TECHNICAL BROCHURE

Electrification products

2019

ABB is a global leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. ABB in India serves customers in process, consumer and manufacturing industries, utilities, oil & gas sector and infrastructure markets.

ABB offers the widest range of Electrification products and systems, backed by in-depth application know-how. ABB addresses not only the core technologies but also systems and services that support customers throughout the life cycle of the product.

Overview

New outlines for energy and asset management

Through a compelling web app interface, ABB Ability™ Electrical Distribution Control System assists anytime and anywhere via smartphone, tablet or personal computer so the user can:

Monitor
Discover plant performance, supervise the electrical system and allocate costs.

Optimize
Schedule and analyze automatic reports, improve the use of assets and take the right business decision.

Predict
Supervise the system health conditions and predict next maintenance actions.

Control
Set up alerts and notify key personnel, and remotely implement an effective power management strategy to achieve energy savings in a simple way.

ABB Ability™ Electrical Distribution Control System also provides access on a multi-site level - monitoring and comparing the performances of different facilities at the same time.

In addition, it allows profiling of the users' experience according to the level of access they require.

According to the customer needs and application, the user can choose between two configurations to connect the system to ABB Ability™ Electrical Distribution Control System: embedded or external.

The first, just a cartridge-type module, the innovative Ekip Com Hub, has to be provided to Emax 2 circuit breaker, Ekip UP and TruONE™.

The second, the Ekip E-Hub module has to be mounted on DIN-rail.

ELECTRIFICATION PRODUCTS

ABB Ability™ Electrical distribution control system

Understanding power

ABB Ability™ Electrical distribution control system is the innovative cloud-computing platform designed to monitor, optimize, predict and control the electrical system.

ABB Ability™ Electrical distribution control system is built on a state-of-the-art cloud architecture for data collection, processing and storage.

This cloud architecture has been developed together with Microsoft in order to enhance performance and guarantee the highest reliability and security.

Value propositions
Your added value from design to operations

"Give your buildings a new dimension" brings advantages to customers from the design to the operations stage.

The digital solution adds value to facilities, meeting customer demands and enabling them to comply with higher energy efficiency standards.

Real time analysis of valuable data from field devices enables customers to closely monitor the performance of multiple installations with a single supervision system.

Clear information about consumption and improvement opportunities makes cutting waste and improving energy efficiency simple. Customers also benefit from lower energy bills and reductions in unplanned downtime.

ABB's "plug and play" devices make installation quick and easy. Customers can make existing installations smart with no need to replace components. New and retrofitted solutions are up and running in no time, immediately starting to collect data.

Design and Specification

Speed up your project

Increase the facility's value by 5%

Reduce investment in supervision systems by 15%

Achieve compliance or higher class of energy efficiency standards

Faster payback

OWNER
DESIGN CONSULTANT
ENGINEERING COMPANY

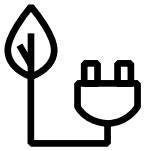
Installation

Easy to install

- Connect to the cloud in only 10 minutes
- Reduce cabling by 60% and connectivity components by 25%
- Upgrade in 1 day the existing installation
- Upgrade with zero component replacement an existing installation

INSTALLER
PANEL BUILDER
SYSTEM INTEGRATOR

Operations



Energy efficiency

- Save up to 20% on maintenance costs
- Save up to 20% on energy bill
- Get proactive alerts and guarantee operations in 1 minute
- Remove energy inefficiency by up to 10%

OWNER
ENERGY MANAGER
MAINTENANCE PROVIDER
FACILITY MANAGER

Architecture

Truly plug and play

Embedded solution with Ekip Com Hub
Emax 2, Ekip UP and TruONE equipped with the new Ekip Com Hub establishes the cloud connection for the whole switchboard.

This dedicated cartridge-type communication module just needs to be inserted into the terminal box and connected to the internet.

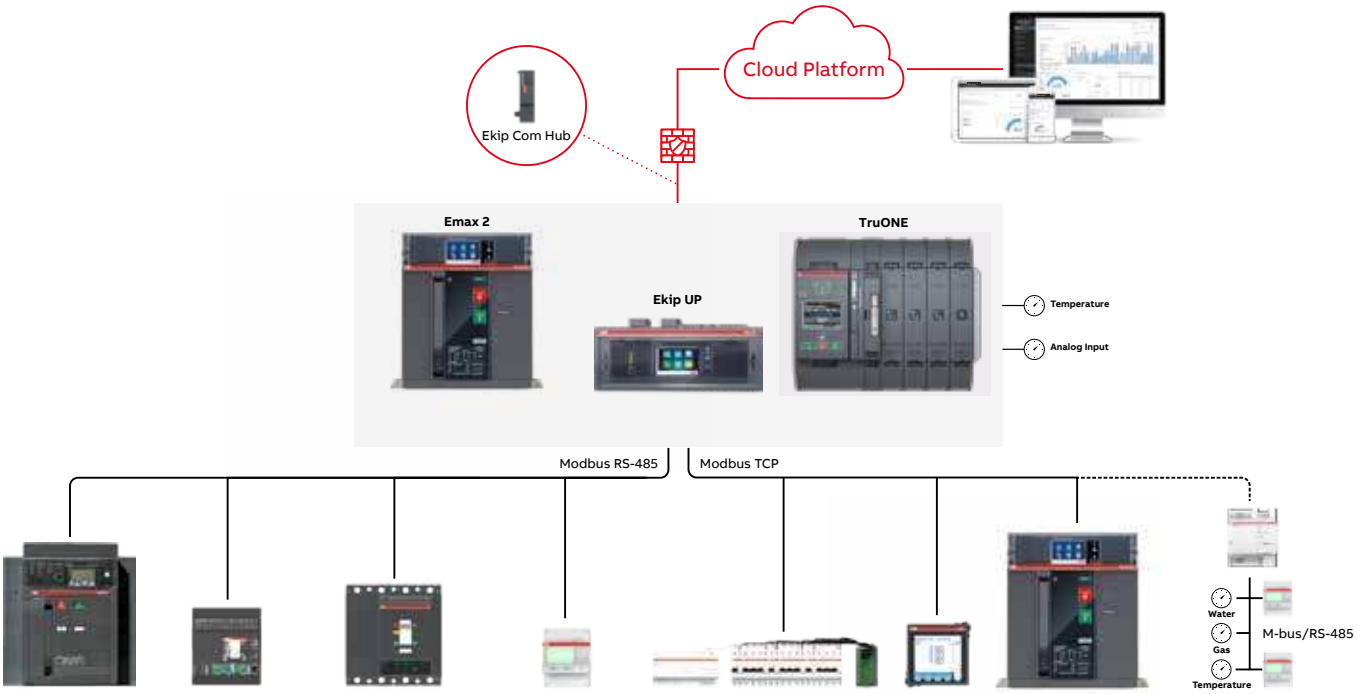


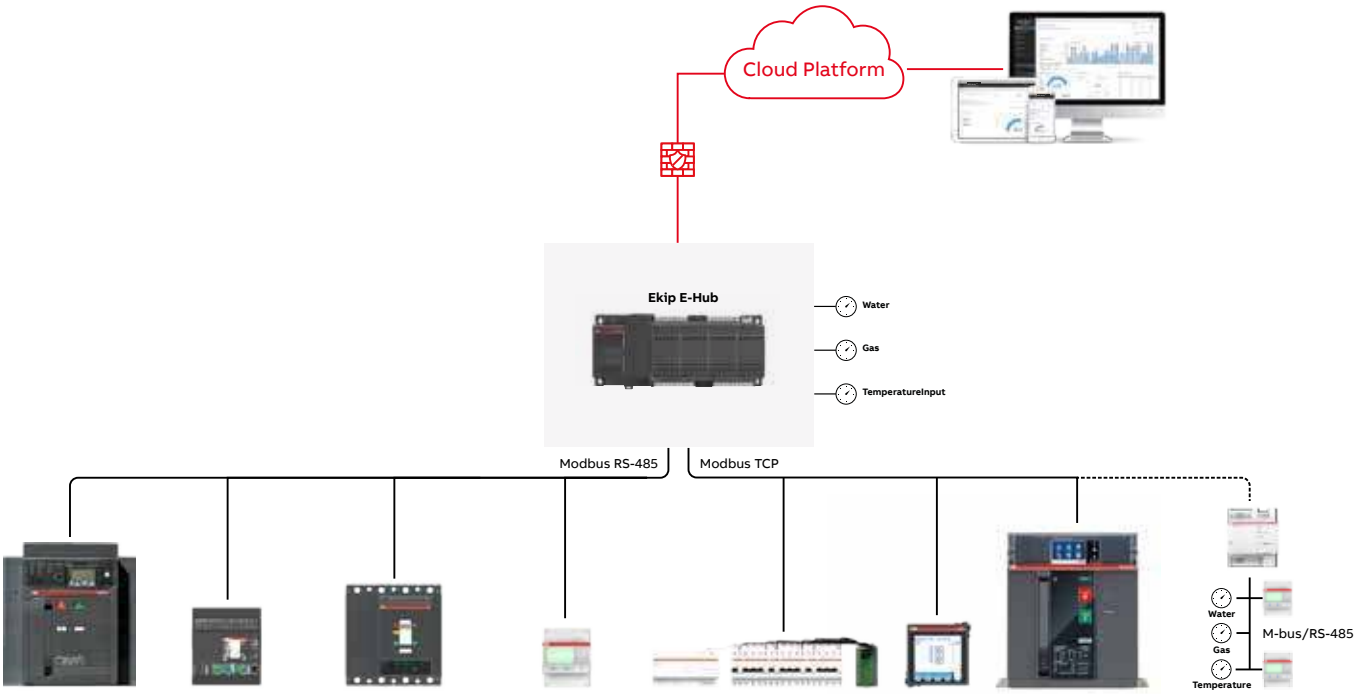
ABB showcases a further evolution in the low-voltage distribution business, setting a new benchmark in terms of simplicity and performance.

ABB Ability™ Electrical Distribution Control System enables the collection of relevant information from the ABB devices installed in the low-voltage power distribution system.

These devices can be connected, plug & play, to the cloud-computing platform by sharing data either with Emax 2 (equipped with Ekip Com Hub) or with Ekip E-Hub via Modbus RS-485, Modbus TCP and Ekip Link.

Family	Device
Low voltage MCCB	Tmax XT
	Tmax T
Low voltage ACB	New Emax
	Emax 2
Digital units	Ekip UP
Low voltage switches and fusegear	TruONE ATS
	Slimline XR ITS 2.1
Digital inputs interface	Ekip Signalling MODBUS TCP
Sub-Metering	EQ Meters
Power meters	M2M
Branch monitoring	CMS700
Medium voltage relays	REF 542 Plus
And many others to come...	

External solution with Ekip E-Hub
The Ekip E-Hub module can be mounted on DIN rail to collect data throughout the system. Moreover, it is possible to connect sensors for environmental parameters (temperature, water, gas) via both analog and digital I/O. Modules for Wi-Fi or GPRS connection are provided as optional features.



INFORMATION										COMMUNICATION
State	Current	Voltages	Power	Energy	Power factor	Power quality	Maintenance & Diagnostics	Load management	Analog or pulse/ digital inputs	Protocol
•	•	•	•	•	•	•	•	•	•	Modbus RS485, Modbus TCP, Ekip Com Hub
•	•	•	•	•	•		•			Modbus RS485
•	•	•	•	•	•	•	•			Modbus RS485
•	•	•	•	•	•	•	•	•	•	Modbus RS485, Modbus TCP, Ekip Com Hub
•	•	•	•	•	•	•		•	•	Modbus RS485, Modbus TCP, Ekip Com Hub
•	•	•	•	•	•	•	•		•	Modbus RS485, Modbus TCP, Ekip Com Hub
•	•	•	•	•	•		•			Modbus RS485
•									•	Modbus TCP
	•	•	•	•	•					Modbus RS485
	•	•	•	•	•	•				Modbus RS485, Modbus TCP
	•	•	•	•						Modbus TCP
	•	•	•	•	•					Modbus TCP

* Provided the product with dedicated accessories for communication and metering functions ** only with Ekip E-Hub module

System Access Points

Embedded solution with Ekip Com Hub
Emax 2 and Ekip UP equipped with the new Ekip Com Hub establish the cloud connection for the whole switchboard. This dedicated cartridge-type communication module just needs to be inserted into the terminal box and connected to the internet.

Solution with EQmatic
EQmatic is a new range of compact, web-based DIN rail devices for energy management applications. They are used for monitoring, logging, displaying and analyzing consumption data from electricity, gas, water or heat meters.

Solution with Ekip E-Hub
The Ekip E-Hub module can be mounted on the DIN rail to collect data from throughout the system.
It is also possible to connect sensors to measure environmental parameters such as temperature, water, gas, via both analog and digital I/O.
Modules for Wi-Fi or GPRS connection are available as optional features.

Solution with CMS-700
The CMS is a compact AC and DC multichannel branch monitoring system. The measurement system consists of a control unit and sensors. The components are simple to install, arranging clearly inside control and distribution cabinets.
The built-in web server offers easy access to live and historical measurement data as well as to the system volumes, allowing constant monitoring of the main electrical parameters to improve energy efficiency and optimize processes.

Ease of use
Power of understanding at your fingertips

ABB Ability™ Electrical Distribution Control System's ease of use sets a benchmark thanks to its integrated and plug-and-play architecture. ABB Ability™ Electrical Distribution Control System requires neither engineering nor special support for commissioning, so users can forget about the cost and time-consuming setup of an energy monitoring and management system involving many components.

For the embedded method, a cartridge-type module - the innovative Ekip Com Hub - just has to be added to the Emax 2 circuit breaker, Ekip UP and TruONE™. The external method simply involves mounting an Ekip E-Hub module on a DIN rail. Then, Ekip Connect commissioning software will set up the system and enable ABB Ability™ EDCS with a few steps.

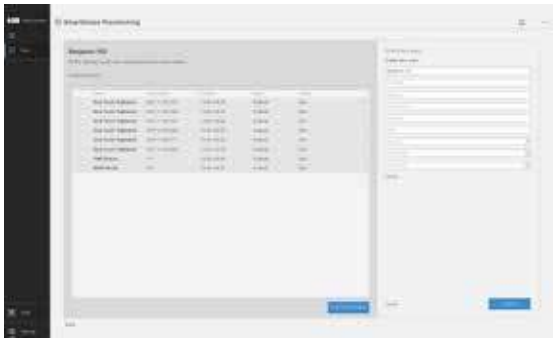
Once the connection is set up, it is possible with a few clicks to extend access to the platform to further users such as partners and staff. Each of them can be entrusted with tasks and authorizations according to their appointed role in the specific plant.

ABB Ability™ Electrical Distribution Control System features an intuitive and compelling graphic interface that guides the user through their job, presenting all the relevant information they seek, derived from thousands of parameters collected from the field.

All the operations run on the ABB Ability™ Electrical Distribution Control System platform are simple, expediting the task of delivering the maximum result.

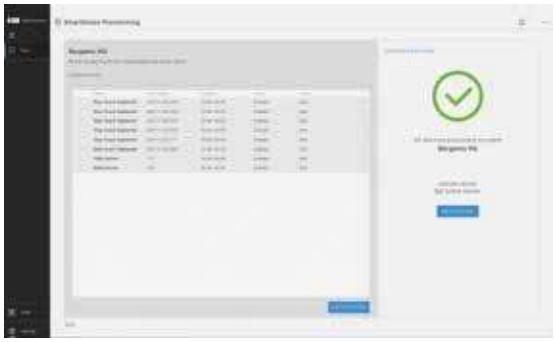
Start Ekip Connect 3.0 wizard

Configure devices and plant



Scan the network

Publish to cloud



Software solutions
EQmatic

The EQmatic is a compact modular device designed to monitor and display consumption and measured values. Often used in stand-alone applications, it also integrates easily into super ordinate systems.

The device has a plug and play system for commissioning that automatically detects any connected meters.

It is accessed via a web browser, with the user interface providing basic analytics functions such as a dashboard, historical data, instantaneous values, comparison functions and cost allocation by consumer group.
As a result, building energy flows and costs are transparent. The solution is suitable for energy management and energy cost allocation applications seeking energy efficiency improvements and cost reductions.

An additional function performs benchmark and comparison analysis by periods and consumers, highlighting opportunities to improve and any non-optimal behaviors.

Data can be collected from field devices including ABB EQmeters; third party gas, water and heat meters; as well as pulse meters with external adapters or converters.

Software solutions
CMS-700

The CMS is a compact AC and DC multichannel branch monitoring system. The heart of the system is a control unit that collects measurement data from sensors, making it available via a built-in web server.

The sensors are universal and can measure all types of current. They can also be mounted wherever they are exactly needed, taking just a matter of minutes to install with no special tools needed for any part of the connection process.

The device makes energy consumption immediately transparent at branch level. It helps identify potential savings, which in turn leads to savings and better allocation of costs. With early warnings, risky situations are detected before they lead to service interruptions or load failures, improving system reliability and supporting continuous operations.

Depending on the application, different mounting options can be chosen to integrate the open-core CMS sensors into any existing system.

There are two sets of sensors available. The first set is designed for ABB installation devices and includes sensors that can be mounted on all ABB installation devices with twin terminals and on S800 high performance circuit breakers with cage terminals.

The second set is a universal design and can be mounted on any DIN rail or can be directly secured to any cables that are to be measured.

Monitor

Discover facility performances any time, anywhere

ABB Ability™ EDCS Dashboard provides users with an entry-level energy management solution based on preconfigured widgets.

Single or multi-site information is processed to display energy consumption and on-site power generation trends.

Both the compelling user interface and the intuitive and immediate availability of data help users to check up on the most relevant information related to different facilities.

ABB Ability™ EDCS Assets enables simplified and enhanced management of low-voltage power distribution system. Users are able to create a sketch or overview of the assets and link it to its “digital twin.” Further, users can upload custom diagrams, photos, technical drawings of switch-boards and plant synoptic panels. As in the social media world, these images can be made interactive through tags and markers. Users are now able to access, at any time, all the information they need for the devices monitored (as state of devices, present of alerts, maintenance, etc..).

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Control
Implement your strategy and reach the goal

The **ABB Ability™ EDCS Power Controller** feature makes load management simple, accurate and remote by combining ABB Ability™ EDCS and Emax 2 Power Manager.

Users can set remotely the power demand they want to target with a weekly, daily or hourly resolution.

Savings and penalty avoidance are guaranteed by simply cutting down demand through a non-priority load shedding / reinsertion routine.

ABB Ability™ EDCS Alert Center provides the users with a plant watchdog. Users can customize alert on single measurement and device level to suit their needs and intervention plan.

Moreover, they can prompt key personnel to take swift action at any time: notifications are sent to the chosen recipients via text messages and/or email. In this way, ABB Ability™ EDCS makes it possible to automatically check up on the electrical systems any time, identify abnormal operations and proactively restore performance.

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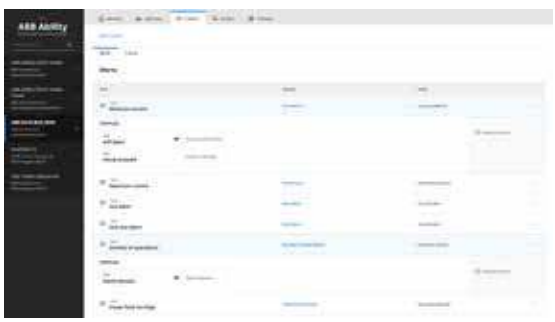

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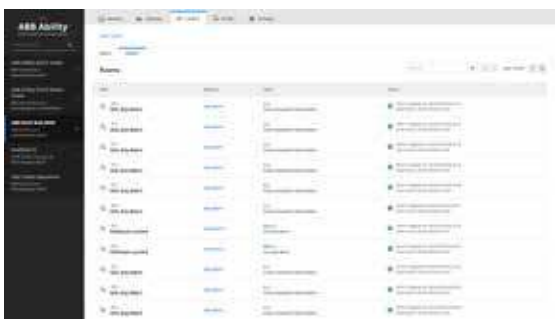

Optimize

Collect your data, analyze information and take your decision

ABB Ability™ EDCS Analytics enables collection and export of data and historical trends, via on-demand query or automatic report scheduling. Users can achieve full knowledge of the electrical systems to set effective benchmarks and compare with best practices. Furthermore, users can digitally file service operations and leverage the power of data for predictive maintenance.

ABB Ability™ EDCS Analytics simplifies and enhance the analyses of power factor compensation, energy management and cost allocation.

By leveraging a comprehensive collection of data, at the single or multi-site level, taking the right decisions is made easier than ever.

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Predict
Supervise the system and schedule its maintenance

ABB Ability™ EDCS Diagnostic lets customers optimize system operating conditions evolving from a pure routine to need-based maintenance.

The ABB Predictive maintenance algorithm makes maintenance smarter, quicker, and less expensive enabling the users to remotely monitor the health of their power system providing an accurate predicting maintenance analysis and optimizing service intervals only when needed.

The analysis combines different key factors such as the real-time number of mechanical operations, nominal current, overloads and short circuits, and environmental conditions such as humidity, temperature, vibration and corrosion.

This cloud-based solution significantly reduces the risk of unplanned shutdowns maximizing service continuity, management and investments costs.

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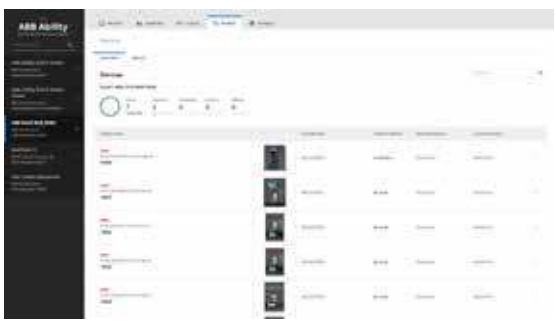

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Applications
High flexibility

ABB Ability™ Electrical Distribution Control System is based on a simple and integrated architecture, with self-configuring connection and guided commissioning that guarantees high flexibility of application.

Buildings
- Commercial buildings
- Offices
- Shopping malls
- Hotels
- Retail or chain stores

Public facilities
- Schools
- Sport centers
- Healthcare facilities

Industrial sector
- Small to mid-sized production plants
- Infrastructure
- Process plants

Table of contents

Type 2 coordination

MCCB DOL-NS

SCPD type : MCCB
Rated voltage : 400/415 V
Short circuit current : 50 kA
Starting type : DOL-NS
Coordination type : IEC Type 2
Overload relay : TOL
Frequency : 50-60 Hz

Motor		Moulded Case Circuit Breakers		Contactor		Overload Relay
Rated Power	Rated Current		Instantaneous Tripping Current			Current setting range
[kW]	[A]	Type	[A]	Type	Type	[A]
0.37	1.1	XT2S160 MF 2	28	A9	TA25DU1.4	1 - 1.4
0.55	1.5	XT2S160 MF 2	28	A9	TA25DU1.8	1.3 - 1.8
0.75	1.9	XT2S160 MF 2	28	A9	TA25DU2.4	1.7 - 2.4
1.1	2.7	XT2S160 MF 4	56	A9	TA25DU4	2.8 - 4
1.5	3.6	XT2S160 MF 4	56	A16	TA25DU5	3.5 - 5
2.2	4.9	XT2S160 MF 8.5	120	A26	TA25DU6.5	4.5 - 6.5
3	6.5	XT2S160 MF 8.5	120	A26	TA25DU8.5	6 - 8.5
4	8.5	XT2S160 MF 12.5	175	A30	TA25DU11	7.5 - 11
5.5	11.5	XT2S160 MF 12.5	175	A30	TA25DU14	10 - 14
7.5	15.5	XT2S160 MA 20	210	A30	TA25DU19	13 - 19
11	22	XT2S160 MA 32	288	A30	TA42DU25	18 - 25
15	29	XT2S160 MA 52	392	A50	TA75DU42	29 - 42
18.5	35	XT2S160 MA 52	469	A50	TA75DU52	36 - 52
22	41	XT2S160 MA 52	547	A50	TA75DU52	36 - 52
30	55	XT2S160 MA 80	840	A63	TA75DU80	60 - 80
37	66	XT2S160 MA 80	960	A75	TA75DU80	60 - 80
45	80	XT2S160 MA 100	1200	A95	TA110DU110	80 - 110
55	97	XT3S250 MA 160	1440	A110	TA110DU110	80 - 110
75	132	XT3S250 MA 200	1800	A145	TA200DU175	130 - 175
90	160	XT3S250 MA 200	2400	A185	TA200DU200	150 - 200
110	193	T5S400 PR221-I In320	2720	AF205	EF205-210	60 - 200
132	232	T5S400 PR221-I In400	3200	AF265	EF205-210	60 - 200
160	282	T5S400 PR221-I In400	4000	AF305	EF205-210	60 - 200
200	349	T5S630 PR221-I In630	5040	AF400	EF460-500	150 - 500
250	430	T6S630 PR221-I In630	6300	AF460	EF460-500	150 - 500
290	520	T6S800 PR221-I In800	7200	AF580	EF750-800	250 - 800
315	545	T6S800 PR221-I In800	8000	AF580	EF750-800	250 - 800
355	610	T6S800 PR221-I In800	8000	AF750	EF750-800	250 - 800

SCPD type : MCCB
Rated voltage : 400/415 V
Short circuit current : 50 kA
Starting type : SD-NS
Coordination type : IEC Type 2
Overload relay : TOL
Frequency : 50-60 Hz

Motor		MCCB		Contactor			Thermal release	
Pe [kW]	Ie [A]	type	Im [A]	line type	delta type	star type	type	[A]
18.5	35	XT2S160 MA52	469	A50	A50	A26	TA75DU25	18-25
22	41	XT2S160 MA52	547	A50	A50	A26	TA75DU32	22-32
30	55	XT2S160 MA80	720	A63	A63	A30	TA75DU42	29-42
37	66	XT2S160 MA80	840	A75	A75	A30	TA75DU52	36-52
45	80	XT2S160 MA100	1050	A75	A75	A30	TA75DU63	45-63
55	97	XT2S160 MA100	1200	A75	A75	A40	TA75DU63	45-63
75	132	XT3S250 MA160	1700	A95	A95	A75	TA110DU90	66-90
90	160	XT3S250 MA200	2000	A110	A110	A95	TA110DU110	80-110
110	195	XT3S250 MA200	2400	A145	A145	A95	TA200DU135	100-135
132	232	T5S400 PR221-I In320	2880	A145	A145	A110	EF205-210	60-200
160	282	T5S400 PR221-I In400	3600	A185	A185	A145	EF205-210	60-200
200	350	T5S630 PR221-I In630	5040	AF265	AF265	AF190	EF370-380	115-380
250	430	T6S630 PR221-I In630	6300	AF265	AF265	AF190	EF370-380	115-380
290	520	T6S630 PR221-I In630	8000	AF580	AF580	AF400	EF750-800	250-800
315	540	T6S800 PR221-I In800	8000	AF580	AF580	AF400	EF750-800	250-800
355	610	T6S800 PR221-I In800	8000	AF580	AF580	AF400	EF750-800	250-800

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SCPD type : MMS
Rated voltage : 400/415 V
Short circuit current : 50 kA
Overload relay : Embedded

Starting type : DOL-NS
Coordination type : IEC Type 2
Frequency : 50-60 Hz

Rated Power	Motor Rated Current		Instantaneous Tripping Current	Manual Motor Starter Current setting range	Contactor
[kW]	[A]	Type	[A]	[A]	Type
0.06	0.2	MS132-0,25	2.44	0.16 - 0.25	A9
0.09	0.3	MS132-0,40	3.9	0.25 - 0.40	A9
0.12	0.44	MS132-0,63	6.14	0.40 - 0.63	A9
0.18	0.6	MS132-0,63	6.14	0.40 - 0.63	A9
0.25	0.85	MS132-1,0	11.5	0.63 - 1.00	A9
0.37	1.1	MS132-1,6	18.4	1.00 - 1.60	A9
0.55	1.5	MS132-1,6	18.4	1.00 - 1.60	A9
0.75	1.9	MS132-2,5	28.75	1.60 - 2.50	A9
1.1	2.7	MS132-4,0	50	2.50 - 4.00	A16
1.5	3.6	MS132-4,0	50	2.50 - 4.00	A16
2.2	4.9	MS132-6,3	78.75	4.00 - 6.30	A26
3	6.5	MS132-10	150	6.30 - 10.00	A26
4	8.5	MS132-10	150	6.30 - 10.00	A26
5.5	11.5	MS132-12	180	8.00 - 12.00	A26
7.5	15.5	MS132-16	240	10.00 - 16.00	A30
11	22	MS132-25	375	20.00 - 25.00	A30
15	29	MS132-32	480	25.00 - 32.00	A30
18.5	35	MS450-40	520	28.00 - 40.00	A40

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SCPD type : MMS
Rated voltage : 400/415 V
Short circuit current : 50 kA
Overload relay : TOL

Starting type : DOL-NS
Coordination type : IEC Type 2
Frequency : 50-60 Hz

	Motor	Manual Motor Starter		Contactor		Overload Relay	
Rated Power	Rated Current [A]	Type	Inst. Trip. Current [A]	Type	Type	Current range [A]	Max allowed load current [A]
0.06	0.20	MO132-0,25	3.13	A9	TA25DU0,25	0.16 - 0.25	0.25
0.09	0.30	MO132-0,40	5.00	A9	TA25DU0,40	0.25 - 0.40	0.40
0.12	0.44	MO132-0,63	7.88	A9	TA25DU0,63	0.40 - 0.63	0.63
0.18	0.72	MO132-0,63	7.88	A9	TA25DU1,00	0.63 - 1.00	1.00
0.25	0.85	MO132-1,0	12.50	A9	TA25DU1,00	0.63 - 1.00	1.00
0.37	1.10	MO132-1,6	20.00	A9	TA25DU1,40	1.00 - 1.40	1.35
0.55	1.50	MO132-1,6	20.00	A9	TA25DU1,80	1.30 - 1.80	1.80
0.75	1.90	MO132-2,5	31.25	A9	TA25DU2,40	1.70 - 2.40	2.35
1.10	2.70	MO132-4,0	50.00	A9	TA25DU3,10	2.30 - 3.10	2.95
1.50	3.60	MO132-4,0	50.00	A12	TA25DU4,00	2.80 - 4.00	3.75
2.00	4.00	MO132-6,3	78.75	A26	TA25DU5,00	3.50 - 5.00	4.75
2.20	4.90	MO132-6,3	78.75	A26	TA25DU6,50	4.50 - 6.50	6.25
3.00	6.50	MO132-10	125.00	A26	TA25DU8,50	6.00 - 8.50	8.00
4.00	8.50	MO132-10	125.00	A26	TA25DU11,0	7.50 - 11.00	10.50
5.50	11.50	MO132-12	150.00	A26	TA25DU14,0	10.00 - 14.00	13.50
7.50	15.50	MO132-16	200.00	A26	TA25DU19,00	13.00 - 19.00	16.00
9.00	18.60	MO132-20	250.00	A26	TA25DU19,00	13.00 - 19.00	18.50
11.00	22.00	MO132-25	313.00	A30	TA25DU25,0	18.00 - 25.00	23.50
15.00	30.00	MO132-32	400.00	A30	TA25DU32,0	22.00 - 32.00	30.50
18.50	37.00	MO450-40,0	520.00	A50	TA75DU42,0	29.00 - 42.00	39.00
22.00	45.00	MO450-50,0	650.00	A50	TA75DU52,0	36.00 - 52.00	48.50
30.00	60.00	MO495-63,0	819.00	A63	TA75DU63,0	45.00 - 63.00	61.50
37.00	72.00	MO495-75,0	975.00	A75	TA75DU80,0	60.00 - 80.00	72.50
40.00	79.00	MO495-90,0	1170.00	A95	TA110DU90	65.00 - 90.00	85.00
45.00	83.00	MO495-90,0	1170.00	A95	TA110DU90	65.00 - 90.00	85.00
51.00	94.00	MO495-100	1235.00	A110	TA110DU110	80.00 - 110.00	95.00

Type 2 coordination

SCPD type : Fuse
Rated voltage : 400/415 V
Short circuit current : 50 kA
Starting type : DOL-NS
Coordination type : IEC Type 2
Overload relay : TOL
Frequency : 50-60 Hz

	Motor			Fuses IEC	Contactor		Overload relay	
Rated power [kW]	Rated current [A]	Switch-Fuse type	Rating gG/ aM [A]	Type and size	Type	Type	Current range[A]	Max allowed load current [A]
0.37	1.10	OESA00-32	6	OFAFN00GG6	AX9	TA25DU-1,4	1.00-1.40	1.40
0.55	1.50	OESA00-32	6	OFAFN00GG6	AX9	TA25DU-1,8	1.30-1.80	1.80
0.75	1.90	OESA00-32	6	OFAFN00GG6	AX9	TA25DU-2,4	1.70-2.40	2.40
1.10	2.70	OESA00-32	10	OFAFN00GG10	AX9	TA25DU-3,1	2.20-3.10	3.10
1.50	3.60	OESA00-32	10	OFAFN00GG10	AX9	TA25DU-4,0	2.80-4.00	4.00
2.20	4.90	OESA00-32	16	OFAFN00GG16	AX9	TA25DU-6,5	4.50-6.50	6.50
3.00	6.50	OESA00-32	20	OFAFN00GG20	AX12	TA25DU-8,5	6.00-8.50	8.30
4.00	8.50	OESA00-32	25	OFAFN00GG25	AX18	TA25DU-11	7.50-11.00	10.00
5.50	11.50	OESA00-32	32	OFAFN00GG32	AX32	TA25DU-14	10.00-14.00	14.00
7.50	15.20	OESA00-63	50	OFAFN00GG50	AX32	TA25DU-19	13.00-19.00	19.00
11.00	22.00	OESA00-63	50	OFAFN00GG50	AX32	TA25DU-25	18.00-25.00	25.00
15.00	29.00	OESA00-63	63	OFAFN00GG63	AX32	TA25DU-32	24.00-32.00	30.00
15.00	29.00	OESA00-63	63	OFAFN00GG63	AX40	TA45DU-42	29.00-42.00	35.00
18.50	35.00	OESA00-125	80	OFAFN00GG80	AX50	TA85DU-42	29.00-42.00	40.00
22.00	41.00	OESA00-125	100	OFAFN00GG100	AX50	TA85DU-52	36.00-52.00	47.00
30.00	55.00	OESA00-125	125	OFAFN00GG125	AX65	TA85DU-63	45.00-63.00	63.00
37.00	66.00	OS250D_	160	OFAFN1GG160	AX80	TA85DU-80	65.00-90.00	80.00
45.00	80.00	OS250D_	160	OFAFN1GG160	AX80	TA85DU-80	65.00-90.00	80.00
45.00	80.00	OS250D_	200	OFAFN1GG200	AX95	TA110DU-110	65.00-90.00	90.00
55.00	97.00	OS250D_	200	OFAFN1GG200	AX115	TA110DU-110	80.00-110.00	110.00
75.00	132.00	OS250D_	250	OFAFN1GG250	AX150	TA200DU-150	110.00-150.00	145.00
90.00	160.00	OS250D_	250	OFAFN1GG250	AX185	TA200DU-175	130.00-175.00	170.00
90.00	160.00	OS400D_	315	OFAFN2GG315	AX185	TA200DU-175	130.00-175.00	175.00
110.00	195.00	OS400D_	400	OFAFN2GG400	AX205	EF 370-380 10	115.00-380.00	205.00
110.00	195.00	OS400D_	400	OFAFN2GG400	AX260	EF 370-380 10	115.00-380.00	245.00
132.00	230.00	OS400D_	400	OFAFN2GG400	AX260	EF 370-380 10	115.00-380.00	245.00
160.00	280.00	OS630D_	500	OFAFN2GG500	AX300	EF 370-380 10	115.00-380.00	300.00
200.00	350.00	OS630D_	630	OFAFN3GG630	AX370	EF 370-380 10	115.00-380.00	370.00

ABB’s comprehensive range of circuit breakers and switches

ABB is a synonym of quality and innovation in the Low Voltage sector, with products which, by integrating perfectly, adapt to the various service and installation requirements, thereby satisfying all plant needs, from the small user up to large industrial power distribution plants.

ABB offer of low voltage circuit-breakers and switches, makes products of high quality, reliability and precision available, which guarantee high performances in any conditions, safe-to-use products and, when needed, easy replacement of any faulty parts.

SACE Emax air circuit breakers

Common data

Voltages			
Rated service voltage	Ue	[V]	690 ~
Rated insulation voltage	Ui	[V]	1000
Rated impulse withstand voltage	Uimp	[kV]	12
Service temperature		[°C]	-25...+70
Storage temperature		[°C]	-40...+70
Frequency	f	[Hz]	50-60
Number of poles			3-4
Version			Fixed-Withdrawable

					E1	
			Levels of performance	[A]	B	N
Currents: rated uninterrupted current (at 40 °C)		Iu		[A]	800	800
				[A]	1000	1000
				[A]	1250	1250
				[A]	1600	1600
				[A]	-	-
				[A]	-	-
				[A]	-	-
Current carrying capacity of neutral pole for 4-pole CBs				[%Iu]	100	100
Rated ultimate short-circuit breaking capacity		Icu	220/230/380/400/415 V~	[kA]	42	50
			440 V~	[kA]	42	50
			500/525 V~	[kA]	42	50
			660/690 V~	[kA]	42	50
Rated service short-circuit breaking capacity		Ics	220/230/380/400/415 V~	[kA]	42	50
			440 V~	[kA]	42	50
			500/525 V~	[kA]	42	50
			660/690 V~	[kA]	42	50
Rated short-time withstand current		Icw	(1s)	[kA]	42	50
			(3s)	[kA]	36	36
Rated making capacity under short-circuit (peak value)		Icm	220/230/380/400/415 V~	[kA]	88.2	105
			440 V~	[kA]	88.2	105
			500/525 V~	[kA]	88.2	105
			660/690 V~	[kA]	88.2	105
Category of use	CEI EN 60947-2				B	B
Isolation behaviour	CEI EN 60947-2				•	•
Overcurrent protection						
Electronic releases for applications in AC					•	•
Operating times						
Closing time (max)				[ms]	80	80
Breaking time for I<Icw (max) (1)				[ms]	70	70
Breaking time for I>Icw (max)				[ms]	30	30
Overall dimensions						
Fixed: H =418 mm-D =302 mm		W	(3/4 poles)	[mm]		296/386
Withdrawable: H =461-D =396.5 mm		W	(3/4 poles)	[mm]		324/414
Weights (circuit-breaker complete with releses and CT, accessories excluded)						
Fixed 3/4 poles				[kg]	45/54	45/54
Withdrawable 3/4 poles (including the fixed part)				[kg]	70/82	70/82

(1) without intentional delays (2) the performance at 600 V is 100 kA

				E1 B-N		
Rated uninterrupted current (at 40 °C)		Iu	[A]	800	1000/ 1250	1600
Mechanical life with regular ordinary maintenance			[No. operations x 1000]	25	25	25
Frequency of operations			[Operations/hour]	60	60	60
Electrical life	(440 V ~)		[No. operations x 1000]	10	10	10
	(690 V ~)		[No. operations x 1000]	10	8	8
Frequency of operations			[Operations/hour]	30	30	30




E2				**E3**					**E4**				**E6**	
B	N	S	L	N	S	H	V	L	S	H	V	H	V
1600	1000	800	1250	2500	1000	800	800	2000	4000	3200	3200	5000	5000
2000	1250	1000	1600	3200	1250	1000	1250	2500	-	4000	4000	6300	6300
-	1600	1250	-	-	1600	1250	1600	-	-	-	-		-
-	2000	1600	-	-	2000	1600	2000	-	-	-	-	-	-
-	-	2000	-	-	2500	2000	2500	-	-	-	-	-	-
-	-	-	-	-	3200	2500	3200	-	-	-	-	-	-
-	-	-	-	-	-	3200	-	-	-	-	-	-	-
100	100	100	100	100	100	100	100	100	50	50	50	50	50
42	65	85	130	65	75	100	130	130	75	100	150	100	150
42	65	85	110	65	75	100	130	110	75	100	150	100	150
42	55	65	85	65	75	85	100	85	75	100	130	100	130
42	55	65	85	65	75	85	100	85	75	85	100	100	130
42	65	85	130	65	75	85	100	130	75	100	125	100	100
42	65	85	110	65	75	85	100	110	75	100	125	100	125
42	55	65	65	65	75	85	85	65	75	100	130	100	125
42	55	65	65	65	75	85	85	65	75	85	100	100	100
42	55	65	10	65	75	75	85	15	75	100	100	100	100
42	42	42	–	65	65	65	65	–	75	75	75	85	85
88.2	143	187	286	143	165	220	286	286	165	220	330	220	330
88.2	143	187	242	143	165	220	286	286	165	220	330	220	330
88.2	121	143	187	143	165	187	220	187	165	220	286	220	286
88.2	121	143	187	143	165	187	220	187	165	187	220	220	220
B	B	B	A	B	B	B	B	A	B	B	B	B	B
•	•	•	•	•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•	•	•	•
80	80	80	80	80	80	80	80	80	80	80	80	80	80
70	70	70	70	70	70	70	70	70	70	70	70	70	70
30	30	30	12	30	30	30	30	12	30	30	30	30	30
			296/386					404/530			566/656		782/908
			324/414					432/558			594/684		810/936
50/61	50/61	50/61	52/63	66/80	66/80	66/80	66/80	72/83	97/117	97/117	97/117	140/160	140/160
78/93	78/93	78/93	80/95	104/125	104/125	104/125	104/125	110/127	147/165	147/165	147/165	210/240	210/240

E2 B-N-S				**E2 L**		**E3 N-S-H-V**							**E3 L**		**E4 S-H-V**		**E6 H-V**	
800	1000 1250	1600	2000	1250	1600	800	1000 1250	1600	2000	2500	3200	3200	2000	2500	3200	4000	5000	6000
25	25	25	25	20	20	20	20	20	20	20	20	20	15	15	15	15	12	12
60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
15	15	12	10	4	3	12	12	10	9	8	6	6	2	1,8	7	5	3	2
15	15	10	8	3	2	12	12	10	9	7	5	5	1.5	1.3	7	4	2	1.5
30	30	30	30	20	20	20	20	20	20	20	20	20	20	20	10	10	10	10

Main characteristics of releases

Combination of release with circuit-breaker

		E1	E2	E3	E4	E6
	In	800/1600	800/2000	800/3200	3200/4000	5000/6300
	Version	F-W	F-W	F-W	F-W	F-W
Electronic	PR121/P	•	•	•	•	•
	PR122/P	•	•	•	•	•
	PR123/P	•	•	•	•	•

Electronic releases

	PR121/P	PR122/P	PR123/P
			
Electronic releases	LI-LSI-LSIG	LI-LSI-LSIG	LI-LSI-LSIG
Compatible circuit-breakers	E1-E2-E3-E4-E6	E1-E2-E3-E4-E6	E1-E2-E3-E4-E6
Applications	Distribution	Distribution	Distribution
Basic protections			
L	(DS) (E) I1=0.4-1 In	(ME) (E) I1=0.4-1 In	(ME) (E) I1=0.4-1 In
	(DS) (E) t1=3-144 s t=k/I^2	(ME) (E) t1=3-144 s t=k/I^2	(ME) (E) t1=3-144 s t=k/I^2
S	(DS) (E) I2=1-10 In	(ME) (E) I2=0.6-10 In	(ME) (E) I2=0.6-10 In
	(DS) (E) t2=0.1-0.8 s t=k	(ME) (E) t2=0.5-0.8 s t=k/I^2 or t=k	(ME) (E) t2=0.05-0.8 s t=k/I^2 or t=k
I	(DS) (E) I3=1.5-15 In	(ME) (E) I3=1.5-15 In	(ME) (E) I3=1.5-15 In
	t3= instantaneous t=k	t3= instantaneous t=k	t3= instantaneous t=k
G	(DS) (E) I4=0.2-1 In	(ME) (E) I4=0.1-1 In	(ME) (E) I4=0.1-1 In
	(DS) (E) t4=0.1-0.8 s t=k	(ME) (E) t4=0.1-1 s t=k/I^2 or t=k	(ME) (E) t4=0.1-1 s t=k/I^2 or t=k
Rc	–	(ME) (E) IΔ=3-30 A	(ME) (E) IΔ=3-30 A
	–	(ME) (E) tΔ=0.06-0.8s t=k	(ME) (E) tΔ=0.06-0.8 s t=k
OT	–	T=85° C	T=85° C
	–	t=instantaneous t=k	t=instantaneous t=k
U	–	(ME) (E) I6=5...90%	(ME) (E) I6=5...90%
		(ME) (E) t6=0.5-60 s t=k	(ME) (E) t6=0.5-60 s t=k
Advanced protections	–		
UV	–	(ME) (E) U8=0.5-0.95 Un	(ME) (E) U8=0.5-0.95 Un
	–	(ME) (E) t8 =0.1-5 s t=k	(ME) (E) t8 =0.1-5 s t=k
OV	–	(ME) (E) U9=1.05-1.2 Un	(ME) (E) U9=1.05-1.2 Un
	–	(ME) (E) t9 =0.1-5 s t=k	(ME) (E) t9 =0.1-5 s t=k
RV	–	(ME) (E) U10 =0.1-0.4 Un	(ME) (E) U10 =0.1-0.4 Un
	–	(ME) (E) t10 =0.5-30 s t=k	(ME) (E) t10 =0.5-30 s t=k
RP	–	(ME) (E) P11 =-0.3 to -0.1 P_n	(ME) (E) P11 =-0.3 to -0.1 P_n
	–	(ME) (E) t10 =0.5-25 s t=k	(ME) (E) t10 =0.5-25 s t=k
UF	–	(ME) (E) f12 =0.90-0.99 fn	(ME) (E) f12 =0.90-0.99 fn
	–	(ME) (E) t10 =0.5-3 s t=k	(ME) (E) t10 =0.5-3 s t=k
OF	–	(ME) (E) f13 =1.01-1.10 fn	(ME) (E) f13 =1.01-1.10 fn
	–	(ME) (E) t13 =0.5-3 s t=k	(ME) (E) t13 =0.5-3 s t=k
S2	–	–	(ME) (E) I2=0.6-10 In
	–	–	(ME) (E) t2=0.05-0.8 s t=k
D	–	–	(ME) (E) I7=0.6-10 In
	–	–	(ME) (E) t7=0.2-0.8 s t=k
R	–	–	–
Communication		With PR120/ D-M	With PR120/ D-M
Measurements	–	Basic: included as standard-advanced with Accessory PR120/V	advanced- harmonic analysis
NOTES	–	Adv. prot. PR120V-Diff. with homopolar toroid- Sett. (E) with PR010T, BT030-USB, PR120/D-BT	Residual with homopolar toroid-Setting (E) with PR010T, BT030-USB, PR120/D-BT

KEY

L-Protection against overload
S-Selective protection against short-circuit
I-Instantaneous protection against short-circuit
G-Protection against earth faults
Rc-Protection against residual current
OT-Protection against overtemperature
U-Protection against phase unbalance
UV-Undervoltage protection

t=k relation t=f(I)

t=k/I2 relation t=f(I)

OV-Overvoltage protection
RV-Protection against residual voltage
RP-Protection against active power reversal R-Protection against rotor block
UF-Protection against under frequency
OF-Protection against over frequency
S2-Selective protection against short-circuit
D-Protection against directional short-circuit
PR010T-Test and configuration unit

PR_ _ _ D-M-Communication module mod-bus
PR_ _ _V Measurement module
Ekip Comm Bluetooth-Wireless communication unit

PR021K-Signalling unit

(M)-Manual setting
(DS)-Setting with Dip Switch
(E)-Electronic setting with external apparatus
(BT030 or PR010T) or remotely with communication
(ME)-Electronic manual setting on front of panel

Basic Measurements
Phase, Neutral, Earth currents

Advanced Measurements
Currents (phase, Neutral, Earth)
Phase voltages (between phases, phase-neutral, residual)
Power (Active, Reactive, Apparent)
Power factor
Frequency and Peak Factor
Energy (Active, Reactive, Apparent)

Version
F- Fixed
P- Plug-in
W- Withdrawable

Communication / Signalling / Measurement

PR120/D-M

PR120/D-M

The PR120/D-M (for Emax) communication modules are the solution for connection the ABB circuit-breakers to a Modbus network, for remove supervision and control of the circuit-breaker.

PR120/V

PR120/V

The PR120/V (for PR122/P) modules can be added to the releases and allow the phase voltages and neutral to be measured and processed, transferring these data to the protection release itself, so that a series of protection and measurement functions can be implemented.

SACE PR021/K -PR120/K

PR021/K

PR120/K

The SACE PR021/K and PR120/K (only for PR122 and PR123) signalling units are able to convert the digital signals supplied by the PR122 and PR123 protection units into electric signals by means of normally open electrical contacts, it allows remote signalling of the release alarms and trips.

Ekip Com Bluetooth

Ekip Com Bluetooth

The Ekip Com Bluetooth is a device to be connected to the test connector of PR222DS/P, PR222DS/PD, PR223DS, PR223 EF, PR232/P, PR331/P and PR332/P. It allows the Bluetooth communication between the protection release and a hand-help PC or a laptop with a Bluetooth port. The Ekip Com Bluetooth can be used with Tmax XT, Tmax and New Emax circuit breakers with microprocessor based releases.

HMI030

This can be used with all the protection releases fitted with dialogue, it is designed to be installed on the front of the panel. It consists of a graphic display where all the measurements and the release alarms/events are displayed. Thanks to its high level of precision, the device can replace the traditional multi-meters without the need of current/voltage transformers. HMI030 is connected directly to the protection release by means of a serial line and requires a 24 V DC power supply.

Ekip T&P

The Ekip T&P unit is an instrument able to carry out the Test, programming and parameter reading functions for the protection units which equip the circuit-breakers.

The kit is composed by:
- Ekip T&P unit;
- Ekip TT unit;
- Adaptors for Emax and Tmax/ Tmax XT trip units;
- USB cable for connecting the Ekip T&P unit to the electonic trip unit;
- CD for installing Ekip Connect and the
- Ekip T&P driver.

Emax 2 and ABB Ability™ Electrical Distribution Control System

Microgrids and the power of data make energy digital

Transforming the flow of energy into analysable, manageable data – this is the function of Ekip Smart-Vision, the cloud computing platform that re-writes the rules for the energy management of low-voltage electrical systems. The internet of things is integrated into the devices, services and processes, allowing for better informed decision-making and easier supervision, even remotely. A simple, ready-to-use system that makes it possible to enhance radically, in combination with the new functions of Emax 2, the efficiency of latest-generation systems – microgrids – in terms of control, connectivity and ease of use.

Are you starting to understand what the future will be like?


ABB
OPEN
TU Feed

SACE TMAX single family of moulded-case circuit-breakers upto 3200 A

— 01 Upto 250 A
— 02 Upto 1000 A
— 03 Upto 3200 A

Tmax moulded-case circuit-breakers guarantee an extremely high performance level while being progressively smaller in size, simple to install and able to provide increasingly better safety guarantees for the operator.

In addition to being ideal for the secondary distribution of alternate and direct current, they feature dedicated solutions for all application requirements.

Moulded-case circuit-breakers can be used in low voltage civil and industrial installations with 1 to 3200 A operating current. The Tmax family includes 9 circuit-breaker sizes in three- or four-pole versions:
- XT1, XT2, XT3 and XT4 up to 250A
- T4, T5 and T6 up to 1000A
- T7 and T8 up to 3200A

The ultimate short-circuit breaking capacity (Icu) at 415V ranges from 18kA to 200kA, or up to 100kA for 690V.

The following ranges are available:
- Circuit-breakers for AC and DC power distribution;
- Circuit-breakers for zone selectivity;
- Circuit-breakers for motor protection;
- Circuit-breakers for up to 1150V AC and 1000V DC applications;
- Switch-disconnectors.

All Tmax circuit breakers can be enhanced with a vast range of standardized accessories. This convenience not only cuts down on inventory, but creates an extremely flexible and easily managed solution.

Tmax circuit-breakers can be equipped with thermomagnetic, magnetic only or electronic trip units; all of which are interchangeable.

Since assembly instructions are simple, trip units can quickly and easily be replaced; even in the field.

All this makes the circuit-breakers very easy to operate with considerable savings due to rationalized stock management.

— 01

— 02

— 03

ABB SACE is proud to present the extraordinary result of a long and intense R&D project to you: the new SACE Tmax XT up to 250A. This is a range of moulded-case circuitbreakers created to fulfil all plant requirements, whether these be standard or technologically advanced - circuit-breakers are able to achieve performances with very high short-circuit protection values. The new SACE Tmax XT can also be equipped with fully updated electronic trip units and fitted with exceptional devices of the latest generation. There are also all types of accessories available, which are easy to install thanks to the rapid assembly system. This is just a taste of the SACE Tmax XT world - a world built on absolute excellence, a world which is Simply XTraordinary.

Tmax moulded-case circuit-breakers

Common data		
Voltages		
Rated service voltage,		690
Rated impulse withstand voltage, Uimp	[kV]	8-12
Rated insulation voltage, Ui	[V]	800...1000
Test voltages at power frequency for 1 min.	[V]	3000...3500
Number of poles		3-4

Type of circuit-breaker				XT1					XT2				
Frame				160					160				
Rated ultimate short-circuit breaking capacity, Icu				B	C	N	S	H	N	S	H	L	V
	(AC) 50-60 Hz 220/230 V/240V		[kA]	25	40	65	85	100	65	85	100	150	200
	(AC) 50-60 Hz 380/415 V		[kA]	18	25	36	50	70	36	50	70	120	150
	(AC) 50-60 Hz 440 V		[kA]	15	25	36	50	65	36	50	65	100	150
	(AC) 50-60 Hz 500 V		[kA]	8	18	30	36	50	30	36	50	60	70
	(AC) 50-60 Hz 690 V		[kA]	3	4	6	8	10	10	12	15	18	20
	(DC) 250 V-2 poles in series		[kA]	18	25	36	50	70	36	50	70	85	100
	(DC) 250 V-3 poles in series		[kA]	–	–	–	–	–	–	–	–	–	–
	(DC) 500 V-2 poles in series		[kA]	–	–	–	–	–	–	–	–	–	–
	(DC) 500 V-3 poles in series		[kA] (3)	18	25	36	50	70	36	50	70	85	100
	(DC) 750 V-3 poles in series		[kA]	–	–	–	–	–	–	–	–	–	–
Rated service short-circuit breaking capacity, Ics (at 415 V)			[%Icu]	100%	100%	100%	75%	50%(37.5)	100%	100%	100%	100%	100%
Rated short-circuit making capacity, Icm (415 V)			[kA]	36	52.5	75.6	105	154	75.6	105	154	264	330
Rated short-time withstand current for 1 s, Icw			[kA]	–					–				
Category of use (IEC 60947-2,EN 60947-2)				A					A				
Isolation behaviour				•					•				
Reference Standard IEC 60947-2, EN 60947-2				•					•				
Release:													
Thermomagnetic	T fixed, M fixed (10xIn) TMF			•					–				
	T adj., M fixed (10xIn) TMD			•					•				
	T adj., M adj. (5...10xIn) TMA			–					•				
	T adj., M fixed (3xIn) TMG			–					•				
	T adj., M adj. (2.5...5xIn) TMG			–					–				
Magnetic only	M adjustable (6...12xIn) MA			•					(MF up to In 12.5 A)				
Eletronic	Ekip LS/I			–					–				
	Ekip I			–					•				
	Ekip LSI			–					•				
	Ekip LSIG			–					•				
	Ekip E-LSIG			–					–				
	Ekip M-I			–					•				
	Ekip M-LIU			–					•				
	Ekip M-LRIU			–					•				
	Ekip N-LS/I			–					•				
	Ekip G-LS/I			–					•				
	PR221DS (I-LS/I)			–					–				
	PR221MP/PR221GP			–					–				
	PR222DS/P (LSI-LSIG)			–					–				
	PR223DS/P			–					–				
	PR223EF			–					–				
	PR231/P (I-LS/I)			–					–				
	PR232/P (LSI)			–					–				
	PR331/P (LSIG)			–					–				
	PR332/P (LI-LSI-LSIG-LSIRc)			–					–				
Interchangeability				–					•				
Versions				F,P(2)					F,P,W				
Terminals	Fixed (F)			F-FCCu-FCuAl- EF-ES-FC CuAl-FB-MC-R					F-FCCu-FCuAl- EF-ES-FC CuAl-FB-MC-R				
	Plug-in (P)			FCCu-FCuAl- EF-ES-FC CuAl-FB-MC-R					FCCu-FCuAl- EF-ES-FC CuAl-FB-MC-R				
	Withdrawable (W)			–					FCCu-FCuAl- EF-ES-FC CuAl-FB-MC-R				
Fixing on DIN rail				•					•				
Mechanical life		[No. operations /hourly oper.]		25000/240					25000/240				
Electrical life (at 415 V)		[No. operations /hourly oper.]		8000/120					8000/120				
Basic fixed dimensions		3/4 poles	W [mm]	76.2/101.6					90/120				
			D [mm]	70					82.5				
			H [mm]	130					130				
Weights	fixed	3/4 poles	[kg]	1.1/1.4					1.2/1.6				
	plug-in	3/4 poles	[kg]	2.21/2.82					2.54/3.27				
	Withdrawable	3/4 poles	[kg]	-					3.32/4.04				

(1) Icu=100kA and Ics=100%Icu @690V only for XT4 160
(2) XT1 plug-in In max=125A
(3) XT1 500V DC 4 poles in series
(4) Version with Icu =35 kA certified at 36 kA
(5) T7X only for T7 800A
(6) W version is not available on T6 1000A





XT3		XT4					T5					T6					T7				
250		160/250					400/630					630/800/1000					800/1000/1250/1600				
N	S	N	S	H	L	V	N	S	H	L	V	N	S	H	L	V	S	H	L	V	X [5]
50	85	65	85	100	150	200	70	85	100	200	200	70	85	100	200	200	85	100	200	200	170
36	50	36	50	70	120	150	36	50	70	120	200	36[4]	50	70	100	150	50	70	120	150	170
25	40	36	50	65	100	150	30	40	65	100	180	30	45	50	80	120	50	65	100	130	170
20	30	30	36	50	60	70	25	30	50	85	150	25	35	50	65	85	40	50	85	100	170
5	6	10	12	15	20	25/100[1]	20	25	40	70	80	20	22	25	30	40	30	30	50	60	75
36	50	36	50	70	85	100	36	50	70	100	150	35	50	65	100	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	36	50	70	85	100	25	36	50	70	100	20	35	50	65	70	–	–	–	–	–
36	50	36	50	70	85	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	16	25	36	50	70	16	20	36	50	50	–	–	–	–	–
75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	75% (120)	100%	100%	100%	100%	100%
75.6	105	75.6	105	154	264	330	75.6	105	154	264	440	75.6	105	154	220	330	105	154	264	330	374
–		–					5 (400 A)					7.6 (630 A)-10 (800 A)					15 (version V)-20 (versions S-H-L)				
A		A					B (400 A)-A (630 A)					B (630 A-800 A)-A (1000 A)					B				
•		•					•					•					•				
•		•					•					•					•				
–		–					–					–					–				
•		•					–					–					–				
–		•					•					• (up to 800 A)					–				
•		–					–														
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F-P		F,P,W					F,P,W					F-W [6]					F-W				
F-FCCu-FCuAl-EF-ES-FC CuAl-FB-MC-R		F-FCCu-FCuAl-EF-ES-FC CuAl-FB-MC-R					F-FC Cu-FC CuAl-EF-ES-R					F-EF-ES-FC (CuAl) -RC-R					F-EF-ES-FC CuAl-HR/VR				
FCCu-FCuAl- EF-ES-FC CuAl-FB-MC-R		FCCu-FCuAl- EF-ES -FC CuAl-FB-MC-R					EF-ES-HR-VR -FC Cu -FC CuAl					–					–				
–		FCCu-FCuAl- EF-ES -FC CuAl-FB-MC-R					EF-ES-HR-VR-FC Cu -FC CuAl					EF-HR-VR					F-HR/VR				
•		•					–					–					–				
25000/240		25000/240					20000/120					20000/120					10000/60				
8000/120		8000/120					7000 (400 A)-5000 (630 A)/60					7000 (630 A)-5000 (800 A) - 4000 (1000 A)/60					2000/60 (version S, H, L) 3000/60 (version V)				
105/140		105/140					140/186					210/280					210/280				
70		82.5					103.5					103.5					154 (manual) 178 (motorizable)				
150		160					205					268					268				
1.7/2.1		2.5/3.5					3.25/4.15					9.5/12					9.7/12.5 (manual) 11/14 (motorizable)				
3.24/4.1		4.19/5.52					5.15/6.65					–					-				
–		5/6.76					5.4/6.9					12.1/15.1					29.7/39.6 (manual) 32/42.6 (motorizable)				

KEY TO TERMINALS

F	= Front	FC	= Front for copper cables	RC	= Rear for copper-aluminium cables
EF	= Front extended	FC CuAl	= Front for copper-aluminium cables	HR	= Rear flat horizontal
ES	= Front extended spread	R	= Rear	VR	= Rear flat vertical
MC	= Multiconnection	FB	= Flexible busbars		

Main release characteristics

Combination of release - circuit-breaker

		XT1	XT2	XT3	XT4	T5	T6	T7	T8
Thermomagnetic	In	160	160	250	250/320	400/630	630/800/1000	800/1000/1250/1600	2000/2500/3200
	Version	F-P	F-P-W	F-P	F-P-W	F-P-W	F-W	F-W	F
	MF	–	•	–	–	–	–	–	–
	MA	–	•	•	•	–	–	–	–
	TMD	•	•	•	•	–	–	–	–
	TMG	–	•	•	–	–	–	–	–
	TMA	–	•	–	•	•	•	–	–
Electronic	Ekip LS/I	–	•	-	•	-	-	-	-
	Ekip I	–	•	-	•	-	-	-	-
	Ekip LSI	–	•	-	•	-	-	-	-
	Ekip LSIG	–	•	-	•	-	-	-	-
	Ekip E-LSIG	–	-	-	•	•	-	-	-
	Ekip M-I	–	•	-	-	-	-	-	-
	Ekip M-LIU	–	•	-	•	-	-	-	-
	Ekip M-LRIU	–	•	-	•	•	•	-	-
	Ekip N-LS/I	–	•	-	•	-	-	-	-
	Ekip G-LS/I	–	•	-	•	-	-	-	-
	PR221DS	–	-	–	-	•	•	–	–
	PR222/P-/PD	–	–	–	-	•	•	–	–
	PR223DS	–	–	–	-	•	•	–	–
	PR223EF	–	–	–	-	•	•	–	–
	PR231/P	–	–	–	–	–	–	•	–
	PR232/P	–	–	–	–	–	–	•	•
	PR331/P	–	–	–	–	–	–	•	•
	PR332/P	–	–	–	–	–	–	•	•

Electronic releases

		Ekip LS/I	Ekip LSI-LSIG	PR222DS/P-DS/PD	Ekip M-LIU	Ekip M-LRIU
						
Protections available		**LS/I-I**	**LSI -LSIG**	**LSI-LSIG**	**LIU**	**LRIU**
Compatible circuit-breakers		XT2-XT4	XT2-XT4	T5-T6	XT2-XT4	T5-T6
Applications		Distribution/Motor protection	Distribution	Distribution	Motor Protection	Motor Protection
Basic protections						
L		(DS) I1=0.4-1 In	(DS) I1=0.4-1 In	(DS) (E) I1=0.4-1 In	(DS) (E) I1=0.4-1 In	(DS) (E) I1=0.4-1 In
		(DS) t1=12-36 s) t=k/I²	(DS) t1=3-60 s) t=k/I²	(DS) (E) t1=3-18 s t=k/I²	(DS) (E) t1= as per trip class 3E, 5E, 10E, 20E t=k/I²	(DS) (E) t1= as per trip class 3E, 5E, 10E, 20E t=k/I²
S		(DS) I2=1-10 In	(DS) I2=1-10 In	(DS) (E) I2=0.6-10 In	–	–
		(DS) t2=0.1-0.2 s t=k/I²	(DS) t2=0.05-0.4 s t=k/I²	(DS) (E) t2=0.05-0.5 s t=k/I2 or t=k	–	
I		(DS) I3=1-10 In	≤40ms	(DS) (E) I3=1.5-12 In	(DS) (E) I3=6-13	(DS) (E) I3=6-13
		(DS) I3=1-10 In	(DS) I4=0.2-1 In (For LSIG)	t3=instantaneous t=k	t3= ≤40ms t=k	t3= ≤40ms t=k
G		–	(DS) t4 = 0.1-0.2-0.4-0.8s(For LSIG)	(DS) (E) I4=0.2-1 In	–	–
		–	–	(DS) (E) t1=0.1-0.8 s t=k/I²	–	–
Rc		Rc Sel XT2-XT4, Rc B Type (XT3)	Rc Sel XT2-XT4	RC222 (T5)	Rc Sel XT2-XT4	Rc Sel XT2-XT4 RC222 (T5)
OT		–	–	–	–	–
		–	–	–	–	–
U		–	–	–	–	(DS) (E) I6=0.1-0.5 I1
		–	–	–	–	(DS) (E) t6=0-5 s
Advanced protections						
UV		–	–	–	–	–
		–	–	–	–	–
OV		–	–	–	–	–
		–	–	–	–	–
RV		–	–	–	–	–
		–	–	–	–	–
RP		–	–	–	–	–
		–	–	–	–	–
UF		–	–	–	–	–
		–	–	–	–	–
OF		–	–	–	–	–
		–	–	–	–	–
S2		–	–	–	–	(DS) (E) I5=3-10 I1
		–	–	–	–	(DS) (E) t5=1-10 s
Communication		–	Add Ekip Com for Modbus Communication	–	–	PR021/K remote signalling
Measurements		–	–	–	–	Basic-with PR010T
NOTES			Thermal Memory available	Setting (E) with with Ekip T&P	Setting (E) with with Ekip T&P	Setting (E) with PR010T or with Ekip T&P

Thermomagnetic releases				
	MF/MA	**TMD**	**TMG**	**TMA**
				
Compatible circuit-breakers	**XT2-XT3-XT4**	**XT1-XT2-XT3-XT4**	**XT2-XT3-T5**	**XT2-XT4-T5-T6**
Applications	Motor protection	Distribution	Generator protection	Distribution
Basic protections				
L	–	(M) I1=0.7-1 In	(M) I1=0.7-1 In	(M) I1=0,7-1 In
I	(M) I3=13 In (M) I3=(6-11 In XT1 T3) (6-14 In XT2, T6-13 In XT3, 5-10 In XT4)	(M) I3=10 In	(M) I3=3 In (I3=2.5-5 In T5)	(M) I3=5-10 In
Rc	Rc Inst - Rc Selec (XT1-XT3) Rc Sel XT2-XT4, Rc B Type (XT3)	Rc Inst - Rc Selec (XT1-XT3) Rc Sel XT2-XT4, Rc B Type	Rc Inst - Rc Selec (XT1-XT3) Rc Sel XT2-XT4, Rc B Type(XT3) RC222 (T5)	RC222 (T5) RCQ (T6)

KEY

L-Protection against overload
S-Selective protection against short-circuit
I- Instantaneous protection against short-circuit
G-Protection against earth faults
Rc-Protection against residual current
OT-Protection against overtemperature
U-Protection against phase unbalance
UV-Undervoltage protection

t=k relation t=f(I) 

t=k/I2 relation t=f(I) 

OV-Overvoltage protection
RV-Protection against residual voltage
RP-Protection against reverse active power
UF-Protection against under frequency
OF-Protection against over frequency
S2-Selective protection against short-circuit
D-Protection against directional short-circuit
R-Protection against rotor blocking

PR010T-Test and Configuration Unit
PR___ D-M-Communication module mod-bus
PR___V Measurement module
BT030-Wireless communication unit

PR021K-Signalling unit

(M)-Manual setting
(DS)-Setting with Dip Switch
(E)-Electronic setting with external apparatus (BT030 or PR010T) or remotely with communication
(ME)-Manual electronic setting on front of panel

RC___-External residual current release for moulded-case circuit-breakers
RCQ SACE-Panel residual current with toroid and opening coil

Basic Measurements
Phase, Neutral, Earth currents

Advanced Measurements
Currents (phase, Neutral, Earth)
Phase voltages (phase-phase, phase-neutral, residual)
Power (Active, Reactive, Apparent)
Power factor
Frequency and Peak Factor
Energy (Active, Reactive, Apparent)

Version
F- Fixed
P- Plug-in
W- Withdrawable

Ekip E-LSIG	**PR223DS**	**PR223EF**	**PR231/P**	**PR232/P**	**PR331/P**	**PR332/P**
						
LSIG	**LSIG**	**LSIG**	**LS/I-I**	**LSI**	**LI-LSI-LSIG**	**LSIG**
T5	T5-T6	T5-T6	T7	T7	T7-T8	T7-T8
Distribution	Distribution	Zone selectivity	Distribution	Distribution	Distribution	Distribution
(DS) (E) I1=0.4-1 In	(E) I1=0.4-1 In	(E) I1=0.18-1 In	(DS) I1=0.4-1 In	(DS) (E) I1=0.4-1 In	(DS) (E) I1=0.4-1 In	(ME) (E) I1=0.4-1 In
(DS) (E) t1= 3-60 s	(E) t1=3-18 s t=k/I²	(E) t1=3-18 s	(DS) t1=3-12 s t=k/I²	(DS) (E) t1=3-18 s t=k/I²	(DS) (E) t1=3-144 s t=k/I²	(ME) (E) t1=3-144 st=k/I²
(E) I2=1-10 In	(E) I2=0.6-10 In	(E) I2=0.6-10 In	(DS) I2=1-10 In	(DS) (E) I2=0.6-10 In	(DS) (E) I2=0.6-10 In	(ME) (E) I2=0.6-10 In
(E) t2=0.05-1 s t=k/I² or t=k	(E) t2=0.05-0.5 s t=k/I2 or t=k	(E) t2=0.05-0.5 s t=k/I2 or t=k	(DS) t2=0.1-0.25 s t=k/I²	(DS) (E) t2=0.1-0.8 s t=k/I² or t=k	(DS) (E) t2=0.1-0.8 s t=k/I2 or t=k	(ME) (E) t2=0.05-0.8 s t=k/I2 or t=k
(DS) (E) I3=1-10 In	(E) I3=1.5-12 In	(E) I3=1.5-12 In	(DS) I3=1-10 In	(DS) (E)I3=1.5-12 In	(DS) (E) I3=1.5-15 In	(ME) (E) I3=1,5-15 In
t3=instantaneous t=k	t3=instantaneous t=k	t3=instantaneous t=k	t3=instantaneous t=k	t3=instantaneous t=k	t3=instantaneous t=k	t3=instantaneous t=k
(DS) (E) I4=0.2-1 In	(E) I4=0.2-1 In	(E) I4=0.2-1 In	–	–	(DS) (E) I4=0.2-1 In	(ME) (E) I4=0.2-1 In
(DS) (E) t1=0.1-0.8 s t=k/I²	(E) t4=0.1-0.8 s t=k/I²	(E) t4=0.1-0.8 s t=k/I²	–	–	(DS) (E) t1=0.1-0.8 s t=k/I2 or t=k	(ME) (E) t4=0.1-0.8 s t=k/I2 or t=k
RC222 (T4-T5)-RC223 (T4)	RC222 (T4-T5)-RC223 (T4)	RC222 (T4-T5)-RC223 (T4)	RCQ SACE	RCQ SACE	RCQ SACE	(ME) (E) IΔ=3-30 A
RCQ SACE (T6)	RCQ SACE (T6)	RCQ SACE (T6)	–	–	–	(ME) (E) tΔ=0.06-0.8 s t=k
–	–	–	–	–	–	T=85° C
–	–	–	–	–	–	t=instantaneous t=k
–	–	–	–	–	–	(ME) (E) I6=0.02-0.9 I1
–	–	–	–	–	–	(ME) (E) t6=0.5-60 s t=k
(E) U8=0.5-0.95 Un	–	–	–	–	–	(ME) (E) U8=0.5-0.95 Un
(E) t8=0.1-5 s t=k	–	–	–	–	–	(ME) (E) t8=0.1-5 s t=k
(E) U9=1.05-1.2 Un	–	–	–	–	–	(ME) (E) U9=1.05-1.2 Un
(E) t9=0.1-5 s t=k	–	–	–	–	–	(ME) (E) t9=0.1-5 s t=k
–	–	–	–	–	–	(ME) (E) U10=0.1-0.4 Un
–	–	–	–	–	–	(ME) (E) t10=0.5-30 s t=k
–	–	–	–	–	–	(ME) (E) P11=-0.3/-0.1 Pn
–	–	–	–	–	–	(ME) (E) t11=0.5-25 s t=k
–	–	–	–	–	–	(ME) (E) f12=0.90-0.99 fn
–	–	–	–	–	–	(ME) (E) t12=0.5-3 s t=k
–	–	–	–	–	–	(ME) (E) f13=1.01-1.10 fn
–	–	–	–	–	–	(ME) (E) t13=0.5-3 s t=k
(DS) (E) I5=3-10 I1	–	–	–	–	–	–
(DS) (E) t5=1-10 s	–	–	–	–	–	–
–	Dialogue unit available with Modbus protocol -PR021/K remote signalling	Dialogue unit available with Modbus protocol - PR021/K remote signalling	–	–	PR021/K remote signalling	With PR330/D-M -protocol Modbus-BT030 communication wireless -PR021/K remote signalling
with Ekip T&P	advanced with VM210	advanced with VM210	–	Basic-with PR010T or BT030	Basic-BT030	Basic included as standard-advanced with PR330/V
with Ekip T&P	Setting (E) with PR010T or with BT030-HMI030 Interface front of panel	Setting (E) with PR010T or with BT030-Protection EF ultra-rapid trip- HMI030 Interface front of panel	–	Setting (E) with PR010T or with BT030	Setting (E) with PR010T or with BT030-Interface front of panel HMI030	Adv. Prot. PR330V-Setting (E) with PR010T or with BT030-Interface front of panel HMI030

New SACE FORMULA
Easy installation system for you

Quality is the rapid installation system. With FORMULA Link, the simplicity of the SACE FORMULA family shows up in all its strength. The connection between the supply side circuit-breaker and FORMULA Link is made using special incoming connections kit, whereas the connection between the load side circuit-breakers and FORMULA Link is made using the outgoing connection kits.

