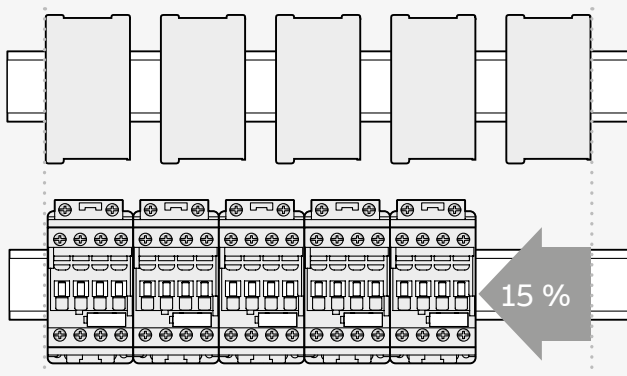
Optimize the number of needed codes by 60%

Only 3 low consumption coil codes are needed to cover all main U_c control voltages used for battery supply thanks to electronic coil interfaces accepting a wide DC control voltage ranges.

Coil	Suitable for U_c
20...60 V DC	24, 33 or 48 V DC
48...130 V DC	72, 96 or 110 V DC
100...250 V DC	220 V DC

Built-in surge protection: surges and surge suppressors are eliminated.

Conventional DC operated contactors



AF..(Z)B contactors

Reduce the size of the installations and minimize the train energy needs

- Weight reduced by up to 45%.
- Depth reduced by up to 20%.
- Side-by-side mounted devices require 15% less width (without spacing) from -40 °C up to +70 °C.
- No need for additional spacing in between contactors when electrically or mechanically interlocked.
- Low coil holding consumption reduced up to 68%.

Secure your cable connections by choosing the adequate technology required for your projects

Push-in Spring terminals for connection with standard ferrules

With the new Push-in Spring terminals, one push is all you need for a faster than ever installation, an easier than ever wiring and a reliable as ever connection.



From 9 to 38 A

Screw terminals for connection with standard ferrules

For a safe insertion and wiring of cables.



From 9 to 370 A

Screw terminals for connection with ring tongue ferrules

Non-detachable screw with conic washer on main and auxiliary terminals for a fast and secure tightening of cables with ring tongue ferrules.



From 9 to 370 A

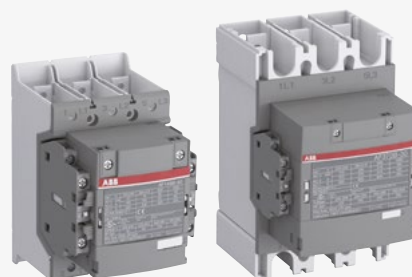
Extend your control circuit possibilities with AF09(Z)B ... AF95B

1-pole auxiliary contact block meeting any contact configuration with only two part numbers (N.O. or N.C. contacts). Fixing up to 6 auxiliary contacts regardless of mounting positions.



More functionalities with the same compact width for AF116B ... AF370B contactors

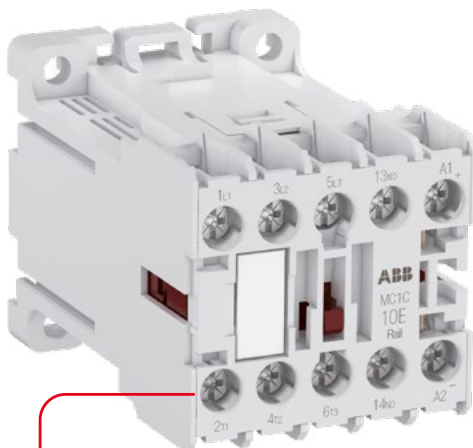
Up to 2 side mounted auxiliary contact blocks without adding to its width and delivered with 2 N.O. + 2 N.C. as standard.



Contactors

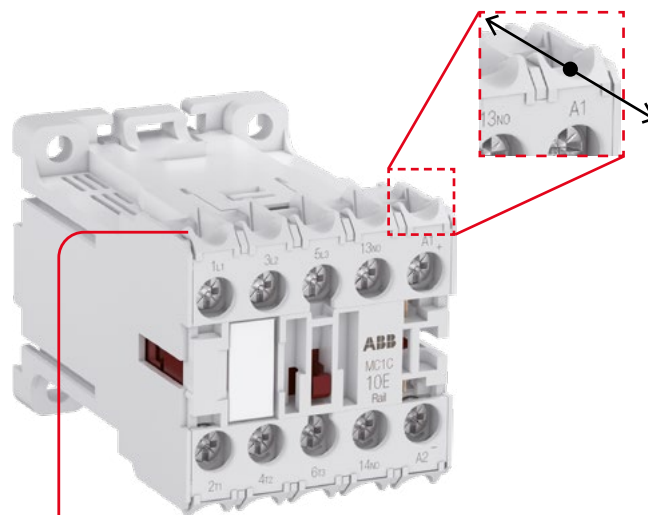
M mini contactors

A performance-dimension optimized solution



Connection with standard ferrules

The same screw is used for all the terminals and circuits of the device for an efficient and fast screwing. The connection is always stable, the range of usable wire dimensions wide and the maintenance easy.



Lugs easy connection



Connection with ring tongue ferrules

A large set of contactors and contactor relays is equipped with specific screw terminals; these allow quick and simple installations using ring tongue ferrules. A must for applications with shocks and vibrations and when the solidity of the connection is a crucial factor.



Wide range of accessories

Up to 2 auxiliary contacts can be mounted on the front of the MC1/MC2 contactors and up to 4 on the MCR contactor relays, with both the connection types. Surge suppressors, parallel connection links and a Lütze® rail adapter are also available in the assortment.



Assemble your reversing starter

Thanks to the mechanical interlock and the connection sets a compact reversing starter can be easily assembled for motor controlling in both directions. Auxiliary contact blocks can be installed on the front or on both sides of the reversing contactor.

Contactors

B, K mini contactors

The most compact in the market



Connection with standard ferrules

This conventional terminal type enables a quick connection to an installation using just a one size screwdriver. All terminal screws, from power to control, are aligned and accessible from the front for easy tightening.

Motors control

B and M mini contactors can be excellent solutions for controlling the small motors inside all your applications thanks to a maximum rated operational power AC-3 of 5.5 kW (B and M) or AC-4 of 4kW (M) at 400 V. Furthermore, a reversing starter with M mini contactors can always be easily assembled whenever bidirectional control is required



Resistive loads

Not only motors! ABB Mini contactors can be used for switching your AC-1 / DC-1 loads up to 20 A as well. Heaters, big coffee machines or other kitchen equipments are just examples of products where it is possible to use these reliable and silent devices as a component.









Contactors

Selection table - AF..(Z)B contactors and NF..(Z)B contactor relays

AF..(Z)B(..K)

3-pole contactors

				AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B	
										
IEC	AC-3 Rated operational power	$\theta \leq 60^\circ\text{C}$, 400 V ⁽¹⁾	kW	4	5.5	7.5	11	15	18.5	
UL/CSA	3-phase motor rating	480 V	hp	5	7.5	10	15	20	25	
IEC	AC-3 Rated operational current	$\theta \leq 60^\circ\text{C}$, 400 V	A	9	12	18	26	32	38	
		$\theta \leq 40^\circ\text{C}$, 690 V	A	25	28	30	45	50	50	
		$\theta \leq 60^\circ\text{C}$, 690 V ⁽¹⁾	A	25	28	30	40	42	42	
		$\theta \leq 70^\circ\text{C}$, 690 V	A	22	24	26	32	37	37	
UL/CSA	General use rating	600 V	A	25	28	30	45/42 ⁽²⁾	50/45 ⁽²⁾	50/45 ⁽²⁾	
NEMA	NEMA Size			00	0	–	1	–	–	

⁽¹⁾ $\theta \leq 55^\circ\text{C}$ for AF50 ... AF95B contactors.