Installation and putting into service are simple and rapid.

Three different frames of FORMULA Link are available:
- 250A FORMULA Link;
- 400A FORMULA Link;
- 630/800A FORMULA Link.

All the versions of the moulded-case circuit-breakers can be installed in the FORMULA Link: SACE FORMULA A1 and A2 in the single-pole, two-pole and three-pole versions, and SACE FORMULA A3 in the three-pole version.

SACE FORMULA.
Small Space, Great Quality.

—
01 SACE FORMULA A1

02 SACE FORMULA A2

03 SACE FORMULA A3

The SACE FORMULA circuit-breakers from 15A to 630A consist of the interruption part together with the trip unit and they can be installed:

- **directly on the back plate of the cubicles;**
- **on a DIN rail (A1 and A2);**
- **back door (A1, A2 and A3, 2-3 4 poles).**

They are characterised by:

- fixed version;
- polarity: 1 pole (A1 and A2), 2 poles (A1 and A2), 3 poles (A1, A2 and A3), 4 poles (A1, A2 and A3);
- maximum breaking capacity of 36kA for A1 and A2 and of 50kA for A3 at 415V AC;
- fixed thermomagnetic trip unit (TMF) for protection of networks in alternating and direct current (A1, A2, A3);
- ELT LI electronic trip unit with fixed thresholds for the protection of networks in alternating current (A3);
- only two depths: 60mm (A1, A2) and 103.5mm (A3);
- standard front terminals;
- the possibility of use at 50°C without derating up to 250A (except for A1 125A);
- a special version for A3 300A-400A for use at 50°C.

—
01

1 pole 2 poles 3 poles 4 poles

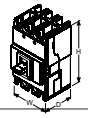
—
02

1 pole 2 poles 3 poles 4 poles

—
03

3 poles 4 poles

New SACE FORMULA

								A1						**A2**		**A3**	
Frame size		[A]						125						250		400/630	
Rated current, In		[A]						15...125						125...250		320...630	
Poles		[Nr]						1, 2, 3, 4						1, 2, 3, 4		3, 4	
Rated service voltage, Ue (AC) 50-60 Hz		[V]						550 (2p-3p-4p); 415 (1p)						550 (2p-3p-4p); 415 (1p)		550	
(DC)		[V]						250 (2p-3p-4p); 125 (1p)						250 (2p-3p-4p); 125 (1p)		250	
Rated insulation voltage, Ui		[V]						690						690		690	
Rated impulse withstand voltage, Uimp		[kV]						6						6		6	
Versions								Fixed						Fixed		Fixed	
Performance Level			A	B		C		N	B		C			N	N	S	
Poles		[Nr]	3/4	3/4	1	3/4	1	2	3/4	3/4	1	3/4	1	2	3/4	3/4	3/4
Rated ultimate short-circuit breaking capacity, Icu																	
Icu @ 240 V 50-60 Hz (AC)		[kA]	10	25	18	30	25	50	100	25	18	50	25	50	85	85	100
Icu @ 380 V 50-60 Hz (AC)		[kA]	10	18	2.5	25	5	36[5]	36[5]	18	2.5	25	5	36	36	36	50
Icu @ 415 V 50-60 Hz (AC)		[kA]	10	18	2.5	25	5	36[5]	36[5]	18	2.5	25	5	36	36	36	50
Icu @ 440 V 50-60 Hz (AC)		[kA]	8	15	-	20	-	25	25	15	-	20	-	25	25	36	50
Icu @ 480 V 50-60 Hz (AC)		[kA]	7.5	10	-	15	-	18	18	15	-	18	-	18	25	25	35
Icu @ 500 V 50-60 Hz (AC)		[kA]	5	5	-	8	-	10	10	5	-	8	-	10	10	20	25
Icu @ 550 V 50-60 Hz (AC)		[kA]	5	5	-	8	-	10	10	5	-	8	-	10	10	15	20
Icu @ 125 V (DC) 1 pole		[kA]	-	-	5	-	10	-	-	-	5	-	10	-	-	-	-
Icu @ 250 V (DC) 2 poles in series		[kA]	5	5	-	10	-	10	10	18	-	25	-	10	36	36	50
Rated short-circuit service breaking capacity, Ics																	
Ics @ 240 V 50-60 Hz (AC)		[kA]	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Ics @ 380 V 50-60 Hz (AC)		[kA]	50%	50%	50%	50%	50%	50%	50%	50%	100%	50%	50%	50%	50%	50%	50%
Ics @ 415 V 50-60 Hz (AC)		[kA]	50%	25%[1]	50%	25%[2]	25%	25%	25%	50%	100%	50%	50%	50%	50%	50%	50%
Ics @ 440 V 50-60 Hz (AC)		[kA]	50%	25%[1]	-	25%	-	25%	25%	50%	-	50%	-	50%	50%	50%	50%
Ics @ 480 V 50-60 Hz (AC)		[kA]	50%	50%	-	25%[1]	-	25%	25%[1]	50%	-	50%	-	50%	50%	50%	50%
Ics @ 500 V 50-60 Hz (AC)		[kA]	50%	50%	-	25%[3]	-	25%	25%	50%	-	50%	-	50%	50%	50%	50%
Ics @ 550 V 50-60 Hz (AC)		[kA]	50%	50%	-	25%[3]	-	25%	25%	50%	-	50%	-	50%	50%	50%	50%
Ics @ 250 V (DC) 2 poles in series		[kA]	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Rated short-circuit making capacity, Icm																	
Icm @ 240 V 50-60 Hz (AC)		[kA]	52.5	52.5	36	63	52.5	105	220	52.5	36	105	52.5	105	187	187	220
Icm @ 380 V 50-60 Hz (AC)		[kA]	17	36	3.8	52.5	7.5	75.6	75.6	36	3.8	52.5	7.5	75.6	75.6	75.6	105
Icm @ 415 V 50-60 Hz (AC)		[kA]	17	36	3.8	52.5	7.5	63	63	36	3.8	52.5	7.5	75.6	75.6	75.6	105
Icm @ 440 V 50-60 Hz (AC)		[kA]	13.6	30	-	40	-	52.5	52.5	30	-	40	-	52.5	52.5	75.6	105
Icm @ 480 V 50-60 Hz (AC)		[kA]	12.8	17	-	30	-	36	17	30	-	36	-	36	52.5	52.5	73.5
Icm @ 500 V 50-60 Hz (AC)		[kA]	7.5	7.5	-	13.6	-	17	17	7.5	-	13.6	-	17	17	40	52.5
Icm @ 550 V 50-60 Hz (AC)		[kA]	7.5	7.5	-	13.6	-	17	17	7.5	-	13.6	-	17	17	30	40
Utilization category (IEC 60947-2)									A						A		A
Hold 100% In at 50°C		[A]							15...100						125...250		300-400(4)
Reference Standard									IEC 60947-2						IEC 60947-2		IEC 60947-2
Isolation behaviour									•						•		•
Fixing onto DIN rail									DIN EN 50022						DIN EN 50022		-
Mechanical life	[No. operations]								8500						10000		5000
Electrical life @ 415 V (AC)	[No. operations]								1500						4000		2000
Total opening time	Shunt opening release (SOR)	[ms]							15						15		15
	Undervoltage release (UVR)	[ms]							15						15		< 25
Dimensions (Width x Depth x Height)	1 pole	[mm]							25.4x60x130						35x60x150		-
	2 poles	[mm]							50.8x60x130						70x60x150		-
	3 poles	[mm]							76.2x60x130						105x60x150		139.5x 103.5x 205
	4 poles	[mm]							101.6x60x130						140x60x150		186x 103.5x 205
Weight	1 pole	[kg]							0.245						0.370		-
	2 poles	[kg]							0.470						0.730		-
	3 poles	[kg]							0.700						1.100		3.25
	4 poles	[kg]							0.925						1.450		4.15
Trip Unit																	
Thermomagnetic TMF									•						•		• (up to 500A)
Electronic ELT LI																	• (up to 630A)

(1) 5kA; (2) 9kA; (3) 2.5kA; (4) Special version; (5) In=15A, Icu=30kA

SACE Tmax PV
Molded case switch disconnectors

The Tmax PV line of IEC switch-disconnectors and UL switch-disconnectors and molded case circuit-breakers expands upon Tmax T Generation's history of offering complete adaptability, versatility and freedom for any type of application.

Using the Tmax PV line, the customer is able to select the most appropriate device for any Solar PV need.

Under IEC 60947-3, Tmax PV offers switch-disconnectors to meet standard 1100V DC applications. In addition, it offers the versatility of extended capacities to 1500V DC for the increasingly demanding solar applications of today's market. Finally, connection jumpers are an available option for the IEC switch-disconnectors to increase safety and ease of installation.

Tmax Automatic Circuit-breakers according to IEC up to 1000V DC are available as a special version of the standard Tmax line. Information about that range can be found in the Tmax technical catalogue.

Common data		
Operating temperature	[°C]	-25 °C ... +70 °C
Storage temperature	[°C]	-40 °C ... +70 °C
Numbers of poles		4
Version		fixed

SACE Tmax PV molded case switch disconnectors

Thanks to the extremely low short-circuit current generated by PV panels, the use of molded-case switch-disconnectors is widely adopted both in combiner boxes and in the DC side of the inverters:

Molded case switch-disconnectors up to 1100V DC in compliance with IEC 60947-3
Electrical charachteristics

Tmax PV switch-disconnectors in compliance with the IEC60947-3		T1D/PV	T3D/PV	T4D/PV	T5D/PV	T6D/PV	T7D/PV[1)]
Conventional thermal current, Ith	(A)	160	250	250	630	800	1250-1600
Rated service current in category DC22 B, Ie	(A)	160	200	250	500	800	1250-1600
Number of poles	(No.)	4	4	4	4	4	4
Rated service voltage, Ue		1100V DC	1100V DC	1100V DC	1100V DC	1100V DC	1100V DC
Rated impulse withstand voltage, Uimp	(kV)	8	8	8	8	8	8
Rated insulation voltage, Ui	(V)	1150V DC	1150V DC	1150V DC	1150V DC	1150V DC	1150V DC
Test voltage at industrial frequency for 1 minute	(V)	3500	3500	3500	3500	3500	3500
Rated short-circuit making capacity, switch-disconnector only, Icm	(kA)	1.92	2.4	3	6	9.6	19.2
Rated short-time withstand current for 1s, Icw	(kA)	1.92	2.4	3	6	9.6	19.2
Versions		F	F	F	F	F	F
Standard terminals		FC Cu	FC Cu	F	F	F	F
Mechanical life with motor	(No. Operations)	15000	15000	7500	7500	7500	20000
Electrical life (operations @ 1100V DC)	(No. Operations)	500	500	500*	500*	500*	500*
Basic dimensions	W (mm/in)	102/4.02	140/5.52	140/5.52	186/7.33	280/11.02	280/11.02
	D (mm/in)	70/2.76	70/2.76	103.5/4.07	103.5/4.07	103.5/4.07	154/6.06 (manual) 178/7.01 (motorized)
	H (mm/in)	130/5.12	150/5.91	205/8.07	205/8.07	268/10.55	268/10.55
Weight (with standard terminals only)	(kg/lbs)	1.2/2.65	2/4.41	3.05/6.72	4.15/9.15	12/26.46	12.5/27.56 (manual) 14/30.86 (motorized)

1) Installation in vertical position only * openings with SOR or UVR

Molded case switch-disconnectors up to 1500V DC in compliance with IEC 60947-3
Electrical charachteristics

Tmax PV switch-disconnectors in compliance with the IEC60947-3		T4D/PV-E	T5D/PV-E	T7D/PV-E[1)]
Conventional thermal current, Ith	(A)	250	500	1250-1600
Rated service current in category DC22 A, Ie	(A)	250	500	1250-1600
Number of poles	(No.)	4	4	4
Rated service voltage, Ue		1500V DC	1500V DC	1500V DC
Rated impulse withstand voltage, Uimp	(kV)	8	8	8
Rated insulation voltage, Ui	(V)	1500V DC	1500V DC	1500V DC
Test voltage at industrial frequency for 1 minute	(V)	3500	3500	3500
Rated short-circuit making capacity, switch-disconnector only, Icm	(kA)	3	6	19.2
Rated short-time withstand current for 1s, Icw	(kA)	3	6	19.2
Versions		F	F	F
Standard terminals		F	F	F
Mechanical life	(No. Operations)	7500	7500	20000
Electrical life (operations @ 1500V DC)	(No. Operations)	1000*	1000*	500*
Basic dimensions	W (mm/in)	140/5.52	186/7.33	280/11.02
	D (mm/in)	103.5/4.07	103.5/4.07	178/7.01
	H (mm/in)	205/8,07	205/8.07	268/10.55
Weight (with standard terminals only)	(kg/lbs)	3.05/6.72	3,15/9.15	14/30.86

1) installation in vertical position only * openings with SOR or UVR

HRC Fuse links - DIN & BS

Features
- Total safety for your cables and motors
- Wide and dense current ratings for optimal dimensioning of other circuit components.
- Low let through energy
- Energy saving through low power losses.
- High breaking capacity
- Superior current limiting capability
- Emission free operation
- Reliable protection and safe operation

Standards
- IEC 60269

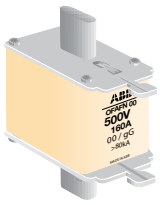
Technical Data

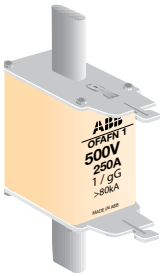
The fuse links are tested to the following short circuit ratings:

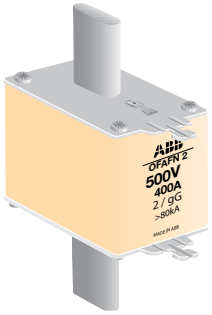
	IEC Fuse 000...3	4
Breaking capacity, AC (DIN) 500 V	80 kA/ 120 kA	120 kA
690 V	80 kA	160 kA
	F1....C3	
Breaking capacity, AC (BS) 415 V	80 kA	

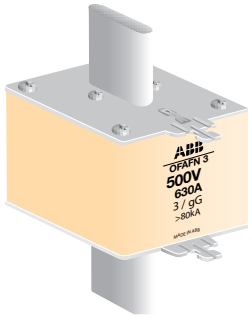
Applications
- General Installation
- Industrial Applications

DIN-Type HRC fuse links, 2A...800 A, 500 V, 80 kA



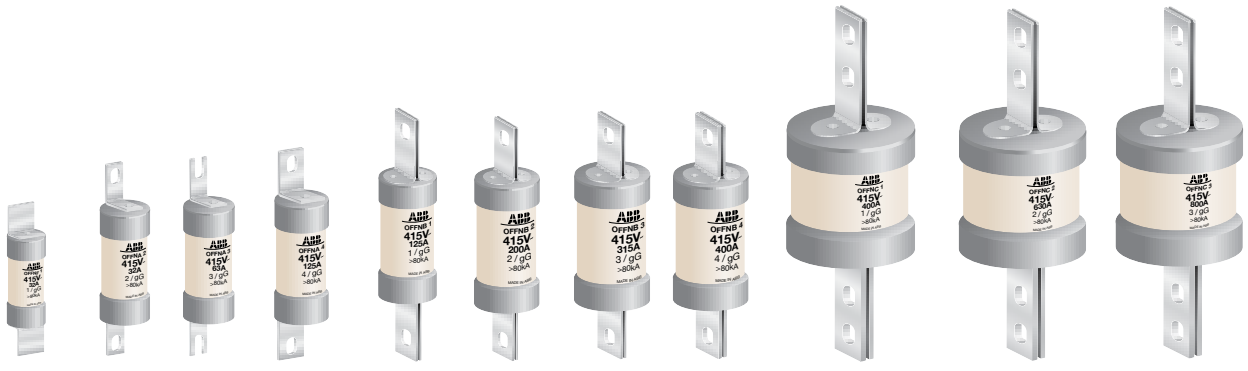






DIN-size	000	00	1	2	3
I_n [A]	2...63	6...160	32...250	100...400	315...800

BS-Type HRC fuse links, 2A...800 A, 415 V, 80 kA



BS-size	F1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3
I_n [A]	2...32	6...32	40...63	50...125	50...100	125...200	250...315	400	400	500...630	800

Technical data

Switch fuses OESA32...160

Technical data according to IEC 60947-3		**Switch size**
Rated insulation voltage and rated operational voltage AC-20 and DC-20	Pollution degree 3	
Dielectric strength Rated impulse withstand voltage		50 Hz 1 min
Rated thermal current in ambient 35°C and temporarily in 40°C / max. fuse power dissipation ....with minimum cable cross section	in open air in enclosure	 Cu
Derating at 60°C	in open air in enclosure	
Rated operational current AC-21A		≤500V 690V
Rated operational current AC-22A		≤500V 690V
Rated operational current AC-23A		≤500V 690V
Rated operational current / pole in series DC-21A, DC-22A and DC - 23A		≤220V 440V
Rated operational power AC-23[1)]		230V 400V 415V 500V 690V
Rated breaking capacity AC - 23A		≤500V
Rated conditional short circuit current Ip (r.m.s) and corresponding max allowed cut-off current Ic		80 kA, 415V
The cut-off current Ic refers to values listed by fuse manufacturers (single phase test acc.to IEC60269)		100kA, 500V 50 kA, 415V
Rated short-time withstand current, 1s	r.m.s - value	
Rated capacitor power when no initial charge of the capacitor	The capacitor ratings of the switch fuses are limited by the fuse links	400V 415V 690V
Power loss/pole	with rated current, without fuse	
Mechanical endurance	Divided by two for operation cycles	
Fuse types, IEC 60269-2	Sec I, DIN 43620 Sec II, BS 88	
Weight without accessories	3/4 pole switch fuses	
Terminal bolt size (included) Terminal tightening torque	Metric thread diameter x length Counter torque reqd.	
Fuse-links bolts tightening torque Operating torque	Typical for 3-pole switch fuses	

[1)] Some fuselinks limit these figures further, starting current characteristics must be considered separately
[2)] Utilization category B
[3)] Ambient temperature 60 °C: derating 20%. Mounting on "ceiling": derating 10%. Mounting on wall, horizontal fuses: derating 8%.
[4)] Utilization category B
[5)] Some fuse links limit these figures further. Starting current characteristics must be considered separately.
[6)] OESA Mini, use 4-pole switches with 2 + 2 parallel contacts in series.
[7)] Maximum fuse body diameter < 55 mm

A	OESA_32	OESA_63	OESA_100	OESA_125	OESA_160
	V	750	750	750	750
kV	8	8	8	8	8
kV	12	12	12	12	12
A/W	32/3.3	63/5.8	100/7.4	125/10.6	160/10.7
A/W	32/3.3	63/5.8	100/7.4	125/10.6	160/10.7
mm2	6	16	50	50	50
%	20/20	20/20	20/20	20/20	20/20
A	32	63	100	125	160
A	-	63[2)]	100[2)]	125[2)]	160[2)]
A	32	63	100	125	160
A	-	63[2)]	100[2)]	1252	135[2)]
A	32	63	100	100	100
A	-	40[2)]	50[2)]	50[2)]	50[2)]
A	32/3	63/3	100/3	125/3	160/3
A	32/4	63/4	100/4	125/4[2)]	160/4[2)]
kW	7.5	15	30	30	30
kW	11	30	55	55	55
kW	15	30	55	55	55
kW	15	30	70	70	70
kW	-	30	45	45	45
A	256	504	800	800	2000
kA	10	12	23	23	23
kA	6	9	17	17	17
kA	6	8	14	14	14
kVAr	15	30	50	50	57
kVAr	16	32	55	55	62
kVAr	-	50	90	90	100
W	0.7	4	5	5	9
Oper	20,000	20,000	20,000	20,000	20,000
	00/000	00/000	00	00	00
	A2	A3	A4	A4	B2
kg	1.6/1.9	1.6/1.9	1.8/2.3	1.8/2.3	1.8/2.3
mm			M8x25	M8x25	M8x25
Nm	5	5	15...22	15...22	15...22
Nm	3.5	3.5	10	10	10
Nm	3	3	5	5	5

Technical data

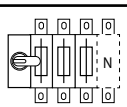
Switch fuses OS/OSM200...1250

Technical data according to IEC 60947-3		**Switch size**	**A**	**OS_ 200_**
Rated insulation voltage and rated operational voltage AC-20 and DC-20	Pollution degree 3		V	1000
Dielectric strength		50 Hz 1min.	kV	10
Rated impulse withstand voltage			kV	12
Rated thermal current in				
ambient 35 °C and temporarily in 40 °C /	In open air		A/W	200/17
max. fuse power dissipation	In enclosure		A/W	200/15
...with minimum cable cross section		Cu	mm^2	95
Rated thermal current of detachable neutral	In open air / Cu cable or bar cross section	In "N3" types	A/mm^2	290/120
Derating, mounting on	In open air or ventilated enclosure		%	0
wall horizontal fuses	Totally enclosed		%	5
Derating, mounting on ceiling			%	10
Derating at 60 °C	In open air / in enclosure		%	20/20
Rated operational current AC-21A		≤ 500 V	A	200
		690 V	A	200
Rated operational current AC-22A		≤ 415 V	A	200
		500 V	A	200
		690 V	A	200
Rated operational current AC-23A		≤ 415 V	A	200
		500 V	A	200
		690 V	A	200
Rated operational current /		≤ 220 V	A	200/1
poles in series DC-21A, DC-22A and DC-23A		440 V	A	200/2
		660 V	A	200/3
		750 V	A	180/4
		880 V	A	180/4
Rated operational power AC-23[1]		230 V	kW	60
		400 V	kW	110
		415 V	kW	110
		500 V	kW	132
		690 V	kW	200
Rated breaking capacity AC-23		≤ 690 V	A	1600
Rated conditional short-	at prospective SC-current	80 kA, 415 V	kA	35
circuit current Ip (r.m.s.)	Max. OFA_ fuse size gG/aM		A	250/200
and corresponding max.	at prospective SC-current	100 kA, 500 V	kA	37.5
allowed cut-off current îc	Max. OFA_ fuse size gG/aM		A	250/200
	at prospective SC-current	80 kA, 690 V	kA	25
	Max. OFA_ fuse size gG/aM		A	160/
The cut-off current îc refers	at prospective SC-current	50 kA, 415 V	kA	28
to values listed by fuse	Max. BS fuse size gG/gM		A	200/200M315
manufacturers (single phase	at prospective SC-current	80 kA, 690 V	kA	28
test acc. to IEC60269)	Max. BS fuse size gG/gM		A	200/200M250
Rated short-time withstand	r.m.s. -value		kA	8
current, 1s.	Max. distance from switch frame to nearest busbar/cable support	mm	150	150
Rated capacitor power	The capacitor ratings of the switch-fuses	400 V	kVAr	90
when no initial charge of the capacitor	are limited by the fuse links	415 V	kVAr	100
		500 V	kVAr	120
		690 V	kVAr	160
Power loss / pole	With rated current, without fuse		W	8
Mechanical endurance	Divide by two for operation cycles		Oper.	20 000
Fuse types, IEC 60269-2	Sec. I, DIN 43620			0
	Sec. IA, NFC 0-3 Ref.A, 4a Ref.B			1
	Sec. II, BS 88			B1-B2
	Size / distance of fuse-link bolts		mm	M6/111
Weight without accessories	3-pole switch fuses		kg	2.6
Terminal bolt size (included)	Metric thread diameter x length		mm	M8X25
Terminal tightening torque	Counter torque required		Nm	15-22
Fuse-links bolts tightening torque			Nm	4
Operating torque	Typical for 3-pole switch fuses		Nm	7

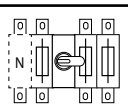
[1] Some fuselinks limit these figures further, starting current characteristics must be considered separately
[2] Utilization category B
[3] Ambient temperature 60 °C: derating 20%. Mounting on "ceiling": derating 10%. Mounting on wall, horizontal fuses: derating 8%.
[4] Utilization category B
[5] Some fuse links limit these figures further. Starting current characteristics must be considered separately.
[6] OESA Mini, use 4-pole switches with 2 + 2 parallel contacts in series.
[7] Maximum fuse body diameter < 55 mm

OS_ 250_	OS_ 315_	OS_ 400_	OS_ 630_	OS_ 800_	OS_ 1250_
1000	1000	1000	1000	1000	1000
10	10	10	10	10	10
12	12	12	12	12	12
250/23	315/32	400/45	630/60	800/65	1250/110
250/20	315/32	400/30	570/50	720/55	1000/85
120	185	240	2 x 158	2 x 240	2 x 400
290/120	450/240	450/250	900/2 X 240	900/2 X 240	1250/2 x 400
0	0	4	[0]	4	4
5	5	8	5	8	8
10	10	10	10	10	10
20/20	20/20	20/20	20/20	20/20	20/20
250	315	400	630	800	1250[4)]
250	315	400	630	800	1250[4)]
250	315	400	630	800	1250
250	315	400	630	800	1250[4)]
250	315	400	630	800	1250[4)]
250	315	400	630	800	1000
250	315	400	630	800	1000[4)]
250	315	400	630	800	1000[4)]
250/1	315/2	400/2	630/1[4)]	800/1[4)]	
250/2	315/3[4)]	400/3[4)]	630/2[4)]	800/2[4)]	
250/3	315/4[4)]	400/4[4)]	630/3[4)]	720/3[4)]	
230/4	315/4[4)]	400/4[4)]	630/4[4)]	720/4[4)]	
230/4			630/4[4)]	720/4[4)]	
75	100	132	200	250	315
140	160	220	355	450	560
145	180	230	355	450	560
170	220	280	450	560	710
250	315	400	630	710	1000
2000	3200	3200	6400	6400	8000
40.5		59	77	77	89
355/315		500/500	800/880	800/880	1250/1250
37.5		63.5	83	83	105
250/250		500/500	800/880	800/880	1250/-
32.5		46	55	55	88
200/250		315/400	500/630	500/630	1000/1000
28	44	44	67	67	90
250/200M315	400/400M500	400/400M500			
28	48	48	55	55	109
250/200M250	400/400M450	400/400M450			1250/-
8	14	14	18	18	40
150	150	150	150	150	
105	145	180	250	310	440
115	160	200	270	340	460
135	175	215	300	375	550
190	250	325	450	550	750
13	19	30	46	75	75
20 000	16 000	16 000	10 000	10 000	600
0-1	2	0-2	3	3	4.4 a
		3	3	4 a	
B1-B3[2)]	B1-B4[3)]	B1-B4[3)]	C1-C2	C1-C3	D1
M8/111	M8/111	M8/111	M 10/133, 184	M 10/133, 184	2xM12/149
3.1	5.7	5.7	11.5	11.5	29
M10x30	M10x30	M10x30	M 12x40	M 12x40	M 12x40
30-44	30-44	30-44	50-75	50-75	50-75
5	20	20	M10:30 M12:40	M10:30 M12:40	M12:40
7	19	19	38	38	65

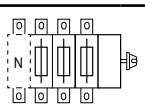
Placing options of the operating mechanism



At the end of the switch fuse
OS_03 or 04



Between the poles
OS_12 or 22



Side operated types
OS_30 or 40
OS_03 or 04

Technical data

Switch-disconnectors OT16...OT160G

Technical data according to IEC 60947-3				**Size [A] /Switch type**
				16 / OT16F
Rated insulation voltage and rated operational voltage AC20/DC20	Pollution degree 3		V	750
Dielectric strength		50 Hz 1min.	kV	6
Rated impulse withstand voltage			kV	8
Rated thermal current and rated operational current AC20/DC20	Ambient 40°C[2)]	In open air	A	25
	Ambient 40°C[2)]	In enclosure	A	25
	Ambient 60°C	In enclosure	A	20
..with minimum conductor cross section		Cu	mm2	4
Rated operational current, AC-21A		up to 415 V	A	16
		440...690 V	A	16
Rated operational current, AC-22A		up to 415 V	A	16
		440...500 V	A	16
		690 V	A	16
Rated operational current, AC-23A		up to 415 V	A	16
		440 V	A	16
		500 V	A	16
		690 V	A	10
Rated operational current / poles in series, DC-21A		24...48 V[1)]	A	16/1
		110 V	A	16/2
		220 V	A	16/3
		440 V	A	16/4
		500 V	A	16/4
		750 V	A	16/8
Rated operational current / poles in series, DC-22A		24...48 V[1)]	A	16/1
		110 V	A	16/2
		220 V	A	16/3
		440 V	A	10/4
		750 V	A	16/8
Rated operational current / poles in series, DC-23A		24...48 V[1)]	A	16/1
		110 V	A	16/2
		220 V	A	16/4
		440 V	A	10/4
		750 V	A	16/8
Rated operational power, AC-23A (These values are given for		220...240 V	kW	3
guidance and may vary acc. to the motor manufacturer)		400...415 V	kW	7.5
		440 V	kW	7.5
		500 V	kW	7.5
		690 V	kW	7.5
Rated breaking capacity, AC-23A		up to 415 V	A	128
		440 V	A	128
		500 V	A	128
		690 V	A	80
Rated breaking capacity/poles in series, DC-23A		24...48 V	A	64/1
		220 V	A	64/3
		110 V	A	64/2
		440 V	A	40/4
		750 V	A	64/8
Rated conditional short-circuit current Ip (r.m.s.) and corresponding	Ip (r.m.s.)	50 kA	kA	6.5
max. allowed cut-off current îc . The cut-off current îc refers to values	Max. OFA_ fuse size gG/aM	≤ 415 V	A	40/32
listed by fuse manufacturers (single phase test acc. to IEC60269)	Ip(r.m.s.)	100 kA	kA	
	Max. OFA_ fuse size gG/aM	≤ 500 V	A	
	Ip (r.m.s.)	10 kA	kA	
	Max. OFA_ fuse size gG/aM	≤ 690 V	A	
	Ip(r.m.s.)	50 kA	kA	4
	Max. OFA_ fuse size gG/aM	≤ 690 V	A	25/16
Rated short-time withstand current	r.m.s. -value Icw	690 V, 0.25 s	kA	
	r.m.s. -value Icw	690 V, 1 s	kA	0.5
Rated short circuit making capacity	Peak value Icm	690 V/500 V	kA	0.705
Rated capacitor power (The capacitor ratings are limited by the fuse link.)		400...415 V	kVAr	6.5
Power loss / pole	At rated operational current		W	0.3
Mechanical endurance	Divide by two for operation cycles		Oper.	20 000
Weight without accessories	3-pole		kg	0.11
	4-pole		kg	0.15
Cable size	Cu-wire size suitable for terminal clamps		mm2	0.75...10
			AWG	18-8
Terminal tightening torque	Counter torque required		Nm	0.8
Operating torque	3-pole switch-disconnector		Nm	1

[1)] Below 48 V, two poles in parallel up to OT80 are recommended particularly in polluted atmosphere. [2)] Acc. to IEC 60947-1, § 6.1.1.




25 / OT25F	40 / OT40F	63 / OT63F	80 / OT80F	100 / OT100F	125 / OT125F	160 / OT160G
750	750	750	750	750	750	1000
6	6	6	6	6	6	10
8	8	8	8	8	8	12
32	40	63	80	115	125	160
32	40	63	80	115	125	160
25	32	50	63	80	100	
6	10	16	25	35	50	70
25	40	63	80	100	125	160
25	40	63	80	100	125	160
25	40	63	80	100	125	160
25	40	63	80	100	125	
25	40	63	80	100	125	
20	23	63	75	80	90	160
20	23	63	65	65	78	160
20	23	45	58	60	70	160
11	12	20	20	40	50	160
25/1	32/1	63/1	80/1	100/1	125/1	
25/2	32/2	63/2	80/2	100/2	125/2	
25/3	32/3	63/4	80/4	100/4	125/4	
16/4	16/4	16/4	16/4			
16/4	16/4	16/4	16/4			
25/8	32/8					
25/1	32/1	63/1	80/1	100/1	125/1	
25/2	32/2	63/2	80/2	100/2	125/2	
25/3	32/4	45/4	45/4	63/4	80/4	
10/4	10/4	10/4	10/4			
25/8	25/8					
25/1	32/1	63/1	80/1	100/1	125/1	
25/2	32/2	63/2	80/2	100/2	125/2	
25/4	32/4	45/4	45/4	63/4	63/4	
10/4	10/4	10/4	10/4			
16/8	16/8					
4	5.5	11	22	22	22	45
9	11	22	37	37	45	75
9	11	22	37	37	45	90
9	11	22	37	37	45	132
9	11	15	18.5	37	45	
160	184	360	640	640	720	1280
160	184	360	448	520	624	1280
160	184	360	464	480	560	1280
88	96	160	160	320	40	1280
100/1	128/1	180/1	252/1	400/1	500/1	
100/4	128/4	180/4	180/4	252/4	252/4	
100/2	128/2	180/2	252/2	400/2	500/2	
40/4	40/4	40/4	40/4			
64/8	64/8					
6.5	6.5	13	13	16.5	16.5	30
40/32	40/32	100/80	100/80	125/125	125/125	200/200
		17	17			
		100/80	100/80			
				8.2	8.2	
				125/100	125/100	
4	4	11	11	10	10	24
25/16	25/16	80/63	80/63	63/63	63/63	200/200
0.5	0.5	1	1.5	2.5	2.5	7
0.705	0.705	1.4	2.1	3.6	3.6	12
10	15	25	30	40	50	65
0.6	1.6	2.8	4.5	4.0	6.3	6.5
20 000	20 000	20 000	20 000	20 000	20 000	20 000
0.11	0.11	0.27	0.27	0.36	0.36	1.1
0.15	0.15	0.35	0.35	0.50	0.50	1.3
0.75...10	0.75...10	1.5...35	1.5...35	10...70	10...70	10...70
18-8	18-8	14-4	14-4	8-00	8-00	8-1/0
0.8	0.8	2	2	6	6	6
1	1	1.2	1.2	2	2	4

Technical data

Switch-disconnectors OT160...800

Technical data according to IEC 60947-3				Switch type						
				OT160EV	OT200E	OT250E	OT315E	OT400E	OT630E	OT800E
Rated insulation voltage and rated operational voltage AC-20, DC-20	**Pollution degree 3**		V	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10	10	10
Rated impulse withstand voltage			kV	12	12	12	12	12	12	12
Rated thermal current and rated operational current AC-20, DC-20	**In open air**		A	200	200	250	315	400	630	800
in ambient 40 °C[4]	**In enclosure**		A	160	200	250	315	400	630	800
...with minimum cable cross section		Cu	mm^2	70	95	120	185	240	2x185	2x240
Rated operational current, AC-21A		≤ 500 V	A	200	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
		1000 V	A	160	200	250	315	400	630	800
Rated operational current, AC-22A		≤ 500 V	A	200	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
		1000 V	A	160	200	250	315	400	630	800
Rated operational current, AC-23A		≤ 500 V	A	160	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
		1000 V	A	135	135	135	200	200	400	400
Rated operational current / poles in series, DC-21A[1]		24...110 V	A	160/2	200/2	250/2	315/1[2]	400/1[2]	630/1	800/1
		220 V	A	160/2	200/2	250/2	315/2[2]	400/2[2]	630/1	800/1
		440 V	A	160/3	200/3	250/3	315/3	360/3	630/2	800/2
		660 V	A	160/4	200/4	230/4[2]	315/4	360/4	630/4[2]	650/4[2]
Rated operational current / poles in series, DC-21B		800 V	A	160/5	200/5	250/5	315/5	400/5	600/5	600/5
		1000 V	A	160/6	200/6	250/6	315/6	400/6	600/6	600/6
Rated operational power, AC-23[3]		230 V	kW	48	60	75	100	132	200	250
		400 V	kW	80	110	140	160	220	355	450
		415 V	kW	88	110	145	180	230	355	450
		500 V	kW	112	132	170	220	280	400	560
		690 V	kW	144	200	250	315	400	630	800
Rated breaking capacity in category AC-23		≤ 500 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
		690 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
Rated conditional short-circuit current Icc (r.m.s.) and corresponding max. allowed cut-off current îc. The cut-off current îc. refers to values listed by fuse manufacturers (single phase test acc. to IEC60269)	**Icc (r.m.s.)**	100 kA, 500 V	kA	40.5	40.5	40.5	61.5	61.5	90	90
	Max. OFA_ fuse size	gG/aM	A	315/315	315/315	315/315	500/450	500/450	800/1 000	800/1 000
	Icc (r.m.s.)	80 kA, 690 V	kA	40.5	40.5	40.5	59	59	83.5	83.5
	Max. OFA_ fuse size	gG/aM	A	355/315	355/315	355/315	500/500	500/500	800/1 000	800/1 000
Rated short-time withstand current	**r.m.s. value Icw**	≤ 1000 V 0,15 s	kA	15	15	15	31	31	38	38
		≤ 1000 V 0,25 s	kA	15	15	15	24	24	36	36
		≤ 1000 V 1 s	kA	8	8	8	15	15	20	20
Rated short-circuit making capacity	**Peak value Icm**	≤ 1000 V	kA	30	30	30	65	65	80	80
Rated capacitor power when no initial charge on the capacitor	**The capacitor ratings are limited by the fuse links**	415 V	kVAr	80	100	115	145	180	250	310
		500 V	kVAr	96	120	135	175	215	300	375
		690 V	kVAr	128	160	190	250	325	450	550
Power loss / pole	**With rated current**		W	3.2	4	6.5	6.5	10	25	40
Mechanical endurance	**Divide by two for oper. cycles**		Oper.	20 000	20 000	20 000	16 000	16 000	10 000	10 000
Weight without accessories	**3-pole switch**		kg	1.2	1.2	1.2	2.2	2.2	5.2	5.2
Terminal bolt size	**Metric thread diameter x length**		mm	M8x25	M8x25	M8x25	M10x30	M10x30	M12x40	M12x40
Terminal tightening torque	**Counter torque required**		Nm	15-22	15-22	15-22	30-44	30-44	50-75	50-75
Operating torque	**3-pole switch disconnector**		Nm	7	7	7	16	16	27	27

1) Further ratings on request.
2) Category B.
3) These values are given for guidance and may vary acc. to the motor manufacturer.
4) Acc. to IEC 60947-1, § 6.1.1.

Technical data

Switch-disconnectors OT1000...4000

Technical data according to IEC 60947-3				Switch type						
				OT1000E	OT1250E	OT1600E	OT2000E	OT2500E	OT3200E	OT4000E
Rated insulation voltage and rated operational voltage AC20/DC20	Pollution degree 3		V	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10	10	10
Rated impulse withstand voltage			kV	12	12	12	12	12	8	8
Rated thermal current and rated operational current AC20/DC20	Ambient 40°C[1]	In open air	A	1 000	1 250	1 600	2 000	2 500	3 200	3 800, 4000[5]
	Ambient 40°C[1]	In enclosure	A	1 000	1 250	1 600				
..with minimum conductor cross section	Cu		mm^2	2x300	2x400	2x500	3x500	4x500	4x1 000	5x1 000
Rated operational current, AC-21A		up to 690 V	A	1 000	1 250	1 600	2 000[2]	2 500[2]	3 200[2]	3 800
		1000 V	A	1 000	1 250	1 600				
Rated operational current, AC-22A		up to 415 V	A	1 000	1 250	1 600	2 000[2]	2 500[2]	3 200[2]	3 800[2], 4000[2] [5]
		500 - 690 V	A	1 000	1 250	1 600	2 000[2] [3]	2 500[2] [3]		
Rated operational current, AC-23A		up to 500 V	A	1 000	1 250	1 250				
		690 V	A	1 000	1 250	1 250				
Rated operational power, AC-23A (These values are given for guidance and may vary acc. to the motor manufacturer)		400...415 V	kW	560	710	710				
		440 V	kW	630	800	800				
		500 V	kW	710	900	900				
		690 V	kW	1 000	1 200	1 200				
Rated breaking capacity, AC-23A		up to 500 V	A	10 000	10 000	10 000				
		690 V	A	10 000	10 000	10 000				
Rated conditional short-circuit current I_{cc} (r.m.s.) and corresponding max. allowed cut-off current $\hat{i}_c$. The cut-off current $\hat{i}_c$ refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	I_{cc} (r.m.s.)	80 kA	kA	100	100	100				
	Max. OFA_ fuse size gG/aM	≤ 415 V	A	1 250/ 1 250	1 250/ 1 250	1 250/ 1 250	1 250/ 1 250			
	I_{cc} (r.m.s.)	100 kA	kA	106	106	106				
	Max. OFA_ fuse size gG/aM	≤ 500 V	A	1 250/ 1 250	1 250/ 1 250	1 250/ 1 250	1 250/ 1 250			
Rated short-time withstand current	r.m.s. -value I_{cw}	690 V, 0.25 s	kA	50	50	50	80	80	80	80, 100[5]
		690 V, 1 s	kA	50	50	50	55	55	80	80
Rated short circuit making capacity	Peak value I_{cm}	690 V	kA	110[4]	110[4]	110[4]	176	176	176	176, 220[5]
	Max. distance from switch frame to nearest busbar/ cable support		mm	150	150	150	150	150	150	150
Rated capacitor power when no initial charge on the capacitor	The capacitor ratings are limited by the fuse links	415 V	kVAr	460	575	575				
		500 V	kVAr	550	690	690				
		690 V	kVAr	750	950	950				
Power loss/pole	At rated operational current		W	19	29	48	55	85	95	130
Mechanical endurance	Divide by two for operation cycles		Oper.	6 000	6 000	6 000	6 000	6 000	5 000	5 000
Weight without accessories	3-pole		kg	14.1	14.1	15.2	22	22	24.7	28.9
	4-pole		kg	18	18	19.5	28	28	32.1	37.7
Terminal bolt size	Metric thread diameter x length		mm	M12x50	M12x50	M12x60	M12x60	M12x60	M12x60	M12x60
Terminal tightening torque	Counter torque required		Nm	50...75	50...75	50...75	50...75	50...75	50...75	50...75
Operating torque	3-pole switch-disconnector		Nm	65	65	65	65	65	65	65

[1] Acc. to IEC60947-1, § 6.1.1.
[2] IEC 947-3, utilization category B, infrequent operation.
[3] Phase barriers or terminal shrouds must be used on both sides of the switch at voltages ≥ 500 V.
[4] The value is 92 kA for 4-pole switch-disconnectors.
[5] OT4000E_W8

Technical data

Motorized switch-disconnectors, IEC

					Switch type			
Technical data according to IEC 60947-3				**OTM40F**	**OTM63F**	**OTM80F**	**OTM100F**	**OTM125F**
Rated insulation voltage and rated operational voltage AC20/DC20	Pollution degree 3		V	750	750	750	750	750
Dielectric strength		50 Hz 1min.	kV	6	6	6	6	6
Rated impulse withstand voltage			kV	8	8	8	8	8
Rated thermal current and rated operational current AC20/DC20	Ambient 40°C[2]	In open air	A	40	63	80	115	125
	Ambient 40°C[2]	In enclosure	A	40	63	80	115	125
	Ambient 60°C	In enclosure	A	32	50	63	80	100
..with minimum conductor cross section		Cu	mm^2	10	16	25	35	50
Rated operational current, AC-21A		up to 415 V	A	40	63	80	100	125
		440...690 V	A	40	63	80	100	125
Rated operational current, AC-22A		up to 415 V	A	40	63	80	100	125
		440...500 V	A	40	63	80	100	125
		690 V	A	40	63	80	100	125
Rated operational current, AC-23A		up to 415 V	A	23	63	75	80	90
		440 V	A	23	63	65	65	78
		500 V	A	23	45	58	60	70
		690 V	A	12	20	20	40	50
Rated operational current / poles in series, DC-21A		24...48 V[1]	A	32/1	63/1	80/1	100/1	125/1
		110 V	A	32/2	63/2	80/2	100/2	125/2
		220 V	A	32/3	63/4	80/4	100/4	125/4
		440 V	A	16/4	16/4	16/4		
		500 V	A	16/4	16/4	16/4		
		750 V	A	32/8				
Rated operational current / poles in series, DC-22A		24...48 V[1]	A	32/1	63/1	80/1	100/1	125/1
		110 V	A	32/2	63/2	80/2	100/2	125/2
		220 V	A	32/4	45/4	45/4	63/4	80/4
		440 V	A	10/4	10/4	10/4		
		750 V	A	25/8				
Rated operational current / poles in series, DC-23A		24...48 V[1]	A	32/1	63/1	80/1	100/1	125/1
		110 V	A	32/2	63/2	80/2	100/2	125/2
		220 V	A	32/4	45/4	45/4	63/4	63/4
		440 V	A	10/4	10/4	10/4		
		750 V	A	16/8				
Rated operational power, AC-23A (These values are given for guidance and may vary acc. to the motor manufacturer)		220...240 V	kW	5.5	11	22	22	22
		400...415 V	kW	11	22	37	37	45
		440 V	kW	11	22	37	37	45
		500 V	kW	11	22	37	37	45
		690 V	kW	11	15	18.5	37	45
Rated breaking capacity, AC-23A		up to 415 V	A	184	360	640	640	720
		440 V	A	184	360	448	520	624
		500 V	A	184	360	464	480	560
		690 V	A	96	160	160	320	40
Rated breaking capacity/ poles in series, DC-23A		24...48 V	A	128/1	180/1	252/1	400/1	500/1
		220 V	A	128/4	180/4	180/4	252/4	252/4
		110 V	A	128/2	180/2	252/2	400/2	500/2
		440 V	A	40/4	40/4	40/4		
		750 V	A	64/8				
Rated conditional short-circuit current I_{cc} (r.m.s.) and corresponding max. allowed cut-off current $\hat{i}_c$. The cut-off current $\hat{i}_c$ refers to values listed by fuse manufacturers (single phase test acc. to IEC60269)	I_{cc} (r.m.s.)	50 kA	kA	6.5	13	13	16.5	16.5
	Max. OFA_ fuse size gG/aM	≤ 415 V	A	40/32	100/80	100/80	125/125	125/125
	I_{cc} (r.m.s.)	100 kA	kA		17	17		
	Max. OFA_ fuse size gG/aM	≤ 500 V	A		100/80	100/80		
	I_{cc} (r.m.s.)	10 kA	kA				8.2	8.2
	Max. OFA_ fuse size gG/aM	≤ 690 V	A				125/100	125/100
	I_{cc} (r.m.s.)	50 kA	kA	4	11	11	10	10
	Max. OFA_ fuse size gG/aM	≤ 690 V	A	25/16	80/63	80/63	63/63	63/63
Rated short-time withstand current	r.m.s. -value I_{cw}	690 V, 0.25 s	kA					
	r.m.s. -value I_{cw}	690 V, 1 s	kA	0.5	1	1.5	2.5	2.5
Rated short circuit making capacity	Peak value I_{cm}	690 V/500 V	kA	0.71	1.4	2.1	3.6	3.6
Rated capacitor power (The capacitor ratings are limited by the fuse link.)		400...415 V	kVAr	15	25	30	40	50
Power loss / pole	At rated operational current		W	1.6	2.8	4.5	4.0	6.3
Mechanical endurance	Divide by two for operation cycles		Oper.	20 000	20 000	20 000	20 000	20 000
Weight without accessories	3-pole		kg	0.11	0.27	0.27	0.36	0.36
	4-pole		kg	0.15	0.35	0.35	0.50	0.50
Cable size	Cu-wire size suitable		mm^2	0.75...10	1.5...35	1.5...35	10...70	10...70
	for terminal clamps		AWG	18-8	14-4	14-4	8-00	8-00
Terminal tightening torque	Counter torque required		Nm	0.8	2	2	6	6
Operating torque	3-pole switch disconnector		Nm	1	1.2	1.2	2	2

[1] Below 48 V, two poles in parallel up to OTM80 are recommended particularly in polluted atmosphere.

[2] Acc. to IEC 60947-1, § 6.1.1.

Technical data

Motorized switch-disconnectors, IEC

				Switch type						
Technical data according to IEC 60947-3				**OTM160EV**	**OTM200E**	**OTM250E**	**OTM315E**	**OTM400E**	**OTM630E**	**OTM800E**
Rated insulation voltage and rated operational voltage AC-20, DC-20	Pollution degree 3		V	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10	10	10
Rated impulse withstand voltage			kV	12	12	12	12	12	12	12
Rated thermal current and rated operational current AC-20, DC-20	In open air		A	200	200	250	315	400	630	800
in ambient 40 °C[4]	In enclosure		A	160	200	250	315	400	630	800
...with minimum cable cross section		Cu	mm^2	70	95	120	185	240	2x185	2x240
Rated operational current, AC-21A		≤ 500 V	A	200	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
		1000 V	A	160	200	250	315	400	630	800
Rated operational current, AC-22A		≤ 500 V	A	200	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
		1000 V	A	160	200	250	315	400	630	800
Rated operational current, AC-23A		≤ 500 V	A	160	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
		1000 V	A	135	135	135	200	200	400	400
Rated operational current / poles in series, DC-21A[1]		24...110 V	A	160/2	200/2	250/2	315/1[2]	400/1[2]	630/1	800/1
		220 V	A	160/2	200/2	250/2	315/2[2]	400/2[2]	630/1	800/1
		440 V	A	160/3	200/3	250/3	315/3	360/3	630/2	800/2
		660 V	A	160/4	200/4	230/4[2]	315/4	360/4	630/4[2]	650/4[2]
Rated operational current / poles in series, DC-21B		800 V	A	160/5	200/5	250/5	315/5	400/5	600/5	600/5
		1000 V	A	160/6	200/6	250/6	315/6	400/6	600/6	600/6
Rated operational power, AC-23		230 V	kW	48	60	75	100	132	200	250
		400 V	kW	80	110	140	160	220	355	450
(These values are given for guidance		415 V	kW	88	110	145	180	230	355	450
		500 V	kW	112	132	170	220	280	400	560
and may vary acc. to the motor manufacturer)		690 V	kW	144	200	250	315	400	630	800
Rated breaking capacity in category AC-23		≤ 500 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
		690 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
Rated conditional short-circuit current I_{cc}	I_{cc} (r.m.s.)	100 kA, 500 V	kA	40.5	40.5	40.5	61.5	61.5	90	90
(r.m.s.) and corresponding max. allowed	Max. OFA_ fuse size	gG/aM	A	315/315	315/315	315/315	500/450	500/450	800/1 000	800/1 000
cut-off current $\hat{i}_c$. The cut-off current $\hat{i}_c$.	I_{cc} (r.m.s.)	80 kA, 690 V	kA	40.5	40.5	40.5	59	59	83.5	83.5
refers to values listed by fuse manufacturers (single phase test acc. to IEC60269)	Max. OFA_ fuse size	gG/aM	A	355/315	355/315	355/315	500/500	500/500	800/1 000	800/1 000
Rated short-time withstand current	r.m.s. value I_{cw}	≤ 1000 V 0,15 s	kA	15	15	15	31	31	38	38
		≤ 1000 V 0,25 s	kA	15	15	15	24	24	36	36
		≤ 1000 V 1 s	kA	8	8	8	15	15	20	20
Rated short-circuit making capacity	Peak value I_{cm}	≤ 1000 V	kA	30	30	30	65	65	80	80
Rated capacitor power when no initial charge on the capacitor	The capacitor ratings are limited by the fuse links	415 V	kVAr	80	100	115	145	180	250	310
		500 V	kVAr	96	120	135	175	215	300	375
		690 V	kVAr	128	160	190	250	325	450	550
Power loss / pole	With rated current		W	3.2	4	6.5	6.5	10	25	40
Mechanical endurance	Divide by two for oper. cycles		Oper.	20 000	20 000	20 000	16 000	16 000	10 000	10 000
Weight without accessories	3-pole switch		kg	1.2	1.2	1.2	2.2	2.2	5.2	5.2
Terminal bolt size	Metric thread diameter x length		mm	M8x25	M8x25	M8x25	M10x30	M10x30	M12x40	M12x40
Terminal tightening torque	Counter torque required		Nm	15-22	15-22	15-22	30-44	30-44	50-75	50-75
Operating torque	3-pole switch disconnector		Nm	7	7	7	16	16	27	27

[1] Further ratings on request.
[2] Category B.

Technical data

Motorized switch-disconnectors, IEC

					Switch type					
Technical data according to IEC 60947-3				**OTM1000E**	**OTM1250E**	**OTM1600E**	**OTM2000E**	**OTM2500E**	**OTM3200E**	**OTM4000E**
Rated insulation voltage and rated operational voltage AC20/DC20	Pollution degree 3		V	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10	10	10
Rated impulse withstand voltage			kV	12	12	12	12	12	8	8
Rated thermal current and rated operational current AC20/ DC20	Ambient 40°C[1]	In open air	A	1 000	1 250	1 600	2 000	2 500	3 200	3 800[2], 4000[5]
	Ambient 40°C[1]	In enclosure	A	1 000	1 250	1 600				
..with minimum conductor cross section	Cu		mm^2	2x300	2x400	2x500	3x500	4x500	4x1 000	5x1 000
Rated operational current, AC-21A		up to 690 V	A	1 000	1 250	1 600	2 000[2]	2 500[2]		
		1000 V	A	1 000	1 250	1 600				
Rated operational current, AC-22A		up to 415 V	A	1 000	1 250	1 600	2 000[2]	2 500[2]	3 200[2]	3 800[2], 4000[5]
		500 - 690 V	A	1 000	1 250	1 600	2 000[2] [3]	2 500[2] [3]		
Rated operational current, AC-23A		up to 500 V	A	1 000	1 250	1 250				
		690 V	A	1 000	1 250	1 250				
Rated operational power, AC-23A (These values are given for guidance and may vary acc. to the motor manufacturer)		400...415 V	kW	560	710	710				
		440 V	kW	630	800	800				
		500 V	kW	710	900	900				
		690 V	kW	1 000	1 200	1 200				
Rated breaking capacity, AC-23A		up to 500 V	A	10 000	10 000	10 000				
		690 V	A	10 000	10 000	10 000				
Rated conditional short-circuit current I_{cc} (r.m.s.) and corresponding max. allowed cut-off current $\hat{i}_c$. The cut-off current $\hat{i}_c$ refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	I_{cc} (r.m.s.)	80 kA	kA	100	100	100				
	Max. OFA_ fuse size gG/aM	≤ 415 V	A	1 250/ 1 250	1 250/ 1 250	1 250/ 1 250				
	I_{cc} (r.m.s.)	100 kA	kA	106	106	106				
	Max. OFA_ fuse size gG/aM	≤ 500 V	A	1 250/ 1 250	1 250/ 1 250	1 250/ 1 250				
Rated short-time withstand current	r.m.s. -value I_{cw}	690 V, 0.25 s	kA	50	50	50	80	80	60	60
		690 V, 1 s	kA	50	50	50	55	55		
Rated short circuit making capacity	Peak value I_{cm}	690 V	kA	110[4]	110[4]	110[4]	176	176	176	176
	Max. distance from switch frame to nearest busbar/ cable support		mm	150	150	150	150	150	150	150
Rated capacitor power when no initial charge on the capacitor	The capacitor ratings are limited by the fuse links	415 V	kVAr	460	575	575				
		500 V	kVAr	550	690	690				
		690 V	kVAr	750	950	950				
Power loss / pole	At rated operational current		W	19	29	48	55	85	95	120
Mechanical endurance	Divide by two for operation cycles		Oper.	6 000	6 000	6 000	6 000	6 000	5 000	5 000
Weight without accessories	3-pole		kg	14.1	14.1	15.2	22	22	32	36
	4-pole		kg	18	18	19.5	28	28	39	45
Terminal bolt size	Metric thread diameter x length		mm	M12x50	M12x50	M12x60	M12x60	M12x60	M12x60	M12x60
Terminal tightening torque	Counter torque required		Nm	50...75	50...75	50...75	50...75	50...75	50...75	50...75
Operating torque	3-pole switch-disconnector		Nm	65	65	65	65	65	65	65

[1] Acc. to IEC60947-1, § 6.1.1.
[2] IEC 947-3, utilization category B, infrequent operation.
[3] Phase barriers or terminal shrouds must be used on both sides of the switch at voltages ≥ 500 V.
[4] The value is 92 kA for 4-pole switch-disconnectors.
[5] OTM4000E_W8_

Technical data

Motor operators OTM40...4000

Data for motor operator of switch-diconnectors, OTM according to IEC 60947				Switch type				
				OTM40...125	OTM160...250	OTM315...400	OTM600...800	OTM1000...4000
Rated operational voltage U_e	Pollution degree 3		V AC/ DC	110...240				
	50/60 Hz		V AC		220...240	220...240	220...240	220...240
Operating voltage range				0.85...1.1 x U_e	0.85...1.1 x U_e	0.85...1.1 x U_e	0.85...1.1 x U_e	0.85...1.1 x U_e
Operating time[1]	90° I - 0, 0 - I	110...240 V AC/DC	s	0.5...1.0				
		24 V DC	s	0.6...1.3				
		220-240 VAC	s		0.5...1.0	0.5...1.0	0.5...1.5	1.0...2.0
Nominal current In[1]		220-240 VAC	A		0,3	0,5	0,9	1,4
Current inrush[1]		220-240 VAC	A		1,5	2,5	4	10
Overload fuse	Type / In / Capacity	220-240 VAC	mA		T / 315 / H	T / 500 / H	T / 1000 / H	T / 2000 / H
	Size		mm		5x20	5x20	5x20	5x20
Operating rate	Max. continuous		cycles / min	1	1	1	1	0,5
	Max. short-time ≤ 10 cycles		cycles / min	10	10	10	10	5
Overvoltage category				III	III	III	III	III
Rated impulse withstand voltage U_{imp}			kV	4	4	4	4	4
Dielectric strength		50 Hz 1 min.	kV	1,5	1,5	1,5	1,5	1,5
Impulse command		Min. impulse						
		duration	ms	100	100	100	100	100
Terminals								
Voltage supply wiring for Ue				PE - N - L	PE - N - L	PE - N - L	PE - N - L	PE - N - L
Cross section		solid/ stranded	mm^2	1.5...2.5	1.5...2.5	1.5...2.5	1.5...2.5	1.5...2.5
Short-circuit protection device		max.MCB/ fuse size	A	16	16	16	16	16
Control terminal for the push -buttons				C - I - O	C - I - O	C - I - O	C - I - O	C - I - O
Push-button control					no SELV	no SELV	no SELV	no SELV
Cross section		solid/ stranded	mm^2	1.5 - 2.5	1.5 - 2.5	1.5...2.5	1.5...2.5	1.5...2.5
Maximum cable length			m	100	100	100	100	100
Terminal for state information		solid/ stranded	mm^2	1,5				
State information of locking					no SELV	no SELV	no SELV	no SELV
Common, voltage supply		11		3A/AC-1/250V				
Handle attached or motor operator locked		14		3A/AC-1/250V				
		11-12-14 (C/O)	cos=1		5A/250V	5A/250V	5A/250V	5A/250V
Locking motor operator		23-24 (NO)	cos=1		5A/250V	5A/250V	5A/250V	5A/250V
Short-circuit protection device		MCB type and size	A	C/2A	C/2A	C/2A	C/2A	C/2A
Protection degree (front panel)				IP20	IP20	IP20	IP20	IP20
Operating temperature			°C	-25...+55	-25...+55	-25...+55	-25...+55	-25...+55
Transportation and storage temperature			°C	-40...+70	-40...+70	-40...+70	-40...+70	-40...+70
Max. altitude			m	2 000	2 000	2 000	2 000	2 000

[1] Under nominal conditions.

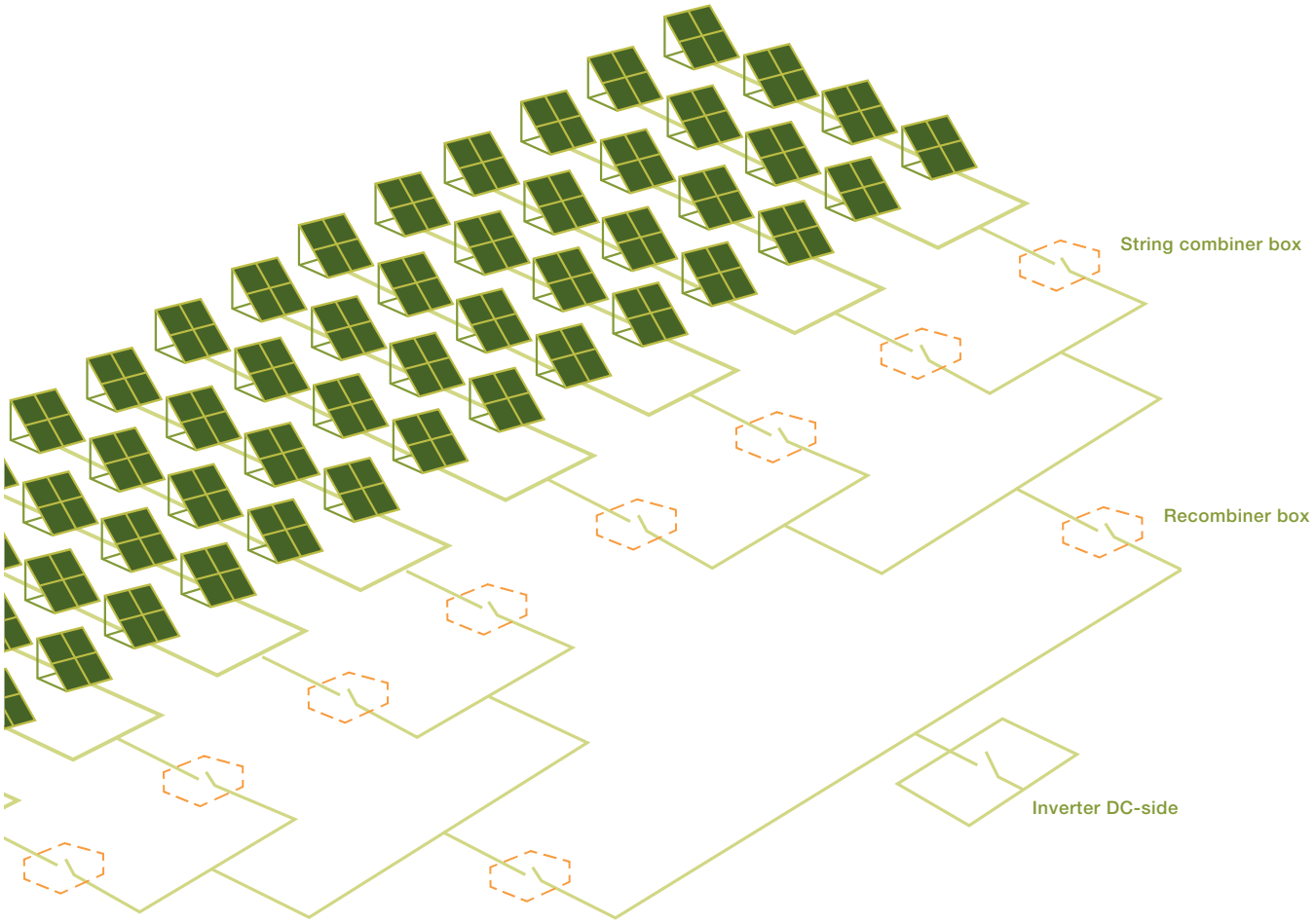
Switch-disconnectors OTDC and OTDCP

Typical photovoltaic applications

Direct current switch-disconnectors by ABB offer reliable switching for a wide range of photovoltaic (PV) applications. They are durable and virtually maintenance-free, and offer easy installation for all imaginable situations.

Depending on the solar farm layout and the customer's wishes, the OTDC switch-disconnectors may be used in one or more sections of the overall setup, on the DC side prior to the inverter. The most typical uses for direct current switch-disconnectors include:

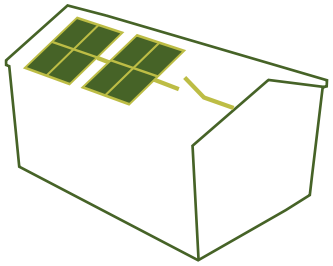
- String combiner boxes
- Recombiner boxes
- Inverter input



String combiner box
The switch-disconnectors can also be used to disconnect individual arrays. In larger photovoltaic (PV) sources arrays, which consist of parallel-connected strings, are often used, with combiner boxes grouping individual strings together. Combiner boxes are an ideal place for placing PV devices, for example control and over-current protective devices. Switches inside combiner boxes allow possible fuse replacement and safe maintenance to be performed on individual arrays.

Recombiner box
Additional disconnect switches may also be installed in the proximity of the inverter to provide a means of isolation, for example for local fuse isolation. Service isolation may be required 'within sight' of the inverter or other locations frequently requiring service. Also these switches may be integrated inside the inverter although more often they are housed in a re-combiner box.

Inverter DC-side
These same devices may also be used to disconnect the inverter from the DC side entirely. For this use the switch-disconnector is installed either just before the inverter on the DC side or inside the inverter itself. This type of main disconnection means is a good practice and generally required by installation norms.



String disconnect for residential use
String disconnects
The switch-disconnectors can be used to break and isolate panels and individual strings on roof-tops to allow for safe repair operations for maintenance workers. The switch-disconnectors can be used to break and isolate panels and individual strings on roof-tops to allow safe repair operations for maintenance workers or fire-brigade.

Technical data for OTDC16...1600, IEC

Technical data according to IEC 60947 for switch-disconnectors OTDC16...250

Switch size				OTDC16F	OTDC25F	OTDC32F	OTDC16U	OTDC25U	OTDC32U	OTDC100E	OTDC160E	OTDC200E	OTDC250E
Rated insulation voltage Ui	Pollution degree 2		V	1250 [1]	1250 [1]	1250 [1]	1250 [1]	1250 [1]	1250 [1]				
	Pollution degree 3		V	1000 [1]	1000 [1]	1000 [1]	1000 [1]	1000 [1]	1000 [1]	1000	1000	1000	1000
Rated impulse withstand voltage			kV	8	8	8	8	8	8	12	12	12	12
Rated thermal current Ith	In open air, normal conditions 2)		A	25	32	45	40	50	63	100	160	200	250
	In enclosure 40°C		A	25	32	45	32	40	50	100	160	200	250
	In enclosure 60°C		A	25	32	32	25	32	40	100	160	200	200
...with minimum cable or bar cross section	Cu		mm²	4	6	10	4	6	10	35	70	95	120
Rated operational current / poles in series DC-21B	500	One circuit	V							100 / 1	160 / 1	200 / 1	250 / 1
	660	One circuit	V	16/2	25/2	32/2	16/2	25/2					
		Two circuits	V		25/2	32/2	16/2	25/2	32/2				
	1000	One circuit	V	10/2	16/2	20/2	10/2 [3]	16/2 [3]		100 / 2	160 / 2	200 / 2	250 / 2
			V	16/3	25/3	32/3							
		Two circuits	V	10/2	16/2	20/2	10/2 [3]	16/2 [3]	20/2 [3]	100 / 2x2	160 / 2x2	200 / 2x2	250 / 2x2
		Three circuits	V				10/2 [3]			100 / 3x2	160 / 3x2	200 / 3x2	
	1500	One circuit	V							100 / 2x2	160 / 2x2	200 / 2x2	
Rated short-time withstand current, 1000 V, 1 s	R.M.S. -value Icw		kA	0,4	0,6	0,8	1,0	1,0	1,0	10	10	10	10
Rated conditional short-circuit current Ip (r.m.s.)	Ip (r.m.s.), 1000 V		kA				10	10	10				
	Max fuse size, gPV		A				80	80	80				
Power loss / pole	At rated current		W	0,15	0,3	0,5	0,1	0,2	0,35	2	4	6	9,5
Terminal cable size	Cu		mm²	2.5...16	2.5...16	2.5...16	2.5...16	2.5...16	2.5...16				
Terminal bolt size	Metric thread diameter × length		mm							M8x25	M8x25	M8x25	M8x25
Terminal tightening torque	Counter torque required		Nm							15...22	15...22	15...22	15...22

[1] When used with external handle. For use with direct mounted handle, see installation instruction.
[2] Normal conditions defined in IEC 60947-1-6.1
[3] U and UT types only. (Not applicable for US nor UST.)

Technical data according to IEC 60947 for switch-disconnectors OTDC315...800

Switch size				OTDC315E	OTDC400E	OTDC500E	OTDC630E	OTDC800E
Rated insulation voltage Ui	Pollution degree 3		V	1500	1500	1500	1500	1500
Rated impulse withstand voltage			kV	12	12	12	12	12
Rated thermal current I_{th}	In open air, normal conditions [4]		A	315	400	630	630	800
	In enclosure 40°C		A	315	400	550	630	800
	In enclosure 60°C		A	315	400	440	630	680
...with minimum cable or bar cross section	Cu		mm²	185	240	240	2x185	2x240
Rated operational current / poles in series DC-21B	1000	One circuit	V	315/2	400/2	500/2	630/2	800/2
		Two circuits	V	315/2	400/2	500/2		
		Three circuits	V	315/2	400/2	500/2		
	1500	One circuit	V	315/3	400/3	500/3		
			V	315/4	400/4	500/4		
		Two circuits	V	315/3	400/3	500/3		
Rated short-time withstand current, 1000 V, 1 s	R.M.S. -value Icw		kA	10	10	10	10	10
Power loss / pole	At rated current		W	6	9,7	15,1	29,1	40
Terminal bolt size	Metric thread diameter × length		mm	M 10x30	M 10x30	M 12x40	M 12x40	M 12x40
Terminal tightening torque	Counter torque required		Nm	30-44	30-44	50-75	50-75	50-75

[4] Normal conditions defined in IEC 60947-1-6.1

Technical data for OTDC16...1600, IEC, OTDCP16...32

Technical data according to IEC 60947 for switch-disconnectors OTDC1000...1600

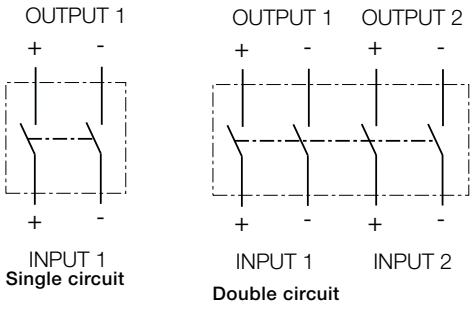
Switch size		A	OTDC1000E	OTDC1250E	OTDC1600E
Rated insulation voltage Ui	Pollution degree 3	V	1500	1500	1500
Rated impulse withstand voltage		kV	12	12	12
Rated thermal current Ith	In open air, normal conditions [4]	A	1000	1250	1600
	In enclosure 40°C	A	1000	1250	1250
	In enclosure 60°C	A	800	1000	1000
...with minimum cable or bar cross section	Cu	mm^2	2x (60x5)	2x (50x8)	2x (50x10)
Rated operational current / poles in series	1000 One circuit	A	1000/4	1250/4	1600/4
Rated short-time withstand current, 1000 V, 1 s	R.M.S. -value Icw	kA	10	10	10
Rated short circuit making capacity, 1000 V	Peak value Icm	kA	10	10	10
Power loss / pole	At rated current	W	22	35	58

[4] Normal conditions defined in IEC 60947-1-6.1

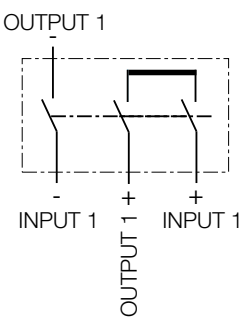
Technical data according to IEC 60947 for enclosed switch-disconnectors OTDCP

Switch size		A	OTDCP16	OTDCP25	OTDCP32
Rated insulation voltage	Pollution degree 2	V	1250	1250	1250
	Pollution degree 3	V	1000	1000	1000
Dielectric strength	50 Hz 1 min	kV	6	6	6
Rated impulse withstand voltage		kV	8	8	8
Rated thermal current Ith	In enclosure 40°C	A	25	32	45
DC-20	In enclosure 60°C	A	25	32	32
Rated operational current / poles in series	660 V	A	16/2	25/2	32/2
DC-21B	1000 V	A	16/3	25/3	32/3
			10/2	16/2	20/2
	2x660 V [5]	A	16/4	25/4	32/4
Rated short-time withstand current, 1000 V, 1 s	R.M.S. -value I_{cw}	kA	0.4	0.6	0.8
Power loss / pole	At rated current	W	0.15	0.3	0.5

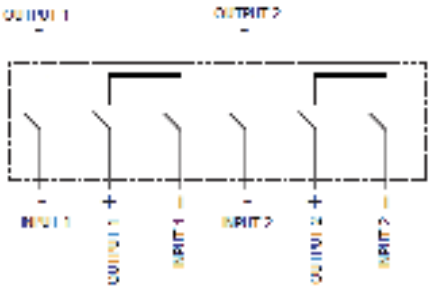
[5] 1000 V with all the poles connected in series, 600 V with 2 poles in series



1000 V DC



Single PV Circuit



Double PV Circuit

1500 V DC

Manual change-over switches
The growing importance of a secure power supply

ABB offers a wide variety of manual change-over switches, from 16 to 3200 Amperes in range. Manual change-over switches are available with three different transition types; Open, fast or closed.

Heavy duty performance
Change-over switches by ABB are extremely well suited for heavy duty applications. They are equipped with CTI (comparative tracking index) of over 600 V, making them great for use in tropical environments.

Real one pole construction
Our switches come with a real one pole construction in even higher ratings (one line per power line), creating savings in terms of energy consumption by reducing power loss. A single terminal per pole across the entire range also eliminates the need to use additional fixing sets to do connections.

Modular and flexible
The modular and flexible construction, which can even include an adjustable periscopic shaft,allows for different arrangements of the poles and handle, providing you with the opportunity to create unique space saving solutions for your customers.

UL/CSA certified performance
To complement our wide range of manual change-over switches, we also offer open transition manual change-over switches designed according to UL/CSA certification standards in a power range from 30 to 800 Amperes.

Manual change-over switches

Technical data for OT16...125_C



Manual change-over switches

										Switch size
Data according to IEC 60947-3				**OT16_**	**OT25_**	**OT40_**	**OT63_**	**OT80_**	**OT100_**	**OT125_**
Rated insulation voltage and rated operational voltage AC20/DC20		Pollution degree 3	V	750	750	750	750	750	750	750
Dielectric strength		50 Hz 1min.	kV	6	6	6	6	6	6	6
Rated impulse withstand voltage			kV	8	8	8	8	8	8	8
Rated thermal current and rated operational current AC20/DC20	/ ambient 40°C	In open air	A	25	32	40	63	80	115	125
	/ ambient 40°C	In enclosure	A	25	32	40	63	80	115	125
	/ ambient 60°C	In enclosure	A	20	25	32	50	63	80	100
..with minimum conductor cross section		Cu	mm^2	4	6	10	16	25	35	50
Rated operational current, AC-21A		up to 500 V	A	16	25	40	63	80	100	125
		690 V	A	16	25	40	63	80	100	125
Rated operational current, AC-22A		up to 500 V	A	16	25	40	63	80	100	125
		690 V	A	16	25	40	63	80	100	125
Rated operational current, AC-23A		up to 415 V	A	16	20	23	45	75	80	90
		440 V	A	16	20	23	45	65	65	78
		500 V	A	16	20	23	45	58	60	70
		690 V	A	10	11	12	20	20	40	50
Rated operational current / poles in series, DC-21A		up to 48 V[1]	A	16/1	25/1	32/1	63/1	80/1	100/1	125/1
		110 V	A	16/2	25/2	32/2	63/2	80/2	100/2	125/2
		220 V	A	16/3	25/3	32/3	63/4	63/4	100/4	100/4
		440 V	A	16/4	16/4	16/4	16/4	16/4		
		500 V	A	16/4	16/4	16/4	16/4	16/4		
Rated operational current / poles in series, DC-22A		up to 48 V[1]	A	16/1	25/1	32/1	63/1	80/1	100/1	125/1
		110 V	A	16/2	25/2	32/2	63/2	80/2	100/2	125/2
		220 V	A	16/3	25/3	32/4	45/4	45/4	63/4	80/4
		440 V	A	10/4	10/4	10/4	10/4	10/4		
Rated operational current / poles in series, DC-23A		up to 48 V[1]	A	16/1	25/1	32/1	63/1	80/1	100/1	125/1
		110 V	A	16/2	25/2	32/2	63/2	80/2	100/2	125/2
		220 V	A	16/4	25/4	32/4	45/4	45/4	63/4	63/4
		440 V	A	10/4	10/4	10/4	10/4	10/4		
Rated operational power, AC-23A[2] The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		230 V	kW	3	4	5,5	11	22	22	22
		400 V	kW	7.5	9	11	22	37	37	45
		415 V	kW	7.5	9	11	22	37	37	45
		500 V	kW	7.5	9	11	22	37	37	45
		690 V	kW	7.5	9	11	15	18.5	37	45
Rated breaking capacity in category AC-23		up to 415 V	A	128	160	184	360	640	640	720
		500 V	A	128	160	184	360	464	480	560
		690 V	A	80	88	96	160	160	320	400
Rated conditional short-circuit current I_p (r.m.s.) and corresponding max. allowed cut-off current $\hat{i}_c$ (peak) value. The cut-off current $\hat{i}_c$ refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	Ip (r.m.s.) 50 kA, 415 V	îc (peak)	kA	6.5	6.5	6.5	13	13	16.5	16.5
	Max. OFA_ fuse size	gG/aM	A/A	40/32	40/32	40/32	100/80	100/80	125/125	125/125
	Ip (r.m.s.) 100 kA, 500 V	îc (peak)	kA				17	17		
	Max. OFA_ fuse size	gG/aM	A				100/80	100/80		
Rated short-time withstand current	Icw (r.m.s.)	690 V 1s	kA	0.5	0.5	0.5	1	1.5	2.5	2.5
Rated short-time making capacity[3]	Icm (peak)	690 V	kA	0.7	0.7	0.7	1.4	2.1	3.6	3.6
Power loss / pole	With rated current		W	0.3	0.6	1.6	2.8	4.5	4.0	6.3
Mechanical endurance	Number of oper. cycles4)		Cycles	10 000	10 000	10 000	10 000	10 000	10 000	10 000
Cable size	Cu-wire size suitable for terminal clamps		mm2	0.75-10	0.75-10	0.75-10	1.5-35	1.5-35	10-70	10-70
			AWG	18-8	18-8	18-8	14-4	14-4	8-00	8-00
Terminal tightening torque	Counter torque required		Nm	0.8	0.8	0.8	2	2	6	6
Operating torque	Typical for 3-pole switches		Nm	1	1	1	1.2	1.2	2	2
Weight without accessories	3-pole switch		kg	0.25	0.25	0.25	0.64	0.64	0.90	0.90
	4-pole switch		kg	0.31	0.31	0.31	0.70	0.70	1.18	1.18
Data according to UL508 (Listed)										
Current			A	16	25	40	60	80		
Horsepower, 3-phase		200 V	HP	3	7.5	10	15	20		
		208 V	HP	3	7.5	10	15	20		
		240 V	HP	5	7.5	10	15	20		
		480 V	HP	10	15	20	30	40		
		600 V	HP	10	20	25	30	40		

[1] Below 48 V, two poles in parallel up to OT80 are recommended particularly in polluted atmosphere
[2] These values are given for guidance and may vary according to the motor manufacturer
[3] Short circuit duration >50ms, without fuse protection
[4] Operating cycle: O - I - O - II - O

Manual change-over switches

Technical data for OT160...800_C

Manual change-over switches

					Switch size						
Data according to IEC 60947-3					**OT_160_**	**OT_200_**	**OT_250_**	**OT_315_**	**OT_400_**	**OT_630_**	**OT_800_**
Rated insulation voltage and rated operational voltage AC20/DC20		Pollution degree 3	V		1 000	1 000	1 000	1 000	1 000	1 000	1 000
Dielectric strength		50 Hz 1min.	kV		10	10	10	10	10	10	10
Rated impulse withstand voltage			kV		12	12	12	12	12	12	12
Rated thermal current and rated operational current AC20/DC20	/ ambient 40°C	In open air	A		160	200	250	315	400	630	800
	/ ambient 40°C	In enclosure	A		160	200	250	315	400	630	800
..with minimum conductor cross section		Cu	mm^2		70	95	120	185	240	2x185	2x240
Rated operational current, AC-21A		up to 500 V	A		160	200	250	315	400	630	800
		690 V	A		160	200	250	315	400	630	800
Rated operational current, AC-22A		up to 500 V	A		160	200	250	315	400	630	800
		690 V	A		160	200	250	315	400	630	800
Rated operational current, AC-23A		up to 415 V	A		160	200	250	315	400	630	800
		440 V	A		160	200	250	315	400	630	800
		500 V	A		160	200	250	315	400	630	800
		690 V	A		160	200	250	315	400	630	800
Rated operational current / poles in series, DC-21A[6]		≤ 110 V	A		160/2	200/2	250/2	315/1[1]	400/1[1]	630/1	800/1
		220 V	A		160/2	200/2	250/2	315/2[1]	400/2[1]	630/1	800/1
		440 V	A		160/3	200/3	230/3	315/3	360/3	630/2	720/2
		660 V	A		160/4	200/4	200/4	315/4	315/4	630/4[1]	630/4[1]
Rated operational power, AC-23A[2]		230 V	kW		45	60	75	100	132	200	250
The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		400 V	kW		90	110	140	160	220	355	450
		415 V	kW		90	110	145	180	230	355	450
		500 V	kW		110	132	170	220	280	400	560
		690 V	kW		160	200	250	315	400	630	800
Rated breaking capacity in category AC-23		up to 415 V	A		1 280	1 600	2 000	2 520	3 200	5 040	6 400
		500 V	A		1 280	1 600	2 000	2 520	3 200	5 040	6 400
		690 V	A		1 280	1 600	2 000	2 520	3 200	5 040	6 400
Rated conditional short-circuit current Ip (r.m.s.) and cut-off current îc (peak) value. The cut-off current îc refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	Ip (r.m.s.) 80 kA, 415 V	îc (peak)	kA		40.5	40.5	40.5	59	59	83.5	83.5
	Max. OFA_ fuse size	gG/aM	A/A		355/315	355/315	355/315	500/500	500/500	800/1 000	800/1 000
	Ip (r.m.s.) 100 kA, 500 V	îc (peak)	kA		40.5	40.5	40.5	61.5	61.5	90	90
	Max. OFA_ fuse size	gG/aM	A		315/315	315/315	315/315	500/450	500/450	800/800	800/800
	Ip (r.m.s.) 80 kA, 690 V	îc (peak)	kA		40.5	40.5	40.5	59	59	83.5	83.5
	Max. OFA_ fuse size	gG/aM	A		355/315	355/315	355/315	500/500	500/500	800/1 000	800/1000
Rated short-time withstand current	Icw (r.m.s.)	690 V 0.15s	kA		15	15	15	31	31	38	38
		690 V 0.25s	kA		15	15	15	24	24	36	36
		690 V 1s	kA		8	8	8	15	15	20	20
Rated short-time making capacity[3]	Icm (peak)[4]	690 V	kA		30	30	30	65	65	80	80
Power loss / pole	With rated current		W		2.4	4	6.5	6.5	10	25	40
Mechanical endurance	Number of oper. cycles[5]		Cycles		8 000	8 000	8 000	8 000	8 000	5 000	5 000
Terminal bolt size	Metric thread diameter x length		mm		M8x25	M8x25	M8x25	M10x30	M10x30	M12x40	M12x40
Terminal tightening torque	Counter torque required		Nm		15-22	15-22	15-22	30-44	30-44	50-75	50-75
Operating torque	3-pole change-over switches		Nm		7	7	7	16	16	27	27
Weight without accessories	Manual change-over switches	3-poles	kg		2.5	2.5	2.5	4.7	4.7	12.8	12.8
		4-poles	kg		3.2	3.2	3.2	5.8	5.8	15.6	15.6
Data according to IEC 60947-6-1											
Class of equipment					PC	PC	PC	PC	PC	PC	PC
Rated short-time withstand current	Icw (r.m.s.)	690 V 0.1s	kA		15	15	15	25	25	38	38
Rated operational current, AC-31B		up to 415 V	A		160	200	250	315	400	630	800
Rated operational current, AC-33B		up to 415 V	A		160	200	250	315	400	630	800

[1] Utilization category B
[2] These values are given for guidance and may vary acc. to the motor manufacturer
[3] Short circuit duration > 50ms, without fuse protection
[4] Max. distance from switch frame to nearest busbar / cable support 150 mm
[5] Operating cycle: O - I - O - II - O
[6] Further 1000 V ratings on request

Manual change-over switches

Technical data for OT1000...3200_C

Manual change-over switches



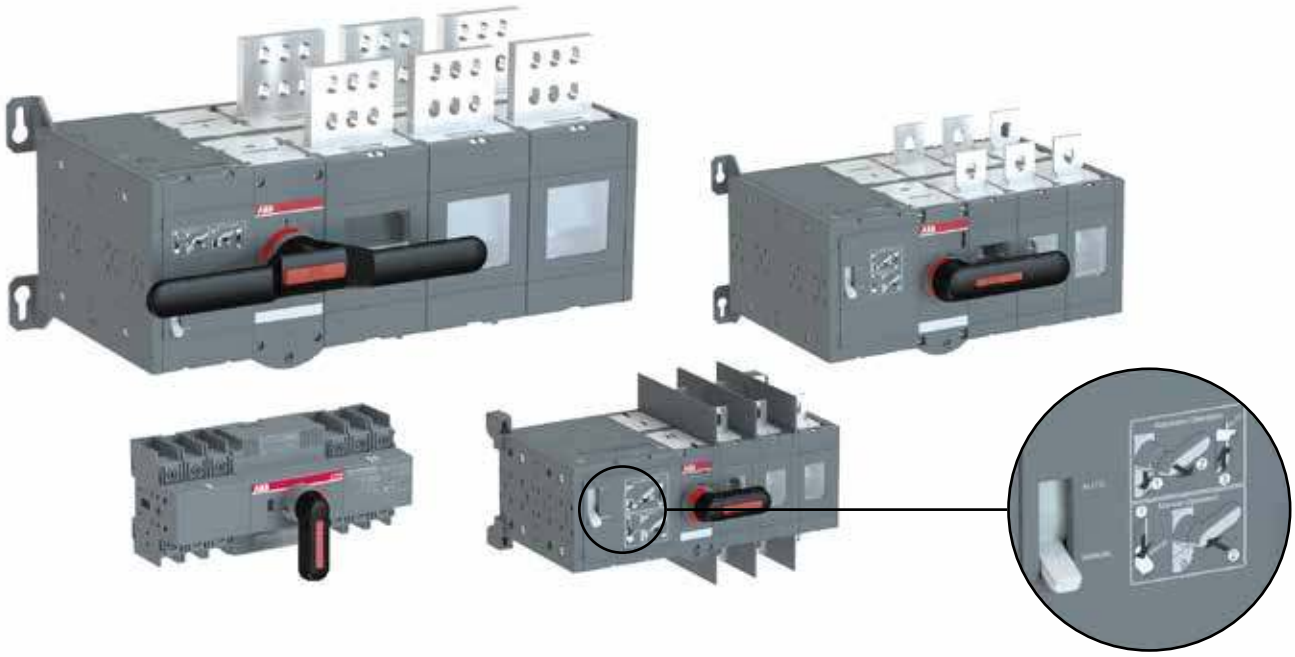

Data according to IEC 60947-3				Switch size , OT_					
				OT_1000_	OT_1250_	OT_1600_	OT_2000_	OT_2500_	OT_3200_
Rated insulation voltage and rated operational voltage AC20/ DC20		Pollution degree 3	V	1 000	1 000	1 000	1 000	1 000	1 000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10	10
Rated impulse withstand voltage			kV	12	12	12	12	12	12
Rated thermal current and	/ ambient 40°C	In open air	A	1 000	1 250	1 600	2 000	2 500	3 200
rated operational current AC20/ DC20	/ ambient 40°C	In enclosure	A						
..with minimum conductor cross section		Cu	mm^2	2x300	2x400	2x500	3x500	4x500	4x1000
Rated operational current, AC-21A		up to 500 V	A	1 000	1 250	1 600	2 000[5]	2 500[5]	3 200[5]
		690 V	A	1 000	1 250	1 600			
Rated operational current, AC-22A		up to 500 V	A	1 000	1 250	1 600			
		690 V	A	1 000	1 250	1 600			
Rated operational current, AC-23A		up to 415 V	A	1 000	1 250	1 250			
		440 V	A	1 000	1 250	1 250			
		500 V	A	1 000	1 250	1 250			
		690 V	A	1 000	1 250	1 250			
Rated operational power, AC-23A[1]		230 V	kW	315	400	400			
The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		400 V	kW	560	710	710			
		415 V	kW	560	710	710			
		500 V	kW	710	900	900			
		690 V	kW	1 000	1 200	1 200			
Rated breaking capacity in category AC-23		up to 415 V	A	10 000	10 000	10 000			
		500 V	A	10 000	10 000	10 000			
		690 V	A	10 000	10 000	10 000			
Rated conditional short-circuit current Ip (r.m.s.) and cut-off current îc (peak) value. The cut-off current îc refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	Ip (r.m.s.) 80 kA, 415 V	îc (peak)	kA	100	100	100			
	Max. OFA_ fuse size	gG/aM	A/A	1 250/1 250	1 250/1 250	1 250/1 250			
	Ip (r.m.s.) 100 kA, 500 V	îc (peak)	kA	106	106	106			
	Max. OFA_ fuse size	gG/aM	A	1 250/1 250	1 250/1 250	1 250/1 250			
Rated short-time withstand current	Icw (r.m.s.)	690 V 0.15s	kA	50	50	50	50	50	
		690 V 0.25s	kA	50	50	50	50	50	
		690 V 1s	kA	50	50	50	55	55	65
Rated short-time making capacity[2]	Icm (peak)[3]	690 V	kA	92	92	92	110	110	143
Power loss / pole	With rated current		W	19	29	48	55	85	95
Mechanical endurance	Number of oper. cycles[4]		Cycles	3 000	3 000	3 000	2 000	2 000	2 000
Terminal bolt size	Metric thread diameter x length		mm	M12x60	M12x60	M12x60	M12x60	M12x60	M12x100
Terminal tightening torque	Counter torque required		Nm	50-75	50-75	50-75	50-75	50-75	50-75
Operating torque	3-pole change-over switches		Nm	78	78	78	78	78	80
Weight without accessories	Manual change-over switches	3-poles	kg	32.3	32.3	34.8	48	48	57
		4-poles	kg	40.2	40.2	43.3	60	60	72
Data according to IEC 60947-6-1									
Class of equipment				PC	PC	PC	PC	PC	
Rated short-time withstand current	Icw (r.m.s.)	690 V 0.1s	kA	50	50	50	50	50	
Rated operational current, AC-31B		up to 415 V	A	1 000	1 250	1 600	2 000	2 000	
Rated operational current, AC-33B		up to 415 V	A	1 000	1 000	1 000			

[1] These values are given for guidance and may vary acc. to the motor manufacturer
[2] Short circuit duration > 50ms, without fuse protection
[3] Max. distance from switch frame to nearest busbar / cable support 150 mm
[4] Operating cycle: O - I - O - II - O
[5] Category AC-21B, up to 415V 1000 V ratings on request

Motorized change-over switches

Uninterrupted power supply with motorized functionality

ABB offers a wide variety of open transition motorized change-over switches from 40 to 3200 Amperes in range. All of our visually redesigned motorized change-over switches now come equipped with a new cover with clear operating instructions and enhanced motor operator performance.



High performance level
Ensuring a high performance level for you is of the utmost importance to us. In change-over applications where the loaded switch may need to be operated remotely, adequate durability has been ensured by testing against the IEC 60947-6-1 standard in the specification of endurance requirements.

Reduced installation time
ABB motorized change-over switches are fast and easy to install. The voltage sensing connectors have been designed to save time, as there is no need to drill holes into the busbars (see page 78 for relevant accessories). Also, the control and power cables are screw mounted, providing a safe and secure connection that stays tight even during transportation.

Safe and reliable
Our switches come equipped with a comprehensive range of inbuilt safety features such as mechanical interlock, which ensures the isolation of the two asynchronous power supplies. This eliminates risk of short-circuiting between them. The motorized change-over switches are also equipped with a handle for manual operation in case of emergency.

Space-saving design
ABB provides compact and cost-effective components for any and all installations. On average, our motorized change-over switches are 20% smaller than other similar products on the market.

Motorized change-over switches

Technical data for OTM40...125_C

Motorized change-over switches

Data according to IEC 60947-3				Switch size				
				OTM40_	OTM63_	OTM80_	OTM100_	OTM125_
Rated insulation voltage and rated operational voltage AC20/DC20		Pollution degree 3	V	800	800	800	800	800
Dielectric strength		50 Hz 1min.	kV	6	6	6	6	6
Rated impulse withstand voltage			kV	8	8	8	8	8
Rated thermal current and rated operational current AC20/DC20	/ ambient 40°C	In open air	A	40	63	80	115	125
	/ ambient 40°C	In enclosure	A	40	63	80	115	125
	/ ambient 60°C	In enclosure	A	32	50	63	80	100
..with minimum conductor cross section		Cu	mm^2	10	16	25	35	50
Rated operational current, AC-21A		up to 500 V	A	40	63	80	100	125
		690 V	A	40	63	80	100	125
Rated operational current, AC-22A		up to 500 V	A	40	63	80	100	125
		690 V	A	40	63	80	100	125
Rated operational current, AC-23A		up to 415 V	A	40	63	80	80	90
		500 V	A	40	60	60	60	70
		690 V	A	40	40	40	40	50
Rated operational current / poles in series, DC-21A		up to 48 V	A	40/1	63/1	80/1	100/1	125/1
		110 V	A	40/2	63/2	80/2	100/2	125/2
		220 V	A	40/4	63/4	80/4	100/4	100/4
Rated operational current / poles in series, DC-22A		up to 48 V	A	40/1	63/1	80/1	100/1	125/1
		110 V	A	40/2	63/2	80/2	100/2	125/2
		220 V	A	40/4	63/4	80/4	80/4	80/4
Rated operational current / poles in series, DC-23A		up to 48 V	A	40/1	63/1	80/1	100/1	125/1
		110 V	A	40/2	63/2	80/2	100/2	125/2
		220 V	A	40/4	63/4	63/4	63/4	63/4
Rated operational power, AC-23A[1]		230 V	kW	7.5	15	22	22	22
The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		400 V	kW	18.5	30	37	37	45
		415 V	kW	18.5	30	37	37	45
		500 V	kW	22	37	37	37	45
		690 V	kW	37	37	37	37	45
Rated breaking capacity in category AC-23		up to 415 V	A	320	504	640	640	720
		500 V	A	320	480	480	480	560
		690 V	A	320	320	320	320	400
Rated conditional short-circuit current Ip (r.m.s.) and corresponding max. allowed cut-off current îc (peak) value. The cut-off current îc refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	Ip (r.m.s.) 50 kA, 415 V	îc (peak)	kA	16.5	16.5	16.5	16.5	16.5
	Max. OFA_ fuse size	gG/aM	A/A	125/125	125/125	125/125	125/125	125/125
	Ip (r.m.s.) 18 kA, 690 V	îc (peak)	kA	11	11	11	11	11
	Max. OFA_ fuse size	gG	A	125	125	125	125	125
	Ip (r.m.s.) 50 kA, 690 V	îc (peak)	kA	10	10	10	10	10
	Max. OFA_ fuse size	gG/aM	A/A	63/63	63/63	63/63	63/63	63/63
Rated short-time withstand current	Icw (r.m.s.)	690 V 1s	kA	2.5	2.5	2.5	2.5	2.5
Rated short-time making capacity[2]	Icm (peak)	690 V	kA	3.6	3.6	3.6	3.6	3.6
Power loss / pole	With rated current		W	1.6	2.8	3.5	4.0	6.3
Mechanical endurance	Number of oper. cycles3)		Cycles	10 000	10 000	10 000	10 000	10 000
Cable size	Cu-wire size suitable for terminal clamps		mm2	2.5-25/2x2.5-16	10-70	10-70	10-70	10-70
			AWG	14-4/2x14-6	8-00	8-00	8-00	8-00
Terminal tightening torque	Counter torque required		Nm	6	6	6	6	6
Operating torque	3-pole switches		Nm	5	5	5	5	5
Weight without accessories	3-pole switch		kg	1.37	1.37	1.37	1.37	1.37
	4-pole switch		kg	1.60	1.60	1.60	1.60	1.60
Data according to IEC 60947-6-1								
Class of equipment				PC	PC	PC	PC	PC
Rated short-time withstand current	Icw (r.m.s.)	690 V 0.1s	kA	5	5	5	5	5
Conditional short-circuit current	Icc (r.m.s.)	415 V	kA	50	50	50	50	50
Corresponding fuse rating	gG/aM fuse	415 V	A	125	125	125	125	125
Rated operational current, AC-31B		up to 415 V	A	40	63	80	100	125
Rated operational current, AC-32B		up to 415 V	A	40	63	80	100	125
Rated operational current, AC-33B		up to 415 V	A	40	63	80	80	80

[1] These values are given for guidance and may vary according to the motor manufacturer
[2] Short circuit duration > 50ms, without fuse protection
[3] Operating cycle: O - I - O - II - O

Motorized change-over switches

Technical data for OTM160...800_C




Motorized change-over switches

Data according to IEC 60947-3				**Switch size**						
				OT_160_	**OT_200_**	**OT_250_**	**OT_315_**	**OT_400_**	**OT_630_**	**OT_800_**
Rated insulation voltage and rated operational voltage AC20/ DC20[1]		Pollution degree 32)	V	1000	1000	1000	1000	1000	1000	1000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10	10	10
Rated impulse withstand voltage3)			kV	12	12	12	12	12	12	12
Rated thermal current and rated	/ ambient 40°C	In open air	A	160	200	250	315	400	630	800
operational current AC20/DC20	/ ambient 40°C	In enclosure	A	160	200	250	315	400	630	800
..with minimum conductor cross section		Cu	mm^2	70	95	120	185	240	2x185	2x240
Rated operational current, AC-21A		up to 500 V	A	160	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
Rated operational current, AC-22A		up to 500 V	A	160	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
Rated operational current, AC-23A		up to 415 V	A	160	200	250	315	400	630	800
		440 V	A	160	200	250	315	400	630	800
		500 V	A	160	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
Rated operational current / poles in series, DC-21A6)		≤ 110 V	A	160/2	200/2	250/2	315/1[1]	400/1[1]	630/1	800/1
		220 V	A	160/2	200/2	250/2	315/2[1]	400/2[1]	630/1	800/1
		440 V	A	160/3	200/3	230/3	315/3	360/3	630/2	720/2
		660 V	A	160/4	200/4	200/4	315/4	315/4	630/4[1]	630/4[1]
Rated operational power, AC-23A2)		230 V	kW	45	60	75	100	132	200	250
The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		400 V	kW	90	110	140	160	220	355	450
		415 V	kW	90	110	145	180	230	355	450
		500 V	kW	110	132	170	220	280	400	560
		690 V	kW	160	200	250	315	400	630	800
Rated breaking capacity in category AC-23		up to 415 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
		500 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
		690 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
Rated conditional short-circuit current Ip (r.m.s.) and cut-off current îc (peak) value. The cut-off current îc refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	Ip (r.m.s.) 80 kA, 415 V	îc (peak)	kA	40.5	40.5	40.5	59	59	83.5	83.5
	Max. OFA_ fuse size	gG/aM	A/A	355/315	355/315	355/315	500/500	500/500	800/1 000	800/1 000
	Ip (r.m.s.) 100 kA, 500 V	îc (peak)	kA	40.5	40.5	40.5	61.5	61.5	90	90
	Max. OFA_ fuse size	gG/aM	A	315/315	315/315	315/315	500/450	500/450	800/800	800/800
	Ip (r.m.s.) 80 kA, 690 V	îc (peak)	kA	40.5	40.5	40.5	59	59	83.5	83.5
	Max. OFA_ fuse size	gG/aM	A	355/315	355/315	355/315	500/500	500/500	800/1 000	800/1 000
Rated short-time withstand current	Icw (r.m.s.)	690 V 0.15s	kA	15	15	15	31	31	38	38
		690 V 0.25s	kA	15	15	15	24	24	36	36
		690 V 1s	kA	8	8	8	15	15	20	20
Rated short-time making capacity3)	Icm (peak)4)	690 V	kA	30	30	30	65	65	80	80
Power loss / pole	With rated current		W	2.4	4	6.5	6.5	10	25	40
Mechanical endurance	Number of oper. cycles[5]		Cycles	8 000	8 000	8 000	8 000	8 000	5 000	5 000
Terminal bolt size	Metric thread diameter x length		mm	M8x25	M8x25	M8x25	M10x30	M10x30	M12x40	M12x40
Terminal tightening torque	Counter torque required		Nm	15-22	15-22	15-22	30-44	30-44	50-75	50-75
Operating torque	3-pole change-over switches		Nm	7	7	7	16	16	27	27
Weight without accessories	3-pole switch		kg	5.7	5.7	5.7	10.2	10.2	17.5	17.5
	4-pole switch		kg	6.4	6.4	6.4	11.4	11.4	20.4	20.4
Data according to IEC 60947-6-1										
Class of equipment				PC	PC	PC	PC	PC	PC	PC
Rated short-time withstand current	Icw (r.m.s.)	690 V 0.1s	kA	15	15	15	25	25	38	38
Rated operational current, AC-31B		up to 415 V	A	160	200	250	315	400	650	720
Rated operational current, AC-33B		up to 415 V	A	160	200	250	315	400	650	650

[1] Utilization category B
[2] These values are given for guidance and may vary acc. to the motor manufacturer
[3] Short circuit duration > 50ms, without fuse protection
[4] Max. distance from switch frame to nearest busbar / cable support 150 mm
[5] Operating cycle: O - I - O - II - O
[6] Further ratings on request

Motorized change-over switches

Technical data for OTM1000...3200_C

Motorized change-over switches

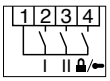
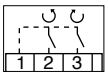
Data according to IEC 60947-3				Switch size					
				OT_1000_	OT_1250_	OT_1600_	OT_2000_	OT_2500_	OT_3200_
Rated insulation voltage and rated operational voltage AC20/DC20[1]		Pollution degree 3[2]	V	1 000	1 000	1 000	1 000	1 000	1 000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10	10
Rated impulse withstand voltage[3]			kV	12	12	12	12	12	12
Rated thermal current and rated operational current AC20/DC20	/ ambient 40°C	In open air	A	1 000	1 250	1 600	2 000	2 500	3 200
	/ ambient 40°C	In enclosure	A						
..with minimum conductor cross section		Cu	mm^2	2x300	2x400	2x500	3x500	4x500	4x1 000
Rated operational current, AC-21A		up to 500 V	A	1 000	1 250	1 600	2 000[5]	2 500[5]	3 200[5]
		690 V	A	1 000	1 250	1 600			
Rated operational current, AC-22A		up to 500 V	A	1 000	1 250	1 600			
		690 V	A	1 000	1 250	1 600			
Rated operational current, AC-23A		up to 415 V	A	1 000	1 250	1 250			
		440 V	A	1 000	1 250	1 250			
		500 V	A	1 000	1 250	1 250			
		690 V	A	1 000	1 250	1 250			
Rated operational power, AC-23A[1]		230 V	kW	315	400	400			
The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		400 V	kW	560	710	710			
		415 V	kW	560	710	710			
		500 V	kW	710	900	900			
		690 V	kW	1 000	1 200	1 200			
Rated breaking capacity in category AC-23		up to 415 V	A	10 000	10 000	10 000			
		500 V	A	10 000	10 000	10 000			
		690 V	A	10 000	10 000	10 000			
Rated conditional short-circuit current I_p (r.m.s.) and cut-off current $\hat{i}_c$ (peak) value. The cut-off current $\hat{i}_c$ refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	I_p (r.m.s.) 80 kA, 415 V	$\hat{i}_c$ (peak)	kA	100	100	100			
	Max. OFA_ fuse size	gG/aM	A/A	1 250/1 250	1 250/1 250	1 250/1 250			
	I_p (r.m.s.) 100 kA, 500 V	$\hat{i}_c$ (peak)	kA	106	106	106			
	Max. OFA_ fuse size	gG/aM	A	1 250/1 250	1 250/1 250	1 250/1 250			
	I_p (r.m.s.) 80 kA, 690 V	$\hat{i}_c$ (peak)	kA						
	Max. OFA_ fuse size	gG/aM	A						
Rated short-time withstand current	I_{cw} (r.m.s.)	690 V 0.15s	kA	50	50	50	50	50	
		690 V 0.25s	kA	50	50	50	50	50	
		690 V 1s	kA	50	50	50	55	55	65
Rated short-time making capacity[2]	I_{cm} (peak)[3]	690 V	kA	92	92	92	110	110	143
Power loss / pole	With rated current		W	19	29	48	55	85	95
Mechanical endurance	Number of oper. cycles[4]		Cycles	3 000	3 000	3 000	2 000	2 000	2 000
Terminal bolt size	Metric thread diameter x length		mm	M12x60	M12x60	M12x60	M12x60	M12x60	M12x100
Terminal tightening torque	Counter torque required		Nm	50-75	50-75	50-75	50-75	50-75	50-75
Operating torque	3-pole change-over switches		Nm	78	78	78	78	78	80
Weight without accessories	3-pole switch		kg	42	42	44	56	56	83
	4-pole switch		kg	50	50	52	70	70	101
Data according to IEC 60947-6-1									
Class of equipment				PC	PC	PC			
Rated short-time withstand current	I_{cw} (r.m.s.)	690 V 0.1s	kA	50	50	50			
Rated operational current, AC-31B		up to 415 V	A	1 000	1 250	1 600			
Rated operational current, AC-33B		up to 415 V	A	1 000	1 000	1 000			

[1] These values are given for guidance and may vary acc. to the motor manufacturer
[2] Short circuit duration > 50ms, without fuse protection
[3] Max. distance from switch frame to nearest busbar / cable support 150 mm
[4] Operating cycle: O - I - O - II - O
[5] Category AC-21B, up to 415V

Motorized change-over switches

Motor operator performance data for OTM40…125_C

Motor operator

Data according to IEC 60947				**Switch size**
				40…125
Rated operational voltage U_e	Pollution degree 3		V AC/DC	110 - 240
	50/60 Hz		V DC	24
Operating voltage range				0.85 - 1.1 x U_e
Operating time[1)]	90° I-0, 0-I, 0-II, II-0	110…240 V AC/DC	s	0.5-1.0
		24 V DC	s	0.6-1.3
Operating transfer time[1)]	180° I-II, II-I	110…240 V AC/DC	s	1.2-1.5
		24 V DC	s	1.4-2.1
OFF -time when operating I-II or II-I[1)]	180° I-II, II-I	110…240 V AC/DC	s	0.4-0.8
		24 V DC	s	0.6-1.0
Nominal current In[1)]		110…240 V AC/DC	A	0.2-0.5
		24 V DC	A	0.6
Current inrush[1)]		110…240 V AC/DC	A	1.5-3.0
		24 V DC	A	3.6
Operating rate	Cycle 0-I-0-II-0	Max. continuous	cycles/min	1
		Max. short-time ≤ 10 cycles	cycles/min	10
Overvoltage category				III
Rated impulse withstand voltage U_{imp}			kV	4
Dielectric strength		50 Hz 1 min.	kV	1.5
Impulse command		Min. impulse duration	ms	100
Terminals				
Voltage supply wiring for U_e				PE - N - L
Cross section		Solid/stranded	mm²	1.5 - 2.5
Short-circuit protection device		Max. MCB	A	C16
Control terminal				C - II - I - O
Cross section		Solid/stranded	mm²	1.5 - 2.5
Maximum cable length			m	100
Terminal for state information				
Terminal for state information		Solid/stranded	mm²	1.5
Also used with the OMD automatic control unit		Rating	A	3
				AC-1/250V
Common, voltage supply	1			
Position of switch I	2			
Position of switch II	3			
Handle attached or motor operator locked	4			
Short-circuit protection device		Max. MCB	A	C2
Control terminal for OMD automatic control unit				
Control terminal for OMD automatic control unit		Solid/stranded	mm²	1.5 - 2.5
Common, voltage supply from motor operator	1		V DC	24
Close switch I or open switch II	2		V DC	24
			mW	500
Close switch II or open switch I	3		V DC	24
			mW	500
Operating temperature			°C	-25…+55
Transportation and storage temperature			°C	-40…+70
Max. altitude			m	2 000
Protection degree (front panel)				IP20

[1)] Under nominal conditions

Motorized change-over switches

Motor operator performance data for OTM160…3200_C

Motor operator

Data according to IEC 60947				Switch size				
				160…250	315…400	630…800	1000…1600	2000…3200
Rated operational voltage U_e	Pollution degree 3	50/60 Hz	V AC					**220 - 240**
			V AC/DC					110 - 125
			V DC					48
			V DC					24
Operating voltage range								0,85 - 1,1 x U_e
Operating time[1)]	90° I-0, 0-I, 0-II, II-0	220-240VAC	s	0.4-1.0	0.4-1.0	0.4-1.0	0.5-1.5	0.5-1.5
		110-125VAC/DC	s	0.5-1.5	0.5-1.5	0.6-1.2	0.5-1.5	0.5-1.5
		48VDC	s	0.5-1.5	0.4-1.0	0.6-1.6	0.5-1.5	0.5-1.5
		24VDC	s	0.4-1.0	0.4-1.0	0.5-1.5	1.0-2.0	1.0-2.0
Operating transfer time[1)]	180° I-0-II, II-0-I	220-240VAC	s	1.0-2.0	0.9-2.0	0.9-2.0	1.5-3.0	1.5-3.0
		110-125VAC/DC	s	1.1-2.5	1.2-2.6	1.2-3.0	1.5-3.0	1.5-3.0
		48VDC	s	1.4-2.5	1.0-2.0	1.3-3.0	1.5-3.0	1.5-3.0
		24VDC	s	1.0-2.0	1.0-2.0	1.1-2.5	2.0-3.5	2.0-3.5
OFF -time when operating I-II or II-I[1)]	180° I-II, II-I	220-240VAC	s	0.4-1.0	0.4-1.0	0.4-1.0	0.5-1.5	0.5-1.5
		110-125VAC/DC	s	0.4-1.1	0.5-1.5	0.6-1.5	0.5-1.5	0.5-1.5
		48VDC	s	0.5-1.1	0.4-1.0	0.7-1.6	0.5-1.5	0.5-1.5
		24VDC	s	0.4-1.0	0.4-1.0	0.5-1.5	0.8-1.7	0.8-1.7
Nominal current I_n[1)]		220-240VAC	A	0.2	0.5	0.7	1.8	1.8
		110-125VAC/DC	A	0.5	0.6	0.8	3.0	3.0
		48VDC	A	1.1	2.1	2.6	5.3	5.3
		24VDC	A	3.3	4.2	4	8.0	8.0
Current inrush[1)]		220-240VAC	A	1.3	2.1	2.8	7.7	7.7
		110-125VAC/DC	A	2.1	2.5	4.6	13.3	13.3
		48VDC	A	4.4	8.3	8.4	22.4	22.4
		24VDC	A	16.8	17.5	22.4	26.6	26.6
Overload fuse	Type / I_n / Capacity	220-240VAC	mA	T/315/H	T/500/H	T/1 000/H	T/2 000/H	T/2 000/H
		110-125VAC/DC	mA	T/500/H	T/630/H	T/1 000/H	T/4 000/H	T/4 000/H
		48VDC	A	T/1,25/H	T/2,5/H	T/2,5/H	T/5/H	T/5/H
		24VDC	A	T/4,0/H	T/5,0/H	T/5,0/H	T/10/H	T/10/H
	Size		mm	5x20	5x20	5x20	5x20	5x20
Operating rate	Cycle 0-I-0-II-0,	220-240VAC	cycles/min	1	1	1	0.5	0.5
	max. continuous	110-125VAC/DC	cycles/min	1	1	1	0.5	0.5
		48VDC	cycles/min	1	1	1	0.5	0.5
		24VDC	cycles/min	1	1	1	0.5	0.5
	Max. short-time,	220-240VAC	cycles/min	10	10	10	5	5
	≤ 10 cycles	110-125VAC/DC	cycles/min	10	10	10	5	5
		48VDC	cycles/min	10	10	10	5	5
		24VDC	cycles/min	10	10	10	5	5
Overvoltage category								III
Rated impulse withstand voltage U_{imp}			kV					4
Dielectric strength		50 Hz 1 min.	kV					1.5
Impulse command		Min. impulse						
		duration	ms					100
Terminals								
Voltage supply wiring for U_e								PE - N - L
Cross section		solid/stranded	mm^2					1.5 - 2.5
Short-circuit protection device		max. MCB	A					C16
Control terminal (no SELV)								C - II - I - O
Cross section		solid/stranded	mm^2					1.5 - 2.5
Maximum cable length			m					100
State information of locking (no SELV)								
Handle attached or motor operator locked		11-12-14 (C/O)						5A/250V/cosφ=1
Locking motor operator		23-24 (NO)						5A/250V/cosφ=1
Short-circuit protection device		Max. MCB	A					C2
Protection degree								IP20
Operating temperature			°C					-25…+55
Transportation and storage temperature			°C					-40…+70
Max. altitude			m					2 000

[1)] Under nominal conditions

Manual and motorized bypass switches

Technical data for OT and OTM160...800_Y_

Manual and motorized bypass switches

Data according to IEC 60947-3				**Switch size , OTM_**						
				OTM160_	**OTM200_**	**OTM250_**	**OTM315_**	**OTM400_**	**OTM630_**	**OTM800_**
Rated insulation voltage and rated operational voltage AC20/DC20		Pollution degree 3	V	1000	1000	1000	1000	1000	1000	1000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10	10	10
Rated impulse withstand voltage			kV	12	12	12	12	12	12	12
Rated thermal current and rated operational current AC20/DC20	/ ambient 40°C	In open air	A	160	200	250	315	400	630	800
	/ ambient 40°C	In enclosure	A	160	200	250	315	400	630	800
..with minimum conductor cross section		Cu	mm^2	70	95	120	185	240	2x185	2x240
Rated operational current, AC-21A		up to 500 V	A	160	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
Rated operational current, AC-22A		up to 500 V	A	160	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
Rated operational current, AC-23A		up to 415 V	A	160	200	250	315	400	630	800
		440 V	A	160	200	250	315	400	630	800
		500 V	A	160	200	250	315	400	630	800
		690 V	A	160	200	250	315	400	630	800
Rated operational current / poles in series, DC-21A1)		≤ 110 V	A	160/2	200/2	250/2	315/1[4]	400/1[4]	630/1	800/1
		220 V	A	160/2	200/2	250/2	315/2[4]	400/2[4]	630/1	800/1
		440 V	A	160/3	200/3	230/3	315/3	360/3	630/2	720/2
		660 V	A	160/4	200/4	200/4	315/4	315/4	630/4[4]	630/4[4]
Rated operational power, AC-23A[2]		230 V	kW	45	60	75	100	132	200	250
The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		400 V	kW	90	110	140	160	220	355	450
		415 V	kW	90	110	145	180	230	355	450
		500 V	kW	110	132	170	220	280	400	560
		690 V	kW	160	200	250	315	400	630	800
Rated breaking capacity in category AC-23		up to 415 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
		500 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
		690 V	A	1 280	1 600	2 000	2 520	3 200	5 040	6 400
Rated conditional short-circuit current Ip (r.m.s.) and cut-off current îc (peak) value. The cut-off current îc refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	Ip (r.m.s.) 80 kA, 415 V	îc (peak)	kA	40.5	40.5	40.5	59	59	83.5	83.5
	Max. OFA_ fuse size	gG/aM	A/A	355/315	355/315	355/315	500/500	500/500	800/1 000	800/1 000
	Ip (r.m.s.) 100 kA, 500 V	îc (peak)	kA	40.5	40.5	40.5	61.5	61.5	90	90
	Max. OFA_ fuse size	gG/aM	A	315/315	315/315	315/315	500/450	500/450	800/800	800/800
	Ip (r.m.s.) 80 kA, 690 V	îc (peak)	kA	40.5	40.5	40.5	59	59	83.5	83.5
	Max. OFA_ fuse size	gG/aM	A	355/315	355/315	355/315	500/500	500/500	800/1 000	800/1 000
Rated short-time withstand current	Icw (r.m.s.)	690 V 0.15s	kA	15	15	15	31	31	38	38
		690 V 0.25s	kA	15	15	15	24	24	36	36
		690 V 1s	kA	8	8	8	15	15	20	20
Rated short-time making capacity[3]	Icm (peak)[4]	690 V	kA	30	30	30	65	65	80	80
Power loss / pole	With rated current		W	2.4	4	6.5	6.5	10	25	40
Mechanical endurance	Number of oper. cycles[5]		Cycles	8 000	8 000	8 000	8 000	8 000	5 000	5 000
Terminal bolt size	Metric thread diameter x length		mm	M8x25	M8x25	M8x25	M10x30	M10x30	M12x40	M12x40
Terminal tightening torque	Counter torque required		Nm	15-22	15-22	15-22	30-44	30-44	50-75	50-75
Operating torque	Typical for 3-pole bypass switches		Nm	14	14	14	32	32	54	54
Weight without accessories	Manual bypass switches	3-pole switch	kg	4.3	4.3	4.3	8.2	8.2	19.9	19.9
		4-pole switch	kg	5.8	5.8	5.8	11.0	11.0	26.6	26.6

[1] Further ratings on request
[2] These values are given for guidance and may vary acc. to the motor manufacturer
[3] Short circuit duration > 50ms, without fuse protection
[4] Max. distance from switch frame to nearest busbar / cable support 150 mm
[5] Operating cycle: O - I - O - II - O

Manual and motorized bypass switches

Technical data for motor operators

Motorized bypass switches, Motor operator

Data according to IEC 60947				Switch size		
				160...250	315...400	630...800
Rated operational voltage Ue	Pollution degree 3	50/60 Hz	V AC			220 - 240
Operating voltage range						0,85 - 1,1 x Ue
Operating time1)	90° I-0, 0-I, 0-II, II-0	220-240VAC	s	0.4-1.0	0.4-1.0	0.4-1.0
Operating transfer time1)	180° I-0-II, II-0-I	220-240VAC	s	1.0-2.0	0.9-2.0	0.9-2.0
OFF -time when operating I-II or II-I1)	180° I-II, II-I	220-240VAC	s	0.4-1.0	0.4-1.0	0.4-1.0
Nominal current In1)		220-240VAC	A	0.2	0.5	0.7
Current inrush1)		220-240VAC	A	1.3	2.1	2.8
Overload fuse	Type / In / Capacity	220-240VAC	mA	T/315/H	T/500/H	T/1 000/H
Operating rate	Cycle 0-I-0-II-0,	220-240VAC	cycles/min	1	1	1
Overvoltage category						III
Rated impulse withstand voltage Uimp			kV			4
Dielectric strength		50 Hz 1 min.	kV			1.5
Impulse command		Min. impulse				
		duration	ms			100
Terminals						
Voltage supply wiring for Ue						PE - N - L
Cross section		solid/stranded	mm2			1.5 - 2.5
Short-circuit protection device		max. MCB	A			C16
Control terminal (no SELV)						C - II - I - O
Cross section		solid/stranded	mm2			1.5 - 2.5
Maximum cable length			m			100
State information of locking (no SELV)						
Handle attached or motor operator locked		11-12-14 (C/O)				5A/250V/cosφ=1
Locking motor operator		23-24 (NO)				5A/250V/cosφ=1
Short-circuit protection device		Max. MCB	A			C2
Protection degree						IP20
Operating temperature			°C			-25...+55
Transportation and storage temperature			°C			-40...+70
Max. altitude			m			2 000

[1] Under nominal conditions

Functionality in brief

The amplified diagram illustrate the basic functionality and application of these switch products.

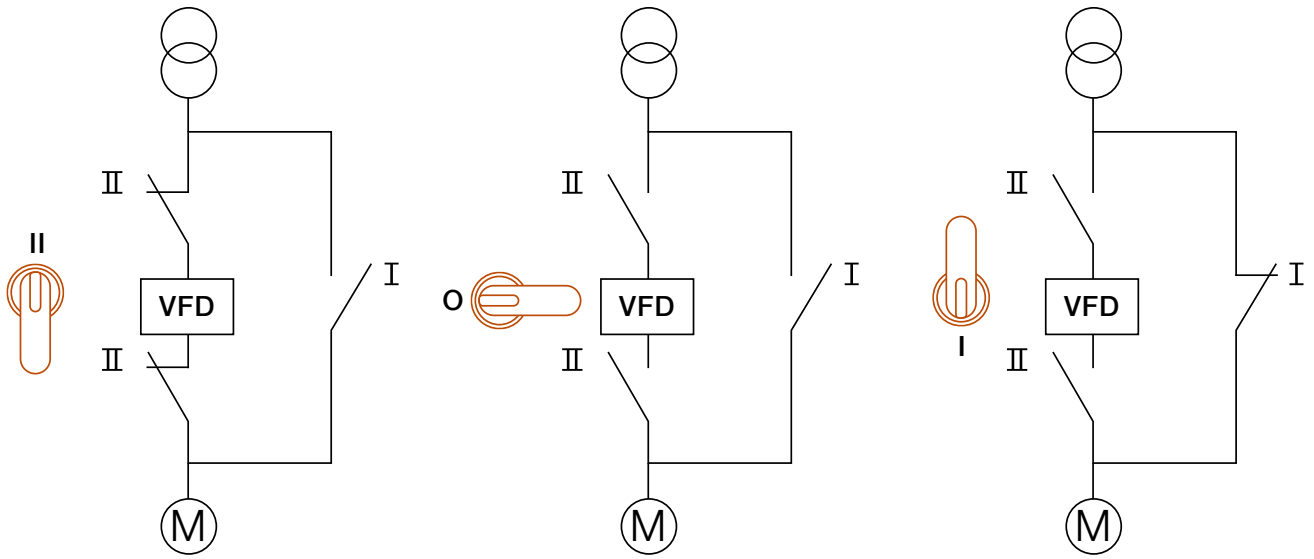


ABB Compact ATS
Compact without compromise

The Compact ATS by ABB is just that - it’s a compact, economical and innovative all-in-one device that delivers all the safety and performance you would expect from an automatic transfer switch... and more. 100% ease and efficiency in a 40% more compact package. You can now get the high ABB quality you know and trust, at a competititve price.

Technical data
Compact automatic transfer switches

Automatic transfer switches functionality

OTM_C_D products overview	OTM_C20D_	OTM_C21D_
Features	x	x
Rated operational voltage Ue		154 V AC - 480 V AC +/- 20% + N
Rated frequency		50 / 60 Hz +/- 10%
Voltage sensing precision		5%
Frequency sensing precision		1%
Rated impulse withstand voltage, Uimp		6 kV
Overvoltage category		III
Pollution degree		2
Protection rating for the front panel		IP20
Operating temperature		– 20...+ 60 °C
Transportation and storage temperature		– 25...+ 80 °C
Altitude		Max. 2000m
Humidity With condensation		5 %...98 %
Humidity Without condensation		5 %...90 %
Operation Types		
Manual operation with handle	x	x
Local operation with front panel keypad		x
Automatic transfer switching equipment (ATSE)	x	x
Applications		
Transfer between two Transformers	x	x
Transfer between a Transformers and a generator		x
Operation modes		
Automatic transfer and back-switching operation	x	x
Automatic transfer and manual back-switching operation	x	x
Source failure detections		
No voltage	x	x
Undervoltage	Fixed 0.7Ue	0.7-0.95 Ue
Overvoltage	Fixed 1.3Ue	1.05-1.3 Ue
Phase missing	x	x
Voltage unbalance		x
Invalid frequency		x
Configuration		
By DIP switches	x	x
By rotary switches		x
Two power status display	x	x
Two switches status display	x	x
Auto status display	x	x
Alarm display	x	x

Technical data
Compact automatic transfer switches

Automatic transfer switches functionality

OTM_C_D products overview	OTM_C20D_	OTM_C21D_
Time delays		
Delay on transfer[3)]		0-30s
Back-switching delay		0-900s
Generator stop delay		30s,400s
Signals input and output		
Emergency Off with 24VDC signal input	x	x
Test signal input		x
Switch position signal	With Auxiliary contacts	Without Auxiliary contact
Alarm output signal		x

[3)] Overvoltage and undervoltage conditions

Compact ATS
Easy use and installation

01 Easy manual operation with the handle in case of emergency

02 DIN- rail mounting

03 Base mounting with screws

Technical data
Compact automatic transfer switches OTM40...125_

Compact automatic transfer switches

				Switch size		
Data according to IEC 60947-3				**OTM40_**	**OTM63_**	**OTM125_**
Rated insulation voltage and rated operational voltage AC20/DC20		Pollution degree 3	V	800	800	800
Dielectric strength		50 Hz 1min.	kV	6	6	6
Rated impulse withstand voltage			kV	8	8	8
Rated thermal current and rated operational current AC20/DC20	/ ambient 40°C	In open air	A	40	63	125
	/ ambient 40°C	In enclosure	A	40	63	125
	/ ambient 60°C	In enclosure	A	32	50	100
..with minimum conductor cross section		Cu	mm²	10	16	50
Rated operational current, AC-21A		up to 500 V	A	40	63	125
		690 V	A	40	63	125
Rated operational current, AC-22A		up to 500 V	A	40	63	125
		690 V	A	40	63	125
Rated operational current, AC-23A		up to 415 V	A	40	63	90
		500 V	A	40	60	70
		690 V	A	40	40	50
Rated operational current / poles in series, DC-21A		up to 48 V	A	40/1	63/1	125/1
		110 V	A	40/2	63/2	125/2
		220 V	A	40/4	63/4	100/4
Rated operational current / poles in series, DC-22A		up to 48 V	A	40/1	63/1	125/1
		110 V	A	40/2	63/2	125/2
		220 V	A	40/4	63/4	80/4
Rated operational current / poles in series, DC-23A		up to 48 V	A	40/1	63/1	125/1
		110 V	A	40/2	63/2	125/2
		220 V	A	40/4	63/4	63/4
Rated operational power, AC-23A[1)]		230 V	kW	7.5	15	22
The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		400 V	kW	18.5	30	45
		415 V	kW	18.5	30	45
		500 V	kW	22	37	45
		690 V	kW	37	37	45
Rated breaking capacity in category AC-23		up to 415 V	A	320	504	720
		500 V	A	320	480	560
		690 V	A	320	320	400
Rated conditional short-circuit current Ip (r.m.s.) and corresponding max. allowed cut-off current îc (peak) value.	Ip (r.m.s.) 50 kA, 415 V	îc (peak)	kA	16.5	16.5	16.5
	Max. OFA_ fuse size	gG/aM	A/A	125/125	125/125	125/125
	Ip (r.m.s.) 18 kA, 690 V	îc (peak)	kA	11	11	11
The cut-off current îc refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	Max. OFA_ fuse size	gG	A	125	125	125
	Ip (r.m.s.) 50 kA, 690 V	îc (peak)	kA	10	10	10
	Max. OFA_ fuse size	gG/aM	A/A	63/63	63/63	63/63
Rated short-time withstand current	Icw (r.m.s.)	690 V 1s	kA	2.5	2.5	2.5
Rated short-time making capacity2)	Icm (peak)	690 V	kA	3.6	3.6	3.6
Power loss / pole	With rated current		W	1.6	2.8	6.3
Mechanical endurance	Number of oper. cycles[3)]		Cycles	10 000	10 000	10 000
Cable size	Cu-wire size suitable for terminal clamps		mm²	2.5-25/2x2.5-16	10-70	10-70
			AWG	14-4/2x14-6	8-00	8-00
Terminal tightening torque	Counter torque required		Nm	6	6	6
Operating torque	Typical for 3-pole switches		Nm	5	5	5
Weight without accessories	3-pole switch		kg	1.75	1.75	1.75
	4-pole switch		kg	2.00	2.00	2.00

Introducing TruONE® ATS from ABB

A critical breakthrough for critical power

The all-new TruONE® is the world's first true purpose-built automatic transfer switch, engineered to incorporate switch and controller in one seamless unit.

Performance tested beyond standard requirements, TruONE® stands ready to ensure the steady delivery of critical power at all times. Its self-contained design reduces the number of wires and connections, which speeds installation and minimizes the potential for connection failures to ensure best-in-class reliability. Its predictive maintenance and modular components reduce downtime and service costs. And its advanced connectivity is ready for the future. In addition, unlike typical ATS solutions, TruONE® allows emergency manual operation under load for immediate power restoration in the event of an equipment malfunction.

TruONE® represents a major shift in engineering and a critical breakthrough for critical power.

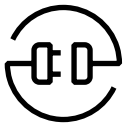
The one ATS with all these advantages

Easy to Install
Reduces installation time by up to 80%.

Why waste time piecing together an ATS from multiple components and as many as 20 connection wires, not to mention the time spent testing? TruONE® is the first automatic transfer switch to put it all together, including the controller with detachable HMI. It can be installed with a single wire using standard enclosures.

Safety and Protection
Reduces risk of operator injury.

TruONE® enables emergency manual operation
— even under load — without opening the panel door when the HMI is mounted to the ATS frame. The HMI can be detached from the frame for door mounting, offering more flexibility for the panel designer. Best of all, regardless of the HMI installation method, there's no need for connecting dangerous line voltages to the door, so the risk of operator injury due to equipment malfunction is reduced.

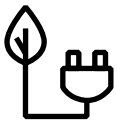


Optimum Interface
Simplifies connectivity.

TruONE® features cloud-based connectivity through the ABB Ability™ Electrical Distribution Control System (EDCS). ABB Ability simplifies implementation and use of TruONE® in coordination with other ABB devices, ensuring one common user interface and one common software environment. Market-leading modular connectivity with seven communication protocols ensures easy installation and connectivity now and far into the future.

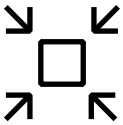
Speed Up Your Project
Now you can speed up your project even more, thanks to TruONE® automatic commissioning capabilities. Pre-made configuration files can be uploaded from your PC to TruONE®, minimizing the risk of human error and reducing programming time by 80%.

Continuous Operation
TruONE® features predictive maintenance, self-diagnostics and customer-replaceable critical modules to simplify service and significantly reduce downtime and service costs. Say goodbye to blinking lights and stopping motors. TruONE® provides a fast in-phase open transition of power, ensuring unnoticed generator use during business hours.



Energy Efficiency
Full compatibility with ABB Ability™ EDCS allows data processing from the site's electrical equipment to deliver analysis and make recommendations for optimizing the electrical system's performance. This allows remote monitoring of plants, energy consumption and costs at a glance, making implementation of energy management strategies easier and faster.

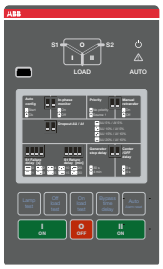
Optimized Logistics
TruONE® features a wide voltage range from 200 to
480 VAC (with +/-20% tolerance), reducing the need to stock multiple SKUs, reducing inventory and saving space in the warehouse.



Space Saving
TruONE® features plug-in factory and field-mount accessorizing, so you don't need extra space inside the panel. Even in the case of specialized customer needs, you can use standard cabinets.

TruONE® feature comparison

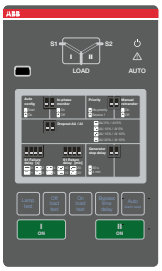
Main features in the table below.
Consult ABB for more information.