⁽²⁾ General use rating: AF..(Z)B/AF..(Z)B..K

Main accessories

Auxiliary contact blocks	Front mounting		CA4, CA4..K, CAT4
	Side mounting		CAL4-11, CAL-11K
Interlocking units	Mechanical		VM4
	Mechanical / electrical		VEM4, VEM4K
Surge suppressors			Built-in surge protection

AF..(Z)B

4-pole contactors

				AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B	AF45	AF50	AF75	
											
IEC	AC-1 Rated operational current	$\theta \leq 40^\circ\text{C}$, 690 V	A	25	30	45	55	70	100	125	
		Ue max. $\leq 690\text{ V}$, 50/60 Hz									
		$\theta \leq 60^\circ\text{C}$, 690 V ⁽¹⁾	A	25	30	40	45	60	85	105	
		$\theta \leq 70^\circ\text{C}$, 690 V	A	22	26	32	37	50	70	85	
UL/CSA	General use rating	600 V	A	25	30	45	55	65	80	105	














⁽¹⁾ $\theta \leq 55^\circ\text{C}$ for AF45 ... AF75 contactors.






Main accessories

Auxiliary contact blocks	Front mounting		CA4, CAT4	CA5
	Side mounting		CAL4-11	CAL5-11
Interlocking units	Mechanical		VM4	–
	Mechanical / electrical		VEM4	VE5-2
Surge suppressors			Built-in surge protection	Built-in surge protection




NF..(Z)B(..K)

Contactor relays

										
Number of contacts										
IEC	AC-15 Rated operational current	400 V	A	3	3	3	3	3	3	
UL/CSA	Pilot Duty			A600, Q600		A600, Q600				
Contactor relay type					NF(Z)B22E NF(Z)B22EK	NF(Z)B31E NF(Z)B31EK	NF(Z)B40E NF(Z)B40EK	NF(Z)B44E NF(Z)B44EK	NF(Z)B62E NF(Z)B62EK	NF(Z)B80E NF(Z)B80EK

	AF40B	AF52B	AF65B	AF80B	AF96B	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
													
	18,5	22	30	37	45	55	75	75	90	110	132	160	200
	30	40	50	60	60	75	100	100	125	150	200	250	300
	40	53	65	80	105	116	140	146	190	205	265	305	370
	70	100	105	125	130	160	200	225	275	350	400	500	600
	60	80	90	100	105	145	175	200	250	300	350	400	500
	50	70	80	85	90	130	160	175	200	240	290	325	400
	60	80	90	105	115	160	200	200	250	300	350	400	520
	-	-	-	-	-	-	4	-	-	-	5	-	-

		CA5	-
	CAL5-11	CAL18-11	CAL19
		-	VM19 (for same size contactors)
		VE5-2	
	Built-in surge protection		Built-in surge protection



	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
							
	160	200	275	350	400	500	525
	145	175	250	300	350	400	425
	130	160	200	240	290	325	350
	160	175	230	250	300	350	420

		-
		CAL19
		VM19 (for same size contactors)
		Built-in surge protection



Contactors



Selection table - Mini contactors

				Screw terminals for standard ferrules	Screw terminals for ring tongue ferrules
M mini contactors					
3-pole contactors		Coil consumption 4 W	Type	MC1C..TW..-RAIL	MC2C..TW..-RAIL
4-pole contactors		Coil consumption 4 W	Type		MC2C..TW..-RAIL
IEC	Rated operational power AC-3	230 V	kW	2.2	3
		400 V	kW	4	5.5
		500 V	kW	4	5.5
		690 V	kW	4 ⁽¹⁾	4 ⁽¹⁾
	Rated operational current AC-1	θ ≤ 55 °C	A	20	20
		55 ≤ θ ≤ 70 °C	A	16	16
		200 V AC	hp	3	3
		240 V AC	hp	3	3
UL/CSA	3-phase motor rating	380-425 V AC	hp	3	5
		440-480 V AC	hp	5	7.5
		500-600 V AC	hp	5	10
		General use rating	A	20 (600 V AC)	20 (600 V AC)

⁽¹⁾ Valid for N.O. contacts only.

Main accessories

Auxiliary contact blocks	Front mounting	MACN / MARN
Surge suppressors		MPO

				Screw terminals for standard ferrules	Screw terminals for ring tongue ferrules
					
4-pole contactor relays		Coil consumption 4 W	Type	MCRC..TW...-RAIL	MCRC..RW...-RAIL
IEC	Rated operational current AC-15	240 V	A	6	6
		400 V	A	4	4
		500 V	A	2.5	2.5
		690 V	A	1.5	1.5
	Rated operational current DC-13	24 V	A	5	5
		48 V	A	2.5	2.5
		125 V	A	0.7	0.7
		250 V	A	0.3	0.3
		440 V	A	0.15	0.15
UL/CSA Pilot duty				A600, Q600	
Main accessories					
Auxiliary contact blocks		Front mounting			MARN
Surge suppressors					MPO

B mini contactors

Screw terminals



DC Control supply				
3-pole contactors		Coil consumption 5 W	Type	TBC7
4-pole contactors		Coil consumption 5 W	Type	TBC7
IEC	Rated operational power AC-3	220-230-240 V	kW	3
		380-400 V	kW	5.5
		440 V	kW	5.5
		500 V	kW	5.5
		690 V	kW	3
	Rated operational current AC-1	400 V, $\theta \leq 40^{\circ}\text{C}$	A	20

K mini contactor relays

Screw terminals



DC Control supply				
4-pole contactor relays		Coil consumption 5 W	Type	TKC6
IEC	Rated operational current AC-15	24 V	A	4
		110-120 V	A	4
		220-230-240 V	A	4
		380-400 V	A	3
		440 V	A	3
		480-500 V	A	2
	Rated operational current DC-13	24 V	A	2.5
		110 V	A	0.7
		220-240 V	A	0.4

Electronic relays and control

Even under the most extreme conditions



Conductor car

Insulation monitoring relays

- Insulation faults can occur in every unearthed supply system. The insulation monitoring relays of ABB monitor different AC or DC IT supply systems (single- or three-phase) for insulation faults.

Time relays

- In case the press switch does not switch off the auxiliary release pumps of the breaking system a delayed switch off is triggered by the time relays
- While switching between hold-on and start-up coil on the main switch the pulse can be prolonged by using a time relay.
- The reliable and safe functionality of the compressor is essential for trains. Using a time relay, the proper working of the compressor can be steered and in case of malfunction the time relay triggers an alarm signal.