Feature comparison

	Level 2 controls	Level 3 controls	Level 4 controls
Ampere sizes available	IEC: 200-1600 A	IEC: 200-1600 A	IEC: 200-1600 A
	UL: 30-1200 A	UL: 30-1200 A	UL: 30-1200 A
Rated voltage	200-480Vac	200-480Vac	200-480Vac
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Phase system	Single and Three	Single and Three	Single and Three
Number of poles	2, 3 and 4	2, 3 and 4	3 and 4
Neutral configuration			
Switched	Yes	Yes	Yes
Overlapping	No	Yes	Yes
Product type			
Open transition (I-II)	Yes	Yes	Yes
Delayed transition (I-O-II)	Yes	Yes	Yes
Voltage and frequency settings			
Pick up Voltage Source 1	Fixed 2% above drop out	81-99%, 101-119%	81-99%, 101-119%
Drop out Voltage Source 1	+/-5, 10, 15, 20%	80-98%, 102-120%	80-98%, 102-120%
Pick up Voltage Source 2	Fixed 2% above drop out	81-99%, 101-119%	81-99%, 101-119%
Drop out Voltage Source 2	+/-5, 10, 15, 20%	80-98%, 102-120%	80-98%, 102-120%
Pick up Frequency Source 1	Fixed 1% above drop out	80.5-99.5%, 100.5-119.5%	80.5-99.5%, 100.5-119.5%
Drop out Frequency Source 1	+/-5, 10 %	80-99%, 101-120%	80-99%, 101-120%
Pick up Frequency Source 2	Fixed 1% above drop out	80.5-99.5%, 100.5-119,5%	80.5-99.5%, 100.5-119.5%
Drop out Frequency Source 2	+/-5, 10 %	80-99%, 101-120%	80-99%, 101-120%
Time delay settings			
Override momentary Source 1 Outage, sec	0, 1, 2, 3, 4, 5, 10, 15, 20, 25, 30	0-60	0-60
Transfer from Source 1 to Source 2, sec	Fixed 2 seconds	0-3600	0-3600
Override momentary Source 2 Outage, sec	Fixed 1,5 seconds	0-60	0-60
Transfer from Source 2 to Source 1, min	0, 1, 2, 3, 4, 5, 10, 15, 20, 25, 30	0-120	0-120
Generator stop delay, min	30 secs or 4 mins	0-60	0-60
Center-OFF delay, sec	0 or 4	0-300	0-300
Pre-transfer delay S1 to S2, sec	No	0-60	0-60
Post-transfer delay S1 to S2 , sec	No	0-60	0-60
Pre-transfer delay S2 to S1, sec	No	0-60	0-60
Post-transfer delay S2 to S1, sec	No	0-60	0-60
Load shed delay, sec	No	0-60	0-60
Source failure detections			
No voltage	Yes	Yes	Yes
Undervoltage	Yes	Yes	Yes
Overvoltage	Yes	Yes	Yes
Phase missing	Yes	Yes	Yes
Voltage unbalance	Yes	Yes	Yes
Invalid frequency	Yes	Yes	Yes
Incorrect phase sequence	Yes	Yes	Yes

TruONE® feature comparison



Feature comparison

	Level 2 controls	Level 3 controls	Level 4 controls
Features			
Controls	DIP + keys	LCD + keys	Touch + keys
LED indications for ATS, S1 and S2 status	Yes	Yes	Yes
Open transition - Standard digital inputs/outputs	0 / 1	1 / 1	2 / 1
Delayed transition - Standard digital inputs/outputs	1 / 1	2 / 1	3 / 1
Programmable digital inputs/outputs	No	Yes	Yes
Auto config (voltage, frequency, phase system)	Yes	Yes	Yes
Source priority	Source 1, No priority	Source 1/2, No priority	Source 1/2, No priority
Manual re-transfer	Yes	Yes	Yes
In-phase monitor (synchro check)	Yes	Yes	Yes
Genset exercising: on-load, off-load	Yes	Yes	Yes
In-built power meter module	No	No	Yes
Load shedding	No	Yes	Yes
Real time clock	No	Yes	Yes
Event log	No	Yes	Yes
Predictive maintenance	No	No	Yes
Voltage and current harmonics measuring	No	No	Yes
Field-mount accessories			
Auxiliary contacts for position indication	Yes	Yes	Yes
Digital input/output modules	No	Yes	Yes
12-24 Vdc aux supply module for controller	No	Yes	Yes
Communication modules	No	Yes	Yes
Connectivity			
Modbus RTU (RS-485)	No	Yes	Yes
Modbus/TCP	No	Yes	Yes
Profibus DP	No	Yes	Yes
ProfiNet	No	Yes	Yes
DeviceNet	No	Yes	Yes
Ethernet IP	No	Yes	Yes
IEC 61850	No	Yes	Yes
Monitoring via ABB Ability™: EDCS	No	Yes	Yes
For applications			
Mains - Mains	Yes	Yes	Yes
Mains - Generator (minimum size 40kVA)	Yes	Yes	Yes

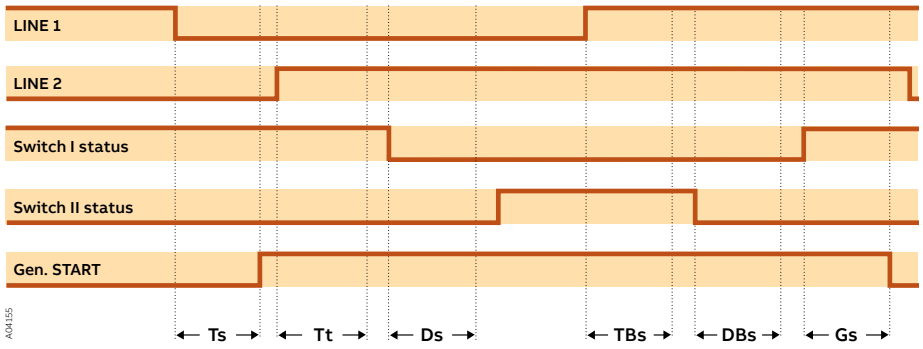
Automatic transfer switches
Switching sequence and operating times

Example of switching sequence for automatic transfer switches

An example of the switching sequence can be summarized in following steps:
- An anomaly occurs on the Line 1
- Switching delay
- Generator start
- Delay on transfer
- Change-over switch (Switch I) to the position O
- Dead band I to II delay
- Change-over switch (Switch II) to the position II

The back switching sequence can be summarized in the following steps:
- The Line 1 will start the normal functioning
- Back switching delay
- Change-over switch (Switch II) to the position O
- Dead band II to I delay
- Change-over switch (Switch I) to the position I
- Generator stop delay
- Generator stop

The diagram is with OTM_C8D and Line 1 priority operating mode



Ts: Switching delay, Tt: Delay on transfer, Ds: Dead band I to II,
TBs: Back switching delay, DBs: Dead band II to I, Gs: Generator stop delay

Automatic transfer switches operating times for OTM160...1600_

Operating times

	Operating transfer time[a)]	OFF-time when operating[a)]
Type	**I - II, II - I [s]**	**I - II, II - I [s]**
OTM160...250_C2D_	2.0 - 4.0	0.4 - 1.0
OTM160...250_C3D_	2.0 - 4.0	0.4 - 1.0
OTM160...250_C8D_	1.5 - 3.0	0.4 - 1.0
OTM315...400_C2D_	2.0 - 5.0	0.4 - 1.0
OTM315...400_C3D_	2.0 - 5.0	0.4 - 1.0
OTM315...400_C8D_	1.5 - 3.0	0.4 - 1.0
OTM630...800_C2D_	2.0 - 5.0	0.4 - 1.0
OTM630...800_C3D_	2.0 - 5.0	0.4 - 1.0
OTM630...800_C8D_	1.5 - 3.0	0.4 - 1.0
OTM1000...1600_C2D_	3.0 - 6.0	0.6 - 1.5
OTM1000...1600_C3D_	3.0 - 6.0	0.6 - 1.5
OTM1000...1600_C8D_	2.5 - 4.0	0.6 - 1.5

[a)] Under nominal conditions

Automatic transfer switches

List of product functionalities

Automatic transfer switches functionality

	OTM_C2D_	OTM_C3D_	OTM_C8D_
OTM_C_D products overview			
Includes automatic control unit	OMD200_	OMD300_	OMD800_
Manual operation with handle	x	x	x
Local operation with front panel keypad	x	x	x
Automatic transfer switching equipment (ATSE)	x	x	x
Dual power source for the motor operator[1)]	o	x	o
Measurements			
Three phase voltage measurement on LINE 1	x	x	x
Single phase voltage measurement on LINE 1	x	x	x
Three phase voltage measurement on LINE 2	x	x	x
Single phase voltage measurement on LINE 2	x	x	x
Frequency on LINE 1	x	x	x
Frequency on LINE 2	x	x	x
Possibility to check the measurements via LCD			x
Source failure detections			
No voltage	x	x	x
Undervoltage	x	x	x
Overvoltage	x	x	x
Phase missing	x	x	x
Voltage unbalance	x	x	x
Invalid frequency	x	x	x
Incorrect phase sequence			x
Configuration			
By DIP switches	x	x	
By rotary switches	x	x	
By keypad and LCD			x
Voltage threshold setting	x	x	x
Voltage hysteresis setting			x
Frequency threshold setting			x
Frequency hysteresis setting			x
Time delays			
Switching delay	x[2)]	x[2)]	0...60 s
Delay on transfer[3)]			0...600 s
Dead band time I-II (stop switching to position O)			0...60 s
Back-switching delay	x[4)]	x[4)]	0...5 400 s
Dead band time II-I (stop switching to position O)			0...60 s
Generator stop delay	x[5)]	x[5)]	0...1 800 s
Status of time delays on the LCD			x

[1)] Dual power source allows the motor operator to be supplied by two separate voltage supplies. This way the motor operator is always energized from the available line.
[2)] Four options: 0, 5, 10 or 30 seconds
[3)] Delaying the switching sequence before transferring to generator, guaranteeing that in cold locations the generator is properly warmed up
[4)] Two options: the duration of back-switching delay is the same as switching delay, i.e. the time delay is same for I - II and II - I, or the back-switching delay is fixed 300 seconds
[5)] Two options: the duration of generator stop delay is the same as Switching delay or fixed 5 min

x = included as standard
o = as an accessory

Automatic transfer switches

List of product functionalities

Automatic transfer switches functionality

Features	OTM_C2D_	OTM_C3D_	OTM_C8D_
Generator start and stop	x	x	x
Off-load test sequence	x	x	x
On-load test sequence	x	x	x
Source status via front panel	x	x	x
Source status via digital outputs			x
Switch position via front panel	x	x	x
LCD[6)]			x
Fieldbus interface[7)]			x
Event/alarm log			x
Counter for number of operations			x
Auxiliary voltage supply[8)]			x
Programmable digital inputs (eight) and digital outputs (six)			x
Secondary load control (load shedding)			x
Digital input - Allow transfer to secondary[9)]			x
Digital input - Generator alarm[10)]			x
Digital input - Remote control to positions I, O and II			x
Operating mode			
Line priority	x[11)]	x[11)]	x[12)]
Manual back-switching[13)]	x	x	x
Automatic operation to position O, in case of source failure[14)]			x
Applications			
Transfer between two transformers	x	x	x
Transfer between a transformer and a generator	x	x	x

[6)] Menus available in eight languages; English, French, German, Italian, Spanish, Russian, Chinese and Finnish
[7)] Two-way communication, bus communication protocol is Modbus
[8)] In case of source failure, the control unit can be supplied with an external auxiliary supply with 24…110 V DC
[9)] Control unit requires an external signal before allowing the transfer to secondary
[10)] Two options for the operating mode after receiving the alarm: control unit either works normally, or initiates generator stop with operation to position O
[11)] Two options: No line priority, or Source 1 is the priority source
[12)] Three options: No line priority, Source 1 or Source 2 is the priority source
[13)] Automatic back-switching to primary source is prevented
[14)] Control unit and motor operator must be energized

x = included as standard
o = as an accessory

Automatic transfer switches

Technical data for OTM160...400_C



Automatic transfer switches

Data according to IEC 60947-3				Switch size , OTM_				
				OTM_160_	OTM_200_	OTM_250_	OTM_315_	OTM_400_
Rated insulation voltage and rated operational voltage AC20/DC20[1]		Pollution degree 3[2]	V	1 000	1 000	1 000	1 000	1 000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10
Rated impulse withstand voltage[3]			kV	12	12	12	12	12
Rated thermal current and rated operational current AC20/DC20	/ ambient 40°C	In open air	A	160	200	250	315	400
	/ ambient 40°C	In enclosure	A	160	200	250	315	400
..with minimum conductor cross section		Cu	mm^2	70	95	120	185	240
Rated operational current, AC-21A		up to 500 V	A	160	200	250	315	400
		690 V	A	160	200	250	315	400
Rated operational current, AC-22A		up to 500 V	A	160	200	250	315	400
		690 V	A	160	200	250	315	400
Rated operational current, AC-23A		up to 415 V	A	160	200	250	315	400
		440 V	A	160	200	250	315	400
		500 V	A	160	200	250	315	400
		690 V	A	160	200	250	315	400
Rated operational current / poles in series, DC-21A[10]		≤ 110 V	A	160/2	200/2	250/2	315/1[4]	400/1[4]
		220 V	A	160/2	200/2	250/2	315/2[4]	400/2[4]
		440 V	A	160/3	200/3	230/3	315/3	360/3
		660 V	A	160/4	200/4	200/4	315/4	315/4
Rated operational power, AC-23A[5] The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		230 V	kW	45	60	75	100	132
		400 V	kW	90	110	140	160	220
		415 V	kW	90	110	145	180	230
		500 V	kW	110	132	170	220	280
		690 V	kW	160	200	250	315	400
Rated breaking capacity in category AC-23		up to 415 V	A	1 280	1 600	2 000	2 520	3 200
		500 V	A	1 280	1 600	2 000	2 520	3 200
		690 V	A	1 280	1 600	2 000	2 520	3 200
Rated conditional short-circuit current I_p (r.m.s.) and cut-off current $\hat{i}_c$(peak) value. The cut-off current $\hat{i}_c$ refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	I_p (r.m.s.) 80 kA, 415 V	$\hat{i}_c$ (peak)	kA	40.5	40.5	40.5	59	59
	Max. OFA_ fuse size	gG/aM	A/A	355/315	355/315	355/315	500/500	500/500
	I_p (r.m.s.) 100 kA, 500 V	$\hat{i}_c$ (peak)	kA	40.5	40.5	40.5	61.5	61.5
	Max. OFA_ fuse size	gG/aM	A	315/315	315/315	315/315	500/450	500/450
	I_p (r.m.s.) 80 kA, 690 V	$\hat{i}_c$ (peak)	kA	40.5	40.5	40.5	59	59
	Max. OFA_ fuse size	gG/aM	A	355/315	355/315	355/315	500/500	500/500
Rated short-time withstand current	I_{cw} (r.m.s.)	690 V 0.15s	kA	15	15	15	31	31
		690 V 0.25s	kA	15	15	15	24	24
		690 V 1s	kA	8	8	8	15	15
Rated short-time making capacity[6]	I_{cm} (peak)[7]	690 V	kA	30	30	30	65	65
Power loss / pole	With rated current		W	2.4	4	6.5	6.5	10
Mechanical endurance	Number of oper. cycles[8]		Cycles	8 000	8 000	8 000	8 000	8 000
Terminal bolt size	Metric thread diameter x length		mm	M8x25	M8x25	M8x25	M10x30	M10x30
Terminal tightening torque	Counter torque required		Nm	15-22	15-22	15-22	30-44	30-44
Operating torque	Typical for 3-pole change-over switches		Nm	7	7	7	16	16
Weight without accessories	Automatic transfer switches	3-pole switch	kg	5.7	5.7	5.7	10.2	10.2
		4-pole switch	kg	6.4	6.4	6.4	11.4	11.4
Data according to IEC 60947-6-1								
Class of equipment				PC	PC	PC	PC	PC
Rated short-time withstand current	I_{cw} (r.m.s.)	690 V 0.1s	kA	15	15	15	25	25
Rated operational current, AC-31B		up to 415 V	A	160	200	250	315	400
Rated operational current, AC-33B		up to 415 V	A	160	200	250	315	400

[1] Automatic transfer switches: operational voltage = max. 415 V AC for OTM_C2D_, OTM_C3D_ and OTM_C8D_
[2] Automatic transfer switches: pollution degree 2 for OTM_C2D_, OTM_C3D_ and OTM_C8D_
[3] Automatic transfer switches: U_{imp} = 6 kV for OTM_C2D_, OTM_C3D_ and OTM_C8D_
[4] Utilization category B
[5] These values are given for guidance and may vary acc. to the motor manufacturer
[6] Short circuit duration > 50ms, without fuse protection
[7] Max. distance from switch frame to nearest busbar / cable support 150 mm
[8] Operating cycle: O - I - O - II - O
[9] Category AC-21B, up to 415V
[13] Further ratings on request

Automatic transfer switches

Technical data for OTM630...1600_C

Automatic transfer switches

Data according to IEC 60947-3				**Switch size , OTM_**				
				OTM_630_	**OTM_800_**	**OTM_1000_**	**OTM_1250_**	**OTM_1600_**
Rated insulation voltage and rated operational voltage AC20/DC20[1]		Pollution degree 3[2]	V	1 000	1 000	1 000	1 000	1 000
Dielectric strength		50 Hz 1min.	kV	10	10	10	10	10
Rated impulse withstand voltage[3]			kV	12	12	12	12	12
Rated thermal current and rated operational current AC20/DC20	/ ambient 40°C	In open air	A	630	800	1 000	1 250	1 600
	/ ambient 40°C	In enclosure	A	630	800			
..with minimum conductor cross section		Cu	mm^2	2x185	2x240	2x300	2x400	2x500
Rated operational current, AC-21A		up to 500 V	A	630	800	1 000	1 250	1 600
		690 V	A	630	800	1 000	1 250	1 600
Rated operational current, AC-22A		up to 500 V	A	630	800	1 000	1 250	1 600
		690 V	A	630	800	1 000	1 250	1 600
Rated operational current, AC-23A		up to 415 V	A	630	800	1 000	1 250	1 250
		440 V	A	630	800	1 000	1 250	1 250
		500 V	A	630	800	1 000	1 250	1 250
		690 V	A	630	800	1 000	1 250	1 250
Rated operational current / poles in series, DC-21A[10]		≤ 110 V	A	630/1	800/1			
		220 V	A	630/1	800/1			
		440 V	A	630/2	720/2			
		660 V	A	630/4[4]	630/4[4]			
Rated operational power, AC-23A[5] The kW-ratings are accurate for 3-phase 1500 R.P.M. standard asychronous motors		230 V	kW	200	250	315	400	400
		400 V	kW	355	450	560	710	710
		415 V	kW	355	450	560	710	710
		500 V	kW	400	560	710	900	900
		690 V	kW	630	800	1 000	1 200	1 200
Rated breaking capacity in category AC-23		up to 415 V	A	5 040	6 400	10 000	10 000	10 000
		500 V	A	5 040	6 400	10 000	10 000	10 000
		690 V	A	5 040	6 400	10 000	10 000	10 000
Rated conditional short-circuit current I_p (r.m.s.) and cut-off current $\hat{i}_c$(peak) value. The cut-off current $\hat{i}_c$ refers to values listed by fuse manufacturers (single phase test acc. to IEC60269).	I_p (r.m.s.) 80 kA, 415 V	$\hat{i}_c$ (peak)	kA	83.5	83.5	100	100	100
	Max. OFA_ fuse size	gG/aM	A/A	800/1 000	800/1 000	1 250/1 250	1 250/1 250	1 250/1 250
	I_p (r.m.s.) 100 kA, 500 V	$\hat{i}_c$ (peak)	kA	90	90	106	106	106
	Max. OFA_ fuse size	gG/aM	A	800/800	800/800	1 250/1 250	1 250/1 250	1 250/1 250
	I_p (r.m.s.) 80 kA, 690 V	$\hat{i}_c$ (peak)	kA	83.5	83.5			
	Max. OFA_ fuse size	gG/aM	A	800/1 000	800/1 000			
Rated short-time withstand current	I_{cw} (r.m.s.)	690 V 0.15s	kA	38	38	50	50	50
		690 V 0.25s	kA	36	36	50	50	50
		690 V 1s	kA	20	20	50	50	50
Rated short-time making capacity[6]	I_{cm} (peak)[7]	690 V	kA	80	80	92	92	92
Power loss / pole	With rated current		W	25	40	19	29	48
Mechanical endurance	Number of oper. cycles[8]		Cycles	5 000	5 000	3 000	3 000	3 000
Terminal bolt size	Metric thread diameter x length		mm	M12x40	M12x40	M12x60	M12x60	M12x60
Terminal tightening torque	Counter torque required		Nm	50-75	50-75	50-75	50-75	50-75
Operating torque	Typical for 3-pole change-over switches		Nm	27	27	78	78	78
Weight without accessories	Automatic transfer switches	3-pole switch	kg	17.5	17.5	42	42	44
		4-pole switch	kg	20.4	20.4	50	50	52
Data according to IEC 60947-6-1								
Class of equipment				PC	PC	PC	PC	PC
Rated short-time withstand current	I_{cw} (r.m.s.)	690 V 0.1s	kA	38	38	50	50	50
Rated operational current, AC-31B		up to 415 V	A	650	720	1 000	1 250	1 600
Rated operational current, AC-33B		up to 415 V	A	650	650	1 000	1 000	1 000

[1] Automatic transfer switches: operational voltage = max. 415 V AC for OTM_C2D_, OTM_C3D_ and OTM_C8D_
[2] Automatic transfer switches: pollution degree 2 for OTM_C2D_, OTM_C3D_ and OTM_C8D_
[3] Automatic transfer switches: U_{imp} = 6 kV for OTM_C2D_, OTM_C3D_ and OTM_C8D_
[4] Utilization category B
[5] These values are given for guidance and may vary acc. to the motor manufacturer
[6] Short circuit duration > 50ms, without fuse protection
[7] Max. distance from switch frame to nearest busbar / cable support 150 mm
[8] Operating cycle: O - I - O - II - O
[9] Category AC-21B, up to 415V
[13] Further ratings on request

Automatic transfer switches

Technical data for power and control circuits

Technical data for automatic transfer switches, power circuit

OTM_C2D_ (OMD200)		
Rated operational voltage U_e		208 - 415 V AC +/- 20 % + N
	Phase - Neutral	120 - 240 V AC +/- 20 %
Rated frequency		50 / 60 Hz +/- 10 %
Rated impulse withstand voltage U_{imp}		6 kV
OTM_C3D_ (OMD300)		
Rated operational voltage U_e		208 - 415 V AC +/- 20 % + N
	Phase - Neutral	120 - 240 V AC +/- 20 %
Rated frequency		50 / 60 Hz +/- 10 %
Rated impulse withstand voltage U_{imp}		6 kV
OTM_C8D_ (OMD800)		
Rated operational voltage U_e on 3 phase system		100 - 415 V AC +/- 20 %
	Phase - Neutral	57,7 - 240 V AC +/- 20 %
Rated operational voltage U_e on 1 phase system[1)]		57,7 - 240 V AC +/- 20 %
Rated frequency		50 / 60 Hz +/- 10 %
Rated impulse withstand voltage U_{imp}		6 kV
AUX voltage[1)]		24 V DC - 110 V DC (-10 to 15 %)
Operating temperature		-5...+40°C
Transportation and storage temperature		-25...+70°C
Altitude		Max.2 000m

[1)] If on 1 phase system the voltage level is between 57,7 – 109 V AC, AUX voltage supply must be used

Technical data for motor operator, control circuit

Motor operator, control circuit				**OTM160...250**	**OTM315...400**	**OTM630...800**	**OTM1000...1600**
Rated operational voltage U [V]	Pollution degree 3						220 - 240 V AC
Operating voltage range	50/60 Hz						0,8...1,2 x U_e
Operating times							See the table below
Nominal current I_n[a)]			A	0.2	0.5	0.7	1.8
Current Inrush[a)]			A	1.3	2.1	2.8	7.7
Overload fuse	Type / In / Capacity		mA	T/315/H	T/500/H	T/1 000/H	T/2 000/H
	Size		mm	5x20	5x20	5x20	5x20
Operating rate	Cycle 0 - I - 0 - II - 0						
	Max. continuous		cycles / min	1	1	1	0.5
Max. short-time ≤ 10 cycles			cycles / min	10	10	10	5
Overvoltage category							III
Rated impulse withstand voltage U_{imp}			kV				4
Dielectric strength		50 Hz 1 min.	kV				1.5
Terminals							
Voltage supply wiring for U							PE - N - L
Cross section		solid/ stranded	mm^2				1.5 - 2.5
Short-circuit protection device		max. MCB	A				C16
State information of locking (no SELV)							
Cross section		solid/stranded	mm^2				1.5 - 2.5
Locking motor operator		23-24 (NO)					5A/250V/cosφ=1
Short-circuit protection device		Max. MCB	A				C2
Protection degree							IP20
Operating temperature			°C				-25...+55
Transportation and storage temperature			°C				-40...+70
Max. altitude			m				2 000

Technical data

EasyLine - XLP

1-pole				XLP00			XLP1			XLP2			XLP3	
Rated operational voltage Ue AC	(V)	-	500	690	-	500	690	-	500	690	-	500	690	
Rated operational voltage Ue DC	(V)	220	-	-	220	-	-	220	-	-	220	-	-	
Rated operational current Ie	(A)	160	160	125	250	250	200	400	400	315	630	630	500	
Thermal current with fuse-link Ith	(A)	160	160	160	250	250	250	400	400	-	630	630	-	
Utilization category		DC22B	AC22B	AC21B	DC22B	AC22B	AC21B	DC22B	AC22B	AC21B	DC22B	AC22B	AC21B	
Rated insulation voltage U_i	(V)			1000			1000			1000			1000	
Rated impulse withstand voltage U_{imp}	(kV)			8			8			8			8	
Rated conditional short circuit current	(kArms)			50			50			50			50	
Rated frequency	(Hz)			50 - 60			50 - 60			50 - 60			50 - 60	
Power loss (I_{th}) without fuselink, per phase	(W)													
Electrical durability				200			200			200			200	
Mechanical durability				1400			1400			800			800	
Degree of protection from the front according to IEC60529	Open			IP20			IP20			IP20			IP20	
	Closed			IP30			IP30			IP30			IP30	

2-pole			XLP00			XLP1			XLP2			XLP3	
Rated operational voltage Ue AC	(V)	-	500	690	-	500	690	-	500	690	-	500	690
Rated operational voltage Ue DC	(V)	220	-	-	440	-	-	440	-	-	440	-	-
Rated operational current Ie	(A)	160	160	125	250	250	200	400	400	315	630	630	500
Thermal current with fuse-link Ith	(A)	160	160	160	250	250	250	400	400	-	630	630	-
Utilization category		DC22B	AC22B	AC21B	DC22B	AC22B	AC21B	DC22B	AC22B	AC21B	DC22B	AC22B	AC21B
Rated insulation voltage Ui	(V)			1000			1000			1000			1000
Rated impulse withstand voltage Uimp	(kV)			8			8			8			8
Rated conditional short circuit current	(kArms)			50			50			50			50
Rated frequency	(Hz)			50 - 60			50 - 60			50 - 60			50 - 60
Power loss (Ith) without fuselink, per phase	(W)												
Electrical durability				200			200			200			200
Mechanical durability				1400			1400			800			800
Degree of protection from the front according to IEC60529	Open			IP20			IP20			IP20			IP20
	Closed			IP30			IP30			IP30			IP30

3-pole				XLP000				XLP00			XLP1		XLP2		XLP3
Rated operational voltage U_e AC	(V)	400	500	690	400	500	690	500	690	500	690	500	690		
Rated operational current I_e AC	(A)	80	100	50	125	160	125	250	200	400	315	630	500		
Thermal current with fuse link I_{th}	(A)			100			160		250		400		630		
Rated insulation voltage U_i	(V)			690			1000		1000		1000		1000		
Rated impulse withstand voltage U_{imp}	(kV)			6			8		8		8		8		
Rated conditional short circuit current	(kArms)			50			50		50		50		50		
Rated making and breaking capacity		AC23B	AC22B	AC21B	AC23B	AC22B	AC21B	AC23B	AC22B	AC22B	AC21B	AC22B	AC21B		
Rated frequency	(Hz)			50 - 60			50- 60		50 - 60		50 - 60		50 - 60		
Power loss at I_{th} without fuse link/per phase	(W)			1,4W			3,5W		7,5W		13W		24W		
Max allowed poweloss in the Fuse per phase	(W)			7,5W			12W		23W		30W		48W		
Electrical durability				300			200		200		200		200		
Mechanical durability				1700			1400		1400		800		800		
Degree of protection from the front acc. to IEC60529	Open			IP20			IP20		IP20		IP20		IP20		
	Closed			IP30			IP30		IP30		IP30		IP30		

4-pole		XLP00	XLP1	XLP2	XLP3
Rated operational voltage Ue AC		500	500	500	500
Rated operational current Ie		160	250	400	630
Thermal current with fuse-link Ith		160	250	400	630
Utilization category		AC22B	AC22B	AC22B	AC22B
Rated insulation voltage U_i	(V)	1000	1000	1000	1000
Rated impulse withstand voltage U_{imp}	(kV)	8	8	8	8
Rated conditional short circuit current	(kArms)	50	50	50	50
Rated frequency	(Hz)	50 - 60	50 - 60	50 - 60	50 - 60
Power loss (I_{th}) without fuselink, per phase	(W)				
Electrical durability		200	200	200	200
Mechanical durability		1400	1400	800	800
Degree of protection from the front according to IEC60529	Open	IP20	IP20	IP20	IP20
	Closed	IP30	IP30	IP30	IP30

Technical data

InLine II - Designed for the future

ABB is proud to introduce the latest technology of Fuse Switch Disconnectors to ensure the best stability and highest safety in the power distribution network. The new generation InLine II also offers the highest level of personal safety during operation and service.

— 01 ON - Closed position
— 02 OFF - Open position
— 03 Replacement of fuses position

Advantages

High level of personal safety by:
Safe and reliable operation ON/OFF
Safe and simple replacement of the NH fuse links
Universal terminal bolts offering standing bolt or fixed nut for high flexibility of cable connections
Variants with integrated V-clamps
Available in two alternative heights (ZLBM/ZHBM), L-version (ZLBM) will save space in Cable Distribution Cabinets by offering reduced depth
Easy installation of current transformers in the H-version (ZHBM)
Variants with non corrosive steel materials (stainless steel)
Designed for intelligent communication to support a high level of stability in the power distribution network

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01

—
02

—
03

ZLBM/ZHBM Fuse Switch Disconnector		ZLBM/ZHBM 00	ZLBM/ZHBM 1	ZLBM/ZHBM 2	ZLBM/ZHBM 3
Rated operational voltage Ue	(V)	400/500/690	400/500/690	400/500/690	400/500/690
Rated operational current Ie	(A)	160/160/125	250	400	630
Rated insulation voltage Ui	(V)	1000	1000	1000	1000
Rated impulse withstand voltage Uimp	(kV)	8	8	8	8
Fuse protected short circuit withstand current	(kArms)	100	100	100	100
Fuse protected short circuit making	(kArms)	100	100	100	100
Rated making and breaking capacity		AC23B/AC22B/ AC21B	AC23B/AC22B/ AC21B	AC23B/AC22B/ AC21B	AC23B/AC22B/ AC21B
Rated frequency	(Hz)	50	50	50	50
Degree of protection from the front	Open	IP20	IP20	IP20	IP20
	Closed	IP30	IP30	IP30	IP30
Type tested according to EN/IEC 60947-3					

Technical features

Control Fuse Base - BS type

Features :

- ABB fuse bases consisting of fuse carrier available in two ratings (20 & 32A) for accommodating BS type F1 size HRC (High Rupturing Capacity) fuselinks.
- Fuse bases conform fully to IEC 269/BS88.
- The VS fuse bases are with OFFN range of fuse links, having low powerloss provide protection for wide range of electrical equipments.

Construction :

- Fuse holders are made of high grade flame retardant, nonhygroscopic, phenolic moulding to IS 1300, BS 771 with a hard gloss surface, black finish.
- They are simple in construction with minimum number of components.
- Carrier contacts and base contacts are mounted using locating ridges formed on the mouldings, assuring perfect alignment.
- Type NS fuse-carriers have a single piece phosphor bronze clip, while type SM fusecarriers have a single piece pressed brass spin rivetted contact.
- The base is also made of a single piece extruded brass tinned contact having adequate size of cable hole to accommodate aluminium cable.

DIN Fuse Base

Technical Details

- Conforms to IEC 60269 / DIN 43620
- Range 6 to 630A (Size 00,1,2,3)
- Rated Voltage : 500V
- Breaking Capacity : 80 kA
- Rated Frequency: 50-60Hz

Wide range of enclosed switches
From 16 to 1600 Amperes, 690 V

Enclosed switches are designed and used as main switches for applications, which need to be isolated from the network. The range includes front operated and side operated switch disconnectors, switch fuses and change-over switches enclosed in plastic, steel sheet or stainless steel sheet and aluminum enclosures. They are rated for utilization categories including disconnecting as well as making and breaking the load. In addition the switch fuses equipped with fuse links protects the application and the cables from overload currents and short circuits.

Plastic enclosures
The plastic enclosures are most suitable for locations with high chemical and moisture requirements. In addition they are light and easy to install and handle.

Steel sheet enclosures
The steel sheet enclosures are hot dip galvanized and the surface is polyester powder painted. The enclosures are durable and robust for various environments.

Stainless steel sheet enclosures
The stainless steel sheet enclosures are made of AISI 304 stainless steel. They are used particularly in the food and beverage industry and in locations where high hygienie is required. The smooth surface does not require any painting and is easy to clean.

Aluminum alloy enclosures
- Aluminum enclosures have very good impact strength and protection against UV light. They are suitable both for indoor and outdoor use in medium to heavy-duty applications.
- Safety for personnel – reliable position indication
- Padlocking in the OFF-position with one, three or six (with the shackle L6) padlocks against unintentional start-up. The handle cannot be padlocked in the OFF-position if one of the contacts is not in the OFF position.
- The cover cannot be removed if the handle is padlocked.
- Door interlock in the ON-position.
- Arc proof, short circuit durability function: Expander washers in aluminium enclosures with Ie > 160 A and door locking release in large metal sheet enclosures type MSC.
- Door interlock defeatable with rectangular and pistol type handles.

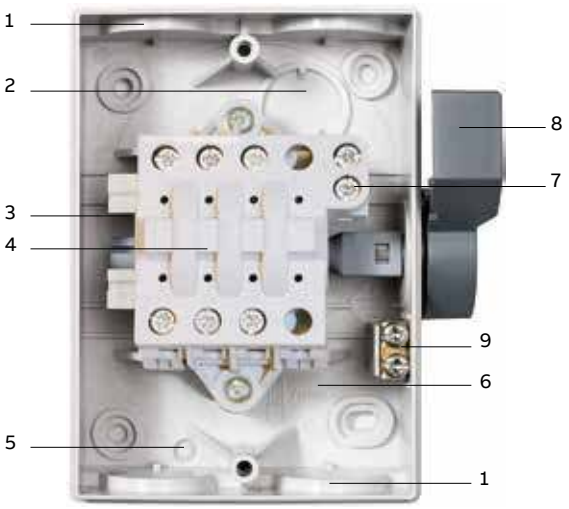
Plastic enclosed switch-disconnectors

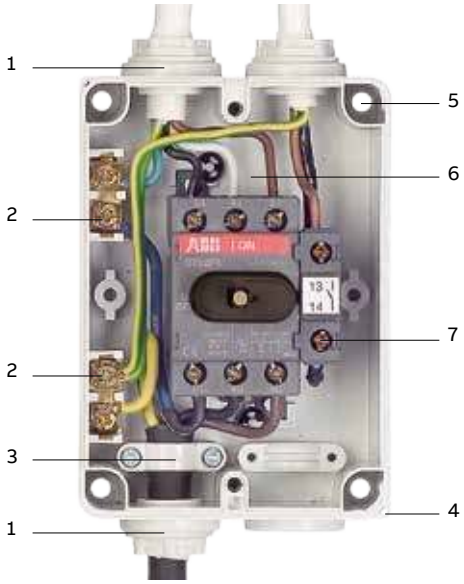
Side operated, type BW

- Degree of protection: IP65, IEC 60529
- Degree of protection without cover: IP20
- Enclosure in PBT (Thermoplastic polyester) plastic,
  high impact strength and chemical resistant
- Flame class UL94 5VA, Glow wire 850˚ (IEC 60695-2-12)
- Resistance against UV-radiation: F 1, UL 746C
- Standard IEC 60947-3 for Switch-disconnectors
- European Standard EN60204 Safety of machinery
- Cable outlets M sized threaded knock-outs
- 2-, 3-, 4- and 6-pole versions
- Light grey/dark grey enclosure with grey handle
- Yellow enclosure have red handle
- Handle indication I-0/ON-OFF
- Suitable for 3-, 4- and 5-wire systems

Front operated, type OTP

- Degree of protection: IP65, IEC 60529
- Degree of protection without cover: IP20, IEC 60529
- Self-extinguishing plastic: UL94 V0
- Resistance against UV-radiation: F 1, UL 746C
- Standard IEC 60947-3 for Switch-disconnectors
- European Standard EN60204 Safety of machinery
- Cable outlets M or Pg sized threaded knock-outs
- Also blank gland plates available
- 3-, 4- and 6-pole versions
- Black or red-yellow handle
- Handle indication I-0/ON-OFF
- Suitable for 4- and 5-wire systems





1 Metric threaded knockouts, IP54 cable glands sealing plugs included | 2 Knockout in the back of the box | 3 Space for auxiliary contacts, (N.O./N.C.) | 4 Handle, axis and switch insert is one system factory assembled. Switch insert UL94 V0 and glow wire 960˚ (IEC 60965-2-12) | 5 Knockout for ventilation / Water drain holes | 6 Cable strip length | 7 Isolated neutral terminal with separate in/out connection | 8 Handle padlockable in "O" position as standard. Knockout for padlock in "I" position. Shackle for 6 padlocks | 9 PE-terminal

1 Knock-out openings for M or Pg threads on the top and bottom, separate threaded knock-out opening for control wires in enclosure sizes width 130 mm and larger | 2 Terminals for 5-wire system: three phases + N + PE terminals | 3 Pull stoppers for two cables in 16 A enclosed switches | 4 Provision for sealing of the lid | 5 Enclosure mounting screws isolated from the inside housing | 6 Knock-out opening on the base for incoming cables | 7 Space for auxiliary contacts, (N.O./N.C.) (to be ordered separately)

Introduction
Kabeldon IP-system

Kabeldon IP-system consists of a unique, screen-protected busbar system which is combined with a broad range of switching devices and connectors.

Features of the Kabeldon IP-system are its simplicity and reliability. These are the most important factors when you want to achieve low operating costs and high delivery reliability in a distribution system.

Features – busbar system
- Busbars of continuously extruded aluminium sections, insulated with a layer of polyamid.
- The busbar has a screen-protected contact slot. This ensures safety regardless of where on the busbar the switching device is placed.
- Busbars are available with rated currents from 400 to 2500 A.
- IP2X: No entry of standard test finger to live parts.

Features – switching devices
- Can be arranged in any order, regardless of rated current.
- Switching devices 100 – 1600 A.
- All parts have a high degree of protection and are safe.
- Switching devices are mounted on and connected to the busbar system in the same operation.
- Switching devices can be connected when the system is live.
- Always voltage-free (“dead”) when changing fuses.
- The width of Switching devices, connectors and busbars combine to form a modular system. Each module is 12.5 mm. The modular system makes planning easier.
- The compact design of the switching devices makes them suitable for use in many different types of distribution boards.
- All switching devices have a utilization category so that they can be used in cable distribution cabinets, substations and other low voltage distribution boards.

Cable distribution cabinets with switching devices and busbar systems.

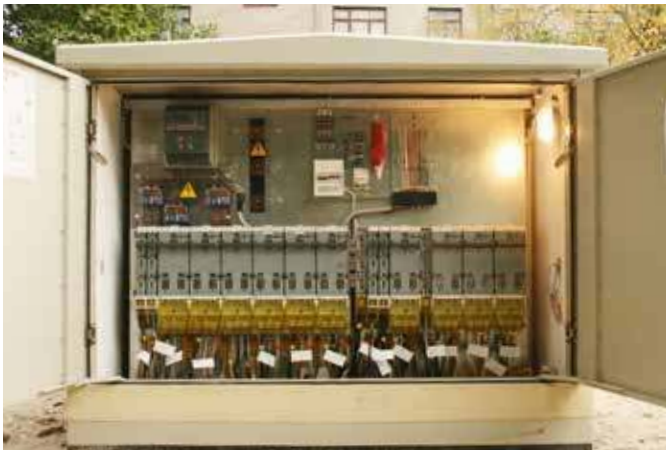
Reference pictures
Application areas

Cable distribution boards at Hedens bandy rink, Gothenburg, Sweden.

Distribution board in powder coated enclosure mounted on the wall in a switchgear room at a bakery, in Gothenburg, Sweden.

Cable distribution board, Sweden.

Kabeldon switching devices SLDL, Sweden, especially designed for CSS.



Kabeldon switching devices in a CSS, Latvia.

Examples of using Kabeldon products on the wall in low voltage switchgear, Sweden.

Technical features
ArTu distribution switchgear

The range of ABB SACE ArTu distribution switchgear provides a complete and integrated offer of modular metalwork structures and kit systems for main and sub low voltage distribution switchgear, which satisfy all plant requirements depending on the type of installation, degree of protection required, and electrical and mechanical characteristics. Starting from simple assembly kits, the ArTu Switchgear allows numerous switchgear configurations:

- For Power Center type main distribution, with a Prevalence of air circuit-breaker and moulded-case circuit-breakers and any internal Segregations up to Form 4
- For floor-mounted secondary distribution, equipped withmoulded-case and modular circuit-breakers

The user of ABB SACE circuit-breakers can therefore have a complete system of enclosures, in accordance with the referencestandards, which guarantees absolute compatibility between the various elements (enclosures, circuit-breakers and distributionsystems), together with maximum assembly and cabling facility.

The ArTu switchgear is noted for the following features:

- Integrated range of modular metalwork structures up to 6300 A with common accessories;
- Possibility of fulfilling all application requirements in terms of installation (floorstanding, Modular and corner versions) and degree of protection (IP31, IP41, IP54 & IP65)
- Maximum integration with modular apparatus and the moulded-case and air circuit-breakers, so that additional drilling or adaptationsare not required
- Minimum switchgear assembly time, thanks to the simplicity of the kits, standardization of the small assembly items, self-supporting elements and the presence of clear reference points for assembly of theplates and panels –Segregations in kits up to Form 4.

The use and installation of the kits according to the instructions provided means thatassembly and cabling times can be reduced to a minimum, for example thanks to the reference points for positioning the panels and plates, and that respect of the insulation distances and the rated characteristics of the circuit-breakers are guaranteed.

Electrical characteristics

ArTu distribution switchgear

Conformity with the CEI EN 60439-1/IEC 61439-1-2 Standard

The ArTu switchboards have undergone the type tests foreseen by the CEI EN 60439-1 Standard and the new IEC 61439-1-2 Standard at the certified test laboratories. The results of these tests guarantee the performances of the ArTu switchboards and allow the assembler of the switchboard using ABB metal structures, ACB's, MCCB's and MCB's, not to carry out further type tests, respecting the selection criteria and the assembly instructions of the various components. These results, given below, can be referred to for drawing up the declaration of conformity of the electric switchboard.

Over temperature (Ref. par. 8.2.1. of the Standard)

The thermal dissipation values are indicated in Detail Catalogue, referring to all the dimensions of the ArTu switchboards and to the type of installation, deriving from the type tests carried out. The dissipated power data (in Watts) are according to the admissible over temperature inside the switchboard in the upper part, and must be compared with the sum of the powers dissipated by all the components installed inside the switchboard (taking appropriately into account the factor of contemporaneity).

Dielectric properties (Ref. par. 8.2.2 of the Standard)		
		ArTu K
Rated service voltage:		up to 1000V AC
Rated insulation voltage:		up to 1000V AC
Rated impulse withstand voltage:		8/12 kV*
Short-circuit withstand current (Ref. par. 8.2.3 of the Standard)		
Rated short-time short-circuit current:	Ph-Ph	50kA ,65 kA ,105kA (1s)
	Ph-N	60 kA (1s)
Rated max. peak short-circuit current		105 kA,137 kA,220 kA
Efficiency of the protection circuit (Ref. par. 8.2.4 of the Standard)		
(Ref. par. 8.2.4.1):		Following the assembly indications of the metal components, the effective electrical continuity between the exposed conductive parts verified with negligible resistance values.
(Ref par. 8.2.4.2):		60 kA (1s)
Insulation distances (Ref. par. 8.2.5 of the Standard)		
The insulation distances are guaranteed by following the ABB metalwork structure and circuit-breaker assembly and mounting instructions.		
Mechanical operation (Ref. par. 8.2.6 of the Standard)		
Mechanical operation is verified by following the assembly and mounting instructions for the ABB SACE metalwork structures and circuit-breakers.		
Degree of protection (Ref. par. 8.2.7 of the Standard) According to CEI EN 60529 (CEI 70-1 publication IEC 529)		
Without Glass door		IP31
With Glass door/without Glass door and ventilated side panels		IP41/IP54
With Glass door		IP 65

*For ACB vertical

Mechanical characteristics
ArTu distribution switchgear

Material		
ArTu K structure	Galvanized steel sheet with 9 fold structure	
Panels	1.5/2.0 mm thick steel sheet	
Doors	1.5/2.0 mm thick steel sheet / 4mm thick tempered glass.	
Mounting Plates	2.0/2.5mm thick hot galvanized steel sheet	
Painting		
Standard colour	Light Grey RAL 7035	
Painting Standard	Powder Coated	
Ambient characteristics		
Type of installation	Indoors	
Installation conditions	Floor-mounted	
Service climate (t° / r.h. %)	constant	23°C/83% - 40°C/93%
	variable	23°C/98% - 40°C/98%
Ambient temperature limits	operating	-5°C +40°C
	storage	-25°C +55°C

Technical information

Information regarding the methods for disposal and end of product life
ABB SACE has carried out a study on the end of product life. Evaluation is made by means of applying the LCA (Life Cycle Assessment) method according to ISO 14040 - 1997 and in conformity with the requirements established by the SEMC in the document ISO TR 14025 TYPE III Environmental Declarations (MSR 1999:2 – “Guidelines for the Environmental Product Declaration”).The study was carried out taking into consideration the disposal and recycling processes of the main materials making up a typical switchboard. Starting from the basic list, the facility of dismantling and separating each piece, as well as recyclability of the materials was considered, and the product results as being almost completely recyclable. Again starting from the basic list reduced to the significant components, the end of life of each of these was evaluated. The flows of recyclable materials, materials to be recovered (or for incineration), given in the Table resulted. According to the hypotheses made, no material should end up directly in the dump.

Substance	**Destination**
Aluminum waste	Recycling
Copper waste	Recycling
Polyurethane gaskets	Incineration
Glass fibers	Recycling
Glass waste	Recycling
Paper/cardboard	Recycling
Plastic Insulators	Recycling
Sheet metal waste	Recycling

ABB Jokab Safety

ABB Jokab Safety offers an extensive range of innovative products and solutions for machine safety systems.

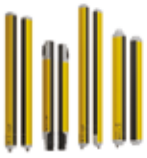
Experience
We have great experience of practical application of safety requirements and standards from both authorities and production. We are represented in standardization organisations for machine safety and we work daily with the practical application of safety requirements in combination with production requirements.

Systems
We deliver everything from a single safety solution to complete safety systems for single machines or entire production lines.

Products
We offer a complete range of safety products, designed to make your machine safety system easy to build. We develop these innovative products continuously, in cooperation with our customers.

Programmable Safety Controllers
A unique All-Master safety PLC concept for dynamic and static safety circuits.

Safety Relays
A wide range of safety relays for different protection purposes.



Optical Safety Devices
Light curtains and light beams for optical protection in an opening or around a risk area.

Safety Sensors, Switches and Locks
Dynamic non-contact sensors, safety switches, magnetic switches and locks.

Emergency Stops and Pilot Devices
Emergency stops and pilot devices for dynamic and static safety circuits.

Safety Mats
Safety mats for personal protection within dangerous areas.

Cables and connectors

Safety Controllers
Safety controllers for supervision of entire safety system based on the dynamic safety circuit.

Safety Adapter Units
Adapter units for connecting safety devices to our dynamic circuits and bus systems.

Safety control devices
Our range of ergonomic and unique safety control devices.

Contact Strips and Bumpers
Our range of contact edges and bumpers for protection against crush injuries.

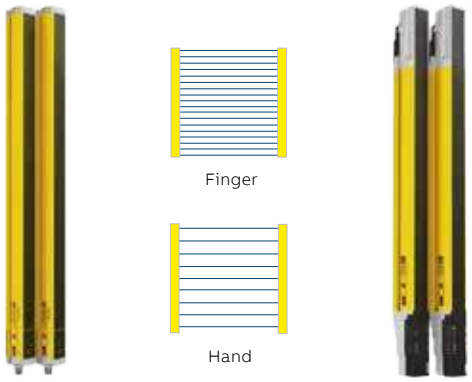
Fencing systems
Stable and flexible fencing system and roller doors.

AS-i Safety
Our product range for AS-i Safety.

Safety production
ABB Jokab Safety

Orion overview

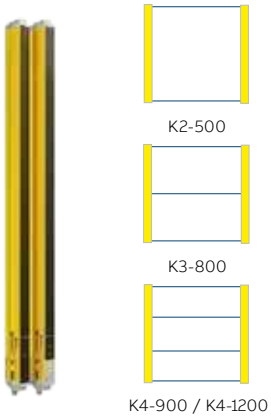
Orion1 - Light curtains,
Transmitter + Receiver - Slim profile



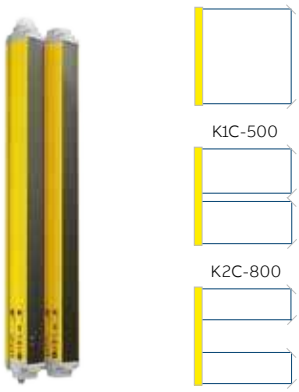
Orion1 Extended requires special cables.

	Orion1 Base		Orion1 Extended	
Type of detection	 Finger	 Hand	 Finger	 Hand
Resolution	14 mm	30 mm	14 mm	30 mm
Type 4	**Orion1-4-14-zzz-B**	**Orion1-4-30-zzz-B**	**Orion1-4-14-zzz-E**	**Orion1-4-30-zzz-E**
Protected height	150 -1800 mm (150 mm steps) zzz= 015-180 cm (15 cm steps)	150 -1800 mm (150 mm steps) zzz= 015-180 cm (15 cm steps)	300 - 1800 mm (150 mm steps) zzz= 030-180 cm (15 cm steps)	300 - 1800 mm (150 mm steps) zzz= 030-180 cm (15 cm steps)
Function				
Range	6 m	19 m	7 m	20 m
Auto/Manual reset	X	X	X	X
EDM	X	X	X	X
Muting			X	X
Override			X	X
Integrated muting lamp				
Blanking			X	X
No dead zone			X	X
Coding			X	X
Cascading			X	X
Don't forget to order			Cables for Transmitter (M12-C02PT2T) and Receiver (Blanking or no function: M12-C02PT6RB, Muting: M12-C02PT62RM)	
Accessories				
Cables **(female connector on the cable)**	Transmitter: M12-5 poles Receiver: M12-8 poles		Transmitter: M12-5 poles Receiver Blanking: M12-12 poles Receiver Muting: M12-12 + M12-5 poles	
Protective tube	Orion WET zzz		-	
Protective stand	Orion Stand		Orion Stand	
Lens shield	Orion Shield-zzz		-	
Deviating Mirror	Orion1 Mirror + Orion Stand + JSM Orion11		Orion1 Mirror + Orion Stand + JSM Orion11	
Laser pointer	Orion Laser Pointer		Orion Laser Pointer	
Rotation bracket	JSM Orion03		-	

Orion2 - Light grids, Transmitter + Receiver -Slim profile



Orion3 - Light grids, Active + passive units - Sturdy profile



The two units are ordered separately.

Orion2 Base	Orion2 Extended	Orion3 Base	Orion3 Extended
 Body		 Body	
Orion2-4-Kx-zzz-B	**Orion2-4-Kx-zzz-E**	**Orion3-4-KxC-zzz-B**	**Orion3-4-KxC-zzz-E**
K2-050: 500 mm K3-080: 800 mm K4-090: 900 mm K4-120: 1200 mm	K2-050: 500 mm K3-080: 800 mm K4-090: 900 mm K4-120: 1200 mm	K1C-050: 500 mm K2C-080: 800 mm K2C-090: 900 mm K2C-120: 1200 mm	K1C-050: 500 mm K2C-080: 800 mm K2C-090: 900 mm K2C-120: 1200 mm
50 m	50 m	8 m (K2C-090: 6.5m)	8 m (K2C-090: 6.5m)
X	X	X	X
X	X	X	X
	X		X
	X		X
	X		X
		Passive unit Orion3-4-MxC-zzz	
Transmitter: M12-5 poles Receiver: M12-8 poles		Active unit: M12-8 poles	
Orion WET Kzzz		-	
Orion Stand		Orion Stand	
Orion Shield-Kzzz		-	
Orion Mirror Kzzz		Orion Mirror Kzzz	
Orion Laser Pointer		Orion Laser Pointer	
JSM Orion04		JSM Orion05	

Accessories

Orion Laser Pointer

JSM Orion03

JSM Orion04

JSM Orion05

Orion Mirror KZZZ

Orion Stand

Sentry safety relays

Keep your business running with powerful and easy to use safety relays from ABB

The Sentry safety relays are powerful and easy to use safety relays, suitable for all common types of safety applications. The Sentry series contains basic models for simple applications and easy output expansion, as well as highly flexible models with extremely accurate timer functions.

Sentry safety relays are used in both simple and more advanced safety solutions when safety devices need to be monitored according to the requirements of functional safety standards.

Continuous operation

LEDs and display
3-color LEDs allow for more status messages and simplify troubleshooting. Models with display offer preset configurations and extensive fault information.

Advanced timer functions
Timer functions with an accuracy of ± 1% minimize unnecessary downtime.

Multi-reset
The multi-reset function enables reset of up to 10 Sentry safety relays using just one reset button.

Optimized logistics

Universal models
A single safety relay for all common safety applications reduces stock and saves warehouse space.

Multi-voltage
Multi-voltage models offer more flexibility and less stock.

Compact size
All models are only 22.5 mm wide, even models with 2 NO + 2 NO outputs.

Easy to install

Detachable terminal blocks
Detachable terminal blocks speed up connection and replacement.

Switch for reset selection
Manual or automatic reset easily selectable by switch.

Powerful outputs
Powerful outputs allow to drive larger contactors and simplify installation by saving the use of an intermediary contactor.

Safety relays
Sentry

BSR10

SSR32

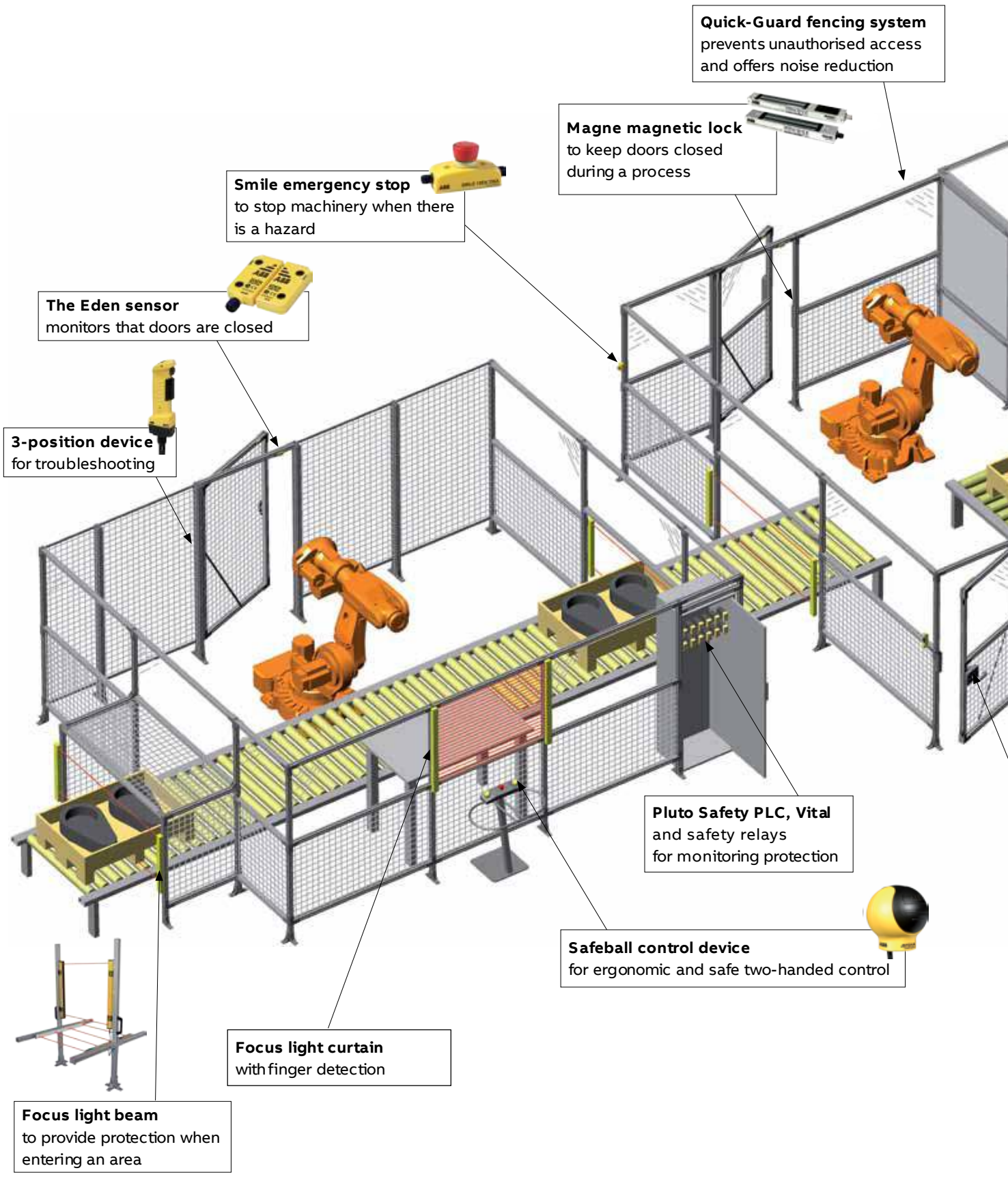
USR10

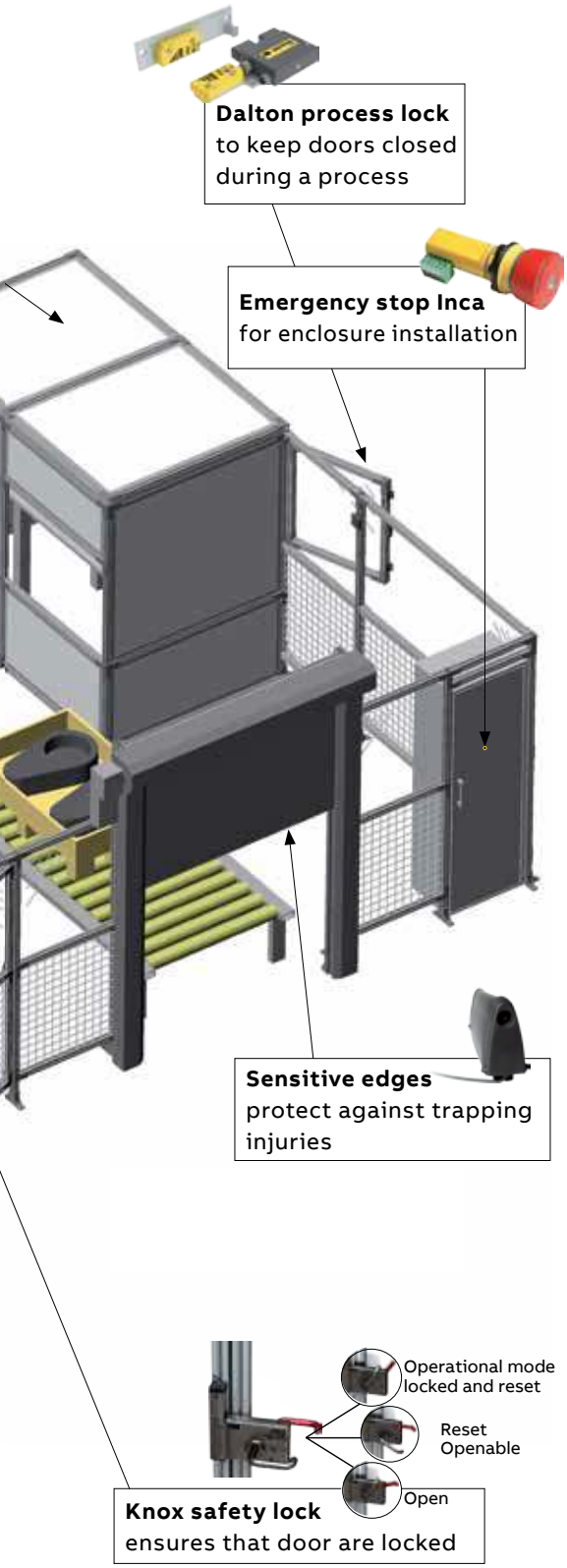
Ordering details

Expansion	Safety devices						Test/ Reset		Safety relay outputs				Timer function			Feature	Power supply			
Expansion of safety controller outputs	1 channel	2 channels with equivalent contacts	2 channels with antivalent contacts	OSSD outputs / PNP outputs	Contact mats, bumpers and safety edges[c]	Two-hand devices	Manual reset (all models have auto reset)	Start/Test	3 NO + 1 NC	4 NO	2 NO + 2 delayed/delayable NO	4 NO + 1 NC	Off-delay 0.5 s	Off-delay 1.5 s	Advanced timerfunctions 0 – 999 s [d]	Configuralble with display	85-265 VAC / 120-375 VDC	+24 VDC	Type	Order code
a)	x	b)						x	x									x	BSR10	2TLA010040R0000
a)	x	b)						x		x								x	BSR11	2TLA010040R0200
a)												x						x	BSR23 [e]	2TLA010041R0600
x	x	x		x			x		x									x	SSR10	2TLA010050R0000
x		x					x		x								x		SSR10M	2TLA010050R0100
x						x	x		x									x	SSR20	2TLA010051R0000
x						x	x		x								x		SSR20M	2TLA010051R0100
x	x	x		x			x				x		x					x	SSR32	2TLA010052R0400
x	x	x		x			x				x			x				x	SSR42	2TLA010053R0400
x	x	x		x					x				x	x	x	x		x	TSR10	2TLA010060R0000
x	x	x		x					x				x	x				x	TSR20	2TLA010061R0000
x		x							x				x	x			x		TSR20M	2TLA010061R0100
x	x	x	x	x	x	x	x		x				x	x	x	x		x	USR10	2TLA010070R0000
x	x	x	x	x	x	x	x				x		x	x	x	x		x	USR22	2TLA010070R0400

a) These models can also be used for expansion of Pluto safe transistor outputs (-24 VDC)
b) No monitoring of two-channel fault, i.e. max Category 3 without fault exclusion.
c) The safety relay detects a short-circuit, not a change in resistance.
d) Off-delay, On-delay, Time bypass or Time reset.
e) BSR23 must be monitored by another device in order to reach higher than Category 1/PL c according to EN ISO 13849-1, for example a safety relay, a safety PLC or an Orion light guard (EDM function).

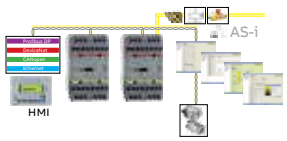
Production-friendly safety systems from ABB Jokab Safety





Product groups

Training & Advice
Practical application of standards and regulations, along with CE-labelling.



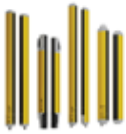
Pluto Safety PLC
A unique All-Master safety PLC for dynamic and static safety circuits.

Pluto AS-i
Programmable safety system AS-i where all units are connected to the same bus cable and the function of the unit is determined in the PLC program.

Vital safety controller
Dynamic safety circuit for multiple protection according to the highest safety
category

Tina adapter units
Transformation of static signals to dynamic safety signals, etc.

Safety relays
The market's most flexible safety relays for different protection purposes and categories.

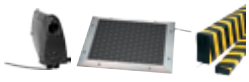


Light curtain/light beam/scanner
Complete range of light beams, light curtains and scanners.

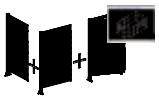
Sensors/switches/locks
Dynamic non-contact sensors, safety switches, magnetic switches and locks.

Control devices
Ergonomic three-position control units, two-hand control units and foot pedals.

Emergency stop devices
Emergency stop devices for dynamic and
static safety circuits.



Contact strips/Bumpers/Safety mats
Sensitive edges, bumpers and safetys mats.



Fencing systems/SafeCAD/Roller doors
A stable and flexible fencing system that is easy to install.

ABB's comprehensive range of LV control products

The range of ABB control products ranks amongst the most extensive on the market with a full range of innovative solutions for Control & Protection, Motor Starting, Intelligent motor management, measurement and monitoring and connection applications.

The business unit is comprised of 3 main product families :
- Control & Protection
- Electronic Relays
- Safety devices

Our products
Our products are already among the most extensive in the market and we are constantly adding new products in order to meet ever changing customer needs.

Quality and reliability are built into every device to ensure total performance satisfaction, even in the most demanding applications.

We offer a very modern and competitive range of contactors, starters, manual motorstarters, a wide range of electronic relays and overload relays, together with an extended program of pilot devices.

Our offering
- Contactors
- Manual motor starters
- Thermal overload relays
- Electronic overload relays
- Intelligent Motor Management Systems
  - Universal Motor Controllers
  - Communication Fieldbus Plugs
- Electronic Products and Relays
  - Timers
  - Measuring and monitoring relays
  - Power Supplies
  - Analog Signal converters
  - Interface Relays & Optocouplers
- Jokab Safety Systems
- Pilot devices
- Arc Guard Systems

Benefits
AF technology

—
01 Reliable in all networks
—
02 Built-in surge suppression
—
03 Wide control voltage range
—
04 Four coils for the entire voltage range

Reliable in all networks
The electronic system within the AF contactor rectifies the AC or DC control circuit voltage to a DC control voltage that is applied on the coil. The contactor is safely operated in an always optimized condition making it virtually noise free.

Four coils for the entire voltage range
The AF contactor features both AC and DC support. With the complete AF contactor range, functionality is improved. Still, the total number of product variants compared to a conventional range is reduced by 90 %.
Only four coils are required to cover 24 V AC, 20 V DC - 500 V AC/DC.

Wide control voltage range
With conventional contactor technology, different contactors were needed for different network voltages. Thanks to the wide operating range of the AF contactor it can operate just as well in Europe as in Asia or North America. The core coil of the AF contactor range covers 100-250 V AC/DC 50/60 Hz.

Built-in surge suppression
With conventional contactor technology it is recommended to use an external surge suppressor, an accessory that could cost as much as half the contactor itself. With the AF technology the surges are handled by the contactor itself and the surge never reaches the control circuit. Neither the surge suppressor nor the actual surge has to be considered anymore. One less product and one less complication to worry about.

—
01

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02

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03

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04

3-pole contactors, for motor control and power switching



IEC (1)	**AC-3 Rated operational power**	**θ ≤ 55 °C, 415 V**	**kW**	**4**	**5.5**	**7.5**	**11**	**15**	**18.5**
UL/CSA	**3-phase motor rating**	480 V	hp	5	7.5	10	20	25	30
AC Control supply		~	Type	**A9**	**A12**	**A16**	**A26**	**A30**	**A40**
IEC	**AC-3 Rated operational current**	θ ≤ 55 °C , 415 V	A	9	12	17	26	32	37
	AC-1 Rated operational current	θ ≤ 40 °C, 690 V	A	25	27	30	45	55	60
UL/CSA	**General use rating**	600 V	A	21	25	30	40	50	60

(1) 1000 V IEC ratings available for A50 ... A185 contactors.

Main accessories				
Auxiliary contact blocks	Front mounting	CA5-10 (1 x N.O.) CA5-01 (1 x N.C.)		
	Side mounting	CAL5-11 (1 x N.O. + 1 x N.C.)		
Timers	Electronic	TEF5-ON TEF5-OFF		
		TE5S (for star-delta starters - direct timing - separate mounting)		
Interlocking units	Mechanical	VM5-1		
	Mechanical / Electrical	VE5-1		
Surge suppressors	Varistor (AC/DC)	RV5 (24...440 V)		
	RC Type (AC)	RC5-1 (24...440 V)		
Overload relays				
 Thermal relays	Trip class 10A	TA25DU-M (0.10...32 A)	TA42DU-M (18...42 A)	
Electronic relay	Trip class 10E, 20E, 30E	E16DU-(0.32...18.9 A)	E45DU-(9...45 A)	
	Mounting kit	DB16E	DB45E	

Manual motor starters				
	Thermal / magnetic protection Class 10	MS116 (0.10...32 A) Ics up to 50 kA for class 10 A		
		MS132 (0.10...32 A) Ics up to 100 kA		
				MS497 (22...100 A) MS165 (10...65A) Ics up to 100 kA
	Magnetic only types	MO132 (0.16...32 A) Ics up to 100 kA		MO496 (32...100 A) Ics up to 100 kA
				MO450 (40...50 A) Ics up to 50 kA MO165 (16-65A) Ics up to 50 kA




	22	**30**	**37**	**45**	**55**	**75**	**90**	**110**	**132**	**160**	**200**
	40	60	60	60	75	100	125	150	200	250	300
	A50	**A63**	**A75**	**A95**	**A110**	**A145**	**A185**	**AF205**	**AF265**	**AF305**	**AF370**
	50	65	75	96	110	145	185	205	265	305	370
	100	115	125	145	160	250	275	350	400	500	600
	80	90	105	125	150	230	250	300	350	400	520
				CAL18-11 (1 x N.O. + 1 x N.C.)				CAL19-11 (1 x N.O. + 1 x N.C.)			
						VM300H VM300V		VM19			
	VE5-2										
	RC5-2 (24...440 V)					RC5-3 (250...440 V)					

TA75DU-M (18...80 A)	TA80DU (29...80 A) TA110DU (66...110 A)	TA200DU (66...200 A)		
	E80DU-(27...80 A)	E140DU (50...140 A)	EF205DU (63...210 A)	EF370DU (115...380 A)
	DB80E	DB140E		
			Short-circuit protection devices	
			Tmax Circuit breaker and accessories	
	MS495 (45...100 A) Ics up to 50 kA			
	MO495 (63...100 A) Ics up to 50 kA			

3-pole contactors, for motor control and power switching

AX09

AX40

								Size 1		Size 2
IEC (1)	**AC-3 Rated operational power**	Ø ≤ 55 °C, 415 V	kW	4	5.5	7.5	11	15	18.5
AC Control supply			Type	**AX09**	**AX12**	**AX18**	**AX25**	**AX32**	**AX40**
IEC	**AC-3 Rated operational current**	Ø ≤ 55 °C, 415 V	A	09	12	18	25	32	40
	AC-1 Rated operational current	Ø ≤ 40 °C, 690 V	A	22	25	27	32	55	60

(1) 1000 V IEC ratings available for AX260 ... AX370 contactors.

Main accessories				
Auxiliary contact blocks		Front mounting		
		Side mounting		
Timers		Electronic		
Interlocking units		Mechanical		VM5-1
		Mechanical / Electrical		VE5-1
Surge suppressors		Varistor (AC / DC)		
		RC type (AC)		RC5-1 (24...440 V)
Overload relays				
Thermal relays		Class 10A		TA25DU-M (0.10...32 A)
				TA42DU-M (18...42 A)
Electronic relays		Class 10E,20E,30E	E16DU(0.10...18.9A)	E45DU(9...45A)
Manual motor starters				
 		Thermal / magnetic protection Class 10		MS116 (0.10...32 A) Ics up to 50 kA for class 10 A
				MS132 (0.10...32 A) Ics up to 100 kA
		Magnetic only types		MO132 (0.16...32 A) Ics up to 100 kA

AX80

AX95

AX185

AX370

		Size 3			Size 4		Size 5			Size 6
22	30	37	45	55	75	90	110	132	160	200
AX50	**AX65**	**AX80**	**AX95**	**AX115**	**AX150**	**AX185**	**AX205**	**AX260**	**AX300**	**AX370**
50	65	80	96	115	150	185	205	265	305	370
100	115	125	145	160	190	250	275	400	500	600
				CA5X-10 (1 x N.O.) CA5X-01 (1 x N.C.)						
CAL5X-11 (1 x N.O. + 1 x N.C.)						CAL18X-11(1 x N.O. + 1 x N.C.)				CAL19
		TEF5-ON TEF5-OFF								
							VM300H			VM19
					VE5-2					
					RV5 (24...440 V)					
					RC5-2 (24...440 V)		RC5-3 (250...440 V)			
TA75DU-M (18...80 A)			TA80DU (29...80 A)			TA200DU (66...200 A)				
			TA110DU (66...110 A)							
E80DU(27...80A)			E140DU(50...140A)			EF205(63...210A)		EF370 (115...380 A)		

Short-circuit protection devices

Tmax Circuit breaker and accessories

MS495 (45...100 A) Ics up to 50 kA		
MS497 (22...100 A) Ics up to 100 kA		
MS165 (10...65A) Ics upto 100 kA		
MO496 (32...100 A) Ics up to 100 kA		
MO450 (40...50 A) Ics up to 50 kA	MO495 (63...100 A) Ics up to 50 kA	
MO165 (16...65 A) Ics upto 100 kA		

3-pole contactors, for motor control and power switching




				Type	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
IEC	**AC-3**	**Rated operational Current power θ ≤ 60 °C for AF09...AF370 θ ≤ 55 °C for AF400...AF2650**	220-230-240V	KW	2.2	3	4	6.5	9	11	11	15	18.5	22	25
			380-400 V	KW	4	5.5	7.5	11	15	18.5	18.5	22	30	37	45
			415 V	KW	4	5.5	9	11	15	18.5	22	30	37	45	55
			440 V	KW	4	5.5	9	15	18.5	22	22	30	37	45	55
			500 V	KW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
			690 V	KW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
			1000 V	KW	-	-	-	-	-	-	-	-	-	-	-
		Rated operational current	380-400 V	A	9	12	18	26	32	38	40	53	65	80	96
	AC - 1	**Rated operational current**	θ ≤ 40 °C, 690 V	A	25	28	30	45	50	50	70	100	105	125	130
UL/CSA		**1-phase motor rating**	120V	hp	0.75	1	1.5	2	2	2	3	3	5	7.5	7.5
			240 V	hp	1.5	2	3	3	5	5	7.5	10	15	15	20
		3-phase motor rating	200-208 V	hp	2	3	5	7.5	10	10	10	15	20	25	30
			220-240 V	hp	2	3	5	7.5	10	10	15	20	25	30	30
			440-480 V	hp	5	7.5	10	15	20	25	30	40	50	60	60
			550-600 V	hp	7.5	10	15	20	25	30	40	50	60	75	75
		General use rating	600 V	**A**	25	28	30	45	50	50	60	80	90	105	115
NEMA		**NEMA Size**			00	0	-	1	-	-	2	-	-	3	-

Auxiliary contact blocks	Front mounting	CA4-10 (1 x N.O.) CA4-01 (1 x N.C.)	
	Side mounting	CAL4-11 (1 x N.O.+ 1 x N.C.)	
Timers	Electronic	TEF4 -ON	
		TEF4 -OFF	
Interlock units	Mechanical	VM4	VM96-4
	Mechanical/ Electronical	VEM4	
Connection sets	For reversing contactors	BER16-4	BER38-4 BER65-4 BER96-4
Surge suppressor	Varistor + RC (AC / DC)	Built -in surge protction	

Thermal overload relays	class 10 (Class 10A for TF140, TA200DU)	TF42(0.10...38A)	TF65(22...67 A)	TF96(40...96 A)
Electronic overload relays	class 10E, 20E, 30E	EF19(0.1...18.9A)	EF19(0.10...18.9A) EF45(9...45 A)	EF65(20...70 A) EF96(36...100 A)

	Thermal /magnetic protection class 10	MS116,(0.10...32 A) Ics up to 50 kA for class 100 A MS132 (0.10...32 A) Ics up to 100 kA	MS 165 Ics up to 100 kA	MS495(45...100 A) Ics up to 50 kA
			MS497(22...100 A) Ics up to 100 kA	
	Magnetic only types	MO132 (0.16...32 A)	MO 165 Ics up to 100 kA	
			MO496(22...100 A) Ics up to 100 kA	MO495(40...50 A) Ics up to 50 kA
Accessories	For contactor mounting	BEA16-4	BEA38-4	






AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
30	37	45	55	55	75	90	110	110	132	160	220		257	315		
55	75	75	90	110	132	160	200	200	250	315	400		475	560		
55	75	75	90	110	132	160	200	220	250	355	425		500	600		
75	90	90	110	132	160	160	200	220	250	355	450		560	670		
75	90	90	110	132	160	200	250	250	315	400	520		560	700		
55	75	90	132	160	200	250	315	315	355	500	600		750	900		
		75	110	132	132	132	132	220	280	355	400					
116	140	146	190	205	265	305	370	400	460	580	750		860	1060	1060	
160	200	225	275	350	400	500	600	600	700	800	1050	1260	1350	1650	2050	2650
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	40	40	50	60	75	100	125	125	150	200	250	-				
40	50	50	60	75	100	125	150	150	200	250	300	-	400	450		
75	100	100	125	150	200	250	300	350	400	500	600		800	900		
100	125	125	150	200	250	300	350	400	500	600	70	-	1000	1150		
160	200	200	250	300	350	400	520	550	650	750	900	1210	1350	1650	2100	2700
	4						5			6	7			8		

	CAL19-11(1 x N.O.+ 1 x N.C.								CAL18-11(1 x N.O.+ 1 x N.C							
VM19 (For same size contactor)									VM750H VM750V						VM1650H	
	BER140-14			BER205-14			BER370-4			BEM460-30				BEM750-30		

TF140DU(66...143 A)			TA200DU(66...200 A)													
	EF146 (54...150 A)			EF205(63...210 A)			EF370(115...380 A)		EF2460(150...500 A)		EF750(250...300 A)			EF1250DU (375...1250 A)		

Short-circuit protection devices

MCCB and switch-fuses




4-pole contactors




IEC	AC-rated operational Current	θ ≤ 40 °C, 690 V	A	25	30	45	55	70	100	125
UL/CSA	General use rating	600 V	A	25	30	45	55	60	80	105
AC/DC Control supply			**Type**	**AF09**	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**
AC Control supply			**Type**	**AF09**	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**
DC Control supply			**Type**	**AF09**	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**
IEC	AC-1 Rated operational Current	θ ≤ 40 °C	A	25	30	45	55	70	100	125
	690 V	θ ≤ 60 °C(1)	A	25	30	40	45	60	80	105
		θ ≤ 70 °C	A	22	26	32	37	50	70	90
	With conductor cross sectional area		mm^2	4	6	10	16	35	35	50
	Rated operational voltage Ue max		V	690	690	690	690	690	690	690

θ ≤ 55 °C for EK550, EK 1000 contactors

Main accessories

Auxiliary contact blocks	Front mounting	CA4-10(1 X N.O.), CA4-01(1 X N.C.)			
	Side mounting	CAL4-11(1 X N.O. + 1 X N.C.)			
Timers	Electronic	TEF4 -ON			
		TEF4 -OFF			
Interlock units	Mechanical	VM4		VM96-4	
	Mechanical/ Electronic	VEM4			
Surge suppressor	Varistor + RC (AC / DC)	Built -in surge protction			

AC Control supply			**Type**	**A9**	**A16**	**A26**	**A45**	**A50**	**A75**
DC Control supply				**AL9**	**AL16**	**AL26**	**AF45**	**AF50**	**AF75**
IEC	AC-1 Rated operational current	θ ≤ 40 °C, 690 V	A	25	30	45	70	100	125
						4 N.O. Main poles			4 N.O. Main poles
Main accessories						2NO + 2NC Main poles			2NO + 2NC Main Poles
Auxiliary contact blocks	Front mounting								CA5-10 (1 x N.O.) CA5-01 (1 x N.C.)
	Side mounting								CAL5-11 (1 x N.O. + 1 x N.C.)
Timers	Electronic								TEF5-ON TEF5-OFF
									TE5S (for star-delta starters - direct timing - separate mounting)
Interlocking units	Mechanical						VM5-1		
	Mechanical / Electrical						VE5-1		VE5-2
Surge suppressors	Varistor (AC/DC)								RV5 (24...440 V)
	RC Type (AC)						RC5-1 (24...440 V)		RC5-2 (24...440 V)






160	200	275	350	400	500	525	800	1000
160	175	230	250	300	350	420	540	-
AF116	**AF140**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**-**	**-**
AF116	**AF140**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**EK550**	**EK1000**
AF116	**AF140**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**EK550**	**EK1000**
160	200	275	350	400	500	525	800	1000
145	175	250	300	350	400	425	650	800
130	160	200	240	290	325	350	575	720
70	95	150	240	240	300	2 X 185	2 X 240	2 X 300
690	690	1000	1000	1000	1000	1000	1000	1000

CAL19-11(1XN.O.+1XN.C.)	CAL16-11(1XN.O.+1XN.C.)
VM19(FOR SAME SIZE CONTACTOR)	VH800
	RC-EH800

Installation contactor

Introduction

ABB offers a complete range of equipment for controlling, remote switching and protecting electrical installations in buildings as hotels, hospitals, shopping centers,office centers and domestic applications.

ESB and EN installation contactors are designed to match the Modular DIN rail components for common use in dedicated panels providing high safety and finger protection.

The range

The ESB range includes 4 ratings from 20 A to 63 A with 2 to 4-pole version. The EN contactor range offers 3 types from 20 A to 40 A with an additional manual switch in front.

Flexible use for many application

- Resistive loads such as electric heaters, water heaters, etc.
- Motors, pumps
- Lamp switching and controls (Building installtion)

Features and benefits

- AC/ DC coil connection
- High comfort due to hum-free operation
- High protection against overvoltages and current peaks
- Compact and optimized design, DIN rain mounting


Techincal description

ESB20	ESB24	ESB40	ESB63
EN20	EN24	EN40	-
20A	24A	40A	63A

Aux contact block EH04-20 - 2NO
Aux contact block EH04-11 - 1NO + 1NO

Mini contactors

			Screw terminals			
AC Control supply						
3-pole contactors	coil consumption 3.5w	Type	**B6**	**B7**	-	-
3-pole reversing contactors	coil consumption 3.5w	Type	-	-	**VB6**	**VB7**
4-pole contactors	coil consumption 3.5w	Type	**B6**	**B7**	**VB6A**[2)]	**VB7A**[2)]
DC Control supply						
3-pole contactors	coil consumption 3.5w	Type	**BC6**	**BC7** **B7D**[1)]	-	-
3-pole interface contactors	coil consumption 1.4 ... 2.4 w	Type	**BC6**	**BC7**	-	
3-pole reversing contactors	coil consumption 3.5w	Type	-	-	**VBC6**	**VBC7**
4-pole contactors	coil consumption 3.5w	Type	**BC6**	**B7D**	**VBC6A**[2)]	**VBC7A**[2)]
wide range types	extended coil voltage and temperature	Type	-	**TBC7**		
PLC types	coil consumption 1.7w	Type	**B6S**[1)]	**B7S**[1)]		
IEC Rated operational power AC-3	22-230-240 V	kW	2.2	3	2.2	3
	380-400V	kW	4	5.5	4	5.5
Rated operational power AC-1	400 V θ ≤ 40°C	A	20	20	20	20
UL/CSA 3- phase motor rating	220-240 V AC	hp	2	3	2	3
	440-480	hp	3	5	3	5
General use rating		A	12(300 V)	16(600 V)	12(300 V)	16(600 V)

θ **with integrated surge suppressor**
² **with safety blocking function**

Main accessories

Auxiliary contact blocks	Front mounting	CAF6
	Side mounting	CA6
Connection sets	For reversing contactors	BSM6-30
Surge suppressor	Varistor (AC/DC)	RV-BC6

Overload relay

Thermal overload relays Thermal and phase failure protection, with single setup possible	class 10	T16
Electronic overload relays With single setup possible	class 10E, 20E, 30E	E16DU

Manual motor starters

Thermal /magnetic protection	class 10	MS116, MS132
Magnetic only types		MO132
Connecting link to manual motor starters		BEEA7/132

Contactor relays

			Screw terminals
AC Control supply			
4-pole contractor relays	coil consumption 3.5w	Type	**K6**
DC Control supply			
4-pole contractors	coil consumption 3.5w	Type	**KC6**
4-pole interface contractors	coil consumption 1.4 ... 2.4 w	Type	**KC6**
wide range types	extendedcoil volage and temperature	Type	**TKC6**
PLC types	coil consumption 1.7w ... 2.8 w	Type	**K6S**
IEC Rated operational power AC- 15	22-230-240 V	A	4
	380-400V	A	3
Rated operational power AC- 13	24V	A	2.5

Main accessories

Auxiliary contact blocks	Front mounting	CAF6
	Side mounting	CA6-11K




				Soldering pins				Flat pins
	B6...P	**B7...P**	**-**	**-**	**B6...F**	**B6...F**	**-**	**-**
	-	**-**	**VB6...P** **VB6A...P**[2]	**VB7...P** **VB7A...P**[2]	**-**	**-**	**VB6...F** **VB6A...F**[2]	**VB7...F** **VB7A...F**[2]
	-	**-**	**-**	**-**	**-**	**-**		
	BC6...P	**B7D...P**[1]	**-**	**-**	**BC6...F**	**BC7...F**	**-**	**-**
	BC6...P	**BC7...P**	**-**	**-**	**BC6...F**	**BC7...F**	**-**	**-**
	-	**-**	**VBC6...P** **VBC6A...P**[2]	**VBC7...P** **VBC7A...P**[2]	**-**	**-**	**VBC6...F**	**VBC7...F**
	-				**-**	**-**	**VBC6A...F**[2]	**VB7A...F**[2]
	2.2	3	2.2	3	2.2	3	2.2	3
	4	5.5	4	5.5	4	5.5	4	5.5
	12	12	12	12	20	20	20	20
	2	3	2	3	2	3	2	3
	3	5	3	5	3	5	3	5
	12(300 V)	16(600 V)	12(300 V)	16(600 V)	12(300 V)	16(600 V)	12(300 V)	16(600 V)

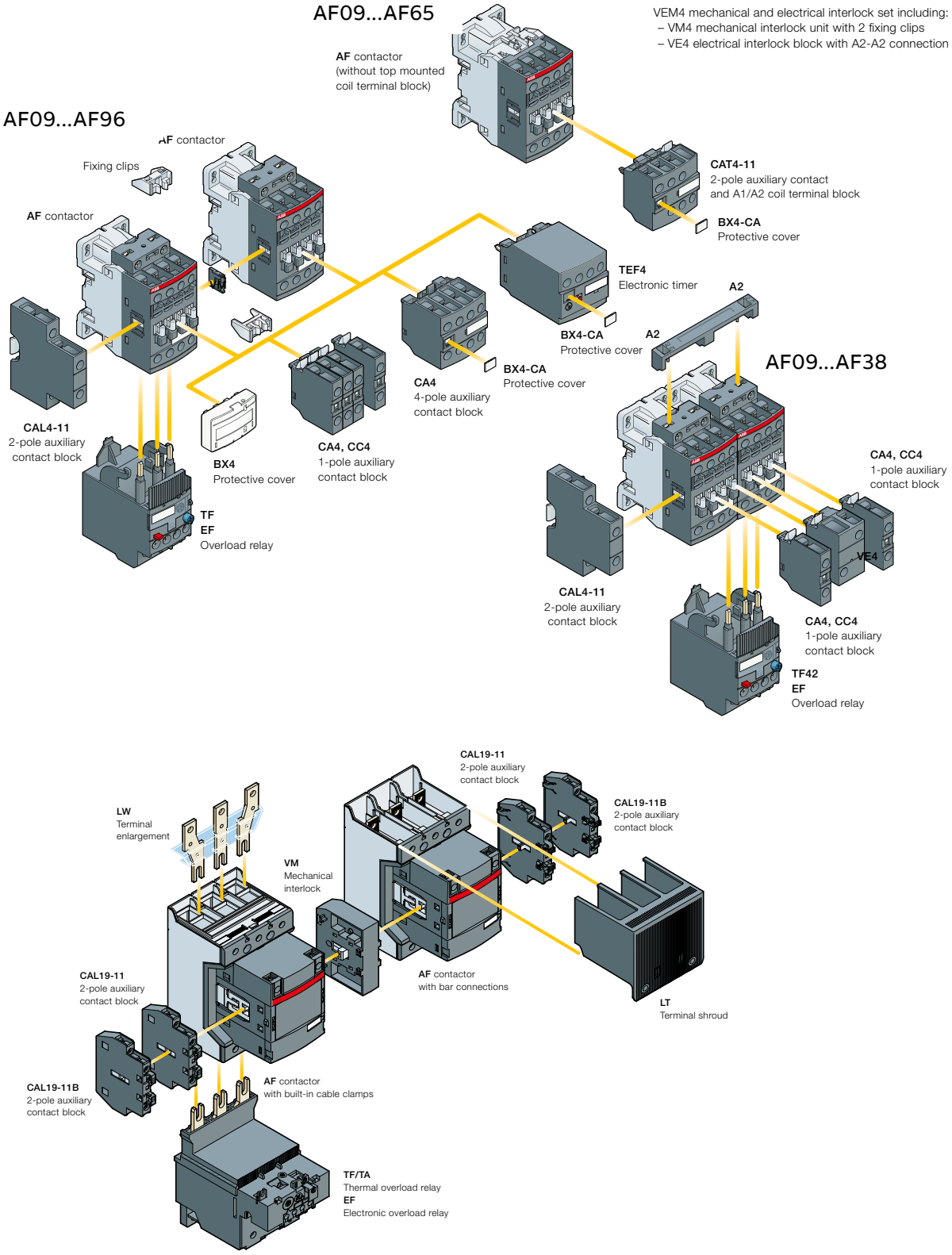
	-	-
	CA6-11K-P	CA6-11K-F
	-	-
	-	-

	MS116, MS132	MS116, MS132
	MO132	MO132

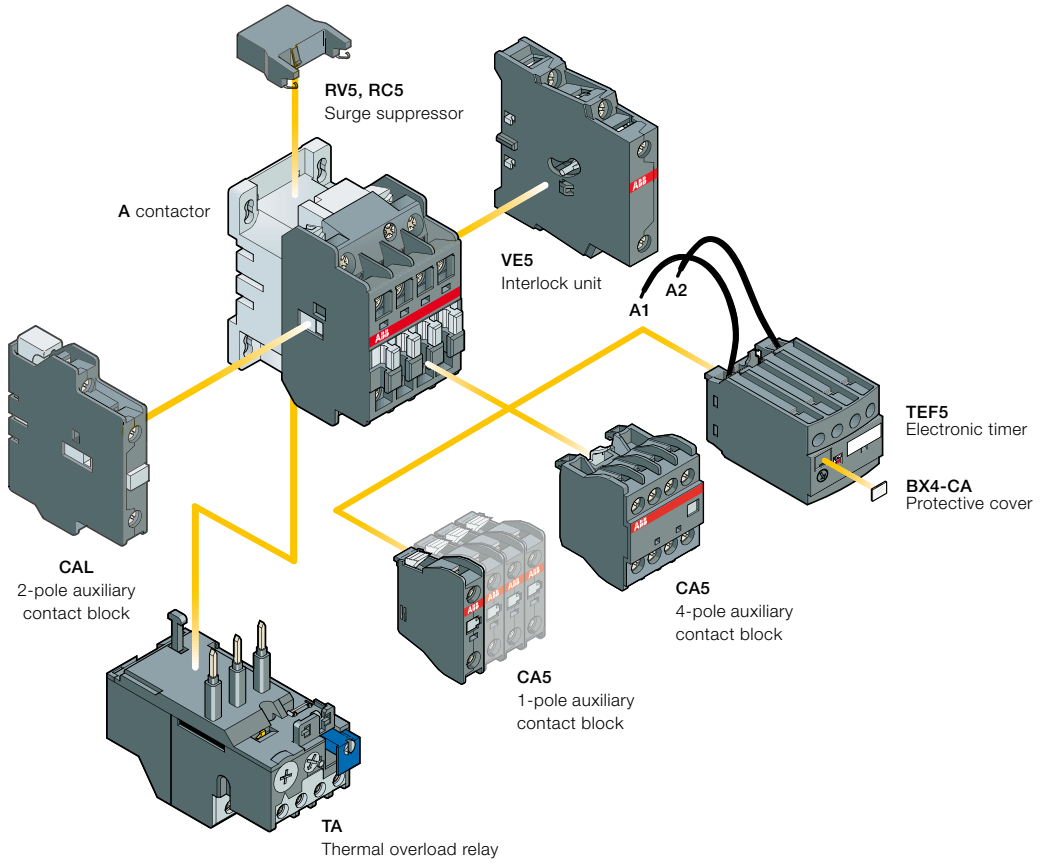

	Soldering pins	**Flat pins**
	K6	**K6...F**
	KC6...P	**KC6...F**
	KC6...P	**KC6...F**
	4	4
	3	3
	2.5	2.5
	-	
	CA6-11K-P	CA6-11K-F

Contactors accessory overview

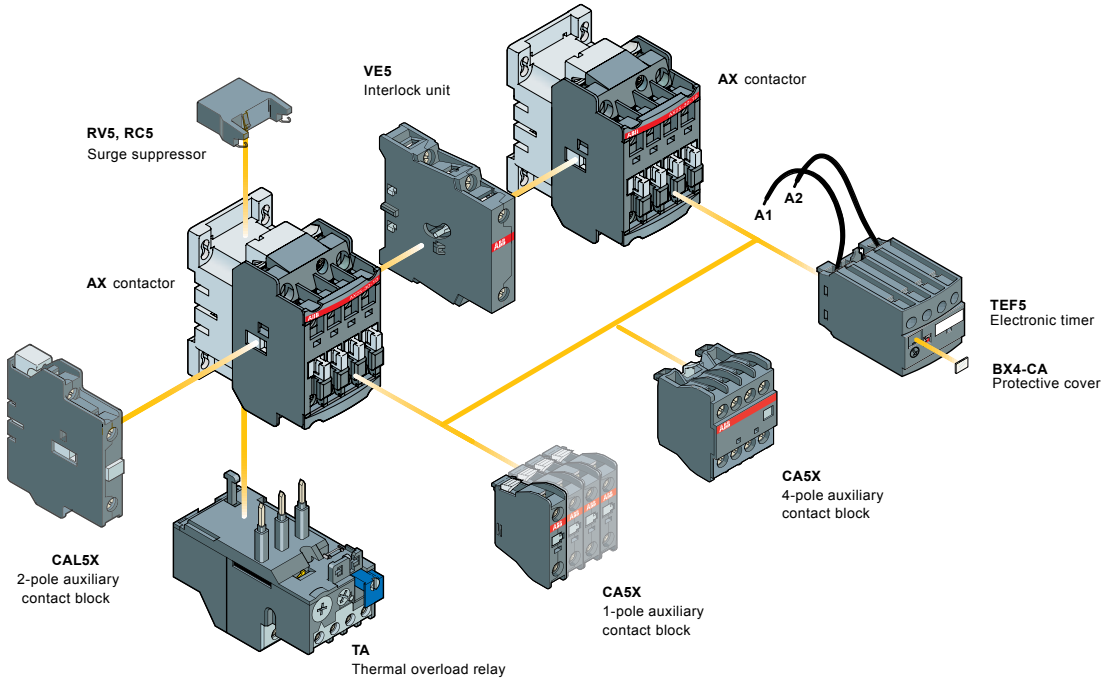
AF contactor main accessories



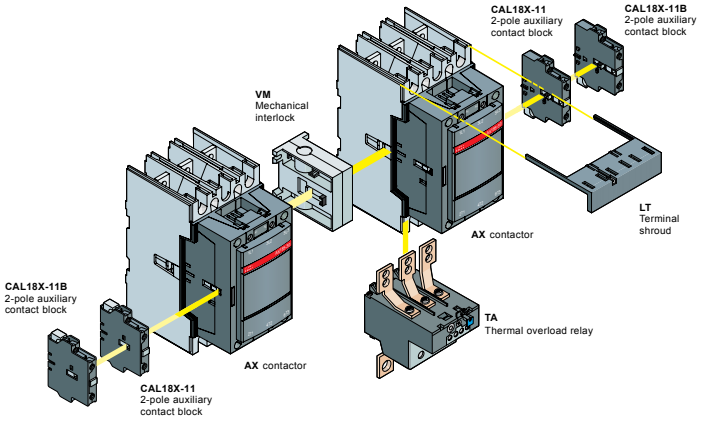
A range contactor main accessories



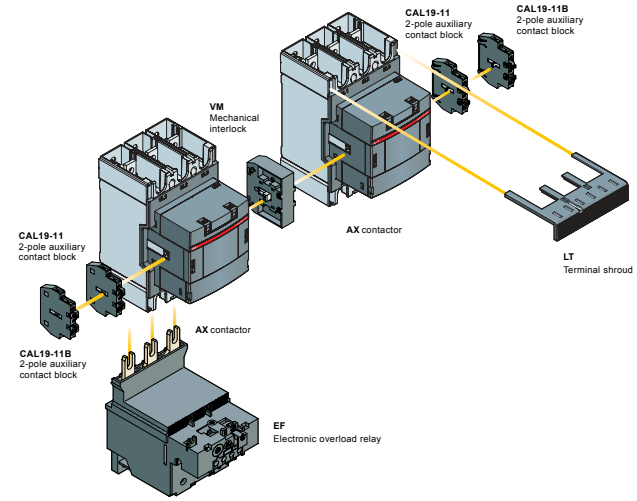
AX contactor main accessories

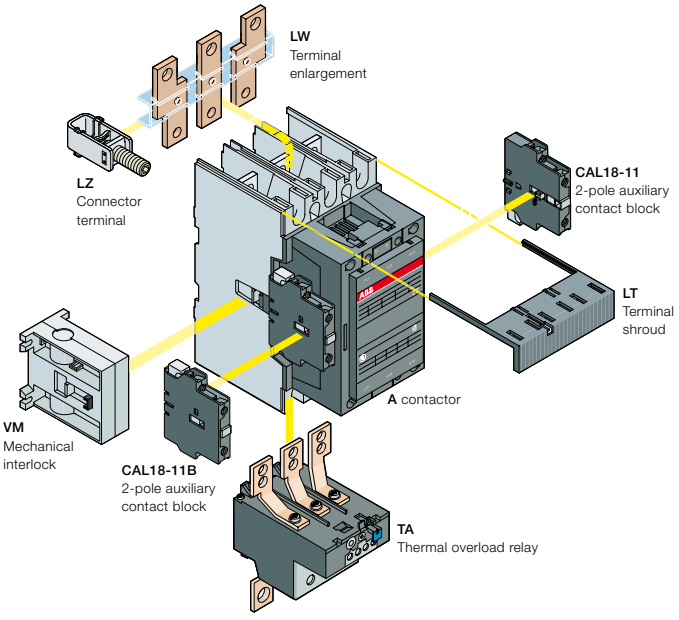


AX185, AX205



AX260 ... AX370





Features benefits
Manual motor starters (MPCB)

Manual motor starters (MMS) are protection devices for the main circuit. They combine motor control and protection in a single device. MMS are used mainly to switch motors manually ON/OFF and protect them and the installation fuse-less against short-circuit, overload and phase failures. Fuse-less protection with a manual motor starter saves costs, space and ensures a quick reaction under short-circuit condition, by switching off the motor within milliseconds.

Safe, compact, and cost-saving solution
Various motor protection functions in one device
- Overload
- Short-circuit
- Phase loss sensitivity

Efficient planning and installation perfectly matching the ABB contactor family, leads to high flexibility and increased exchangeability. Simple connecting links ensure the electrical and mechanical connection.

Products range for different applications available
- Short-circuit breaking capacity up to 100 kA
- Magnetic-only devices (only short-circuit protection)
- Selected types are certified according to ATEX
- Special version for transformer protection

The manual motor starter range is compatible with all major national and international standards.

Comprehensive accessory range
Manual motor starters can be equipped with busbars, auxiliary contacts, signalling contacts, undervoltage releases and shunt trips. Moreover it is possible to order IP65 (UL/CSA Type 12) door mounting kits, IP65 (UL/CSA Type 12) enclosures and shafts for doors.

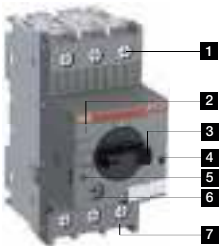
MS116, MS132, MS165, MO132, MO165 and MS132-T share almost the same accessory range. Customers can optimize administration costs and inventory costs through reduced number of order codes by benefiting from a compatible range of accessories.


Manual motor starters with busbar connection

Accessories
- Aux. contacts for lateral (HK, HKS)
- Aux. contacts for front (HKF)
- Signalling contact (SK)
- Short-circuit signalling contacts (CK)
- Undervoltage release (UA)
- Shunt trip (AA)
- 3-phase bus bars (PS)
- Power in-feed blocks (S)
- Locking devices
- Enclosures
- Door moounting kit (DMS)

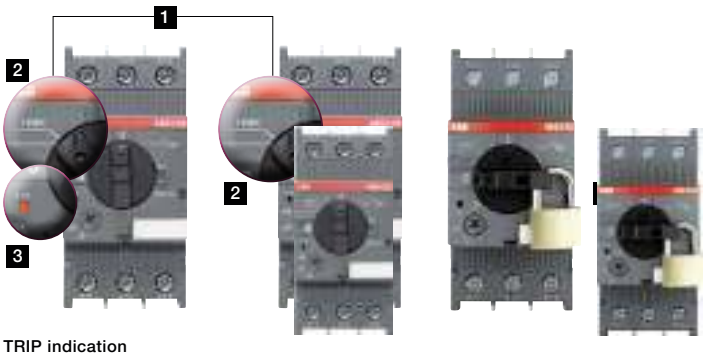
Features :
- Manual control
- Disconnect function
- Handle can be locked in the off position
- Remote control via undervoltage release or shunt trip
- Trip indication
- Temperature compensation
- Adjustable current setting

1 Terminals (1L1, 3L2, 5L3)
2 Switch position TRIP
3 Lockable handle
4 Test function
5 Status indication for short-circuit
6 Current setting range
7 Terminals 2T1, 4T2, 6T3



Features of type MS132

Magnetic tripping
Thermal tripping



TRIP indication

Technical data

Manual motor starters

Type	MS 116	MS 132	MS 165	MS 495	MS 497
Thermal and electromagnetic protection	yes	yes	yes	yes	yes
Electromagnetic protection	-	-	-	-	-
Phase loss sensitivity	yes	yes	yes	yes	yes
Switch position	ON/OFF	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP
Magnetic trip indication	-	yes	yes	-	-
Lockable handle without accessories	-	yes	yes	yes	yes
Discounting feature	yes	yes	yes	yes	yes
Width	45 mm	45 mm	55 mm	70 mm	70 mm
Rated operational current I_e	0.16 ... 32 A	0.16 ... 32 A	16 ... 65 A	63 ... 100 A	32 ... 100 A
Setting range	0.1 ... 32 A	0.1 ... 32 A	10 ... 65 A	45 ... 100 A	22 ... 100 A
Ambient air temperature	-25 ... +55 °C*)	-25 ... +60 °C*)	-20 ... +60 °C*)	-20 ... +60 °C*)	

Table for short circuit ratings 400 /415V

Compensated*

	Standard range MS 116, MS 495			Performance range MS 132, MS 165, MS497		
Selection Parameters						
Rated operational power	**Setting change for thermal release**	**Type**	**Short-circuit breaking capacity**		**Type**	**Short-circuit breaking capacity**
			I_{cu}	I_{cs}		I_{cu}	I_{cs}
0.03 kW[1)]	0.1 ... 0.16 A	MS116-0.16	50 kA	50 kA	MS132-0.16	100 kA	100 kA
0.06 kW	0.16 ... 0.25 A	MS116-0.25	50 kA	50 kA	MS132-0.25	100 kA	100 kA
0.09 kW	0.25 ... 0.4 A	MS116-0.4	50 kA	50 kA	MS132-0.4	100 kA	100 kA
0.18 kW	0.4 ... 0.63 A	MS116-0.63	50 kA	50 kA	MS132-0.63	100 kA	100 kA
0.25 kW	0.63 ... 1.0 A	MS116-1.0	50 kA	50 kA	MS132-1.0	100 kA	100 kA
0.55 kW	1.0 ... 1.6 A	MS116-1.6	50 kA	50 kA	MS132-1.6	100 kA	100 kA
0.75 kW	1.6 ... 2.5 A	MS116-2.5	50 kA	50 kA	MS132-2.5	100 kA	100 kA
1.5 kW	25 ... 4.0 A	MS116-4.0	50 kA	50 kA	MS132-4.0	100 kA	100 kA
2.2 kW	4.0 ... 6.3 A	MS116-6.3	50 kA	50 kA	MS132-6.3	100 kA	100 kA
4.0 kW	6.3 ... 10 A	MS116-10	50 kA	50 kA	MS132-10	100 kA	100 kA
5.5 kW	8 ... 12 A	MS116-12	25 kA	25 kA	MS132-12	100 kA	100 kA
7.5 kW	10 ... 16 A	MS116-16	16 kA	16 kA	MS132-16/ MS165-16	100 kA	100 kA
7.5 kW	14 ...20 A				MS165-20	100 kA	100 kA
7.5 kW	16 ... 20 A	MS116-20	15 kA	100 kA	MS132-20	100 kA	100 kA
11 kW	18 ... 25 A				MS165-25	100 kA	100 kA
11 kW	20 ... 25 A	MS116-25	15kA	10 kA	MS132-25	50 kA	50 kA
15 kW	25 ... 32 A	MS116-32	10 kA	10 kA	MS132-32	50 kA	25 kA
15 kW	22 ... 32 A				MS497-32	100 kA	50 kA
15 kW	23 ... 32 A				MS165-32	100 kA	75 kA
18.5 kW	28 ... 40 A				MS497-40	100 kA	50 kA
22 kW	30 ... 42 A				MS165-42	50 kA	25 kA
22 kW	36 ... 45 A						
22 kW	40 ... 50 A				MS497-50	100 kA	50 kA
22 kW	40 ... 54 A				MS165-54	50 kA	25 kA
30 kW	45 ... 63 A	MS495-63	50 kA	25 kA	MS497-63	100 kA	50 kA
30 kW	52 ... 65 A				MS165-65	50 kA	25 kA
37 kW	57 ... 75 A	MS495-75	50 kA	25 kA	MS497-75	100 kA	50 kA
55 kW	80 ... 100 A	MS495-100	50 kA	25 kA	MS497-100	100 kA	50 kA

1) 690 V




MO132	MO165	MO495	MO496	MS132-T
-	-	-	-	yes
yes	yes	yes	yes	-
-	-	-	-	yes
ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP
-	-	-	-	yes
yes	yes	yes	yes	yes
yes	yes	yes	yes	yes
45 mm	55 mm	70 mm	70 mm	45 mm
0.16 ... 32 A	16 .. 65 A	63 .. 100 A	32 .. 100 A	0.16 .. 32 A
-	-			
-25 ... +60 C	-25 ... +60 °C	-20 ... +60 °C	-20 ... +60 °C	-25 ... +60 °C

Standard range MO132, MO450, MO495		Performance range MO132, MO165, MO496			Transformer protection MS132-T		
Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity
	I_{cu}	I_{cs}		I_{cu}	I_{cs}		I_{cu}/ I_{cs}
MO132-0.16	100 kA	100 kA	MO132-0.16	100 kA	100 kA	MS132-0.16T	100 kA
MO132-0.25	100 kA	100 kA	MO132-0.25	100 kA	100 kA	MS132-0.25T	100 kA
MO132-0.4	100 kA	100 kA	MO132-0.4	100 kA	100 kA	MS132-0.4T	100 kA
MO132-0.63	100 kA	100 kA	MO132-0.63	100 kA	100 kA	MS132-0.63T	100 kA
MO132-1.0	100 kA	100 kA	MO132-1.0	100 kA	100 kA	MS132-1.0T	100 kA
MO132-1.6	100 kA	100 kA	MO132-1.6	100 kA	100 kA	MS132-1.6T	100 kA
MO132-2.5	100 kA	100 kA	MO132-2.5	100 kA	100 kA	MS132-2.5T	100 kA
MO 132-4.0	100 kA	100 kA	MO 132-4.0	100 kA	100 kA	MS132-4.0T	100 kA
MO132-6.3	100 kA	100 kA	MO132-6.3	100 kA	100 kA	MS132-6.3T	100 kA
MO132-10	100 kA	100 kA	MO132-10	100 kA	100 kA	MS132-10T	100 kA
MO132-12	100 kA	100 kA	MO132-12	100 kA	100 kA	MS132-12T	100 kA
MO132-16	100 kA	100 kA	MO132-16/ MO165-16	100 kA	100 kA	MS132-16T	100 kA
			MO165-20	100 kA	100 kA		
MO132-20	100 kA	100 kA	MO132-20	100 kA	100 kA	55kA	MS132-20T 100 kA
MO132-25	50 kA	50 kA	MO132-25/ MO165-25	50 kA/ 100 kA	50 kA/ 100 kA	50kA	MS132-25T 50 kA
MO132-32	50 kA	25 kA	MO132-32	50 kA	25 kA		
			MO496-32	100 kA	50 kA		
			MO165-32	100 kA	50 kA		
	50 kA	25 kA	MO496-40	100 kA	50 kA		
			MO165-42	50 kA	25 k A		
	50 kA	25 kA					
	50 kA	25 kA	MO496-50	100 kA	50 kA		
			MO165-54	50 kA	25 kA		
MO495-63	50 kA	25 kA	MO496-63	100 kA	50 kA		
			MO165-65	50 kA	25 kA		
MO495-75	50 kA	25 kA	MO496-75	100 kA	50 kA		
MO495-100	50 kA	25 kA	MO496-100	100 kA	50 kA		

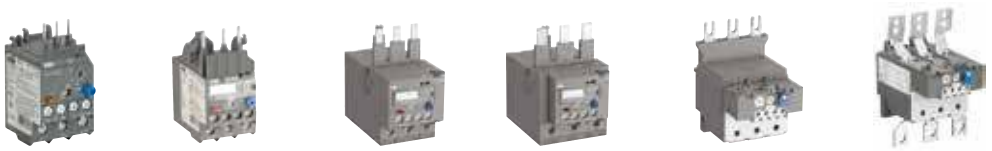
Transformer protection:
The instantaneous short-circuit current setting is 20 times the rated operational current

Thermal and electronic overload relays

Thermal overload relays

Type	TA25DU-M	TA42DU-M	TA75DU-M	TA80DU-M	TA110DU	TA200DU
Current range	0.10 ... 32 A	18 ... 42 A	18 ... 80 A	29 ... 80 A	66 ... 110 A	66 ... 200 A
Trip class	10A	10A	10A	10A	10A	10A
Single mounting kit	DB25	DB80	DB80	DB80	DB200	DB200
For contactors	A09 ... A30	A30 ... A40	A50 ... A75	A95 ... A110	A95 ... A110	A145 ... A185
For contactors	AX09 ... AX32	AX32 ... AX40	AX50 ... AX80	AX95 ... AX150	AX95 ... AX150	AX185 ... AX205

Thermal overload relays



IEC: rated operational power AC-3 Fitting to contactors	0.03 ... 4.0 kW B6, B7, AS	4.0 ... 18.5 kW AF09 ... AF38	18.5 ... 30 kW AF40, AF52, AF65	37 ... 45 kW AF80, AF96	55 ... 75 kW AF116, AF140, AF146	90 ... 110 kW AF190, AF205
Type	**T16**	**TF42**	**TF65**	**TF96**	**TF140DU**	**TA200DU**
Current range	0.10 ... 16 A	0.10 ... 38 A	22 ... 67 A	40 ... 96 A	66 ... 142 A	66 ... 200 A
Trip class	10	10	10	10	10A	10A
Separate mounting kit	DB16	DB42	-	-	-	-
Trip class			10			10

Electronic overload relays with integrated CT

IEC: rated operational power AC-3 400 V	0.03 ... 4.0 kW	4 ... 7.5 kW	4.0 ... 18.5 kW	18.5 ... 30 kW	37 ... 45 kW	55 ... 75 kW	90 ... 110 kW	132...200 kW
Fitting to contactors	B6, B7,	AF09...AF16	AF26 ... AF38	AF40...AF65	AF80, AF96	AF116, AF140	AF190, AF205	AF265...AF370
Type	**E16DU**	**EF19**	**EF45**	**EF65**	**EF96**	**EF146**	**EF205**	**EF370**
Current range	0.10 ... 18.9 A	0.10 ... 19 A	9 ... 45 A	25 ... 70 A	36 ... 100 A	54 ... 150 A	63 ... 210 A	115 ... 380 A
Separate mounting kit	DB16E	-	-	-	-	-	-	-
Trip class				10E, 20E, 30E selectable				

Electronic overload relays with external separate CT

IEC: rated operational power AC-3 400 V	475 ... 560 kW
Fitting to contactors	AF1350, AF1650, AF2050
Type	**E1250DU**
Current range	375 ... 1250 A
Trip class	10E, 20E, 30E selectable





Electronic overload relays

Type	E16DU	E45DU	E80DU	E140DU	EF205
Current range	0.10 … 18.9 A	9 … 45 A	27 … 80 A	50 … 140 A	63 … 210 A
Trip class			10E, 20E, 30E selectable		
Single mounting kit	DB16E	DB45E	DB80E	DB140E	-
For contactors	A09 … A16	A26 … A40	A50 … A75	A95 …110	A145 … A185
For contactors	AX09 … AX18	AX32 … AX40	AX50 … AX115	AX150	AX185 … AX205








37…45 kW	55…75kW	90…110 kW	
60 hp	75…100 hp	125…150 hp	
AF80, AF96	AF116, AF140	AF190, AF205	
TF96	**TF140DU**	**TA200DU**	
40…96A	66…142 A	66…200A	
10	10A	10A	
-	-	DB200	




37…45 kW	55…75 kW	90…110 kW	132…200 kW
60 hp	75…100 hp	125…150 hp	200…350 hp
AF80, AF96	AF116, AF140, AF146	AF190, AF205	AF265, AF305, AF370
EF96	**EF146**	**EF205**	**EF370**
36…100 A	54…150 A	63…210 A	115…380 A
	10E, 20E, 30E selectable		
-	-	-	-

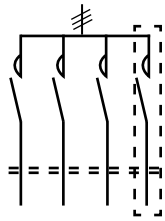
475…560 kW
800…900 hp
AF 1350, AF1650
E1250DU
375…1250 A
10E, 20E, 30E selectable
-

Contactors for capacitor switching

UA..RA contactors for capacitor switching (UA16..RA to UA110..RA) with insertion of damping resistors
The insertion of damping resistor protects the contactor and the capacitor from the highest inrush currents.

Main pole - Utilization characterstics according to IEC

Contactor type		AC operated	UA16..RA	UA26..RA	UA30..RA	UA50..RA	UA63..RA	UA75..RA	UA95..RA	UA110..RA
Standards			IEC 60947-1 / 60947-4-1 and EN 60947-4-1 / 60947-4-1							
Rated operational voltage Ue max			690 V							
Rated frequency (without derating)			50 / 60 Hz							
Ac-6b utilization category										
Rated operational power AC-6b(1)										
For air temprature close	θ ≤ 40°C	230-240 V	8 kvar	12.5 kvar	16 kvar	25 kvar	30 kvar	35 kvar	40 kvar	45 kvar
to contactor		400-415 V	12.5 kvar	22 kvar	30 kvar	40 kvar	50 kvar	60 kvar	70 kvar	80 kvar
		440 V	15 kvar	24 kvar	32 kvar	50 kvar	55 kvar	65 kvar	75 kvar	85 kvar
		500-550 V	18 kvar	30 kvar	34 kvar	55 kvar	65 kvar	75 kvar	85 kvar	95 kvar
		8 kvar	22 kvar	35 kvar	45 kvar	72 kvar	80 kvar	100 kvar	120 kvar	130 kvar
	θ ≤ 55°C	230-240 V	7.5 kvar	11.5 kvar	16 kvar	24 kvar	27 kvar	30 kvar	35 kvar	40 kvar
		400-415 V	12.5 kvar	20 kvar	27.5 kvar	40 kvar	45 kvar	50 kvar	60 kvar	70 kvar
		440 V	13 kvar	20 kvar	30 kvar	43 kvar	48 kvar	53 kvar	65 kvar	75 kvar
		500-550 V	16 kvar	25 kvar	34 kvar	50 kvar	60 kvar	65 kvar	75 kvar	82 kvar
		690 V	21 kvar	31 kvar	45 kvar	65 kvar	75 kvar	80 kvar	105 kvar	110 kvar
	θ ≤ 70°C	230-240 V	6 kvar	9 kvar	11 kvar	20 kvar	23 kvar	25 kvar	30 kvar	35 kvar
		400-415 V	10 kvar	15.5 kvar	19.5 kvar	35 kvar	39 kvar	41 kvar	53 kvar	60 kvar
		440 V	11 kvar	17 kvar	20.5 kvar	37 kvar	42.5 kvar	45 kvar	58 kvar	70 kvar
		500-550 V	12.5 kvar	20 kvar	25 kvar	46 kvar	50 kvar	55 kvar	70 kvar	78 kvar
		690 V	17 kvar	26 kvar	32 kvar	60 kvar	65 kvar	70 kvar	85 kvar	100 kvar
Max. permissible peak current Î		Unlimited								
Short circuit protection device for contactors gG type fuse(2)		80 A	125 A	200 A					250 A	
Max. electrical switching		240 cycles/h								
Electrical durability AC-6b θ ≤ Ue 440°C		250 000 operating cycles								
500 V ≤ Ueθ ≤ 690°C		100 000 operating cycles								



Multi- step capacitor bank scheme

[1] For 220 V and 380 V, multiple by 0.9 the rated values at 230 V and 400 V respectively.
Example : 50 kvar / 400 V corresponding to 0.9 x 50 = 45 kvar /380 V
[2] The fuse ratings given represent the maximum ratings ensuring type 1 coordination according to the definition of standard IEC 60947-4-1.

R contactors
Tailored to your needs

With over 100 years of experience in control, ABB has designed its R contactors to meet the particular requirements of power applications from 63 A up to 5000 A in AC and DC.

With a variable number of poles and advanced features, these tailor-made bar mounted contactors remain the most flexible solution. Robustness and reliability bring our technology far beyond the limits of standard contactors. Our know-how enables us to offer R contactors perfectly suited to your applications whatever the environment.

Performance

- High making and breaking capacity
- Current up to 5000 A
- Voltage up to 1000 V AC or 1500 V DC.

Flexibility

- Variable number of poles
- Combination of N.O. and N.C. poles
- Adjustable number of auxiliary contacts.

Reliability

- Robust construction
- Durability up to 5 millions of operating cycles
- Experienced and proven for years.

... you can trust

Advanced applications
N.O./N.C. main poles combination

AC circuit switching
NOR..MT contactors

DC circuit switching
NOR..CC contactors

Up to 1000 V AC/ 1500 V DC
LOR couplers

Slip-ring motor control
FOR contactors

Sustainability of control for a wide variety of applications

- Iron and steel indutries
- Mining
- Cranes
- Induction furnaces
- Hydroelectric power stations
- Photovoltaic power plants
- Power distribution
- Energy storage
- Railway substation
- Lighting equipment
- Pump stations.

Benefits and advantages
UMC100.3 Intelligent Motor Protection & Control System

UMC100.3 is a flexible, modular and expandable motor management system for constant-speed low-voltage range motors.
It's most important tasks include motor protection, prevention of plant standstills and the reduction of down time. This is made possible by early information relating to possible motor problems which avoids unplanned plant standstills. Even if a motor trips, quick diagnosis of the cause of the fault serves to reduce downtime.

UMC100.3 combines in a very compact unit:

Motor protection
- Overload, underload
- Overvoltage, undervoltage
- Blocked rotor, low / high current
- Phase failure, imbalance, phase sequence
- Earth leakage
- Thermistor protection
- Limitation of starts per time
- One single version with integrated measuring system covers the rated
- motor current from 0,24 to 63 A

Motor control
- Integrated and easy to parametrize motor starter functions like direct, reverse, star-delta,...
- Additionally free programmable logic for application specific control functions
- Expansion modules DX111, DX122 for more I/Os
- Expansion modules VI150, VI155 for 3-phase voltage measuring

Motor diagnostics
- Quick and comprehensive access to all relevant data
- via fieldbus and/or operator panel
- Current, thermal load
- Phase voltages
- Power factor
- Energy
- Communication
- Communication-independent basic device
- Freely selectable fieldbus protocol with Field-BusPlug
- Profibus DP
- DeviceNet
- Modbus
- CANopen
- Ethernet Modbus TCP

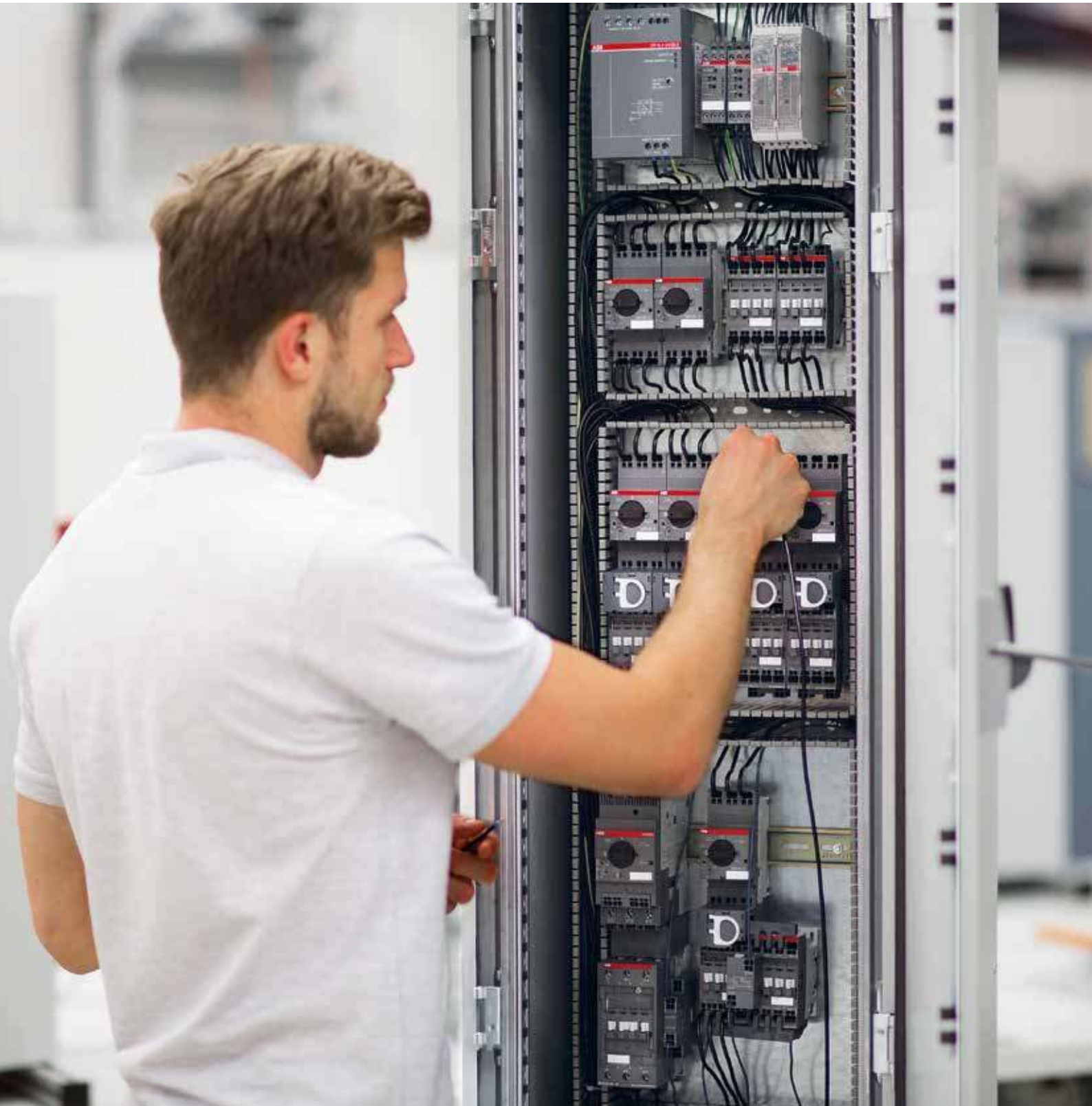
Typical application segments
- Oil & gas
- Cement
- Paper
- Mining
- Steel
- Chemical industry

- UMC100.3 DC 24 V DC
- UMC100.3 AC 110 ... 240 V AC/DC
- UMC100.3 DC EX 24 V DC ATEX
- UMC100.3 AC EX 110 ... 240 V AC/DC ATEX

- UMC100-PAN Control Panel
- DX111/122 Expansion Modules Digital I/O
- VI150/155 Expansion Modules Voltage

Just push it NEW
Push-in Spring motor starting solution

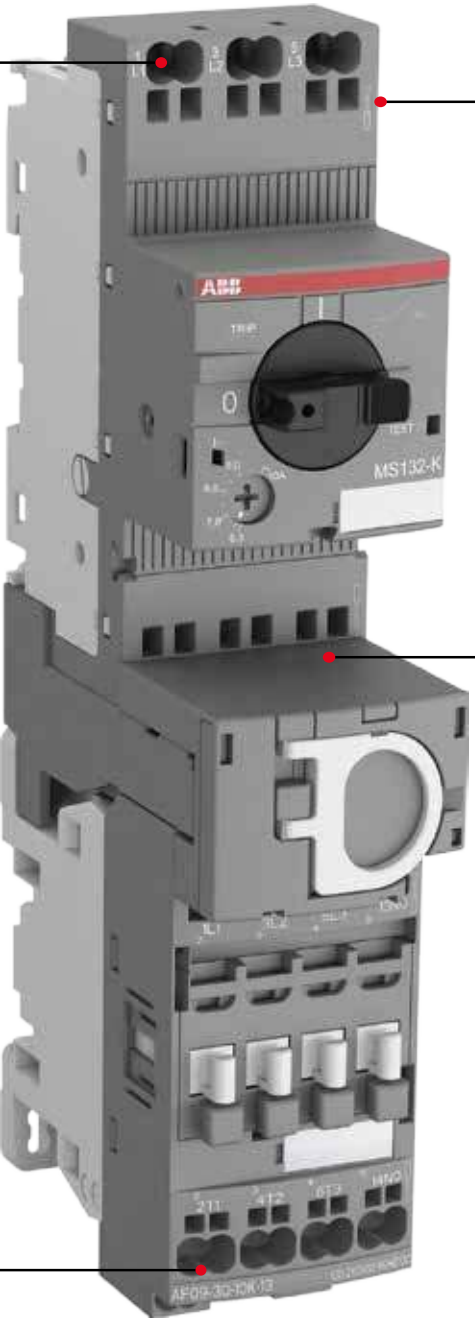
- Faster than ever installation
- Easier than ever wiring
- Reliable as ever connections



Push-in Spring motor starting solution NEW
Complete range, complete efficiency

With the new Push-in Spring motor starting solution, one push is all you need for extremely fast wiring. No tool is required, so you can save up to 50% wiring time with Push-in Spring compared to conventional spring solutions. And the connections are just as reliable. So for speed, ease and reliability, just push it.

2-in-1
Benefit from both Push-in mode and Spring mode and use ferruled cables or cables without ferrules in the same terminal.



Just one tool for everything
You only need a 3 mm screwdriver in Spring mode as well as for de-wiring the complete solution.

Compatible with screw range
Mount accessories for control circuits on the screw range up to 30 kW AC-3 400 V on manual motor starters and up to 45 kW AC-3 400 V, 130 A AC-1 on contactors.

Tool-less connecting links
100% tool-less mounting and dismounting connecting links.

Robust by design
Contact robustness by design, independent from operator.

Higher connecting capacity
The solution ranges up to 18.5 kW 400 V AC-3 and 50 A AC-1 (25 hp 480 V and 45 A 600 V general use).

Note: Contact our nearest sales office for more information

Electronic compact starters NEW

More functions, less space

- Compact size of only 22.5 mm
- Direct-on-line and reversed starter with overload protection and emergency stop in just one device

Electronic compact starters: HF range NEW

A compact solution with great functionality

ABB's electronic compact starter, up to 3 kW / 400 V, is a 22.5 mm wide product. Even though its compact, it has, direct-on-line, reversed starting, motor overload protection, and emergency stop all included. It is well suited for paper machines, conveyors or machine tools.

Space saving

Up to 90% less space required
Decrease your cabinet size.
ABB's electronic compact starter is 22.5 mm wide while still containing motor starting functionalities and embedding motor protection and safety.

Safety and protection

Integrated safety function
Protect your personnel with emergency stop version complying with SIL3, PL e safety standards.
Extend equipment life time and decrease maintenance cost as our starters service life is 10 times higher than electromechanical solutions.

Easy to install

Up to 75% reduced time in wiring
Wiring time upon installation is reduced to a minimum as motor protection, reversing function and emergency stop are already part of the product. Only one component to install reduces the risk of wiring errors.

Note: Contact our nearest sales office for more information

AFS contactors with front-mounted auxiliary contact blocks NEW

Dedicated for safety applications

ABB's complete range of safety components make protection systems easier to build. Designed for machine safety applications, AFS contactors come with fixed front auxiliary contact blocks, making them ideal for monitoring and controlling circuits. Mechanically linked and mirror contacts help make your system safer.

Safety and protection

Safety in all things
ABB's AFS contactors can be easily integrated in machine manufacturer's systems complying with main safety standards EN ISO 13849 and EN 62061 guaranteeing the safe use of your machinery and equipment.
The AFS contactor range is an integral part of ABB's comprehensive range of safety products.

Continuous operation

Secure uptime
The AFS contactor secures system uptime. It allows direct control by relay outputs of safety PLCs and safety relays to ensure the safety performance customers require.
A low energy auxiliary contact guarantees system status feedback.

Speed up your projects

Simplify design
Perfect design makes integration easier. ABB's distinctive yellow auxiliary contact block makes identifying the right product quicker.
By reducing the contactor coil's power consumption, panels can also be made smaller and transformers more compact. In addition, all the safety data for the contactors are readily available using safety design tools.

Note: Contact our nearest sales office for more information

Contactors and motor protection for rolling stock application

—

- AF..ZB/ AF..B / TAL/ AL Contactors
- NF..ZB Contactor relays
- Manual Motor Starters
- Thermal overload Relays

Distribution automation
Product offering

Voltage operated auxiliary relays
- CV2DJ - Single element, flush mounting with 2 contacts
- CV2D2J - Two element, flush mounting with 2 contacts
- P8nCH2J - Single element, flush mounting with 7 contacts
- P8nAHX - Single element, plug-in base mounting with 7 contacts
- PN8nCH2J - No volt relay with reverse flag, flush mounting with 7 contacts
- RXP8n - Single element, combiflex mounting with 7 contacts

Tripping relays
- PQ8nCH2J - High speed tripping relay, flush mounting with 7 contacts
- PQ5nCH2J - High speed tripping relay, flush mounting with 4 contacts
- PQ8nC2JW - High speed high burden tripping relay, flush mounting with 7 contacts
- PSU14n-2X - High speed tripping relay, electrically reset plug-in base with 14 contacts
- RXPQ8n - High speed tripping relay, combiflex mounting with 7 contacts
- RXPSU14n - High speed tripping relay, electrically reset combiflex mounting with 14 contacts

Bi-stable relays
- PSU6n-x - Bi-stable relay with electrically reset contacts, plug-in base with 6 contacts
- PSU14n-2x - Bi-stable relay with electrically reset contacts, plug-in base with 14 contacts
- RXPSU6n - Bi-stable relay with electrically reset contacts, combiflex with 6 contacts
- RXPSU14n - Bi-stable relay with electrically reset contacts, combiflex with 14 contacts

Timer
- NT10 - universal time delay relay, flush mounting

Monitoring relays
Trip circuit supervision relay
- TCS - Trip Circuit Supervision relay, flush mounting
- RXTCS - Trip Circuit Supervision relay, combiflex mounting

PT fuse fail supervision relay
- UVT92m - PT fuse fail supervision relay, flush mounting

Distribution automation
Product offering

Static / Numerical protective relays
Voltage relays
- VHXm22A - Single phase instantaneous AC under voltage relay, flush mounting
- VHXm22B - Single phase AC under voltage relay with built-in timer, flush mounting
- VHXm23A - Single phase instantaneous AC over voltage relay, flush mounting
- VHXm23B - Single phase AC over voltage relay with built-in timer, flush mounting
- UBX117C - Residual over voltage (Neutral displacement) relay, flush mounting

Circulating current relays
- IRXm - Single phase circulating current relay, flush mounting

The Relion® product family
605 series - for secondary and primary distribution applications
- REJ601 - Feeder protection
- REF601 - Feeder protection and control
- REJ603 - Self-powered feeder protection
- REM 601 - Motor protection and control

611 series - for distribution applications with pre-configured functionality
- REF611 - Feeder protection and control
- REM611 - Motor protection and control
- REB611 - Busbar protection and control

615 series - for distribution applications
- REF615 - Feeder protection and control
- REM615 - Motor protection and control
- RET615 -Transformer protection and control
- REU615 -Voltage protection and control
- RED615 -Line differential protection and control

620 series - for advanced distribution applications
- REF620 - Feeder protection and control
- REM620 - Motor protection and control
- RET620 - Transformer protection and control

630 series - for advanced distribution applications
- REF630 - Feeder protection and control
- REM630 - Motor protection and control
- RET630 -Transformer protection and control
- REG630 -Generator protection and control

Distribution automation
Product offering

Distribution automation solutions
COM600 - Station automation
COM600, is all-in-one station automation device that combines: a user interface solution, communication gateway and automation platform for utility and industrial distribution substations. Station automation COM600 helps to transfer all the vital information and data from the process and bay level to the higher level system and/ or to provide a central Human Machine Interface (HMI) as a focus for interaction between the substation and its operator.

PML630 - Load shedding controller
PML630 is a power management IED that introduces comprehensive load shedding functionality for industrial power systems. It provides disturbance-related blackout and power outage protection for industrial power plants. PML630 provides system level disturbance management for small and medium sized industrial power systems.
The PML630 supports three types of load-shedding functions, fast load shedding based on potential network contingencies, slow load shedding based on overloading the grid transformer or violating the maximum demand at the grid connection, manual load shedding based on operator initiated actions.

SUE3000 - High speed transfer device
The SUE 3000 High speed transfer device guarantees an optimum safeguarding of energy supply. The device ensures continued supply to the consumer through safely automatic transfer to a stand-by feeder and protects the subsidiary process from expensive stoppage time. Furthermore, through the possibility of manually-initiated transfers – for targeted clearings, for example – the operation of the installation is considerably simplified.

RIO600 - Remote I/O
- User-specific channel configuration by combining different modules
- Various available modules:
- Power supply module
- High and low version
- Communication module
- Binary input module - Eight optically isolated inputs
- Binary output module - Four binary outputs
- RTD / mA inputs module - Four RTD / mA inputs
- mA output module - Four mA outputs with 0-20 mA range

Arc Guard system
Technical features

Arc Guard System™ quickly detects an arc fault and trips the incoming circuit-breaker. Using light as the main trip criteria, Arc Guard System™ trips instantaneously. Thanks to this key functional advantage, it overrides all other protections and delays, which is crucial when reaction times need to be measured in milliseconds.

How it works
The system acts in three phases:

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Light passes through an optical sensor (Detection)

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The Arc monitor determines the intensity of light (Recognition)

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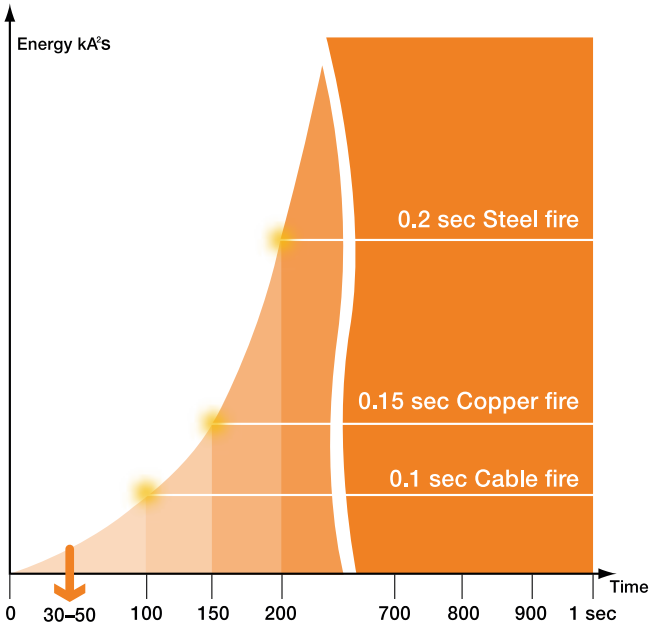
The Arc monitor sends signal to trip breaker (s) (Action)

Arc Faults
Short-circuit faults in LV and MV switchgears are often accompanied by an electric arc. An arc fault always leads to considerable damage to equipment and injury to personnel unless it is detected very quickly. To avoid serious damage and give the person involved a good chance of surviving the accident without severe injury, the fault should be disconnected as fast as possible, typicallyin less than 30-50 ms.



Total breaking time = ABB ArcGuard System™ + B reaker

Arc Monitor
With its modular concept, the Arc Monitor is designed to fit all types and sizes of low-and medium-voltage switchgears.

It is designed according to Functional Safety, and is SIL 2-certified according to IEC 61508 and IEC 62061 which puts full focus on reliability. This corresponds to performance level d according to EN ISO 13849-1. Safety functions are exclusively handled by hardware. In addition, the system, trip logs and user-interface are all microprocessor-monitored.

The system can be configured to trip selected breakers, depending on which sensor that detects the light. The DIP-switches that take care of this function also handle settings like auto-reset and Current Sensor Unit (See pages 12-13 for more details).

Energy is stored in the unit for operation up to 0.2 s if the supply voltage fails. This is sufficient to close the tripping circuit even if voltage disappears at a short-circuit fault.

Note: The circuit breaker still needs a back-up energy source for its tripping circuit.

Connections
All connections can be accssed from the front of the arc monitor. Pluggable terminal blocks allow electrical wiring before mounting TVOC-2 into the cabinet. The solid state tripping contacts are type IGBT, which guarantees fast and reliable tripping.

More details can be found on page 8, technical data.

HMI (Human Machine Interface)
- Handles settings with key-pad and full text display
- Holds error log and trip information after power loss
- Error log and trip log include time/ date stamp from a real-time clock
- TVOC-2 can handle two separate HMI:s (cabiner door and on product)
- Three-meter cable included

Sensor & Sensor modules
- Fiber-optic sensors nor affected by electrical noise
- Pre-calibrated sensors remove need for manual configuration
- Up to 30 detectors can be connected

Current Sensing Unit (optional)
The Current Sensing Unit (CSU) is an accessory needed only in those few specific applications where strong light is expected on a regular basis.

CSUs are connected with an optical fiber using light as signal for normal current. If this was removed by accident, the system would treat it as an over-current and trip if an arc flash is seen of reliability reasons.

Adding a CSU will result in an additional operating time depending on the size of the over current and the number of phases measured. Under normal conditions the time from over-current occurring to actuating optical output is in the region between 2 and 8 milliseconds.

HMI (Human Machine Interface)
3 IGBT solid state tripping contacts
2 change-over trip signal relays
1 change-over self supervision alarm relay (IRF)
2 current sensing unit inputs
1 current sensing unit output

Mounting alternatives
DIN-rail
Wall mounting

Optical detector inputs
1-10 Main unit X1
1-10 Extension module X2
1-10 Extension module X3

HMI
Can be mounted on door
IP 54
Additional HMI possible
User-friendly starts up meny

Pilot devices
Modular and compact

With two ranges, ABB can offer a solution to virtually any customer need.
The compact range is a high-quality extremely reliable solution in only one ordering code while the modular range lets you combine components to match your exact needs and also provides market leading electrical ratings.

Main benefits
- Long lifetime thanks to self-cleaning contacts
- Compact range provides extremely reliable IP66, IP67 and IP69K products in just one ordering code simplifying ordering and administration
- Reduce your installation size with compact range
- Select modular range and get flexible and adjustable products to meet your exact needs
- Unique snap-on design, for modular range, simplifies and quickens installation without the need for any tools.

Main features
- Compact range includes: pilot lights, pushbuttons, emergency stops, selector switch and machine stops and more
- Modular range includes: pilot lights, pushbuttons, emergency stops, selector switch, machine stops, joysticks, reset buttons, key operated selector switches, potentiometer and more
- High chemical resistance polycarbonate
- Operating range: -25 to +70.

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Pilot Devices Offering
ABB Pilot Devices offers both a Modular and compact Range of pushbutton. Both feature the same front-of-panel design and appear consistent when combined.

- The Modular Range, features a wide range of operators that can be combined with high flexibility. The unique snap-on design promotes simple and fast assembly.
- The Compact Range features an all-in-one construction and rugged design for added simplicity and ease of installation.

IP67 - IP69K
ABB's entire Compact Range, and selected devices from the Modular Range, are approved IP67 and IP69K. This means that the products are designed to withstand periodic submersion, as well as high pressure, high temperature spraydown.

Wiping Action
The Contact Blocks for both compact and modular devices feature self-cleaning contacts per a built-in wiping action. Upon operation, the moving contact rolls over and slides a sideways when touching the fixed contact. This feature ensures a good, clean contact even in applications of seldom or periodic use.

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IP69K: High pressure, high temperature spraydown at multiple angles and rotation.

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IP67: Submersion to one meter for 30 minutes.

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Pluggable interface relays

Slim relays CR-S

- Standard slim relays (5 mm), sockets (6.2 mm) and accessories
- Combination of 9 different rated control supply voltages possible:
  - DC versions: 5 V, 12 V, 24 V
  - AC/DC versions: 12 V, 24 V, 48 V, 60 V, 110 V, 230 V
- Output: 1 c/o (SPDT) contacts (6 A), standard and goldplated contacts
- Cadmium-free contact material
- All sockets with LED
- Screw and spring connection terminals
- Jumper bar (red, black, blue), marker and separator available as accessories

Pluggable miniature relays CR-M

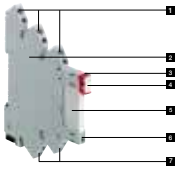
- 2 different coil voltages
  - DC versions: 12 V, 24 V, 48 V, 60 V, 110 V, 125 V, 220 V
  - AC versions: 24 V, 48 V, 110 V, 120 V, 230 V
- Output contacts
  - 2 c/o contacts (12 A) or
  - 3 c/o contacts (10 A) or
  - 4 c/o contacts (6 A)
- optionally equipped with gold contacts, LED and free wheeling diode
- Integrated test button for manual actuation and locking of the output contacts (blue = DC, orange = AC) that can be removed if necessary
- With or without integrated LED
- Logical or standard sockets
- Cadmium-free contact material
- Width on socket: 27 mm
- Pluggable function modules
  - Reverse polarity protection/Free wheeling diode
  - LED indication
  - RC elements
  - Overvoltage protection

Pluggable PCB relays CR-P

- 9 different coil voltages
  - DC versions: 12 V, 24 V, 48 V, 110 V
  - AC versions: 24 V, 48 V, 110 V, 120 V, 230 V
- Output contacts:
  - 1 c/o contact (16 A) or
  - 2 c/o contacts (8 A)
- optionally equipped with gold contacts
- Logical or standard sockets
- Cadmium-free contact material
- Width of socket: 15,5 mm
- Pluggable function modules
  - Reverse polarity protection/Free wheeling diode
  - LED indication
  - RC elements
  - Overvoltage protection

Pluggable PCB relays CR-MX

- 7 different coil voltages
  - DC versions: 12 V, 24 V, 48 V, 110 V
  - AC versions: 24 V, 110 V, 230 V
- Output: 2 c/o (SPDT) contacts (7A) or 4 c/o (SPDT) Contacts (5A)
  - Available with LED and without LED
  - Cadmium free contact material
  - Width on socket is 27mm (1.063 in)
  - Pluggable function modules available



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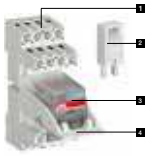

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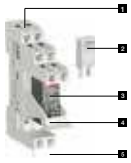

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Pluggable Interface Relays

CR-M Range

Type	CR-M012DC2	CR-M024DC2	CR-M048DC2	CR-M060DC2	CR-M110DC2	CR-M125DC2	CR-M220DC2	CR-M024AC2	CR-M048AC2	CR-M110AC2	CR-M120AC2	CR-M230AC2	CR-M012DC3	CR-M024DC3	CR-M048DC3	CR-M060DC3	CR-MD110DC3	CR-M125DC3	CR-M220DC3	CR-M024AC3	CR-M048AC3	CR-M060AC3	CR-M110AC3	CR-M120AC3	CR-M230AC3	CR-M012DC4	CR-M024DC4	CR-M048DC4	CR-M060DC4	CR-MD110DC4	CR-M125DC4	CR-M220DC4	CR-M024AC4	CR-M048AC4	CR-M110AC4	CR-M120AC4	CR-M230AC4	CR-M012DC2L	CR-M024DC2L	CR-M048DC2L	CR-M060DC2L	CR-M110DC2L	CR-M125DC2	CR-M220DC2L
Input voltage																																												
12 V DC	■												■													■												■							
24 V DC		■												■													■												■						
48 V DC			■												■													■												■					
60 V DC				■												■													■												■				
110 V DC					■												■													■												■			
125 V DC						■												■													■												■		
220 V DC							■												■													■												■
24 V AC								■												■													■											
48 V AC									■												■													■										
60 V AC																						■													■									
110 V AC										■													■													■								
120 V AC											■													■													■							
230 V AC												■													■													■						
Output rating																																													
250 V 16 A																																												
250 V 8 A																																												
250 V 12 A	■	■	■	■	■	■	■	■	■	■	■	■																											■	■	■	■	■	■	■
250 V 10 A													■	■	■	■	■	■	■	■	■	■	■																					
250 V 6 A																									■	■	■	■	■	■	■	■	■	■	■	■								
Output contacts																																												
c/o	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2
Gold contact																																												
LED																																							■	■	■	■	■	■	■
Free-wheeling Diode																																												

Accessories – Sockets CR-M

Type	Version	Connection terminal	Order code
CR-M2LS	Logical socket for 2 c/o	Screw	1SVR405651R1100
CR-M3LS	Logical socket for 3 c/o		1SVR405651R2100
CR-M4LS	Logical socket for 2/4 c/o		1SVR405651R3100
CR-M2LC	Logical socket for 2 c/o	Spring connection	1SVR405651R1200
CR-M4LC	Logical socket for 2/4 c/o		1SVR405651R3200
CR-M2SS	Standard socket for 2 c/o	Screw	1SVR405651R11000
CR-M3SS	Standard socket for 3 c/o		1SVR405651R12000
CR-M4SS	Standard socket for 2/4 c/o		1SVR405651R13000
CR-M2SF	Standard socket for 2 c/o	Fork type	1SVR405651R1300
CR-M4SF	Standard socket for 2/4 c/o		1SVR405651R3300

Socket accessories		
CR-MH	Plastic holder	1SVR405659R1000
CR-MH1	Metal holder	1SVR405659R1100
CR-MJ	Jumper bar for sockets with screw connection	1SVR405658R6000
Markars		
CR-M	Marker	1SVR405658R1000

	■		2				■									■									CR-M024AC2L
	■		2				■								■										CR-M048AC2L
	■		2				■						■												CR-M110AC2L
	■		2				■					■													CR-M120AC2L
	■		2				■				■														CR-M230AC2L
	■		3																				■		CR-M012DC3L
	■		3			■																■			CR-M024DC3L
	■		3			■															■				CR-M048DC3L
	■		3			■														■					CR-M060DC3L
	■		3			■													■						CR-MD110DC3L
	■		3			■												■							CR-M125DC3L
	■		3			■											■								CR-M220DC3L
	■		3			■										■									CR-M024AC3
	■		3			■									■										CR-M048AC3L
	■		3			■							■												CR-M110AC3L
	■		3			■						■													CR-M120AC3L
	■		3			■					■														CR-M230AC3L
	■		4			■																	■		CR-M012DC4L
	■		4			■																■			CR-M024DC4L
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	■		4			■																■			CR-M024DC4LG
	■		4			■																■			CR-M024DC4G
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		4				■							■												CR-M110AC4G
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	■	4				■										■									CR-M024AC4LG
	■	4				■									■										CR-M048AC4LG
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	■	4				■																■			CR-M024DC4LDG

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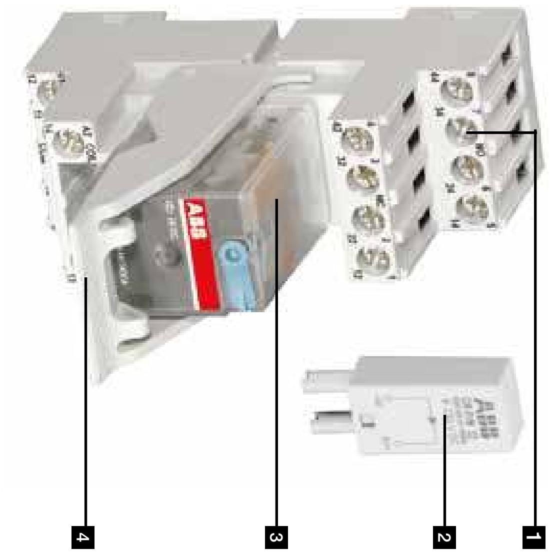


1 Socket
2 Pluggable function module
3 Interface relay
4 Holder

Electronic timers
Technical features

	CT-D range		CT-E range			CT-S range
Timing function	**Multi-functional**	**Single-functional**	**Multi-functional**	**Single-functional**	**Single-functional**	**Single-functional**
ON -delay	CT-MFD	CT-ERD	CT-MFE, CT-MKE	CT-ERE, CT-EKE	CT-MVS, CT-MFS, CT-MBS, CT-WBS	CT-ERS
OFF -delay	CT-MFD	CT-AHD	CT-MFE	CT-AHE, CT-ARE, CT-AKE	CT-MVS, CT-MFS, CT-MBS	CT-APS, CT-AHS, CT-ARS
ON - and OFF -delay					CT-MVS, CT-MXS CT-MFS, CT-MBS	
Impulse-ON	CT-MFD	CT-VWD	CT-MFE, CT-MKE	CT-VWE	CT-MVS, CT-MFS, CT-MBS, CT-WBS	
Impulse-OFF	CT-MFD			CT-AWE	CT-MVS, CT-MFS, CT-MBS	
Impulse-ON - and OFF					CT-MXS	
Flasher starting with ON	CT-MFD	CT-EBD	CT-MFE, CT-MKE		CT-MFS, CT-MBS, CT-WBS	
Flasher starting with OFF ONOFF	CT-MFD		CT-MFE, CT-MKE	CT-EBE	CT-MFS, CT-MBS, CT-WBS	
Flasher starting with ON or OFF					CT-MVS	
Pulse generator starting with ON or OFF		CT-TGD			CT-MXS	
Pulse former	CT-MFD		CT-MFE		CT-MFS, CT-MVS, CT-MBS CT-MBS	
Star delta change - over		CT-SDD CT-SAD				CT-SDS
Star delta change - over with impulse				CT-SDE	CT-MVS, 2x, CT-MFS, CT-MBS	
Star delta change - over twice ON-delay				CT-YDE		
Further functions (depending on device)					CT-MVS, CT-MXS, CT-MFS, CT-MBS CT-WBS	

Technical data (extract)			
Time ranges	7 (0.05 s - 100h) CT-SDD, CT-SAD: 4(0.05 s - 100h min)	Multifunction device: 8 (0.05 s - 100h) Single-function device: 5 single ranges (0.05-1 s , 0.1-10 s, 0.3-30 s, 0.3-300, 0.3-300 min)	810(0.05 s - 300h) CT-ARS, CT-SDS: 7 (0.05 s - 10 min)
Control supply voltage	Wide and multi ranges	Wide ranges / Single and dual ranges	Wide, multiand single ranges
Type ranges	1 or 2 c/o contacts CT-SDD, CT-SAD: 2 n/o contacts	1 c/o contact CT-SDE: 1 n/o contact and 1 n/c contact CT-MKE, CT-EKE, CT-AKE: 1 tyristor	1 or 2 c/o contact CT-MVS.21, CT-MFS, CT-MBS: 2ND c/o contactselectable as inst. contact
Control inputs	Voltage- related triggering, polarized, capable of switching a parallel load	Voltage- related triggering, polarized CT-MFE, CT-AHE, CT-AWE: with auxiliary voltage	Voltage- related triggering, non polarized, capable of switching a parallel load CT-MFS, CT-MBS, CT-AHS: volt-free triggering

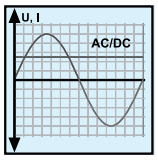
Measuring and monitoring relays
Monitoring features and application ranges

Single-phase current and voltage monitoring
- Over- or undercurrent monitoring CM-SRS and CM-SRS. M
- Over- and undercurrent monitoring CM-SFS
- Over- or undervoltage monitoring CM-ESS and CM-ESS.M
- Over- and undervoltage monitoring CM-EFS

Current monitoring
- Monitoring of motor current consumption
- Monitoring of lighting installations and heating circuits
- Monitoring of hoisting gear and transportation equipment overload
- Monitoring of locking devices, electromechanical brake gear and locked rotor

Voltage monitoring
- Speed monitoring of DC motors
- Monitoring of battery voltages and other supply networks
- Monitoring of upper and lower voltage threshold values

Insulation monitoring
- For electrically isolated AC systems: CM-IWS.2
- For electrically isolated AC, DC and mixed AC/DC systems: CM-IWS.1, CM-IWN.1 and especially for solar applications:
  ≤ 1000 µF: CM-IWM.10
  ≤ 3000 µF: CM-IWM.11
- Monitoring of electrically isolated supply mains for insulation resistance failure
- Detection of initial faults
- Protection against earth faults



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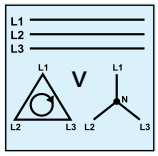

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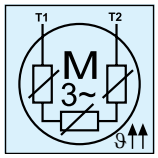

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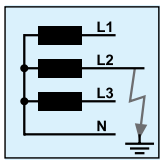

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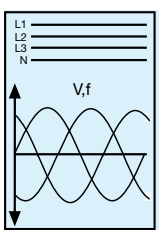


— 05

Three-phase monitoring
- Phase failure CM-PBE
- Over- and undervoltage CM-PVE
- Phase sequence and phase failure CM-PFE and CM-PFS
- Phase sequence and phase failure, over- and undervoltage CM-PSS.xx and CM-PVS.xx
- Phase sequence and phase failure, unbalance CM-PAS.xx
- Phase sequence and phase failure, unbalance, over- and undervoltage CM-MPS.xx and CM-MPN.xx
- Over- and undervoltage, over- and underfrequency CM-UFD

Three-phase voltage monitoring
- Voltage monitoring of mobile three-phase equipment
- Protection of personnel and installations against phase reversal
- Monitoring of the supply voltage to machines and installations
- Protection of equipment against damage caused by unstable supply voltage
- Switching to emergency or auxiliary supply
- Protection of motors against damage caused by unbalanced phase voltages and phase loss
- Automatic connection & disconnection of decentralised power stations to the grid

Grid feeding monitoring relays
The CM-UFx range monitors all voltage and frequency parameters in a grid and ensures the safe feeding of decentral produced eletrical energy into the grid.
- Monitoring of the voltage with up to 2 thresholds for overand undervoltage
- Monitoring of the frequency with up to 2 thresholds for over- and underfrequency
- Optional ROCOF (rate of change of frequency) and vector shift
- Acc. to national grid feeding standards such as CEI 0-21, VDE AR-N 4105 etc.