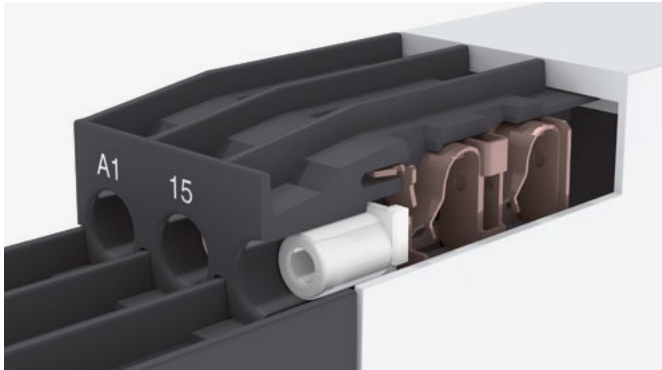
Passenger car

Time relays

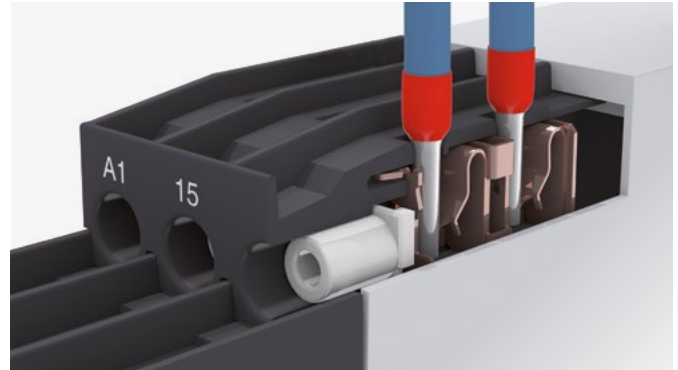
- The control of air flow as well as the light inside is controlled by time relays. This way, a time interval can trigger a delayed start and end of the air circulation as well as turning on or off the lights inside the cabin.
- Inside passenger cabins, different applications like light and air conditioning are controlled by time relays. The highly sophisticated CT-S range of time relays from ABB is ideally suited to fulfill all necessary requirements for rail construction.

Single-phase monitoring relays

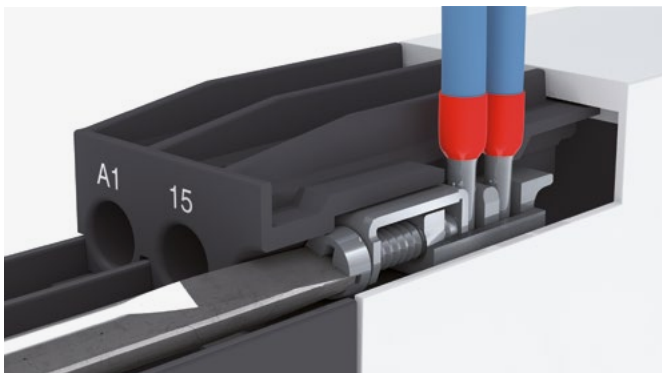
- The single-phase current and voltages inside a train need to be monitored. The wide range of voltage and current monitors of ABB's assortment are ideally suited for use inside trains.



Easy Connect Technology push-in terminals



Tool-free mounting of wires



Wiring of double-chamber cage connection terminals with screw driver terminals with screw driver



Restaurant car

Three-phase monitoring relays

- Every train has applications running which are connected to the 50 Hz three-phase supply system like the air condition and various applications inside the restaurant car. A three-phase monitoring relay monitors those 50 Hz three-phase supplies.
- Coffee machine: monitoring the presence of the supply in order to protect the coffee machine from damages in case of abnormal supply voltage conditions.

Double-chamber cage connection terminals

The screw terminals can be connected with two wires with different wire diameters up to 2.5 mm². According to IEC/EN 60947-1 two rigid or fine-strand wires with ferrules up to 2.5 mm² (AWG 14) can be used.

Benefits for train constructors through push-in terminal technology

Regular train maintenance is essential to ensure passenger

safety. Usually, maintenance work is performed on trains after every 100,000 km (~ 62,000 miles). For example, within these maintenance cycles, the train's electrical components are dismantled and subjected to testing. The cabling within the train remains intact and is used again after the testing, in order to remount and install the appropriate components. As this is very complex for many of the devices within the train, there are various methods of reducing the work involved:

- Use of multifunctional devices, in order to reduce the overall number of devices
- Use of push-in terminals for simple mounting and dismantling of the devices

The product range of single-function and multifunctional devices, time relays, single- and three-phase monitoring relays and insulation monitoring relays can combine these options. Thus, instead of individual monitoring relays, it is possible to use a single multifunctional device.

Electronic relays and control

Overview



Time relays

CT-S range - The sophisticated range for harsh environments

For many years, ABB's 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. The range of time relays provide timing functions for all applications.

All devices are available with two different terminal versions. Choose between screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (push-in terminals) with excellent vibration resistance.



Single-phase monitoring relays

CM-range - Current and voltage monitoring relays

Single-phase voltage and current monitoring relays protect sensitive equipment and control systems against undervoltage (brownout) or undercurrent events or overvoltage or overcurrent events.

Different units with adjustable or fixed threshold values (trip points) are available.

All devices are available with two different terminal versions. Choose between screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (push-in terminals) with excellent vibration resistance.



Single-/multifunctional monitoring relays

CM-range - Three-phase monitoring relays

The reliable and continuous monitoring of three-phase networks guarantees trouble-free and economic operation of machines and installations.

The most multifunctional devices in the ERC assortment are the CM-MPS/N monitoring relays for rated voltage levels up to 820 V AC and 400 Hz. Additionally, a variety of economic and cost-efficient three-phase monitoring relays are offered in this range with specialized functionality.

All devices are available with two different terminal versions. Choose between screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (push-in terminals) with excellent vibration resistance.



Insulation monitoring relays

CM-range - Monitoring of unearthed supply systems

The high reliability of a system is guaranteed by a continuous monitoring of the resistance between the system and the earth potential. An insulation monitoring of the CM-IWx range recognizes these so-called insulation faults and trips as soon as the measured value of the resistance between the system and earth potential falls below the set threshold. By using an insulation monitoring relay already the first insulation fault will be detected and can be fixed before a second fault occurs and forces the system to switch off.

Choose between screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (push-in terminals) with excellent vibration resistance.

Electronic relays and control

Electrical, mechanical and environmental requirements

The selected products from the Electronic Relays and Controls range fulfill the train construction requirements EN 50155 (applicable parts), IEC 60571 (applicable parts), EN 45545-2.. The following table shows which product of the range meets the requirements to which extent.

EN 50155											
Voltage supply											
Order code	Type	Supply from accumulator battery	Supply by a static converter or a rotating set	Interrupts				Temperature class	Shock and vibration EN 61373	Altitude class EN 50125-1	Coated PCB Board
				S1 no interruptions	S2 interruptions of up to 10 ms	C1 0.6 x U _n over 100 ms	C2 0.6 x U _n over 30 ms				
Time relays											
1SVR7x0030R3300	CT-MXS.22x	48 V DC	230 V AC / 50 Hz	■	■	■	■	T3 ⁵⁾	Cat. 1, Class B	AX max. 2000 m ¹⁾	no
1SVR7x0010R0200	CT-MFS.21x	24-110 V DC		■	■	■	-				
1SVR7x0020R0200	CT-MVS.21x			■	■	■	-				
1SVR7x0100R0300	CT-ERS.21x			■	■	■	-				
1SVR7x0180R0300	CT-APS.21x			■	■	■	-				
1SVR7x0120R3300	CT-ARS.21x			■	■	-	n/a				
Single-phase monitoring relays											
1SVR7x0830R0300	CM-ESS.1x	24-110 V DC	230 V AC / 50 Hz	■	■	■	-	T3 ⁵⁾	Cat. 1, Class B	AX max. 2000 m ¹⁾	no
1SVR7x0830R0400	CM-ESS.2x			■	■	■	-				
1SVR7x0840R0200	CM-SRS.11x			■	■	■	-				
1SVR7x0840R0400	CM-SRS.21x			■	■	■	-				
1SVR730840R0500	CM-SRS.22S			■	■	■	-				
1SVR7x0840R0700	CM-SRS.M2S			■	■	■	-				
Single-/multifunctional monitoring relays											
1SVR7x0885R3300	CM-MPS.21x	n/a ²⁾	3 x 400 V AC / 50 Hz ⁴⁾	■	■	2)	2)	T3 ⁵⁾	Cat.1, Class B	AX max. 2000 m ¹⁾	no
1SVR7x0884R3300	CM-MPS.41x			■	■	2)	2)				
1SVR7x0884R4300	CM-MPS.43x			■	■	2)	2)				
1SVR7x0824R9300	CM-PFS.x			■	■	2)	2)				
1SVR7x0794R3300	CM-PVS.41x			■	■	2)	2)				
1SVR7x0794R1300	CM-PVS.31x		3 x 230 V AC / 50 Hz ⁴⁾	■	■	2)	2)				
Insulation monitoring relays											
1SVR7x0660R0100	CM-IWS.1x	24-110 V DC	230 V AC / 50 Hz	■	■	■	■	T3 ⁵⁾	Cat. 1, Class B	AX max. 2000 m ¹⁾	no
1SVR7x0670R0200	CM-IWS.2x			■	■	■	■				
1SVR7x0660R0200	CM-IWN.1x			■	■	-	■				
1SVR7x0669R9400	CM-IVN.x	n/a ³⁾	n/a ³⁾	n/a ³⁾	n/a ³⁾	n/a ³⁾	n/a ³⁾				
1SVR7x0660R0200	CM-IWN.1x	24-110 V DC	230 V AC / 50 Hz	■	■	-	■				
1SVR7x0669R9400	in comb. with CM-IVN.x			■	■	-	■				