Thermistor motor protection
CM-MSS provide full protection of motors with integrated PTC resistor sensors.
- Protection of motors against thermal overload, e. g. caused by insufficient cooling, heavy load starting conditions, undersized motors, etc.

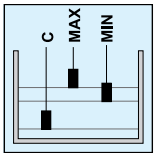
Measuring and monitoring relays

Monitoring features and application ranges

—
01 CM-N range: Multifunctional
—
02 CM-S range
—
03 CM-E range

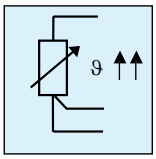
Liquid level monitoring and control
CM-ENE, CM-ENS for control and regulation of liquid levels and ratios of mixtures of conductive fluids.

- Protection of pumps against dry running
- Protection against container overflow
- Control of liquid levels
- Detection of leaks
- Control of mixing ratios



Temperature monitoring
Acquisition, messaging and regulation of temperatures of solid, liquid and gaseous media in processes and machines

- with CM-TCS via PT100 sensor
- with C512 and C513 with PT100, PT1000 KTY83, KTY84 or NTC sensors
- Motor and system protection
- Control panel temperature monitoring
- Frost monitoring
- Temperature limits for process variables, e.g. in the packing or electroplating industry
- Control of systems and machines like heating, air-conditioning and ventilation systems, solar collectors, heat pumps or hot water supply systems
- Monitoring of servomotors with KTY sensors
- Bearing and gear oil monitoring
- Coolant monitoring



Benefits and advantages

CM-N range: Multifunctional

- 45 mm wide housing
- Output contacts: 2 c/o (SPDT) contacts
- Continuous voltage range (24-240 V AC/DC) or single-supply
- Setting and operation via front-face operating controls
- Adjustment of threshold values and switching hysteresis via direct reading scale
- Adjustable time delays
- I ntegrated and snap-fitted front-face marker label
- Sealable transparent cover (accessory)

—
01

CM-S range:
Universal and multifunctional

- Only 22.5 mm wide housing
- Output contacts: 1 or 2 c/o (SPDT) contacts
- One supply voltage range or supplied by measuring circuit
- Setting and operation via front-face operating controls
- Adjustment of threshold values and switching hysteresis via direct reading scale
- I ntegrated and snap-fitted front-face marker
- Snap-on housing: The relays can be placed on a DIN rail tool-free - just snap it on or remove it tool-free
- Sealable transparent cover (accessory)

—
02

CM-E range: Economy

- Only 22.5 mm wide housing
- Output contacts: 1 c/o contact or 1 n/o contact
- One supply voltage range
- One monitoring function
- Cost-efficient solution for OEM applications
- Preset monitoring ranges

—
03

Analog Signal Converter
Benefits and Advantages

Nowadays various types of data transmission and interfaces are used in processes. Nearly every process includes a control system that receives data either by means of analog signals or by data transmission. The data is then evaluated and the appropriate parameters are set. A reliable process control essentially depends on the faultless, untroubled and secure transmission and processing of these analog signals. There may however, arise numerous problems which can disturb or even block an ideal process sequence. ABB's range of analog signal converters are ideally suited when existing electrical or physical values have to be converted into proportional standard signals or relay threshold signals.
The serial data converters from ABB allow the establishment of a communication between units with different communication standards.
In order to assure the process continuity, existing systems consistently have to be updated or connected to new devices. If the communication standard of the existing system and the connected device are different, serial data converters make the establishment of the communication possible.

Besides the conversion of signals, analog signal converters and serial data converters are suited for the amplification, filtering or separation of analog signals.

Analog Signal Converters
They are ideally suited to the requirements of measuring and processing electrical and physical values.

Conversion, measurement and isolation of:
- Standard signals (0 - 10 V, 4 - 20 mA, etc.)
- Temperature signals of RTD sensors like PT 10, PT 100, PT 1000
- Temperature signals of thermocouples like TC.K, TC.J, TC.T, TC.S, TC.E, TC.N, TC.R., TC.B
- Measurement of current and voltage signals

CC - E product range for analog signal processing
- Universally configurable devices and single-function devices
- Adjustment and operating elements on the front side
- Safe operation by electrical 3-way isolation (2.5 kV)
- Unambiguous and clear connecting terminal markings

CC - U product range for analog signal processing
- 8 different standard signal outputs on one device
- Input and output side universally configurable
- Also available with 2 threshold relay outputs
- Adjustment and operating elements on the front side
- Safe operation by electrical 3-way isolation (1.5 kV)
- Plug-in connecting terminals

Switch mode power supplies
CP Range

The CP range offers newest technology in a compact construction of power supplies.

Characteristics of the CP-D range of power supplies
- Output voltages 12 V, 24 V DC
- Adjustable output voltages (devices > 10 W)
- Output currents 0.42 A / 0.83 A / 1.3 A / 2.1 A / 2.5 A / 4.2 A
- Power range 10 W, 30 W, 60 W, 100 W
- Wide range input 100-240 V AC (90-264 V AC, 120-370 V DC)
- High efficiency of up to 89 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -25 ...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- U/I characteristic (fold-forward behaviour at overload - no switch-off)
- LEDs for status indication
- Light-grey enclosure in RAL 7035

Characteristics of the CP-E range of power supplies
- Output voltage 5 V, 12 V, 24 V, 48 V DC
- Adjustable output voltages
- Output current 0.625 A / 0.75 A / 1.25 A / 2.5 A / 3 A / 5 A / 10 A / 20 A
- Power range 18 W, 30 W, 60 W, 120 W, 240 W, 480 W
- Wide range input or auto select input
- High efficiency of up to 90%
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -25...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- U/I characteristic curve on devices < 18 W (fold-forward behaviour at overload – no shutdown)
- Redundancy units offering true redundancy
- LED(s) for status indication
- Signalling output/contact for output voltage OK

Characteristics of the CP-T range of power supplies
- Output voltage 24 V or 48 V DC
- Output voltage adjustable via front-face rotary potentiometer "OUTPUT Adjust"
- Rated output current 5 A / 10 A/ 20 A / 40 A
- Rated output power 120 W / 240 W / 480 W / 960 W
- Supply range 3 x 400-500 V AC (3 x 340-575 V AC, 480-820 V DC)
- Two-phase supply with a derating of the output to 75% possible/permitted
- Typical efficiency of 89%
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -25...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- Redundancy unit CP-A RU offering true redundancy, available as accessory
- Signalling contact "13-14" (Relay) for output voltage OK

Characteristics of CP-C.1 Range of power supply
- Rated output voltage 24 V DC
- Power reserve design delivers up to 150 % at Ta ≤ 40 °C
- Output voltage adjustable via front-face rotary potentiometer “OUTPUT Adjust”, 22.5-28.5 V
- Input voltage range 100-240 V AC, 90-300 V DC
- High efficiency
- Low power dissipation and low heating
- Free convection cooling (no forced cooling)
- Ambient temperature range during operation -25...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- DC OK - signaling output “13-14” (Relay), Power reserve signaling output “I > IR (Transistor) Redundancy unit CP-A RU offering true redundancy, available as accessory

Switch mode power supplies

CP Range - Single phase

		Single phase																					
		CP-D						CP-E													CP-C.1		
Rated output voltage	5 V DC							■															
	12 V DC	■	■						■	■													
	24 V DC			■	■	■	■				■	■	■	■	■	■					■	■	■
	48 V DC																■	■	■	■			
Rated output current	0.42 A			■																			
	0.625 A																■						
	0.75 A										■												
	0.83 A	■																					
	1.25 A											■						■					
	1.3 A				■																		
	2.1 A		■																				
	2.5 A					■			■				■										
	3 A							■															
	4.2 A						■																
	5 A													■					■		■		
	10 A									■					■					■		■	
	20 A															■							■
Rated output power	10 W	■		■																			
	15 W							■															
	18 W										■												
	30 W		■		■				■			■					■						
	60 W					■							■					■					
	100 W						■																
	120 W									■				■							■		
	240 W														■				■			■	
	480 W															■				■			■
Rated input voltage	100 - 240 V AC	■	■	■	■	■	■	■	■		■	■	■				■	■					
	115/230 V AC auto select									■				■	■				■				
	115 - 230 V AC															■				■			
	110 - 240 V AC																				■	■	■
	110 - 120 V AC																						
	220 - 240 V AC																						
DC input voltage range	120 - 370 V DC	■	■	■	■	■	■	■			■					■				■			
	90 - 375 V DC								■			■	■				■	■					
	210 - 370 V DC									■				■	■				■				
	90 - 300 V DC																				■	■	■
Features	Power reserve design																				■	■	■
	Adjustable output voltage		■		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Integrated input fuse	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Short circuit stable	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Fold forward behavior (U/I)	■	■	■	■	■	■		■	■		■	■	■	■	■	■	■	■	■	■	■	■
	Fold back ehavior (hiccup)							■			■												
	Power factor correction									pas				pas	pas	pas			pas	act	act	act	act
	Ambient temp. rating -25°C (-40°C) to 70°C	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Parallel connection							■	■	3	■	■	■	3	3	3	■	■	3	3	5	5	5
	Serial connection	■	■	■	■	■	■	■	■	2	■	■	■	2	2	2	■	■	2	2	■	■	■

Switch mode power supplies

CP Range - Three phase

		Order number	1SVR427054R0000	1SVR427055R0000	1SVR427056R0000	1SVR427057R0000	1SVR427054R2000	1SVR427055R2000	1SVR427056R2000
			Three phase						
			CP-T						
Rated output voltage	24 V DC		■	■	■	■			
	30.5 V DC								
	48 V DC						■	■	■
Rated output current	2.8 A								
	3 A								
	5 A		■				■		
	8 A								
	10 A			■				■	
	20 A				■				■
	40 A					■			
Rated output power	85 W								
	120 W		■						
	122 W								
	240 W			■			■		
	244 W								
	480 W				■			■	
	960 W					■			■
Rated input voltage	85-132 V AC, 184-264 V AC								
	3 x 400 - 800 V AC		■	■	■	■	■	■	■
DC input voltage range	18-32.4 V DC								
	480 - 820 V DC		■	■	■	■	■	■	■
Features	Adjustable output voltage		■	■	■	■	■	■	■
	Integrated input fuse		■	■	■	■	■	■	■
	Short circuit stable		■	■	■	■	■	■	■
	Fold forward behavior (U/I)		■	■	■		■	■	
	Fold back behavior (hiccup)		■	■	■	■	■	■	■
	Power factor correction								
	Ambient temp. rating -25°C (-40°C) to 70°C		■	■	■	■	■	■	■
	Serial connection			2	2	2	2	2	2
	Suited for AS-Interfaces								

Accessories

Accessories CP-Range

[redacted]	[redacted]	Order number
CP-D RU	Redundancy module for CP-D range	1SVR427049R0000
CP-RUD	Redundancy module ≤ 35 V; ≤ 5A	1SVR423418R9000
CP-A RU	Redundancy module≤ 40 V; ≥ 5A	1SVR427071R0000

MNS - Modular low voltage switchgear system

ABB is the global leader for low voltage switchgear with over 1.4 million MNS cubicles delivered worldwide since the inception of this system in 1973. ABB's history in switchgear can be traced back even further, to the 1890's when we first manufactured switchgear systems in Sweden.

The ABB MNS system is a low voltage switchgear assembly. Its design is verified in accordance with IEC 61439-1/-2. The consistent application of the modular principle both in electrical and mechanical design as well as the use of standardized components allows its flexible and compact design. Depending on operating and environmental conditions different design levels are available.

MNS switchboard enclosure is made of sheet steel protected by galvanic coating and powder coating for maximum durability. The fixing of the enclosure with respect to doors, roof plates, rear and side walls is achieved with thread forming screws. Final construction varies depending upon the required degree of protection.

MNS cubicles can be arranged as follows:
1. Free standing
2. Back-to-Back
3. Duplex.

Technical Data		
Standards	Low Voltage Switchgear and Controlgear Assemblies	IEC 61439-1/-2
Test certificates	ASTA, Great-Britain (resist. to accidental arcs acc. to IEC 61641 and IEC 60298, Appendix AA) CPRI Bangalore, ERDA Vadodara	
Electrical data	Rated insulation voltage Ui Rated operating voltage Ue Rated impulse withstand voltage Uimp Overvoltage category Degree of pollution Rated frequency	1000 V 3~, 1500 V- ** 690 V 3~, 750 V-** 6 / 8 / 12 kV ** II / III / IV ** 3 Upto 60 Hz
Rated Current	Rated current Ie Rated peak withstand current Ipk Rated short-time withstand current Icw	up to 6300 A up to 250 kA up to 100 kA
Arc Fault Containment	Rated operational voltage Prospective short-circuit current Duration Criteria (IEC 61641)	690 V up to 100 kA 300 ms 1 to 7

** Depending on the electrical equipment

Safety:
MNS offers the highest standard safety level available in the market
today. Notable aspects are:

- The MNS arc free zone comprises the vertical distribution bars and the power contact to the short circuit protection device.
- Active and passive arc fault prevention tested according to IEC 61641
- To ensure the arc is limited to the defined area, gas tight seals are used between main busbar system & equipment compartment
- Embedded vertical distribution bars guarantee superior phase segregation, creepage distance and increased safety.

Reliability:
The constructional aspects of the MNS platform have remained the same throughout the product evolution. This enables extensions and retrofit throughout the installed base. Close to 1.5 million MNS sections have been delivered so far, and over 80 percent of these remain in operation, this demonstrates the reliability offered by MNS.

- Maintenance free busbars and mechanical structure helps to reduce cost.
- The main power contact is that of turn-able construction, de-coupling cable stress and elimination hot spots.

Flexibility:
The MNS modular design forms the basis of the system flexibility. The aspect also provides the ability to combine solutions from the entire ABB low voltage product range. These products are integrated in close co-ordination with the associated product development team which provides increased performance for MNS and ensure the full requirement of the IEC61439 are met.

- Fixed, Plug-in and withdrawable motor starters, energy distribution, variable speed drives, soft starters and power factor correction can be configured in the same vertical section.
- MNS easily meets the harsh / extreme environments.

Ease of doing Business:
Our customers deal directly with an ABB single point of contact.

Worldwide sales & service support network with more than 30 countries located globally. True Global supplier & Global quality product with local point of contact.

Ease of Maintenance:
Customer benefit from a tailor made service strategy to meet their demands. This coupled with a standardized design can reduce spares inventory. With Maintenance free frame construction reduces the frequent or periodic maintenance activity on the MNS switchgear increasing the Plant availability.

These 5 essentials, safety, flexibility, reliability, ease of doing business and ease of maintenance, establish ABB's basis of solutions for today's challenging business environment.

Engineered installation products
Protection, connection and wire management

At ABB, our focus is on impr oving your business performance by providing practical, reliable electrical products & services. To connect & protect for life. To solve everyday problems in the area's of Wire & Cable Management, Cable Protection, Power Connection & Control and Safety.

Our extensive engineering, supply chain management and technical sales support teams are committed to understanding everything that impacts your ability to accomplish your business objectives by reducing your total cost of ownership.

Whether you are designing, installing, operating, maintaining or owning an office building, off-shore platform, hospital, or a high speed train, power generating plant, machine equipment or a manufacturing facility, ABB engineered products fit and function in your application while providing superior performance, sustainability, and value throughout the project life cycle.

All our brands are built upon four pr oduct & service solution platforms. Platforms that address you or your customers' critical electrical & lighting needs covering the pr otection of data, energy, processes, assets and personal safety.

Beyond high performance application characteristics, ABB products, information and services facilitate and speed up your time critical assembly, installation or maintenance process:

Wire management and connection

Cable ties

- Right cable tie for the right application
- Ty-Rap® high performance
- Ty-Met® stainless steel cable ties
- Ty-Fast® cable ties
- Twist-Tail® cable ties: install without fastening tools
- Temperature withstand upto 150oC
- Tensile strength upto 4005N
- Spec-Kon® for control panel application

Strut systems - Superstrut (USA/Canada)

Superstrut® offers the installer a complete 1-5/8" metal framing system that yields a consistent finish for the channel, fittings and accessories every time. Superstrut offers a wide range of finishes to ensure your system will withstand the harshest environments.

Cabletray

Complete range of cable tray systems, including perforated tray, cable ladder, channel tray and strut (metal framing). Combining local manufacture and distribution with an extensive product range, our different facilities ensure we can effectively support customer demand and respond rapidly to project timelines for all types of installation across regions.

Ladder cable tray

Light, strong and exceedingly quick to install, SpeedTray® cable runways are preferred for such applications as cell phone networks, railway signal sheds, community area television, and are favored by cabling contractors and electrical contractors.

Perforated cable tray

ABB perforated tray is a durable and cost effective solution for supporting cable, which is easy to install, modify and maintain. Suitable for a wide variety of industries and installations, T&B perforated tray offers the sure choice for high quality, high performance cable management.

Wire management and connection

Heatshrink technology.
Identification, protection & repair

- Protection, Repair, Identification (colors), Isolation
- 3 wall thicknesses | thin, medium, double
- Heat & radiation protective | Polyolefin material
- Options | with or without adhesion; By length or reel
- Insulation | of wire terminations, joints, connections (Medium & Thick walls)
- End caps | for protection against liquid and dirt
- Insulation, bundling, identification, strain relief
- Flexible product with rapid shrinkage for effective electrical insulation
- Shrink ratios: 2:1 – 3:1and 4:1
- Available in different colours
- Green Yellow Stripped for identifying and marking earth connectors and cables
- Special material Kynar®: very high resistance to solvents
- Special material Viton®: good oil and fuel resistance

Spec-Kon® metric wire terminals
Easier installation, a better connection

Complete range of metric terminals

- Our range contains over 700 articles of non-insulated and insulated wire terminals

Safety & long term reliability

- Longer, funneled barrels, tin plated electrolytic copper, butted or welded seams -> for easier installation and reliable termination
- All terminals are made of electrolytic copper, have butted or brazed (non-insulated, DIN heat-shrink) seams, to provide both safety and long term reliability
- Certifications: ROHS compliance, REACH

Available:

- Non-insulated and insulated nylon, vinyl and polycarbonate terminals
- Terminal types: male and female disconnects, rings, forks, pins, blades, butt splices and bullet connectors
- Funnel entry, internal serrations, insulation grip (nylon), proper identification
- Special terminals: “easy entry” (vinyl insulated), “heat-shrink”, “double crimp” (nylon)
- Standard hand & stripping tools

Wire management and connection

Color-Keyed® metric compression connectors More copper, better crimp = more reliable connection

Solid, homogenous connection

- Special system utilizing compression tools with matching dies that forms connector & wire to provide an optimum electrical bond between connector & conductor. Our Color-Keyed lugs are made of 99.9% pure, oxygen free copper.

Assured high conductivity, exceeding IEC 61238

- Circumferential compression creates a large area of high pressure contact between cable and connector which in turn result in low resistance and high pull-out values. Tested to IEC 61238-1 type A

Available lugs:

- Straight 1 hole / 2 hole : wire sizes from 10 - 400mm² with metric bolt hole from M5 to M24 45°: wire sizes from 10mm² till 240mm² with metric bolt hole from M6 to M1690°: wire sizes from 10mm² till 240mm² with metric bolt hole from M6 to M16.

DragonTooth®
connectors. For magnet wires

- Developed for magnet wires with varnish insulator
- Uninsulated copper terminals, with tin plating
- Principle: hardened teeth pierce insulating varnish and penetrates into conductive copper
- No need to remove varnish with costly traditional methods: scratching, brushing, burning, dissolving

Wiring duct
Manage your cable and wires efficiently

- Slotted Wiring Duct (PVC & Halogen-Free)
- Height 17 - 30 - 40 - 60 - 80 - 100 mm
- Width 15 - 25 - 40 - 60 - 80 - 100 - 120 - 150 mm
- Length 2 meters, 56 part numbers
- Slots Narrow (4 mm), Wide (8 mm)
- Specs: Color: Grey RAL 7030. Raw material: Ca-Zn stabilized PVC, Pb-free and RoHS compliant

Wiring Duct with circular knockouts

- Dimensions: 50 x 50 mm and 100 x 60 mm
- 2 m standard length, 2 part numbers
- Circular knockouts to facilitate branch connections using rigid and corrugated conduits
- Specs: Color: grey RAL 7030, UL94 V0 (self-extinguishing)
- Ideal in applications where cables require greater protection against external agents (e.g. in the elevator well)

Ty-Rap®

Detectable ties
- Detectable with metal detectors, X-Ray equipment
- Help achieve the HACCP EU directive
- Bright blue color also helps visual detection
- Nylon (Polyamide) version with metal particles
- Polypropylene version with particles of metal: which is floating + has increased resistance to chemicals / acidity

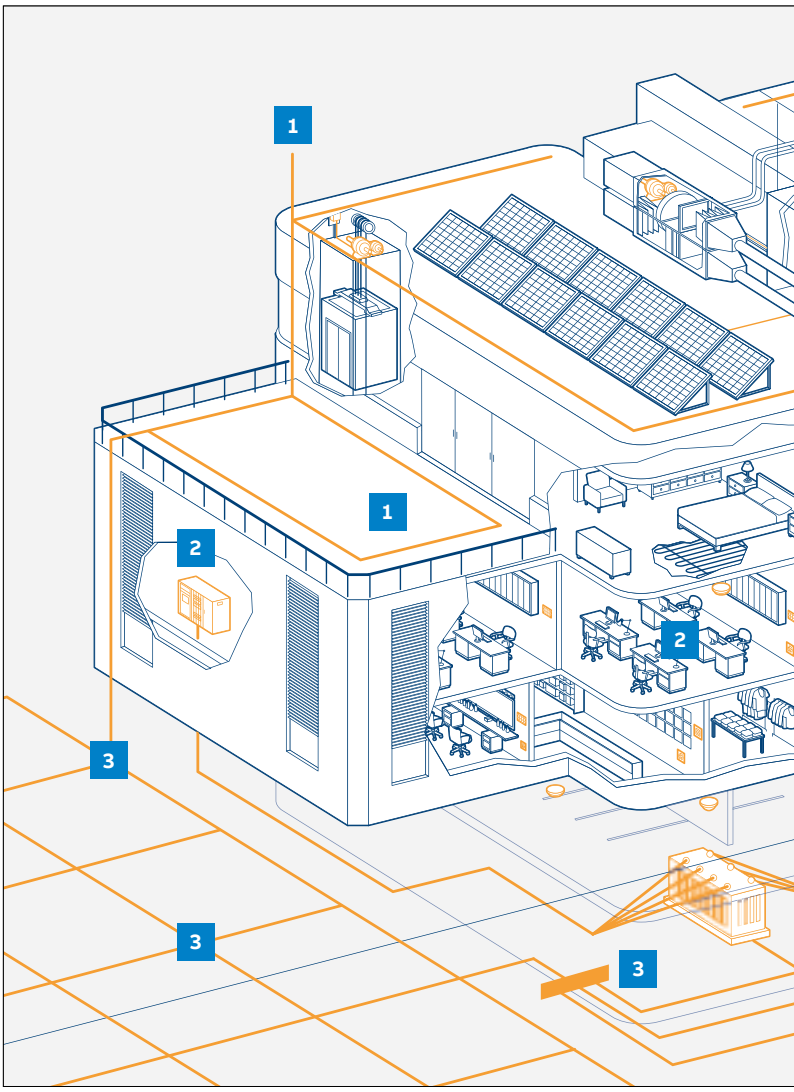
Special cable ties for extreme conditions
- **Polypropylene:** increased chemical resistance
- **Fluoropolymer (ETFE)** for extreme applications:
  - resistant to radiation: nuclear plants
  - to very low pressure/vacuum: aerospace
  - to high temperature (+150°C) and chemicals
- Fluoropolymer (ECTFE) for extreme
  - applications with low smoke requirements

Ty-Rap® cable ties
UV-resistant and flame retardant for rail applications
- **“Grip of Steel” Non-Magnetic Stainless Steel locking Barb – marine grade type 316**
- **Rounded edges to prevent sharp edges from damaging cables**
- **Smooth, notchless body, making the cable ties stronger**
- **Ribbed and Stippled surface to prevent the tie from slipping under vibration conditions and external shock**
- **UV-resistant and flame retardant Ty-Rap® cable ties are certified to the latest standard for the train industry:**
- **NFF 16-101 standard, EN 45545-2**
- **Different dimensions up to a tensile strength of 540N**

1. Structural lightning protection

From Furse air termination systems including air rods and strike plates to capture lightning strikes, through to our comprehensive range of down conductors and lightning protection components which channel lightning energy safely to a Furse earth termination network.

Including:
- Air termination systems
- Lightning protection conductors
- Conductor clips, clamps & holdfasts
- Bimetallic connection components

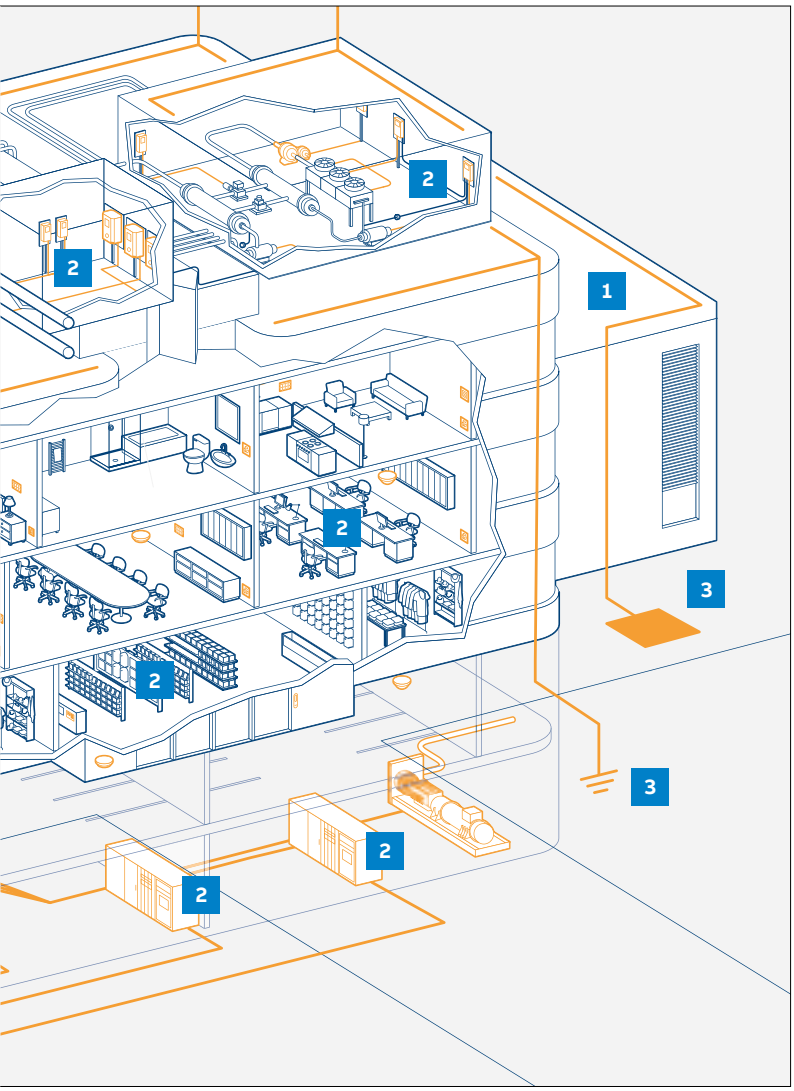


1 Structural lightning protection | 2 Electronic systems protection | 3 Earthing

2. Electronic systems protection

Our extensive range of equipotential bonding and transient overvoltage Surge Protection Devices (SPDs) providing fully coordinated protection against transient overvoltages. SPDs are able to cover all incoming and outgoing metallic service lines including power, data, signal and telecoms.

Including:
- Lightning equipotential bonding SPDs
- Mains power transient overvoltage SPDs
- Data, signal & telecommunication lines SPDs
- DC power & photovoltaic system SPDs



3. Earthing

The combination of Furse earth electrodes, clamps, conductors and equipotential bonding bars which provide lightning and transient overvoltage energy with an effective, low resistance route from lightning protection system to earth.

Including:

- Earth rods & conductor systems
- Mechanical earth clamps & bonds
- FurseWELD exothermic welding
- Earth bars & equipotential bonding

4. Design and technical support

Furse technical design teams ensure all designs for lightning protection, earthing and transient overvoltage protection meet relevant National and International standards, whilst our sales engineers provide key updates on lightning protection matters.

Including:

- Lightning protection system design
- Site surveys & earthing analysis
- Lightning protection seminars & training
- Technical guides & StrikeRisk software

Flexible Conduit Systems
Adaptaflex

- Metallic & non-metallic conduit fittings.
- Provide excellent flexing and fatigue life in extreme operating temperature ranges.
- Extreme resistance to lubricants and corrosive chemicals.
- A system to provide the physical protection of electrical cables – power, data and signal.
  - Assists with routing and installation of cables.
  - Conduit systems provide 3 single or combinations of protection type.
  - Mechanical e.g.. compression, tensile, abrasion,
  - Chemical e.g.. water, oil, acid, other chemicals
  - Environmental e.g.. Fire, Heat, UV

Adaptaflex flexible conduit systems are used to protect critical power and data cabling are available throughout a wide range of markets including:

- Commercial contracting
- Machinery
- Rail / Infrastructure
- Marine
- Mechanical
- Security / CCTV
- Data cabling
- Critical power

Our conduit & fittings offer solutions for:

- Extreme temperature protection
- Corrosive & harsh environment protection
- Liquid ingress protection
- Explosive environment protection
- Continuous operation
- Reduced installation time & cost

NF NORME FRANÇAISE

Transport for London

BOEING AIRBUS VDE IEC Ex

Non-metallic conduits

Our conduit range is available in many different materials, ranging from lightweight to heavyweight with nominal conduit sizes from 10mm right up to the Jumbo size of 106mm.
For more demanding applications there is a wide-ranging high specification series of conduit with enhanced low fire hazard properties, EMI screening and incorporating high fatigue life. Overbraided options are available for use in abrasive environments.
Standard product is manufactured in a wide range of materials. The corrugated construction provides good flexibility and low weight. In addition a range of fittings are specifically designed to maintain system integrity.

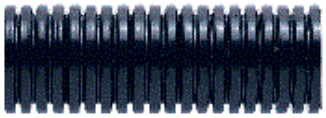
Polyamide Conduits (PA6)
Tough and durable Nylon PA 6 Material. General purpose system for light / industrial commercial wiring, public buildings, machine tools and marine

Polyamide conduits (PA)

Modified Polyamide conduits
Enhanced fire properties for traction, infrastructure, exteriors and dynamic low temperature applications.

Polyamide conduits (modified)

Polypropylene Conduits (PP)
High chemical resistance conduit



Polypropylene conduits (PP)

PVCu Spiral with Plasticised PVC Covering
Smooth bore

PVCu plasticised PVC covering

Korifit Conduit
Pliable Conduit range, available in 3 weights

Korifit - PVCu - pliable conduits

Hi-spec and overbraided conduits
Ultra High Specification – extreme temperature, mechanical, environmental and chemical performance

Hi-Spec Conduits

Non-metallic fittings

Adaptaflex offers the broadest range of non-metallic flexible conduits & fittings.
Find the ideal conduit for your specification below.

Adaptalok Fittings
Nylon PA66 LFH, Fast Fit range of fittings, suitable for all non-metallic conduit materials and types. Rated to IP66 with Polypropylene, UNEF, Metric, PG, Gas & NPT versions available

Adaptalok Fittings

Adaptalok ATS Fittings
Sophisticated moulded internal conduit seal and face seal washer fitting range,for faster, reliable, installation times. IP66-IP69K rated

Adaptalok ATS Fittings

***NEW* Composite Fittings**
Offering reduced weight, enhanced strength providing and a smooth, unrestricted internal bore in demanding applications

NEW Composite Fittings

Adaptaseal & Adaptaring Fittings
Adaptaseal
Nylon PA66, LFH fitting range. IP66 - IP69k rated
Adaptaring
Polyamide (Nylon) 66 & Acetal (POM) screw in fitting range. IP40 rated

Adaptaseal & Adaptaring Fittings

Hi-Spec Fittings
Hi-Spec fittings for use with braided non-metallic conduit range. IP66 - IP67 rated, ILFH, London Underground and NF approved

Hi-Spec Fittings

Korifit, XF & RF Fittings
Korifit Fittings
Polyamide (Nylon) 66, IP40 rated fitting range for use with the Korifit pliable conduit range
XF & RF fittings
For use with PVCu range of conduits. IP65 & IP67 rated

Korifit, XF & RF Fittings

Non-metallic accessories

1 Locknuts
Polyamide (Nylon) 6 locknuts
2 Sealing Washer
For use with Nylon or swivel metal threaded fittings
3 Clip
Conduit clip
4 End Caps, Sleeves & Removal Tools
For sealing cables, damage prevention and fitting removal
5 Multiway Adapters
Non metallic enclosure which can be machined to take upto eight Adaptalok ATS™ fittings
6 Hinged Fittings
IP40 rated hinged fittings

Metallic conduits

Adaptaflex offers a wide range of metallic flexible conduits & fittings.
Find the ideal conduit for your specification below.

Steel Conduit
Inherent Low Fire Hazard (ILFH) system. Features high compression, mechanical and tensile strength. IP40 rated

Steel

Liquid Resistant Covered Steel Flexible Conduit
IP65 rated with appropriate fitting. Range features self-extinguishing, LFH and Halogen free materials

Liquid resistant covered steel

Liquid Tight Covered Steel Flexible Conduit
Up to IP69K rated with appropriate fitting. Range features self-extinguishing, ELFH, Halogen free extreme temperature range materials

Liquid tight covered steel

Braided Steel Flexible Conduit
Inherent Low Fire Hazard (ILFH), EMI screen system. IP40 rated with very high UV resistance

Braided Steel - EMI screen

Braided Liquid Resistant & Liquid Tight Covered Steel Flexible Conduit
Liquid resistant options up to IP54 rated with appropriate fitting. Liquid tight options up to IP68 rated with appropriate fitting. EMI screen, self-extinguishing, ELFH, Halogen free extreme temperature range materials

Braided liquid resistant & liquid tight covered steel - EMI screen

Anti-microbial liquid tight conduit
Anti-microbial liquid tight high temperature covered steel flexible conduit. Suitable for indoor splash zone areas or food processing equipment

Anti-microbial liquid tight conduit

A wide range of different conduit types provide a solution for liquid resistant specifications, with further conduit options in liquid tight covered steel conduit for especially demanding environments. Conduit ranges are offered in nominal conduit size from 3mm for CCTV/roller shutter doors and for protecting fibre optics cables right up to 75mm for larger cable carrying capacity.

Overbraided conduits are particularly suitable for installation in abrasive environments. Where applications call for enhanced low fire hazard properties or EMI screening then there is the option of high specification tinned copper overbraided for greater EMI protection levels.

In addition a range of fittings are specifically designed to maintain system integrity including fixed and swivel fittings, straights, 90°, 45°, and a host of accessories including locknuts, enlargers, reducers and converters.

Many of our conduit systems have industry recognised approvals including British Kitemark, CE Approval & UL amongst others.

Advantages:
- High compression/crush strength
- Tensile strength - pull off load under tension
- Impact resistance
- Inherent fire protection on uncoated versions
- Corrosion resistant - stainless steel options
- Braided - High level EMI screening with tinned copper overbraided
- Greater temperature tolerances

Metallic fittings

Adaptaflex offers a range of metallic fittings that are specifically designed to maintain system integrity. The range includes fixed and swivel fittings, straights, 90° and 45° elbows

Inherent low fire hazard fittings
* IP40 rated
* Operating Temperature:
-50ºC to +300ºC

Fittings for use with S & SS conduits

Liquid Resistant
* IP54 - IP65 rated
* Operating Temperature:
-50ºC to +300ºC

Fittings for SN, SP & LFH-SP conduits

Liquid Tight
* IP54 - IP69 rated
* Operating Temperature:
-65ºC to +150ºC

Fittings for SPL, SPLHC, SPUL, SPL-EF & LFH-SPL Conduits

EMI screen
* IP40 rated
* Operating Temperature:
-50ºC to +300ºC

Fittings for SB, STC, SSB & SSBGS Conduits

EMI screen, liquid resistant & liquid tight
* IP54 rated (liquid resistant)
* IP66 - IP69 rated (liquid tight)
* Operating Temperature:
-50ºC to +300ºC

Fittings for SPB, SPTC & SPLHCB Conduits

Liquid tight, anti-microbial cable protection
* IP40 - IP69 rated
* Operating Temperature:
-50ºC to +130ºC

Fittings for SAMHL antimicrobial conduit

Metallic accessories

1 Locknuts
Nickel Plated Brass and Galvanised Steel locknuts
2 Proximity Switch Connectors
Nickel Plated Brass Accessories
3 Clip
Conduit support
4 Elbow accessories
Nickel Plated Brass Accessories
5 Converter and couplers
Nickel Plated Brass Accessories
6 Enlargers, Reducers & Converters
Nickel Plated Brass Accessories

Harnessflex
Flexible Conduit Systems

Harnessflex offers complete system solutions for the routing and protection of electrical wiring against damage by mechanical abrasion, liquid ingress and corrosion salts. Their use ensures that vulnerable connectors are not exposed to the elements, impact of foreign bodies and jet washing, which can cause malfunction and failure.

Our success has come from our systematic commitment to providing an extensive range of high-grade quality components. Combining a full range of slit and un-slit conduit, fittings and connectors, we also offer a large range of hinged system components and connector interfaces

Conduits
Our conduit range is available in many different materials, including lightweight.
For more demanding applications, there is a wide-range of high specification conduit with enhanced low fire hazard properties, increased extreme temperature tolerances - both high and low, incorporating high fatigue life.

Hinged Fittings
Hinged fittings are designed to protect against liquid ingress, excessive cable strain and mechanical abrasion.
- Radiussed internal form of conduit protects cables
from abrasion
- Internal backstop alleviates any potential problems caused by unevenly cut conduit and ensures correct assembly

Connector Interfaces
Harnessflex connector interfaces are designed to protect against the high pressure wash-down, excessive cable strain and mechanical abrasion identified as the principle causes.
– Interfaces can be used in areas where electrical connectors are vulnerable to high pressure washing
– Our interfaces offer strain relief to crimped contacts

Sealed Fittings
Sealed fittings designed to protect against the high pressure wash-down, excessive cable strain and mechanical abrasion
Features & benefits
– Interfaces can be used in areas where electrical connectors are vulnerable to high pressure washing
– Our interfaces offer strain relief to crimped contacts

NEW TempGuard Range
High temperature range (up to 200°C) of cable protection solutions for the automotive market
Features & benefits
– High temperature Polyamide fittings
– High temperature Co-Polyester conduit
– UL94 V2 certified fittings
– Very high flexibility & fatigue life, with protection from heat, abrasion, vibration and automotive fluids in all harness routing areas

Accessories
A range of accessories to compliment Harnessflex's product offering.

Harnessflex
Sealed fittings

Designed to protect against high pressure washing, excessive cable strain and mechanical abrasion.

Features & benefits

- The anti-vibration spring clips can be released easily if access is needed - no tool required
- In order to maintain the IP rating of the sealed fittings face sealing washers must be used with all threaded fittings
- Our sealed T & X pieces and sealed manifolds have inspection covers, which can be removed during installation to aid cable routing

Product offering

Straight Fittings
Straight compression type fitting incorporating fixed or swivel male threads to provide connection to knockouts and threaded entries.

90º Elbow
90° compression type fittings incorporating fixed or swivel male threads to provide connection to knockouts and threaded entries.

90º Flange
90° elbow compression type fittings providing a 4 hole panel mounting facility.

T-piece
Symmetrical, 3 junction compression type fittings providing a variety of conduit size configurations.

X-piece
Symmetrical, 4 junction compression type fittings providing a variety of conduit size configurations.

Multi-way
Asymmetrical 4 junction

Circular UNEF Connector Interfaces
Straight compression type fittings providing connection between UNEF style circular connections and conduit systems.

Solenoid Connector Interfaces
Screw-thread straight and elbow connectable interfaces for circular solenoids, sensors and switches.

Cable Glands
Straight compression type cable glands incorporating fixed male threads to provide secure cable connections through knockouts and threaded entries.

Reducing sealing bushes
Reducing sealing bushes - Sealed fittings

Harnessflex
TempGuard Range

Solving automotive routing temperature issues

TempGuard External Hinged Fittings
Enhanced high temperature protection for high temperature wiring

TempGuard External Hinged Fittings

TempGuard Two-piece Fittings
Fittings providing protection for in-line connectors, fuse links, circuit breakers and splicing areas

TempGuard Two-piece fittings

TempGuard Connector Interfaces
Protection for OEM connectors against high pressure wash-down, excessive cable strain and mechanical abrasion.

TempGuard Connector Interfaces

HTC Conduit
Standard Weight High Temperature Conduit

HTC Conduit
Suited to applications where elevated temperatures are present. High compression strength and excellent chemical resistance.

Harnessflex
Hinged fittings

Hinged fittings are designed to protect against liquid ingress, excessive cable strain and mechanical abrasion.

Features & benefits
- Radiussed internal form of conduit protects cables from abrasion
- Internal backstop (found on all hinged fittings) alleviates any potential problems caused by unevenly cut conduit and ensures correct assembly

Hinged Fittings
Tough and durable Nylon PA 6 Material. Hinged fittings for commercial wiring harnesses.

Hinged Fittings

TempGuard Fittings
Enhanced high temperature protection for high temperature wiring

Two-piece fittings

Two-piece Fittings
Fittings providing protection for in-line connectors, fuse links, circuit breakers and splicing areas

Accessories

Accessories
Circular fittings and breakout

Harnessflex
Conduits

Harnessflex offers a broad range of flexible conduits & fittings. Find the ideal conduit for your specification below.

NC Conduit
Flexible standard weight nylon (PA6) conduit is a general-purpose conduit suitable for automotive harness applications. Able to withstand extremes of temperatures and resistant to automotive oils and solvents. It is extremely tough and has a high impact strength and fatigue life.

NC Slit Conduit
NC standard weight is extensively used in harnesses on HGV, off road vehicles and marine applications where a superior protection against impact and mechanical shock is preferred. The conduit is used for both chassis and engine applications and can be used in a wide range of temperatures.

CTPA Extra Flexible
Lightweight Conduit
General purpose, lightweight loom applications.

CTPA Slit Lightweight Conduit
General purpose, lightweight loom applications.

HNC Conduit
Used in applications requiring
repeated flexing such as dynamic couplings, i.e. hydraulic arms and trailer couplings or rapid continuous motion, demanding high fatigue life and extra flexibility even in low temperature
environments. Highly resistant to low temperature impact.

NCV Flame Retardant Conduit
NCV flame retardant, high specification automotive harness conduit.

Harnessflex
Conduits

CPC Medium Weight Conduit
A low smoke, low toxicity conduit, CP has excellent high and low temperature properties, making it ideal for harness applications such as engine, body section and chassis. CPC is resistant to hydrocarbons, greases, fuels and oils.

PP Medium Weight Conduit
PP is particularly used in lighter applications where compression strength and LFH is not so important. The main property of this conduit is acid resistance.

DSPP Deep Section Conduit
DSPP has a deep section to maintain the conduit shape during bending. Deep Section Conduits are supplied in slit form to facilitate rapid cable installation and are designed for connection to all Harnessflex hinged fittings.

PKC Standard Weight Conduit
Super Low Fire Hazard PK is a UL94 V0 rated, standard weight conduit, which offers superior mechanical strength as well as high radiation and chemical protection in extreme temperatures.

HTC High Temperature Conduit
This conduit has been developed for use in where elevated temperatures occur. Suitable for long term exposure, up to 190ºC.

Applications
- Agricultural vehicles
- Construction vehicles
- Engine manufacturers
- Harness Manufacturers
- Truck & bus manufacturers
- Tanker & trailer manufacturers
- Specialist vehicle components
- Military vehicles

Connector-interfaces

Features & benefits

- Interfaces can be used in areas where electrical connectors are vulnerable to high pressure washing
- Our interfaces offer strain relief to crimped contacts our 90º swivel elbows are used with interfaces they allow the harness to self level
- Using our part CI-MF-90, in addition to a standard 90º swivel fitting, a 180º swivel bend is possible

External Hinged Connector Interfaces
Tough and durable protection for OEM connectors against high pressure wash-down, excessive cable strain and mechanical abrasion

External Hinged Connector Interfaces

External Split Connector Interfaces
Split type customised interfaces providing high integrity connections to the Molex SRC series of connectors and Harnessflex conduit systems.

External Split Connector Interfaces

Special Customised Products
Special hinged interfaces and blanking products

Special Customised Products

TempGuard Connector Interfaces

Markets we serve together:

Commercial

Institutional

Transportation

Agriculture

Machinery

Chemical & Pharmaceutical

Food & Beverage

Oil & Gas

OCAL

Ocal® Blue PVC-coated conduit and fittings represent a complete corrosion-protection package for your entire conduit system. This extensive product line includes the largest number of items in stock along with corrosion-resistant supports and patching compounds. With Ocal® PVC-coated conduit and fittings, you get corrosion protection that will extend the life of your electrical raceway system for years and years.

Only Ocal® PVC-coated conduit is UL® Listed with both the zinc coating and the PVC coating investigated and listed per UL6.

- Only Ocal® PVC-coated conduit has hot-dipped galvanized threads. Hot-dip galvanizing is the process through which the steel shell is dipped in molten zinc, causing the zinc to penetrate the steel.
- Only Ocal® PVC-coated conduit offers a full undisturbed zinc coating under the PVC coating, fulfilling the requirement of NEMA RN-1 regarding undisturbed zinc coating over the conduit.
- Only Ocal® PVC-coated conduit meets the requirements of NEMA RN-1 without exception.
- Only Ocal® PVC-coated conduit is UL® Listed for UV resistance.
- Only Ocal® supplies “Double-Coat” coated fittings, enhancing corrosion protection by applying urethane to the interior and exterior of the fittings before PVC coating.
- Only Ocal® offers custom colors.
- Only Ocal® offers local installation training and certification

Emergency lighting & central battery systems

- Emergency & safety lighting | for commercial, institutional & industrial buildings
- Functional and stylish | escape route- and anti panic LED lighting products
- Stylish LED Exit sign products | for escape route signalization
- Robust emergency lighting | for heavy duty use in factories, storage rooms, terminals. Web based software | for testing and maintenance of Emergency Lighting
- Twister® S1 | green power back up technology, alternative to a diesel
- BSV | specific static power supply for all hospitals
- Naveo | web based software for easy in field inspection & maintenance
- Sentara® | decentralised & modular AC & DC power supply system, easy to plan, install, extend Emergency & safety lighting | stylish, high impact and cost efficient LED downlighters and exit signs

Ex proof products

Ex proof lighting - UL Listed.

Hazlux

- Available in high pressure sodium, metal halide, induction, fluorescent & incandescent, up to 400W.
- New: LED versions for low energy and maintenance performance.
- Withstand temperature range from -51oC to 65oC.
- UL Listed and CSA Certified for Class 1, Div 1 and Div 2 locations. NEMA 4X and IP66 ratings.

Ex proof control panels and junction boxes.

DTS

- Instumentation boxes, control boxes, junction boxes, and cabinets.
- Available in Aluminum, stainless steel and GRP.
- DTS Ex d control panels can be composed of a wide variety of standard components which are switches, contactors and relays for instance.

Ex proof lighting and floodlights

DTS

- All components mounted on removable gear tray for easy and safe maintenance.
- Available in emergency and escape lighting versions.
- ATEX / IECEx certified.
- Approved for use in Zone 1, 2 and 21, 22.
- Compact and robust design.
- Available in LED, Sodium, Metal Halide, and Halogen versions.
- Ideal for lighting up large areas.

Ex proof conduit systems and fittings.

KOPEX

- Liquid tight, flexible metallic and non-metallic conduit.
- Flameproof Ex d, Ex e fittings.
- Non-metallic, conduit systems for really dynamic applications.
- Ideal for running multiple cores from one point to another.
- Available for oil-resistant, high-temperature and low and limited fire hazard applications.

Ex proof metallic cable glands.

KOPEX

- Ex d, Ex e single or double compression glands.
- Ex d, Ex e compound barrier glands.
- ATEX / IECEx certified.
- Wide range of cable sizes.
- IP66, IP68 ratings.

Joslyn

- Vacuum switch and controls used specifically for capacitor bank switching. Load interrupter attachments used on air disconnect switches for isolating sections of the overhead circuit Available from 15kV to 230kV system range, substation or pole mounted installations.
- Solid dielectric insulation with vacuum interruption.
- VacStat Vacuum Interrupter Monitor allows for Local / remote monitoring of vacuum interrupters and block operations if fault is detected.
- Long, maintenance-free service time.
- Zero voltage closing control available to initiate the system overvoltage and high inrush currents.

Elastimold

Separable connectors
- Largest product offering in the industry of IEEE 200 Amp loadbreak, deadbreak, 600 Amp and 900 Amp Medium Voltage EPDM rubber molded products and epoxy components.
- Elbows, T-Bodies, inserts, junctions, bushings and other power cable accessories.

Cable joints & terminations
- Largest product offer of IEEE Medium Voltage EPDM rubber molded joints: Separable, Permanent Shrink-Fit™, Permanent Push-on, and transition.
- High Voltage joints up to 138kV (IEC and IEEE) EPDM rubber molded joints. IEEE Medium Voltage Terminations: EPDM rubber molded push-on and silicon cold nk

Fisher Pierce
- Quick fault location with a complete line of overhead and underground cable-mount and test-point mounted faulted circuit indicators: Backfeed restraint, inrush restraint, single phase and three phase, trip & reset, with multiple indicators: led, fluorescent, strobe, fiber optic, radio and SCADA

Power distribution, cable management, connection & protection

Designed to perform in the oil & gas industry

High performance & reliability during demanding conditions is the starting point for us for all our products and services in the oil & gas industry.

Intensive testing and certification by recognized authorities result in a portfolio meeting highest international standards and legislation. With over 145,000 people in 100 countries, ABB can quickly support local needs in a global offshore / oil & gas environment.

KOPEX-Ex

Ex proof conduit systems and fittings.

- Liquid tight, flexible metallic and non-metallic conduit.
- Flameproof Ex d, Ex e fittings.
- Non-metallic, conduit systems for really dynamic applications.
- Ideal for running multiple cores from one point to another.
- Available for oil-resistant, high-temperature and low and limited fire hazard applications.

KOPEX-Ex

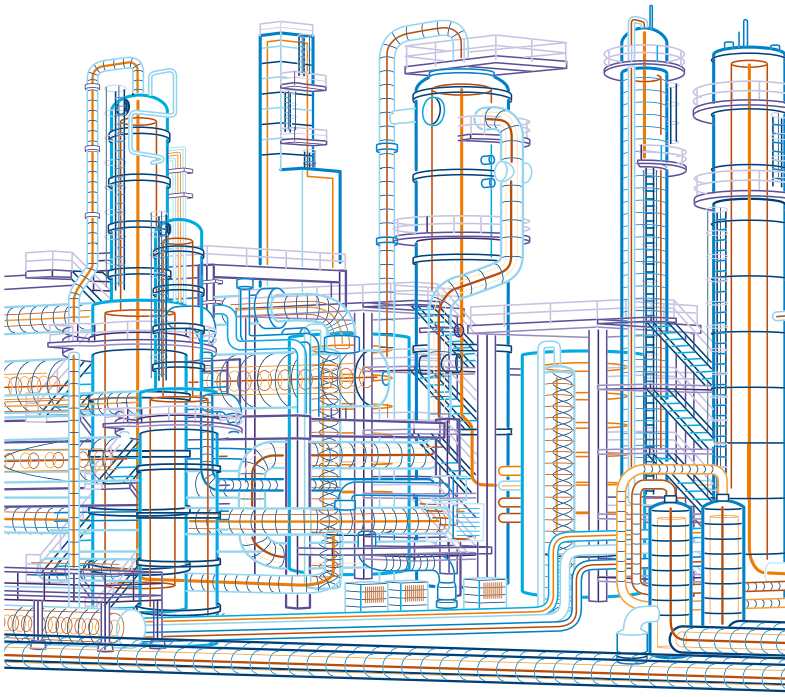
Ex proof metallic cable glands.

- Ex d, Ex e single or double compression glands.
- Ex d, Ex e compound barrier glands.
- ATEX / IECEx certified.
- Wide range of cable sizes.
- IP66, IP68 ratings.

DTS

Ex proof control panels and junction boxes.

- Instumentation boxes, control boxes, junction boxes, and cabinets.
- Available in Aluminum, stainless steel and GRP.
- DTS Ex d control panels can be composed of a wide variety of standard components which are switches, contactors and relays for instance.



DTS

Ex proof lighting.

- All components mounted on removable gear tray for easy and safe maintenance.
- Available in emergency and escape lighting versions.
- ATEX / IECEx certified.
- Approved for use in Zone 1, 2 and 21, 22.
- New: LED versions for low energy, low maintenance performance.

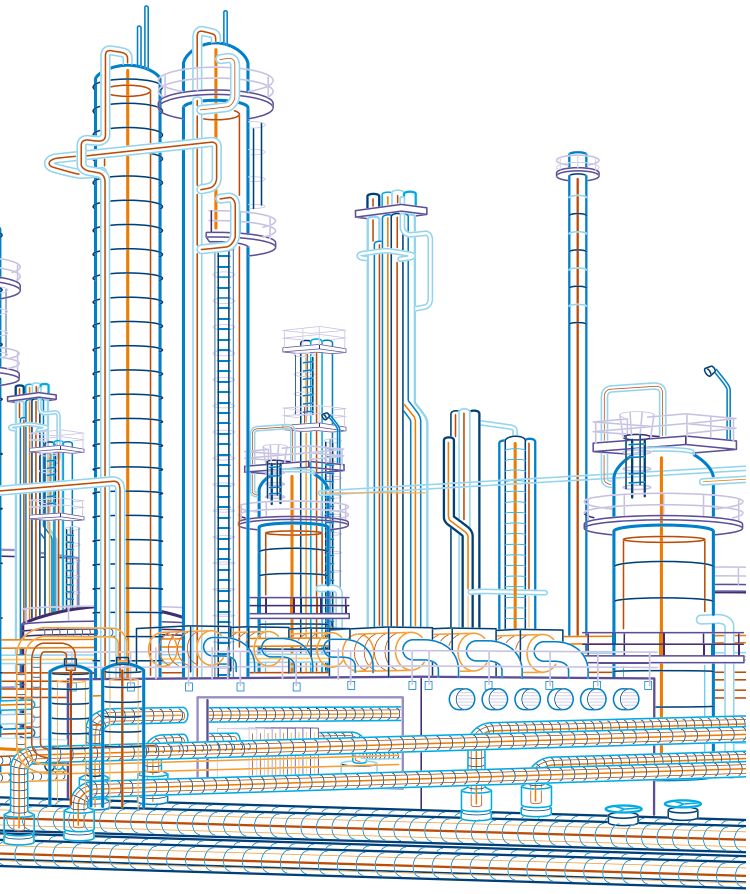
DTS

Ex proof floodlight.

- Compact and robust design.
- Available in LED, Sodium, Metal Halide, and Halogen versions.
- Ideal for lighting up large areas.
- Approved for use in Zone 1 and 2.
- ATEX / IECEx certified.

Designed to perform.
ABB understands continuous operation and reliability are essential for your business. Our solutions are designed to support you to:

- Maintain a safe environment for personnel and areas classified as hazardous.
- Battle extreme temperatures, UV resistance and other harsh conditions.
- Protect your cables and wire from liquid ingress & corrosion.
- Reduce your total cost of ownership | ease of design & installation and low energy & maintenance cost.



Ty-Met™

Stainless steel cable ties.

- Ballock, ladder type, releasable, identification, tooling.
- Strong, safe installation with dual locking mechanism.
- Coated version | halogen free, non-toxic polyester.
- Uncoated version | for extreme / high temperature applications: -80°C to +300°C.
- Corrosion resistant 316 grade stainless steel.
- Ultraviolet resistant, weather & fire-proof, resistant to radiation, chemicals, absolutely fireproof.

Ty-Rap®

High performance nylon cable ties.

- Withstand temperatures between -40°C to 150°C
- Tensile strength up to 540N.
- Flame retardant, Ultraviolet resistant.
- Extra-high temperature resistant nylon.
- Flammability ratings UL94V-2 and V-0.
- Provides a smooth and low-profile look.

Color-Keyed®

Compression connectors.

- Solid, homogenous connection via special system utilizing compression tools with matching dies that forms connector & wire.
- Made of 99.9% pure, oxygen free copper.
- Assured high conductivity, conforms IEC 61238.
- Straight 1 hole / 2 hole :10 - 400mm² M5 to M24 45° / 90°: 10mm² till 240mm² M6 to M16.

T&B® Cable Tray

Cable tray systems.

- Smart and easy to install solutions for cable.
- Ladder tray | perforated cable tray management systems.
- Available in aluminium & steel range.
- Easy & quick installation through extensive range of accessories.
- Easy to expand & rewire modular system.

Hazlux®

Ex proof lighting - UL Listed.

- Available in high pressure sodium, metal halide, induction, fluorescent & incandescent, up to 400W.
- New: LED versions for low energy and maintenance performance.
- Withstand temperature range from -51°C to 65°C.
- UL Listed and CSA Certified for Class 1, Div 1 and Div 2 locations. NEMA 4X and IP66 ratings.

furse

Earthing and lightning protection.

- Provides total solution to earthing & lightning protection.
- Risk assessment complying to latest IEC 62305-2 standards.
- Soil resistivity surveys by team of experienced surveyors are key to creating effective earthing system.
- Latest CDEGS software to optimise designs and provide range of customised detailed reports.

Power distribution, cable management, connection & protection

Designed to perform in the oil & gas industry

Key business drivers for oil & gas industry:

- Maintaining a safe environment in process areas classified as hazardous locations (Zone 1, 2 and 21, 22).
- Unforgiving time schedules to meet investment deadlines.
- Battling corrosion.
- Managing unpredictable raw material costs.
- Adapting to changing technologies used to find energy resources.
- Increating environmental and community demands.

KM35161

Intertek

Adaptaflex

Metallic flexible conduit systems.

Stainless steel

Overbraided

Liquid resistant

Liquid tight oil resistant

- Designed for extreme temperature environments.
- Operating temperature range -50°C to 350°C
- Tensile strength - pull off load under tension.
- Impact resistance.
- More than 20 different conduit types.
- Enhanced low fire hazard conduit with stainless steel overbraid.
- Inherent fire protection on uncoated versions.
- Weather resistant.
- SPL conduit systems - liquid-tight oil resistant covered steel flexible conduit.
- LFH-SP conduit systems.
- Metallic and non-metallic IP40 - IP69K on specialist fittings.

Adaptaflex

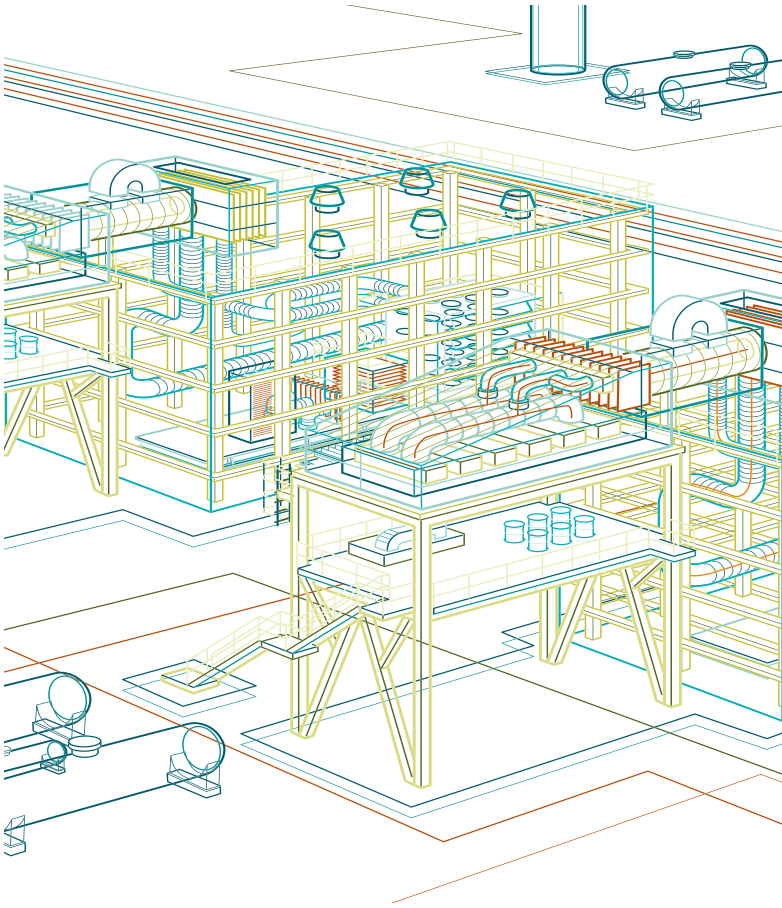
Nylon flexible conduit systems.

- Provide excellent flexing and fatigue life in extreme operating temperature ranges.
- Extreme resistance to lubricants and corrosive chemicals.
- PA / PR conduit systems, polyamide (Nylon) 6, self extinguishing, halogen free, very high ultraviolet resistance.
- Conduit diameters non-metallic: 13mm - 106mm.

Adaptaflex

Adaptalok ATS™ system.

- Ingress protection ratings: IP66 / 67 / 68 / 69K.
- Integral face seal washer guaranteed fit, cannot be lost or fitted incorrectly.
- Elastomer with 3 visible confirmation points.
- One piece fast fit (Push - Twist - Pull) installation.
- Visual fitting guides - highly visible elastomer markings on lugs.
- Proven clip design - pitch independent, secure fitment to coarse and fine pitch conduits.



Adaptaflex

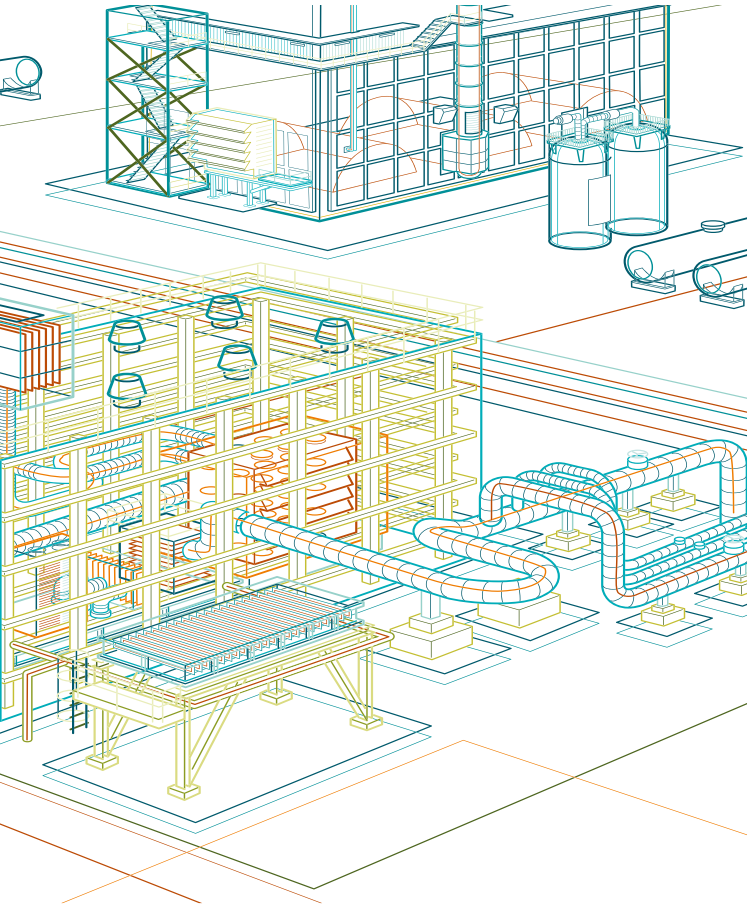
Adaptaflex product approvals.

- Lloyds Register Type Approved.
- UR.
- BSI Kitemark to IEC 61386.
- CE marked to Low Voltage Directive.
- UL Listed to UL514B and CSA Approved (Liquid Tight Type SPUL).

Designed to perform.

ABB understands continuous operation and reliability are essential for your business. Our solutions are designed to support you to:

- Maintain a safe environment for personnel and areas classified as hazardous.
- Battle extreme temperatures, UV resistance and other harsh conditions.
- Protect your cables and wire from liquid ingress & corrosion.
- Reduce your total cost of ownership | ease of design & installation and low energy & maintenance cost.



T&B Fittings

Star Teck® Extreme® jacketed metal-clad and Teck cable termination fittings.

- Suitable for extreme locations.
- Form a strong mechanical grip and water and/or oil-resistant termination.
- Provide grounding continuity of cable armor.
- Patented powergrip grouding ring for easy installation.
- Designed to accommodate a broad range of cables.
- Built-in sealing device provides a 360° seal when enclosure surface is rough or uneven.
- NEMA 4, 4X (stainless steel), 6P ratings. UL Listed and CSA Certified.

T&B Fittings

Star Teck® Extreme Director™ cable fittings.

- Truly adjustable series of range-taking fittings for flexibility in space-constraint locations.
- Exclusive swash-plate design, angle adjustable from 90° to 180°.
- Accept a range of jacketed metal-clad and teck cable diameters.
- Easy to install (Install - Insert - Rotate - Done) and disconnect.
- UL Listed, NEMA 4, Class I Div 2 / Zone 2 and Class II Div 2 / Zone 22 when installed.

T&B Fittings

52® series high temperature flexible metal liquid-tight fittings.

- Withstand temperature range between -60° to 150°C.
- Steel or malleable iron construction, electro-zinc plated and chromate coated for corrosion protection.
- Plastic sealing ring to provide a water-tight / oil-tight seal.
- Available in straight, 45o and 90° versions

T&B Fittings

Ex proof flexible couplings - XP Flex couplings.

- Explosion-proof and dust-ignition proof for use in hazardous locations.
- Flexible design makes it easy to achieve tight bends in conduit systems in confined spaces or vibration-prone locations.
- Corrosion resistant | ideal for washdown areas.
- Flexible bronze construction with arc-resistant inner sleeve and brass fittings.
- Terminated with two threaded female end fittings and male close nipples.
- UL Listed and CSA Certified for hazardous locations. Class 1 Div 1 and Div 2, Class II Div 1, Class III.

Ocal

OCAL-BLUE ® PVC-coated conduit & fittings system.