¹⁾ The insulation measurement of the devices is based on a figure of 2,000 m. The devices can be used in higher altitudes on request.

²⁾ Only applicable for devices with a DC power supply.

³⁾ passive device, no supply.

⁴⁾ self supplied from the measuring input.

⁵⁾ -25...+70 °C - if continuous ambient temperature of +70 °C is expected, derate the output relay values to AC-15=1.5 A, DC-13=1.0 A and I_{the}=2.5 A

Order code and product type

Order code: 1SVR7x.....

x: 3/5 = screw connection

x: 4/6 = Easy connect / push-in connection

Product type: CM-IWN.1x

x: S = screw connection

x: P = Easy connect / push-in connection

Network analyzers

M4M Network Analyzers

Discover the benefit

M4M as a stand-alone network analyzer guarantees all power monitoring needs in the energy distribution system: from high-accuracy energy efficiency monitoring of electrical parameters to complete power quality analysis. Thanks to its connectivity capabilities, M4M can get leverage on the integration in ABB scalable energy and asset management solutions.

Thanks to MID certification, M4M allows now to fulfill all legal requirements for accounting and energy acquisition.



-50% Time for integration in the ABB turnkey solution

Full connectivity

Natively integrated in sub-distribution management System pro M compact® InSite and ABB Ability™ Energy and Asset Manager cloud-solution, M4M benefits from the scalability of the ABB digital solutions: from stand-alone visualization and commissioning to monitoring, optimization and control of the complete electrical system.



Reliable and accurate power monitoring

Energy Efficiency

ABB's M4M range of network analyzers gathers data from the electrical system and provides a complete power quality analysis and high accuracy energy monitoring. MID certification available to ensure certified and tamper-proof measurement for billing applications and fulfilment of legal requirements for accounting and energy acquisition.



-40% Time for installation and commissioning

Simple and Intuitive

M4M makes configuration and operations simple and fast, from easy installation and wiring thanks to compact dimensions, all-removable terminals and Rogowski coils, to intuitive use and data access thanks to touchscreen color display, mobile APP and desktop software.



Improve reactivity and reduce uncoordinated maintenance



Realtime supervision

M4M network analyzers make information easy to access from any area of the system, providing a comprehensive range of accurate data and notifications that enhance reactivity to the events on the electrical system and allowing to avoid overloads, outages and uncoordinated maintenance.



Network analyzers

Selection table

	M4M 20 - Class 0,5S	M4M 30 - Class 0,5S
		
MID certification	Option	Option
Real-time		
TRMS current	■	■
TRMS voltage	■	■
Frequency	■	■
Active, Reactive and Apparent power	■	■
Power factor	■	■
Operating timer, countdown timer	■	■
Energy		
Active, Reactive and Apparent energy	■	■
4 quadrants Energy (Import/Export)	■	■
Tariffs	/	■
Power Quality		
THD (I, VLN, VLL)	■	■
Individual Harmonics	/	40 th
Unbalances (I, VLN, VLL)	/	■
Neutral current	Calculated	Measured
Phasors (I, VLN)	/	■
Waveforms (I, VLN, VLL)	/	■
Data recording and logs		
Single alarms	25	25
Warnings, alarms and errors logs	■	■
Complex alarms with logics	/	4
Demand values (average)	Basic	Advanced
Min/Max Demand values	Basic	Advanced
Energy Trending logs	/	■
RTC	/	■
HMI		
	Graphic color	Graphic color touchscreen
Graphs visualization	Basic	Advanced
Notifications	■	■
Homepage and favourite page	■	■
Password protection	■	■
Connectivity		
Automatic integration in ABB Ability™	■	■
Energy and Asset Manager		
Automatic integration in System pro M compact® InSite	■	■
Bluetooth Low Energy	■	■
Communication Protocols	Modbus RTU, Modbus TCP/IP, Profibus DP-V0, BACnet/IP	Modbus RTU, Modbus TCP/IP, Profibus DP-V0, BACnet/IP
RJ45 Daisy Chain (Ethernet version)	/	■*

* daisy-chain not available on M4M 30-M

M4M 2X - Class 0,5S

TRMS current	■
TRMS voltage	■
Frequency	■
Active, Reactive and Apparent power	■
Power factor	■
Operating timer, countdown timer	■
Active, Reactive and Apparent energy	■
4 quadrants Energy (Import/Export)	■
THD (I, VLN, VLL)	■
Neutral current	Calculated
Single alarms	25
Demand values (average)	Basic
Max/min values	Basic
Warnings, alarms and errors logs	■
Digital Outputs	2
+PQ1	
Individual Harmonics	25 th
Unbalances	■
Historicals logs	Intermediate
RTC	■
+PQ2	
Individual Harmonics	40 th
Unbalances	■
Historicals logs	Advanced
RTC	■
Neutral current	Measured
+RTS	
Tariffs	6
Complex alarms with logics	4
RTC	■
Programmable I/O*	4
Connectivity	
Automatic integration in ABB Ability™	■
Energy and Asset Manager	
Automatic integration in System pro M compact® InSite	■
Bluetooth Low Energy	■
Communication Protocols	Modbus RTU, Modbus TCP/IP
RJ45 Daisy Chain (Ethernet version)	■

* instead of 2 Digital Outputs

Wiring accessories for rolling stock

CWA for rolling stock dedicated material is fire & smoke protected, ensuring passenger & personal safety.

Extensive range of accessories ensures installation flexibility and fulfills requirements of all application.

Vibration and shock tested and approved products of highest quality.