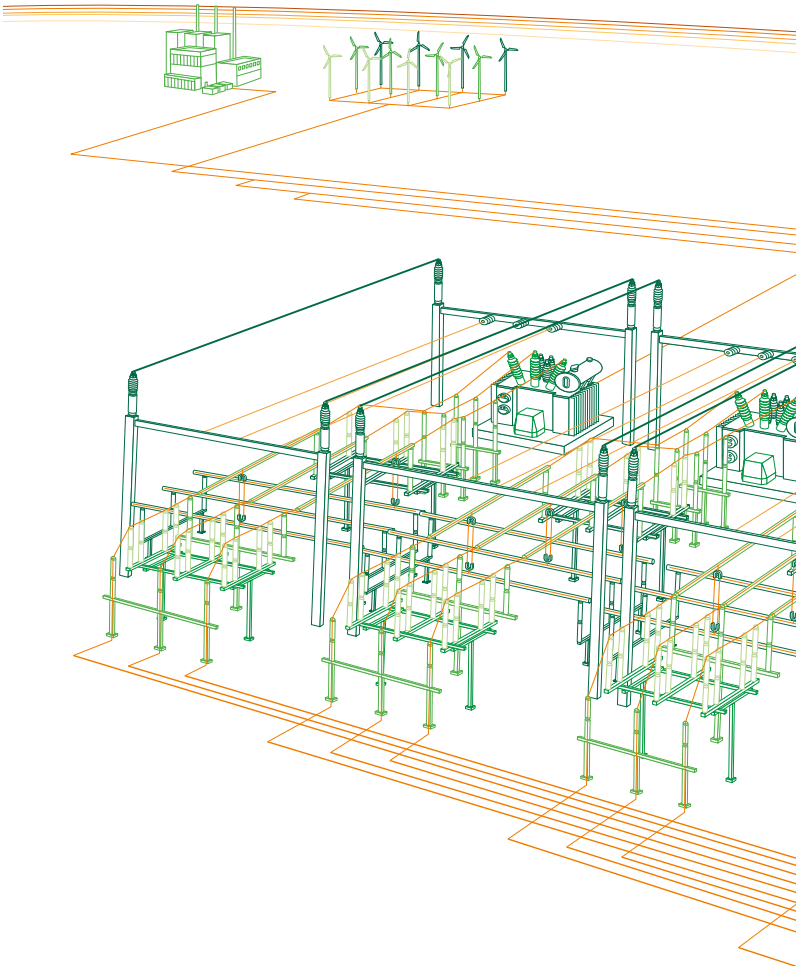
- PVC-coated, hot-dipped galvanised conduit and threads.
- Complies fully with UL®6, NEMA RN-1 and ANSI C80.1.
- Superior corrosion protection against harsh elements.
- Interior blue polyurethane provides corrosion protection around copper wire or fiber optics.

Power distribution, cable management, connection & protection

Designed to perform in the oil & gas industry

ABB designs, manufactures and supplies technically advanced products for electrical systems to the oil & gas industry.

Profitable drilling, extracting, processing, transporting and dispensing operations require reliable, robust and cost-effective equipment. ABB offers the industry's most advanced materials distribution system, and our commitment shows in our unmatched products, unequaled service and loyalty from end-users and OEMs.



elastimold

Transmission cable termination and joints.

- Transmission cable joints (46kV - 138kV) and 69kV terminators are factory molded and fully tested to provide highest quality and maximum reliability.
- Designed with optimized pre-molded stress control and heat transfer capability.
- Easy installation | eliminated need for labor-intensive field molds, tape wrapping machines or fleld expansion.

elastimold

Medium voltage cable termination and joints.

- Permanent distribution cable joints (5kV - 35kV) and shrink-fit cable joints (5kV - 35kV).
- Premolded and cold-shrink cable termination and joints for medium voltage cable systems.
- Electric stress control.
- Reliable, high quality, wide range of cables and conductor sizes supported.

elastimold

Medium voltage cable joints.

- Deadfront design and modular construction enables maximum reliability, performance and versatility.
- 200A bushing wells, bushing inserts and 600A bushings available for use on air, oil or SF6 insulated transformer, switchgear and other equipment.
- Complies with IEEE Standard to ensure interchangeability.

elastimold

Medium voltage moulded vacuum recloser.

- Smart grid ready with three integral load-side voltage sensors and provision to add source-side voltage sensors.
- Modular and flexible design, so field upgrades. and retrofits are easy and fast.
- 360°recloser position indicator.

elastimold

Underground switchgear.

- Modular dimension provides maximum flexibility in field applications, saving inventory and labour costs.
- Molded deadfront and submersible design.
- Automatic source transfers (AT) allows for full transfer of load in less than two seconds, lowering risks of costly lost production and setup time.

JOSLYN

High-voltage capacitor and reactor switches.

- Available from 15kV to 230kV system range, substation or pole mounted installations.
- Solid dielectric insulation with vacuum interruption.
- VacStat Vacuum Interrupter Monitor allows for Local / remote monitoring of vacuum interrupters and block operations if fault is detected.
- Long, maintenance-free service time.
- Zero voltage closing control available to initiate the system overvoltage and high inrush currents.

FISHER PIERCE

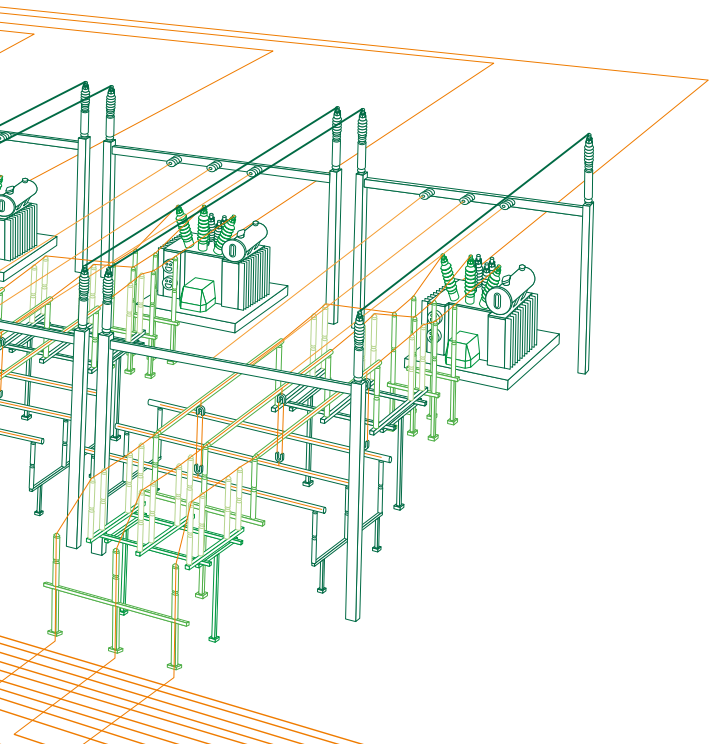
Faulted circuit indicators.

- For single-phase or three-phase underground or overhead applications.
- Locate faults faster and cost effectively, and reduce outage duration.
- Automatic and manual reset logic.
- Adaptive current trip with inrush restraint logic.
- Ability to integrate into SCADA systems.
- Protection from moisture enables long and maintenance-free service life.

FISHER PIERCE

AutoCap® capacitor controls.

- Range of analog and digital options.
- Variety of control parameters | VAr, voltage, current, temperature and time.
- Multi-step controls for use with multiple capacitor banks in substation applications.
- Microprocess-based, SCADA capability, allowing the unit to program itself.
- Pole-mounted or substation-switched applications.



HOMAC

Substation and underground connectors.

- Substation connectors and products up to 500kV applications.
- Flood-seal® underground distribution connectors.
- For single-phase or three-phase underground or overhead applications.
- Transformer connectors for stud-mount and pad-mount.

Blackburn

EZGround™ grounding system.

- Complete line of grid-ground compression connectors (C-Taps, Pigtail connector, Figure 6-6, 6-8 connector, GG connector, splice/two-way connector, I-Beam clamp, grounding plate).
- EZGround™ connectors are designed for direct burial and offer a low-cost, safe and efficient alternative to exothermic welding products.
- Connectors are prefilled with oxide inhibitor and sealed.
- Compliant with IEEE 837, UL® 467, CSA 22.2 Standards.

Hi-Tech

Current-limiting fuse.

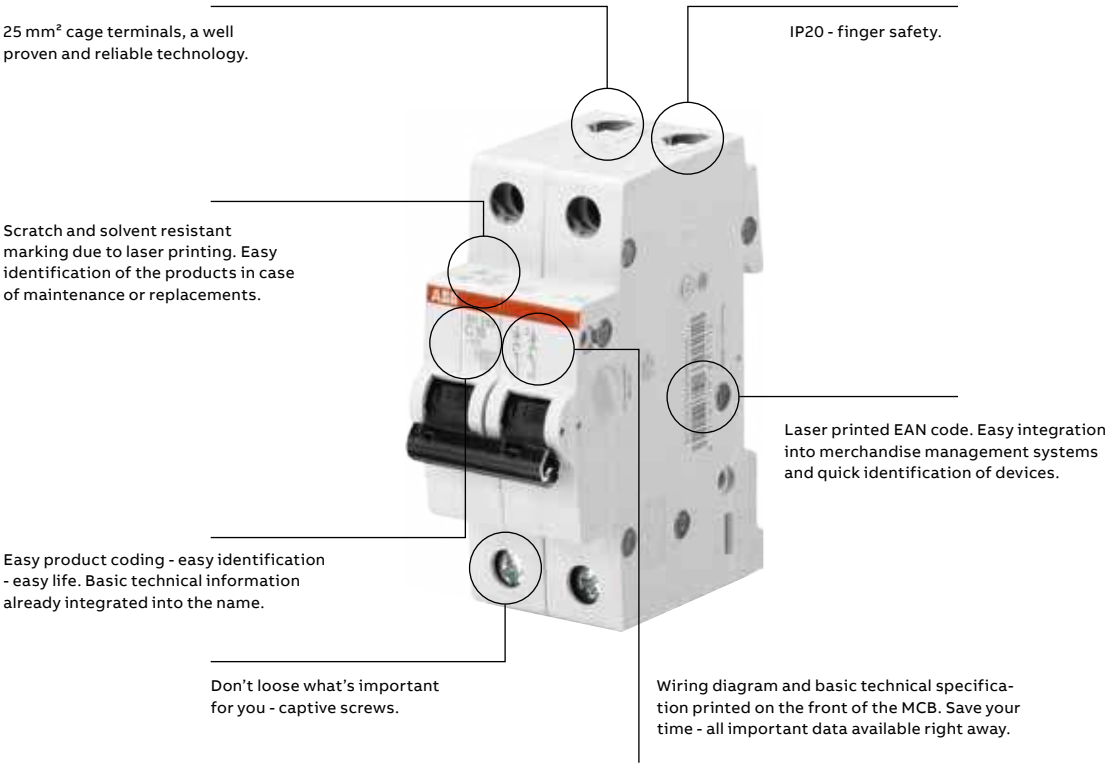
- Interrupting capabilities through to 50kA.
- No external arcs or by products.
- Durable design with hermetically sealed construction.
- Provide superior protection for transformer capacitor banks, switchgears and wind farms.
- Greatly reduce energy let-through, minimizing the risk of catastrophic failures.

Blackburn

Overhead distribution connectors.

- Complete and reliable range of overhead, grounding, mechanical and compression connectors.
- Medium voltage splices, taps, wedges and terminals or connectors are available for all overhead distribution applications.

Miniature circuit-breakers (MCBs)
SH200M Series



Technical Features

Electrical Data	SH200 M
Standards	IS/IEC 60898-1
Poles	1P, 2P, 3P, 4P, 1P +N, 3P +N
Tripping Characteristics	B, C, D
Rated Curent	0.5A - 63 A
Rated Voltage	1P : 230/400/415 V AC 1P + N : 230 V AC 2...4P : 400/415 V AC 3P + N : 400/415 V AC
Insulation Voltage	250 V AC (Phase to Ground) 440 V AC (Phase to Phase)
Max Operating Voltage	1P: 253 V AC 2...4P : 440 V AC
Min Operating Voltage	12 V AC
Rated Frequency	50/60 Hz
Rated Short Circuit Capacity	10kA
Energy Limiting Class	3
Over Voltage Category (B,C upto 40A)	III
Pollution Degree	2
Rated Impulse withstand Voltage	4kV (Test Voltage 6.2kV at Sea Level, 5kV at 2,000 m)
Dielectric Test Voltage	2kV (50/60 Hz, 1 min)
Accessories mountable	No

MCBs

S 200 technical features

S 200

			S 200	S 200 M
General Data	Standards		IEC/EN 60898-1, IEC/EN 60947-2	IEC/EN 60898-1, IEC/EN 60947-2
			UL 1077	UL 1077, CSA 22.2 No. 235
	Poles		1P, 2P, 3P, 4P, 1P+N, 3P+N	
	Tripping characteristics		B, C, D, K, Z	
	Rated current I_n	A	0.5...63 A	
	Rated frequency f	Hz	50 / 60 Hz	
	Rated insulation voltage U_i acc. to IEC/EN 60664-1	V	440 V AC (phase to phase)	
	Overvoltage category		III	
	Pollution degree		3	
Data acc. to IEC/EN 60898-1 (except S 200 M UC data acc. to IEC/EN 60898-2)	Rated operational voltage U_n	V	1P: 230/400 V AC; 1P+N: 230 V AC ; 2...4P: 400 V AC; 3P+N: 400 V AC	
	Max. power frequency recovery voltage (U_{max})	V	1P: 253 V AC; 1P+N: 253 V AC; 2P: 440 V AC; 3...4P: 440 V AC; 3P+N: 440 V AC; 1P: 72 V DC; 2P: 125 V DC	
	Min. operating voltage	V	12 V AC - 12 V DC	
	Rated short-circuit capacity I_{cn}	kA	6 kA	10 kA
	Energy limiting class (B, C up to 40 A)		3	
	Rated impulse withstand voltage Uimp. (1.2/50µs)	kV	4 kV (test voltage 6.2 kV at sea level, 5 kV at 2,000 m)	
	Dielectric test voltage	kV	2 kV (50 / 60Hz, 1 min.)	
	Reference temperature for tripping characteristics	°C	B, C, D: 30°C	
	Electrical endurance	ops.	In < 32A: 20,000 ops (AC), In ≥ 32A: 10,000 ops. (AC); 1,000 ops. (DC); (1 cycle 2s - ON, 13s - OFF, In ≤ 32A), (1 cycle 2s - ON, 28s - OFF, In > 32A)	
Data acc. to IEC/EN 60947-2	Rated operational voltage U_e	V	1P: 230 V AC; 1P+N: 230 V AC; 2...4P: 440 V AC; 3P+N: 440 V AC	
	Max. power frequency recovery voltage (U_{max})	V	1P: 253 V AC; 1P+N: 253 V AC; 2P...4P: 462 V AC; 3P+N: 462 V AC; 1P: 72 V DC; 2P: 125 V DC	
	Min. operating voltage	V	12 V AC - 12 V DC	
	Rated ultimate short-circuit breaking capacity I_{cu}	kA	10 kA	15 kA
	Rated service short-circuit breaking capacity I_{cs}	kA	7.5 kA	≤ 40 A: 11.2 kA 50, 63 A: 7.5 kA
	Rated impulse withstand voltage Uimp. (1.2/50µs)	kV	4 kV (test voltage 6.2 kV at sea level, 5 kV at 2,000 m)	
	Dielectric test voltage	kV	2 kV (50 / 60Hz, 1 min.)	
	Reference temperature for tripping characteristics	°C	B, C, D: 55°C; K, Z: 20°C	
	Electrical endurance	ops.	In < 32A: 20,000 ops (AC), In ≥ 32A: 10,000 ops. (AC); 1,000 ops. (DC); (1 cycle 2s - ON, 13s - OFF, In ≤ 32A), (1 cyle 2s - ON, 28s - OFF, In > 32A)	

Note:
* Only acc. to IEC/EN 60898-1

S 200 M UC	S 200 P	S 200 MR	S 200 S	SU 200 M		SU 200 MR	S 200 UDC
IEC/EN 60898-2, IEC/EN 60947-2	IEC/EN 60898-1, IEC/EN 60947-2	IEC/EN 60947-2	IEC/EN 60898-1	IEC/EN 60947-2		IEC/EN 60947-2	
	UL 1077, CSA 22.2 No. 235	UL 1077, CSA 22.2 No. 235		UL 489, CSA22.2 No.5		UL 489, CSA22.2 No.5	UL 489
1P, 2P, 3P, 4P	1P, 2P, 3P, 4P, 1P+N, 3P+N	1P, 2P, 3P, 4P	1P, 3P	1P, 2P, 3P, 4P		1P, 2P, 3P, 4P	1P, 2P
B, C, K, Z	B, C, D, K, Z	K	B, C	C, K, Z		K	
0.2…63 A			6…20 A	0.2…63 A	0.2…25 A	0.2…63 A	1…63 A
0 / 50 / 60 Hz	50 / 60 Hz	50 / 60 Hz					DC
440 V AC (phase to phase)							
							--
2							--
1P: 230 V AC, 220 V DC 2P: 400 V AC, 440 V DC 3...4P: 400 V AC*			1P: 230 V AC, 3P: 440 V AC	--			
1P: 253 V AC, 250 V DC 2P: 440 V AC, 500 V DC 3...4P:440 V AC*			1P: 253 V AC, 3P: 440 V AC	--			
			12 V AC	--			
10 kA	≤ 25 A: 25 kA > 25 A: 15 kA		6 kA	--			
				--			
				--			
				--			
30 °C			B, C: 30 °C	--			
			20,000 ops.	--			
1P: 253 V AC, 220 V DC 2...4P: 440 V AC, 440 V DC	1P: 230 V AC; 1P+N: 230 V AC; 2...4P: 400 V AC; 3P+N: 400 V AC	1P: 230 V AC 2...4P: 400 V AC		1P: 230 V AC 2...4P: 400 V AC		1P: 230 V AC 2...4P: 400 V AC	--
1P: 266 V AC, 250 V DC 2...4P: 462 V AC, 500 V DC	1P: 253 V AC; 1P+N: 253 V AC; 2P...4P: 440 V AC; 3P+N: 440 V AC; 1P: 72 V DC; 2P: 125 V DC	1P: 253 V AC 2...4P: 440 V AC		1P: 253/440 V AC; 2...4P: 440 V AC		1P: 253 V AC 2...4P: 440 V AC	--
		12 V AC		12 V AC			--
≤ 40 A: 10 kA AC; 10 kA DC > 40 A: 6 kA AC; 10 kA DC	≤ 25 A: 25 kA ≥ 32 A: 15 kA	15 kA		10 kA		15 kA	--
≤ 40 A: 7,5 kA AC; 10 kA DC > 40 A: 6 kA(AC; 10 kA DC	≤ 25 A: 12.5 kA ≤ 32…40 A: 11.2 kA 50, 63 A: 7.5 kA	≤ 40 A: 11.2 kA; > 40 A: 7.5 kA AC;		7.5 kA		≤ 40 A: 11.2 kA; > 40 A: 7.5 kA (AC);	--
							--
							--
B, C: 55 °C; K, Z: 20 °C		20 °C		C, K, Z: 20°C		20 °C	--
In < 32A: 20,000 ops (AC), In ≥ 32A: 10,000 ops. (AC); 1,500 ops. (DC);	In < 32A: 20,000 ops (AC), In ≥ 32A: 10,000 ops. (AC); 1,000 ops. (DC); (1 cycle 2s - ON, 13s - OFF, In ≤ 32A), (1 cyle 2s - ON, 28s - OFF, In ≥ 32A)	In < 25A: 20,000 ops (AC), In ≥ 25A: 10,000 ops. (AC);				In < 25A: 20,000 ops (AC), In ≥ 25A: 10,000 ops. (AC);	--

MCBs

S 200 technical features

S 200

			S 200	S 200 M
Data acc. to UL / CSA	Rated voltage	V	480Y / 277 V AC;	480Y / 277 V AC;
			1P: 60 V DC; 2P...4P: 110 V DC	1P: 60 V DC; 2P...4P: 125 V DC
	Rated interrupting capacity acc. to UL 1077	kA	6 kA AC; 10 kA DC	
	Short-circuit current rating acc. to UL 489		--	
	Application		Suppl. prot. for general use. Application Codes: TC2, OL0, SC: U1	
	Reference temperature for tripping characteristics	°C	B, C, D, K, Z: 25°C	
	Electrical endurance	ops.	6,000 ops (AC), 6,000 ops. (DC); 1 cycle (1s - ON, 9s - OFF)	
Mechanical Data	Housing		Insulation group II, RAL 7035	
	Toggle		Insulation group II, black, sealable	
	Contact position indication		Marking on toggle (I ON / 0 OFF), Real CPI (red ON / green OFF)	
	Protection degree acc. to EN 60529		IP20*, IP40 in enclosure with cover	
	Mechanical endurance	ops.	20,000 ops.	
	Shock resistance acc. to IEC/EN 60068-2-27		25 g - 2 shocks - 13 ms	
	Vibration resistance acc. to IEC/EN 60068-2-6		5g - 20 cycles at 5...150...5 Hz with load 0.8In	
	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%	
	Ambient temperature	°C	-25 ... +55°C	
	Storage temperature	°C	-40 ... +70°C	

Note:
* Also fulfilling the requirement acc. to the protection degree IPXXB
** Only with accessory: IP20 terminal clip

	S 200 M UC	S 200 P	S 200 MR	S 200 S	SU 200 M		SU 200 MR	S 200 UDC
	480Y / 277 V AC	480Y / 277 V AC	480Y / 277 V AC		240 V AC	480 Y / 277 V AC	1P: ≤ 35 A: 277 V AC; > 35 A: 240 V AC 2...4P: ≤ 35 A: 480 / 277 V AC; > 35 A: 240 V AC	
	1P: 250 V DC 2...4P: 500 V DC		480 / 277 V AC					1P: 60 V DC 2P: 125 V DC
		≤ 25 A: 10 kA > 25 A: 6 kA	10 kA		--			
					10 kA		10 kA	14 kA (UL)
	TC1, 0L0, SC: U1	TC2, 0L0, SC: U1	Ring tongue terminal, not for general use				Ring tongue terminal, not for general use	
			25 °C		C, K, Z: 25 °C		25 °C	
							6,000 ops. (1 cycle 1s - ON, 9s - OFF)	
	Insulation group I, RAL 7035			Insulation group II, RAL 7035			Insulation group I, RAL 7035	
					IP20**, IP40 in enclosure with cover			
		30 g - 3 shocks - 11 ms	25 g - 2 shocks - 13 ms	25 g - 2 shocks - 13 ms	30 g - 3 shocks - 11 ms		25 g - 2 shocks - 13 ms	

MCBs

S800 series technical features

S800

Tripping characteristics		**S800S** **B, C, D, K**	**S803S-KM** **KM**
Standards		IEC/EN 60947-2 IEC/EN 60898-1 UL 1077	IEC/EN 60947-2
Poles		1 … 4	3
Rated current $\mathbf{I_e}$	A	6 … 125	20 … 80
Rated frequency **f**	Hz	50/60	50/60
Rated insulation voltage $\mathbf{U_i}$ acc. to IEC/EN 60664-1	V	AC 690	AC 690
Rated impulse withstand voltage $\mathbf{U_{imp}}$ (1.2/50µs)	kV	8	8
Overvoltage category		IV	IV
Pollution degree		3	3
Suitability for isolation		yes	yes
Data acc. to IEC/EN 60898-1			
Rated operational voltage $\mathbf{U_e}$	V	AC 230/400	–
Rated short-circuit capacity $\mathbf{I_{cn}}$	kA	Char. B, C, D: 230/400 V (10 … 80 A) = 25 kA	–
Service short-circuit capacity $\mathbf{I_{cs}}$	kA	Char. B, C, D: 230/400 V (10 … 80 A) = 12.5 kA	–
Data acc. to IEC/EN 60947-2			
Rated operational voltage $\mathbf{U_e}$	V	AC 400/690 1-pole: DC 125 2-pole: DC 250 3-pole: DC 375 4-pole: DC 500	AC 690
Rated ultimate short-circuit capacity $\mathbf{I_{cu}}$	kA	AC 240/415 V = 50 kA AC 254/440 V = 30 kA AC 400/690 V (up to 80 A) = 6 kA AC 400/690 V (100 … 125 A) = 4.5 kA DC 125 V (1-pole) = 30 kA DC 250 V (2-pole) = 30 kA DC 375 V (3-pole) = 30 kA DC 500 V (4-pole) = 30 kA	AC 240/415 V = 50 kA AC 254/440 V = 30 kA AC 400/690 V = 6 kA DC 375 V = 30 kA
Rated service short-circuit capacity $\mathbf{I_{cs}}$	kA	AC 240/415 V = 40 kA AC 254/440 V (up to 80 A) = 22.5 kA AC 254/440 V (100 … 125 A) = 15 kA AC 400/690 V (up to 80 A) = 4 kA AC 400/690 V (100 … 125 A) = 3 kA DC 125 V (1-pole) = 30 kA DC 250 V (2-pole) = 30 kA DC 375 V (3-pole) = 30 kA DC 500 V (4-pole) = 30 kA	AC 240/415 V = 40 kA AC 254/440 V = 22.5 kA AC 400/690 V = 4 kA DC 375 V = 30 kA
Data acc.to UL 1077, Supplementary Protector			
Poles		1 …4	
Rated voltage $\mathbf{U_n}$	V	AC 240 (1 -pole…4-pole) Δ AC 277 (1 -pole) Y AC 277/480 (2-pole … 4-pole) Y AC 347 (1 -pole) Y AC 347/600 (2-pole … 4-pole) Y	
Rated current $\mathbf{I_n}$	A	6 … 63	
Tripping characteristic		B, C, D, K	
Short - circuit breaking capacity $\mathbf{I_{cc}}$	kA	AC 240 (1 -pole … 4-pole) Δ = 30 kA AC 277 (1 -pole) Y = 14 kA AC 277/480 (2-pole…4-pole) Y = 14 kA AC 347 (1 -pole) Y = 6 kA AC 347/600 (2-pole … 4-pole) Y = 6 kA *	

Note: The minimum operating voltage for S800 is 12 VAC/VDC. *certification 50A ongoing

S800S-UC UCB, UCK	S800N B, C, D	S800C B, C, D, K
IEC/EN 60947-2	IEC/EN 60947-2, IEC/EN 60898-1	IEC/EN 60947-2 EN 60898-1 UL 1077
1 … 4	1 … 4	1 … 4
10 … 125	6 … 125	10 … 125
50/60	50/60	50/60
DC 1000	AC 690	AC 500
8	8	8
IV	IV	IV
1- and 2-pole: 3 3- and 4-pole: 2	3	3
yes	yes	yes
–	AC 230/400	AC 230/400
–	230/400 V (10 … 80 A) = 20 kA	Char. B, C, D: 230/400 V = 15 kA
–	230/400 V (10 … 80 A) = 10 kA	Char. B, C, D: 230/400 V = 7.5 kA
1-pole: DC 250 2-pole: DC 500 3-pole: DC 750 4-pole (63 … 125 A): DC 750 4-pole (10 … 50 A): DC 1000	AC 400/690 1-pole: DC 125 2-pole: DC 250 3-pole: DC 375 4-pole: DC 500	AC 254/440 1-pole: DC 125 2-pole: DC 250 3-pole: DC 375 4-pole: DC 500
DC 250 V (1-pole) = 50 kA DC 500 V (2-pole) = 50 kA DC 750 V (3-pole) = 50 kA DC 750 V (4-pole) = 50 kA (63…25A) DC 1000 V (4-pole) = 50 kA (10…50A)	AC 240/415 V = 36 kA AC 254/440 V = 20 kA AC 400/690 V = 4.5 kA DC 125 V (1-pole) = 20 kA DC 250 V (2-pole) = 20 kA DC 375 V (3-pole) = 20 kA DC 500 V (4-pole) = 20 kA	AC 240/415 V = 25 kA AC 254/440 V = 15 kA DC 125 V (1-pole) = 10 kA DC 250 V (2-pole) = 10 kA DC 375 V (3-pole) = 10 kA DC500V (4-pole) = 10kA
DC 250 V (1-pole) = 50 kA DC 500 V (2-pole) = 50 kA DC 750 V (3-pole) = 50 kA DC 750 V (4-pole) = 50 kA (63…25A) DC 1000 V (4-pole) = 50 kA (10…50A)	AC 240/415 V = 30 kA AC 254/440 V (up to 80 A) = 15 kA AC 254/440 V (100 … 125 A) = 10 kA AC 400/690 V = 3 kA DC 125 V (1-pole) = 20 kA DC 250 V (2-pole) = 20 kA DC 375 V (3-pole) = 20 kA DC 500 V (4-pole) = 20 kA DC 375 V (3-pole) = 30 kA	AC 240/415 V = 18 kA AC 254/440 V = 10 kA DC 125 V (1-pole) = 10 kA DC 250 V (2-pole) = 10 kA DC 375 V (3-pole) = 10 kA DC 500 V (4-pole) = 10 kA
		1…4
		AC 240 (1 -pole … 4-pole) Δ AC 277 (1 -pole) Y AC 277/480 (2 -pole … 4-pole) Y DC 125 (1-pole) DC 250 (2-pole) DC 375 (3-pole) DC 500 (4-pole)
		10 … 100
		B, C, D, K
		AC 240 (1 -pole … 4-pole) Δ = 20 kA AC 277 (1 -pole) Y = 10 kA AC 277/480 (2 -pole … 4-pole) Y = 10 kA DC 125 (1-pole) = 10 kA DC 250 (2-pole) = 10 kA DC 375 (3-pole) = 10 kA DC 500 (4-pole) = 10 kA

MCBs

S800 series technical features

S800

		S800S B, C, D, K	S803S-KM KM	S800S-UC UCB, UCK
Mechanical Data				
Housing		Material group I, RAL 7035		
Toggle		black, lockable		
Classification acc. to NF F 126-101, NF F 16-102		I3, F2		
Protection degree acc. to EN 60529		IP20; IP40(actuating end only)		
Shock resistance acc. to IEC/EN 60068-2-31		IEC 61373 Cat. 1 Class B, 5g / 30 ms acc. to IEC 60068-27 Test Ea		
Vibration resistance acc. to IEC/EN 60068-2-6		IEC 60068-2-6 Test Fc; 2 - 13.2 Hz /1 mm 13.2 - 100 Hz / 0.7g with load 100% x I_e		
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	°C/RH	12 + 12 cycle with 55 °C/90–96 % and 25 °C/95–100 %		
Environmental conditions (dry heat) acc. to IEC/EN 60068-2-2 Test B	°C/RH	16 hours 55 °C / 2 hours 70 °C with damp heat 55 %		
Ambient temperature	°C	–25 … +60		
Storage temperature	°C	–40 … +70		
Data acc. to UL 1077/ C22.2 No 235, Supplementary Protector				
Alternating current: int. cap.				
Direct current: int. cap.				
Installation				
Terminal		Failsafe cage or ringlug terminal		
Connections (top/bottom) – Cu only	mm^2	1 … 50 stranded 1 … 70 flexible		
Tightening torque	Nm	3.5		
	in-lbs.	31		
Screwdriver		POZI 2		
Mounting		EN 60715		
Mounting position		any		
Supply		any		
Dimensions and weight				
Pole dimensions (H x L x W)	mm	82.5 x 95 x 26.5		
Pole weight	g	ca. 240		

	S800N B, C, D	S800C B, C, D, K
	Material group I, RAL 7035	Material group I, RAL 7035
	black, lockable	black, lockable
	I3, F2	I3, F2
	IP20; IP40 (actuating end only)	IP20; IP40 (actuating end only)
	IEC 61373 Cat. 1 Class B, 5g / 30ms acc. To IEC 60068-27 Test Ea	IEC 61373 Cat. 1 Class B, 5g / 30ms acc. To IEC 60068-27 Test Ea
	IEC 60068-2-6 Test Fc; 2–13.2 Hz/1 mm 13.2–100 Hz/0.7 g with load 100% x I_e	IEC 60068-2-6 Test Fc; 2–13.2 Hz/1 mm 13.2–100 Hz/0.7 g with load 100% x I_e
	12 + 12 cycle with 55 °C/90–96 % and 25 °C/95–100 %	12 + 12 cycle with 55 °C/90–96 % and 25 °C/95–100 %
	16 hours 55 °C/2 hours 70 °C with damp heat 55 %	16 hours 55 °C/2 hours 70 °C with damp heat 55 %
	–25 … +60	–25 … +60
	–40 … +70	–40 … +70
		1, 1P+N 240: 20(≤ 100A) 347: 10 (≤ 100A)
		2,3,4 480 Y/277: 10 (≤ 100A)
		1, 1P+N 125: 10 (≤ 100A)
		2, 3, 4 250: 10 (2P, ≤ 100A) 375: 10 (3P, ≤ 100A) 500: 10 (4P, ≤ 100A)
	Failsafe cage or ringlug terminal	Failsafe cage or ringlug terminal
	1 … 50 stranded 1 … 70 flexible	1 … 50 stranded 1 … 70 flexible
	3.5	3.5
	31	31
	POZI 2	POZI 2
	EN 60715	EN 60715
	any	any
	any	any
	82.5 x 95 x 26.5	82.5 x 95 x 26.5
	ca. 240	ca. 240

MCBs

S800 series technical features

S800

Tripping characteristics		S800B B, C, D, K	S800HV C, K
Standards		IEC 60947-2 EN 60898-1	IEC/EN 60947-2 UL 1077
Poles		1 … 4	1 … 3
Rated current **I_e**	A		Char. C: 10, 32 Char. K: 6...125
Rated frequency **f**	Hz	50/60	50/60
Rated insulation voltage **Ui** acc. to IEC/EN 60664-1	V	AC 500	AC 1000
Rated impulse withstand voltage Uimp (1.2/50µs)	kV	6	8
Overvoltage category		III	III
Pollution degree		3	2
Suitability for isolation		yes	yes
Data acc. to IEC/EN 60898-1			
Rated operational voltage **U_e**	V	AC 230/400	–
Rated short-circuit capacity **I_{cn}**	kA	230/400 V = 10 kA	–
Service short-circuit capacity **I_{cs}**	kA	230/400 V = 7.5 kA	–
Data acc. to IEC/EN 60947-3			
Rated operational voltage **Ue**	V	–	–
Min. operating voltage	V	–	–
Rated short-term withstand current **Icw**	kA	–	–
Rated short-circuit making capacity **Icm**	kA	–	–
Utilisation category		–	–
Data acc. to IEC/EN 60947-2			
Rated operational voltage **Ue**	V	AC 230/400	AC 580/1000
Rated ultimate short-circuit capacity **I_{cu}**	kA	AC 230 V = 16 kA AC 230/400 V = 16 kA DC 75 V (1-pole) = 10 kA DC 150 V (2-pole) = 10 kA DC 225 V (3-pole = 10 kA DC 300 V (4-pole) = 10 kA	AC 580/1000 (6 … 63 A) = 4kA (80 … 125 A) = 3kA
Rated service short-circuit capacity **I_{cs}**	kA	AC 230 V = 10 kA AC 230/400 V = 10 kA	2.5 (6 … 63 A) 2 (80 … 125 A)
Data acc.to UL 1077, Supplementary Protector			
Poles			3
Rated voltage **U_n**	V		AC 600
Rated current **I_n**	A		10 ... 32
Characteristic			C, K
Short - circuit breaking capacity **I_{cc}**	kA		AC 600 Y = 15 kA with XT2L 125A TMF35-400

		S800B B, C, D, K	S800HV C, K
Mechanical Data			
Housing		Material group I, RAL 7035	Material group I, RAL 7035
Toggle		black, lockable	black, lockable
Classification acc. to NF F 126-101, NF F 16-102		I3, F2	I3, F2
Protection degree acc. to EN 60529		IP20; IP40 (actuating end only)	IP20; IP40 (actuating end only)
Classification acc. to IEC 61373 (shock and vibration)			Cat. 1, Class B
Shock resistance acc. to IEC/EN 60068-2-27			Test Ea: 5 g / 30 ms
Vibration resistance acc. to IEC/EN 60068-2-6			Test Fc: 2–13.2 Hz/1 mm 13.2–100 Hz/0.7 g with load 100 % x I_e
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	°C/RH		12 + 12 cycle with 55 °C/90–96 % and 25 °C/95–100 %
Environmental conditions (dry heat) acc. to IEC/EN 60068-2-2 Test B	°C/RH		16 hours 55°C / 2 hours 70°C / 55% RH
Ambient temperature	°C	–25 … +60	–25 … +60
Storage temperature	°C	–40 … +70	–40 … +70
Installation			
Terminal		Failsafe cage or ringlug terminal	Failsafe cage terminal
Connections (top/bottom) – Cu only	mm^2	1 … 50 stranded 1 … 70 flexible	1 … 50 stranded 1 … 70 flexible
Tightening torque	Nm	3.5	3.5
	in-lbs.	31	
Screwdriver		POZI 2	POZI 2
Mounting		EN 60715	EN 60715
Mounting position		any	any
Supply		any	any
Dimensions and weight			
Pole dimensions (H x L x W)	mm	82.5 x 95 x 26.5	142 x 82.5 x 26.5
Pole weight	g	ca. 240	0.27

High performance MCBs

S800PV series technical features

2CCC413002F0021

S800PV

			S800PV-SP
General Data	Standards		IEC / EN 60947-2 and Annex P
	Poles		2 ... 4
	Tripping characteristics		B
	Rated current Ie	A	5 ... 125
	Rated frequency f	Hz	-
	Rated insulation voltage Ui acc. to IEC/EN 60664-1	V	DC 1500
	Rated impulse withstand voltage Uimp. (1.2/50µs)	kV	8
	Overvoltage category		III
	Pollution degree		2
	Suitability for isolation		yes
Data acc. to IEC/EN 60947-2	Rated operational voltage Ue	V	2-pole DC 800V: 5 ... 125A 3-pole DC 1200V: 5 ... 125A 4-pole DC 1500V: 5 ... 125A
	Min. operating voltage	V	-
	Rated ultimate short-circuit capacity Icu	kA	5 ... 16 A **acc. IEC 60947-2 Annex P.**, Icu 5 kA 20 ... 125 A **acc. IEC 60947-2**, Icu 5 kA 20 ... 125 A **acc. IEC 60947-2 Annex P.**, Icu 3 kA
	Rated service short-circuit capacity Ics	kA	Ics = Icu
	Reference temperature for tripping characteristics	°C	40°C
	Electrical and Mechanical Endurance	ops.	**acc. to Annex P:** 5 ... 16A: 300 electrical cycles 9700 mechanical cycles **acc. to IEC 60947-2 (general part):** 20 ... 100A: 1500 electrical cycles 8500 mechanical cycles 125A: 1000 electrical cycles 9000 mechanical cycles
Mechanical Data	Housing		Material group I, RAL 7035
	Toggle		black, lockable
	Classification acc. To NF F 126-101, NF F 16-102		-
	Protection degree acc. to EN 60529		IP20; IP40 (actuating end only)
	Shock resistance acc. to IEC/EN 60068-2-30		IEC 61373 Cat. 1 Class B, 5g / 30ms acc. To IEC 60068-27 Test Ea
	Vibration resistance acc. to IEC/EN 60068-2-6		IEC 60068-2-6 Test Fc; 2 - 13.2Hz /1mm 13.2 - 100Hz / 0.7g with load 100% x Ie
	Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	°C/RH	12 + 12 cycle with 55°C / 90-96% and 25% / 95-100%
	Environmental conditions (dry heat) acc. to IEC/EN 60068-2-2 Test B	°C/RH	16 hours 55°C / 2 hours 70°C with damp heat 55%
	Ambient temperature	°C	-25 ... + 60
	Storage temperature	°C	-40 ... +70
Installation	Terminal		Failsafe cage or ringlug terminal
	Stranded Cross-section of conductors (top / bottom)	mm^2	1 ... 50
	Flexible Cross-section of conductors (top/ bottom)	mm^2	1 ... 70
	Tightening torque	Nm	3,5
		in-lbs.	31
	Screwdriver		POZI 2
	Mounting		any
	Mounting position		any
	Supply		any
Dimensions and weight	Pole dimensions (H x L x W)	mm	95 x 26.5 x 82.5
	Pole weight	g	240
Combination with aux. elements	Auxiliary contact		yes
	Combined auxiliary- / signal contact		yes
	Shunt trip		yes
	Undervoltage release		yes
	Shunt open release		yes
	Motor Operating Device		yes

High performance MCBs

S802PV-M-H and S804PV-SD technical features

		S802PV-M-H	S800PV-SD
General Data			
Tripping characteristics		none	none
Standards		IEC / EN 60947-3	IEC / EN 60947-3 and Annex D
Poles		2 (polarized)	2 ... 4
Rated current I_e	A	32, 63, 100	32, 63, 125
Rated insulation voltage U_i acc. to IEC/EN 60664-1	V	DC 1500	DC 1500
Rated impulse withstand voltage $U_{imp.}$ (1.2/50 µs)	kV	8	8
Overvoltage category		III	III
Pollution degree		2	2
Suitability for isolation		yes	yes
Data acc. to IEC/EN 60947-3			
Rated operational voltage U_e	V	DC 1000 V: 2-pole	DC 800V: 2-pole DC 1200V: 3-Pole DC 1500 V: 4-pole
Min. operating voltage	V	-	-
Rated short-term withstand current I_{cw}	kA	1.5	1.5
Rated short-circuit making capacity I_{cm}	kA	0.5	0.5
Utilisation category		DC-21 A	DC-21 A, DC-PV2
Electrical and Mechanical Endurance	ops.	1500 electric; 8500 mechanic	32, 63A: 1500 electric; 8500 mechanic 125 A: 1000 electrical, 7000 mechanic acc. to IEC 60947-3
Mechanical Data			
Housing		Material group I, RAL 7035	Material group I, RAL 7035
Toggle		black, lockable	black, lockable
Classification acc. To NF F 126-101, NF F 16-102		-	-
Protection degree acc. to EN 60529		IP20; IP40 (actuating end only)	IP20; IP40 (actuating end only)
Shock resistance acc. to IEC/EN 60068-2-30		IEC 61373 Cat. 1 Class B, 5 g / 30 ms acc. To IEC 60068-27 Test Ea	IEC 61373 Cat. 1 Class B, 5 g / 30 ms acc. To IEC 60068-27 Test Ea
Vibration resistance acc. to IEC/EN 60068-2-6		IEC 60068-2-6 Test Fc; 2 - 13.2 Hz/1 mm 13.2 - 100 Hz/0.7 g with load 100 % x I_e	IEC 60068-2-6 Test Fc; 2 - 13.2 Hz/1 mm 13.2 - 100 Hz/0.7 g with load 100 % x I_e
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	°C/RH	12 + 12 cycle with 55 °C/90 - 96 % and 25 °C/95 - 100 %	12 + 12 cycle with 55 °C/90 - 96 % and 25 °C/95 - 100 %
Environmental conditions (dry heat) acc. to IEC/EN 60068-2-2 Test B	°C/RH	16 hours 55 °C/2 hours 70 °C with damp heat 55 %	16 hours 55 °C/2 hours 70 °C with damp heat 55 %
Ambient temperature	°C	-25 ... +60	-25 ... +60
Storage temperature	°C	-40 ... +70	-40 ... +70
Installation			
Terminal		Failsafe cage or ringlug terminal	Failsafe cage or ringlug terminal
Connections (top/bottom) - C_u only	mm^2	1 ... 50 stranded 1 ... 70 flexible	1 ... 50 stranded 1 ... 70 flexible
Tightening torque	Nm	3.5	3.5
	in-lbs.	31	31
Screwdriver		POZI 2	POZI 2
Mounting		any	any
Mounting position		any	any
Supply		any (taking into account the polarization)	any (taking into account the polarization)
Dimensions and weight			
Pole dimensions (H x L x W)	mm	95 x 26.5 x 82.5	95 x 26.5 x 82.5
Pole weight	g	240	240

Switch disconnectors

Isolator - SHD200 series

SHD 200

Technical data

Electrical Data

Standards DIN	IEC/EN 60947-3
Number of poles	1P, 2P, 3P, 4P
Rated current In	16□.....63 A
Rated voltage Ue	240/415 V AC
Rated frequency f	50/60 Hz
Rated breaking capacity	IN 16□....63 A AC-22A (1..4-pole)
	IEC/EN 60947-3
Protection fuse	NH 00 gL-gG . Rated current SHD 200
Short-circuit withstand capacity	16□.....63 A (1- to 4-pole): 10 Ka
Surge withstand capability Uimp	4 kV (EN 60947-1)
Min. voltage Umin.	12 V AC
Min. contact loading	24 V AC; 4 mA

Mechanical Data

Housing	grey, RAL 7035
Toggle	red (RAL 3000)
Contact position indication	on toggle (I ON / 0 OFF), on dome (I / 0)
Protection degree acc. to IEC EN 60529	IP20, IP40 in enclosure with cover
Electrical endurance	16□....25A: 20,000 ops ..16..63A: 1.500 ops.,32...63 A: 10,000 ops.
Mechanical endurance	20.000 ops.
"Environmental conditions acc. to IEC 68 60068-2-30"	28 cycles @55°c/90-95% 28 cycles @25°c/95-100%
Ambient temperature	-25... +55 □0C
Storage temperature	-40... +70 □0C

Installation

Terminal size	2,5 to 25 mm²
Tigthening torque	2 Nm
Screw driver	Nr. 2 Pozidrive
Mounting	On DIN rail 35 mm acc. to EN 60715 by fast clip
Mounting position	any
Supply	any

Dimensions and weight

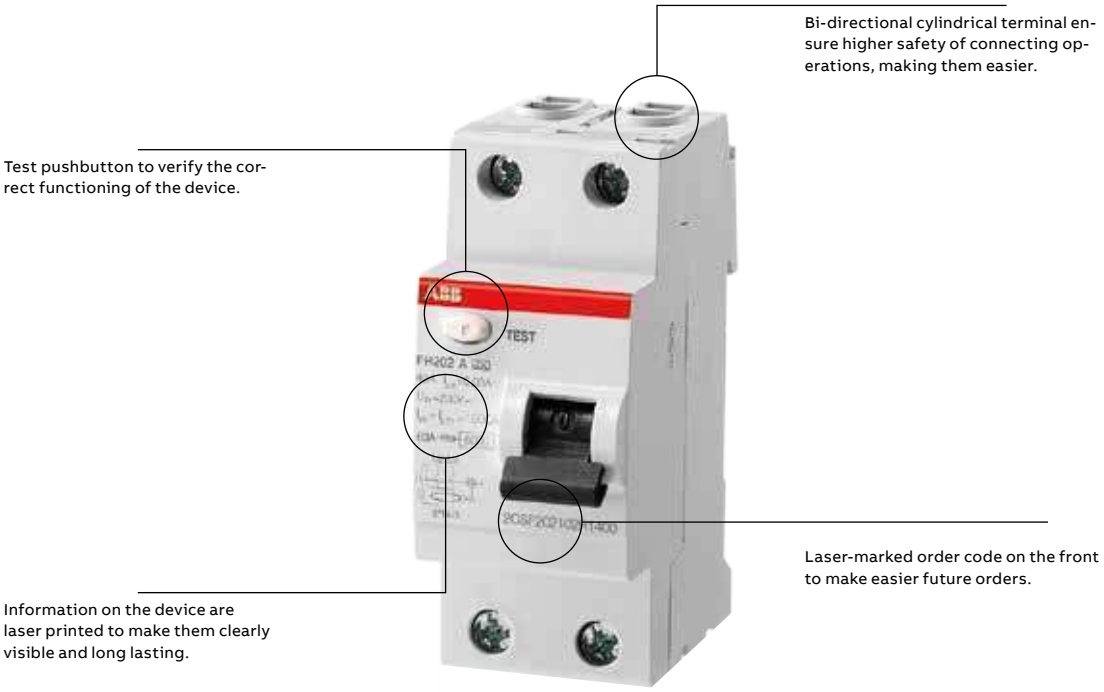
Mounting dimensions acc. to DIN 43880	Frame Size 1
Pole dimensions (H x D x W)	85 x 69 x 17,5 mm

Isolator – E200 Series

E 200

Standards DIN	IEC/EN 60947-3
Number of poles	1P, 2P, 3P, 4P
Rated current In	16 ... 125 A
Rated voltage Ue	230/400 V AC; 60 V DC
Rated frequency f	50/60 Hz; DC
Min. voltage Umin.	12 V AC/DC
Electrical endurance	16 ... 100 A: 1,500 ops., 125 A: 1,000 ops.
Mechanical endurance	20,000 ops.
Ambient temperature	-25 ... +55 °C
Storage temperature	-40 ... +70 °C
Terminal size	2.5 to 50 mm2
Cross-section busbar	≥ 16 mm2
Tigthening torque	2.5 Nm
Pole dimensions (H x D x W)	85 x 70 x 17.5 mm

Residual current circuit breaker (RCCB)
FH 200 Series



Technical Data	FH200
Standards	**IEC/EN 61008; IS 12640–1: 2008**
Type (wave form of the earth leakage sensed)	AC
Poles	2P, 4P
Rated current I_n	25, 40, 63 A
Rated sensitivity $I_{\Delta n}$	30, 100, 300 mA
Rated voltage U_e	230/400 - 240/415 V
Insulation voltage U_i	500 V
Max. operating voltage of circuit test	254 V
Min. operating voltage of circuit test	110 V
Rated frequency	50..60 Hz
Dielectric test voltage at ind. freq. for 1 min.	2.5 kV
Mechanical features	
Toggle	BLACK sealable in ON-OFF position
Contact position indicator (CPI)	not available
Ambient temperature (with daily average ≤ +35 °C)	-5..+40 °C
Storage temperature	-40…+70 °C
Installation	
Terminal type	Failsafe bi-directional cylinder-lift terminal at top and bottom (shock protected)
Terminal size top/bottom for cable	25/25 mm^2
Terminal size top/bottom for busbar	10/10 mm^2
Tightening torque	2.8 N*m
Connection	from top and bottom
Accessories mountability	No

RCCBs

F200 technical features


2CSC400565F0201

	Standards		
Electrical features	Type (wave form of the earth leakage sensed)		
	Poles		
	Rated current In		A
	Rated sensitivity IΔn		A
	Rated voltage Ue	IEC	V
		UL/CSA	V
	Insulation voltage Ui		V
	Operating voltage of circuit test Ut	IEC	V
		UL/CSA	V
	Rated frequency		Hz
	Rated conditional short-circuit current Inc=IΔ③	SCPD - fuse gG 100 A	kA
	Rated residual breaking capacity IΔm=Im		kA
	Rated impulse withstand voltage (1.2/50) Uimp		kV
	Dielectric test voltage at ind. freq. for 1 min.		kV
	Overvoltage category		
	Surge current resistance (wave 8/20)		A
Mechanical features	Toggle		
	Contact position indicator (CPI)		
	Electrical life		
	Mechanical life		
	Protection degree	housing	
		terminals	
	Environmental conditions (damp heat) acc. to	IEC/EN 60068-2-30	°C/RH
	Ambient temperature (with daily average ≤ +35 °C)	IEC	°C
	Storage temperature		°C
Installation	Terminal type		
	Terminal size top/bottom for cable	IEC	mm²
		UL/CSA	AWG
	Terminal size top/bottom for busbar	IEC	mm²
		UL/CSA	AWG
	Tightening torque	IEC	Nm
		UL/CSA	in-lbs.
	Tool		
	Mounting		
	Mounting position		
	Connection		
	Withdrawal from busbar		
Dimensions and weight	Dimensions (H x D x W)	2P	mm
		4P	mm
	Weight	2P	g
		4P	g
Combination with auxiliary elements	Combinable with:	auxiliary contact	
		signal contact/auxiliary switch	
		shunt trip	
		undervoltage release	

① Ground-fault sensing and relaying equipment-component (up to 63 A)
② prior to connection of aluminium conductors (≥ 4 mm²) ensure that their contact points are cleaned, brushed and coated with grease
③ for S700-E/K 100A, S750-E 63A, S750DR-E/K 63A and other SCPD coordination values see Chapter 3 of Solutions for electrical distribution in buildings - technical details
④ F200 left neutral has not the UL certification and the UL mark
⑤ Only for versions with marking according to EN 61008-1; EN 61008-2-1
⑥ Neutral conductor can be wired anywhere for 2P devices

F200 AC	F200 A	F200 A AP-R	F200 A S	F200 A 110V	F200 A 400 Hz	F200 A 16 2/3 Hz
IEC/EN 61008-1; IEC/EN 61008-2-1, UL 1053 ①				IEC 61008-1; IEC 61008-2-1; UL 1053	IEC/EN 61008-1; IEC/EN 61008-2-1	IEC/EN 61008-1; IEC/EN 61008-2-1
AC	A	A	A	A	A	A
2P ⑥, 4P (for 125 A only 4P)				2P, 4P	4P	2P, 4P
16, 25, 40, 63, 80, 100, 125		25, 40, 63, 80, 100, 125	40, 63, 80, 100, 125	25, 40, 63, 80, 100	25, 40	63
0.01-0.03-0.1-0.3-0.5		0.03	0.1-0.3-0.5-1	0.03	0.03	0.03-0.3-0.5
230/400 - 240/415						
480Y/277 (up to 100 A)				-	-	
500						
In ≤ 100; Right neutral: 110 (170 for 30mA) - 254 ⑤; Left neutral: 195 (250 for 30 mA) - 440 ⑤ In = 125 A; Right neutral: 185 (150 for 30 mA) - 440 (250 for 30 mA) ⑤; Left neutral: 195 (250 for 30 mA) - 440				110-254	170-254	110 (170 for 30 mA) - 254
In ≤ 100; Right neutral: 110 (170 for 30mA) - 277 ⑤; Left neutral: 195 (250 for 30 mA) - 480 ⑤ ④					-	
50…60					50...400	16 2/3
10 (for 125 A fuse is gG 125 A)						
1 (1.25 for 125 A)						
4						
2.5						
III, disconnector abilities						
NA		3000	5000	NA	NA	NA
blue sealable in ON-OFF position						
yes						
10000 (2000 for 125 A)				10000	10000	10000
20000 (5000 for 125 A)				20000	20000	20000
IP4X						
IP2X						
28 cycles with 55°C/90-96% and 25°C/95-100%						
-25…+55 (-25...+40 for 125 A)				-25...+55	-25...+55	-25...+55
-40…+70						
failsafe bi-directional cylinder-lift terminal at top and bottom (shock protected) (cage for In > 63 A) ②						
25/25 (35/35 single slot terminal for In > 63 A)					25/25	25/25
18-4 (up to 63 A)				-	-	
10/10 (not for In = 80-100 A)					10/10	10/10
18-8 (up to 63 A)				-	-	
2.8 (3 for In = 125 A)				2.8	2.8	2.8
25 (up to 63 A)				-	-	
Nr. 2 Pozidriv						
on DIN rail EN 60715 (35 mm) by means of fast clip device						
Any						
from top and bottom						
it is possible without using any tools only from the bottom (not for 125 A)						
85 x 69 x 35					-	
85 x 69 x 70 (85 x 69.5 x 72 for 125 A)					85 x 69 x 70	85 x 69 x 70
200					-	
350 (380 for In = 80 and 100 A and 460 for In = 125A)					350	350
yes (no for 125 A)					yes	yes
yes					yes	yes
yes (no for 125 A)					yes	yes
yes (no for 125 A)					yes	yes

RCD-blocks

DDA200 technical features

DDA 200

Standards		
Operating characteristic: type		
Rated current In		[A]
Poles		
Rated voltage Ue	2P	[V]
	3P	
	4P	
Insulation voltage Ui		[V]
Operating voltage of circuit test Ut	2P	[V]
	3P	
	4P	
Rated frequency		Hz
Rated breaking capacity according to	IEC EN 61009	[A]
Rated breaking capacity according to	IEC EN 60947-2	[A]
Rated residual breaking capacity IΔm		[kA]
Rated inpulse withstand capacity (1,2/50) Uimp		[kV]
Dielectric test voltage at ind. freq. for 1 min.		[kV]
Surge current resistance (wave 8/20)		[A]
Rated sensitivity IΔn		[A]
Toggle		
Electrical life		
Mechanical life		
Protection degree	housing	
	terminals	
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30		[°C/RH]
Ambient temperature (with daily average ≤ +35 °C)		[°C]
Storage temperature		[°C]
Terminal type	2P	
	3P/4P In=25 and 40 A	
	3P/4P In=63 A	
Terminal size	2P	[mm²]
	3P/4P In=25 and 40 A	[mm²]
	3P/4P In=63 A	[mm²]
Tightening torque	2P	[Nm]
	3P/4P In=25 and 40 A	[Nm]
	3P/4P In=63 A	[Nm]
Mounting		
Dimensions	2P	[mm]
H x P x L	3P/4P In=25 and 40 A	[mm]
	3P/4P In=63 A	[mm]
Weight	2P	[g]
	3P/4P In=25 and 40 A	[g]
	3P/4P In=63 A	[g]
Combinable with	S 200 L	
	S 200	
	S 200 M	
	S 200 P	

a All RCD-blocks DDA 200 with rated current 63 A are provided with two additional terminals for remote tripping.

b DDA200 A AE is provided with two additional terminals for remote release in positive safety.

A remote control circuit should be connected to those terminals where circuit breakers or push buttons with normally closed contacts should be inserted.

DDA 200 AC	DDA 200 A	DDA 200 A AP-R	DDA 200 A AE	DDA 200 A S	DDA 200 B
				IEC EN 61009 App.G	IEC EN 62423
AC	A	A	A	A	B
	25, 40, 63 a	25, 40, 63 a	63 b	63 a	25-40-63
				2P, 3P, 4P	2P, 3P, 4P
	230 (400 for special execution @400 V)		230	230	230
		230/400	400	400	400
		230/400	230/400	230/400	230/400
					500
	110-254 (400 for special execution @400 V)		184-264	110-254	195-254 (170-254 for 30 mA)
	195-440 (110-254 for special execution @110 V)		310-440	195-440	310-440 (300-440 for 30 mA)
	195-440 (110-254 for special execution @110 V)		184-264	195-440	195-254 (300-440 for 30 mA)
					50...60
					same of the coupled MCB
					same of the coupled MCB
					same of the coupled MCB
					4
					2,5
	250	3000	250	5000	3000 (5000 for selective types)
	0.01-0.03-0.1-0.3-0.5-1	0.03	0.03-0.3-0.5-1	0.1-0.3-0.5-1	0.03 - 0.3 - 0.5
					blue
					10000
					20000
					IP4X
					IP2X
					28 cycles with 55°C/90-96% and 25°C/95-100%
					-25...+55
					-40...+70
					bi-directional cylinder-lift
				cage type	-
					bi-directional cylinder-lift
					(rigid or flexible) up to 25
				(rigid or flexible) up to 16	-
					(rigid or flexible) up to 25
					2.8
				1.2	-
					2.8
					on DIN rail EN 60715 (35 mm) by means of fast clip device
				85 x 69 x 35	85 x 69 x 70
				85 x 69 x 35	85 x 69 x 70
				85 x 69 x 70	85 x 69 x 70
				175	350
				175	375
				325	395
					yes
					yes
					yes
					yes

RCBOs

DS201 technical features

DS201 L

	Standards		
Electrical features	Type (wave form of the earth leakage sensed)		
	Poles		
	Rated current In		A
	Rated sensitivity IΔn		A
	Rated voltage Ue		V
	Insulation voltage Ui		V
	Operating voltage of circuit test Ut		V
	Rated frequency		Hz
	Rated breaking capacity acc. to IEC/EN 61009	ultimate Icn	A
	Rated breaking capacity acc. to IEC/EN 60947-2	ultimate Icu	kA
	1P+N @230 VAC	service Ics	kA
	Rated residual breaking capacity IΔm		kA
	Rated impulse withstand voltage (1.2/50) Uimp		kV
	Dielectric test voltage at ind. freq. for 1 min.		kV
	Thermomagnetic release characteristic	B: 3 In ≤ Im ≤ 5 In	
		C: 5 In ≤ Im ≤ 10 In	
		K: 10 In ≤ Im ≤ 14 In	
	Surge current resistance (wave 8/20)		A
Mechanical features	Toggle		
	Flag indicators		
	Electrical life		
	Mechanical life		
	Protection degree	housing	
		terminals	
	Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30		°C/RH
	Reference temperature for setting of thermal element		°C
	Ambient temperature (with daily average ≤ +35 °C)		°C
	Storage temperature		°C
Installation	Terminal type	top	
		bottom	
	Terminal size top/bottom for cables		mm^2
	Terminal size top/bottom for busbar		mm^2
	Tightening torque top/bottom		Nm
	Mounting		
	Mounting position		
	Connection		
Dimensions and weight	Dimensions (H x D x W)		mm
	Weight		g
Combination with auxiliary elements	Combinable with:	auxiliary contact	
		signal contact	
		shunt trip	
		undervoltage release	

DS201 L			DS201			DS201 M			DS201 M 110V
IEC/EN 61009-1; IEC/EN 61009-2-1									IEC 61009-1; IEC 61009-2-1
AC	A	APR	AC	A	APR	AC	A	APR	A
1P+N									
6 ≤ In ≤ 32			1 ≤ In ≤ 40			4 ≤ In ≤ 40			6 ≤ In ≤ 40
0.03-0.3	0.01-0.03-0.3	0.03	0.03-0.1-0.3-1	0.01-0.03-0.1-0.3	0.03-0.1-0.3	0.03-0.1-0.3	0.01-0.03-0.1-0.3	0.03-0.1-0.3	0.03
230-240									
500									
110 (170 for 30 mA) - 254									110-254
50…60									
4500			6000			10000			10000
6			10			10			10
4.5			6			7.5			7.5
4.5			6			6			6
4									
2.5									
			■	■		■	■		■
■	■	■	■	■	■	■	■	■	■
				■			■		
NA for A, AC versions; 3000 for APR version									
black sealable in ON-OFF position									
differential trip indicator (blue)									
contact position indicator (green/red)									
10000									
20000									
IP4X									
IP2X									
28 cycles with 55°C/90-96% and 25°C/95-100%									
30									
-25…+55									
-40…+70									
failsafe bi-directional cylinder-lift terminal at top and bottom (shock protected)									
failsafe bi-directional cylinder-lift terminal at top and bottom (shock protected)									
25/25									
10/10									
2.8									
on DIN rail EN 60715 (35 mm) by means of fast clip device									
Any									
from top and bottom									
85 x 69 x 35									
239									
yes									
yes									
yes									
yes									

RCD blocks

DDA800-technical features

DDA 800

					DDA 800 AC
		Standards			IEC/EN 60947-2 Ann. B
	Electrical features	Type (wave form of the earth leakage sensed)			AC
		Poles			2P, 3P, 4P
		Rated current In		A	63
		Rated sensitivity IΔn		A	0.03-0.3
		Rated voltage Ue		V	230/400 - 240/415 - 400/690
		Insulation voltage Ui		V	690
		Max. operating voltage of circuit test		V	690
		Min. operating voltage of circuit test		V	195
		Rated frequency		Hz	50...60
		Rated breaking capacity (Icn) acc. to IEC /EN 60947-2		A	according to the breaking capacity of the associated MCB
		Rated residual breaking capacity IΔm	with S 800 C	kA	according to the Icu of the associated MCB
			with S 800 N	kA	according to the Icu of the associated MCB
			with S 800 S	kA	according to the Icu of the associated MCB
		Rated impulse withstand voltage (1.2/50) Uimp		kV	6
		Dielectric test voltage at ind. freq. for 1 min.		kV	2.5
		Surge current resistance (wave 8/20)		A	250
	Mechanical features	Toggle			blue operating just from OFF position
		Electrical life			10000
		Mechanical life			20000
		Protection degree	housing		IP4X
			terminals		IP2X
		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%
		Ambient temperature (with daily average ≤ +35 °C)		°C	-25...+60
		Storage temperature		°C	-40...+70
		Terminal size for cables	flexible	mm^2	6...50
			rigid	mm^2	6...70
		Tightening torque		Nm	min. 3 / max. 4
		Mounting			on DIN rail EN 60715 (35 mm) by means of rapid fixing device
	Dimensions and weight	Dimensions (H x D x W)	2P	mm	108.2 x 82.3 x 81
			3P	mm	108.2 x 82.3 x 117
			4P	mm	108.2 x 82.3 x 117
		Weight	2P	g	300 for 63 A - 415 for 100 A
			3P	g	400 for 63 A - 640 for 100 A
			4P	g	460 for 63 A - 765 for 100 A
	Combination with MCBs	Combinable with:	S 800 N		yes
			S 800 S		yes

Note: Also available in A type, A AP-R type and A S type

RCCB / RCBO
Solution for unwanted tripping – AP-R type (high immunity)

The ABB range of AP-R anti-disturbance residual current circuit-breakers and blocks was designed to overcome the problem of unwanted tripping due to overvoltages of atmospheric or operation origin.

The electronic circuit in these devices can distinguish between temporary leakage caused by disturbances on the mains and permanent leakage due to actual faults, only breaking the circuit in the latter case.

AP-R residual current circuit-breakers and blocks have a slight delay into the tripping time, but this does not compromise the safety limits set by the Standards in force (release time at 2 IΔn=150 ms). Compared with standard type breakers, AP-R residual current breakers are therefore characterised, for any given sensibility, by:

- Higher residual trip current
- Tripping time delay
- Better resistance to overvoltages, harmonics and impulse disturbances.

Guaranteeing conventional residual current protection, their installation in the electrical circuit therefore allows any unwanted tripping to be avoided in domestic and industrial systems in which service continuity is essential.
This delay makes the AP-R residual current devices especially suited for installations involving motor starters/variable speed drives, fluorescent lamps or IT/electronic equipment.

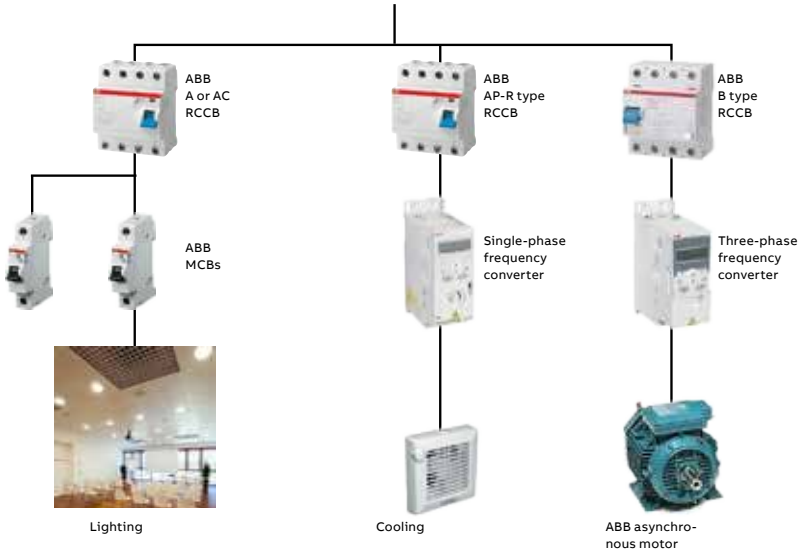
The use of multiple electronic reactors for the supply of fluorescent lamps instead generates permanent leakage currents and inrush currents that can cause nuisance tripping of a standard residual current circuit breaker.

IT system loads and other electronic equipment (e.g. dimmers, computers, inverters) with capacitive input filters connected between the phases and ground can also generate permanent earth leakage currents whose sum may provoke the nuisance tripping of a standard residual current circuit breaker. For these situations, the AP-R breakers allow a greater number of devices to be connected to the installation.

Frequency converters include a rectifier section and an inverter section.

In case of fault within a single-phase frequency converter AP-R type RCDs provide complete protection, because an earth fault occurring downstream the inverter, produces an earth fault current with multi-frequency shape with high amount of harmonics.

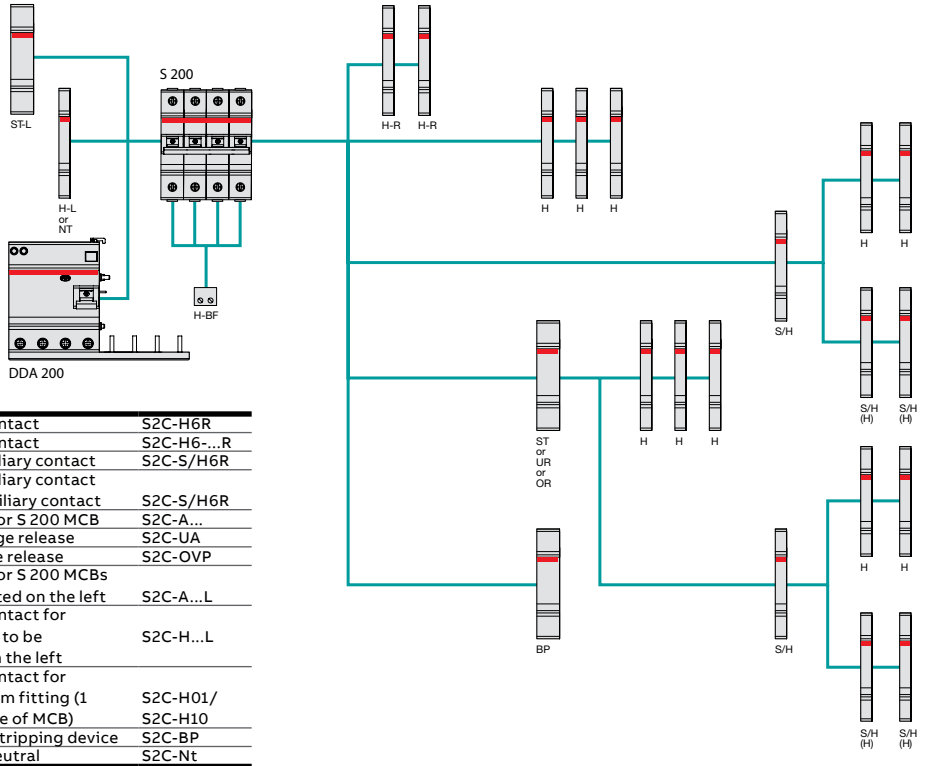
While, in case of fault within a three-phase frequency converter, B type RCDs ensure complete protection because in case of insulation fault between the rectifier and the inverter or downstream the inverter we can have a smooth DC earth fault current.