- 01 Frame 2-gang 1+1 modules (for reduced space)
- 02 French/Earth pin Socket outlet w/LED
- 03 USB type A + Schuko socket outlet in wall without frame



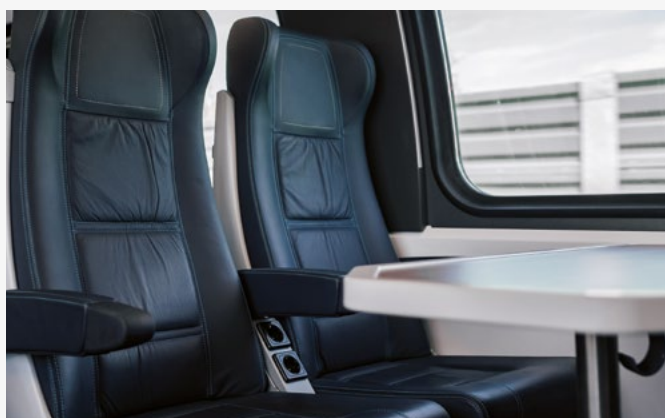
— 01



— 02



— 03



— 07



— 08

Wiring accessories for rolling stock

Different applications. ABB products adapt to different spaces

First of all, there are some parts where reduced space is a critical issue. In this case, the functional device can be installed directly wherever it is needed (in a table, between seats...). This can be done as ABB will supply the client with the drawing of the needed hole that the client must do in order to install directly the functional device in it. This option will always be available, as ABB products will fit in the hole due to their clipping system, that is going to be valid forever.

Because of that, if the functional device must be replaced in the future, it is ensured that the new device of ABB, will fit in the same space.

There are other parts of the train, where the space is important, but not so critical. Part of the railway product are adapted to this reduced space. In these limited spaces, sockets, USB's... can be inserted to allow the user to have a better experience during the trip.

However, there are other spaces in the train, such as restaurant, common zones... where the reduced spaces are not a problem, so different and more standard solutions can be adopted.

04 Side view of USB type A + Schuko socket outlet in wall without frame

05 Front view of 2 x USB A in reduced frame 1+1 modules

06 Side view of 2 x USB in reduced frame 1+1 modules

07 Socket outlets between seats

08 Socket outlets w/LED between seats

09 Common zones inside the train

10 Restaurant zone inside the train



04



05



06



09



10

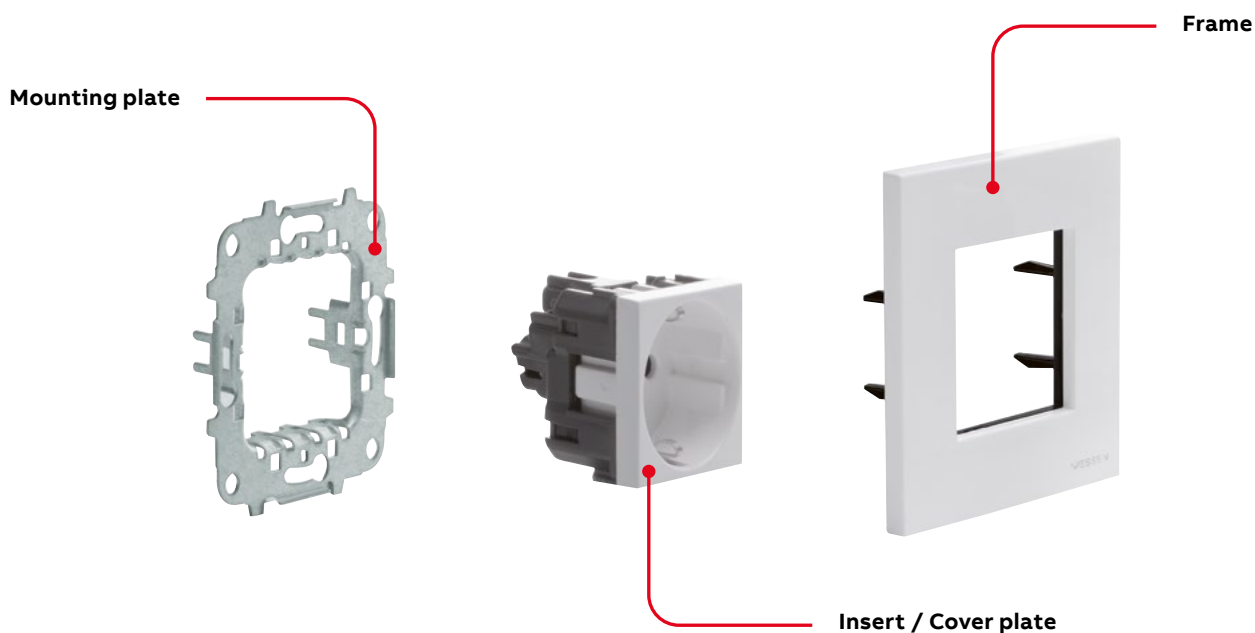
Wiring accessories for rolling stock

Modular and monoblock devices

Schuko socket outlet composition in square box

Thanks to the wide variety and the great flexibility of ABB products, several combinations can be done with the

accessories and functional devices shown in the catalogue below, so that the client will select the solutions that best meet their expectations.



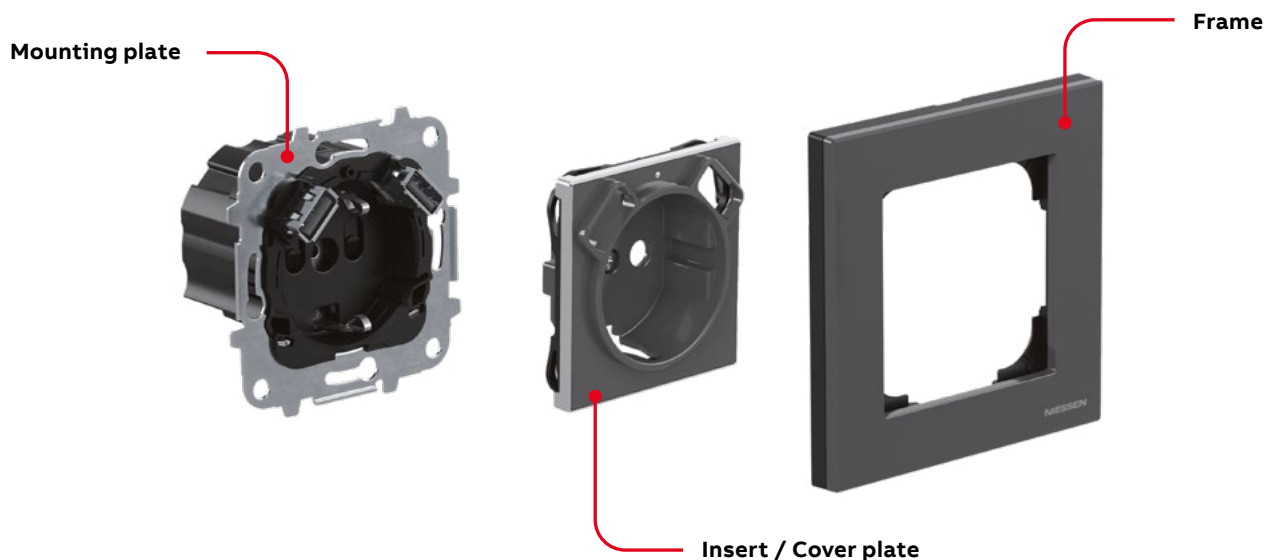
Apart from the modular devices shown above, there are other kind of product solutions for this segment.

In this case, and taking into account the existing problem with the reduced space, this solution provides a Schuko outlet and 2 type A USB chargers, all of them in one mounted device, as a "monoblock".

This solution allows to have up to three devices connected (socket +2 USB's) in one device.

It has also two working methods in order to work with safety:

- **Normal mode:** in this mode, both the Schuko and the USB's are working and operative and the LED lighting is on.
- **Safe mode:** in this case, if there is some risk of overload, short circuit or overheating, the LED lighting turns off, and the two USB ports also get dishabilitated -the Schuko socket keeps turned on-. When this situation is overcome, the LED light turns on and the USB ports start working again.

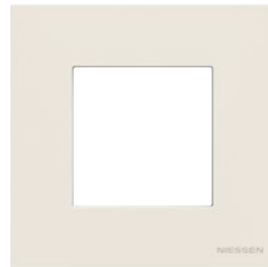


Wiring accessories for rolling stock

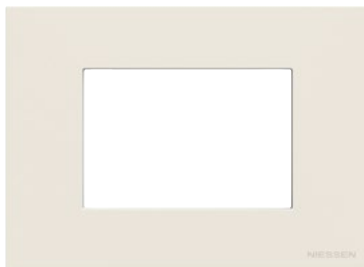
Modular devices - Frames



—
**01 Frame 1-gang, 1 module
(R2171)**



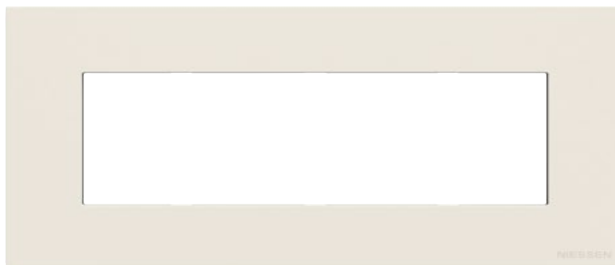
—
**02 Frame 1-gang, 2 modules
(R2271)**



—
**03 Frame 1-gang, 3 modules
(R2473)**



—
**04 Frame 1-gang, 4 modules
(R2474)**



—
**05 Frame 1-gang, 7 modules
(R2777)**

Cable Protection

Conduit overview

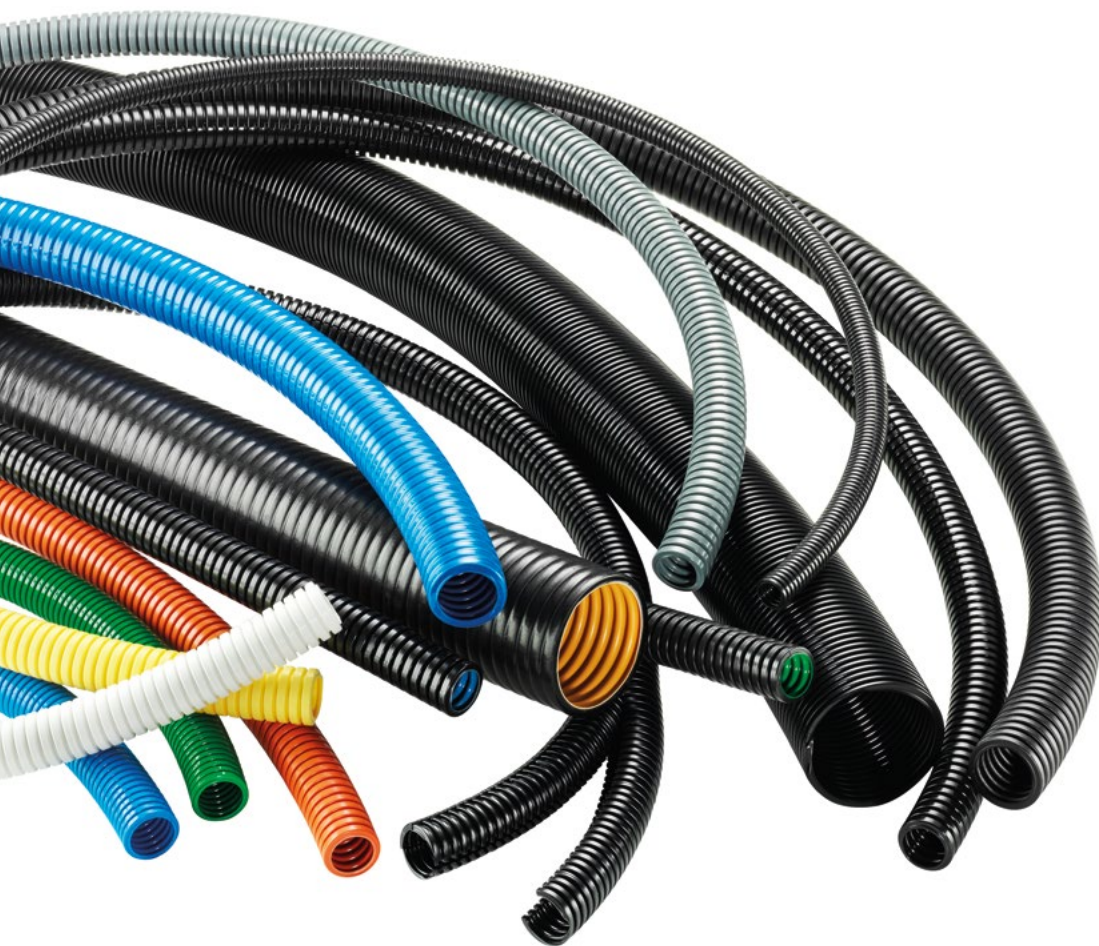
We offer many types of conduit with different technical characteristics to serve the diverse requirements of various applications.

The product groups:

- PMAFLEX Pro
- PMAFLEX
- PMAFLEX PLus
- PMAFLEX Multilayer
- PMA Divisible System
- PMA Smart Line
- PMA overbraided
- PMA overextruded

Conduit sizes range from 6 mm to 125 mm Ø, from lightweight to heavyweight, and from pliable to highly flexible. PMA also offers slit and divisible conduits. Standard colours are black and grey.

Many conduits are specially approved, e.g. CSA, UL Recognition, DNV, Lloyds, Bureau Veritas etc. All conduits are REACH and RoHS compliant.



PMA Conduits for the Rail industry for diverse applications with various technical requirements

Products		PMAFLEX Pro	PMAFLEX			PMAFLEX Multilayer						Divisible System
		POH	VAM	VAML	PLR	XVCS1H	XVCS2H	XVCSF	XPCS	XPCSF	JXPCSF	PACOF
Material properties	Ductility											
	Reversed bending resistance											
	Compression resistance											
	Low temperature performance											
	High temperature performance											
	Resistance to weathering											
Approvals	Free from halogens, REACH + RoHS compliant	●	●	●	●	●	●	●	●	●	●	●
	Non flame propagating EN61386		●	●	●							●
	EN 45545-2	EN	●	●	●			●	●	●	●	●
	NFPA 130 (ASTM E162 – ASTM E662)		●	●					●			●
	BSS 7239/SMP 800-C ASTM E1354		●	●					●			●
	PN-K 2511		●	●								
Temperature range	GOST 12.1.044-89		●	●								
	Continuous operating temperature (acc. to DO 9.21-4510)	Min. (–) –25	–40	–40	–40	–50	–50	–50	–40	–50	–50	–40
		Max. (+) 95	105	105	105	90	90	105	95	95	95	105
Sizes	Short term max. operating temperature 168h (acc. to DO 9.21-4360)	(+) 120	160	160	160	120	120	160	150	150	150	160
	Nominal width min.	10	10	10	07	12	12	10	10	07	07	07
	Nominal width max.	48	48	125	48	48	48	48	48	48	48	70
	Metric size min.	12	12	12	10	16	16	12	12	12	12	10
	Metric size max.	50	50	146	50	50	50	50	50	50	50	80

Cable Protection

Fitting overview

Next generation cable protection. The extremely successful and technically proven PMAFIX System has been developed further to create the PMAFIX Pro product range.