Auxiliary elements and accessories

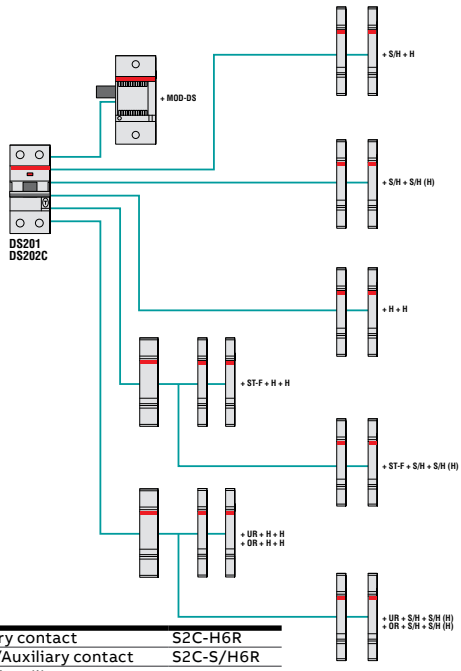
for MCBs S 200 and RCDs F 200 and DS 200 series

Combination of auxiliary elements with S 200, DDA 200 + S 200 or DS 200



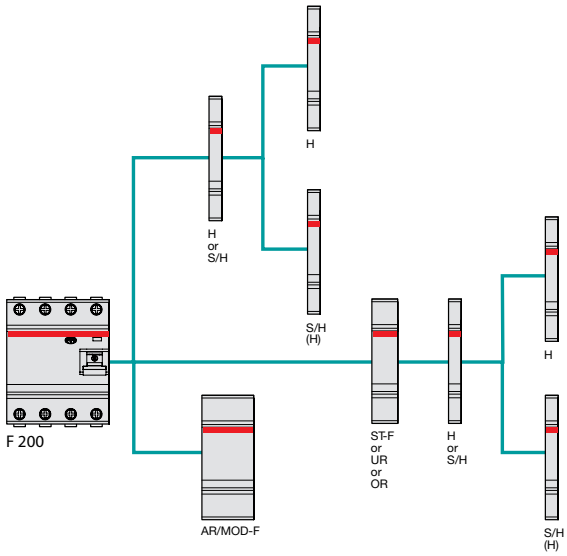
H	Auxiliary contact	S2C-H6R
H-R	Auxiliary contact	S2C-H6-...R
S/H	Signal/Auxiliary contact	S2C-S/H6R
S/H (H)	Signal/Auxiliary contact used as auxiliary contact	S2C-S/H6R
ST	Shunt trip for S 200 MCB	S2C-A...
UR	Undervoltage release	S2C-UA
OR	Overvoltage release	S2C-OVP
ST-L	Shunt trip for S 200 MCBs to be mounted on the left	S2C-A...L
H-L	Auxiliary contact for S 200 MCBs to be mounted on the left	S2C-H...L
H-BF	Auxiliary contact for MCBs bottom fitting (1 for each pole of MCB)	S2C-H01/ S2C-H10
BP	Mechanical tripping device	S2C-BP
NT	Switched neutral	S2C-Nt

Combination of auxiliary elements with DS201, DS202C



H	Auxiliary contact	S2C-H6R
S/H	Signal/Auxiliary contact	S2C-S/H6R
S/H (H)	Signal/Auxiliary contact used as auxiliary contact	S2C-S/H6R
ST-F	Shunt trip for F 200 RCCB	F2C-A
UR	Undervoltage release	S2C-UA
OR	Overvoltage release	S2C-OVP
MOD-DS	Motor operating device	DS2C-CM

Combination of auxiliary elements with F 200



H	Auxiliary contact	S2C-H6R
S/H	Signal/Auxiliary contact	S2C-S/H6R
S/H (H)	Signal/Auxiliary contact used as auxiliary contact	S2C-S/H6R
UR	Undervoltage release	S2C-UA
OR	Overvoltage release	S2C-OVP
AR	Auto reclosing unit	F2C-ARI
MOD-F	Motor operating device	F2C-CM
ST-F	Shunt trip for F 200 RCCB	F2C-A

Earth Leakage Relay
Front panel mountable

ELR front panel residual current relay
Front panel residual current relays are electronic devices used in combination with an external toroidal transformer. They are according to the protection standard IEC/EN 60947-2 Annex-M.
The sensitivity can be set from 0.03 A to 30 A, while the tripping time from 0 to 5 seconds.
Residual current relays are available in versions 48x48 mm, 72x72 mm, and 96x96 mm.
The Fail Safe function is available for versions ELR48P, ELR72P and ELR96P: the contacts switch when there is no auxiliary power. The ELR96PF version is equipped with Fail Safe function, fault memory LED, and a frequency filter, that ensure continuity of service in the presence of harmonics.
ELR96PD has (in addition to these functions) a digital display for an instantaneous view of the residual current IΔn.

Compliance to IEC/ EN 60947-2 Annex M
The new range of ELR products from ABB comply with IEC/ EN 60947-2 Annex M and is tested within a configuration that includes residual current relay, toroid, shunt-trip, MCCB/MCB available in ABB offer.

The new range of ELR front panel residual current relays has been tested in combination with miniature circuit breaker (S200 range) and moulded case circuit breakers (Tmax series up to T5 630 A) conforming with IEC/EN 60947-2 Annex M.

In order to ensure compliance to IEC/EN 60947-2 Annex M ABB has considered the following parameters:

Operational time: time that elapses between the occurrence of a fault and the intervention of the relay contacts.

Cumulative operational time: time that elapses between the occurrence of a fault and the intervention (opening) of the associated circuit breaker.

Non-operation time: delay, adjustable on the device, which defines how long the fault should last before the relay contacts switch. This value is important to ensure selectivity and resistance to unwanted tripping of the associated circuit breaker.

Technical features

		ELR48P	ELR72	ELR72P	ELR96	ELR96P	ELR96PF	ELR96PD
Operating voltage	[V]	24, 48,	24, 48,	24, 48, 110	24, 48, 110,	24, 48, 110,	110,	110,
		110, 230 a.c./	110, 230 a.c./	230, 400 a.c./	230, 400 a.c./	230, 400 a.c./	230, 400 a.c.	230, 400 a.c.
		24, 48, 115 d.c.	24, 48, 110 d.c.	24, 48 d.c.	24, 48 d.c.	24, 48 d.c.	24, 48 d.c.	24, 48 d.c.
Frequency	[Hz]	50 – 60	50 – 60	50 – 60	50 – 60	50 – 60	50 – 60	50 – 60
Frequency filter		-	-	-	-	-	Yes	Yes
Type		A	A	A	A	A	A	A
Operating temperature	[°C]	-10…+60	-10…+60	-10…+60	-10…+60	-10…+60	-10…+60	-10…+60
Power consumption	[W]	<7	<7	<7	<7	<7	<7	<7
Sensitivity setting IΔn	[A]	from 0,03 to 30	from 0,03 to 30	from 0,03 to 30	from 0,03 to 30	from 0,03 to 30	from 0,03 to 30	from 0,03 to 30
Tripping time setting Dt	[s]	from 0 to 5	from 0 to 5	from 0 to 5	from 0 to 5	from 0 to 5	from 0 to 5	from 0 to 5
Contacts	[no.]	2	1	2	1	2	2	2
Contact capacity	[A]				5 (250 V a.c.)			
Dimensions	[mm]	48 x 48	72 x 72	72 x 72	96 x 96	96 x 96	96 x 96	96 x 96
Digital display		-	-	-	-	-	-	Yes
Protection degree (with cover)		IP52	IP52	IP52	IP52	IP52	IP52	IP52
Protection degree (without cover)		IP40	IP40	IP40	IP40	IP40	IP40	IP40
Protection degree (terminals)		IP20	IP20	IP20	IP20	IP20	IP20	IP20
Standards		IEC EN 60947-2 Annex M	IEC EN 60947-2 Annex M	IEC EN 60947-2 Annex M	IEC EN 60947-2 Annex M	IEC EN 60947-2 Annex M	IEC EN 60947-2 Annex M	IEC EN 60947-2 Annex M

Residual current relays

DIN rail mountable

RD3 residual current relays
The RD3 family of electronic residual current relays provides residual current protection and monitoring functions according to IEC/EN 60947-2:2006 annex M and can be used in conjunction with all S 200 automatic devices and Tmax range moulded case devices up to T5, for industrial installations.
The RD3 residual current relays can provide status indications through two output contacts.

Technical features

	RD3/RD3-48	RD3M/RD3M-48	RD3P/RD3P-48
Operating voltage	RD3: 230-400 Vac +10% / -15%	RD3M: 230-400 Vac +10% / -15%	RD3P: 230-400 Vac +10% / -15%
	RD3-48: 12-48 Vac/Vdc +10% / -15%	RD3M-48: 12-48 Vac/Vdc +10% / -15%	RD3P-48: 12-48 Vac/Vdc +10% / -15%
Auxiliary supply frequency	50-60 Hz	50-60 Hz	50-60 Hz
Network monitored frequency	50-150 Hz a	50-150 Hz a	50-150 Hz a
Frequency filter	-	Yes	Yes
Type	A (up to IDn=5 A)	A (up to IDn=5 A)	A (up to IDn=5 A)
	AC (for higher current)	AC (for higher current)	AC (for higher current)
Operating temperature	-25....+70 °C	-25....+70 °C	-25....+70 °C
Power consumption	<3.6 W (RD3, RD3M, RD3P),	<3.6 W (RD3, RD3M, RD3P),	<3.6 W (RD3, RD3M, RD3P),
	<600 mW RD3-48, RD3M-48, RD3P-48)	<600 mW RD3-48, RD3M-48, RD3P-48)	<600 mW RD3-48, RD3M-48, RD3P-48)
Sensitivity settings IDn	0.03-0.1-0.3-0.5-1-2-3-5-10-30 A	0.03-0.1-0.3-0.5-1-2-3-5-10-30 A	0.03-0.1-0.3-0.5-1-2-3-5-10-30 A
Tripping time settings Dt	0-0.06-0.2-0.3-0.5-1-2-3-5-10 s	0-0.06-0.2-0.3-0.5-1-2-3-5-10 s	0-0.06-0.2-0.3-0.5-1-2-3-5-10 s
Pre-alarm threshold	-	60%	60%
Max. resistance connection between toroidal transformer and relay	3 W	3 W	3 W
Max. length connection of remote reset button	15 m	15 m	15 m
Output Contact capacity (7-8-9); (10-11-12)	8 A, 250 V a.c.	8 A, 250 V a.c.	8 A, 250 V a.c.
Led bar indicator	-	-	Yes
Max. cable terminals section	2.5 mm²	2.5 mm²	2.5 mm²
Modules	3	3	3
Dimensions	52.8 × 85 × 64.7 mm	52.8 × 85 × 64.7 mm	52.8 × 85 × 64.7 mm
Protection degree	IP20	IP20	IP20
Standards	IEC/EN 60947-2 annex. M	IEC/EN 60947-2 annex. M	IEC/EN 60947-2 annex. M

a RD3 can detect, as a monitor, sinusoidal earth fault currents in networks with frequencies between 50 Hz and 150 Hz.

Toroidal Transformers
The choice of toroidal transformers is made according to the useful diameter and the minimum value of the leakage current to be detected.

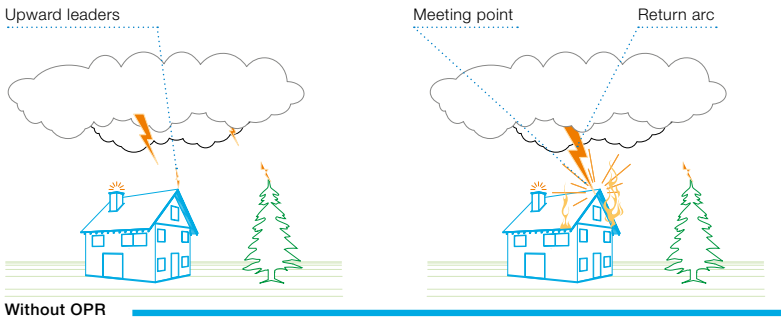
Type	Toroid useful diameter [mm]	Max rated current [A]	Min measurable current [mA]
TRM	29	65	1
TR1	35	75	1
TR2	60	85	1
TR3	80	160	1
TR4	110	250	1
TR4/A	110	250	1
TR160	160	400	1
TR160/A	160	400	1
TR5	210	630	1
TR5/A	210	630	1

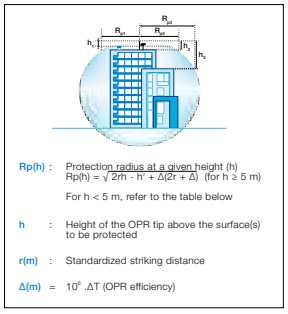
Table 1 shows toroidal transformers selection for use with ELR according to IEC/ EN 60947-2 Annex M in combination with

Type	Toroid useful diameter [mm]	Min measurable current [mA]	Maximum capacity [A]
TRM	29	30	160
TR1	35	30	250
TR2	60	30	400
TR3	80	100	800
TR4	110	100	1250
TR4/A	110	300	1250
TR160	160	300	2000
TR160/A	160	500	2000
TR5	210	300	3200
TR5/A	210	500	3200

Table 2 shows the technical features of the toroidal transformers.

OPR - Optimized pulse pod
External lightning protection





	LPL I	LPL II	LPL III	LPL IV
Rolling sphere radius r(m)	20	30	45	60

The OPR efficiency (ΔT)
Lightning is one of the most spectacular meteorological phenomena. Generated by the interaction of clouds elements (water and ice), it can kill, injure and damage. The unique efficiency of the OPR Early streamer emission is based on the difference (ΔT), measured in a laboratory, in between the emission time of the OPR and the one from a simple rod. The OPR ESE air terminal is composed of a striking point connected to a down conductor to conduct the lightning to the ground.

Complete autonomy
During a storm the ambient electric field may rise from 600 V to 10-20 kV/m. When the electric field reach this level representing a minimum risk for a lightning, the OPR begins to get activated and generates high voltage pulses, helping to create and propagating an upward leader. After a strike on the OPR, the lightning current is driven to ground by the down conductor to the earth termination system.

Radius of protection
The radius of protection (Rp) of the OPR is calculated according to the NF C 17-102 (edition 2011). It depends on the OPR efficiency (ΔT) expressed in micro-seconds.
The maximum value for ΔT is 60 µs.

The risk assessment shall be calculated according to the NF C 17-102 Annex A / IEC 62305-2 and will define the protection level (LPL I, II, III or IV) which will be used in the determination of the OPR radius of protection.

OPR radius of protection

Protection level		I (r = 20 m)			II (r = 30 m)			III (r = 45 m)			IV (r = 60 m)	
OPR	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60
h (m)												Radius of protection Rp (m)
2	19	25	31	22	28	35	25	32	39	28	36	43
3	29	38	47	33	42	52	38	48	58	43	57	64
4	38	51	63	44	57	69	51	65	78	57	72	85
5	48	63	79	55	71	86	63	81	97	71	89	107
6	48	63	79	55	71	87	64	81	97	72	90	107
8	49	64	79	56	72	87	65	82	98	73	91	108
10	49	64	79	57	72	88	66	83	99	75	92	109
15	50	65	80	58	73	89	69	85	101	78	95	111
20	50	65	80	59	74	89	71	86	102	81	97	113
45	43	65	76	58	75	89	75	90	105	89	104	119
50	40	65	74	57	75	88	75	90	105	89	104	120
55	36	65	72	55	75	86	74	90	105	90	105	120
60	30	65	69	52	75	85	73	90	104	90	105	120

Surge protection devices (OVR)

Type 1 – Spark gap type

Description

Type 1 surge protective devices are designed to discharge high current surges without any destruction of the installation. These surge protective devices are characterized by their capacity to withstand impulse current with 10/350 µs wave form which simulate natural lightning current.Type 1 SPDs can be installed at the entrance in the main switch board for a global protection of the electrical installation.

Technical features						**Type 1**
						OVR T1 25 TS
Technology						**Triggered spark-gap**
Electrical features						
Standard						IEC 61643-1 / EN 61643-11
Type / test class						1 / I
Poles		1P -	1P -, 2P 2L	3P 3L	4P 4L	1P+N 1N	3P+N 3N
Types of networks		IT - TNS	TNS-TNC	TNC	TNS	TT - TNS	TT - TNS
Type of current							A.C.
Nominal voltage Un (L-N/L-L)	V	400	230	230/400		230/400	230/400
Max. cont. operating voltage Uc	V	440		255		-	-
Max. cont. operating voltage Uc (L-N / N-⏚)	V	-		-		255 / 255	255 / 255
Impulse current Iimp (10/350) per pole	kA	25		25		-	-
Impulse current Iimp (10/350) (L-N / N-⏚)	kA	-		-		25 / 50	25 / 100
Imax discharge current (8/20) per pole (Imax)	kA	-		-		-	-
Imax discharge current (8/20) (L-N/N-terre) (Imax)	kA	-		-		-	-
Nominal discharge current In (8/20)	kA	25		25		25	25
Voltage protection level Up	kV	2		2.5		-	-
Voltage protection level Up (L-N / N-⏚)	kV	-		-		2.5 / 2	2.5 / 2
Follow current interrupting rating If_i	kArms	50		50		-	-
Follow current interrupting rating If_i (L-N / N-⏚)	kArms	-		-		50 / 0.1	50 / 0.1
TOV (Temporary overvoltage) withstand U_T (5s.)	V	690		400		-	-
TOV (Temporary overvoltage) withstand U_T (L-N: 5s. / N-⏚ : 200ms.)	V	-		-		400 / 1200	400 / 1200
Continuous operating current Ic	mA						None
Short-circuit withstand capability	kArms						50
Load current I_{load} (for V-wiring)	A						125
Maximum back-up fuse gG/gL							-
Parallel Connection	A						≤125
Serial Connection (V-wiring)	A						≤125
Mechanical features							
Stocking and operating temperature	°C						-40 to +80
Degree of protection							IP 20
Fire resistance according to UL 94							V0
Colour of Housing							Polyarylamide grey RAL 7035
State indicator							Option (with TS)
TS remote indicator							Option (TS)
Installation							
Wire range (L, N, ⏚)							
solid wire	mm^2						2.5 ... 50
stranded wire	mm^2						2.5 ... 35
Stripping length (L, N, ⏚)	mm						15
Tightening torque (L, N, ⏚)	Nm						3.5

Technical features of the integrated auxiliary contact (TS)		
Electrical features		
Contact complement		1NO (1 normally open contact), +1NC (1 normally closed contact)
Min. load		6 V D.C. - 10 mA
Max. load		250 V A.C. - 5 A
Continuous operating current	mA	10
Installation		
Connection cross-section	mm^2	1.5

Surge protection devices (OVR)

Type 2 – Metal oxide varistor

Description

Type 2 surge protective devices are designed to protect electric installations and sensitive equipment against indirect surges with ensuring a low protection level (Up). They are characterized by their capacity to safely discharge current with 8/20 µs wave form.
Type 2 SPDs can be installed at the sub-distribution switch board for the protection of electrical installation and equipments.

Technical features						Type 2 (pluggable) OVR T2 (s) P (TS)
Technology						**Varistor**
Electrical features						
Standard	IEC 61643-1 / EN 61643-11					
Type / test class	2 / II					
Poles		1P -	3P 3L 4P 4L	3P+N 3N	1P - 3P 3L 4P 4L	1P+N 1N 3P+N 3N
Types of networks		IT - TNS	IT* IT	TT - TNS	TNS-TNC TNC TNS	TT-TNS TT-TNS
Type of current		A.C.	A.C.	A.C.	A.C.	A.C.
Nominal voltage Un (L-N/L-L)	V	400	230/400	230/400	230 230 400	230 230/400
Max. cont. operating voltage Uc	V	440	440	-	275	-
Max. cont. operating voltage Uc (L-N / N-PE)	V	-	-	440 / 255	-	275 / 255
Max. cont. operating voltage Ucpv	V					
Maximum discharge current Imax (8/20) per pole	kA	15 40 70	40 70	- - -	15 40 70	- - -
Maximum discharge current Imax (8/20) (L-N / N-PE)	kA	- - -	- -	15/70 40/70 70/70	- - -	15/70 40/70 70/70
Nominal discharge current In (8/20)	kA	5 20 30	20 30	5 20 30	5 20 30	5 20 30
Nominal discharge current In (8/20) (L-N / N-PE)	kA	- - -	- -	5/30 20/30 30/30	- - -	5/30 20/30 30/30
Voltage protection level Up	kV	1.5 1.9 2	1.9 2	- - -	1 1.4 1.5	- - -
Voltage protection level Up (L-N / N-PE)	kV	- - -	- -	1.5/1.4 1.9/1.4 2/1.4	- - -	1/1.4 1.4/1.4 1.5/1.4
Residual voltage Ures at 3 kA per pole	kV	1.4 1.4 1.3	1.4 1.3	-	0.9 0.9 0.85	-
Residual voltage Ures at 3kA (L-N / N-PE)	kV	- - -	- -	1.4/1.2 1.4/1.2 1.3/1.2	-	0.9/1.2 0.9/1.2 0.85/1.2
Follow current interrupting rating I_{f_I}	kArms	NA	NA	-	NA	-
Follow current interrupting rating I_{f_I} (L-N / N-PE)	kArms	-	-	NA / 0.1	-	NA / 0.1
TOV (Temporary overvoltage) withstand Ut (5s.)	V	440 440 440	440	-	334	-
TOV (Temporary overvoltage) withstand Ut (L-N: 5s./N-PE: 200ms)	V	-	-	440 / 1200	-	334 / 1200
Continuous operating current Ic	mA	< 1	< 1	< 1	< 1	< 1
Short-circuit withstand capability	kArms	50	50	50	50	50
Short-circuit D.C. current withstand capability Iscwpv	A					
Disconnector						
gG -gL fuse	A	≤50	≤50	≤50	≤50	≤50
curve C circuit breaker	A	≤50	≤50	≤50	≤50	≤50
Mechanical features						
Stocking and operating temperature	°C					-40 to +80
Degree of protection						IP 20
Fire resistance according to UL 94						V0
Material of Housing						PC grey RAL 7035
Pluggable cartridge						Yes
Integrated thermal disconnector						Yes
State indicator						Yes
Safety reserve						Option (s)
TS remote indicator						Option (TS)
Installation						
Wire range (L, N, ⏚)						
solid wire	mm^2					2.5 ... 25
stranded wire	mm^2					2.5 ... 16
Stripping length (L, N, ⏚)	mm					12.5
Tightening torque (L, N, ⏚)	Nm					2.8

Technical features of the integrated auxiliary contact (TS)		
Electrical features		
Contact complement		1NO (1 make contact), +1NC (1 normally closed contact)
Min. load		12V D.C. - 10 mA
Max. load		250V A.C. - 1 A
Continuous operating current	mA	None
Installation		
Connection cross-section	mm^2	1.5

Measurement devices

Energy meters selection table





	EQ meters C11	EQ meters C13	EQ meters B21	EQ meters B23	EQ meters B24
Overall dimensions	1 DIN module	3 DIN modules	2 DIN modules	4 DIN modules	4 DIN modules
Display	LCD	LCD	Backlit LCD	Backlit LCD	Backlit LCD
Operating voltage	230 V AC	3x230/400 V AC	220...240 V AC		3x220/380...240/415 V AC
Frequency					50 / 60 Hz
Max current	40 A	40 A	65 A	65 A	6 A
CTVT connected	-	-	-	-	CT
Active energy					
Reactive energy	-	-			optional
Apparent energy	-	-			
Accuracy	Cl. 1	Cl. 1 (B)	Cl. 1 (B)	Cl. 1 (B)	Cl. 1 (B), Cl. 0,5 S (C)
Tariff	-	-			optional
Event log	-	-			
Maximum demand	-	-	-	-	-
Previous values	-	-	-	-	-
Load profiles	-	-	-	-	-
Harmonic analysis	-	-	-	-	-
Alarm function					
Voltage					
Current					
Power factor					
Frequency	-	-			optional
Pulse output					
Outputs	-	-			optional
Inputs	-	-			
Built-in serial communication	-	-			IR, M-Bus, RS-485
Protocols	-	-			M-Bus, Modbus RTU, EQ bus

					
	EQ meters A41	**EQ meters A42**	**EQ meters A43**	**EQ meters A44**	**EQ meters G13**
	4 DIN modules	4 DIN modules	7 DIN modules	7 DIN modules	4 DIN modules
	Backlit Pixel (LCD)	Backlit Pixel (LCD)	Backlit Pixel (LCD)	Backlit Pixel (LCD)	No display
		57.7...288 V AC		3 x 57.7/100...288/500 V AC	100...240 V AC
					50 / 60 Hz
	80 A	6 A	80 A	6 A	-
	-	CTVT	-	CTVT	-
					-
					-
				optional	-
					-
	Cl. 1 (B)	Cl. 1 (B), Cl. 0,5 S (C)	Cl. 1 (B)	Cl.1 (B), Cl. 0,5 S (C)	-
				optional	-
					-
					-
					-
				optional	-
					-
					-
					-
				optional	-
					-
					-
				optional	-
					-
				IR, M-Bus, RS-485	IR, RS-485, M-Bus
				M-Bus, Modbus, EQ bus	EQ bus, M-Bus, JSON

Measurement devices

Multifunction meters selection table

			Modular and front panel multimeters		Front panel network analysers
					
	DMTME	**DMTME-72**	**DMTME-96**	**M2M**	**ANR96**
Overall dimensions	6 DIN modules	72x72x90	96x96x103	96x96x77	96x96x130
Display			LED	LCD backlit	LCD graphic backlit
Power supply	110 V a.c. 230 V a.c.	230 V a.c. 400 V a.c.	110 V a.c. 230 V a.c.	24-240 V c.a./c.c.	20-60 V a.c./d.c.
TRMS voltage					
TRMS current					
Frequency					
Power factor					
Cosj					
Active power					
Reactive power				Electrical parameters measurement	
Apparent power					
Active energy					
Reactive energy					
Apparent energy					
Peak value Min/Max/Avg					
Timer and count-down					
Power 4Q					
Energy 4Q					
Current THD					Power quality
Voltage THD					
Password set up					
Neutral current					
Tariff					
Maximum demand					
Harmonic analysis up to 31°					Energy management
Wave form visualisation					
Memory 1 MB					
Outputs			Digital	Digital Electromechanical relays Analogue	Digital
Inputs					Digital
Serial port			RS485	RS485 RJ45	RS485 RS232 RJ45
Protocols			Modbus RTU		Modbus RTU Ethernet TCP/IP Profibus DP

Miniature circuit breaker (MCB)
S200M DC - MCB for DC applications

S200 M DC MCB in System pro M compact range impresses with its performance range, approvals and high inbuilt short circuit breaking capacity in DC applications. S200 M DC MCBs can be used in 1-pole version at 220V DC and in 2-pole version up to 440V DC. During the installation process it is necessary to take into account, the polarity marked on the device.

Technical Features

Electrical Data	S200 M DC	
Standards	IEC / EN 60947-2	
Poles	1P, 2P	
Tripping Characteristics Curve	C	
Rated Curent	1A - 63 A	
Rated Voltage	1P : 220 V DC	2P : 440V DC
Maximum Power frequency recovery Voltage, Umax	1P : 250V DC	2P : 500V DC
Min Operating Voltage	12 V DC	
Rated Ultimate short-circuit breaking Capacity, Icu	10kA	
Rated Service short-circuit breaking Capacity, Ics	10kA	
Cross-section of conductor (top / bottom)	35 mm2	
Terminal	Fail safe bi-directional cylinder - lift terminal	
Contact position indication	Marking on toggle (1 ON / 0 OFF), Real CPI (red ON / green OFF)	
Real Contact position indication	Red ON / green OFF	
Accessories mountable	Yes (All System ProM Compact accessorries)	
Housing	Insulation group I, RAL 7035	
Toggle	Insulation group II, black ,sealable	
Ambient temperature	-25□.....+55°C	
Storage temperature	-40□.....+70°C	
Torque	2.8 Nm	
Screwdriver	No. 2 Pozidrive	
Mounting	On DIN rail 35 mm acc. to EN 60715 by fast clip	
Mounting position	any	
Mounting dimensions acc. To DIN 43880	1	
Pole dimensions (H X D X W)	85 X 69 X 17.5	
Pole weight	approx. 125g	

Distribution boards
Elegance series

Type		**SPN**		**PPI DB**			**Vertical**
Configuration		**SPN DB**	**Horizontal**	**Vertical**	**MCB/Isolator/ RCD incomer**	**T1 incomer**	**T3 incomer**
Incomer		2 pole (MCB/ Isolator/RCD)	8 pole (MCB/ Isolator/RCD) as incomer, 3 DP MCB/ Isolator/RCD as sub-incomer	8 pole (MCB/ Isolator/RCD) as incomer, 3 DP MCB/ Isolator/RCD as sub-incomer	8 pole (MCB/ Isolator/RCD)	4 pole MCCB (T-max/T1) up to 160A	4 pole MCCB (T-max/T1) up to 250A
Outgoing (No.of ways)	IP30 (without door)	4,6,8,10,12,14,16,20	6,8,12,16		4,6,8,12	4,6,8,12	4,6,8,12
	IP 43 (metal door)	4,6,8,10,12,14,16,20	6,8,12,16	6,8,12	4,6,8,12	4,6,8,12	4,6,8,12
	IP 43 (metal door with acrylic)	4,6,8,10,12,14,16,20	6,8,12,16	6,8,12	4,6,8,12	-	-
	IP 54 (metal door)	4,6,8,10,12,14,16,20	6,8,12,16		4,6,8,12	4,6,8,12	4,6,8,12
Application		1) Aesthetically attractive Design.	1) Aesthetically attractive four quadrant design. 2) Sub incomers for each Phase. 3) The outgoings can be only single phase.	1) 4-tier Structure 2) Sub incomers for each Phase. 3) The outgoings can be only single phase.			

Cement spill protector

Insulated busbar

Door earthing

Anti insertion marking

			Special purpose DBs	**Plug & Socket**
Flexi tier DB	**8 Segment DB**	**7 Segment DB**	**Phase Selector DB**	**-**
-	4P + 8P incomer (MCB/ Isolator/RCD) & 4 pole sub-incomer (MCB/Isolator/RCD)	4 pole MCCB (T-max/T1) up to 160A as incomer & 4 pole sub-incomers (MCB/Isolator/RCD)	8 pole MCB/Isolator/RCD	-
-	4,6,8,12	4,6,8,12	4,6,8,12	10A/20A SP 20A/30A TP 20A DP RCBO 25A FP RCBO 60A FP
2 row of 13 module 3 row of 13 module 4 row of 13 module 2 row of 14 module 3 row of 14 module 4 row of 14 module	4,6,8,12	4,6,8,12	4,6,8,12	
2 row of 13 module 3 row of 13 module 4 row of 13 module 2 row of 14 module 3 row of 14 module 4 row of 14 module	-	-	-	
-	-	-	-	
1) Total Flexibility as per site needs - configuration as per your choice of incomer and outgoing. 2) Supply busbars need to be selected.	1) Eight segment DB with phase segregation and separation between incoming and outgoing. 2) Sub incomers for each phase. 3) The outgoings can be only single phase.	1) Seven segment DB with phase segregation and separation between incoming and outgoing. 2) Sub incomers for each phase. 3) The outgoings can be only single phase.	1) Inbuilt 3 numbers of selector switches and 3 numbers of piano switches. 2) Selector Switch available in 2 ratings - 63A & 40A. 3) The outgoings can be only single phase.	1) Can be used for three phase and single phase application up to 63A. 2) With MCB or RCBO with provision for universal mounting.

ITUS distribution enclosures NEW
Complete range

Customization in ITUS Distribution Enclosures available on request*

i) Enclosures-TV/TEL/IOT related backend devices
ii) Enclosures-SPD provision
iii) Pre-wired DB's
iv) Indication lamps provision
v) MCCB Enclosures

Type		**SPN**	**TPN**	**PPI DB**		
Configuration		**SPN DB**	**TPN DB**	**Horizontal**	**Vertical**	**Flexi tier DB**
Incomer		DP/4M (MCB/ Isolator/RCD)	4P/8M MCB/ Isolator/RCD as incomer	4P/8M (MCB/Isolator/ RCD) as incomer, 3 DP MCB/ Isolator/RCD as sub-incomer	4P/8M (MCB/Isolator/ RCD) as incomer, 3 DP MCB/ Isolator/RCD as sub-incomer	
Outgoing (No. of ways)	IP30 (without door)	6,8,10,12,14, 16,18,20,22	4,6,8,12	6,8,12,16		
	IP 43 (metal door)	6,8,10,12,14, 16,18,20,22	4,6,8,12	6,8,12,16	6,8,12	2 row of 13 module 3 row of 13 module 4 row of 13 module 2 row of 14 module 3 row of 14 module 4 row of 14 module
	IP 43 (metal door with acrylic)	6,8,10,12,14, 16,18,20,22	4,6,8,12	6,8,12,16		
	IP 54 (metal door)	6,8,10,12,14, 16,18,20,22	4,6,8,12	6,8,12,16		

ITUS distribution enclosures
Open for customisation

ITUS Distribution Enclosures with flexibility for customisation enables synergy between different applications.

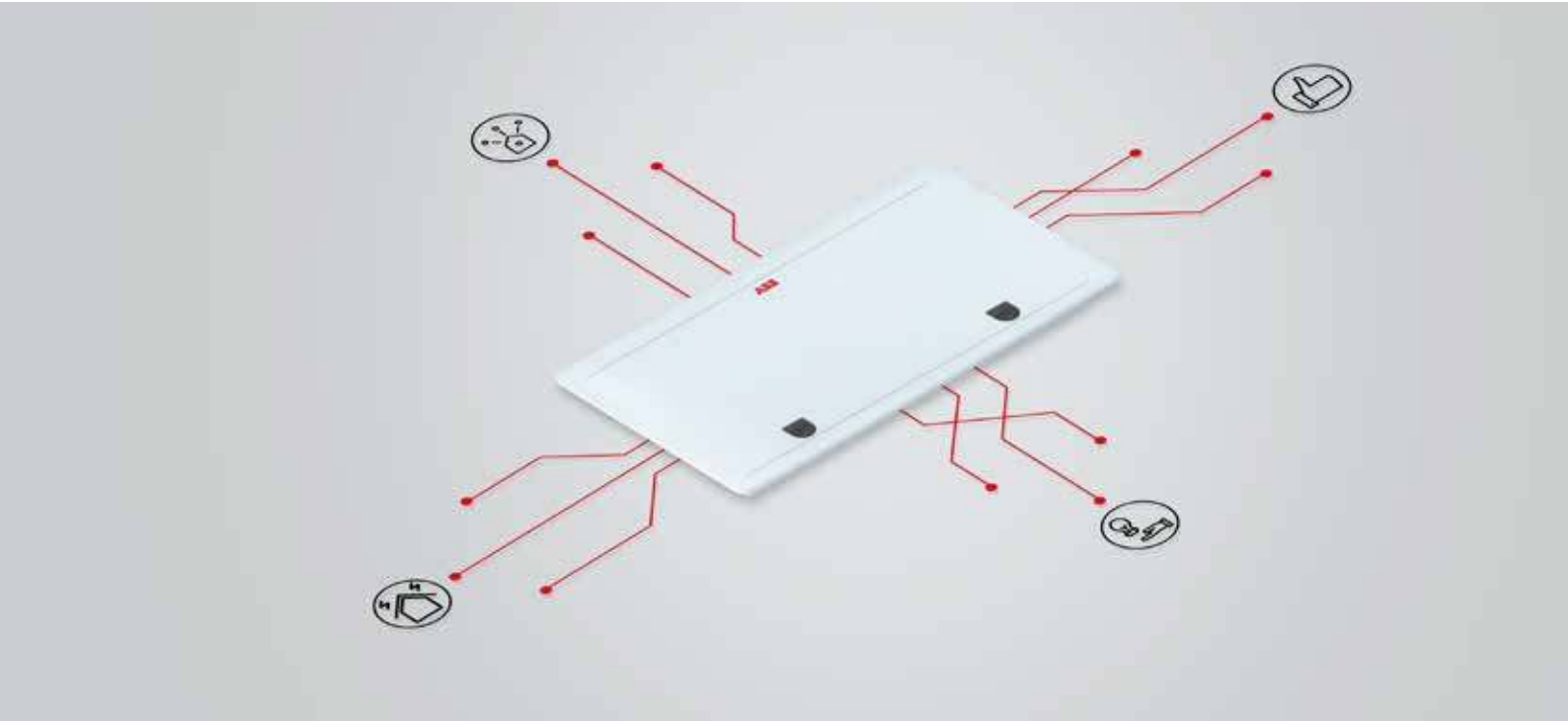
IOT
Keeping you connected always
With the entry of IOT systems, people are in constant touch with each other. Similarly, ITUS has recognized the need for TV telecom enhancements for your home.

CUSTOMIZATION
Dedicated for you
Open for tailor made options with respect to non-standard product offering makes ITUS unique for your needs.

SPD
Safety simplified
To ensure optimum protection, ITUS provides a dedicated SPD provision for added protection from the elements. SPDs protect your appliances from over voltage.

KNX
Keeping your power needs in mind, ITUS provides the best solution by providing dedicated provisions for KNX automation systems.

Vertical				Special purpose DBs	Plug & Socket	Oneway enclosure
MCB/Isolator/ RCD incomer	T1 incomer	T3 incomer	8 Segment DB	Phase Selector DB	-	-
4P / 8M (MCB / Isolator/RCD)	4 pole MCCB (T-max/T1) up to 160A	4 pole MCCB (T-max/T1) up to 250A	4P + 8M incomer (MCB/ Isolator/RCD) & 4 pole sub-incomer (MCB/Isolator/RCD)	4P / 8M MCB/ Isolator/RCD	-	-
						2,4,6,8
4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	20A 2P + E 30A 3P + E RCBO	



Distribution boards

Classic series

Type		**SPN**	**TPN**		**PPI DB**
Configuration		**SPN DB**	**TPN DB**	**Horizontal**	**Vertical**
Incomer		2 pole (MCB/Isolator/ RCD)	8 pole (MCB/ Isolator/RCD)	8 pole (MCB/Isolator/RCD) as incomer, 3 DP (MCB/Isolator/ RCD) as sub-incomer	8 pole (MCB/Isolator/RCD) as incomer, 3 DP (MCB/ Isolator/RCD) as sub-incomer
Outgoing (No. of ways)	IP 30 (without door)	4,6,8,10,12,14,16,20	4,6,8,12,16	6,8,12,16	-
	IP 43 (metal door)	4,6,8,10,12,14,16,20	4,6,8,12,16	6,8,12,16	6,8,12
	IP 43 (metal door with acrylic)	4,6,8,10,12,14,16,20	4,6,8,12,16	6,8,12,16	6,8,12
	IP 54 (metal door)	4,6,8,10,12,14,16,20	4,6,8,12,16	6,8,12,16	-
Application		м 1) Aesthetically attractive Design.	1) Three Phase incoming with Neutral Link. 2) The outgoings can be only single phase.	1) Aesthetically attractive four quadrant design. 2) Sub incomers for each Phase. 3) The outgoings can be only single phase.	1) 4-tier Structure 2) Sub incomers for each Phase. 3) The outgoings can be only single phase.

		Vertical			Special purpose DBs		Plug & Socket	Metal Enclosures
MCB/Isolator/ RCD incomer	**T1 incomer**	**T3 incomer**	**T3 incomer**	**T3 incomer**	**T3 incomer**	**Phase Selector DB**	**-**	**-**
8 pole (MCB/ Isolator/RCD)	4 pole MCCB (T-max/T1) up to 160A	4 pole MCCB (T-max/ T1) up to 250A	4 pole MCCB (T-max/T1) up to 250A	4 pole MCCB (T-max/T1) up to 250A	4 pole MCCB (T-max/ T1) up to 250A	8 pole MCB/ Isolator/RCD	-	-
4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	10A/20A SP 20A/30A TP 20A DP RCBO 25A FP RCBO 60A FP	1 Module 2 Module 4 Module 6 Module 8 Module
4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12		
4,6,8,12	-	-	-	-	-	-		
4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	4,6,8,12	-		
1) PAN assembly type design. 2) The outgoings can be three phase and single phase.			1) Total Flexibility as per site needs - configuration as per your choice of incomer and outgoing. 2) Supply busbars need to be selected.	1) Seven segment DB with phase segregation and separation between incoming and outgoing. 2) Sub incomers for each phase. 3) The outgoings can be only single phase.		1) Inbuilt 3 numbers of selector switches and 3 numbers of piano switches. 2) Selector Switch available in 2 ratings - 63A & 40A. 3) The outgoings can be only single phase.	1) Can be used for three phase and single phase application up to 63A. 2) With MCB or RCBO with provision for universal mounting.	1) Universal mounting suitable for SP, DP, FP, 6P & 8P arrangements.

Metal enclosures

SR2 Enclosures

Technical Characteristics:

- Standards : IEC 62208, IEC 60439-1, IEC 61439-1-2
- Certifications : UL, CSA, ATEX
- Degree of Protection : IP 65 (IEC 60529)
- Degree of Mechanical Strength : IK10 blind door, IK09 glazed door
- Material : Metallic
- Installation site : Indoors
- Fixing method : Wall/Floor
- Colour : RAL 7035
- Application : Switchgear and controlgear switchboards
- Available Sizes : H = 300mm to 1200mm
- Accessories : DIN rail channel, Modular panels and others
- Catalogue reference : 1STC804013D0204

Distribution Boards

Mirage

Technical Characteristics:

- Standard : IEC BS EN 61439 – 1 & 2
- Max.Load : 250/400/630/800 A
- Type : T-max MCCB, Formula MCCB, XT MCCB, S800 MCB
- Max. Voltage : 415V AC, 50/60 Hz
- Degree of Protection : IP 42 (IP 20 for PAN Assembly)
- Range : 2, 4, 6, 8, 12, 16 TP ways
- Catalogue reference : SKC802050C1320
- These Boards are available in total solution form with enclosure and PAN Assembly (without switchgear).
- Separate PAN assemblies can also be ordered.
- Mirage is suitable for T-max, Formula, XT breaker series & S800 MCB series.

Low voltage insulating switchboards

Gemini

Technical Characteristics:

- Standards : CEI EN 50298, CEI 23-48, CEI 23-49, IEC 60670, CEI EN 60439-1 CEI EN 62208 : IEC 61439-1-2
- Rated insulation voltage : 1000V AC / 1500V DC
- Rated service voltage : 690V AC
- Operating Temperature °C : -25°C to 100°C
- Resistance to abnormal heat and fire : up to 750°C
- Degree of resistance to impacts : IK10 (IEC 62262)
- Degree of protection (CEI EN 60529) : IP30 (open door) IP66 (closed door)
- Recyclable : 100%
- No. of modules : 24, 54, 72, 96, 120, 216
- Application : Photovoltaic & outdoor application
- Door Type : Opaque / Transparent
- Catalogue reference : 1SLC805001D0205

Consumer Units

Mistral

Technical Characteristics:

- Standards : IEC 60670-24; (IEC 61439-1-3)
- Marks : IMQ, RoHS, REACH
- Rated insulation voltage : 1000V AC / 1500V DC
- Material : Thermoplastic
- Resistance to Heat : BPT 70°C
- Ranges : IP 65 & IP 41 (wall mounting), IP 41 (flush mounting)
- Degree of resistance to impacts : IK 08 for IP 41, IK 09 for IP 65
- Maximum Current : 63A / 125A
- No. of Modules : 4,8,12,18,24,36,48,54,72
- Application : Industrial / Commercial / Residential
- Type of Doors : Opaque / Transparent
- Accessories : DIN Rail channel, Blind Panel, Base Plate, Coupling kit
- Catalogue reference : 1SLC801013D0201

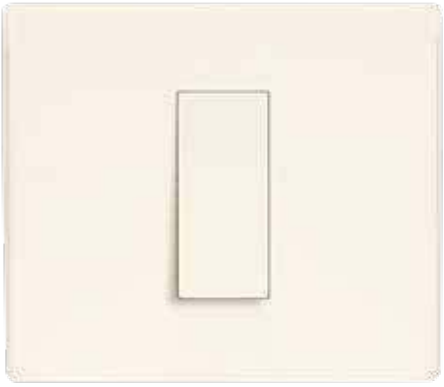
Distribution boards
Special enclosures

Range	Combiner (String) Boxes	Junction Boxes
Enclosure Material	**Thermoplastic**	**Thermoplastic**
IP rating	**IP65 / IP66**	**IP44 / IP55 / IP65**
Application	1) Suitable for DC application. 2) Suitable for photovoltaic applications. 3) Pre assembled boxes with enclosure and switchgear. Catalogue - 1SDC007099B0203	1) To host cable terminals for cable derivations. 2) Accessories such as Base plate and cable glands available. Catalogue - 1SLC001001D0204

Range	Protecta & Minicenter	ECO
Enclosure Material	**Cold Rolled Sheet Steel**	**Cold Rolled Sheet Steel**
IP rating	**IP 41**	**IP 41**
Application	1) Available in Row type and Busbar (with PAN assembly) type configuration. 2) MCB outgoing only. 3) In Busbar Type incomer kits for T1, T3, MCB or Isolator, RCCB, direct cable connection available. 4) PAN assemblies can also be ordered. 5) Row Type: 100A max. load 6) Busbar Type: Protecta - 250A Minicenter - 160A 7) Protecta - Surface Mounting Minicenter - Flush Mounting Catalogue - 1SKC802015C0205	1) Available in row type and busbar type (without PAN assembly). 2) MCB outgoing only. 3) In busbar type incomer kits for T1, isolator, RCCB, direct cable connection available. 4) Row type - 100A Busbar type - 160A 5) Flush or surface mounting. Catalogue - 1SKC802016C0206

ABB Tvisha NEW
Key features

- Plastic parts which holds current carrying parts are made of PA6 20% glass filled rating upto 16A
- All switches are marked with IS 3854:1997
- Terminals are designed in such a way that wire is tightened without damage
- Bi-metal silver contact tips for less spark and longer life
- 6A & 6/16A marked with IS 1293, up to 16A
- Non-flammable thermoplastic resin parts and a very high insulating resistance after humidity test



- Internal arc shield provided in switch mechanism
- Terminal screws with Combihead for star/flat screw drivers.
- Easy terminal accessibility by top entry to load connection.
- ISI marking on switch socket and fan regulator and laser marked.
- Laser marking and arrow showing the correct orientation of the mechanism.
- 20A DP switch in one module (space optimisation)• Large variety of sockets, equipped with shutters for increased safety.
- Universal regulator with 360 degree rotation.
- 6/16A sockets are equipped with dual shutters which can take two pin plugs.
- HDMI moduler ports equipped with female connector for easy termination.
- USB charger current rating 1A and 2A, visible LED indication, Dual color LED indication for on load & without load operation.
- Communication mechanisms – RJ-11, RJ-45 cat6. Self-moving shutter to screen the jack when it is not in use.
- Mounting screws press fitted on the screw holder on inner frame to avoid losning the screws.
- Two module partition is provided for sturdiness with extra ribs to ensure better strength of the frame and overlap of plugs.
- Visual signs provided in inner grids to guide proper fitment for easy installation and easy removal during fitment of mechanism with inner grid.
- Resin frame with extra ribs provides better mechanical strength, insulation resistance and corrosion proof.
- ABB warranty policy for Tvisha range
  - 10 years for mechanical switches and sockets
  - One year for electronic devices

IVIE switches NEW

Sleek and convex design in different finishes

Thanks to the complete system, The Ivie series provides a comprehensive range of solutions for building concepts. The convex and sleek design not only provides quality and style to the overall building, but is easy to install.

- Modern and latest finishes in white, silver, anthracite and colours of your choice.
- Convex profile plate with less projected sleek design. Dust free surface and a slim design
- Double shrouded internal mechanism under the rocker, totally preventing visibility of sparks.
- Terminal screws with Combihead for star/flat screw drivers.
- Large variety of sockets, equipped with shutters for increased safety. Compatible for 6/16A two pin plug.
- Universal regulator with 360 degree rotation.
- IP20 Finger Proof for total safety, user friendly terminal design-easy terminal accessibility by top entry to load connection.
- ISI marking on switch socket and fan regulator.
- Independent shutter provided in sockets for earth and phase+neutral for child safety and easy connection.
- Resin frame with extra ribs provides better mechanical strength, insulation resistance and corrosive proof.
- Mounting screws press fitted in back side screw holder to prevent loosing of the same.
- Provided with laser marking on the mechanisms
- Suitable design for a variety of plug tops - no overlapping on the mechanism fitted next to the socket.
- ABB warranty policy for IVIE range
  - 10 years for mechanical switches and sockets
  - One year for electronic devices

01

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Different finishes and combinations:

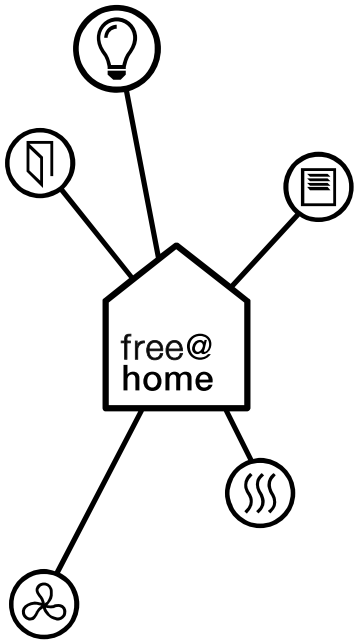
01 Anthracite grey mechanisms in Silver plate

02 Anthracite grey mechanisms in White plate

03 Silver mechanisms in Anthracite Grey plate

IVIE switches
Flexibility in design which provides total control

The IVIE range is the first Indian range to incorporate wired and wireless home automation systems together. This range can be integrated with ABB-free@home® home automation system, which is the most intelligent way of managing spaces with energy saving.



Great comfort, safety and energy efficiency for buildings

ABB-free@home® sensor for switching control, blind control, dimming and scene control.

Cheiron series
High-end design meets high quality components

Cheiron
The Cheiron series combines high quality thermoplastic resin with a unique design that adds quality and style to any building. Cheiron is now available in two different mounting plates to match the mood of any interior. The Cheiron series provides a comprehensive range of functionalities. From homes to offices, hotels or hospitals, Cheiron is customized to meet any requirement of any application.

Hospitality range
Cheiron is specially suitable for hotel projects. The modern design and broad range of functionalities provide a high level of comfort to hotel guests.

Switch modules
- Made of thermoplastic resin 943R material
- Tested up to 1 lakh operations
- Confirms to IS3854
- Bigger size bimetallic silver alloy* contact tips

Socket modules
- Combigrip terminal
- All screw access from top only
- Equipped with child safety shutter
- More space for easy looping
- Rivet free design
- Easy installation
- Floating terminal patent design

Snieo series
The complete range

Snieo
Snieo combines modern design with high-performance materials such as premium thermoplastic resin. Our switches are made of fire retardant substances with superior electrical properties. Chamfered edges prevent dust accumulation and well-crafted sockets provide an enduring grip for a variety of plugs.

Snieo caters to all electrical needs of today's modern buildings. This comprehensive range offers a variety of mounting plates and a broad selection of functionalities to create a perfect fit for any type of building - from living room to office space.

Switches
- All metal parts are independent and the completely revertless design increases durability
- Silver tip contacts for better conductivity
- All plastic parts are made of premium thermoplastic resin
- Up to 20A marked with fluorescent lamp load

Sockets
- Specially designed sockets, which perfectly match 2 and 3 pin plug tops
- Specially designed shutter which slides smoothly even with 2 pin plugs
- Conducting parts of copper, phosphorous, bronze and brass
- All sockets are equipped with child safety shutter

Light switches

Modern light management
Saving costs with innovation

—
01 Busch-Watchdog Presence tech
—
02 Busch-Watchdog Presence tech BasicLINE Corridor
—
03 Busch-Watchdog Presence tech BasicLINE
—
04 Busch-Presence detector
—
05 Busch-Watchdog Presence tech BasicLINE mini

For pass-through and large areas
Lights in corridors and large areas where people only pass-by should be only switched on when a person is detected and switched off as soon as they leave the area or after a selected delay time. The persons do not need to actuate a button or switch. Switch off of the lighting is assured. This saves both energy and costs.

With only one Busch-Watchdog Presence tech BasicLINE Corridor a detection range of 24m detection area at 3m installation height is possible. The use of a special housing makes the Busch-Watchdog suitable also for use in outdoor areas.

For toilets and small rooms
Lighting control depending on the occupancy in toilets, cabinets and other small rooms can avoid unnecessary expenses and alert about remained people after hours. In internal toilets the ventilation is comfortable to implement with an on/off delay.

The Busch-Watchdog Presence tech BasicLINE mini and the new Busch-Presence detector mini KNX are extremely flat and easy to install in the false ceiling.


Corridors


Large areas outdoor


Toilets


Cabinets small rooms

The choice of the right model depends on the height of the ceiling, the size of the room, the installation situation and the type of movement to be detected. ABB offers the right solution for each situation:


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ABB Welcome
Door entry system

A holistic concept.
Already today Busch-Jaeger fulfils the desire for harmoniously matching indoor concepts and holistic installation solutions. As standard. This allows all indoor stations of door communication to be integrated into every style of living.

That is why the ABB-WelcomeTouch and the ABB-Welcome indoor station with handset is available in studio white matt, aluminium silver and anthracite matt. And the ABB-Welcome indoor audio station with display is available in studio white, aluminium silver, anthracite, alpine white and white.

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Mobile door communication.
As supplement to the permanently installed indoor stations, up to four additional participants can be connected to the ABB-Welcome system via the IP gateway. These devices can be smartphones, tablet PCs or a busch-ComfortTouch®. The devices can be mixed.

There is only one system controller irrespective of whether audio or video systems are set up. Starting from a specific number of participants, additional power supplies are necessary. Detailed information on the system setup is available in the ABB-Welcome system manual (0001-0-1292). The system controller already has connections for the door opener and for one outdoor light. Both are switched via the indoor station.

System		ransformer, AC 1.3 A	IP gateway
83300-5		53315-500	83341-500
Supply device and controller of the ABB-Welcome system.	Addi of th	Power supply for an electric door opener.	Makes communication possible between the ABB-Welcome door communication and the local IP network.
Video indo MDRC	indoor	eo out	Switch actuator flush-mounted	Telephone g
83320/2-500	83320/2 U-500	83325/2-500	83335 U-500	83350-500
For the distribution of the video signal with line junctions (in a riser m	For the distribution of the video signal with line junctions (e.g. in a riser mains)	For connecting several outdoor video stations to the system troller	Switch actuator for connection to the door communication bus.	Telephone gateway for connecting an ABB-Welcome system with the log inputs of ivate branch hange (PBX).

ABB Welcome

Door entry system

01 One-family house
02 Multi-family house
03 Apartment building
04 High rise building
05 Residential Complex

No matter in single family house, multi-family house, highrise building with more than 200 apartments or in residential complex with higher security requirement to screen incoming calls, Welcome M provide solution for all the requirements.

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ABB-Welcome M Video Outdoor Station

ABB-Welcome M Audio Outdoor Station

ABB-Welcome M Video Gate Station

ABB-Welcome M 7" Video Hands-free Indoor Station

ABB-Welcome M 4.3" Video Hands-free Indoor Station

ABB-Welcome M 4.3" Video Handset Indoor Station

ABB-Welcome M Audio Handset Indoor Station

ABB-Welcome M System Controller

ABB-Welcome M Indoor Station Distributor

ABB-Welcome M Gateway

ABB-Welcome M Floor Gateway

ABB-Welcome M Guard Unit

Eletronic Door Opener

2-Wire Bus Line

Wire

Main Entrance

Analog camera

Free@home
The door opener to your customers

Making home automation easier than ever.
ABBfree@home® sets new standards for easy installation, commissioning and operation.

Comfortable
Complete scenes are easy to adjust and also easy to be changed later by electricians and end customers alike.

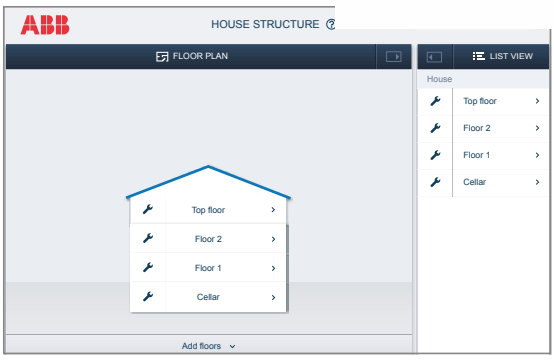
Blind
Air-conditioning
Light
Door communication
Heating

Commissioning
Intuitive commissioning with all conventional Internet browsers as well as an app for iOS and Android.

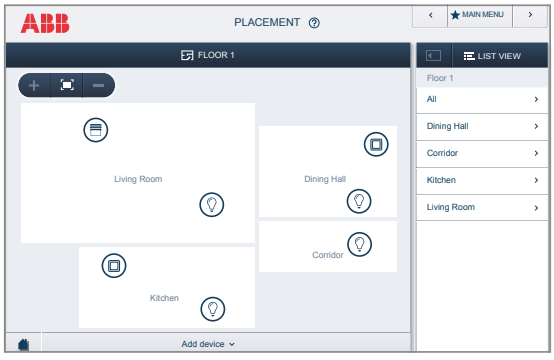
Free@home

Adjusting everything via an app

- Easy to operate
- Business segment with ar id) via
- Competitive advantage wser



First step – the house
First, the floor plan with floors and rooms is created.



Second step – the allocation
The sensors are integrated in the app in the floor plan and allocated in the system. This simultaneously allocates the devices to the floors and rooms, as basis for later operation by the customer.

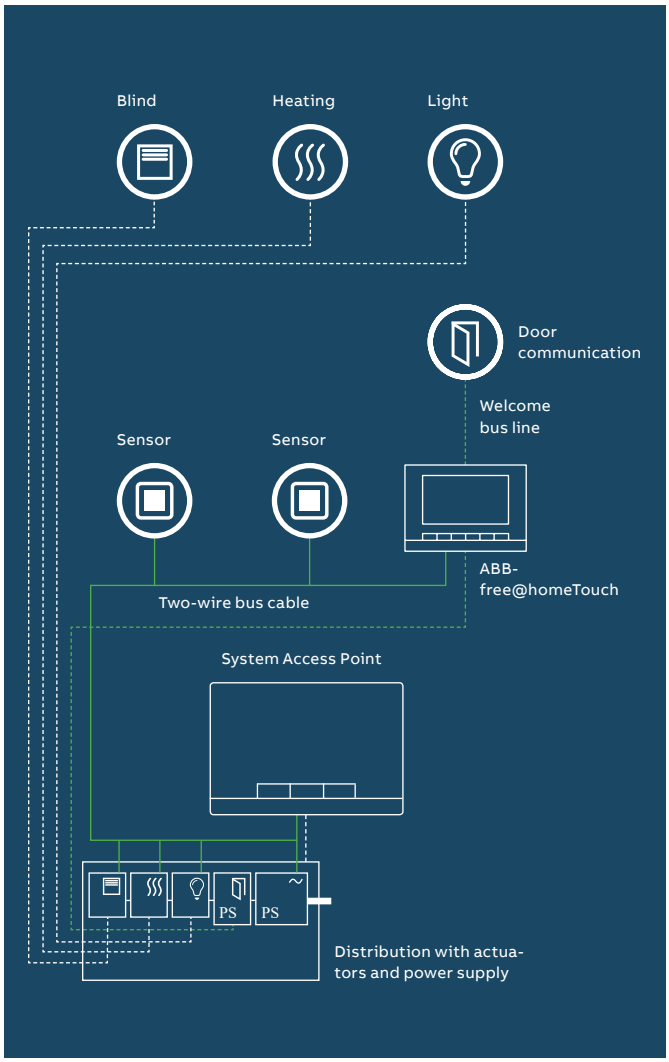
Third step – linking
And finally, the elements can be combined as needed.

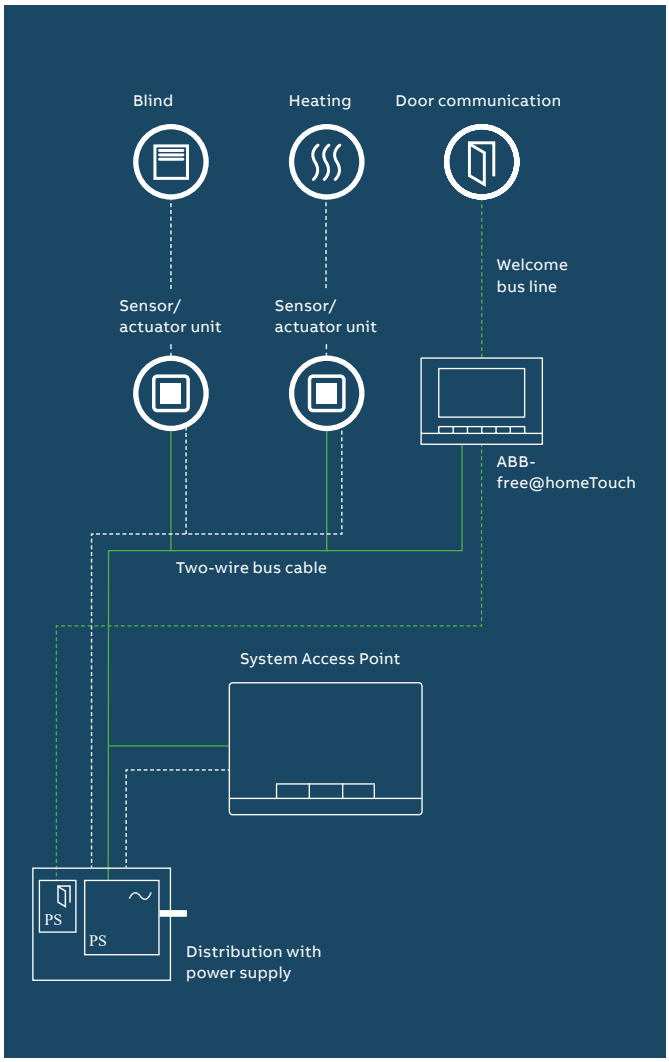
Free@home

Two possibilities central or decentralized

Central control with DIN rail mounting actuator
The installation of central DIN rail mounting actuators in the switch cabinet makes the installation of the sensors even easier – as only the bus line is located in the flush-mounted box. With this method, the costs for each channel can be reduced.

Sensor/actuator unit for decentralized control
All in one. To save space the sensor and actuator are located in one flush-mounted box of the switch combination. The function of both components is preconfigured. This makes programming of the basic functions unnecessary – but possible if required. This enables the lights and blinds to be controlled even before project planning of the system has been carried out. The 230-Volt line is wired as usual.





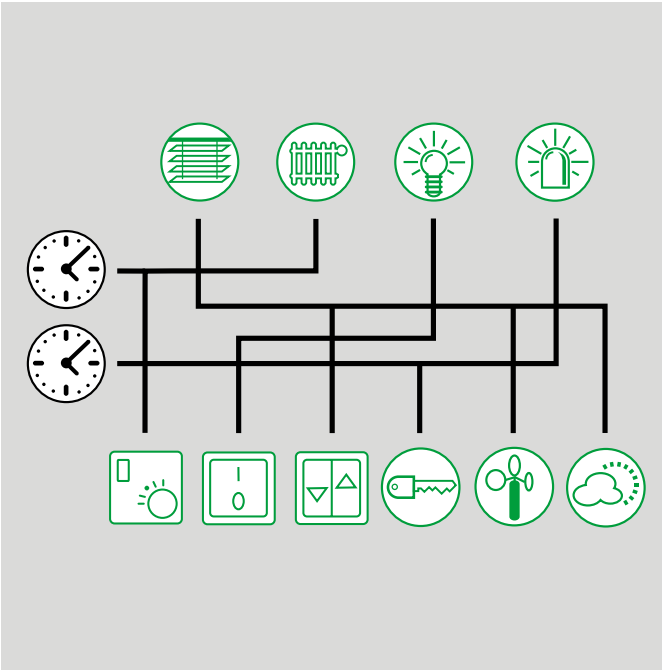
KNX and ABB i-bus KNX
Intelligent Building Control

In many areas of our private and working lifes, the increasing level of automation is a trend that confronts us on a daily basis without actually being noticed.

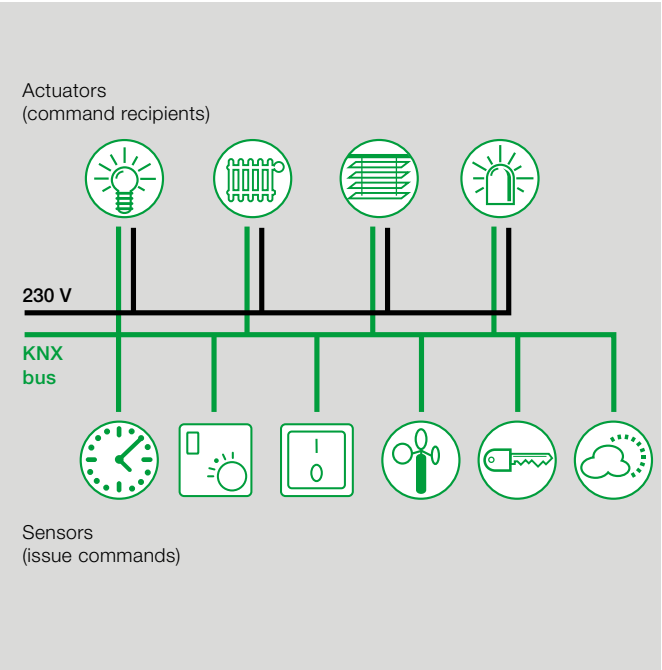
Automation in buildings aims to combine individual room functions with one another and to simplify the implementation of individual customer preferences.

KNX is the logical development for implementing traditional and new requirements in electrical building installations and thus replacing conventional installation techniques. The intelligent installation bus system efficiently performs the conventional functions and offers an additional broad range of expanded features, which could not be realized without a bus system. ABB offers consultants, system integrators and electrical installers a comprehensive product range with ABB i-bus® KNX, in order to meet the challenges posed to electrical building installations both today and in the future.

The conventional solution: Many separate cables, separate functionality, little flexibility



The intelligent solution: KNX – a system, a standard, many interoperable functions for maximum flexibility



What does KNX stand for?

KNX – The standard

The KNX system is the leading intelligent control system for buildings world-wide.

KNX resulted from the merger of major bus systems, including the well-known EIB (European Installation Bus) that has been successfully on the market since 1992.

What does KNX stand for?

- KNX is the first globally standardized system for the automation of residential and non-residential buildings in accordance with the international standard (ISO/IEC 14543-3), the European standard (CENELEC EN 50090, CEN EN 13321-1 and 13321-2), the Chinese standard (GB/Z 20965) and the US standard (ANSI/ ASHRAE 135).
- KNX has established a clearly defined system platform where the KNX products of different manufacturers can be operated with one another.
- Both the data protocol and the devices are certified compliant to the KNX standard.
- KNX thus guarantees the networkability, interoperability, is both upward and downward compatible and thus future-proof.
- Just one common software tool is required for planning, engineering and commissioning of all KNX installations.
- Both the manufacturers and the KNX Association support professionals during planning, commissioning and maintenance world-wide.
- Comprehensive training opportunities are available for beginners and experienced users in certified training centres.
- More than 170 internationally certified manufacturers are members of the KNX association.
- More than 22,000 qualified KNX partners plan, install and integrate KNX systems worldwide.
- Thousands of buildings, ranging from private houses to airport complexes around the world, are equipped with more than 10 million KNX products.

What does KNX do?
Application

The use of new materials and the application of renewable energies are considered as the most significant innovations in the building industry over the last few years. The growing desire for comfort and functionality simultaneously with the limited availability of resources and increasing energy costs provide the basis for intelligent building control in modern constructions.

KNX interconnects all the components in the electrical installation to form a networked system and thus guarantees the transparency and utilization of information across the installation. In this system, all users “communicate” via a single bus cable. Thus it is possible to integrate all the different fuctional subsystems within the building into a seamless solution.

KNX bus systems can be used both in residential and non-residential buildings.

Applications:
- Lighting
- Climate control
- Sun protection
- Security
- Energy management
- Operation
- Automation
- Communication

ABB i-bus®KNX

What links ABB and KNX?

ABB is represented in over 100 countries with more than 100,000 employees. Our company benefits from over 25 years of experience in intelligent building control systems.

ABB develops, produces and sells a complete range of innovative products for building installation.

ABB plays a leading role in the KNX Association. ABB i-bus® KNX conforms to the international KNX standards and thus belongs to the leading technology worldwide for intelligent building control.

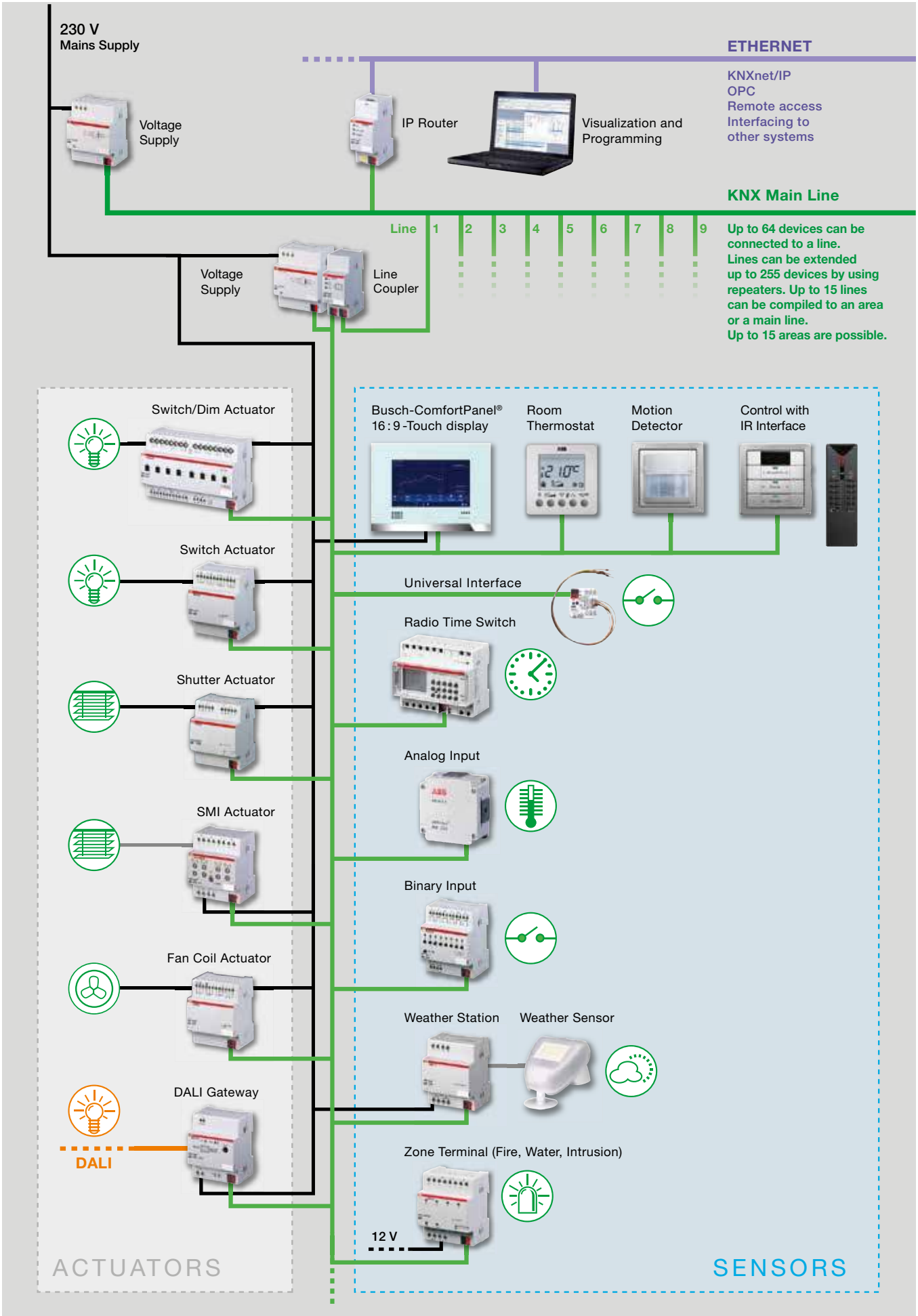
How does ABB i-bus® KNX work?

Intelligent building control in detail

Within the KNX bus system, all sensors (e.g. buttons or motion detectors) are interconnected to the actuators (e.g. dimming actuators, roller shutter actuators) via a data cable as opposed to directly wired switches and consumers (conventional installation). The actuators control the power circuit to the consumer.

Communication for all devices is implemented using data telegrams on the same bus cable. The sensors send commands, actuators “listen in” and execute a defined function as soon as they are addressed.

A broad range of functions can be parameterized with ABB i-bus® KNX, such as group commands, logical sequences, control and regulation tasks.


230 V
Mains Supply
ETHERNET
KNXnet/IP
OPC
Remote access
Interfacing to
other systems
Voltage
Supply
IP Router
Visualization and
Programming
KNX Main Line
Line 1 2 3 4 5 6 7 8 9
Up to 64 devices can be
connected to a line.
Lines can be extended
up to 255 devices by using
repeaters. Up to 15 lines
can be compiled to an area
or a main line.
Up to 15 areas are possible.
Voltage
Supply
Line
Coupler
Switch/Dim Actuator
Busch-ComfortPanel®
16:9-Touch display
Room
Thermostat
Motion
Detector
Control with
IR Interface
Switch Actuator
Universal Interface
Radio Time Switch
Shutter Actuator
Analog Input
SMI Actuator
Binary Input
Fan Coil Actuator
Weather Station
Weather Sensor
DALI Gateway
DALI
Zone Terminal (Fire, Water, Intrusion)
12 V
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SENSORS

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