The new generation fittings are the product of experience gained over many years in the most varied application areas. The PMAFIX Pro has two components, an outer body and an inner sealing element. The sealing element functions both as a seal and as a locking mechanism providing all ingress protection grades up to IP68 and IP69 even in applications where there is long term continuous movement. PMAFIX Pro is manufactured by using multiple component injection moulding process.

Key features

- Meets all ingress protection categories up to and including IP68 and IP69 also when the conduit connection is continually in motion
- Manufactured with newest 2-component injection moulding technology
- Fulfills highest international quality and standard requirements
- Intelligent safety locking mechanism
- Allows simple “push-in” installation of conduits
- Due to the integrated conduit supports conduit remains centralised with little deformation even when bent sharply directly at the fitting



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01 patent
—
02 Up to 100 bar

Material

- Fittings made from specially modified polyamide 6
- Threads made from nickel-plated brass or polyamide 6
- Sealings made from cross linked polyester elastomer
- Self-extinguishing
- Free from halogens, REACH + RoHS compliant
- Temperature range: -50°C to +105°C, short-term to +160°C

Characteristics

- Highest assembly reliability – the fitting only locks when the sealing element is fully inserted
- Highest operational safety assured through visual and acoustic correct assembly controls
- Excellente resistance to ultra violet rays and weathering
- Highest impact resistance through fully closed design
- Highest conduit pull out strength
- Vibration-proof connection to PMA conduits
- Fits conduit profiles – fine (T) and coarse (G)
- To avoid accidental opening, disassembling only possible with a screwdriver

—
01



—
02



—
IP68 + IP69

Static + dynamic

- Highest sealing through fully closed system also in highest dynamic applications
- Extra long ribbed sealing areas (cross linked material)
- 360° locking and sealing element shields against high pressure water jets (up to 100 bar)
- Content of delivery: Locking and sealing element and thread seal for male threads (O-Ring and/or flat gasket)

Cable Protection

Fitting overview

PMAFIX connectors. The designation PMAFIX describes a very large range of connectors for PMA conduits with the patented PMA safety clip system.

Connectors are available for degrees of ingress protection IP66 and IP68 according to IEC 60529. IP66 connectors are fitted with a pre-installed universal safety clip which ensures a quick “push-in” installation. IP68 connectors for increased requirements will be delivered with a special conduit seal cap.

The new PMAFIX IP68GT fittings combine simplest push-in assembly with highest sealing performance. It is also possible to upgrade to IP69 by retrofitting water impact protection.

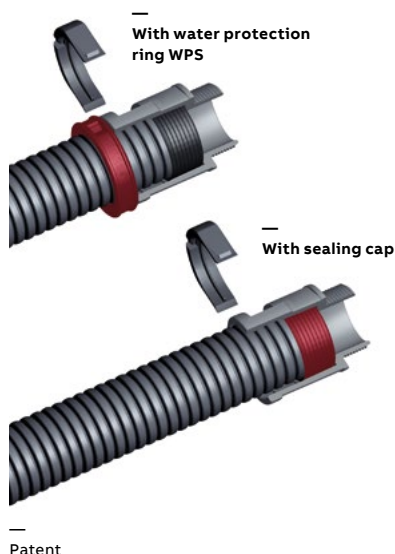
Material

- Fittings made from specially formulated polyamide 6
- Threads made from nickel-plated brass or polyamide 6
- Self-extinguishing
- Free from halogens, REACH + RoHS compliant
- Very good chemical properties
- Temperature range: -40°C to +105°C, short-term to +160°C

Characteristics

- Excellent conduit pull-out strength
- High impact resistance
- Vibration-proof connection to PMA corrugated conduits
- Fits conduit profiles – fine (T) and coarse (G)
- To avoid accidental opening, disassembly is only possible with a screwdriver

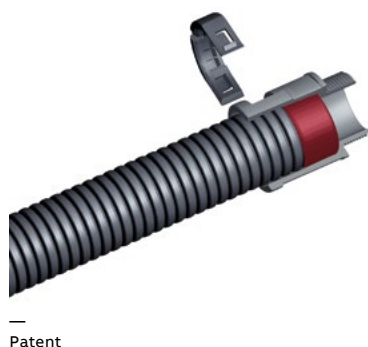




IP68

IP68, IP69 static**IP67, IP69 dynamic**

- High sealing through additional seal cap
- For highest dynamic applications
- Additional water protection ring WPS for IP69 ingress protection in conjunction with the IP68 system to be applied right after the IP68 connector onto the conduit
- Content of delivery: Connector with sealing cap, safety clip and thread seal for male thread (O-ring and/or flat gasket)



IP68GT

IP68, IP69 static**IP67, IP69 dynamic**

- The single piece PMAFIX IP68GT fitting with integrated sealing cap and pre-installed locking clip
- Simple push-in assembly (as with the proven PMAFIX IP66 system)
- The extra long sealing cap guarantees the highest level of ingress protection
- Identical approvals as for the PMAFIX IP68 system component version
- Fast modification of specification drawings through simple addition of "GT" to the existing order number (e.g. BVNV-M257 → BVNV-M257GT)
- Additional water protection ring WPS for IP69 ingress protection in conjunction with the IP68 system to be applied right after the IP68 connector onto the conduit
- Content of delivery: Connector with integrated sealing cap, pre-installed safety clip and thread seal for male thread (O-ring and/or flat gasket)



IP66

IP66 static**IP54 dynamic**

- One piece fitting
- Conical sealing method
- Easy "push-in" installation
- Pre-installed safety clip AFN2
- Content of delivery: Connector with pre-installed safety clip

Cable Protection

EMC and Fire Barrier Solution

Providing electro-magnetic shielding



The PMA EMC System provides an additional function within the PMA Cable Protection System, offering high quality shielding against electro-magnetic signals over and above the mechanical cable protection.

The F.CK, F.CU and F.HY screening braids provide excellent shielding for electro-magnetic signals. The patented EMC fittings allow a low impedance 360° termination of the braid preventing stray signals and an earth connection via the termination thread, in addition to the standard water and dust tight termination.

How the fire barrier works in a train

In the event of a fire, the intumescent material ensures that two areas remain separated from each other for at least 30 minutes (E30) in accordance with EN 45545-3. The intumescent material is fixed within the adapter to block the transport of fire, heat and fumes. The material is expanding to fill the cavities between the cables within the adapter.

Intumescent materials (typically sodium silicate or graphite) swell as a result of heat exposure to many times their original volume. The PMA adapters use this material very effectively to seal cavities preventing heat, fire and gases from passing through.

With PMA fire barrier: more safety and better prevention

The intumescent material within the PMA adapters swell in case of fire exposure and blocks transport of fire heat and fumes between the compartments or cabins up to 30 minutes in accordance to EN 45545-3.

In the event of a fire the intumescent material swells to up to 40 times its original volume, sealing all cavities around and between the cables, preventing the propagation of fire and transport of smoke and gas along the cable protection system.

Giving valuable extra time to evacuate passengers and initiate the emergency plan.



Cable Protection

Divisible System Modular Support System

General technical details



One-piece Divisible System. The ideal solution for repairs, retrofit and pre-loomed applications.

PMA offers a divisible system based upon PMA standard nominal widths. This allows free combination of the PACOF and PPCOF divisible conduits with PMAFIX Pro, PMAFIX and PMA Smart Line fittings. Using the PMA Divisible Sytem Fittings repairs can be easily made to existing installations without disconnecting cables. Equally all PMA conduits - also slit - are compatible with the fittings of the divisible system.



Modular support system for conduits and cables



designed for use in railway vehicle construction and other applications where fixation of parallel running conduits and cables is required.

Quick and user friendly installation

The new modular support system offers total flexibility in terms of installation complying with all kinds of installation requirements. Each element can host different combinations of both conduits and cables, in various and different sizes, so that cable routing is made easy regardless of its complexity. Furthermore the fixation of the modular support system can be done with different techniques: on a C-rail, pre-assembled, stacked or upside-down.

Your key benefits with the BGPM:

- Light weight, compact design
- High impact resistance
- Quick installation, possible with one hand
- Conduit rotation possible, preventing torsion
- Axial fixation of conduit and/or cables
- Pre-assembly possible for the bottom half of the support by clips
- Reduction half shell for conduits of smaller size
- Clearance holes for M6 threaded screws for fixation
- Use of Allen-screws and hexagonal-head-screws possible

Lightweight, compact with high impact resistance

BGPM is a lightweight, compact solution with high impact resistance. Thanks to the new design, external dimensions are reduced the very minimum and internal spacing between adjoining conduits is very small. The system is specifically

High Speed Circuit Breaker

ABB's latest generation high-speed DC circuit breaker
Setting a new standard of sustainability for rolling stock

ABB's latest DC circuit breaker for urban and inter-city rail lines is smaller and easier to service than similar commercial products. Environmentally friendly with its cadmium-free contacts.

(*) : 40% less base surface required considering breaker dimensions and recommended clearances toward earthed metallic parts.

Cadmium-free for lower environmental impact

The contacts of the DCBreak are cadmium-free and fully compliant with the RoHS directive on the restriction of the use of specific hazardous substances in electrical equipment.

Customer benefits & savings:

- Reduced flashover distance
- Minimal weight
- Improved portability and facilitated installation
- Reduced handling time and cost
- Simplified systems integration
- Cadmium-free (RoHS standard compliant)
- Maximized operation and environmental specifications
- Available with optional enclosure protection

Compact footprint

When installed on board rolling stock, the DCBreak features shorter flashover distances to ground than other HSBCs. It takes upwards of 40% (*) less footprint, resulting in easier integration and optimum adaptation to customers' space constraints. The DCBreak has a reduced footprint compared to what available on the market, resulting in optimum adaption to customer's space constraints.

DCBreak:
its strengths,
your benefits

Productivity

Maximize your results



- High mechanical endurance 200.000 CO with operational frequency C3
- Reduced flashover distance
- Limited maximum arc voltage
- Electromagnetic closing and reduced holding power

A lighter design

Lighter than similar products, the DCBreak simplifies handling and installation by making them faster and easier. This also improves the performance of the overall system.

Easy to service

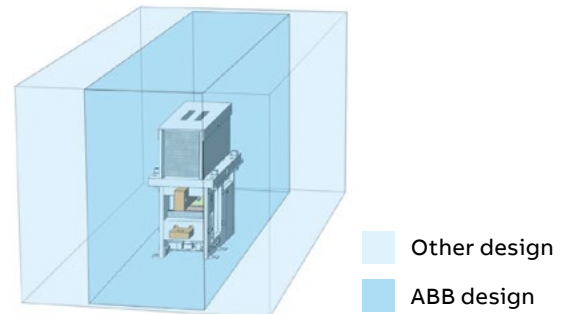
The circuit breaker is rated for over 200,000 maintenance-free operations. The product was engineered to simplify access to wear parts, allowing for simplified maintenance and service procedures.

**Fit for installation in new vehicles as well as retrofits**

With its ergonomic design and adaptable mechanical holders, it is a plug-and-play solution that can easily replace older equipment.

Conformity to railway standards

This exceptionally robust circuit breaker has been tested to operate under harsh climatic conditions including extreme temperatures as well as shock and vibration situations. It is capable of operating in all railway industry conditions.

**Improved portability**

Easy installation



- Smaller footprint
- Simplified systems integration
- Available with high-protection enclosure for underframe or roof installation

Efficiency



Optimize your investments



- Reduced handling time and cost
- Maximized operation and environmental specifications
- Reduced and simplified maintenance requirements

High Speed Circuit Breaker

Ratings and technical characteristics

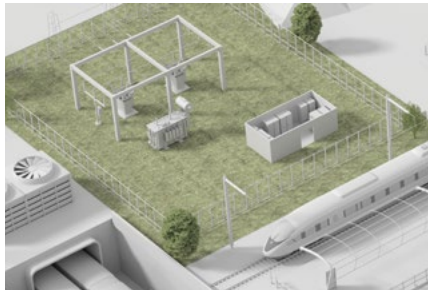
		DCBreak 915 / 915 B	DCBreak 1815 / 1815 B
			
Rated service voltage	U _e	900 V	1800 V
Highest non-permanent voltage	U _{maxz}	1000 V	1950 V
Rated insulations voltage	U _i	2300 V	2300 V
Rated impulse withstand voltage	U _{BIL}	18 kV	18 kV
Rated service current	I _e	1500 A (1400 A in box)	1500 A (1400 A in box)
Conventional thermal current in free air	I _{th}	1500 A (1400 A in box)	1500 A (1400 A in box)
Rated duty short-circuit making and breaking capacity (Nominal operating cycle)		O - 20sec - CO - 60sec CO	O - 20sec - CO - 60sec CO
Time constant T1	I _{ss} at τ	30 kA at 0 ms	17 kA at 0 ms
Time constant T2	I _{ss} at τ	30 kA at 15 ms	30 kA at 15 ms
Time constant T3	I _{ss} at τ	30 kA at 50 ms	30 kA at 40 ms
Time constant T4	I _{ss} at τ	30 kA at 150 ms	30 kA at 100 ms
Maximum arc voltage	Ū _{arc}	2.5 x U _e	2.5 x U _e
Direct overcurrent release		0.9 to 3.6 kA	0.9 to 3.6 kA
Rated auxiliary voltage	U _n	24 - 36 - 48 - 72 - 96 - 110 Vdc	24 - 36 - 48 - 72 - 96 - 110 Vdc
Auxiliary voltage limits		70% U _n ÷ 125% U _n	70% U _n ÷ 125% U _n
Number of auxiliary contacts		2 NO + 2 NC 4 NO + 4 NC 6 NO + 6 NC 8 NO + 8 NC	2 NO + 2 NC 4 NO + 4 NC 6 NO + 6 NC 8 NO + 8 NC
Class of functional operations		C3	C3
Installation		indoor outdoor (with protective enclosure)	indoor outdoor (with protective enclosure)
Degree of protection of protective enclosure (optional)		IP65	IP65
Ambient temperature	T. amb	-25 °C ÷ +70 °C	-25 °C ÷ +70 °C
Relative humidity		95% at 40 °C	95% at 40 °C
Altitude	h	≤ 1400 m	≤ 1400 m
Vibrations and shocks (according to IEC/EN61373)		category 1 class B	category 1 class B

For more information

We are offering a wide range of solutions for:



**Traction System & Products
for Rolling Stock**



Electrification - Traction Power Supply



Control & Signaling



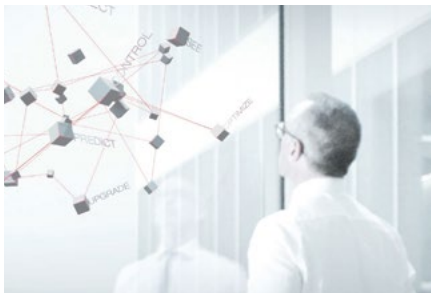
Passenger Station



Tunnel & Other



Service



Digital solutions



Consult our website
<https://new.abb.com/railway>
for more information.

Notes



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